Sheffler & Company, Inc.
ENGINEERING • SURVEYING

POST-CONSTRUCTION STORM WATER MANAGEMENT PLAN

MEADOWS LANDING
RESIDENTIAL DEVELOPMENT

SITUATE IN:
SOUTH STRABANE TOWNSHIP
WASHINGTON COUNTY, PENNSYLVANIA

PREPARED FOR:
Meadows Landing Associates, LP
650 Washington Road, Suite 400
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3992

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Executive Summary

The Meadows Landing Residential Development Plan project is located off of Washington Road in South Strabane Township, Washington County, Pennsylvania. The applicant/owner Meadows Landing Associates, LP is located at 650 Washington Road, Pittsburgh, PA 15228.

This proposed project consists of the construction of a residential development. The site currently consists of primarily wooded, open meadow and some impervious areas. Due to existing site topography, the site is divided into three (3) drainage areas. Drainage Area 1 (DA-1)(POI-1), consisting of the Northern portion of the site flows to the North to UNT of Chartiers Creek. Drainage Area 2 (DA-2), consisting of the Southwester portions of the site flows to the Southwest to a separate UNT of Chartiers Creek. Drainage Area 3 (DA-3)(POI-3), consisting of the Southeastern portions of the site flows to the Southeast to a separate UNT of Chartiers Creek. Chartiers Creek has a Chapter 93 designation of Warm Water Fishes (WWF). The PA Water Plan watershed is Upper Ohio River. There is an approved ACT 167 Plan for Washington County. The sites' past (50 years) and present (5 years) use is primarily woodland and meadow.

The developer intends to begin mass grading operations as soon as project approvals are received. Stabilization of the site will consist of either grass for the lawn areas to minimize impervious areas or impervious surfacing for the structures and paved areas. Land clearing and grading will be minimized by only clearing and grading land areas we are going to be utilized for construction. New impervious areas have been minimized by strategic placement of the proposed roadway layout. Compaction in the basin areas and soil compaction will be minimized by primarily traveling over disturbed areas rather than non-paved areas. The proposed schedule for the project's start of final grading could be as soon as approvals are obtained, with an anticipated project life of two years before construction is completed.

Three (3) permanent surface storm water management facilities will attenuate post-development peak flow rates from the proposed site improvements. This project will preserve the integrity of stream channels and maintain and protect the physical, biological and chemical qualities of the receiving streams and maximize the protection of drainage features and existing vegetation.

The purpose of this report is to determine the effect that the development will have on storm water runoff volume and peak flow rates. Specifically, the means of controlling increases in runoff volume for the 2-year 24-hour event and storm water peak flow rate during the 1-, 2-, 10-, 25-, 50-, and 100-year storms. The site is located within the Ohio River Watershed in Washington County.

Methodology

The storm water calculations in this report were generated using the program Hydraflow Hydrographs 2016. This program uses both the USDA SCS TR-55 methodology defined in Technical Release No. 55 and the previous version, TR-20 to calculate time of concentrations and develop pre- and post-development hydrographs. The Modified Puls method is also used in this program to route the hydrographs through the storm water facilities. Rainfall amounts for the indicated storms above were taken from the NOAA Atlas 14 Server. The rainfall amounts for the indicated storms are as follows for this site:

RAINFALL DATA

Design Storm	Precipitation (Inches)
1 YR	2.02
2 YR	2.41
10 YR	3.38
25 YR	4.00
50 YR	4.50
100 YR	5.03

The soils present on the site were determined from the NRCS Soil Survey Mapping (refer to Appendix B). All ground coverage was assumed to be in good condition.

Existing Conditions

Due to existing site topography, the site is divided into three (3) drainage areas. Drainage Area 1 (DA-1)(POI-1), consisting of the Northern portion of the site flows to the North to UNT of Chartiers Creek. Drainage Area 2 (DA-2), consisting of the Southwestern portions of the site flows to the Southwest to a separate UNT of Chartiers Creek. Drainage Area 3 (DA-3)(POI-3), consisting of the Southeastern portions of the site flows to the Southeast to a separate UNT of Chartiers Creek. Chartiers Creek has a Chapter 93 designation of Warm Water Fishes (WWF). The PA Water Plan watershed is Upper Ohio River. There is an approved ACT 167 Plan for Washington County. The sites' past (50 years) and present (5 years) use is primarily woodland and meadow.

Using the rainfall data, curve numbers, and time of concentrations, a hydrograph was developed for the drainage area. The ground cover and peak flows were calculated for the existing pre-development site conditions and can be seen in the following two (2) tables.

POI = Downstream Point of Interest
DA = Drainage Area

PRE-DEVELOPMENT CONDITIONS – COVER TYPE

Cover Type/Condition		
Meadow	A, B, C, D	30, 58, 71, 78
Woods	B, C, D	55, 70, 77
Impervious Pavement	NA	98

Storm Frequency (yr)	POI-1 Peak Flow (cfs)	POI-2 Peak Flow (cfs)	POI-3 Peak Flow (cfs)
1	33.31	23.01	14.72
2	54.64	38.99	24.94
10	116.42	85.79	54.89
25	160.72	119.41	76.40
50	198.38	148.27	94.86
100	239.49	179.87	115.08

Proposed Conditions – With Post Construction Stormwater Management (PCSM) Facilities

For this project four (4) sediment basin are proposed to be installed during the E&S and site grading phase to control and limit sediment laden runoff from leaving the site. Once site construction is completed and the site is stabilized, the sediment basins will be converted into a infiltration basins. The basins will serve as the primary means of storm water management for the project site.

<u>The Post-Construction Drainage Area (DA) contributing to POI-1 was analyzed as follows:</u>

- The overall contributing DA consists of three (3) component sub-DA's.
- Two (2) DA's will be collected and conveyed to Infiltration Basins for release rate and 2-yr storm volume control.
    - DA-1A flows to Infiltration Basin 1 Forebay and has a contributing area of approximately 41.61 acres.
        - DA-1A flows to Infiltration Basin 1 Forebay and has a contributing area of approximately 40.30 acres. IB-2 Forebay, discharges directly into IB-1.
    - DA-1B flows to IB-1 and has a contributing area of approximately 19.52 acres.
        - **9.13 acres of meadow area within DA-1A are considered 70% impervious and 30% open space to account for potential future development. This area is shown on the Post Development Drainage Area Map (See Appendix C).**
- One (1) DA, DA-1C, will be released uncontrolled and has a contributing area of approximately 17.19 acres.

<u>The Post-Construction Drainage Area (DA) contributing to POI-2 was analyzed as follows:</u>

- The overall contributing DA consists of three (3) component sub-DA's.
- Two (2) DA's will be collected and conveyed to Infiltration Basins for release rate and 2-yr storm volume control.
    - DA-2A flows to Infiltration Basin 2 Forebay and has a contributing area of approximately 40.30 acres. IB-2 Forebay, discharges directly into IB-2.
    - DA-2B flows to Infiltration Basin 2 and has a contributing area of approximately 2.24 acres.
- One (1) DA, DA-2C, will be released uncontrolled and has a contributing area of approximately 22.42 acres.

The Post-Construction Drainage Area (DA) contributing to POI-3 was analyzed as follows:

- The overall contributing DA consists of two (2) component sub-DA's.

- One (1) DA will be collected and conveyed to an Infiltration Basin for release rate and 2-yr storm volume control.
    - DA-3A flows to Infiltration Basin 3 and has a contributing area of approximately 34.84 acres.
        - A portion of meadow area (approximately 7.3 acres) exists between the proposed local road and a run of existing 48" diameter storm pipe and that is tributary to basin 3, will remain during the post-development phase of this project. This meadow area is within DA-3A and is tributary to Infiltration Basin 3. The as-designed capacity of Infiltration Basin 3 does not account for any additional future impervious cover in this meadow area or anywhere else beyond the scope of the current project. Should future development occur in this meadow area, or elsewhere, Basin 3 will need to be re-designed and retrofitted, and/or additional stormwater facilities designed and implemented accordingly.
- One (1) DA, DA-3B, will be released uncontrolled and has a contributing area of approximately 6.42 acres.

PCSM Facilities

The stormwater basins will provide storm water management for the increased runoff caused by the additional impervious and open space area resulting from the development. The basins have been designed, and routing calculations performed, to demonstrate that the post-development flow is reduced to levels less than or equal to those of the pre-development conditions when analyzed at the same downstream Points of Interest (POI). The above ground infiltration basins will be routed through a Type M inlet outlet control structure to regulate the discharge of the basin. The basins will detain up to a 2-year runoff volume for the given drainage areas which will improve the water quality downstream.

Below are stage storage table (available basin volume) and outlet structure characteristics for the proposed basins:

INFILTRATION BASIN-1 FOREBAY

STAGE STORAGE TABLE

Elevation (ft)	Area (sf)	Storage (cf)
1114	14,648	0
1115	16,236	15,434
1116	17,929	32,507
1116.5	18,777	41,682
1118	21,593	71,932
1120	25,593	119,057

Infiltration Basin Outlet Structure Configuration – Type M Inlet

15' Wide Weir/Emergency Spillway @ Elevation 1117.80

Top of 10' Wide Berm 1120.0

Using the outlet structure and the available volume in the storm water management facilities, the following routings were calculated:

BASIN-1 FOREBAY - ROUTING SUMMARY

Storm Frequency	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Stage (ELEV)	Peak Storage Volume (cf)
1	53.68	6.82	1116.8	46,938
2	73.81	32.51	1117.3	56,826
10	128.23	104.40	1118.1	75,075
25	164.71	139.74	1118.5	83,345
50	194.49	166.97	1118.7	89,247
100	226.23	195.54	1119.0	95,114

BASIN-1
STAGE STORAGE TABLE

Elevation (ft)	Area (sf)	Storage (cf)
1113	41,195	0
1114	44,172	42,671
1116	50,293	137,060
1118	56,640	243,919
1120	63,214	363,701

Infiltration Basin Outlet Structure Configuration – Type M Inlet
48” Outlet Pipe @ Elevation 1106.18 (Existing Pipe)
Adjusted Top of Existing Concrete Outlet Structure @ Elevation 1114.5
116’ Wide Emergency Spillway @ Elevation 1118.0
Top of 10' Wide Berm 1120.0

Using the outlet structure and the available volume in the storm water management facilities, the following routings were calculated:

BASIN-1 - ROUTING SUMMARY

Storm Frequency	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Stage (ELEV)	Peak Storage Volume (cf)
1	32.29	3.21	1114.2	53,060
2	58.92	8.67	1114.7	76,731
10	166.44	59.50	1115.7	123,767
25	220.54	77.95	1116.7	164,875
50	262.41	87.45	1117.2	203,476
100	306.36	98.54	1118.0	243,869

INFILTRATION BASIN-2 FOREBAY

STAGE STORAGE TABLE

Elevation (ft)	Area (sf)	Storage (cf)
1118	7830	0
1120	10570	18,330
1122	13621	42,454
1124	16944	72,956
1126	20494	110,334

Infiltration Basin Outlet Structure Configuration – Type M Inlet

36" Outlet Pipe @ Elevation 1112.0
Top of 2'x4' Concrete Outlet Structure @ Elevation 1120.0
12' Wide Emergency Spillway @ Elevation 1122.0
Top of 10' Wide Berm 1126.0

Using the outlet structure and the available volume in the storm water management facilities, the following routings were calculated:

BASIN-2 FOREBAY - ROUTING SUMMARY

Storm Frequency	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Stage (ELEV)	Peak Storage Volume (cf)
1	59.07	47.66	1121.1	31,870
2	79.50	66.15	1121.4	36,515
10	134.12	102.93	1122.8	54,550
25	169.91	145.05	1123.3	62,541
50	198.96	171.88	1123.6	67,252
100	229.81	198.55	1124.0	73,187

Computer printouts of the hydrographs and routing calculations are found in appendix D.

INFILTRATION BASIN-2

STAGE STORAGE TABLE

Elevation (ft)	Area (sf)	Storage (cf)
1110	25,324	0
1112	29,507	54,772
1114	33,993	118,213
1116	38,715	190,863
1118	43,663	273,183
1120	48,837	365,625
1122	54,237	468,642

Infiltration Basin Outlet Structure Configuration – Type M Inlet
36" Outlet Pipe @ Elevation 1106.82 (Existing Pipe)
12" Diameter Orifice in Outlet Structure @ Elevation 1114.37 (Existing Orifice)
Top of 2'x4' Concrete Outlet Structure @ Elevation 1118.0
40' Wide Emergency Spillway @ Elevation 1119.5
Top of 10' Wide Berm 1122.0

Using the outlet structure and the available volume in the storm water management facilities, the following routings were calculated:

BASIN-2 - ROUTING SUMMARY

Storm Frequency	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Stage (ELEV)	Peak Storage Volume (cf)
1	49.47	0	1113.6	104,568
2	68.14	0.51	1114.7	144,010
10	107.64	3.29	1115.6	177,298
25	151.18	5.08	1116.7	218,817
50	179.91	6.34	1117.7	259,906
100	208.70	13.94	1118.3	287,181

Computer printouts of the hydrographs and routing calculations are found in appendix D.

INFILTRATION BASIN-3
STAGE STORAGE TABLE

Elevation (ft)	Area (sf)	Storage (cf)
1104	16,343	0
1106	19,264	35,563
1108	22,065	76,857
1110	24,864	123,753
1112	27,661	176,248
1114	30,578	234,457

Infiltration Basin Outlet Structure Configuration – Type M Inlet
48" Outlet Pipe @ Elevation 1097.23 (Existing Pipe)
20" Diameter Orifice Plate over Outlet Pipe @ Elevation 1097.23
8" Diameter Orifice in Outlet Structure @ Elevation 1106.0
Top of 2'x4' Concrete Outlet Structure @ Elevation 1109.81 (Verify Existing Top Elev)
70' Wide Emergency Spillway @ Elevation 1112.0
Top of 10' Wide Berm 1114.0

Using the outlet structure and the available volume in the storm water management facilities, the following routings were calculated:

BASIN-3 - ROUTING SUMMARY

Storm Frequency	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Stage (ELEV)	Peak Storage Volume (cf)
1	39.17	1.00	1106.7	49,827
2	55.27	1.73	1107.4	64,246
10	98.86	3.32	1109.8	119,324
25	128.85	16.17	1110.3	130,946
50	153.49	37.08	1110.9	148,497
100	179.87	39.02	1111.9	174,635

POI-1 PEAK RATE COMPARISON – POI-1 – With PCSM Facilities

Storm Frequency (YR)	Pre-Development Peak Rate (cfs)	Post-Development Peak Rate (cfs)	Change In Peak Flow Rate (cfs)
1	33.31	9.57	-23.74
2	54.64	16.44	-38.20
10	116.42	61.64	-54.78
25	160.72	107.06	-53.66
50	198.38	124.18	-74.20
100	239.49	146.60	-92.89

POI-2 PEAK RATE COMPARISON – POI-2 – With PCSM Facilities

Storm Frequency (YR)	Pre-Development Peak Rate (cfs)	Post-Development Peak Rate (cfs)	Change In Peak Flow Rate (cfs)
1	23.01	15.55	-7.46
2	38.99	24.37	-14.62
10	85.79	49.42	-36.37
25	119.41	66.92	-52.49
50	148.27	81.54	-66.73
100	179.87	98.42	-81.45

POI-3 PEAK RATE COMPARISON – POI-3 – With PCSM Facilities

Storm Frequency (YR)	Pre-Development Peak Rate (cfs)	Post-Development Peak Rate (cfs)	Change In Peak Flow Rate (cfs)
1	14.72	4.83	-9.89
2	24.94	7.40	-17.54
10	54.89	16.66	-38.23
25	76.40	22.41	-53.99
50	94.86	48.97	-45.89
100	115.08	65.32	-49.76

2-YR RUNOFF VOUME

	Pre-Development Volume (Cuft)	Post-Development Volume (No BMPs) (Cuft)	Required Control Volume (Cuft)	Treated Volume Provided (with BMPs) Cuft)	Volume Reduction (Cuft)
POI-1	193,721	310,704	116,984	118,680	1,696
POI-2	138,420	241,708	103,288	103,303	15
POI-3	93,995	148,368	54,374	55,926	1,552

Because the net 2-yr runoff volume is decreased from the pre-development to post-development conditions, it is implied that adequate volume storage is provided by the PCSM facilities. Calculations for runoff volume and volume detention provided can be found on BMP Worksheets 4 and 5 in the appendices of this report. Calculations and hydrographs to support the peak rates tabulated in the report narrative can be found in the appendices as well

BMP Volume Credits

Post construction, the sediment basin will be converted to an infiltration basin designed to detain and slowly infiltrate the additional 2-year volume, thus providing the detention and infiltration necessary to reduce runoff volumes to below pre-development levels for the 2-year storm. This approach will maximize the opportunity for infiltration, evapotranspiration, and uptake and use by vegetation of this additional runoff volume. The storm water management facilities will release runoff slowly, providing detention, for the 1-, 2-, 10-, 25-, 50-, and 100- year storms, to manage the peak discharge rates to below pre-development rates. The reduction of runoff rate and volume can be seen numerically in the previous tables accompanying this narrative.

Storm Sewer System

A storm sewer system will capture impervious road storm water runoff and convey the runoff to the infiltration basins. Once routed through the basin, that runoff which is not infiltrated through the infiltration media and which accumulates to a volume that crests at least the lowest orifice, will be routed through the outlet structure and eventually discharge to the existing streams. The storm sewer system has been designed to convey the **100-year** storm without surcharging the inlet rim elevation.

Conclusion and Act 167 Consistency

From the calculations and report as submitted, the proposed Basin for the development will reduce storm water peak flow rates to less than the pre-developed conditions. According to the South Strabane Township Stormwater Management Ordinance and the storm water requirements of the Pennsylvania Department of Environmental Protection (Chapter 102), the runoff rate leaving a proposed development site may not exceed the runoff rate that existed prior to construction. This standard was analyzed and demonstrated to be achievable at the site for the 1-, 2-, 10-, 25-, 50-, and 100-year design storms. A reduction in the post-development total runoff volume for all storms equal to or less than the 2-year 24-hour event was achieved for the drainage area within the proposed development. Due to existing site topography, the site drains to unnamed tributaries to Chartiers Creek, classified as Warm Water Fishes (WWF). The PA Water Plan watershed is Upper Ohio River. Washington County does have an approved ACT 167 Plan.

The following narrative is in accordance with PA Title 25, Chapter 102, Section 102.8, Post Construction Stormwater Management Requirements:

102.8(b)(1) Preserve the integrity of stream channels and maintain and protect the physical, biological and chemical qualities of the receiving stream.

The proposed plan utilizes structural and non-structural BMP's which reduce runoff volume and rate and provide water quality measures.

102.8(b)(2) Prevent an increase in the rate of storm water runoff.

As shown in the tables in the PCSM report narrative along with supporting calculations in Appendix D, the proposed detention basin will reduce storm water discharge rates to less than the historical peak rates from the site for the 1-, 2-, 10-, 25-, 50-, and 100-year design storms.

102.8(b)(3) Minimize an increase in storm water runoff volume.

As shown in the tables in the PCSM report narrative along with supporting calculations from the PADEP Worksheets in Appendix E, the proposed detention basin will reduce runoff volume for up the 2-year storm event.

102.8(b)(4) Minimize impervious areas**.**

The proposed development was designed in a manner to reduce paving to the largest extent possible.

102.8(b)(5) Maximize the protection of existing drainage features and existing vegetation.

The existing drainage features and vegetation will be protected by disturbing only those areas required for construction of the site.

102.8(b)(6) Minimize land clearing and grading**.**

Land clearing and grading will be minimized by clearing and grading only those areas required for construction of the site.

102.8(b)(7) Minimize soil compaction.

Contractors should spend minimal time in areas that are not to be graded, in order to minimize soil compaction.

102.8(b)(8) Utilize other structural or nonstructural BMPs that prevent or minimize changes in storm water runoff.

Areas of proposed disturbance will be revegetated. Existing vegetation on the property will be protected by clearly delineating the limit of disturbance on the plans. The site will be revegetated with an approved landscape plan.

102.8.f The PCSM Plan must contain drawings and a narrative consistent with the requirements of this chapter. The PCSM Plan shall be designed to minimize the threat to human health, safety and the environment to the greatest extent practicable. PCSM Plans must contain at a minimum the following:

102.8.f.1 The existing topographic features of the project site and immediate surrounding area.

Existing contours are shown on the attached PCSM Plan at 2 foot intervals.

102.8.f.2 The types, depth, slope, locations and limitations of the soils and geological formations.

Refer to Appendix B for soils information.

102.8.f.3 The characteristics of the project site, including the past, present and proposed land uses and the proposed alteration to the project site.

The current and past land use (over 50 years) of the site has been a primarily wooded area with some meadow. The proposed site consists of houses and impervious drive ways, open space/lawn areas, storm water basins, utility installation, and erosion and sediment control practices.

Topsoil and debris will be stripped and stockpiled at the approximate locations shown on the Erosion and Sediment Control Plan. Stockpiled topsoil will be utilized when construction operations are complete.

102.8.f.4 An identification of the net change in volume and rate of storm water from pre-construction hydrology to post construction hydrology for the entire project site and each drainage area.

The watershed boundaries are shown by the existing topography and proposed grades on the attached PCSM Plan. Infiltration basins will be installed to control the rate of runoff from the proposed disturbance. The post-development runoff rate will be less than the pre-development rate for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events. According to Chapter 102 of the Pennsylvania Department of Environmental Protection, the 2-year runoff volume increase must be stored on-site. Refer to the PCSM plans for details of these

facilities. The methods used to calculate runoff include the SCS method and methods described in the DEP Erosion and Sediment Pollution Control Manual.

102.8.f.5 An identification of the location of surface waters of this Commonwealth, which may receive runoff within or from the project site and their classification under Chapter 93 (relating to water quality standards).

The receiving streams are UNT to Chartiers Creek, classified as Warm Water Fishes (WWF). The PA Water Plan watershed is Upper Ohio River. Refer to Appendix A, Site Location Map, for stream locations. The project site discharges to waters that are classified as impaired due to

HABITAT MODIFICATION - OTHER THAN HYDROMODIFICATION - SILTATION ; HABITAT MODIFICATION - OTHER THAN HYDROMODIFICATION – TURBIDITY

URBAN RUNOFF/STORM SEWERS – SILTATION

102.8.f.6 A written description of the location and type of PCSM BMPs including construction details for permanent storm water BMPs including permanent stabilization specifications and locations.

Permanent control measures include three (3) infiltration basins (converted from sediment basins), interceptor & diversion channels, riprap aprons, and permanent seeding. Disturbed areas will be stabilized in accordance with temporary, permanent and/or steep slope seeding specifications.

102.8.f.7 A sequence of PCSM BMP implementation or installation in relation to earth disturbance activities of the project site and a schedule of inspections for critical stages of PCSM BMP installation.

PCSM Construction Sequence:

1. Once grading operations are complete, permanently seed and mulch all disturbed areas per the seeding specifications.
2. Convert Sediment Basin to Infiltration Basin by: **(Critical Stage: A licensed professional or designee shall be on-site to oversee the installation of the detention basin, including the permanent outlet structure, outfall protection, emergency spillway, and grading.)**
   1) Dewater as necessary using pumped water filter bag.
   2) Remove all accumulated sediment from the sediment basin.
   3) Remove the skimmer systems from the from the sediment basins.
   4) Remove orifice coverings installed during E&S phase.
   5) Install 2' underdrain system

102.8.f.8 Supporting calculations.

Supporting calculations can be found in the appendices.

102.8.f.9 Plan drawings.

Refer to the Post Construction Storm Water Management Plan.

102.8.f.10 A long-term operation and maintenance schedule, which provides for inspection of PCSM BMPs, including the repair, replacement, or other routine maintenance of the PCSM BMPs to ensure proper function and operation. The program must provide for completion of a written report documenting each inspection and all BMP repair and maintenance activities and how access to the PCSM BMPs will be provided.

Refer to Appendix G for a long-term operation and maintenance schedule.

102.8.f.11 Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the PCSM BMPs are in accordance with Department laws, regulations and requirements.

A differentiation must be identified between construction waste (waste generated before the site is entirely stabilized, completed, and converted) to the post construction phase.

Erosion control wastes differ from post constructions generated materials and must be addressed and handled separately from the traditional form of recycling criteria that often is outlined in erosion and sedimentation control plan guidelines.

Regarding wastes generated after the plan is fully operational, all wastes from post construction BMPs, such as silt/gravel, trash/litter/floatables, grass clippings, branches, leaves, etc. shall be removed from the site and recycled or disposed of in accordance with the departments solid waste management regulations at Title 25 PA Code 260.1 et seq., 271.1., and 287.1 et seq. No wastes or other materials shall be burned, buried, dumped, or discharged at the site.

102.8.f.12 An identification of naturally occurring geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance activities are completed and PCSM BMPs are operational and development of a management plan to avoid or minimize potential pollution and its impacts.

A review of available resources does not indicate the presence of any current or historical deep mining actives underlying the site.

There are no know geologic formations or soil conditions that have potential to cause pollution. Refer to Appendix B for soil limitations and resolutions to any limitations.

102.8.f.13 An identification of potential thermal impacts from post construction storm water to surface waters of this Commonwealth including BMPs to avoid, minimize or mitigate potential pollution from thermal impacts.

Establishment of permanent vegetation over all disturbed areas will further mitigate thermal impacts.

All storm water runoff from the infiltration basins will discharge to UNT to Chartiers Creek. Storm water runoff from other areas of the site will discharge to vegetated areas prior to entering any surface waters of the Commonwealth.

102.8.f.14 A riparian forest buffer management plan when required under Chapter 102.14 (relating to riparian buffer requirements).

The proposed work will not disturb areas within riparian forest buffers. Design precautions were implemented in an effort to eliminate such impacts.

102.8.g PCSM Plan storm water analysis.

Refer to appendices for pre and post development storm water analysis.

102.8.k Licensed professional oversight of critical stages**.**

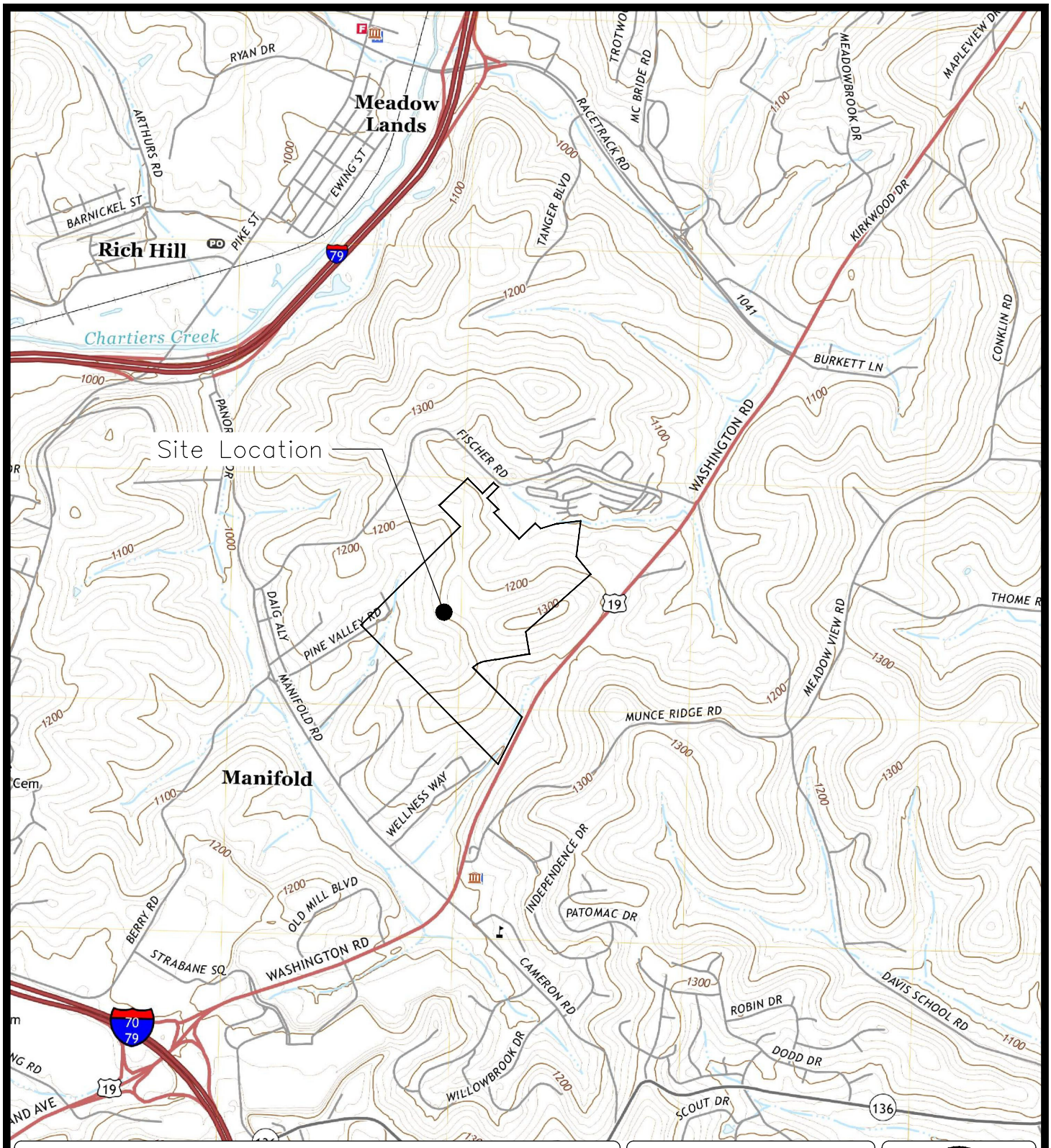
A licensed professional or designee shall oversee the installation of the infiltration pond basin, including the permanent outlet structure, outfall protections, underdrains, emergency spillways, and grading. A licensed professional or designee shall also verify establishment of permanent vegetation at the site.

102.8.m PCSM long-term operation and maintenance requirements**.**

Refer to Appendix for PCSM long-term operation and maintenance requirements.

APPENDIX A

SITE LOCATION MAP



Site Location Map

Meadow Landings
Washington East, PA USGS Quadrangle
South Strabane Township, Washington County, Pennsylvania

Sheffler & Company, Inc.
ENGINEERING • SURVEYING

DRAWN BY:	ASB
REVIEWED BY:	
DATE:	2/25/2021
SCALE:	1"=2000'
PROJECT NUMBER:	3992

APPENDIX B

SOILS REPORT

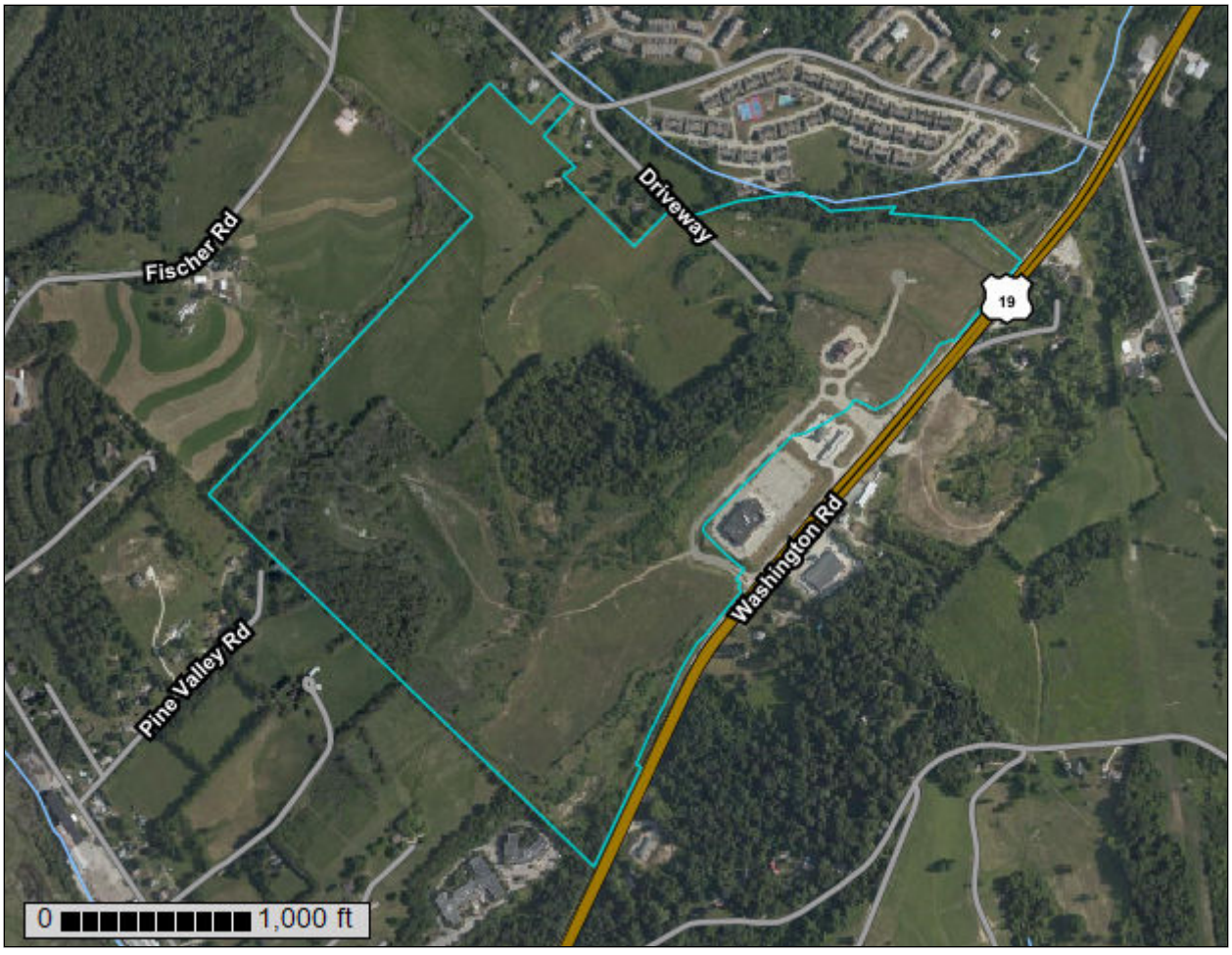
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Greene and Washington Counties, Pennsylvania



April 7, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

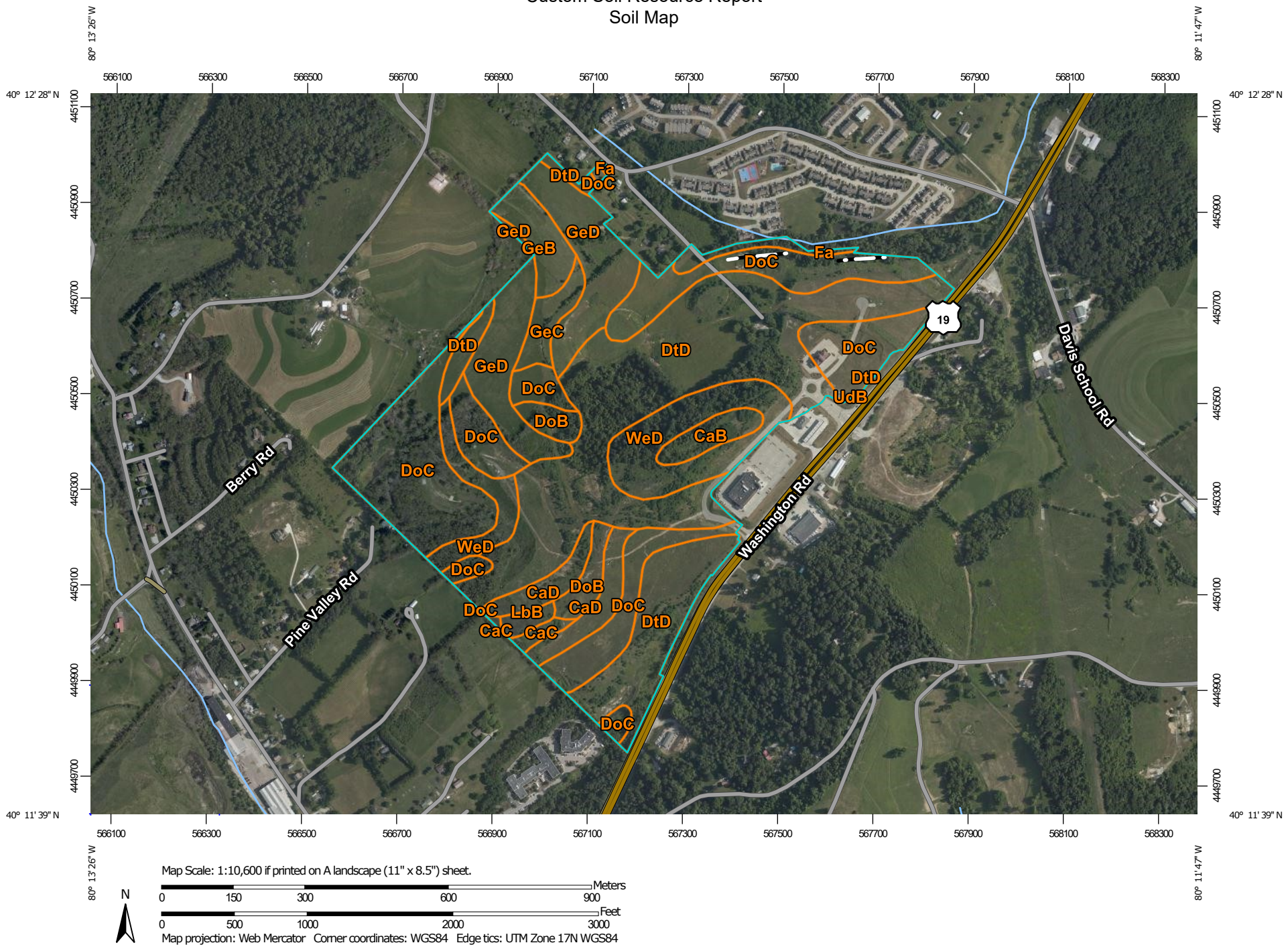
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:10,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

Soil Survey Area: Greene and Washington Counties, Pennsylvania
Survey Area Data: Version 18, Jun 5, 2020

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

Date(s) aerial images were photographed: May 7, 2020—Jul 5, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CaB	Culleoka channery silt loam, 3 to 8 percent slopes	3.1	1.8%
CaC	Culleoka channery silt loam, 8 to 15 percent slopes	1.0	0.6%
CaD	Culleoka channery silt loam, 15 to 25 percent slopes	7.0	4.0%
DoB	Dormont silt loam, 3 to 8 percent slopes	4.4	2.5%
DoC	Dormont silt loam, 8 to 15 percent slopes	49.0	27.9%
DtD	Dormont-Culleoka complex, 15 to 25 percent slopes	65.3	37.1%
Fa	Fluvaquents, loamy	1.8	1.0%
GeB	Guernsey silt loam, 3 to 8 percent slopes	4.5	2.6%
GeC	Guernsey silt loam, 8 to 15 percent slopes	3.1	1.8%
GeD	Guernsey silt loam, 15 to 25 percent slopes	19.1	10.9%
LbB	Library silty clay loam, 3 to 8 percent slopes	1.2	0.7%
UdB	Udorthents, smoothed, gently sloping	0.1	0.0%
WeD	Weikert-Culleoka complex, 15 to 25 percent slopes	16.3	9.2%
Totals for Area of Interest		**176.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made

up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Greene and Washington Counties, Pennsylvania

CaB—Culleoka channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2s5gm
Elevation: 720 to 1,610 feet
Mean annual precipitation: 37 to 48 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 173 to 206 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Dormont

Percent of map unit: 10 percent
Landform: Hills

Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lowell

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

CaC—Culleoka channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2s5gn
Elevation: 720 to 1,610 feet
Mean annual precipitation: 37 to 48 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 173 to 206 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Culleoka and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Dormont

Percent of map unit: 15 percent
Landform: Hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lowell

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

CaD—Culleoka channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2s5gp
Elevation: 720 to 1,610 feet
Mean annual precipitation: 37 to 48 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 173 to 206 days
Farmland classification: Not prime farmland

Map Unit Composition

Culleoka and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Dormont

Percent of map unit: 15 percent
Landform: Hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lowell

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

DoB—Dormont silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2s5gj
Elevation: 800 to 1,540 feet
Mean annual precipitation: 37 to 47 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 173 to 197 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dormont and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dormont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Fine-loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 11 inches: silt loam
Bt1 - 11 to 21 inches: silt loam
Bt2 - 21 to 31 inches: silty clay loam
Bt3 - 31 to 46 inches: channery silty clay loam
Bt4 - 46 to 62 inches: channery silty clay loam
BC - 62 to 75 inches: channery silty clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.66 in/hr)
Depth to water table: About 24 to 44 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lowell

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Culleoka

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Guernsey

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

DoC—Dormont silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2s5gh
Elevation: 800 to 1,540 feet
Mean annual precipitation: 37 to 47 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 173 to 197 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dormont and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dormont

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, interfluve

Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Fine-loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 11 inches: silt loam
Bt1 - 11 to 21 inches: silt loam
Bt2 - 21 to 31 inches: silty clay loam
Bt3 - 31 to 46 inches: channery silty clay loam
Bt4 - 46 to 62 inches: channery silty clay loam
BC - 62 to 75 inches: channery silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.66 in/hr)
Depth to water table: About 24 to 44 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Culleoka

Percent of map unit: 15 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Lowell

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Guernsey

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave

Hydric soil rating: No

DtD—Dormont-Culleoka complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2s5gy
Elevation: 200 to 1,300 feet
Mean annual precipitation: 32 to 48 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Dormont and similar soils: 45 percent
Culleoka and similar soils: 37 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dormont

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, head slope
Down-slope shape: Linear
Across-slope shape: Linear, concave
Parent material: Fine-loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 11 inches: silt loam
Bt1 - 11 to 21 inches: silt loam
Bt2 - 21 to 31 inches: silty clay loam
Bt3 - 31 to 46 inches: channery silty clay loam
Bt4 - 46 to 62 inches: channery silty clay loam
BC - 62 to 75 inches: channery silty clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.66 in/hr)
Depth to water table: About 24 to 44 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D
Hydric soil rating: No

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope, head slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Lowell

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, head slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Guernsey

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Thorndale

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Fa—Fluvaquents, loamy

Map Unit Setting

National map unit symbol: l64w
Elevation: 700 to 1,340 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 42 inches: silt loam
H3 - 42 to 60 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None

Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Newark

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Melvin

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Huntington

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

GeB—Guernsey silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2wdrv
Elevation: 670 to 1,860 feet
Mean annual precipitation: 38 to 43 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 175 to 198 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Guernsey

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and shale over residuum weathered from limestone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
BE - 8 to 15 inches: silt loam
Bt1 - 15 to 22 inches: silty clay loam
Bt2 - 22 to 37 inches: silty clay
Btg - 37 to 54 inches: silty clay loam
2C - 54 to 60 inches: channery silt loam
2Cr - 60 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 59 to 62 inches to paralithic bedrock
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 23 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Dormont

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Culleoka

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Westmoreland

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

GeC—Guernsey silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t32f
Elevation: 600 to 1,880 feet
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Guernsey

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Interfluve, crest, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and shale over residuum weathered from limestone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
BE - 8 to 15 inches: silt loam
Bt1 - 15 to 22 inches: silty clay loam
Bt2 - 22 to 37 inches: silty clay
Btg - 37 to 54 inches: silty clay loam
2C - 54 to 60 inches: channery silt loam
2Cr - 60 to 70 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 59 to 62 inches to paralithic bedrock
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 23 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Coshocton

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Berks

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Westmoreland

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

GeD—Guernsey silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2t32g
Elevation: 670 to 2,510 feet
Mean annual precipitation: 37 to 52 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Guernsey and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guernsey

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and shale over residuum weathered from limestone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
BE - 8 to 15 inches: silt loam
Bt1 - 15 to 22 inches: silty clay loam
Bt2 - 22 to 37 inches: silty clay
Btg - 37 to 54 inches: silty clay loam
2C - 54 to 60 inches: channery silt loam
2Cr - 60 to 70 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 59 to 62 inches to paralithic bedrock
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 23 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Culleoka

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Westmoreland

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Berks

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, interfluve, side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

LbB—Library silty clay loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l655
Elevation: 800 to 1,300 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Library and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Library

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey residuum weathered from limestone and shale

Typical profile

Ap - 0 to 11 inches: silt loam
Btg - 11 to 62 inches: silty clay
Cg - 62 to 76 inches: channery silty clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Guernsey

Percent of map unit: 15 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: No

Culleoka

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Dormont

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

UdB—Udorthents, smoothed, gently sloping

Map Unit Setting

National map unit symbol: l659
Elevation: 740 to 1,500 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Man made and altered materials from mixed rock types

Typical profile

H1 - 0 to 6 inches: very channery silt loam
H2 - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wet spots

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

WeD—Weikert-Culleoka complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: l65m
Elevation: 500 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 50 percent
Culleoka and similar soils: 40 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from siltstone

Typical profile

H1 - 0 to 7 inches: channery silt loam
H2 - 7 to 19 inches: extremely channery silt loam
H3 - 19 to 23 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Culleoka

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from nonacid siltstone, fine-grained sandstone, and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 26 inches: channery silt loam
C - 26 to 31 inches: very channery silt loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Brooke

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Dormont

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, nose slope, head slope
Down-slope shape: Linear
Across-slope shape: Concave, linear
Hydric soil rating: No

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APPENDIX C

PRE AND POST DEVELOPMENT DRAINAGE AREA MAPS

LEGEND:
PRE-DEVELOPMENT DRAINAGE AREA

PRE DA-2
DRAINAGE AREA
CN: 75 62.88 ACRES
TOC: 18.0 MIN

PRE DA-1 DRAINAGE AREA
CN: 76 81.43 ACRES
TOC: 19.3 MIN

PRE-DEV DA-3 DRAINAGE AREA
CN: 75 40.23 ACRES
TOC: 19.2 MIN

POI-1

POI-2

POI-3

NORTH

811 Know what's below. Call before you dig.

MEADOW LANDINGS
PRE-DEVELOPMENT
DRAINAGE AREA MAP

PLAN REVISIONS

DATE	DESCRIPTION

Prepared By:
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1712 Mount Nebo Road
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DRAWN BY:	KDP
REVIEWED BY:	ALB
DATE:	05.12.2021
SCALE:	1"=350'
PROJECT NUMBER:	3992

EXHIBIT "A"

LEGEND:
POST-DEVELOPMENT DRAINAGE AREA

FUTURE DEV. AREA (70% IMPERVIOUS COVER)

POST DA-2B DRAINAGE AREA (TO BASIN 1)
CN: 80 2.24 ACRES
TOC: 5 MIN

INFILTRATION BASIN 2

POI-2

INFILTRATION BASIN 2 FOREBAY

POST DA-2A DRAINAGE AREA (TO INFILTRATION BASIN-2 FOREBAY)
CN: 86 40.30 ACRES
TOC: 5 MIN

POST DA-2C DRAINAGE AREA (UNCONTROLLED)
CN: 76 22.42 ACRES
TOC: 5 MIN

POST DA-1C DRAINAGE AREA (UNCONTROLLED)
CN: 73 17.19 ACRES
TOC: 5 MIN

POST DA-1A DRAINAGE AREA (TO BASIN 1 FOREBAY)
CN: 84 41.61 ACRES
TOC: 5 MIN

INFILTRATION BASIN 1 FOREBAY

POST DA-1B DRAINAGE AREA (TO BASIN 1)
CN: 88 19.52 ACRES
TOC: 5 MIN

INFILTRATION BASIN 1

FUTURE DEVELOPMENT AREA TRIBUTARY TO BASIN 1 (COVER AREA ASSUMED TO CONSIST OF 70% IMPERVIOUS AND 30% "D" OPEN SPACE

POI-1

POI-3

INFILTRATION BASIN 3

POST-DEV DA-3B DRAINAGE AREA (UNCONTROLLED)
CN: 77 6.42 ACRES
TOC: 5 MIN

POST-DEV DA-3A DRAINAGE AREA (TO BASIN 3)
CN: 82 34.84 ACRES
TOC: 5 MIN

NORTH

811 Know what's **below.** **Call** before you dig.

MEADOW LANDINGS
POST-DEVELOPMENT
DRAINAGE AREA MAP

PLAN REVISIONS	
DESCRIPTION	DATE

Prepared By:
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DATE:	05.12.2021
SCALE:	1"=350'
PROJECT NUMBER:	3992

EXHIBIT "B"

APPENDIX D

PRE AND POST DEVELOPMENT HYDROGRAPHS

CURVE NUMBER CALCULATION
Project: Meadows Landing
Project Number: 3992

PRE-DEVELOPMENT RCN

Sub-basin	Landuse	Soil Group				Subtotal	CN by Landuse				Sub-CN	Weighted CN
		A	B	C	D		A	B	C	D		
PRE DA-1	Impervious			0.00		0.00	98	98	98	98	98	76
	Open Space			0.00		0.00	39	61	74	80	74	
	Meadow	0.07	1.83	14.46	47.18	63.54	30	58	71	78	76	
	Woodlands			0.00	17.89	17.9	36	55	70	77	77	
1 Total		**0.07**	**1.83**	**14.46**	**65.07**	**81.43**						
PRE DA-2	Impervious			0.00		0.00	98	98	98	98	98	75
	Open Space			0.00		0.00	39	61	74	80	74	
	Meadow		0.19	11.88	9.74	21.81	30	58	71	78	74	
	Woodlands		3.25	1.54	36.28	41.07	36	55	70	77	75	
2 Total		**0.00**	**3.44**	**13.42**	**46.02**	**62.88**						
PRE DA-3	Impervious			0.00		0.00	98	98	98	98	98	75
	Open Space			0.00		0.00	39	61	74	80	74	
	Meadow		4.60	0.04	21.79	26.43	30	58	71	78	75	
	Woodlands			0.00	13.80	13.80	36	55	70	77	77	
3 Total		**0.00**	**4.60**	**0.04**	**35.59**	**40.23**						
SITE OVERALL		**0.07**	**9.87**	**27.92**	**146.68**	**184.54**						

POST-DEVELOPMENT RCN

Sub-basin	Landuse	Soil Group				Subtotal	CN by Landuse				Sub-CN	Weighted CN
		A	B	C	D		A	B	C	D		
POST DA-1A TO BASIN 1 FOREBAY	Impervious		2.960	4.970	2.0	9.93	98	98	98	98	98	84
	Open Space				24.94	24.94	39	61	74	80	80	
	Meadow			2.63	3.63	6.26	30	58	71	78	75	
	Woodlands				0.5	0.48	36	55	70	77	77	
Total		**0.00**	**2.96**	**7.60**	**31.05**	**41.61**						
POST DA-1B TO BASIN 1	Impervious		3.63	6.52		10.15	98	98	98	98	98	88
	Open Space				2.80	2.80	39	61	74	80	80	
	Meadow			2.63	3.46	6.09	30	58	71	78	75	
	Woodlands				0.5	0.48	36	55	70	77	77	
Total		**0.00**	**3.63**	**9.15**	**6.74**	**19.52**						
POST DA-1C UNCONTROLLED	Impervious			0.29	0.00	0.29	98	98	98	98	98	73
	Open Space			0.0	1.37	1.37	39	61	74	80	80	
	Meadow	0.070	1.59	7.99	5.88	15.53	30	58	71	78	72	
	Woodlands			0.0		0.0	36	55	70	77	70	
Total		**0.07**	**1.59**	**8.28**	**7.25**	**17.19**						
POI-1 Total		**0.07**	**8.18**	**25.03**	**45.04**	**78.32**						
POST DA-2A TO BASIN 2 FOREBAY	Impervious			11.46	2.51	13.97	98	98	98	98	98	86
	Open Space			0.0	22.65	22.65	39	61	74	80	80	
	Meadow		0.030	0.0	0.15	0.18	30	58	71	78	75	
	Woodlands			0.0	3.51	3.51	36	55	70	77	77	
Total		**0.00**	**0.03**	**11.46**	**28.81**	**40.30**						
POST DA-2B TO BASIN 2	Impervious			0.00		0.00	98	98	98	98	98	80
	Open Space				2.24	2.24	39	61	74	80	80	
	Meadow			0.0		0.00	30	58	71	78	71	
	Woodlands			0.0		0.00	36	55	70	77	70	
Total		**0.00**	**0.00**	**0.00**	**2.24**	**2.24**						
POST DA-2C UNCONTROLLED	Impervious			0.0	0.00	0.00	98	98	98	98	98	76
	Open Space			0.0	4.74	4.74	39	61	74	80	80	
	Meadow			5.01	0.69	5.70	30	58	71	78	72	
	Woodlands			0.0	11.98	12.0	36	55	70	77	77	
Total		**0.00**	**0.00**	**5.01**	**17.41**	**22.42**						
POI-2 Total		**0.00**	**0.03**	**16.47**	**48.46**	**64.96**						
POST DA-3A TO BASIN 3	Impervious			7.13	0.54	7.67	98	98	98	98	98	82
	Open Space			0.0	8.73	8.73	39	61	74	80	80	
	Meadow		1.13	0.0	11.37	12.50	30	58	71	78	76	
	Woodlands		0.01	0.0	5.93	5.94	36	55	70	77	77	
Total		**0.00**	**1.14**	**7.13**	**26.57**	**34.84**						
POST DA-3B UNCONTROLLED	Impervious			0.0	0.00	0.00	98	98	98	98	98	77
	Open Space			0.0	0.60	0.60	39	61	74	80	80	
	Meadow		0.19	0.0	1.30	1.49	30	58	71	78	75	
	Woodlands			0.0	4.33	4.33	36	55	70	77	77	
Total		**0.00**	**0.19**	**0.00**	**6.23**	**6.42**						
POI-3 Total		**0.00**	**1.33**	**7.13**	**32.80**	**41.26**						
OVERALL		**0.07**	**9.54**	**48.63**	**126.30**	**184.54**						

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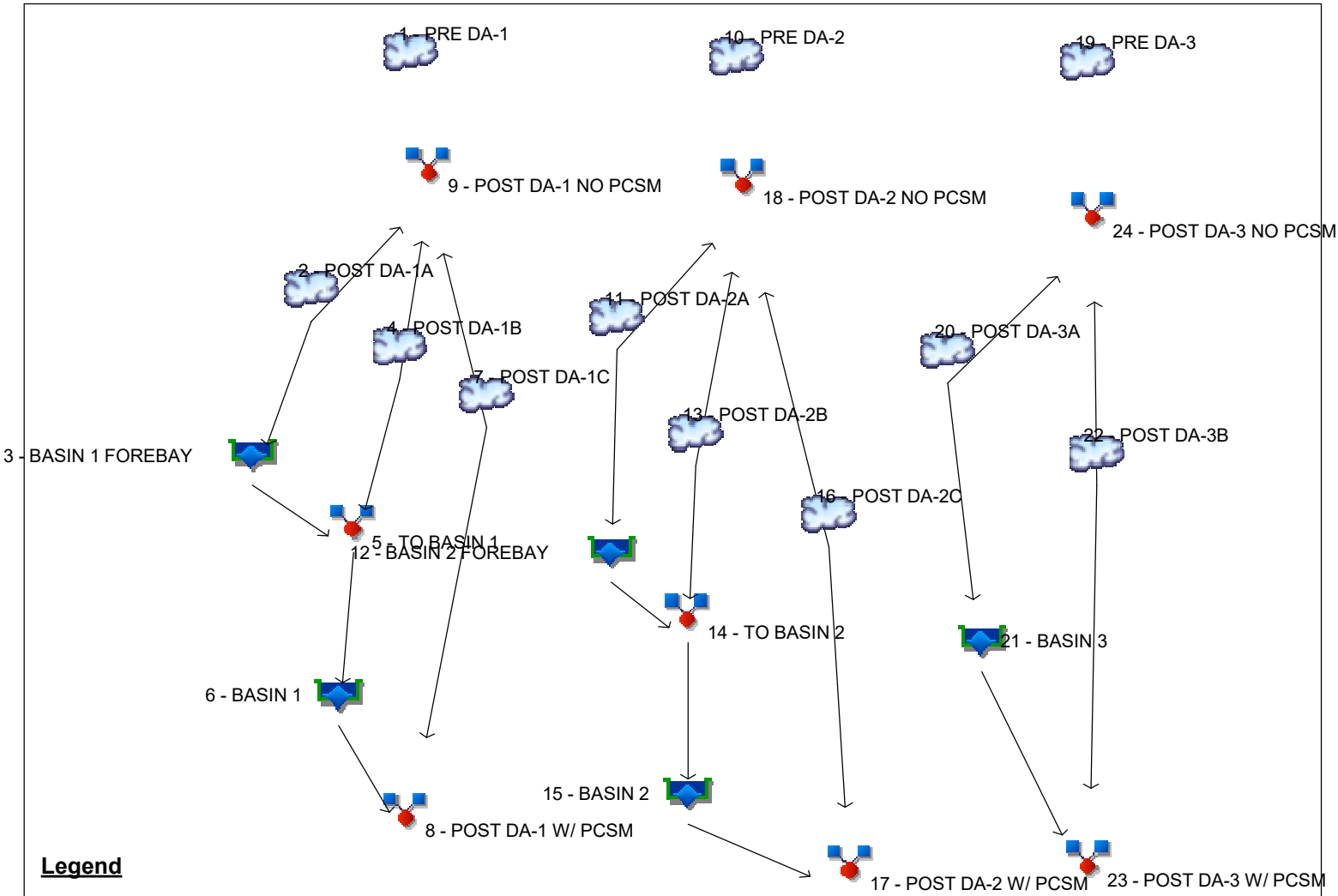
Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	PRE DA-1
2	SCS Runoff	POST DA-1A
3	Reservoir	BASIN 1 FOREBAY
4	SCS Runoff	POST DA-1B
5	Combine	TO BASIN 1
6	Reservoir	BASIN 1
7	SCS Runoff	POST DA-1C
8	Combine	POST DA-1 W/ PCSM
9	Combine	POST DA-1 NO PCSM
10	SCS Runoff	PRE DA-2
11	SCS Runoff	POST DA-2A
12	Reservoir	BASIN 2 FOREBAY
13	SCS Runoff	POST DA-2B
14	Combine	TO BASIN 2
15	Reservoir	BASIN 2
16	SCS Runoff	POST DA-2C
17	Combine	POST DA-2 W/ PCSM
18	Combine	POST DA-2 NO PCSM
19	SCS Runoff	PRE DA-3
20	SCS Runoff	POST DA-3A
21	Reservoir	BASIN 3
22	SCS Runoff	POST DA-3B
23	Combine	POST DA-3 W/ PCSM
24	Combine	POST DA-3 NO PCSM

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	33.31	54.64	-------	-------	116.42	160.72	198.38	239.49	PRE DA-1
2	SCS Runoff	------	53.68	73.81	-------	-------	128.23	164.71	194.49	226.23	POST DA-1A
3	Reservoir	2	6.817	32.51	-------	-------	104.40	139.74	166.97	195.54	BASIN 1 FOREBAY
4	SCS Runoff	------	32.29	42.80	-------	-------	69.76	87.22	101.32	116.25	POST DA-1B
5	Combine	3, 4	32.29	58.92	-------	-------	166.44	220.54	262.41	306.36	TO BASIN 1
6	Reservoir	5	3.206	8.667	-------	-------	59.50	77.95	87.45	98.54	BASIN 1
7	SCS Runoff	------	8.506	14.51	-------	-------	32.10	44.68	55.31	66.93	POST DA-1C
8	Combine	6, 7	9.572	16.44	-------	-------	65.20	114.36	125.39	147.52	POST DA-1 W/ PCSM
9	Combine	2, 4, 7,	94.41	130.68	-------	-------	229.05	295.81	350.59	409.23	POST DA-1 NO PCSM
10	SCS Runoff	------	23.01	38.99	-------	-------	85.79	119.41	148.27	179.87	PRE DA-2
11	SCS Runoff	------	59.07	79.50	-------	-------	134.12	169.91	198.96	229.81	POST DA-2A
12	Reservoir	11	47.66	66.15	-------	-------	102.93	145.05	171.88	198.55	BASIN 2 FOREBAY
13	SCS Runoff	------	2.169	3.151	-------	-------	5.837	7.702	9.260	10.94	POST DA-2B
14	Combine	12, 13	49.47	68.14	-------	-------	107.64	151.18	179.91	208.70	TO BASIN 2
15	Reservoir	14	0.000	0.508	-------	-------	3.286	5.084	6.335	13.94	BASIN 2
16	SCS Runoff	------	15.55	24.37	-------	-------	49.42	66.92	81.54	97.93	POST DA-2C
17	Combine	15, 16	15.55	24.37	-------	-------	49.42	66.92	81.54	98.42	POST DA-2 W/ PCSM
18	Combine	11, 13, 16,	76.79	106.87	-------	-------	188.44	244.06	289.75	338.67	POST DA-2 NO PCSM
19	SCS Runoff	------	14.72	24.94	-------	-------	54.89	76.40	94.86	115.08	PRE DA-3
20	SCS Runoff	------	39.17	55.27	-------	-------	98.86	128.85	153.49	179.87	POST DA-3A
21	Reservoir	20	0.999	1.726	-------	-------	3.318	16.17	37.08	39.01	BASIN 3
22	SCS Runoff	------	4.830	7.404	-------	-------	14.65	19.67	23.92	28.60	POST DA-3B
23	Combine	21, 22	4.830	7.404	-------	-------	16.66	22.41	48.97	65.32	POST DA-3 W/ PCSM
24	Combine	20, 22,	44.00	62.67	-------	-------	113.30	148.45	177.41	208.47	POST DA-3 NO PCSM

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

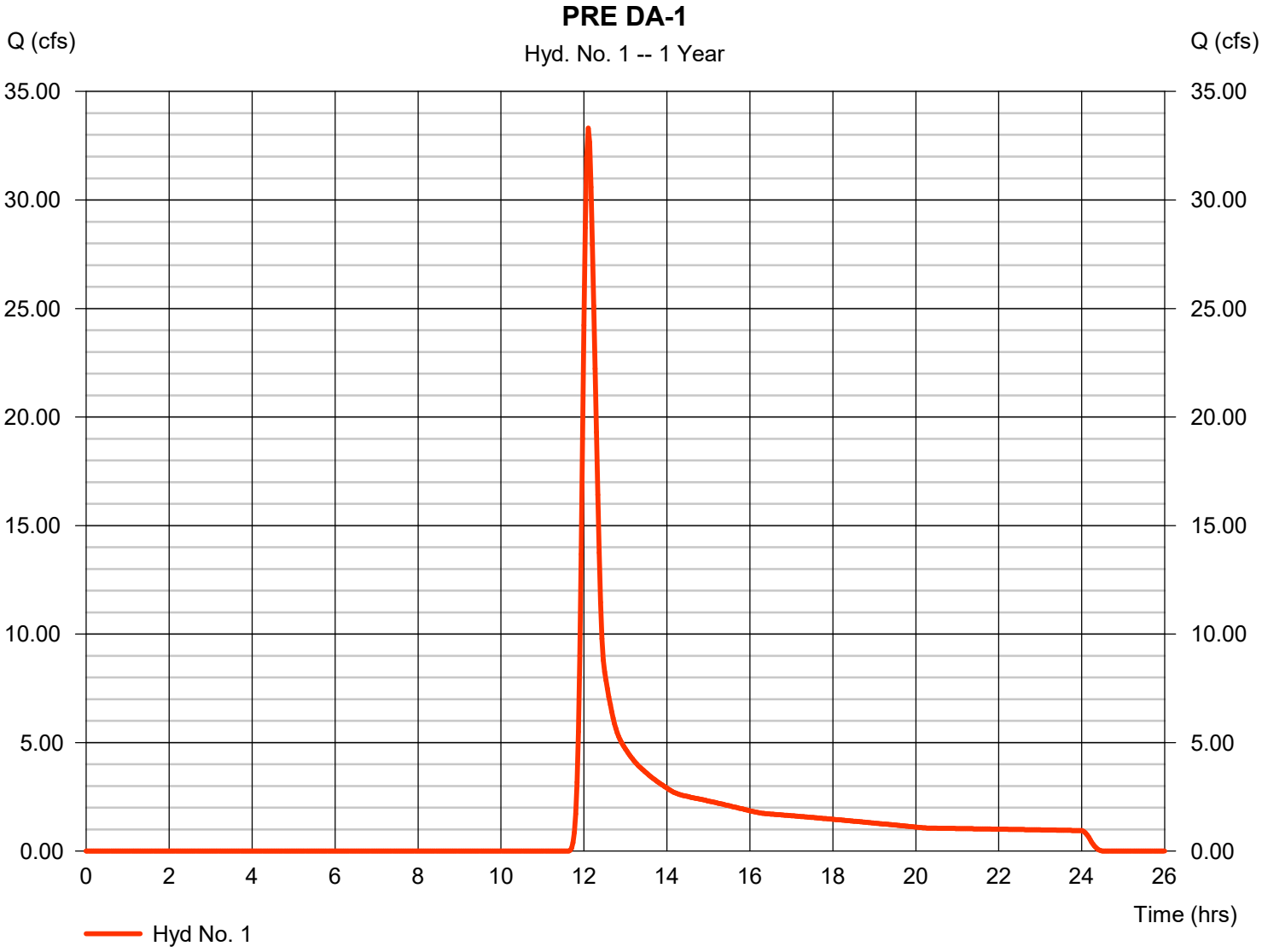
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	33.31	2	726	124,276	------	------	------	PRE DA-1
2	SCS Runoff	53.68	2	718	107,347	------	------	------	POST DA-1A
3	Reservoir	6.817	2	738	65,663	2	1116.76	46,938	BASIN 1 FOREBAY
4	SCS Runoff	32.29	2	716	65,192	------	------	------	POST DA-1B
5	Combine	32.29	2	716	130,855	3, 4	------	------	TO BASIN 1
6	Reservoir	3.206	2	844	130,190	5	1114.22	53,060	BASIN 1
7	SCS Runoff	8.506	2	718	19,253	------	------	------	POST DA-1C
8	Combine	9.572	2	718	149,443	6, 7	------	------	POST DA-1 W/ PCSM
9	Combine	94.41	2	718	191,791	2, 4, 7,	------	------	POST DA-1 NO PCSM
10	SCS Runoff	23.01	2	726	89,190	------	------	------	PRE DA-2
11	SCS Runoff	59.07	2	718	118,517	------	------	------	POST DA-2A
12	Reservoir	47.66	2	720	100,187	11	1121.12	31,870	BASIN 2 FOREBAY
13	SCS Runoff	2.169	2	718	4,381	------	------	------	POST DA-2B
14	Combine	49.47	2	720	104,568	12, 13	------	------	TO BASIN 2
15	Reservoir	0.000	2	n/a	0	14	1113.57	104,568	BASIN 2
16	SCS Runoff	15.55	2	718	32,767	------	------	------	POST DA-2C
17	Combine	15.55	2	718	32,767	15, 16	------	------	POST DA-2 W/ PCSM
18	Combine	76.79	2	718	155,665	11, 13, 16,	------	------	POST DA-2 NO PCSM
19	SCS Runoff	14.72	2	726	57,063	------	------	------	PRE DA-3
20	SCS Runoff	39.17	2	718	78,481	------	------	------	POST DA-3A
21	Reservoir	0.999	2	950	42,887	20	1106.69	49,844	BASIN 3
22	SCS Runoff	4.830	2	718	10,027	------	------	------	POST DA-3B
23	Combine	4.830	2	718	52,914	21, 22	------	------	POST DA-3 W/ PCSM
24	Combine	44.00	2	718	88,508	20, 22,	------	------	POST DA-3 NO PCSM

Hydrograph Report

Hyd. No. 1

PRE DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.31 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	124,276 cuft
Drainage area	=	80.750 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 1

PRE DA-1

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.41		0.00		0.00		
Land slope (%)	= 15.00		0.00		0.00		
Travel Time (min)	**= 11.05**	**+**	**0.00**	**+**	**0.00**	**=**	**11.05**
Shallow Concentrated Flow							
Flow length (ft)	= 864.00		0.00		0.00		
Watercourse slope (%)	= 17.80		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=6.81		0.00		0.00		
Travel Time (min)	**= 2.12**	**+**	**0.00**	**+**	**0.00**	**=**	**2.12**
Channel Flow							
X sectional flow area (sqft)	= 1.00		0.00		0.00		
Wetted perimeter (ft)	= 4.12		0.00		0.00		
Channel slope (%)	= 3.40		0.00		0.00		
Manning's n-value	= 0.030		0.015		0.015		
Velocity (ft/s)	=3.55						
			0.00				
					0.00		
Flow length (ft)	({0})1301.0		0.0		0.0		
Travel Time (min)	**= 6.11**	**+**	**0.00**	**+**	**0.00**	**=**	**6.11**

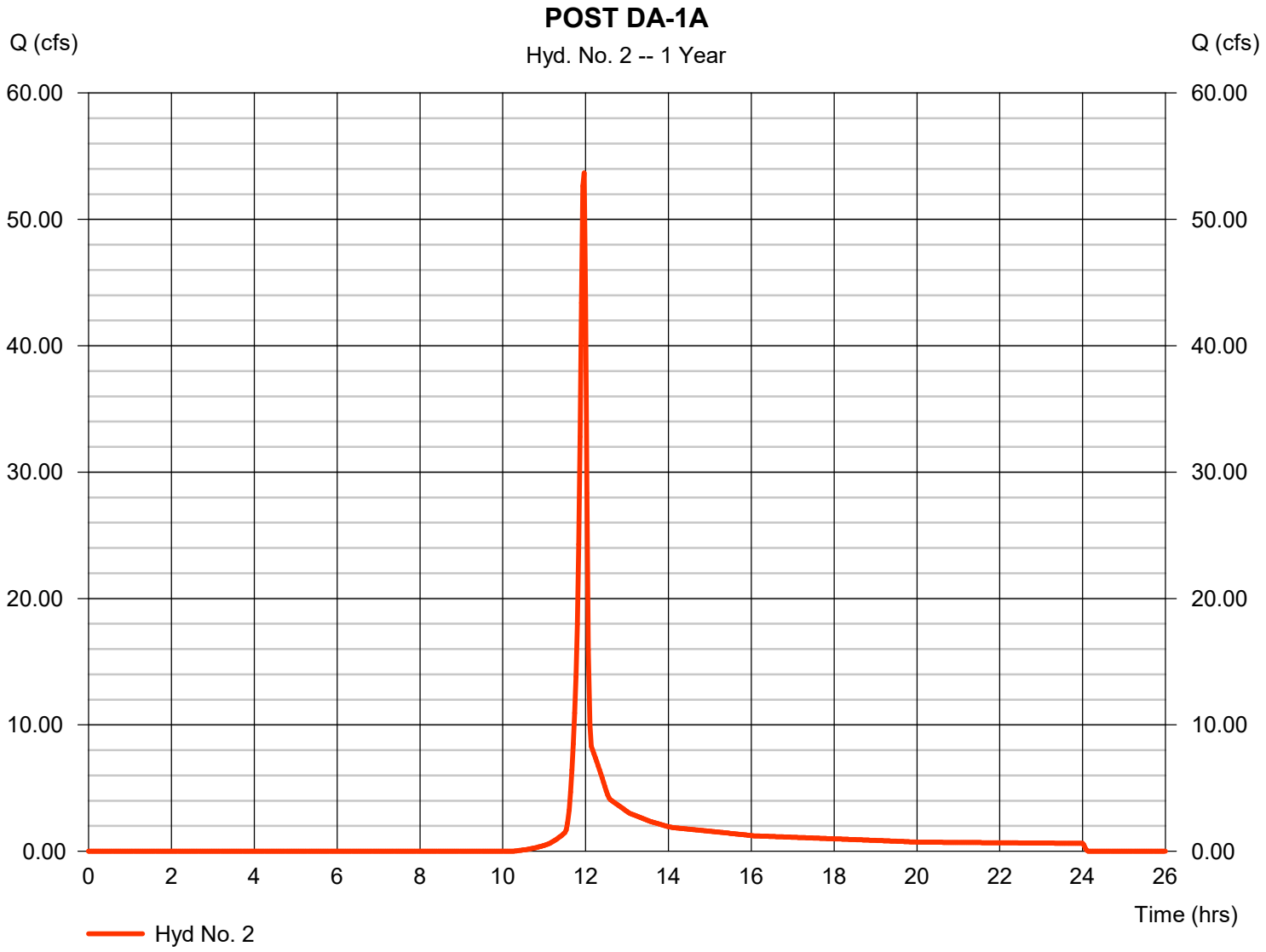
Total Travel Time, Tc ..... 19.30 min

Hydrograph Report

Hyd. No. 2

POST DA-1A

Hydrograph type	= SCS Runoff	Peak discharge	= 53.68 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 107,347 cuft
Drainage area	= 41.610 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



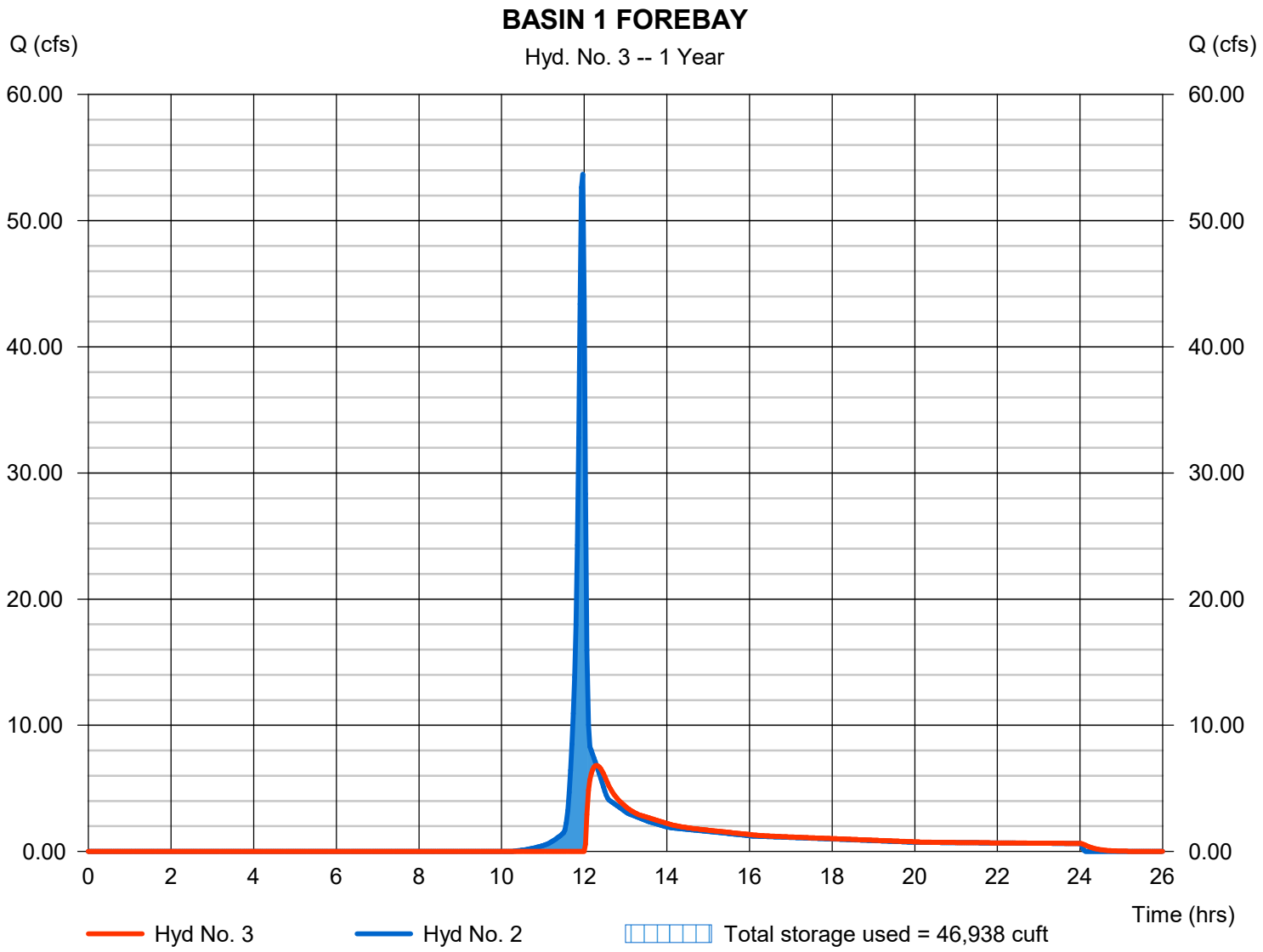
Hydrograph Report

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	= Reservoir	Peak discharge	= 6.817 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.30 hrs
Time interval	= 2 min	Hyd. volume	= 65,663 cuft
Inflow hyd. No.	= 2 - POST DA-1A	Max. Elevation	= 1116.76 ft
Reservoir name	= BASIN 1 FOREBAY	Max. Storage	= 46,938 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN 1 FOREBAY

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1114.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1114.00	14,648	0	0
1.00	1115.00	16,236	15,434	15,434
2.00	1116.00	17,929	17,074	32,507
2.50	1116.50	18,777	9,175	41,682
4.00	1118.00	21,593	30,250	71,932
6.00	1120.00	25,593	47,125	119,057

Culvert / Orifice Structures

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

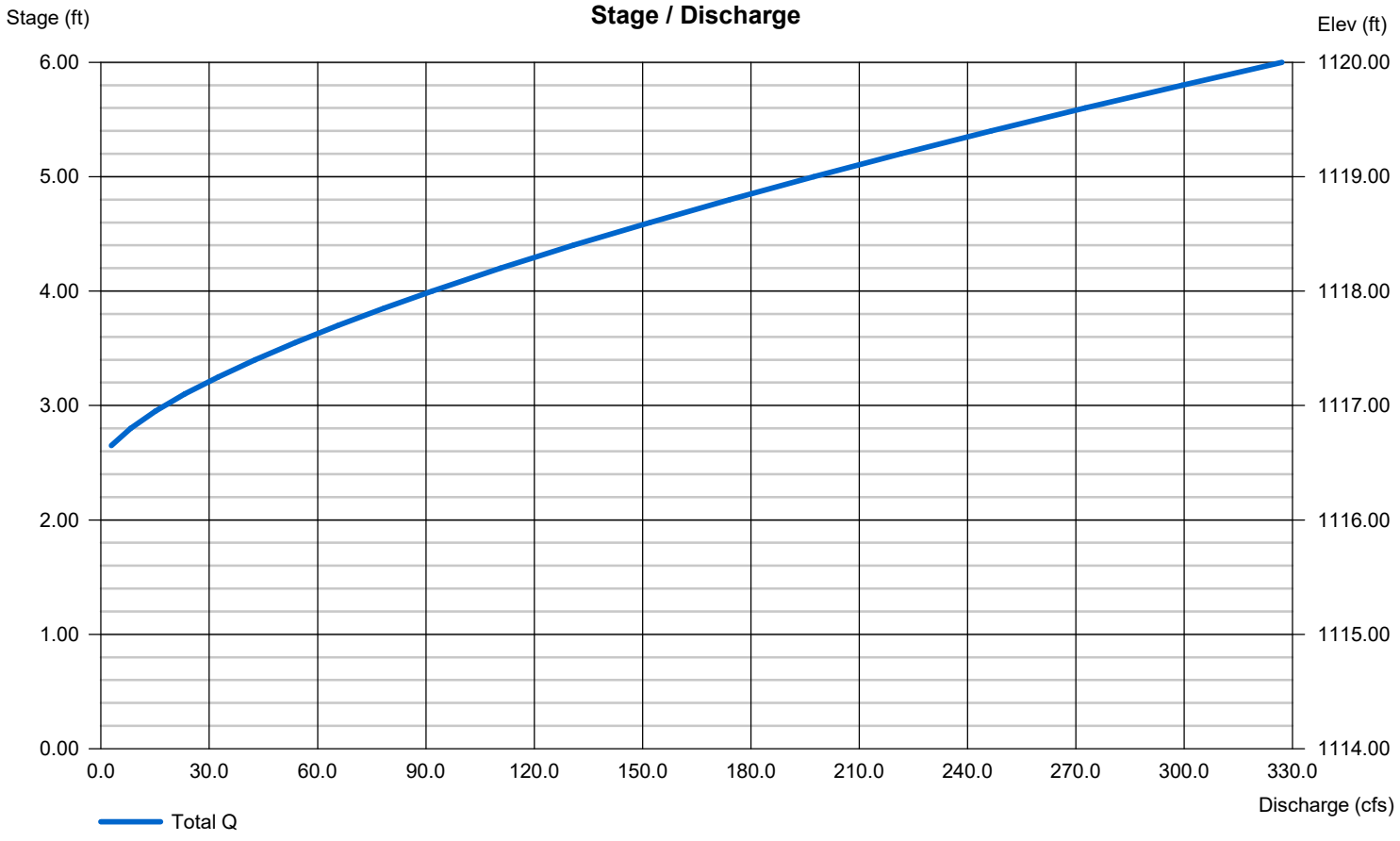
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	Inactive	0.00	0.00
Crest El. (ft)	= 1116.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	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).

