Business License C-3881

Stormwater Management Report

for

Kalas Falls P. U. D.

Phase 3

Rolesville Road

Rolesville, North Carolina

Prepared For

Mitchell Mill Road Investors LLC
105 Weston Estates Way
Cary, NC 27513

February 15, 2021
Rev. 8/12/21
Rev. 10/28/21
Rev. 11/19/24
Rev. 3/07/25

Prepared by
American Engineers
4020 Westchase Blvd., Suite 450
Raleigh, NC 27607

Table of Contents

Kalas Falls P. U. D., Phase 3 Supplemental

General

This project is located in Rolesville, North Carolina at Rolesville Road. It involves the combining of separately proposed projects known as Kalas Falls, Rogers Farm and one other tract known as the Watkins Property. It drains to tributaries of Harris Branch which is part of the Neuse River basin. It is bounded on all sides by mostly undeveloped land. It is approximately 0.5 miles northwest of the intersection of Mitchell Mill Road and Rolesville Road in Wake County, North Carolina. The site is currently undeveloped and primarily wooded.

The purpose of the project is to provide a residential subdivision consisting of single-family homes as well as townhouses not to exceed 550 units. This report pertains to a single phase (phase 3) of the larger overall project known as Kalas Falls. The total area of the overall project is 282.73 acres. Phase 3 has a total area of 79.96 acres and contains 145 single-family lots.

The purpose of this report is to provide information pertaining to the proposed subdivision and its drainage network.

Effects at POI 3, 4, & 8 Discharge Points

The drainage area located within phase 3 is 79.96 ac. The drainage area for this phase is bound by unnamed creeks to the west and east, phase 5 to the south and project boundy to the north. There are currently no existing impervious areas on this site.

There are six wet ponds proposed to service this phase. Locations of the proposed ponds can be found in the map provided in the appendix. Phase 3 discharges at 3 different Points of Interest (POIs). POI #3 accounts for stormwater generated from phase 1, 2, and 5 in addition to this phase (phase 3). POI #4 accounts for stormwater generated from phases 3 and 4. POI # 8 only contains stormwater from phase 3. These ponds are large enough to restrain the post-development flow to or below that of the pre-development flow. Flow calculations by John Harman, P. E. #9810 are in the Appendix. A summary of the flows are shown below:

POI #3		
Storm	Pre-development Flow	Post-development Flow
1 Year	142.19 cfs	81.55 cfs
2 Year	219.57 cfs	131.95 cfs
5 Year	395.05 cfs	267.83 cfs
10 Year	547.57 cfs	408.39 cfs
25 Year	770.38 cfs	627.14 cfs
100 Year	1153.66 cfs	983.05 cfs

POI #4		
Storm	Pre-development Flow	Post-development Flow
1 Year	35.14 cfs	24.39 cfs
2 Year	57.39 cfs	33.63 cfs
5 Year	108.76 cfs	54.41 cfs
10 Year	153.86 cfs	74.65 cfs
25 Year	220.27 cfs	135.15 cfs
100 Year	334.43 cfs	294.67 cfs

POI #8		
Storm	Pre-development Flow	Post-development Flow
1 Year	1.45 cfs	0.34 cfs
2 Year	2.78 cfs	0.61 cfs
5 Year	6.19 cfs	1.24 cfs
10 Year	9.39 cfs	1.81 cfs
25 Year	14.22 cfs	8.07 cfs
100 Year	22.72 cfs	25.68 cfs

As can be seen the peak flows for the post-development conditions are less than the pre-development peak flows. This should not produce any adverse effects on the downstream environment.

Note: POI #1 previously referenced in the Phase 2 submittals has been changed to Node 16 in this submittal.

Effect at SCM Outlet Points

The calculations at the outlet points are shown in the Appendix. The outlet velocity is calculated by using the width of the outlet end of the rip-rap, the slope of the ground at the outlet, Manning's n for rip-rap (0.045) and the flow shown for the ten year storm. If this produces an erosive velocity (greater than 4 cfs), then a plunge pool is considered. Rip-rap shall be used to slow the flow at the outlet to a non-erosive velocity. The design parameters of the rip-rap pads are shown in the appendix.

Structural Stability of Receiving Surface Waters

As the maximum flow is not increased, the stability of the downstream waters should not be affected.

Appendix

USGS Site Map

Kalas Falls Phase Map

Phase 3 Pre & Post Drainage Exhibits

Phase 3 SCM Calculations

Phase 3 Rip Rap Calculations

Storm Profiles HGL

2-year Gutter Spread Calculations

Hydrographs Calculations POI #3

Hydrographs Calculations POI #4

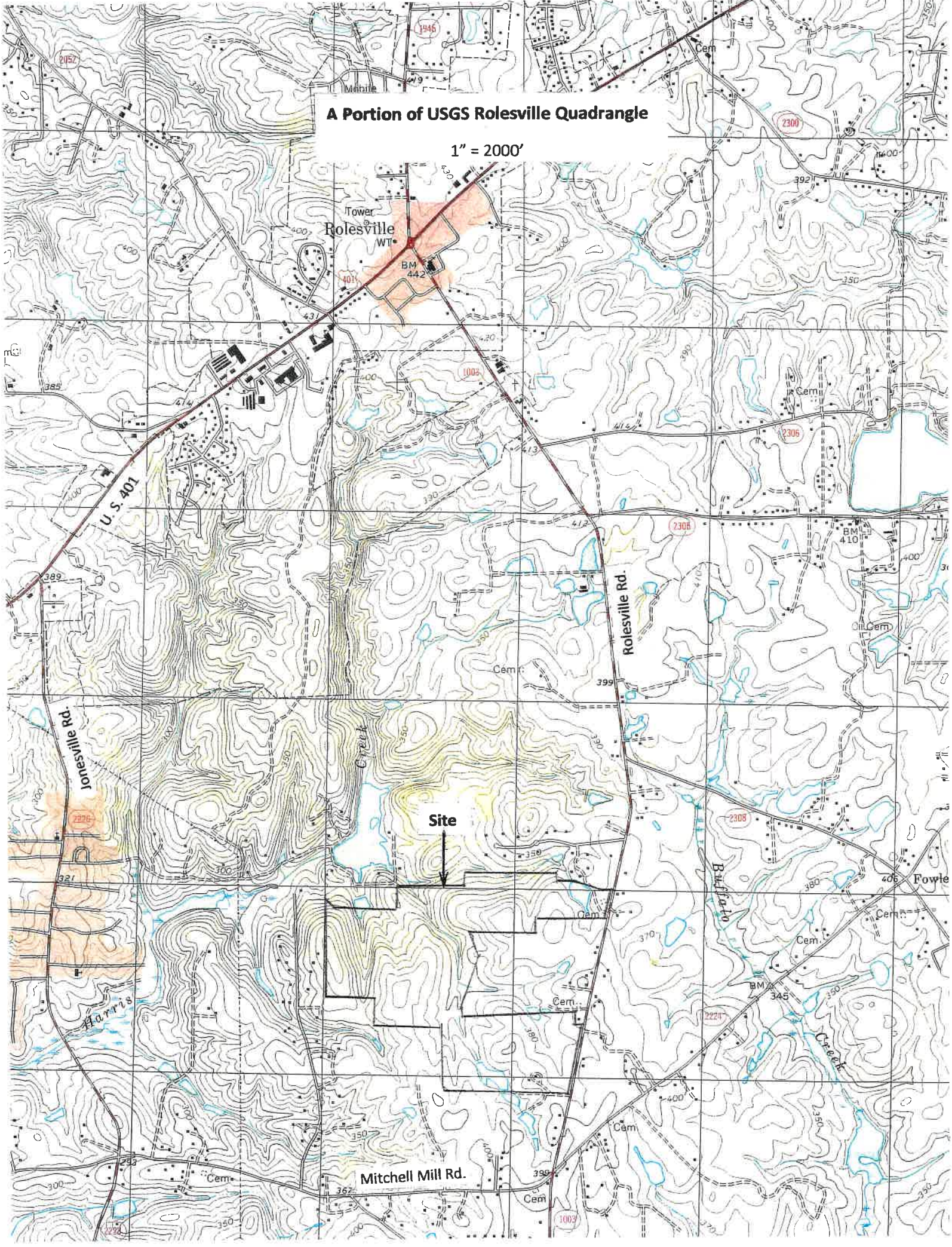
Hydrographs Calculations POI #8

Sediment Basin Calculations

Impact Exhibit Maps

Erosion Control Calculations

USGS Site Map

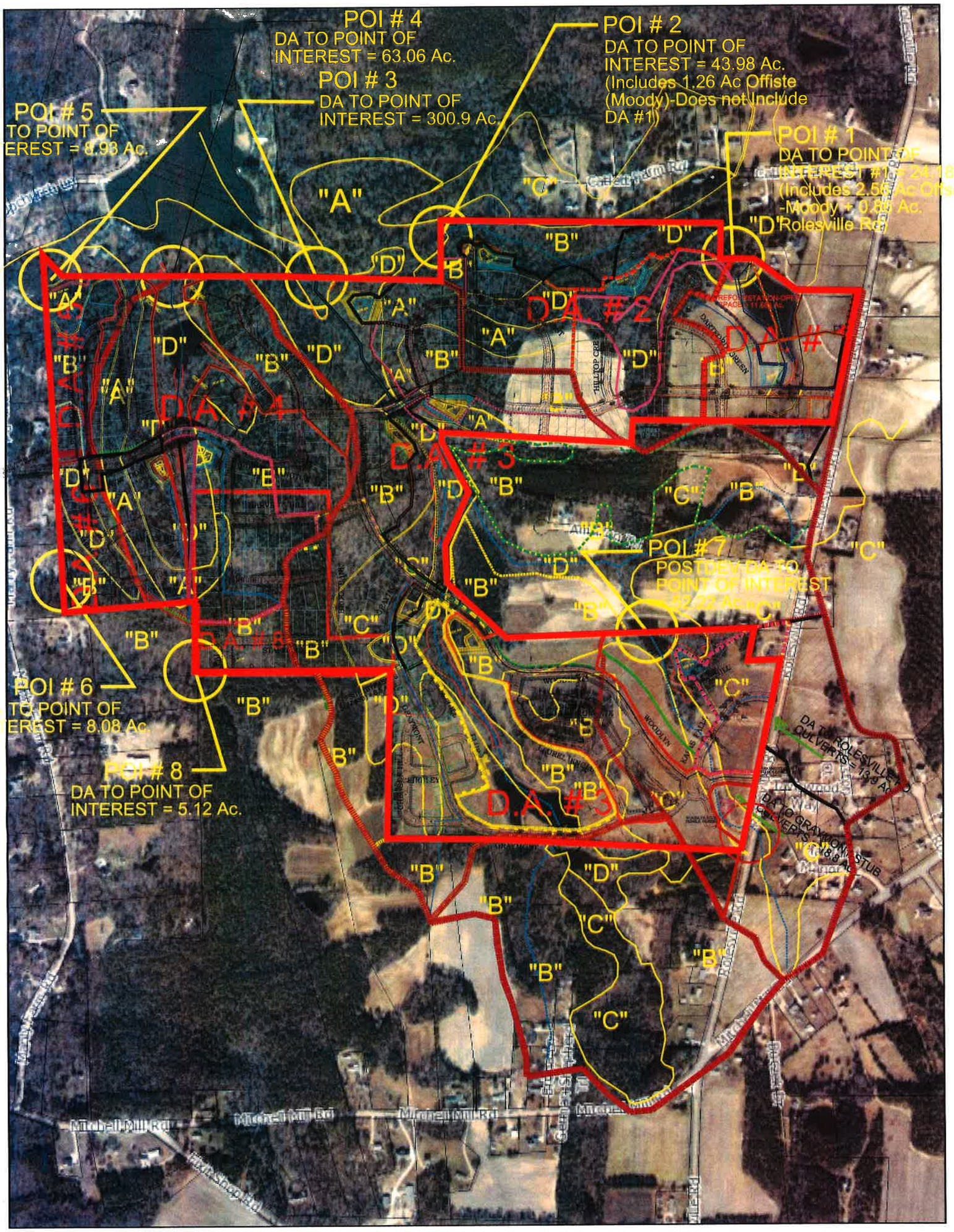

A Portion of USGS Rolesville Quadrangle
1" = 2000'
Rolesville
Tower
WT
BM 442
U.S. 401
Rolesville Rd.
Jonesville Rd.
Site
Mitchell Mill Rd.
Harris Creek
Buffalo Creek
Cem
BM 410
BM 345
Fowle

(Joins sheet 22)

(Joins sheet 23)

(Joins sheet 41)

(Joins sheet 42)



Kalas PostDevLand Coverage Map

N

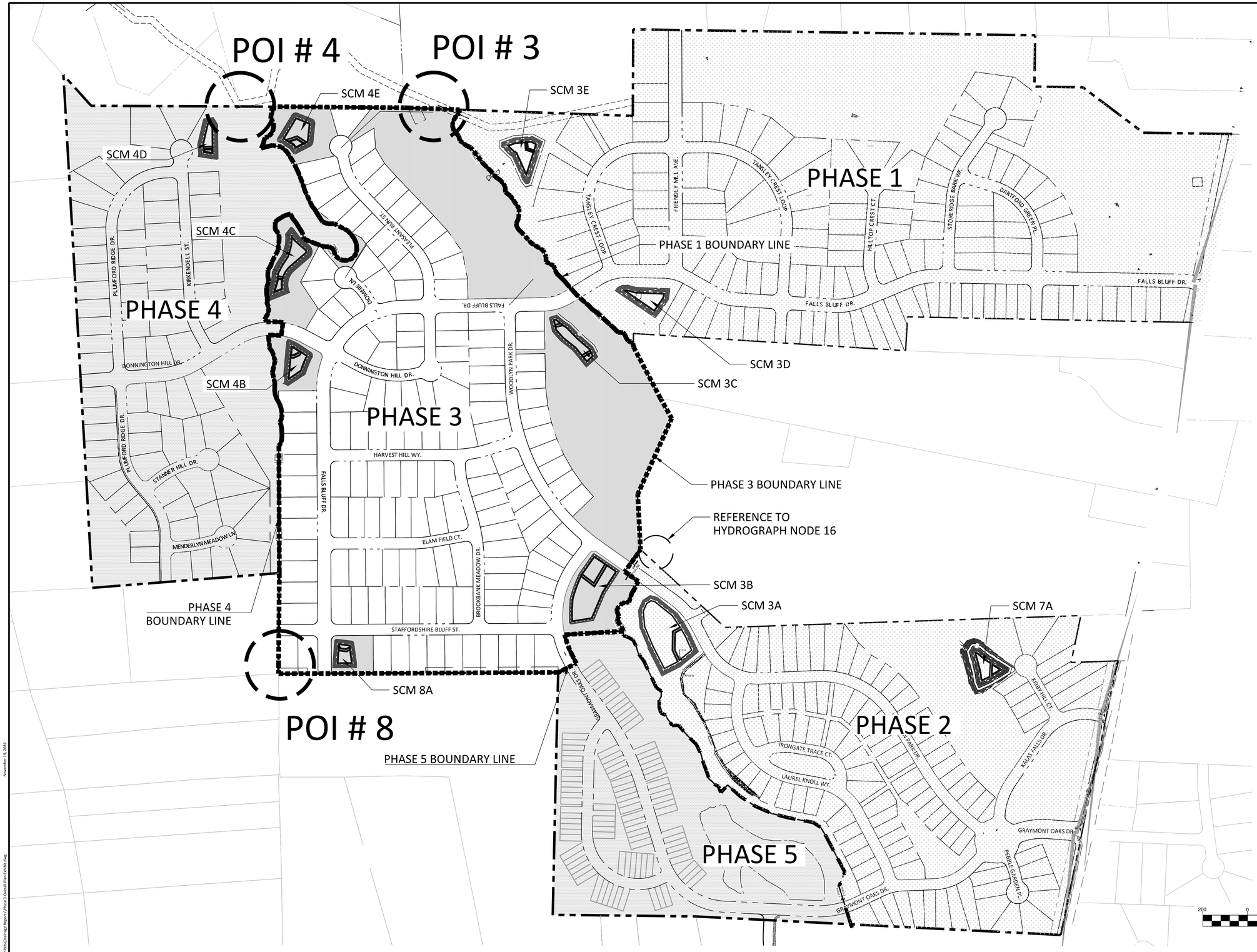
0 325 650 1,300 ft

1 inch = 600 feet

Disclaimer

iMaps makes every effort to produce and publish the most current and accurate information possible. However, the maps are produced for information purposes, and are **NOT** surveys. No warranties, expressed or implied, are provided for the data therein, its use,or its interpretation.

Kalas Falls Phase Map



GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch =200

NOTE:

1. ONLY PROPOSED SCMS THAT CONTRIBUTE TO PHASE 3 POI'S (POI 3, 4, & 8) ARE SHOWN IN THIS EXHIBIT.
2. NODES THAT ARE INDICATED ARE IN REFERENCE TO THE HYDROGRAPH WATERSHED SCHEMATIC PROVIDED IN THE DRAINAGE REPORT.

AMERICAN Engineering
American Engineering Associates - Southeast, P.A.
4020 Westchase Boulevard, Suite 450
Raleigh, NC 27607
919-469-1101

NORTH CAROLINA
AMERICAN ENGINEERING ASSOCIATES SOUTHEAST
C-3681
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
9810
ENGINEER
JOHN R. HARMAN

NO.	DATE	REVISION:

STIPULATION FOR REUSE

THIS DRAWING WAS PREPARED FOR USE ON THE SPECIFIC SITE, NAMED HEREON, CONTEMPORANEOUSLY WITH ITS ISSUE DATE AS LISTED, HEREON, AND IT IS NOT SUITABLE FOR USE ON A DIFFERENT PROJECT SITE OR AT A LATER TIME. USE OF THIS DRAWING FOR REFERENCE OR EXAMPLE ON ANOTHER PROJECT REQUIRES THE SERVICES OF PROPERLY LICENSED ARCHITECTS AND ENGINEERS. REPRODUCTION OF THIS DRAWING FOR REUSE ON ANOTHER PROJECT IS NOT AUTHORIZED AND MAY BE CONTRARY TO THE LAW.

KALAS FALLS
PHASE 3
1832 ROLESVILLE ROAD
WAKE COUNTY, NC

JOB NUMBER:	9900
CHECKED BY:	BH/JH
DRAWN BY:	SM/MA/LL/ES/AH/DH
DATE:	NOV 1, 2024

SHEET TITLE:

OVERALL SITE PLAN

SHEET NO.:

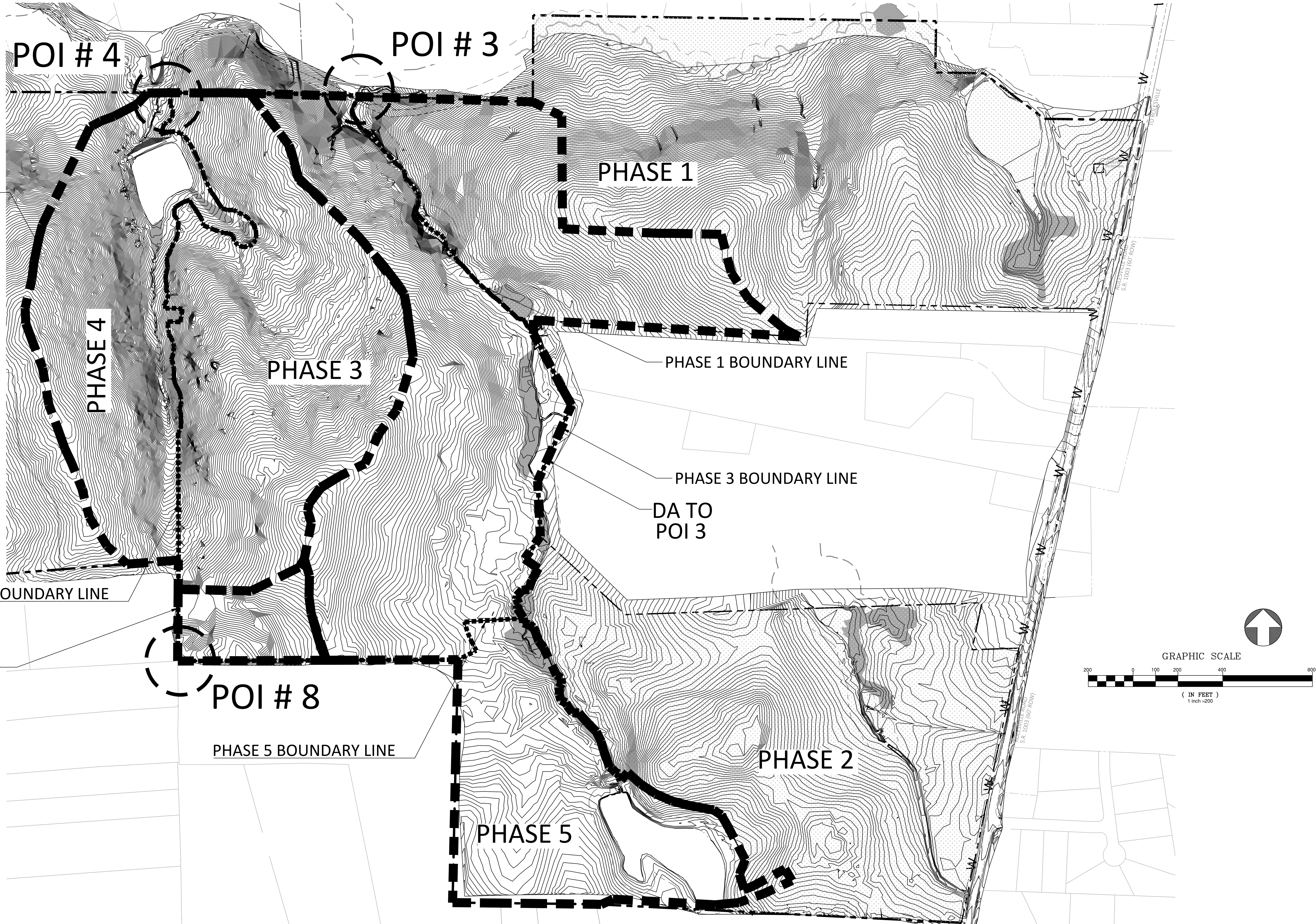
EXHIBIT-1

North Carolina 811
www.nc-811.org
*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

November 19, 2024

Z:\Jobs\9900\Winston Property\dwg\Exhibits\Drainage Report\Phase 3 Overall Plan Exhibit.dwg

Phase 3 Pre & Post Drainage Exhibits



NOTE:

1. OFFSITE DRAINAGE AREAS ARE NOT SHOWN IN THIS EXHIBIT NOR ARE THEY ACCOUNTED FOR IN THE WAKE COUNTY STORM TOOL CALCULATIONS AS THEY ARE TREATED AS PASS-THOUGH AND MAKE THE SAME CONTRIBUTION TO PRE AND POST POI STORM VALUES. THE HYDROGRAPH CALCULATIONS ACCOUNT FOR OFFSITE AREAS TO ALLOW FOR APPROPRIATE SIZING OF STORM WATER CULVERTS.

*** 3 Days Before Digging ***
North Carolina 811
811 or 1-800-632-4949
Remote Ticket Entry
http://nc811.org/remoteticketentry.htm

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NORTH CAROLINA AMERICAN ENGINEERING ASSOCIATES SOUTHEAST C-3881 CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

NO.	DATE	REVISION:

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1832 ROLESVILLE ROAD
WAKE COUNTY, NC

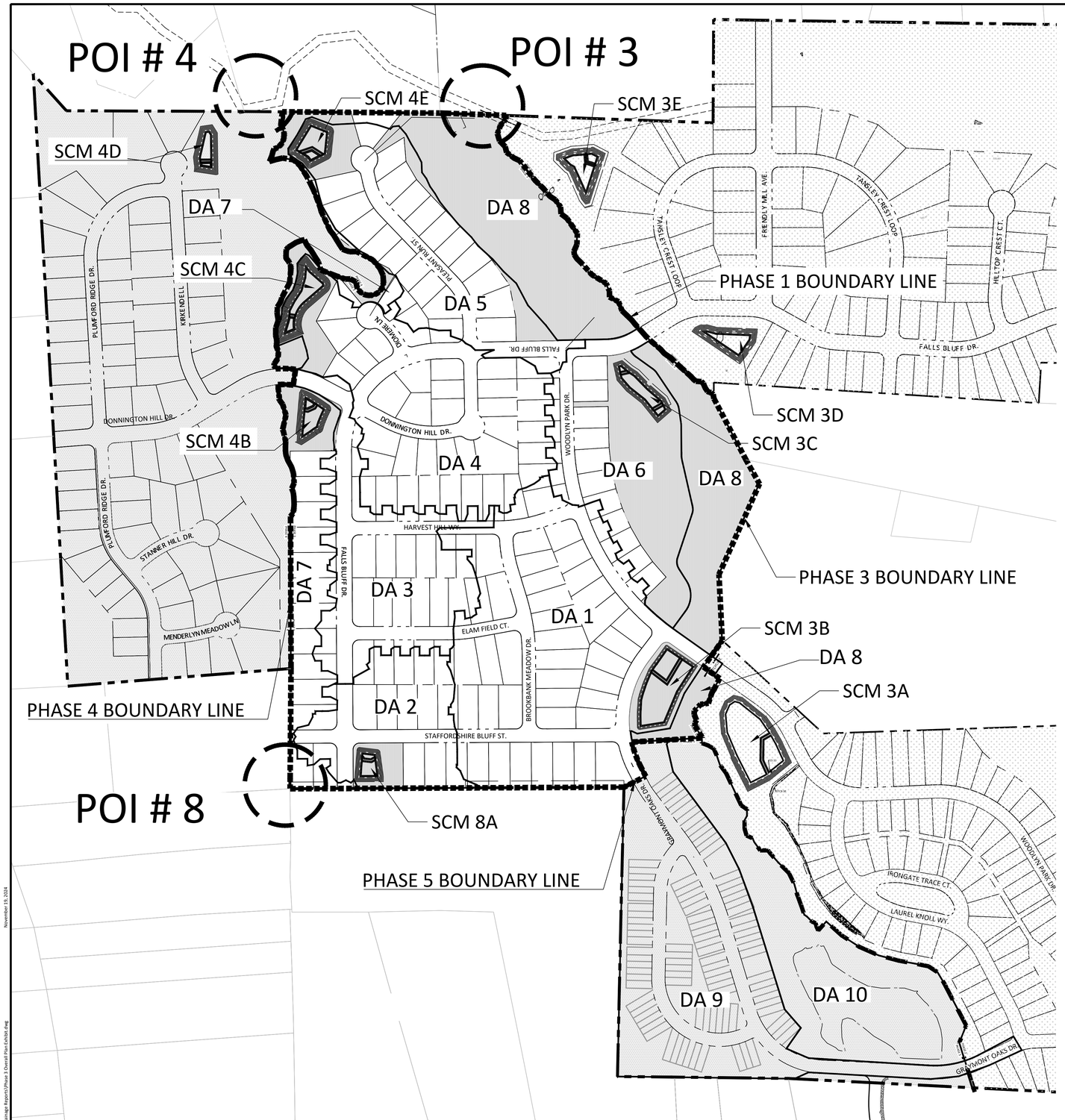
JOB NUMBER:	9900
CHECKED BY:	BH/JH
DRAWN BY:	SM/MA/LL/ES/AH/DH
DATE:	NOV 1, 2024

SHEET TITLE:

PRE-DEVELOPMENT DRAINAGE EXHIBIT

SHEET NO.:

EXHIBIT-2



GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150

Phase 3 - Drainage Area Summary

Drainage Area	Collection Point	Area (Acres)	POI
DA 1	SCM 3B	17.63	3
DA 2	SCM 8A	5.58	8
DA 3	SCM 4B	8.02	4
DA 4	SCM 4C	12.51	4
DA 5	SCM 4E	9.10	4
DA 6	SCM 3C	8.50	3
DA 7	Bypass to POI 4	4.97	4
DA 8	Bypass to POI 3	13.65	3
	PHASE 3 TOTAL:	**79.96**	

**DA 7 is bypass area contributing to POI #4*
***DA 8 is bypass area contributing to POI #3*

Phase 3 - Drainage Area Land Use Breakdown

	Associated Drainage Area							
Land Use	DA 1 (Acres)	DA 2 (Acres)	DA 3 (Acres)	DA 4 (Acres)	DA 5 (Acres)	DA 6 (Acres)	DA 7 (Acres)	DA 8 (Acres)
Impervious								
Roadways	2.29	0.57	1.56	0.73	0.73	0.67	0	0
Sidewalks	0.85	0.21	0.58	0.27	0.27	0.25	0	0
Roofs	2.77	0.81	1.58	2.1	1.4	0.81	0.18	0.39
Driveways	0.58	0.15	0.43	0.28	0.27	0.15	0	0
Ponds/Water	0.87	0.19	0.27	0.16	0.33	0.35	0	0
Pervious								
Open Space	10.27	3.65	3.60	8.97	6.10	6.27	4.79	13.26
TOTAL IMPERVIOUS	**7.36**	**1.93**	**4.42**	**3.54**	**3**	**2.23**	**0.18**	**0.39**
TOTAL	**17.63**	**5.58**	**8.02**	**12.51**	**9.10**	**8.50**	**4.97**	**13.65**

**This data was used as the input values for the Wake County Storm Tool*
***3600 SF Impervious per lot*

Phase 5 - Drainage Area Summary

Drainage Area	Collection Point	Area (Acres)	POI
DA 9	SCM 3B	14.26	3
DA 10	Bypass to POI 3	9.13	3

**DA 10 is bypass area contributing to POI #3*

Phase 5 - Drainage Area Land Use Breakdown

	Associated Drainage Area	
Land Use	DA 1 (Acres)	DA 2 (Acres)
Impervious		
Roadways	1.82	0
Sidewalks	0.67	0
Parking Lots/Street Parking	0.4	0
Roofs	3.05	0
Driveways	1.31	0
Ponds/Water	0	2.95
Pervious		
Open Space	7.01	6.18
TOTAL IMPERVIOUS	**7.25**	**2.95**
TOTAL	**14.26**	**9.13**

**This data was used as the input values for the Wake County Storm Tool*
***2000 SF Impervious per townhouse*

NOTE:

1. PHASE 5 LAYOUT SHOWN IS A PRELIMINARY DESIGN AND IS SUBJECT TO MINOR CHANGES. IT IS SHOWN IN THIS EXHIBIT TO DEMONSTRATE THE GENERAL PROPOSED STORM WATER CONVEYANCE AND CONTRIBUTION TO SCM 3B.

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919-469-1101

NORTH CAROLINA — AMERICAN ENGINEERING ASSOCIATES SOUTHEAST — C-3881 — CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 9810 ENGINEER JOHN R. HARMAN

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WAKE COUNTY, NC

JOB NUMBER:	9900
CHECKED BY:	BH/JH
DRAWN BY:	SM/MA/LL/ES/AH/DH
DATE:	NOV 1, 2024

SHEET TITLE:
POST-DEVELOPMENT DRAINAGE EXHIBIT

SHEET NO.:
EXHIBIT-3

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*** 3 Days Before Digging ***
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November 19, 2024

Z:\Jobs\9900\Working Property\Dwg\AH/dhh\Drainage Report\Phase 3 Overall Plan Exhibit.dwg

Phase 3 SCM Calculations

Kalas Development-Phase Three: Supplemental & Supporting Info for Hydrograph Generation Pre & Post to POI #3

11/7/2024

Note: 1" Storage volumes generated from PE's calculations below are more conservative than those generated by the Wake County Storm Tool

Composite CN-Value from Wake County Stormwater Tool: 81.6

SCM #3B Design Elements:		VPP, c.f.	Perimeter, ft.	V_{shelf}, c.f.	A_{bottom}, s.f.	D Avg, ft
$D_{avg} = VPP-V_{shelf} / A_{bottom}$		104611	791	593.25	20868.5	4.98
	(From HydraFlow Attachment)			Design Pond Depth, ft.=		**3.50**
Treatment Volume Requirement:						
	DA to SCM:	31.89	Ac.			
Rv=0.05-.009*(%Impervious)	Composite % Impervious (Above) =	42.5%				
Total Runoff for 1" Event= S in Ac-Ft:	Rv=0.05-.009*(%Impervious)	0.43	inch/inch			
Treatment "S" in Cu. Ft. =	Total Runoff for 1" Event= S in Ac-Ft:	1.15	S=1"*Rv*Drainage Area/12			
Treatment Volume to Be Stored:	Treatment "S" in Cu. Ft. =	50066.50				
Treatment Volume Provided, Cu.Ft.	Treatment Volume to Be Stored:	50067	Cu. FT			
	Volume Achieved at Elev.	352.8	Orifice Dia	4.00	Inch Drawdown Pipe	
	Drawdown Pipe Elev.	351.5	Elev Diff, H., ft.	1.3		
	Effective Operating Head (1/3 H)	0.429		Q=.62*8.02(H^0.5)*A,sq.ft.		
	Hours to Drawdown Treatm't Vol.	49.0	Hrs., (48 Hr Min.)			

*Composite CN Value generated from Wake County Stormwater Too

**SCM 3B received flow from phase 5 which was accounted for in this calculatior

Composite CN-Value from Wake County Stormwater Tool: 77

SCM #3C Design Elements:		VPP, c.f.	Perimeter, ft.	V_{shelf}, c.f.	A_{bottom}, s.f.	D Avg, ft
$D_{avg} = VPP-V_{shelf} / A_{bottom}$		29122	441	330.75	5445.9	5.29
	(From HydraFlow Attachment)			Design Pond Depth, ft.=		**3.50**
Treatment Volume Requirement:						
	DA to SCM:	8.50	Ac.			
Rv=0.05-.009*(%Impervious)	Composite % Impervious (Above) =	22.0%				
Total Runoff for 1" Event= S in Ac-Ft:	Rv=0.05-.009*(%Impervious)	0.25	inch/inch			
Treatment "S" in Cu. Ft. =	Total Runoff for 1" Event= S in Ac-Ft:	0.18	S=1"*Rv*Drainage Area/12			
Treatment Volume to Be Stored:	Treatment "S" in Cu. Ft. =	7652.04				
Treatment Volume Provided, Cu.Ft.	Treatment Volume to Be Stored:	7652	Cu. FT			
	Volume Achieved at Elev.	341.1	Orifice Dia	1.50	Inch Drawdown Pipe	
	Drawdown Pipe Elev.	340.5	Elev Diff, H., ft.	0.6		
	Effective Operating Head (1/3 H)	0.198		Q=.62*8.02(H^0.5)*A,sq.ft.		
	Hours to Drawdown Treatm't Vol.	78.3	Hrs., (48 Hr Min.)			

*Composite CN Value generated from Wake County Stormwater Too

Kalas Development-Phase Three: Supplemental & Supporting Info for Hydrograph Generation

Pre & Post to POI #4

11/7/2024

Note: 1" Storage volumes generated from PE's calculations below are more conservative than those generated by the Wake County Storm Tool

Composite CN-Value from Wake County Stormwater Tool: 80

SCM #4B Design Elements:		VPP, c.f.	Perimeter, ft.	V_{shelf}, c.f.	A_{bottom}, s.f.	D Avg, ft
D_{avg} = VPP-V_{shelf} /A_{bottom}		20709	349	261.75	4158.8	4.92
	(From HydraFlow Attachment)			Design Pond Depth, ft.=		**3.50**
Treatment Volume Requirement:						
	DA to SCM:	8.02	Ac.			
Rv=0.05-.009*(%Impervious)	Composite % Impervious (Above) =	51.6%				
Total Runoff for 1" Event= S in Ac-Ft:	Rv=0.05+.009*(%Impervious)	0.51	inch/inch			
Treatment "S" in Cu. Ft. =	Total Runoff for 1" Event= S in Ac-Ft:	0.34	S=1"*Rv*Drainage Area/12			
Treatment Volume to Be Stored:	Treatment "S" in Cu. Ft. =	14975.52				
Treatment Volume Provided, Cu.Ft.	Treatment Volume to Be Stored:	14976	Cu. FT			
	Volume Achieved at Elev.	325.1	Orifice Dia	2.00	Inch Drawdown Pipe	
	Drawdown Pipe Elev.	323.5	Elev Diff, H., ft.	1.6		
	Effective Operating Head (1/3 H)	0.528		Q=.62*8.02(H^0.5)*A,sq.ft.		
	Hours to Drawdown Treatm't Vol.	52.8	Hrs., (48 Hr Min.)			

*Composite CN Value generated from Wake County Stormwater Tool

Composite CN-Value from Wake County Stormwater Tool: 79

SCM #4C Design Elements:		VPP, c.f.	Perimeter, ft.	V_{shelf}, c.f.	A_{bottom}, s.f.	D Avg, ft
D_{avg} = VPP-V_{shelf} /A_{bottom}		33104	491	368.25	6130	5.34
	(From HydraFlow Attachment)			Design Pond Depth, ft.=		**3.50**
Treatment Volume Requirement:						
	DA to SCM:	12.51	Ac.			
Rv=0.05-.009*(%Impervious)	Composite % Impervious (Above) =	26.9%				
Total Runoff for 1" Event= S in Ac-Ft:	Rv=0.05+.009*(%Impervious)	0.29	inch/inch			
Treatment "S" in Cu. Ft. =	Total Runoff for 1" Event= S in Ac-Ft:	0.30	S=1"*Rv*Drainage Area/12			
Treatment Volume to Be Stored:	Treatment "S" in Cu. Ft. =	13264.64				
Treatment Volume Provided, Cu.Ft.	Treatment Volume to Be Stored:	13265	Cu. FT			
	Volume Achieved at Elev.	294.4	Orifice Dia	2.00	Inch Drawdown Pipe	
	Drawdown Pipe Elev.	293.5	Elev Diff, H., ft.	0.9		
	Effective Operating Head (1/3 H)	0.297		Q=.62*8.02(H^0.5)*A,sq.ft.		
	Hours to Drawdown Treatm't Vol.	62.4	Hrs., (48 Hr Min.)			

*Composite CN Value generated from Wake County Stormwater Tool

Composite CN-Value from Wake County Stormwater Tool: 78

SCM #4E Design Elements:		VPP, c.f.	Perimeter, ft.	V_{shelf}, c.f.	A_{bottom}, s.f.	D Avg, ft
D_{avg} = VPP-V_{shelf} /A shelf bottom		34008	420	315	10628	3.17
	(From HydraFlow Attachment)			Design Pond Depth, ft.=		**3.50**
Treatment Volume Requirement:						
	DA to SCM:	9.10	Ac.			
Rv=0.05-.009*(%Impervious)	Composite % Impervious (Above) =	29.2%				
Total Runoff for 1" Event= S in Ac-Ft:	Rv=0.05+.009*(%Impervious)	0.31	inch/inch			
Treatment "S" in Cu. Ft. =	Total Runoff for 1" Event= S in Ac-Ft:	0.24	S=1"*Rv*Drainage Area/12			
Treatment Volume to Be Stored:	Treatment "S" in Cu. Ft. =	10332.72				
Treatment Volume Provided, Cu.Ft.	Treatment Volume to Be Stored:	10333	Cu. FT			
	Volume Achieved at Elev.	281.3	Orifice Dia	2.00	Inch Drawdown Pipe	
	Drawdown Pipe Elev.	280.5	Elev Diff, H., ft.	0.8		
	Effective Operating Head (1/3 H)	0.264		Q=.62*8.02(H^0.5)*A,sq.ft.		
	Hours to Drawdown Treatm't Vol.	51.5	Hrs., (48 Hr Min.)			

*Composite CN Value generated from Wake County Stormwater Tool

Kalas Development-Phase Three: Supplemental & Supporting Info for Hydrograph Generation Pre & Post to POI #8

11/7/2024

Note: 1" Storage volumes generated from PE's calculations below are more conservative than those generated by the Wake County Storm Tool

Composite CN-Value from Wake County Stormwater Tool: 80

SCM #8A Design Elements:		VPP, c.f.	Perimeter, ft.	V_{shelf}, c.f.	A_{bottom}, s.f.	D Avg, ft
D_{avg} = VPP-V_{shelf} /A shelf bottom		16492	323	242.25	5375	3.02
	(From HydraFlow Attachment)			Design Pond Depth, ft.=		**3.50**
Treatment Volume Requirement:						
	DA to SCM:	5.58	Ac.			
Rv=0.05-.009*(%Impervious)	Composite % Impervious (Above) =	31.0%				
Total Runoff for 1" Event= S in Ac-Ft:	Rv=0.05+.009*(%Impervious)	0.33	inch/inch			
Treatment "S" in Cu. Ft. =	Total Runoff for 1" Event= S in Ac-Ft:	0.15	S=1"*Rv*Drainage Area/12			
Treatment Volume to Be Stored:	Treatment "S" in Cu. Ft. =	6664.03				
Treatment Volume Provided, Cu.Ft.	Treatment Volume to Be Stored:	6664	Cu. FT			
	Volume Achieved at Elev.	358.53	Orifice Dia	1.50	Inch Drawdown Pipe	
	Drawdown Pipe Elev.	357.5	Elev Diff, H., ft.	1.03		
	Effective Operating Head (1/3 H)	0.3399		Q=.62*8.02(H^0.5)*A,sq.ft.		
	Hours to Drawdown Treatm't Vol.	52.1	Hrs., (48 Hr Min.)			

*Composite CN Value generated from Wake County Stormwater Tool

Towns of Rolesville, Wendell and Zebulon Stormwater Tool Directions

The Wake County Municipal Stormwater Tool is required for all stormwater submittals in Rolesville Wendell, and Zebulon. Engineer will input all data requested that is highlighted in **blue**. Engineer may follow provided links to view calculations used in this tool. Calculations for peak flow, runoff, time of concentration, etc. are for individual drainage areas. Engineer should complete a worksheet for each drainage area within a project limit.

1	Complete SITE DATA worksheet. SITE DATA worksheet should be submitted with preliminary plan submittals and modified and submitted for construction plan submittals. The 2-yr, 24-hr rainfall input will be used for projects requesting LID classification further into the tool. The 10-year, 24-hour rainfall input will be used for potential Downstream Impact Analyses (DIA). Stormwater Narrative should describe the site conditions in pre- and post-development conditions including a description of site improvements and proposed stormwater BMPs.
2	Complete DA worksheets. Most of the site data is inputted by the engineer on the DA worksheets. DA worksheets are designed essentially to account for Ultra-Low, Low, and High Density project requirements per Ordinance standards. DA Worksheets will calculate runoff, time of concentration, peak flow, and volume to be managed per drainage area. Inputs will also be used to calculate the site composite curve numbers for pre and post development, Target Curve Number (TCN), and total nitrogen loading (TN) calculations. This sheet will also calculate required volume management for the 1st inch rainfall for high density projects. 1st inch of runoff should be handled by each DA BMP for High Density projects. Disconnected Impervious - This area will be used to provide an adjusted post development composite curve number ($CN_{adjusted}$) to allow a credit for the use of disconnected impervious. Site plans should clearly indicate areas of disconnected impervious.
3	SITE SUMMARY worksheet summarizes the pre and post runoff, Tc, and peak flow per drainage area based on inputs from DA worksheets. This worksheet denotes the volume required for management per drainage area based on high density requirements. TCN and composite curve numbers for pre and post development are also calculated and summarized. If the TCN is exceeded, this worksheet will calculate total volume to be managed for the entire site based on TCN requirements. Nitrogen Loading: Nitrogen Loading Rate for the site is calculated based on the Hydrologic Soil Groups and site acreages imputed on DA worksheets. This worksheet calculates the total amount of nitrogen loading. Nitrogen total will be used on following BMP worksheets. Note: There are no engineer inputs on this sheet and all exeedances from DA worksheets will be flagged in **red**.
4	DA BMP worksheets require engineer to input proposed BMP information. BMPs are categorized by sub-basins within the drainage area. Engineer should input BMP device name, type, and volume provided. BMP requirements are automatically imported from previous inputs. Engineer should input land uses by sub-basin. Off-site drainage to the sub-basin may also be inputted to allow credit for nitrogen removal (if said drainage is routed through the BMP). BMPs are required in each DA where post-development peak flow is higher than pre-development peak flow. Only under special circumstances will a BMP not be required. In these cases, the engineer must show the following: 1. Total runoff volume for the DA must be less than 10% of the entire site runoff. 2. TN must be handled for the site elsewhere. 3. Runoff must not leave the DA at an erosive velocity. 4. Proposed design must comply with all state and federal regulations. DA BMP worksheets will ensure that proposed BMPs meet requirements for peak flow, TCN, and for Nitrogen. Engineer must input post-BMP discharge. Note: Engineers are required to input post BMP peak flow for the 1-year, 2-year, and 10-year storms for each DA. The SW Design Tool uses the TR-55 method. The TR-55 method is preferred for post BMP calculations. If engineer uses a method/model other than TR-55 for the post-BMP peak discharge and runoff, engineer must also provide pre-development calculations from the method/model (in addition to the SW Design Tool) and pre-development calculations must be within 10% of results computed by the SW Design Tool). A summary sheet should be attached with the submittal to for all inputs used in design.
5	BMP SUMMARY worksheet summarizes the pre and post BMP runoff, and peak flow per drainage area based on inputs from DA BMP worksheets. Nitrogen Loading: Nitrogen mitigated for the site is calculated based on the inputs on DA BMP worksheets. This worksheet calculates the total amount of nitrogen left to be mitigated for the site (Wendell only). Site expansions use the aportioning method. Note: There are no engineer inputs on this sheet and all exeedances from DA BMP worksheets will be flagged in **red**.
6	LID worksheet summarizes the pre and post runoff, Tc, and peak flow per drainage area for the 2-year, 24-hour storm based on inputs from DA and BMP worksheets. This worksheet will determine if design calculations provided meet LID classification. Engineers may wish to modify site design or mitigate with additional BMPs to meet LID Requirements. In that case, DA and BMP worksheets should be modified to meet these requirements and the LID sheet will be updated automatically. If calculation requirements for LID are met, Engineer should complete the *LID CHECKLIST* on **LID** worksheet and provide associated documentation to determine if project meets ALL LID requirements.
7	Downstream Impact Analysis DIA worksheet presents requirements for a downstream impact analysis. Based on engineer inputs, this sheet will report if a DIA is required for the project based on the 10-year storm discharge leaving each discharge point. This stormwater tool does NOT complete the actual downstream impact analyses. A DIA shall be performed at the outlet(s) of the site, and downstream at each tributary junction to the point(s) in the conveyance system where the area of the portion of the site draining into the system is less than or equal to 10 percent of the total drainage area above that point. The outflow hydrograph at these points is to be determined for the pre-development condition. Then, the outflow hydrograph at each of these points is to be determined for the conditions after the site in question has been developed. <u>All hydrographs and inputs should be provided with plan submittal.</u>

SITE DATA

Project Information	
Project Name:	**Kalas Falls Phase 3**
Applicant:	
Applicant Contact Name:	
Applicant Contact Number:	
Contact Email:	
Municipal Jurisdiction (Select from dropdown menu):	Rolesville
Last Updated:	Thursday, November 7, 2024
Site Data:	
Total Site Area (Ac):	79.96
Existing Lake/Pond Area (Ac):	0.00
Proposed Disturbed Area (Ac):	71.62
Impervious Surface Area (acre):	20.82
Type of Development (Select from Dropdown menu):	Residential
Percent Built Upon Area (BUA):	26%
Project Density:	High
Is the proposed project a site expansion?	Yes
Number of Drainage Areas on Site:	8
NOAA — **1-Year, 24-Hour Storm (inches) (See NOAA Website):**	2.86
2-Year, 24-Hour Storm (inches) (See NOAA Website):	3.46
10-Year, 24-Hour Storm (inches) (See NOAA Website):	5.06
Lot Data (if applicable):	
Total Acreage in Lots:	46.60
Number of Lots:	145
Average Lot Size (SF):	14000.00
Total Impervious Surface Area on Lots (SF):	522000.00
Average Impervious Surface Area Per Lot (SF):	3600.00
Stormwater Narrative (limit to 1,200 characters - attach additional pages with submittal if necessary):	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	31.89				31.89			
Site Acreage within Drainage=	17.63				17.63			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.87			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition		10.00	6.28	1.35				
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition						6.32	3.97	0.85
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						6.49		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.048				0.048			
Surface Cover:	Woods				Grass			
n-value=	0.400				0.240			
T_t (hrs)=	0.267				0.177			
Shallow Flow								
Length (ft)=	958.00				170.00			
Slope (ft/ft)=	0.048				0.050			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	3.53				3.61			
T_t (hrs)=	0.08				0.01			
Channel Flow 1								
Length (ft)=	30.00				170.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Grass				Concrete, finished			
n-value=	0.035				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.47				15.76			
T_t (hrs)=	0.00				0.00			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	100.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	1.24
Wetted Perimeter (ft)=	6.13	2.90
Channel Lining:	Gravel Bottom/riprap sides	Concrete, finished
n-value=	0.033	0.012
Hydraulic Radius (ft)=	0.33	0.43
Average Velocity (ft/sec)=	2.62	15.76
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	60.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	4.78
T_t (hrs)=		0.00
Tc (hrs)=	0.35	0.20
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	66	83
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**83**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	26,991	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.48	1.31
Volume of runoff (ft^3) =	30,901	83,946
Volume change (ft^3) =	53,045	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	11.637	52.426
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	0.78	1.80
Volume of runoff (ft^3) =	50,112	115,091
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	18.871	71.877
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	1.78	3.19
Volume of runoff (ft^3) =	113,625	204,458
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	42.789	127.689

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 2
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	5.58				5.58			
Site Acreage within Drainage=	5.58				5.58			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.19			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition		5.58						
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition						3.85		
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						1.73		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.045				0.045			
Surface Cover:	Woods				Grass			
n-value=	0.400				0.240			
T_t (hrs)=	0.274				0.182			
Shallow Flow								
Length (ft)=	629.00				272.00			
Slope (ft/ft)=	0.055				0.068			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	3.78				4.21			
T_t (hrs)=	0.05				0.02			
Channel Flow 1								
Length (ft)=	0.00				90.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Gravel Bottom/riprap sides				Concrete, finished			
n-value=	0.033				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.62				15.76			
T_t (hrs)=					0.00			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 2
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	100.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	1.24
Wetted Perimeter (ft)=	6.13	2.90
Channel Lining:	Gravel Bottom/riprap sides	Concrete, finished
n-value=	0.033	0.012
Hydraulic Radius (ft)=	0.33	0.43
Average Velocity (ft/sec)=	2.62	15.76
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	222.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	4.78
T_t (hrs)=		0.01
Tc (hrs)=	0.32	0.22
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	60	
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.28	
Volume of runoff (ft^3) =	5,762	
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	0.919	
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	0.51	
Volume of runoff (ft^3) =	10,418	
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	1.662	
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	1.34	
Volume of runoff (ft^3) =	27,066	
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	4.318	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 3
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	8.02				8.02			
Site Acreage within Drainage=	8.02				8.02			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.27			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition	0.64	7.35		0.03				
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition					0.31	3.56		0.01
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						4.14		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.045				0.045			
Surface Cover:	Woods				Grass			
n-value=	0.400				0.240			
T_t (hrs)=	0.274				0.182			
Shallow Flow								
Length (ft)=	526.00				258.00			
Slope (ft/ft)=	0.079				0.079			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	4.53				4.53			
T_t (hrs)=	0.03				0.02			
Channel Flow 1								
Length (ft)=	868.00				928.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Gravel Bottom/riprap sides				Concrete, finished			
n-value=	0.033				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.62				15.76			
T_t (hrs)=	0.09				0.02			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 3
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	50.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	1.24
Wetted Perimeter (ft)=	6.13	2.90
Channel Lining:	Gravel Bottom/riprap sides	Concrete, finished
n-value=	0.033	0.012
Hydraulic Radius (ft)=	0.33	0.43
Average Velocity (ft/sec)=	2.62	15.76
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	93.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		0.01
Tc (hrs)=	0.40	0.22
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 4
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	12.51				12.51			
Site Acreage within Drainage=	12.51				12.51			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.16			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition		10.37		2.14				
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition						7.58		1.56
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						3.37		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.110				0.110			
Surface Cover:	Woods				Grass			
n-value=	0.400				0.240			
T_t (hrs)=	0.191				0.127			
Shallow Flow								
Length (ft)=	1321.00				251.00			
Slope (ft/ft)=	0.070				0.107			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	4.27				5.28			
T_t (hrs)=	0.09				0.01			
Channel Flow 1								
Length (ft)=	0.00				996.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Gravel Bottom/riprap sides				Concrete, finished			
n-value=	0.033				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.62				15.76			
T_t (hrs)=					0.02			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 4
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	50.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	1.24
Wetted Perimeter (ft)=	6.13	2.90
Channel Lining:	Concrete, finished	Concrete, finished
n-value=	0.012	0.012
Hydraulic Radius (ft)=	0.33	0.43
Average Velocity (ft/sec)=	7.21	15.76
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	84.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		0.01
Tc (hrs)=	0.28	0.17
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	63	79
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**79**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	13,280	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.38	1.07
Volume of runoff (ft^3) =	17,437	48,533
Volume change (ft^3) =	31,096	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	3.592	17.844
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	0.65	1.51
Volume of runoff (ft^3) =	29,575	68,709
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	6.093	25.262
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	1.57	2.82
Volume of runoff (ft^3) =	71,072	128,252
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	14.643	47.153

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 5
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	9.10				9.10			
Site Acreage within Drainage=	9.10				9.10			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.33			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition		8.68		0.42				
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition						6.14		0.30
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						2.66		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.055				0.075			
Surface Cover:	Woods				Grass			
n-value=	0.400				0.240			
T_t (hrs)=	0.253				0.148			
Shallow Flow								
Length (ft)=	1390.00				74.00			
Slope (ft/ft)=	0.014				0.075			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	1.91				4.42			
T_t (hrs)=	0.20				0.00			
Channel Flow 1								
Length (ft)=	0.00				1164.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Gravel Bottom/riprap sides				Concrete, finished			
n-value=	0.033				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.62				15.76			
T_t (hrs)=					0.02			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 5
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	50.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	1.24
Wetted Perimeter (ft)=	6.13	2.90
Channel Lining:	Gravel Bottom/riprap sides	Concrete, finished
n-value=	0.033	0.012
Hydraulic Radius (ft)=	0.33	0.43
Average Velocity (ft/sec)=	2.62	15.76
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	50.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		0.01
Tc (hrs)=	0.45	0.18
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	61	78
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**78**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	10,342	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.31	1.03
Volume of runoff (ft^3) =	10,240	33,977
Volume change (ft^3) =	23,737	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	1.346	12.184
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	0.55	1.47
Volume of runoff (ft^3) =	18,167	48,394
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	2.387	17.354
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	1.40	2.76
Volume of runoff (ft^3) =	46,145	91,171
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	6.064	32.693

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 6
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	8.50				8.50			
Site Acreage within Drainage=	8.50				8.50			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.35			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition		7.14	1.14	0.22				
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition						5.57	0.89	0.17
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						1.87		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.075				0.075			
Surface Cover:	Woods				Grass			
n-value=	0.400				0.240			
T_t (hrs)=	0.223				0.148			
Shallow Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.075				0.075			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	4.42				4.42			
T_t (hrs)=	0.01				0.01			
Channel Flow 1								
Length (ft)=	610.00				538.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Gravel Bottom/riprap sides				Concrete, finished			
n-value=	0.033				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.62				15.76			
T_t (hrs)=	0.06				0.01			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 6
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	46.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	1.24
Wetted Perimeter (ft)=	6.13	2.90
Channel Lining:	Gravel Bottom/riprap sides	Concrete, finished
n-value=	0.033	0.012
Hydraulic Radius (ft)=	0.33	0.43
Average Velocity (ft/sec)=	2.62	15.76
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	510.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		0.05
Tc (hrs)=	0.29	0.22
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	62	77
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**77**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	7,652	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.35	0.96
Volume of runoff (ft^3) =	10,846	29,640
Volume change (ft^3) =	18,794	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	2.166	8.533
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	0.61	1.38
Volume of runoff (ft^3) =	18,733	42,681
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	3.740	12.288
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	1.49	2.65
Volume of runoff (ft^3) =	46,053	81,745
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	9.195	23.534

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 7
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	4.97				4.97			
Site Acreage within Drainage=	4.97				4.97			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.00			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition	0.70	1.79		2.49	0.64	1.65		2.29
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						0.39		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.050				0.050			
Surface Cover:	Grass				Grass			
n-value=	0.240				0.240			
T_t (hrs)=	0.174				0.174			
Shallow Flow								
Length (ft)=	223.00				223.00			
Slope (ft/ft)=	0.045				0.045			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	3.42				3.42			
T_t (hrs)=	0.02				0.02			
Channel Flow 1								
Length (ft)=	1050.00				1050.00			
Slope (ft/ft)=	0.015				0.015			
Cross Sectional Flow Area (ft^2)=	2.00				2.00			
Wetted Perimeter (ft)=	6.13				6.13			
Channel Lining:	Gravel Bottom/riprap sides				Gravel Bottom/riprap sides			
n-value=	0.033				0.033			
Hydraulic Radius (ft)=	0.33				0.33			
Average Velocity (ft/sec)=	2.62				2.62			
T_t (hrs)=	0.11				0.11			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 7
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	0.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		
Channel Flow 3		
Length (ft)=	0.00	0.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		
Tc (hrs)=	0.30	0.30
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	66	69
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**69**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	2,176	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.48	0.58
Volume of runoff (ft^3) =	8,744	10,489
Volume change (ft^3) =	1,745	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	1.949	2.576
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	0.79	0.91
Volume of runoff (ft^3) =	14,171	16,439
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	3.158	4.037
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	1.78	1.97
Volume of runoff (ft^3) =	32,100	35,588
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	7.153	8.739

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 8
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	13.65				13.65			
Site Acreage within Drainage=	13.65				13.65			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.00			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition	0.55	1.50	0.82	10.78	0.54	1.48	0.81	10.64
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious						0.18		
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.110				0.110			
Surface Cover:	Grass				Grass			
n-value=	0.240				0.240			
T_t (hrs)=	0.127				0.127			
Shallow Flow								
Length (ft)=	135.00				135.00			
Slope (ft/ft)=	0.190				0.190			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	7.03				7.03			
T_t (hrs)=	0.01				0.01			
Channel Flow 1								
Length (ft)=	810.00				810.00			
Slope (ft/ft)=	0.015				0.015			
Cross Sectional Flow Area (ft^2)=	2.00				2.00			
Wetted Perimeter (ft)=	6.13				6.13			
Channel Lining:	Gravel Bottom/riprap sides				Gravel Bottom/riprap sides			
n-value=	0.033				0.033			
Hydraulic Radius (ft)=	0.33				0.33			
Average Velocity (ft/sec)=	2.62				2.62			
T_t (hrs)=	0.09				0.09			

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 8
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	0.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		
Channel Flow 3		
Length (ft)=	0.00	0.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		
Tc (hrs)=	0.22	0.22
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	75	75
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**75**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	3,066	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.86	0.88
Volume of runoff (ft^3) =	42,705	43,483
Volume change (ft^3) =	778	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	12.308	12.532
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.26	1.28
Volume of runoff (ft^3) =	62,584	63,535
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	18.037	18.311
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.48	2.51
Volume of runoff (ft^3) =	123,049	124,376
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	35.464	35.846

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 9
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=								
Site Acreage within Drainage=								
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious								
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 9
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.00	0.00
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 10
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=								
Site Acreage within Drainage=								
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious								
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 10
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.00	0.00
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

Project Name: Kalas Falls Phase 3

DA SITE SUMMARY
STORMWATER PRE-POST CALCULATIONS

SITE SUMMARY

DRAINAGE AREA SUMMARIES

DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development (1-year, 24-hour storm)										
Runoff (in) = $Q_{pre,1\text{-}year}$ =	0.48	0.28		0.38	0.31	0.35	0.48	0.86		
Peak Flow (cfs)=$Q_{1\text{-}year}$ =	11.637	0.919		3.592	1.346	2.166	1.949	12.308		
Post-Development (1-year, 24-hour storm)										
Proposed Impervious Surface (acre) =	6.49	1.73	4.14	3.37	2.66	1.87	0.39	0.18		
Runoff (in)=$Q_{1\text{-}year}$ =	1.31			1.07	1.03	0.96	0.58	0.88		
Peak Flow (cfs)=$Q_{1\text{-}year}$ =	52.426			17.844	12.184	8.533	2.576	12.532		
Increase in volume per DA (ft^3)_1-yr storm=	53,045			31,096	23,737	18,794	1,745	778		
Minimum Volume to be Managed for DA HIGH DENSITY REQUIREMENT = (ft^3) =	26,991			13,280	10,342	7,652	2,176	3,066		

TARGET CURVE NUMBER (TCN)

Site Data

SITE \SOIL COMPOSITION

HYDROLOGIC SOIL GROUP	Site Area	%	Target CN
A	1.49	2%	N/A
B	56.98	71%	N/A
C	5.67	7%	N/A
D	15.82	20%	N/A

Total Site Area (acres) =	79.96
Percent BUA (Includes Existing Lakes/Pond Areas) =	25%
Project Density =	High
Target Curve Number (TCN) =	N/A
$CN_{adjusted\ (1\text{-}year)}$=	65
Minimum Volume to be Managed (Total Site) Per TCN Requirement= ft^3 =	N/A

Site Nitrogen Loading Data

HSG	TN export coefficient (lbs/ac/yr)	Site Acreage	N Export
Pasture	1.2	0.00	0.00
Woods, Poor Condition	1.6	0.00	0.00
Woods, Fair Condition	1.2	18.05	21.66
Woods, Good Condition	0.8	0.00	0.00
Open Space, Poor Condition	1.0	0.00	0.00
Open Space, Fair Condition	0.8	41.08	32.86
Open Space, Good Condition	0.6	0.00	0.00
Reforestation (in dedicated OS)	0.6	0.00	0.00
Impervious	21.2	20.83	441.60

SITE NITROGEN LOADING RATE (lbs/ac/yr)=	NA
Nitrogen Load (lbs/yr)=	496.12
TOTAL SITE NITROGEN TO MITIGATE (lbs/yr)_Wendell Only=	NA

Site Nitrogen Loading Data For Expansions Only

	Existing	New
Impervious(acres)=		20.83
"Expansion Area" (acres=)	79.96	
Nitrogen Load (lbs/yr)=	0.00	496.12
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	0.00	6.20
Total Site loading rate (lbs/ac/yr)	6.20	
TOTAL SITE NITROGEN TO MITIGATE (lbs/yr)=	208.26	

WAKE COUNTY
NORTH CAROLINA

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 1
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA1 Site Acreage=	17.63			
DA1 Off-Site Acreage=	14.26			
Total Required Storage Volume for Site TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA1 1" Rainfall for High Density (ft^3)=	26,991			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA1(a) (Ac)		Sub-DA1(b) (Ac)		Sub-DA1(c) (Ac)		Sub-DA1(d) (Ac)		Sub-DA1(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	11.14									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	6.49									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 3B	Wet Detention Basin	24,403	50,067	25%	146.50	36.63	49
				0%	109.88	0.00	
				0%	109.88	0.00	
				0%	109.88	0.00	
				0%	109.88	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**109.88**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 1
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA1 BMP SUMMARY	
Total Volume Treated (ft^3)=	50,067
Nitrogen Mitigated(lbs)=	36.63
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	33,879
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.53
Post BMP $CN_{(1\text{-year})}$=	67
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	65,024
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	1.02
Post BMP $CN_{(2\text{-year})}$=	70
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	154,391
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	2.41
Post BMP $CN_{(10\text{-year})}$=	90
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 2
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA2 Site Acreage=	5.58			
DA2 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA2 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA2(a) (Ac)		Sub-DA2(b) (Ac)		Sub-DA2(c) (Ac)		Sub-DA2(d) (Ac)		Sub-DA2(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	3.58									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	1.73									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 8A	Wet Detention Basin	6,616	16,492	25%	39.54	9.89	52.1
				0%	29.66	0.00	
				0%	29.66	0.00	
				0%	29.66	0.00	
				0%	29.66	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**29.66**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

WAKE COUNTY
NORTH CAROLINA

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 2
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA2 BMP SUMMARY	
Total Volume Treated (ft^3)=	16,492
Nitrogen Mitigated(lbs)=	9.89
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 3
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA3 Site Acreage=	8.02			
DA3 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA3 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA3(a) (Ac)		Sub-DA3(b) (Ac)		Sub-DA3(c) (Ac)		Sub-DA3(d) (Ac)		Sub-DA3(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	3.88									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	4.14									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 4B	Wet Detention Basin	14,981	20,709	25%	90.87	22.72	52.8
				0%	68.15	0.00	
				0%	68.15	0.00	
				0%	68.15	0.00	
				0%	68.15	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**68.15**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 3
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA3 BMP SUMMARY	
Total Volume Treated (ft^3)=	20,709
Nitrogen Mitigated(lbs)=	22.72
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 4
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA4 Site Acreage=	12.51			
DA4 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA4 1" Rainfall for High Density (ft3)=	13,280			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA4(a) (Ac)		Sub-DA4(b) (Ac)		Sub-DA4(c) (Ac)		Sub-DA4(d) (Ac)		Sub-DA4(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	9.14									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	3.37									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 4C	Wet Detention Basin	13,280	33,104	25%	78.76	19.69	62.4
				0%	59.07	0.00	
				0%	59.07	0.00	
				0%	59.07	0.00	
				0%	59.07	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**59.07**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 4
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA4 BMP SUMMARY	
Total Volume Treated (ft^3)=	33,104
Nitrogen Mitigated(lbs)=	19.69
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	15,429
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.34
Post BMP $CN_{(1\text{-year})}$=	61
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	35,605
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.78
Post BMP $CN_{(2\text{-year})}$=	66
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	95,148
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	2.10
Post BMP $CN_{(10\text{-year})}$=	86
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 5
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA5 Site Acreage=	9.10			
DA5 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA5 1" Rainfall for High Density (ft3)=	10,342			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA5(a) (Ac)		Sub-DA5(b) (Ac)		Sub-DA5(c) (Ac)		Sub-DA5(d) (Ac)		Sub-DA5(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	6.44									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	2.66									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 4E	Wet Detention Basin	10,342	34,008	25%	61.54	15.39	51.5
				0%	46.16	0.00	
				0%	46.16	0.00	
				0%	46.16	0.00	
				0%	46.16	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**46.16**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 5
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA5 BMP SUMMARY	
Total Volume Treated (ft^3)=	34,008
Nitrogen Mitigated(lbs)=	15.39
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	14,386
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.44
Post BMP $CN_{(2\text{-year})}$=	57
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	57,163
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	1.73
Post BMP $CN_{(10\text{-year})}$=	81
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 6
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA6 Site Acreage=	8.50			
DA6 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA6 1" Rainfall for High Density (ft3)=	7,652			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA6(a) (Ac)		Sub-DA6(b) (Ac)		Sub-DA6(c) (Ac)		Sub-DA6(d) (Ac)		Sub-DA6(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	6.63									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	1.87									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 3C	Wet Detention Basin	7,652	29,122	25%	44.95	11.24	78.3
				0%	33.71	0.00	
				0%	33.71	0.00	
				0%	33.71	0.00	
				0%	33.71	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**33.71**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 6
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA6 BMP SUMMARY	
Total Volume Treated (ft^3)=	29,122
Nitrogen Mitigated(lbs)=	11.24
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	518
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.02
Post BMP $CN_{(1\text{-year})}$=	45
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	13,559
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.44
Post BMP $CN_{(2\text{-year})}$=	58
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	52,623
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	1.71
Post BMP $CN_{(10\text{-year})}$=	81
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 7
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA7 Site Acreage=	4.97			
DA7 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA7 1" Rainfall for High Density (ft3)=	2,176			
Will site use underground detention/cistern?		Enter % of the year water will be reused=		Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA7(a) (Ac)		Sub-DA7(b) (Ac)		Sub-DA7(c) (Ac)		Sub-DA7(d) (Ac)		Sub-DA7(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious										

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

WAKE COUNTY
NORTH CAROLINA

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 7
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA7 BMP SUMMARY	
Total Volume Treated (ft^3)=	
Nitrogen Mitigated(lbs)=	
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-}year)}$=	10,489
Post BMP Runoff (inches) = $Q^*_{(1\text{-}year)}$=	0.58
Post BMP $CN_{(1\text{-}year)}$=	68
Post BMP Peak Discharge (cfs)= $Q_{1\text{-}year}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-}year)}$=	16,439
Post BMP Runoff (inches) = $Q^*_{(2\text{-}year)}$=	0.91
Post BMP $CN_{(2\text{-}year)}$=	68
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-}year)}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-}year)}$=	35,588
Post BMP Runoff (inches) = $Q^*_{(10\text{-}year)}$=	1.97
Post BMP $CN_{(10\text{-}year)}$=	84
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-}year)}$=	

WAKE COUNTY
NORTH CAROLINA

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 8
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA8 Site Acreage=	13.65			
DA8 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA8 1" Rainfall for High Density (ft3)=	3,066			
Will site use underground detention/cistern?		Enter % of the year water will be reused=		Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA8(a) (Ac)		Sub-DA8(b) (Ac)		Sub-DA8(c) (Ac)		Sub-DA8(d) (Ac)		Sub-DA8(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious										

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 8
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA8 BMP SUMMARY	
Total Volume Treated (ft^3)=	
Nitrogen Mitigated(lbs)=	
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	43,483
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.88
Post BMP $CN_{(1\text{-year})}$=	75
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	63,535
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	1.28
Post BMP $CN_{(2\text{-year})}$=	75
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	124,376
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	2.51
Post BMP $CN_{(10\text{-year})}$=	91
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

WAKE COUNTY
NORTH CAROLINA

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 9
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA9 Site Acreage=				
DA9 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA9 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?		Enter % of the year water will be reused=		Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA9(a) (Ac)		Sub-DA9(b) (Ac)		Sub-DA9(c) (Ac)		Sub-DA9(d) (Ac)		Sub-DA9(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious										

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 9
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA9 BMP SUMMARY	
Total Volume Treated (ft^3)=	
Nitrogen Mitigated(lbs)=	
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 10
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA10 Site Acreage=				
DA10 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA10 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?		Enter % of the year water will be reused=		Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA10(a) (Ac)		Sub-DA10(b) (Ac)		Sub-DA10(c) (Ac)		Sub-DA10(d) (Ac)		Sub-DA10(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious										

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 3

DRAINAGE AREA 10
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA10 BMP SUMMARY	
Total Volume Treated (ft^3)=	
Nitrogen Mitigated(lbs)=	
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 3

DA SITE SUMMARY
BMP CALCULATIONS

BMP SUMMARY										
DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development (1-year, 24-hour storm)										
Runoff (in)=$Q^*_{1\text{-year}}$ =	0.48	0.28		0.38	0.31	0.35	0.48	0.86		
Peak Flow (cfs)=$Q_{1\text{-year}}$ =	11.637	0.919		3.592	1.346	2.166	1.949	12.308		
Post-Development (1-year, 24-hour storm)										
Target Curve Number (TCN) =	NA									
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.53			0.34		0.02	0.58	0.88		
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=										
Post BMP $CN_{(1\text{-year})}$=	46									
Post-BMP Nitrogen Loading										
TOTAL SITE NITROGEN MITIGATED (lbs)=	115.54									
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	4.76									
TOTAL SITE NITROGEN LEFT TO MITIGATE_Wendell Only (lbs)=	**92.72**									

Project Name:	Kalas Falls Phase 3

LOW IMPACT DEVELOPMENT SUMMARY

DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development										
Runoff (in) = $Q_{pre\_2\text{-}year}$ =	0.78	0.51		0.65	0.55	0.61	0.79	1.26		
Total Runoff Volume (ft^3)=	50,112	10,418		29,575	18,167	18,733	14,171	62,584		
Peak Flow (cfs)=$Q_{2\text{-}year}$ =	18.871	1.662		6.093	2.387	3.740	3.158	18.037		
Post-Development										
2-year, 24-hour storm (LID)										
Post BMP Runoff (inches) = $Q^*_{(2\text{-}year)}$=	1.02			0.78	0.44	0.44	0.91	1.28		
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-}year)}$=										
Post BMP Volume of Runoff $(ft3)_{(2\text{-}year)}$=	65,024			35,605	14,386	13,559	16,439	63,535		
Does Runoff meet LID requirements?	No	Yes		No	Yes	Yes	No	Yes		
Does Peak Flow meet LID requirements?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		
Does Runoff Volume meet LID requirements?	No	Yes		No	Yes	Yes	No	Yes		

SITE SUMMARY	
Site Data	
Target CN =	N/A
Post-Development CN =	55
Does CN meet LID requirements?	

LID CHECKLIST
Complete the below checklist if all requirements have been met above:

LID Narrative (limit to 600 characters - attach additional pages with submittal if necessary):
Describe in detail how the proposed development has utilized "Natural Site Design". Narrative should include the location of site buildings, roads and other land disturbances in the least environmentally-sensitive areas, preservation of steep slopes, and preservation of naturally well draining soils and other hydrologically valuable features.

LID Techniques (check all that apply)
At least **one** of the following techniques must be used to achieve LID classification:

☐	Bioretention
☐	On-site infiltration

Additional LID Techniques (check all that apply)
At least **two** (**one for Wendell**) of the following techniques must be used to achieve LID classification:

☐	Retention of 50% of vegetated area, including open space, landscaping or forests
☐	Use of permeable pavement for all private driveways, private roads, sidewalks and parking areas
☐	Installation of one rain cistern per lot or three rain barrels per lot
☐	Installation of vegetative roofs
☐	Increasing all buffers in the Riparian buffer zone or the Flood Protection Zone, whichever is greater, by 50 feet
☐	Use of reclaimed water for all buildings
☐	Use of innovative LID techniques subject to approval

Project Name:	Kalas Falls Phase 3

DOWNSTREAM IMPACT ANALYSIS SITE SUMMARY

DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development										
Peak Discharge (cfs)=$Q_{10\text{-year}}$ =	42.79	4.32		14.64	6.06	9.20	7.15	35.46		
Volume of Runoff (ft^3)$_{(10\text{-year})}$ =	113,625	27,066		71,072	46,145	46,053	32,100	123,049		
Post-Development										
10-year, 24-hour storm (DIA)										
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=										
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	154,391			95,148	57,163	52,623	35,588	124,376		

CALCULATIONS AND REFERENCE

TARGET CURVE NUMBER				
MAXIMUM CURVE NUMBER AFTER DEVELOPMENT				
PROJECT DENSITY	**A**	**B**	**C**	**D**
Ultra-Low	43	63	76	81
Low	48	66	78	83
High	N/A	N/A	N/A	N/A

WEIGHTED CURVE NUMBER				
RUNOFF CURVE NUMBERS FOR URBAN AREAS				
LAND USE	**A**	**B**	**C**	**D**
Pasture	39	61	74	80
Woods, Poor Condition[1]	45	66	77	83
Woods, Fair Condition[2]	36	60	73	79
Woods, Good Condition[3]	30	55	70	77
Open Space, Poor Condition[4]	68	79	86	89
Open Space, Fair Condition[5]	49	69	79	84
Open Space, Good Condition[6]	39	61	74	80
Reforestation (in dedicated OS)[7]	30	55	70	77
Impervious[8]	98	98	98	98

Notes:
[1] Poor Condition = Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
[2] Fair Condition = Woods are grazed but not burned, and some forest litter covers the soil.
[3] Good Condition = Woods that are protected from grazing, litter, and brush adequately cover the soil
[4] Poor Condition = Grass Cover <50% (lawns, parks, golf courses, cemeteries, etc.)
[5] Fair Condition = Grass Cover = 50% - 75% (lawns, parks, golf courses, cemeteries, etc.)
[6] Good Condition = Grass Cover >75% (lawns, parks, golf courses, cemeteries, etc.)
[7] Includes paved/gravel/compacted soil driveways and roads, roofs, etc.
[8] Includes paved/gravel/compacted soil driveways and roads, roofs, etc.

SCS RUNOFF METHOD

$$Q^* = (P-.2S)^2/(P+.8S)$$

Where:
Q*= Runoff (in)
P= Precipitation (in)
S= Potential max retention after runoff begins (in) = (1000/CN)-10

Notes:
Calculations used on Drainage Area Sheets

DISCRETE RUNOFF METHOD (HIGH DENSITY ONLY)

$$Q^*_{High} = Q^*_{(imp)} \times DA_{(imp)} + Q^*_{(pervious)} \times DA_{(pervious)}$$

$Q^*_{(imp)}$ = Runoff from Impervious Area (in)
$DA_{(imp)}$ = Drainage from impervious area (acre)
$Q^*_{(pervious)}$ = Runoff from pervious area (in)
$DA_{(pervious)}$ = Drainage from pervious area (acre)

PEAK FLOW

Method: TR-55 Graphical Peak Discharge Method for Type II Distribution

$$Q_p = q_u A_m Q^* F_p$$

Where:
Q_p = Peak Discharge (cfs)
q_u = Unit peak discharge (csm/in) *TR-55 Appendix F*
A_m = Drainage Area (mi^2)
Q* = runoff (inches)
F_p = pond adjustment factor

$$\log(q_u) = C_o + C_1 \log(Tc) + C_2 [\log(Tc)]^2$$

Where:
C_o, C_1, C_2 = coefficient from Table F-1
T_c = time of concentration (hr)

Limitations:
The watershed must be hydrologically homogeneous
The watershed may have only one main stream or, if more than one, the branches must have nearly equal T_c's.
The Fp factor can be applied only for ponds or swamps that are not in the T_c flow path
This method should be used only if the weighted CN is greater than 40.
When this method is used to develop estimates of peak discharge for both pre and post development, use the same procedure for estimating Tc.
T_c values with this method may range from 0.1 to 10 hours.

TIME OF CONCENTRATION

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor from seconds to hours

T_c = sum of T_t values for consecutive flow segments

$T_c = T_1 + T_2 + T_3 + \ldots T_m$

T_c = time of concentration (hr)
m = # of flow segments

Note: Minimal 5 minute Tc

SHEET FLOW (FOR FLOW LESS THAN 300 FEET)

$$T_t = \frac{0.0007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}$$

T_t =travel time (hr)
n = Manning's roughness coefficient (Table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

SHALLOW FLOW

Surface Cover

Unpaved: $V = 16.1345(s)^{0.5}$

Paved: $V = 20.3282(s)^{0.6}$

V=Average Velocity (ft/s)
s = slope of hydraulic grade line (watercourse slope, ft/ft)

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor from seconds to hours

OPEN CHANNEL FLOW

$$V = \frac{1.49r^{2/3}s^{1/2}}{n}$$

V=Average Velocity (ft/s)
r = hydraulic radius (ft)
s = slope of hydraulic grade line (channel slope, ft/ft)
n = Manning's roughness coefficient for open channel flow

$$r = \frac{a}{p_w}$$

a = cross sectional flow area (ft2)
p_w=wetted perimeter (ft)

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor (sec-hrs)

Modified Table 3-1 for Stormwater Tool

SURFACE DESCRIPTION	n
Paved, Gravel, or Bare Soil	0.011
Grass	0.24
Woods	0.40

TABLE 4-1, TR-55
I_a values for runoff curve numbers

CN	I_a (in)	CN	I_a (in)	CN	I_a (in)
40	3.000	60	1.333	80	0.500
41	2.878	61	1.279	81	0.469
42	2.762	62	1.226	82	0.439
43	2.651	63	1.175	83	0.410
44	2.545	64	1.125	84	0.381
45	2.444	65	1.077	85	0.353
46	2.348	66	1.030	86	0.326
47	2.255	67	0.985	87	0.299
48	2.167	68	0.941	88	0.273
49	2.082	69	0.899	89	0.247
50	2.000	70	0.857	90	0.222
51	1.922	71	0.817	91	0.198
52	1.846	72	0.778	92	0.174
53	1.774	73	0.740	93	0.151
54	1.704	74	0.703	94	0.128
55	1.636	75	0.667	95	0.105
56	1.571	76	0.632	96	0.083
57	1.509	77	0.597	97	0.062
58	1.448	78	0.564	98	0.041
59	1.390	79	0.532		

TABLE 3-9, TR-55
Rational Runoff Coefficients

CHANNEL LINING	n
Asphalt	0.016
Concrete, finished	0.012
Concrete, unfinished	0.014
Grass	0.035
Gravel Bottom/riprap sides	0.033
Weeds	0.040

DISCONNECTED IMPERVIOUS CALCULATION

$$CN_{adjusted} = CN_p + [(P_{imp}/100)*(98-CN_p)*(1-(0.5*R))]$$

Where:

$CN_{adjusted}$ = Composite Curve Number

CN_p = Pervious runoff curve number =(PostCN - (Pimp/100)*98)/(1 -(Pimp/100))

P_{imp} = Percent Imperviousness

R = ratio of unconnected impervious area to total impervious area

TABLE 4-1, SW BMP MANUAL
BMP ABILITY FOR SW QUANTITY CONTROL

BMP	TSS	TN
Bioretention without IWS	**85%**	**35%**
Bioretention with IWS	**85%**	**40%**
Stormwater Wetlands	**85%**	**40%**
Wet Detention Basin	**85%**	**25%**
Sand Filter	**85%**	**35%**
Filter Strip	**25-40%**	**20%**
Grass Swale	**35%**	**20%**
Restored Riparian Buffer	**60%**	**30%**
Infiltration Device	**85%**	**30%**
Dry Extended Detention Basin	**50%**	**10%**
Permeable Pavement	**0%**	**0%**
Rooftop Runoff Management (Excluding Cisterns)	**0%**	**0%**
Cistern/Underground Detention	**See Note**	**100%**

[1] Use of underground detention reduces total volume required for storage as well total nitrogen load. To receive total reduction,

	engineer must show year-round use of reclaimed water. If water is not reused year-round, a percent of the total reduction may be given (See DA BMP sheets).

Towns of Rolesville, Wendell and Zebulon Stormwater Tool Directions

The Wake County Municipal Stormwater Tool is required for all stormwater submittals in Rolesville Wendell, and Zebulon. Engineer will input all data requested that is highlighted in **blue**. Engineer may follow provided links to view calculations used in this tool. Calculations for peak flow, runoff, time of concentration, etc. are for individual drainage areas. Engineer should complete a worksheet for each drainage area within a project limit.

1	Complete SITE DATA worksheet. SITE DATA worksheet should be submitted with preliminary plan submittals and modified and submitted for construction plan submittals. The 2-yr, 24-hr rainfall input will be used for projects requesting LID classification further into the tool. The 10-year, 24-hour rainfall input will be used for potential Downstream Impact Analyses (DIA). Stormwater Narrative should describe the site conditions in pre- and post-development conditions including a description of site improvements and proposed stormwater BMPs.
2	Complete DA worksheets. Most of the site data is inputted by the engineer on the DA worksheets. DA worksheets are designed essentially to account for Ultra-Low, Low, and High Density project requirements per Ordinance standards. DA Worksheets will calculate runoff, time of concentration, peak flow, and volume to be managed per drainage area. Inputs will also be used to calculate the site composite curve numbers for pre and post development, Target Curve Number (TCN), and total nitrogen loading (TN) calculations. This sheet will also calculate required volume management for the 1st inch rainfall for high density projects. 1st inch of runoff should be handled by each DA BMP for High Density projects. Disconnected Impervious - This area will be used to provide an adjusted post development composite curve number ($CN_{adjusted}$) to allow a credit for the use of disconnected impervious. Site plans should clearly indicate areas of disconnected impervious.
3	SITE SUMMARY worksheet summarizes the pre and post runoff, Tc, and peak flow per drainage area based on inputs from DA worksheets. This worksheet denotes the volume required for management per drainage area based on high density requirements. TCN and composite curve numbers for pre and post development are also calculated and summarized. If the TCN is exceeded, this worksheet will calculate total volume to be managed for the entire site based on TCN requirements. Nitrogen Loading: Nitrogen Loading Rate for the site is calculated based on the Hydrologic Soil Groups and site acreages imputed on DA worksheets. This worksheet calculates the total amount of nitrogen loading. Nitrogen total will be used on following BMP worksheets. Note: There are no engineer inputs on this sheet and all exeedances from DA worksheets will be flagged in **red**.
4	DA BMP worksheets require engineer to input proposed BMP information. BMPs are categorized by sub-basins within the drainage area. Engineer should input BMP device name, type, and volume provided. BMP requirements are automatically imported from previous inputs. Engineer should input land uses by sub-basin. Off-site drainage to the sub-basin may also be inputted to allow credit for nitrogen removal (if said drainage is routed through the BMP). BMPs are required in each DA where post-development peak flow is higher than pre-development peak flow. Only under special circumstances will a BMP not be required. In these cases, the engineer must show the following: 1. Total runoff volume for the DA must be less than 10% of the entire site runoff. 2. TN must be handled for the site elsewhere. 3. Runoff must not leave the DA at an erosive velocity. 4. Proposed design must comply with all state and federal regulations. DA BMP worksheets will ensure that proposed BMPs meet requirements for peak flow, TCN, and for Nitrogen. Engineer must input post-BMP discharge. Note: Engineers are required to input post BMP peak flow for the 1-year, 2-year, and 10-year storms for each DA. The SW Design Tool uses the TR-55 method. The TR-55 method is preferred for post BMP calculations. If engineer uses a method/model other than TR-55 for the post-BMP peak discharge and runoff, engineer must also provide pre-development calculations from the method/model (in addition to the SW Design Tool) and pre-development calculations must be within 10% of results computed by the SW Design Tool). A summary sheet should be attached with the submittal to for all inputs used in design.
5	BMP SUMMARY worksheet summarizes the pre and post BMP runoff, and peak flow per drainage area based on inputs from DA BMP worksheets. Nitrogen Loading: Nitrogen mitigated for the site is calculated based on the inputs on DA BMP worksheets. This worksheet calculates the total amount of nitrogen left to be mitigated for the site (Wendell only). Site expansions use the aportioning method. Note: There are no engineer inputs on this sheet and all exeedances from DA BMP worksheets will be flagged in **red**.
6	LID worksheet summarizes the pre and post runoff, Tc, and peak flow per drainage area for the 2-year, 24-hour storm based on inputs from DA and BMP worksheets. This worksheet will determine if design calculations provided meet LID classification. Engineers may wish to modify site design or mitigate with additional BMPs to meet LID Requirements. In that case, DA and BMP worksheets should be modified to meet these requirements and the LID sheet will be updated automatically. If calculation requirements for LID are met, Engineer should complete the *LID CHECKLIST* on **LID** worksheet and provide associated documentation to determine if project meets ALL LID requirements.
7	Downstream Impact Analysis DIA worksheet presents requirements for a downstream impact analysis. Based on engineer inputs, this sheet will report if a DIA is required for the project based on the 10-year storm discharge leaving each discharge point. This stormwater tool does NOT complete the actual downstream impact analyses. A DIA shall be performed at the outlet(s) of the site, and downstream at each tributary junction to the point(s) in the conveyance system where the area of the portion of the site draining into the system is less than or equal to 10 percent of the total drainage area above that point. The outflow hydrograph at these points is to be determined for the pre-development condition. Then, the outflow hydrograph at each of these points is to be determined for the conditions after the site in question has been developed. <u>All hydrographs and inputs should be provided with plan submittal.</u>

WAKE COUNTY
NORTH CAROLINA

SITE DATA

Project Information	
Project Name:	**Kalas Falls Phase 5**
Applicant:	
Applicant Contact Name:	
Applicant Contact Number:	
Contact Email:	
Municipal Jurisdiction (Select from dropdown menu):	Rolesville
Last Updated:	Thursday, November 7, 2024
Site Data:	
Total Site Area (Ac):	23.39
Existing Lake/Pond Area (Ac):	0.93
Proposed Disturbed Area (Ac):	14.26
Impervious Surface Area (acre):	7.09
Type of Development (Select from Dropdown menu):	Residential
Percent Built Upon Area (BUA):	30%
Project Density:	High
Is the proposed project a site expansion?	Yes
Number of Drainage Areas on Site:	2
NOAA — **1-Year, 24-Hour Storm (inches) (See NOAA Website):**	2.86
2-Year, 24-Hour Storm (inches) (See NOAA Website):	3.46
10-Year, 24-Hour Storm (inches) (See NOAA Website):	5.06
Lot Data (if applicable):	
Total Acreage in Lots:	5.70
Number of Lots:	95
Average Lot Size (SF):	2400.00
Total Impervious Surface Area on Lots (SF):	190000.00
Average Impervious Surface Area Per Lot (SF):	2000.00
Stormwater Narrative (limit to 1,200 characters - attach additional pages with submittal if necessary):	

Project Name: Kalas Falls Phase 5

DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	14.26				14.26			
Site Acreage within Drainage=	14.26				14.26			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.46							
Ten-year, 24-hour storm (in)=	5.06							
Total Lake/Pond Area (Acres)=	0.00				0.00			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition		13.01		1.25				0.65
Open Space, Good Condition						6.52		
Reforestation (in dedicated OS)								
Connected Impervious					7.09			
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=	100.00				100.00			
Slope (ft/ft)=	0.023				0.023			
Surface Cover:	Grass				Grass			
n-value=	0.240				0.240			
T_t (hrs)=	0.238				0.238			
Shallow Flow								
Length (ft)=	988.00				135.00			
Slope (ft/ft)=	0.017				0.023			
Surface Cover:	Unpaved				Unpaved			
Average Velocity (ft/sec)=	2.10				2.45			
T_t (hrs)=	0.13				0.02			
Channel Flow 1								
Length (ft)=	976.00				1565.00			
Slope (ft/ft)=	0.015				0.050			
Cross Sectional Flow Area (ft^2)=	2.00				1.24			
Wetted Perimeter (ft)=	6.13				2.90			
Channel Lining:	Gravel Bottom/riprap sides				Concrete, finished			
n-value=	0.033				0.012			
Hydraulic Radius (ft)=	0.33				0.43			
Average Velocity (ft/sec)=	2.62				15.76			
T_t (hrs)=	0.10				0.03			

Project Name: Kalas Falls Phase 5

DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=	0.00	38.00
Slope (ft/ft)=	0.015	0.050
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Concrete, finished
n-value=	0.033	0.012
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	13.16
T_t (hrs)=		0.00
Channel Flow 3		
Length (ft)=	0.00	193.00
Slope (ft/ft)=	0.015	0.015
Cross Sectional Flow Area (ft^2)=	2.00	2.00
Wetted Perimeter (ft)=	6.13	6.13
Channel Lining:	Gravel Bottom/riprap sides	Gravel Bottom/riprap sides
n-value=	0.033	0.033
Hydraulic Radius (ft)=	0.33	0.33
Average Velocity (ft/sec)=	2.62	2.62
T_t (hrs)=		0.02
Tc (hrs)=	0.47	0.30
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	70	80
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**80**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	25,751	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.65	1.17
Volume of runoff (ft^3) =	33,707	60,694
Volume change (ft^3) =	26,987	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	6.571	17.610
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.00	1.64
Volume of runoff (ft^3) =	51,782	84,682
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	10.095	24.570
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.11	2.99
Volume of runoff (ft^3) =	109,010	154,572
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	21.252	44.847

Project Name: Kalas Falls Phase 5

DA SITE SUMMARY
STORMWATER PRE-POST CALCULATIONS

SITE SUMMARY

DRAINAGE AREA SUMMARIES

DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development (1-year, 24-hour storm)										
Runoff (in) = $Q_{pre,1\text{-}year}$ =	0.65									
Peak Flow (cfs)=$Q_{1\text{-}year}$ =	6.571									
Post-Development (1-year, 24-hour storm)										
Proposed Impervious Surface (acre) =	7.09									
Runoff (in)=$Q_{1\text{-}year}$ =	1.17									
Peak Flow (cfs)=$Q_{1\text{-}year}$ =	17.610									
Increase in volume per DA (ft^3)_1-yr storm=	26,987									
Minimum Volume to be Managed for DA HIGH DENSITY REQUIREMENT = (ft^3) =	25,751									

TARGET CURVE NUMBER (TCN)

Site Data

SITE \SOIL COMPOSITION

HYDROLOGIC SOIL GROUP	Site Area	%	Target CN
A	7.09	50%	N/A
B	6.52	46%	N/A
C	0.00	0%	N/A
D	0.65	5%	N/A

Total Site Area (acres) =	14.26
Percent BUA (Includes Existing Lakes/Pond Areas) =	50%
Project Density =	High
Target Curve Number (TCN) =	N/A
$CN_{adjusted\ (1\text{-}year)}$=	80
Minimum Volume to be Managed (Total Site) Per TCN Requirement= ft^3 =	N/A

Site Nitrogen Loading Data

HSG	TN export coefficient (lbs/ac/yr)	Site Acreage	N Export
Pasture	1.2	0.00	0.00
Woods, Poor Condition	1.6	0.00	0.00
Woods, Fair Condition	1.2	0.00	0.00
Woods, Good Condition	0.8	0.00	0.00
Open Space, Poor Condition	1.0	0.00	0.00
Open Space, Fair Condition	0.8	0.65	0.52
Open Space, Good Condition	0.6	6.52	3.91
Reforestation (in dedicated OS)	0.6	0.00	0.00
Impervious	21.2	7.09	150.31

SITE NITROGEN LOADING RATE (lbs/ac/yr)=	NA
Nitrogen Load (lbs/yr)=	154.74
TOTAL SITE NITROGEN TO MITIGATE (lbs/yr)_Wendell Only=	NA

Site Nitrogen Loading Data For Expansions Only

	Existing	New
Impervious(acres)=		7.09
"Expansion Area" (acres=)	14.26	
Nitrogen Load (lbs/yr)=	0.00	154.74
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	0.00	10.85
Total Site loading rate (lbs/ac/yr)	10.85	
TOTAL SITE NITROGEN TO MITIGATE (lbs/yr)=	103.40	

Project Name: Kalas Falls Phase 5

DRAINAGE AREA 1
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA1 Site Acreage=	14.26			
DA1 Off-Site Acreage=				
Total Required Storage Volume for Site TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA1 1" Rainfall for High Density (ft^3)=	25,751			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA1(a) (Ac)		Sub-DA1(b) (Ac)		Sub-DA1(c) (Ac)		Sub-DA1(d) (Ac)		Sub-DA1(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition	7.17									
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious	7.09									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 3B	Wet Detention Basin	25,751	50,067	25%	156.04	39.01	49
				0%	117.03	0.00	
				0%	117.03	0.00	
				0%	117.03	0.00	
				0%	117.03	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**117.03**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Project Name: Kalas Falls Phase 5

DRAINAGE AREA 1
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA1 BMP SUMMARY	
Total Volume Treated (ft^3)=	50,067
Nitrogen Mitigated(lbs)=	39.01
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	10,627
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.21
Post BMP $CN_{(1\text{-year})}$=	57
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	34,615
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.67
Post BMP $CN_{(2\text{-year})}$=	63
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	104,505
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	2.02
Post BMP $CN_{(10\text{-year})}$=	85
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

Project Name: Kalas Falls Phase 5

DA SITE SUMMARY
BMP CALCULATIONS

BMP SUMMARY										
DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development (1-year, 24-hour storm)										
Runoff (in)=$Q^*_{1\text{-year}}$ =	0.65									
Peak Flow (cfs)=$Q_{1\text{-year}}$ =	6.571									
Post-Development (1-year, 24-hour storm)										
Target Curve Number (TCN) =	NA									
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.21									
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=										
Post BMP $CN_{(1\text{-year})}$=	57									
Post-BMP Nitrogen Loading										
TOTAL SITE NITROGEN MITIGATED (lbs)=	39.01									
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	8.12									
TOTAL SITE NITROGEN LEFT TO MITIGATE_Wendell Only (lbs)=	**64.39**									

Project Name:	Kalas Falls Phase 5

LOW IMPACT DEVELOPMENT SUMMARY

DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development										
Runoff (in) = $Q_{pre\_2\text{-}year}$ =	1.00									
Total Runoff Volume (ft^3)=	51,782									
Peak Flow (cfs)=$Q_{2\text{-}year}$ =	10.095									
Post-Development										
2-year, 24-hour storm (LID)										
Post BMP Runoff (inches) = $Q^*_{(2\text{-}year)}$=	0.67									
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-}year)}$=										
Post BMP Volume of Runoff $(ft3)_{(2\text{-}year)}$=	34,615									
Does Runoff meet LID requirements?	Yes									
Does Peak Flow meet LID requirements?	Yes									
Does Runoff Volume meet LID requirements?	Yes									

SITE SUMMARY	
Site Data	
Target CN =	N/A
Post-Development CN =	63
Does CN meet LID requirements?	

LID CHECKLIST
Complete the below checklist if all requirements have been met above:

LID Narrative (limit to 600 characters - attach additional pages with submittal if necessary):
Describe in detail how the proposed development has utilized "Natural Site Design". Narrative should include the location of site buildings, roads and other land disturbances in the least environmentally-sensitive areas, preservation of steep slopes, and preservation of naturally well draining soils and other hydrologically valuable features.

LID Techniques (check all that apply)
At least **one** of the following techniques must be used to achieve LID classification:

☐	Bioretention
☐	On-site infiltration

Additional LID Techniques (check all that apply)
At least **two** (**one for Wendell**) of the following techniques must be used to achieve LID classification:

☐	Retention of 50% of vegetated area, including open space, landscaping or forests
☐	Use of permeable pavement for <u>all</u> private driveways, private roads, sidewalks and parking areas
☐	Installation of one rain cistern per lot or three rain barrels per lot
☐	Installation of vegetative roofs
☐	Increasing all buffers in the Riparian buffer zone or the Flood Protection Zone, whichever is greater, by 50 feet
☐	Use of reclaimed water for all buildings
☐	Use of innovative LID techniques subject to approval

Project Name:	Kalas Falls Phase 5

DOWNSTREAM IMPACT ANALYSIS SITE SUMMARY

DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development										
Peak Discharge (cfs)=$Q_{10\text{-year}}$ =	21.25									
Volume of Runoff (ft^3)$_{(10\text{-year})}$ =	109,010									
Post-Development										
10-year, 24-hour storm (DIA)										
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=										
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	104,505									

CALCULATIONS AND REFERENCE

TARGET CURVE NUMBER				
MAXIMUM CURVE NUMBER AFTER DEVELOPMENT				
PROJECT DENSITY	**A**	**B**	**C**	**D**
Ultra-Low	43	63	76	81
Low	48	66	78	83
High	N/A	N/A	N/A	N/A

WEIGHTED CURVE NUMBER				
RUNOFF CURVE NUMBERS FOR URBAN AREAS				
LAND USE	**A**	**B**	**C**	**D**
Pasture	39	61	74	80
Woods, Poor Condition[1]	45	66	77	83
Woods, Fair Condition[2]	36	60	73	79
Woods, Good Condition[3]	30	55	70	77
Open Space, Poor Condition[4]	68	79	86	89
Open Space, Fair Condition[5]	49	69	79	84
Open Space, Good Condition[6]	39	61	74	80
Reforestation (in dedicated OS)[7]	30	55	70	77
Impervious[8]	98	98	98	98

Notes:
[1] Poor Condition = Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
[2] Fair Condition = Woods are grazed but not burned, and some forest litter covers the soil.
[3] Good Condition = Woods that are protected from grazing, litter, and brush adequately cover the soil
[4] Poor Condition = Grass Cover <50% (lawns, parks, golf courses, cemeteries, etc.)
[5] Fair Condition = Grass Cover = 50% - 75% (lawns, parks, golf courses, cemeteries, etc.)
[6] Good Condition = Grass Cover >75% (lawns, parks, golf courses, cemeteries, etc.)
[7] Includes paved/gravel/compacted soil driveways and roads, roofs, etc.
[8] Includes paved/gravel/compacted soil driveways and roads, roofs, etc.

SCS RUNOFF METHOD

$$Q^* = (P-.2S)^2/(P+.8S)$$

Where:
Q*= Runoff (in)
P= Precipitation (in)
S= Potential max retention after runoff begins (in) = (1000/CN)-10

Notes:
Calculations used on Drainage Area Sheets

DISCRETE RUNOFF METHOD (HIGH DENSITY ONLY)

$$Q^*_{High} = Q^*_{(imp)} \times DA_{(imp)} + Q^*_{(pervious)} \times DA_{(pervious)}$$

$Q^*_{(imp)}$ = Runoff from Impervious Area (in)
$DA_{(imp)}$ = Drainage from impervious area (acre)
$Q^*_{(pervious)}$ = Runoff from pervious area (in)
$DA_{(pervious)}$ = Drainage from pervious area (acre)

PEAK FLOW

Method: TR-55 Graphical Peak Discharge Method for Type II Distribution

$$Q_p = q_u A_m Q^* F_p$$

Where:
Q_p = Peak Discharge (cfs)
q_u = Unit peak discharge (csm/in) *TR-55 Appendix F*
A_m = Drainage Area (mi^2)
Q* = runoff (inches)
F_p = pond adjustment factor

$$\log(q_u) = C_o + C_1 \log(Tc) + C_2 [\log(Tc)]^2$$

Where:
C_o, C_1, C_2 = coefficient from Table F-1
T_c = time of concentration (hr)

Limitations:
The watershed must be hydrologically homogeneous
The watershed may have only one main stream or, if more than one, the branches must have nearly equal T_c's.
The Fp factor can be applied only for ponds or swamps that are not in the T_c flow path
This method should be used only if the weighted CN is greater than 40.
When this method is used to develop estimates of peak discharge for both pre and post development, use the same procedure for estimating Tc.
T_c values with this method may range from 0.1 to 10 hours.

TIME OF CONCENTRATION

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor from seconds to hours

T_c = sum of T_t values for consecutive flow segments

$T_c = T_1 + T_2 + T_3 + \ldots T_m$

T_c = time of concentration (hr)
m = # of flow segments

Note: Minimal 5 minute Tc

SHEET FLOW (FOR FLOW LESS THAN 300 FEET)

$$T_t = \frac{0.0007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}$$

T_t =travel time (hr)
n = Manning's roughness coefficient (Table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

SHALLOW FLOW

Surface Cover

Unpaved: $V = 16.1345(s)^{0.5}$

Paved: $V = 20.3282(s)^{0.6}$

V=Average Velocity (ft/s)
s = slope of hydraulic grade line (watercourse slope, ft/ft)

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor from seconds to hours

OPEN CHANNEL FLOW

$$V = \frac{1.49r^{2/3}s^{1/2}}{n}$$

V=Average Velocity (ft/s)
r = hydraulic radius (ft)
s = slope of hydraulic grade line (channel slope, ft/ft)
n = Manning's roughness coefficient for open channel flow

$$r = \frac{a}{p_w}$$

a = cross sectional flow area (ft2)
p_w=wetted perimeter (ft)

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor (sec-hrs)

Modified Table 3-1 for Stormwater Tool

SURFACE DESCRIPTION	n
Paved, Gravel, or Bare Soil	0.011
Grass	0.24
Woods	0.40

TABLE 4-1, TR-55
I_a values for runoff curve numbers

CN	I_a (in)	CN	I_a (in)	CN	I_a (in)
40	3.000	60	1.333	80	0.500
41	2.878	61	1.279	81	0.469
42	2.762	62	1.226	82	0.439
43	2.651	63	1.175	83	0.410
44	2.545	64	1.125	84	0.381
45	2.444	65	1.077	85	0.353
46	2.348	66	1.030	86	0.326
47	2.255	67	0.985	87	0.299
48	2.167	68	0.941	88	0.273
49	2.082	69	0.899	89	0.247
50	2.000	70	0.857	90	0.222
51	1.922	71	0.817	91	0.198
52	1.846	72	0.778	92	0.174
53	1.774	73	0.740	93	0.151
54	1.704	74	0.703	94	0.128
55	1.636	75	0.667	95	0.105
56	1.571	76	0.632	96	0.083
57	1.509	77	0.597	97	0.062
58	1.448	78	0.564	98	0.041
59	1.390	79	0.532		

TABLE 3-9, TR-55
Rational Runoff Coefficients

CHANNEL LINING	n
Asphalt	0.016
Concrete, finished	0.012
Concrete, unfinished	0.014
Grass	0.035
Gravel Bottom/riprap sides	0.033
Weeds	0.040

DISCONNECTED IMPERVIOUS CALCULATION

$$CN_{adjusted} = CN_p + [(P_{imp}/100)*(98-CN_p)*(1-(0.5*R))]$$

Where:

$CN_{adjusted}$ = Composite Curve Number

CN_p = Pervious runoff curve number =(PostCN - (Pimp/100)*98)/(1 -(Pimp/100))

P_{imp} = Percent Imperviousness

R = ratio of unconnected impervious area to total impervious area

TABLE 4-1, SW BMP MANUAL
BMP ABILITY FOR SW QUANTITY CONTROL

BMP	TSS	TN
Bioretention without IWS	**85%**	**35%**
Bioretention with IWS	**85%**	**40%**
Stormwater Wetlands	**85%**	**40%**
Wet Detention Basin	**85%**	**25%**
Sand Filter	**85%**	**35%**
Filter Strip	**25-40%**	**20%**
Grass Swale	**35%**	**20%**
Restored Riparian Buffer	**60%**	**30%**
Infiltration Device	**85%**	**30%**
Dry Extended Detention Basin	**50%**	**10%**
Permeable Pavement	**0%**	**0%**
Rooftop Runoff Management (Excluding Cisterns)	**0%**	**0%**
Cistern/Underground Detention	**See Note**	**100%**

[1] Use of underground detention reduces total volume required for storage as well total nitrogen load. To receive total reduction,

Phase 3 SCM Outlet Rip Rap Calculations

RIP-RAP PADS

Date: 11/8/24 **Kalas Falls, Phase 3**

Y:\Jobs\9900\Watkins Property\Documents\Schedules\Rip-Rap Pads, Ph3.xlsx

Using NYSDOT Method

OUTLET NO.	PIPE DIA. (IN.)	VELOCITY (FPS)	ZONE	STONE SIZE	STONE CLASS	WIDTH (FT.)*	LENGTH (FT.)	DEPTH (IN.)
FES 30	24	9.36	2	6"	B	8	12	18
FES 3B	48	9.69	3	13"	1	17.5	32	24
FES 3C	18	6.54	1	3"	A	5.5	6	12
FES 4B	30	6.76	3***	13"	1	11	20	24
FES 4C	18	7.06	3***	13"	1	6.5	12	24
FES 4E	24	5.55	3***	13"	1	8.75	16	24
FES 8A	18	5.01	1	3"	A	5.5	6	12
FES 17	15	7.41	1	3"	A	4.75	5	12
FES 19	15	8.34	2	6"	B	5	7.5	18
FES 21	15	4.52	1	3"	A	4.75	5	12
FES 23	18	6.95	2	6"	B	6	9	18
SB#403	4	**	1	3"	A	2	4	12
SB#404	4	**	1	3"	A	2	4	12
SB#406	4	**	1	3"	A	2	4	12
FES 25	18	6.73	2	6"	B	6	9	18
FES 330	18	5.53	1	3"	A	5.5	6	12
FES 338	24	5.73	2	6"	B	8	12	18
FES 349	42	5.77	2	6"	B	14	21	18
FES 392	18	4.07	1	3"	A	5.5	6	12
FES 401	24	7.55	2	6"	B	8	12	18
FES 419	30	12.91	3	13"	1	11	20	24
FES 469	36	8.89	2	6"	B	12	18	18
FES 800	18	8.76	2	6"	B	6	9	18
FES 815	15	6.13	1	3"	A	4.75	5	12
Note:	Sediment basins to be converted to SCM's are shown by the permanent SCM number.							

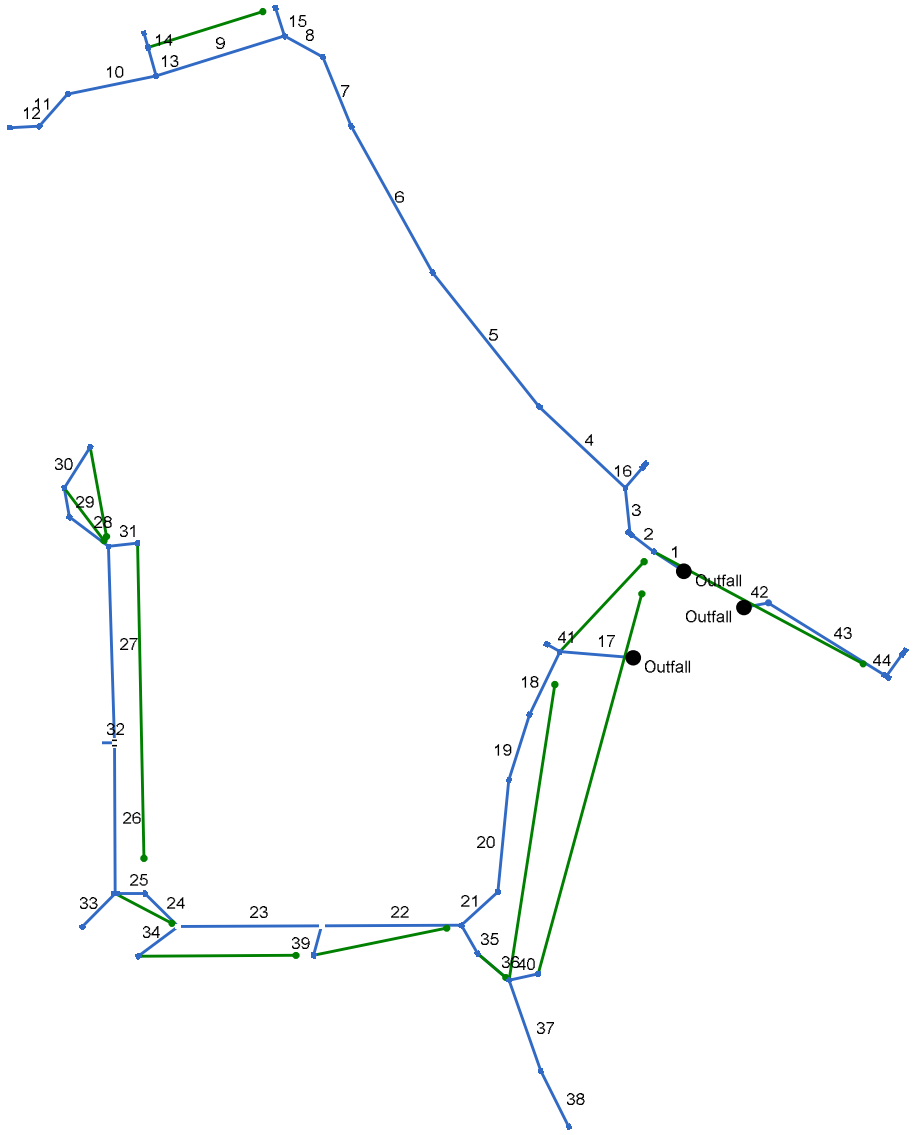
*Downstream width, use 3 x pipe diameter upstream.

**Flow velocity very small as it comes through max. 2" orifice only a few inches below the surface.

***Next higher zone due to steep ground slope

Storm Profiles HGL

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM #3B 10-Year Report



Project File: Outfall 3B.stm	Number of lines: 44	Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	33.000	-146.610	Comb	0.00	0.25	0.55	10.0	351.50	1.82	352.10	24	Cir	0.013	0.50	358.45	Pipe - (110)
2	1	27.000	4.157	Comb	0.00	0.25	0.55	10.0	352.20	1.00	352.47	24	Cir	0.013	1.15	358.74	Pipe - (109)
3	2	42.155	46.480	Comb	0.00	0.19	0.55	10.0	352.60	0.50	352.81	24	Cir	0.013	1.14	359.10	Pipe - (108)
4	3	108.118	-40.556	Comb	0.00	0.30	0.55	10.0	352.91	0.50	353.45	24	Cir	0.013	0.50	360.97	Pipe - (107)
5	4	156.840	8.071	Comb	0.00	0.36	0.55	10.0	353.95	3.50	359.44	18	Cir	0.013	0.50	365.36	Pipe - (106)
6	5	153.881	9.495	Comb	0.00	0.08	0.55	10.0	359.55	3.00	364.17	18	Cir	0.013	0.50	369.65	Pipe - (105)
7	6	68.214	6.744	Comb	0.00	0.02	0.55	10.0	364.27	0.92	364.90	15	Cir	0.013	1.01	371.01	Pipe - (104)
8	7	40.034	-38.755	Comb	0.00	0.20	0.55	10.0	365.00	0.87	365.35	15	Cir	0.013	1.65	370.77	Pipe - (103)
9	8	122.836	-46.405	Comb	0.00	0.10	0.55	10.0	365.55	3.30	369.60	15	Cir	0.013	1.50	375.28	Pipe - (102)
10	9	82.378	5.637	Comb	0.00	0.02	0.55	10.0	369.70	2.12	371.45	15	Cir	0.013	0.97	377.58	Pipe - (215)
11	10	39.000	-36.751	Comb	0.00	0.25	0.55	10.0	371.55	0.51	371.75	15	Cir	0.013	1.13	377.57	Pipe - (101)
12	11	27.000	45.280	Comb	0.00	0.25	0.55	10.0	371.85	1.00	372.12	15	Cir	0.013	1.00	377.52	Pipe - (100)
13	9	27.000	91.596	Comb	0.00	0.21	0.55	10.0	369.70	1.00	369.97	15	Cir	0.013	0.50	375.27	Pipe - (213)
14	13	13.666	0.000	DrGrt	0.00	0.33	0.55	10.0	370.17	1.02	370.31	15	Cir	0.013	1.00	376.58	Pipe - (212)
15	8	27.000	43.478	Comb	0.00	0.16	0.55	10.0	365.81	1.00	366.08	15	Cir	0.013	1.00	370.80	Pipe - (111)
16	3	27.045	45.965	Comb	0.00	0.74	0.55	10.0	352.91	1.00	353.18	24	Cir	0.013	1.00	358.74	Pipe - (113)
17	End	67.178	-175.243	Comb	0.00	0.13	0.55	10.0	351.50	0.60	351.90	42	Cir	0.013	1.65	360.15	Pipe - (153)
18	17	64.000	-68.820	Comb	0.00	0.12	0.55	10.0	352.00	0.61	352.39	42	Cir	0.013	0.50	360.85	Pipe - (152)
19	18	63.168	-8.841	Comb	0.00	0.18	0.55	10.0	352.50	1.58	353.50	42	Cir	0.013	0.50	361.54	Pipe - (151)
20	19	102.760	-11.449	Comb	0.00	0.06	0.55	10.0	353.60	1.00	354.63	42	Cir	0.013	1.07	362.70	Pipe - (150)
21	20	45.158	41.847	Comb	0.00	0.18	0.55	10.0	354.79	1.24	355.35	42	Cir	0.013	1.47	363.21	Pipe - (176)
22	21	127.817	42.259	Comb	0.00	0.14	0.55	10.0	356.20	2.45	359.33	30	Cir	0.013	1.46	365.79	Pipe - (148)
23	22	130.784	-0.028	Comb	0.00	0.14	0.08	10.0	359.45	2.87	363.20	24	Cir	0.013	1.45	368.99	Pipe - (147)

Project File: Outfall 3B.stm

Number of lines: 44

Date: 2/3/2025

Storm Sewer Inventory Report

SCM #3B 10-Year Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	43.134	45.000	Comb	0.00	0.08	0.55	10.0	363.30	1.81	364.08	24	Cir	0.013	1.13	370.06	Pipe - (146)
25	24	27.000	-45.000	Comb	0.00	0.25	0.55	10.0	364.20	0.52	364.34	24	Cir	0.013	1.69	370.76	Pipe - (145)
26	25	138.188	90.000	Comb	0.00	0.32	0.55	10.0	364.72	0.88	365.94	24	Cir	0.013	1.50	371.23	Pipe - (144)
27	26	180.079	-1.496	Comb	0.00	0.09	0.55	10.0	366.30	1.00	368.10	18	Cir	0.013	1.50	375.43	Pipe - (142)
28	27	44.685	-50.994	Comb	0.00	0.35	0.55	10.0	368.20	3.80	369.90	15	Cir	0.013	1.08	376.58	Pipe - (141)
29	28	27.000	42.603	Comb	0.00	0.35	0.55	10.0	371.06	0.52	371.20	15	Cir	0.013	1.09	377.16	Pipe - (140)
30	29	44.433	42.712	Comb	0.00	0.12	0.55	10.0	371.53	0.50	371.75	15	Cir	0.013	1.00	379.19	Pipe - (139)
31	27	26.746	85.218	Comb	0.00	0.56	0.55	10.0	369.96	1.01	370.23	15	Cir	0.013	1.00	375.33	Pipe - (225)
32	26	14.000	-89.921	DrGrt	0.00	1.30	0.55	10.0	366.10	7.79	367.19	18	Cir	0.013	1.00	372.54	Pipe - (154)
33	25	43.134	-45.000	Comb	0.00	0.40	0.55	10.0	364.90	1.00	365.33	24	Cir	0.013	1.00	373.25	Pipe - (157)
34	23	45.610	-36.297	Comb	0.00	0.50	0.55	10.0	363.30	4.28	365.25	18	Cir	0.013	1.00	370.38	Pipe - (158)
35	21	30.000	-77.118	Comb	0.00	0.32	0.55	10.0	355.46	0.50	355.61	36	Cir	0.013	0.59	363.00	Pipe - (162)
36	35	37.602	-20.013	Comb	0.00	0.16	0.55	10.0	355.71	0.51	355.90	36	Cir	0.013	1.24	363.67	Pipe - (165)
37	36	87.912	30.556	Comb	0.00	0.03	0.55	10.0	356.00	1.25	357.10	36	Cir	0.013	0.50	364.22	Pipe - (164)
38	37	57.092	-7.667	Comb	0.00	8.70	0.55	24.0	357.90	0.68	358.29	36	Cir	0.013	1.00	364.11	Pipe - (163) (1)
39	22	28.034	-74.418	Comb	0.00	0.32	0.55	10.0	360.58	1.00	360.86	15	Cir	0.013	1.00	365.95	Pipe - (159)
40	36	27.098	-52.606	Comb	0.00	0.08	0.55	10.0	357.82	1.03	358.10	15	Cir	0.013	1.00	363.27	Pipe - (166)
41	17	13.666	25.641	DrGrt	0.00	3.63	0.55	10.0	352.00	7.98	353.09	30	Cir	0.013	1.00	359.27	Pipe - (218)
42	End	22.660	-11.055	MH	0.00	0.17	0.55	10.0	350.75	0.66	350.90	18	Cir	0.013	0.73	356.83	Pipe - (119)
43	42	127.251	43.042	Comb	0.00	0.17	0.55	10.0	351.04	0.50	351.68	18	Cir	0.013	1.50	356.04	Pipe - (118)
44	43	27.000	-86.611	Comb	0.00	0.17	0.55	10.0	351.78	0.52	351.92	15	Cir	0.013	1.00	356.27	Pipe - (117)

Project File: Outfall 3B.stm

Number of lines: 44

Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 338A	Combination	358.45	Rect	4.00	4.00	24	Cir	352.10	24	Cir	352.20
2	CB 338B	Combination	358.74	Rect	8.00	4.00	24	Cir	352.47	24	Cir	352.60
3	CB 338E	Combination	359.10	Rect	4.00	4.00	24	Cir	352.81	24 24	Cir Cir	352.91 352.91
4	CB 340	Combination	360.97	Rect	4.00	4.00	24	Cir	353.45	18	Cir	353.95
5	CB 341	Combination	365.36	Rect	4.00	4.00	18	Cir	359.44	18	Cir	359.55
6	CB 342	Combination	369.65	Rect	4.00	4.00	18	Cir	364.17	15	Cir	364.27
7	CB 343	Combination	371.01	Rect	4.00	4.00	15	Cir	364.90	15	Cir	365.00
8	CB 344A	Combination	370.77	Rect	4.00	4.00	15	Cir	365.35	15 15	Cir Cir	365.55 365.81
9	CB 344B	Combination	375.28	Rect	4.00	4.00	15	Cir	369.60	15 15	Cir Cir	369.70 369.70
10	CB 346	Combination	377.58	Rect	4.00	4.00	15	Cir	371.45	15	Cir	371.55
11	CB 347	Combination	377.57	Rect	4.00	4.00	15	Cir	371.75	15	Cir	371.85
12	CB 348	Combination	377.52	Rect	4.00	4.00	15	Cir	372.12			
13	CB 344C	Combination	375.27	Rect	4.00	4.00	15	Cir	369.97	15	Cir	370.17
14	YI 344D	DropGrate	376.58	Rect	4.00	4.00	15	Cir	370.31			
15	CB 345	Combination	370.80	Rect	4.00	4.00	15	Cir	366.08			
16	CB 339A	Combination	358.74	Rect	8.00	4.00	24	Cir	353.18			
17	CB 350	Combination	360.15	Rect	4.00	4.00	42	Cir	351.90	42 30	Cir Cir	352.00 352.00
18	CB 352	Combination	360.85	Rect	4.00	4.00	42	Cir	352.39	42	Cir	352.50
19	CB 353	Combination	361.54	Rect	4.00	4.00	42	Cir	353.50	42	Cir	353.60
20	CB 354	Combination	362.70	Rect	4.00	4.00	42	Cir	354.63	42	Cir	354.79
21	CB 355	Combination	363.21	Rect	4.00	4.00	42	Cir	355.35	30 36	Cir Cir	356.20 355.46

Project File: Outfall 3B.stm | Number of Structures: 44 | Run Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
22	CB 359	Combination	365.79	Rect	4.00	4.00	30	Cir	359.33	24 15	Cir Cir	359.45 360.58
23	CB 362	Combination	368.99	Rect	4.00	4.00	24	Cir	363.20	24 18	Cir Cir	363.30 363.30
24	CB 364	Combination	370.06	Rect	4.00	4.00	24	Cir	364.08	24	Cir	364.20
25	CB 365B	Combination	370.76	Rect	8.00	4.00	24	Cir	364.34	24 24	Cir Cir	364.72 364.90
26	CB 369	Combination	371.23	Rect	8.00	4.00	24	Cir	365.94	18 18	Cir Cir	366.30 366.10
27	CB 370A	Combination	375.43	Rect	4.00	4.00	18	Cir	368.10	15 15	Cir Cir	368.20 369.96
28	CB 371	Combination	376.58	Rect	4.00	4.00	15	Cir	369.90	15	Cir	371.06
29	CB 372	Combination	377.16	Rect	4.00	4.00	15	Cir	371.20	15	Cir	371.53
30	CB 373	Combination	379.19	Rect	4.00	4.00	15	Cir	371.75			
31	CB 370B	Combination	375.33	Rect	4.00	4.00	15	Cir	370.23			
32	YI 369B	DropGrate	372.54	Rect	4.00	4.00	18	Cir	367.19			
33	CB 366	Combination	373.25	Rect	4.00	4.00	24	Cir	365.33			
34	CB 363	Combination	370.38	Rect	4.00	4.00	18	Cir	365.25			
35	CB 356	Combination	363.00	Rect	4.00	4.00	36	Cir	355.61	36	Cir	355.71
36	CB 357	Combination	363.67	Rect	4.00	4.00	36	Cir	355.90	36 15	Cir Cir	356.00 357.82
37	CB 374	Combination	364.22	Rect	4.00	4.00	36	Cir	357.10	36	Cir	357.90
38	CB 375A	Combination	364.11	Rect	4.00	4.00	36	Cir	358.29			
39	CB 361	Combination	365.95	Rect	4.00	4.00	15	Cir	360.86			
40	CB 358	Combination	363.27	Rect	4.00	4.00	15	Cir	358.10			
41	YI 350A	DropGrate	359.27	Rect	4.00	4.00	30	Cir	353.09			

Project File: Outfall 3B.stm | Number of Structures: 44 | Run Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
42	JB 392A	Manhole	356.83	Cir	4.00	4.00	18	Cir	350.90	18	Cir	351.04
43	CB 393	Combination	356.04	Rect	8.00	4.00	18	Cir	351.68	15	Cir	351.78
44	CB 394	Combination	356.27	Rect	8.00	4.00	15	Cir	351.92			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (110)	10.77	24	Cir	33.000	351.50	352.10	1.818	353.50	353.40	0.19	353.59	End	Combination
2	Pipe - (109)	10.07	24	Cir	27.000	352.20	352.47	1.000	353.59	353.60	n/a	353.60 j	1	Combination
3	Pipe - (108)	9.38	24	Cir	42.155	352.60	352.81	0.498	353.70	353.91	n/a	354.41 j	2	Combination
4	Pipe - (107)	6.77	24	Cir	108.118	352.91	353.45	0.499	354.41	354.37	n/a	354.37	3	Combination
5	Pipe - (106)	5.94	18	Cir	156.840	353.95	359.44	3.500	354.52	360.38	0.20	360.38	4	Combination
6	Pipe - (105)	4.95	18	Cir	153.881	359.55	364.17	3.002	360.38	365.03	0.18	365.03	5	Combination
7	Pipe - (104)	4.74	15	Cir	68.214	364.27	364.90	0.924	365.09	365.78	0.41	365.78	6	Combination
8	Pipe - (103)	4.70	15	Cir	40.034	365.00	365.35	0.874	365.83	366.23	n/a	366.23	7	Combination
9	Pipe - (102)	3.64	15	Cir	122.836	365.55	369.60	3.297	366.23	370.37	n/a	370.37	8	Combination
10	Pipe - (215)	1.66	15	Cir	82.378	369.70	371.45	2.124	370.37	371.96	n/a	371.96 j	9	Combination
11	Pipe - (101)	1.60	15	Cir	39.000	371.55	371.75	0.513	372.06	372.26	0.21	372.46	10	Combination
12	Pipe - (100)	0.81	15	Cir	27.000	371.85	372.12	1.000	372.46	372.47	n/a	372.47 j	11	Combination
13	Pipe - (213)	1.74	15	Cir	27.000	369.70	369.97	1.000	370.37	370.49	n/a	370.49 j	9	Combination
14	Pipe - (212)	1.07	15	Cir	13.666	370.17	370.31	1.024	370.51	370.72	n/a	370.72	13	DropGrate
15	Pipe - (111)	0.52	15	Cir	27.000	365.81	366.08	1.000	366.23	366.36	n/a	366.36 j	8	Combination
16	Pipe - (113)	2.39	24	Cir	27.045	352.91	353.18	0.998	354.41	353.72	0.19	353.72	3	Combination
17	Pipe - (153)	38.99	42	Cir	67.178	351.50	351.90	0.595	355.00	355.07	0.47	355.53	End	Combination
18	Pipe - (152)	31.23	42	Cir	64.000	352.00	352.39	0.609	355.53	355.58	0.09	355.67	17	Combination
19	Pipe - (151)	31.11	42	Cir	63.168	352.50	353.50	1.583	355.67	355.22	0.34	355.22	18	Combination
20	Pipe - (150)	30.89	42	Cir	102.760	353.60	354.63	1.002	355.22	356.35	0.72	356.35	19	Combination
21	Pipe - (176)	30.84	42	Cir	45.158	354.79	355.35	1.240	356.35	357.07	0.99	357.07	20	Combination
22	Pipe - (148)	14.29	30	Cir	127.817	356.20	359.33	2.449	357.07	360.60	n/a	360.60	21	Combination
23	Pipe - (147)	13.06	24	Cir	130.784	359.45	363.20	2.867	360.60	364.50	0.82	364.50	22	Combination
24	Pipe - (146)	11.54	24	Cir	43.134	363.30	364.08	1.808	364.50	365.30	n/a	365.30	23	Combination

Project File: Outfall 3B.stm

Number of lines: 44

Run Date: 2/3/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	Pipe - (145)	11.33	24	Cir	27.000	364.20	364.34	0.518	365.43	365.57	0.83	366.39	24	Combination
26	Pipe - (144)	9.53	24	Cir	138.188	364.72	365.94	0.883	366.39	367.04	n/a	367.04 j	25	Combination
27	Pipe - (142)	4.63	18	Cir	180.079	366.30	368.10	1.000	367.04	368.93	0.50	368.93	26	Combination
28	Pipe - (141)	2.60	15	Cir	44.685	368.20	369.90	3.804	368.93	370.55	n/a	370.55 j	27	Combination
29	Pipe - (140)	1.50	15	Cir	27.000	371.06	371.20	0.519	371.55	371.69	0.19	371.88	28	Combination
30	Pipe - (139)	0.39	15	Cir	44.433	371.53	371.75	0.495	371.88	371.99	0.08	372.08	29	Combination
31	Pipe - (225)	1.81	15	Cir	26.746	369.96	370.23	1.010	370.41	370.76	n/a	370.76	27	Combination
32	Pipe - (154)	4.20	18	Cir	14.000	366.10	367.19	7.786	367.04	367.97	n/a	367.97 j	26	DropGrate
33	Pipe - (157)	1.29	24	Cir	43.134	364.90	365.33	0.997	366.39	365.72	0.14	365.72	25	Combination
34	Pipe - (158)	1.62	18	Cir	45.610	363.30	365.25	4.275	364.50	365.73	n/a	365.73 j	23	Combination
35	Pipe - (162)	20.11	36	Cir	30.000	355.46	355.61	0.500	357.07	357.05	0.33	357.05	21	Combination
36	Pipe - (165)	19.46	36	Cir	37.602	355.71	355.90	0.505	357.05	357.31	0.68	357.31	35	Combination
37	Pipe - (164)	19.04	36	Cir	87.912	356.00	357.10	1.251	357.31	358.50	0.27	358.50	36	Combination
38	Pipe - (163) (1)	19.04	36	Cir	57.092	357.90	358.29	0.683	359.12	359.69	0.54	359.69	37	Combination
39	Pipe - (159)	1.03	15	Cir	28.034	360.58	360.86	0.999	360.92	361.26	0.15	361.26	22	Combination
40	Pipe - (166)	0.26	15	Cir	27.098	357.82	358.10	1.033	357.99	358.30	n/a	358.30	36	Combination
41	Pipe - (218)	11.73	30	Cir	13.666	352.00	353.09	7.976	355.53	355.54	0.09	355.63	17	DropGrate
42	Pipe - (119)	1.57	18	Cir	22.660	350.75	350.90	0.662	352.25	352.25	0.01	352.26	End	Manhole
43	Pipe - (118)	1.09	18	Cir	127.251	351.04	351.68	0.503	352.26	352.07	0.21	352.07	42	Combination
44	Pipe - (117)	0.55	15	Cir	27.000	351.78	351.92	0.519	352.07	352.21	n/a	352.31 j	43	Combination

Project File: Outfall 3B.stm

Number of lines: 44

Run Date: 2/3/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 338A	0.81	2.12	1.90	1.02	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.26	9.08	0.19	5.50	0.0	43
2	CB 338B	0.81	0.04	0.80	0.05	Comb	6.0	3.00	0.00	6.00	2.50	0.011	2.00	0.060	0.020	0.013	0.18	4.95	0.06	1.06	0.0	1
3	CB 338E	0.61	0.12	0.69	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.018	2.00	0.060	0.020	0.013	0.16	3.89	0.05	0.88	0.0	2
4	CB 340	0.97	0.10	0.96	0.12	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.18	4.78	0.08	1.31	0.0	3
5	CB 341	1.16	0.00	1.06	0.10	Comb	6.0	1.50	0.00	3.00	2.50	0.031	2.00	0.060	0.020	0.013	0.17	4.40	0.07	1.16	0.0	4
6	CB 342	0.26	0.00	0.26	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.12	1.95	0.00	0.00	0.0	5
7	CB 343	0.06	0.02	0.08	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.08	1.26	0.00	0.00	0.0	6
8	CB 344A	0.65	0.00	0.63	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.023	2.00	0.060	0.020	0.013	0.15	3.26	0.04	0.60	0.0	7
9	CB 344B	0.32	0.00	0.32	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.11	1.79	0.00	0.00	0.0	8
10	CB 346	0.06	0.03	0.09	0.00	Comb	4.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.07	1.12	0.00	0.00	0.0	Off
11	CB 347	0.81	0.00	0.78	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.15	3.49	0.04	0.71	0.0	10
12	CB 348	0.81	0.00	0.77	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.024	2.00	0.060	0.020	0.013	0.16	3.78	0.05	0.84	0.0	Off
13	CB 344C	0.68	0.00	0.67	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.14	3.06	0.03	0.49	0.0	15
14	YI 344D	1.07	0.00	1.07	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.13	14.53	0.13	14.53	0.0	Off
15	CB 345	0.52	0.01	0.52	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.023	2.00	0.060	0.020	0.013	0.14	2.76	0.02	0.35	0.0	Off
16	CB 339A	2.39	0.00	1.95	0.44	Comb	6.0	3.00	0.00	6.00	2.50	0.020	2.00	0.060	0.020	0.013	0.22	7.24	0.13	2.49	0.0	Off
17	CB 350	0.42	4.30	2.65	2.07	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.30	11.13	0.24	7.78	0.0	1
18	CB 352	0.39	0.03	0.41	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.14	3.09	0.03	0.47	0.0	17
19	CB 353	0.58	0.00	0.55	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.16	3.94	0.05	0.88	0.0	18
20	CB 354	0.19	0.03	0.23	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.11	1.89	0.00	0.00	0.0	19
21	CB 355	0.58	0.16	0.70	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.16	3.79	0.05	0.83	0.0	20
22	CB 359	0.45	0.00	0.45	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.13	2.56	0.01	0.24	0.0	21
23	CB 362	0.07	0.09	0.16	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.032	2.00	0.060	0.020	0.013	0.08	1.35	0.00	0.00	0.0	22

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	CB 364	0.26	0.28	0.52	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.010	2.00	0.060	0.020	0.013	0.16	3.88	0.05	0.84	0.0	23
25	CB 365B	0.81	0.15	0.89	0.07	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.19	5.44	0.07	1.22	0.0	23
26	CB 369	1.03	0.00	0.95	0.08	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.19	5.67	0.08	1.31	0.0	25
27	CB 370A	0.29	0.12	0.42	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.11	1.88	0.00	0.00	0.0	26
28	CB 371	1.13	0.00	1.07	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.16	3.87	0.05	0.90	0.0	27
29	CB 372	1.13	0.00	1.07	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.16	3.87	0.05	0.90	0.0	27
30	CB 373	0.39	0.00	0.39	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.11	1.87	0.00	0.00	0.0	27
31	CB 370B	1.81	0.00	1.53	0.28	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.19	5.36	0.10	1.63	0.0	24
32	YI 369B	4.20	0.00	4.20	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.31	33.27	0.31	33.27	0.0	Off
33	CB 366	1.29	0.00	1.23	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.062	2.00	0.060	0.020	0.013	0.16	3.77	0.05	0.86	0.0	25
34	CB 363	1.62	0.00	1.45	0.17	Comb	6.0	1.50	0.00	3.00	2.50	0.052	2.00	0.060	0.020	0.013	0.17	4.59	0.08	1.27	0.0	39
35	CB 356	1.03	0.00	0.93	0.10	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.17	4.68	0.08	1.26	0.0	36
36	CB 357	0.52	7.57	3.80	4.29	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.36	13.87	0.29	10.69	0.0	17
37	CB 374	0.10	12.42	5.05	7.47	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.41	16.49	0.35	13.43	0.0	36
38	CB 375A	19.04	0.00	6.62	12.42	Comb	6.0	3.00	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.47	19.43	0.41	16.44	0.0	37
39	CB 361	1.03	0.17	1.05	0.16	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.18	5.11	0.09	1.47	0.0	21
40	CB 358	0.26	0.00	0.26	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.12	1.99	0.00	0.00	0.0	1
41	YI 350A	11.73	0.00	11.73	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.62	64.02	0.62	64.02	0.0	Off
42	JB 392A	0.55	0.00	0.00	0.55	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
43	CB 393	0.55	1.02	1.57	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.19	5.57	0.19	5.57	0.0	Off
44	CB 394	0.55	0.00	0.55	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.14	2.75	0.14	2.75	0.0	Off

Project File: Outfall 3B.stm

Number of lines: 44

Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	24	10.77	351.50	353.50	2.00	3.14	3.43	0.18	353.68	0.227	33.000	352.10	353.40	1.30	2.16	4.97	0.38	353.79	0.395	0.311	0.103	0.50	0.19
2	24	10.07	352.20	353.59	1.39	1.84	4.31	0.47	354.06	0.000	27.000	352.47	353.60 j	1.13**	1.84	5.47	0.47	354.07	0.000	0.000	n/a	1.15	0.54
3	24	9.38	352.60	353.70	1.10*	1.76	5.28	0.43	354.14	0.498	42.155	352.81	353.91 j	1.10**	1.78	5.28	0.43	354.35	0.496	0.497	0.210	1.14	0.49
4	24	6.77	352.91	354.41	1.50	1.41	2.68	0.36	354.76	0.000	108.118	353.45	354.37	0.92**	1.41	4.78	0.36	354.73	0.000	0.000	n/a	0.50	n/a
5	18	5.94	353.95	354.52	0.57*	0.61	9.74	0.40	354.92	0.000	156.840	359.44	360.38	0.94**	1.17	5.10	0.40	360.78	0.000	0.000	n/a	0.50	0.20
6	18	4.95	359.55	360.38	0.83	1.00	4.93	0.35	360.73	0.000	153.881	364.17	365.03	0.86**	1.04	4.76	0.35	365.38	0.000	0.000	n/a	0.50	0.18
7	15	4.74	364.27	365.09	0.82*	0.85	5.57	0.41	365.50	0.000	68.214	364.90	365.78	0.88**	0.93	5.12	0.41	366.19	0.000	0.000	n/a	1.01	0.41
8	15	4.70	365.00	365.83	0.83*	0.86	5.44	0.40	366.23	0.000	40.034	365.35	366.23	0.88**	0.92	5.10	0.40	366.63	0.000	0.000	n/a	1.65	n/a
9	15	3.64	365.55	366.23	0.68	0.68	5.35	0.33	366.56	0.000	122.836	369.60	370.37	0.77**	0.79	4.59	0.33	370.70	0.000	0.000	n/a	1.50	n/a
10	15	1.66	369.70	370.37	0.67	0.47	2.47	0.19	370.56	0.000	82.378	371.45	371.96 j	0.51**	0.47	3.52	0.19	372.15	0.000	0.000	n/a	0.97	0.19
11	15	1.60	371.55	372.06	0.51*	0.46	3.42	0.18	372.24	0.512	39.000	371.75	372.26	0.51**	0.47	3.43	0.18	372.44	0.513	0.513	0.200	1.13	0.21
12	15	0.81	371.85	372.46	0.61	0.28	1.35	0.13	372.59	0.000	27.000	372.12	372.47 j	0.35**	0.28	2.85	0.13	372.60	0.000	0.000	n/a	1.00	0.13
13	15	1.74	369.70	370.37	0.67	0.49	2.60	0.20	370.57	0.000	27.000	369.97	370.49 j	0.52**	0.49	3.57	0.20	370.69	0.000	0.000	n/a	0.50	n/a
14	15	1.07	370.17	370.51	0.34*	0.27	3.92	0.15	370.66	0.000	13.666	370.31	370.72	0.41**	0.35	3.09	0.15	370.86	0.000	0.000	n/a	1.00	n/a
15	15	0.52	365.81	366.23	0.42	0.21	1.44	0.10	366.33	0.000	27.000	366.08	366.36 j	0.28**	0.21	2.52	0.10	366.46	0.000	0.000	n/a	1.00	n/a
16	24	2.39	352.91	354.41	1.50	0.68	0.95	0.19	354.60	0.000	27.045	353.18	353.72	0.54**	0.68	3.52	0.19	353.91	0.000	0.000	n/a	1.00	0.19
17	42	38.99	351.50	355.00	3.50*	9.62	4.05	0.26	355.26	0.150	67.178	351.90	355.07	3.17	9.15	4.26	0.28	355.35	0.132	0.141	0.095	1.65	0.47
18	42	31.23	352.00	355.53	3.50	9.62	3.25	0.16	355.70	0.096	64.000	352.39	355.58	3.19	9.19	3.40	0.18	355.75	0.084	0.090	0.058	0.50	0.09
19	42	31.11	352.50	355.67	3.17	4.72	3.40	0.68	356.34	0.000	63.168	353.50	355.22	1.72**	4.72	6.60	0.68	355.90	0.000	0.000	n/a	0.50	0.34
20	42	30.89	353.60	355.22	1.62	4.37	7.07	0.67	355.90	0.000	102.760	354.63	356.35	1.72**	4.70	6.58	0.67	357.02	0.000	0.000	n/a	1.07	0.72
21	42	30.84	354.79	356.35	1.56	4.14	7.45	0.67	357.02	0.000	45.158	355.35	357.07	1.72**	4.69	6.58	0.67	357.74	0.000	0.000	n/a	1.47	0.99

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

SCM #3B 10-Year Report

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
22	30	14.29	356.20	357.07	0.87	1.51	9.48	0.50	357.57	0.000	127.817	359.33	360.60	1.27**	2.51	5.69	0.50	361.11	0.000	0.000	n/a	1.46	n/a
23	24	13.06	359.45	360.60	1.15	1.87	6.97	0.57	361.17	0.000	130.784	363.20	364.50	1.30**	2.16	6.05	0.57	365.07	0.000	0.000	n/a	1.45	0.82
24	24	11.54	363.30	364.50	1.20	1.97	5.87	0.52	365.02	0.000	43.134	364.08	365.30	1.22**	2.00	5.76	0.52	365.81	0.000	0.000	n/a	1.13	n/a
25	24	11.33	364.20	365.43	1.23*	2.02	5.60	0.49	365.92	0.518	27.000	364.34	365.57	1.23	2.02	5.61	0.49	366.06	0.521	0.520	0.140	1.69	0.83
26	24	9.53	364.72	366.39	1.67	1.78	3.39	0.45	366.84	0.000	138.188	365.94	367.04 j	1.10**	1.78	5.37	0.45	367.49	0.000	0.000	n/a	1.50	n/a
27	18	4.63	366.30	367.04	0.74	0.87	5.30	0.34	367.38	0.000	180.079	368.10	368.93	0.83**	1.00	4.64	0.34	369.26	0.000	0.000	n/a	1.50	0.50
28	15	2.60	368.20	368.93	0.73	0.64	3.52	0.26	369.18	0.000	44.685	369.90	370.55 j	0.65**	0.64	4.06	0.26	370.80	0.000	0.000	n/a	1.08	n/a
29	15	1.50	371.06	371.55	0.49*	0.44	3.37	0.18	371.72	0.518	27.000	371.20	371.69	0.49**	0.44	3.38	0.18	371.86	0.522	0.520	0.140	1.09	0.19
30	15	0.39	371.53	371.88	0.35	0.17	1.37	0.03	371.91	0.122	44.433	371.75	371.99	0.24**	0.17	2.30	0.08	372.08	0.520	0.321	0.143	1.00	0.08
31	15	1.81	369.96	370.41	0.45*	0.40	4.53	0.20	370.61	0.000	26.746	370.23	370.76	0.53**	0.50	3.61	0.20	370.97	0.000	0.000	n/a	1.00	n/a
32	18	4.20	366.10	367.04	0.94	0.94	3.59	0.31	367.36	0.000	14.000	367.19	367.97 j	0.78**	0.94	4.49	0.31	368.29	0.000	0.000	n/a	1.00	n/a
33	24	1.29	364.90	366.39	1.49	0.43	0.51	0.14	366.53	0.000	43.134	365.33	365.72	0.39**	0.43	2.97	0.14	365.86	0.000	0.000	n/a	1.00	0.14
34	18	1.62	363.30	364.50	1.20	0.48	1.07	0.17	364.67	0.000	45.610	365.25	365.73 j	0.48**	0.48	3.34	0.17	365.90	0.000	0.000	n/a	1.00	n/a
35	36	20.11	355.46	357.07	1.61	3.35	5.22	0.56	357.63	0.000	30.000	355.61	357.05	1.44**	3.35	6.01	0.56	357.61	0.000	0.000	n/a	0.59	0.33
36	36	19.46	355.71	357.05	1.34*	3.05	6.37	0.55	357.60	0.000	37.602	355.90	357.31	1.41**	3.27	5.94	0.55	357.86	0.000	0.000	n/a	1.24	0.68
37	36	19.04	356.00	357.31	1.31	2.98	6.40	0.54	357.85	0.000	87.912	357.10	358.50	1.40**	3.23	5.90	0.54	359.04	0.000	0.000	n/a	0.50	0.27
38	36	19.04	357.90	359.12	1.22*	2.69	7.08	0.54	359.66	0.000	57.092	358.29	359.69	1.40**	3.23	5.90	0.54	360.23	0.000	0.000	n/a	1.00	0.54
39	15	1.03	360.58	360.92	0.34*	0.27	3.85	0.15	361.06	0.000	28.034	360.86	361.26	0.40**	0.34	3.06	0.15	361.40	0.000	0.000	n/a	1.00	0.15
40	15	0.26	357.82	357.99	0.17*	0.10	2.59	0.07	358.06	0.000	27.098	358.10	358.30	0.20**	0.12	2.09	0.07	358.36	0.000	0.000	n/a	1.00	n/a
41	30	11.73	352.00	355.53	2.50	4.91	2.39	0.09	355.62	0.082	13.666	353.09	355.54	2.45	4.89	2.40	0.09	355.63	0.073	0.078	0.011	1.00	0.09
42	18	1.57	350.75	352.25	1.50*	1.77	0.89	0.01	352.26	0.022	22.660	350.90	352.25	1.35	1.68	0.94	0.01	352.27	0.020	0.021	0.005	0.73	0.01

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

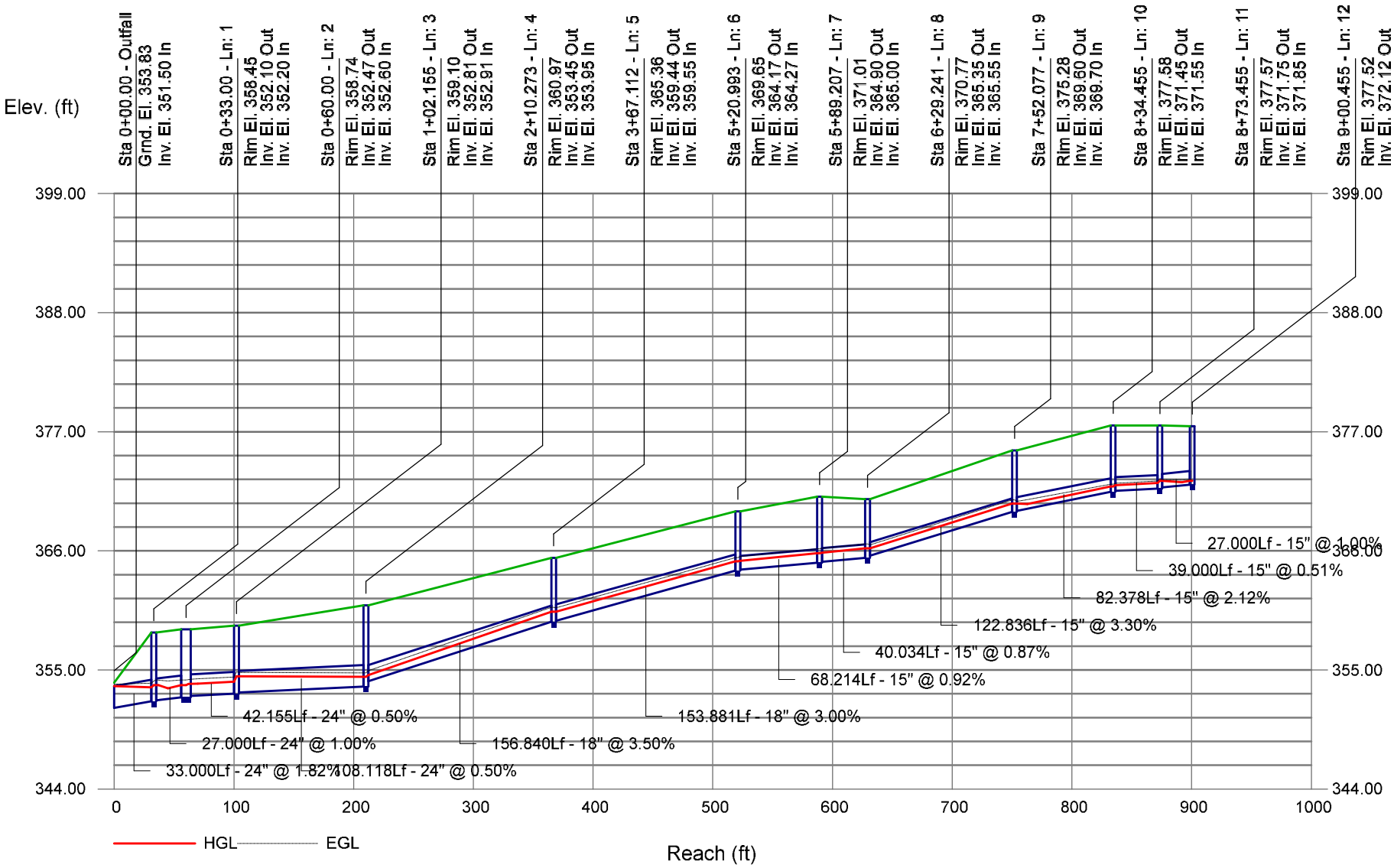
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
43	18	1.09	351.04	352.26	1.22	0.36	0.71	0.14	352.40	0.000	127.251	351.68	352.07	0.39**	0.36	2.99	0.14	352.21	0.000	0.000	n/a	1.50	0.21
44	15	0.55	351.78	352.07	0.29*	0.21	2.54	0.10	352.17	0.518	27.000	351.92	352.21 j	0.29**	0.22	2.53	0.10	352.31	0.510	0.514	0.139	1.00	0.10

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

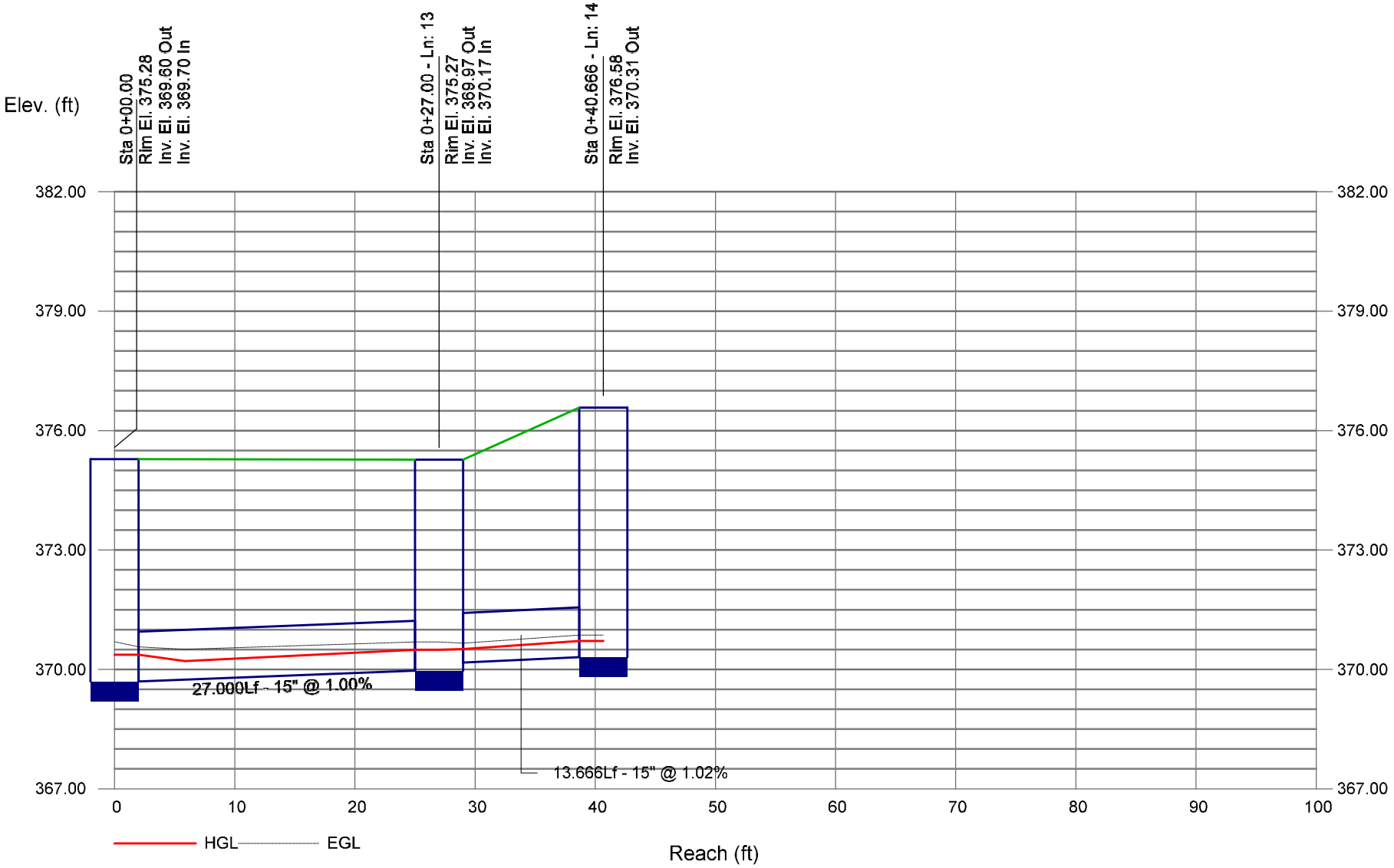
Storm Sewer Profile

SCM #3B 10-Year Profile 1-12 Proj. file: Outfall 3B.stm



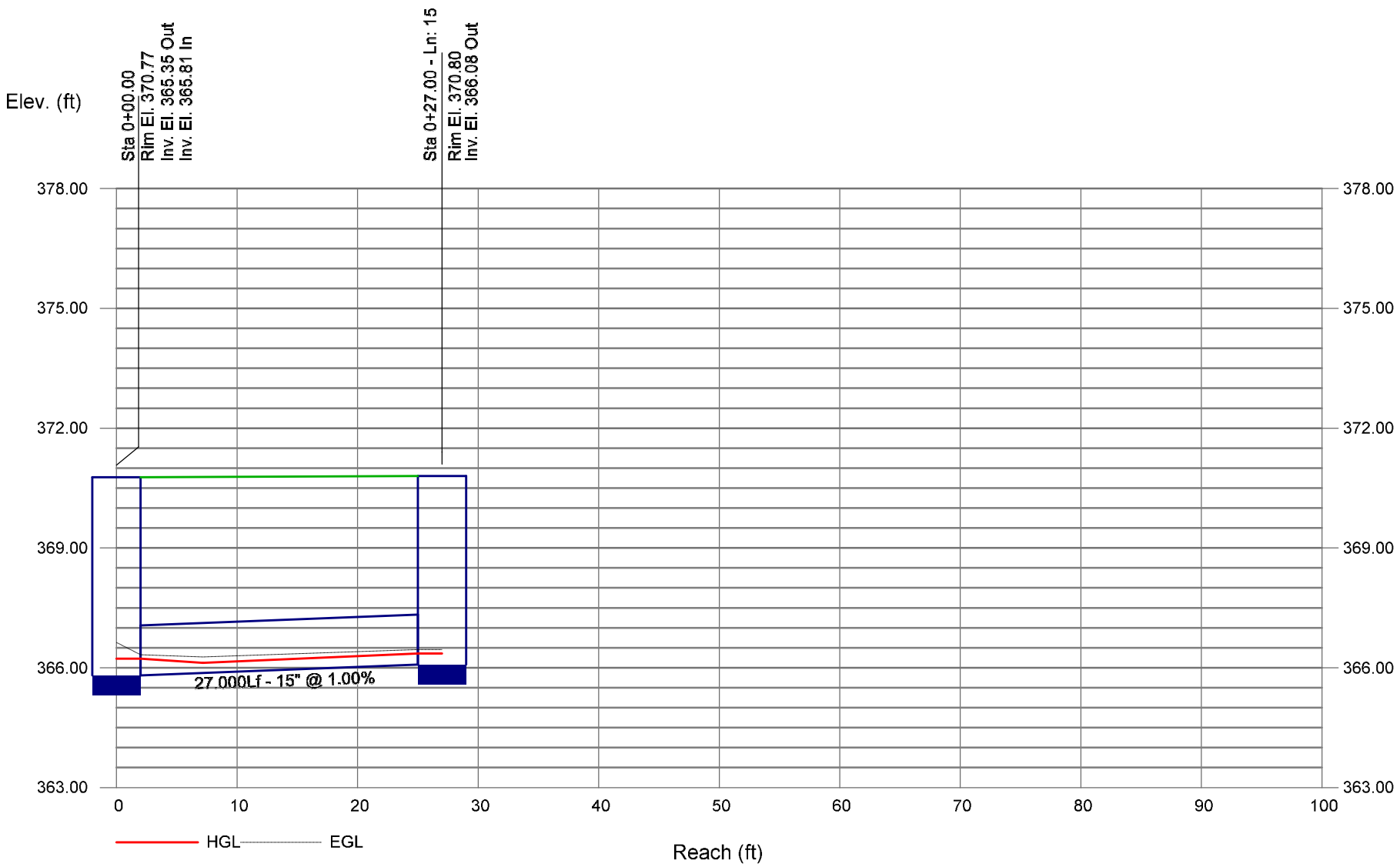
Storm Sewer Profile

SCM #3B 10-Year Profile 13-14 Proj. file: Outfall 3B.stm



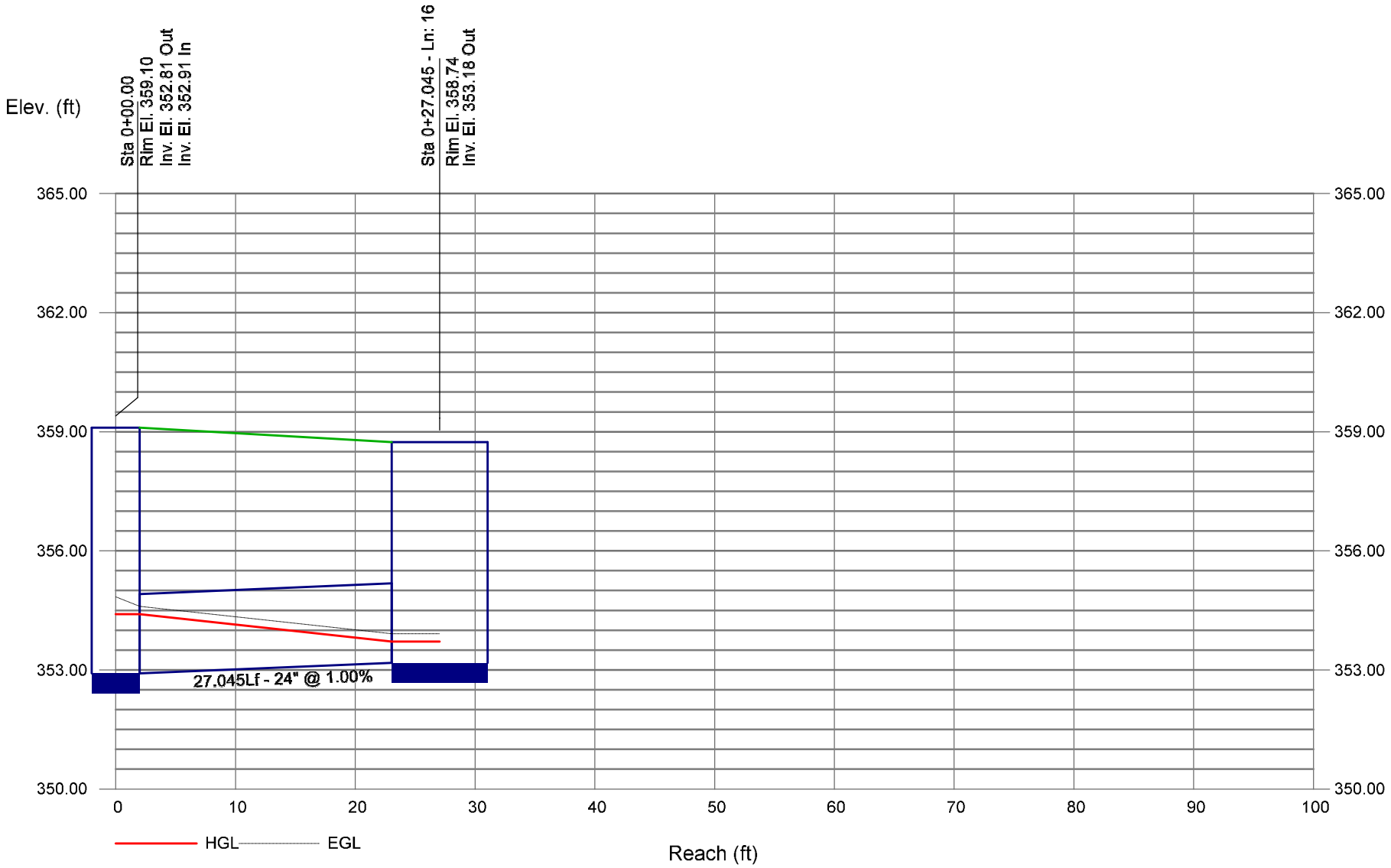
Storm Sewer Profile

SCM #3B 10-Year Profile 15-15 Proj. file: Outfall 3B.stm



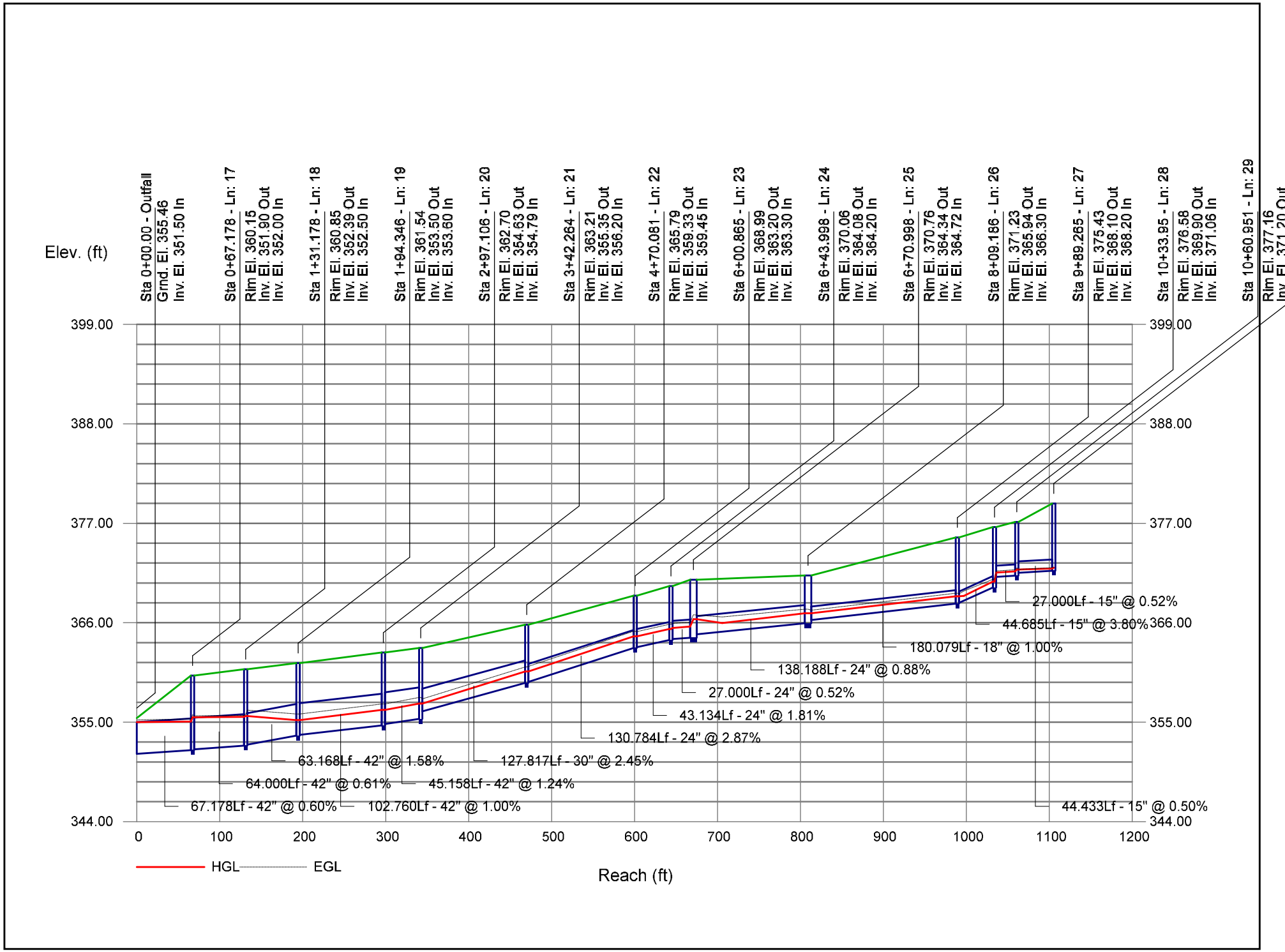
Storm Sewer Profile

SCM #3B 10-Year Profile 16-16 Proj. file: Outfall 3B.stm



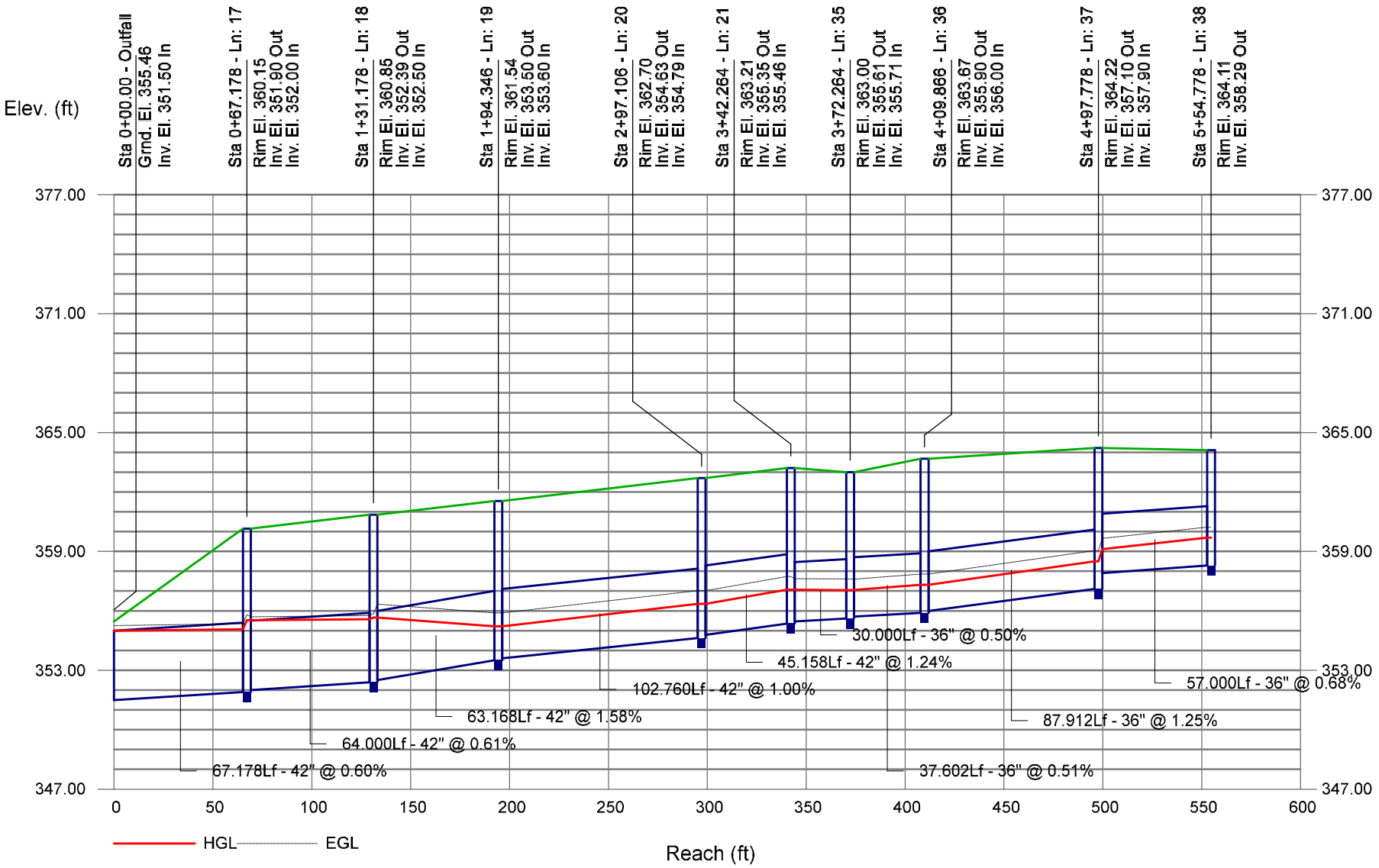
Storm Sewer Profile

SCM #3B 10-Year Profile 17-30 Proj. file: Outfall 3B.stm



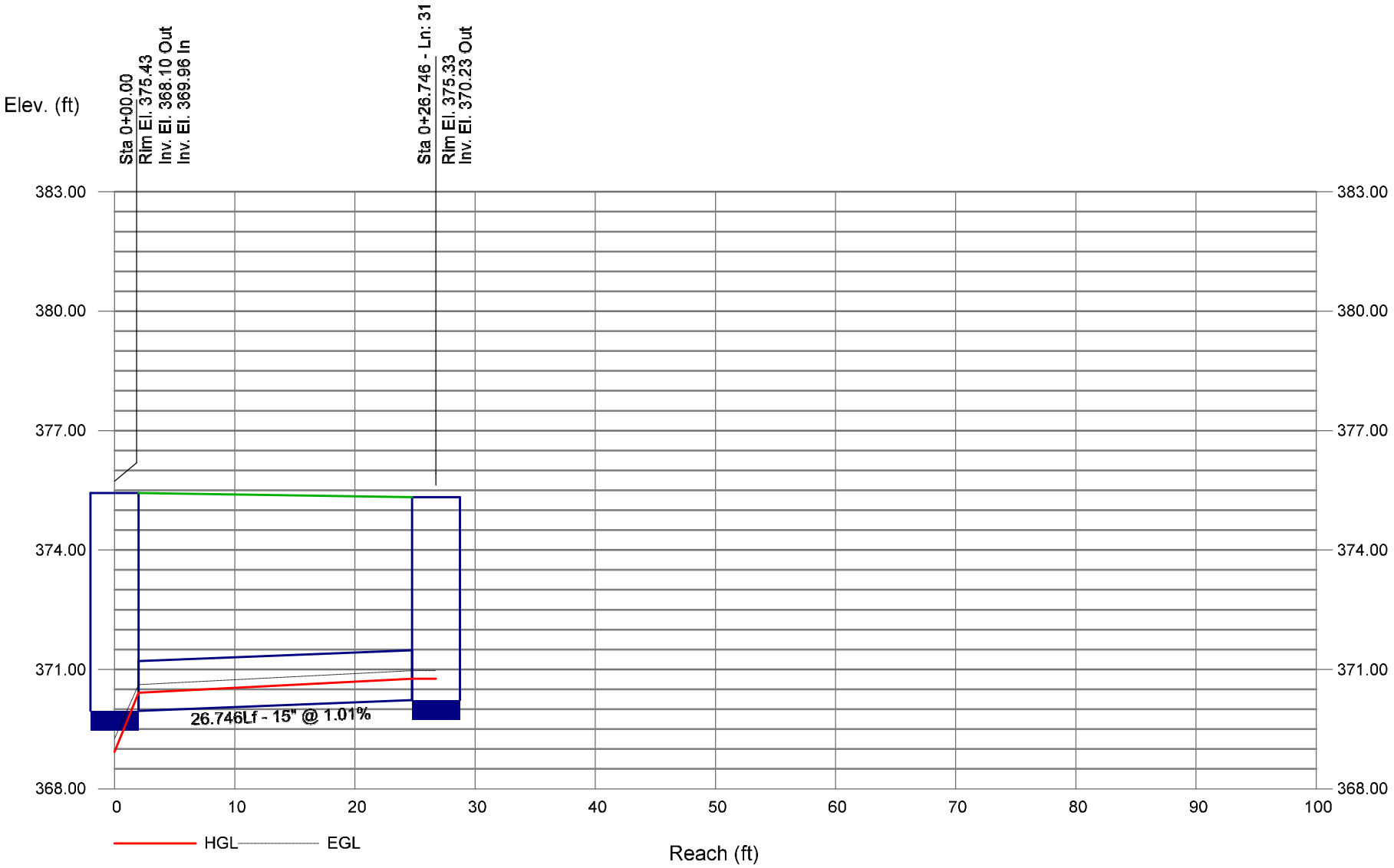
Storm Sewer Profile

SCM #3B 10-Year Profile 17-38 Proj. file: Outfall 3B.stm



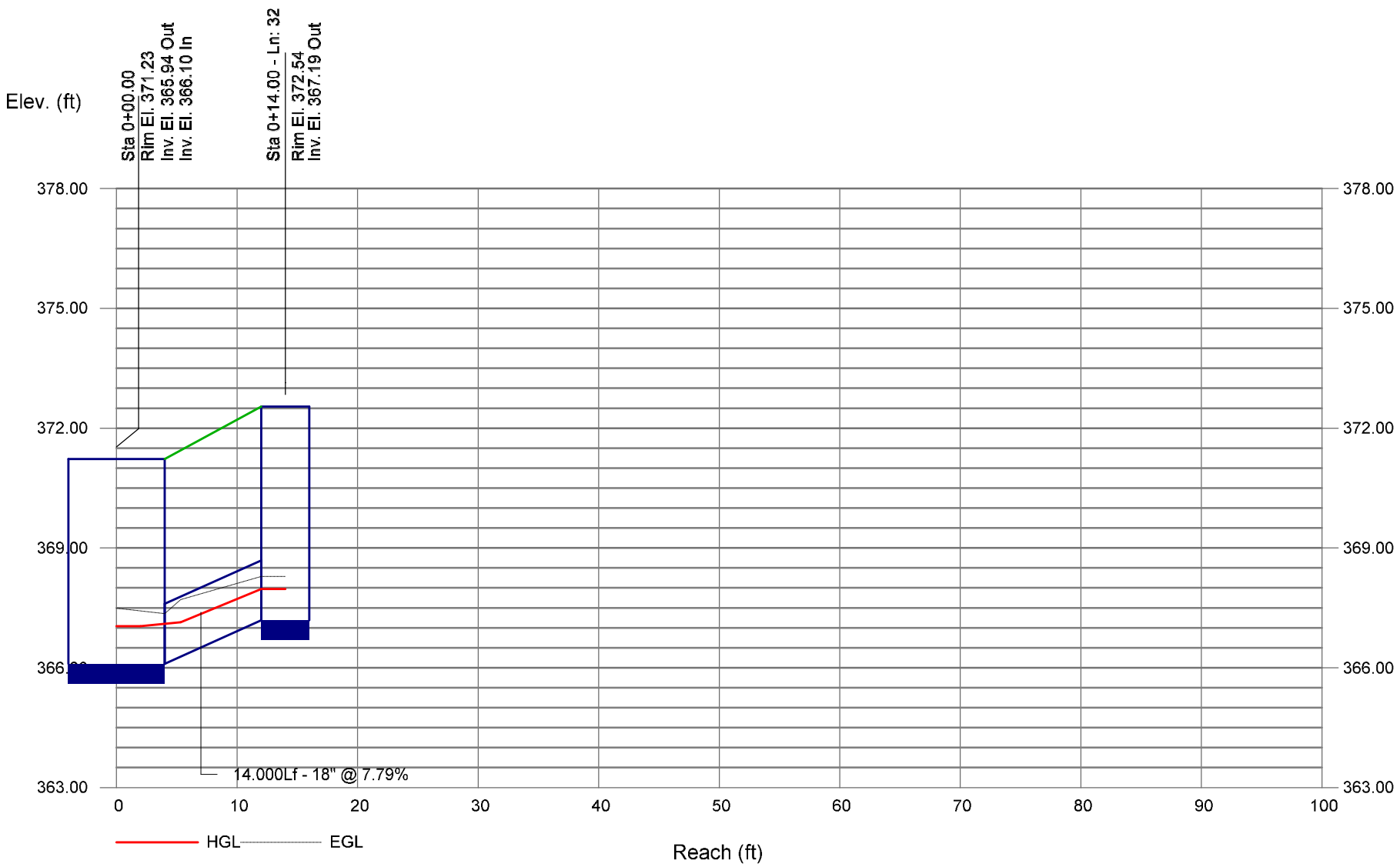
Storm Sewer Profile

SCM #3B 10-Year Profile 31-31 Proj. file: Outfall 3B.stm



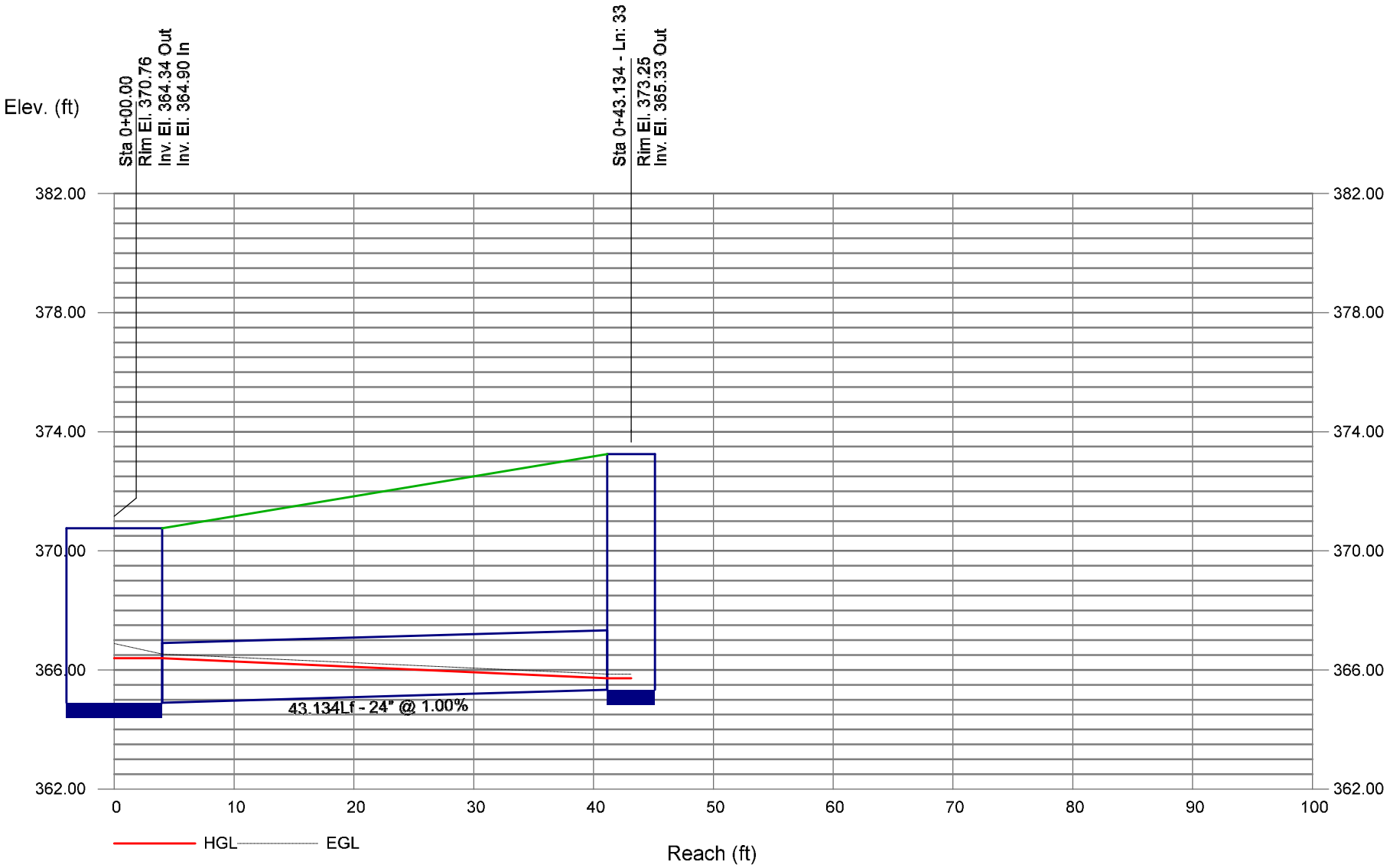
Storm Sewer Profile

SCM #3B 10-Year Profile 32-32 Proj. file: Outfall 3B.stm



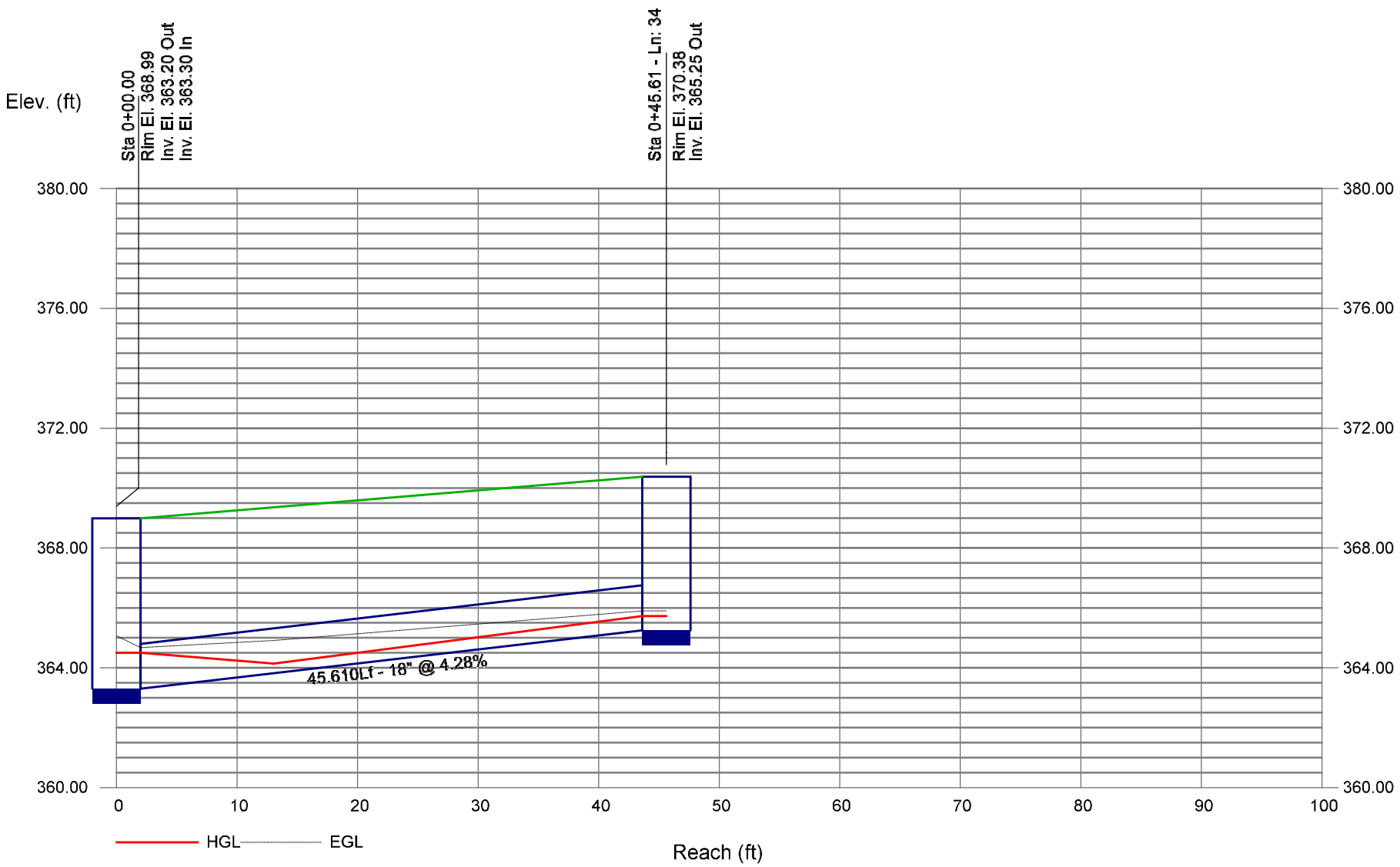
Storm Sewer Profile

SCM #3B 10-Year Profile 33-33 Proj. file: Outfall 3B.stm



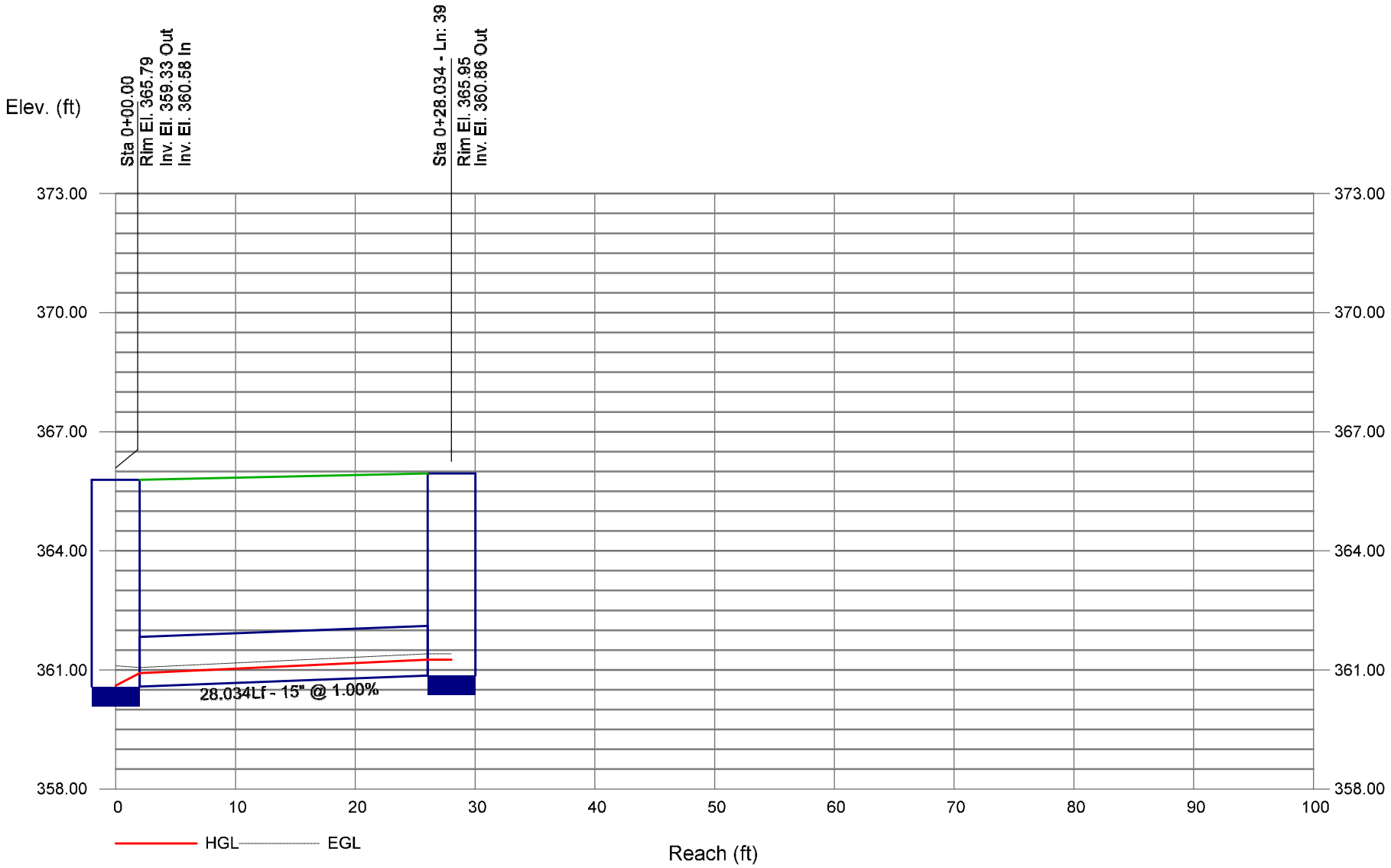
Storm Sewer Profile

SCM #3B 10-Year Profile 34-34 Proj. file: Outfall 3B.stm



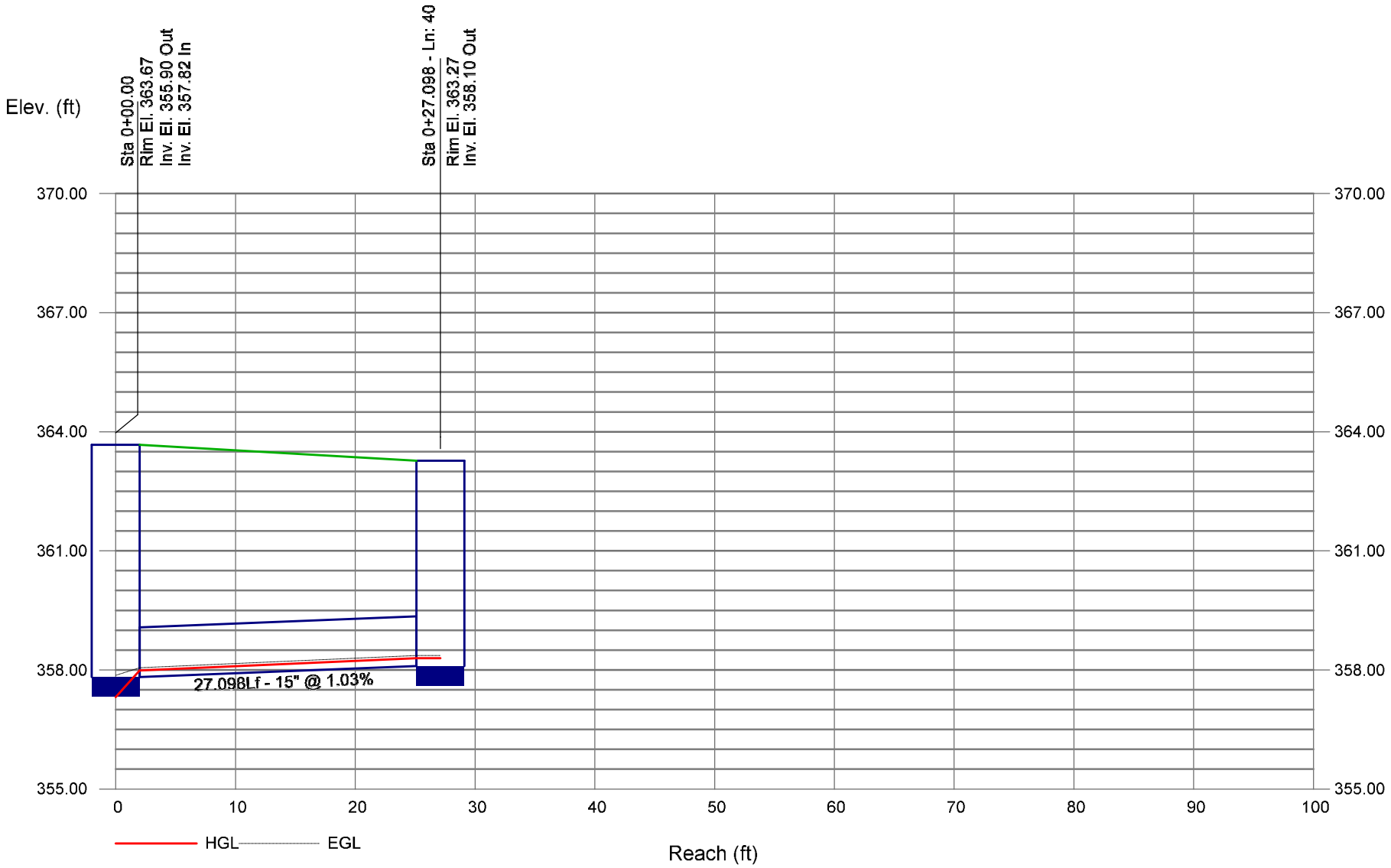
Storm Sewer Profile

SCM #3B 10-Year Profile 39-39 Proj. file: Outfall 3B.stm



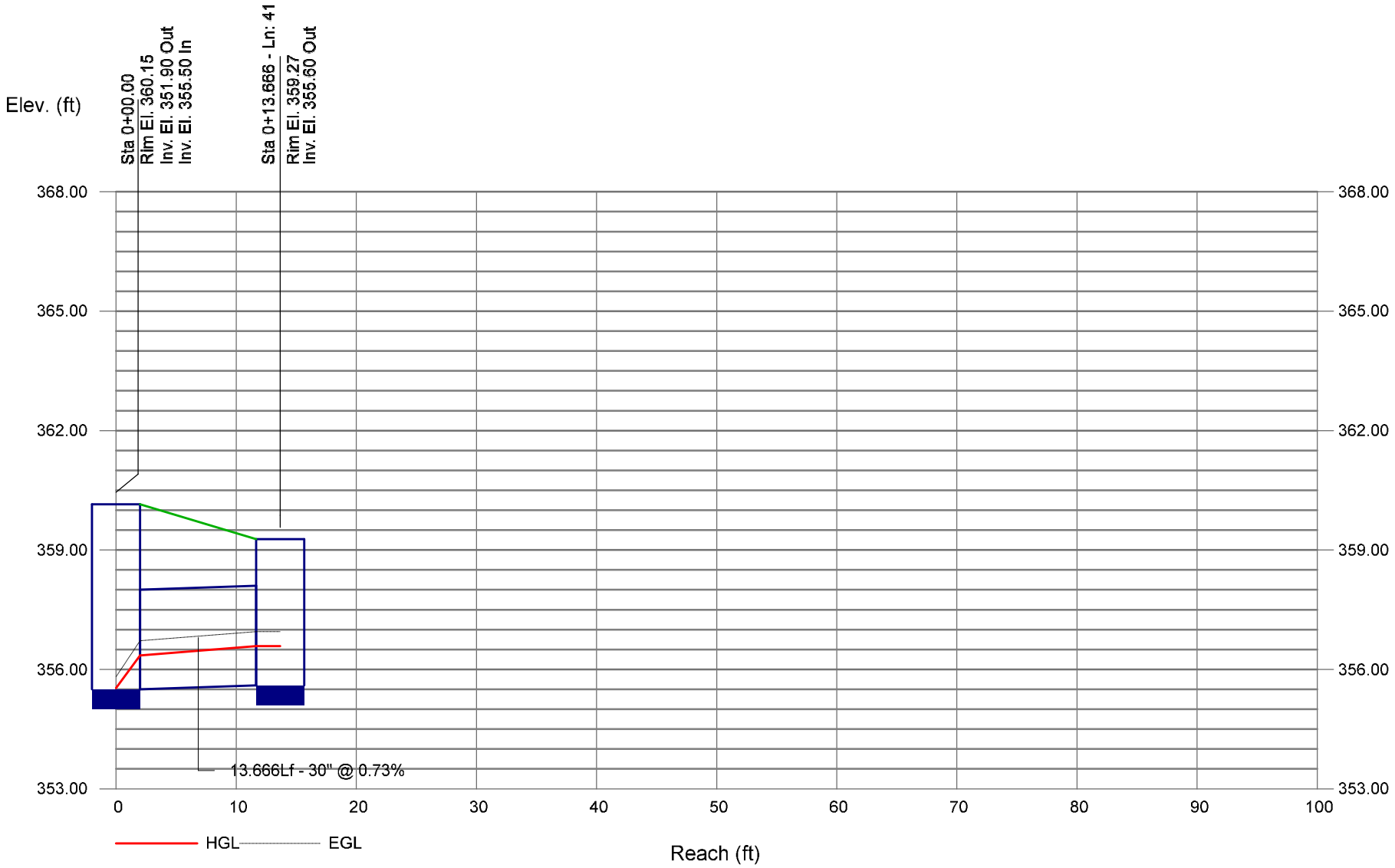
Storm Sewer Profile

SCM #3B 10-Year Profile 40-40 Proj. file: Outfall 3B.stm



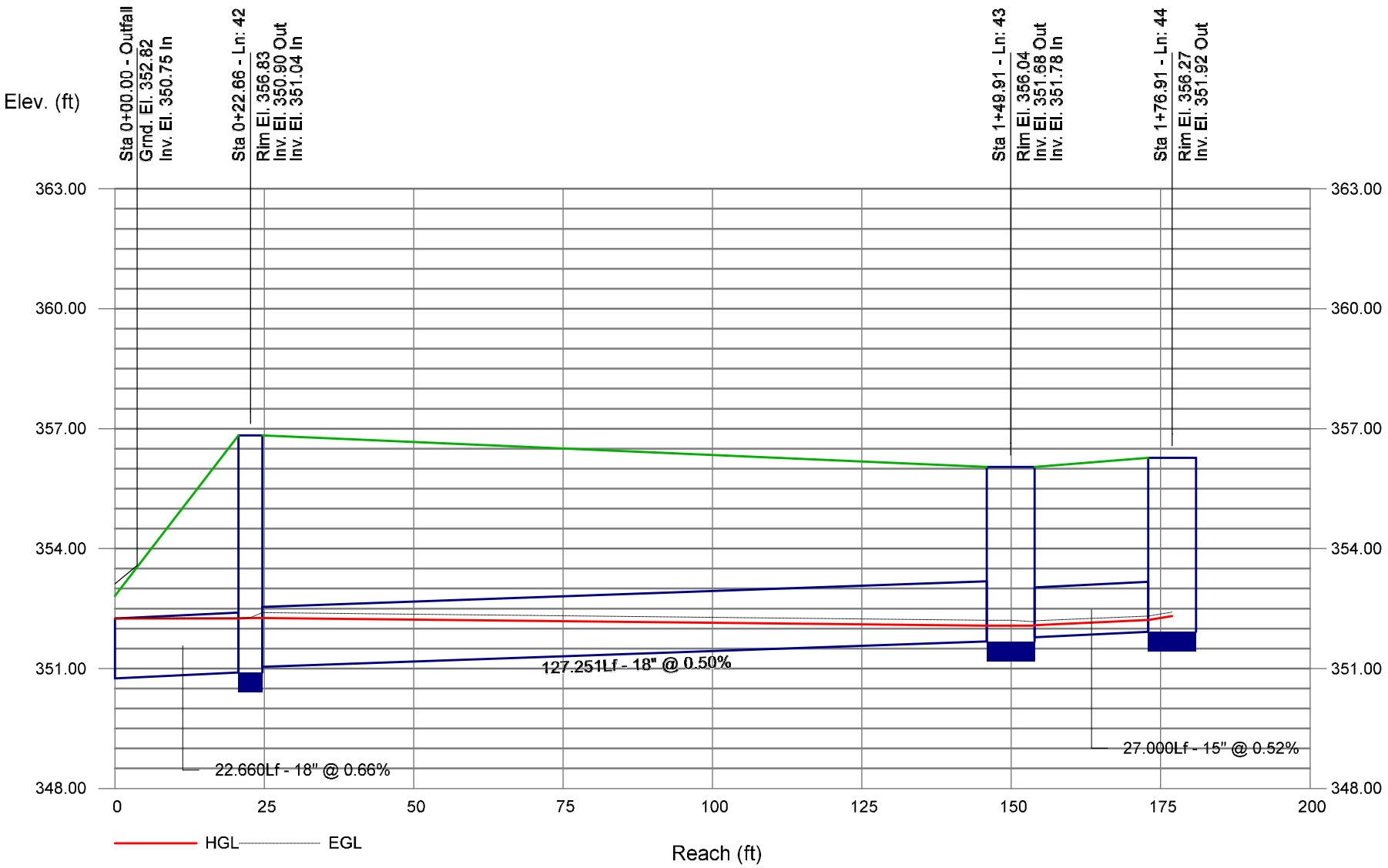
Storm Sewer Profile

SCM #3B 10-Year Profile 41-41 Proj. file: Outfall 3B.stm

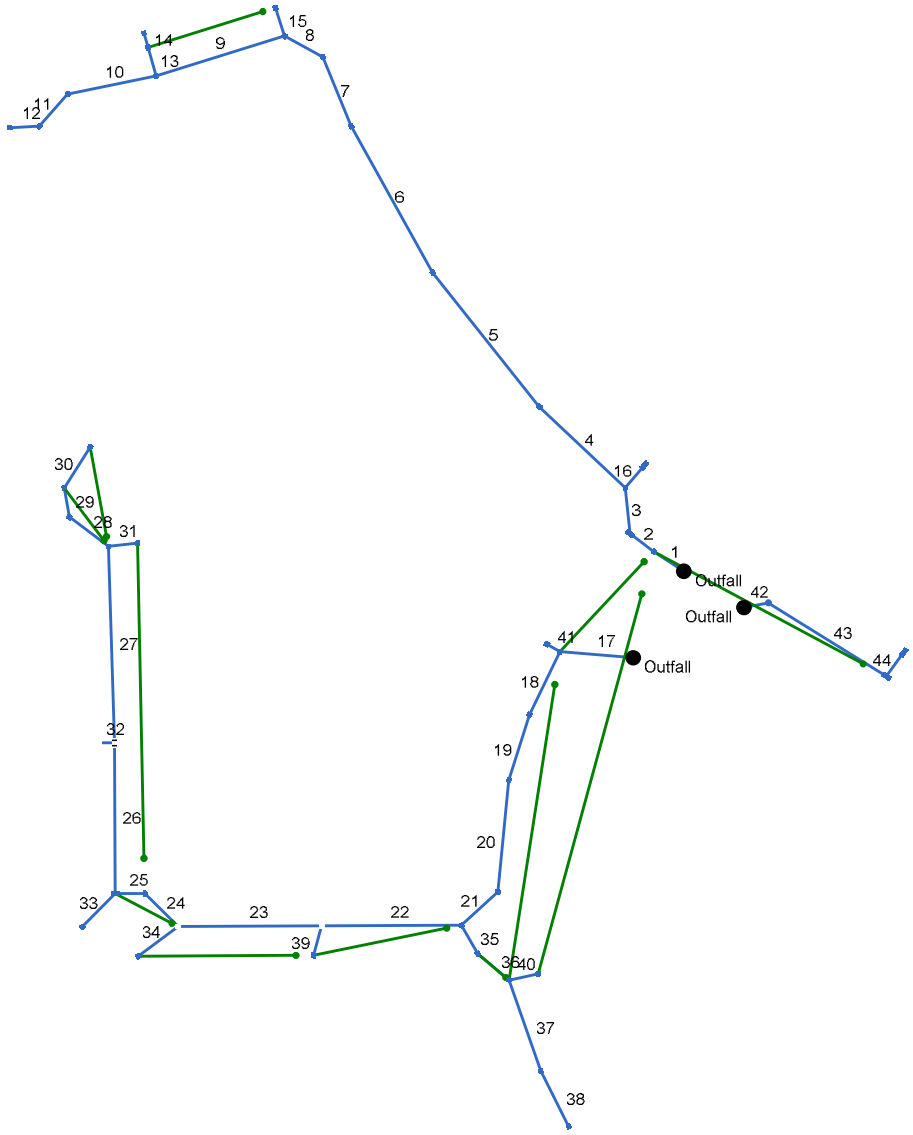


Storm Sewer Profile

SCM #3B 10-Year Profile 42-44 Proj. file: Outfall 3B.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM #3B 25-Year Report



Project File: Outfall 3B.stm	Number of lines: 44	Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	33.000	-146.610	Comb	0.00	0.25	0.55	10.0	351.50	1.82	352.10	24	Cir	0.013	0.50	358.45	Pipe - (110)
2	1	27.000	4.157	Comb	0.00	0.25	0.55	10.0	352.20	1.00	352.47	24	Cir	0.013	1.15	358.74	Pipe - (109)
3	2	42.155	46.480	Comb	0.00	0.19	0.55	10.0	352.60	0.50	352.81	24	Cir	0.013	1.14	359.10	Pipe - (108)
4	3	108.118	-40.556	Comb	0.00	0.30	0.55	10.0	352.91	0.50	353.45	24	Cir	0.013	0.50	360.97	Pipe - (107)
5	4	156.840	8.071	Comb	0.00	0.36	0.55	10.0	353.95	3.50	359.44	18	Cir	0.013	0.50	365.36	Pipe - (106)
6	5	153.881	9.495	Comb	0.00	0.08	0.55	10.0	359.55	3.00	364.17	18	Cir	0.013	0.50	369.65	Pipe - (105)
7	6	68.214	6.744	Comb	0.00	0.02	0.55	10.0	364.27	0.92	364.90	15	Cir	0.013	1.01	371.01	Pipe - (104)
8	7	40.034	-38.755	Comb	0.00	0.20	0.55	10.0	365.00	0.87	365.35	15	Cir	0.013	1.65	370.77	Pipe - (103)
9	8	122.836	-46.405	Comb	0.00	0.10	0.55	10.0	365.55	3.30	369.60	15	Cir	0.013	1.50	375.28	Pipe - (102)
10	9	82.378	5.637	Comb	0.00	0.02	0.55	10.0	369.70	2.12	371.45	15	Cir	0.013	0.97	377.58	Pipe - (215)
11	10	39.000	-36.751	Comb	0.00	0.25	0.55	10.0	371.55	0.51	371.75	15	Cir	0.013	1.13	377.57	Pipe - (101)
12	11	27.000	45.280	Comb	0.00	0.25	0.55	10.0	371.85	1.00	372.12	15	Cir	0.013	1.00	377.52	Pipe - (100)
13	9	27.000	91.596	Comb	0.00	0.21	0.55	10.0	369.70	1.00	369.97	15	Cir	0.013	0.50	375.27	Pipe - (213)
14	13	13.666	0.000	DrGrt	0.00	0.33	0.55	10.0	370.17	1.02	370.31	15	Cir	0.013	1.00	376.58	Pipe - (212)
15	8	27.000	43.478	Comb	0.00	0.16	0.55	10.0	365.81	1.00	366.08	15	Cir	0.013	1.00	370.80	Pipe - (111)
16	3	27.045	45.965	Comb	0.00	0.74	0.55	10.0	352.91	1.00	353.18	24	Cir	0.013	1.00	358.74	Pipe - (113)
17	End	67.178	-175.243	Comb	0.00	0.13	0.55	10.0	351.50	0.60	351.90	42	Cir	0.013	1.65	360.15	Pipe - (153)
18	17	64.000	-68.820	Comb	0.00	0.12	0.55	10.0	352.00	0.61	352.39	42	Cir	0.013	0.50	360.85	Pipe - (152)
19	18	63.168	-8.841	Comb	0.00	0.18	0.55	10.0	352.50	1.58	353.50	42	Cir	0.013	0.50	361.54	Pipe - (151)
20	19	102.760	-11.449	Comb	0.00	0.06	0.55	10.0	353.60	1.00	354.63	42	Cir	0.013	1.07	362.70	Pipe - (150)
21	20	45.158	41.847	Comb	0.00	0.18	0.55	10.0	354.79	1.24	355.35	42	Cir	0.013	1.47	363.21	Pipe - (176)
22	21	127.817	42.259	Comb	0.00	0.14	0.55	10.0	356.20	2.45	359.33	30	Cir	0.013	1.46	365.79	Pipe - (148)
23	22	130.784	-0.028	Comb	0.00	0.14	0.08	10.0	359.45	2.87	363.20	24	Cir	0.013	1.45	368.99	Pipe - (147)

Project File: Outfall 3B.stm

Number of lines: 44

Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	43.134	45.000	Comb	0.00	0.08	0.55	10.0	363.30	1.81	364.08	24	Cir	0.013	1.13	370.06	Pipe - (146)
25	24	27.000	-45.000	Comb	0.00	0.25	0.55	10.0	364.20	0.52	364.34	24	Cir	0.013	1.69	370.76	Pipe - (145)
26	25	138.188	90.000	Comb	0.00	0.32	0.55	10.0	364.72	0.88	365.94	24	Cir	0.013	1.50	371.23	Pipe - (144)
27	26	180.079	-1.496	Comb	0.00	0.09	0.55	10.0	366.30	1.00	368.10	18	Cir	0.013	1.50	375.43	Pipe - (142)
28	27	44.685	-50.994	Comb	0.00	0.35	0.55	10.0	368.20	3.80	369.90	15	Cir	0.013	1.08	376.58	Pipe - (141)
29	28	27.000	42.603	Comb	0.00	0.35	0.55	10.0	371.06	0.52	371.20	15	Cir	0.013	1.09	377.16	Pipe - (140)
30	29	44.433	42.712	Comb	0.00	0.12	0.55	10.0	371.53	0.50	371.75	15	Cir	0.013	1.00	379.19	Pipe - (139)
31	27	26.746	85.218	Comb	0.00	0.56	0.55	10.0	369.96	1.01	370.23	15	Cir	0.013	1.00	375.33	Pipe - (225)
32	26	14.000	-89.921	DrGrt	0.00	1.30	0.55	10.0	366.10	7.79	367.19	18	Cir	0.013	1.00	372.54	Pipe - (154)
33	25	43.134	-45.000	Comb	0.00	0.40	0.55	10.0	364.90	1.00	365.33	24	Cir	0.013	1.00	373.25	Pipe - (157)
34	23	45.610	-36.297	Comb	0.00	0.50	0.55	10.0	363.30	4.28	365.25	18	Cir	0.013	1.00	370.38	Pipe - (158)
35	21	30.000	-77.118	Comb	0.00	0.32	0.55	10.0	355.46	0.50	355.61	36	Cir	0.013	0.59	363.00	Pipe - (162)
36	35	37.602	-20.013	Comb	0.00	0.16	0.55	10.0	355.71	0.51	355.90	36	Cir	0.013	1.24	363.67	Pipe - (165)
37	36	87.912	30.556	Comb	0.00	0.03	0.55	10.0	356.00	1.25	357.10	36	Cir	0.013	0.50	364.22	Pipe - (164)
38	37	57.000	-7.667	Comb	0.00	8.70	0.55	24.0	357.90	0.68	358.29	36	Cir	0.013	1.00	364.11	Pipe - (163) (1)
39	22	28.034	-74.418	Comb	0.00	0.32	0.55	10.0	360.58	1.00	360.86	15	Cir	0.013	1.00	365.95	Pipe - (159)
40	36	27.098	-52.606	Comb	0.00	0.08	0.55	10.0	357.82	1.03	358.10	15	Cir	0.013	1.00	363.27	Pipe - (166)
41	17	13.666	25.641	DrGrt	0.00	3.63	0.55	20.0	355.50	0.73	355.60	30	Cir	0.013	1.00	359.27	Pipe - (218)
42	End	22.660	-11.055	MH	0.00	0.17	0.55	10.0	350.75	0.66	350.90	18	Cir	0.013	0.73	356.83	Pipe - (119)
43	42	127.251	43.042	Comb	0.00	0.17	0.55	10.0	351.04	0.50	351.68	18	Cir	0.013	1.50	356.04	Pipe - (118)
44	43	27.000	-86.611	Comb	0.00	0.17	0.55	10.0	351.78	0.52	351.92	15	Cir	0.013	1.00	356.27	Pipe - (117)

Project File: Outfall 3B.stm

Number of lines: 44

Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 338A	Combination	358.45	Rect	4.00	4.00	24	Cir	352.10	24	Cir	352.20
2	CB 338B	Combination	358.74	Rect	8.00	4.00	24	Cir	352.47	24	Cir	352.60
3	CB 338E	Combination	359.10	Rect	4.00	4.00	24	Cir	352.81	24 24	Cir Cir	352.91 352.91
4	CB 340	Combination	360.97	Rect	4.00	4.00	24	Cir	353.45	18	Cir	353.95
5	CB 341	Combination	365.36	Rect	4.00	4.00	18	Cir	359.44	18	Cir	359.55
6	CB 342	Combination	369.65	Rect	4.00	4.00	18	Cir	364.17	15	Cir	364.27
7	CB 343	Combination	371.01	Rect	4.00	4.00	15	Cir	364.90	15	Cir	365.00
8	CB 344A	Combination	370.77	Rect	4.00	4.00	15	Cir	365.35	15 15	Cir Cir	365.55 365.81
9	CB 344B	Combination	375.28	Rect	4.00	4.00	15	Cir	369.60	15 15	Cir Cir	369.70 369.70
10	CB 346	Combination	377.58	Rect	4.00	4.00	15	Cir	371.45	15	Cir	371.55
11	CB 347	Combination	377.57	Rect	4.00	4.00	15	Cir	371.75	15	Cir	371.85
12	CB 348	Combination	377.52	Rect	4.00	4.00	15	Cir	372.12			
13	CB 344C	Combination	375.27	Rect	4.00	4.00	15	Cir	369.97	15	Cir	370.17
14	YI 344D	DropGrate	376.58	Rect	4.00	4.00	15	Cir	370.31			
15	CB 345	Combination	370.80	Rect	4.00	4.00	15	Cir	366.08			
16	CB 339A	Combination	358.74	Rect	8.00	4.00	24	Cir	353.18			
17	CB 350	Combination	360.15	Rect	4.00	4.00	42	Cir	351.90	42 30	Cir Cir	352.00 355.50
18	CB 352	Combination	360.85	Rect	4.00	4.00	42	Cir	352.39	42	Cir	352.50
19	CB 353	Combination	361.54	Rect	4.00	4.00	42	Cir	353.50	42	Cir	353.60
20	CB 354	Combination	362.70	Rect	4.00	4.00	42	Cir	354.63	42	Cir	354.79
21	CB 355	Combination	363.21	Rect	4.00	4.00	42	Cir	355.35	30 36	Cir Cir	356.20 355.46

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
22	CB 359	Combination	365.79	Rect	4.00	4.00	30	Cir	359.33	24 15	Cir Cir	359.45 360.58
23	CB 362	Combination	368.99	Rect	4.00	4.00	24	Cir	363.20	24 18	Cir Cir	363.30 363.30
24	CB 364	Combination	370.06	Rect	4.00	4.00	24	Cir	364.08	24	Cir	364.20
25	CB 365B	Combination	370.76	Rect	8.00	4.00	24	Cir	364.34	24 24	Cir Cir	364.72 364.90
26	CB 369	Combination	371.23	Rect	8.00	4.00	24	Cir	365.94	18 18	Cir Cir	366.30 366.10
27	CB 370A	Combination	375.43	Rect	4.00	4.00	18	Cir	368.10	15 15	Cir Cir	368.20 369.96
28	CB 371	Combination	376.58	Rect	4.00	4.00	15	Cir	369.90	15	Cir	371.06
29	CB 372	Combination	377.16	Rect	4.00	4.00	15	Cir	371.20	15	Cir	371.53
30	CB 373	Combination	379.19	Rect	4.00	4.00	15	Cir	371.75			
31	CB 370B	Combination	375.33	Rect	4.00	4.00	15	Cir	370.23			
32	YI 369B	DropGrate	372.54	Rect	4.00	4.00	18	Cir	367.19			
33	CB 366	Combination	373.25	Rect	4.00	4.00	24	Cir	365.33			
34	CB 363	Combination	370.38	Rect	4.00	4.00	18	Cir	365.25			
35	CB 356	Combination	363.00	Rect	4.00	4.00	36	Cir	355.61	36	Cir	355.71
36	CB 357	Combination	363.67	Rect	4.00	4.00	36	Cir	355.90	36 15	Cir Cir	356.00 357.82
37	CB 374	Combination	364.22	Rect	4.00	4.00	36	Cir	357.10	36	Cir	357.90
38	CB 375A	Combination	364.11	Rect	4.00	4.00	36	Cir	358.29			
39	CB 361	Combination	365.95	Rect	4.00	4.00	15	Cir	360.86			
40	CB 358	Combination	363.27	Rect	4.00	4.00	15	Cir	358.10			
41	YI 350A	DropGrate	359.27	Rect	4.00	4.00	30	Cir	355.60			

Project File: Outfall 3B.stm | Number of Structures: 44 | Run Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
42	JB 392A	Manhole	356.83	Cir	4.00	4.00	18	Cir	350.90	18	Cir	351.04
43	CB 393	Combination	356.04	Rect	8.00	4.00	18	Cir	351.68	15	Cir	351.78
44	CB 394	Combination	356.27	Rect	8.00	4.00	15	Cir	351.92			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (110)	12.07	24	Cir	33.000	351.50	352.10	1.818	353.50	353.35	0.26	353.62	End	Combination
2	Pipe - (109)	11.28	24	Cir	27.000	352.20	352.47	1.000	353.62	353.67	n/a	353.67 j	1	Combination
3	Pipe - (108)	10.51	24	Cir	42.155	352.60	352.81	0.498	353.78	354.00	0.52	354.52	2	Combination
4	Pipe - (107)	7.57	24	Cir	108.118	352.91	353.45	0.499	354.52	354.43	0.19	354.43	3	Combination
5	Pipe - (106)	6.65	18	Cir	156.840	353.95	359.44	3.500	354.55	360.44	n/a	360.44	4	Combination
6	Pipe - (105)	5.53	18	Cir	153.881	359.55	364.17	3.002	360.44	365.08	n/a	365.08	5	Combination
7	Pipe - (104)	5.29	15	Cir	68.214	364.27	364.90	0.924	365.16	365.83	n/a	365.83	6	Combination
8	Pipe - (103)	5.25	15	Cir	40.034	365.00	365.35	0.874	365.90	366.28	0.74	366.28	7	Combination
9	Pipe - (102)	4.06	15	Cir	122.836	365.55	369.60	3.297	366.28	370.41	0.54	370.41	8	Combination
10	Pipe - (215)	1.85	15	Cir	82.378	369.70	371.45	2.124	370.41	371.99	n/a	371.99 j	9	Combination
11	Pipe - (101)	1.79	15	Cir	39.000	371.55	371.75	0.513	372.09	372.29	n/a	372.51 j	10	Combination
12	Pipe - (100)	0.90	15	Cir	27.000	371.85	372.12	1.000	372.51	372.49	n/a	372.49 j	11	Combination
13	Pipe - (213)	1.94	15	Cir	27.000	369.70	369.97	1.000	370.41	370.52	n/a	370.52 j	9	Combination
14	Pipe - (212)	1.19	15	Cir	13.666	370.17	370.31	1.024	370.53	370.74	n/a	370.74	13	DropGrate
15	Pipe - (111)	0.58	15	Cir	27.000	365.81	366.08	1.000	366.28	366.38	n/a	366.38 j	8	Combination
16	Pipe - (113)	2.66	24	Cir	27.045	352.91	353.18	0.998	354.52	353.75	0.20	353.75	3	Combination
17	Pipe - (153)	44.10	42	Cir	67.178	351.50	351.90	0.595	355.00	355.09	0.59	355.68	End	Combination
18	Pipe - (152)	35.29	42	Cir	64.000	352.00	352.39	0.609	355.68	355.75	0.11	355.86	17	Combination
19	Pipe - (151)	35.14	42	Cir	63.168	352.50	353.50	1.583	355.86	355.34	0.37	355.34	18	Combination
20	Pipe - (150)	34.88	42	Cir	102.760	353.60	354.63	1.002	355.34	356.46	0.78	356.46	19	Combination
21	Pipe - (176)	34.81	42	Cir	45.158	354.79	355.35	1.240	356.46	357.18	n/a	357.18	20	Combination
22	Pipe - (148)	15.99	30	Cir	127.817	356.20	359.33	2.449	357.18	360.68	0.80	360.68	21	Combination
23	Pipe - (147)	14.60	24	Cir	130.784	359.45	363.20	2.867	360.68	364.58	0.91	364.58	22	Combination
24	Pipe - (146)	12.90	24	Cir	43.134	363.30	364.08	1.808	364.58	365.37	0.64	365.37	23	Combination

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	Pipe - (145)	12.66	24	Cir	27.000	364.20	364.34	0.518	365.53	365.67	0.86	366.53	24	Combination
26	Pipe - (144)	10.64	24	Cir	138.188	364.72	365.94	0.883	366.53	367.11	n/a	367.11 j	25	Combination
27	Pipe - (142)	5.16	18	Cir	180.079	366.30	368.10	1.000	367.11	368.97	0.54	368.97	26	Combination
28	Pipe - (141)	2.90	15	Cir	44.685	368.20	369.90	3.804	368.97	370.58	n/a	370.58 j	27	Combination
29	Pipe - (140)	1.67	15	Cir	27.000	371.06	371.20	0.519	371.58	371.72	n/a	371.92 j	28	Combination
30	Pipe - (139)	0.43	15	Cir	44.433	371.53	371.75	0.495	371.92	372.01	0.09	372.09	29	Combination
31	Pipe - (225)	2.02	15	Cir	26.746	369.96	370.23	1.010	370.44	370.80	0.22	370.80	27	Combination
32	Pipe - (154)	4.68	18	Cir	14.000	366.10	367.19	7.786	367.11	368.02	n/a	368.02 j	26	DropGrate
33	Pipe - (157)	1.44	24	Cir	43.134	364.90	365.33	0.997	366.53	365.74	0.15	365.74	25	Combination
34	Pipe - (158)	1.80	18	Cir	45.610	363.30	365.25	4.275	364.58	365.75	n/a	365.75 j	23	Combination
35	Pipe - (162)	22.70	36	Cir	30.000	355.46	355.61	0.500	357.18	357.14	n/a	357.14	21	Combination
36	Pipe - (165)	21.97	36	Cir	37.602	355.71	355.90	0.505	357.15	357.41	n/a	357.41	35	Combination
37	Pipe - (164)	21.48	36	Cir	87.912	356.00	357.10	1.251	357.41	358.59	0.29	358.59	36	Combination
38	Pipe - (163) (1)	21.47	36	Cir	57.000	357.90	358.29	0.684	359.20	359.78	0.59	359.78	37	Combination
39	Pipe - (159)	1.15	15	Cir	28.034	360.58	360.86	0.999	360.94	361.28	0.15	361.28	22	Combination
40	Pipe - (166)	0.29	15	Cir	27.098	357.82	358.10	1.033	358.00	358.31	0.07	358.31	36	Combination
41	Pipe - (218)	9.80	30	Cir	13.666	355.50	355.60	0.732	356.40	356.64	n/a	356.64	17	DropGrate
42	Pipe - (119)	1.76	18	Cir	22.660	350.75	350.90	0.662	352.25	352.25	0.01	352.27	End	Manhole
43	Pipe - (118)	1.22	18	Cir	127.251	351.04	351.68	0.503	352.27	352.09	n/a	352.09	42	Combination
44	Pipe - (117)	0.61	15	Cir	27.000	351.78	351.92	0.519	352.09	352.23	0.11	352.33	43	Combination

Project File: Outfall 3B.stm

Number of lines: 44

Run Date: 2/3/2025

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 338A	0.90	2.85	2.26	1.49	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.28	10.10	0.21	6.66	0.0	43
2	CB 338B	0.90	0.06	0.89	0.07	Comb	6.0	3.00	0.00	6.00	2.50	0.011	2.00	0.060	0.020	0.013	0.19	5.32	0.07	1.20	0.0	1
3	CB 338E	0.68	0.16	0.78	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.018	2.00	0.060	0.020	0.013	0.17	4.28	0.06	1.06	0.0	2
4	CB 340	1.08	0.14	1.06	0.16	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.18	5.15	0.09	1.49	0.0	3
5	CB 341	1.30	0.00	1.16	0.14	Comb	6.0	1.50	0.00	3.00	2.50	0.031	2.00	0.060	0.020	0.013	0.17	4.70	0.08	1.30	0.0	4
6	CB 342	0.29	0.00	0.29	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.12	2.10	0.00	0.00	0.0	5
7	CB 343	0.07	0.03	0.10	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.08	1.35	0.00	0.00	0.0	6
8	CB 344A	0.72	0.00	0.69	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.023	2.00	0.060	0.020	0.013	0.15	3.54	0.04	0.72	0.0	7
9	CB 344B	0.36	0.00	0.36	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.11	1.86	0.00	0.00	0.0	8
10	CB 346	0.07	0.04	0.12	0.00	Comb	4.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.07	1.22	0.00	0.00	0.0	Off
11	CB 347	0.90	0.00	0.86	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.16	3.77	0.05	0.85	0.0	10
12	CB 348	0.90	0.00	0.84	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.024	2.00	0.060	0.020	0.013	0.16	4.06	0.06	0.97	0.0	Off
13	CB 344C	0.76	0.00	0.74	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.030	2.00	0.060	0.020	0.013	0.15	3.33	0.04	0.62	0.0	15
14	YI 344D	1.19	0.00	1.19	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.13	15.47	0.13	15.47	0.0	Off
15	CB 345	0.58	0.02	0.59	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.023	2.00	0.060	0.020	0.013	0.14	3.06	0.03	0.48	0.0	Off
16	CB 339A	2.66	0.00	2.13	0.53	Comb	6.0	3.00	0.00	6.00	2.50	0.020	2.00	0.060	0.020	0.013	0.23	7.62	0.14	2.97	0.0	Off
17	CB 350	0.47	5.38	3.06	2.79	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.32	12.15	0.26	8.89	0.0	1
18	CB 352	0.43	0.04	0.46	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.15	3.41	0.04	0.64	0.0	17
19	CB 353	0.65	0.00	0.61	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.16	4.22	0.06	1.01	0.0	18
20	CB 354	0.22	0.06	0.28	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.12	2.13	0.00	0.00	0.0	19
21	CB 355	0.65	0.22	0.81	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.16	4.21	0.06	1.04	0.0	20
22	CB 359	0.50	0.00	0.50	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.14	2.82	0.02	0.38	0.0	21
23	CB 362	0.07	0.14	0.21	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.032	2.00	0.060	0.020	0.013	0.09	1.51	0.00	0.00	0.0	22

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	CB 364	0.29	0.36	0.60	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.010	2.00	0.060	0.020	0.013	0.17	4.36	0.06	1.06	0.0	23
25	CB 365B	0.90	0.20	1.01	0.09	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.20	5.87	0.08	1.39	0.0	23
26	CB 369	1.15	0.00	1.05	0.10	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.20	6.00	0.09	1.44	0.0	25
27	CB 370A	0.32	0.19	0.51	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.12	2.09	0.00	0.00	0.0	26
28	CB 371	1.26	0.00	1.17	0.09	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.16	4.15	0.06	1.04	0.0	27
29	CB 372	1.26	0.00	1.17	0.09	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.16	4.15	0.06	1.04	0.0	27
30	CB 373	0.43	0.00	0.43	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.12	1.95	0.00	0.00	0.0	27
31	CB 370B	2.02	0.00	1.65	0.36	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.19	5.68	0.11	1.79	0.0	24
32	YI 369B	4.68	0.00	4.68	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.34	35.60	0.34	35.60	0.0	Off
33	CB 366	1.44	0.00	1.34	0.10	Comb	6.0	1.50	0.00	3.00	2.50	0.062	2.00	0.060	0.020	0.013	0.16	4.05	0.06	1.00	0.0	25
34	CB 363	1.80	0.00	1.57	0.23	Comb	6.0	1.50	0.00	3.00	2.50	0.052	2.00	0.060	0.020	0.013	0.18	4.89	0.08	1.42	0.0	39
35	CB 356	1.15	0.00	1.01	0.14	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.18	4.98	0.08	1.41	0.0	36
36	CB 357	0.58	9.04	4.25	5.36	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.38	14.86	0.31	11.73	0.0	17
37	CB 374	0.11	14.33	5.54	8.90	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.43	17.44	0.37	14.41	0.0	36
38	CB 375A	21.47	0.00	7.14	14.33	Comb	6.0	3.00	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.49	20.36	0.43	17.39	0.0	37
39	CB 361	1.15	0.23	1.16	0.22	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.19	5.50	0.10	1.66	0.0	21
40	CB 358	0.29	0.00	0.29	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.011	2.00	0.060	0.020	0.013	0.12	2.20	0.00	0.07	0.0	1
41	YI 350A	9.80	0.00	9.80	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.55	57.03	0.55	57.03	0.0	Off
42	JB 392A	0.61	0.00	0.00	0.61	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
43	CB 393	0.61	1.49	2.10	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.22	6.98	0.22	6.98	0.0	Off
44	CB 394	0.61	0.00	0.61	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.14	2.75	0.14	2.75	0.0	Off

Project File: Outfall 3B.stm

Number of lines: 44

Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	24	12.07	351.50	353.50	2.00	2.06	3.84	0.23	353.73	0.285	33.000	352.10	353.35	1.25**	2.07	5.83	0.53	353.88	0.555	0.420	0.139	0.50	0.26
2	24	11.28	352.20	353.62	1.42	1.98	4.74	0.51	354.12	0.000	27.000	352.47	353.67 j	1.20**	1.98	5.71	0.51	354.18	0.000	0.000	n/a	1.15	0.58
3	24	10.51	352.60	353.78	1.18*	1.94	5.42	0.46	354.24	0.498	42.155	352.81	354.00	1.19	1.94	5.42	0.46	354.45	0.497	0.498	0.210	1.14	0.52
4	24	7.57	352.91	354.52	1.61	1.53	2.80	0.38	354.90	0.000	108.118	353.45	354.43	0.98**	1.53	4.96	0.38	354.81	0.000	0.000	n/a	0.50	0.19
5	18	6.65	353.95	354.55	0.60*	0.66	10.04	0.44	354.99	0.000	156.840	359.44	360.44	1.00**	1.25	5.33	0.44	360.88	0.000	0.000	n/a	0.50	n/a
6	18	5.53	359.55	360.44	0.89	1.09	5.09	0.38	360.82	0.000	153.881	364.17	365.08	0.91**	1.12	4.96	0.38	365.46	0.000	0.000	n/a	0.50	n/a
7	15	5.29	364.27	365.16	0.89*	0.93	5.68	0.45	365.61	0.000	68.214	364.90	365.83	0.93**	0.98	5.39	0.45	366.28	0.000	0.000	n/a	1.01	n/a
8	15	5.25	365.00	365.90	0.90*	0.95	5.54	0.45	366.35	0.000	40.034	365.35	366.28	0.93**	0.98	5.37	0.45	366.73	0.000	0.000	n/a	1.65	0.74
9	15	4.06	365.55	366.28	0.73	0.74	5.47	0.36	366.63	0.000	122.836	369.60	370.41	0.81**	0.85	4.79	0.36	370.77	0.000	0.000	n/a	1.50	0.54
10	15	1.85	369.70	370.41	0.71	0.51	2.55	0.21	370.62	0.000	82.378	371.45	371.99 j	0.54**	0.51	3.64	0.21	372.20	0.000	0.000	n/a	0.97	0.20
11	15	1.79	371.55	372.09	0.54*	0.50	3.52	0.19	372.28	0.512	39.000	371.75	372.29 j	0.54**	0.51	3.52	0.19	372.48	0.510	0.511	0.199	1.13	0.22
12	15	0.90	371.85	372.51	0.66	0.31	1.38	0.13	372.64	0.000	27.000	372.12	372.49 j	0.37**	0.31	2.94	0.13	372.63	0.000	0.000	n/a	1.00	n/a
13	15	1.94	369.70	370.41	0.71	0.53	2.68	0.21	370.63	0.000	27.000	369.97	370.52 j	0.55**	0.53	3.69	0.21	370.74	0.000	0.000	n/a	0.50	n/a
14	15	1.19	370.17	370.53	0.36*	0.29	4.05	0.16	370.69	0.000	13.666	370.31	370.74	0.43**	0.37	3.19	0.16	370.90	0.000	0.000	n/a	1.00	n/a
15	15	0.58	365.81	366.28	0.47	0.22	1.37	0.10	366.38	0.000	27.000	366.08	366.38 j	0.30**	0.22	2.59	0.10	366.48	0.000	0.000	n/a	1.00	n/a
16	24	2.66	352.91	354.52	1.61	0.73	0.99	0.20	354.72	0.000	27.045	353.18	353.75	0.57**	0.73	3.63	0.20	353.95	0.000	0.000	n/a	1.00	0.20
17	42	44.10	351.50	355.00	3.50*	9.62	4.58	0.33	355.33	0.192	67.178	351.90	355.09	3.19	9.20	4.79	0.36	355.45	0.168	0.180	0.121	1.65	0.59
18	42	35.29	352.00	355.68	3.50	9.62	3.67	0.21	355.89	0.123	64.000	352.39	355.75	3.36	9.49	3.72	0.21	355.96	0.107	0.115	0.074	0.50	0.11
19	42	35.14	352.50	355.86	3.36	5.11	3.70	0.73	356.59	0.000	63.168	353.50	355.34	1.84**	5.11	6.87	0.73	356.07	0.000	0.000	n/a	0.50	0.37
20	42	34.88	353.60	355.34	1.74	4.76	7.32	0.73	356.07	0.000	102.760	354.63	356.46	1.83**	5.09	6.86	0.73	357.19	0.000	0.000	n/a	1.07	0.78
21	42	34.81	354.79	356.46	1.67	4.53	7.69	0.73	357.19	0.000	45.158	355.35	357.18	1.83**	5.08	6.85	0.73	357.91	0.000	0.000	n/a	1.47	n/a

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
22	30	15.99	356.20	357.18	0.98	1.78	8.99	0.54	357.72	0.000	127.817	359.33	360.68	1.35**	2.70	5.92	0.54	361.22	0.000	0.000	n/a	1.46	0.80
23	24	14.60	359.45	360.68	1.23	2.02	7.21	0.62	361.30	0.000	130.784	363.20	364.58	1.38**	2.30	6.34	0.62	365.20	0.000	0.000	n/a	1.45	0.91
24	24	12.90	363.30	364.58	1.28	2.12	6.10	0.56	365.14	0.000	43.134	364.08	365.37	1.29**	2.14	6.02	0.56	365.93	0.000	0.000	n/a	1.13	0.64
25	24	12.66	364.20	365.53	1.33*	2.21	5.73	0.51	366.04	0.518	27.000	364.34	365.67	1.33	2.21	5.73	0.51	366.18	0.518	0.518	0.140	1.69	0.86
26	24	10.64	364.72	366.53	1.81	1.90	3.56	0.49	367.01	0.000	138.188	365.94	367.11 j	1.17**	1.90	5.59	0.49	367.59	0.000	0.000	n/a	1.50	0.73
27	18	5.16	366.30	367.11	0.81	0.97	5.32	0.36	367.47	0.000	180.079	368.10	368.97	0.87**	1.07	4.83	0.36	369.34	0.000	0.000	n/a	1.50	0.54
28	15	2.90	368.20	368.97	0.77	0.69	3.63	0.28	369.25	0.000	44.685	369.90	370.58 j	0.68**	0.69	4.22	0.28	370.86	0.000	0.000	n/a	1.08	0.30
29	15	1.67	371.06	371.58	0.52*	0.47	3.48	0.19	371.77	0.518	27.000	371.20	371.72 j	0.52**	0.48	3.47	0.19	371.91	0.516	0.517	0.140	1.09	0.20
30	15	0.43	371.53	371.92	0.39	0.18	1.31	0.03	371.95	0.098	44.433	371.75	372.01	0.26**	0.18	2.37	0.09	372.09	0.517	0.307	0.137	1.00	0.09
31	15	2.02	369.96	370.44	0.48*	0.43	4.67	0.22	370.66	0.000	26.746	370.23	370.80	0.57**	0.54	3.74	0.22	371.01	0.000	0.000	n/a	1.00	0.22
32	18	4.68	366.10	367.11	1.01	1.00	3.71	0.34	367.45	0.000	14.000	367.19	368.02 j	0.83**	1.00	4.66	0.34	368.36	0.000	0.000	n/a	1.00	0.34
33	24	1.44	364.90	366.53	1.63	0.47	0.53	0.15	366.67	0.000	43.134	365.33	365.74	0.41**	0.47	3.06	0.15	365.89	0.000	0.000	n/a	1.00	0.15
34	18	1.80	363.30	364.58	1.28	0.52	1.12	0.18	364.76	0.000	45.610	365.25	365.75 j	0.50**	0.52	3.45	0.18	365.94	0.000	0.000	n/a	1.00	0.18
35	36	22.70	355.46	357.18	1.72	3.63	5.43	0.61	357.78	0.000	30.000	355.61	357.14	1.53**	3.63	6.25	0.61	357.75	0.000	0.000	n/a	0.59	n/a
36	36	21.97	355.71	357.15	1.44*	3.34	6.58	0.59	357.74	0.000	37.602	355.90	357.41	1.51**	3.55	6.18	0.59	358.00	0.000	0.000	n/a	1.24	n/a
37	36	21.48	356.00	357.41	1.41	3.25	6.60	0.59	357.99	0.000	87.912	357.10	358.59	1.49**	3.50	6.14	0.59	359.17	0.000	0.000	n/a	0.50	0.29
38	36	21.47	357.90	359.20	1.30*	2.94	7.31	0.59	359.79	0.000	57.000	358.29	359.78	1.49**	3.50	6.14	0.59	360.36	0.000	0.000	n/a	1.00	0.59
39	15	1.15	360.58	360.94	0.36*	0.29	3.97	0.15	361.09	0.000	28.034	360.86	361.28	0.42**	0.37	3.15	0.15	361.44	0.000	0.000	n/a	1.00	0.15
40	15	0.29	357.82	358.00	0.18*	0.11	2.68	0.07	358.07	0.000	27.098	358.10	358.31	0.21**	0.13	2.15	0.07	358.38	0.000	0.000	n/a	1.00	0.07
41	30	9.80	355.50	356.40	0.90*	1.60	6.12	0.40	356.80	0.000	13.666	355.60	356.64	1.04**	1.94	5.04	0.40	357.04	0.000	0.000	n/a	1.00	n/a
42	18	1.76	350.75	352.25	1.50*	1.77	0.99	0.02	352.27	0.028	22.660	350.90	352.25	1.35	1.68	1.05	0.02	352.27	0.025	0.026	0.006	0.73	0.01

Project File: Outfall 3B.stm | Number of lines: 44 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

SCM #3B 25-Year Report

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
43	18	1.22	351.04	352.27	1.23	0.39	0.79	0.15	352.41	0.000	127.251	351.68	352.09	0.41**	0.39	3.08	0.15	352.24	0.000	0.000	n/a	1.50	n/a
44	15	0.61	351.78	352.09	0.31	0.23	2.55	0.10	352.19	0.481	27.000	351.92	352.23	0.31**	0.23	2.61	0.11	352.33	0.510	0.495	0.134	1.00	0.11

Project File: Outfall 3B.stm

Number of lines: 44

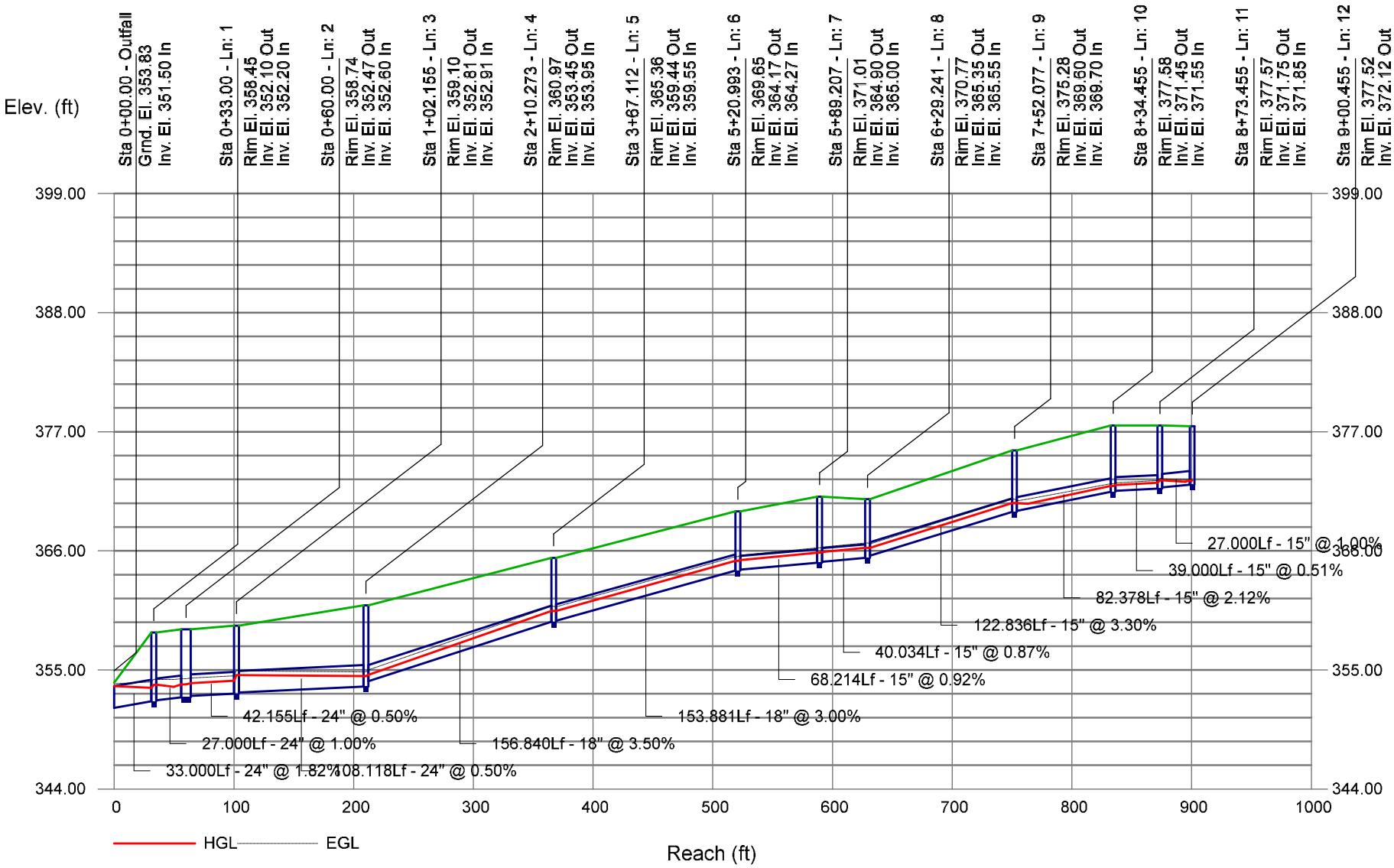
Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Storm Sewer Profile

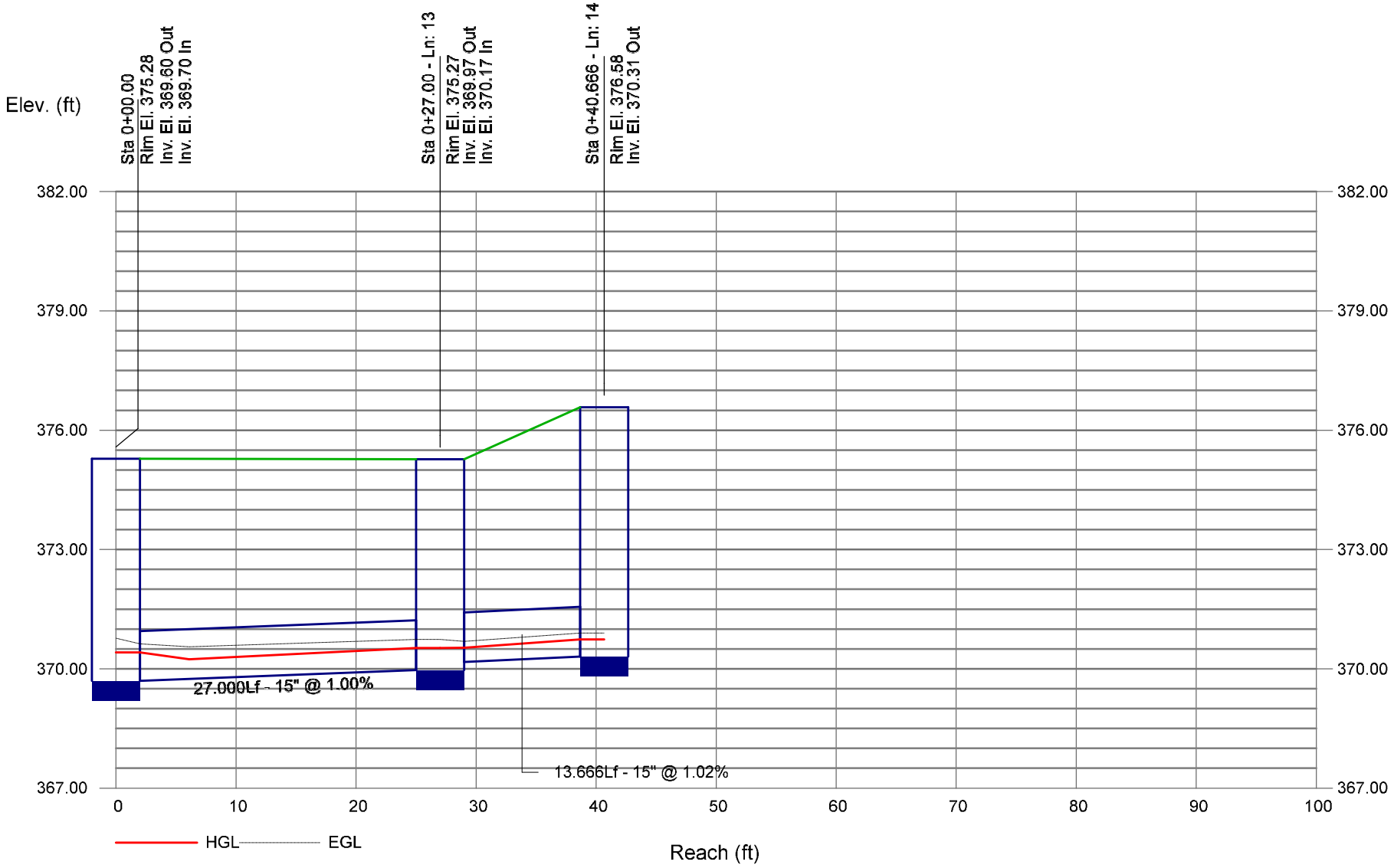
SCM #3B 25-Year Profile 1-12

Proj. file: Outfall 3B.stm



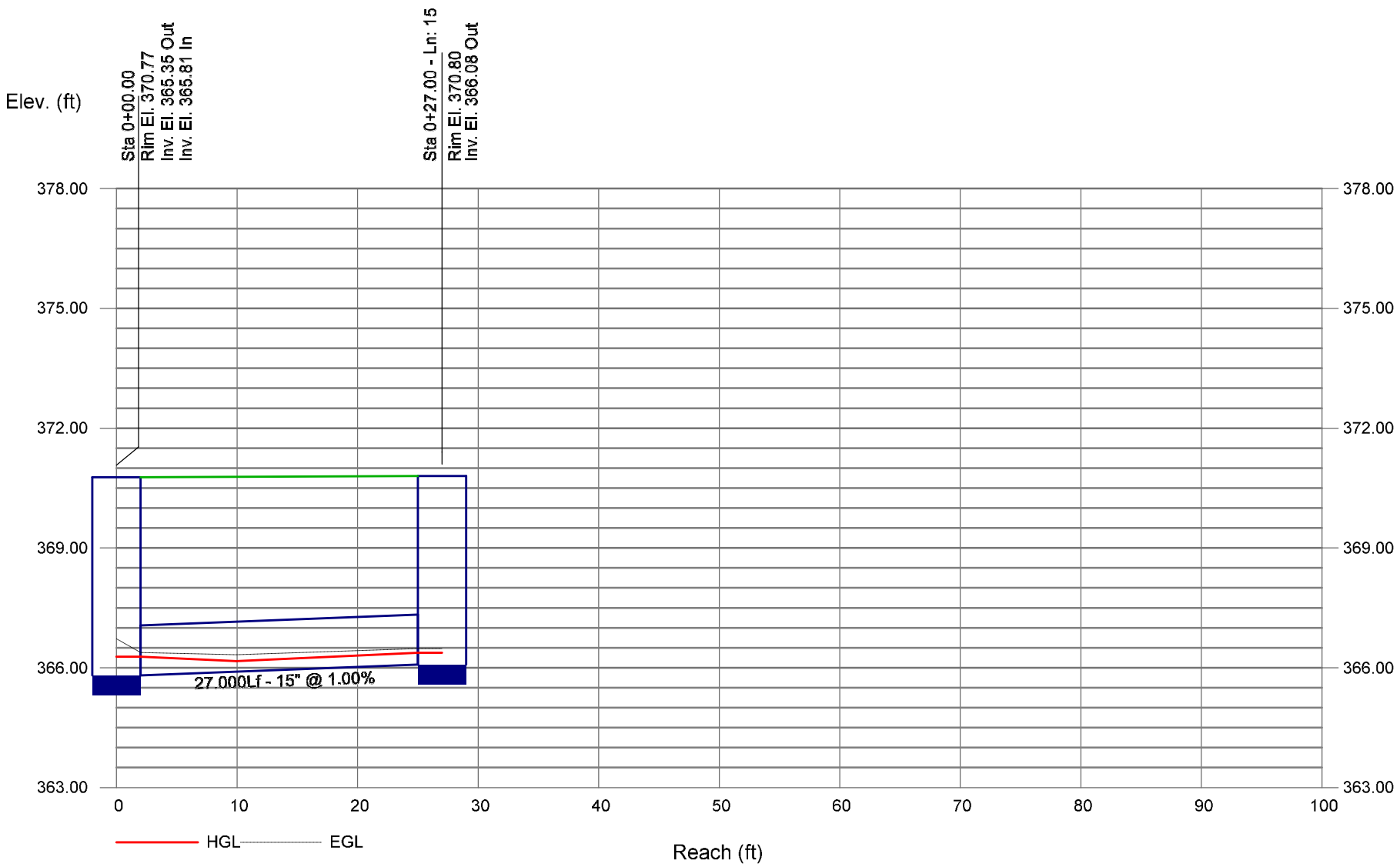
Storm Sewer Profile

SCM #3B 25-Year Profile 13-14 Proj. file: Outfall 3B.stm



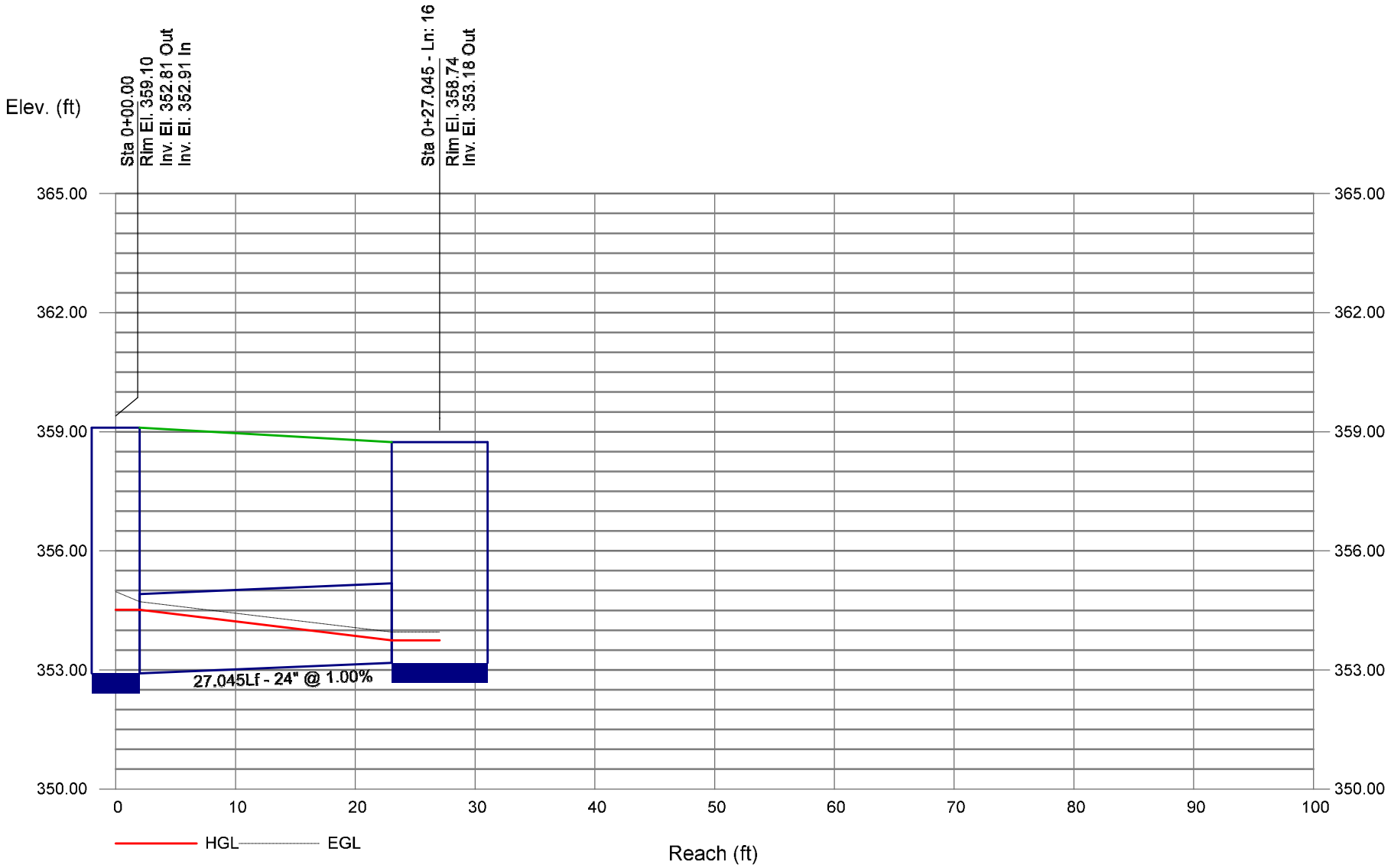
Storm Sewer Profile

SCM #3B 25-Year Profile 15-15 Proj. file: Outfall 3B.stm



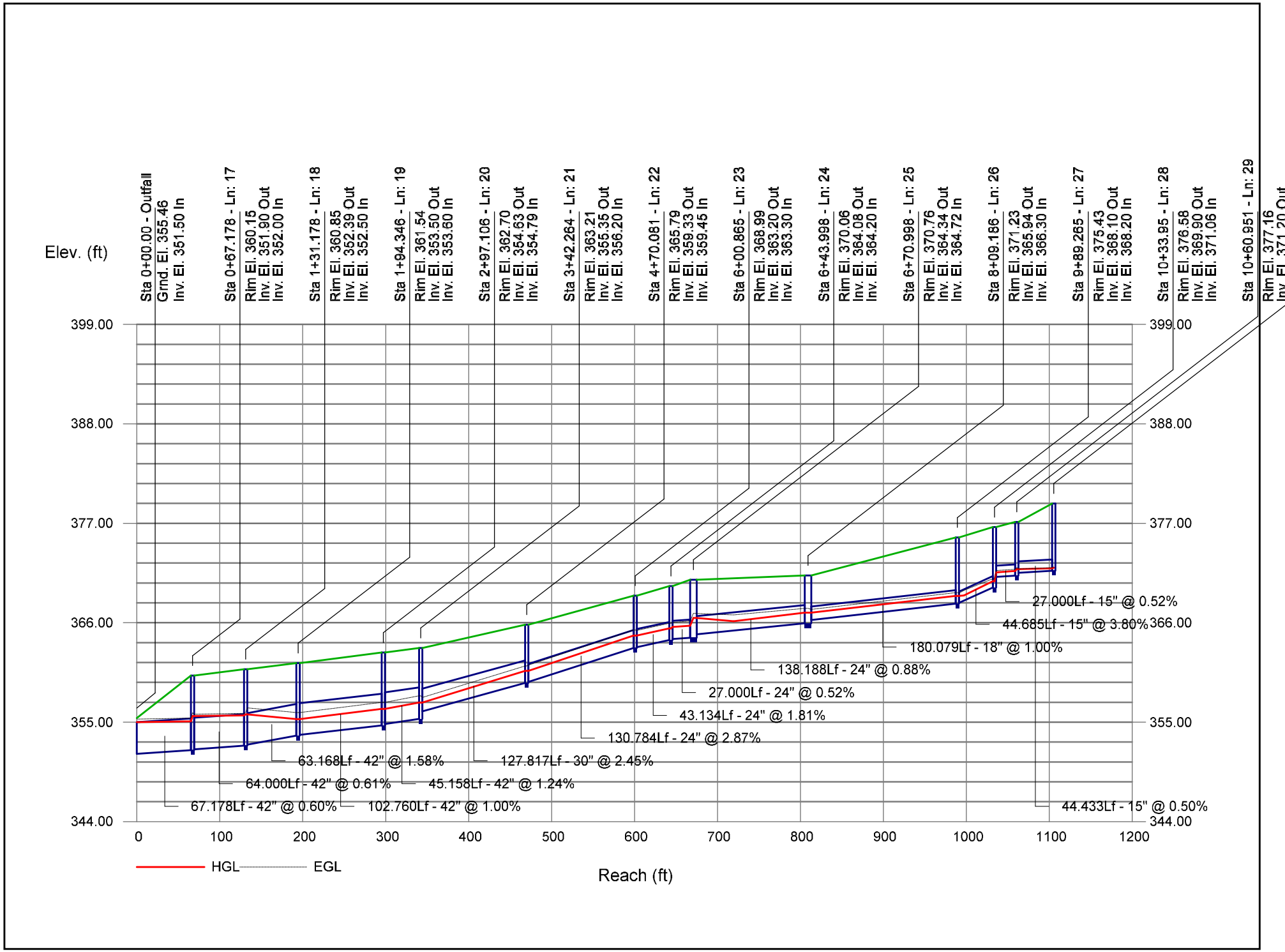
Storm Sewer Profile

SCM #3B 25-Year Profile 16-16 Proj. file: Outfall 3B.stm



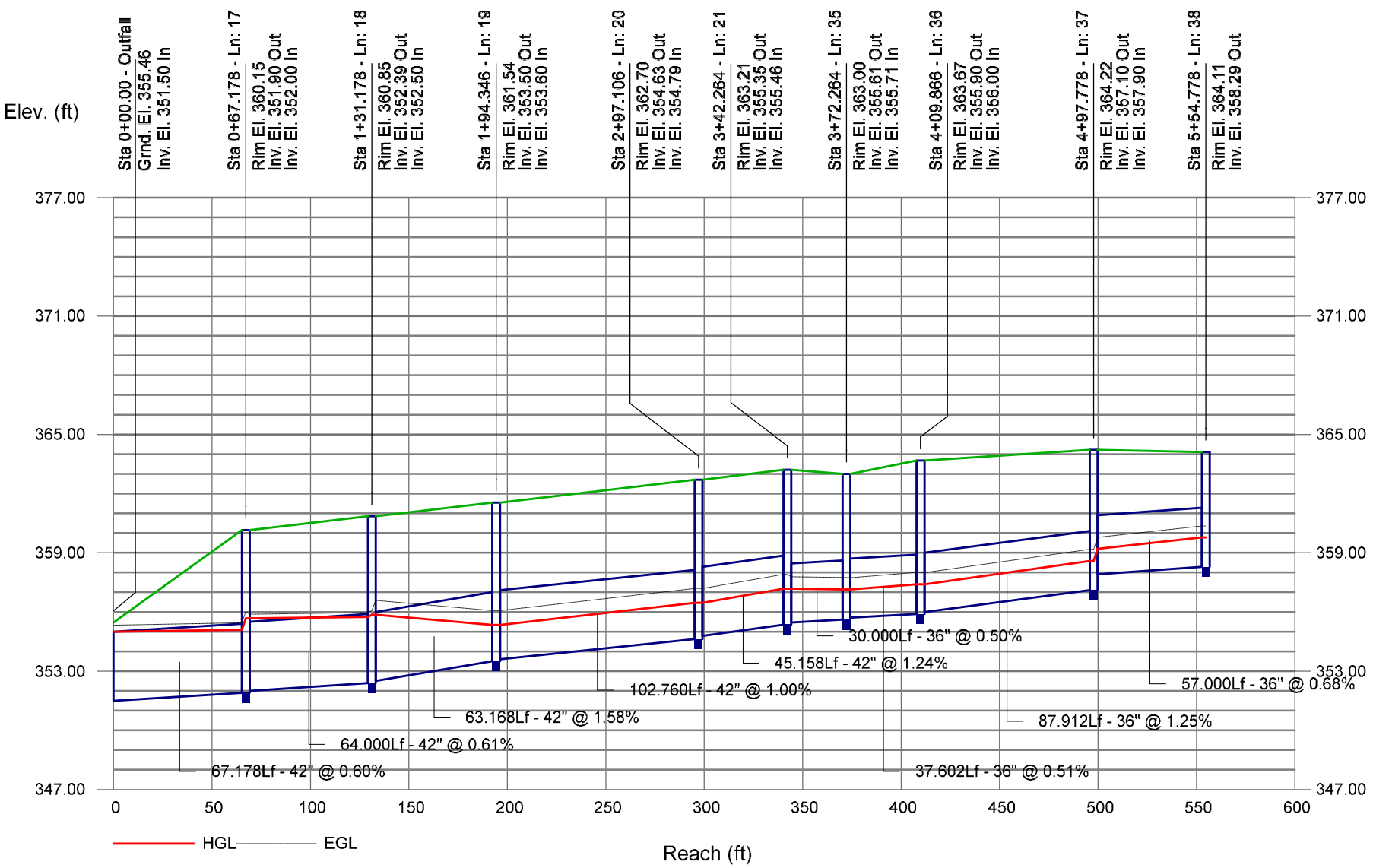
Storm Sewer Profile

SCM #3B 25-Year Profile 17-30 Proj. file: Outfall 3B.stm



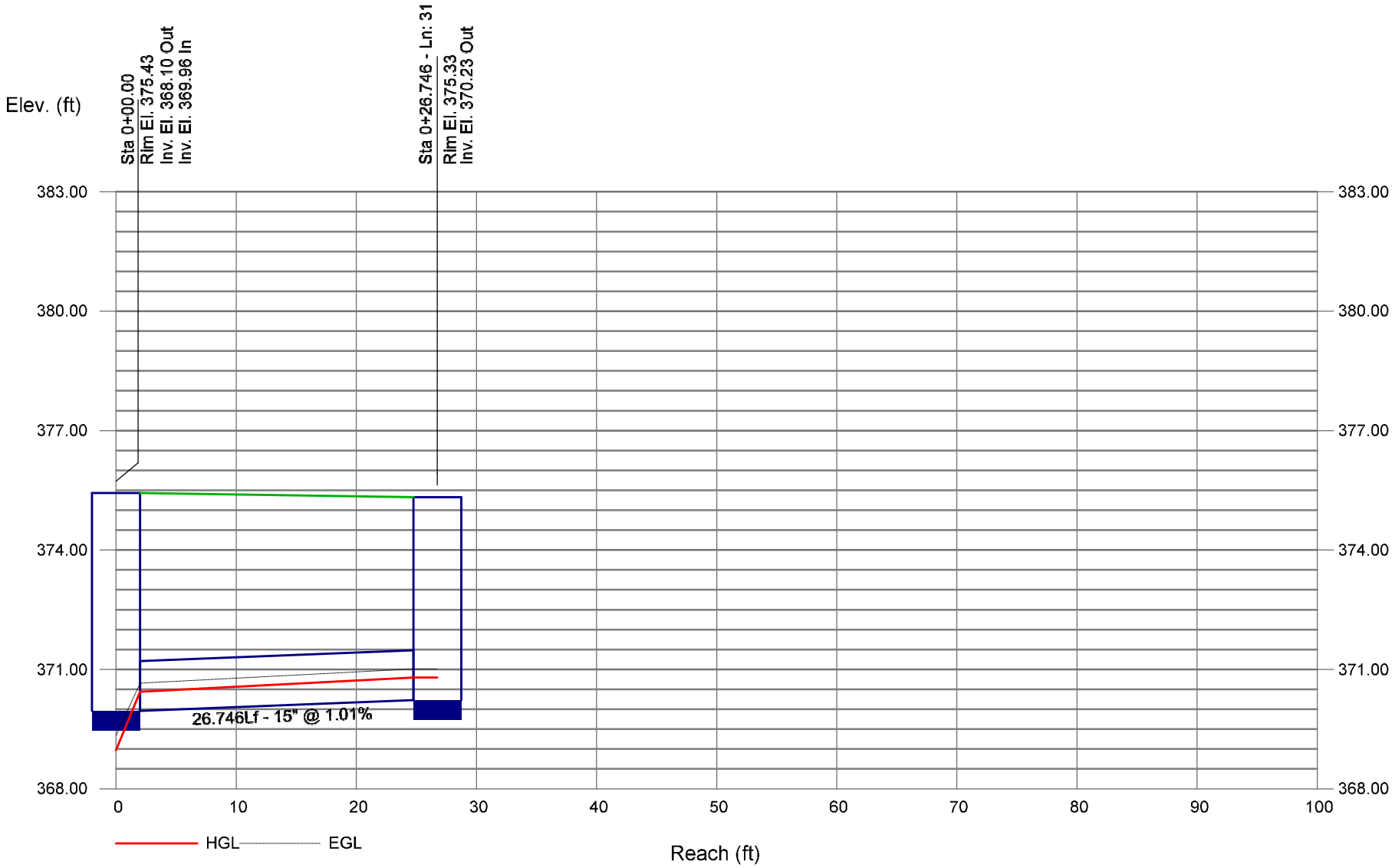
Storm Sewer Profile

SCM #3B 25-Year Profile 17-38 Proj. file: Outfall 3B.stm



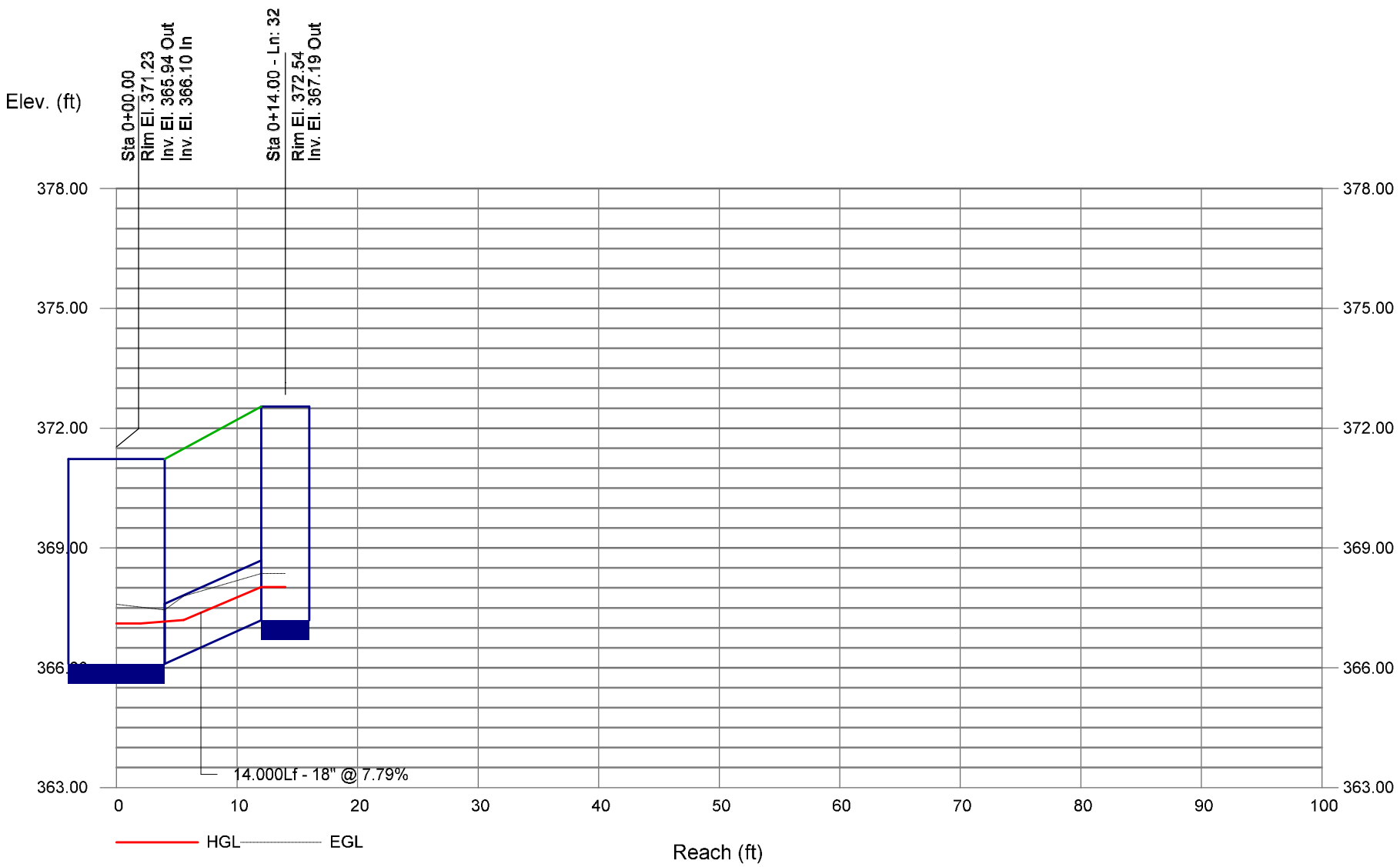
Storm Sewer Profile

SCM #3B 25-Year Profile 31-31 Proj. file: Outfall 3B.stm



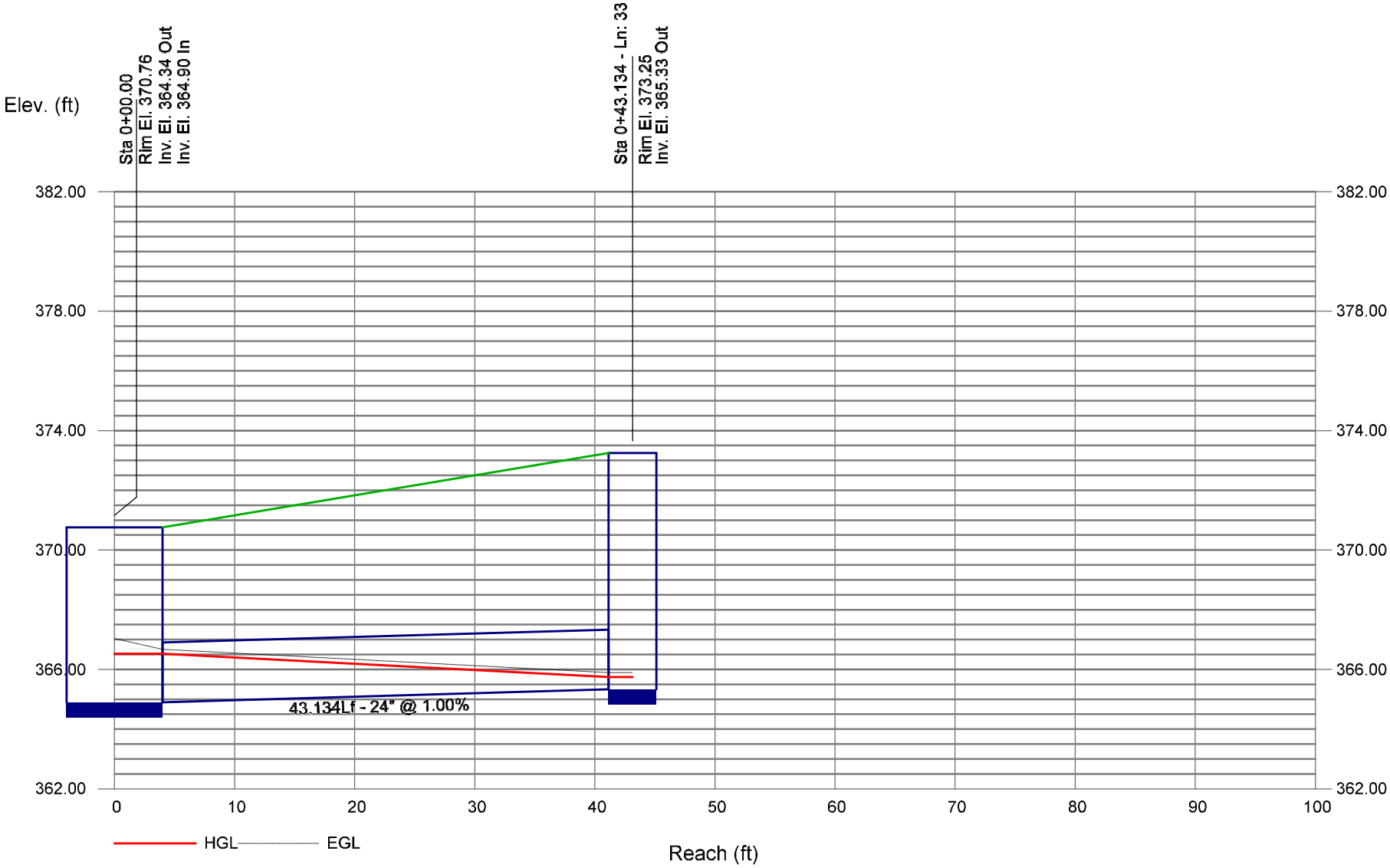
Storm Sewer Profile

SCM #3B 25-Year Profile 32-32 Proj. file: Outfall 3B.stm



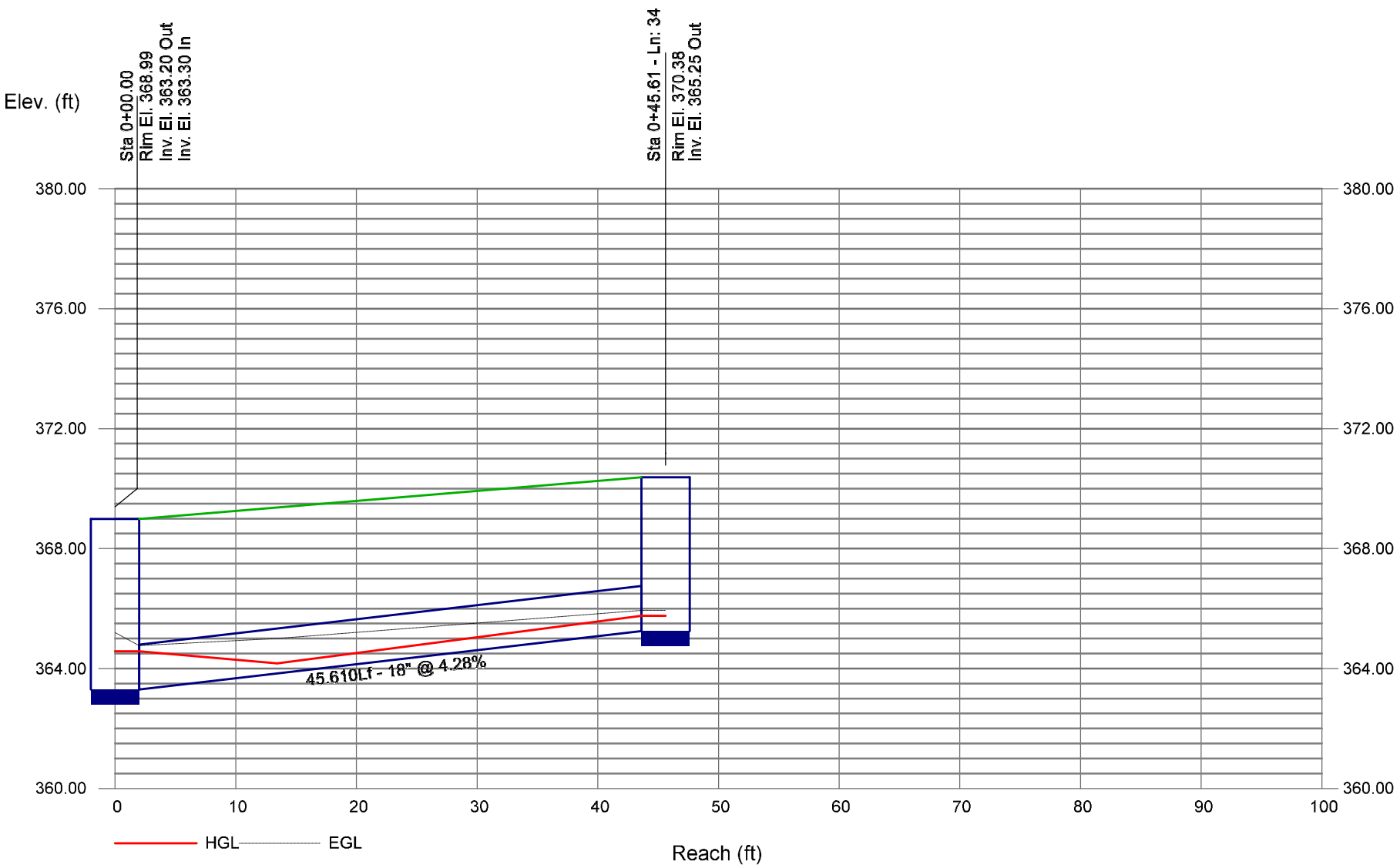
Storm Sewer Profile

SCM #3B 25-Year Profile 33-33 Proj. file: Outfall 3B.stm



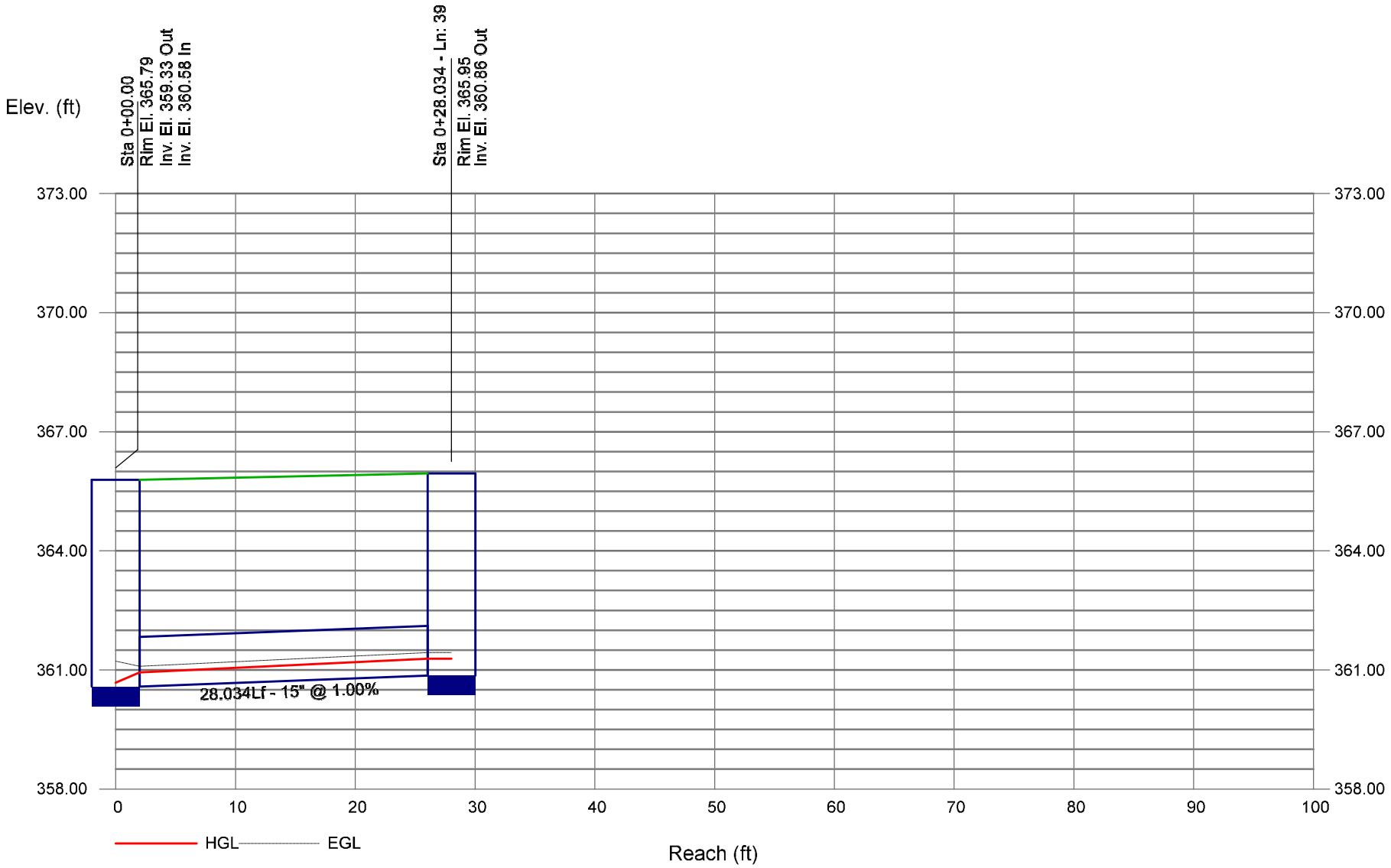
Storm Sewer Profile

SCM #3B 25-Year Profile 34-34 Proj. file: Outfall 3B.stm



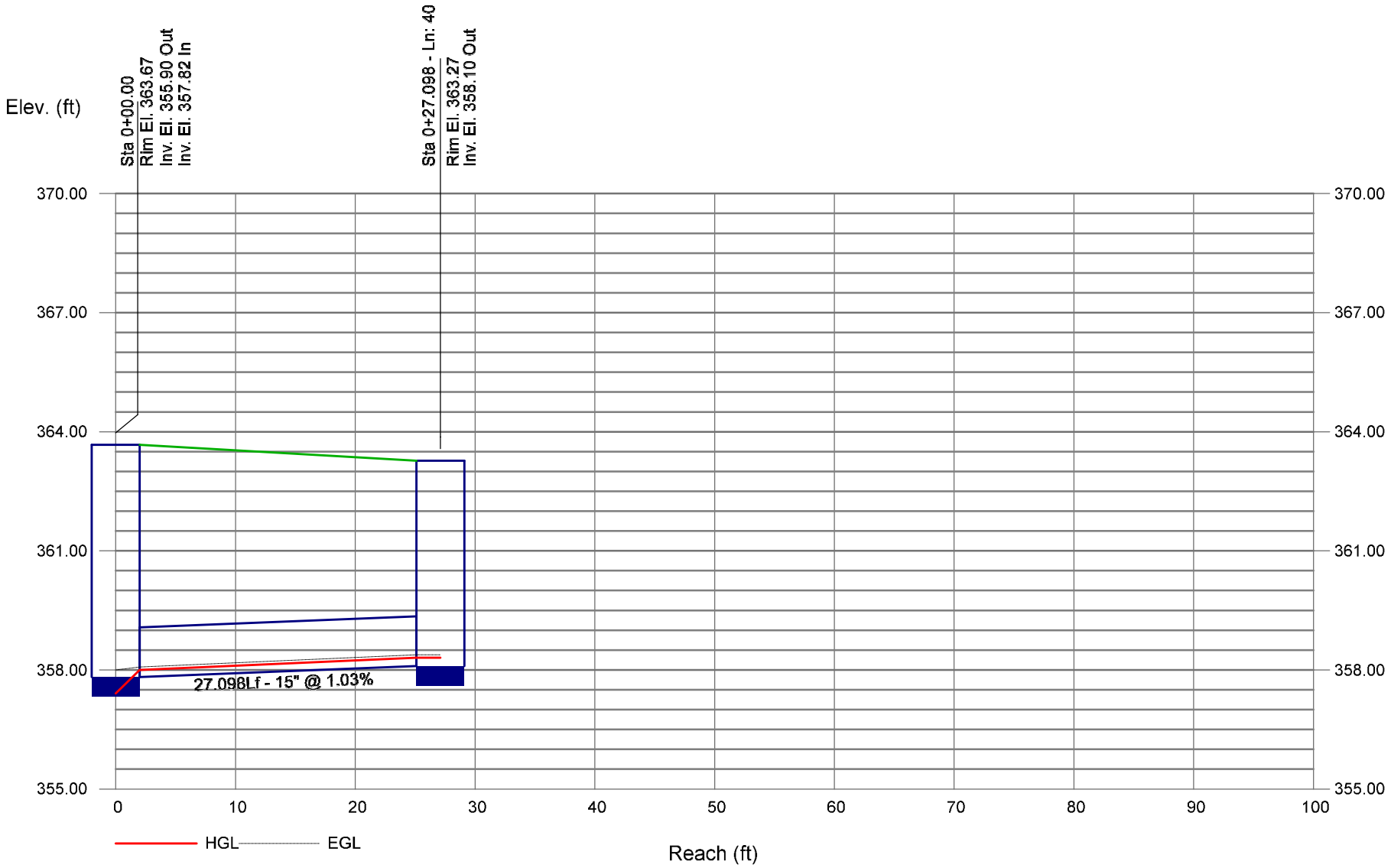
Storm Sewer Profile

SCM #3B 25-Year Profile 39-39 Proj. file: Outfall 3B.stm



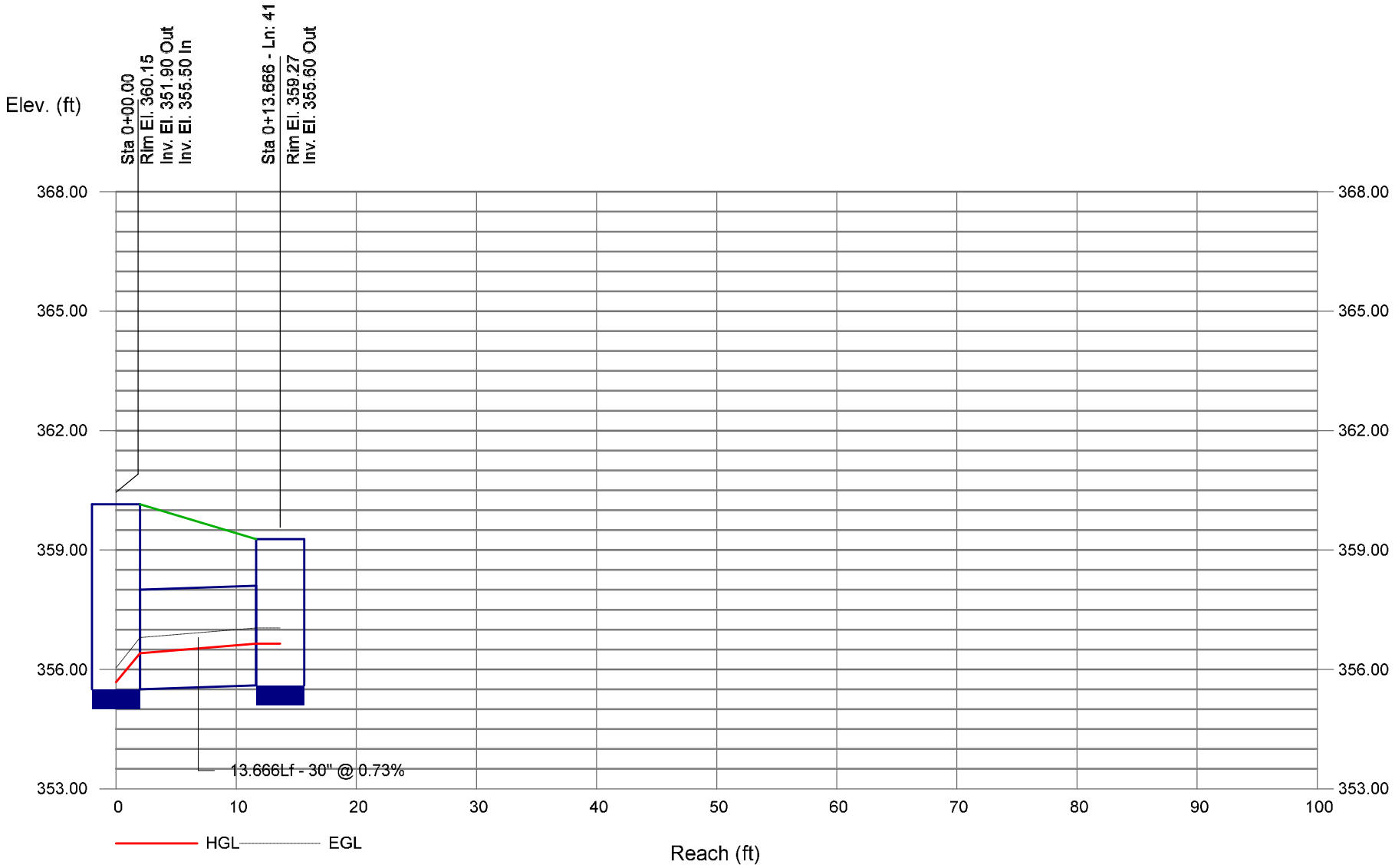
Storm Sewer Profile

SCM #3B 25-Year Profile 40-40 Proj. file: Outfall 3B.stm



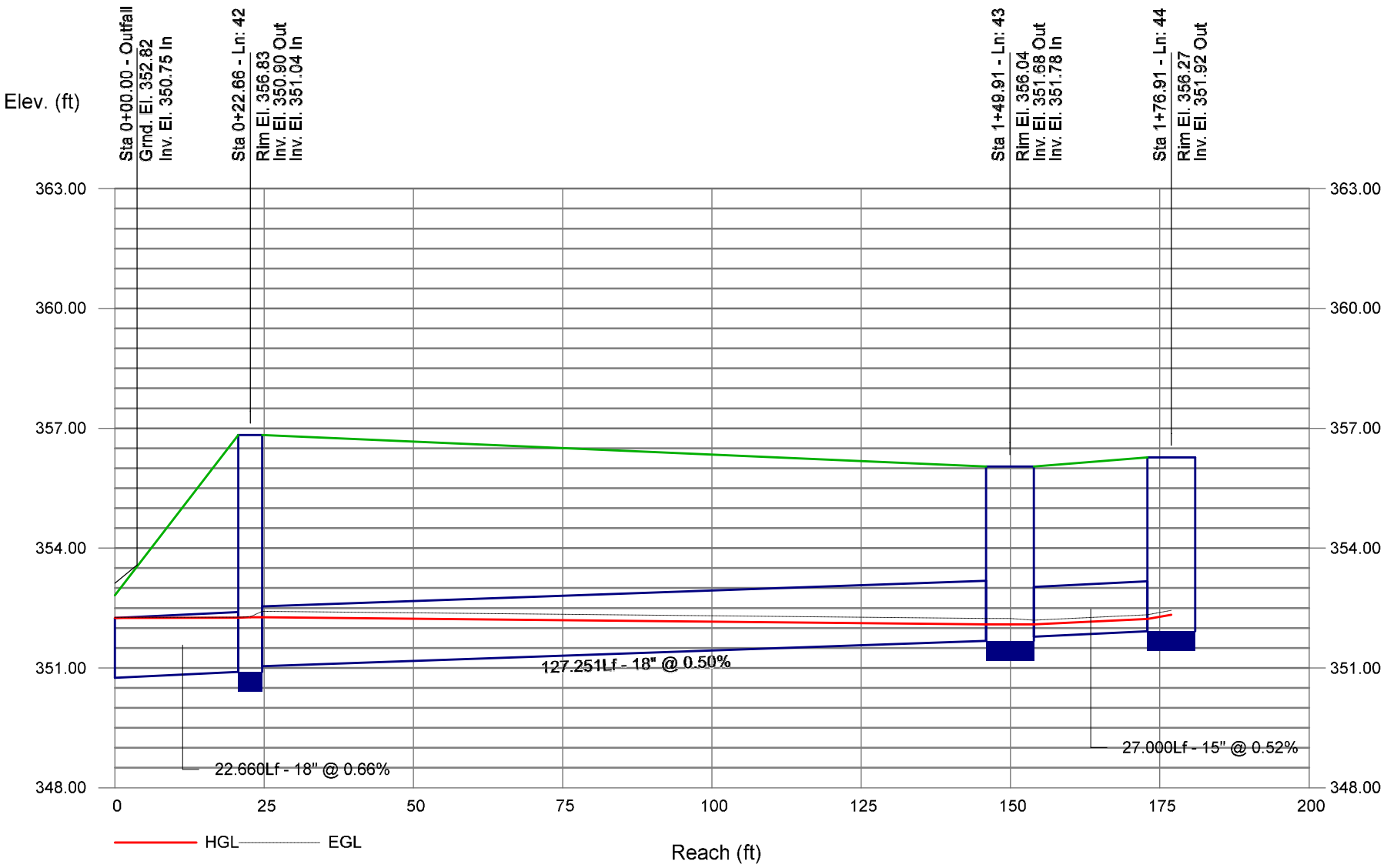
Storm Sewer Profile

SCM #3B 25-Year Profile 41-41 Proj. file: Outfall 3B.stm

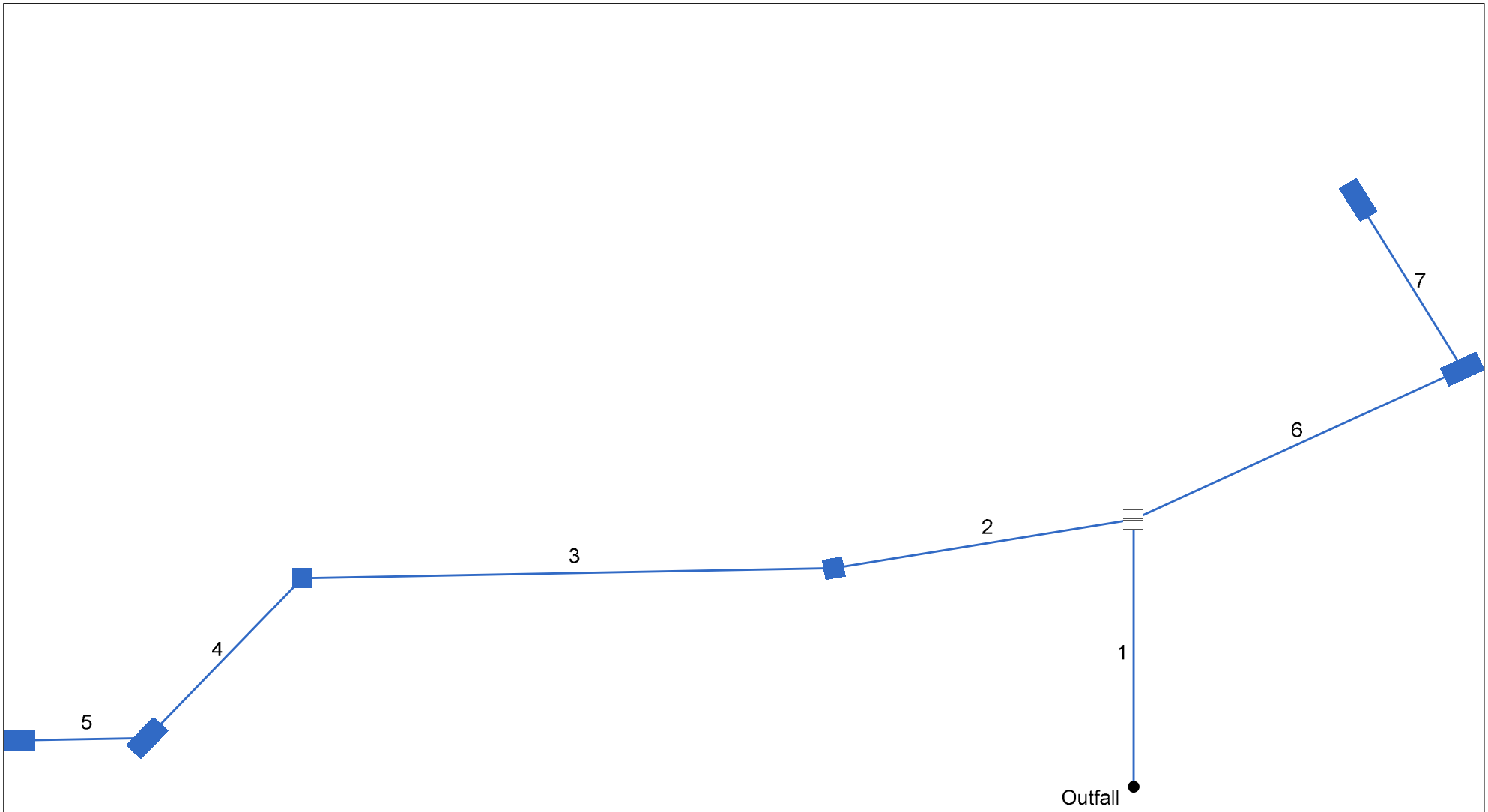


Storm Sewer Profile

SCM #3B 25-Year Profile 42-44 Proj. file: Outfall 3B.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM 3C 10-Year Report