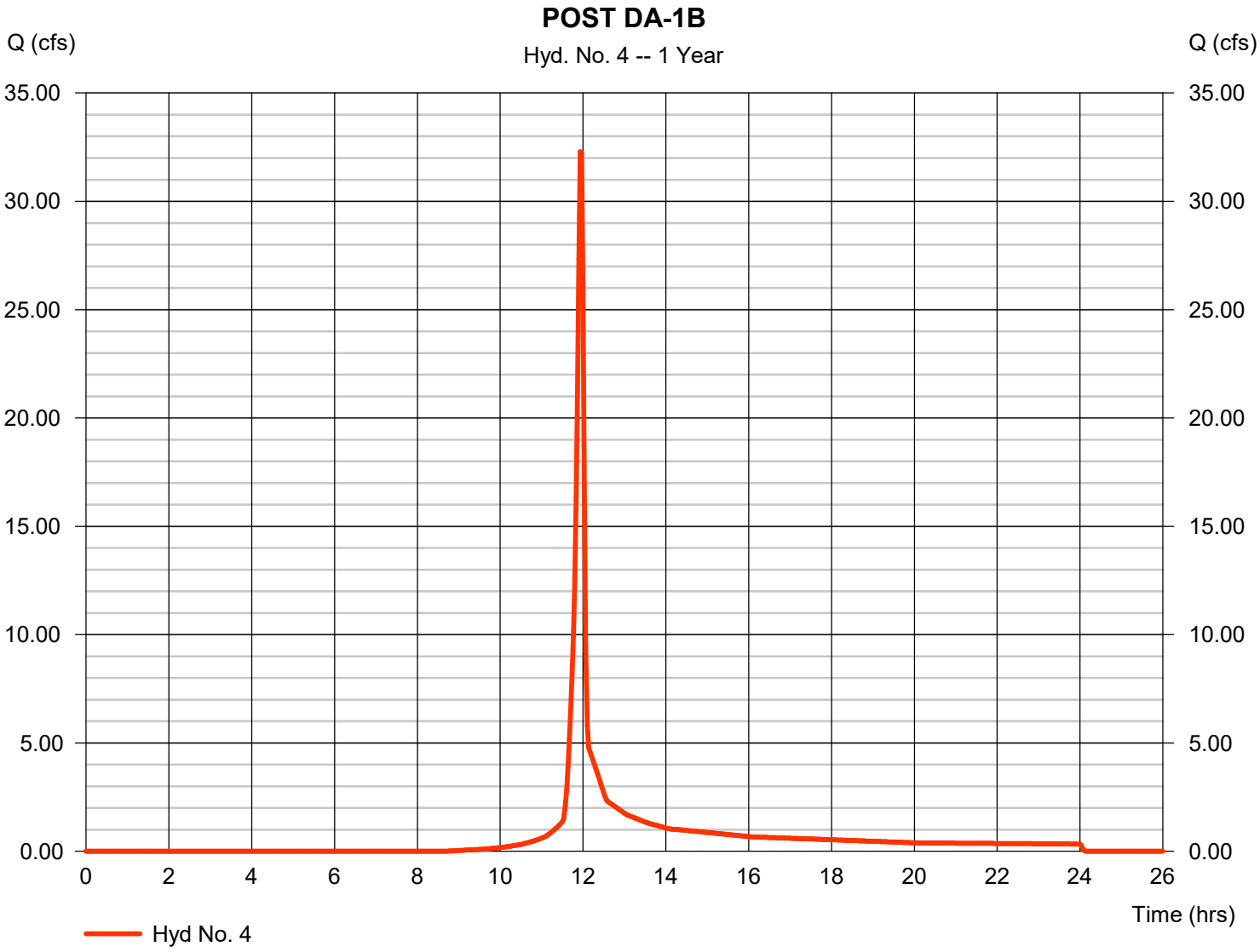


Hydrograph Report

Hyd. No. 4

POST DA-1B

Hydrograph type	= SCS Runoff	Peak discharge	= 32.29 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 65,192 cuft
Drainage area	= 19.520 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

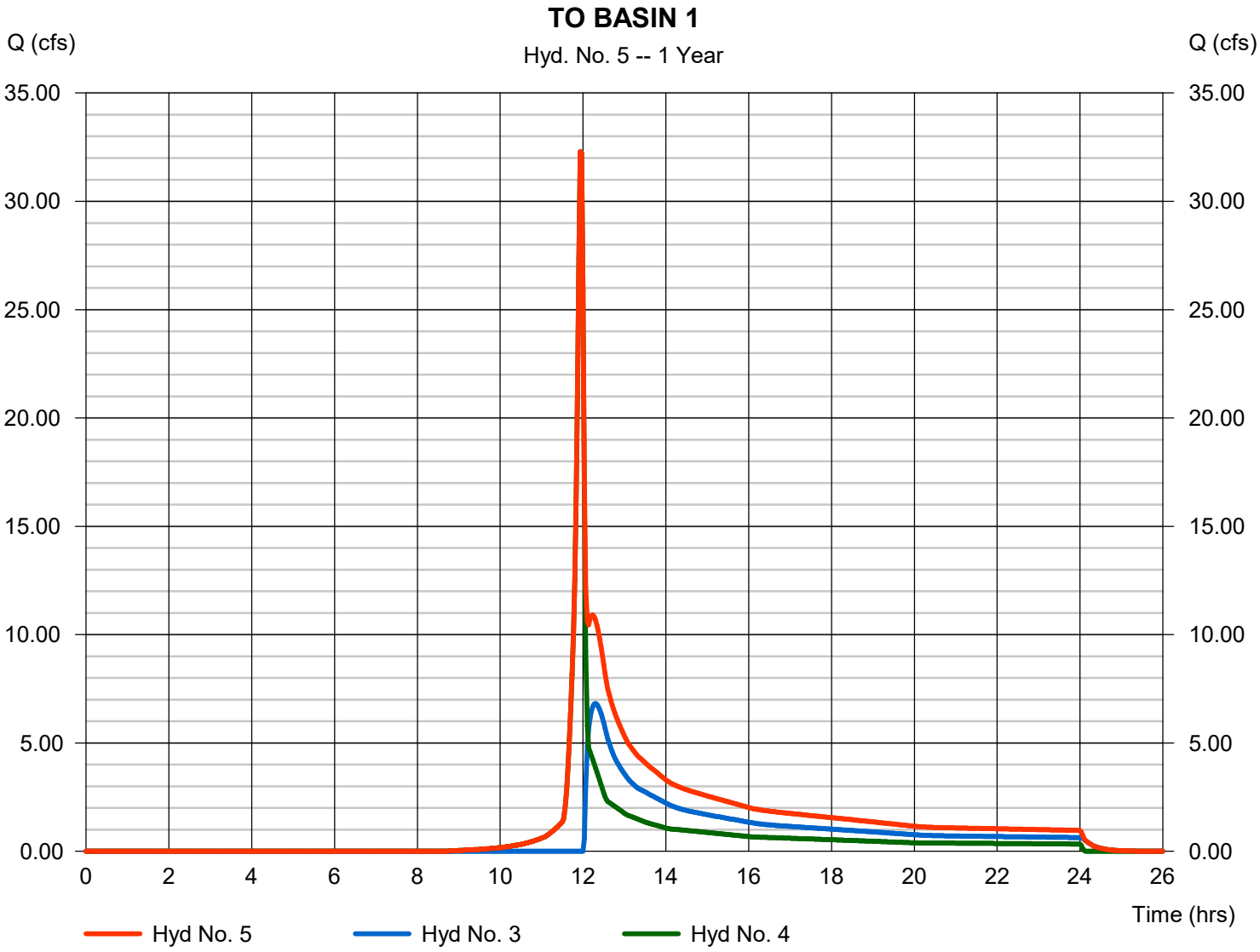


Hydrograph Report

Hyd. No. 5

TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 32.29 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 130,855 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 19.520 ac



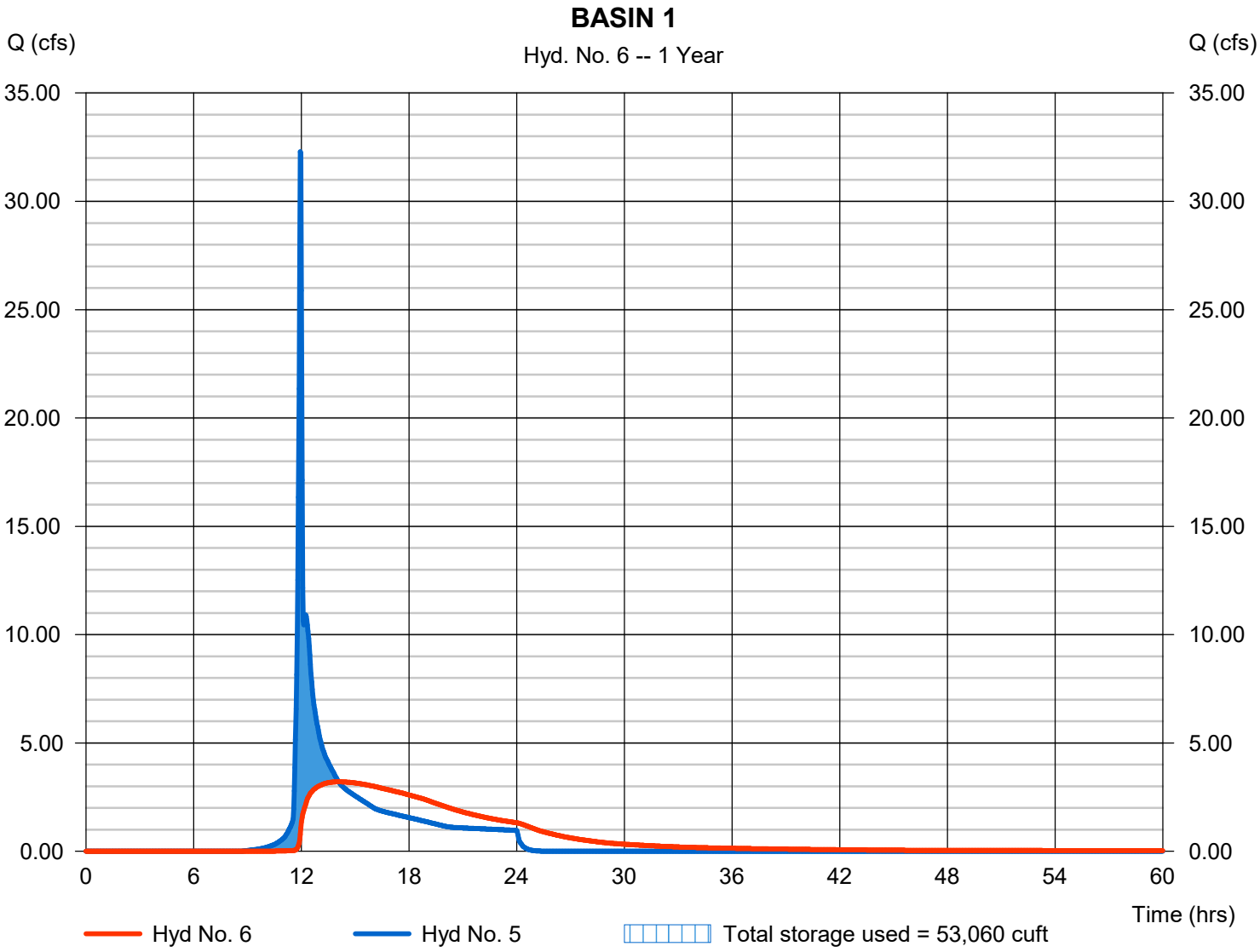
Hydrograph Report

Hyd. No. 6

BASIN 1

Hydrograph type	=	Reservoir	Peak discharge	=	3.206 cfs
Storm frequency	=	1 yrs	Time to peak	=	14.07 hrs
Time interval	=	2 min	Hyd. volume	=	130,190 cuft
Inflow hyd. No.	=	5 - TO BASIN 1	Max. Elevation	=	1114.22 ft
Reservoir name	=	BASIN 1	Max. Storage	=	53,060 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BASIN 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1113.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1113.00	41,195	0	0
1.00	1114.00	44,172	42,671	42,671
3.00	1116.00	50,293	94,389	137,060
5.00	1118.00	56,640	106,859	243,919
7.00	1120.00	63,214	119,782	363,701

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 48.00	12.00	0.00	0.00
Span (in)	= 48.00	12.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1106.18	1113.00	0.00	0.00
Length (ft)	= 79.70	0.00	0.00	0.00
Slope (%)	= 1.10	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

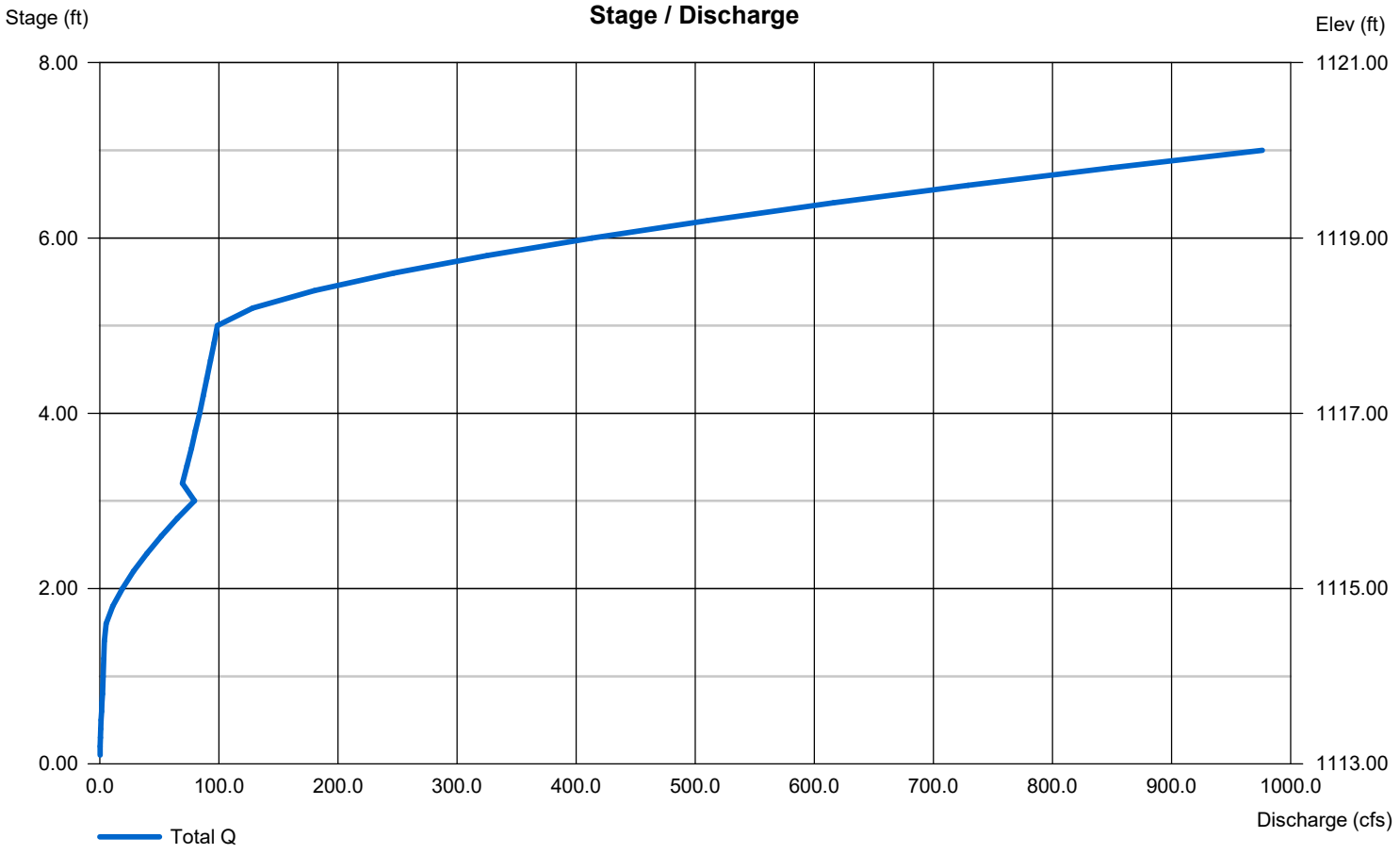
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	116.00	Inactive	0.00
Crest El. (ft)	= 1114.50	1118.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	Rect	---
Multi-Stage	= Yes	No	Yes	No

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

TW Elev. (ft) = 0.00

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

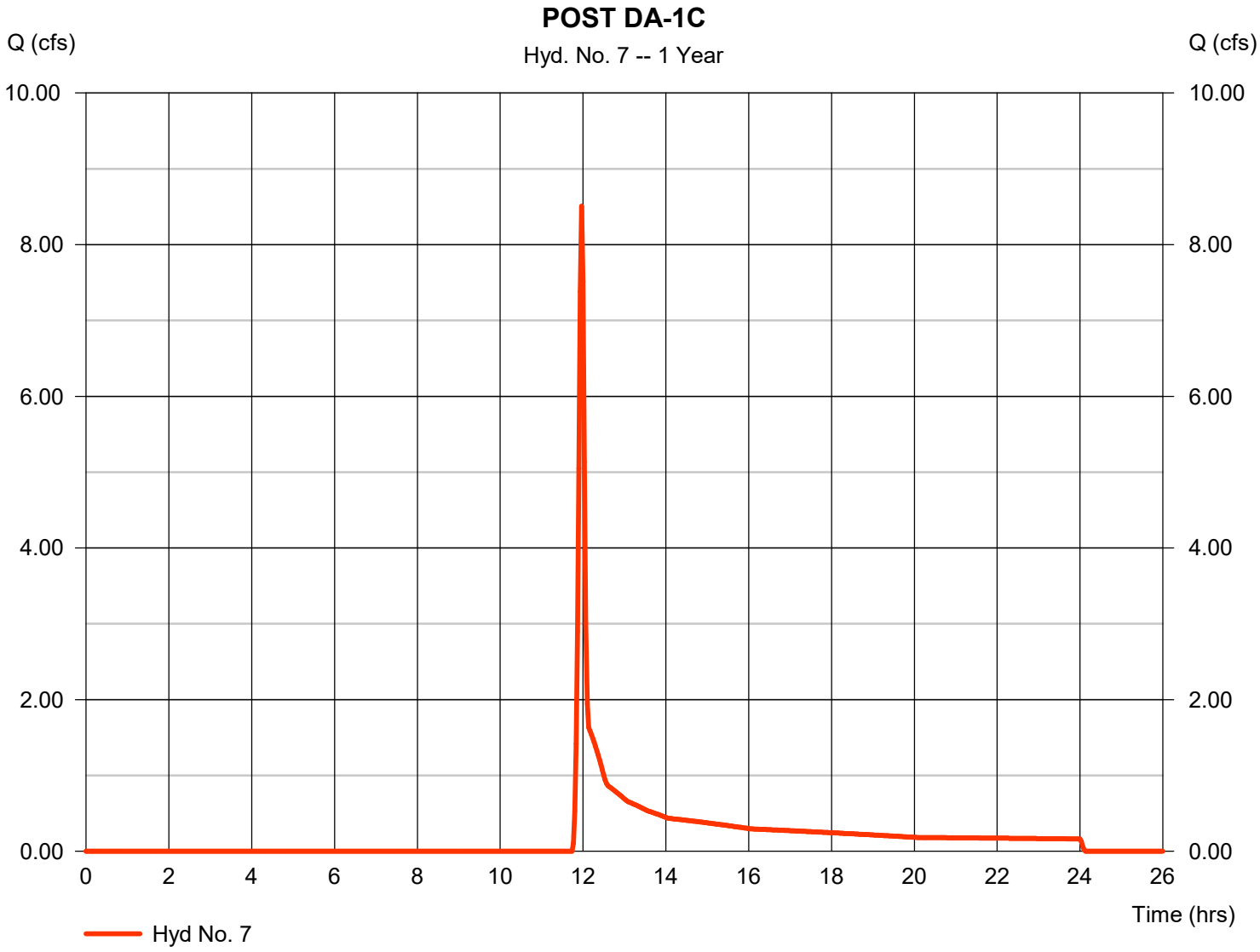


Hydrograph Report

Hyd. No. 7

POST DA-1C

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.506 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	19,253 cuft
Drainage area	=	17.190 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

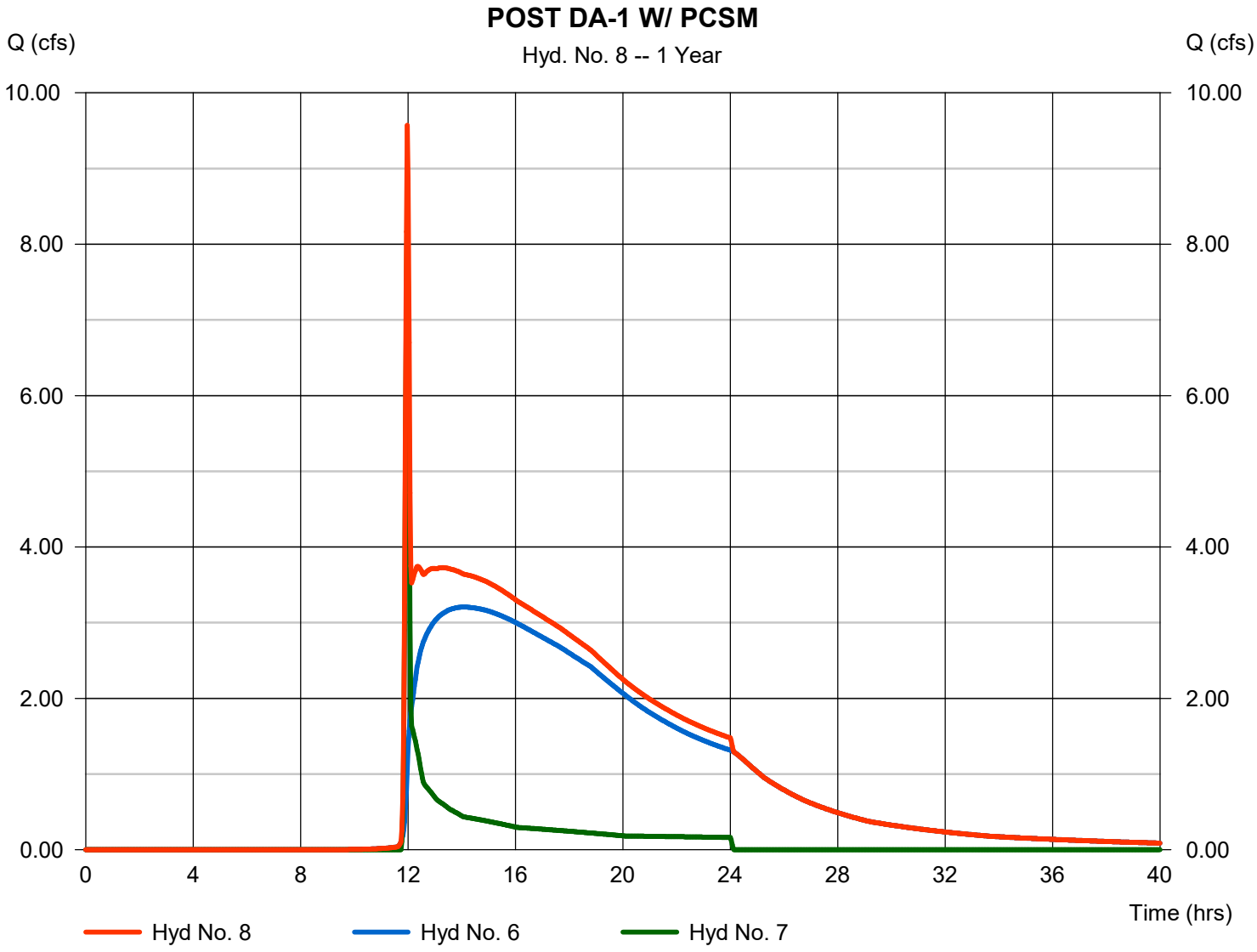


Hydrograph Report

Hyd. No. 8

POST DA-1 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 9.572 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 149,443 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 17.190 ac

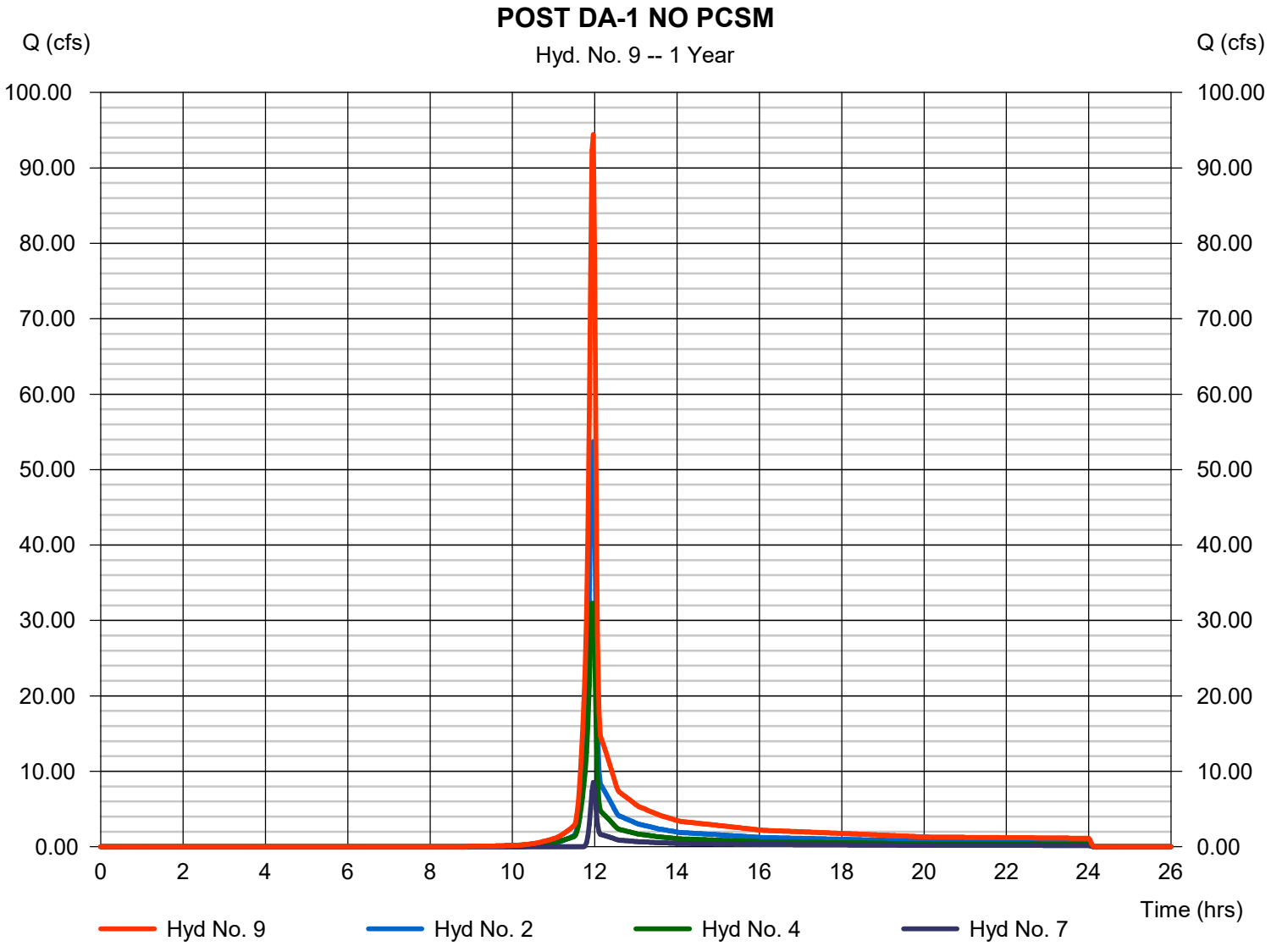


Hydrograph Report

Hyd. No. 9

POST DA-1 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 94.41 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 191,791 cuft
Inflow hyds.	= 2, 4, 7	Contrib. drain. area	= 78.320 ac

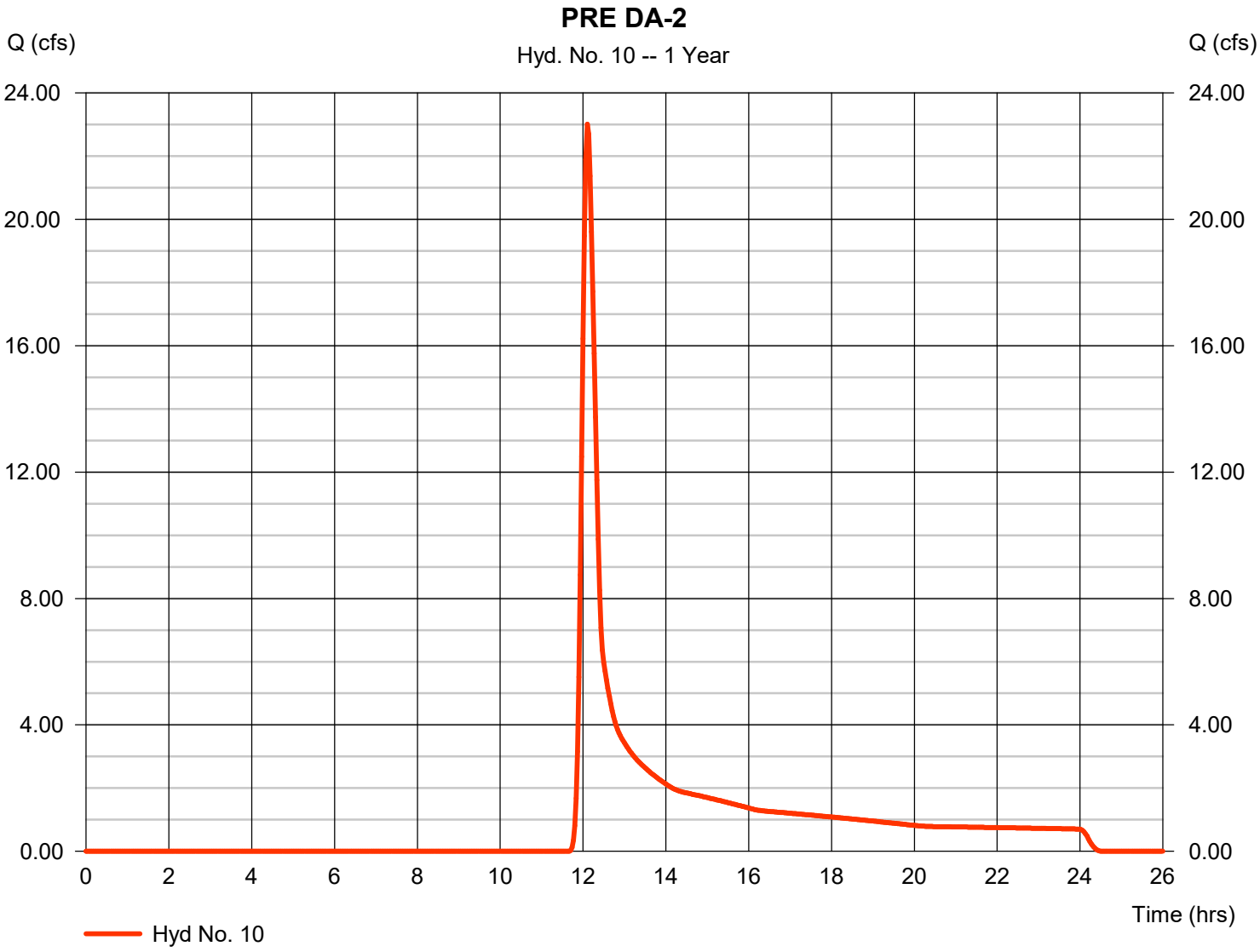


Hydrograph Report

Hyd. No. 10

PRE DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.01 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	89,190 cuft
Drainage area	=	62.880 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.00 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 10

PRE DA-2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.240		0.011		
Flow length (ft)	= 42.4		57.6		0.0		
Two-year 24-hr precip. (in)	= 2.41		2.41		0.00		
Land slope (%)	= 7.00		14.00		0.00		
Travel Time (min)	**= 7.55**	**+**	**4.86**	**+**	**0.00**	**=**	**12.40**
Shallow Concentrated Flow							
Flow length (ft)	= 421.00		388.00		0.00		
Watercourse slope (%)	= 15.90		18.00		0.00		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=6.43		6.85		0.00		
Travel Time (min)	**= 1.09**	**+**	**0.94**	**+**	**0.00**	**=**	**2.04**
Channel Flow							
X sectional flow area (sqft)	= 1.00		0.00		0.00		
Wetted perimeter (ft)	= 4.10		0.00		0.00		
Channel slope (%)	= 7.20		0.00		0.00		
Manning's n-value	= 0.030		0.015		0.015		
Velocity (ft/s)	=5.18						
			0.00				
					0.00		
Flow length (ft)	({0})1103.0		0.0		0.0		
Travel Time (min)	**= 3.55**	**+**	**0.00**	**+**	**0.00**	**=**	**3.55**

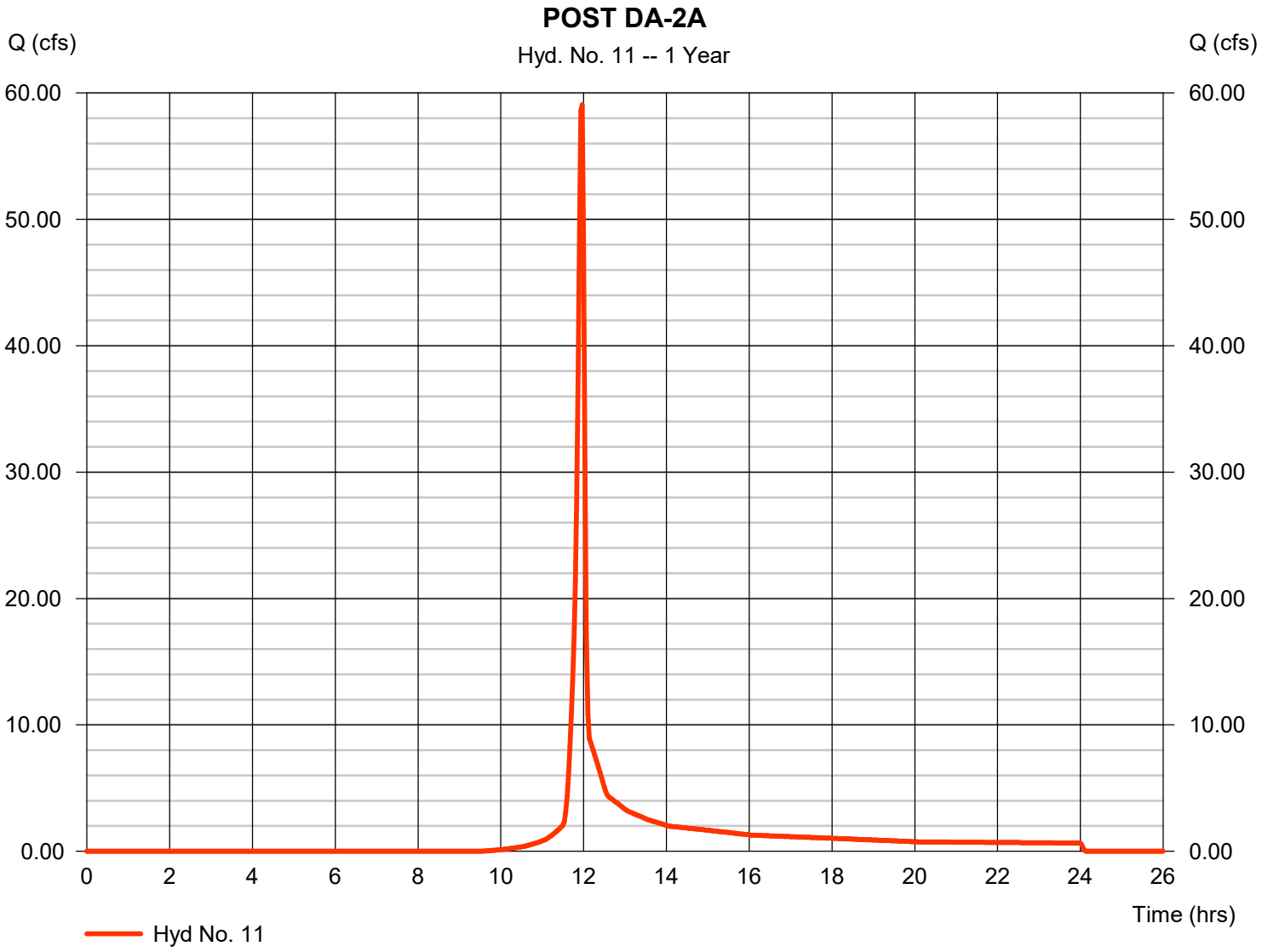
Total Travel Time, Tc ..... 18.00 min

Hydrograph Report

Hyd. No. 11

POST DA-2A

Hydrograph type	=	SCS Runoff	Peak discharge	=	59.07 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	118,517 cuft
Drainage area	=	40.300 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



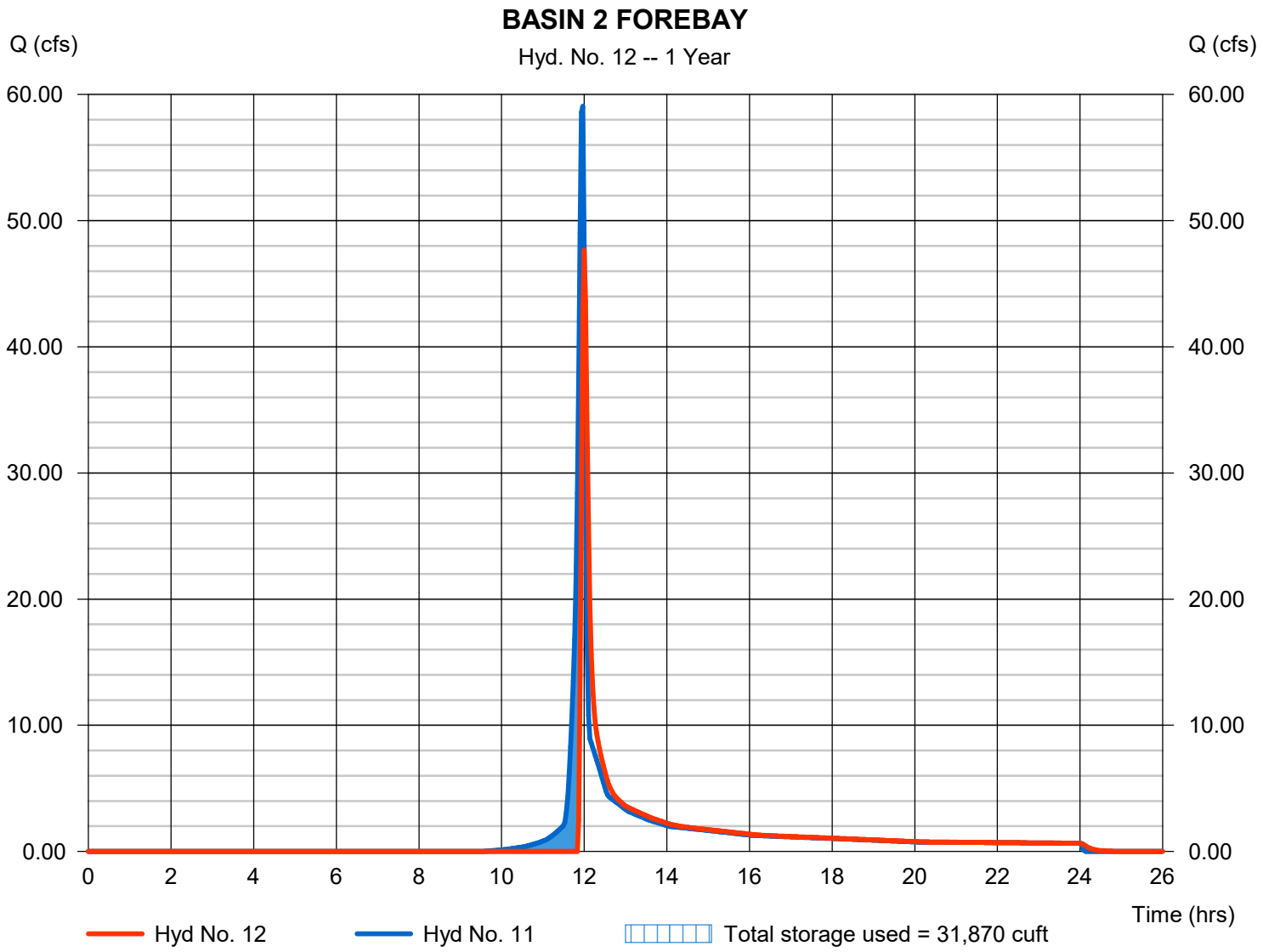
Hydrograph Report

Hyd. No. 12

BASIN 2 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	47.66 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	100,187 cuft
Inflow hyd. No.	=	11 - POST DA-2A	Max. Elevation	=	1121.12 ft
Reservoir name	=	BASIN 2 FOREBAY	Max. Storage	=	31,870 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BASIN 2 FOREBAY

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1118.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1118.00	7,830	0	0
2.00	1120.00	10,570	18,330	18,330
4.00	1122.00	13,621	24,124	42,454
6.00	1124.00	16,944	30,502	72,956
8.00	1126.00	20,494	37,378	110,334

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	0.00	0.00	0.00
Span (in)	= 36.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1112.00	0.00	0.00	0.00
Length (ft)	= 106.70	0.00	0.00	0.00
Slope (%)	= 1.90	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

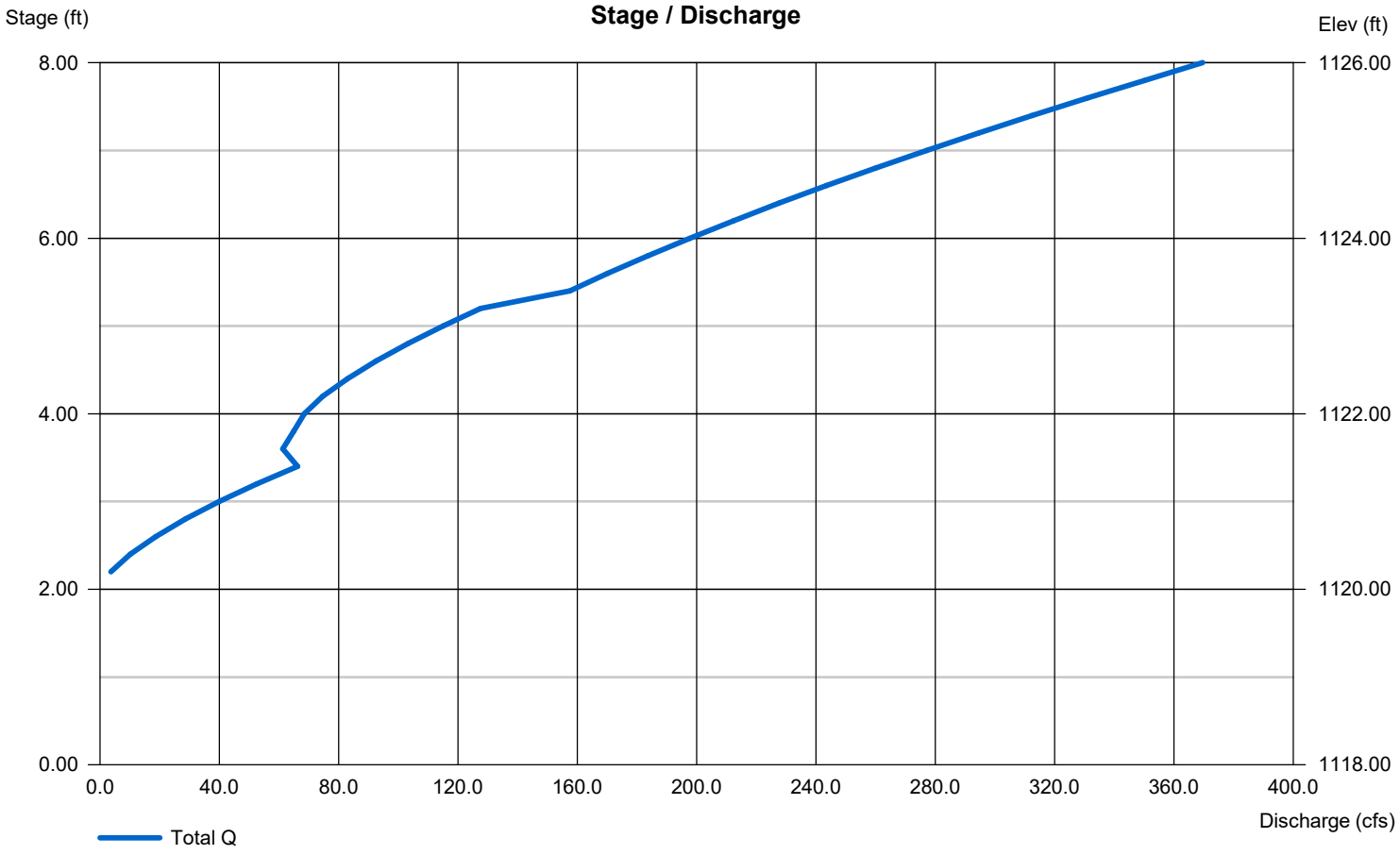
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	12.00	0.00	0.00
Crest El. (ft)	= 1120.00	1122.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
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).

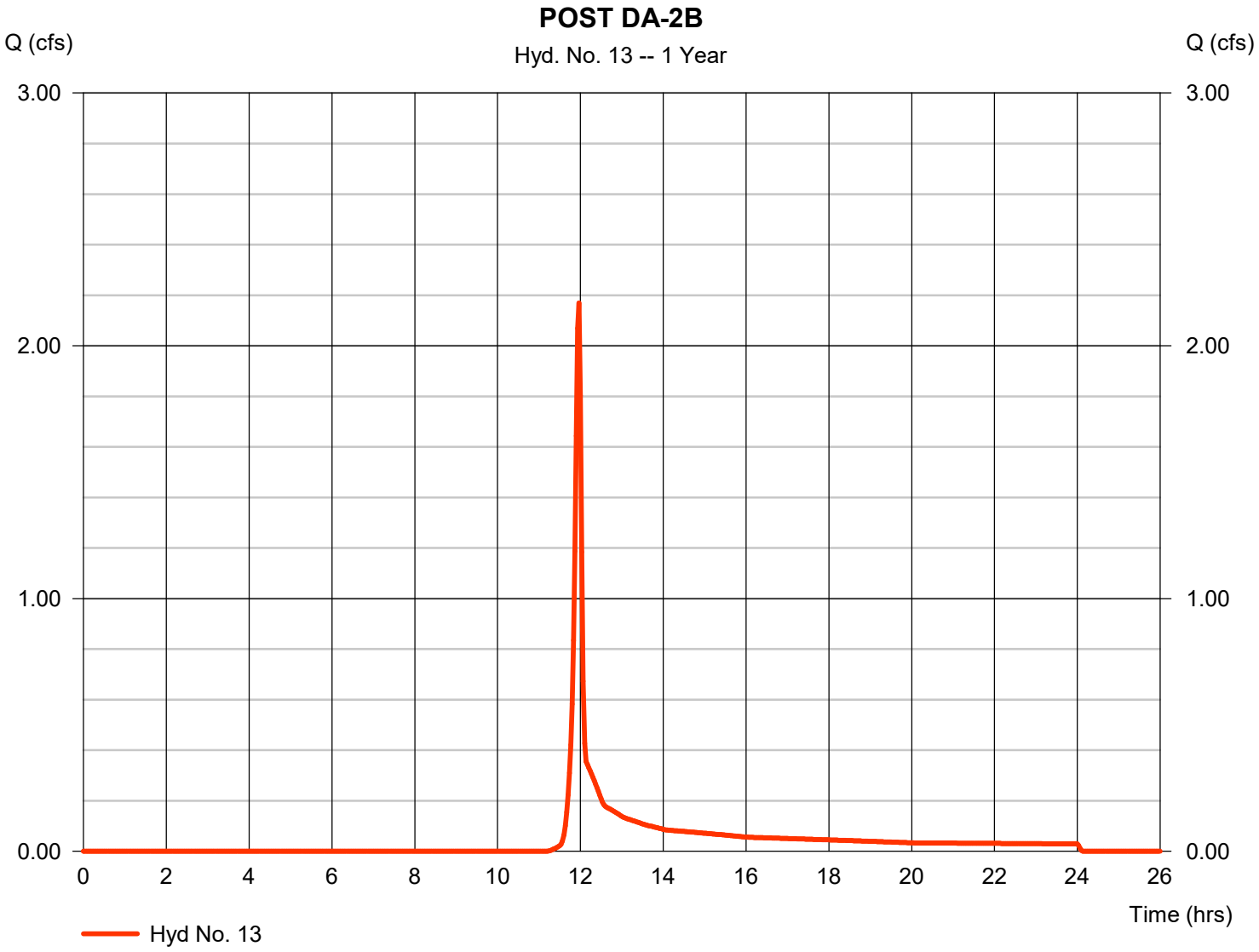


Hydrograph Report

Hyd. No. 13

POST DA-2B

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.169 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	4,381 cuft
Drainage area	=	2.240 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

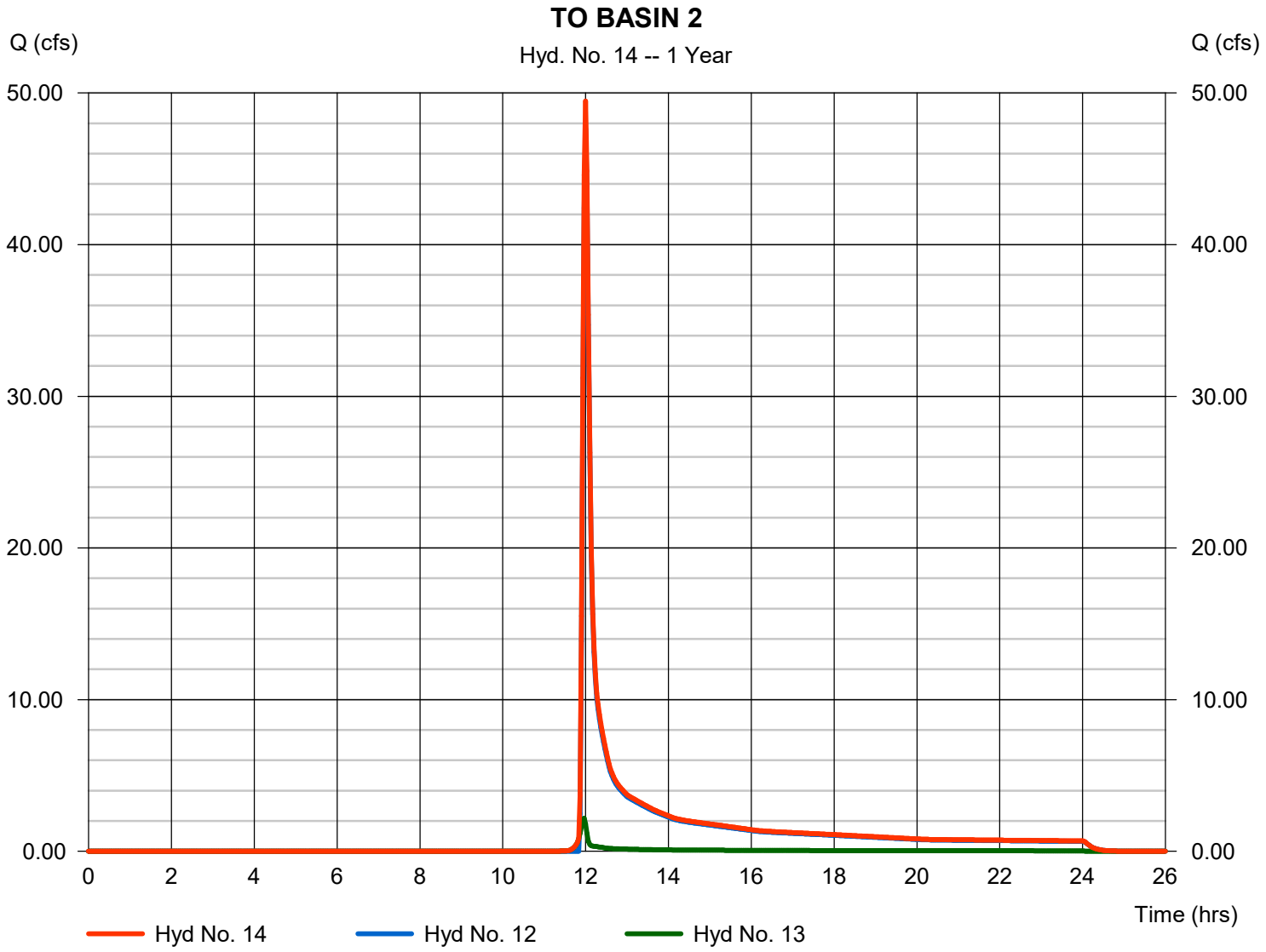


Hydrograph Report

Hyd. No. 14

TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 49.47 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 104,568 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 2.240 ac



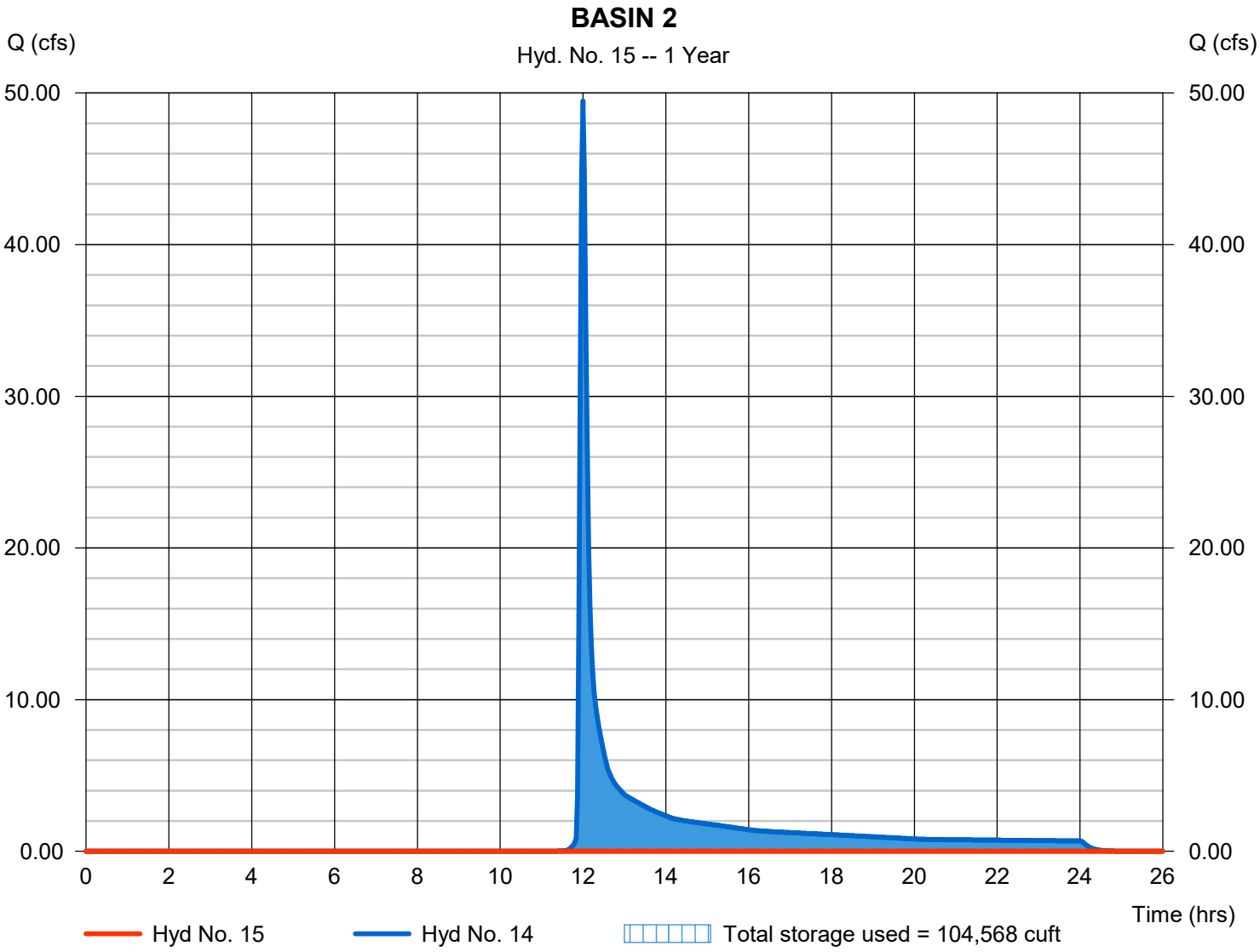
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	14 - TO BASIN 2	Max. Elevation	=	1113.57 ft
Reservoir name	=	BASIN 2	Max. Storage	=	104,568 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - BASIN 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1110.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1110.00	25,324	0	0
2.00	1112.00	29,507	54,772	54,772
4.00	1114.00	33,993	63,441	118,213
6.00	1116.00	38,715	72,650	190,863
8.00	1118.00	43,663	82,320	273,183
10.00	1120.00	48,837	92,443	365,625
12.00	1122.00	54,237	103,017	468,642

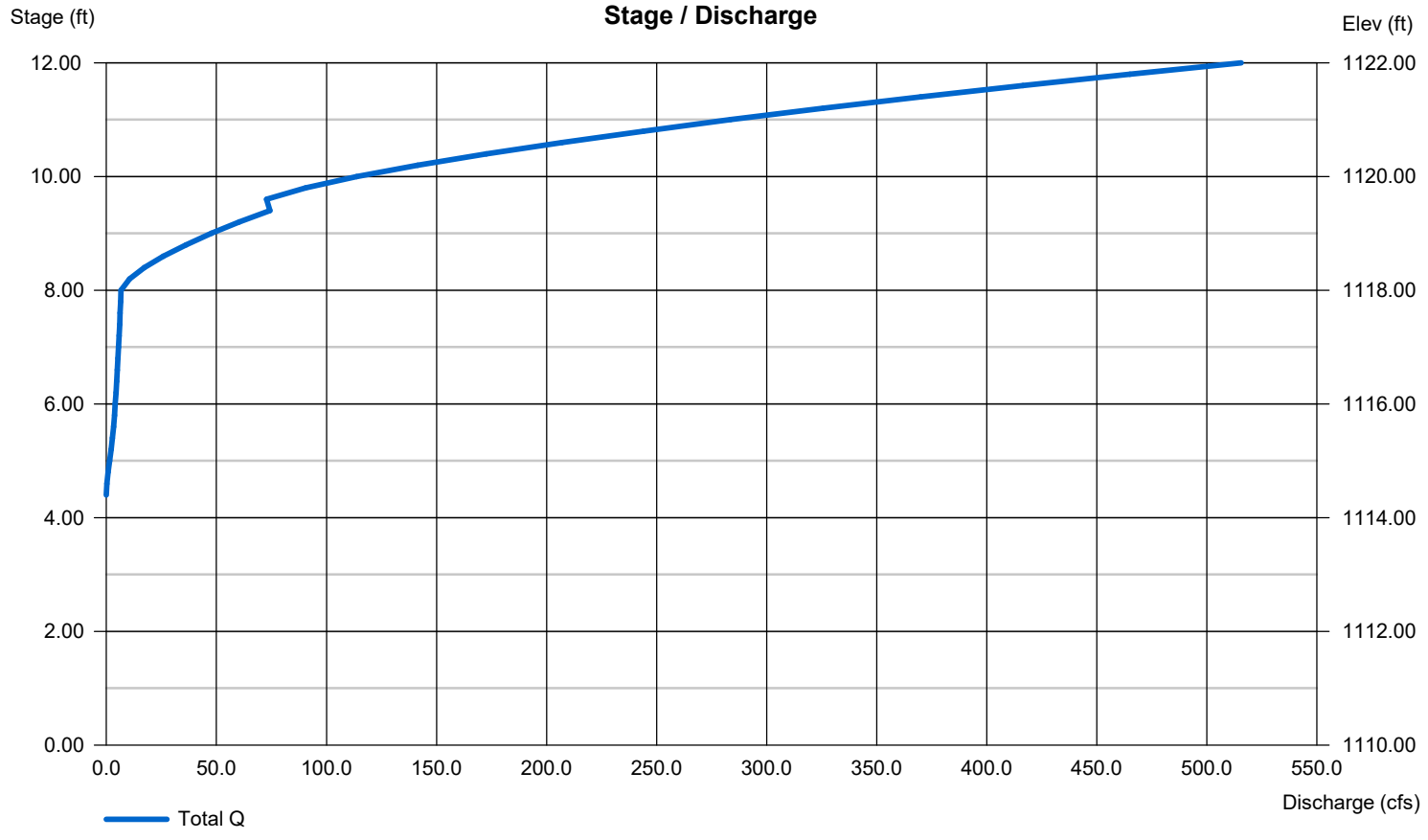
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	12.00	Inactive	0.00
Span (in)	= 36.00	12.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1106.82	1114.37	0.00	0.00
Length (ft)	= 183.30	0.00	0.00	0.00
Slope (%)	= 12.70	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	40.00	Inactive	0.00
Crest El. (ft)	= 1118.00	1119.50	1114.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	Rect	---
Multi-Stage	= Yes	No	Yes	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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

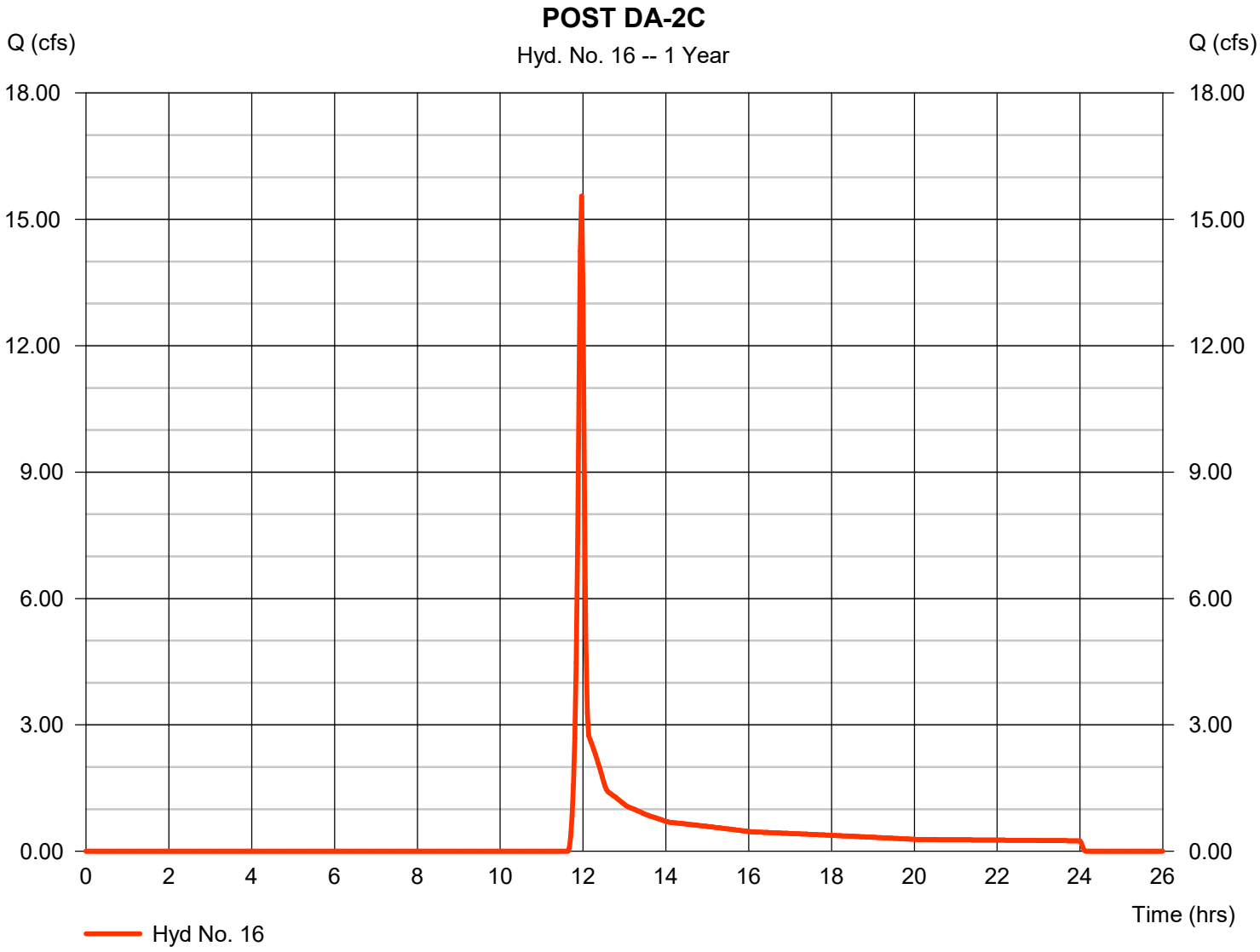


Hydrograph Report

Hyd. No. 16

POST DA-2C

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.55 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	32,767 cuft
Drainage area	=	22.710 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

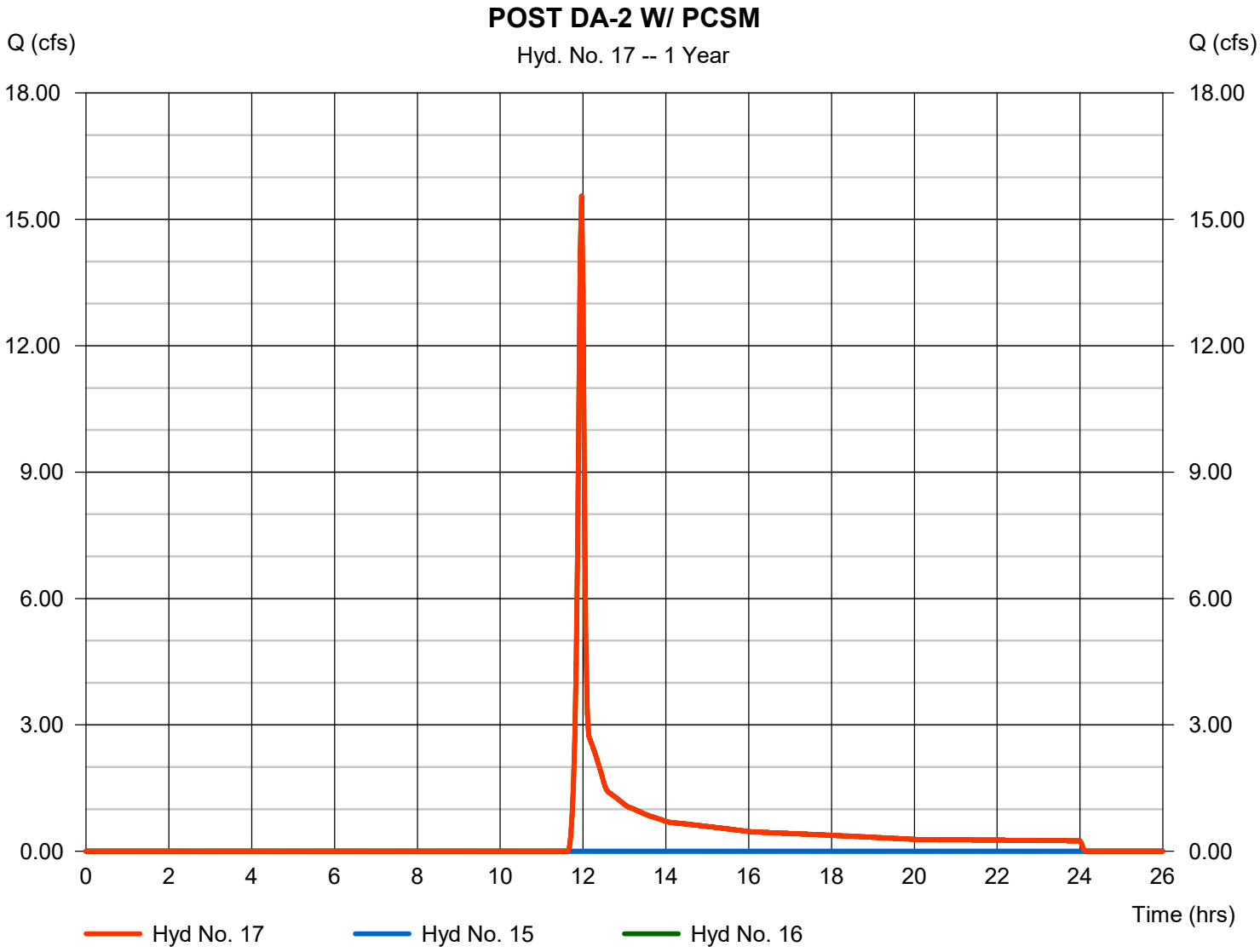


Hydrograph Report

Hyd. No. 17

POST DA-2 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 15.55 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 32,767 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 22.710 ac

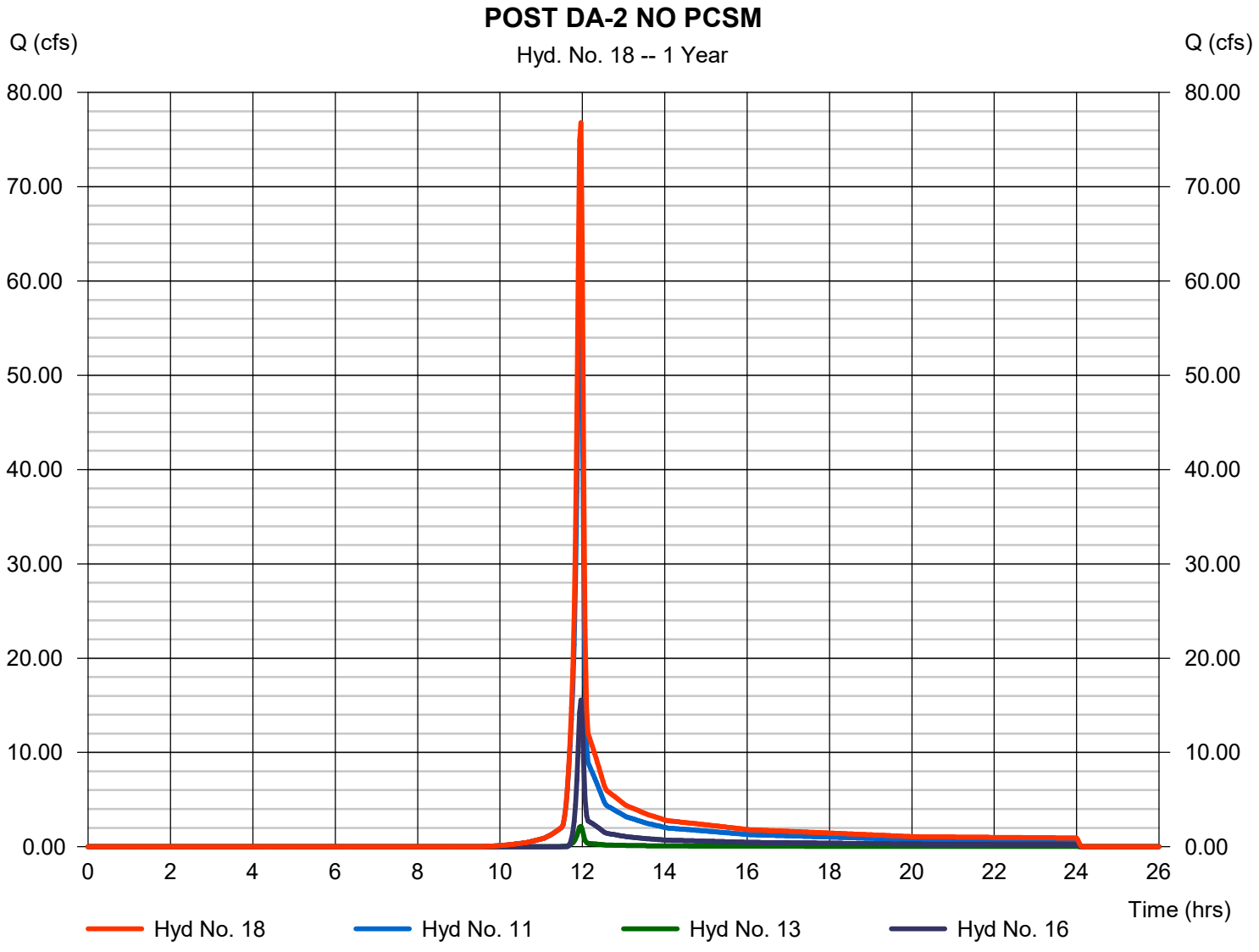


Hydrograph Report

Hyd. No. 18

POST DA-2 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 76.79 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 155,665 cuft
Inflow hyds.	= 11, 13, 16	Contrib. drain. area	= 65.250 ac

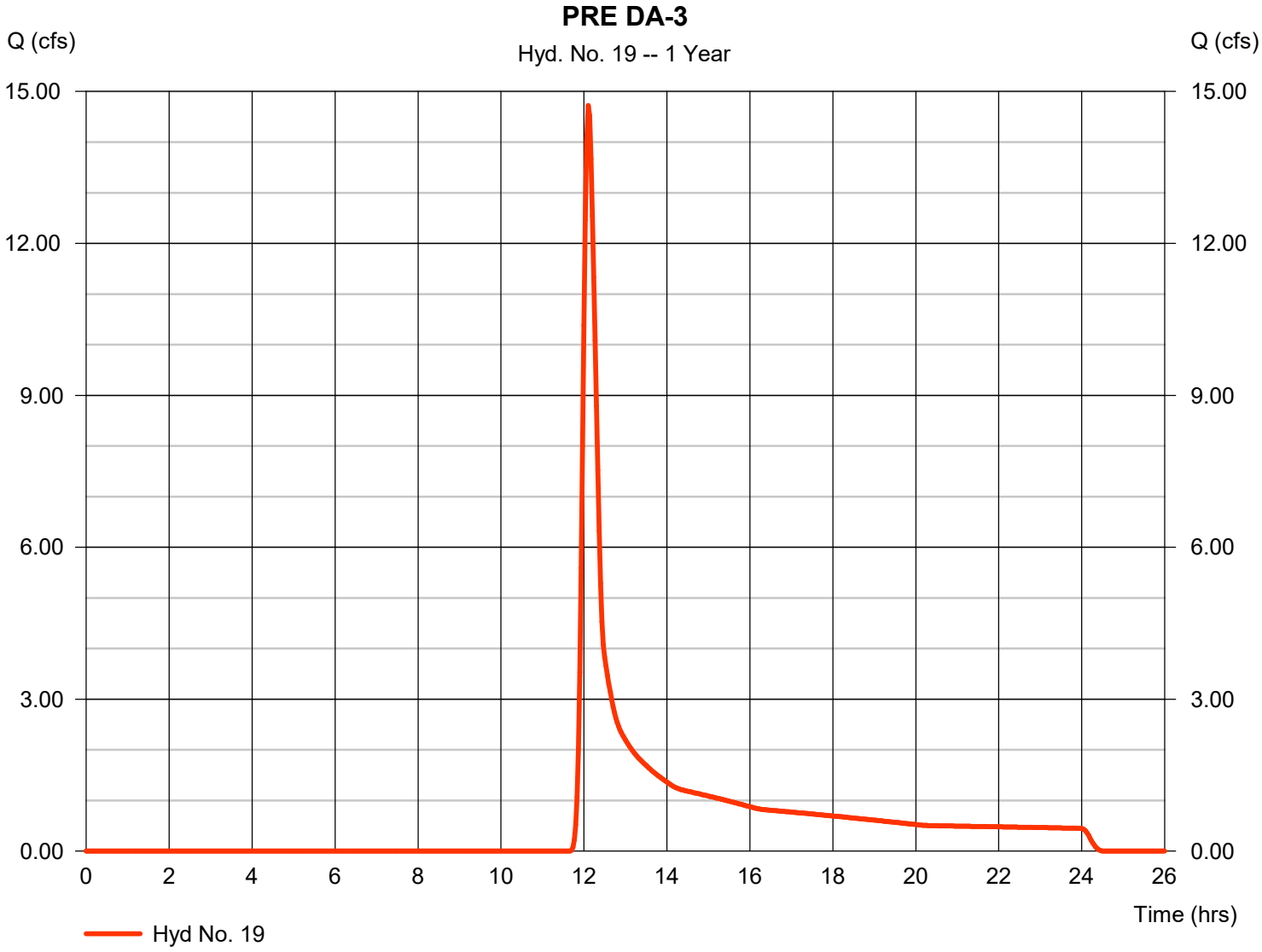


Hydrograph Report

Hyd. No. 19

PRE DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.72 cfs
Storm frequency	=	1 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	57,063 cuft
Drainage area	=	40.230 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 19

PRE DA-3

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.41		0.00		0.00		
Land slope (%)	= 16.00		0.00		0.00		
Travel Time (min)	**= 10.77**	**+**	**0.00**	**+**	**0.00**	**=**	**10.77**
Shallow Concentrated Flow							
Flow length (ft)	= 629.00		0.00		0.00		
Watercourse slope (%)	= 19.10		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=7.05		0.00		0.00		
Travel Time (min)	**= 1.49**	**+**	**0.00**	**+**	**0.00**	**=**	**1.49**
Channel Flow							
X sectional flow area (sqft)	= 1.00		0.00		0.00		
Wetted perimeter (ft)	= 4.10		0.00		0.00		
Channel slope (%)	= 4.70		0.00		0.00		
Manning's n-value	= 0.030		0.015		0.015		
Velocity (ft/s)	=4.18						
			0.00				
					0.00		
Flow length (ft)	({0})1731.0		0.0		0.0		
Travel Time (min)	**= 6.90**	**+**	**0.00**	**+**	**0.00**	**=**	**6.90**

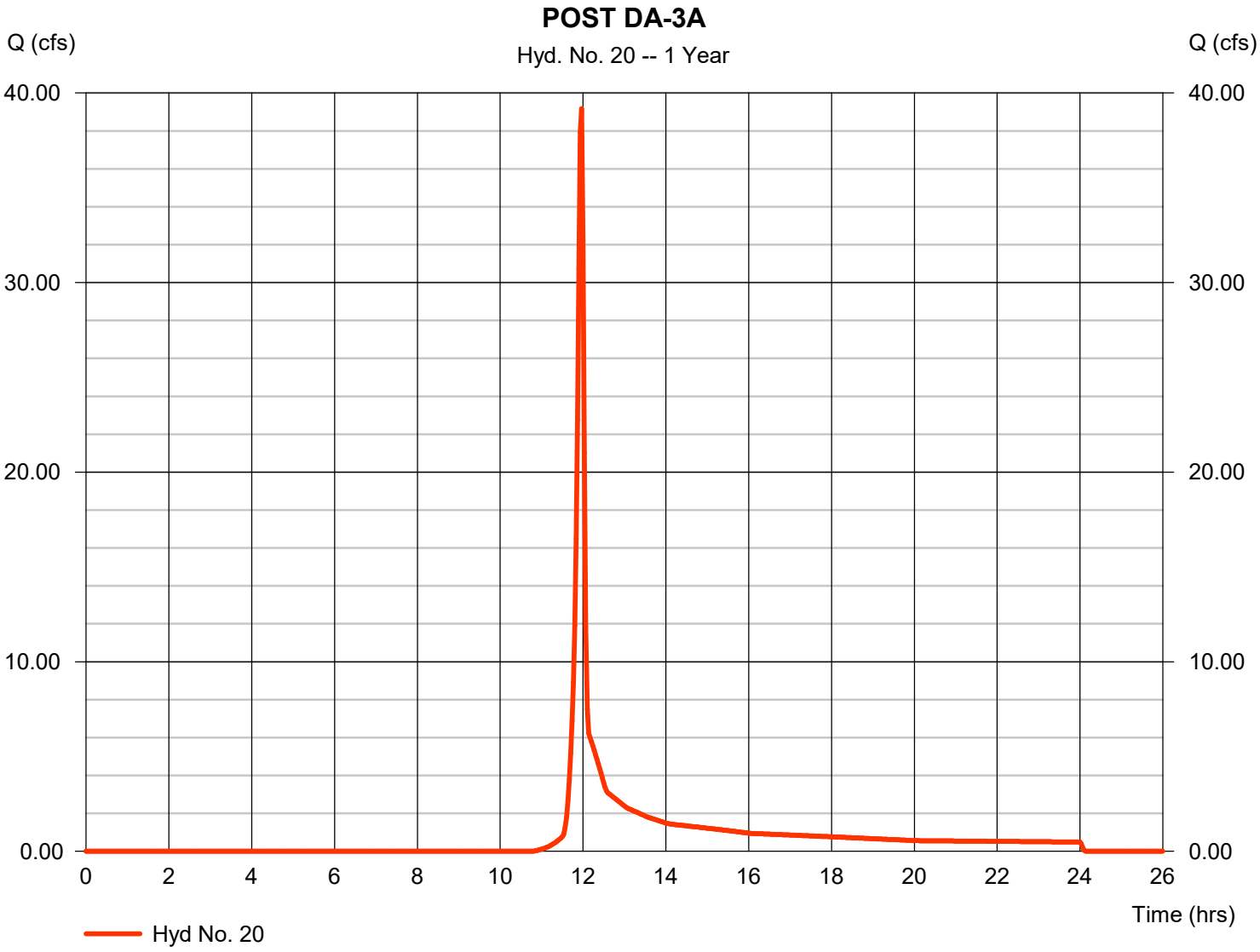
Total Travel Time, Tc ..... 19.20 min

Hydrograph Report

Hyd. No. 20

POST DA-3A

Hydrograph type	= SCS Runoff	Peak discharge	= 39.17 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 78,481 cuft
Drainage area	= 34.840 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



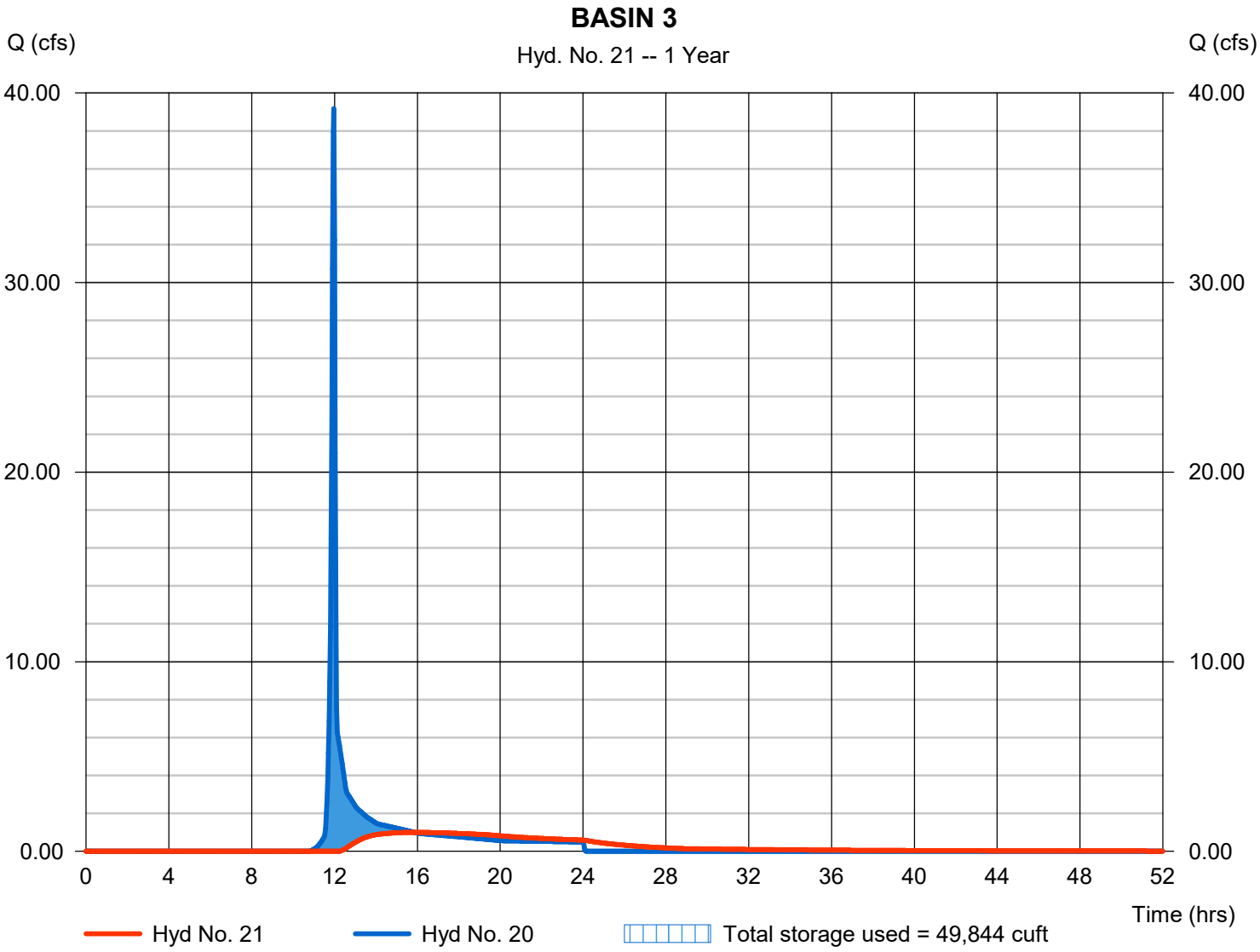
Hydrograph Report

Hyd. No. 21

BASIN 3

Hydrograph type	= Reservoir	Peak discharge	= 0.999 cfs
Storm frequency	= 1 yrs	Time to peak	= 15.83 hrs
Time interval	= 2 min	Hyd. volume	= 42,887 cuft
Inflow hyd. No.	= 20 - POST DA-3A	Max. Elevation	= 1106.69 ft
Reservoir name	= BASIN 3	Max. Storage	= 49,844 cuft

Storage Indication method used.