Project File: Outfall 3C.stm	Number of lines: 7	Date: 11/4/2024

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	55.258	-89.825	Comb	0.00	0.04	0.55	10.0	340.50	6.33	344.00	18	Cir	0.013	2.08	351.47	Pipe - (94)
2	1	62.088	-99.549	Comb	0.00	0.13	0.55	10.0	344.46	1.59	345.45	18	Cir	0.013	0.50	352.51	Pipe - (93)
3	2	108.797	8.311	Comb	0.00	0.03	0.55	10.0	345.65	1.25	347.01	18	Cir	0.013	1.12	353.07	Pipe - (92)
4	3	45.962	-44.970	Comb	0.00	1.08	0.55	10.0	347.21	0.50	347.44	18	Cir	0.013	1.12	352.15	Pipe - (91)
5	4	27.000	45.000	Comb	0.00	0.80	0.55	10.0	347.70	1.48	348.10	15	Cir	0.013	1.00	352.13	Pipe - (90)
6	1	73.927	64.975	Comb	0.00	0.19	0.55	10.0	344.71	2.16	346.31	15	Cir	0.013	1.50	350.74	Pipe - (99)
7	6	41.000	-96.542	Comb	0.00	0.29	0.55	10.0	346.80	1.00	347.21	15	Cir	0.013	1.00	350.70	Pipe - (97)

Project File: Outfall 3C.stm

Number of lines: 7

Date: 11/4/2024

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 331	Combination	351.47	Rect	4.00	4.00	18	Cir	344.00	18 15	Cir Cir	344.46 344.71
2	CB 334	Combination	352.51	Rect	4.00	4.00	18	Cir	345.45	18	Cir	345.65
3	CB 335	Combination	353.07	Rect	4.00	4.00	18	Cir	347.01	18	Cir	347.21
4	CB 336	Combination	352.15	Rect	8.00	4.00	18	Cir	347.44	15	Cir	347.70
5	CB 337	Combination	352.13	Rect	8.00	4.00	15	Cir	348.10			
6	CB 332	Combination	350.74	Rect	8.00	4.00	15	Cir	346.31	15	Cir	346.80
7	CB 333	Combination	350.70	Rect	8.00	4.00	15	Cir	347.21			

Project File: Outfall 3C.stm | Number of Structures: 7 | Run Date: 11/4/2024

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (94)	8.05	18	Cir	55.258	340.50	344.00	6.334	342.18	345.10	n/a	345.10 j	End	Combination
2	Pipe - (93)	6.45	18	Cir	62.088	344.46	345.45	1.595	345.20	346.43	0.22	346.43	1	Combination
3	Pipe - (92)	6.10	18	Cir	108.797	345.65	347.01	1.250	346.43	347.96	n/a	347.96	2	Combination
4	Pipe - (91)	6.04	18	Cir	45.962	347.21	347.44	0.500	348.24	348.47	0.38	348.85	3	Combination
5	Pipe - (90)	2.58	15	Cir	27.000	347.70	348.10	1.481	348.85	348.74	0.26	348.74	4	Combination
6	Pipe - (99)	1.54	15	Cir	73.927	344.71	346.31	2.164	345.10	346.80	0.28	346.80	1	Combination
7	Pipe - (97)	0.94	15	Cir	41.000	346.80	347.21	1.000	347.12	347.59	0.14	347.59	6	Combination

Project File: Outfall 3C.stm | Number of lines: 7 | Run Date: 11/4/2024

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 331	0.13	0.01	0.14	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.018	2.00	0.060	0.020	0.013	0.09	1.45	0.00	0.00	0.0	Off
2	CB 334	0.42	0.11	0.51	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.014	2.00	0.060	0.020	0.013	0.15	3.38	0.04	0.63	0.0	1
3	CB 335	0.10	0.79	0.78	0.11	Comb	6.0	1.50	0.00	3.00	2.50	0.010	2.00	0.060	0.020	0.013	0.18	5.23	0.09	1.46	0.0	2
4	CB 336	3.49	0.00	2.70	0.79	Comb	6.0	3.00	0.00	6.00	2.50	0.046	2.00	0.060	0.020	0.013	0.22	7.11	0.14	2.90	0.0	3
5	CB 337	2.58	0.00	2.15	0.44	Comb	6.0	3.00	0.00	6.00	2.50	0.046	2.00	0.060	0.020	0.013	0.20	6.14	0.11	1.85	0.0	Off
6	CB 332	0.61	0.00	0.59	0.02	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.16	4.21	0.05	0.76	0.0	Off
7	CB 333	0.94	0.00	0.87	0.06	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.19	5.38	0.07	1.20	0.0	Off

Project File: Outfall 3C.stm | Number of lines: 7 | Run Date: 11/4/2024

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	8.05	340.50	342.18	1.50	1.39	4.55	0.32	342.50	0.587	55.258	344.00	345.10 j	1.10**	1.39	5.80	0.52	345.62	0.748	0.668	n/a	2.08	n/a
2	18	6.45	344.46	345.20	0.74*	0.87	7.45	0.43	345.63	0.000	62.088	345.45	346.43	0.98**	1.22	5.27	0.43	346.86	0.000	0.000	n/a	0.50	0.22
3	18	6.10	345.65	346.43	0.78	0.93	6.56	0.41	346.84	0.000	108.797	347.01	347.96	0.95**	1.19	5.15	0.41	348.38	0.000	0.000	n/a	1.12	n/a
4	18	6.04	347.21	348.24	1.03*	1.29	4.68	0.34	348.58	0.500	45.962	347.44	348.47	1.03	1.29	4.69	0.34	348.81	0.501	0.500	0.230	1.12	0.38
5	15	2.58	347.70	348.85	1.15	0.64	2.19	0.26	349.11	0.000	27.000	348.10	348.74	0.64**	0.64	4.06	0.26	349.00	0.000	0.000	n/a	1.00	0.26
6	15	1.54	344.71	345.10	0.39	0.32	4.74	0.18	345.28	0.000	73.927	346.31	346.80	0.49**	0.45	3.44	0.18	346.99	0.000	0.000	n/a	1.50	0.28
7	15	0.94	346.80	347.12	0.32*	0.25	3.74	0.14	347.26	0.000	41.000	347.21	347.59	0.38**	0.32	2.97	0.14	347.73	0.000	0.000	n/a	1.00	0.14

Project File: Outfall 3C.stm

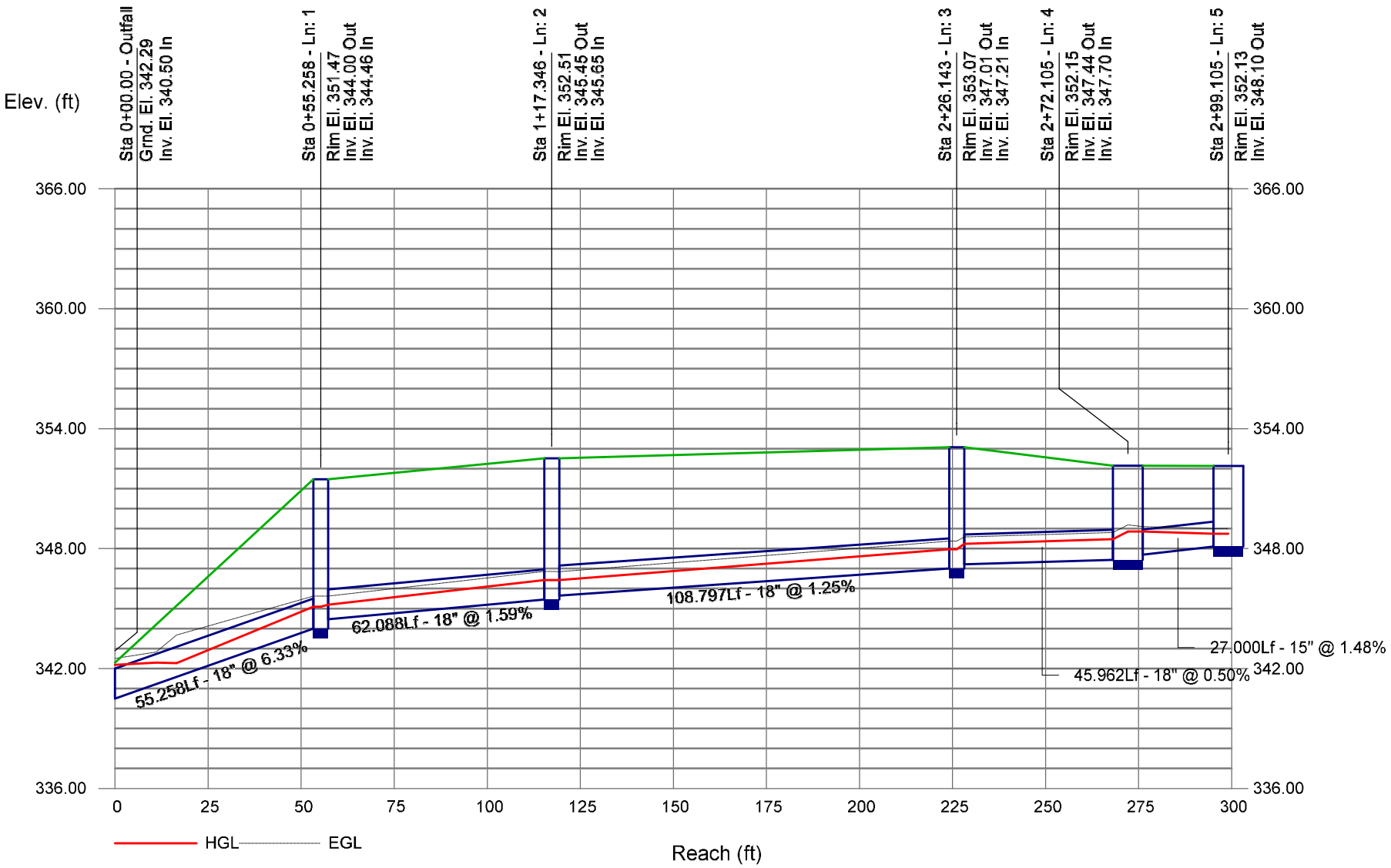
Number of lines: 7

Run Date: 11/4/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Storm Sewer Profile

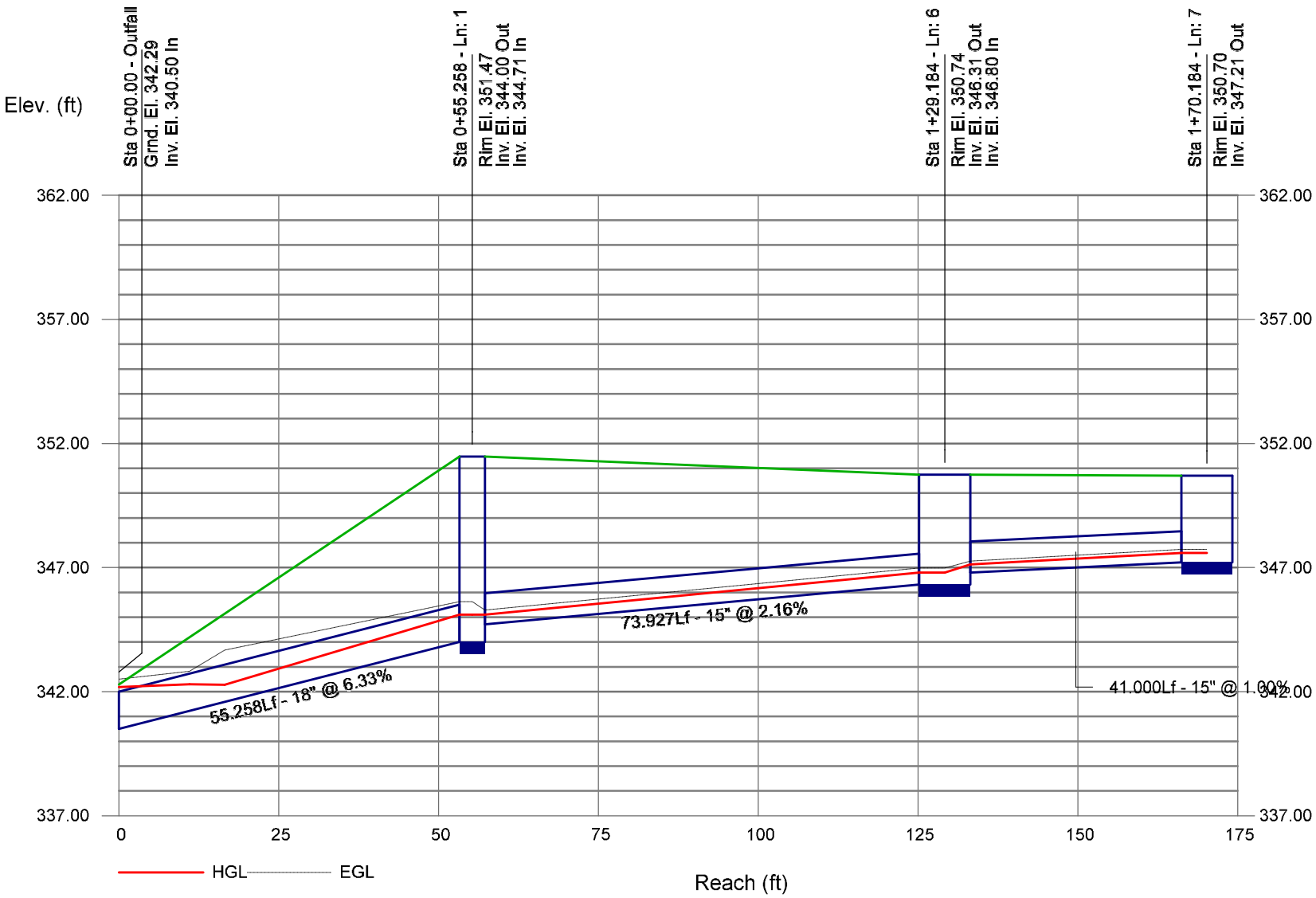
SCM 3C 1-5 Profile10-Year Proj. file: Outfall 3C.stm



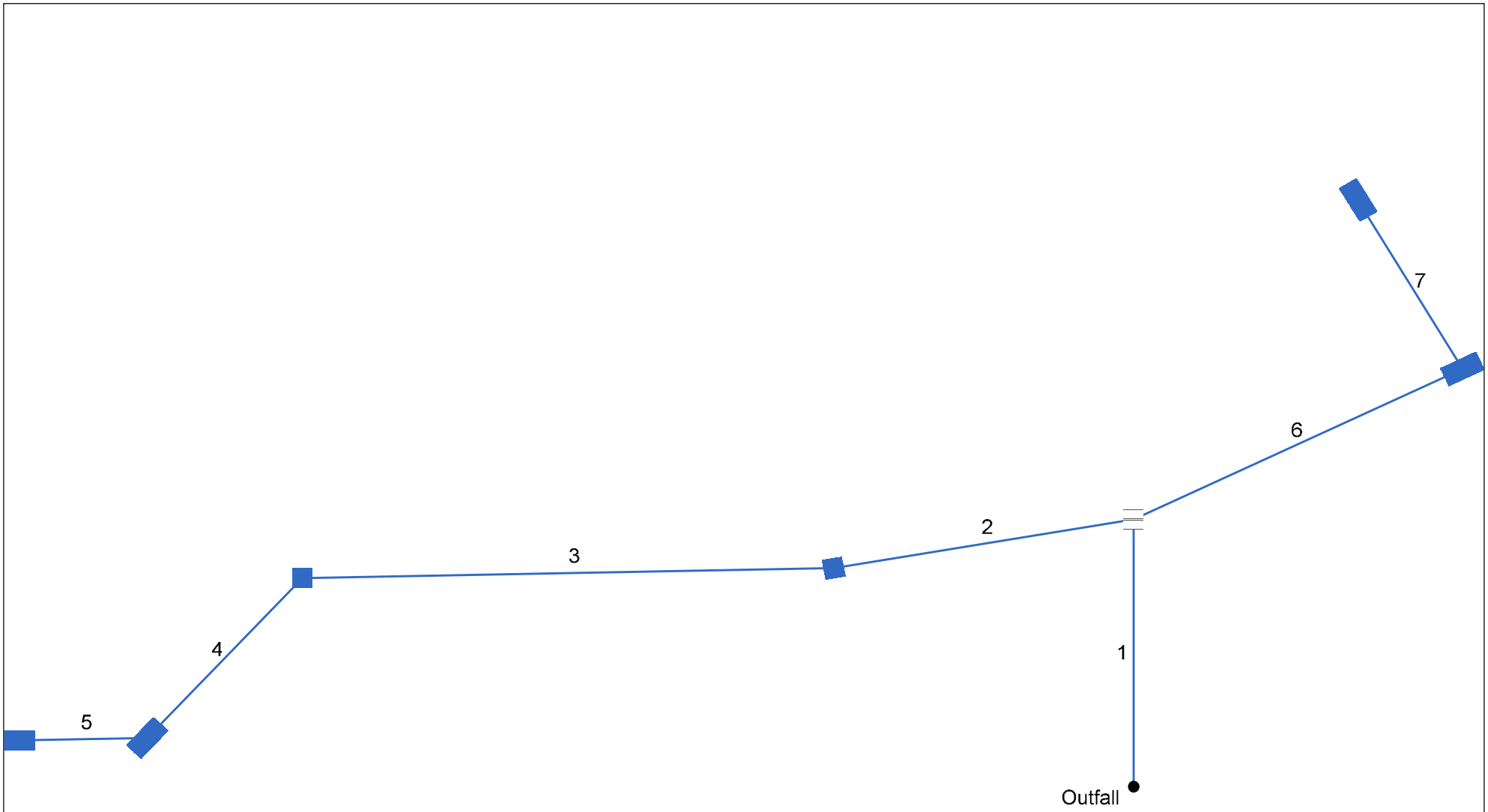
Storm Sewer Profile

10-Year SCM 3C 1-7 Profile

Proj. file: Outfall 3C.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM 3C 25-Year Report



Project File: Outfall 3C.stm	Number of lines: 7	Date: 11/4/2024

Storm Sewer Inventory Report

SCM 3C 25-Year Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	55.258	-89.825	Comb	0.00	0.04	0.55	10.0	340.50	6.33	344.00	18	Cir	0.013	2.08	351.47	Pipe - (94)
2	1	62.088	-99.549	Comb	0.00	0.13	0.55	10.0	344.46	1.59	345.45	18	Cir	0.013	0.50	352.51	Pipe - (93)
3	2	108.797	8.311	Comb	0.00	0.03	0.55	10.0	345.65	1.25	347.01	18	Cir	0.013	1.12	353.07	Pipe - (92)
4	3	45.962	-44.970	Comb	0.00	1.08	0.55	10.0	347.21	0.50	347.44	18	Cir	0.013	1.12	352.15	Pipe - (91)
5	4	27.000	45.000	Comb	0.00	0.80	0.55	10.0	347.70	1.48	348.10	15	Cir	0.013	1.00	352.13	Pipe - (90)
6	1	73.927	64.975	Comb	0.00	0.19	0.55	10.0	344.71	2.16	346.31	15	Cir	0.013	1.50	350.74	Pipe - (99)
7	6	41.000	-96.542	Comb	0.00	0.29	0.55	10.0	346.80	1.00	347.21	15	Cir	0.013	1.00	350.70	Pipe - (97)

Project File: Outfall 3C.stm | Number of lines: 7 | Date: 11/4/2024

Structure Report

SCM 3C 25-Year Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 331	Combination	351.47	Rect	4.00	4.00	18	Cir	344.00	18 15	Cir Cir	344.46 344.71
2	CB 334	Combination	352.51	Rect	4.00	4.00	18	Cir	345.45	18	Cir	345.65
3	CB 335	Combination	353.07	Rect	4.00	4.00	18	Cir	347.01	18	Cir	347.21
4	CB 336	Combination	352.15	Rect	8.00	4.00	18	Cir	347.44	15	Cir	347.70
5	CB 337	Combination	352.13	Rect	8.00	4.00	15	Cir	348.10			
6	CB 332	Combination	350.74	Rect	8.00	4.00	15	Cir	346.31	15	Cir	346.80
7	CB 333	Combination	350.70	Rect	8.00	4.00	15	Cir	347.21			

Project File: Outfall 3C.stm | Number of Structures: 7 | Run Date: 11/4/2024

Storm Sewer Summary Report

SCM 3C 25-Year Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (94)	8.97	18	Cir	55.258	340.50	344.00	6.334	342.00	345.16	n/a	345.16 j	End	Combination
2	Pipe - (93)	7.19	18	Cir	62.088	344.46	345.45	1.595	345.25	346.49	n/a	346.49	1	Combination
3	Pipe - (92)	6.80	18	Cir	108.797	345.65	347.01	1.250	346.49	348.02	n/a	348.02	2	Combination
4	Pipe - (91)	6.73	18	Cir	45.962	347.21	347.44	0.500	348.33	348.56	0.39	348.95	3	Combination
5	Pipe - (90)	2.88	15	Cir	27.000	347.70	348.10	1.481	348.95	348.94	0.17	349.11	4	Combination
6	Pipe - (99)	1.72	15	Cir	73.927	344.71	346.31	2.164	345.16	346.83	n/a	346.83	1	Combination
7	Pipe - (97)	1.04	15	Cir	41.000	346.80	347.21	1.000	347.14	347.61	0.15	347.61	6	Combination

Project File: Outfall 3C.stm | Number of lines: 7 | Run Date: 11/4/2024

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Inlet Report

SCM 3C 25-Year Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 331	0.14	0.03	0.17	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.018	2.00	0.060	0.020	0.013	0.09	1.56	0.00	0.00	0.0	Off
2	CB 334	0.47	0.17	0.61	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.014	2.00	0.060	0.020	0.013	0.16	3.86	0.05	0.85	0.0	1
3	CB 335	0.11	0.96	0.90	0.17	Comb	6.0	1.50	0.00	3.00	2.50	0.010	2.00	0.060	0.020	0.013	0.20	5.77	0.10	1.72	0.0	2
4	CB 336	3.89	0.00	2.93	0.96	Comb	6.0	3.00	0.00	6.00	2.50	0.046	2.00	0.060	0.020	0.013	0.23	7.48	0.15	3.39	0.0	3
5	CB 337	2.88	0.00	2.33	0.55	Comb	6.0	3.00	0.00	6.00	2.50	0.046	2.00	0.060	0.020	0.013	0.21	6.48	0.12	2.04	0.0	Off
6	CB 332	0.68	0.00	0.66	0.03	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.17	4.50	0.05	0.87	0.0	Off
7	CB 333	1.04	0.00	0.96	0.08	Comb	6.0	3.00	0.00	6.00	2.50	0.010	2.00	0.060	0.020	0.013	0.19	5.70	0.08	1.32	0.0	Off

Project File: Outfall 3C.stm | Number of lines: 7 | Run Date: 11/4/2024

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Hydraulic Grade Line Computations

SCM 3C 25-Year Report

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	8.97	340.50	342.00	1.50	1.46	5.08	0.40	342.40	0.730	55.258	344.00	345.16 j	1.16**	1.46	6.13	0.58	345.74	0.822	0.776	n/a	2.08	n/a
2	18	7.19	344.46	345.25	0.79*	0.94	7.65	0.47	345.72	0.000	62.088	345.45	346.49	1.04**	1.30	5.51	0.47	346.96	0.000	0.000	n/a	0.50	n/a
3	18	6.80	345.65	346.49	0.84	1.01	6.70	0.45	346.94	0.000	108.797	347.01	348.02	1.01**	1.26	5.38	0.45	348.47	0.000	0.000	n/a	1.12	n/a
4	18	6.73	347.21	348.33	1.12*	1.41	4.76	0.35	348.68	0.500	45.962	347.44	348.56	1.12	1.41	4.76	0.35	348.91	0.500	0.500	0.230	1.12	0.39
5	15	2.88	347.70	348.95	1.25	1.23	2.35	0.09	349.04	0.199	27.000	348.10	348.94	0.84	0.88	3.27	0.17	349.11	0.314	0.256	0.069	1.00	0.17
6	15	1.72	344.71	345.16	0.45	0.40	4.34	0.20	345.35	0.000	73.927	346.31	346.83	0.52**	0.48	3.56	0.20	347.03	0.000	0.000	n/a	1.50	n/a
7	15	1.04	346.80	347.14	0.34*	0.27	3.86	0.15	347.29	0.000	41.000	347.21	347.61	0.40**	0.34	3.07	0.15	347.76	0.000	0.000	n/a	1.00	0.15

Project File: Outfall 3C.stm

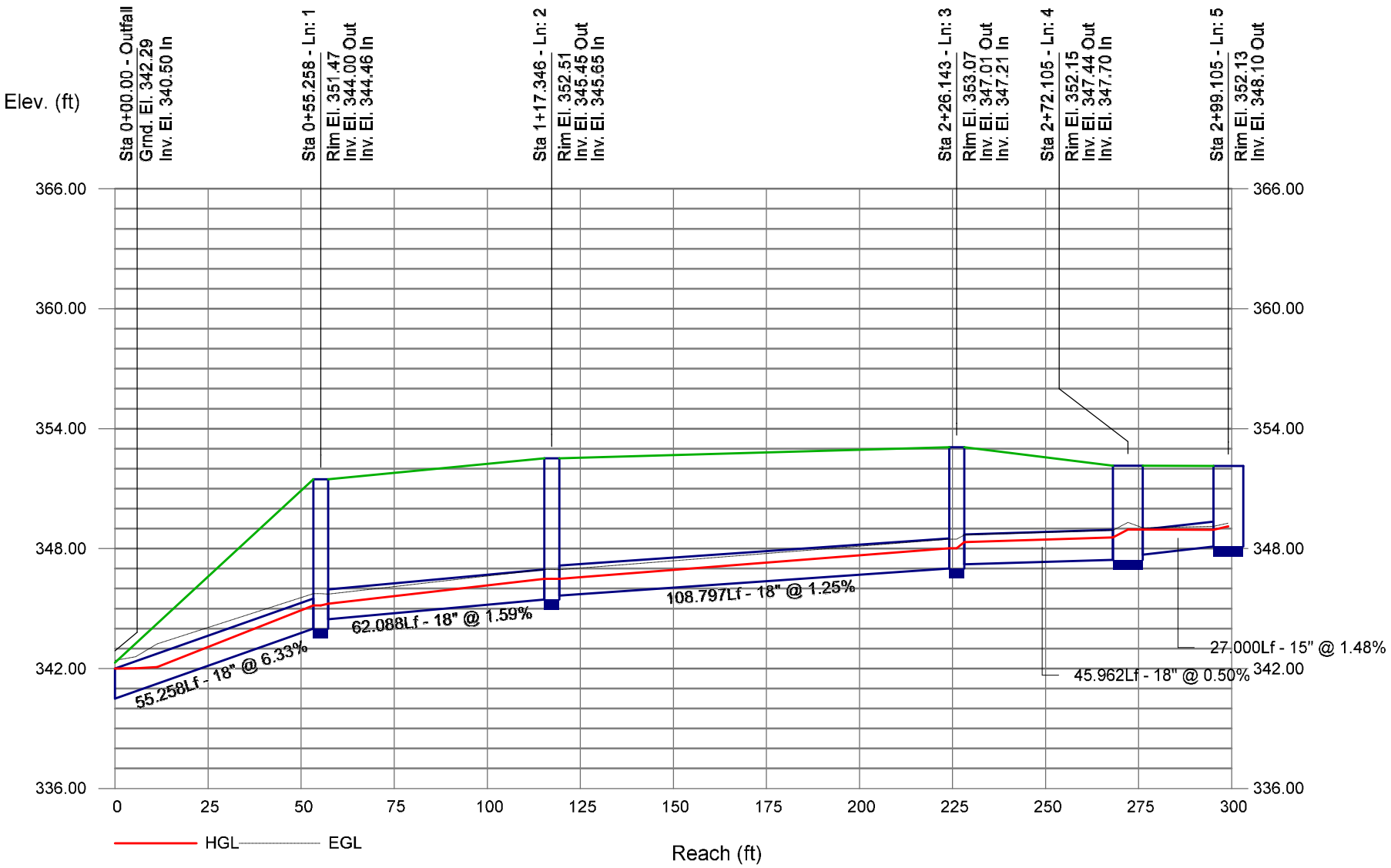
Number of lines: 7

Run Date: 11/4/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

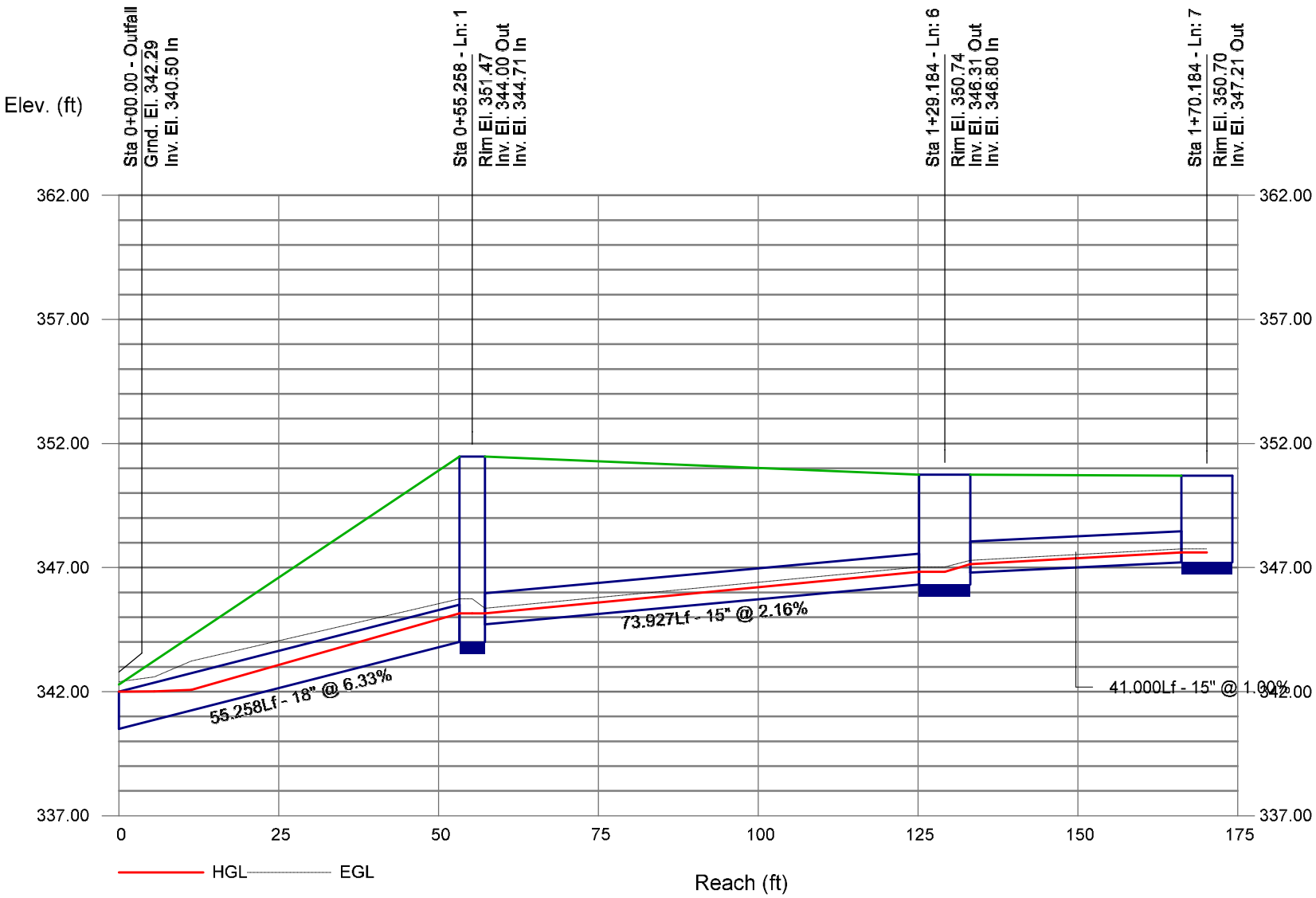
Storm Sewer Profile

SCM 3C 1-5 Profile 25 Year Proj. file: Outfall 3C.stm

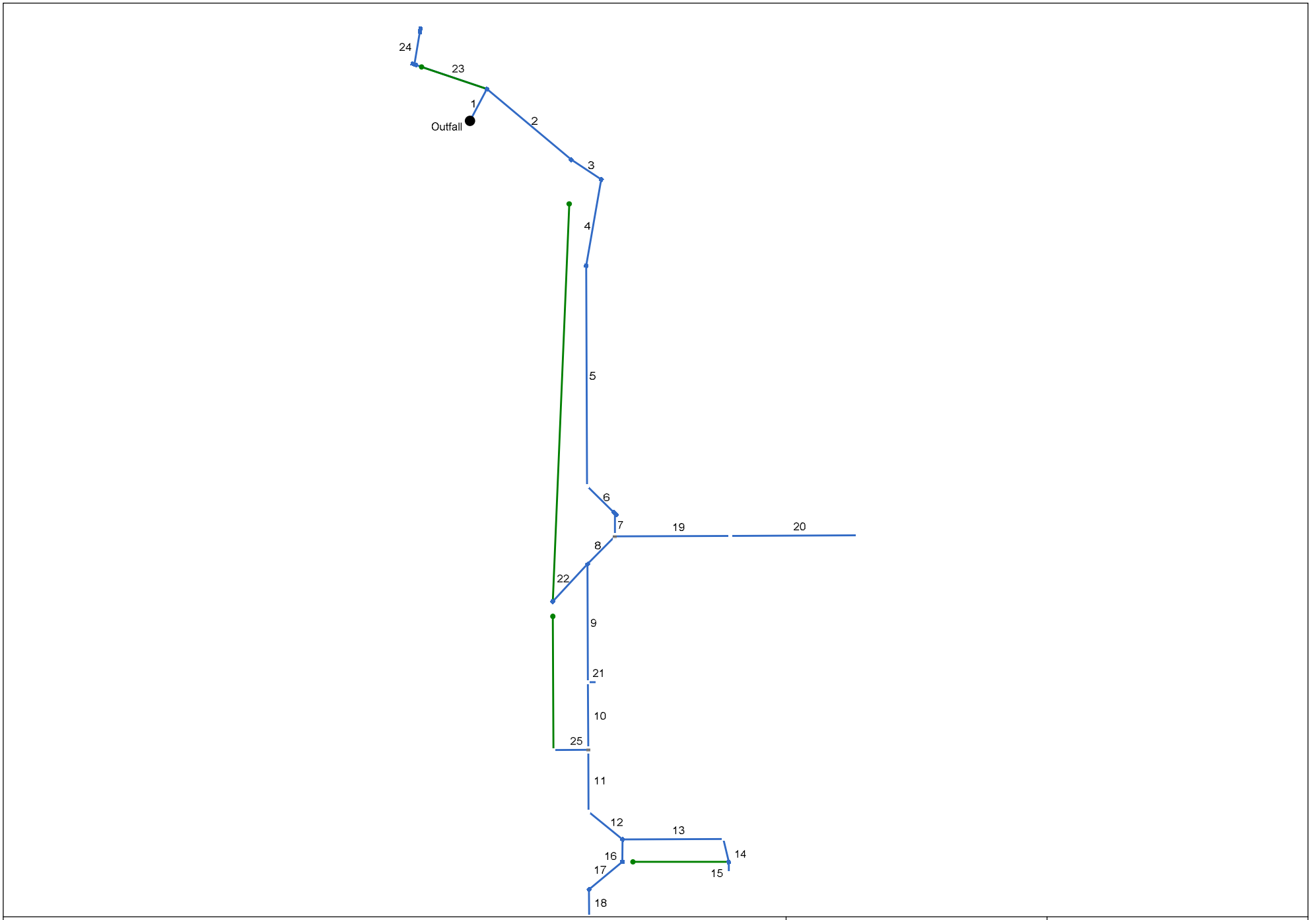


Storm Sewer Profile

SCM 3C 1-7 Profile 25 Year Proj. file: Outfall 3C.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM 4B 10-Year Report



Project File: Outfall 4B.stm	Number of lines: 25	Date: 11/4/2024

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	42.516	-61.942	Comb	0.00	0.14	0.55	10.0	323.50	0.82	323.85	36	Cir	0.013	2.25	334.99	Pipe - (59)
2	1	129.387	102.054	Comb	0.00	0.63	0.55	10.0	328.76	1.75	331.02	36	Cir	0.013	0.50	340.12	Pipe - (76)
3	2	42.581	-6.884	Comb	0.00	0.15	0.55	10.0	335.95	2.00	336.80	36	Cir	0.013	1.40	343.27	Pipe - (75)
4	3	103.486	66.751	Comb	0.00	0.35	0.55	10.0	337.00	6.00	343.21	36	Cir	0.013	0.50	349.57	Pipe - (74)
5	4	260.350	-10.221	Comb	0.00	0.07	0.55	10.0	343.86	5.33	357.73	30	Cir	0.013	1.13	363.71	Pipe - (73)
6	5	45.962	-45.033	Comb	0.00	0.73	0.55	10.0	357.93	3.00	359.31	30	Cir	0.013	1.13	364.60	Pipe - (72)
7	6	27.000	45.000	Comb	0.00	0.34	0.55	10.0	359.51	1.00	359.78	30	Cir	0.013	1.50	364.80	Pipe - (71)
8	7	45.855	44.867	Comb	0.00	0.15	0.55	10.0	360.28	0.50	360.51	30	Cir	0.013	1.12	366.65	Pipe - (70)
9	8	139.486	-44.805	Comb	0.00	0.10	0.55	10.0	360.71	1.46	362.75	24	Cir	0.013	1.50	368.64	Pipe - (69)
10	9	80.000	-0.062	Comb	0.00	0.10	0.55	10.0	363.25	1.00	364.05	18	Cir	0.013	1.50	369.59	Pipe - (68)
11	10	72.897	0.000	Comb	0.00	0.03	0.55	10.0	364.59	0.66	365.07	18	Cir	0.013	1.21	370.91	Pipe - (66)
12	11	51.744	-50.255	Comb	0.00	0.23	0.55	10.0	365.27	0.89	365.73	18	Cir	0.013	1.22	370.00	Pipe - (124)
13	12	118.800	-39.728	Comb	0.00	0.34	0.55	10.0	365.93	4.49	371.26	18	Cir	0.013	1.47	376.19	Pipe - (123)
14	13	27.692	77.428	Comb	0.00	0.34	0.55	10.0	371.46	1.01	371.74	15	Cir	0.013	0.50	376.50	Pipe - (122)
15	14	13.666	12.997	DrGrt	0.00	0.93	0.55	10.0	371.94	1.98	372.21	15	Cir	0.013	1.00	377.81	Pipe - (121)
16	12	26.466	51.215	Comb	0.00	0.31	0.55	10.0	365.93	0.53	366.07	18	Cir	0.013	1.20	370.41	Pipe - (88)
17	16	51.002	49.520	Comb	0.00	0.04	0.55	10.0	366.32	0.90	366.78	15	Cir	0.013	1.21	371.92	Pipe - (87)
18	17	32.000	-50.479	Comb	0.00	0.14	0.55	10.0	366.98	1.00	367.30	15	Cir	0.013	1.00	372.06	Pipe - (86)
19	7	135.998	-89.999	Comb	0.00	0.29	0.55	10.0	361.03	3.38	365.62	18	Cir	0.013	0.50	370.40	Pipe - (81)
20	19	150.000	0.000	Comb	0.00	0.36	0.55	10.0	365.92	2.43	369.57	15	Cir	0.013	1.00	374.90	Pipe - (80)
21	9	11.666	-89.981	DrGrt	0.00	2.98	0.55	10.0	363.00	1.97	363.23	15	Cir	0.013	1.00	369.67	Pipe - (83)
22	8	60.248	-1.786	Comb	0.00	0.20	0.55	10.0	361.04	1.00	361.64	18	Cir	0.013	1.00	367.36	Pipe - (78)
23	1	90.414	-99.308	Comb	0.00	0.23	0.55	10.0	327.61	1.21	328.70	15	Cir	0.013	1.48	333.72	Pipe - (58)

Project File: Outfall 4B.stm

Number of lines: 25

Date: 11/4/2024

Storm Sewer Inventory Report

SCM 4B 10-Year Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	41.000	80.692	Comb	0.00	0.41	0.55	10.0	328.90	1.00	329.31	15	Cir	0.013	1.00	333.72	Pipe - (61)
25	10	41.000	89.970	Comb	0.00	0.58	0.55	10.0	364.45	0.71	364.74	15	Cir	0.013	1.00	369.60	

Project File: Outfall 4B.stm

Number of lines: 25

Date: 11/4/2024

Structure Report

SCM 4B 10-Year Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 472	Combination	334.99	Rect	4.00	4.00	36	Cir	323.85	36 15	Cir Cir	328.76 327.61
2	CB 473	Combination	340.12	Rect	4.00	4.00	36	Cir	331.02	36	Cir	335.95
3	CB 474	Combination	343.27	Rect	4.00	4.00	36	Cir	336.80	36	Cir	337.00
4	CB 475	Combination	349.57	Rect	4.00	4.00	36	Cir	343.21	30	Cir	343.86
5	CB 476	Combination	363.71	Rect	4.00	4.00	30	Cir	357.73	30	Cir	357.93
6	CB 477	Combination	364.60	Rect	8.00	4.00	30	Cir	359.31	30	Cir	359.51
7	CB 478	Combination	364.80	Rect	8.00	4.00	30	Cir	359.78	30 18	Cir Cir	360.28 361.03
8	CB 481	Combination	366.65	Rect	4.00	4.00	30	Cir	360.51	24 18	Cir Cir	360.71 361.04
9	CB 483	Combination	368.64	Rect	4.00	4.00	24	Cir	362.75	18 15	Cir Cir	363.25 363.00
10	CB 484	Combination	369.59	Rect	8.00	4.00	18	Cir	364.05	18 15	Cir Cir	364.59 364.45
11	CB 485	Combination	370.91	Rect	4.00	4.00	18	Cir	365.07	18	Cir	365.27
12	CB 486	Combination	370.00	Rect	4.00	4.00	18	Cir	365.73	18 18	Cir Cir	365.93 365.93
13	CB 488	Combination	376.19	Rect	4.00	4.00	18	Cir	371.26	15	Cir	371.46
14	CB 489	Combination	376.50	Rect	4.00	4.00	15	Cir	371.74	15	Cir	371.94
15	YI 489A	DropGrate	377.81	Rect	4.00	4.00	15	Cir	372.21			
16	CB 487	Combination	370.41	Rect	4.00	4.00	18	Cir	366.07	15	Cir	366.32
17	CB 490	Combination	371.92	Rect	4.00	4.00	15	Cir	366.78	15	Cir	366.98
18	CB 491	Combination	372.06	Rect	4.00	4.00	15	Cir	367.30			
19	CB 479	Combination	370.40	Rect	4.00	4.00	18	Cir	365.62	15	Cir	365.92
20	CB 480	Combination	374.90	Rect	4.00	4.00	15	Cir	369.57			

Project File: Outfall 4B.stm | Number of Structures: 25 | Run Date: 11/4/2024

Structure Report

SCM 4B 10-Year Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	YI 483A	DropGrate	369.67	Rect	4.00	4.00	15	Cir	363.23			
22	CB 482	Combination	367.36	Rect	4.00	4.00	18	Cir	361.64			
23	CB 470	Combination	333.72	Rect	8.00	4.00	15	Cir	328.70	15	Cir	328.90
24	CB 471	Combination	333.72	Rect	8.00	4.00	15	Cir	329.31			
25	CB 484B	Combination	369.60	Rect	4.00	4.00	15	Cir	364.74			

Project File: Outfall 4B.stm | Number of Structures: 25 | Run Date: 11/4/2024

Storm Sewer Summary Report

SCM 4B 10-Year Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (59)	29.09	36	Cir	42.516	323.50	323.85	0.823	326.50	326.55	0.66	327.21	End	Combination
2	Pipe - (76)	27.06	36	Cir	129.387	328.76	331.02	1.747	329.90	332.70	n/a	332.70	1	Combination
3	Pipe - (75)	25.31	36	Cir	42.581	335.95	336.80	1.996	337.01	338.42	0.92	338.42	2	Combination
4	Pipe - (74)	25.06	36	Cir	103.486	337.00	343.21	6.001	338.42	344.82	n/a	344.82	3	Combination
5	Pipe - (73)	24.36	30	Cir	260.350	343.86	357.73	5.327	344.82	359.41	0.85	359.41	4	Combination
6	Pipe - (72)	24.23	30	Cir	45.962	357.93	359.31	3.002	359.41	360.99	0.84	360.99	5	Combination
7	Pipe - (71)	22.12	30	Cir	27.000	359.51	359.78	1.000	360.99	361.38	1.04	361.38	6	Combination
8	Pipe - (70)	19.26	30	Cir	45.855	360.28	360.51	0.502	361.77	362.00	0.69	362.69	7	Combination
9	Pipe - (69)	18.91	24	Cir	139.486	360.71	362.75	1.463	362.69	364.31	n/a	364.31 j	8	Combination
10	Pipe - (68)	9.46	18	Cir	80.000	363.25	364.05	1.000	364.36	365.24	n/a	365.24	9	Combination
11	Pipe - (66)	7.40	18	Cir	72.897	364.59	365.07	0.658	365.67	366.15	0.56	366.71	10	Combination
12	Pipe - (124)	7.35	18	Cir	51.744	365.27	365.73	0.889	366.71	366.78	n/a	366.78 j	11	Combination
13	Pipe - (123)	5.18	18	Cir	118.800	365.93	371.26	4.487	366.78	372.14	n/a	372.14	12	Combination
14	Pipe - (122)	4.10	15	Cir	27.692	371.46	371.74	1.011	372.18	372.56	n/a	372.56	13	Combination
15	Pipe - (121)	3.00	15	Cir	13.666	371.94	372.21	1.976	372.56	372.91	n/a	372.91	14	DropGrate
16	Pipe - (88)	1.56	18	Cir	26.466	365.93	366.07	0.529	366.78	366.54	n/a	366.54	12	Combination
17	Pipe - (87)	0.58	15	Cir	51.002	366.32	366.78	0.902	366.58	367.08	0.13	367.08	16	Combination
18	Pipe - (86)	0.45	15	Cir	32.000	366.98	367.30	1.000	367.20	367.56	n/a	367.56	17	Combination
19	Pipe - (81)	2.06	18	Cir	135.998	361.03	365.62	3.375	361.38	366.16	n/a	366.16	7	Combination
20	Pipe - (80)	1.16	15	Cir	150.000	365.92	369.57	2.433	366.21	369.99	n/a	369.99	19	Combination
21	Pipe - (83)	9.63	15	Cir	11.666	363.00	363.23	1.972	364.31*	364.57*	0.96	365.53	9	DropGrate
22	Pipe - (78)	0.65	18	Cir	60.248	361.04	361.64	0.996	362.69	362.69	0.00	362.70	8	Combination
23	Pipe - (58)	2.05	15	Cir	90.414	327.61	328.70	1.206	328.07	329.27	n/a	329.27	1	Combination
24	Pipe - (61)	1.32	15	Cir	41.000	328.90	329.31	1.000	329.28	329.76	n/a	329.76	23	Combination

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

SCM 4B 10-Year Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25		1.87	15	Cir	41.000	364.45	364.74	0.707	365.24	365.28	n/a	365.28 j	10	Combination

Project File: Outfall 4B.stm

Number of lines: 25

Run Date: 11/4/2024

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Inlet Report

SCM 4B 10-Year Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 472	0.45	0.36	0.80	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.051	2.00	0.060	0.020	0.013	0.14	2.83	0.02	0.39	0.0	23
2	CB 473	2.04	0.17	1.85	0.36	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.19	5.35	0.10	1.64	0.0	1
3	CB 474	0.48	0.04	0.53	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.11	1.91	0.00	0.00	0.0	Off
4	CB 475	1.13	0.00	1.09	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.15	3.53	0.04	0.74	0.0	3
5	CB 476	0.23	0.00	0.23	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.08	1.39	0.00	0.00	0.0	4
6	CB 477	2.36	0.00	2.36	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.23	7.61	0.23	7.61	0.0	Off
7	CB 478	1.10	0.06	1.16	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.17	4.37	0.17	4.37	0.0	Off
8	CB 481	0.48	0.00	0.47	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.15	3.36	0.04	0.61	0.0	7
9	CB 483	0.32	0.00	0.32	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.13	2.37	0.00	0.00	0.0	8
10	CB 484	0.32	0.00	0.32	0.00	Comb	6.0	3.00	0.00	6.00	2.50	0.012	2.00	0.060	0.020	0.013	0.13	2.37	0.00	0.00	0.0	9
11	CB 485	0.10	0.00	0.10	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.08	1.35	0.00	0.00	0.0	10
12	CB 486	0.74	0.05	0.79	0.00	Comb	6.0	3.00	7.50	3.00	2.50	Sag	2.00	0.060	0.020	0.013	0.16	4.14	0.16	4.14	0.0	Off
13	CB 488	1.10	0.00	1.05	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.15	3.63	0.05	0.78	0.0	12
14	CB 489	1.10	0.00	1.05	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.15	3.63	0.05	0.78	0.0	16
15	YI 489A	3.00	0.00	3.00	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.20	22.72	0.20	22.72	0.0	Off
16	CB 487	1.00	0.05	1.05	0.00	Comb	6.0	3.00	7.50	3.00	2.50	Sag	2.00	0.060	0.020	0.013	0.18	5.20	0.18	5.20	0.0	Off
17	CB 490	0.13	0.01	0.14	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.09	1.54	0.00	0.00	0.0	16
18	CB 491	0.45	0.00	0.44	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.14	3.19	0.03	0.53	0.0	17
19	CB 479	0.94	0.17	1.06	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.15	3.64	0.05	0.80	0.0	7
20	CB 480	1.16	0.00	0.99	0.17	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.19	5.42	0.10	1.60	0.0	19
21	YI 483A	9.63	0.00	9.63	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.44	46.47	0.44	46.47	0.0	Off
22	CB 482	0.65	0.48	0.95	0.17	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.19	5.66	0.10	1.69	0.0	2
23	CB 470	0.74	0.01	0.75	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.14	3.02	0.14	3.02	0.0	Off

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

SCM 4B 10-Year Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	CB 471	1.32	0.00	1.32	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.18	4.87	0.18	4.87	0.0	Off
25	CB 484B	1.87	0.00	1.39	0.48	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.23	7.28	0.15	3.33	0.0	22

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

SCM 4B 10-Year Report

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	29.09	323.50	326.50	3.00	7.07	4.12	0.26	326.76	0.190	42.516	323.85	326.55	2.70	6.69	4.34	0.29	326.84	0.168	0.179	0.076	2.25	0.66
2	36	27.06	328.76	329.90	1.14*	2.47	10.97	0.69	330.59	0.000	129.387	331.02	332.70	1.68**	4.07	6.64	0.69	333.39	0.000	0.000	n/a	0.50	n/a
3	36	25.31	335.95	337.01	1.06*	2.24	11.30	0.65	337.67	0.000	42.581	336.80	338.42	1.62**	3.90	6.49	0.65	339.08	0.000	0.000	n/a	1.40	0.92
4	36	25.06	337.00	338.42	1.42	3.30	7.60	0.65	339.07	0.000	103.486	343.21	344.82	1.61**	3.87	6.47	0.65	345.47	0.000	0.000	n/a	0.50	n/a
5	30	24.36	343.86	344.82	0.96	1.74	13.97	0.75	345.57	0.000	260.350	357.73	359.41	1.68**	3.51	6.95	0.75	360.16	0.000	0.000	n/a	1.13	0.85
6	30	24.23	357.93	359.41	1.48	3.03	8.01	0.75	360.16	0.000	45.962	359.31	360.99	1.68**	3.50	6.93	0.75	361.73	0.000	0.000	n/a	1.13	0.84
7	30	22.12	359.51	360.99	1.48	3.01	7.34	0.69	361.68	0.000	27.000	359.78	361.38	1.60**	3.31	6.68	0.69	362.07	0.000	0.000	n/a	1.50	1.04
8	30	19.26	360.28	361.77	1.49*	3.04	6.33	0.62	362.39	0.501	45.855	360.51	362.00	1.49**	3.06	6.30	0.62	362.62	0.496	0.498	0.229	1.12	0.69
9	24	18.91	360.71	362.69	1.98	2.63	6.03	0.80	363.49	0.699	139.486	362.75	364.31 j	1.56**	2.63	7.18	0.80	365.11	0.766	0.733	n/a	1.50	n/a
10	18	9.46	363.25	364.36	1.11*	1.41	6.73	0.62	364.98	0.000	80.000	364.05	365.24	1.19**	1.50	6.31	0.62	365.86	0.000	0.000	n/a	1.50	n/a
11	18	7.40	364.59	365.67	1.08*	1.36	5.43	0.46	366.13	0.658	72.897	365.07	366.15	1.08	1.36	5.43	0.46	366.61	0.659	0.659	0.480	1.21	0.56
12	18	7.35	365.27	366.71	1.44	1.32	4.22	0.48	367.19	0.000	51.744	365.73	366.78 j	1.05**	1.32	5.57	0.48	367.26	0.000	0.000	n/a	1.22	0.59
13	18	5.18	365.93	366.78	0.85	1.03	5.02	0.36	367.14	0.000	118.800	371.26	372.14	0.88**	1.07	4.83	0.36	372.50	0.000	0.000	n/a	1.47	n/a
14	15	4.10	371.46	372.18	0.72*	0.73	5.59	0.36	372.54	0.000	27.692	371.74	372.56	0.82**	0.85	4.81	0.36	372.92	0.000	0.000	n/a	0.50	n/a
15	15	3.00	371.94	372.56	0.62	0.61	4.96	0.28	372.84	0.000	13.666	372.21	372.91	0.70**	0.70	4.27	0.28	373.19	0.000	0.000	n/a	1.00	n/a
16	18	1.56	365.93	366.78	0.85	0.47	1.51	0.17	366.95	0.000	26.466	366.07	366.54	0.47**	0.47	3.31	0.17	366.71	0.000	0.000	n/a	1.20	n/a
17	15	0.58	366.32	366.58	0.26*	0.18	3.14	0.10	366.68	0.000	51.002	366.78	367.08	0.30**	0.22	2.60	0.10	367.18	0.000	0.000	n/a	1.21	0.13
18	15	0.45	366.98	367.20	0.22*	0.15	3.03	0.09	367.30	0.000	32.000	367.30	367.56	0.26**	0.19	2.43	0.09	367.65	0.000	0.000	n/a	1.00	n/a
19	18	2.06	361.03	361.38	0.35	0.31	6.62	0.20	361.58	0.000	135.998	365.62	366.16	0.54**	0.57	3.59	0.20	366.36	0.000	0.000	n/a	0.50	n/a
20	15	1.16	365.92	366.21	0.29*	0.21	5.47	0.16	366.36	0.000	150.000	369.57	369.99	0.42**	0.37	3.16	0.16	370.15	0.000	0.000	n/a	1.00	n/a
21	15	9.63	363.00	364.31	1.25	1.23	7.85	0.96	365.27	2.223	11.666	363.23	364.57	1.25	1.23	7.84	0.96	365.53	2.222	2.223	0.259	1.00	0.96
22	18	0.65	361.04	362.69	1.50	1.77	0.37	0.00	362.70	0.004	60.248	361.64	362.69	1.05	1.33	0.49	0.00	362.70	0.005	0.005	0.003	1.00	0.00

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

SCM 4B 10-Year Report

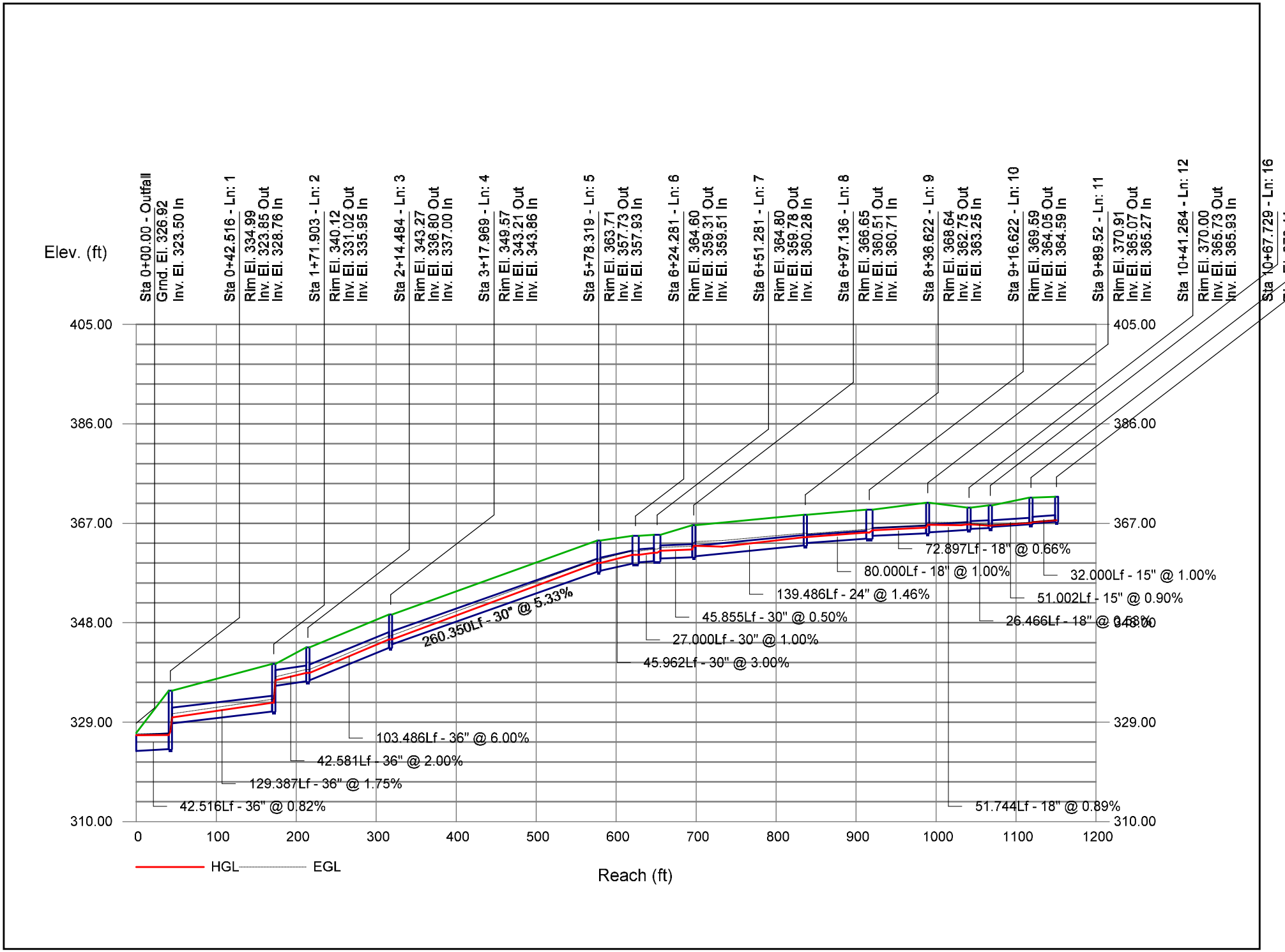
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	15	2.05	327.61	328.07	0.46*	0.41	5.00	0.22	328.29	0.000	90.414	328.70	329.27	0.57**	0.55	3.76	0.22	329.49	0.000	0.000	n/a	1.48	n/a
24	15	1.32	328.90	329.28	0.38*	0.32	4.13	0.17	329.45	0.000	41.000	329.31	329.76	0.45**	0.40	3.29	0.17	329.93	0.000	0.000	n/a	1.00	n/a
25	15	1.87	364.45	365.24	0.79	0.51	2.30	0.21	365.44	0.000	41.000	364.74	365.28 j	0.54**	0.51	3.65	0.21	365.49	0.000	0.000	n/a	1.00	0.21

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

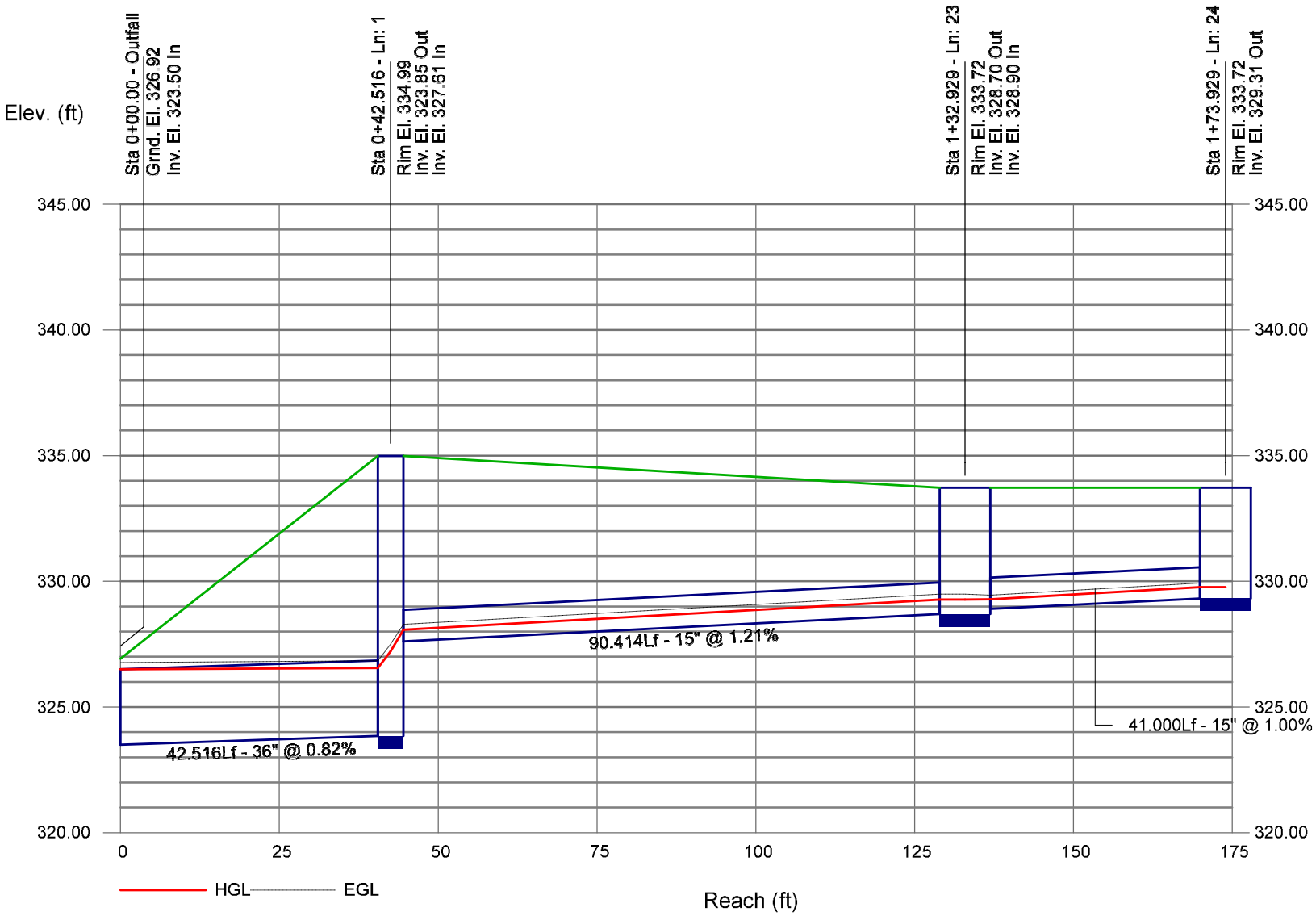
Storm Sewer Profile

SCM 4B 10-Year 1-18 Profile Proj. file: Outfall 4B.stm



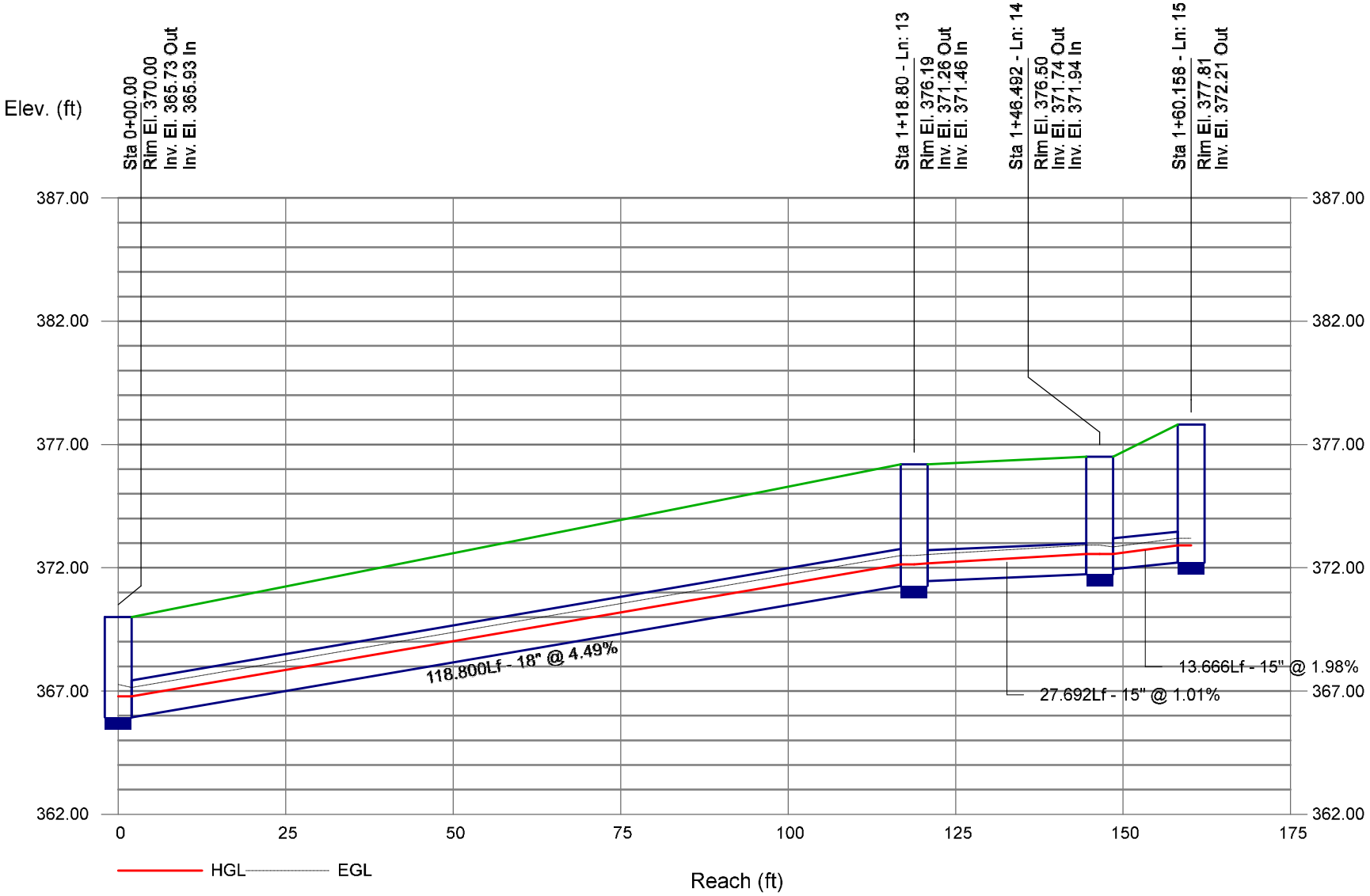
Storm Sewer Profile

SCM 4B 10-Year 1-24 Profile Proj. file: Outfall 4B.stm



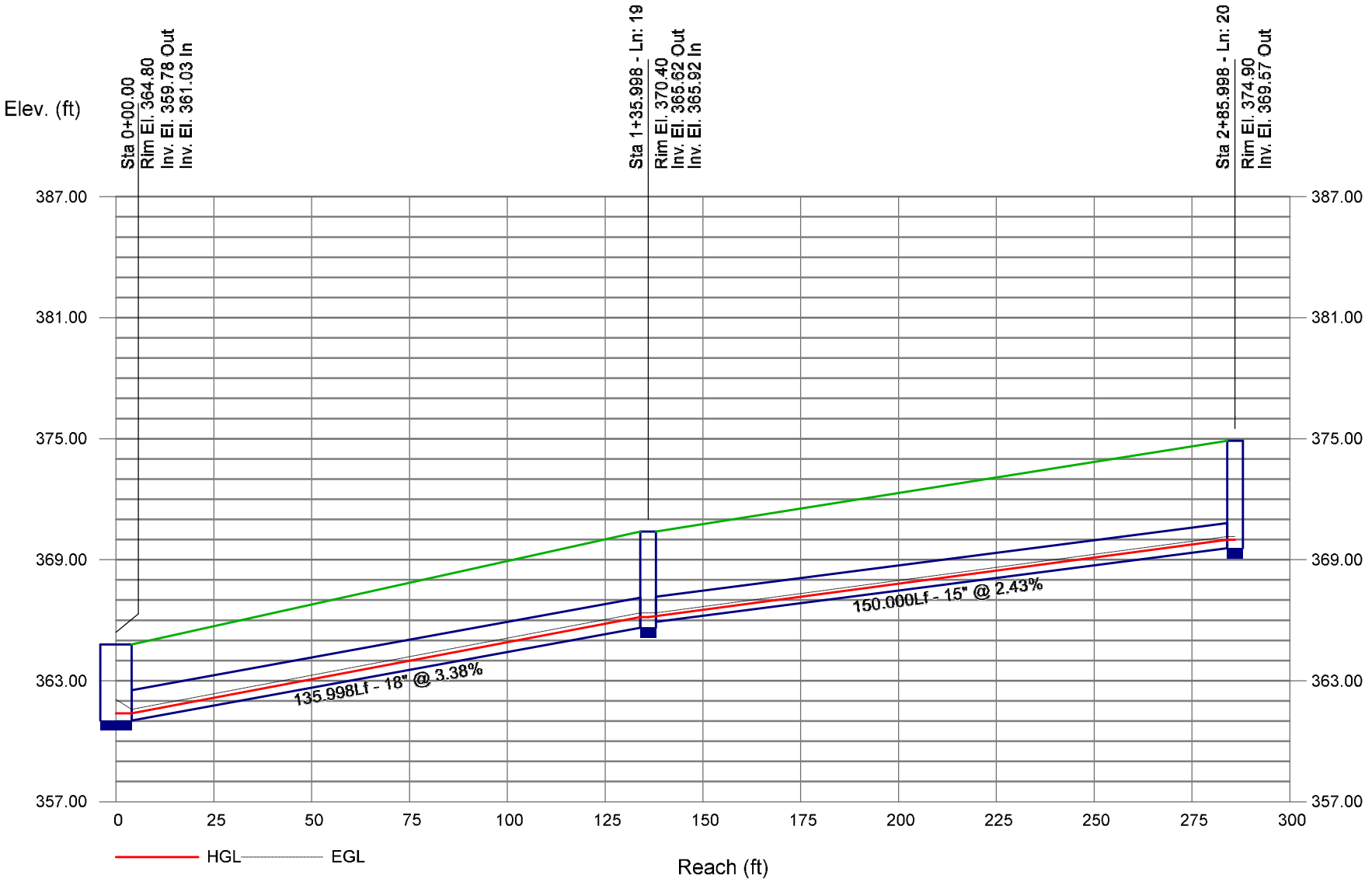
Storm Sewer Profile

SCM 4B 10-Year 13-15 Profile Proj. file: Outfall 4B.stm



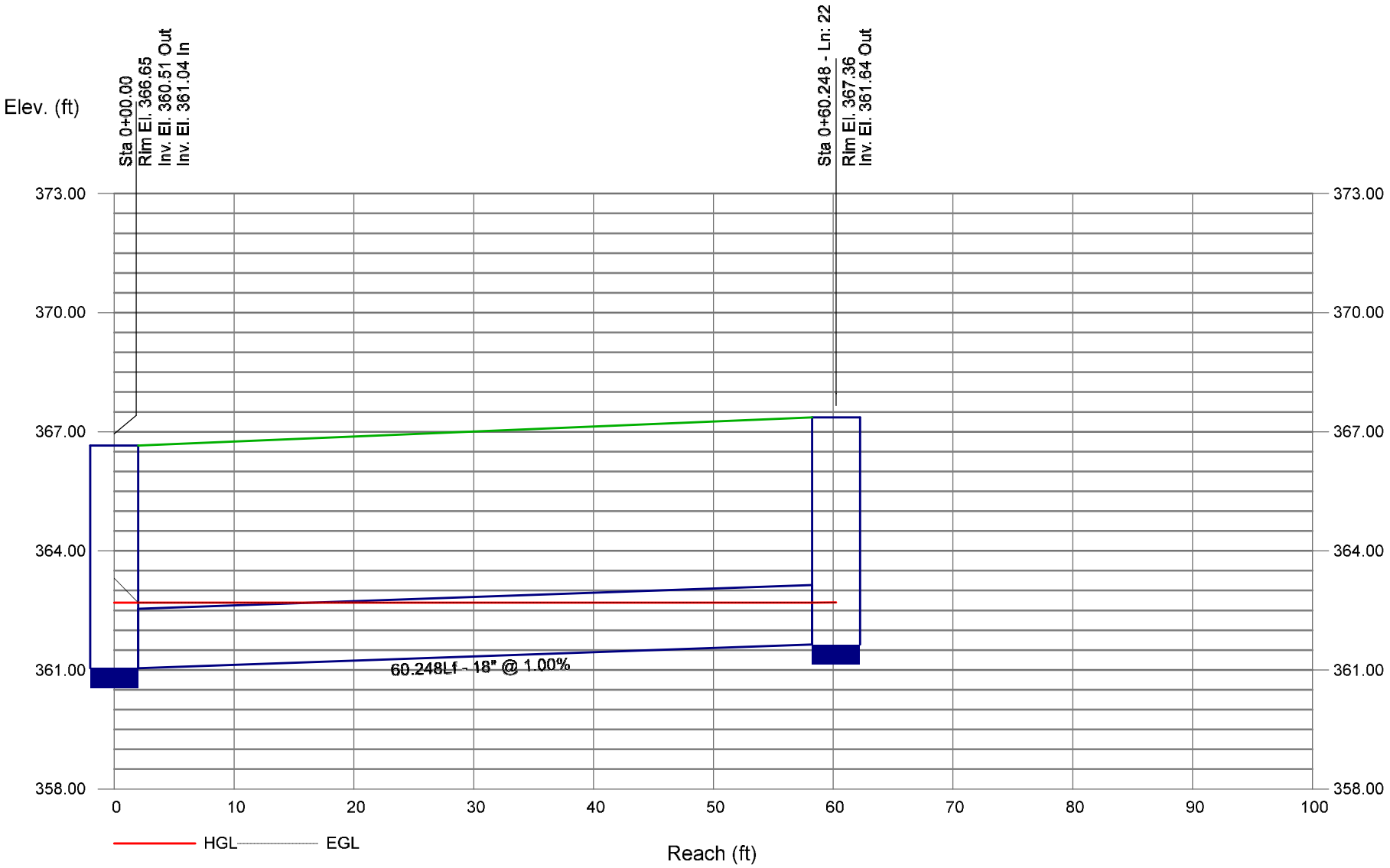
Storm Sewer Profile

SCM 4B 10-Year 19-20 Profile Proj. file: Outfall 4B.stm



Storm Sewer Profile

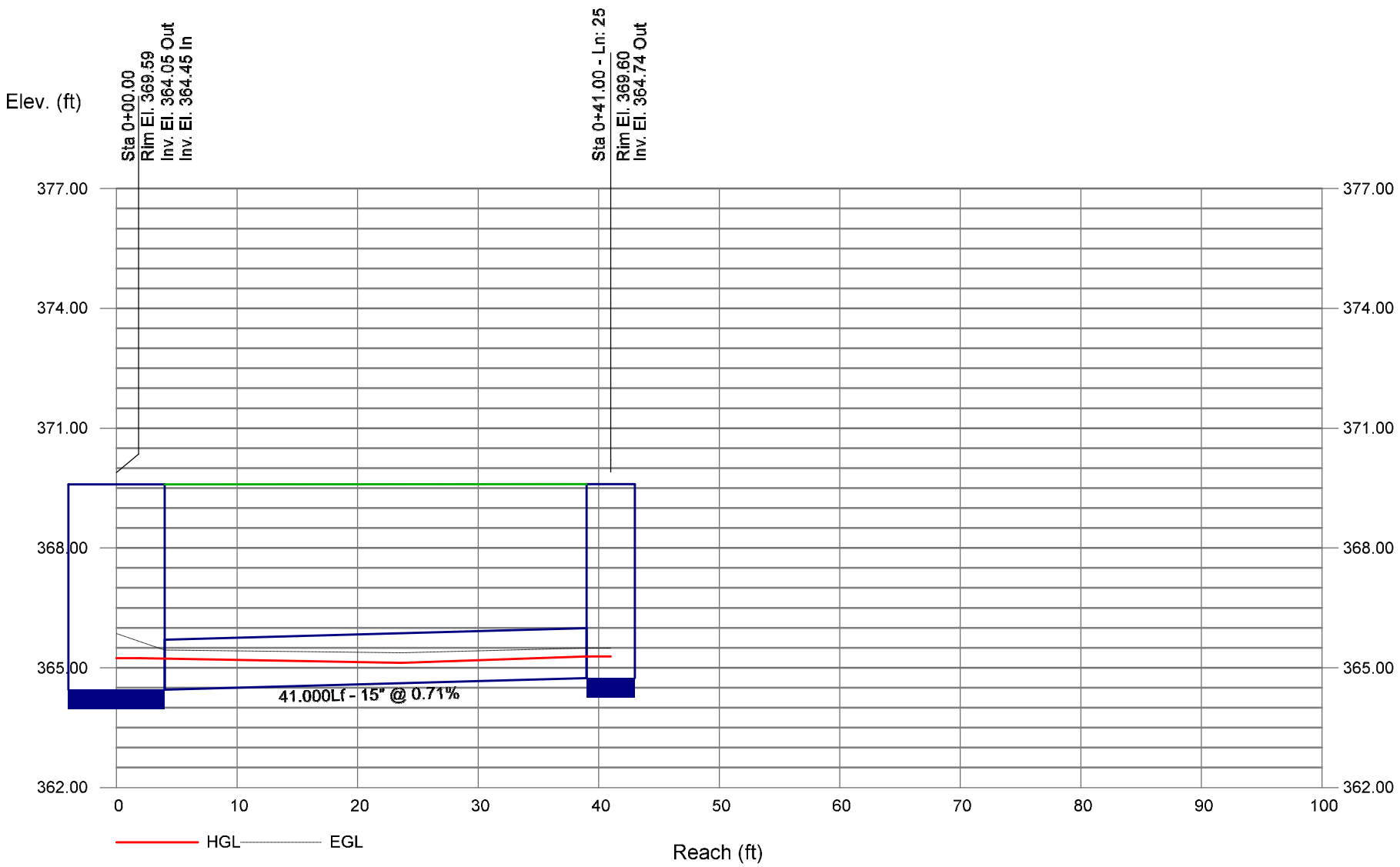
SCM 4B 10-Year 22-22 Profile Proj. file: Outfall 4B.stm



Storm Sewer Profile

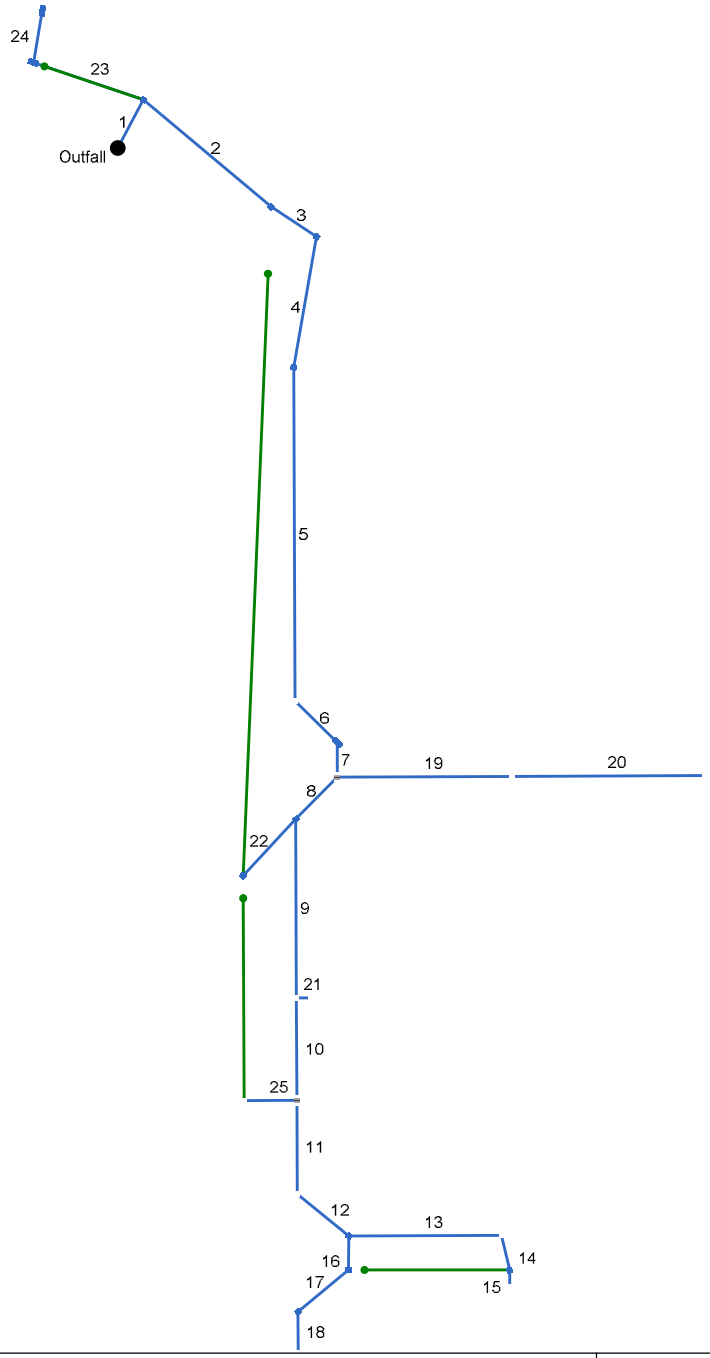
SCM 4B 10-Year 25-25 Profile

Proj. file: Outfall 4B.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

SCM 4B 25-Year Report



Project File: Outfall 4B.stm	Number of lines: 25	Date: 11/4/2024

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	42.516	-61.942	Comb	0.00	0.14	0.55	10.0	323.50	0.82	323.85	36	Cir	0.013	2.25	334.99	Pipe - (59)
2	1	129.387	102.054	Comb	0.00	0.63	0.55	10.0	328.76	1.75	331.02	36	Cir	0.013	0.50	340.12	Pipe - (76)
3	2	42.581	-6.884	Comb	0.00	0.15	0.55	10.0	335.95	2.00	336.80	36	Cir	0.013	1.40	343.27	Pipe - (75)
4	3	103.486	66.751	Comb	0.00	0.35	0.55	10.0	337.00	6.00	343.21	36	Cir	0.013	0.50	349.57	Pipe - (74)
5	4	260.350	-10.221	Comb	0.00	0.07	0.55	10.0	343.86	5.33	357.73	30	Cir	0.013	1.13	363.71	Pipe - (73)
6	5	45.962	-45.033	Comb	0.00	0.73	0.55	10.0	357.93	3.00	359.31	30	Cir	0.013	1.13	364.60	Pipe - (72)
7	6	27.000	45.000	Comb	0.00	0.34	0.55	10.0	359.51	1.00	359.78	30	Cir	0.013	1.50	364.80	Pipe - (71)
8	7	45.855	44.867	Comb	0.00	0.15	0.55	10.0	360.28	0.50	360.51	30	Cir	0.013	1.12	366.65	Pipe - (70)
9	8	139.486	-44.805	Comb	0.00	0.10	0.55	10.0	360.71	1.46	362.75	24	Cir	0.013	1.50	368.64	Pipe - (69)
10	9	80.000	-0.062	Comb	0.00	0.10	0.55	10.0	363.25	1.00	364.05	18	Cir	0.013	1.50	369.59	Pipe - (68)
11	10	72.897	0.000	Comb	0.00	0.03	0.55	10.0	364.59	0.66	365.07	18	Cir	0.013	1.21	370.91	Pipe - (66)
12	11	51.744	-50.255	Comb	0.00	0.23	0.55	10.0	365.27	0.89	365.73	18	Cir	0.013	1.22	370.00	Pipe - (124)
13	12	118.800	-39.728	Comb	0.00	0.34	0.55	10.0	365.93	4.49	371.26	18	Cir	0.013	1.47	376.19	Pipe - (123)
14	13	27.692	77.428	Comb	0.00	0.34	0.55	10.0	371.46	1.01	371.74	15	Cir	0.013	0.50	376.50	Pipe - (122)
15	14	13.666	12.997	DrGrt	0.00	0.93	0.55	10.0	371.94	1.98	372.21	15	Cir	0.013	1.00	377.81	Pipe - (121)
16	12	26.466	51.215	Comb	0.00	0.31	0.55	10.0	365.93	0.53	366.07	18	Cir	0.013	1.20	370.41	Pipe - (88)
17	16	51.002	49.520	Comb	0.00	0.04	0.55	10.0	366.32	0.90	366.78	15	Cir	0.013	1.21	371.92	Pipe - (87)
18	17	32.000	-50.479	Comb	0.00	0.14	0.55	10.0	366.98	1.00	367.30	15	Cir	0.013	1.00	372.06	Pipe - (86)
19	7	135.998	-89.999	Comb	0.00	0.29	0.55	10.0	361.03	3.38	365.62	18	Cir	0.013	0.50	370.40	Pipe - (81)
20	19	150.000	0.000	Comb	0.00	0.36	0.55	10.0	365.92	2.43	369.57	15	Cir	0.013	1.00	374.90	Pipe - (80)
21	9	11.666	-89.981	DrGrt	0.00	2.98	0.55	10.0	363.00	1.97	363.23	15	Cir	0.013	1.00	369.67	Pipe - (83)
22	8	60.248	-1.786	Comb	0.00	0.20	0.55	10.0	361.04	1.00	361.64	18	Cir	0.013	1.00	367.36	Pipe - (78)
23	1	90.414	-99.308	Comb	0.00	0.23	0.55	10.0	327.61	1.21	328.70	15	Cir	0.013	1.48	333.72	Pipe - (58)

Project File: Outfall 4B.stm

Number of lines: 25

Date: 11/4/2024

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	41.000	80.692	Comb	0.00	0.41	0.55	10.0	328.90	1.00	329.31	15	Cir	0.013	1.00	333.72	Pipe - (61)
25	10	41.000	89.970	Comb	0.00	0.58	0.55	10.0	364.45	0.71	364.74	15	Cir	0.013	1.00	369.60	

Project File: Outfall 4B.stm

Number of lines: 25

Date: 11/4/2024

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 472	Combination	334.99	Rect	4.00	4.00	36	Cir	323.85	36 15	Cir Cir	328.76 327.61
2	CB 473	Combination	340.12	Rect	4.00	4.00	36	Cir	331.02	36	Cir	335.95
3	CB 474	Combination	343.27	Rect	4.00	4.00	36	Cir	336.80	36	Cir	337.00
4	CB 475	Combination	349.57	Rect	4.00	4.00	36	Cir	343.21	30	Cir	343.86
5	CB 476	Combination	363.71	Rect	4.00	4.00	30	Cir	357.73	30	Cir	357.93
6	CB 477	Combination	364.60	Rect	8.00	4.00	30	Cir	359.31	30	Cir	359.51
7	CB 478	Combination	364.80	Rect	8.00	4.00	30	Cir	359.78	30 18	Cir Cir	360.28 361.03
8	CB 481	Combination	366.65	Rect	4.00	4.00	30	Cir	360.51	24 18	Cir Cir	360.71 361.04
9	CB 483	Combination	368.64	Rect	4.00	4.00	24	Cir	362.75	18 15	Cir Cir	363.25 363.00
10	CB 484	Combination	369.59	Rect	8.00	4.00	18	Cir	364.05	18 15	Cir Cir	364.59 364.45
11	CB 485	Combination	370.91	Rect	4.00	4.00	18	Cir	365.07	18	Cir	365.27
12	CB 486	Combination	370.00	Rect	4.00	4.00	18	Cir	365.73	18 18	Cir Cir	365.93 365.93
13	CB 488	Combination	376.19	Rect	4.00	4.00	18	Cir	371.26	15	Cir	371.46
14	CB 489	Combination	376.50	Rect	4.00	4.00	15	Cir	371.74	15	Cir	371.94
15	YI 489A	DropGrate	377.81	Rect	4.00	4.00	15	Cir	372.21			
16	CB 487	Combination	370.41	Rect	4.00	4.00	18	Cir	366.07	15	Cir	366.32
17	CB 490	Combination	371.92	Rect	4.00	4.00	15	Cir	366.78	15	Cir	366.98
18	CB 491	Combination	372.06	Rect	4.00	4.00	15	Cir	367.30			
19	CB 479	Combination	370.40	Rect	4.00	4.00	18	Cir	365.62	15	Cir	365.92
20	CB 480	Combination	374.90	Rect	4.00	4.00	15	Cir	369.57			

Project File: Outfall 4B.stm | Number of Structures: 25 | Run Date: 11/4/2024

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	YI 483A	DropGrate	369.67	Rect	4.00	4.00	15	Cir	363.23			
22	CB 482	Combination	367.36	Rect	4.00	4.00	18	Cir	361.64			
23	CB 470	Combination	333.72	Rect	8.00	4.00	15	Cir	328.70	15	Cir	328.90
24	CB 471	Combination	333.72	Rect	8.00	4.00	15	Cir	329.31			
25	CB 484B	Combination	369.60	Rect	4.00	4.00	15	Cir	364.74			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (59)	32.65	36	Cir	42.516	323.50	323.85	0.823	326.50	326.56	0.83	327.39	End	Combination
2	Pipe - (76)	30.36	36	Cir	129.387	328.76	331.02	1.747	329.97	332.80	0.37	332.80	1	Combination
3	Pipe - (75)	28.39	36	Cir	42.581	335.95	336.80	1.996	337.08	338.52	1.00	338.52	2	Combination
4	Pipe - (74)	28.11	36	Cir	103.486	337.00	343.21	6.001	338.52	344.92	0.35	344.92	3	Combination
5	Pipe - (73)	27.31	30	Cir	260.350	343.86	357.73	5.327	344.92	359.51	0.94	359.51	4	Combination
6	Pipe - (72)	27.16	30	Cir	45.962	357.93	359.31	3.002	359.51	361.09	0.93	361.09	5	Combination
7	Pipe - (71)	24.79	30	Cir	27.000	359.51	359.78	1.000	361.09	361.47	n/a	361.47	6	Combination
8	Pipe - (70)	21.58	30	Cir	45.855	360.28	360.51	0.502	361.89	362.11	0.74	362.85	7	Combination
9	Pipe - (69)	20.75	24	Cir	139.486	360.71	362.75	1.463	362.85	364.38	n/a	364.38 j	8	Combination
10	Pipe - (68)	10.38	18	Cir	80.000	363.25	364.05	1.000	364.46	365.29	1.03	365.29	9	Combination
11	Pipe - (66)	8.11	18	Cir	72.897	364.59	365.07	0.658	365.76	366.24	0.57	366.81	10	Combination
12	Pipe - (124)	8.06	18	Cir	51.744	365.27	365.73	0.889	366.81	367.05	0.46	367.50	11	Combination
13	Pipe - (123)	5.77	18	Cir	118.800	365.93	371.26	4.487	367.50	372.19	n/a	372.19 j	12	Combination
14	Pipe - (122)	4.56	15	Cir	27.692	371.46	371.74	1.011	372.23	372.61	0.20	372.61	13	Combination
15	Pipe - (121)	3.35	15	Cir	13.666	371.94	372.21	1.976	372.61	372.95	0.31	372.95	14	DropGrate
16	Pipe - (88)	1.72	18	Cir	26.466	365.93	366.07	0.529	367.50	367.51	0.02	367.53	12	Combination
17	Pipe - (87)	0.64	15	Cir	51.002	366.32	366.78	0.902	367.53	367.09	0.13	367.09	16	Combination
18	Pipe - (86)	0.50	15	Cir	32.000	366.98	367.30	1.000	367.22	367.58	0.10	367.58	17	Combination
19	Pipe - (81)	2.29	18	Cir	135.998	361.03	365.62	3.375	361.47	366.19	0.11	366.19	7	Combination
20	Pipe - (80)	1.30	15	Cir	150.000	365.92	369.57	2.433	366.22	370.02	n/a	370.02	19	Combination
21	Pipe - (83)	10.73	15	Cir	11.666	363.00	363.23	1.972	364.38*	364.70*	1.19	365.89	9	DropGrate
22	Pipe - (78)	0.72	18	Cir	60.248	361.04	361.64	0.996	362.85	362.85	0.00	362.85	8	Combination
23	Pipe - (58)	2.29	15	Cir	90.414	327.61	328.70	1.206	328.10	329.30	0.35	329.30	1	Combination
24	Pipe - (61)	1.48	15	Cir	41.000	328.90	329.31	1.000	329.31	329.79	n/a	329.79	23	Combination

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25		2.09	15	Cir	41.000	364.45	364.74	0.707	365.29	365.32	n/a	365.32 j	10	Combination

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 472	0.50	0.47	0.95	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.051	2.00	0.060	0.020	0.013	0.15	3.30	0.04	0.62	0.0	23
2	CB 473	2.27	0.24	2.04	0.47	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.19	5.72	0.11	1.83	0.0	1
3	CB 474	0.54	0.07	0.61	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.12	2.03	0.00	0.00	0.0	Off
4	CB 475	1.26	0.00	1.19	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.16	3.81	0.05	0.89	0.0	3
5	CB 476	0.25	0.00	0.25	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.057	2.00	0.060	0.020	0.013	0.09	1.45	0.00	0.00	0.0	4
6	CB 477	2.63	0.00	2.63	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.25	8.26	0.25	8.26	0.0	Off
7	CB 478	1.22	0.10	1.32	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.18	4.86	0.18	4.86	0.0	Off
8	CB 481	0.54	0.00	0.52	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.15	3.64	0.04	0.74	0.0	7
9	CB 483	0.36	0.00	0.36	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.13	2.63	0.02	0.26	0.0	8
10	CB 484	0.36	0.00	0.36	0.00	Comb	6.0	3.00	0.00	6.00	2.50	0.012	2.00	0.060	0.020	0.013	0.13	2.63	0.01	0.20	0.0	9
11	CB 485	0.11	0.00	0.11	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.08	1.41	0.00	0.00	0.0	10
12	CB 486	0.83	0.07	0.90	0.00	Comb	6.0	3.00	7.50	3.00	2.50	Sag	2.00	0.060	0.020	0.013	0.17	4.61	0.17	4.61	0.0	Off
13	CB 488	1.22	0.00	1.15	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.16	3.90	0.06	0.93	0.0	12
14	CB 489	1.22	0.00	1.15	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.16	3.90	0.06	0.93	0.0	16
15	YI 489A	3.35	0.00	3.35	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.22	24.23	0.22	24.23	0.0	Off
16	CB 487	1.12	0.07	1.19	0.00	Comb	6.0	3.00	7.50	3.00	2.50	Sag	2.00	0.060	0.020	0.013	0.19	5.75	0.19	5.75	0.0	Off
17	CB 490	0.14	0.01	0.16	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.10	1.63	0.00	0.00	0.0	16
18	CB 491	0.50	0.00	0.49	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.15	3.46	0.04	0.66	0.0	17
19	CB 479	1.04	0.22	1.18	0.08	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.16	3.98	0.06	0.96	0.0	7
20	CB 480	1.30	0.00	1.08	0.22	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.19	5.74	0.11	1.75	0.0	19
21	YI 483A	10.73	0.00	10.73	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.47	49.75	0.47	49.75	0.0	Off
22	CB 482	0.72	0.58	1.06	0.24	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.20	6.09	0.11	1.90	0.0	2
23	CB 470	0.83	0.02	0.85	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.15	3.37	0.15	3.37	0.0	Off

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	CB 471	1.48	0.00	1.48	0.00	Comb	6.0	6.00	15.00	6.00	2.50	Sag	2.00	0.060	0.020	0.013	0.19	5.30	0.19	5.30	0.0	Off
25	CB 484B	2.09	0.00	1.51	0.58	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.23	7.66	0.16	3.82	0.0	22

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	32.65	323.50	326.50	3.00	7.07	4.62	0.33	326.83	0.240	42.516	323.85	326.56	2.71	6.72	4.86	0.37	326.93	0.210	0.225	0.096	2.25	0.83
2	36	30.36	328.76	329.97	1.21*	2.68	11.31	0.75	330.72	0.000	129.387	331.02	332.80	1.78**	4.38	6.93	0.75	333.55	0.000	0.000	n/a	0.50	0.37
3	36	28.39	335.95	337.08	1.13*	2.44	11.66	0.71	337.79	0.000	42.581	336.80	338.52	1.72**	4.20	6.76	0.71	339.23	0.000	0.000	n/a	1.40	1.00
4	36	28.11	337.00	338.52	1.52	3.60	7.81	0.71	339.23	0.000	103.486	343.21	344.92	1.71**	4.17	6.74	0.71	345.63	0.000	0.000	n/a	0.50	0.35
5	30	27.31	343.86	344.92	1.06	1.99	13.73	0.83	345.75	0.000	260.350	357.73	359.51	1.78**	3.74	7.30	0.83	360.34	0.000	0.000	n/a	1.13	0.94
6	30	27.16	357.93	359.51	1.58	3.27	8.31	0.83	360.34	0.000	45.962	359.31	361.09	1.78**	3.73	7.29	0.83	361.91	0.000	0.000	n/a	1.13	0.93
7	30	24.79	359.51	361.09	1.58	3.26	7.61	0.76	361.85	0.000	27.000	359.78	361.47	1.69**	3.54	7.00	0.76	362.24	0.000	0.000	n/a	1.50	n/a
8	30	21.58	360.28	361.89	1.61*	3.33	6.48	0.65	362.54	0.501	45.855	360.51	362.11	1.60	3.32	6.50	0.66	362.77	0.505	0.503	0.231	1.12	0.74
9	24	20.75	360.71	362.85	2.00	2.74	6.61	0.68	363.53	0.842	139.486	362.75	364.38 j	1.63**	2.74	7.56	0.89	365.27	0.849	0.846	n/a	1.50	1.33
10	18	10.38	363.25	364.46	1.21*	1.53	6.77	0.69	365.15	0.000	80.000	364.05	365.29	1.24**	1.56	6.65	0.69	365.98	0.000	0.000	n/a	1.50	1.03
11	18	8.11	364.59	365.76	1.17*	1.48	5.49	0.47	366.23	0.658	72.897	365.07	366.24	1.17	1.48	5.49	0.47	366.71	0.658	0.658	0.480	1.21	0.57
12	18	8.06	365.27	366.81	1.50	1.77	4.56	0.32	367.13	0.589	51.744	365.73	367.05	1.32	1.64	4.91	0.37	367.42	0.532	0.561	0.290	1.22	0.46
13	18	5.77	365.93	367.50	1.50	1.14	3.26	0.17	367.67	0.302	118.800	371.26	372.19 j	0.93**	1.14	5.04	0.39	372.58	0.613	0.458	n/a	1.47	n/a
14	15	4.56	371.46	372.23	0.77*	0.80	5.73	0.39	372.63	0.000	27.692	371.74	372.61	0.87**	0.91	5.04	0.39	373.00	0.000	0.000	n/a	0.50	0.20
15	15	3.35	371.94	372.61	0.67	0.66	5.04	0.31	372.91	0.000	13.666	372.21	372.95	0.74**	0.75	4.45	0.31	373.25	0.000	0.000	n/a	1.00	0.31
16	18	1.72	365.93	367.50	1.50	1.77	0.97	0.01	367.52	0.027	26.466	366.07	367.51	1.44	1.74	0.99	0.02	367.52	0.023	0.025	0.007	1.20	0.02
17	15	0.64	366.32	367.53	1.21	0.24	0.53	0.11	367.64	0.000	51.002	366.78	367.09	0.31**	0.24	2.68	0.11	367.20	0.000	0.000	n/a	1.21	0.13
18	15	0.50	366.98	367.22	0.24*	0.16	3.13	0.10	367.31	0.000	32.000	367.30	367.58	0.28**	0.20	2.50	0.10	367.67	0.000	0.000	n/a	1.00	0.10
19	18	2.29	361.03	361.47	0.44	0.44	5.23	0.21	361.69	0.000	135.998	365.62	366.19	0.57**	0.62	3.70	0.21	366.41	0.000	0.000	n/a	0.50	0.11
20	15	1.30	365.92	366.22	0.30*	0.23	5.64	0.17	366.39	0.000	150.000	369.57	370.02	0.45**	0.40	3.27	0.17	370.19	0.000	0.000	n/a	1.00	n/a
21	15	10.73	363.00	364.38	1.25	1.23	8.74	1.19	365.57	2.760	11.666	363.23	364.70	1.25	1.23	8.74	1.19	365.89	2.759	2.759	0.322	1.00	1.19
22	18	0.72	361.04	362.85	1.50	1.77	0.41	0.00	362.85	0.005	60.248	361.64	362.85	1.21	1.52	0.47	0.00	362.85	0.005	0.005	0.003	1.00	0.00

Project File: Outfall 4B.stm | Number of lines: 25 | Run Date: 11/4/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	15	2.29	327.61	328.10	0.49*	0.44	5.15	0.24	328.33	0.000	90.414	328.70	329.30	0.60**	0.59	3.90	0.24	329.54	0.000	0.000	n/a	1.48	0.35
24	15	1.48	328.90	329.31	0.41*	0.35	4.26	0.18	329.49	0.000	41.000	329.31	329.79	0.48**	0.43	3.40	0.18	329.97	0.000	0.000	n/a	1.00	n/a
25	15	2.09	364.45	365.29	0.84	0.55	2.39	0.22	365.51	0.000	41.000	364.74	365.32 j	0.58**	0.55	3.78	0.22	365.54	0.000	0.000	n/a	1.00	0.22

Project File: Outfall 4B.stm

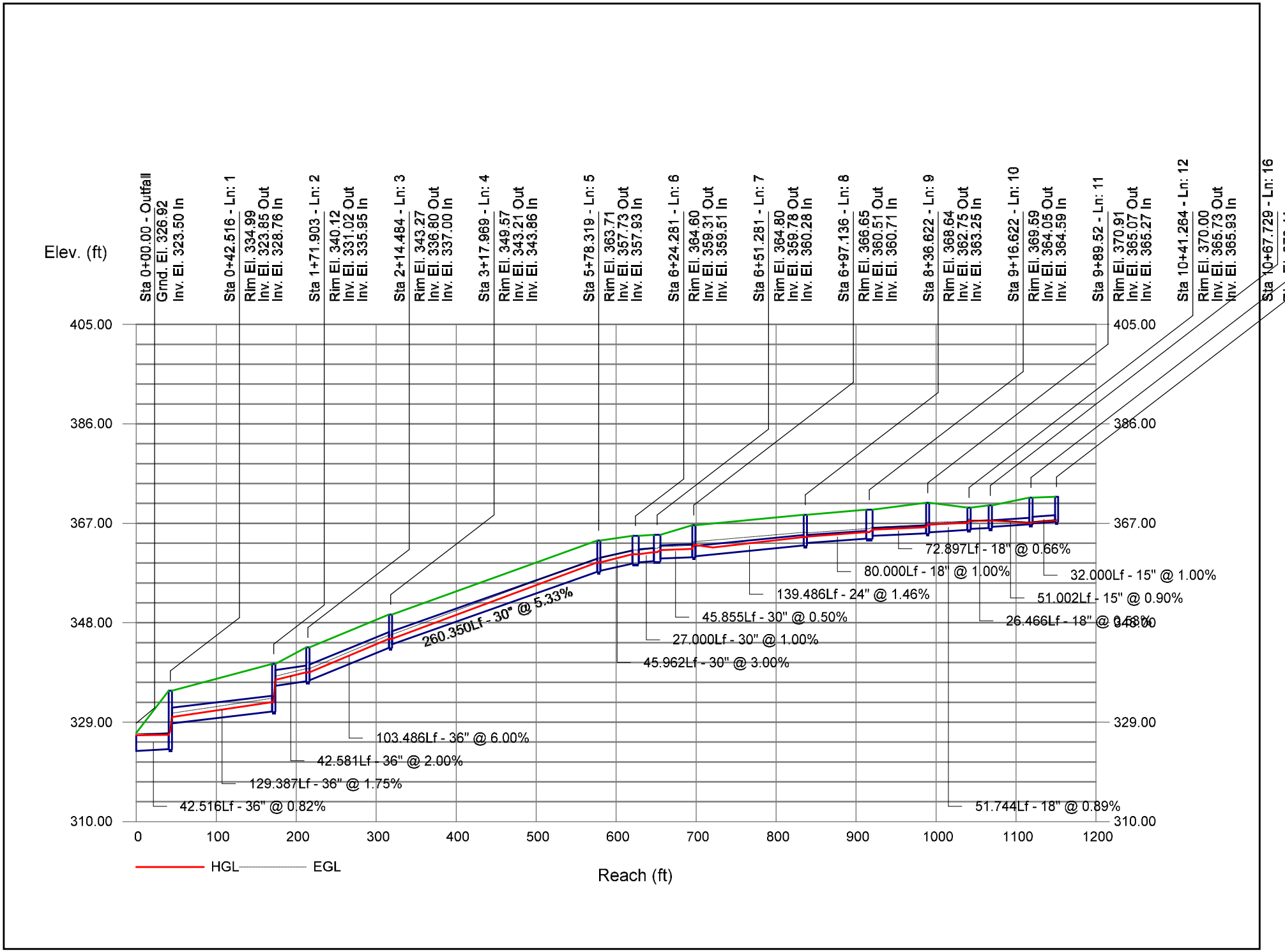
Number of lines: 25

Run Date: 11/4/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

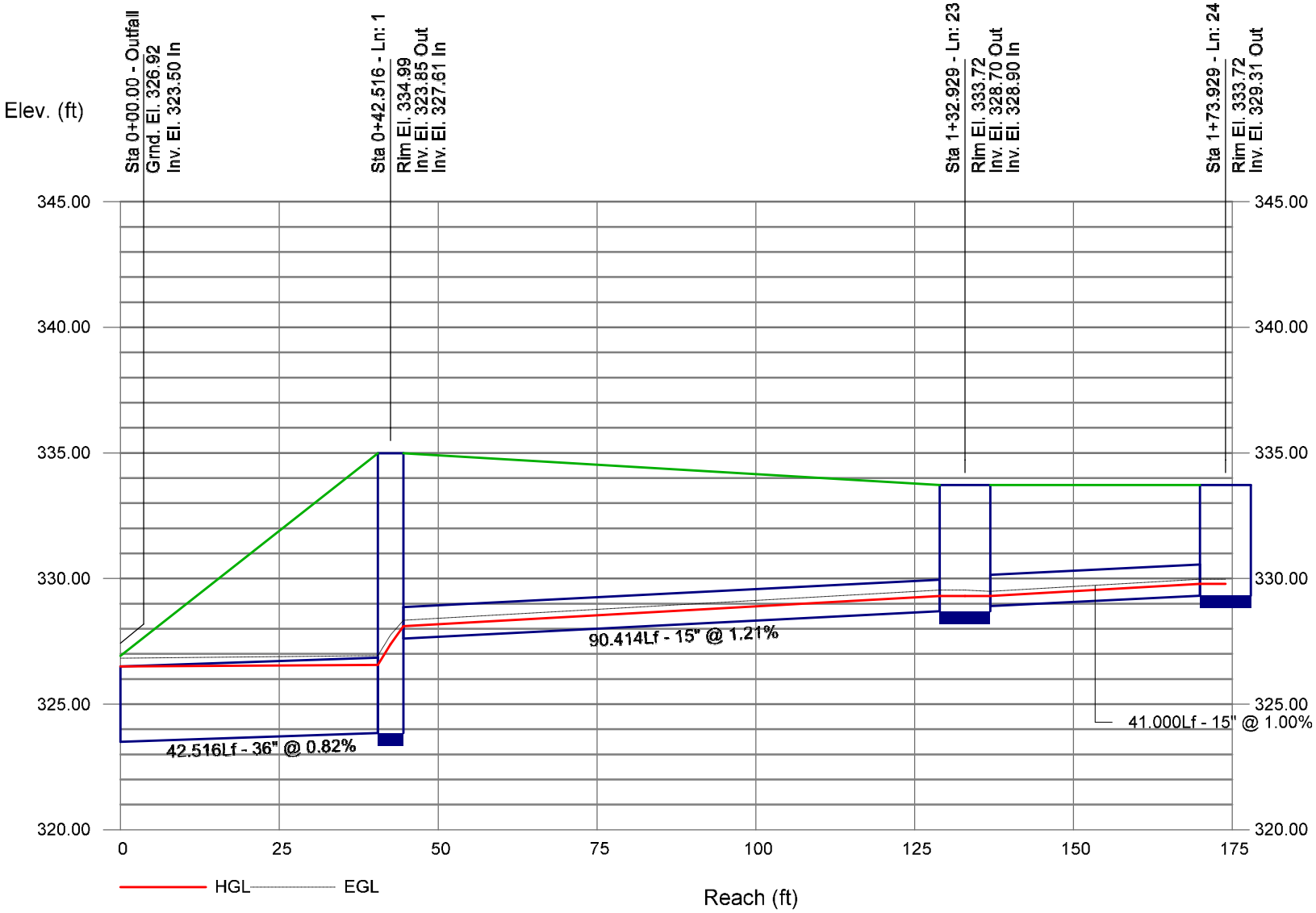
Storm Sewer Profile

SCM 4B 25-Year 1-18 Profile Proj. file: Outfall 4B.stm



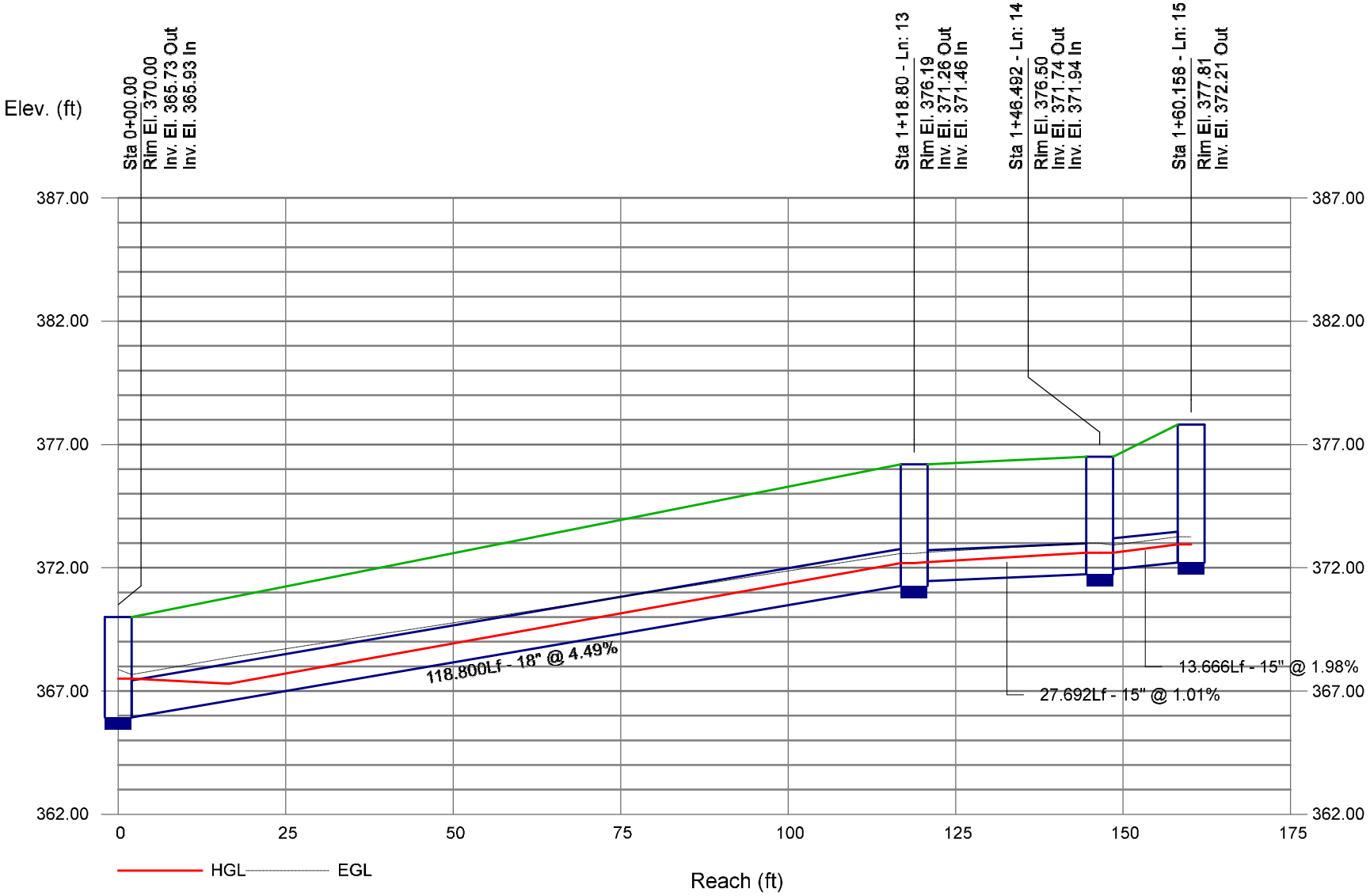
Storm Sewer Profile

SCM 4B 25-Year 1-24 Profile Proj. file: Outfall 4B.stm



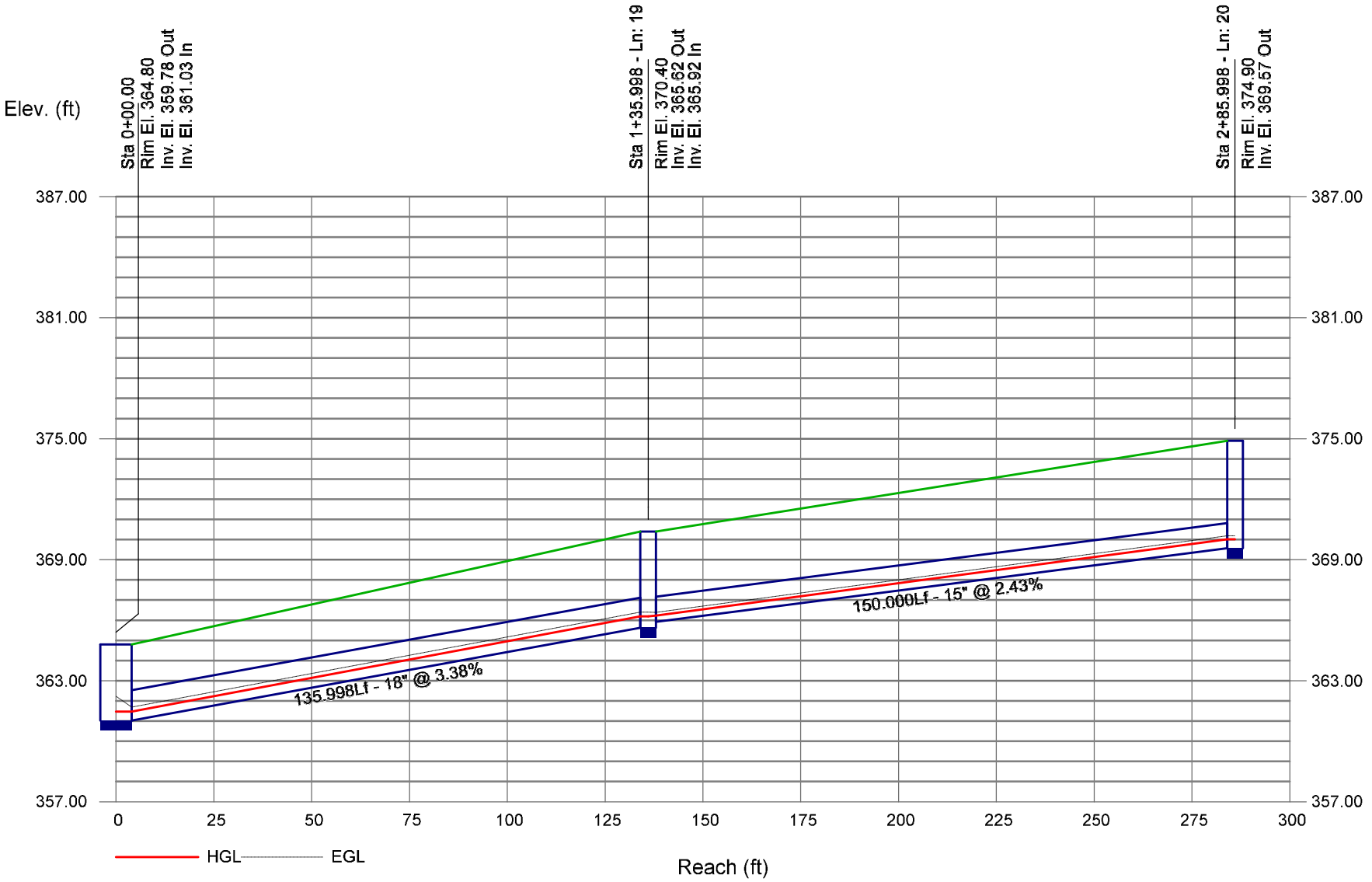
Storm Sewer Profile

SCM 4B 25-Year 13-15 Profile Proj. file: Outfall 4B.stm



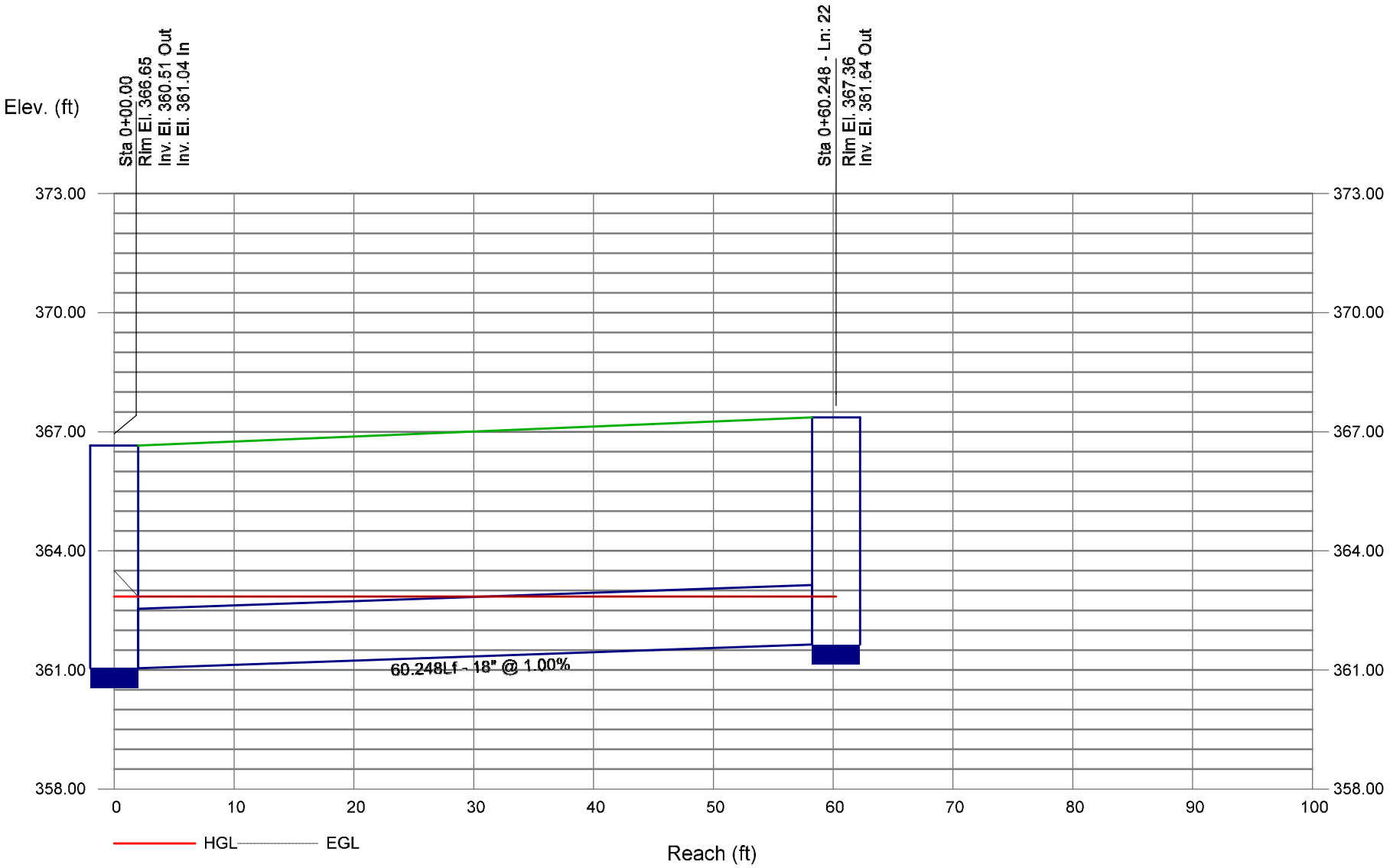
Storm Sewer Profile

SCM 4B 25-Year 19-20 Profile Proj. file: Outfall 4B.stm



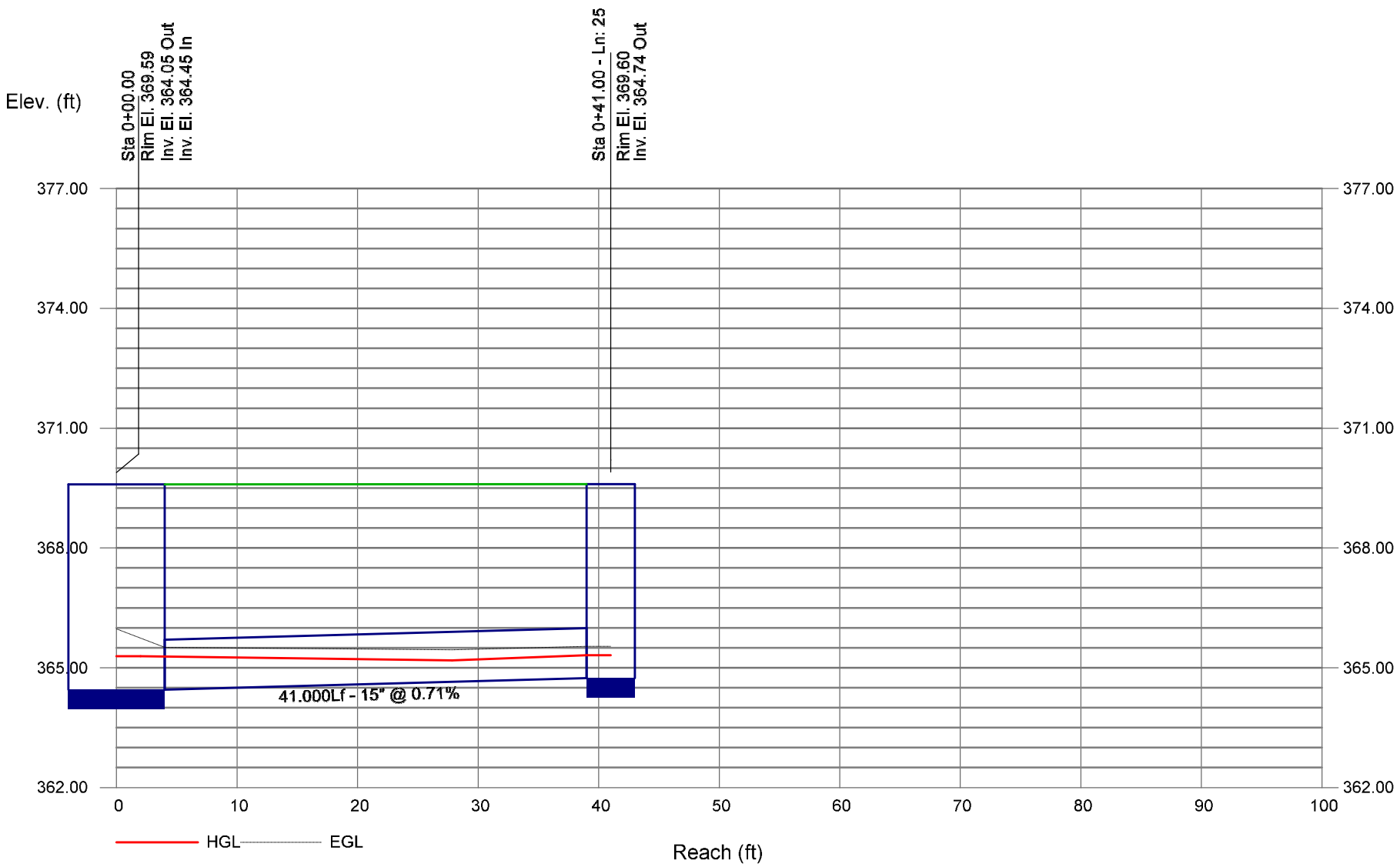
Storm Sewer Profile

SCM 4B 25-Year 22-22 Profile Proj. file: Outfall 4B.stm



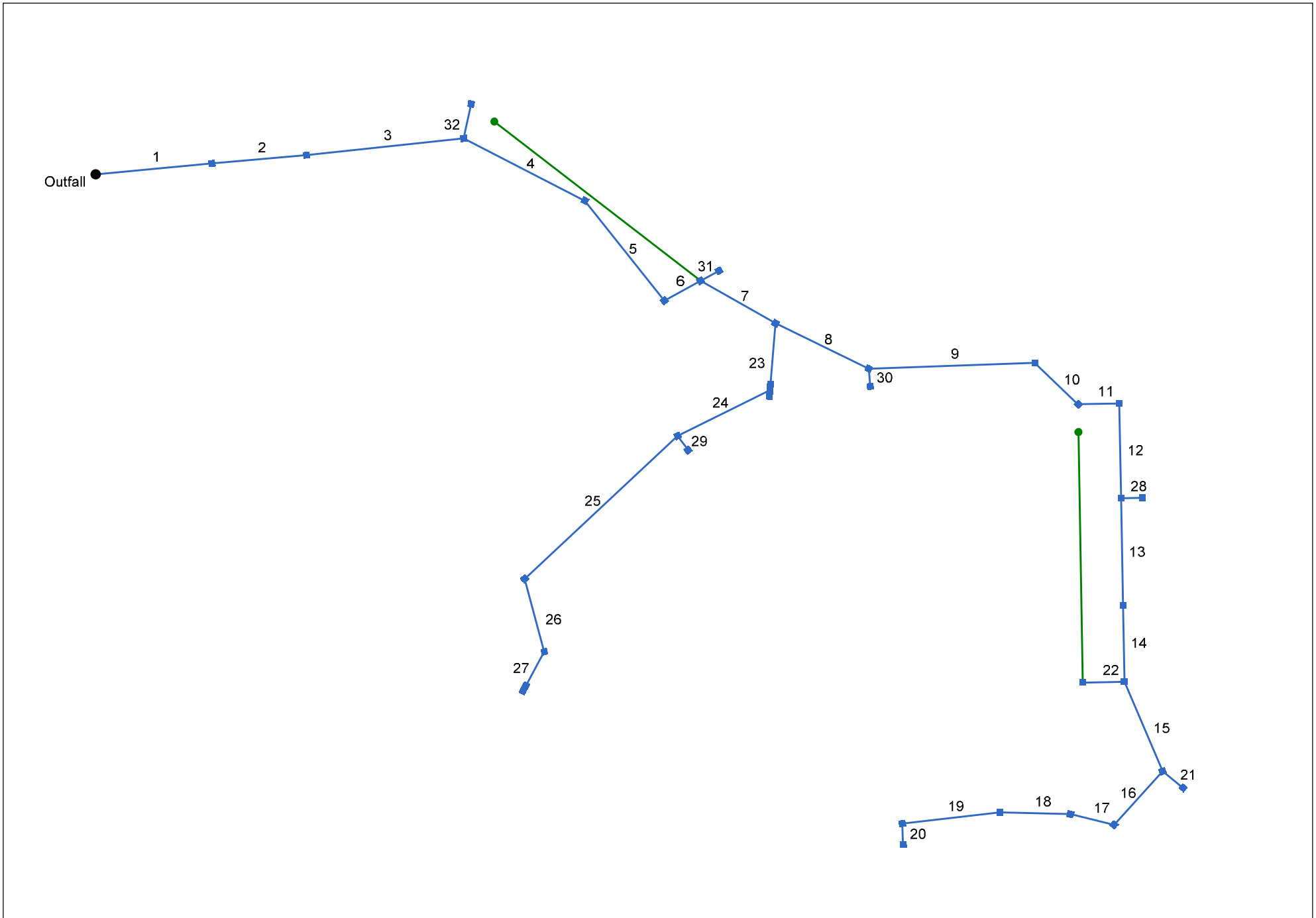
Storm Sewer Profile

SCM 4B 25-Year 25-25 Profile Proj. file: Outfall 4B.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

SCM #4C 10-Year Report



Project File: Outfall 4C.stm	Number of lines: 32	Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	76.046	-5.425	DrGrt	0.00	0.37	0.55	10.0	293.50	6.60	298.52	36	Cir	0.013	0.50	315.32	Pipe - (43)
2	1	61.760	0.401	DrGrt	0.00	0.14	0.55	10.0	299.50	7.29	304.00	30	Cir	0.013	0.50	314.13	Pipe - (222)
3	2	102.861	-1.118	Comb	0.00	0.33	0.55	10.0	304.10	1.50	305.64	30	Cir	0.013	1.44	317.41	Pipe - (42)
4	3	88.974	33.505	Comb	0.00	0.04	0.55	10.0	307.64	4.99	312.08	30	Cir	0.013	0.70	325.73	Pipe - (41)
5	4	83.199	24.379	Comb	0.00	0.37	0.55	10.0	318.24	5.00	322.40	30	Cir	0.013	1.48	331.22	Pipe - (40)
6	5	27.000	-80.422	Comb	0.00	0.05	0.55	10.0	324.26	0.52	324.40	30	Cir	0.013	1.31	331.22	Pipe - (39)
7	6	56.000	58.331	Comb	0.00	0.22	0.55	10.0	325.17	4.02	327.42	30	Cir	0.013	1.38	333.32	Pipe - (38)
8	7	67.556	-3.541	Comb	0.00	0.16	0.55	10.0	327.92	0.50	328.26	30	Cir	0.013	1.31	333.93	Pipe - (37)
9	8	108.273	-28.115	Comb	0.00	0.13	0.55	10.0	328.66	1.54	330.33	30	Cir	0.013	1.14	336.53	Pipe - (36)
10	9	38.891	45.973	Comb	0.00	0.33	0.55	10.0	330.53	3.50	331.89	24	Cir	0.013	1.13	337.54	Pipe - (35)
11	10	27.000	-45.000	Comb	0.00	0.12	0.55	10.0	332.09	1.41	332.47	24	Cir	0.013	1.50	338.19	Pipe - (34)
12	11	62.001	90.000	Comb	0.00	0.13	0.55	10.0	332.67	1.40	333.54	24	Cir	0.013	1.50	339.11	Pipe - (33)
13	12	70.000	0.000	Comb	0.00	0.09	0.55	10.0	333.74	1.00	334.44	24	Cir	0.013	0.50	341.03	Pipe - (32)
14	13	50.103	0.000	Comb	0.00	0.13	0.55	10.0	334.64	1.50	335.39	24	Cir	0.013	1.50	342.25	Pipe - (31)
15	14	63.605	-22.081	Comb	0.00	0.19	0.55	10.0	335.59	1.49	336.54	24	Cir	0.013	1.73	342.89	Pipe - (30)
16	15	47.317	65.156	Comb	0.00	0.06	0.55	10.0	337.04	0.70	337.37	24	Cir	0.013	1.35	343.36	Pipe - (29)
17	16	29.174	61.949	Comb	0.00	0.08	0.55	10.0	337.57	4.70	338.94	18	Cir	0.013	0.50	343.64	Pipe - (28)
18	17	46.088	-12.524	Comb	0.00	0.13	0.55	10.0	339.16	1.45	339.83	18	Cir	0.013	0.50	344.23	Pipe - (27)
19	18	63.822	-8.013	Comb	0.00	0.12	0.55	10.0	340.03	1.19	340.79	18	Cir	0.013	1.50	345.18	Pipe - (26)
20	19	13.666	-85.245	DrGrt	0.00	2.83	0.55	10.0	340.89	2.71	341.26	15	Cir	0.013	1.00	345.72	Pipe - (25)
21	15	17.041	-27.258	DrGrt	0.00	0.80	0.55	10.0	338.46	2.00	338.80	15	Cir	0.013	1.00	343.61	Pipe - (211)
22	14	27.035	90.000	Comb	0.00	0.25	0.55	10.0	336.14	1.74	336.61	15	Cir	0.013	1.00	342.27	Pipe - (44)
23	7	43.958	64.945	Comb	0.00	0.23	0.55	10.0	327.92	0.50	328.14	24	Cir	0.013	1.32	333.36	Pipe - (54)

Project File: Outfall 4C.stm | Number of lines: 32 | Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	67.254	59.039	Comb	0.00	0.38	0.55	10.0	329.13	0.51	329.47	18	Cir	0.013	1.50	333.94	Pipe - (51)
25	24	136.530	-16.931	Comb	0.00	0.10	0.55	10.0	329.72	2.24	332.78	15	Cir	0.013	1.35	337.94	Pipe - (50)
26	25	49.187	-61.481	Comb	0.00	0.16	0.55	10.0	332.98	3.11	334.51	15	Cir	0.013	1.09	340.19	Pipe - (49)
27	26	27.000	42.836	Comb	0.00	0.53	0.55	10.0	334.71	1.00	334.98	15	Cir	0.013	1.00	340.09	Pipe - (48)
28	12	13.667	-89.992	DrGrt	0.00	1.24	0.55	10.0	334.29	1.02	334.43	15	Cir	0.013	1.00	335.86	Pipe - (45)
29	24	11.720	-100.980	DrGrt	0.00	0.29	0.55	10.0	329.47	1.96	329.70	18	Cir	0.013	1.00	331.91	Pipe - (55)
30	8	11.669	58.129	DrGrt	0.00	0.47	0.55	10.0	329.51	1.97	329.74	18	Cir	0.013	1.00	334.49	Pipe - (46)
31	6	13.666	0.000	DrGrt	0.00	0.14	0.55	10.0	326.83	1.98	327.10	15	Cir	0.013	1.00	330.37	Pipe - (195)
32	3	23.043	-71.594	Comb	0.00	0.39	0.55	10.0	306.63	4.99	307.78	15	Cir	0.013	1.00	315.61	Pipe - (56)

Project File: Outfall 4C.stm | Number of lines: 32 | Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	YI 419B	DropGrate	315.32	Rect	4.00	4.00	36	Cir	298.52	30	Cir	299.50
2	YI 419A	DropGrate	314.13	Rect	4.00	4.00	30	Cir	304.00	30	Cir	304.10
3	CB 420	Combination	317.41	Rect	4.00	4.00	30	Cir	305.64	30 15	Cir Cir	307.64 306.63
4	CB 422	Combination	325.73	Rect	4.00	4.00	30	Cir	312.08	30	Cir	318.24
5	CB 423	Combination	331.22	Rect	4.00	4.00	30	Cir	322.40	30	Cir	324.26
6	CB 423A	Combination	331.22	Rect	4.00	4.00	30	Cir	324.40	30 15	Cir Cir	325.17 326.83
7	CB 424	Combination	333.32	Rect	4.00	4.00	30	Cir	327.42	30 24	Cir Cir	327.92 327.92
8	CB 425	Combination	333.93	Rect	4.00	4.00	30	Cir	328.26	30 18	Cir Cir	328.66 329.51
9	CB 426	Combination	336.53	Rect	4.00	4.00	30	Cir	330.33	24	Cir	330.53
10	CB 427	Combination	337.54	Rect	4.00	4.00	24	Cir	331.89	24	Cir	332.09
11	CB 428	Combination	338.19	Rect	4.00	4.00	24	Cir	332.47	24	Cir	332.67
12	CB 429	Combination	339.11	Rect	4.00	4.00	24	Cir	333.54	24 15	Cir Cir	333.74 334.29
13	CB 430	Combination	341.03	Rect	4.00	4.00	24	Cir	334.44	24	Cir	334.64
14	CB 431	Combination	342.25	Rect	4.00	4.00	24	Cir	335.39	24 15	Cir Cir	335.59 336.14
15	CB 432	Combination	342.89	Rect	4.00	4.00	24	Cir	336.54	24 15	Cir Cir	337.04 338.46
16	CB 433	Combination	343.36	Rect	4.00	4.00	24	Cir	337.37	18	Cir	337.57
17	CB 434	Combination	343.64	Rect	4.00	4.00	18	Cir	338.94	18	Cir	339.16
18	CB 435	Combination	344.23	Rect	4.00	4.00	18	Cir	339.83	18	Cir	340.03
19	CB 436	Combination	345.18	Rect	4.00	4.00	18	Cir	340.79	15	Cir	340.89

Project File: Outfall 4C.stm | Number of Structures: 32 | Run Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
20	YI 437	DropGrate	345.72	Rect	4.00	4.00	15	Cir	341.26			
21	YI 432A	DropGrate	343.61	Rect	4.00	4.00	15	Cir	338.80			
22	CB 438	Combination	342.27	Rect	4.00	4.00	15	Cir	336.61			
23	CB 439	Combination	333.36	Rect	12.00	4.00	24	Cir	328.14	18	Cir	329.13
24	CB 440	Combination	333.94	Rect	4.00	4.00	18	Cir	329.47	15 18	Cir Cir	329.72 329.47
25	CB 441	Combination	337.94	Rect	4.00	4.00	15	Cir	332.78	15	Cir	332.98
26	CB 442	Combination	340.19	Rect	4.00	4.00	15	Cir	334.51	15	Cir	334.71
27	CB 443	Combination	340.09	Rect	8.00	4.00	15	Cir	334.98			
28	YI 429A	DropGrate	335.86	Rect	4.00	4.00	15	Cir	334.43			
29	YI 440A	DropGrate	331.91	Rect	4.00	4.00	18	Cir	329.70			
30	YI 425A	DropGrate	334.49	Rect	4.00	4.00	18	Cir	329.74			
31	YI 423B	DropGrate	330.37	Rect	4.00	4.00	15	Cir	327.10			
32	CB 421	Combination	315.61	Rect	4.00	4.00	15	Cir	307.78			

Project File: Outfall 4C.stm | Number of Structures: 32 | Run Date: 2/3/2025

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (43)	32.69	36	Cir	76.046	293.50	298.52	6.601	296.50	300.37	n/a	300.37 j	End	DropGrate
2	Pipe - (222)	31.67	30	Cir	61.760	299.50	304.00	7.286	300.42	305.92	0.48	305.92	1	DropGrate
3	Pipe - (42)	31.47	30	Cir	102.861	304.10	305.64	1.497	305.92	307.55	1.37	307.55	2	Combination
4	Pipe - (41)	29.43	30	Cir	88.974	307.64	312.08	4.990	308.61	313.93	0.62	313.93	3	Combination
5	Pipe - (40)	29.42	30	Cir	83.199	318.24	322.40	5.000	319.21	324.25	1.32	324.25	4	Combination
6	Pipe - (39)	28.36	30	Cir	27.000	324.26	324.40	0.518	326.23	326.36	0.96	327.32	5	Combination
7	Pipe - (38)	27.91	30	Cir	56.000	325.17	327.42	4.018	327.32	329.22	n/a	329.22 j	6	Combination
8	Pipe - (37)	22.22	30	Cir	67.556	327.92	328.26	0.503	329.56	329.90	0.87	330.76	7	Combination
9	Pipe - (36)	20.52	30	Cir	108.273	328.66	330.33	1.542	330.76	331.87	n/a	331.87 j	8	Combination
10	Pipe - (35)	20.17	24	Cir	38.891	330.53	331.89	3.497	331.87	333.50	n/a	333.50	9	Combination
11	Pipe - (34)	19.18	24	Cir	27.000	332.09	332.47	1.407	333.50	334.04	1.22	334.04	10	Combination
12	Pipe - (33)	18.90	24	Cir	62.001	332.67	333.54	1.403	334.04	335.10	1.20	335.10	11	Combination
13	Pipe - (32)	14.71	24	Cir	70.000	333.74	334.44	1.000	335.10	335.82	0.31	335.82	12	Combination
14	Pipe - (31)	14.49	24	Cir	50.103	334.64	335.39	1.497	335.82	336.76	0.93	336.76	13	Combination
15	Pipe - (30)	13.36	24	Cir	63.605	335.59	336.54	1.494	336.76	337.85	1.00	337.85	14	Combination
16	Pipe - (29)	10.27	24	Cir	47.317	337.04	337.37	0.697	338.09	338.52	n/a	338.52	15	Combination
17	Pipe - (28)	10.10	18	Cir	29.174	337.57	338.94	4.696	338.52	340.16	0.33	340.16	16	Combination
18	Pipe - (27)	9.88	18	Cir	46.088	339.16	339.83	1.454	340.16	341.04	n/a	341.04	17	Combination
19	Pipe - (26)	9.52	18	Cir	63.822	340.03	340.79	1.191	341.07	341.98	0.93	341.98	18	Combination
20	Pipe - (25)	9.14	15	Cir	13.666	340.89	341.26	2.707	341.98	342.42	0.92	342.42	19	DropGrate
21	Pipe - (211)	2.58	15	Cir	17.041	338.46	338.80	1.995	338.92	339.44	0.26	339.44	15	DropGrate
22	Pipe - (44)	0.81	15	Cir	27.035	336.14	336.61	1.738	336.76	336.96	n/a	336.96 j	14	Combination
23	Pipe - (54)	5.23	24	Cir	43.958	327.92	328.14	0.500	329.22	328.95	0.40	328.95	7	Combination
24	Pipe - (51)	4.55	18	Cir	67.254	329.13	329.47	0.506	329.98	330.31	0.46	330.77	23	Combination

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	Pipe - (50)	2.53	15	Cir	136.530	329.72	332.78	2.241	330.77	333.42	n/a	333.42 j	24	Combination
26	Pipe - (49)	2.22	15	Cir	49.187	332.98	334.51	3.111	333.42	335.10	0.25	335.10	25	Combination
27	Pipe - (48)	1.71	15	Cir	27.000	334.71	334.98	1.000	335.15	335.50	0.20	335.50	26	Combination
28	Pipe - (45)	4.01	15	Cir	13.667	334.29	334.43	1.024	335.10	335.24	n/a	335.24 j	12	DropGrate
29	Pipe - (55)	0.94	18	Cir	11.720	329.47	329.70	1.963	330.77	330.06	n/a	330.06	24	DropGrate
30	Pipe - (46)	1.52	18	Cir	11.669	329.51	329.74	1.971	330.76	330.20	n/a	330.20	8	DropGrate
31	Pipe - (195)	0.45	15	Cir	13.666	326.83	327.10	1.976	327.32	327.36	n/a	327.36 j	6	DropGrate
32	Pipe - (56)	1.26	15	Cir	23.043	306.63	307.78	4.991	307.55	308.22	n/a	308.22 j	3	Combination

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	YI 419B	1.20	0.00	1.20	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.11	13.43	0.11	13.43	0.0	Off
2	YI 419A	0.45	0.01	0.46	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.06	8.27	0.06	8.27	0.0	Off
3	CB 420	1.07	0.00	1.06	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.100	2.00	0.060	0.020	0.013	0.13	2.70	0.02	0.31	0.0	2
4	CB 422	0.13	0.04	0.17	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.086	2.00	0.060	0.020	0.013	0.07	1.15	0.00	0.00	0.0	3
5	CB 423	1.20	0.00	1.16	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.069	2.00	0.060	0.020	0.013	0.15	3.43	0.04	0.69	0.0	4
6	CB 423A	0.16	0.02	0.18	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.08	1.34	0.00	0.00	0.0	32
7	CB 424	0.71	0.02	0.71	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.15	3.38	0.04	0.65	0.0	6
8	CB 425	0.52	0.00	0.52	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.13	2.52	0.01	0.23	0.0	7
9	CB 426	0.42	0.07	0.49	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.12	2.01	0.00	0.00	0.0	8
10	CB 427	1.07	0.05	1.04	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.16	4.02	0.06	0.97	0.0	9
11	CB 428	0.39	0.00	0.39	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.12	1.98	0.00	0.00	0.0	10
12	CB 429	0.42	0.00	0.42	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.12	2.13	0.00	0.00	0.0	11
13	CB 430	0.29	0.00	0.29	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.11	1.78	0.00	0.00	0.0	12
14	CB 431	0.42	0.01	0.43	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.12	2.21	0.00	0.00	0.0	13
15	CB 432	0.61	0.00	0.60	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.15	3.31	0.04	0.61	0.0	14
16	CB 433	0.19	0.00	0.19	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.10	1.68	0.00	0.00	0.0	15
17	CB 434	0.26	0.00	0.26	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.11	1.88	0.00	0.00	0.0	16
18	CB 435	0.42	0.00	0.42	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.13	2.74	0.02	0.31	0.0	17
19	CB 436	0.39	0.00	0.39	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.13	2.54	0.01	0.23	0.0	18
20	YI 437	9.14	0.00	9.14	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.42	44.98	0.42	44.98	0.0	Off
21	YI 432A	2.58	0.00	2.58	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.18	20.79	0.18	20.79	0.0	Off
22	CB 438	0.81	0.00	0.76	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.16	4.02	0.06	0.94	0.0	10
23	CB 439	0.74	0.11	0.83	0.02	Comb	6.0	4.50	0.00	9.00	2.50	0.020	2.00	0.060	0.020	0.013	0.16	4.17	0.04	0.70	0.0	7

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	CB 440	1.23	0.00	1.11	0.11	Comb	6.0	1.50	0.00	3.00	2.50	0.033	2.00	0.060	0.020	0.013	0.17	4.47	0.07	1.19	0.0	23
25	CB 441	0.32	0.00	0.32	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.10	1.68	0.00	0.00	0.0	24
26	CB 442	0.52	0.00	0.52	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.12	1.94	0.00	0.00	0.0	25
27	CB 443	1.71	0.00	1.55	0.16	Comb	6.0	3.00	0.00	6.00	2.50	0.050	2.00	0.060	0.020	0.013	0.18	4.81	0.08	1.25	0.0	Off
28	YI 429A	4.01	0.00	4.01	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.24	27.00	0.24	27.00	0.0	Off
29	YI 440A	0.94	0.00	0.94	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.09	11.79	0.09	11.79	0.0	Off
30	YI 425A	1.52	0.00	1.52	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.13	15.33	0.13	15.33	0.0	Off
31	YI 423B	0.45	0.00	0.45	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.06	8.22	0.06	8.22	0.0	Off
32	CB 421	1.26	0.00	1.26	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.160	2.00	0.060	0.020	0.013	0.13	2.53	0.01	0.22	0.0	3

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	32.69	293.50	296.50	3.00	4.59	4.63	0.33	296.83	0.240	76.046	298.52	300.37 j	1.85**	4.59	7.13	0.79	301.16	0.487	0.364	n/a	0.50	0.40
2	30	31.67	299.50	300.42	0.92*	1.63	19.45	0.96	301.37	0.000	61.760	304.00	305.92	1.92**	4.04	7.85	0.96	306.87	0.000	0.000	n/a	0.50	0.48
3	30	31.47	304.10	305.92	1.82	3.82	8.24	0.95	306.87	0.000	102.861	305.64	307.55	1.91**	4.02	7.82	0.95	308.50	0.000	0.000	n/a	1.44	1.37
4	30	29.43	307.64	308.61	0.97*	1.77	16.62	0.89	309.50	0.000	88.974	312.08	313.93	1.85**	3.89	7.57	0.89	314.82	0.000	0.000	n/a	0.70	0.62
5	30	29.42	318.24	319.21	0.97*	1.77	16.62	0.89	320.10	0.000	83.199	322.40	324.25	1.85**	3.89	7.56	0.89	325.14	0.000	0.000	n/a	1.48	1.32
6	30	28.36	324.26	326.23	1.97*	4.14	6.85	0.73	326.96	0.518	27.000	324.40	326.36	1.96	4.14	6.85	0.73	327.09	0.519	0.519	0.140	1.31	0.96
7	30	27.91	325.17	327.32	2.15	3.78	6.21	0.85	328.17	0.000	56.000	327.42	329.22 j	1.80**	3.78	7.38	0.85	330.07	0.000	0.000	n/a	1.38	n/a
8	30	22.22	327.92	329.56	1.64*	3.40	6.53	0.66	330.22	0.503	67.556	328.26	329.90	1.64	3.41	6.52	0.66	330.56	0.502	0.502	0.339	1.31	0.87
9	30	20.52	328.66	330.76	2.10	3.17	4.65	0.65	331.42	0.000	108.273	330.33	331.87 j	1.54**	3.17	6.48	0.65	332.52	0.000	0.000	n/a	1.14	n/a
10	24	20.17	330.53	331.87	1.34	2.23	9.04	0.86	332.73	0.000	38.891	331.89	333.50	1.61**	2.71	7.44	0.86	334.36	0.000	0.000	n/a	1.13	n/a
11	24	19.18	332.09	333.50	1.41	2.37	8.10	0.81	334.31	0.000	27.000	332.47	334.04	1.57**	2.65	7.23	0.81	334.86	0.000	0.000	n/a	1.50	1.22
12	24	18.90	332.67	334.04	1.37	2.30	8.21	0.80	334.84	0.000	62.001	333.54	335.10	1.56**	2.63	7.17	0.80	335.90	0.000	0.000	n/a	1.50	1.20
13	24	14.71	333.74	335.10	1.36	2.28	6.45	0.63	335.73	0.000	70.000	334.44	335.82	1.38**	2.31	6.36	0.63	336.45	0.000	0.000	n/a	0.50	0.31
14	24	14.49	334.64	335.82	1.18	1.93	7.51	0.62	336.44	0.000	50.103	335.39	336.76	1.37**	2.29	6.32	0.62	337.38	0.000	0.000	n/a	1.50	0.93
15	24	13.36	335.59	336.76	1.17	1.91	7.00	0.58	337.34	0.000	63.605	336.54	337.85	1.31**	2.19	6.10	0.58	338.43	0.000	0.000	n/a	1.73	1.00
16	24	10.27	337.04	338.09	1.05*	1.67	6.13	0.47	338.56	0.000	47.317	337.37	338.52	1.15**	1.86	5.51	0.47	338.99	0.000	0.000	n/a	1.35	n/a
17	18	10.10	337.57	338.52	0.95	1.18	8.60	0.67	339.18	0.000	29.174	338.94	340.16	1.22**	1.54	6.55	0.67	340.83	0.000	0.000	n/a	0.50	0.33
18	18	9.88	339.16	340.16	1.00	1.26	7.87	0.65	340.81	0.000	46.088	339.83	341.04	1.21**	1.53	6.46	0.65	341.69	0.000	0.000	n/a	0.50	n/a
19	18	9.52	340.03	341.07	1.04*	1.31	7.25	0.62	341.70	0.000	63.822	340.79	341.98	1.19**	1.50	6.33	0.62	342.60	0.000	0.000	n/a	1.50	0.93
20	15	9.14	340.89	341.98	1.09	1.14	8.05	0.92	342.90	0.000	13.666	341.26	342.42	1.16**	1.19	7.70	0.92	343.34	0.000	0.000	n/a	1.00	0.92
21	15	2.58	338.46	338.92	0.46*	0.40	6.39	0.26	339.17	0.000	17.041	338.80	339.44	0.64**	0.64	4.06	0.26	339.70	0.000	0.000	n/a	1.00	0.26
22	15	0.81	336.14	336.76	0.62	0.28	1.33	0.13	336.89	0.000	27.035	336.61	336.96 j	0.35**	0.28	2.85	0.13	337.09	0.000	0.000	n/a	1.00	0.13

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	24	5.23	327.92	329.22	1.30	1.18	2.42	0.30	329.52	0.000	43.958	328.14	328.95	0.81**	1.18	4.41	0.30	329.25	0.000	0.000	n/a	1.32	0.40
24	18	4.55	329.13	329.98	0.85*	1.03	4.43	0.31	330.28	0.505	67.254	329.47	330.31	0.84	1.03	4.44	0.31	330.62	0.508	0.506	0.341	1.50	0.46
25	15	2.53	329.72	330.77	1.05	0.63	2.29	0.25	331.03	0.000	136.530	332.78	333.42 j	0.64**	0.63	4.03	0.25	333.67	0.000	0.000	n/a	1.35	n/a
26	15	2.22	332.98	333.42	0.44	0.38	5.83	0.23	333.65	0.000	49.187	334.51	335.10	0.59**	0.58	3.86	0.23	335.34	0.000	0.000	n/a	1.09	0.25
27	15	1.71	334.71	335.15	0.44*	0.39	4.44	0.20	335.35	0.000	27.000	334.98	335.50	0.52**	0.48	3.55	0.20	335.70	0.000	0.000	n/a	1.00	0.20
28	15	4.01	334.29	335.10	0.81	0.84	4.74	0.35	335.46	0.000	13.667	334.43	335.24 j	0.81**	0.84	4.77	0.35	335.59	0.000	0.000	n/a	1.00	0.35
29	18	0.94	329.47	330.77	1.30	0.33	0.57	0.13	330.90	0.000	11.720	329.70	330.06	0.36**	0.33	2.87	0.13	330.19	0.000	0.000	n/a	1.00	n/a
30	18	1.52	329.51	330.76	1.25	0.46	0.96	0.17	330.93	0.000	11.669	329.74	330.20	0.46**	0.46	3.28	0.17	330.37	0.000	0.000	n/a	1.00	n/a
31	15	0.45	326.83	327.32	0.49	0.19	1.01	0.09	327.41	0.000	13.666	327.10	327.36 j	0.26**	0.19	2.43	0.09	327.45	0.000	0.000	n/a	1.00	n/a
32	15	1.26	306.63	307.55	0.92	0.39	1.30	0.16	307.71	0.000	23.043	307.78	308.22 j	0.44**	0.39	3.24	0.16	308.39	0.000	0.000	n/a	1.00	n/a

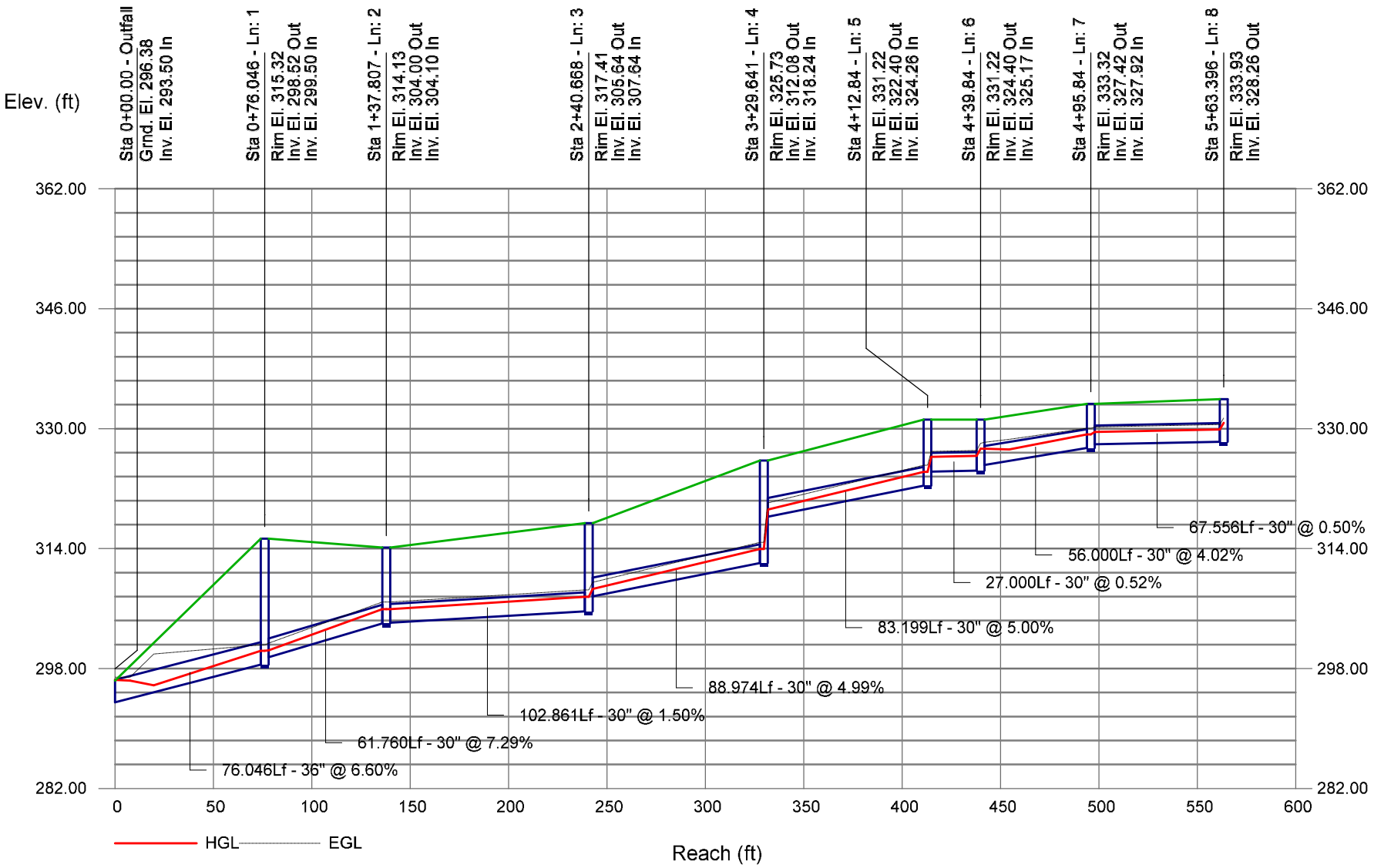
Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Storm Sewer Profile

SCM #4C 10-Year Profile 1-8

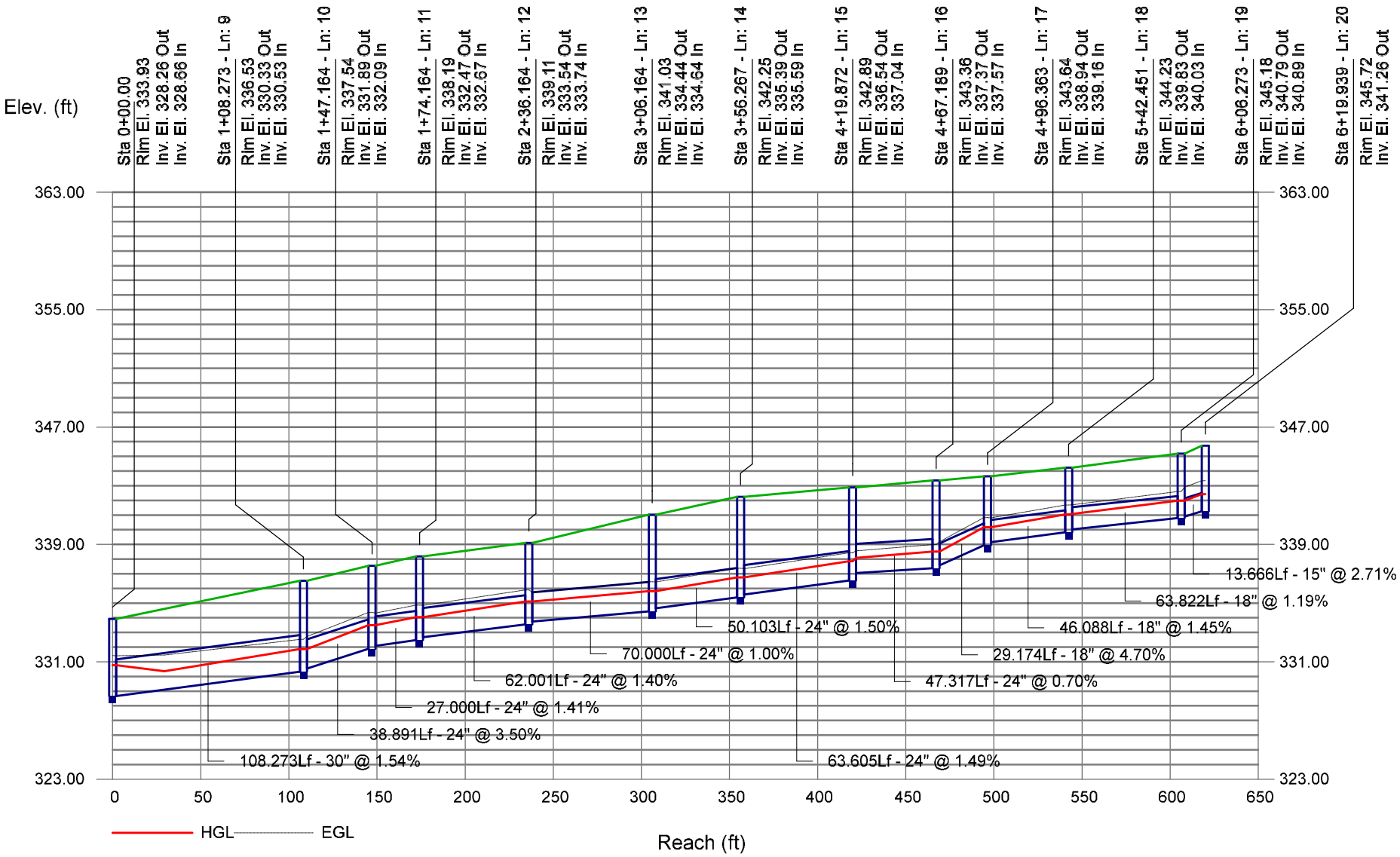
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 9-20

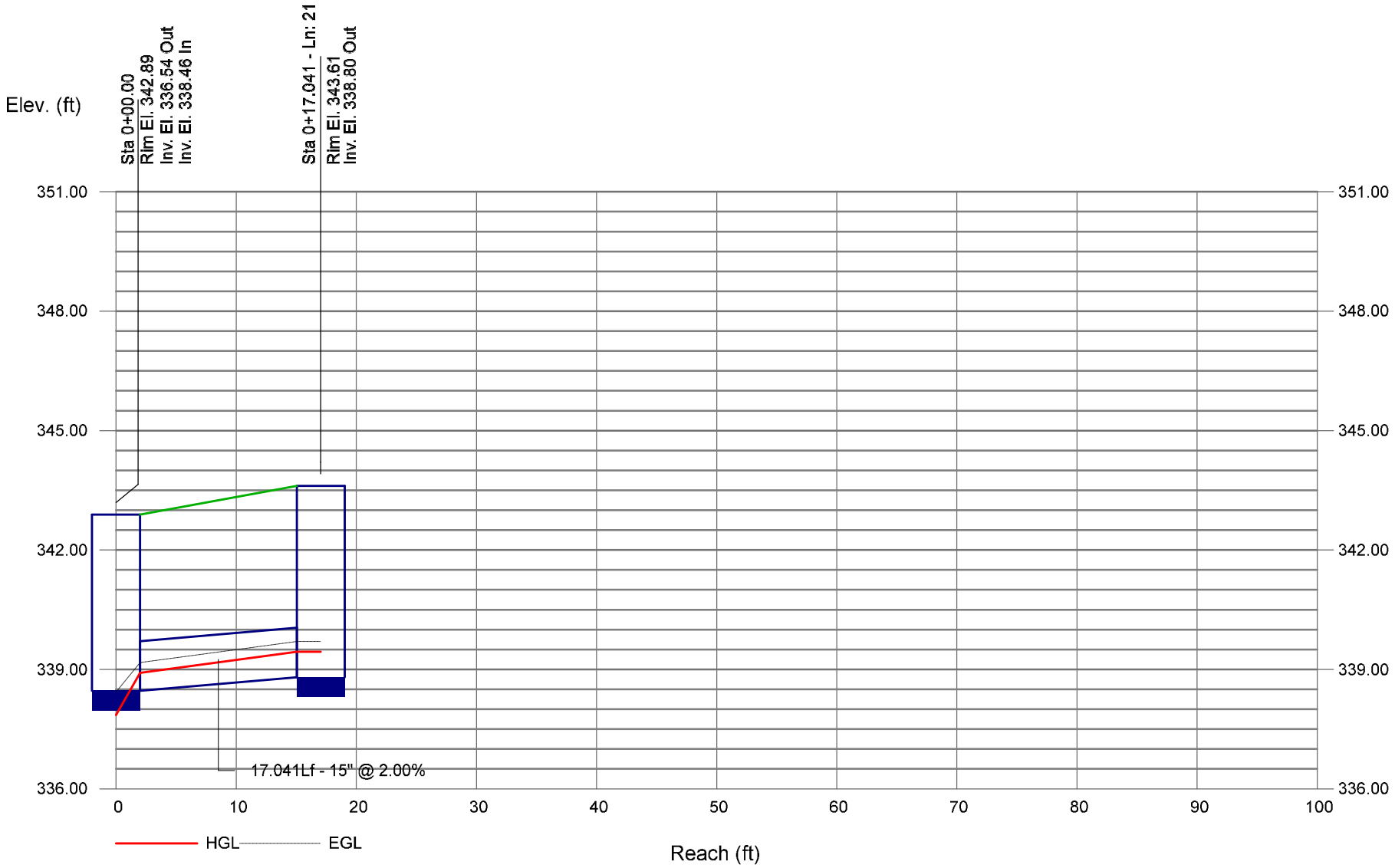
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 21-21

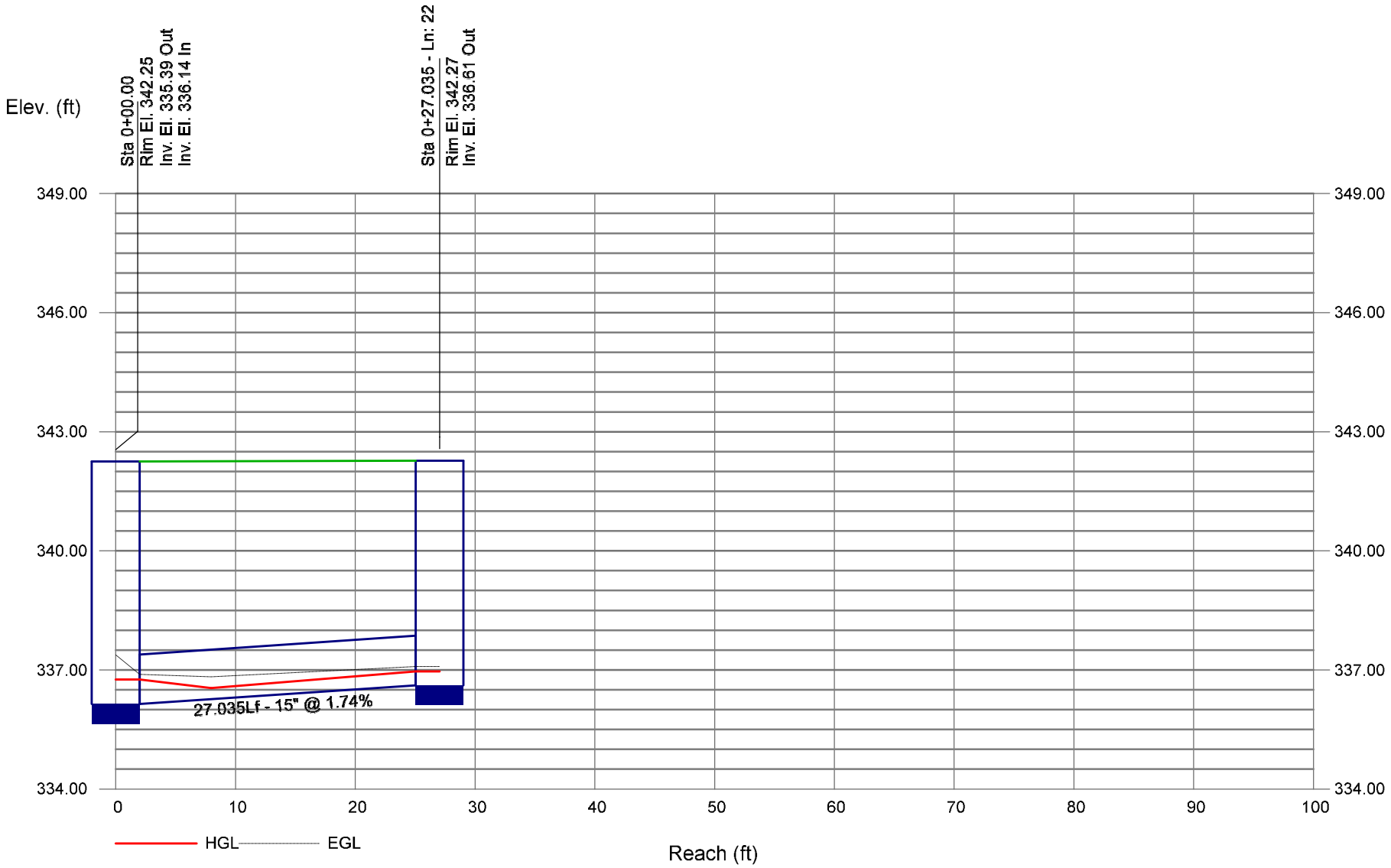
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 22-22

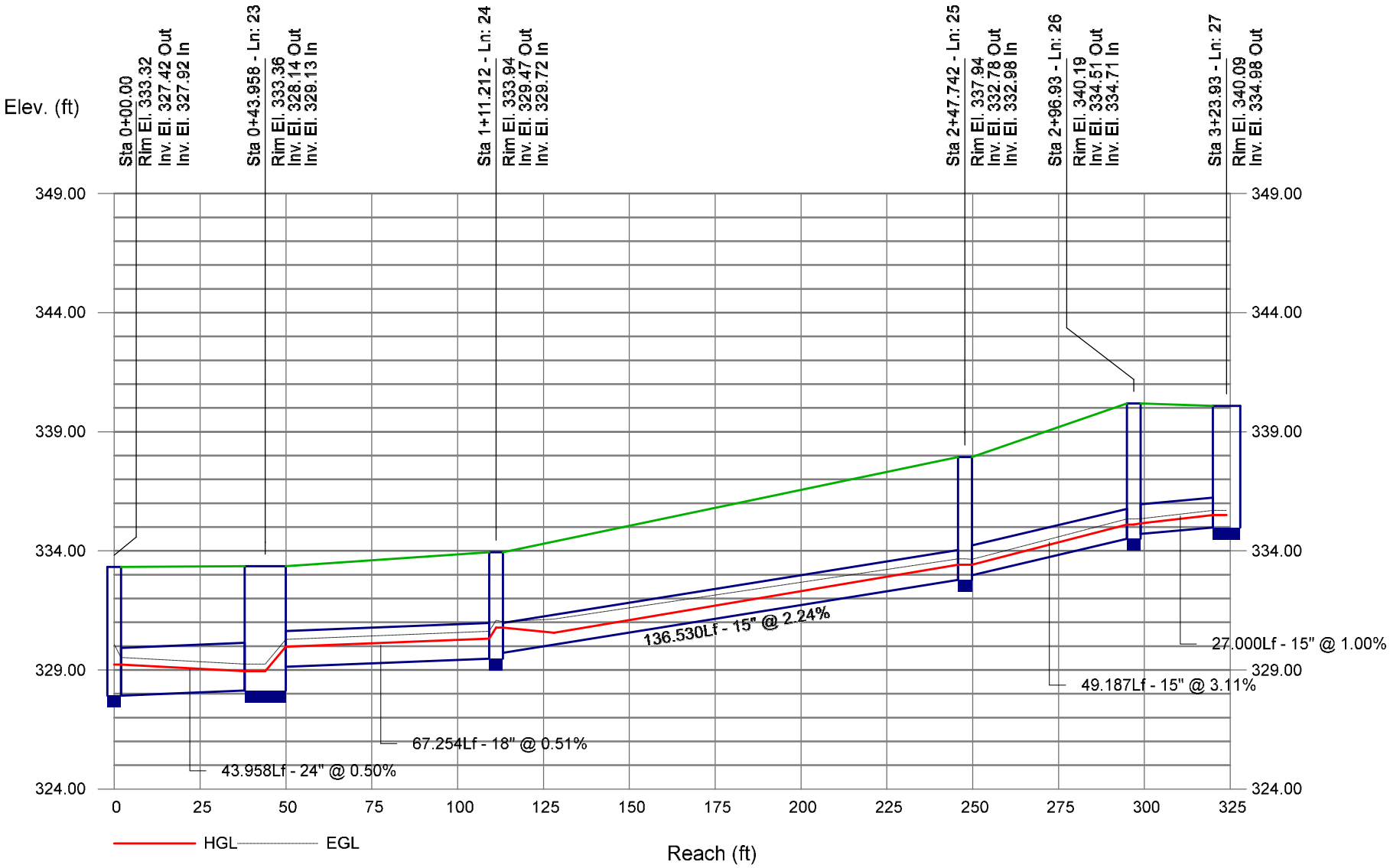
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 23-27

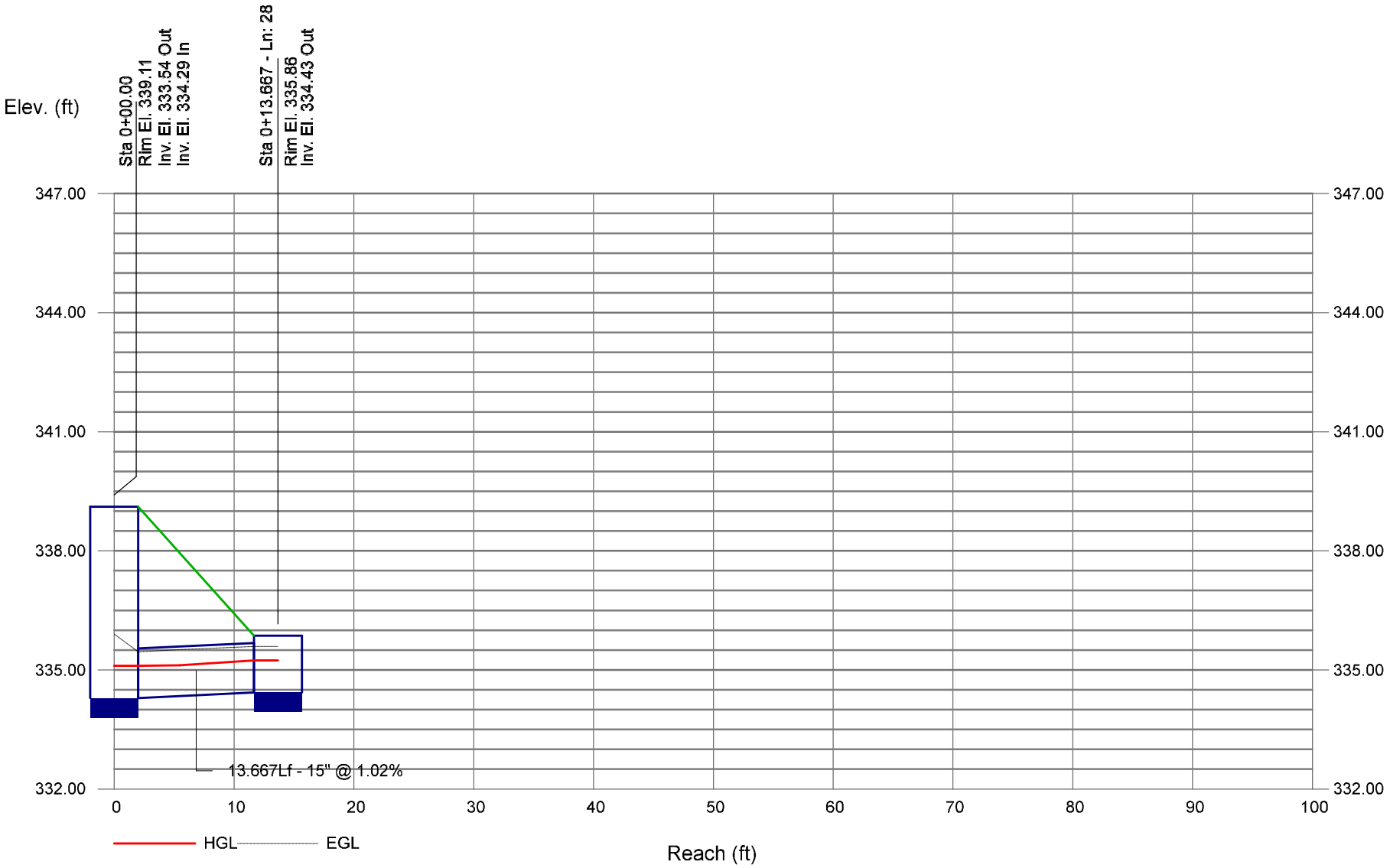
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 28-28

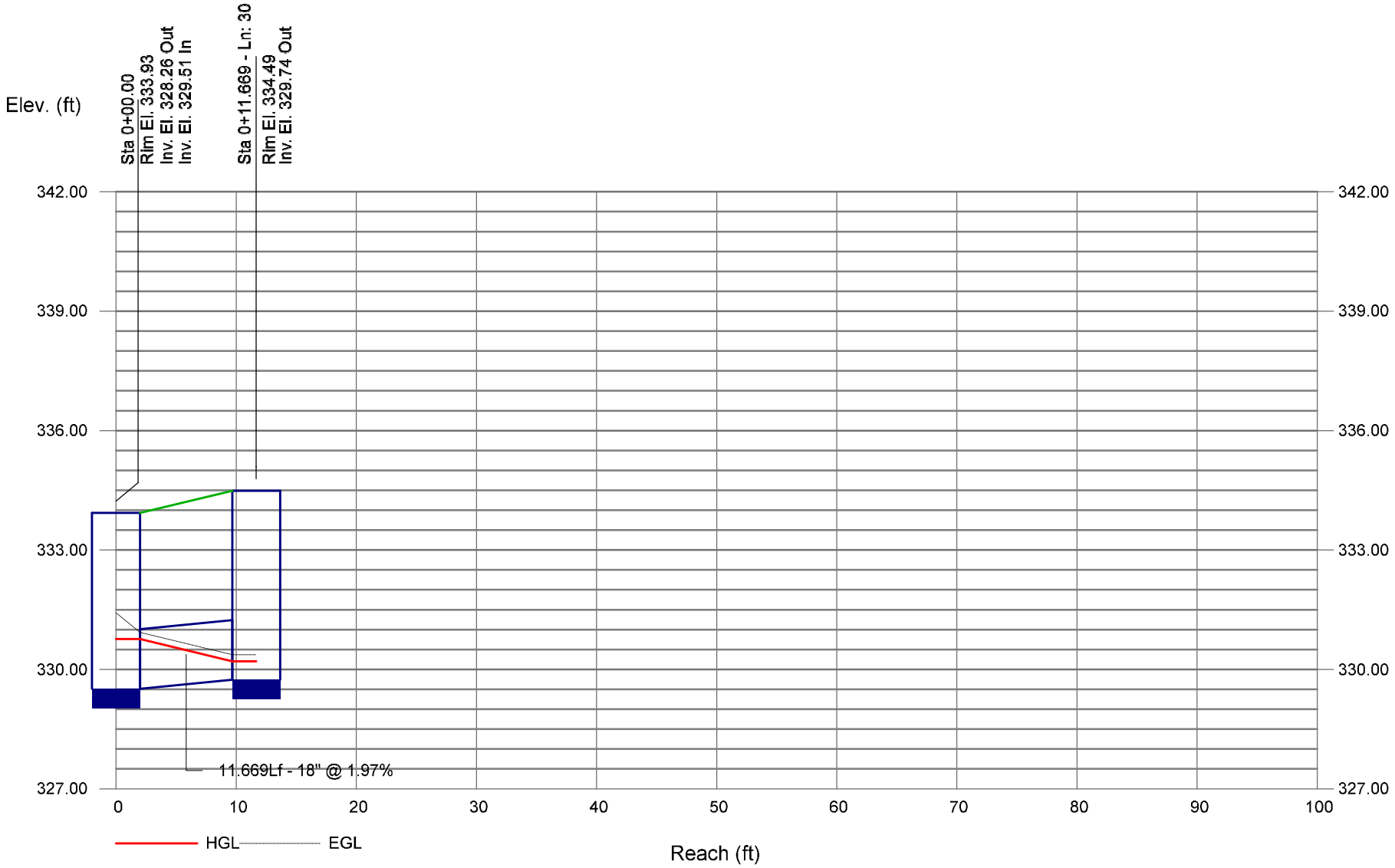
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 30-30

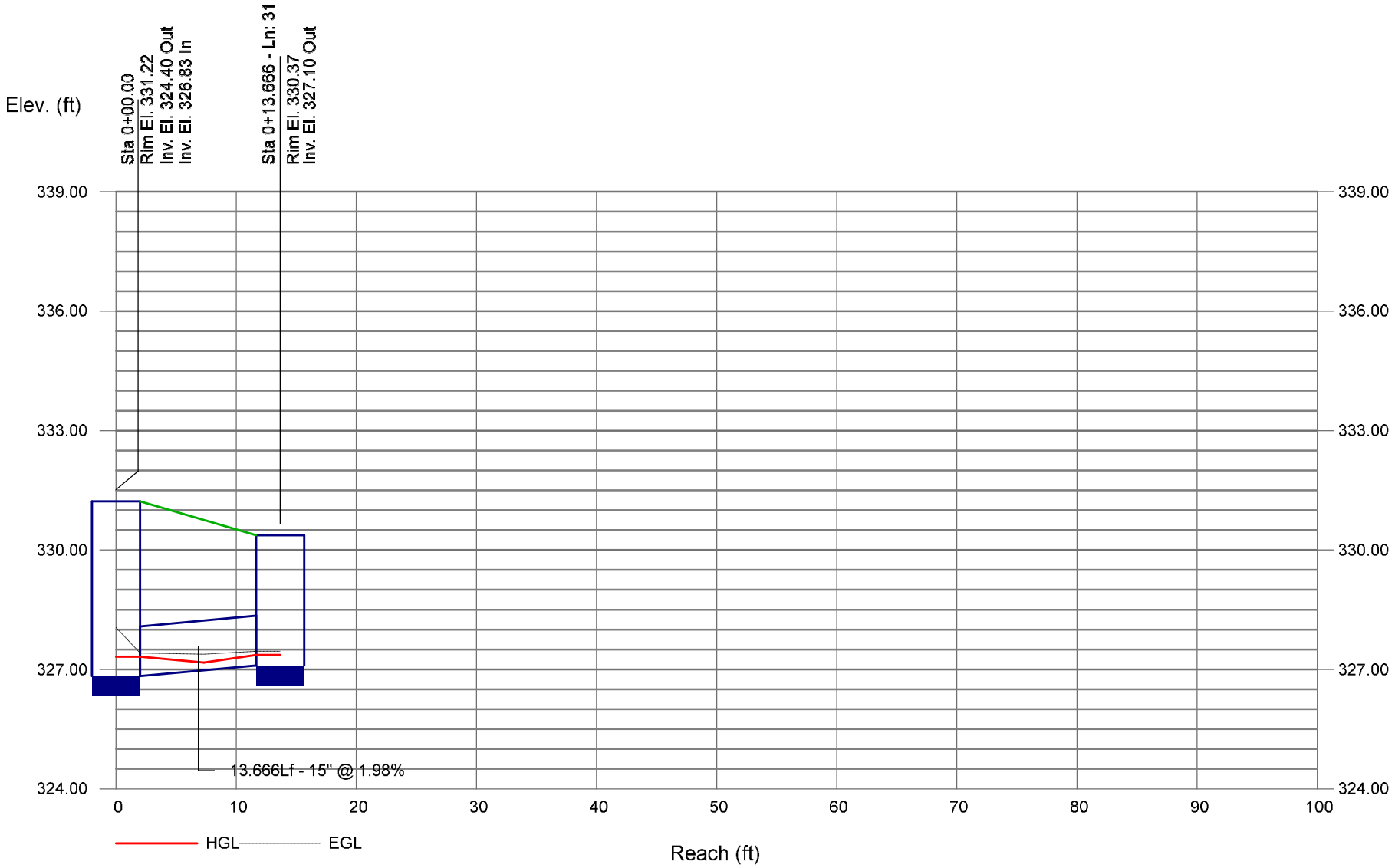
Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 10-Year Profile 31-31

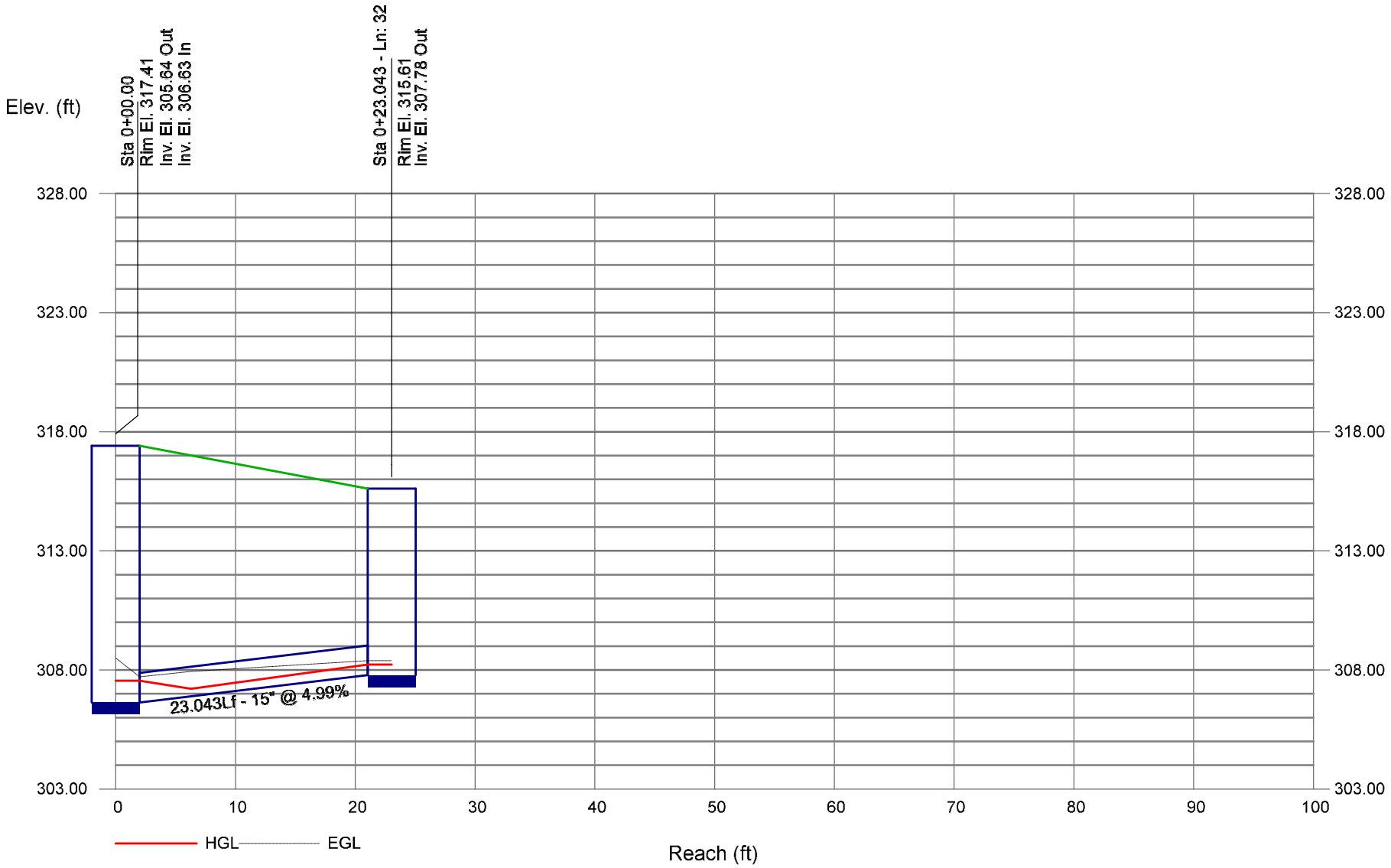
Proj. file: Outfall 4C.stm



Storm Sewer Profile

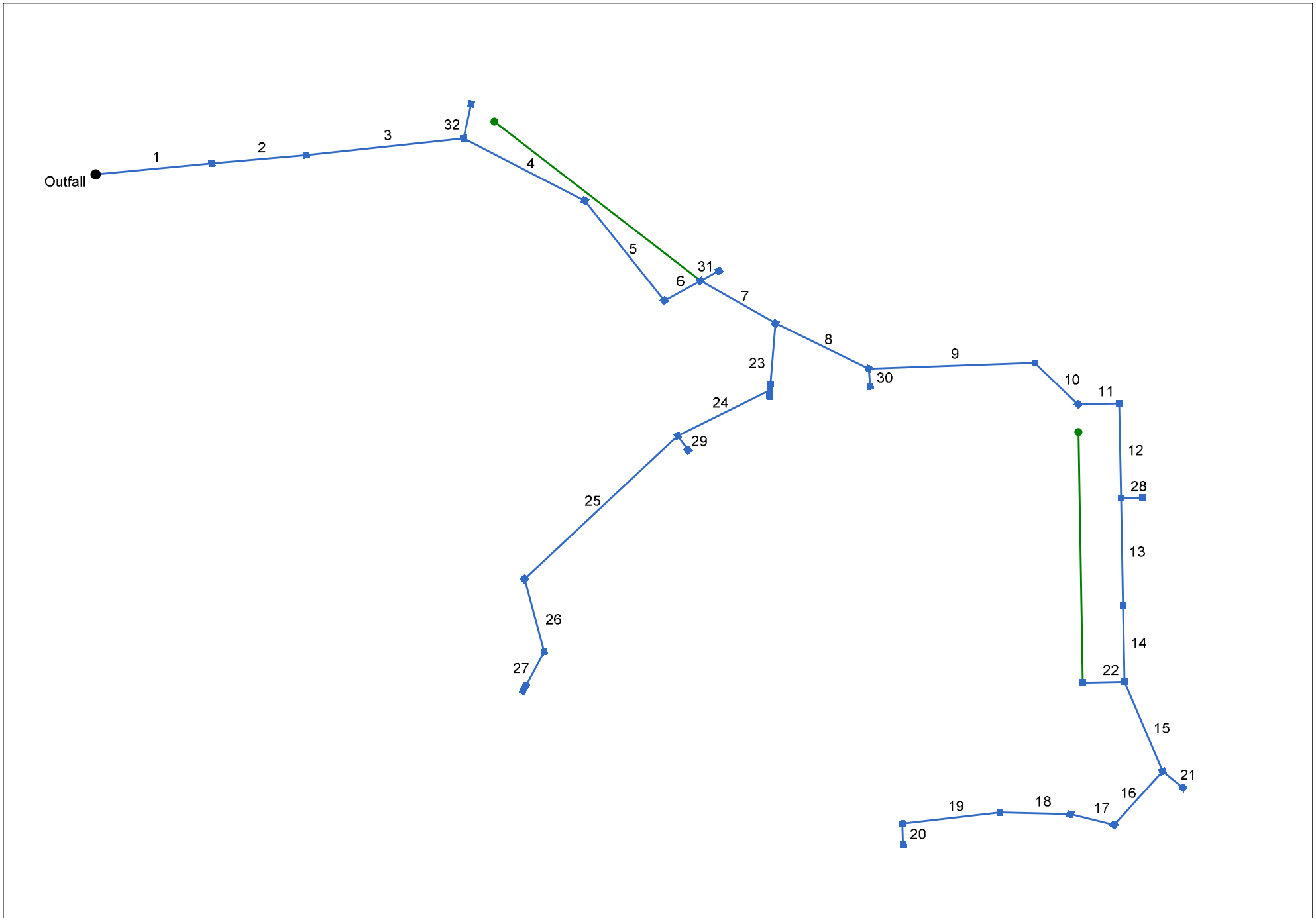
SCM #4C 10-Year Profile 32-32

Proj. file: Outfall 4C.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

SCM #4C 25-Year Report



Project File: Outfall 4C.stm	Number of lines: 32	Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	76.046	-5.425	DrGrt	0.00	0.37	0.55	10.0	293.50	6.60	298.52	36	Cir	0.013	0.50	315.32	Pipe - (43)
2	1	61.760	0.401	DrGrt	0.00	0.14	0.55	10.0	299.50	7.29	304.00	30	Cir	0.013	0.50	314.13	Pipe - (222)
3	2	102.861	-1.118	Comb	0.00	0.33	0.55	10.0	304.10	1.50	305.64	30	Cir	0.013	1.44	317.41	Pipe - (42)
4	3	88.974	33.505	Comb	0.00	0.04	0.55	10.0	307.64	4.99	312.08	30	Cir	0.013	0.70	325.73	Pipe - (41)
5	4	83.199	24.379	Comb	0.00	0.37	0.55	10.0	318.24	5.00	322.40	30	Cir	0.013	1.48	331.22	Pipe - (40)
6	5	27.000	-80.422	Comb	0.00	0.05	0.55	10.0	324.26	0.52	324.40	30	Cir	0.013	1.31	331.22	Pipe - (39)
7	6	56.000	58.331	Comb	0.00	0.22	0.55	10.0	325.17	4.02	327.42	30	Cir	0.013	1.38	333.32	Pipe - (38)
8	7	67.556	-3.541	Comb	0.00	0.16	0.55	10.0	327.92	0.50	328.26	30	Cir	0.013	1.31	333.93	Pipe - (37)
9	8	108.273	-28.115	Comb	0.00	0.13	0.55	10.0	328.66	1.54	330.33	30	Cir	0.013	1.14	336.53	Pipe - (36)
10	9	38.891	45.973	Comb	0.00	0.33	0.55	10.0	330.53	3.50	331.89	24	Cir	0.013	1.13	337.54	Pipe - (35)
11	10	27.000	-45.000	Comb	0.00	0.12	0.55	10.0	332.09	1.41	332.47	24	Cir	0.013	1.50	338.19	Pipe - (34)
12	11	62.001	90.000	Comb	0.00	0.13	0.55	10.0	332.67	1.40	333.54	24	Cir	0.013	1.50	339.11	Pipe - (33)
13	12	70.000	0.000	Comb	0.00	0.09	0.55	10.0	333.74	1.00	334.44	24	Cir	0.013	0.50	341.03	Pipe - (32)
14	13	50.103	0.000	Comb	0.00	0.13	0.55	10.0	334.64	1.50	335.39	24	Cir	0.013	1.50	342.25	Pipe - (31)
15	14	63.605	-22.081	Comb	0.00	0.19	0.55	10.0	335.59	1.49	336.54	24	Cir	0.013	1.73	342.89	Pipe - (30)
16	15	47.317	65.156	Comb	0.00	0.06	0.55	10.0	337.04	0.70	337.37	24	Cir	0.013	1.35	343.36	Pipe - (29)
17	16	29.174	61.949	Comb	0.00	0.08	0.55	10.0	337.57	4.70	338.94	18	Cir	0.013	0.50	343.64	Pipe - (28)
18	17	46.088	-12.524	Comb	0.00	0.13	0.55	10.0	339.16	1.45	339.83	18	Cir	0.013	0.50	344.23	Pipe - (27)
19	18	63.822	-8.013	Comb	0.00	0.12	0.55	10.0	340.03	1.19	340.79	18	Cir	0.013	1.50	345.18	Pipe - (26)
20	19	13.666	-85.245	DrGrt	0.00	2.83	0.55	10.0	340.89	2.71	341.26	15	Cir	0.013	1.00	345.72	Pipe - (25)
21	15	17.041	-27.258	DrGrt	0.00	0.80	0.55	10.0	338.46	2.00	338.80	15	Cir	0.013	1.00	343.61	Pipe - (211)
22	14	27.035	90.000	Comb	0.00	0.25	0.55	10.0	336.14	1.74	336.61	15	Cir	0.013	1.00	342.27	Pipe - (44)
23	7	43.958	64.945	Comb	0.00	0.23	0.55	10.0	327.92	0.50	328.14	24	Cir	0.013	1.32	333.36	Pipe - (54)

Project File: Outfall 4C.stm

Number of lines: 32

Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	67.254	59.039	Comb	0.00	0.38	0.55	10.0	329.13	0.51	329.47	18	Cir	0.013	1.50	333.94	Pipe - (51)
25	24	136.530	-16.931	Comb	0.00	0.10	0.55	10.0	329.72	2.24	332.78	15	Cir	0.013	1.35	337.94	Pipe - (50)
26	25	49.187	-61.481	Comb	0.00	0.16	0.55	10.0	332.98	3.11	334.51	15	Cir	0.013	1.09	340.19	Pipe - (49)
27	26	27.000	42.836	Comb	0.00	0.53	0.55	10.0	334.71	1.00	334.98	15	Cir	0.013	1.00	340.09	Pipe - (48)
28	12	13.667	-89.992	DrGrt	0.00	1.24	0.55	10.0	334.29	1.02	334.43	15	Cir	0.013	1.00	335.86	Pipe - (45)
29	24	11.720	-100.980	DrGrt	0.00	0.29	0.55	10.0	329.47	1.96	329.70	18	Cir	0.013	1.00	331.91	Pipe - (55)
30	8	11.669	58.129	DrGrt	0.00	0.47	0.55	10.0	329.51	1.97	329.74	18	Cir	0.013	1.00	334.49	Pipe - (46)
31	6	13.666	0.000	DrGrt	0.00	0.14	0.55	10.0	326.83	1.98	327.10	15	Cir	0.013	1.00	330.37	Pipe - (195)
32	3	23.043	-71.594	Comb	0.00	0.39	0.55	10.0	306.63	4.99	307.78	15	Cir	0.013	1.00	315.61	Pipe - (56)

Project File: Outfall 4C.stm

Number of lines: 32

Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	YI 419B	DropGrate	315.32	Rect	4.00	4.00	36	Cir	298.52	30	Cir	299.50
2	YI 419A	DropGrate	314.13	Rect	4.00	4.00	30	Cir	304.00	30	Cir	304.10
3	CB 420	Combination	317.41	Rect	4.00	4.00	30	Cir	305.64	30 15	Cir Cir	307.64 306.63
4	CB 422	Combination	325.73	Rect	4.00	4.00	30	Cir	312.08	30	Cir	318.24
5	CB 423	Combination	331.22	Rect	4.00	4.00	30	Cir	322.40	30	Cir	324.26
6	CB 423A	Combination	331.22	Rect	4.00	4.00	30	Cir	324.40	30 15	Cir Cir	325.17 326.83
7	CB 424	Combination	333.32	Rect	4.00	4.00	30	Cir	327.42	30 24	Cir Cir	327.92 327.92
8	CB 425	Combination	333.93	Rect	4.00	4.00	30	Cir	328.26	30 18	Cir Cir	328.66 329.51
9	CB 426	Combination	336.53	Rect	4.00	4.00	30	Cir	330.33	24	Cir	330.53
10	CB 427	Combination	337.54	Rect	4.00	4.00	24	Cir	331.89	24	Cir	332.09
11	CB 428	Combination	338.19	Rect	4.00	4.00	24	Cir	332.47	24	Cir	332.67
12	CB 429	Combination	339.11	Rect	4.00	4.00	24	Cir	333.54	24 15	Cir Cir	333.74 334.29
13	CB 430	Combination	341.03	Rect	4.00	4.00	24	Cir	334.44	24	Cir	334.64
14	CB 431	Combination	342.25	Rect	4.00	4.00	24	Cir	335.39	24 15	Cir Cir	335.59 336.14
15	CB 432	Combination	342.89	Rect	4.00	4.00	24	Cir	336.54	24 15	Cir Cir	337.04 338.46
16	CB 433	Combination	343.36	Rect	4.00	4.00	24	Cir	337.37	18	Cir	337.57
17	CB 434	Combination	343.64	Rect	4.00	4.00	18	Cir	338.94	18	Cir	339.16
18	CB 435	Combination	344.23	Rect	4.00	4.00	18	Cir	339.83	18	Cir	340.03
19	CB 436	Combination	345.18	Rect	4.00	4.00	18	Cir	340.79	15	Cir	340.89

Project File: Outfall 4C.stm | Number of Structures: 32 | Run Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
20	YI 437	DropGrate	345.72	Rect	4.00	4.00	15	Cir	341.26			
21	YI 432A	DropGrate	343.61	Rect	4.00	4.00	15	Cir	338.80			
22	CB 438	Combination	342.27	Rect	4.00	4.00	15	Cir	336.61			
23	CB 439	Combination	333.36	Rect	12.00	4.00	24	Cir	328.14	18	Cir	329.13
24	CB 440	Combination	333.94	Rect	4.00	4.00	18	Cir	329.47	15 18	Cir Cir	329.72 329.47
25	CB 441	Combination	337.94	Rect	4.00	4.00	15	Cir	332.78	15	Cir	332.98
26	CB 442	Combination	340.19	Rect	4.00	4.00	15	Cir	334.51	15	Cir	334.71
27	CB 443	Combination	340.09	Rect	8.00	4.00	15	Cir	334.98			
28	YI 429A	DropGrate	335.86	Rect	4.00	4.00	15	Cir	334.43			
29	YI 440A	DropGrate	331.91	Rect	4.00	4.00	18	Cir	329.70			
30	YI 425A	DropGrate	334.49	Rect	4.00	4.00	18	Cir	329.74			
31	YI 423B	DropGrate	330.37	Rect	4.00	4.00	15	Cir	327.10			
32	CB 421	Combination	315.61	Rect	4.00	4.00	15	Cir	307.78			

Project File: Outfall 4C.stm | Number of Structures: 32 | Run Date: 2/3/2025

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (43)	36.61	36	Cir	76.046	293.50	298.52	6.601	296.50	300.49	n/a	300.49 j	End	DropGrate
2	Pipe - (222)	35.46	30	Cir	61.760	299.50	304.00	7.286	300.49	306.02	0.54	306.02	1	DropGrate
3	Pipe - (42)	35.22	30	Cir	102.861	304.10	305.64	1.497	306.02	307.65	n/a	307.65	2	Combination
4	Pipe - (41)	32.93	30	Cir	88.974	307.64	312.08	4.990	308.68	314.03	n/a	314.03	3	Combination
5	Pipe - (40)	32.91	30	Cir	83.199	318.24	322.40	5.000	319.28	324.35	n/a	324.35	4	Combination
6	Pipe - (39)	31.72	30	Cir	27.000	324.26	324.40	0.518	326.57	326.71	0.91	327.62	5	Combination
7	Pipe - (38)	31.21	30	Cir	56.000	325.17	327.42	4.018	327.62	329.32	n/a	329.32 j	6	Combination
8	Pipe - (37)	24.85	30	Cir	67.556	327.92	328.26	0.503	329.70	330.04	0.90	330.94	7	Combination
9	Pipe - (36)	22.93	30	Cir	108.273	328.66	330.33	1.542	330.94	331.96	n/a	331.96 j	8	Combination
10	Pipe - (35)	22.53	24	Cir	38.891	330.53	331.89	3.497	331.96	333.58	1.11	333.58	9	Combination
11	Pipe - (34)	21.43	24	Cir	27.000	332.09	332.47	1.407	333.58	334.13	1.39	334.13	10	Combination
12	Pipe - (33)	21.10	24	Cir	62.001	332.67	333.54	1.403	334.13	335.18	n/a	335.18	11	Combination
13	Pipe - (32)	16.42	24	Cir	70.000	333.74	334.44	1.000	335.18	335.90	n/a	335.90	12	Combination
14	Pipe - (31)	16.17	24	Cir	50.103	334.64	335.39	1.497	335.90	336.84	n/a	336.84	13	Combination
15	Pipe - (30)	14.91	24	Cir	63.605	335.59	336.54	1.494	336.84	337.93	n/a	337.93	14	Combination
16	Pipe - (29)	11.45	24	Cir	47.317	337.04	337.37	0.697	338.16	338.58	n/a	338.58	15	Combination
17	Pipe - (28)	11.26	18	Cir	29.174	337.57	338.94	4.696	338.58	340.22	n/a	340.22	16	Combination
18	Pipe - (27)	11.02	18	Cir	46.088	339.16	339.83	1.454	340.24	341.10	0.37	341.10	17	Combination
19	Pipe - (26)	10.61	18	Cir	63.822	340.03	340.79	1.191	341.17	342.04	n/a	342.04	18	Combination
20	Pipe - (25)	10.19	15	Cir	13.666	340.89	341.26	2.707	342.04	342.45	n/a	342.45	19	DropGrate
21	Pipe - (211)	2.88	15	Cir	17.041	338.46	338.80	1.995	338.94	339.48	n/a	339.48	15	DropGrate
22	Pipe - (44)	0.90	15	Cir	27.035	336.14	336.61	1.738	336.84	336.98	n/a	336.98 j	14	Combination
23	Pipe - (54)	5.84	24	Cir	43.958	327.92	328.14	0.500	329.32	328.99	n/a	328.99	7	Combination
24	Pipe - (51)	5.08	18	Cir	67.254	329.13	329.47	0.506	330.04	330.38	0.48	330.86	23	Combination

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	Pipe - (50)	2.82	15	Cir	136.530	329.72	332.78	2.241	330.86	333.45	n/a	333.45 j	24	Combination
26	Pipe - (49)	2.47	15	Cir	49.187	332.98	334.51	3.111	333.45	335.14	0.27	335.14	25	Combination
27	Pipe - (48)	1.91	15	Cir	27.000	334.71	334.98	1.000	335.18	335.53	n/a	335.53	26	Combination
28	Pipe - (45)	4.46	15	Cir	13.667	334.29	334.43	1.024	335.18	335.29	0.39	335.29	12	DropGrate
29	Pipe - (55)	1.04	18	Cir	11.720	329.47	329.70	1.963	330.86	330.08	0.14	330.08	24	DropGrate
30	Pipe - (46)	1.69	18	Cir	11.669	329.51	329.74	1.971	330.94	330.23	0.18	330.23	8	DropGrate
31	Pipe - (195)	0.50	15	Cir	13.666	326.83	327.10	1.976	327.62	327.38	0.10	327.38	6	DropGrate
32	Pipe - (56)	1.40	15	Cir	23.043	306.63	307.78	4.991	307.65	308.25	n/a	308.25 j	3	Combination

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	YI 419B	1.33	0.00	1.33	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.12	14.25	0.12	14.25	0.0	Off
2	YI 419A	0.50	0.02	0.52	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.06	8.77	0.06	8.77	0.0	Off
3	CB 420	1.19	0.01	1.18	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.100	2.00	0.060	0.020	0.013	0.14	2.98	0.03	0.46	0.0	2
4	CB 422	0.14	0.06	0.21	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.086	2.00	0.060	0.020	0.013	0.07	1.24	0.00	0.00	0.0	3
5	CB 423	1.33	0.00	1.27	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.069	2.00	0.060	0.020	0.013	0.15	3.71	0.05	0.83	0.0	4
6	CB 423A	0.18	0.04	0.22	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.09	1.43	0.00	0.00	0.0	32
7	CB 424	0.79	0.04	0.79	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.15	3.69	0.05	0.80	0.0	6
8	CB 425	0.58	0.00	0.57	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.14	2.79	0.02	0.35	0.0	7
9	CB 426	0.47	0.11	0.57	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.13	2.37	0.01	0.15	0.0	8
10	CB 427	1.19	0.07	1.15	0.11	Comb	6.0	1.50	0.00	3.00	2.50	0.038	2.00	0.060	0.020	0.013	0.17	4.34	0.07	1.13	0.0	9
11	CB 428	0.43	0.00	0.43	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.12	2.20	0.00	0.00	0.0	10
12	CB 429	0.47	0.00	0.47	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.13	2.38	0.01	0.17	0.0	11
13	CB 430	0.32	0.00	0.32	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.11	1.85	0.00	0.00	0.0	12
14	CB 431	0.47	0.02	0.49	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.13	2.50	0.01	0.17	0.0	13
15	CB 432	0.68	0.00	0.66	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.15	3.59	0.04	0.74	0.0	14
16	CB 433	0.22	0.00	0.22	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.11	1.75	0.00	0.00	0.0	15
17	CB 434	0.29	0.01	0.29	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.12	1.97	0.00	0.00	0.0	16
18	CB 435	0.47	0.00	0.47	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.14	3.01	0.03	0.45	0.0	17
19	CB 436	0.43	0.00	0.43	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.015	2.00	0.060	0.020	0.013	0.14	2.80	0.02	0.36	0.0	18
20	YI 437	10.19	0.00	10.19	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.46	48.15	0.46	48.15	0.0	Off
21	YI 432A	2.88	0.00	2.88	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.20	22.16	0.20	22.16	0.0	Off
22	CB 438	0.90	0.00	0.83	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.020	2.00	0.060	0.020	0.013	0.17	4.30	0.07	1.09	0.0	10
23	CB 439	0.83	0.15	0.95	0.03	Comb	6.0	4.50	0.00	9.00	2.50	0.020	2.00	0.060	0.020	0.013	0.17	4.54	0.05	0.82	0.0	7

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	CB 440	1.37	0.00	1.21	0.15	Comb	6.0	1.50	0.00	3.00	2.50	0.033	2.00	0.060	0.020	0.013	0.18	4.76	0.08	1.33	0.0	23
25	CB 441	0.36	0.00	0.36	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.10	1.75	0.00	0.00	0.0	24
26	CB 442	0.58	0.00	0.58	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.050	2.00	0.060	0.020	0.013	0.12	2.06	0.00	0.00	0.0	25
27	CB 443	1.91	0.00	1.69	0.21	Comb	6.0	3.00	0.00	6.00	2.50	0.050	2.00	0.060	0.020	0.013	0.18	5.11	0.08	1.39	0.0	Off
28	YI 429A	4.46	0.00	4.46	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.26	28.83	0.26	28.83	0.0	Off
29	YI 440A	1.04	0.00	1.04	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.10	12.49	0.10	12.49	0.0	Off
30	YI 425A	1.69	0.00	1.69	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.14	16.29	0.14	16.29	0.0	Off
31	YI 423B	0.50	0.00	0.50	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.06	8.65	0.06	8.65	0.0	Off
32	CB 421	1.40	0.00	1.39	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.160	2.00	0.060	0.020	0.013	0.14	2.79	0.02	0.37	0.0	3

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	36	36.61	293.50	296.50	3.00	4.91	5.18	0.42	296.92	0.301	76.046	298.52	300.49 j	1.97**	4.91	7.46	0.86	301.35	0.514	0.408	n/a	0.50	n/a
2	30	35.46	299.50	300.49	0.99	1.80	19.70	1.08	301.57	0.000	61.760	304.00	306.02	2.02**	4.25	8.35	1.08	307.10	0.000	0.000	n/a	0.50	0.54
3	30	35.22	304.10	306.02	1.92	4.04	8.71	1.07	307.09	0.000	102.861	305.64	307.65	2.01**	4.24	8.31	1.07	308.73	0.000	0.000	n/a	1.44	n/a
4	30	32.93	307.64	308.68	1.04*	1.92	17.12	1.00	309.67	0.000	88.974	312.08	314.03	1.95**	4.11	8.01	1.00	315.03	0.000	0.000	n/a	0.70	n/a
5	30	32.91	318.24	319.28	1.04*	1.92	17.13	1.00	320.27	0.000	83.199	322.40	324.35	1.95**	4.11	8.01	1.00	325.35	0.000	0.000	n/a	1.48	n/a
6	30	31.72	324.26	326.57	2.31*	4.74	6.69	0.70	327.27	0.518	27.000	324.40	326.71	2.31	4.74	6.70	0.70	327.41	0.519	0.518	0.140	1.31	0.91
7	30	31.21	325.17	327.62	2.45	4.01	6.39	0.94	328.57	0.000	56.000	327.42	329.32 j	1.90**	4.01	7.79	0.94	330.27	0.000	0.000	n/a	1.38	1.30
8	30	24.85	327.92	329.70	1.78*	3.73	6.66	0.69	330.39	0.503	67.556	328.26	330.04	1.78	3.73	6.66	0.69	330.73	0.503	0.503	0.340	1.31	0.90
9	30	22.93	328.66	330.94	2.28	3.38	4.88	0.71	331.65	0.000	108.273	330.33	331.96 j	1.63**	3.38	6.77	0.71	332.67	0.000	0.000	n/a	1.14	n/a
10	24	22.53	330.53	331.96	1.43	2.40	9.39	0.98	332.94	0.000	38.891	331.89	333.58	1.69**	2.83	7.95	0.98	334.56	0.000	0.000	n/a	1.13	1.11
11	24	21.43	332.09	333.58	1.49	2.51	8.53	0.92	334.50	0.000	27.000	332.47	334.13	1.65**	2.78	7.71	0.92	335.05	0.000	0.000	n/a	1.50	1.39
12	24	21.10	332.67	334.13	1.45	2.45	8.62	0.91	335.03	0.000	62.001	333.54	335.18	1.64**	2.76	7.64	0.91	336.09	0.000	0.000	n/a	1.50	n/a
13	24	16.42	333.74	335.18	1.44	2.43	6.76	0.69	335.88	0.000	70.000	334.44	335.90	1.46**	2.46	6.68	0.69	336.59	0.000	0.000	n/a	0.50	n/a
14	24	16.17	334.64	335.90	1.26	2.08	7.76	0.68	336.58	0.000	50.103	335.39	336.84	1.45**	2.44	6.63	0.68	337.52	0.000	0.000	n/a	1.50	n/a
15	24	14.91	335.59	336.84	1.25	2.06	7.23	0.64	337.47	0.000	63.605	336.54	337.93	1.39**	2.33	6.39	0.64	338.57	0.000	0.000	n/a	1.73	n/a
16	24	11.45	337.04	338.16	1.12*	1.82	6.30	0.51	338.68	0.000	47.317	337.37	338.58	1.21**	1.99	5.74	0.51	339.10	0.000	0.000	n/a	1.35	n/a
17	18	11.26	337.57	338.58	1.01	1.27	8.86	0.76	339.35	0.000	29.174	338.94	340.22	1.28**	1.61	7.00	0.76	340.98	0.000	0.000	n/a	0.50	n/a
18	18	11.02	339.16	340.24	1.08*	1.37	8.07	0.74	340.98	0.000	46.088	339.83	341.10	1.27**	1.60	6.90	0.74	341.84	0.000	0.000	n/a	0.50	0.37
19	18	10.61	340.03	341.17	1.14*	1.44	7.36	0.71	341.88	0.000	63.822	340.79	342.04	1.25**	1.57	6.74	0.71	342.75	0.000	0.000	n/a	1.50	n/a
20	15	10.19	340.89	342.04	1.15	1.18	8.62	1.11	343.15	0.000	13.666	341.26	342.45	1.19**	1.20	8.46	1.11	343.56	0.000	0.000	n/a	1.00	n/a
21	15	2.88	338.46	338.94	0.48*	0.44	6.59	0.28	339.22	0.000	17.041	338.80	339.48	0.68**	0.68	4.21	0.28	339.76	0.000	0.000	n/a	1.00	n/a
22	15	0.90	336.14	336.84	0.70	0.31	1.28	0.13	336.97	0.000	27.035	336.61	336.98 j	0.37**	0.31	2.94	0.13	337.12	0.000	0.000	n/a	1.00	n/a

Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	24	5.84	327.92	329.32	1.40	1.28	2.48	0.32	329.65	0.000	43.958	328.14	328.99	0.85**	1.28	4.57	0.32	329.32	0.000	0.000	n/a	1.32	n/a
24	18	5.08	329.13	330.04	0.91*	1.12	4.54	0.32	330.36	0.505	67.254	329.47	330.38	0.91	1.12	4.55	0.32	330.70	0.506	0.506	0.340	1.50	0.48
25	15	2.82	329.72	330.86	1.14	0.67	2.40	0.27	331.13	0.000	136.530	332.78	333.45 j	0.67**	0.67	4.18	0.27	333.72	0.000	0.000	n/a	1.35	0.37
26	15	2.47	332.98	333.45	0.47	0.43	5.81	0.25	333.70	0.000	49.187	334.51	335.14	0.63**	0.62	4.00	0.25	335.39	0.000	0.000	n/a	1.09	0.27
27	15	1.91	334.71	335.18	0.47*	0.42	4.58	0.21	335.39	0.000	27.000	334.98	335.53	0.55**	0.52	3.68	0.21	335.74	0.000	0.000	n/a	1.00	n/a
28	15	4.46	334.29	335.18	0.89	0.90	4.75	0.39	335.57	0.000	13.667	334.43	335.29	0.86**	0.90	4.99	0.39	335.67	0.000	0.000	n/a	1.00	0.39
29	18	1.04	329.47	330.86	1.39	0.35	0.61	0.14	331.00	0.000	11.720	329.70	330.08	0.38**	0.35	2.95	0.14	330.22	0.000	0.000	n/a	1.00	0.14
30	18	1.69	329.51	330.94	1.43	0.50	0.97	0.18	331.12	0.000	11.669	329.74	330.23	0.49**	0.50	3.39	0.18	330.41	0.000	0.000	n/a	1.00	0.18
31	15	0.50	326.83	327.62	0.79	0.20	0.61	0.10	327.72	0.000	13.666	327.10	327.38	0.28**	0.20	2.50	0.10	327.47	0.000	0.000	n/a	1.00	0.10
32	15	1.40	306.63	307.65	1.02	0.42	1.31	0.17	307.83	0.000	23.043	307.78	308.25 j	0.47**	0.42	3.35	0.17	308.42	0.000	0.000	n/a	1.00	0.17

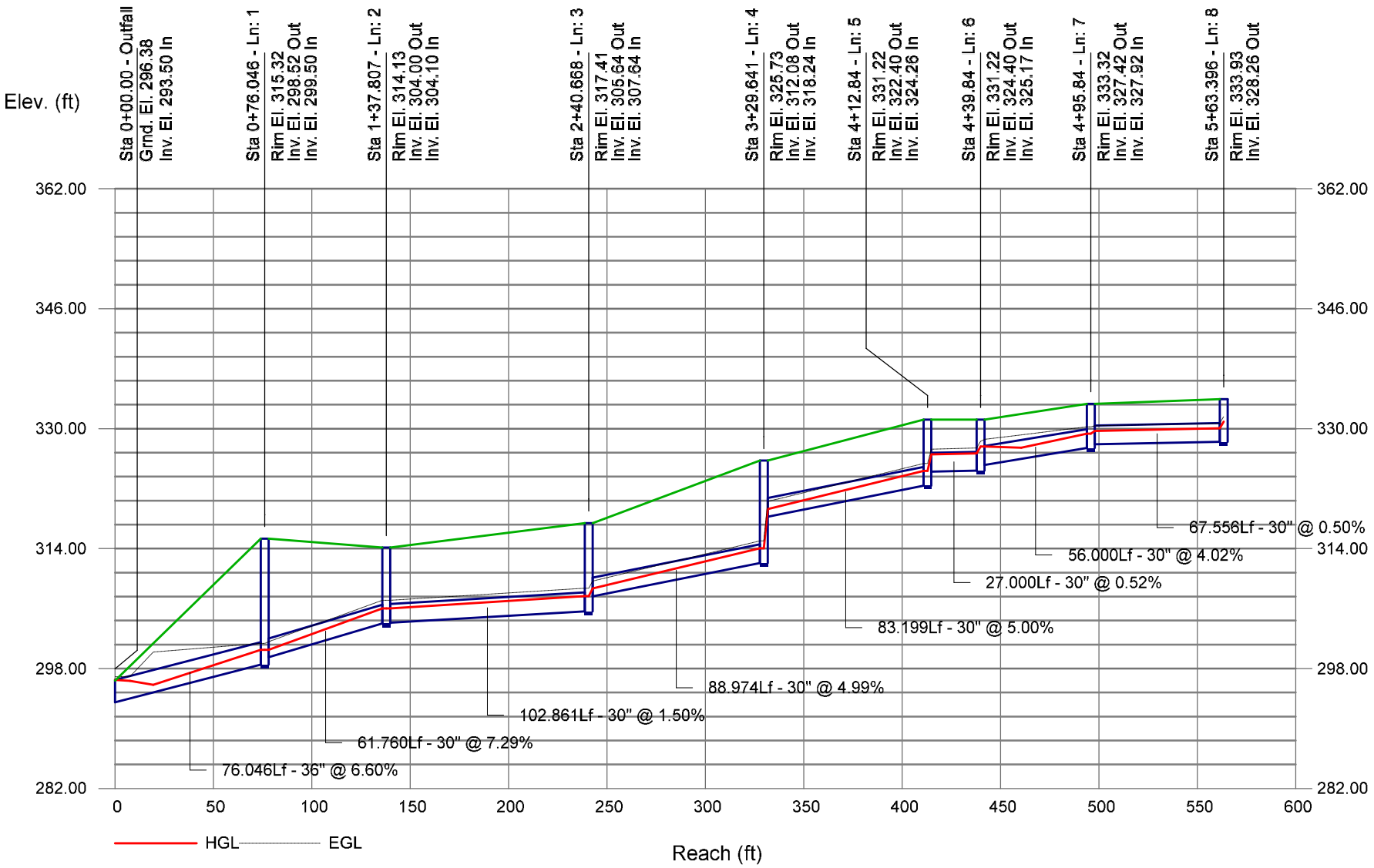
Project File: Outfall 4C.stm | Number of lines: 32 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Storm Sewer Profile

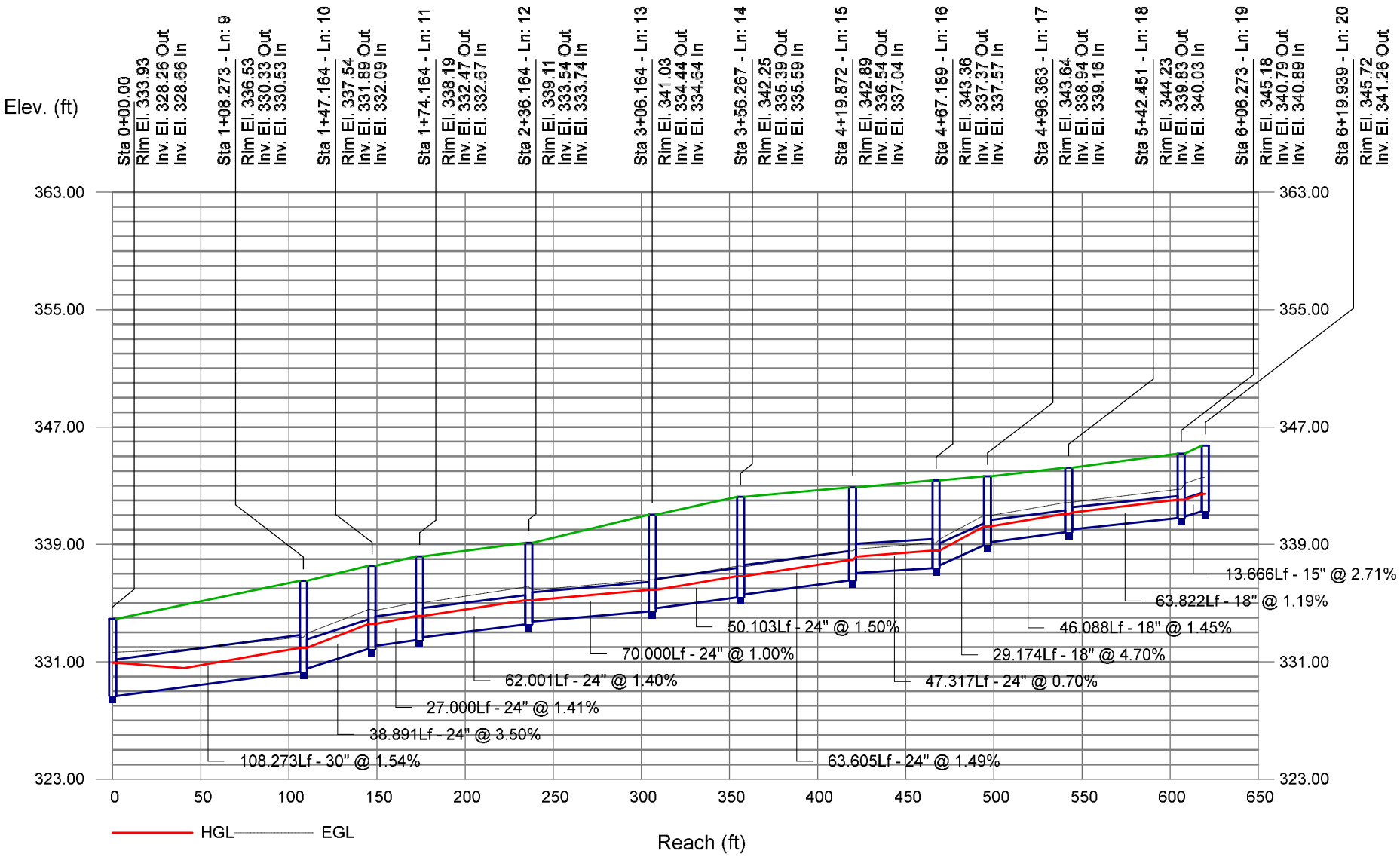
SCM #4C 25-Year Profile 1-8

Proj. file: Outfall 4C.stm



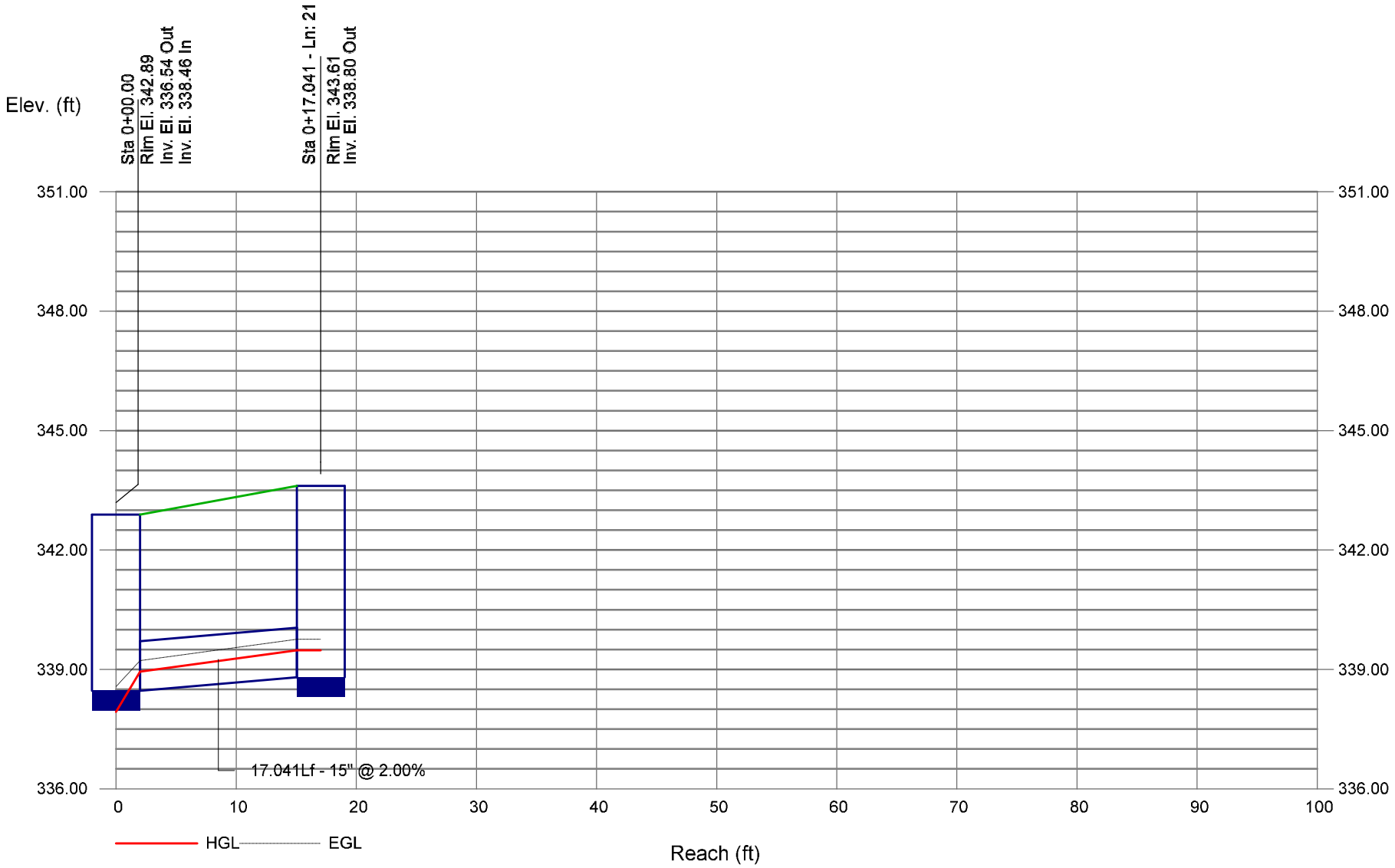
Storm Sewer Profile

SCM #4C 25-Year Profile 9-20 Proj. file: Outfall 4C.stm



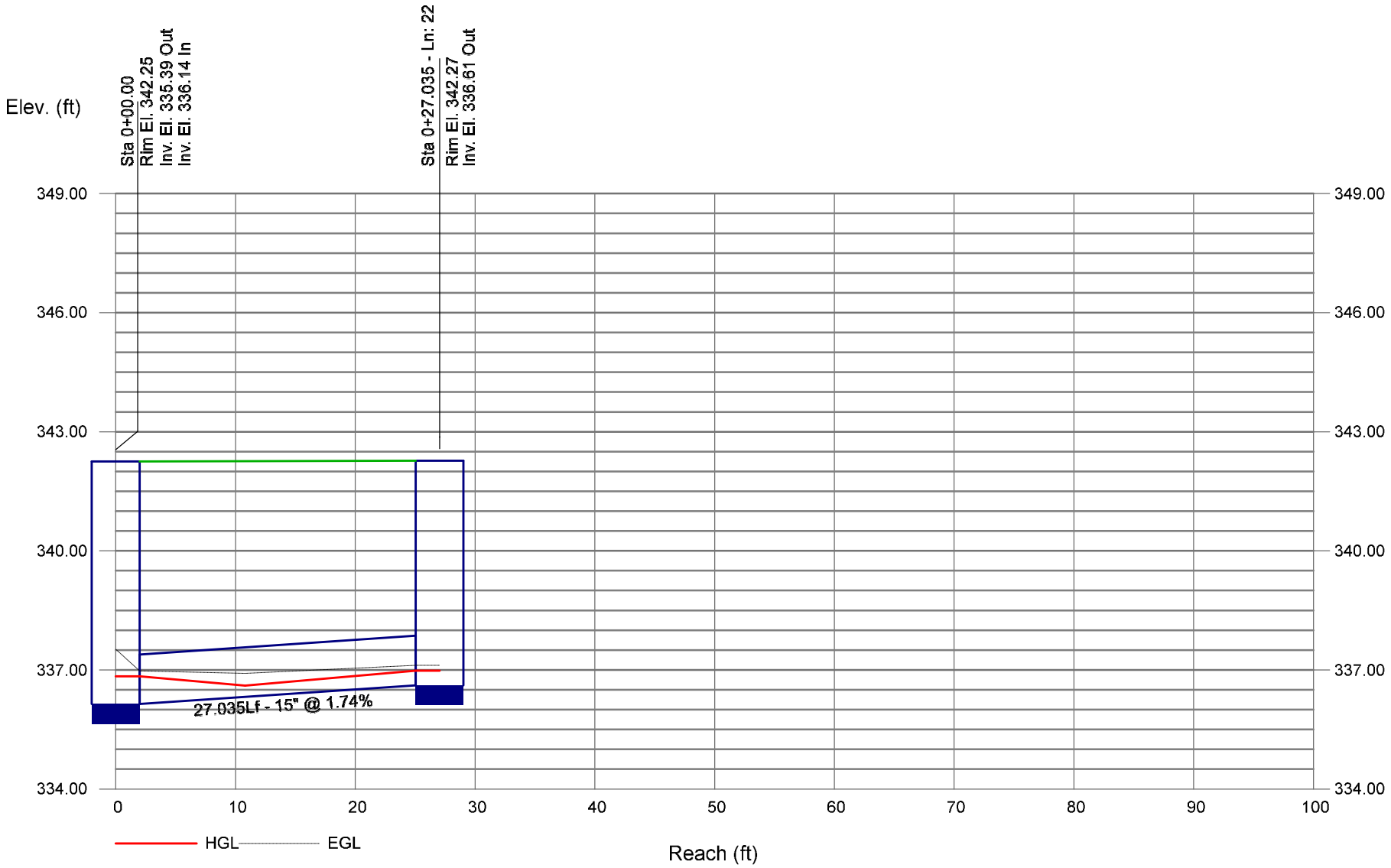
Storm Sewer Profile

SCM #4C 25-Year Profile 21-21 Proj. file: Outfall 4C.stm



Storm Sewer Profile

SCM #4C 25-Year Profile 22-22 Proj. file: Outfall 4C.stm



Storm Sewer Profile

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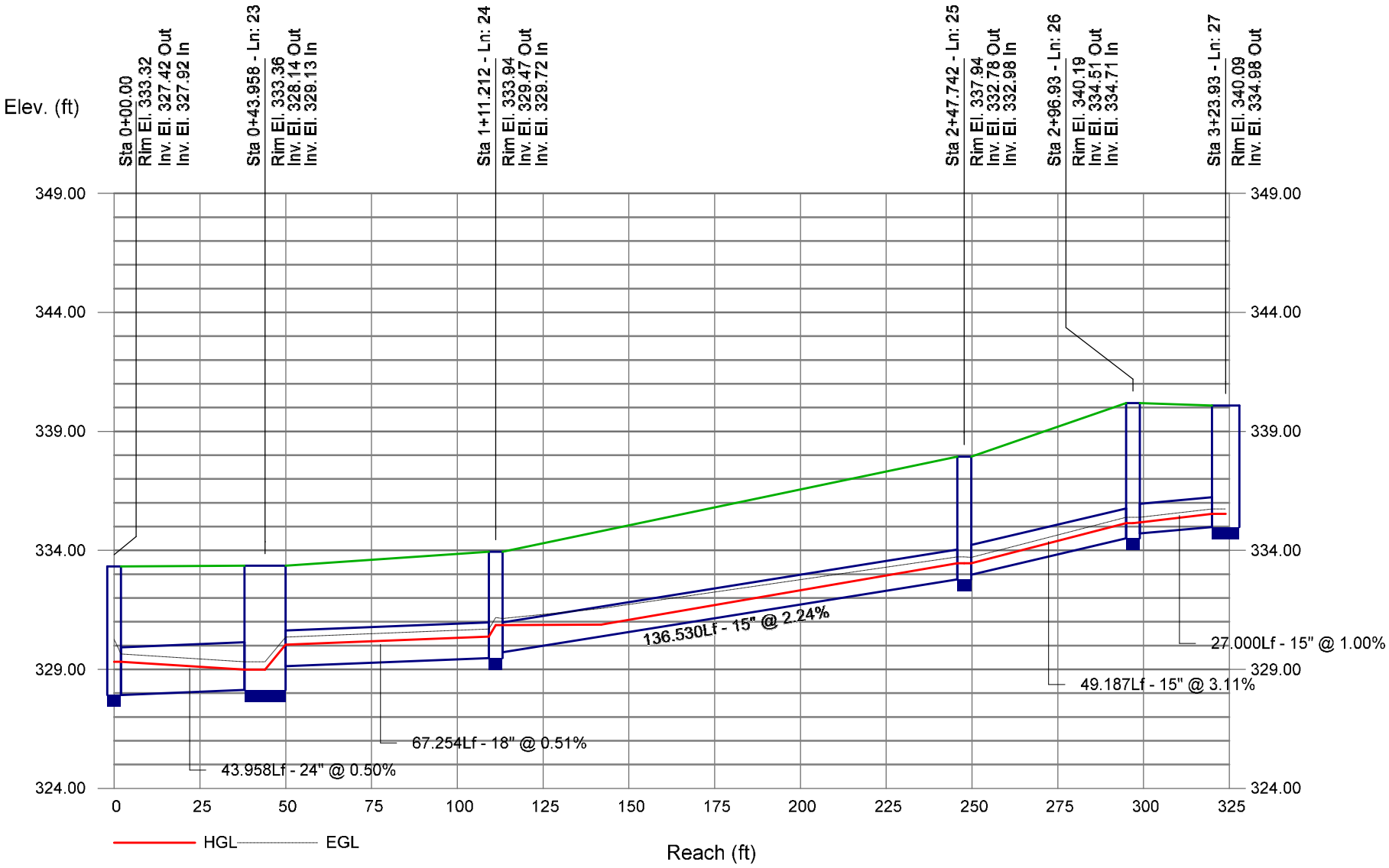
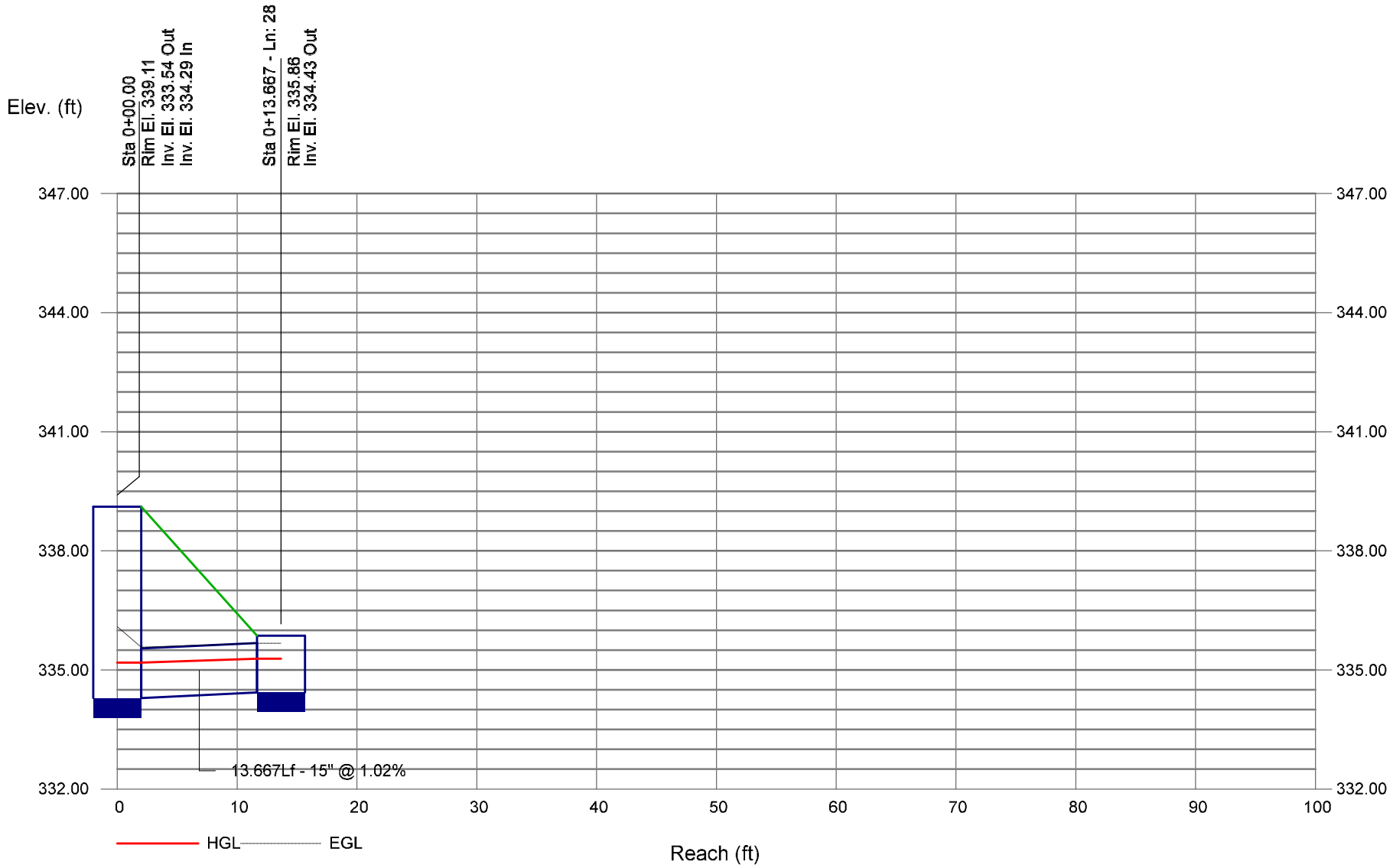