Pond Report

Pond No. 5 - BASIN 3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1104.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1104.00	16,343	0	0
2.00	1106.00	19,264	35,563	35,563
4.00	1108.00	22,065	41,293	76,857
6.00	1110.00	24,864	46,896	123,753
8.00	1112.00	27,661	52,495	176,248
10.00	1114.00	30,578	58,209	234,457

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 20.00	Inactive	8.00	0.00
Span (in)	= 20.00	8.00	8.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1097.23	1104.47	1106.00	0.00
Length (ft)	= 81.90	0.00	0.00	0.00
Slope (%)	= 1.60	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

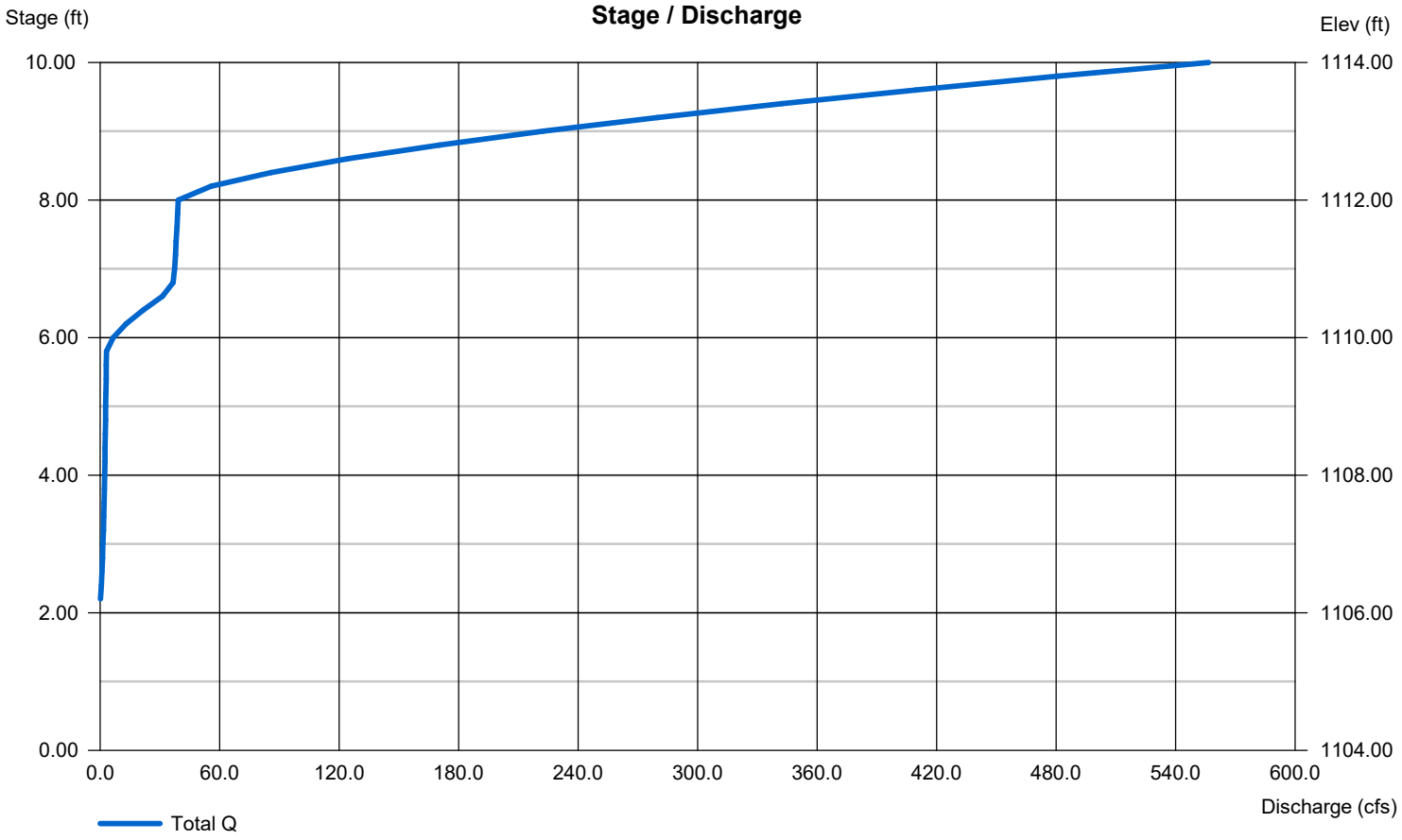
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	70.00	0.00	0.00
Crest El. (ft)	= 1109.81	1112.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

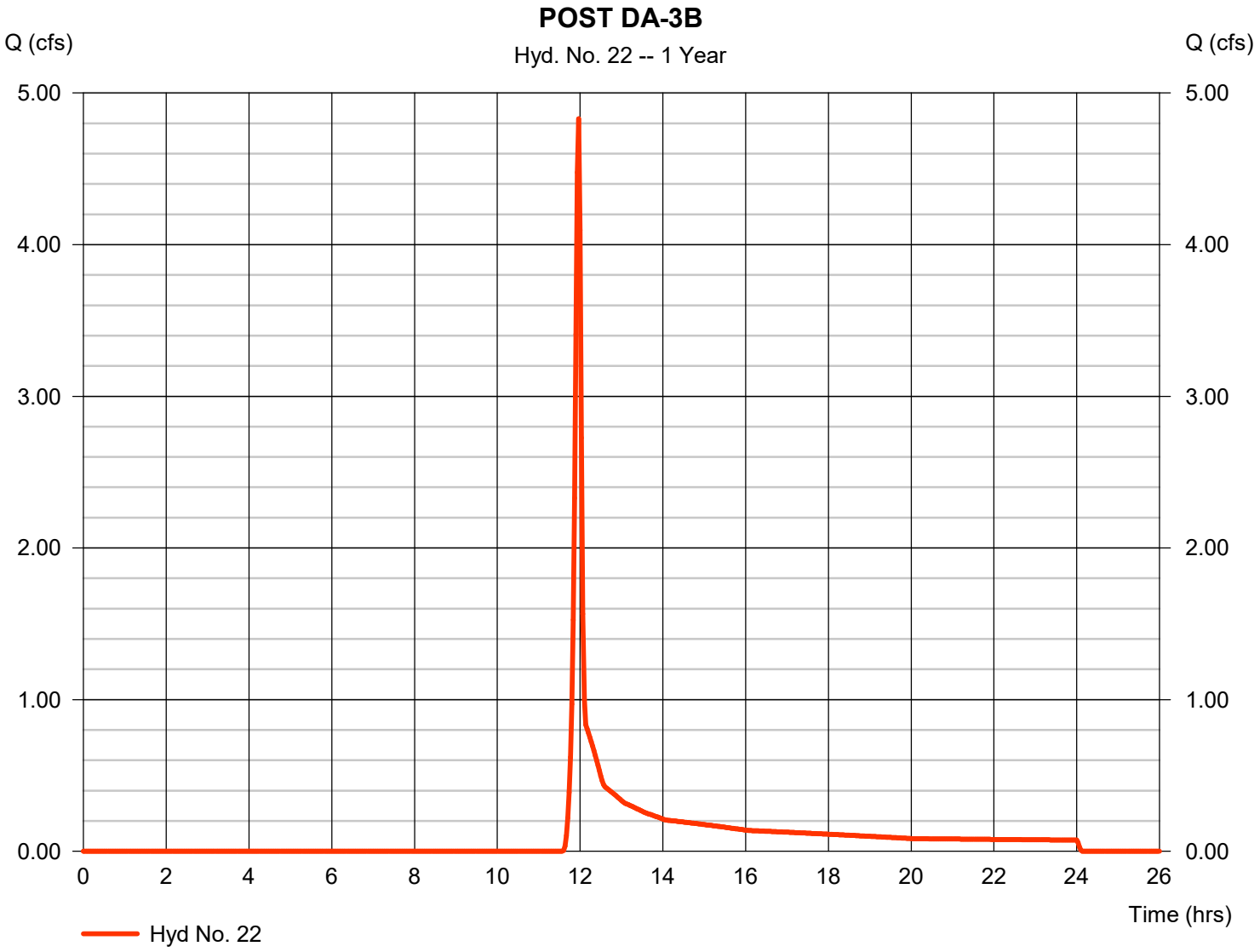


Hydrograph Report

Hyd. No. 22

POST DA-3B

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.830 cfs
Storm frequency	=	1 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	10,027 cuft
Drainage area	=	6.420 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

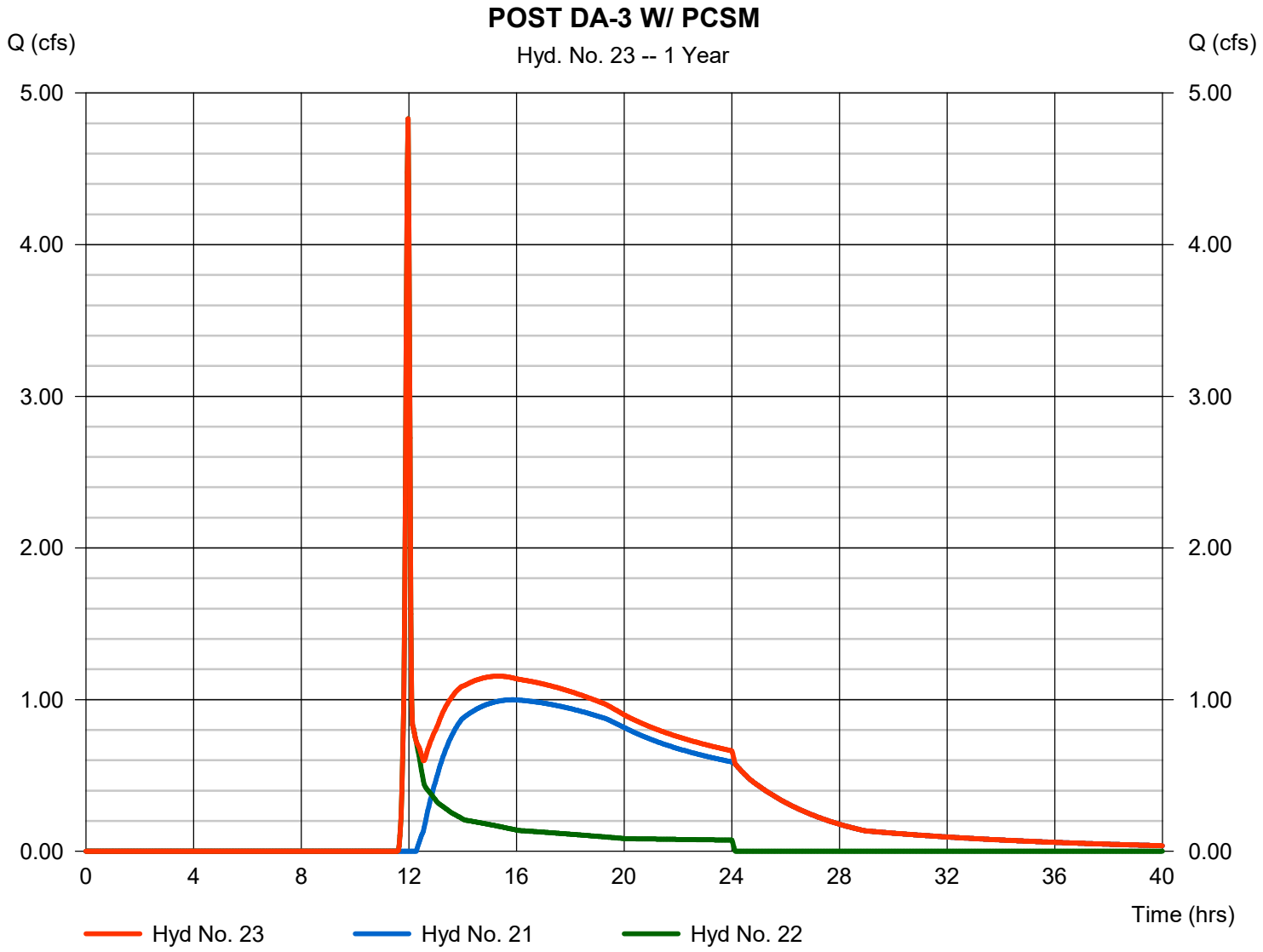


Hydrograph Report

Hyd. No. 23

POST DA-3 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 4.830 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 52,914 cuft
Inflow hyds.	= 21, 22	Contrib. drain. area	= 6.420 ac

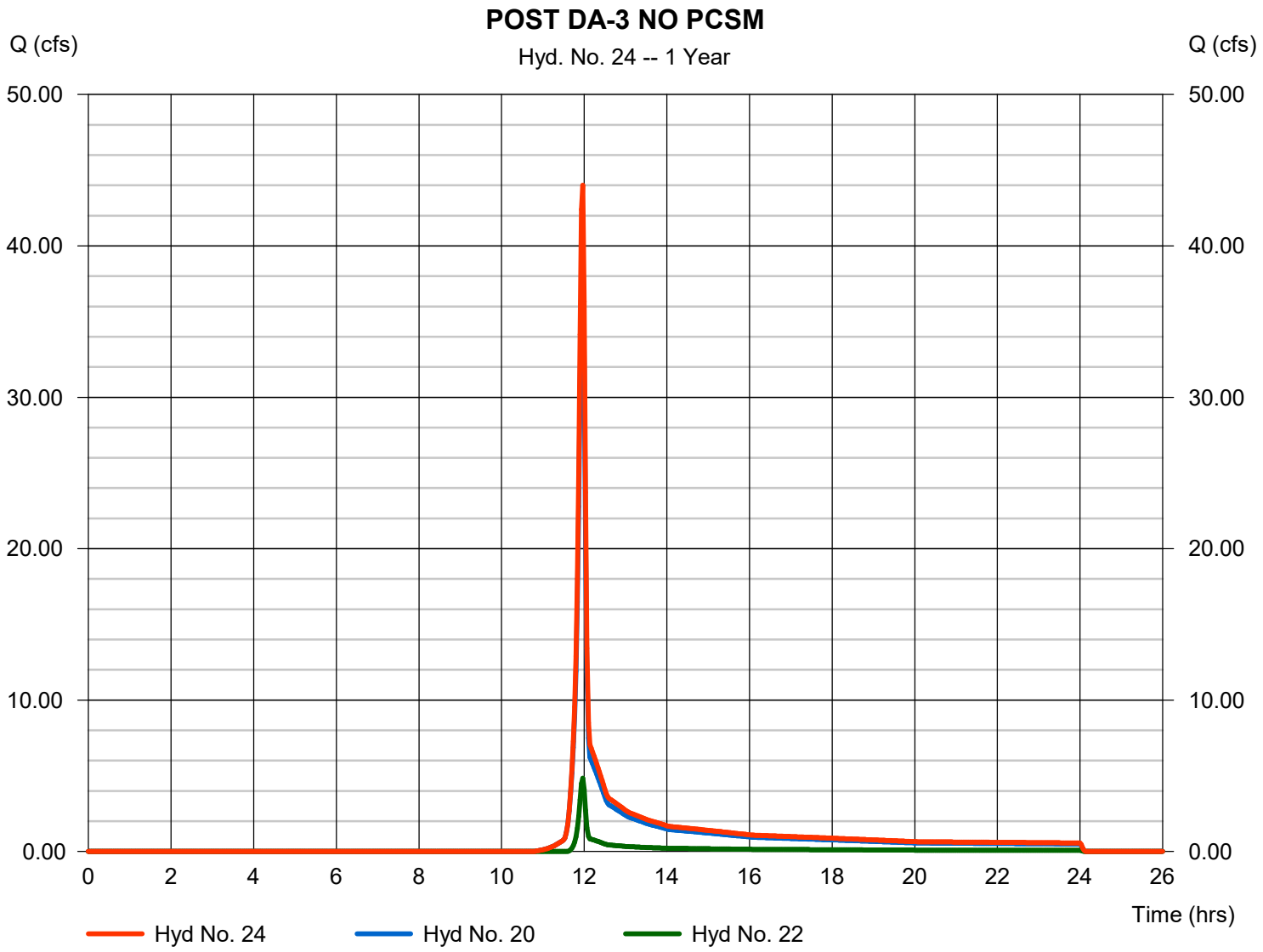


Hydrograph Report

Hyd. No. 24

POST DA-3 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 44.00 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 88,508 cuft
Inflow hyds.	= 20, 22	Contrib. drain. area	= 41.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

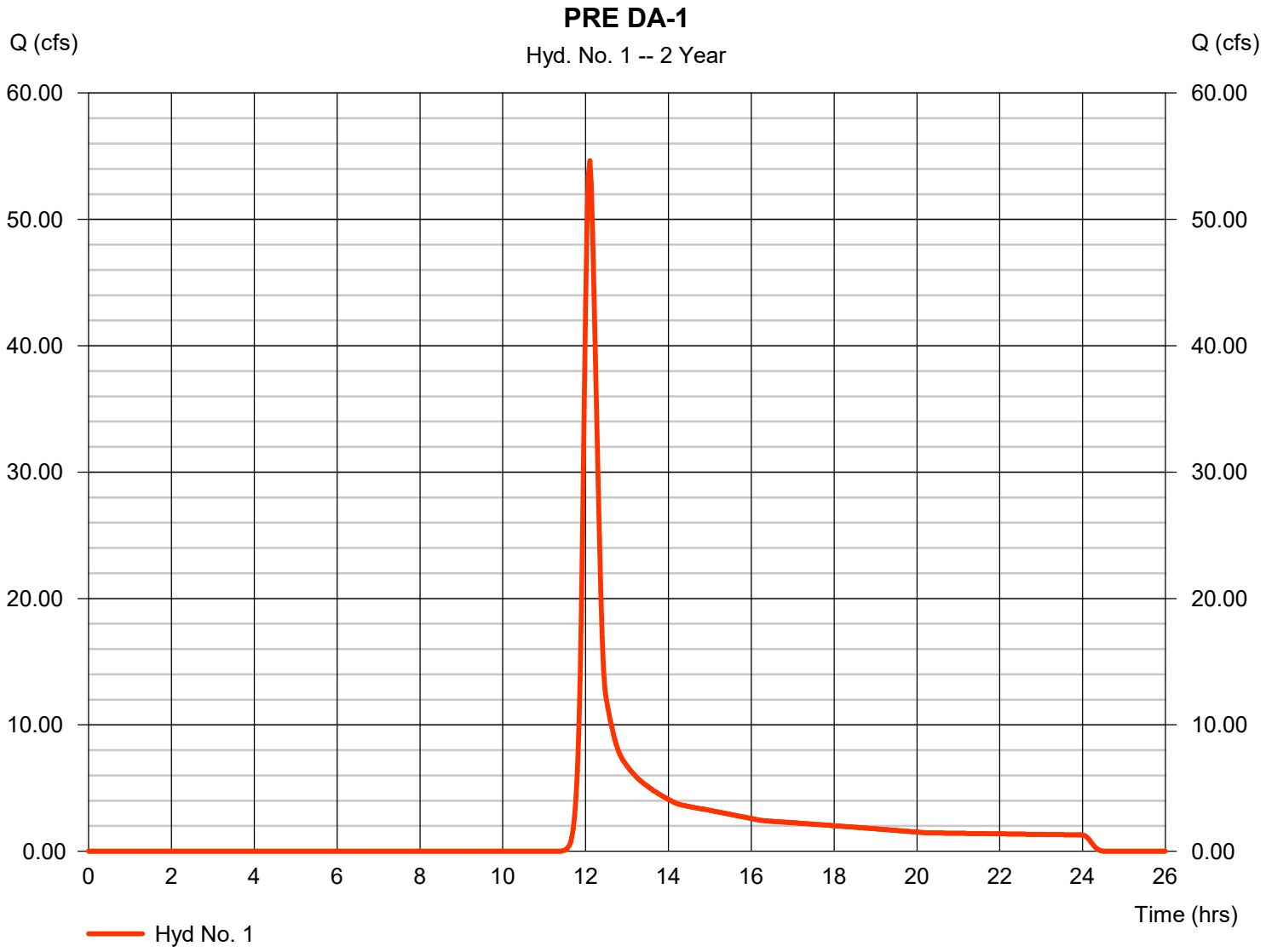
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	54.64	2	726	187,808	------	------	------	PRE DA-1
2	SCS Runoff	73.81	2	718	148,199	------	------	------	POST DA-1A
3	Reservoir	32.51	2	722	106,516	2	1117.27	56,826	BASIN 1 FOREBAY
4	SCS Runoff	42.80	2	716	86,676	------	------	------	POST DA-1B
5	Combine	58.92	2	720	193,192	3, 4	------	------	TO BASIN 1
6	Reservoir	8.667	2	764	192,503	5	1114.72	76,731	BASIN 1
7	SCS Runoff	14.51	2	718	30,398	------	------	------	POST DA-1C
8	Combine	16.44	2	718	222,901	6, 7	------	------	POST DA-1 W/ PCSM
9	Combine	130.68	2	718	265,273	2, 4, 7,	------	------	POST DA-1 NO PCSM
10	SCS Runoff	38.99	2	726	136,647	------	------	------	PRE DA-2
11	SCS Runoff	79.50	2	716	160,512	------	------	------	POST DA-2A
12	Reservoir	66.15	2	722	142,181	11	1121.53	36,515	BASIN 2 FOREBAY
13	SCS Runoff	3.151	2	718	6,306	------	------	------	POST DA-2B
14	Combine	68.14	2	718	148,487	12, 13	------	------	TO BASIN 2
15	Reservoir	0.508	2	1450	16,258	14	1114.71	144,011	BASIN 2
16	SCS Runoff	24.37	2	718	49,518	------	------	------	POST DA-2C
17	Combine	24.37	2	718	65,776	15, 16	------	------	POST DA-2 W/ PCSM
18	Combine	106.87	2	718	216,335	11, 13, 16,	------	------	POST DA-2 NO PCSM
19	SCS Runoff	24.94	2	726	87,425	------	------	------	PRE DA-3
20	SCS Runoff	55.27	2	718	110,558	------	------	------	POST DA-3A
21	Reservoir	1.726	2	880	74,964	20	1107.39	64,249	BASIN 3
22	SCS Runoff	7.404	2	718	14,956	------	------	------	POST DA-3B
23	Combine	7.404	2	718	89,920	21, 22	------	------	POST DA-3 W/ PCSM
24	Combine	62.67	2	718	125,514	20, 22,	------	------	POST DA-3 NO PCSM

Hydrograph Report

Hyd. No. 1

PRE DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.64 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	187,808 cuft
Drainage area	=	80.750 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

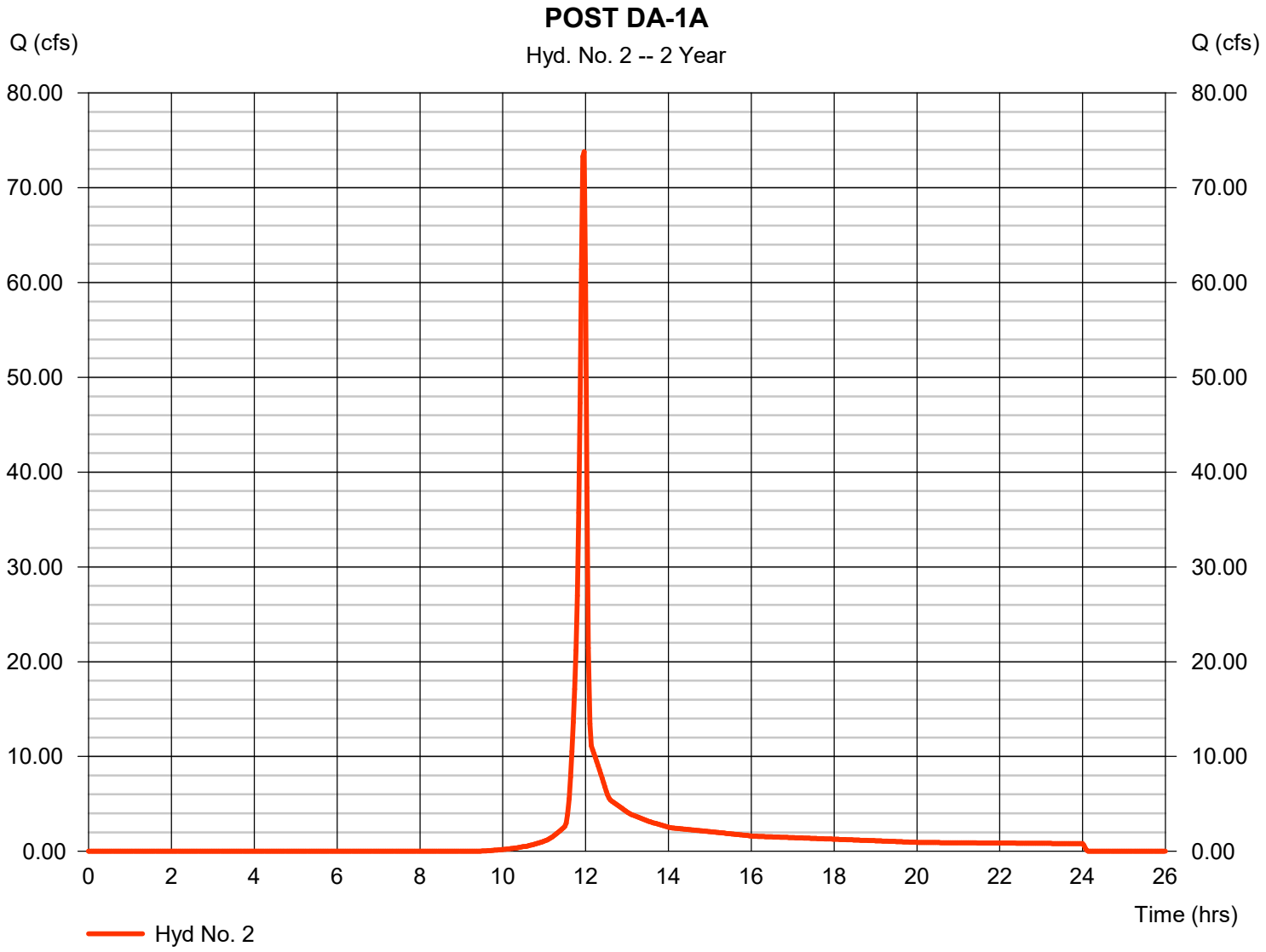


Hydrograph Report

Hyd. No. 2

POST DA-1A

Hydrograph type	=	SCS Runoff	Peak discharge	=	73.81 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	148,199 cuft
Drainage area	=	41.610 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



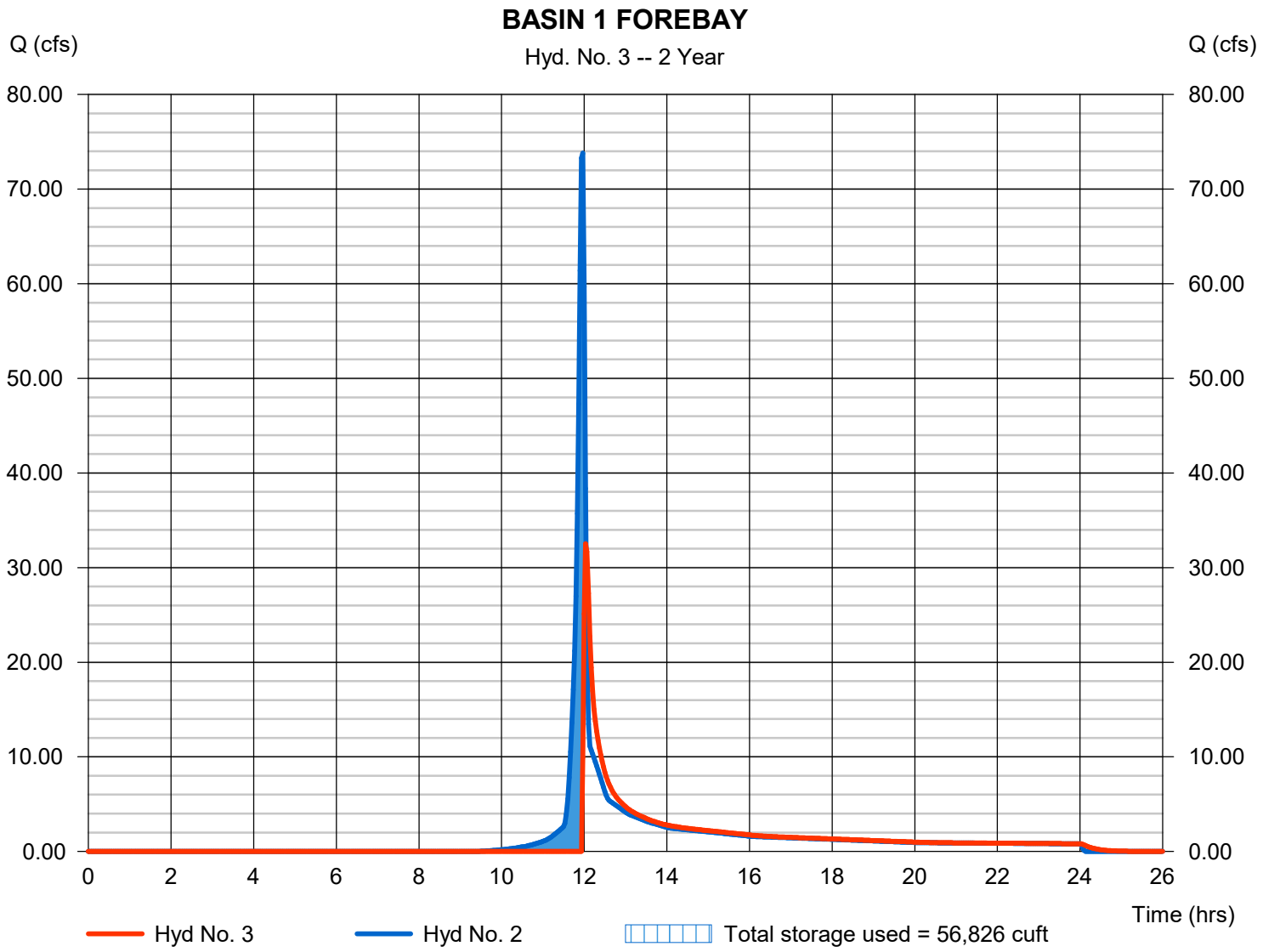
Hydrograph Report

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	32.51 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	106,516 cuft
Inflow hyd. No.	=	2 - POST DA-1A	Max. Elevation	=	1117.27 ft
Reservoir name	=	BASIN 1 FOREBAY	Max. Storage	=	56,826 cuft

Storage Indication method used.

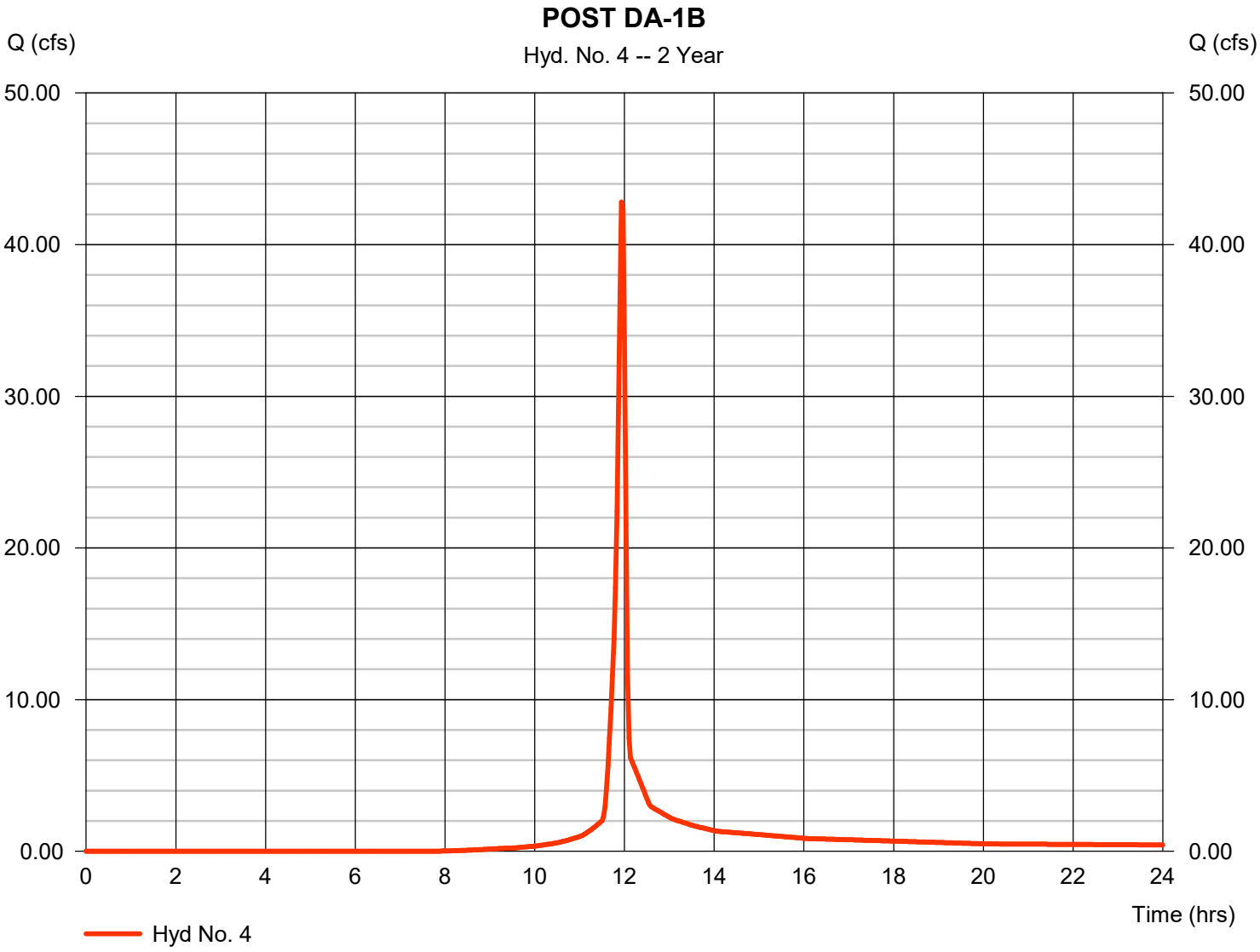


Hydrograph Report

Hyd. No. 4

POST DA-1B

Hydrograph type	=	SCS Runoff	Peak discharge	=	42.80 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	86,676 cuft
Drainage area	=	19.520 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

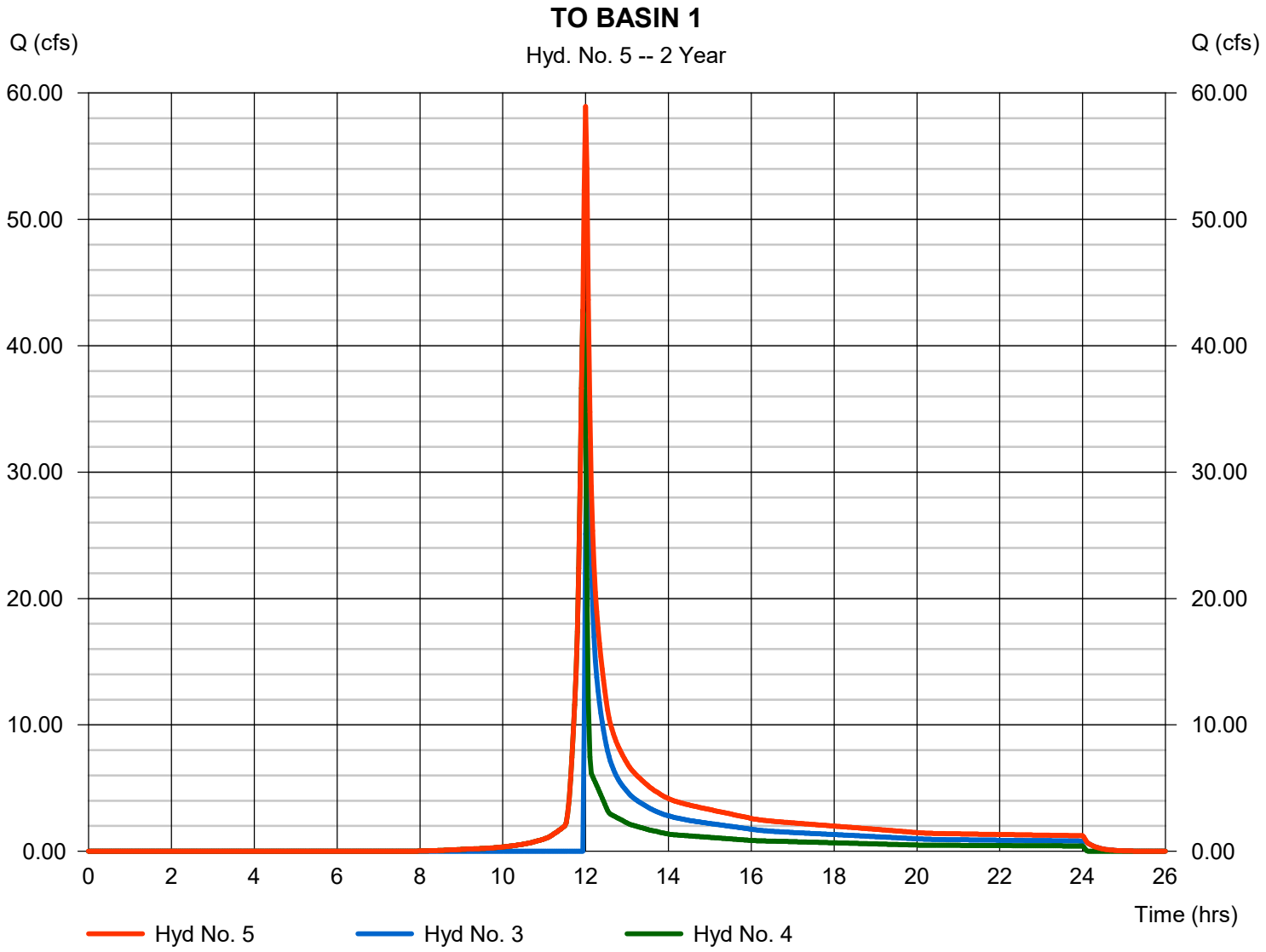


Hydrograph Report

Hyd. No. 5

TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 58.92 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 193,192 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 19.520 ac



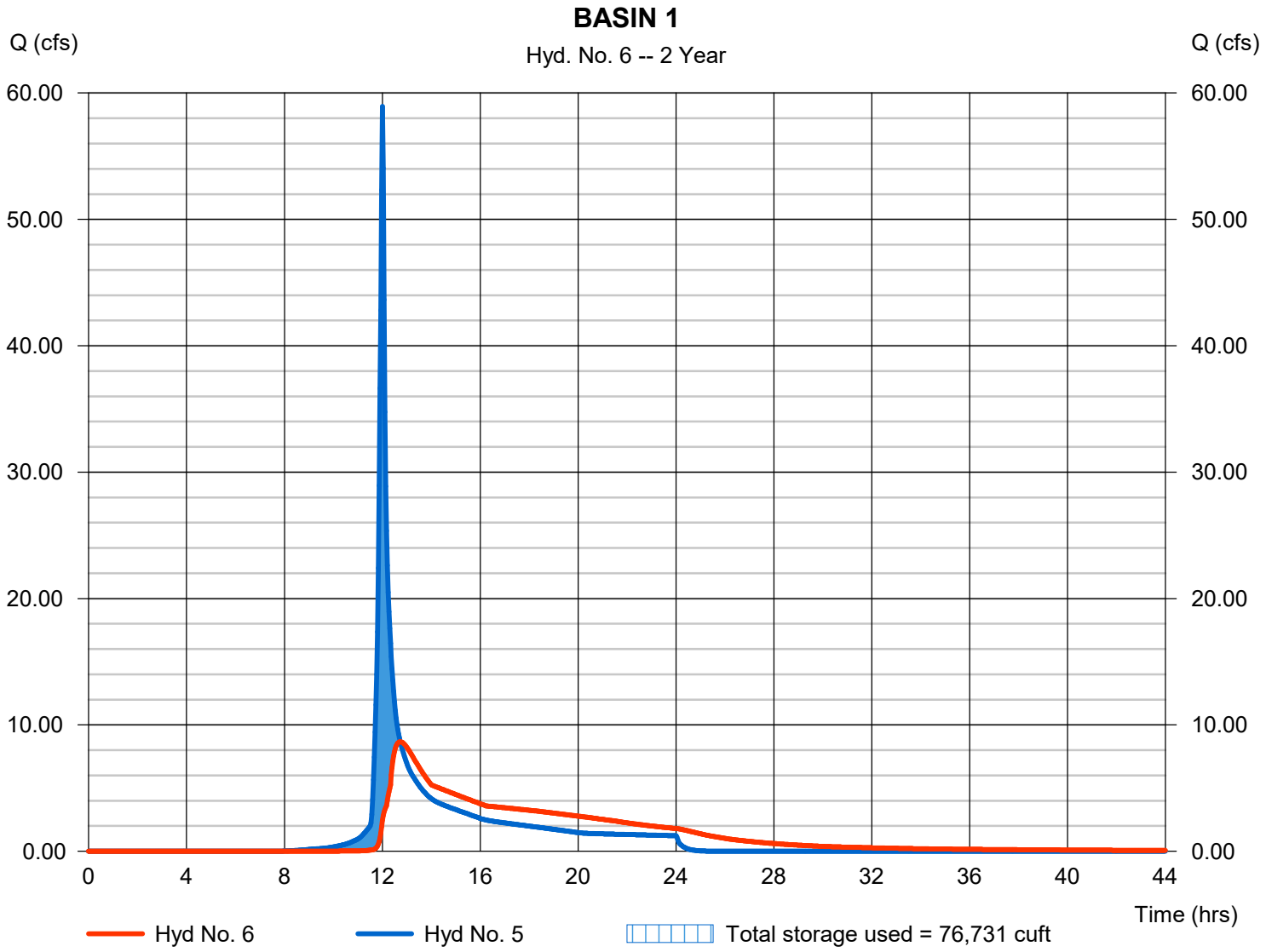
Hydrograph Report

Hyd. No. 6

BASIN 1

Hydrograph type	=	Reservoir	Peak discharge	=	8.667 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.73 hrs
Time interval	=	2 min	Hyd. volume	=	192,503 cuft
Inflow hyd. No.	=	5 - TO BASIN 1	Max. Elevation	=	1114.72 ft
Reservoir name	=	BASIN 1	Max. Storage	=	76,731 cuft

Storage Indication method used.

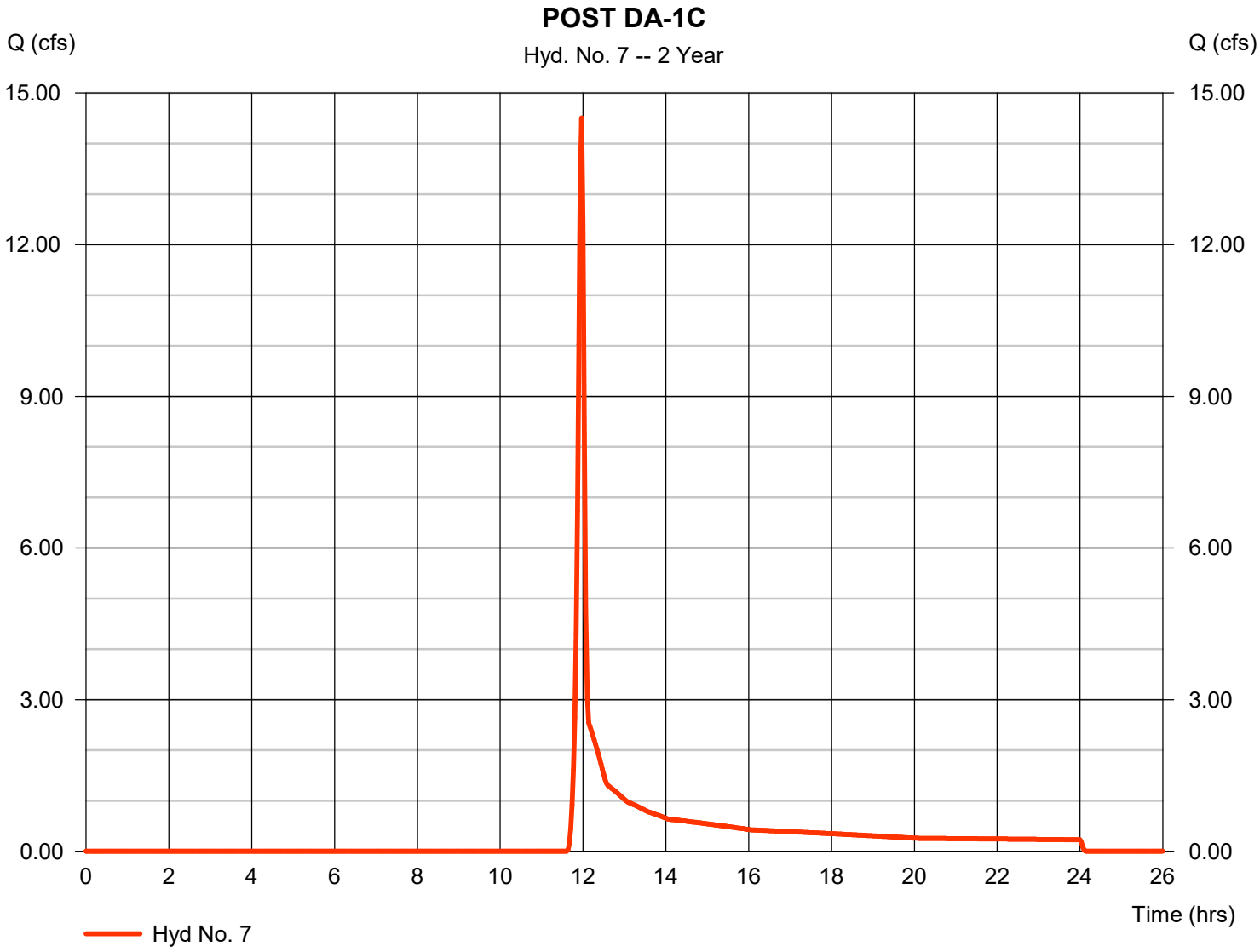


Hydrograph Report

Hyd. No. 7

POST DA-1C

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.51 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	30,398 cuft
Drainage area	=	17.190 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

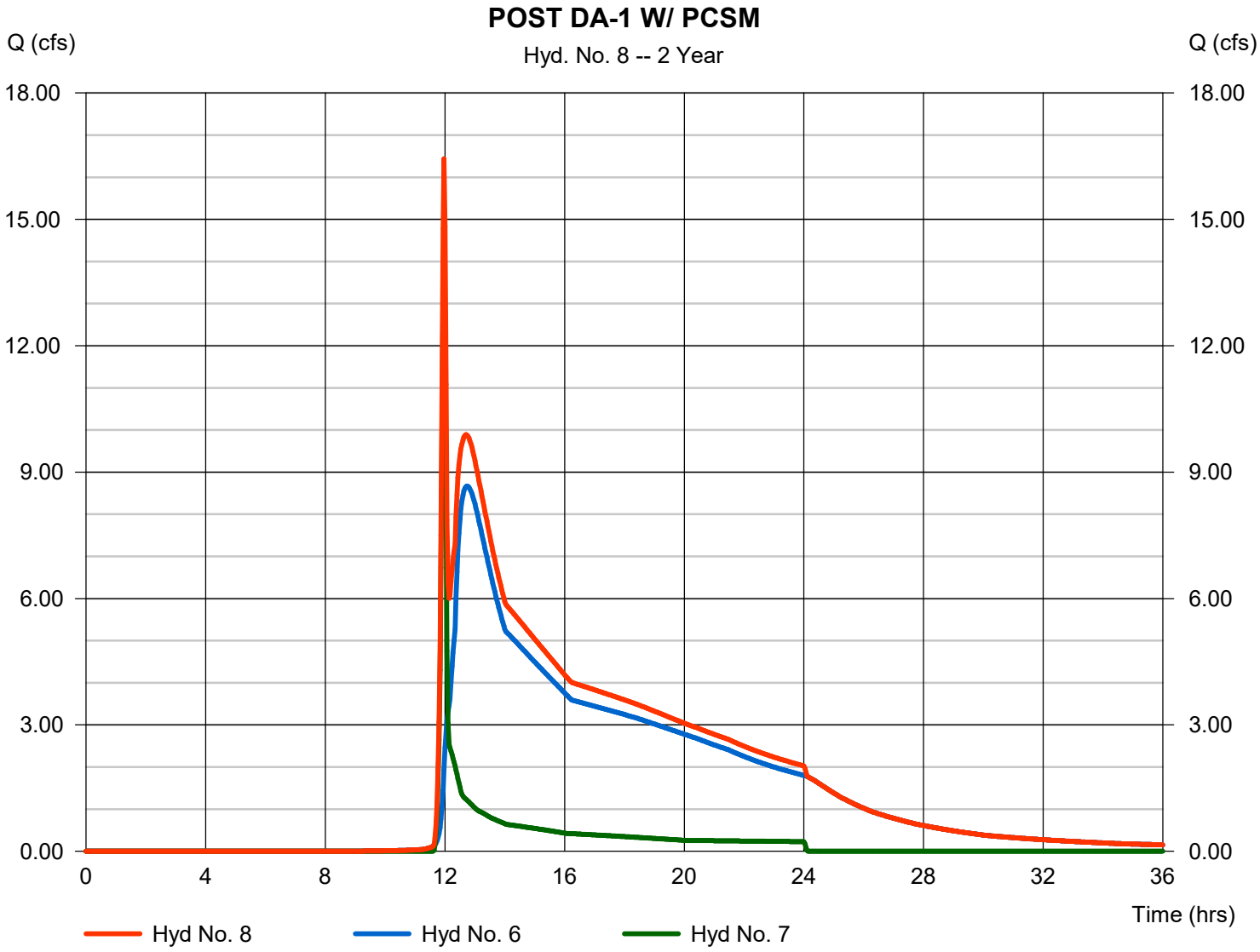


Hydrograph Report

Hyd. No. 8

POST DA-1 W/ PCSM

Hydrograph type	=	Combine	Peak discharge	=	16.44 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	222,901 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	17.190 ac

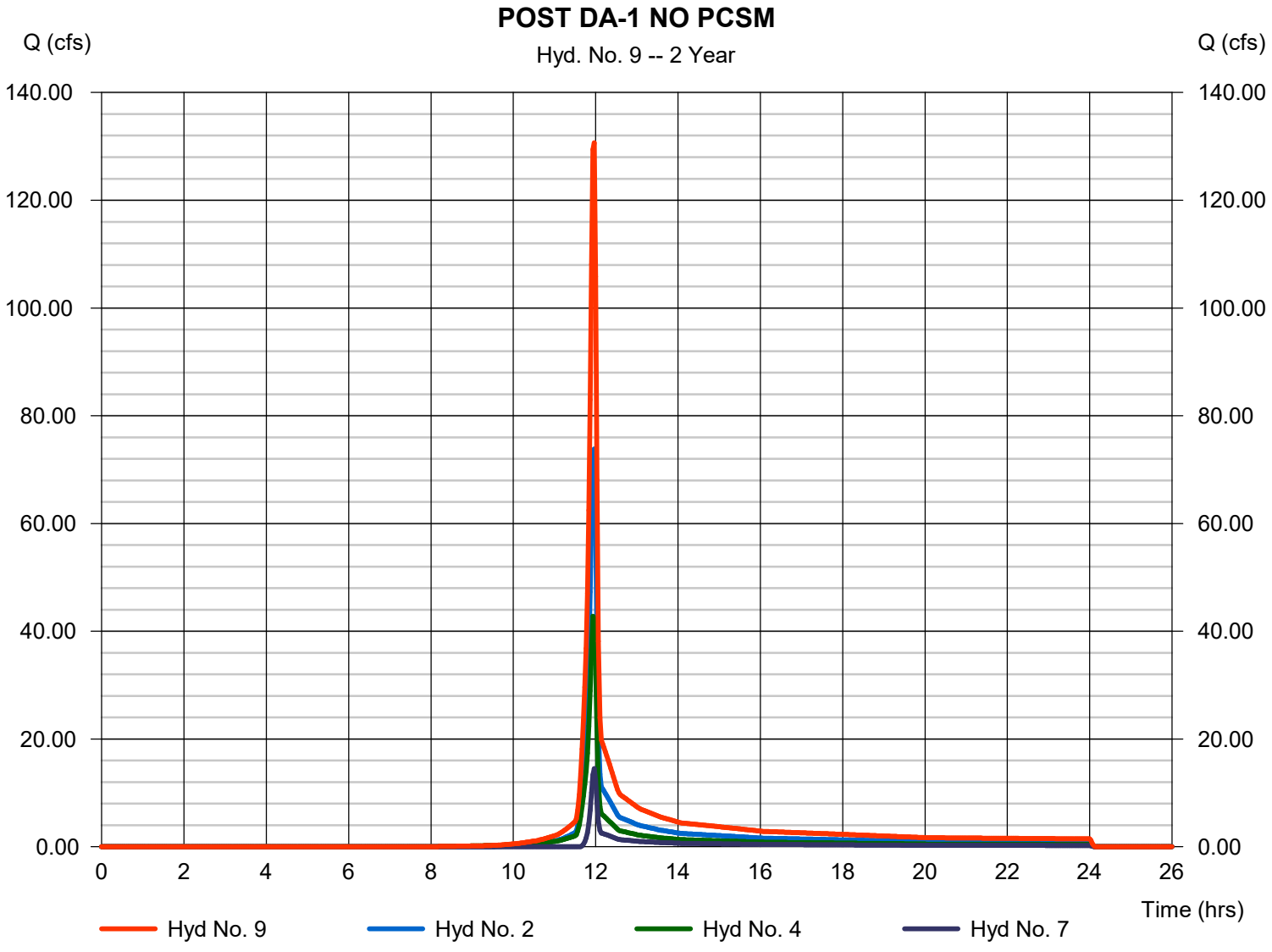


Hydrograph Report

Hyd. No. 9

POST DA-1 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 130.68 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 265,273 cuft
Inflow hyds.	= 2, 4, 7	Contrib. drain. area	= 78.320 ac

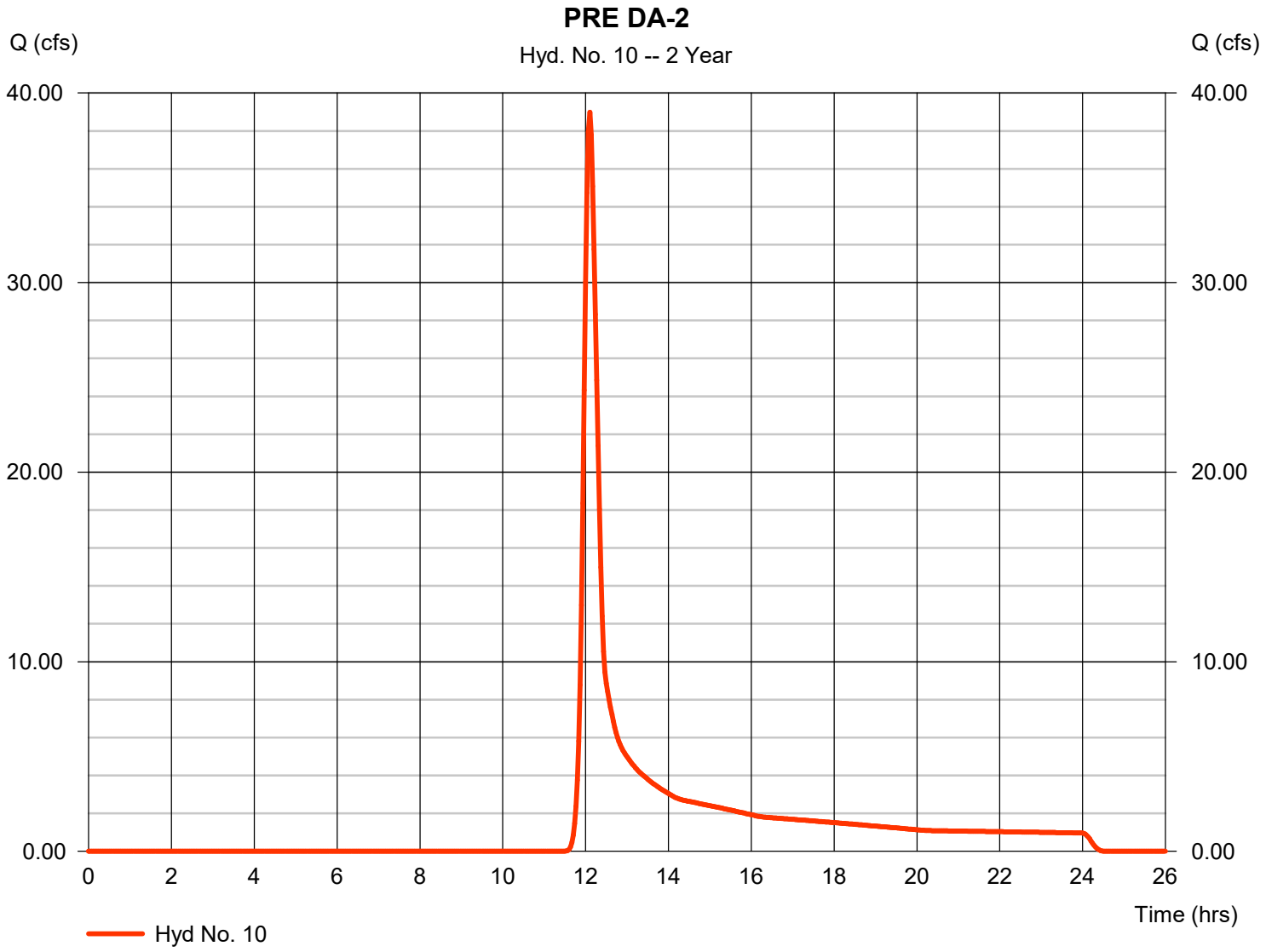


Hydrograph Report

Hyd. No. 10

PRE DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.99 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	136,647 cuft
Drainage area	=	62.880 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

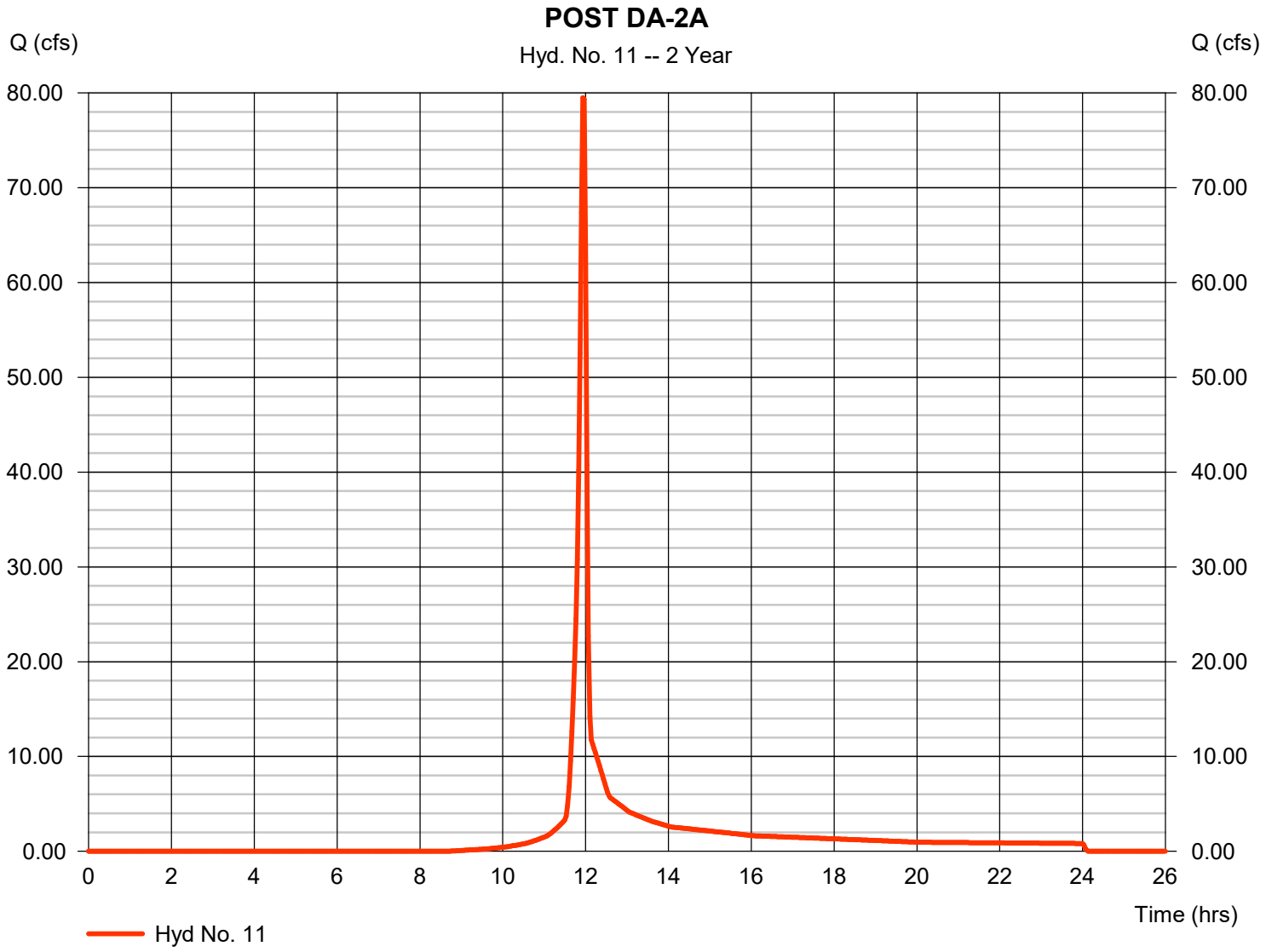


Hydrograph Report

Hyd. No. 11

POST DA-2A

Hydrograph type	=	SCS Runoff	Peak discharge	=	79.50 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	160,512 cuft
Drainage area	=	40.300 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



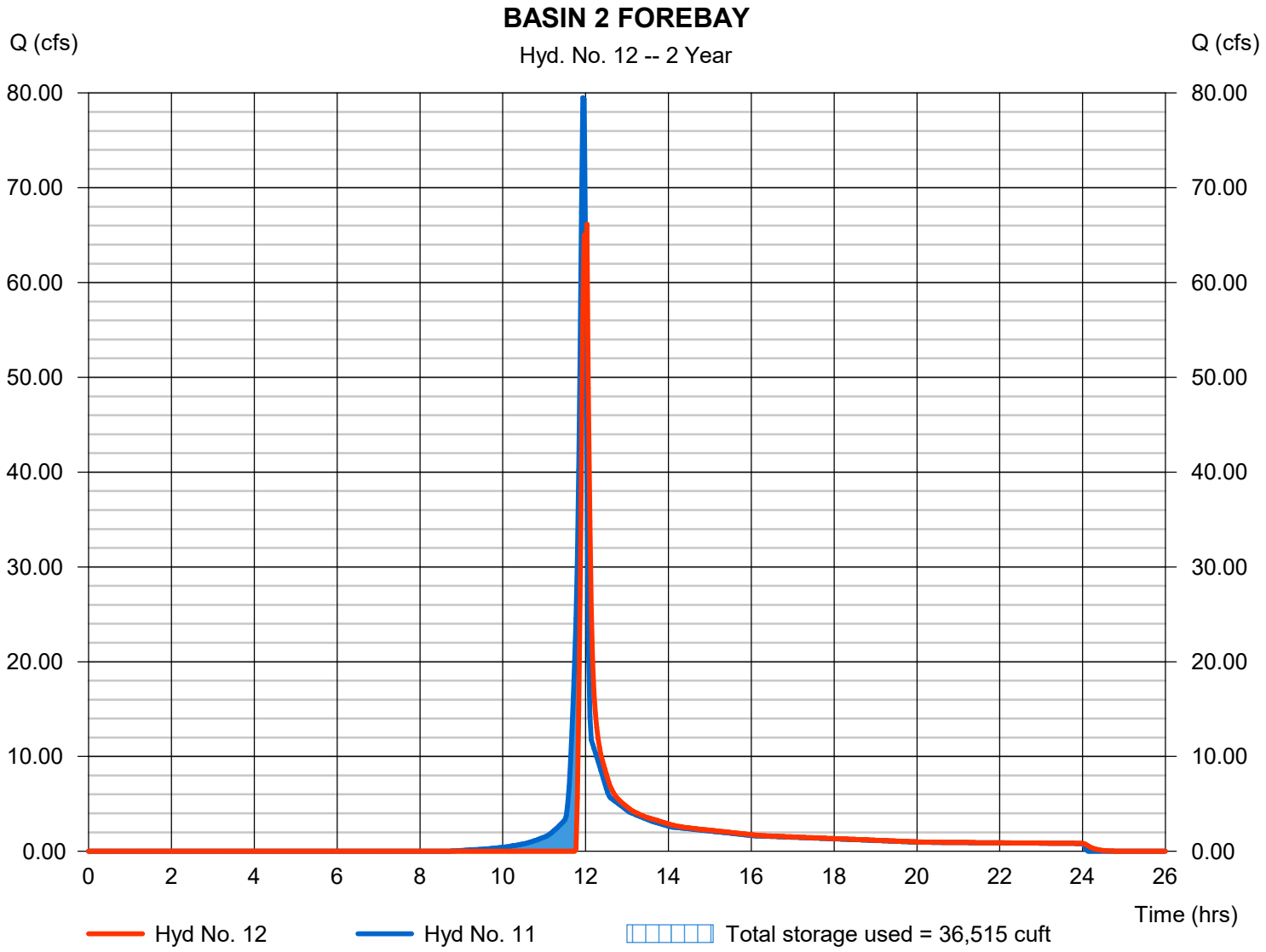
Hydrograph Report

Hyd. No. 12

BASIN 2 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	66.15 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	142,181 cuft
Inflow hyd. No.	=	11 - POST DA-2A	Max. Elevation	=	1121.53 ft
Reservoir name	=	BASIN 2 FOREBAY	Max. Storage	=	36,515 cuft

Storage Indication method used.

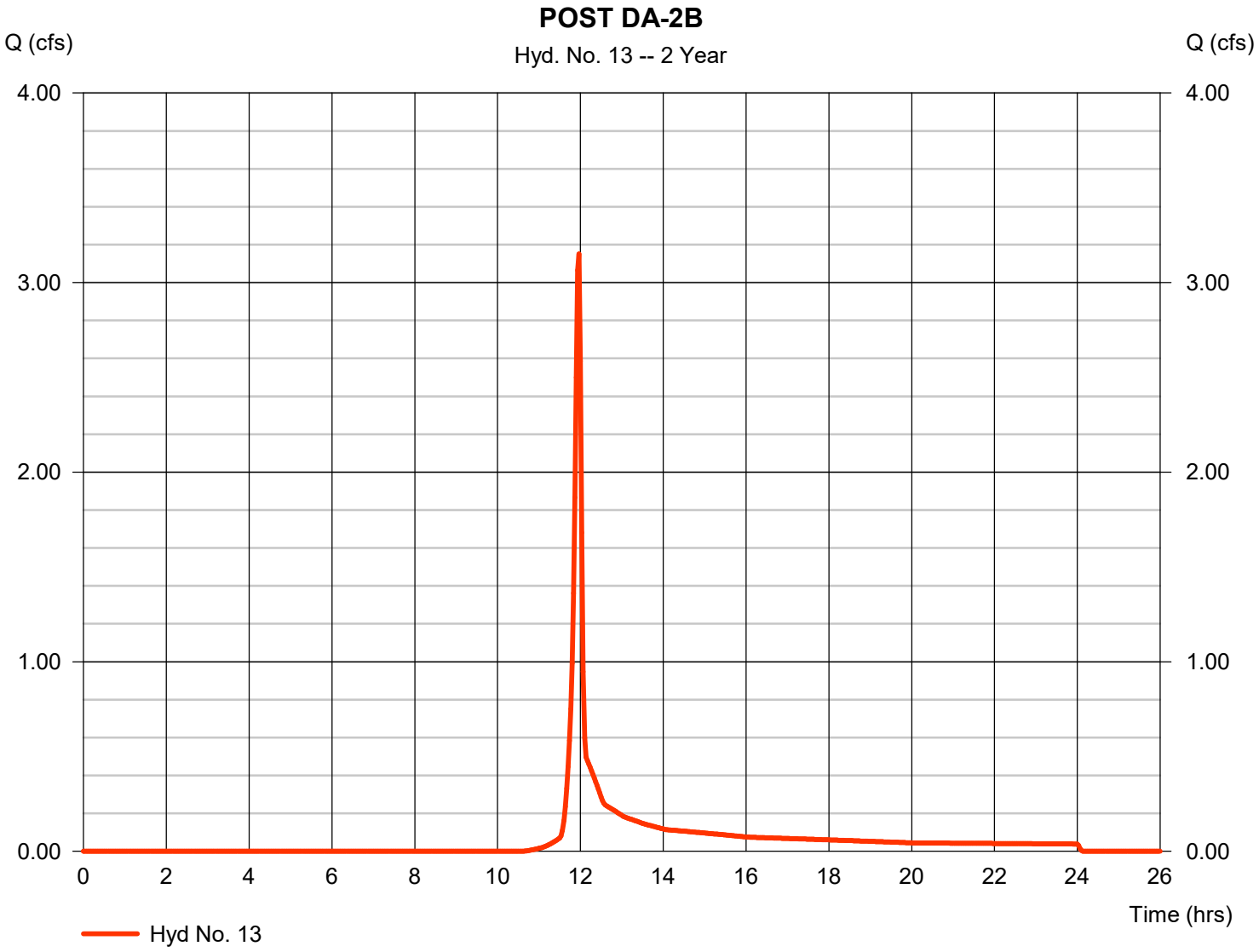


Hydrograph Report

Hyd. No. 13

POST DA-2B

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.151 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	6,306 cuft
Drainage area	=	2.240 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

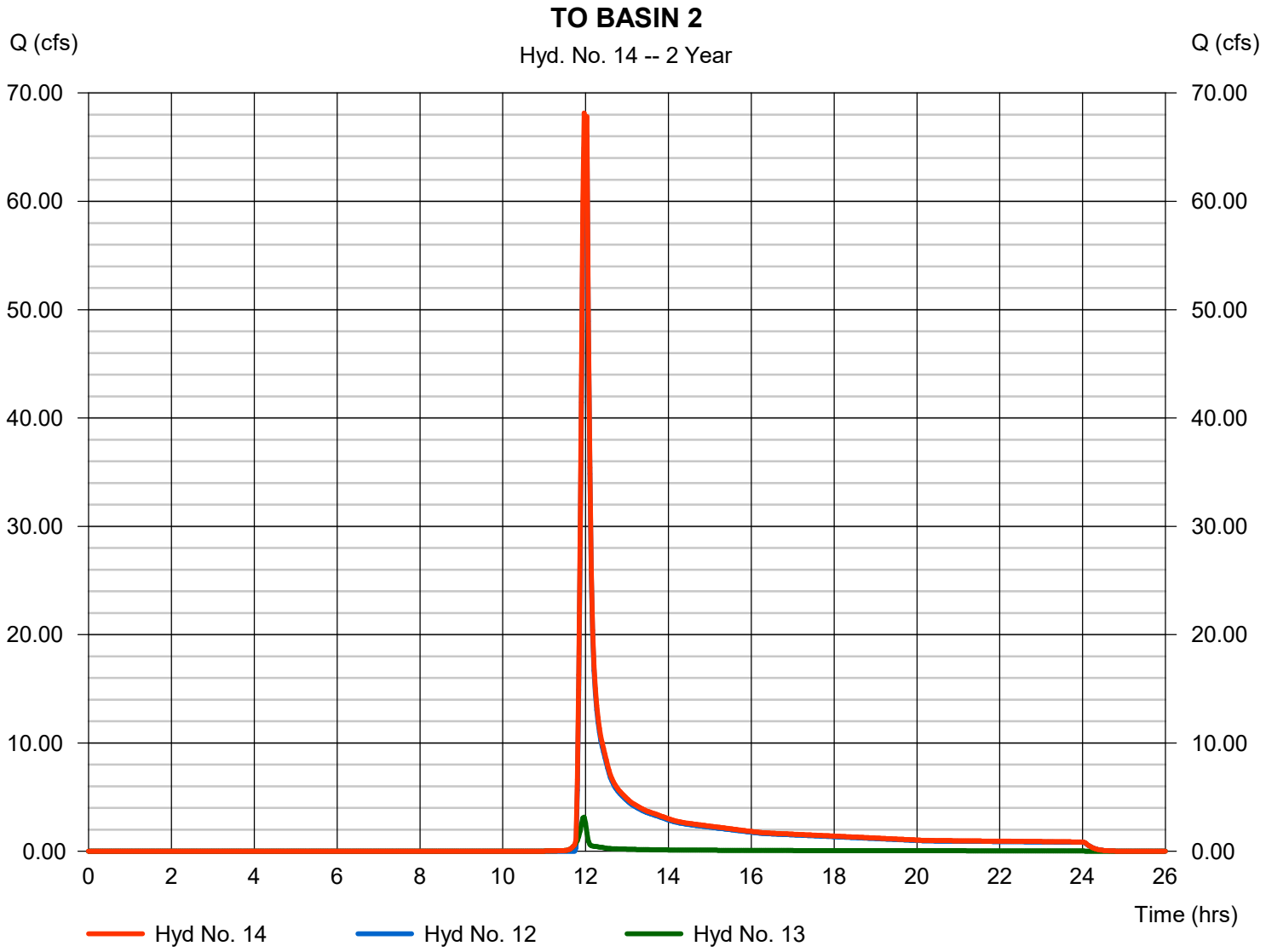


Hydrograph Report

Hyd. No. 14

TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 68.14 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 148,487 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 2.240 ac



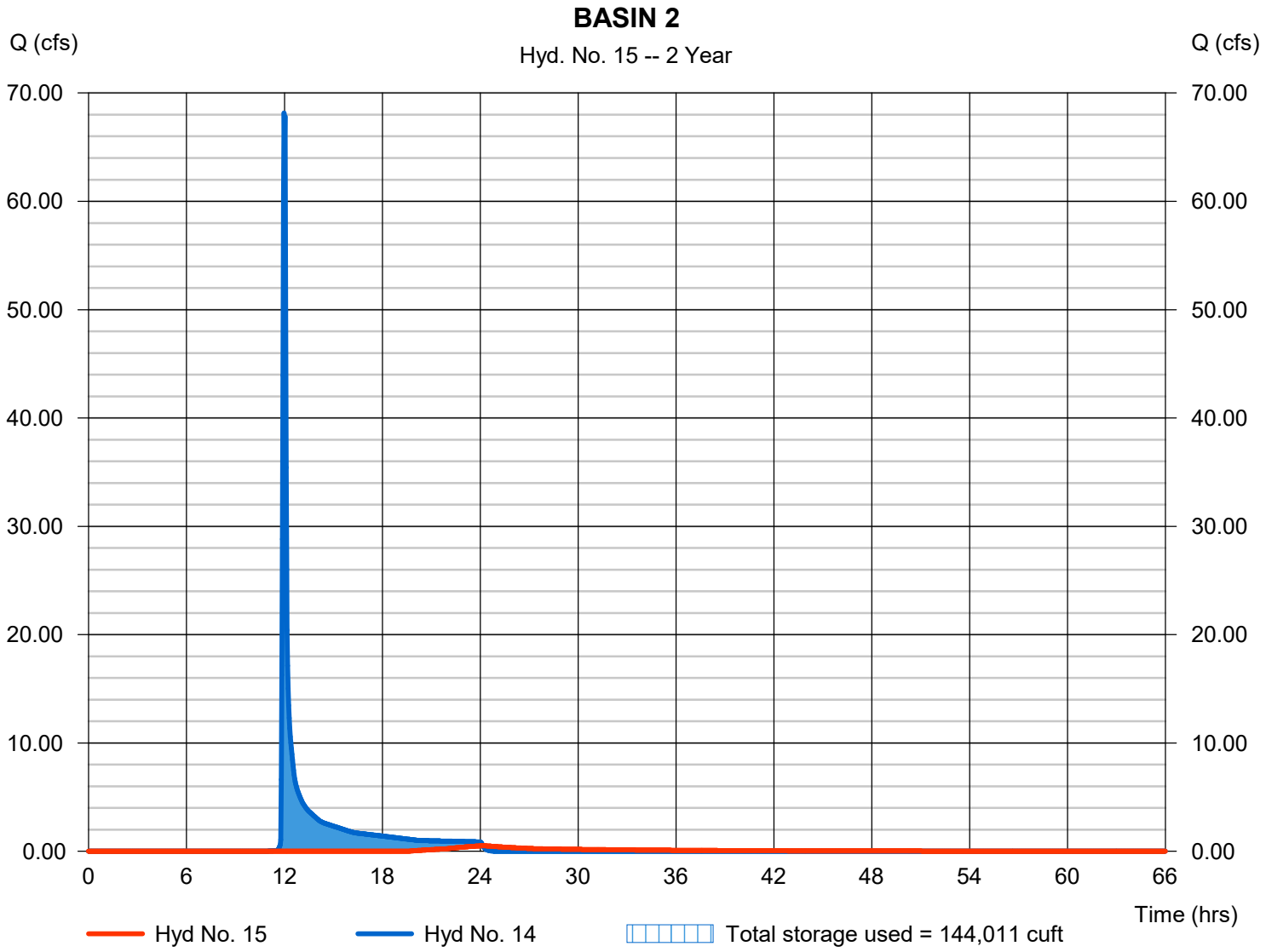
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	=	Reservoir	Peak discharge	=	0.508 cfs
Storm frequency	=	2 yrs	Time to peak	=	24.17 hrs
Time interval	=	2 min	Hyd. volume	=	16,258 cuft
Inflow hyd. No.	=	14 - TO BASIN 2	Max. Elevation	=	1114.71 ft
Reservoir name	=	BASIN 2	Max. Storage	=	144,011 cuft

Storage Indication method used.

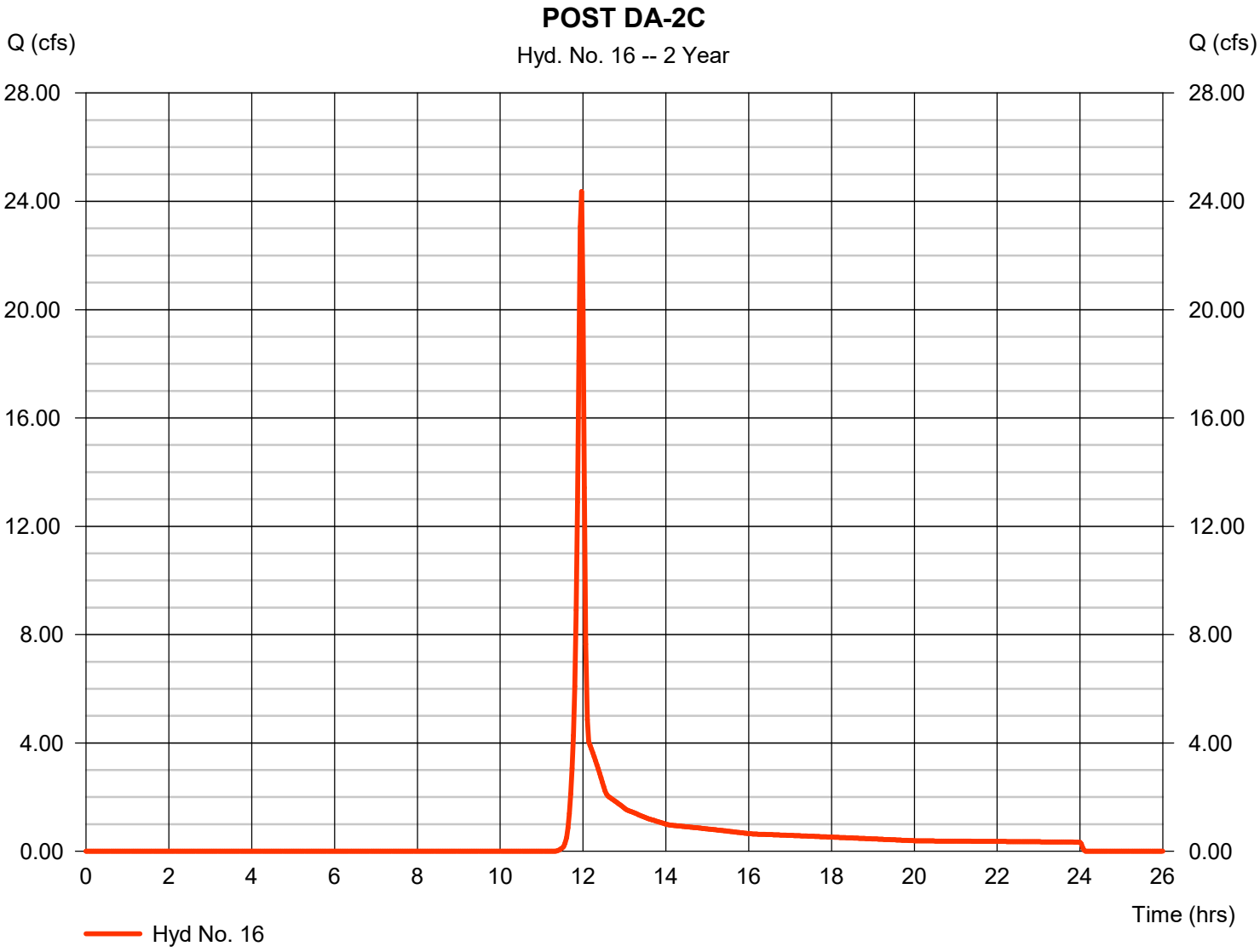


Hydrograph Report

Hyd. No. 16

POST DA-2C

Hydrograph type	=	SCS Runoff	Peak discharge	=	24.37 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	49,518 cuft
Drainage area	=	22.710 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

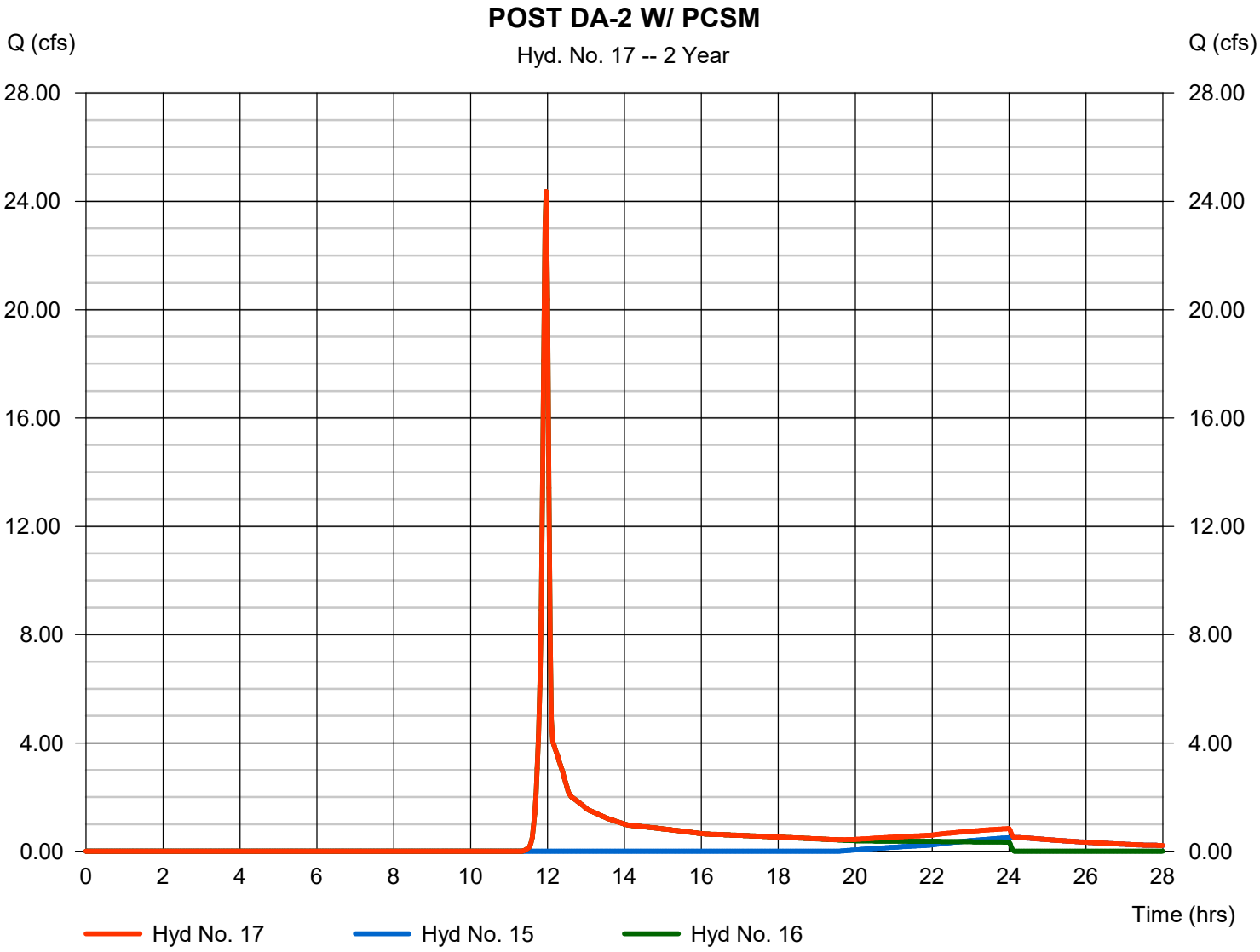


Hydrograph Report

Hyd. No. 17

POST DA-2 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 24.37 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 65,776 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 22.710 ac

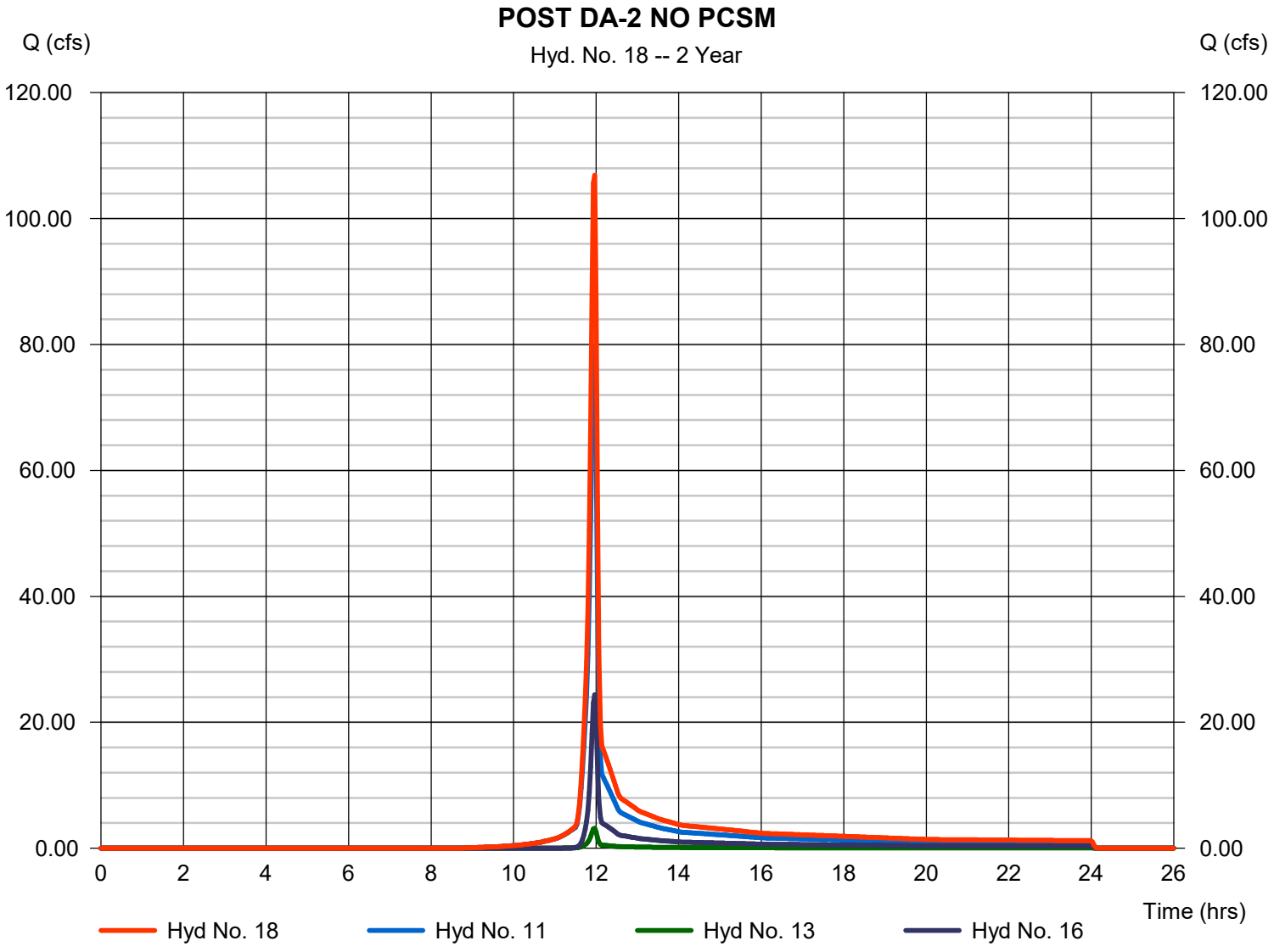


Hydrograph Report

Hyd. No. 18

POST DA-2 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 106.87 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 216,335 cuft
Inflow hyds.	= 11, 13, 16	Contrib. drain. area	= 65.250 ac

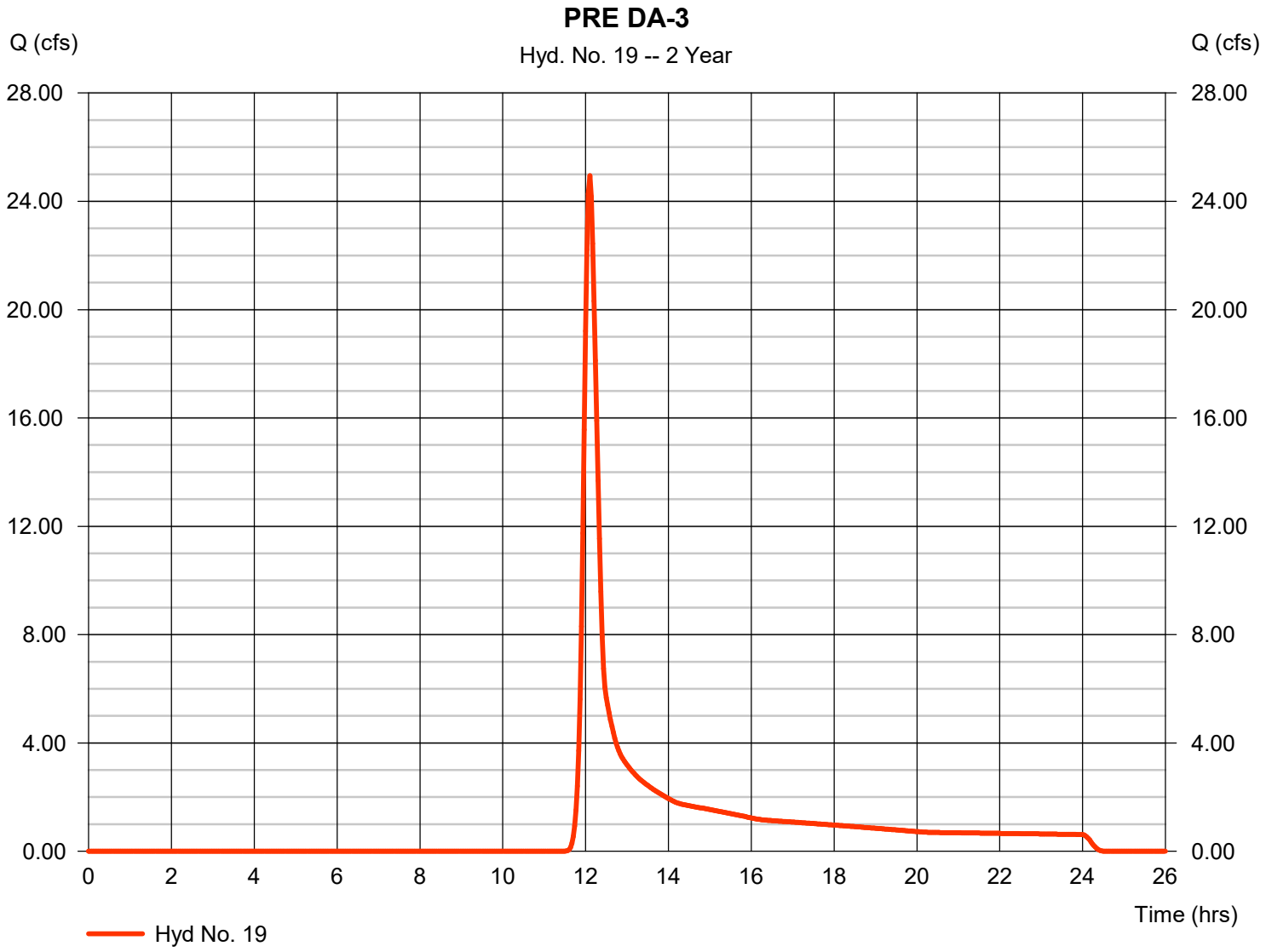


Hydrograph Report

Hyd. No. 19

PRE DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 24.94 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 87,425 cuft
Drainage area	= 40.230 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.20 min
Total precip.	= 2.41 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

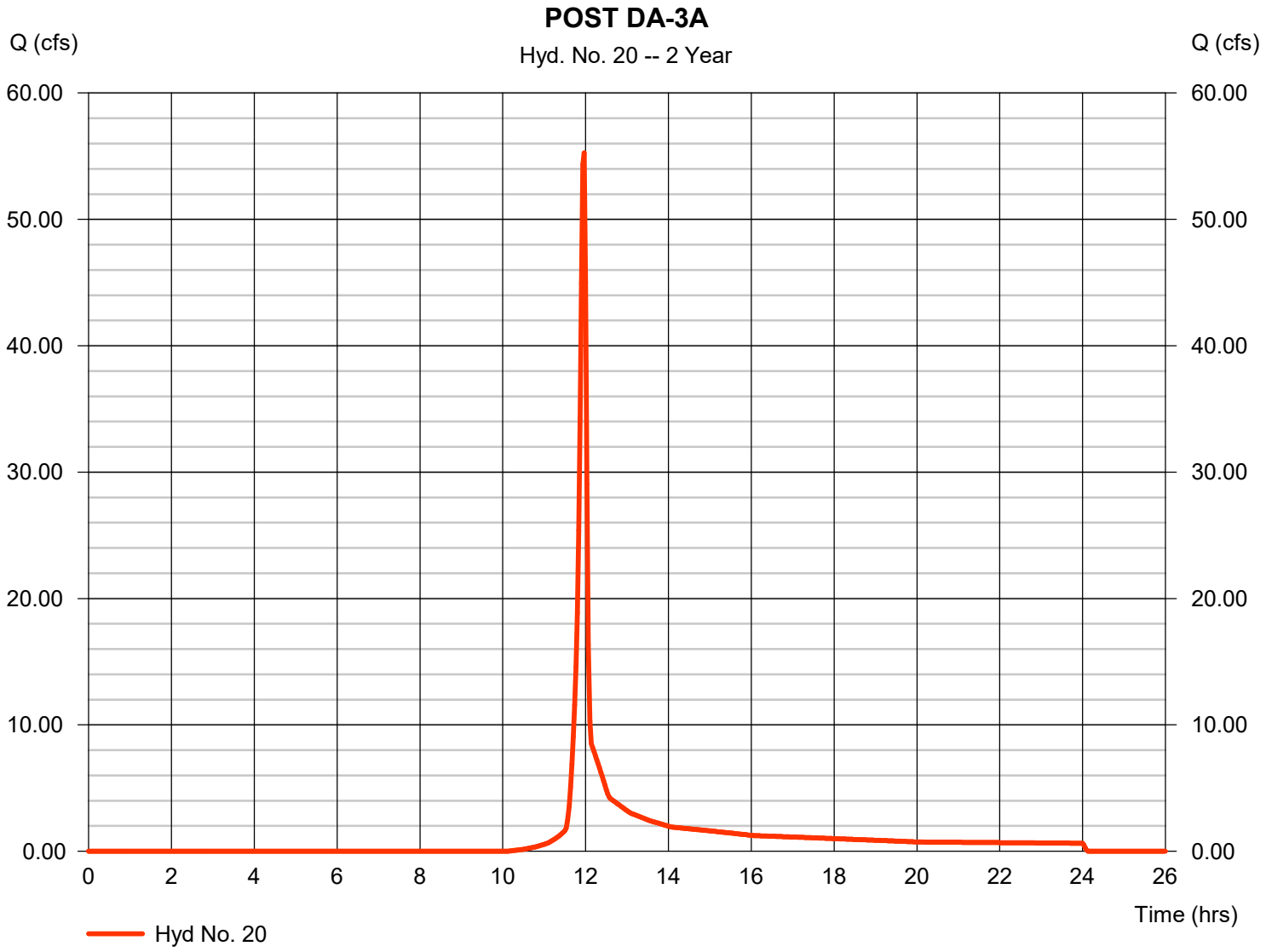


Hydrograph Report

Hyd. No. 20

POST DA-3A

Hydrograph type	=	SCS Runoff	Peak discharge	=	55.27 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	110,558 cuft
Drainage area	=	34.840 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.41 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



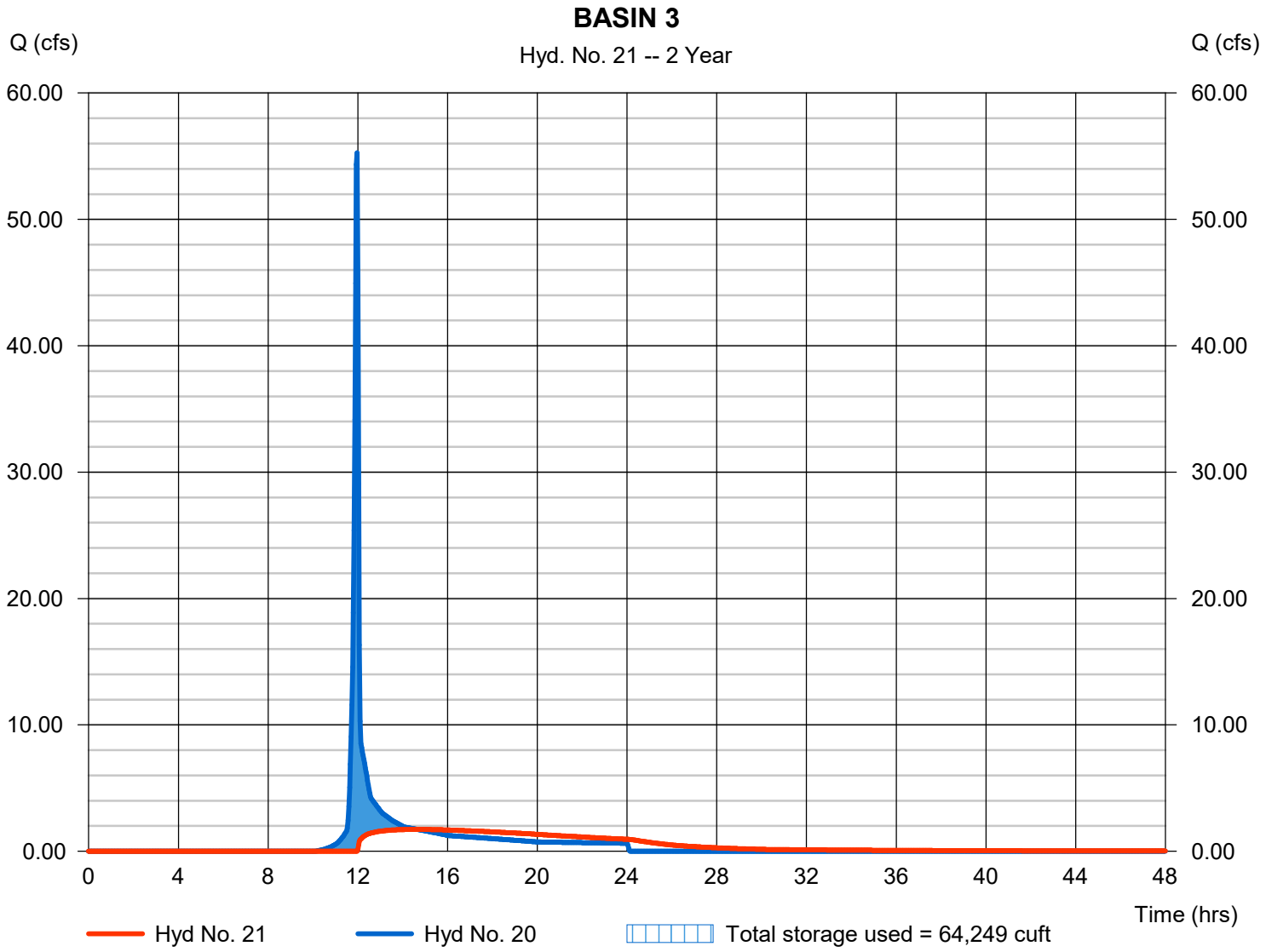
Hydrograph Report

Hyd. No. 21

BASIN 3

Hydrograph type	=	Reservoir	Peak discharge	=	1.726 cfs
Storm frequency	=	2 yrs	Time to peak	=	14.67 hrs
Time interval	=	2 min	Hyd. volume	=	74,964 cuft
Inflow hyd. No.	=	20 - POST DA-3A	Max. Elevation	=	1107.39 ft
Reservoir name	=	BASIN 3	Max. Storage	=	64,249 cuft

Storage Indication method used.

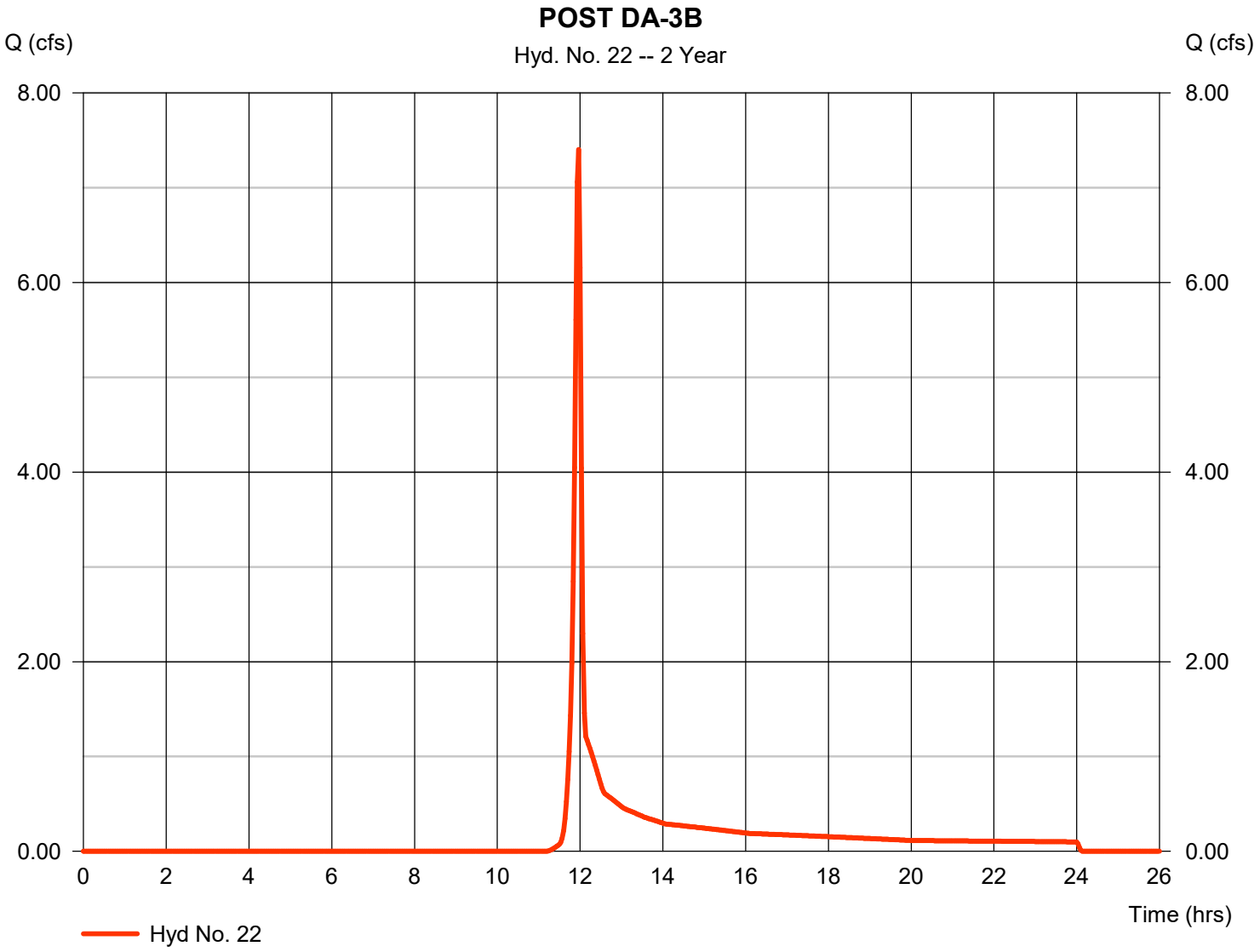


Hydrograph Report

Hyd. No. 22

POST DA-3B

Hydrograph type	= SCS Runoff	Peak discharge	= 7.404 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 14,956 cuft
Drainage area	= 6.420 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.41 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

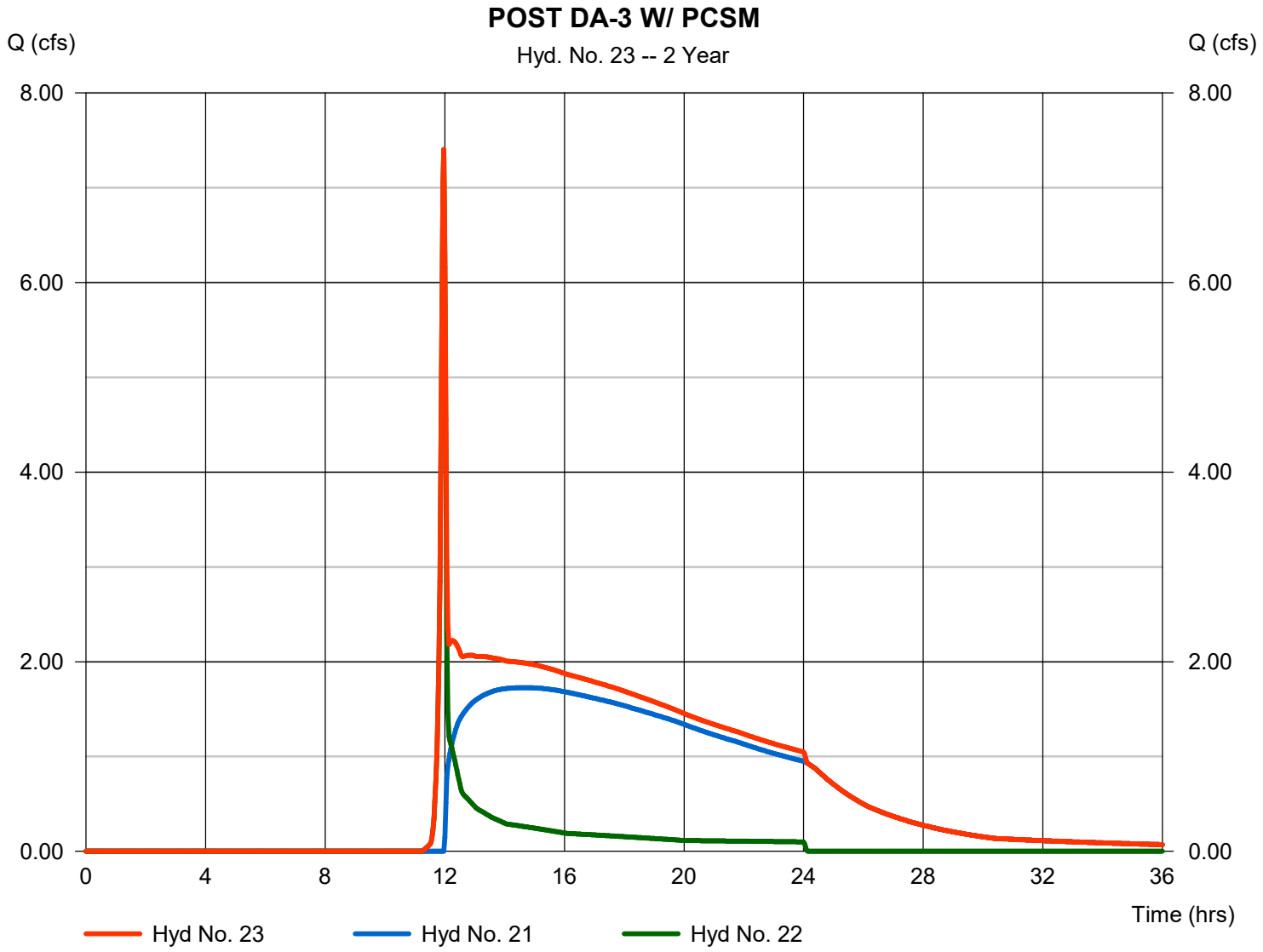


Hydrograph Report

Hyd. No. 23

POST DA-3 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 7.404 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 89,920 cuft
Inflow hyds.	= 21, 22	Contrib. drain. area	= 6.420 ac

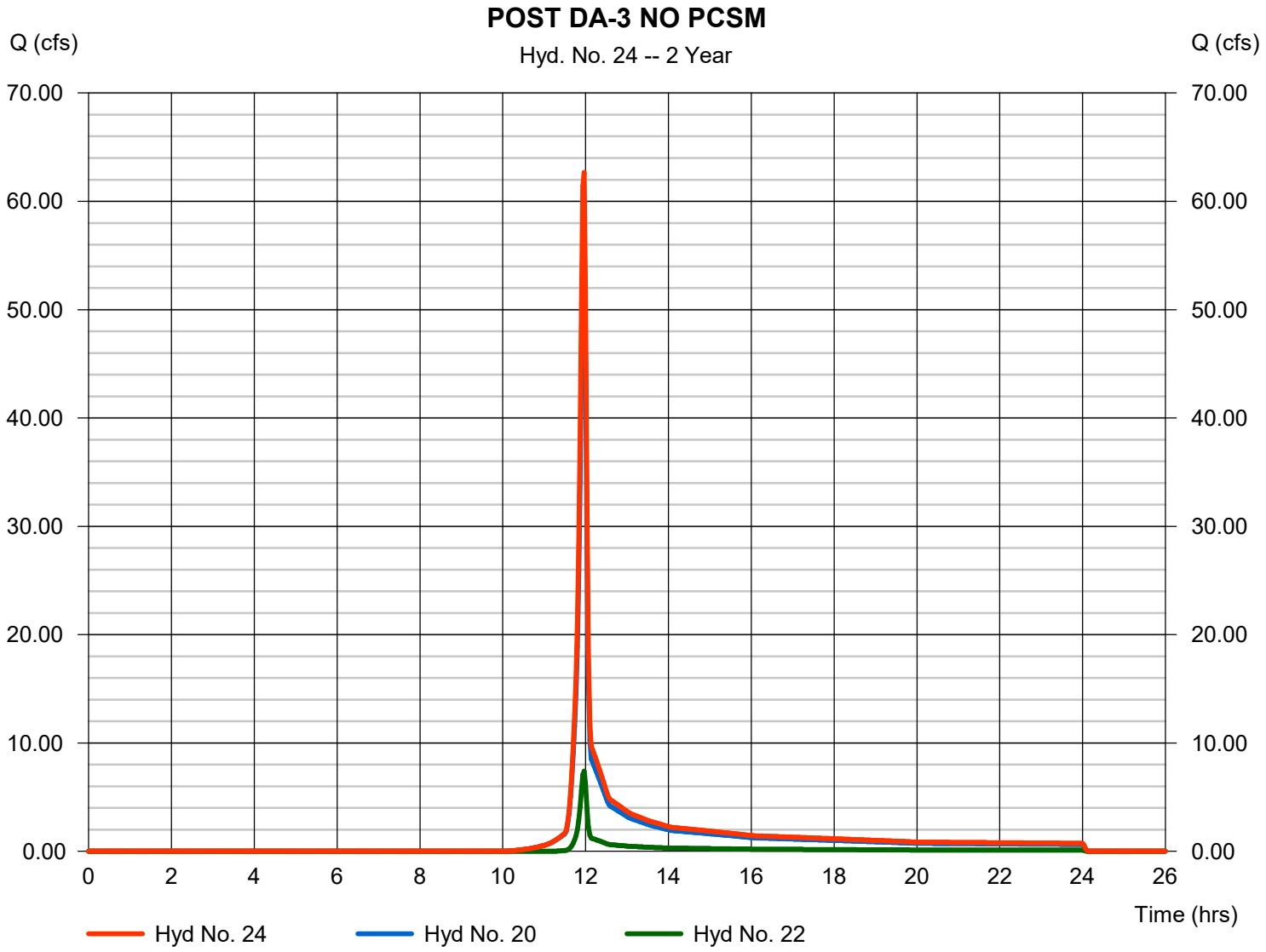


Hydrograph Report

Hyd. No. 24

POST DA-3 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 62.67 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 125,514 cuft
Inflow hyds.	= 20, 22	Contrib. drain. area	= 41.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

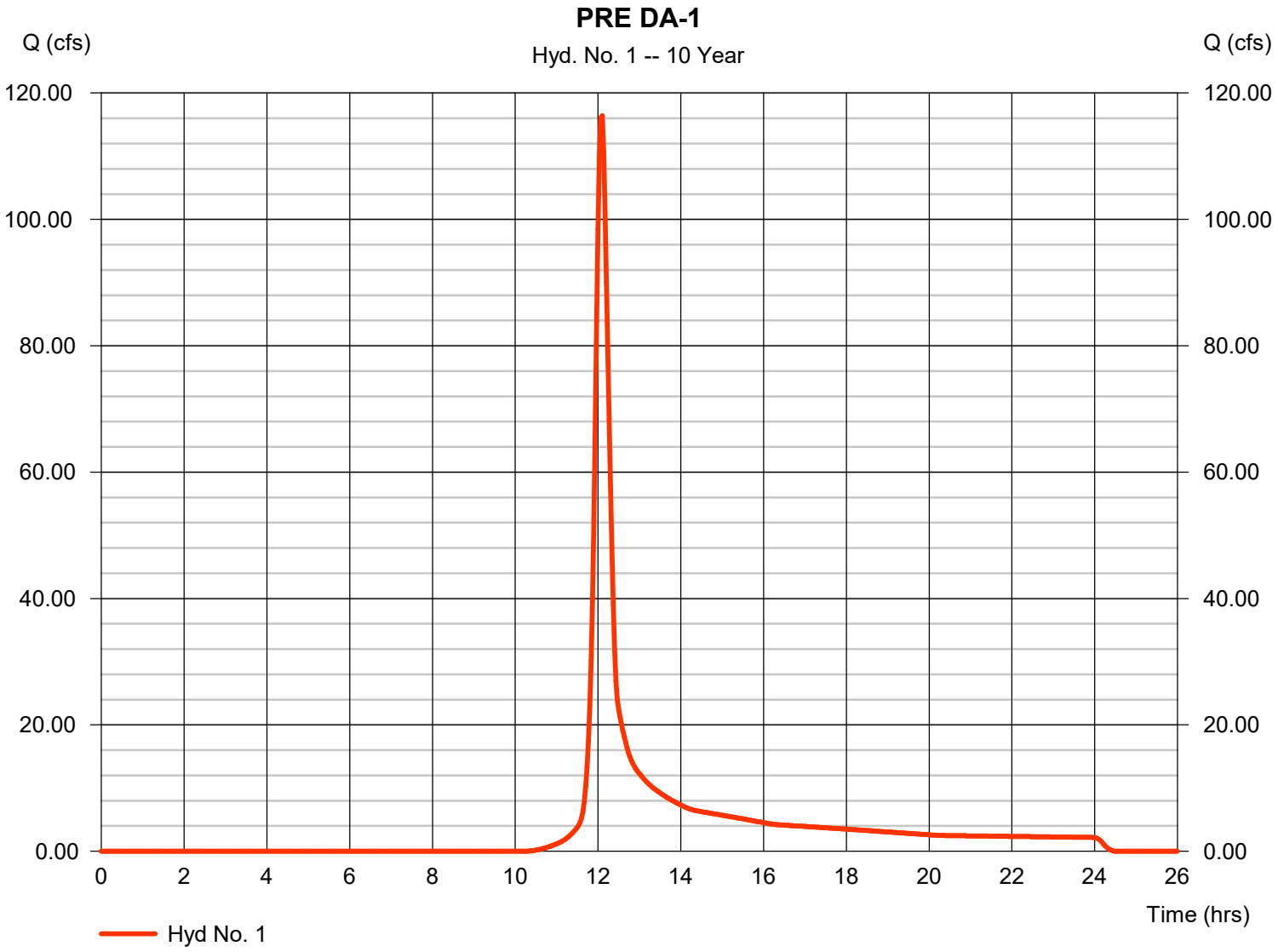
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	116.42	2	726	374,886	------	------	------	PRE DA-1
2	SCS Runoff	128.23	2	716	259,722	------	------	------	POST DA-1A
3	Reservoir	104.40	2	720	218,039	2	1118.14	75,075	BASIN 1 FOREBAY
4	SCS Runoff	69.76	2	716	143,457	------	------	------	POST DA-1B
5	Combine	166.44	2	718	361,496	3, 4	------	------	TO BASIN 1
6	Reservoir	59.50	2	728	360,768	5	1115.73	123,767	BASIN 1
7	SCS Runoff	32.10	2	718	64,334	------	------	------	POST DA-1C
8	Combine	65.20	2	726	425,101	6, 7	------	------	POST DA-1 W/ PCSM
9	Combine	229.05	2	716	467,512	2, 4, 7,	------	------	POST DA-1 NO PCSM
10	SCS Runoff	85.79	2	726	277,913	------	------	------	PRE DA-2
11	SCS Runoff	134.12	2	716	273,261	------	------	------	POST DA-2A
12	Reservoir	102.93	2	720	254,931	11	1122.80	54,550	BASIN 2 FOREBAY
13	SCS Runoff	5.837	2	718	11,752	------	------	------	POST DA-2B
14	Combine	107.64	2	720	266,683	12, 13	------	------	TO BASIN 2
15	Reservoir	3.286	2	926	134,399	14	1115.63	177,298	BASIN 2
16	SCS Runoff	49.42	2	718	98,843	------	------	------	POST DA-2C
17	Combine	49.42	2	718	233,241	15, 16	------	------	POST DA-2 W/ PCSM
18	Combine	188.44	2	716	383,857	11, 13, 16,	------	------	POST DA-2 NO PCSM
19	SCS Runoff	54.89	2	726	177,806	------	------	------	PRE DA-3
20	SCS Runoff	98.86	2	716	199,667	------	------	------	POST DA-3A
21	Reservoir	3.318	2	838	164,073	20	1109.81	119,325	BASIN 3
22	SCS Runoff	14.65	2	718	29,320	------	------	------	POST DA-3B
23	Combine	16.66	2	718	193,393	21, 22	------	------	POST DA-3 W/ PCSM
24	Combine	113.30	2	716	228,987	20, 22,	------	------	POST DA-3 NO PCSM

Hydrograph Report

Hyd. No. 1

PRE DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	116.42 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	374,886 cuft
Drainage area	=	80.750 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

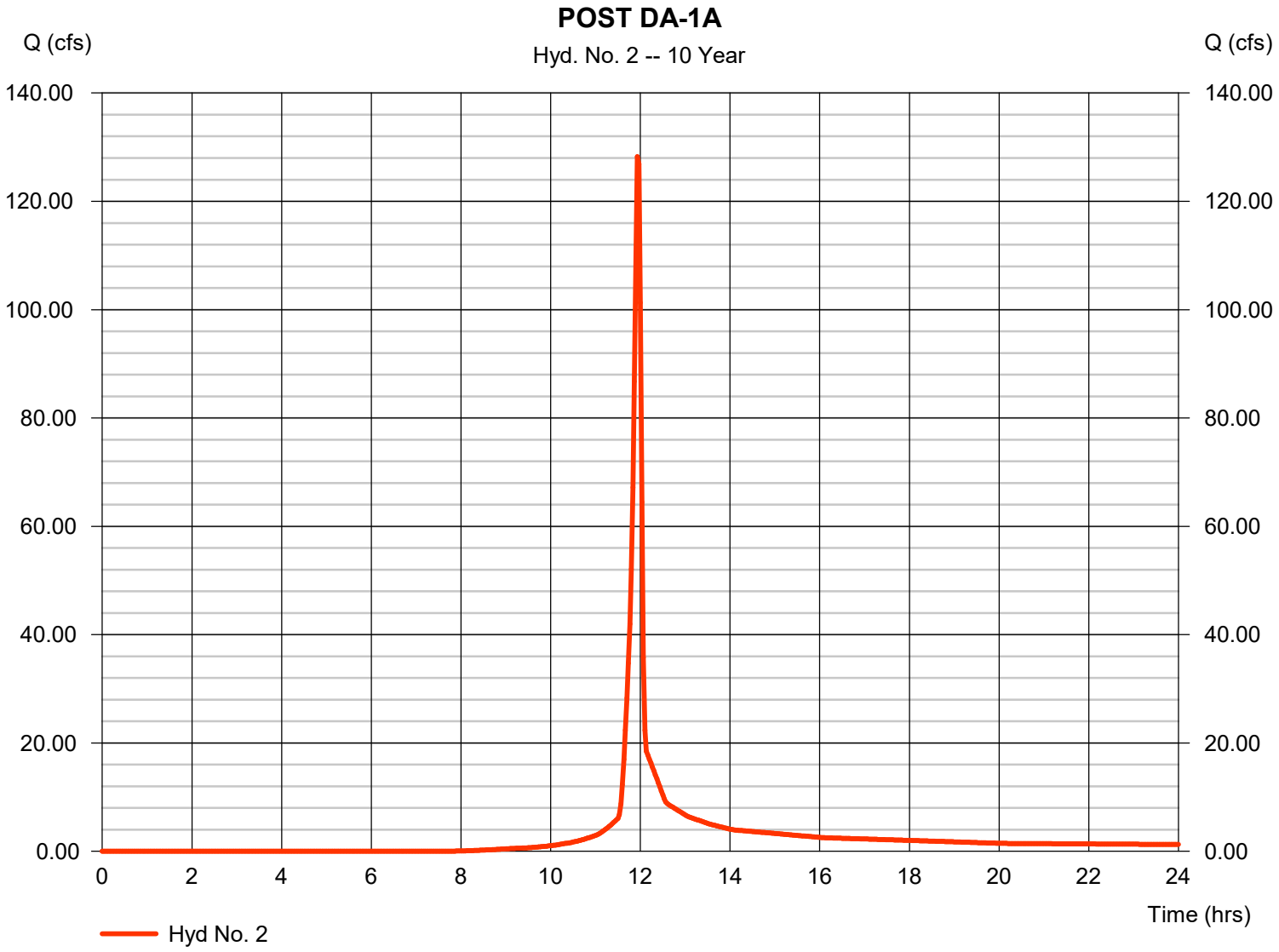


Hydrograph Report

Hyd. No. 2

POST DA-1A

Hydrograph type	=	SCS Runoff	Peak discharge	=	128.23 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	259,722 cuft
Drainage area	=	41.610 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



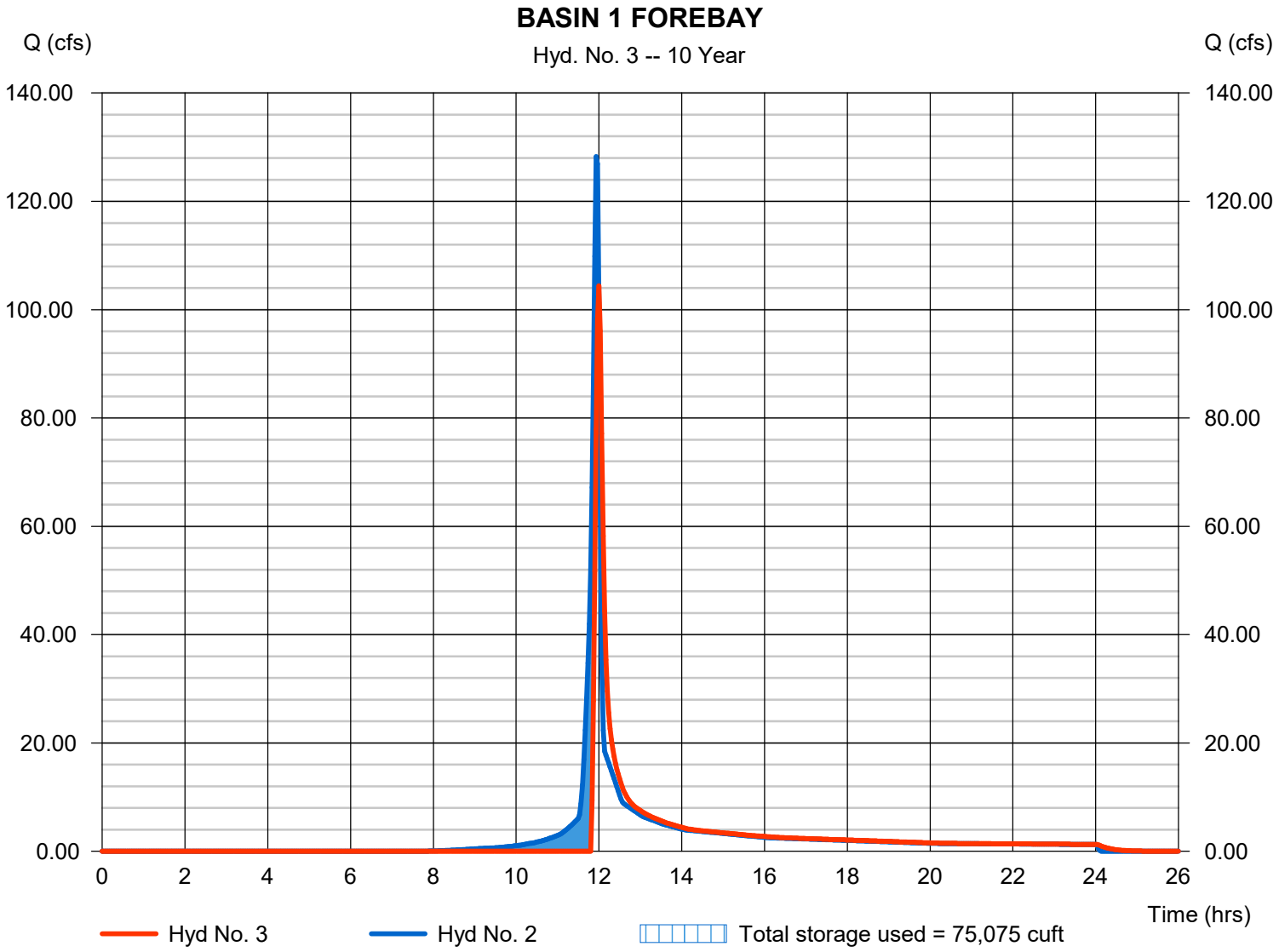
Hydrograph Report

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	104.40 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	218,039 cuft
Inflow hyd. No.	=	2 - POST DA-1A	Max. Elevation	=	1118.14 ft
Reservoir name	=	BASIN 1 FOREBAY	Max. Storage	=	75,075 cuft

Storage Indication method used.

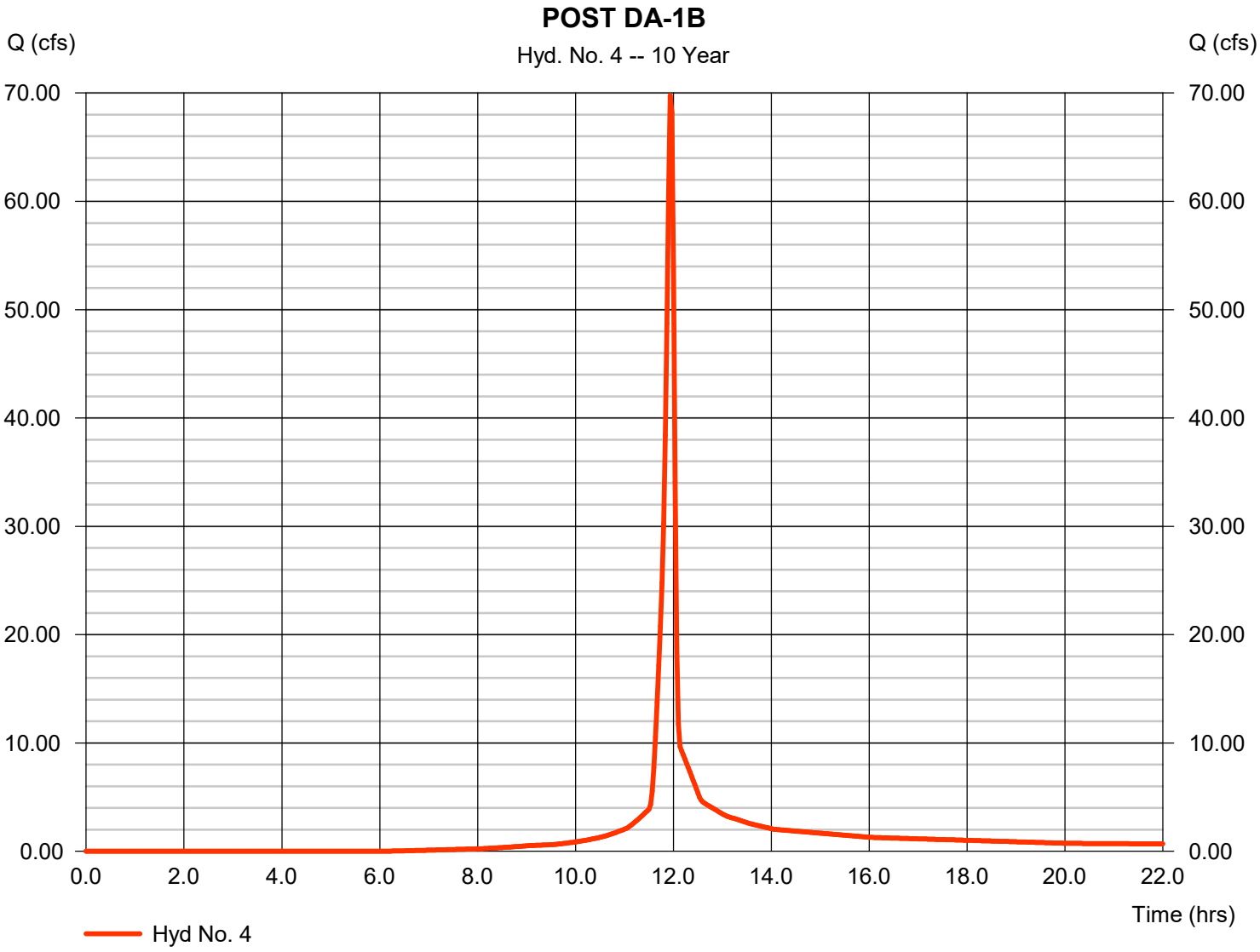


Hydrograph Report

Hyd. No. 4

POST DA-1B

Hydrograph type	=	SCS Runoff	Peak discharge	=	69.76 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	143,457 cuft
Drainage area	=	19.520 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

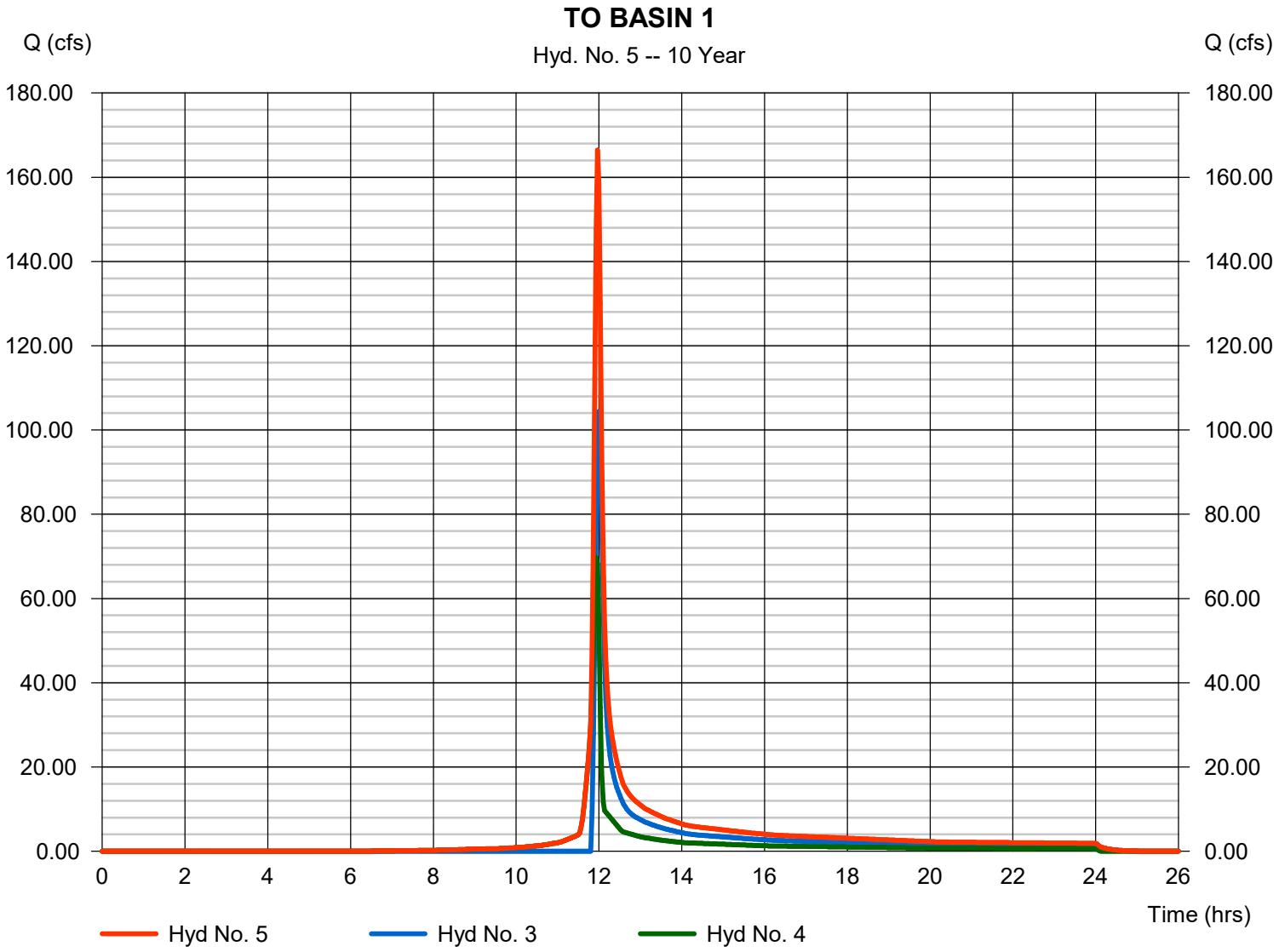


Hydrograph Report

Hyd. No. 5

TO BASIN 1

Hydrograph type	=	Combine	Peak discharge	=	166.44 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	361,496 cuft
Inflow hyds.	=	3, 4	Contrib. drain. area	=	19.520 ac



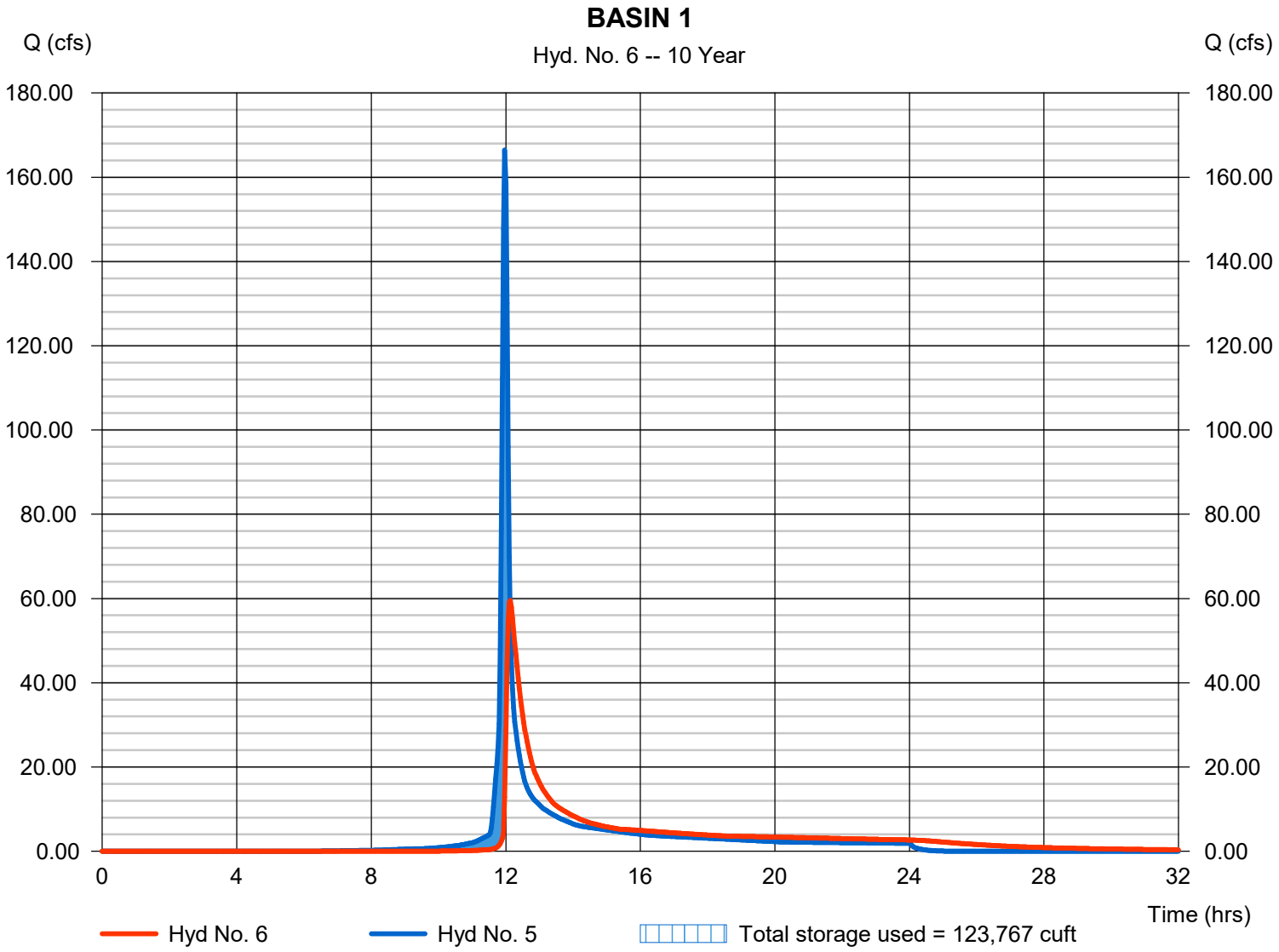
Hydrograph Report

Hyd. No. 6

BASIN 1

Hydrograph type	=	Reservoir	Peak discharge	=	59.50 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	360,768 cuft
Inflow hyd. No.	=	5 - TO BASIN 1	Max. Elevation	=	1115.73 ft
Reservoir name	=	BASIN 1	Max. Storage	=	123,767 cuft

Storage Indication method used.