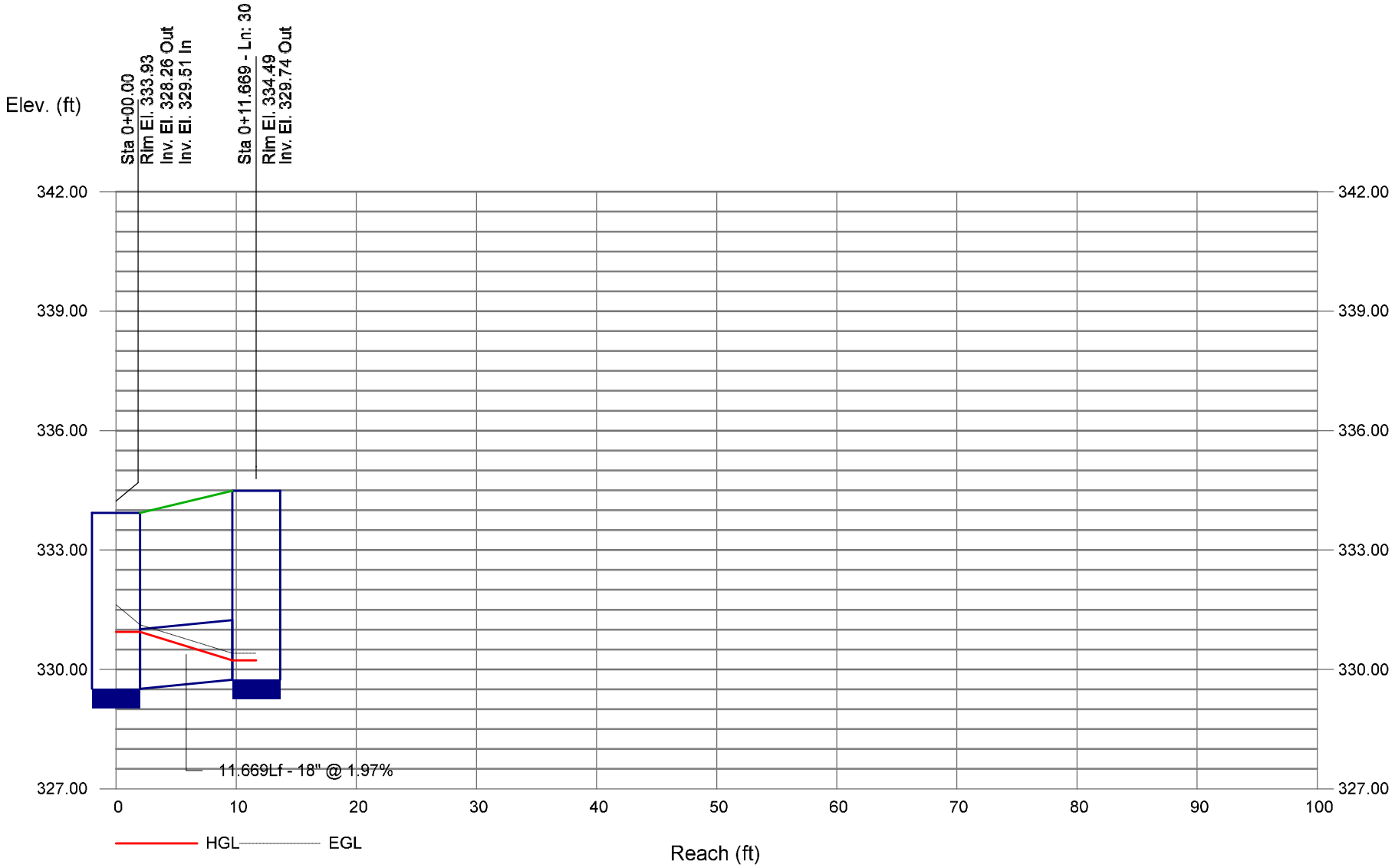
Storm Sewer Profile

SCM #4C 25-Year Profile 28-28 Proj. file: Outfall 4C.stm



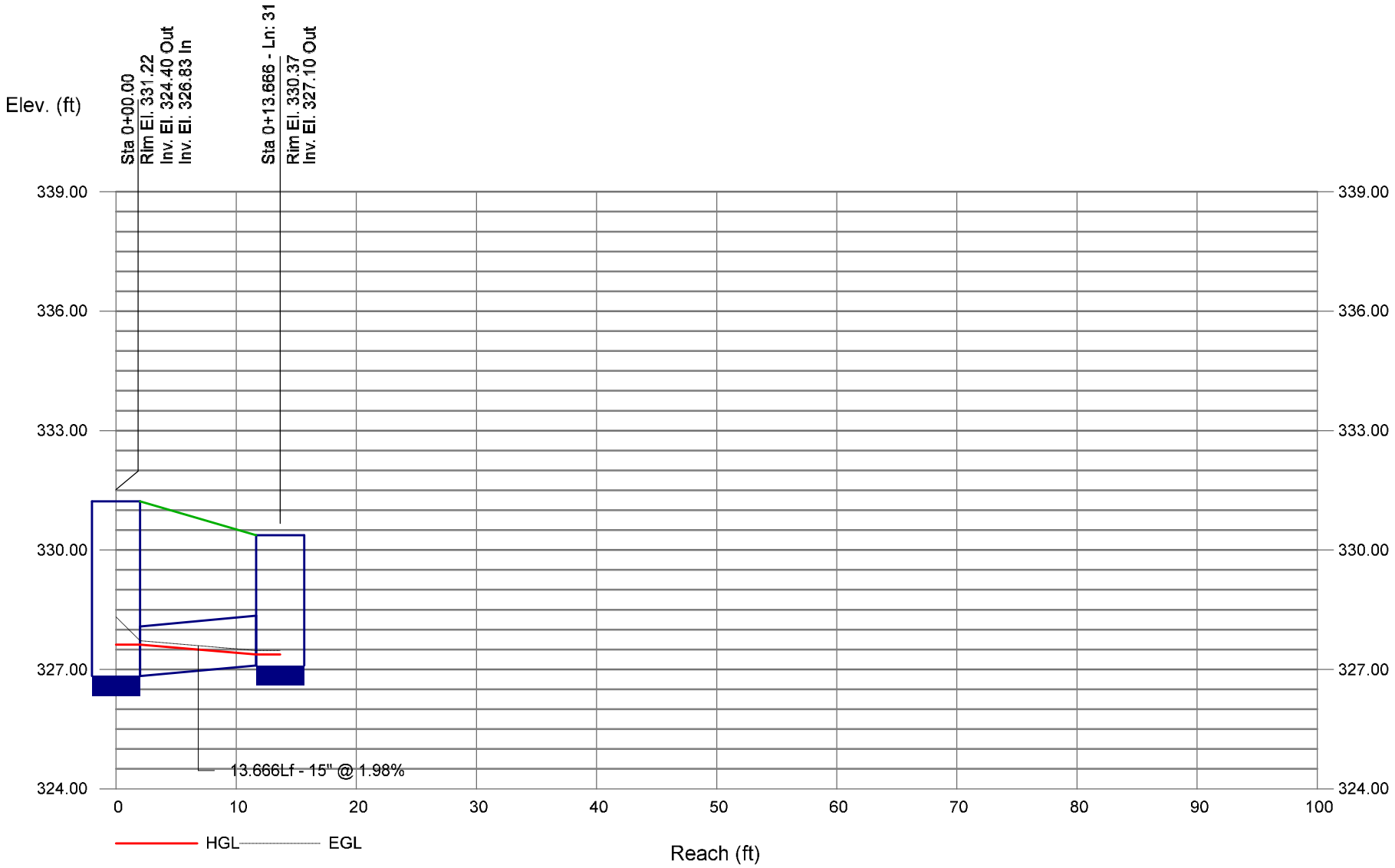
Storm Sewer Profile

SCM #4C 25-Year Profile 30-30 Proj. file: Outfall 4C.stm



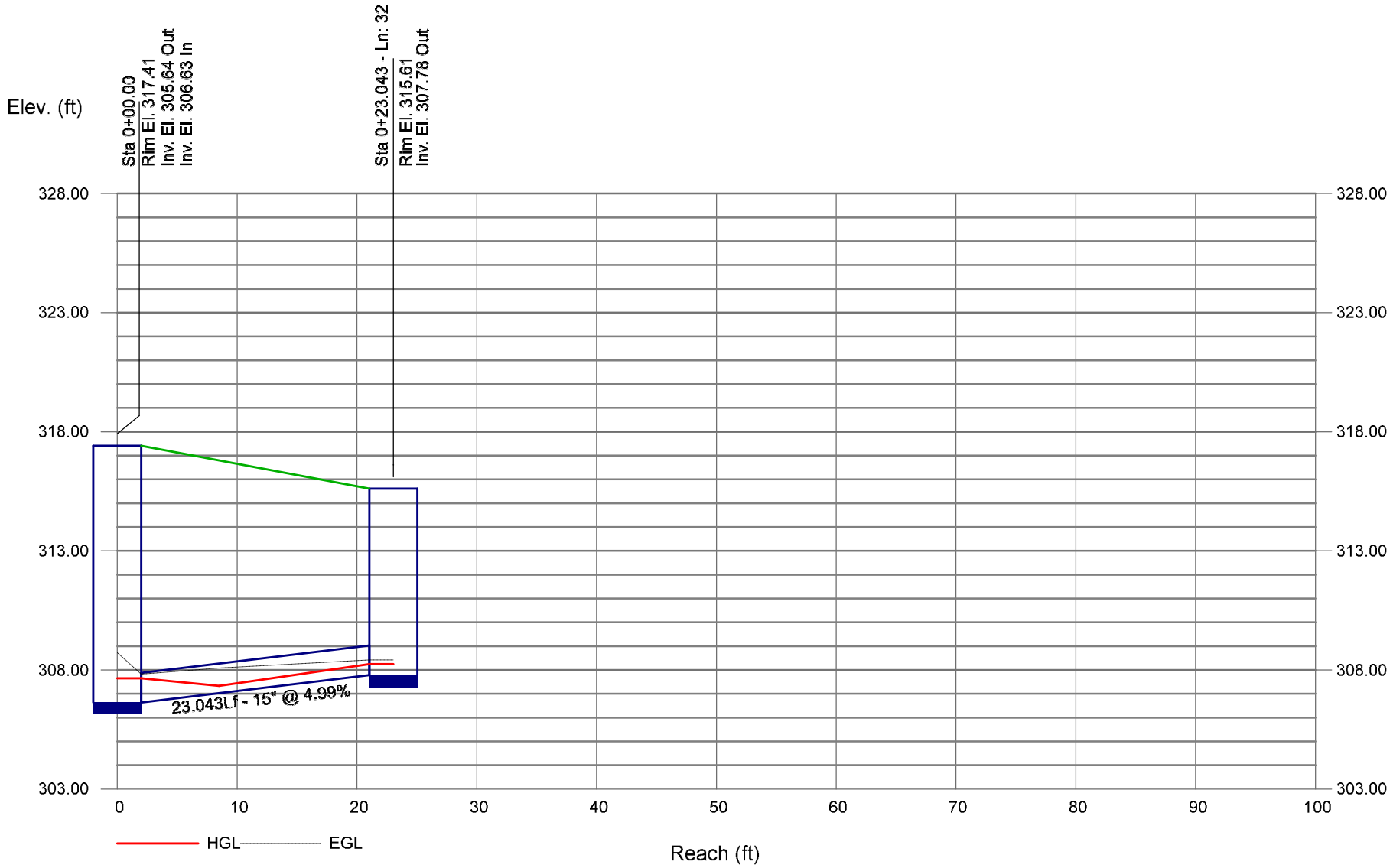
Storm Sewer Profile

SCM #4C 25-Year Profile 31-31 Proj. file: Outfall 4C.stm

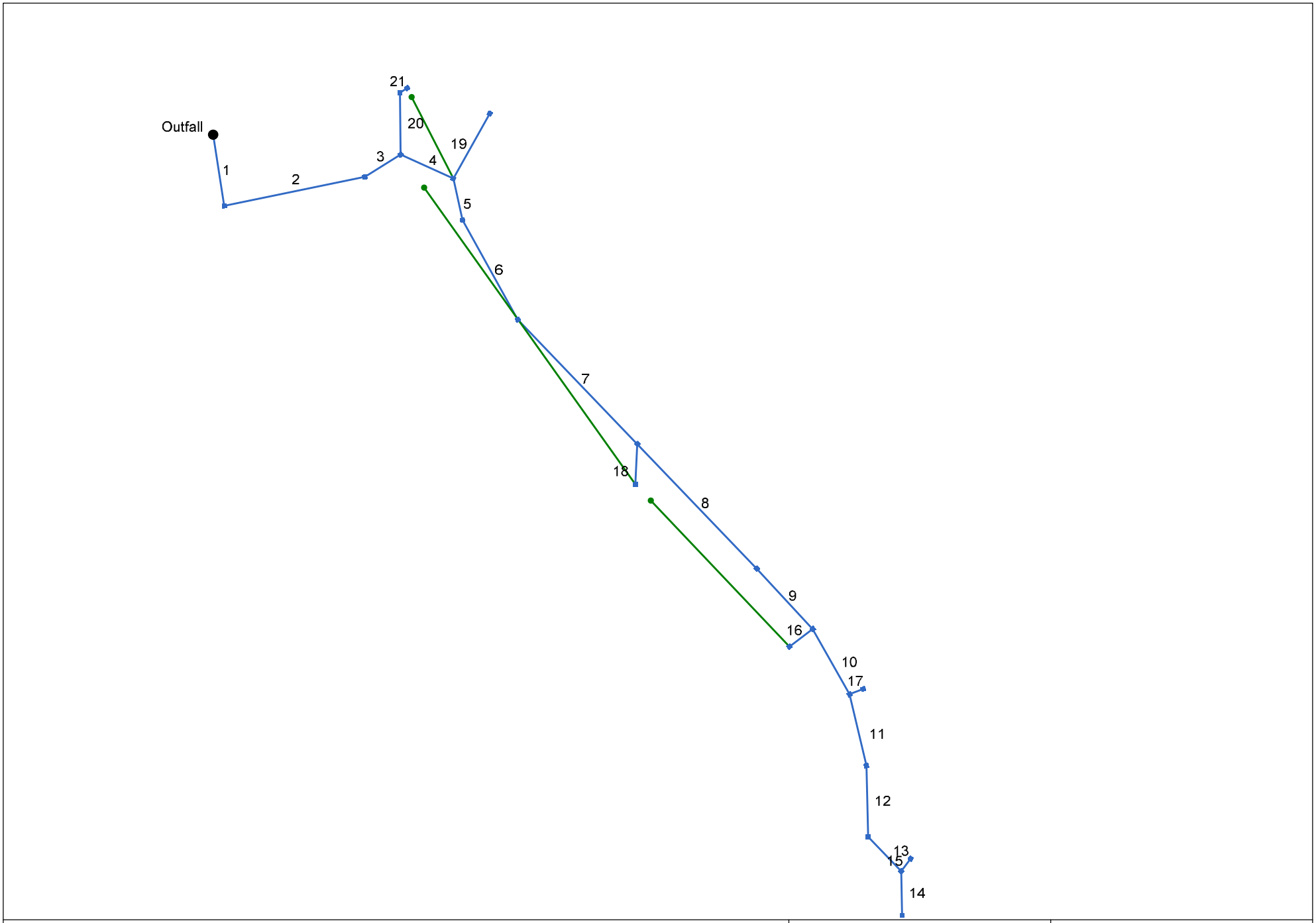


Storm Sewer Profile

SCM #4C 25-Year Profile 32-32 Proj. file: Outfall 4C.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM 4E 10-Year Report



Project File: Outfall 4E.stm	Number of lines: 21	Date: 11/5/2024

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	67.000	81.219	DrGrt	0.00	1.91	0.55	10.0	280.50	0.75	281.00	42	Cir	0.013	1.50	292.94	Pipe - (22)
2	1	132.834	-92.982	MH	0.00	0.00	0.00	0.0	281.75	9.49	294.35	24	Cir	0.013	0.40	304.09	Pipe - (21)
3	2	38.757	-20.335	Comb	0.00	0.60	0.55	10.0	296.56	8.90	300.01	24	Cir	0.013	1.32	309.90	Pipe - (20)
4	3	53.591	56.680	Comb	0.00	0.08	0.55	10.0	300.21	6.48	303.68	24	Cir	0.013	1.50	311.01	Pipe - (19)
5	4	39.458	52.941	Comb	0.00	0.20	0.55	10.0	303.88	3.62	305.31	24	Cir	0.013	0.50	312.01	Pipe - (18)
6	5	105.426	-16.424	Comb	0.00	0.33	0.55	10.0	305.51	2.60	308.25	24	Cir	0.013	0.50	314.84	Pipe - (17)
7	6	160.140	-14.783	Comb	0.00	0.34	0.55	10.0	308.45	2.50	312.45	24	Cir	0.013	1.15	318.87	Pipe - (16)
8	7	160.000	0.006	Comb	0.00	0.19	0.55	10.0	312.65	3.37	318.05	24	Cir	0.013	0.50	324.36	Pipe - (15)
9	8	76.131	1.031	Comb	0.00	0.13	0.55	10.0	318.55	4.23	321.77	18	Cir	0.013	1.50	327.65	Pipe - (14)
10	9	69.571	13.262	Comb	0.00	0.13	0.55	10.0	321.97	4.24	324.92	18	Cir	0.013	1.49	330.57	Pipe - (13)
11	10	68.033	16.244	Comb	0.00	0.12	0.55	10.0	325.17	3.79	327.75	15	Cir	0.013	0.50	333.43	Pipe - (12)
12	11	66.183	11.583	Comb	0.00	0.02	0.55	10.0	327.95	3.79	330.46	15	Cir	0.013	1.08	336.47	Pipe - (11)
13	12	44.230	-42.173	Comb	0.00	0.26	0.55	10.0	330.66	6.31	333.45	15	Cir	0.013	1.50	340.32	Pipe - (10)
14	13	41.000	42.709	Comb	0.00	0.37	0.55	10.0	333.65	0.71	333.94	15	Cir	0.013	1.00	340.38	Pipe - (9)
15	13	14.650	-100.071	DrGrt	0.00	0.04	0.55	10.0	333.65	1.98	333.94	15	Cir	0.013	1.00	340.18	Pipe - (190)
16	9	27.000	95.243	Comb	0.00	0.32	0.55	10.0	323.50	1.00	323.77	15	Cir	0.013	1.00	327.64	Pipe - (231)
17	10	13.500	-81.787	DrGrt	0.00	0.93	0.55	10.0	324.50	1.04	324.64	18	Cir	0.013	1.00	329.04	Pipe - (192)
18	7	37.334	46.313	Comb	0.00	0.32	0.55	10.0	315.00	0.99	315.37	15	Cir	0.013	1.00	319.58	Pipe - (230)
19	4	69.346	-85.388	DrGrt	0.00	1.43	0.55	10.0	303.88	0.89	304.50	15	Cir	0.013	1.00	315.15	Pipe - (194)
20	3	57.363	-58.398	Comb	0.00	0.05	0.55	10.0	300.76	0.75	301.19	15	Cir	0.013	1.29	308.18	Pipe - (24)
21	20	8.000	55.996	Comb	0.00	0.25	0.55	10.0	301.39	1.75	301.53	15	Cir	0.013	1.00	308.19	Pipe - (23)

Project File: Outfall 4E.stm

Number of lines: 21

Date: 11/5/2024

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	YI 402	DropGrate	292.94	Rect	4.00	4.00	42	Cir	281.00	24	Cir	281.75
2	YI 403	Manhole	304.09	Rect	4.00	4.00	24	Cir	294.35	24	Cir	296.56
3	CB 404	Combination	309.90	Rect	4.00	4.00	24	Cir	300.01	24 15	Cir Cir	300.21 300.76
4	CB 406	Combination	311.01	Rect	4.00	4.00	24	Cir	303.68	24 15	Cir Cir	303.88 303.88
5	CB 407	Combination	312.01	Rect	4.00	4.00	24	Cir	305.31	24	Cir	305.51
6	CB 408	Combination	314.84	Rect	4.00	4.00	24	Cir	308.25	24	Cir	308.45
7	CB 409A	Combination	318.87	Rect	4.00	4.00	24	Cir	312.45	24 15	Cir Cir	312.65 315.00
8	CB 410	Combination	324.36	Rect	4.00	4.00	24	Cir	318.05	18	Cir	318.55
9	CB 410A	Combination	327.65	Rect	4.00	4.00	18	Cir	321.77	18 15	Cir Cir	321.97 323.50
10	CB 411	Combination	330.57	Rect	4.00	4.00	18	Cir	324.92	15 18	Cir Cir	325.17 324.50
11	CB 411A	Combination	333.43	Rect	4.00	4.00	15	Cir	327.75	15	Cir	327.95
12	CB 412	Combination	336.47	Rect	4.00	4.00	15	Cir	330.46	15	Cir	330.66
13	CB 413	Combination	340.32	Rect	4.00	4.00	15	Cir	333.45	15 15	Cir Cir	333.65 333.65
14	CB 414	Combination	340.38	Rect	4.00	4.00	15	Cir	333.94			
15	YI 413A	DropGrate	340.18	Rect	4.00	4.00	15	Cir	333.94			
16	CB 410B	Combination	327.64	Rect	4.00	4.00	15	Cir	323.77			
17	YI 411B	DropGrate	329.04	Rect	4.00	4.00	18	Cir	324.64			
18	CB 409B	Combination	319.58	Rect	4.00	4.00	15	Cir	315.37			
19	YI 406A	DropGrate	315.15	Rect	4.00	4.00	15	Cir	304.50			
20	CD 405	Combination	308.18	Rect	4.00	4.00	15	Cir	301.19	15	Cir	301.39

Project File: Outfall 4E.stm | Number of Structures: 21 | Run Date: 11/5/2024

Structure Report

SCM 4E 10-Year Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	CB 405A	Combination	308.19	Rect	4.00	4.00	15	Cir	301.53			

Project File: Outfall 4E.stm | Number of Structures: 21 | Run Date: 11/5/2024

Storm Sewer Summary Report

SCM 4E 10-Year Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (22)	23.44	42	Cir	67.000	280.50	281.00	0.746	283.72	282.49	n/a	282.49	End	DropGrate
2	Pipe - (21)	17.96	24	Cir	132.834	281.75	294.35	9.486	282.49	295.88	n/a	295.88	1	Manhole
3	Pipe - (20)	17.99	24	Cir	38.757	296.56	300.01	8.902	297.27	301.54	1.00	301.54	2	Combination
4	Pipe - (19)	15.40	24	Cir	53.591	300.21	303.68	6.475	301.54	305.09	n/a	305.09	3	Combination
5	Pipe - (18)	10.98	24	Cir	39.458	303.88	305.31	3.624	305.09	306.50	n/a	306.50 j	4	Combination
6	Pipe - (17)	10.48	24	Cir	105.426	305.51	308.25	2.599	306.50	309.41	0.24	309.41	5	Combination
7	Pipe - (16)	9.64	24	Cir	160.140	308.45	312.45	2.498	309.41	313.56	n/a	313.56	6	Combination
8	Pipe - (15)	7.76	24	Cir	160.000	312.65	318.05	3.375	313.56	319.04	n/a	319.04	7	Combination
9	Pipe - (14)	7.21	18	Cir	76.131	318.55	321.77	4.230	319.15	322.81	0.71	322.81	8	Combination
10	Pipe - (13)	5.85	18	Cir	69.571	321.97	324.92	4.240	322.81	325.85	0.59	325.85	9	Combination
11	Pipe - (12)	2.56	15	Cir	68.033	325.17	327.75	3.792	325.85	328.39	n/a	328.39 j	10	Combination
12	Pipe - (11)	2.20	15	Cir	66.183	327.95	330.46	3.792	328.39	331.05	0.25	331.05	11	Combination
13	Pipe - (10)	2.15	15	Cir	44.230	330.66	333.45	6.308	331.05	334.03	n/a	334.03	12	Combination
14	Pipe - (9)	1.20	15	Cir	41.000	333.65	333.94	0.707	334.05	334.37	0.16	334.37	13	Combination
15	Pipe - (190)	0.13	15	Cir	14.650	333.65	333.94	1.980	334.03	334.08	n/a	334.08 j	13	DropGrate
16	Pipe - (231)	1.03	15	Cir	27.000	323.50	323.77	1.000	323.84	324.17	0.15	324.17	9	Combination
17	Pipe - (192)	3.00	18	Cir	13.500	324.50	324.64	1.037	325.85	325.30	0.25	325.30	10	DropGrate
18	Pipe - (230)	1.03	15	Cir	37.334	315.00	315.37	0.991	315.34	315.77	0.15	315.77	7	Combination
19	Pipe - (194)	4.62	15	Cir	69.346	303.88	304.50	0.894	305.09	305.37	n/a	305.37 j	4	DropGrate
20	Pipe - (24)	0.97	15	Cir	57.363	300.76	301.19	0.750	301.54	301.58	n/a	301.58 j	3	Combination
21	Pipe - (23)	0.81	15	Cir	8.000	301.39	301.53	1.750	301.65	301.88	0.13	301.88	20	Combination

Project File: Outfall 4E.stm

Number of lines: 21

Run Date: 11/5/2024

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Inlet Report

SCM 4E 10-Year Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	YI 402	6.17	0.00	6.17	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.33	35.18	0.33	35.18	0.0	Off
2	YI 403	0.00	0.40	0.00	0.40	MH	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.020	0.020	0.013	0.00	0.00	0.00	0.00	0.0	Off
3	CB 404	1.94	0.10	1.63	0.40	Comb	6.0	1.50	0.00	3.00	2.50	0.032	2.00	0.060	0.020	0.013	0.20	5.97	0.12	1.92	0.0	2
4	CB 406	0.26	0.03	0.29	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.10	1.67	0.00	0.00	0.0	21
5	CB 407	0.65	0.12	0.74	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.15	3.61	0.05	0.76	0.0	4
6	CB 408	1.07	0.10	1.04	0.12	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.17	4.71	0.08	1.30	0.0	5
7	CB 409A	1.10	0.00	0.99	0.10	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.17	4.54	0.07	1.21	0.0	6
8	CB 410	0.61	0.00	0.61	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.13	2.35	0.01	0.12	0.0	7
9	CB 410A	0.42	0.00	0.42	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.11	1.84	0.00	0.00	0.0	8
10	CB 411	0.42	0.00	0.42	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.11	1.84	0.00	0.00	0.0	9
11	CB 411A	0.39	0.00	0.39	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.11	1.78	0.00	0.00	0.0	10
12	CB 412	0.06	0.01	0.07	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.06	0.96	0.00	0.00	0.0	11
13	CB 413	0.84	0.00	0.83	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.054	2.00	0.060	0.020	0.013	0.14	2.86	0.02	0.41	0.0	12
14	CB 414	1.20	0.00	1.14	0.06	Comb	6.0	1.50	0.00	3.00	2.50	0.054	2.00	0.060	0.020	0.013	0.15	3.74	0.05	0.85	0.0	Off
15	YI 413A	0.13	0.00	0.13	0.00	DrGrt	6.0	0.00	7.50	3.00	2.50	Sag	2.00	0.060	0.020	0.013	0.02	4.98	0.02	4.98	0.0	Off
16	CB 410B	1.03	0.00	0.99	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.15	3.63	0.05	0.79	0.0	18
17	YI 411B	3.00	0.00	3.00	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.20	22.72	0.20	22.72	0.0	Off
18	CB 409B	1.03	0.04	0.98	0.10	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.17	4.49	0.07	1.18	0.0	3
19	YI 406A	4.62	0.00	4.62	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.27	29.44	0.27	29.44	0.0	Off
20	CD 405	0.16	0.02	0.18	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.08	1.41	0.00	0.00	0.0	3
21	CB 405A	0.81	0.00	0.79	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.15	3.33	0.04	0.64	0.0	20

Project File: Outfall 4E.stm | Number of lines: 21 | Run Date: 11/5/2024

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

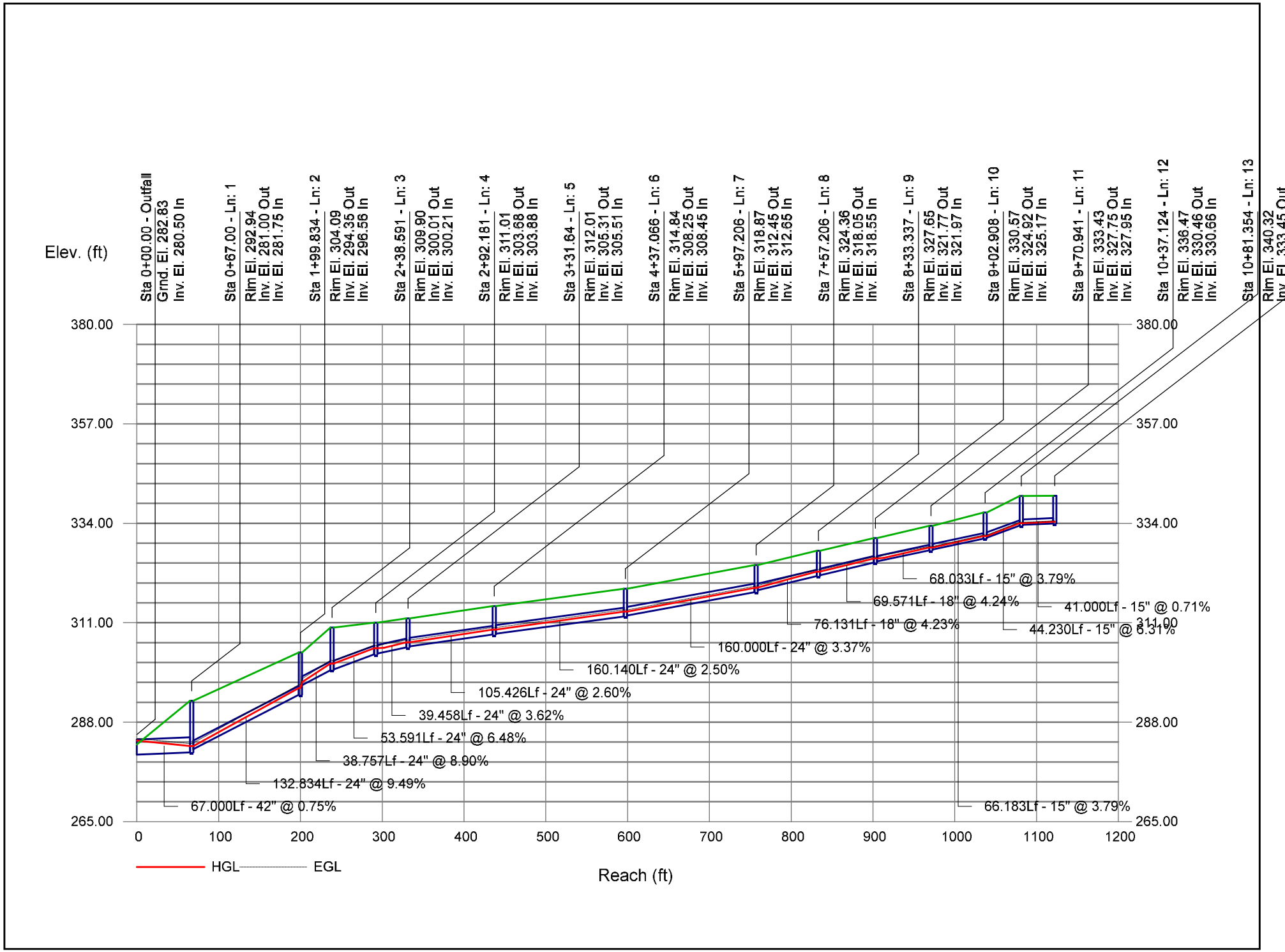
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	42	23.44	280.50	283.72	3.22	3.89	2.53	0.56	284.28	0.000	67.000	281.00	282.49	1.49**	3.89	6.02	0.56	283.05	0.000	0.000	n/a	1.50	n/a
2	24	17.96	281.75	282.49	0.74	1.05	17.11	0.76	283.24	0.000	132.834	294.35	295.88	1.53**	2.57	6.99	0.76	296.63	0.000	0.000	n/a	0.40	n/a
3	24	17.99	296.56	297.27	0.71*	0.99	18.17	0.76	298.02	0.000	38.757	300.01	301.54	1.53**	2.57	6.99	0.76	302.30	0.000	0.000	n/a	1.32	1.00
4	24	15.40	300.21	301.54	1.33	2.21	6.96	0.65	302.19	0.000	53.591	303.68	305.09	1.41**	2.37	6.49	0.65	305.75	0.000	0.000	n/a	1.50	n/a
5	24	10.98	303.88	305.09	1.21	1.94	5.50	0.50	305.59	0.000	39.458	305.31	306.50 j	1.19**	1.94	5.65	0.50	306.99	0.000	0.000	n/a	0.50	0.25
6	24	10.48	305.51	306.50	0.99	1.54	6.79	0.48	306.98	0.000	105.426	308.25	309.41	1.16**	1.89	5.55	0.48	309.89	0.000	0.000	n/a	0.50	0.24
7	24	9.64	308.45	309.41	0.96	1.49	6.47	0.45	309.86	0.000	160.140	312.45	313.56	1.11**	1.79	5.39	0.45	314.01	0.000	0.000	n/a	1.15	n/a
8	24	7.76	312.65	313.56	0.91	1.39	5.59	0.39	313.95	0.000	160.000	318.05	319.04	0.99**	1.55	5.00	0.39	319.43	0.000	0.000	n/a	0.50	n/a
9	18	7.21	318.55	319.15	0.60*	0.66	10.99	0.47	319.62	0.000	76.131	321.77	322.81	1.04**	1.31	5.52	0.47	323.28	0.000	0.000	n/a	1.50	0.71
10	18	5.85	321.97	322.81	0.84	1.02	5.76	0.40	323.21	0.000	69.571	324.92	325.85	0.93**	1.16	5.07	0.40	326.25	0.000	0.000	n/a	1.49	0.59
11	15	2.56	325.17	325.85	0.68	0.63	3.73	0.25	326.11	0.000	68.033	327.75	328.39 j	0.64**	0.63	4.04	0.25	328.65	0.000	0.000	n/a	0.50	0.13
12	15	2.20	327.95	328.39	0.44	0.39	5.69	0.23	328.62	0.000	66.183	330.46	331.05	0.59**	0.57	3.85	0.23	331.28	0.000	0.000	n/a	1.08	0.25
13	15	2.15	330.66	331.05	0.39	0.33	6.53	0.23	331.28	0.000	44.230	333.45	334.03	0.58**	0.56	3.82	0.23	334.26	0.000	0.000	n/a	1.50	n/a
14	15	1.20	333.65	334.05	0.40*	0.34	3.55	0.16	334.21	0.000	41.000	333.94	334.37	0.43**	0.37	3.19	0.16	334.53	0.000	0.000	n/a	1.00	0.16
15	15	0.13	333.65	334.03	0.38	0.07	0.40	0.05	334.08	0.000	14.650	333.94	334.08 j	0.14**	0.07	1.75	0.05	334.13	0.000	0.000	n/a	1.00	0.05
16	15	1.03	323.50	323.84	0.34*	0.27	3.85	0.15	323.98	0.000	27.000	323.77	324.17	0.40**	0.34	3.06	0.15	324.31	0.000	0.000	n/a	1.00	0.15
17	18	3.00	324.50	325.85	1.35	0.75	1.79	0.25	326.10	0.000	13.500	324.64	325.30	0.66**	0.75	4.02	0.25	325.55	0.000	0.000	n/a	1.00	0.25
18	15	1.03	315.00	315.34	0.34*	0.27	3.84	0.15	315.48	0.000	37.334	315.37	315.77	0.40**	0.34	3.06	0.15	315.91	0.000	0.000	n/a	1.00	0.15
19	15	4.62	303.88	305.09	1.21	0.91	3.80	0.40	305.49	0.000	69.346	304.50	305.37 j	0.87**	0.91	5.06	0.40	305.77	0.000	0.000	n/a	1.00	n/a
20	15	0.97	300.76	301.54	0.78	0.32	1.21	0.14	301.68	0.000	57.363	301.19	301.58 j	0.39**	0.32	3.00	0.14	301.72	0.000	0.000	n/a	1.29	n/a
21	15	0.81	301.39	301.65	0.26*	0.18	4.37	0.13	301.78	0.000	8.000	301.53	301.88	0.35**	0.28	2.85	0.13	302.01	0.000	0.000	n/a	1.00	0.13

Project File: Outfall 4E.stm | Number of lines: 21 | Run Date: 11/5/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

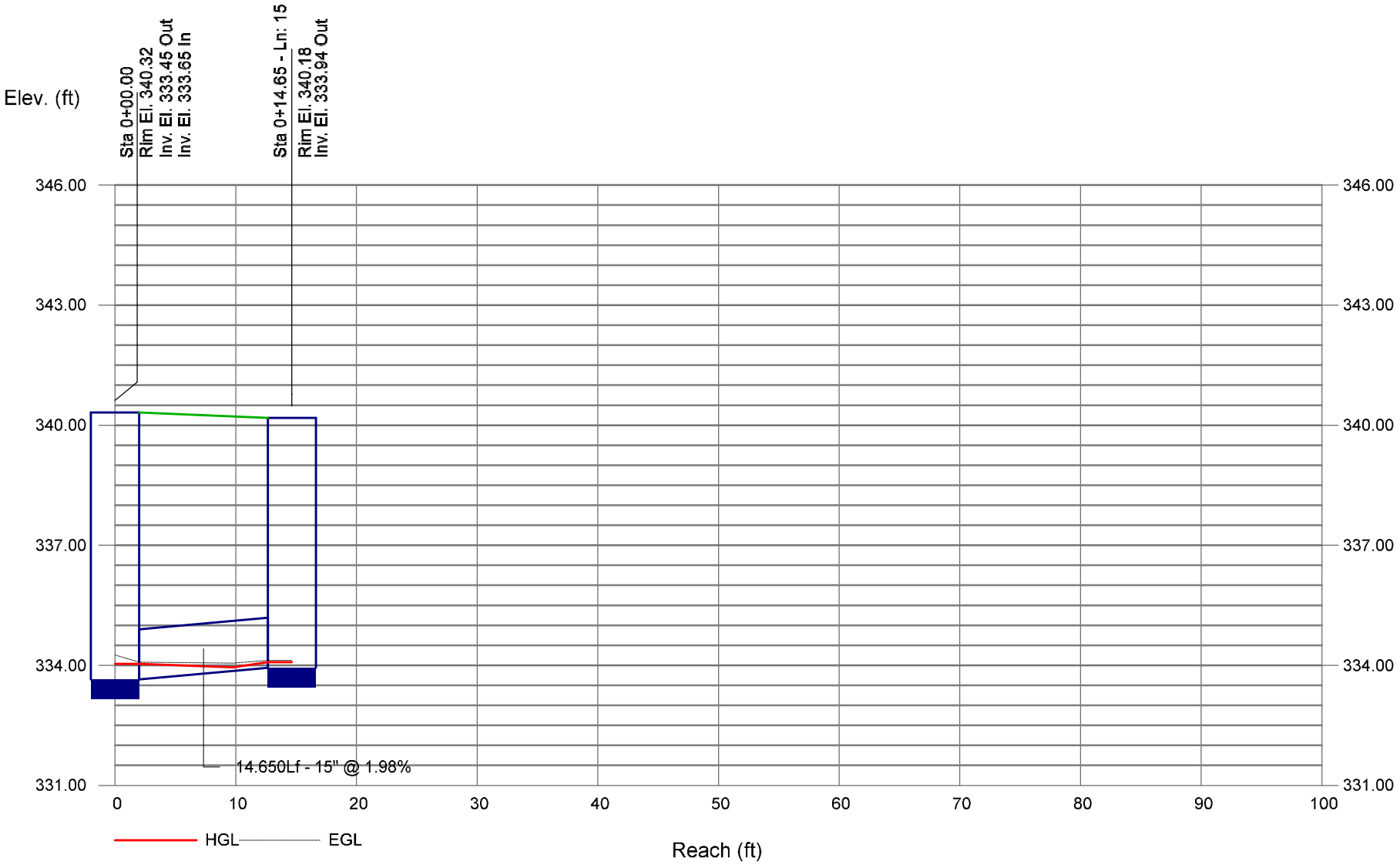
Storm Sewer Profile

SCM 4E 10-Year 1-14 Profile Proj. file: Outfall 4E.stm



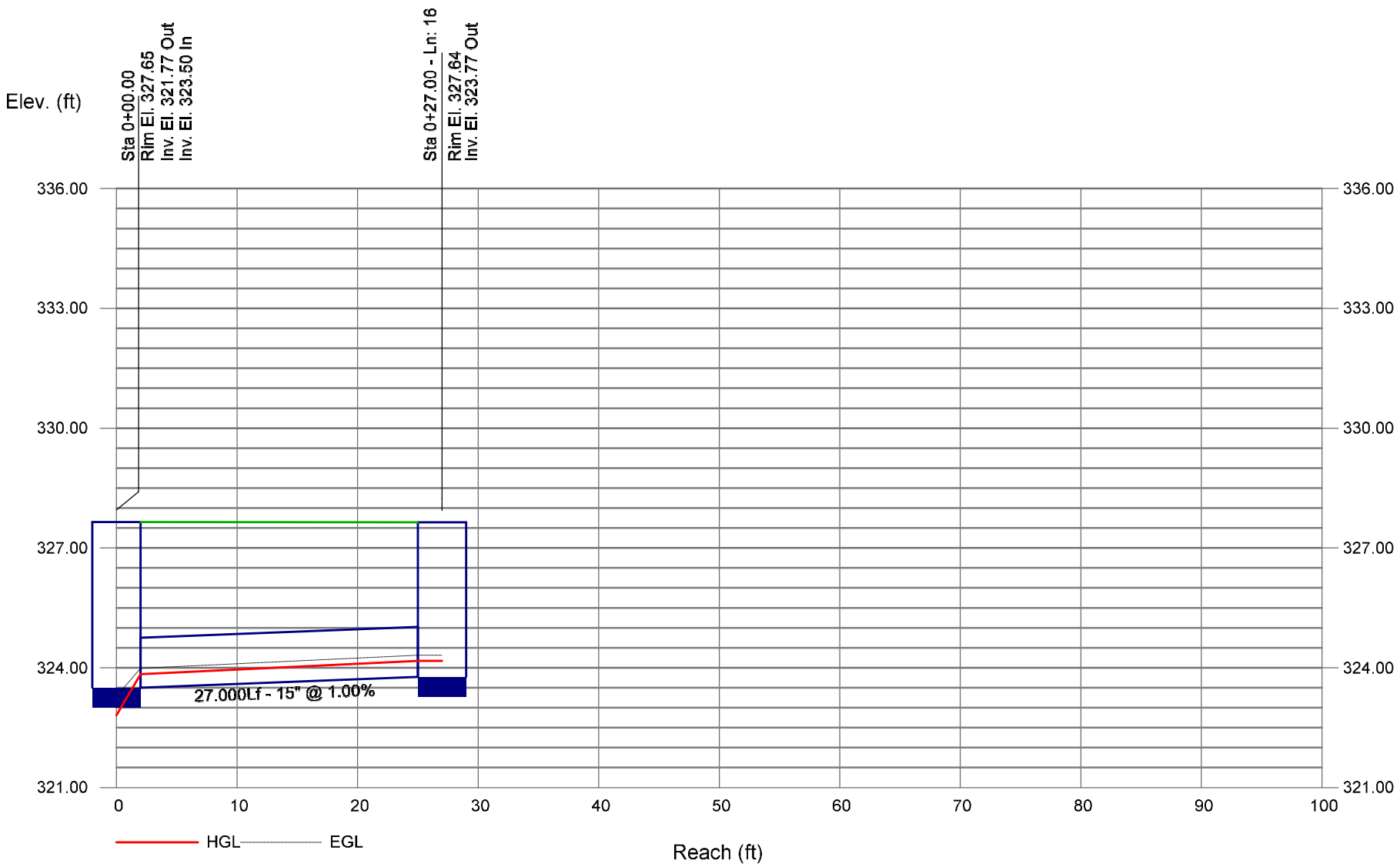
Storm Sewer Profile

SCM 4E 10-Year 15-15 Profile Proj. file: Outfall 4E.stm



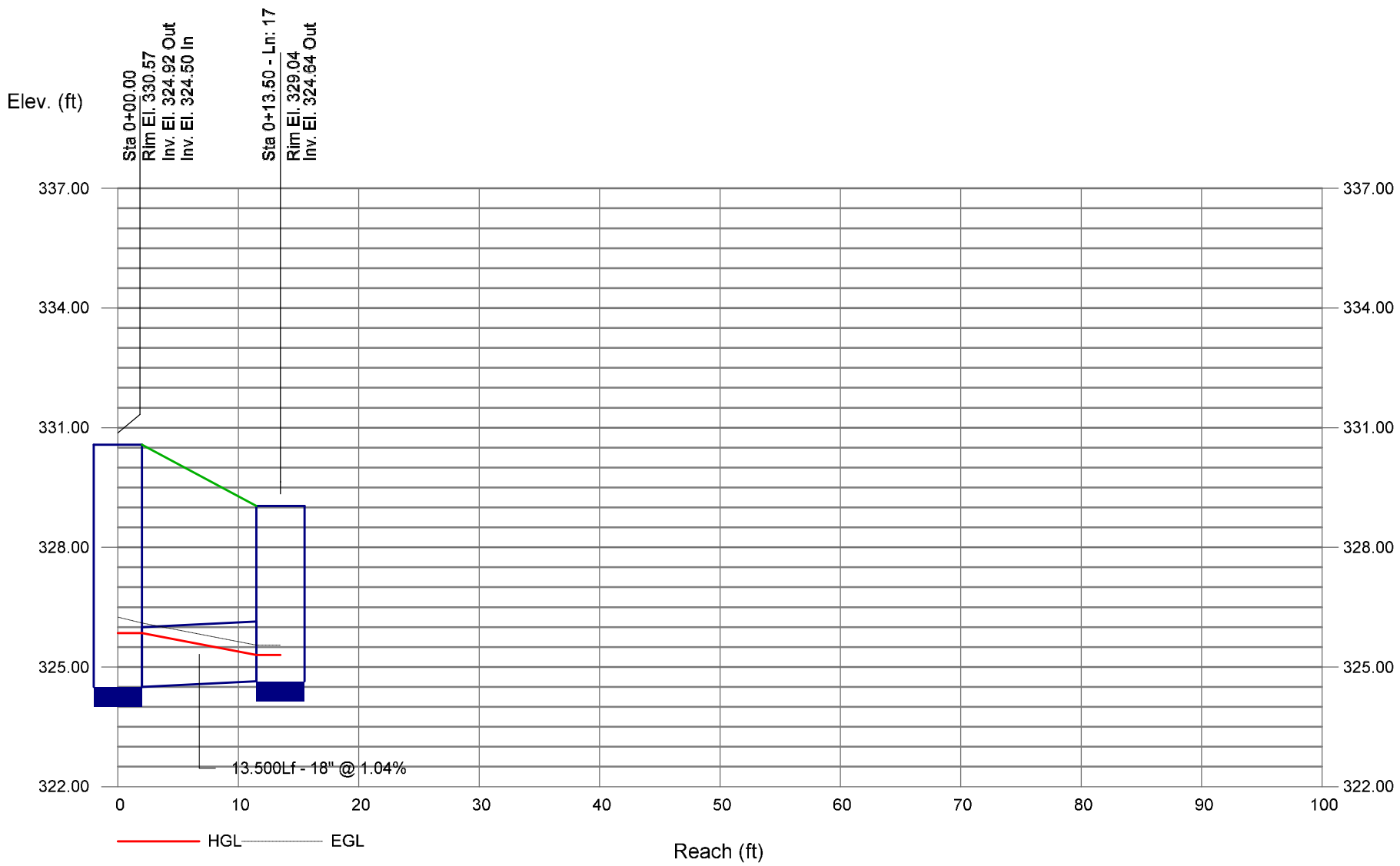
Storm Sewer Profile

SCM 4E 10-Year 16-16 Profile Proj. file: Outfall 4E.stm



Storm Sewer Profile

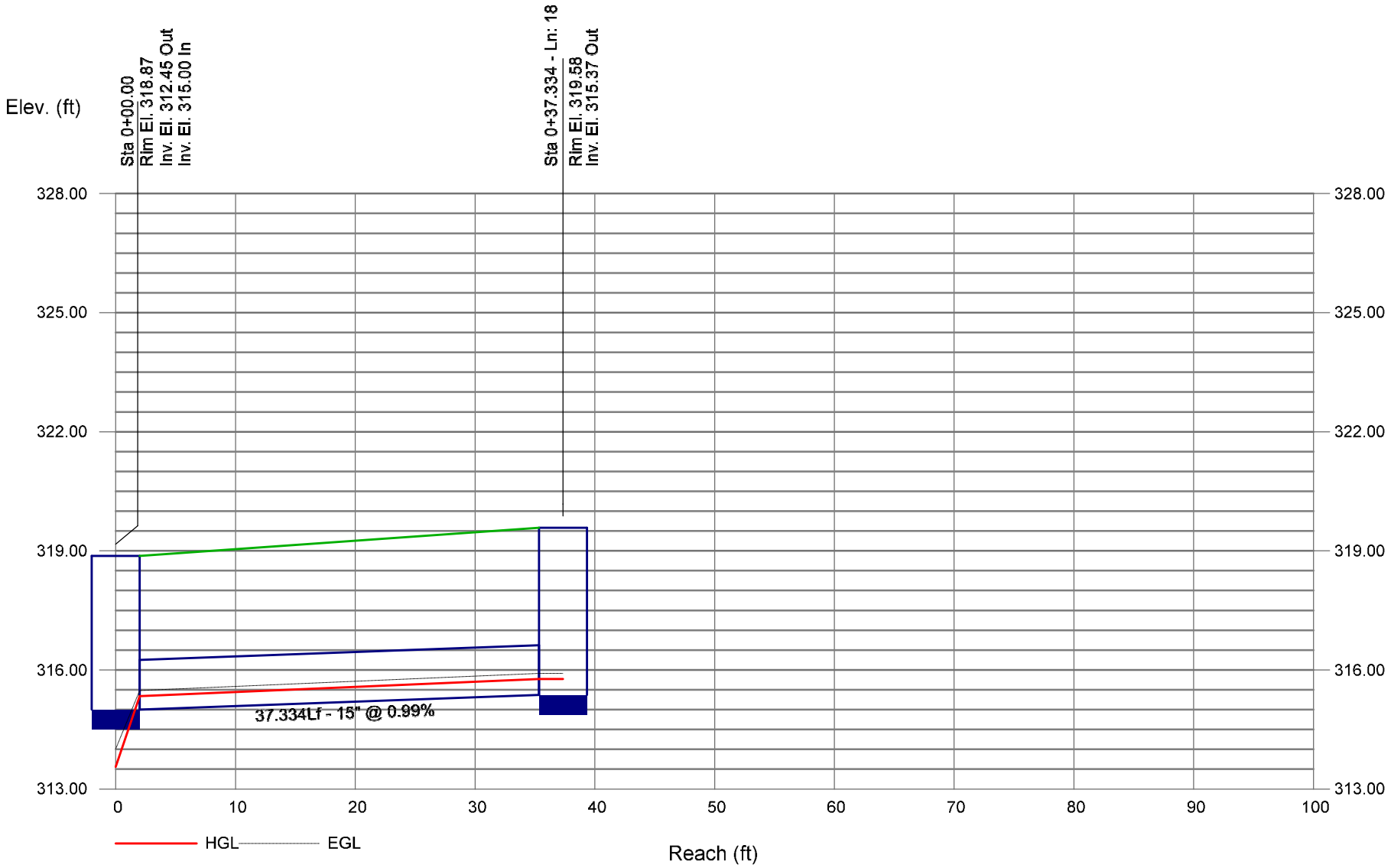
SCM 4E 10-Year 17-17 Profile Proj. file: Outfall 4E.stm



Storm Sewer Profile

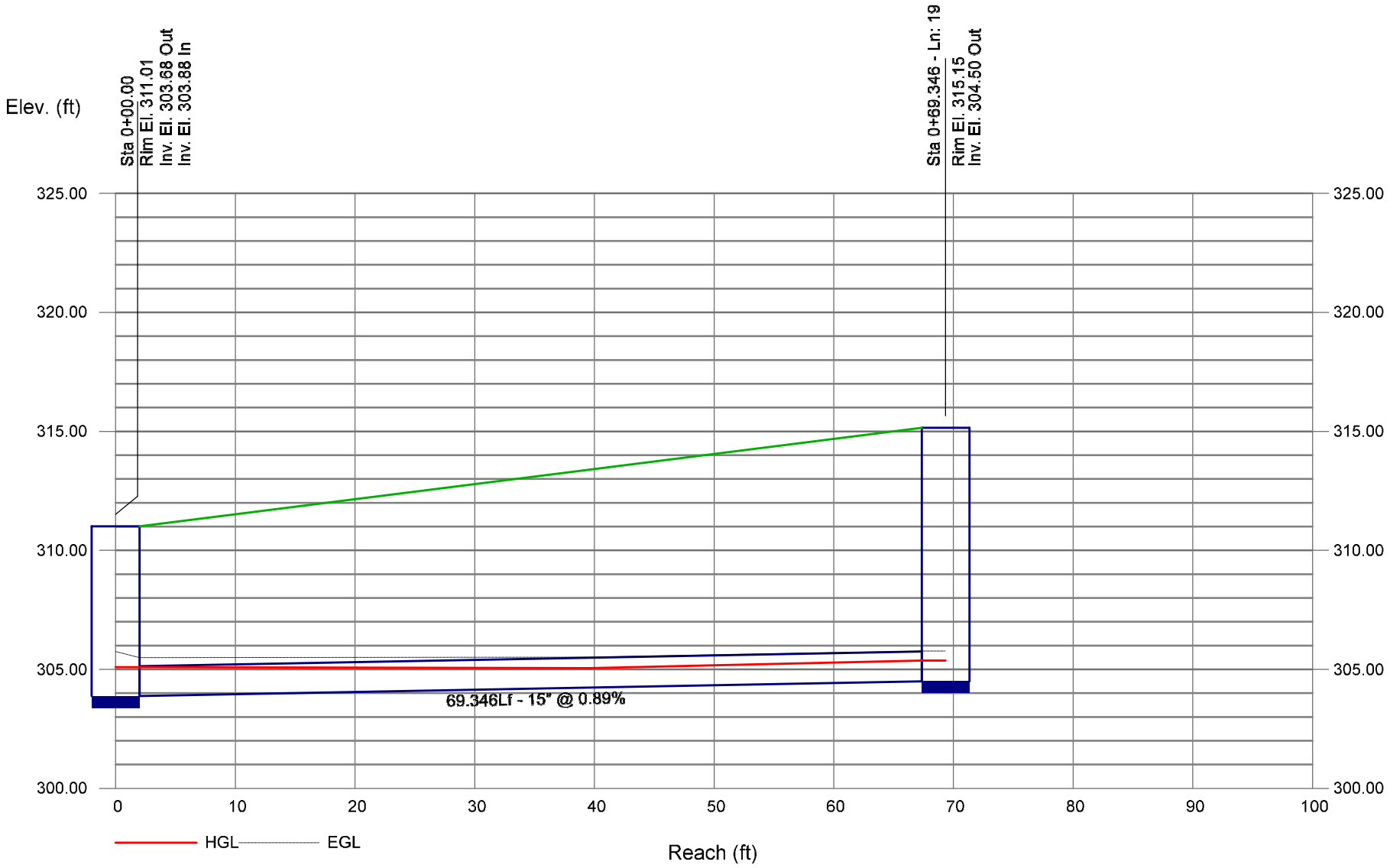
SCM 4E 10-Year 18-18 Profile

Proj. file: Outfall 4E.stm



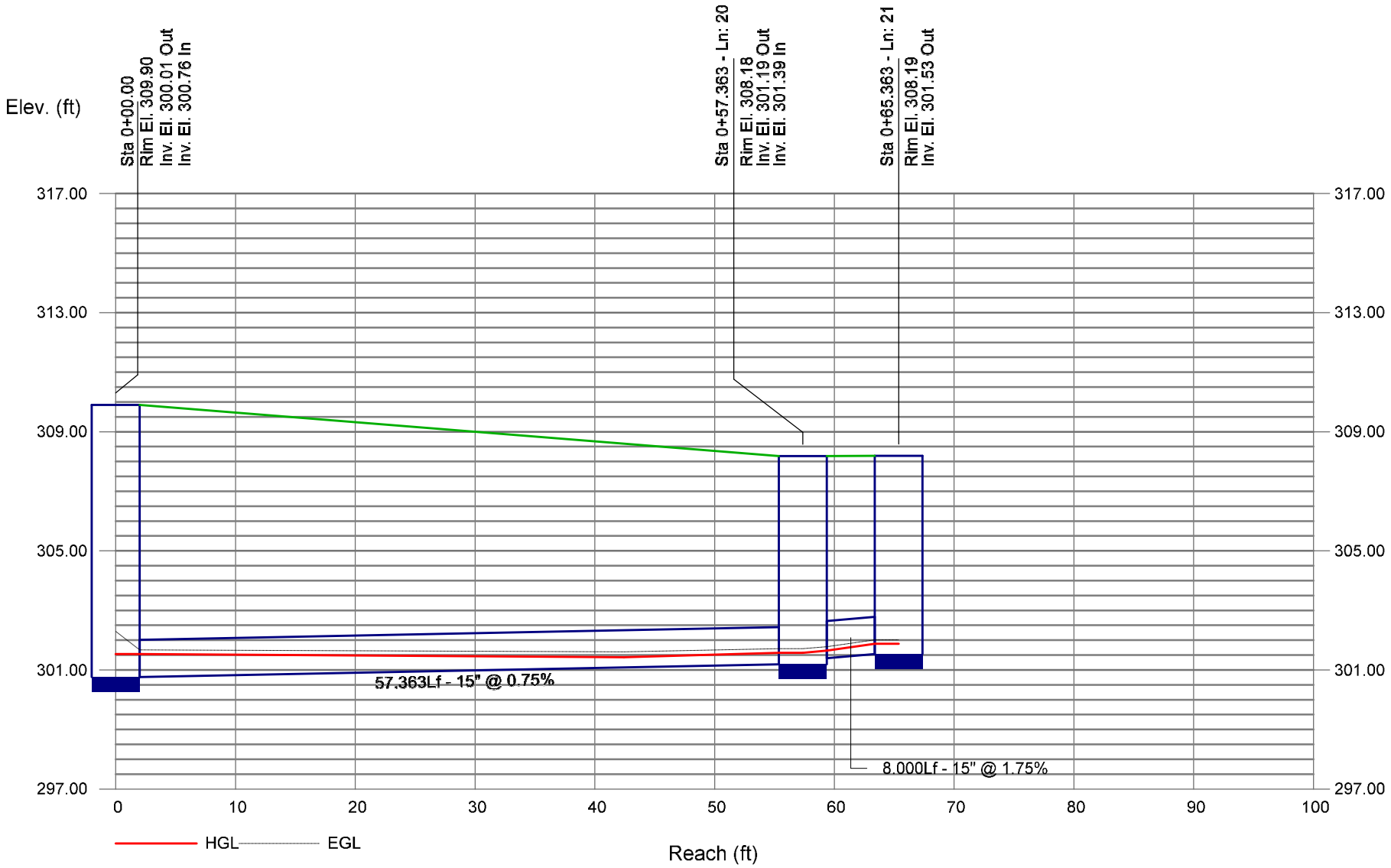
Storm Sewer Profile

SCM 4E 10-Year 19-19 Profile Proj. file: Outfall 4E.stm



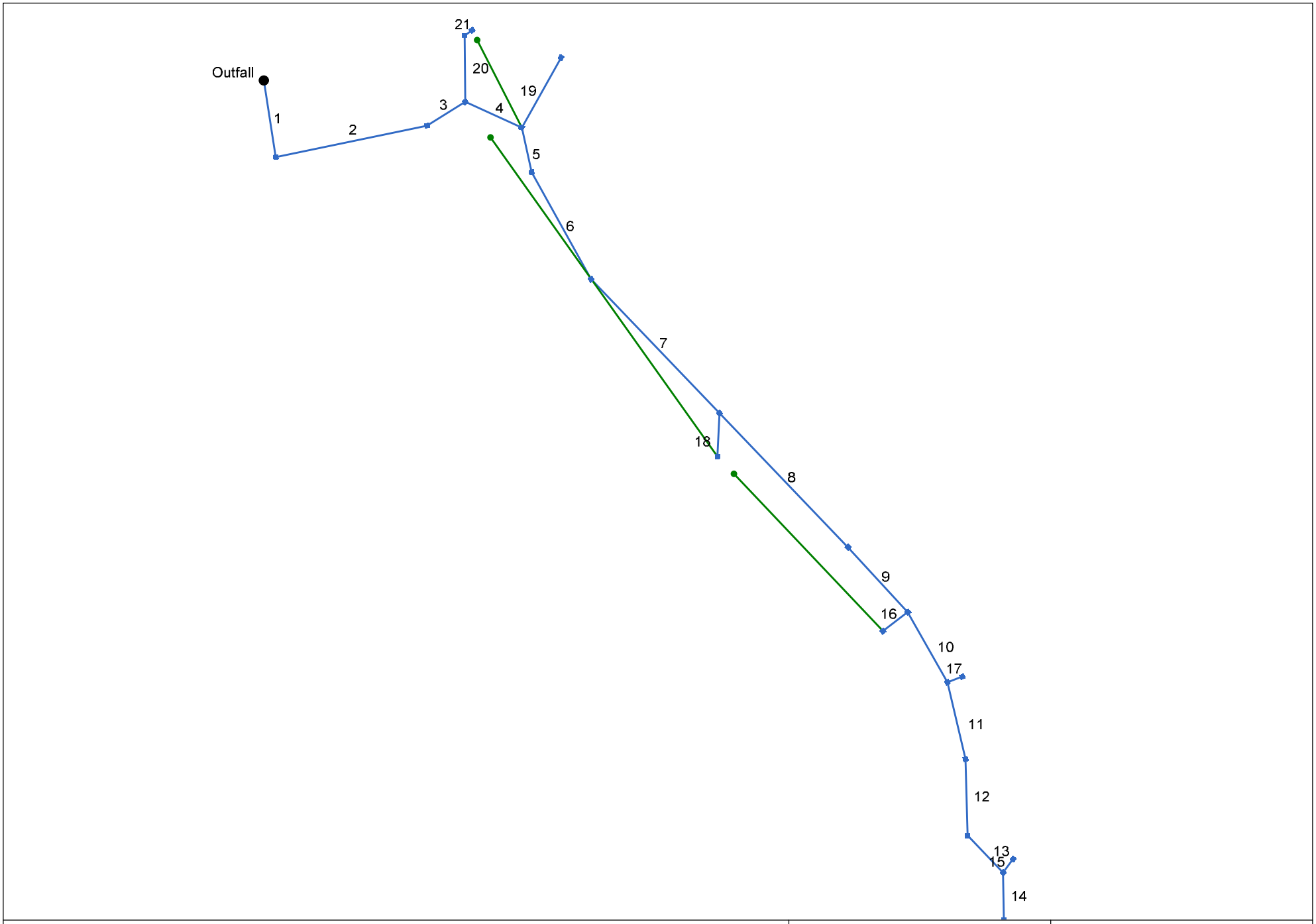
Storm Sewer Profile

SCM 4E 10-Year 20-21Profile Proj. file: Outfall 4E.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

SCM 4E 25-Year Report



Project File: Outfall 4E.stm	Number of lines: 21	Date: 11/5/2024

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	67.000	81.219	DrGrt	0.00	1.91	0.55	10.0	280.50	0.75	281.00	42	Cir	0.013	1.50	292.94	Pipe - (22)
2	1	132.834	-92.982	MH	0.00	0.00	0.00	0.0	281.75	9.49	294.35	24	Cir	0.013	0.40	304.09	Pipe - (21)
3	2	38.757	-20.335	Comb	0.00	0.60	0.55	10.0	296.56	8.90	300.01	24	Cir	0.013	1.32	309.90	Pipe - (20)
4	3	53.591	56.680	Comb	0.00	0.08	0.55	10.0	300.21	6.48	303.68	24	Cir	0.013	1.50	311.01	Pipe - (19)
5	4	39.458	52.941	Comb	0.00	0.20	0.55	10.0	303.88	3.62	305.31	24	Cir	0.013	0.50	312.01	Pipe - (18)
6	5	105.426	-16.424	Comb	0.00	0.33	0.55	10.0	305.51	2.60	308.25	24	Cir	0.013	0.50	314.84	Pipe - (17)
7	6	160.140	-14.783	Comb	0.00	0.34	0.55	10.0	308.45	2.50	312.45	24	Cir	0.013	1.15	318.87	Pipe - (16)
8	7	160.000	0.006	Comb	0.00	0.19	0.55	10.0	312.65	3.37	318.05	24	Cir	0.013	0.50	324.36	Pipe - (15)
9	8	76.131	1.031	Comb	0.00	0.13	0.55	10.0	318.55	4.23	321.77	18	Cir	0.013	1.50	327.65	Pipe - (14)
10	9	69.571	13.262	Comb	0.00	0.13	0.55	10.0	321.97	4.24	324.92	18	Cir	0.013	1.49	330.57	Pipe - (13)
11	10	68.033	16.244	Comb	0.00	0.12	0.55	10.0	325.17	3.79	327.75	15	Cir	0.013	0.50	333.43	Pipe - (12)
12	11	66.183	11.583	Comb	0.00	0.02	0.55	10.0	327.95	3.79	330.46	15	Cir	0.013	1.08	336.47	Pipe - (11)
13	12	44.230	-42.173	Comb	0.00	0.26	0.55	10.0	330.66	6.31	333.45	15	Cir	0.013	1.50	340.32	Pipe - (10)
14	13	41.000	42.709	Comb	0.00	0.37	0.55	10.0	333.65	0.71	333.94	15	Cir	0.013	1.00	340.38	Pipe - (9)
15	13	14.650	-100.071	DrGrt	0.00	0.04	0.55	10.0	333.65	1.98	333.94	15	Cir	0.013	1.00	340.18	Pipe - (190)
16	9	27.000	95.243	Comb	0.00	0.32	0.55	10.0	323.50	1.00	323.77	15	Cir	0.013	1.00	327.64	Pipe - (231)
17	10	13.500	-81.787	DrGrt	0.00	0.93	0.55	10.0	324.50	1.04	324.64	18	Cir	0.013	1.00	329.04	Pipe - (192)
18	7	37.334	46.313	Comb	0.00	0.32	0.55	10.0	315.00	0.99	315.37	15	Cir	0.013	1.00	319.58	Pipe - (230)
19	4	69.346	-85.388	DrGrt	0.00	1.43	0.55	10.0	303.88	0.89	304.50	15	Cir	0.013	1.00	315.15	Pipe - (194)
20	3	57.363	-58.398	Comb	0.00	0.05	0.55	10.0	300.76	0.75	301.19	15	Cir	0.013	1.29	308.18	Pipe - (24)
21	20	8.000	55.996	Comb	0.00	0.25	0.55	10.0	301.39	1.75	301.53	15	Cir	0.013	1.00	308.19	Pipe - (23)

Project File: Outfall 4E.stm

Number of lines: 21

Date: 11/5/2024

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	YI 402	DropGrate	292.94	Rect	4.00	4.00	42	Cir	281.00	24	Cir	281.75
2	YI 403	Manhole	304.09	Rect	4.00	4.00	24	Cir	294.35	24	Cir	296.56
3	CB 404	Combination	309.90	Rect	4.00	4.00	24	Cir	300.01	24 15	Cir Cir	300.21 300.76
4	CB 406	Combination	311.01	Rect	4.00	4.00	24	Cir	303.68	24 15	Cir Cir	303.88 303.88
5	CB 407	Combination	312.01	Rect	4.00	4.00	24	Cir	305.31	24	Cir	305.51
6	CB 408	Combination	314.84	Rect	4.00	4.00	24	Cir	308.25	24	Cir	308.45
7	CB 409A	Combination	318.87	Rect	4.00	4.00	24	Cir	312.45	24 15	Cir Cir	312.65 315.00
8	CB 410	Combination	324.36	Rect	4.00	4.00	24	Cir	318.05	18	Cir	318.55
9	CB 410A	Combination	327.65	Rect	4.00	4.00	18	Cir	321.77	18 15	Cir Cir	321.97 323.50
10	CB 411	Combination	330.57	Rect	4.00	4.00	18	Cir	324.92	15 18	Cir Cir	325.17 324.50
11	CB 411A	Combination	333.43	Rect	4.00	4.00	15	Cir	327.75	15	Cir	327.95
12	CB 412	Combination	336.47	Rect	4.00	4.00	15	Cir	330.46	15	Cir	330.66
13	CB 413	Combination	340.32	Rect	4.00	4.00	15	Cir	333.45	15 15	Cir Cir	333.65 333.65
14	CB 414	Combination	340.38	Rect	4.00	4.00	15	Cir	333.94			
15	YI 413A	DropGrate	340.18	Rect	4.00	4.00	15	Cir	333.94			
16	CB 410B	Combination	327.64	Rect	4.00	4.00	15	Cir	323.77			
17	YI 411B	DropGrate	329.04	Rect	4.00	4.00	18	Cir	324.64			
18	CB 409B	Combination	319.58	Rect	4.00	4.00	15	Cir	315.37			
19	YI 406A	DropGrate	315.15	Rect	4.00	4.00	15	Cir	304.50			
20	CD 405	Combination	308.18	Rect	4.00	4.00	15	Cir	301.19	15	Cir	301.39

Project File: Outfall 4E.stm | Number of Structures: 21 | Run Date: 11/5/2024

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
21	CB 405A	Combination	308.19	Rect	4.00	4.00	15	Cir	301.53			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (22)	26.13	42	Cir	67.000	280.50	281.00	0.746	284.00	284.02	0.20	284.23	End	DropGrate
2	Pipe - (21)	20.10	24	Cir	132.834	281.75	294.35	9.486	284.23	295.96	n/a	295.96 j	1	Manhole
3	Pipe - (20)	20.13	24	Cir	38.757	296.56	300.01	8.902	297.31	301.62	n/a	301.62	2	Combination
4	Pipe - (19)	17.24	24	Cir	53.591	300.21	303.68	6.475	301.62	305.18	1.09	305.18	3	Combination
5	Pipe - (18)	12.28	24	Cir	39.458	303.88	305.31	3.624	305.18	306.57	n/a	306.57 j	4	Combination
6	Pipe - (17)	11.72	24	Cir	105.426	305.51	308.25	2.599	306.57	309.48	0.26	309.48	5	Combination
7	Pipe - (16)	10.77	24	Cir	160.140	308.45	312.45	2.498	309.48	313.63	0.56	313.63	6	Combination
8	Pipe - (15)	8.66	24	Cir	160.000	312.65	318.05	3.375	313.63	319.10	n/a	319.10	7	Combination
9	Pipe - (14)	8.05	18	Cir	76.131	318.55	321.77	4.230	319.18	322.87	n/a	322.87	8	Combination
10	Pipe - (13)	6.53	18	Cir	69.571	321.97	324.92	4.240	322.87	325.91	n/a	325.91	9	Combination
11	Pipe - (12)	2.86	15	Cir	68.033	325.17	327.75	3.792	325.91	328.43	n/a	328.43 j	10	Combination
12	Pipe - (11)	2.45	15	Cir	66.183	327.95	330.46	3.792	328.43	331.09	0.27	331.09	11	Combination
13	Pipe - (10)	2.39	15	Cir	44.230	330.66	333.45	6.308	331.09	334.07	n/a	334.07	12	Combination
14	Pipe - (9)	1.33	15	Cir	41.000	333.65	333.94	0.707	334.07	334.40	0.17	334.40	13	Combination
15	Pipe - (190)	0.14	15	Cir	14.650	333.65	333.94	1.980	334.07	334.09	n/a	334.09 j	13	DropGrate
16	Pipe - (231)	1.15	15	Cir	27.000	323.50	323.77	1.000	323.86	324.19	0.15	324.19	9	Combination
17	Pipe - (192)	3.35	18	Cir	13.500	324.50	324.64	1.037	325.91	325.34	0.27	325.34	10	DropGrate
18	Pipe - (230)	1.15	15	Cir	37.334	315.00	315.37	0.991	315.36	315.79	0.15	315.79	7	Combination
19	Pipe - (194)	5.15	15	Cir	69.346	303.88	304.50	0.894	305.18	305.54	0.35	305.88	4	DropGrate
20	Pipe - (24)	1.08	15	Cir	57.363	300.76	301.19	0.750	301.62	301.60	n/a	301.60 j	3	Combination
21	Pipe - (23)	0.90	15	Cir	8.000	301.39	301.53	1.750	301.66	301.90	n/a	301.90	20	Combination

Project File: Outfall 4E.stm | Number of lines: 21 | Run Date: 11/5/2024

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	YI 402	6.87	0.00	6.87	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.35	37.62	0.35	37.62	0.0	Off
2	YI 403	0.00	0.52	0.00	0.52	MH	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.020	0.020	0.013	0.00	0.00	0.00	0.00	0.0	Off
3	CB 404	2.16	0.14	1.78	0.52	Comb	6.0	1.50	0.00	3.00	2.50	0.032	2.00	0.060	0.020	0.013	0.21	6.34	0.13	2.32	0.0	2
4	CB 406	0.29	0.05	0.34	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.11	1.79	0.00	0.00	0.0	21
5	CB 407	0.72	0.17	0.84	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.16	3.99	0.06	0.95	0.0	4
6	CB 408	1.19	0.14	1.15	0.17	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.18	5.07	0.09	1.47	0.0	5
7	CB 409A	1.22	0.00	1.09	0.14	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.18	4.85	0.08	1.36	0.0	6
8	CB 410	0.68	0.00	0.68	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.13	2.61	0.02	0.29	0.0	7
9	CB 410A	0.47	0.00	0.47	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.11	1.91	0.00	0.00	0.0	8
10	CB 411	0.47	0.00	0.47	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.11	1.91	0.00	0.00	0.0	9
11	CB 411A	0.43	0.00	0.43	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.11	1.86	0.00	0.00	0.0	10
12	CB 412	0.07	0.02	0.09	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.06	1.03	0.00	0.00	0.0	11
13	CB 413	0.94	0.00	0.92	0.02	Comb	6.0	1.50	0.00	3.00	2.50	0.054	2.00	0.060	0.020	0.013	0.14	3.12	0.03	0.55	0.0	12
14	CB 414	1.33	0.00	1.24	0.09	Comb	6.0	1.50	0.00	3.00	2.50	0.054	2.00	0.060	0.020	0.013	0.16	4.03	0.06	0.98	0.0	Off
15	YI 413A	0.14	0.00	0.14	0.00	DrGrt	6.0	0.00	7.50	3.00	2.50	Sag	2.00	0.060	0.020	0.013	0.03	5.17	0.03	5.17	0.0	Off
16	CB 410B	1.15	0.00	1.08	0.07	Comb	6.0	1.50	0.00	3.00	2.50	0.044	2.00	0.060	0.020	0.013	0.16	3.91	0.06	0.93	0.0	18
17	YI 411B	3.35	0.00	3.35	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.22	24.23	0.22	24.23	0.0	Off
18	CB 409B	1.15	0.07	1.08	0.14	Comb	6.0	1.50	0.00	3.00	2.50	0.025	2.00	0.060	0.020	0.013	0.18	4.83	0.08	1.35	0.0	3
19	YI 406A	5.15	0.00	5.15	0.00	DrGrt	0.0	0.00	7.50	3.00	2.50	Sag	2.00	0.020	0.020	0.013	0.29	31.46	0.29	31.46	0.0	Off
20	CD 405	0.18	0.04	0.22	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.09	1.50	0.00	0.00	0.0	3
21	CB 405A	0.90	0.00	0.86	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.034	2.00	0.060	0.020	0.013	0.15	3.61	0.05	0.77	0.0	20

Project File: Outfall 4E.stm | Number of lines: 21 | Run Date: 11/5/2024

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Hydraulic Grade Line Computations

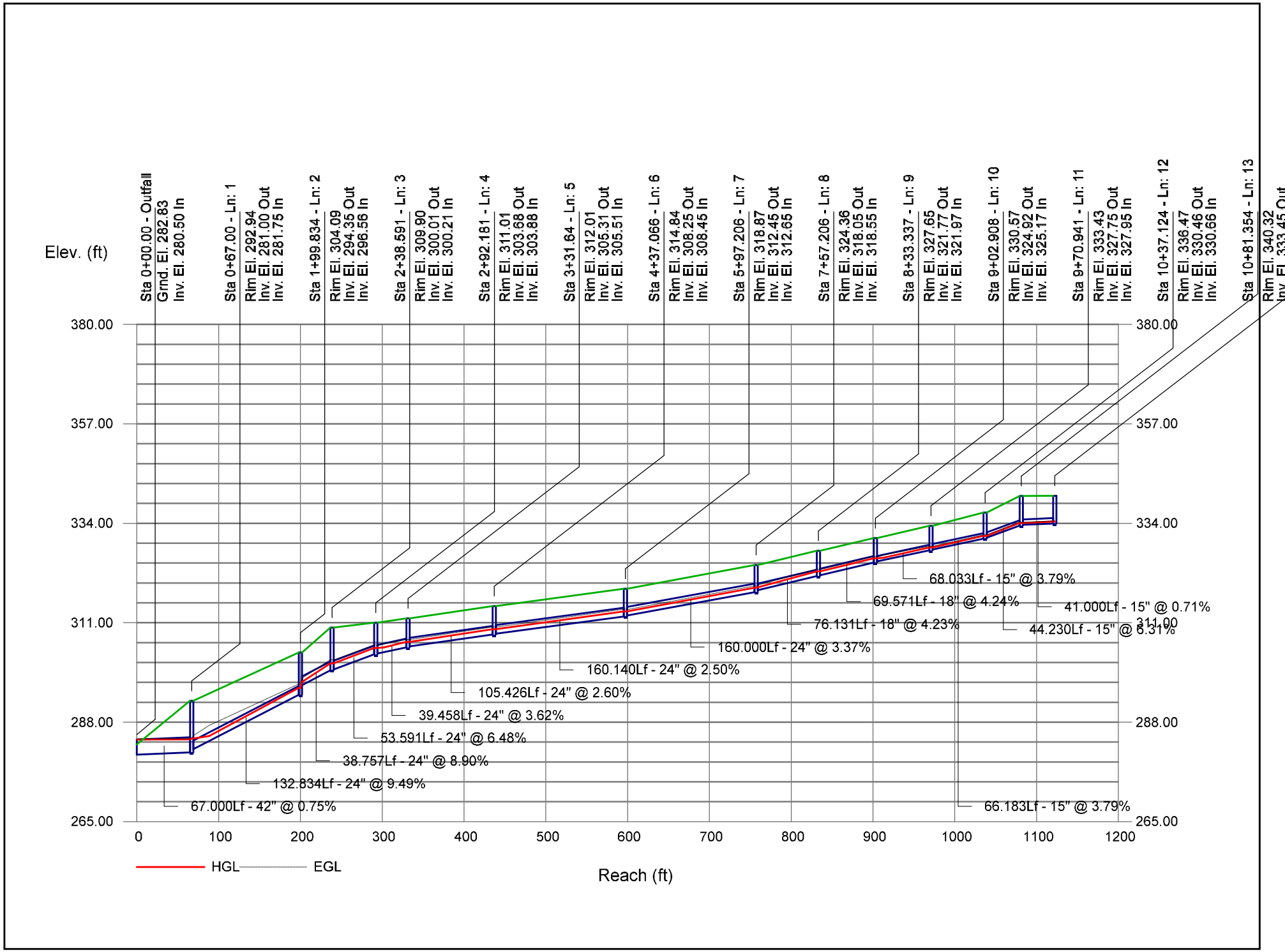
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	42	26.13	280.50	284.00	3.50	9.62	2.72	0.11	284.11	0.067	67.000	281.00	284.02	3.02	8.83	2.96	0.14	284.16	0.062	0.065	0.043	1.50	0.20
2	24	20.10	281.75	284.23	2.00	2.71	6.40	0.64	284.86	0.790	132.834	294.35	295.96 j	1.61**	2.71	7.42	0.86	296.82	0.818	0.804	n/a	0.40	n/a
3	24	20.13	296.56	297.31	0.75*	1.07	18.73	0.86	298.17	0.000	38.757	300.01	301.62	1.61**	2.71	7.43	0.86	302.48	0.000	0.000	n/a	1.32	n/a
4	24	17.24	300.21	301.62	1.41	2.37	7.28	0.73	302.35	0.000	53.591	303.68	305.18	1.50**	2.52	6.84	0.73	305.90	0.000	0.000	n/a	1.50	1.09
5	24	12.28	303.88	305.18	1.30	2.08	5.71	0.54	305.72	0.000	39.458	305.31	306.57 j	1.26**	2.08	5.90	0.54	307.11	0.000	0.000	n/a	0.50	0.27
6	24	11.72	305.51	306.57	1.06	1.69	6.94	0.52	307.09	0.000	105.426	308.25	309.48	1.23**	2.02	5.79	0.52	310.00	0.000	0.000	n/a	0.50	0.26
7	24	10.77	308.45	309.48	1.03	1.63	6.62	0.49	309.97	0.000	160.140	312.45	313.63	1.18**	1.92	5.61	0.49	314.11	0.000	0.000	n/a	1.15	0.56
8	24	8.66	312.65	313.63	0.98	1.52	5.69	0.42	314.04	0.000	160.000	318.05	319.10	1.05**	1.67	5.19	0.42	319.52	0.000	0.000	n/a	0.50	n/a
9	18	8.05	318.55	319.18	0.63*	0.71	11.32	0.52	319.71	0.000	76.131	321.77	322.87	1.10**	1.39	5.80	0.52	323.39	0.000	0.000	n/a	1.50	n/a
10	18	6.53	321.97	322.87	0.90	1.10	5.91	0.44	323.30	0.000	69.571	324.92	325.91	0.99**	1.23	5.29	0.44	326.34	0.000	0.000	n/a	1.49	n/a
11	15	2.86	325.17	325.91	0.74	0.68	3.79	0.27	326.18	0.000	68.033	327.75	328.43 j	0.68**	0.68	4.20	0.27	328.70	0.000	0.000	n/a	0.50	n/a
12	15	2.45	327.95	328.43	0.48	0.43	5.68	0.25	328.68	0.000	66.183	330.46	331.09	0.63**	0.62	3.99	0.25	331.33	0.000	0.000	n/a	1.08	0.27
13	15	2.39	330.66	331.09	0.43	0.37	6.48	0.24	331.33	0.000	44.230	333.45	334.07	0.62**	0.61	3.95	0.24	334.31	0.000	0.000	n/a	1.50	n/a
14	15	1.33	333.65	334.07	0.42*	0.36	3.66	0.17	334.24	0.000	41.000	333.94	334.40	0.46**	0.40	3.29	0.17	334.56	0.000	0.000	n/a	1.00	0.17
15	15	0.14	333.65	334.07	0.42	0.08	0.40	0.05	334.12	0.000	14.650	333.94	334.09 j	0.15**	0.08	1.80	0.05	334.14	0.000	0.000	n/a	1.00	n/a
16	15	1.15	323.50	323.86	0.36*	0.29	3.98	0.15	324.01	0.000	27.000	323.77	324.19	0.42**	0.37	3.15	0.15	324.35	0.000	0.000	n/a	1.00	0.15
17	18	3.35	324.50	325.91	1.41	0.80	1.94	0.27	326.18	0.000	13.500	324.64	325.34	0.70**	0.80	4.17	0.27	325.61	0.000	0.000	n/a	1.00	0.27
18	15	1.15	315.00	315.36	0.36*	0.29	3.96	0.15	315.51	0.000	37.334	315.37	315.79	0.42**	0.37	3.15	0.15	315.95	0.000	0.000	n/a	1.00	0.15
19	15	5.15	303.88	305.18	1.25	1.23	4.19	0.27	305.45	0.635	69.346	304.50	305.54	1.04	1.09	4.73	0.35	305.88	0.622	0.629	0.436	1.00	0.35
20	15	1.08	300.76	301.62	0.86	0.35	1.20	0.15	301.77	0.000	57.363	301.19	301.60 j	0.41**	0.35	3.09	0.15	301.75	0.000	0.000	n/a	1.29	0.19
21	15	0.90	301.39	301.66	0.27*	0.20	4.52	0.13	301.80	0.000	8.000	301.53	301.90	0.37**	0.31	2.94	0.13	302.04	0.000	0.000	n/a	1.00	n/a

Project File: Outfall 4E.stm | Number of lines: 21 | Run Date: 11/5/2024

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

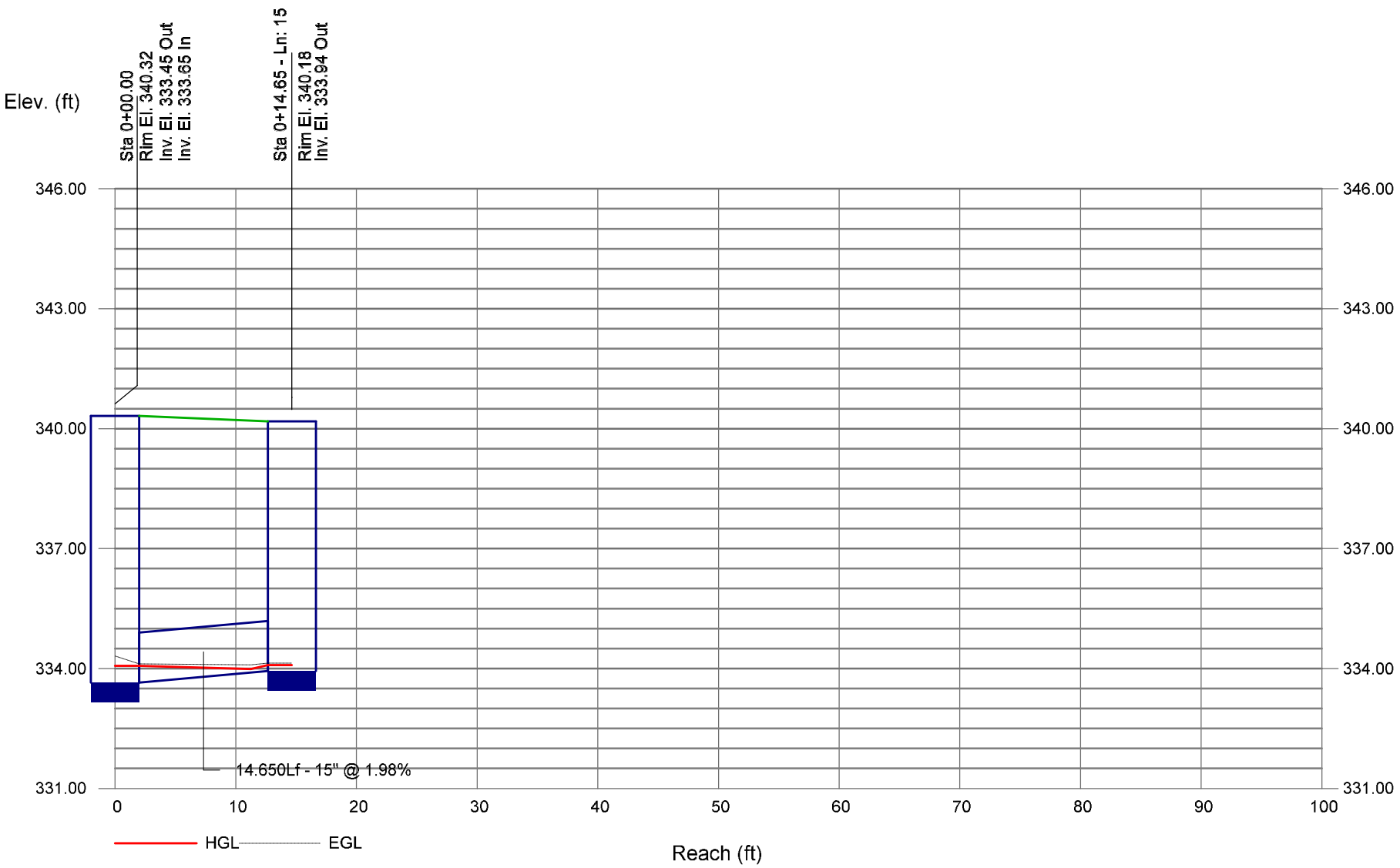
Storm Sewer Profile

SCM 4E 25-Year 1-14 Profile Proj. file: Outfall 4E.stm



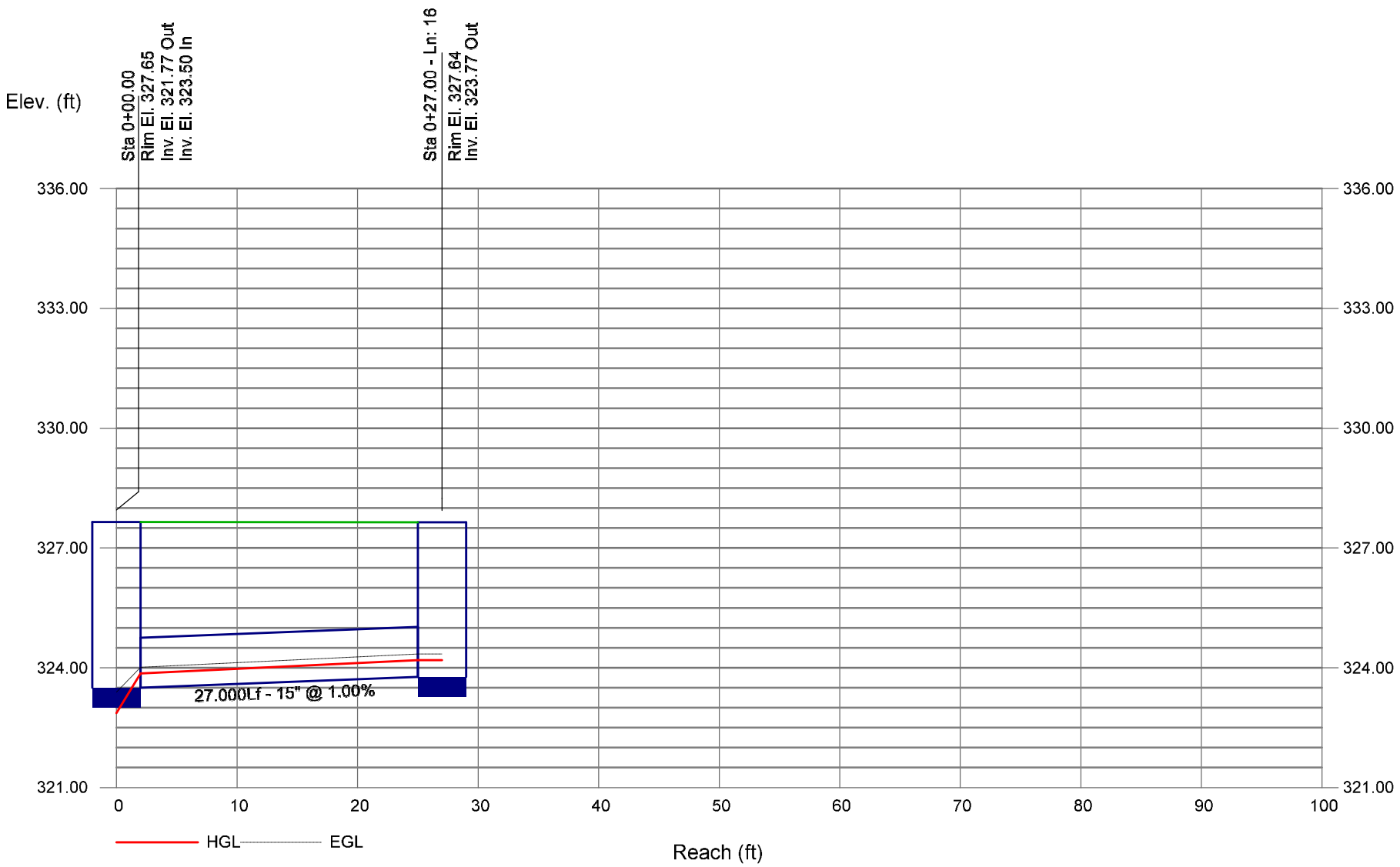
Storm Sewer Profile

SCM 4E 25-Year 15-15 Profile Proj. file: Outfall 4E.stm



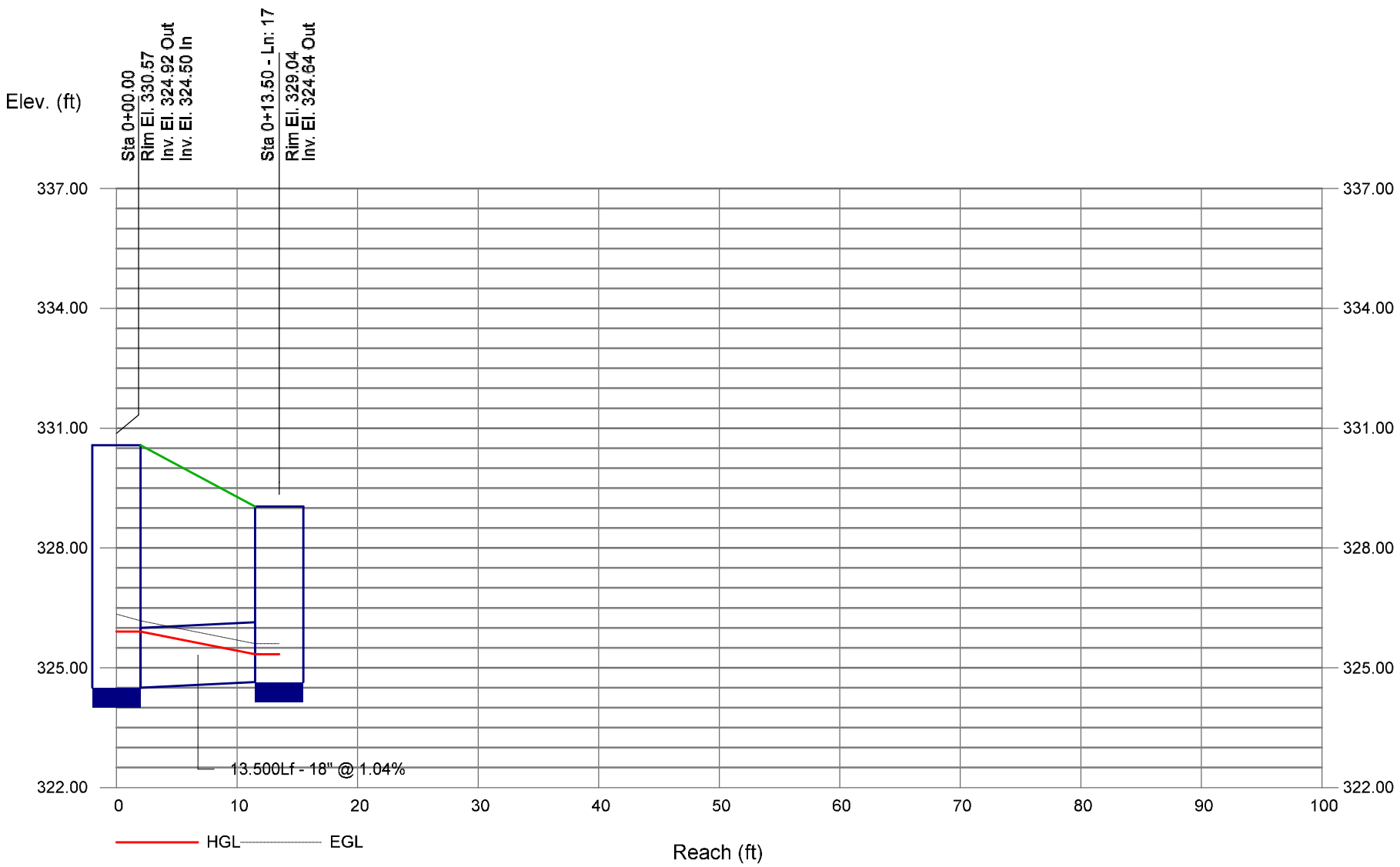
Storm Sewer Profile

SCM 4E 25-Year 16-16 Profile Proj. file: Outfall 4E.stm



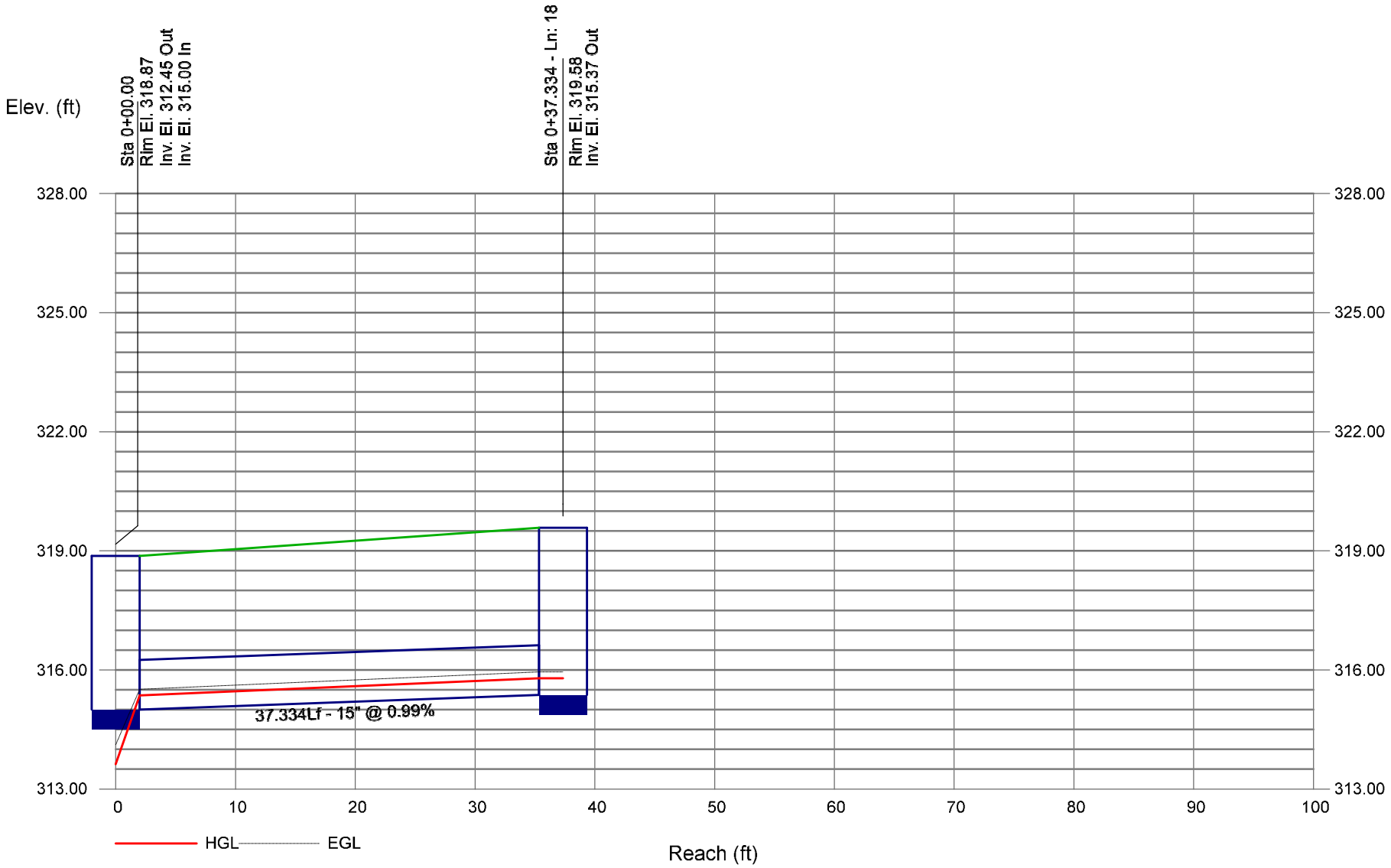
Storm Sewer Profile

SCM 4E 25-Year 17-17 Profile Proj. file: Outfall 4E.stm



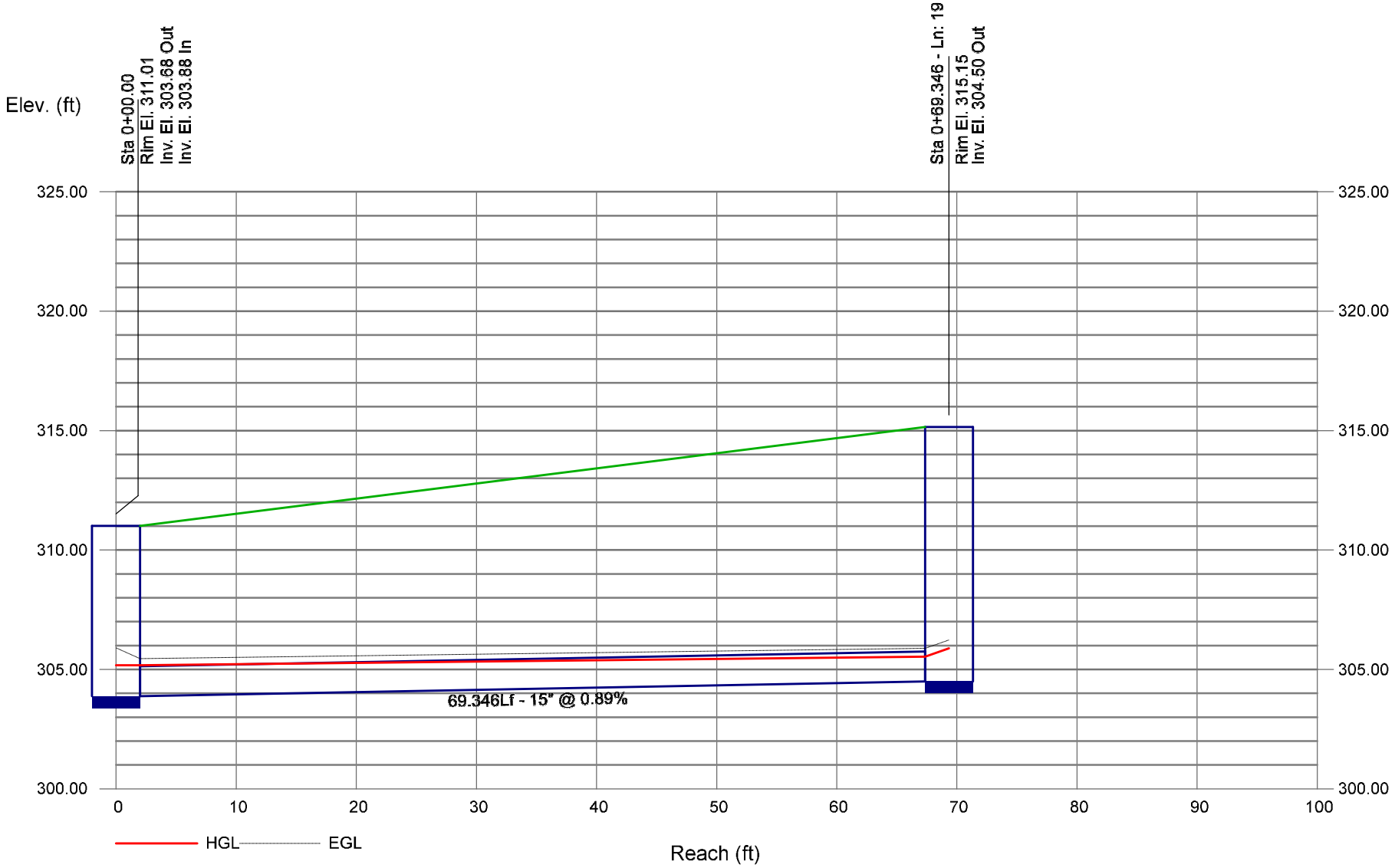
Storm Sewer Profile

SCM 4E 25-Year 18-18 Profile Proj. file: Outfall 4E.stm



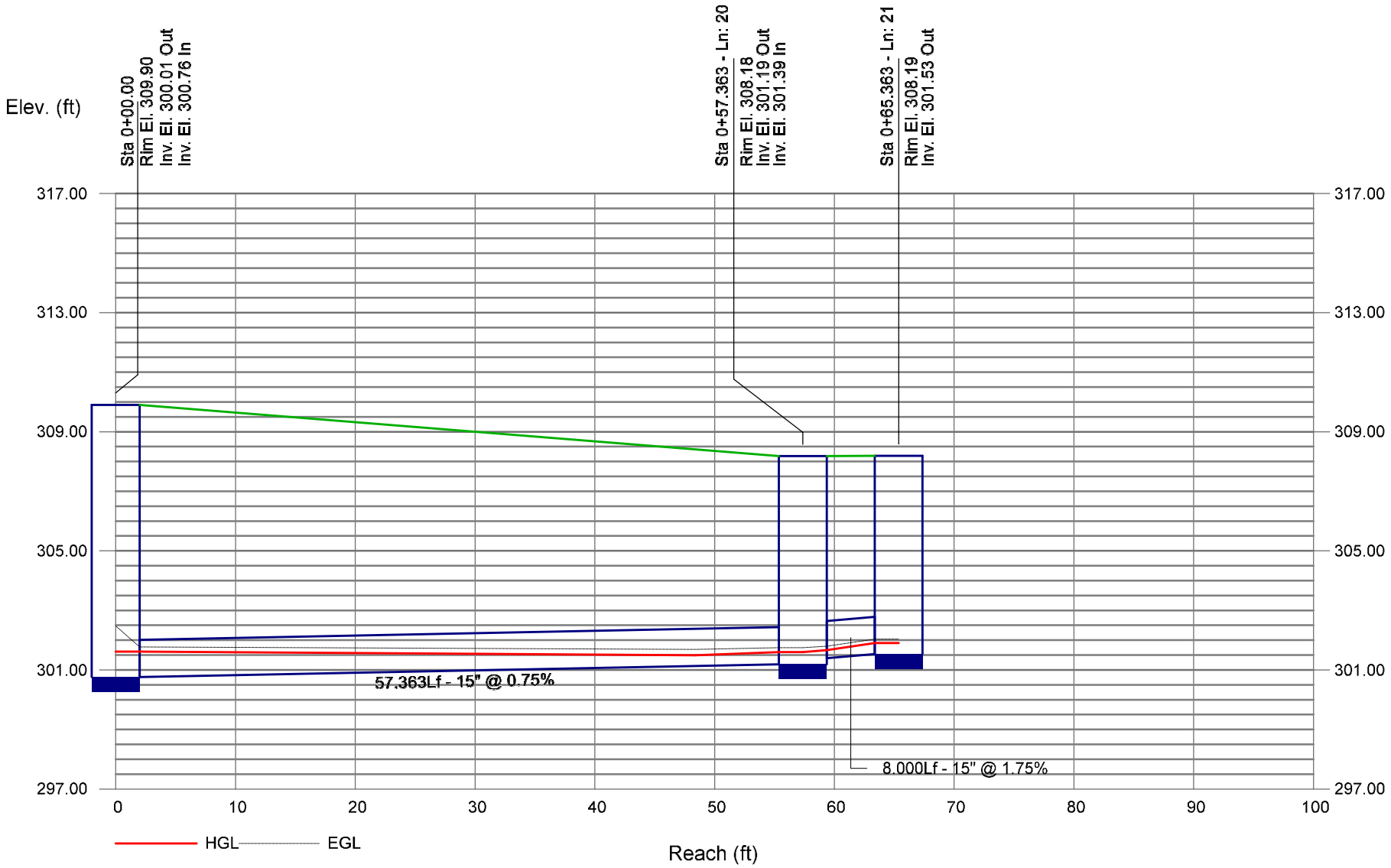
Storm Sewer Profile

SCM 4E 25-Year 19-19 Profile Proj. file: Outfall 4E.stm

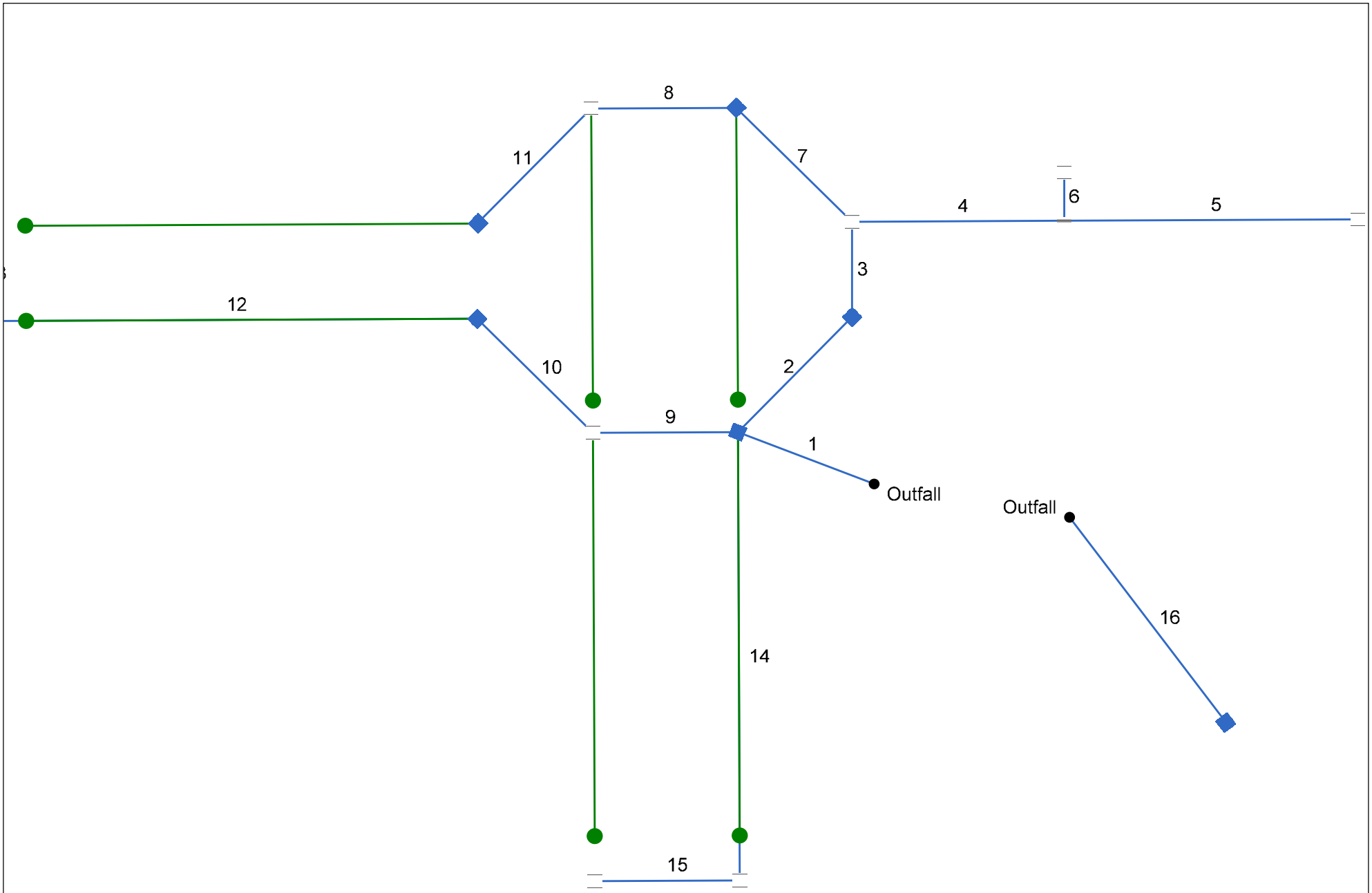


Storm Sewer Profile

SCM 4E 25-Year 20-21Profile Proj. file: Outfall 4E.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM #8A 10-Year Report



Project File: Outfall 8A.stm	Number of lines: 16	Date: 2/3/2025

Storm Sewer Inventory Report

SCM #8A 10-Year Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	41.359	-159.129	Comb	0.00	0.09	0.55	10.0	359.51	1.21	360.01	18	Cir	0.013	2.25	368.62	Pipe - (129)
2	1	45.962	113.853	Comb	0.00	0.39	0.55	10.0	361.71	3.74	363.43	18	Cir	0.013	1.12	369.11	Pipe - (134)
3	2	27.000	-45.000	Comb	0.00	0.12	0.55	10.0	363.63	1.00	363.90	18	Cir	0.013	1.69	369.31	Pipe - (133)
4	3	60.184	90.000	Comb	0.00	0.15	0.55	10.0	364.37	3.79	366.65	15	Cir	0.013	1.50	371.46	Pipe - (135)
5	4	83.030	0.000	Comb	0.00	0.37	0.55	10.0	367.15	4.00	370.47	15	Cir	0.013	1.00	374.93	Pipe - (201)
6	4	13.666	-90.000	DrGrt	0.00	0.94	0.55	10.0	366.65	1.98	366.92	15	Cir	0.013	1.00	372.78	Pipe - (200)
7	3	45.962	-45.000	Comb	0.00	0.17	0.55	10.0	364.17	0.50	364.40	15	Cir	0.013	1.12	371.12	Pipe - (132)
8	7	41.000	-45.000	Comb	0.00	0.22	0.55	10.0	364.61	0.49	364.81	15	Cir	0.013	1.13	371.11	Pipe - (131)
9	1	41.000	-21.147	Comb	0.00	0.01	0.55	10.0	360.46	1.61	361.12	15	Cir	0.013	1.12	368.66	Pipe - (128)
10	9	45.962	45.000	Comb	0.00	0.05	0.55	10.0	361.32	0.48	361.54	15	Cir	0.013	1.12	368.94	Pipe - (127)
11	8	45.890	-45.060	Comb	0.00	0.04	0.55	10.0	365.01	0.50	365.24	15	Cir	0.013	1.00	369.06	Pipe - (130)
12	10	141.830	-45.000	Comb	0.00	0.27	0.55	10.0	361.74	0.50	362.45	15	Cir	0.013	1.50	367.25	Pipe - (126)
13	12	27.000	90.000	Comb	0.00	0.19	0.55	10.0	362.65	0.52	362.79	15	Cir	0.013	1.00	367.24	Pipe - (125)
14	1	127.122	-111.147	Comb	0.00	0.09	0.55	10.0	360.46	0.52	361.12	15	Cir	0.013	1.50	364.61	Pipe - (137)
15	14	41.000	90.000	Comb	0.00	0.17	0.55	10.0	361.32	0.51	361.53	15	Cir	0.013	1.00	364.61	Pipe - (136)
16	End	73.029	52.868	DrGrt	0.00	0.47	0.55	10.0	358.97	8.63	365.27	15	Cir	0.013	1.00	366.71	Pipe - (138)

Project File: Outfall 8A.stm

Number of lines: 16

Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 801	Combination	368.62	Rect	4.00	4.00	18	Cir	360.01	18 15 15	Cir Cir Cir	361.71 360.46 360.46
2	CB 809	Combination	369.11	Rect	4.00	4.00	18	Cir	363.43	18	Cir	363.63
3	CB 810	Combination	369.31	Rect	4.00	4.00	18	Cir	363.90	15 15	Cir Cir	364.37 364.17
4	CB 814	Combination	371.46	Rect	4.00	2.00	15	Cir	366.65	15 15	Cir Cir	367.15 366.65
5	CB 815	Combination	374.93	Rect	4.00	4.00	15	Cir	370.47			
6	YI 814A	DropGrate	372.78	Rect	4.00	4.00	15	Cir	366.92			
7	CB 811	Combination	371.12	Rect	4.00	4.00	15	Cir	364.40	15	Cir	364.61
8	CB 813	Combination	371.11	Rect	4.00	4.00	15	Cir	364.81	15	Cir	365.01
9	CB 804	Combination	368.66	Rect	4.00	4.00	15	Cir	361.12	15	Cir	361.32
10	CB 805	Combination	368.94	Rect	4.00	4.00	15	Cir	361.54	15	Cir	361.74
11	CB 806	Combination	369.06	Rect	4.00	4.00	15	Cir	365.24			
12	CB 807	Combination	367.25	Rect	4.00	4.00	15	Cir	362.45	15	Cir	362.65
13	CB 808	Combination	367.24	Rect	4.00	4.00	15	Cir	362.79			
14	CB 802	Combination	364.61	Rect	4.00	4.00	15	Cir	361.12	15	Cir	361.32
15	CB 803	Combination	364.61	Rect	4.00	4.00	15	Cir	361.53			
16	FES INLET 816	DropGrate	366.71	Rect	4.00	4.00	15	Cir	365.27			

Project File: Outfall 8A.stm | Number of Structures: 16 | Run Date: 2/3/2025

Storm Sewer Summary Report

SCM #8A 10-Year Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (129)	10.02	18	Cir	41.359	359.51	360.01	1.209	360.59	361.23	1.49	361.23	End	Combination
2	Pipe - (134)	7.39	18	Cir	45.962	361.71	363.43	3.742	362.34	364.48	0.54	364.48	1	Combination
3	Pipe - (133)	6.21	18	Cir	27.000	363.63	363.90	1.000	364.48	364.86	0.71	364.86	2	Combination
4	Pipe - (135)	4.65	15	Cir	60.184	364.37	366.65	3.788	364.90	367.52	0.60	367.52	3	Combination
5	Pipe - (201)	1.20	15	Cir	83.030	367.15	370.47	3.999	367.52	370.90	0.16	370.90	4	Combination
6	Pipe - (200)	3.04	15	Cir	13.666	366.65	366.92	1.976	367.52	367.62	n/a	367.62 j	4	DropGrate
7	Pipe - (132)	1.34	15	Cir	45.962	364.17	364.40	0.500	364.86	364.90	0.15	365.05	3	Combination
8	Pipe - (131)	0.82	15	Cir	41.000	364.61	364.81	0.488	365.05	365.17	0.14	365.31	7	Combination
9	Pipe - (128)	1.61	15	Cir	41.000	360.46	361.12	1.610	361.23	361.62	n/a	361.62 j	1	Combination
10	Pipe - (127)	1.59	15	Cir	45.962	361.32	361.54	0.479	361.84	362.05	0.19	362.25	9	Combination
11	Pipe - (130)	0.13	15	Cir	45.890	365.01	365.24	0.501	365.31	365.39	0.04	365.43	8	Combination
12	Pipe - (126)	1.47	15	Cir	141.830	361.74	362.45	0.501	362.25	362.93	0.26	363.20	10	Combination
13	Pipe - (125)	0.61	15	Cir	27.000	362.65	362.79	0.519	363.20	363.20	0.05	363.25	12	Combination
14	Pipe - (137)	0.83	15	Cir	127.122	360.46	361.12	0.519	361.23	361.48	0.19	361.67	1	Combination
15	Pipe - (136)	0.55	15	Cir	41.000	361.32	361.53	0.512	361.67	361.82	n/a	361.92 j	14	Combination
16	Pipe - (138)	1.52	15	Cir	73.029	358.97	365.27	8.627	360.37	365.76	n/a	365.76 j	End	DropGrate

Project File: Outfall 8A.stm | Number of lines: 16 | Run Date: 2/3/2025

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

Inlet Report

SCM #8A 10-Year Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 801	0.29	0.10	0.39	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.12	1.97	0.00	0.00	0.0	14
2	CB 809	1.26	0.00	1.16	0.10	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.16	4.21	0.06	1.07	0.0	1
3	CB 810	0.39	0.00	0.39	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.11	1.80	0.00	0.00	0.0	2
4	CB 814	0.48	0.08	0.57	0.00	Comb	6.0	3.00	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.12	2.22	0.00	0.00	0.0	3
5	CB 815	1.20	0.00	1.11	0.08	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.16	4.07	0.06	1.00	0.0	4
6	YI 814A	3.04	0.00	3.04	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.25	27.18	0.25	27.18	0.0	Off
7	CB 811	0.55	0.00	0.54	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.021	2.00	0.060	0.020	0.013	0.14	2.97	0.03	0.45	0.0	1
8	CB 813	0.71	0.00	0.68	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.021	2.00	0.060	0.020	0.013	0.15	3.62	0.05	0.76	0.0	9
9	CB 804	0.03	0.03	0.06	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.06	0.97	0.00	0.00	0.0	15
10	CB 805	0.16	0.00	0.16	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.016	2.00	0.060	0.020	0.013	0.09	1.55	0.00	0.00	0.0	12
11	CB 806	0.13	0.00	0.13	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.016	2.00	0.060	0.020	0.013	0.09	1.43	0.00	0.00	0.0	13
12	CB 807	0.87	0.00	0.78	0.09	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.18	4.92	0.08	1.34	0.0	Off
13	CB 808	0.61	0.00	0.58	0.03	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.16	3.97	0.05	0.89	0.0	Off
14	CB 802	0.29	0.00	0.29	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.11	1.75	0.00	0.00	0.0	Off
15	CB 803	0.55	0.00	0.55	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.13	2.67	0.02	0.31	0.0	Off
16	FES INLET 816	1.52	0.00	1.52	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.16	17.86	0.16	17.86	0.0	Off

Project File: Outfall 8A.stm | Number of lines: 16 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 72.00 / (Inlet time + 12.50) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

SCM #8A 10-Year Report

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	10.02	359.51	360.59	1.08	1.36	7.36	0.66	361.25	0.000	41.359	360.01	361.23	1.22**	1.54	6.52	0.66	361.89	0.000	0.000	n/a	2.25	1.49
2	18	7.39	361.71	362.34	0.63*	0.70	10.58	0.48	362.82	0.000	45.962	363.43	364.48	1.05**	1.32	5.58	0.48	364.97	0.000	0.000	n/a	1.12	0.54
3	18	6.21	363.63	364.48	0.85	1.04	5.99	0.42	364.90	0.000	27.000	363.90	364.86	0.96**	1.20	5.18	0.42	365.28	0.000	0.000	n/a	1.69	0.71
4	15	4.65	364.37	364.90	0.53*	0.49	9.47	0.40	365.30	0.000	60.184	366.65	367.52	0.87**	0.92	5.08	0.40	367.92	0.000	0.000	n/a	1.50	0.60
5	15	1.20	367.15	367.52	0.37	0.31	3.88	0.16	367.68	0.000	83.030	370.47	370.90	0.43**	0.37	3.19	0.16	371.06	0.000	0.000	n/a	1.00	0.16
6	15	3.04	366.65	367.52	0.87	0.71	3.31	0.29	367.81	0.000	13.666	366.92	367.62 j	0.70**	0.71	4.29	0.29	367.91	0.000	0.000	n/a	1.00	n/a
7	15	1.34	364.17	364.86	0.69	0.70	1.93	0.06	364.92	0.123	45.962	364.40	364.90	0.50	0.46	2.90	0.13	365.03	0.372	0.248	0.114	1.12	0.15
8	15	0.82	364.61	365.05	0.44	0.29	2.12	0.07	365.12	0.228	41.000	364.81	365.17	0.36**	0.29	2.83	0.12	365.29	0.507	0.368	0.151	1.13	0.14
9	15	1.61	360.46	361.23	0.77	0.46	2.03	0.19	361.42	0.000	41.000	361.12	361.62 j	0.50**	0.46	3.49	0.19	361.81	0.000	0.000	n/a	1.12	n/a
10	15	1.59	361.32	361.84	0.52*	0.48	3.33	0.17	362.01	0.478	45.962	361.54	362.05	0.51	0.48	3.34	0.17	362.23	0.481	0.480	0.220	1.12	0.19
11	15	0.13	365.01	365.31	0.30	0.07	0.58	0.01	365.31	0.026	45.890	365.24	365.39	0.15**	0.08	1.61	0.04	365.43	0.477	0.252	0.115	1.00	0.04
12	15	1.47	361.74	362.25	0.51	0.43	3.14	0.15	362.40	0.429	141.830	362.45	362.93	0.48**	0.44	3.36	0.18	363.11	0.521	0.475	0.674	1.50	0.26
13	15	0.61	362.65	363.20	0.55	0.52	1.19	0.02	363.22	0.058	27.000	362.79	363.20	0.41	0.35	1.74	0.05	363.25	0.163	0.110	0.030	1.00	0.05
14	15	0.83	360.46	361.23	0.77	0.29	1.05	0.02	361.25	0.034	127.122	361.12	361.48	0.36**	0.29	2.84	0.13	361.61	0.507	0.271	0.344	1.50	0.19
15	15	0.55	361.32	361.67	0.35	0.21	1.97	0.06	361.73	0.252	41.000	361.53	361.82 j	0.29**	0.22	2.53	0.10	361.92	0.510	0.381	0.156	1.00	0.10
16	15	1.52	358.97	360.37	1.25	0.44	1.24	0.02	360.39	0.055	73.029	365.27	365.76 j	0.49**	0.44	3.43	0.18	365.94	0.534	0.295	n/a	1.00	0.18

Project File: Outfall 8A.stm

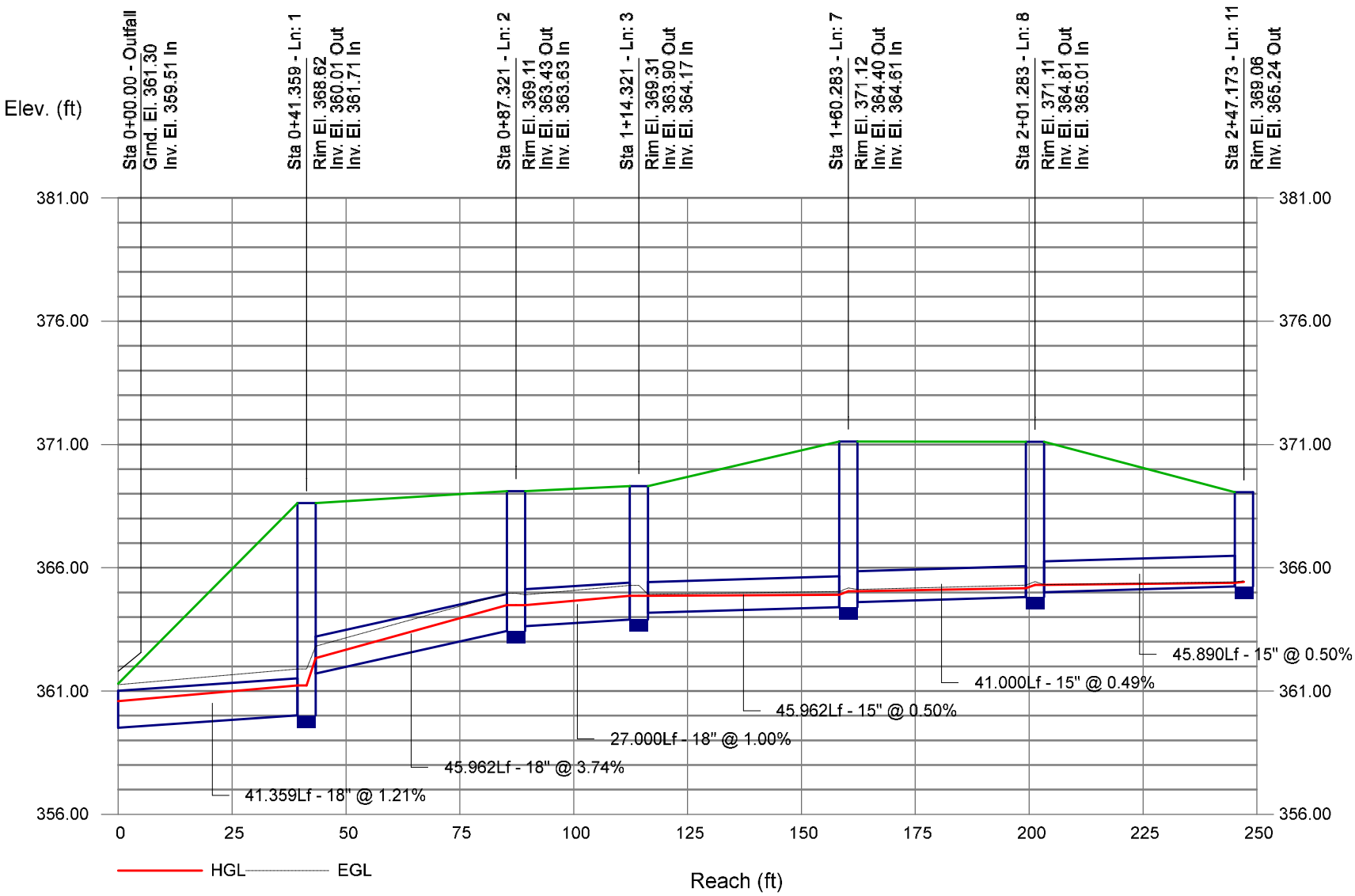
Number of lines: 16

Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

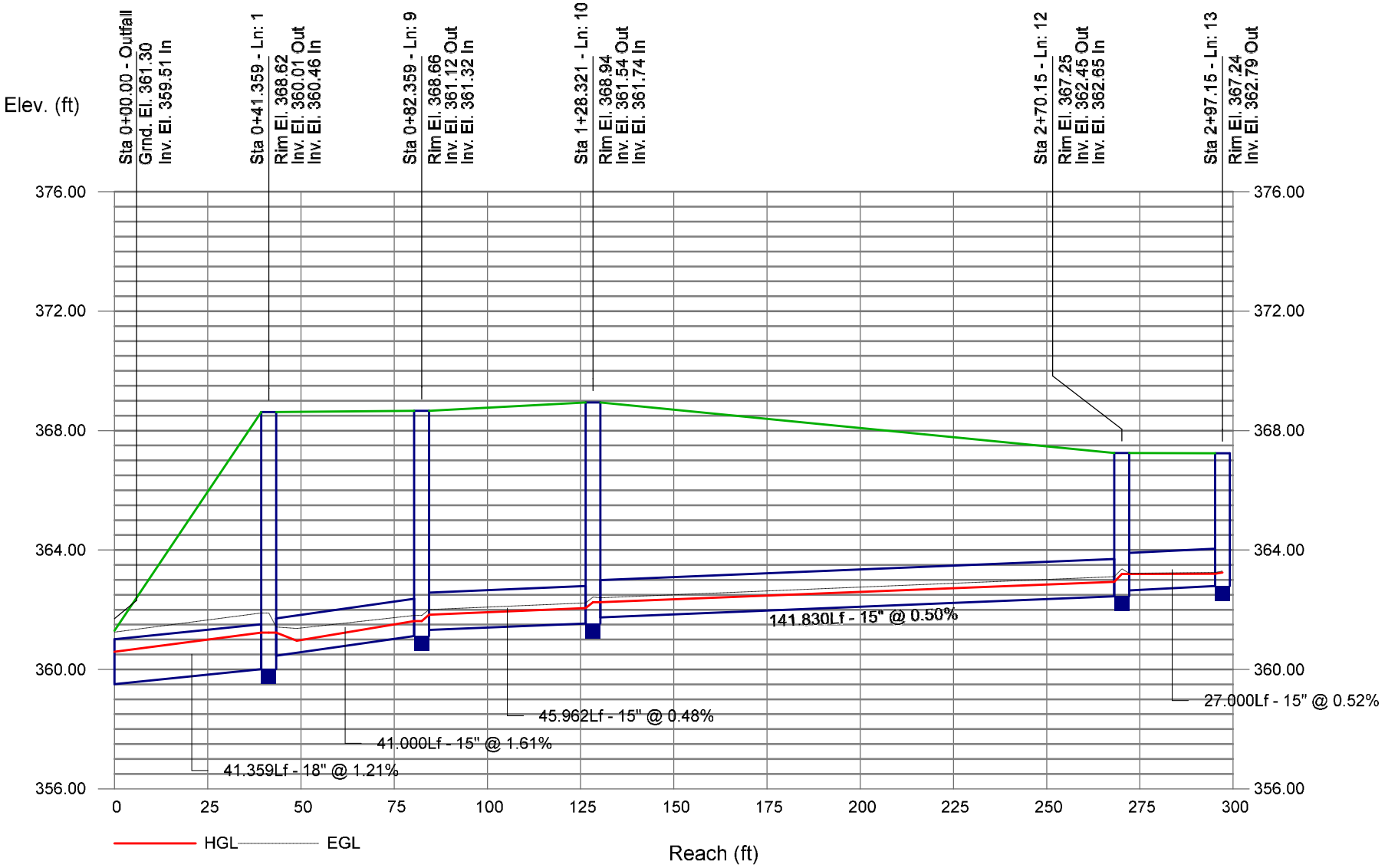
Storm Sewer Profile

SCM #8A 10-Year Profile 1-11 Proj. file: Outfall 8A.stm



Storm Sewer Profile

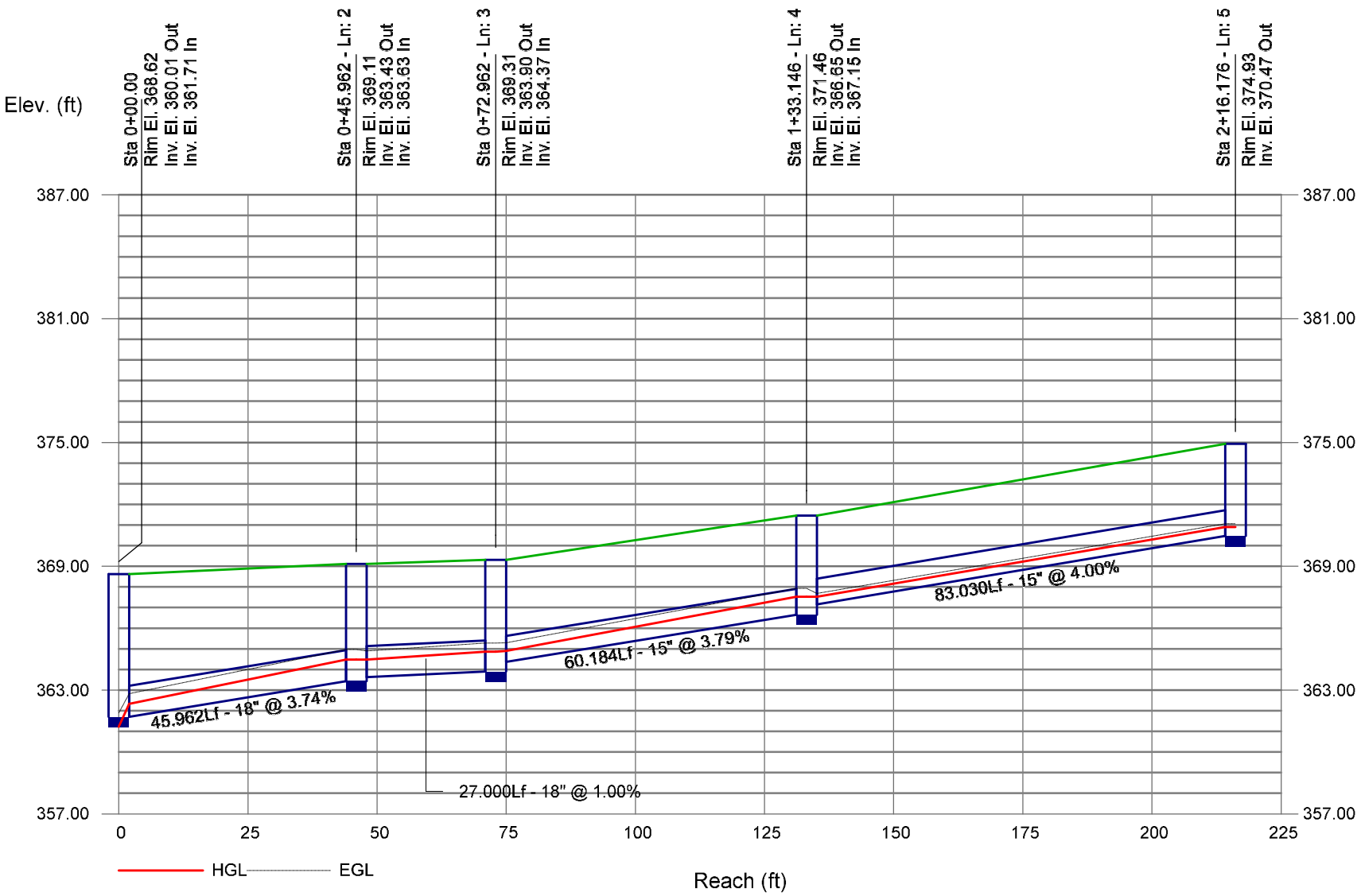
SCM #8A 10-Year Profile 1-13 Proj. file: Outfall 8A.stm



Storm Sewer Profile

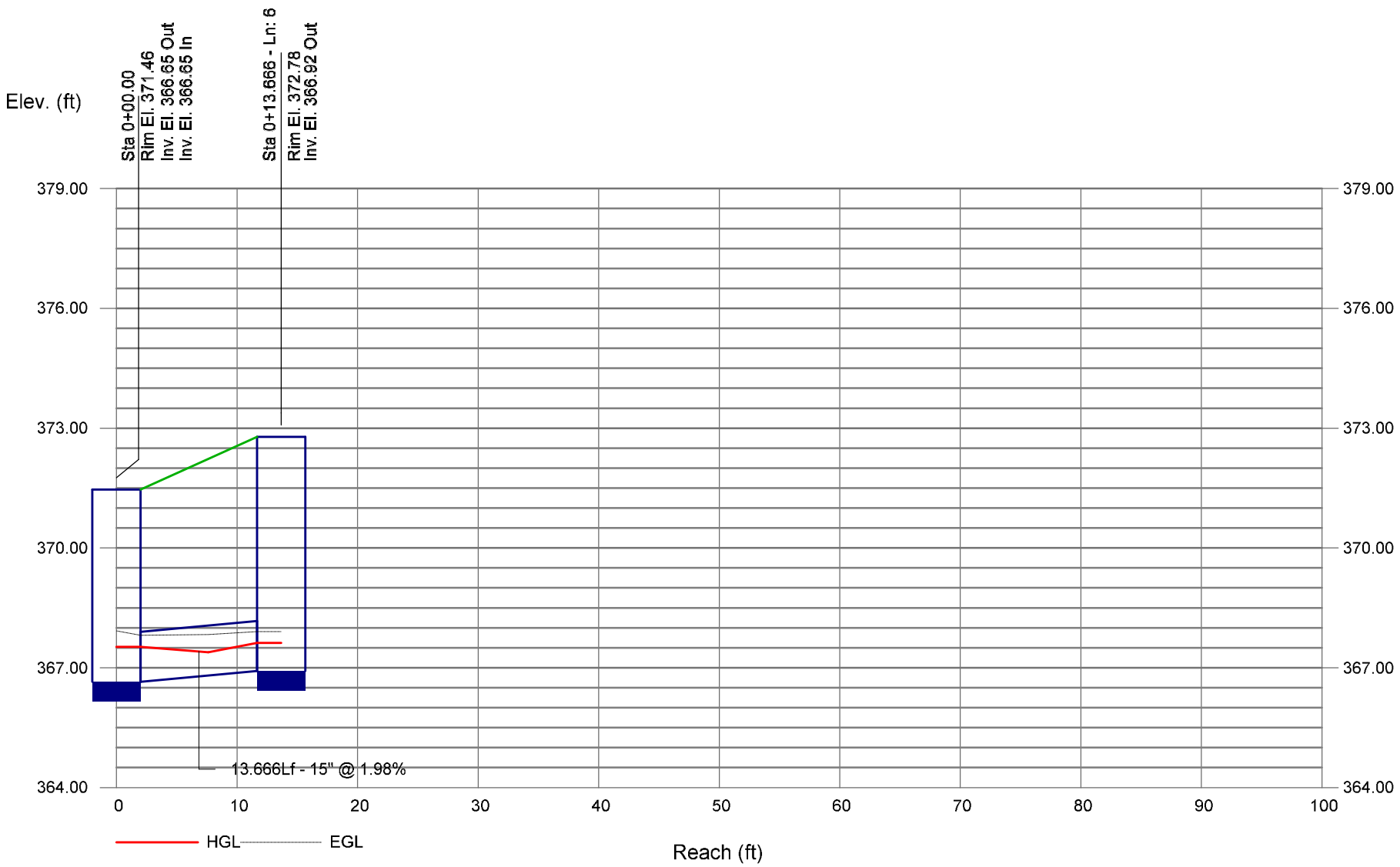
SCM #8A 10-Year Profile 2-5

Proj. file: Outfall 8A.stm



Storm Sewer Profile

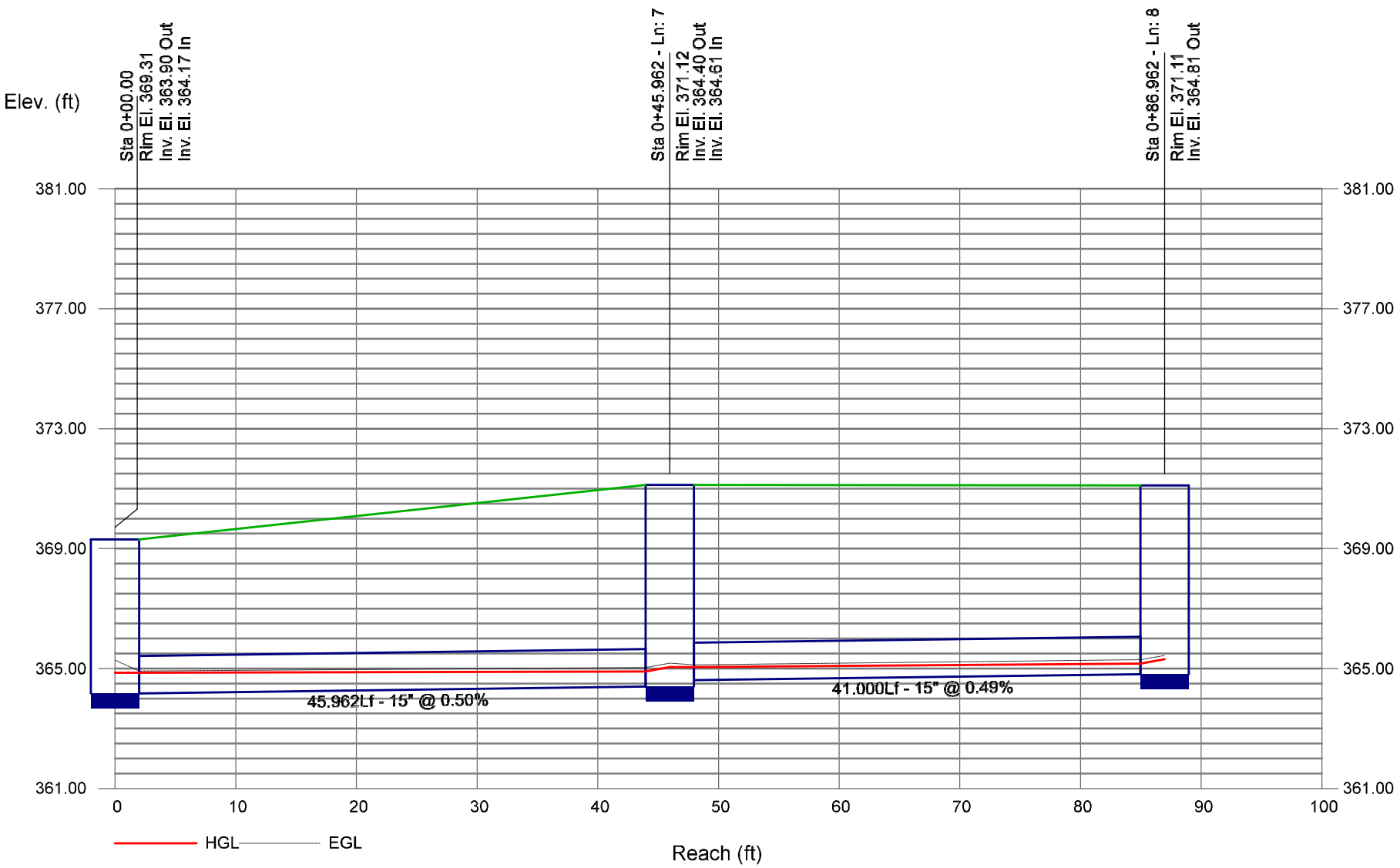
SCM #8A 10-Year Profile 6-6 Proj. file: Outfall 8A.stm



Storm Sewer Profile

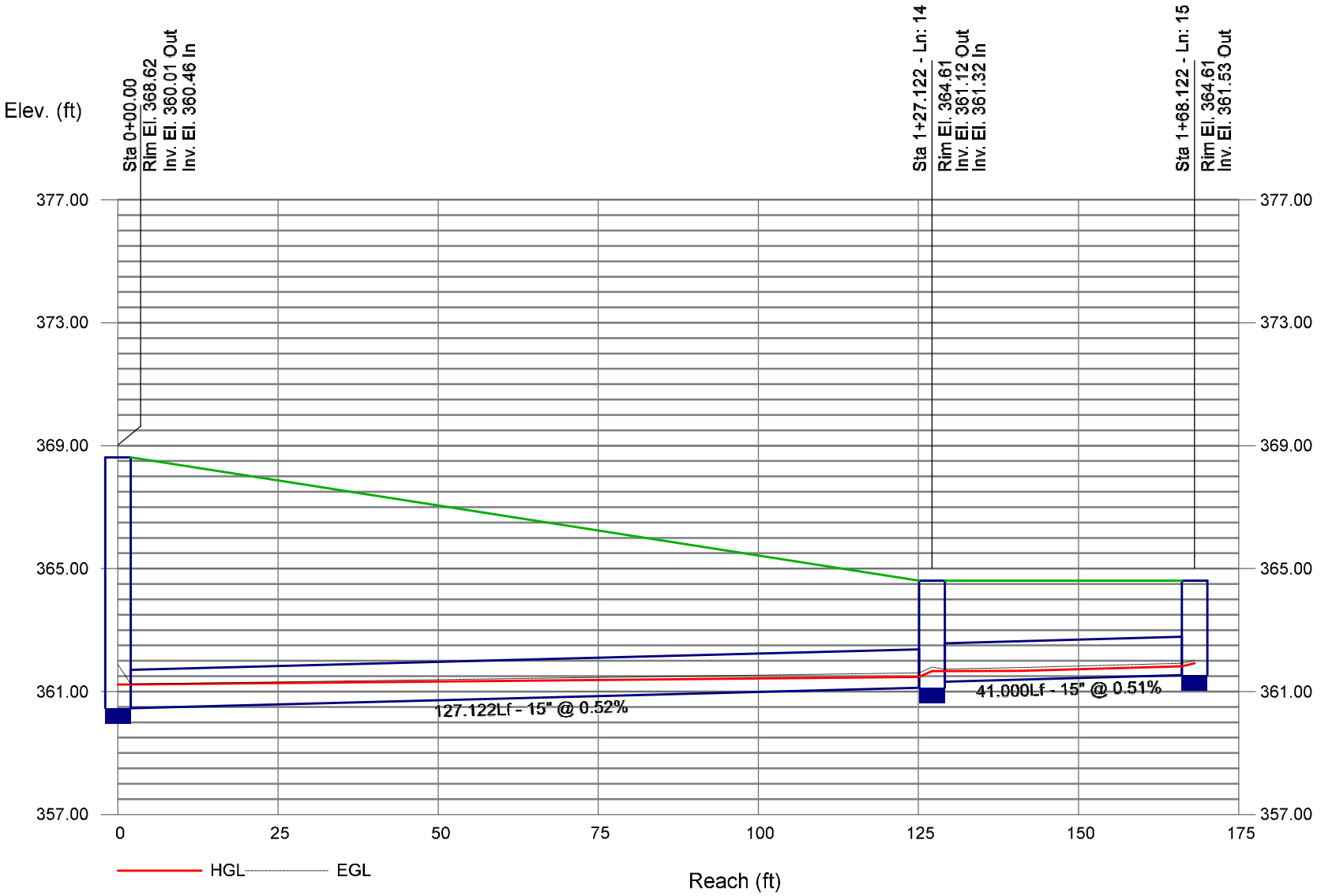
SCM #8A 10-Year Profile 7-8

Proj. file: Outfall 8A.stm



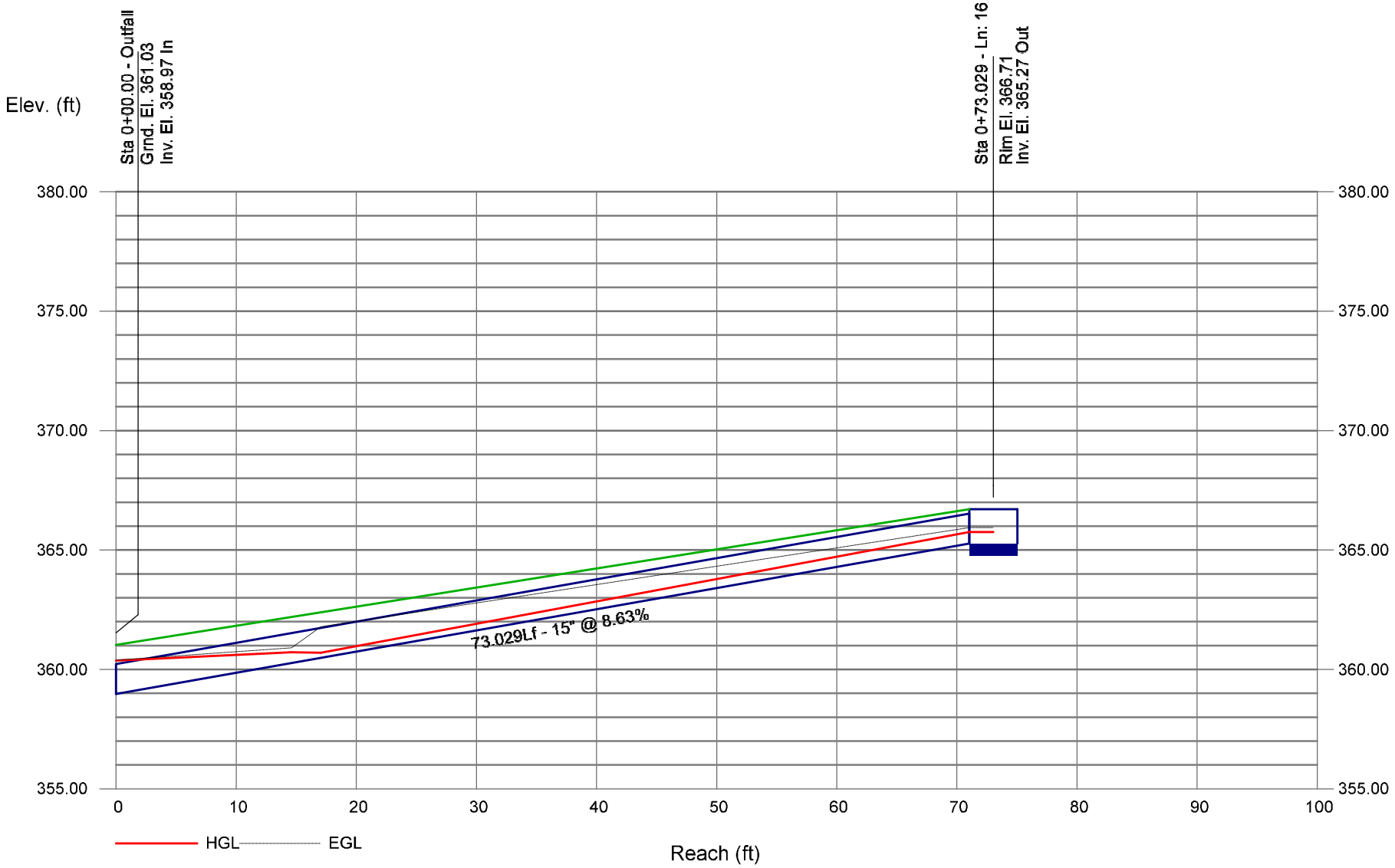
Storm Sewer Profile

SCM #8A 10-Year Profile 14-15 Proj. file: Outfall 8A.stm

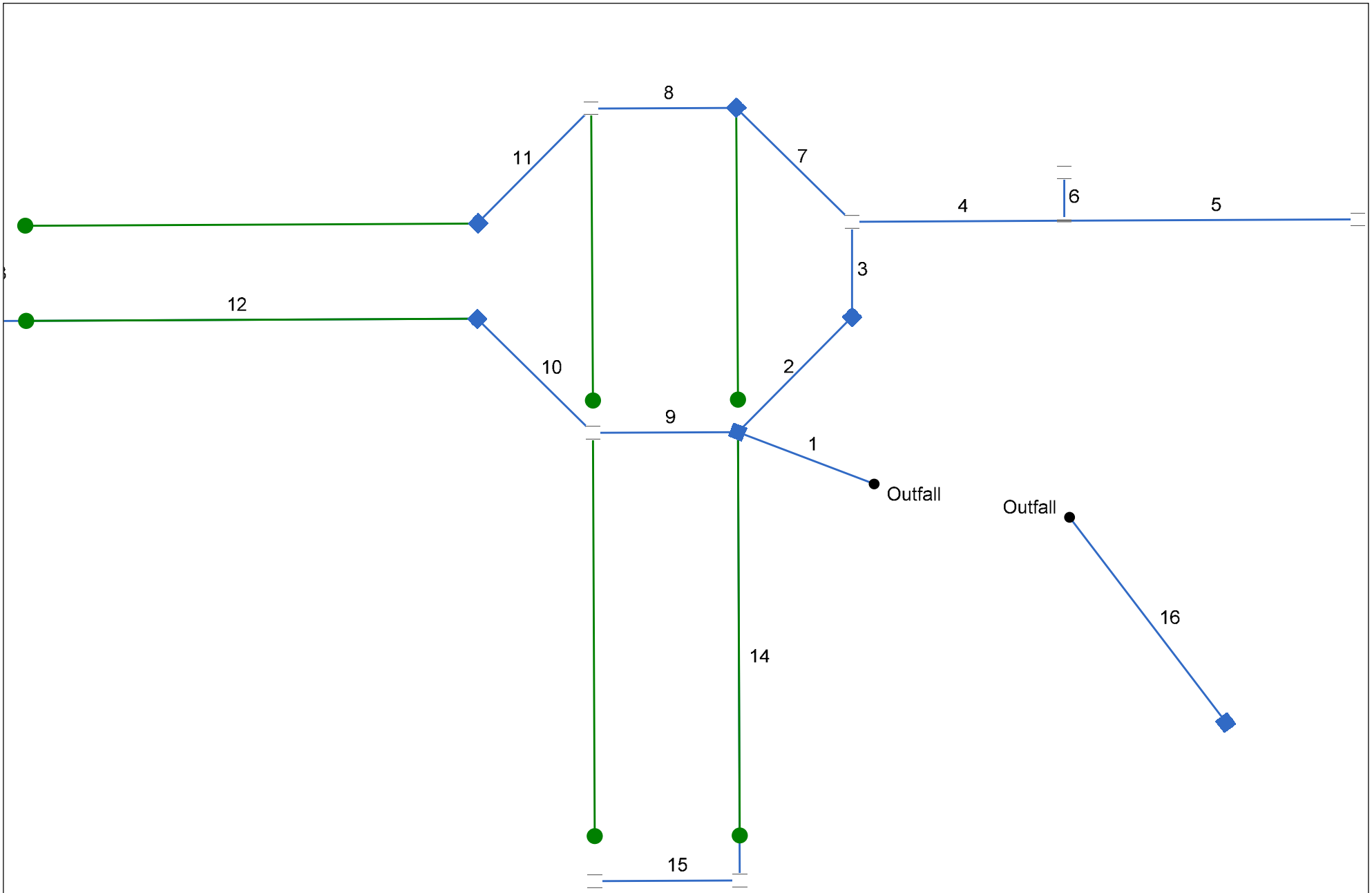


Storm Sewer Profile

SCM #8A 10-Year Profile 16-16 Proj. file: Outfall 8A.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan SCM #8A 25-Year Report



Project File: Outfall 8A.stm	Number of lines: 16	Date: 2/3/2025

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	41.359	-159.129	Comb	0.00	0.09	0.55	10.0	359.51	1.21	360.01	18	Cir	0.013	2.25	368.62	Pipe - (129)
2	1	45.962	113.853	Comb	0.00	0.39	0.55	10.0	361.71	3.74	363.43	18	Cir	0.013	1.12	369.11	Pipe - (134)
3	2	27.000	-45.000	Comb	0.00	0.12	0.55	10.0	363.63	1.00	363.90	18	Cir	0.013	1.69	369.31	Pipe - (133)
4	3	60.184	90.000	Comb	0.00	0.15	0.55	10.0	364.37	3.79	366.65	15	Cir	0.013	1.50	371.46	Pipe - (135)
5	4	83.030	0.000	Comb	0.00	0.37	0.55	10.0	367.15	4.00	370.47	15	Cir	0.013	1.00	374.93	Pipe - (201)
6	4	13.666	-90.000	DrGrt	0.00	0.94	0.55	10.0	366.65	1.98	366.92	15	Cir	0.013	1.00	372.78	Pipe - (200)
7	3	45.962	-45.000	Comb	0.00	0.17	0.55	10.0	364.17	0.50	364.40	15	Cir	0.013	1.12	371.12	Pipe - (132)
8	7	41.000	-45.000	Comb	0.00	0.22	0.55	10.0	364.61	0.49	364.81	15	Cir	0.013	1.13	371.11	Pipe - (131)
9	1	41.000	-21.147	Comb	0.00	0.01	0.55	10.0	360.46	1.61	361.12	15	Cir	0.013	1.12	368.66	Pipe - (128)
10	9	45.962	45.000	Comb	0.00	0.05	0.55	10.0	361.32	0.48	361.54	15	Cir	0.013	1.12	368.94	Pipe - (127)
11	8	45.890	-45.060	Comb	0.00	0.04	0.55	10.0	365.01	0.50	365.24	15	Cir	0.013	1.00	369.06	Pipe - (130)
12	10	141.830	-45.000	Comb	0.00	0.27	0.55	10.0	361.74	0.50	362.45	15	Cir	0.013	1.50	367.25	Pipe - (126)
13	12	27.000	90.000	Comb	0.00	0.19	0.55	10.0	362.65	0.52	362.79	15	Cir	0.013	1.00	367.24	Pipe - (125)
14	1	127.122	-111.147	Comb	0.00	0.09	0.55	10.0	360.46	0.52	361.12	15	Cir	0.013	1.50	364.61	Pipe - (137)
15	14	41.000	90.000	Comb	0.00	0.17	0.55	10.0	361.32	0.51	361.53	15	Cir	0.013	1.00	364.61	Pipe - (136)
16	End	73.029	52.868	DrGrt	0.00	0.47	0.55	10.0	358.97	8.63	365.27	15	Cir	0.013	1.00	366.71	Pipe - (138)

Project File: Outfall 8A.stm

Number of lines: 16

Date: 2/3/2025

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	CB 801	Combination	368.62	Rect	4.00	4.00	18	Cir	360.01	18 15 15	Cir Cir Cir	361.71 360.46 360.46
2	CB 809	Combination	369.11	Rect	4.00	4.00	18	Cir	363.43	18	Cir	363.63
3	CB 810	Combination	369.31	Rect	4.00	4.00	18	Cir	363.90	15 15	Cir Cir	364.37 364.17
4	CB 814	Combination	371.46	Rect	4.00	2.00	15	Cir	366.65	15 15	Cir Cir	367.15 366.65
5	CB 815	Combination	374.93	Rect	4.00	4.00	15	Cir	370.47			
6	YI 814A	DropGrate	372.78	Rect	4.00	4.00	15	Cir	366.92			
7	CB 811	Combination	371.12	Rect	4.00	4.00	15	Cir	364.40	15	Cir	364.61
8	CB 813	Combination	371.11	Rect	4.00	4.00	15	Cir	364.81	15	Cir	365.01
9	CB 804	Combination	368.66	Rect	4.00	4.00	15	Cir	361.12	15	Cir	361.32
10	CB 805	Combination	368.94	Rect	4.00	4.00	15	Cir	361.54	15	Cir	361.74
11	CB 806	Combination	369.06	Rect	4.00	4.00	15	Cir	365.24			
12	CB 807	Combination	367.25	Rect	4.00	4.00	15	Cir	362.45	15	Cir	362.65
13	CB 808	Combination	367.24	Rect	4.00	4.00	15	Cir	362.79			
14	CB 802	Combination	364.61	Rect	4.00	4.00	15	Cir	361.12	15	Cir	361.32
15	CB 803	Combination	364.61	Rect	4.00	4.00	15	Cir	361.53			
16	FES INLET 816	DropGrate	366.71	Rect	4.00	4.00	15	Cir	365.27			

Project File: Outfall 8A.stm | Number of Structures: 16 | Run Date: 2/3/2025

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (129)	10.27	18	Cir	41.359	359.51	360.01	1.209	361.01	361.27	1.47	362.74	End	Combination
2	Pipe - (134)	8.24	18	Cir	45.962	361.71	363.43	3.742	362.74	364.54	0.60	364.54	1	Combination
3	Pipe - (133)	6.92	18	Cir	27.000	363.63	363.90	1.000	364.54	364.92	n/a	364.92	2	Combination
4	Pipe - (135)	5.18	15	Cir	60.184	364.37	366.65	3.788	364.93	367.57	n/a	367.57	3	Combination
5	Pipe - (201)	1.33	15	Cir	83.030	367.15	370.47	3.999	367.57	370.93	0.17	370.93	4	Combination
6	Pipe - (200)	3.38	15	Cir	13.666	366.65	366.92	1.976	367.57	367.66	n/a	367.66 j	4	DropGrate
7	Pipe - (132)	1.50	15	Cir	45.962	364.17	364.40	0.500	364.92	364.95	0.14	365.10	3	Combination
8	Pipe - (131)	0.91	15	Cir	41.000	364.61	364.81	0.488	365.10	365.19	n/a	365.34 j	7	Combination
9	Pipe - (128)	1.75	15	Cir	41.000	360.46	361.12	1.610	362.74*	362.77*	0.04	362.80	1	Combination
10	Pipe - (127)	1.75	15	Cir	45.962	361.32	361.54	0.479	362.80*	362.84*	0.04	362.87	9	Combination
11	Pipe - (130)	0.14	15	Cir	45.890	365.01	365.24	0.501	365.34	365.40	0.04	365.44	8	Combination
12	Pipe - (126)	1.64	15	Cir	141.830	361.74	362.45	0.501	362.87	363.04	0.19	363.23	10	Combination
13	Pipe - (125)	0.68	15	Cir	27.000	362.65	362.79	0.519	363.23	363.24	0.05	363.28	12	Combination
14	Pipe - (137)	0.89	15	Cir	127.122	360.46	361.12	0.519	362.74*	362.76*	0.01	362.77	1	Combination
15	Pipe - (136)	0.61	15	Cir	41.000	361.32	361.53	0.512	362.77	362.78	0.00	362.78	14	Combination
16	Pipe - (138)	1.69	15	Cir	73.029	358.97	365.27	8.627	360.22	365.79	n/a	365.79 j	End	DropGrate

Project File: Outfall 8A.stm

Number of lines: 16

Run Date: 2/3/2025

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Inlet Report

SCM #8A 25-Year Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB 801	0.32	0.15	0.47	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.13	2.31	0.01	0.15	0.0	14
2	CB 809	1.40	0.00	1.27	0.14	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.17	4.50	0.07	1.21	0.0	1
3	CB 810	0.43	0.00	0.43	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.11	1.88	0.00	0.00	0.0	2
4	CB 814	0.54	0.12	0.65	0.00	Comb	6.0	3.00	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.13	2.56	0.01	0.24	0.0	3
5	CB 815	1.33	0.00	1.22	0.12	Comb	6.0	1.50	0.00	3.00	2.50	0.042	2.00	0.060	0.020	0.013	0.17	4.36	0.07	1.14	0.0	4
6	YI 814A	3.38	0.00	3.38	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.27	29.07	0.27	29.07	0.0	Off
7	CB 811	0.61	0.00	0.60	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.021	2.00	0.060	0.020	0.013	0.14	3.24	0.03	0.58	0.0	1
8	CB 813	0.79	0.00	0.75	0.04	Comb	6.0	1.50	0.00	3.00	2.50	0.021	2.00	0.060	0.020	0.013	0.16	3.90	0.05	0.89	0.0	9
9	CB 804	0.04	0.04	0.08	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.06	1.07	0.00	0.00	0.0	15
10	CB 805	0.18	0.00	0.18	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.016	2.00	0.060	0.020	0.013	0.10	1.62	0.00	0.00	0.0	12
11	CB 806	0.14	0.00	0.14	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.016	2.00	0.060	0.020	0.013	0.09	1.49	0.00	0.00	0.0	13
12	CB 807	0.97	0.00	0.85	0.12	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.18	5.23	0.09	1.48	0.0	Off
13	CB 808	0.68	0.00	0.64	0.05	Comb	6.0	1.50	0.00	3.00	2.50	0.012	2.00	0.060	0.020	0.013	0.17	4.25	0.06	1.03	0.0	Off
14	CB 802	0.32	0.00	0.32	0.00	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.11	1.83	0.00	0.00	0.0	Off
15	CB 803	0.61	0.00	0.61	0.01	Comb	6.0	1.50	0.00	3.00	2.50	0.027	2.00	0.060	0.020	0.013	0.14	2.93	0.03	0.43	0.0	Off
16	FES INLET 816	1.69	0.00	1.69	0.00	DrGrt	0.0	0.00	4.00	2.00	2.00	Sag	2.00	0.020	0.020	0.013	0.17	19.05	0.17	19.05	0.0	Off

Project File: Outfall 8A.stm | Number of lines: 16 | Run Date: 2/3/2025

NOTES: Inlet N-Values = 0.016; Intensity = 65.79 / (Inlet time + 11.50) ^ 0.75; Return period = 25 Yrs. ; * Indicates Known Q added.All curb inlets are throat.

Hydraulic Grade Line Computations

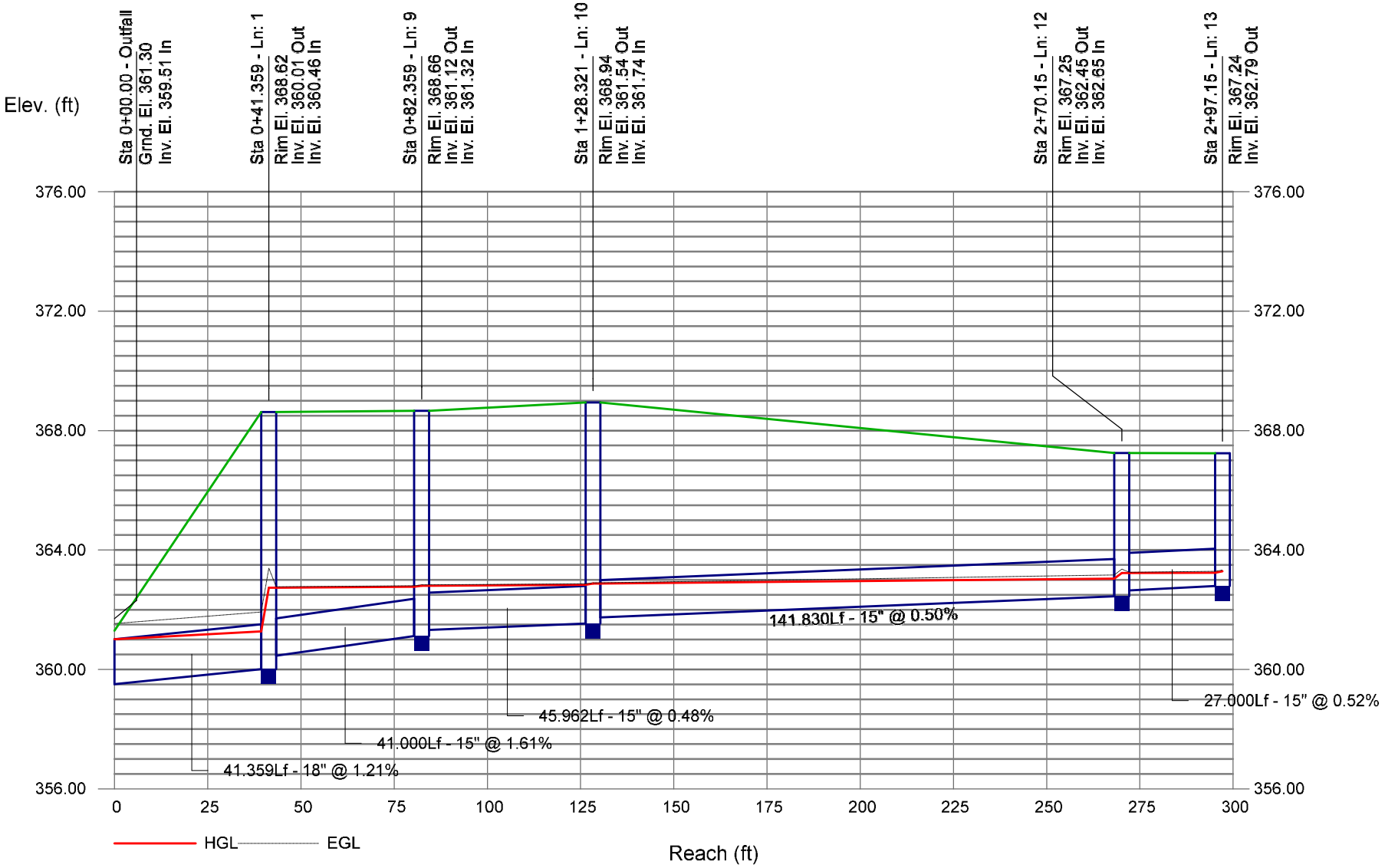
Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	10.27	359.51	361.01	1.50	1.77	5.81	0.52	361.53	0.956	41.359	360.01	361.27	1.26	1.58	6.48	0.65	361.92	0.916	0.936	0.387	2.25	1.47
2	18	8.24	361.71	362.74	1.03	1.29	6.38	0.54	363.27	0.000	45.962	363.43	364.54	1.11**	1.40	5.87	0.54	365.08	0.000	0.000	n/a	1.12	0.60
3	18	6.92	363.63	364.54	0.91	1.12	6.16	0.46	365.00	0.000	27.000	363.90	364.92	1.02**	1.28	5.42	0.46	365.37	0.000	0.000	n/a	1.69	n/a
4	15	5.18	364.37	364.93	0.56*	0.53	9.74	0.44	365.37	0.000	60.184	366.65	367.57	0.92**	0.97	5.34	0.44	368.02	0.000	0.000	n/a	1.50	n/a
5	15	1.33	367.15	367.57	0.42	0.36	3.65	0.17	367.74	0.000	83.030	370.47	370.93	0.46**	0.40	3.29	0.17	371.09	0.000	0.000	n/a	1.00	0.17
6	15	3.38	366.65	367.57	0.92	0.76	3.49	0.31	367.88	0.000	13.666	366.92	367.66 j	0.74**	0.76	4.46	0.31	367.97	0.000	0.000	n/a	1.00	0.31
7	15	1.50	364.17	364.92	0.75	0.77	1.95	0.06	364.98	0.120	45.962	364.40	364.95	0.55	0.53	2.84	0.13	365.08	0.325	0.223	0.102	1.12	0.14
8	15	0.91	364.61	365.10	0.49	0.31	2.07	0.07	365.16	0.196	41.000	364.81	365.19 j	0.38**	0.31	2.92	0.13	365.32	0.508	0.352	0.144	1.13	0.15
9	15	1.75	360.46	362.74	1.25	1.23	1.43	0.03	362.77	0.074	41.000	361.12	362.77	1.25	1.23	1.43	0.03	362.80	0.074	0.074	0.030	1.12	0.04
10	15	1.75	361.32	362.80	1.25	1.23	1.43	0.03	362.84	0.073	45.962	361.54	362.84	1.25	1.23	1.43	0.03	362.87	0.073	0.073	0.034	1.12	0.04
11	15	0.14	365.01	365.34	0.33	0.26	0.56	0.00	365.34	0.022	45.890	365.24	365.40	0.16	0.09	1.57	0.04	365.44	0.403	0.213	0.098	1.00	0.04
12	15	1.64	361.74	362.87	1.13	1.17	1.40	0.03	362.90	0.056	141.830	362.45	363.04	0.59	0.57	2.89	0.13	363.17	0.318	0.187	0.265	1.50	0.19
13	15	0.68	362.65	363.23	0.58	0.56	1.22	0.02	363.26	0.057	27.000	362.79	363.24	0.45	0.39	1.74	0.05	363.28	0.150	0.104	0.028	1.00	0.05
14	15	0.89	360.46	362.74	1.25	1.23	0.73	0.01	362.75	0.019	127.122	361.12	362.76	1.25	1.23	0.73	0.01	362.77	0.019	0.019	0.024	1.50	0.01
15	15	0.61	361.32	362.77	1.25	1.23	0.50	0.00	362.78	0.009	41.000	361.53	362.78	1.25	1.23	0.50	0.00	362.78	0.009	0.009	0.004	1.00	0.00
16	15	1.69	358.97	360.22	1.25*	0.48	1.38	0.03	360.25	0.069	73.029	365.27	365.79 j	0.52**	0.48	3.54	0.19	365.98	0.540	0.304	n/a	1.00	n/a

Project File: Outfall 8A.stm | Number of lines: 16 | Run Date: 2/3/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

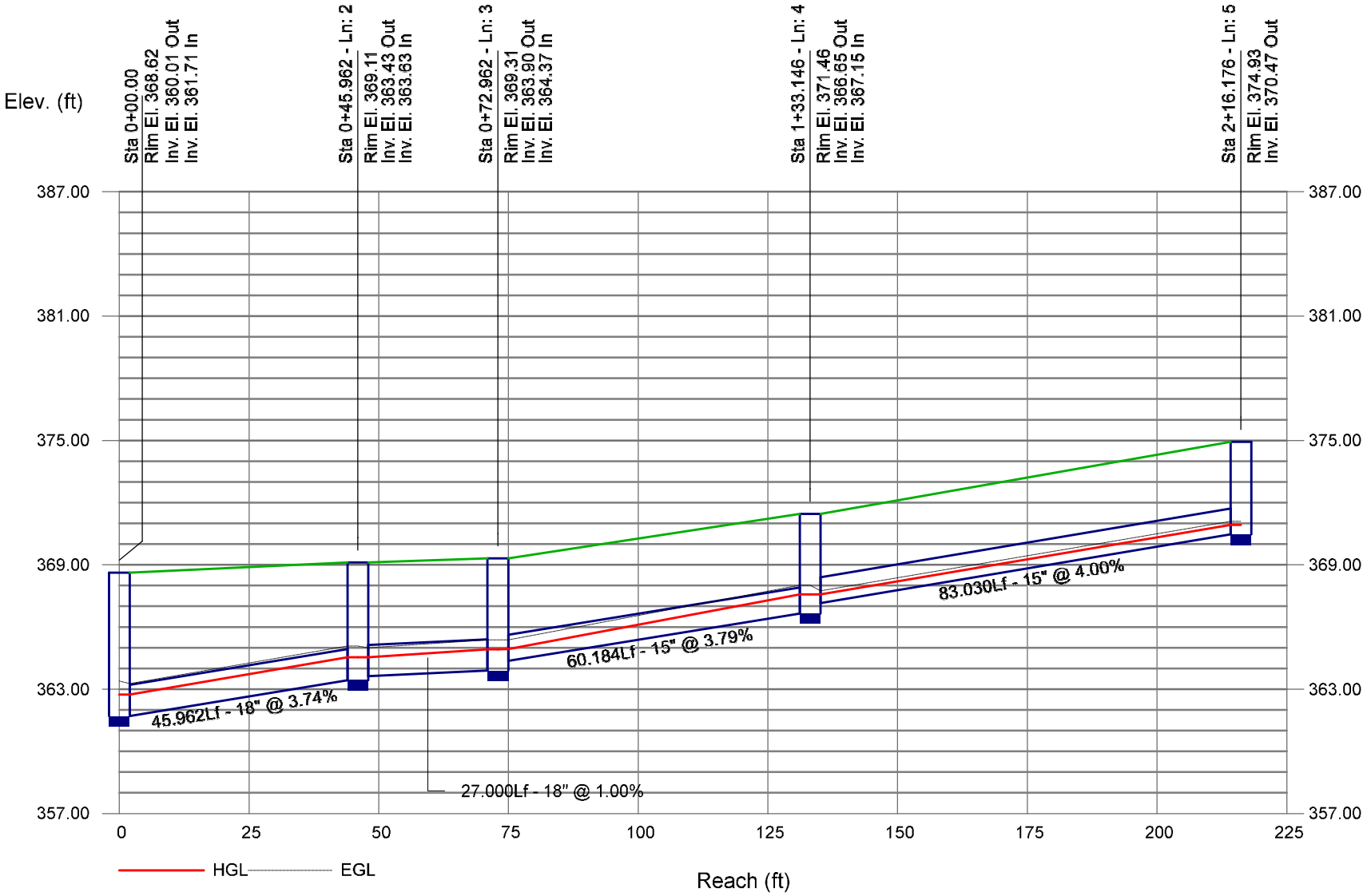
Storm Sewer Profile

SCM #8A 25-Year Profile 1-13 Proj. file: Outfall 8A.stm



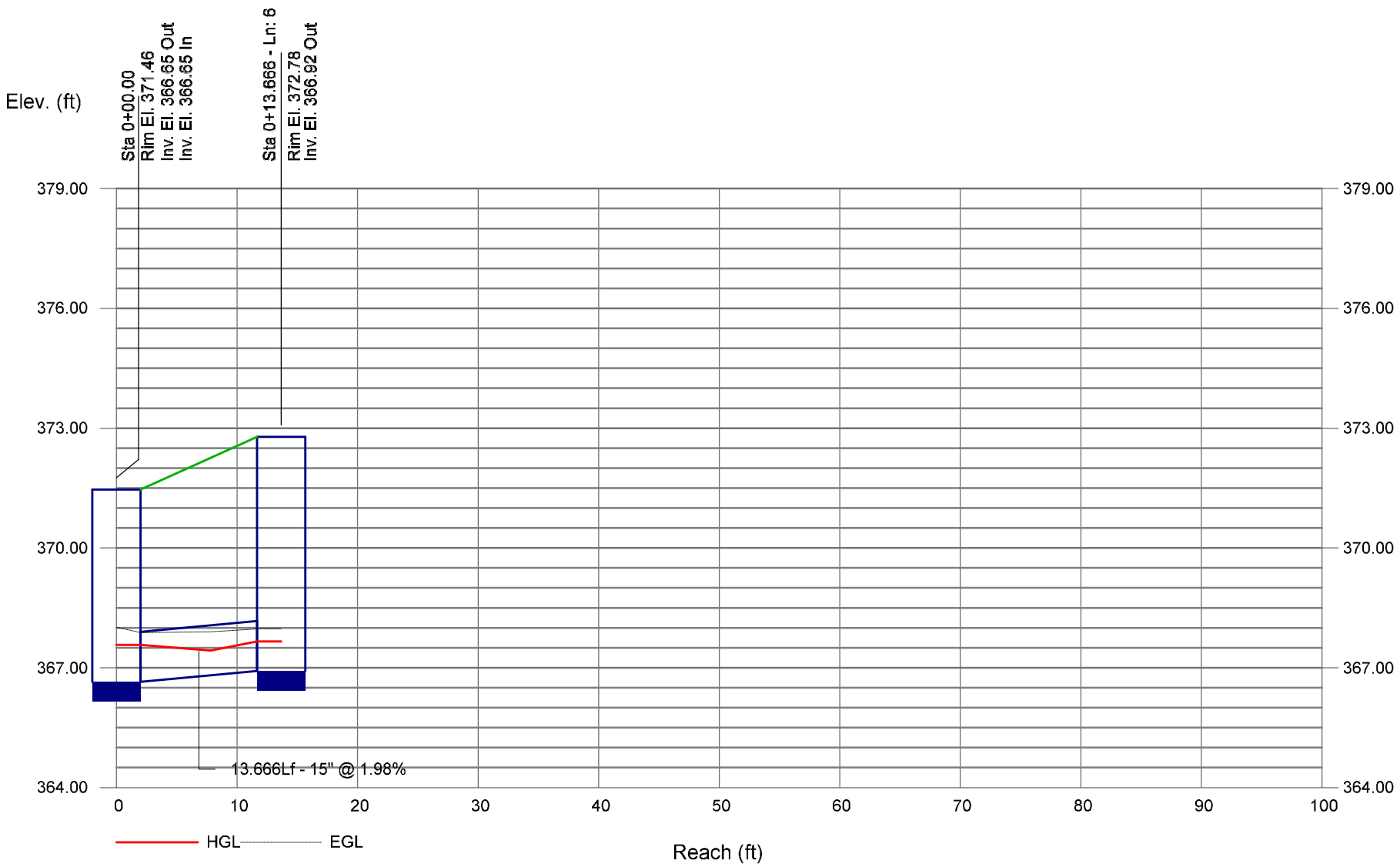
Storm Sewer Profile

SCM #8A 25-Year Profile 2-5 Proj. file: Outfall 8A.stm



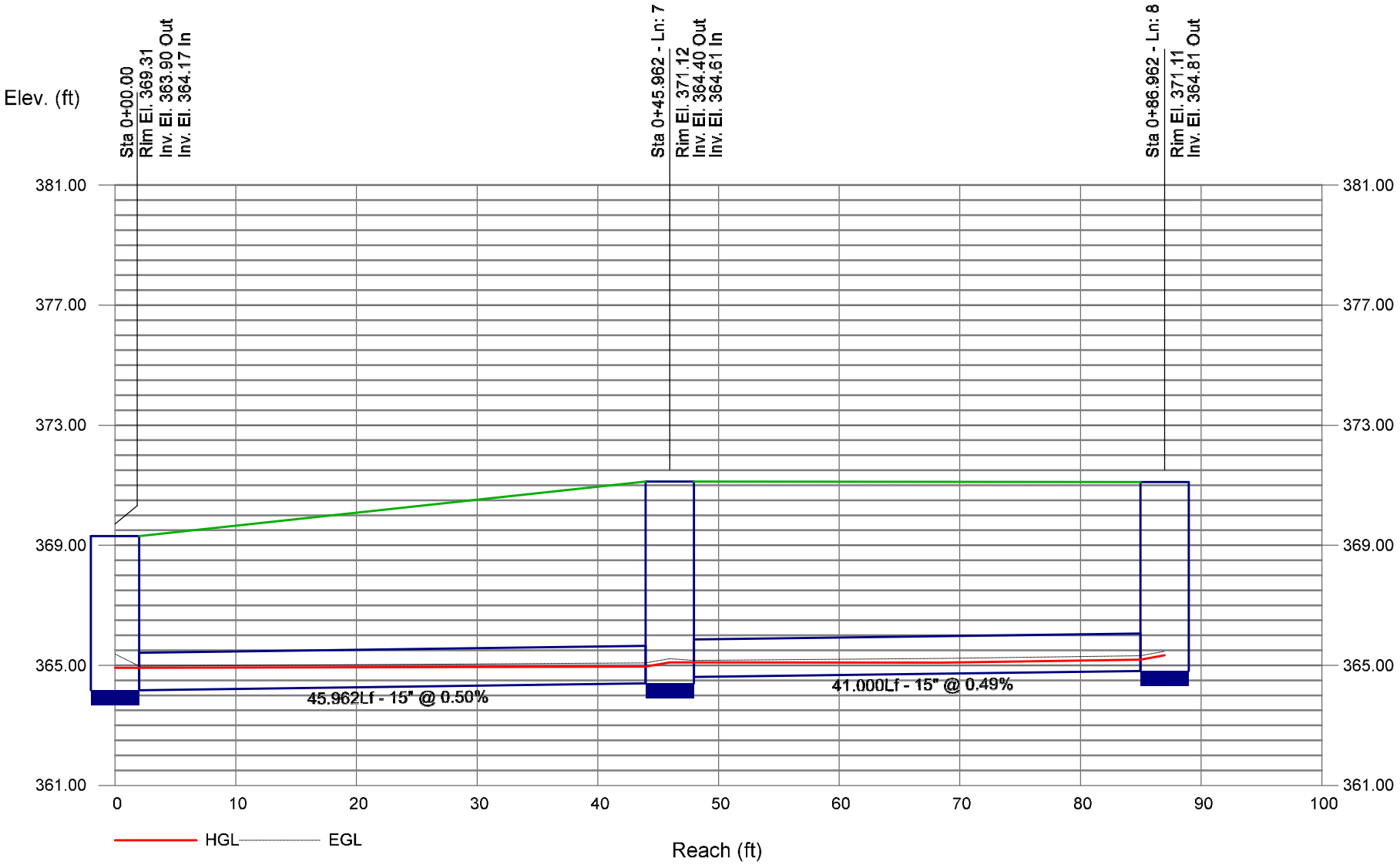
Storm Sewer Profile

SCM #8A 25-Year Profile 6-6 Proj. file: Outfall 8A.stm



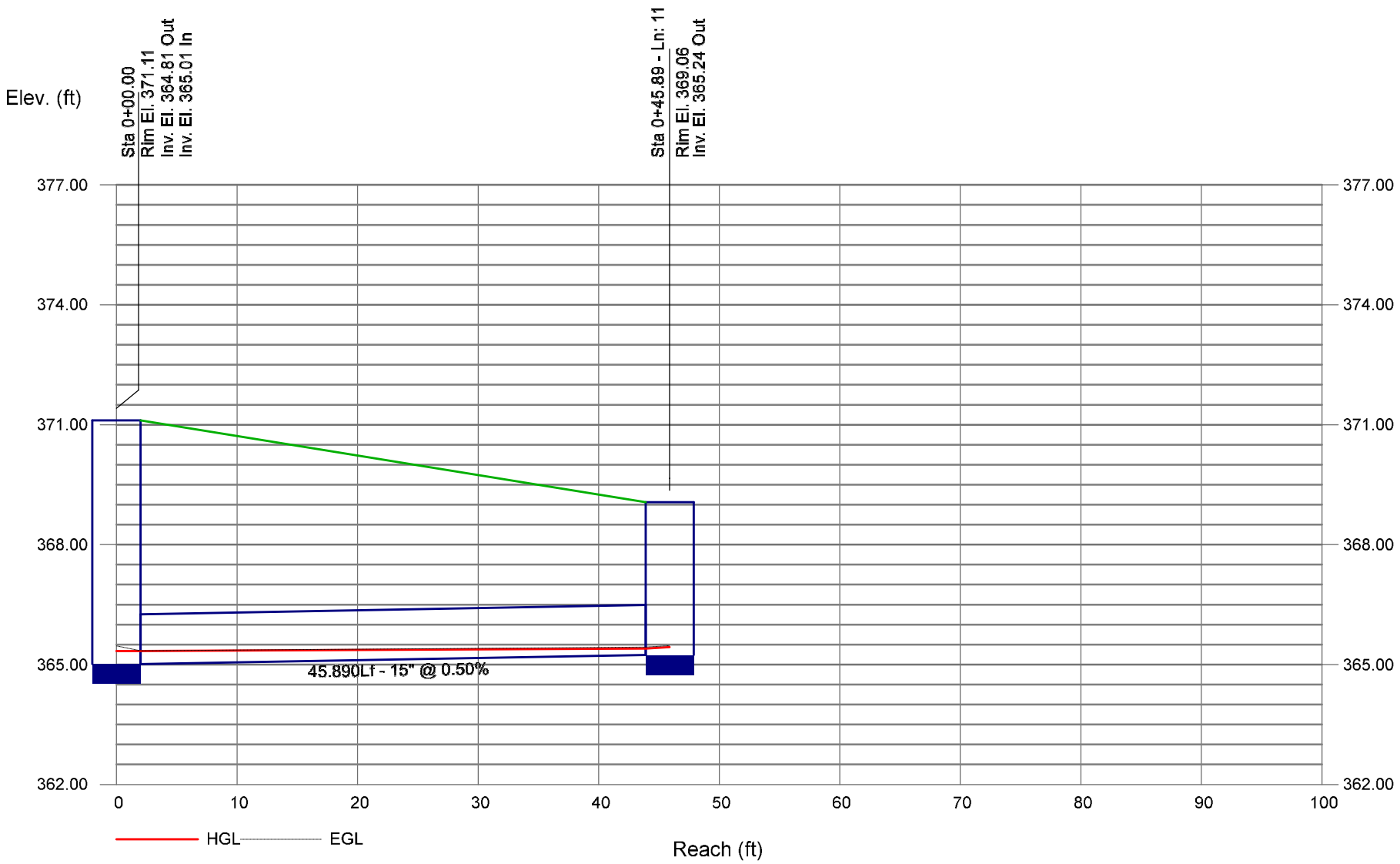
Storm Sewer Profile

SCM #8A 25-Year Profile 7-8 Proj. file: Outfall 8A.stm



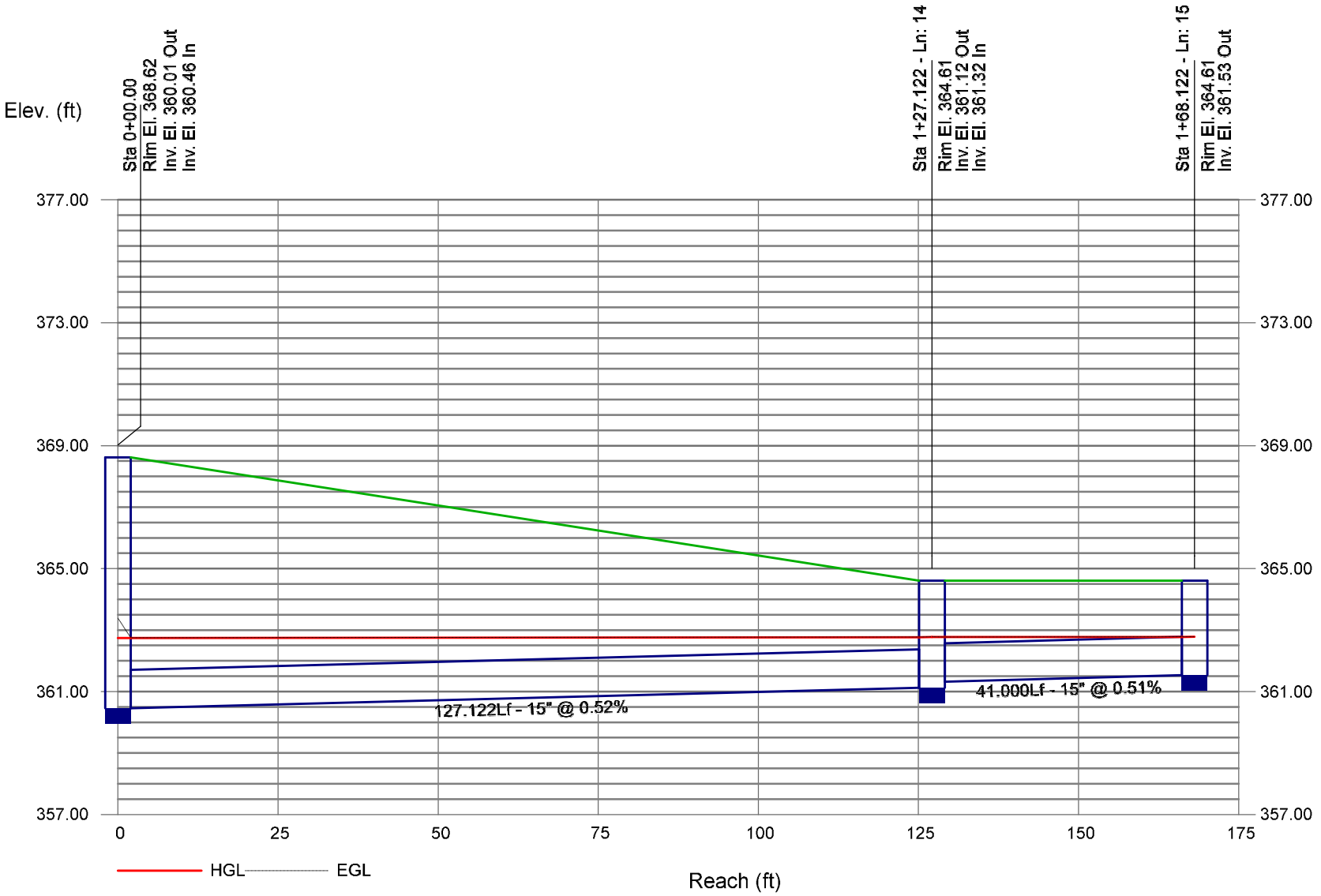
Storm Sewer Profile

SCM #8A 25-Year Profile 11-11 Proj. file: Outfall 8A.stm



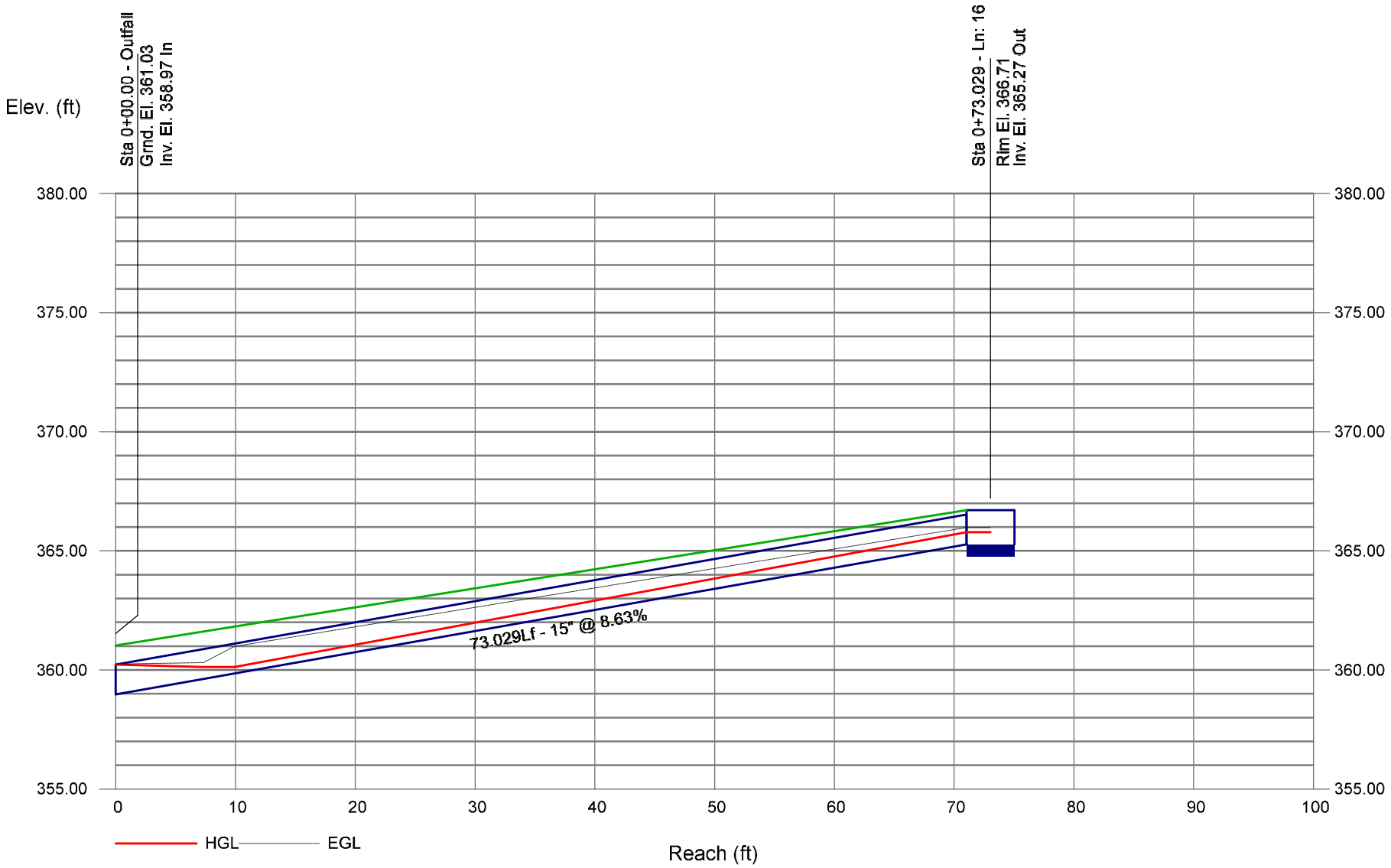
Storm Sewer Profile

SCM #8A 25-Year Profile 14-15 Proj. file: Outfall 8A.stm



Storm Sewer Profile

SCM #8A 25-Year Profile 16-16 Proj. file: Outfall 8A.stm

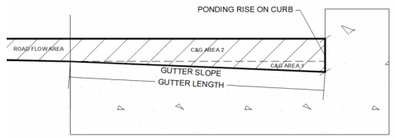


2-year Gutter Spread Calculations

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Falls Bluff (41' B-B)** Date: 2/3/25



Inlet No. **1** Allowable Spread=Pvm't + Gutter Width: 11 ft

Compute "C" Factor: One Half R/W Width: 30 One Half B/B Width: 20.5 S/W Width 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.81 0.03

Standard Curb and Gutter Profile (see diagram above)

Gutter Length (ft) 2

Gutter Slope (ft/ft) 0.04

Ponding Rise on Curb (ft) 0.26

Gutter Width= 2.00 ft.

Total Allow. Spread = 11.00 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.84 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	tual Drainage Ar Area (S.F.)	al Drainage Area (ACRE)	Check	
CB 813	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	48774	9424	0.22	GOOD	
CB 811	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	48774	7507	0.17	GOOD	
CB 804	0.027	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.72**	11.00	56671	389	0.01	GOOD	
CB 801	0.027	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.72**	11.00	56671	4006	0.09	GOOD	
CB 803	0.027	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.72**	11.00	56671	7365	0.17	GOOD	
CB 802	0.027	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.72**	11.00	56671	3808	0.09	GOOD	
CB 491	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	6135	0.14	GOOD	
CB 490	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	1576	0.04	GOOD	
CB 485	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	1390	0.03	GOOD	
CB 484/484A	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	75561	4214	0.10	GOOD	*Dbl CB
CB 483	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	4299	0.10	GOOD	
CB 484B	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	25629	0.59	GOOD	
CB 482	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	8437	0.19	GOOD	
CB 481	0.012	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.15**	11.00	37780	6453	0.15	GOOD	
CB 476	0.039	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**5.67**	11.00	68109	3264	0.07	GOOD	
CB 475	0.057	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**6.88**	11.00	82629	15184	0.35	GOOD	
CB 474	0.057	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**6.88**	11.00	82629	6679	0.15	GOOD	
CB 473	0.057	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**6.88**	11.00	82629	27531	0.63	GOOD	
CB 441	0.050	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**6.42**	11.00	77119	4327	0.10	GOOD	
CB 440	0.019	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.96**	11.00	47539	16357	0.38	GOOD	
CB 439/A/B	0.005	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**2.03**	11.00	73161	9876	0.23	GOOD	*Trpl CB
CB 424	0.005	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**2.03**	11.00	24387	9486	0.22	GOOD	
CB 425	0.015	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**3.52**	11.00	42240	6969	0.16	GOOD	
CB 426	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	48774	5474	0.13	GOOD	
CB 413	0.054	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**6.68**	11.00	80144	11522	0.26	GOOD	
CB 414	0.054	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**6.68**	11.00	80144	15923	0.37	GOOD	
CB 335	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	48774	1386	0.03	GOOD	
CB 334	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	48774	5489	0.13	GOOD	
CB 331	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	48774	1761	0.04	GOOD	
CB 332/332A	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	97548	8469	0.19	GOOD	*Dbl CB
CB 333/333A	0.020	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.06**	11.00	97548	12704	0.29	GOOD	*Dbl CB

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

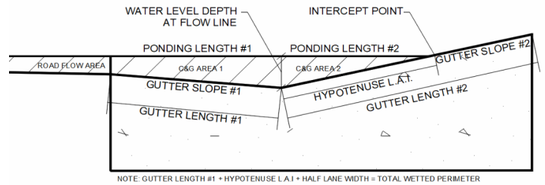
A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Staffordshire (27' B-B)** Date: 2/3/25



Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width 25 One Half B/B Width: 13.5 S/W Width: 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check
CB 808	0.012	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.02**	7.50	13545	8472	0.19	GOOD
CB 807	0.012	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.02**	7.50	13545	11649	0.27	GOOD
CB 806	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.14**	7.50	15144	1806	0.04	GOOD
CB 805	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.14**	7.50	15144	2380	0.05	GOOD
CB 810	0.042	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.90**	7.50	25250	5050	0.12	GOOD
CB 809	0.042	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.90**	7.50	25250	16991	0.39	GOOD
CB 814	0.042	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.90**	7.50	25250	6340	0.15	GOOD
CB 815	0.042	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.90**	7.50	25250	16322	0.37	GOOD
CB 366	0.066	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.38**	7.50	31669	17525	0.40	GOOD
CB 363	0.060	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.27**	7.50	30288	21693	0.50	GOOD
CB 362	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	3532	0.08	GOOD
CB 361	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	13738	0.32	GOOD
CB 359	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	6273	0.14	GOOD
CB 355	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	7997	0.18	GOOD
CB 356	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	14101	0.32	GOOD

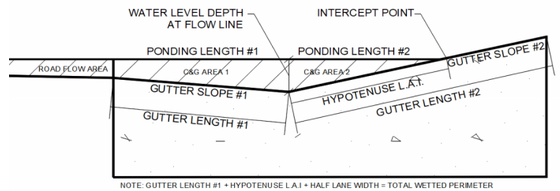
E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.



Project: **Kalas Falls Phase 3** Road: **Elam (27' B-B)** Date: 2/3/25

Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width: 25 One Half B/B Width: 13.5 S/W Width: 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check
CB 486	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.07**	7.50	27510	10089	0.23	GOOD
CB 487	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.07**	7.50	27510	13393	0.31	GOOD
CB 488	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.07**	7.50	27510	14967	0.34	GOOD
CB 489	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.07**	7.50	27510	14599	0.34	GOOD
CB 372	0.046	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.99**	7.50	26520	15214	0.35	GOOD
CB 371	0.046	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.99**	7.50	26520	15403	0.35	GOOD

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

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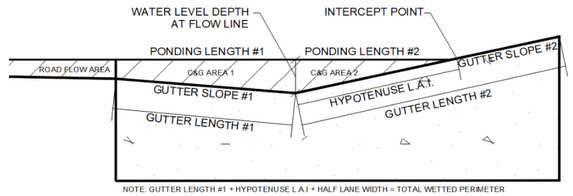
Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.



Project: **Kalas Falls Phase 3** Road: **Harvest Hill (27' B-B)** Date: 2/3/25

Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width 25 One Half B/B Width: 13.5 S/W Width: 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
ater Level Depth at Flow Line	0.19
potenuse Length at Intercept	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check	
CB 477/477A	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.08**	7.50	55297	31844	0.73	GOOD	*Dbl CB
CB 478/478A	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.08**	7.50	55297	14711	0.34	GOOD	*Dbl CB
CB 479	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	12446	0.29	GOOD	
CB 480	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	15552	0.36	GOOD	
CB 346	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	782	0.02	GOOD	
CB 344A	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	8752	0.20	GOOD	
CB 344B	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	4151	0.10	GOOD	
CB 344C	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	9276	0.21	GOOD	
CB 345	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	7152	0.16	GOOD	

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

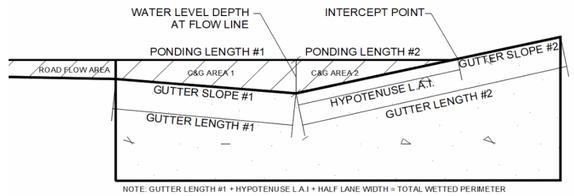
A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Donnington Hill (27' B-B)** Date: 2/3/25



Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width 25 One Half B/B Width: 13.5 S/W Width: 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area (S.F.)	Actual Drainage Area (ACRE)	Check	
CB 442	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.08**	7.50	27649	6894	0.16	GOOD	
CB 443/443A	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.08**	7.50	55297	23263	0.53	GOOD	*Dbl CB
CB 436	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.15**	7.50	15294	5055	0.12	GOOD	
CB 435	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.15**	7.50	15294	5701	0.13	GOOD	
CB 434	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.15**	7.50	15294	3493	0.08	GOOD	
CB 433	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.15**	7.50	15294	2674	0.06	GOOD	
CB 432	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.15**	7.50	15294	8075	0.19	GOOD	

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Donnington Hill (41' B-B)** Date: 2/3/25

C

Inlet No. **1** Allowable Spread=Pvm't + Gutter Width: 11 ft

Compute "C" Factor: One Half R/W Width 30 One Half B/B Width 20.5 S/W Width 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.81 0.03

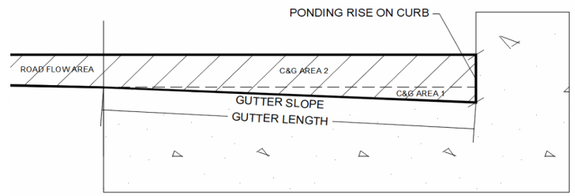
Gutter Width= 2.00 ft.

Total Allow. Spread = 11.00 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.84 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input



Standard Curb and Gutter Profile (see diagram above)

Gutter Length (ft)	2
Gutter Slope (ft/ft)	0.04
Ponding Rise on Curb (ft)	0.26

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check	
CB 472	0.030	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**4.98**	11.00	59736	6119	0.14	GOOD	
CB 470/470A	0.010	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**2.87**	11.00	68977	10000	0.23	GOOD	*Dbl CB
CB 471/471A	0.010	0.020	0.18	0.18	0.08	0.36	2.26	0.81	9.00	1.25	11.26	**2.87**	11.00	68977	17748	0.41	GOOD	*Dbl CB

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

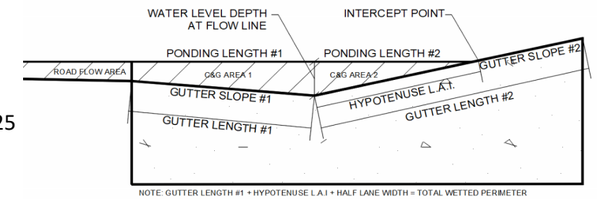
A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Pleasant Run (27' B-B)** Date: 2/3/25



Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Widt 25 One Half B/B Width: 13.5 S/W Width 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

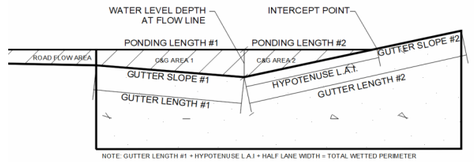
C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area (S.F.)	Actual Drainage Area (ACRE)	Check	
CB 431	0.027	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.53**	7.50	20430	5585	0.13	GOOD	
CB 438	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	10811	0.25	GOOD	
CB 430	0.027	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.53**	7.50	20430	3725	0.09	GOOD	
CB 429	0.027	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.53**	7.50	20430	5588	0.13	GOOD	
CB 428	0.027	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.53**	7.50	20430	5307	0.12	GOOD	
CB 427	0.027	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.53**	7.50	20430	14542	0.33	GOOD	
CB 412	0.044	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.95**	7.50	25937	1056	0.02	GOOD	
CB 411A	0.044	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.95**	7.50	25937	5160	0.12	GOOD	
CB 411	0.044	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.95**	7.50	25937	5494	0.13	GOOD	
CB 410B	0.044	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.95**	7.50	25937	13843	0.32	GOOD	
CB 410A	0.044	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.95**	7.50	25937	5763	0.13	GOOD	
CB 410	0.044	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.95**	7.50	25937	8062	0.19	GOOD	
CB 409B	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	13726	0.32	GOOD	
CB 409A	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	14937	0.34	GOOD	
CB 408	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	14387	0.33	GOOD	
CB 408A	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	11027	0.25	GOOD	
CB 404	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	15116	0.35	GOOD	
CB 407	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	8825	0.20	GOOD	
CB 406	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	3288	0.08	GOOD	
CB 405	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	1981	0.05	GOOD	
CB 405/405A	0.047	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.01**	7.50	26806	11094	0.25	GOOD	*Dbl CB

E. O. P. - Edge of Pavement A - Area (s. f.) Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Diomere Lane (27' B-B)** Date: 2/3/25



Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width 25 One Half B/B Width: 13.5 S/W Widt 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
ater Level Depth at Flow Line (	0.19
potenuse Length at Intercept	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check
CB 423	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	16287	0.37	GOOD
CB 423A	0.020	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.31**	7.50	17487	2160	0.05	GOOD
CB 422	0.050	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.08**	7.50	27649	1637	0.04	GOOD
CB 420	0.075	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.54**	7.50	33863	14168	0.33	GOOD
CB 421	0.075	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**2.54**	7.50	33863	16984	0.39	GOOD

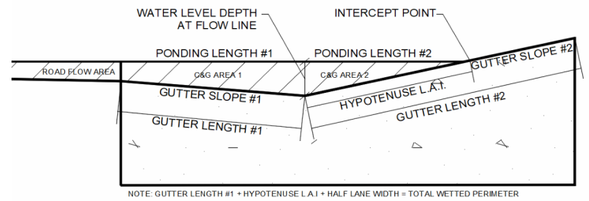
E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.



Project: **Kalas Falls Phase 3** Road: **Brookbank (27' B-B)** Date: 2/3/25

Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width 25 One Half B/B Width: 13.5 S/W Width 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check	
CB 348	0.045	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.97**	7.50	26230	10675	0.25	GOOD	
CB 347	0.045	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.97**	7.50	26230	10817	0.25	GOOD	
CB 373	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	5222	0.12	GOOD	
CB 370A	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	3926	0.09	GOOD	
CB 370B	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	14276	0.33	GOOD	
CB 369/369A	0.010	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**0.91**	7.50	24230	13859	0.32	GOOD	*Dbl CB
CB 365B	0.010	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**0.91**	7.50	24230	10428	0.24	GOOD	*Dbl CB
CB 364	0.019	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.29**	7.50	34427	27914	0.64	GOOD	*Dbl CB

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

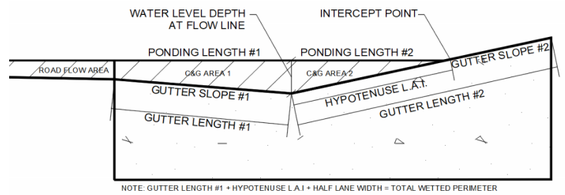
A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Woodlyn (27' B-B)** Date: 2/3/25



Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width: 25 One Half B/B Width: 13.5 S/W Width 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check	
CB 336/336A	0.046	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.99**	7.50	53039	46841	1.08	GOOD	
CB 337/337A	0.046	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.99**	7.50	53039	34680	0.80	GOOD	
CB 343	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.14**	7.50	15144	771	0.02	GOOD	
CB 342	0.019	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.28**	7.50	17044	3614	0.08	GOOD	
CB 341	0.026	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.50**	7.50	19938	15681	0.36	GOOD	
CB 340	0.030	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.61**	7.50	21417	13000	0.30	GOOD	
CB 338E	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	19551	8171	0.19	GOOD	
CB 339A	0.025	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.47**	7.50	39101	32243	0.74	GOOD	*Dbl CB
CB 393/393A	0.010	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**0.93**	7.50	24730	7621	0.17	GOOD	*Dbl CB
CB 394/394A	0.010	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**0.93**	7.50	24730	7398	0.17	GOOD	*Dbl CB

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

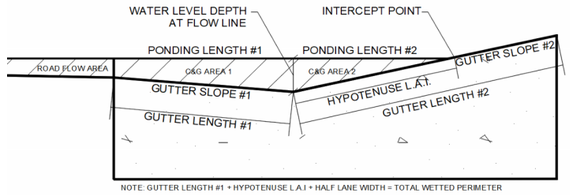
A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

Gutter Spread by Limited Area

Determine maximum area to on-grade inlet using input factors as shown below.

Project: **Kalas Falls Phase 3** Road: **Graymont (27' B-B)** Date: 2/3/25



Inlet No. **2** Allowable Spread=Pvm't + Gutter Width: 6.5 ft

Compute "C" Factor: One Half R/W Width: 25 One Half B/B Width 13.5 S/W Widt 5

Paved Area "C": 0.95 Grass Area "C": 0.2

0.70 0.05

Gutter Width= 1.00 ft.

Total Allow. Spread = 6.50 ft. Manning's n = 0.015 Weir C = 3.33

Inlet Type 1 Inlet Types 1 NCDOT Std. 840.03

Composite Rational C = 0.76 I (2yr.) = 4.00 iph

Roadway X-slope = 0.02 Varies Manual Input

Valley Curb and Gutter Profile (see diagram above)

Gutter Length #1 (ft)	1
Gutter Length #2 (ft)	1.5
Gutter Slope #1 (ft/ft)	0.083
Gutter Slope #2 (ft/ft)	0.222
Ponding Length #1 (ft)	1.00
Ponding Length #2 (ft)	0.87
Water Level Depth at Flow Line (ft)	0.19
Hypotenuse Length at Intercept (ft)	0.89

Max Flow for Limited Spread

C.B. NUMBER	Long. Slope	ROAD X-SLOPE	E. O. P. Depth	Weir Depth	C&G Flow Area 1	C&G Flow Area 2	C&G WP	Road Flow Area	Road WP	Total Flow A	Total WP	MAX Q FOR SPREAD, CFS	On-Grade Spread	Max Drainage Area (S.F.)	Actual Drainage Area Area (S.F.)	Actual Drainage Area Area (ACRE)	Check	
CB 338B/C	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	30186	10790	0.25	GOOD	*Dbl CB
CB 338A	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	10714	0.25	GOOD	
CB 350	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	5687	0.13	GOOD	
CB 352	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	5280	0.12	GOOD	
CB 353	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	7920	0.18	GOOD	
CB 354	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	2696	0.06	GOOD	
CB 357	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	6849	0.16	GOOD	
CB 358	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	3491	0.08	GOOD	
CB 374	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	1438	0.03	GOOD	
CB 375A	0.015	0.020	0.11	0.11	0.15	0.08	1.89	0.30	5.50	0.54	7.39	**1.13**	7.50	15093	5000	0.11	GOOD	

E. O. P. - Edge of Pavement
C&G - Curb and gutter
WP - Wetted Perimeter (ft.)

A - Area (s. f.)
V - Velocity (fps)

Note: Program uses Manning's formula for open channel flow.

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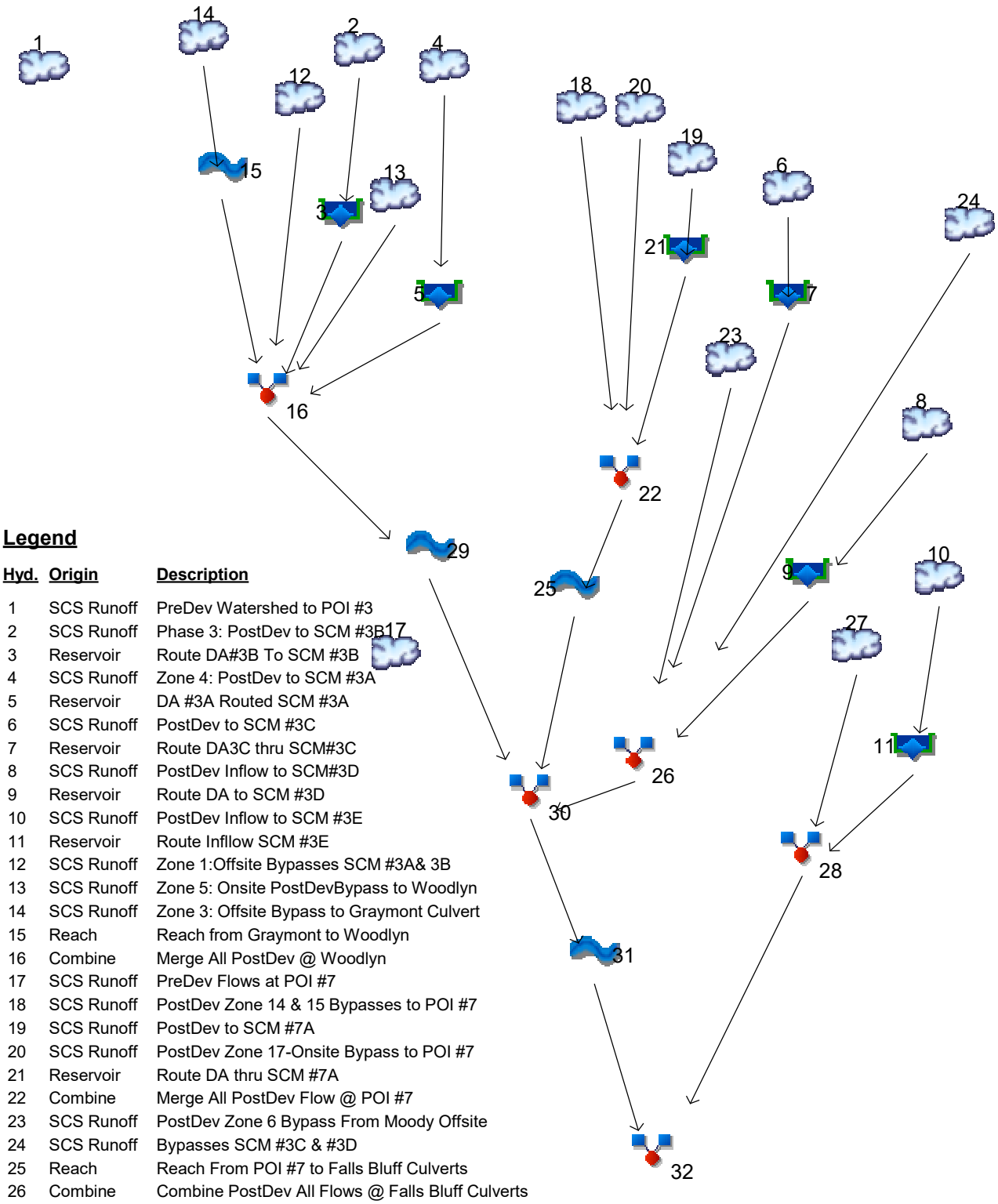
Hydrographs Calculations POI #3

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PreDev Watershed to POI #3
2	SCS Runoff	Phase 3: PostDev to SCM #3B
3	Reservoir	Route DA#3B To SCM #3B
4	SCS Runoff	Zone 4: PostDev to SCM #3A
5	Reservoir	DA #3A Routed SCM #3A
6	SCS Runoff	PostDev to SCM #3C
7	Reservoir	Route DA3C thru SCM#3C
8	SCS Runoff	PostDev Inflow to SCM#3D
9	Reservoir	Route DA to SCM #3D
10	SCS Runoff	PostDev Inflow to SCM #3E
11	Reservoir	Route Infllow SCM #3E
12	SCS Runoff	Zone 1:Offsite Bypasses SCM #3A& 3B
13	SCS Runoff	Zone 5: Onsite PostDevBypass to Woodlyn
14	SCS Runoff	Zone 3: Offsite Bypass to Graymont Culvert
15	Reach	Reach from Graymont to Woodlyn
16	Combine	Merge All PostDev @ Woodlyn
17	SCS Runoff	PreDev Flows at POI #7
18	SCS Runoff	PostDev Zone 14 & 15 Bypasses to POI #7
19	SCS Runoff	PostDev to SCM #7A
20	SCS Runoff	PostDev Zone 17-Onsite Bypass to POI #7
21	Reservoir	Route DA thru SCM #7A
22	Combine	Merge All PostDev Flow @ POI #7
23	SCS Runoff	PostDev Zone 6 Bypass From Moody Offsite
24	SCS Runoff	Bypasses SCM #3C & #3D
25	Reach	Reach From POI #7 to Falls Bluff Culverts
26	Combine	Combine PostDev All Flows @ Falls Bluff Culverts
27	SCS Runoff	PostDev Zone 12 & 13: ByPasses SCM #3E
28	Combine	Combine All PostDev Flow to POI #3
29	Reach	Reach from Woodlyn-Falls Bluff
30	Combine	Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts
31	Reach	Reach Downstream Falls Bluff to POI#3
32	Combine	Combine All PostDev Flows at POI #3

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

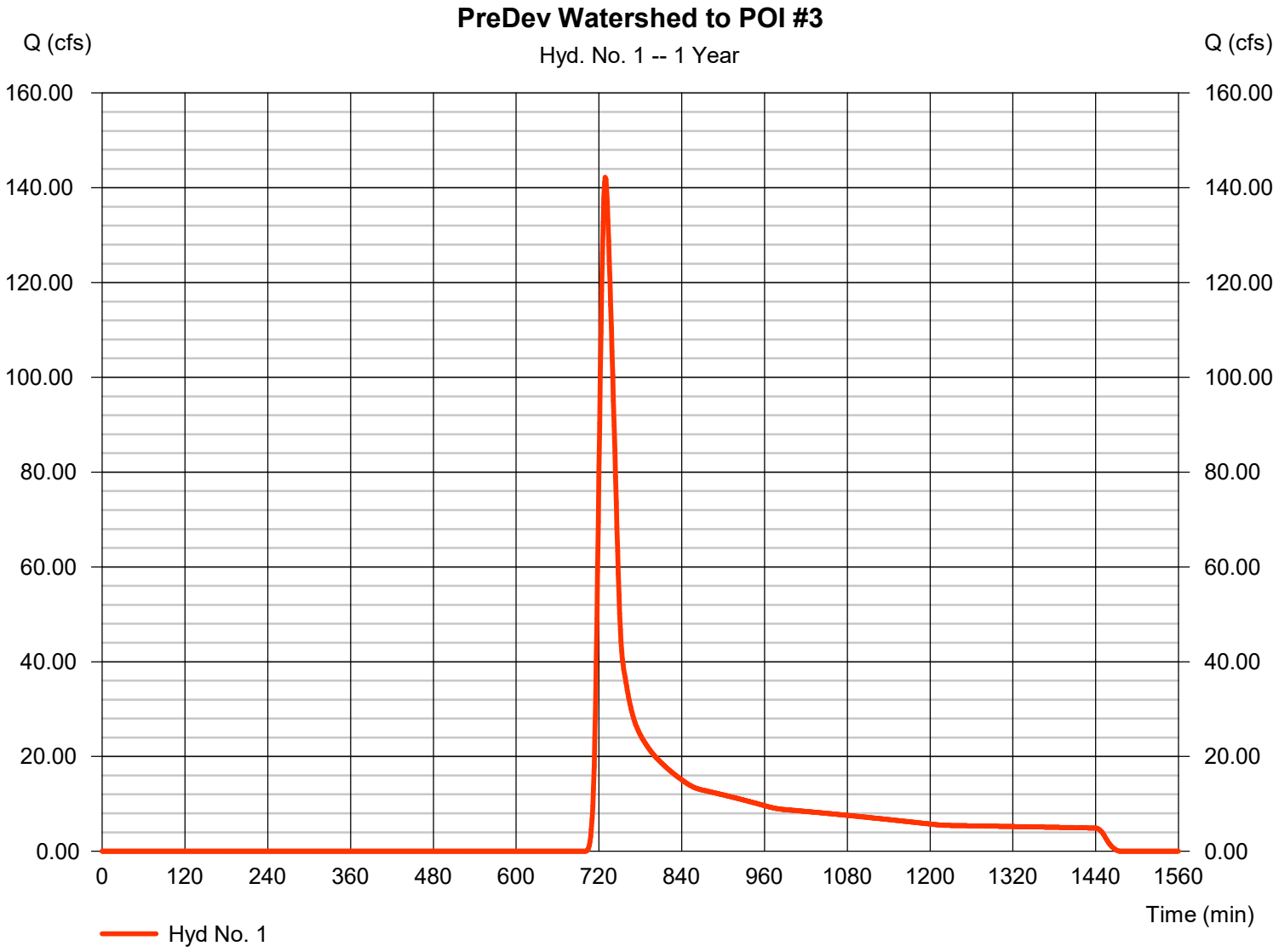
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	142.19	1	729	615,622	------	------	------	PreDev Watershed to POI #3
2	SCS Runoff	62.23	1	722	167,456	------	------	------	Phase 3: PostDev to SCM #3B
3	Reservoir	20.83	1	734	145,715	2	353.09	166,097	Route DA#3B To SCM #3B
4	SCS Runoff	39.81	1	722	108,305	------	------	------	Zone 4: PostDev to SCM #3A
5	Reservoir	0.675	1	1348	43,552	4	353.52	220,735	DA #3A Routed SCM #3A
6	SCS Runoff	12.63	1	722	32,530	------	------	------	PostDev to SCM #3C
7	Reservoir	0.192	1	1191	13,730	6	341.67	45,132	Route DA3C thru SCM#3C
8	SCS Runoff	11.10	1	718	22,373	------	------	------	PostDev Inflow to SCM#3D
9	Reservoir	0.075	1	1444	9,021	8	346.17	42,496	Route DA to SCM #3D
10	SCS Runoff	13.38	1	718	26,943	------	------	------	PostDev Inflow to SCM #3E
11	Reservoir	0.131	1	1442	15,265	10	308.14	49,857	Route Infllow SCM #3E
12	SCS Runoff	4.742	1	722	14,739	------	------	------	Zone 1:Offsite Bypasses SCM #3A&
13	SCS Runoff	15.39	1	722	41,349	------	------	------	Zone 5: Onsite PostDevBypass to Wo
14	SCS Runoff	30.51	1	724	104,925	------	------	------	Zone 3: Offsite Bypass to Graymont
15	Reach	25.59	1	729	104,922	14	------	------	Reach from Graymont to Woodlyn
16	Combine	41.12	1	726	328,464	3, 5, 12, 13, 15	------	------	Merge All PostDev @ Woodlyn
17	SCS Runoff	66.89	1	725	208,951	------	------	------	PreDev Flows at POI #7
18	SCS Runoff	25.49	1	725	85,207	------	------	------	PostDev Zone 14 & 15 Bypasses to P
19	SCS Runoff	16.09	1	721	40,948	------	------	------	PostDev to SCM #7A
20	SCS Runoff	16.92	1	719	35,874	------	------	------	PostDev Zone 17-Onsite Bypass to P
21	Reservoir	0.369	1	1075	37,084	19	373.06	46,859	Route DA thru SCM #7A
22	Combine	36.91	1	721	158,166	18, 20, 21	------	------	Merge All PostDev Flow @ POI #7
23	SCS Runoff	29.14	1	726	114,546	------	------	------	PostDev Zone 6 Bypass From Moody
24	SCS Runoff	17.17	1	718	34,905	------	------	------	Bypasses SCM #3C & #3D
25	Reach	28.97	1	728	158,104	22	------	------	Reach From POI #7 to Falls Bluff Cul
26	Combine	35.86	1	722	168,230	7, 9, 23, 24,	------	------	Combine PostDev All Flows @ Falls
27	SCS Runoff	24.88	1	718	50,117	------	------	------	PostDev Zone 12 & 13: ByPasses SC
28	Combine	24.95	1	718	65,296	11, 27	------	------	Combine All PostDev Flow to POI #3
29	Reach	23.76	1	742	349,927	16	------	------	Reach from Woodlyn-Falls Bluff
30	Combine	80.65	1	728	676,261	25, 26, 29	------	------	Combine Upper DA 3 & DA 7 @ Falls
31	Reach	77.69	1	731	666,251	30	------	------	Reach Downstream Falls Bluff to POI
32	Combine	81.55	1	731	731,547	28, 31	------	------	Combine All PostDev Flows at POI #3

Hydrograph Report

Hyd. No. 1

PreDev Watershed to POI #3

Hydrograph type	= SCS Runoff	Peak discharge	= 142.19 cfs
Storm frequency	= 1 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 615,622 cuft
Drainage area	= 300.880 ac	Curve number	= 66.6
Basin Slope	= 3.0 %	Hydraulic length	= 5451 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 22.67 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

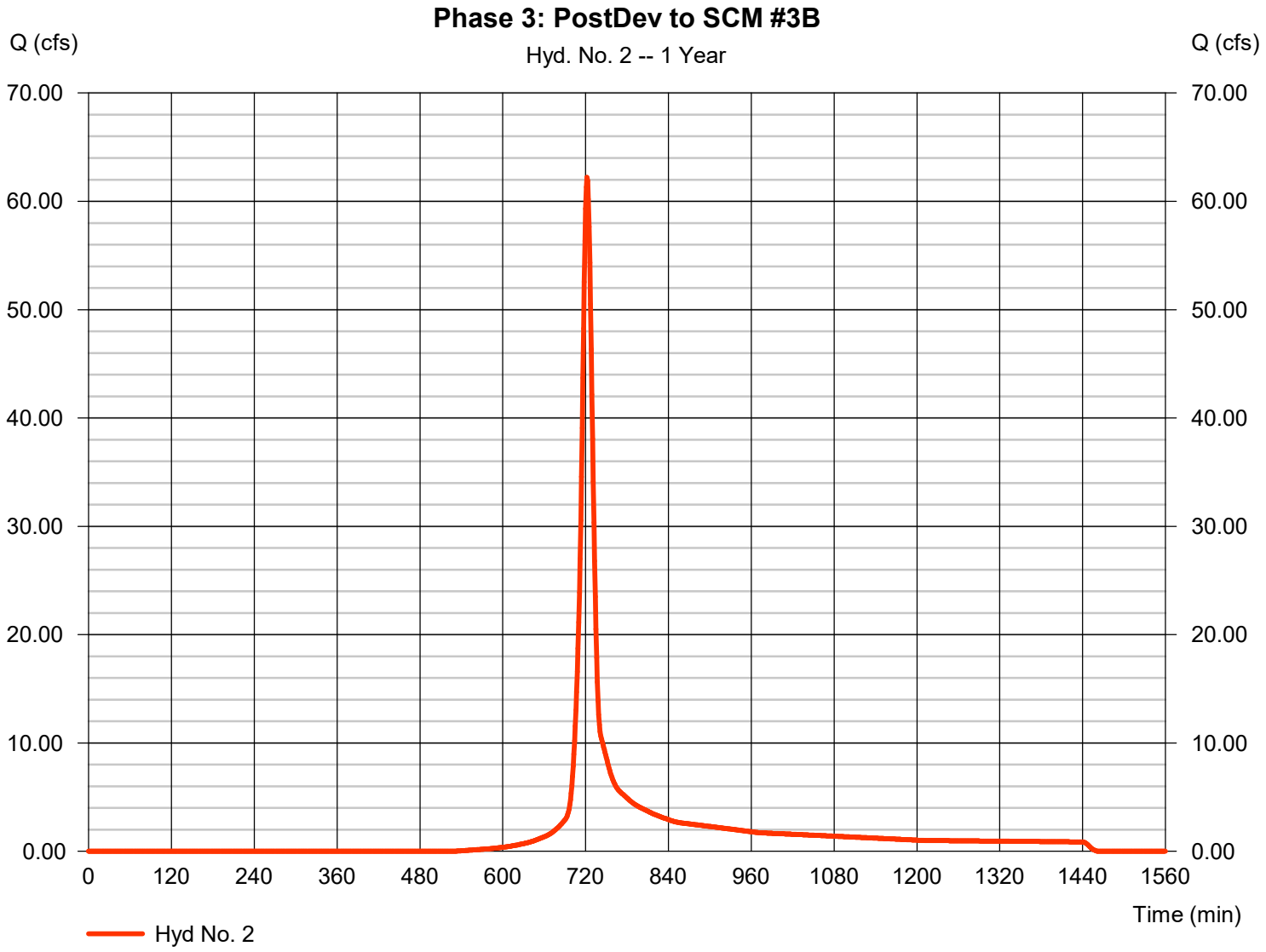


Hydrograph Report

Hyd. No. 2

Phase 3: PostDev to SCM #3B

Hydrograph type	= SCS Runoff	Peak discharge	= 62.23 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 167,456 cuft
Drainage area	= 31.890 ac	Curve number	= 83
Basin Slope	= 1.9 %	Hydraulic length	= 2520 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.80 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



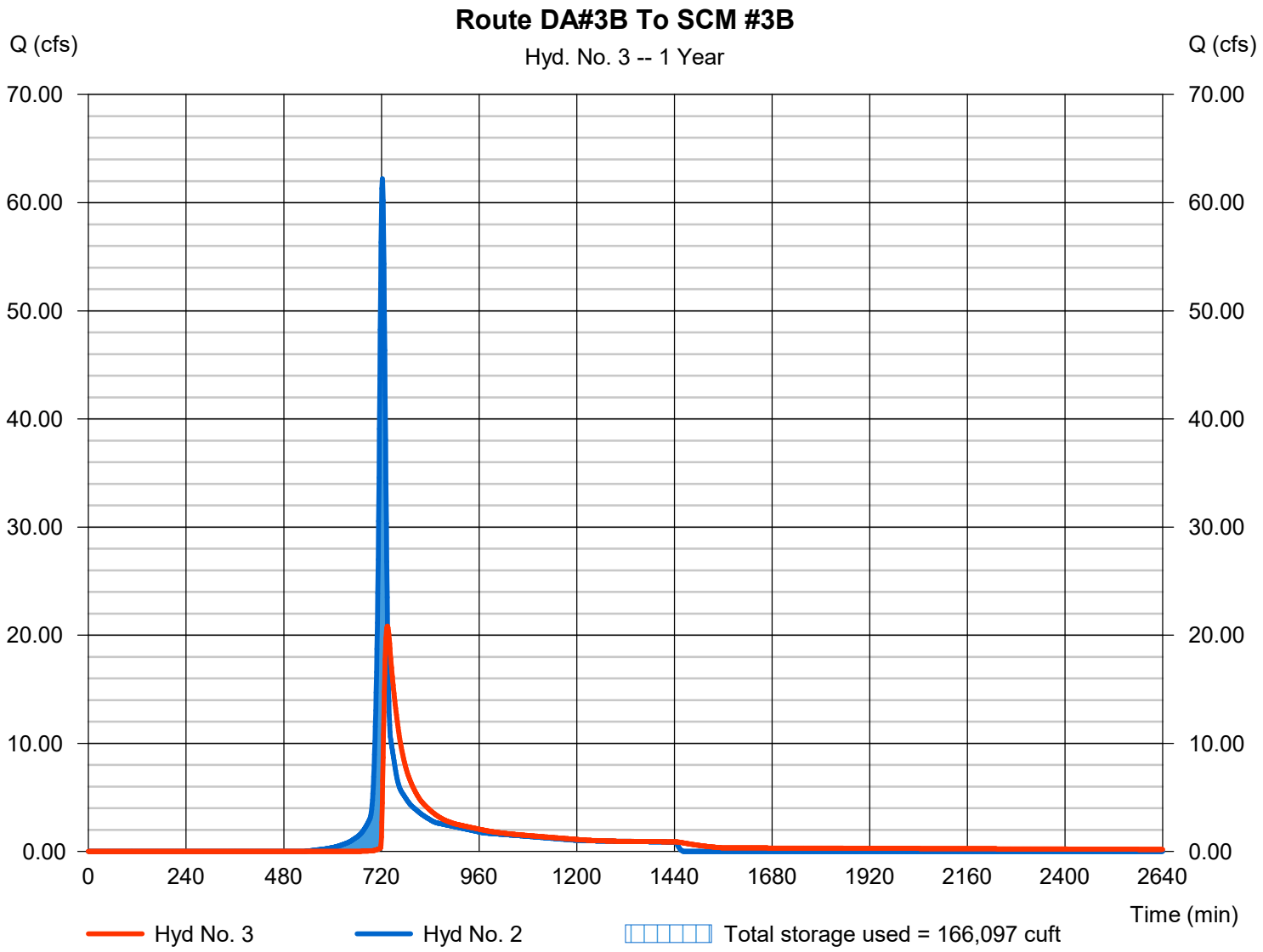
Hydrograph Report

Hyd. No. 3

Route DA#3B To SCM #3B

Hydrograph type	=	Reservoir	Peak discharge	=	20.83 cfs
Storm frequency	=	1 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	145,715 cuft
Inflow hyd. No.	=	2 - Phase 3: PostDev to SCM #3B	Max. Elevation	=	353.09 ft
Reservoir name	=	SCM 3B-rev102924	Max. Storage	=	166,097 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.



Pond Report

Pond No. 8 - SCM 3B-rev102924

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 348.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	348.00	25,976	0	0
1.00	349.00	28,087	27,032	27,032
2.00	350.00	30,261	29,174	56,206
3.00	351.00	32,497	31,379	87,585
3.50	351.50	35,607	17,026	104,611
4.00	352.00	38,045	18,413	123,024
5.00	353.00	40,542	39,294	162,317
6.00	354.00	43,100	41,821	204,138
7.00	355.00	45,719	44,410	248,548
8.00	356.00	48,543	47,131	295,679

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 48.00	4.00	12.00	0.00
Span (in)	= 48.00	4.00	36.00	0.00
No. Barrels	= 1	1	3	0
Invert El. (ft)	= 348.20	351.50	352.33	0.00
Length (ft)	= 36.00	0.50	0.50	0.00
Slope (%)	= 0.50	0.50	0.01	n/a
N-Value	= .013	.013	3.330	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

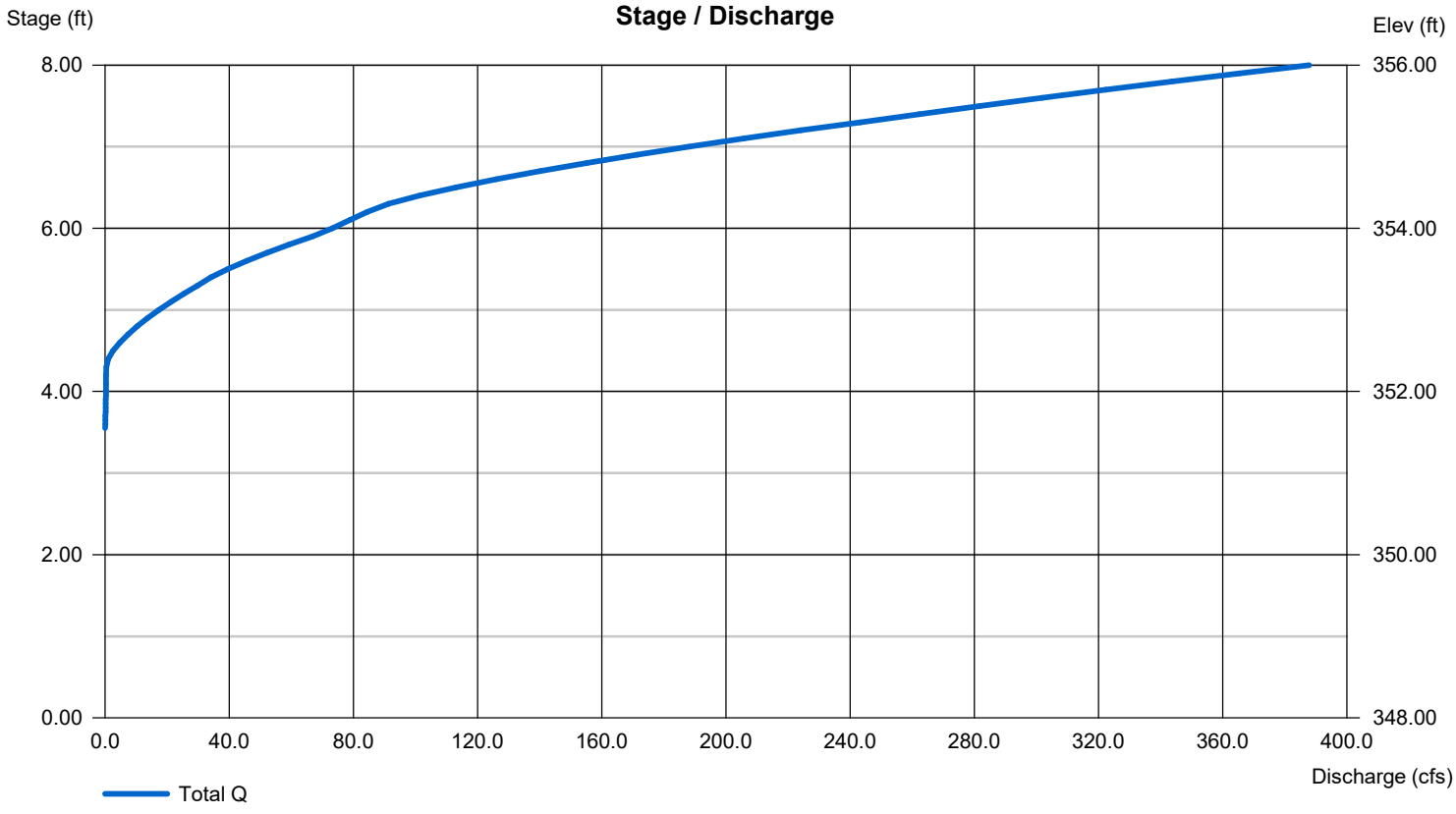
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	32.00	0.00	0.00
Crest El. (ft)	= 353.33	354.25	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

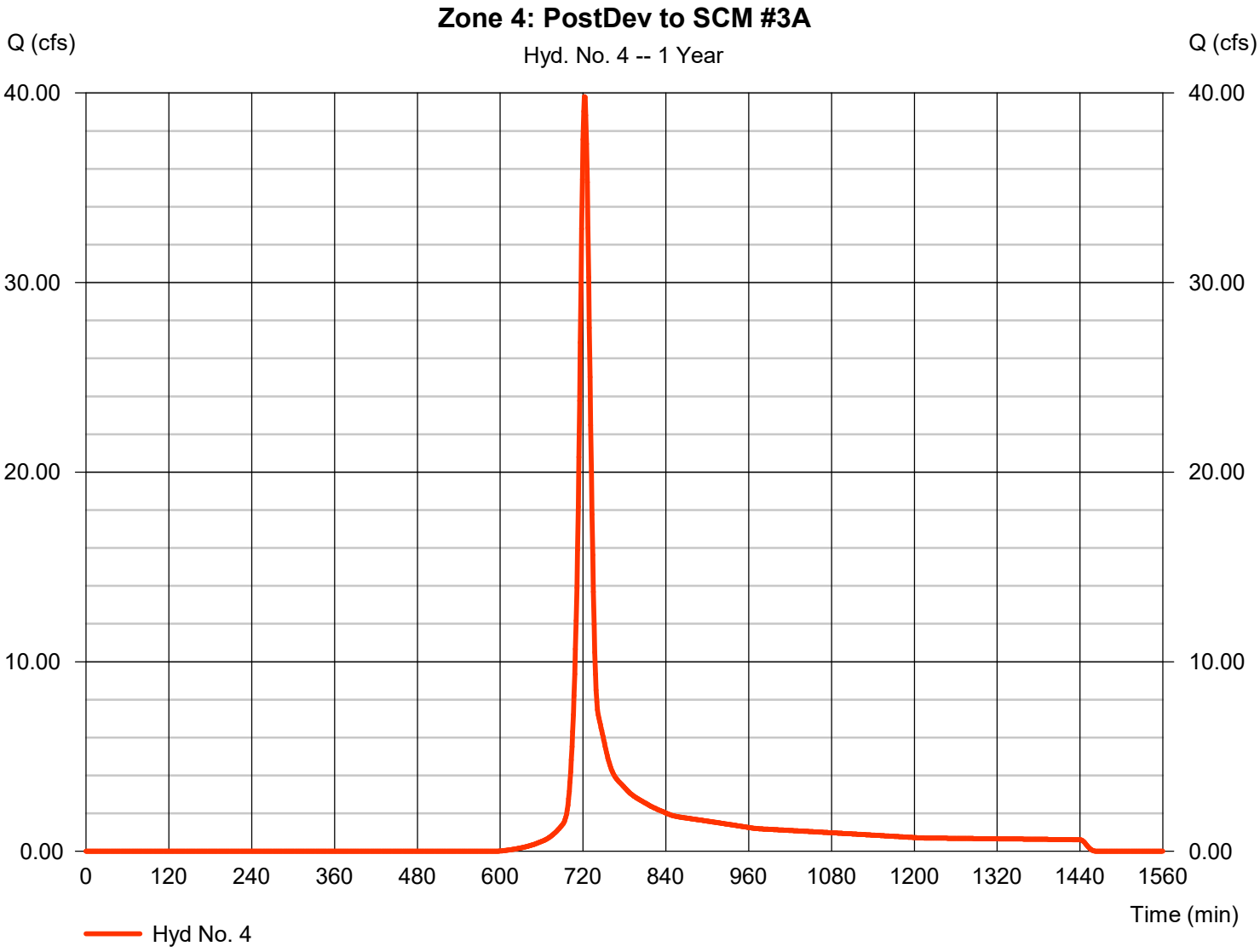


Hydrograph Report

Hyd. No. 4

Zone 4: PostDev to SCM #3A

Hydrograph type	= SCS Runoff	Peak discharge	= 39.81 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 108,305 cuft
Drainage area	= 24.600 ac	Curve number	= 79.4
Basin Slope	= 1.5 %	Hydraulic length	= 2250 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.94 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



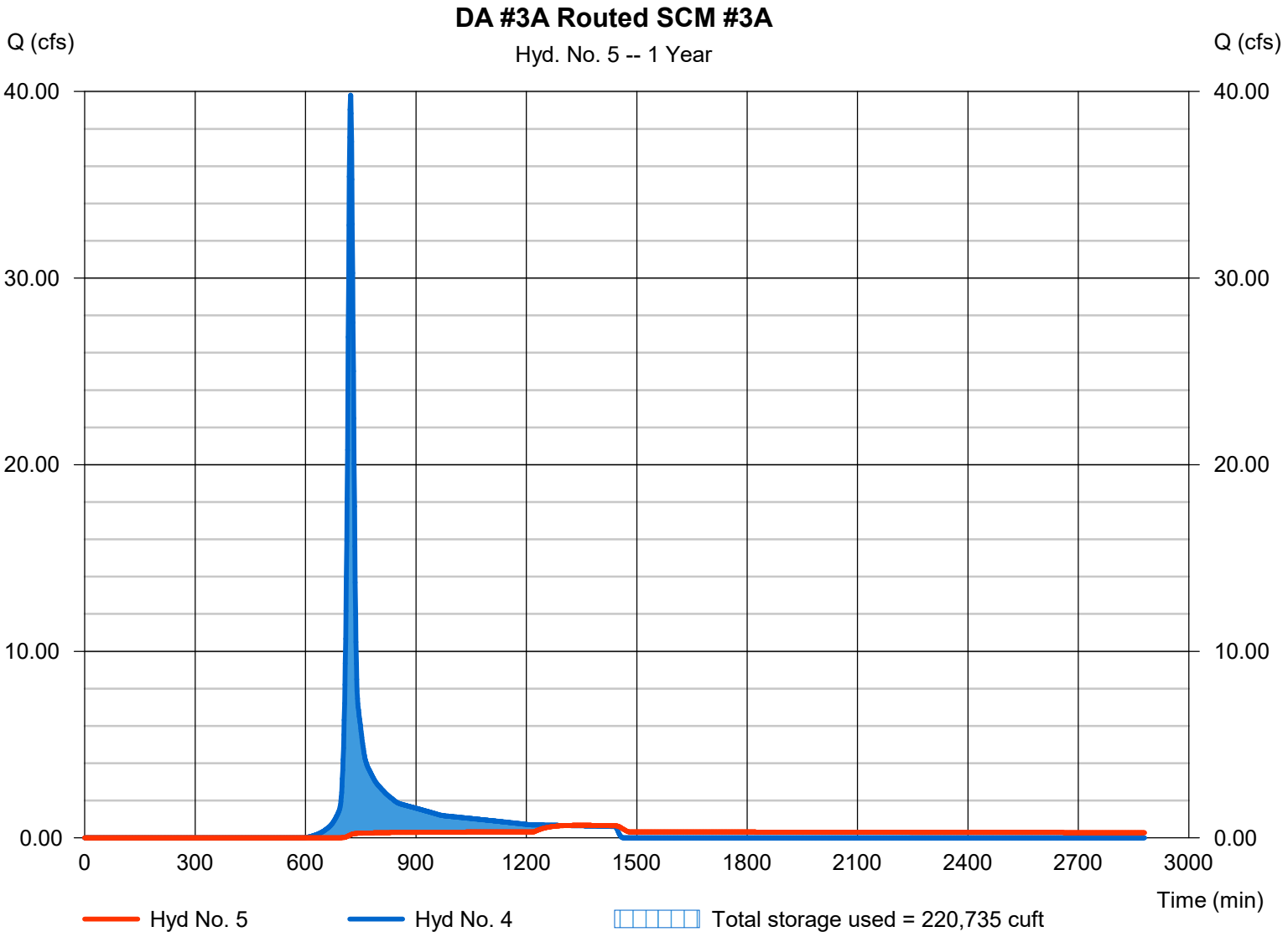
Hydrograph Report

Hyd. No. 5

DA #3A Routed SCM #3A

Hydrograph type	=	Reservoir	Peak discharge	=	0.675 cfs
Storm frequency	=	1 yrs	Time to peak	=	1348 min
Time interval	=	1 min	Hyd. volume	=	43,552 cuft
Inflow hyd. No.	=	4 - Zone 4: PostDev to SCM #3A	Max. Elevation	=	353.52 ft
Reservoir name	=	SCM #3A	Max. Storage	=	220,735 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.



Pond No. 3 - SCM #3A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 348.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	348.00	32,500	0	0
1.00	349.00	34,655	33,568	33,568
2.00	350.00	36,870	35,753	69,322
3.00	351.00	39,145	37,998	107,320
3.50	351.50	42,308	20,356	127,676
4.00	352.00	44,830	21,779	149,455
5.00	353.00	47,410	46,109	195,564
6.00	354.00	50,057	48,723	244,287
7.00	355.00	52,770	51,402	295,689
8.00	356.00	55,540	54,144	349,833

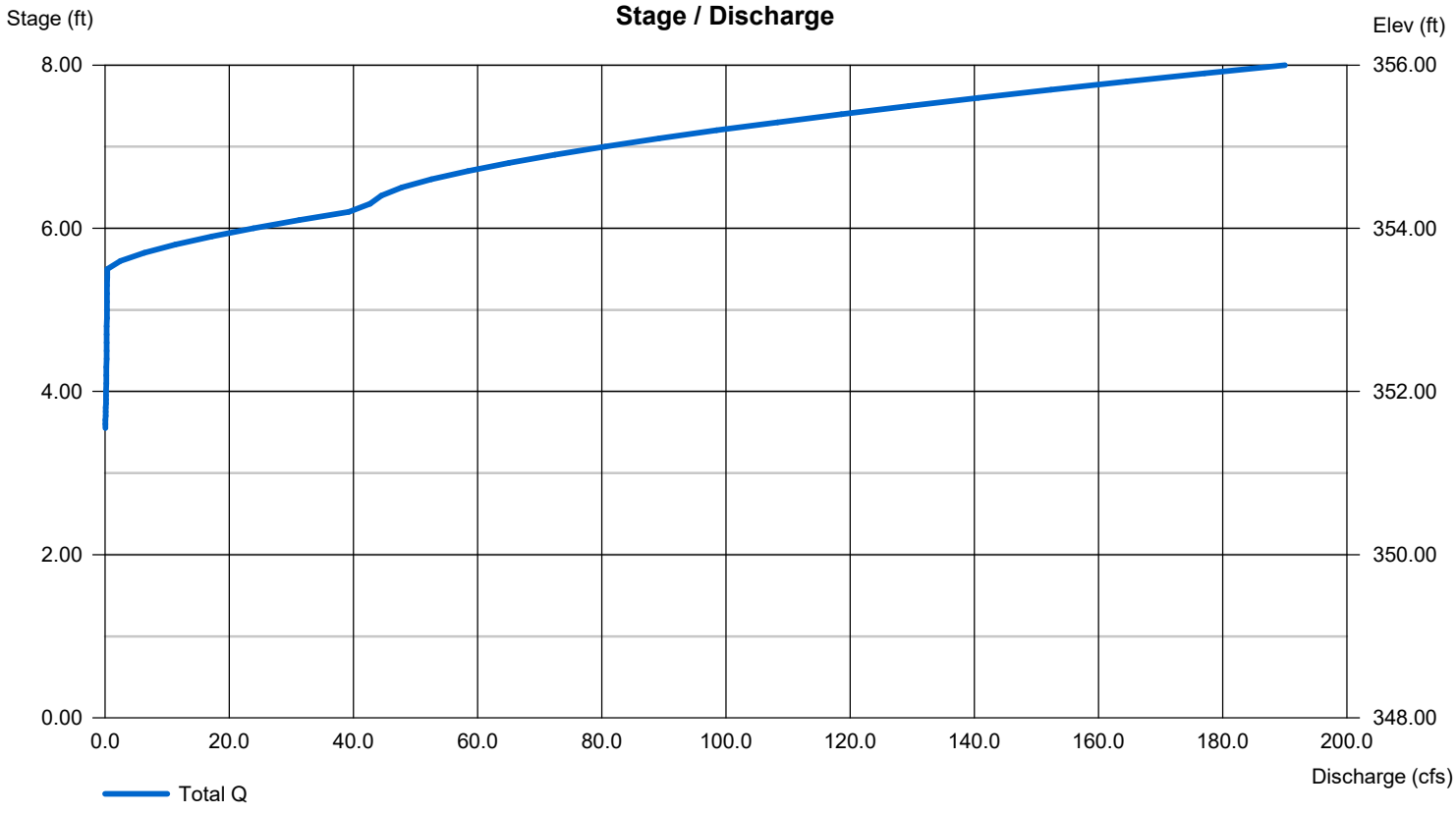
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	3.00	0.00	0.00
Span (in)	= 30.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 349.25	351.50	0.00	0.00
Length (ft)	= 54.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.75	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	20.00	0.00	0.00
Crest El. (ft)	= 353.50	354.40	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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

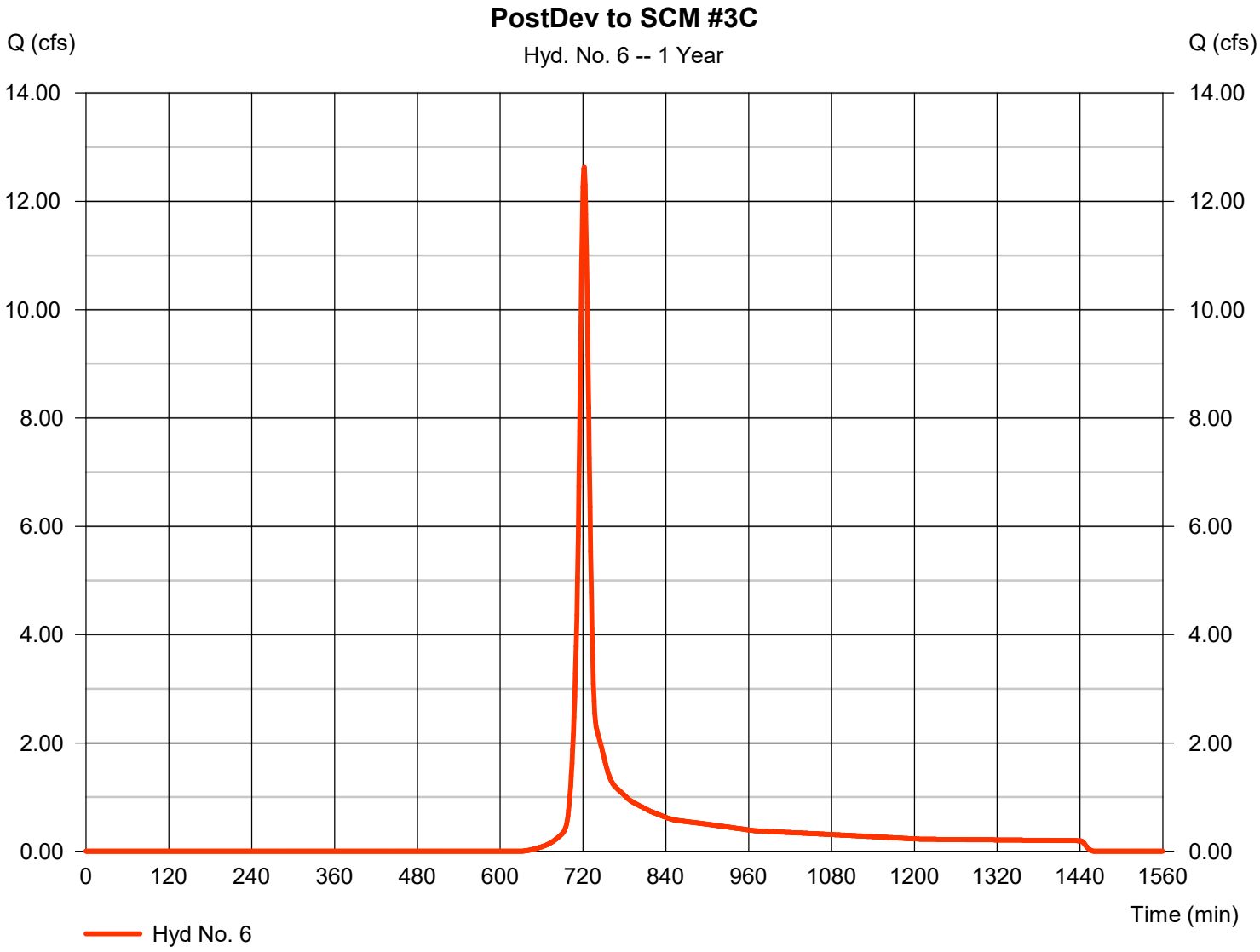


Hydrograph Report

Hyd. No. 6

PostDev to SCM #3C

Hydrograph type	= SCS Runoff	Peak discharge	= 12.63 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 32,530 cuft
Drainage area	= 8.500 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



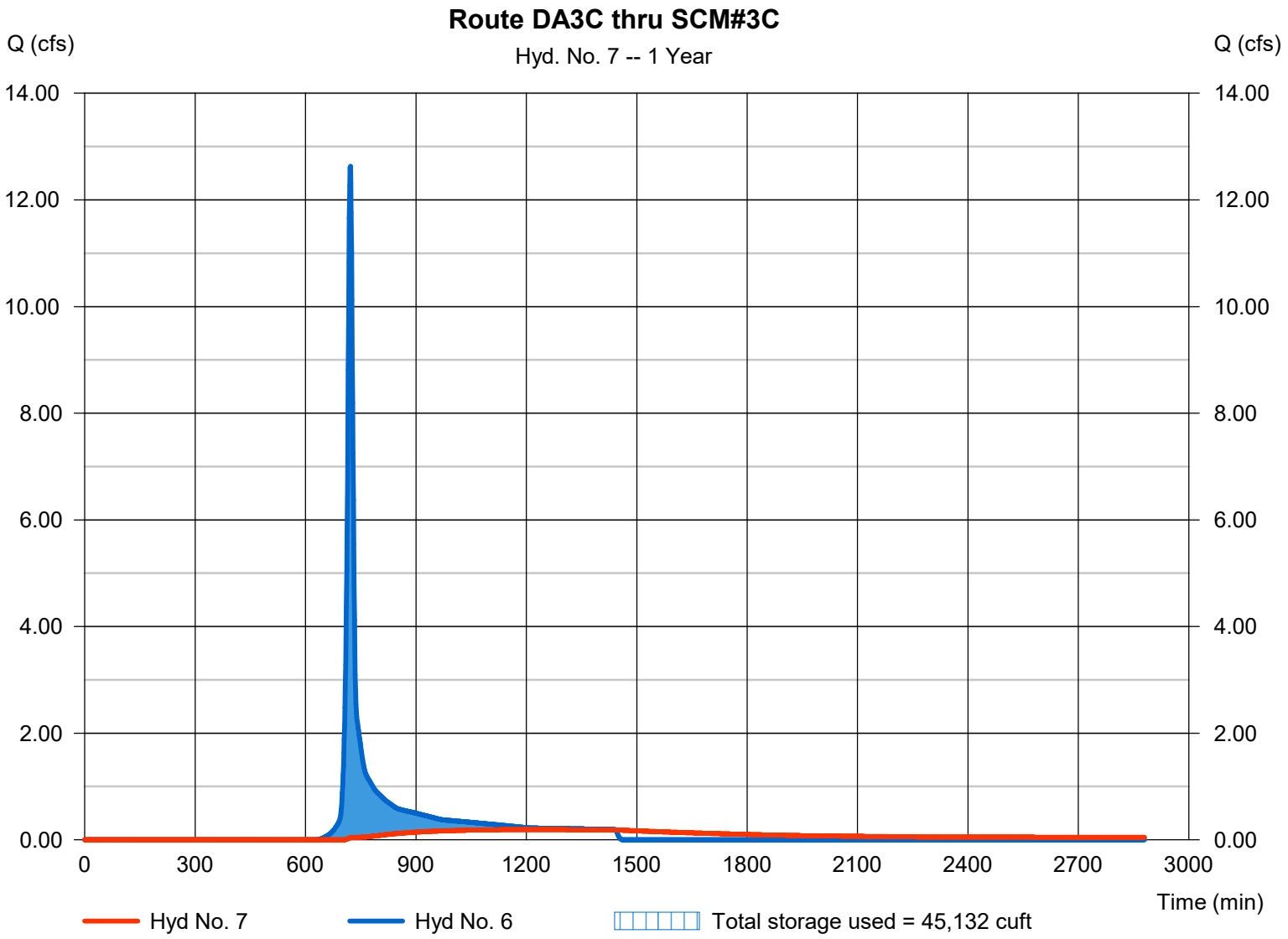
Hydrograph Report

Hyd. No. 7

Route DA3C thru SCM#3C

Hydrograph type	=	Reservoir	Peak discharge	=	0.192 cfs
Storm frequency	=	1 yrs	Time to peak	=	1191 min
Time interval	=	1 min	Hyd. volume	=	13,730 cuft
Inflow hyd. No.	=	6 - PostDev to SCM #3C	Max. Elevation	=	341.67 ft
Reservoir name	=	SCM #3C	Max. Storage	=	45,132 cuft

Storage Indication method used. Wet pond routing start elevation = 340.50 ft.



Pond Report

Pond No. 4 - SCM #3C

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 337.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	337.00	6,091	0	0
1.00	338.00	7,237	6,655	6,655
2.00	339.00	8,551	7,884	14,539
3.00	340.00	9,823	9,179	23,718
3.50	340.50	11,828	5,404	29,122
4.00	341.00	13,562	6,342	35,464
5.00	342.00	15,364	14,452	49,917
6.00	343.00	17,232	16,287	66,204
7.00	344.00	19,167	18,189	84,393

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	1.50	8.00	0.00
Span (in)	= 18.00	1.50	30.00	0.00
No. Barrels	= 1	1	3	0
Invert El. (ft)	= 337.88	340.50	341.33	0.00
Length (ft)	= 75.00	0.50	0.50	0.00
Slope (%)	= 0.50	0.50	0.01	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

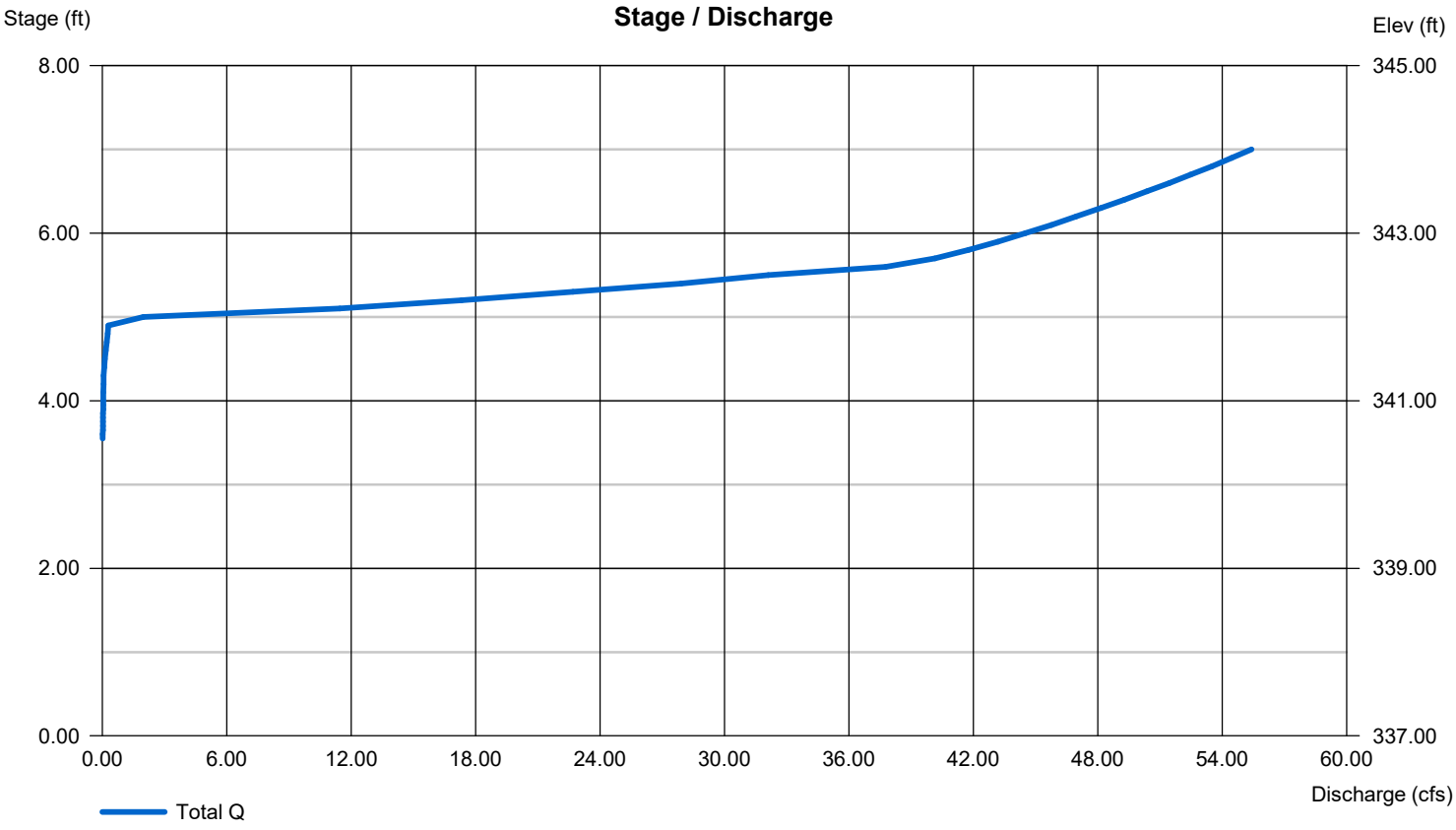
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.50	12.00	0.00	0.00
Crest El. (ft)	= 342.00	342.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

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

TW Elev. (ft) = 0.00

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

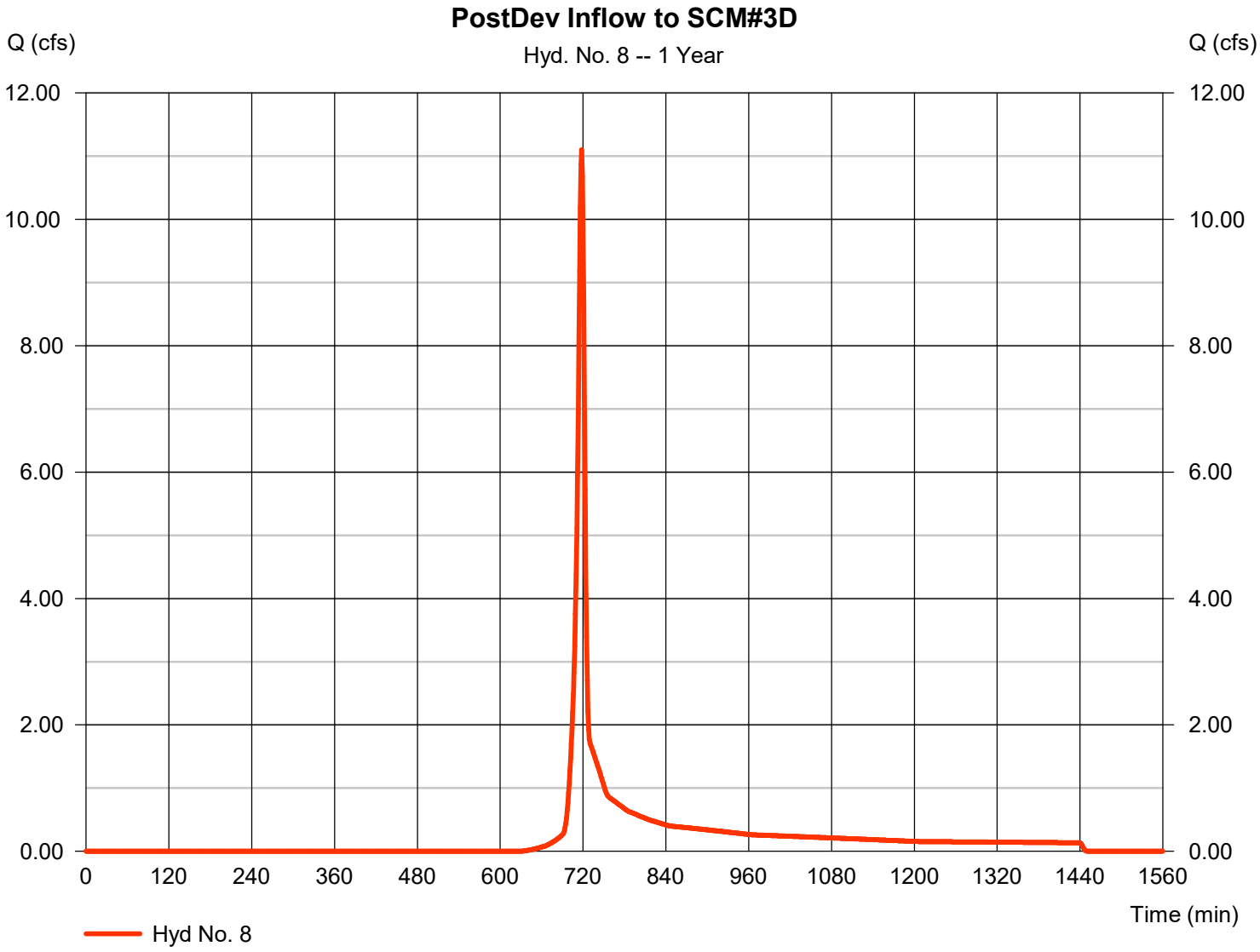


Hydrograph Report

Hyd. No. 8

PostDev Inflow to SCM#3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.10 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	22,373 cuft
Drainage area	=	5.640 ac	Curve number	=	76.8
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



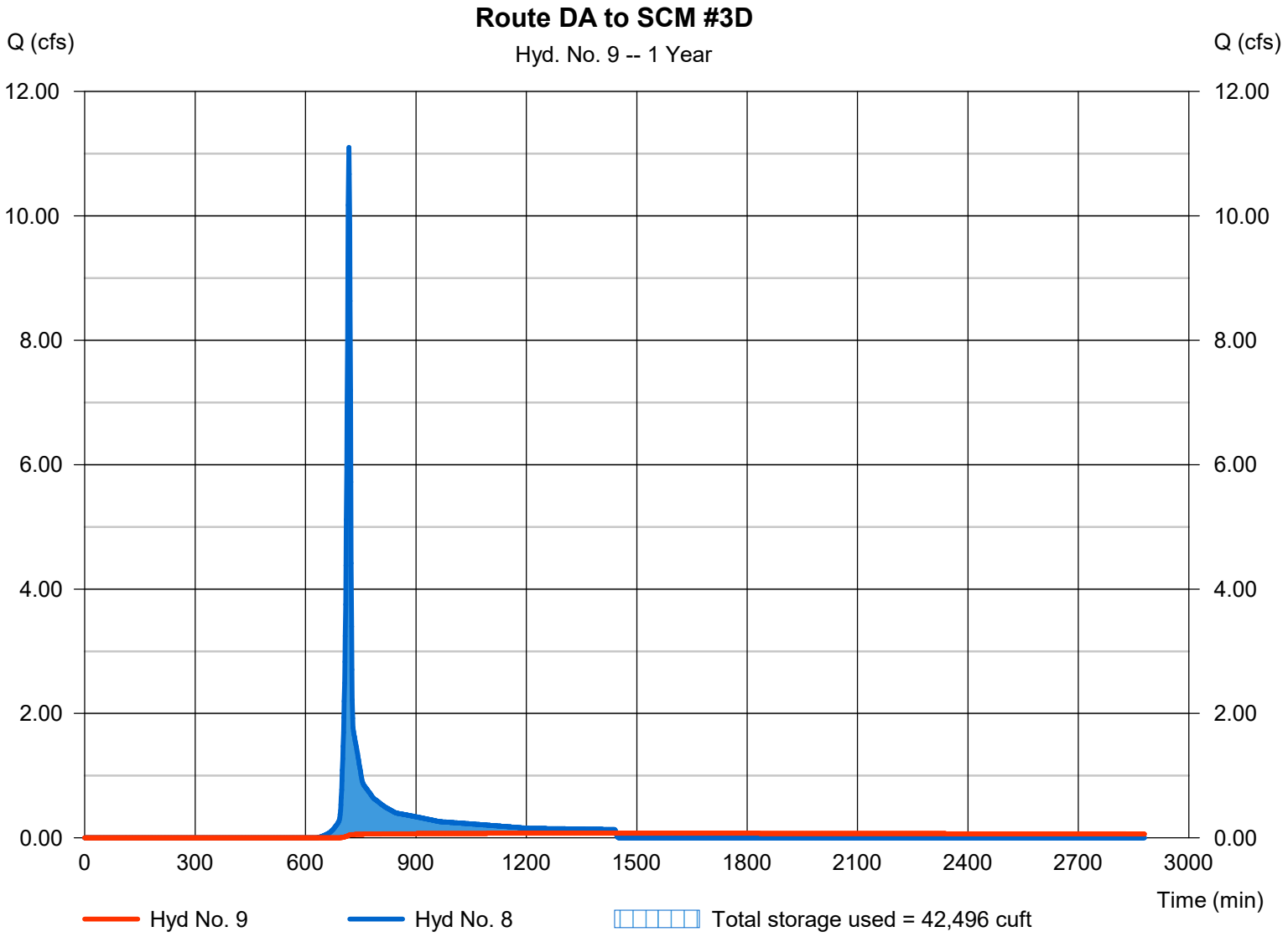
Hydrograph Report

Hyd. No. 9

Route DA to SCM #3D

Hydrograph type	=	Reservoir	Peak discharge	=	0.075 cfs
Storm frequency	=	1 yrs	Time to peak	=	1444 min
Time interval	=	1 min	Hyd. volume	=	9,021 cuft
Inflow hyd. No.	=	8 - PostDev Inflow to SCM#3D	Max. Elevation	=	346.17 ft
Reservoir name	=	SCM #3D	Max. Storage	=	42,496 cuft

Storage Indication method used. Wet pond routing start elevation = 344.50 ft.