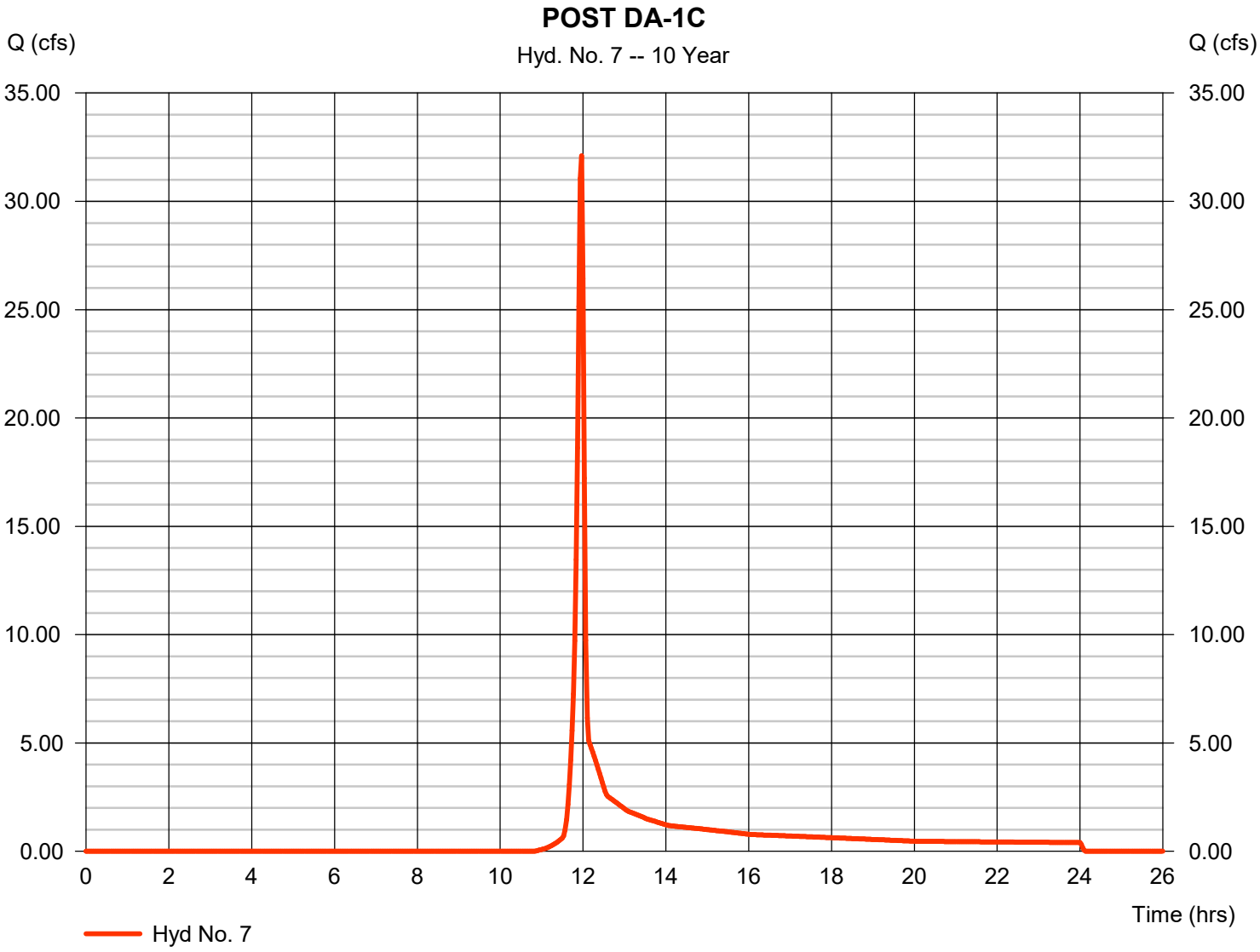


Hydrograph Report

Hyd. No. 7

POST DA-1C

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.10 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	64,334 cuft
Drainage area	=	17.190 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

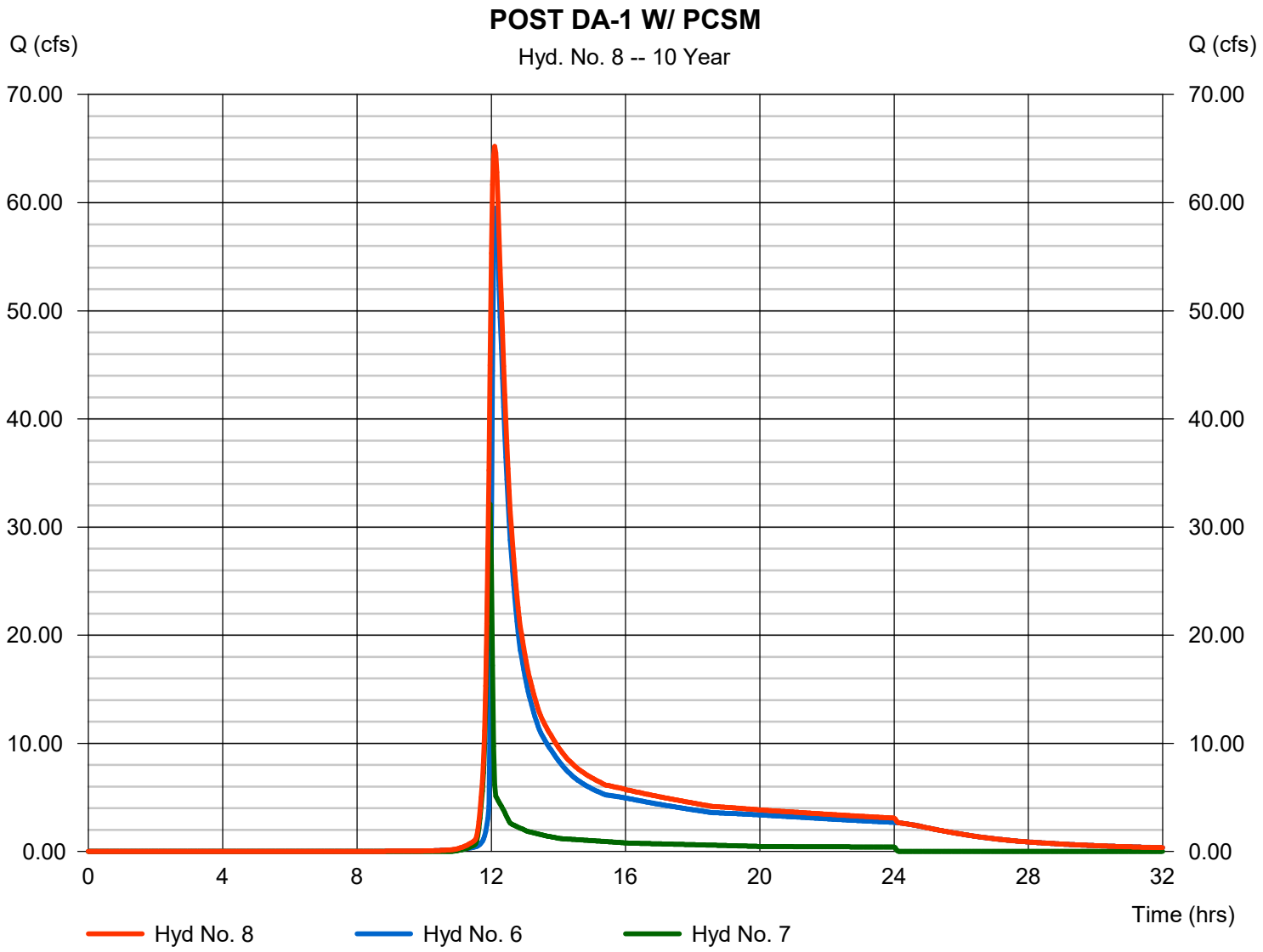


Hydrograph Report

Hyd. No. 8

POST DA-1 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 65.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 425,101 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 17.190 ac

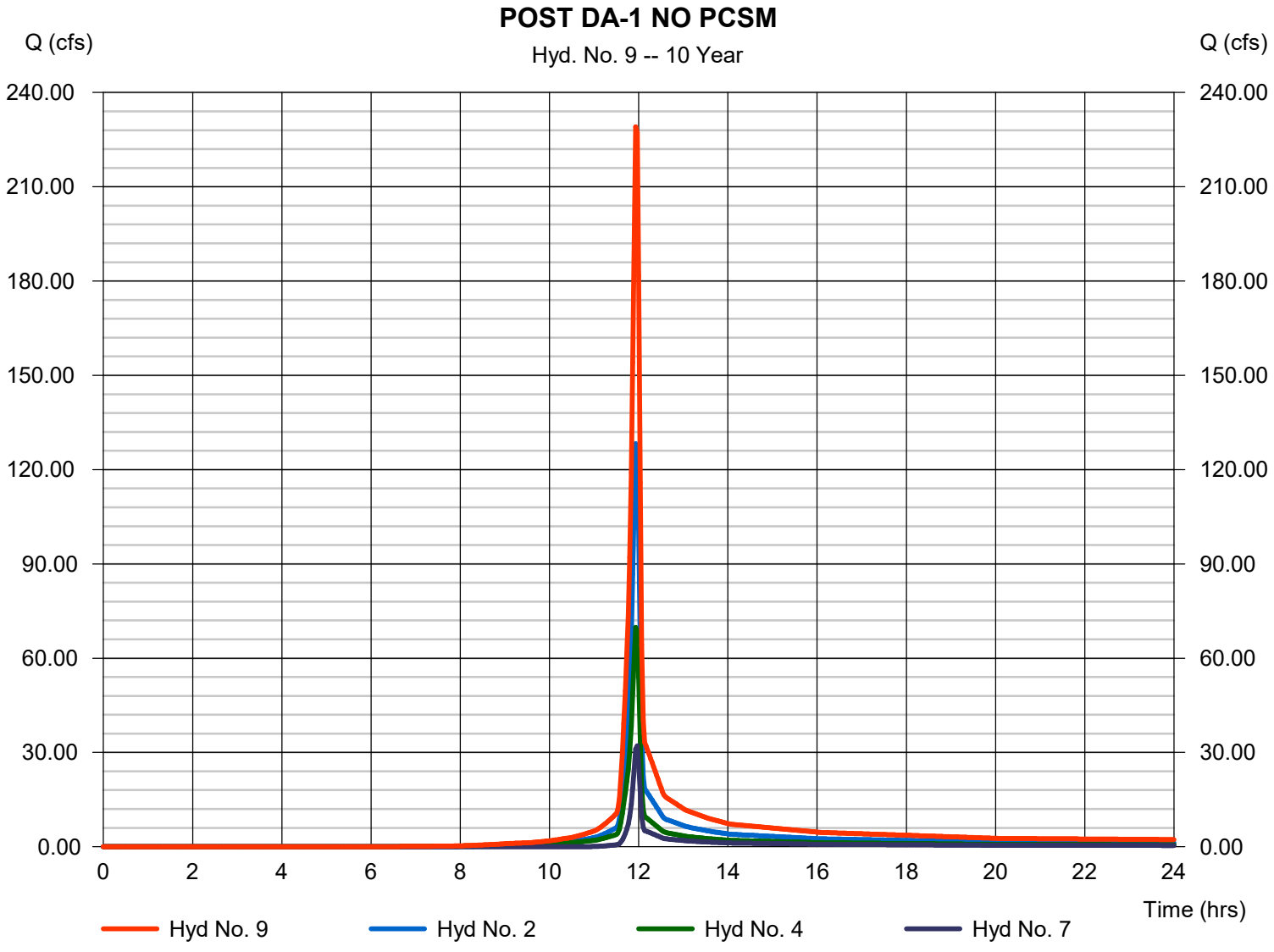


Hydrograph Report

Hyd. No. 9

POST DA-1 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 229.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 467,512 cuft
Inflow hyds.	= 2, 4, 7	Contrib. drain. area	= 78.320 ac

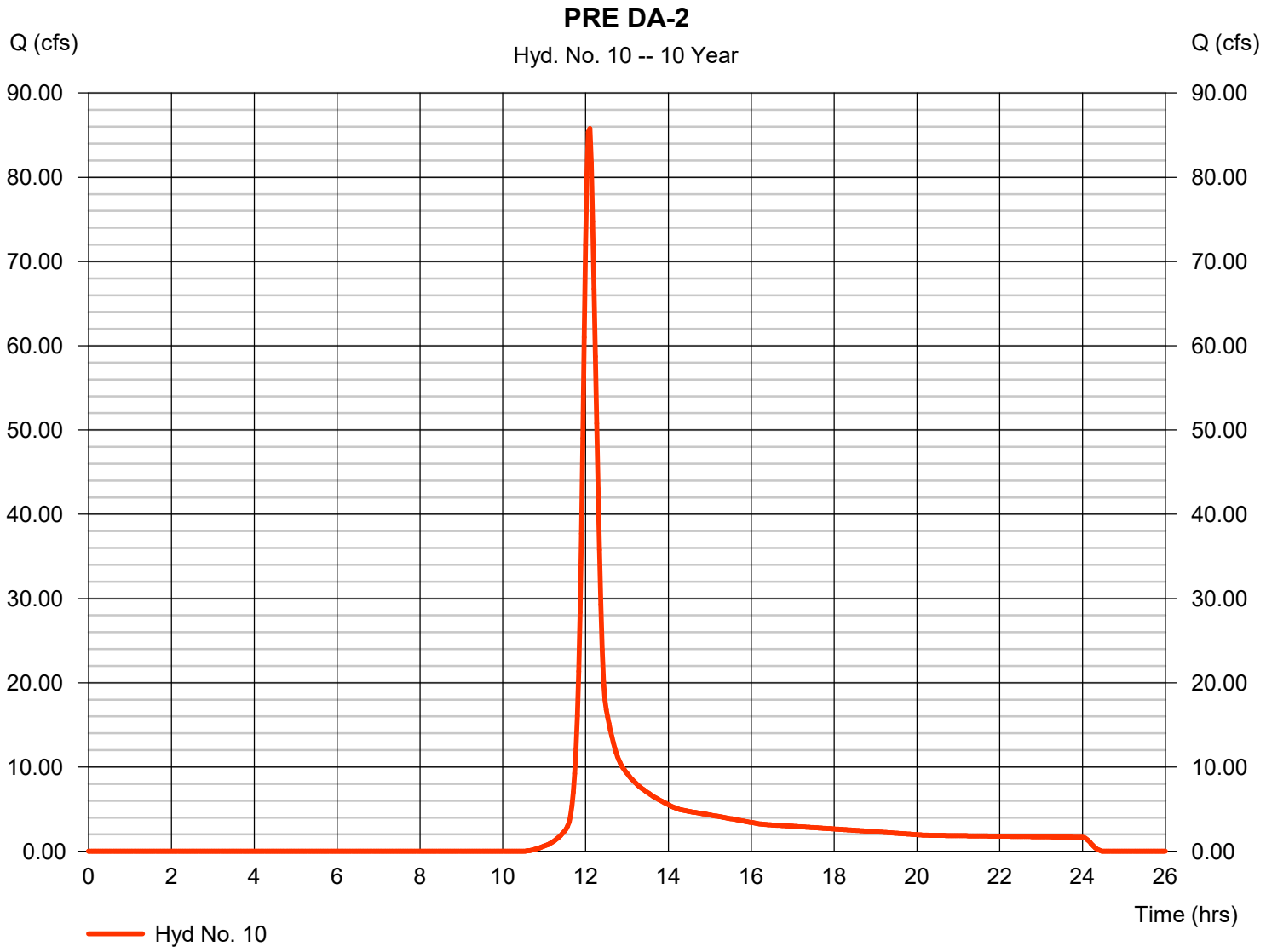


Hydrograph Report

Hyd. No. 10

PRE DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	85.79 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	277,913 cuft
Drainage area	=	62.880 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

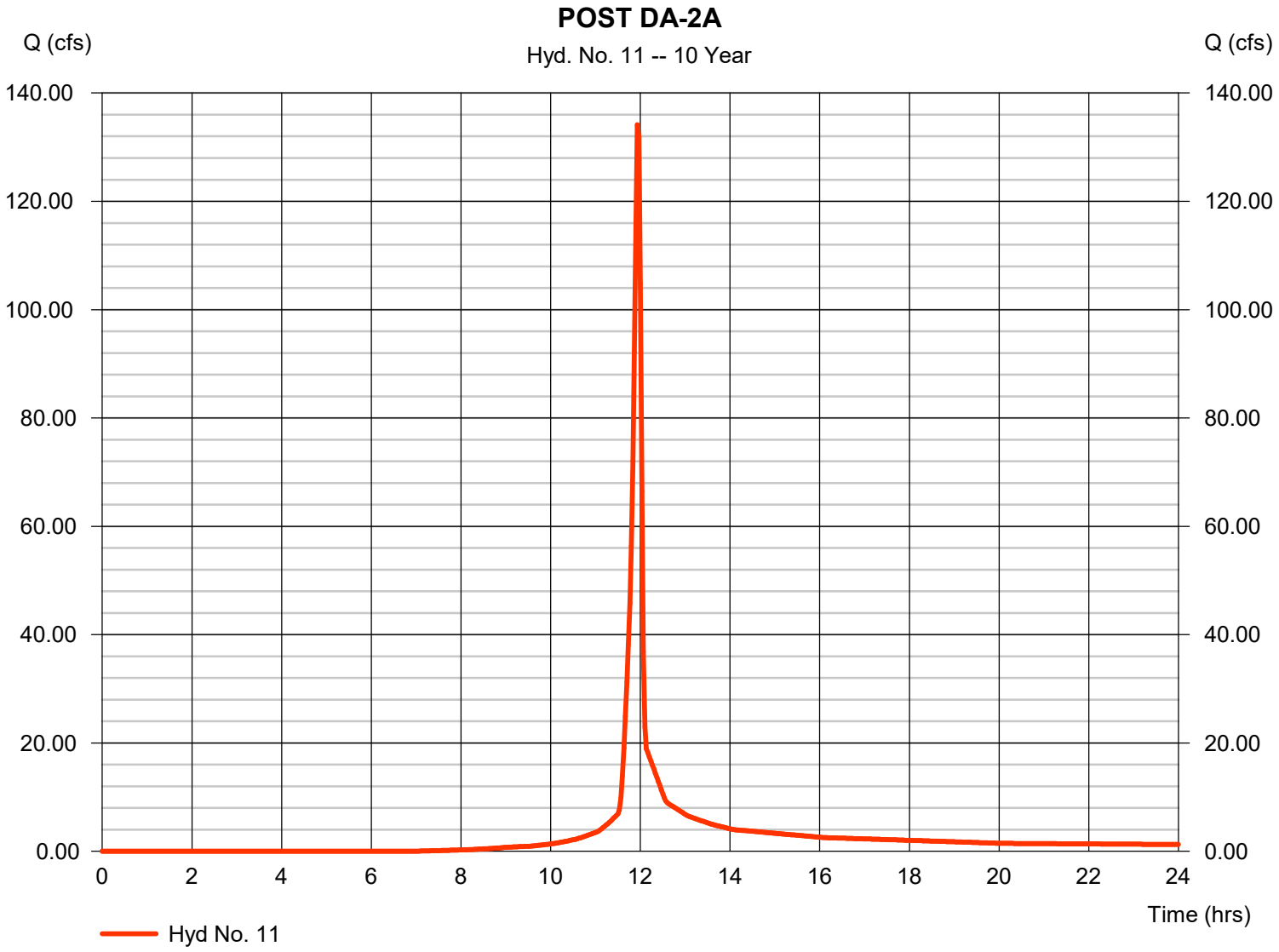


Hydrograph Report

Hyd. No. 11

POST DA-2A

Hydrograph type	=	SCS Runoff	Peak discharge	=	134.12 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	273,261 cuft
Drainage area	=	40.300 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



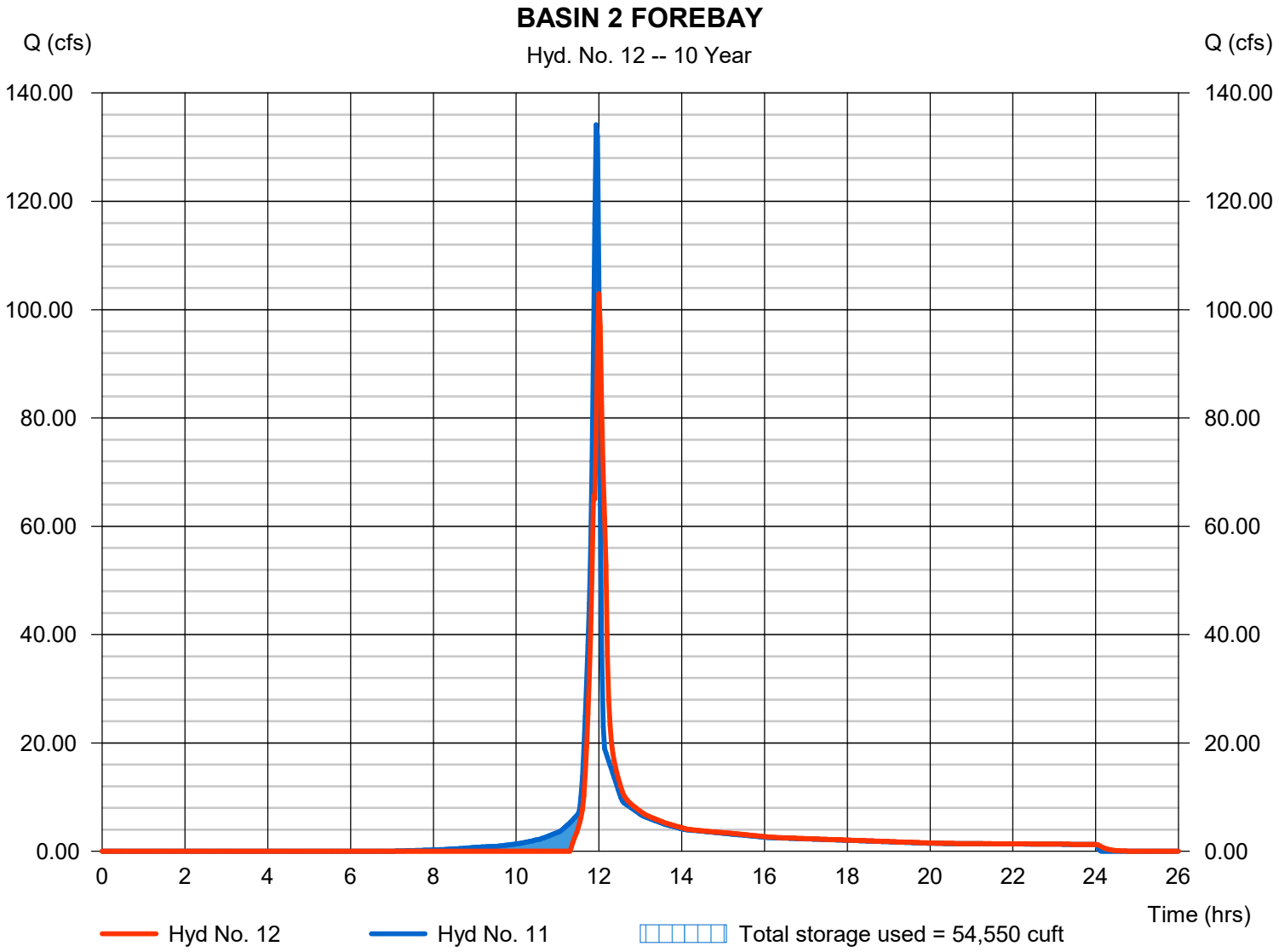
Hydrograph Report

Hyd. No. 12

BASIN 2 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	102.93 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	254,931 cuft
Inflow hyd. No.	=	11 - POST DA-2A	Max. Elevation	=	1122.80 ft
Reservoir name	=	BASIN 2 FOREBAY	Max. Storage	=	54,550 cuft

Storage Indication method used.

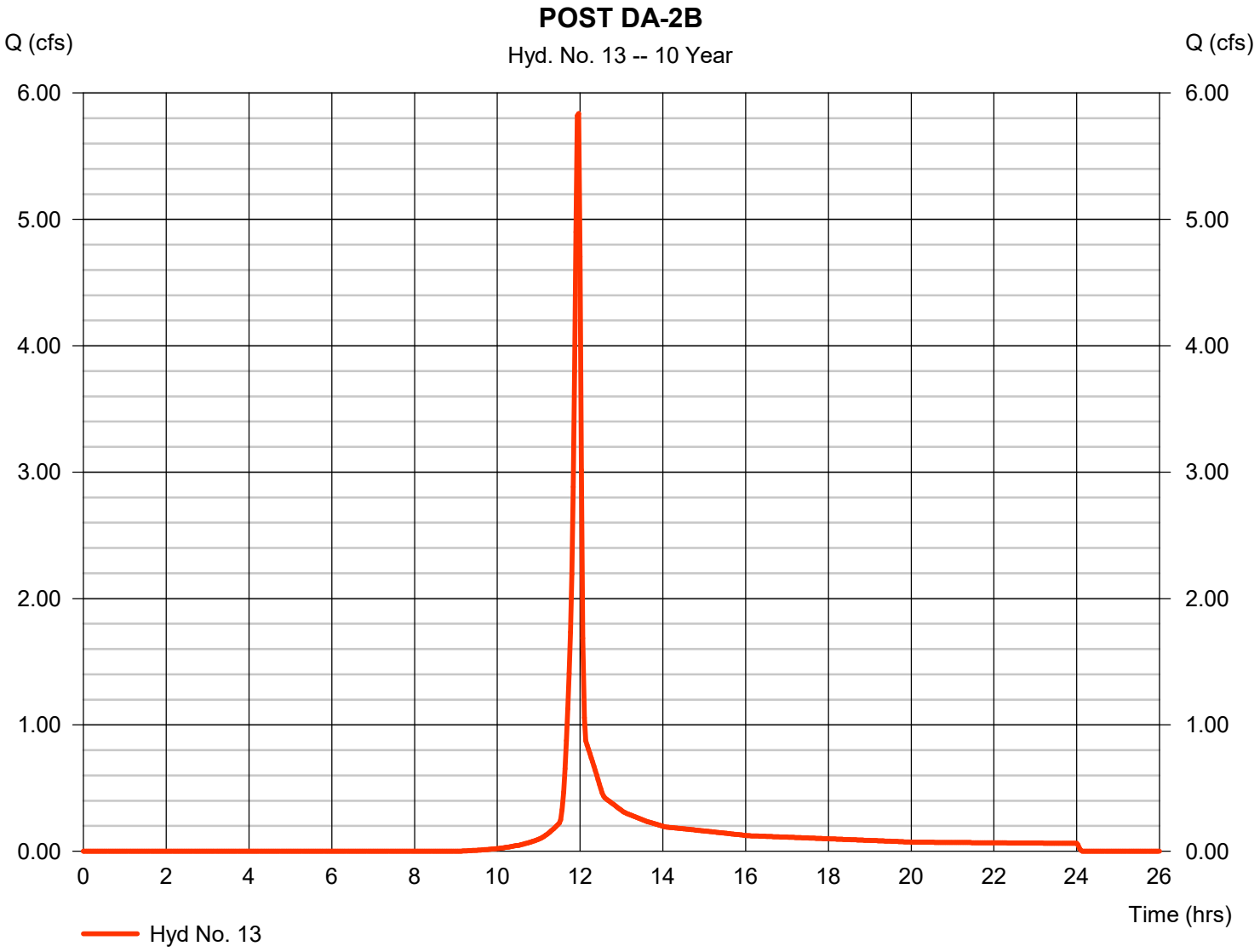


Hydrograph Report

Hyd. No. 13

POST DA-2B

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.837 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	11,752 cuft
Drainage area	=	2.240 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

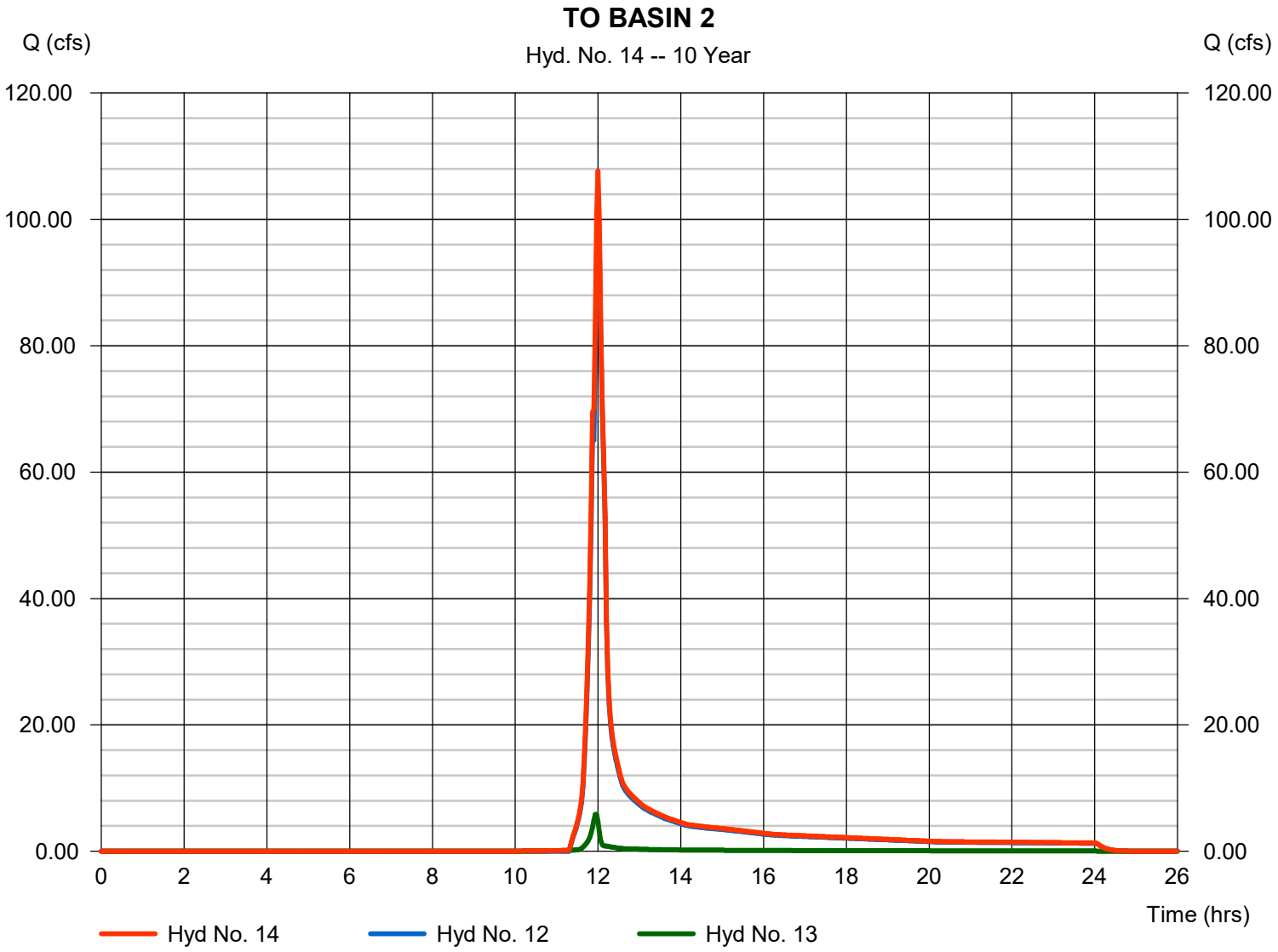


Hydrograph Report

Hyd. No. 14

TO BASIN 2

Hydrograph type	=	Combine	Peak discharge	=	107.64 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	266,683 cuft
Inflow hyds.	=	12, 13	Contrib. drain. area	=	2.240 ac



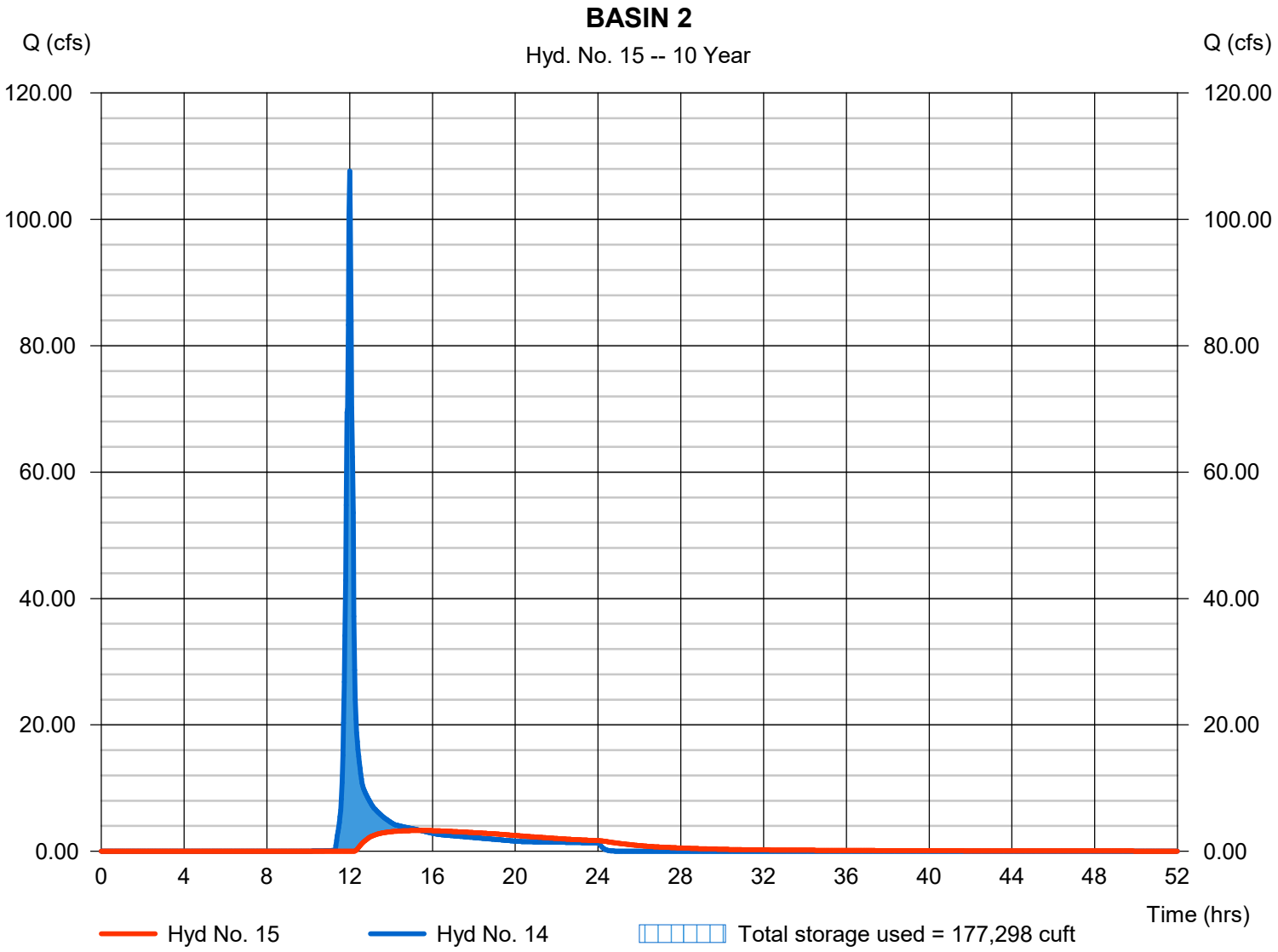
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	=	Reservoir	Peak discharge	=	3.286 cfs
Storm frequency	=	10 yrs	Time to peak	=	15.43 hrs
Time interval	=	2 min	Hyd. volume	=	134,399 cuft
Inflow hyd. No.	=	14 - TO BASIN 2	Max. Elevation	=	1115.63 ft
Reservoir name	=	BASIN 2	Max. Storage	=	177,298 cuft

Storage Indication method used.

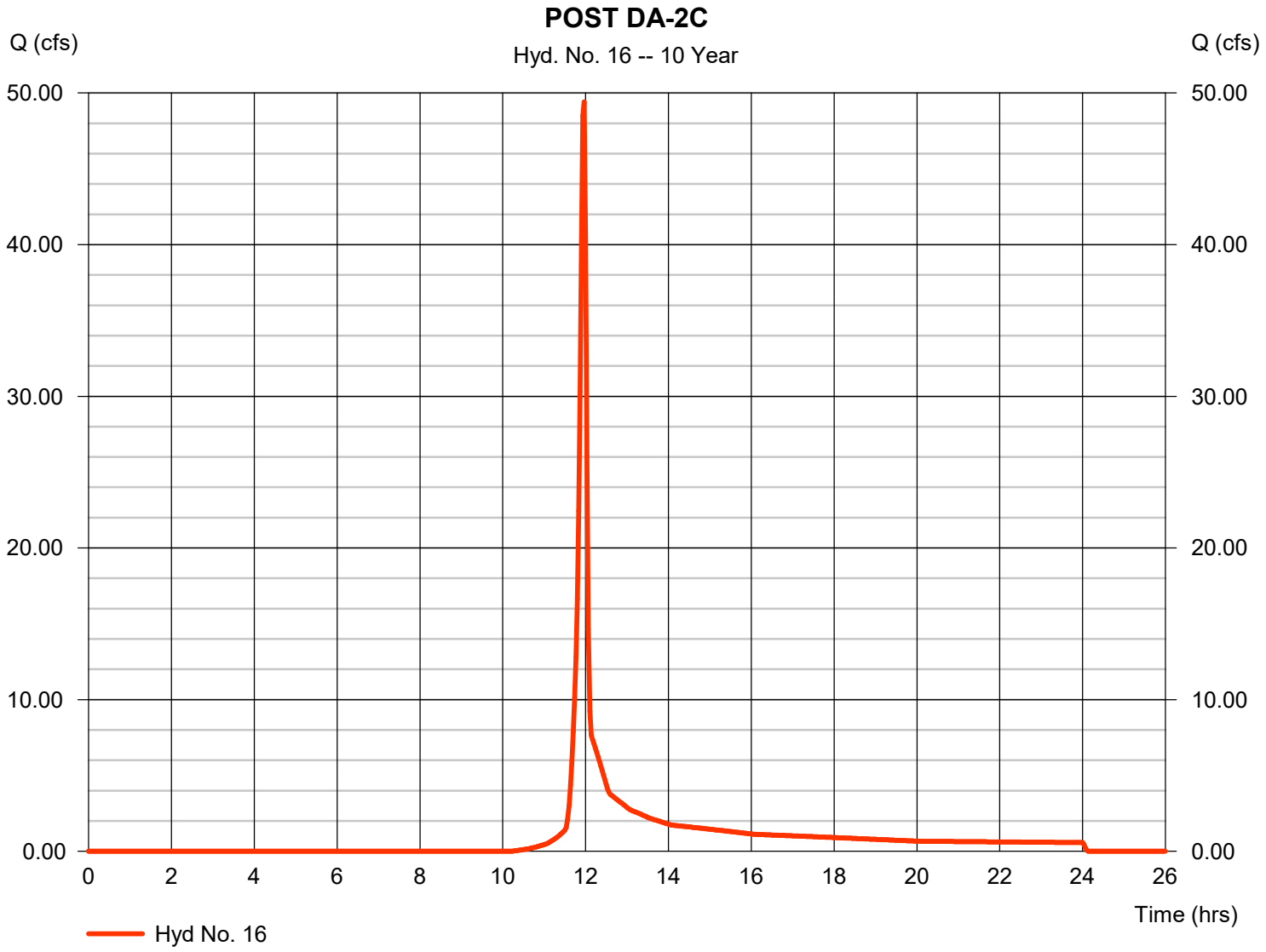


Hydrograph Report

Hyd. No. 16

POST DA-2C

Hydrograph type	= SCS Runoff	Peak discharge	= 49.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 98,843 cuft
Drainage area	= 22.710 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

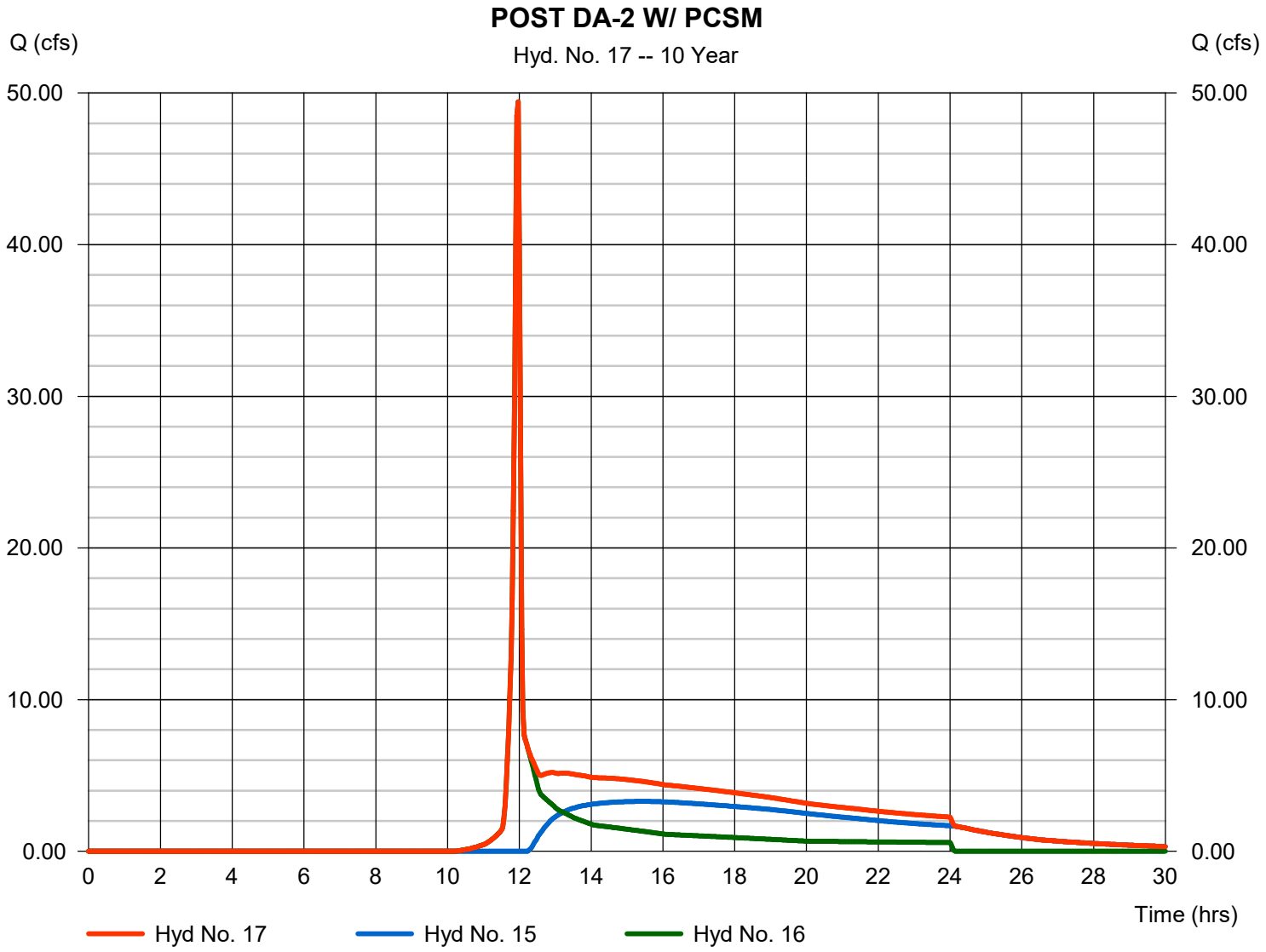


Hydrograph Report

Hyd. No. 17

POST DA-2 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 49.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 233,241 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 22.710 ac

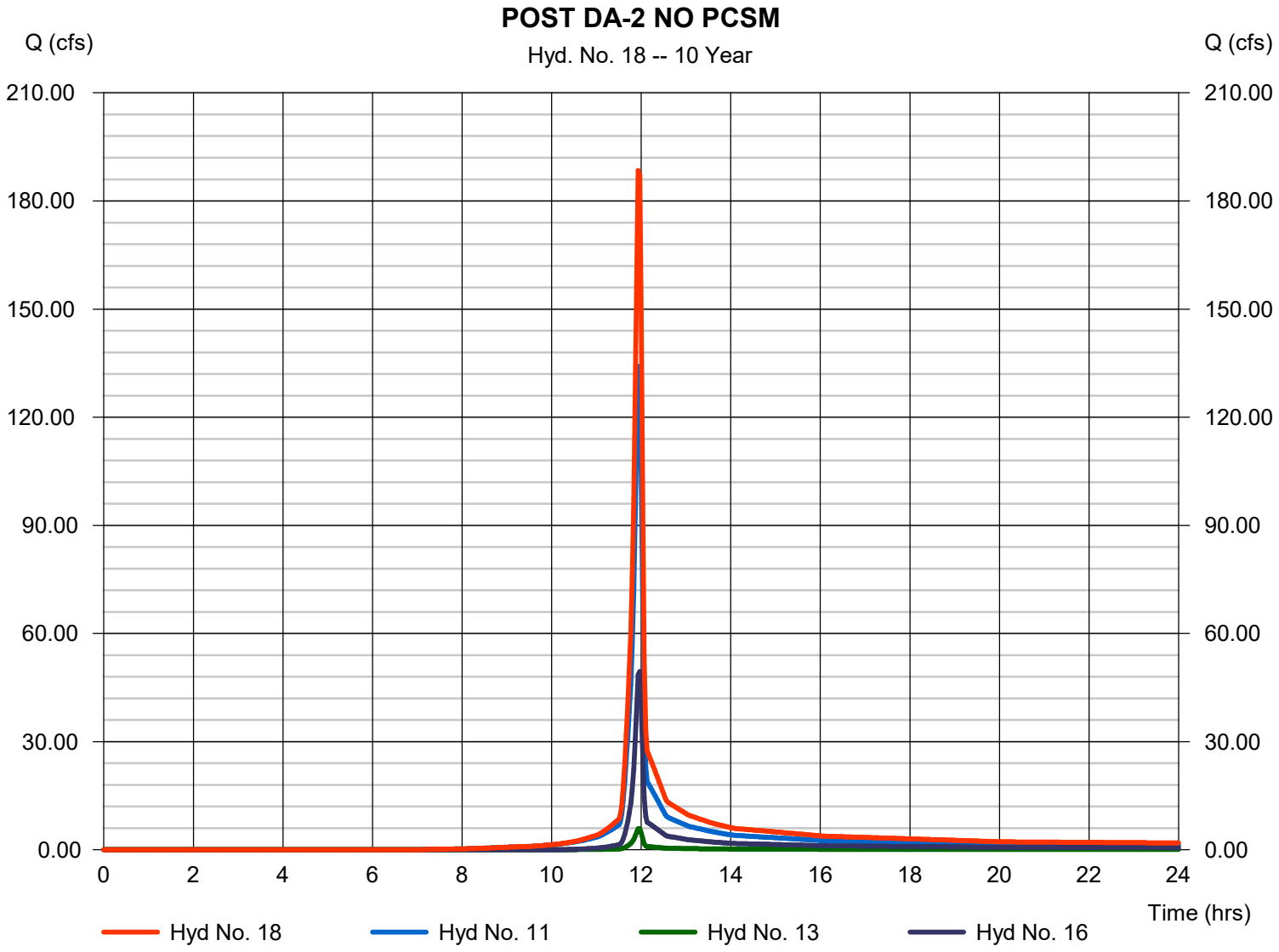


Hydrograph Report

Hyd. No. 18

POST DA-2 NO PCSM

Hydrograph type	=	Combine	Peak discharge	=	188.44 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	383,857 cuft
Inflow hyds.	=	11, 13, 16	Contrib. drain. area	=	65.250 ac

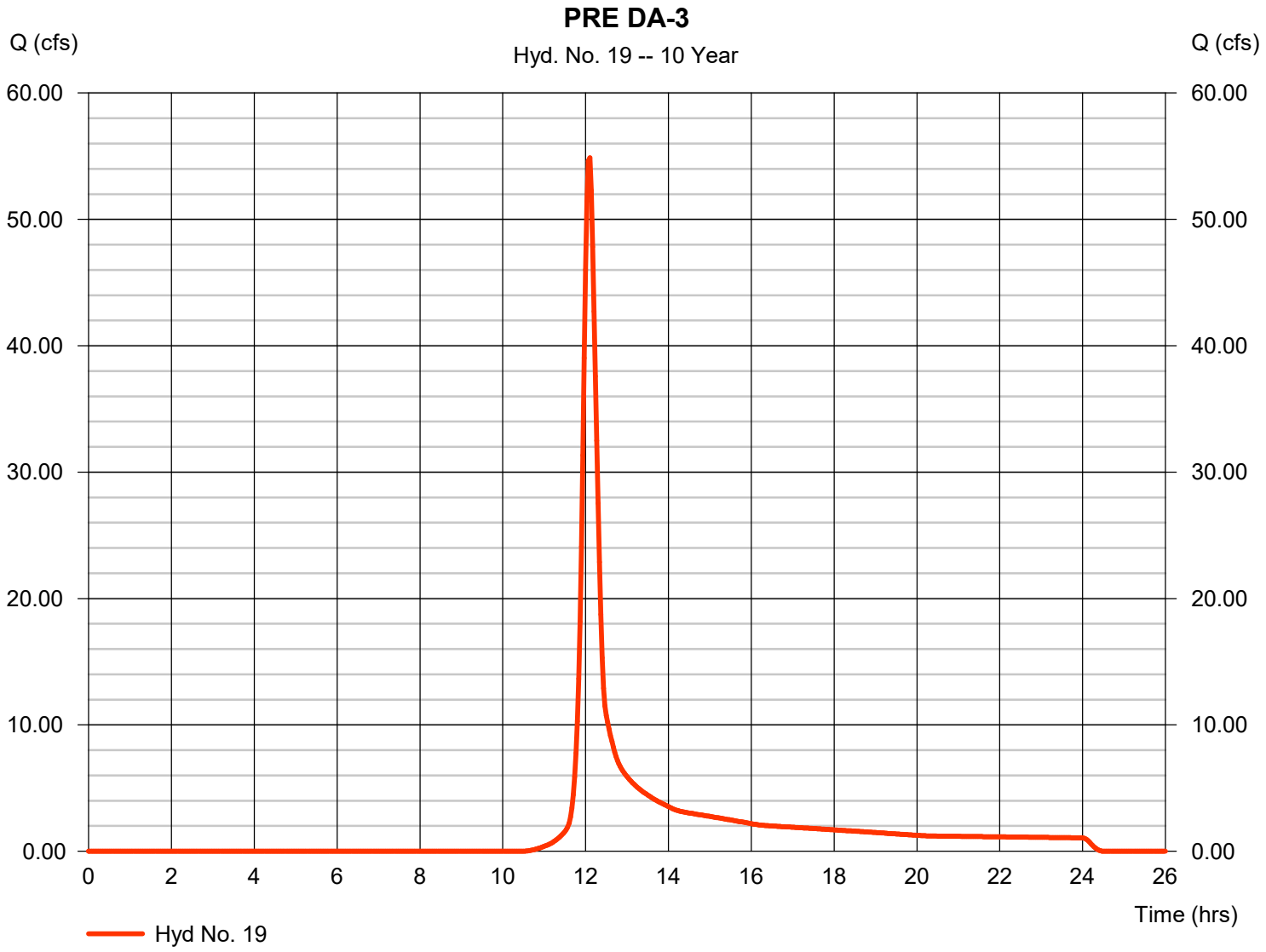


Hydrograph Report

Hyd. No. 19

PRE DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.89 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	177,806 cuft
Drainage area	=	40.230 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

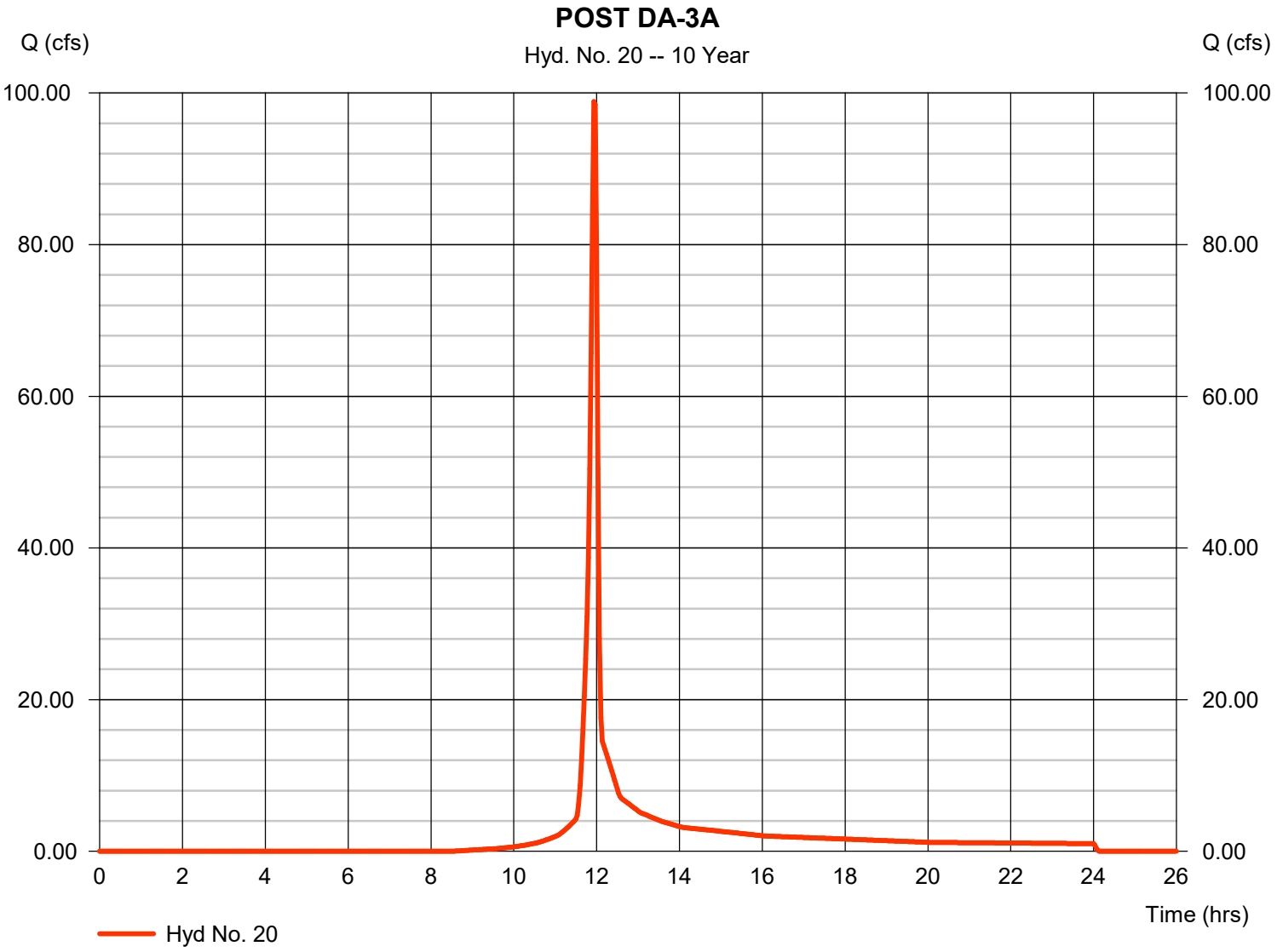


Hydrograph Report

Hyd. No. 20

POST DA-3A

Hydrograph type	=	SCS Runoff	Peak discharge	=	98.86 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	199,667 cuft
Drainage area	=	34.840 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

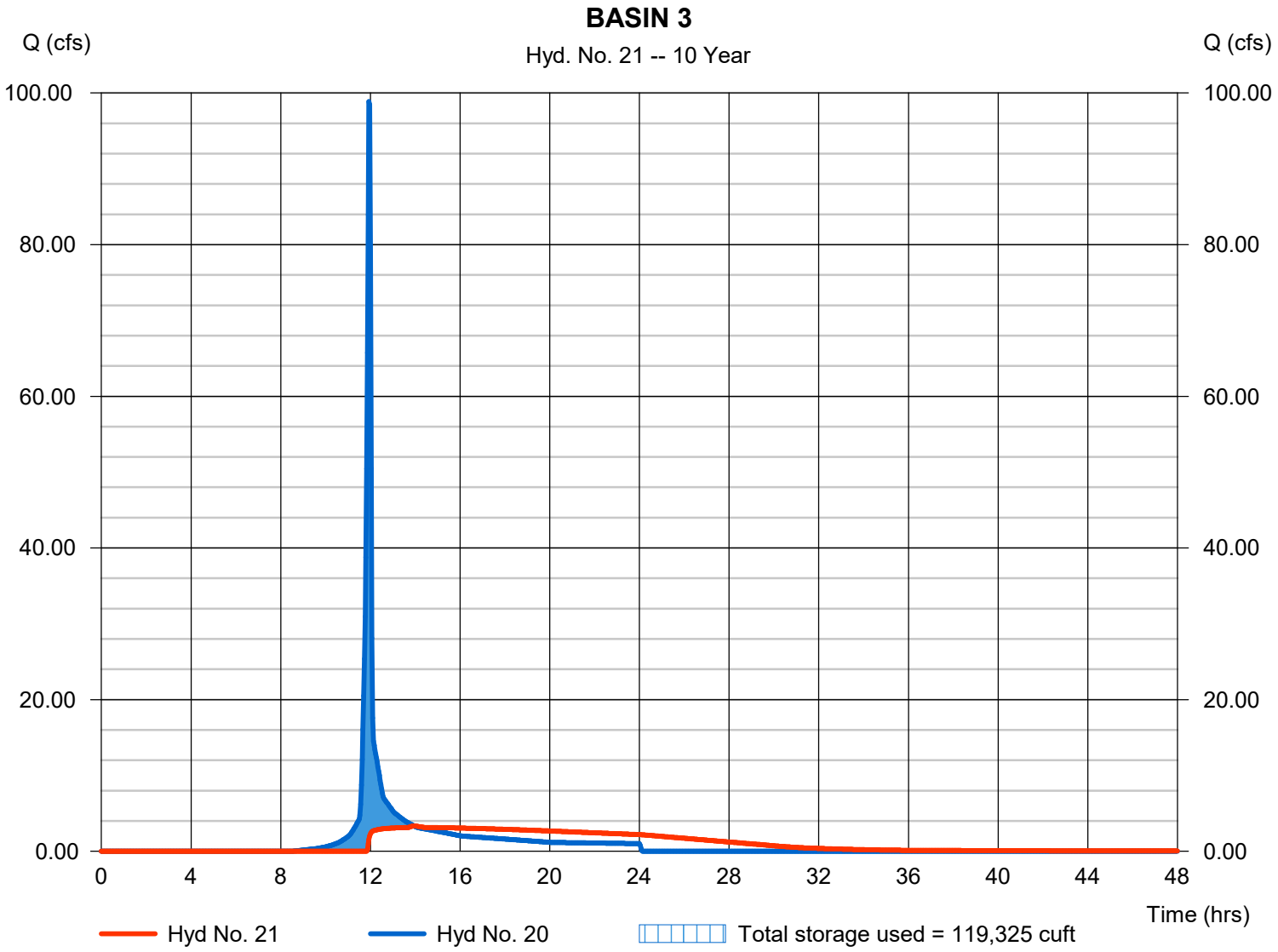
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Friday, 07 / 30 / 2021

Hyd. No. 21

BASIN 3

Hydrograph type	=	Reservoir	Peak discharge	=	3.318 cfs
Storm frequency	=	10 yrs	Time to peak	=	13.97 hrs
Time interval	=	2 min	Hyd. volume	=	164,073 cuft
Inflow hyd. No.	=	20 - POST DA-3A	Max. Elevation	=	1109.81 ft
Reservoir name	=	BASIN 3	Max. Storage	=	119,325 cuft

Storage Indication method used.

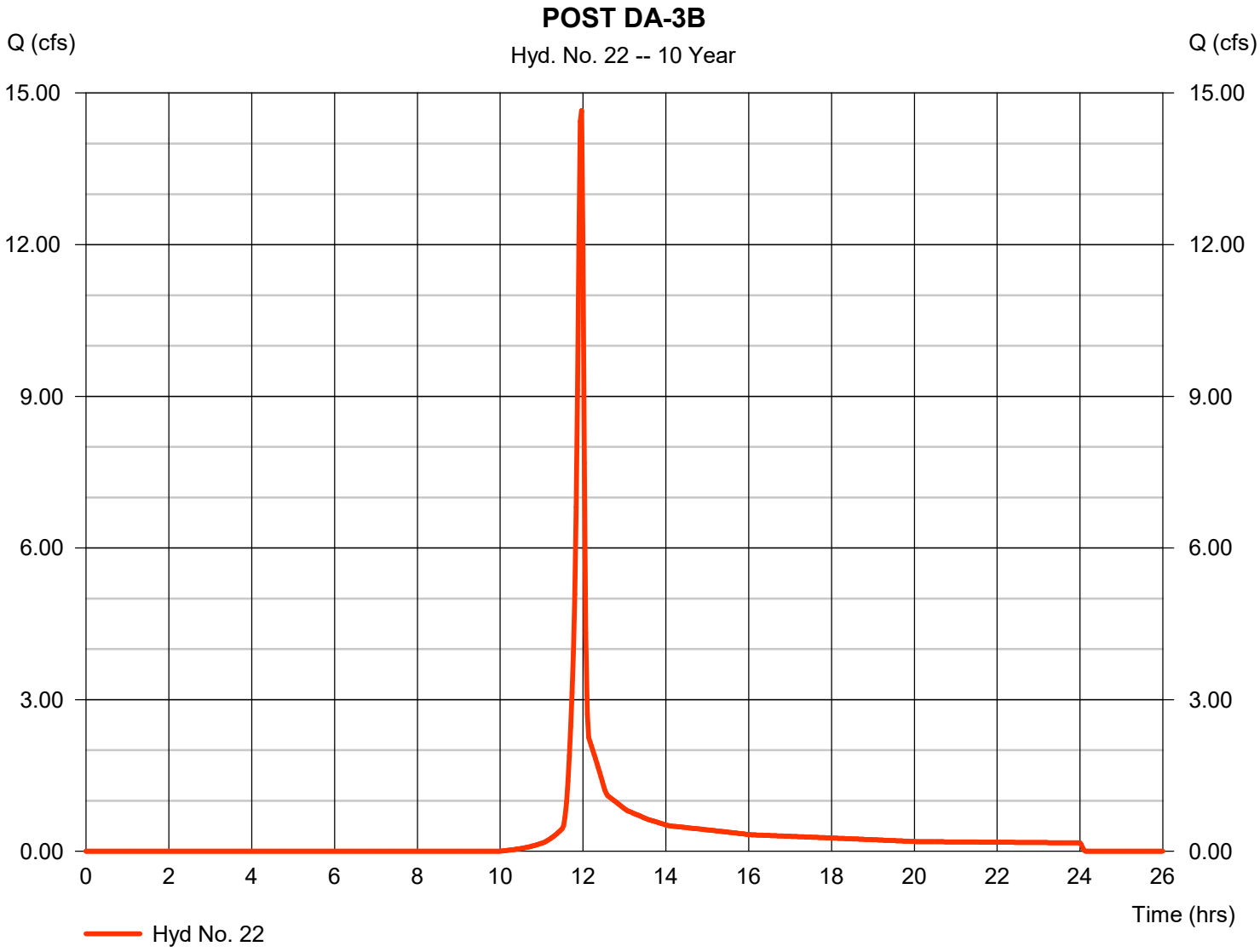


Hydrograph Report

Hyd. No. 22

POST DA-3B

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.65 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	29,320 cuft
Drainage area	=	6.420 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.38 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

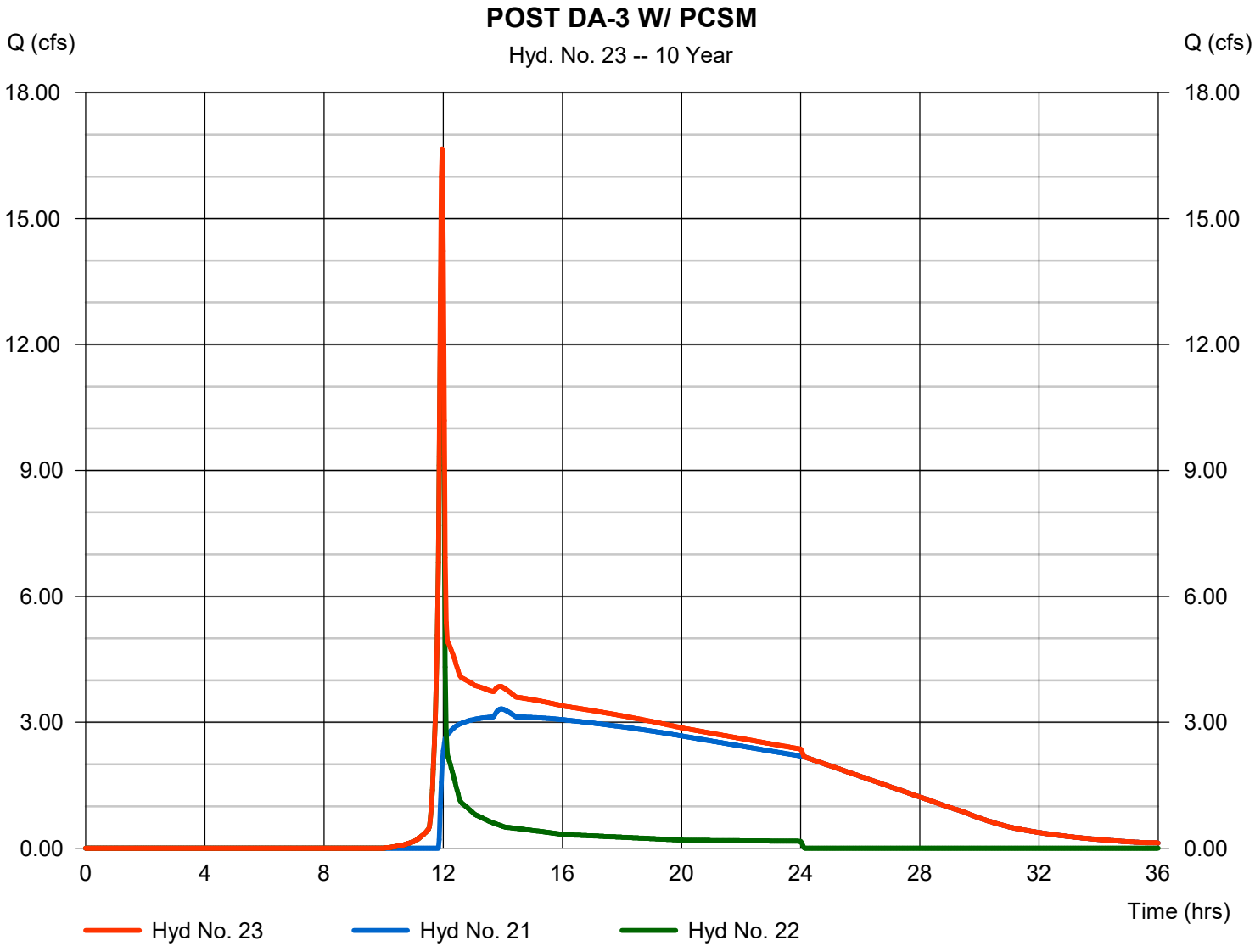


Hydrograph Report

Hyd. No. 23

POST DA-3 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 16.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 193,393 cuft
Inflow hyds.	= 21, 22	Contrib. drain. area	= 6.420 ac

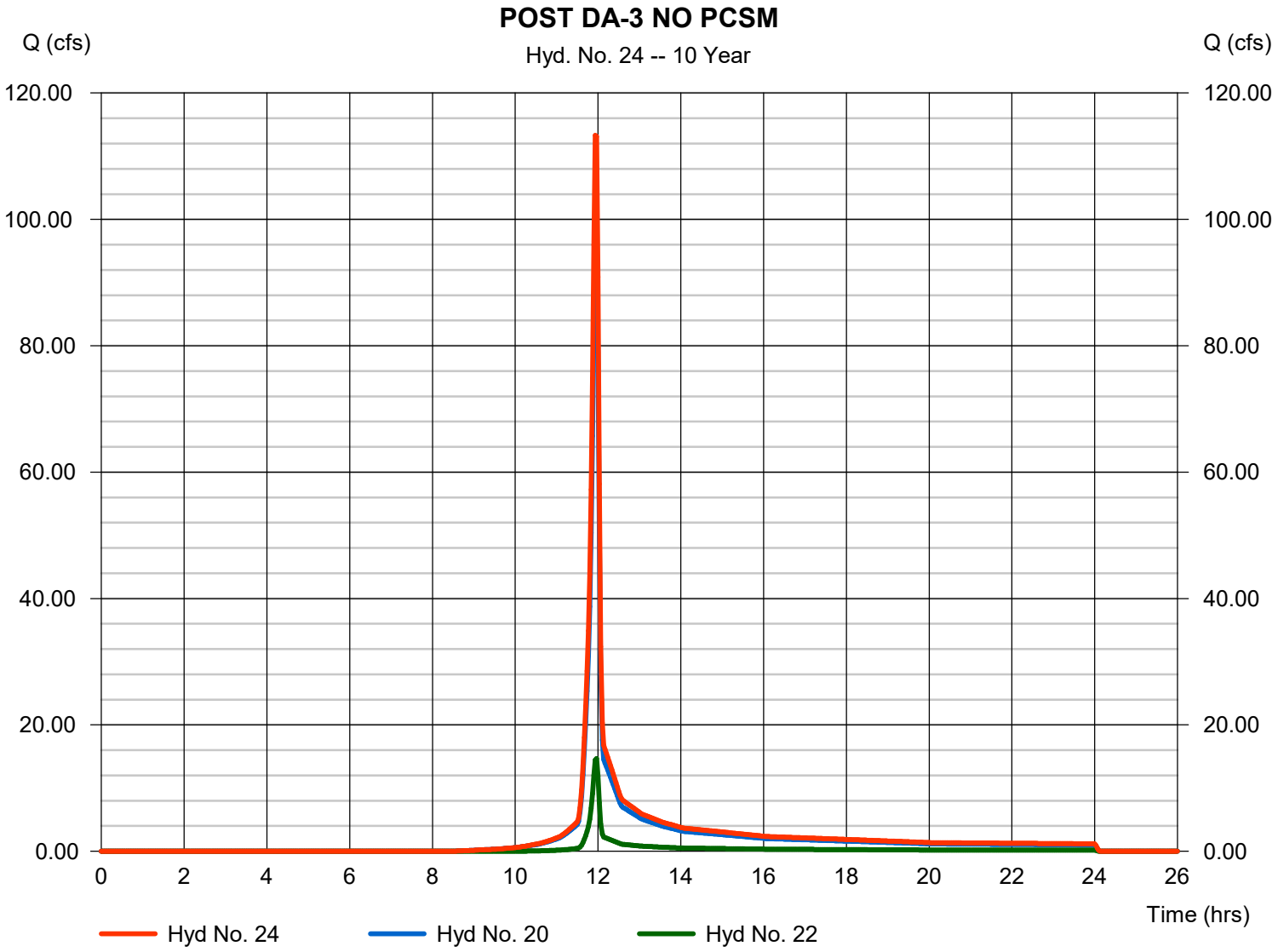


Hydrograph Report

Hyd. No. 24

POST DA-3 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 113.30 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 228,987 cuft
Inflow hyds.	= 20, 22	Contrib. drain. area	= 41.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

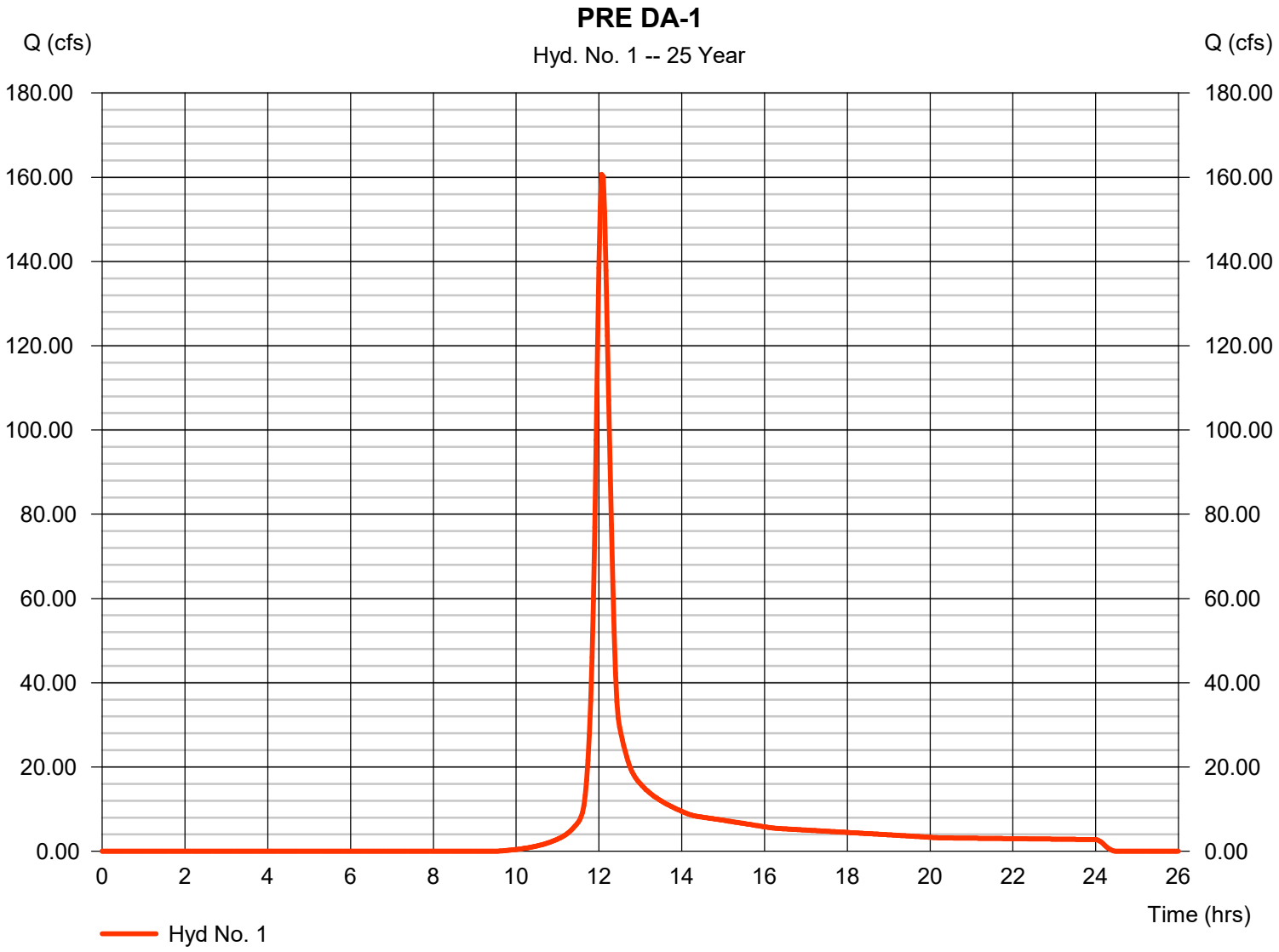
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	160.72	2	724	509,605	------	------	------	PRE DA-1
2	SCS Runoff	164.71	2	716	335,757	------	------	------	POST DA-1A
3	Reservoir	139.74	2	720	294,074	2	1118.51	83,345	BASIN 1 FOREBAY
4	SCS Runoff	87.22	2	716	181,278	------	------	------	POST DA-1B
5	Combine	220.54	2	718	475,352	3, 4	------	------	TO BASIN 1
6	Reservoir	77.95	2	720	474,605	5	1116.53	164,875	BASIN 1
7	SCS Runoff	44.68	2	718	89,355	------	------	------	POST DA-1C
8	Combine	114.36	2	720	563,959	6, 7	------	------	POST DA-1 W/ PCSM
9	Combine	295.81	2	716	606,390	2, 4, 7,	------	------	POST DA-1 NO PCSM
10	SCS Runoff	119.41	2	724	380,424	------	------	------	PRE DA-2
11	SCS Runoff	169.91	2	716	349,216	------	------	------	POST DA-2A
12	Reservoir	145.05	2	720	330,885	11	1123.37	62,541	BASIN 2 FOREBAY
13	SCS Runoff	7.702	2	716	15,564	------	------	------	POST DA-2B
14	Combine	151.18	2	720	346,449	12, 13	------	------	TO BASIN 2
15	Reservoir	5.084	2	856	214,144	14	1116.68	218,817	BASIN 2
16	SCS Runoff	66.92	2	718	134,363	------	------	------	POST DA-2C
17	Combine	66.92	2	718	348,507	15, 16	------	------	POST DA-2 W/ PCSM
18	Combine	244.06	2	716	499,142	11, 13, 16,	------	------	POST DA-2 NO PCSM
19	SCS Runoff	76.40	2	724	243,391	------	------	------	PRE DA-3
20	SCS Runoff	128.85	2	716	261,195	------	------	------	POST DA-3A
21	Reservoir	16.17	2	734	225,601	20	1110.27	130,947	BASIN 3
22	SCS Runoff	19.67	2	718	39,588	------	------	------	POST DA-3B
23	Combine	22.41	2	718	265,189	21, 22	------	------	POST DA-3 W/ PCSM
24	Combine	148.45	2	716	300,783	20, 22,	------	------	POST DA-3 NO PCSM

Hydrograph Report

Hyd. No. 1

PRE DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	160.72 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	509,605 cuft
Drainage area	=	80.750 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

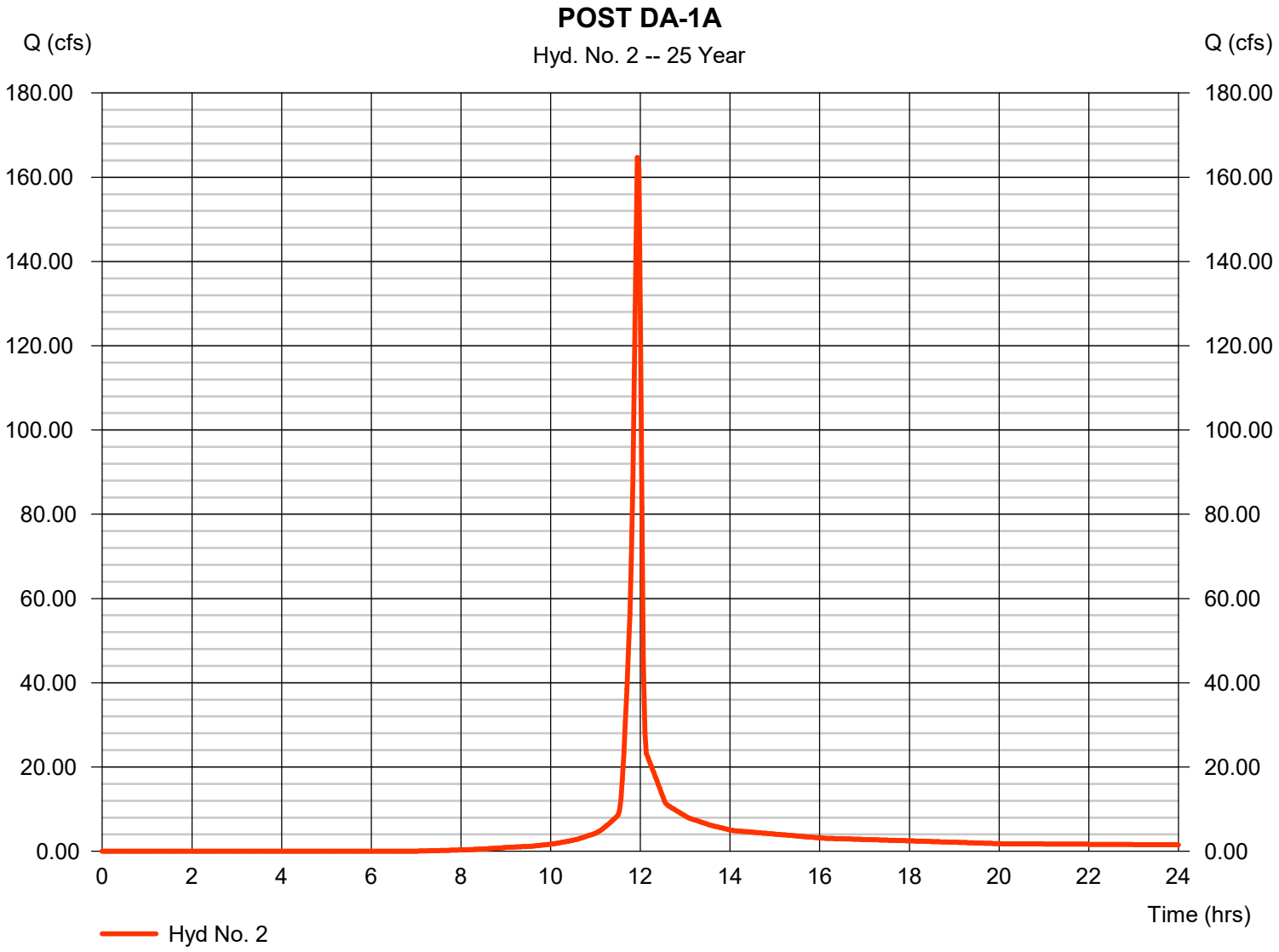


Hydrograph Report

Hyd. No. 2

POST DA-1A

Hydrograph type	=	SCS Runoff	Peak discharge	=	164.71 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	335,757 cuft
Drainage area	=	41.610 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



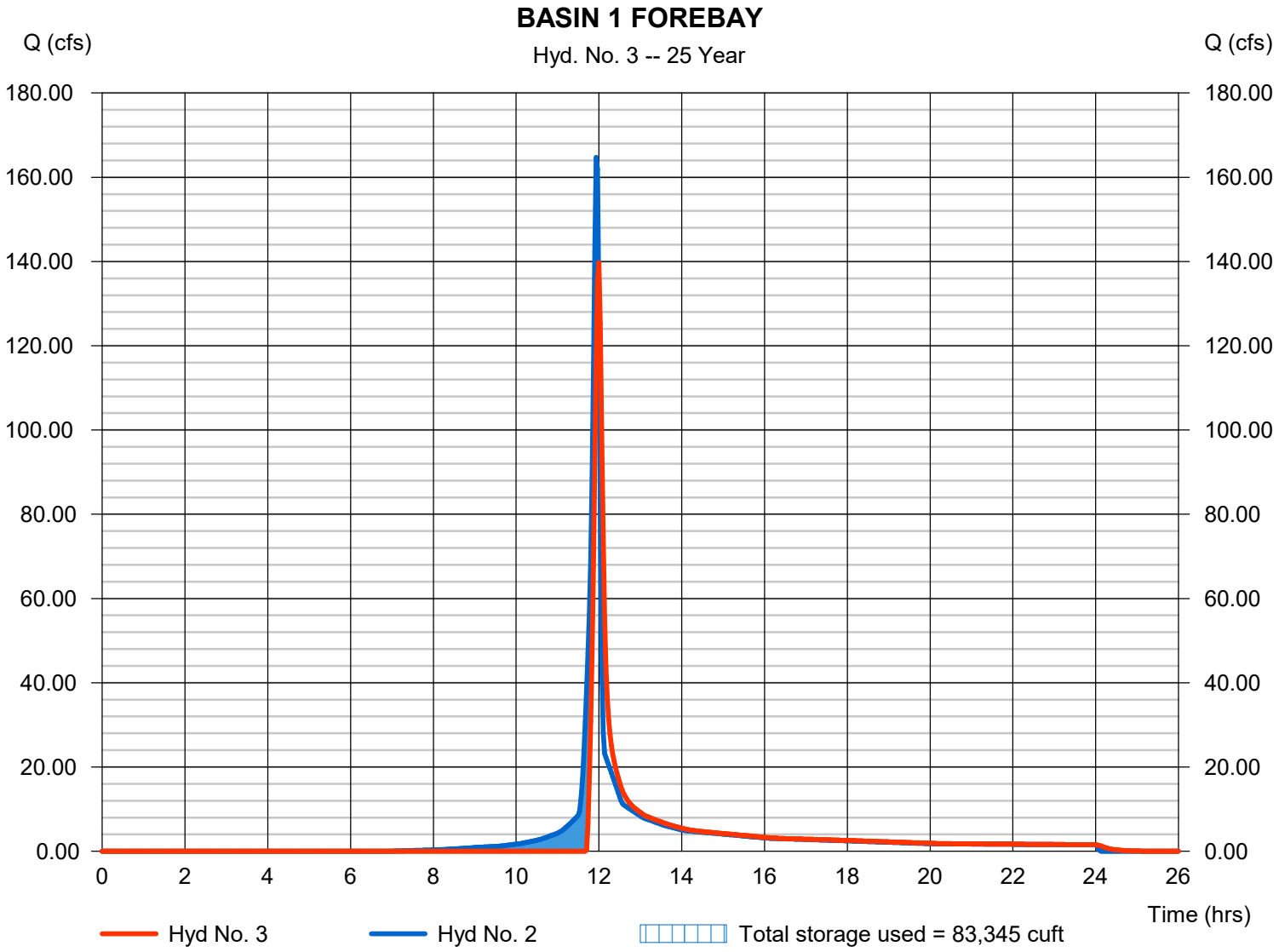
Hydrograph Report

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	139.74 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	294,074 cuft
Inflow hyd. No.	=	2 - POST DA-1A	Max. Elevation	=	1118.51 ft
Reservoir name	=	BASIN 1 FOREBAY	Max. Storage	=	83,345 cuft

Storage Indication method used.

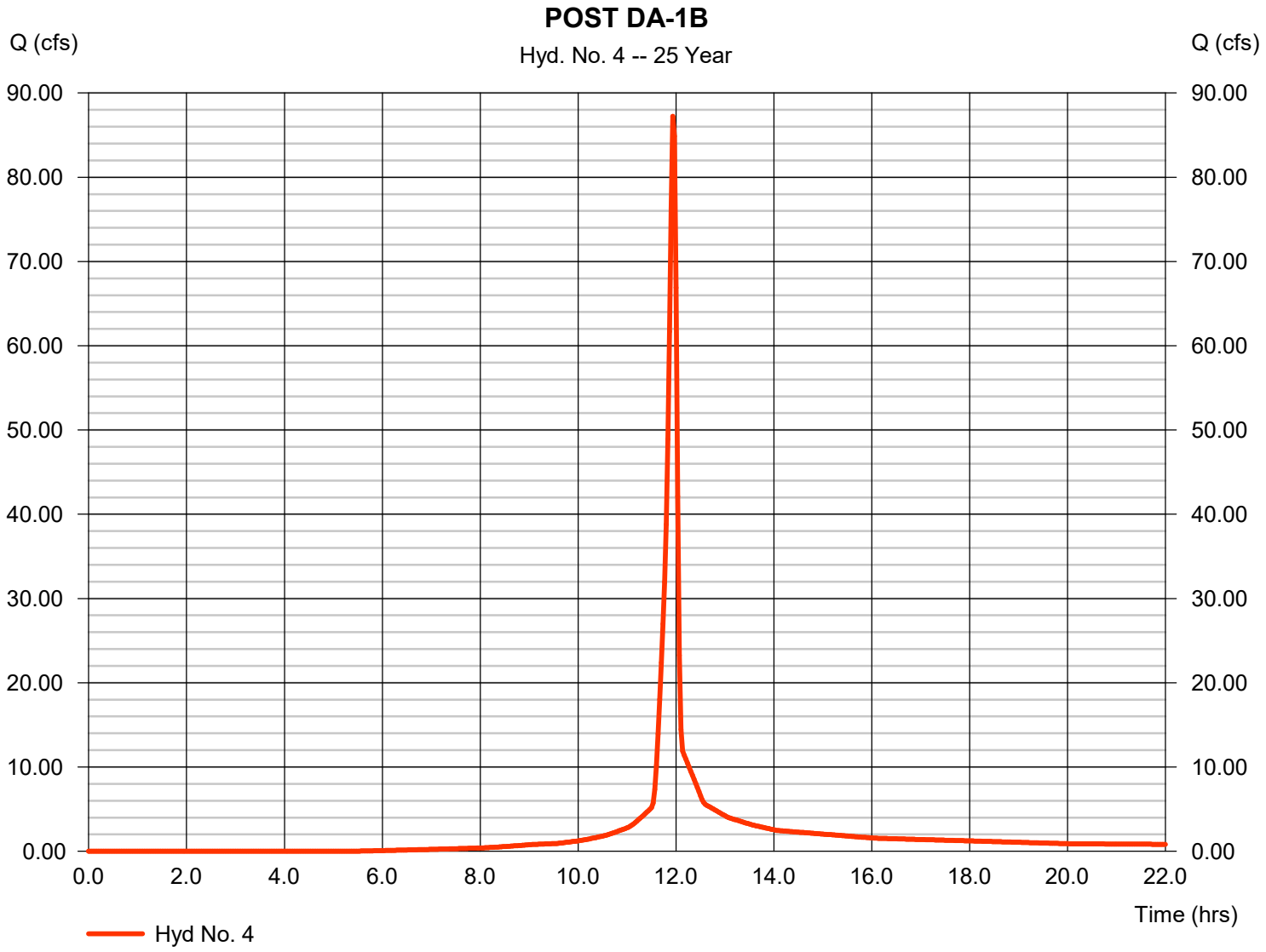


Hydrograph Report

Hyd. No. 4

POST DA-1B

Hydrograph type	=	SCS Runoff	Peak discharge	=	87.22 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	181,278 cuft
Drainage area	=	19.520 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

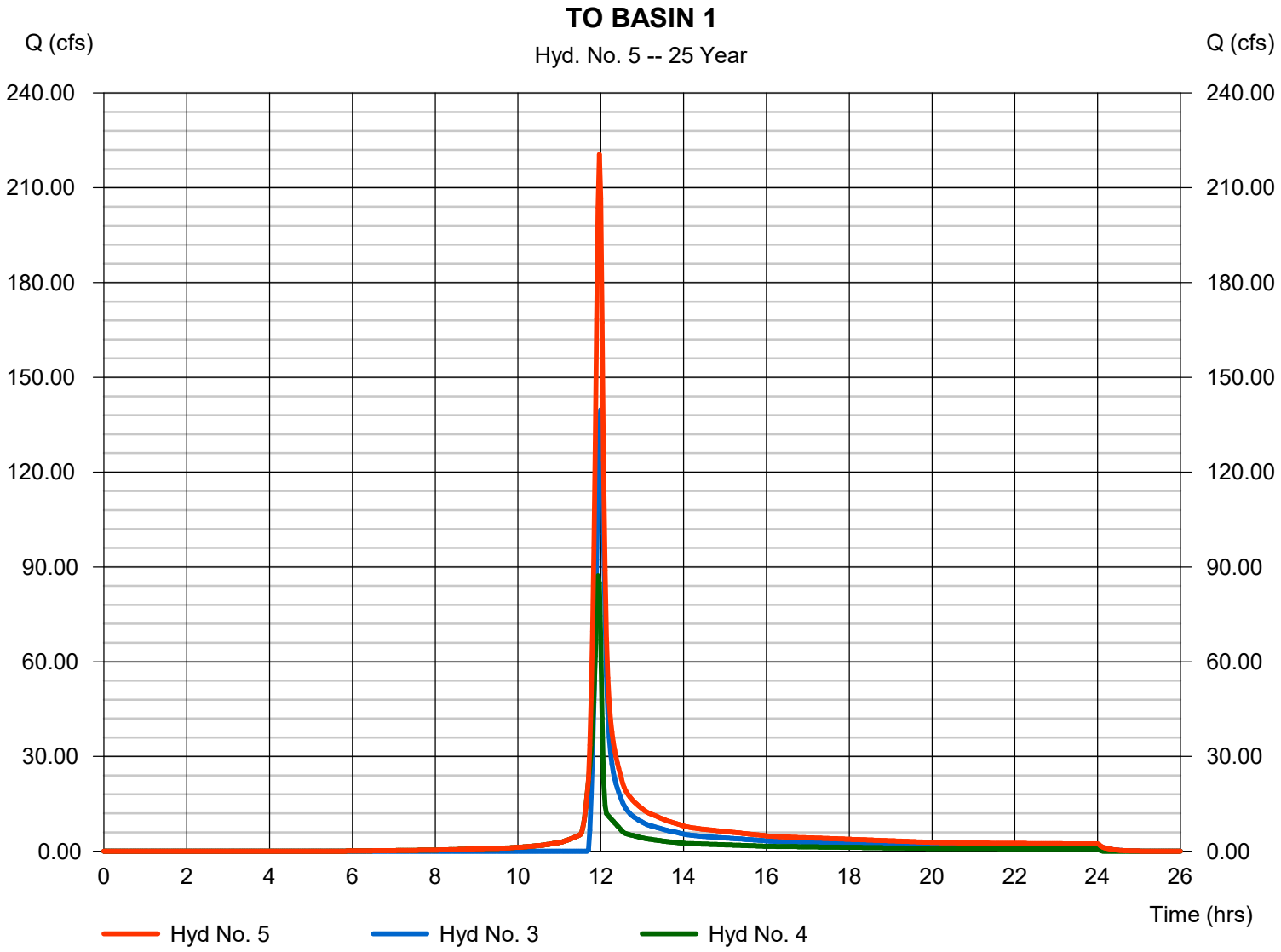


Hydrograph Report

Hyd. No. 5

TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 220.54 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 475,352 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 19.520 ac



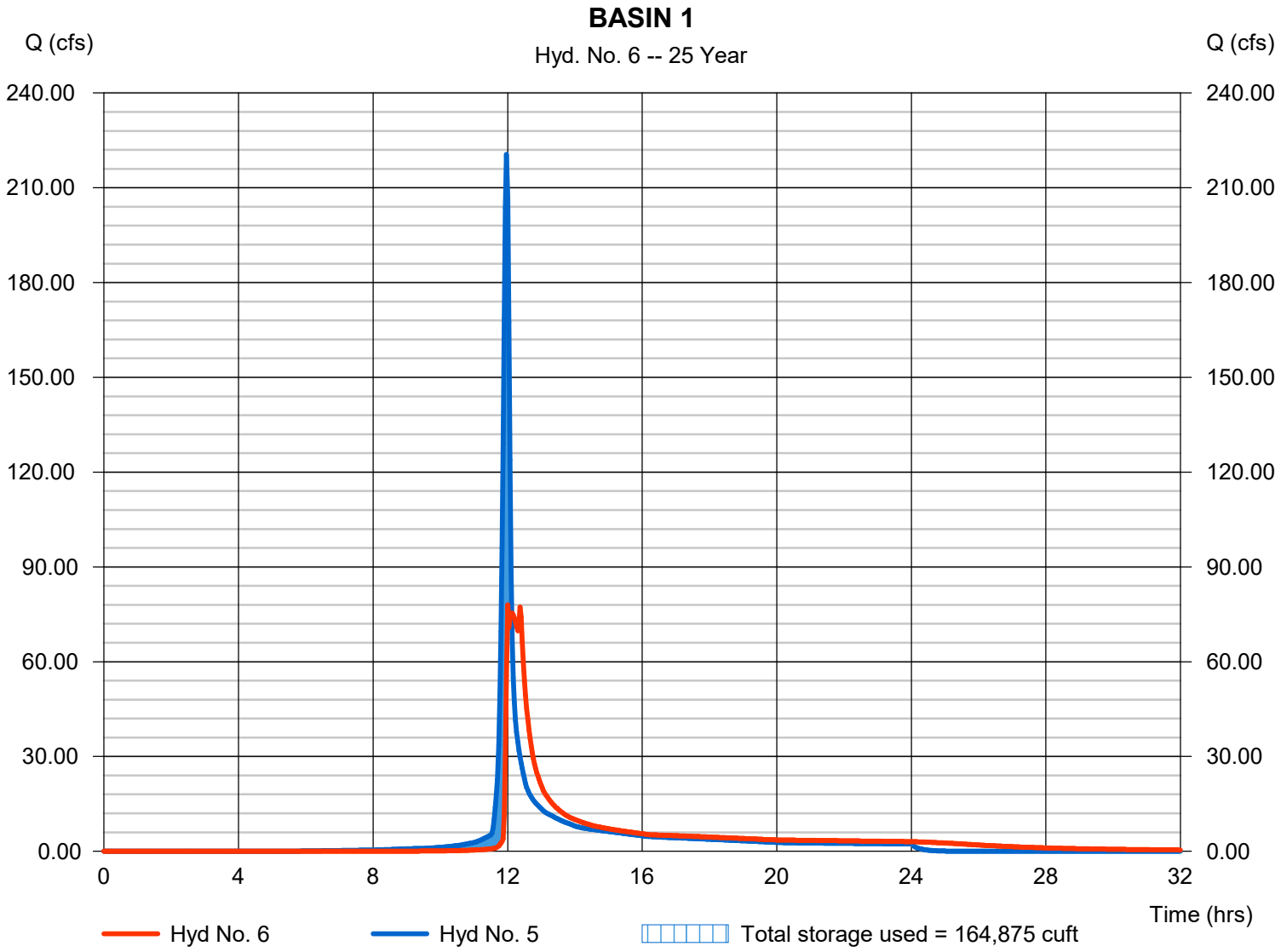
Hydrograph Report

Hyd. No. 6

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 77.95 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 474,605 cuft
Inflow hyd. No.	= 5 - TO BASIN 1	Max. Elevation	= 1116.53 ft
Reservoir name	= BASIN 1	Max. Storage	= 164,875 cuft

Storage Indication method used.

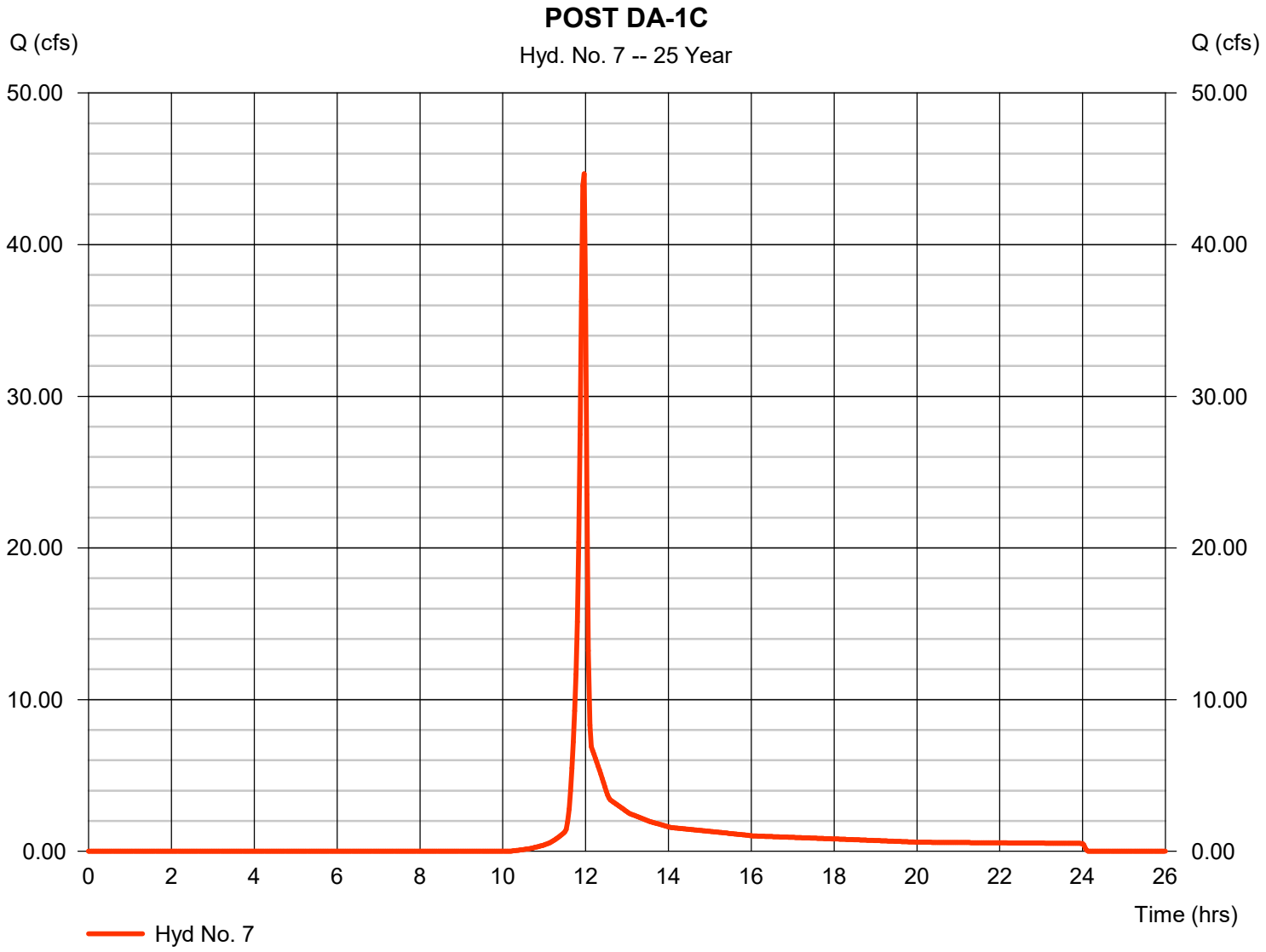


Hydrograph Report

Hyd. No. 7

POST DA-1C

Hydrograph type	= SCS Runoff	Peak discharge	= 44.68 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 89,355 cuft
Drainage area	= 17.190 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

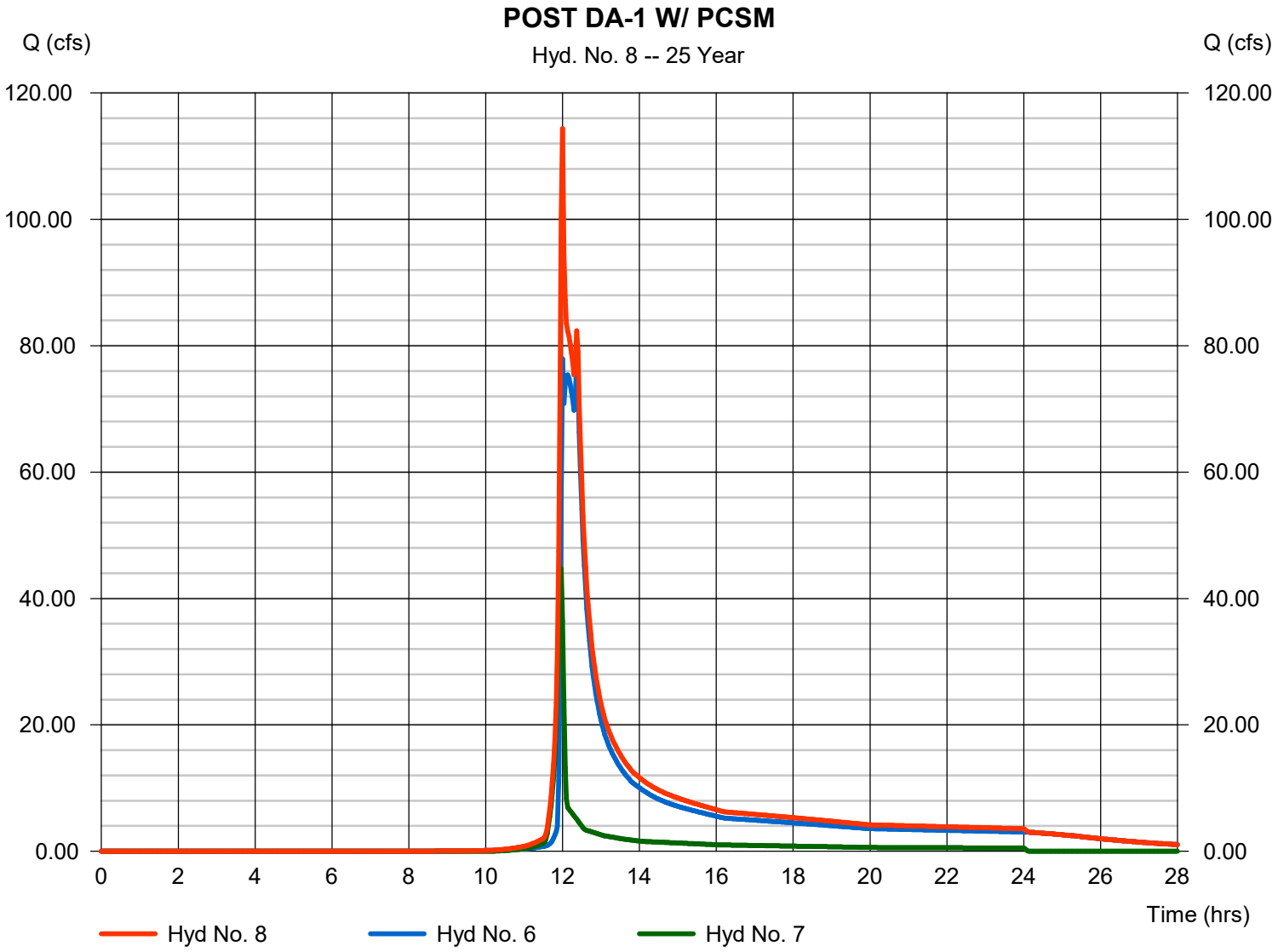


Hydrograph Report

Hyd. No. 8

POST DA-1 W/ PCSM

Hydrograph type	=	Combine	Peak discharge	=	114.36 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	563,959 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	17.190 ac

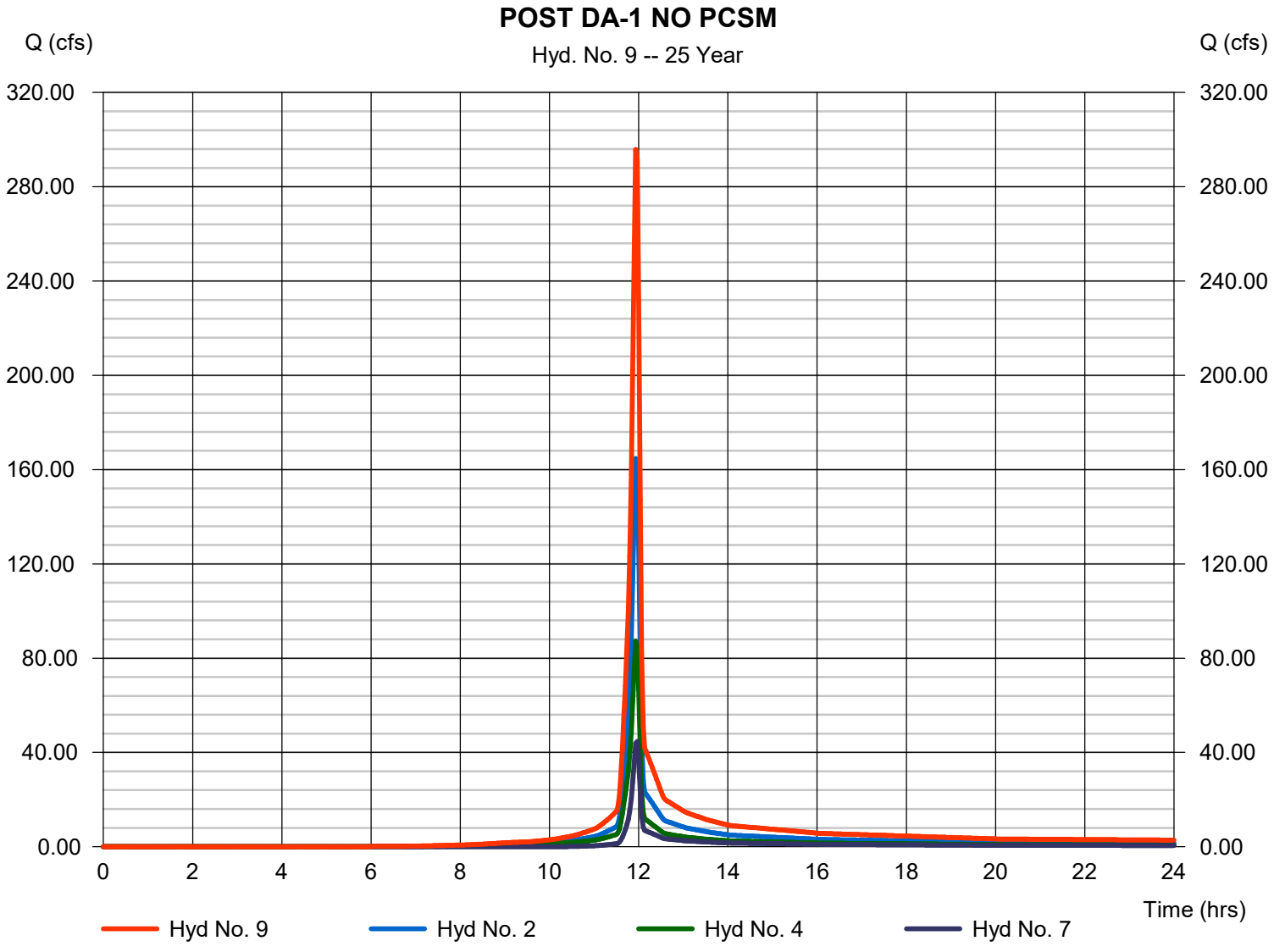


Hydrograph Report

Hyd. No. 9

POST DA-1 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 295.81 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 606,390 cuft
Inflow hyds.	= 2, 4, 7	Contrib. drain. area	= 78.320 ac

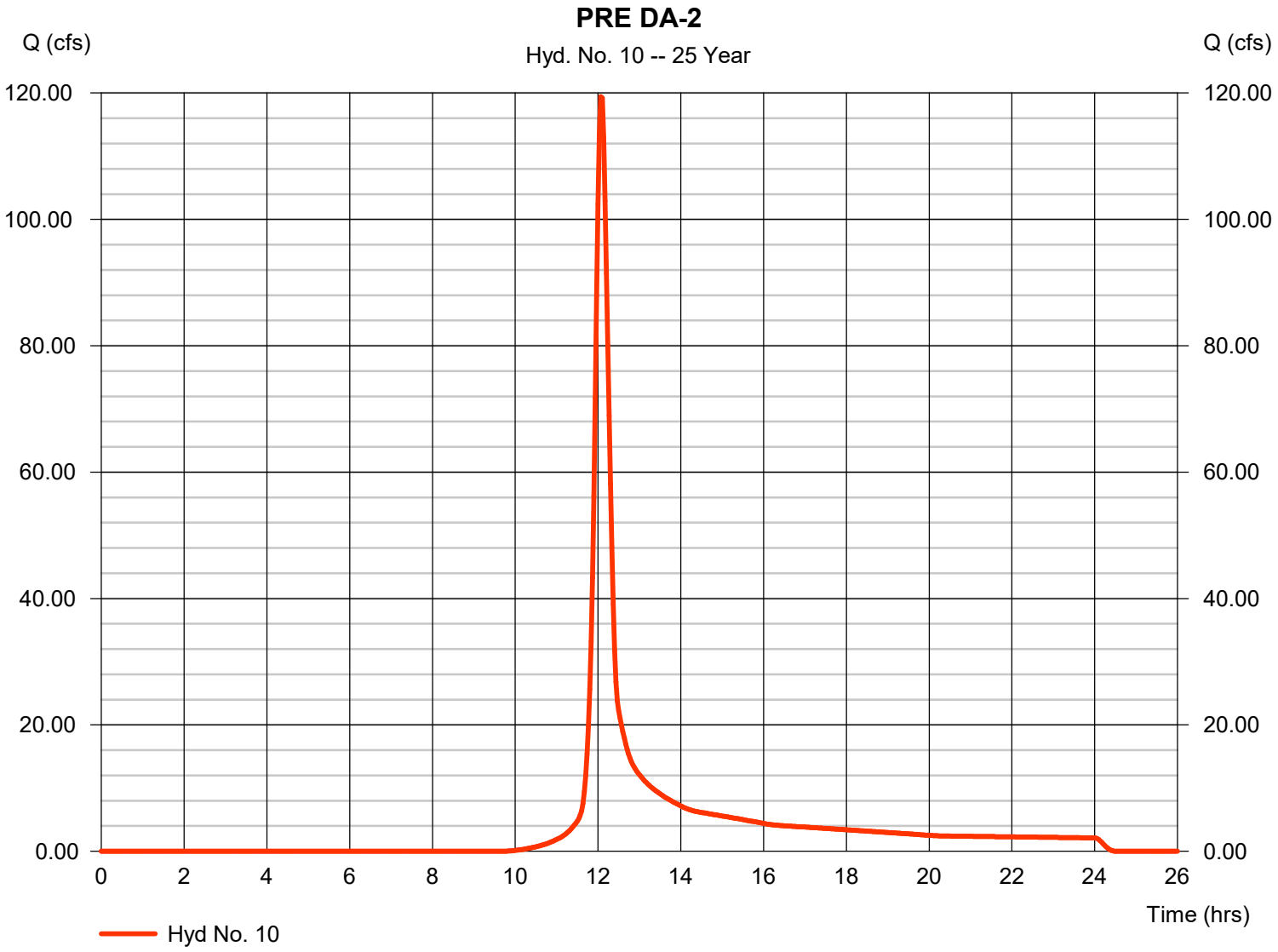


Hydrograph Report

Hyd. No. 10

PRE DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	119.41 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	380,424 cuft
Drainage area	=	62.880 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

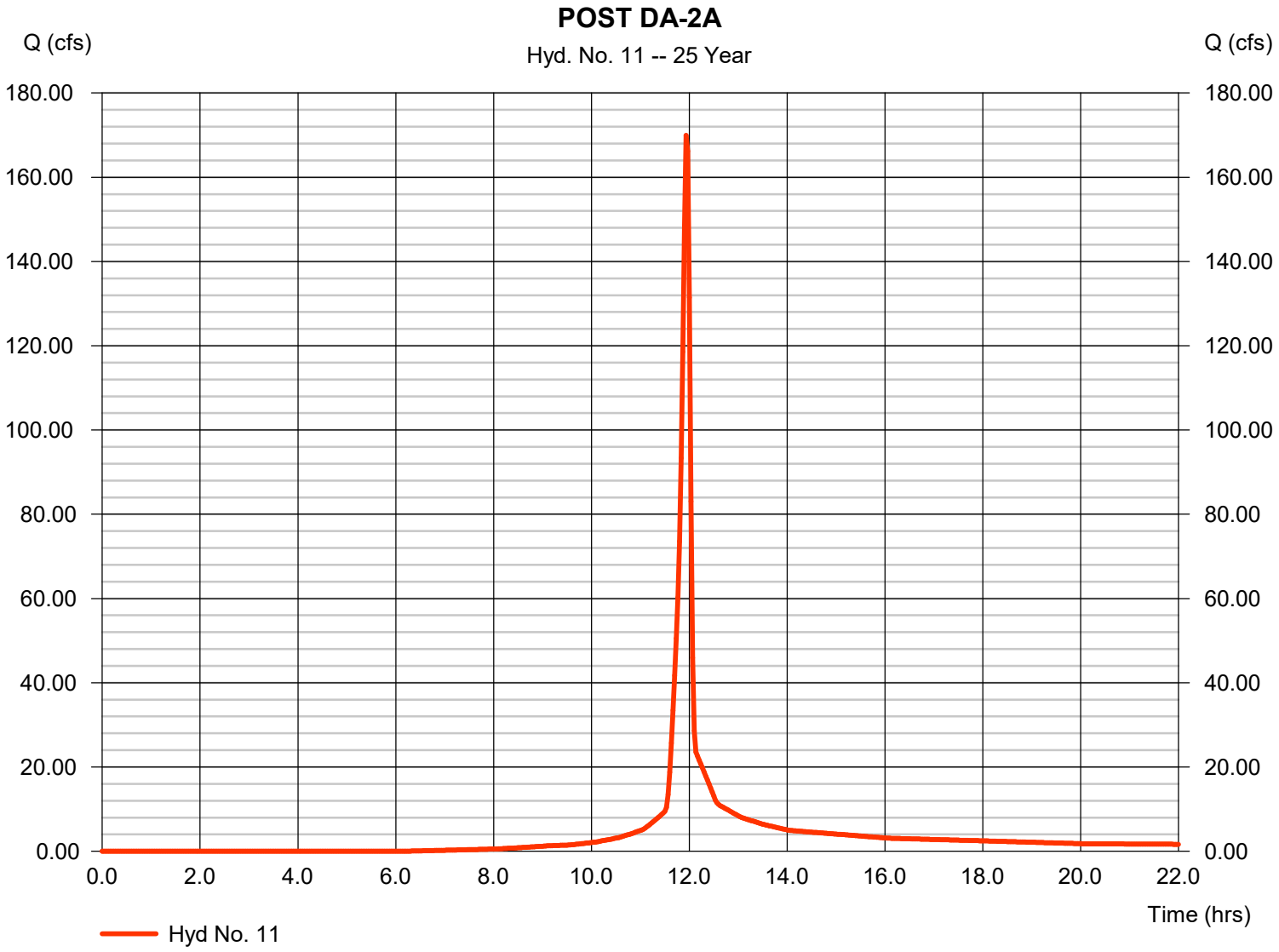


Hydrograph Report

Hyd. No. 11

POST DA-2A

Hydrograph type	=	SCS Runoff	Peak discharge	=	169.91 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	349,216 cuft
Drainage area	=	40.300 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



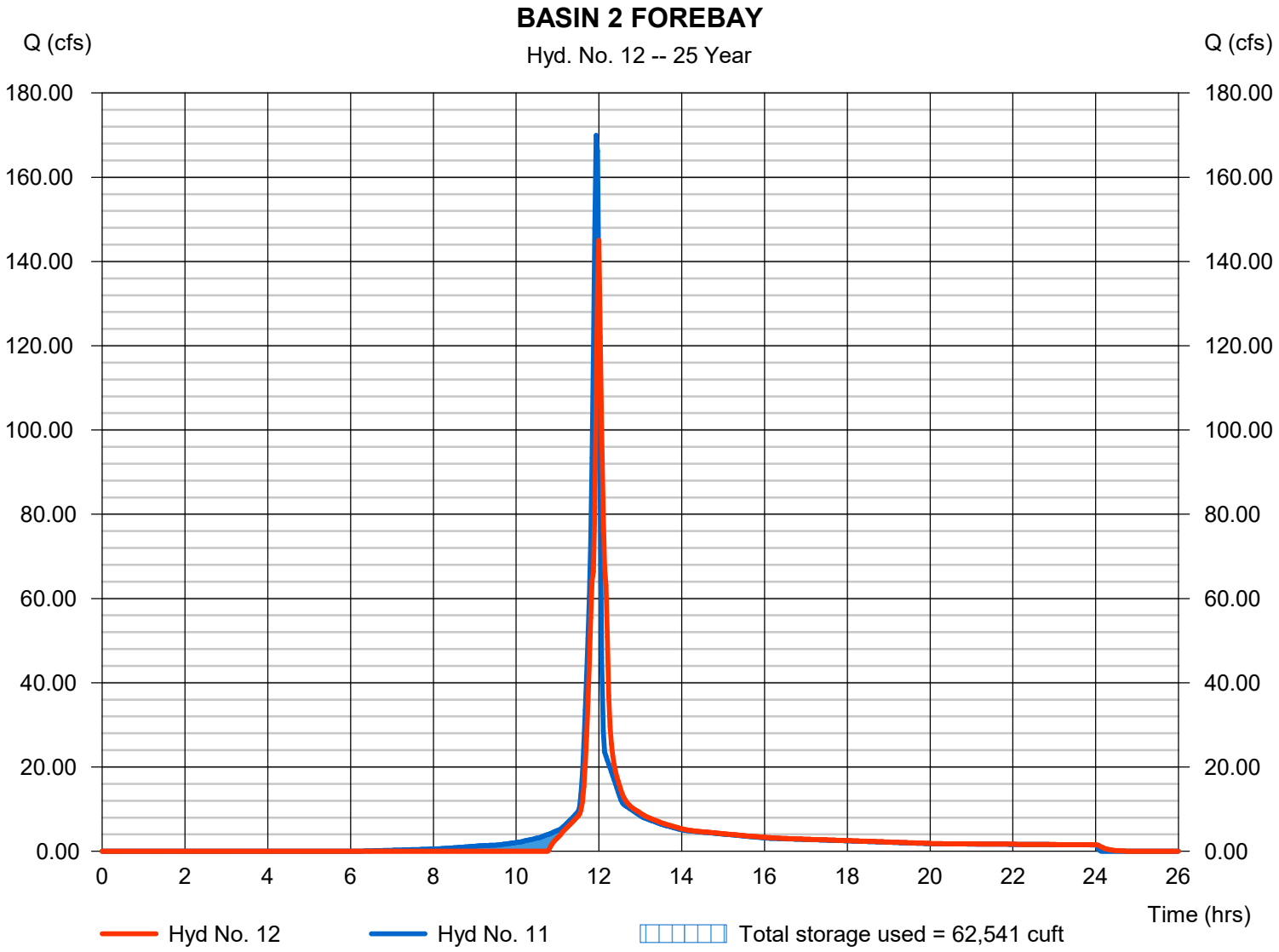
Hydrograph Report

Hyd. No. 12

BASIN 2 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	145.05 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	330,885 cuft
Inflow hyd. No.	=	11 - POST DA-2A	Max. Elevation	=	1123.37 ft
Reservoir name	=	BASIN 2 FOREBAY	Max. Storage	=	62,541 cuft

Storage Indication method used.

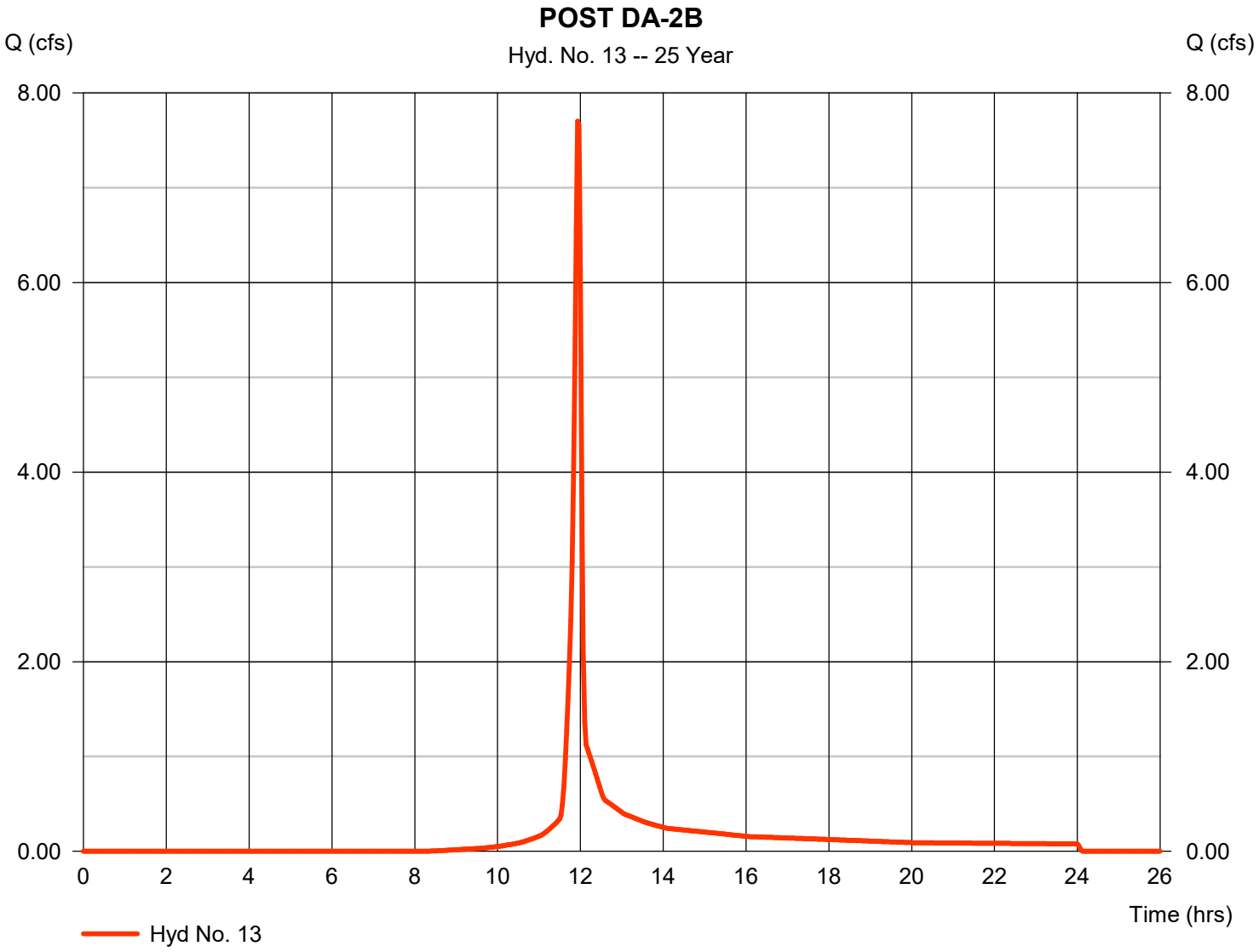


Hydrograph Report

Hyd. No. 13

POST DA-2B

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.702 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	15,564 cuft
Drainage area	=	2.240 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

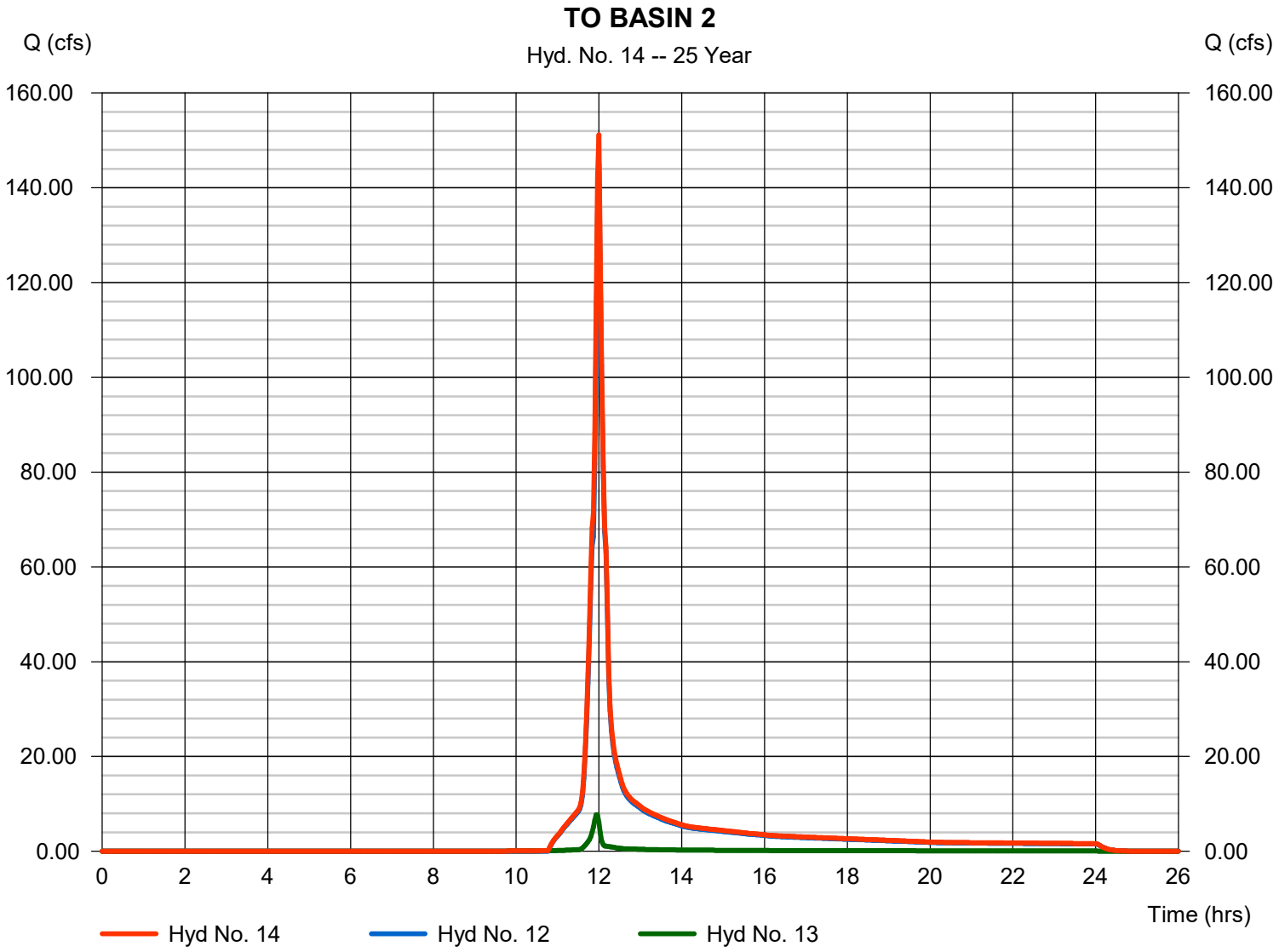


Hydrograph Report

Hyd. No. 14

TO BASIN 2

Hydrograph type	=	Combine	Peak discharge	=	151.18 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	346,449 cuft
Inflow hyds.	=	12, 13	Contrib. drain. area	=	2.240 ac



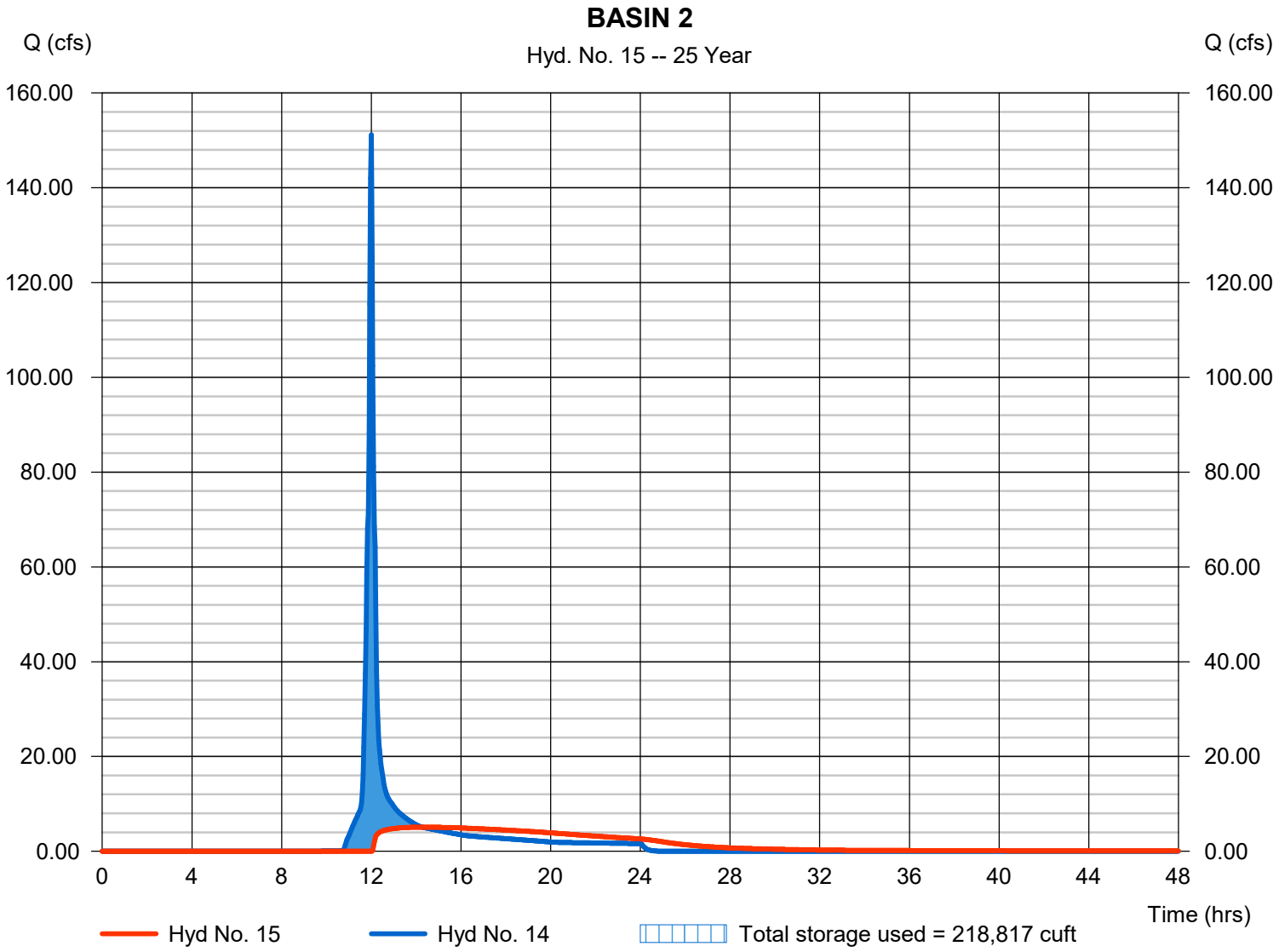
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	=	Reservoir	Peak discharge	=	5.084 cfs
Storm frequency	=	25 yrs	Time to peak	=	14.27 hrs
Time interval	=	2 min	Hyd. volume	=	214,144 cuft
Inflow hyd. No.	=	14 - TO BASIN 2	Max. Elevation	=	1116.68 ft
Reservoir name	=	BASIN 2	Max. Storage	=	218,817 cuft

Storage Indication method used.

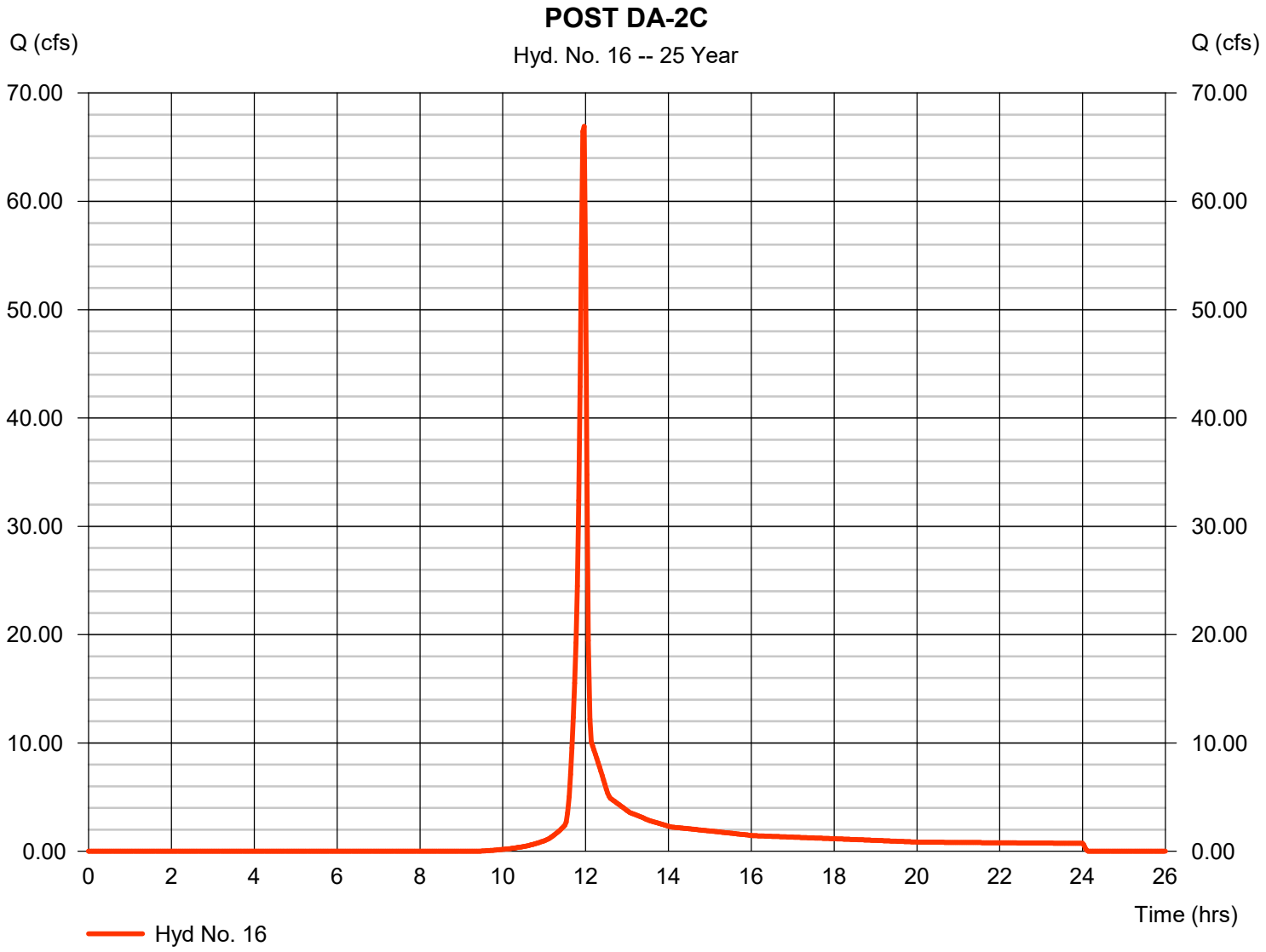


Hydrograph Report

Hyd. No. 16

POST DA-2C

Hydrograph type	=	SCS Runoff	Peak discharge	=	66.92 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	134,363 cuft
Drainage area	=	22.710 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

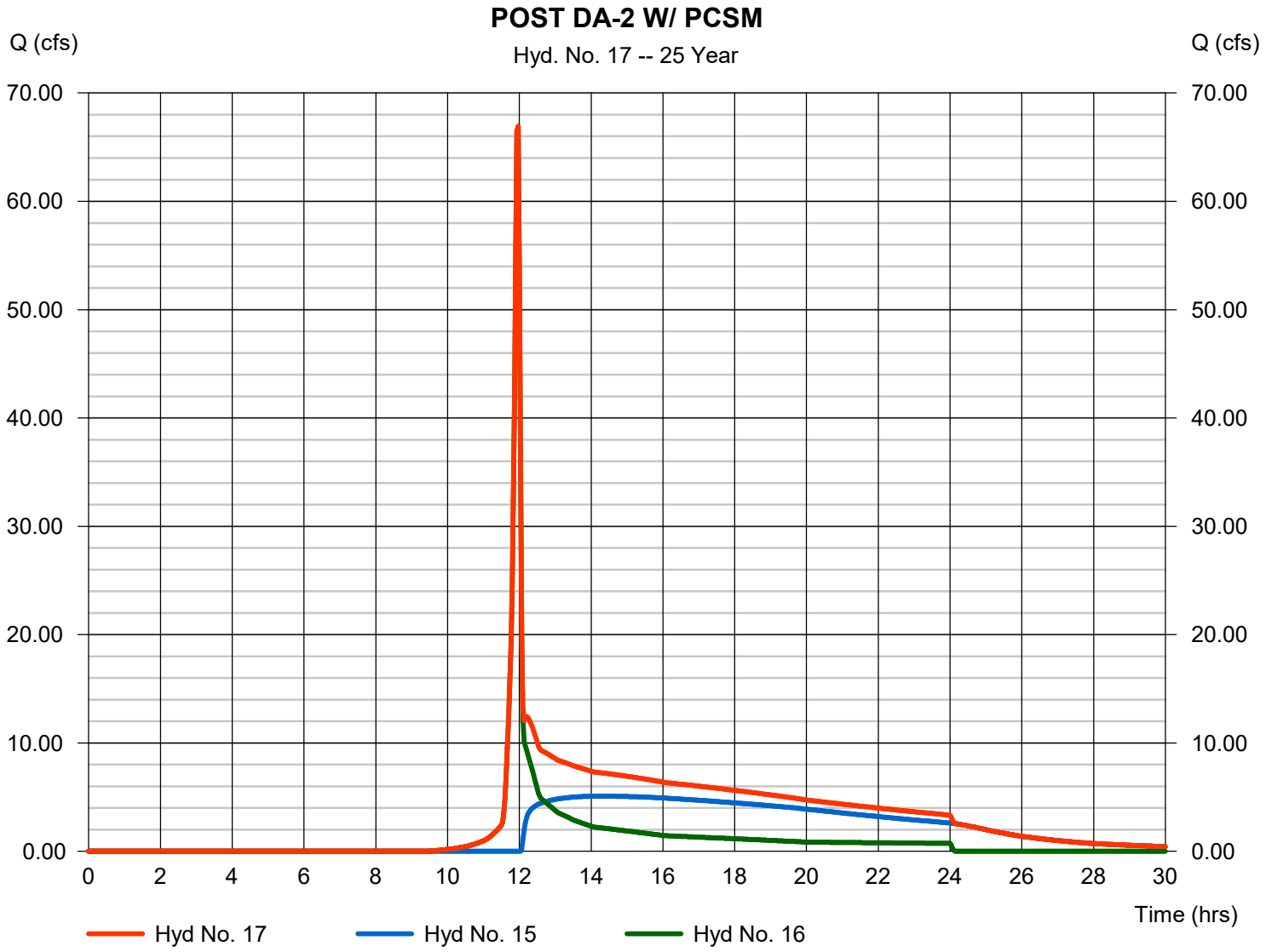


Hydrograph Report

Hyd. No. 17

POST DA-2 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 66.92 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 348,507 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 22.710 ac

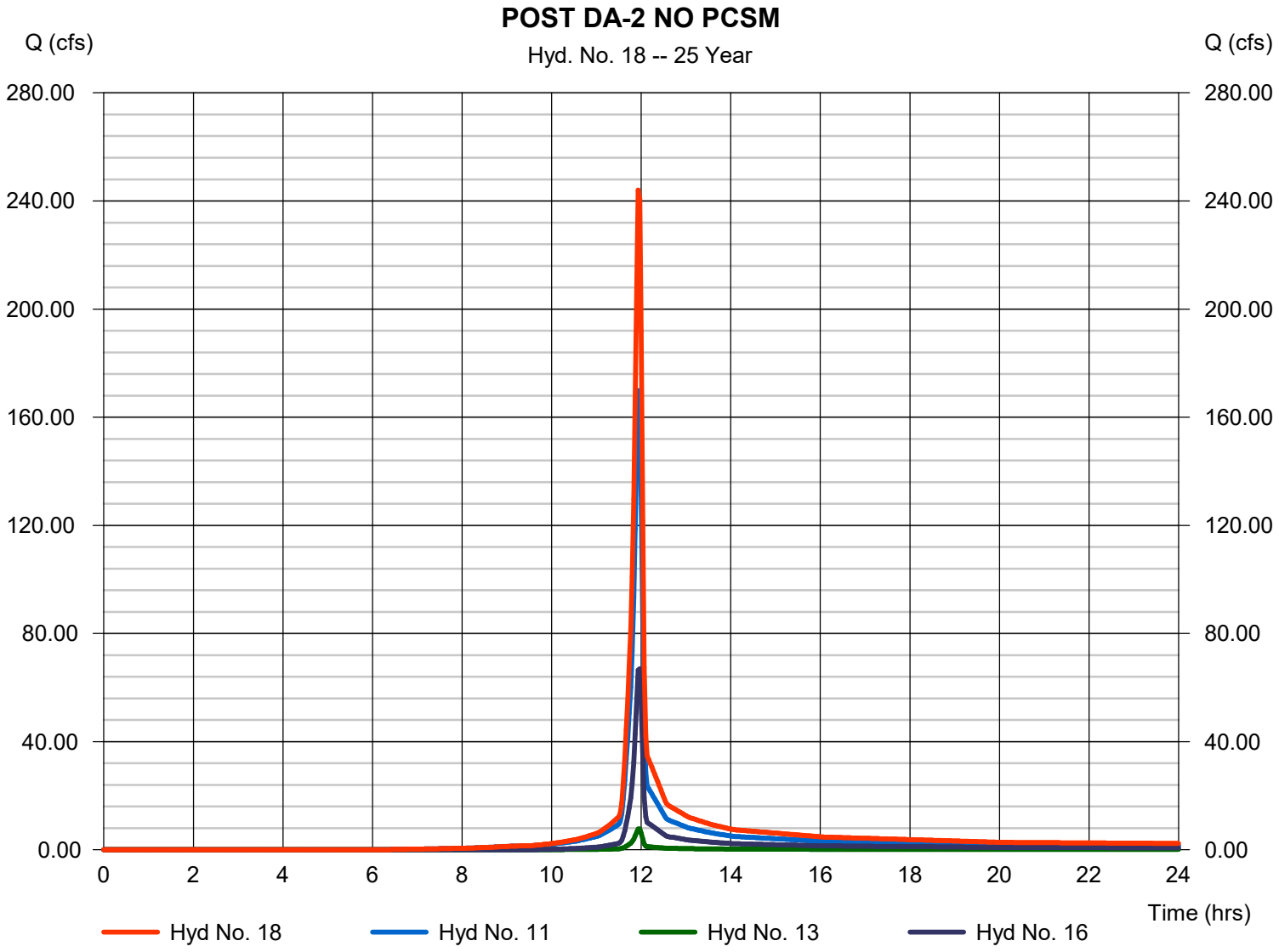


Hydrograph Report

Hyd. No. 18

POST DA-2 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 244.06 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 499,142 cuft
Inflow hyds.	= 11, 13, 16	Contrib. drain. area	= 65.250 ac

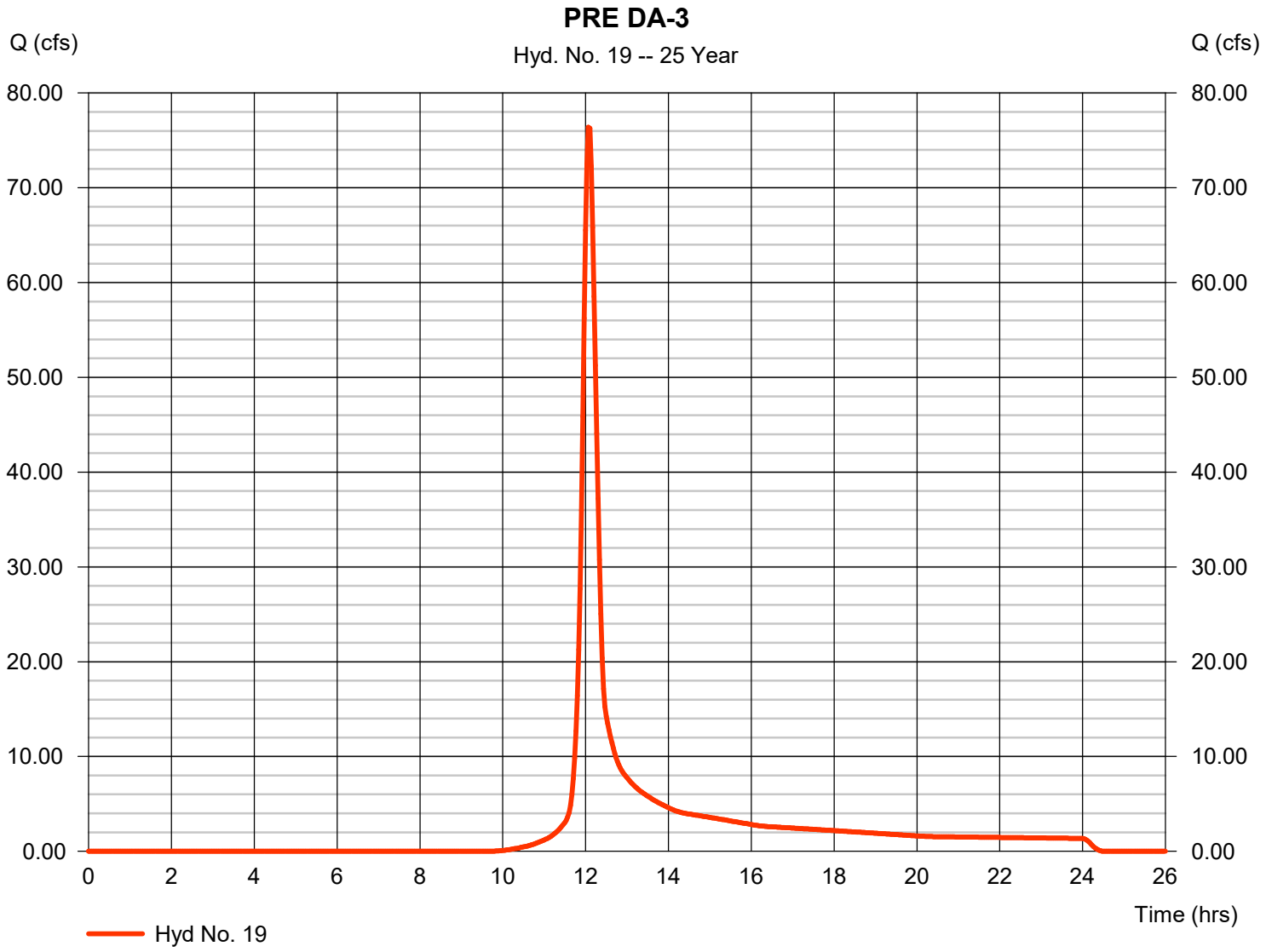


Hydrograph Report

Hyd. No. 19

PRE DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	76.40 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	243,391 cuft
Drainage area	=	40.230 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

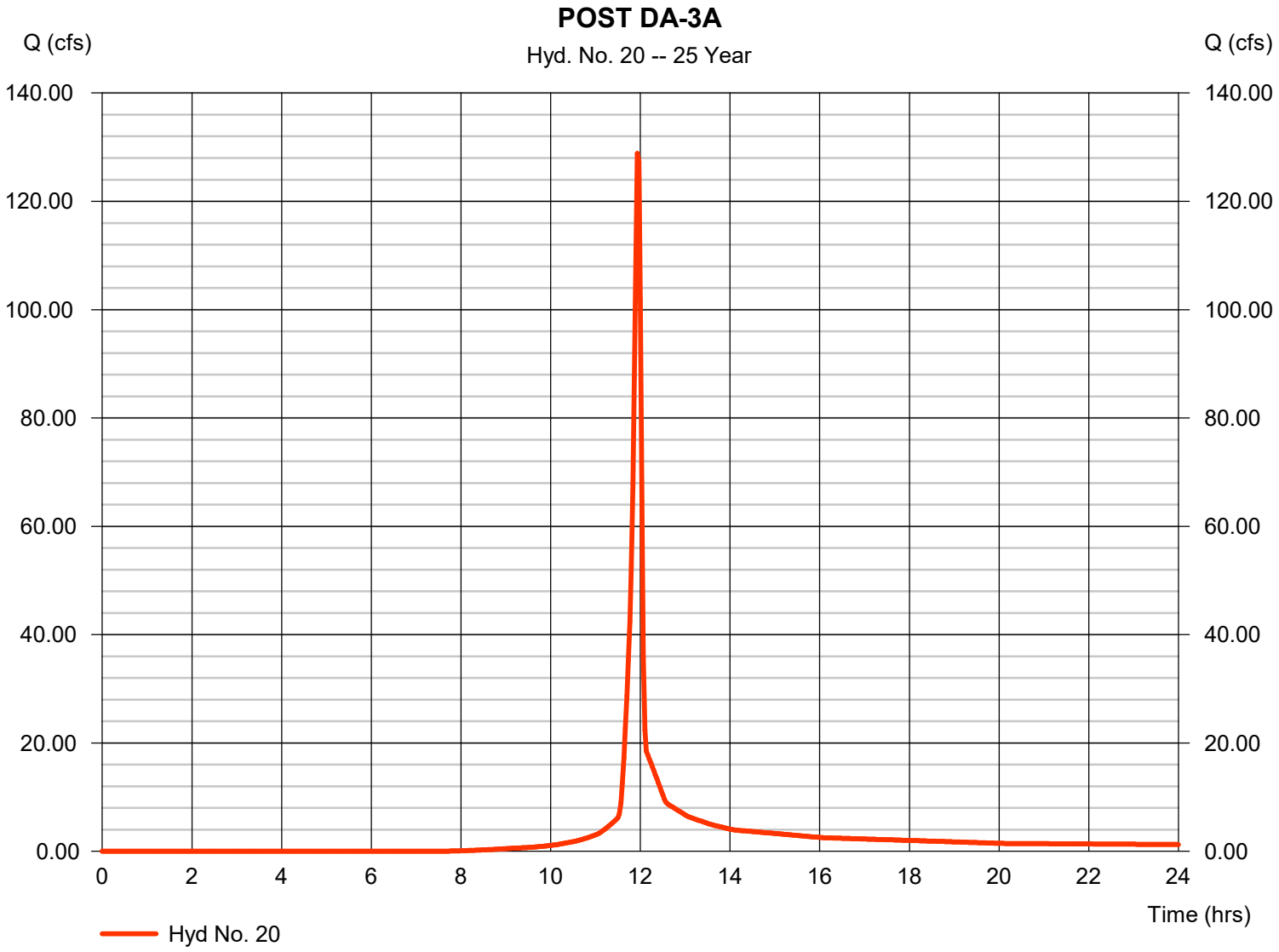


Hydrograph Report

Hyd. No. 20

POST DA-3A

Hydrograph type	=	SCS Runoff	Peak discharge	=	128.85 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	261,195 cuft
Drainage area	=	34.840 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



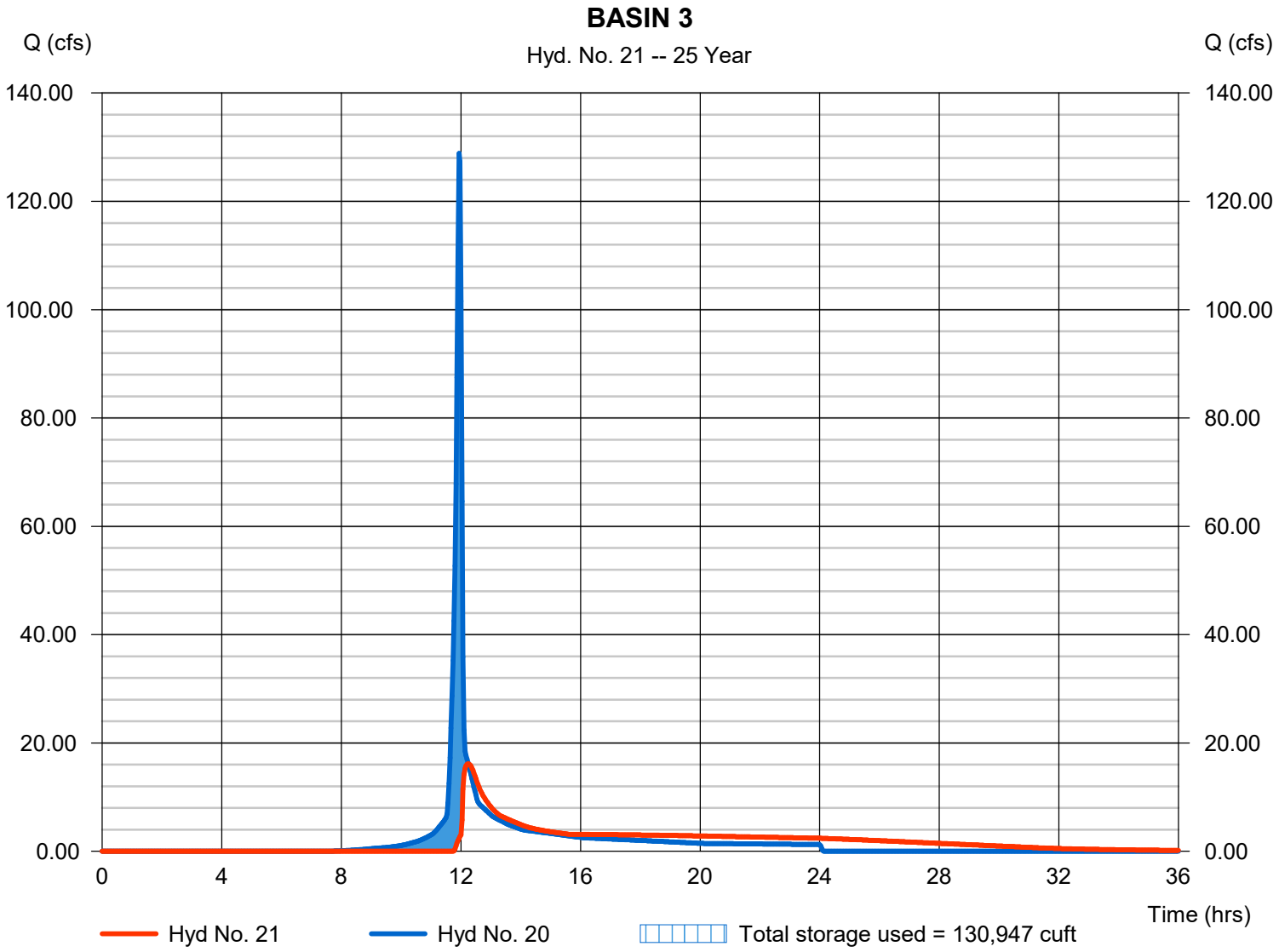
Hydrograph Report

Hyd. No. 21

BASIN 3

Hydrograph type	=	Reservoir	Peak discharge	=	16.17 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	225,601 cuft
Inflow hyd. No.	=	20 - POST DA-3A	Max. Elevation	=	1110.27 ft
Reservoir name	=	BASIN 3	Max. Storage	=	130,947 cuft

Storage Indication method used.