Pond Report

Pond No. 5 - SCM #3D

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 341.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	341.00	5,039	0	0
1.00	342.00	5,857	5,442	5,442
2.00	343.00	6,751	6,298	11,740
3.00	344.00	7,721	7,230	18,970
3.50	344.50	9,216	4,228	23,199
4.00	345.00	11,131	5,079	28,277
5.00	346.00	12,691	11,901	40,179
6.00	347.00	14,321	13,496	53,675
7.00	348.00	16,019	15,161	68,836
8.00	349.00	17,786	16,893	85,729
9.00	350.00	19,623	18,695	104,424

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	1.50	0.00	0.00
Span (in)	= 18.00	1.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 341.00	344.50	0.00	0.00
Length (ft)	= 60.00	0.50	0.00	0.00
Slope (%)	= 3.33	0.50	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

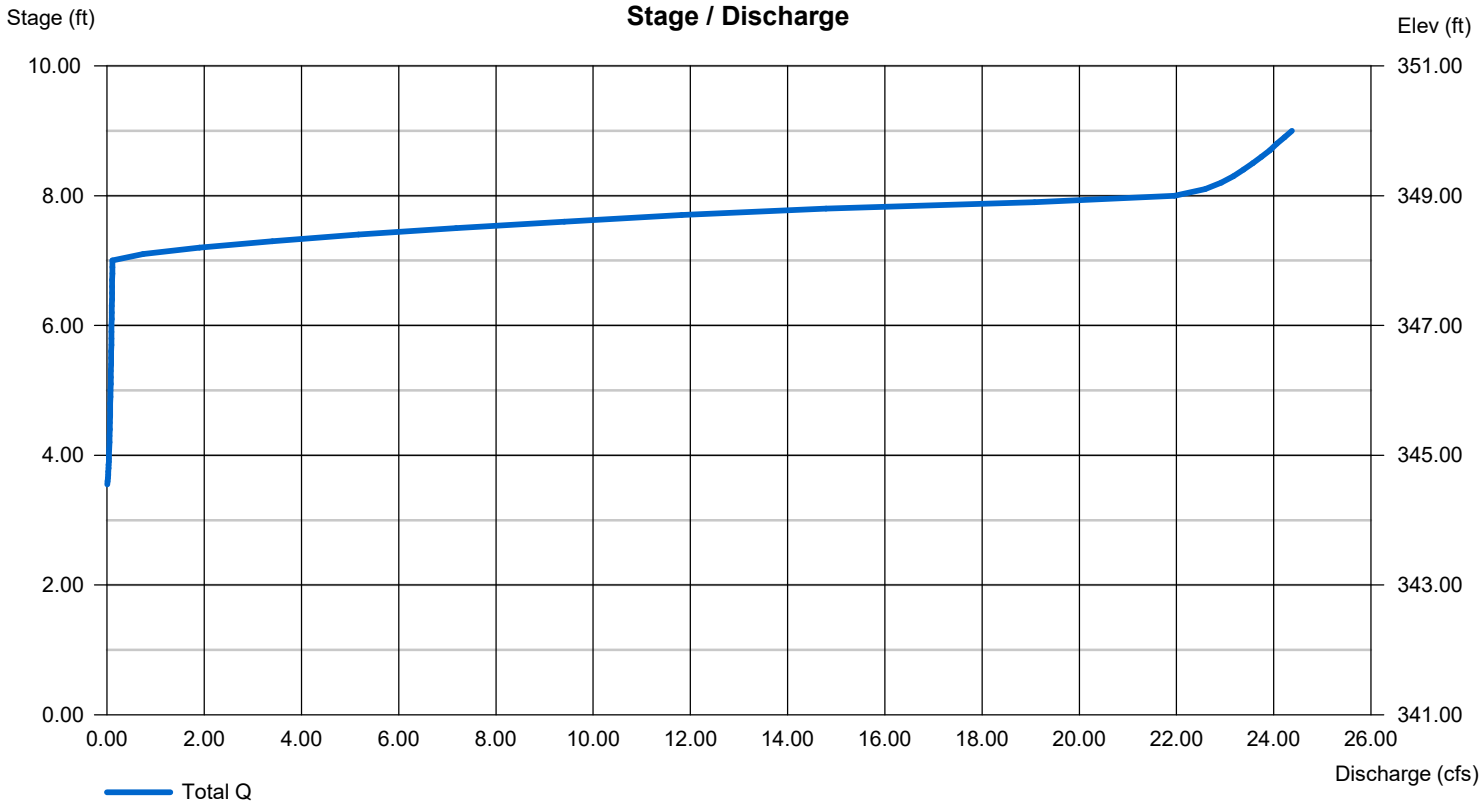
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	6.00	0.00	0.00
Crest El. (ft)	= 348.75	348.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

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

TW Elev. (ft) = 0.00

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

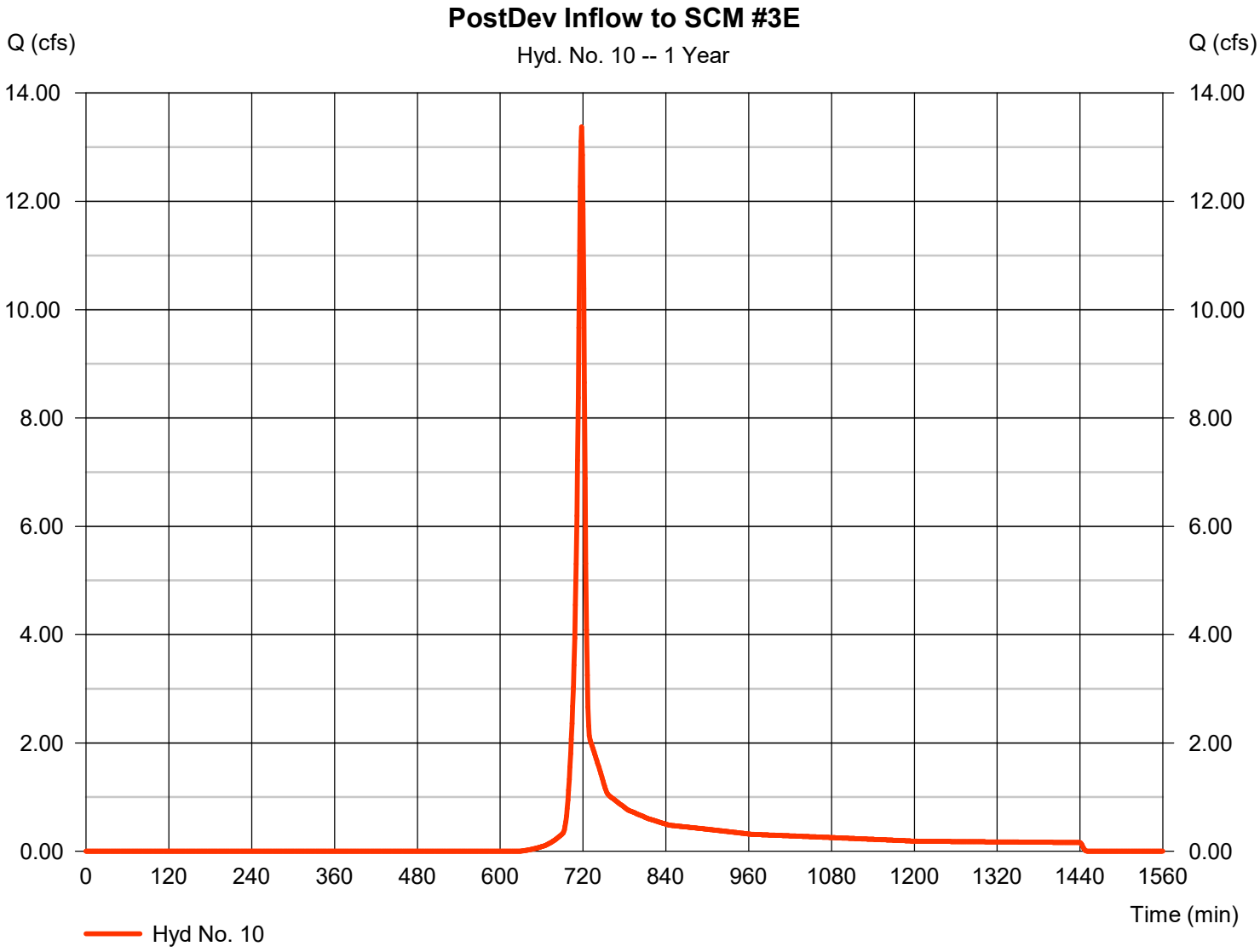


Hydrograph Report

Hyd. No. 10

PostDev Inflow to SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 13.38 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 26,943 cuft
Drainage area	= 6.720 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



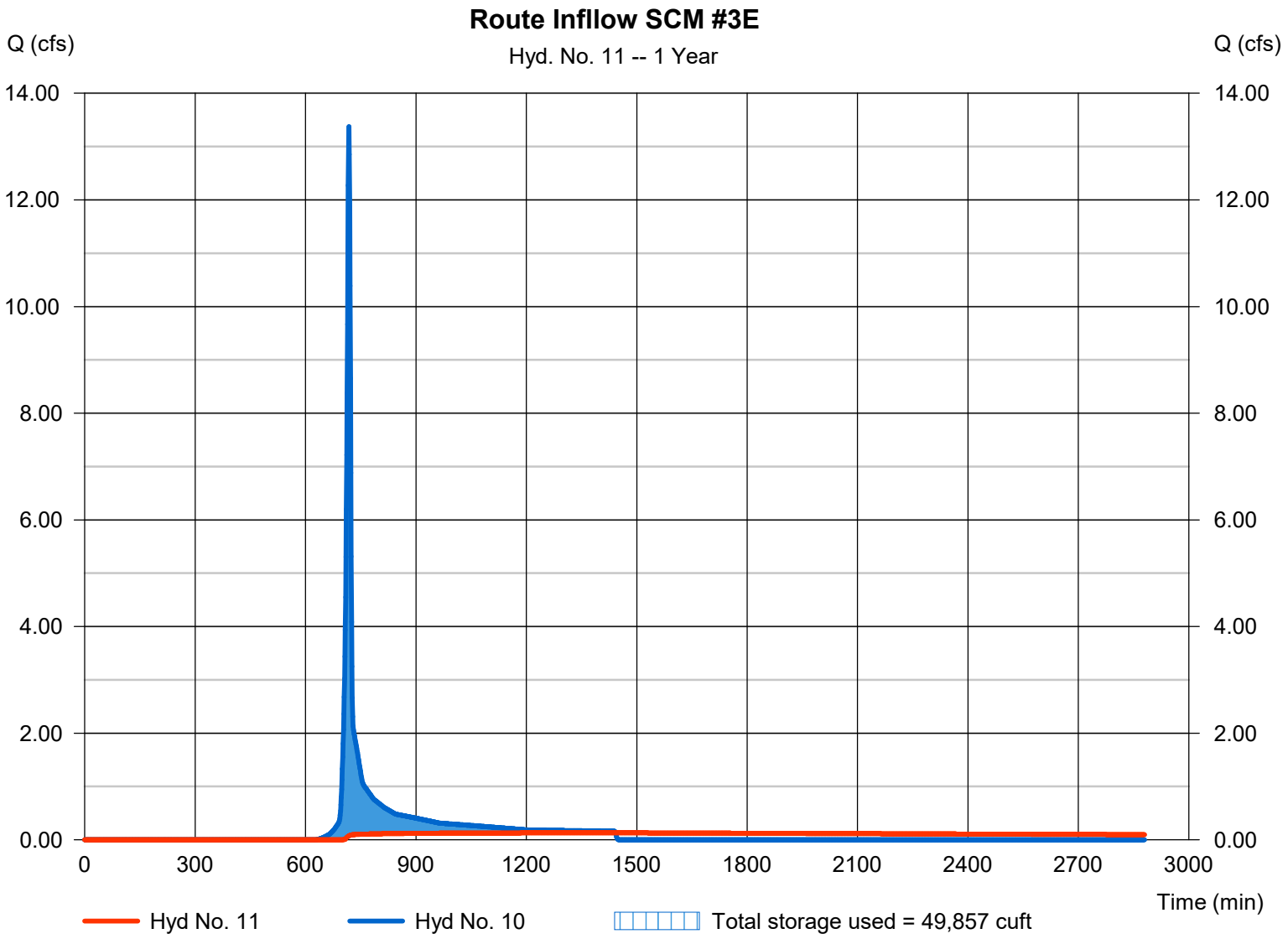
Hydrograph Report

Hyd. No. 11

Route Infllow SCM #3E

Hydrograph type	=	Reservoir	Peak discharge	=	0.131 cfs
Storm frequency	=	1 yrs	Time to peak	=	1442 min
Time interval	=	1 min	Hyd. volume	=	15,265 cuft
Inflow hyd. No.	=	10 - PostDev Inflow to SCM #3E	Max. Elevation	=	308.14 ft
Reservoir name	=	SCM #3E	Max. Storage	=	49,857 cuft

Storage Indication method used. Wet pond routing start elevation = 306.50 ft.



Pond Report

Pond No. 6 - SCM #3E

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 303.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	303.00	6,188	0	0
1.00	304.00	7,188	6,681	6,681
2.00	305.00	8,263	7,718	14,400
3.00	306.00	9,411	8,830	23,229
3.50	306.50	11,122	5,127	28,356
4.00	307.00	12,660	5,941	34,297
5.00	308.00	14,229	13,436	47,733
6.00	309.00	15,907	15,059	62,791
7.00	310.00	17,607	16,748	79,539
8.00	311.00	19,391	18,490	98,029
9.00	312.00	21,253	20,313	118,342

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.00	0.00	0.00
Span (in)	= 18.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 303.00	306.50	0.00	0.00
Length (ft)	= 60.00	0.50	0.00	0.00
Slope (%)	= 1.66	0.50	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

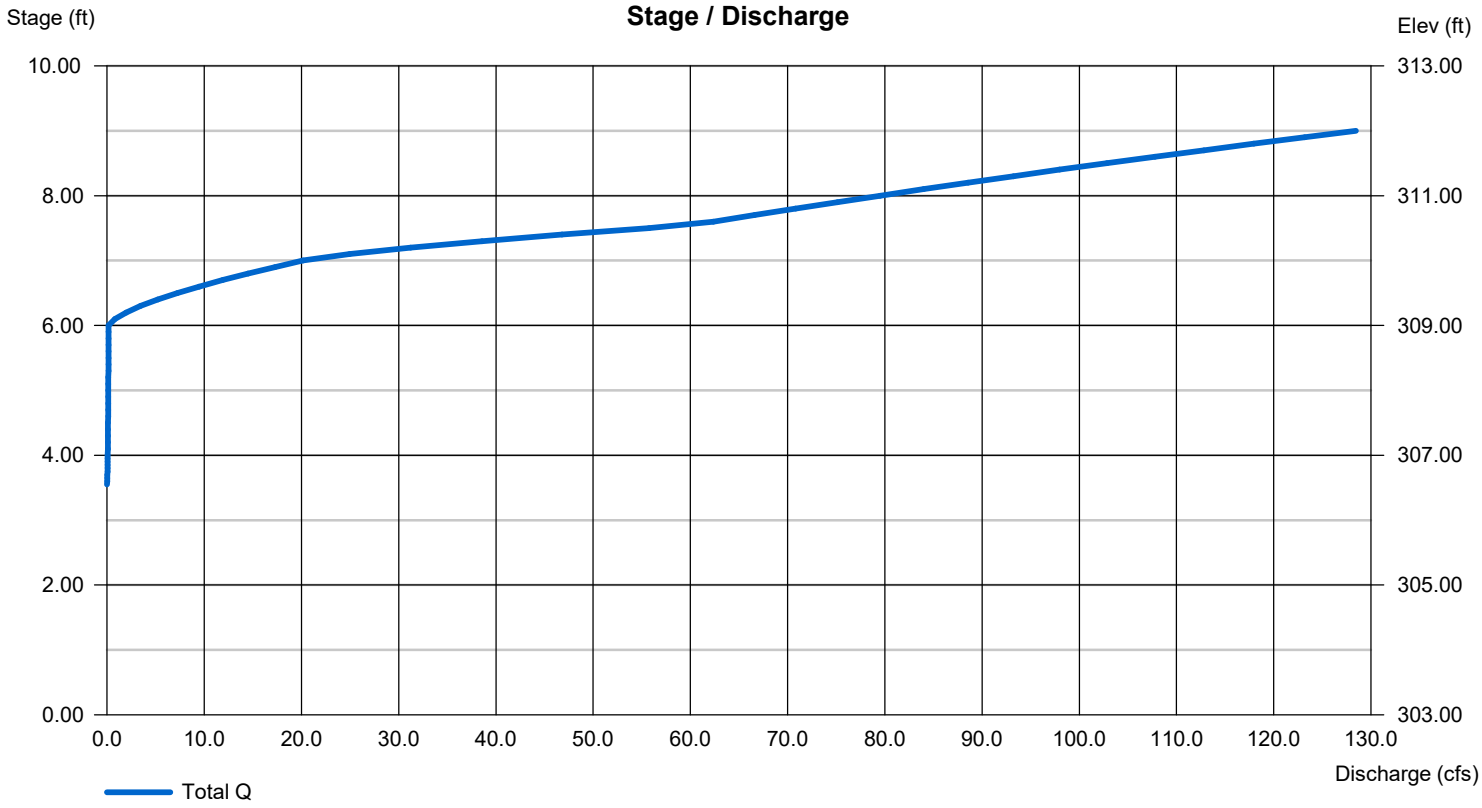
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	6.00	0.00	0.00
Crest El. (ft)	= 310.00	309.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

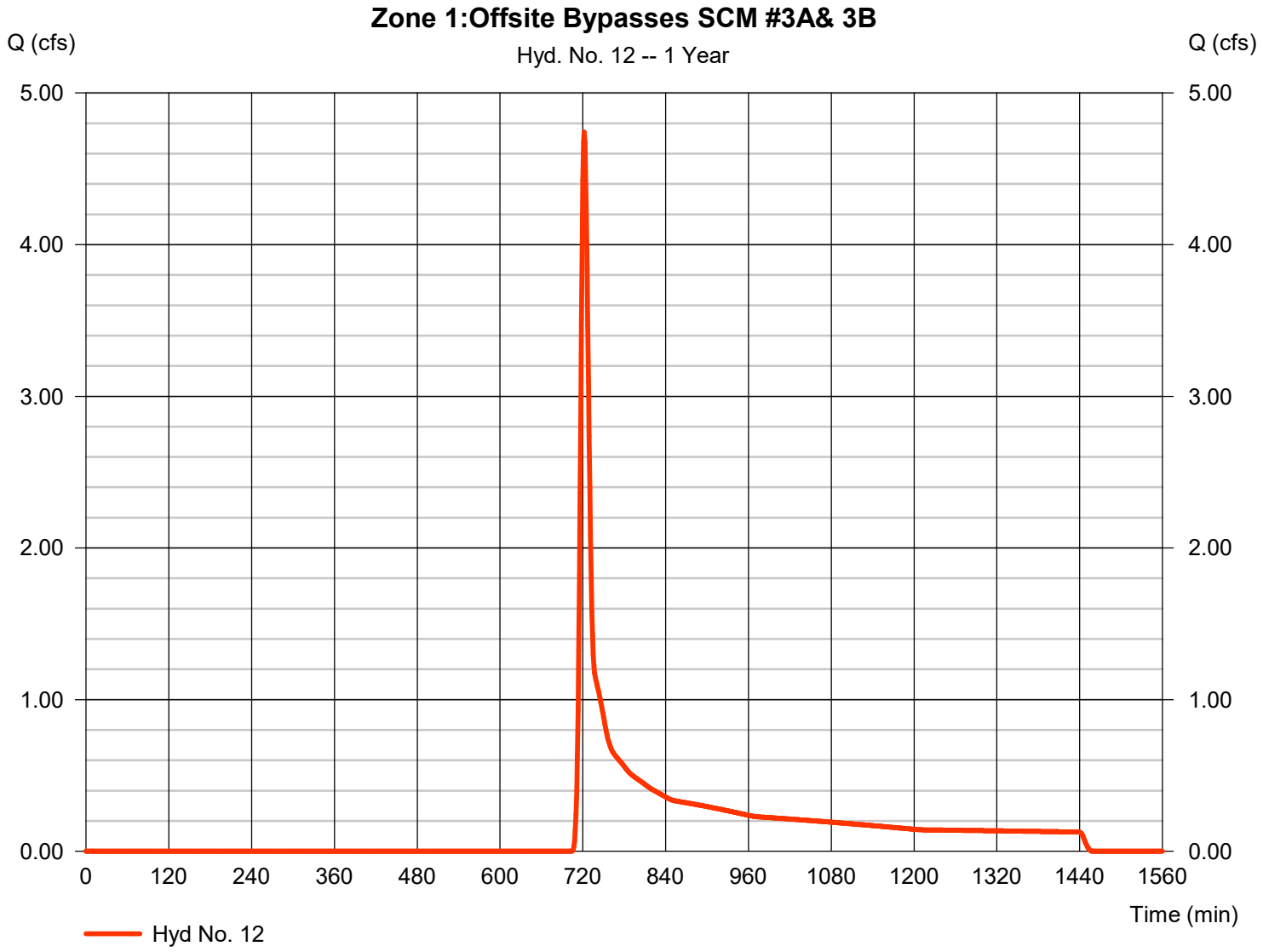


Hydrograph Report

Hyd. No. 12

Zone 1:Offsite Bypasses SCM #3A& 3B

Hydrograph type	= SCS Runoff	Peak discharge	= 4.742 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 14,739 cuft
Drainage area	= 8.510 ac	Curve number	= 64
Basin Slope	= 2.9 %	Hydraulic length	= 1370 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

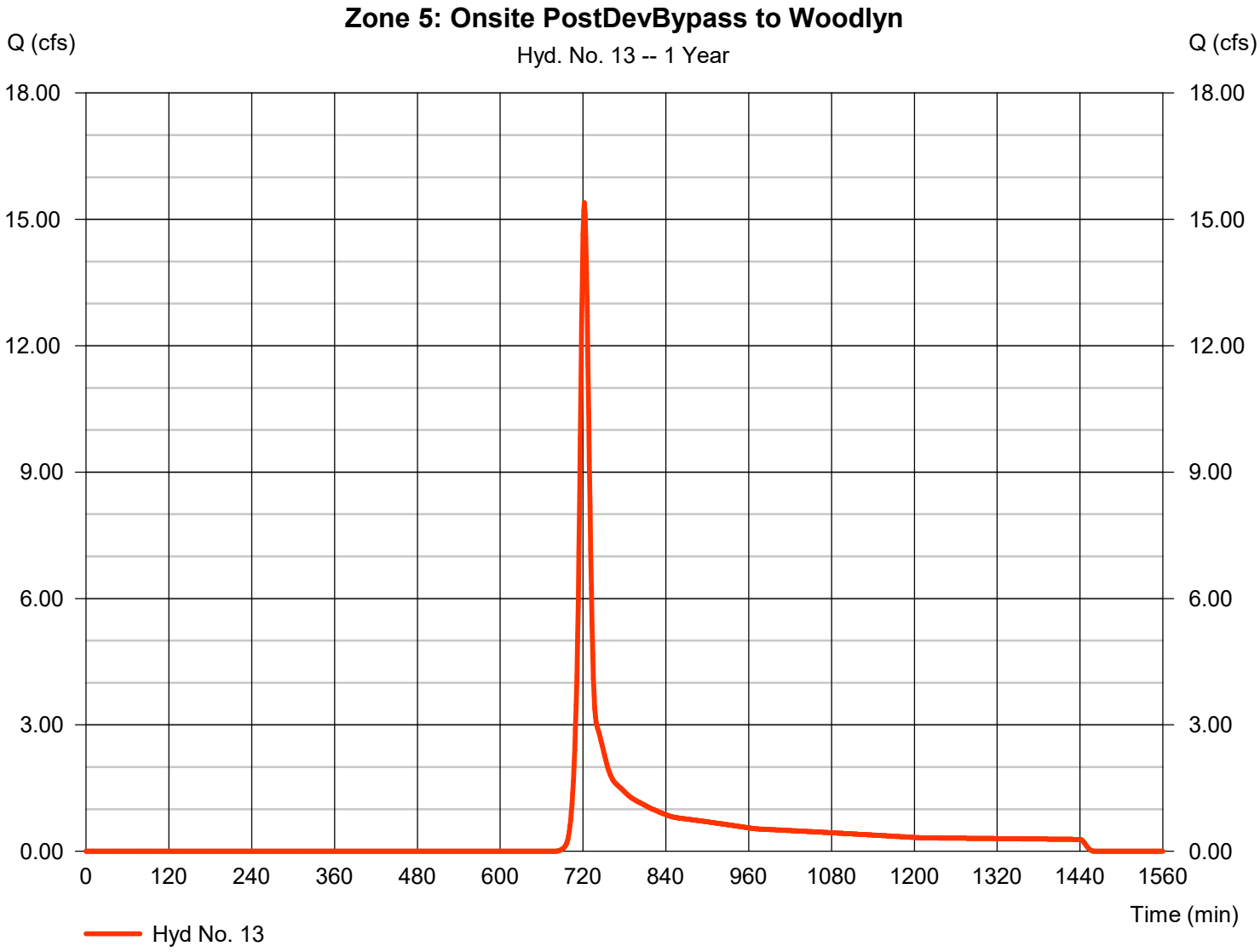


Hydrograph Report

Hyd. No. 13

Zone 5: Onsite PostDevBypass to Woodlyn

Hydrograph type	= SCS Runoff	Peak discharge	= 15.39 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 41,349 cuft
Drainage area	= 14.320 ac	Curve number	= 72
Basin Slope	= 1.5 %	Hydraulic length	= 1788 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 12.58 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

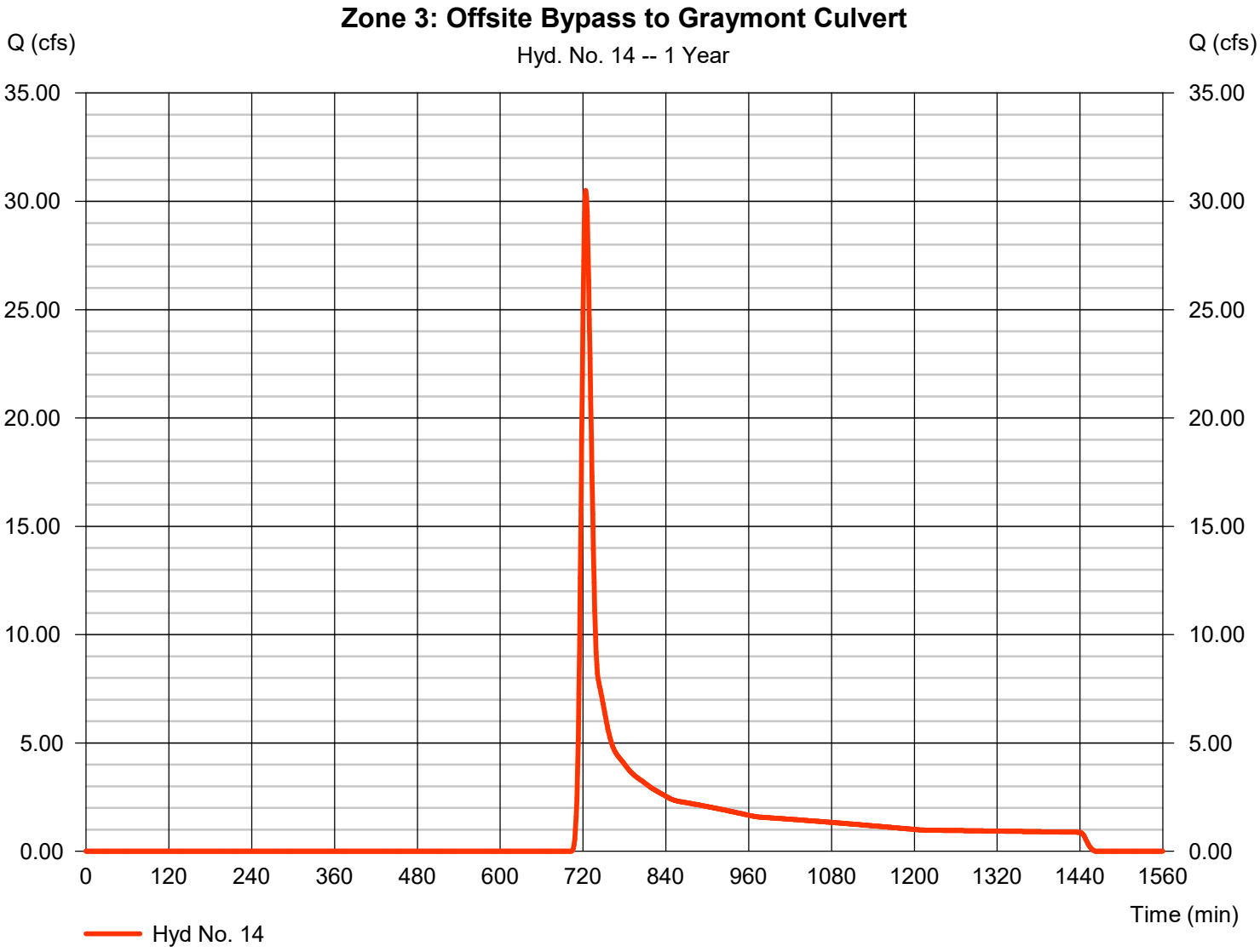


Hydrograph Report

Hyd. No. 14

Zone 3: Offsite Bypass to Graymont Culvert

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.51 cfs
Storm frequency	=	1 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	104,925 cuft
Drainage area	=	57.120 ac	Curve number	=	65
Basin Slope	=	1.8 %	Hydraulic length	=	1220 ft
Tc method	=	User	Time of conc. (Tc)	=	14.00 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



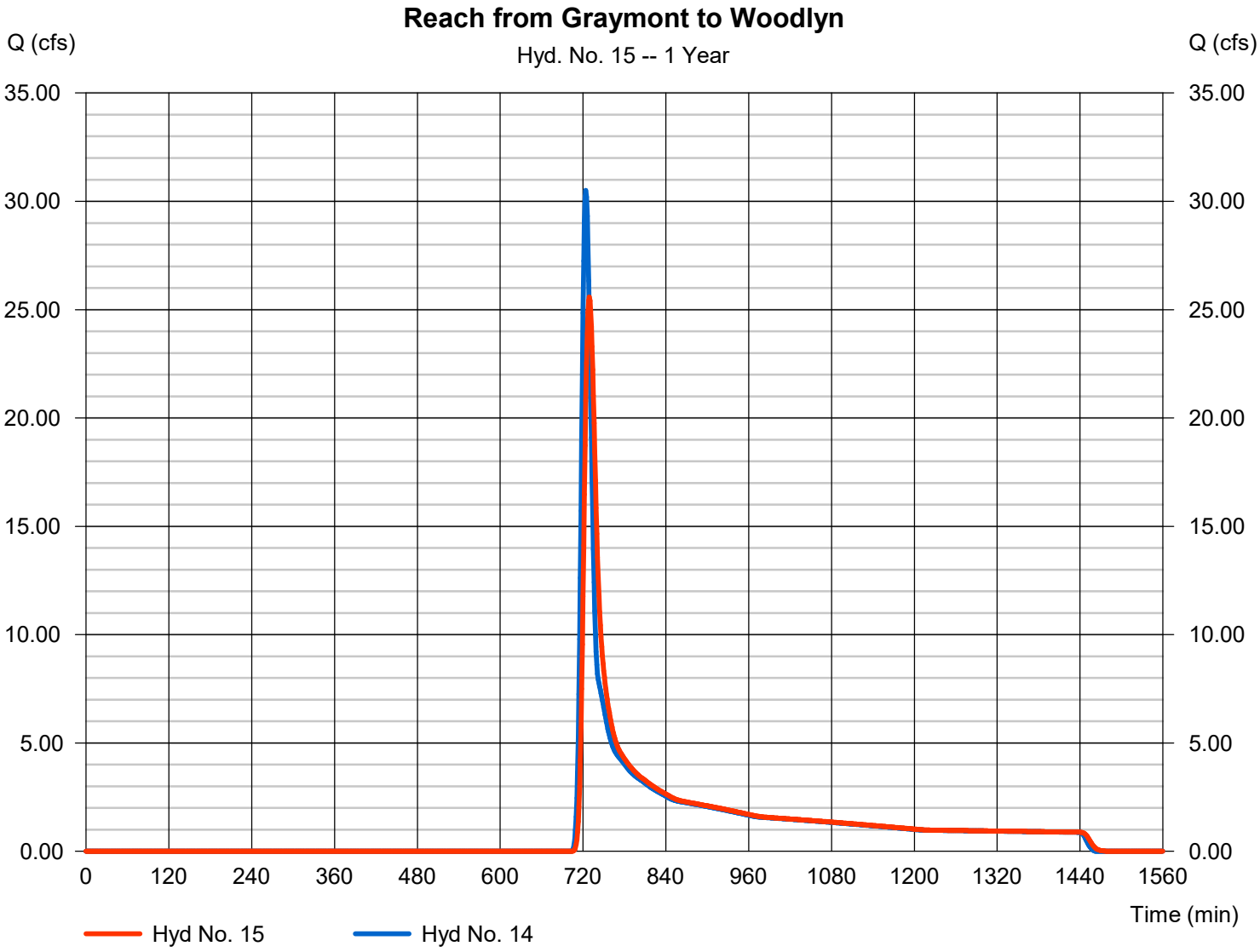
Hydrograph Report

Hyd. No. 15

Reach from Graymont to Woodlyn

Hydrograph type	=	Reach	Peak discharge	=	25.59 cfs
Storm frequency	=	1 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	104,922 cuft
Inflow hyd. No.	=	14 - Zone 3: Offsite Bypass to Graymont Culvert	Section type	=	Trapezoidal
Reach length	=	1750.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	2.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.009	Rating curve m	=	1.370
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1791

Modified Att-Kin routing method used.

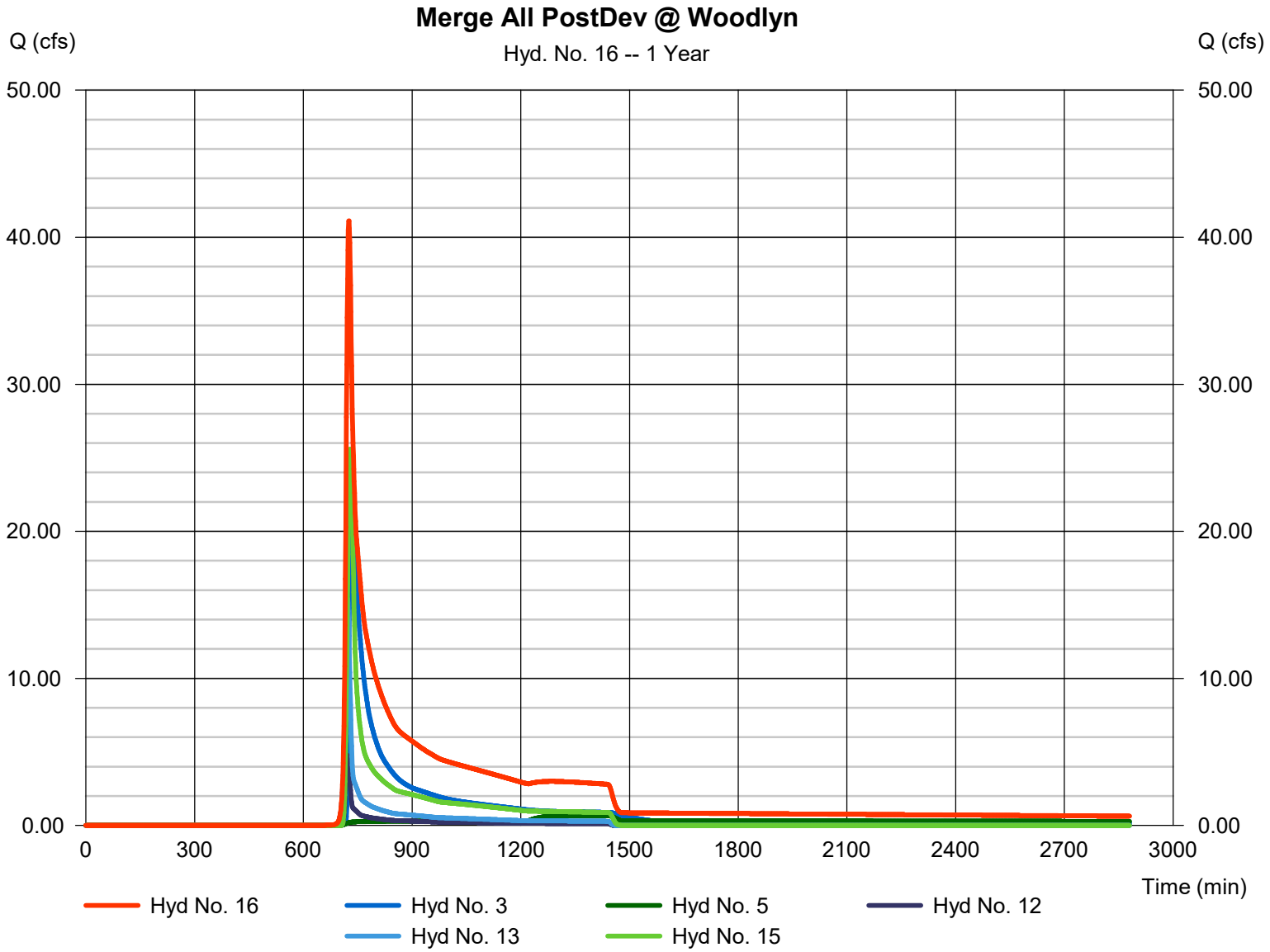


Hydrograph Report

Hyd. No. 16

Merge All PostDev @ Woodlyn

Hydrograph type	= Combine	Peak discharge	= 41.12 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 328,464 cuft
Inflow hyds.	= 3, 5, 12, 13, 15	Contrib. drain. area	= 22.830 ac

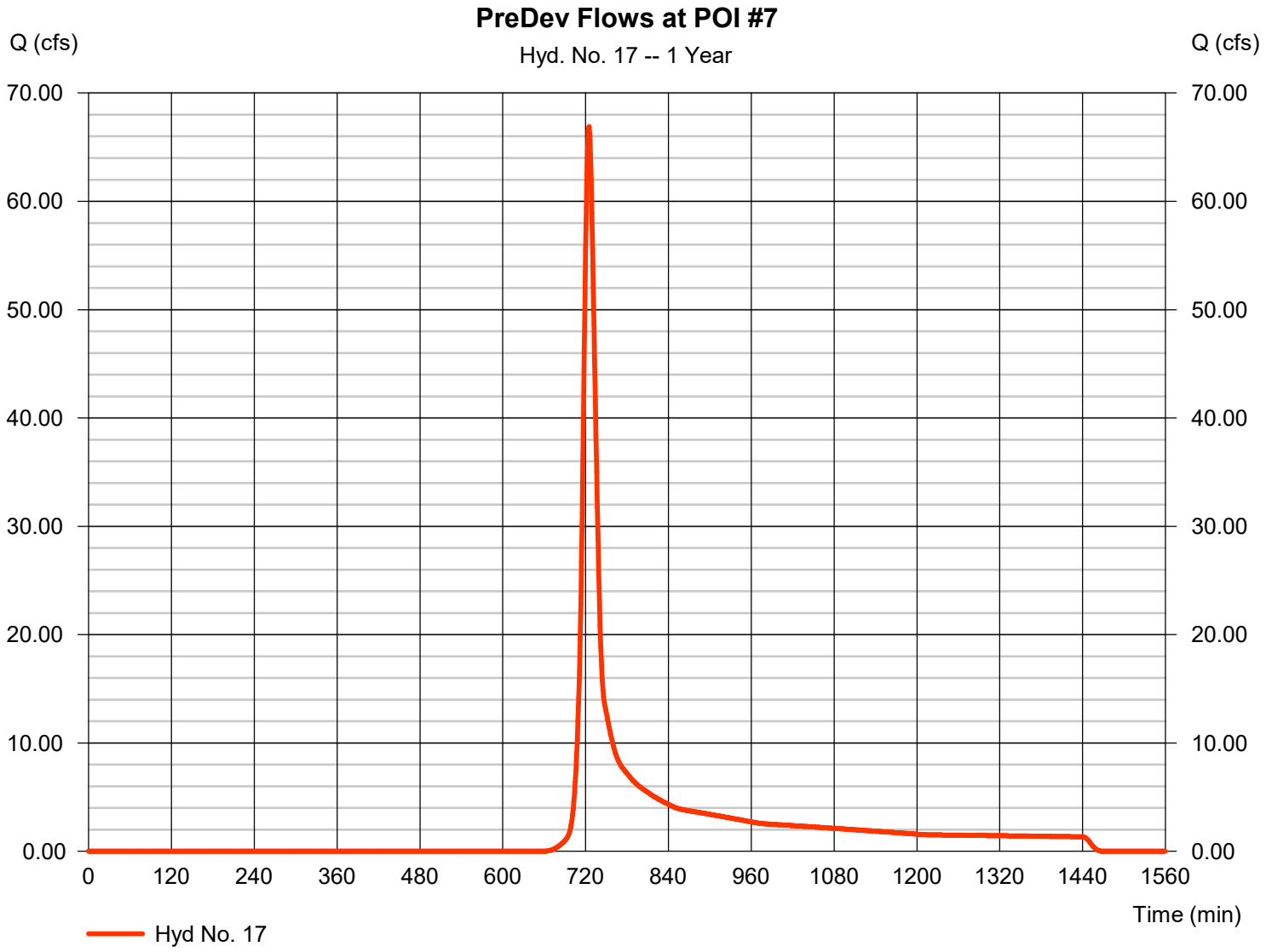


Hydrograph Report

Hyd. No. 17

PreDev Flows at POI #7

Hydrograph type	=	SCS Runoff	Peak discharge	=	66.89 cfs
Storm frequency	=	1 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	208,951 cuft
Drainage area	=	62.670 ac	Curve number	=	74.4
Basin Slope	=	1.3 %	Hydraulic length	=	2500 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.43 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

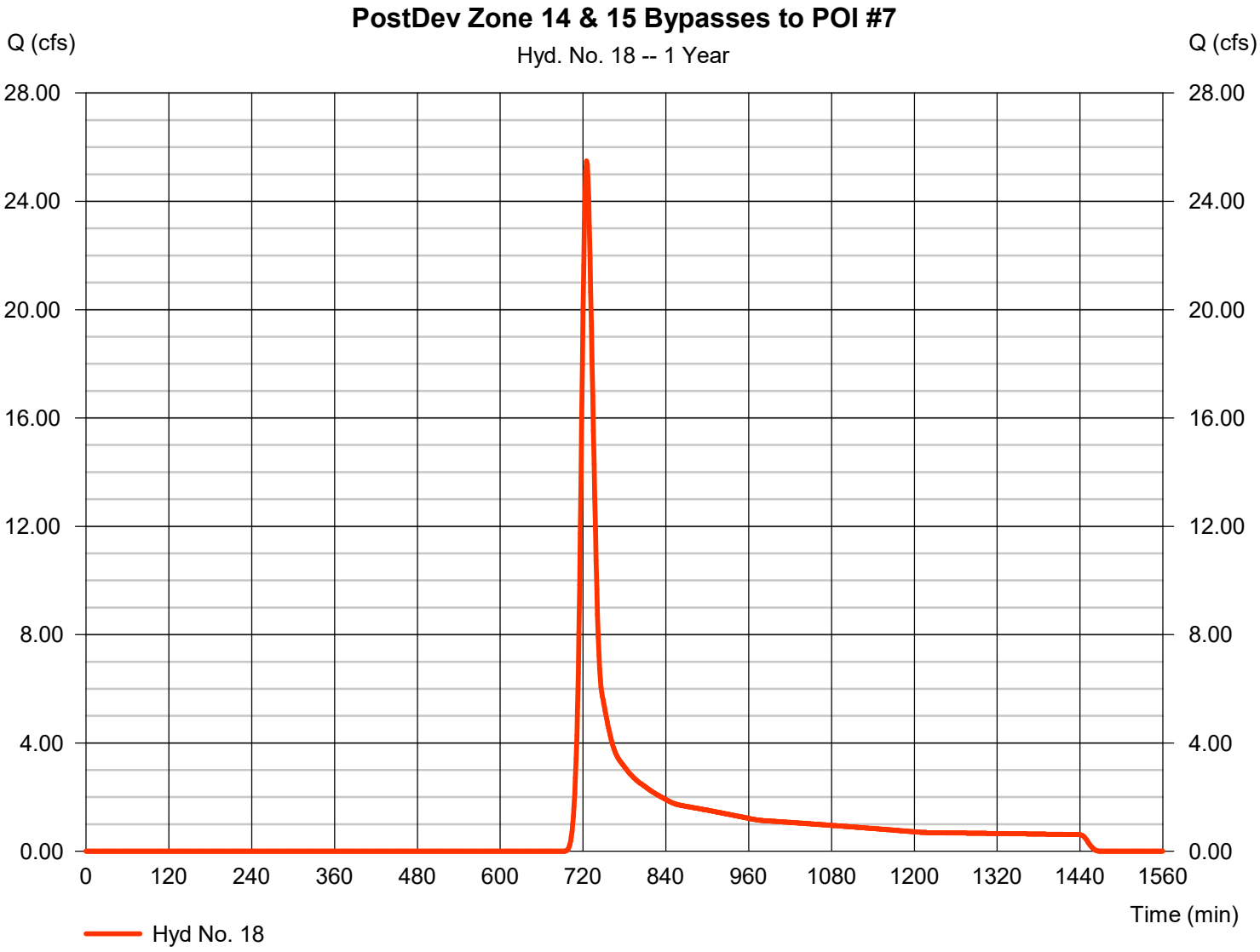


Hydrograph Report

Hyd. No. 18

PostDev Zone 14 & 15 Bypasses to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 25.49 cfs
Storm frequency	= 1 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 85,207 cuft
Drainage area	= 33.240 ac	Curve number	= 70
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.27 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

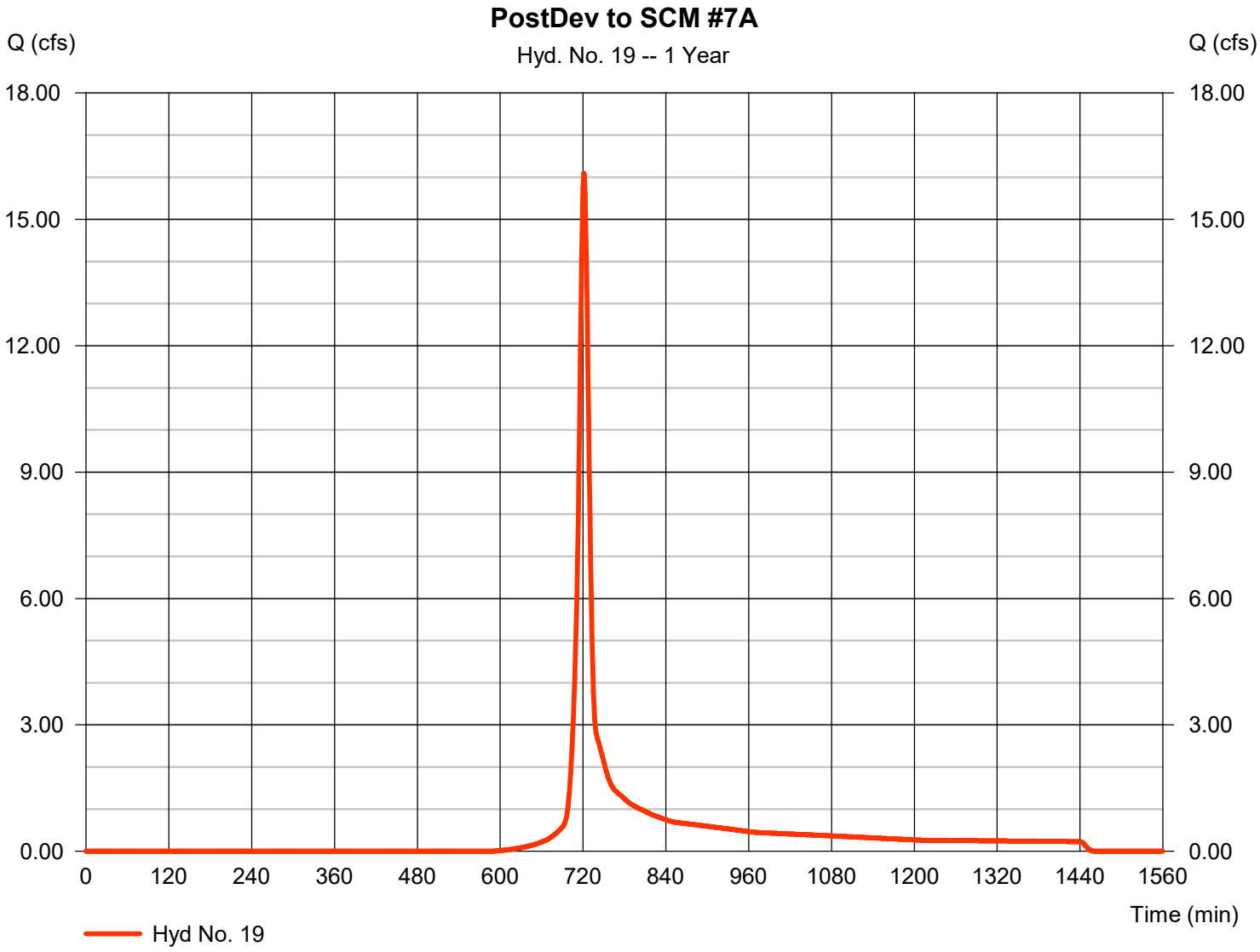


Hydrograph Report

Hyd. No. 19

PostDev to SCM #7A

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.09 cfs
Storm frequency	=	1 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	40,948 cuft
Drainage area	=	9.260 ac	Curve number	=	79.8
Basin Slope	=	1.1 %	Hydraulic length	=	1505 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.38 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

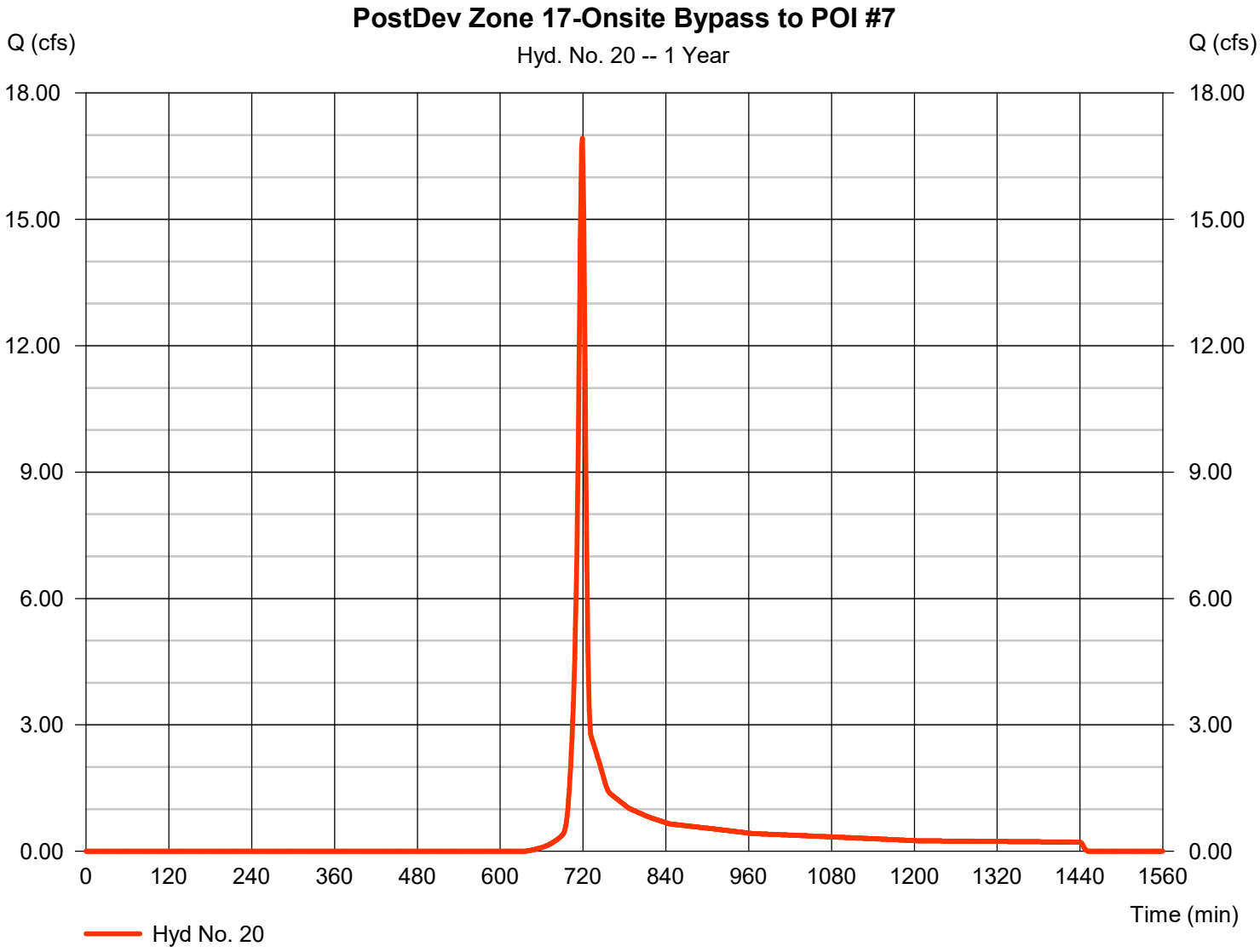


Hydrograph Report

Hyd. No. 20

PostDev Zone 17-Onsite Bypass to POI #7

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.92 cfs
Storm frequency	=	1 yrs	Time to peak	=	719 min
Time interval	=	1 min	Hyd. volume	=	35,874 cuft
Drainage area	=	9.720 ac	Curve number	=	76.5
Basin Slope	=	1.0 %	Hydraulic length	=	810 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	7.97 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



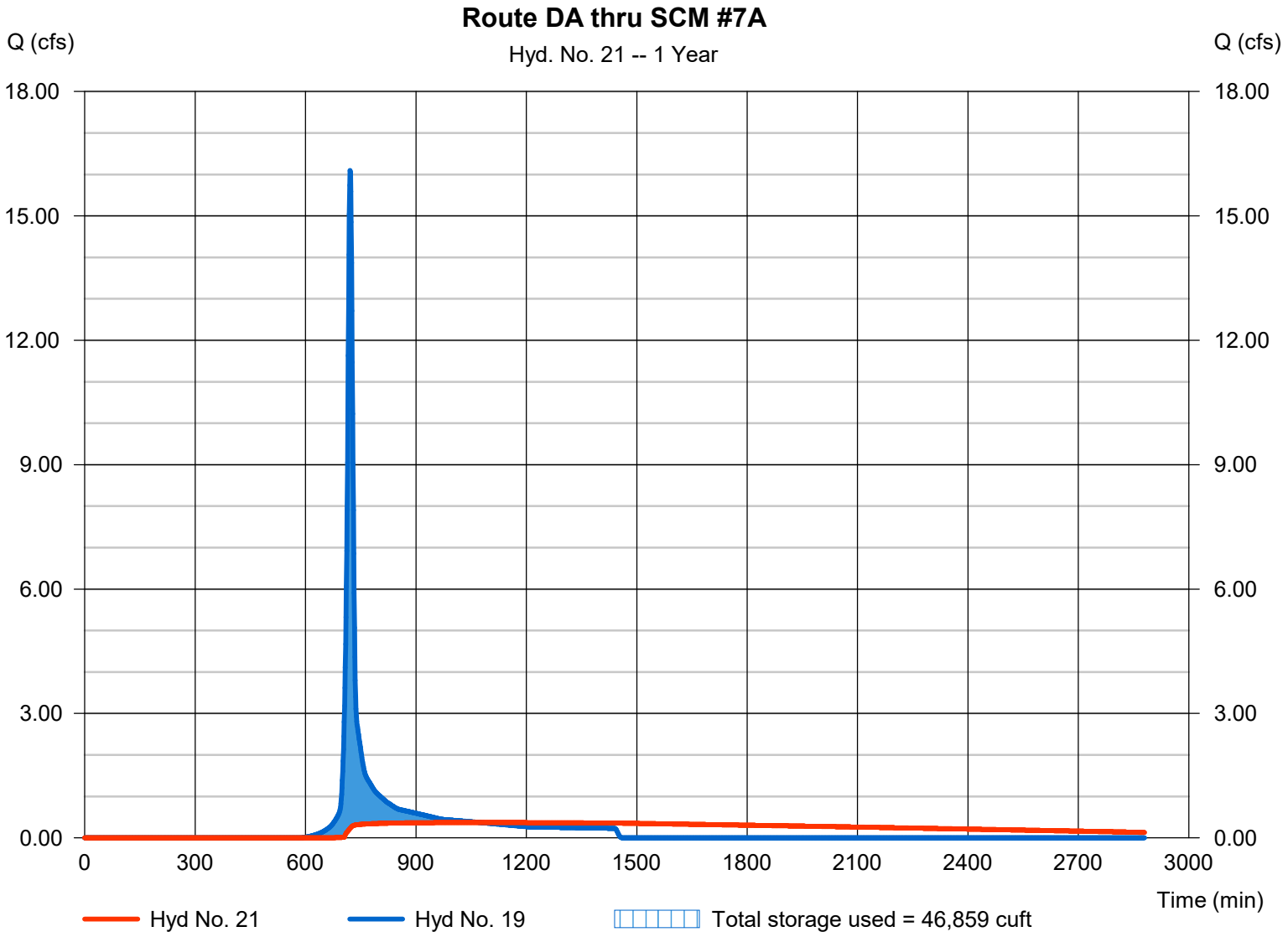
Hydrograph Report

Hyd. No. 21

Route DA thru SCM #7A

Hydrograph type	=	Reservoir	Peak discharge	=	0.369 cfs
Storm frequency	=	1 yrs	Time to peak	=	1075 min
Time interval	=	1 min	Hyd. volume	=	37,084 cuft
Inflow hyd. No.	=	19 - PostDev to SCM #7A	Max. Elevation	=	373.06 ft
Reservoir name	=	SCM #7A	Max. Storage	=	46,859 cuft

Storage Indication method used. Wet pond routing start elevation = 370.50 ft.



Pond Report

Pond No. 7 - SCM #7A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 367.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	367.00	3,374	0	0
1.00	368.00	5,172	4,241	4,241
2.00	369.00	6,123	5,640	9,881
3.00	370.00	7,111	6,610	16,491
3.50	370.50	8,318	3,853	20,344
4.00	371.00	9,598	4,475	24,819
5.00	372.00	10,955	10,268	35,087
6.00	373.00	12,381	11,660	46,746
7.00	374.00	13,873	13,119	59,865
8.00	375.00	15,443	14,650	74,515
9.00	376.00	16,997	16,212	90,727

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	3.00	0.00	0.00
Span (in)	= 24.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 367.00	370.50	0.00	0.00
Length (ft)	= 60.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.50	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

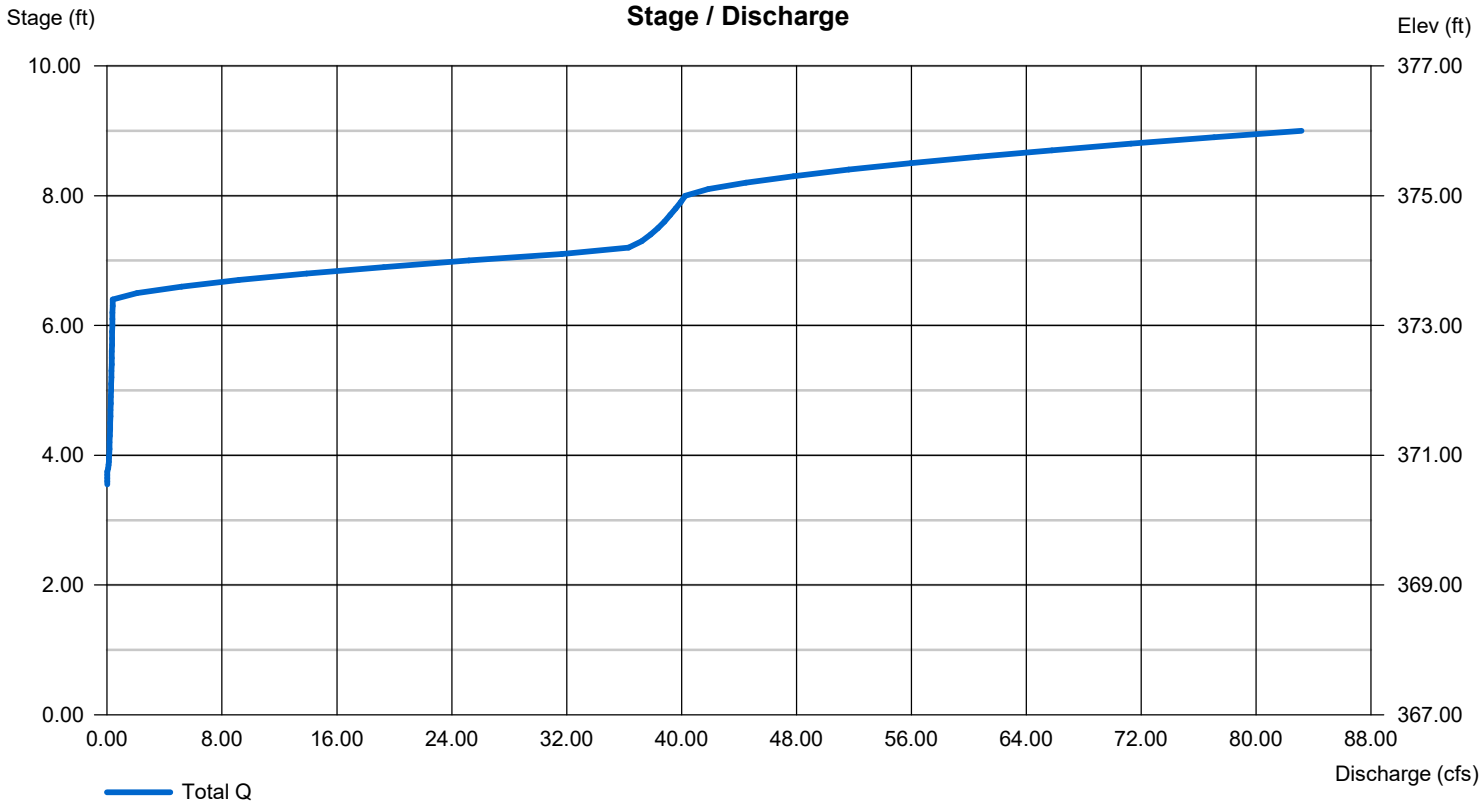
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	12.00	0.00	0.00
Crest El. (ft)	= 373.40	375.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

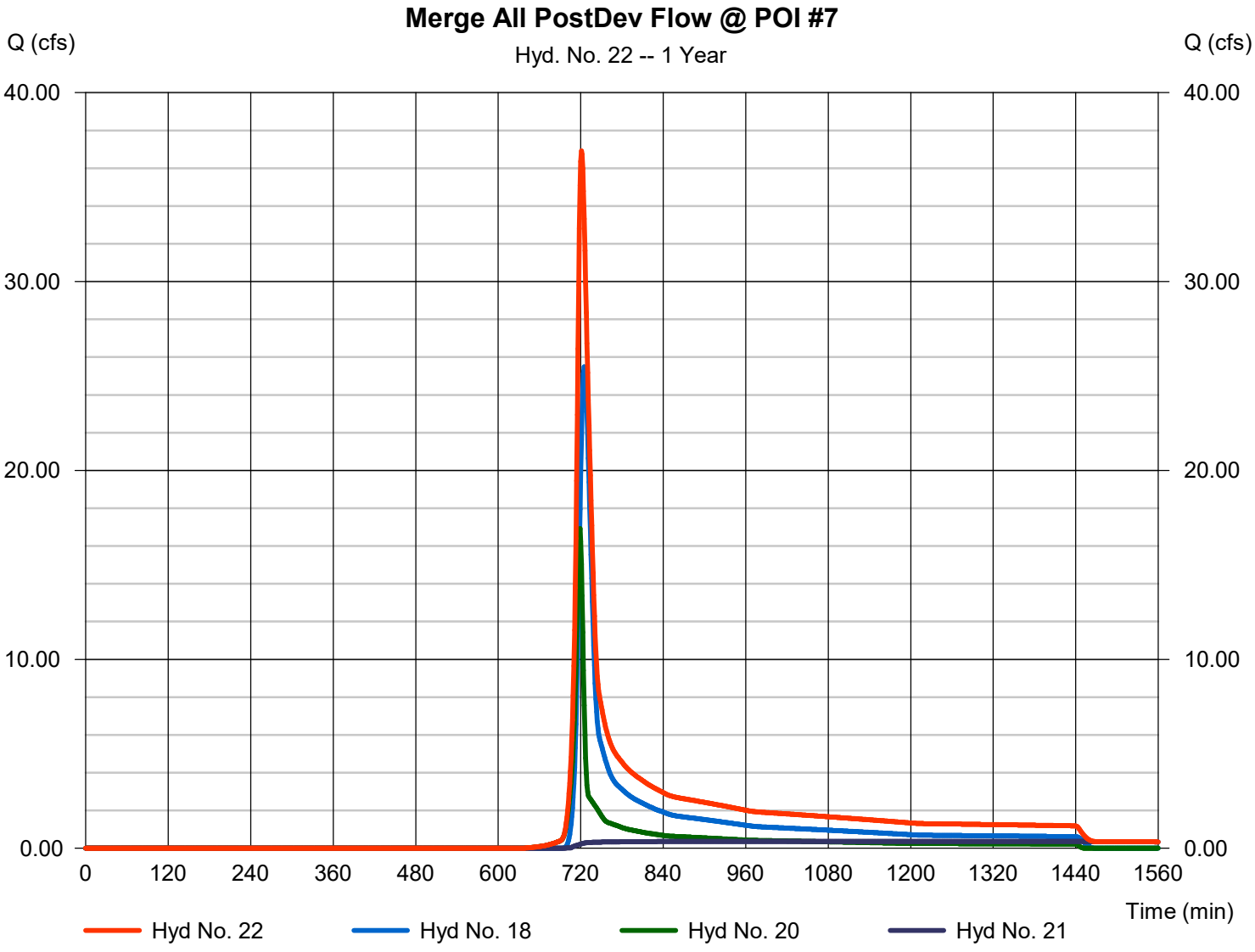


Hydrograph Report

Hyd. No. 22

Merge All PostDev Flow @ POI #7

Hydrograph type	= Combine	Peak discharge	= 36.91 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 158,166 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 42.960 ac

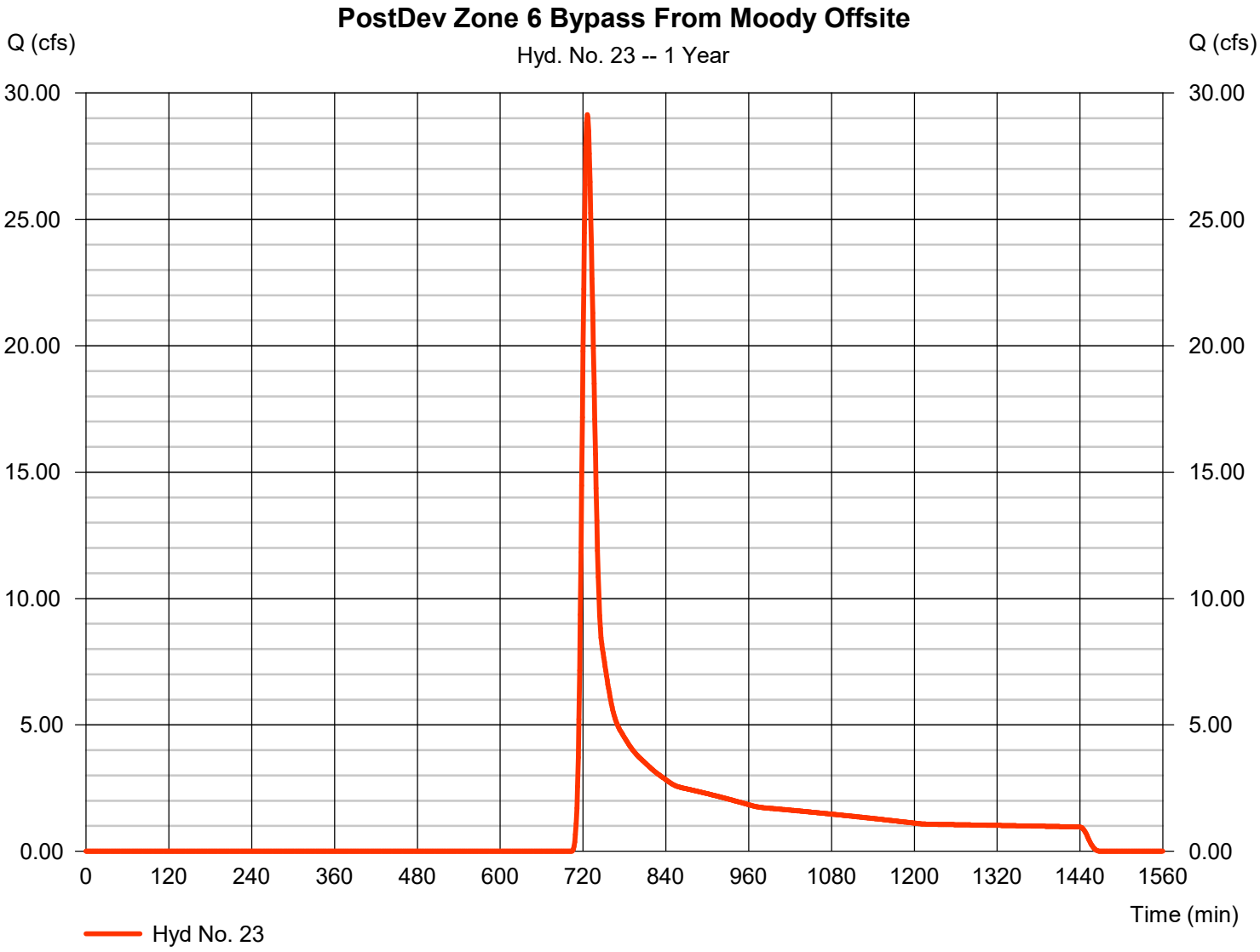


Hydrograph Report

Hyd. No. 23

PostDev Zone 6 Bypass From Moody Offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 29.14 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 114,546 cuft
Drainage area	= 64.030 ac	Curve number	= 64.8
Basin Slope	= 1.8 %	Hydraulic length	= 2940 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.01 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

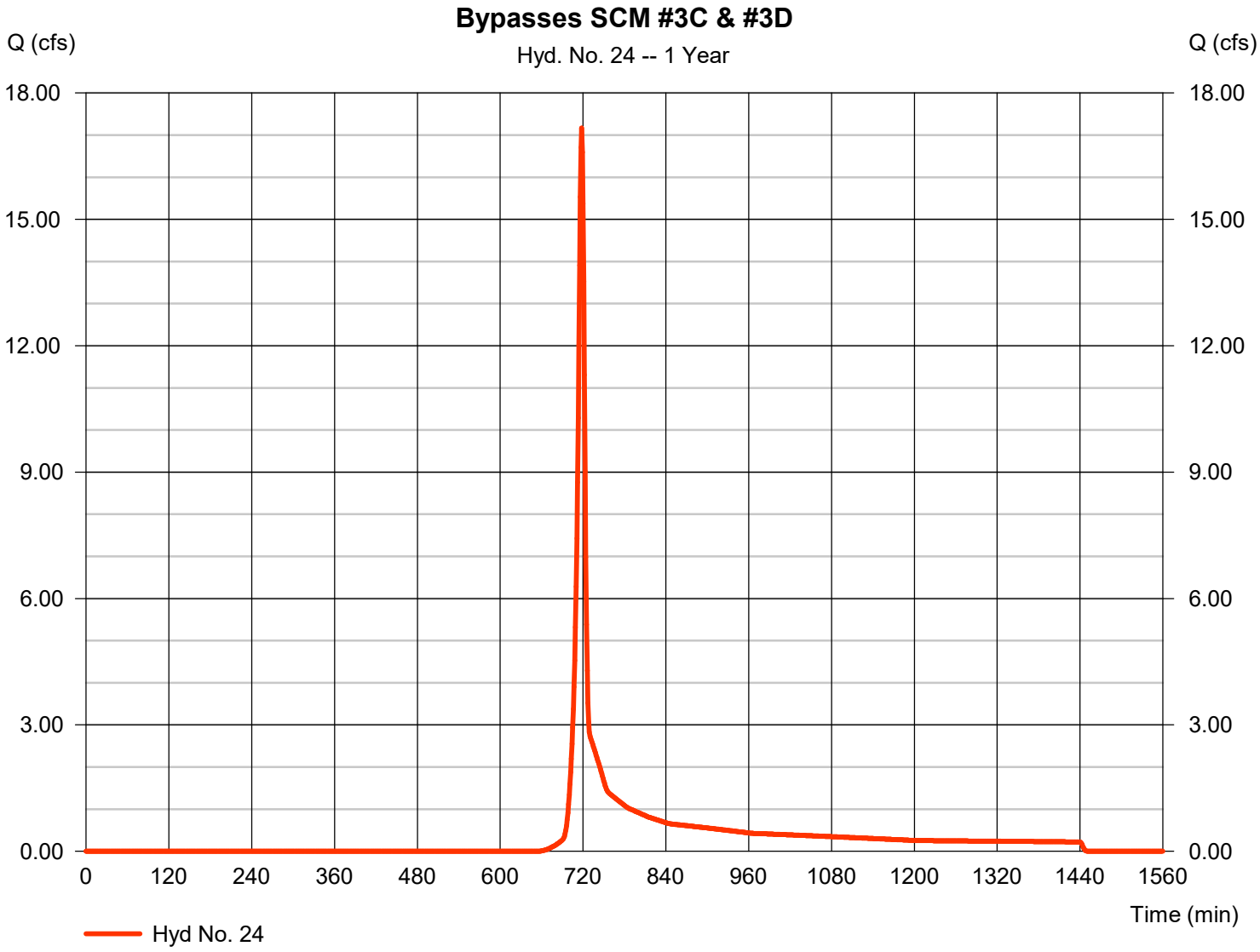


Hydrograph Report

Hyd. No. 24

Bypasses SCM #3C & #3D

Hydrograph type	= SCS Runoff	Peak discharge	= 17.17 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 34,905 cuft
Drainage area	= 9.980 ac	Curve number	= 74.5
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



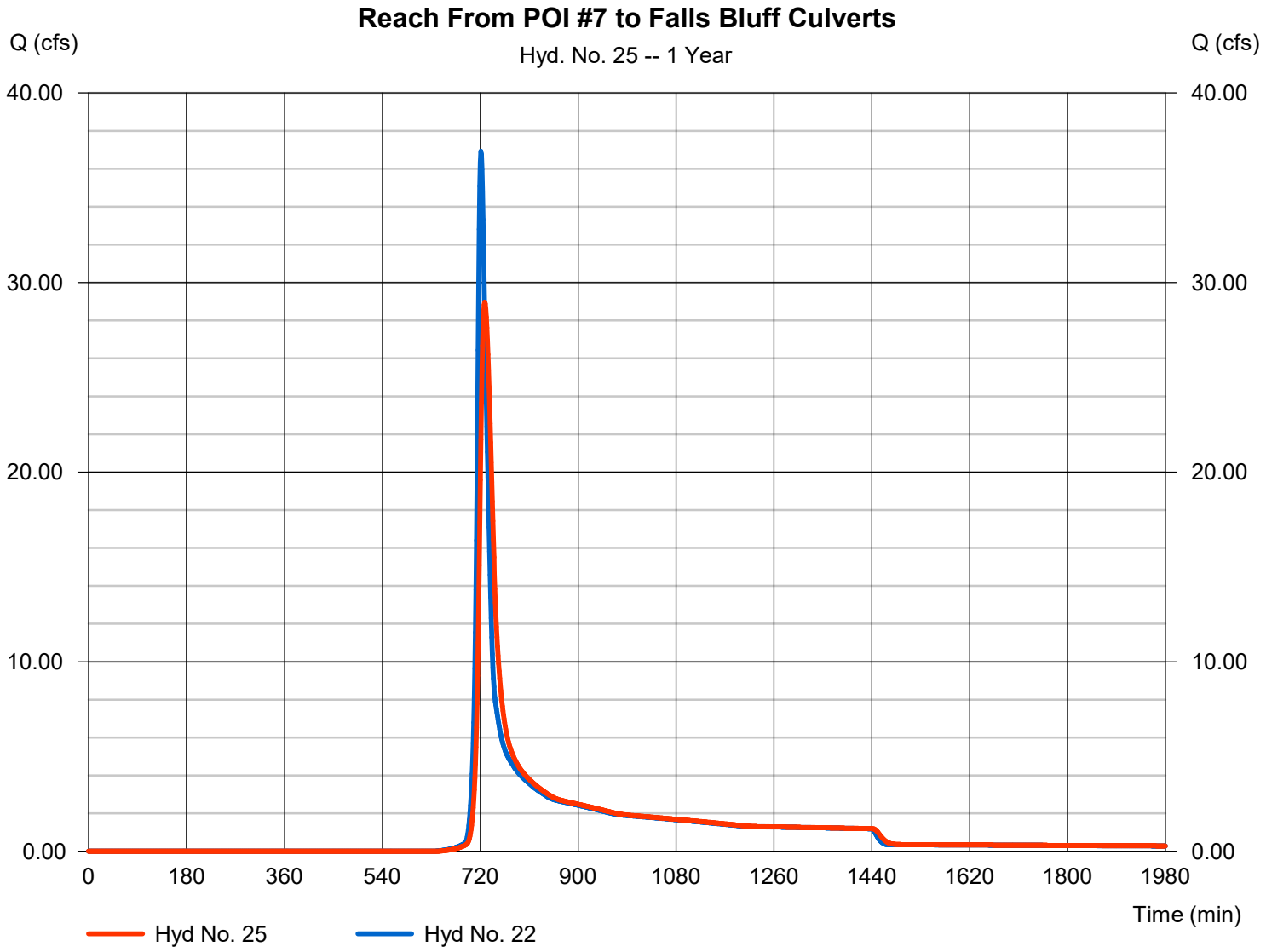
Hydrograph Report

Hyd. No. 25

Reach From POI #7 to Falls Bluff Culverts

Hydrograph type	=	Reach	Peak discharge	=	28.97 cfs
Storm frequency	=	1 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	158,104 cuft
Inflow hyd. No.	=	22 - Merge All PostDev Flow @ POI #7	Section type	=	Trapezoidal
Reach length	=	1845.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	4.0 ft
Side slope	=	30.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.289	Rating curve m	=	1.183
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1269

Modified Att-Kin routing method used.

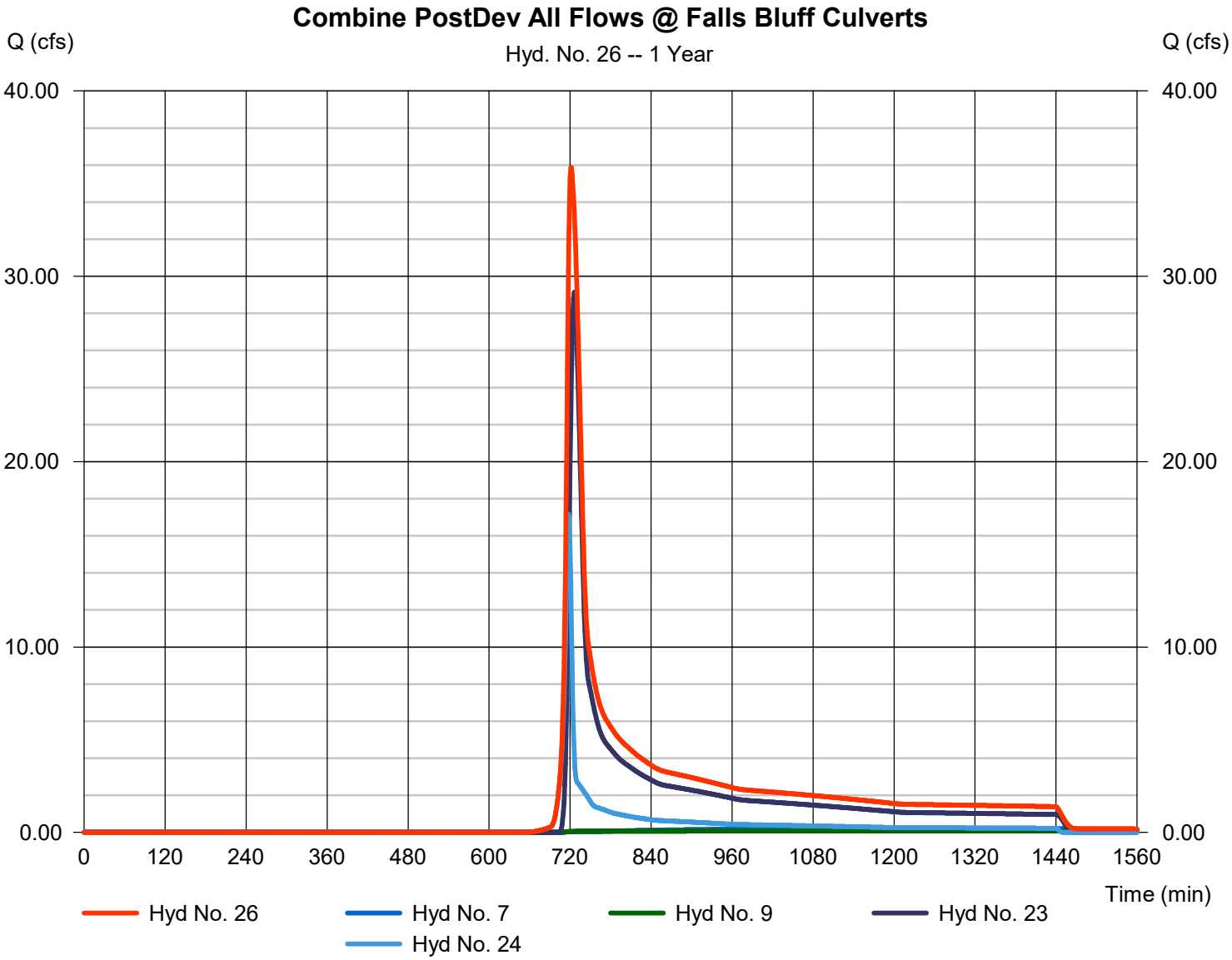


Hydrograph Report

Hyd. No. 26

Combine PostDev All Flows @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 35.86 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 168,230 cuft
Inflow hyds.	= 7, 9, 23, 24	Contrib. drain. area	= 74.010 ac

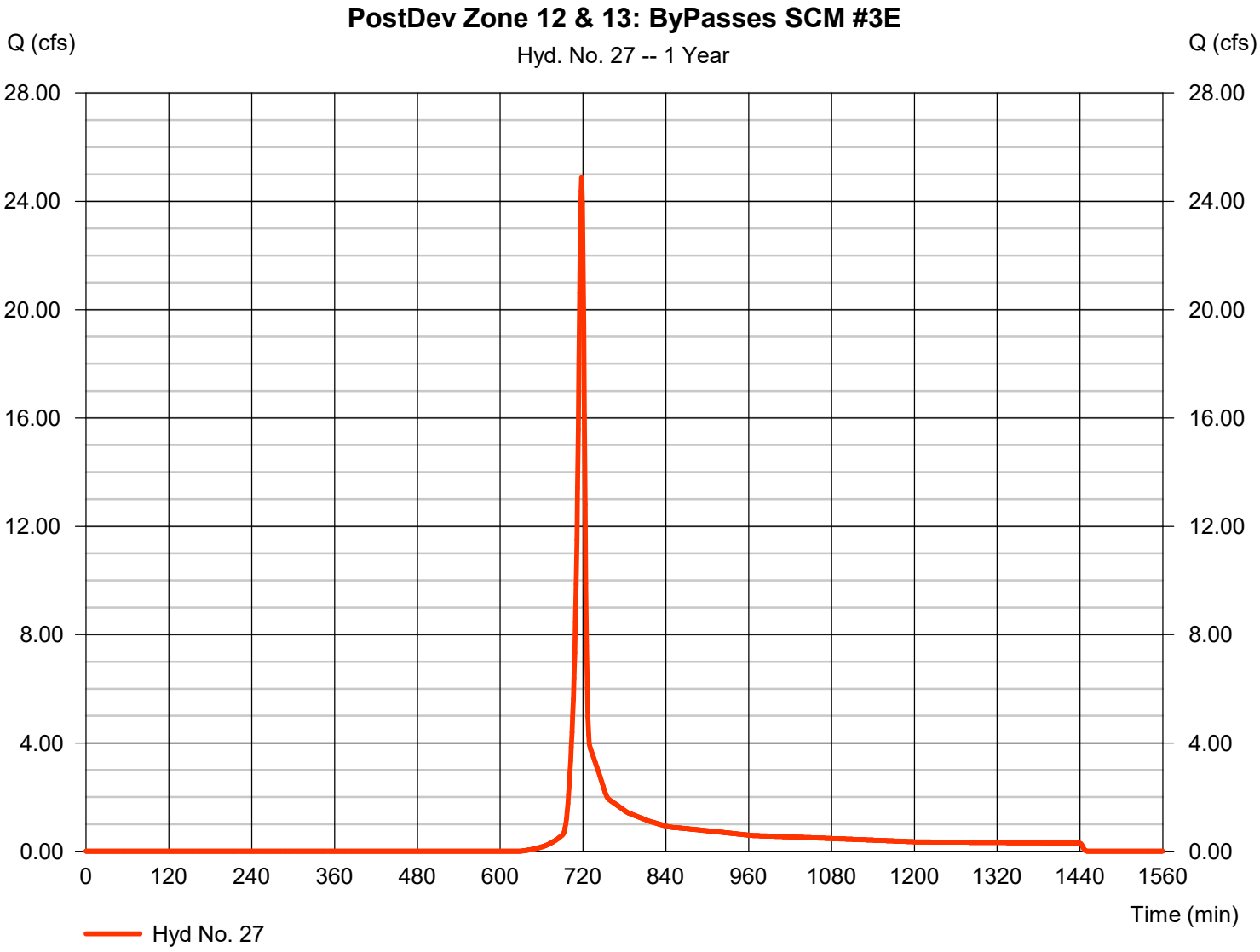


Hydrograph Report

Hyd. No. 27

PostDev Zone 12 & 13: ByPasses SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 24.88 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 50,117 cuft
Drainage area	= 12.500 ac	Curve number	= 77
Basin Slope	= 5.7 %	Hydraulic length	= 1080 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 5.08 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

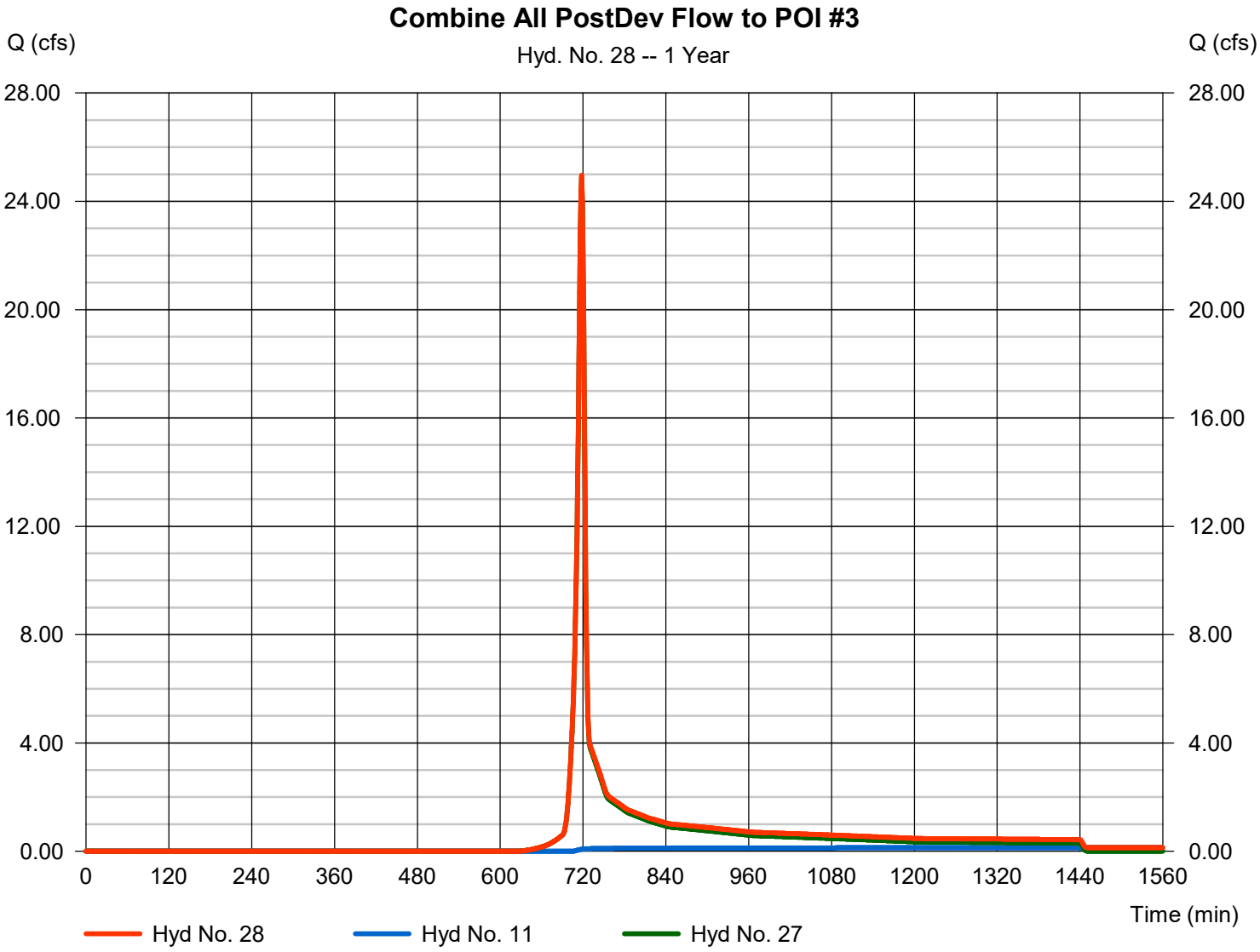


Hydrograph Report

Hyd. No. 28

Combine All PostDev Flow to POI #3

Hydrograph type	= Combine	Peak discharge	= 24.95 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 65,296 cuft
Inflow hyds.	= 11, 27	Contrib. drain. area	= 12.500 ac



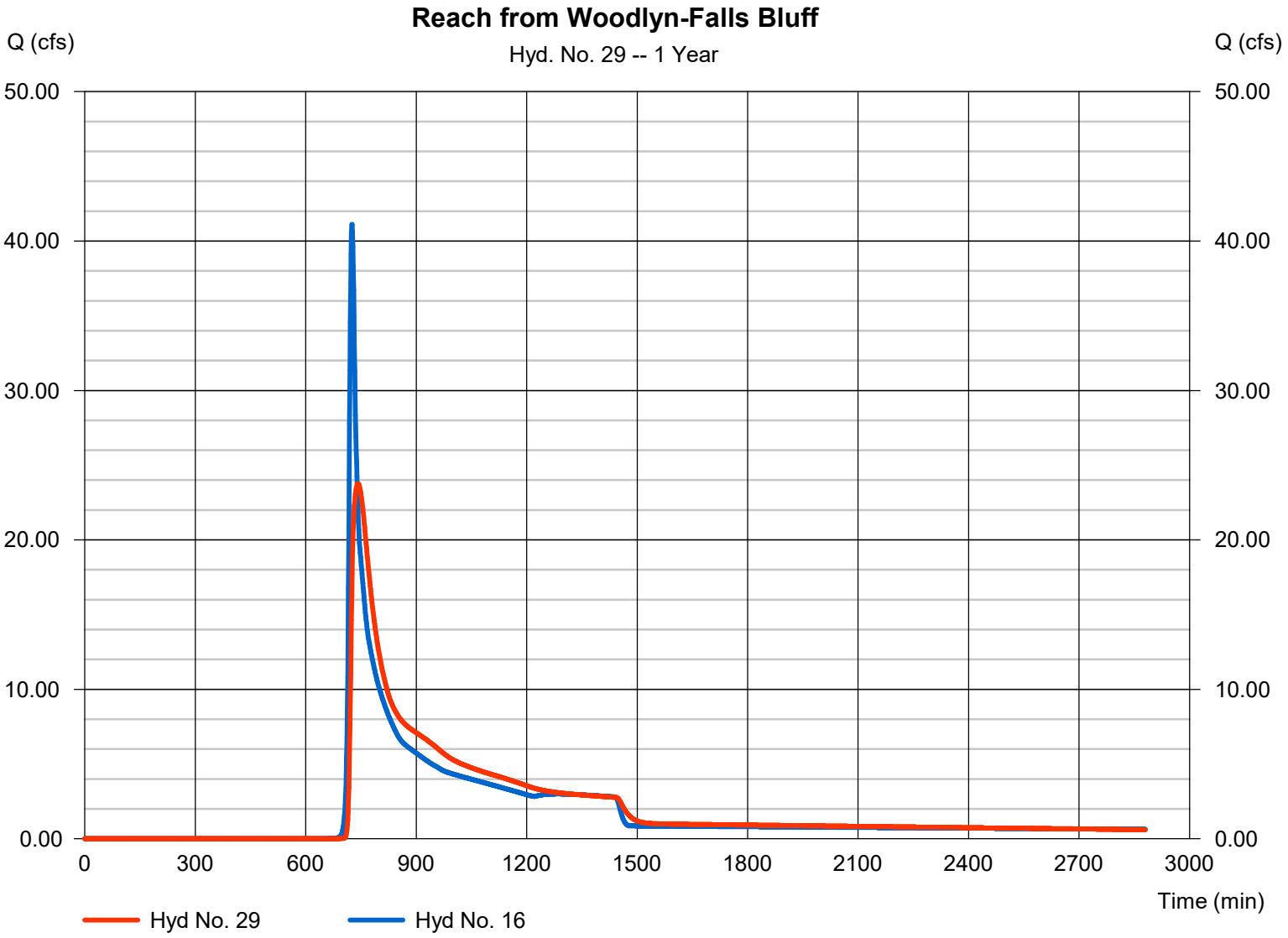
Hydrograph Report

Hyd. No. 29

Reach from Woodlyn-Falls Bluff

Hydrograph type	=	Reach	Peak discharge	=	23.76 cfs
Storm frequency	=	1 yrs	Time to peak	=	742 min
Time interval	=	1 min	Hyd. volume	=	349,927 cuft
Inflow hyd. No.	=	16 - Merge All PostDev @ Woodlyn	Section type	=	Trapezoidal
Reach length	=	12152.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.009	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	6.0 ft
Rating curve x	=	5.011	Rating curve m	=	1.255
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0483

Modified Att-Kin routing method used.

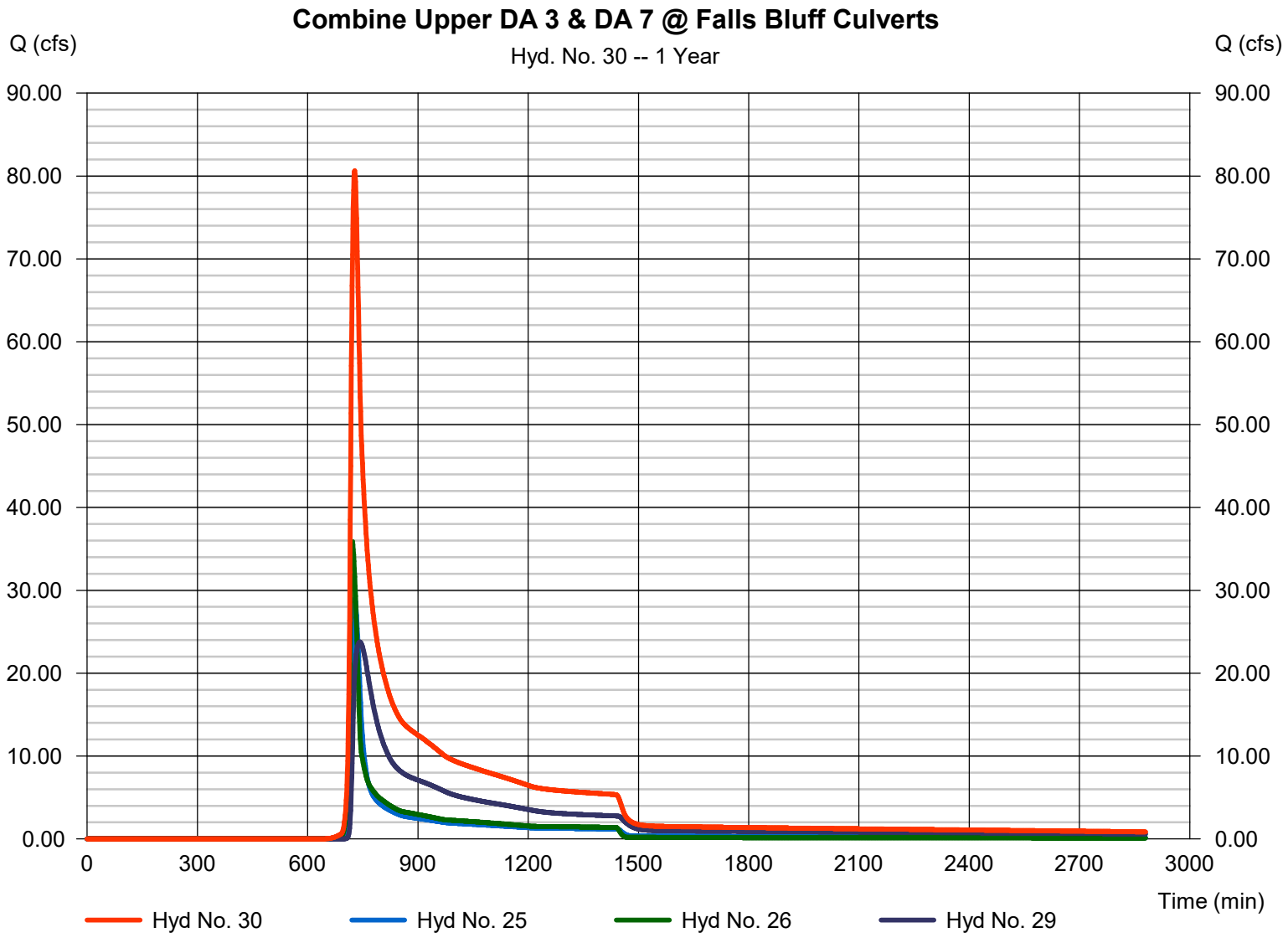


Hydrograph Report

Hyd. No. 30

Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts

Hydrograph type	=	Combine	Peak discharge	=	80.65 cfs
Storm frequency	=	1 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	676,261 cuft
Inflow hyds.	=	25, 26, 29	Contrib. drain. area	=	0.000 ac



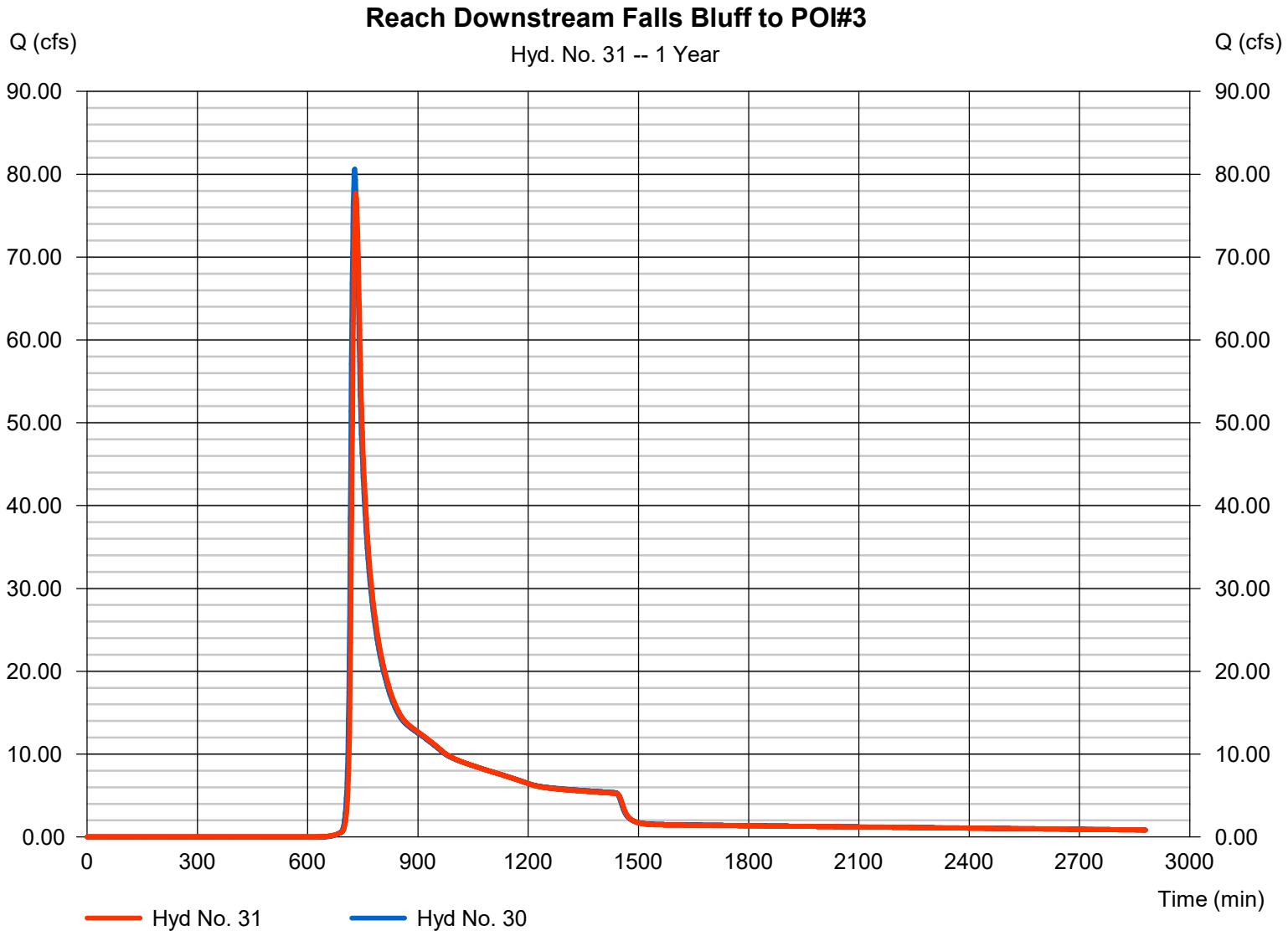
Hydrograph Report

Hyd. No. 31

Reach Downstream Falls Bluff to POI#3

Hydrograph type	=	Reach	Peak discharge	=	77.69 cfs
Storm frequency	=	1 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	666,251 cuft
Inflow hyd. No.	=	30 - Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts	Section type	=	Trapezoidal
Reach length	=	1200.0 ft	Channel slope	=	5.0 %
Manning's n	=	0.030	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	8.0 ft
Rating curve x	=	3.361	Rating curve m	=	1.269
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.3448

Modified Att-Kin routing method used.

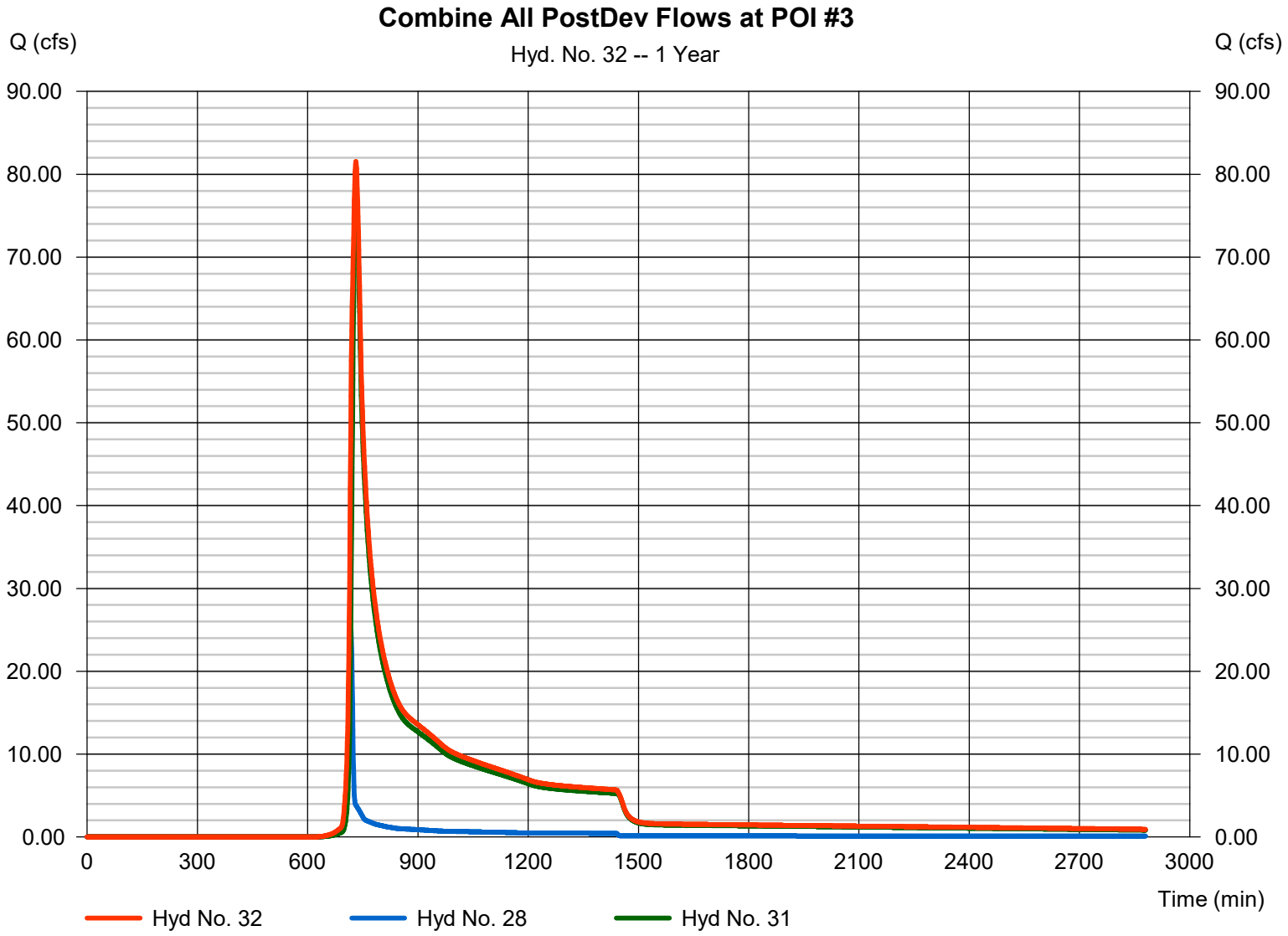


Hydrograph Report

Hyd. No. 32

Combine All PostDev Flows at POI #3

Hydrograph type	= Combine	Peak discharge	= 81.55 cfs
Storm frequency	= 1 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 731,547 cuft
Inflow hyds.	= 28, 31	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

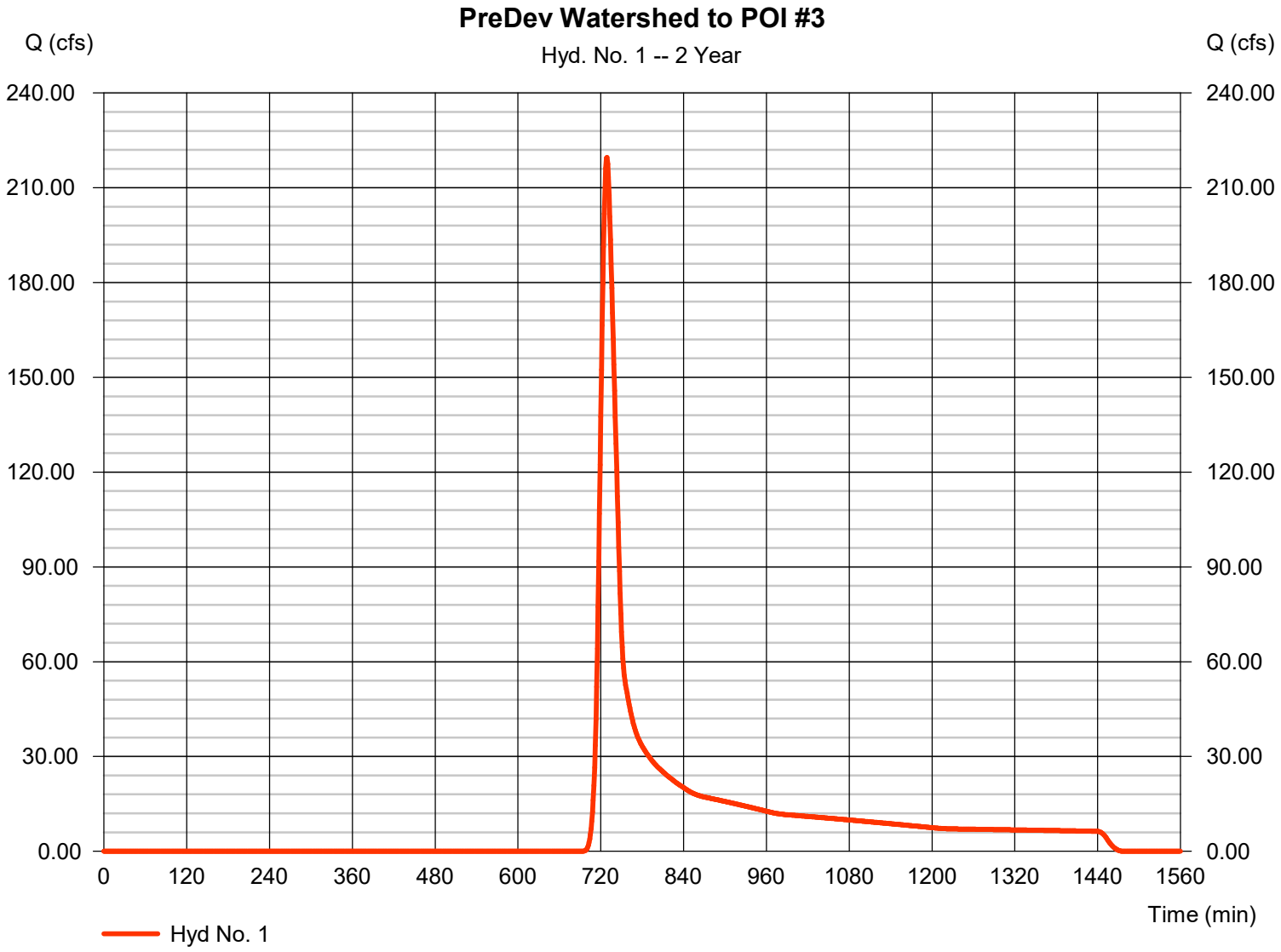
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	219.57	1	729	868,588	------	------	------	PreDev Watershed to POI #3
2	SCS Runoff	78.23	1	722	210,289	------	------	------	Phase 3: PostDev to SCM #3B
3	Reservoir	33.31	1	733	187,222	2	353.38	178,278	Route DA#3B To SCM #3B
4	SCS Runoff	51.45	1	722	138,845	------	------	------	Zone 4: PostDev to SCM #3A
5	Reservoir	2.010	1	904	75,382	4	353.58	223,812	DA #3A Routed SCM #3A
6	SCS Runoff	16.61	1	721	42,324	------	------	------	PostDev to SCM #3C
7	Reservoir	0.445	1	936	21,524	6	341.91	48,607	Route DA3C thru SCM#3C
8	SCS Runoff	14.51	1	718	29,146	------	------	------	PostDev Inflow to SCM#3D
9	Reservoir	0.085	1	1444	10,374	8	346.64	48,820	Route DA to SCM #3D
10	SCS Runoff	17.46	1	718	35,054	------	------	------	PostDev Inflow to SCM #3E
11	Reservoir	0.150	1	1443	17,819	10	308.63	57,149	Route Infllow SCM #3E
12	SCS Runoff	7.647	1	721	21,380	------	------	------	Zone 1:Offsite Bypasses SCM #3A&
13	SCS Runoff	21.31	1	722	55,690	------	------	------	Zone 5: Onsite PostDevBypass to Wo
14	SCS Runoff	48.36	1	723	150,517	------	------	------	Zone 3: Offsite Bypass to Graymont
15	Reach	41.98	1	728	150,514	14	------	------	Reach from Graymont to Woodlyn
16	Combine	70.72	1	730	468,283	3, 5, 12, 13, 15	------	------	Merge All PostDev @ Woodlyn
17	SCS Runoff	90.55	1	725	276,577	------	------	------	PreDev Flows at POI #7
18	SCS Runoff	36.63	1	725	116,590	------	------	------	PostDev Zone 14 & 15 Bypasses to P
19	SCS Runoff	20.70	1	721	52,371	------	------	------	PostDev to SCM #7A
20	SCS Runoff	22.19	1	719	46,824	------	------	------	PostDev Zone 17-Onsite Bypass to P
21	Reservoir	1.013	1	827	46,453	19	373.44	51,788	Route DA thru SCM #7A
22	Combine	51.95	1	721	209,868	18, 20, 21	------	------	Merge All PostDev Flow @ POI #7
23	SCS Runoff	46.76	1	726	164,668	------	------	------	PostDev Zone 6 Bypass From Moody
24	SCS Runoff	22.92	1	718	46,170	------	------	------	Bypasses SCM #3C & #3D
25	Reach	41.65	1	728	209,791	22	------	------	Reach From POI #7 to Falls Bluff Cul
26	Combine	56.38	1	722	237,445	7, 9, 23, 24,	------	------	Combine PostDev All Flows @ Falls
27	SCS Runoff	32.47	1	718	65,204	------	------	------	PostDev Zone 12 & 13: ByPasses SC
28	Combine	32.56	1	718	82,930	11, 27	------	------	Combine All PostDev Flow to POI #3
29	Reach	47.48	1	737	486,974	16	------	------	Reach from Woodlyn-Falls Bluff
30	Combine	128.68	1	728	934,210	25, 26, 29	------	------	Combine Upper DA 3 & DA 7 @ Falls
31	Reach	127.06	1	731	918,592	30	------	------	Reach Downstream Falls Bluff to POI
32	Combine	131.95	1	731	1,001,523	28, 31	------	------	Combine All PostDev Flows at POI #3

Hydrograph Report

Hyd. No. 1

PreDev Watershed to POI #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	219.57 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	868,588 cuft
Drainage area	=	300.880 ac	Curve number	=	66.6
Basin Slope	=	3.0 %	Hydraulic length	=	5451 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	22.67 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

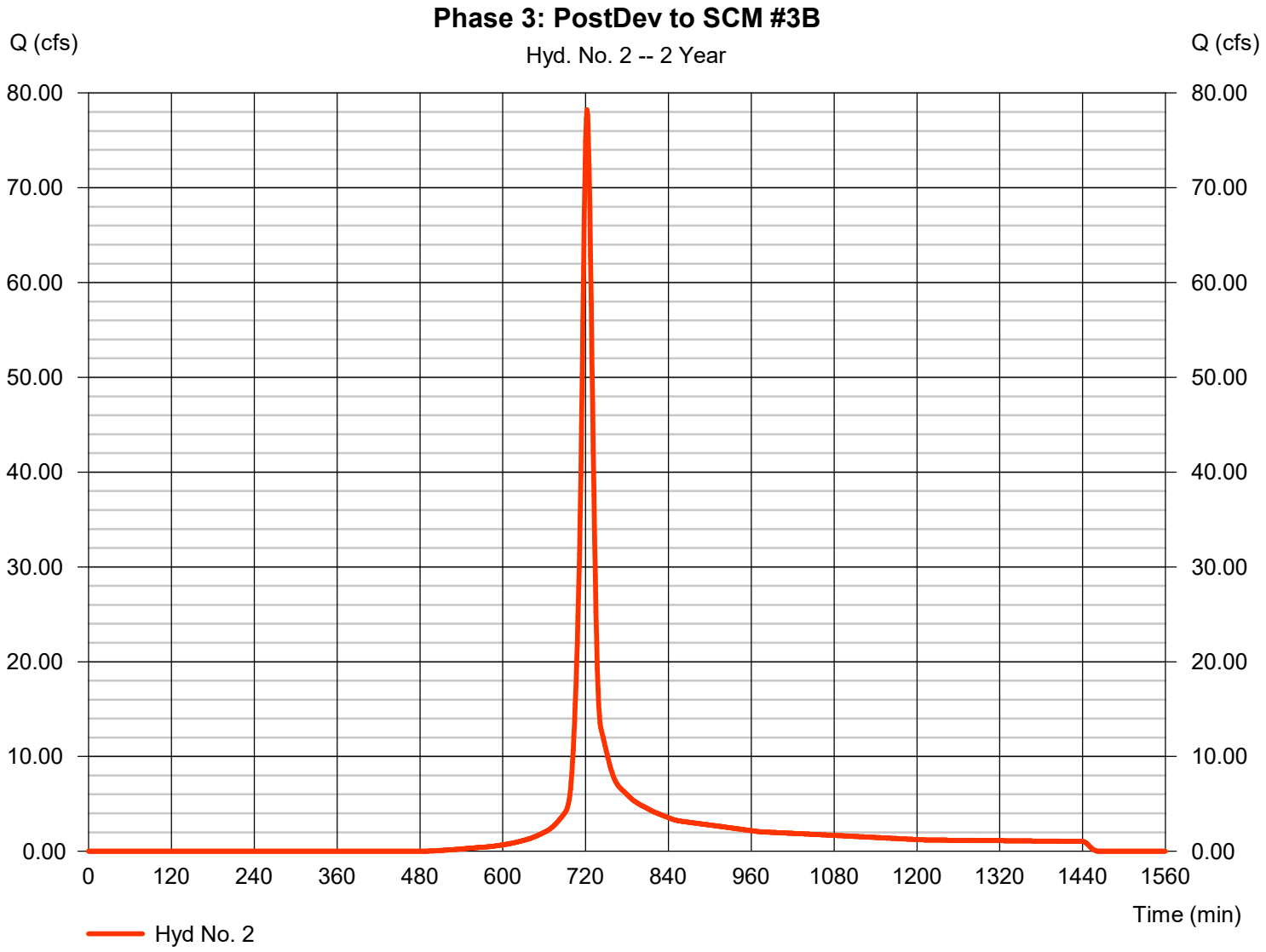


Hydrograph Report

Hyd. No. 2

Phase 3: PostDev to SCM #3B

Hydrograph type	= SCS Runoff	Peak discharge	= 78.23 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 210,289 cuft
Drainage area	= 31.890 ac	Curve number	= 83
Basin Slope	= 1.9 %	Hydraulic length	= 2520 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.80 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



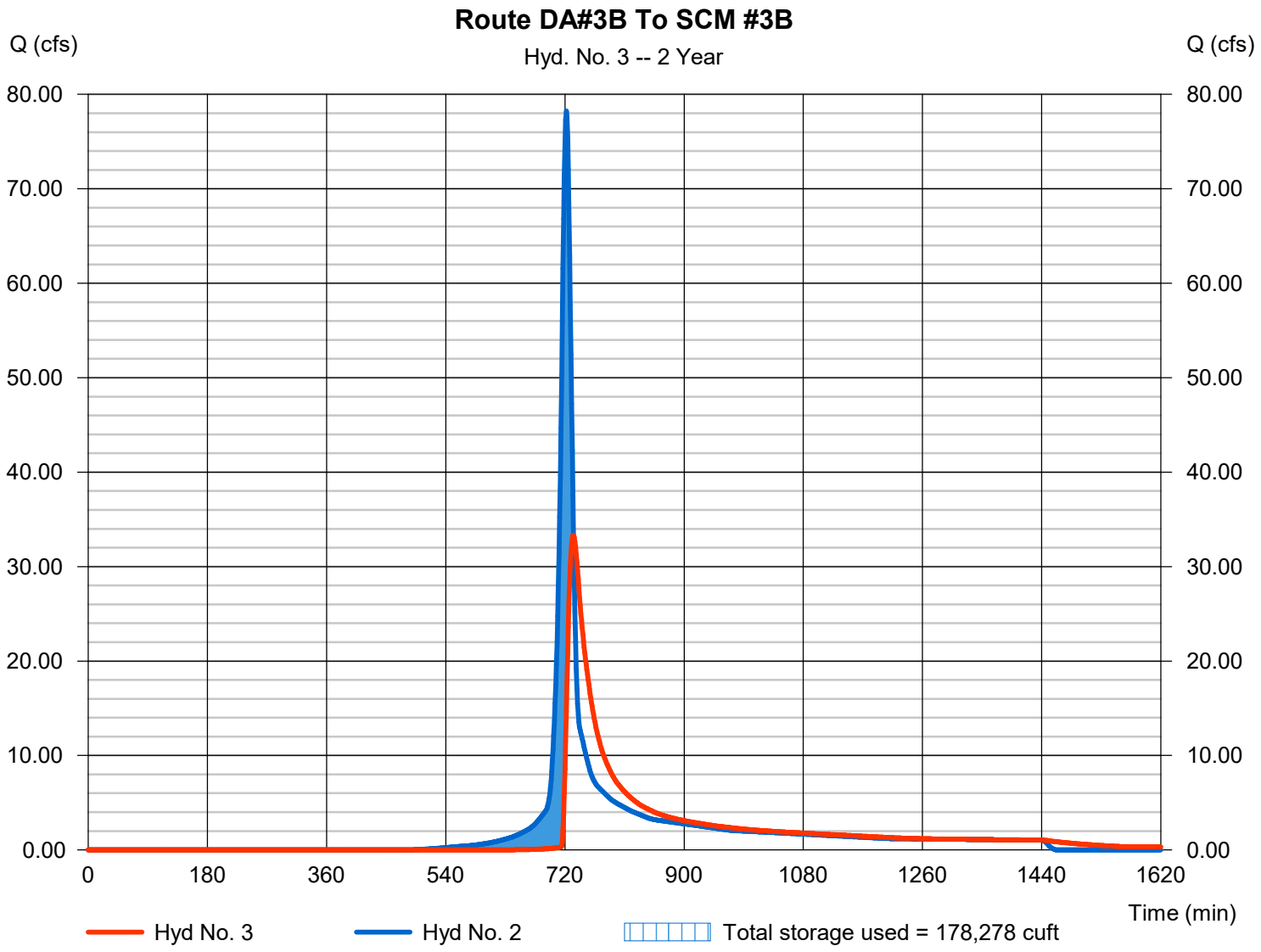
Hydrograph Report

Hyd. No. 3

Route DA#3B To SCM #3B

Hydrograph type	=	Reservoir	Peak discharge	=	33.31 cfs
Storm frequency	=	2 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	187,222 cuft
Inflow hyd. No.	=	2 - Phase 3: PostDev to SCM #3B	Max. Elevation	=	353.38 ft
Reservoir name	=	SCM 3B-rev102924	Max. Storage	=	178,278 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

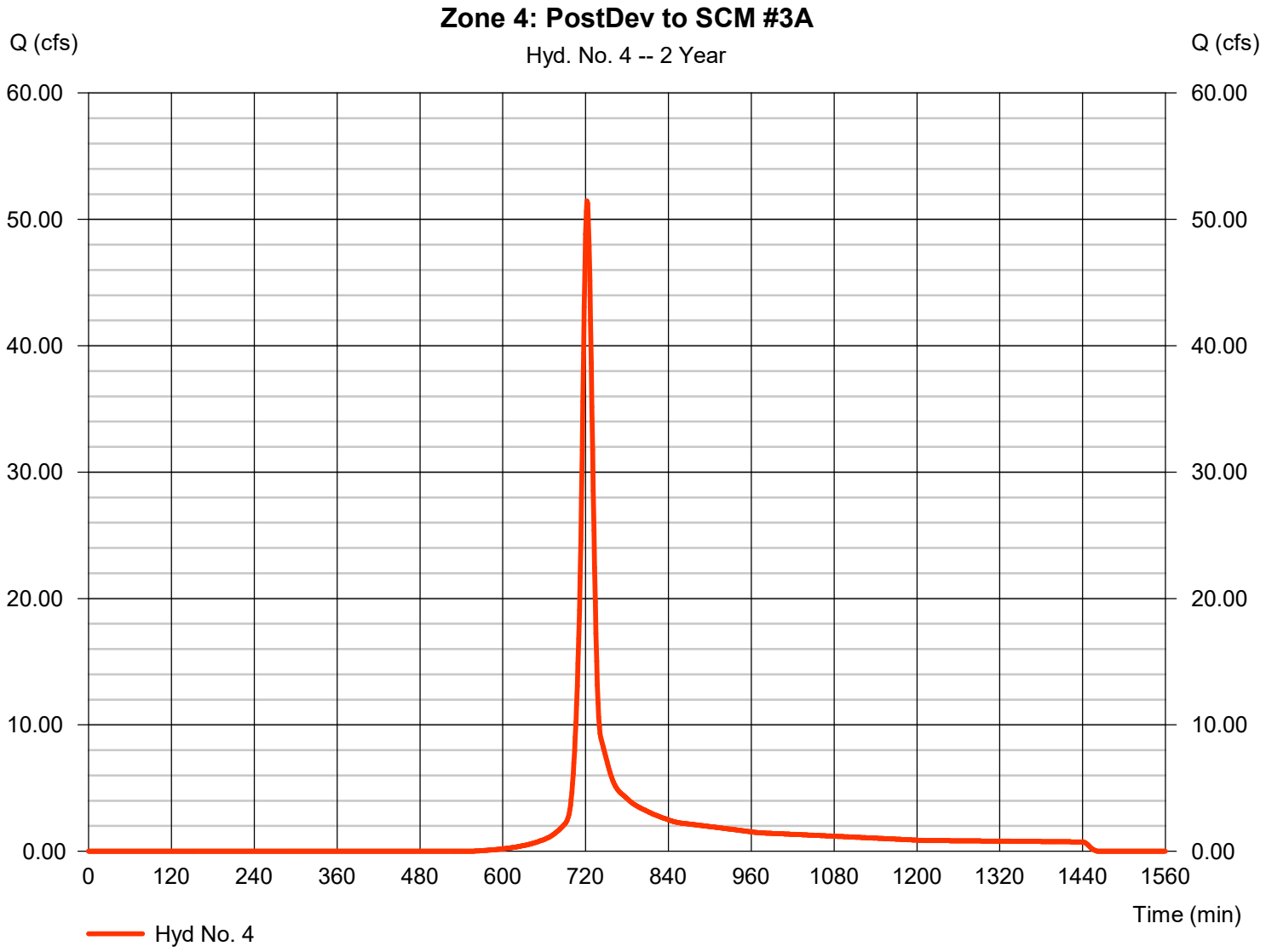


Hydrograph Report

Hyd. No. 4

Zone 4: PostDev to SCM #3A

Hydrograph type	= SCS Runoff	Peak discharge	= 51.45 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 138,845 cuft
Drainage area	= 24.600 ac	Curve number	= 79.4
Basin Slope	= 1.5 %	Hydraulic length	= 2250 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.94 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



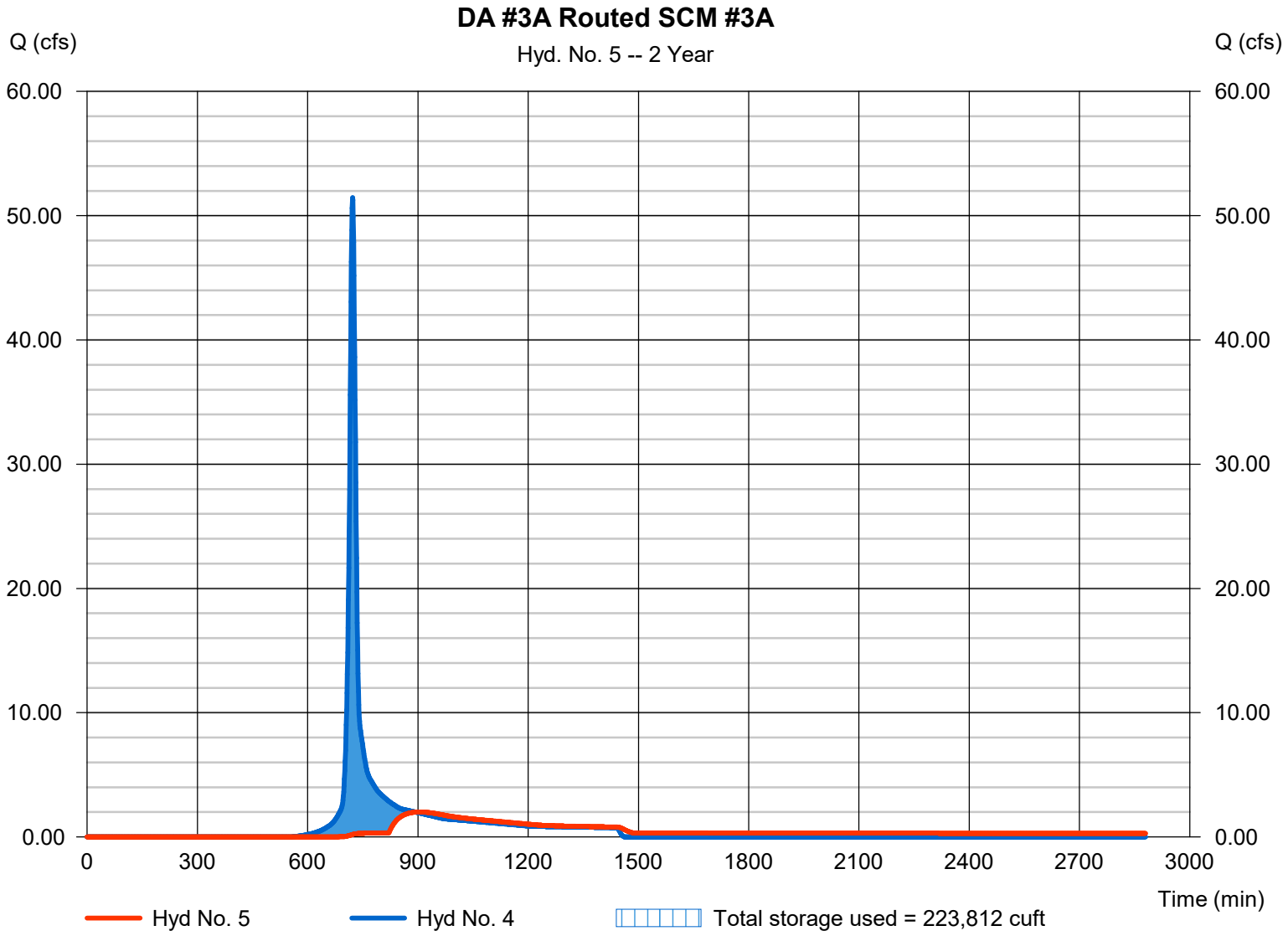
Hydrograph Report

Hyd. No. 5

DA #3A Routed SCM #3A

Hydrograph type	=	Reservoir	Peak discharge	=	2.010 cfs
Storm frequency	=	2 yrs	Time to peak	=	904 min
Time interval	=	1 min	Hyd. volume	=	75,382 cuft
Inflow hyd. No.	=	4 - Zone 4: PostDev to SCM #3A	Max. Elevation	=	353.58 ft
Reservoir name	=	SCM #3A	Max. Storage	=	223,812 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

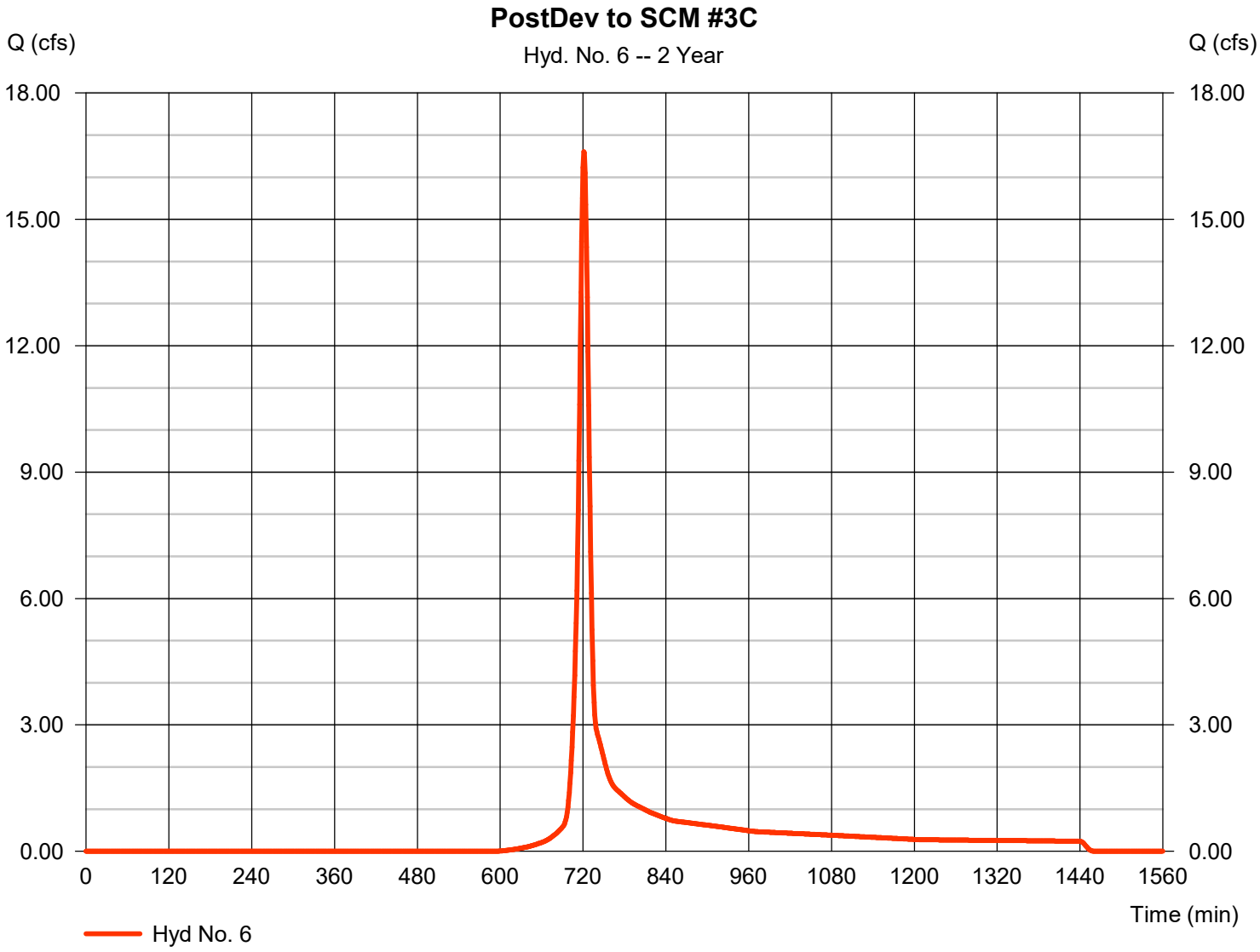


Hydrograph Report

Hyd. No. 6

PostDev to SCM #3C

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.61 cfs
Storm frequency	=	2 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	42,324 cuft
Drainage area	=	8.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



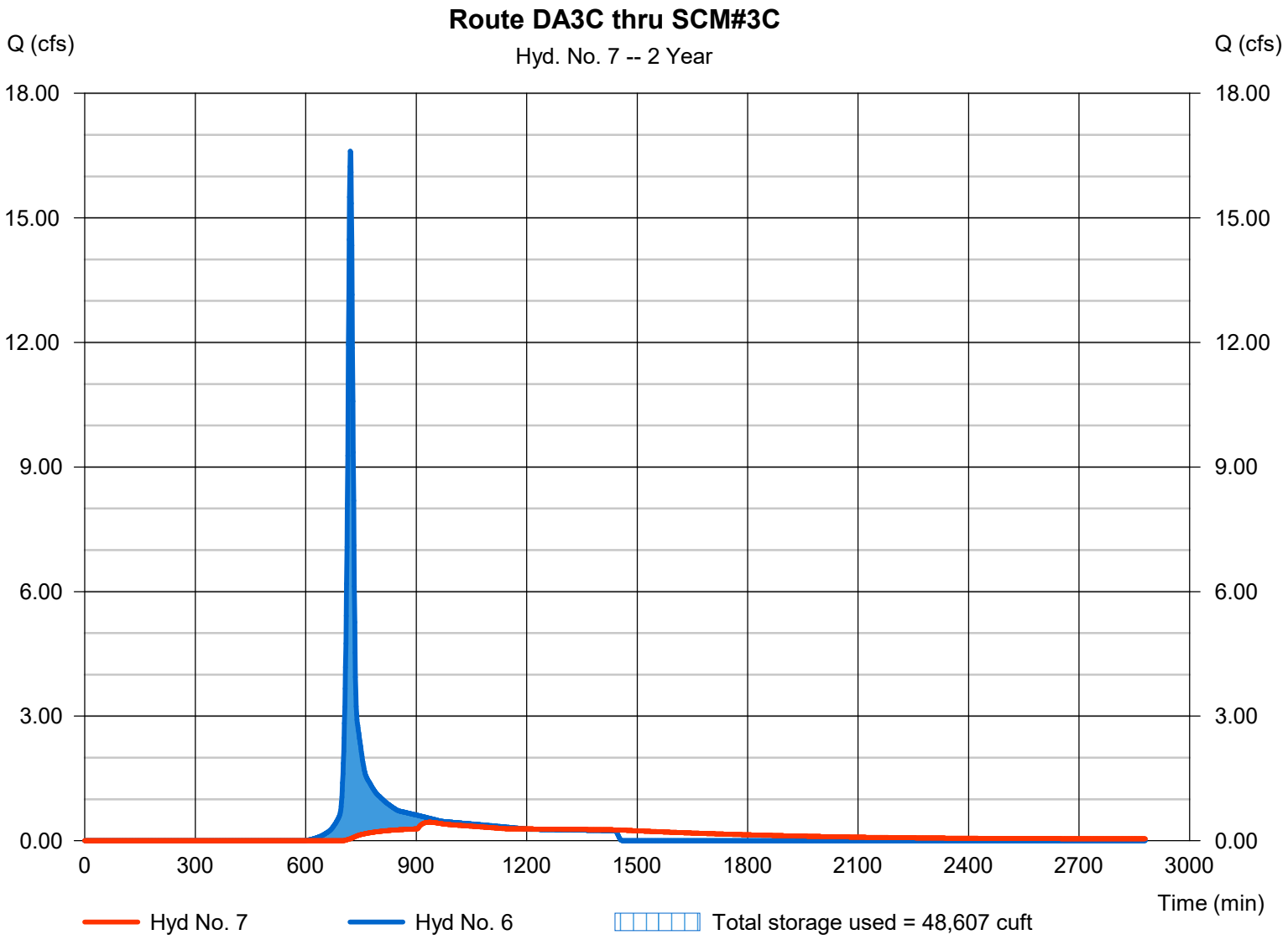
Hydrograph Report

Hyd. No. 7

Route DA3C thru SCM#3C

Hydrograph type	=	Reservoir	Peak discharge	=	0.445 cfs
Storm frequency	=	2 yrs	Time to peak	=	936 min
Time interval	=	1 min	Hyd. volume	=	21,524 cuft
Inflow hyd. No.	=	6 - PostDev to SCM #3C	Max. Elevation	=	341.91 ft
Reservoir name	=	SCM #3C	Max. Storage	=	48,607 cuft

Storage Indication method used. Wet pond routing start elevation = 340.50 ft.

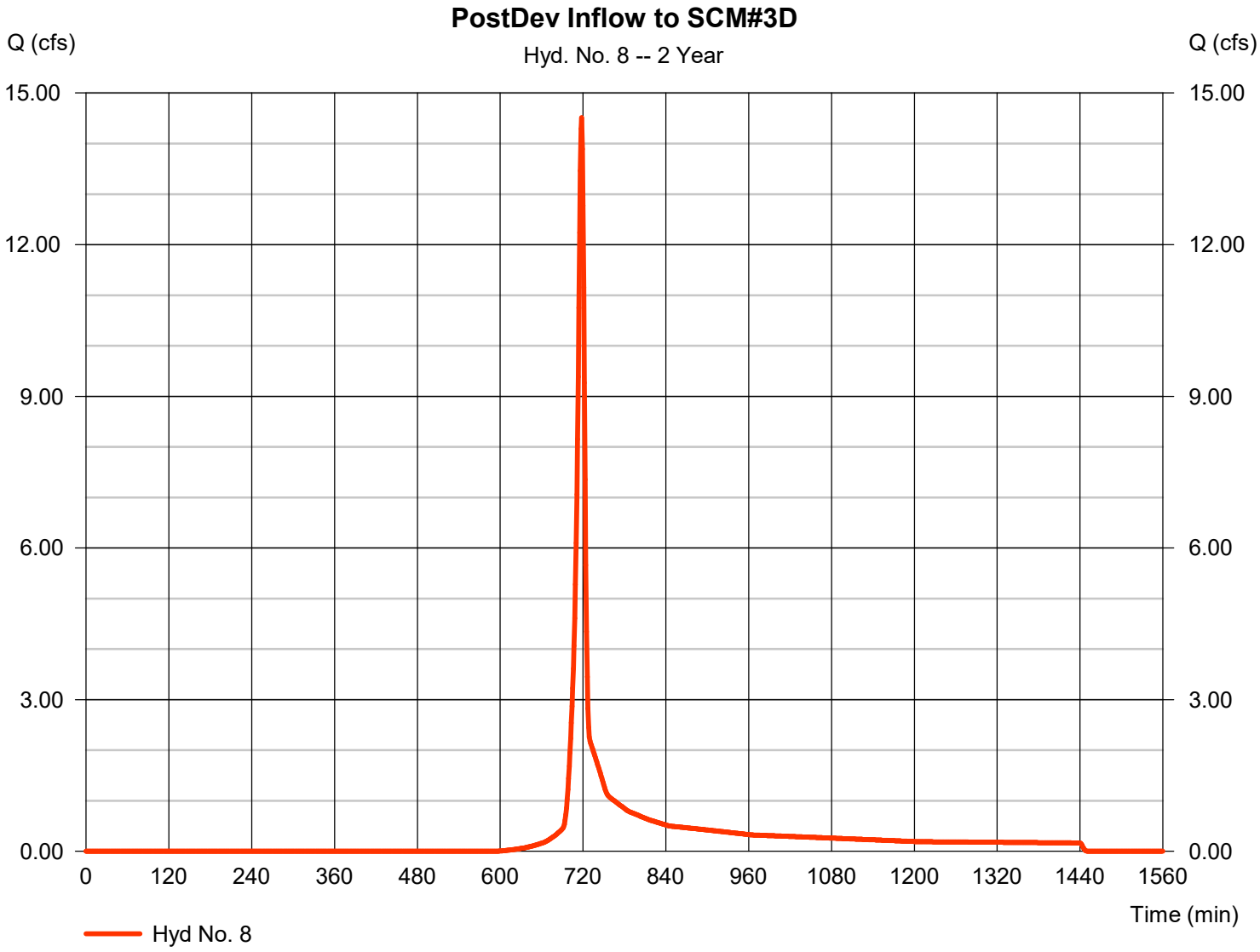


Hydrograph Report

Hyd. No. 8

PostDev Inflow to SCM#3D

Hydrograph type	= SCS Runoff	Peak discharge	= 14.51 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 29,146 cuft
Drainage area	= 5.640 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



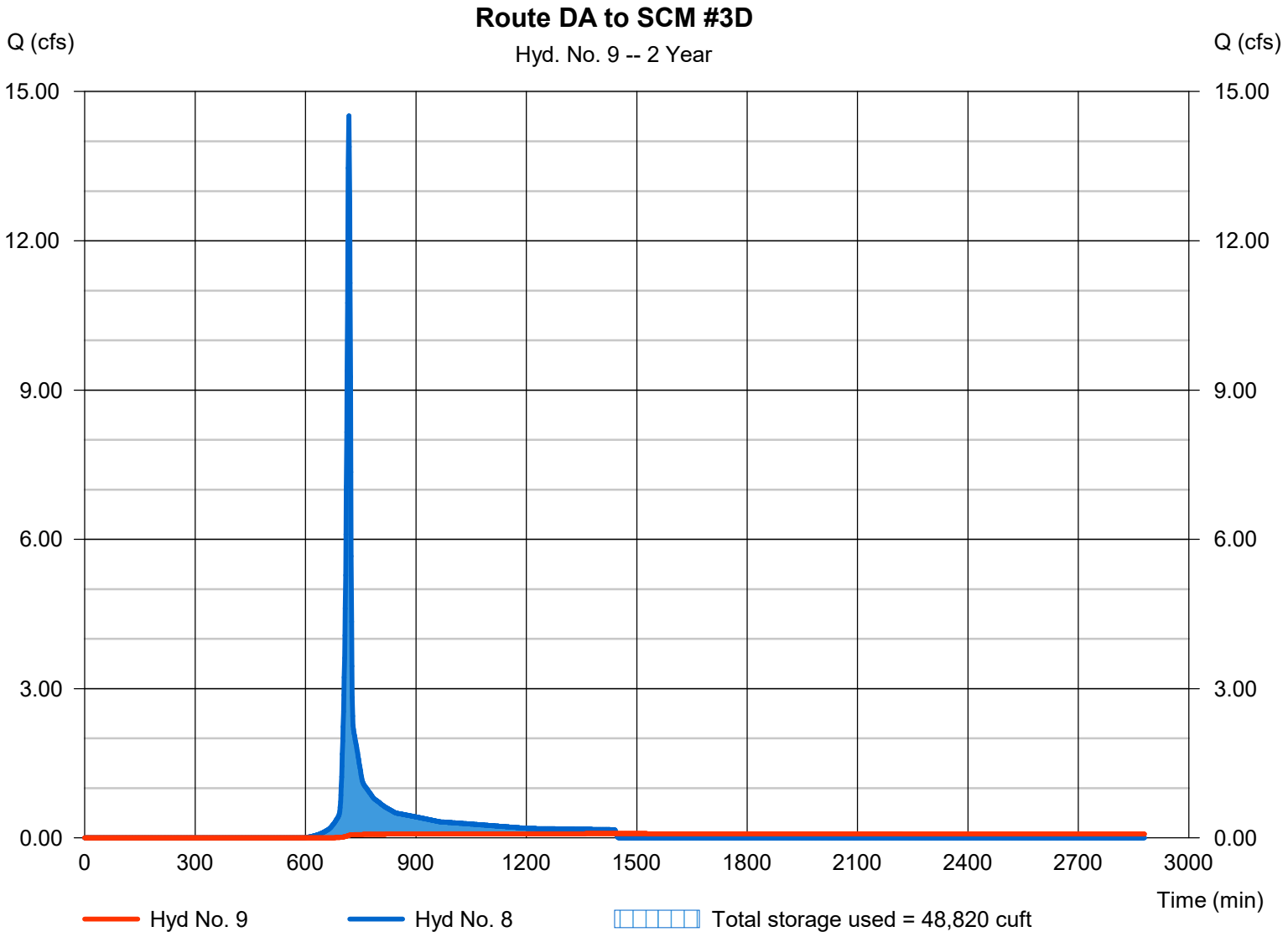
Hydrograph Report

Hyd. No. 9

Route DA to SCM #3D

Hydrograph type	=	Reservoir	Peak discharge	=	0.085 cfs
Storm frequency	=	2 yrs	Time to peak	=	1444 min
Time interval	=	1 min	Hyd. volume	=	10,374 cuft
Inflow hyd. No.	=	8 - PostDev Inflow to SCM#3D	Max. Elevation	=	346.64 ft
Reservoir name	=	SCM #3D	Max. Storage	=	48,820 cuft

Storage Indication method used. Wet pond routing start elevation = 344.50 ft.

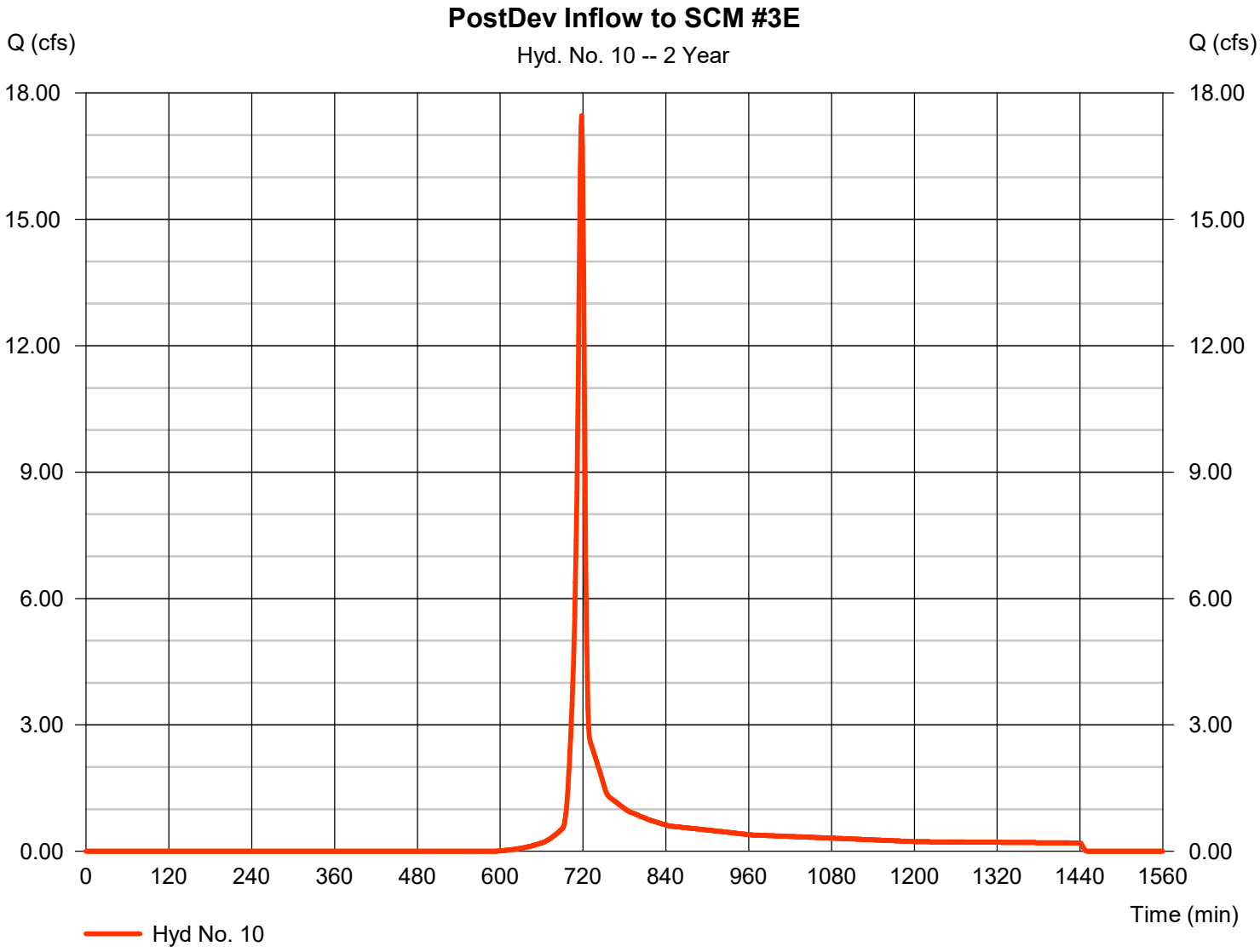


Hydrograph Report

Hyd. No. 10

PostDev Inflow to SCM #3E

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.46 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	35,054 cuft
Drainage area	=	6.720 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



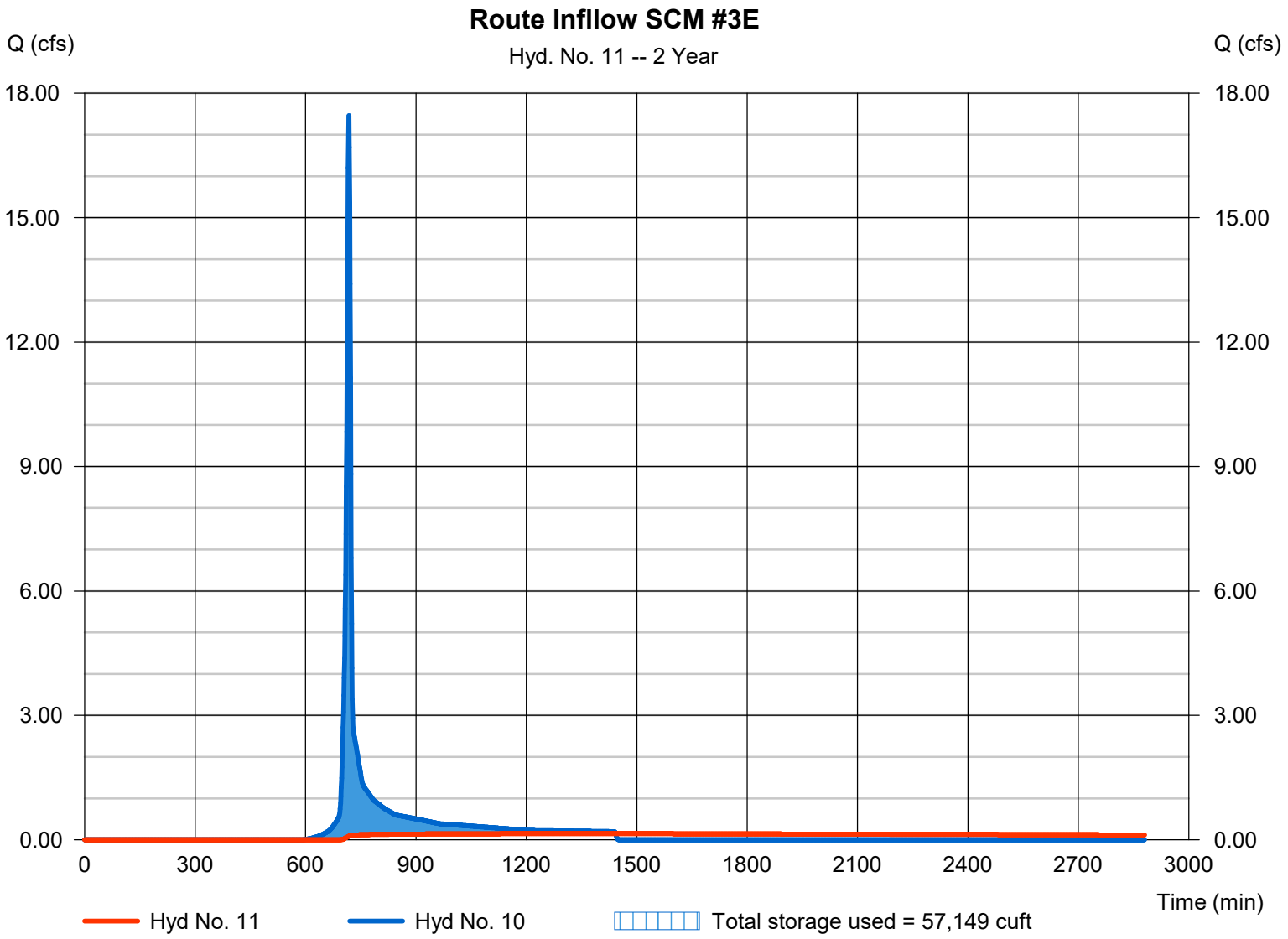
Hydrograph Report

Hyd. No. 11

Route Infllow SCM #3E

Hydrograph type	=	Reservoir	Peak discharge	=	0.150 cfs
Storm frequency	=	2 yrs	Time to peak	=	1443 min
Time interval	=	1 min	Hyd. volume	=	17,819 cuft
Inflow hyd. No.	=	10 - PostDev Inflow to SCM #3E	Max. Elevation	=	308.63 ft
Reservoir name	=	SCM #3E	Max. Storage	=	57,149 cuft

Storage Indication method used. Wet pond routing start elevation = 306.50 ft.

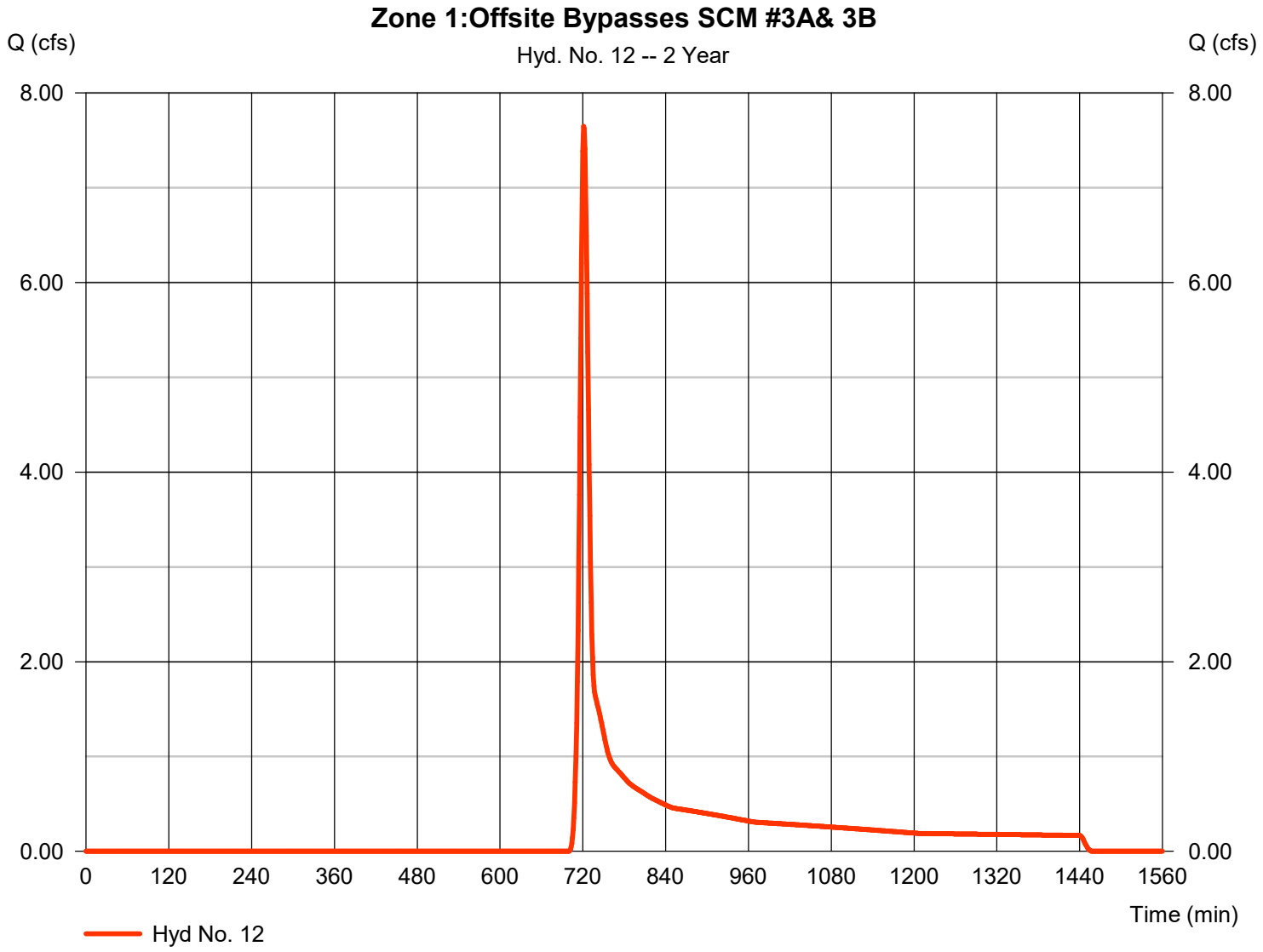


Hydrograph Report

Hyd. No. 12

Zone 1:Offsite Bypasses SCM #3A& 3B

Hydrograph type	= SCS Runoff	Peak discharge	= 7.647 cfs
Storm frequency	= 2 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 21,380 cuft
Drainage area	= 8.510 ac	Curve number	= 64
Basin Slope	= 2.9 %	Hydraulic length	= 1370 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

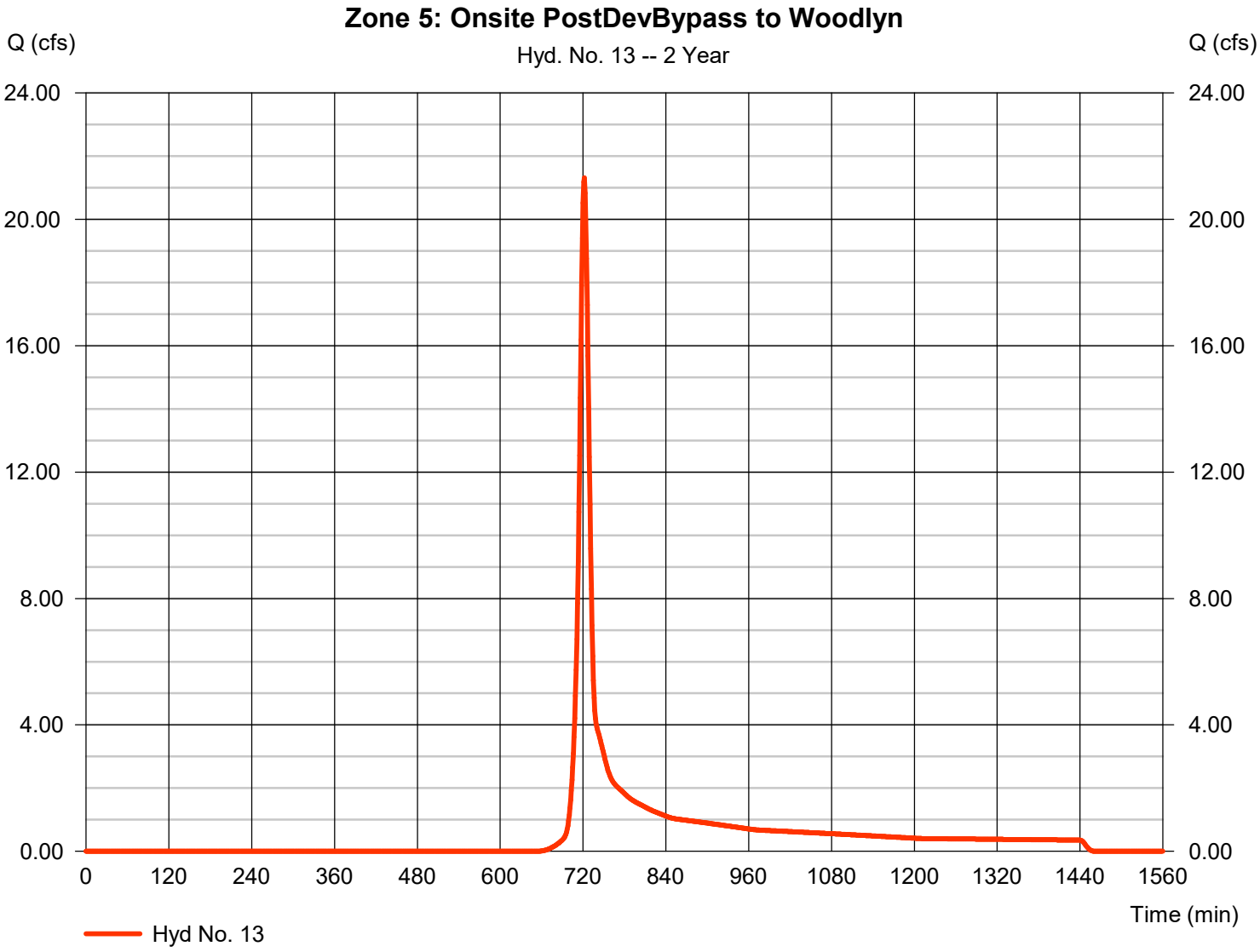


Hydrograph Report

Hyd. No. 13

Zone 5: Onsite PostDevBypass to Woodlyn

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.31 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	55,690 cuft
Drainage area	=	14.320 ac	Curve number	=	72
Basin Slope	=	1.5 %	Hydraulic length	=	1788 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.58 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

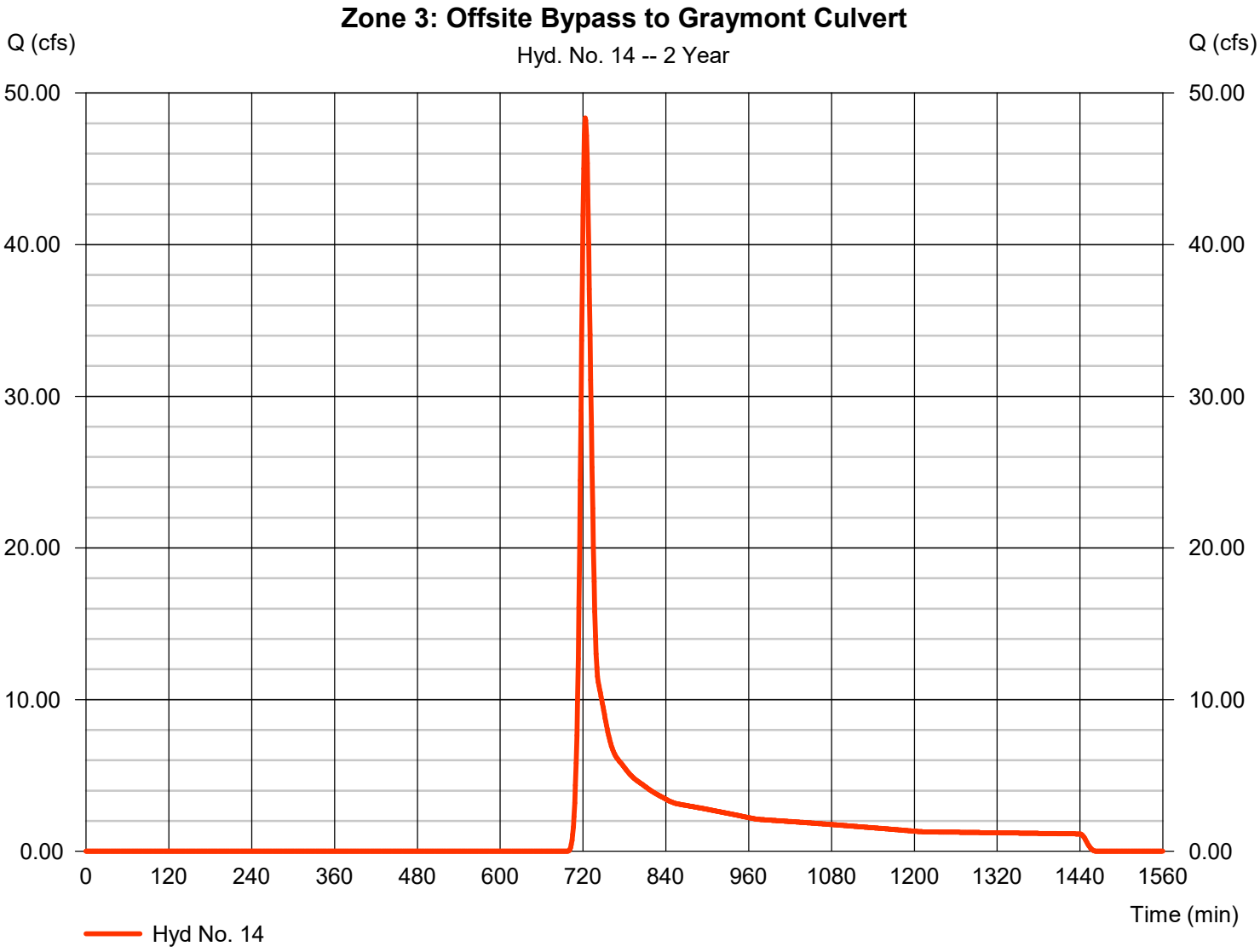


Hydrograph Report

Hyd. No. 14

Zone 3: Offsite Bypass to Graymont Culvert

Hydrograph type	=	SCS Runoff	Peak discharge	=	48.36 cfs
Storm frequency	=	2 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	150,517 cuft
Drainage area	=	57.120 ac	Curve number	=	65
Basin Slope	=	1.8 %	Hydraulic length	=	1220 ft
Tc method	=	User	Time of conc. (Tc)	=	14.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



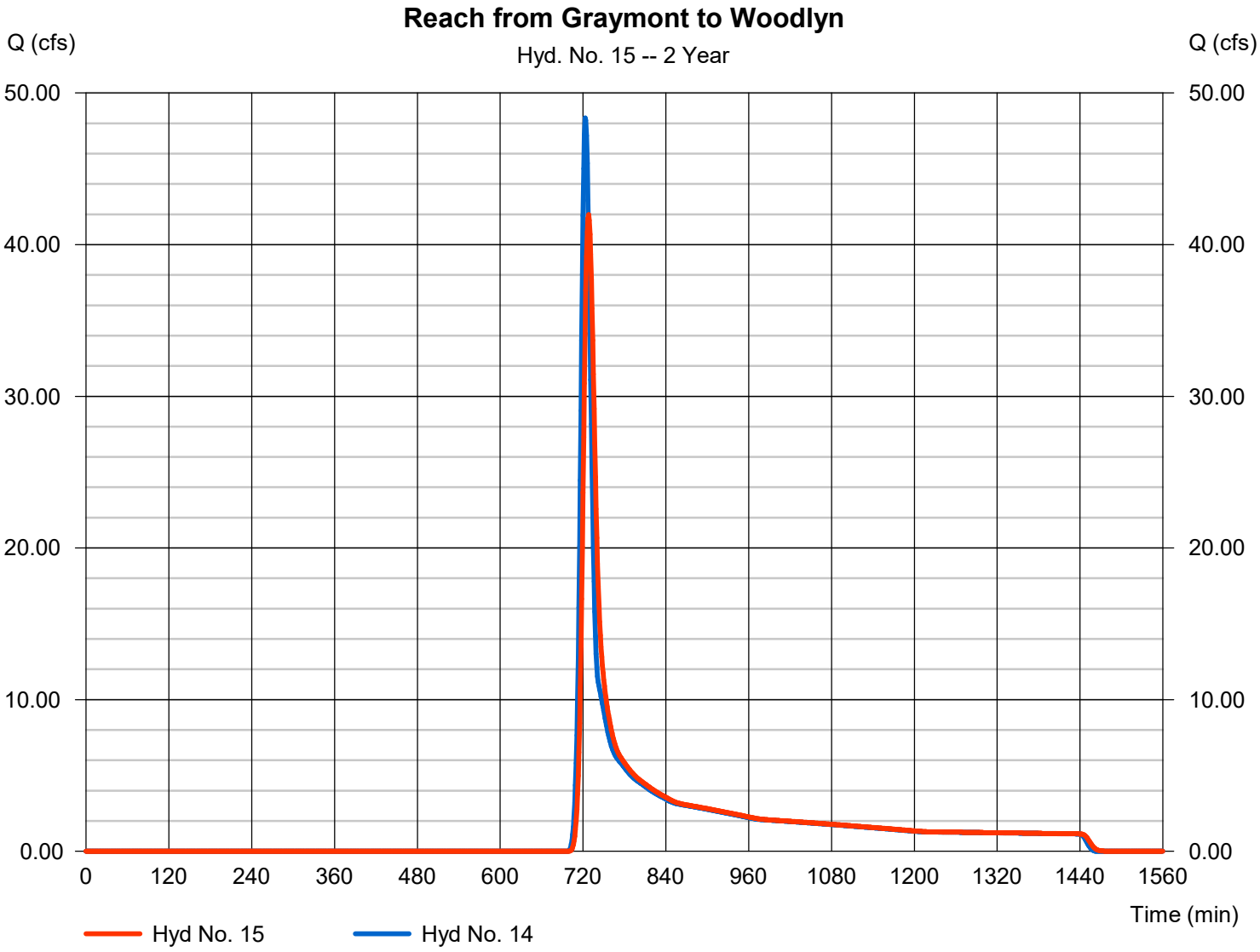
Hydrograph Report

Hyd. No. 15

Reach from Graymont to Woodlyn

Hydrograph type	=	Reach	Peak discharge	=	41.98 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	150,514 cuft
Inflow hyd. No.	=	14 - Zone 3: Offsite Bypass to Graymont Culvert	Section type	=	Trapezoidal
Reach length	=	1750.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	2.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.009	Rating curve m	=	1.370
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2004

Modified Att-Kin routing method used.

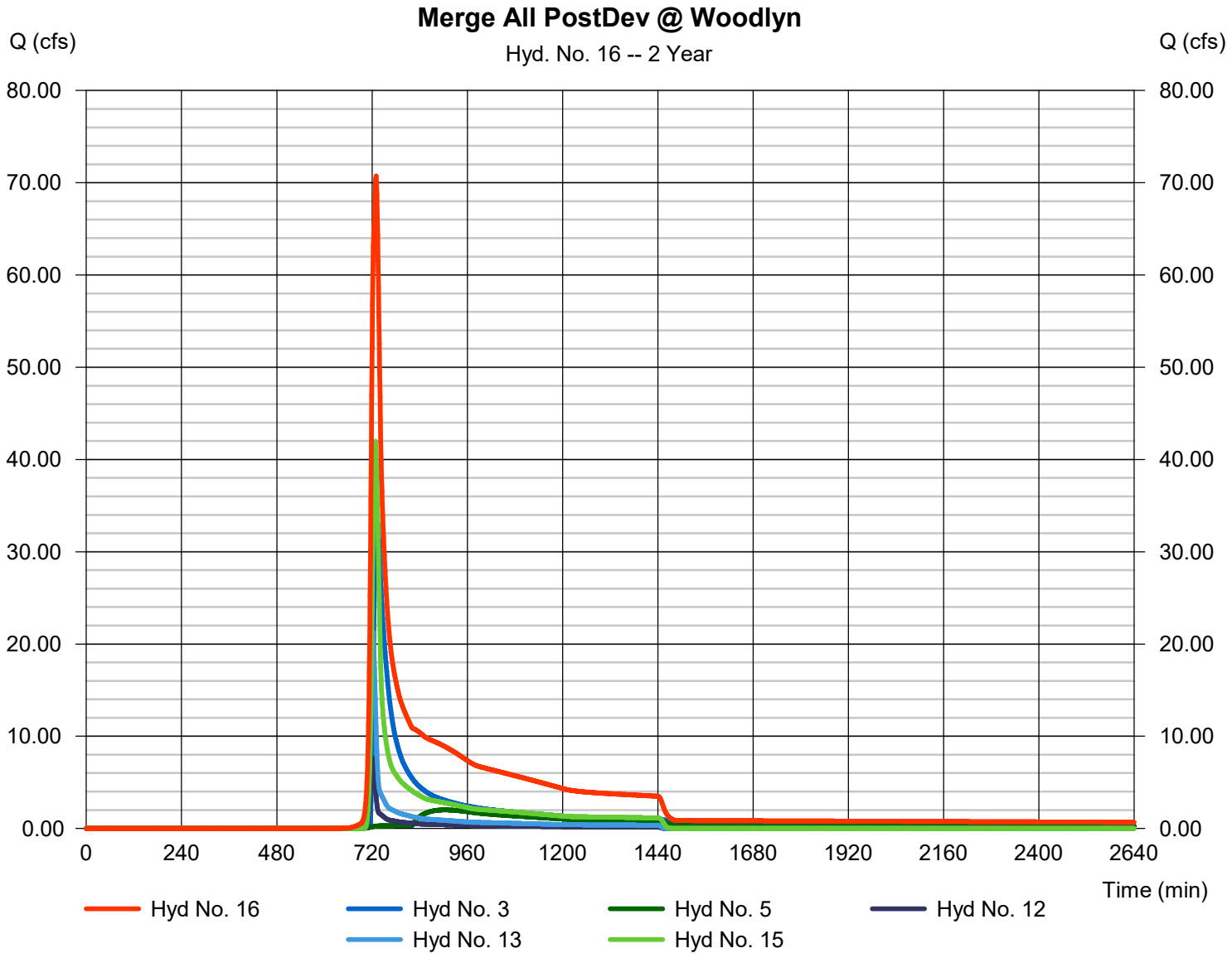


Hydrograph Report

Hyd. No. 16

Merge All PostDev @ Woodlyn

Hydrograph type	= Combine	Peak discharge	= 70.72 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 468,283 cuft
Inflow hyds.	= 3, 5, 12, 13, 15	Contrib. drain. area	= 22.830 ac

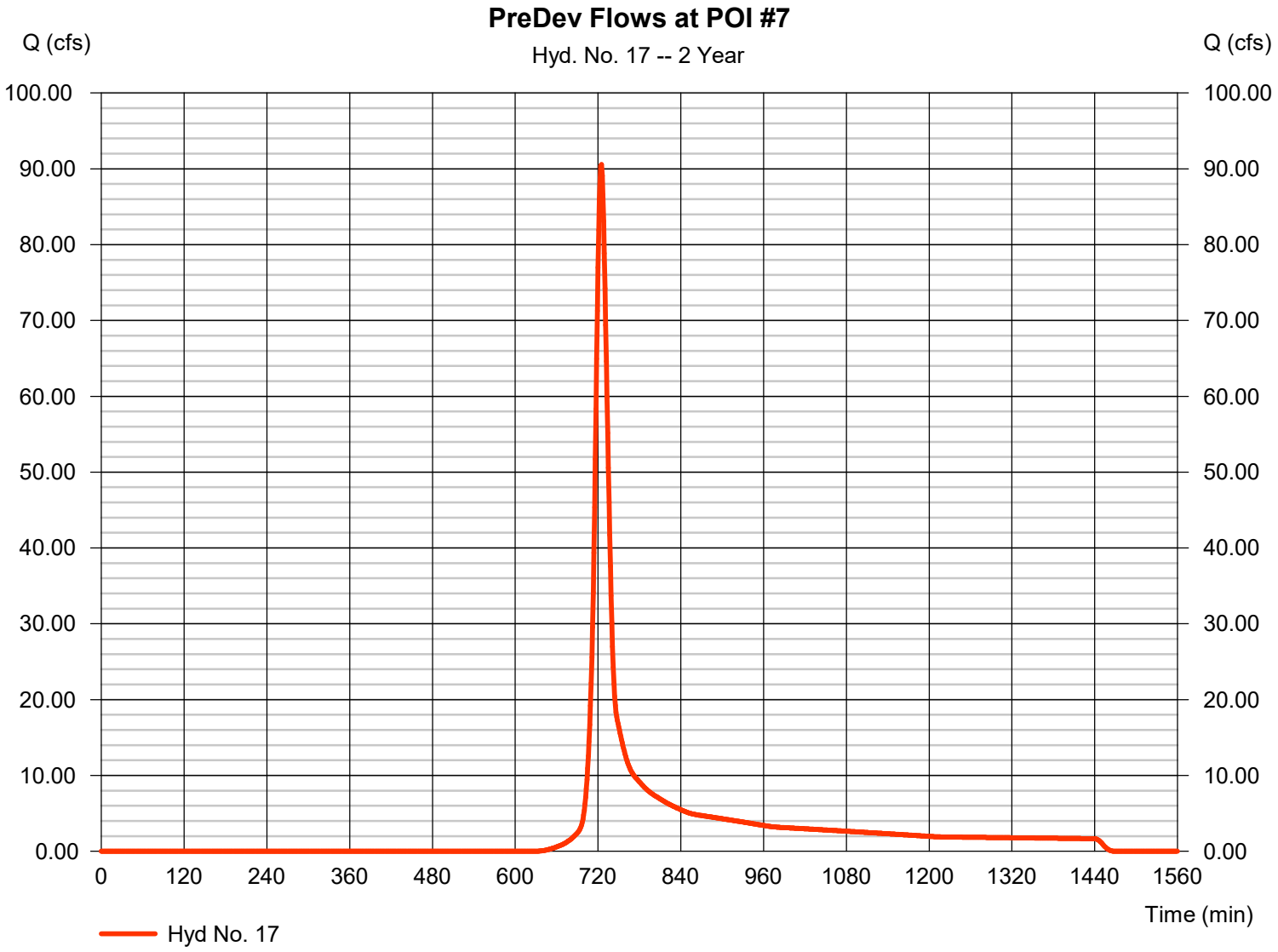


Hydrograph Report

Hyd. No. 17

PreDev Flows at POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 90.55 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 276,577 cuft
Drainage area	= 62.670 ac	Curve number	= 74.4
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.43 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

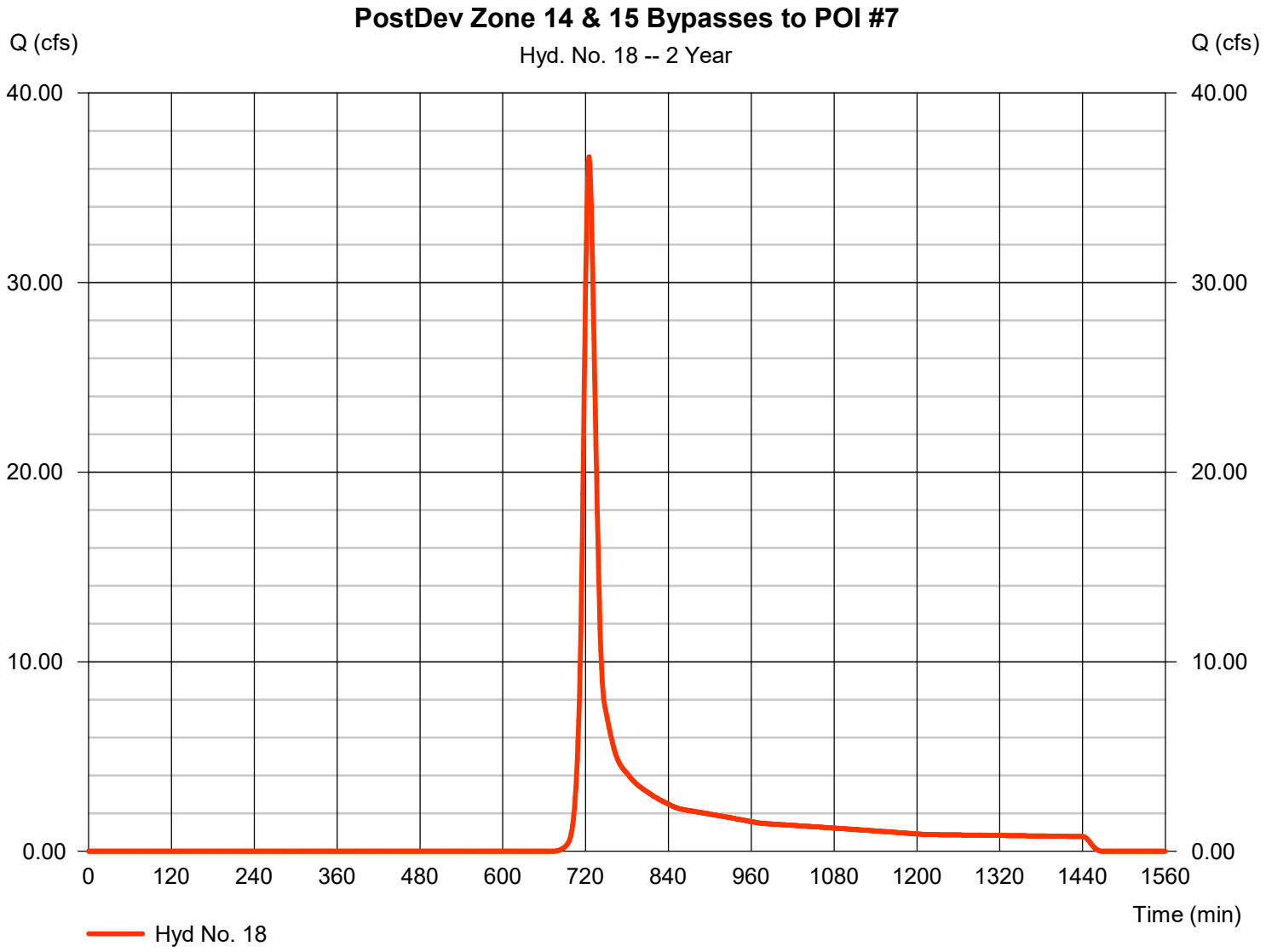


Hydrograph Report

Hyd. No. 18

PostDev Zone 14 & 15 Bypasses to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 36.63 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 116,590 cuft
Drainage area	= 33.240 ac	Curve number	= 70
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.27 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

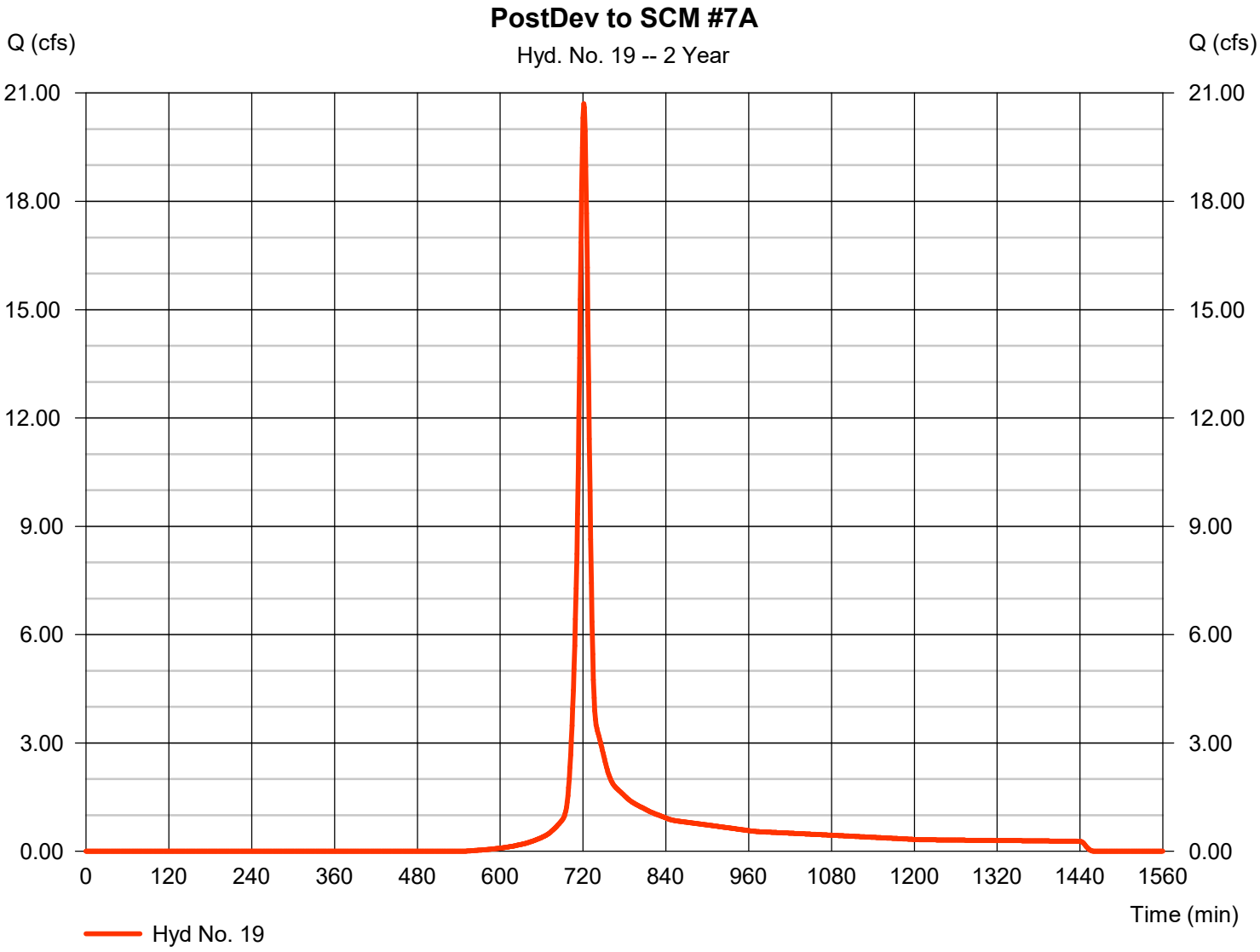


Hydrograph Report

Hyd. No. 19

PostDev to SCM #7A

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.70 cfs
Storm frequency	=	2 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	52,371 cuft
Drainage area	=	9.260 ac	Curve number	=	79.8
Basin Slope	=	1.1 %	Hydraulic length	=	1505 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.38 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

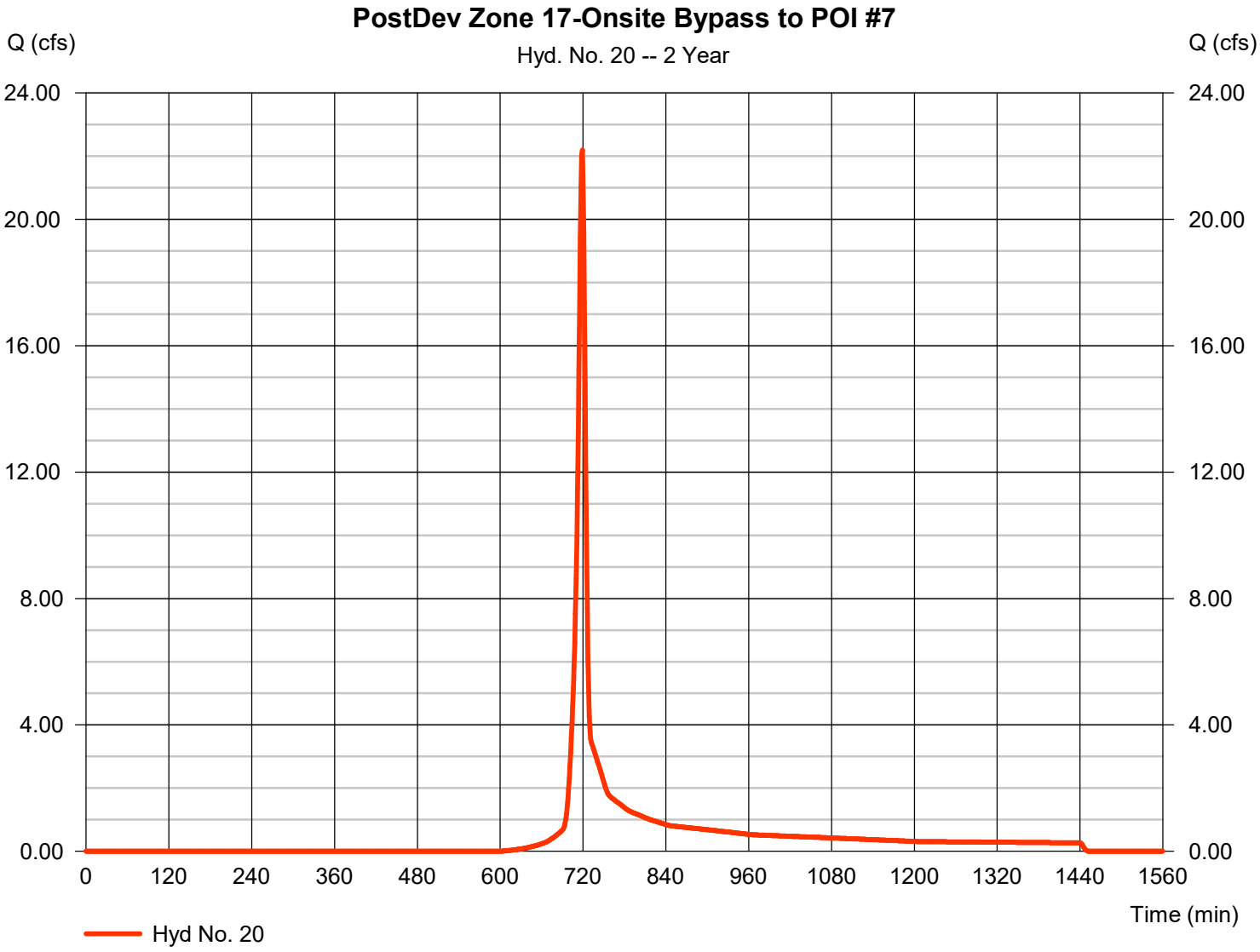


Hydrograph Report

Hyd. No. 20

PostDev Zone 17-Onsite Bypass to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 22.19 cfs
Storm frequency	= 2 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 46,824 cuft
Drainage area	= 9.720 ac	Curve number	= 76.5
Basin Slope	= 1.0 %	Hydraulic length	= 810 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 7.97 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



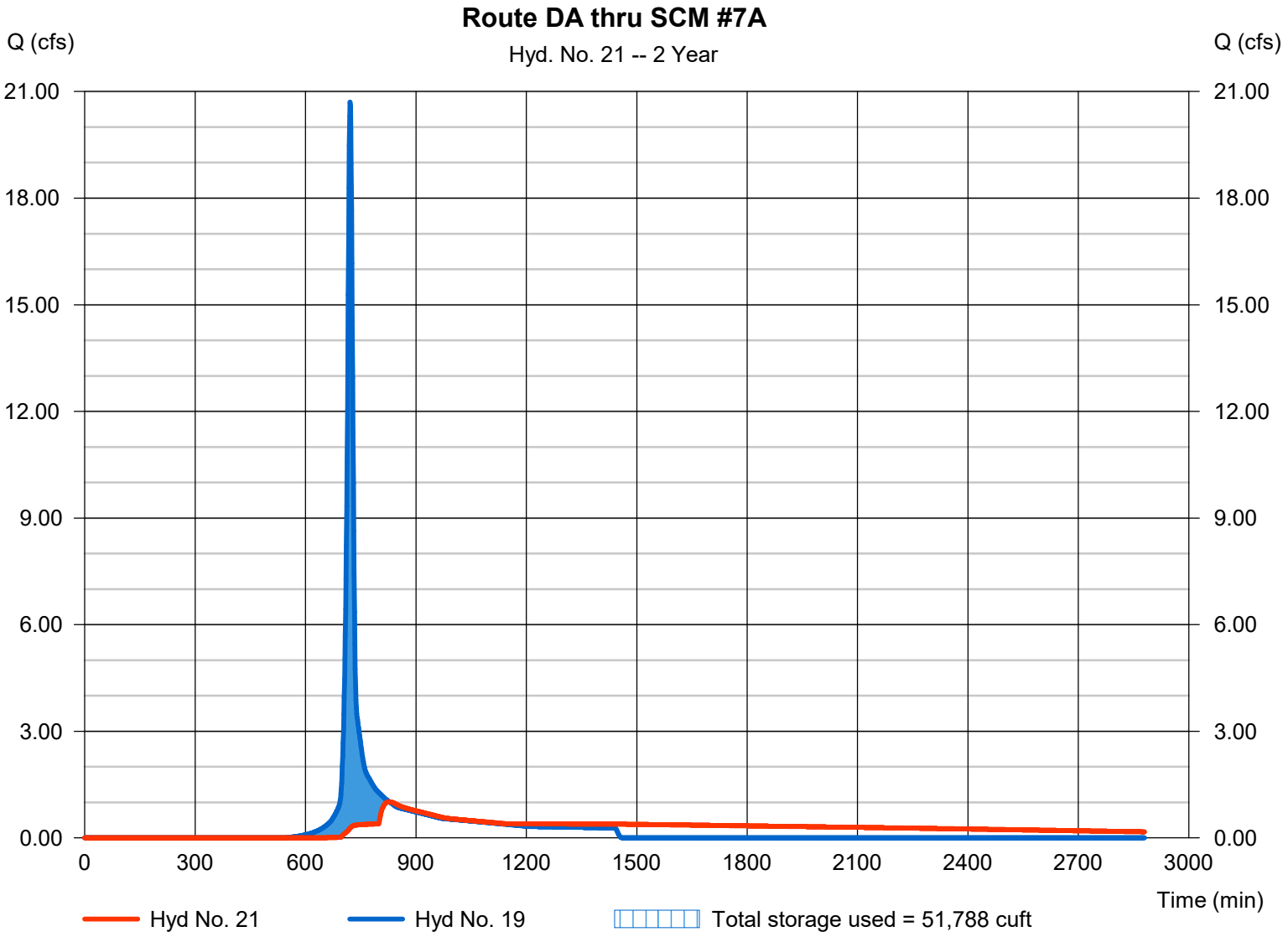
Hydrograph Report

Hyd. No. 21

Route DA thru SCM #7A

Hydrograph type	=	Reservoir	Peak discharge	=	1.013 cfs
Storm frequency	=	2 yrs	Time to peak	=	827 min
Time interval	=	1 min	Hyd. volume	=	46,453 cuft
Inflow hyd. No.	=	19 - PostDev to SCM #7A	Max. Elevation	=	373.44 ft
Reservoir name	=	SCM #7A	Max. Storage	=	51,788 cuft

Storage Indication method used. Wet pond routing start elevation = 370.50 ft.

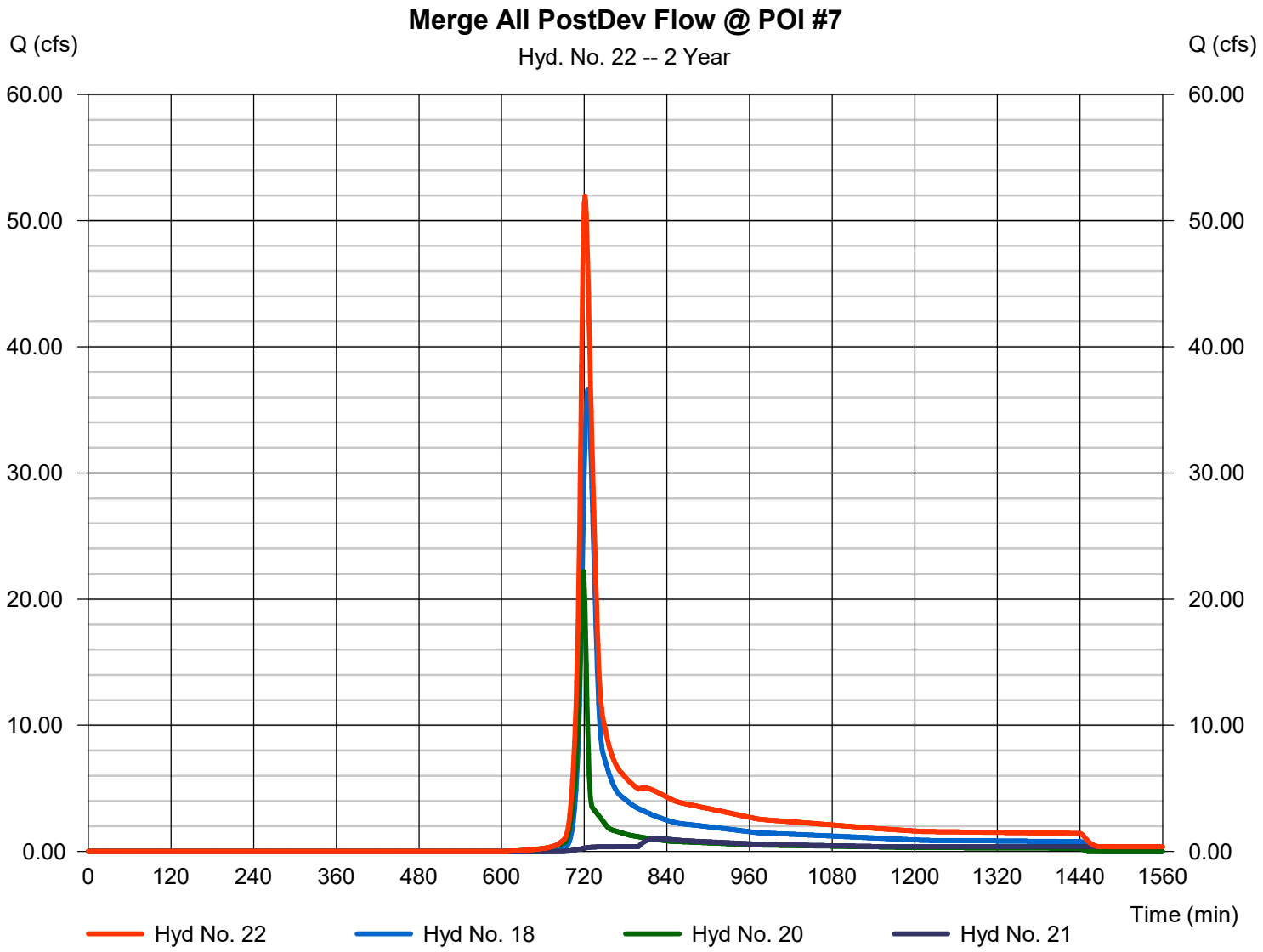


Hydrograph Report

Hyd. No. 22

Merge All PostDev Flow @ POI #7

Hydrograph type	= Combine	Peak discharge	= 51.95 cfs
Storm frequency	= 2 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 209,868 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 42.960 ac

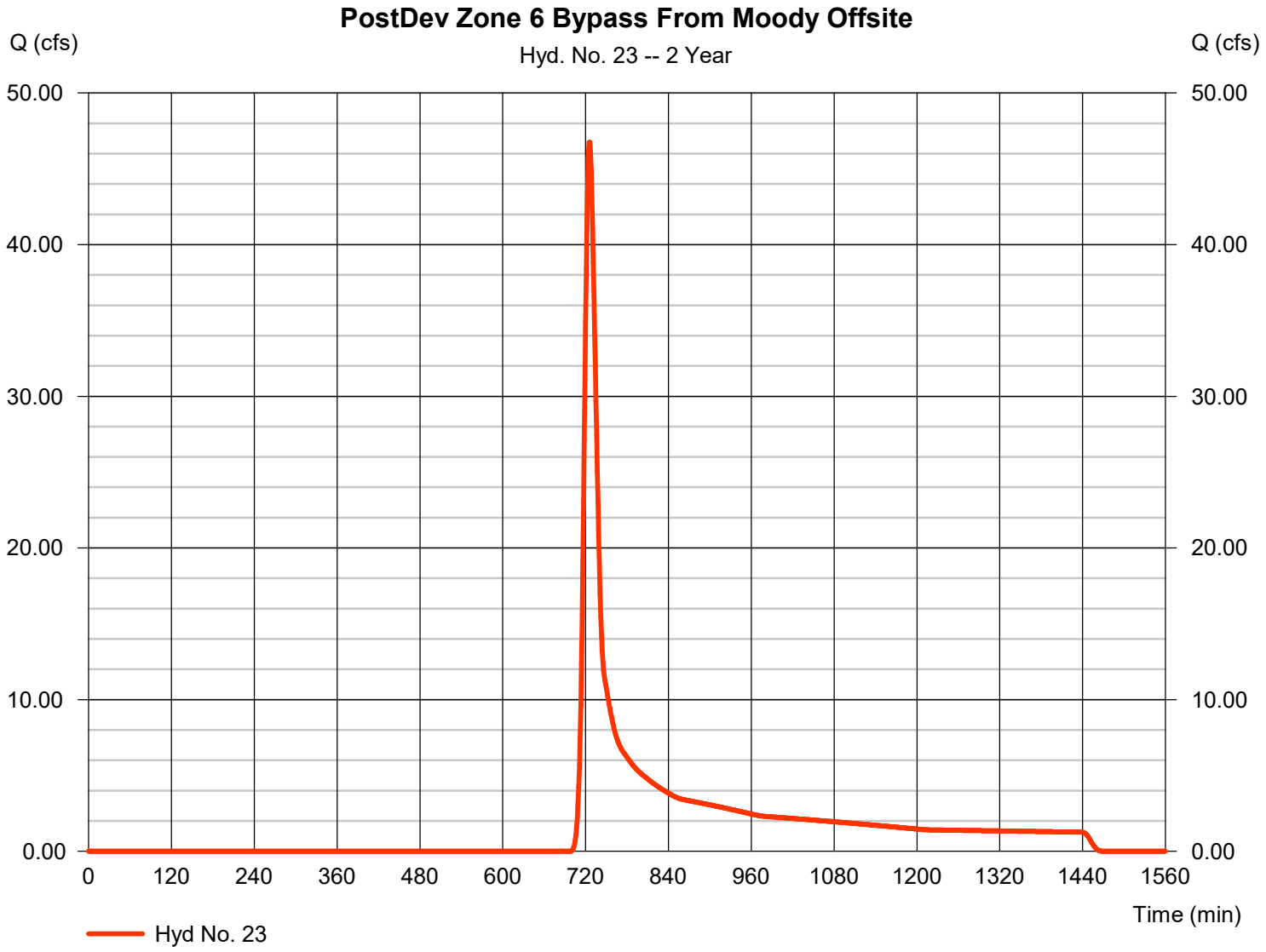


Hydrograph Report

Hyd. No. 23

PostDev Zone 6 Bypass From Moody Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.76 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	164,668 cuft
Drainage area	=	64.030 ac	Curve number	=	64.8
Basin Slope	=	1.8 %	Hydraulic length	=	2940 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.01 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

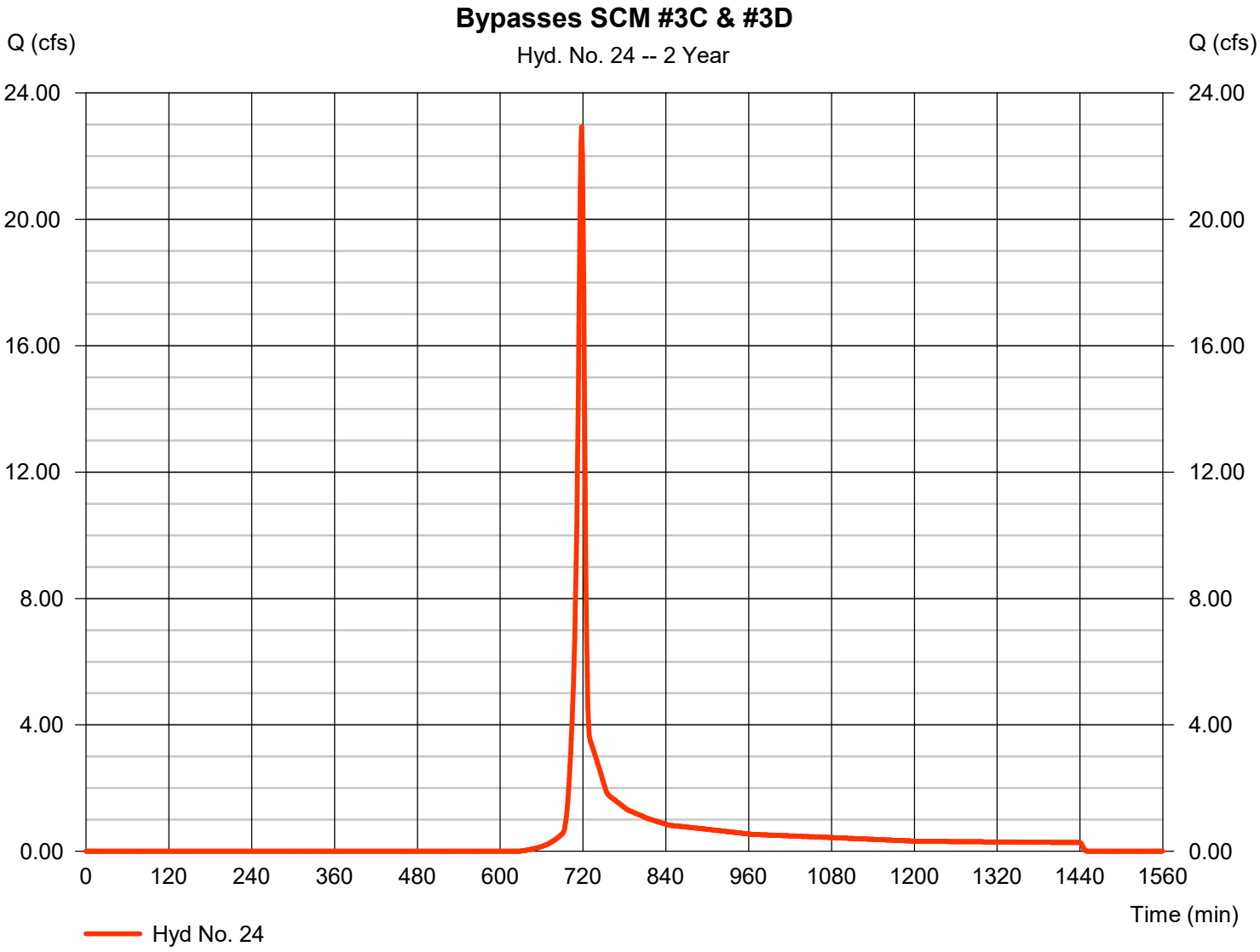


Hydrograph Report

Hyd. No. 24

Bypasses SCM #3C & #3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.92 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	46,170 cuft
Drainage area	=	9.980 ac	Curve number	=	74.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



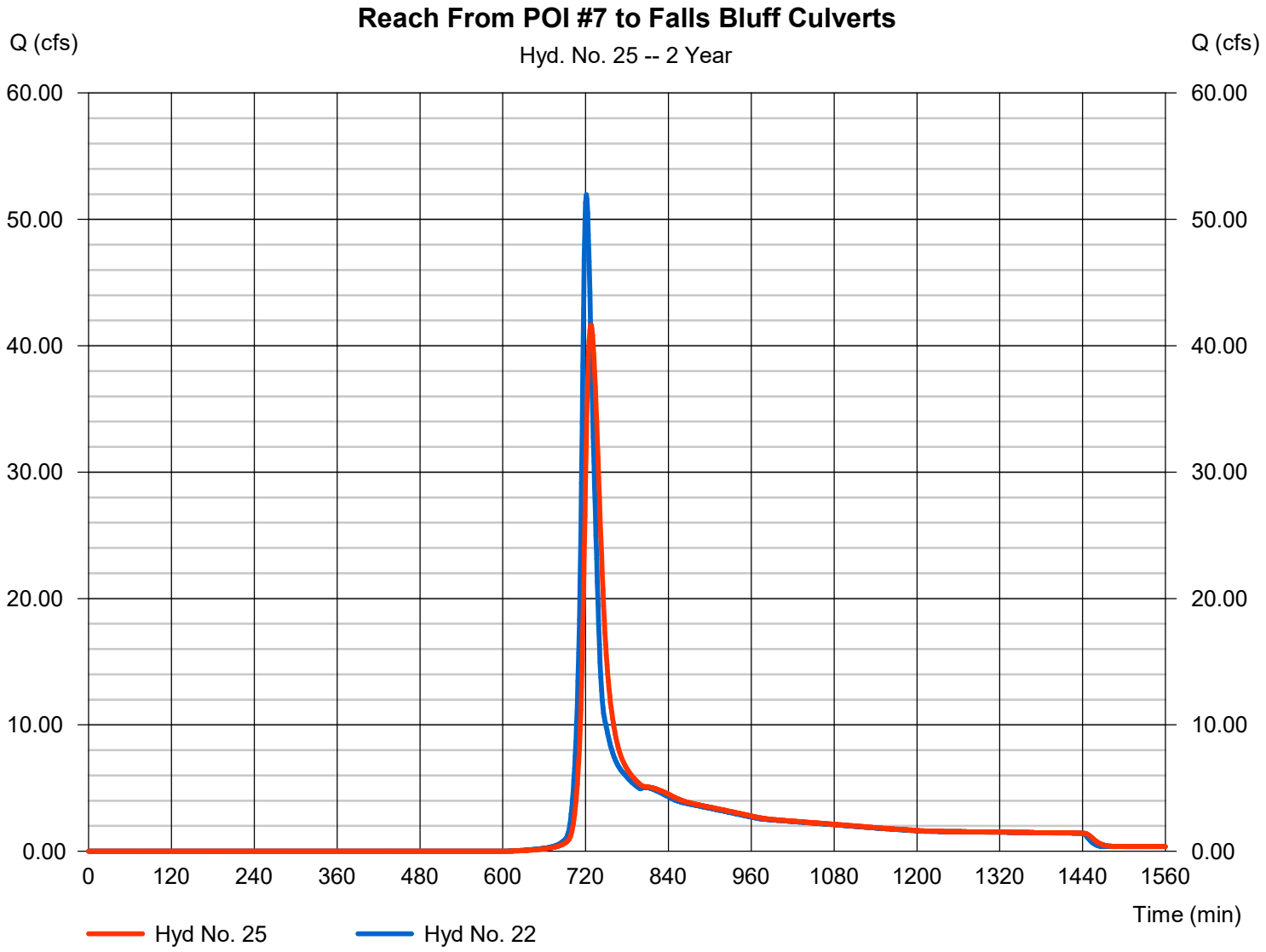
Hydrograph Report

Hyd. No. 25

Reach From POI #7 to Falls Bluff Culverts

Hydrograph type	=	Reach	Peak discharge	=	41.65 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	209,791 cuft
Inflow hyd. No.	=	22 - Merge All PostDev Flow @ POI #7	Section type	=	Trapezoidal
Reach length	=	1845.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	4.0 ft
Side slope	=	30.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.289	Rating curve m	=	1.183
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1334

Modified Att-Kin routing method used.

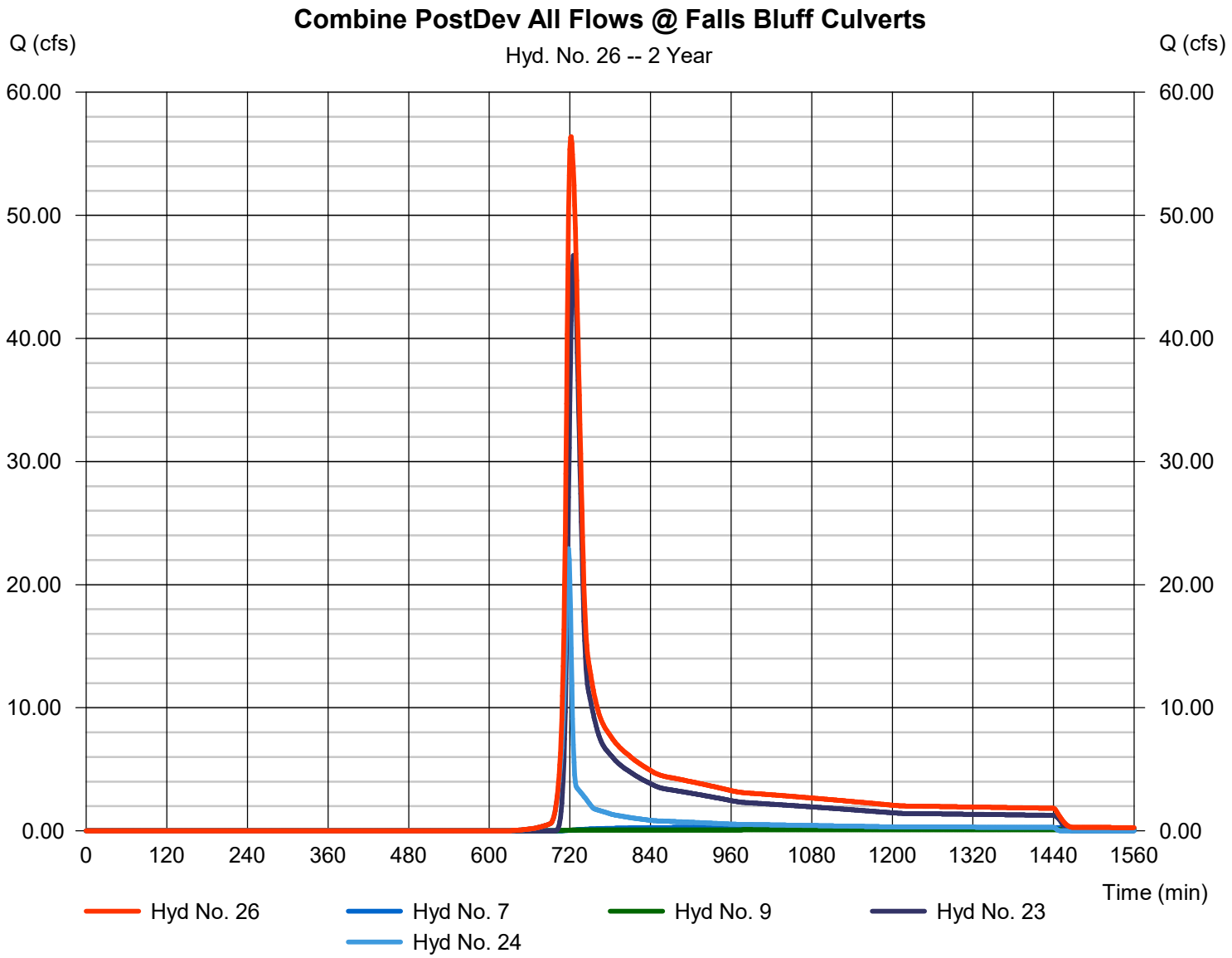


Hydrograph Report

Hyd. No. 26

Combine PostDev All Flows @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 56.38 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 237,445 cuft
Inflow hyds.	= 7, 9, 23, 24	Contrib. drain. area	= 74.010 ac

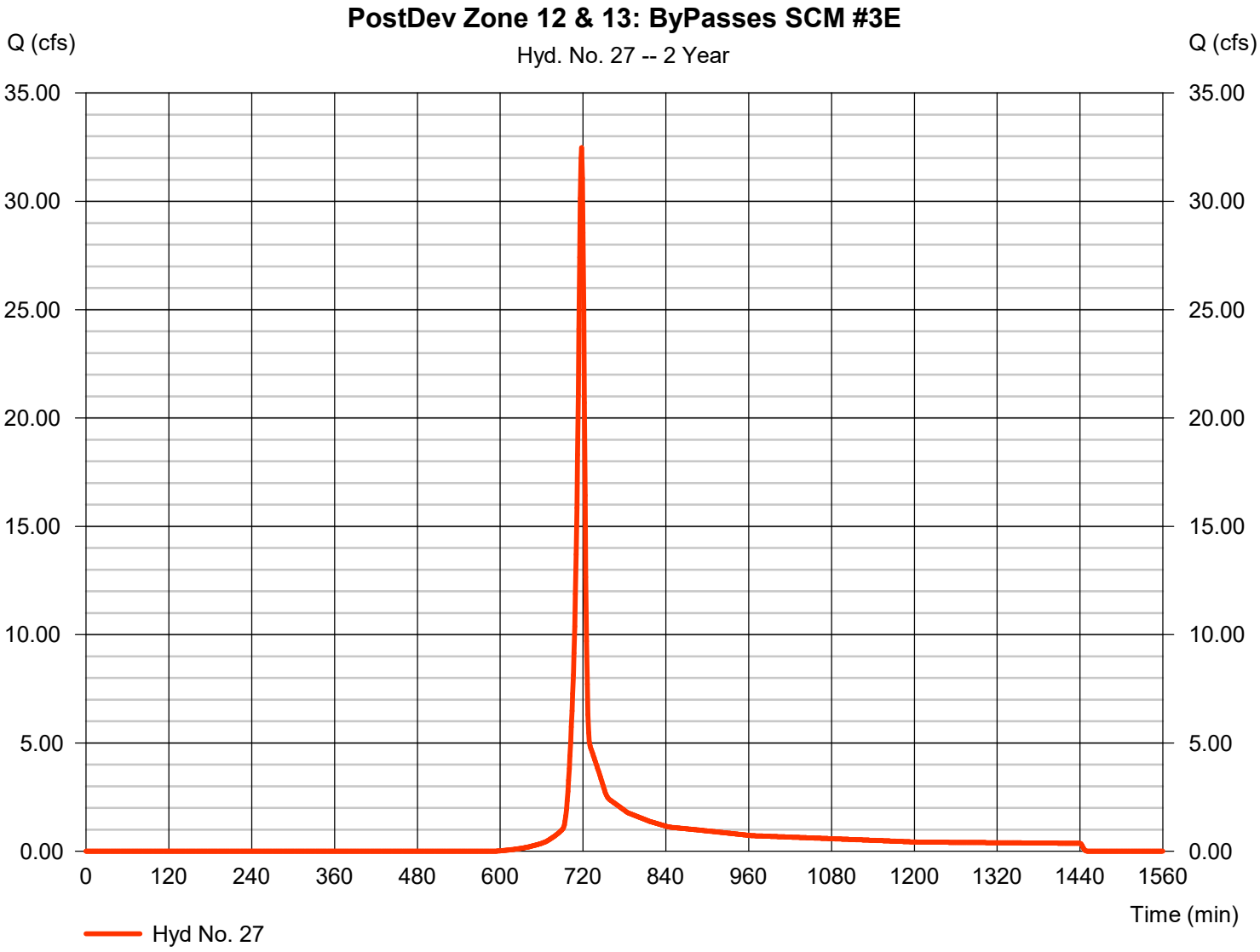


Hydrograph Report

Hyd. No. 27

PostDev Zone 12 & 13: ByPasses SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 32.47 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 65,204 cuft
Drainage area	= 12.500 ac	Curve number	= 77
Basin Slope	= 5.7 %	Hydraulic length	= 1080 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 5.08 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

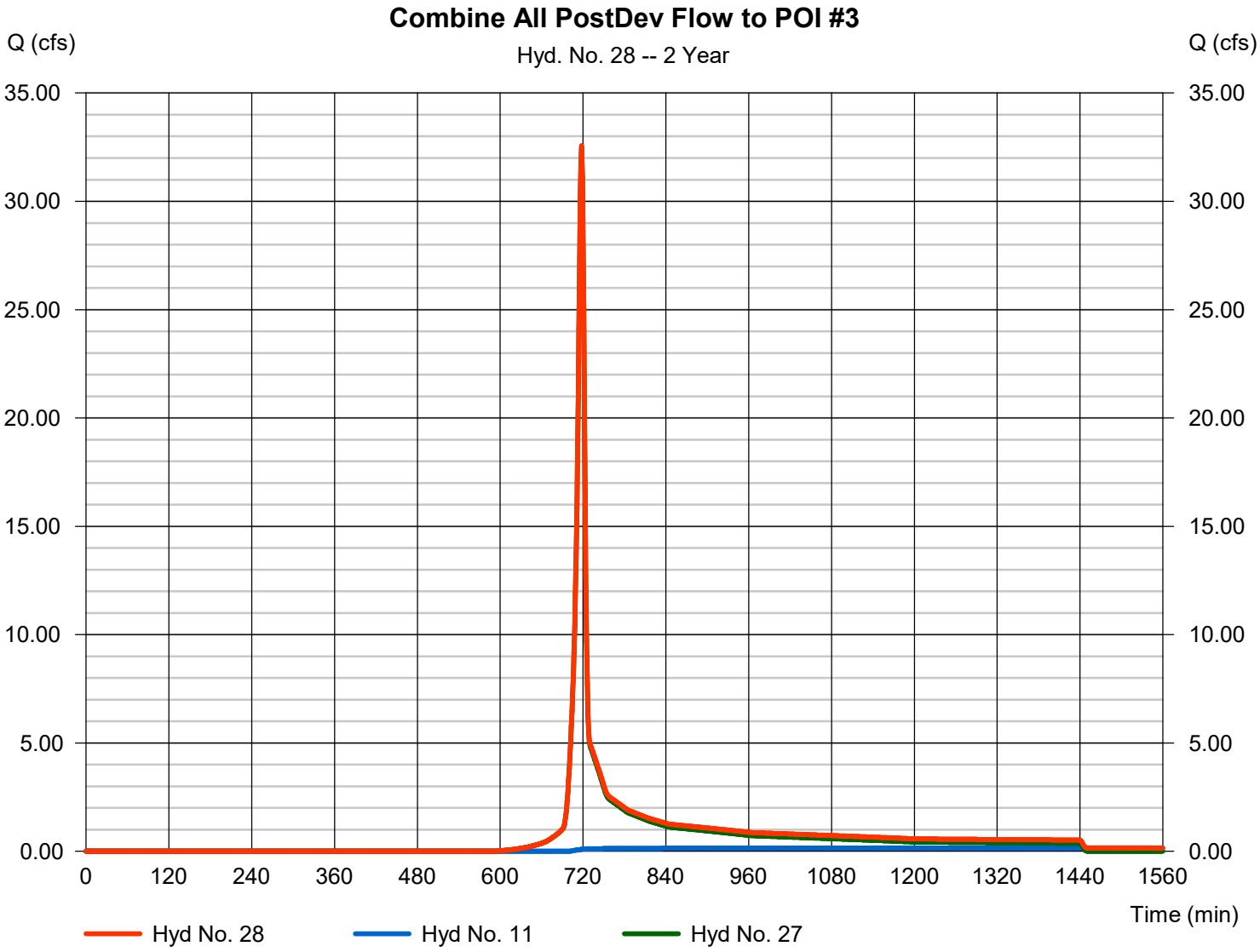


Hydrograph Report

Hyd. No. 28

Combine All PostDev Flow to POI #3

Hydrograph type	= Combine	Peak discharge	= 32.56 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 82,930 cuft
Inflow hyds.	= 11, 27	Contrib. drain. area	= 12.500 ac



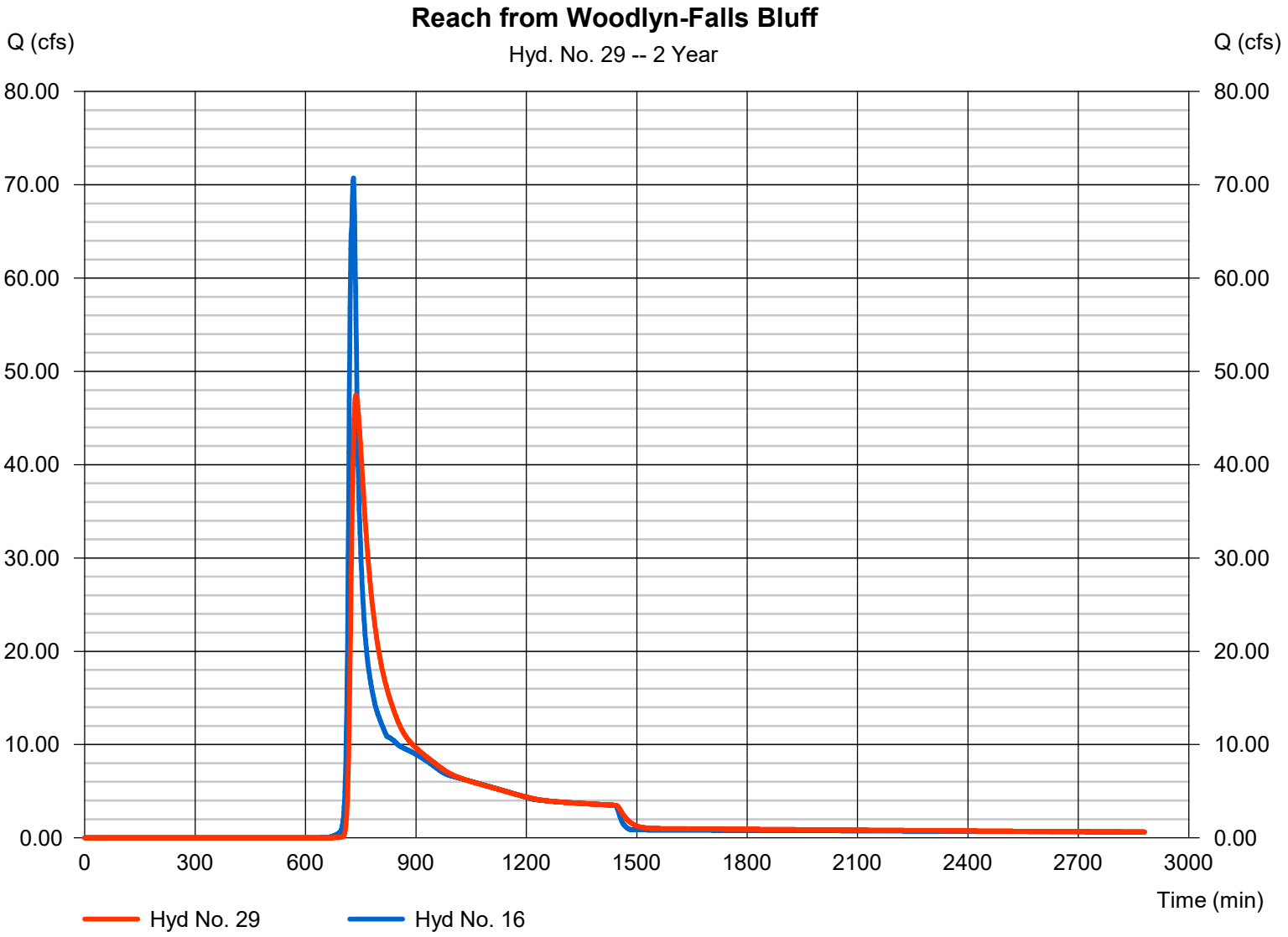
Hydrograph Report

Hyd. No. 29

Reach from Woodlyn-Falls Bluff

Hydrograph type	=	Reach	Peak discharge	=	47.48 cfs
Storm frequency	=	2 yrs	Time to peak	=	737 min
Time interval	=	1 min	Hyd. volume	=	486,974 cuft
Inflow hyd. No.	=	16 - Merge All PostDev @ Woodlyn	Section type	=	Trapezoidal
Reach length	=	12152.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.009	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	6.0 ft
Rating curve x	=	5.011	Rating curve m	=	1.255
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0532

Modified Att-Kin routing method used.

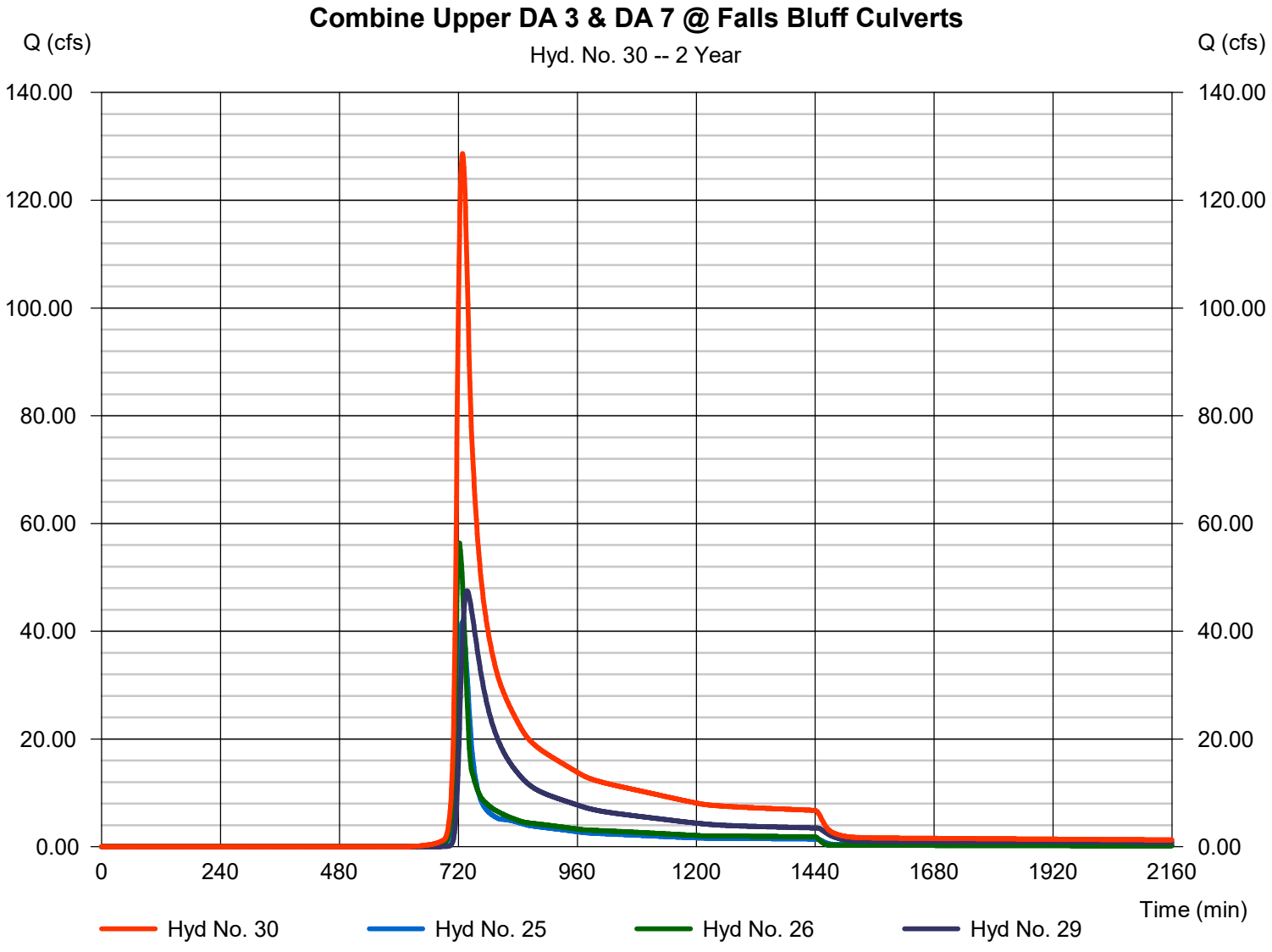


Hydrograph Report

Hyd. No. 30

Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 128.68 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 934,210 cuft
Inflow hyds.	= 25, 26, 29	Contrib. drain. area	= 0.000 ac



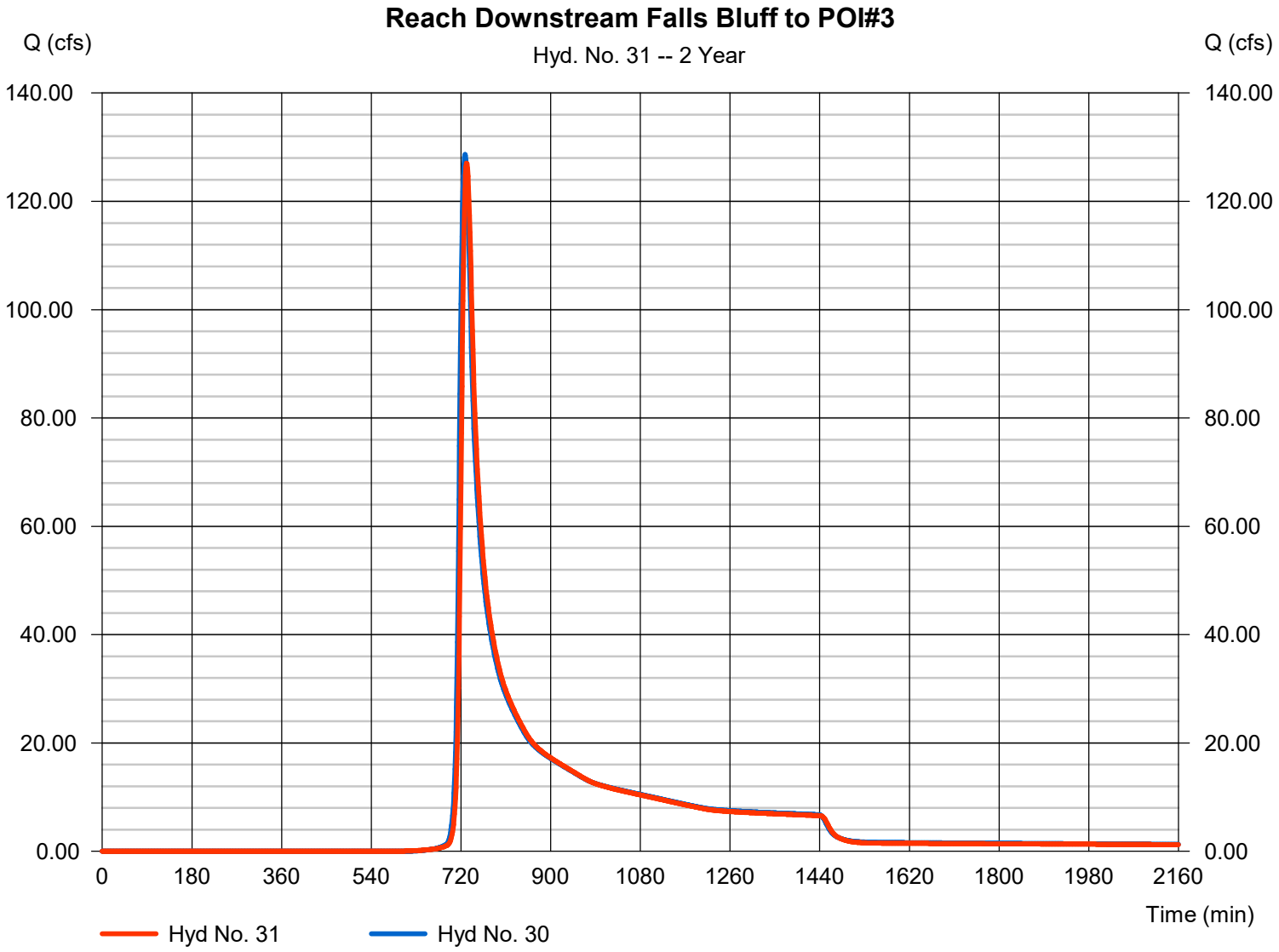
Hydrograph Report

Hyd. No. 31

Reach Downstream Falls Bluff to POI#3

Hydrograph type	=	Reach	Peak discharge	=	127.06 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	918,592 cuft
Inflow hyd. No.	=	30 - Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts	Section type	=	Trapezoidal
Reach length	=	1200.0 ft	Channel slope	=	5.0 %
Manning's n	=	0.030	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	8.0 ft
Rating curve x	=	3.361	Rating curve m	=	1.269
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.3750

Modified Att-Kin routing method used.

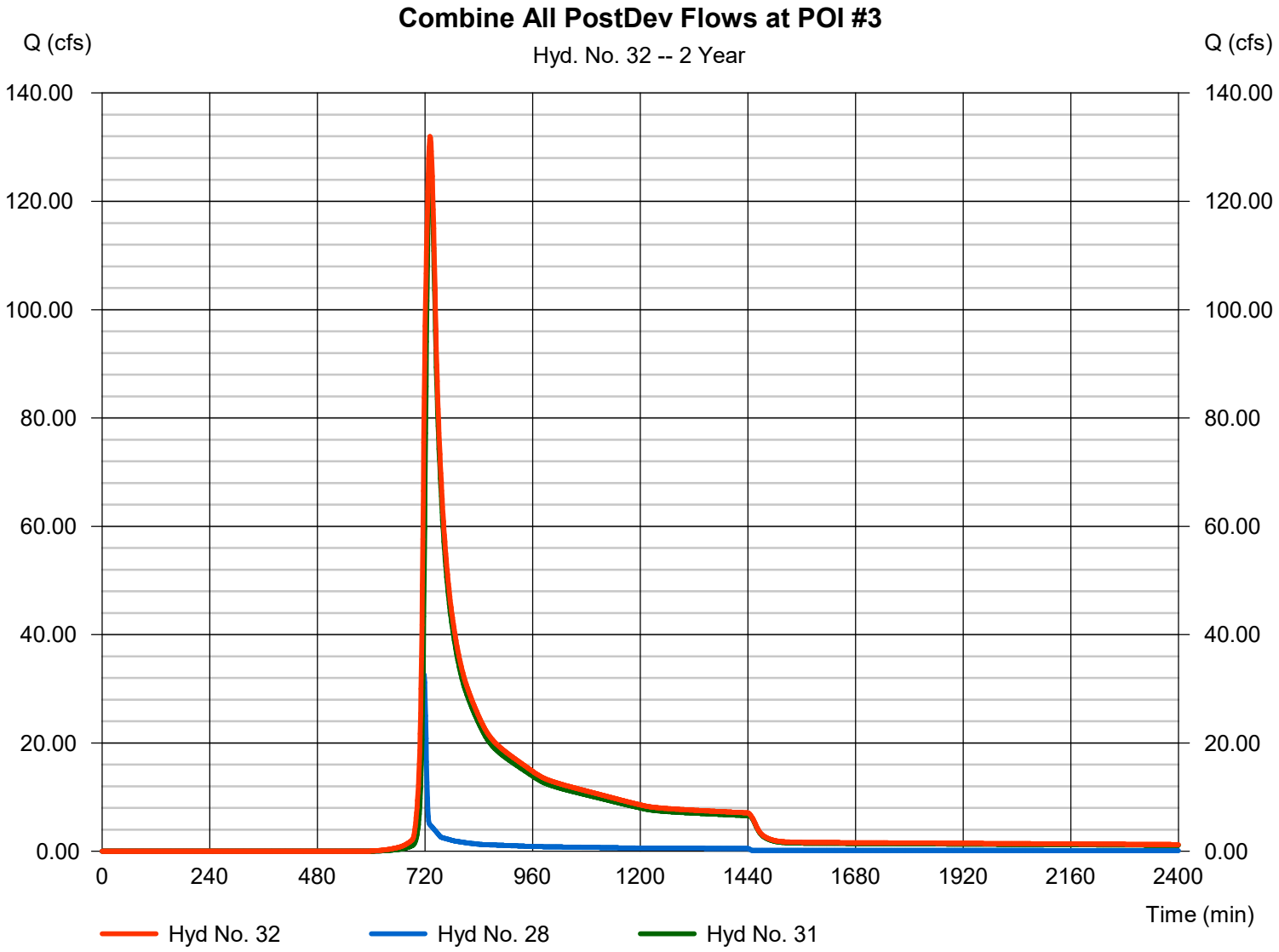


Hydrograph Report

Hyd. No. 32

Combine All PostDev Flows at POI #3

Hydrograph type	=	Combine	Peak discharge	=	131.95 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	1,001,523 cuft
Inflow hyds.	=	28, 31	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

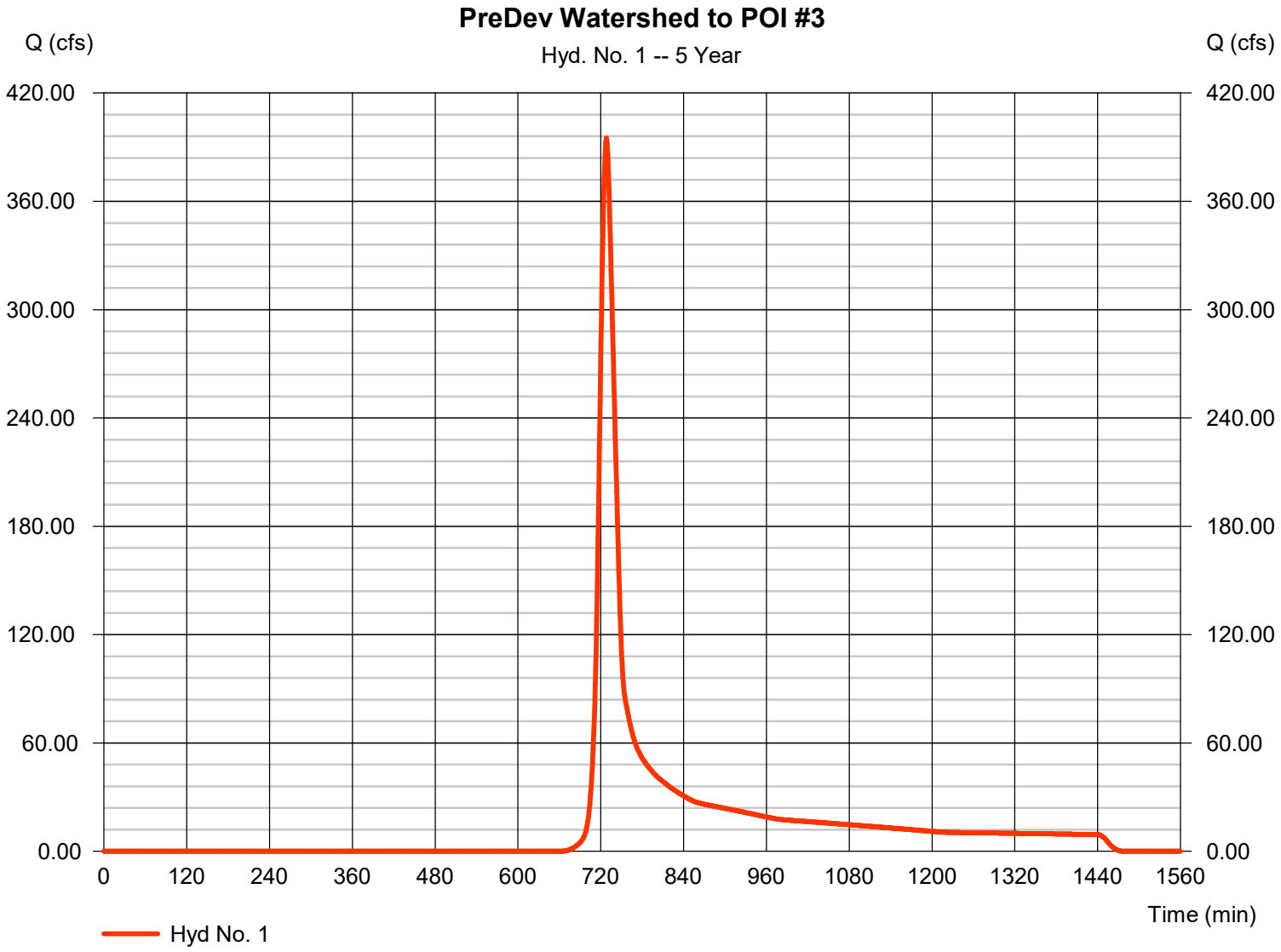
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	395.05	1	728	1,436,278	------	------	------	PreDev Watershed to POI #3
2	SCS Runoff	110.47	1	722	298,088	------	------	------	Phase 3: PostDev to SCM #3B
3	Reservoir	64.86	1	730	272,910	2	353.87	198,891	Route DA#3B To SCM #3B
4	SCS Runoff	75.33	1	722	202,482	------	------	------	Zone 4: PostDev to SCM #3A
5	Reservoir	11.00	1	749	142,071	4	353.79	234,259	DA #3A Routed SCM #3A
6	SCS Runoff	24.92	1	721	62,974	------	------	------	PostDev to SCM #3C
7	Reservoir	3.467	1	734	39,735	6	342.02	50,173	Route DA3C thru SCM#3C
8	SCS Runoff	21.57	1	718	43,442	------	------	------	PostDev Inflow to SCM#3D
9	Reservoir	0.102	1	1445	12,708	8	347.57	62,322	Route DA to SCM #3D
10	SCS Runoff	25.88	1	718	52,158	------	------	------	PostDev Inflow to SCM #3E
11	Reservoir	0.684	1	906	30,249	10	309.08	64,165	Route Infllow SCM #3E
12	SCS Runoff	14.32	1	721	36,578	------	------	------	Zone 1:Offsite Bypasses SCM #3A&
13	SCS Runoff	33.96	1	721	86,771	------	------	------	Zone 5: Onsite PostDevBypass to Wo
14	SCS Runoff	88.96	1	723	254,030	------	------	------	Zone 3: Offsite Bypass to Graymont
15	Reach	80.04	1	727	254,028	14	------	------	Reach from Graymont to Woodlyn
16	Combine	174.79	1	727	770,280	3, 5, 12, 13, 15	------	------	Merge All PostDev @ Woodlyn
17	SCS Runoff	140.89	1	724	421,156	------	------	------	PreDev Flows at POI #7
18	SCS Runoff	60.77	1	725	185,437	------	------	------	PostDev Zone 14 & 15 Bypasses to P
19	SCS Runoff	30.13	1	721	76,126	------	------	------	PostDev to SCM #7A
20	SCS Runoff	33.12	1	719	69,973	------	------	------	PostDev Zone 17-Onsite Bypass to P
21	Reservoir	8.945	1	733	69,569	19	373.69	55,170	Route DA thru SCM #7A
22	Combine	84.28	1	721	324,978	18, 20, 21	------	------	Merge All PostDev Flow @ POI #7
23	SCS Runoff	87.31	1	725	278,659	------	------	------	PostDev Zone 6 Bypass From Moody
24	SCS Runoff	34.97	1	718	70,241	------	------	------	Bypasses SCM #3C & #3D
25	Reach	69.51	1	727	324,903	22	------	------	Reach From POI #7 to Falls Bluff Cul
26	Combine	103.21	1	721	394,539	7, 9, 23, 24,	------	------	Combine PostDev All Flows @ Falls
27	SCS Runoff	48.15	1	718	97,019	------	------	------	PostDev Zone 12 & 13: ByPasses SC
28	Combine	48.26	1	718	126,746	11, 27	------	------	Combine All PostDev Flow to POI #3
29	Reach	117.90	1	735	786,127	16	------	------	Reach from Woodlyn-Falls Bluff
30	Combine	259.64	1	729	1,505,569	25, 26, 29	------	------	Combine Upper DA 3 & DA 7 @ Falls
31	Reach	260.86	1	731	1,475,095	30	------	------	Reach Downstream Falls Bluff to POI
32	Combine	267.83	1	731	1,601,841	28, 31	------	------	Combine All PostDev Flows at POI #3

Hydrograph Report

Hyd. No. 1

PreDev Watershed to POI #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	395.05 cfs
Storm frequency	=	5 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	1,436,278 cuft
Drainage area	=	300.880 ac	Curve number	=	66.6
Basin Slope	=	3.0 %	Hydraulic length	=	5451 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	22.67 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

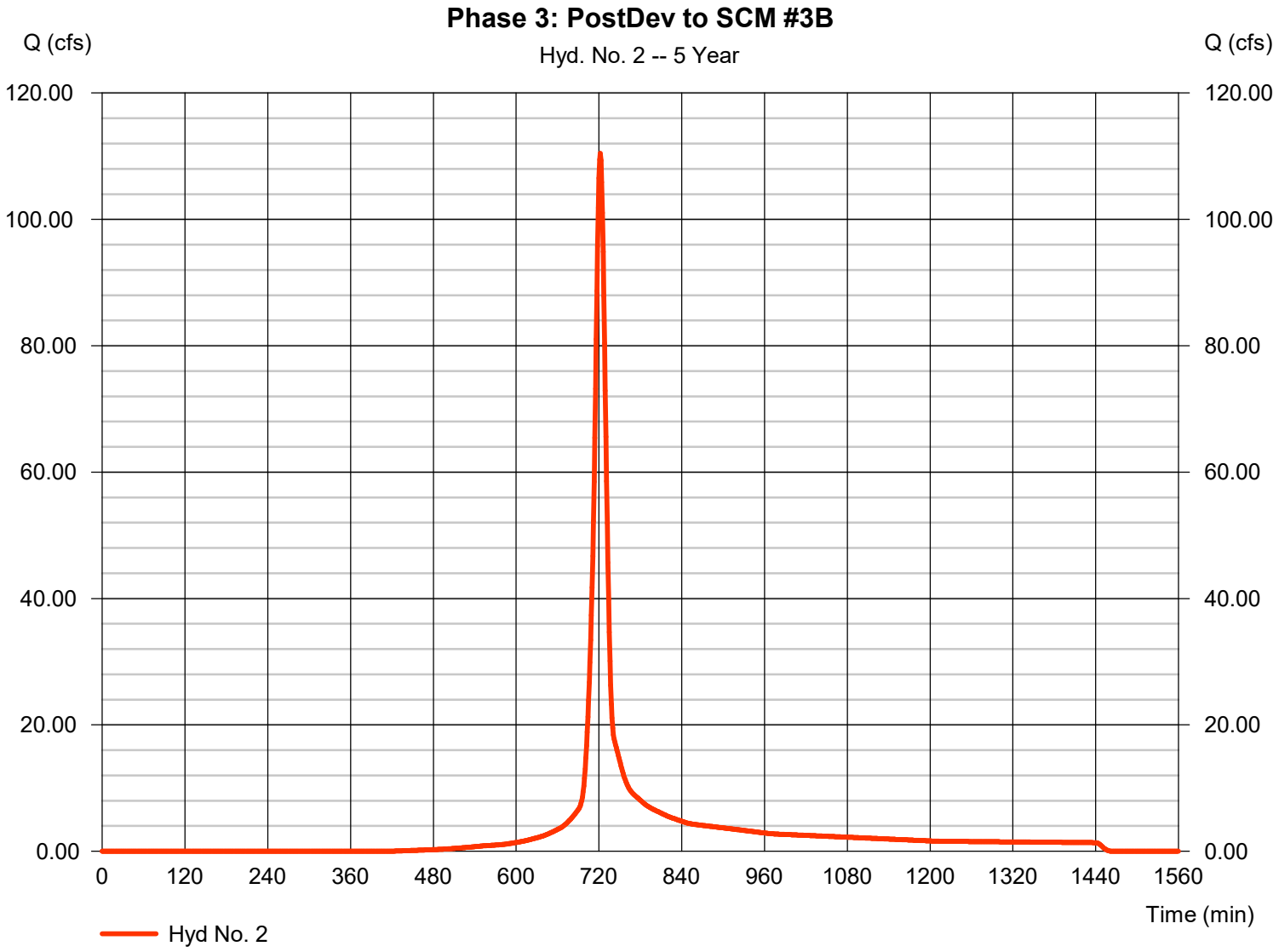


Hydrograph Report

Hyd. No. 2

Phase 3: PostDev to SCM #3B

Hydrograph type	= SCS Runoff	Peak discharge	= 110.47 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 298,088 cuft
Drainage area	= 31.890 ac	Curve number	= 83
Basin Slope	= 1.9 %	Hydraulic length	= 2520 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.80 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



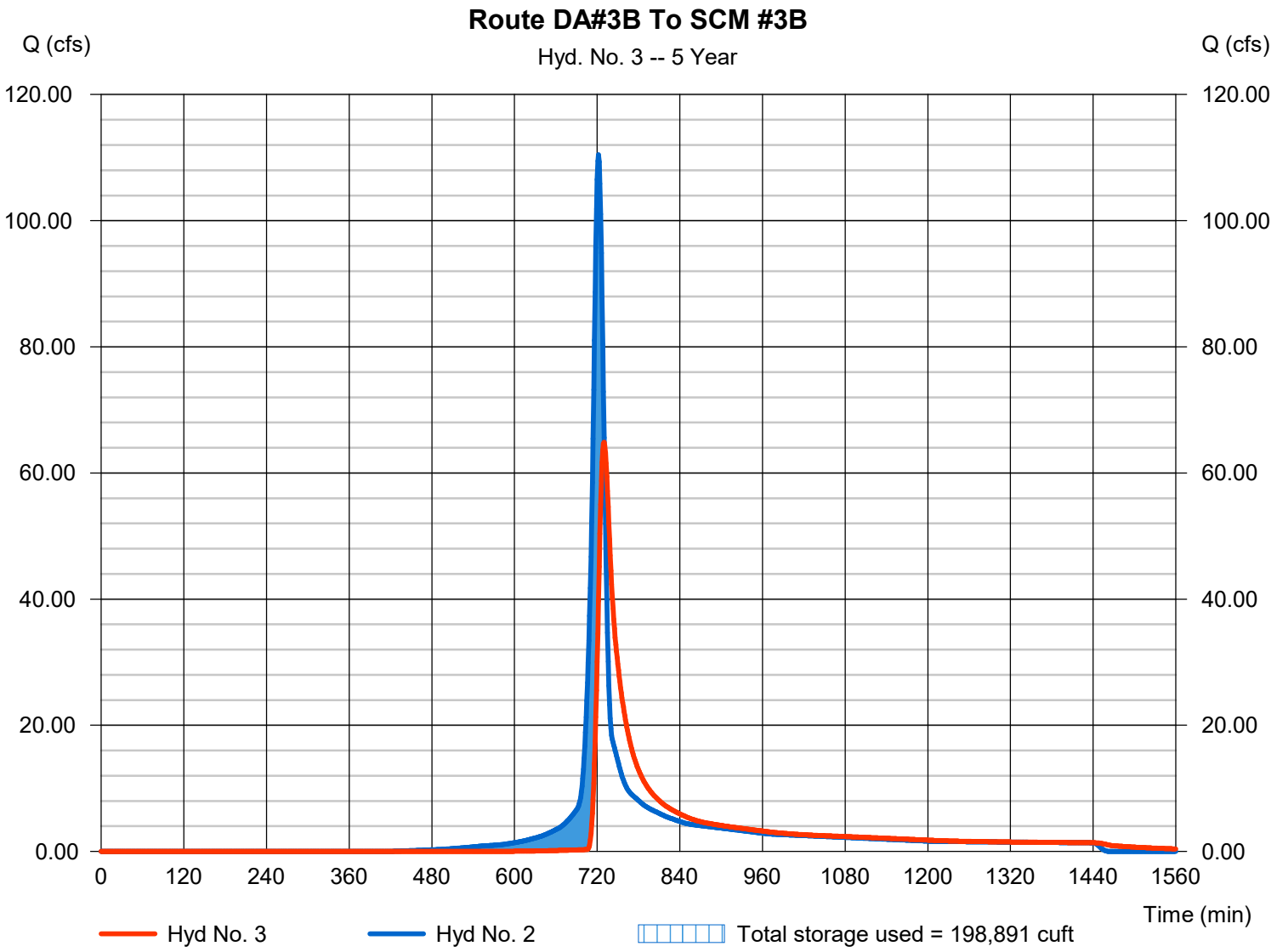
Hydrograph Report

Hyd. No. 3

Route DA#3B To SCM #3B

Hydrograph type	=	Reservoir	Peak discharge	=	64.86 cfs
Storm frequency	=	5 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	272,910 cuft
Inflow hyd. No.	=	2 - Phase 3: PostDev to SCM #3B	Max. Elevation	=	353.87 ft
Reservoir name	=	SCM 3B-rev102924	Max. Storage	=	198,891 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

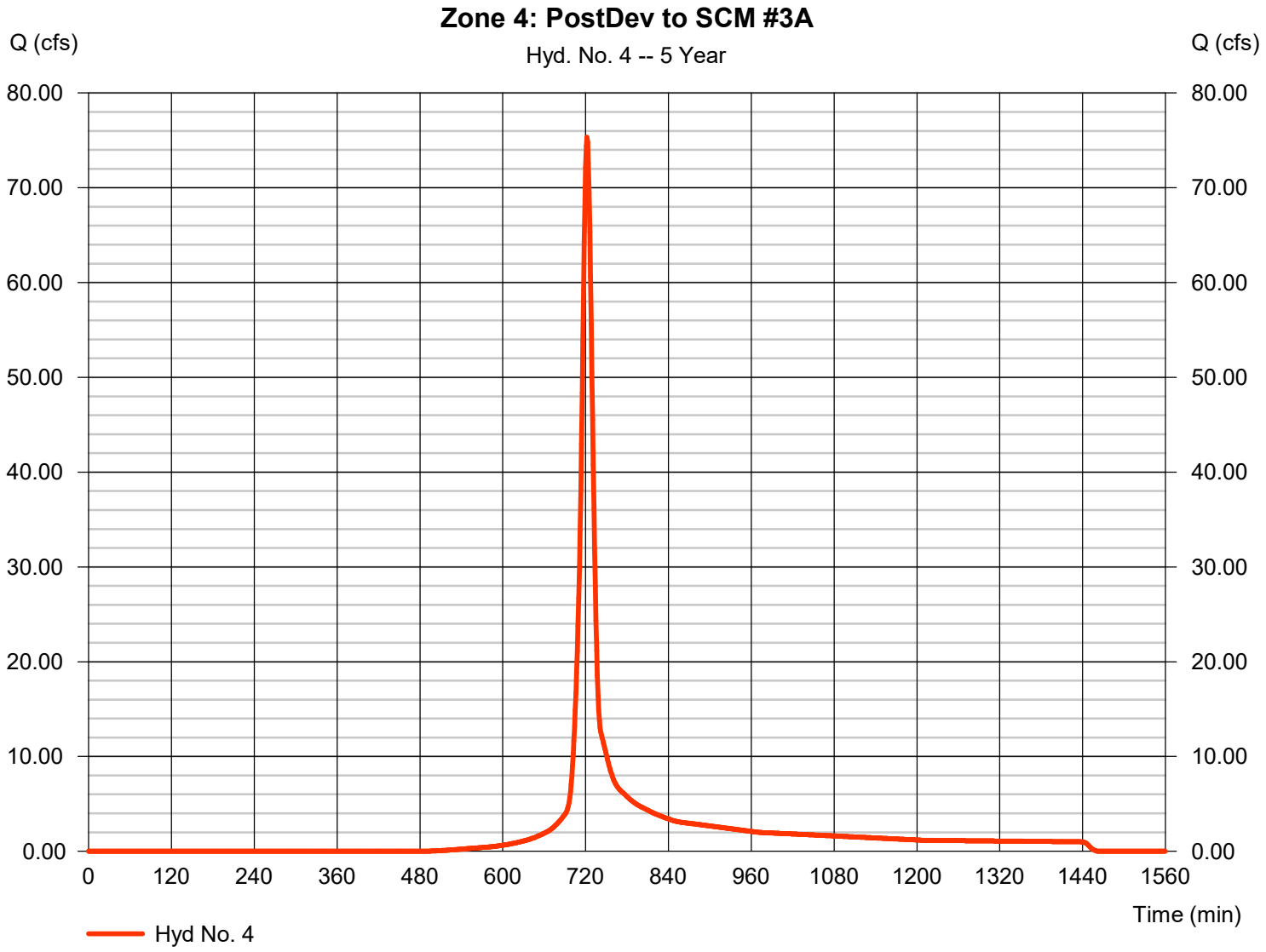


Hydrograph Report

Hyd. No. 4

Zone 4: PostDev to SCM #3A

Hydrograph type	= SCS Runoff	Peak discharge	= 75.33 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 202,482 cuft
Drainage area	= 24.600 ac	Curve number	= 79.4
Basin Slope	= 1.5 %	Hydraulic length	= 2250 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.94 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



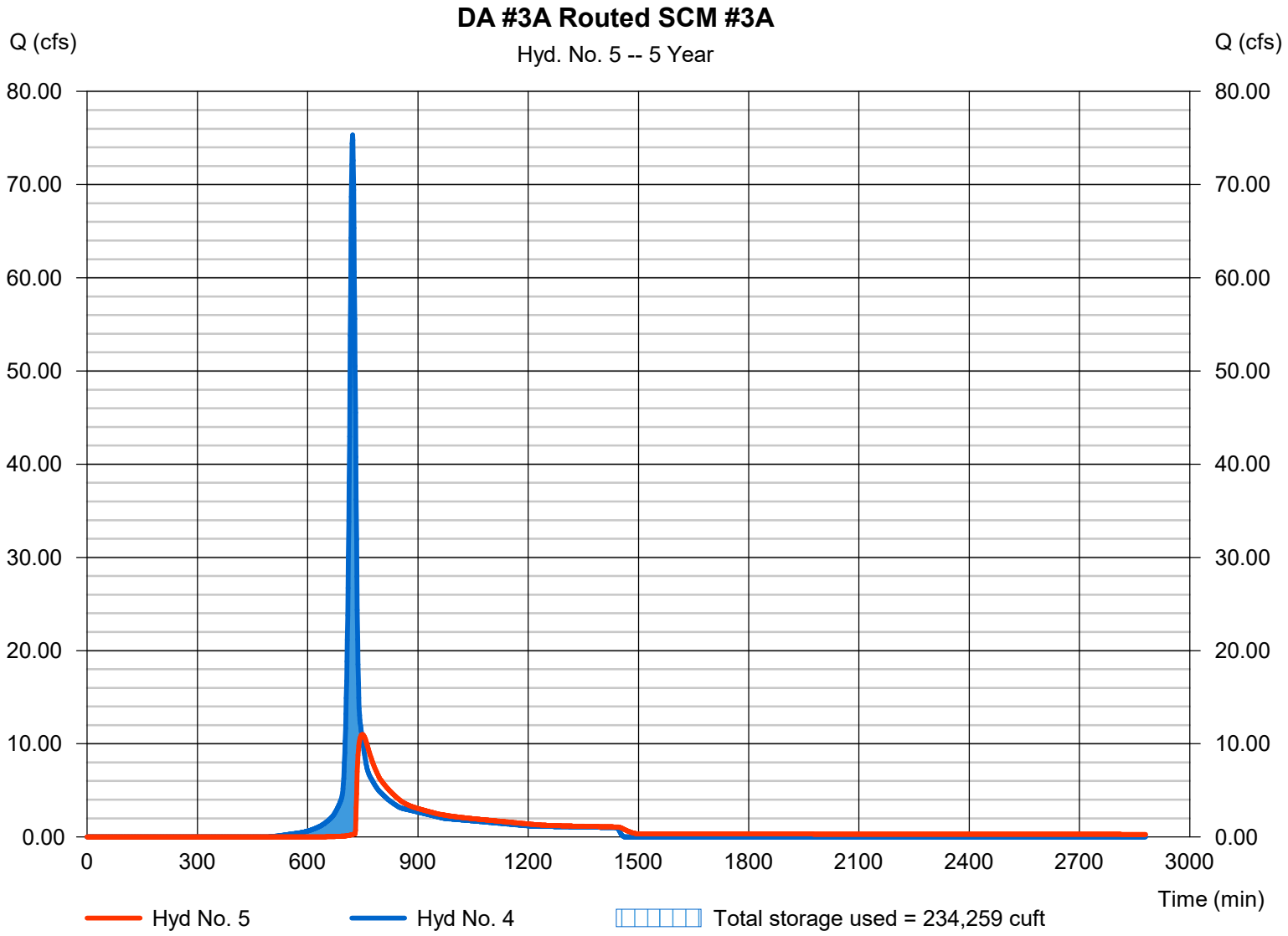
Hydrograph Report

Hyd. No. 5

DA #3A Routed SCM #3A

Hydrograph type	=	Reservoir	Peak discharge	=	11.00 cfs
Storm frequency	=	5 yrs	Time to peak	=	749 min
Time interval	=	1 min	Hyd. volume	=	142,071 cuft
Inflow hyd. No.	=	4 - Zone 4: PostDev to SCM #3A	Max. Elevation	=	353.79 ft
Reservoir name	=	SCM #3A	Max. Storage	=	234,259 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

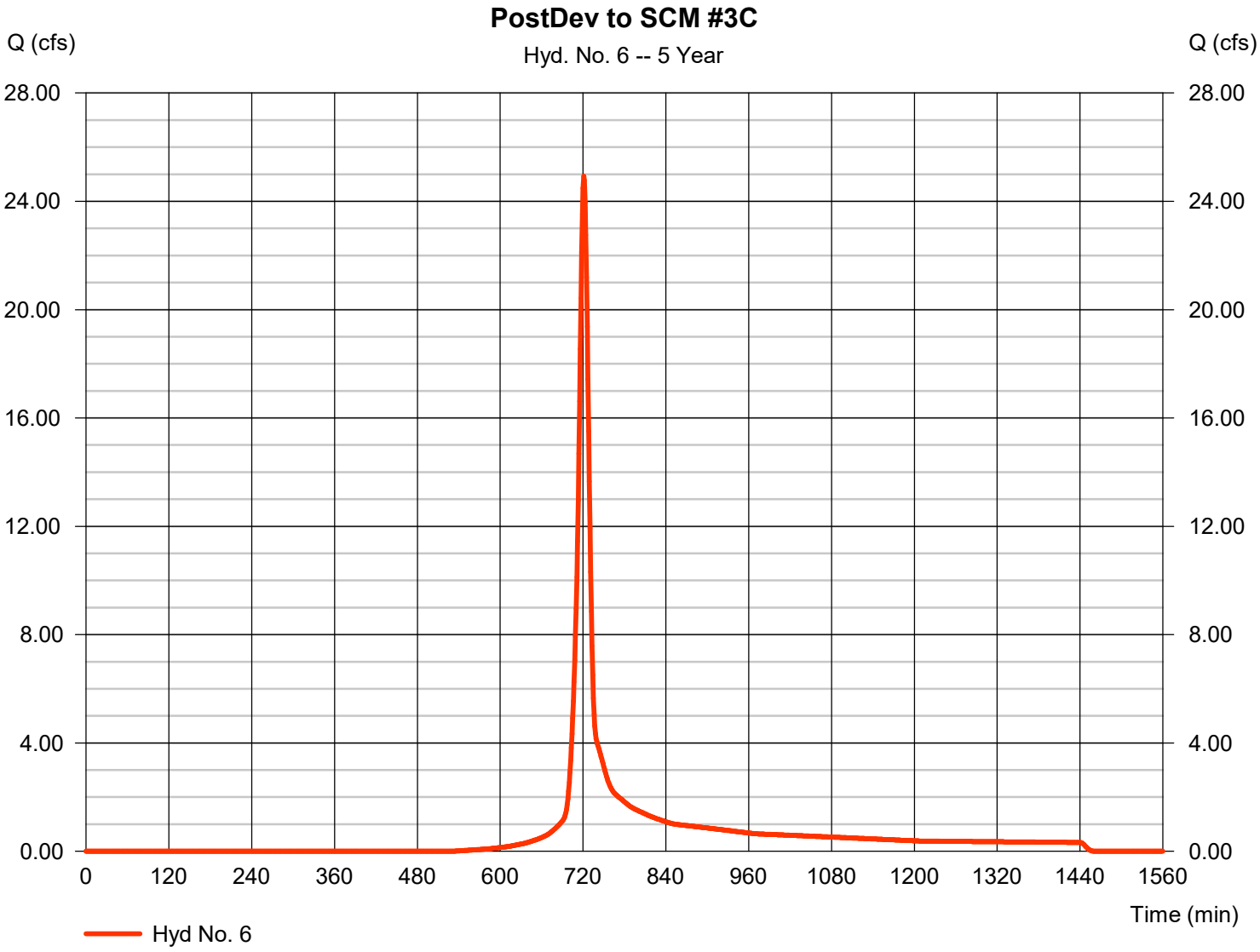


Hydrograph Report

Hyd. No. 6

PostDev to SCM #3C

Hydrograph type	= SCS Runoff	Peak discharge	= 24.92 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 62,974 cuft
Drainage area	= 8.500 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



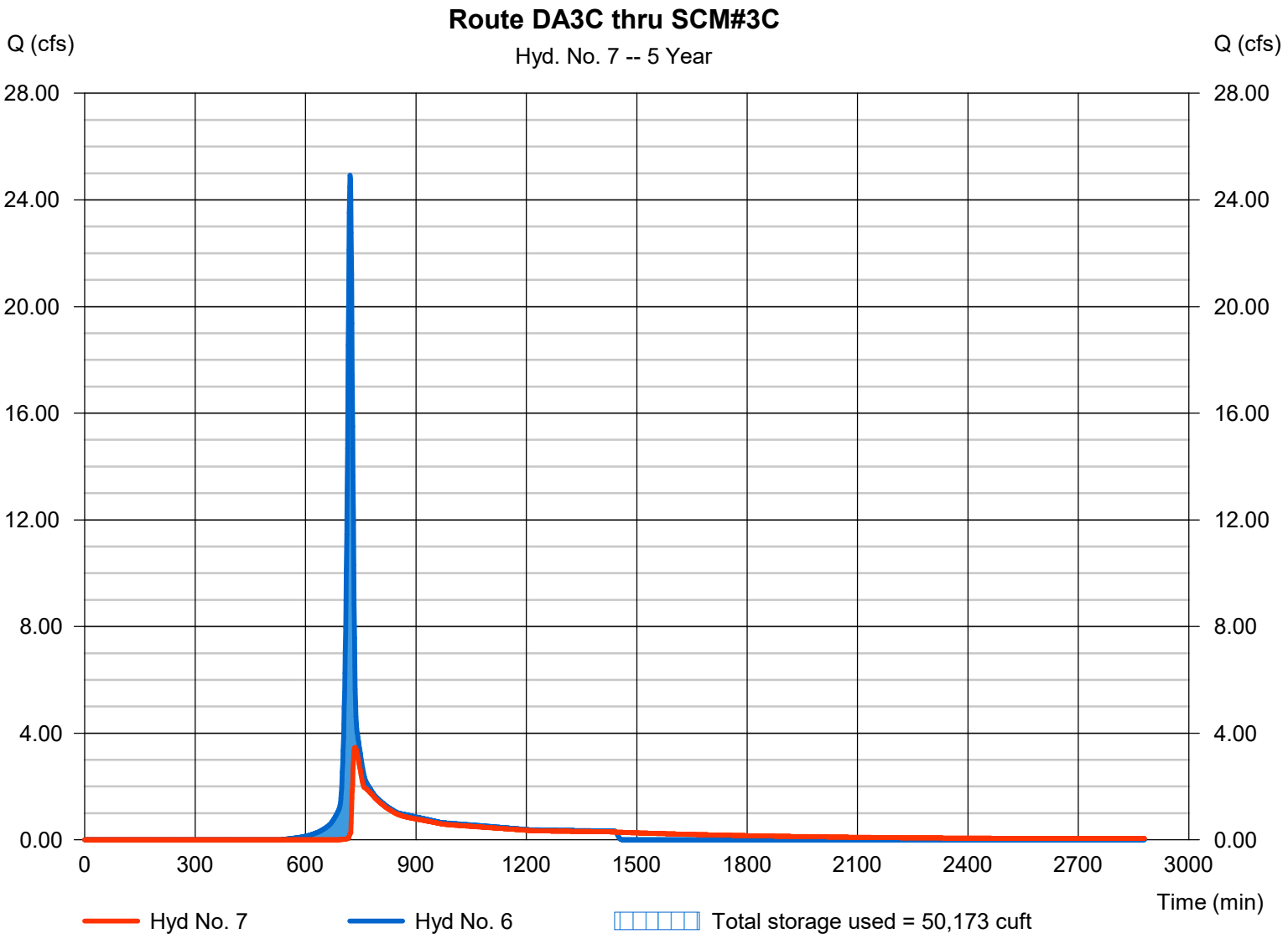
Hydrograph Report

Hyd. No. 7

Route DA3C thru SCM#3C

Hydrograph type	=	Reservoir	Peak discharge	=	3.467 cfs
Storm frequency	=	5 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	39,735 cuft
Inflow hyd. No.	=	6 - PostDev to SCM #3C	Max. Elevation	=	342.02 ft
Reservoir name	=	SCM #3C	Max. Storage	=	50,173 cuft

Storage Indication method used. Wet pond routing start elevation = 340.50 ft.