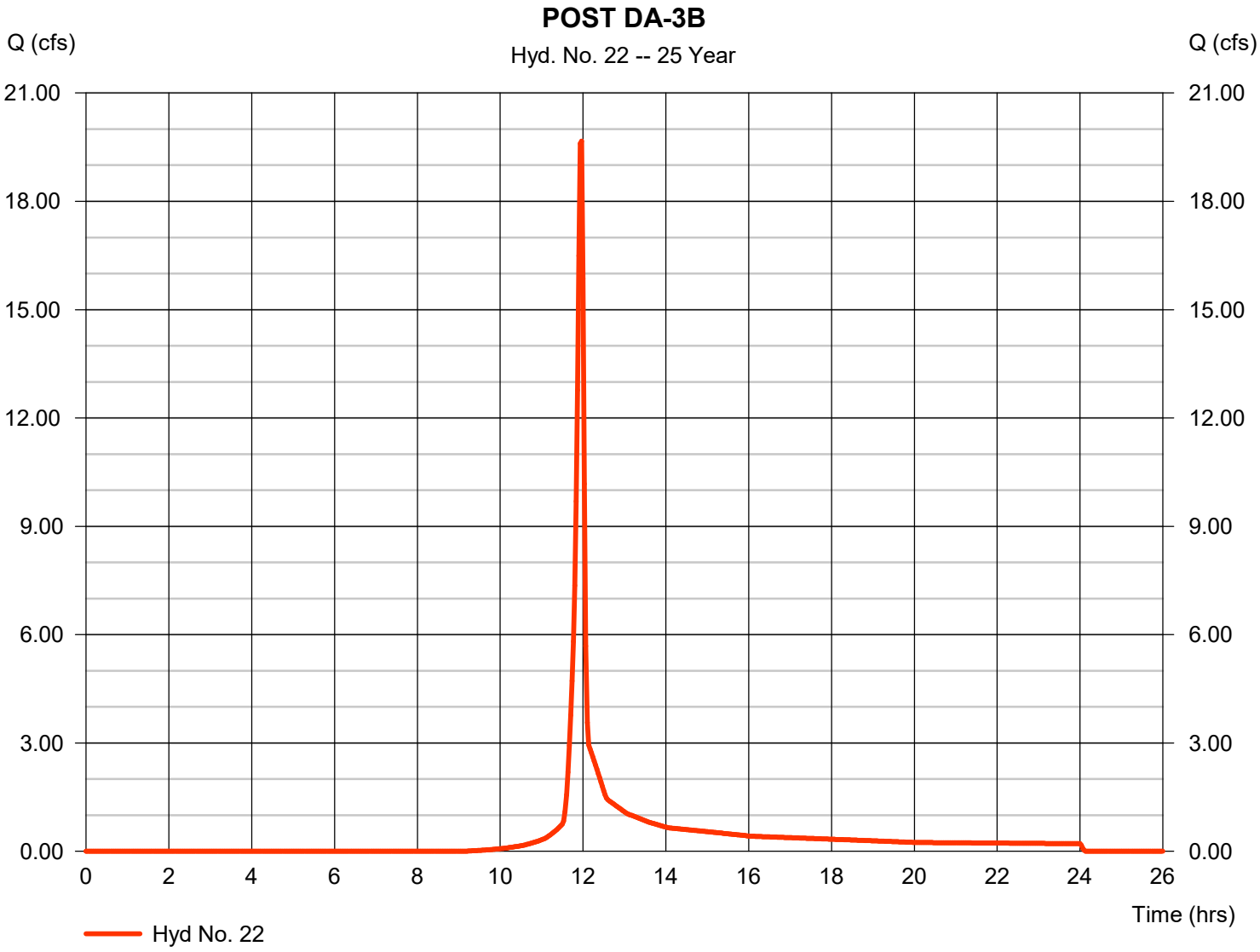


Hydrograph Report

Hyd. No. 22

POST DA-3B

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.67 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	39,588 cuft
Drainage area	=	6.420 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

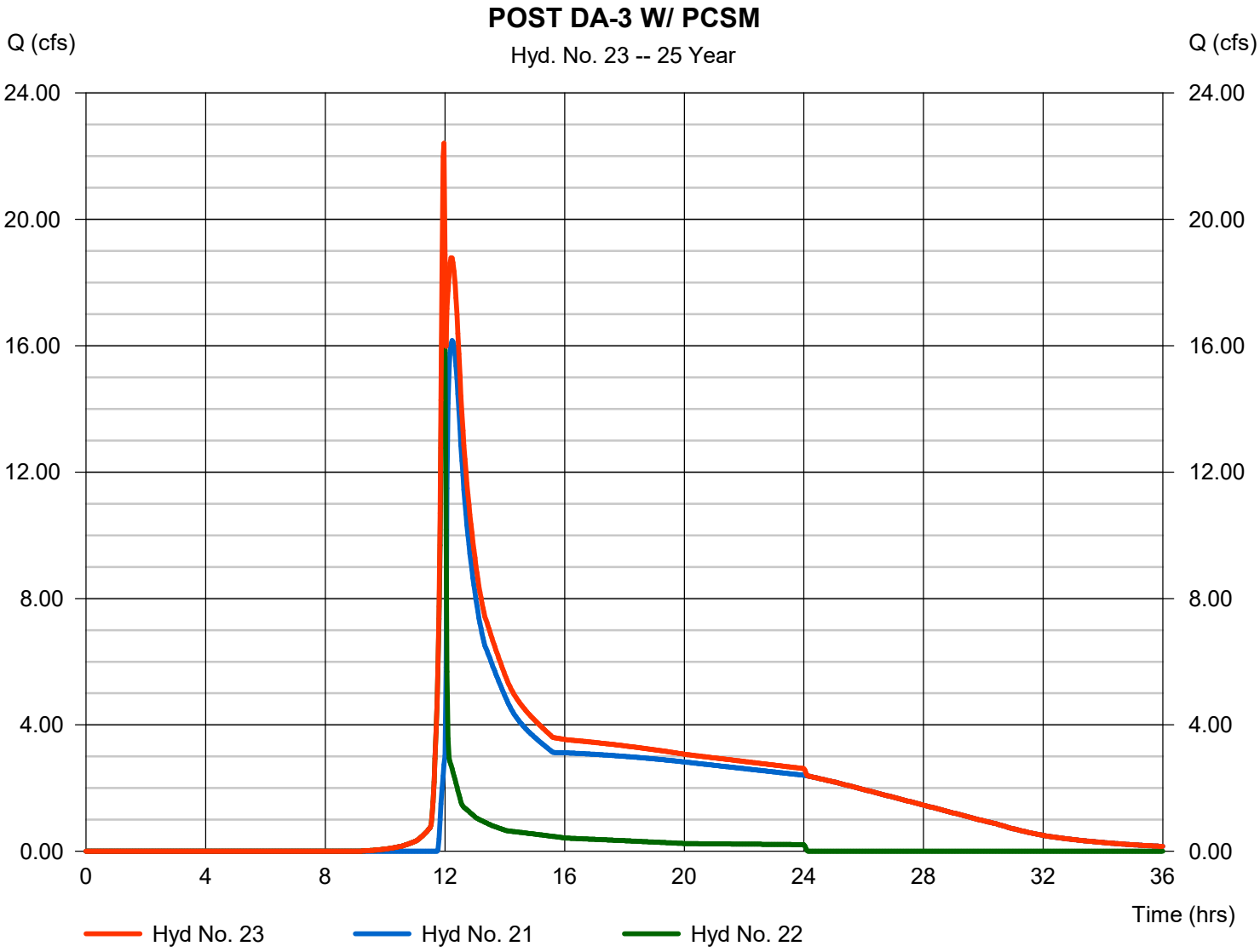


Hydrograph Report

Hyd. No. 23

POST DA-3 W/ PCSM

Hydrograph type	=	Combine	Peak discharge	=	22.41 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	265,189 cuft
Inflow hyds.	=	21, 22	Contrib. drain. area	=	6.420 ac

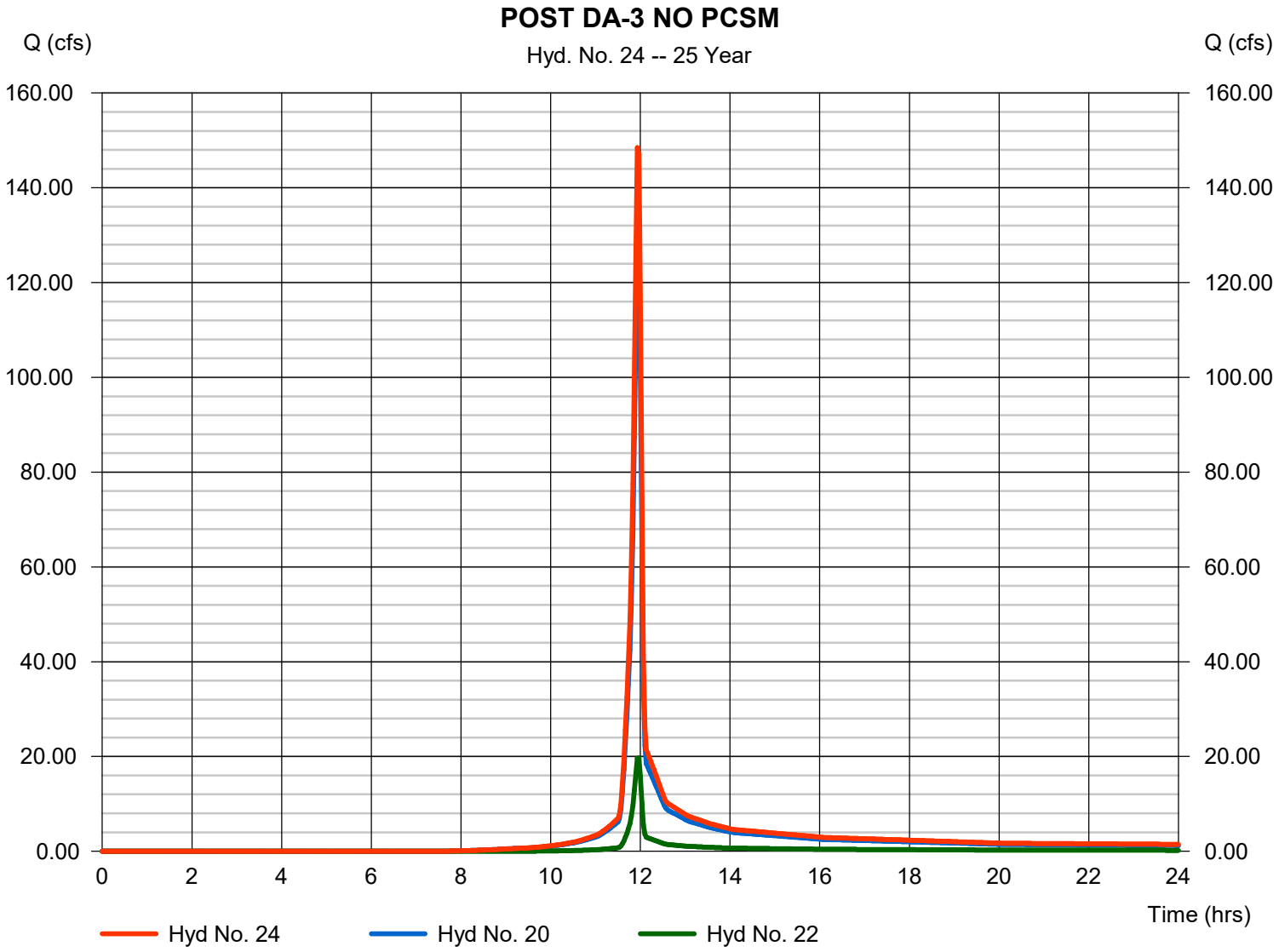


Hydrograph Report

Hyd. No. 24

POST DA-3 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 148.45 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 300,783 cuft
Inflow hyds.	= 20, 22	Contrib. drain. area	= 41.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

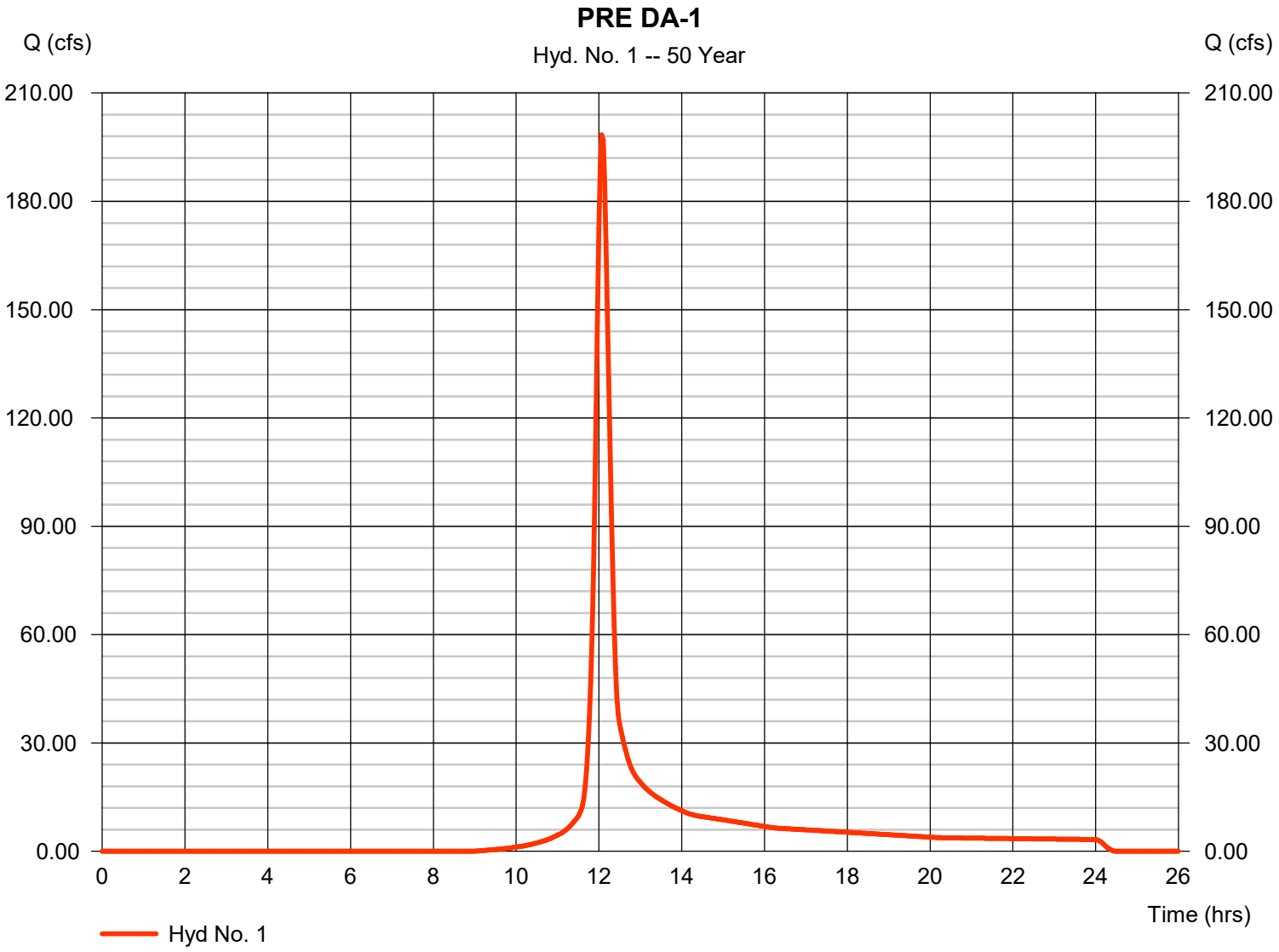
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	198.38	2	724	624,293	------	------	------	PRE DA-1
2	SCS Runoff	194.49	2	716	398,839	------	------	------	POST DA-1A
3	Reservoir	166.97	2	720	357,156	2	1118.78	89,247	BASIN 1 FOREBAY
4	SCS Runoff	101.32	2	716	212,322	------	------	------	POST DA-1B
5	Combine	262.41	2	718	569,478	3, 4	------	------	TO BASIN 1
6	Reservoir	87.45	2	728	568,720	5	1117.25	203,476	BASIN 1
7	SCS Runoff	55.31	2	718	110,896	------	------	------	POST DA-1C
8	Combine	125.39	2	718	679,616	6, 7	------	------	POST DA-1 W/ PCSM
9	Combine	350.59	2	716	722,058	2, 4, 7,	------	------	POST DA-1 NO PCSM
10	SCS Runoff	148.27	2	724	468,010	------	------	------	PRE DA-2
11	SCS Runoff	198.96	2	716	411,882	------	------	------	POST DA-2A
12	Reservoir	171.88	2	720	393,551	11	1123.70	67,252	BASIN 2 FOREBAY
13	SCS Runoff	9.260	2	716	18,764	------	------	------	POST DA-2B
14	Combine	179.91	2	718	412,316	12, 13	------	------	TO BASIN 2
15	Reservoir	6.335	2	842	279,991	14	1117.68	259,906	BASIN 2
16	SCS Runoff	81.54	2	718	164,602	------	------	------	POST DA-2C
17	Combine	81.54	2	718	444,593	15, 16	------	------	POST DA-2 W/ PCSM
18	Combine	289.75	2	716	595,247	11, 13, 16,	------	------	POST DA-2 NO PCSM
19	SCS Runoff	94.86	2	724	299,428	------	------	------	PRE DA-3
20	SCS Runoff	153.49	2	716	312,545	------	------	------	POST DA-3A
21	Reservoir	37.08	2	724	276,952	20	1110.95	148,499	BASIN 3
22	SCS Runoff	23.92	2	716	48,298	------	------	------	POST DA-3B
23	Combine	48.97	2	722	325,249	21, 22	------	------	POST DA-3 W/ PCSM
24	Combine	177.41	2	716	360,843	20, 22,	------	------	POST DA-3 NO PCSM

Hydrograph Report

Hyd. No. 1

PRE DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	198.38 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	624,293 cuft
Drainage area	=	80.750 ac	Curve number	=	76
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

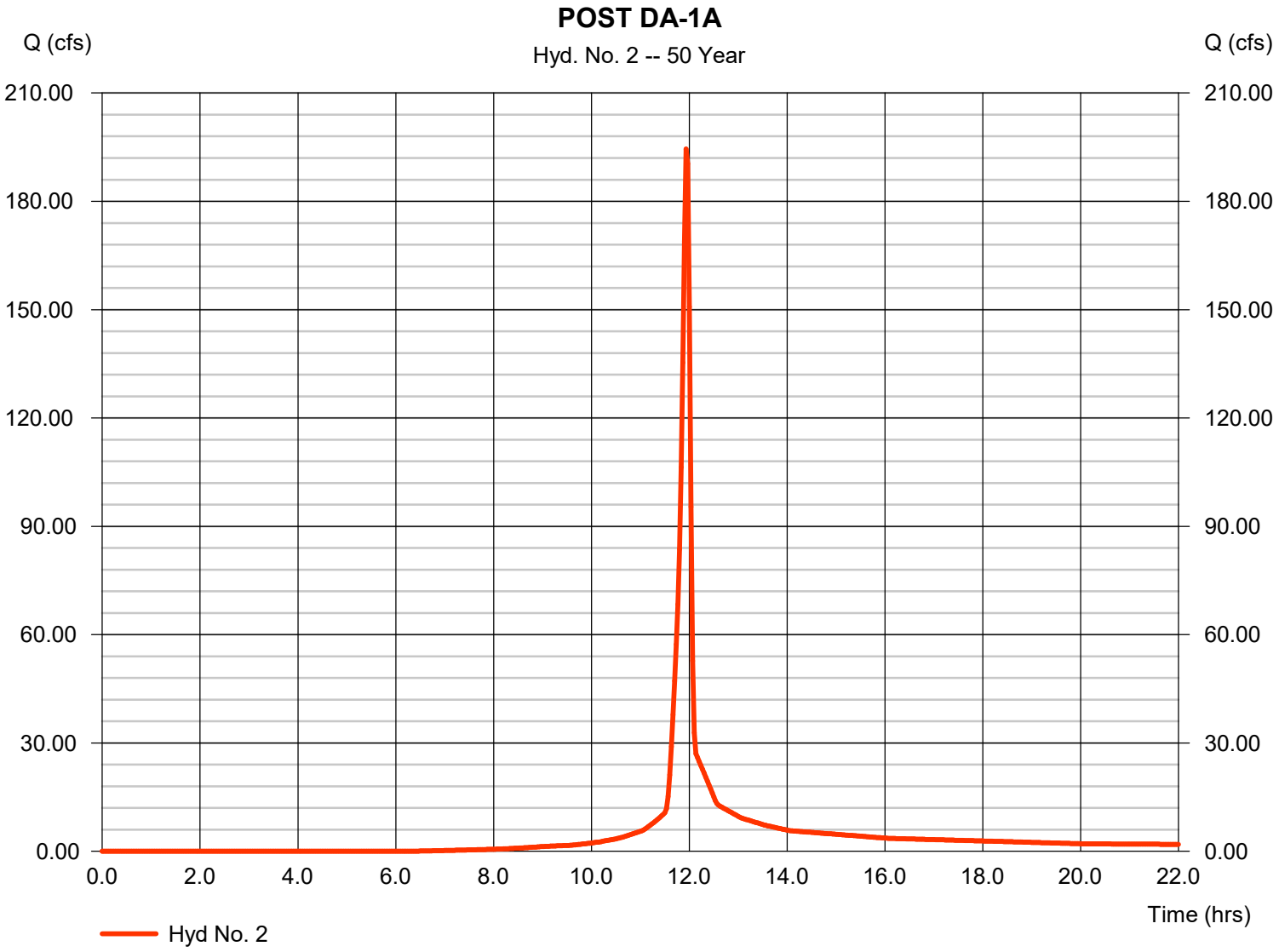


Hydrograph Report

Hyd. No. 2

POST DA-1A

Hydrograph type	=	SCS Runoff	Peak discharge	=	194.49 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	398,839 cuft
Drainage area	=	41.610 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



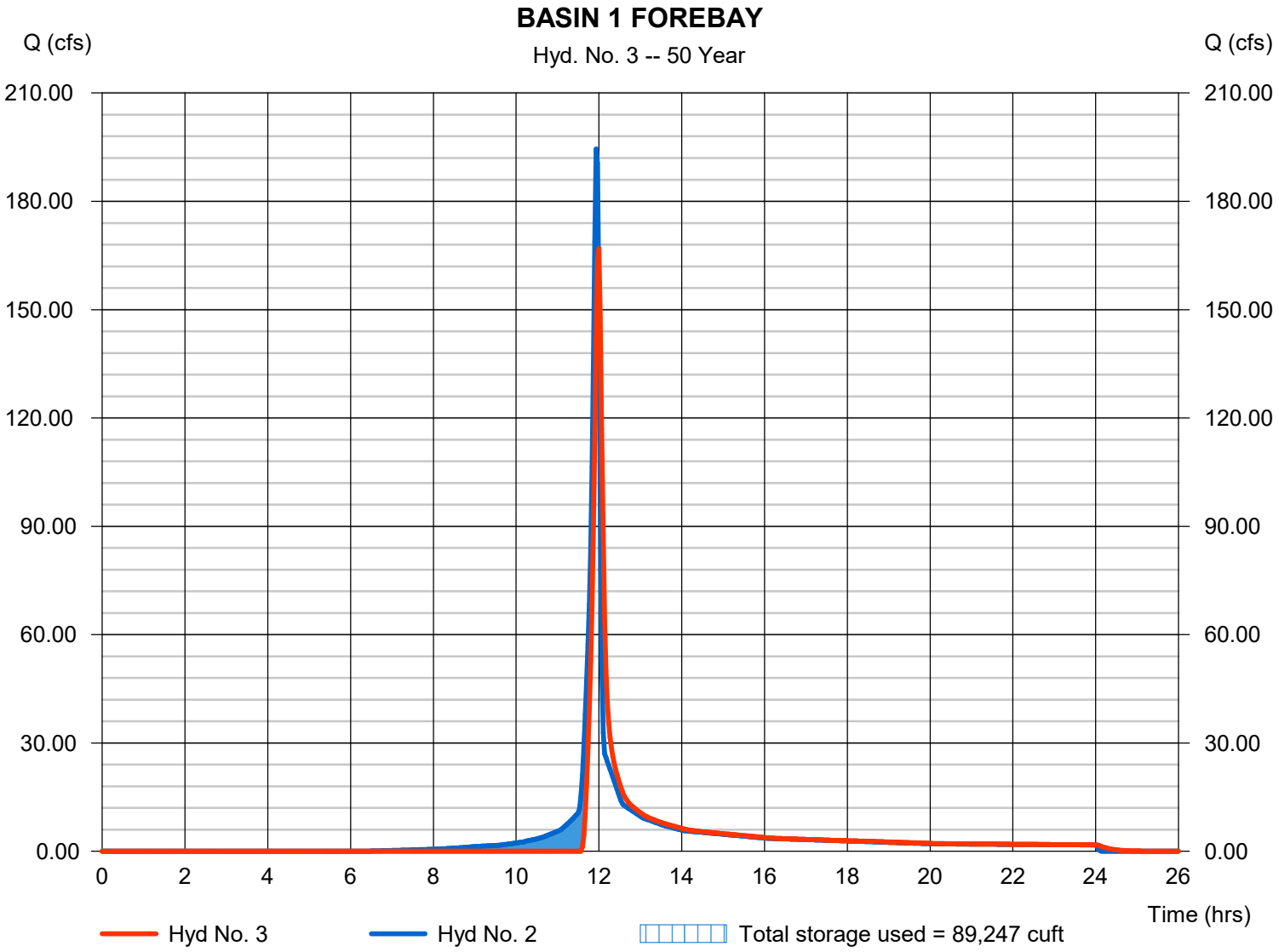
Hydrograph Report

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	166.97 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	357,156 cuft
Inflow hyd. No.	=	2 - POST DA-1A	Max. Elevation	=	1118.78 ft
Reservoir name	=	BASIN 1 FOREBAY	Max. Storage	=	89,247 cuft

Storage Indication method used.

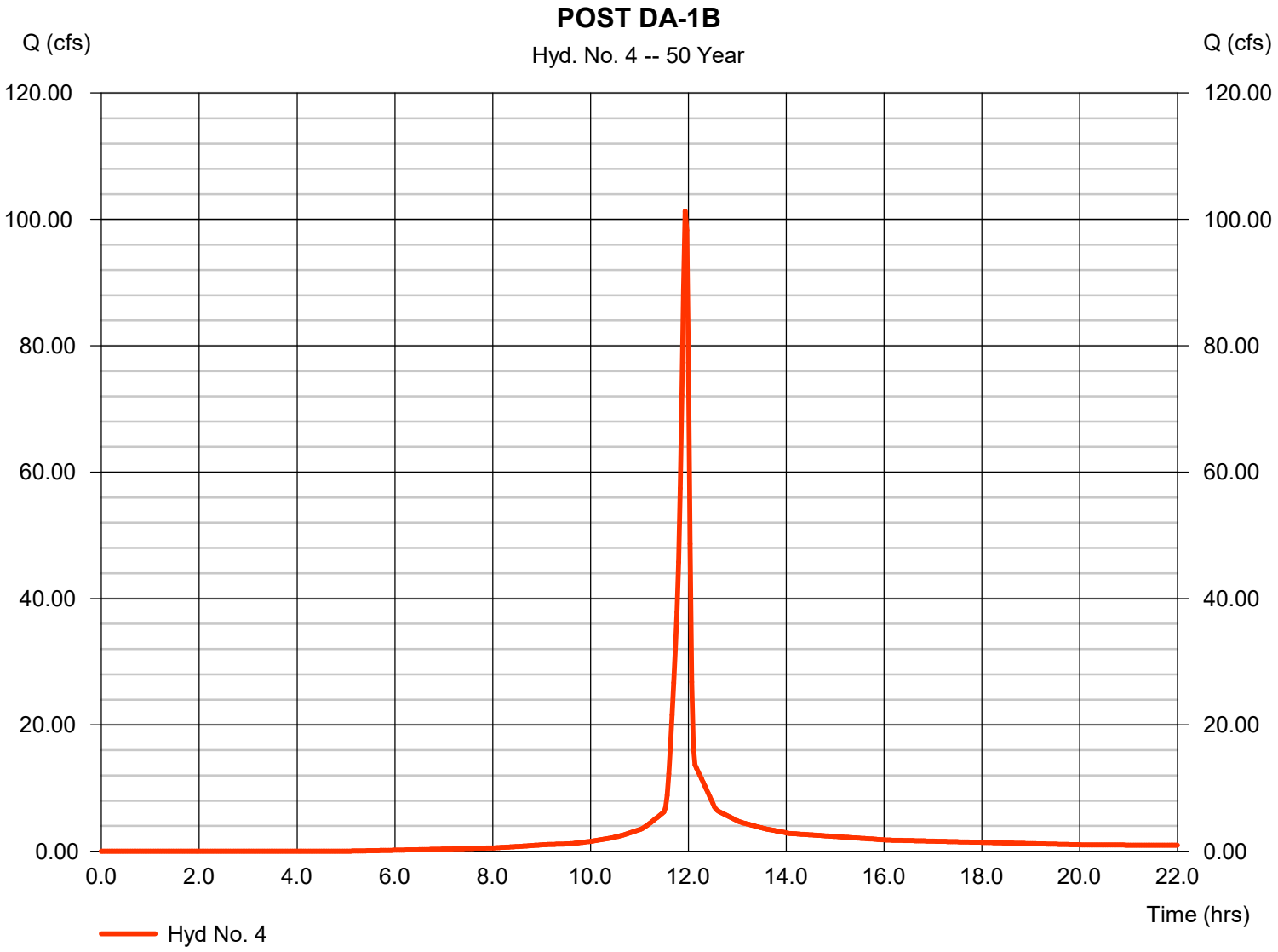


Hydrograph Report

Hyd. No. 4

POST DA-1B

Hydrograph type	=	SCS Runoff	Peak discharge	=	101.32 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	212,322 cuft
Drainage area	=	19.520 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

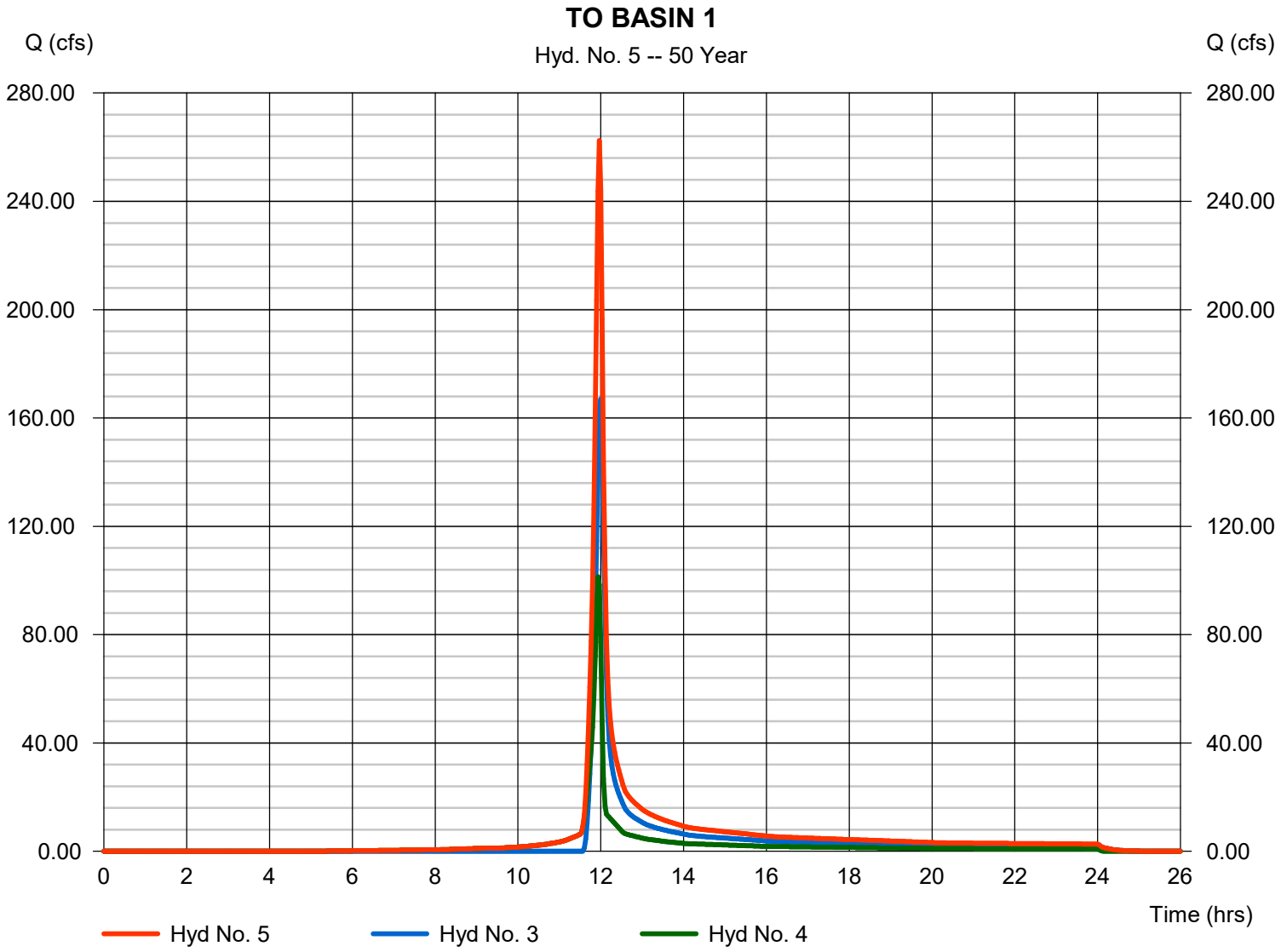


Hydrograph Report

Hyd. No. 5

TO BASIN 1

Hydrograph type	=	Combine	Peak discharge	=	262.41 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	569,478 cuft
Inflow hyds.	=	3, 4	Contrib. drain. area	=	19.520 ac



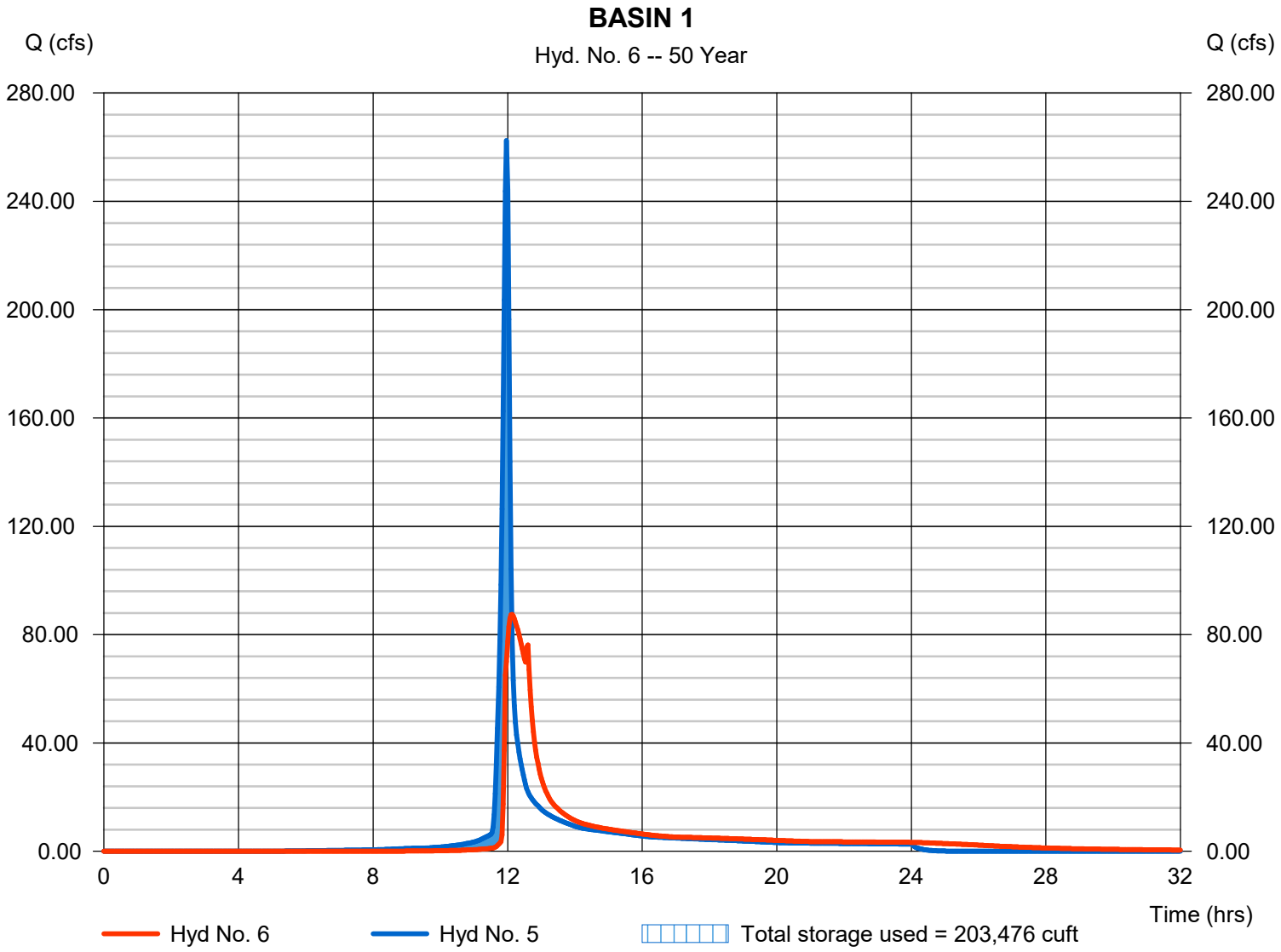
Hydrograph Report

Hyd. No. 6

BASIN 1

Hydrograph type	=	Reservoir	Peak discharge	=	87.45 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	568,720 cuft
Inflow hyd. No.	=	5 - TO BASIN 1	Max. Elevation	=	1117.25 ft
Reservoir name	=	BASIN 1	Max. Storage	=	203,476 cuft

Storage Indication method used.

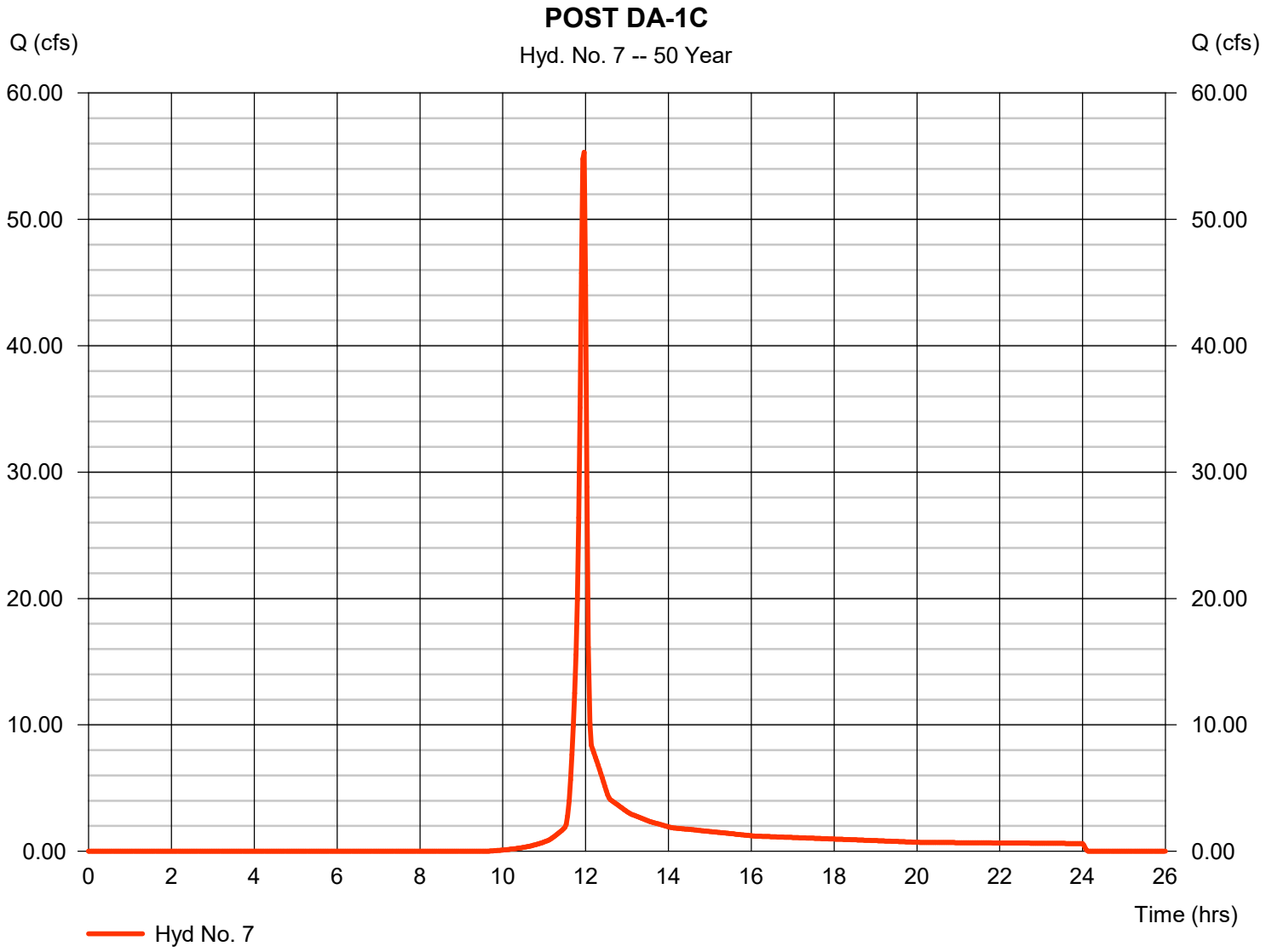


Hydrograph Report

Hyd. No. 7

POST DA-1C

Hydrograph type	= SCS Runoff	Peak discharge	= 55.31 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 110,896 cuft
Drainage area	= 17.190 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

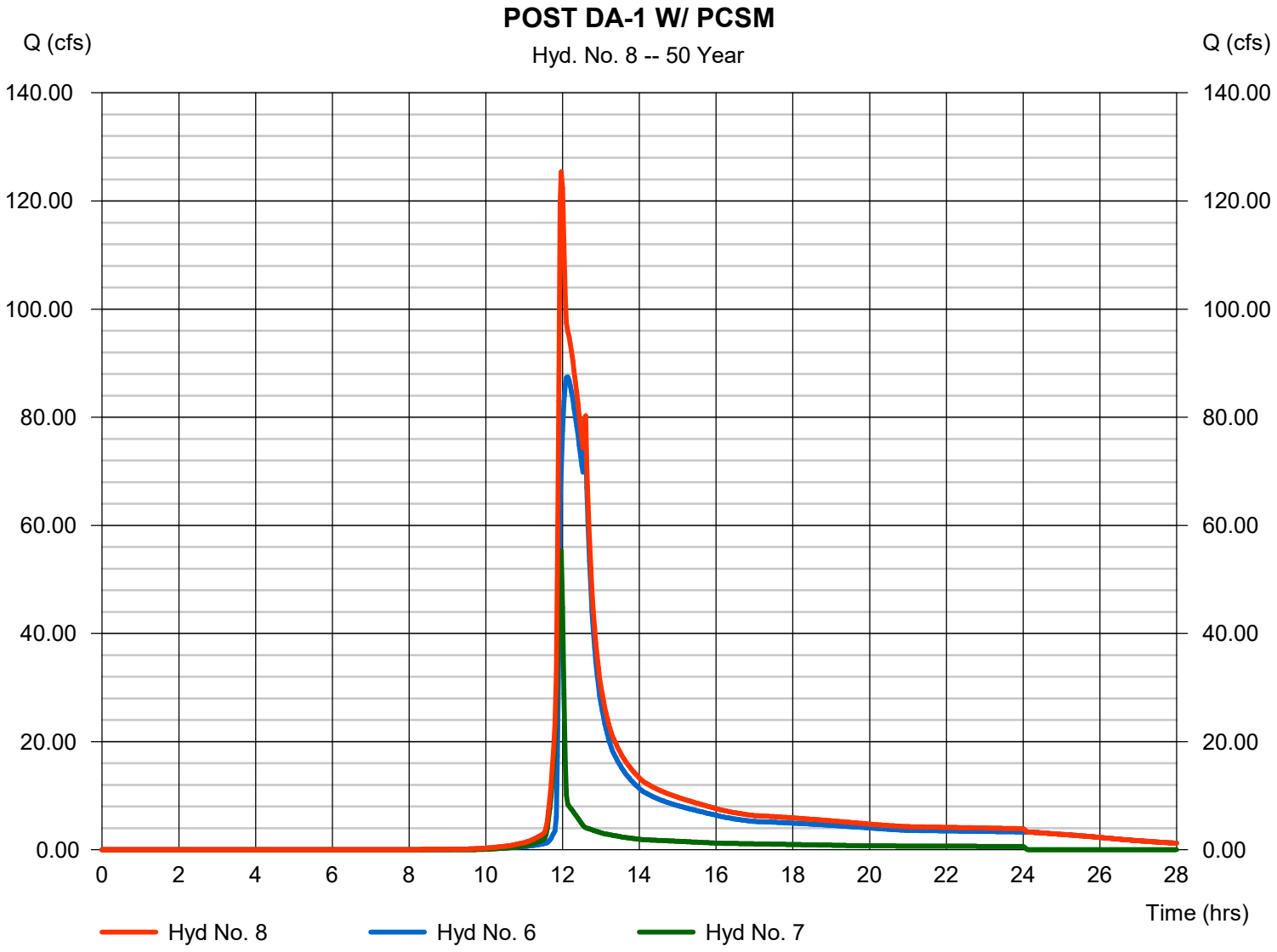


Hydrograph Report

Hyd. No. 8

POST DA-1 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 125.39 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 679,616 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 17.190 ac

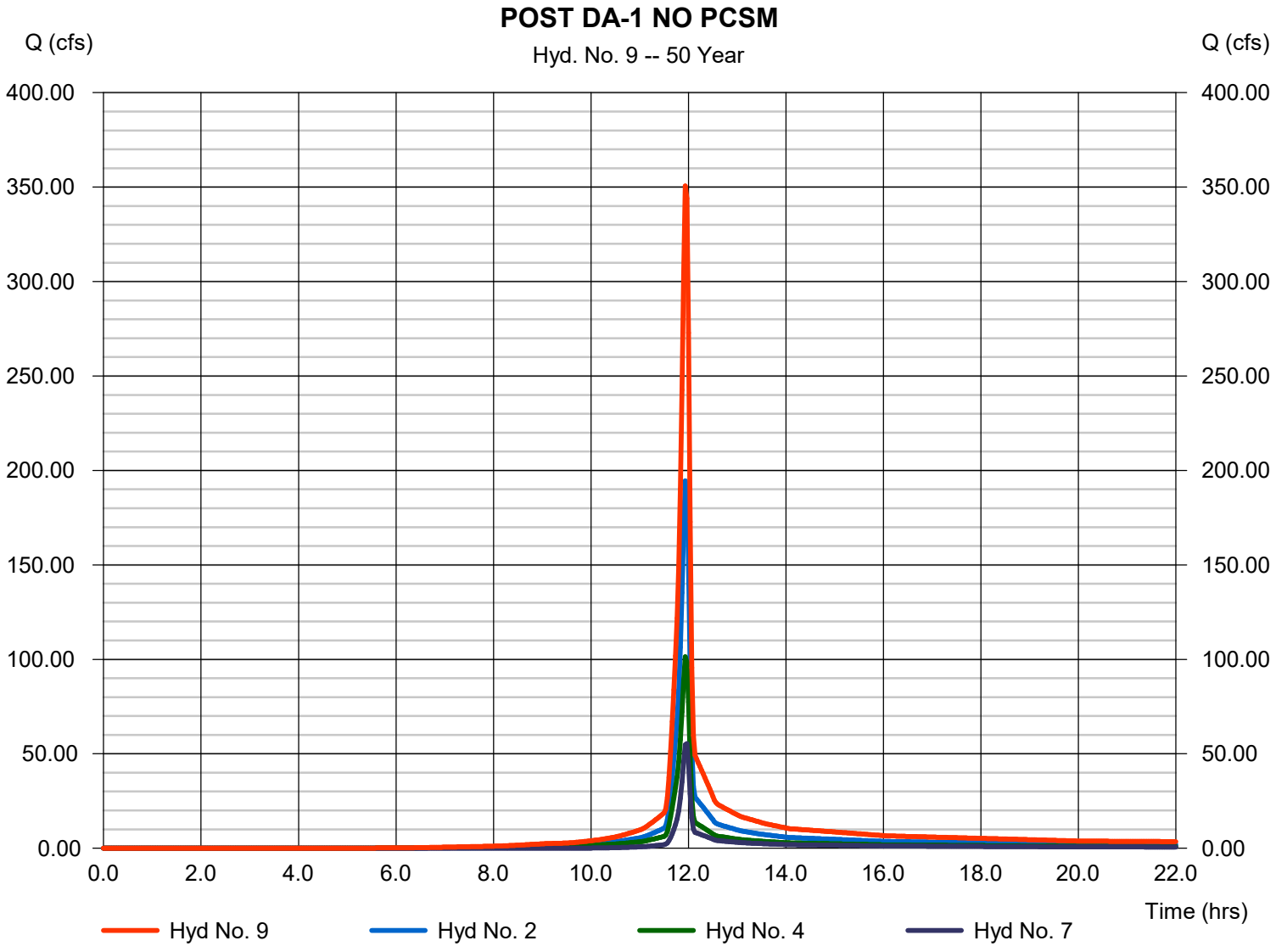


Hydrograph Report

Hyd. No. 9

POST DA-1 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 350.59 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 722,058 cuft
Inflow hyds.	= 2, 4, 7	Contrib. drain. area	= 78.320 ac

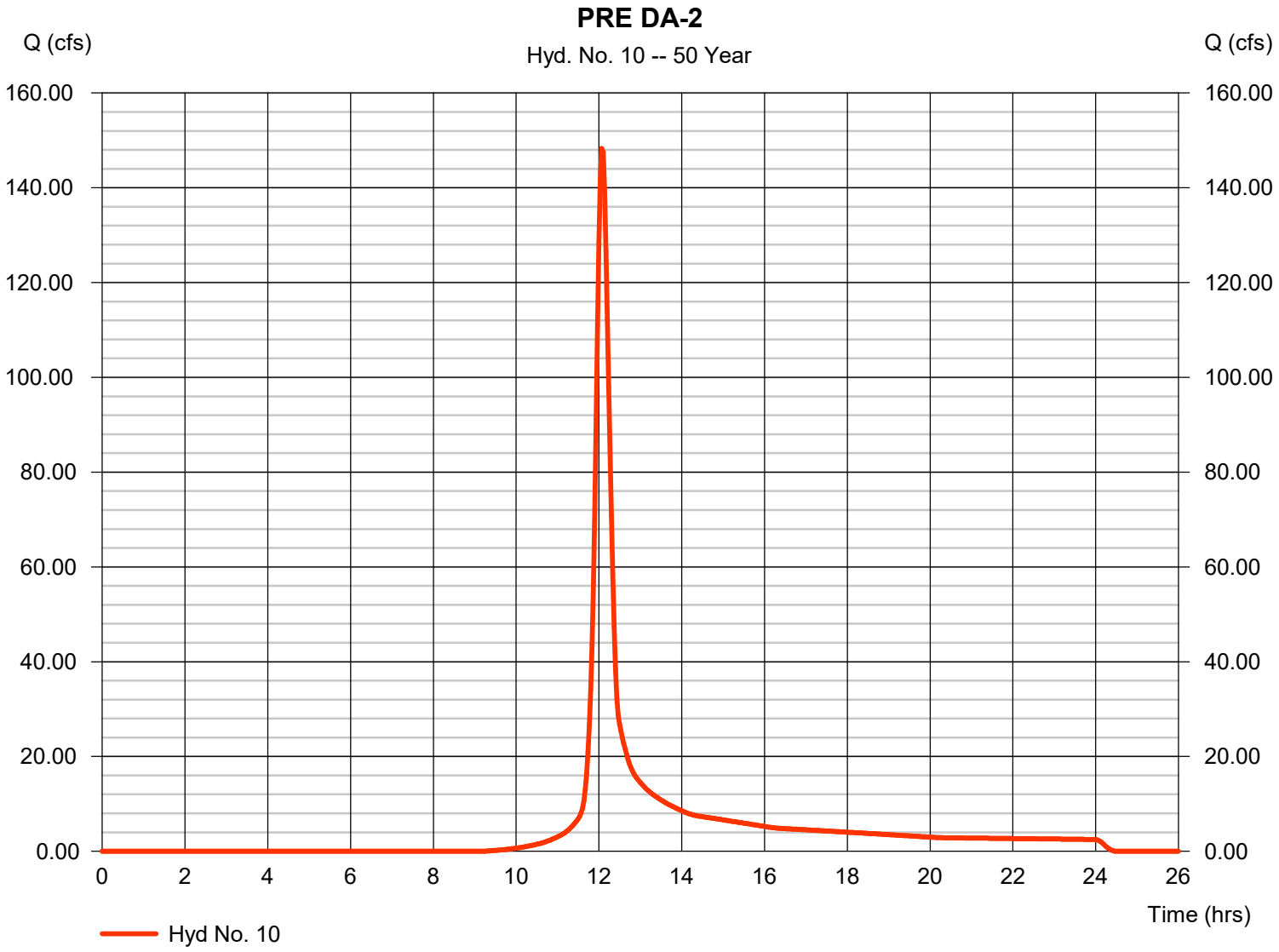


Hydrograph Report

Hyd. No. 10

PRE DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	148.27 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	468,010 cuft
Drainage area	=	62.880 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

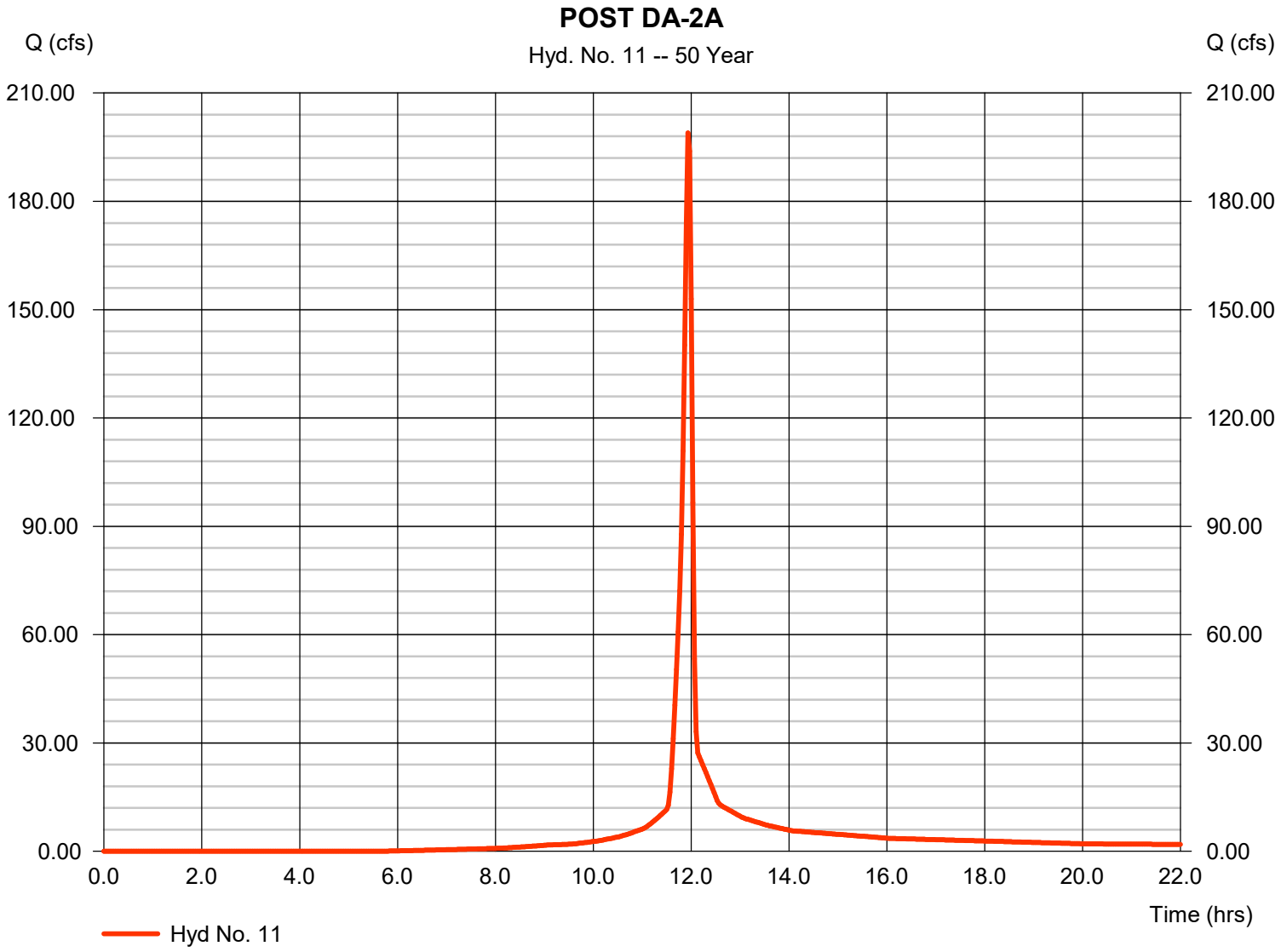


Hydrograph Report

Hyd. No. 11

POST DA-2A

Hydrograph type	=	SCS Runoff	Peak discharge	=	198.96 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	411,882 cuft
Drainage area	=	40.300 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

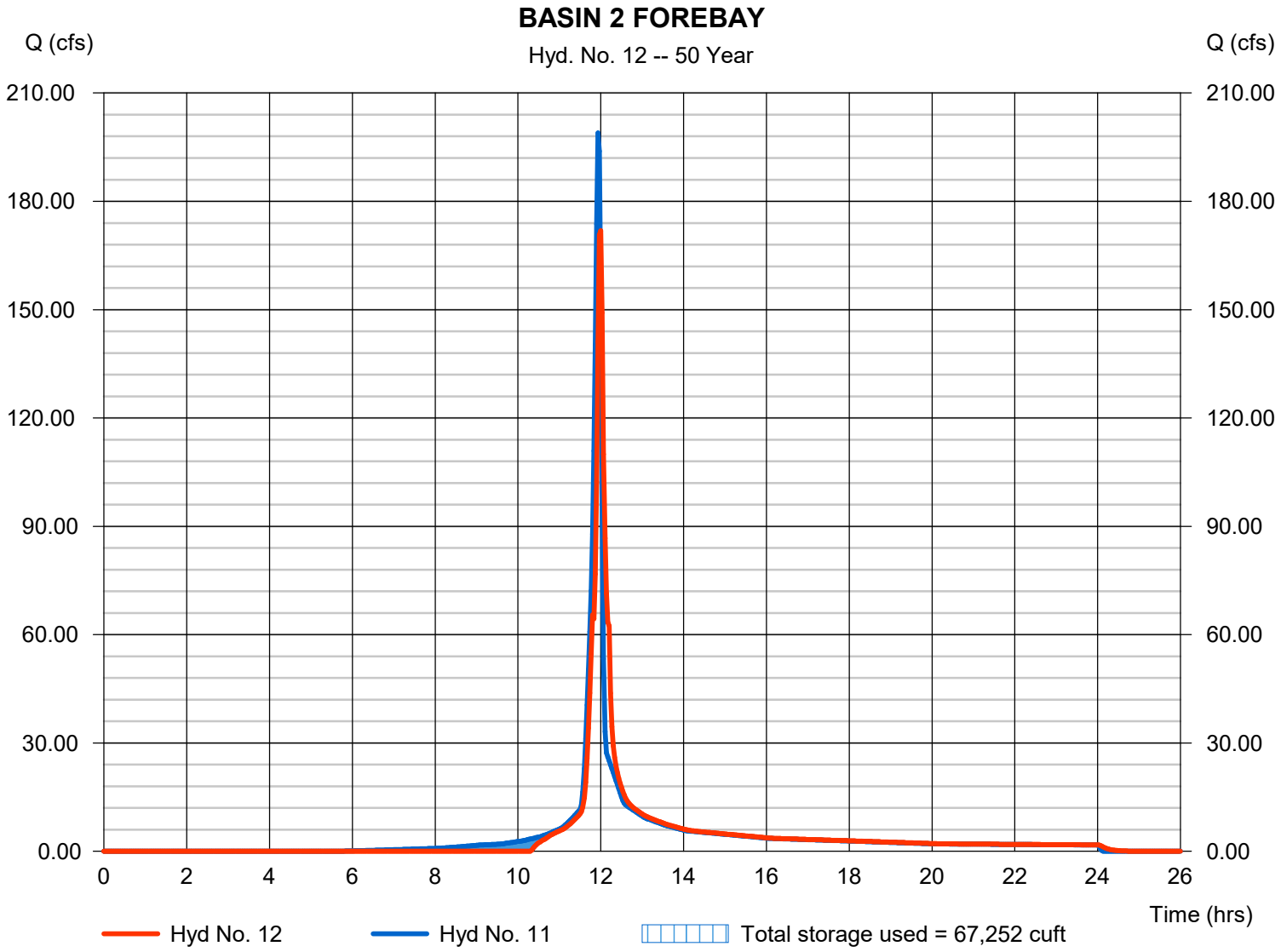
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Friday, 07 / 30 / 2021

Hyd. No. 12

BASIN 2 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	171.88 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	393,551 cuft
Inflow hyd. No.	=	11 - POST DA-2A	Max. Elevation	=	1123.70 ft
Reservoir name	=	BASIN 2 FOREBAY	Max. Storage	=	67,252 cuft

Storage Indication method used.

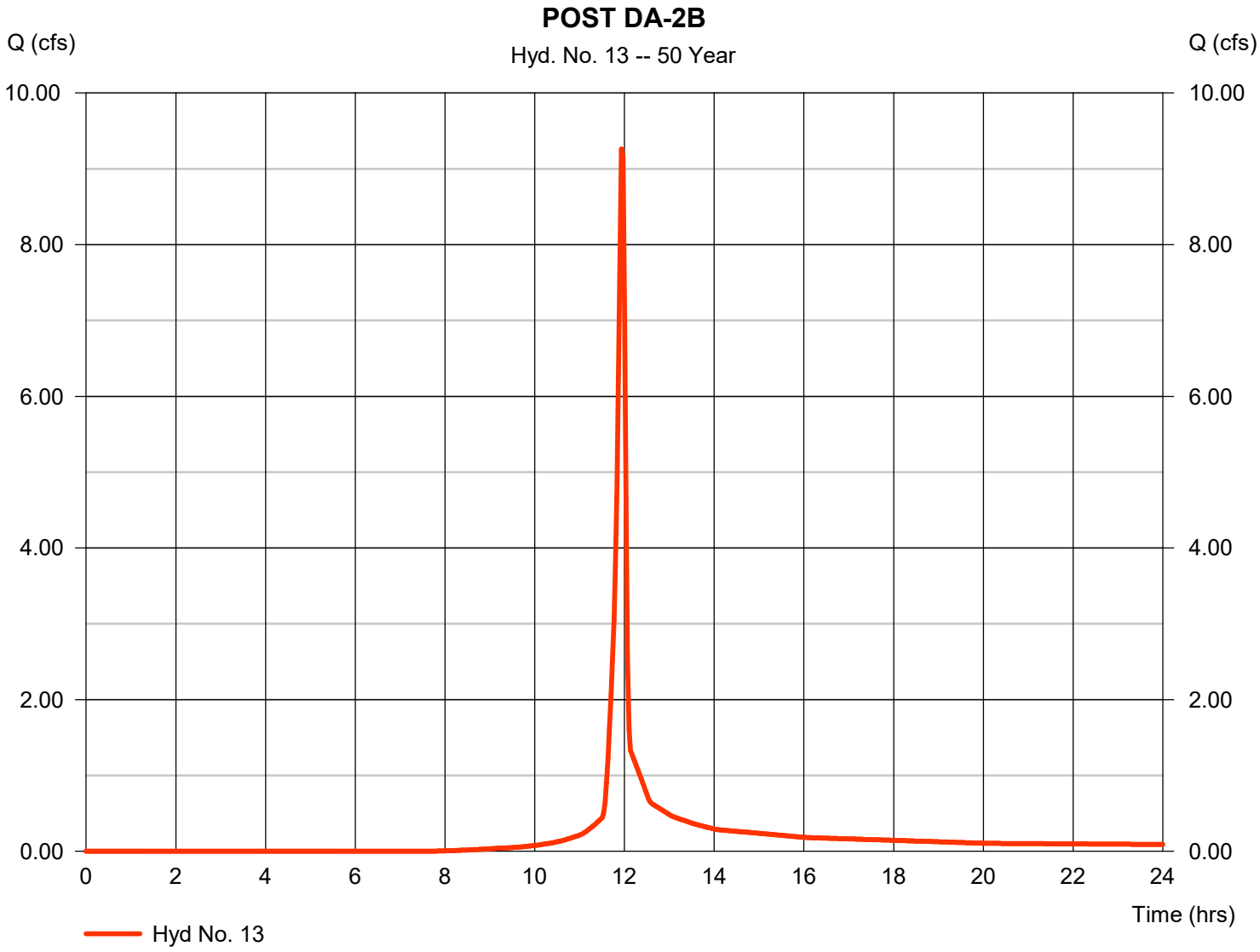


Hydrograph Report

Hyd. No. 13

POST DA-2B

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.260 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	18,764 cuft
Drainage area	=	2.240 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

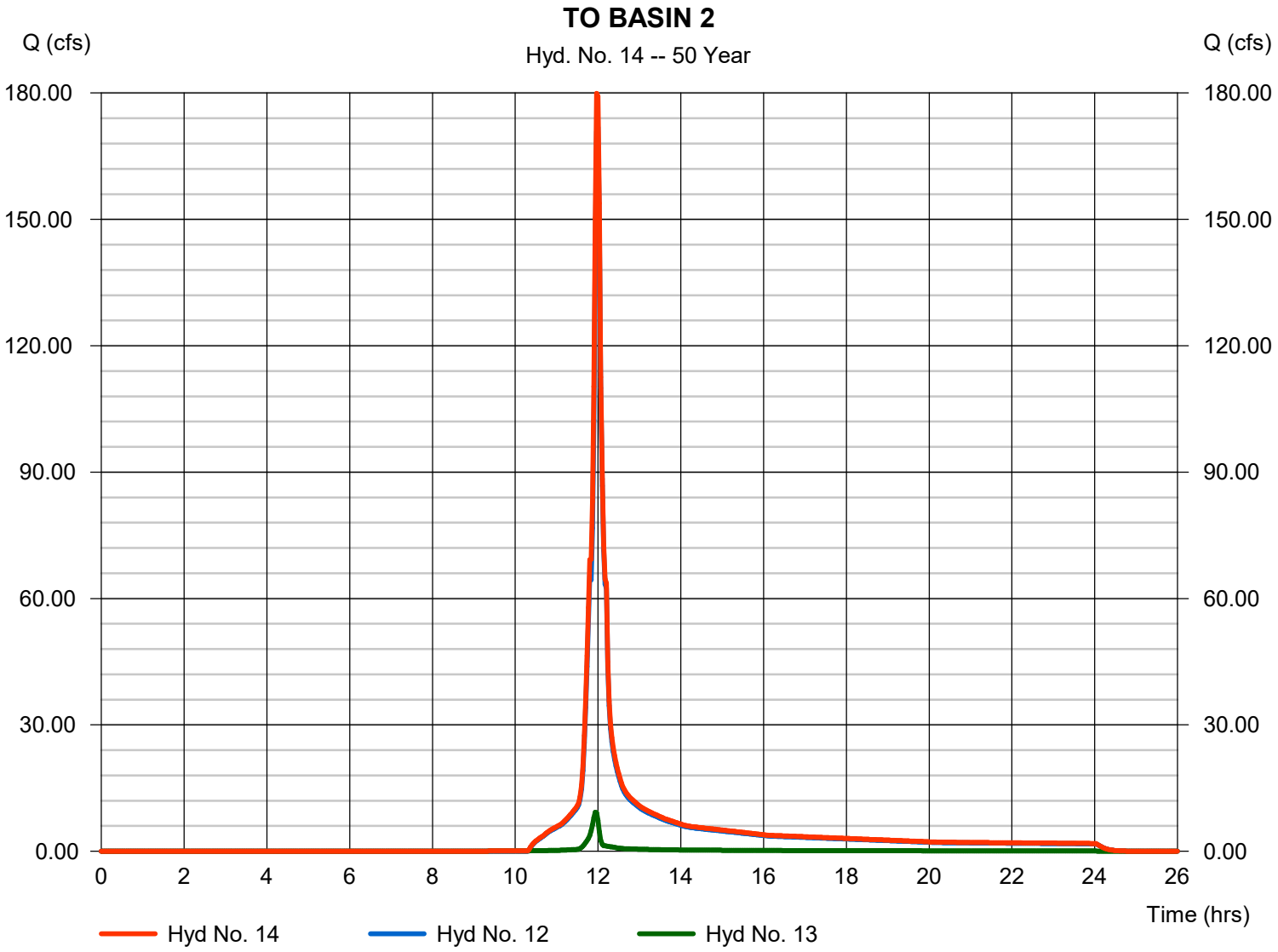


Hydrograph Report

Hyd. No. 14

TO BASIN 2

Hydrograph type	=	Combine	Peak discharge	=	179.91 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	412,316 cuft
Inflow hyds.	=	12, 13	Contrib. drain. area	=	2.240 ac



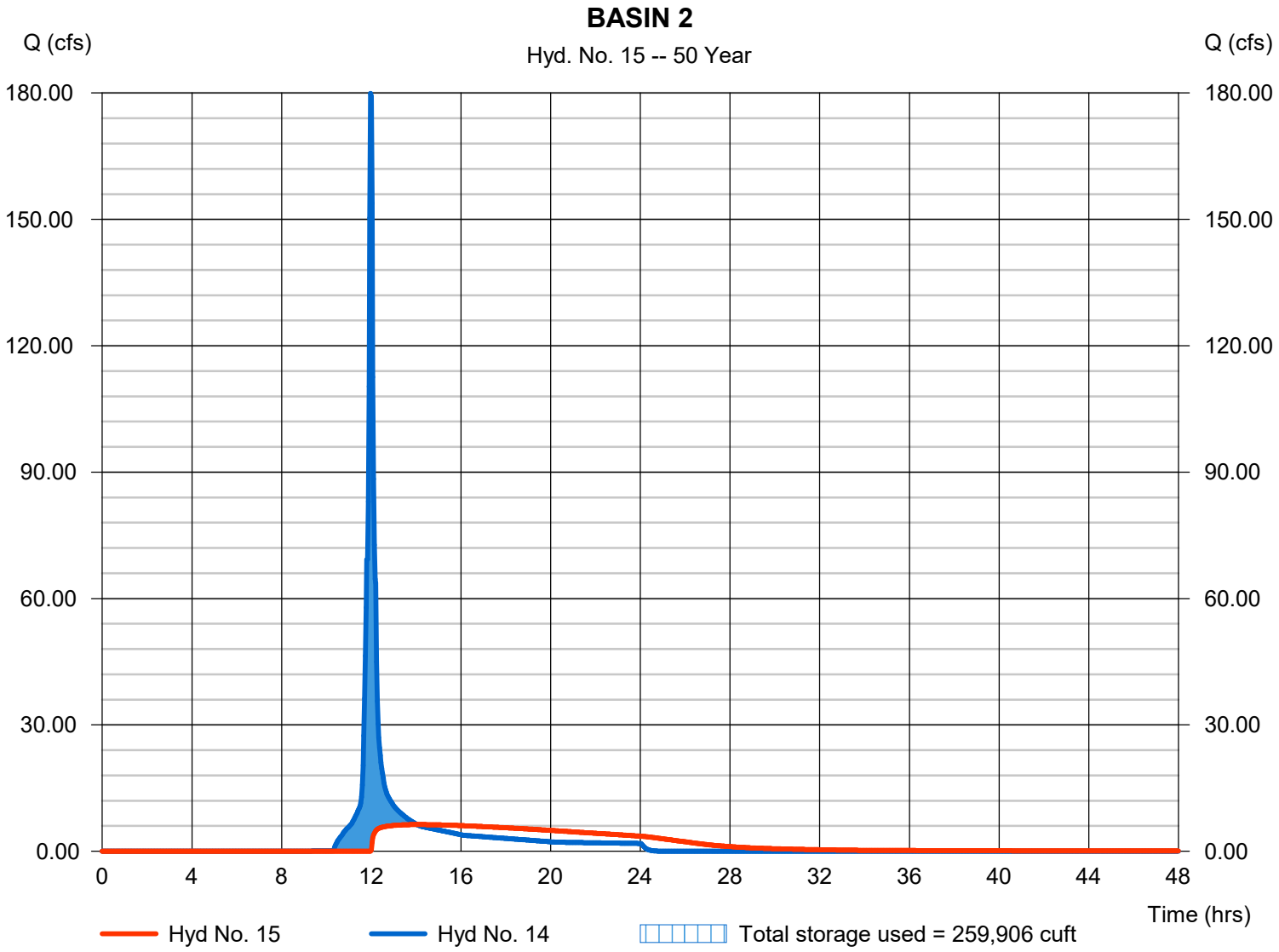
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	=	Reservoir	Peak discharge	=	6.335 cfs
Storm frequency	=	50 yrs	Time to peak	=	14.03 hrs
Time interval	=	2 min	Hyd. volume	=	279,991 cuft
Inflow hyd. No.	=	14 - TO BASIN 2	Max. Elevation	=	1117.68 ft
Reservoir name	=	BASIN 2	Max. Storage	=	259,906 cuft

Storage Indication method used.