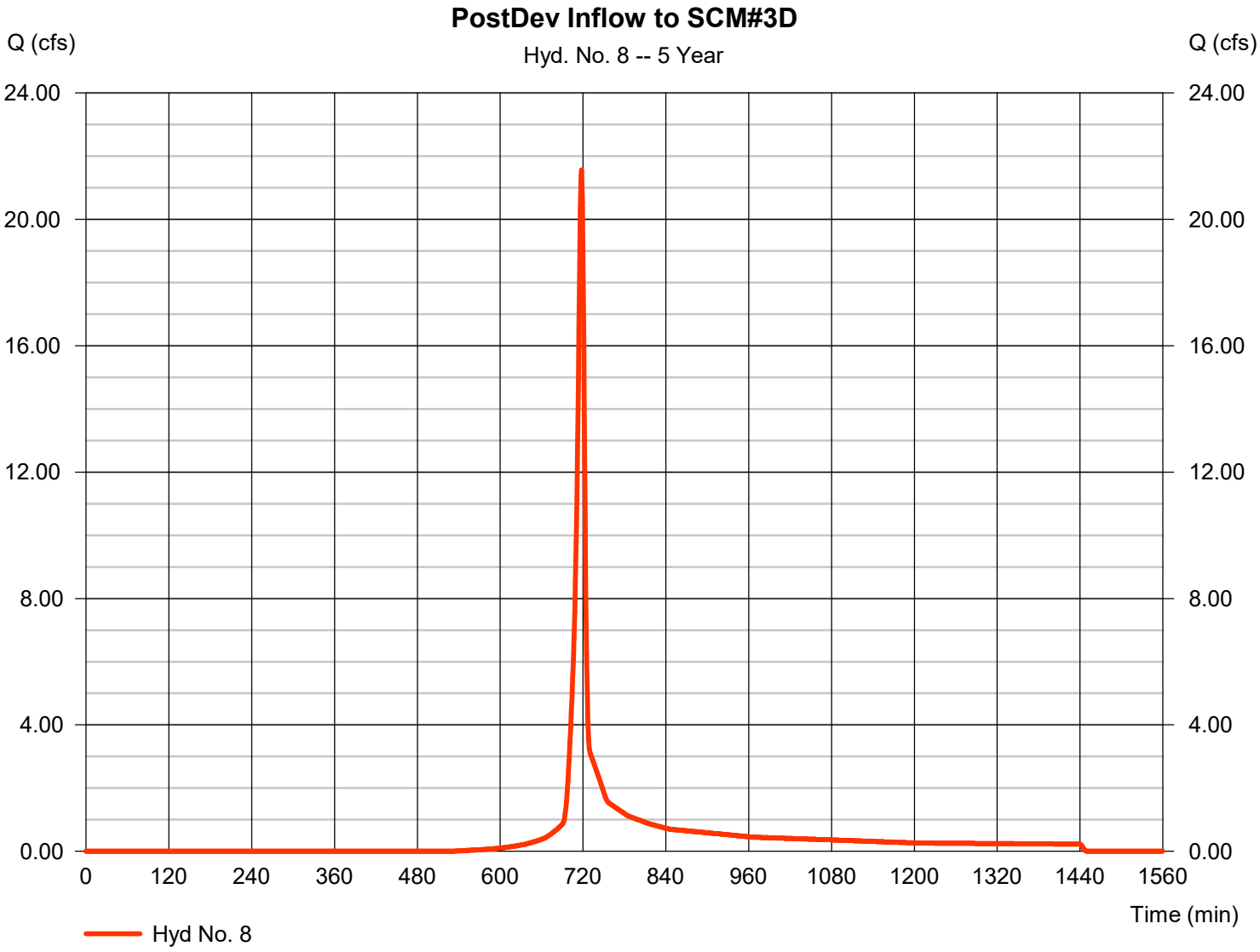


Hydrograph Report

Hyd. No. 8

PostDev Inflow to SCM#3D

Hydrograph type	= SCS Runoff	Peak discharge	= 21.57 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 43,442 cuft
Drainage area	= 5.640 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



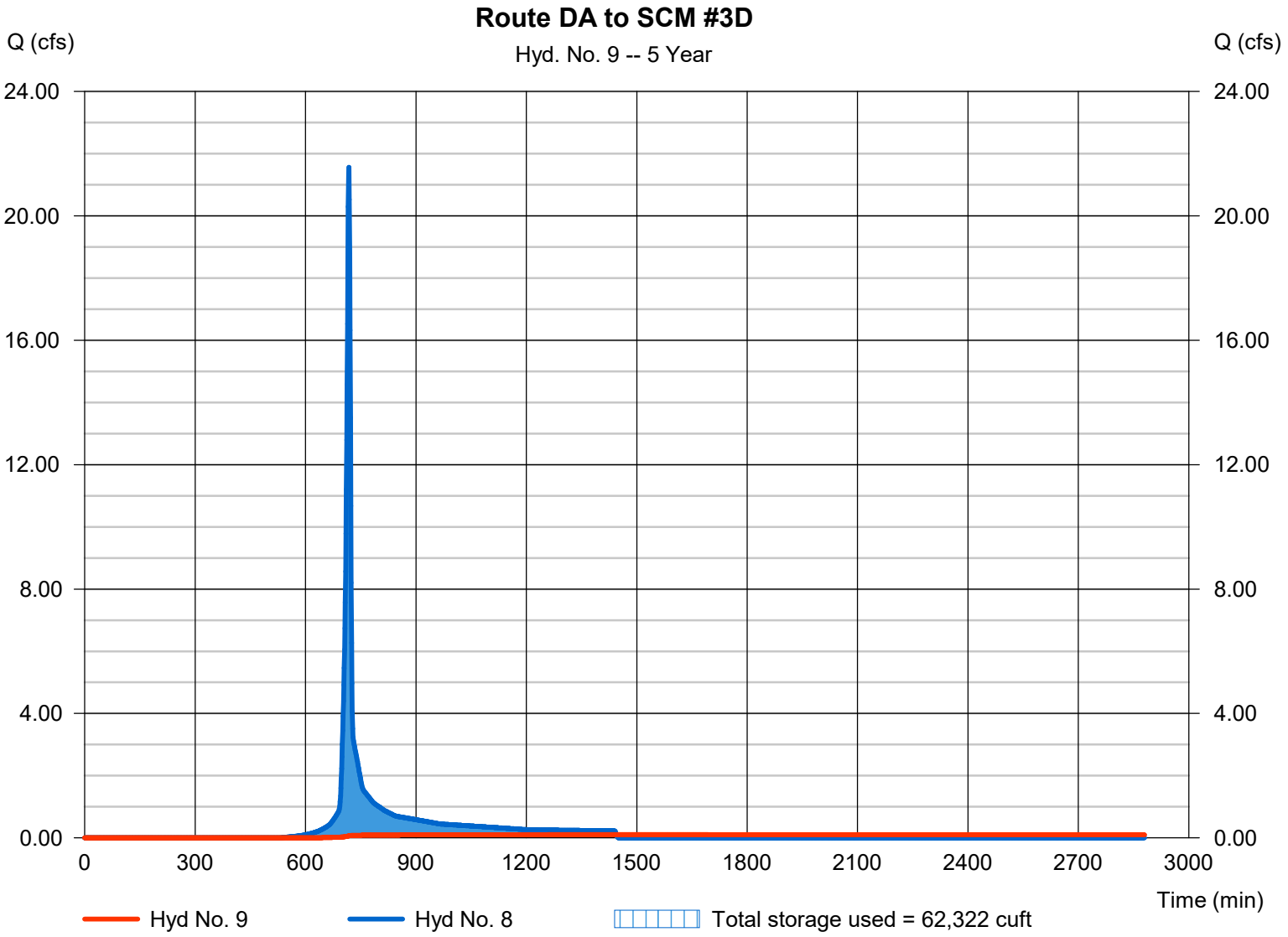
Hydrograph Report

Hyd. No. 9

Route DA to SCM #3D

Hydrograph type	=	Reservoir	Peak discharge	=	0.102 cfs
Storm frequency	=	5 yrs	Time to peak	=	1445 min
Time interval	=	1 min	Hyd. volume	=	12,708 cuft
Inflow hyd. No.	=	8 - PostDev Inflow to SCM#3D	Max. Elevation	=	347.57 ft
Reservoir name	=	SCM #3D	Max. Storage	=	62,322 cuft

Storage Indication method used. Wet pond routing start elevation = 344.50 ft.

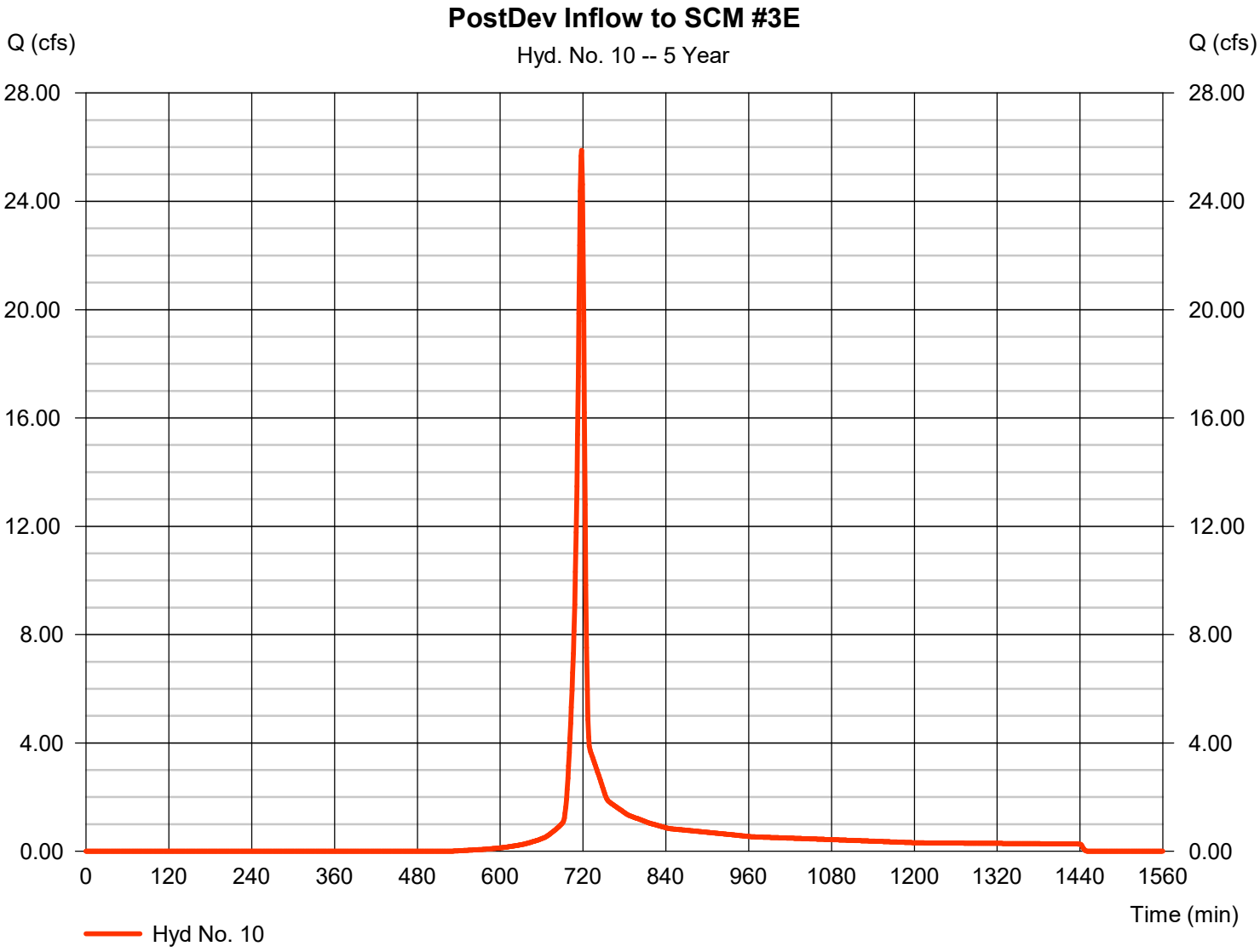


Hydrograph Report

Hyd. No. 10

PostDev Inflow to SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 25.88 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 52,158 cuft
Drainage area	= 6.720 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



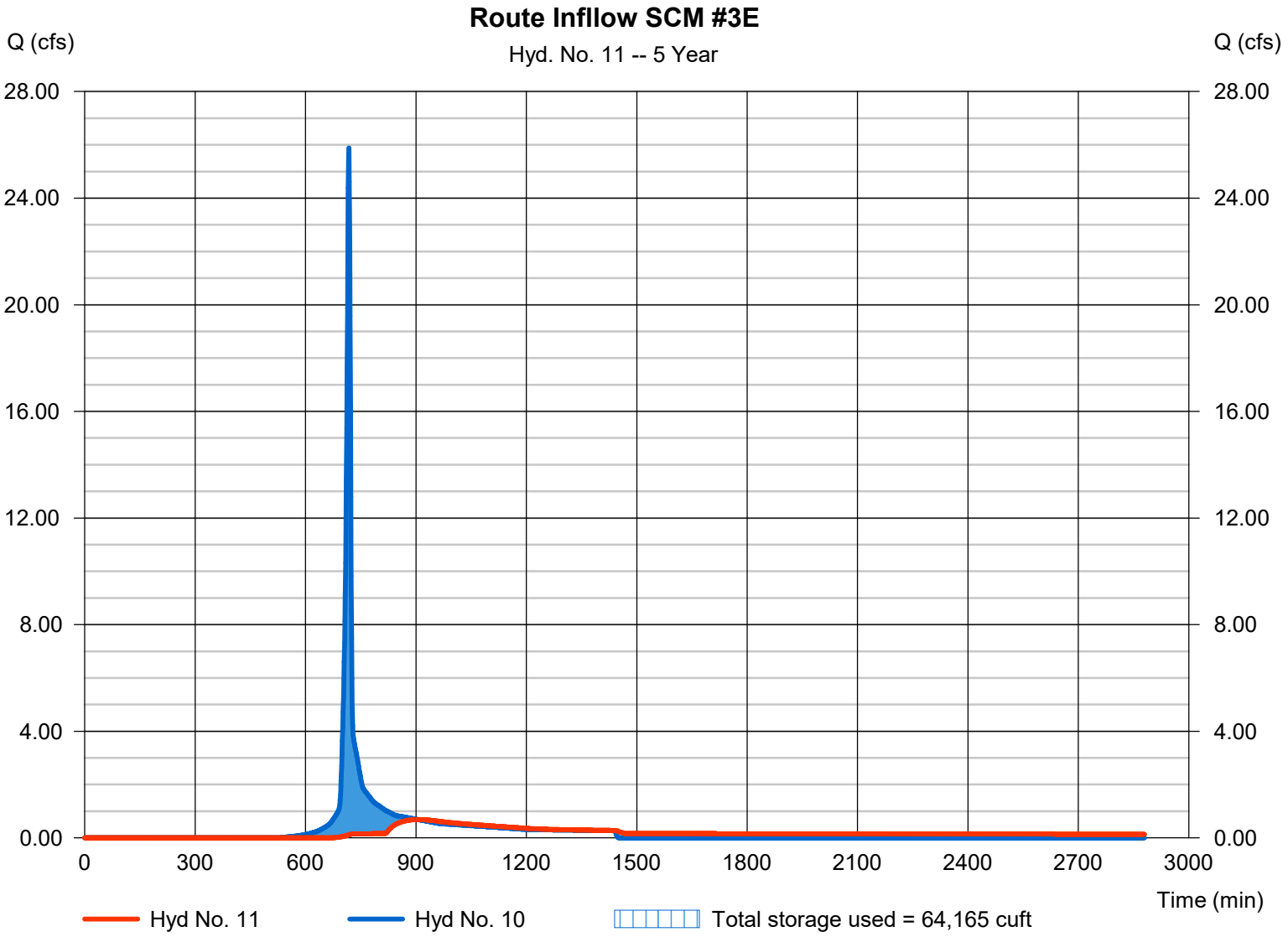
Hydrograph Report

Hyd. No. 11

Route Infllow SCM #3E

Hydrograph type	=	Reservoir	Peak discharge	=	0.684 cfs
Storm frequency	=	5 yrs	Time to peak	=	906 min
Time interval	=	1 min	Hyd. volume	=	30,249 cuft
Inflow hyd. No.	=	10 - PostDev Inflow to SCM #3E	Max. Elevation	=	309.08 ft
Reservoir name	=	SCM #3E	Max. Storage	=	64,165 cuft

Storage Indication method used. Wet pond routing start elevation = 306.50 ft.

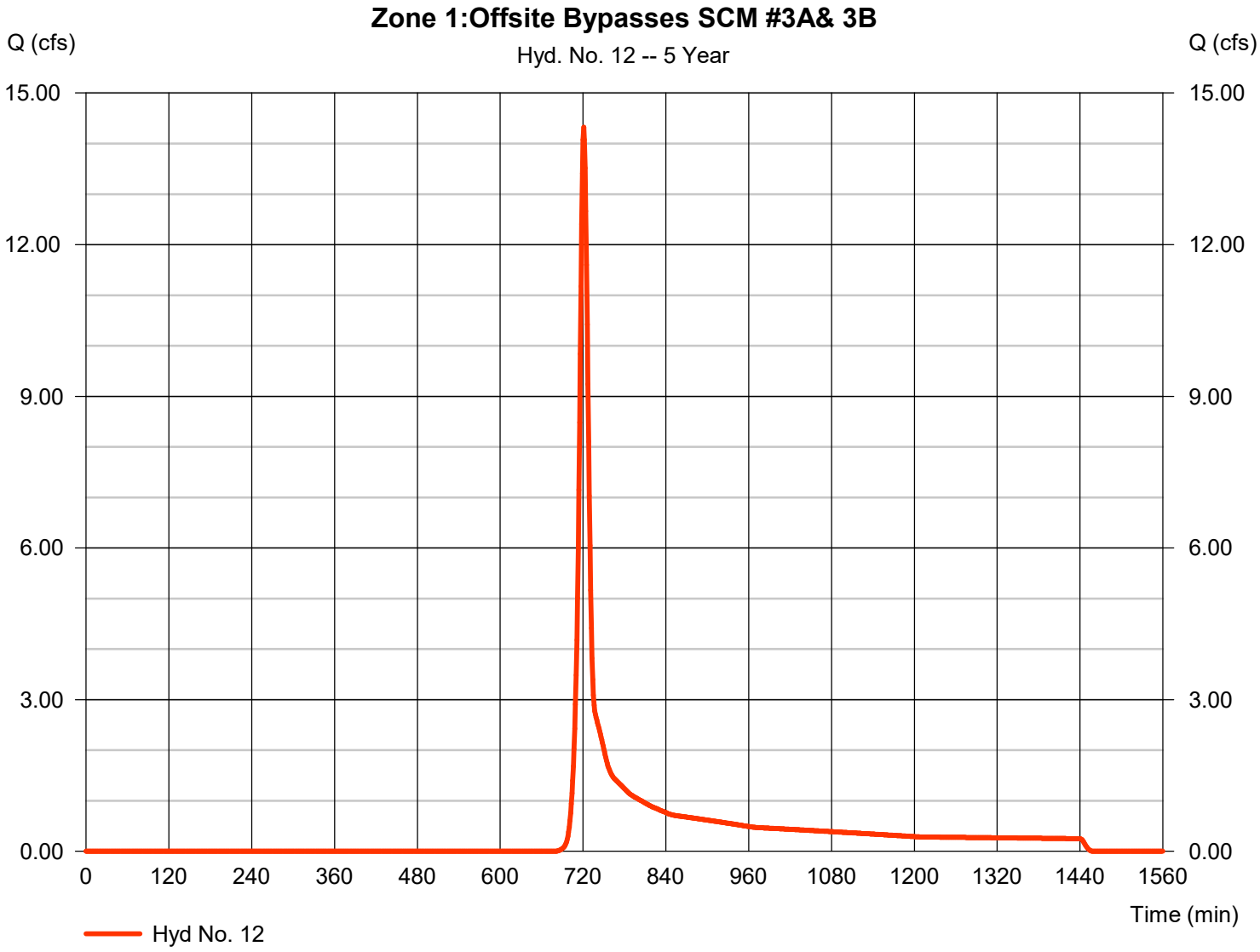


Hydrograph Report

Hyd. No. 12

Zone 1:Offsite Bypasses SCM #3A& 3B

Hydrograph type	= SCS Runoff	Peak discharge	= 14.32 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 36,578 cuft
Drainage area	= 8.510 ac	Curve number	= 64
Basin Slope	= 2.9 %	Hydraulic length	= 1370 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

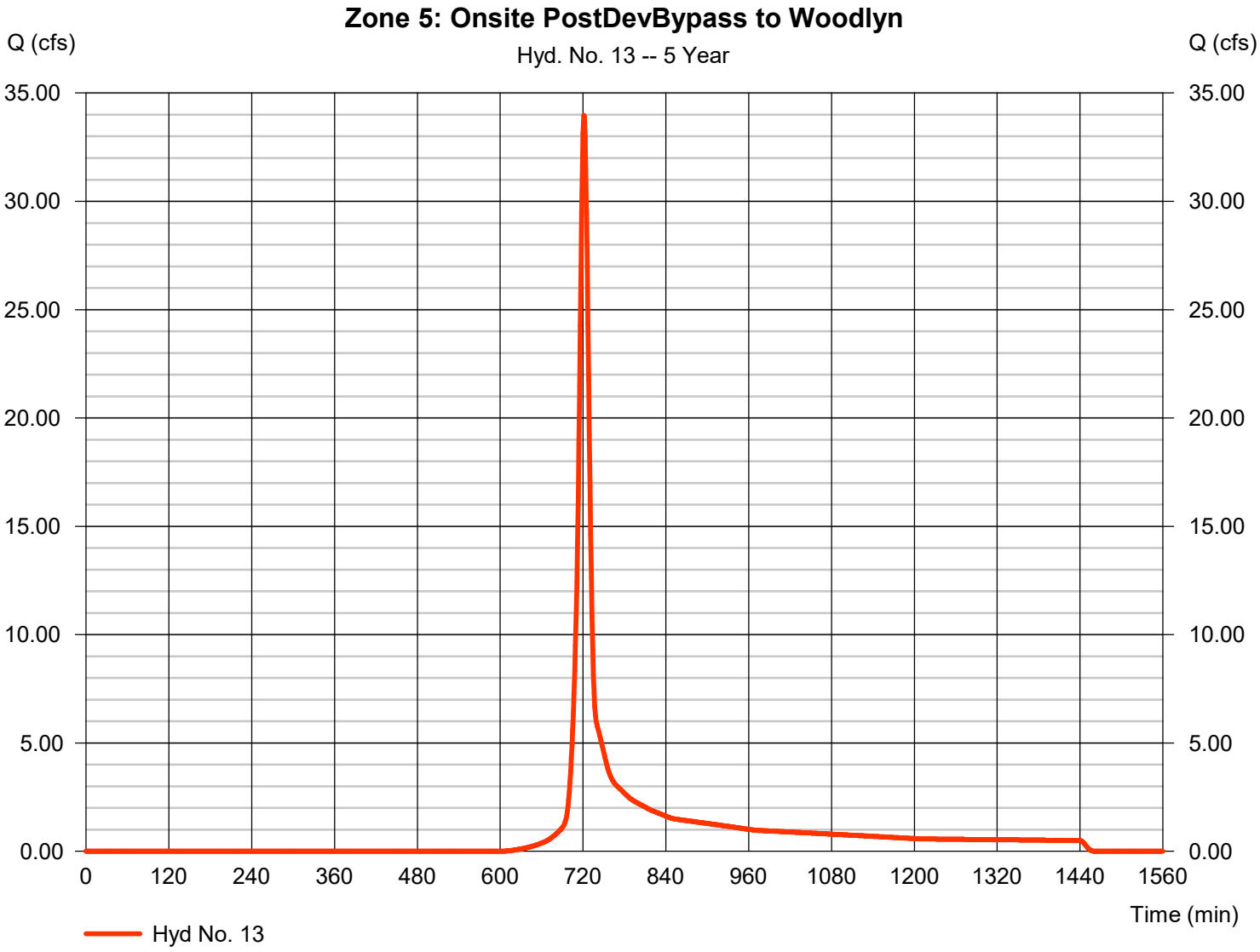


Hydrograph Report

Hyd. No. 13

Zone 5: Onsite PostDevBypass to Woodlyn

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.96 cfs
Storm frequency	=	5 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	86,771 cuft
Drainage area	=	14.320 ac	Curve number	=	72
Basin Slope	=	1.5 %	Hydraulic length	=	1788 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.58 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

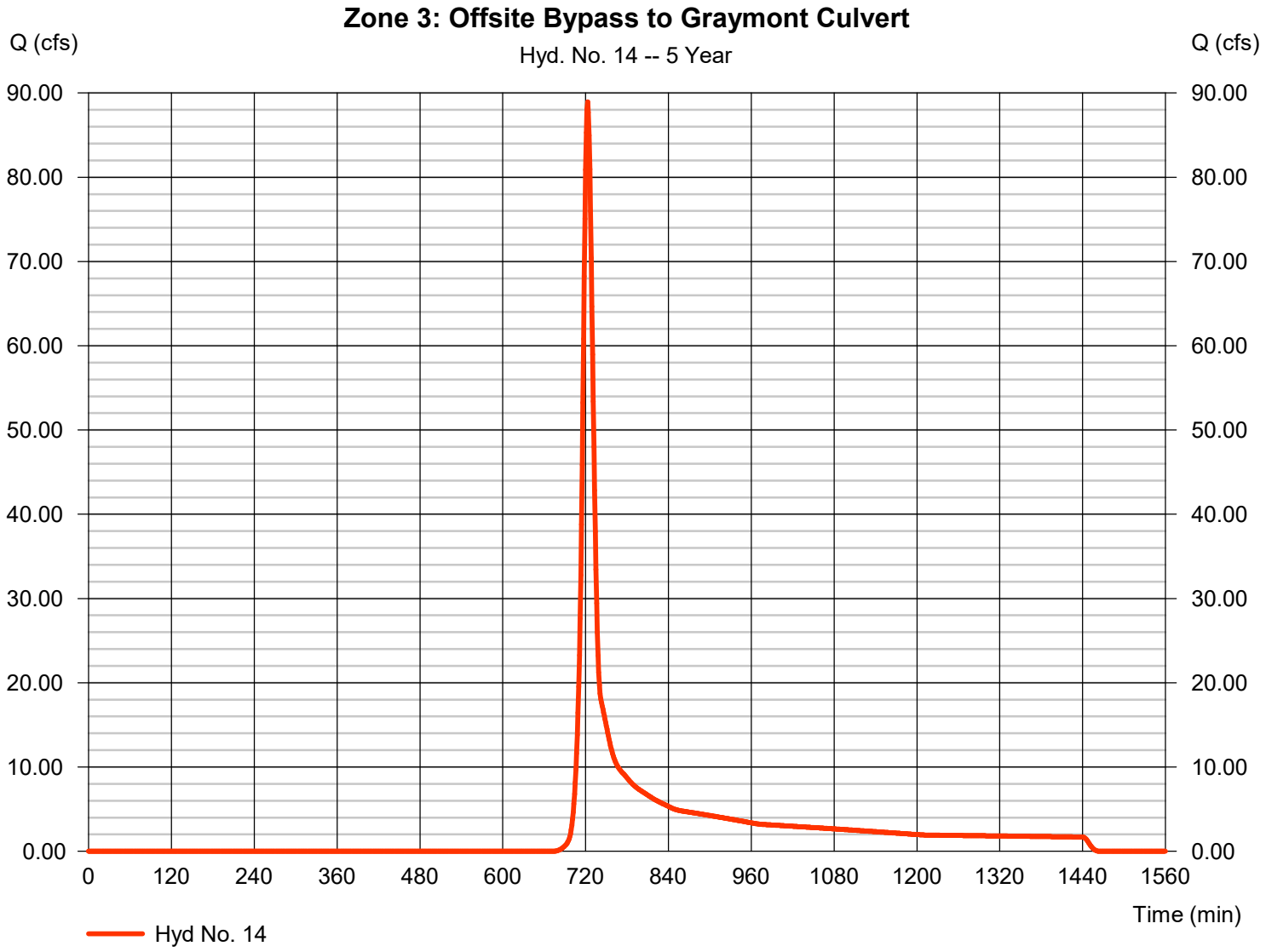


Hydrograph Report

Hyd. No. 14

Zone 3: Offsite Bypass to Graymont Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 88.96 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 254,030 cuft
Drainage area	= 57.120 ac	Curve number	= 65
Basin Slope	= 1.8 %	Hydraulic length	= 1220 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



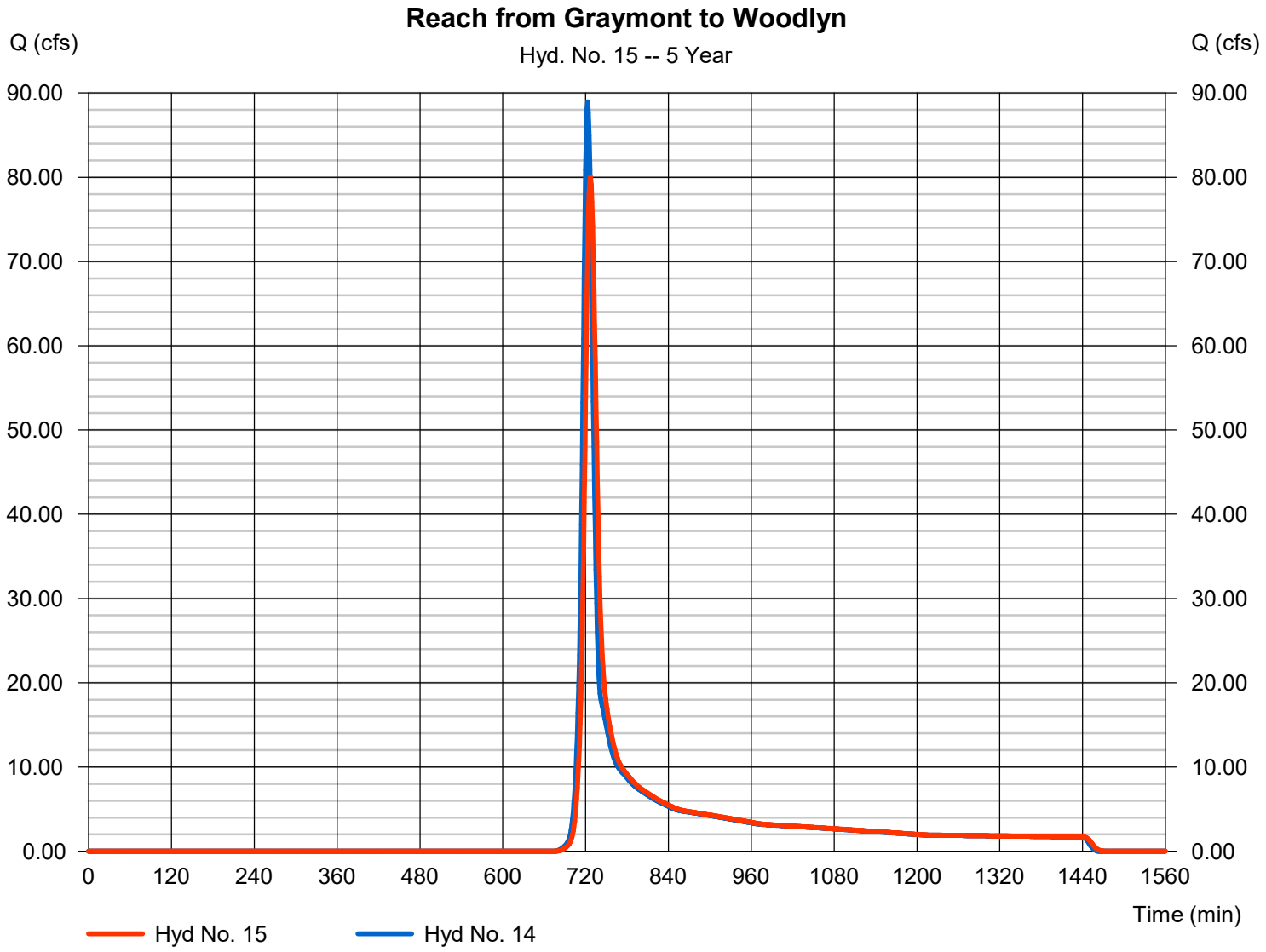
Hydrograph Report

Hyd. No. 15

Reach from Graymont to Woodlyn

Hydrograph type	=	Reach	Peak discharge	=	80.04 cfs
Storm frequency	=	5 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	254,028 cuft
Inflow hyd. No.	=	14 - Zone 3: Offsite Bypass to Graymont Culvert	Section type	=	Trapezoidal
Reach length	=	1750.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	2.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.009	Rating curve m	=	1.370
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2321

Modified Att-Kin routing method used.

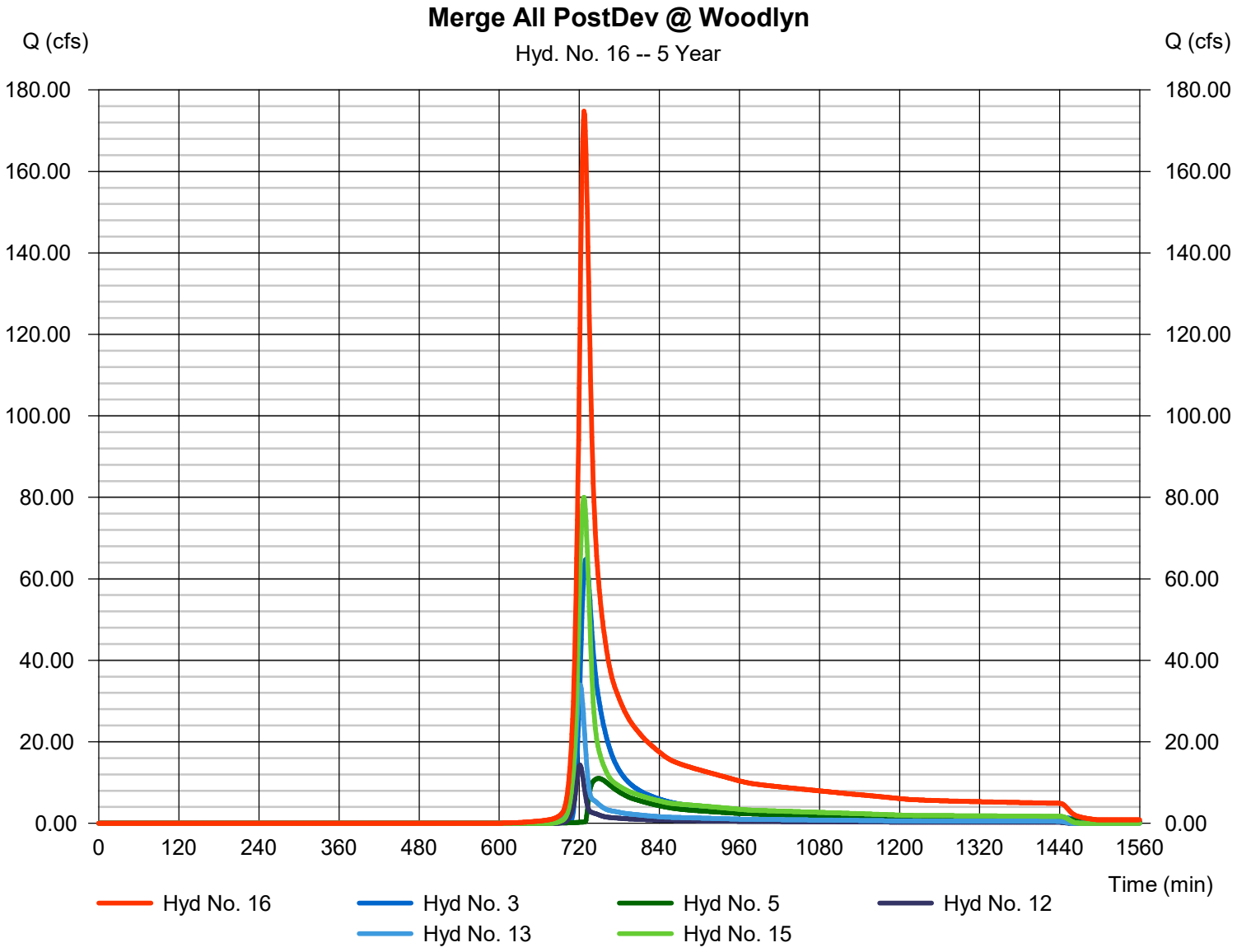


Hydrograph Report

Hyd. No. 16

Merge All PostDev @ Woodlyn

Hydrograph type	= Combine	Peak discharge	= 174.79 cfs
Storm frequency	= 5 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 770,280 cuft
Inflow hyds.	= 3, 5, 12, 13, 15	Contrib. drain. area	= 22.830 ac

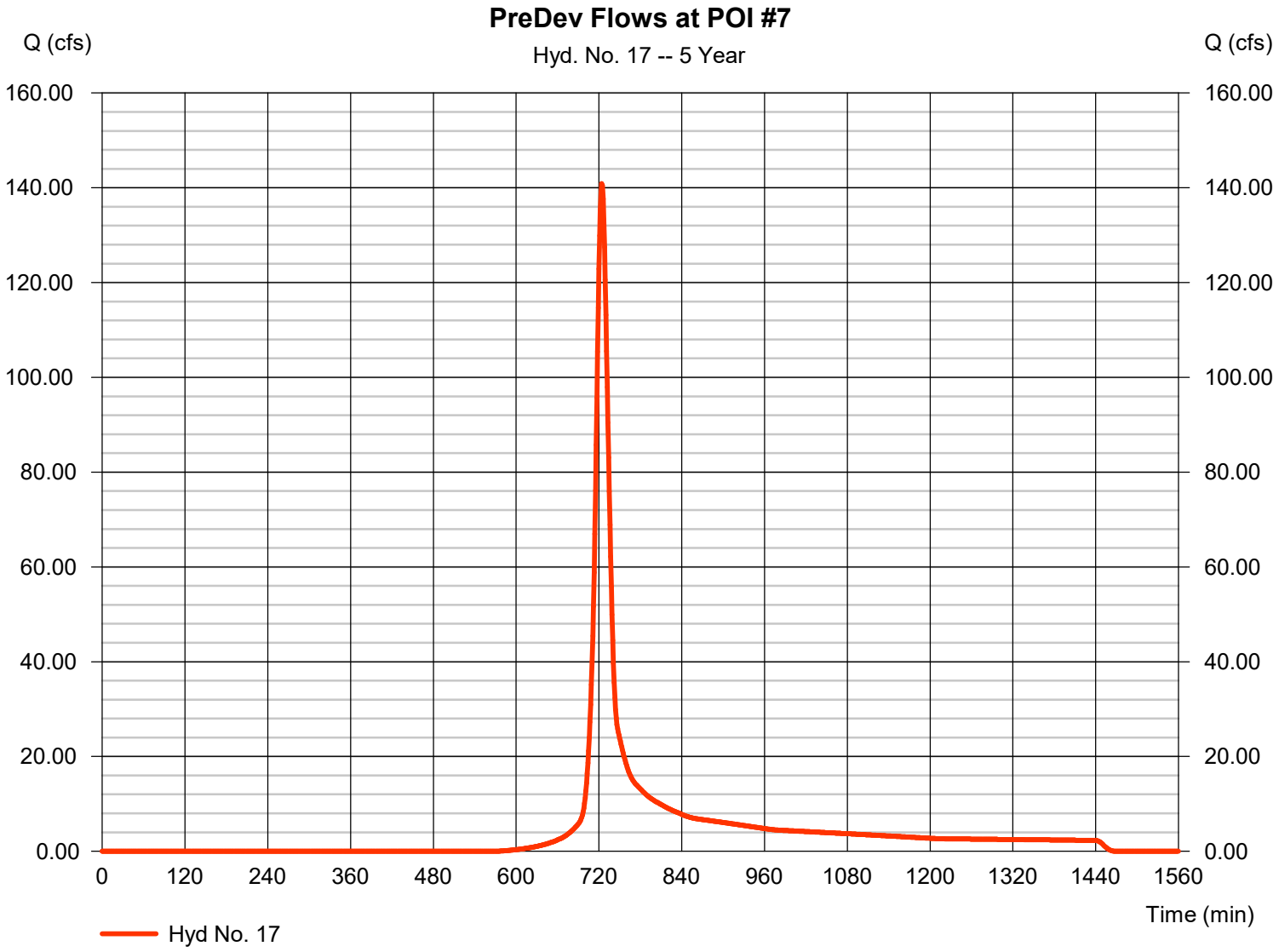


Hydrograph Report

Hyd. No. 17

PreDev Flows at POI #7

Hydrograph type	=	SCS Runoff	Peak discharge	=	140.89 cfs
Storm frequency	=	5 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	421,156 cuft
Drainage area	=	62.670 ac	Curve number	=	74.4
Basin Slope	=	1.3 %	Hydraulic length	=	2500 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.43 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

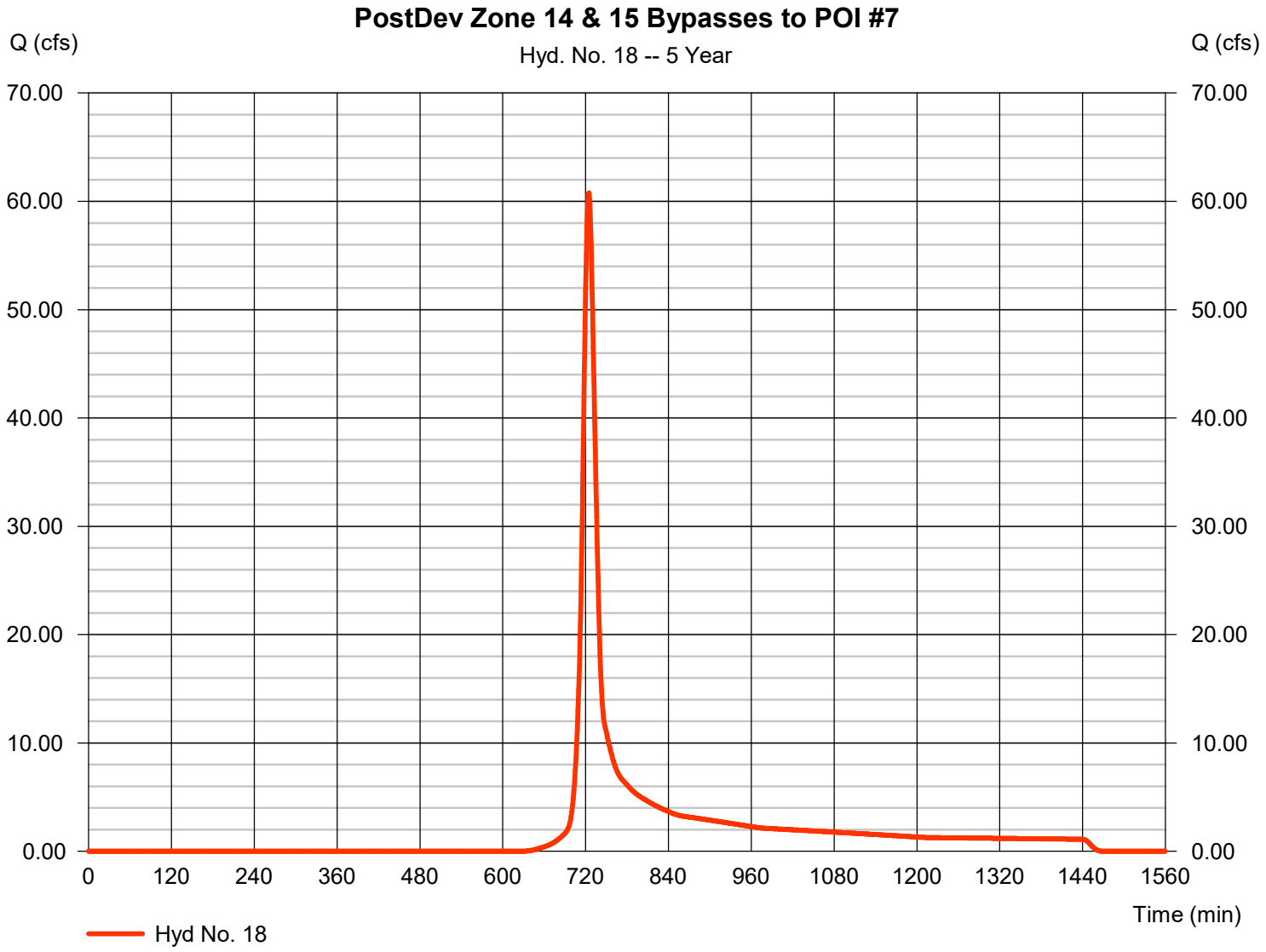


Hydrograph Report

Hyd. No. 18

PostDev Zone 14 & 15 Bypasses to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 60.77 cfs
Storm frequency	= 5 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 185,437 cuft
Drainage area	= 33.240 ac	Curve number	= 70
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.27 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

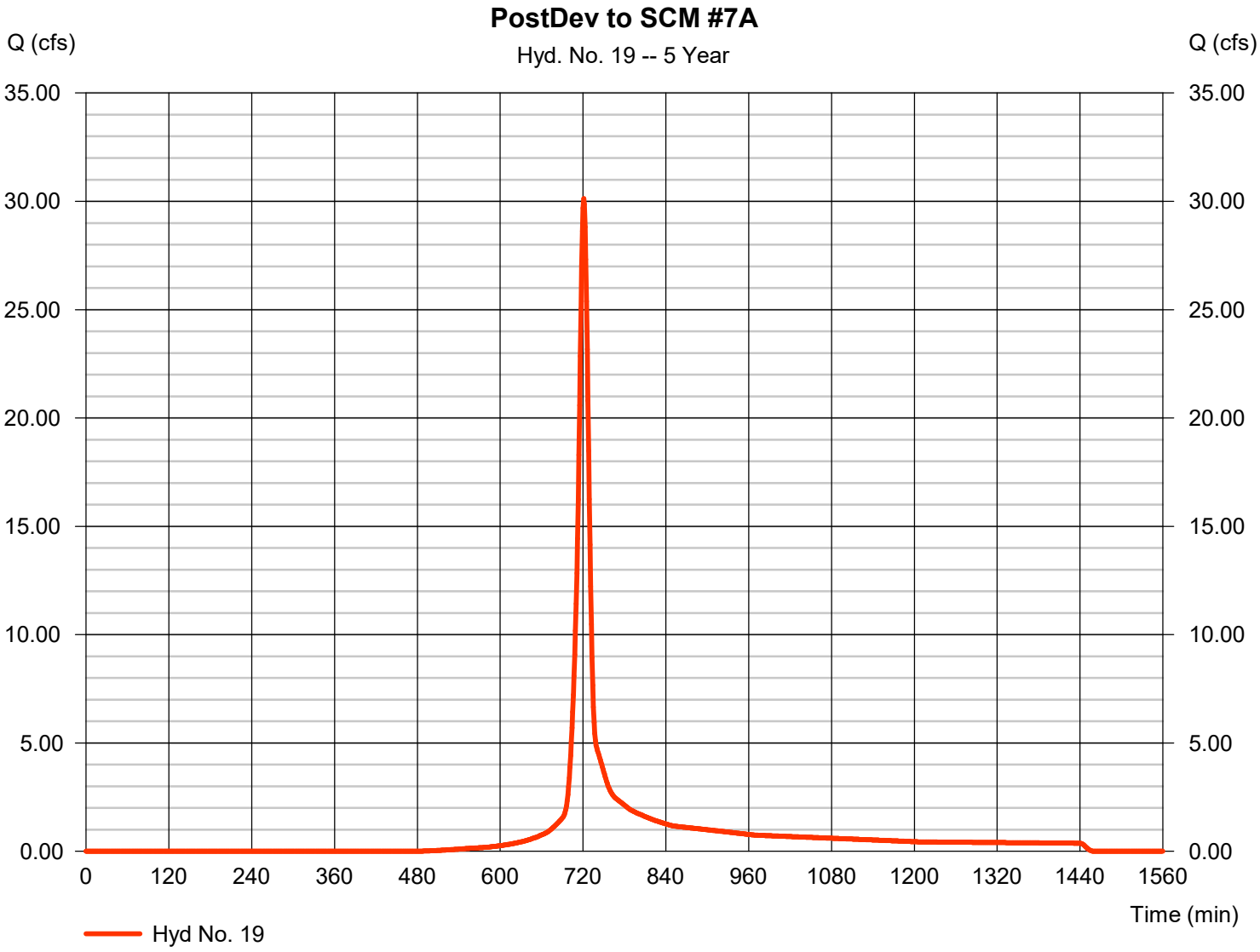


Hydrograph Report

Hyd. No. 19

PostDev to SCM #7A

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.13 cfs
Storm frequency	=	5 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	76,126 cuft
Drainage area	=	9.260 ac	Curve number	=	79.8
Basin Slope	=	1.1 %	Hydraulic length	=	1505 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.38 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

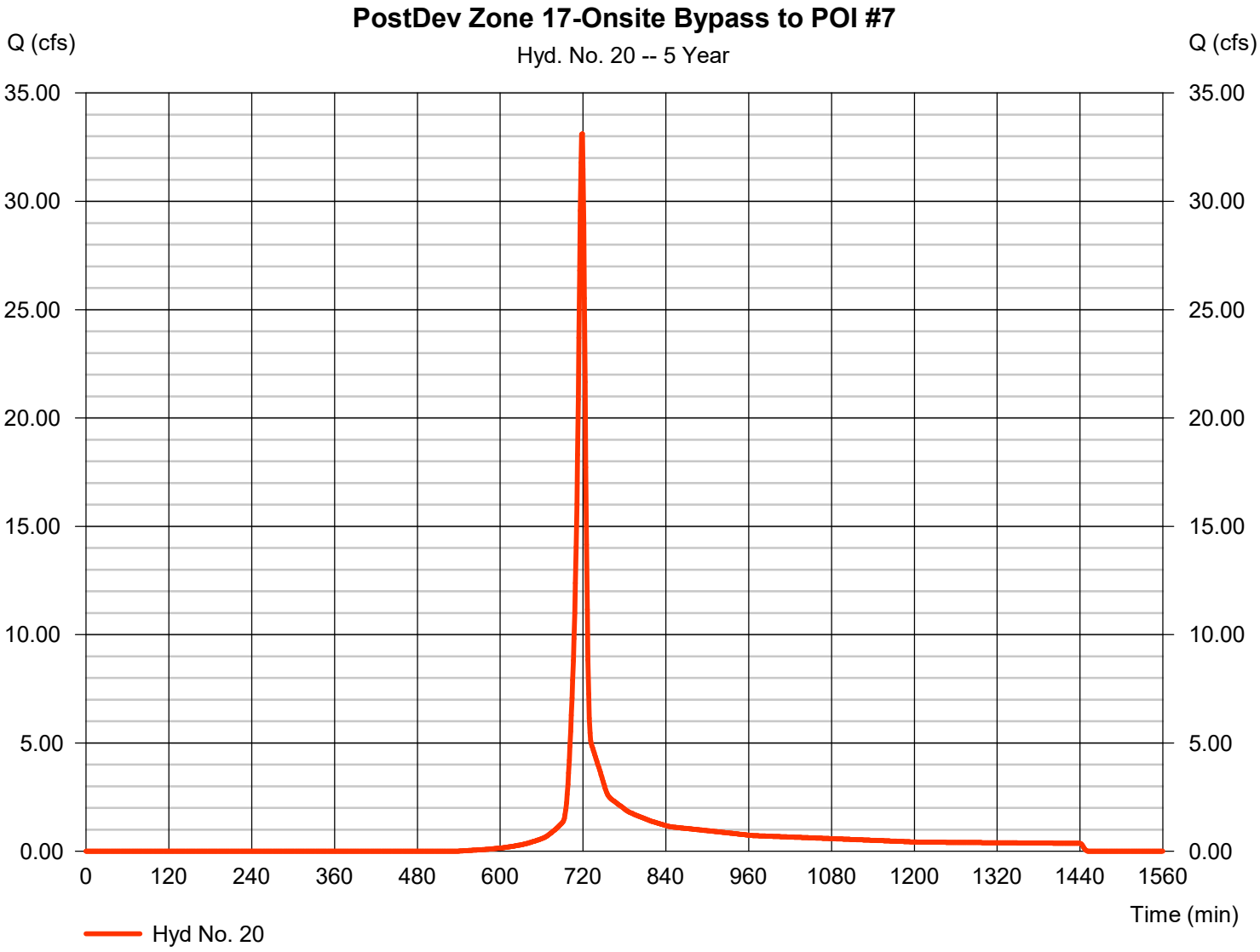


Hydrograph Report

Hyd. No. 20

PostDev Zone 17-Onsite Bypass to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 33.12 cfs
Storm frequency	= 5 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 69,973 cuft
Drainage area	= 9.720 ac	Curve number	= 76.5
Basin Slope	= 1.0 %	Hydraulic length	= 810 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 7.97 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



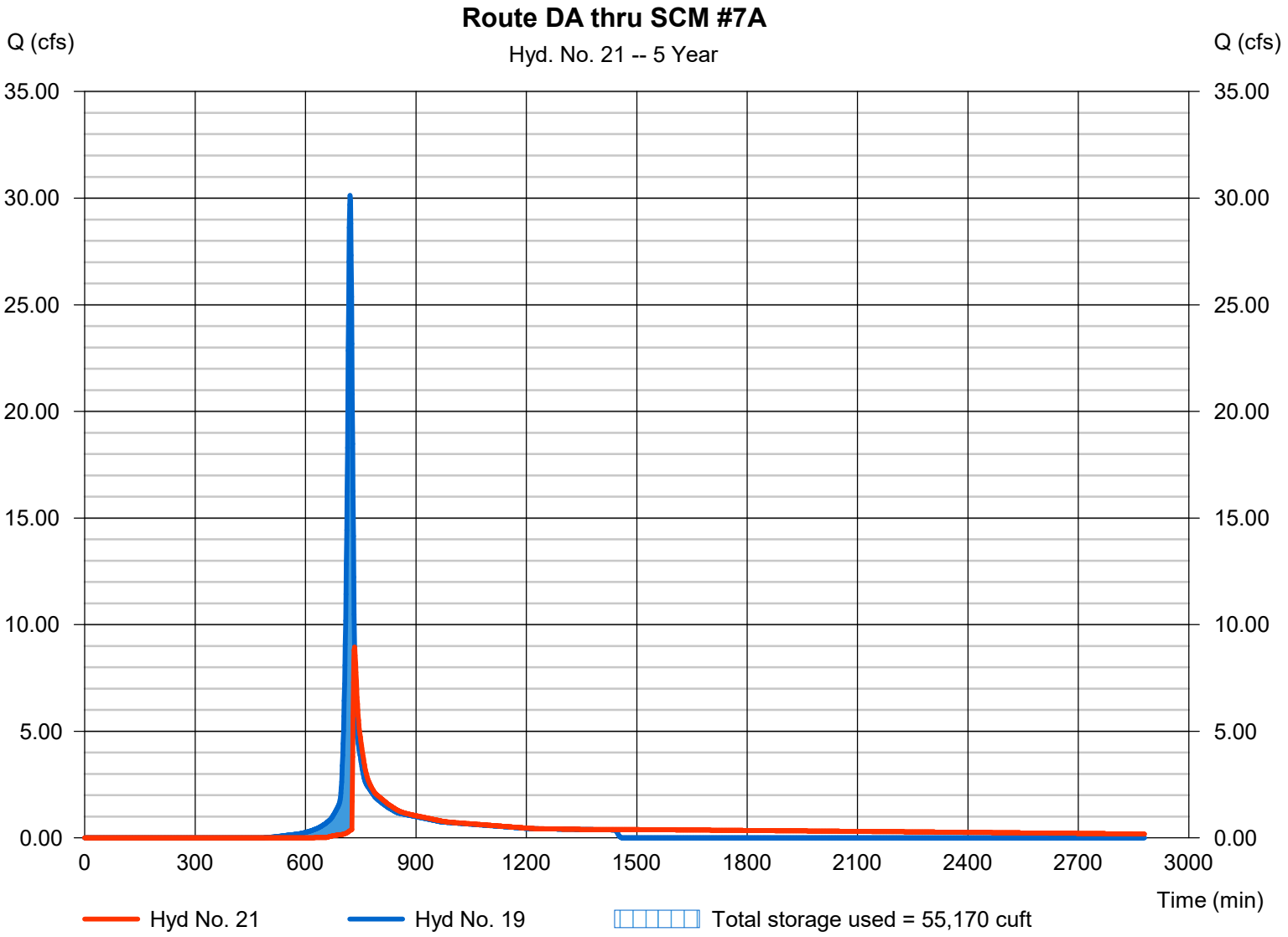
Hydrograph Report

Hyd. No. 21

Route DA thru SCM #7A

Hydrograph type	=	Reservoir	Peak discharge	=	8.945 cfs
Storm frequency	=	5 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	69,569 cuft
Inflow hyd. No.	=	19 - PostDev to SCM #7A	Max. Elevation	=	373.69 ft
Reservoir name	=	SCM #7A	Max. Storage	=	55,170 cuft

Storage Indication method used. Wet pond routing start elevation = 370.50 ft.

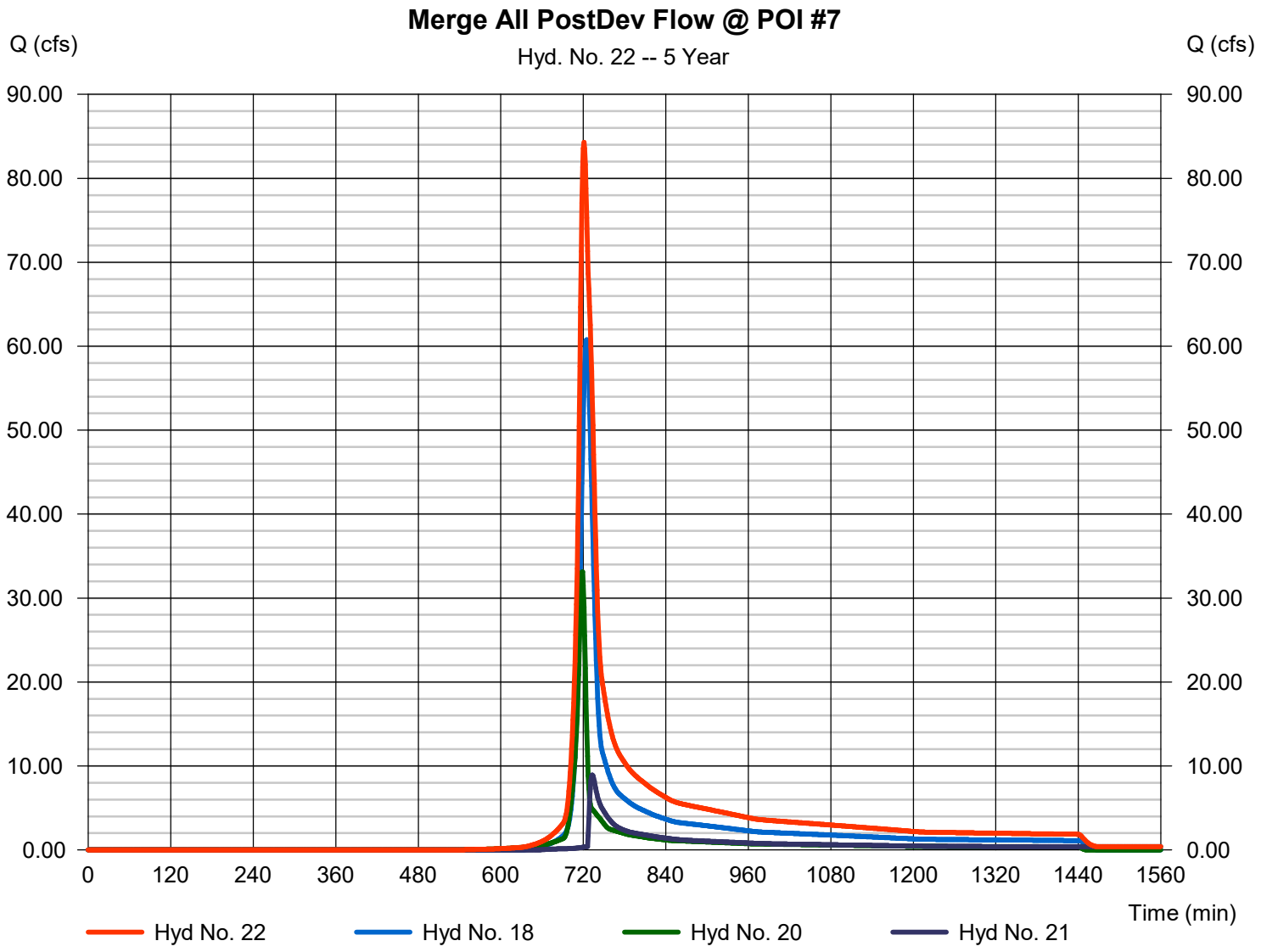


Hydrograph Report

Hyd. No. 22

Merge All PostDev Flow @ POI #7

Hydrograph type	= Combine	Peak discharge	= 84.28 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 324,978 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 42.960 ac

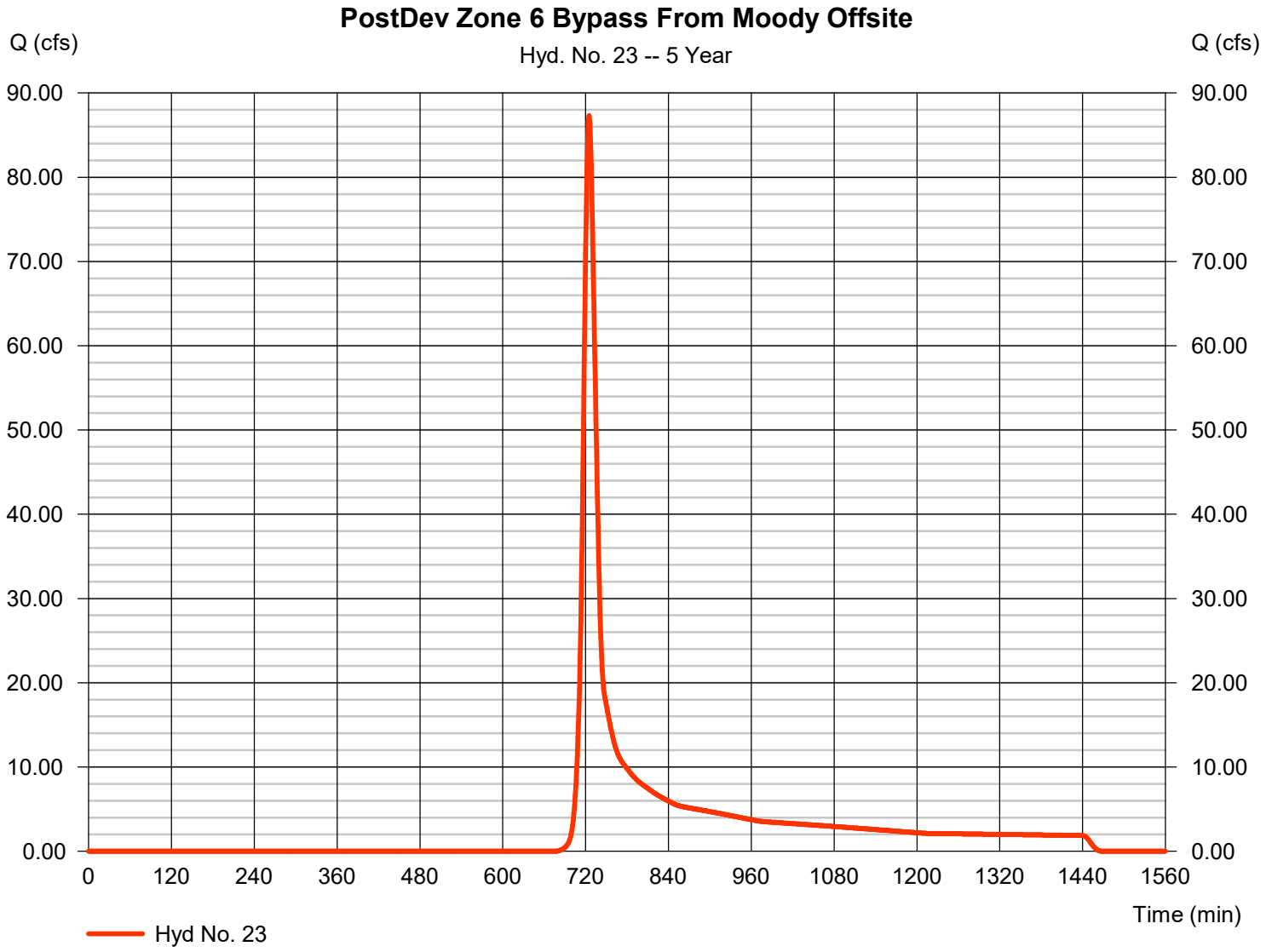


Hydrograph Report

Hyd. No. 23

PostDev Zone 6 Bypass From Moody Offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 87.31 cfs
Storm frequency	= 5 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 278,659 cuft
Drainage area	= 64.030 ac	Curve number	= 64.8
Basin Slope	= 1.8 %	Hydraulic length	= 2940 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.01 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

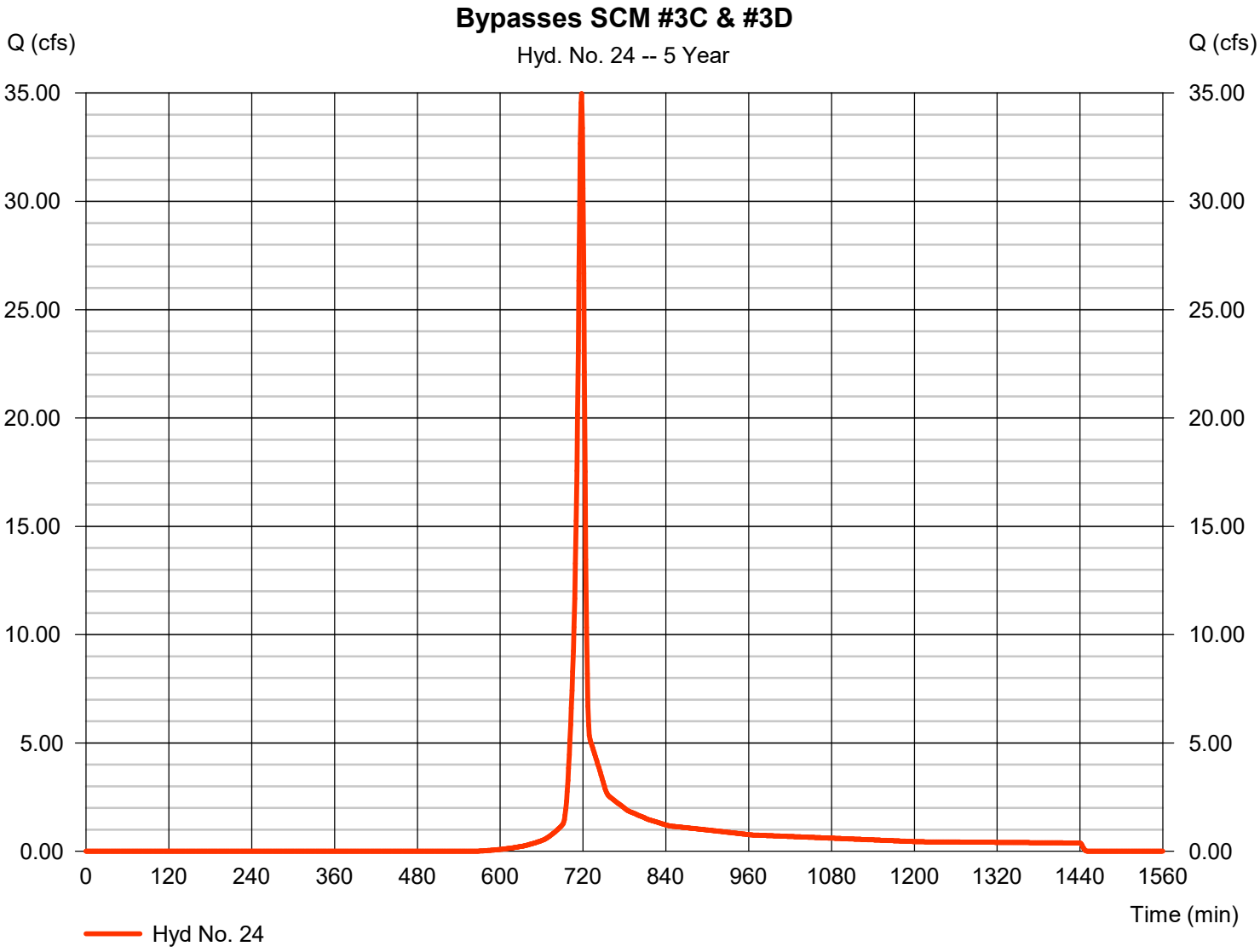


Hydrograph Report

Hyd. No. 24

Bypasses SCM #3C & #3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	34.97 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	70,241 cuft
Drainage area	=	9.980 ac	Curve number	=	74.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



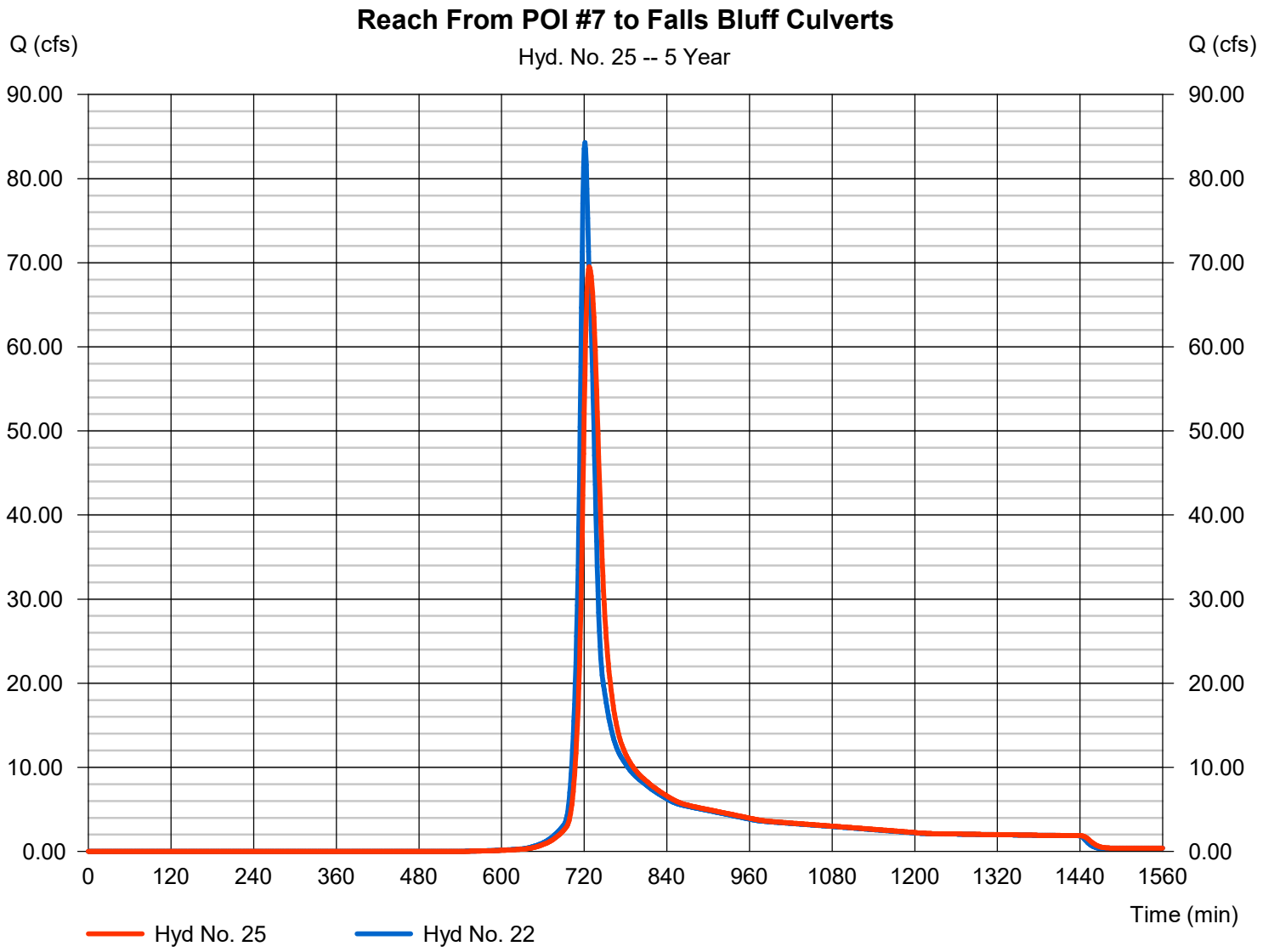
Hydrograph Report

Hyd. No. 25

Reach From POI #7 to Falls Bluff Culverts

Hydrograph type	=	Reach	Peak discharge	=	69.51 cfs
Storm frequency	=	5 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	324,903 cuft
Inflow hyd. No.	=	22 - Merge All PostDev Flow @ POI #7	Section type	=	Trapezoidal
Reach length	=	1845.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	4.0 ft
Side slope	=	30.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.289	Rating curve m	=	1.183
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1430

Modified Att-Kin routing method used.

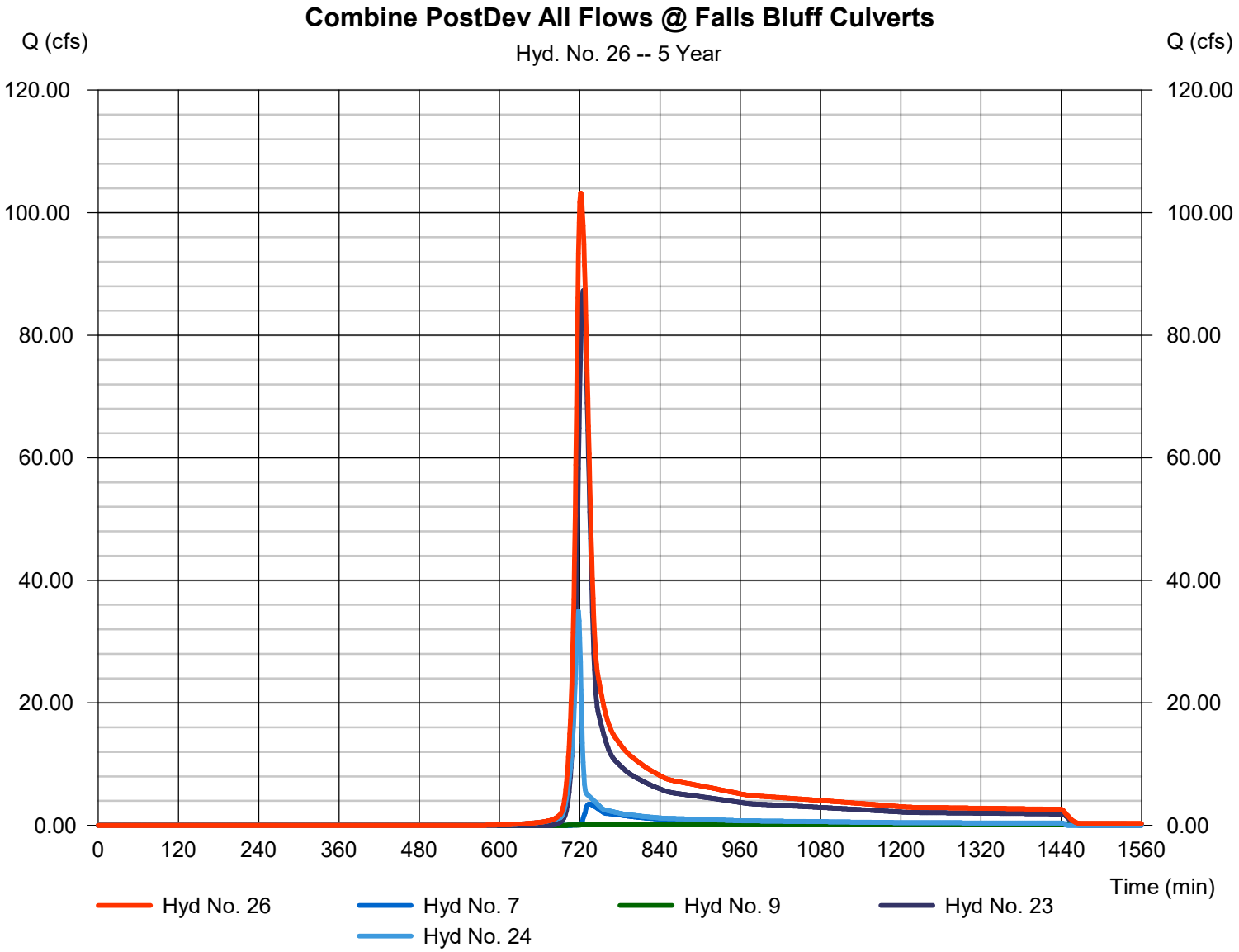


Hydrograph Report

Hyd. No. 26

Combine PostDev All Flows @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 103.21 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 394,539 cuft
Inflow hyds.	= 7, 9, 23, 24	Contrib. drain. area	= 74.010 ac

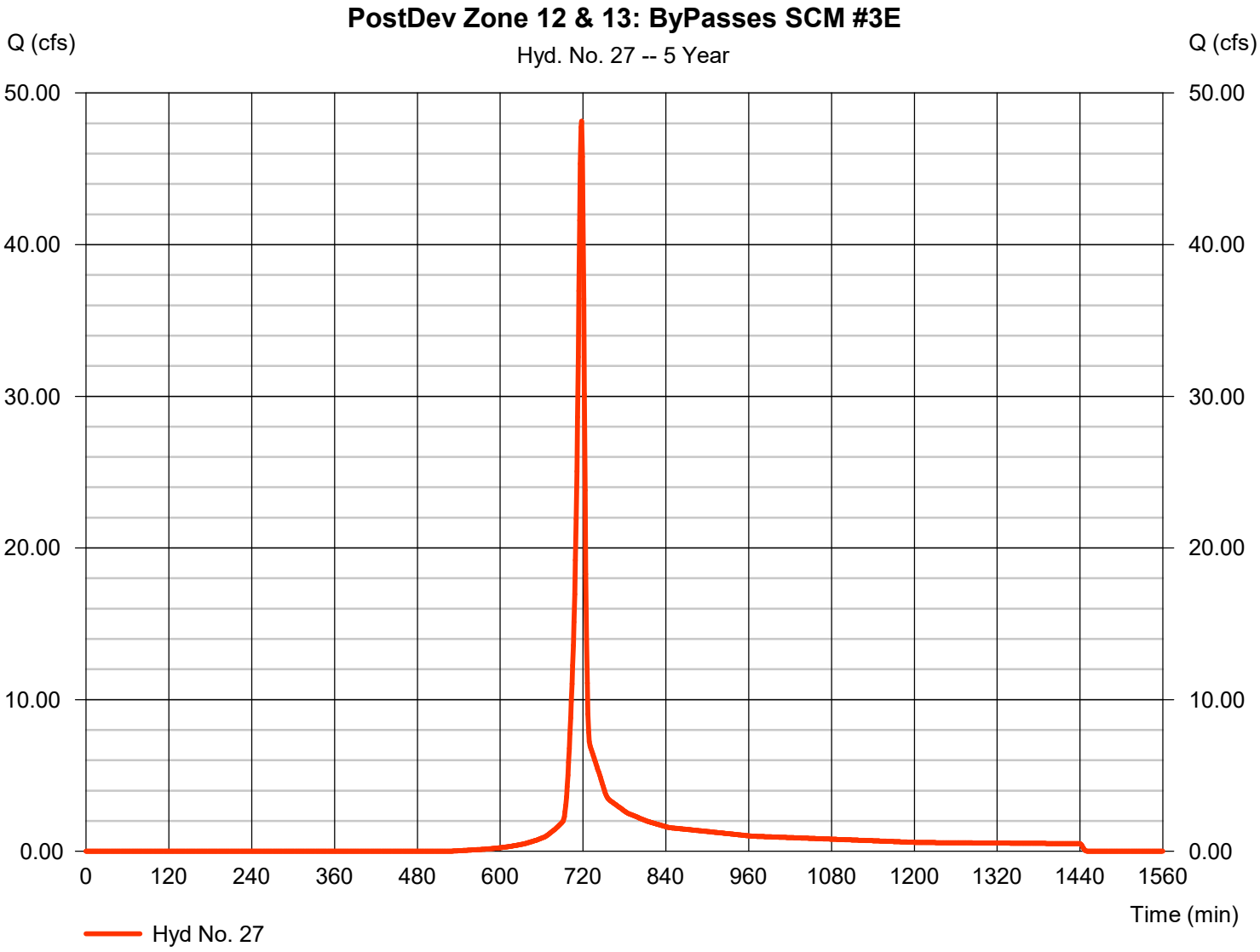


Hydrograph Report

Hyd. No. 27

PostDev Zone 12 & 13: ByPasses SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 48.15 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 97,019 cuft
Drainage area	= 12.500 ac	Curve number	= 77
Basin Slope	= 5.7 %	Hydraulic length	= 1080 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 5.08 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

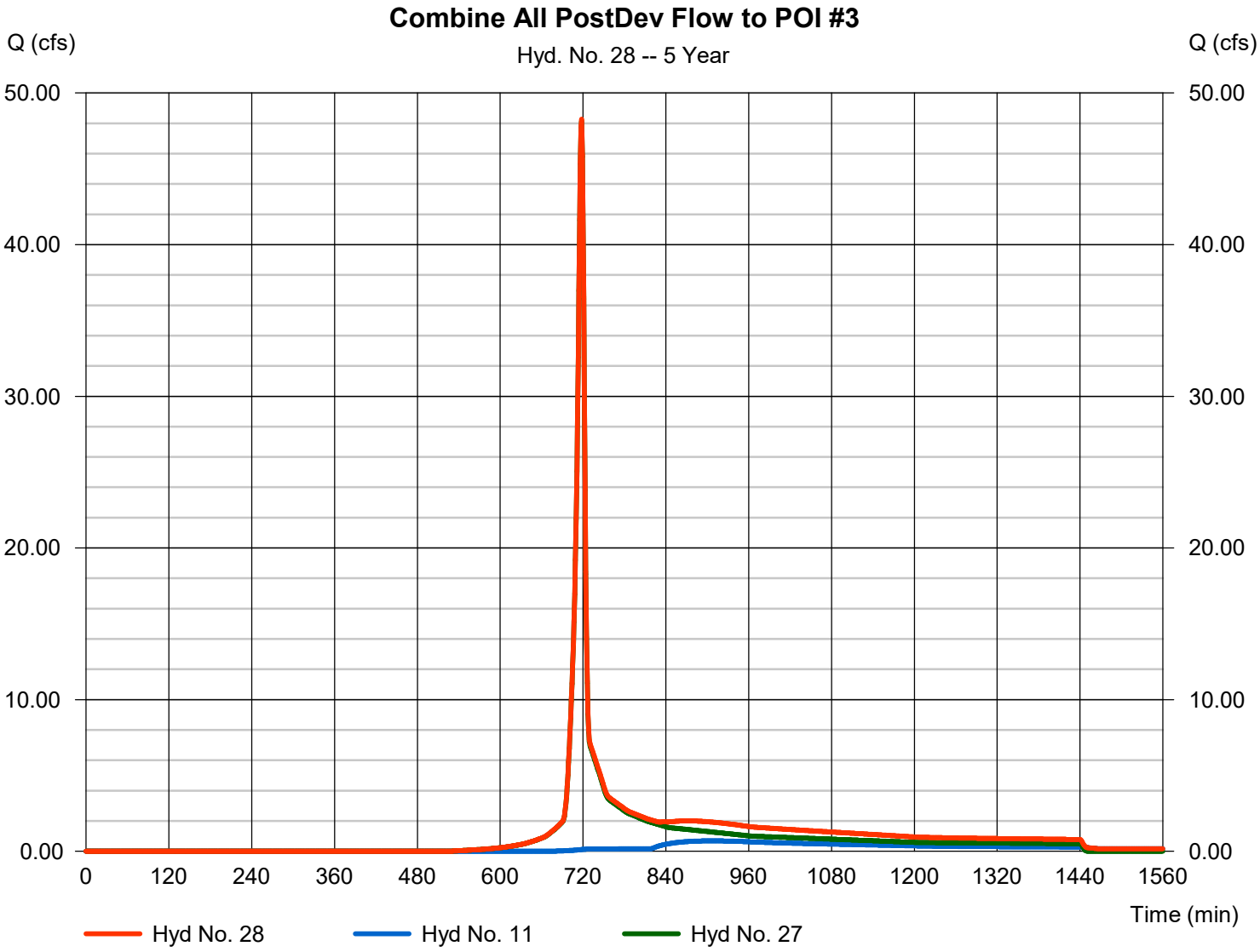


Hydrograph Report

Hyd. No. 28

Combine All PostDev Flow to POI #3

Hydrograph type	= Combine	Peak discharge	= 48.26 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 126,746 cuft
Inflow hyds.	= 11, 27	Contrib. drain. area	= 12.500 ac



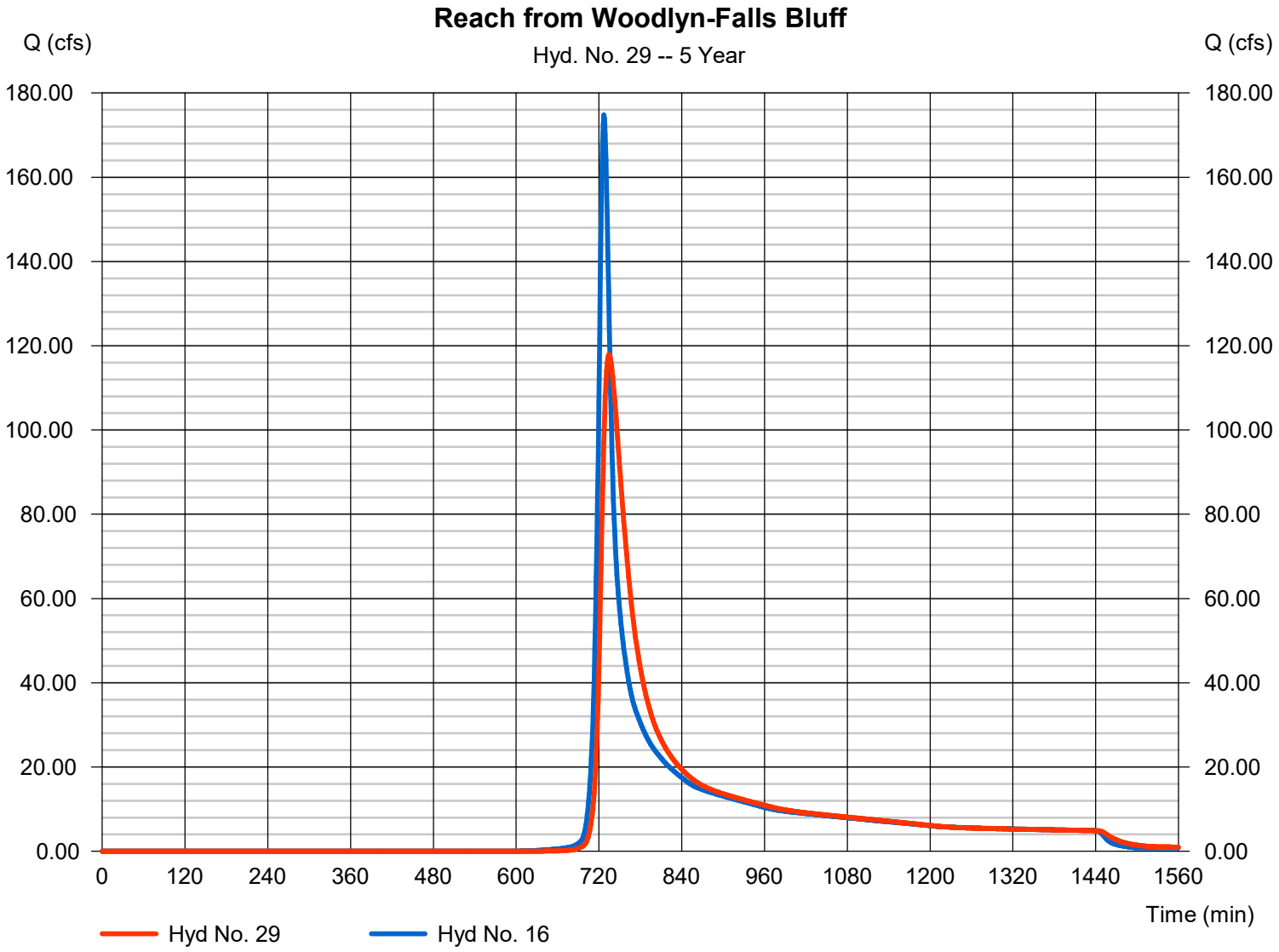
Hydrograph Report

Hyd. No. 29

Reach from Woodlyn-Falls Bluff

Hydrograph type	=	Reach	Peak discharge	=	117.90 cfs
Storm frequency	=	5 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	786,127 cuft
Inflow hyd. No.	=	16 - Merge All PostDev @ Woodlyn	Section type	=	Trapezoidal
Reach length	=	12152.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.009	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	6.0 ft
Rating curve x	=	5.011	Rating curve m	=	1.255
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0635

Modified Att-Kin routing method used.

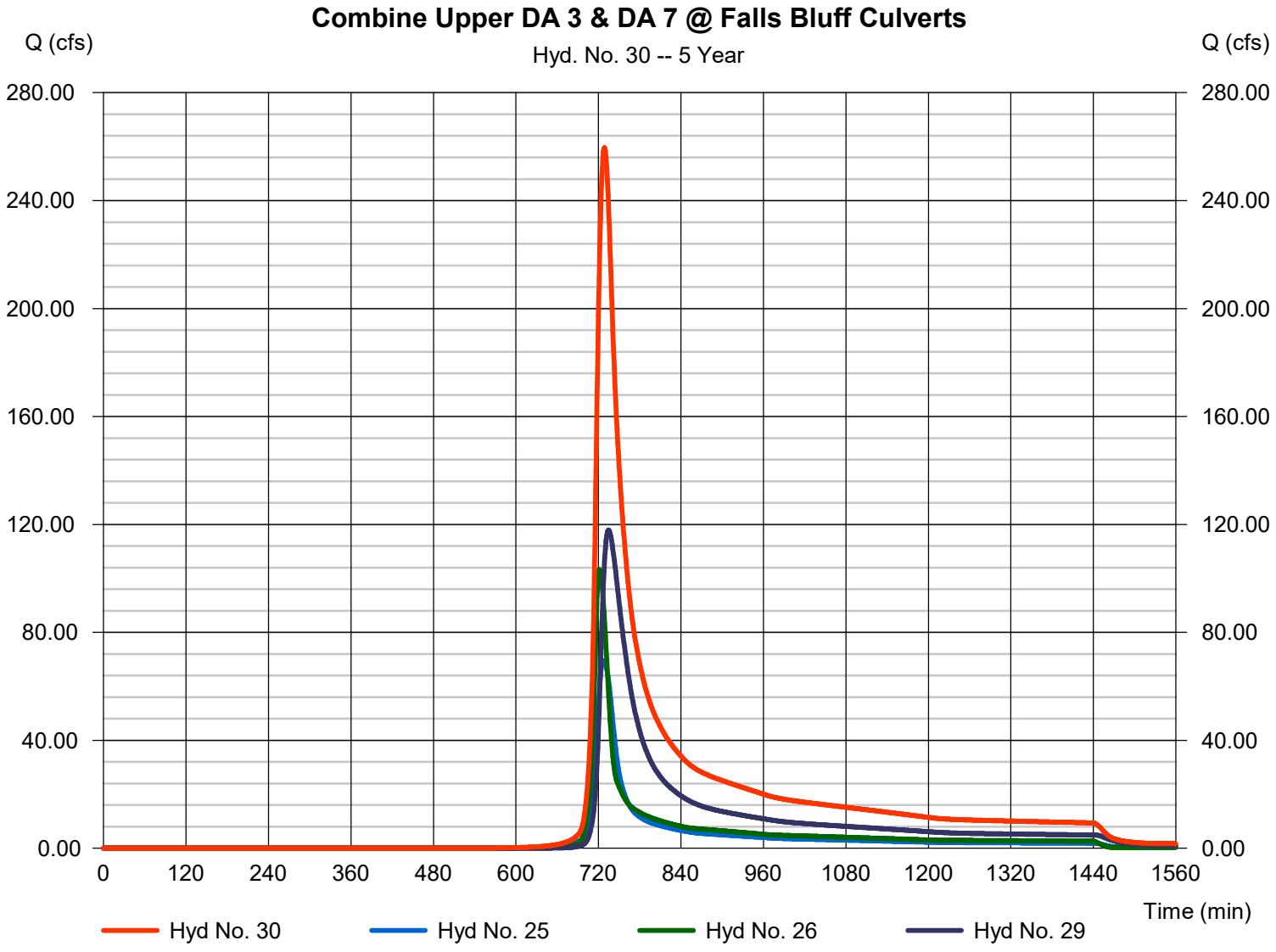


Hydrograph Report

Hyd. No. 30

Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 259.64 cfs
Storm frequency	= 5 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 1,505,569 cuft
Inflow hyds.	= 25, 26, 29	Contrib. drain. area	= 0.000 ac



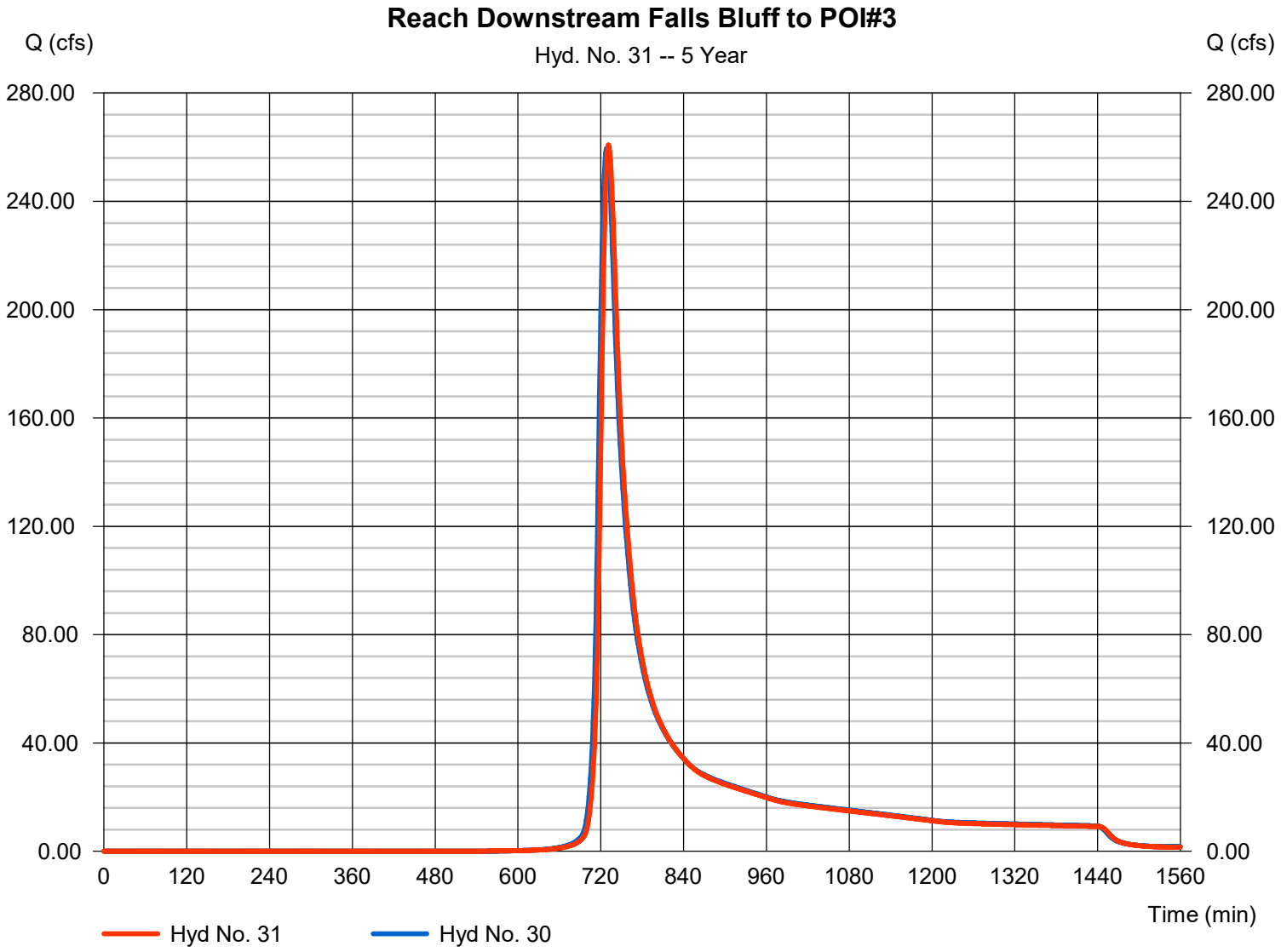
Hydrograph Report

Hyd. No. 31

Reach Downstream Falls Bluff to POI#3

Hydrograph type	=	Reach	Peak discharge	=	260.86 cfs
Storm frequency	=	5 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	1,475,095 cuft
Inflow hyd. No.	=	30 - Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts	Section type	=	Trapezoidal
Reach length	=	1200.0 ft	Channel slope	=	5.0 %
Manning's n	=	0.030	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	8.0 ft
Rating curve x	=	3.361	Rating curve m	=	1.269
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.4232

Modified Att-Kin routing method used.

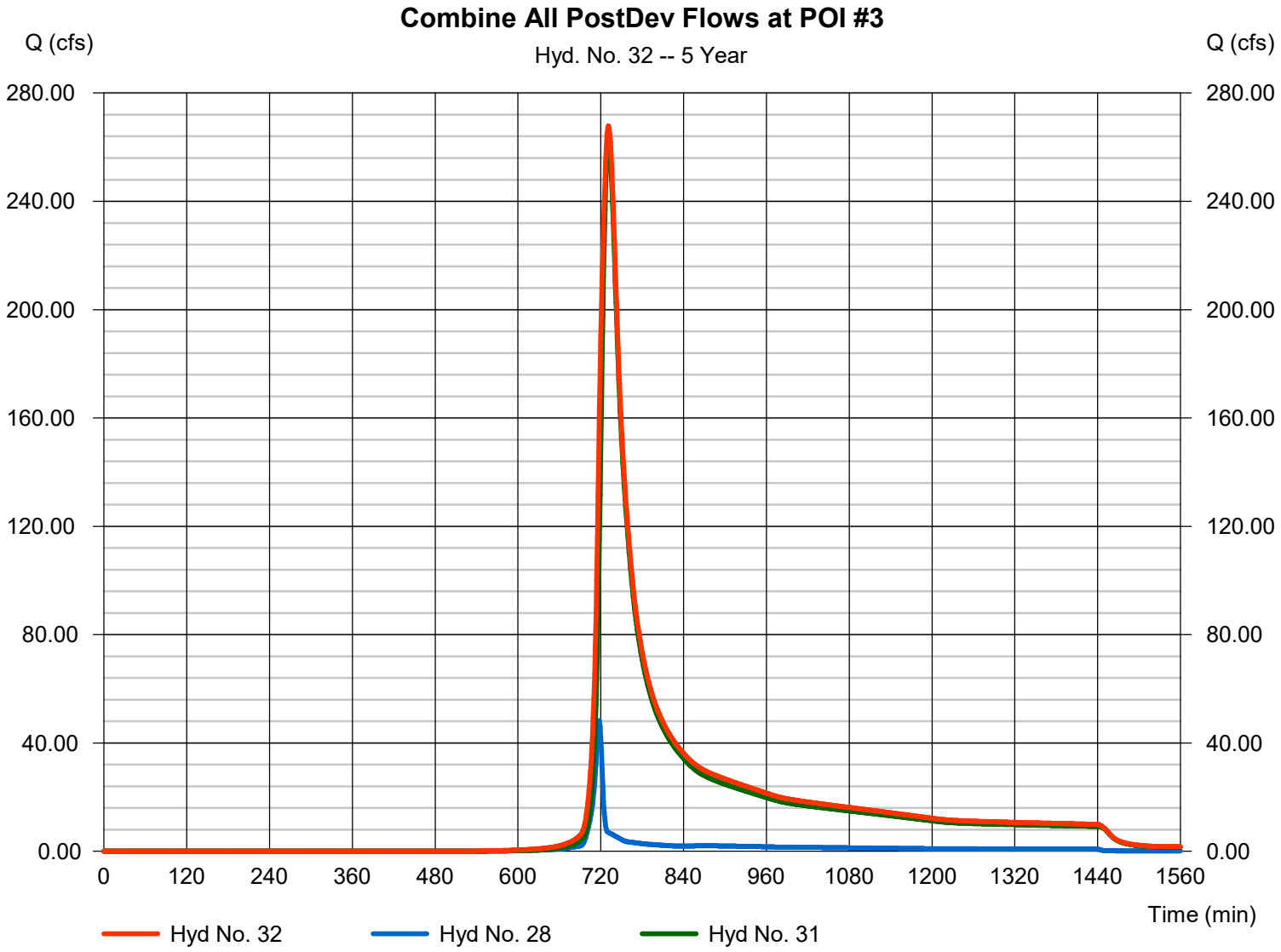


Hydrograph Report

Hyd. No. 32

Combine All PostDev Flows at POI #3

Hydrograph type	= Combine	Peak discharge	= 267.83 cfs
Storm frequency	= 5 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 1,601,841 cuft
Inflow hyds.	= 28, 31	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

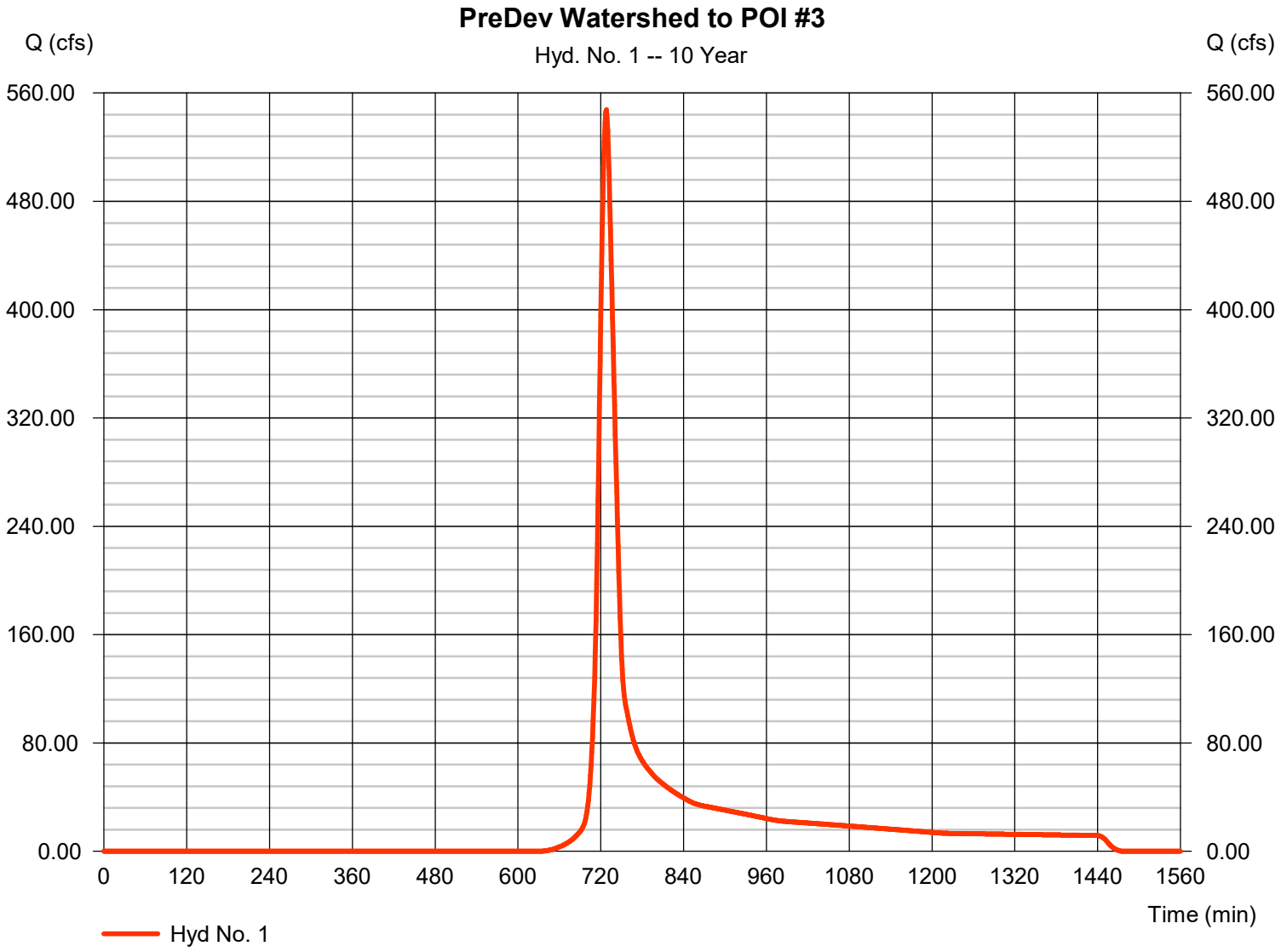
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	547.57	1	728	1,933,853	------	------	------	PreDev Watershed to POI #3
2	SCS Runoff	136.21	1	722	369,531	------	------	------	Phase 3: PostDev to SCM #3B
3	Reservoir	85.64	1	729	343,015	2	354.22	213,822	Route DA#3B To SCM #3B
4	SCS Runoff	94.70	1	722	254,973	------	------	------	Zone 4: PostDev to SCM #3A
5	Reservoir	32.02	1	735	197,317	4	354.11	249,939	DA #3A Routed SCM #3A
6	SCS Runoff	31.74	1	721	80,176	------	------	------	PostDev to SCM #3C
7	Reservoir	16.33	1	723	55,529	6	342.18	52,901	Route DA3C thru SCM#3C
8	SCS Runoff	27.32	1	718	55,360	------	------	------	PostDev Inflow to SCM#3D
9	Reservoir	0.356	1	1163	18,485	8	348.04	69,494	Route DA to SCM #3D
10	SCS Runoff	32.75	1	718	66,405	------	------	------	PostDev Inflow to SCM #3E
11	Reservoir	1.989	1	770	44,429	10	309.20	66,176	Route Infllow SCM #3E
12	SCS Runoff	20.17	1	721	50,107	------	------	------	Zone 1:Offsite Bypasses SCM #3A&
13	SCS Runoff	44.69	1	721	113,252	------	------	------	Zone 5: Onsite PostDevBypass to Wo
14	SCS Runoff	124.40	1	723	345,614	------	------	------	Zone 3: Offsite Bypass to Graymont
15	Reach	113.93	1	726	345,612	14	------	------	Reach from Graymont to Woodlyn
16	Combine	275.45	1	727	1,027,119	3, 5, 12, 13, 15	------	------	Merge All PostDev @ Woodlyn
17	SCS Runoff	182.90	1	724	542,968	------	------	------	PreDev Flows at POI #7
18	SCS Runoff	81.41	1	724	244,683	------	------	------	PostDev Zone 14 & 15 Bypasses to P
19	SCS Runoff	37.75	1	721	95,690	------	------	------	PostDev to SCM #7A
20	SCS Runoff	42.15	1	718	89,296	------	------	------	PostDev Zone 17-Onsite Bypass to P
21	Reservoir	22.20	1	728	89,077	19	373.95	58,517	Route DA thru SCM #7A
22	Combine	116.11	1	724	423,056	18, 20, 21	------	------	Merge All PostDev Flow @ POI #7
23	SCS Runoff	122.84	1	725	379,633	------	------	------	PostDev Zone 6 Bypass From Moody
24	SCS Runoff	44.90	1	718	90,511	------	------	------	Bypasses SCM #3C & #3D
25	Reach	102.39	1	729	422,984	22	------	------	Reach From POI #7 to Falls Bluff Cul
26	Combine	151.95	1	722	536,288	7, 9, 23, 24,	------	------	Combine PostDev All Flows @ Falls
27	SCS Runoff	60.92	1	718	123,521	------	------	------	PostDev Zone 12 & 13: ByPasses SC
28	Combine	61.05	1	718	167,404	11, 27	------	------	Combine All PostDev Flow to POI #3
29	Reach	189.06	1	733	1,042,827	16	------	------	Reach from Woodlyn-Falls Bluff
30	Combine	405.03	1	728	2,002,099	25, 26, 29	------	------	Combine Upper DA 3 & DA 7 @ Falls
31	Reach	399.76	1	731	1,958,615	30	------	------	Reach Downstream Falls Bluff to POI
32	Combine	408.39	1	731	2,126,018	28, 31	------	------	Combine All PostDev Flows at POI #3

Hydrograph Report

Hyd. No. 1

PreDev Watershed to POI #3

Hydrograph type	= SCS Runoff	Peak discharge	= 547.57 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 1,933,853 cuft
Drainage area	= 300.880 ac	Curve number	= 66.6
Basin Slope	= 3.0 %	Hydraulic length	= 5451 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 22.67 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

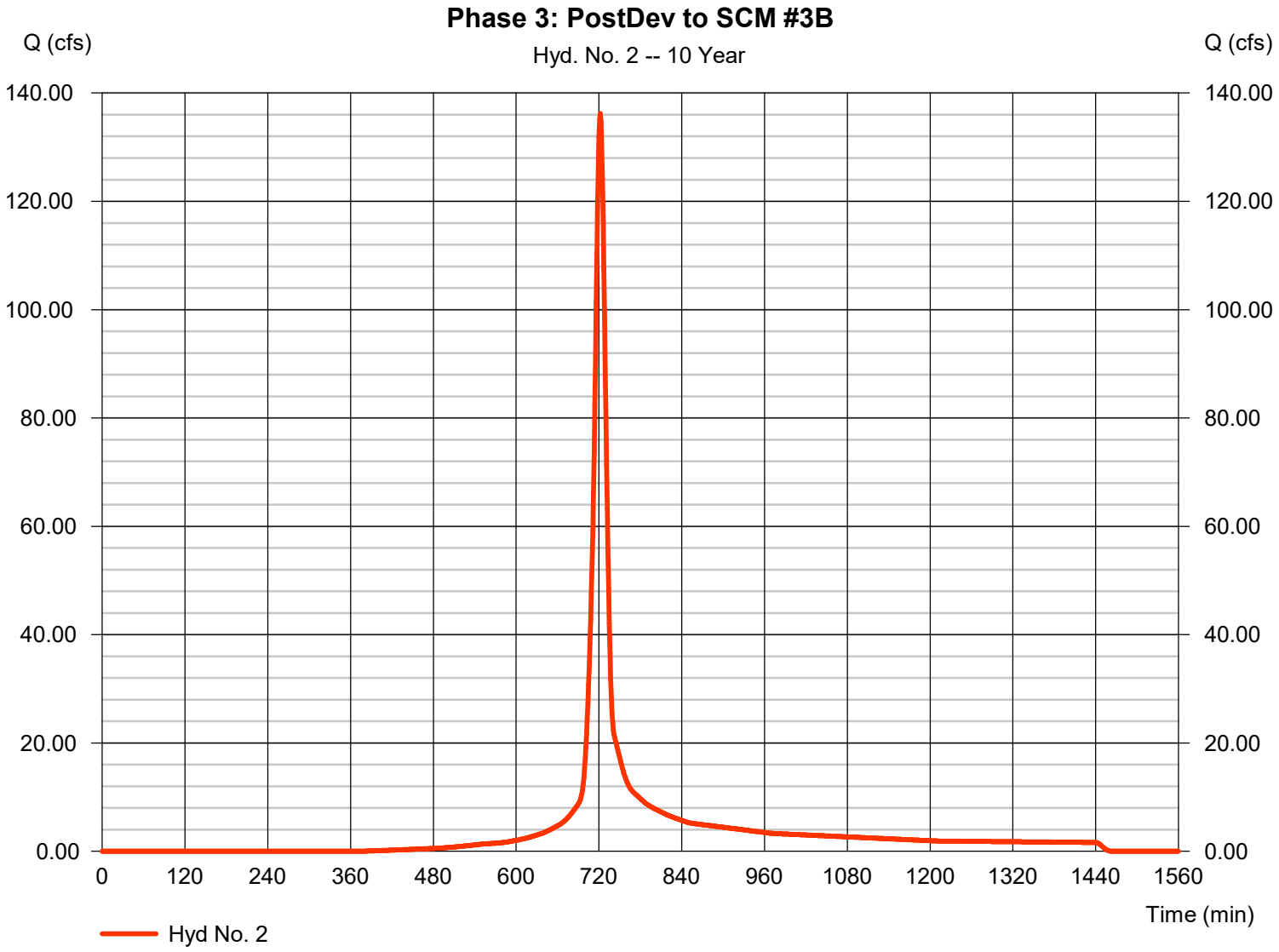


Hydrograph Report

Hyd. No. 2

Phase 3: PostDev to SCM #3B

Hydrograph type	= SCS Runoff	Peak discharge	= 136.21 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 369,531 cuft
Drainage area	= 31.890 ac	Curve number	= 83
Basin Slope	= 1.9 %	Hydraulic length	= 2520 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.80 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



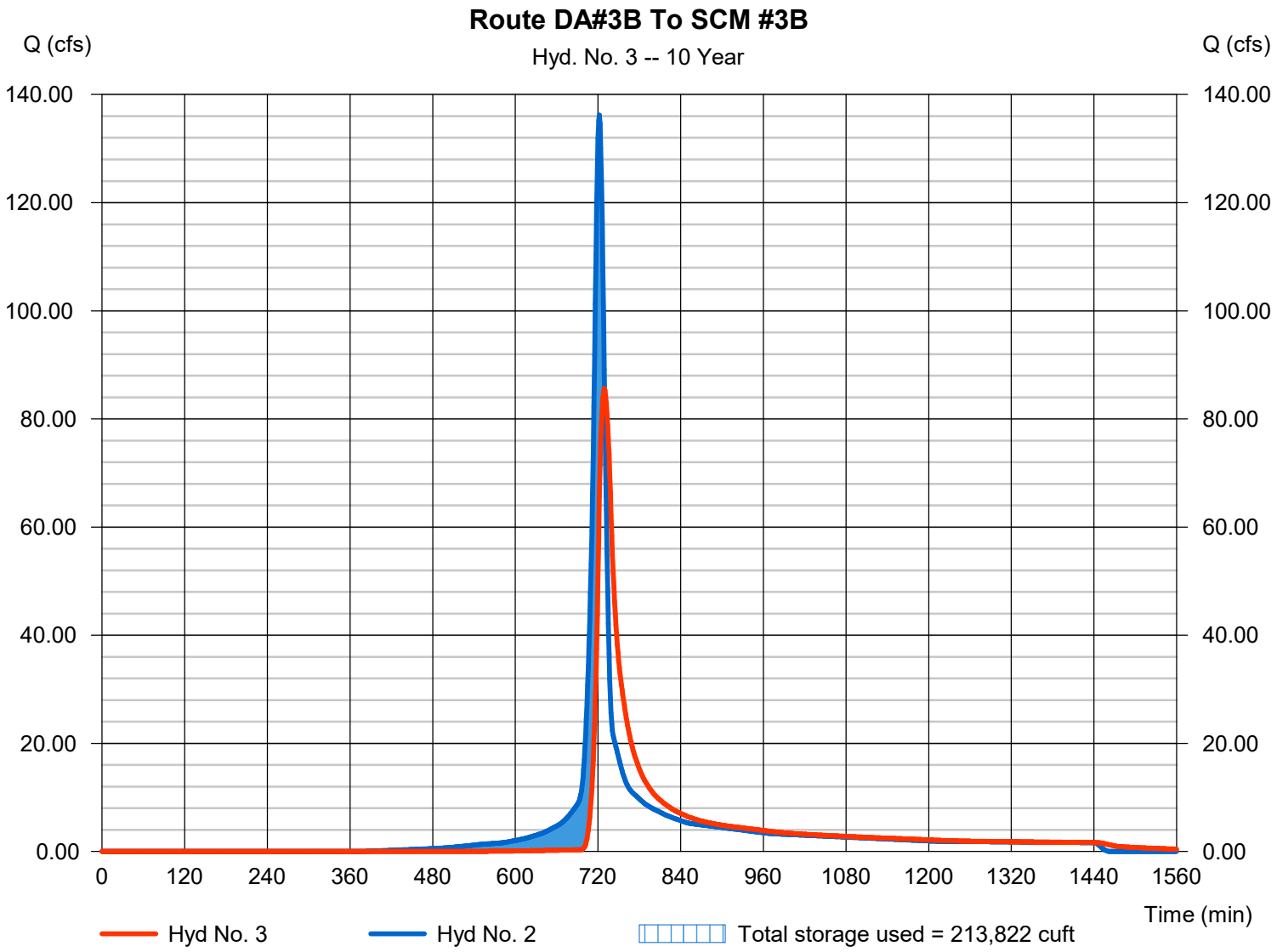
Hydrograph Report

Hyd. No. 3

Route DA#3B To SCM #3B

Hydrograph type	=	Reservoir	Peak discharge	=	85.64 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	343,015 cuft
Inflow hyd. No.	=	2 - Phase 3: PostDev to SCM #3B	Max. Elevation	=	354.22 ft
Reservoir name	=	SCM 3B-rev102924	Max. Storage	=	213,822 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

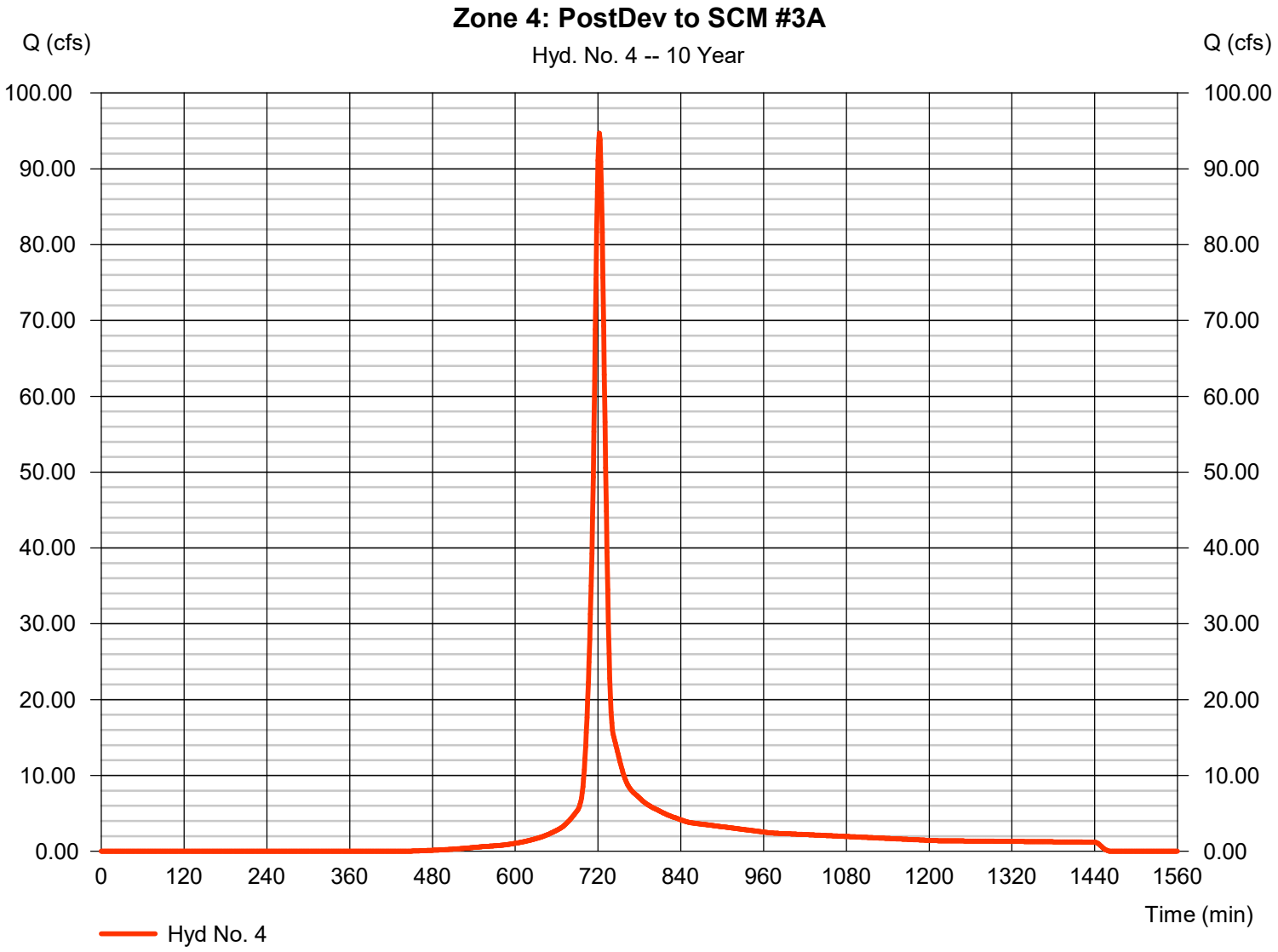


Hydrograph Report

Hyd. No. 4

Zone 4: PostDev to SCM #3A

Hydrograph type	= SCS Runoff	Peak discharge	= 94.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 254,973 cuft
Drainage area	= 24.600 ac	Curve number	= 79.4
Basin Slope	= 1.5 %	Hydraulic length	= 2250 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.94 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



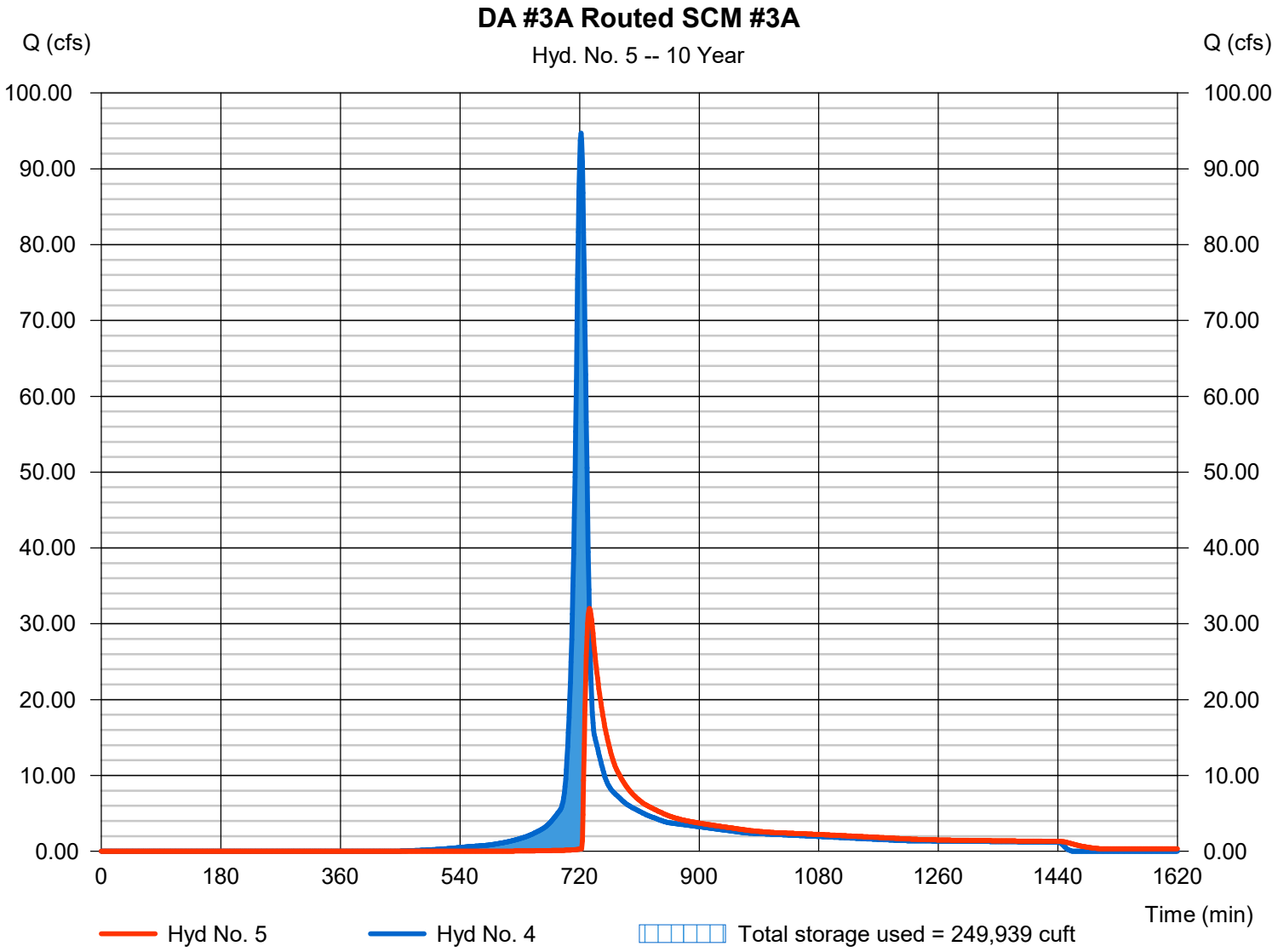
Hydrograph Report

Hyd. No. 5

DA #3A Routed SCM #3A

Hydrograph type	=	Reservoir	Peak discharge	=	32.02 cfs
Storm frequency	=	10 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	197,317 cuft
Inflow hyd. No.	=	4 - Zone 4: PostDev to SCM #3A	Max. Elevation	=	354.11 ft
Reservoir name	=	SCM #3A	Max. Storage	=	249,939 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

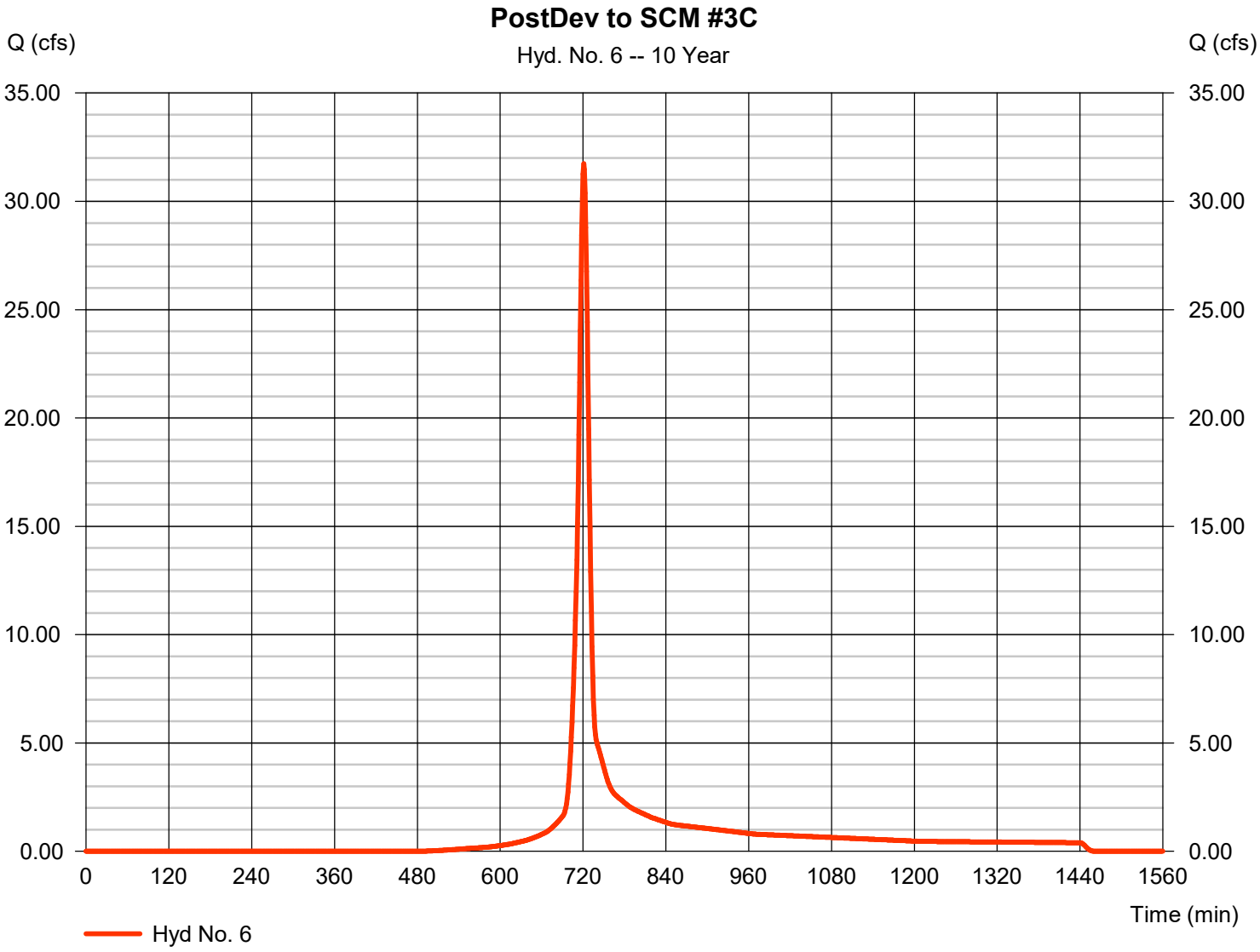


Hydrograph Report

Hyd. No. 6

PostDev to SCM #3C

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.74 cfs
Storm frequency	=	10 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	80,176 cuft
Drainage area	=	8.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



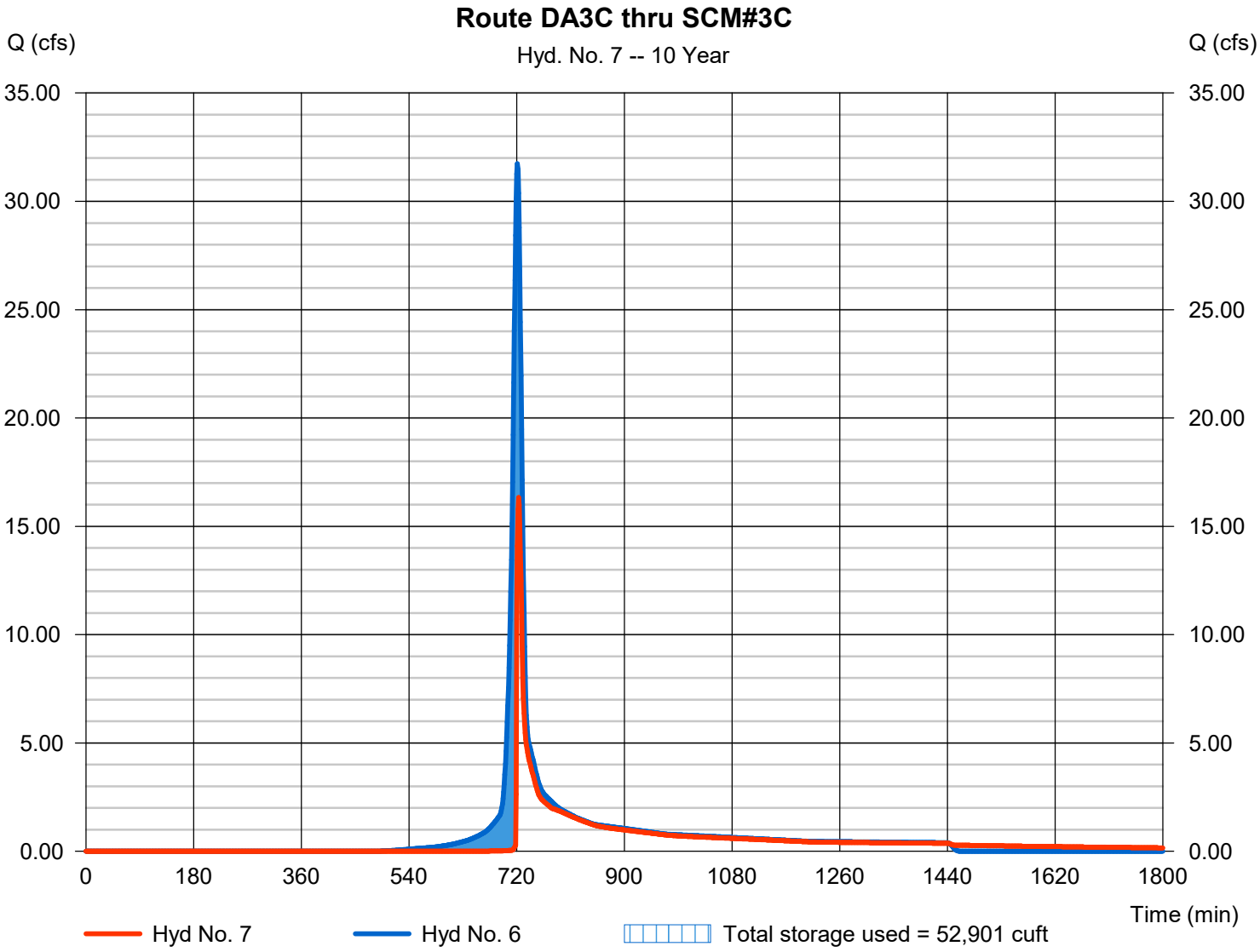
Hydrograph Report

Hyd. No. 7

Route DA3C thru SCM#3C

Hydrograph type	= Reservoir	Peak discharge	= 16.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 55,529 cuft
Inflow hyd. No.	= 6 - PostDev to SCM #3C	Max. Elevation	= 342.18 ft
Reservoir name	= SCM #3C	Max. Storage	= 52,901 cuft

Storage Indication method used. Wet pond routing start elevation = 340.50 ft.

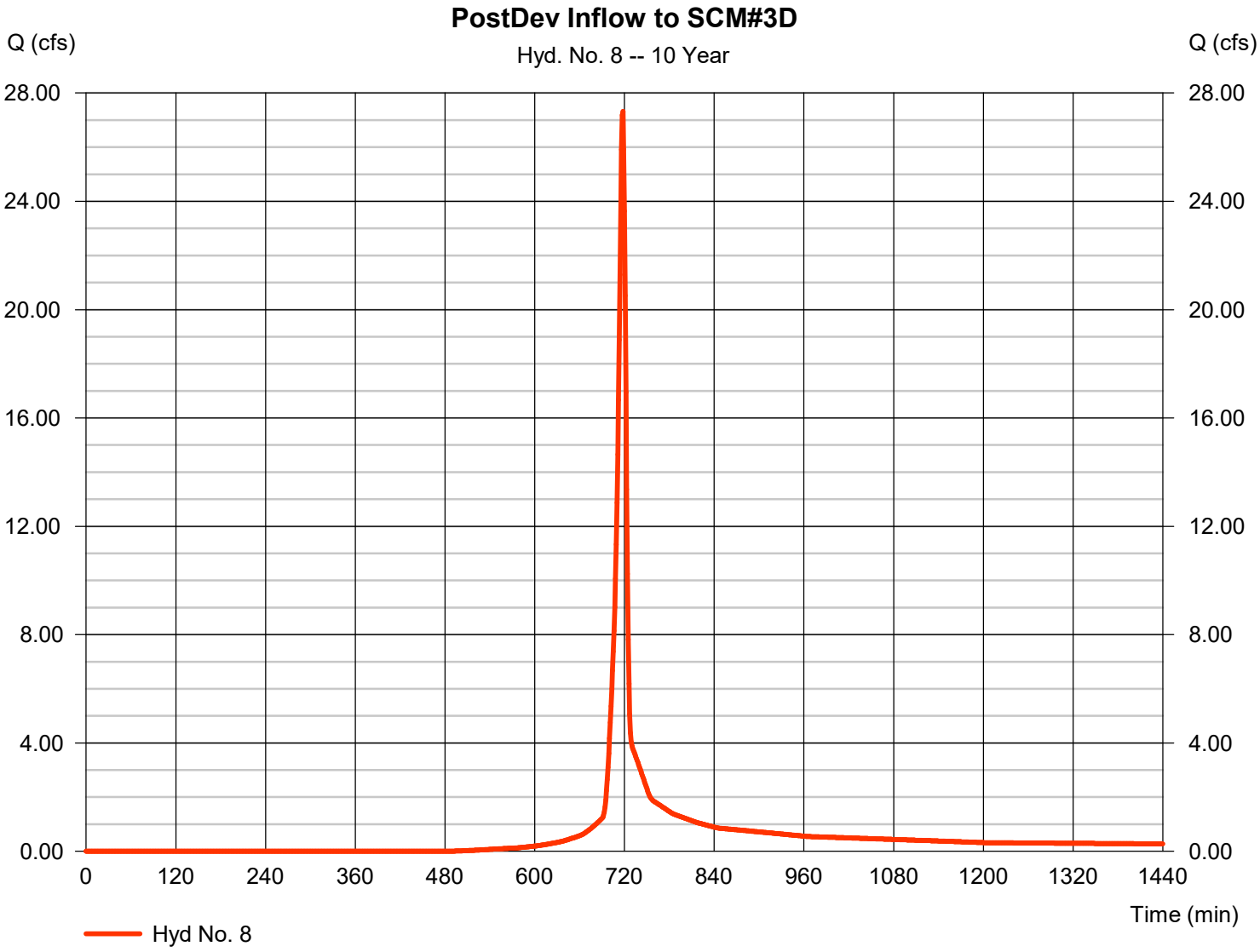


Hydrograph Report

Hyd. No. 8

PostDev Inflow to SCM#3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.32 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	55,360 cuft
Drainage area	=	5.640 ac	Curve number	=	76.8
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



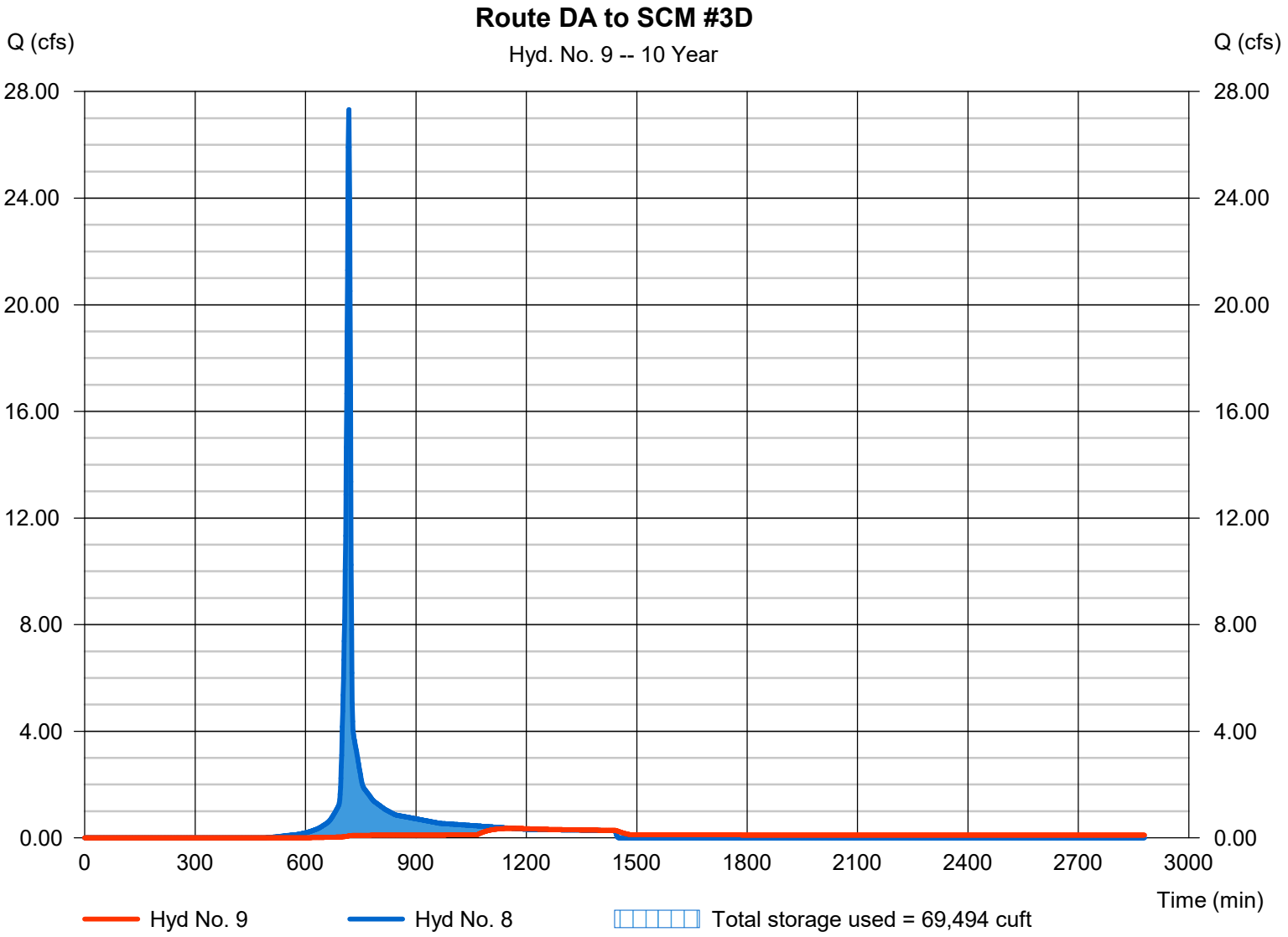
Hydrograph Report

Hyd. No. 9

Route DA to SCM #3D

Hydrograph type	=	Reservoir	Peak discharge	=	0.356 cfs
Storm frequency	=	10 yrs	Time to peak	=	1163 min
Time interval	=	1 min	Hyd. volume	=	18,485 cuft
Inflow hyd. No.	=	8 - PostDev Inflow to SCM#3D	Max. Elevation	=	348.04 ft
Reservoir name	=	SCM #3D	Max. Storage	=	69,494 cuft

Storage Indication method used. Wet pond routing start elevation = 344.50 ft.

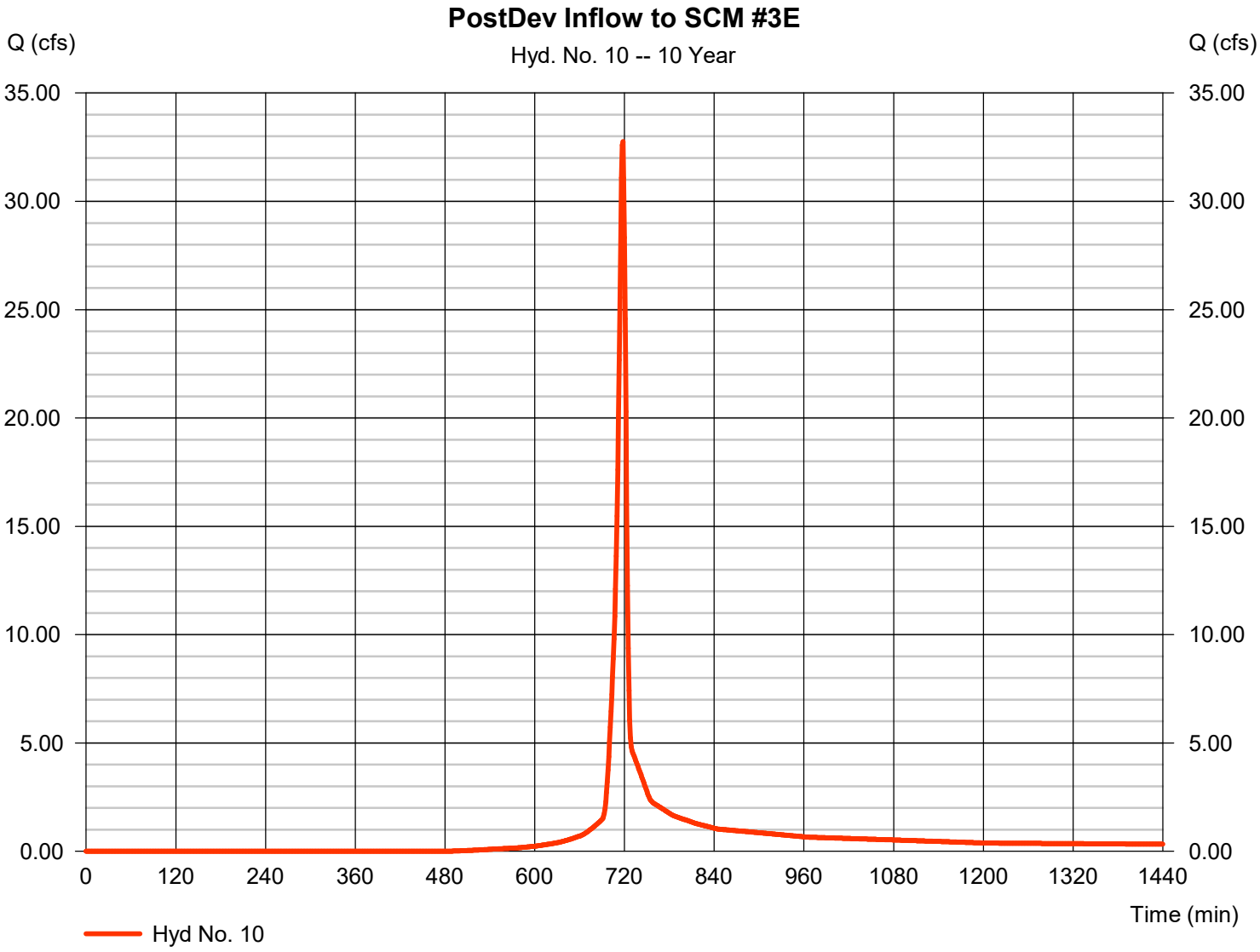


Hydrograph Report

Hyd. No. 10

PostDev Inflow to SCM #3E

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	66,405 cuft
Drainage area	=	6.720 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



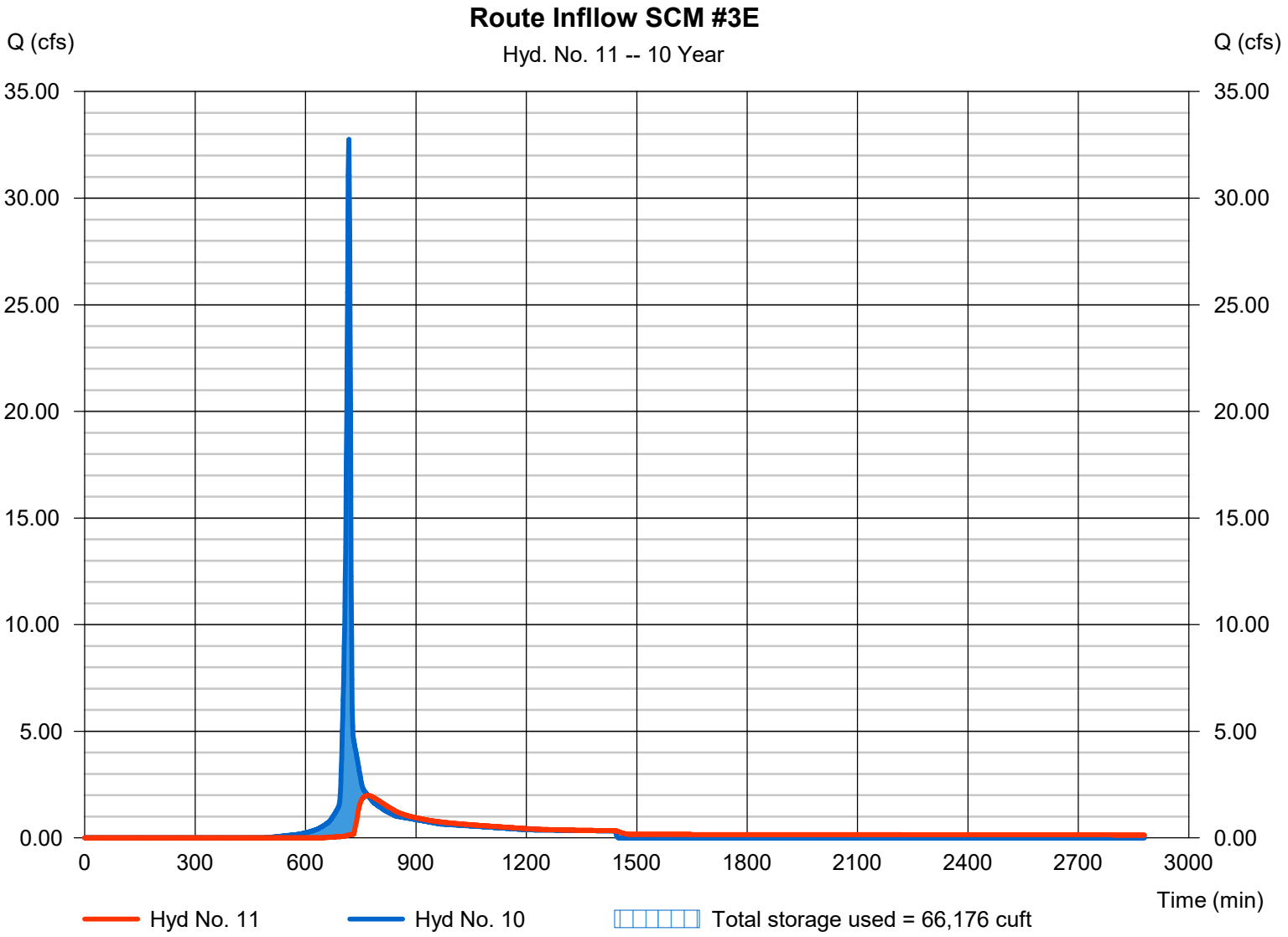
Hydrograph Report

Hyd. No. 11

Route Infllow SCM #3E

Hydrograph type	=	Reservoir	Peak discharge	=	1.989 cfs
Storm frequency	=	10 yrs	Time to peak	=	770 min
Time interval	=	1 min	Hyd. volume	=	44,429 cuft
Inflow hyd. No.	=	10 - PostDev Inflow to SCM #3E	Max. Elevation	=	309.20 ft
Reservoir name	=	SCM #3E	Max. Storage	=	66,176 cuft

Storage Indication method used. Wet pond routing start elevation = 306.50 ft.

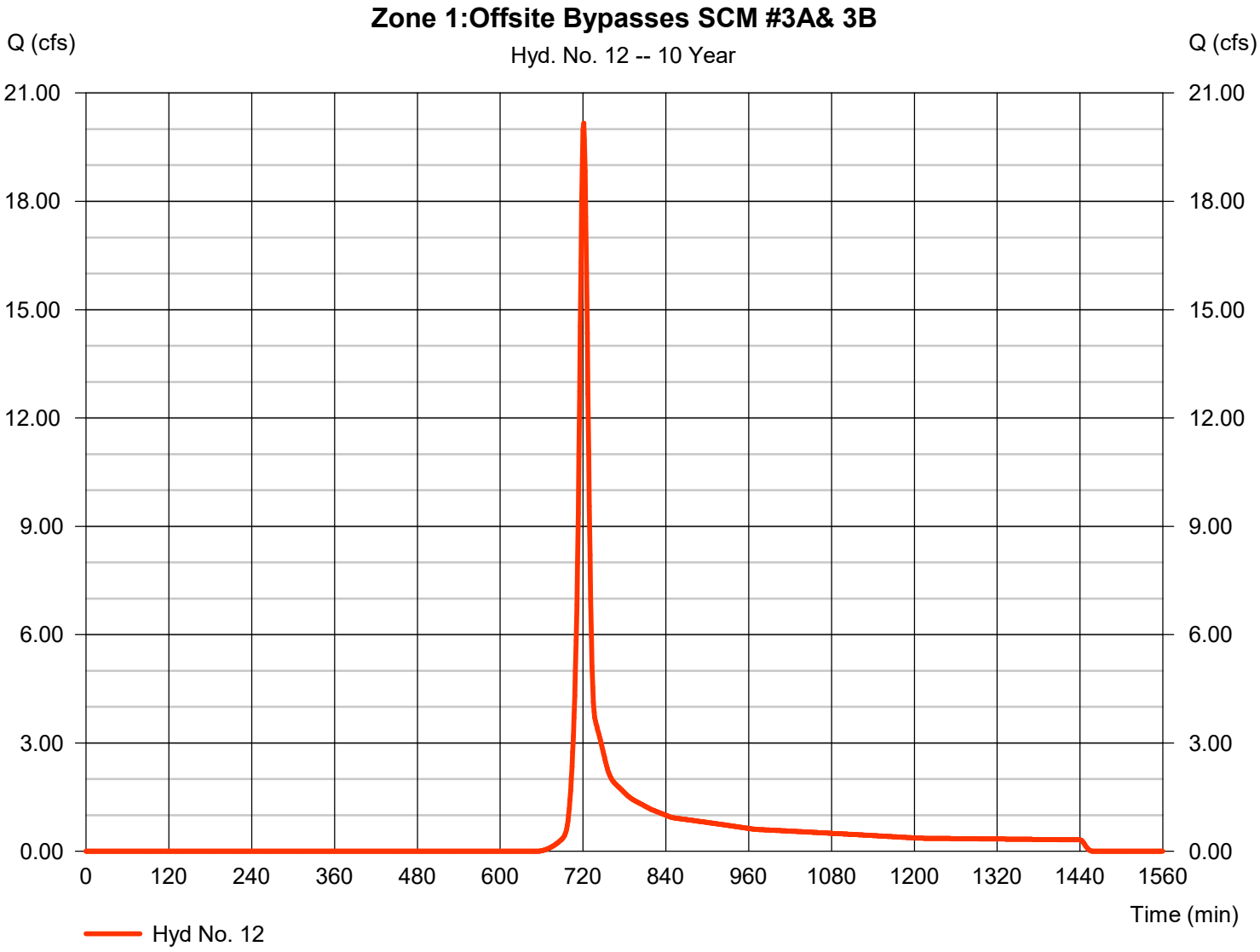


Hydrograph Report

Hyd. No. 12

Zone 1:Offsite Bypasses SCM #3A& 3B

Hydrograph type	= SCS Runoff	Peak discharge	= 20.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 50,107 cuft
Drainage area	= 8.510 ac	Curve number	= 64
Basin Slope	= 2.9 %	Hydraulic length	= 1370 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

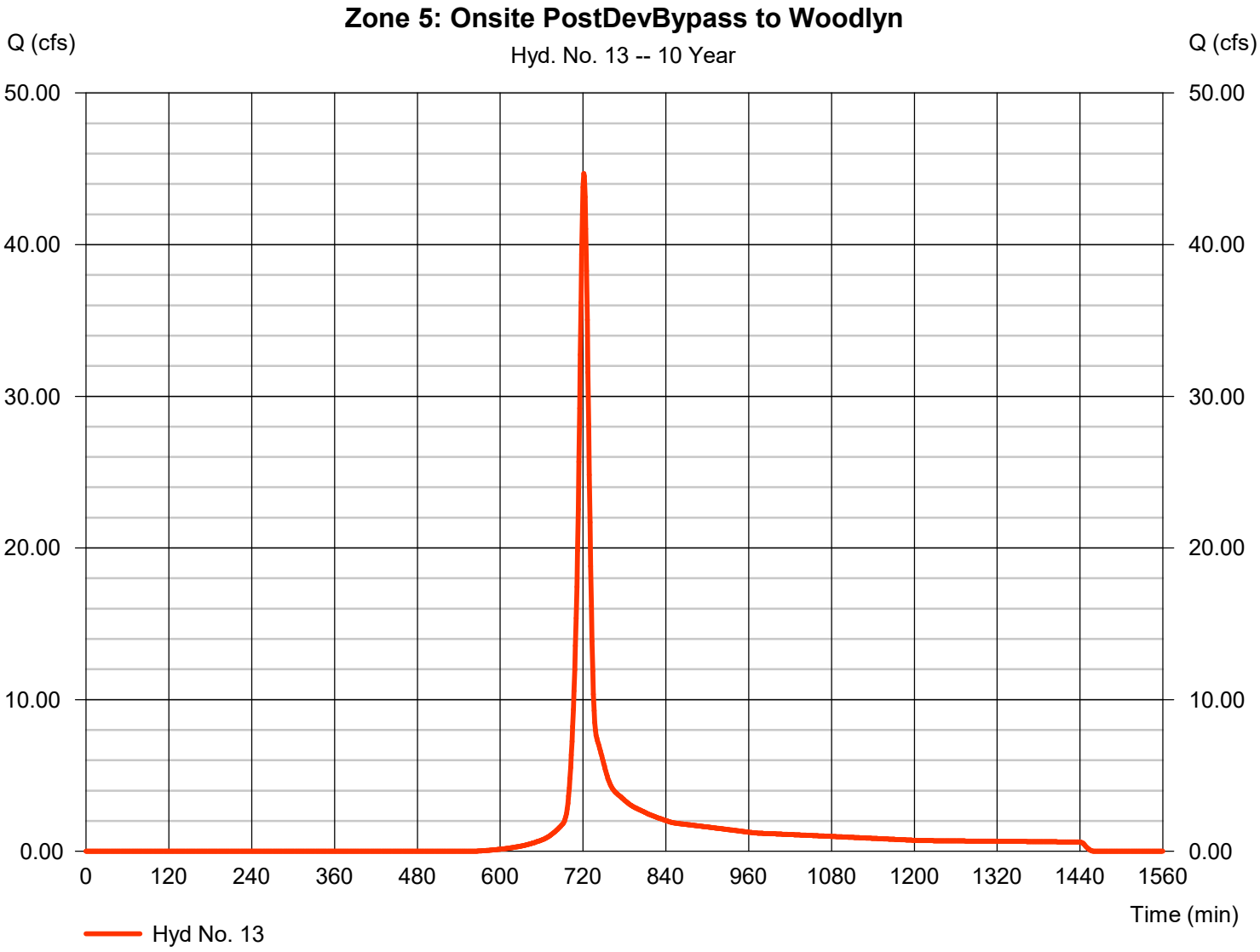


Hydrograph Report

Hyd. No. 13

Zone 5: Onsite PostDevBypass to Woodlyn

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.69 cfs
Storm frequency	=	10 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	113,252 cuft
Drainage area	=	14.320 ac	Curve number	=	72
Basin Slope	=	1.5 %	Hydraulic length	=	1788 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.58 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

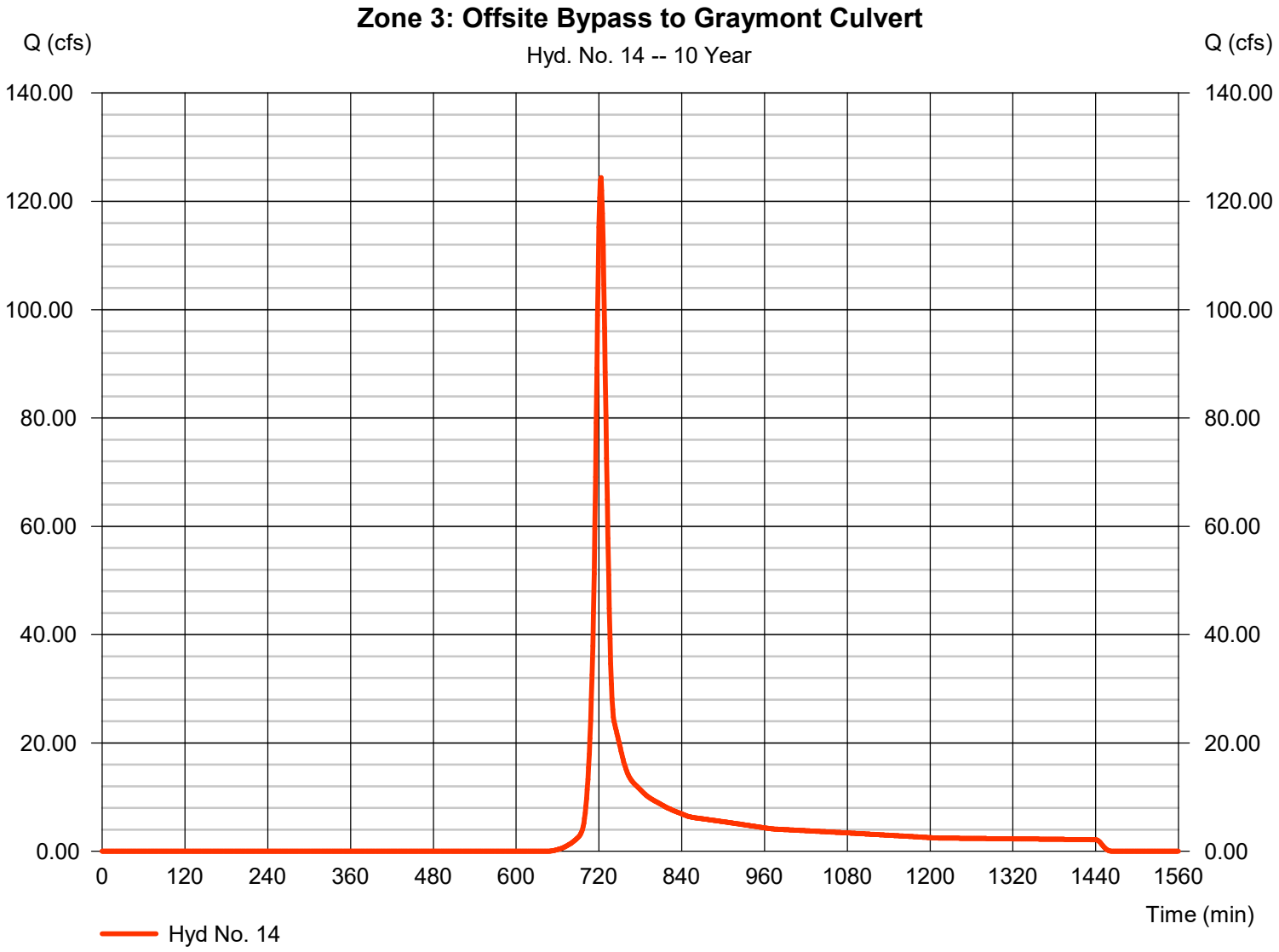


Hydrograph Report

Hyd. No. 14

Zone 3: Offsite Bypass to Graymont Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 124.40 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 345,614 cuft
Drainage area	= 57.120 ac	Curve number	= 65
Basin Slope	= 1.8 %	Hydraulic length	= 1220 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



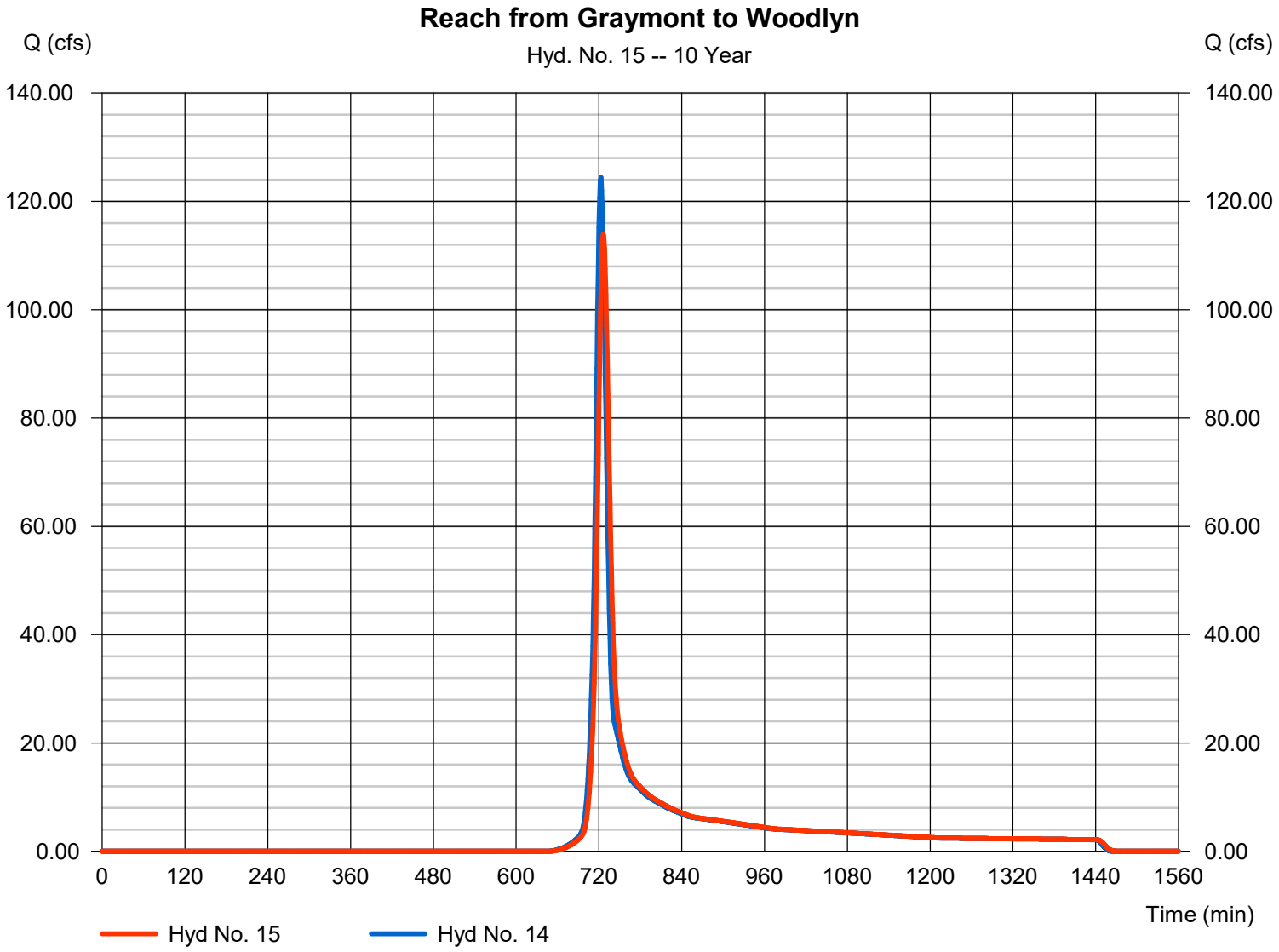
Hydrograph Report

Hyd. No. 15

Reach from Graymont to Woodlyn

Hydrograph type	=	Reach	Peak discharge	=	113.93 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	345,612 cuft
Inflow hyd. No.	=	14 - Zone 3: Offsite Bypass to Section 1 Q	Section type	=	Trapezoidal
Reach length	=	1750.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	2.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.009	Rating curve m	=	1.370
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2513

Modified Att-Kin routing method used.

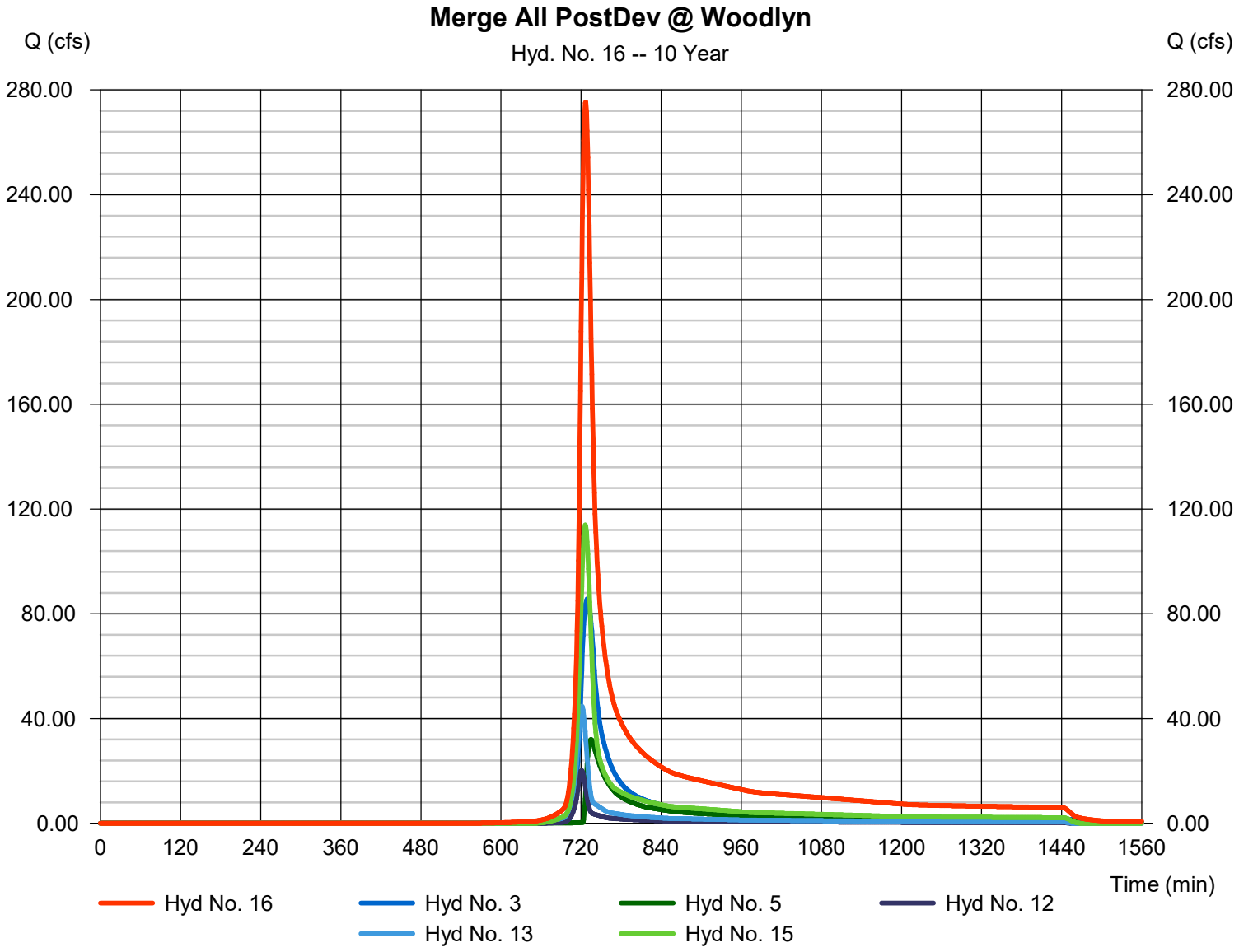


Hydrograph Report

Hyd. No. 16

Merge All PostDev @ Woodlyn

Hydrograph type	= Combine	Peak discharge	= 275.45 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,027,119 cuft
Inflow hyds.	= 3, 5, 12, 13, 15	Contrib. drain. area	= 22.830 ac

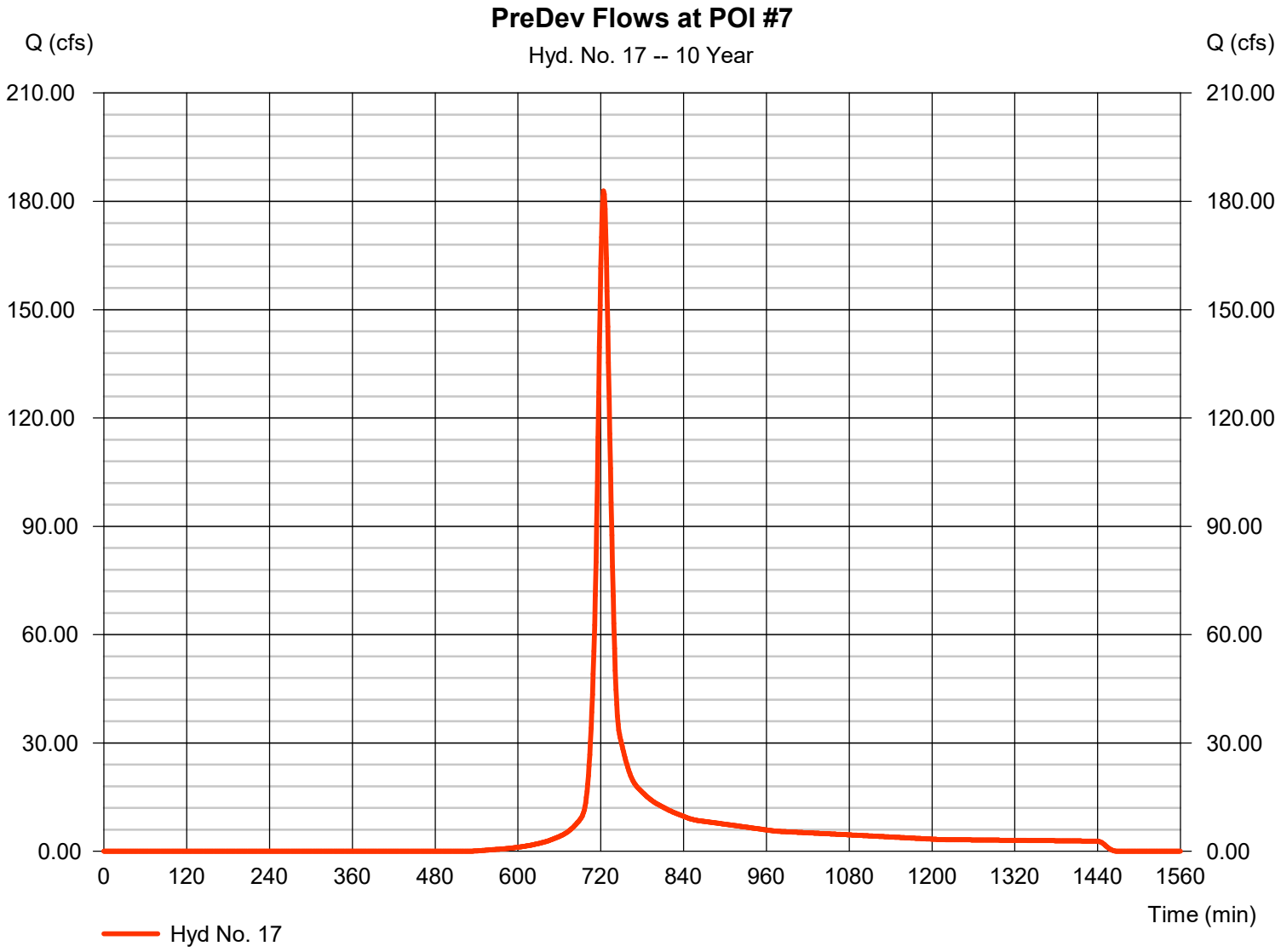


Hydrograph Report

Hyd. No. 17

PreDev Flows at POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 182.90 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 542,968 cuft
Drainage area	= 62.670 ac	Curve number	= 74.4
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.43 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

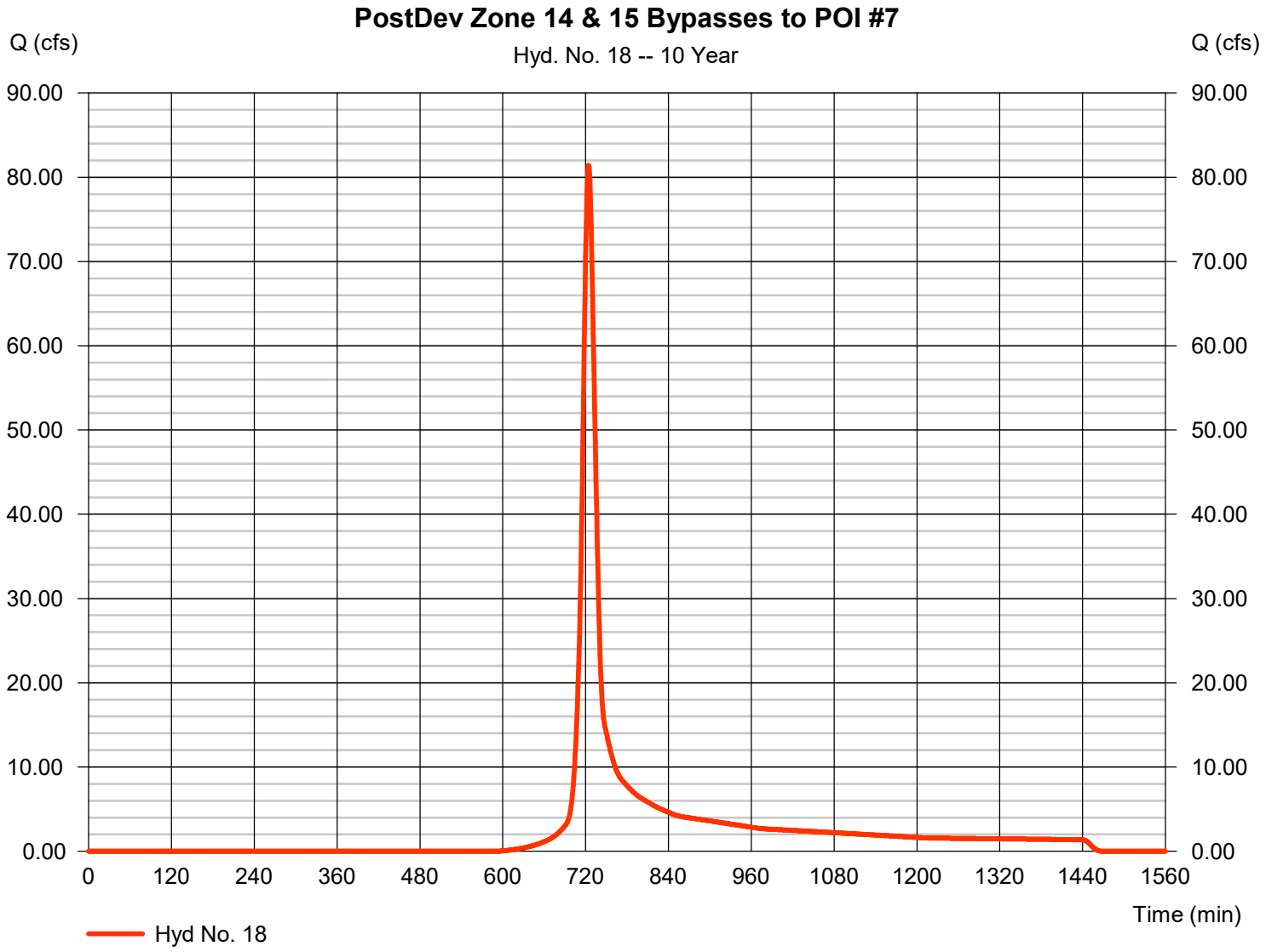


Hydrograph Report

Hyd. No. 18

PostDev Zone 14 & 15 Bypasses to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 81.41 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 244,683 cuft
Drainage area	= 33.240 ac	Curve number	= 70
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.27 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

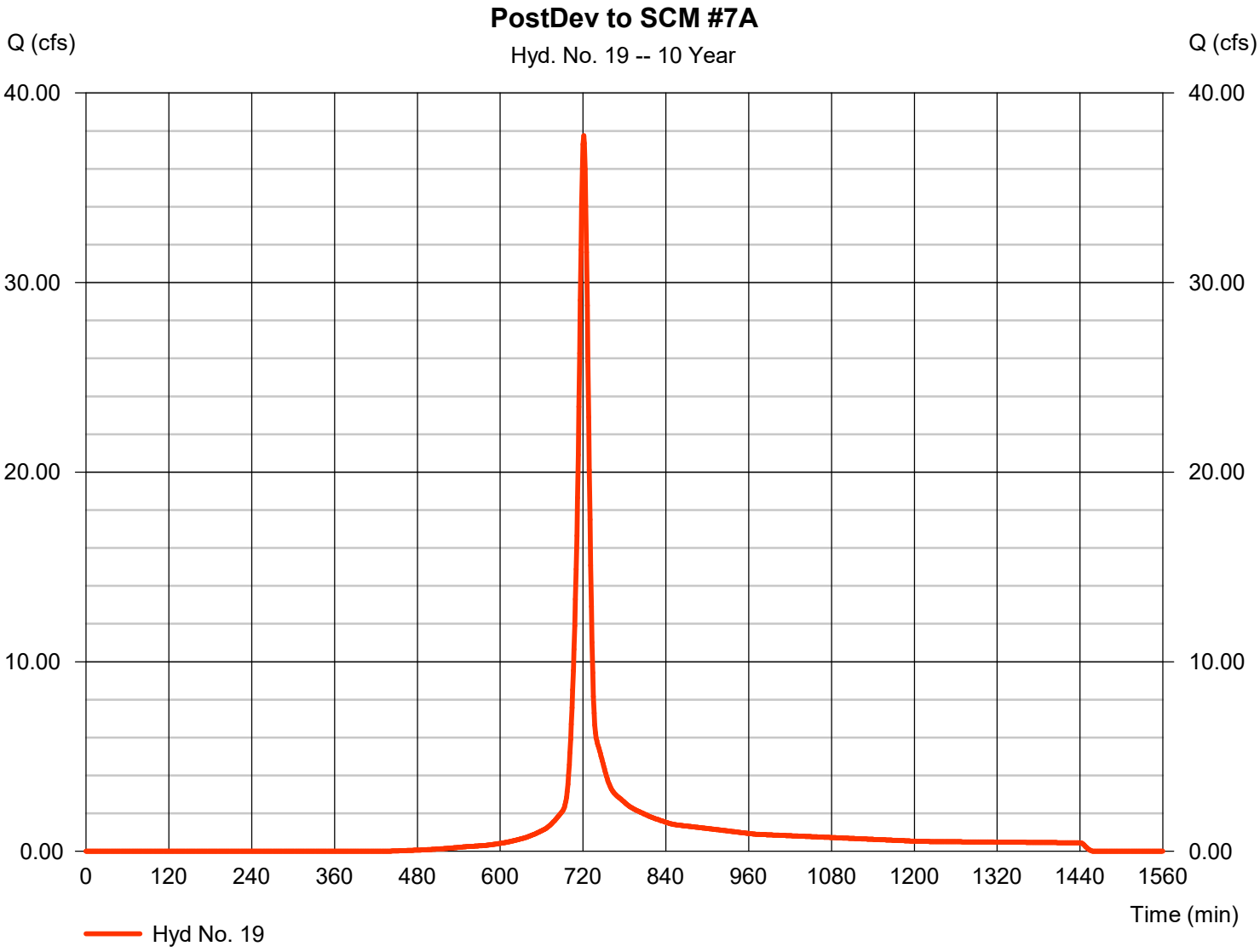


Hydrograph Report

Hyd. No. 19

PostDev to SCM #7A

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.75 cfs
Storm frequency	=	10 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	95,690 cuft
Drainage area	=	9.260 ac	Curve number	=	79.8
Basin Slope	=	1.1 %	Hydraulic length	=	1505 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.38 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

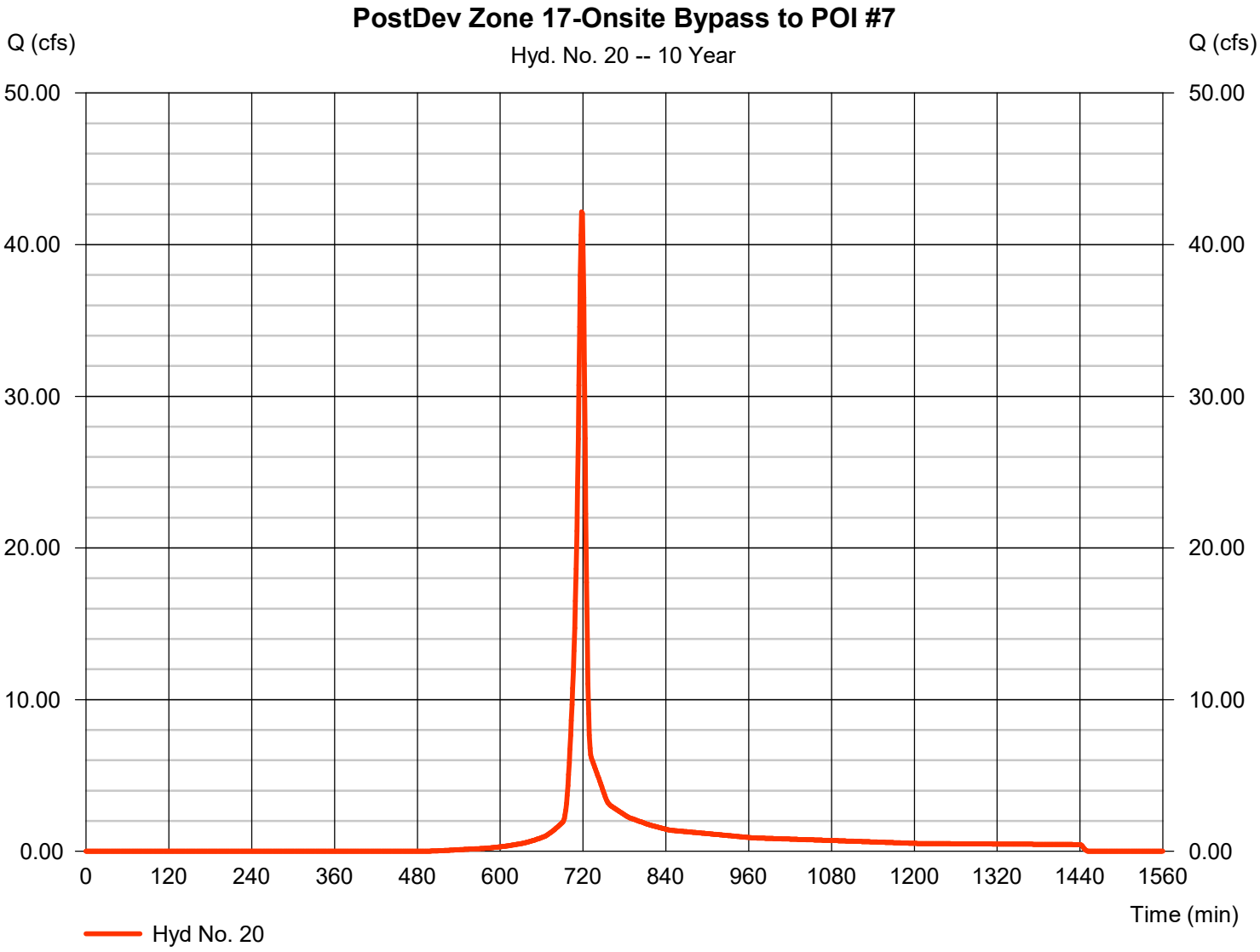


Hydrograph Report

Hyd. No. 20

PostDev Zone 17-Onsite Bypass to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 42.15 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 89,296 cuft
Drainage area	= 9.720 ac	Curve number	= 76.5
Basin Slope	= 1.0 %	Hydraulic length	= 810 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 7.97 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



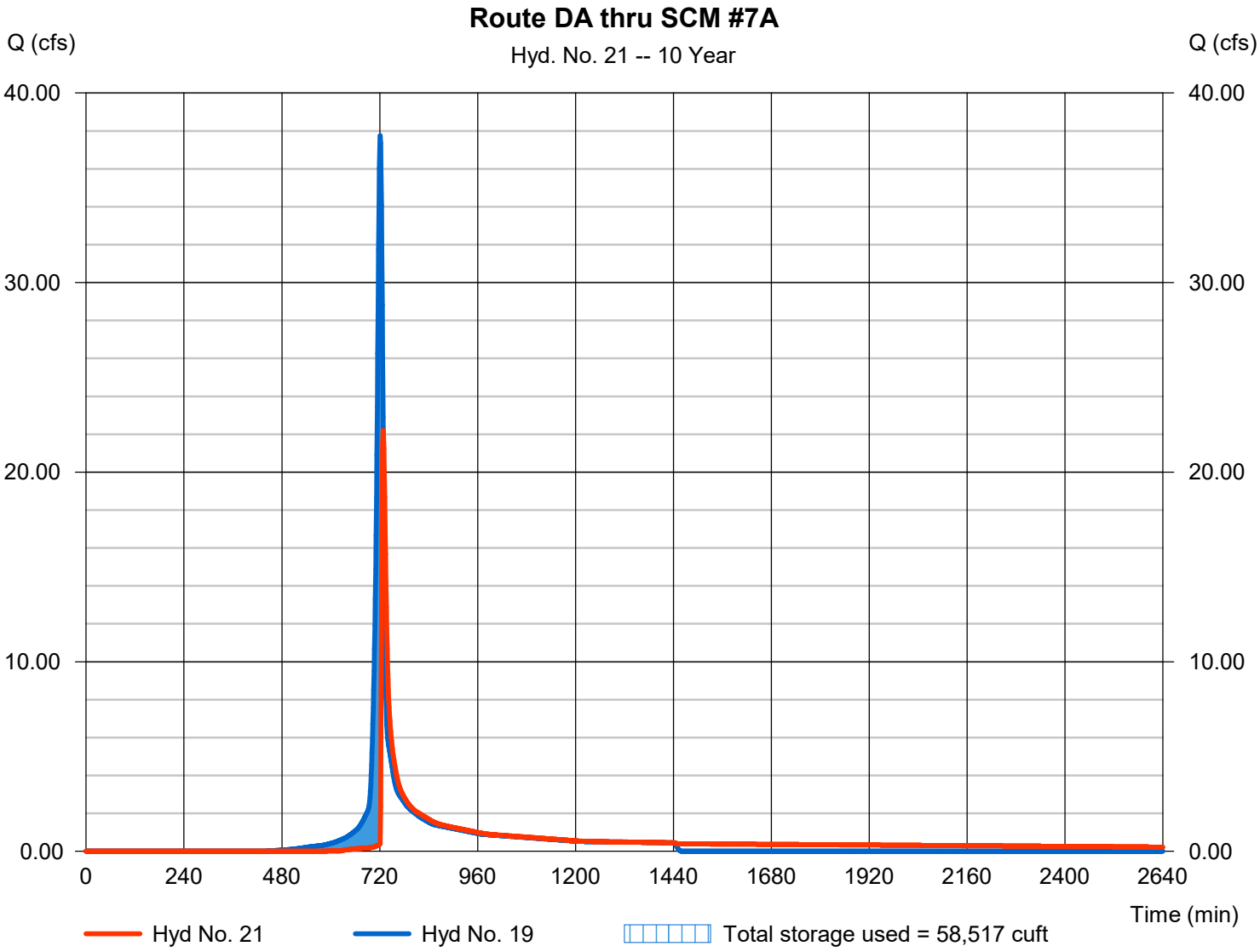
Hydrograph Report

Hyd. No. 21

Route DA thru SCM #7A

Hydrograph type	=	Reservoir	Peak discharge	=	22.20 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	89,077 cuft
Inflow hyd. No.	=	19 - PostDev to SCM #7A	Max. Elevation	=	373.95 ft
Reservoir name	=	SCM #7A	Max. Storage	=	58,517 cuft

Storage Indication method used. Wet pond routing start elevation = 370.50 ft.

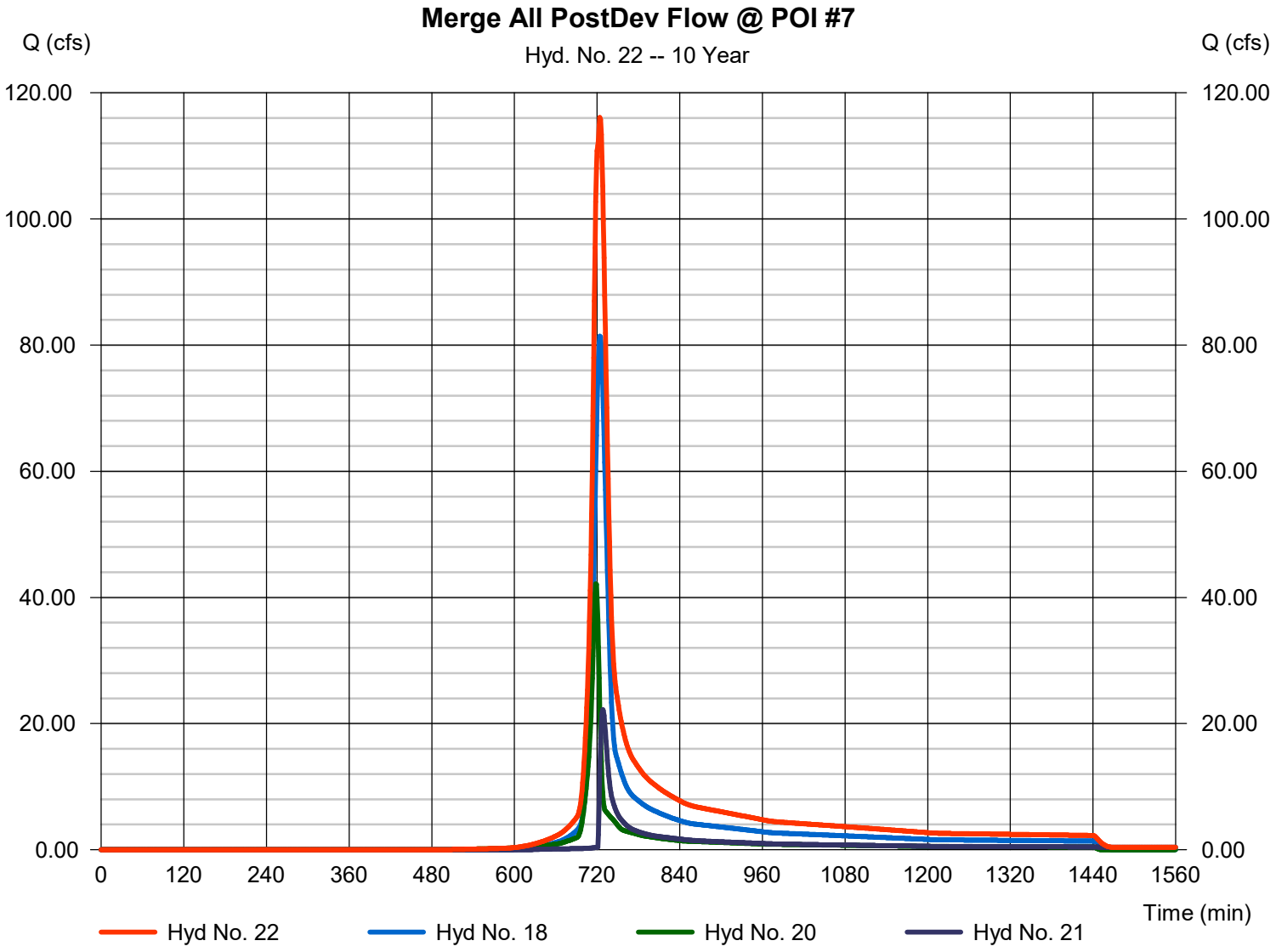


Hydrograph Report

Hyd. No. 22

Merge All PostDev Flow @ POI #7

Hydrograph type	= Combine	Peak discharge	= 116.11 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 423,056 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 42.960 ac

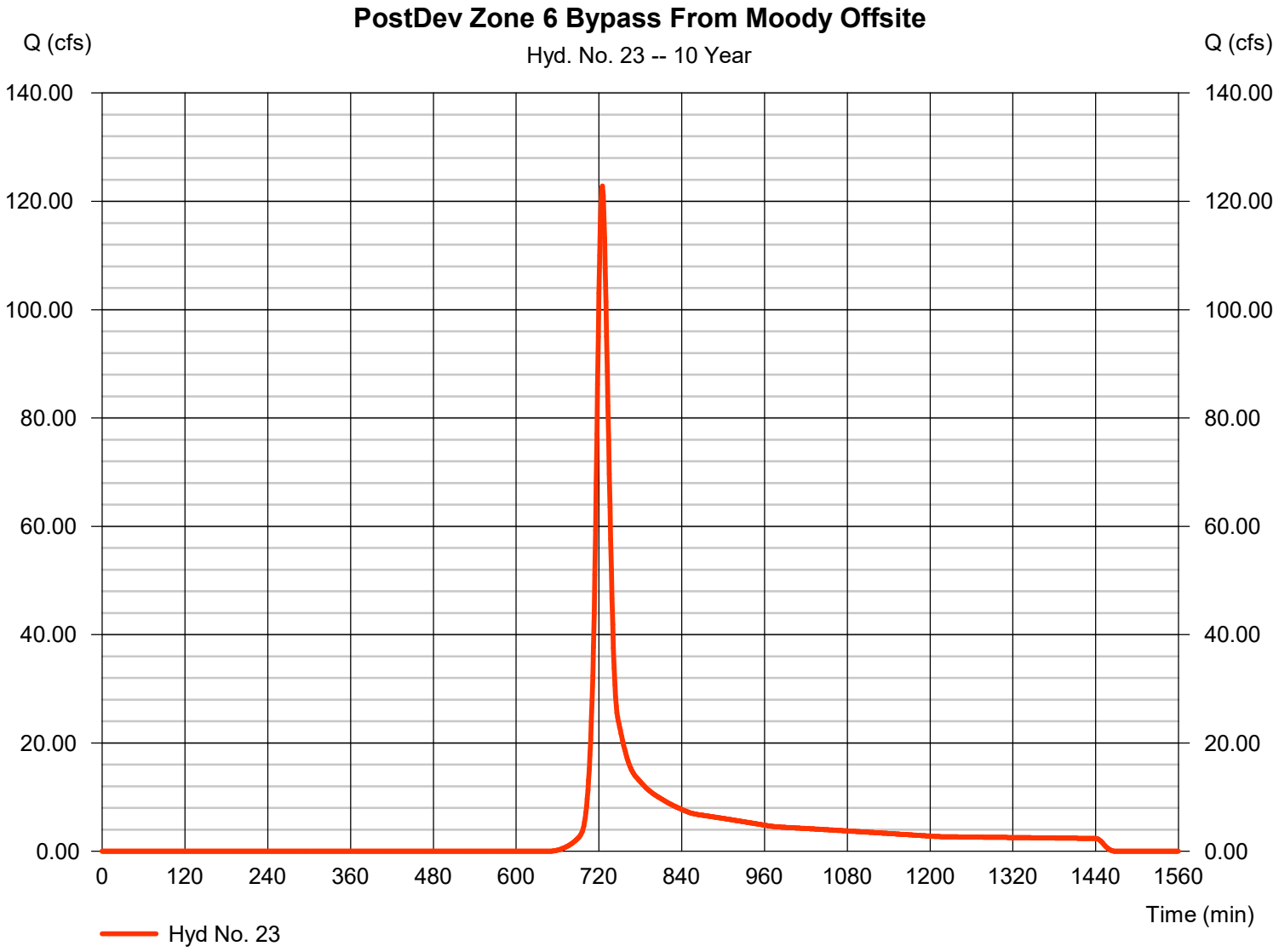


Hydrograph Report

Hyd. No. 23

PostDev Zone 6 Bypass From Moody Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	122.84 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	379,633 cuft
Drainage area	=	64.030 ac	Curve number	=	64.8
Basin Slope	=	1.8 %	Hydraulic length	=	2940 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.01 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

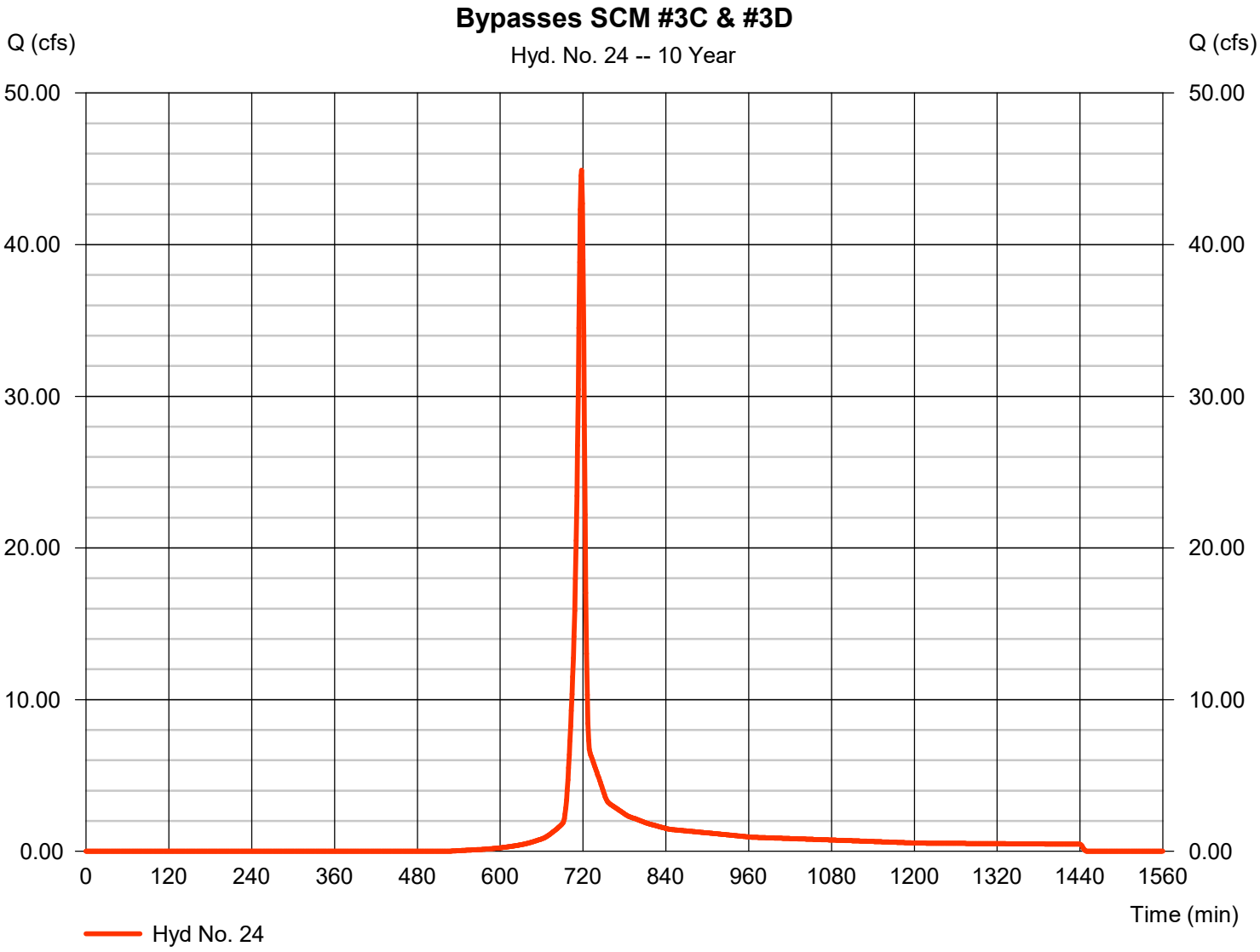


Hydrograph Report

Hyd. No. 24

Bypasses SCM #3C & #3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.90 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	90,511 cuft
Drainage area	=	9.980 ac	Curve number	=	74.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



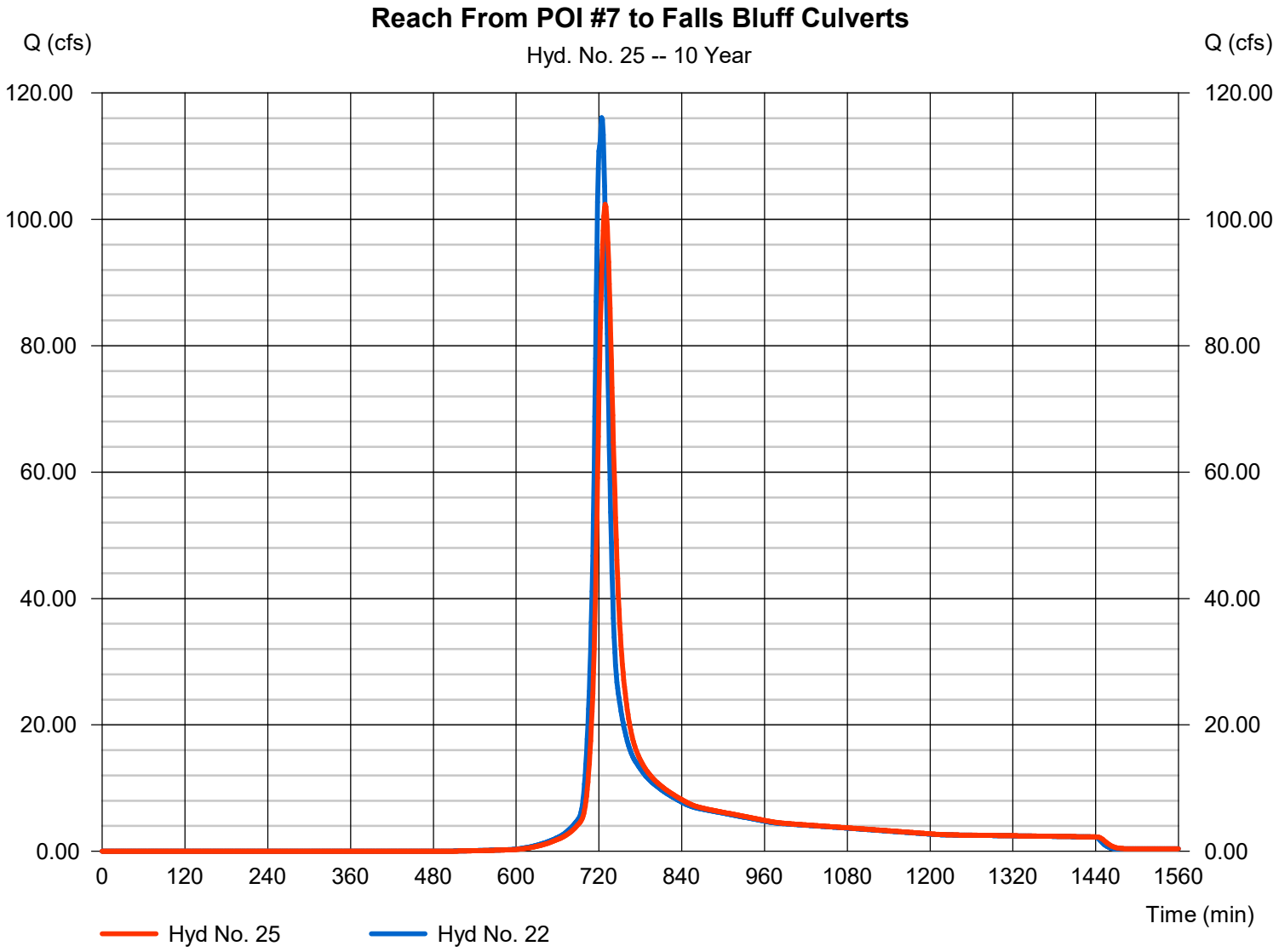
Hydrograph Report

Hyd. No. 25

Reach From POI #7 to Falls Bluff Culverts

Hydrograph type	=	Reach	Peak discharge	=	102.39 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	422,984 cuft
Inflow hyd. No.	=	22 - Merge All PostDev Flow @ POI #7	Section type	=	Trapezoidal
Reach length	=	1845.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	4.0 ft
Side slope	=	30.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.289	Rating curve m	=	1.183
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1497

Modified Att-Kin routing method used.

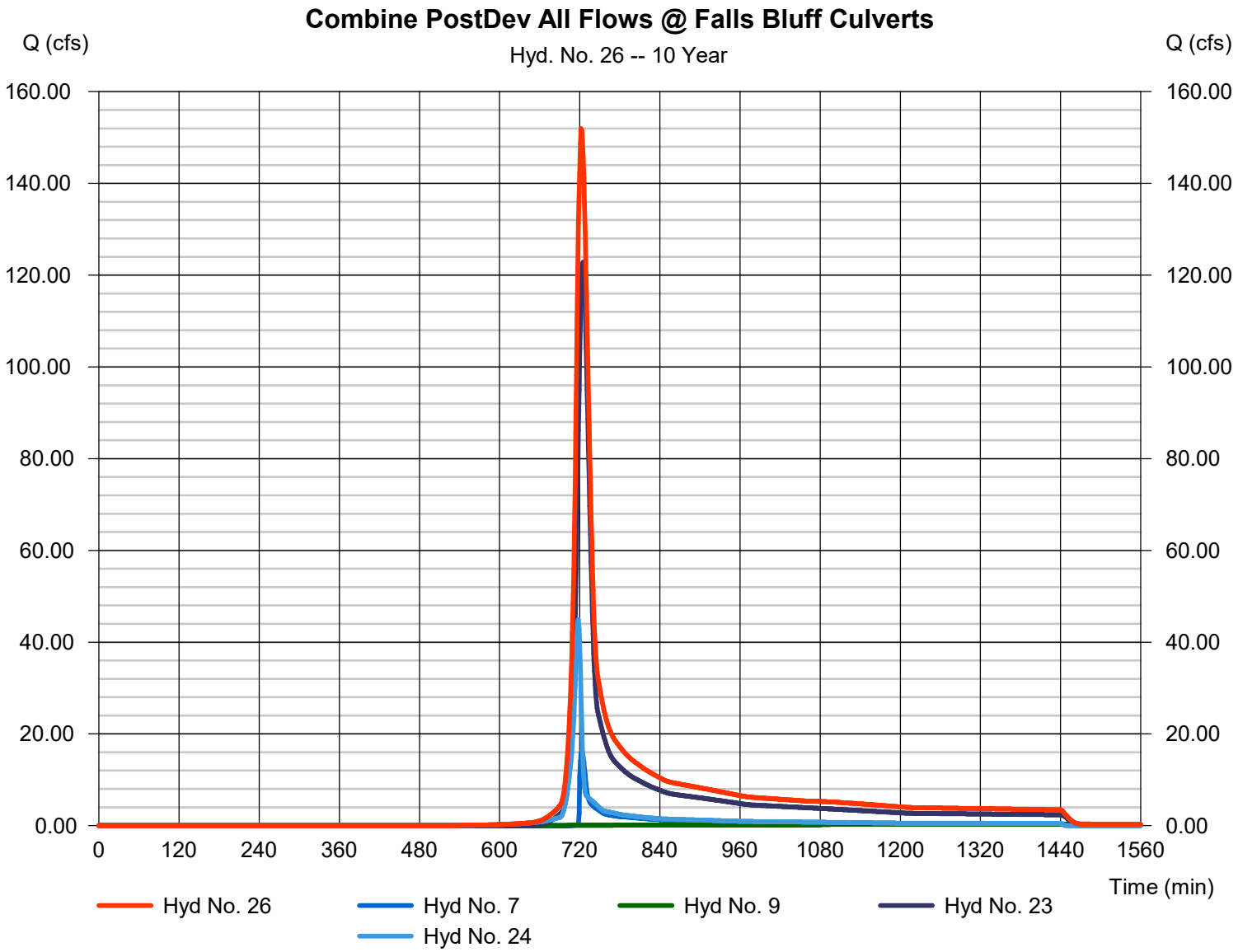


Hydrograph Report

Hyd. No. 26

Combine PostDev All Flows @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 151.95 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 536,288 cuft
Inflow hyds.	= 7, 9, 23, 24	Contrib. drain. area	= 74.010 ac

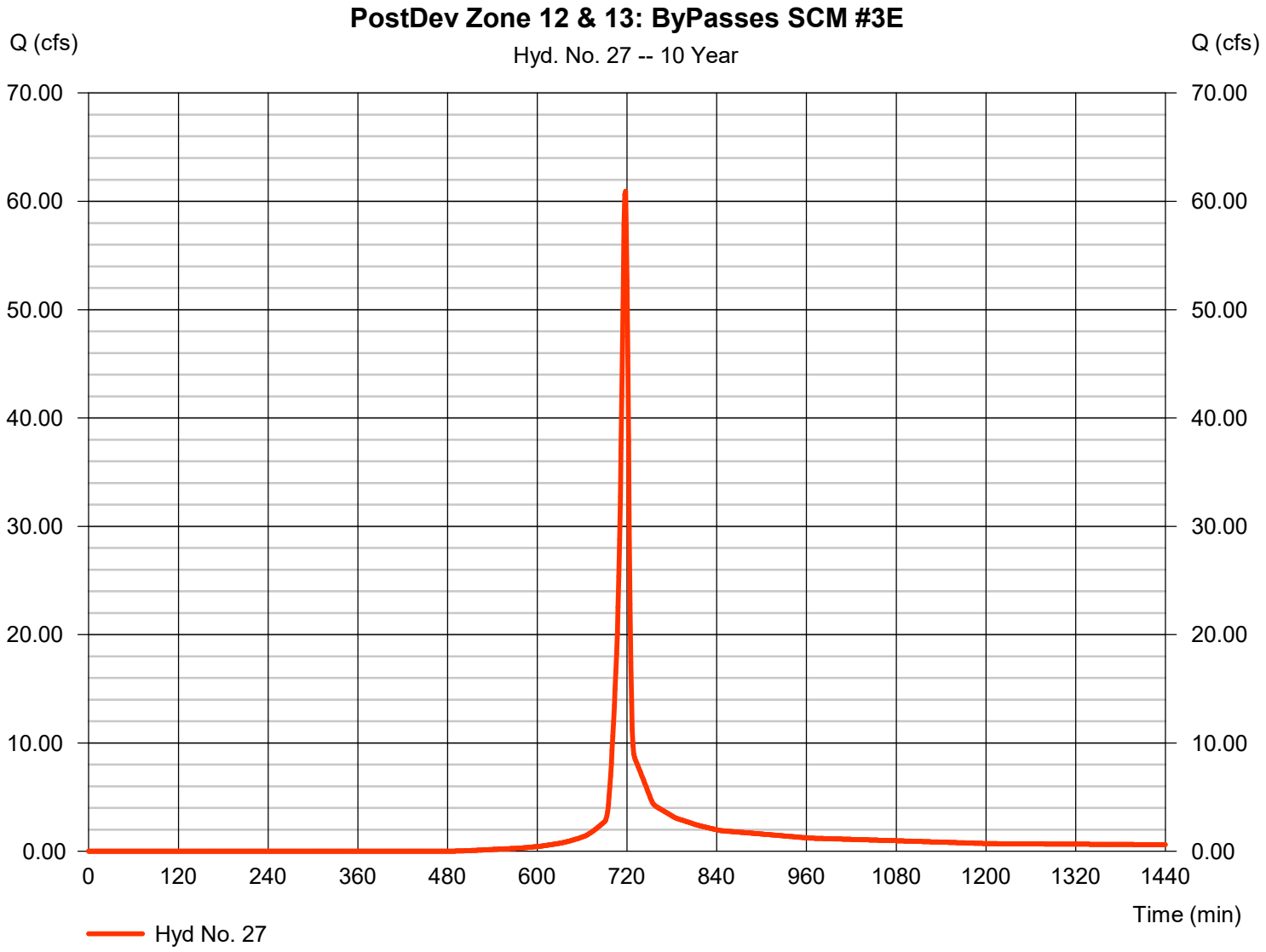


Hydrograph Report

Hyd. No. 27

PostDev Zone 12 & 13: ByPasses SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 60.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 123,521 cuft
Drainage area	= 12.500 ac	Curve number	= 77
Basin Slope	= 5.7 %	Hydraulic length	= 1080 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 5.08 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

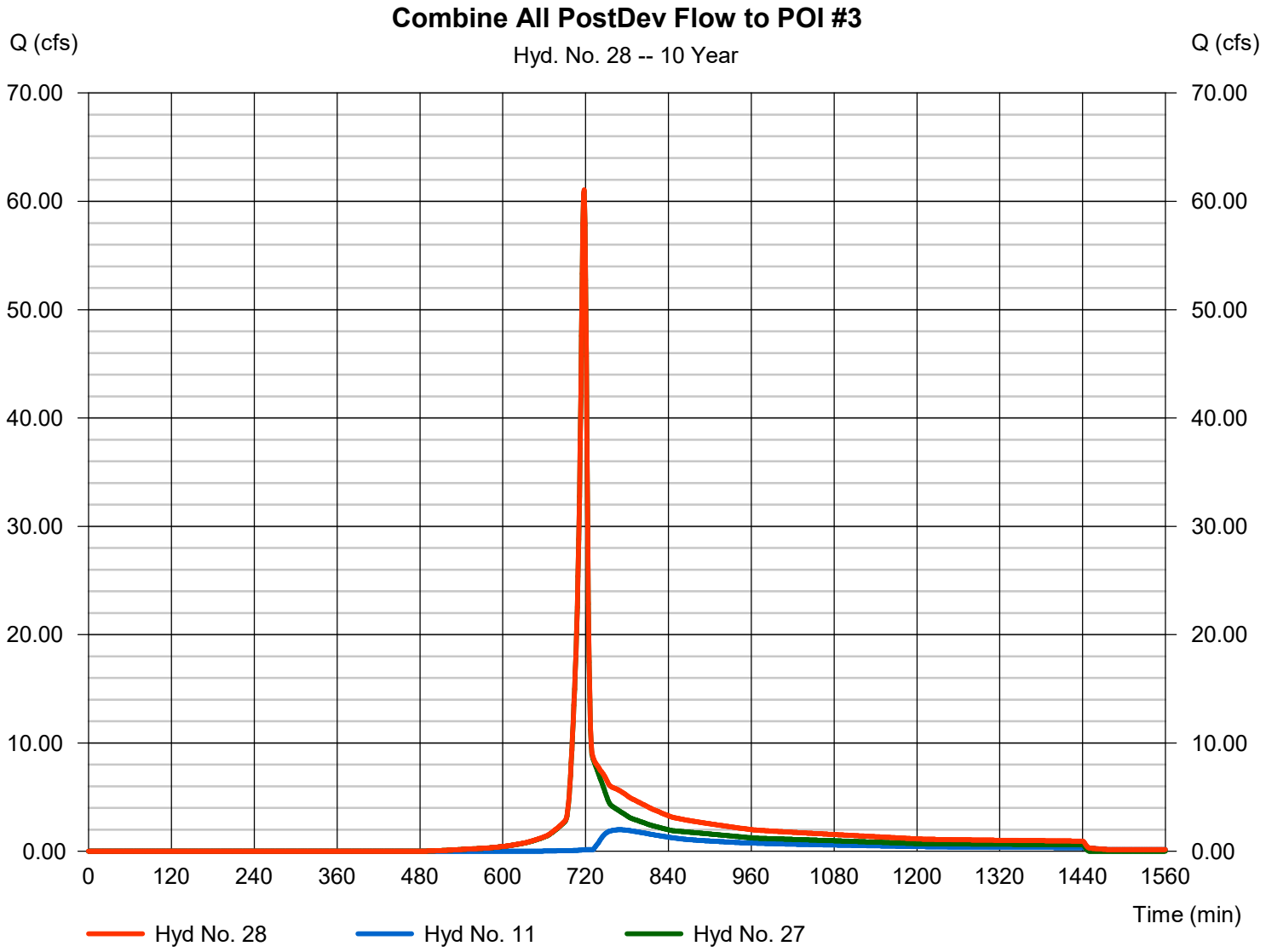


Hydrograph Report

Hyd. No. 28

Combine All PostDev Flow to POI #3

Hydrograph type	= Combine	Peak discharge	= 61.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 167,404 cuft
Inflow hyds.	= 11, 27	Contrib. drain. area	= 12.500 ac



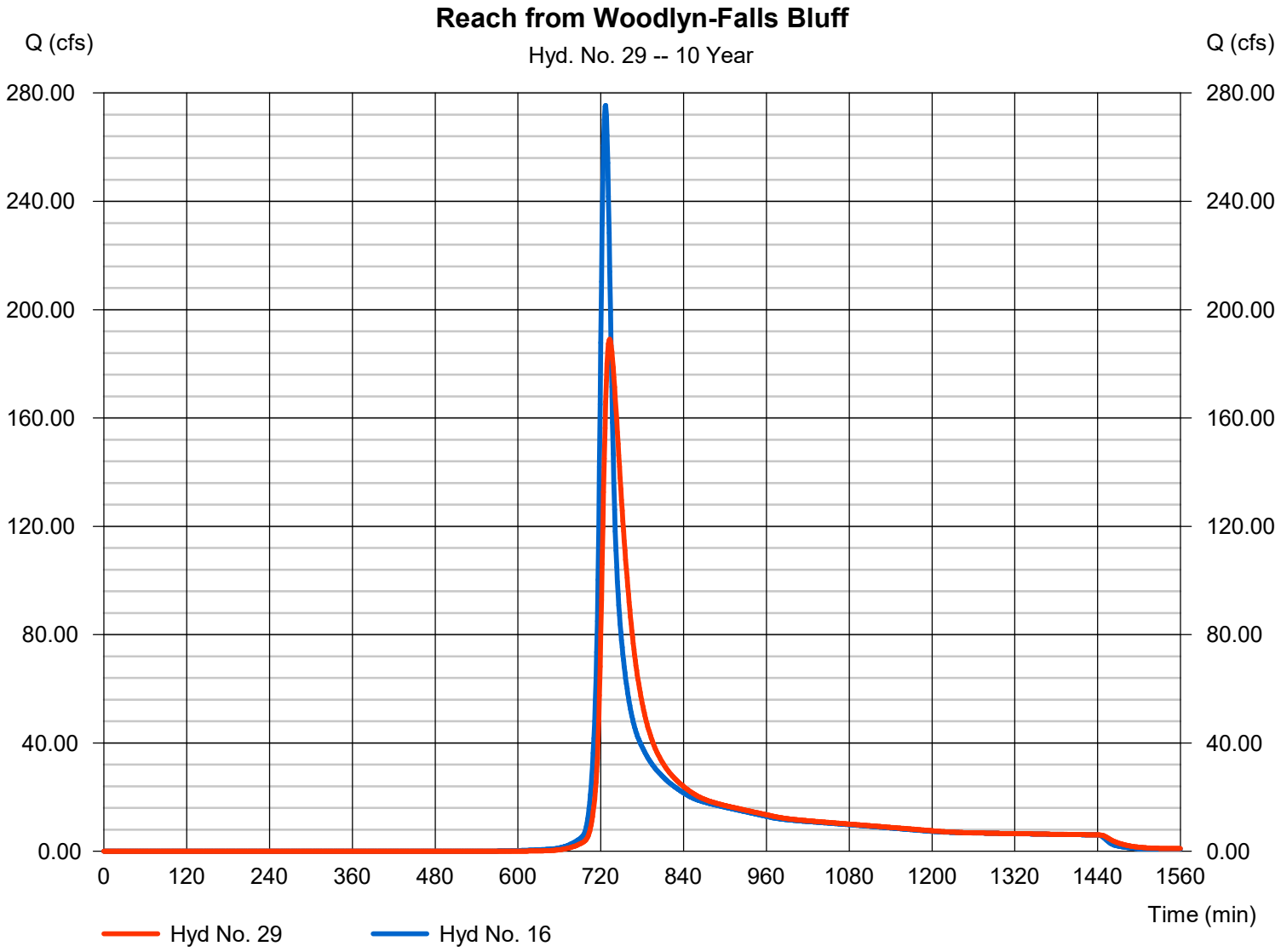
Hydrograph Report

Hyd. No. 29

Reach from Woodlyn-Falls Bluff

Hydrograph type	=	Reach	Peak discharge	=	189.06 cfs
Storm frequency	=	10 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	1,042,827 cuft
Inflow hyd. No.	=	16 - Merge All PostDev @ Woodlyn	Section type	=	Trapezoidal
Reach length	=	12152.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.009	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	6.0 ft
Rating curve x	=	5.011	Rating curve m	=	1.255
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0693

Modified Att-Kin routing method used.

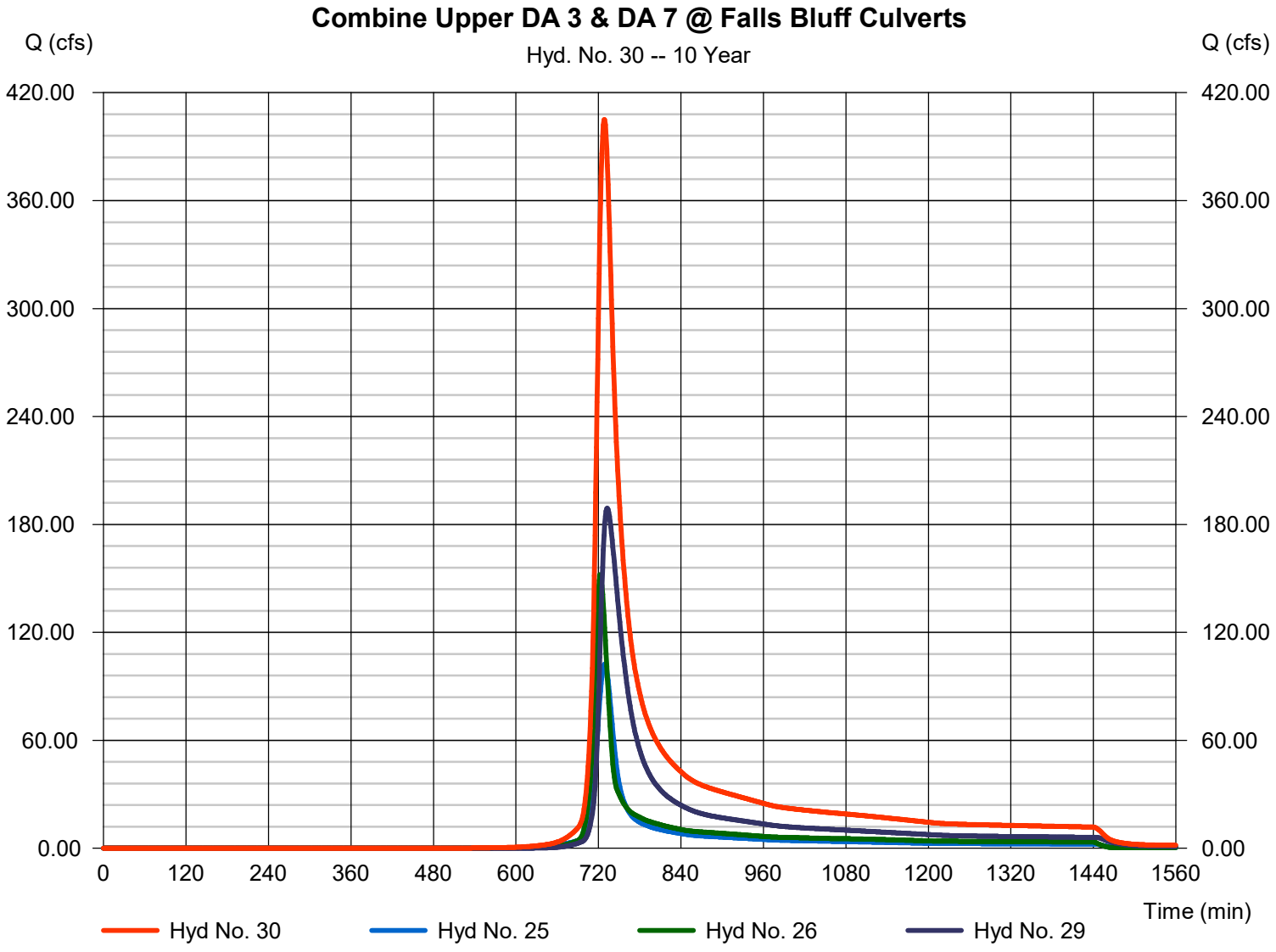


Hydrograph Report

Hyd. No. 30

Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 405.03 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 2,002,099 cuft
Inflow hyds.	= 25, 26, 29	Contrib. drain. area	= 0.000 ac



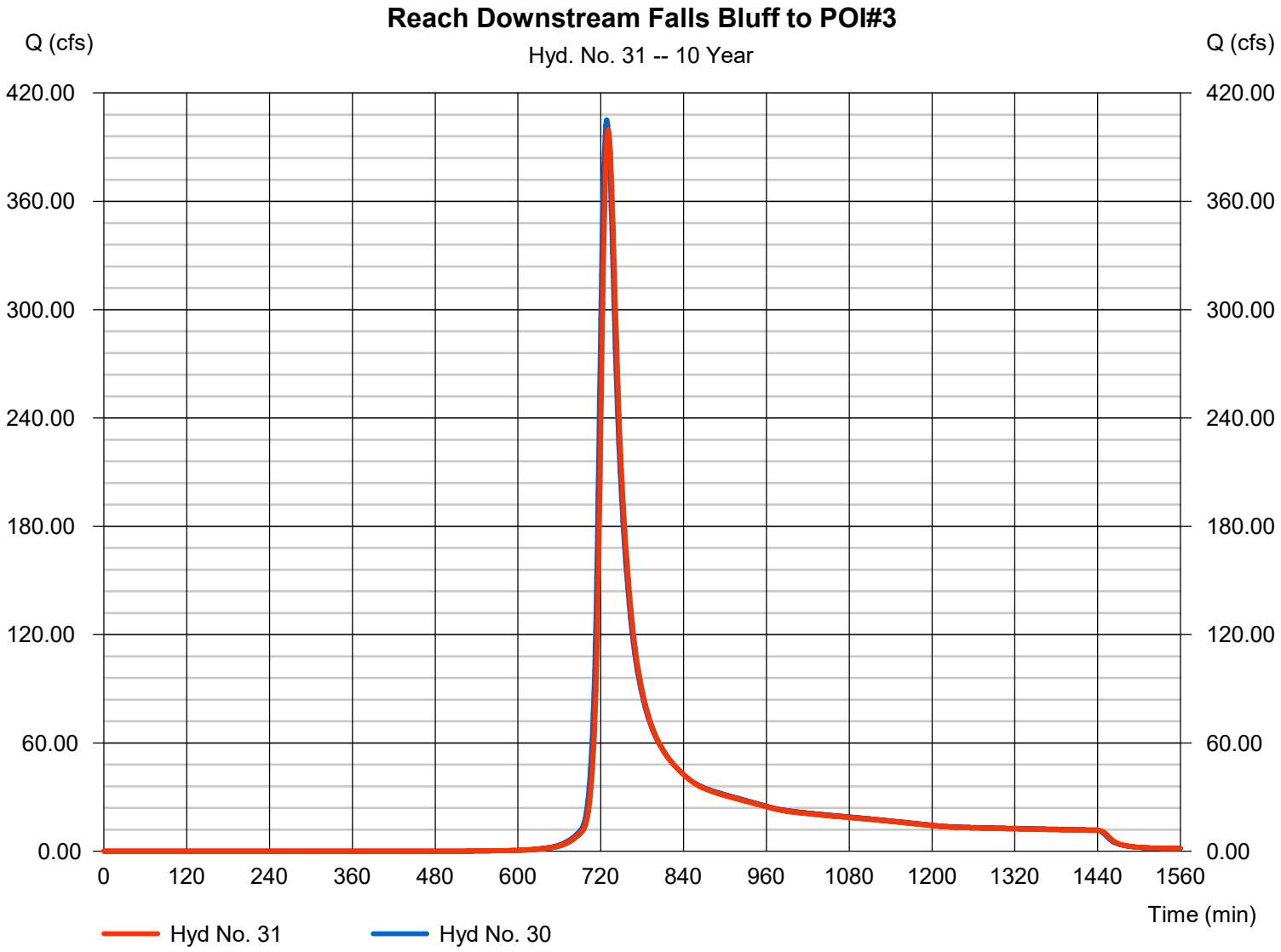
Hydrograph Report

Hyd. No. 31

Reach Downstream Falls Bluff to POI#3

Hydrograph type	=	Reach	Peak discharge	=	399.76 cfs
Storm frequency	=	10 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	1,958,615 cuft
Inflow hyd. No.	=	30 - Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts	Section type	=	Trapezoidal
Reach length	=	1200.0 ft	Channel slope	=	5.0 %
Manning's n	=	0.030	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	8.0 ft
Rating curve x	=	3.361	Rating curve m	=	1.269
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.4541

Modified Att-Kin routing method used.

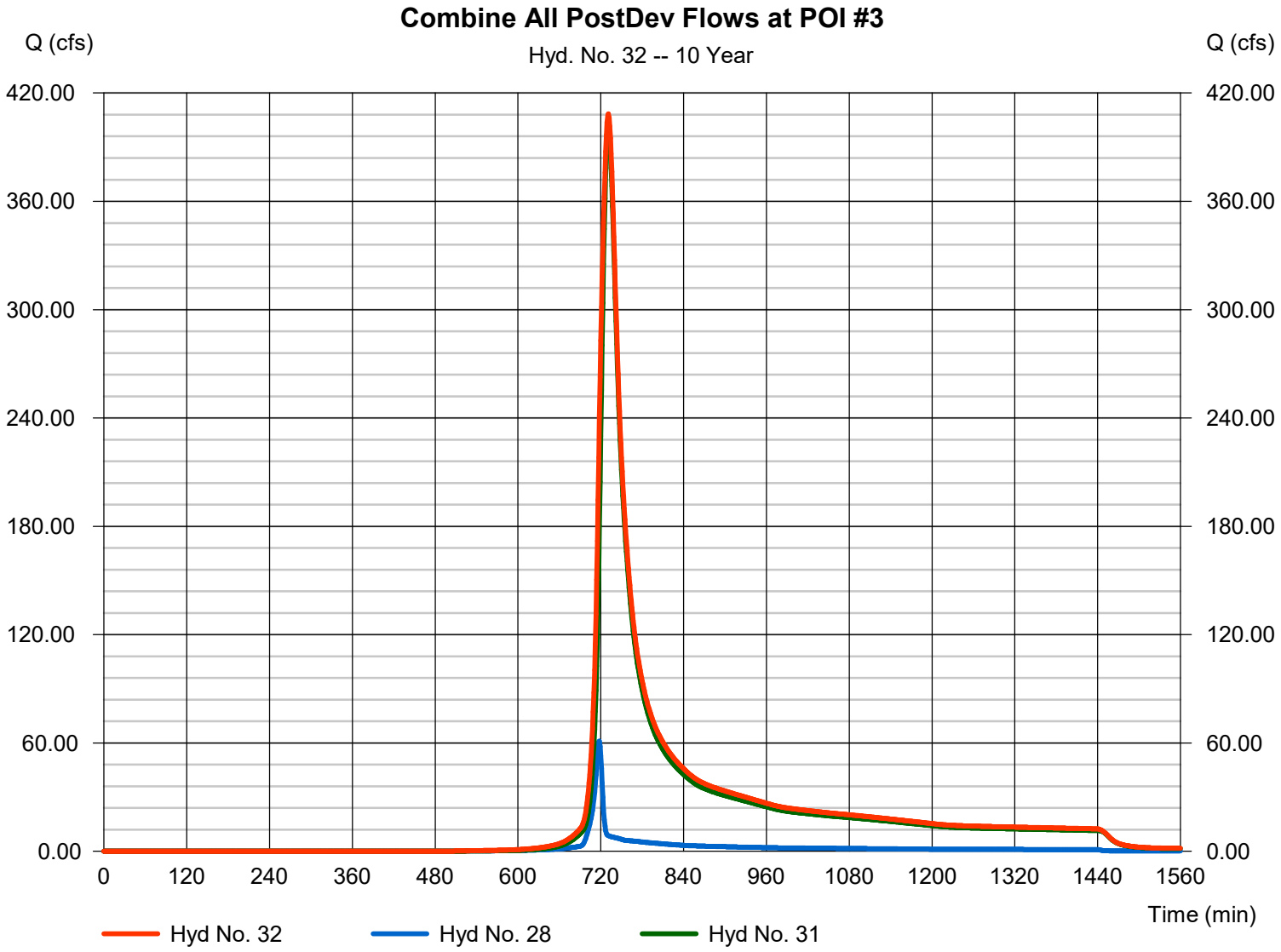


Hydrograph Report

Hyd. No. 32

Combine All PostDev Flows at POI #3

Hydrograph type	= Combine	Peak discharge	= 408.39 cfs
Storm frequency	= 10 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 2,126,018 cuft
Inflow hyds.	= 28, 31	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

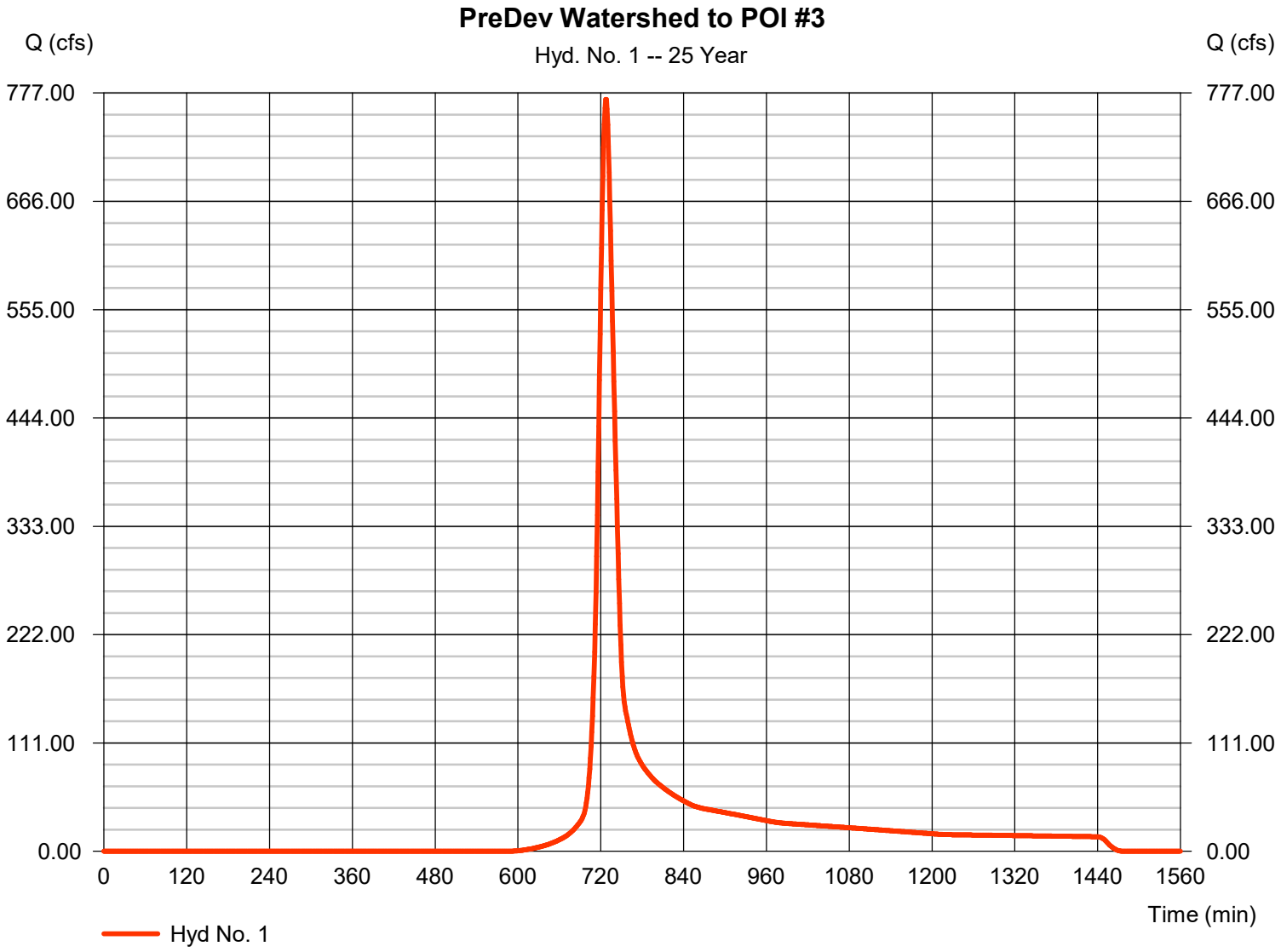
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	770.38	1	728	2,667,221	------	------	------	PreDev Watershed to POI #3
2	SCS Runoff	171.56	1	722	469,324	------	------	------	Phase 3: PostDev to SCM #3B
3	Reservoir	124.02	1	728	441,311	2	354.58	230,117	Route DA#3B To SCM #3B
4	SCS Runoff	121.58	1	722	329,003	------	------	------	Zone 4: PostDev to SCM #3A
5	Reservoir	52.36	1	733	275,473	4	354.60	274,911	DA #3A Routed SCM #3A
6	SCS Runoff	41.27	1	721	104,609	------	------	------	PostDev to SCM #3C
7	Reservoir	29.70	1	722	78,503	6	342.44	57,127	Route DA3C thru SCM#3C
8	SCS Runoff	35.33	1	718	72,299	------	------	------	PostDev Inflow to SCM#3D
9	Reservoir	1.258	1	825	35,367	8	348.14	71,277	Route DA to SCM #3D
10	SCS Runoff	42.31	1	718	86,641	------	------	------	PostDev Inflow to SCM #3E
11	Reservoir	7.240	1	727	64,591	10	309.50	71,162	Route Infllow SCM #3E
12	SCS Runoff	28.76	1	721	70,272	------	------	------	Zone 1:Offsite Bypasses SCM #3A&
13	SCS Runoff	59.98	1	721	151,489	------	------	------	Zone 5: Onsite PostDevBypass to Wo
14	SCS Runoff	176.35	1	723	481,514	------	------	------	Zone 3: Offsite Bypass to Graymont
15	Reach	164.11	1	726	481,512	14	------	------	Reach from Graymont to Woodlyn
16	Combine	420.46	1	725	1,397,760	3, 5, 12, 13, 15	------	------	Merge All PostDev @ Woodlyn
17	SCS Runoff	242.31	1	724	717,420	------	------	------	PreDev Flows at POI #7
18	SCS Runoff	111.26	1	724	330,850	------	------	------	PostDev Zone 14 & 15 Bypasses to P
19	SCS Runoff	48.32	1	721	123,250	------	------	------	PostDev to SCM #7A
20	SCS Runoff	54.81	1	718	116,786	------	------	------	PostDev Zone 17-Onsite Bypass to P
21	Reservoir	36.45	1	726	116,607	19	374.22	62,331	Route DA thru SCM #7A
22	Combine	179.13	1	722	564,243	18, 20, 21	------	------	Merge All PostDev Flow @ POI #7
23	SCS Runoff	175.09	1	724	529,599	------	------	------	PostDev Zone 6 Bypass From Moody
24	SCS Runoff	58.85	1	718	119,533	------	------	------	Bypasses SCM #3C & #3D
25	Reach	152.09	1	728	564,175	22	------	------	Reach From POI #7 to Falls Bluff Cul
26	Combine	226.23	1	722	753,399	7, 9, 23, 24,	------	------	Combine PostDev All Flows @ Falls
27	SCS Runoff	78.71	1	718	161,163	------	------	------	PostDev Zone 12 & 13: ByPasses SC
28	Combine	78.86	1	718	225,181	11, 27	------	------	Combine All PostDev Flow to POI #3
29	Reach	291.48	1	731	1,415,565	16	------	------	Reach from Woodlyn-Falls Bluff
30	Combine	621.84	1	727	2,733,137	25, 26, 29	------	------	Combine Upper DA 3 & DA 7 @ Falls
31	Reach	609.43	1	730	2,670,614	30	------	------	Reach Downstream Falls Bluff to POI
32	Combine	627.14	1	730	2,895,799	28, 31	------	------	Combine All PostDev Flows at POI #3

Hydrograph Report

Hyd. No. 1

PreDev Watershed to POI #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	770.38 cfs
Storm frequency	=	25 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	2,667,221 cuft
Drainage area	=	300.880 ac	Curve number	=	66.6
Basin Slope	=	3.0 %	Hydraulic length	=	5451 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	22.67 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

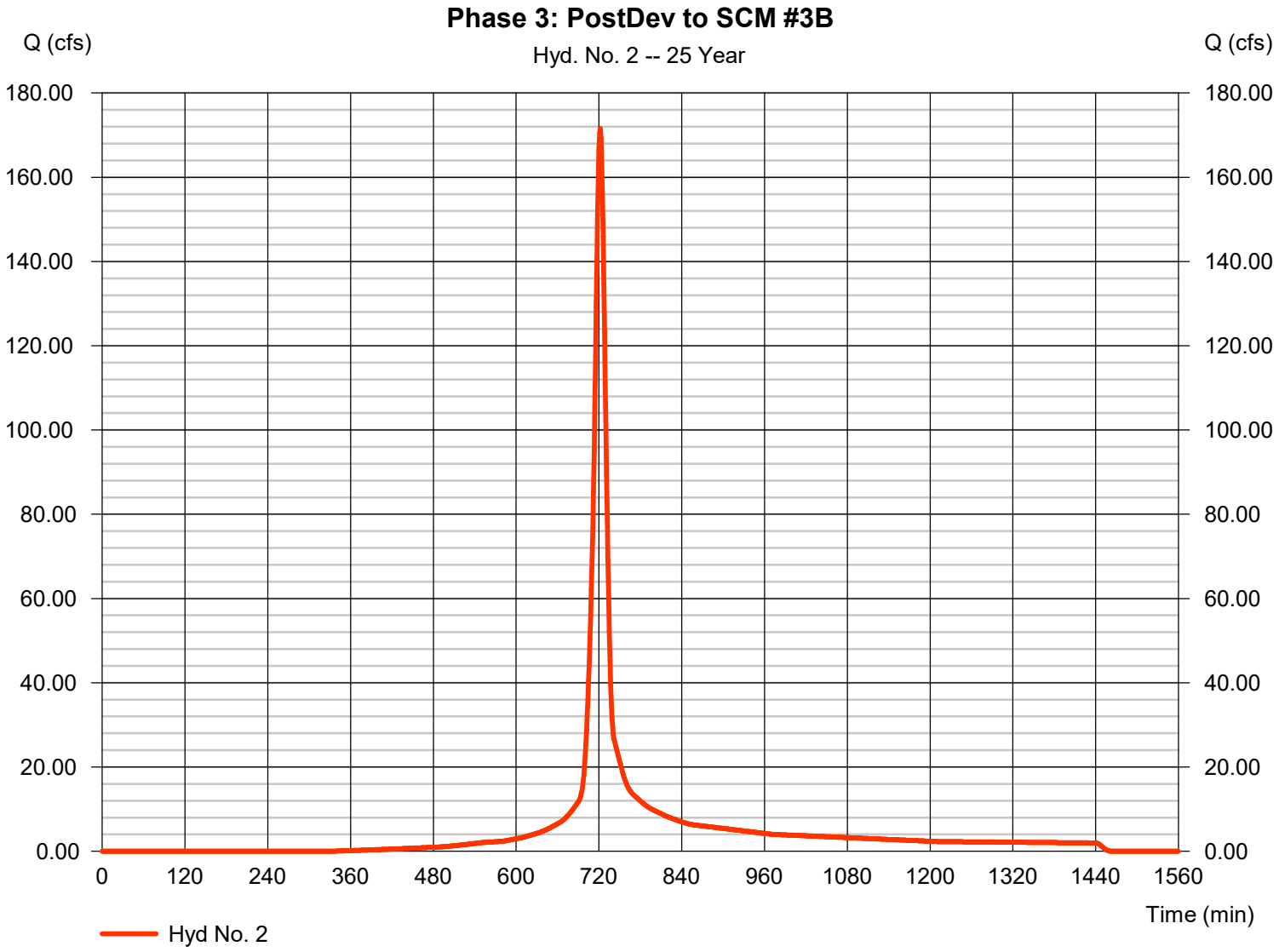


Hydrograph Report

Hyd. No. 2

Phase 3: PostDev to SCM #3B

Hydrograph type	= SCS Runoff	Peak discharge	= 171.56 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 469,324 cuft
Drainage area	= 31.890 ac	Curve number	= 83
Basin Slope	= 1.9 %	Hydraulic length	= 2520 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.80 min
Total precip.	= 5.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



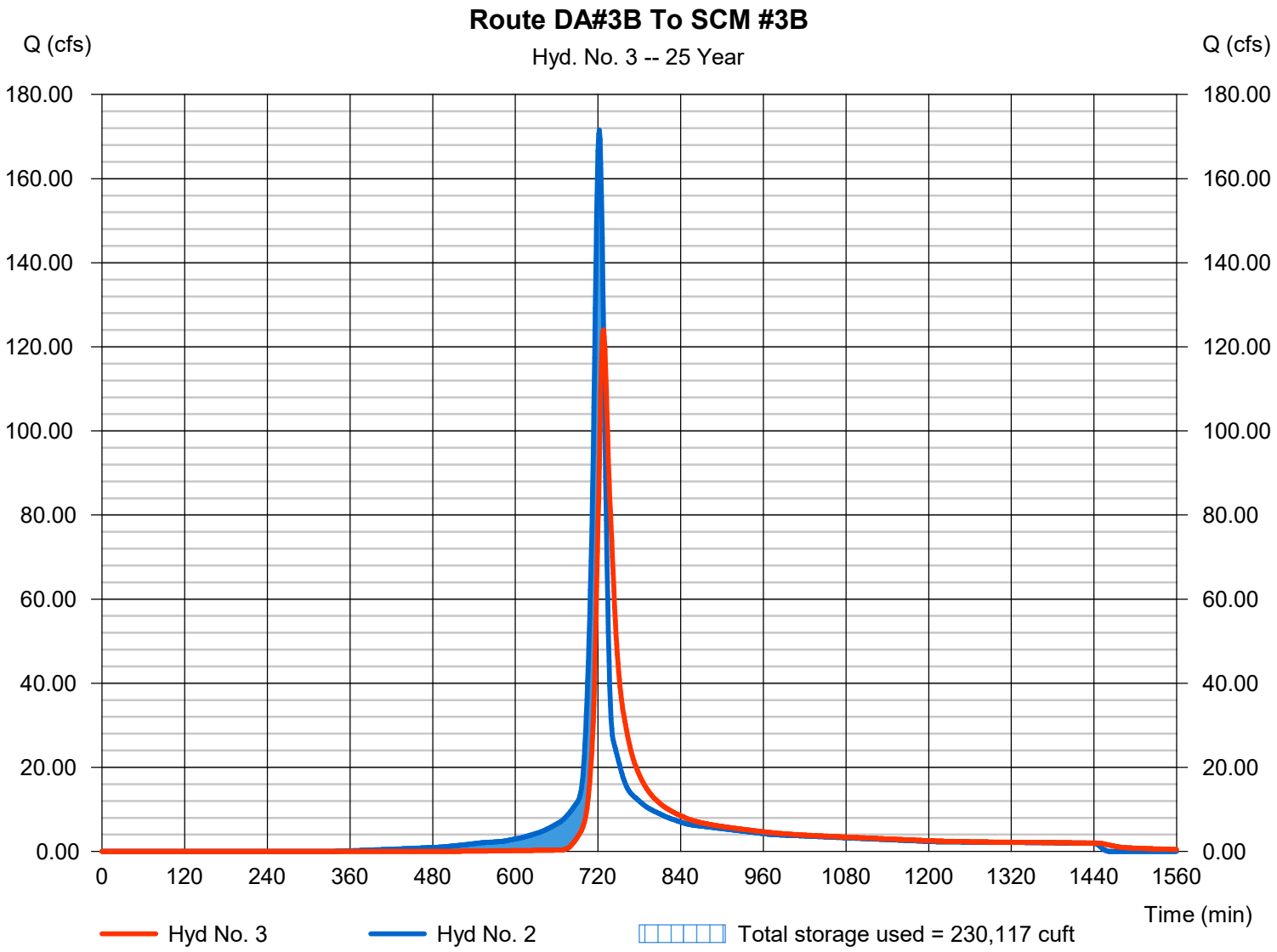
Hydrograph Report

Hyd. No. 3

Route DA#3B To SCM #3B

Hydrograph type	=	Reservoir	Peak discharge	=	124.02 cfs
Storm frequency	=	25 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	441,311 cuft
Inflow hyd. No.	=	2 - Phase 3: PostDev to SCM #3B	Max. Elevation	=	354.58 ft
Reservoir name	=	SCM 3B-rev102924	Max. Storage	=	230,117 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

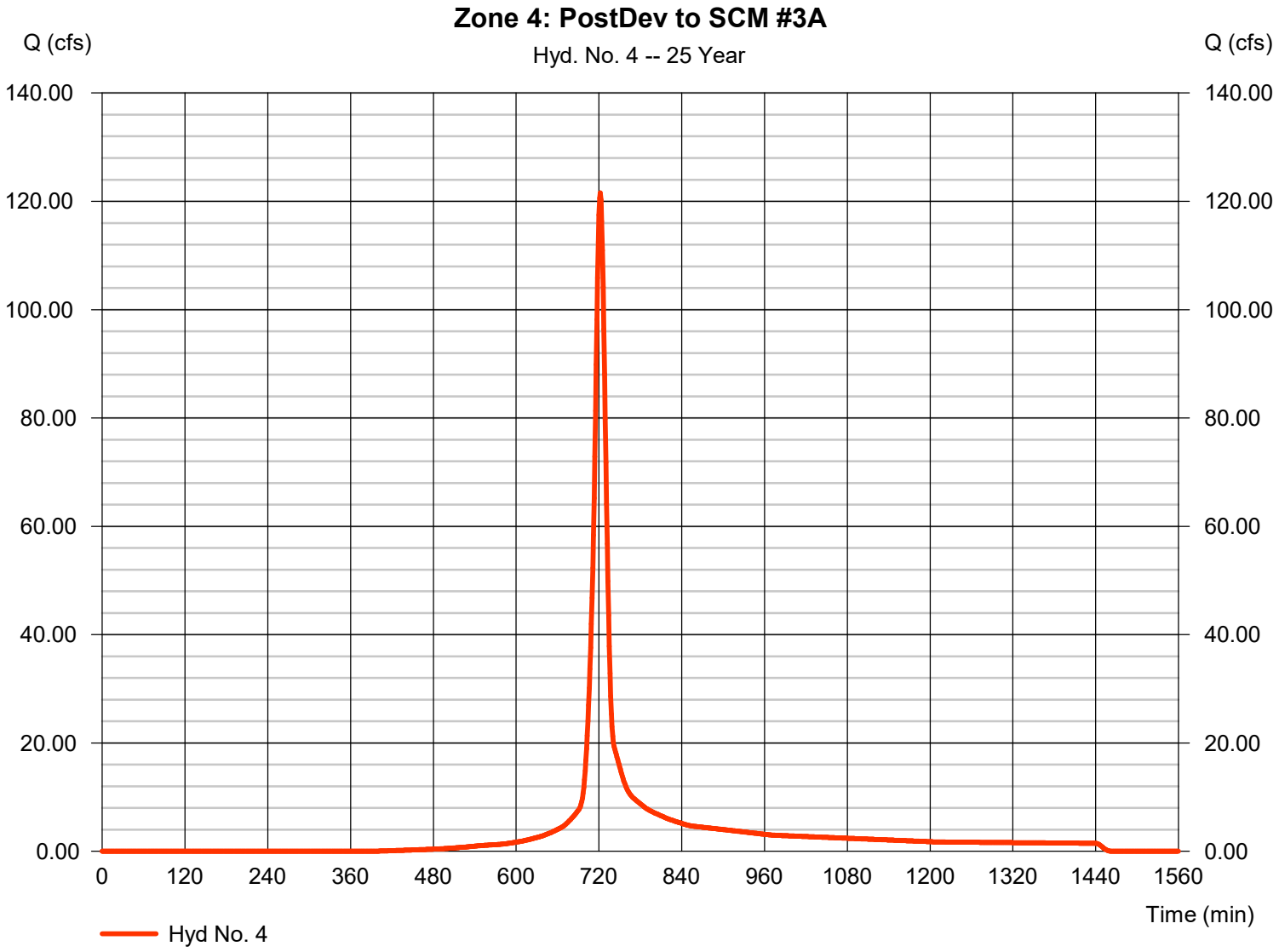


Hydrograph Report

Hyd. No. 4

Zone 4: PostDev to SCM #3A

Hydrograph type	=	SCS Runoff	Peak discharge	=	121.58 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	329,003 cuft
Drainage area	=	24.600 ac	Curve number	=	79.4
Basin Slope	=	1.5 %	Hydraulic length	=	2250 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	14.94 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



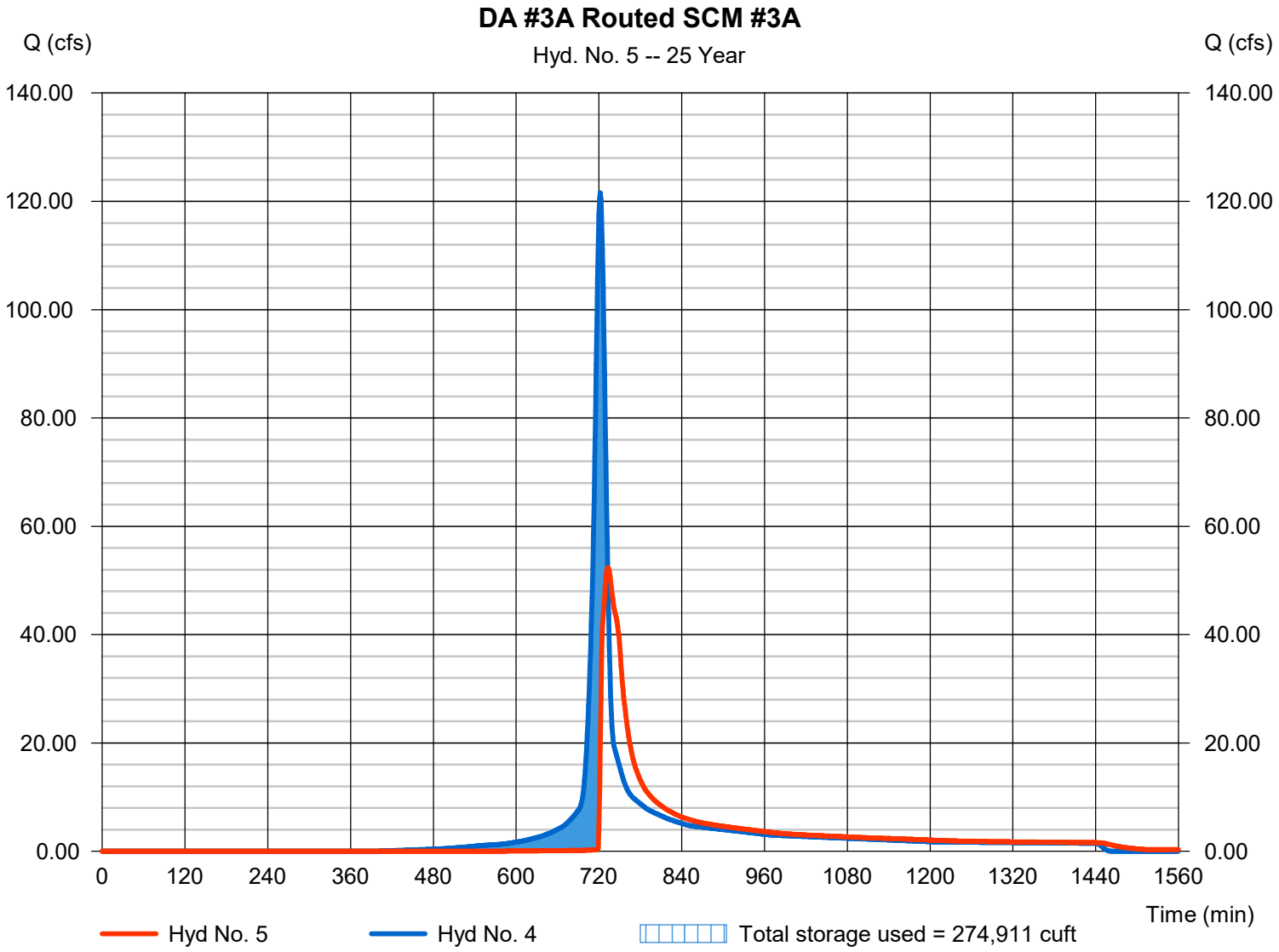
Hydrograph Report

Hyd. No. 5

DA #3A Routed SCM #3A

Hydrograph type	=	Reservoir	Peak discharge	=	52.36 cfs
Storm frequency	=	25 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	275,473 cuft
Inflow hyd. No.	=	4 - Zone 4: PostDev to SCM #3A	Max. Elevation	=	354.60 ft
Reservoir name	=	SCM #3A	Max. Storage	=	274,911 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

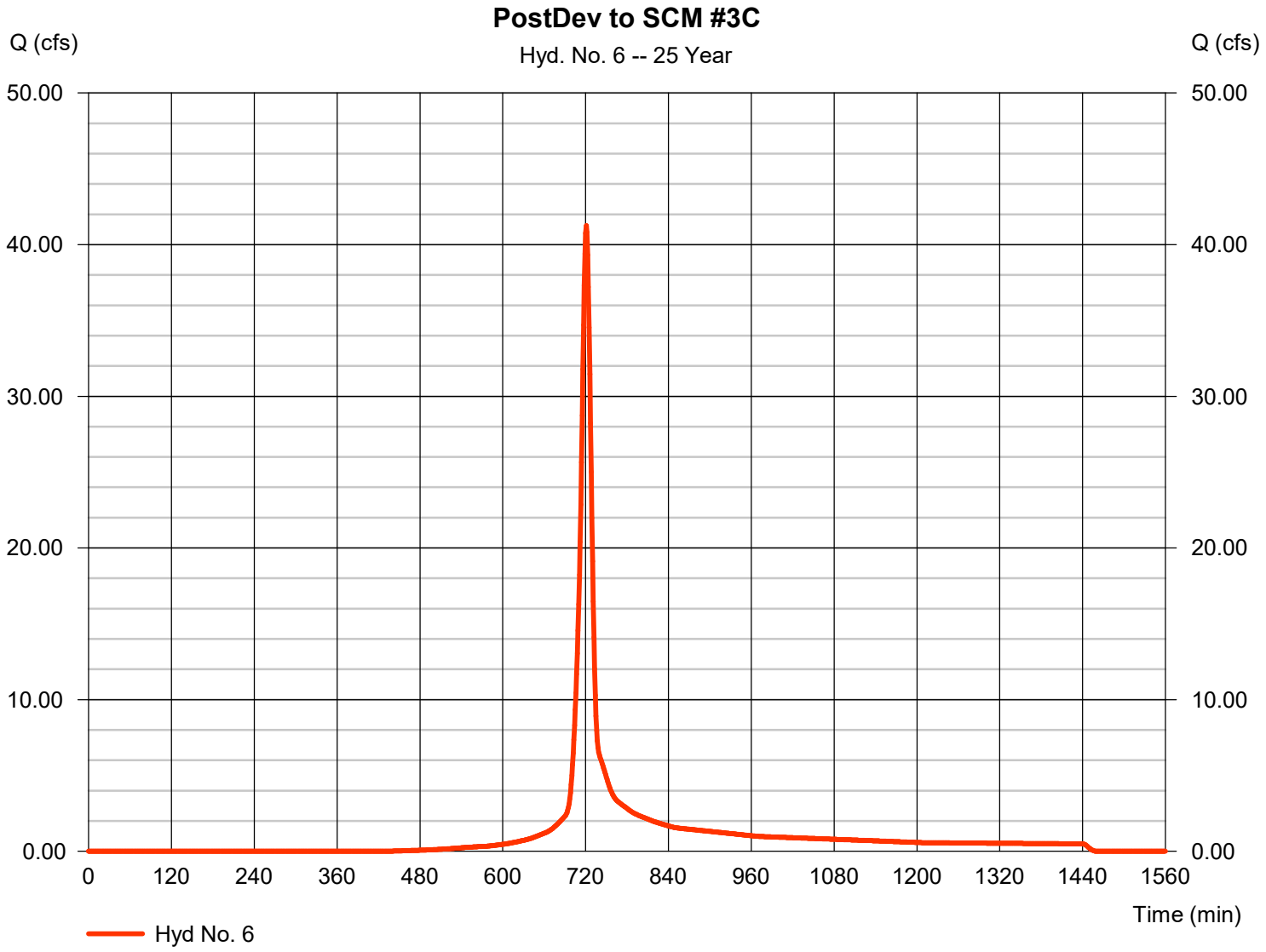


Hydrograph Report

Hyd. No. 6

PostDev to SCM #3C

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.27 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	104,609 cuft
Drainage area	=	8.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



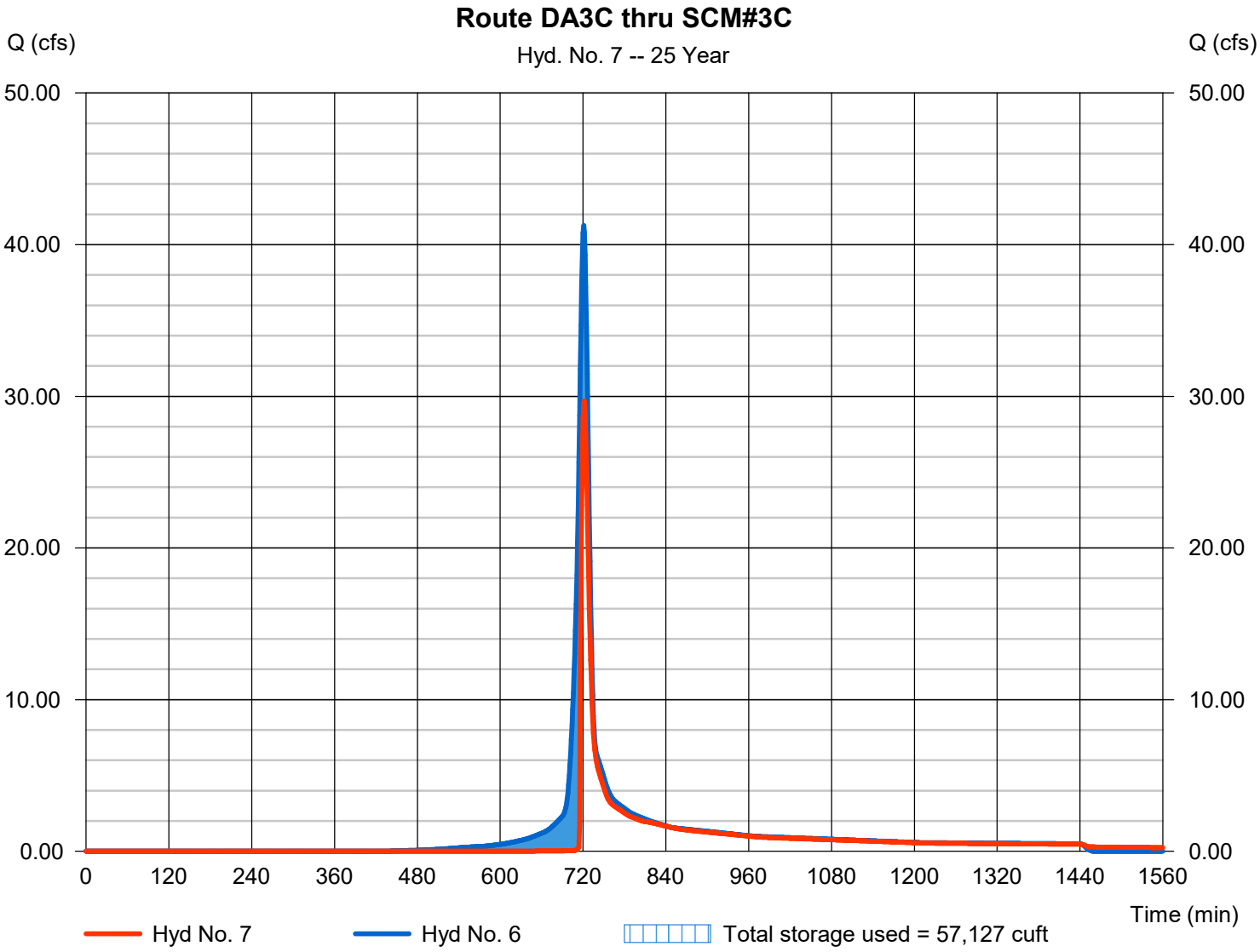
Hydrograph Report

Hyd. No. 7

Route DA3C thru SCM#3C

Hydrograph type	=	Reservoir	Peak discharge	=	29.70 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	78,503 cuft
Inflow hyd. No.	=	6 - PostDev to SCM #3C	Max. Elevation	=	342.44 ft
Reservoir name	=	SCM #3C	Max. Storage	=	57,127 cuft

Storage Indication method used. Wet pond routing start elevation = 340.50 ft.

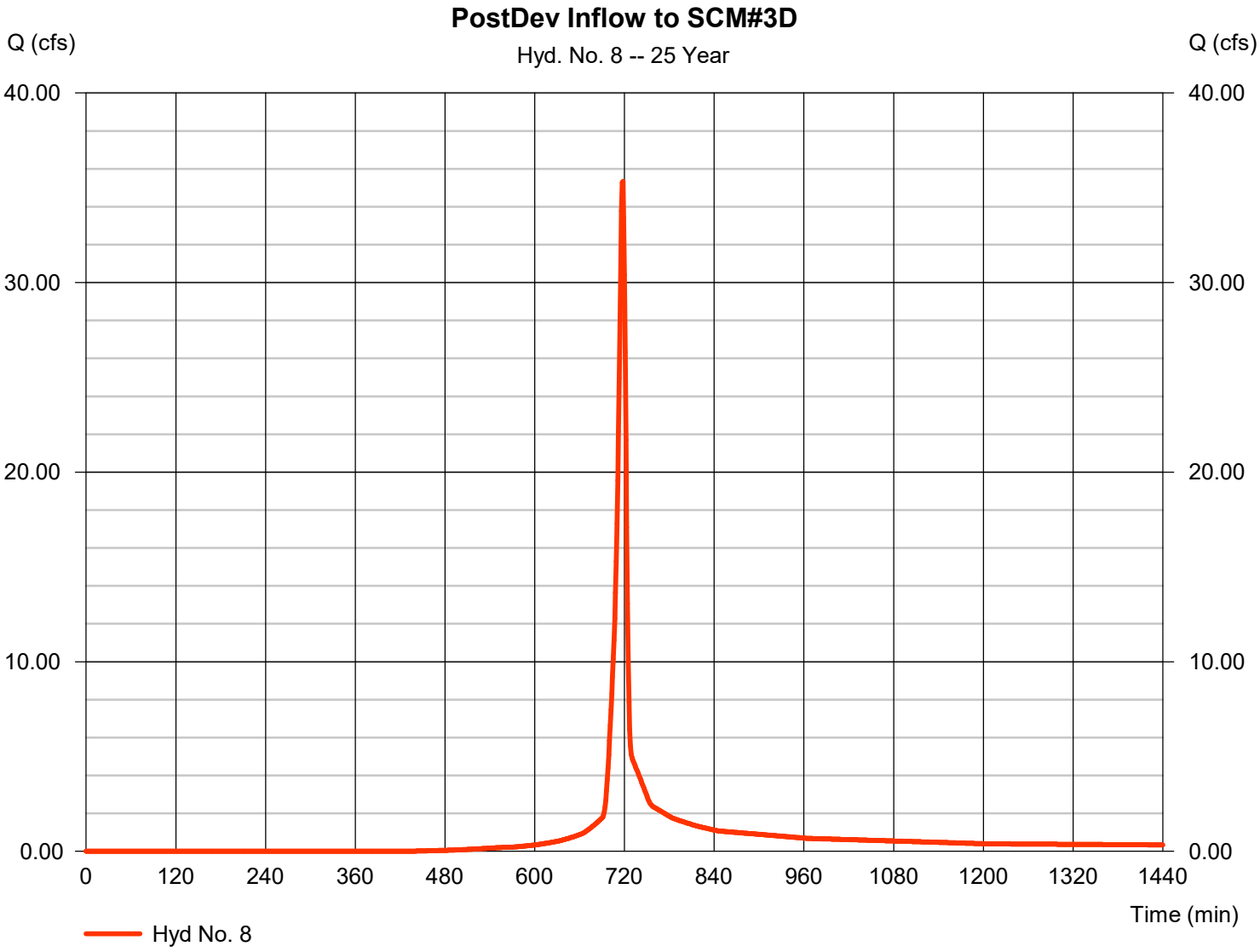


Hydrograph Report

Hyd. No. 8

PostDev Inflow to SCM#3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.33 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	72,299 cuft
Drainage area	=	5.640 ac	Curve number	=	76.8
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



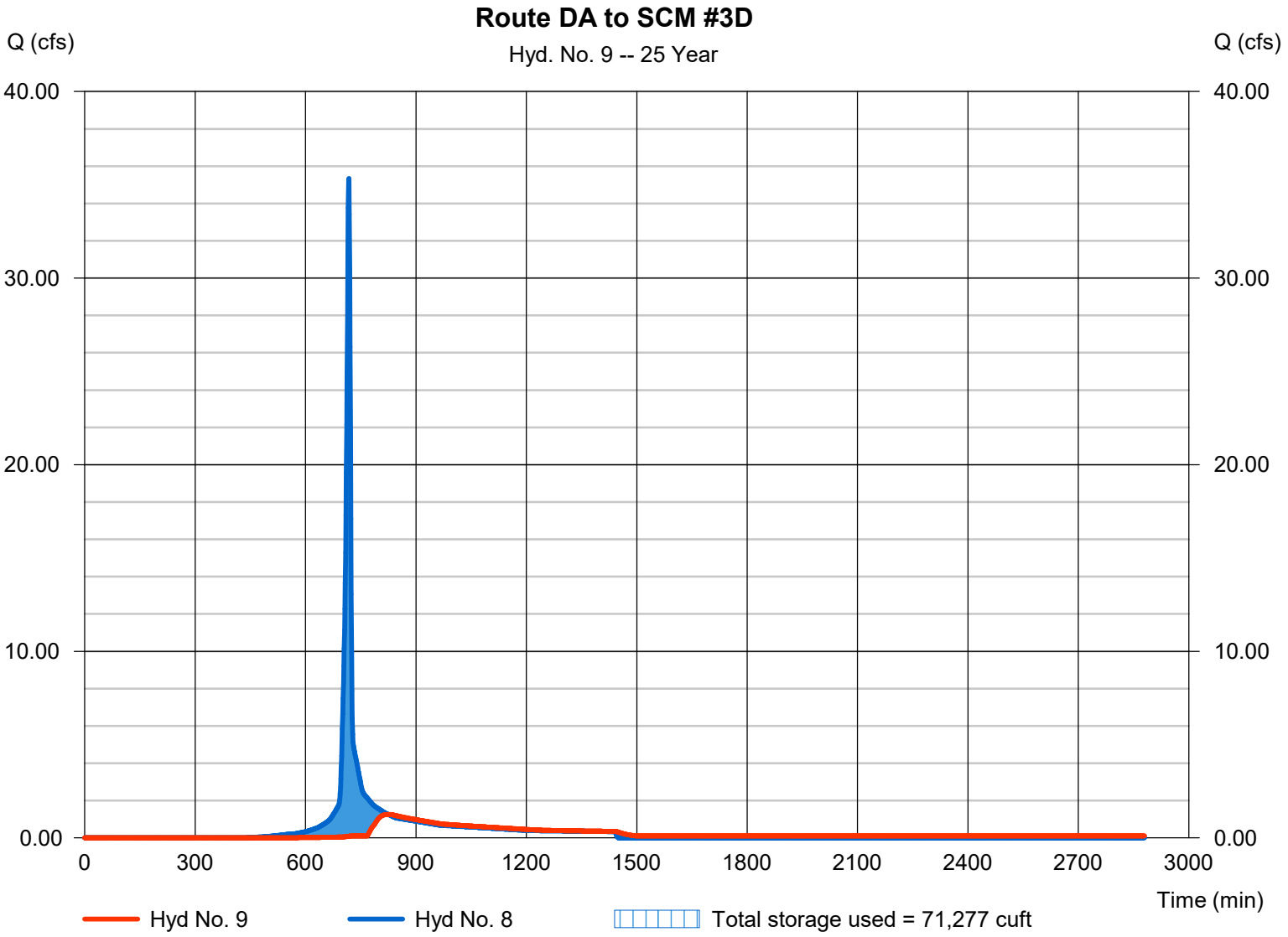
Hydrograph Report

Hyd. No. 9

Route DA to SCM #3D

Hydrograph type	=	Reservoir	Peak discharge	=	1.258 cfs
Storm frequency	=	25 yrs	Time to peak	=	825 min
Time interval	=	1 min	Hyd. volume	=	35,367 cuft
Inflow hyd. No.	=	8 - PostDev Inflow to SCM#3D	Max. Elevation	=	348.14 ft
Reservoir name	=	SCM #3D	Max. Storage	=	71,277 cuft

Storage Indication method used. Wet pond routing start elevation = 344.50 ft.

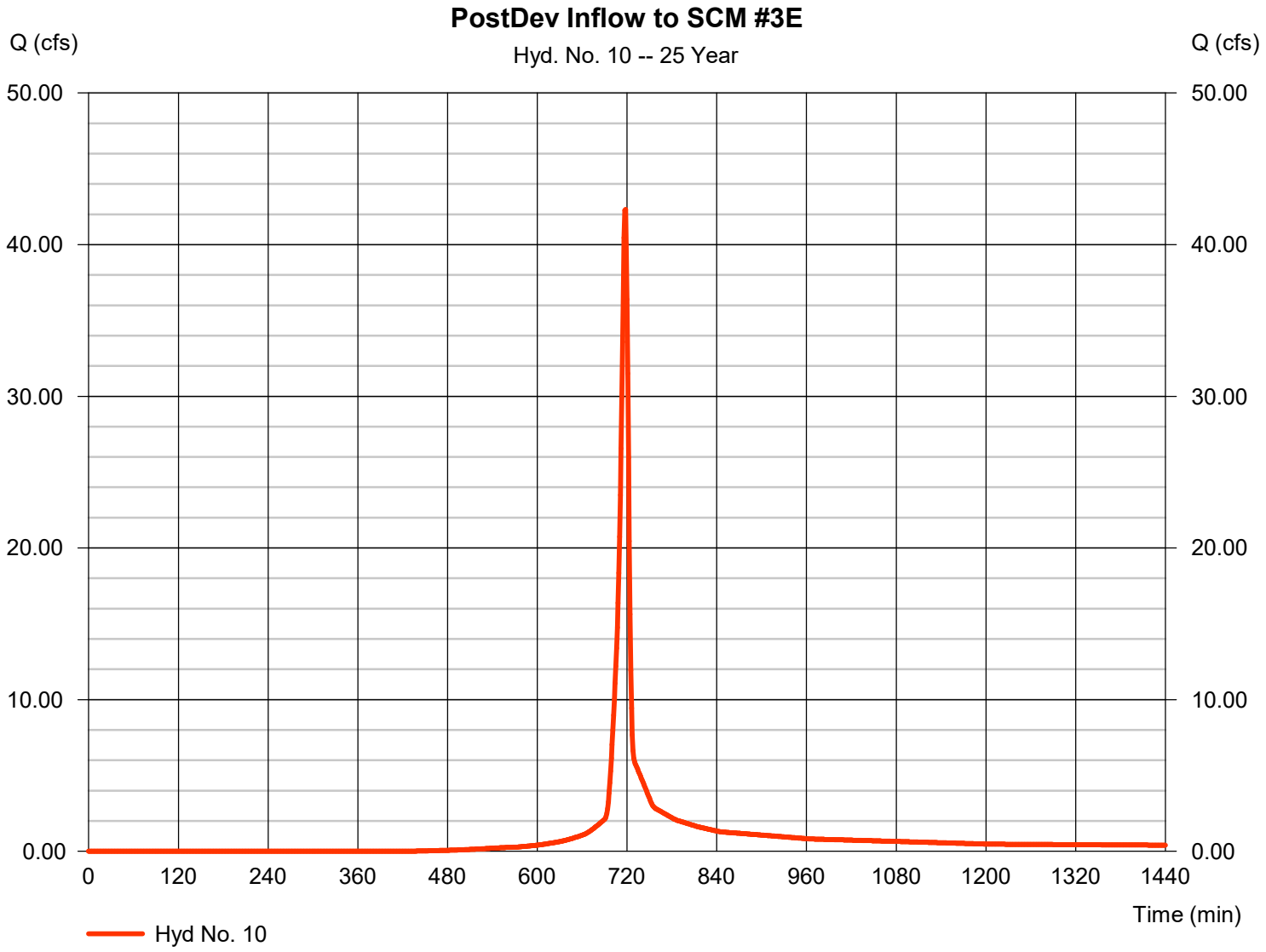


Hydrograph Report

Hyd. No. 10

PostDev Inflow to SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 42.31 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 86,641 cuft
Drainage area	= 6.720 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



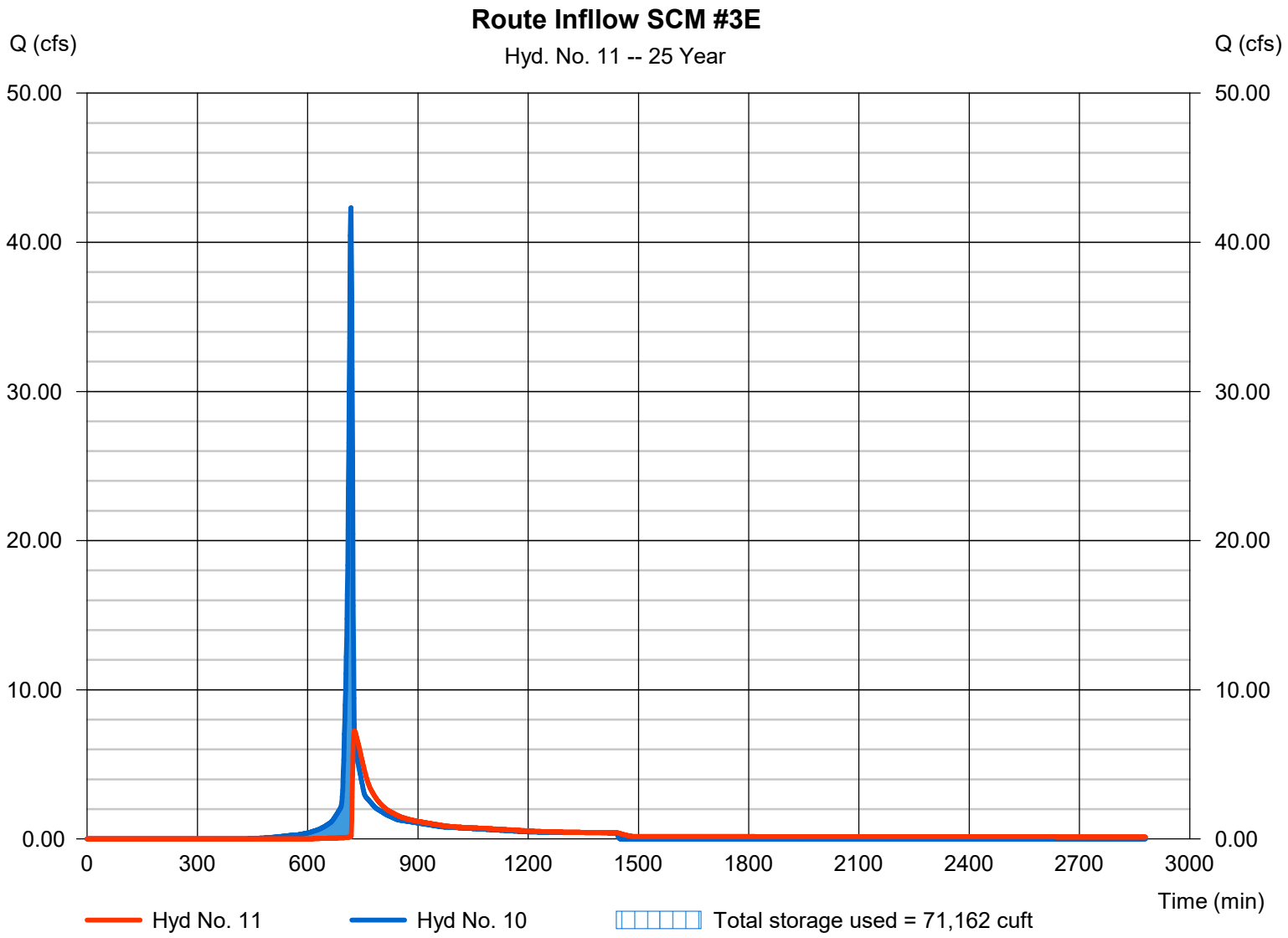
Hydrograph Report

Hyd. No. 11

Route Infllow SCM #3E

Hydrograph type	=	Reservoir	Peak discharge	=	7.240 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	64,591 cuft
Inflow hyd. No.	=	10 - PostDev Inflow to SCM #3E	Max. Elevation	=	309.50 ft
Reservoir name	=	SCM #3E	Max. Storage	=	71,162 cuft

Storage Indication method used. Wet pond routing start elevation = 306.50 ft.

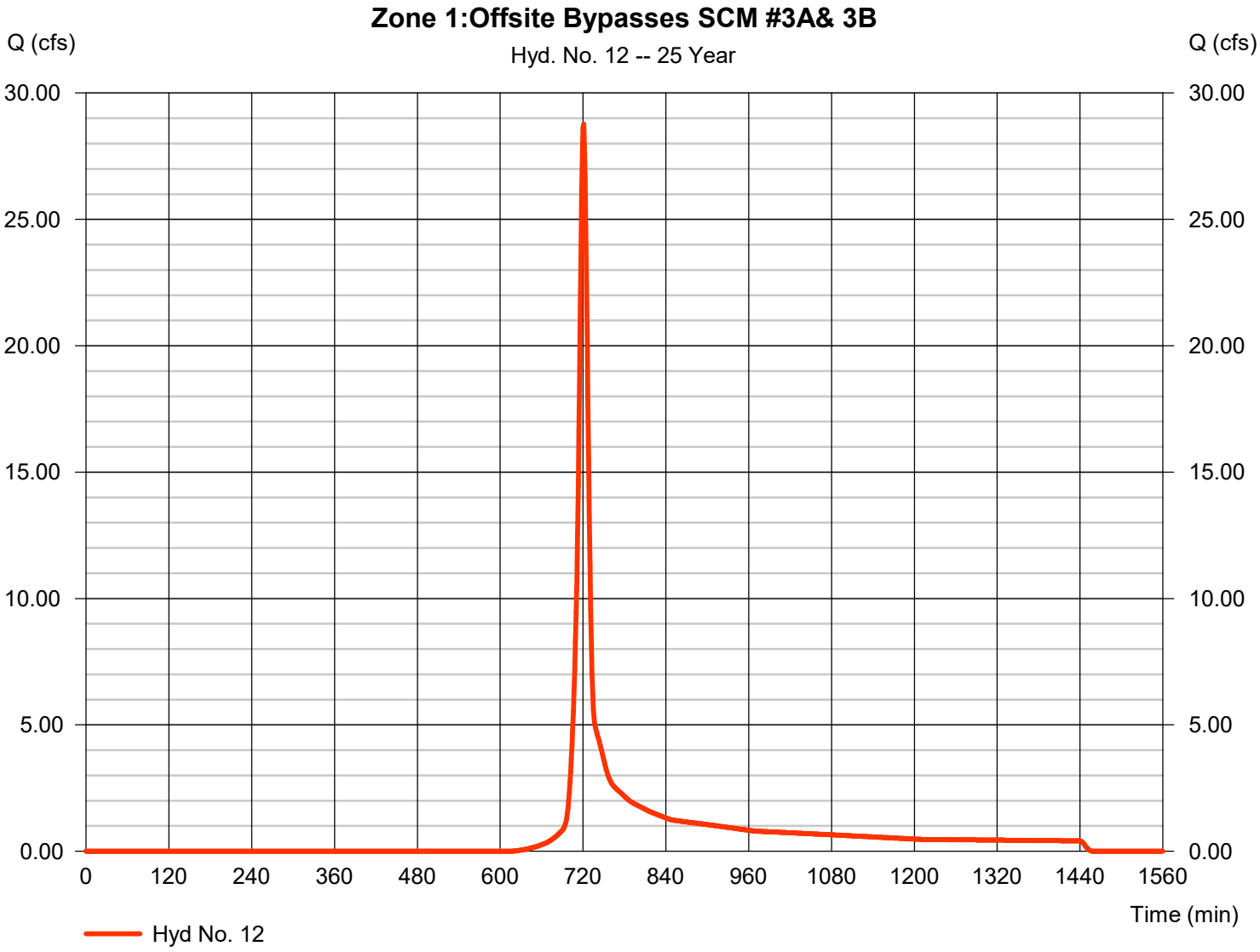


Hydrograph Report

Hyd. No. 12

Zone 1:Offsite Bypasses SCM #3A& 3B

Hydrograph type	= SCS Runoff	Peak discharge	= 28.76 cfs
Storm frequency	= 25 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 70,272 cuft
Drainage area	= 8.510 ac	Curve number	= 64
Basin Slope	= 2.9 %	Hydraulic length	= 1370 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 5.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

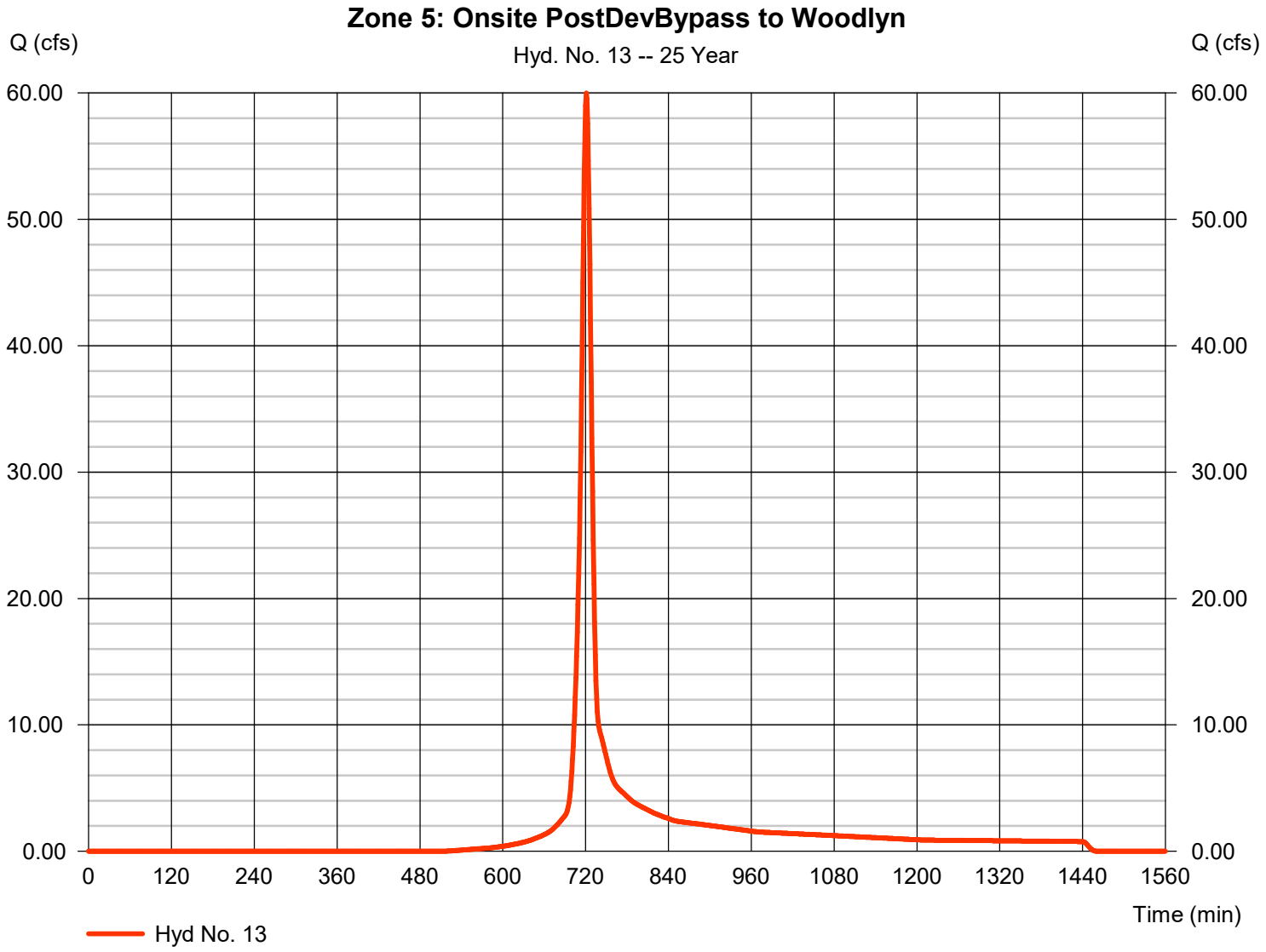


Hydrograph Report

Hyd. No. 13

Zone 5: Onsite PostDevBypass to Woodlyn

Hydrograph type	=	SCS Runoff	Peak discharge	=	59.98 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	151,489 cuft
Drainage area	=	14.320 ac	Curve number	=	72
Basin Slope	=	1.5 %	Hydraulic length	=	1788 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.58 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

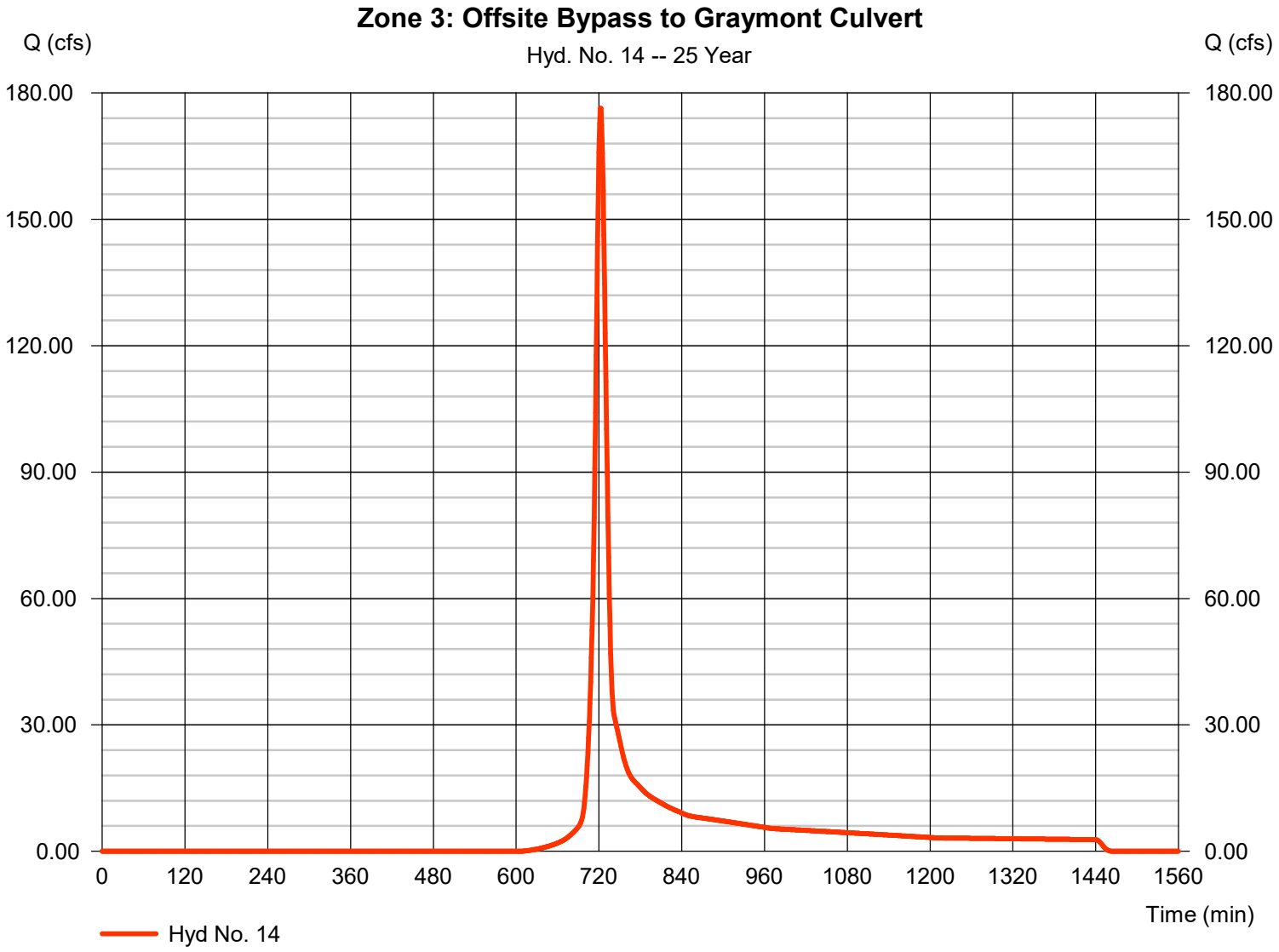


Hydrograph Report

Hyd. No. 14

Zone 3: Offsite Bypass to Graymont Culvert

Hydrograph type	=	SCS Runoff	Peak discharge	=	176.35 cfs
Storm frequency	=	25 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	481,514 cuft
Drainage area	=	57.120 ac	Curve number	=	65
Basin Slope	=	1.8 %	Hydraulic length	=	1220 ft
Tc method	=	User	Time of conc. (Tc)	=	14.00 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



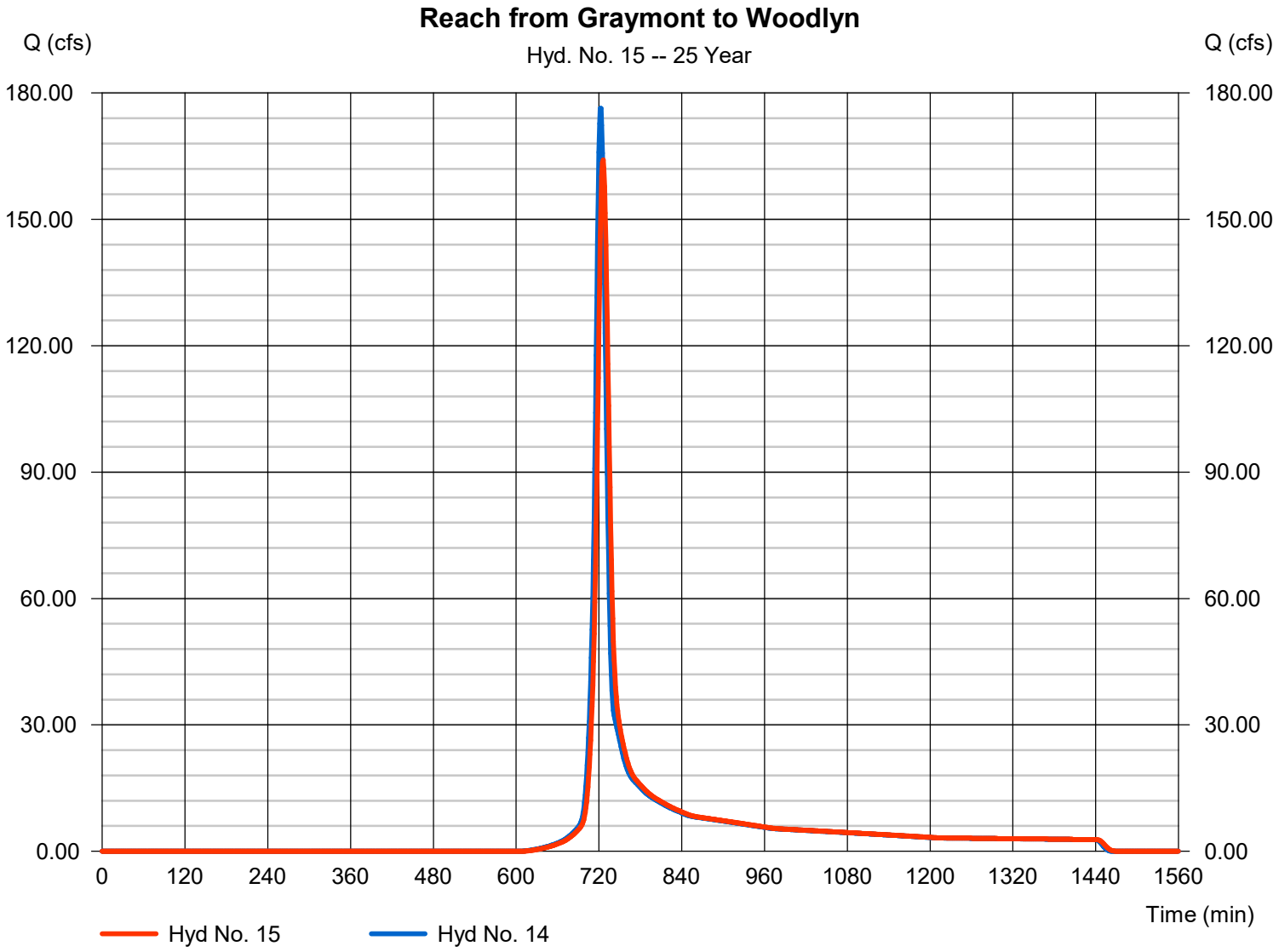
Hydrograph Report

Hyd. No. 15

Reach from Graymont to Woodlyn

Hydrograph type	=	Reach	Peak discharge	=	164.11 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	481,512 cuft
Inflow hyd. No.	=	14 - Zone 3: Offsite Bypass to Graymont Culvert	Section type	=	Trapezoidal
Reach length	=	1750.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	2.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.009	Rating curve m	=	1.370
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2727

Modified Att-Kin routing method used.

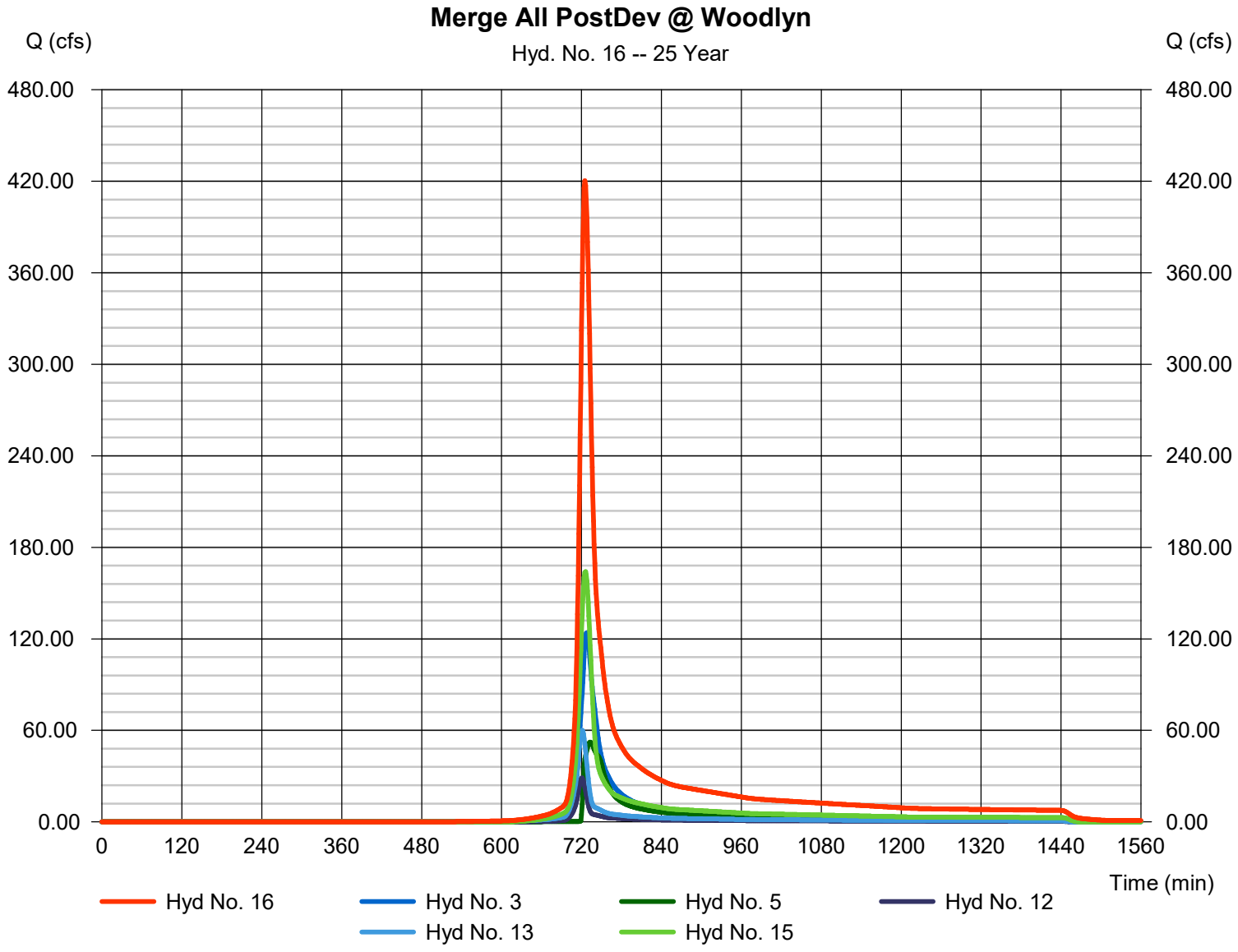


Hydrograph Report

Hyd. No. 16

Merge All PostDev @ Woodlyn

Hydrograph type	= Combine	Peak discharge	= 420.46 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,397,760 cuft
Inflow hyds.	= 3, 5, 12, 13, 15	Contrib. drain. area	= 22.830 ac

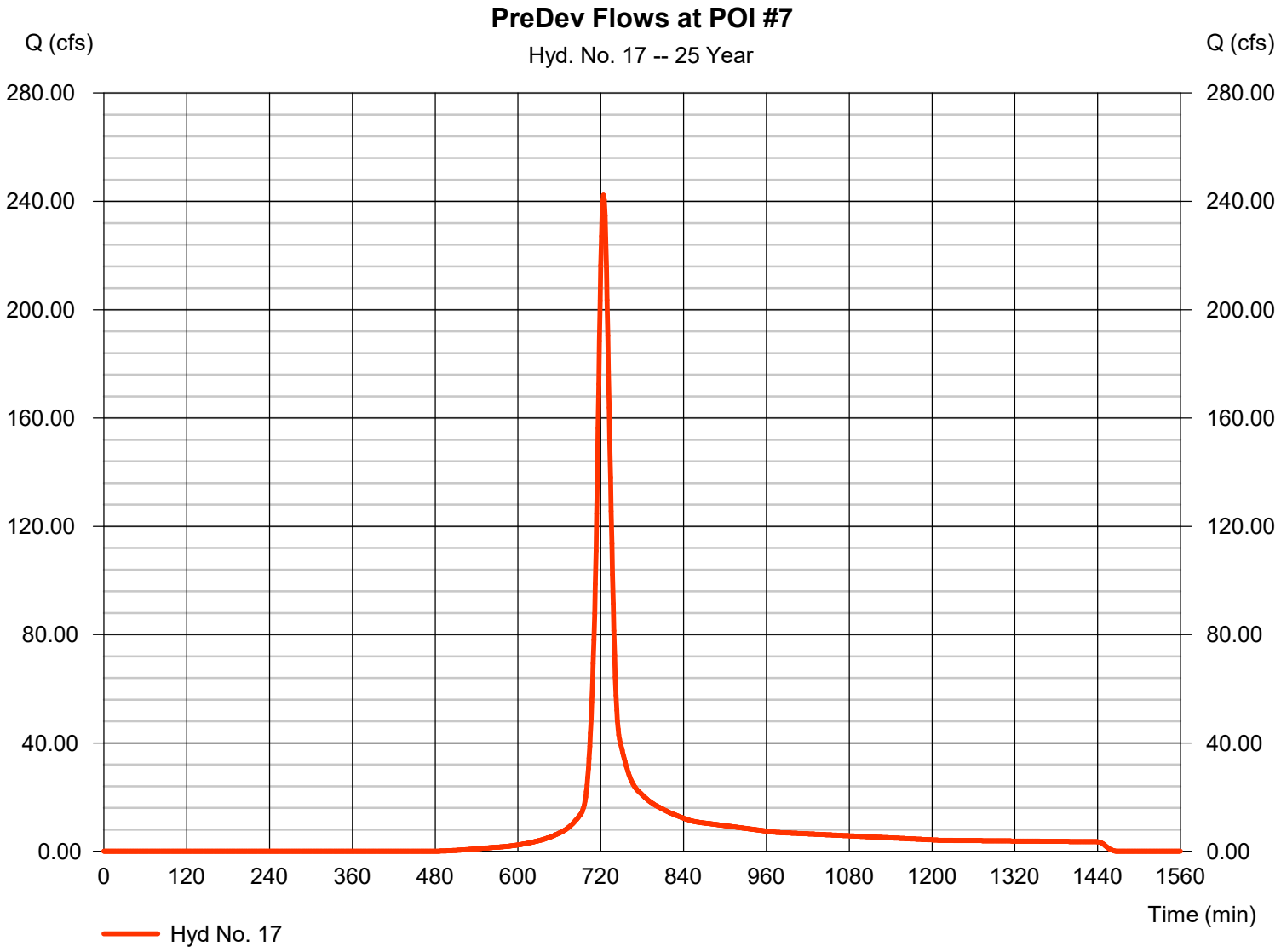


Hydrograph Report

Hyd. No. 17

PreDev Flows at POI #7

Hydrograph type	=	SCS Runoff	Peak discharge	=	242.31 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	717,420 cuft
Drainage area	=	62.670 ac	Curve number	=	74.4
Basin Slope	=	1.3 %	Hydraulic length	=	2500 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.43 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

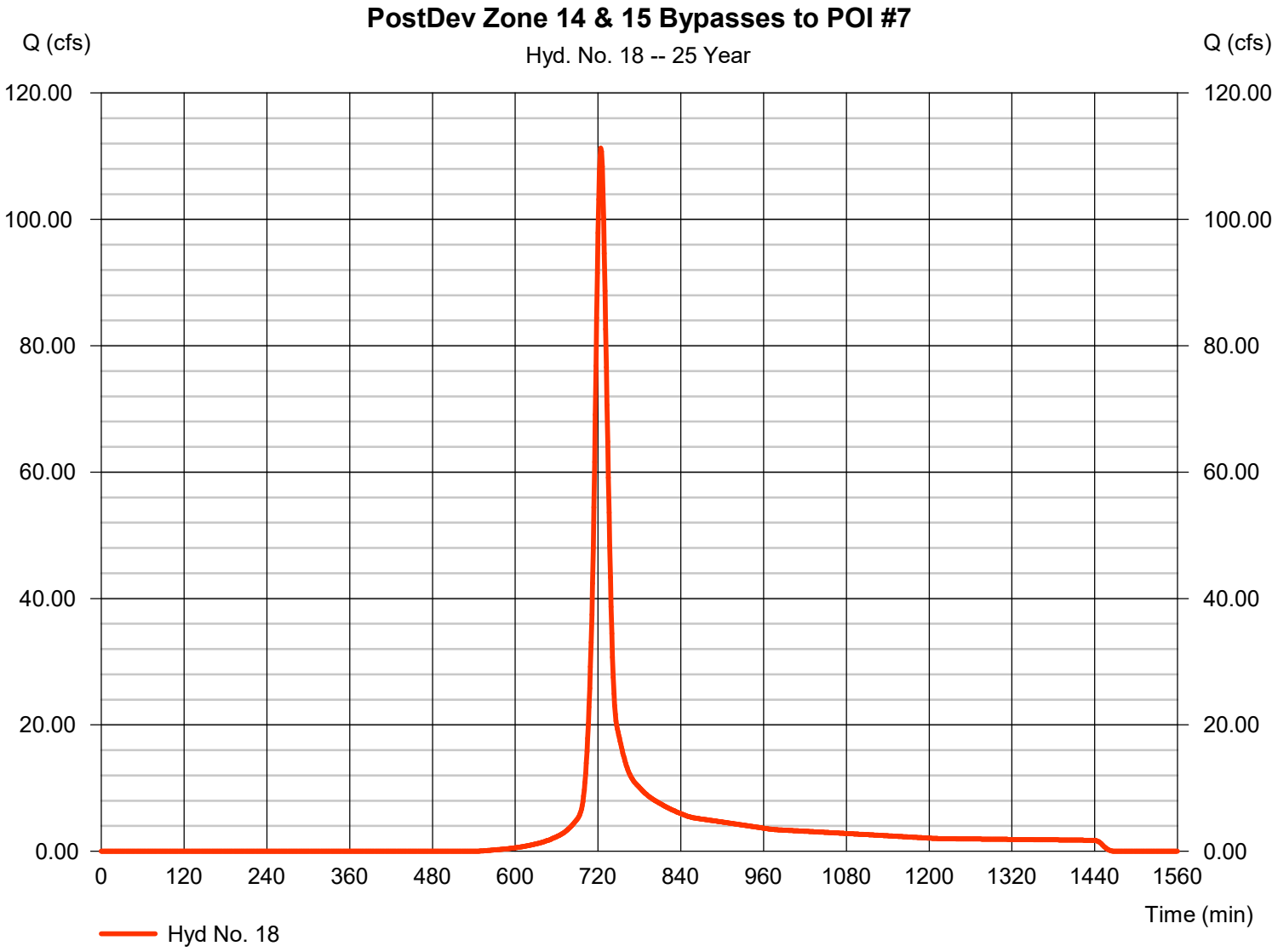


Hydrograph Report

Hyd. No. 18

PostDev Zone 14 & 15 Bypasses to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 111.26 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 330,850 cuft
Drainage area	= 33.240 ac	Curve number	= 70
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.27 min
Total precip.	= 5.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

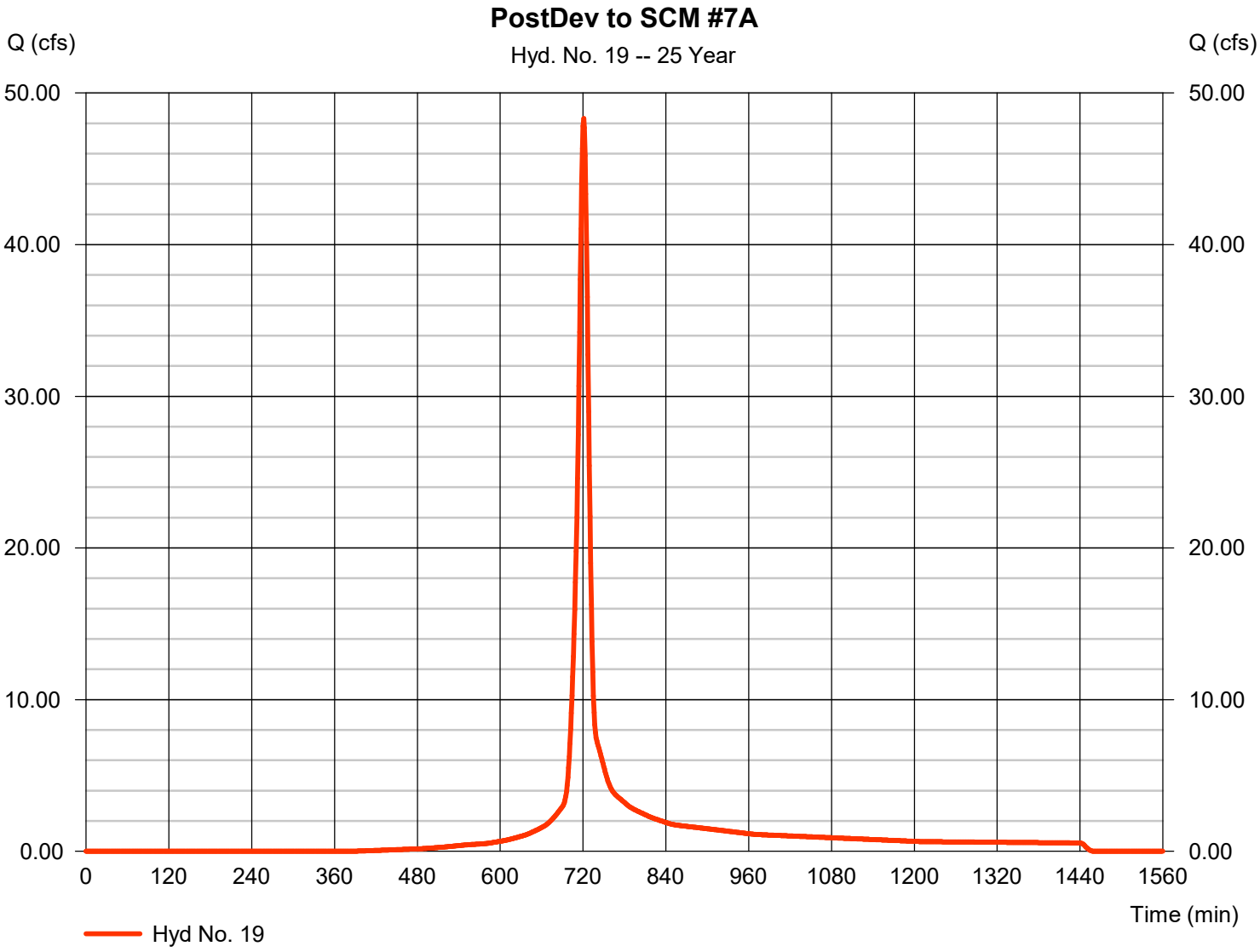


Hydrograph Report

Hyd. No. 19

PostDev to SCM #7A

Hydrograph type	=	SCS Runoff	Peak discharge	=	48.32 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	123,250 cuft
Drainage area	=	9.260 ac	Curve number	=	79.8
Basin Slope	=	1.1 %	Hydraulic length	=	1505 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.38 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

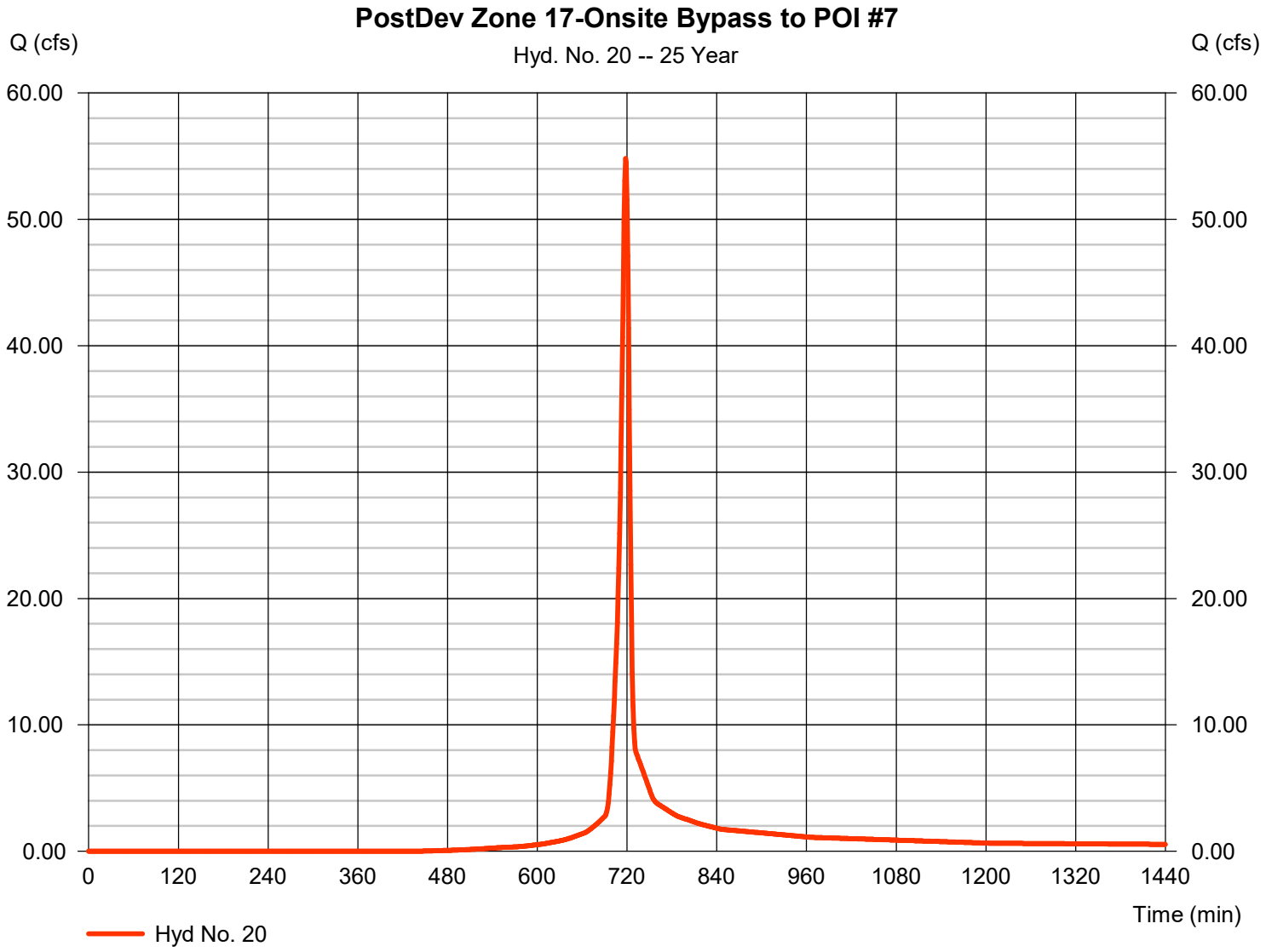


Hydrograph Report

Hyd. No. 20

PostDev Zone 17-Onsite Bypass to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 54.81 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 116,786 cuft
Drainage area	= 9.720 ac	Curve number	= 76.5
Basin Slope	= 1.0 %	Hydraulic length	= 810 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 7.97 min
Total precip.	= 5.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



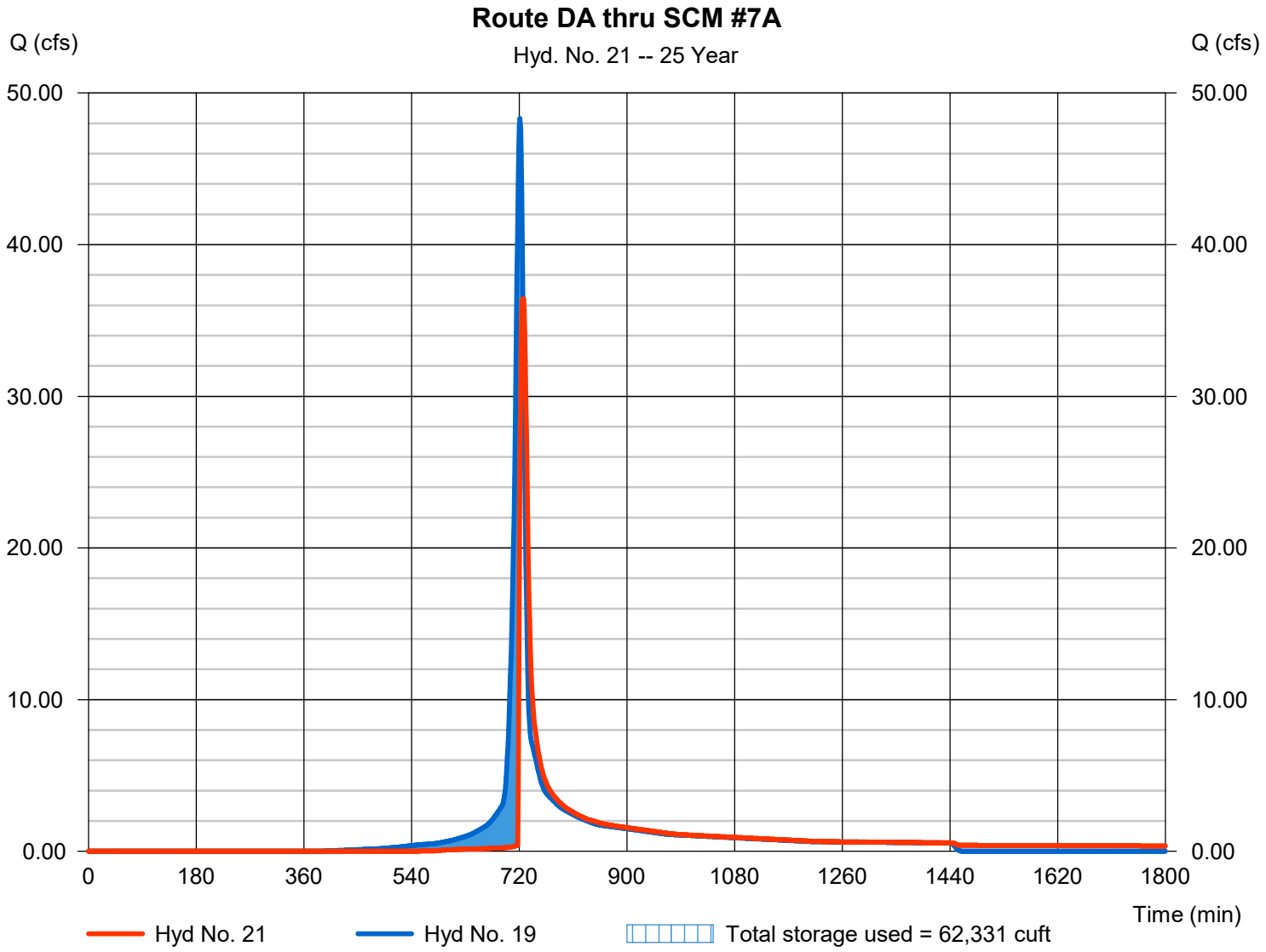
Hydrograph Report

Hyd. No. 21

Route DA thru SCM #7A

Hydrograph type	= Reservoir	Peak discharge	= 36.45 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 116,607 cuft
Inflow hyd. No.	= 19 - PostDev to SCM #7A	Max. Elevation	= 374.22 ft
Reservoir name	= SCM #7A	Max. Storage	= 62,331 cuft

Storage Indication method used. Wet pond routing start elevation = 370.50 ft.

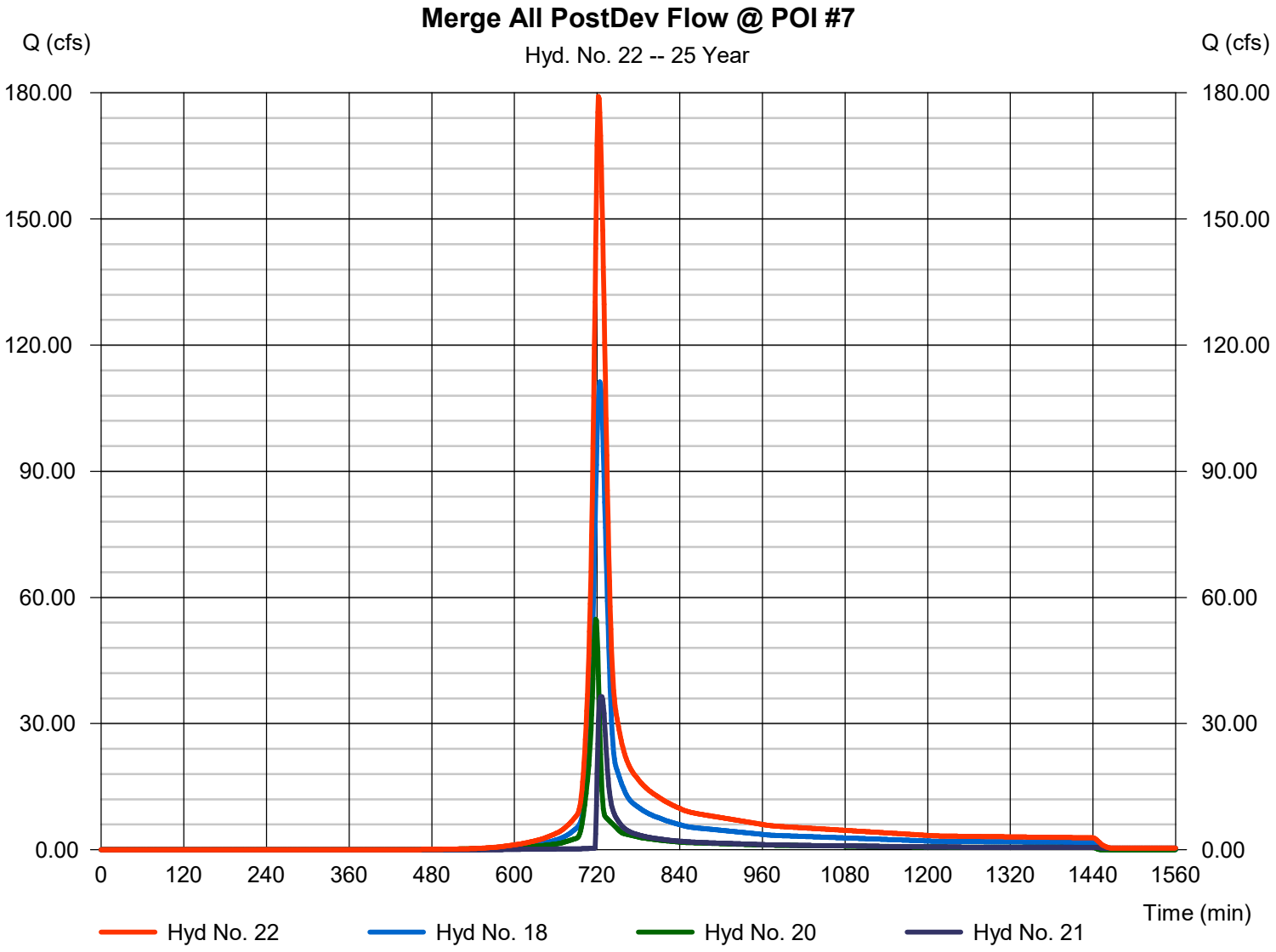


Hydrograph Report

Hyd. No. 22

Merge All PostDev Flow @ POI #7

Hydrograph type	= Combine	Peak discharge	= 179.13 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 564,243 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 42.960 ac

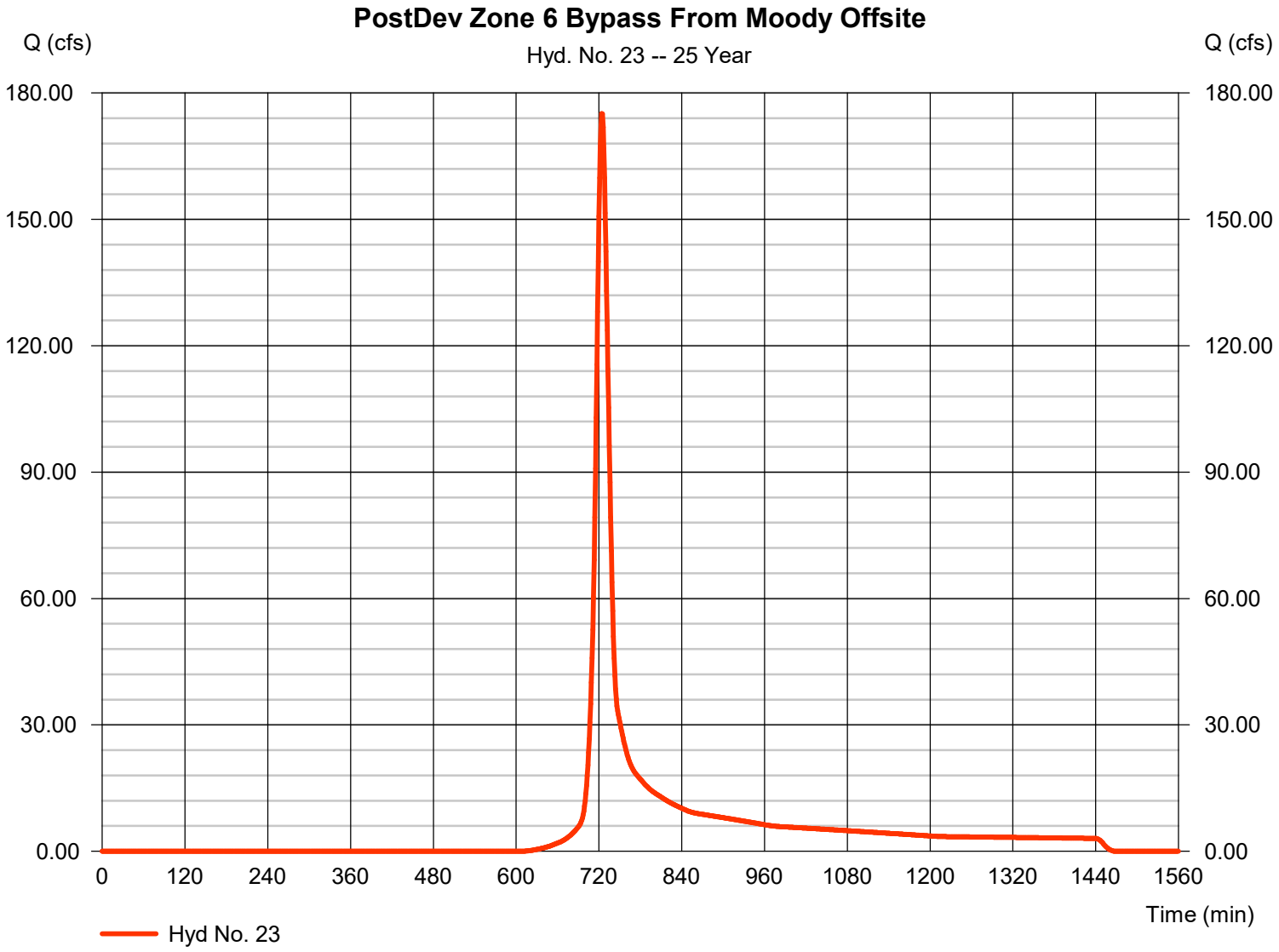


Hydrograph Report

Hyd. No. 23

PostDev Zone 6 Bypass From Moody Offsite

Hydrograph type	=	SCS Runoff	Peak discharge	=	175.09 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	529,599 cuft
Drainage area	=	64.030 ac	Curve number	=	64.8
Basin Slope	=	1.8 %	Hydraulic length	=	2940 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.01 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

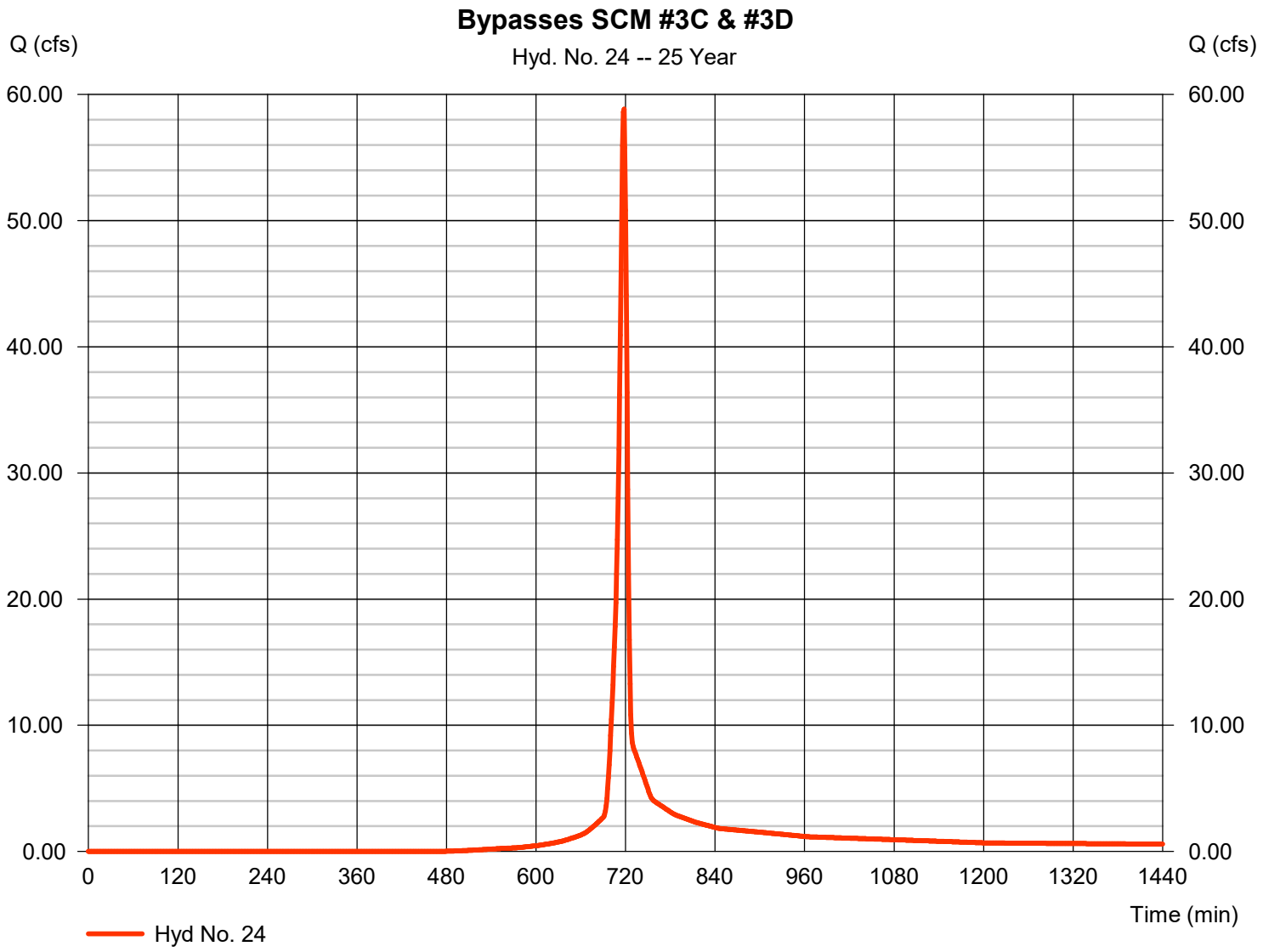


Hydrograph Report

Hyd. No. 24

Bypasses SCM #3C & #3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	58.85 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	119,533 cuft
Drainage area	=	9.980 ac	Curve number	=	74.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



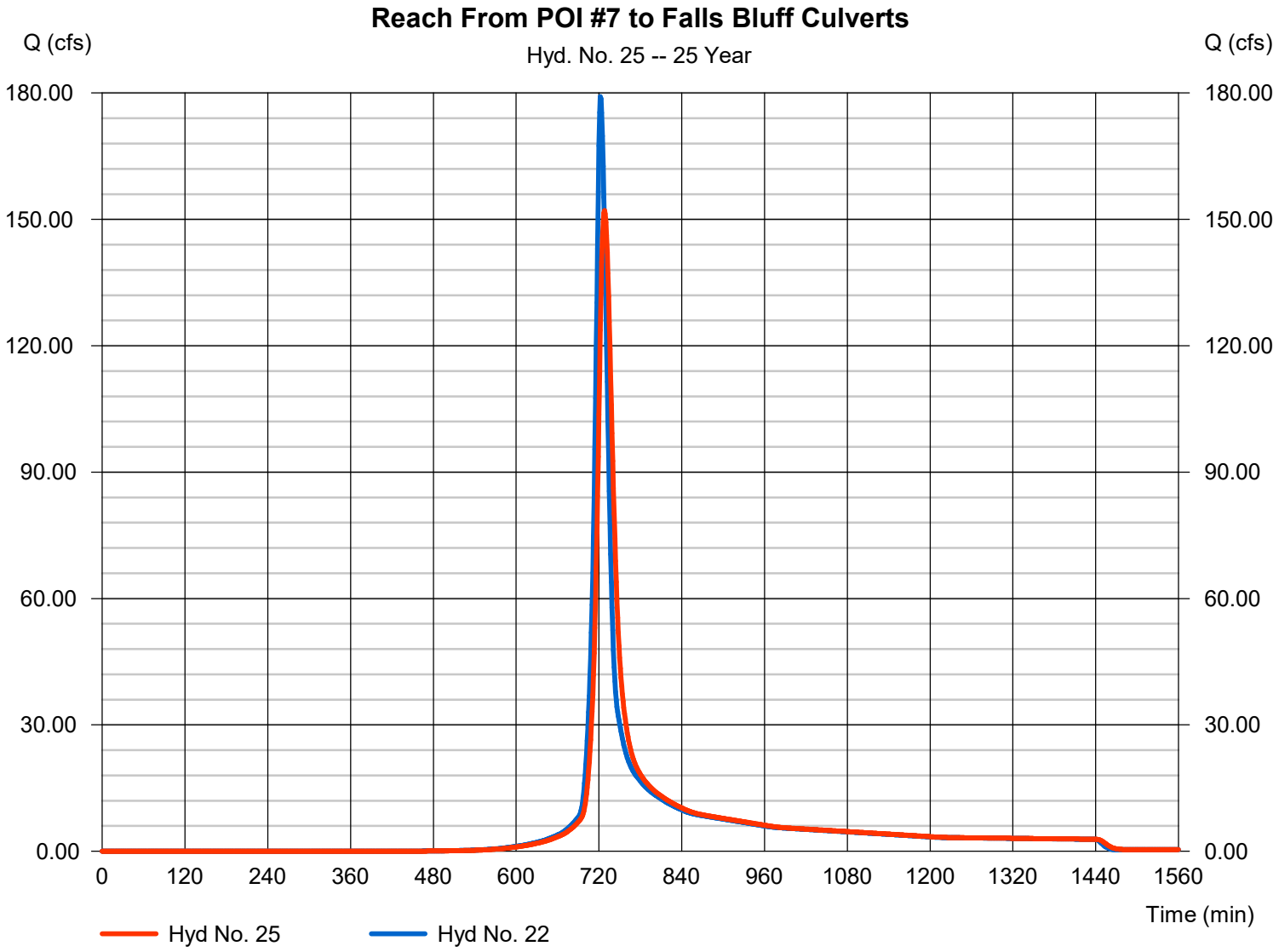
Hydrograph Report

Hyd. No. 25

Reach From POI #7 to Falls Bluff Culverts

Hydrograph type	=	Reach	Peak discharge	=	152.09 cfs
Storm frequency	=	25 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	564,175 cuft
Inflow hyd. No.	=	22 - Merge All PostDev Flow @ POI #7	Section type	=	Trapezoidal
Reach length	=	1845.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	4.0 ft
Side slope	=	30.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.289	Rating curve m	=	1.183
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1593

Modified Att-Kin routing method used.

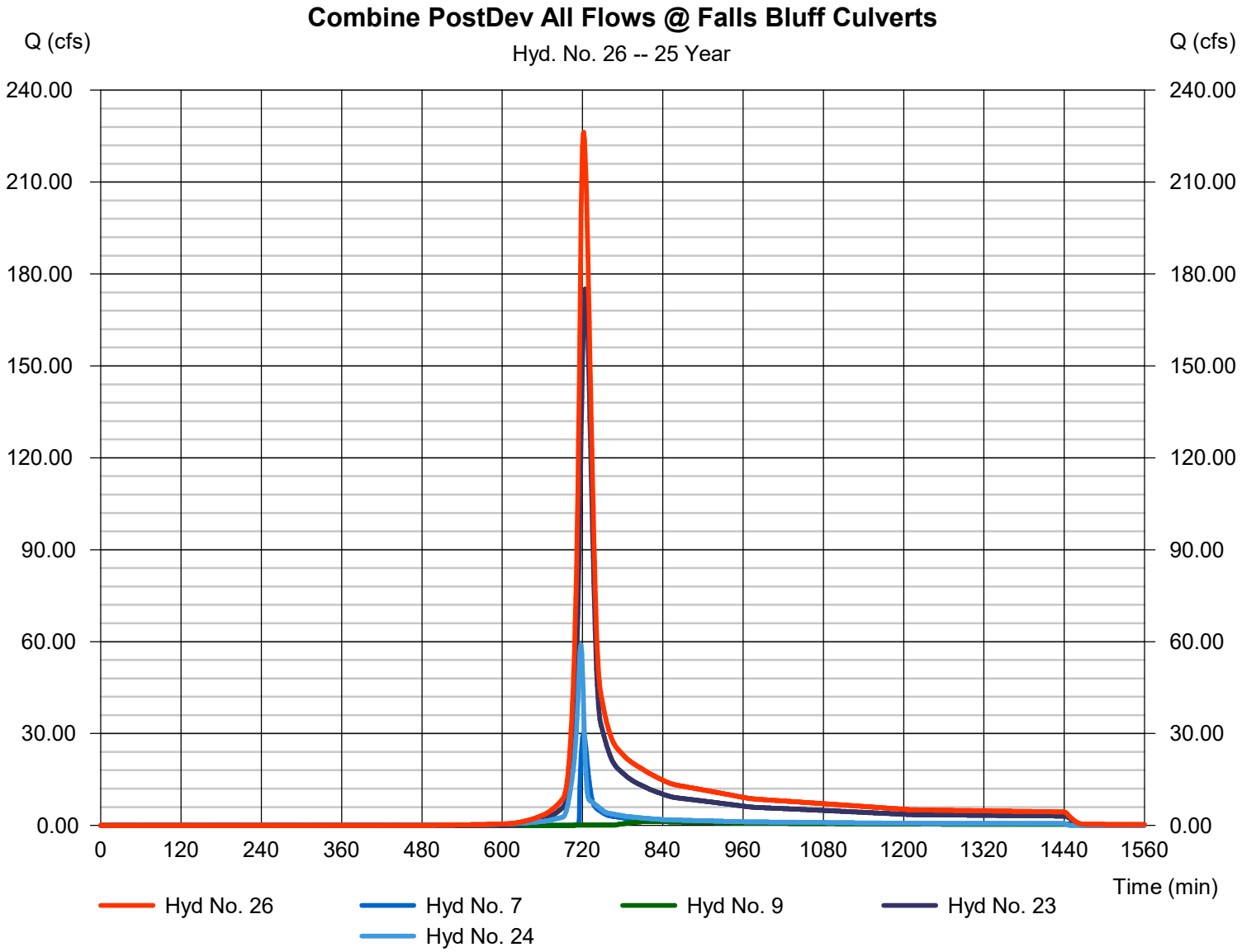


Hydrograph Report

Hyd. No. 26

Combine PostDev All Flows @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 226.23 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 753,399 cuft
Inflow hyds.	= 7, 9, 23, 24	Contrib. drain. area	= 74.010 ac

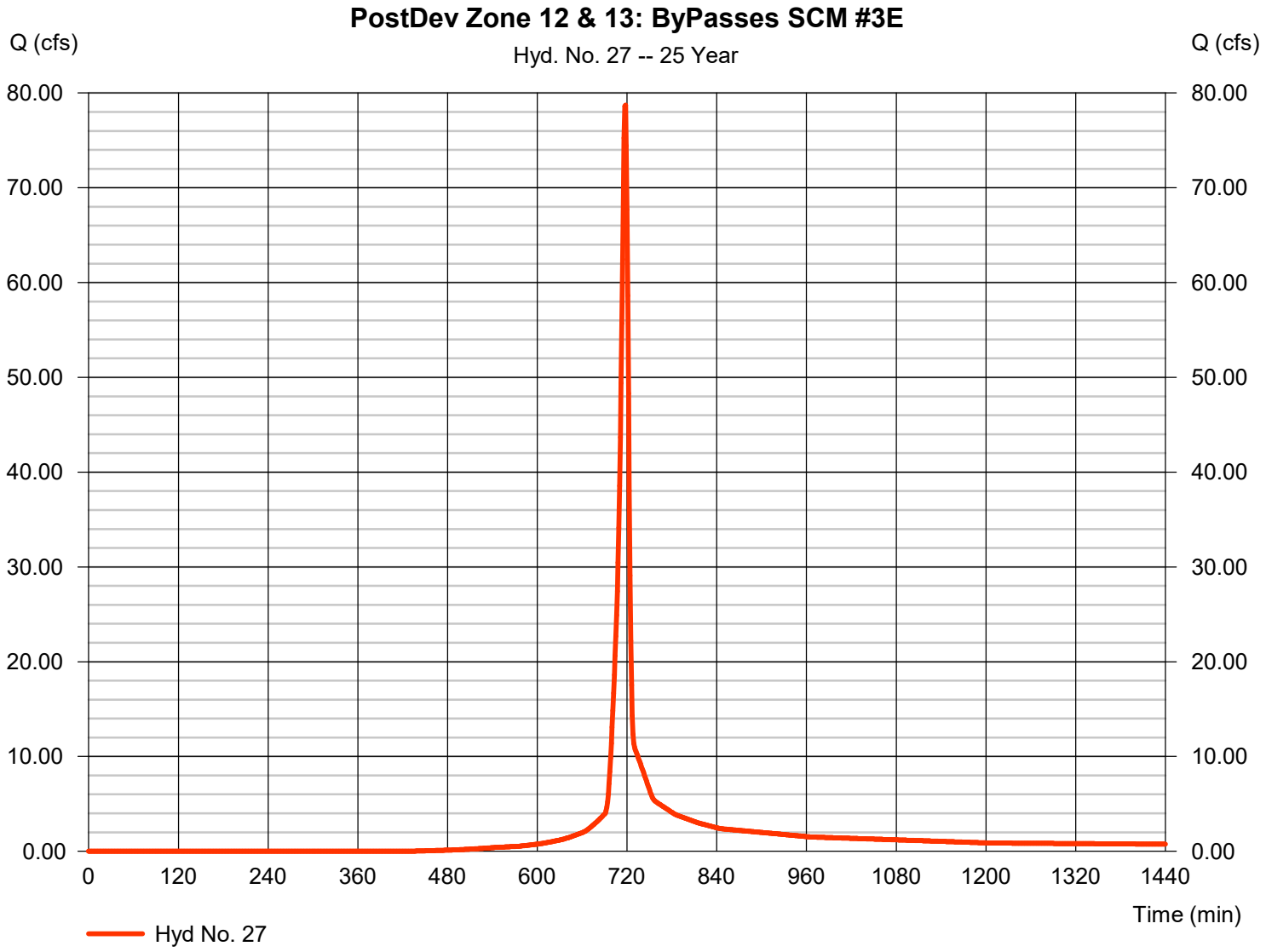


Hydrograph Report

Hyd. No. 27

PostDev Zone 12 & 13: ByPasses SCM #3E

Hydrograph type	=	SCS Runoff	Peak discharge	=	78.71 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	161,163 cuft
Drainage area	=	12.500 ac	Curve number	=	77
Basin Slope	=	5.7 %	Hydraulic length	=	1080 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.08 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

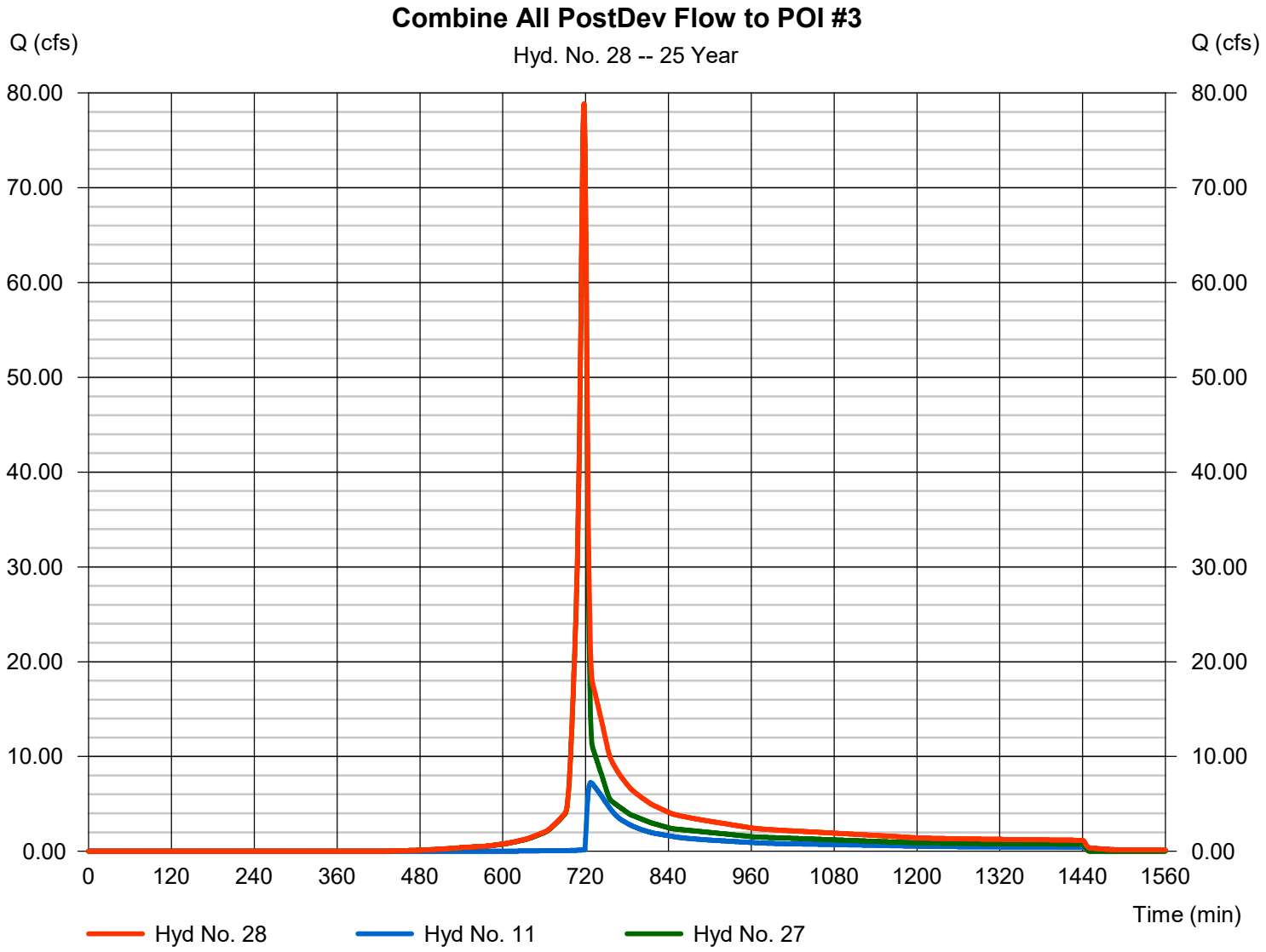


Hydrograph Report

Hyd. No. 28

Combine All PostDev Flow to POI #3

Hydrograph type	= Combine	Peak discharge	= 78.86 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 225,181 cuft
Inflow hyds.	= 11, 27	Contrib. drain. area	= 12.500 ac



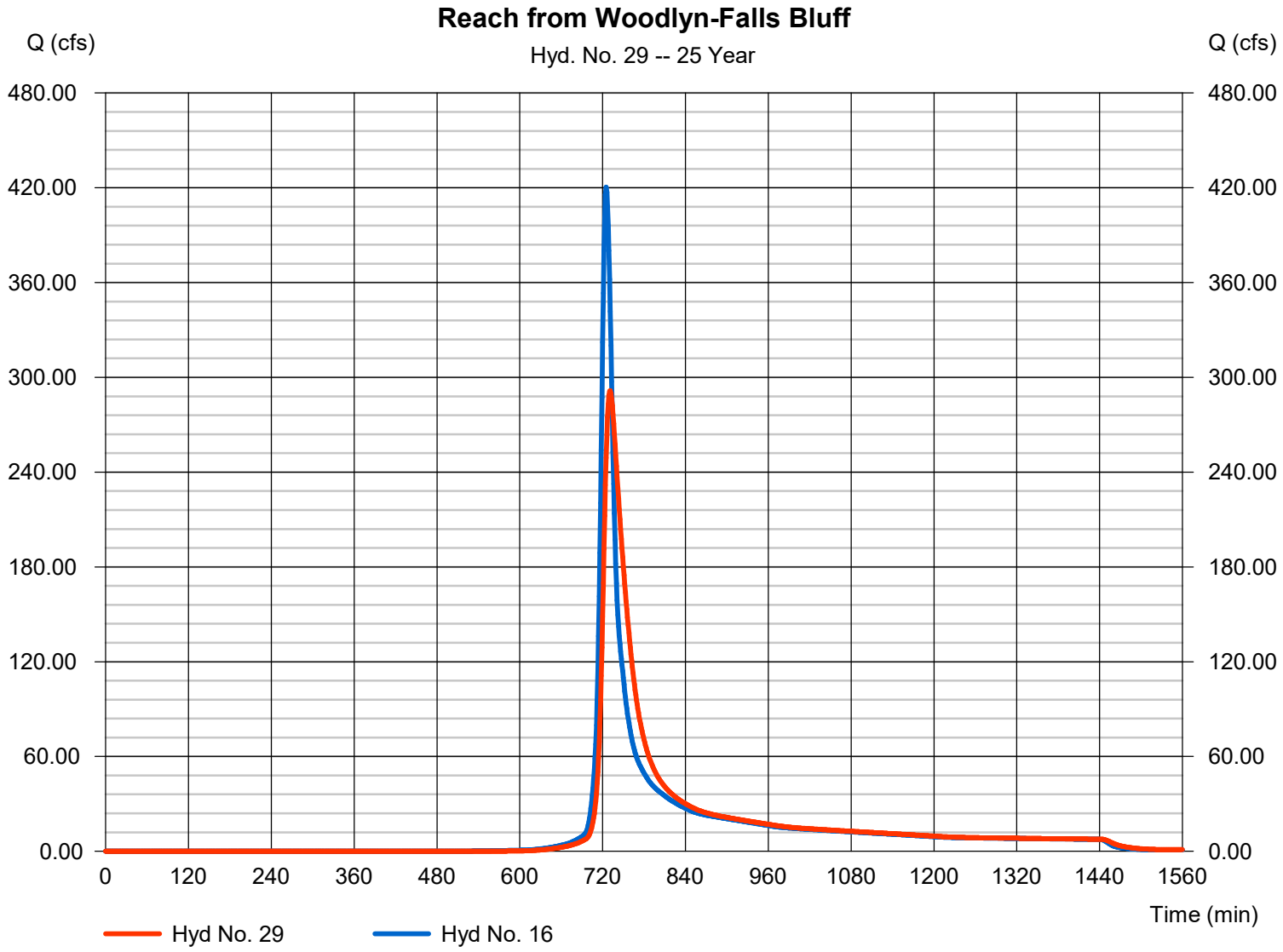
Hydrograph Report

Hyd. No. 29

Reach from Woodlyn-Falls Bluff

Hydrograph type	=	Reach	Peak discharge	=	291.48 cfs
Storm frequency	=	25 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	1,415,565 cuft
Inflow hyd. No.	=	16 - Merge All PostDev @ Woodlyn	Section type	=	Trapezoidal
Reach length	=	12152.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.009	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	6.0 ft
Rating curve x	=	5.011	Rating curve m	=	1.255
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0752

Modified Att-Kin routing method used.

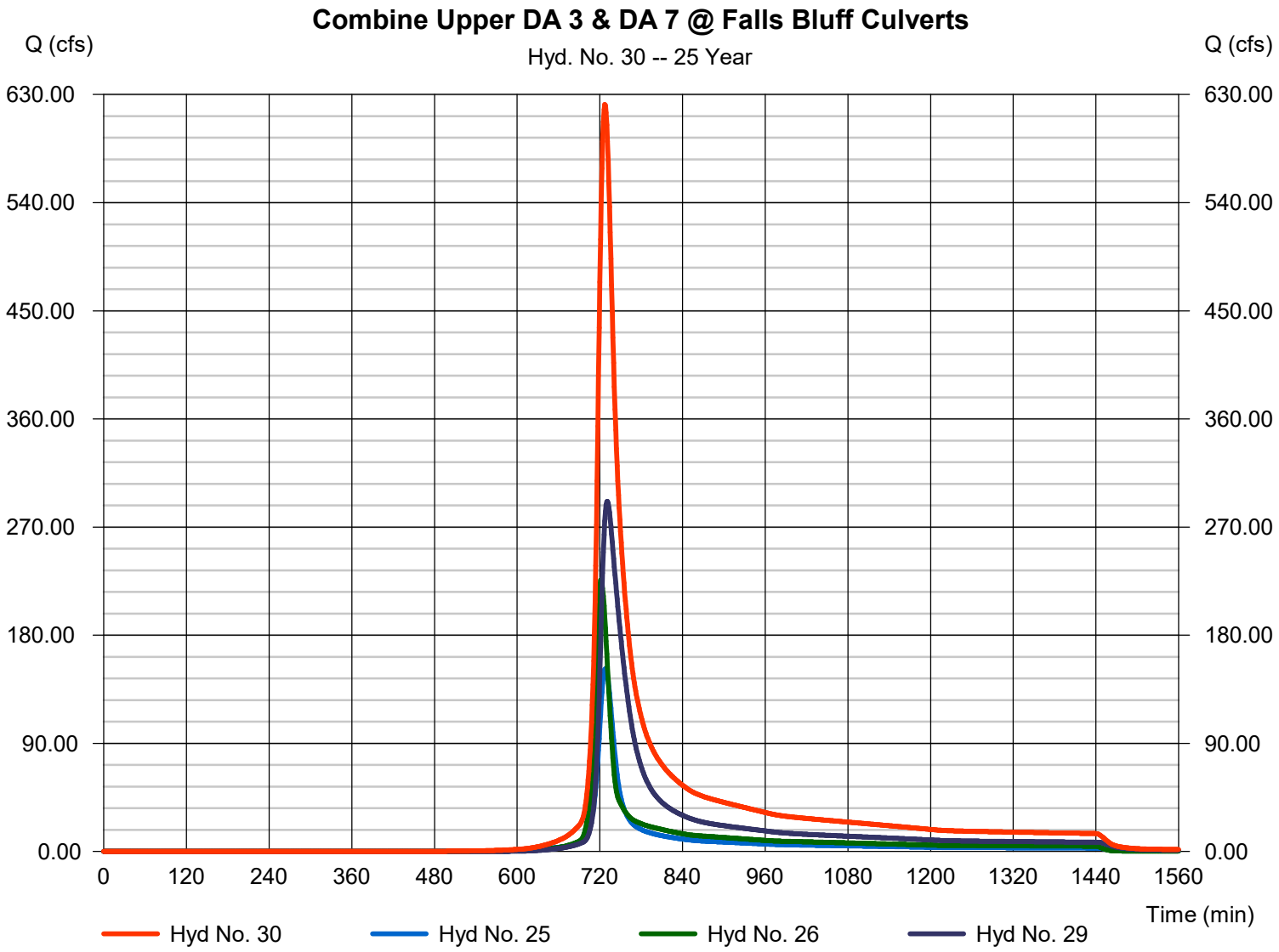


Hydrograph Report

Hyd. No. 30

Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 621.84 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,733,137 cuft
Inflow hyds.	= 25, 26, 29	Contrib. drain. area	= 0.000 ac



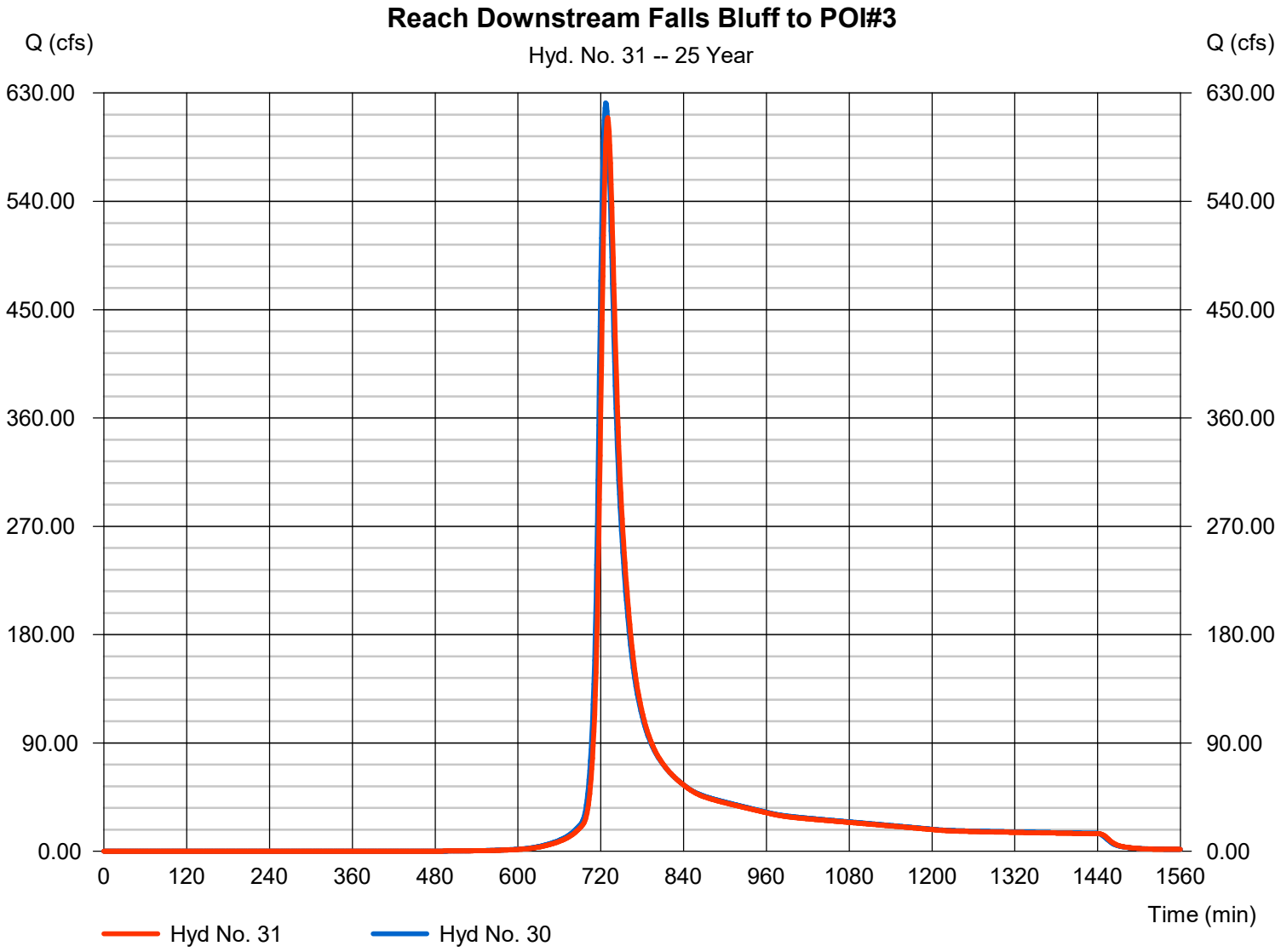
Hydrograph Report

Hyd. No. 31

Reach Downstream Falls Bluff to POI#3

Hydrograph type	=	Reach	Peak discharge	=	609.43 cfs
Storm frequency	=	25 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	2,670,614 cuft
Inflow hyd. No.	=	30 - Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts	Section type	=	Trapezoidal
Reach length	=	1200.0 ft	Channel slope	=	5.0 %
Manning's n	=	0.030	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	8.0 ft
Rating curve x	=	3.361	Rating curve m	=	1.269
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.4862

Modified Att-Kin routing method used.

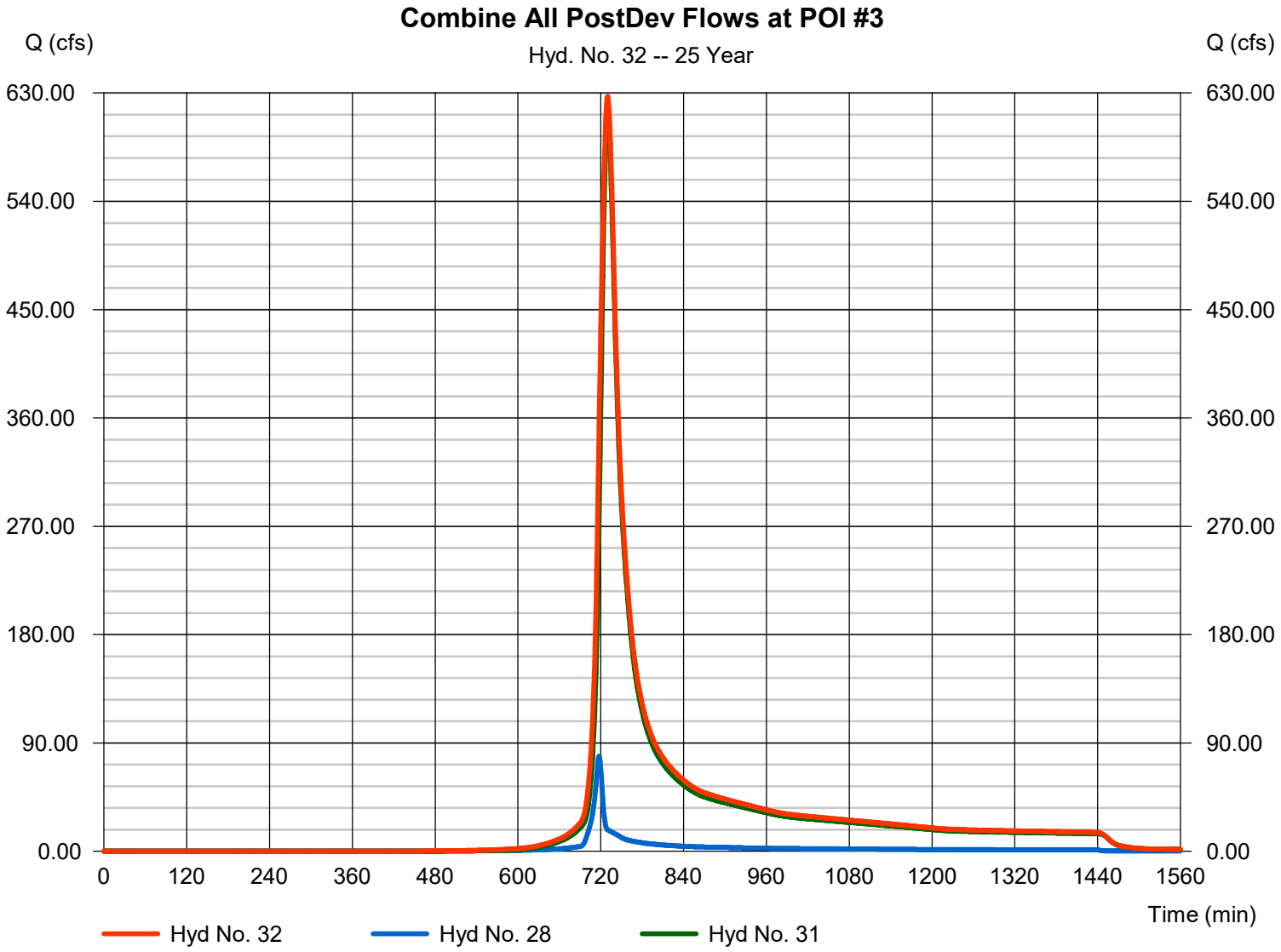


Hydrograph Report

Hyd. No. 32

Combine All PostDev Flows at POI #3

Hydrograph type	= Combine	Peak discharge	= 627.14 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 2,895,799 cuft
Inflow hyds.	= 28, 31	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

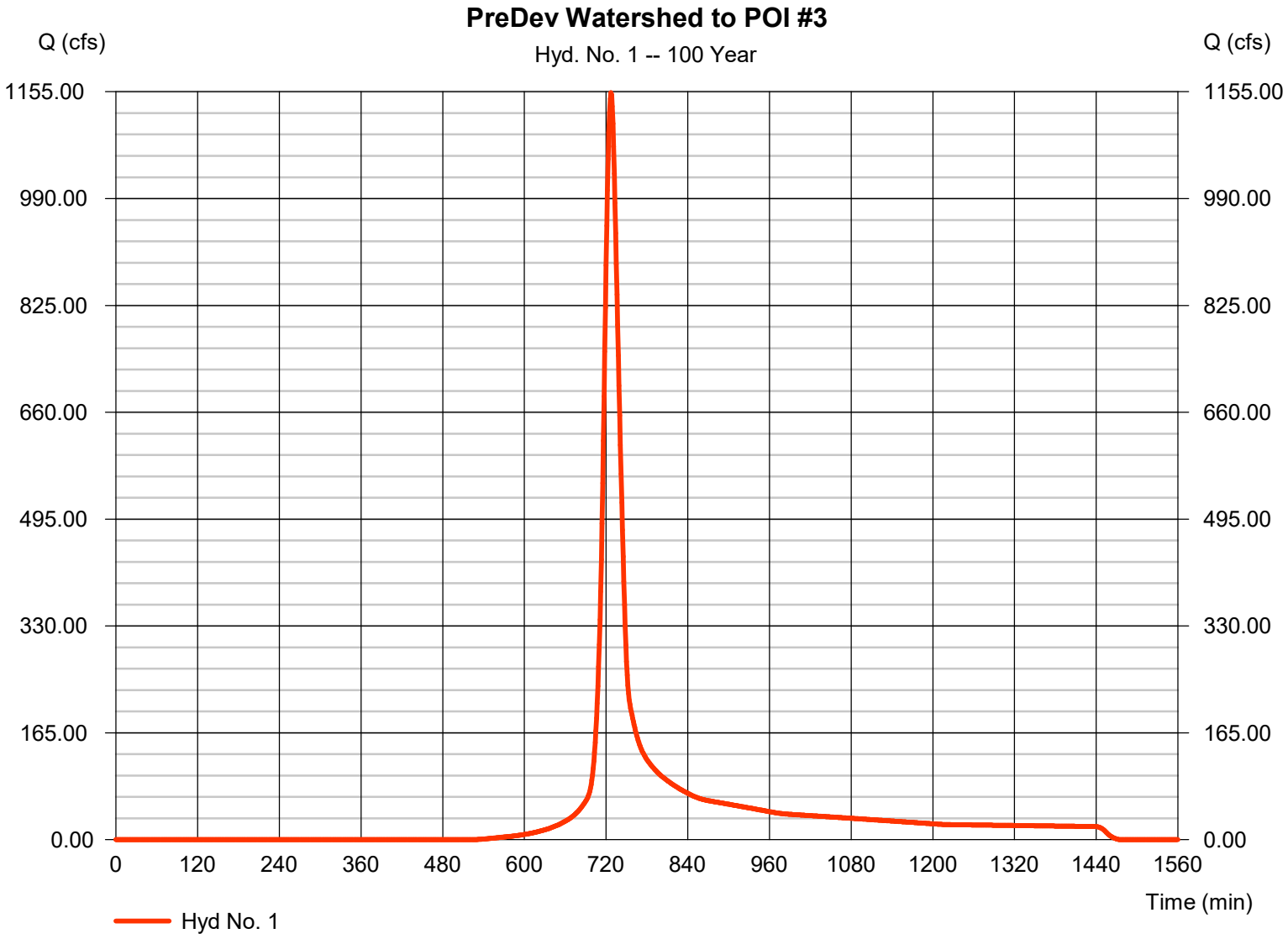
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1153.66	1	727	3,933,927	------	------	------	PreDev Watershed to POI #3
2	SCS Runoff	228.13	1	722	632,429	------	------	------	Phase 3: PostDev to SCM #3B
3	Reservoir	186.36	1	726	602,583	2	354.99	248,067	Route DA#3B To SCM #3B
4	SCS Runoff	165.03	1	722	451,183	------	------	------	Zone 4: PostDev to SCM #3A
5	Reservoir	102.71	1	730	404,855	4	355.24	308,852	DA #3A Routed SCM #3A
6	SCS Runoff	56.77	1	721	145,226	------	------	------	PostDev to SCM #3C
7	Reservoir	42.88	1	722	117,645	6	342.88	64,223	Route DA3C thru SCM#3C
8	SCS Runoff	48.44	1	717	100,475	------	------	------	PostDev Inflow to SCM#3D
9	Reservoir	6.245	1	733	63,472	8	348.45	76,495	Route DA to SCM #3D
10	SCS Runoff	57.95	1	717	120,281	------	------	------	PostDev Inflow to SCM #3E
11	Reservoir	26.94	1	723	98,138	10	310.13	81,978	Route Infllow SCM #3E
12	SCS Runoff	43.54	1	720	105,508	------	------	------	Zone 1:Offsite Bypasses SCM #3A&
13	SCS Runoff	85.35	1	721	216,138	------	------	------	Zone 5: Onsite PostDevBypass to Wo
14	SCS Runoff	266.39	1	722	717,899	------	------	------	Zone 3: Offsite Bypass to Graymont
15	Reach	251.07	1	725	717,898	14	------	------	Reach from Graymont to Woodlyn
16	Combine	638.51	1	725	2,024,665	3, 5, 12, 13, 15	------	------	Merge All PostDev @ Woodlyn
17	SCS Runoff	340.14	1	724	1,009,891	------	------	------	PreDev Flows at POI #7
18	SCS Runoff	161.32	1	724	477,636	------	------	------	PostDev Zone 14 & 15 Bypasses to P
19	SCS Runoff	65.36	1	721	168,684	------	------	------	PostDev to SCM #7A
20	SCS Runoff	75.42	1	718	162,555	------	------	------	PostDev Zone 17-Onsite Bypass to P
21	Reservoir	40.19	1	728	162,004	19	374.98	73,494	Route DA thru SCM #7A
22	Combine	253.99	1	721	802,196	18, 20, 21	------	------	Merge All PostDev Flow @ POI #7
23	SCS Runoff	265.75	1	724	790,683	------	------	------	PostDev Zone 6 Bypass From Moody
24	SCS Runoff	81.67	1	717	168,171	------	------	------	Bypasses SCM #3C & #3D
25	Reach	219.77	1	727	802,130	22	------	------	Reach From POI #7 to Falls Bluff Cul
26	Combine	343.15	1	722	1,127,525	7, 9, 23, 24,	------	------	Combine PostDev All Flows @ Falls
27	SCS Runoff	107.80	1	717	223,737	------	------	------	PostDev Zone 12 & 13: ByPasses SC
28	Combine	119.23	1	718	321,269	11, 27	------	------	Combine All PostDev Flow to POI #3
29	Reach	466.40	1	729	2,050,065	16	------	------	Reach from Woodlyn-Falls Bluff
30	Combine	977.57	1	727	3,979,723	25, 26, 29	------	------	Combine Upper DA 3 & DA 7 @ Falls
31	Reach	947.83	1	729	3,884,594	30	------	------	Reach Downstream Falls Bluff to POI
32	Combine	983.05	1	729	4,205,861	28, 31	------	------	Combine All PostDev Flows at POI #3

Hydrograph Report

Hyd. No. 1

PreDev Watershed to POI #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	1153.66 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	3,933,927 cuft
Drainage area	=	300.880 ac	Curve number	=	66.6
Basin Slope	=	3.0 %	Hydraulic length	=	5451 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	22.67 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

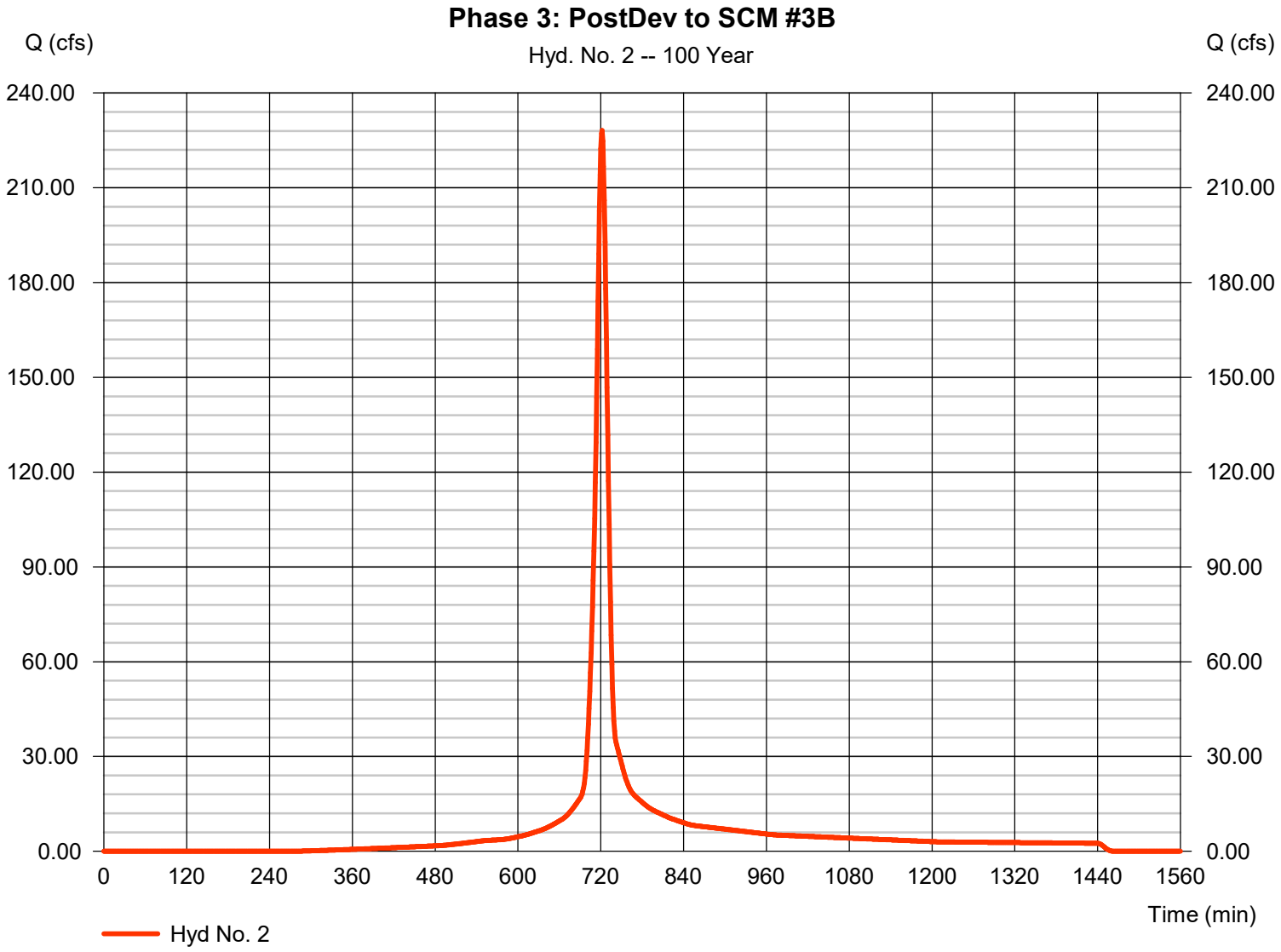


Hydrograph Report

Hyd. No. 2

Phase 3: PostDev to SCM #3B

Hydrograph type	= SCS Runoff	Peak discharge	= 228.13 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 632,429 cuft
Drainage area	= 31.890 ac	Curve number	= 83
Basin Slope	= 1.9 %	Hydraulic length	= 2520 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 14.80 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

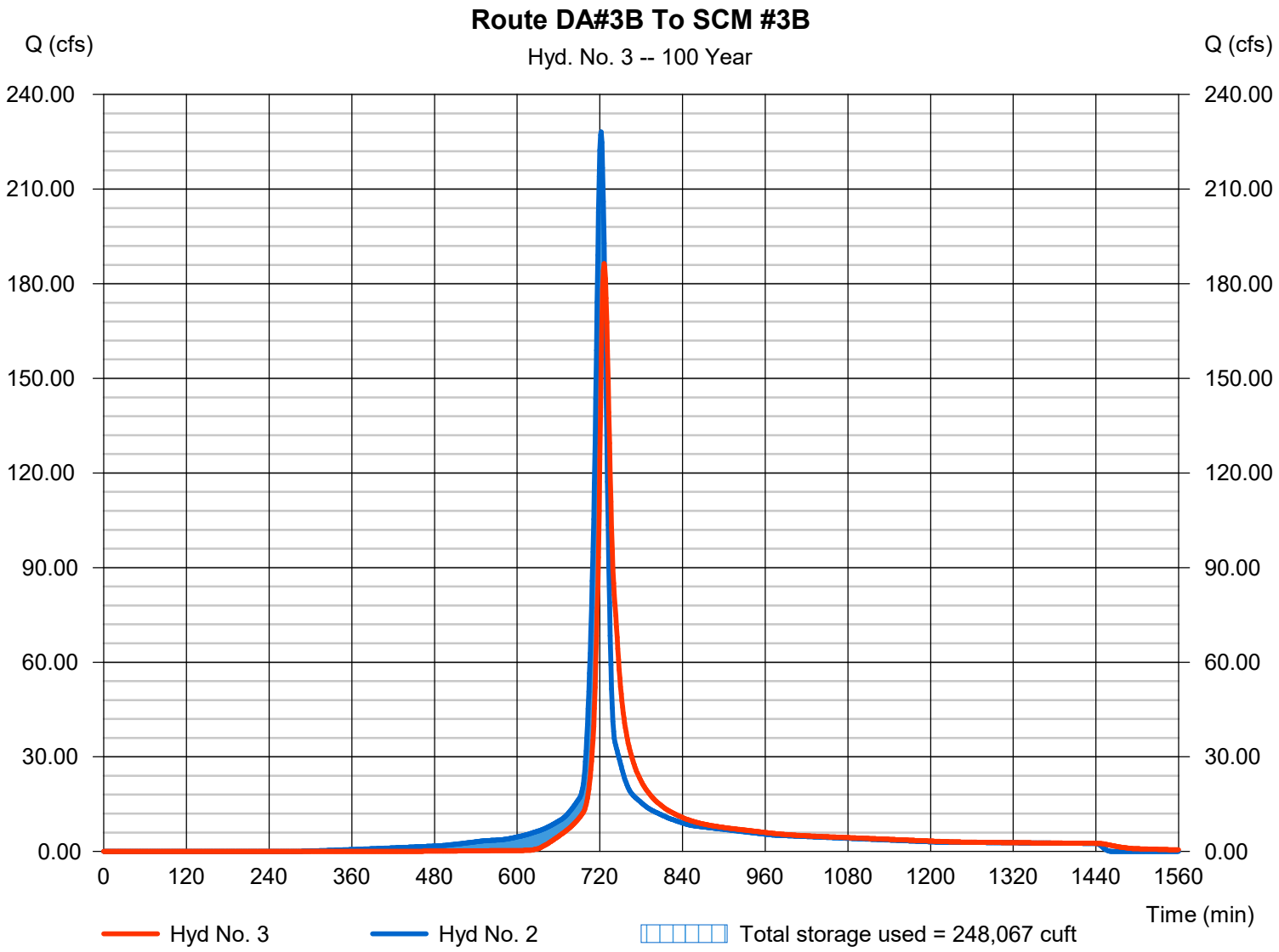
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Friday, 11 / 15 / 2024

Hyd. No. 3

Route DA#3B To SCM #3B

Hydrograph type	=	Reservoir	Peak discharge	=	186.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	602,583 cuft
Inflow hyd. No.	=	2 - Phase 3: PostDev to SCM #3B	Max. Elevation	=	354.99 ft
Reservoir name	=	SCM 3B-rev102924	Max. Storage	=	248,067 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

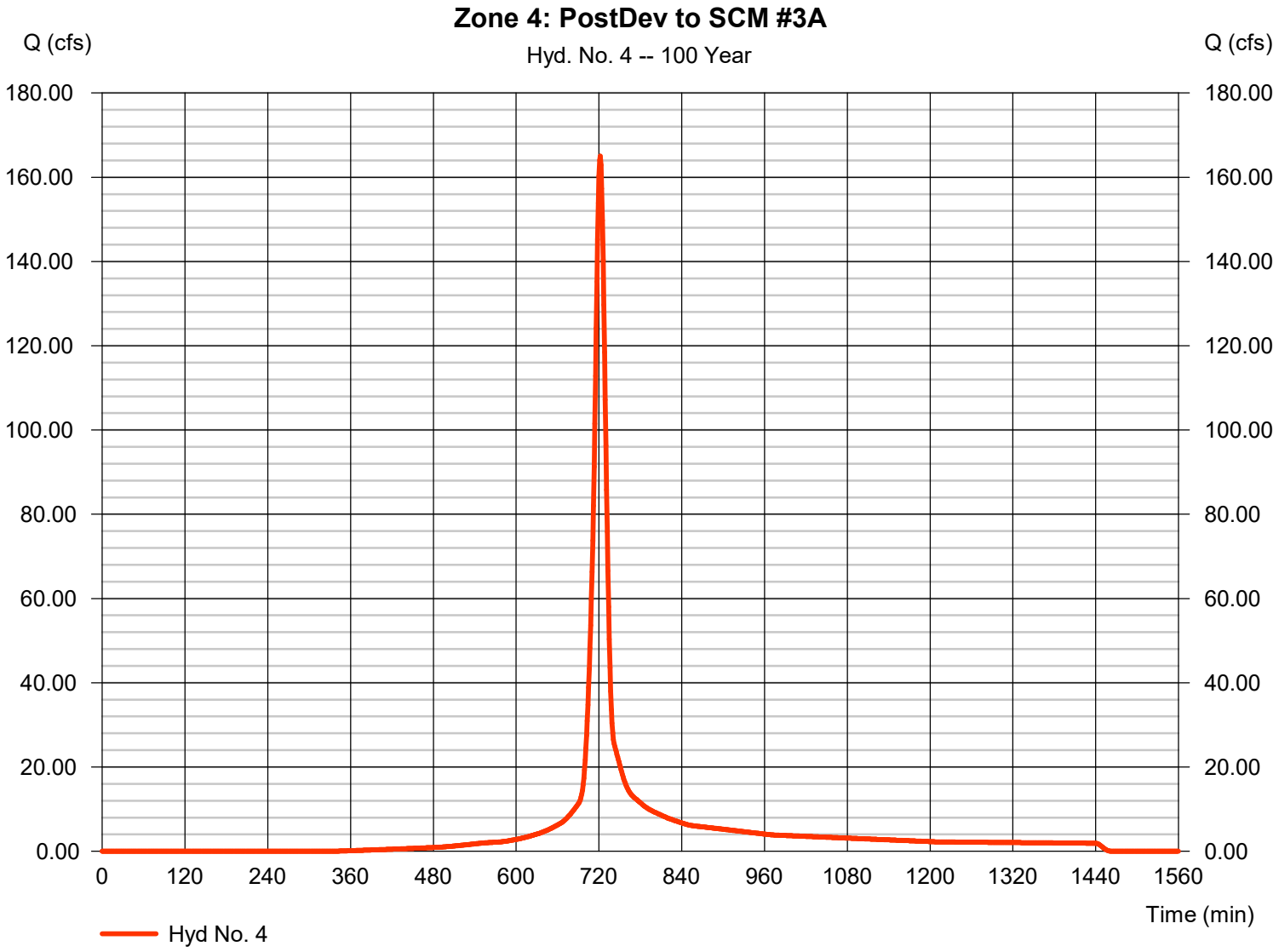


Hydrograph Report

Hyd. No. 4

Zone 4: PostDev to SCM #3A

Hydrograph type	=	SCS Runoff	Peak discharge	=	165.03 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	451,183 cuft
Drainage area	=	24.600 ac	Curve number	=	79.4
Basin Slope	=	1.5 %	Hydraulic length	=	2250 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	14.94 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



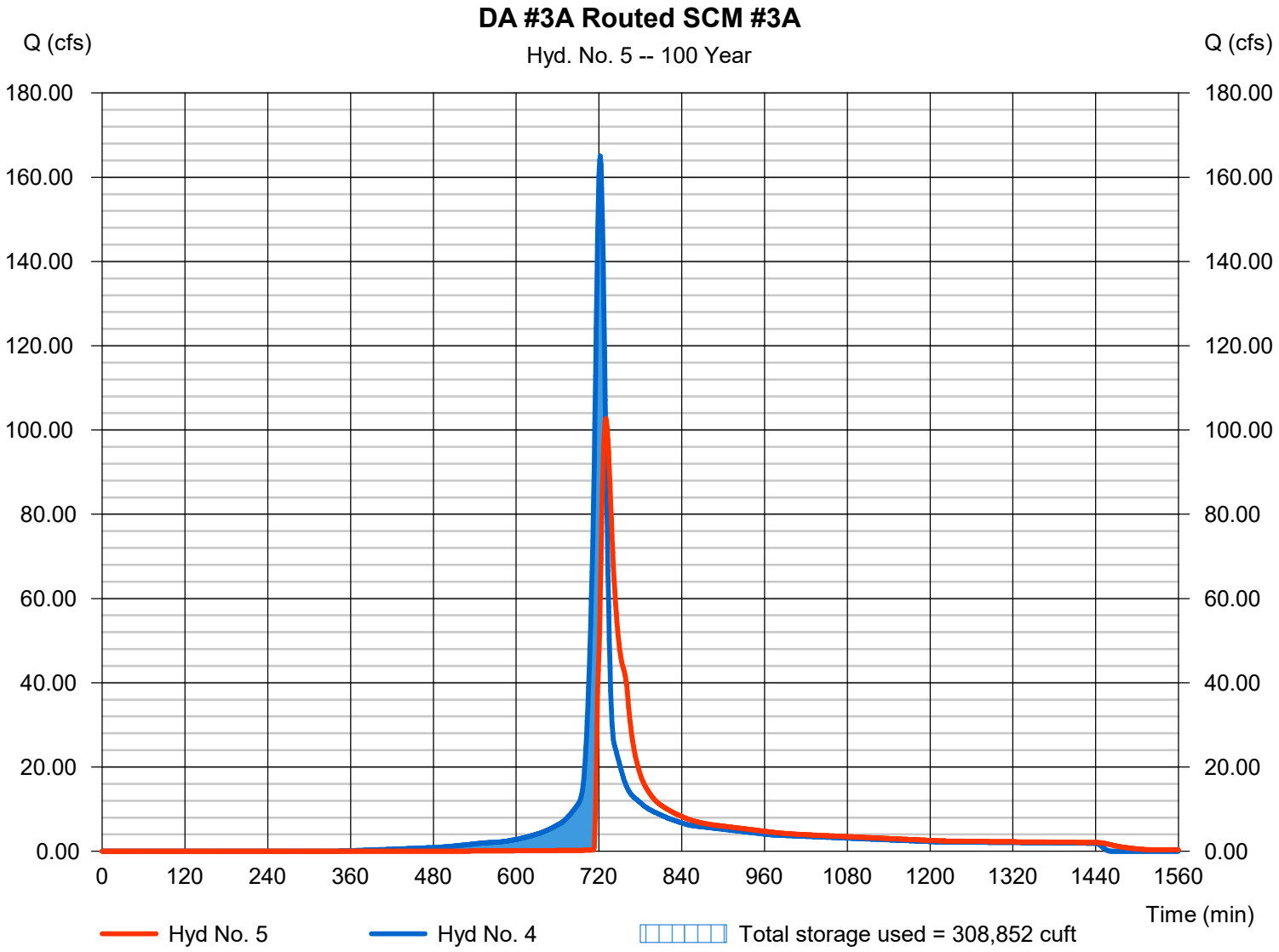
Hydrograph Report

Hyd. No. 5

DA #3A Routed SCM #3A

Hydrograph type	=	Reservoir	Peak discharge	=	102.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	404,855 cuft
Inflow hyd. No.	=	4 - Zone 4: PostDev to SCM #3A	Max. Elevation	=	355.24 ft
Reservoir name	=	SCM #3A	Max. Storage	=	308,852 cuft

Storage Indication method used. Wet pond routing start elevation = 351.50 ft.

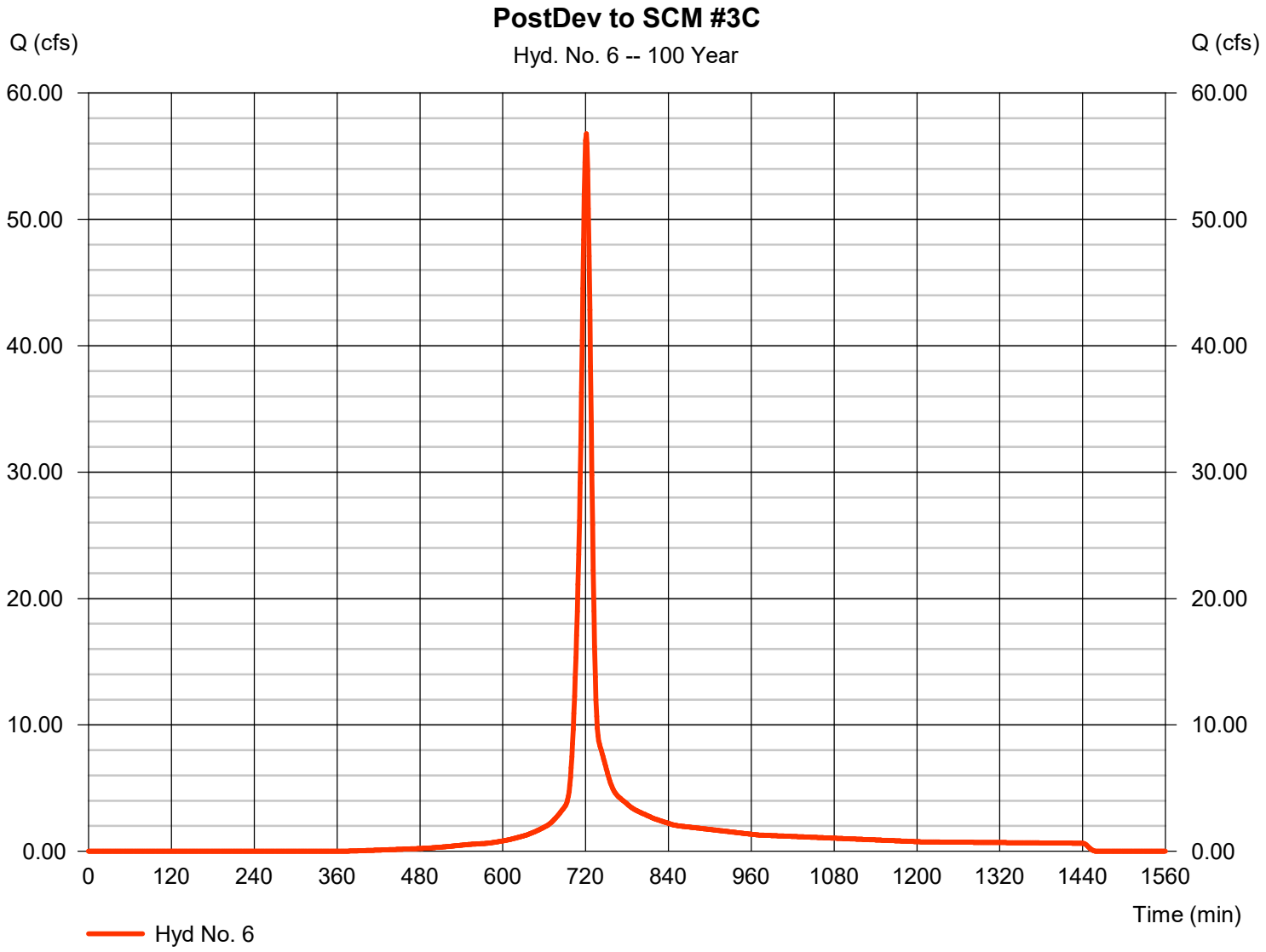


Hydrograph Report

Hyd. No. 6

PostDev to SCM #3C

Hydrograph type	=	SCS Runoff	Peak discharge	=	56.77 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	145,226 cuft
Drainage area	=	8.500 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



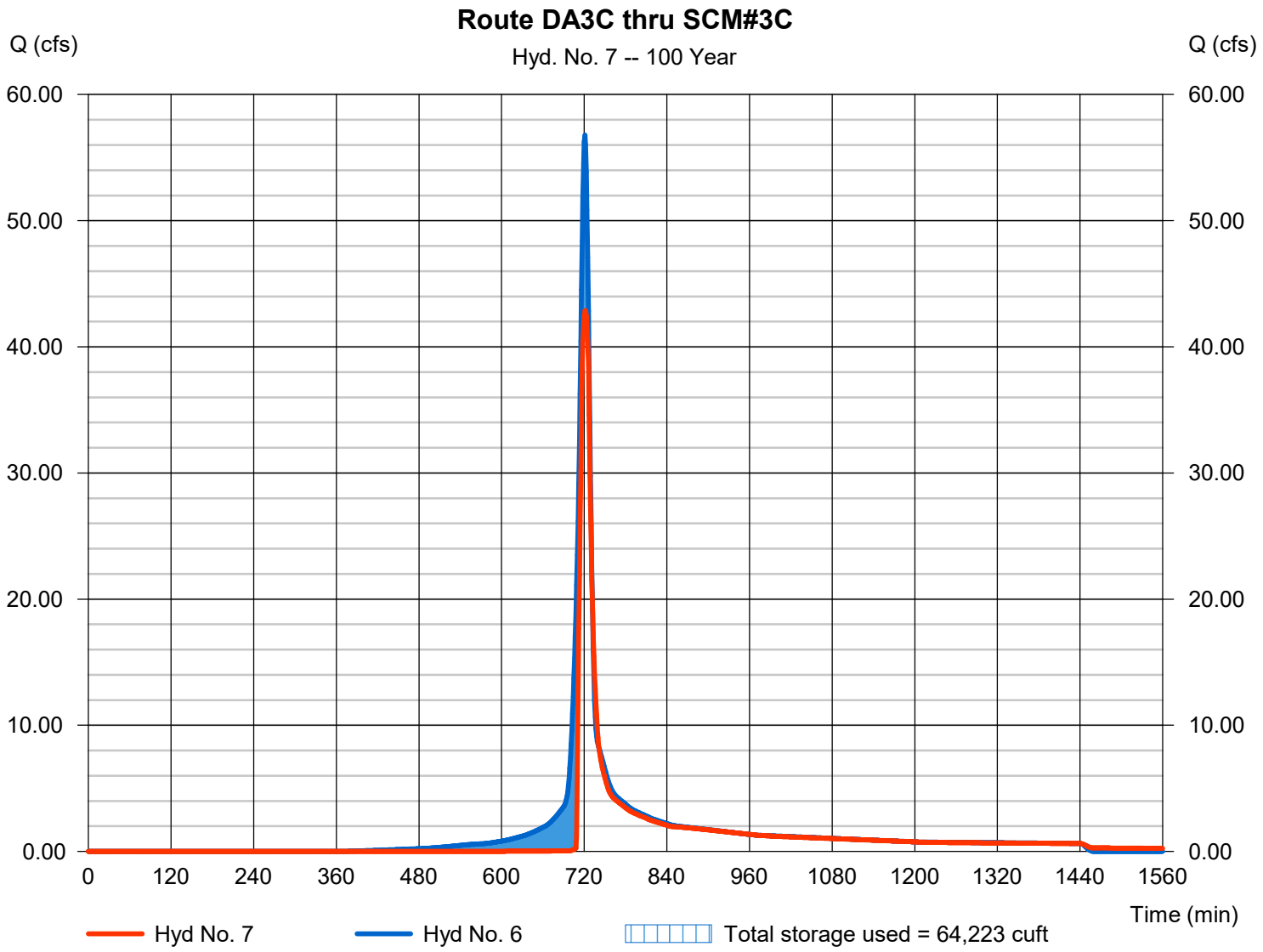
Hydrograph Report

Hyd. No. 7

Route DA3C thru SCM#3C

Hydrograph type	=	Reservoir	Peak discharge	=	42.88 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	117,645 cuft
Inflow hyd. No.	=	6 - PostDev to SCM #3C	Max. Elevation	=	342.88 ft
Reservoir name	=	SCM #3C	Max. Storage	=	64,223 cuft

Storage Indication method used. Wet pond routing start elevation = 340.50 ft.

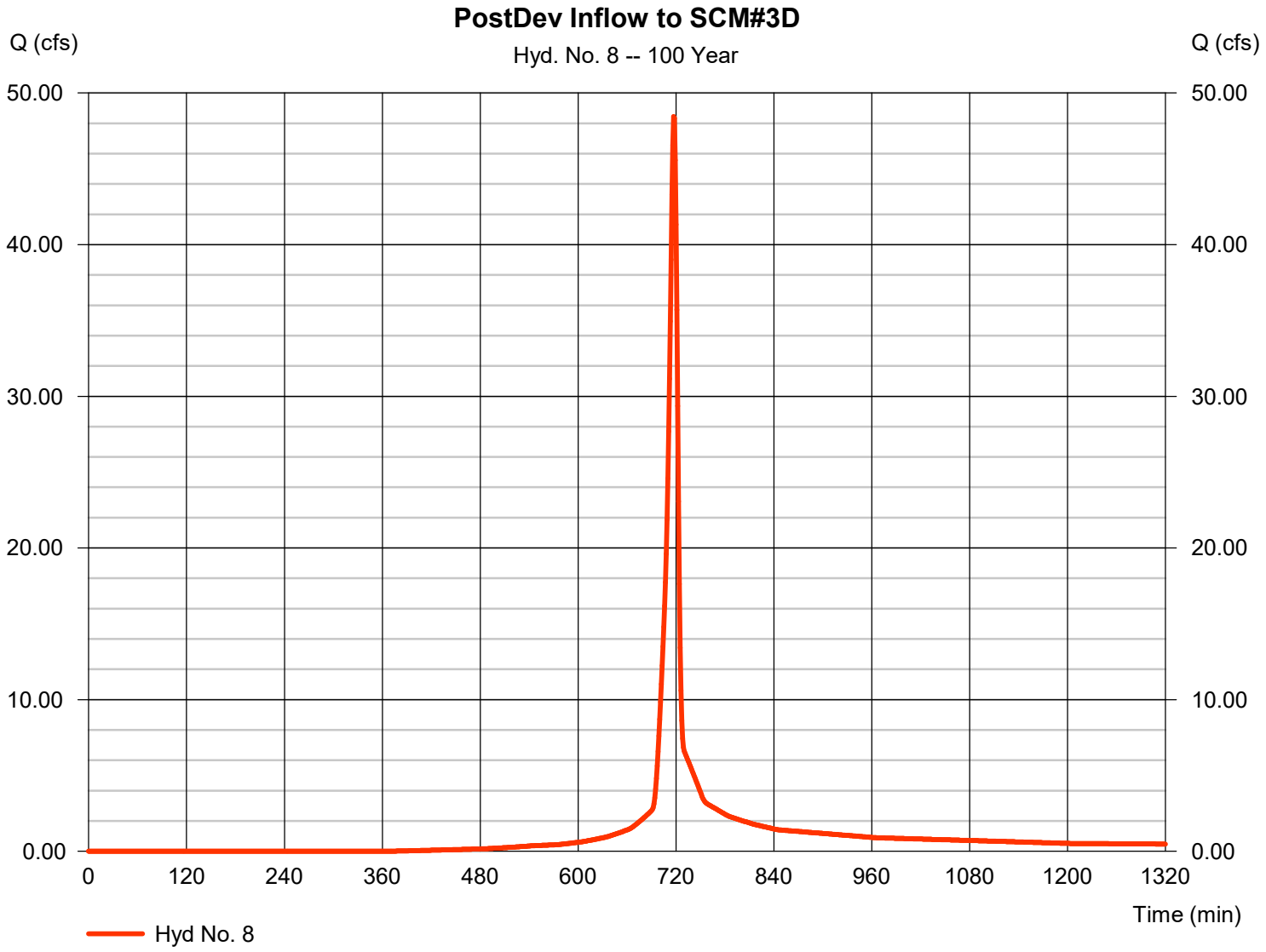


Hydrograph Report

Hyd. No. 8

PostDev Inflow to SCM#3D

Hydrograph type	= SCS Runoff	Peak discharge	= 48.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 100,475 cuft
Drainage area	= 5.640 ac	Curve number	= 76.8
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

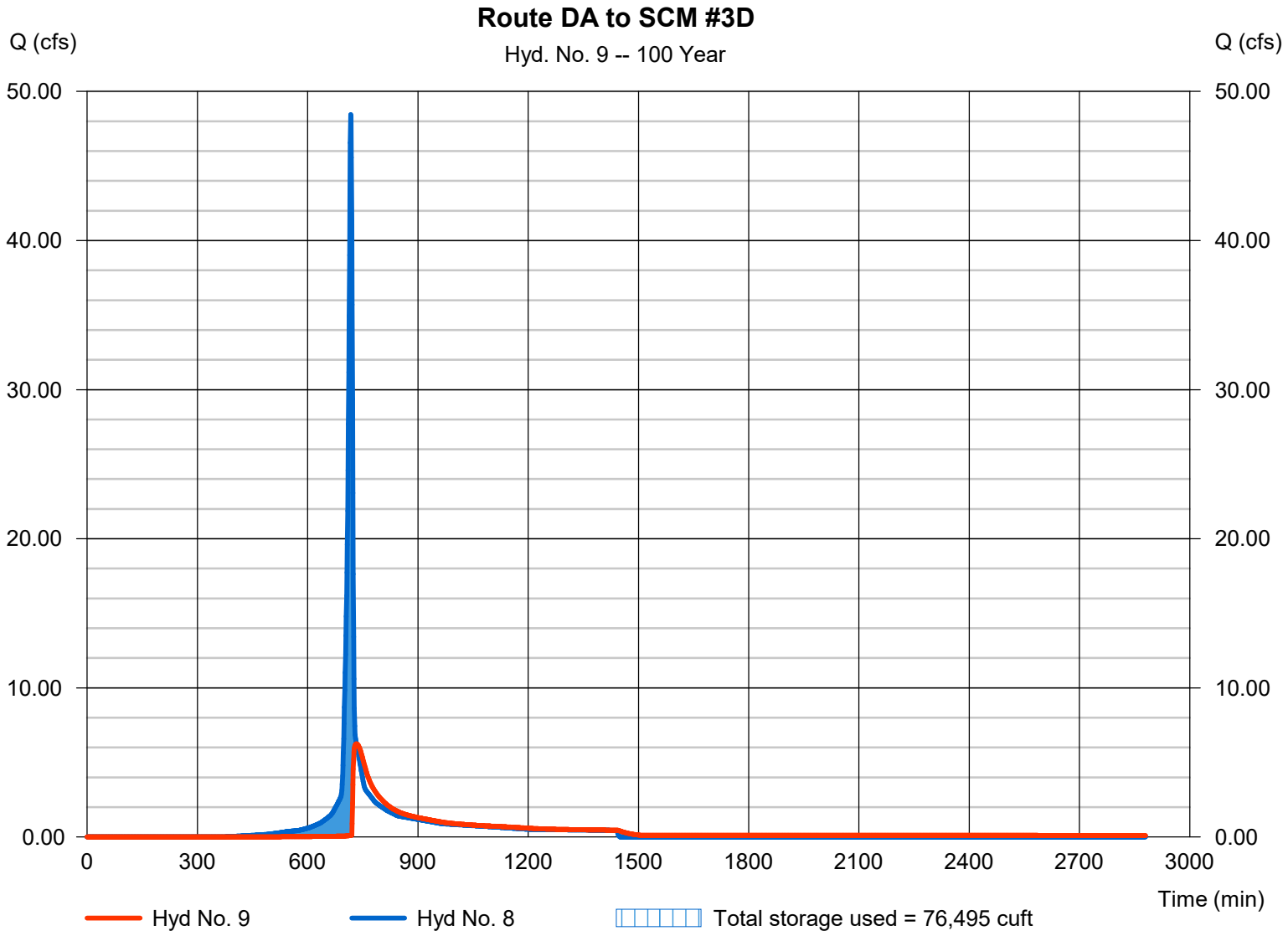
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Friday, 11 / 15 / 2024

Hyd. No. 9

Route DA to SCM #3D

Hydrograph type	=	Reservoir	Peak discharge	=	6.245 cfs
Storm frequency	=	100 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	63,472 cuft
Inflow hyd. No.	=	8 - PostDev Inflow to SCM#3D	Max. Elevation	=	348.45 ft
Reservoir name	=	SCM #3D	Max. Storage	=	76,495 cuft

Storage Indication method used. Wet pond routing start elevation = 344.50 ft.

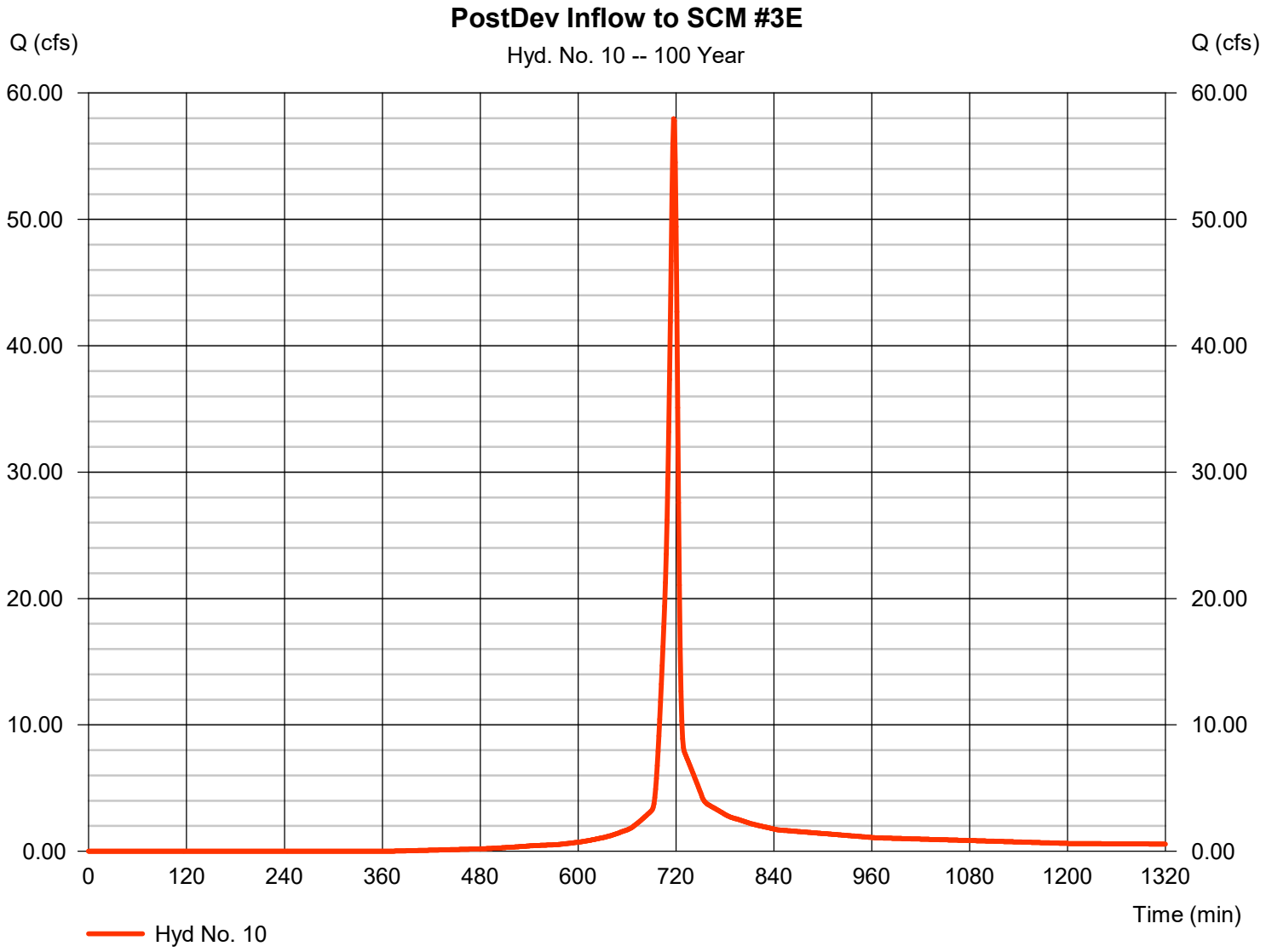


Hydrograph Report

Hyd. No. 10

PostDev Inflow to SCM #3E

Hydrograph type	= SCS Runoff	Peak discharge	= 57.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 120,281 cuft
Drainage area	= 6.720 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



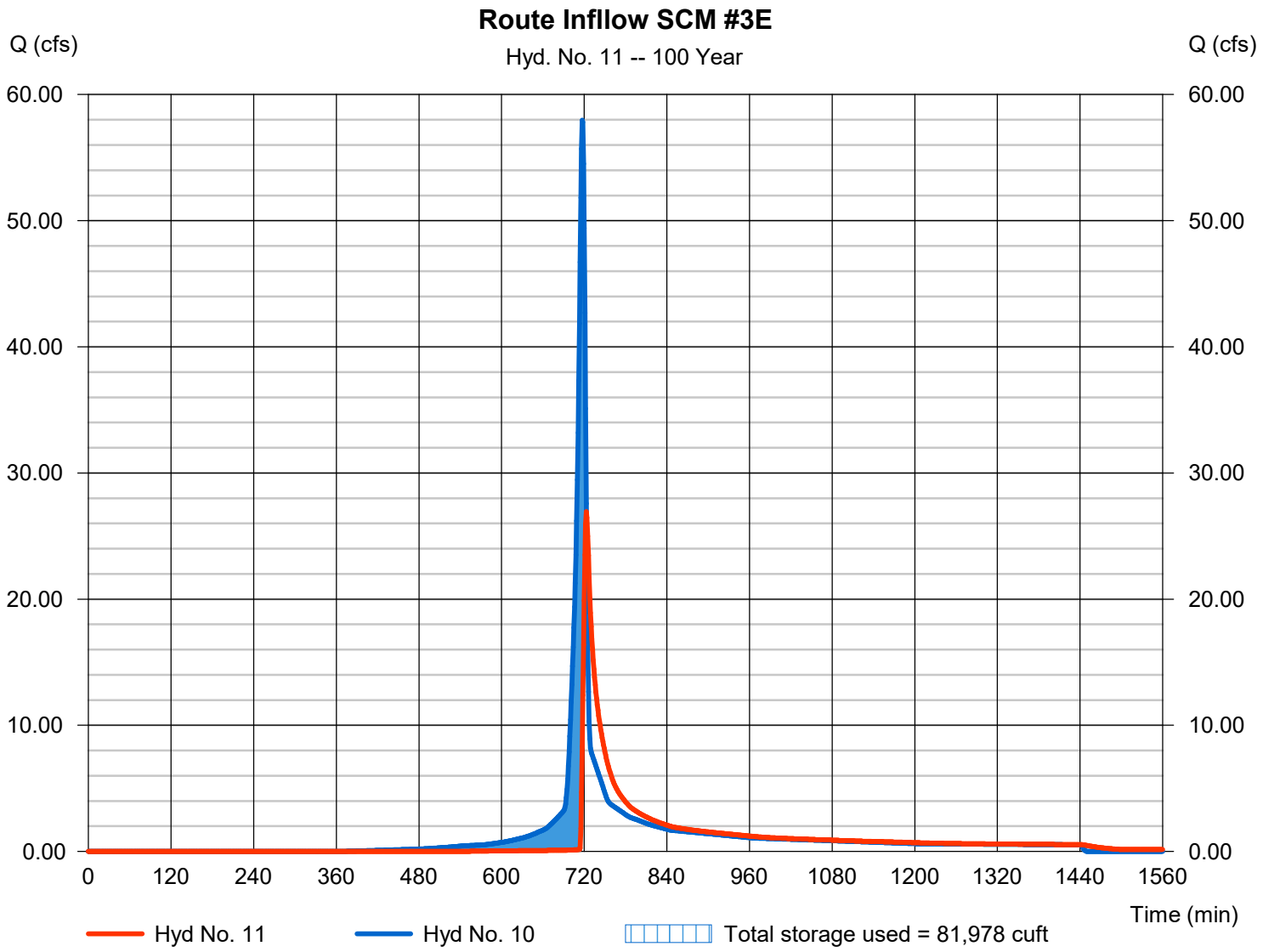
Hydrograph Report

Hyd. No. 11

Route Infllow SCM #3E

Hydrograph type	=	Reservoir	Peak discharge	=	26.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	98,138 cuft
Inflow hyd. No.	=	10 - PostDev Inflow to SCM #3E	Max. Elevation	=	310.13 ft
Reservoir name	=	SCM #3E	Max. Storage	=	81,978 cuft

Storage Indication method used. Wet pond routing start elevation = 306.50 ft.

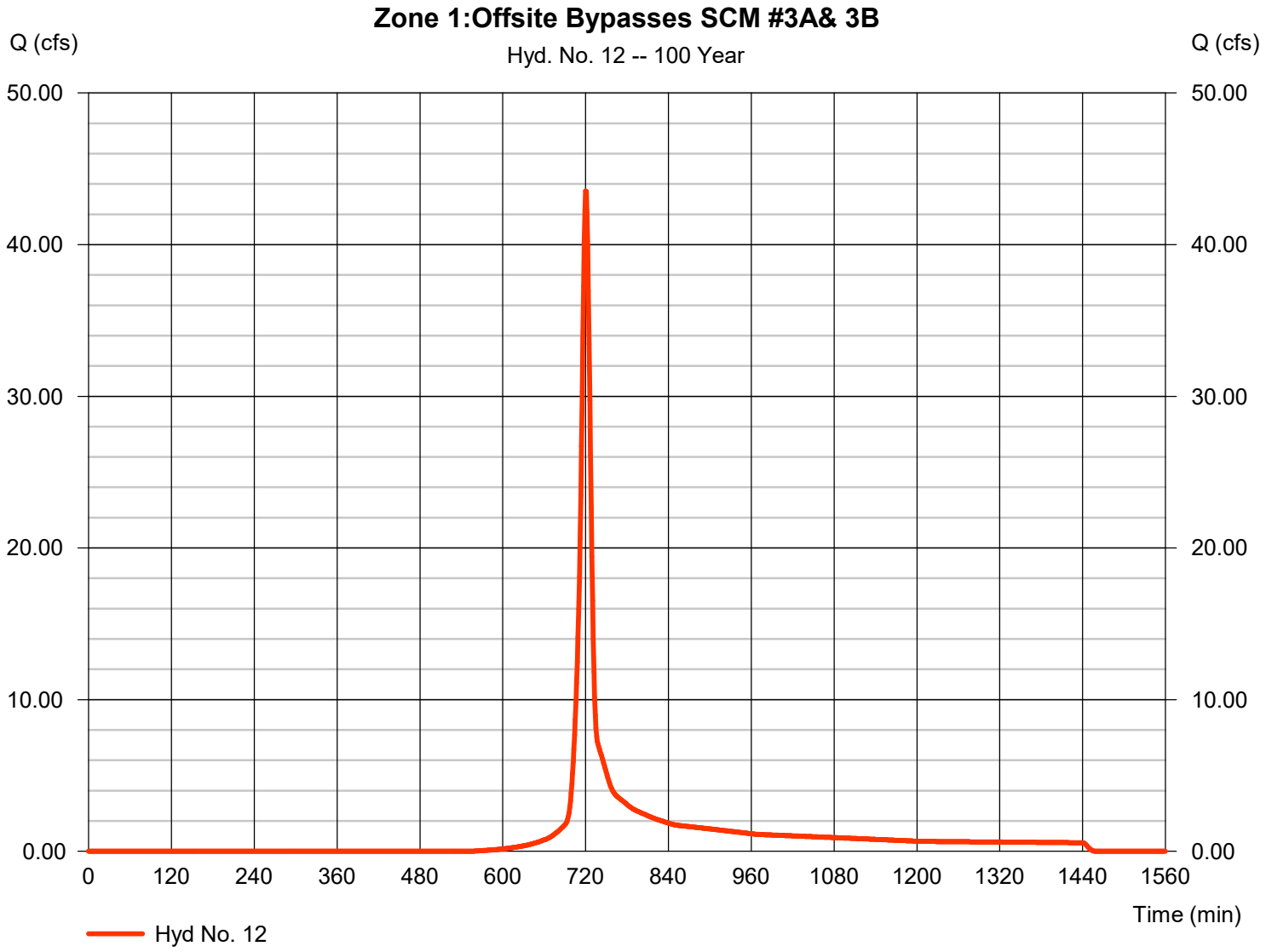


Hydrograph Report

Hyd. No. 12

Zone 1:Offsite Bypasses SCM #3A& 3B

Hydrograph type	= SCS Runoff	Peak discharge	= 43.54 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 105,508 cuft
Drainage area	= 8.510 ac	Curve number	= 64
Basin Slope	= 2.9 %	Hydraulic length	= 1370 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

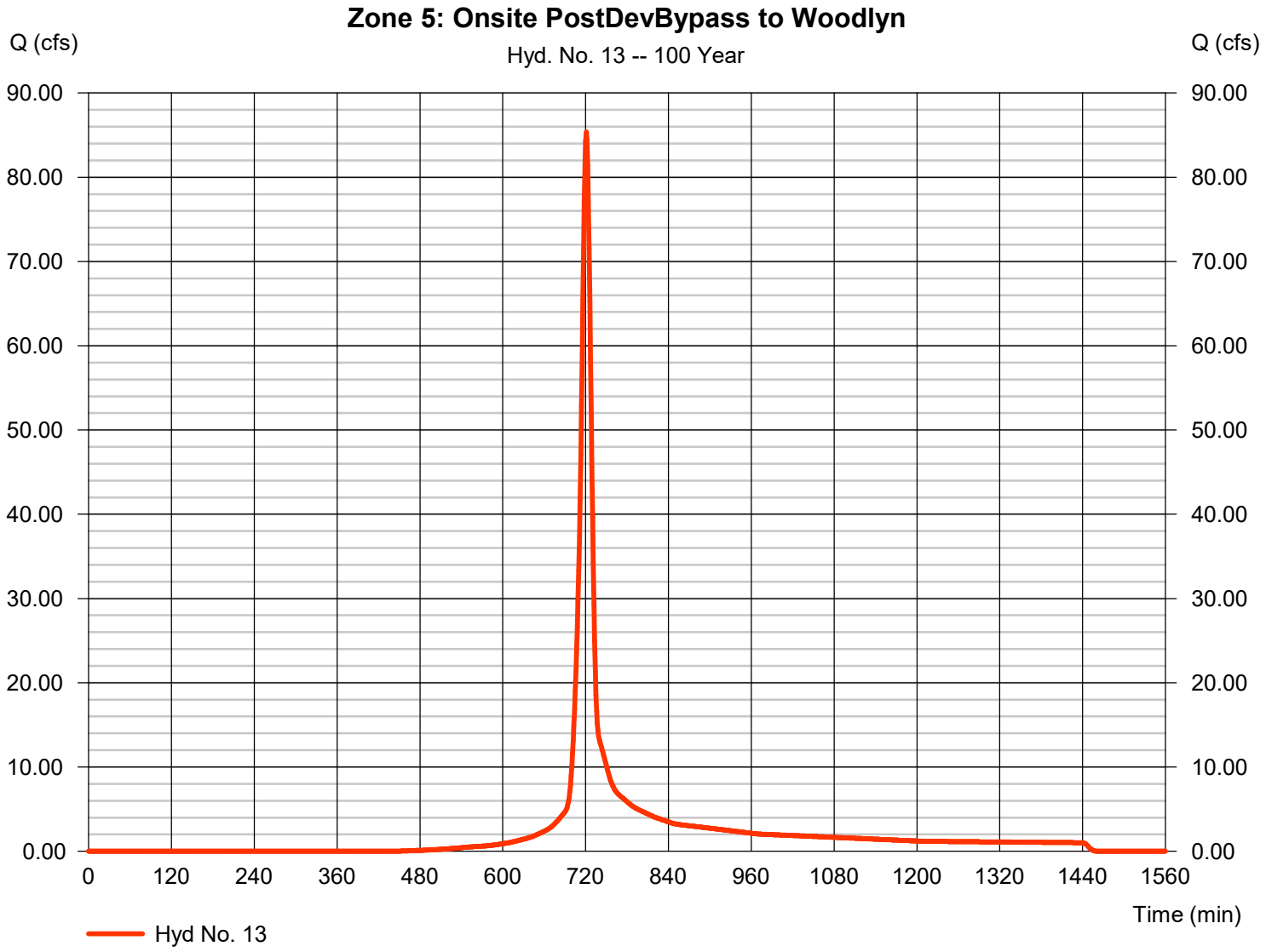


Hydrograph Report

Hyd. No. 13

Zone 5: Onsite PostDevBypass to Woodlyn

Hydrograph type	=	SCS Runoff	Peak discharge	=	85.35 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	216,138 cuft
Drainage area	=	14.320 ac	Curve number	=	72
Basin Slope	=	1.5 %	Hydraulic length	=	1788 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.58 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

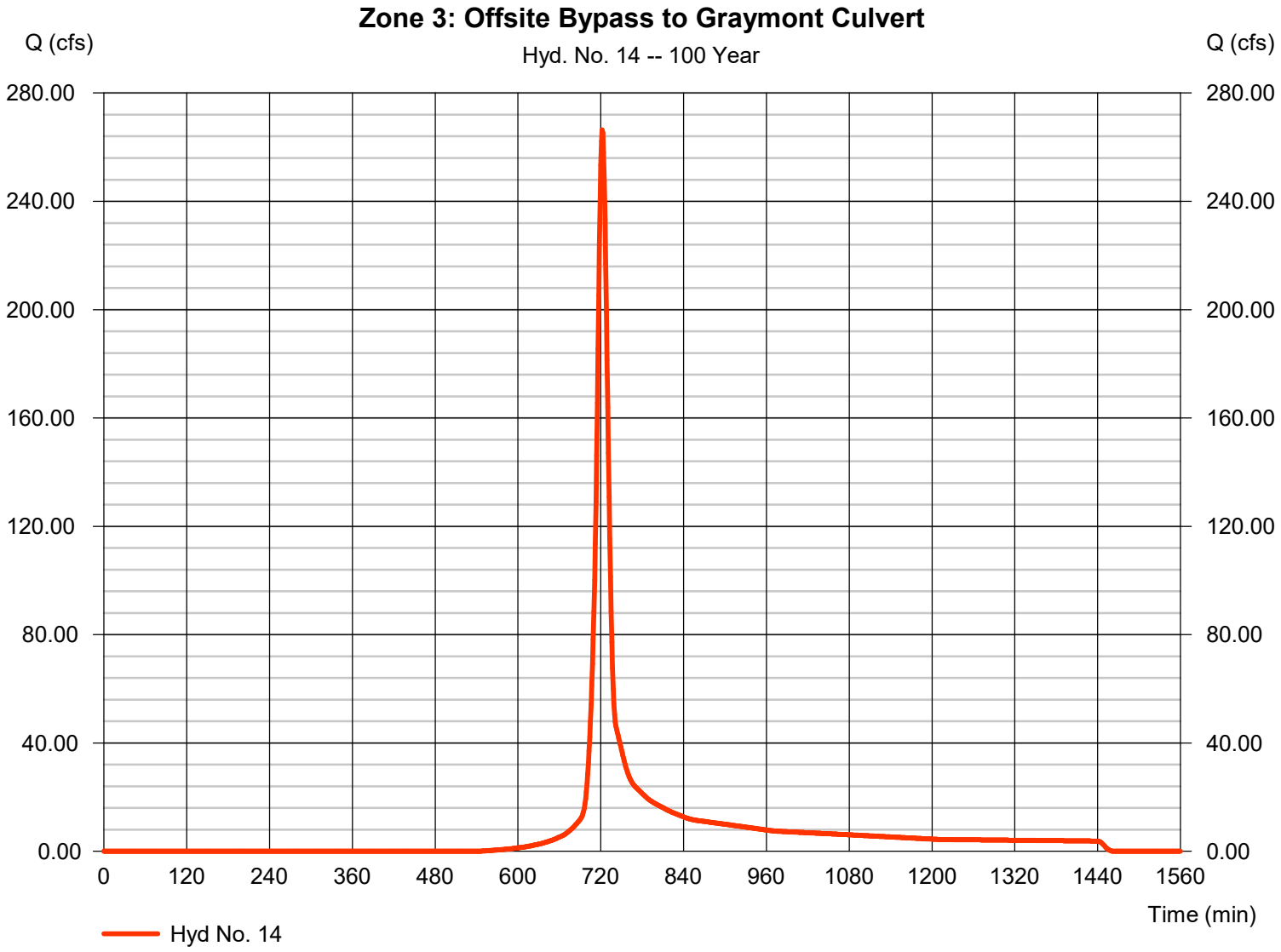


Hydrograph Report

Hyd. No. 14

Zone 3: Offsite Bypass to Graymont Culvert

Hydrograph type	= SCS Runoff	Peak discharge	= 266.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 717,899 cuft
Drainage area	= 57.120 ac	Curve number	= 65
Basin Slope	= 1.8 %	Hydraulic length	= 1220 ft
Tc method	= User	Time of conc. (Tc)	= 14.00 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



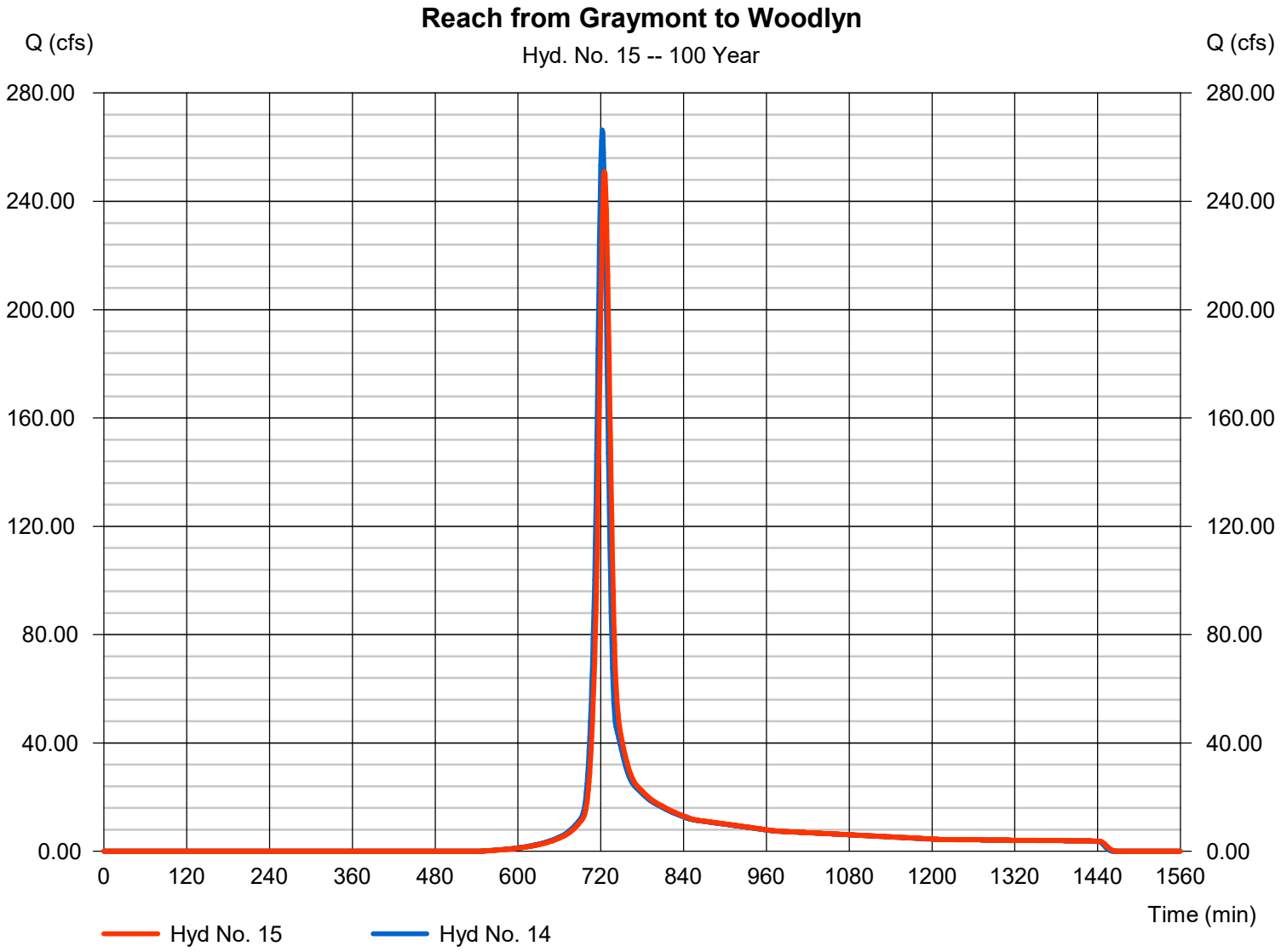
Hydrograph Report

Hyd. No. 15

Reach from Graymont to Woodlyn

Hydrograph type	=	Reach	Peak discharge	=	251.07 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	717,898 cuft
Inflow hyd. No.	=	14 - Zone 3: Offsite Bypass to Graymont Culvert	Section type	=	Trapezoidal
Reach length	=	1750.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	5.0 ft
Side slope	=	2.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.009	Rating curve m	=	1.370
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.3001

Modified Att-Kin routing method used.

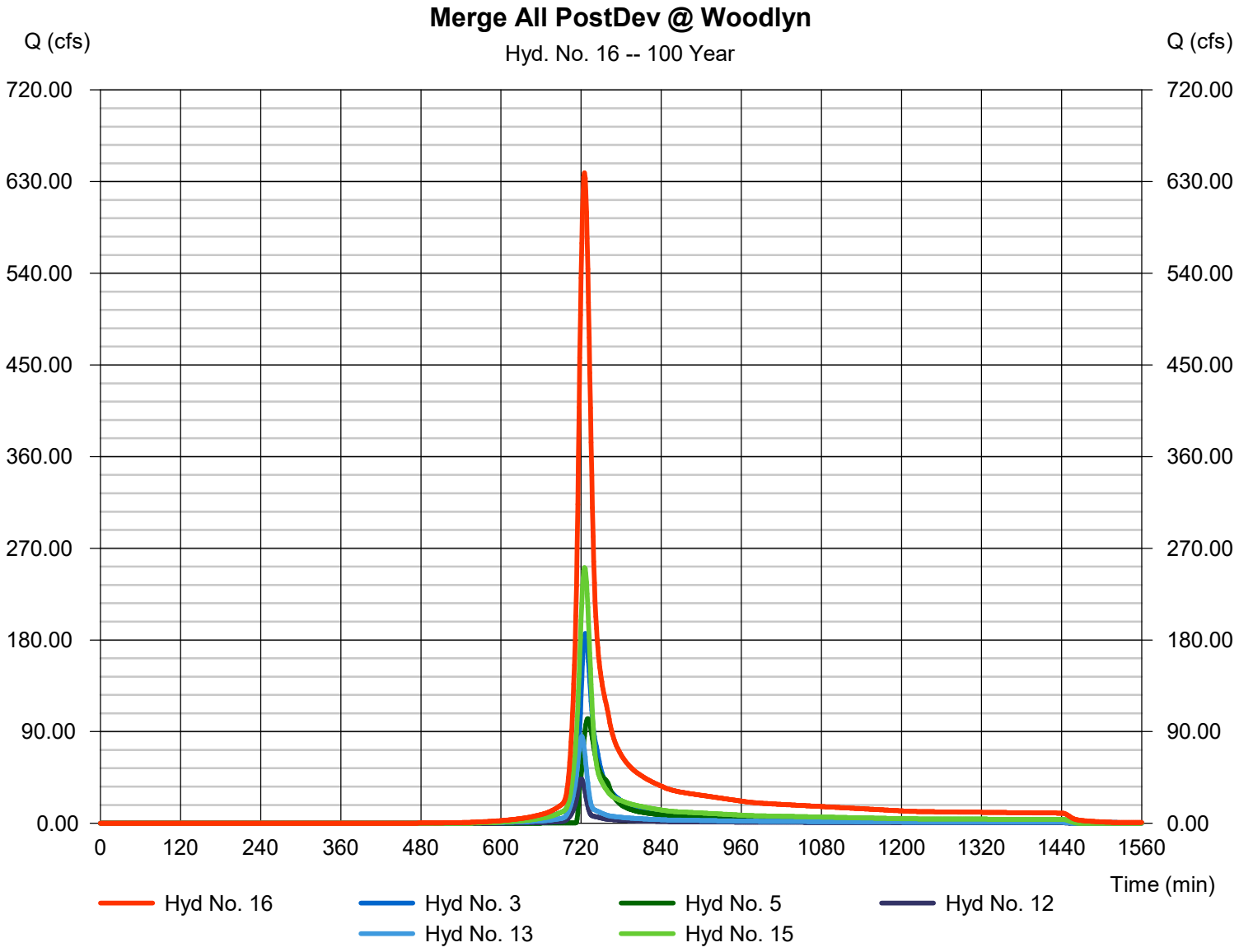


Hydrograph Report

Hyd. No. 16

Merge All PostDev @ Woodlyn

Hydrograph type	= Combine	Peak discharge	= 638.51 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,024,665 cuft
Inflow hyds.	= 3, 5, 12, 13, 15	Contrib. drain. area	= 22.830 ac

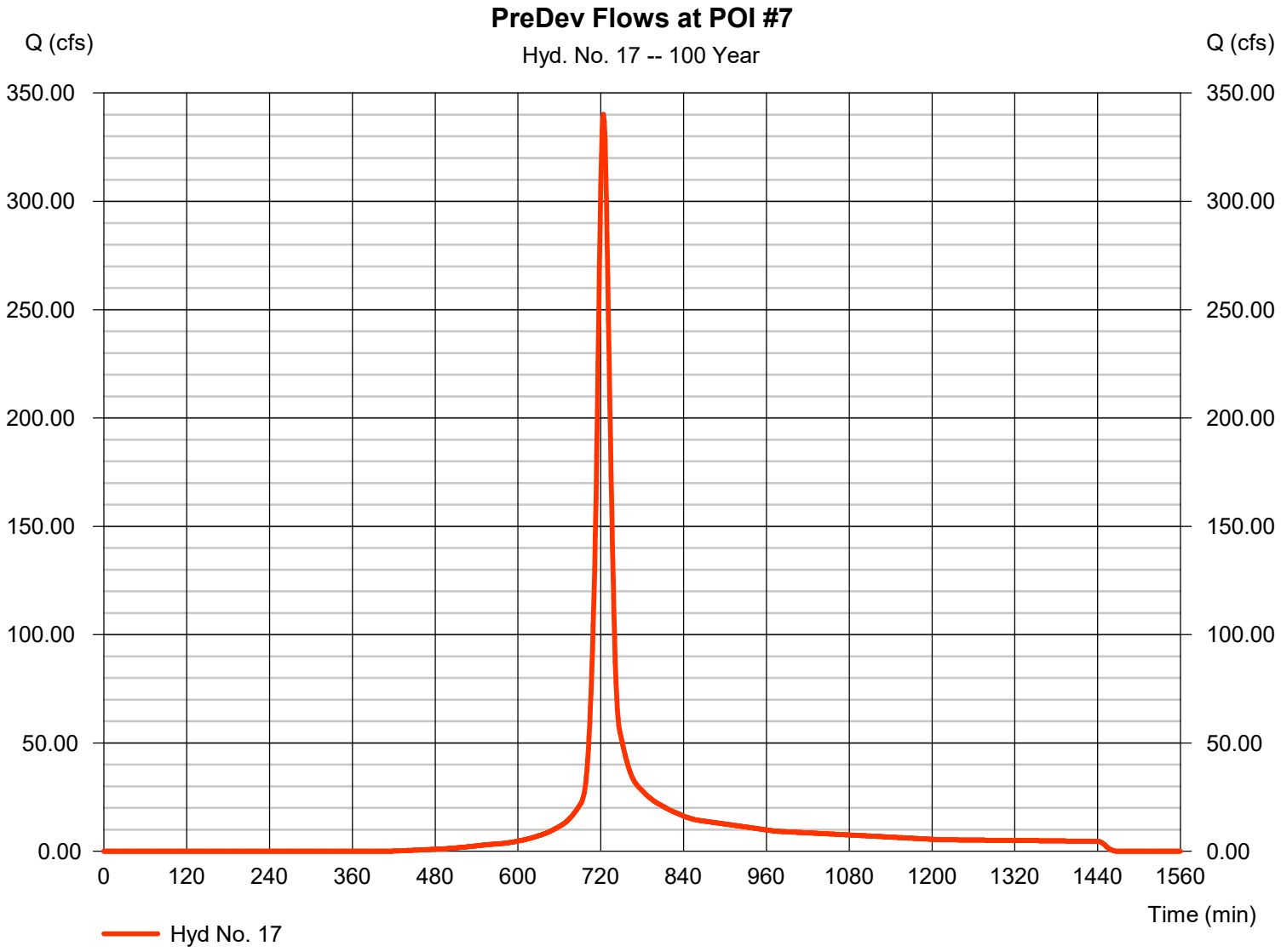


Hydrograph Report

Hyd. No. 17

PreDev Flows at POI #7

Hydrograph type	=	SCS Runoff	Peak discharge	=	340.14 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,009,891 cuft
Drainage area	=	62.670 ac	Curve number	=	74.4
Basin Slope	=	1.3 %	Hydraulic length	=	2500 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	17.43 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

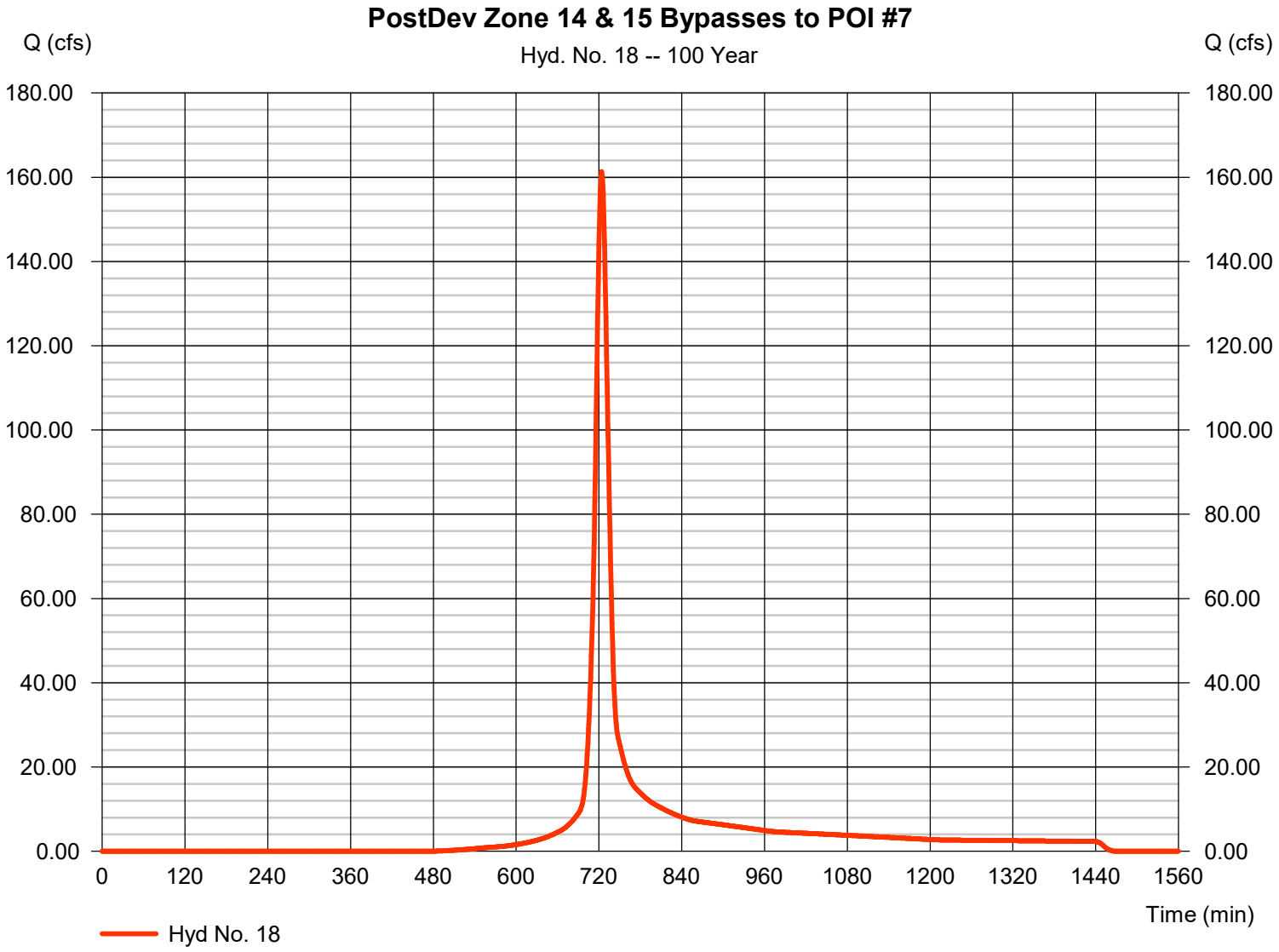


Hydrograph Report

Hyd. No. 18

PostDev Zone 14 & 15 Bypasses to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 161.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 477,636 cuft
Drainage area	= 33.240 ac	Curve number	= 70
Basin Slope	= 1.3 %	Hydraulic length	= 2500 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.27 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

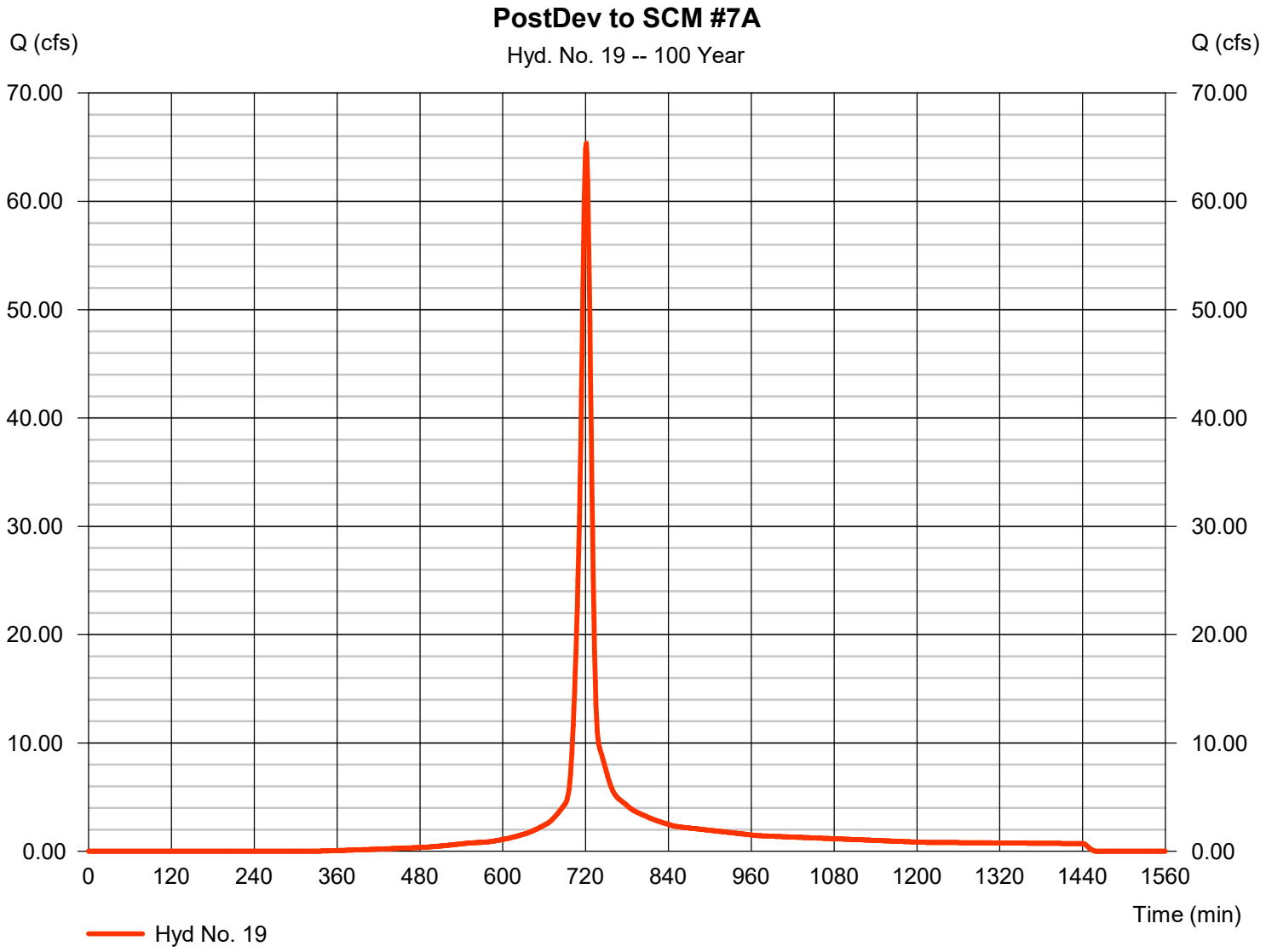


Hydrograph Report

Hyd. No. 19

PostDev to SCM #7A

Hydrograph type	=	SCS Runoff	Peak discharge	=	65.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	168,684 cuft
Drainage area	=	9.260 ac	Curve number	=	79.8
Basin Slope	=	1.1 %	Hydraulic length	=	1505 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	12.38 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

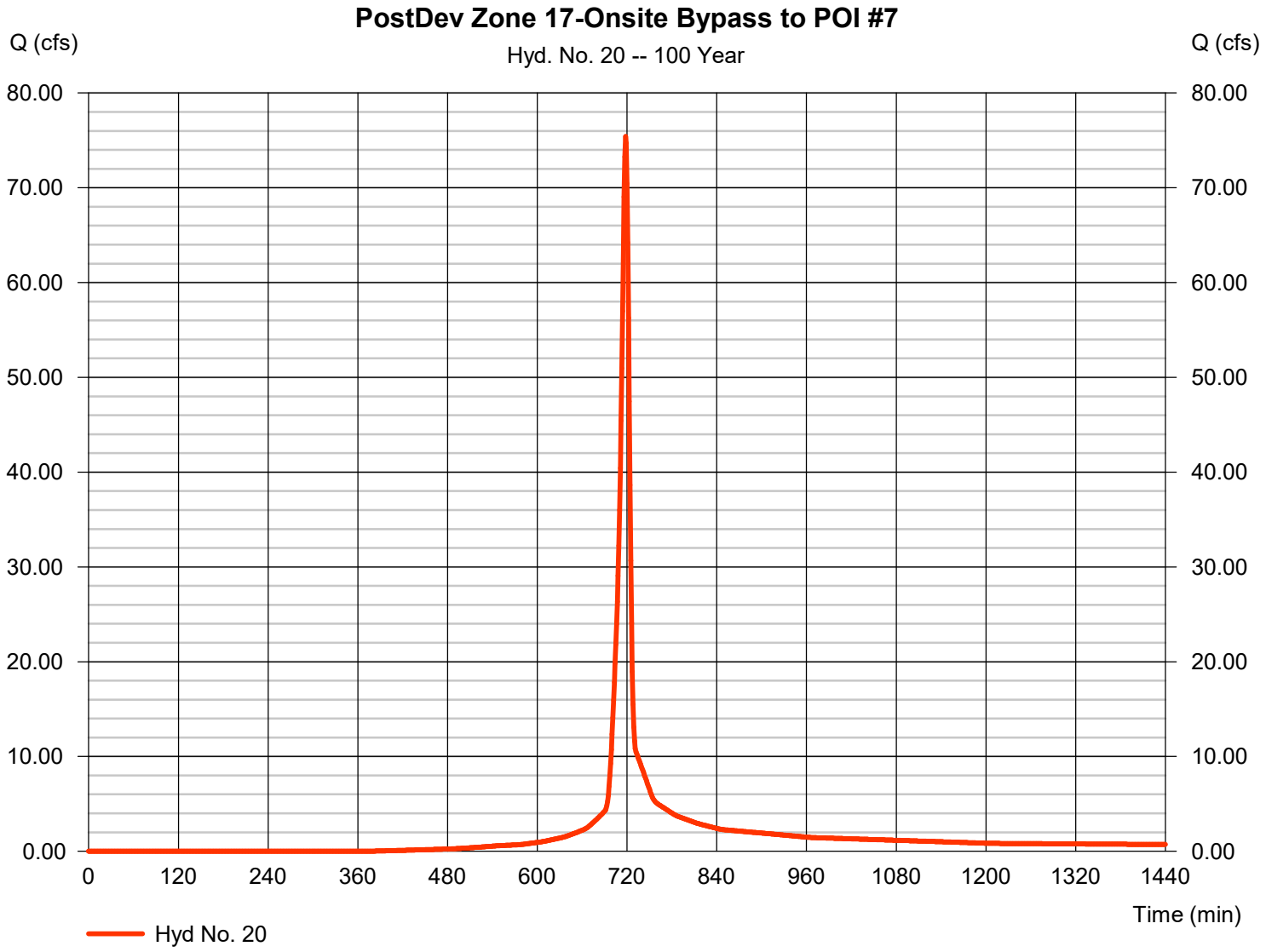


Hydrograph Report

Hyd. No. 20

PostDev Zone 17-Onsite Bypass to POI #7

Hydrograph type	= SCS Runoff	Peak discharge	= 75.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 162,555 cuft
Drainage area	= 9.720 ac	Curve number	= 76.5
Basin Slope	= 1.0 %	Hydraulic length	= 810 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 7.97 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

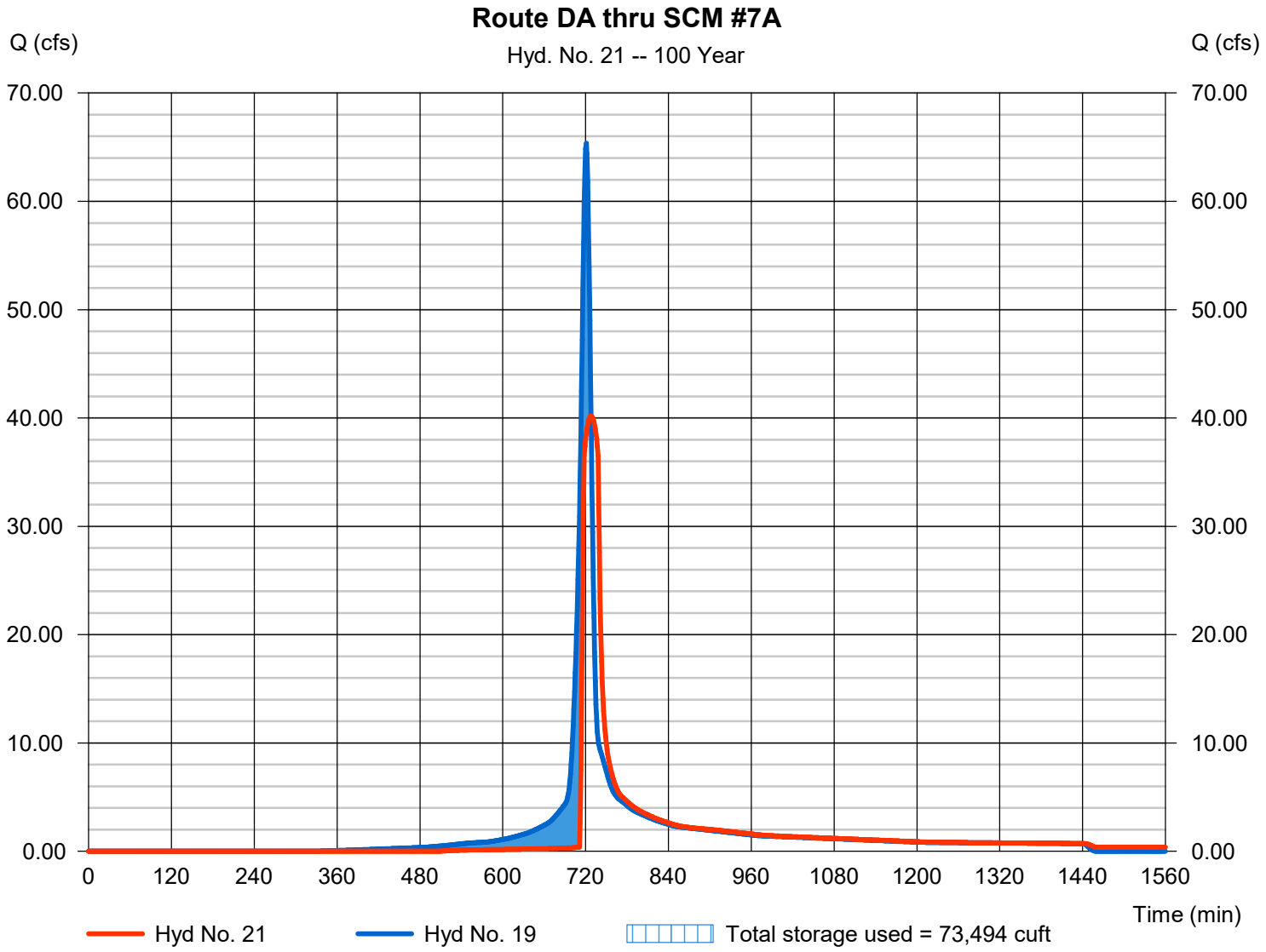
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Friday, 11 / 15 / 2024

Hyd. No. 21

Route DA thru SCM #7A

Hydrograph type	=	Reservoir	Peak discharge	=	40.19 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	162,004 cuft
Inflow hyd. No.	=	19 - PostDev to SCM #7A	Max. Elevation	=	374.98 ft
Reservoir name	=	SCM #7A	Max. Storage	=	73,494 cuft

Storage Indication method used. Wet pond routing start elevation = 370.50 ft.

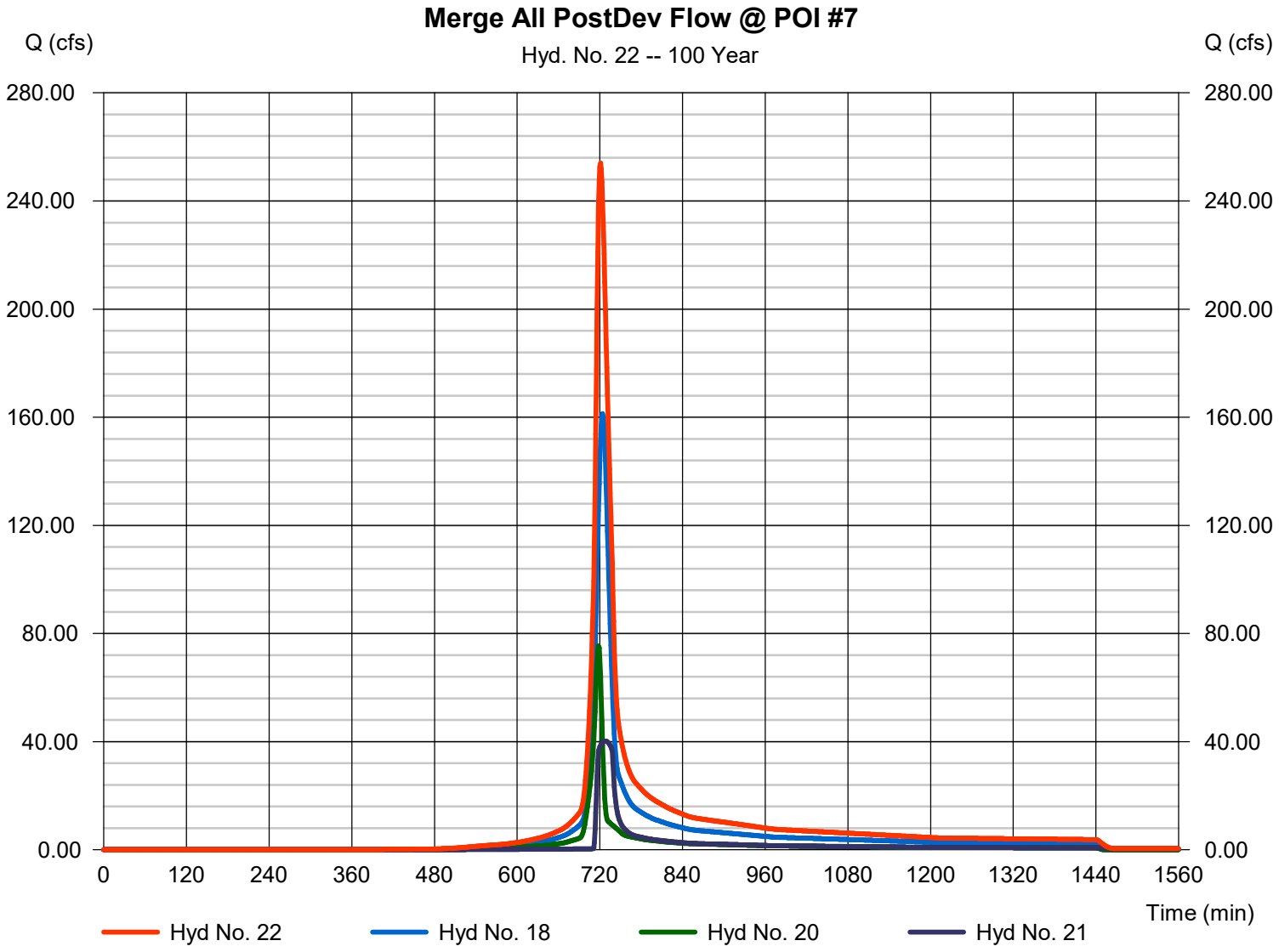


Hydrograph Report

Hyd. No. 22

Merge All PostDev Flow @ POI #7

Hydrograph type	= Combine	Peak discharge	= 253.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 802,196 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 42.960 ac

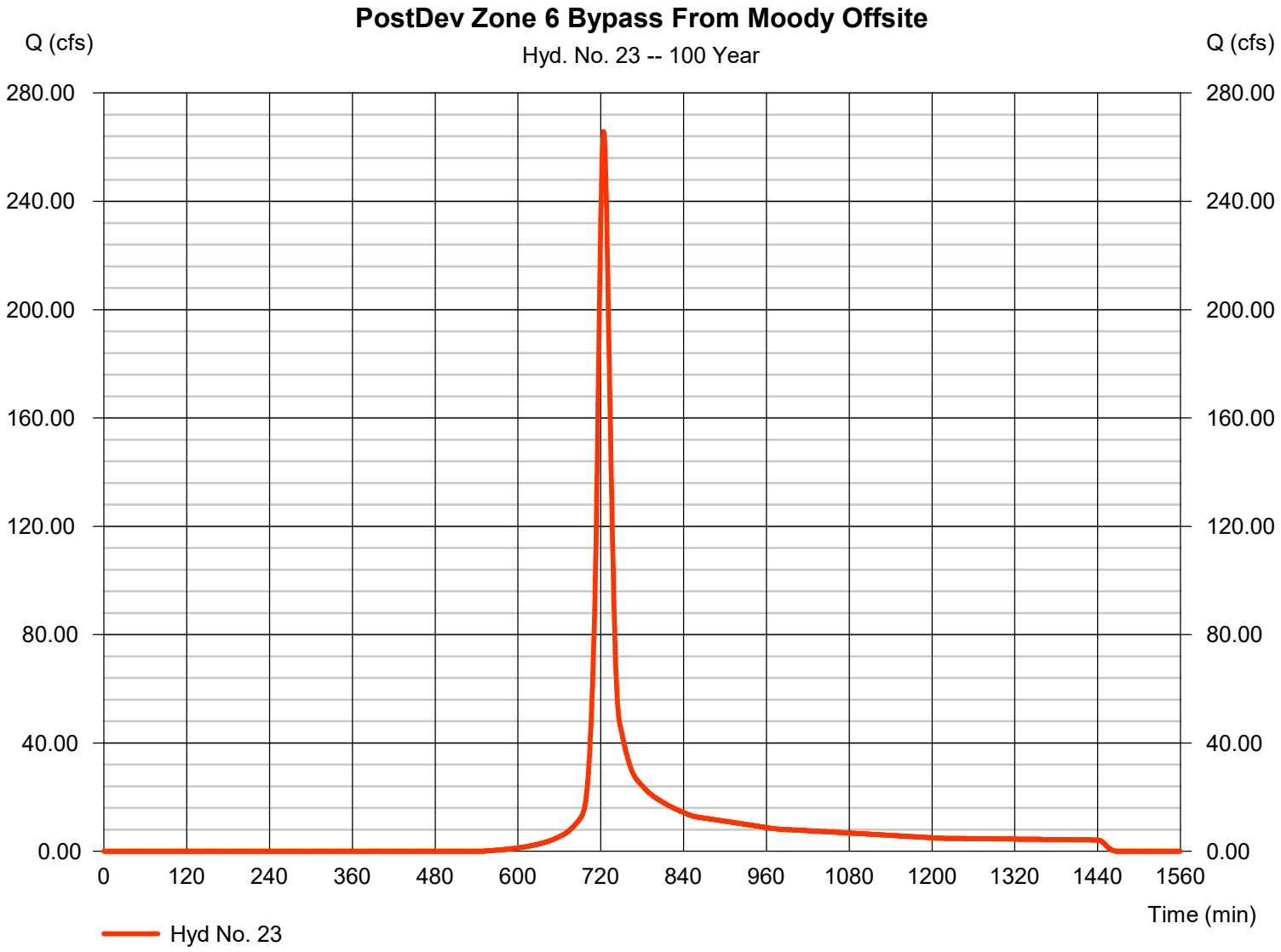


Hydrograph Report

Hyd. No. 23

PostDev Zone 6 Bypass From Moody Offsite

Hydrograph type	= SCS Runoff	Peak discharge	= 265.75 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 790,683 cuft
Drainage area	= 64.030 ac	Curve number	= 64.8
Basin Slope	= 1.8 %	Hydraulic length	= 2940 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 17.01 min
Total precip.	= 7.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

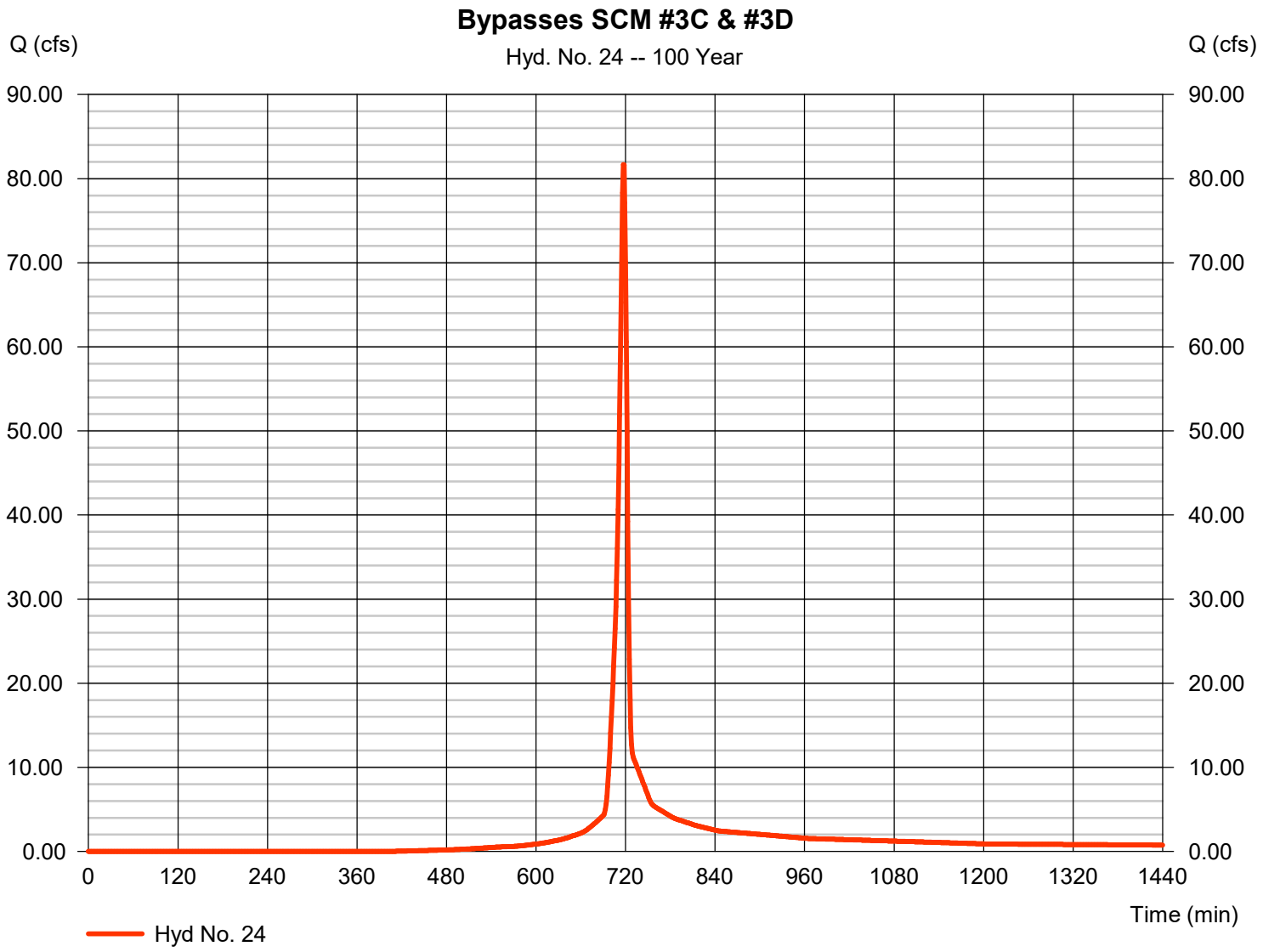


Hydrograph Report

Hyd. No. 24

Bypasses SCM #3C & #3D

Hydrograph type	=	SCS Runoff	Peak discharge	=	81.67 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	168,171 cuft
Drainage area	=	9.980 ac	Curve number	=	74.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



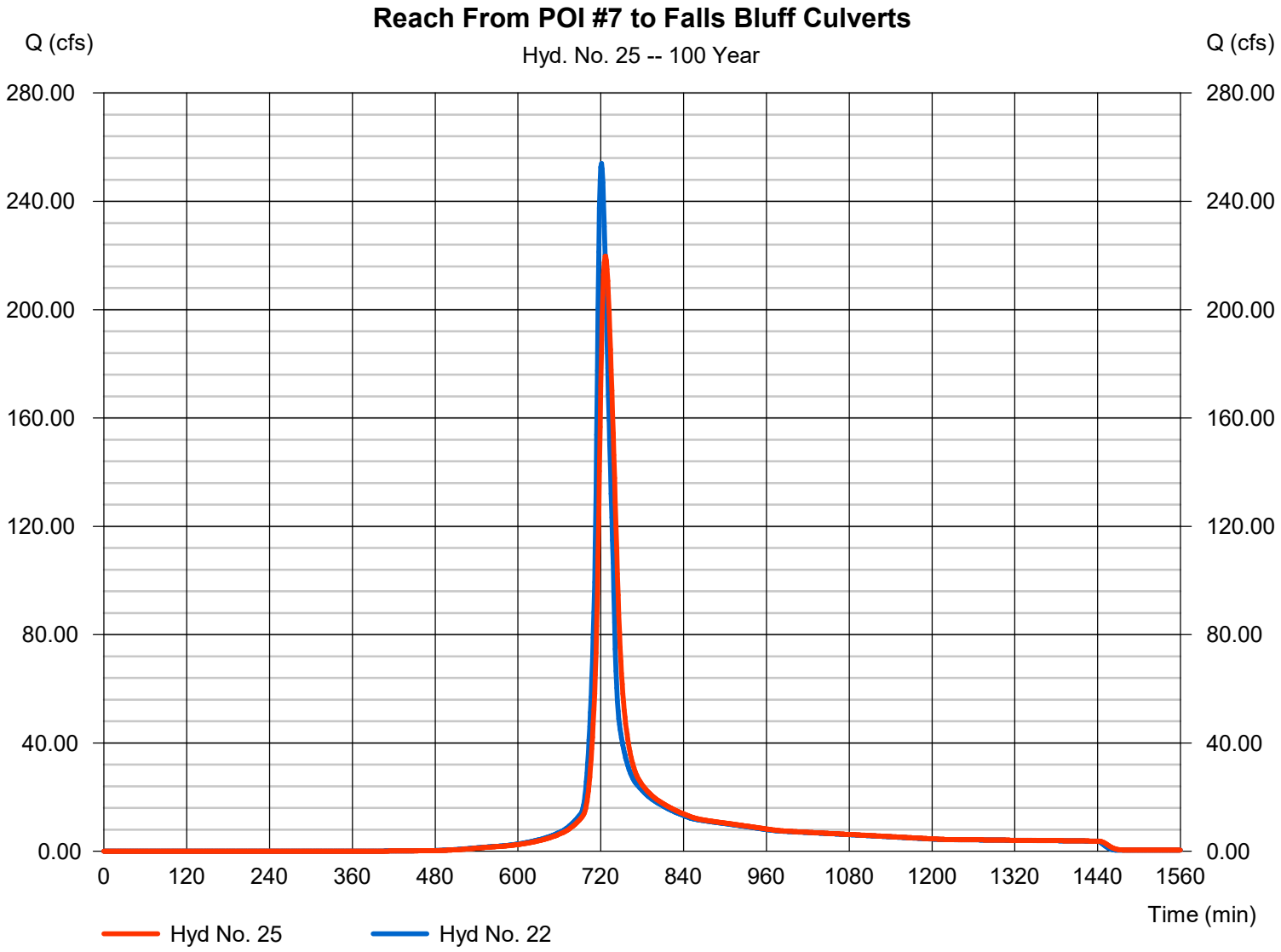
Hydrograph Report

Hyd. No. 25

Reach From POI #7 to Falls Bluff Culverts

Hydrograph type	=	Reach	Peak discharge	=	219.77 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	802,130 cuft
Inflow hyd. No.	=	22 - Merge All PostDev Flow @ POI #7	Section type	=	Trapezoidal
Reach length	=	1845.0 ft	Channel slope	=	1.4 %
Manning's n	=	0.030	Bottom width	=	4.0 ft
Side slope	=	30.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.289	Rating curve m	=	1.183
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.1674

Modified Att-Kin routing method used.

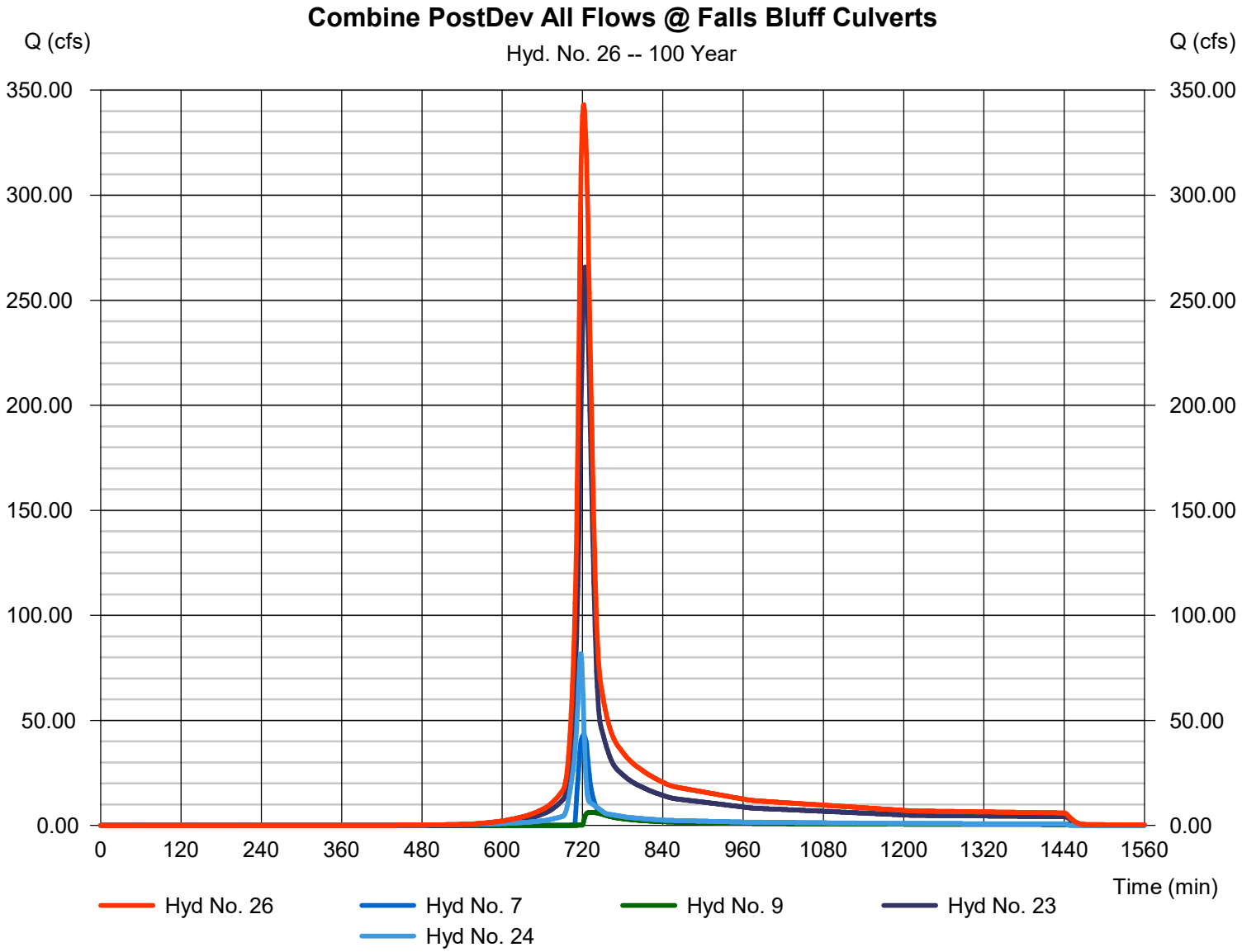


Hydrograph Report

Hyd. No. 26

Combine PostDev All Flows @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 343.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 1,127,525 cuft
Inflow hyds.	= 7, 9, 23, 24	Contrib. drain. area	= 74.010 ac

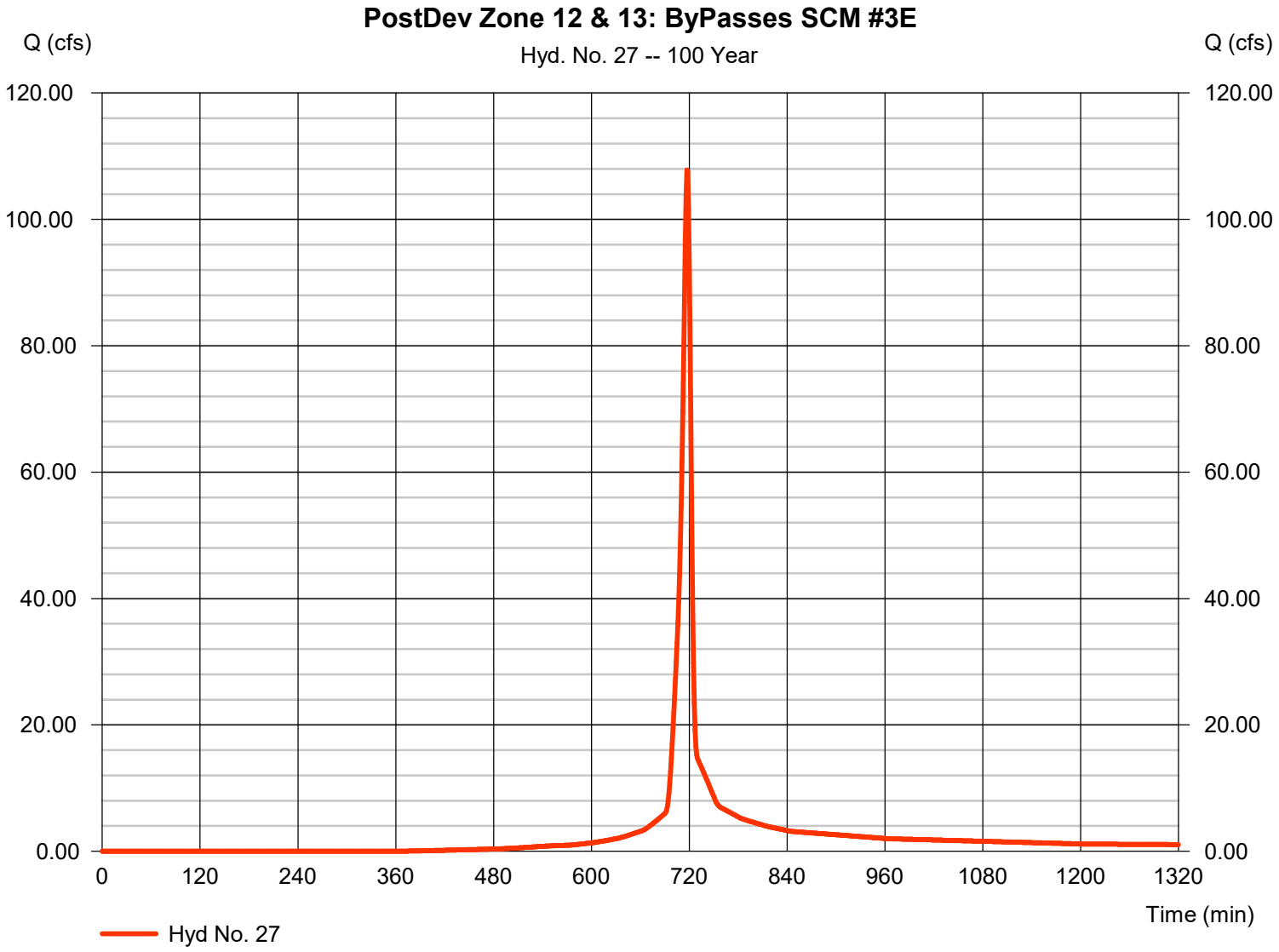


Hydrograph Report

Hyd. No. 27

PostDev Zone 12 & 13: ByPasses SCM #3E

Hydrograph type	=	SCS Runoff	Peak discharge	=	107.80 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	223,737 cuft
Drainage area	=	12.500 ac	Curve number	=	77
Basin Slope	=	5.7 %	Hydraulic length	=	1080 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.08 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

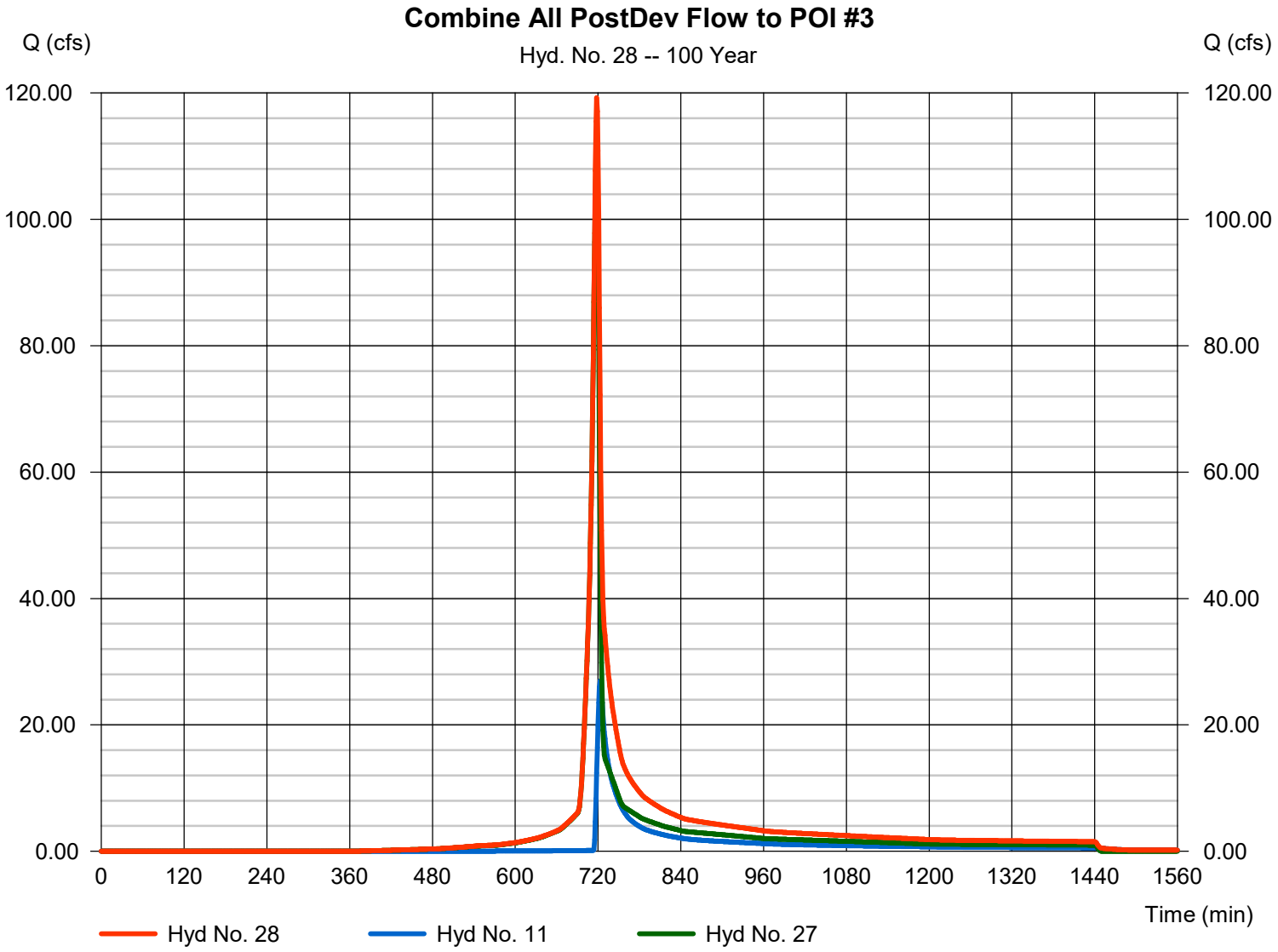


Hydrograph Report

Hyd. No. 28

Combine All PostDev Flow to POI #3

Hydrograph type	= Combine	Peak discharge	= 119.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 321,269 cuft
Inflow hyds.	= 11, 27	Contrib. drain. area	= 12.500 ac



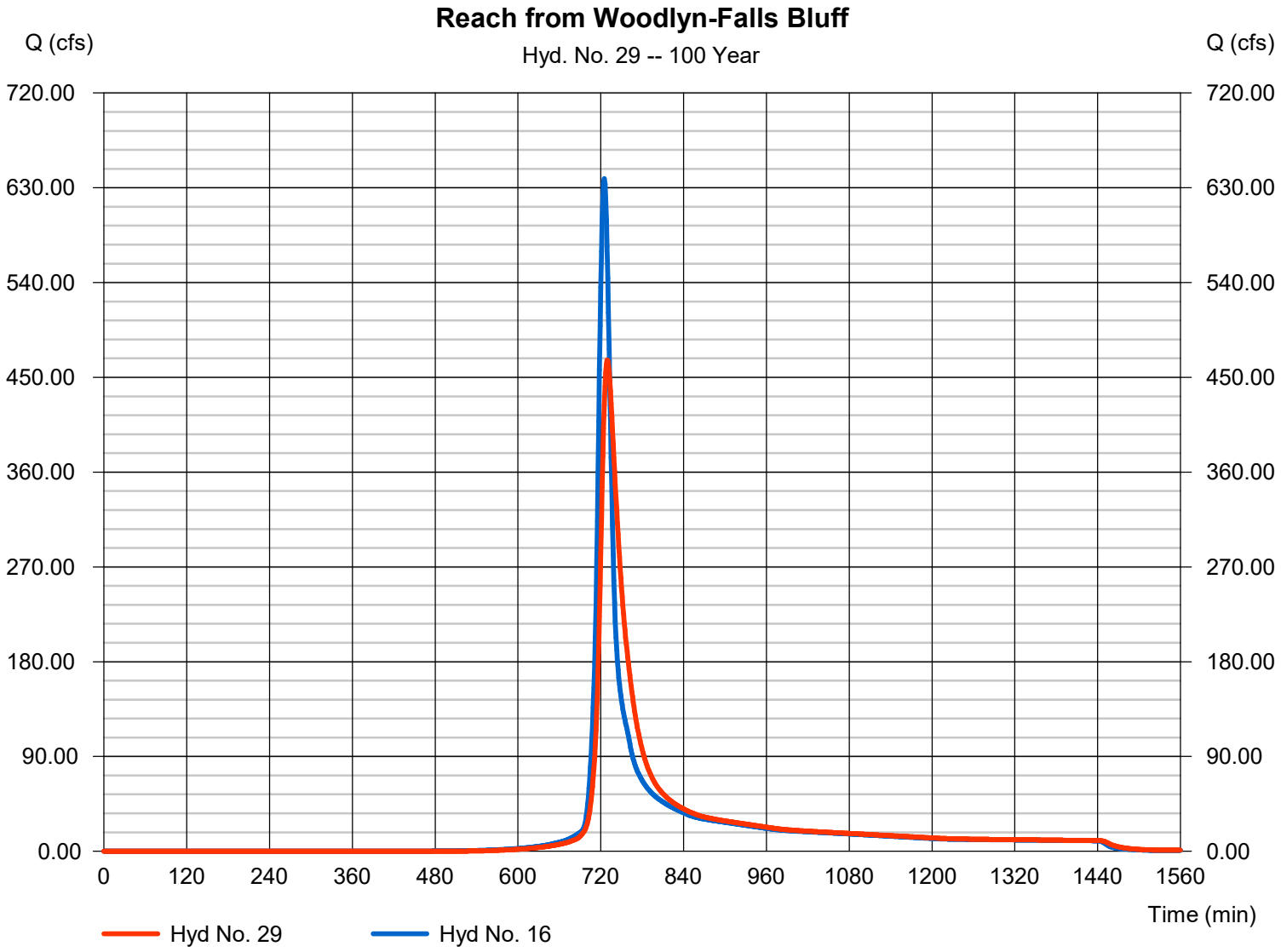
Hydrograph Report

Hyd. No. 29

Reach from Woodlyn-Falls Bluff

Hydrograph type	=	Reach	Peak discharge	=	466.40 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	2,050,065 cuft
Inflow hyd. No.	=	16 - Merge All PostDev @ Woodlyn	Section type	=	Trapezoidal
Reach length	=	12152.0 ft	Channel slope	=	1.0 %
Manning's n	=	0.009	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	6.0 ft
Rating curve x	=	5.011	Rating curve m	=	1.255
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.0813

Modified Att-Kin routing method used.

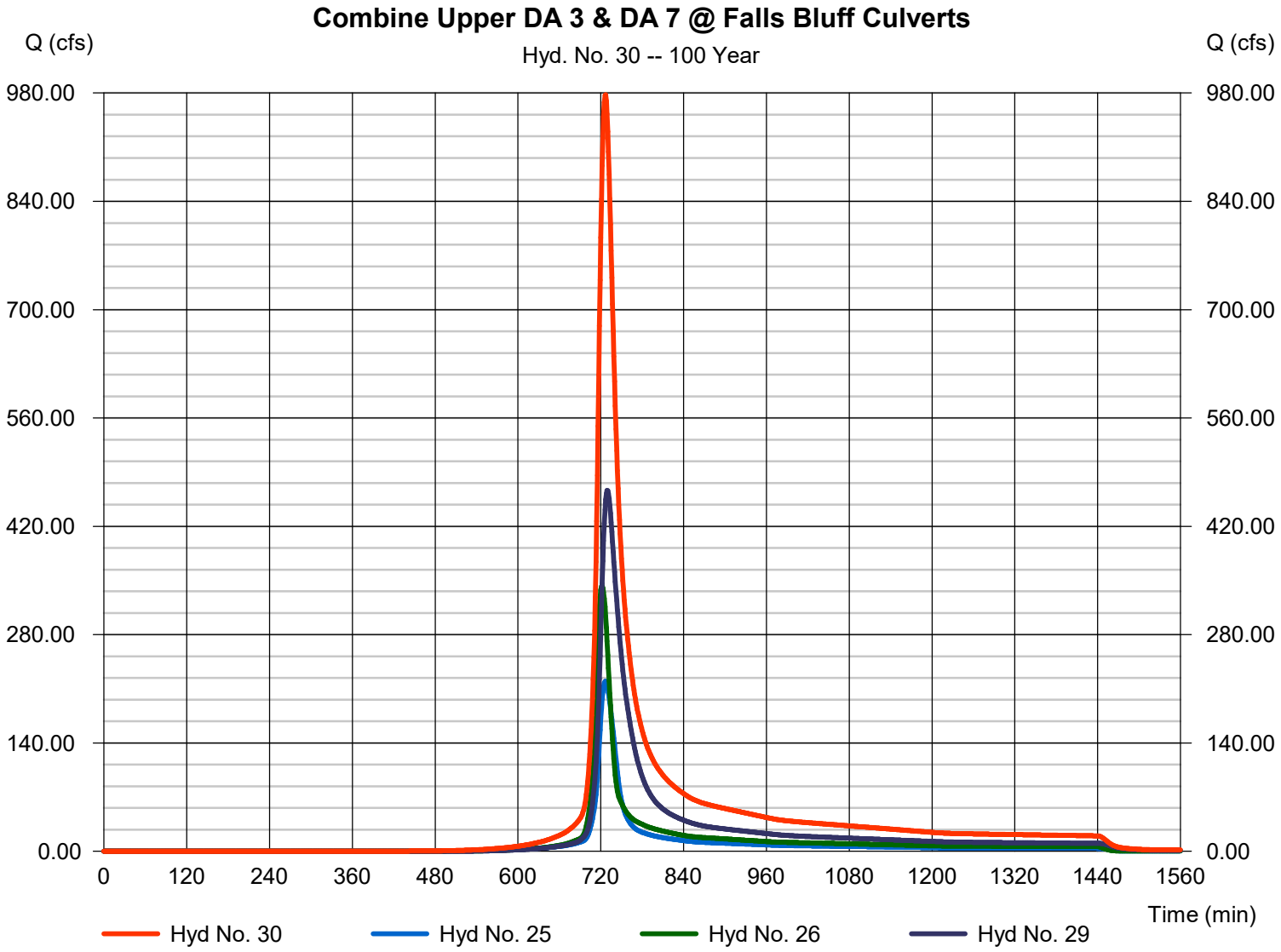


Hydrograph Report

Hyd. No. 30

Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts

Hydrograph type	= Combine	Peak discharge	= 977.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 3,979,723 cuft
Inflow hyds.	= 25, 26, 29	Contrib. drain. area	= 0.000 ac



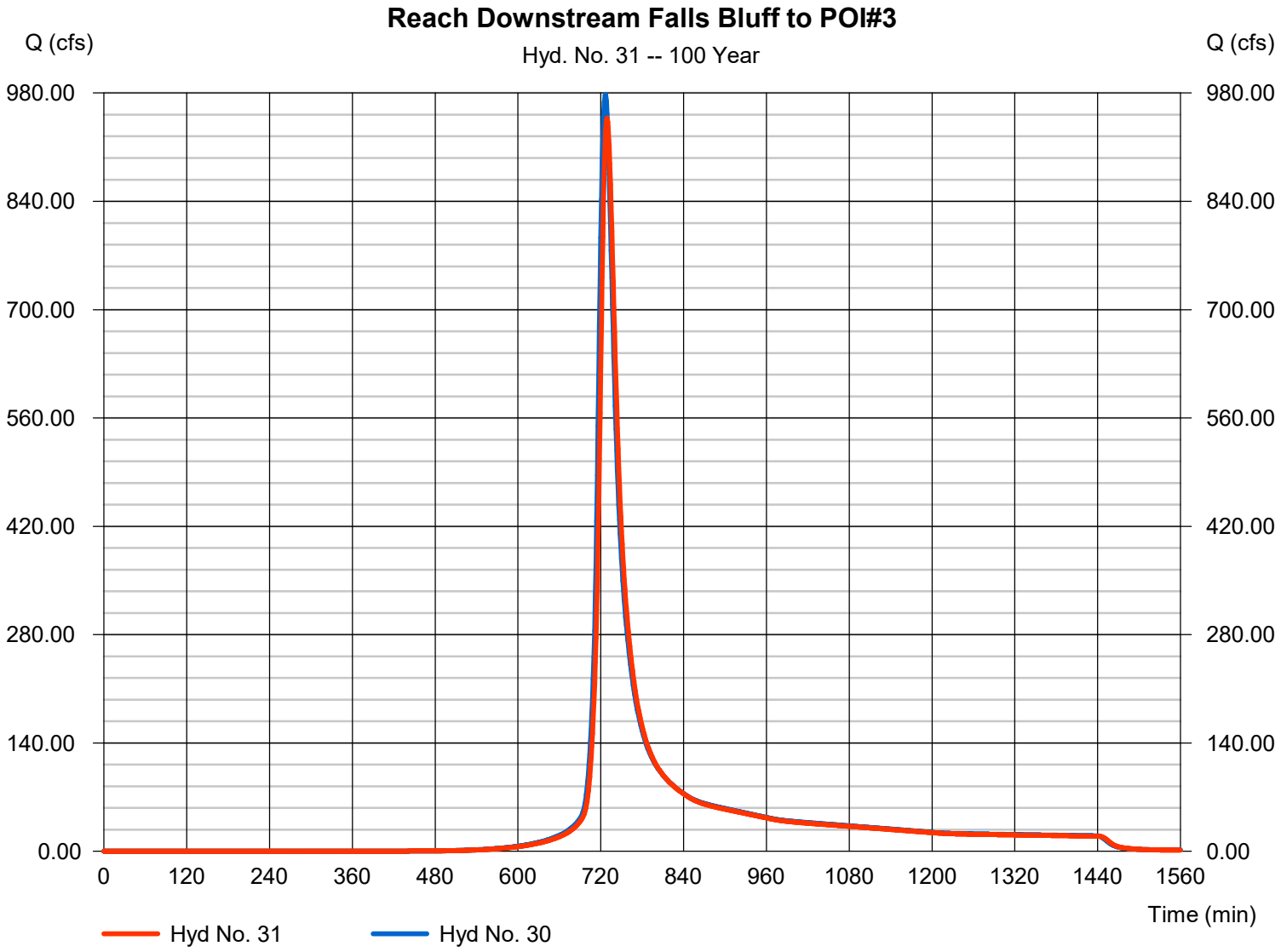
Hydrograph Report

Hyd. No. 31

Reach Downstream Falls Bluff to POI#3

Hydrograph type	=	Reach	Peak discharge	=	947.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	3,884,594 cuft
Inflow hyd. No.	=	30 - Combine Upper DA 3 & DA 7 @ Falls Bluff Culverts	Section type	=	Trapezoidal
Reach length	=	1200.0 ft	Channel slope	=	5.0 %
Manning's n	=	0.030	Bottom width	=	6.0 ft
Side slope	=	20.0:1	Max. depth	=	8.0 ft
Rating curve x	=	3.361	Rating curve m	=	1.269
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.5213

Modified Att-Kin routing method used.

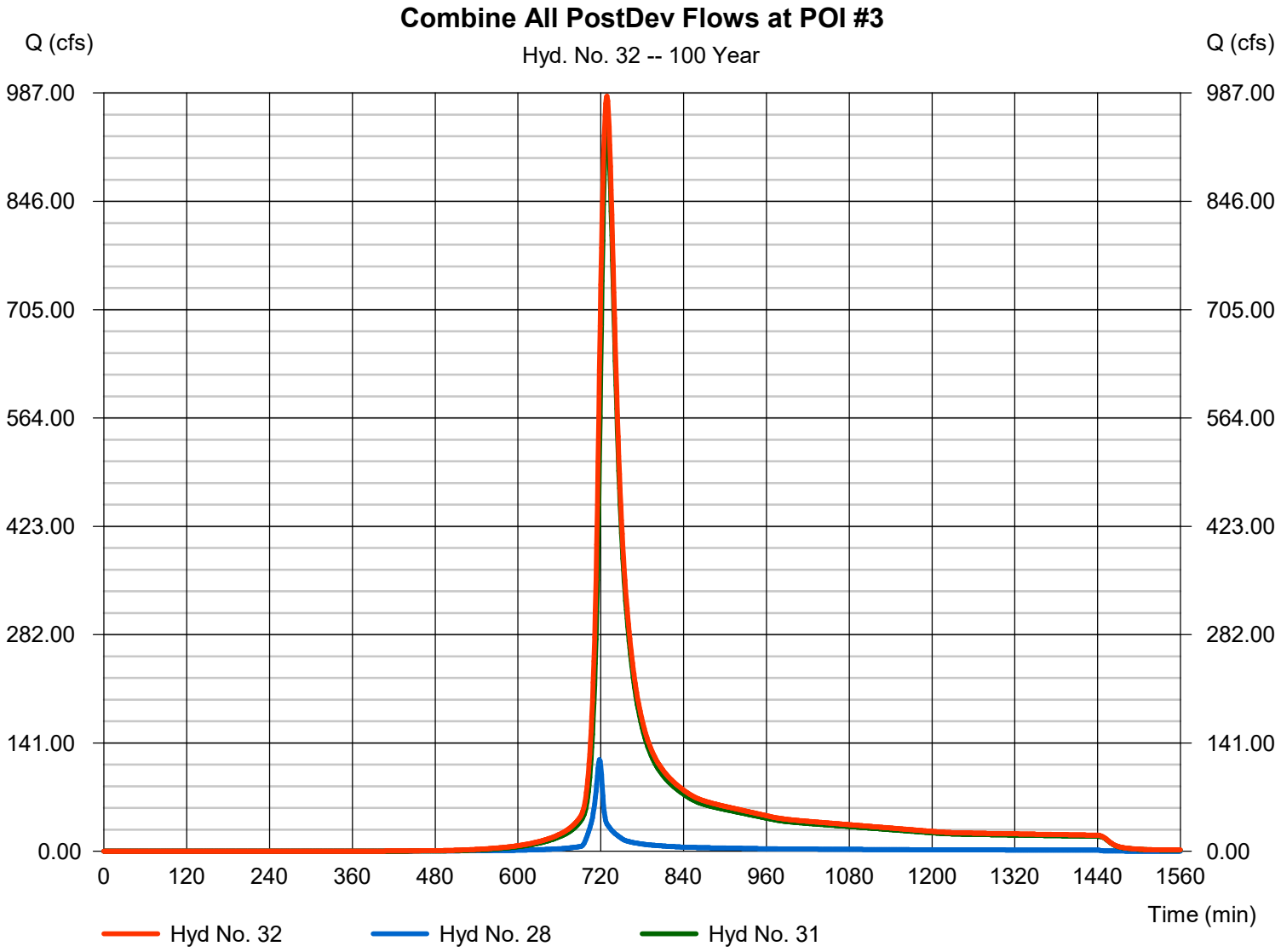


Hydrograph Report

Hyd. No. 32

Combine All PostDev Flows at POI #3

Hydrograph type	= Combine	Peak discharge	= 983.05 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,205,861 cuft
Inflow hyds.	= 28, 31	Contrib. drain. area	= 0.000 ac



Hydraflow Table of Contents

5 - Year

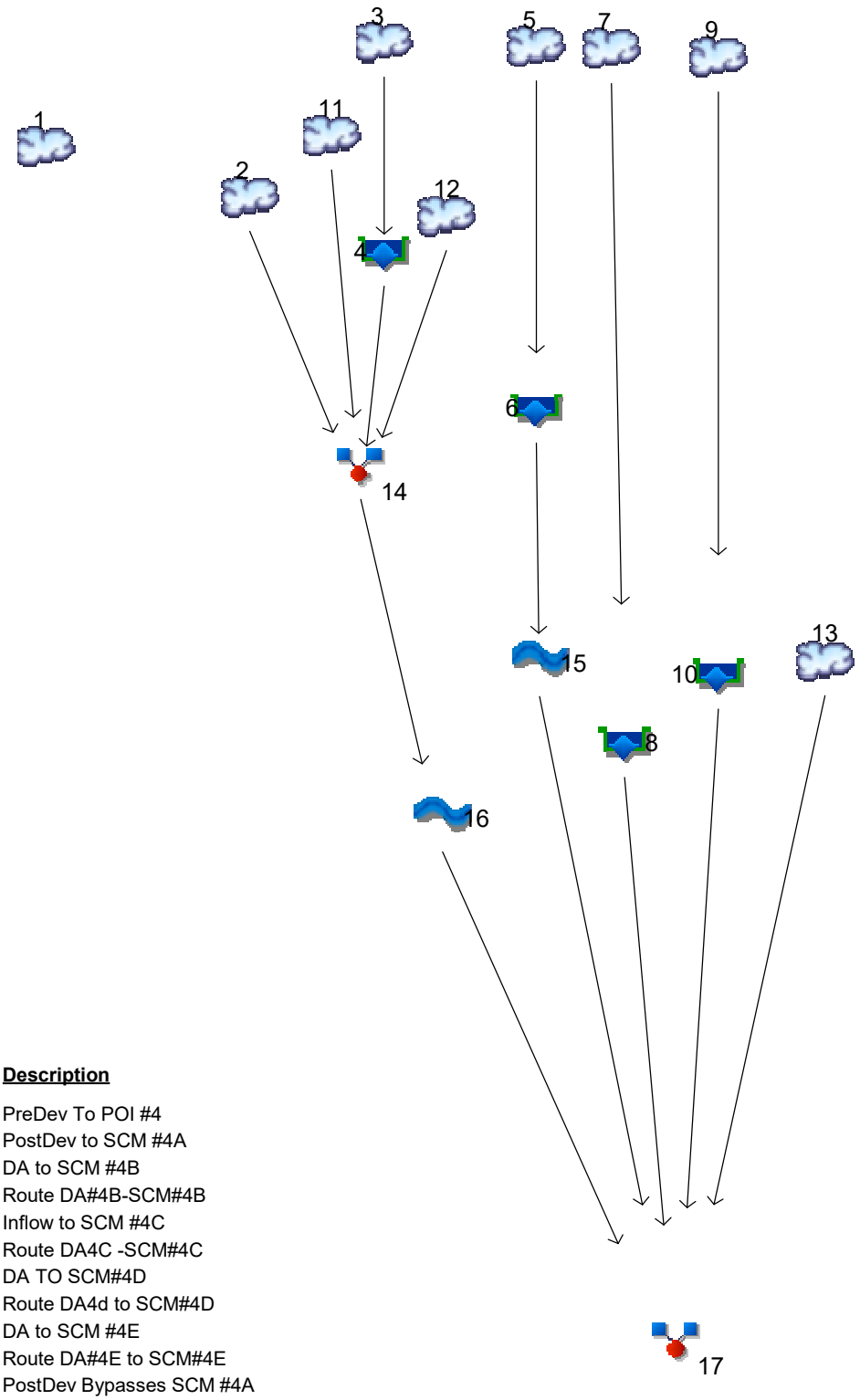
10 - Year

25 - Year

100 - Year

Hydrographs Calculations POI #4

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PreDev To POI #4
2	SCS Runoff	PostDev to SCM #4A
3	SCS Runoff	DA to SCM #4B
4	Reservoir	Route DA#4B-SCM#4B
5	SCS Runoff	Inflow to SCM #4C
6	Reservoir	Route DA4C -SCM#4C
7	SCS Runoff	DA TO SCM#4D
8	Reservoir	Route DA4d to SCM#4D
9	SCS Runoff	DA to SCM #4E
10	Reservoir	Route DA#4E to SCM#4E
11	SCS Runoff	PostDev Bypasses SCM #4A
12	SCS Runoff	PostDev Bypasses SCM #4B
13	SCS Runoff	PostDev Bypasses SCM 4C, 4D, & 4E
14	Combine	Merge SCM 4A, 4B & Bypasses
15	Reach	Reach from SCM #4C to POI #4
16	Reach	Reach-Donnington to POI3$
17	Combine	Sum PostDev Flows @ POI#4

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

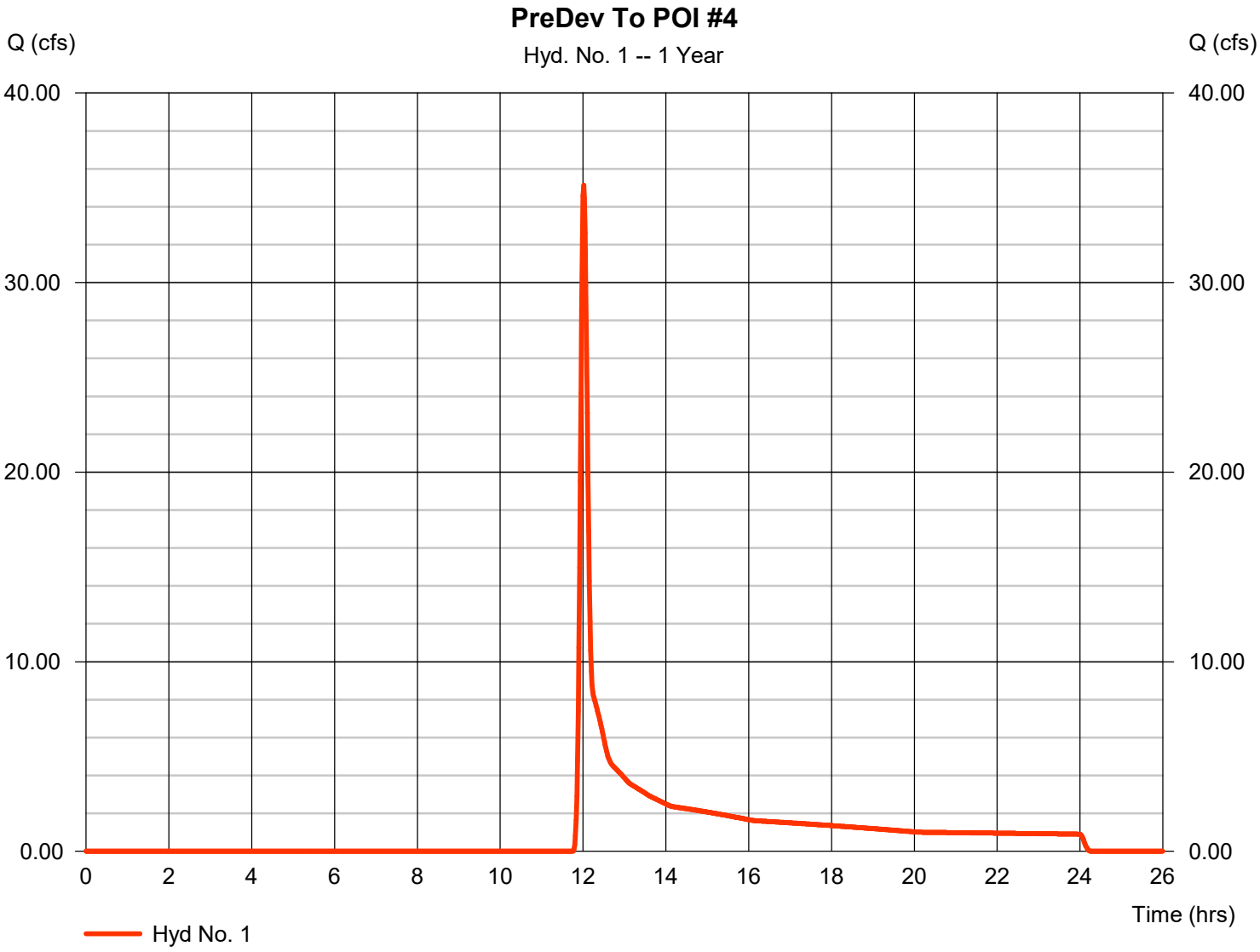
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	35.14	1	721	102,251	------	------	------	PreDev To POI #4
2	SCS Runoff	11.92	1	722	30,799	------	------	------	PostDev to SCM #4A
3	SCS Runoff	14.09	1	721	35,822	------	------	------	DA to SCM #4B
4	Reservoir	0.168	1	1445	19,816	3	326.13	49,434	Route DA#4B-SCM#4B
5	SCS Runoff	22.56	1	721	54,933	------	------	------	Inflow to SCM #4C
6	Reservoir	0.174	1	1447	21,132	5	296.33	80,795	Route DA4C -SCM#4C
7	SCS Runoff	12.90	1	719	27,835	------	------	------	DA TO SCM#4D
8	Reservoir	0.228	1	1175	13,880	7	283.05	37,427	Route DA4d to SCM#4D
9	SCS Runoff	15.54	1	721	37,955	------	------	------	DA to SCM #4E
10	Reservoir	0.155	1	1446	18,360	9	282.75	65,540	Route DA#4E to SCM#4E
11	SCS Runoff	4.716	1	718	9,479	------	------	------	PostDev Bypasses SCM #4A
12	SCS Runoff	0.500	1	721	3,493	------	------	------	PostDev Bypasses SCM #4B
13	SCS Runoff	13.33	1	718	27,376	------	------	------	PostDev Bypasses SCM 4C, 4D, & 4
14	Combine	16.28	1	720	65,629	2, 4, 11, 12,	------	------	Merge SCM 4A, 4B & Bypasses
15	Reach	0.156	1	1450	18,700	6	------	------	Reach from SCM #4C to POI #4
16	Reach	14.24	1	724	65,590	14	------	------	Reach-Donnington to POI3$
17	Combine	24.39	1	720	143,907	8, 10, 13, 15, 16	------	------	Sum PostDev Flows @ POI#4

Hydrograph Report

Hyd. No. 1

PreDev To POI #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.14 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	102,251 cuft
Drainage area	=	63.520 ac	Curve number	=	63.3
Basin Slope	=	4.1 %	Hydraulic length	=	1900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	8.96 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

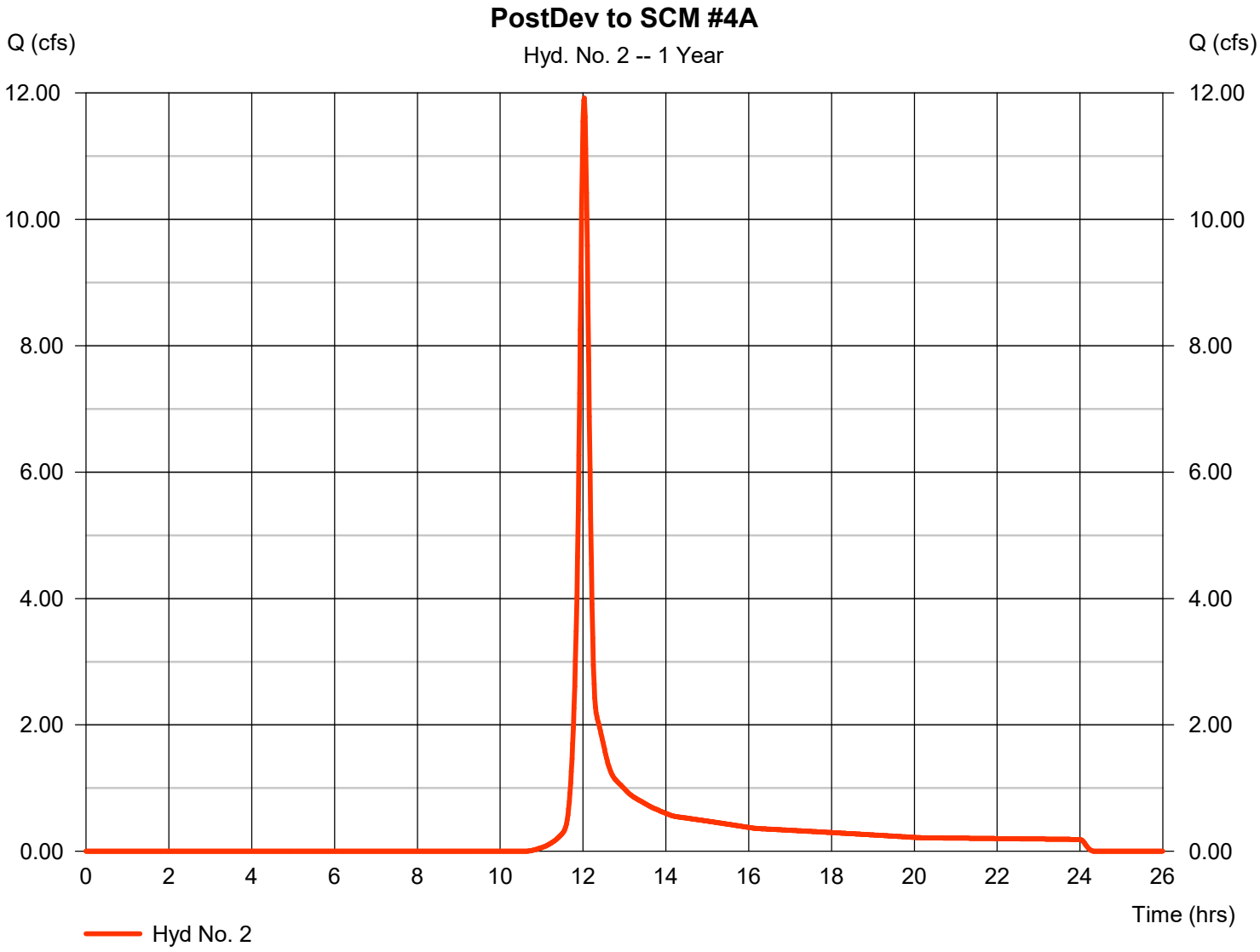


Hydrograph Report

Hyd. No. 2

PostDev to SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.92 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.03 hrs
Time interval	=	1 min	Hyd. volume	=	30,799 cuft
Drainage area	=	8.310 ac	Curve number	=	76.4
Basin Slope	=	3.3 %	Hydraulic length	=	1200 ft
Tc method	=	User	Time of conc. (Tc)	=	12.20 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

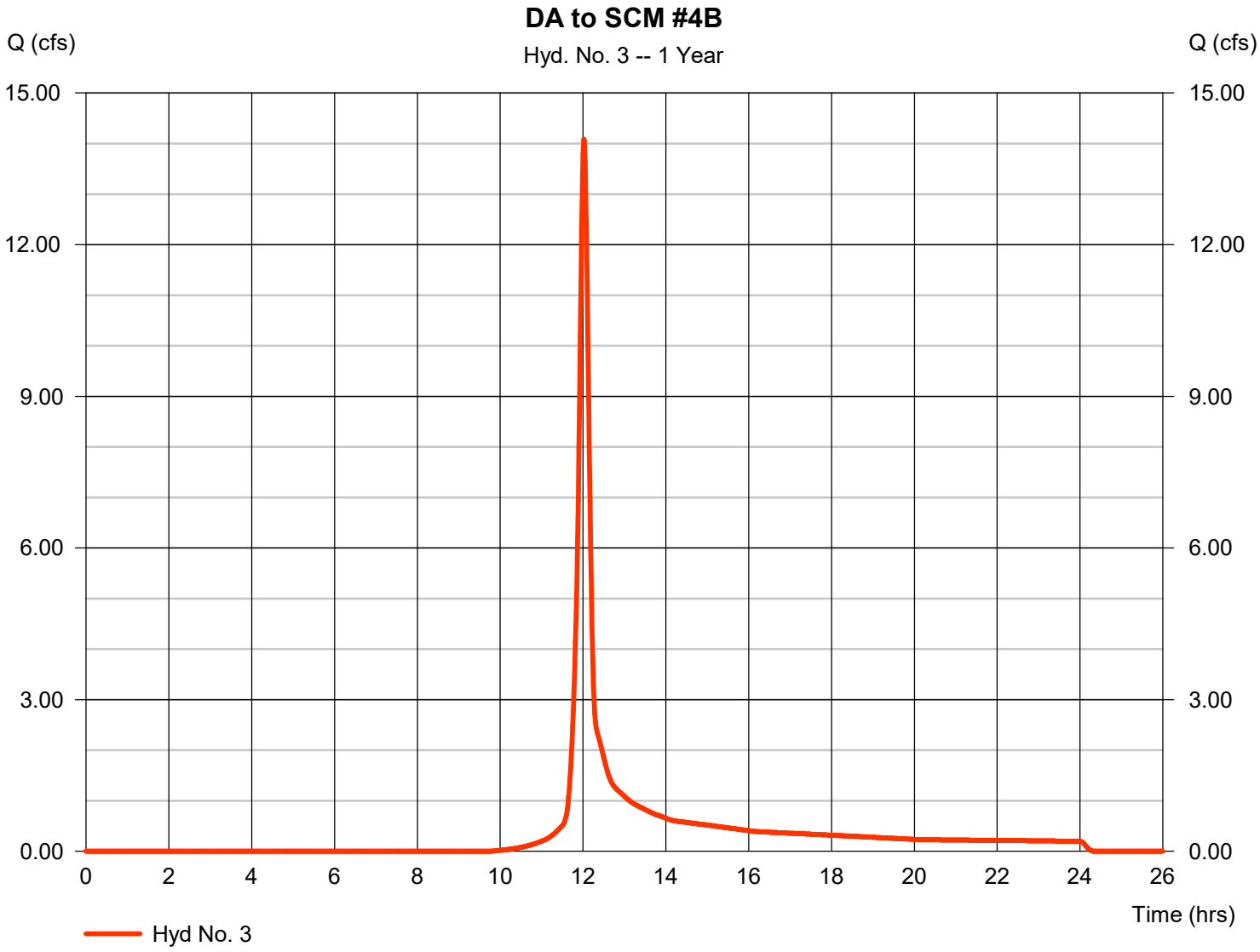


Hydrograph Report

Hyd. No. 3

DA to SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.09 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	35,822 cuft
Drainage area	=	8.020 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



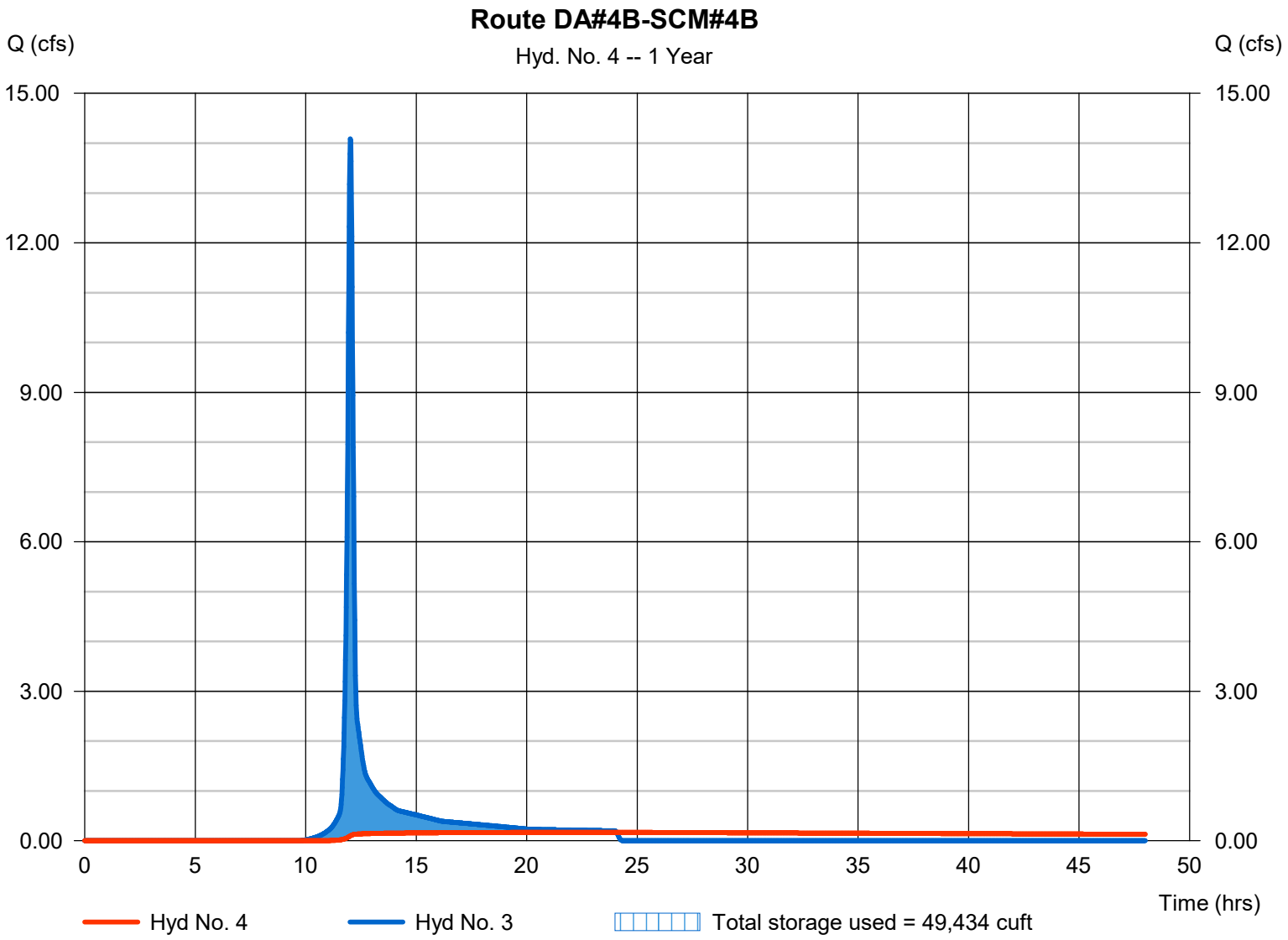
Hydrograph Report

Hyd. No. 4

Route DA#4B-SCM#4B

Hydrograph type	= Reservoir	Peak discharge	= 0.168 cfs
Storm frequency	= 1 yrs	Time to peak	= 24.08 hrs
Time interval	= 1 min	Hyd. volume	= 19,816 cuft
Inflow hyd. No.	= 3 - DA to SCM #4B	Max. Elevation	= 326.13 ft
Reservoir name	= SCM #4B	Max. Storage	= 49,434 cuft

Storage Indication method used. Wet pond routing start elevation = 323.50 ft.



Pond Report

Pond No. 2 - SCM #4B

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 320.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	320.00	4,319	0	0
1.00	321.00	5,144	4,725	4,725
2.00	322.00	6,038	5,584	10,310
3.00	323.00	7,002	6,513	16,823
3.50	323.50	8,571	3,886	20,709
4.00	324.00	9,843	4,599	25,309
5.00	325.00	11,180	10,503	35,812
6.00	326.00	12,584	11,874	47,686
7.00	327.00	14,053	13,310	60,996
8.00	328.00	15,588	14,812	75,809
9.00	329.00	17,189	16,380	92,189

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	2.00	6.00	0.00
Span (in)	= 30.00	2.00	24.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	323.50	326.50	0.00
Length (ft)	= 81.00	0.50	0.50	0.00
Slope (%)	= 0.50	0.50	0.01	n/a
N-Value	= .013	.013	3.330	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

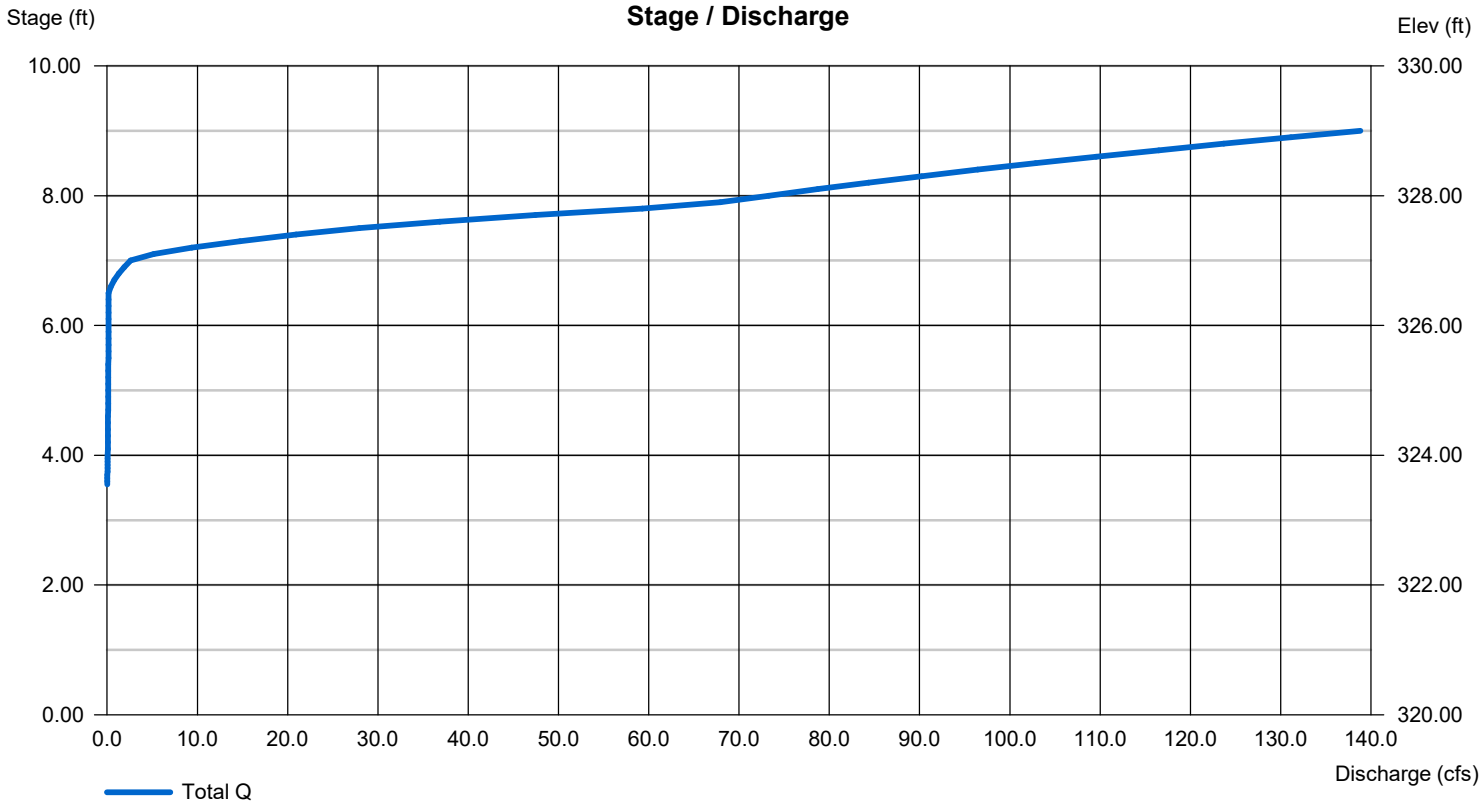
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 20.00	12.00	0.00	0.00
Crest El. (ft)	= 327.00	327.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

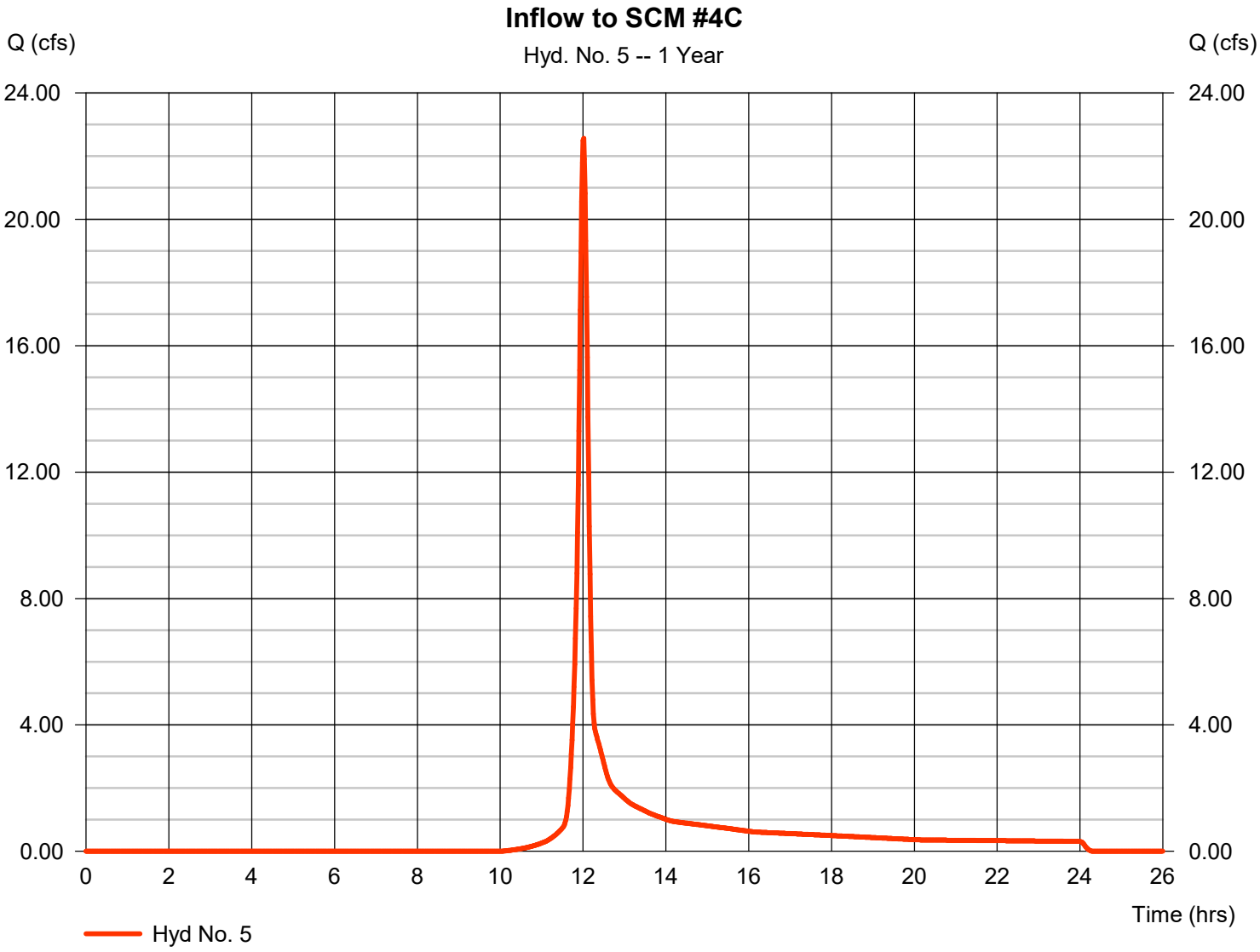


Hydrograph Report

Hyd. No. 5

Inflow to SCM #4C

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.56 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	54,933 cuft
Drainage area	=	12.510 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.20 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



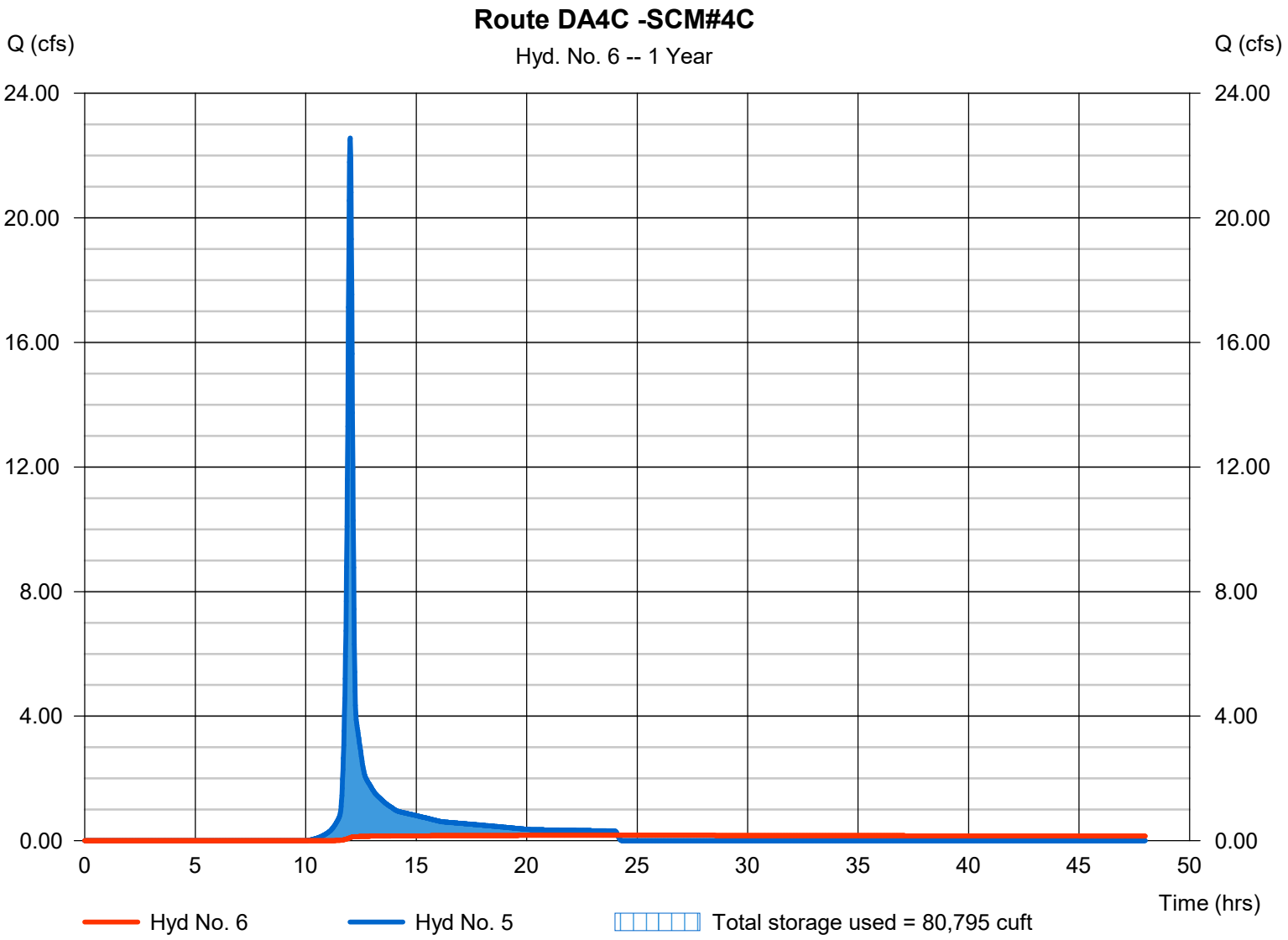
Hydrograph Report

Hyd. No. 6

Route DA4C -SCM#4C

Hydrograph type	=	Reservoir	Peak discharge	=	0.174 cfs
Storm frequency	=	1 yrs	Time to peak	=	24.12 hrs
Time interval	=	1 min	Hyd. volume	=	21,132 cuft
Inflow hyd. No.	=	5 - Inflow to SCM #4C	Max. Elevation	=	296.33 ft
Reservoir name	=	SCM #4C	Max. Storage	=	80,795 cuft

Storage Indication method used. Wet pond routing start elevation = 293.50 ft.



Pond Report

Pond No. 3 - SCM #4C

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 290.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	290.00	7,259	0	0
1.00	291.00	8,435	7,839	7,839
2.00	292.00	9,658	9,039	16,878
3.00	293.00	10,922	10,283	27,160
3.50	293.50	12,884	5,944	33,104
4.00	294.00	14,922	6,945	40,049
5.00	295.00	17,038	15,967	56,016
6.00	296.00	19,232	18,122	74,138
7.00	297.00	21,503	20,355	94,493
8.00	298.00	23,850	22,664	117,157
9.00	299.00	26,269	25,047	142,204
10.00	300.00	28,763	27,504	169,708

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.00	6.00	0.00
Span (in)	= 18.00	2.00	24.00	0.00
No. Barrels	= 1	1	3	0
Invert El. (ft)	= 289.90	293.50	296.40	0.00
Length (ft)	= 67.00	0.50	0.50	0.00
Slope (%)	= 0.50	0.50	0.01	n/a
N-Value	= .013	.013	3.330	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

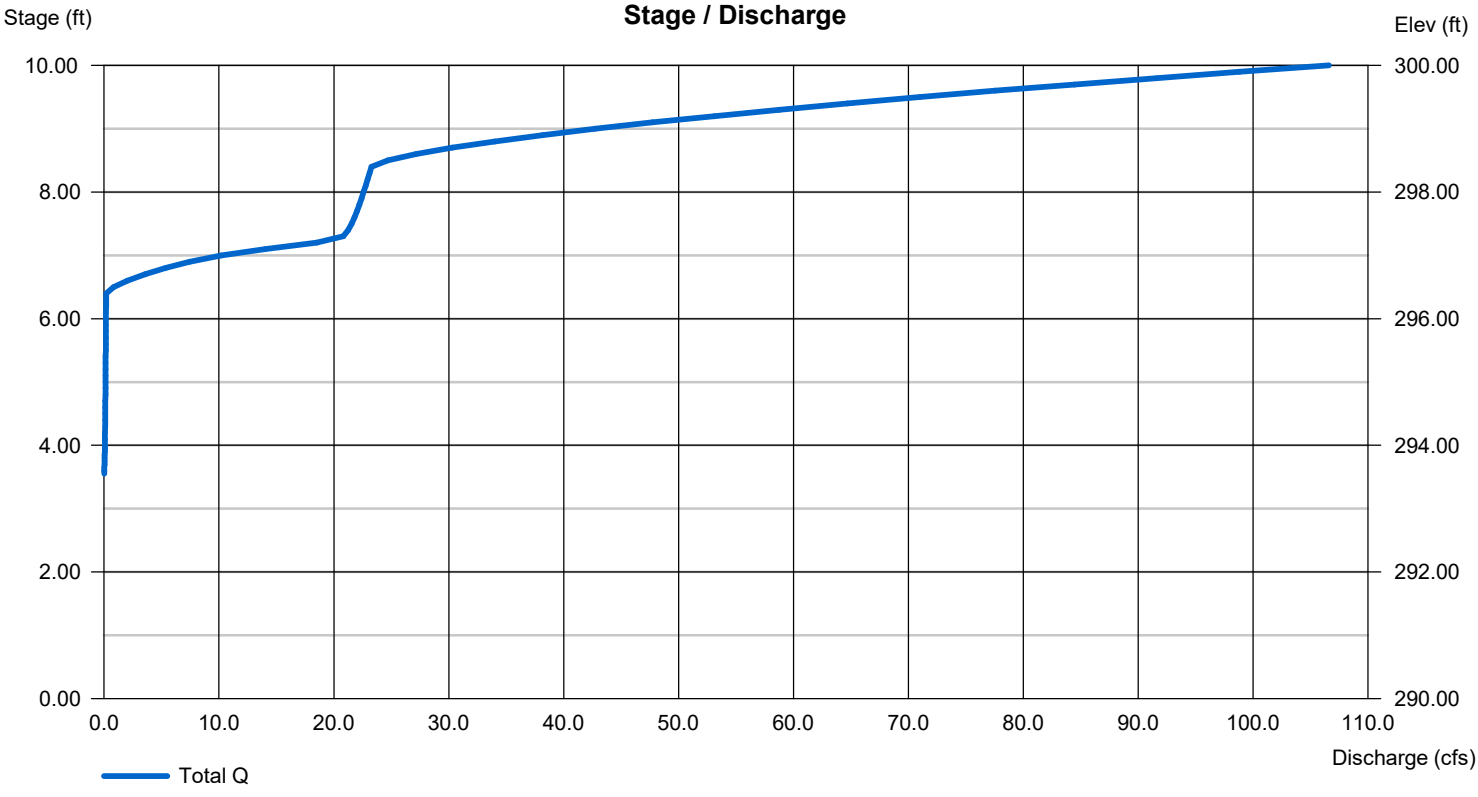
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	12.00	0.00	0.00
Crest El. (ft)	= 296.90	298.40	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

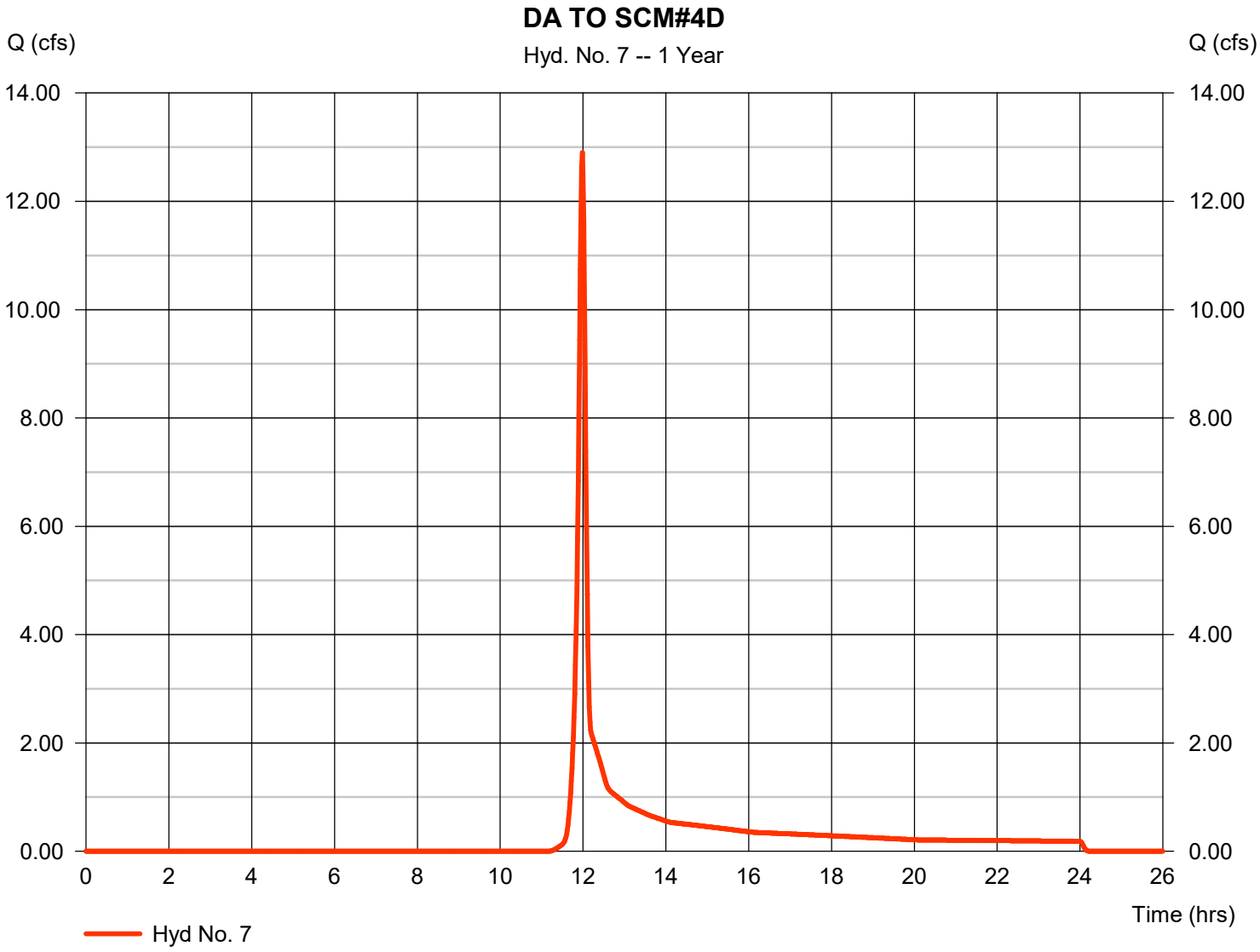


Hydrograph Report

Hyd. No. 7

DA TO SCM#4D

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.90 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.98 hrs
Time interval	=	1 min	Hyd. volume	=	27,835 cuft
Drainage area	=	9.120 ac	Curve number	=	73.1
Basin Slope	=	6.0 %	Hydraulic length	=	1465 ft
Tc method	=	User	Time of conc. (Tc)	=	8.20 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



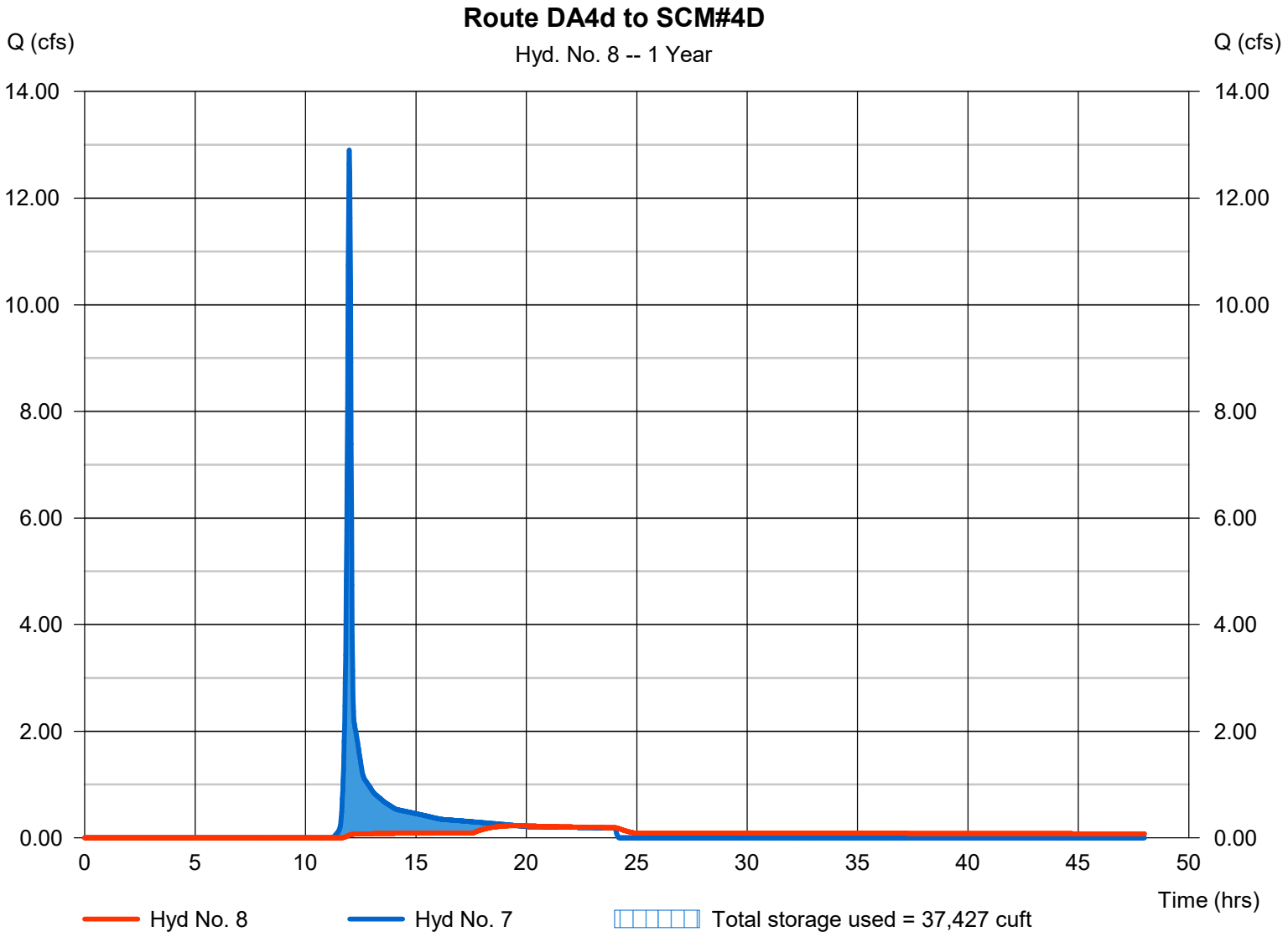
Hydrograph Report

Hyd. No. 8

Route DA4d to SCM#4D

Hydrograph type	= Reservoir	Peak discharge	= 0.228 cfs
Storm frequency	= 1 yrs	Time to peak	= 19.58 hrs
Time interval	= 1 min	Hyd. volume	= 13,880 cuft
Inflow hyd. No.	= 7 - DA TO SCM#4D	Max. Elevation	= 283.05 ft
Reservoir name	= SCM #4D	Max. Storage	= 37,427 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.



Pond Report

Pond No. 4 - SCM #4D

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 277.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	277.00	3,412	0	0
1.00	278.00	4,008	3,706	3,706
2.00	279.00	4,633	4,316	8,022
3.00	280.00	5,288	4,956	12,978
3.50	280.50	6,444	2,928	15,906
4.00	281.00	7,560	3,497	19,403
5.00	282.00	8,738	8,141	27,544
6.00	283.00	9,978	9,350	36,895
7.00	284.00	11,275	10,619	47,513
8.00	285.00	12,648	11,954	59,467
9.00	286.00	14,068	13,350	72,817

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	1.50	6.00	0.00
Span (in)	= 30.00	1.50	30.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 277.00	280.50	283.00	0.00
Length (ft)	= 64.00	0.50	0.50	0.00
Slope (%)	= 0.50	0.50	0.01	n/a
N-Value	= .013	.013	3.330	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

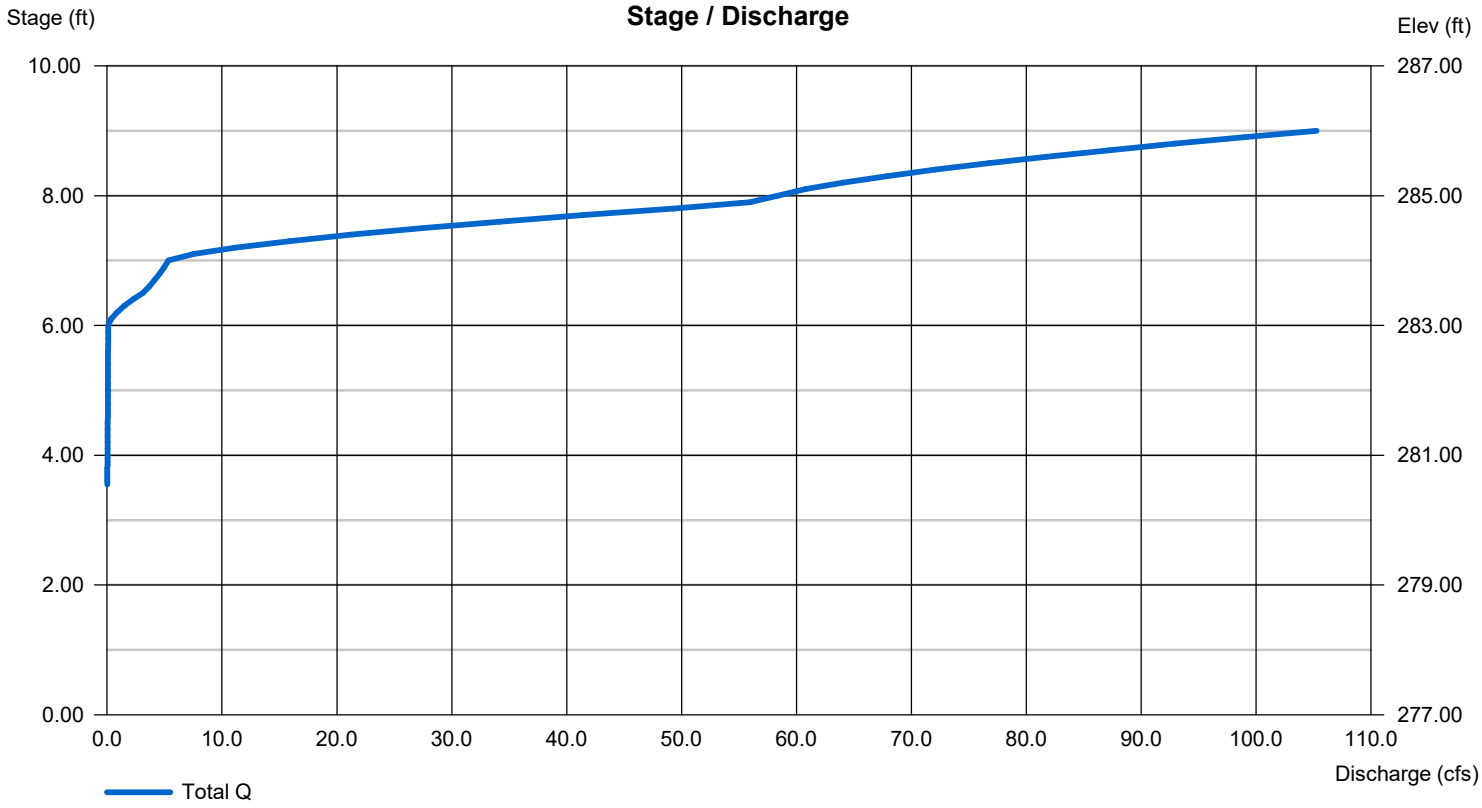
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 17.50	12.00	0.00	0.00
Crest El. (ft)	= 284.00	285.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

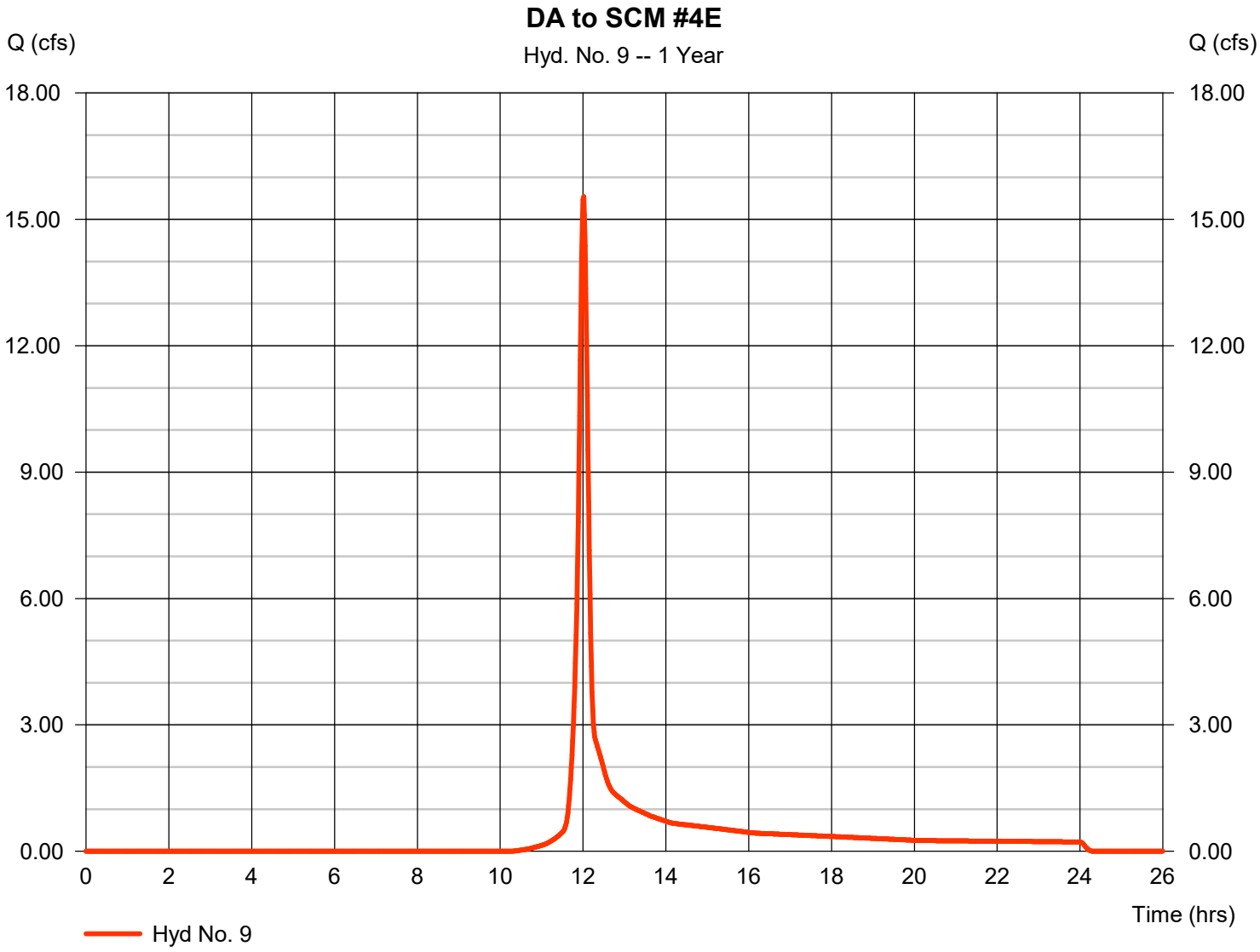


Hydrograph Report

Hyd. No. 9

DA to SCM #4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.54 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	37,955 cuft
Drainage area	=	9.100 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.80 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



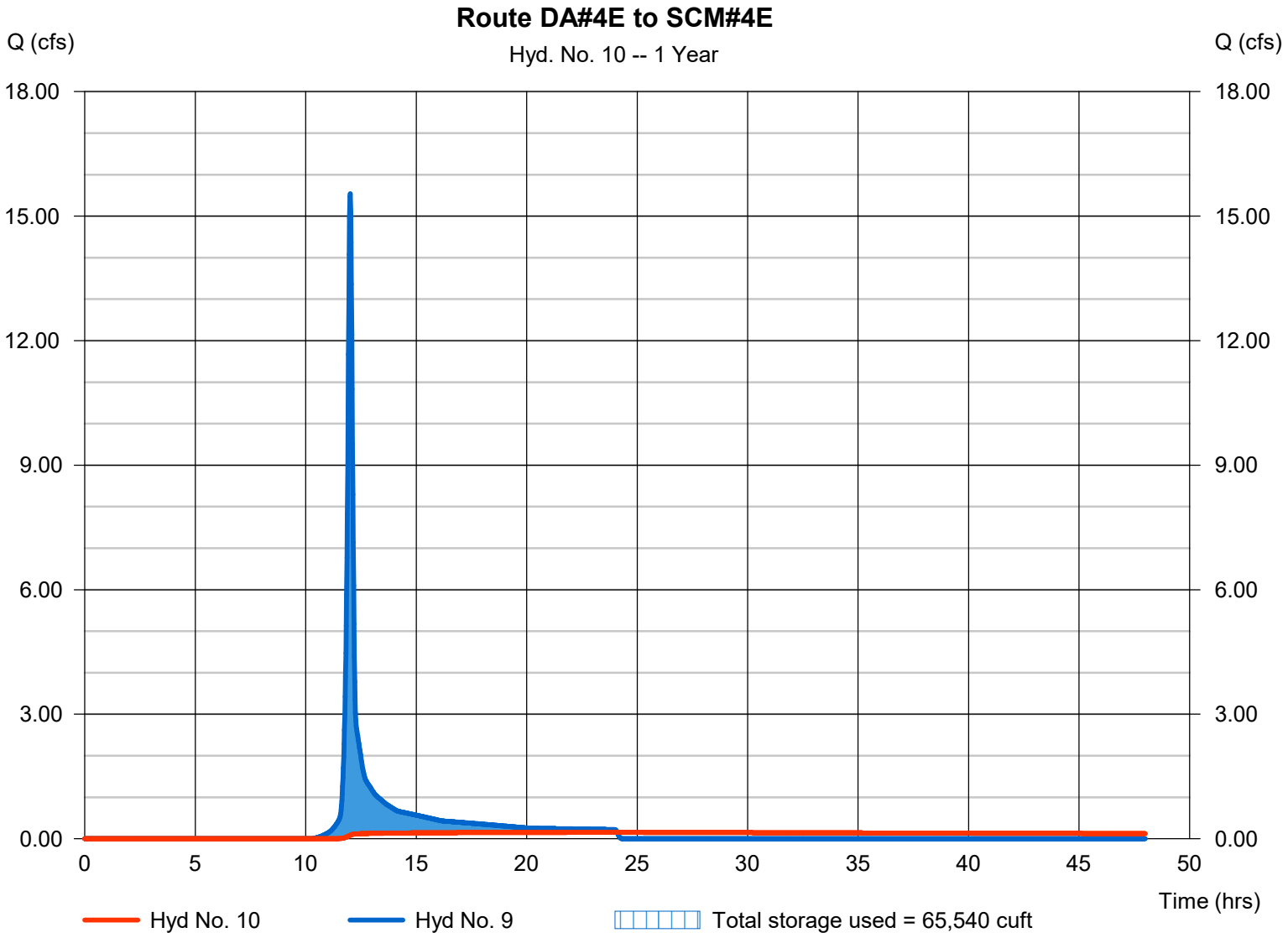
Hydrograph Report

Hyd. No. 10

Route DA#4E to SCM#4E

Hydrograph type	= Reservoir	Peak discharge	= 0.155 cfs
Storm frequency	= 1 yrs	Time to peak	= 24.10 hrs
Time interval	= 1 min	Hyd. volume	= 18,360 cuft
Inflow hyd. No.	= 9 - DA to SCM #4E	Max. Elevation	= 282.75 ft
Reservoir name	= SCM #4E	Max. Storage	= 65,540 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.



Pond Report

Pond No. 5 - SCM #4E

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 277.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	277.00	8,344	0	0
1.00	278.00	9,076	8,707	8,707
2.00	279.00	9,838	9,453	18,160
3.00	280.00	10,628	10,229	28,389
3.50	280.50	11,860	5,619	34,008
4.00	281.00	13,150	6,249	40,257
5.00	282.00	14,540	13,838	54,095
6.00	283.00	15,969	15,247	69,342
7.00	284.00	17,459	16,707	86,049
8.00	285.00	19,011	18,228	104,277
9.00	286.00	20,625	19,811	124,087

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	2.00	6.00	0.00
Span (in)	= 24.00	2.00	27.00	0.00
No. Barrels	= 1	1	3	0
Invert El. (ft)	= 276.90	280.50	283.50	0.00
Length (ft)	= 64.00	0.50	0.50	0.00
Slope (%)	= 0.50	0.50	0.01	n/a
N-Value	= .013	.013	3.330	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

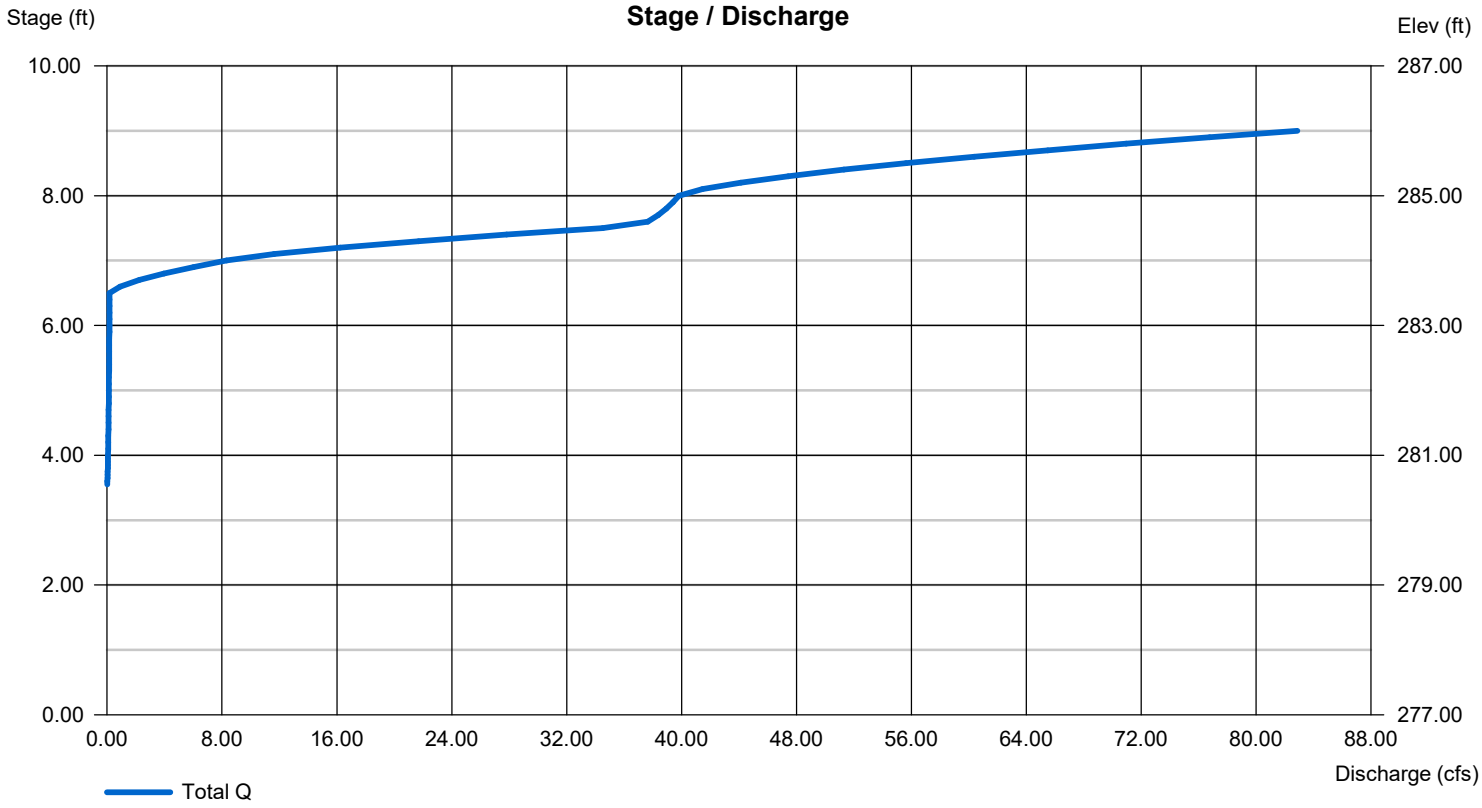
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 17.25	12.00	0.00	0.00
Crest El. (ft)	= 284.00	285.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

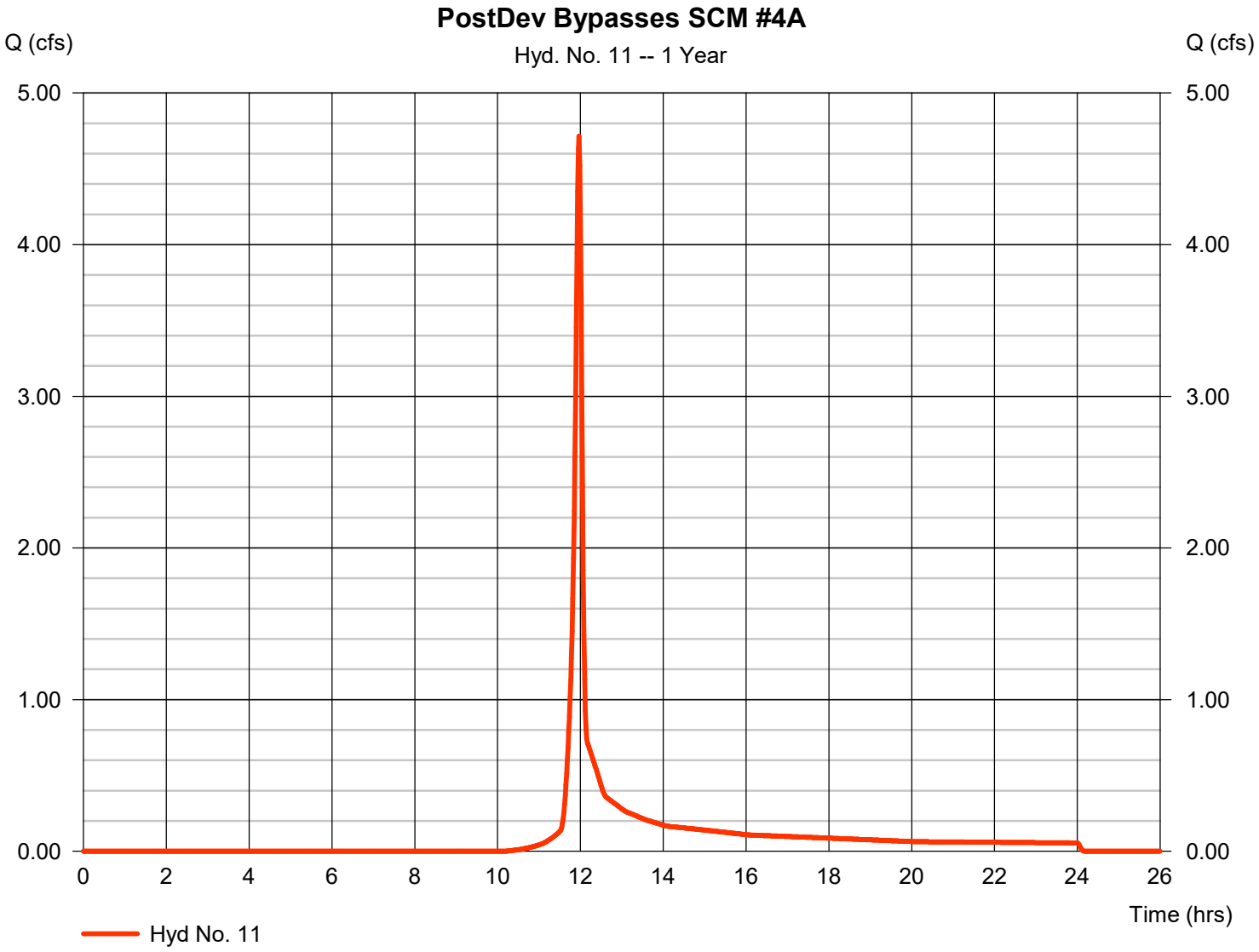


Hydrograph Report

Hyd. No. 11

PostDev Bypasses SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.716 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	9,479 cuft
Drainage area	=	2.220 ac	Curve number	=	78.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

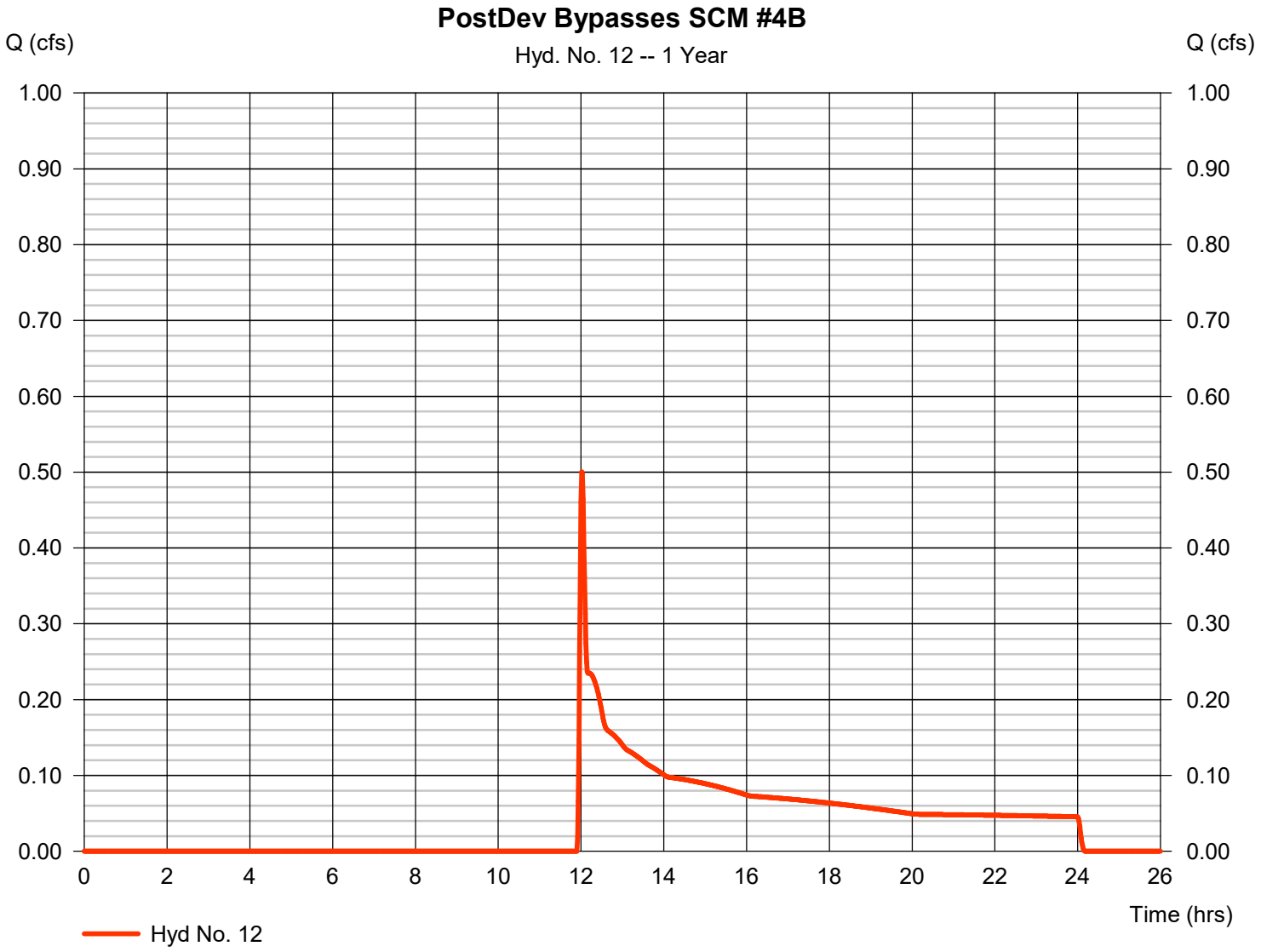


Hydrograph Report

Hyd. No. 12

PostDev Bypasses SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.500 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	3,493 cuft
Drainage area	=	5.240 ac	Curve number	=	54.3
Basin Slope	=	5.1 %	Hydraulic length	=	1220 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.84 min
Total precip.	=	3.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

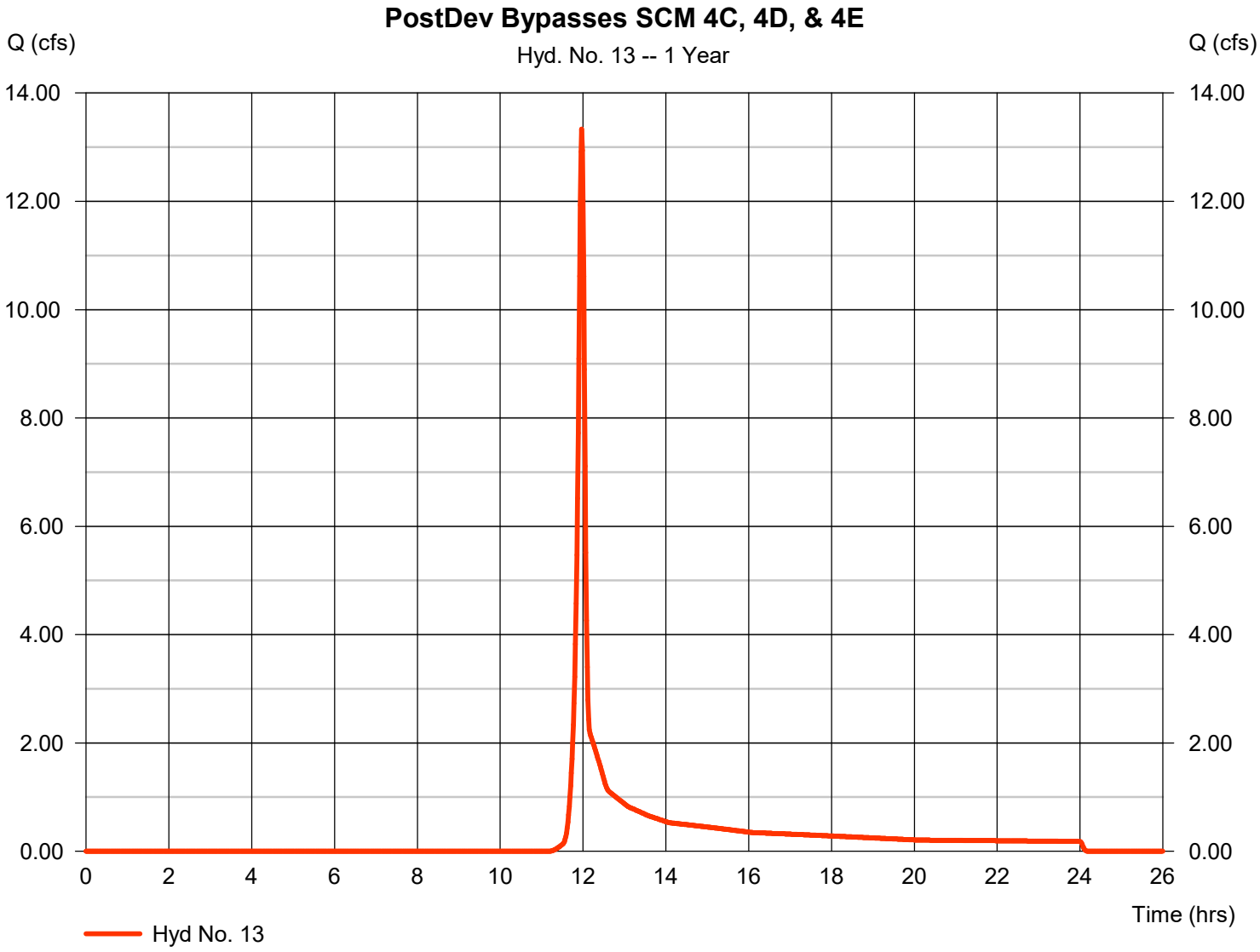


Hydrograph Report

Hyd. No. 13

PostDev Bypasses SCM 4C, 4D, & 4E

Hydrograph type	= SCS Runoff	Peak discharge	= 13.33 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 1 min	Hyd. volume	= 27,376 cuft
Drainage area	= 8.580 ac	Curve number	= 72.9
Basin Slope	= 2.6 %	Hydraulic length	= 900 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 6.02 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

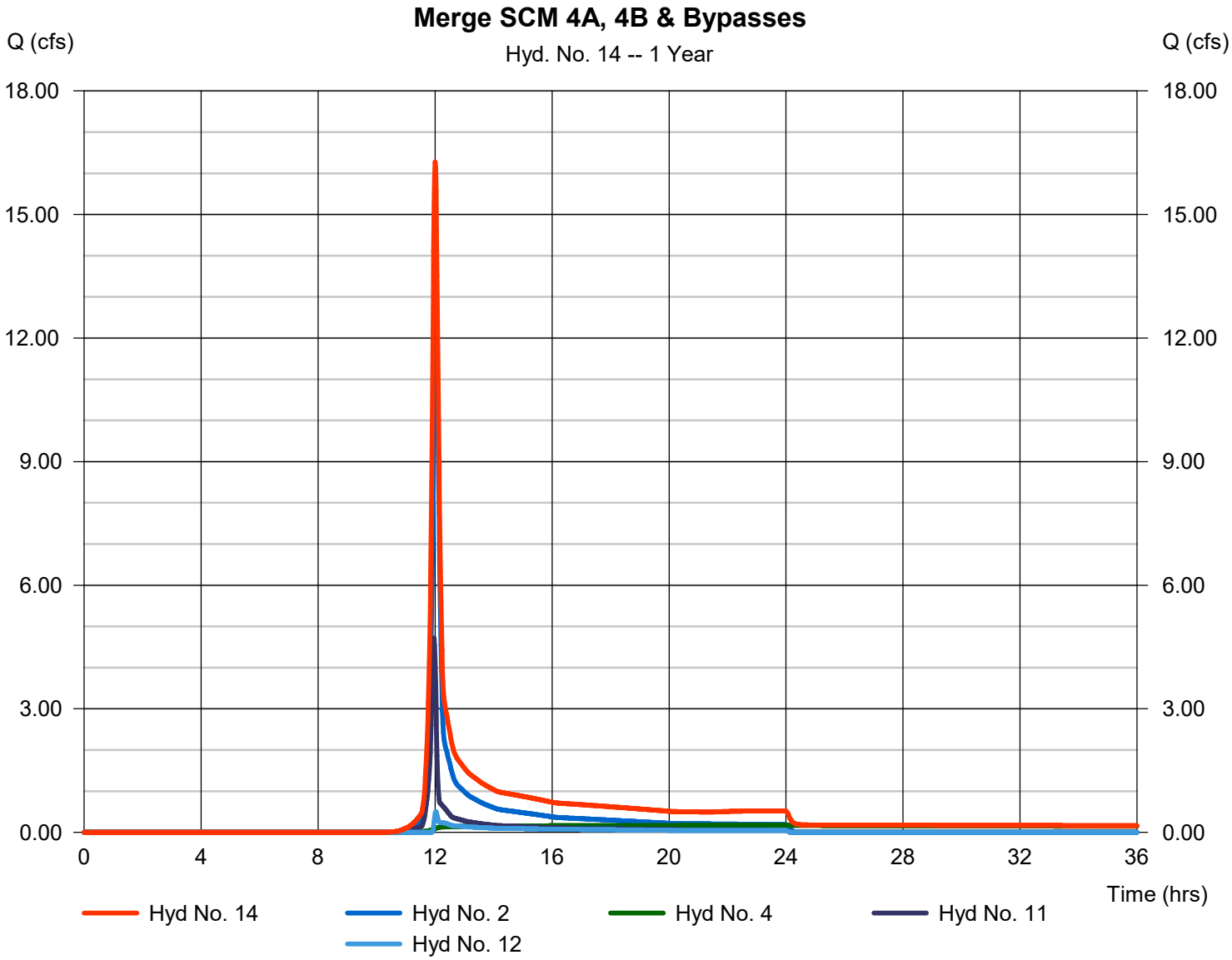


Hydrograph Report

Hyd. No. 14

Merge SCM 4A, 4B & Bypasses

Hydrograph type	= Combine	Peak discharge	= 16.28 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 65,629 cuft
Inflow hyds.	= 2, 4, 11, 12	Contrib. drain. area	= 15.770 ac



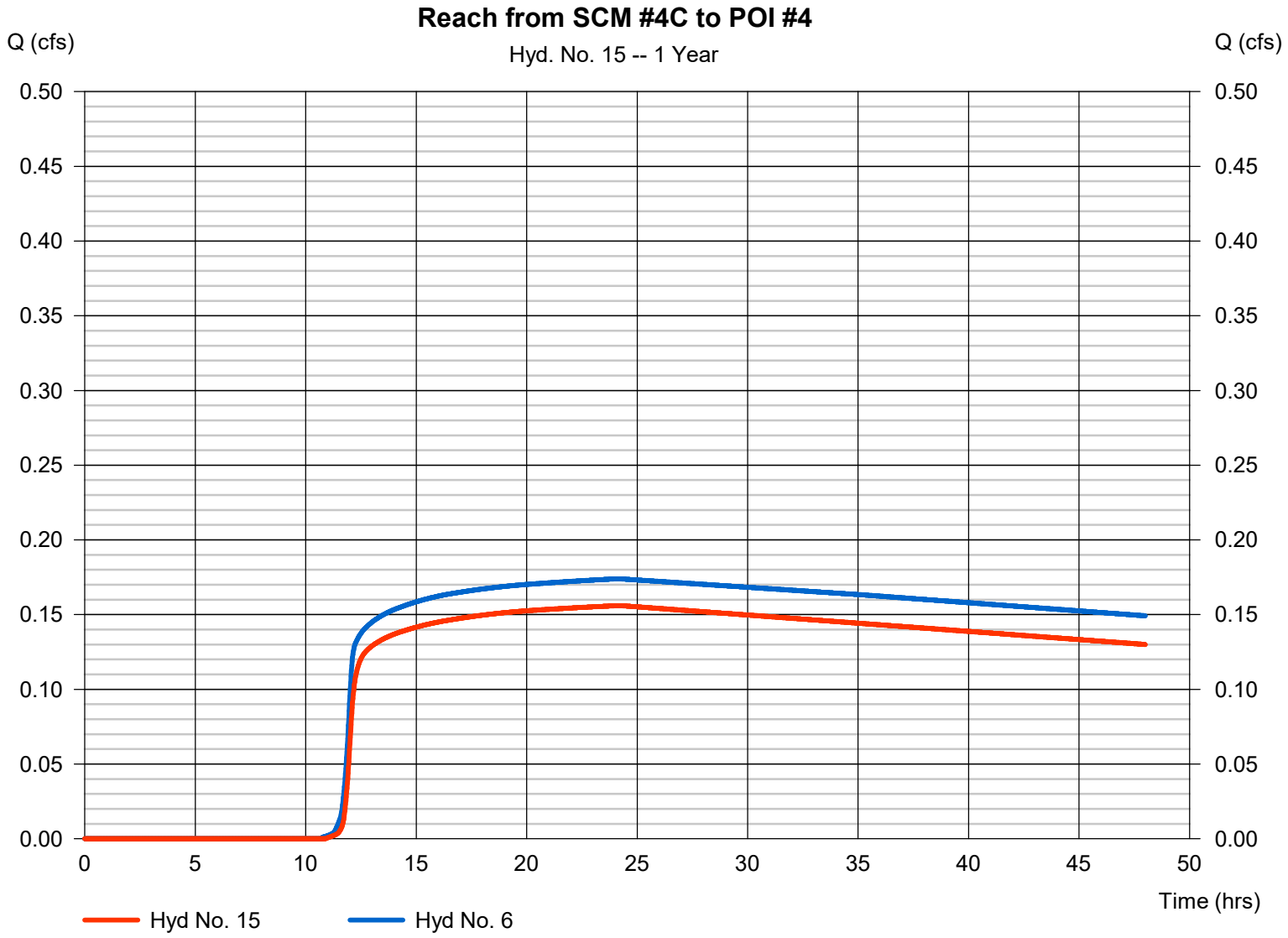
Hydrograph Report

Hyd. No. 15

Reach from SCM #4C to POI #4

Hydrograph type	= Reach	Peak discharge	= 0.156 cfs
Storm frequency	= 1 yrs	Time to peak	= 24.17 hrs
Time interval	= 1 min	Hyd. volume	= 18,700 cuft
Inflow hyd. No.	= 6 - Route DA4C -SCM#4C	Section type	= Trapezoidal
Reach length	= 900.0 ft	Channel slope	= 2.6 %
Manning's n	= 0.032	Bottom width	= 4.0 ft
Side slope	= 25.0:1	Max. depth	= 4.0 ft
Rating curve x	= 2.955	Rating curve m	= 1.189
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.1367

Modified Att-Kin routing method used.



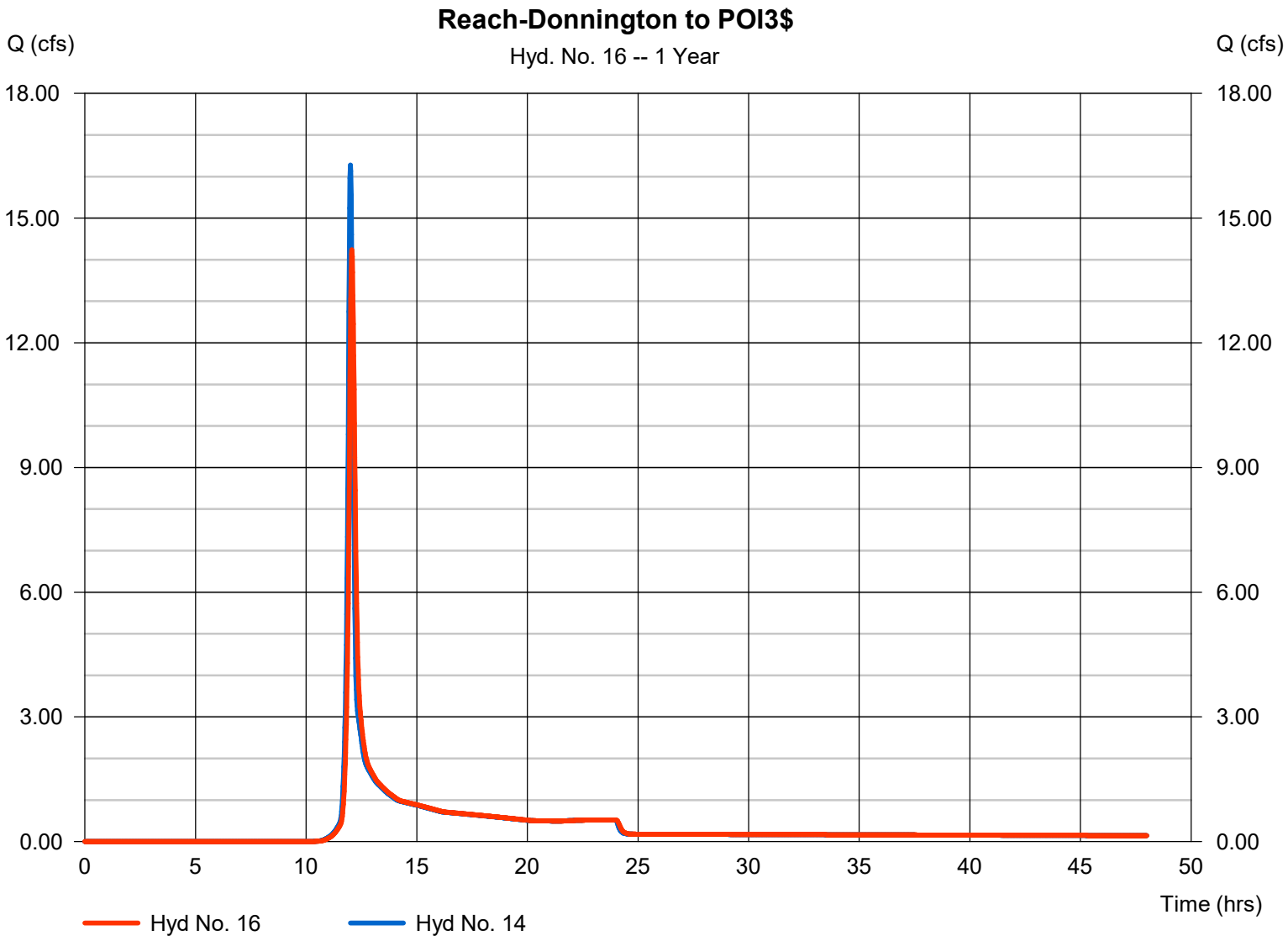
Hydrograph Report

Hyd. No. 16

Reach-Donnington to POI3$

Hydrograph type	=	Reach	Peak discharge	=	14.24 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	65,590 cuft
Inflow hyd. No.	=	14 - Merge SCM 4A, 4B & Bypass$	Section type	=	Trapezoidal
Reach length	=	1220.0 ft	Channel slope	=	2.9 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	5.0 ft
Rating curve x	=	3.124	Rating curve m	=	1.206
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2187

Modified Att-Kin routing method used.

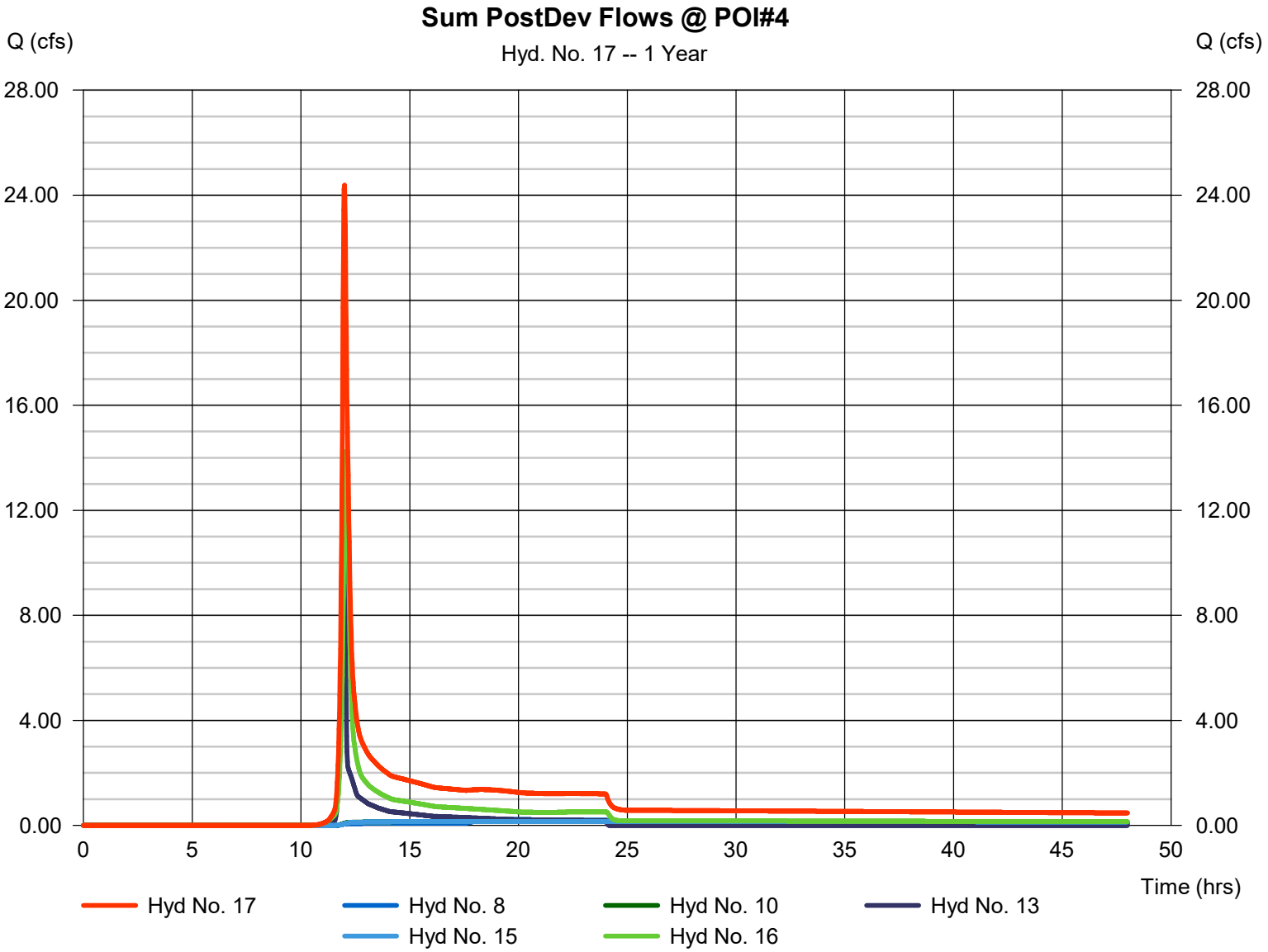


Hydrograph Report

Hyd. No. 17

Sum PostDev Flows @ POI#4

Hydrograph type	= Combine	Peak discharge	= 24.39 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 143,907 cuft
Inflow hyds.	= 8, 10, 13, 15, 16	Contrib. drain. area	= 8.580 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

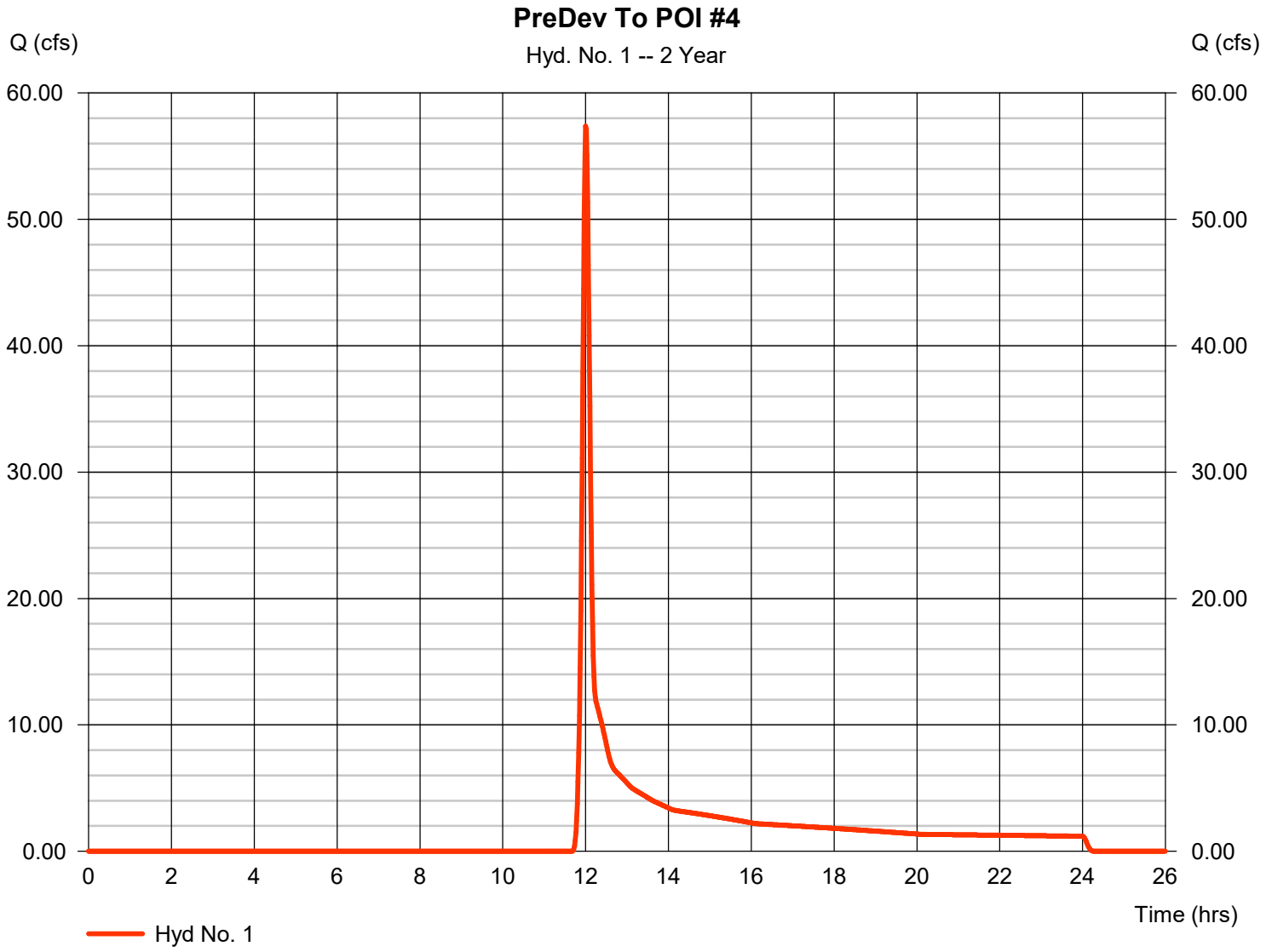
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	57.39	1	720	149,555	------	------	------	PreDev To POI #4
2	SCS Runoff	15.75	1	721	40,226	------	------	------	PostDev to SCM #4A
3	SCS Runoff	18.09	1	721	45,760	------	------	------	DA to SCM #4B
4	Reservoir	0.361	1	1111	25,632	3	326.58	55,446	Route DA#4B-SCM#4B
5	SCS Runoff	29.11	1	720	70,593	------	------	------	Inflow to SCM #4C
6	Reservoir	0.762	1	965	35,160	5	296.49	84,117	Route DA4C -SCM#4C
7	SCS Runoff	17.49	1	719	37,185	------	------	------	DA TO SCM#4D
8	Reservoir	0.638	1	868	23,162	7	283.16	38,546	Route DA4d to SCM#4D
9	SCS Runoff	20.21	1	721	49,072	------	------	------	DA to SCM #4E
10	Reservoir	0.176	1	1446	21,187	9	283.38	75,717	Route DA#4E to SCM#4E
11	SCS Runoff	6.095	1	718	12,240	------	------	------	PostDev Bypasses SCM #4A
12	SCS Runoff	1.654	1	720	6,013	------	------	------	PostDev Bypasses SCM #4B
13	SCS Runoff	18.10	1	718	36,625	------	------	------	PostDev Bypasses SCM 4C, 4D, & 4
14	Combine	22.49	1	720	91,830	2, 4, 11, 12,	------	------	Merge SCM 4A, 4B & Bypasses
15	Reach	0.176	1	1450	21,414	6	------	------	Reach from SCM #4C to POI #4
16	Reach	19.74	1	724	91,792	14	------	------	Reach-Donnington to POI3$
17	Combine	33.63	1	720	194,180	8, 10, 13, 15, 16	------	------	Sum PostDev Flows @ POI#4

Hydrograph Report

Hyd. No. 1

PreDev To POI #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	57.39 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	149,555 cuft
Drainage area	=	63.520 ac	Curve number	=	63.3
Basin Slope	=	4.1 %	Hydraulic length	=	1900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	8.96 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

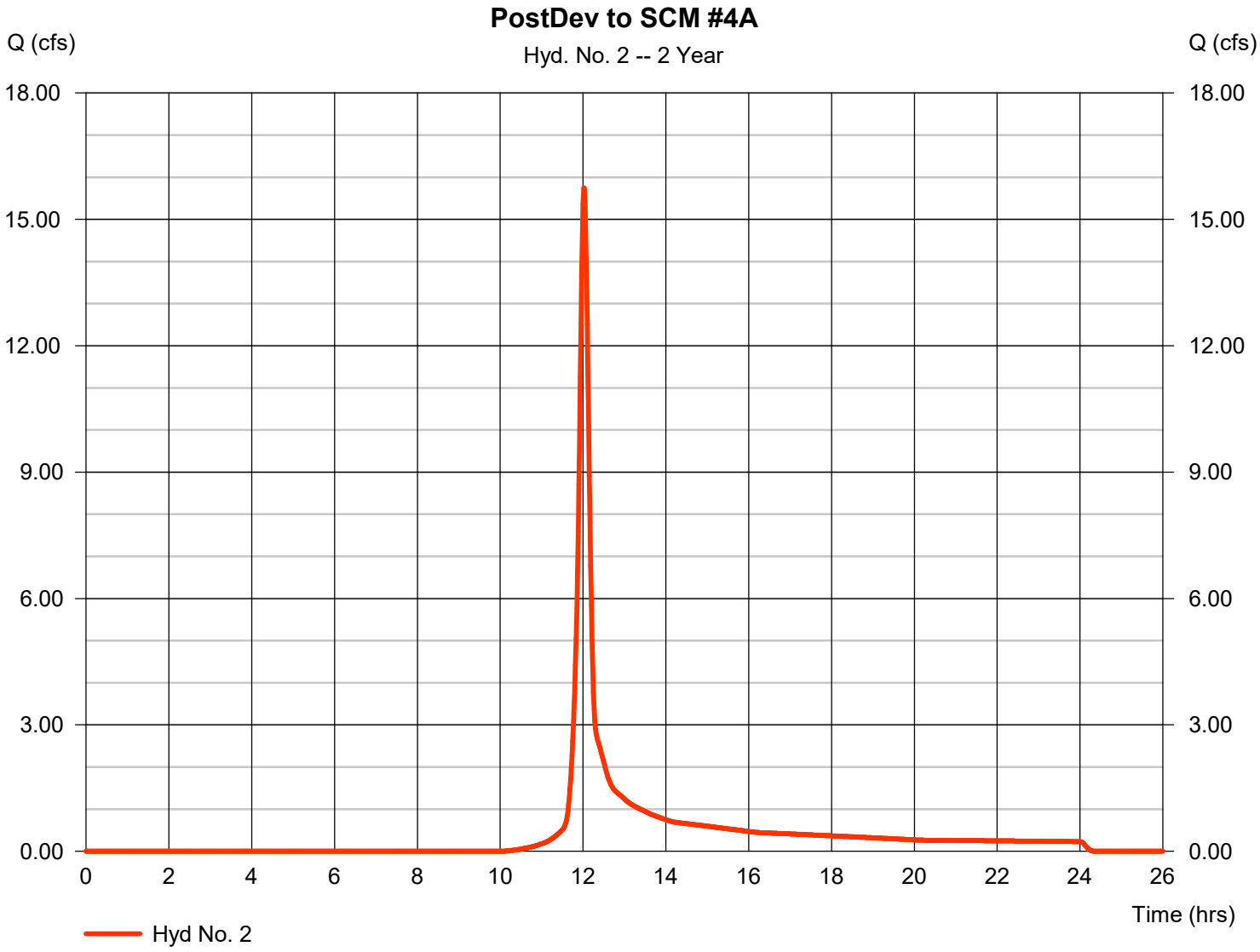


Hydrograph Report

Hyd. No. 2

PostDev to SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.75 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	40,226 cuft
Drainage area	=	8.310 ac	Curve number	=	76.4
Basin Slope	=	3.3 %	Hydraulic length	=	1200 ft
Tc method	=	User	Time of conc. (Tc)	=	12.20 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

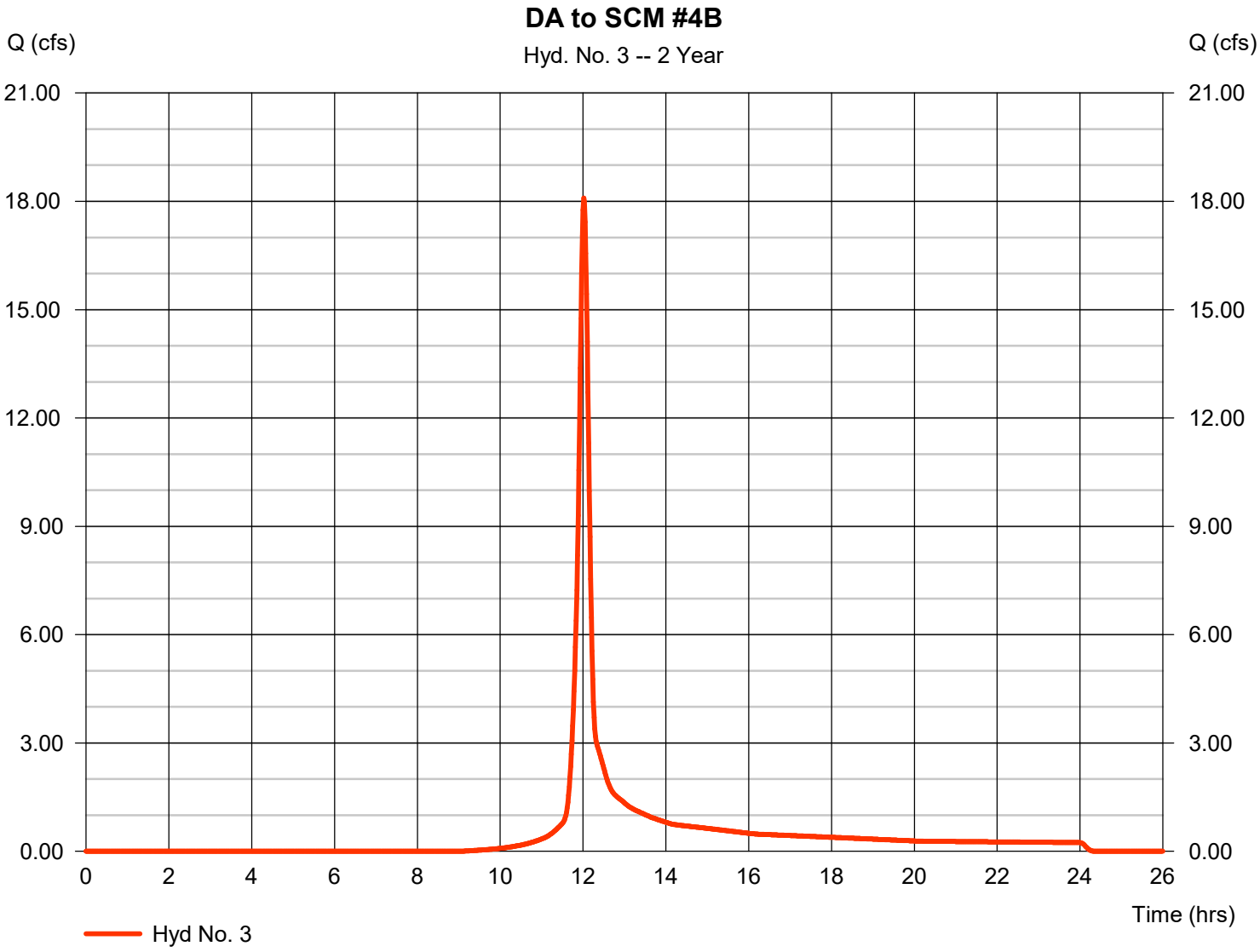


Hydrograph Report

Hyd. No. 3

DA to SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.09 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	45,760 cuft
Drainage area	=	8.020 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



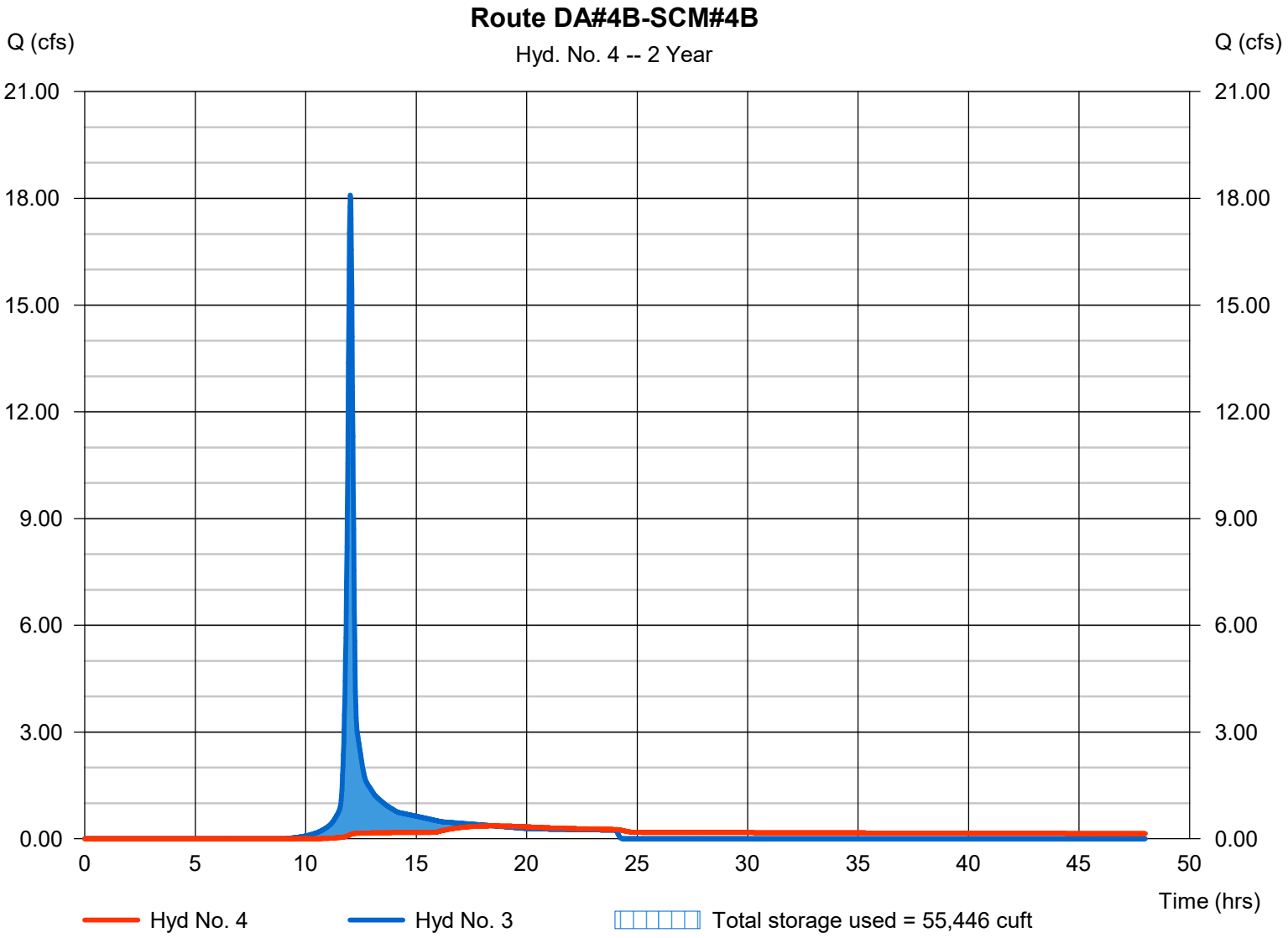
Hydrograph Report

Hyd. No. 4

Route DA#4B-SCM#4B

Hydrograph type	=	Reservoir	Peak discharge	=	0.361 cfs
Storm frequency	=	2 yrs	Time to peak	=	18.52 hrs
Time interval	=	1 min	Hyd. volume	=	25,632 cuft
Inflow hyd. No.	=	3 - DA to SCM #4B	Max. Elevation	=	326.58 ft
Reservoir name	=	SCM #4B	Max. Storage	=	55,446 cuft

Storage Indication method used. Wet pond routing start elevation = 323.50 ft.

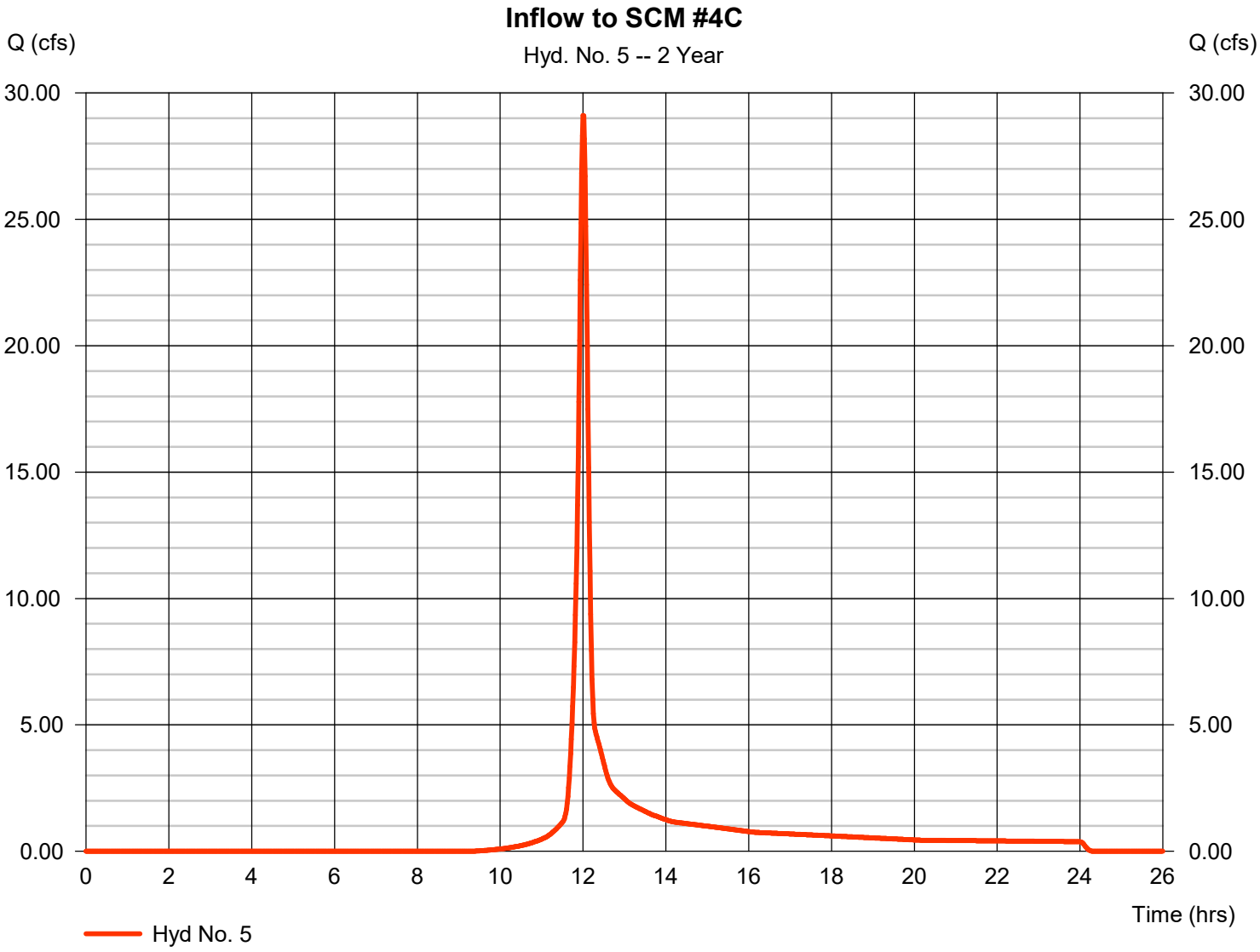


Hydrograph Report

Hyd. No. 5

Inflow to SCM #4C

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.11 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	70,593 cuft
Drainage area	=	12.510 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.20 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



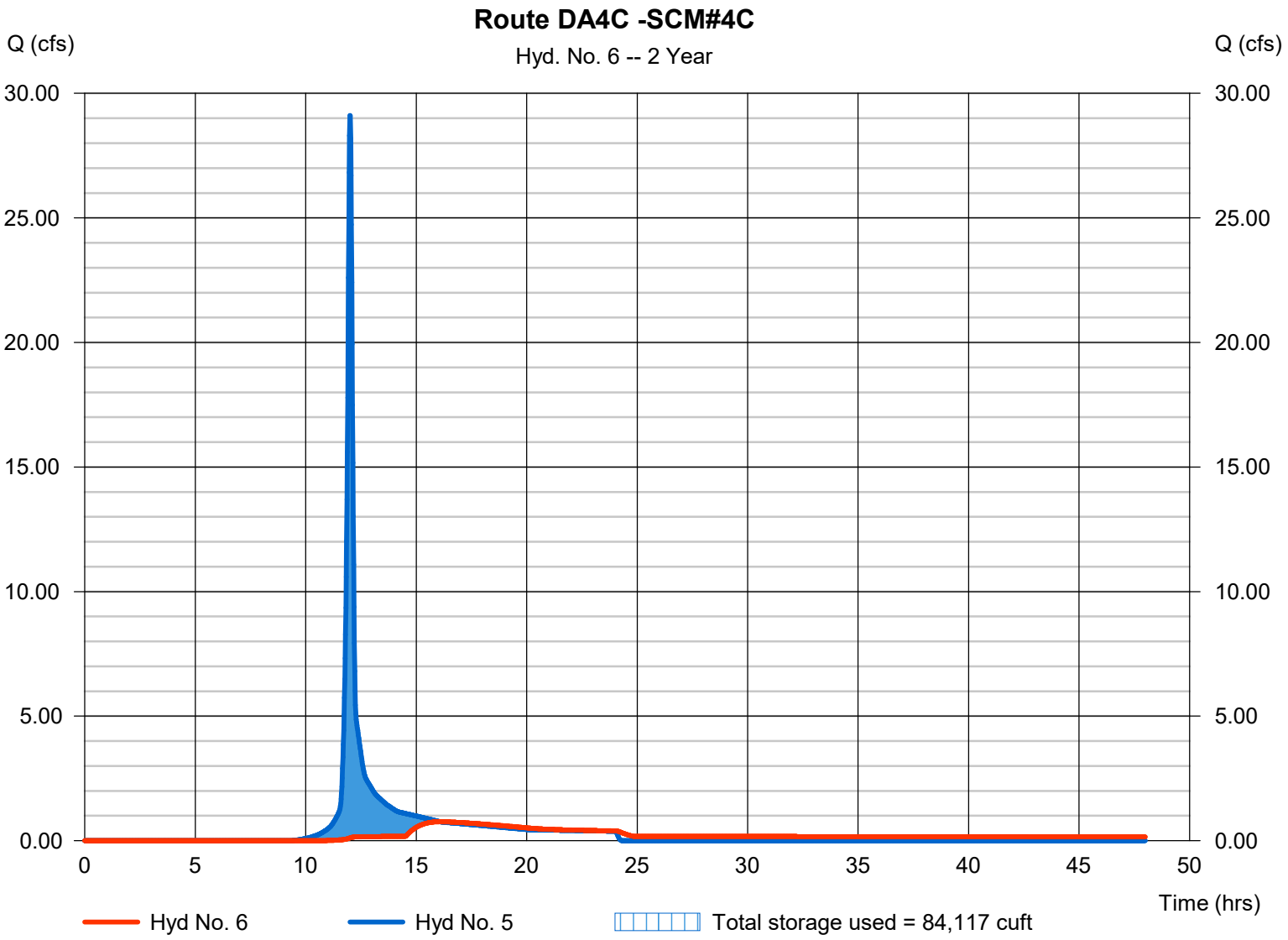
Hydrograph Report

Hyd. No. 6

Route DA4C -SCM#4C

Hydrograph type	= Reservoir	Peak discharge	= 0.762 cfs
Storm frequency	= 2 yrs	Time to peak	= 16.08 hrs
Time interval	= 1 min	Hyd. volume	= 35,160 cuft
Inflow hyd. No.	= 5 - Inflow to SCM #4C	Max. Elevation	= 296.49 ft
Reservoir name	= SCM #4C	Max. Storage	= 84,117 cuft

Storage Indication method used. Wet pond routing start elevation = 293.50 ft.

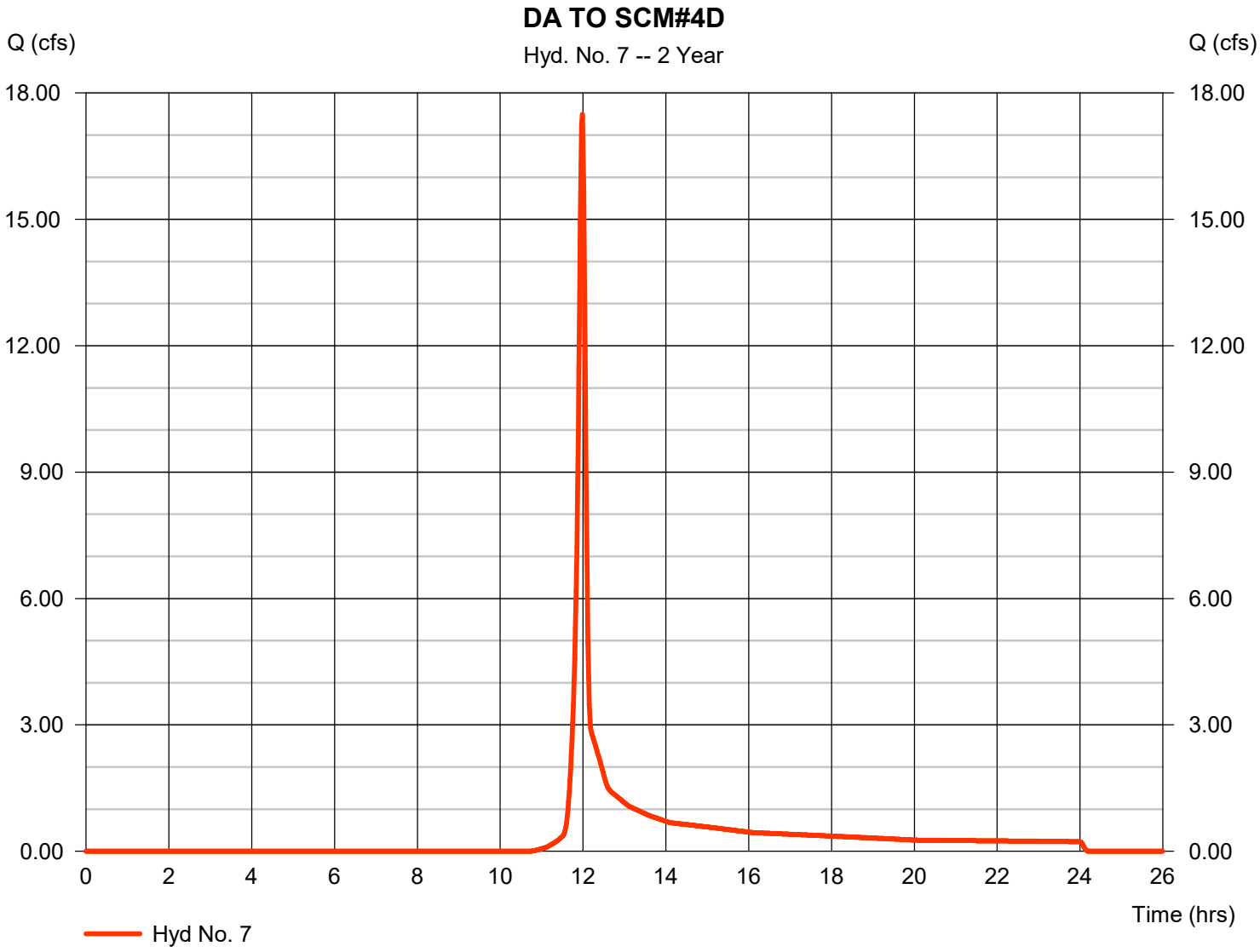


Hydrograph Report

Hyd. No. 7

DA TO SCM#4D

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.49 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.98 hrs
Time interval	=	1 min	Hyd. volume	=	37,185 cuft
Drainage area	=	9.120 ac	Curve number	=	73.1
Basin Slope	=	6.0 %	Hydraulic length	=	1465 ft
Tc method	=	User	Time of conc. (Tc)	=	8.20 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



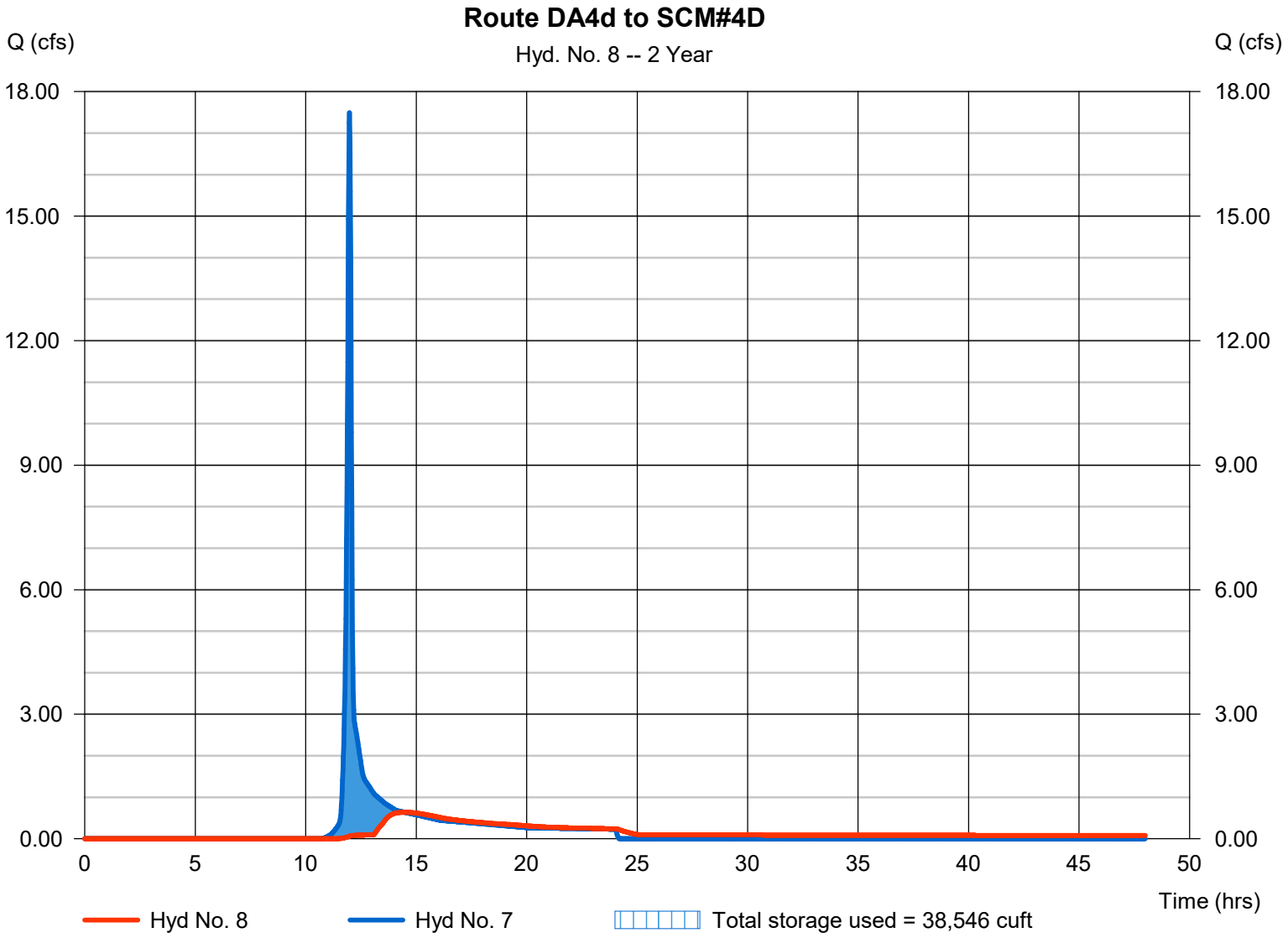
Hydrograph Report

Hyd. No. 8

Route DA4d to SCM#4D

Hydrograph type	= Reservoir	Peak discharge	= 0.638 cfs
Storm frequency	= 2 yrs	Time to peak	= 14.47 hrs
Time interval	= 1 min	Hyd. volume	= 23,162 cuft
Inflow hyd. No.	= 7 - DA TO SCM#4D	Max. Elevation	= 283.16 ft
Reservoir name	= SCM #4D	Max. Storage	= 38,546 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

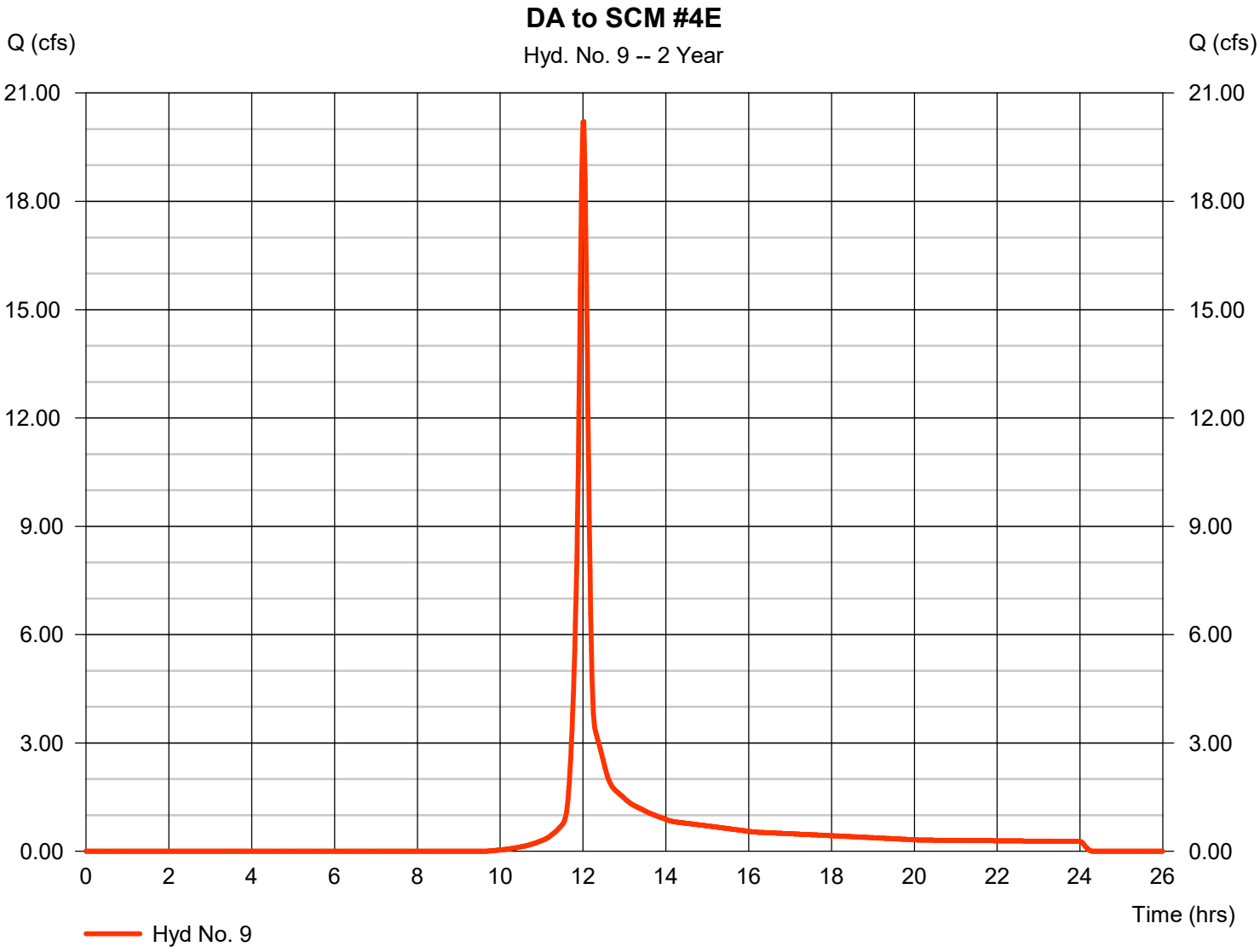


Hydrograph Report

Hyd. No. 9

DA to SCM #4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.21 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	49,072 cuft
Drainage area	=	9.100 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.80 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



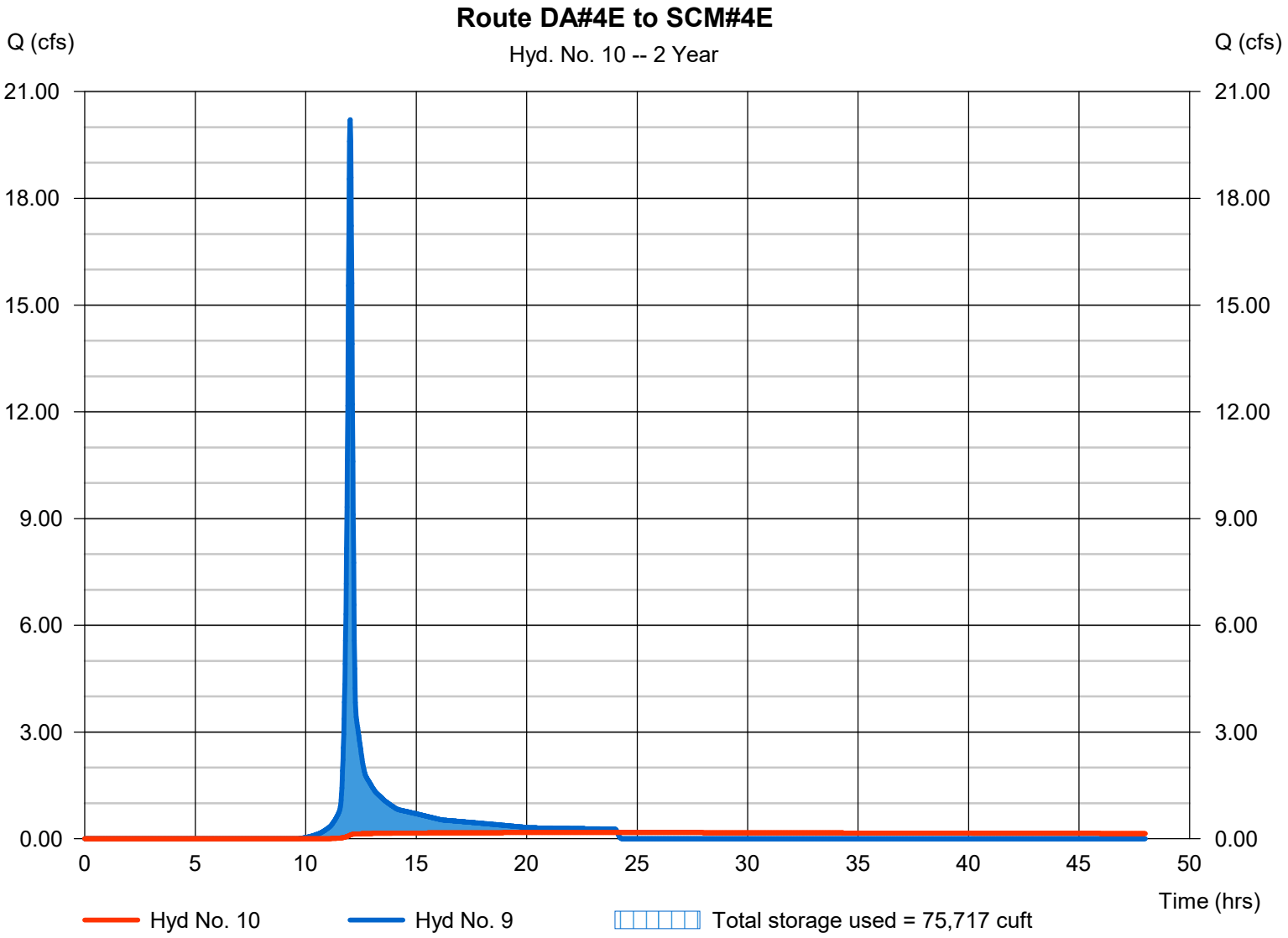
Hydrograph Report

Hyd. No. 10

Route DA#4E to SCM#4E

Hydrograph type	= Reservoir	Peak discharge	= 0.176 cfs
Storm frequency	= 2 yrs	Time to peak	= 24.10 hrs
Time interval	= 1 min	Hyd. volume	= 21,187 cuft
Inflow hyd. No.	= 9 - DA to SCM #4E	Max. Elevation	= 283.38 ft
Reservoir name	= SCM #4E	Max. Storage	= 75,717 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

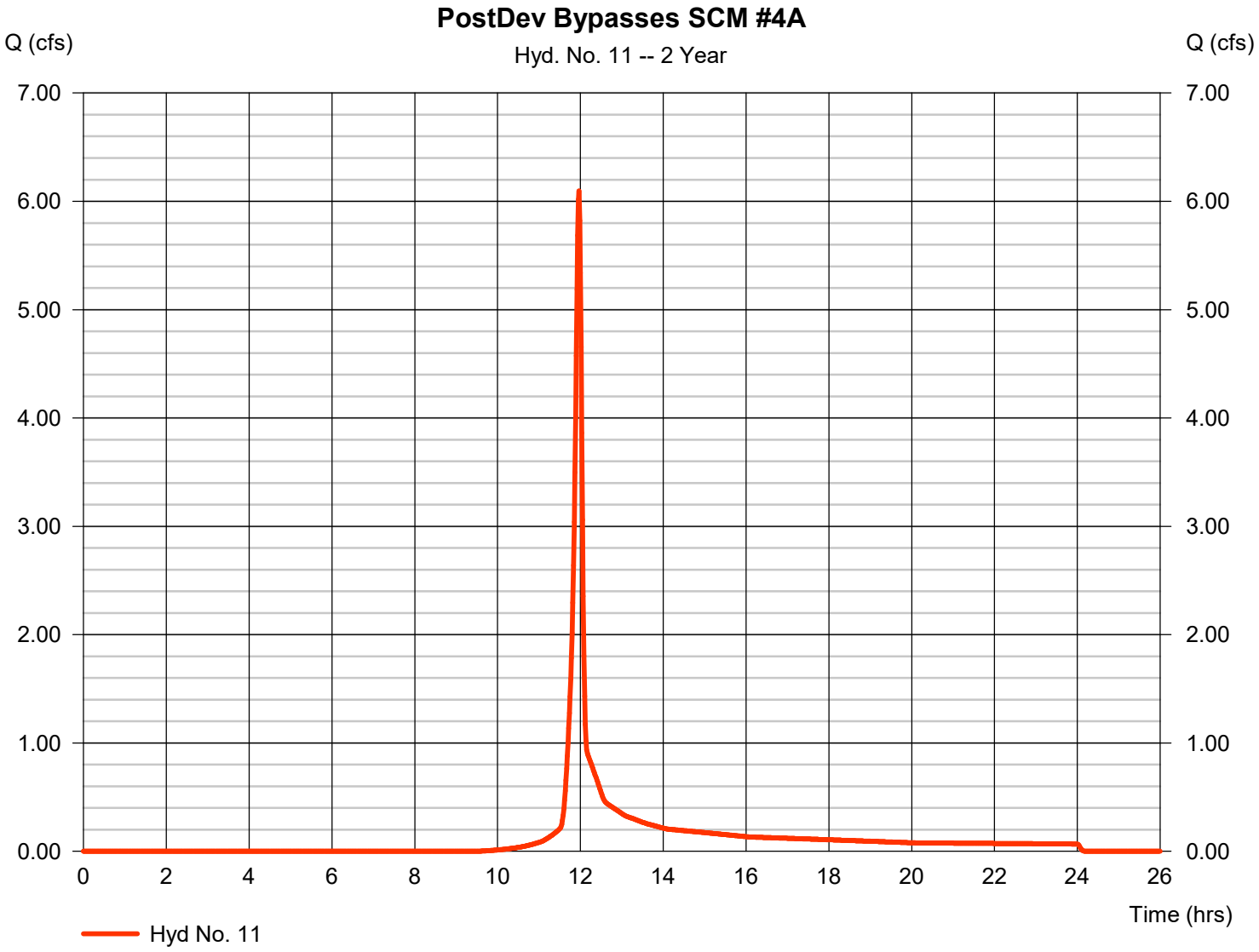


Hydrograph Report

Hyd. No. 11

PostDev Bypasses SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.095 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	12,240 cuft
Drainage area	=	2.220 ac	Curve number	=	78.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

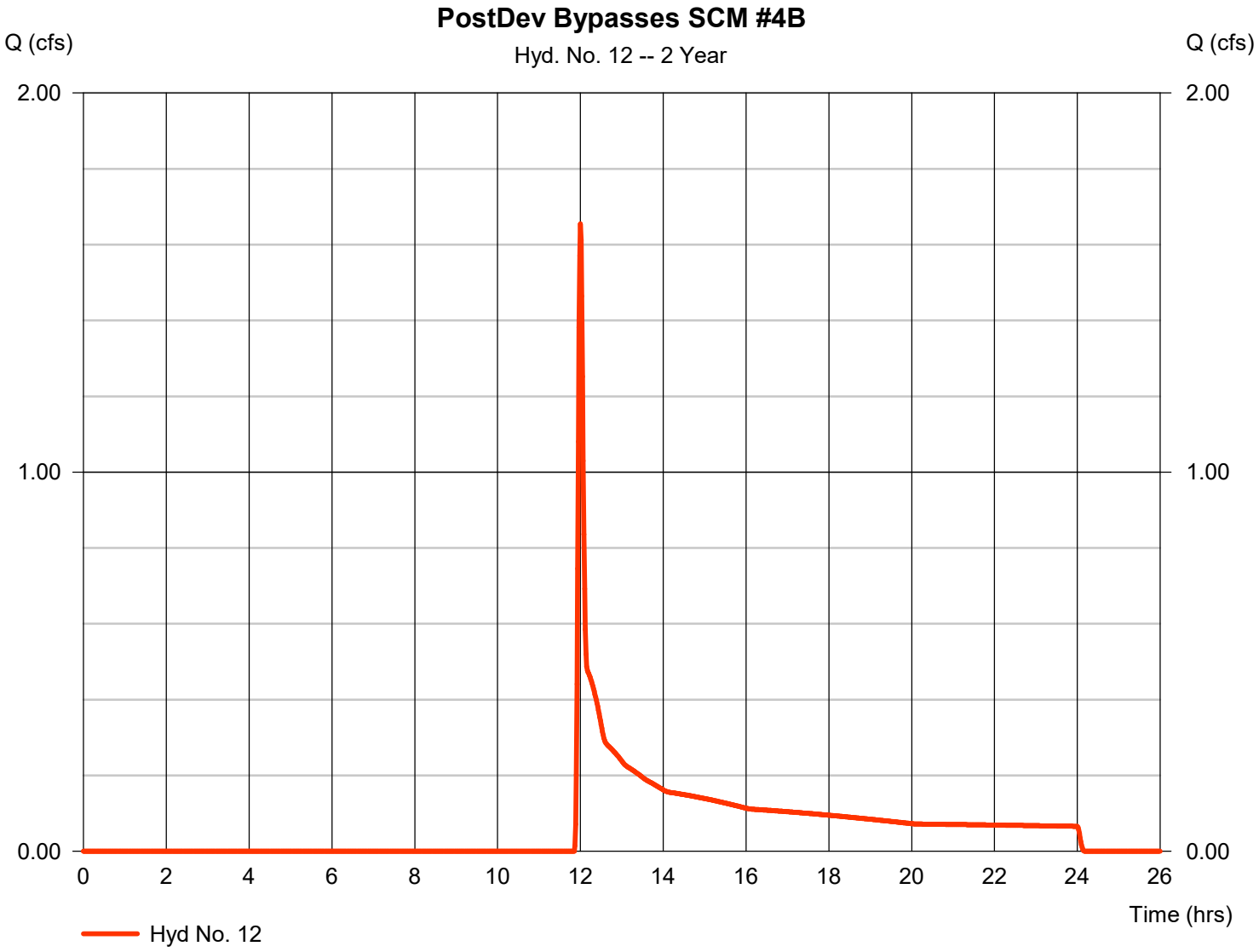


Hydrograph Report

Hyd. No. 12

PostDev Bypasses SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.654 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	6,013 cuft
Drainage area	=	5.240 ac	Curve number	=	54.3
Basin Slope	=	5.1 %	Hydraulic length	=	1220 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.84 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

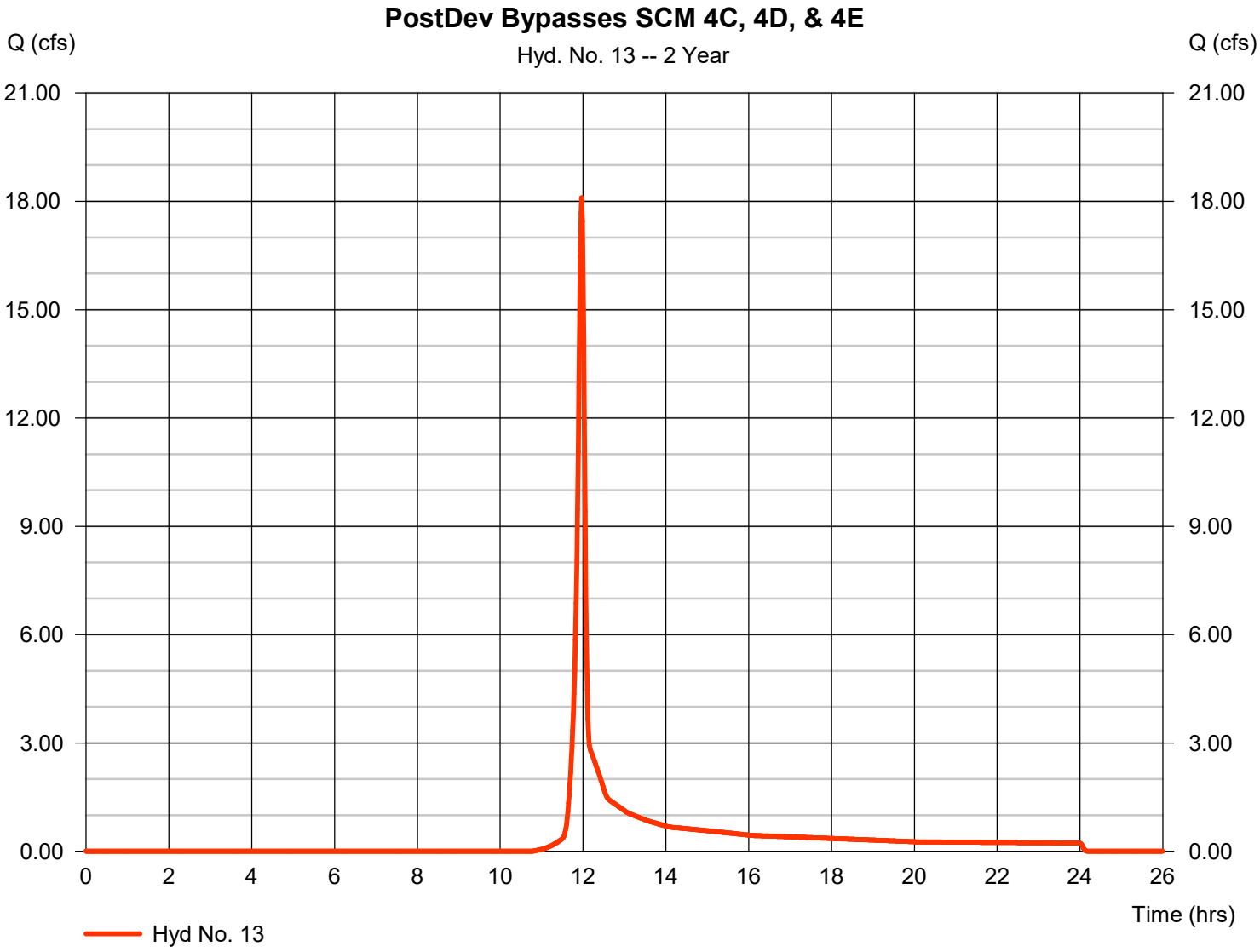


Hydrograph Report

Hyd. No. 13

PostDev Bypasses SCM 4C, 4D, & 4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.10 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	36,625 cuft
Drainage area	=	8.580 ac	Curve number	=	72.9
Basin Slope	=	2.6 %	Hydraulic length	=	900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	6.02 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

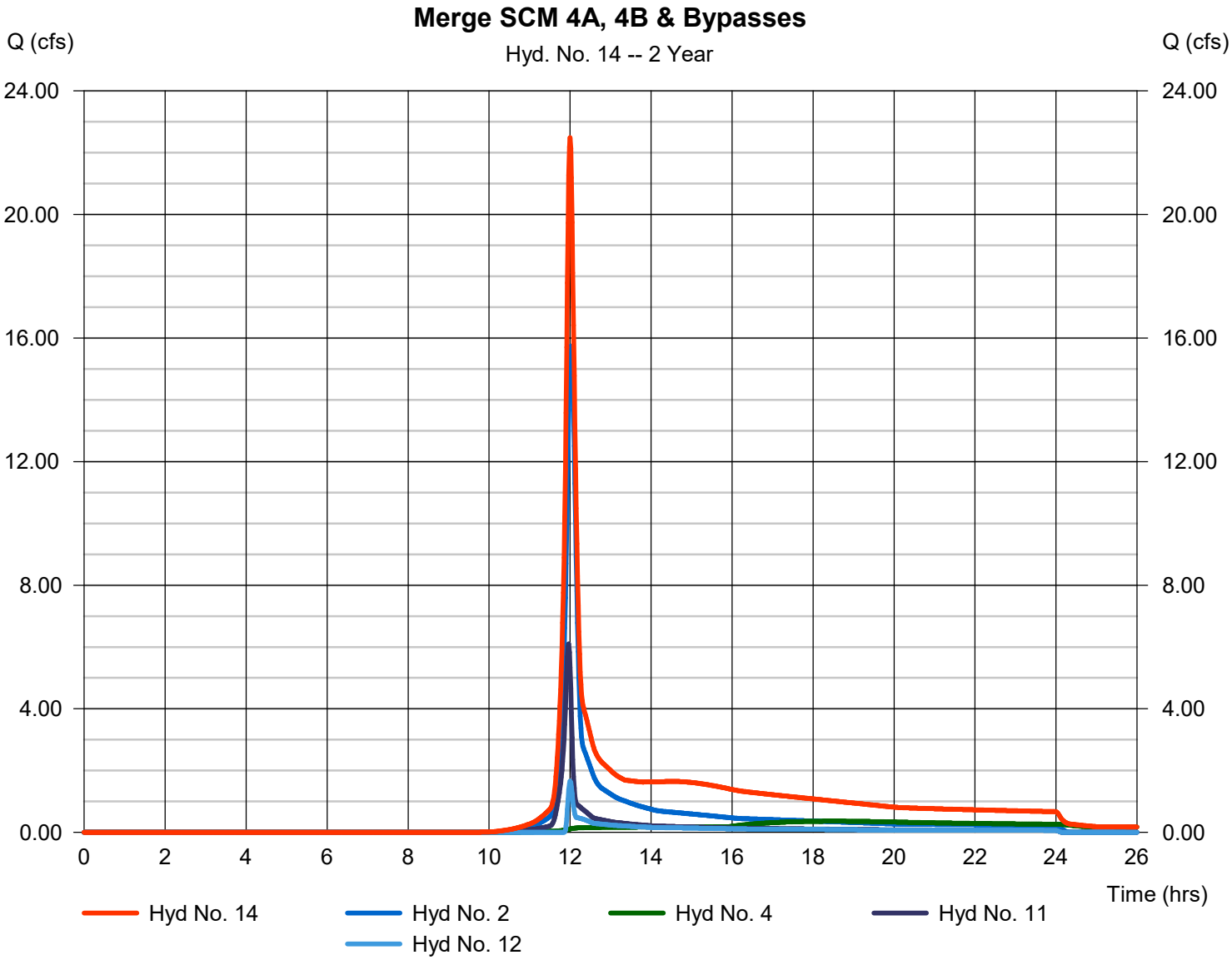


Hydrograph Report

Hyd. No. 14

Merge SCM 4A, 4B & Bypasses

Hydrograph type	= Combine	Peak discharge	= 22.49 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 91,830 cuft
Inflow hyds.	= 2, 4, 11, 12	Contrib. drain. area	= 15.770 ac



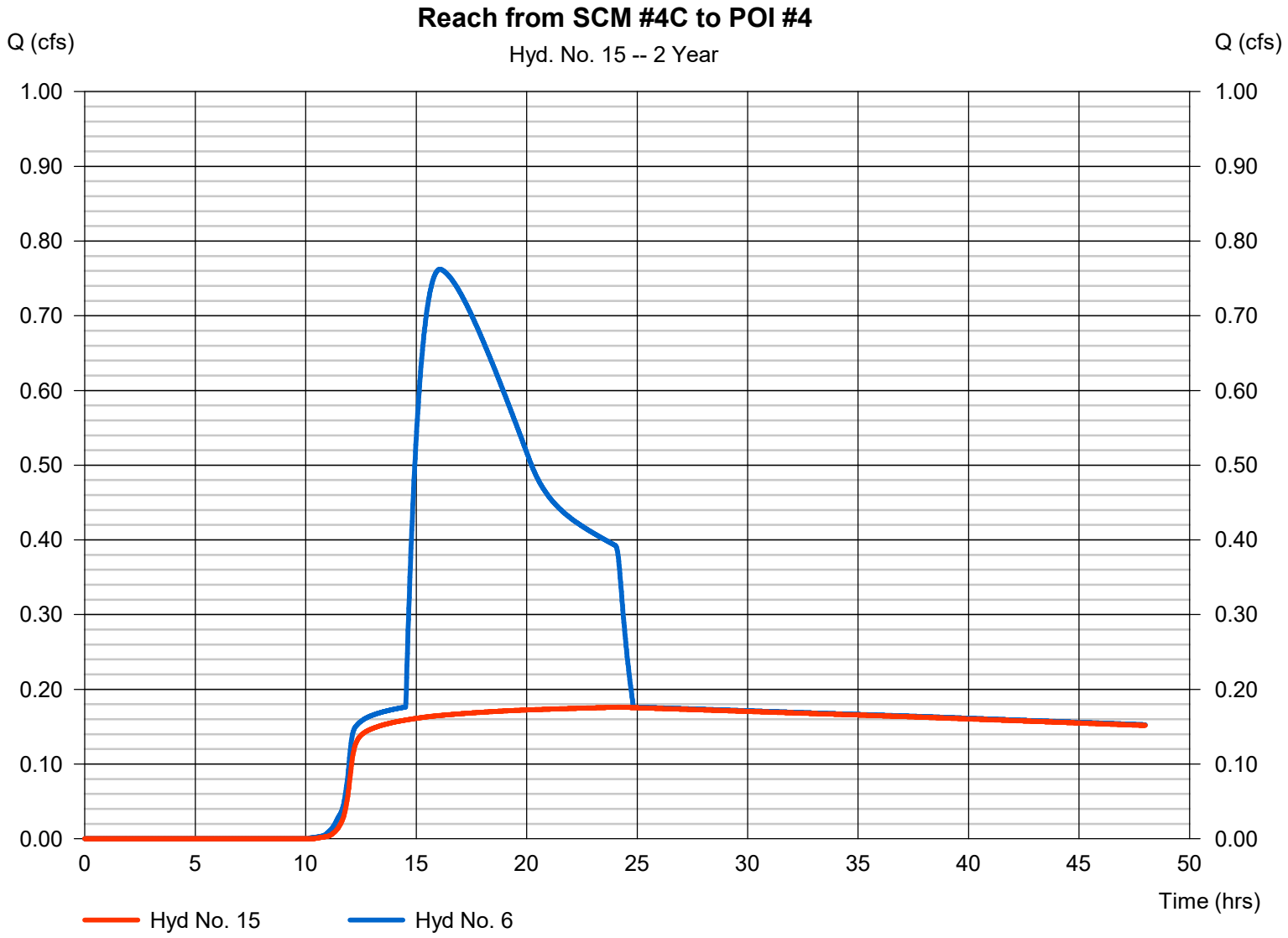
Hydrograph Report

Hyd. No. 15

Reach from SCM #4C to POI #4

Hydrograph type	= Reach	Peak discharge	= 0.176 cfs
Storm frequency	= 2 yrs	Time to peak	= 24.17 hrs
Time interval	= 1 min	Hyd. volume	= 21,414 cuft
Inflow hyd. No.	= 6 - Route DA4C -SCM#4C	Section type	= Trapezoidal
Reach length	= 900.0 ft	Channel slope	= 2.6 %
Manning's n	= 0.032	Bottom width	= 4.0 ft
Side slope	= 25.0:1	Max. depth	= 4.0 ft
Rating curve x	= 2.955	Rating curve m	= 1.189
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.1391

Modified Att-Kin routing method used.



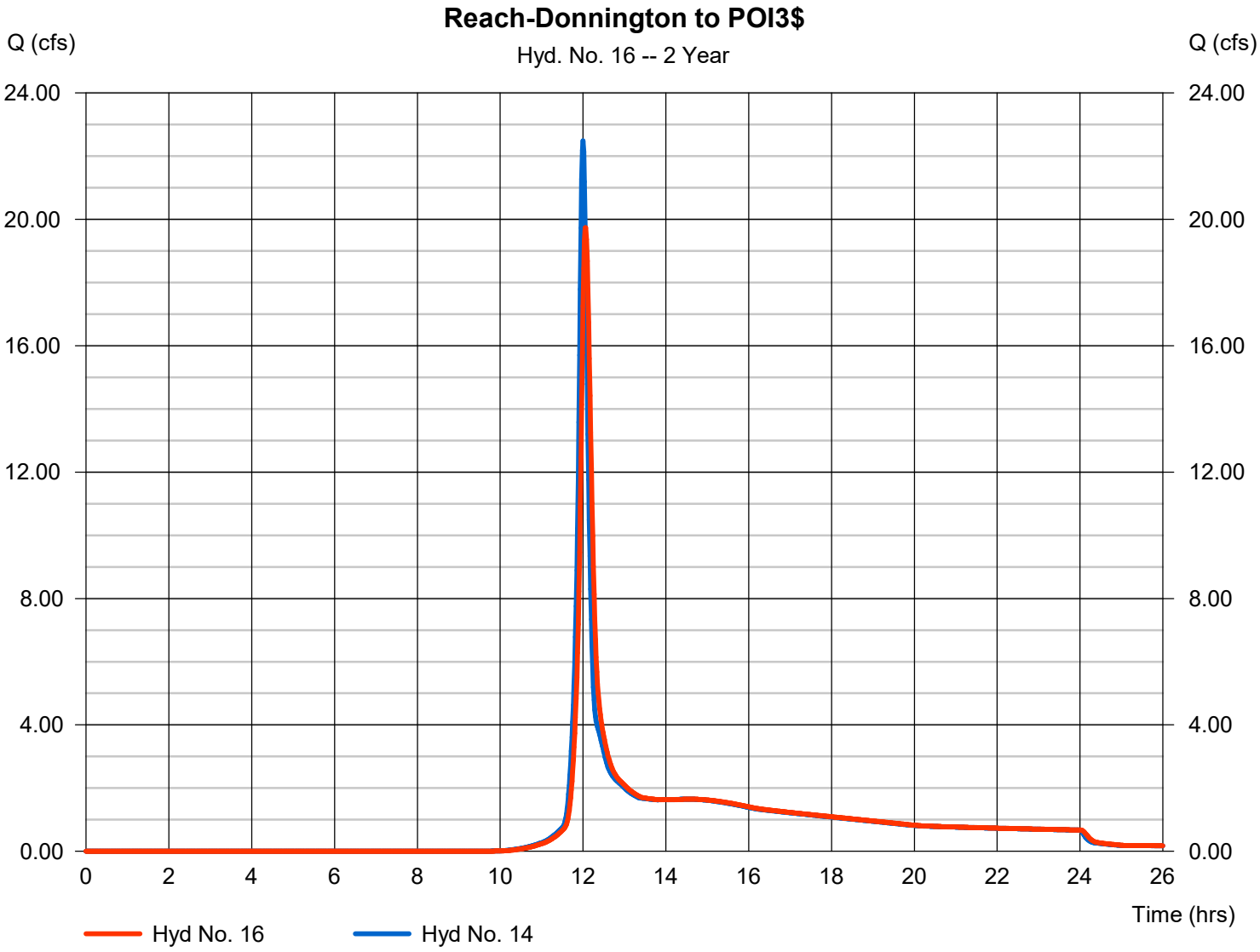
Hydrograph Report

Hyd. No. 16

Reach-Donnington to POI3$

Hydrograph type	=	Reach	Peak discharge	=	19.74 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	91,792 cuft
Inflow hyd. No.	=	14 - Merge SCM 4A, 4B & Bypass$	Section type	=	Trapezoidal
Reach length	=	1220.0 ft	Channel slope	=	2.9 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	5.0 ft
Rating curve x	=	3.124	Rating curve m	=	1.206
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2297

Modified Att-Kin routing method used.

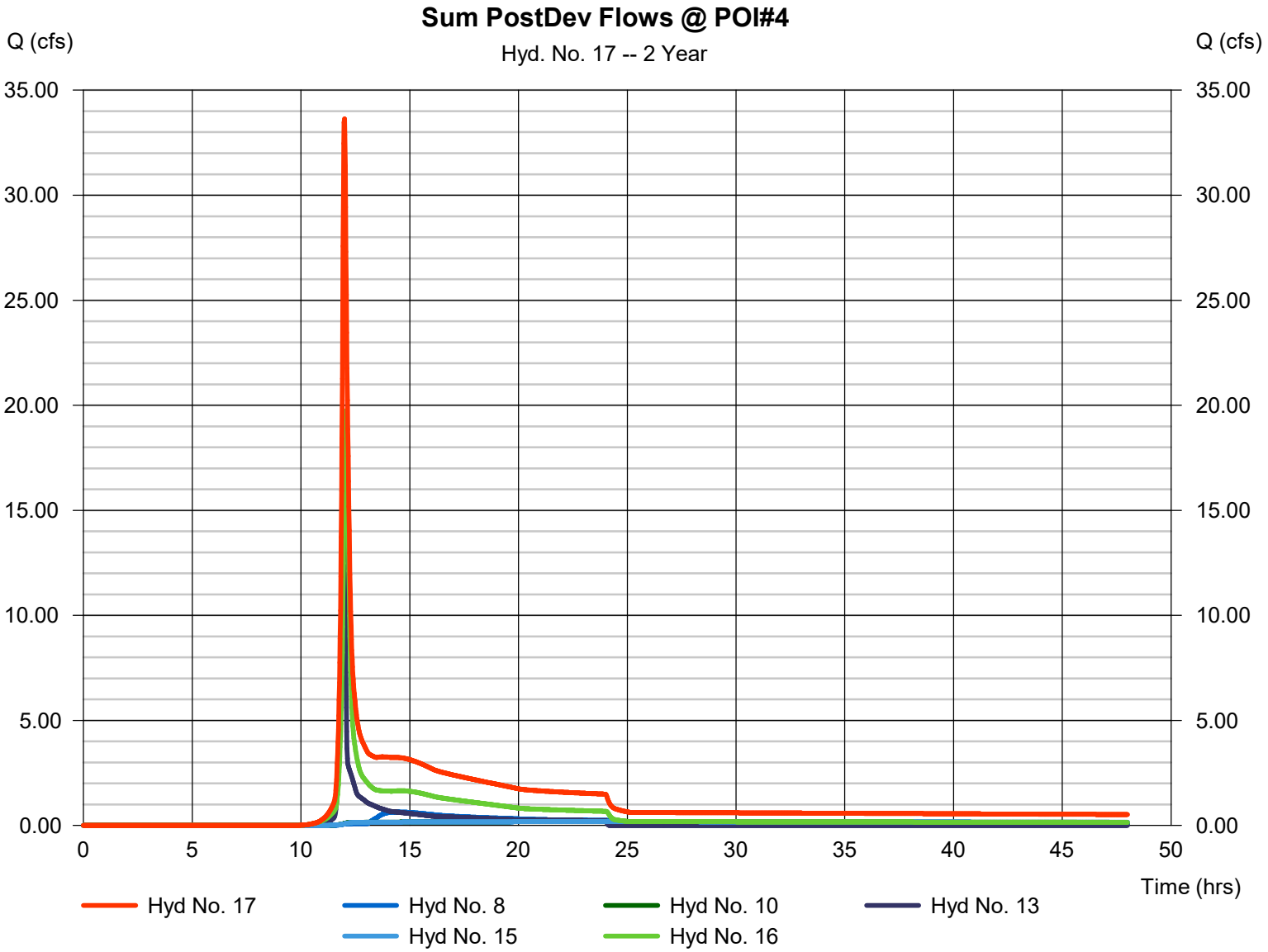


Hydrograph Report

Hyd. No. 17

Sum PostDev Flows @ POI#4

Hydrograph type	= Combine	Peak discharge	= 33.63 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 194,180 cuft
Inflow hyds.	= 8, 10, 13, 15, 16	Contrib. drain. area	= 8.580 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

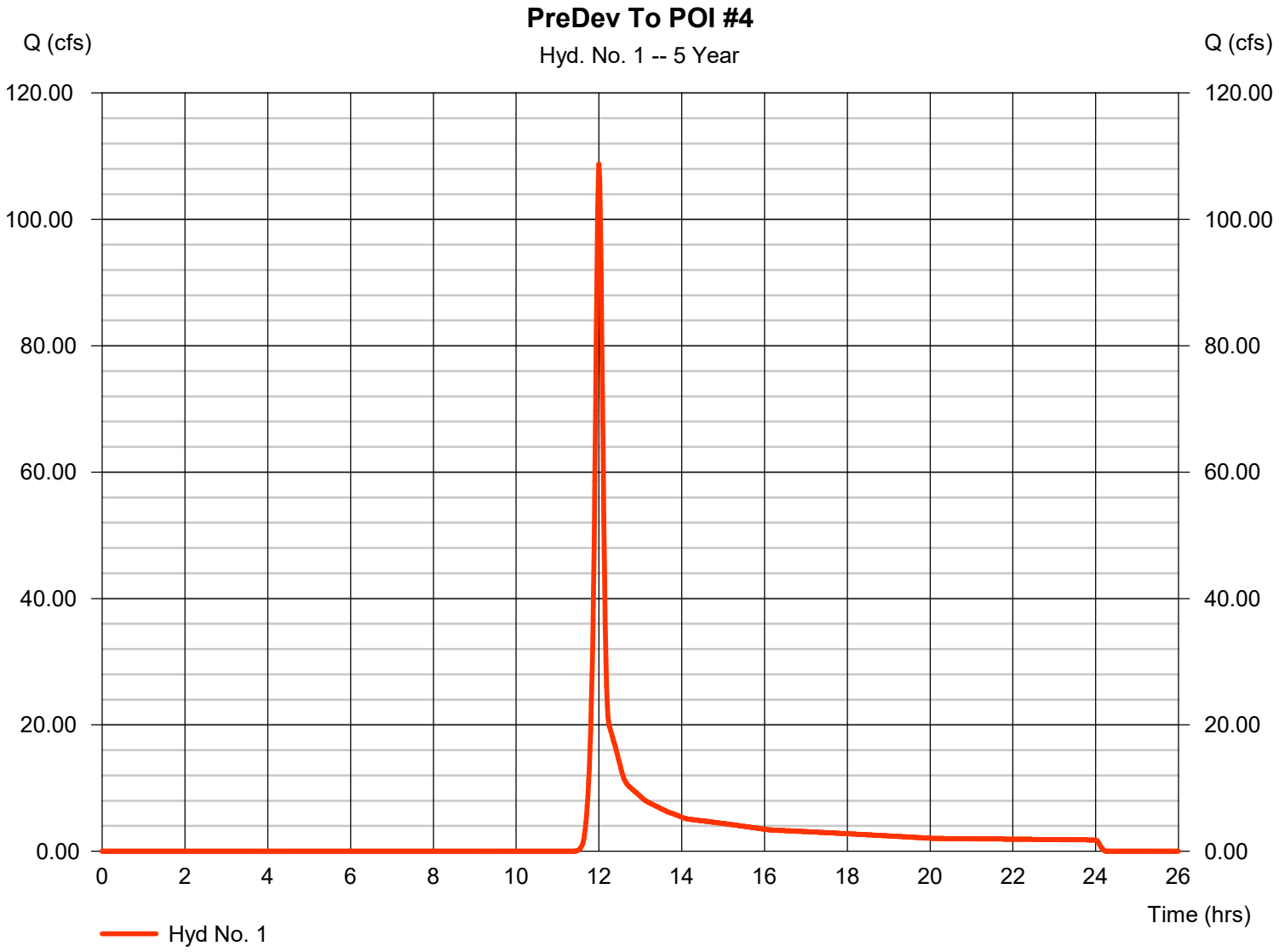
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	108.76	1	720	258,434	------	------	------	PreDev To POI #4
2	SCS Runoff	23.80	1	721	60,165	------	------	------	PostDev to SCM #4A
3	SCS Runoff	26.28	1	721	66,410	------	------	------	DA to SCM #4B
4	Reservoir	1.729	1	786	46,032	3	326.87	59,258	Route DA#4B-SCM#4B
5	SCS Runoff	42.71	1	720	103,285	------	------	------	Inflow to SCM #4C
6	Reservoir	3.973	1	757	67,710	5	296.72	88,869	Route DA4C -SCM#4C
7	SCS Runoff	27.18	1	719	57,319	------	------	------	DA TO SCM#4D
8	Reservoir	3.119	1	745	43,196	7	283.50	42,219	Route DA4d to SCM#4D
9	SCS Runoff	29.94	1	720	72,397	------	------	------	DA to SCM #4E
10	Reservoir	1.389	1	823	42,631	9	283.64	79,968	Route DA#4E to SCM#4E
11	SCS Runoff	8.924	1	718	18,028	------	------	------	PostDev Bypasses SCM #4A
12	SCS Runoff	5.011	1	719	12,421	------	------	------	PostDev Bypasses SCM #4B
13	SCS Runoff	28.17	1	718	56,565	------	------	------	PostDev Bypasses SCM 4C, 4D, & 4
14	Combine	36.11	1	720	148,185	2, 4, 11, 12,	------	------	Merge SCM 4A, 4B & Bypasses
15	Reach	1.579	1	827	47,500	6	------	------	Reach from SCM #4C to POI #4
16	Reach	32.30	1	723	148,150	14	------	------	Reach-Donnington to POI3$
17	Combine	54.41	1	720	338,042	8, 10, 13, 15, 16	------	------	Sum PostDev Flows @ POI#4

Hydrograph Report

Hyd. No. 1

PreDev To POI #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	108.76 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	258,434 cuft
Drainage area	=	63.520 ac	Curve number	=	63.3
Basin Slope	=	4.1 %	Hydraulic length	=	1900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	8.96 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

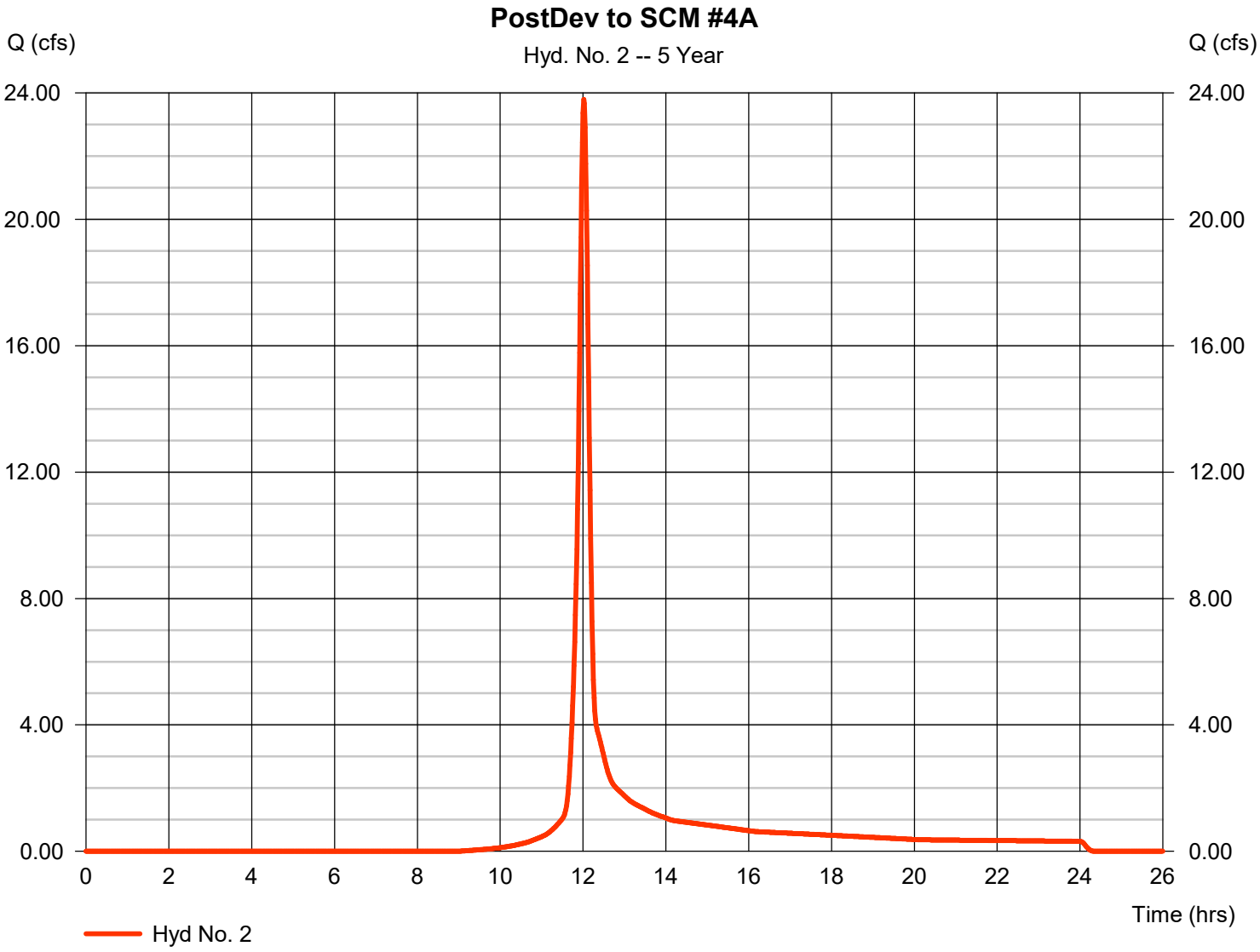


Hydrograph Report

Hyd. No. 2

PostDev to SCM #4A

Hydrograph type	= SCS Runoff	Peak discharge	= 23.80 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.02 hrs
Time interval	= 1 min	Hyd. volume	= 60,165 cuft
Drainage area	= 8.310 ac	Curve number	= 76.4
Basin Slope	= 3.3 %	Hydraulic length	= 1200 ft
Tc method	= User	Time of conc. (Tc)	= 12.20 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

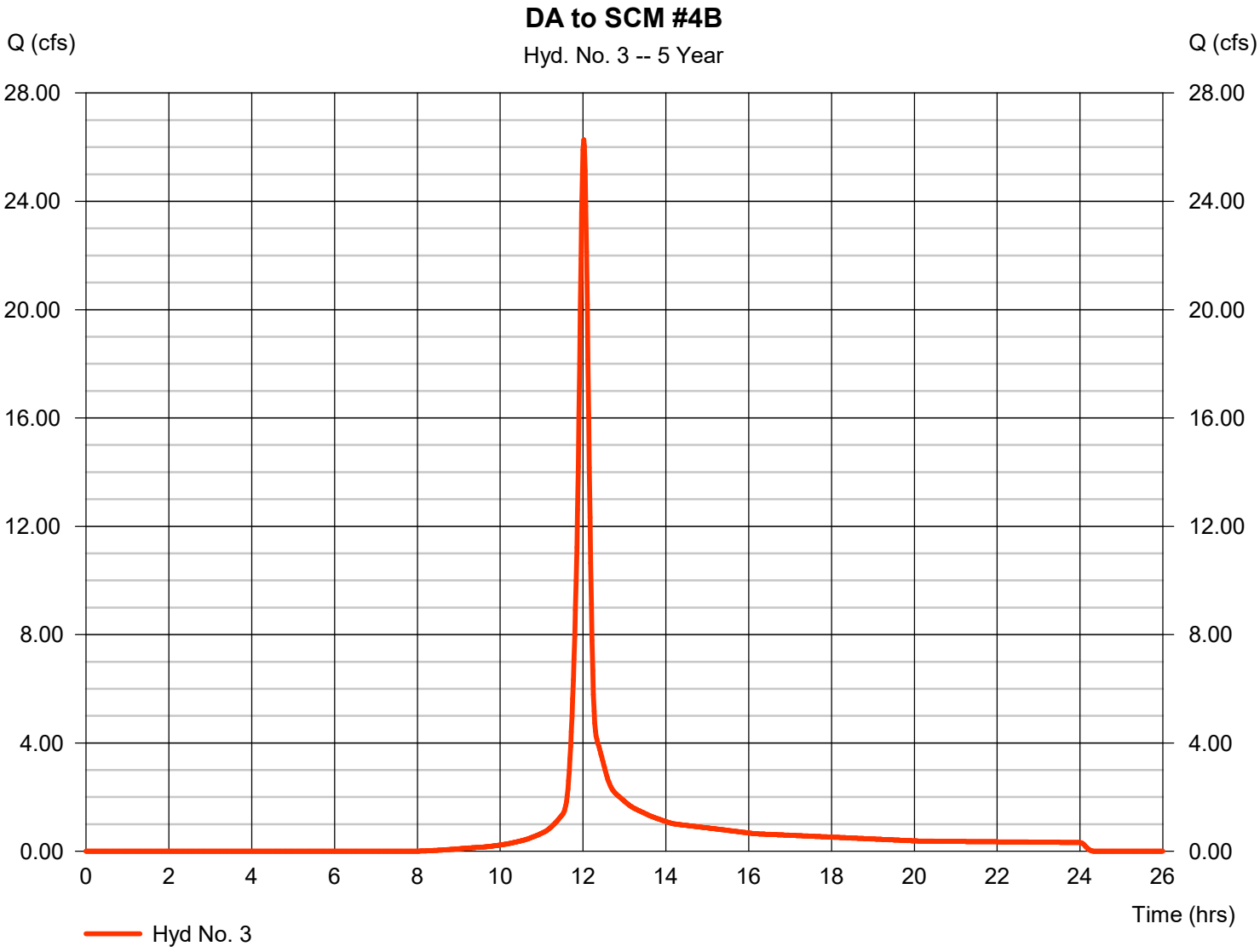


Hydrograph Report

Hyd. No. 3

DA to SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.28 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	66,410 cuft
Drainage area	=	8.020 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



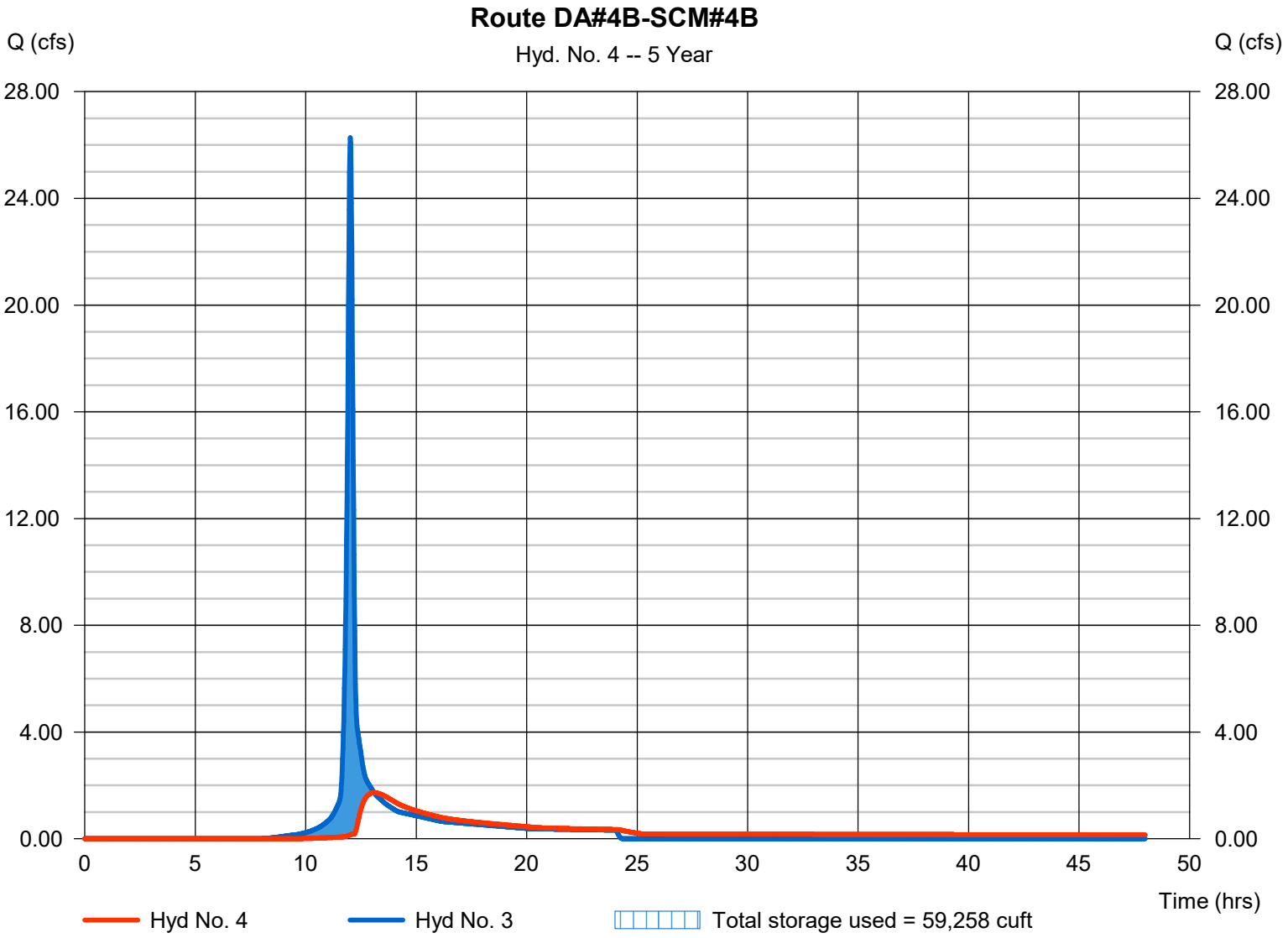
Hydrograph Report

Hyd. No. 4

Route DA#4B-SCM#4B

Hydrograph type	= Reservoir	Peak discharge	= 1.729 cfs
Storm frequency	= 5 yrs	Time to peak	= 13.10 hrs
Time interval	= 1 min	Hyd. volume	= 46,032 cuft
Inflow hyd. No.	= 3 - DA to SCM #4B	Max. Elevation	= 326.87 ft
Reservoir name	= SCM #4B	Max. Storage	= 59,258 cuft

Storage Indication method used. Wet pond routing start elevation = 323.50 ft.

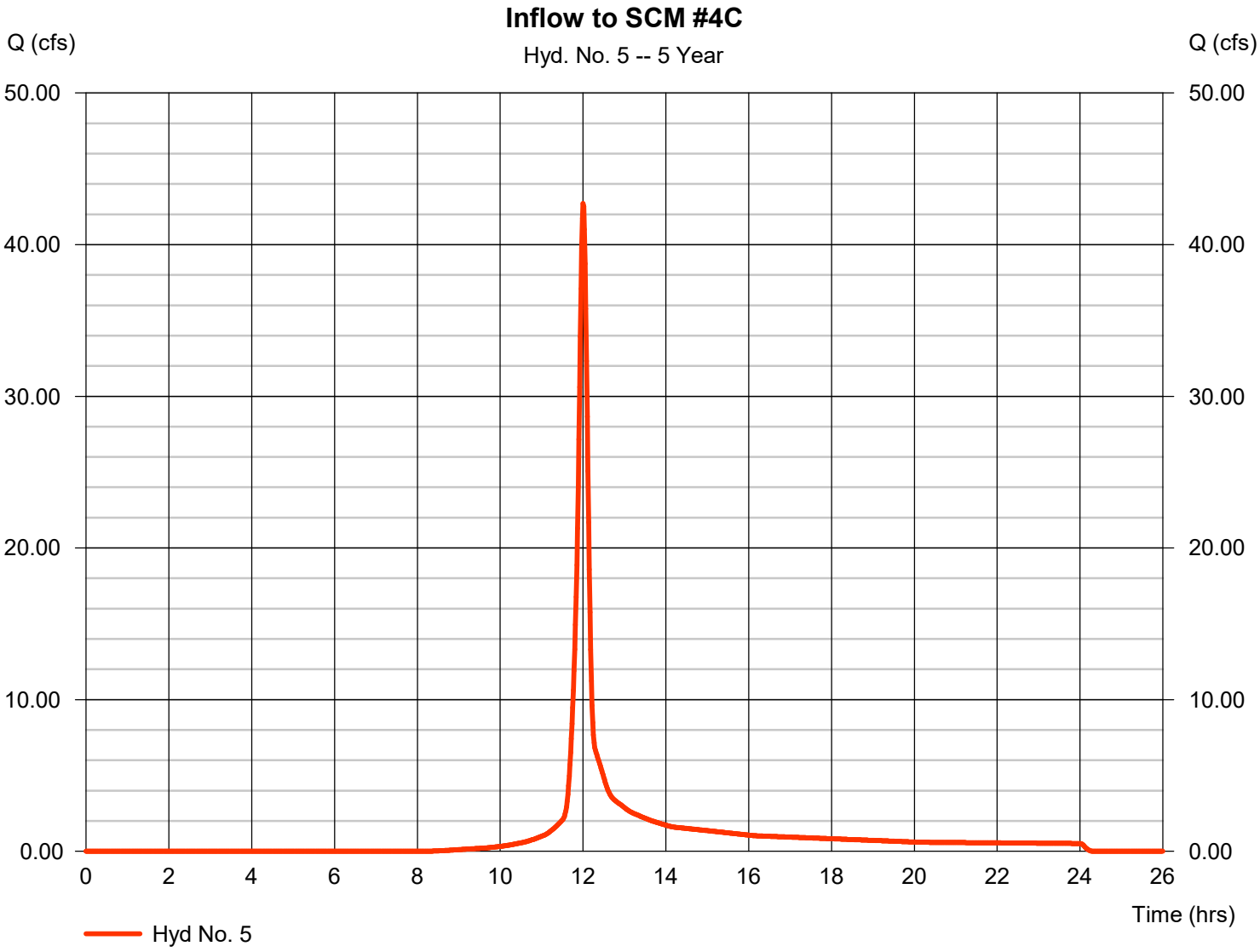


Hydrograph Report

Hyd. No. 5

Inflow to SCM #4C

Hydrograph type	=	SCS Runoff	Peak discharge	=	42.71 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	103,285 cuft
Drainage area	=	12.510 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.20 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



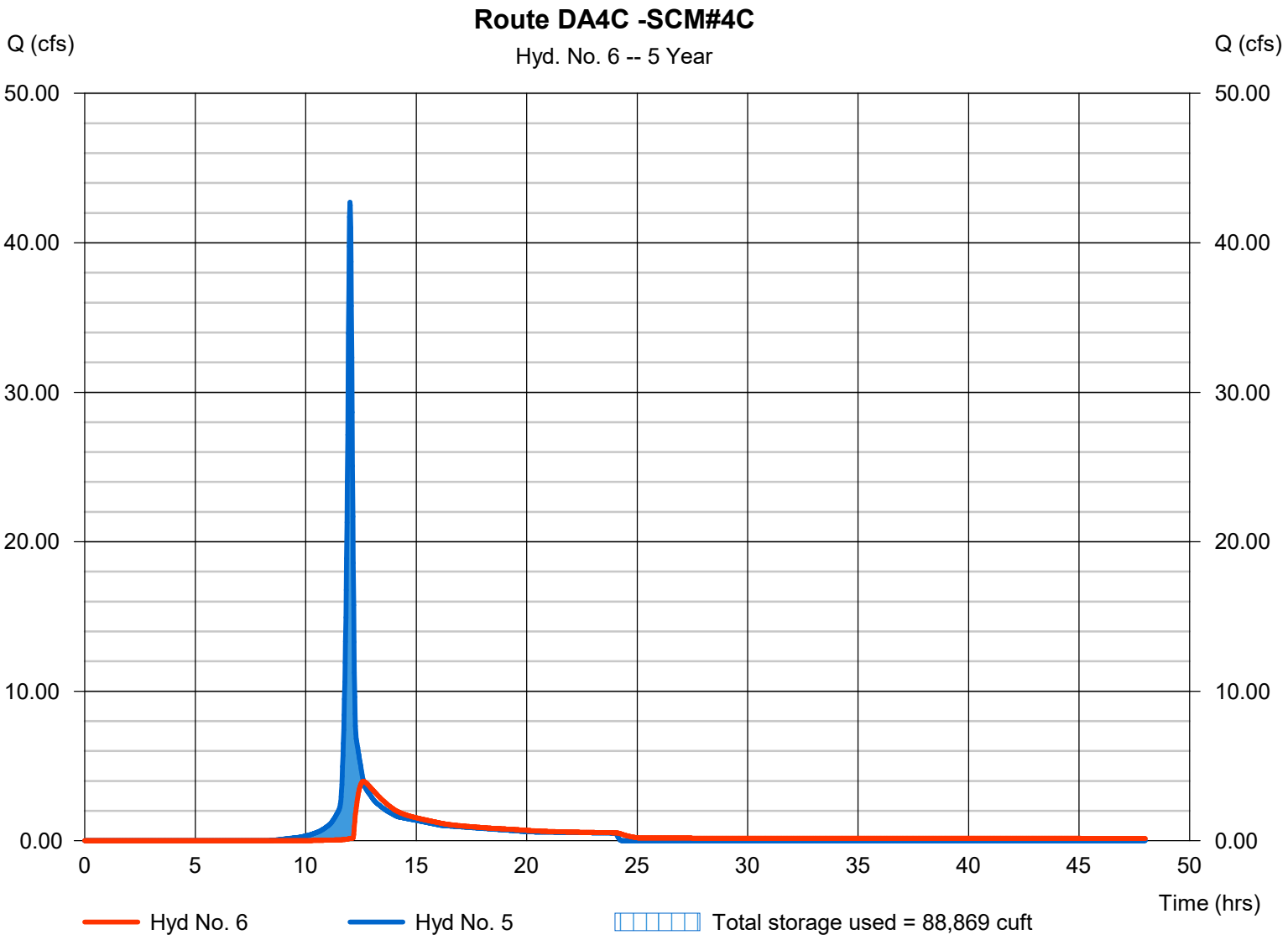
Hydrograph Report

Hyd. No. 6

Route DA4C -SCM#4C

Hydrograph type	= Reservoir	Peak discharge	= 3.973 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.62 hrs
Time interval	= 1 min	Hyd. volume	= 67,710 cuft
Inflow hyd. No.	= 5 - Inflow to SCM #4C	Max. Elevation	= 296.72 ft
Reservoir name	= SCM #4C	Max. Storage	= 88,869 cuft

Storage Indication method used. Wet pond routing start elevation = 293.50 ft.

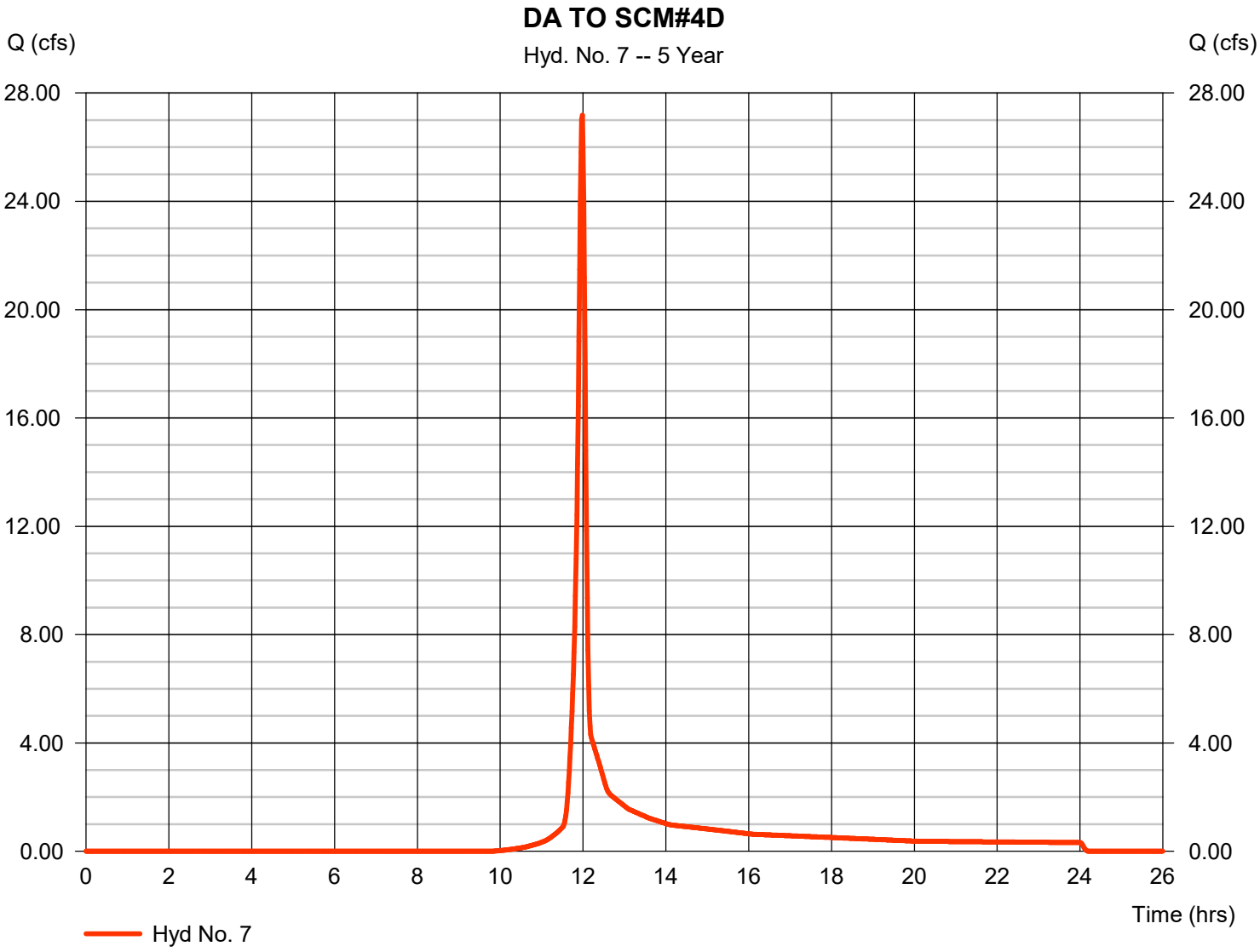


Hydrograph Report

Hyd. No. 7

DA TO SCM#4D

Hydrograph type	= SCS Runoff	Peak discharge	= 27.18 cfs
Storm frequency	= 5 yrs	Time to peak	= 11.98 hrs
Time interval	= 1 min	Hyd. volume	= 57,319 cuft
Drainage area	= 9.120 ac	Curve number	= 73.1
Basin Slope	= 6.0 %	Hydraulic length	= 1465 ft
Tc method	= User	Time of conc. (Tc)	= 8.20 min
Total precip.	= 4.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



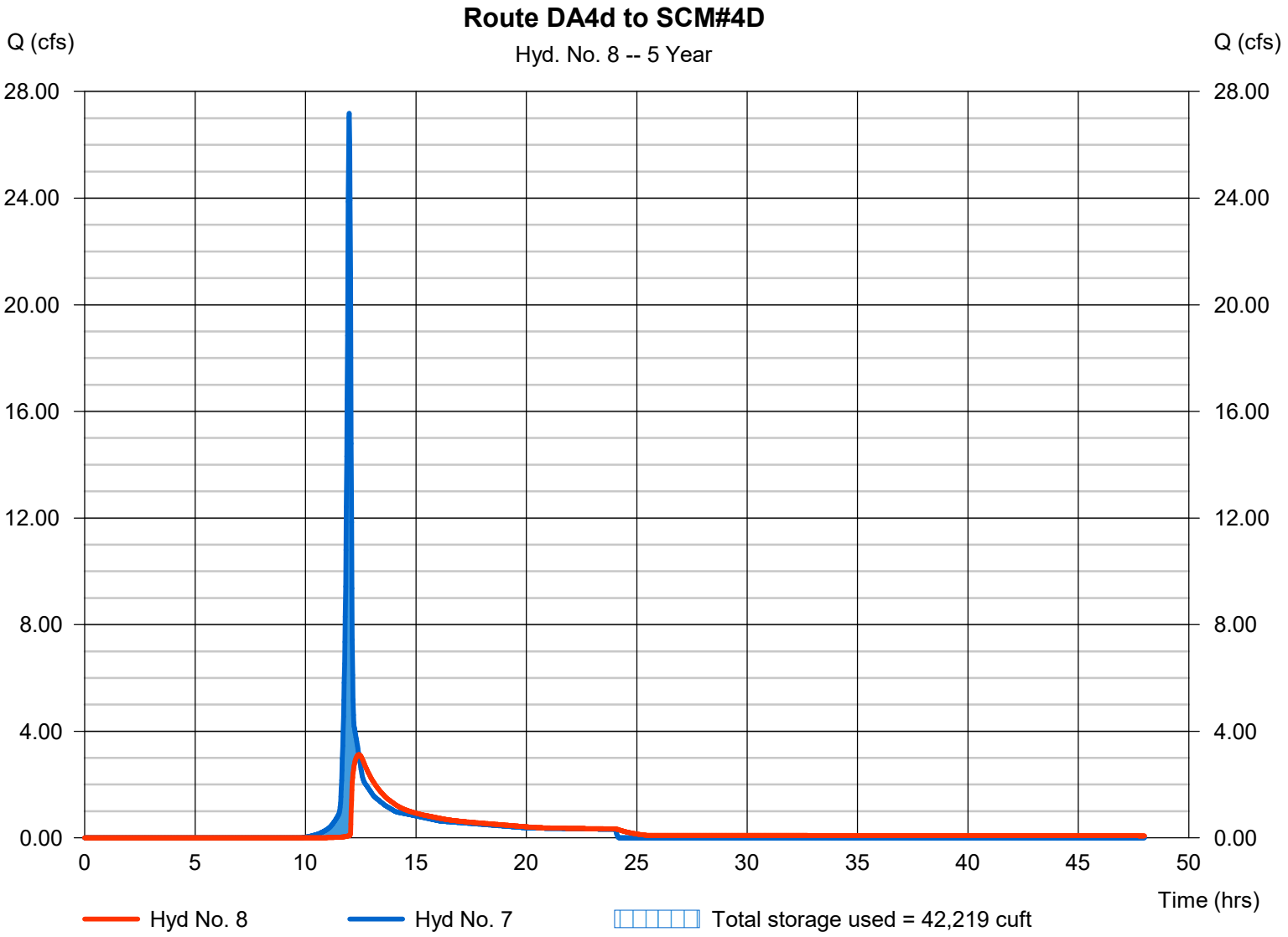
Hydrograph Report

Hyd. No. 8

Route DA4d to SCM#4D

Hydrograph type	= Reservoir	Peak discharge	= 3.119 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.42 hrs
Time interval	= 1 min	Hyd. volume	= 43,196 cuft
Inflow hyd. No.	= 7 - DA TO SCM#4D	Max. Elevation	= 283.50 ft
Reservoir name	= SCM #4D	Max. Storage	= 42,219 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

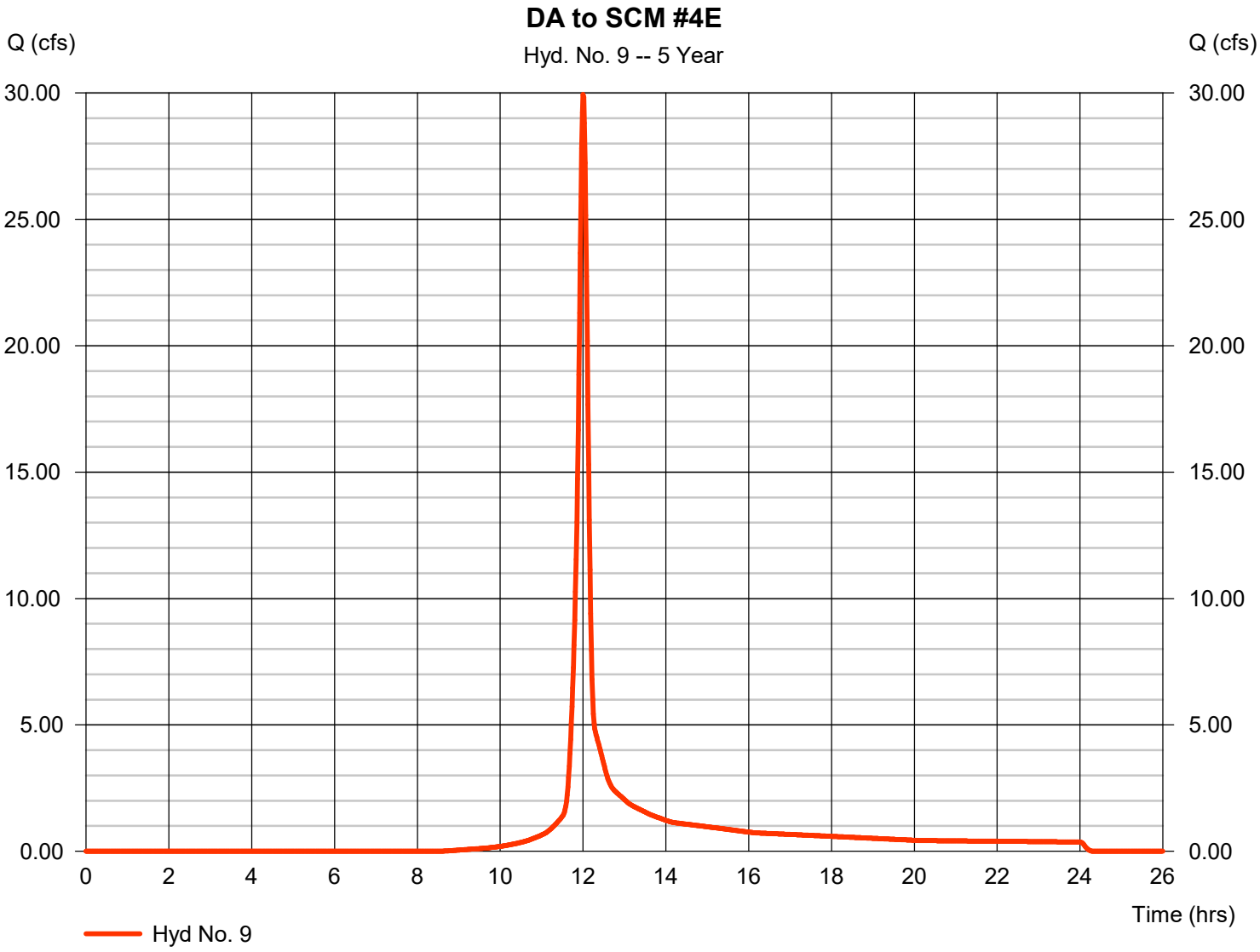


Hydrograph Report

Hyd. No. 9

DA to SCM #4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.94 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	72,397 cuft
Drainage area	=	9.100 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.80 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



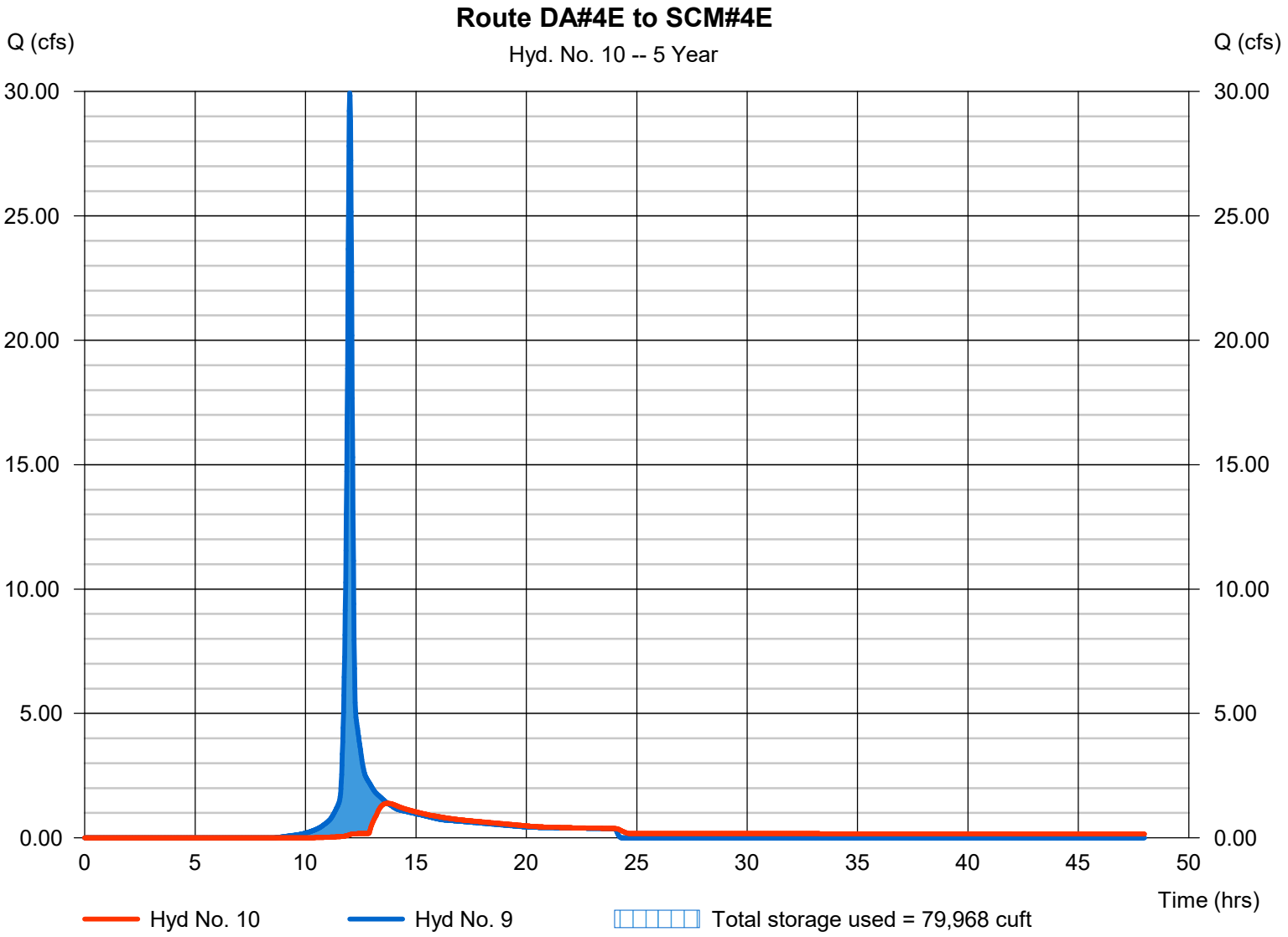
Hydrograph Report

Hyd. No. 10

Route DA#4E to SCM#4E

Hydrograph type	= Reservoir	Peak discharge	= 1.389 cfs
Storm frequency	= 5 yrs	Time to peak	= 13.72 hrs
Time interval	= 1 min	Hyd. volume	= 42,631 cuft
Inflow hyd. No.	= 9 - DA to SCM #4E	Max. Elevation	= 283.64 ft
Reservoir name	= SCM #4E	Max. Storage	= 79,968 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

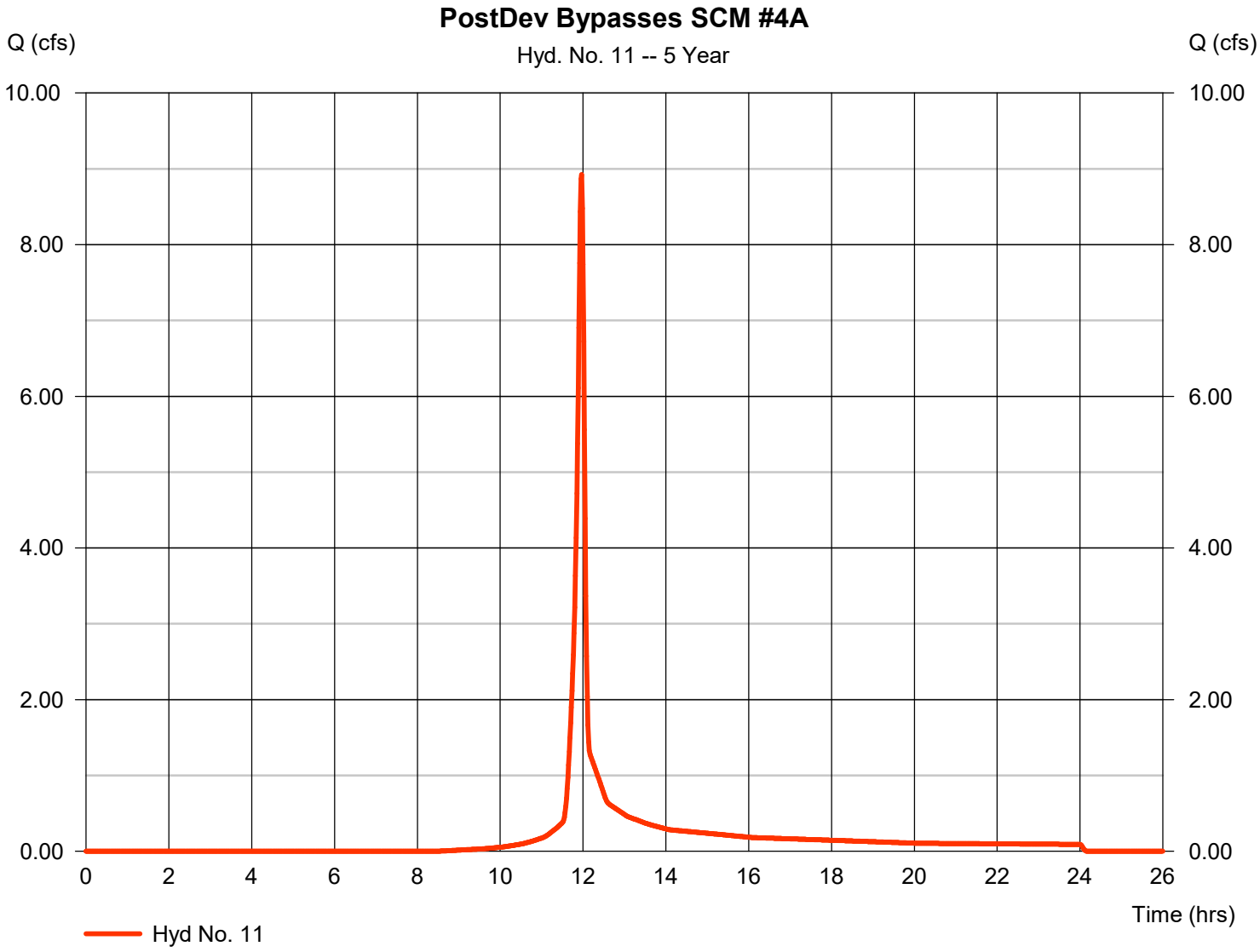


Hydrograph Report

Hyd. No. 11

PostDev Bypasses SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.924 cfs
Storm frequency	=	5 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	18,028 cuft
Drainage area	=	2.220 ac	Curve number	=	78.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

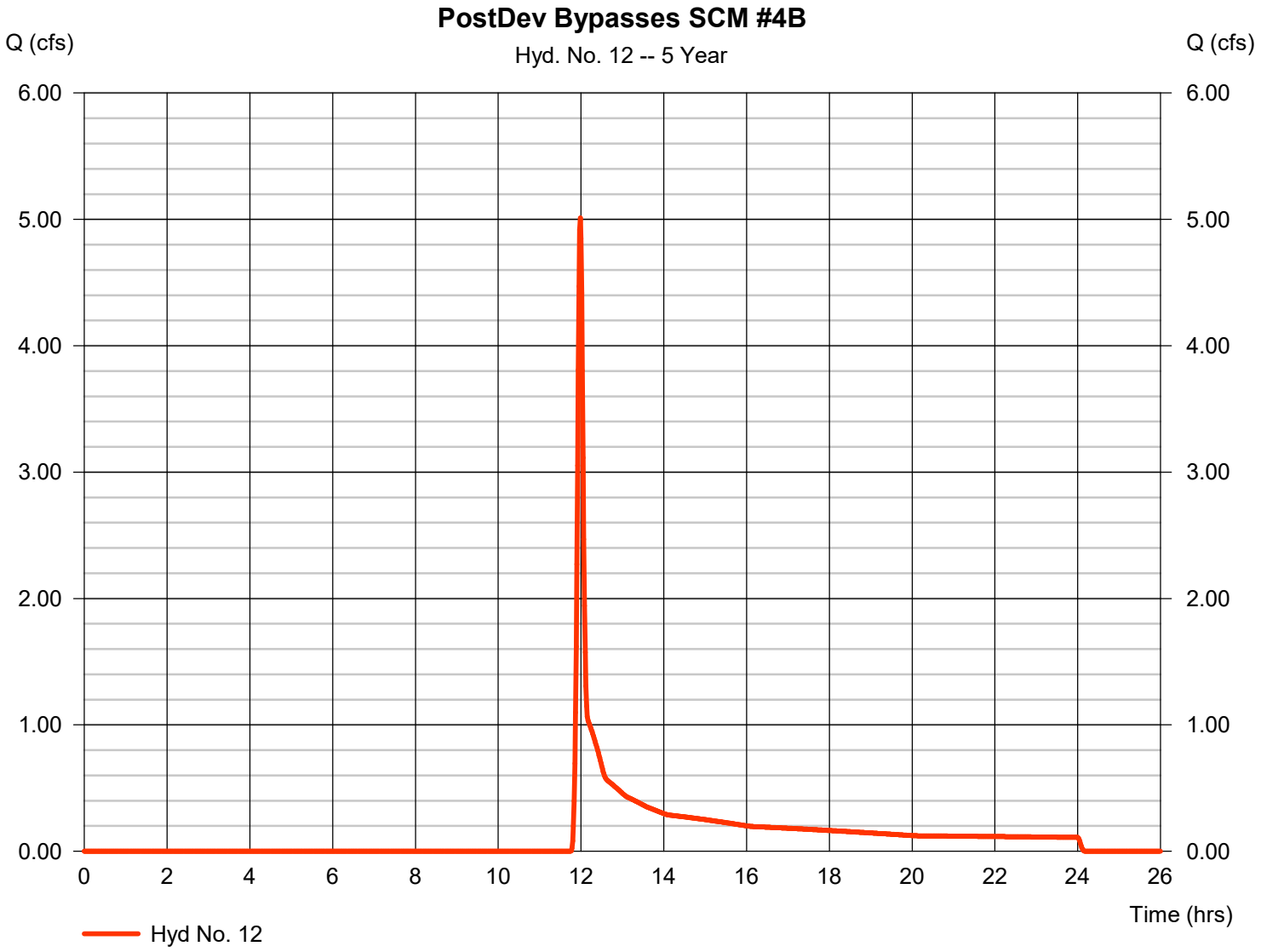


Hydrograph Report

Hyd. No. 12

PostDev Bypasses SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.011 cfs
Storm frequency	=	5 yrs	Time to peak	=	11.98 hrs
Time interval	=	1 min	Hyd. volume	=	12,421 cuft
Drainage area	=	5.240 ac	Curve number	=	54.3
Basin Slope	=	5.1 %	Hydraulic length	=	1220 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.84 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

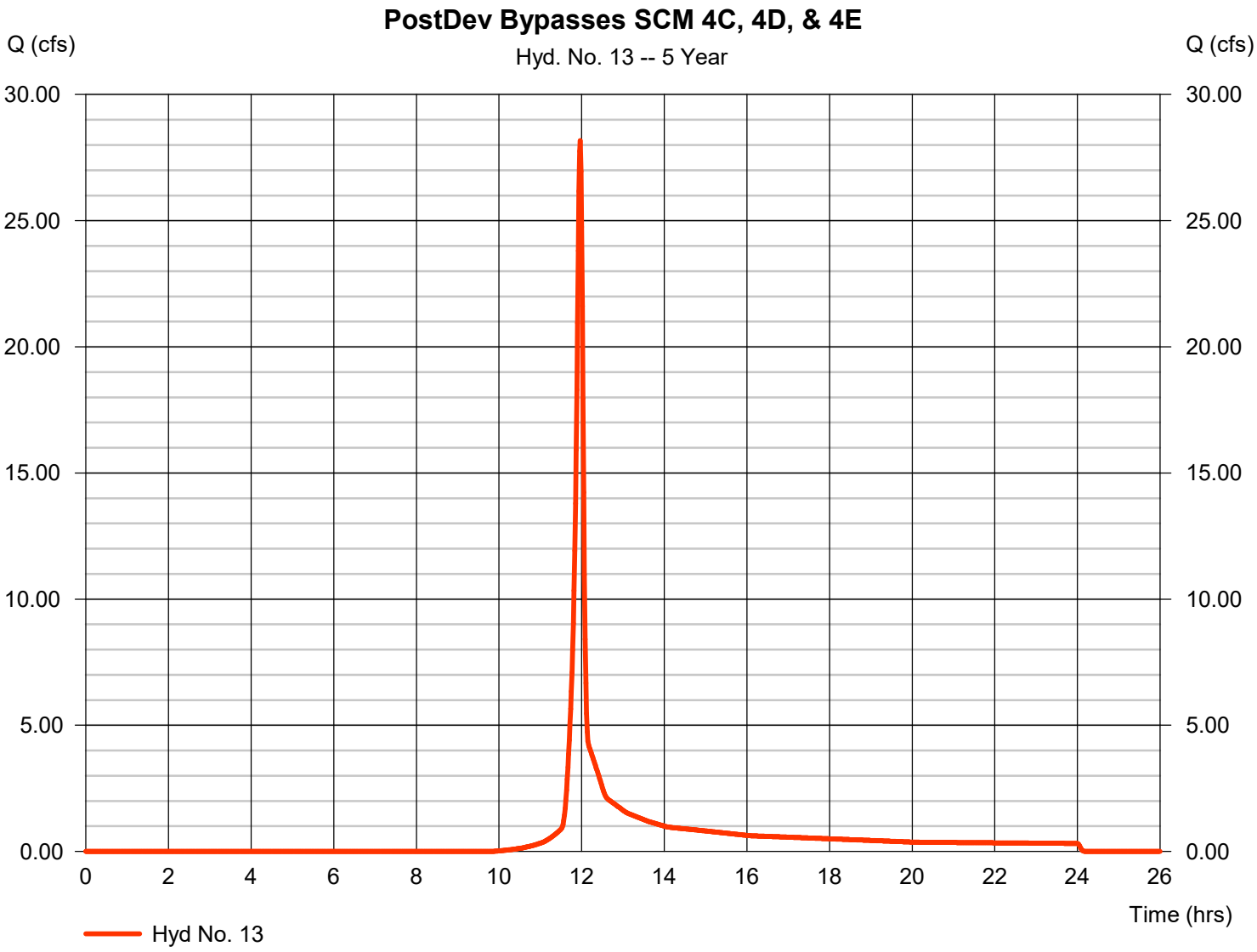


Hydrograph Report

Hyd. No. 13

PostDev Bypasses SCM 4C, 4D, & 4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.17 cfs
Storm frequency	=	5 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	56,565 cuft
Drainage area	=	8.580 ac	Curve number	=	72.9
Basin Slope	=	2.6 %	Hydraulic length	=	900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	6.02 min
Total precip.	=	4.33 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

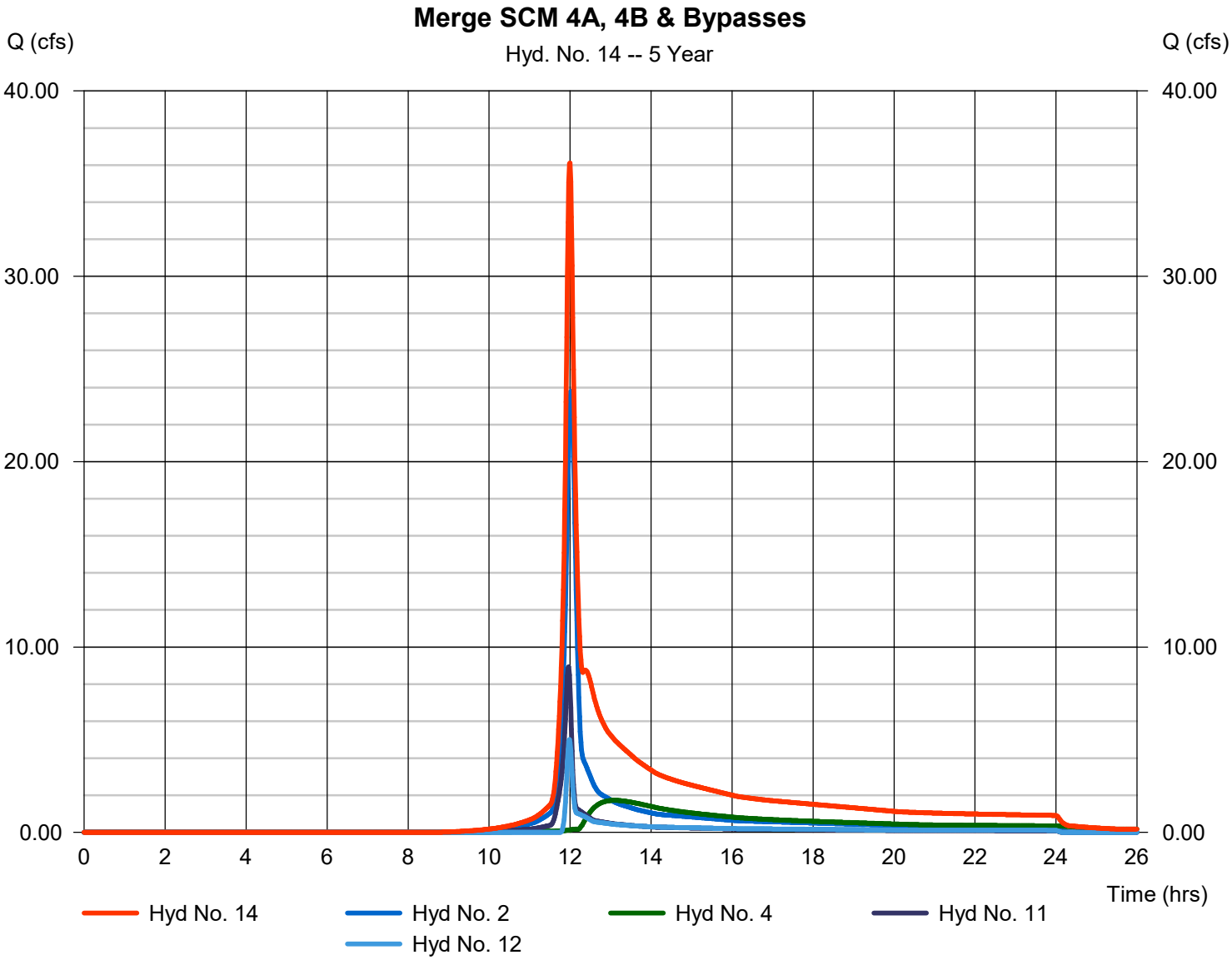


Hydrograph Report

Hyd. No. 14

Merge SCM 4A, 4B & Bypasses

Hydrograph type	= Combine	Peak discharge	= 36.11 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 148,185 cuft
Inflow hyds.	= 2, 4, 11, 12	Contrib. drain. area	= 15.770 ac



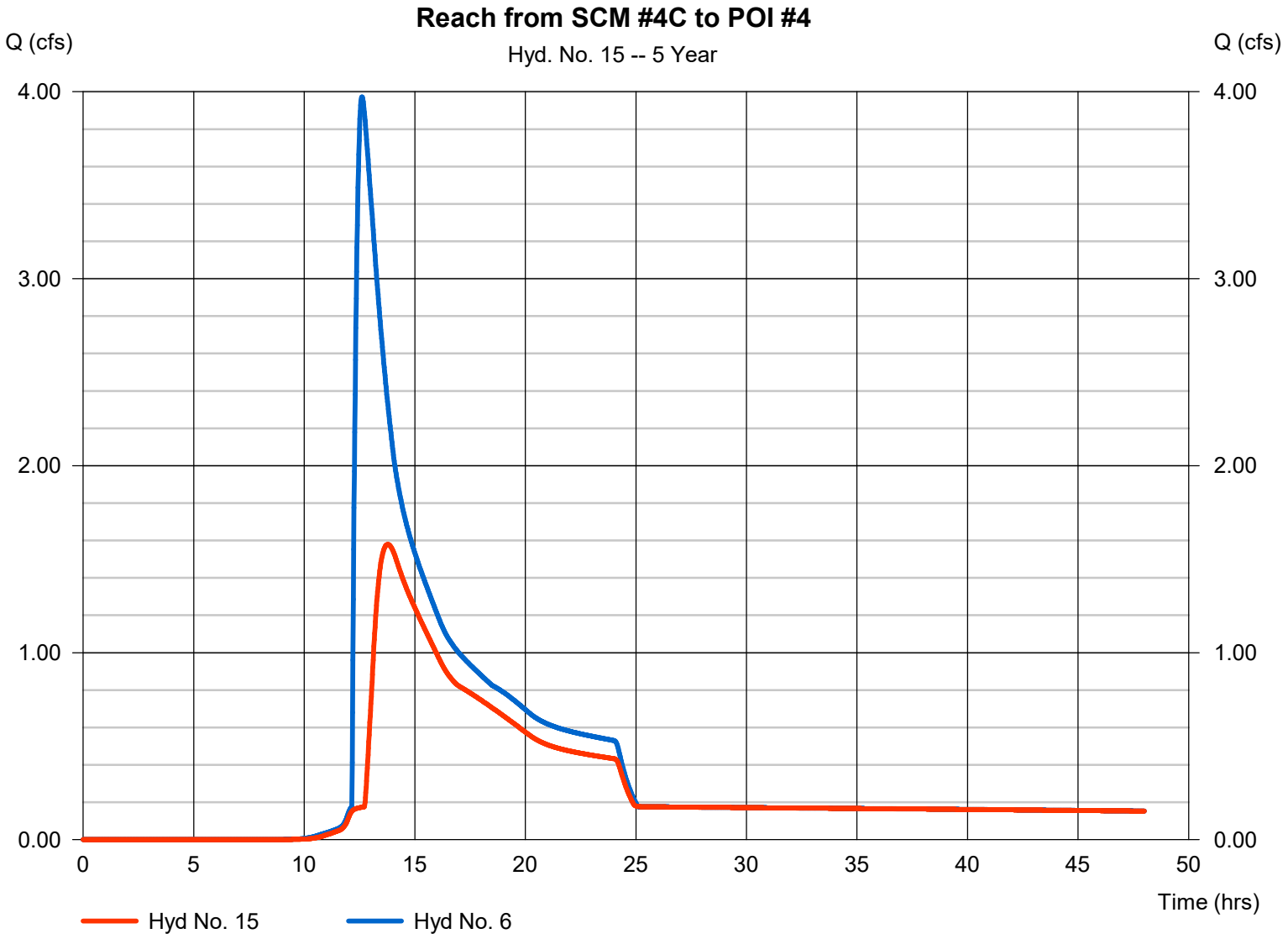
Hydrograph Report

Hyd. No. 15

Reach from SCM #4C to POI #4

Hydrograph type	= Reach	Peak discharge	= 1.579 cfs
Storm frequency	= 5 yrs	Time to peak	= 13.78 hrs
Time interval	= 1 min	Hyd. volume	= 47,500 cuft
Inflow hyd. No.	= 6 - Route DA4C -SCM#4C	Section type	= Trapezoidal
Reach length	= 900.0 ft	Channel slope	= 2.6 %
Manning's n	= 0.032	Bottom width	= 4.0 ft
Side slope	= 25.0:1	Max. depth	= 4.0 ft
Rating curve x	= 2.955	Rating curve m	= 1.189
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.1918

Modified Att-Kin routing method used.



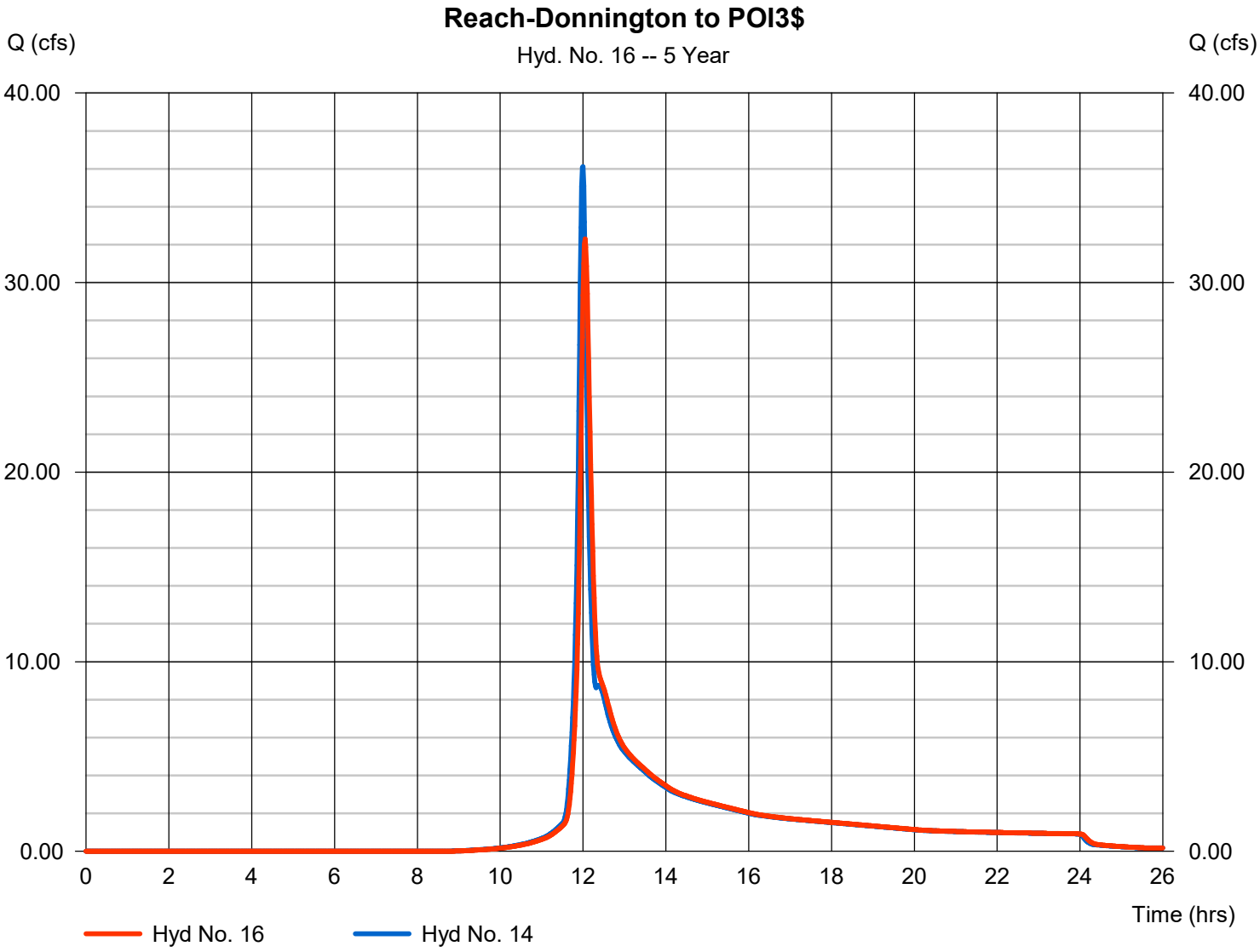
Hydrograph Report

Hyd. No. 16

Reach-Donnington to POI3$

Hydrograph type	=	Reach	Peak discharge	=	32.30 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.05 hrs
Time interval	=	1 min	Hyd. volume	=	148,150 cuft
Inflow hyd. No.	=	14 - Merge SCM 4A, 4B & Bypass$	Section type	=	Trapezoidal
Reach length	=	1220.0 ft	Channel slope	=	2.9 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	5.0 ft
Rating curve x	=	3.124	Rating curve m	=	1.206
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2466

Modified Att-Kin routing method used.

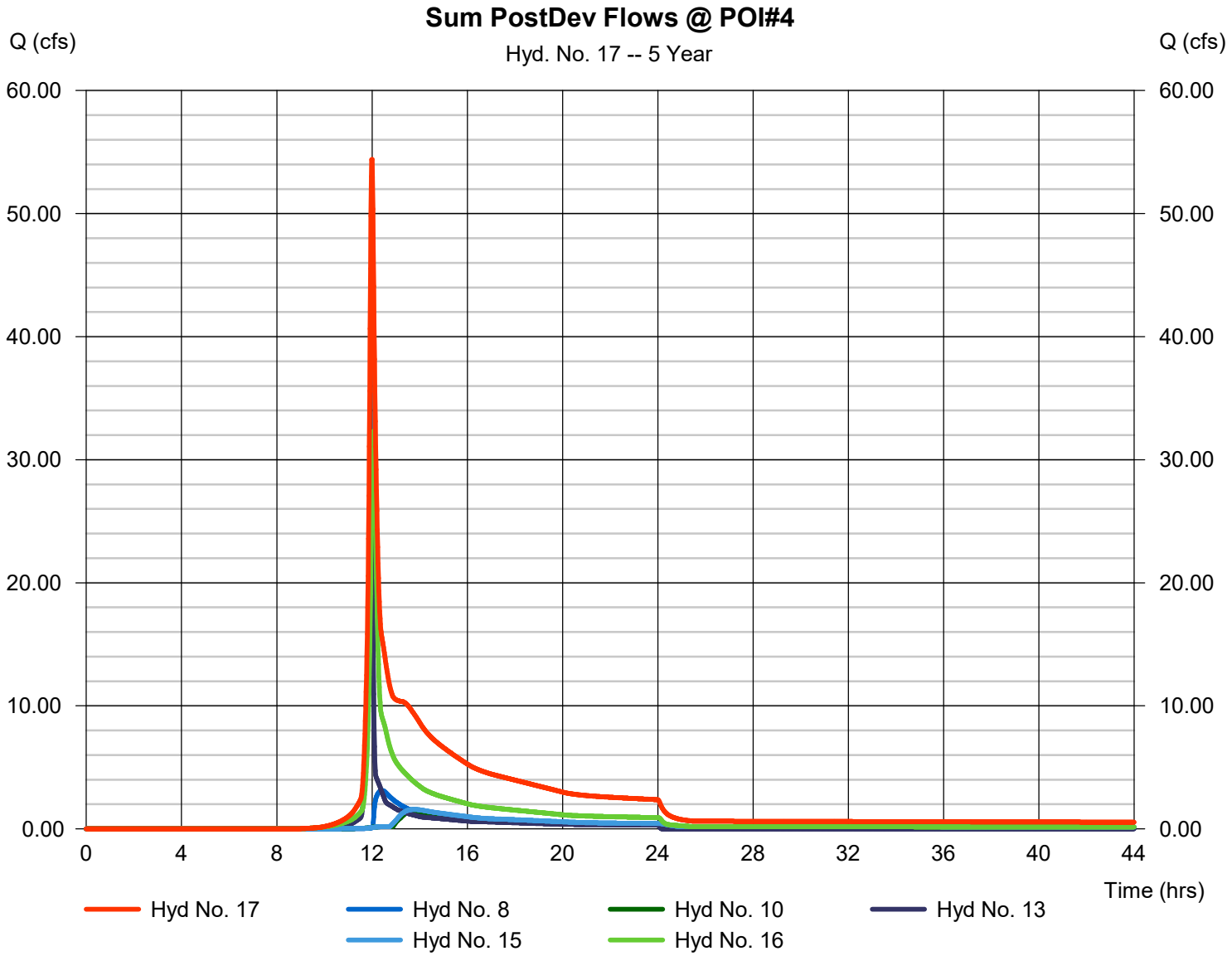


Hydrograph Report

Hyd. No. 17

Sum PostDev Flows @ POI#4

Hydrograph type	= Combine	Peak discharge	= 54.41 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 338,042 cuft
Inflow hyds.	= 8, 10, 13, 15, 16	Contrib. drain. area	= 8.580 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

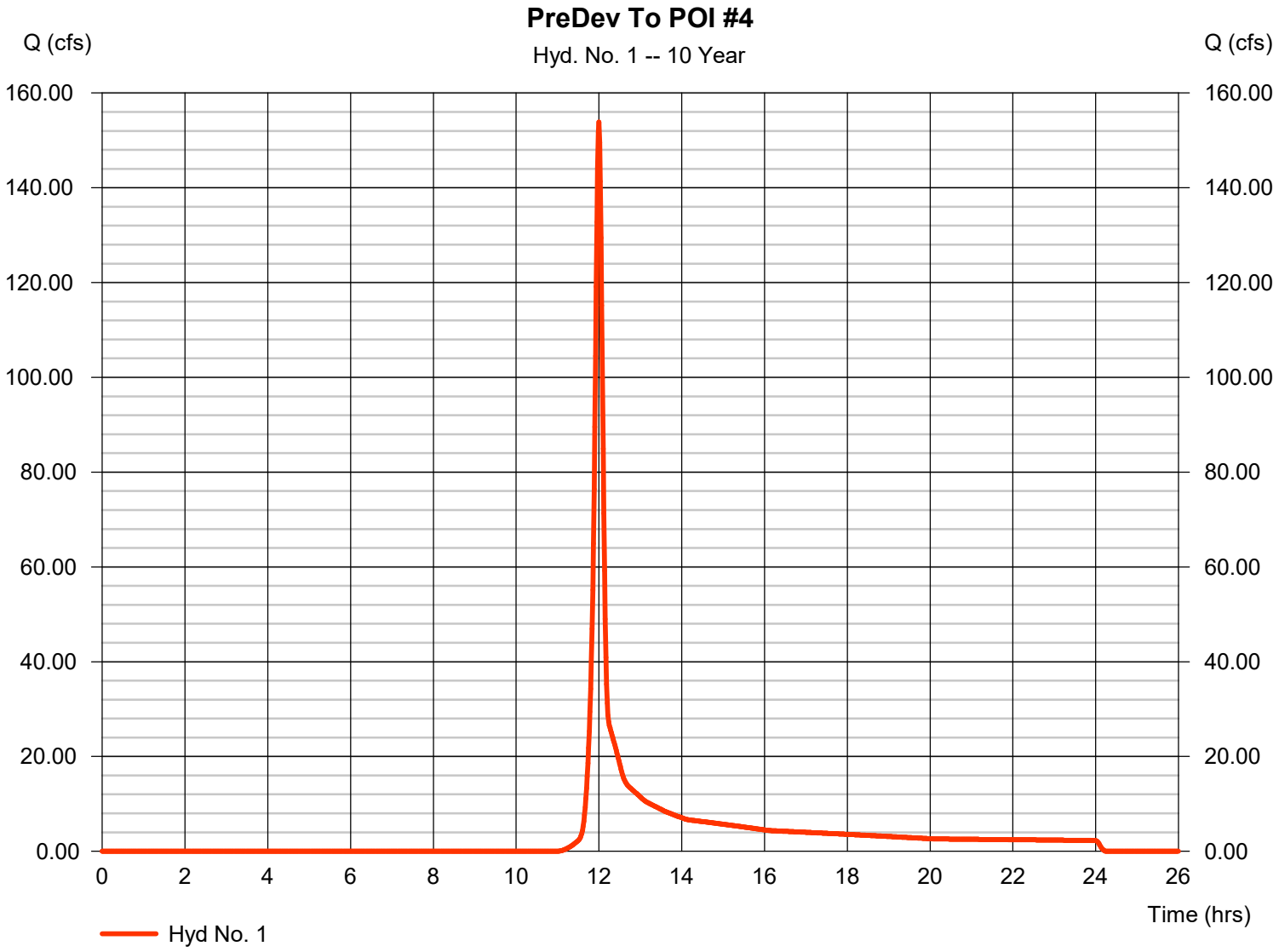
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	153.86	1	720	355,790	------	------	------	PreDev To POI #4
2	SCS Runoff	30.41	1	721	76,817	------	------	------	PostDev to SCM #4A
3	SCS Runoff	32.89	1	721	83,403	------	------	------	DA to SCM #4B
4	Reservoir	6.591	1	736	62,896	3	327.13	62,981	Route DA#4B-SCM#4B
5	SCS Runoff	53.74	1	720	130,295	------	------	------	Inflow to SCM #4C
6	Reservoir	12.88	1	732	94,630	5	297.07	96,068	Route DA4C -SCM#4C
7	SCS Runoff	35.23	1	719	74,384	------	------	------	DA TO SCM#4D
8	Reservoir	6.966	1	729	60,218	7	284.08	48,414	Route DA4d to SCM#4D
9	SCS Runoff	37.89	1	720	91,746	------	------	------	DA to SCM #4E
10	Reservoir	4.209	1	750	61,915	9	283.81	82,908	Route DA#4E to SCM#4E
11	SCS Runoff	11.22	1	718	22,826	------	------	------	PostDev Bypasses SCM #4A
12	SCS Runoff	8.267	1	718	18,582	------	------	------	PostDev Bypasses SCM #4B
13	SCS Runoff	36.54	1	718	73,481	------	------	------	PostDev Bypasses SCM 4C, 4D, & 4
14	Combine	47.85	1	719	195,855	2, 4, 11, 12,	------	------	Merge SCM 4A, 4B & Bypasses
15	Reach	4.464	1	754	69,455	6	------	------	Reach from SCM #4C to POI #4
16	Reach	43.26	1	723	195,822	14	------	------	Reach-Donnington to POI3$
17	Combine	74.65	1	720	460,891	8, 10, 13, 15, 16	------	------	Sum PostDev Flows @ POI#4

Hydrograph Report

Hyd. No. 1

PreDev To POI #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	153.86 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	355,790 cuft
Drainage area	=	63.520 ac	Curve number	=	63.3
Basin Slope	=	4.1 %	Hydraulic length	=	1900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	8.96 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

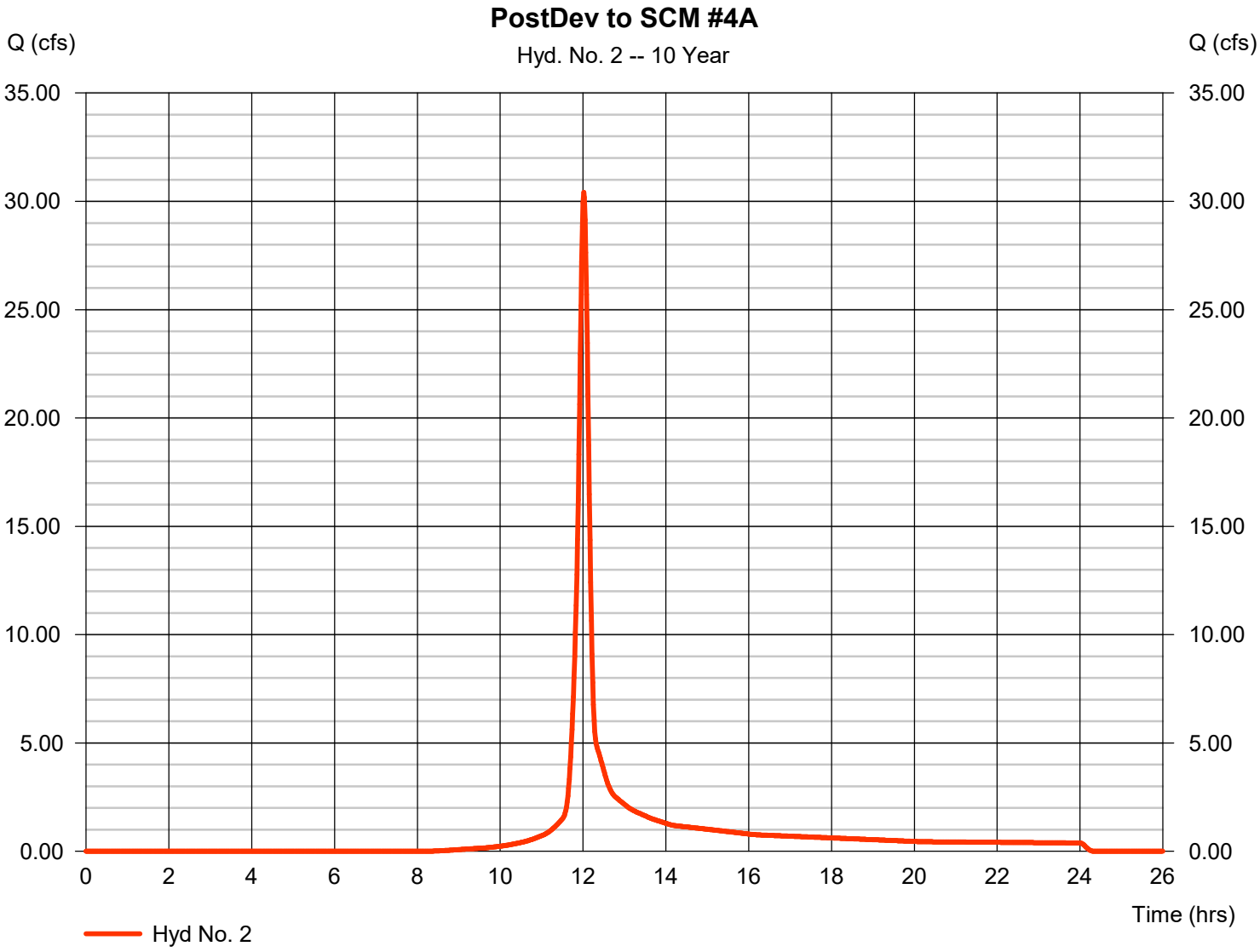


Hydrograph Report

Hyd. No. 2

PostDev to SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.41 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	76,817 cuft
Drainage area	=	8.310 ac	Curve number	=	76.4
Basin Slope	=	3.3 %	Hydraulic length	=	1200 ft
Tc method	=	User	Time of conc. (Tc)	=	12.20 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

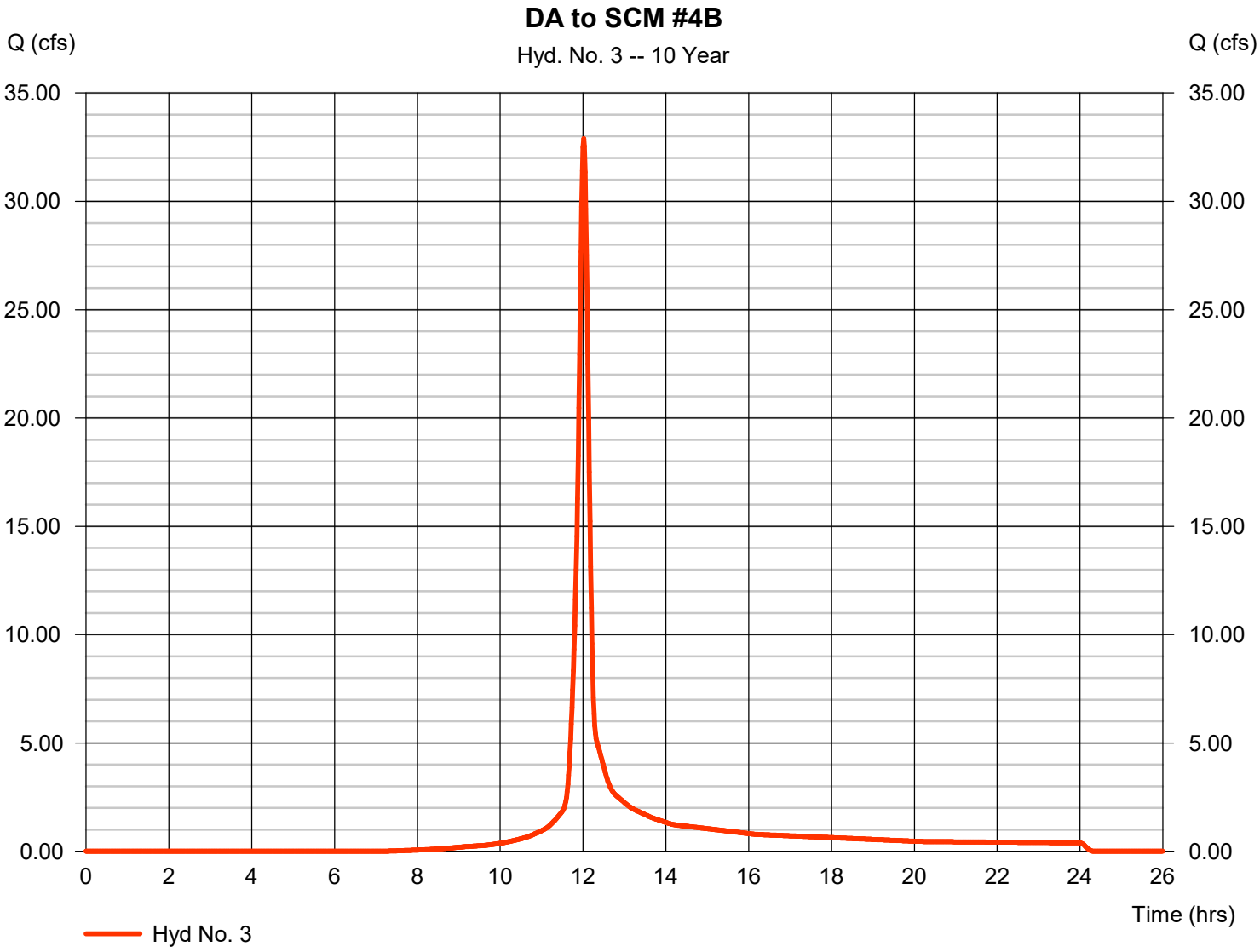


Hydrograph Report

Hyd. No. 3

DA to SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	83,403 cuft
Drainage area	=	8.020 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



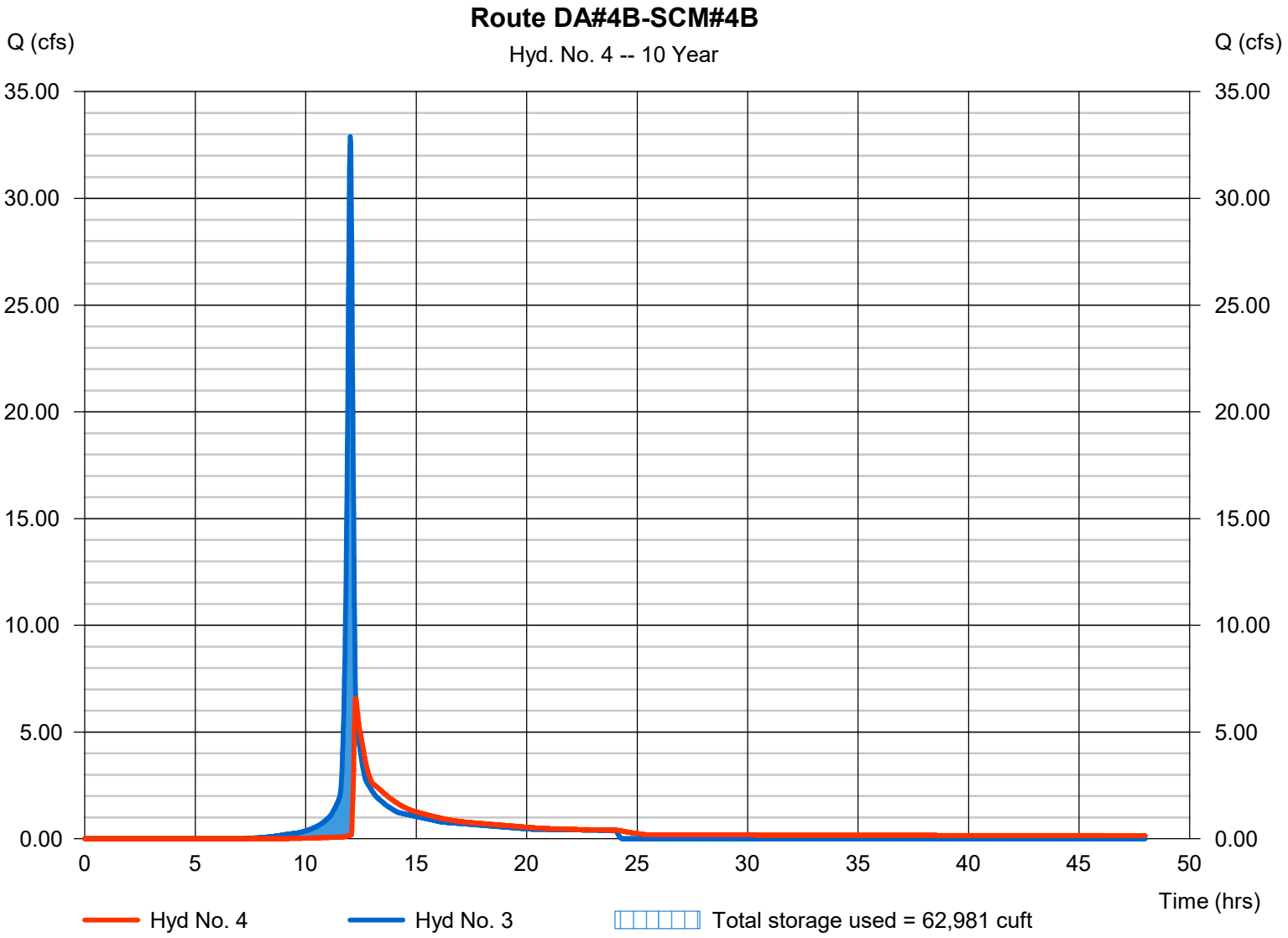
Hydrograph Report

Hyd. No. 4

Route DA#4B-SCM#4B

Hydrograph type	= Reservoir	Peak discharge	= 6.591 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.27 hrs
Time interval	= 1 min	Hyd. volume	= 62,896 cuft
Inflow hyd. No.	= 3 - DA to SCM #4B	Max. Elevation	= 327.13 ft
Reservoir name	= SCM #4B	Max. Storage	= 62,981 cuft

Storage Indication method used. Wet pond routing start elevation = 323.50 ft.

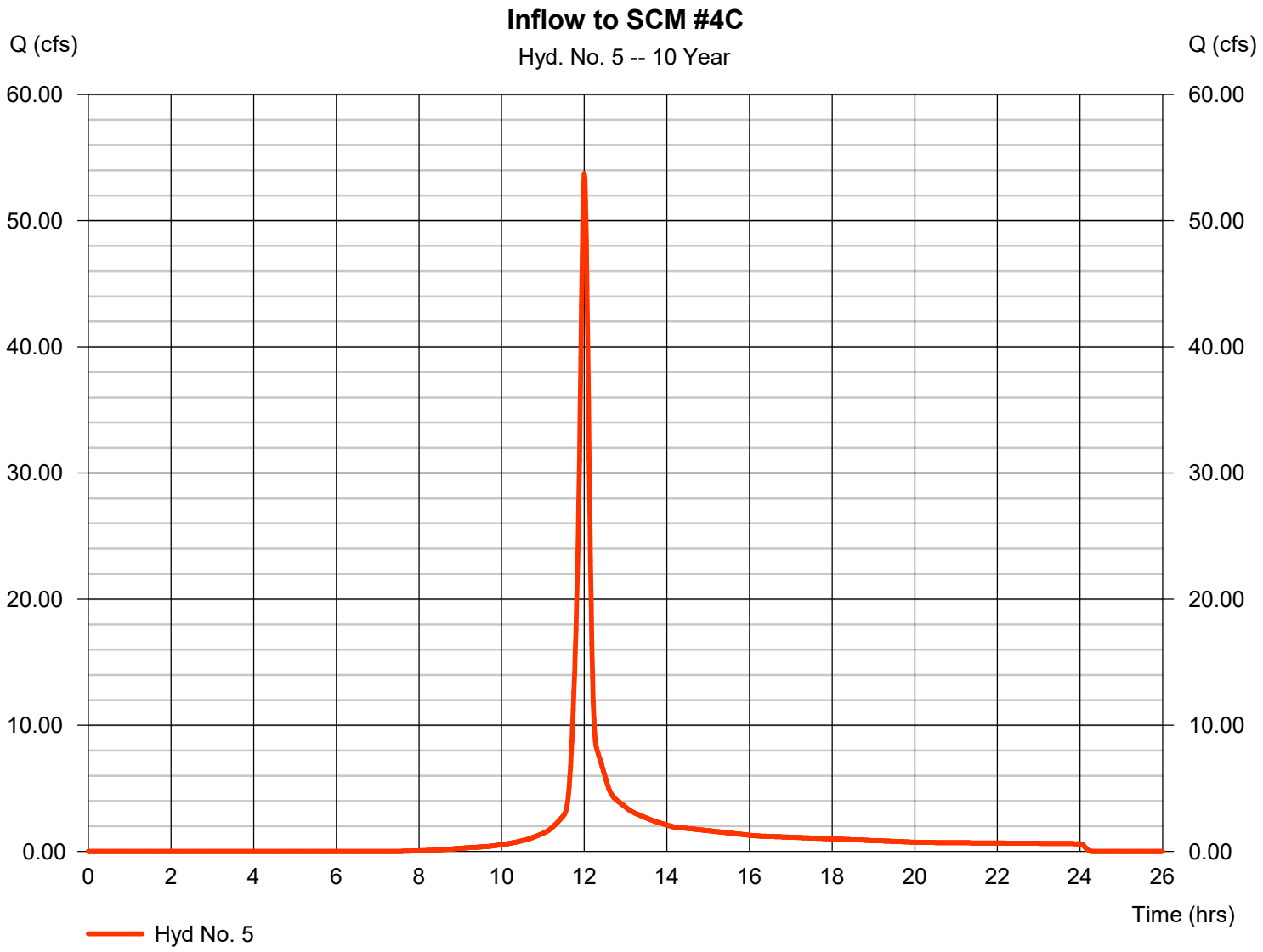


Hydrograph Report

Hyd. No. 5

Inflow to SCM #4C

Hydrograph type	=	SCS Runoff	Peak discharge	=	53.74 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	130,295 cuft
Drainage area	=	12.510 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.20 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



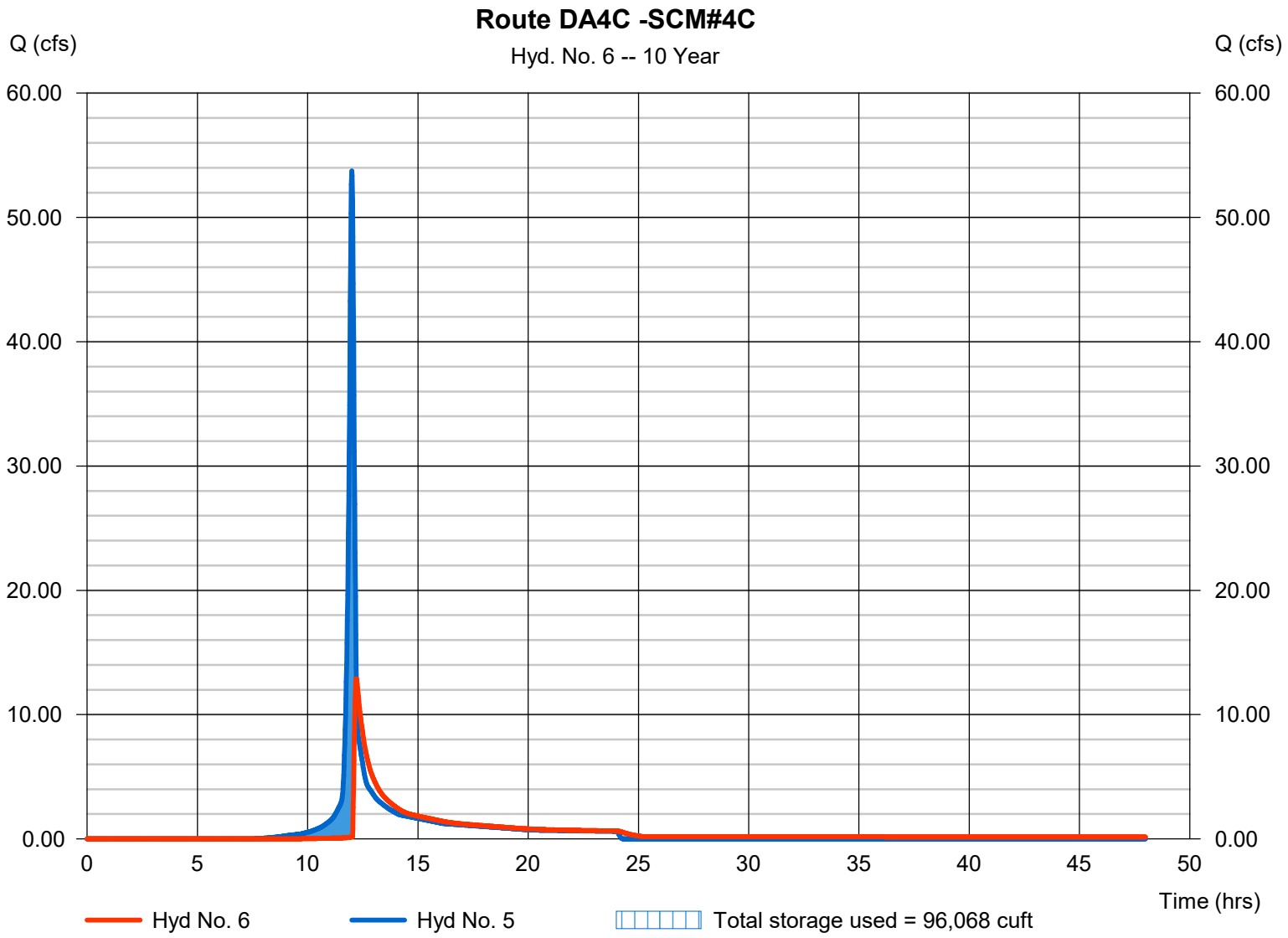
Hydrograph Report

Hyd. No. 6

Route DA4C -SCM#4C

Hydrograph type	= Reservoir	Peak discharge	= 12.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.20 hrs
Time interval	= 1 min	Hyd. volume	= 94,630 cuft
Inflow hyd. No.	= 5 - Inflow to SCM #4C	Max. Elevation	= 297.07 ft
Reservoir name	= SCM #4C	Max. Storage	= 96,068 cuft

Storage Indication method used. Wet pond routing start elevation = 293.50 ft.

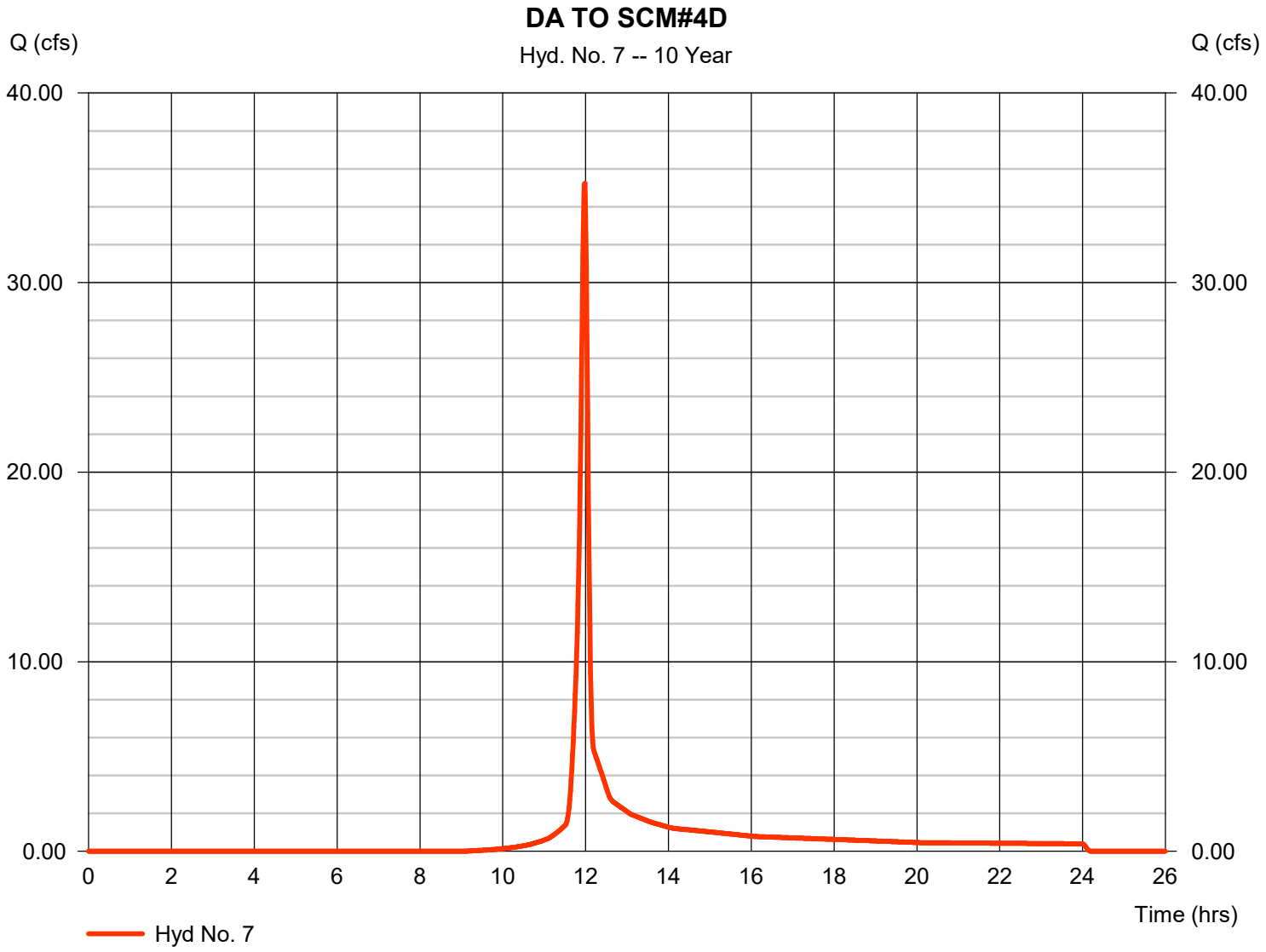


Hydrograph Report

Hyd. No. 7

DA TO SCM#4D

Hydrograph type	= SCS Runoff	Peak discharge	= 35.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.98 hrs
Time interval	= 1 min	Hyd. volume	= 74,384 cuft
Drainage area	= 9.120 ac	Curve number	= 73.1
Basin Slope	= 6.0 %	Hydraulic length	= 1465 ft
Tc method	= User	Time of conc. (Tc)	= 8.20 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



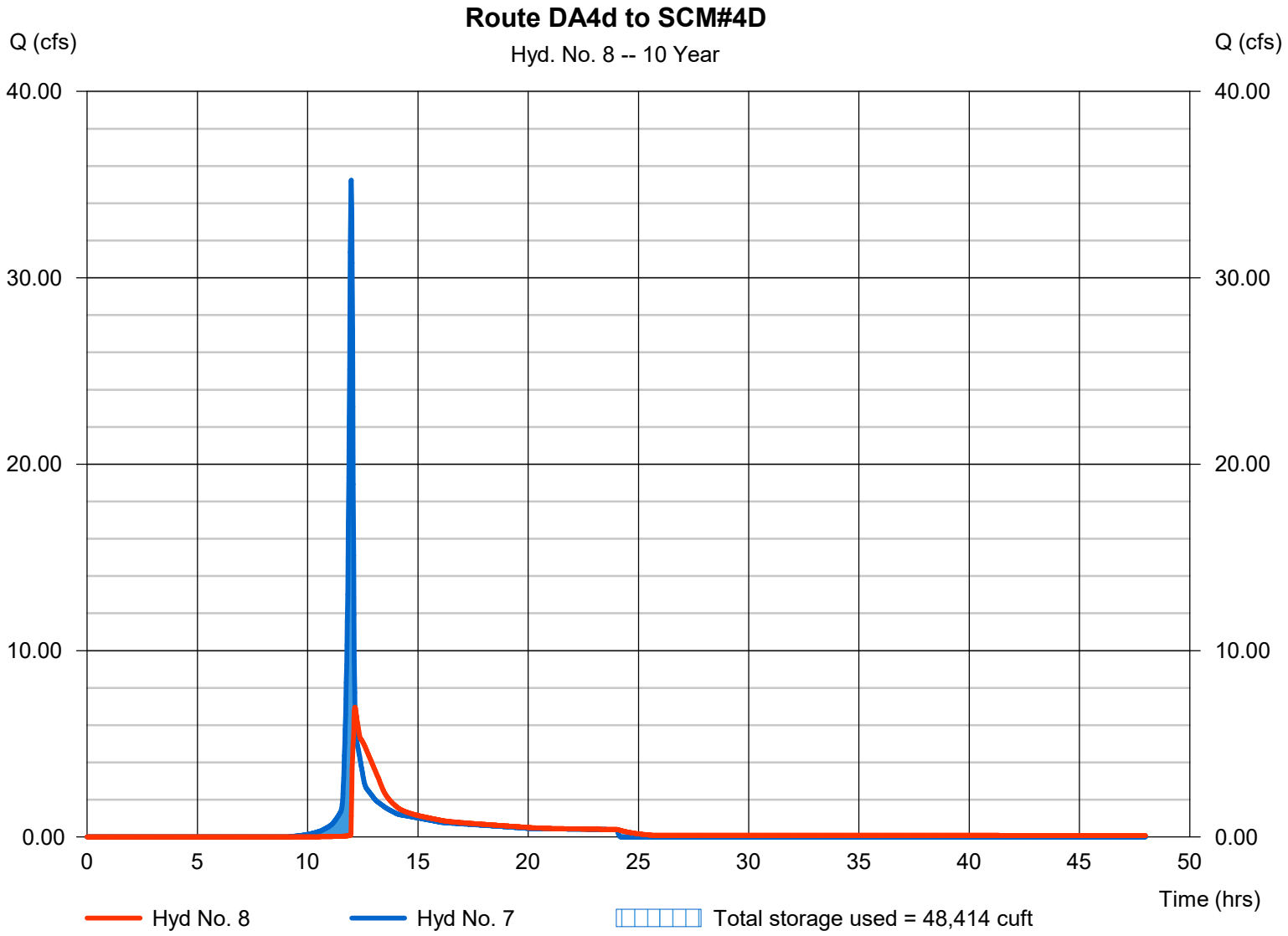
Hydrograph Report

Hyd. No. 8

Route DA4d to SCM#4D

Hydrograph type	= Reservoir	Peak discharge	= 6.966 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 60,218 cuft
Inflow hyd. No.	= 7 - DA TO SCM#4D	Max. Elevation	= 284.08 ft
Reservoir name	= SCM #4D	Max. Storage	= 48,414 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

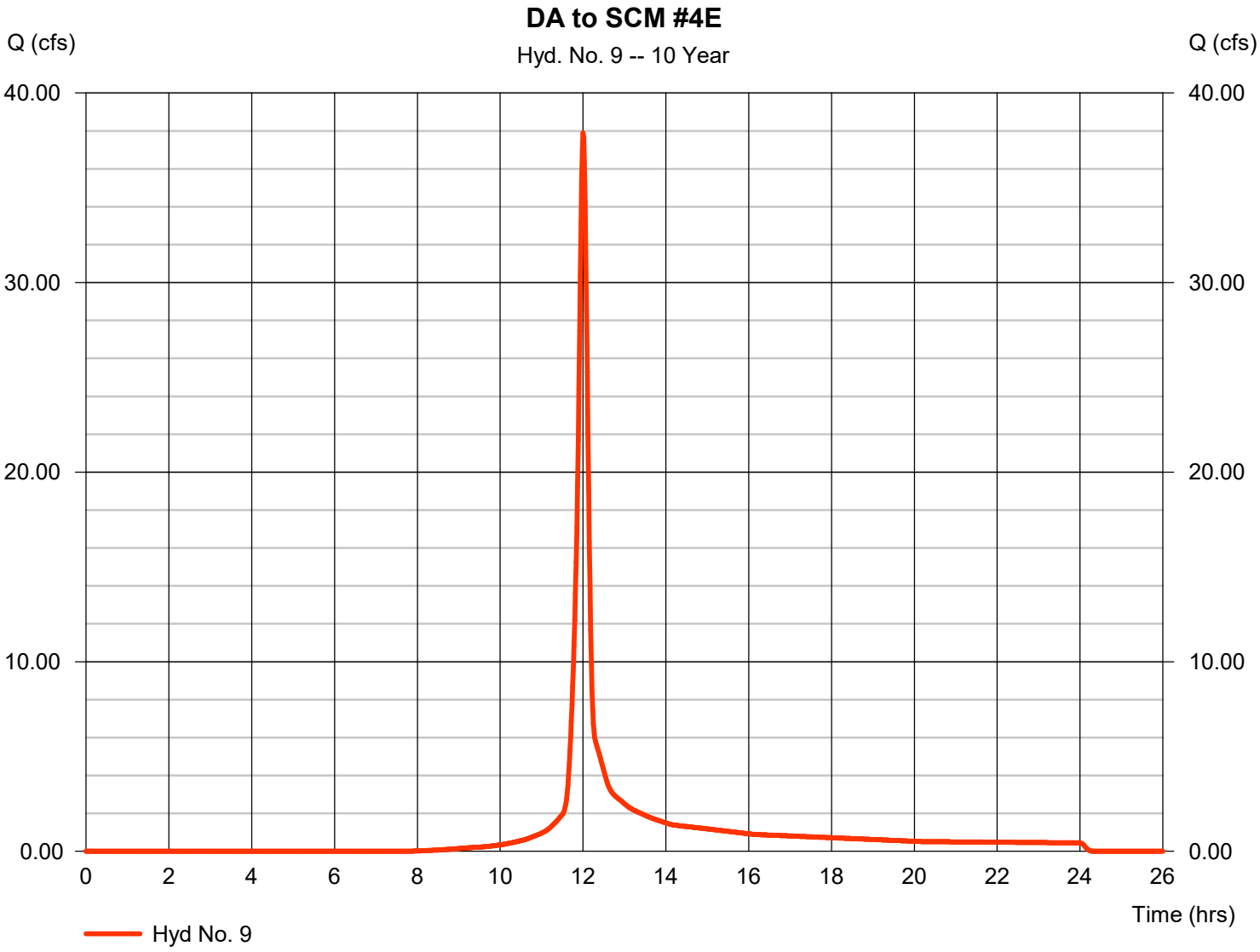


Hydrograph Report

Hyd. No. 9

DA to SCM #4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	91,746 cuft
Drainage area	=	9.100 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.80 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



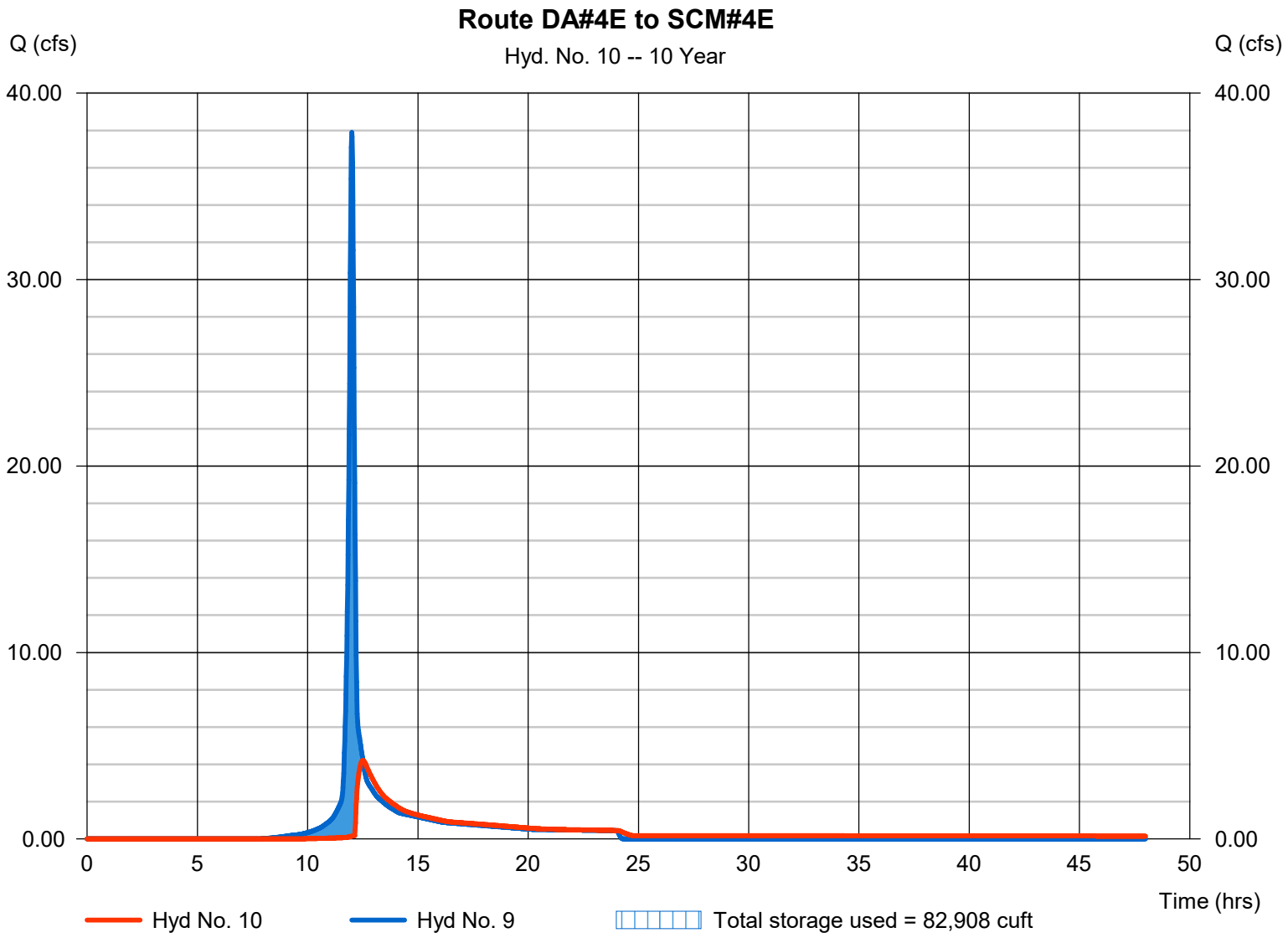
Hydrograph Report

Hyd. No. 10

Route DA#4E to SCM#4E

Hydrograph type	= Reservoir	Peak discharge	= 4.209 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.50 hrs
Time interval	= 1 min	Hyd. volume	= 61,915 cuft
Inflow hyd. No.	= 9 - DA to SCM #4E	Max. Elevation	= 283.81 ft
Reservoir name	= SCM #4E	Max. Storage	= 82,908 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

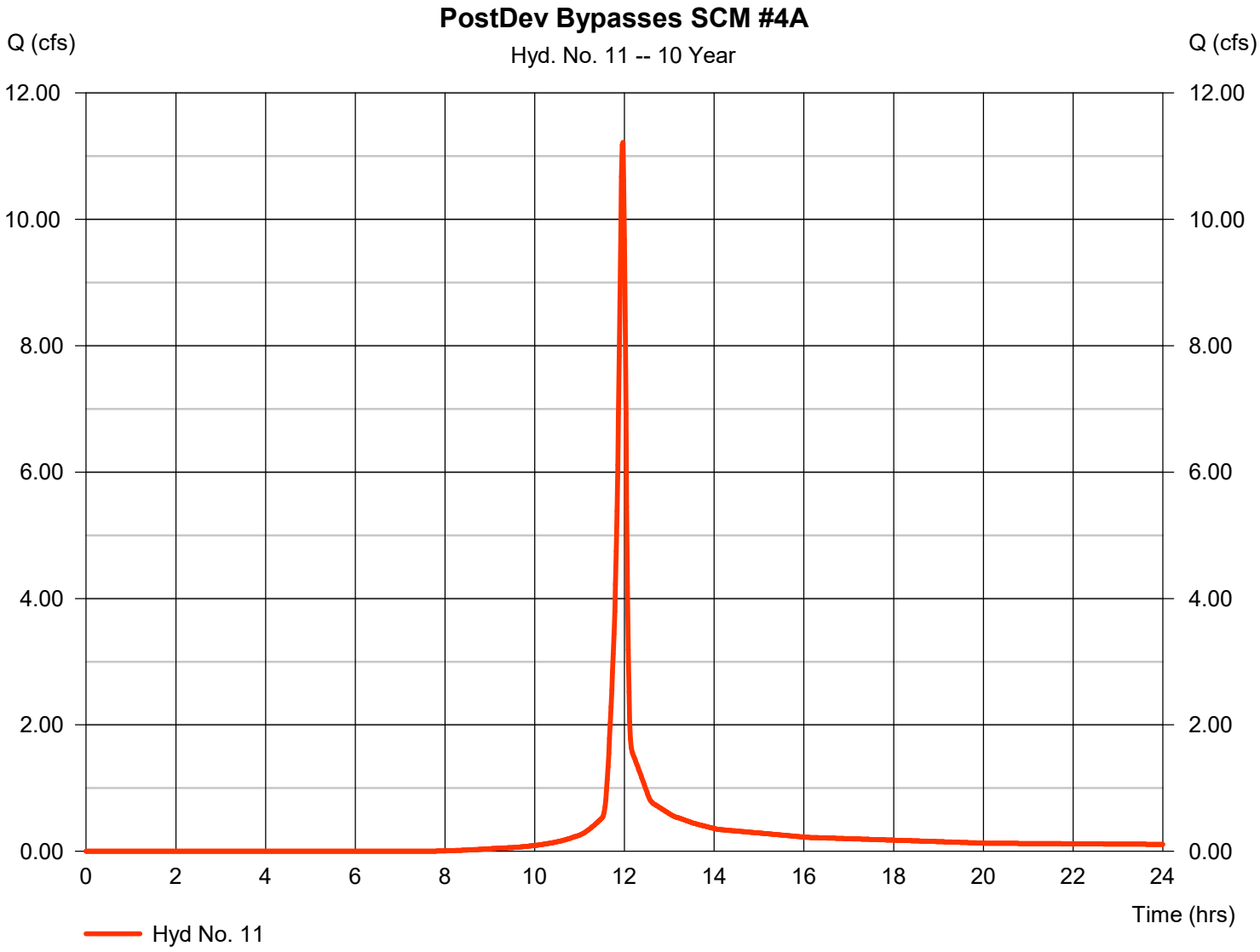


Hydrograph Report

Hyd. No. 11

PostDev Bypasses SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.22 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	22,826 cuft
Drainage area	=	2.220 ac	Curve number	=	78.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

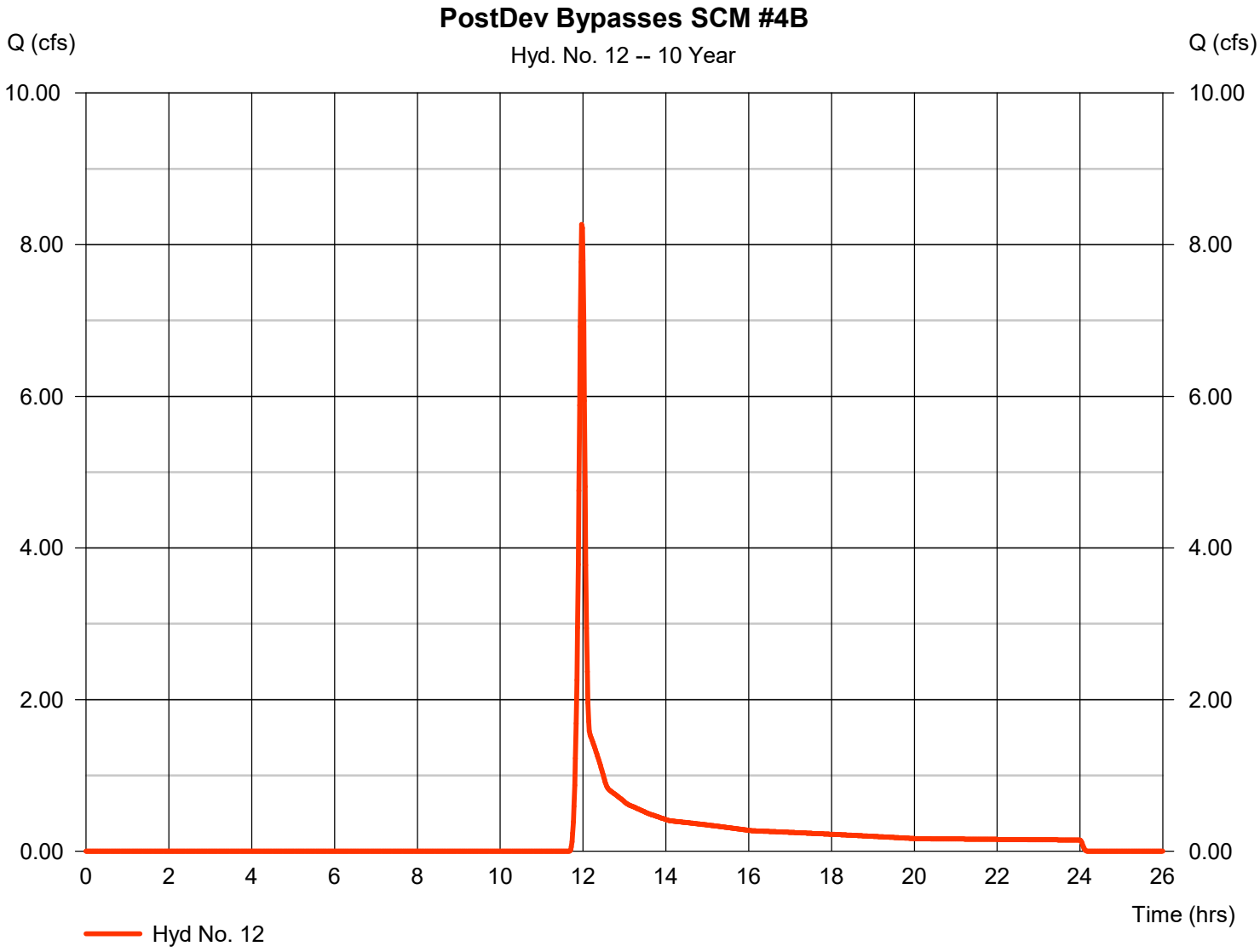


Hydrograph Report

Hyd. No. 12

PostDev Bypasses SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.267 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	18,582 cuft
Drainage area	=	5.240 ac	Curve number	=	54.3
Basin Slope	=	5.1 %	Hydraulic length	=	1220 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.84 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

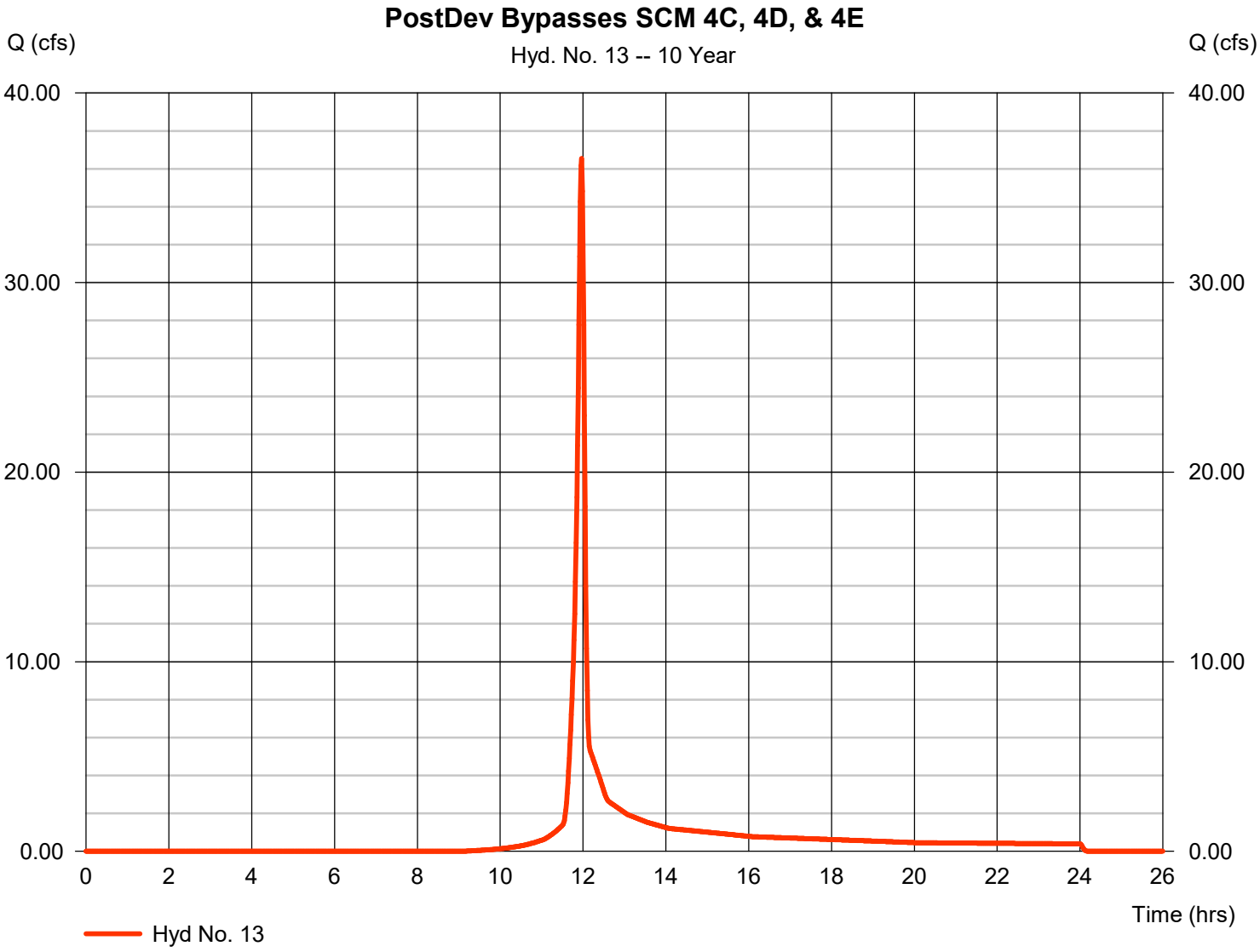


Hydrograph Report

Hyd. No. 13

PostDev Bypasses SCM 4C, 4D, & 4E

Hydrograph type	= SCS Runoff	Peak discharge	= 36.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 1 min	Hyd. volume	= 73,481 cuft
Drainage area	= 8.580 ac	Curve number	= 72.9
Basin Slope	= 2.6 %	Hydraulic length	= 900 ft
Tc method	= KIRPICH	Time of conc. (Tc)	= 6.02 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

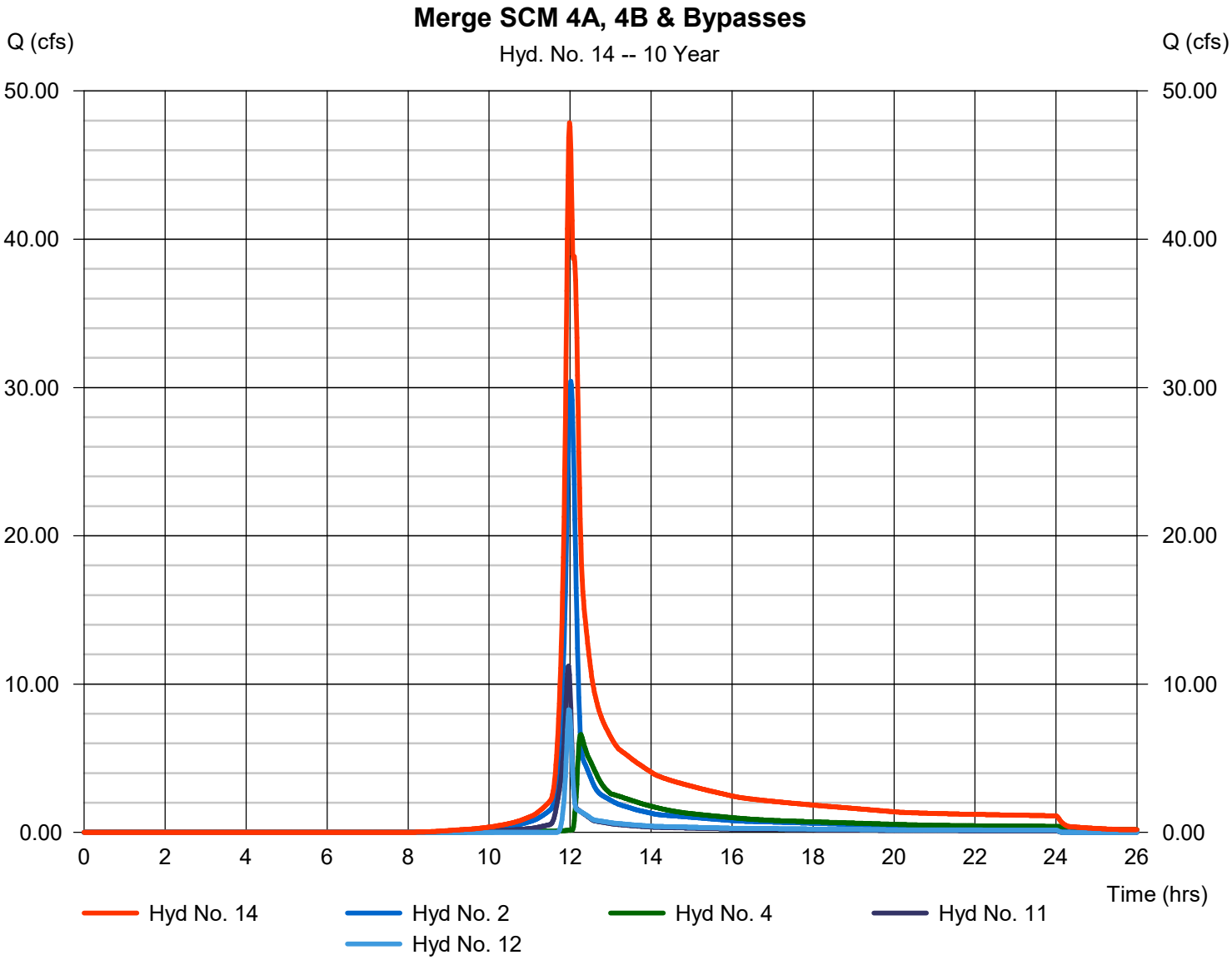


Hydrograph Report

Hyd. No. 14

Merge SCM 4A, 4B & Bypasses

Hydrograph type	= Combine	Peak discharge	= 47.85 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.98 hrs
Time interval	= 1 min	Hyd. volume	= 195,855 cuft
Inflow hyds.	= 2, 4, 11, 12	Contrib. drain. area	= 15.770 ac



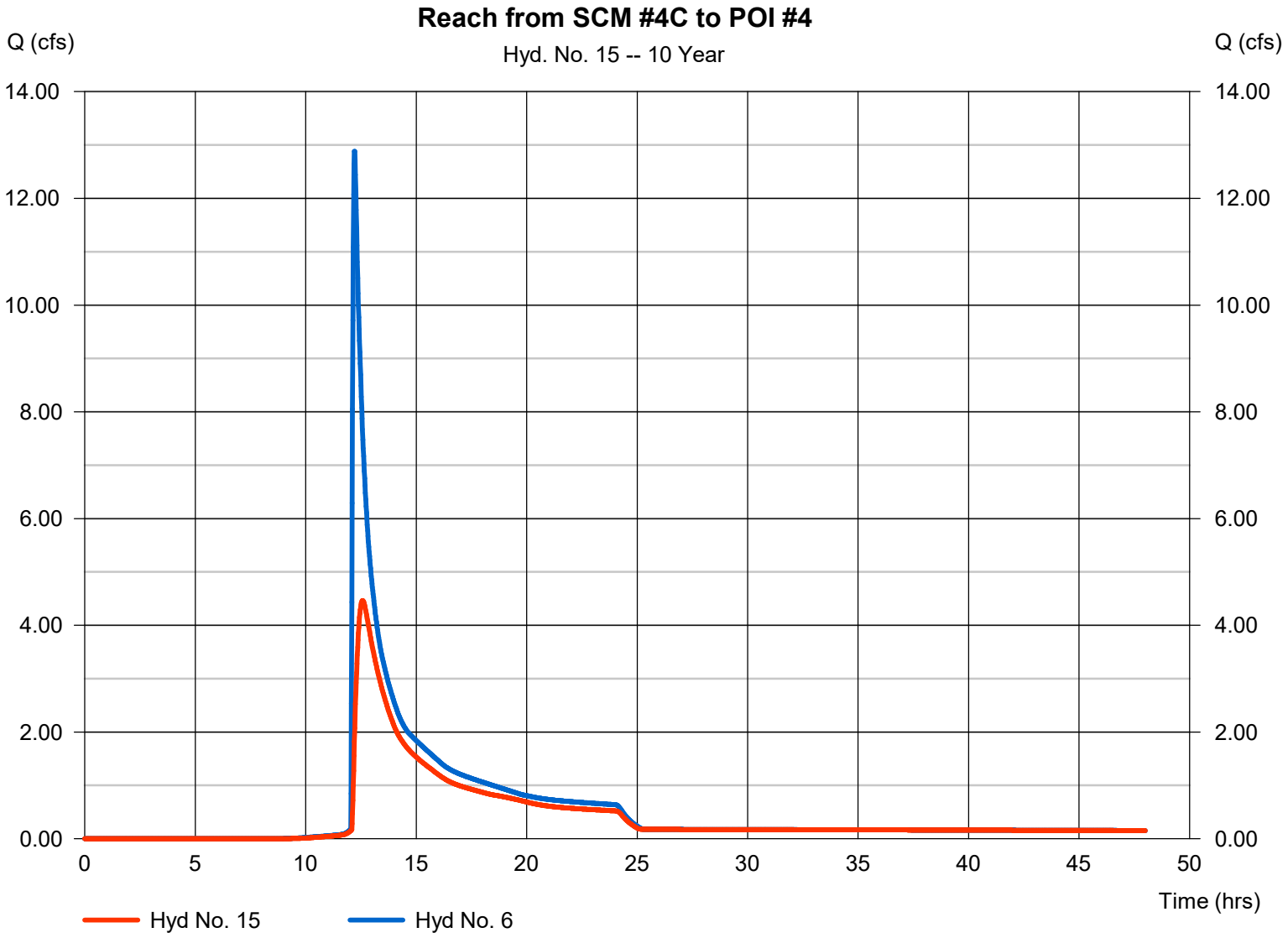
Hydrograph Report

Hyd. No. 15

Reach from SCM #4C to POI #4

Hydrograph type	= Reach	Peak discharge	= 4.464 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.57 hrs
Time interval	= 1 min	Hyd. volume	= 69,455 cuft
Inflow hyd. No.	= 6 - Route DA4C -SCM#4C	Section type	= Trapezoidal
Reach length	= 900.0 ft	Channel slope	= 2.6 %
Manning's n	= 0.032	Bottom width	= 4.0 ft
Side slope	= 25.0:1	Max. depth	= 4.0 ft
Rating curve x	= 2.955	Rating curve m	= 1.189
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.2229

Modified Att-Kin routing method used.



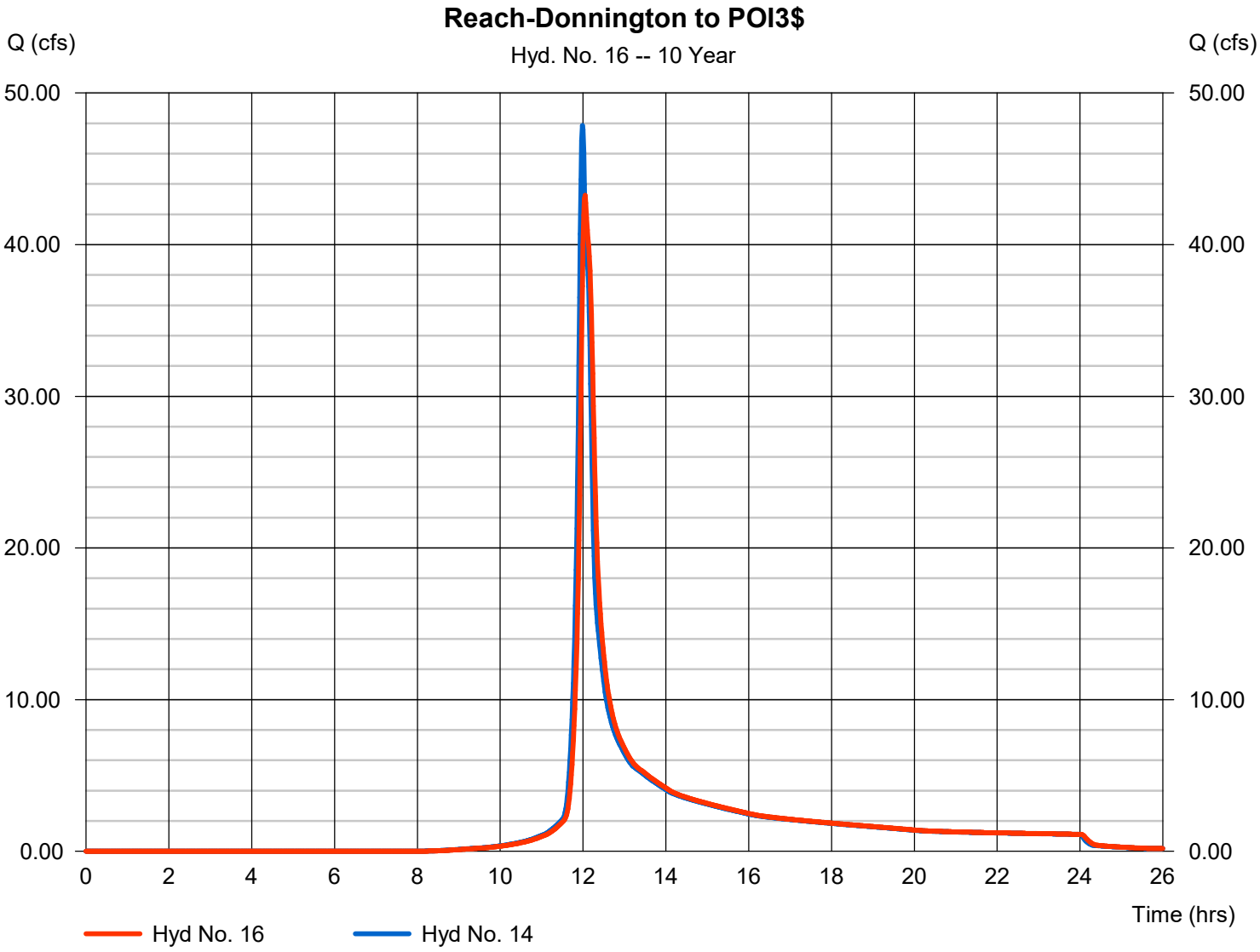
Hydrograph Report

Hyd. No. 16

Reach-Donnington to POI3$

Hydrograph type	=	Reach	Peak discharge	=	43.26 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.05 hrs
Time interval	=	1 min	Hyd. volume	=	195,822 cuft
Inflow hyd. No.	=	14 - Merge SCM 4A, 4B & Bypass$	Section type	=	Trapezoidal
Reach length	=	1220.0 ft	Channel slope	=	2.9 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	5.0 ft
Rating curve x	=	3.124	Rating curve m	=	1.206
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2572

Modified Att-Kin routing method used.

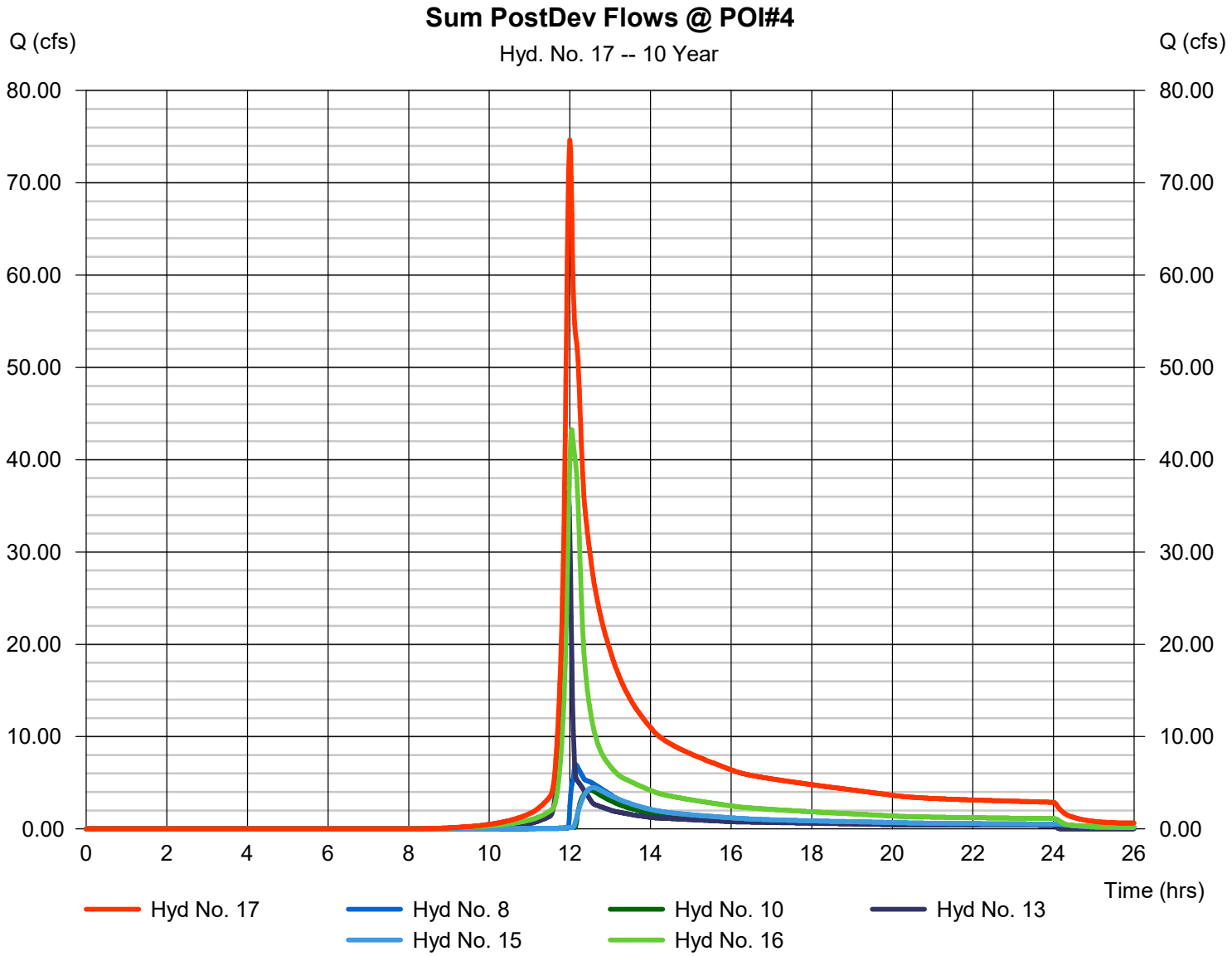


Hydrograph Report

Hyd. No. 17

Sum PostDev Flows @ POI#4

Hydrograph type	= Combine	Peak discharge	= 74.65 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 460,891 cuft
Inflow hyds.	= 8, 10, 13, 15, 16	Contrib. drain. area	= 8.580 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

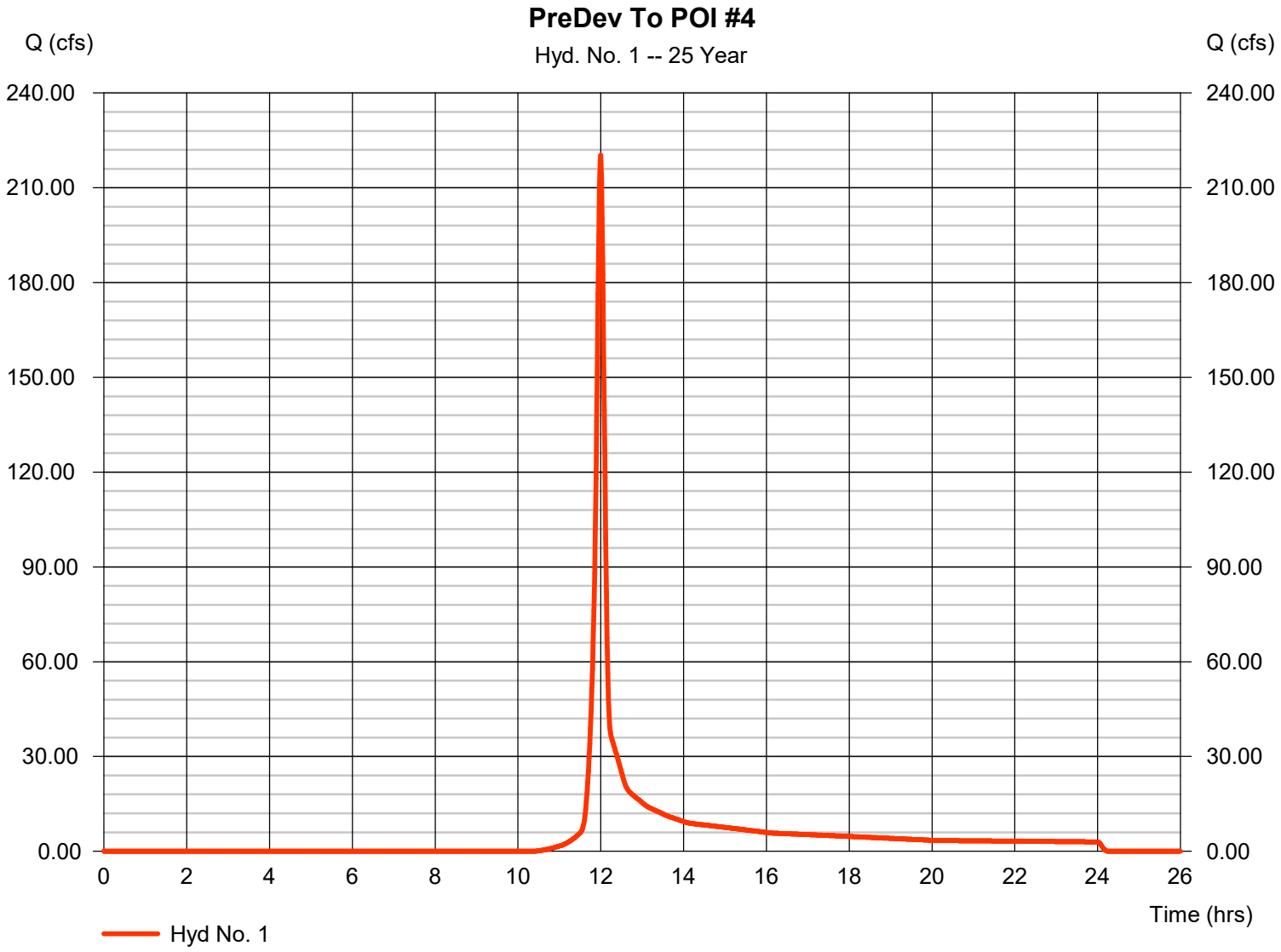
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	220.27	1	720	501,356	------	------	------	PreDev To POI #4
2	SCS Runoff	39.69	1	721	100,512	------	------	------	PostDev to SCM #4A
3	SCS Runoff	42.05	1	721	107,328	------	------	------	DA to SCM #4B
4	Reservoir	23.63	1	729	86,723	3	327.44	67,493	Route DA#4B-SCM#4B
5	SCS Runoff	69.06	1	720	168,431	------	------	------	Inflow to SCM #4C
6	Reservoir	21.91	1	731	132,669	5	297.65	109,312	Route DA4C -SCM#4C
7	SCS Runoff	46.71	1	718	98,932	------	------	------	DA TO SCM#4D
8	Reservoir	27.89	1	723	84,728	7	284.51	53,567	Route DA4d to SCM#4D
9	SCS Runoff	48.97	1	720	119,146	------	------	------	DA to SCM #4E
10	Reservoir	17.26	1	730	89,242	9	284.22	90,037	Route DA#4E to SCM#4E
11	SCS Runoff	14.40	1	718	29,615	------	------	------	PostDev Bypasses SCM #4A
12	SCS Runoff	13.42	1	718	28,266	------	------	------	PostDev Bypasses SCM #4B
13	SCS Runoff	48.36	1	718	97,831	------	------	------	PostDev Bypasses SCM 4C, 4D, & 4
14	Combine	84.02	1	723	264,325	2, 4, 11, 12,	------	------	Merge SCM 4A, 4B & Bypasses
15	Reach	15.67	1	731	100,542	6	------	------	Reach from SCM #4C to POI #4
16	Reach	77.51	1	726	264,295	14	------	------	Reach-Donnington to POI3$
17	Combine	135.15	1	726	636,638	8, 10, 13, 15, 16	------	------	Sum PostDev Flows @ POI#4

Hydrograph Report

Hyd. No. 1

PreDev To POI #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	220.27 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	501,356 cuft
Drainage area	=	63.520 ac	Curve number	=	63.3
Basin Slope	=	4.1 %	Hydraulic length	=	1900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	8.96 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

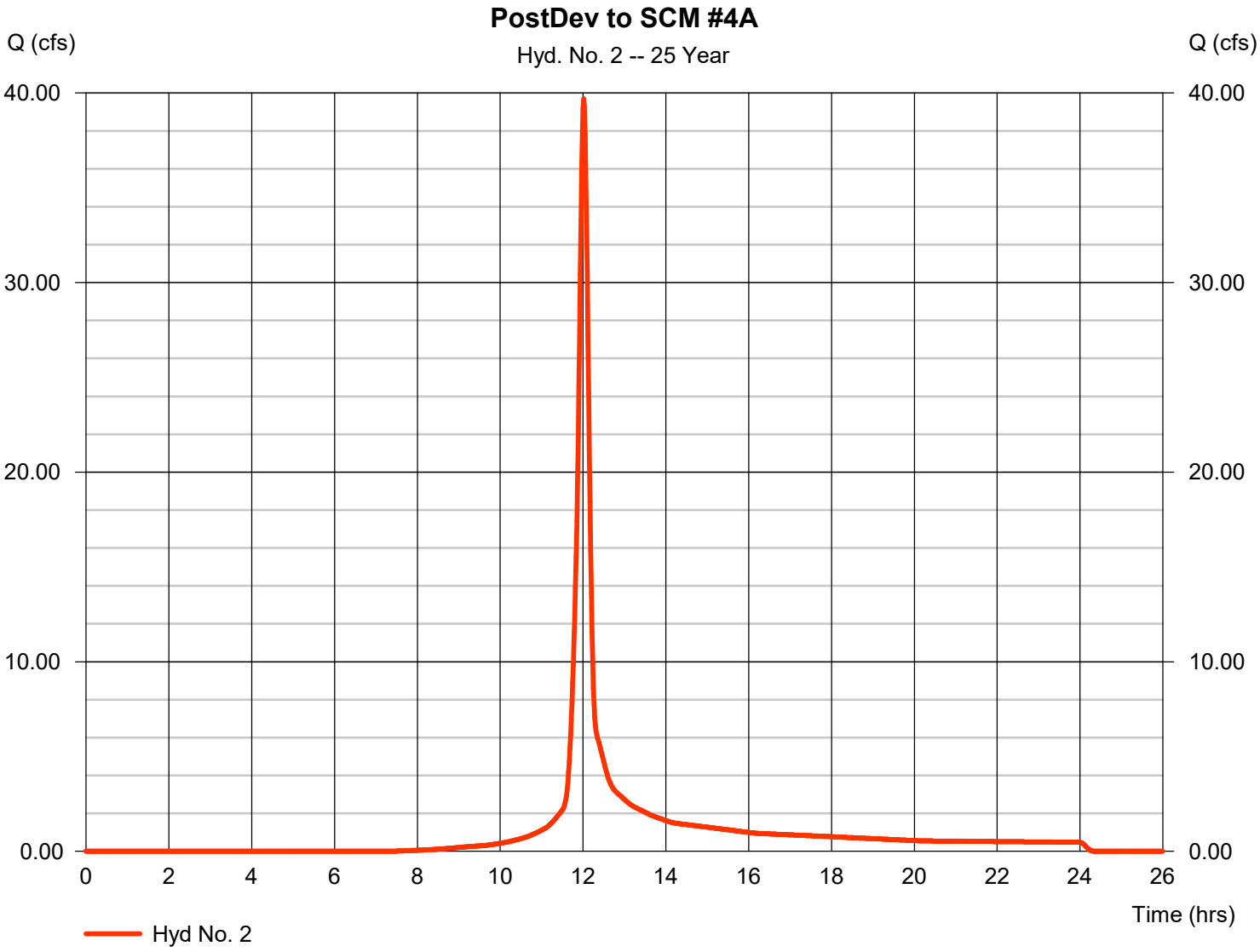


Hydrograph Report

Hyd. No. 2

PostDev to SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	39.69 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	100,512 cuft
Drainage area	=	8.310 ac	Curve number	=	76.4
Basin Slope	=	3.3 %	Hydraulic length	=	1200 ft
Tc method	=	User	Time of conc. (Tc)	=	12.20 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

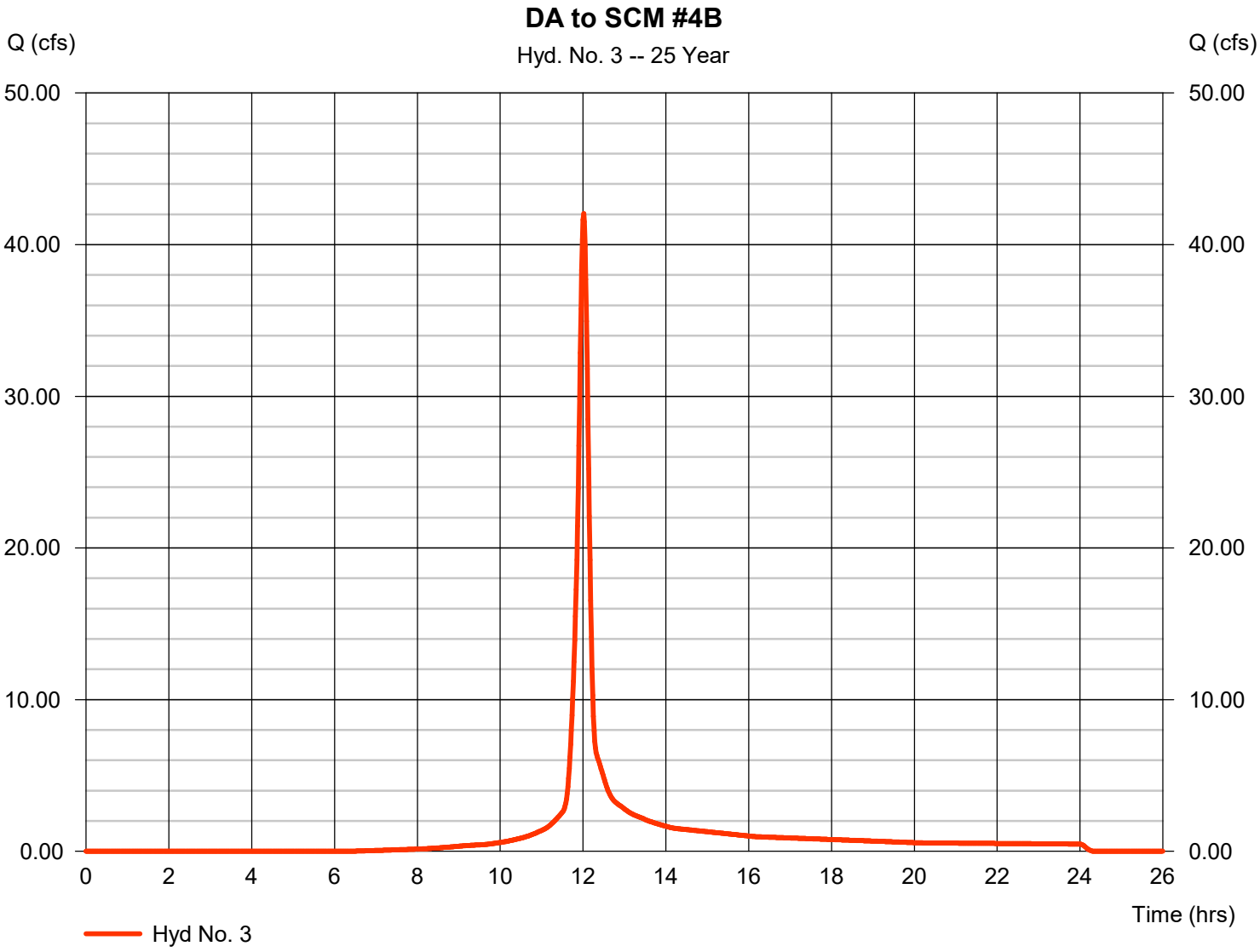


Hydrograph Report

Hyd. No. 3

DA to SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	42.05 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	107,328 cuft
Drainage area	=	8.020 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



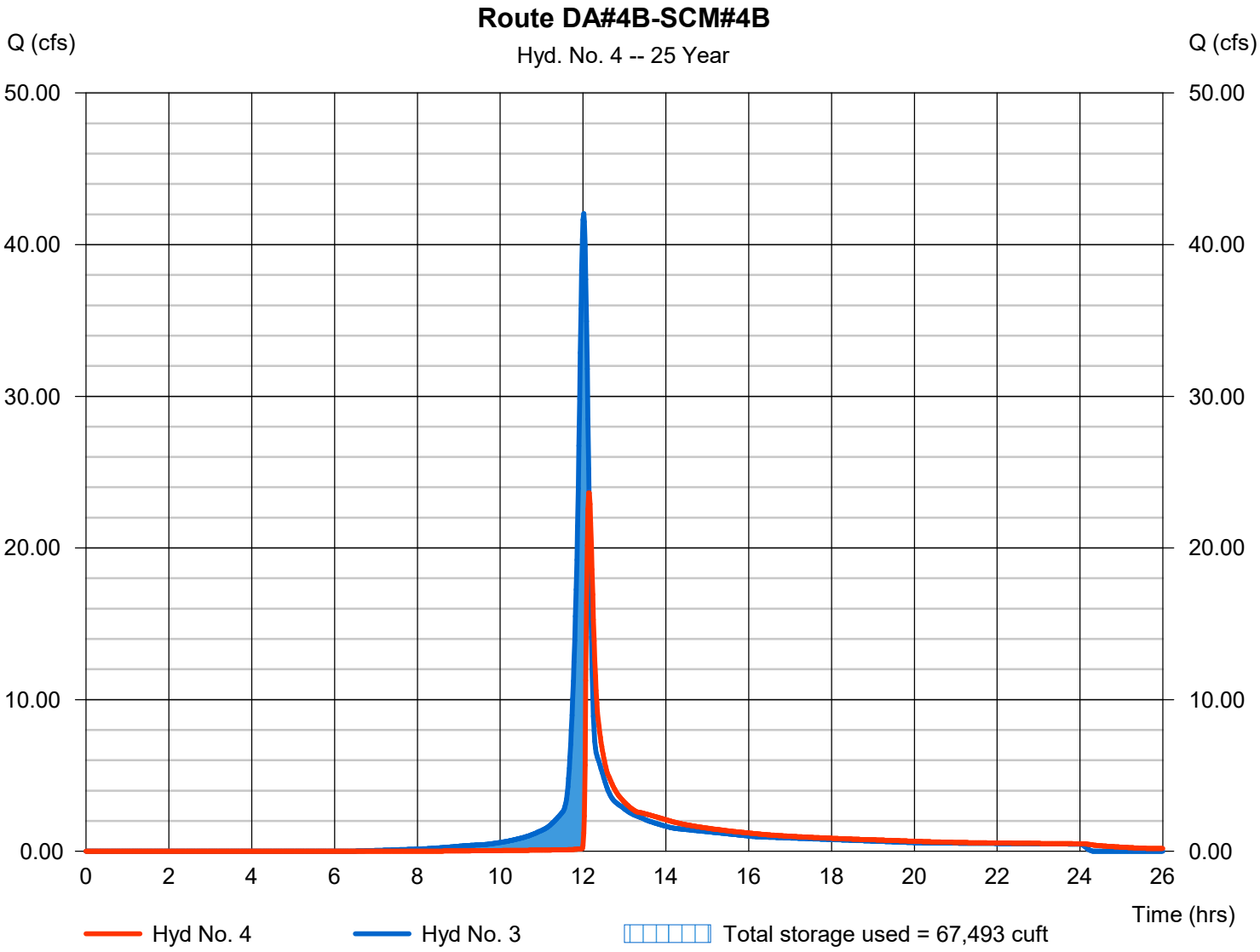
Hydrograph Report

Hyd. No. 4

Route DA#4B-SCM#4B

Hydrograph type	= Reservoir	Peak discharge	= 23.63 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 86,723 cuft
Inflow hyd. No.	= 3 - DA to SCM #4B	Max. Elevation	= 327.44 ft
Reservoir name	= SCM #4B	Max. Storage	= 67,493 cuft

Storage Indication method used. Wet pond routing start elevation = 323.50 ft.

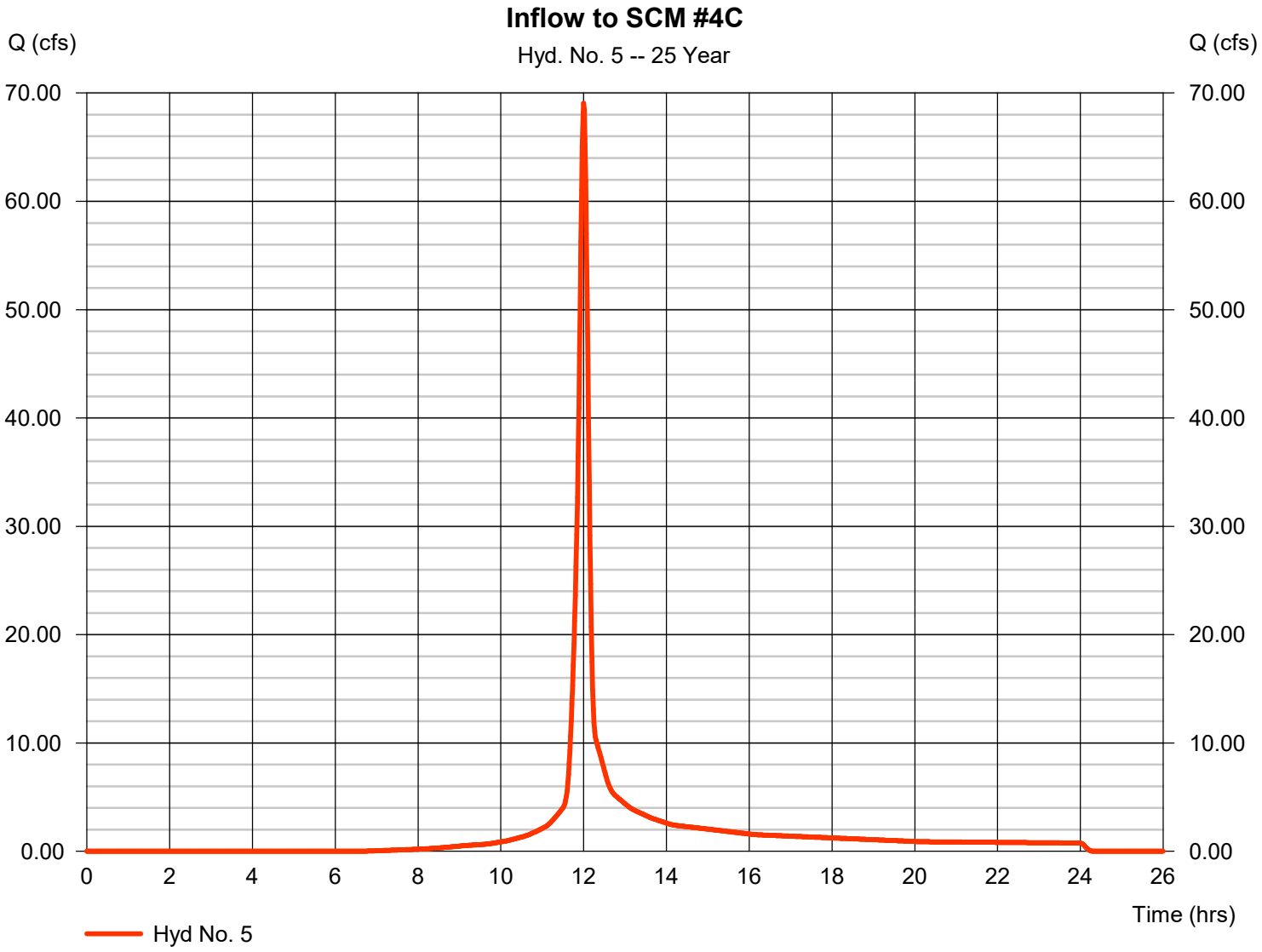


Hydrograph Report

Hyd. No. 5

Inflow to SCM #4C

Hydrograph type	=	SCS Runoff	Peak discharge	=	69.06 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	168,431 cuft
Drainage area	=	12.510 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.20 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



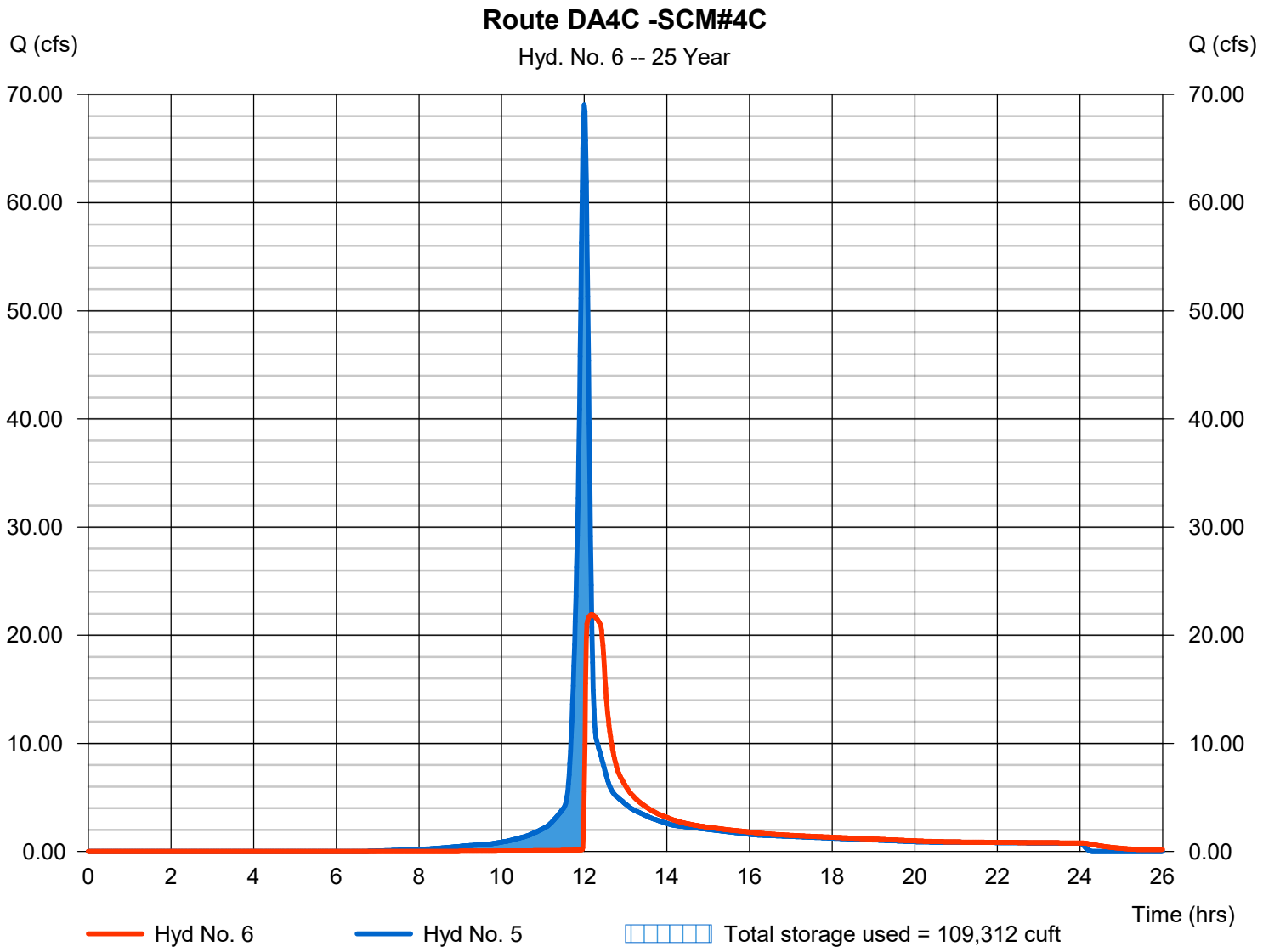
Hydrograph Report

Hyd. No. 6

Route DA4C -SCM#4C

Hydrograph type	=	Reservoir	Peak discharge	=	21.91 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	132,669 cuft
Inflow hyd. No.	=	5 - Inflow to SCM #4C	Max. Elevation	=	297.65 ft
Reservoir name	=	SCM #4C	Max. Storage	=	109,312 cuft

Storage Indication method used. Wet pond routing start elevation = 293.50 ft.

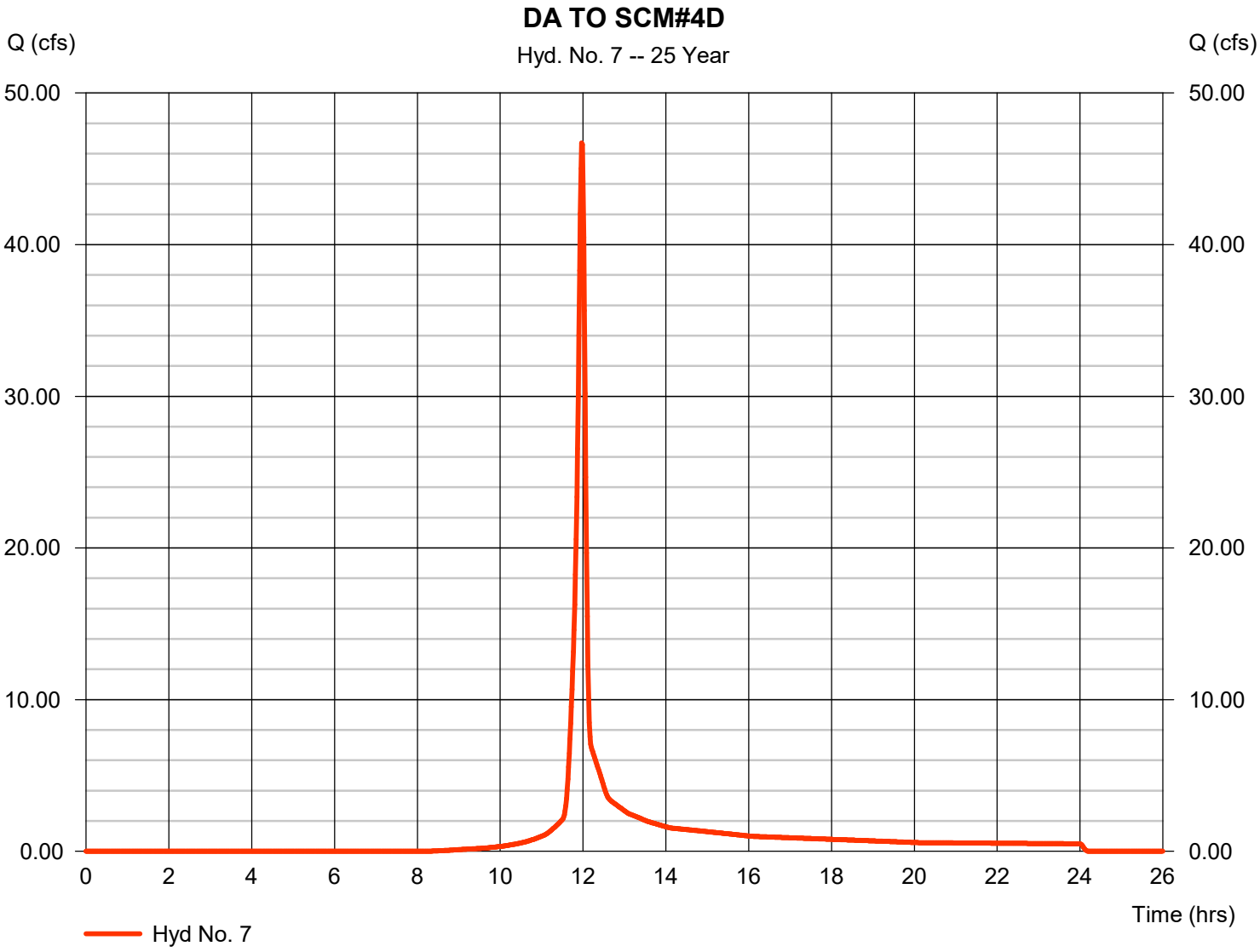


Hydrograph Report

Hyd. No. 7

DA TO SCM#4D

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.71 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	98,932 cuft
Drainage area	=	9.120 ac	Curve number	=	73.1
Basin Slope	=	6.0 %	Hydraulic length	=	1465 ft
Tc method	=	User	Time of conc. (Tc)	=	8.20 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



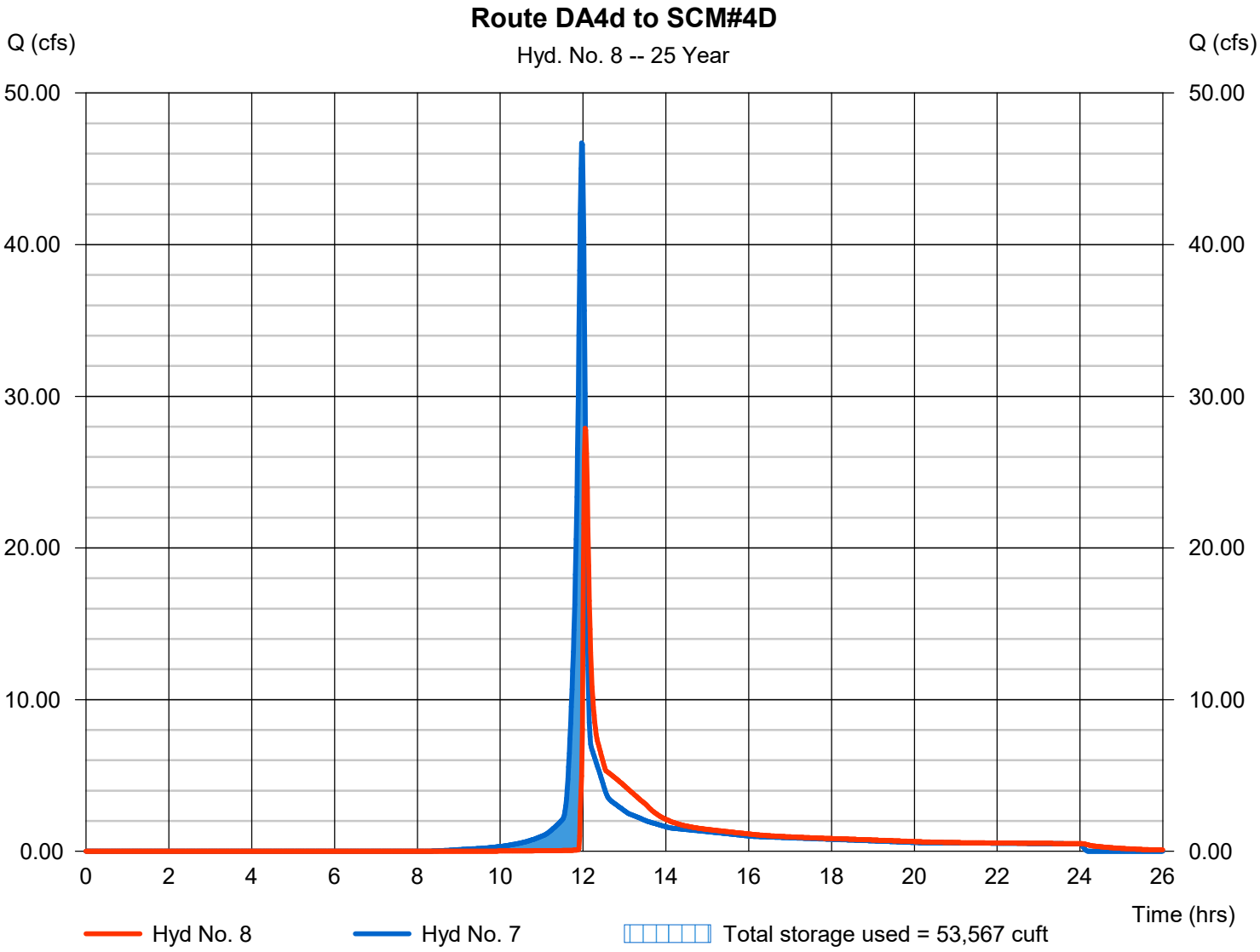
Hydrograph Report

Hyd. No. 8

Route DA4d to SCM#4D

Hydrograph type	= Reservoir	Peak discharge	= 27.89 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.05 hrs
Time interval	= 1 min	Hyd. volume	= 84,728 cuft
Inflow hyd. No.	= 7 - DA TO SCM#4D	Max. Elevation	= 284.51 ft
Reservoir name	= SCM #4D	Max. Storage	= 53,567 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

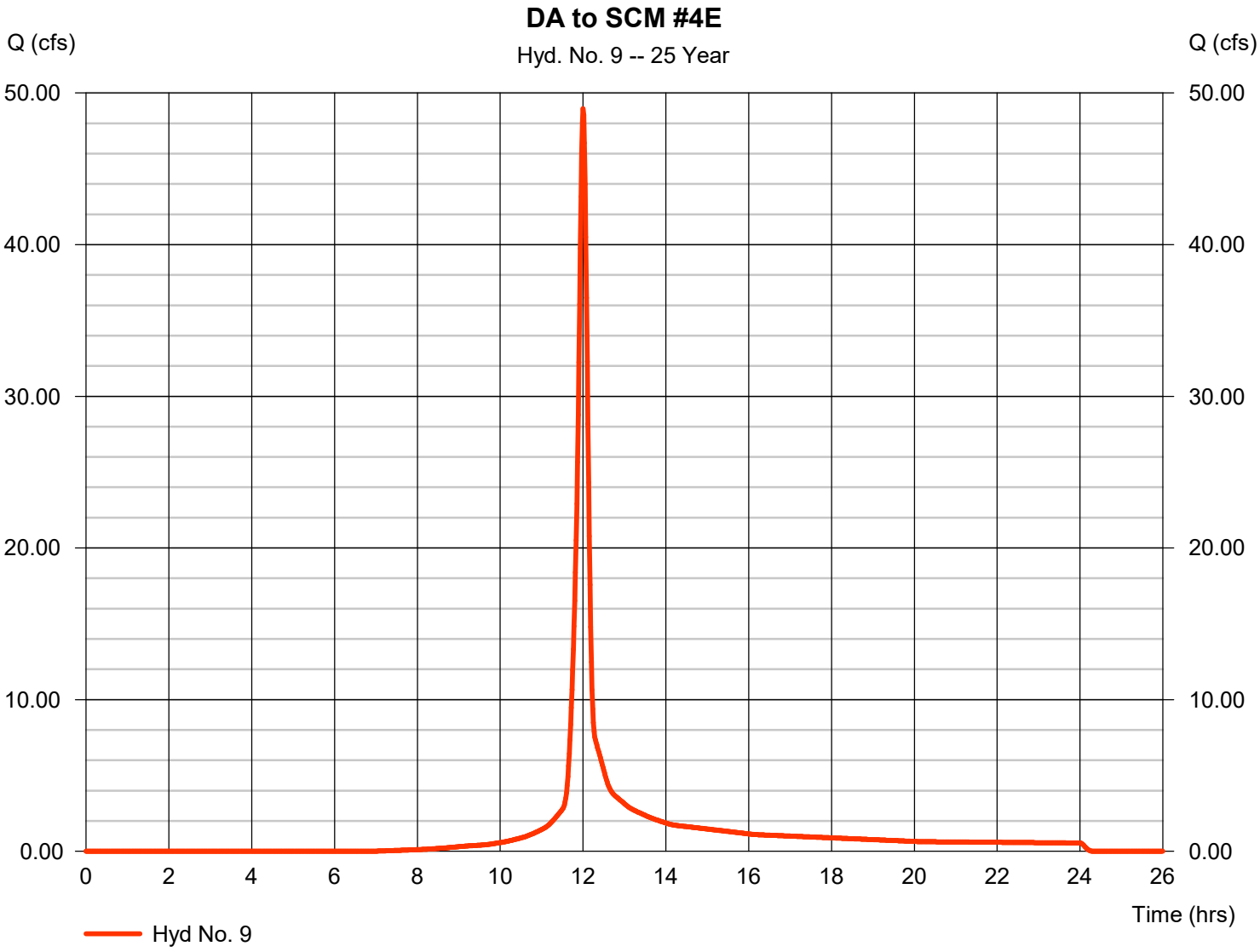


Hydrograph Report

Hyd. No. 9

DA to SCM #4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	48.97 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	119,146 cuft
Drainage area	=	9.100 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.80 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



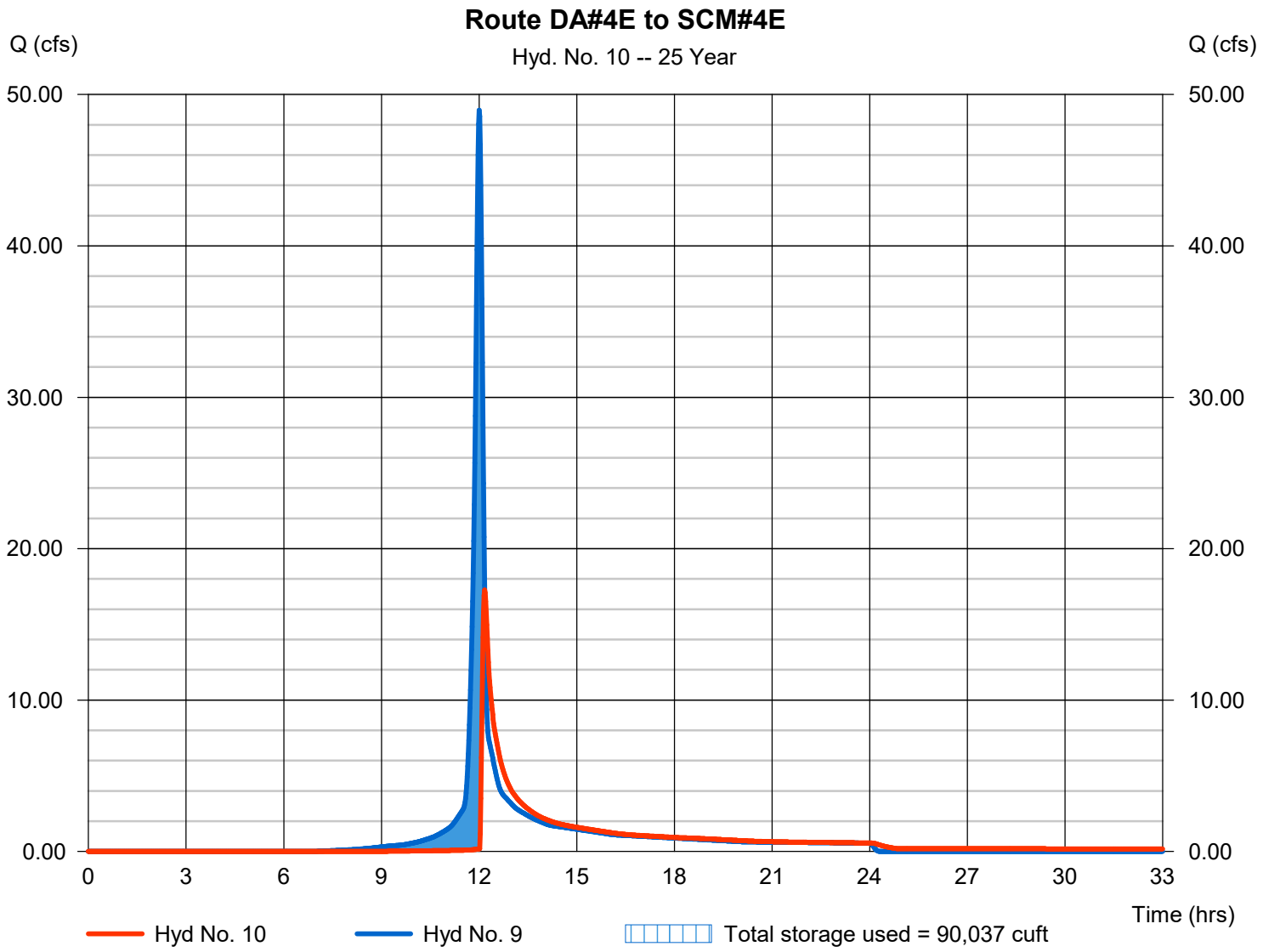
Hydrograph Report

Hyd. No. 10

Route DA#4E to SCM#4E

Hydrograph type	= Reservoir	Peak discharge	= 17.26 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 89,242 cuft
Inflow hyd. No.	= 9 - DA to SCM #4E	Max. Elevation	= 284.22 ft
Reservoir name	= SCM #4E	Max. Storage	= 90,037 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

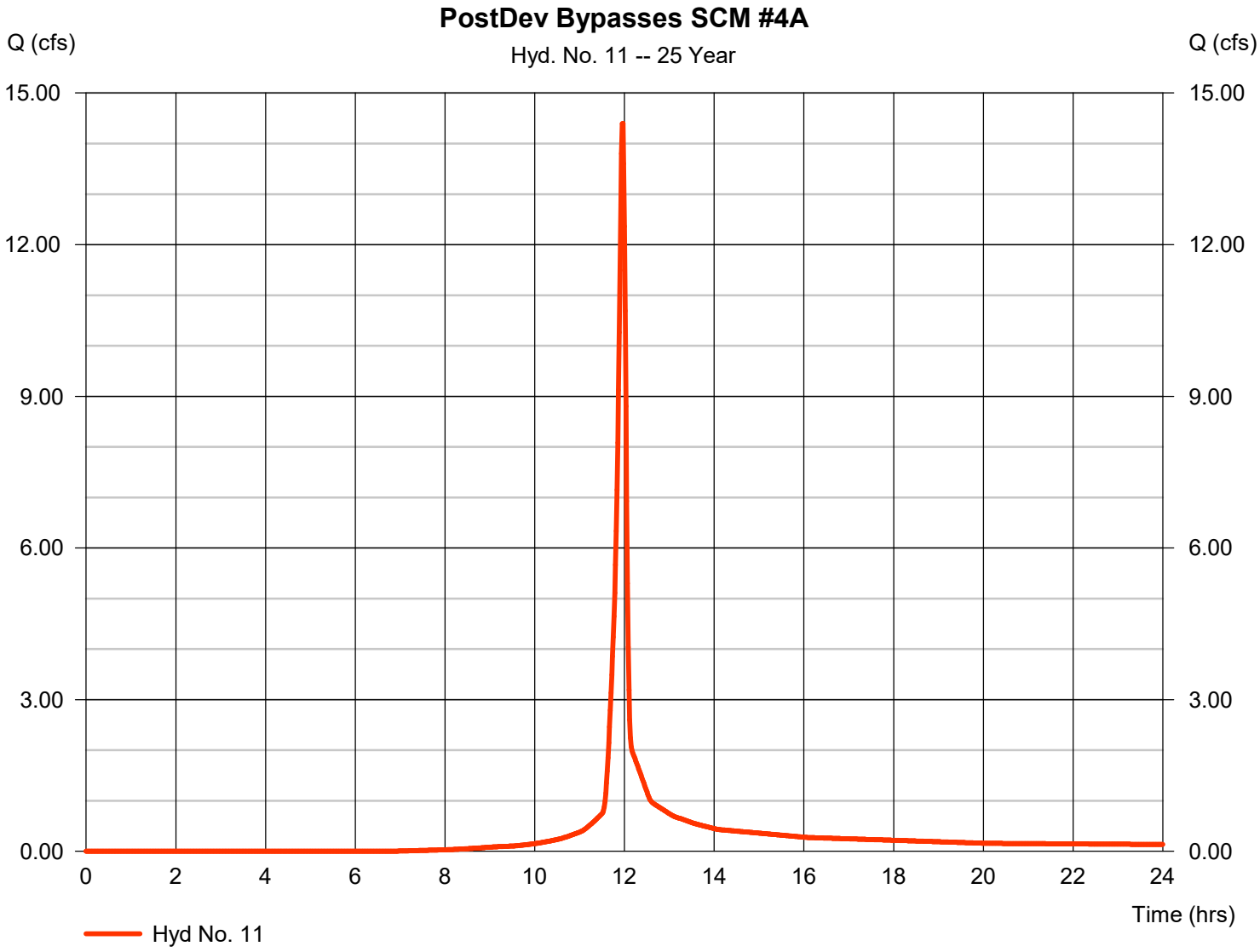


Hydrograph Report

Hyd. No. 11

PostDev Bypasses SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.40 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	29,615 cuft
Drainage area	=	2.220 ac	Curve number	=	78.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

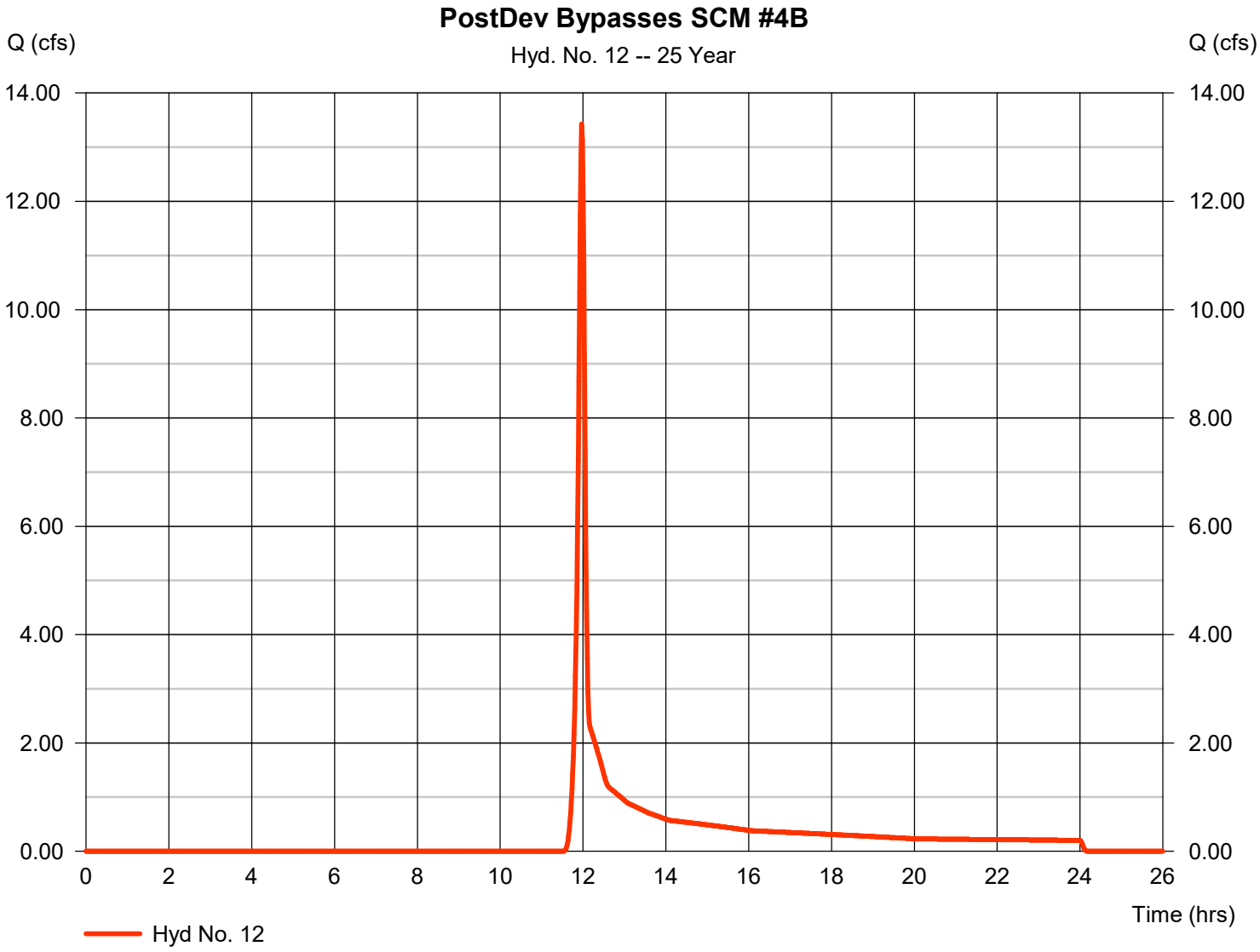


Hydrograph Report

Hyd. No. 12

PostDev Bypasses SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.42 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	28,266 cuft
Drainage area	=	5.240 ac	Curve number	=	54.3
Basin Slope	=	5.1 %	Hydraulic length	=	1220 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.84 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

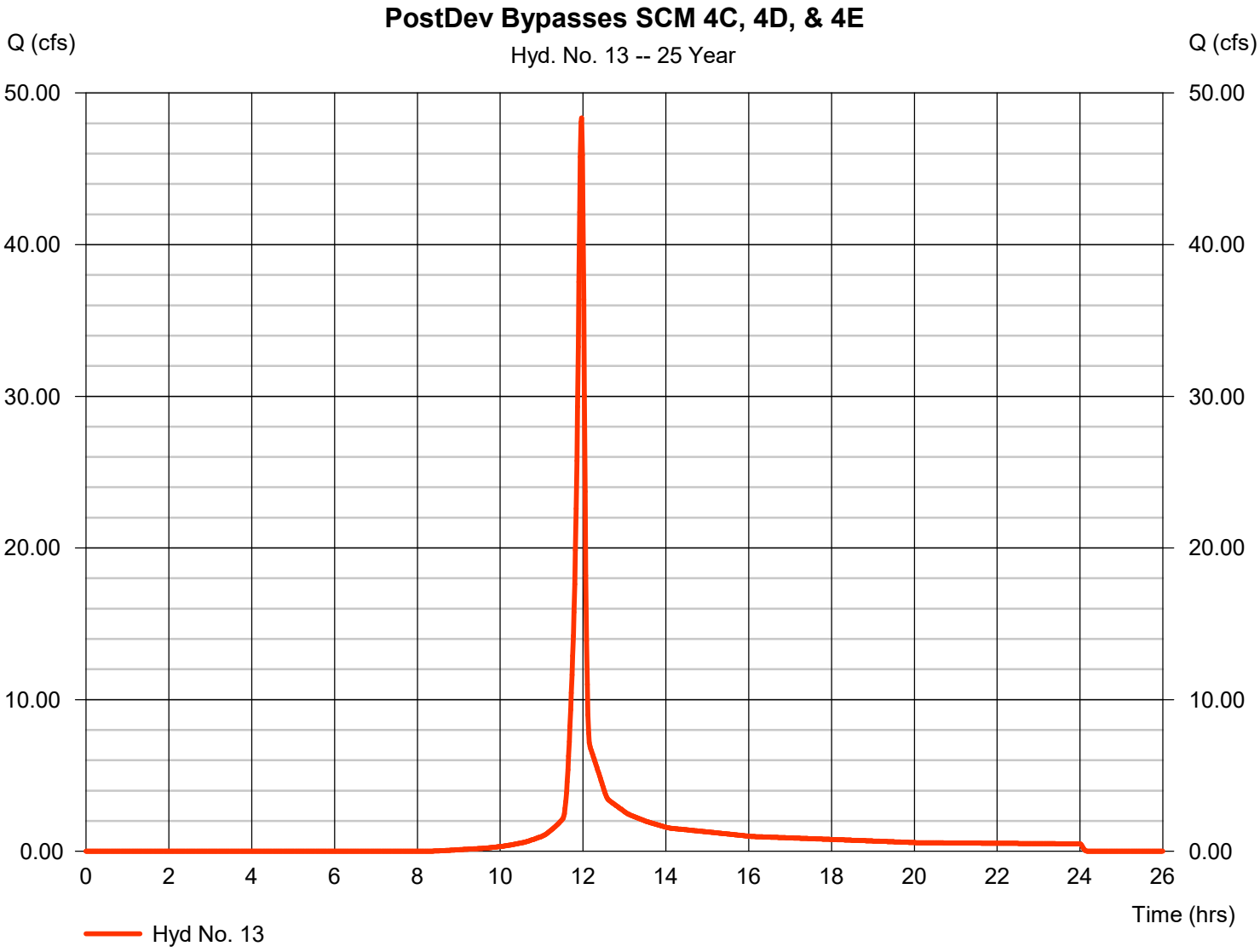


Hydrograph Report

Hyd. No. 13

PostDev Bypasses SCM 4C, 4D, & 4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	48.36 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	97,831 cuft
Drainage area	=	8.580 ac	Curve number	=	72.9
Basin Slope	=	2.6 %	Hydraulic length	=	900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	6.02 min
Total precip.	=	5.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

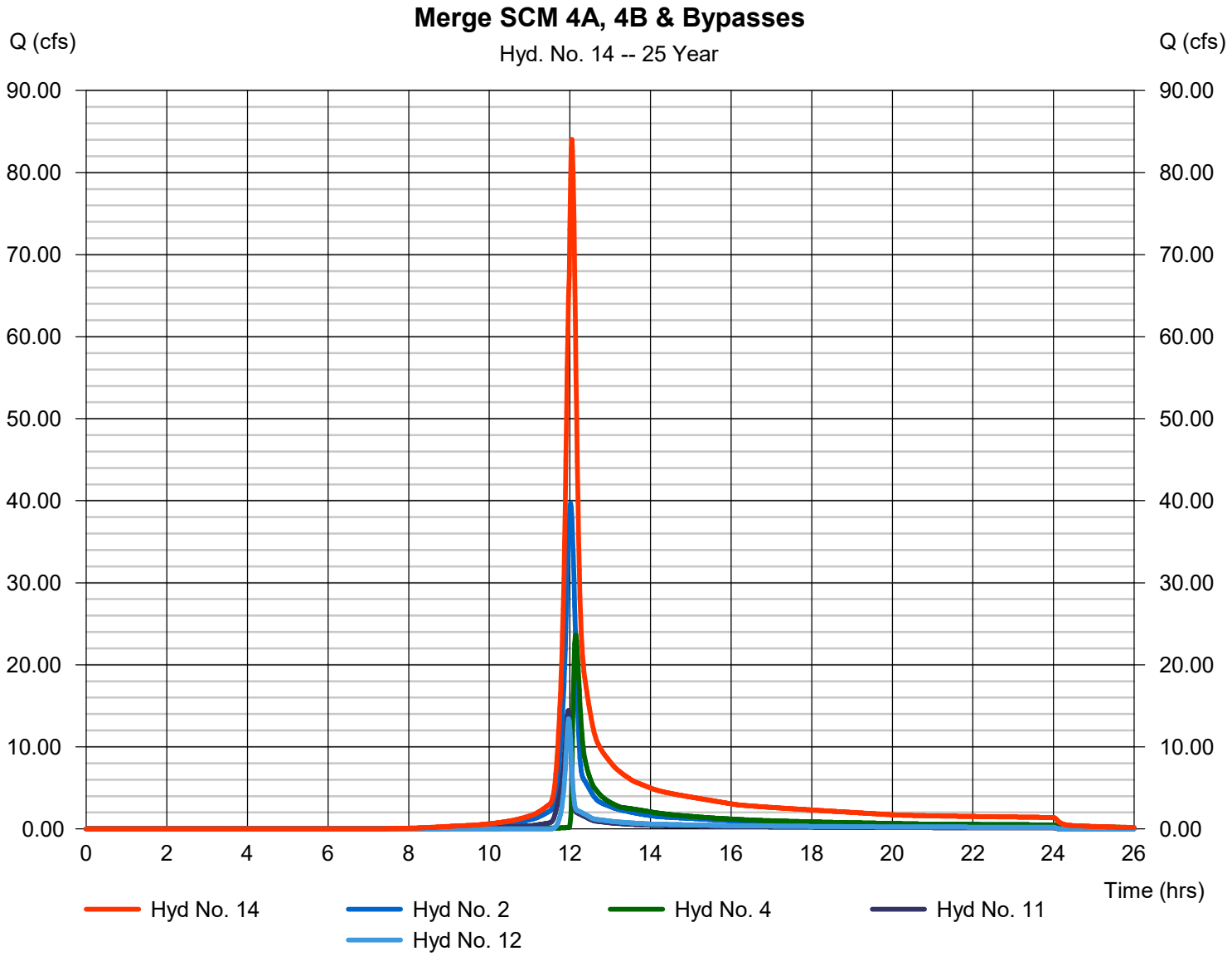


Hydrograph Report

Hyd. No. 14

Merge SCM 4A, 4B & Bypasses

Hydrograph type	= Combine	Peak discharge	= 84.02 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.05 hrs
Time interval	= 1 min	Hyd. volume	= 264,325 cuft
Inflow hyds.	= 2, 4, 11, 12	Contrib. drain. area	= 15.770 ac



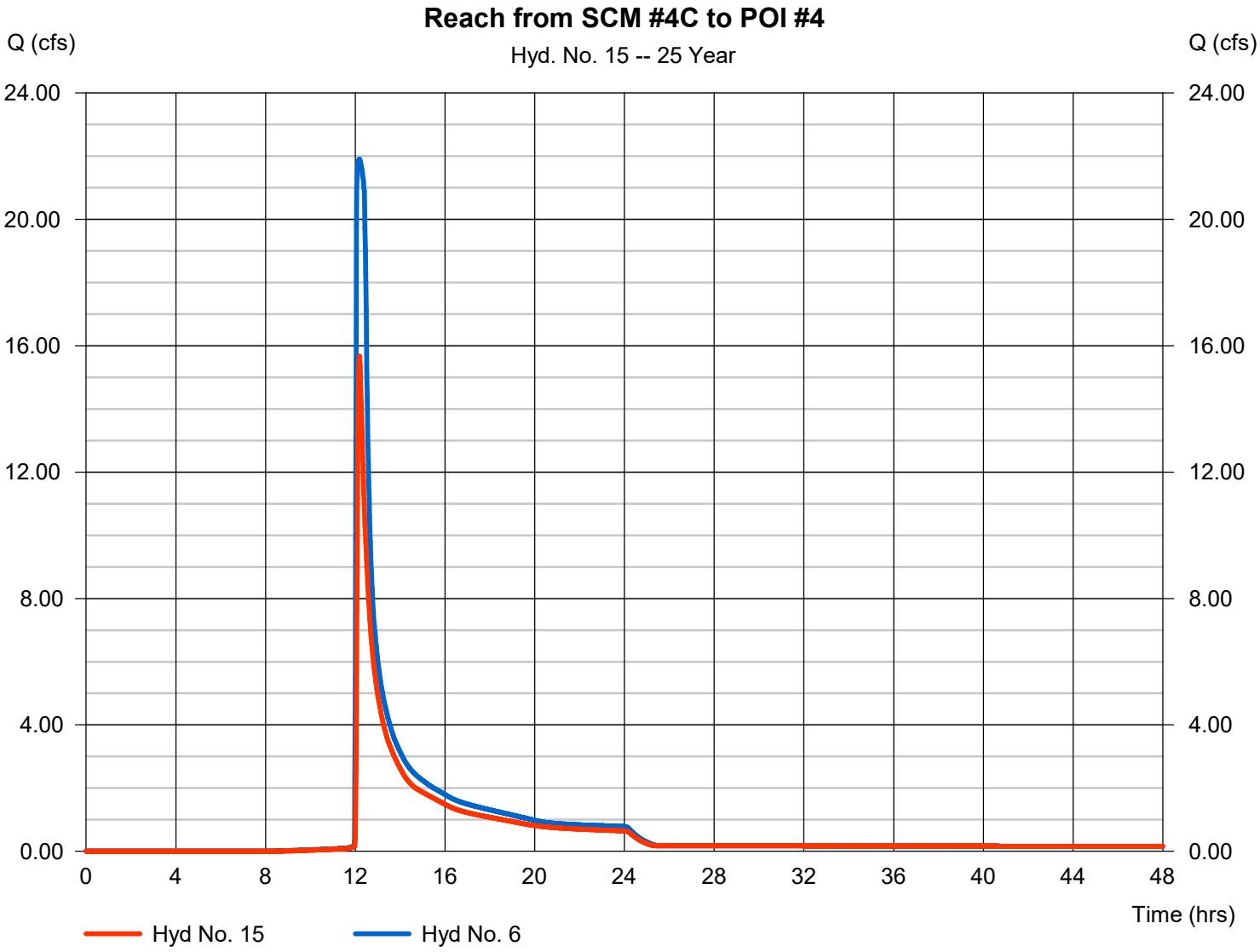
Hydrograph Report

Hyd. No. 15

Reach from SCM #4C to POI #4

Hydrograph type	=	Reach	Peak discharge	=	15.67 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.18 hrs
Time interval	=	1 min	Hyd. volume	=	100,542 cuft
Inflow hyd. No.	=	6 - Route DA4C -SCM#4C	Section type	=	Trapezoidal
Reach length	=	900.0 ft	Channel slope	=	2.6 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.955	Rating curve m	=	1.189
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2696

Modified Att-Kin routing method used.



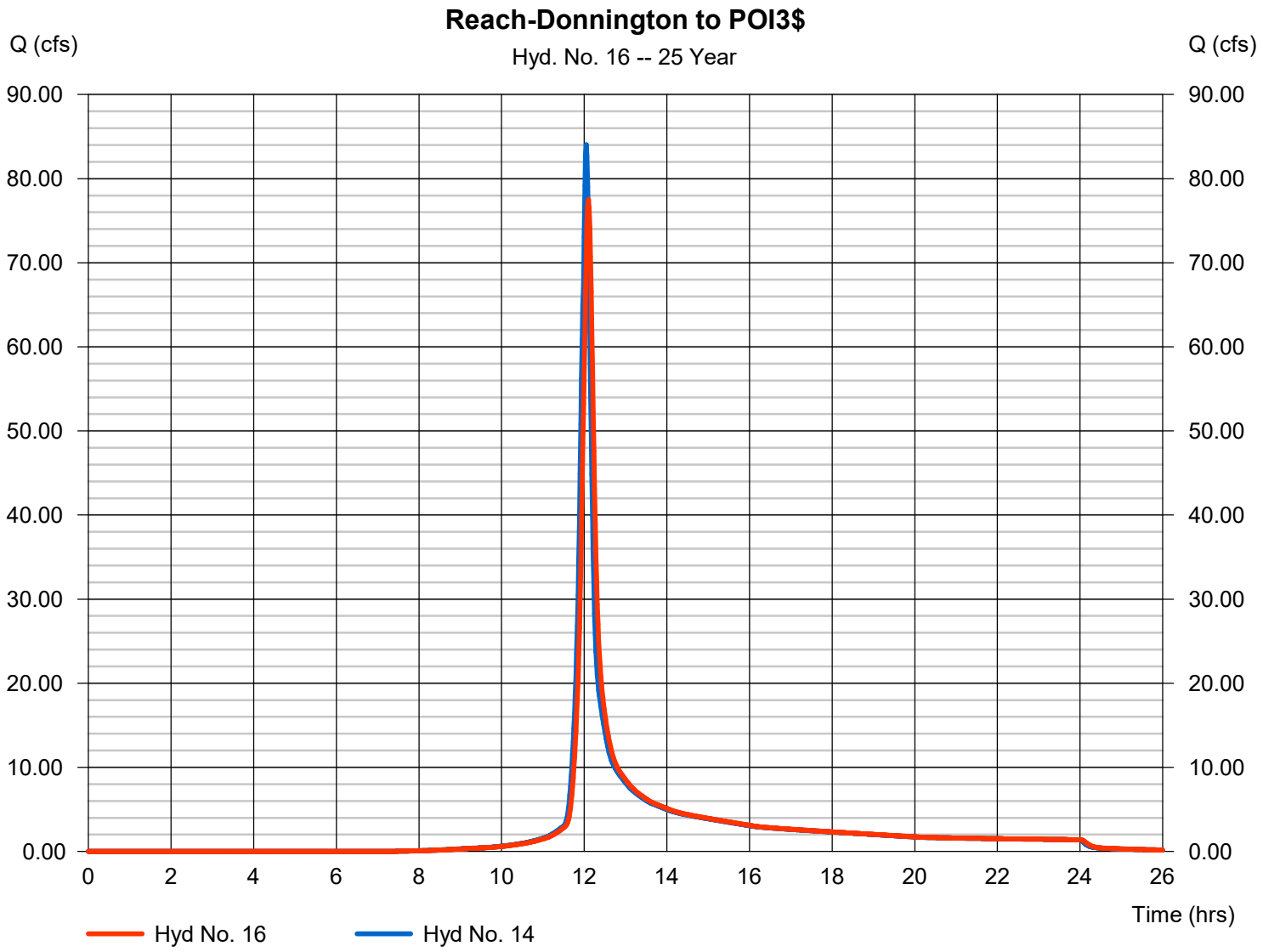
Hydrograph Report

Hyd. No. 16

Reach-Donnington to POI3$

Hydrograph type	=	Reach	Peak discharge	=	77.51 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	264,295 cuft
Inflow hyd. No.	=	14 - Merge SCM 4A, 4B & Bypass to	Section type	=	Trapezoidal
Reach length	=	1220.0 ft	Channel slope	=	2.9 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	5.0 ft
Rating curve x	=	3.124	Rating curve m	=	1.206
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.2795

Modified Att-Kin routing method used.

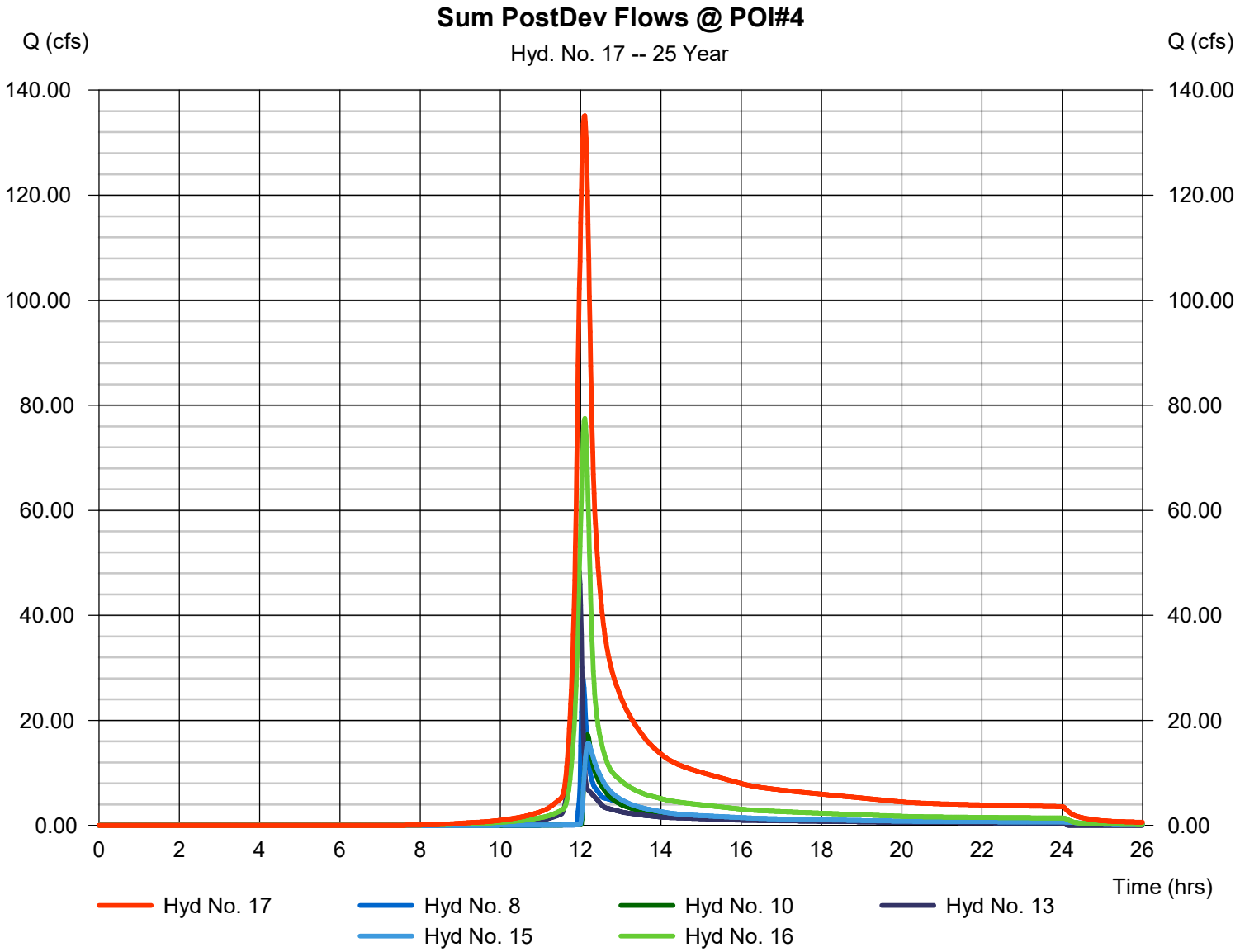


Hydrograph Report

Hyd. No. 17

Sum PostDev Flows @ POI#4

Hydrograph type	= Combine	Peak discharge	= 135.15 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 636,638 cuft
Inflow hyds.	= 8, 10, 13, 15, 16	Contrib. drain. area	= 8.580 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

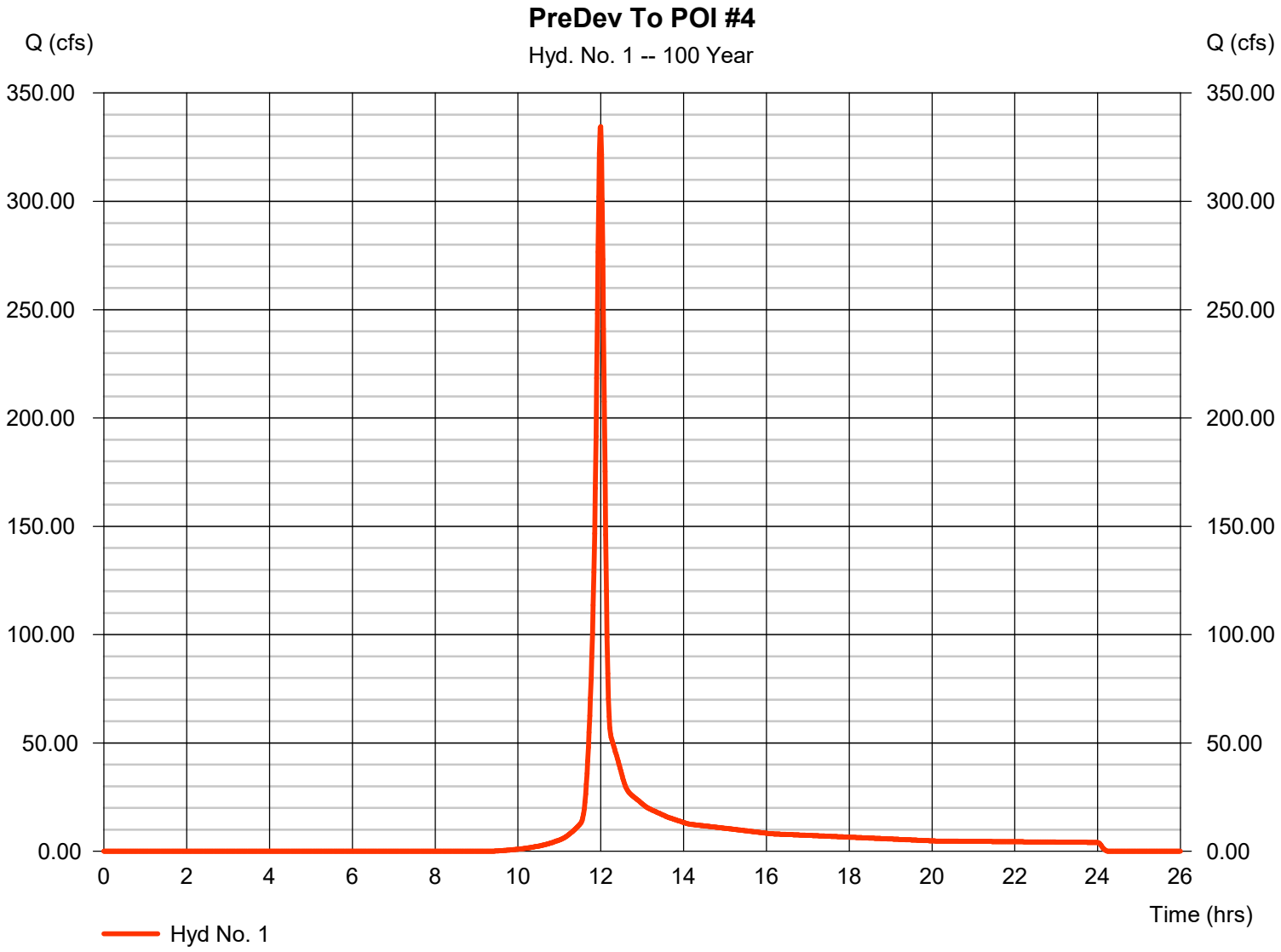
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	334.43	1	720	756,550	------	------	------	PreDev To POI #4
2	SCS Runoff	54.81	1	721	139,977	------	------	------	PostDev to SCM #4A
3	SCS Runoff	56.81	1	721	146,747	------	------	------	DA to SCM #4B
4	Reservoir	49.79	1	724	126,018	3	327.72	71,658	Route DA#4B-SCM#4B
5	SCS Runoff	93.83	1	720	231,445	------	------	------	Inflow to SCM #4C
6	Reservoir	33.18	1	730	195,604	5	298.78	136,640	Route DA4C -SCM#4C
7	SCS Runoff	65.71	1	718	140,271	------	------	------	DA TO SCM#4D
8	Reservoir	56.15	1	721	126,021	7	284.91	58,365	Route DA4d to SCM#4D
9	SCS Runoff	66.93	1	720	164,555	------	------	------	DA to SCM #4E
10	Reservoir	38.71	1	727	134,560	9	284.76	99,861	Route DA#4E to SCM#4E
11	SCS Runoff	19.60	1	717	40,860	------	------	------	PostDev Bypasses SCM #4A
12	SCS Runoff	22.71	1	718	46,121	------	------	------	PostDev Bypasses SCM #4B
13	SCS Runoff	67.79	1	718	138,866	------	------	------	PostDev Bypasses SCM 4C, 4D, & 4
14	Combine	150.32	1	720	379,612	2, 4, 11, 12,	------	------	Merge SCM 4A, 4B & Bypasses
15	Reach	37.73	1	730	152,053	6	------	------	Reach from SCM #4C to POI #4
16	Reach	137.19	1	724	379,584	14	------	------	Reach-Donnington to POI3$
17	Combine	294.67	1	722	931,086	8, 10, 13, 15, 16	------	------	Sum PostDev Flows @ POI#4

Hydrograph Report

Hyd. No. 1

PreDev To POI #4

Hydrograph type	=	SCS Runoff	Peak discharge	=	334.43 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	756,550 cuft
Drainage area	=	63.520 ac	Curve number	=	63.3
Basin Slope	=	4.1 %	Hydraulic length	=	1900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	8.96 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

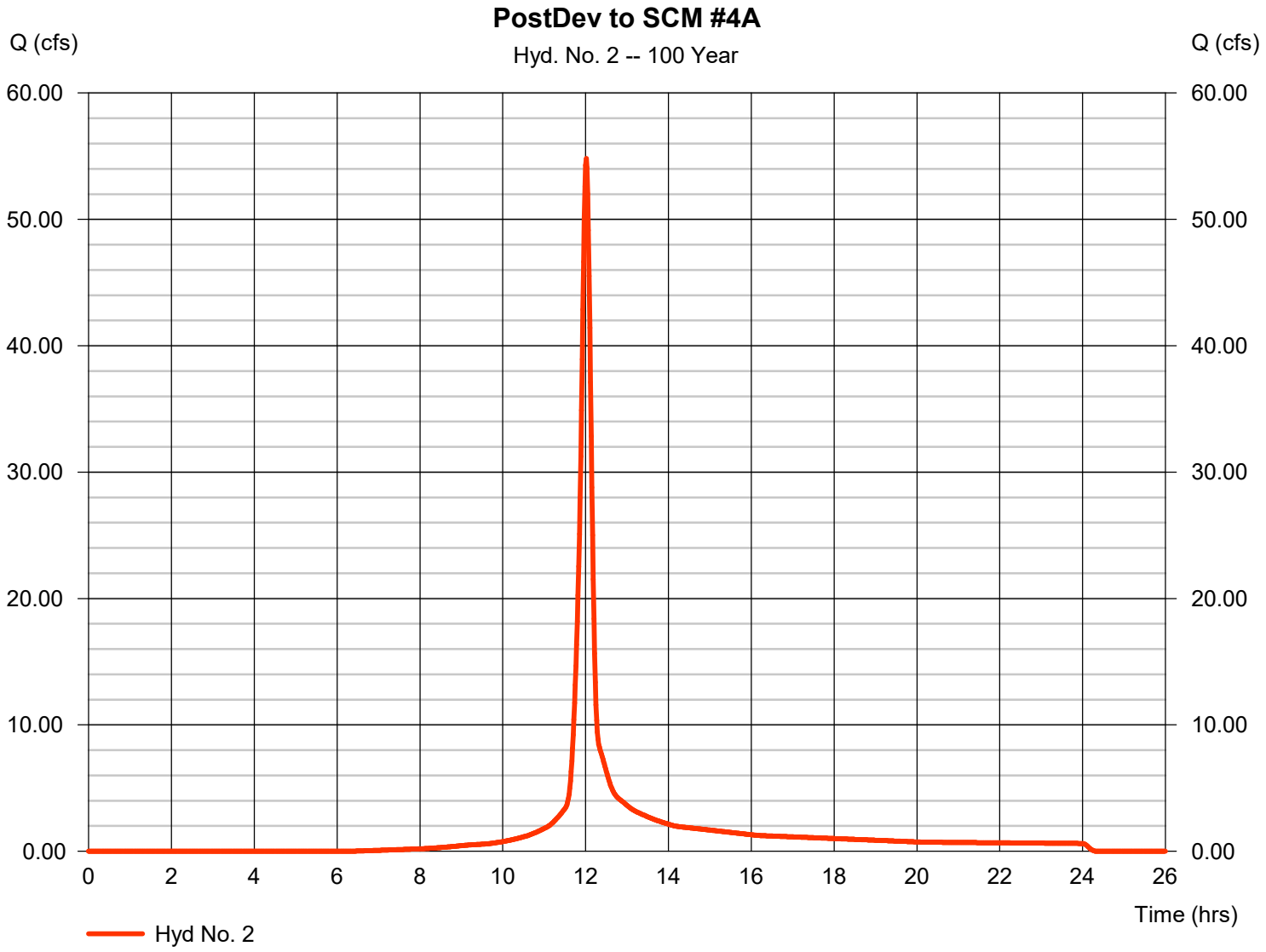


Hydrograph Report

Hyd. No. 2

PostDev to SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	139,977 cuft
Drainage area	=	8.310 ac	Curve number	=	76.4
Basin Slope	=	3.3 %	Hydraulic length	=	1200 ft
Tc method	=	User	Time of conc. (Tc)	=	12.20 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

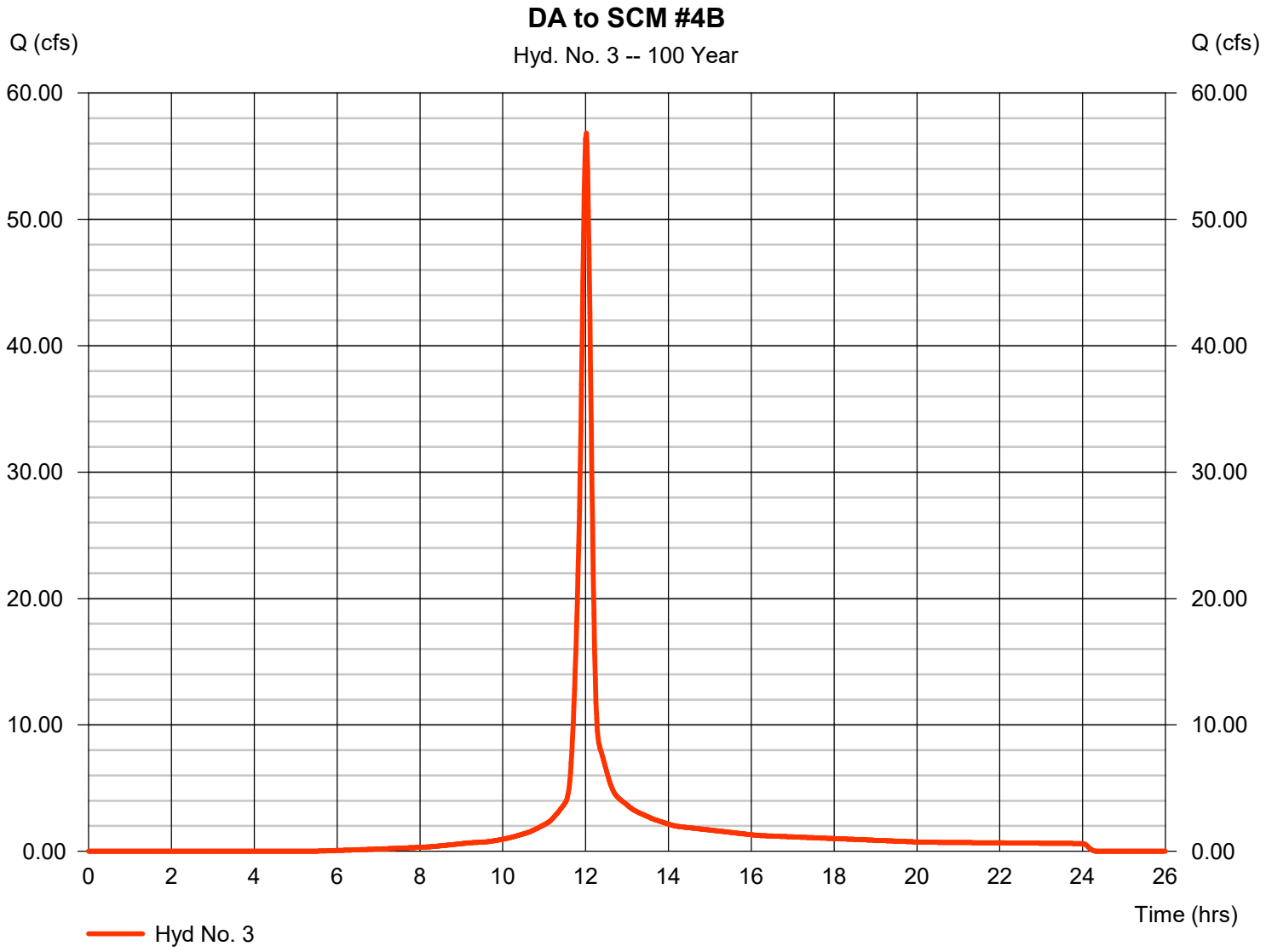


Hydrograph Report

Hyd. No. 3

DA to SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	56.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	146,747 cuft
Drainage area	=	8.020 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	13.20 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

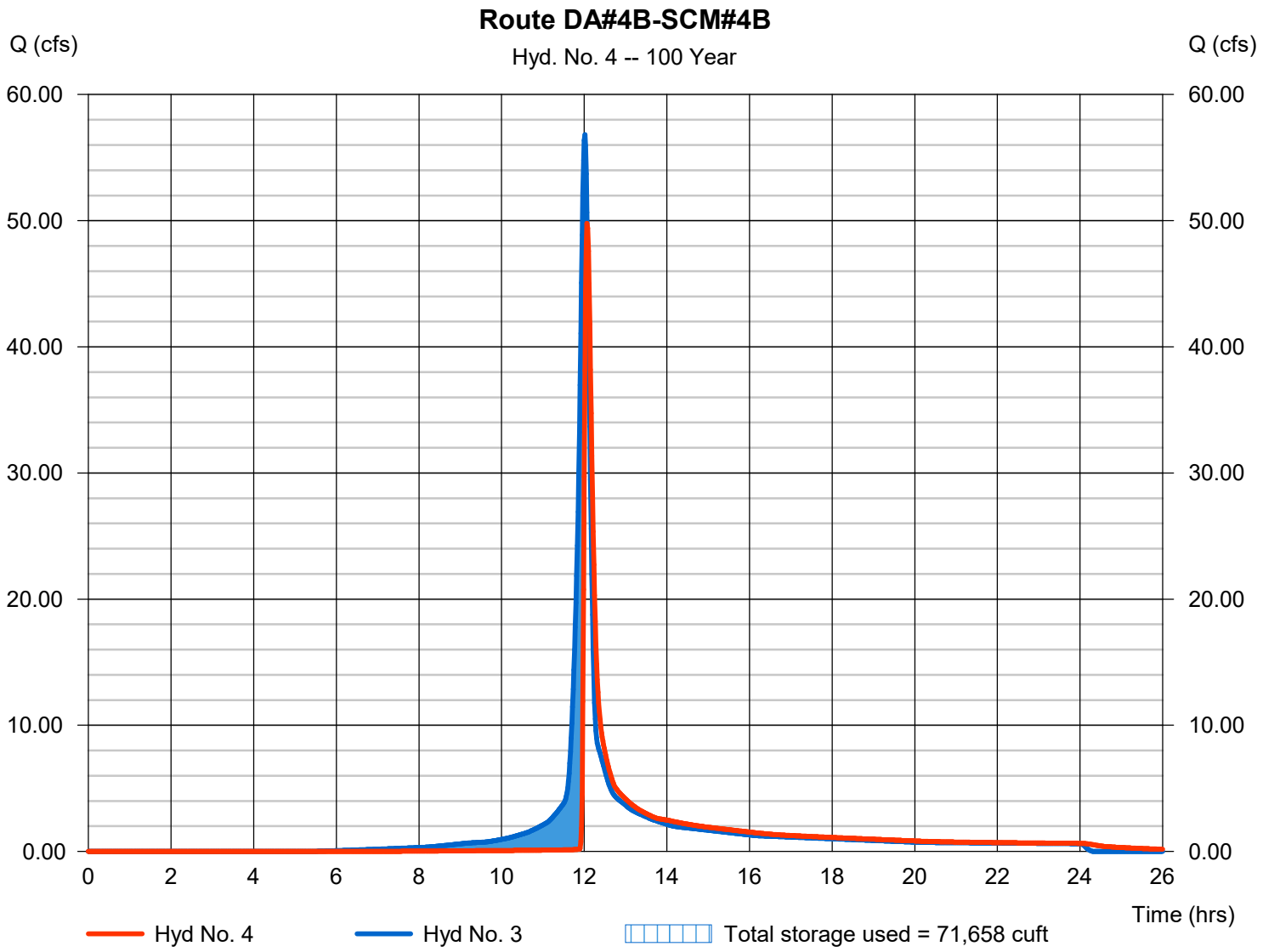
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Friday, 11 / 8 / 2024

Hyd. No. 4

Route DA#4B-SCM#4B

Hydrograph type	= Reservoir	Peak discharge	= 49.79 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 126,018 cuft
Inflow hyd. No.	= 3 - DA to SCM #4B	Max. Elevation	= 327.72 ft
Reservoir name	= SCM #4B	Max. Storage	= 71,658 cuft

Storage Indication method used. Wet pond routing start elevation = 323.50 ft.

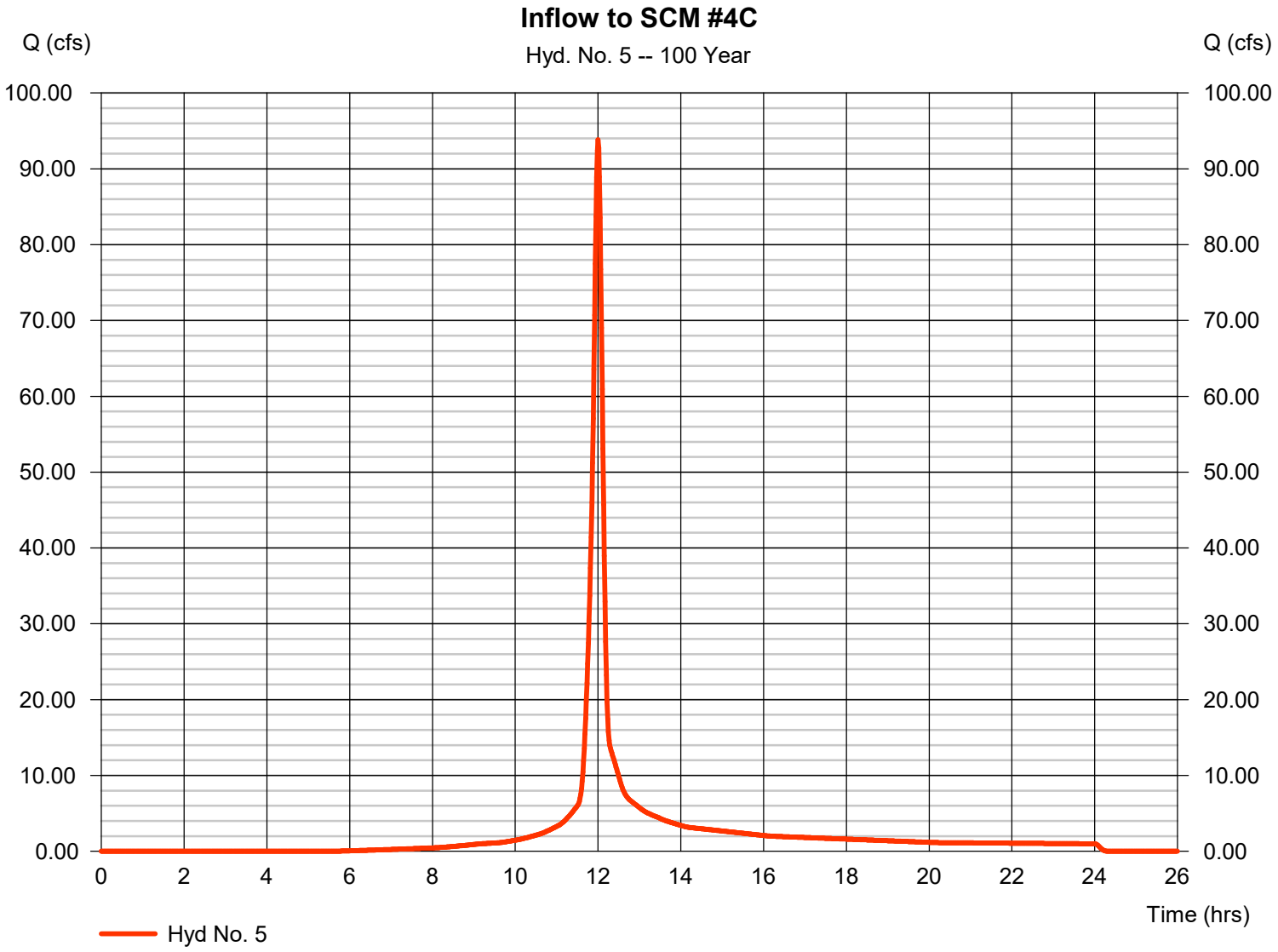


Hydrograph Report

Hyd. No. 5

Inflow to SCM #4C

Hydrograph type	=	SCS Runoff	Peak discharge	=	93.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	231,445 cuft
Drainage area	=	12.510 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.20 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



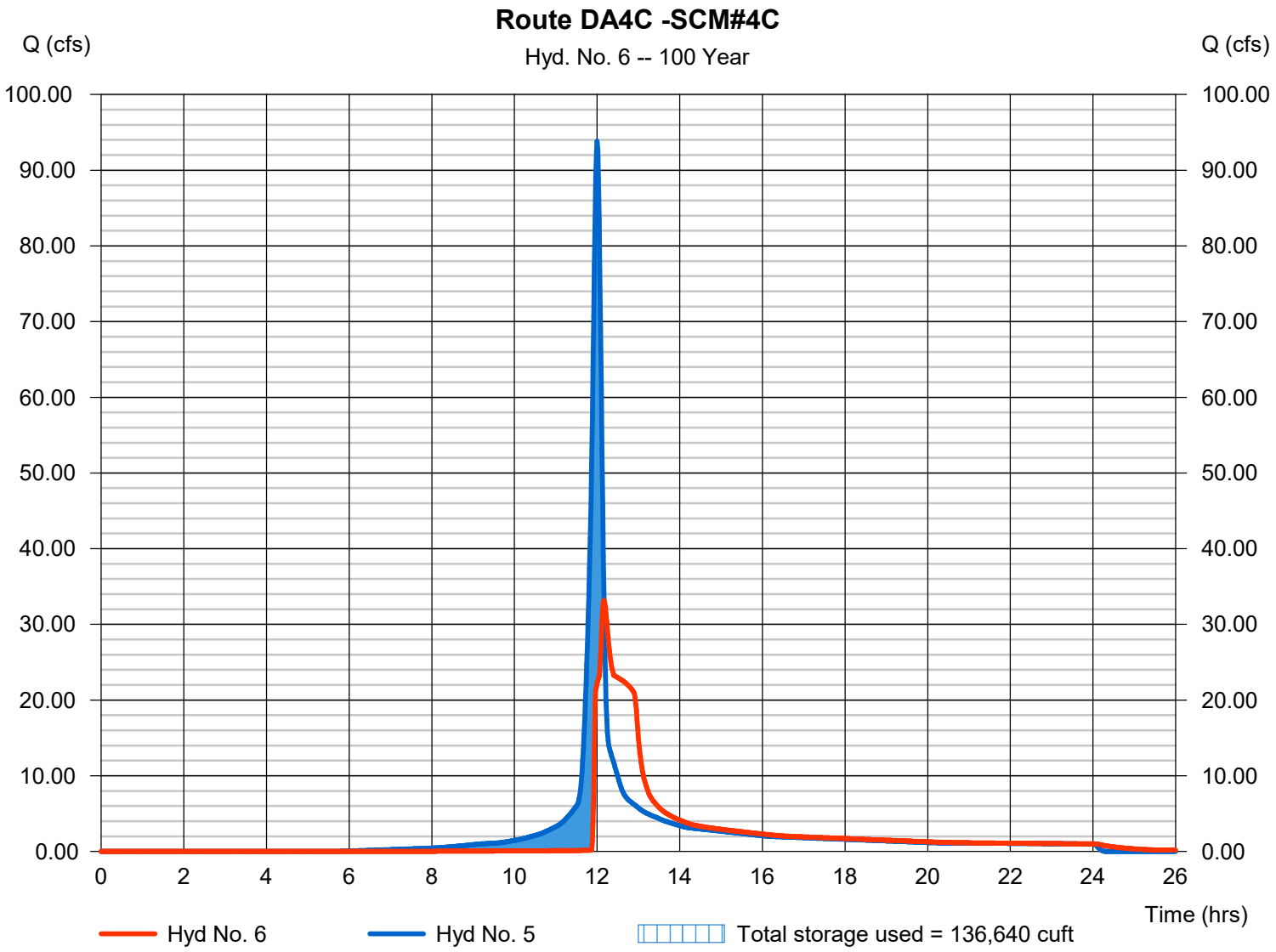
Hydrograph Report

Hyd. No. 6

Route DA4C -SCM#4C

Hydrograph type	=	Reservoir	Peak discharge	=	33.18 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	195,604 cuft
Inflow hyd. No.	=	5 - Inflow to SCM #4C	Max. Elevation	=	298.78 ft
Reservoir name	=	SCM #4C	Max. Storage	=	136,640 cuft

Storage Indication method used. Wet pond routing start elevation = 293.50 ft.

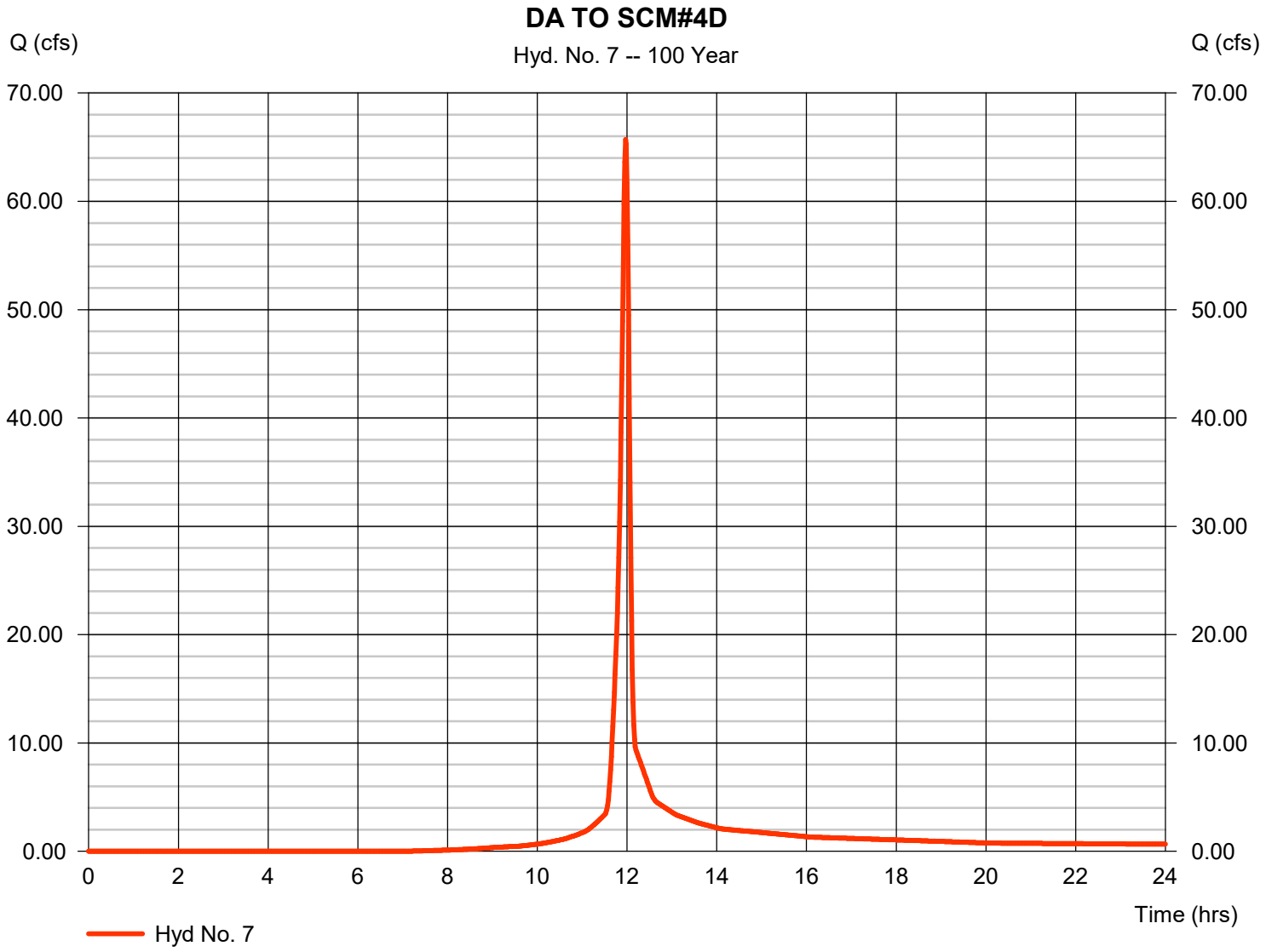


Hydrograph Report

Hyd. No. 7

DA TO SCM#4D

Hydrograph type	=	SCS Runoff	Peak discharge	=	65.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	140,271 cuft
Drainage area	=	9.120 ac	Curve number	=	73.1
Basin Slope	=	6.0 %	Hydraulic length	=	1465 ft
Tc method	=	User	Time of conc. (Tc)	=	8.20 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



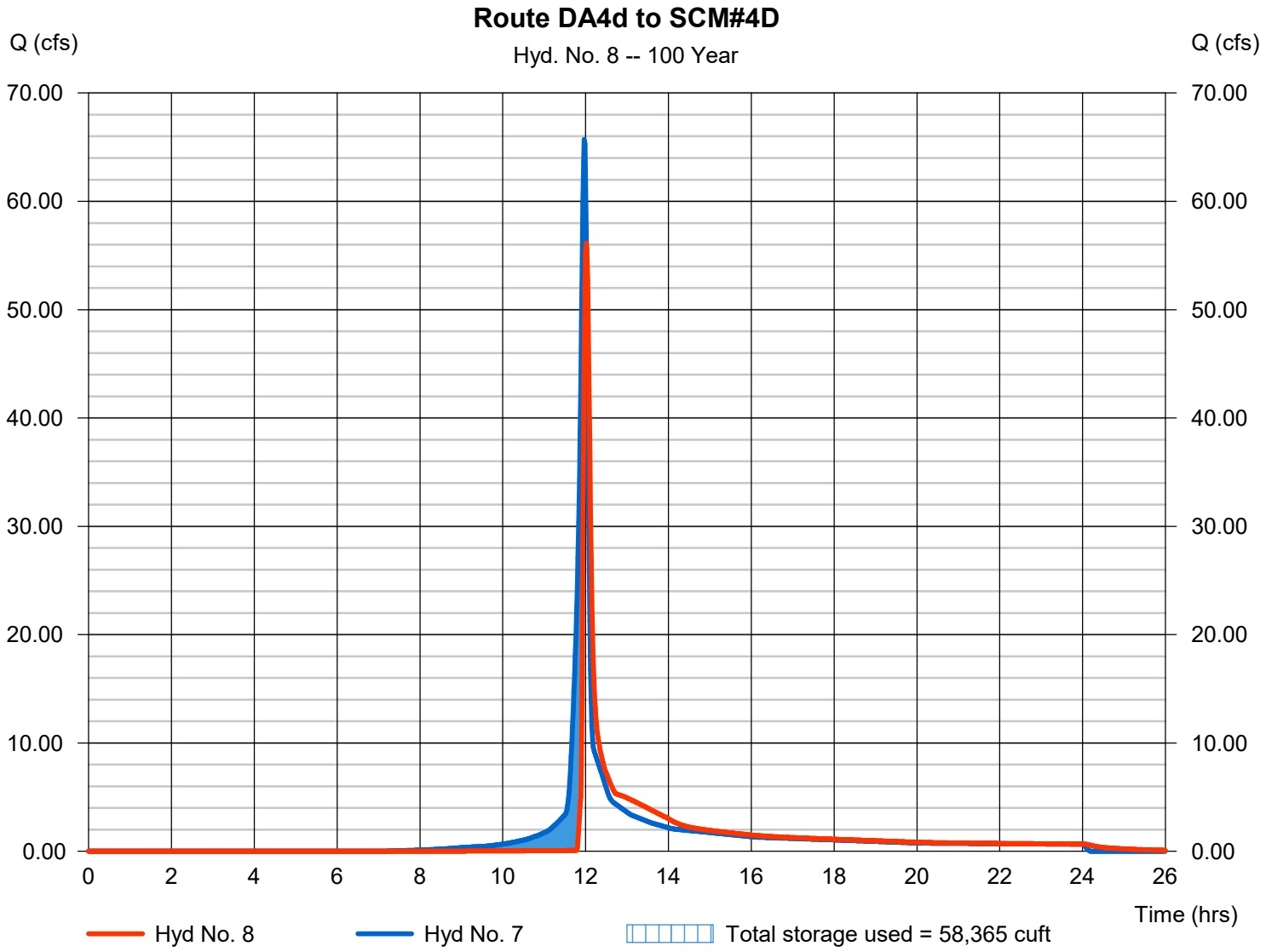
Hydrograph Report

Hyd. No. 8

Route DA4d to SCM#4D

Hydrograph type	=	Reservoir	Peak discharge	=	56.15 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.02 hrs
Time interval	=	1 min	Hyd. volume	=	126,021 cuft
Inflow hyd. No.	=	7 - DA TO SCM#4D	Max. Elevation	=	284.91 ft
Reservoir name	=	SCM #4D	Max. Storage	=	58,365 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

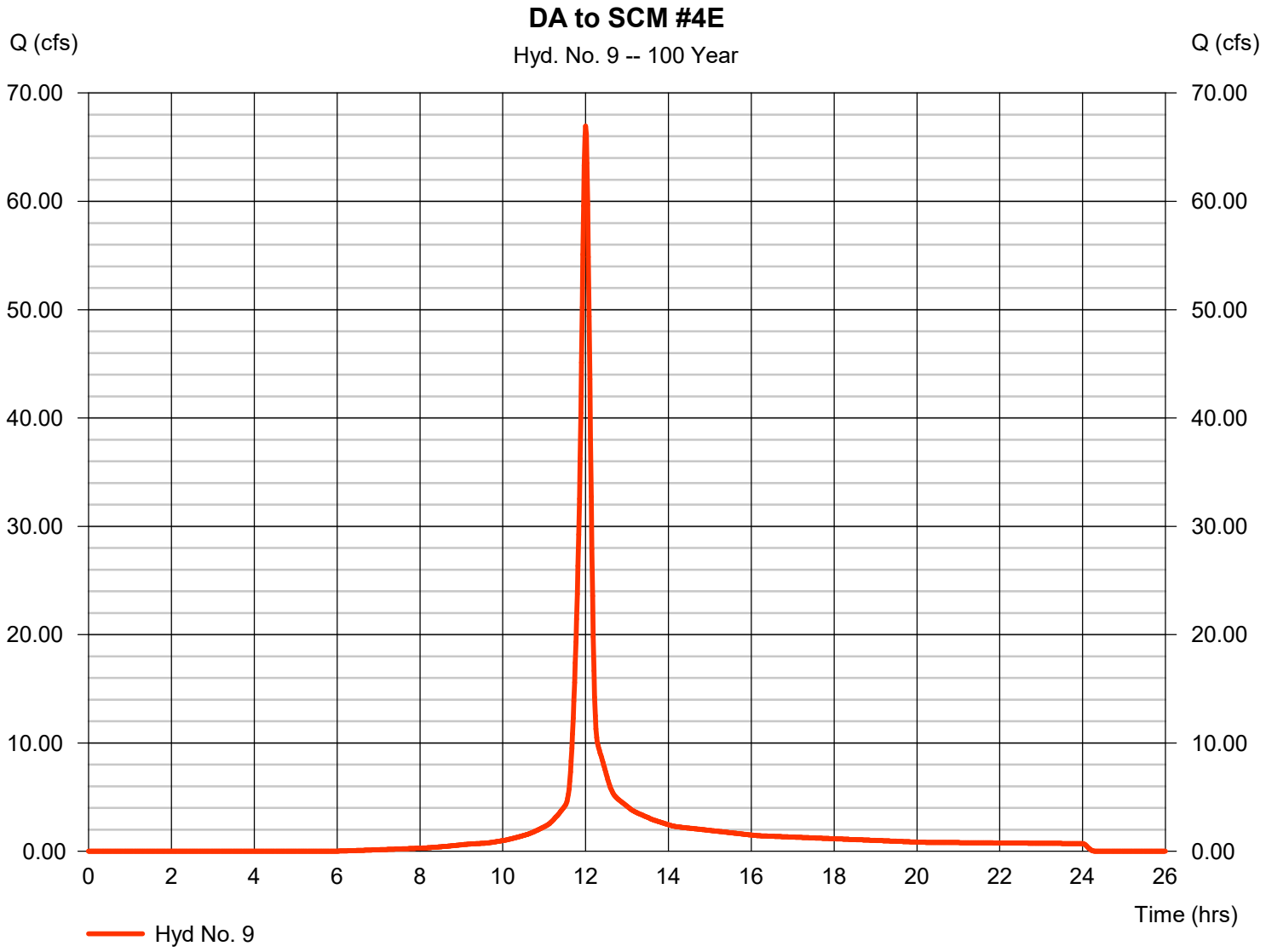


Hydrograph Report

Hyd. No. 9

DA to SCM #4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	66.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	1 min	Hyd. volume	=	164,555 cuft
Drainage area	=	9.100 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.80 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



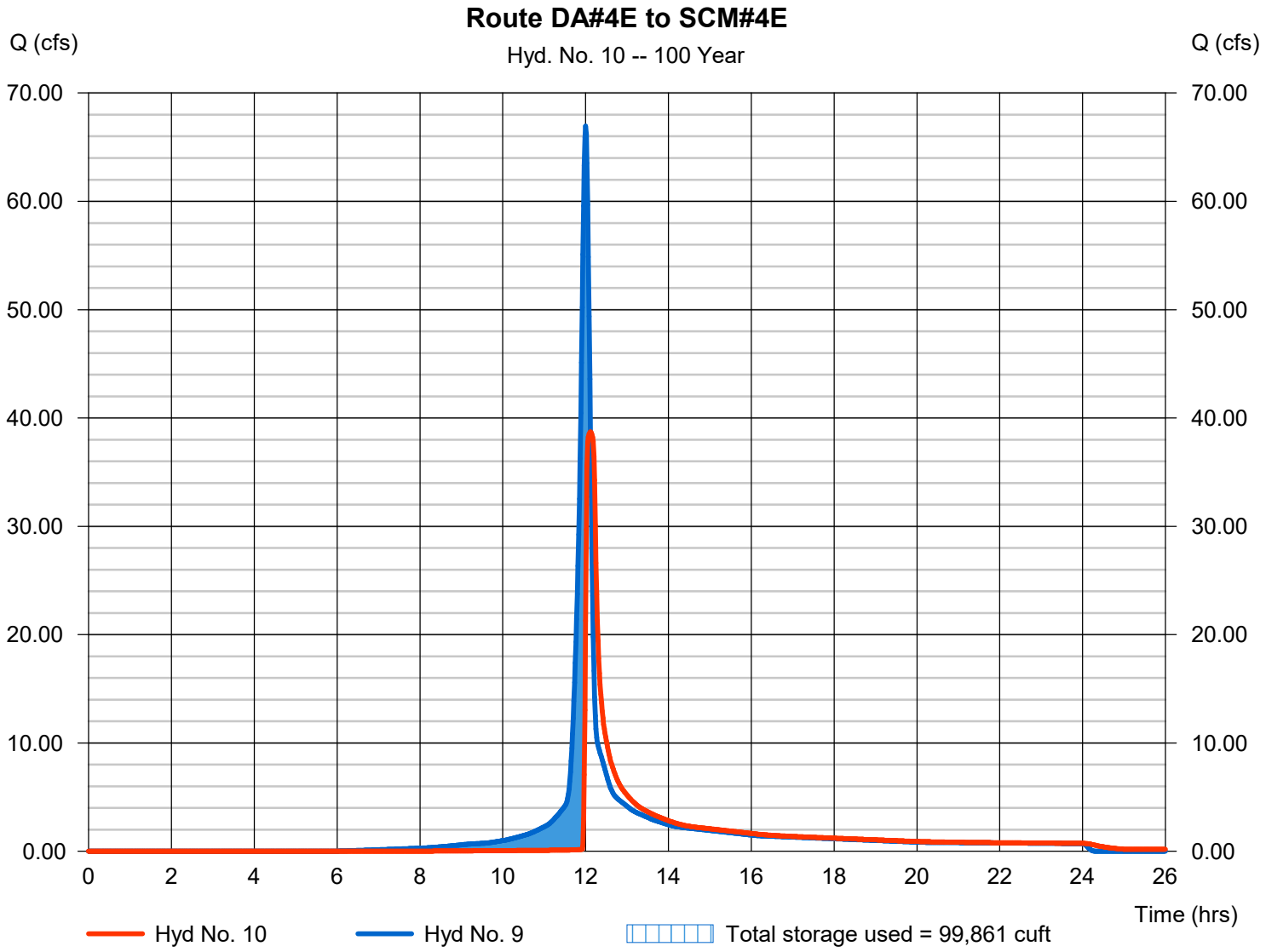
Hydrograph Report

Hyd. No. 10

Route DA#4E to SCM#4E

Hydrograph type	=	Reservoir	Peak discharge	=	38.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.12 hrs
Time interval	=	1 min	Hyd. volume	=	134,560 cuft
Inflow hyd. No.	=	9 - DA to SCM #4E	Max. Elevation	=	284.76 ft
Reservoir name	=	SCM #4E	Max. Storage	=	99,861 cuft

Storage Indication method used. Wet pond routing start elevation = 280.50 ft.

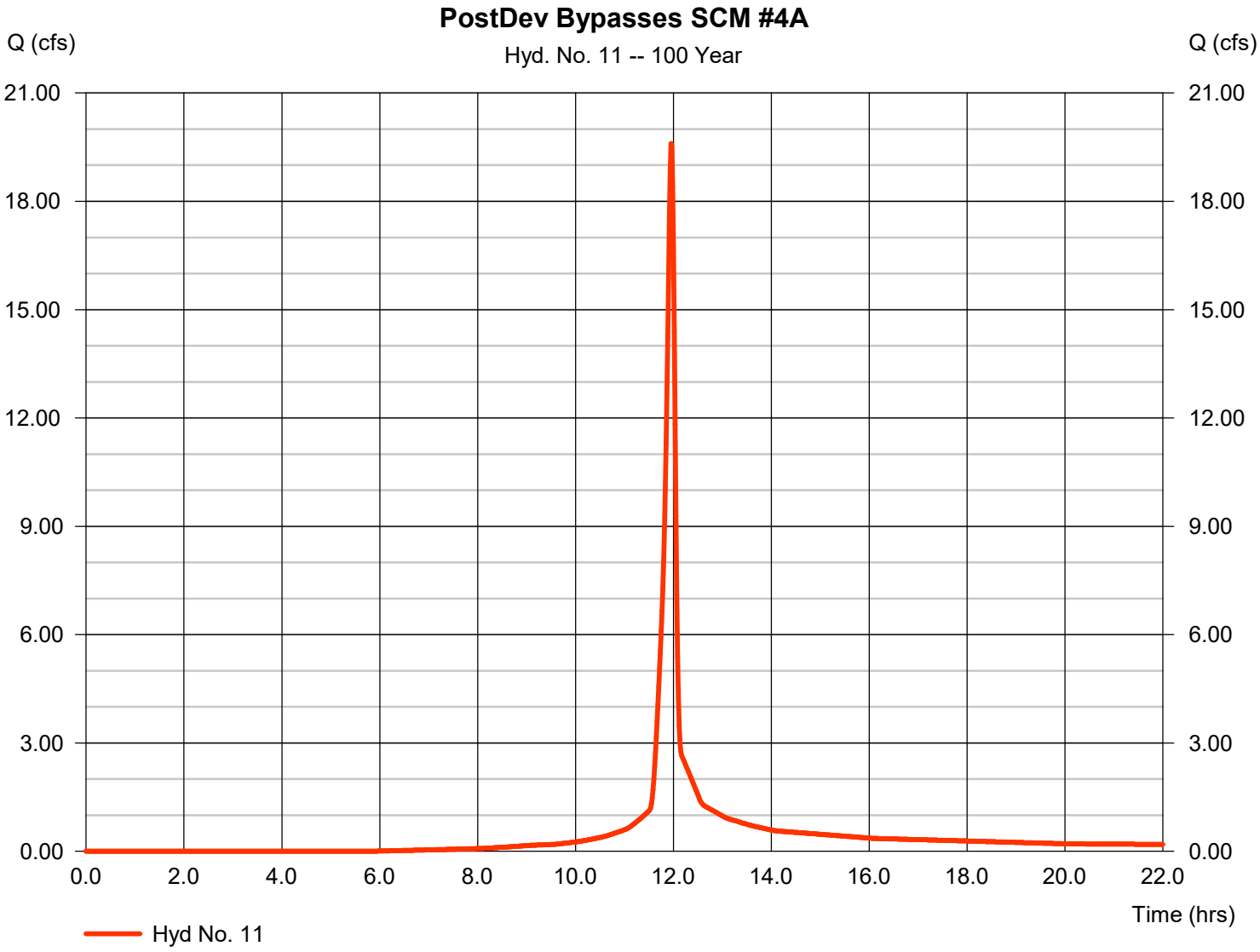


Hydrograph Report

Hyd. No. 11

PostDev Bypasses SCM #4A

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.60 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.95 hrs
Time interval	=	1 min	Hyd. volume	=	40,860 cuft
Drainage area	=	2.220 ac	Curve number	=	78.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

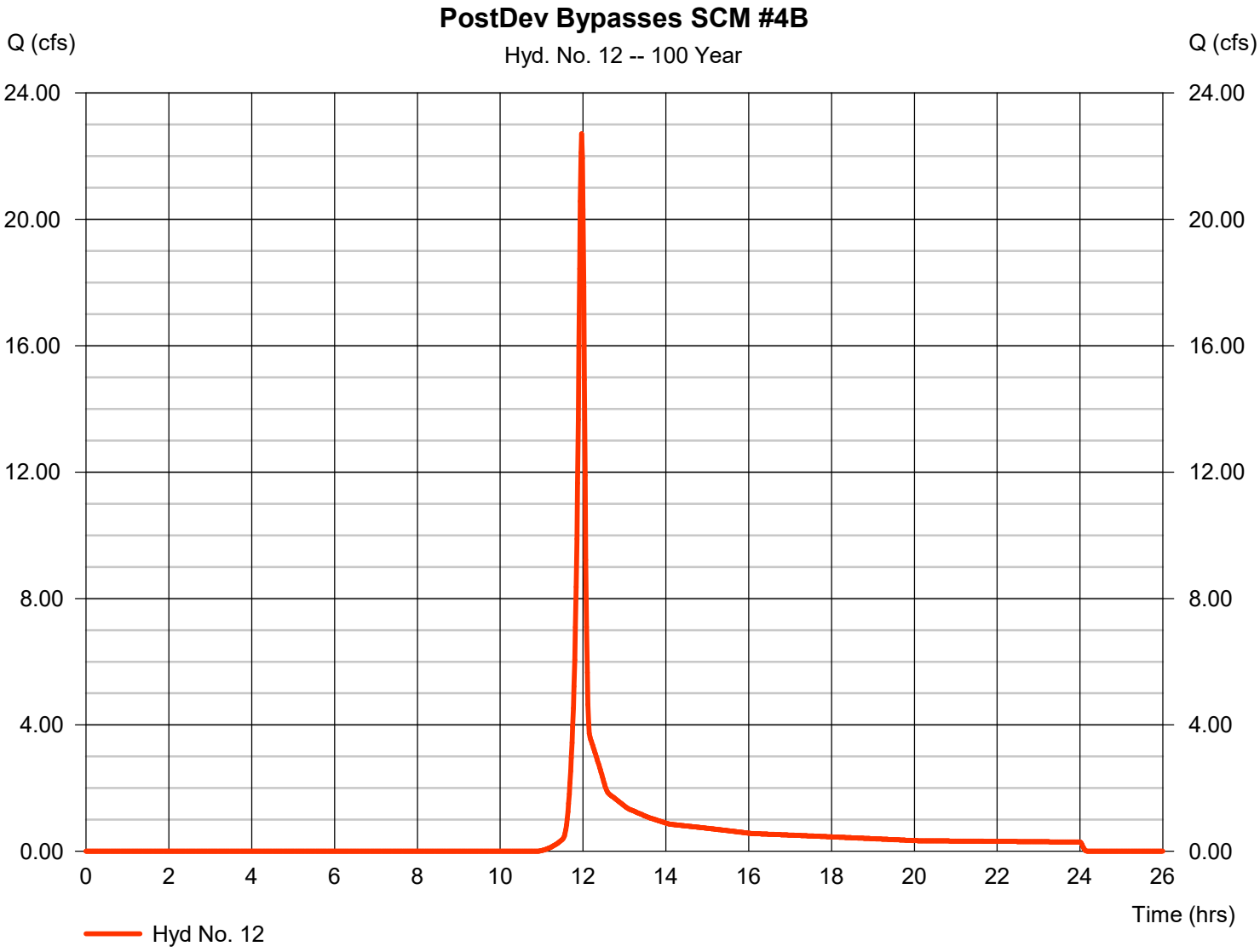


Hydrograph Report

Hyd. No. 12

PostDev Bypasses SCM #4B

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.71 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	46,121 cuft
Drainage area	=	5.240 ac	Curve number	=	54.3
Basin Slope	=	5.1 %	Hydraulic length	=	1220 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	5.84 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

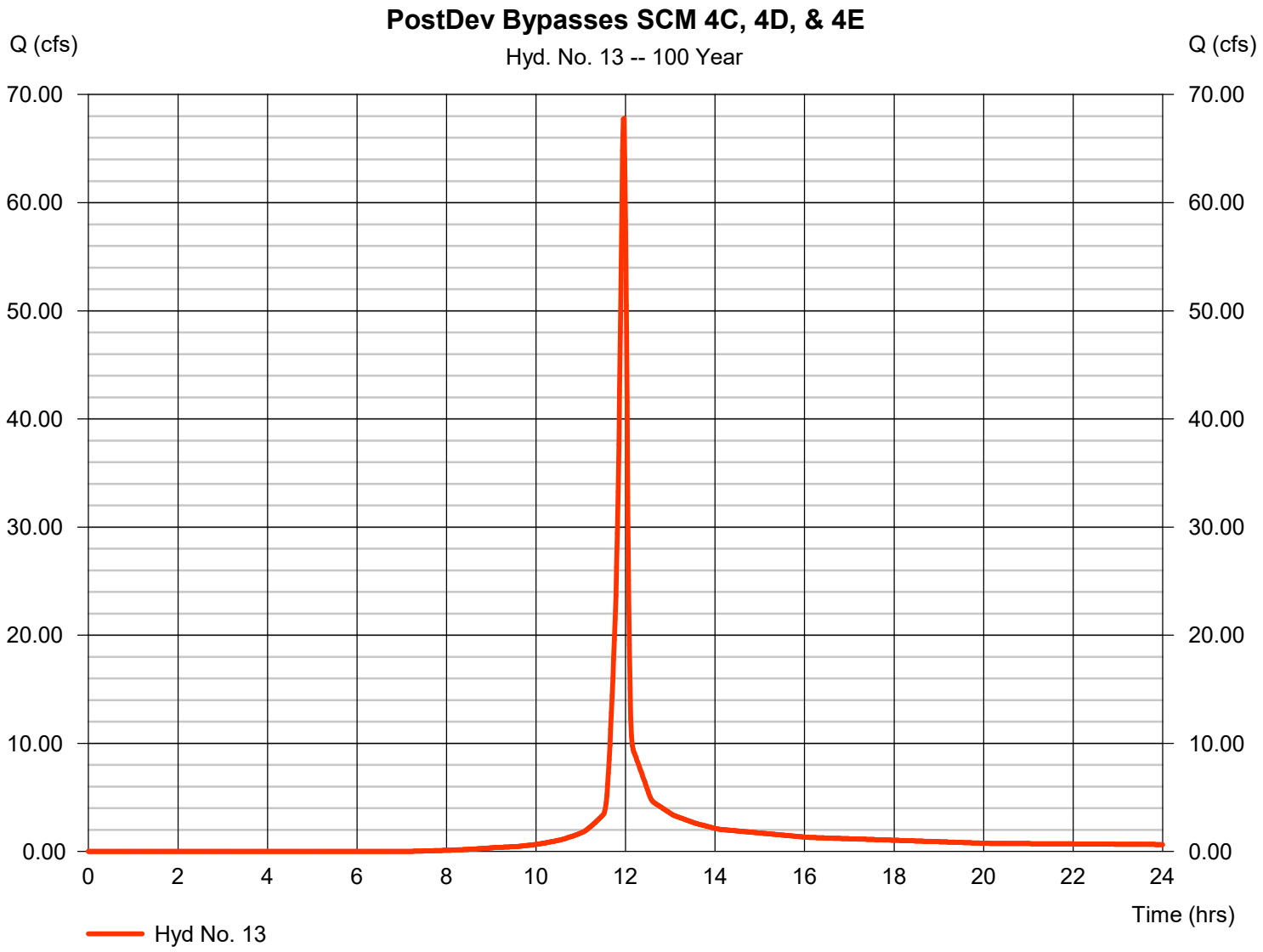


Hydrograph Report

Hyd. No. 13

PostDev Bypasses SCM 4C, 4D, & 4E

Hydrograph type	=	SCS Runoff	Peak discharge	=	67.79 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	1 min	Hyd. volume	=	138,866 cuft
Drainage area	=	8.580 ac	Curve number	=	72.9
Basin Slope	=	2.6 %	Hydraulic length	=	900 ft
Tc method	=	KIRPICH	Time of conc. (Tc)	=	6.02 min
Total precip.	=	7.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

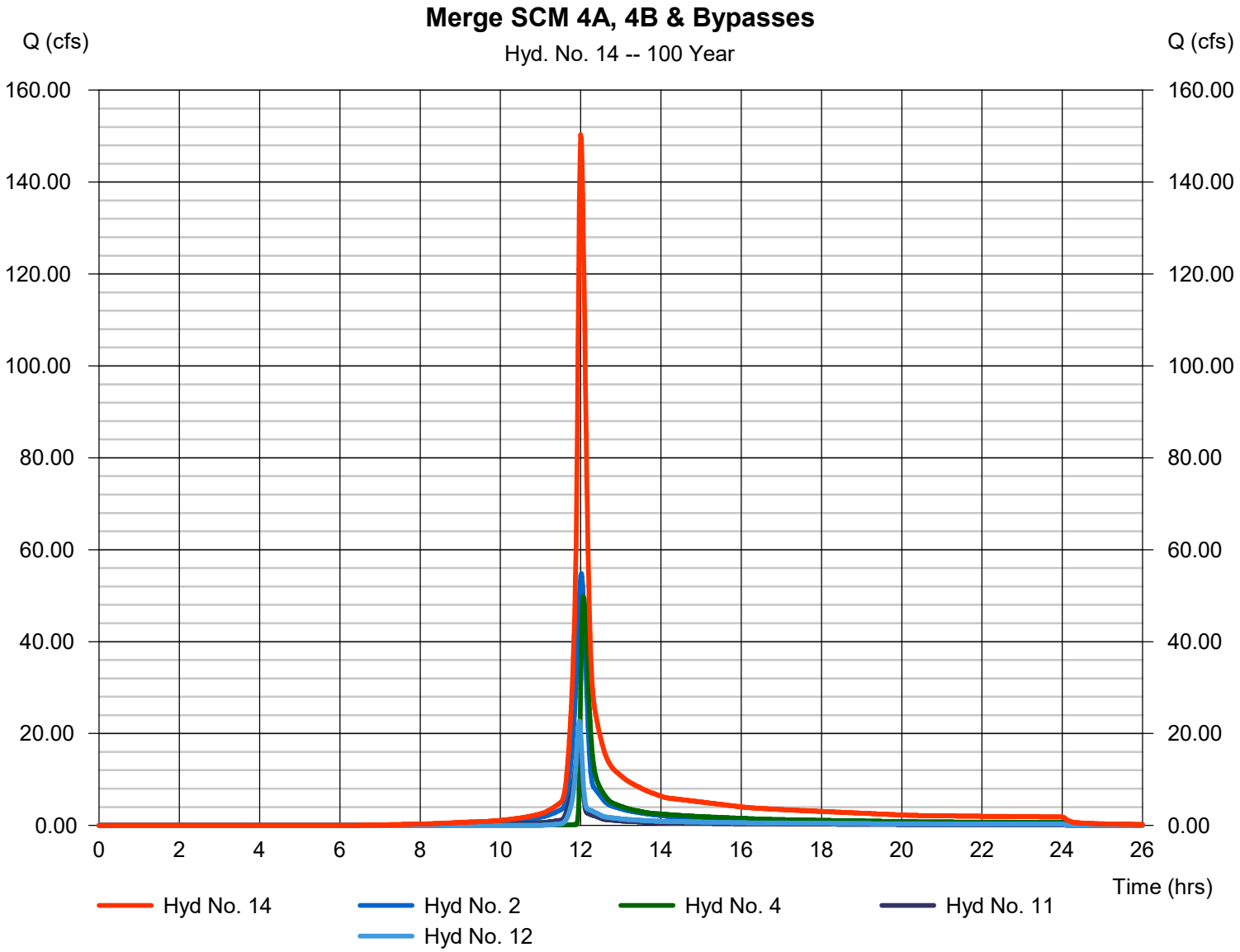


Hydrograph Report

Hyd. No. 14

Merge SCM 4A, 4B & Bypasses

Hydrograph type	= Combine	Peak discharge	= 150.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 1 min	Hyd. volume	= 379,612 cuft
Inflow hyds.	= 2, 4, 11, 12	Contrib. drain. area	= 15.770 ac



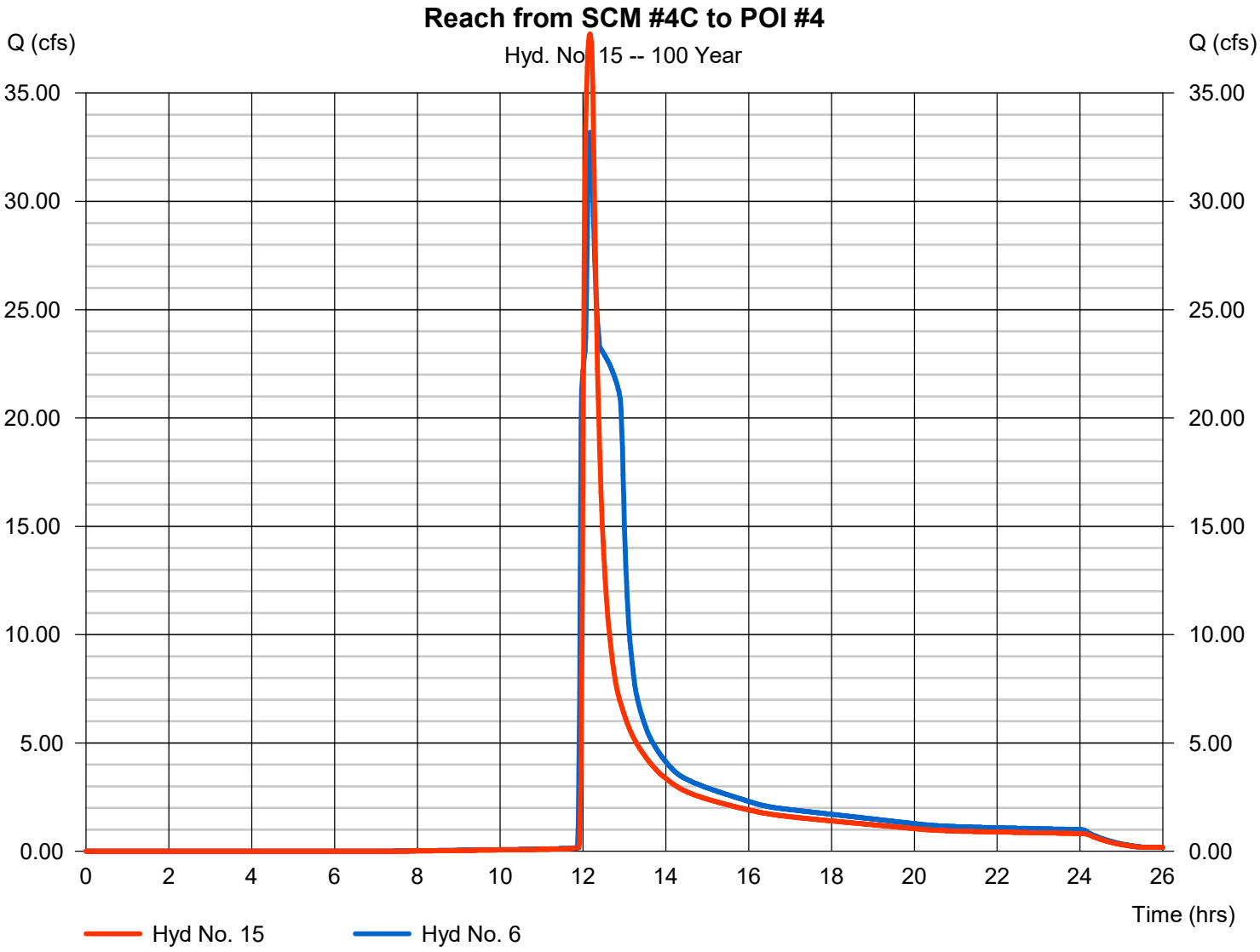
Hydrograph Report

Hyd. No. 15

Reach from SCM #4C to POI #4

Hydrograph type	=	Reach	Peak discharge	=	37.73 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.17 hrs
Time interval	=	1 min	Hyd. volume	=	152,053 cuft
Inflow hyd. No.	=	6 - Route DA4C -SCM#4C	Section type	=	Trapezoidal
Reach length	=	900.0 ft	Channel slope	=	2.6 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	4.0 ft
Rating curve x	=	2.955	Rating curve m	=	1.189
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.3001

Modified Att-Kin routing method used.



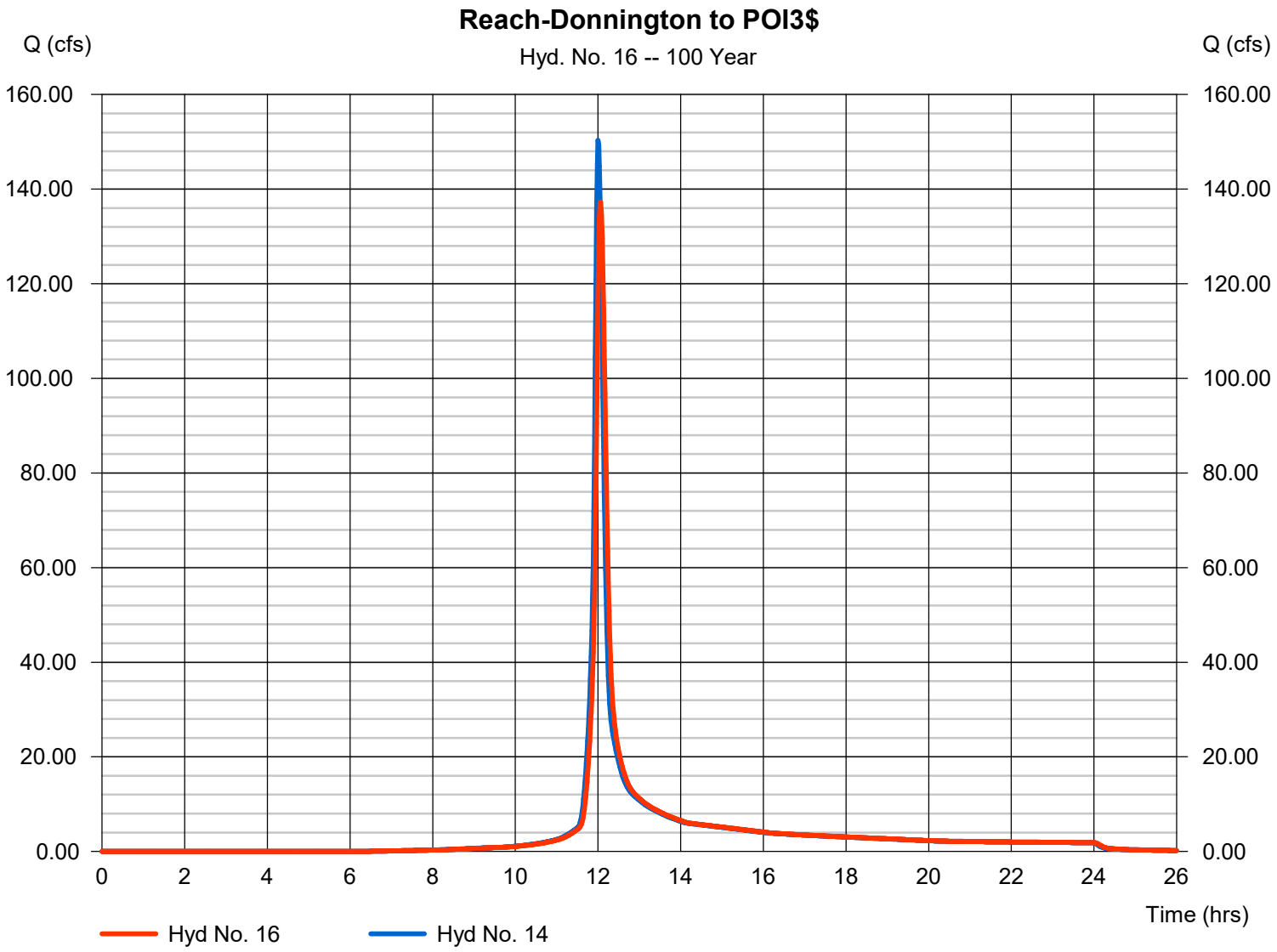
Hydrograph Report

Hyd. No. 16

Reach-Donnington to POI3$

Hydrograph type	=	Reach	Peak discharge	=	137.19 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	1 min	Hyd. volume	=	379,584 cuft
Inflow hyd. No.	=	14 - Merge SCM 4A, 4B & Bypass$	Section type	=	Trapezoidal
Reach length	=	1220.0 ft	Channel slope	=	2.9 %
Manning's n	=	0.032	Bottom width	=	4.0 ft
Side slope	=	25.0:1	Max. depth	=	5.0 ft
Rating curve x	=	3.124	Rating curve m	=	1.206
Ave. velocity	=	0.00 ft/s	Routing coeff.	=	0.3043

Modified Att-Kin routing method used.

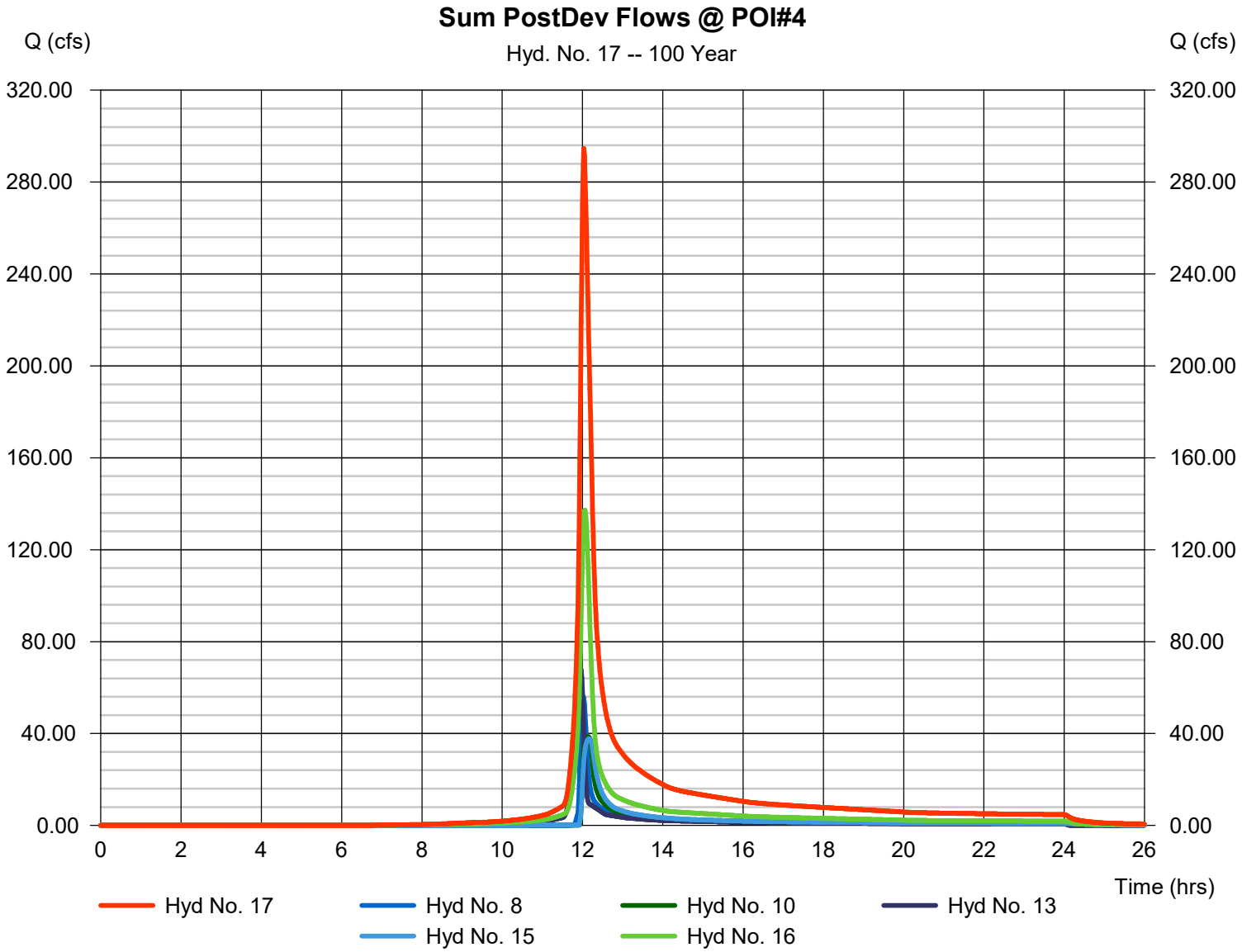


Hydrograph Report

Hyd. No. 17

Sum PostDev Flows @ POI#4

Hydrograph type	= Combine	Peak discharge	= 294.67 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 1 min	Hyd. volume	= 931,086 cuft
Inflow hyds.	= 8, 10, 13, 15, 16	Contrib. drain. area	= 8.580 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	0.0000	0.0000	0.0000	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	0.0000	0.0000	0.0000	--------
25	0.0000	0.0000	0.0000	--------
50	0.0000	0.0000	0.0000	--------
100	0.0000	0.0000	0.0000	--------

File name: SCM 1.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tc = time in minutes. Values may exceed 60.

Precip. file name: F:\Kalas Assemblage\Raleigh-Wake County 24Hr Rain.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	3.00	3.45	0.00	4.33	5.02	5.96	6.80	7.46
SCS 6-Hr	2.05	2.46	0.00	3.04	3.55	0.00	0.00	5.32
Huff-1st	0.00	0.00	0.00	2.75	0.00	5.38	6.50	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	2.80	0.00	5.25	6.00	0.00

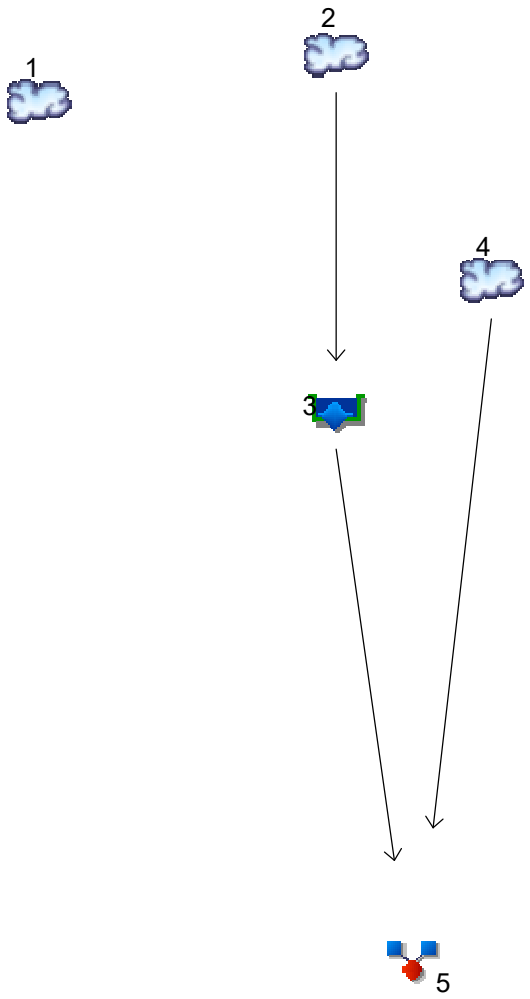
Hydraflow Table of Contents

10 - Year

25 - Year

Hydrographs Calculations POI #8

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PreDev DA #8
2	SCS Runoff	PostDev tp SCM $8A
3	Reservoir	Route DA #8 to SCM #8A
4	SCS Runoff	DA#8 Bypasses SCM #8A
5	Combine	PostDev to POI #8

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.455	1	729	8,239	------	------	------	PreDev DA #8
2	SCS Runoff	5.999	1	722	16,112	------	------	------	PostDev tp SCM $8A
3	Reservoir	0.076	1	1447	8,801	2	359.20	29,512	Route DA #8 to SCM #8A
4	SCS Runoff	0.312	1	720	923	------	------	------	DA#8 Bypasses SCM #8A
5	Combine	0.344	1	720	9,724	3, 4	------	------	PostDev to POI #8

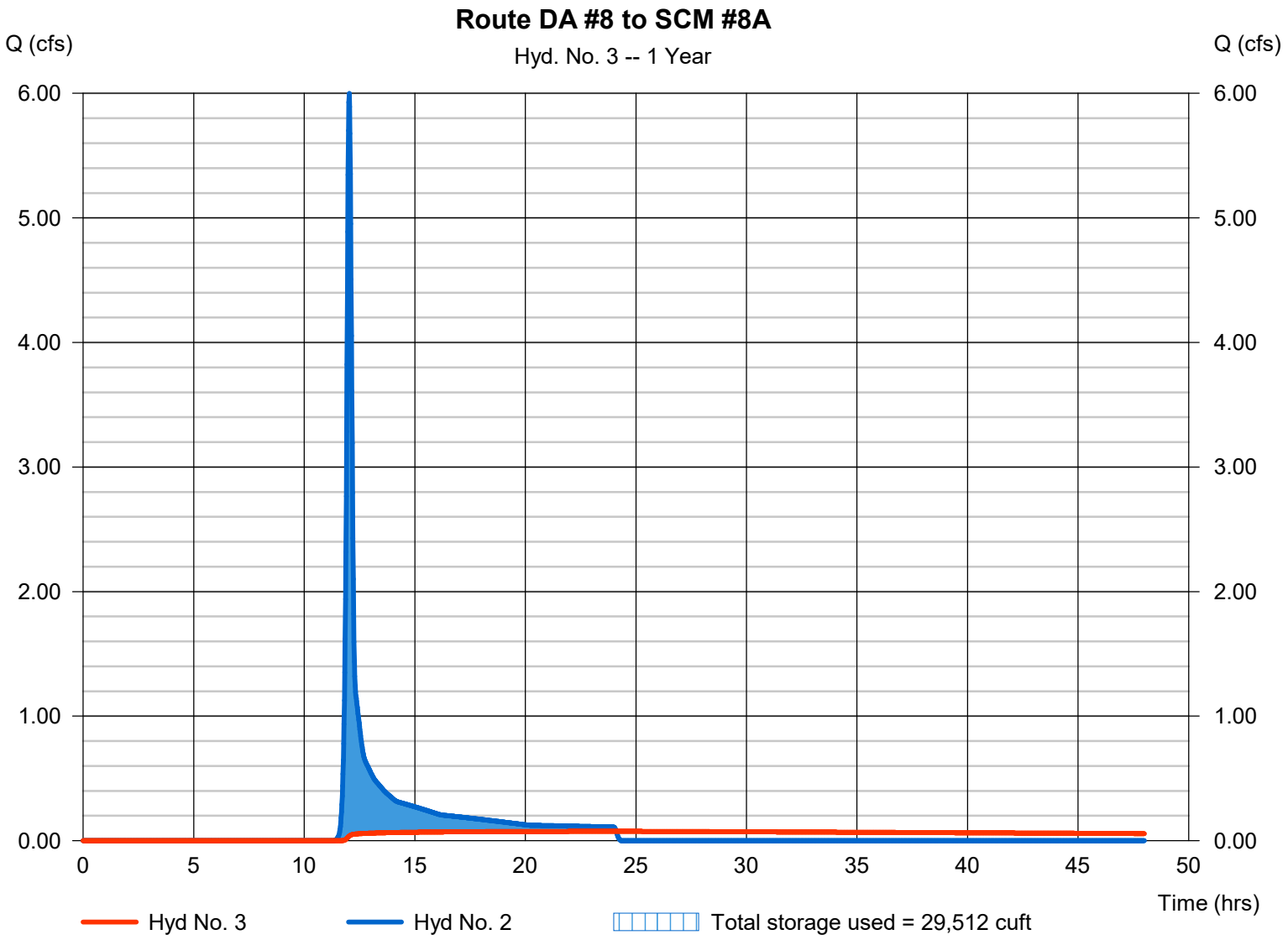
Hydrograph Report

Hyd. No. 3

Route DA #8 to SCM #8A

Hydrograph type	=	Reservoir	Peak discharge	=	0.076 cfs
Storm frequency	=	1 yrs	Time to peak	=	24.12 hrs
Time interval	=	1 min	Hyd. volume	=	8,801 cuft
Inflow hyd. No.	=	2 - PostDev tp SCM $8A	Max. Elevation	=	359.20 ft
Reservoir name	=	SCM #8A	Max. Storage	=	29,512 cuft

Storage Indication method used. Wet pond routing start elevation = 357.50 ft.



Pond Report

Pond No. 1 - SCM #8A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 354.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	354.00	3,724	0	0
1.00	355.00	4,242	3,980	3,980
2.00	356.00	4,792	4,514	8,494
3.00	357.00	5,375	5,080	13,574
3.50	357.50	6,310	2,918	16,492
4.00	358.00	7,316	3,403	19,895
5.00	359.00	8,392	7,847	27,742
6.00	360.00	9,537	8,958	36,699
7.00	361.00	10,750	10,136	46,836
8.00	362.00	12,024	11,380	58,216

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	1.50	0.00	0.00
Span (in)	= 18.00	1.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 354.00	357.50	0.00	0.00
Length (ft)	= 28.00	0.50	0.00	0.00
Slope (%)	= 0.50	0.50	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

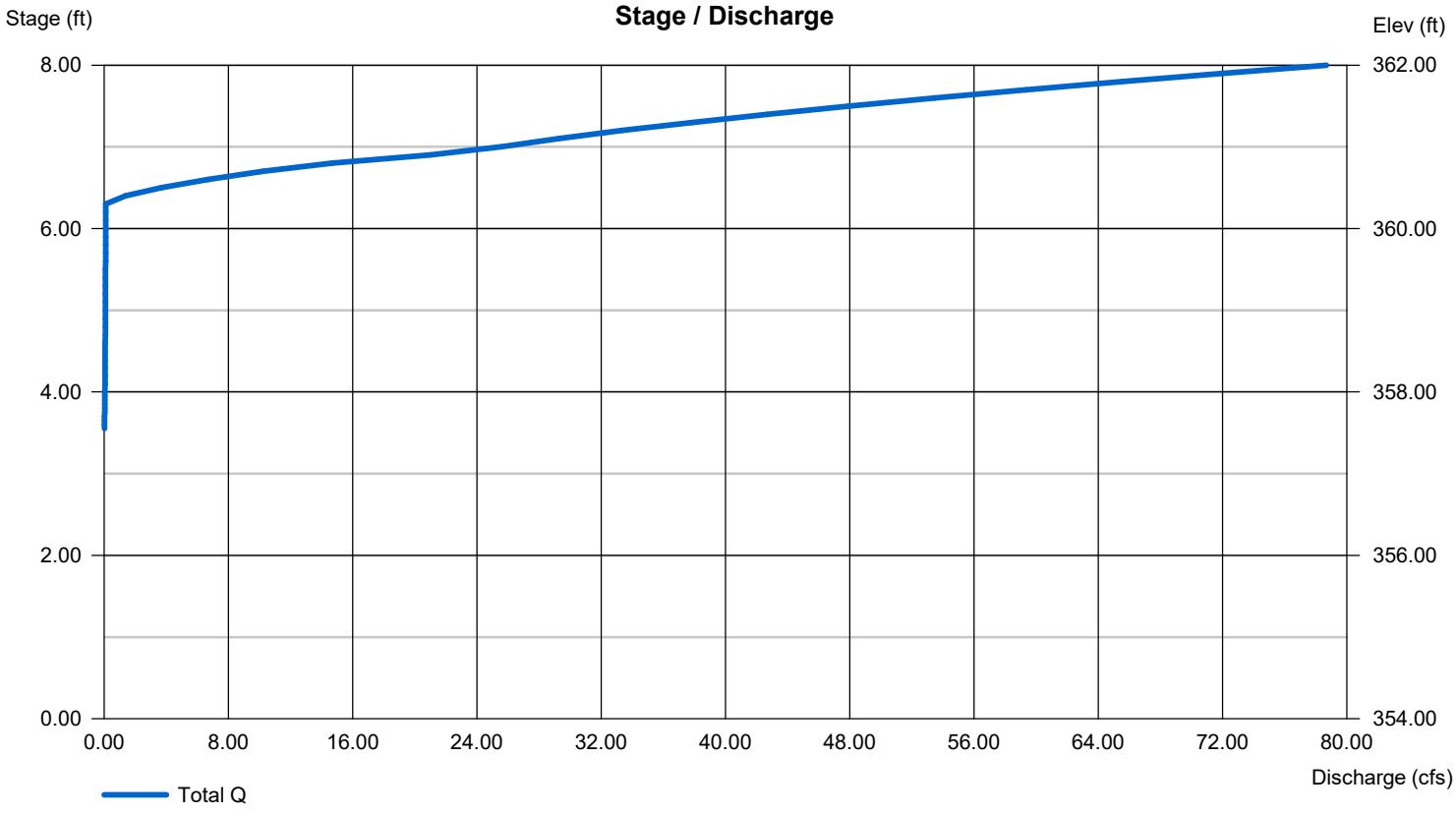
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	12.00	Inactive	0.00
Crest El. (ft)	= 360.30	360.75	362.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	Rect	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.786	1	728	12,610	------	------	------	PreDev DA #8
2	SCS Runoff	8.304	1	722	21,700	------	------	------	PostDev tp SCM $8A
3	Reservoir	0.088	1	1447	10,408	2	359.76	34,582	Route DA #8 to SCM #8A
4	SCS Runoff	0.573	1	719	1,413	------	------	------	DA#8 Bypasses SCM #8A
5	Combine	0.612	1	719	11,821	3, 4	------	------	PostDev to POI #8

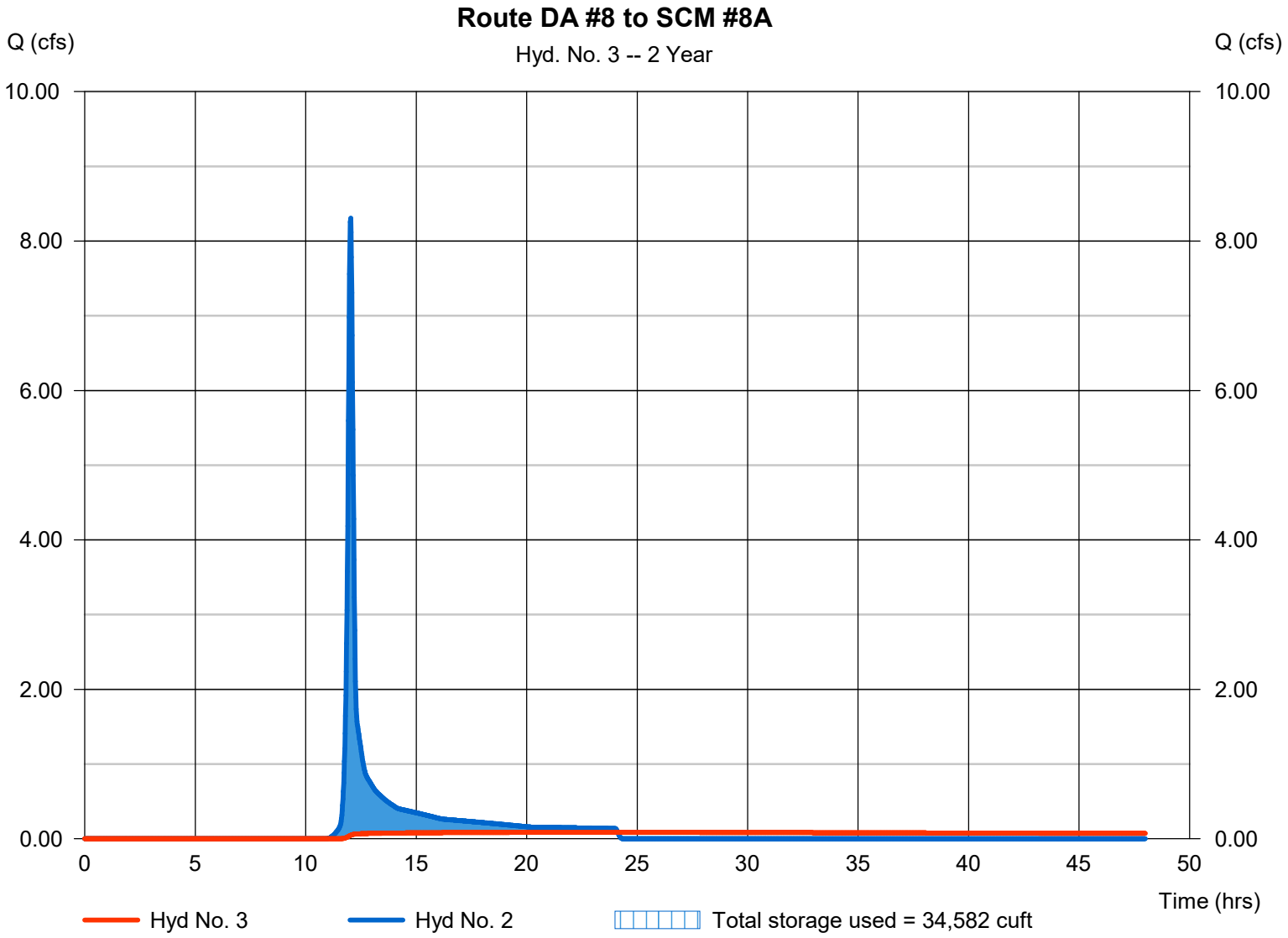
Hydrograph Report

Hyd. No. 3

Route DA #8 to SCM #8A

Hydrograph type	=	Reservoir	Peak discharge	=	0.088 cfs
Storm frequency	=	2 yrs	Time to peak	=	24.12 hrs
Time interval	=	1 min	Hyd. volume	=	10,408 cuft
Inflow hyd. No.	=	2 - PostDev tp SCM $8A	Max. Elevation	=	359.76 ft
Reservoir name	=	SCM #8A	Max. Storage	=	34,582 cuft

Storage Indication method used. Wet pond routing start elevation = 357.50 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.199	1	727	22,972	------	------	------	PreDev DA #8
2	SCS Runoff	13.23	1	721	33,811	------	------	------	PostDev tp SCM $8A
3	Reservoir	0.458	1	925	18,242	2	360.33	40,028	Route DA #8 to SCM #8A
4	SCS Runoff	1.190	1	718	2,574	------	------	------	DA#8 Bypasses SCM #8A
5	Combine	1.242	1	718	20,816	3, 4	------	------	PostDev to POI #8

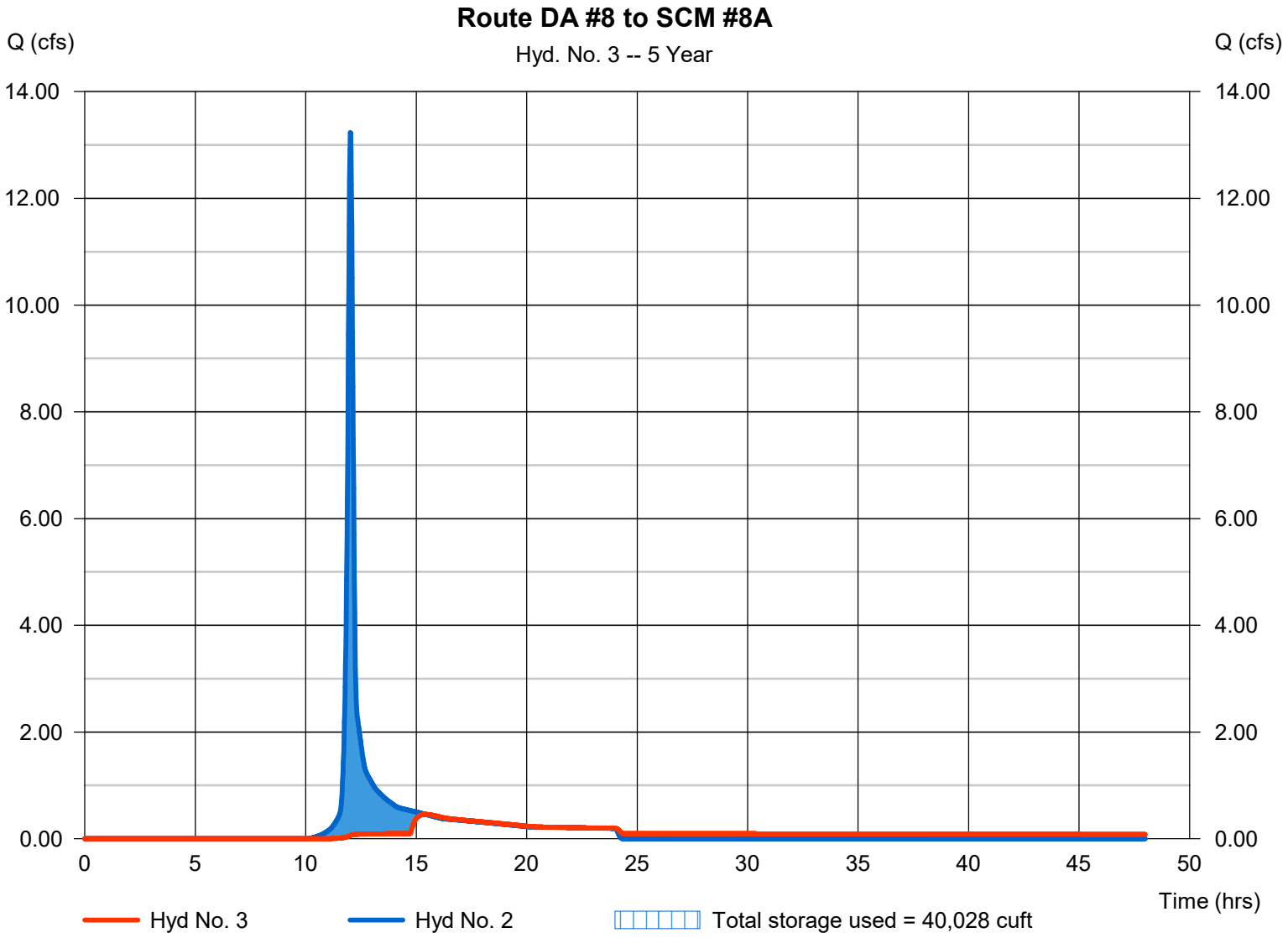
Hydrograph Report

Hyd. No. 3

Route DA #8 to SCM #8A

Hydrograph type	= Reservoir	Peak discharge	= 0.458 cfs
Storm frequency	= 5 yrs	Time to peak	= 15.42 hrs
Time interval	= 1 min	Hyd. volume	= 18,242 cuft
Inflow hyd. No.	= 2 - PostDev tp SCM $8A	Max. Elevation	= 360.33 ft
Reservoir name	= SCM #8A	Max. Storage	= 40,028 cuft

Storage Indication method used. Wet pond routing start elevation = 357.50 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.394	1	726	32,452	------	------	------	PreDev DA #8
2	SCS Runoff	17.41	1	721	44,130	------	------	------	PostDev tp SCM $8A
3	Reservoir	1.406	1	774	28,547	2	360.40	40,773	Route DA #8 to SCM #8A
4	SCS Runoff	1.751	1	718	3,637	------	------	------	DA#8 Bypasses SCM #8A
5	Combine	1.814	1	718	32,184	3, 4	------	------	PostDev to POI #8

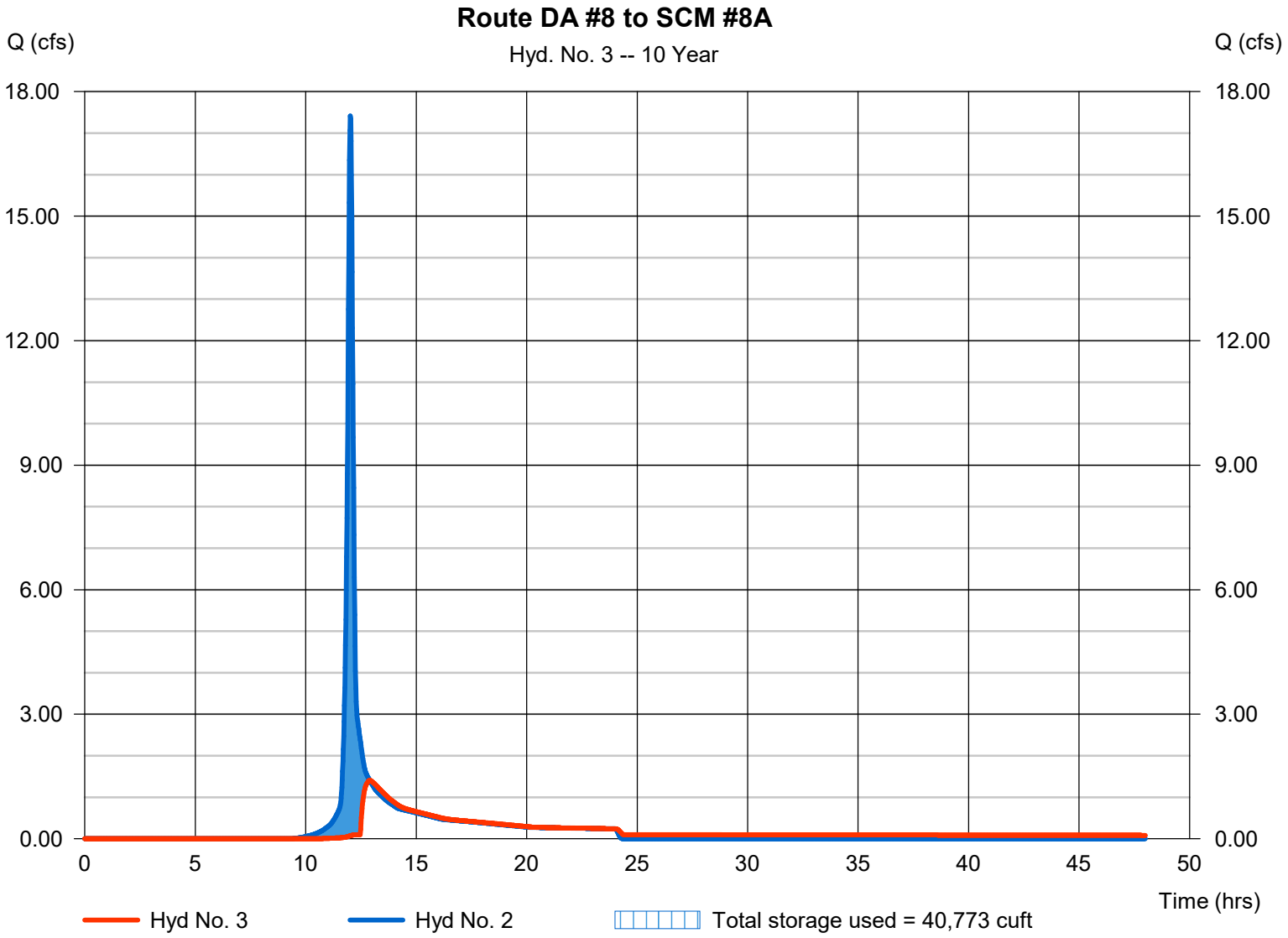
Hydrograph Report

Hyd. No. 3

Route DA #8 to SCM #8A

Hydrograph type	=	Reservoir	Peak discharge	=	1.406 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.90 hrs
Time interval	=	1 min	Hyd. volume	=	28,547 cuft
Inflow hyd. No.	=	2 - PostDev tp SCM $8A	Max. Elevation	=	360.40 ft
Reservoir name	=	SCM #8A	Max. Storage	=	40,773 cuft

Storage Indication method used. Wet pond routing start elevation = 357.50 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	14.22	1	726	46,856	------	------	------	PreDev DA #8
2	SCS Runoff	23.37	1	721	59,030	------	------	------	PostDev tp SCM $8A
3	Reservoir	7.679	1	732	43,432	2	360.63	43,070	Route DA #8 to SCM #8A
4	SCS Runoff	2.587	1	718	5,251	------	------	------	DA#8 Bypasses SCM #8A
5	Combine	8.074	1	732	48,682	3, 4	------	------	PostDev to POI #8

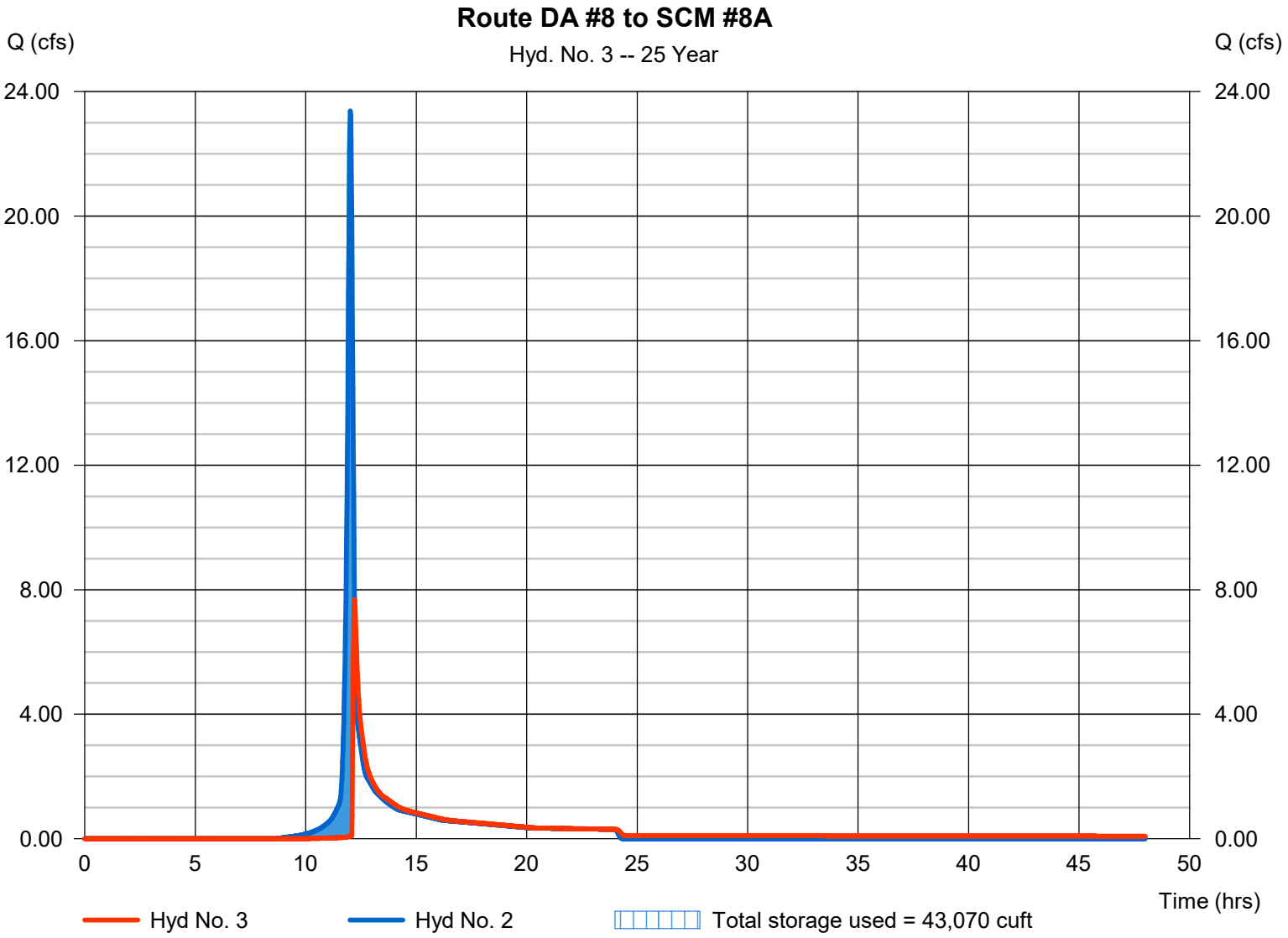
Hydrograph Report

Hyd. No. 3

Route DA #8 to SCM #8A

Hydrograph type	= Reservoir	Peak discharge	= 7.679 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.20 hrs
Time interval	= 1 min	Hyd. volume	= 43,432 cuft
Inflow hyd. No.	= 2 - PostDev tp SCM $8A	Max. Elevation	= 360.63 ft
Reservoir name	= SCM #8A	Max. Storage	= 43,070 cuft

Storage Indication method used. Wet pond routing start elevation = 357.50 ft.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	22.72	1	726	72,530	------	------	------	PreDev DA #8
2	SCS Runoff	33.26	1	721	84,221	------	------	------	PostDev tp SCM $8A
3	Reservoir	24.71	1	726	68,605	2	360.98	46,646	Route DA #8 to SCM #8A
4	SCS Runoff	4.046	1	718	8,128	------	------	------	DA#8 Bypasses SCM #8A
5	Combine	25.68	1	726	76,732	3, 4	------	------	PostDev to POI #8

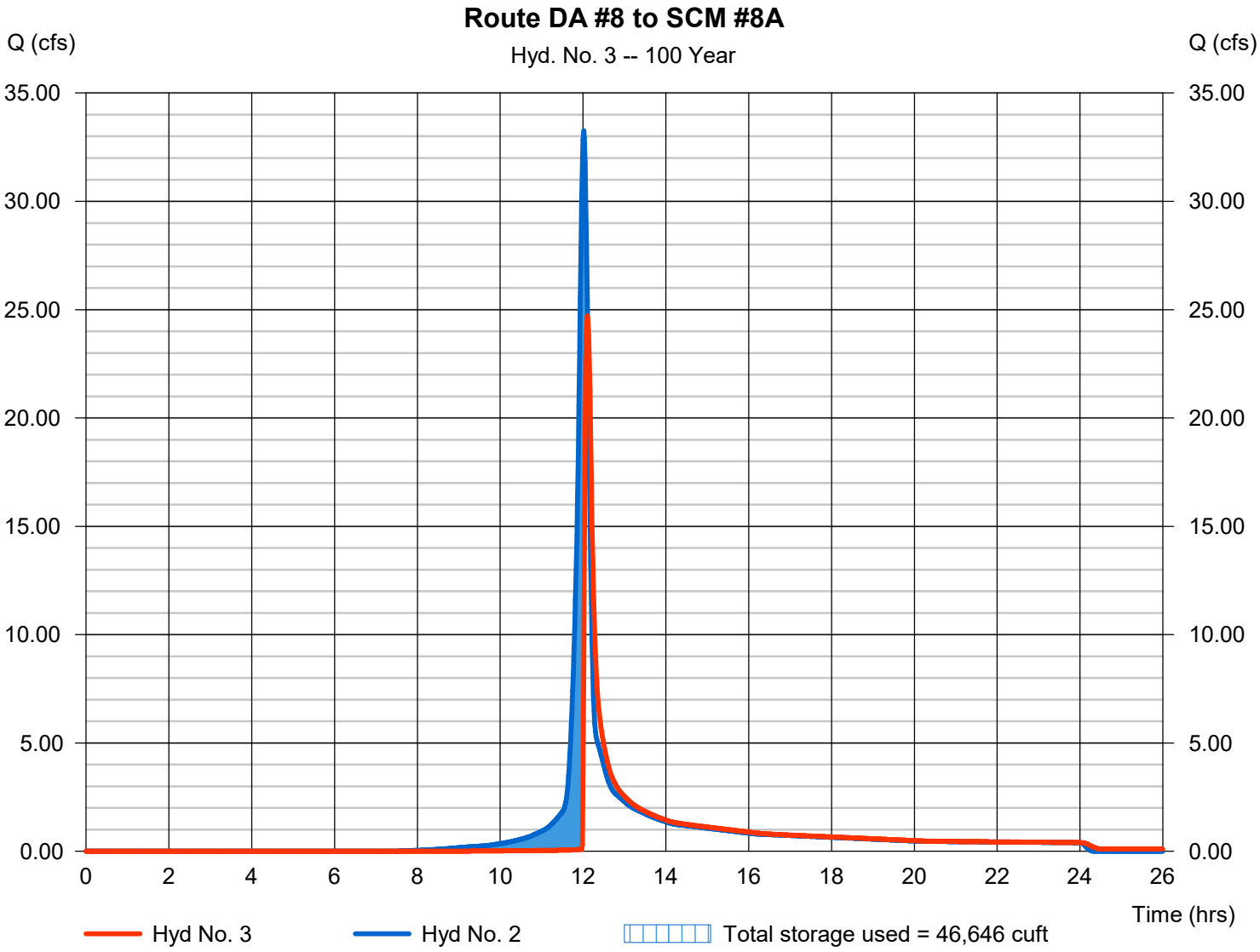
Hydrograph Report

Hyd. No. 3

Route DA #8 to SCM #8A

Hydrograph type	= Reservoir	Peak discharge	= 24.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 68,605 cuft
Inflow hyd. No.	= 2 - PostDev tp SCM $8A	Max. Elevation	= 360.98 ft
Reservoir name	= SCM #8A	Max. Storage	= 46,646 cuft

Storage Indication method used. Wet pond routing start elevation = 357.50 ft.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	0.0000	0.0000	0.0000	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	0.0000	0.0000	0.0000	--------
25	0.0000	0.0000	0.0000	--------
50	0.0000	0.0000	0.0000	--------
100	0.0000	0.0000	0.0000	--------

File name: SCM 1.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tc = time in minutes. Values may exceed 60.

Precip. file name: F:\Kalas Assemblage\Raleigh-Wake County 24Hr Rain.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	3.00	3.45	0.00	4.33	5.02	5.96	6.80	7.46
SCS 6-Hr	2.05	2.46	0.00	3.04	3.55	0.00	0.00	5.32
Huff-1st	0.00	0.00	0.00	2.75	0.00	5.38	6.50	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	2.80	0.00	5.25	6.00	0.00

Hydraflow Table of Contents

Sediment Basin Calculations

SEDIMENT BASINS AND TRAPS

Project: Kalas Falls, Phase 3

Date: 2/8/21

Y:\Jobs\9900\Watkins Property\Documents\Reports\Sediment Measures, Ph3.xlsx

BASIN No.	TYPE	DRAIN AREA (ac.)	DIST. AREA (AC.)	REQ'D VOL. (c.f.)	REQ'D S. A. (s. f.)	SIZE (W' X L' X D') SCM's show equivalents					WEIR LENGTH (ft.)	VOL. Provided (c. f.)	VOL. GOOD
		0.00	0.00	0	0		x		x	3.5		0	NO
SCM#3B	2	18.31	6.81	12258	17913	133	x	266	x	6	24	212268	YES
SCM#3C	2	7.54	3.27	5889	5440	73	x	150	x	5.5	12	60225	YES
SCM#4B	2	9.65	4.91	8838	10506	69	x	142	x	7.5	24	73485	YES
		0.00	0.00	0	0		x		x	3.5		0	NO
SB#403	2	0.61	0.34	611	509	15	x	34	x	3.5	10	1785	YES
SB#404	2	5.72	3.27	5881	4820	49	x	99	x	3.5	12	16978.5	YES
SCM#4C	2	14.89	4.45	8019	16084	87	x	175	x	8.5	12	129413	YES
		0.00	0.00	0	0		x		x	3.5		0	NO
SB#406	2	2.10	0.57	1030	1609	28	x	58	x	3.5	10	5684	YES
SCM#4E	2	14.46	7.12	12811	11217	78	x	158	x	8	12	98592	YES
SCM#8A	2	4.49	2.12	3823	6169	57	x	118	x	7	12	47082	YES
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO
		0.00	0.00	0	0		x		x	3.5		0	NO

Type:
1 Temporary Sediment Trap (Storage = 3600 c. f./disturbed acre)
2 Skimmer Sediment Basin (Storage = 1800 c. f./disturbed acre)
3 Temporary Sediment Basin (Storage = 1800 c. f./disturbed acre)

Sediment Basins and Traps

Project: Kalas Falls, Phase 3
Date: 2/8/21
Y:\Jobs\9900\Watkins Property\Documents\Reports\Sediment Measures, Ph3.xlsx

Basin	Begin Construction			End Construction			Governing		
No.	Square Feet		C	Square Feet		C			
	D. A.	Disturbed	Factor	D. A.	Disturbed	Factor	D. A.	Disturbed	C
0			0.300			0.300	0	0	0.300
SCM#3B			0.300	797635	296641	0.340	797635	296641	0.340
SCM#3C	328455	142508	0.255			0.300	328455	142508	0.255
SCM#4B			0.300	420226	213875	0.363	420226	213875	0.363
0			0.300			0.300	0	0	0.300
SB#403	26438	14788	0.265			0.300	26438	14788	0.265
SB#404	249271	142310	0.266			0.300	249271	142310	0.266
SCM#4C	588590	216785	0.249	648393	194054	0.346	648393	194054	0.346
0			0.300			0.300	0	0	0.300
SB#406	91444	24931	0.242			0.300	91444	24931	0.242
SCM#4E	629743	310019	0.259			0.300	629743	310019	0.259
SCM#8A			0.300	195538	92525	0.434	195538	92525	0.434
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300
0			0.300			0.300	0	0	0.300

Sediment Basins and Traps

Project: Kalas Falls, Phase 3
Date: 2/8/21
Y:\Jobs\9900\Watkins Property\Documents\Reports\Sediment Measures, Ph3.xlsx

Basin	Kirpich Equation				C	I10	Q10	S.A. Req'd
No.	H1	H2	L	Tc	Factor			(s. f.)
0	1			5.00	0.300	7.22	0.00	0
SCM#3B	397.5	347	1500	8.04	0.340	6.56	41.18	17913
SCM#3C	389.1	346	1500	8.55	0.255	6.45	12.50	5440
SCM#4B	397.7	320	1490	6.76	0.363	6.84	24.15	10506
0	1			5.00	0.300	7.22	0.00	0
SB#403	390	359	480	5.00	0.265	7.22	1.17	509
SB#404	397.5	353	590	5.00	0.266	7.22	11.08	4820
SCM#4C	386.5	290	1335	5.48	0.346	7.12	36.97	16084
0	1			5.00	0.300	7.22	0.00	0
SB#406	377.2	309	975	5.00	0.242	7.22	3.70	1609
SCM#4E	376.8	277	1630	6.81	0.259	6.83	25.79	11217
SCM#8A	395.3	354	590	5.00	0.434	7.22	14.18	6169
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0
0	1			5.00	0.300	7.22	0.00	0

Kirpich Equation $Tc = \{[L^3/H\}^{0.385}\}/128$

Sediment Basin/Sediment Trap Schedule

Basin No.	Bottom Elev.	Top of Dam Elev.	Top of Riser Elev.	Spillway Elev.	Weir Length	Riser/ Barrel Size	Basin Dimensions			Skimmer Size	Skimmer Hole Size	Anti-Flotation Size*
							At Top of Dam	At Emerg. Spillway	At Bott. of Basin			
SCM#3B	348.00	356.00	353.33	354.00	24'	6'x6'	**	**	**	8"	6"	7'x7'x17"
SCM#3C	337.00	344.00	342.00	342.50	12'	4'x4'	**	**	**	6"	4"	5'x5'x7.5"
SCM#4B	320.00	329.00	326.50	327.50	24'	5'x5'	**	**	**	6"	4.5"	6'x6'x37"
SB#403	356.00	361.00	N/A	359.50	10'	N/A	21'x40'	15'x34'	1'x20'	1.5"	0.5"	N/A
SB#404	347.00	352.00	N/A	350.50	12'	N/A	53'x105'	49'x99'	35'x84'	2.5"	2"	N/A
SCM#4C	290.00	300.00	296.90	298.50	12'	4'x4'	**	**	**	8"	6"	5'x5'x9"
SB#406	308.00	313.00	N/A	311.50	10'	N/A	34'x64'	28'x58'	14'x44'	2"	1.25"	N/A
SCM#4E	277.00	286.00	284.00	285.00	12'	6'x6'	**	**	**	6"	5"	7'x7'x22.5"
SCM#8A	354.00	362.00	360.50	361.00	12'	3'x3'	**	**	**	4"	3"	4'x4'x8"

*Side x side x depth **Irregular, see plans

SCM#3B
2/8/21

Selection of Sediment Control Measure

18.31	Total Drainage Area

User entry

Calculated Value

Do Not Use	Temporary Sediment Trap
Do Not Use	Rock Dam,
Do Not Use	Skimmer Sediment Basin
Okay	Temporary Sediment Basin

6.81	Disturbed Area (Acres)
41.18	Peak Flow from 10-year Storm (cfs)

TGH and BRB/11/25/2008

SCM#3B
2/8/21

Temporary Sediment Basin

Okay

6.81	Disturbed Area (Acres)
41.18	Peak Flow from 10-year Storm (cfs)
12258	Required Volume ft^3
17938	Required Surface Area ft^2
94.7	Suggested Width ft
189.4	Suggested Length ft
133	Trial Top Width at Spillway Invert ft
266	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
6	Trial Depth ft (2 to 13 feet above grade)
109	Bottom Width ft
242	Bottom Length ft
26378	Bottom Area ft^2
184692	Actual Volume ft^3 **Okay**
35378	Actual Surface Area ft^2 **Okay**

Use Spillway Capacity Sheet to Size Primary and Emergency Spillways

8	Skimmer Size (inches)
0.5	Head on Skimmer (feet)
6	Orifice Size (1/4 inch increments)
3.14	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Note: Width and Length shown here give same surface area as actual surface area. The basin is of irregular shape.

SCM#3C
2/3/21

Selection of Sediment Control Measure

7.54	Total Drainage Area

Do Not Use	Temporary Sediment Trap
Okay	Rock Dam,
Okay	Skimmer Sediment Basin
Okay	Temporary Sediment Basin

3.27	Disturbed Area (Acres)
12.5	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SCM#3C

2/3/21

Skimmer Basin

Okay

0.34	Disturbed Area (Acres)
12.5	Peak Flow from 10-year Storm (cfs)
612	Required Volume ft^3
4063	Required Surface Area ft^2
45.1	Suggested Width ft
90.1	Suggested Length ft
90	Trial Top Width at Spillway Invert ft
181	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
5.5	Trial Depth ft (2 to 3.5 feet above grade)
68	Bottom Width ft
159.1	Bottom Length ft
10818.8	Bottom Area ft^2
74130	Actual Volume ft^3 **Okay**
16299	Actual Surface Area ft^2 **Okay**
12	Trial Weir Length ft
0.5	Trial Depth of Flow ft
12.7	Spillway Capacity cfs **Okay**
6	Skimmer Size (inches)
0.417	Head on Skimmer (feet)
4	Orifice Size (1/4 inch increments)
3.11	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Note: Width and Length shown here give same surface area as actual surface area. The basin is of irregular shape.

SCM#4B
2/3/21

Selection of Sediment Control Measure

9.65	Total Drainage Area

Do Not Use	Temporary Sediment Trap
Okay	Rock Dam,
Okay	Skimmer Sediment Basin
Okay	Temporary Sediment Basin

4.91	Disturbed Area (Acres)
24.15	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SCM#4B

2/3/21

Skimmer Basin

Okay

0.34	Disturbed Area (Acres)
24.15	Peak Flow from 10-year Storm (cfs)
612	Required Volume ft^3
7849	Required Surface Area ft^2
62.6	Suggested Width ft
125.3	Suggested Length ft
87	Trial Top Width at Spillway Invert ft
176	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
7.5	Trial Depth ft (2 to 3.5 feet above grade)
57	Bottom Width ft
145.5	Bottom Length ft
8293.5	Bottom Area ft^2
87233	Actual Volume ft^3 **Okay**
15268.5	Actual Surface Area ft^2 **Okay**
24	Trial Weir Length ft
0.5	Trial Depth of Flow ft
25.5	Spillway Capacity cfs **Okay**
6	Skimmer Size (inches)
0.417	Head on Skimmer (feet)
4.5	Orifice Size (1/4 inch increments)
2.89	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Note: Width and Length shown here give same surface area as actual surface area. The basin is of irregular shape.

SB#403
1/18/21

Selection of Sediment Control Measure

0.61	Total Drainage Area
Okay	Temporary Sediment Trap
Okay	Rock Dam,
Okay	Skimmer Sediment Basin
Okay	Temporary Sediment Basin
0.34	Disturbed Area (Acres)
1.17	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SB#403

1/18/21

Skimmer Basin

Okay

0.34	Disturbed Area (Acres)
1.17	Peak Flow from 10-year Storm (cfs)
612	Required Volume ft^3
380	Required Surface Area ft^2
13.8	Suggested Width ft
27.6	Suggested Length ft
15	Trial Top Width at Spillway Invert ft
34	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
3.5	Trial Depth ft (2 to 3.5 feet above grade)
1	Bottom Width ft
20	Bottom Length ft
20	Bottom Area ft^2
813	Actual Volume ft^3 **Okay**
510	Actual Surface Area ft^2 **Okay**
10	Trial Weir Length ft
0.5	Trial Depth of Flow ft
10.6	Spillway Capacity cfs **Okay**
1.5	Skimmer Size (inches)
0.125	Head on Skimmer (feet)
0.5	Orifice Size (1/4 inch increments)
3.98	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

SB#404
1/18/21

Selection of Sediment Control Measure

5.72	Total Drainage Area

Do Not Use	Temporary Sediment Trap
Okay	Rock Dam,
Okay	Skimmer Sediment Basin
Okay	Temporary Sediment Basin

3.27	Disturbed Area (Acres)
11.08	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SB#404

1/18/21

Skimmer Basin

Okay

3.27	Disturbed Area (Acres)
11.08	Peak Flow from 10-year Storm (cfs)
5886	Required Volume ft^3
3601	Required Surface Area ft^2
42.4	Suggested Width ft
84.9	Suggested Length ft
49	Trial Top Width at Spillway Invert ft
99	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
3.5	Trial Depth ft (2 to 3.5 feet above grade)
35	Bottom Width ft
85	Bottom Length ft
2975	Bottom Area ft^2
13581	Actual Volume ft^3 **Okay**
4851	Actual Surface Area ft^2 **Okay**
12	Trial Weir Length ft
0.5	Trial Depth of Flow ft
12.7	Spillway Capacity cfs **Okay**
2.5	Skimmer Size (inches)
0.208	Head on Skimmer (feet)
2	Orifice Size (1/4 inch increments)
3.22	Dewatering Time (days)

Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

SCM#4C
2/3/21

Selection of Sediment Control Measure

14.89	Total Drainage Area

Do Not Use	Temporary Sediment Trap
Do Not Use	Rock Dam,
Do Not Use	Skimmer Sediment Basin
Okay	Temporary Sediment Basin

4.45	Disturbed Area (Acres)
36.97	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SCM#4C
2/3/21

Temporary Sediment Basin

Okay

4.45	Disturbed Area (Acres)
36.97	Peak Flow from 10-year Storm (cfs)
8010	Required Volume ft^3
16104	Required Surface Area ft^2
89.7	Suggested Width ft
179.5	Suggested Length ft
111	Trial Top Width at Spillway Invert ft
226	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
8.5	Trial Depth ft (2 to 13 feet above grade)
77	Bottom Width ft
191.8	Bottom Length ft
14768.6	Bottom Area ft^2
167650	Actual Volume ft^3 **Okay**
25063.8	Actual Surface Area ft^2 **Okay**

Use Spillway Capacity Sheet to Size Primary and Emergency Spillways

8	Skimmer Size (inches)
0.5	Head on Skimmer (feet)
6	Orifice Size (1/4 inch increments)
2.85	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Note: Width and Length shown here give same surface area as actual surface area. The basin is of irregular shape.

SB#406
1/18/21

Selection of Sediment Control Measure

2.1	Total Drainage Area
Okay	Temporary Sediment Trap
Okay	Rock Dam,
Okay	Skimmer Sediment Basin
Okay	Temporary Sediment Basin
0.57	Disturbed Area (Acres)
3.7	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SB#406

1/18/21

Skimmer Basin

Okay

0.57	Disturbed Area (Acres)
3.7	Peak Flow from 10-year Storm (cfs)
1026	Required Volume ft^3
1203	Required Surface Area ft^2
24.5	Suggested Width ft
49.0	Suggested Length ft
28	Trial Top Width at Spillway Invert ft
58	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
3.5	Trial Depth ft (2 to 3.5 feet above grade)
14	Bottom Width ft
44	Bottom Length ft
616	Bottom Area ft^2
3806	Actual Volume ft^3 **Okay**
1624	Actual Surface Area ft^2 **Okay**
10	Trial Weir Length ft
0.5	Trial Depth of Flow ft
10.6	Spillway Capacity cfs **Okay**
2	Skimmer Size (inches)
0.167	Head on Skimmer (feet)
1.25	Orifice Size (1/4 inch increments)
2.58	Dewatering Time (days)

Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

SCM#8A
2/8/21

Selection of Sediment Control Measure

4.49	Total Drainage Area
Okay	Temporary Sediment Trap
Okay	Rock Dam,
Okay	Skimmer Sediment Basin
Okay	Temporary Sediment Basin
2.12	Disturbed Area (Acres)
14.18	Peak Flow from 10-year Storm (cfs)

User entry

Calculated Value

TGH and BRB/11/25/2008

SCM#8A

2/8/21

Skimmer Basin

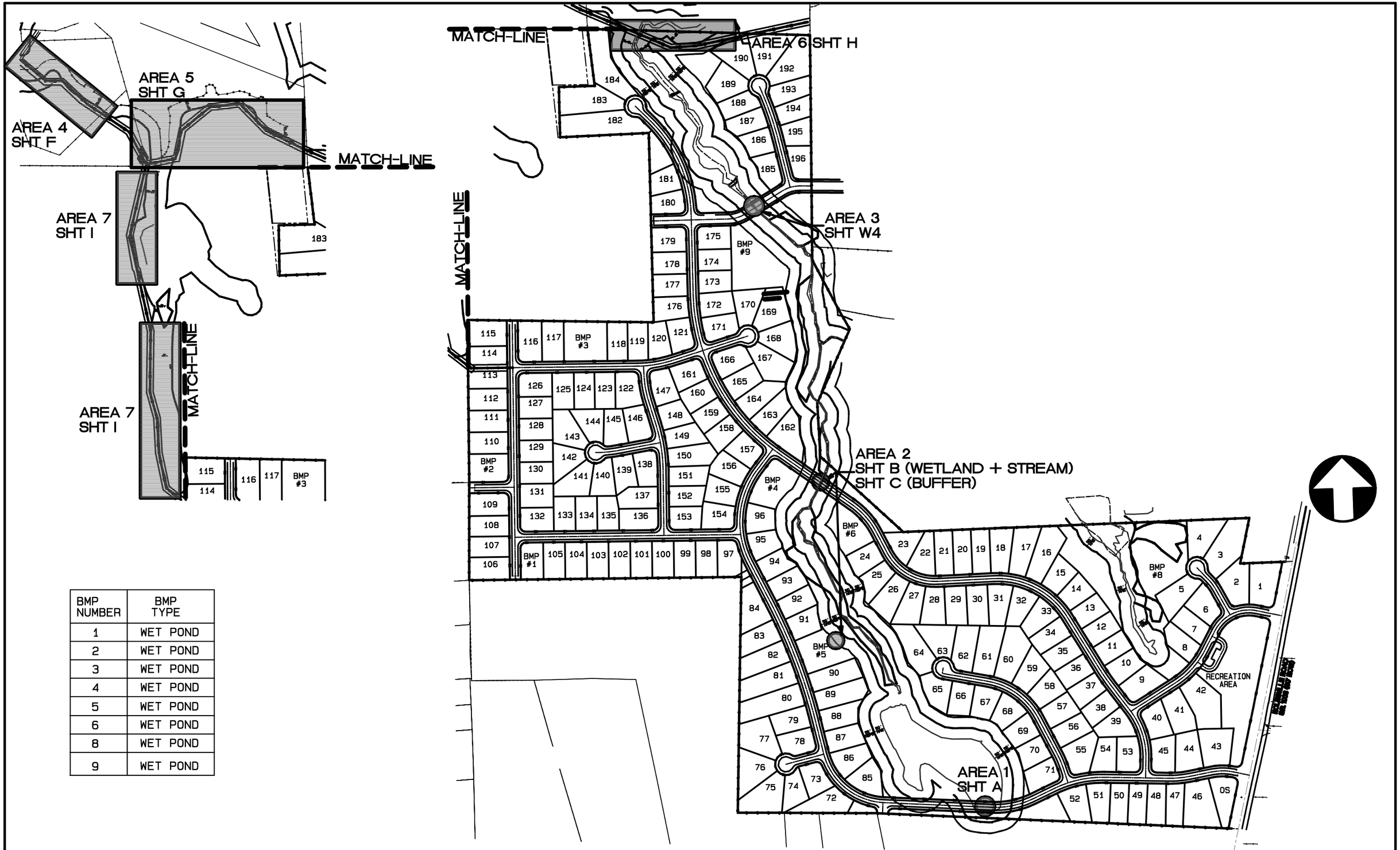
Okay

2.12	Disturbed Area (Acres)
14.18	Peak Flow from 10-year Storm (cfs)
3816	Required Volume ft^3
4609	Required Surface Area ft^2
48.0	Suggested Width ft
96.0	Suggested Length ft
57	Trial Top Width at Spillway Invert ft
118	Trial Top Length at Spillway Invert ft
2	Trial Side Slope Ratio Z:1
7	Trial Depth ft (2 to 3.5 feet above grade)
29	Bottom Width ft
90	Bottom Length ft
2610	Bottom Area ft^2
31761	Actual Volume ft^3 **Okay**
6726	Actual Surface Area ft^2 **Okay**
12	Trial Weir Length ft
0.55	Trial Depth of Flow ft
14.7	Spillway Capacity cfs **Okay**
4	Skimmer Size (inches)
0.333	Head on Skimmer (feet)
3	Orifice Size (1/4 inch increments)
2.65	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8

Note: Width and Length shown here give same surface area as actual surface area. The basin is of irregular shape.

Impact Exhibit Maps



BMP NUMBER	BMP TYPE
1	WET POND
2	WET POND
3	WET POND
4	WET POND
5	WET POND
6	WET POND
8	WET POND
9	WET POND

KALAS FALLS SUBDIVISION

OVERALL IMPACT MAP
ON-SITE

Hugh J. Gilleece and Associates
Business Lic. # c-496
875 Walnut Street Suite 360 Cary, NC Phone: (919)469-1101

KALAS FALLS SUBDIVISION

DWN BY: - JOB #: 9900.55 SHT: OA
DATE: 09/28/17 HRZ SCALE: 1"=400'

MAP	IMPACT NUMBER	IMPACT SPECIFICATION	WETLAND AND STREAM								
			TEMPORARY			PERMANENT					
			STREAM	WETLAND		STREAM		WETLAND		OPEN WATER	
			(LF)	(SF)	(AC.)	(LF)	(SF)	(SF)	(AC.)	(SF)	(AC.)
A	1	ROADWAY	--	--	--	--	--	--	--	9, 922	0.23
B	6A	ROADWAY/ CULVERT	--	--	--	78	648	--	--	--	--
B	6B	RIP RAP	--	--	--	14	127	--	--	--	--
B	6C	CULVERT INSTALLATION	5	--	--	--	--	--	--	--	--
B	6D	ROADWAY	--	--	--	--	--	259	0.006	--	--
B	6E	ROADWAY	--	142	0.003	--	--	--	--	--	--
B	6F	CULVERT INSTALLATION	15	--	--	--		--	--	--	--
D	10A	ROADWAY/ CULVERT	--	--	--	119	999	--	--	--	--
D	10B	RIP RAP	--	--	--	28	307	--	--	--	--
D	10C	CULVERT INSTALLATION	5	--	--	--	--	--	--	--	--
D	10D	ROADWAY	10	--	--	--	--	--	0.000	--	--
G	17A	SEWER	--	1, 032	0.02	--	--	--	--	--	--
		TOTAL	35	1, 174	0.03	239	2, 081	12, 633	0.29	9, 922	0.23

MAP	IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
			TEMPORARY		PERMANENT	
			ZONE 1	ZONE 2	ZONE 1	ZONE 2
			(SF)	(SF)	(SF)	(SF)
A	2	ROADWAY	--	--	8, 367	4, 819
A	3	ROADWAY	--	--	727	2, 241
A	4	STORMWATER OUTFALL	--	--	--	376
C	5	STORMWATER OUTFALL	--	--	--	285
C	7	ROADWAY	--	--	5, 344	3, 393
C	8	BMP/ OUTFALL	--	--	513	1, 484
C	9	BMP/ OUTFALL	--	--	37	1, 911
E	11	ROADWAY	--	--	4, 059	2, 656
E	12	ROADWAY	--	--	4, 039	2, 612
E	13	BMP/ OUTFALL	--	--	--	96
F	14A	SEWER	--	--	2, 413	687
F	14B	SEWER	790	275	--	--
F	15A	SEWER	--	--	N/A	1, 208
F	15B	SEWER	N/A	932	--	--
F	16A	SEWER	--	--	N/A	155
G	17B	SEWER	--	--	1, 471	2, 663
G	17C	SEWER	719	708	--	--
G	18A	SEWER	--	--	N/A	1, 863
G	18B	SEWER	N/A	1, 074	--	--
G	19A	SEWER	--	--	N/A	1, 905
G	19B	SEWER	8	1, 167	--	--
H	20A	SEWER	--	--	N/A	612
H	20B	SEWER	N/A	370	--	--
H	21A	SEWER	--	--	2, 095	2, 067
H	21B	SEWER	636	598	--	--
H	22A	SEWER	--	--	N/A	270
H	22B	SEWER	N/A	666	--	--
I	23A	SEWER	--	--	N/A	3, 335
I	23B	SEWER	N/A	793	--	--
I	24A	SEWER	--	--	N/A	10, 472
I	24B	SEWER	--	240	--	--
		TOTAL	2, 153	6, 823	29, 065	45, 110

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IMPACT 4
BUFFER IMPACT- PERM.
STORMWATER OUTFALL
ZONE 1- N/A
ZONE 2- 376 SF

IMPACT 3
BUFFER IMPACT- PERM.
ROADWAY
ZONE 1- 727 SF
ZONE 2- 2,241 SF

KALAS FALLS
EX. POND

WATER LEVEL

2: 1 SLOPES

2: 1 SLOPES

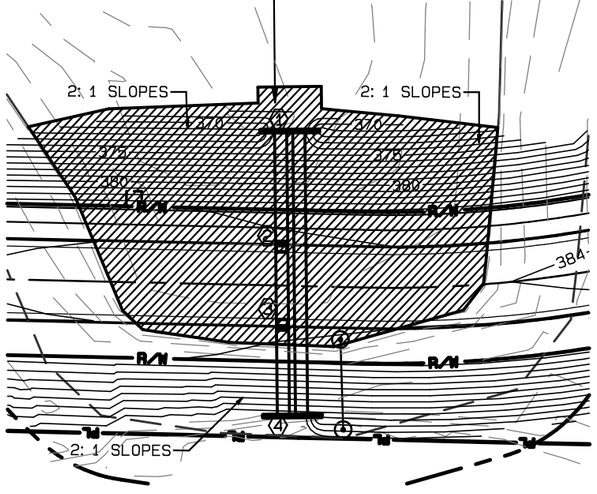
2: 1 SLOPES

1227.13'

SUE SCARBORO PARKER
BESTY SCARBORO GARDNER
ZONING: R-30
D.B. 3599, PG. 618
LOT 8 B.M. 1947, PG. 78
PIN NO. 1767.01-26-4441

IMPACT 2
BUFFER IMPACT- PERM.
ROADWAY
ZONE 1- 8,367 SF
ZONE 2- 4,819 SF

IMPACT 1
SURFACE WATER IMPACT- PERM.
ROADWAY
9,922 SF (0.23 ACRES)



LEGEND:

ZONE 1 IMPACT (PERMANENT)

ZONE 2 IMPACT (PERMANENT)

WETLAND IMPACT (PERMANENT)

IMPACT NUMBER	IMPACT SPECIFICATION	WETLAND AND STREAM							
		TEMPORARY			PERMANENT				
		STREAM	WETLAND		STREAM	WETLAND		OPEN WATER	
		(LF)	(SF)	(AC.)	(LF)	(SF)	(AC.)	(SF)	(AC.)
1	ROADWAY	--	--	--	--	--	--	9,922	0.23
TOTAL		--	--	--	--	--	--	9,922	0.23

IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
		TEMPORARY		PERMANENT	
		ZONE 1	ZONE 2	ZONE 1	ZONE 2
		(SF)	(SF)	(SF)	(SF)
2	ROADWAY	--	--	8,367	4,819
3	ROADWAY	--	--	727	2,241
4	STORMWATER OUTFALL	--	--	--	376
TOTAL		--	--	9,094	7,436

KALAS FALLS SUBDIVISION

AREA 1
IMPACT MAP

Hugh J. Gilleece and Associates
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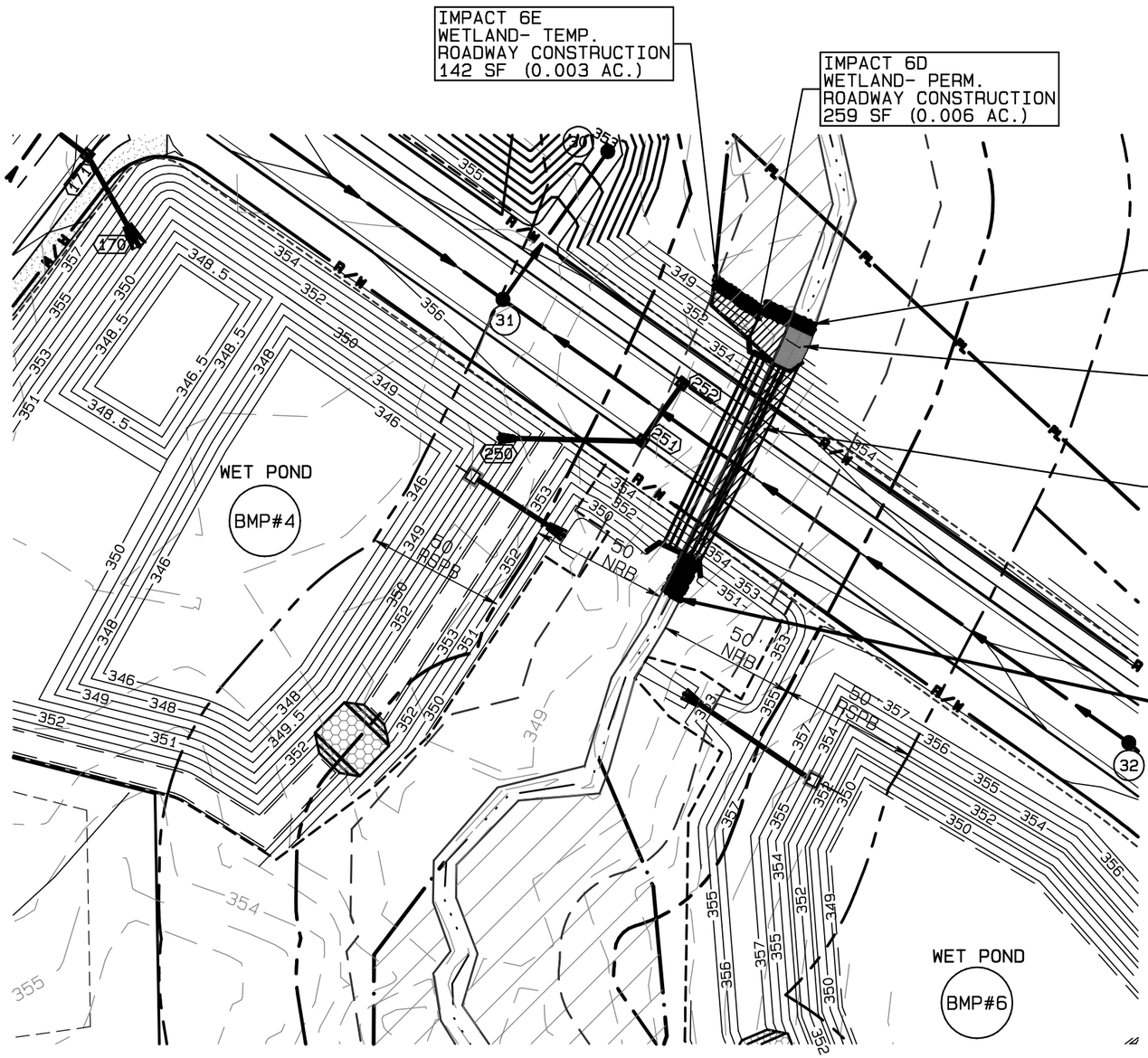
KALAS FALLS SUBDIVISION
DWN BY: - JOB #: 9900.55 SHT: A
DATE: 09/28/17 HRZ SCALE: 1"=50'



LEGEND:

- WETLAND/STREAM IMPACT (PERMANENT)
- WETLAND IMPACT (PERMANENT RIP-RAP)
- WETLAND/STREAM IMPACT (TEMPORARY)

IMPACT NUMBER	IMPACT SPECIFICATION	WETLAND AND STREAM						
		TEMPORARY			PERMANENT			
		STREAM	WETLAND		STREAM		WETLAND	
		(LF)	(SF)	(AC.)	(LF)	(SF)	(SF)	(AC.)
6A	ROADWAY/ CULVERT	--	--	--	78	648	--	--
6B	RIP RAP	--	--	--	14	127	--	--
6C	CULVERT INSTALLATION	5	48	0.000	--	--	--	--
6D	ROADWAY	--	--	--	--	--	259	0.006
6E	ROADWAY	--	142	0.003	--	--	--	--
6F	CULVERT INSTALLATION	15	109	0.002	--	--	--	--
TOTAL		20	299	0.005	92	775	259	0.01

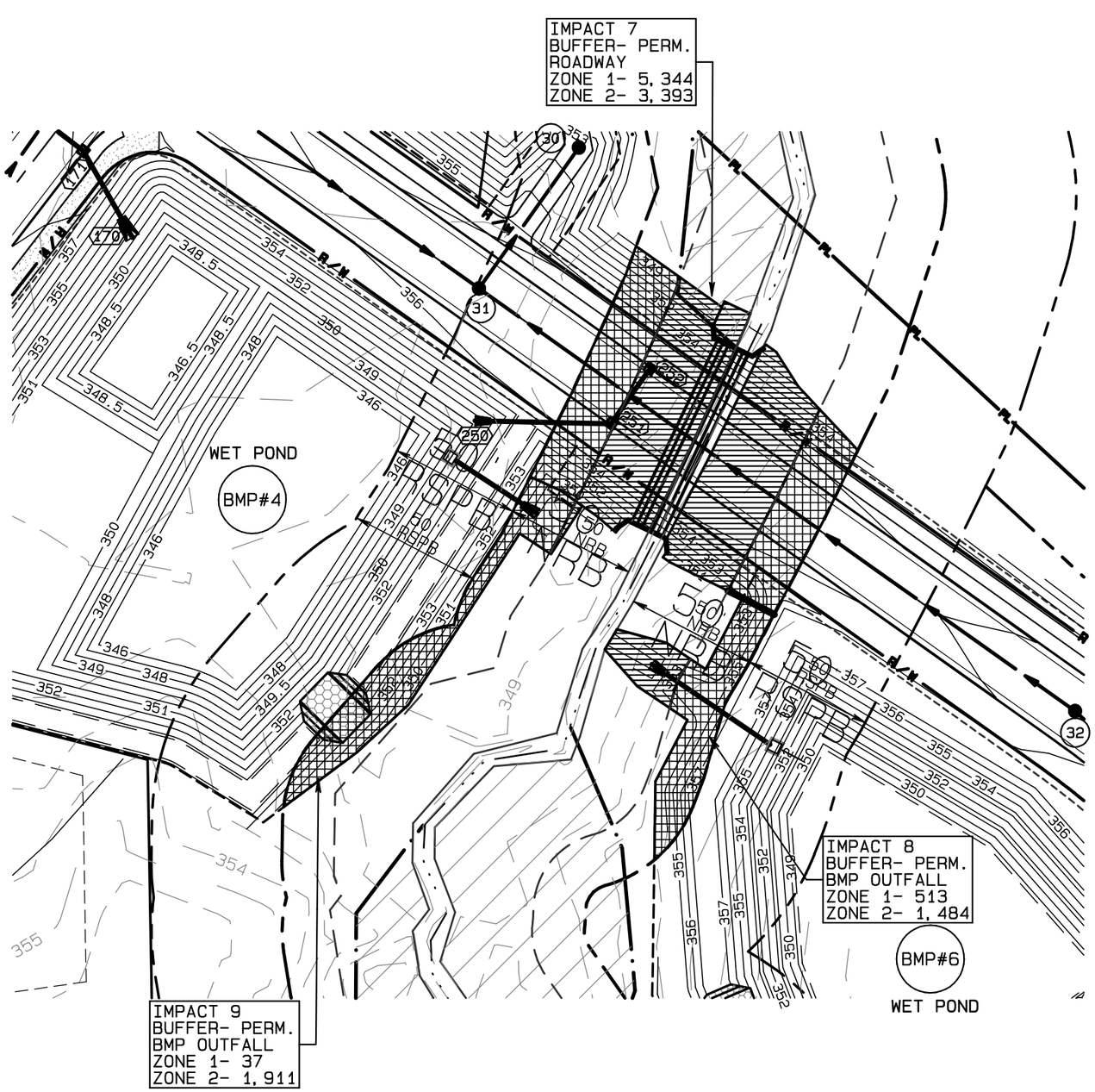
KALAS FALLS SUBDIVISION

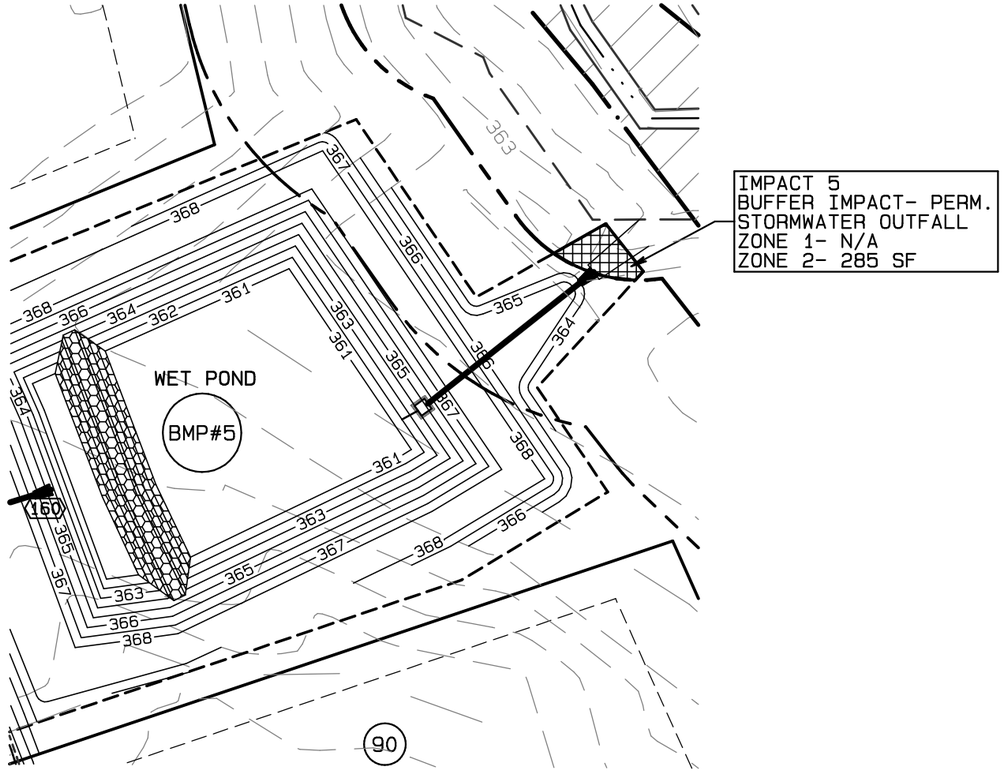
AREA 2
IMPACT MAP

Hugh J. Gilleece and Associates
Business Lic. # c-496
875 Walnut Street Suite 360 Cary, NC Phone: (919)469-1101

KALAS FALLS SUBDIVISION

DWN BY: - | JOB #: 9900.55 | SHT: B
DATE: 09/28/17 | HRZ SCALE: 1"=50'





LEGEND:

ZONE 1 IMPACT (PERMANENT)

ZONE 2 IMPACT (PERMANENT)

IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
		TEMPORARY		PERMANENT	
		ZONE 1 (SF)	ZONE 2 (SF)	ZONE 1 (SF)	ZONE 2 (SF)
5	STORMWATER OUTFALL	--	--	--	285
7	ROADWAY	--	--	5,344	3,393
8	BMP/ OUTFALL	--	--	513	1,484
9	BMP/ OUTFALL	--	--	37	1,911
	TOTAL	--	--	5,894	7,073

KALAS FALLS SUBDIVISION

AREA 2
IMPACT MAP

Hugh J. Gilleece and Associates
Business Lic. # C-496
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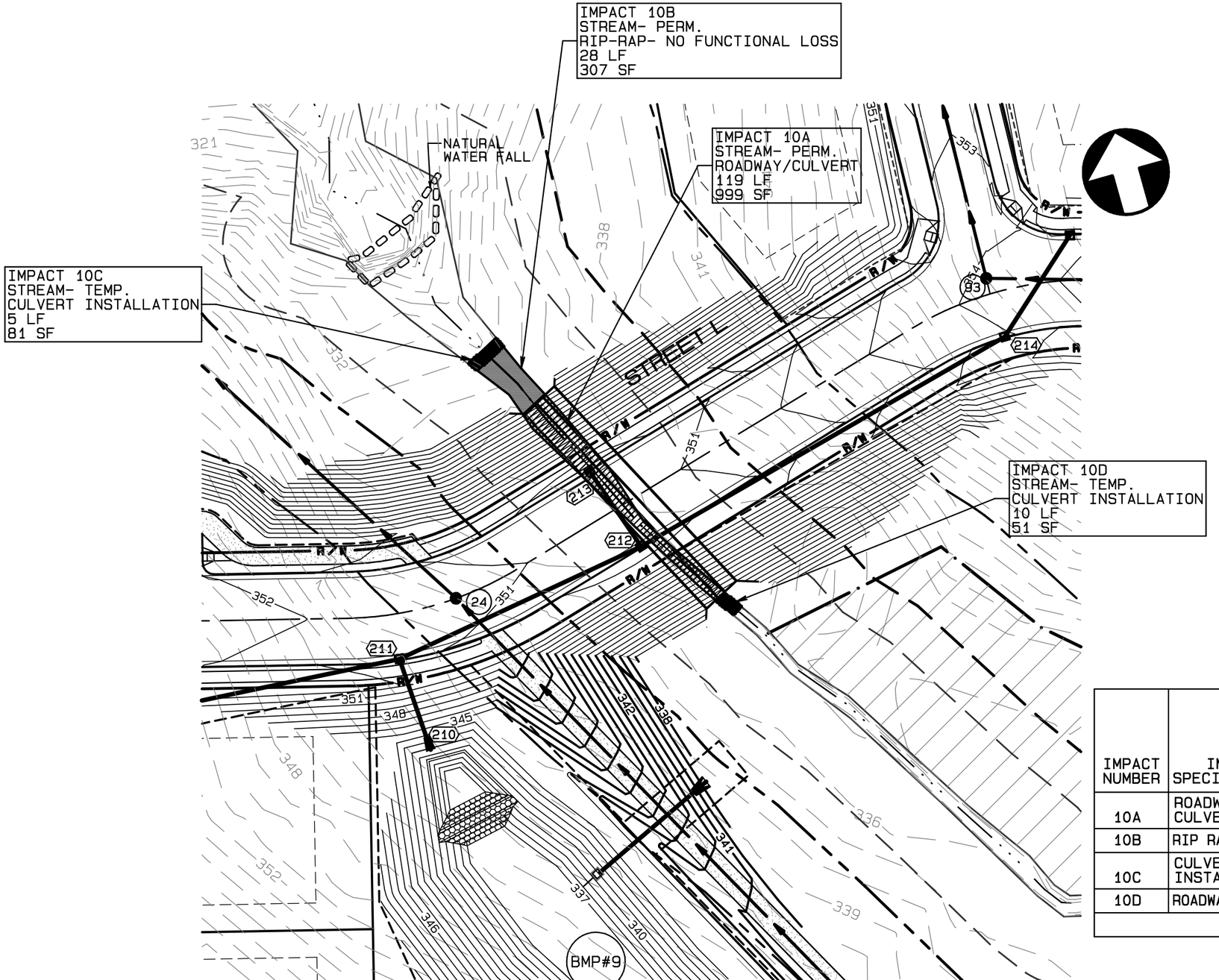
KALAS FALLS SUBDIVISION

DWN BY: - | JOB #: 9900.55 | SHT: C

DATE: 09/28/17 | HRZ SCALE: 1"=50'



LEGEND:

- WETLAND/STREAM IMPACT (PERMANENT)
- WETLAND IMPACT (PERMANENT RIP-RAP)
- WETLAND/STREAM IMPACT (TEMPORARY)

IMPACT NUMBER	IMPACT SPECIFICATION	WETLAND AND STREAM						
		TEMPORARY			PERMANENT			
		STREAM	WETLAND		STREAM		WETLAND	
		(LF)	(SF)	(AC.)	(LF)	(SF)	(SF)	(AC.)
10A	ROADWAY/ CULVERT	--	--	--	119	999	--	--
10B	RIP RAP	--	--	--	28	307	--	--
10C	CULVERT INSTALLATION	5	81	0.000	--	--	--	--
10D	ROADWAY	10	132	0.003	--	--	--	--
	TOTAL	15	299	0.003	147	1,306	--	--

KALAS FALLS SUBDIVISION

AREA 3
IMPACT MAP

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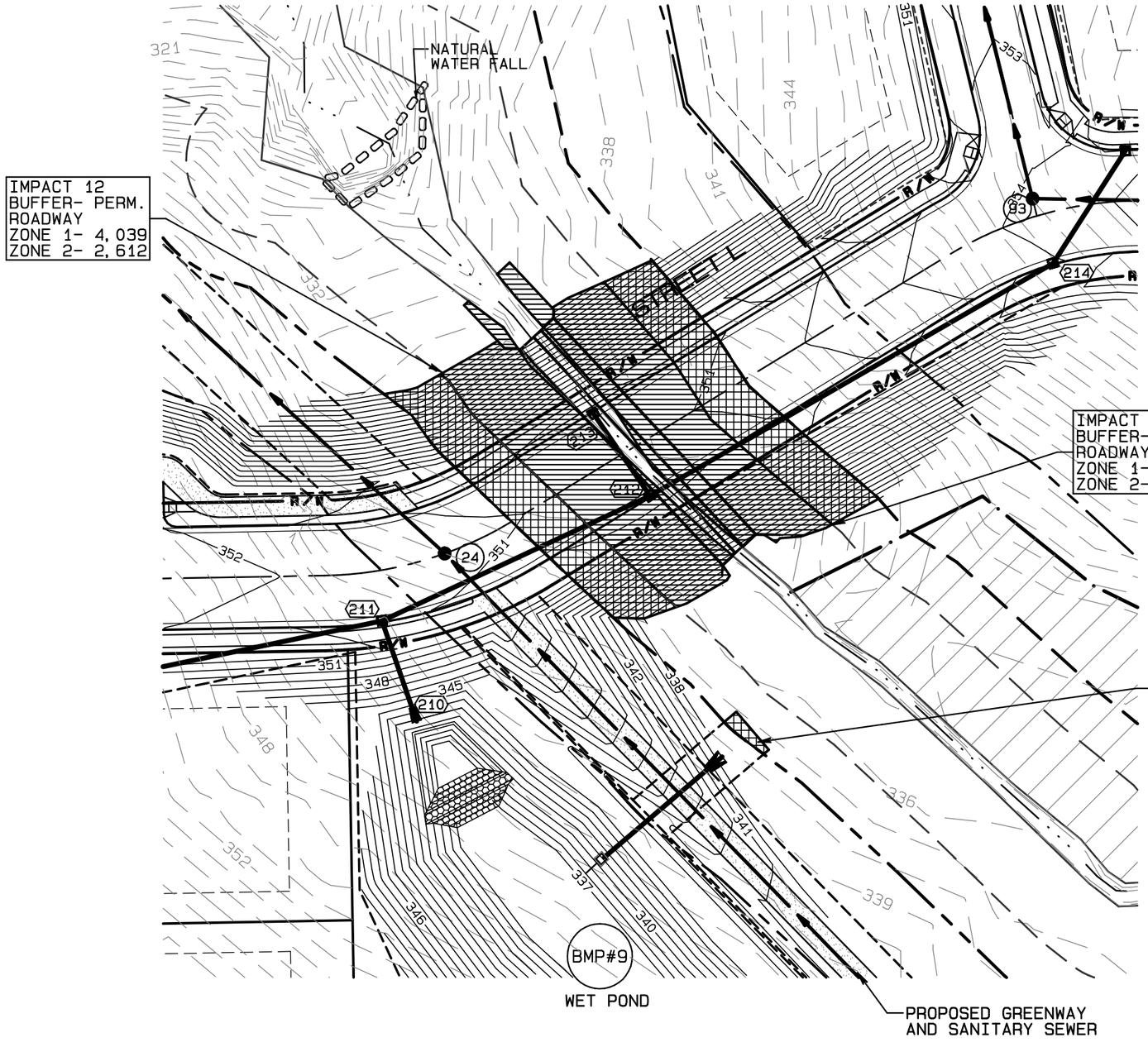
KALAS FALLS SUBDIVISION

DWN BY: - JOB #: 9900.55 SHT: D
DATE: 09/28/17 HRZ SCALE: 1"=50'



LEGEND:

ZONE 1 IMPACT (PERMANENT)

ZONE 2 IMPACT (PERMANENT)

IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
		TEMPORARY		PERMANENT	
		ZONE 1 (SF)	ZONE 2 (SF)	ZONE 1 (SF)	ZONE 2 (SF)
11	ROADWAY	--	--	4,059	2,656
12	ROADWAY	--	--	4,039	2,612
13	BMP/ OUTFALL	--	--	--	96
	TOTAL	--	--	8,098	5,364

KALAS FALLS SUBDIVISION

AREA 3
IMPACT MAP

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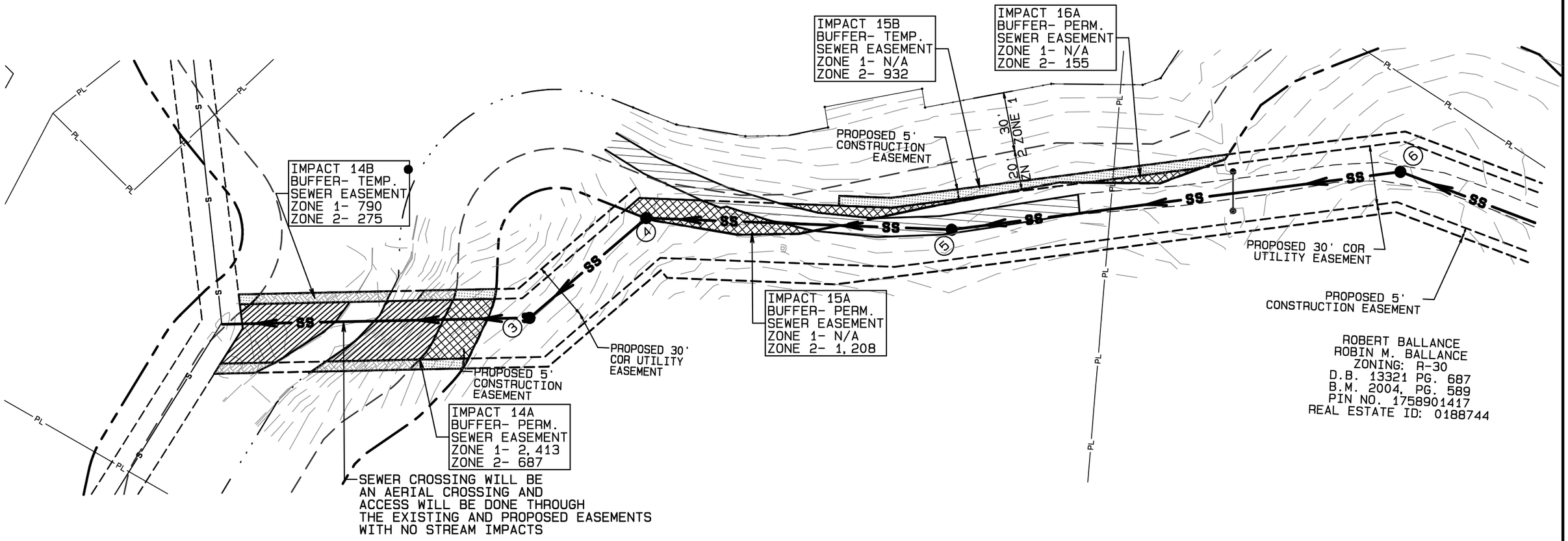
Business Lic. # c-496
875 Walnut Street Suite 360 Cary, NC Phone: (919)469-1101

KALAS FALLS SUBDIVISION

DWN BY: - | JOB #: 9900.55 | SHT: E
DATE: 09/28/17 | HRZ SCALE: 1"=50'



LEGEND:

- ZONE 1 IMPACT (PERMANENT)
- ZONE 2 IMPACT (PERMANENT)
- ZONE 1 IMPACT (TEMPORARY)
- ZONE 2 IMPACT (TEMPORARY)

IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
		TEMPORARY		PERMANENT	
		ZONE 1 (SF)	ZONE 2 (SF)	ZONE 1 (SF)	ZONE 2 (SF)
14A	SEWER	--	--	2,413	687
14B	SEWER	790	275	--	--
15A	SEWER	--	--	N/A	1,208
15B	SEWER	N/A	932	--	--
16A	SEWER	--	--	N/A	155
	TOTAL	790	1,207	2,413	2,050

KALAS FALLS SUBDIVISION

AREA 4
IMPACT MAP

Hugh J. Gilleece and Associates
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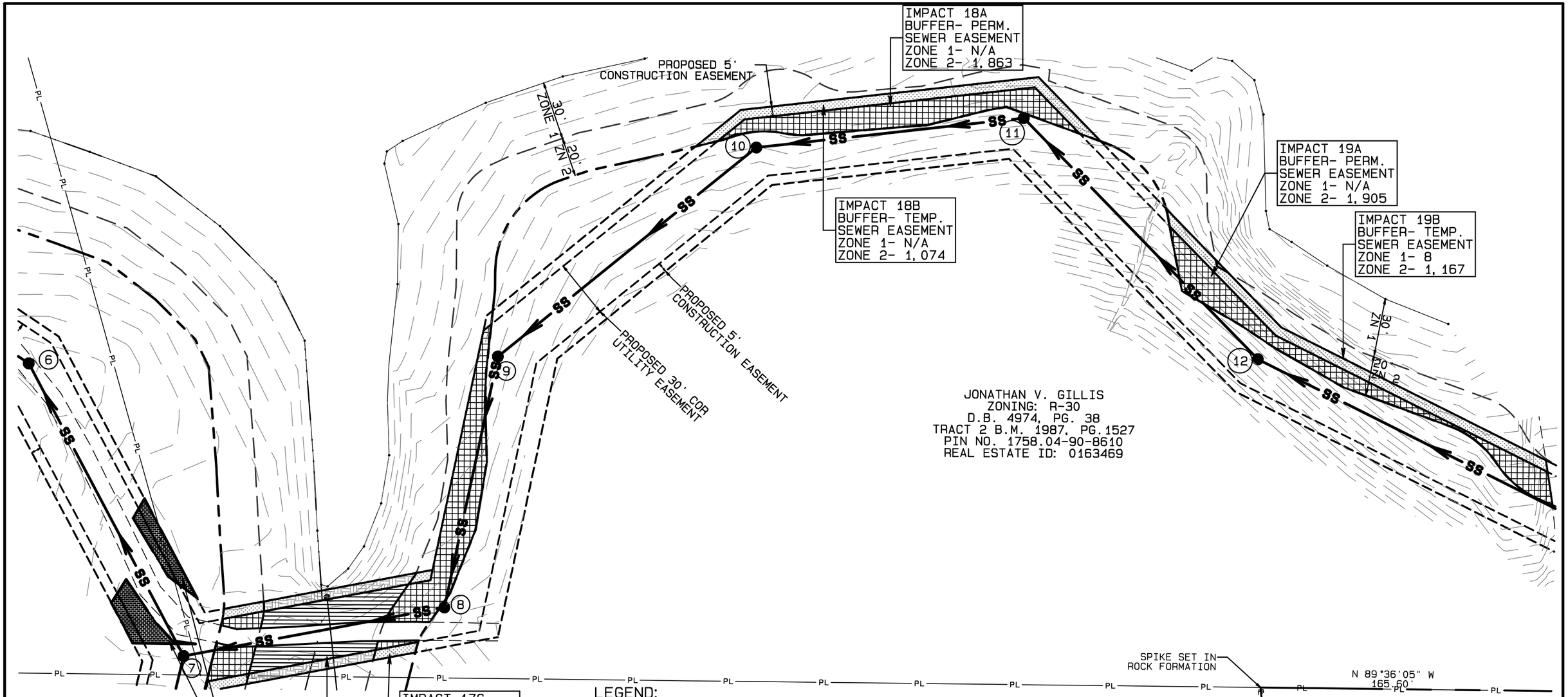
KALAS FALLS SUBDIVISION

DWN BY: - JOB #: 20000.05 SHT: F
DATE: HORIZ 1"=60'



LEGEND:

- ZONE 1 IMPACT (PERMANENT)
- ZONE 2 IMPACT (PERMANENT)
- WETLAND/STREAM IMPACT (PERMANENT)
- ZONE 1 IMPACT (TEMPORARY)
- WETLAND/STREAM IMPACT (TEMPORARY)
- ZONE 2 IMPACT (TEMPORARY)

IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER				WETLAND			
		TEMPORARY		PERMANENT		PERMANENT		TEMPORARY	
		ZONE 1 (SF)	ZONE 2 (SF)	ZONE 1 (SF)	ZONE 2 (SF)	(SF)	(AC.)	(SF)	(AC.)
17A	SEWER	--	--	--	--	--	--	1,032	0.02
17B	SEWER	--	--	1,471	2,663	--	--	--	--
17C	SEWER	719	708	--	--	--	--	--	--
18A	SEWER	--	--	N/A	1,863	--	--	--	--
18B	SEWER	N/A	1,074	--	--	--	--	--	--
19A	SEWER	--	--	N/A	1,905	--	--	--	--
19B	SEWER	8	1,167	--	--	--	--	--	--
	TOTAL	727	2,949	1,471	6,431	--	--	1,032	0.02

KALAS FALLS SUBDIVISION

AREA 5
IMPACT MAP

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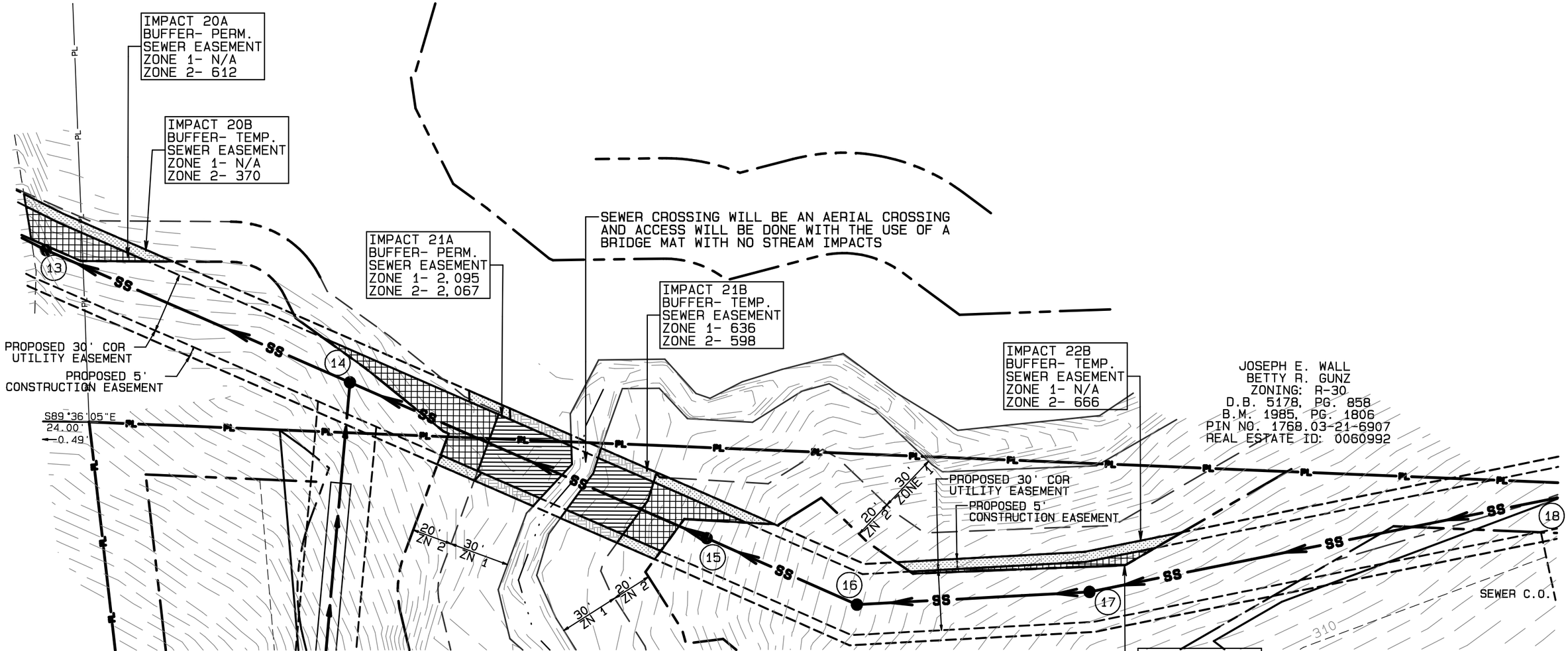
Business Lic. # c-496
875 Walnut Street Suite 360 Cary, NC Phone: (919)469-1101

KALAS FALLS SUBDIVISION

DWN BY: - | JOB #: 20000.05 | SHT: G
DATE: 09/28/17 | HRZ SCALE: 1"=60'



LEGEND:

- ZONE 1 IMPACT (PERMANENT)
- ZONE 2 IMPACT (PERMANENT)
- ZONE 1 IMPACT (TEMPORARY)
- ZONE 2 IMPACT (TEMPORARY)

IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
		TEMPORARY		PERMANENT	
		ZONE 1 (SF)	ZONE 2 (SF)	ZONE 1 (SF)	ZONE 2 (SF)
20A	SEWER	--	--	N/A	612
20B	SEWER	N/A	370	--	--
21A	SEWER	--	--	2,095	2,067
21B	SEWER	636	598	--	--
22A	SEWER	--	--	N/A	270
22B	SEWER	N/A	666	--	--
	TOTAL	727	2,617	1,471	6,431

KALAS FALLS SUBDIVISION

AREA 6
IMPACT MAP

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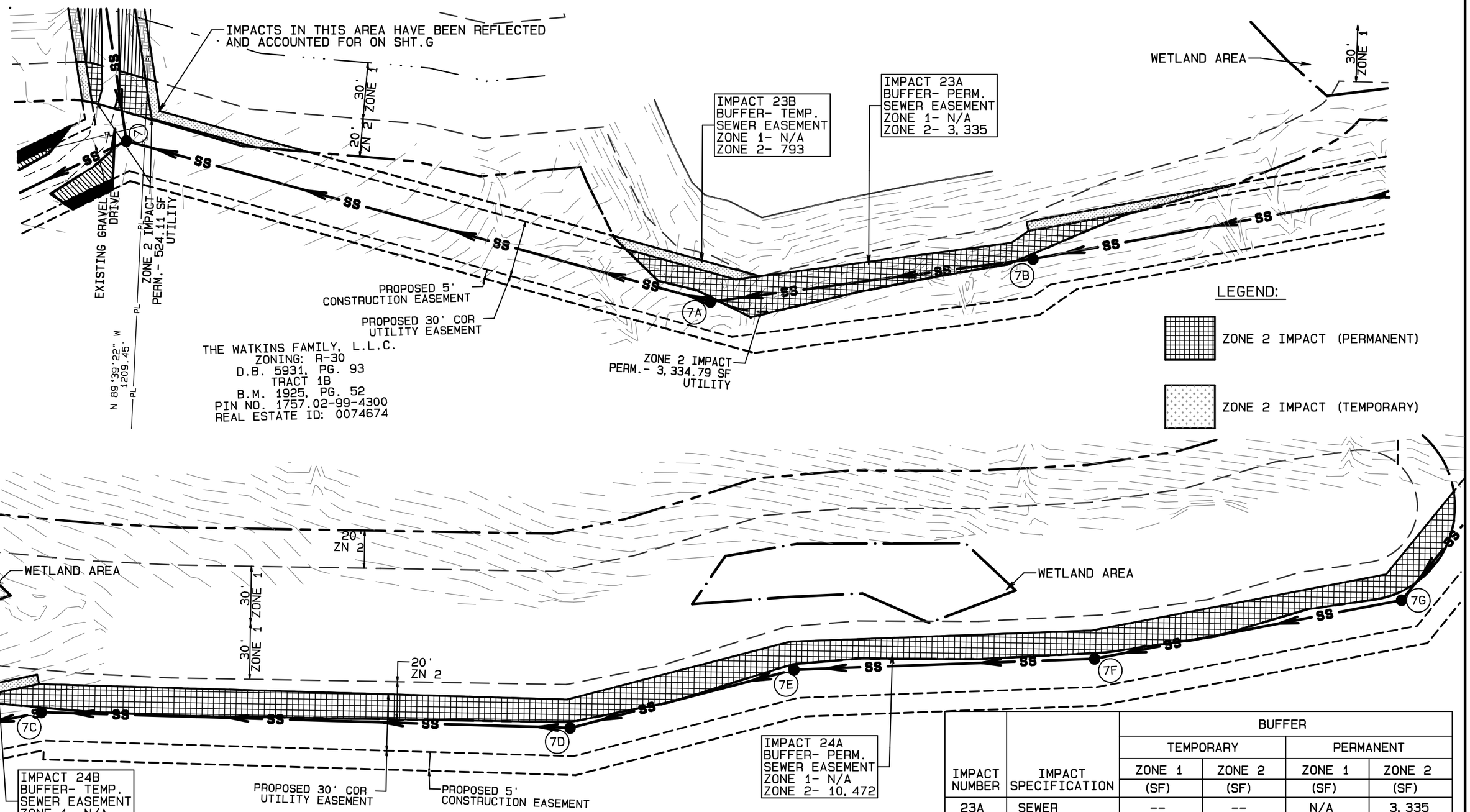
Business Lic. # c-496
875 Walnut Street Suite 360 Cary, NC Phone: (919)469-1101

KALAS FALLS SUBDIVISION

DWN BY: - JOB #: 9900.55 SHT: H
DATE: 09/28/17 HRZ SCALE: 1"=50'



IMPACT NUMBER	IMPACT SPECIFICATION	BUFFER			
		TEMPORARY		PERMANENT	
		ZONE 1 (SF)	ZONE 2 (SF)	ZONE 1 (SF)	ZONE 2 (SF)
23A	SEWER	--	--	N/A	3,335
23B	SEWER	--	793	--	--
24A	SEWER	--	--	N/A	10,472
24B	SEWER	--	240	--	--
TOTAL		--	1,033	--	10,807

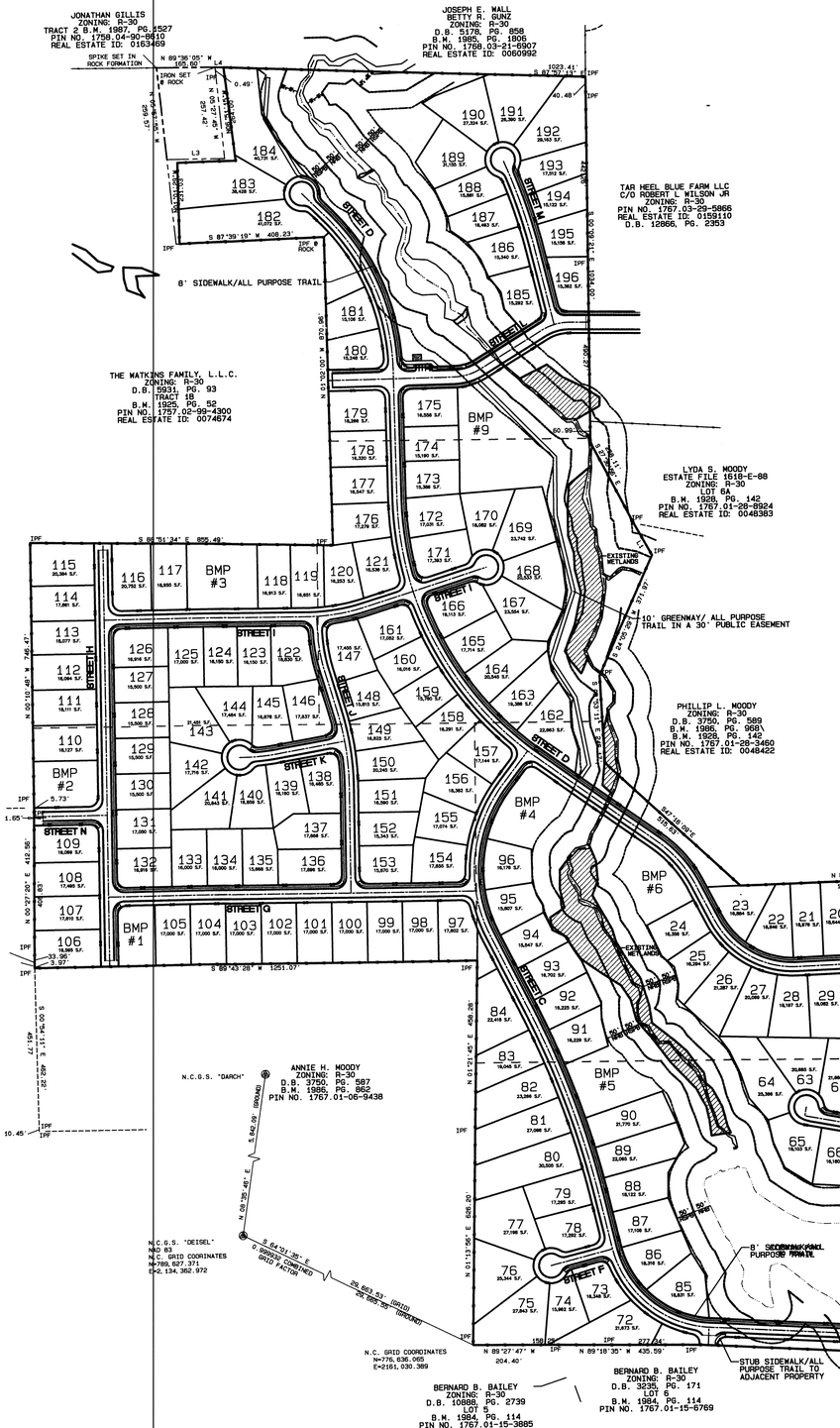
KALAS FALLS SUBDIVISION

AREA 7
IMPACT MAP

Hugh J. Gilleece and Associates
Business Lic. # c-496
875 Walnut Street Suite 360 Cary, NC Phone: (919)469-1101

KALAS FALLS SUBDIVISION

DWN BY: - JOB #: 9900.55 SHT: 1
DATE: 09/28/17 HRZ SCALE: 1"=50'



SITE DATA

OWNER	MITCHELL MILL ROAD INVESTORS, LLC 100 WESTON ESTATES WAY CARY, NC 27519
PARCEL ADDRESS	1832 ROLESVILLE ROAD, ROLESVILLE NC
PIN NUMBER	1767-17-8299, 1767-08-3228
DEED BOOK	DB 011940 PG 01155, DB 012007 PG 02228
DEEDED ACREAGE	143.69 AC
PROJECT AREA	145.06 AC (INCLUDES ROW AREA TO RD CL)
PROJECT AREA AFTER ROW DEDICATION	143.77 AC.
ZONING	R-2 SUD
MAX. # OF LOTS	199 LOTS
SINGLE FAMILY LOTS PROPOSED	196 LOTS
PROPOSED DENSITY	1.36 UNITS/AC
MIN. LOT WIDTH	85'
AVERAGE LOT SIZE	18,890 SF
MIN. LOT SIZE PROVIDED	15, 122 SF
AREA IN LOTS	85.00 AC
AREA IN ROW	18.92 AC
AREA IN OPEN SPACE PROVIDED	39.36 AC
OPEN SPACE REQUIRED	14.38 AC
OPEN SPACE REQUIRED FOR REC (50%)	7.19 AC
OPEN SPACE PROVIDED FOR REC	10.26 AC
LF OF PUBLIC STREETS	15,990 LF
LF OF ROAD WIDENING	1,558 LF
IMPERVIOUS AREA	31.12 AC
PERCENT IMPERVIOUS	24%
DISTURBED AREA	44 AC.

SETBACK DATA

FRONT	30'
SIDE	12'
REAR	25'
CORNER	22'

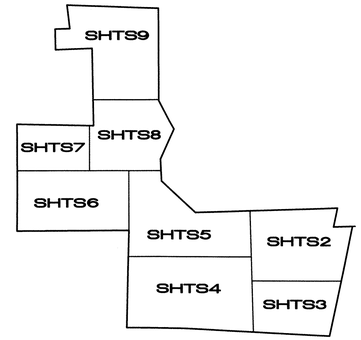
AREA SUITABLE FOR RECREATION

ABBREVIATION

NRB- NEUSE RIVER BUFFER

RSPB- ROLESVILLE STREAM PROTECTION BUFFER

CORUE- CITY OF RALEIGH UTILITY EASEMENT



EXISTING LINETYPE LEGEND

- PROPERTY BOUNDARY
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING 50' NRB
- EXISTING 50' ROLESVILLE BUFFER
- CENTERLINE OF STREAM
- EXISTING WATER ELEVATION

Hugh J. Gilleece and Associates
875 Walnut Street
Suite 360
Cary, NC 27511
BUSINESS LIC. # C-496
Phone: (919)469-1101

No.	DATE	REVISION	DWN/CHK

PRELIMINARY

NOT FOR CONSTRUCTION

OVERALL SITE PLAN

FOR

KALAS FALLS

SITUATED AT

1832 ROLESVILLE ROAD
WAKE COUNTY, NORTH CAROLINA

JOB #	9900.55
DSN/CHK BY:	DAS
DWN BY:	BAH
DATE:	07/11/2017
HRZ SCALE:	1"=200'
VRT SCALE:	NONE

SHEET NO.

S1

GRAPHIC SCALE 1"=200'

0 200 400 600

Plot Date : 10/5/2017 Time: 8:35AM FILE: Z:\Jobs\9900\Rolesville\dwg\Base Map\Kalas_Rodgers Tied Layout.pro

AERIAL CROSSING 1

12" SEWER OUTFALL
W 30' COR S.S. EASEMENT

WETLAND

N 89°39'22" W
1209.45'

IPF

SPIKE SET IN
ROCK FORMATION

N 89°36'05" W
165.60'

L4

IRON SET
@ ROCK

IPF

9.49'

N 05°57'55" W
259.57'

N 05°27'45" W
257.42'

255.93'

L3

N 05°36'20" W
242.19'

IPF

S 87°39'19" W 417.90'

IPF @
ROCK

WETLAND

JOSEPH E. WALL
BETTY R. GUNZ
ZONING: R-30
D.B. 5178, PG. 858
B.M. 1985, PG. 1806
PIN NO. 1768.03-21-6907
REAL ESTATE ID: 0060992

AERIAL CROSSING 2

FUTURE
SEWER
CONNECTION

S 87°57'13" E 1023.41'

IPF

40.48'

IPF

50' RSPBT TYP

50' RSPBT TYP

50' RSPBT TYP

442.26'

S 00°09'21" E 1034.00'

IPF

N 01°02'00" W 870.96'

490.27'

60.99'

45FB 141
S 24°36'56" E

S 24°05'29" W 317.67'

EXISTING
WETLANDS

THE WATKINS FAMILY, L.L.C.
ZONING: R-30
D.B. 5931, PG. 93
TRACT 1B
B.M. 1925, PG. 52
PIN NO. 1757.02-99-4300
REAL ESTATE ID: 0074674

THE WATKINS FAMILY, L.L.C.
ZONING: R-30
D.B. 5931, PG. 93
TRACT 1B
B.M. 1925, PG. 52
PIN NO. 1757.02-99-4300
REAL ESTATE ID: 0074674

IPF

S 88°51'34" E 855.49'

IPF

190 191 192 193 194 195 196
189 188 187 186 185
184 183 182 181 180
179 178 177 176
175 174 173 172 171
170 169 168 167 166
115 116 117 BMP 118 119 120 121
114
113
161

STREET L
STREET K
STREET D
STREET J
STREET J

BMP

GRAPHIC SCALE 1"=100'
0 100 200 300

Hugh J. Gilleece and Associates
875 Walnut Street
Suite 360
Cary, NC 27511
BUSINESS LIC. # C-496
Phone: (919)469-1101

No.	DATE	REVISION	DWN/CHK
1	06/27/16	TOWN OF ROLESVILLE & CITY OF RALEIGH COMMENTS DATED 03-02-16	BAH/DAS

PRELIMINARY

NOT FOR CONSTRUCTION

OFF-SITE SEWER EXHIBIT

FOR

KALAS FALLS

SITUATED AT

ROLESVILLE RD., ROLESVILLE
WAKE COUNTY, NORTH CAROLINA

FILE: Z:\Jobs\9900\Rosesville\dwg\Base Map\Revised Sewer Tie in R1.pro

JOB # 9900.55

DSN/CHK BY:	DAS
DWN BY:	BAH
DATE:	02/03/2016
HRZ SCALE:	1"=100'
VRT SCALE:	NONE

SHEET NO.

OS-EXB

Erosion Control Calculations