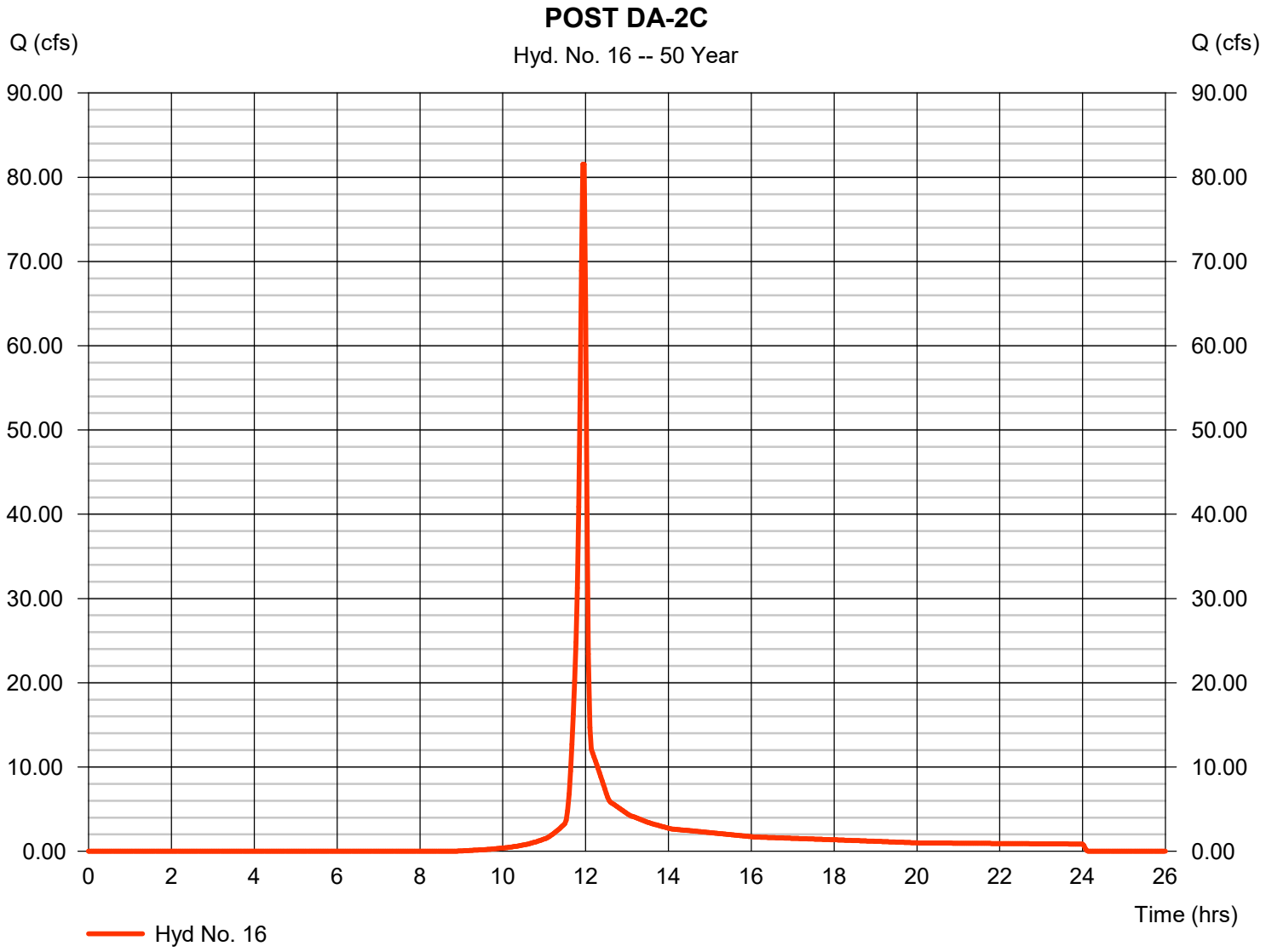


Hydrograph Report

Hyd. No. 16

POST DA-2C

Hydrograph type	= SCS Runoff	Peak discharge	= 81.54 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 164,602 cuft
Drainage area	= 22.710 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

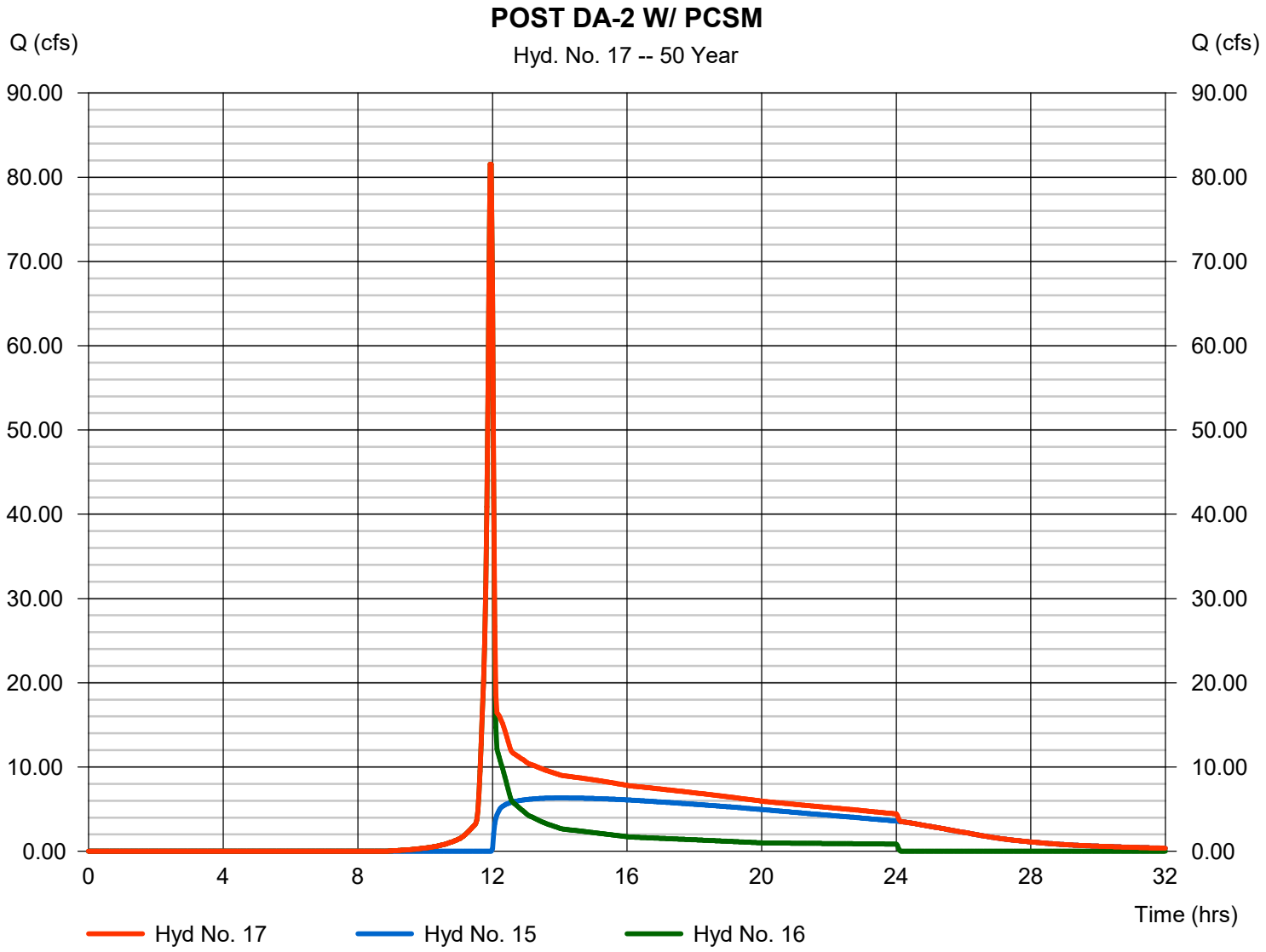


Hydrograph Report

Hyd. No. 17

POST DA-2 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 81.54 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 444,593 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 22.710 ac

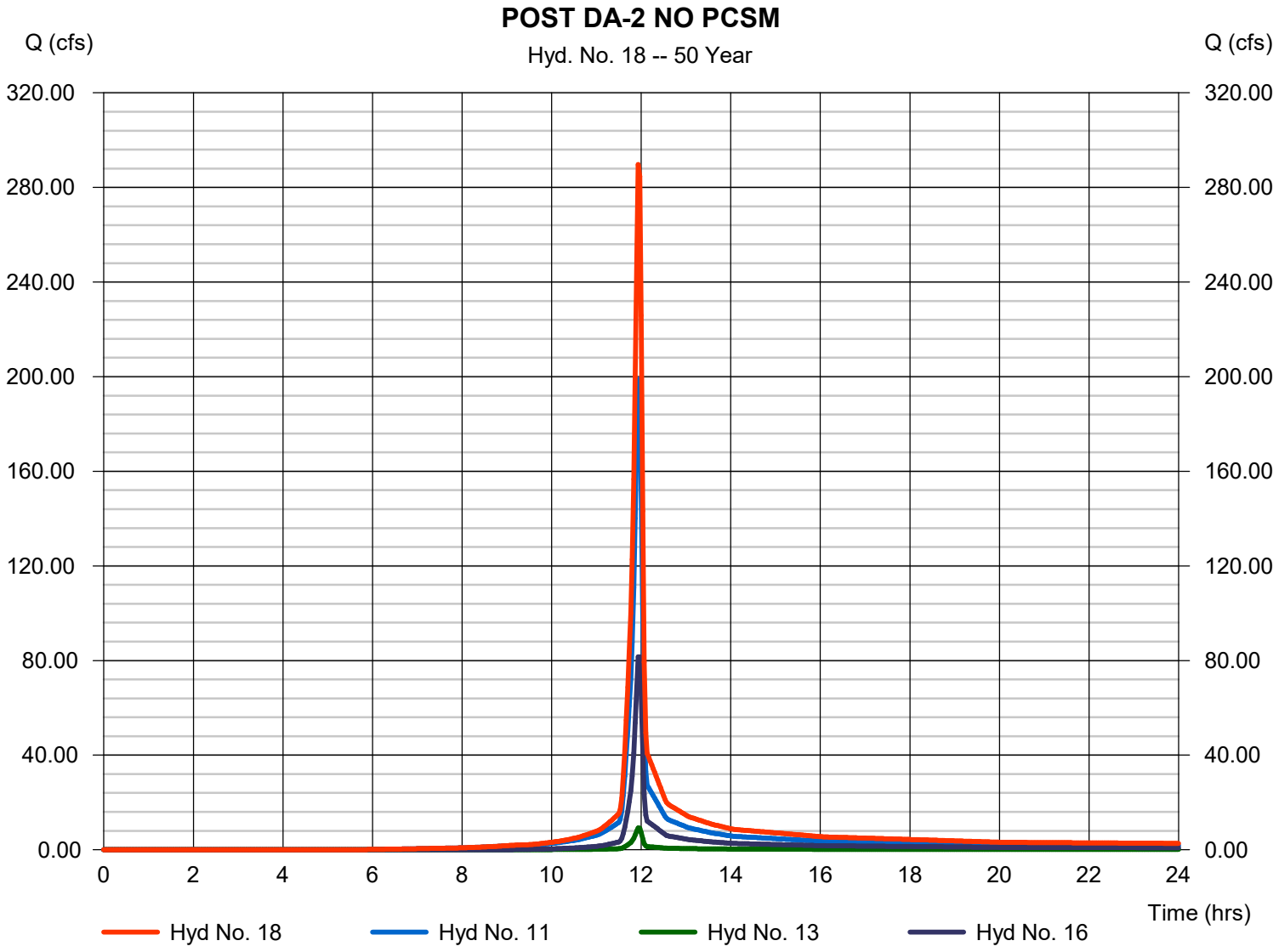


Hydrograph Report

Hyd. No. 18

POST DA-2 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 289.75 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 595,247 cuft
Inflow hyds.	= 11, 13, 16	Contrib. drain. area	= 65.250 ac

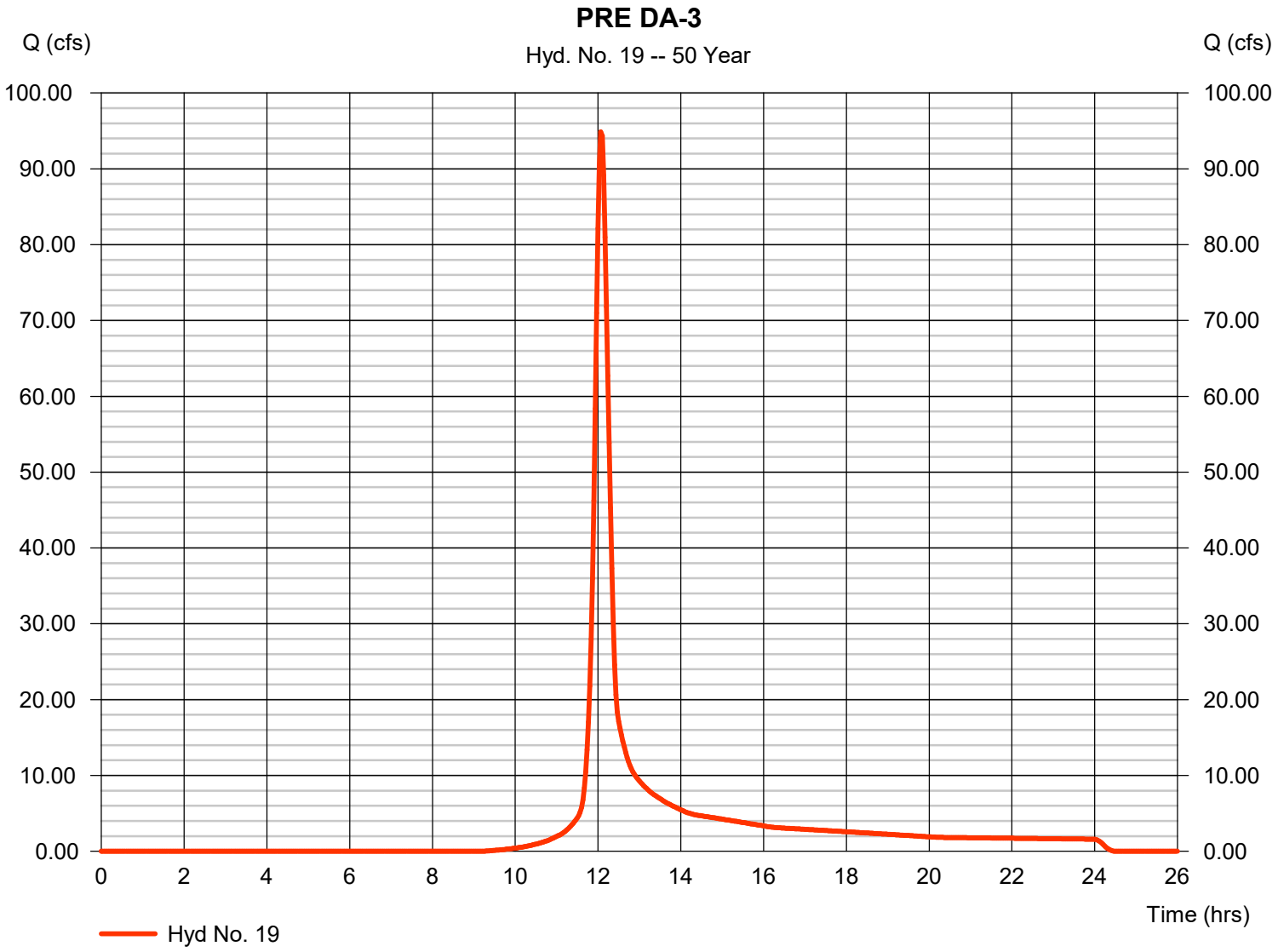


Hydrograph Report

Hyd. No. 19

PRE DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	94.86 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	299,428 cuft
Drainage area	=	40.230 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

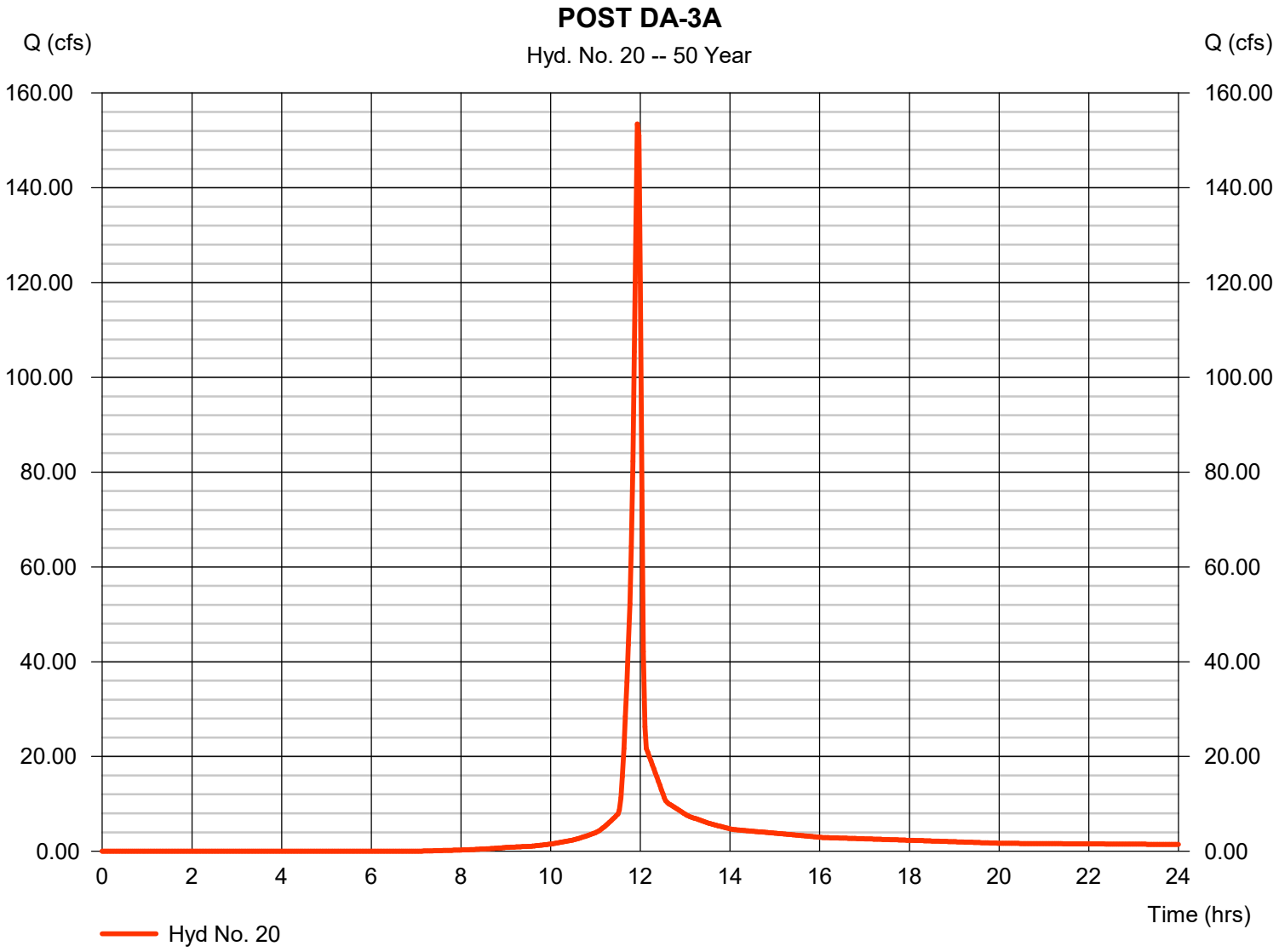


Hydrograph Report

Hyd. No. 20

POST DA-3A

Hydrograph type	=	SCS Runoff	Peak discharge	=	153.49 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	312,545 cuft
Drainage area	=	34.840 ac	Curve number	=	82
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



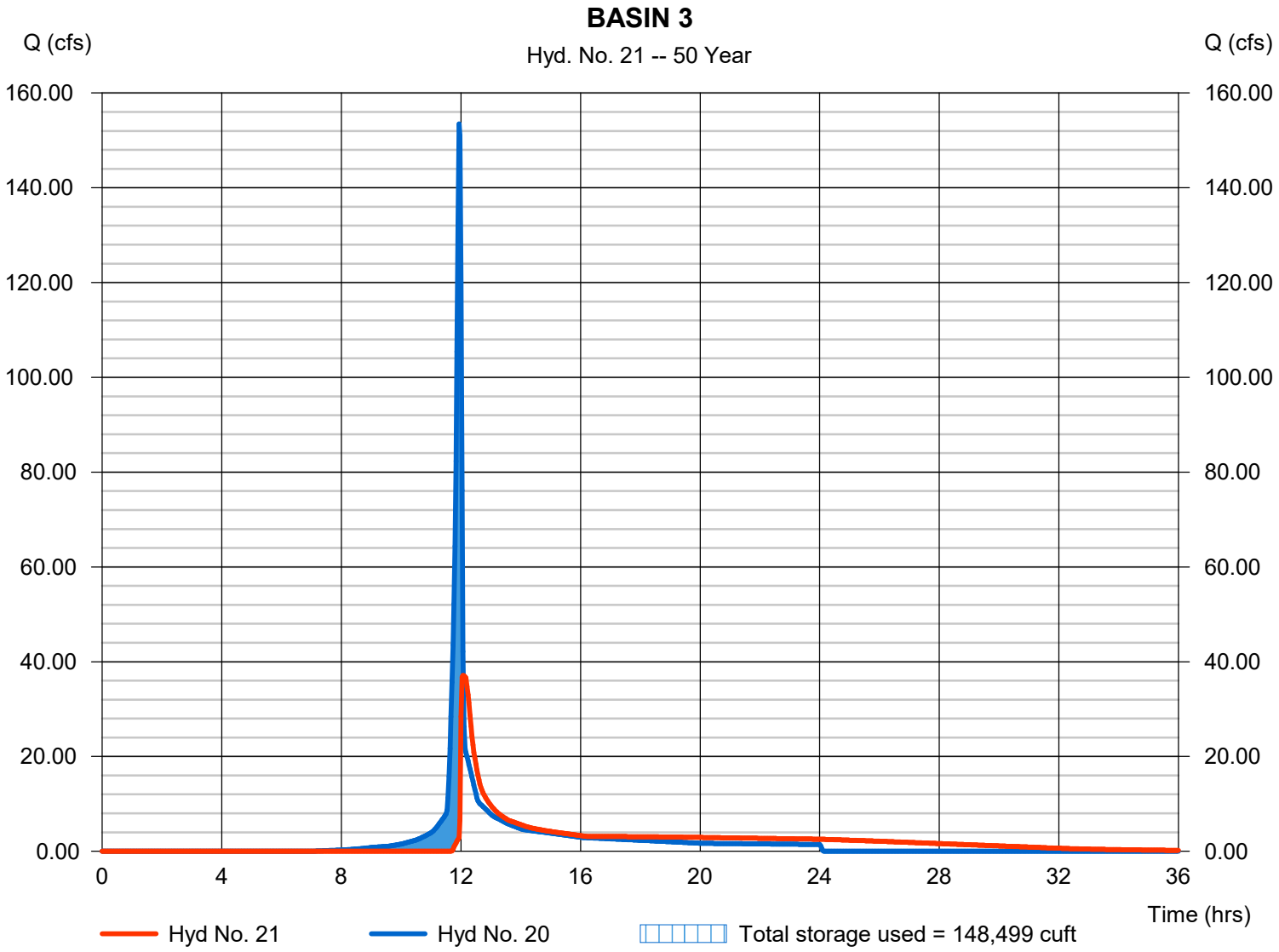
Hydrograph Report

Hyd. No. 21

BASIN 3

Hydrograph type	=	Reservoir	Peak discharge	=	37.08 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	276,952 cuft
Inflow hyd. No.	=	20 - POST DA-3A	Max. Elevation	=	1110.95 ft
Reservoir name	=	BASIN 3	Max. Storage	=	148,499 cuft

Storage Indication method used.

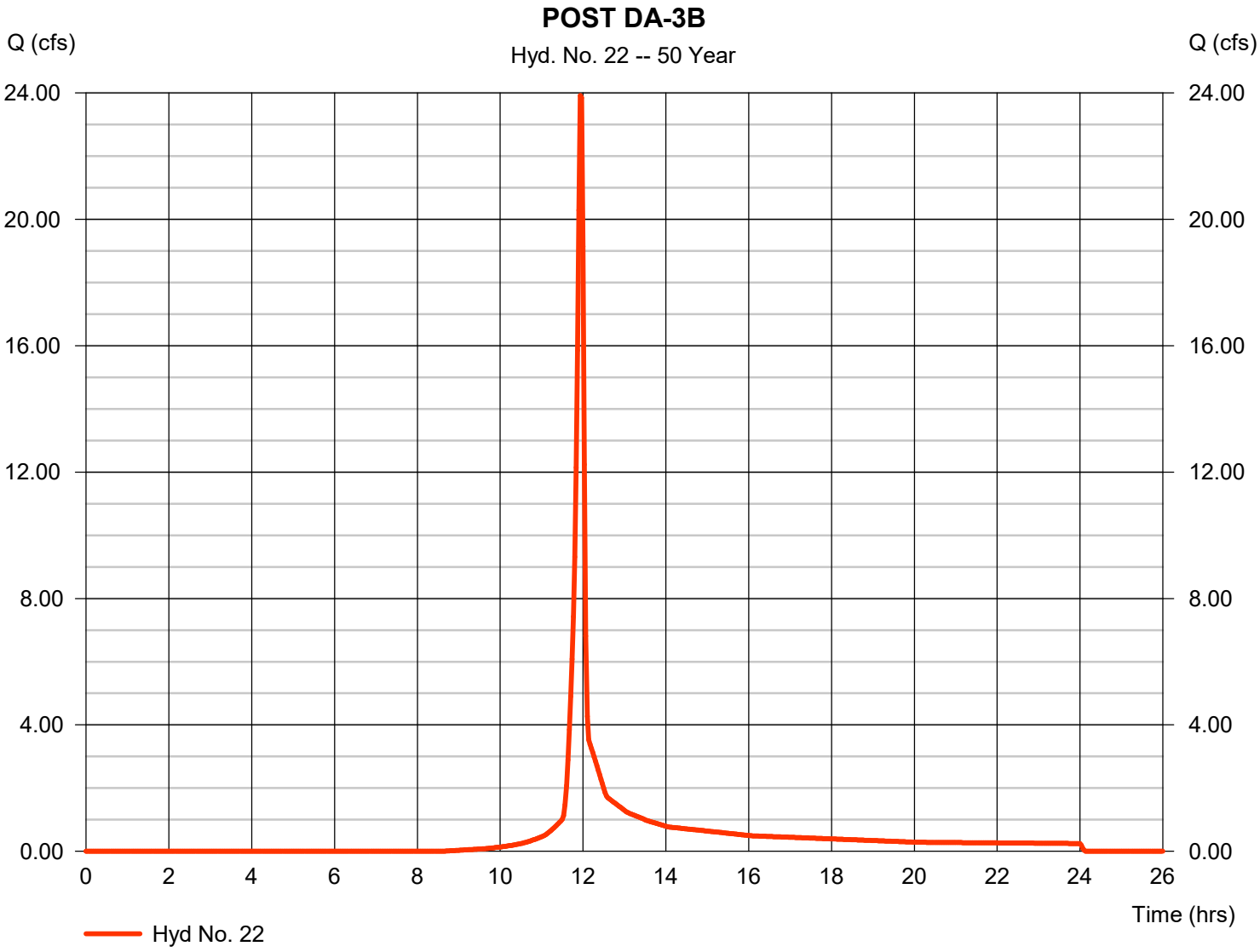


Hydrograph Report

Hyd. No. 22

POST DA-3B

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.92 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	48,298 cuft
Drainage area	=	6.420 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

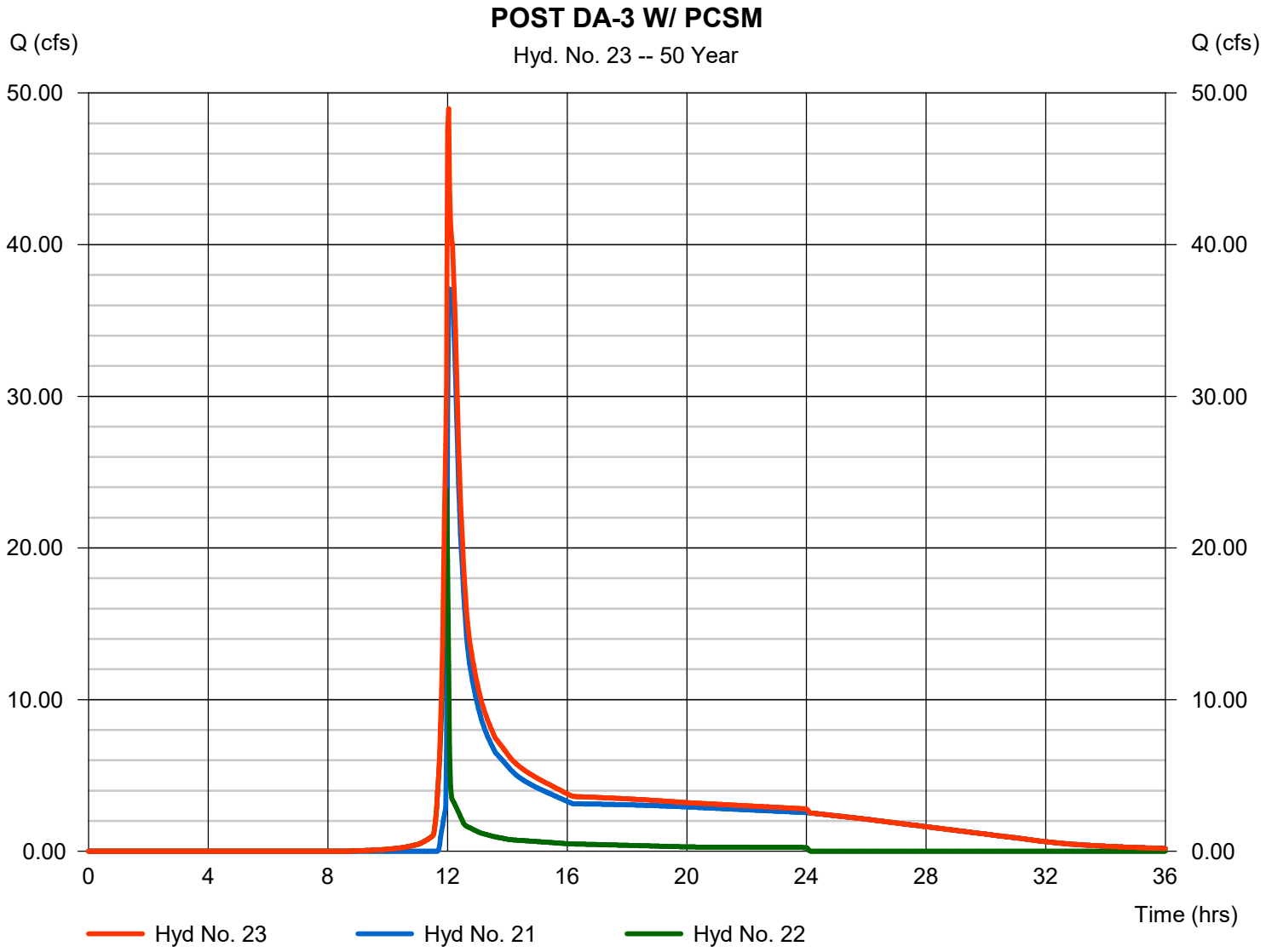


Hydrograph Report

Hyd. No. 23

POST DA-3 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 48.97 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 325,249 cuft
Inflow hyds.	= 21, 22	Contrib. drain. area	= 6.420 ac

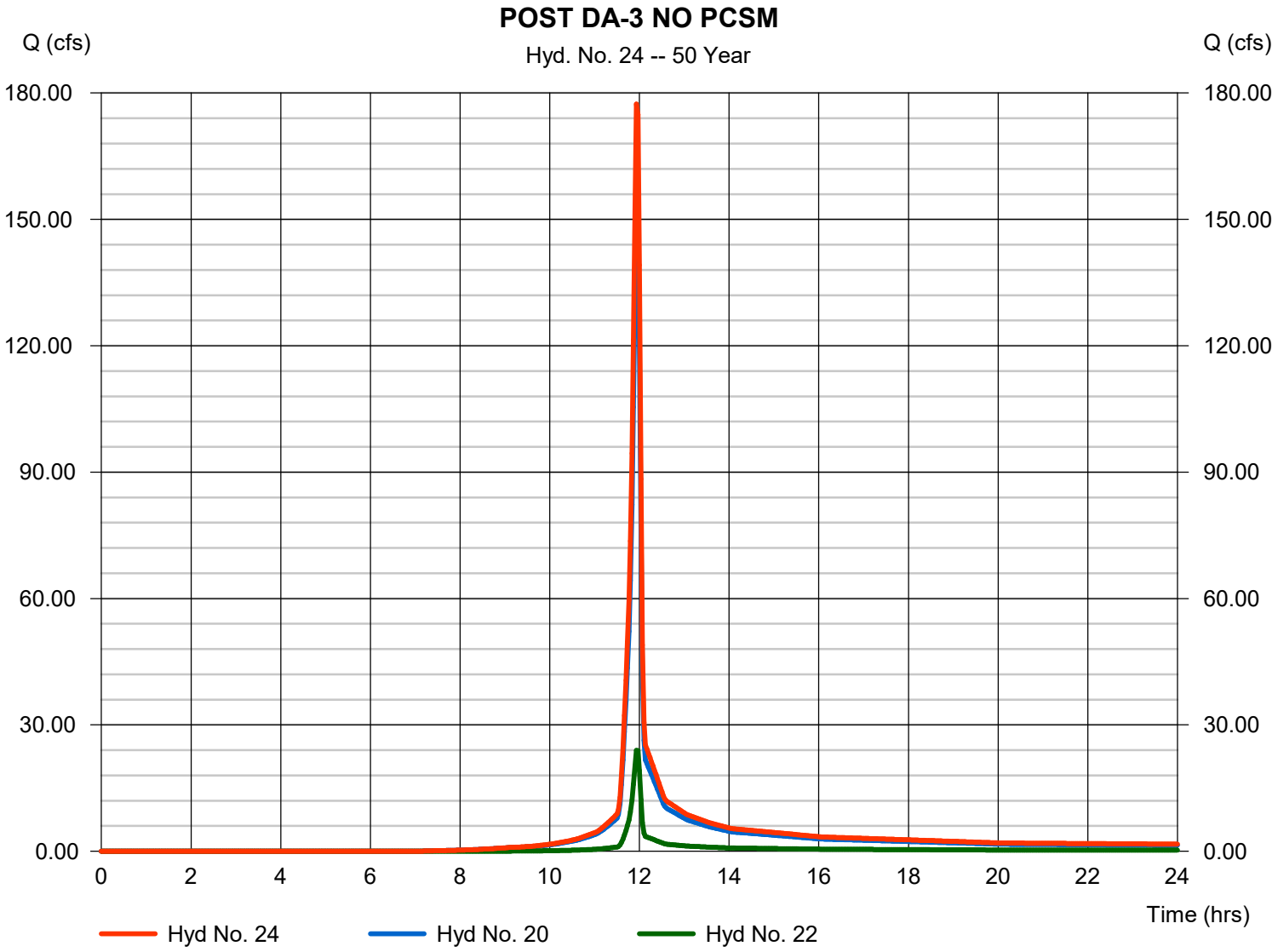


Hydrograph Report

Hyd. No. 24

POST DA-3 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 177.41 cfs
Storm frequency	= 50 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 360,843 cuft
Inflow hyds.	= 20, 22	Contrib. drain. area	= 41.260 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

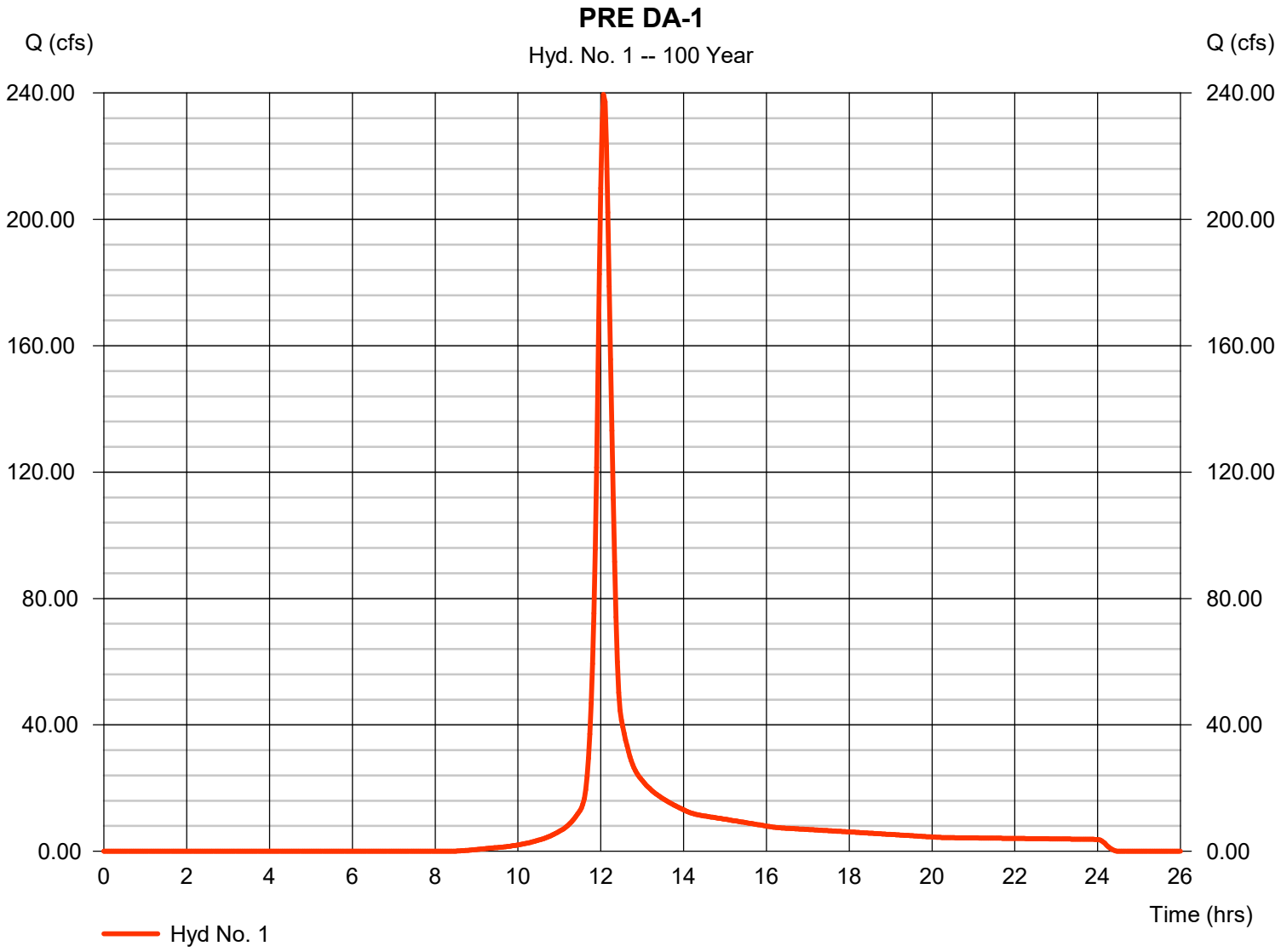
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	239.49	2	724	750,468	------	------	------	PRE DA-1
2	SCS Runoff	226.23	2	716	466,993	------	------	------	POST DA-1A
3	Reservoir	195.54	2	720	425,309	2	1119.04	95,114	BASIN 1 FOREBAY
4	SCS Runoff	116.25	2	716	245,617	------	------	------	POST DA-1B
5	Combine	306.36	2	718	670,926	3, 4	------	------	TO BASIN 1
6	Reservoir	98.54	2	728	670,157	5	1118.01	243,870	BASIN 1
7	SCS Runoff	66.93	2	718	134,783	------	------	------	POST DA-1C
8	Combine	147.52	2	718	804,941	6, 7	------	------	POST DA-1 W/ PCSM
9	Combine	409.23	2	716	847,392	2, 4, 7,	------	------	POST DA-1 NO PCSM
10	SCS Runoff	179.87	2	724	564,616	------	------	------	PRE DA-2
11	SCS Runoff	229.81	2	716	479,327	------	------	------	POST DA-2A
12	Reservoir	198.55	2	720	460,996	11	1124.09	73,187	BASIN 2 FOREBAY
13	SCS Runoff	10.94	2	716	22,252	------	------	------	POST DA-2B
14	Combine	208.70	2	718	483,248	12, 13	------	------	TO BASIN 2
15	Reservoir	13.94	2	770	350,911	14	1118.30	287,181	BASIN 2
16	SCS Runoff	97.93	2	716	197,869	------	------	------	POST DA-2C
17	Combine	98.42	2	718	548,776	15, 16	------	------	POST DA-2 W/ PCSM
18	Combine	338.67	2	716	699,448	11, 13, 16,	------	------	POST DA-2 NO PCSM
19	SCS Runoff	115.08	2	724	361,236	------	------	------	PRE DA-3
20	SCS Runoff	179.87	2	716	368,253	------	------	------	POST DA-3A
21	Reservoir	39.01	2	726	332,659	20	1111.96	174,638	BASIN 3
22	SCS Runoff	28.60	2	716	57,856	------	------	------	POST DA-3B
23	Combine	65.32	2	718	390,515	21, 22	------	------	POST DA-3 W/ PCSM
24	Combine	208.47	2	716	426,109	20, 22,	------	------	POST DA-3 NO PCSM

Hydrograph Report

Hyd. No. 1

PRE DA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 239.49 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 750,468 cuft
Drainage area	= 80.750 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.30 min
Total precip.	= 5.03 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

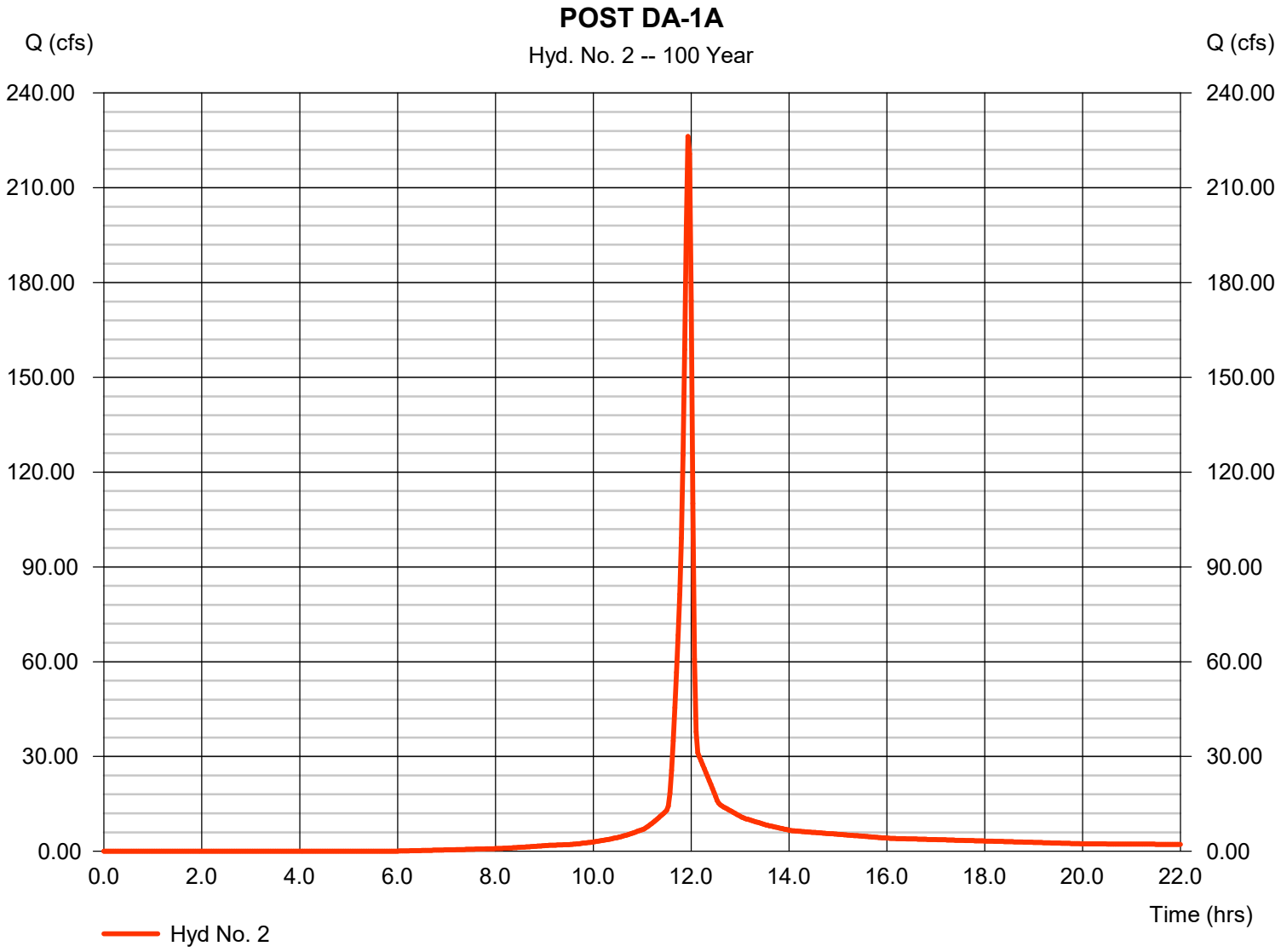


Hydrograph Report

Hyd. No. 2

POST DA-1A

Hydrograph type	= SCS Runoff	Peak discharge	= 226.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 466,993 cuft
Drainage area	= 41.610 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.03 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



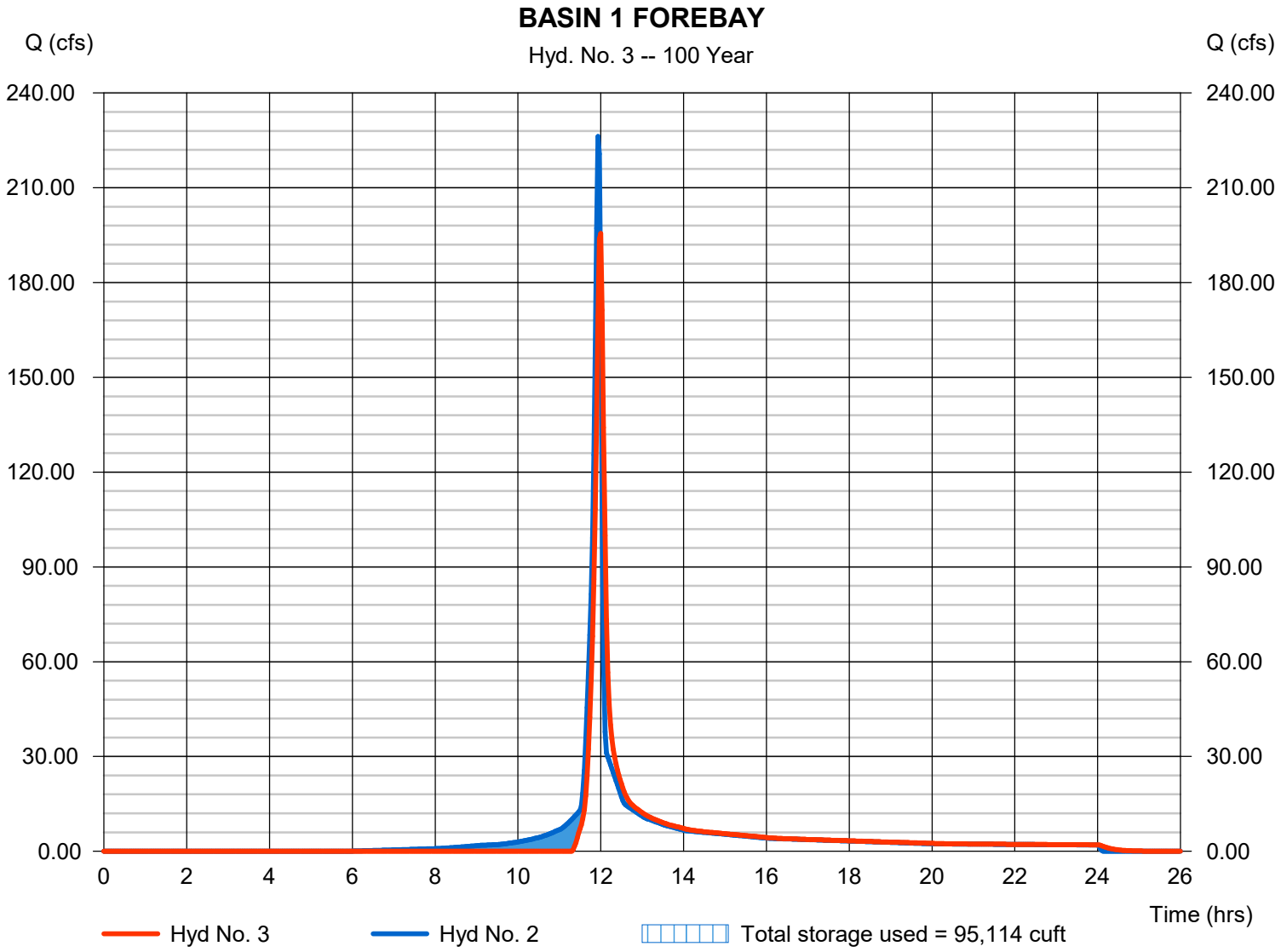
Hydrograph Report

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	195.54 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	425,309 cuft
Inflow hyd. No.	=	2 - POST DA-1A	Max. Elevation	=	1119.04 ft
Reservoir name	=	BASIN 1 FOREBAY	Max. Storage	=	95,114 cuft

Storage Indication method used.

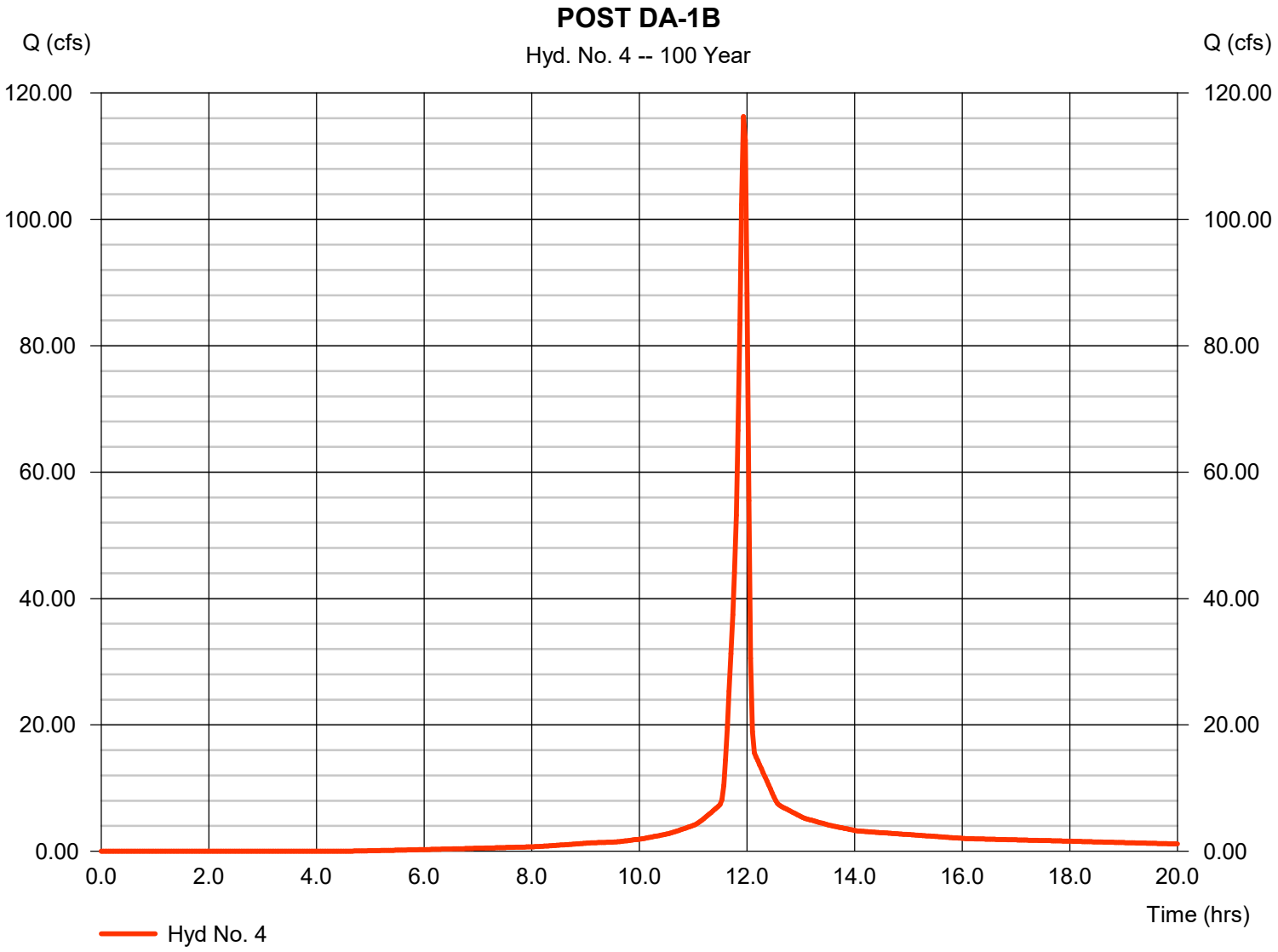


Hydrograph Report

Hyd. No. 4

POST DA-1B

Hydrograph type	=	SCS Runoff	Peak discharge	=	116.25 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	245,617 cuft
Drainage area	=	19.520 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.03 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

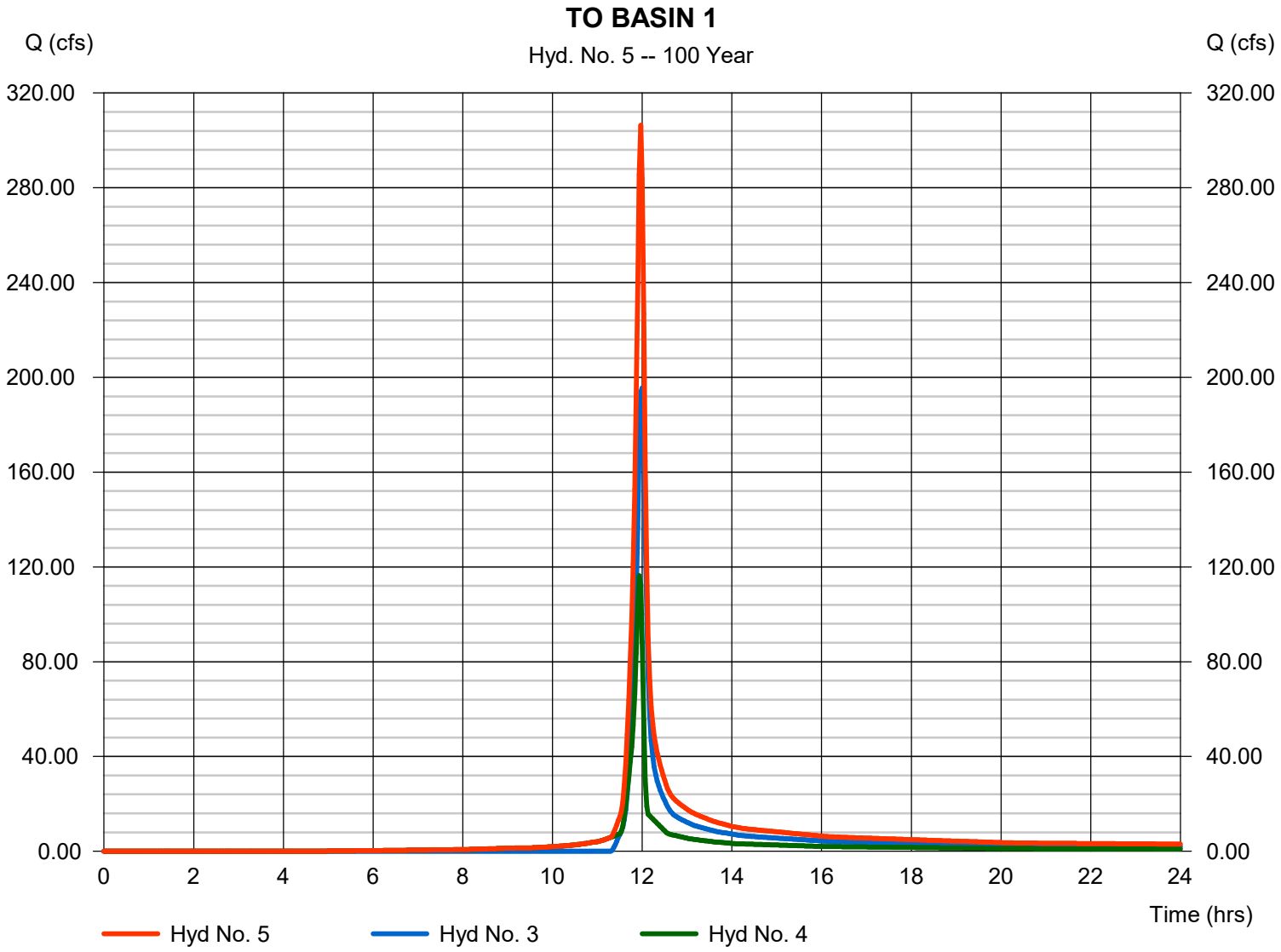


Hydrograph Report

Hyd. No. 5

TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 306.36 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 670,926 cuft
Inflow hyds.	= 3, 4	Contrib. drain. area	= 19.520 ac



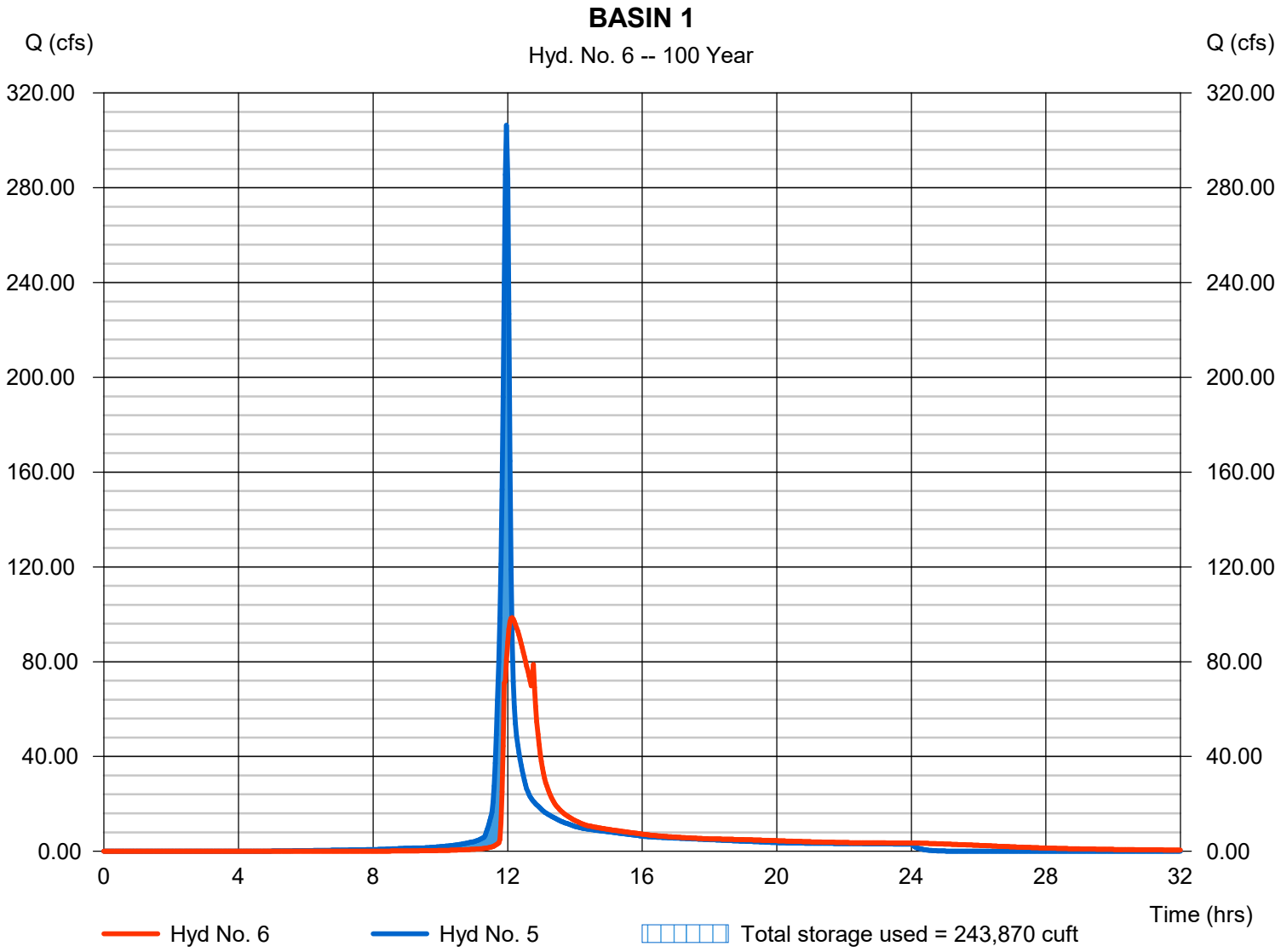
Hydrograph Report

Hyd. No. 6

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 98.54 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 670,157 cuft
Inflow hyd. No.	= 5 - TO BASIN 1	Max. Elevation	= 1118.01 ft
Reservoir name	= BASIN 1	Max. Storage	= 243,870 cuft

Storage Indication method used.

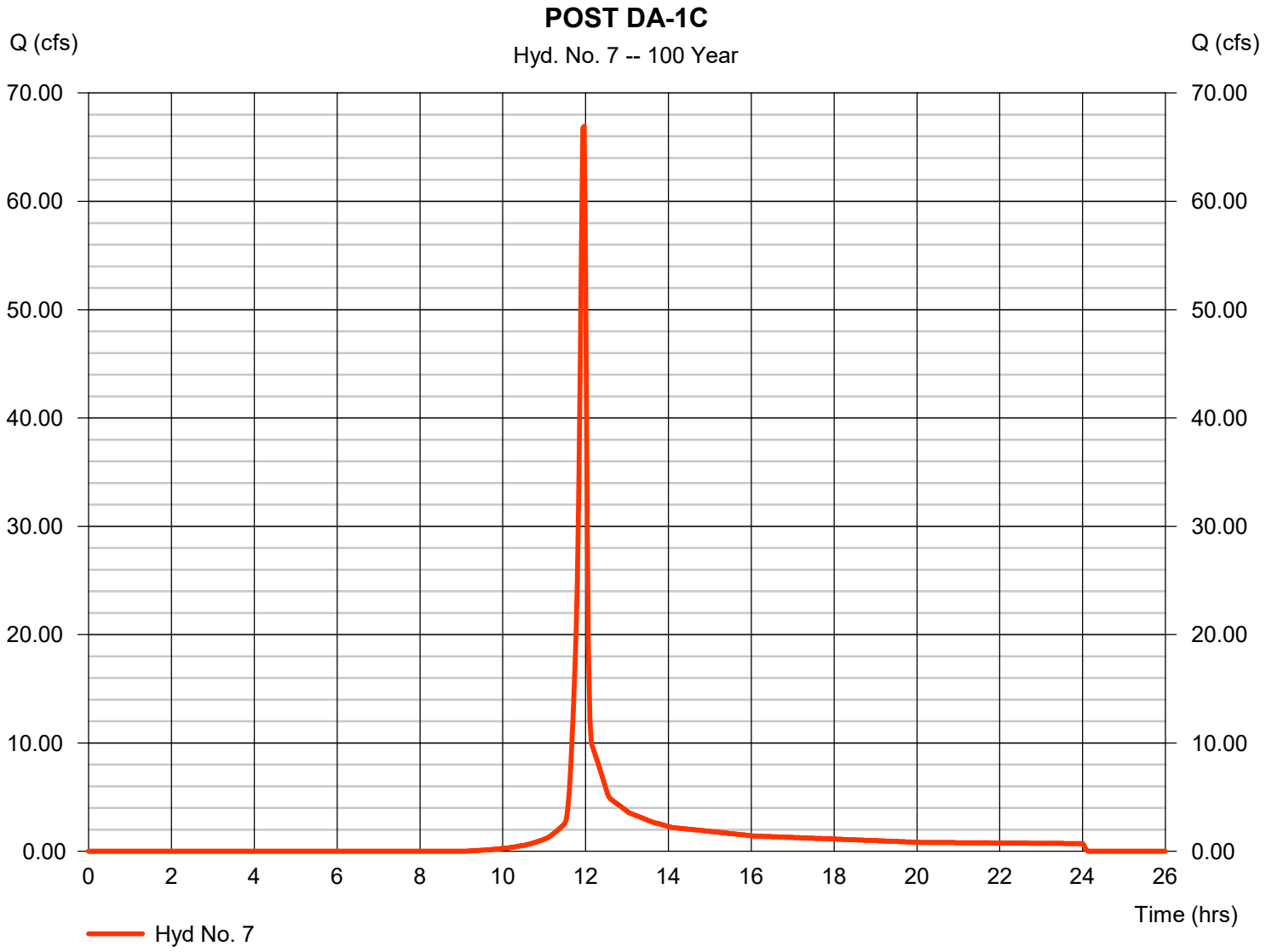


Hydrograph Report

Hyd. No. 7

POST DA-1C

Hydrograph type	=	SCS Runoff	Peak discharge	=	66.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	134,783 cuft
Drainage area	=	17.190 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.03 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

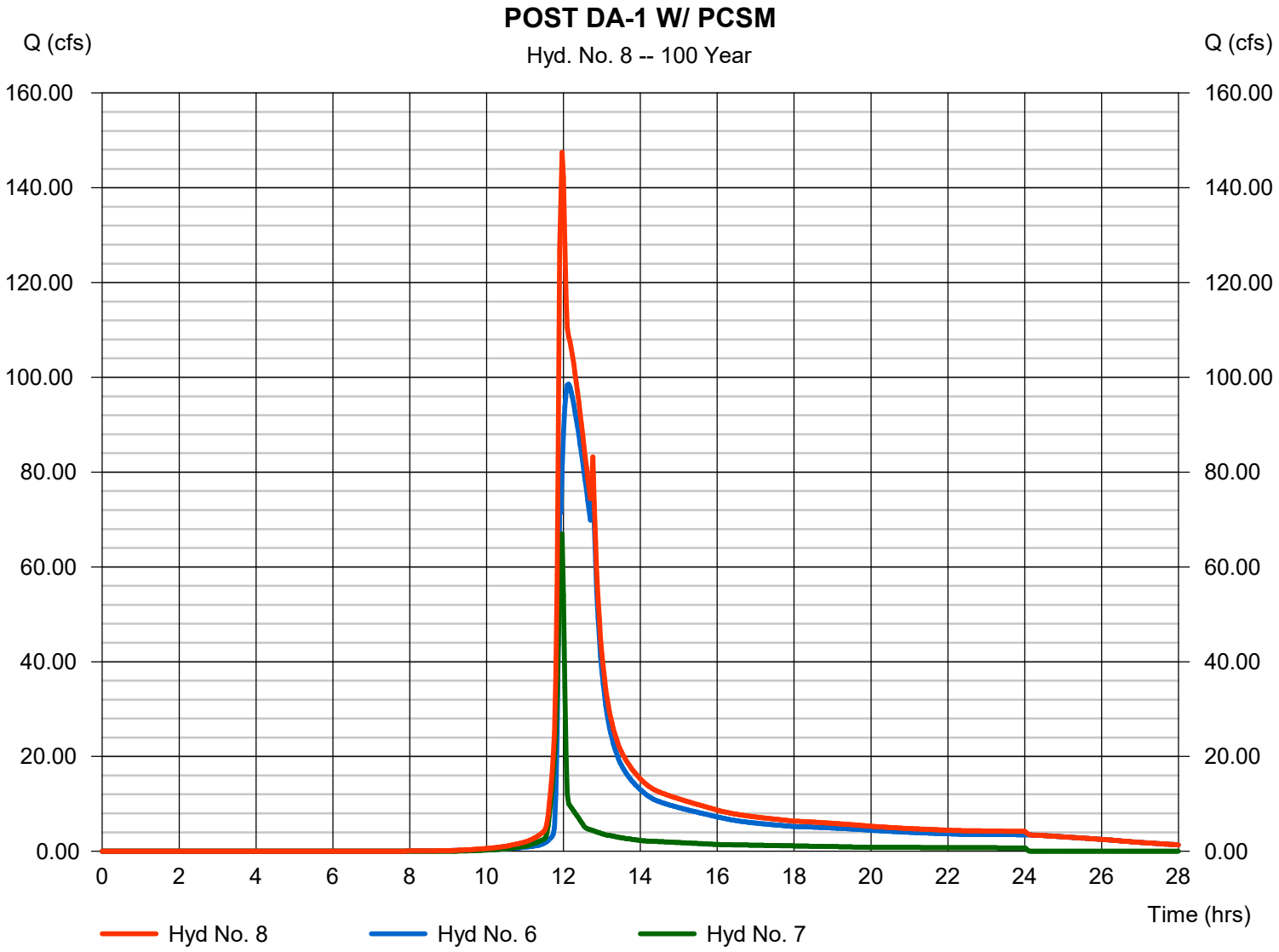


Hydrograph Report

Hyd. No. 8

POST DA-1 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 147.52 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 804,941 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 17.190 ac

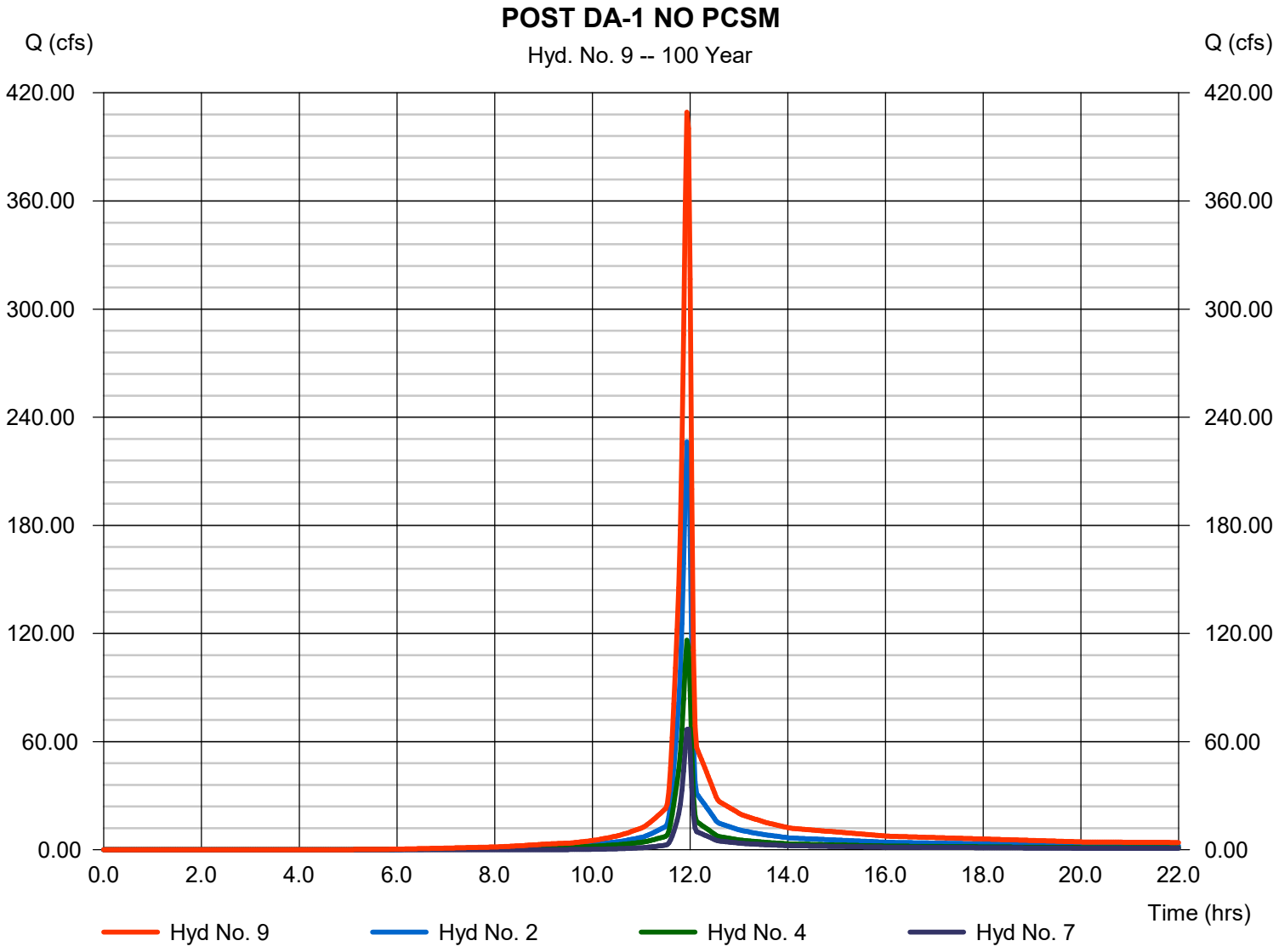


Hydrograph Report

Hyd. No. 9

POST DA-1 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 409.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 847,392 cuft
Inflow hyds.	= 2, 4, 7	Contrib. drain. area	= 78.320 ac

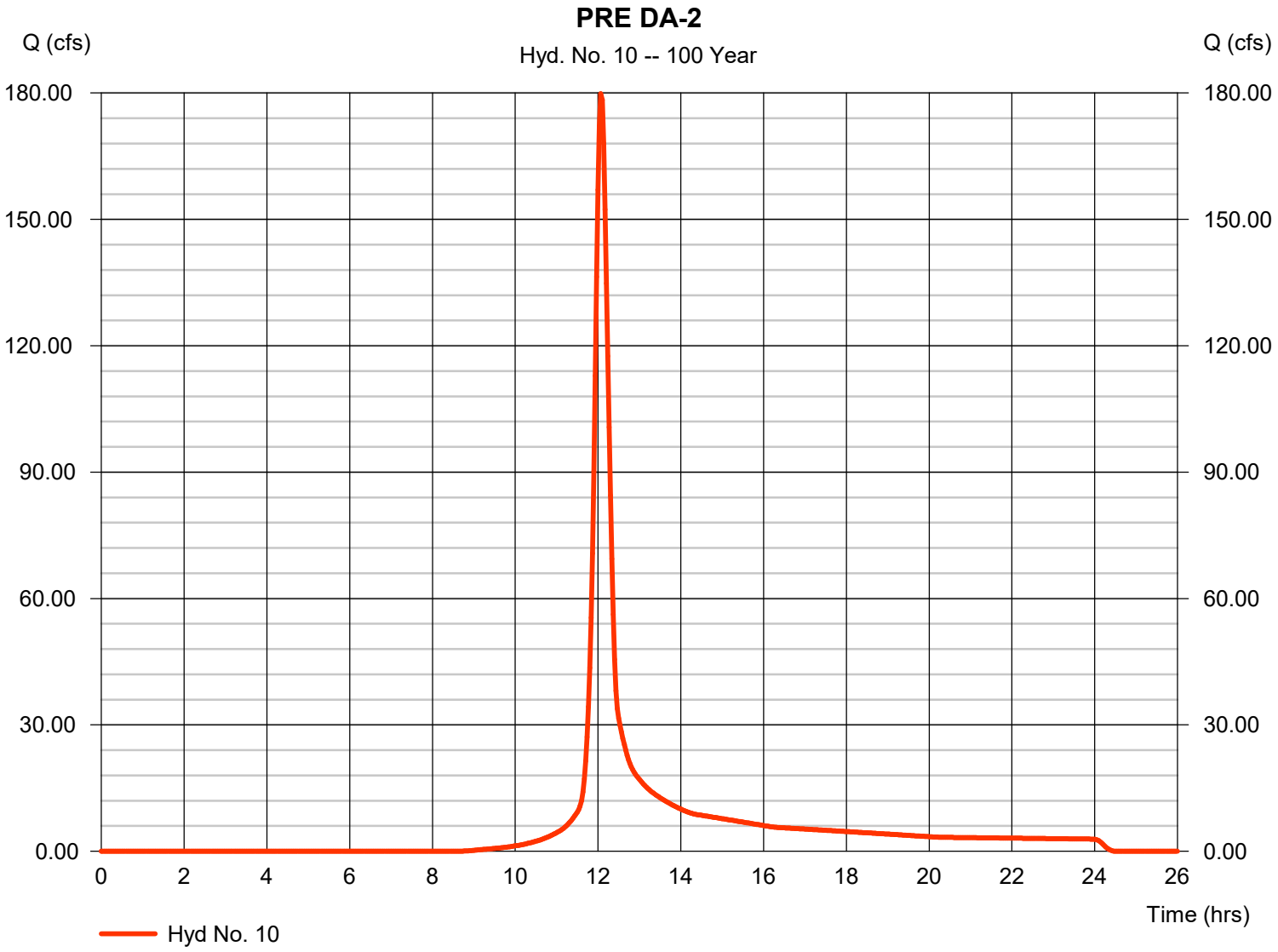


Hydrograph Report

Hyd. No. 10

PRE DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	179.87 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	564,616 cuft
Drainage area	=	62.880 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	18.00 min
Total precip.	=	5.03 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

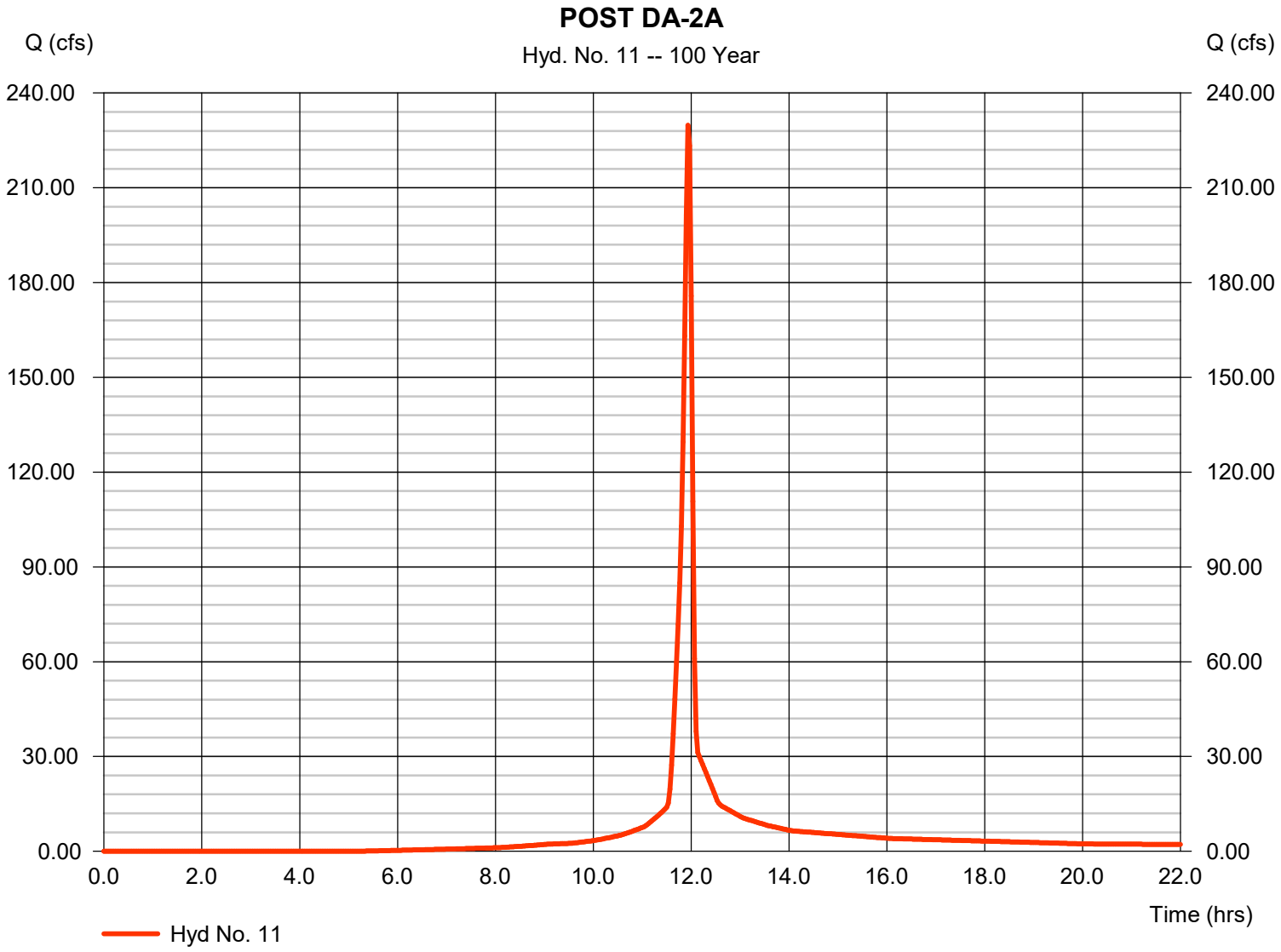


Hydrograph Report

Hyd. No. 11

POST DA-2A

Hydrograph type	=	SCS Runoff	Peak discharge	=	229.81 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	479,327 cuft
Drainage area	=	40.300 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.03 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



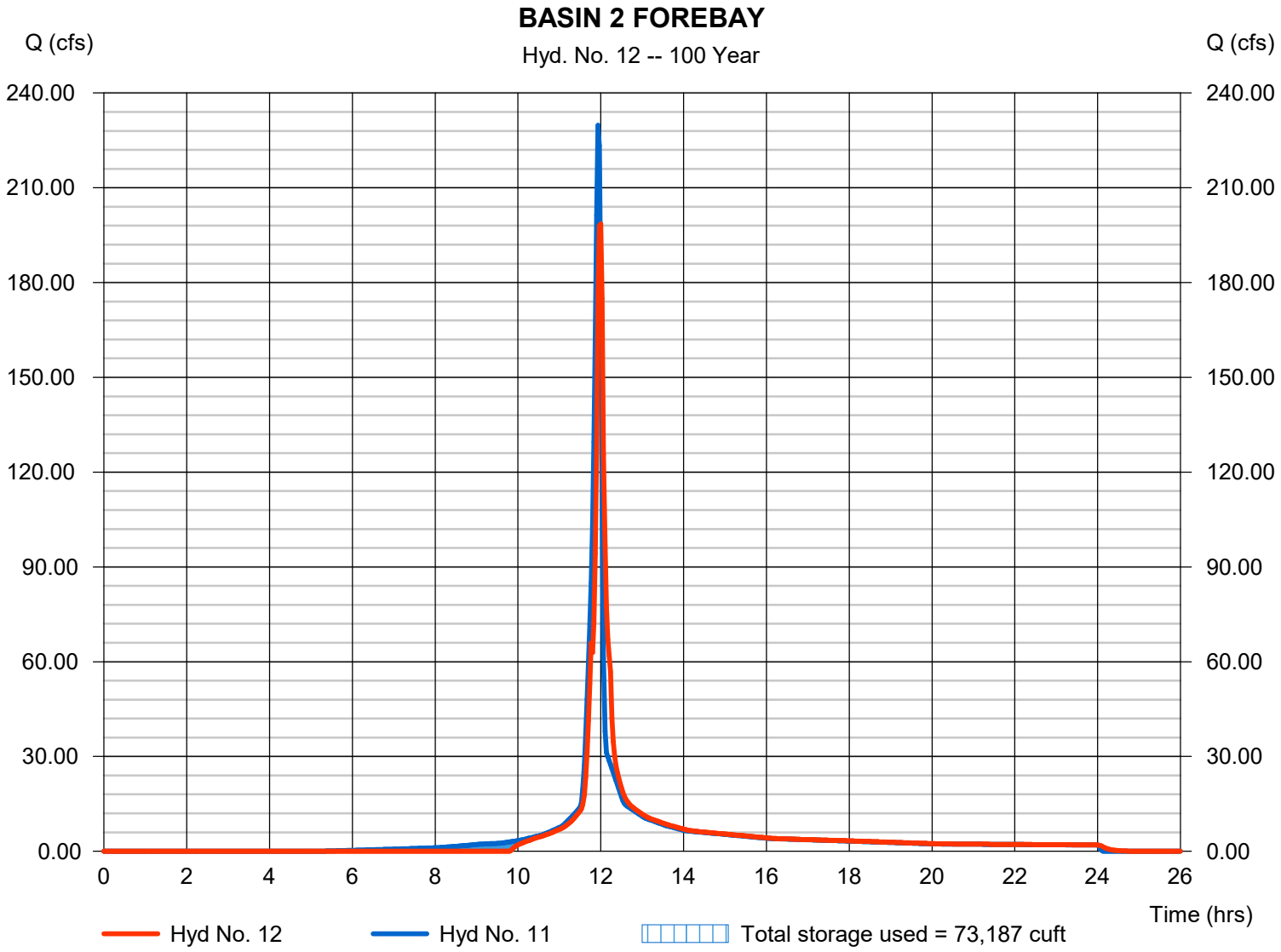
Hydrograph Report

Hyd. No. 12

BASIN 2 FOREBAY

Hydrograph type	=	Reservoir	Peak discharge	=	198.55 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	460,996 cuft
Inflow hyd. No.	=	11 - POST DA-2A	Max. Elevation	=	1124.09 ft
Reservoir name	=	BASIN 2 FOREBAY	Max. Storage	=	73,187 cuft

Storage Indication method used.

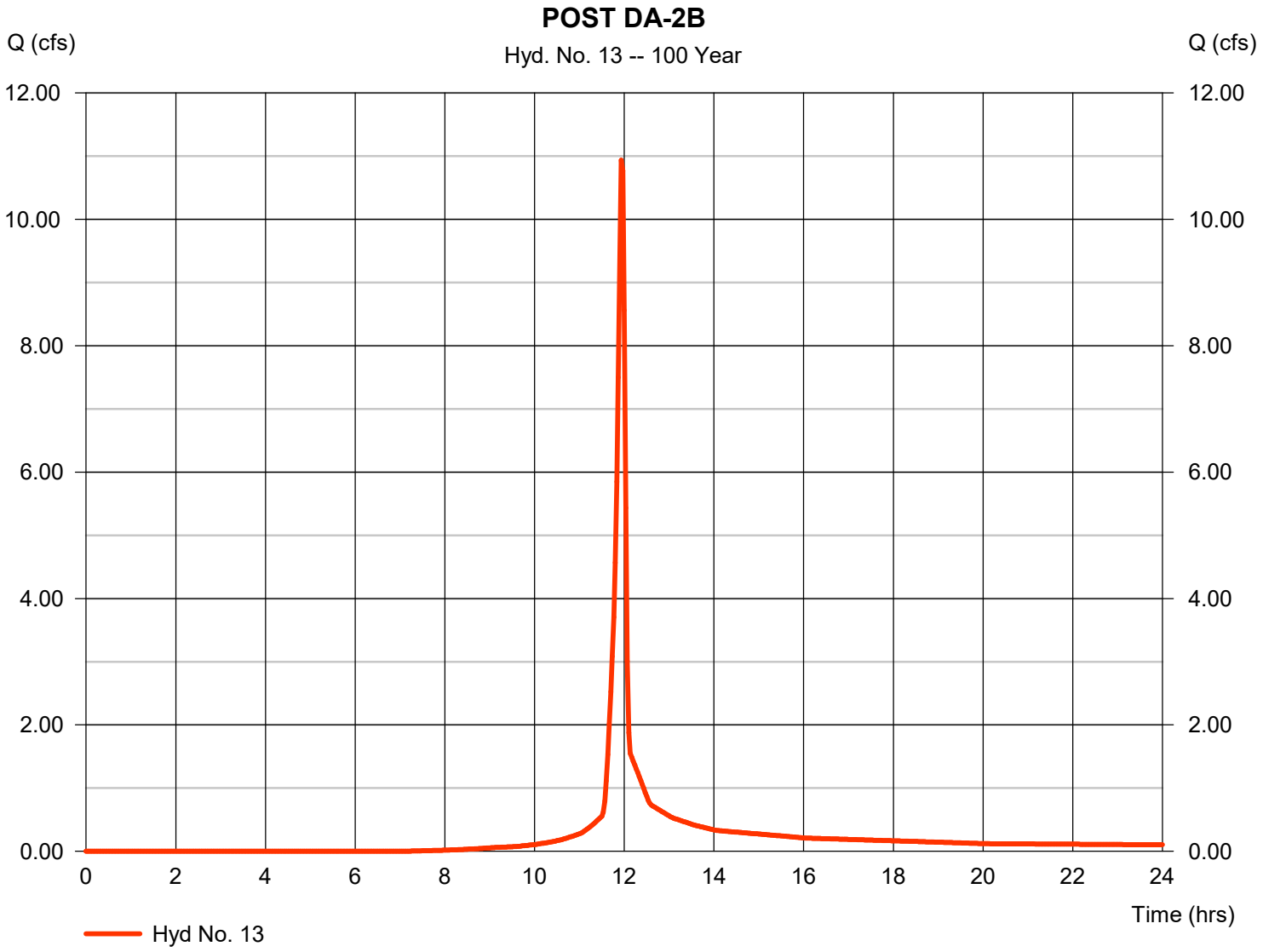


Hydrograph Report

Hyd. No. 13

POST DA-2B

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	22,252 cuft
Drainage area	=	2.240 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.03 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

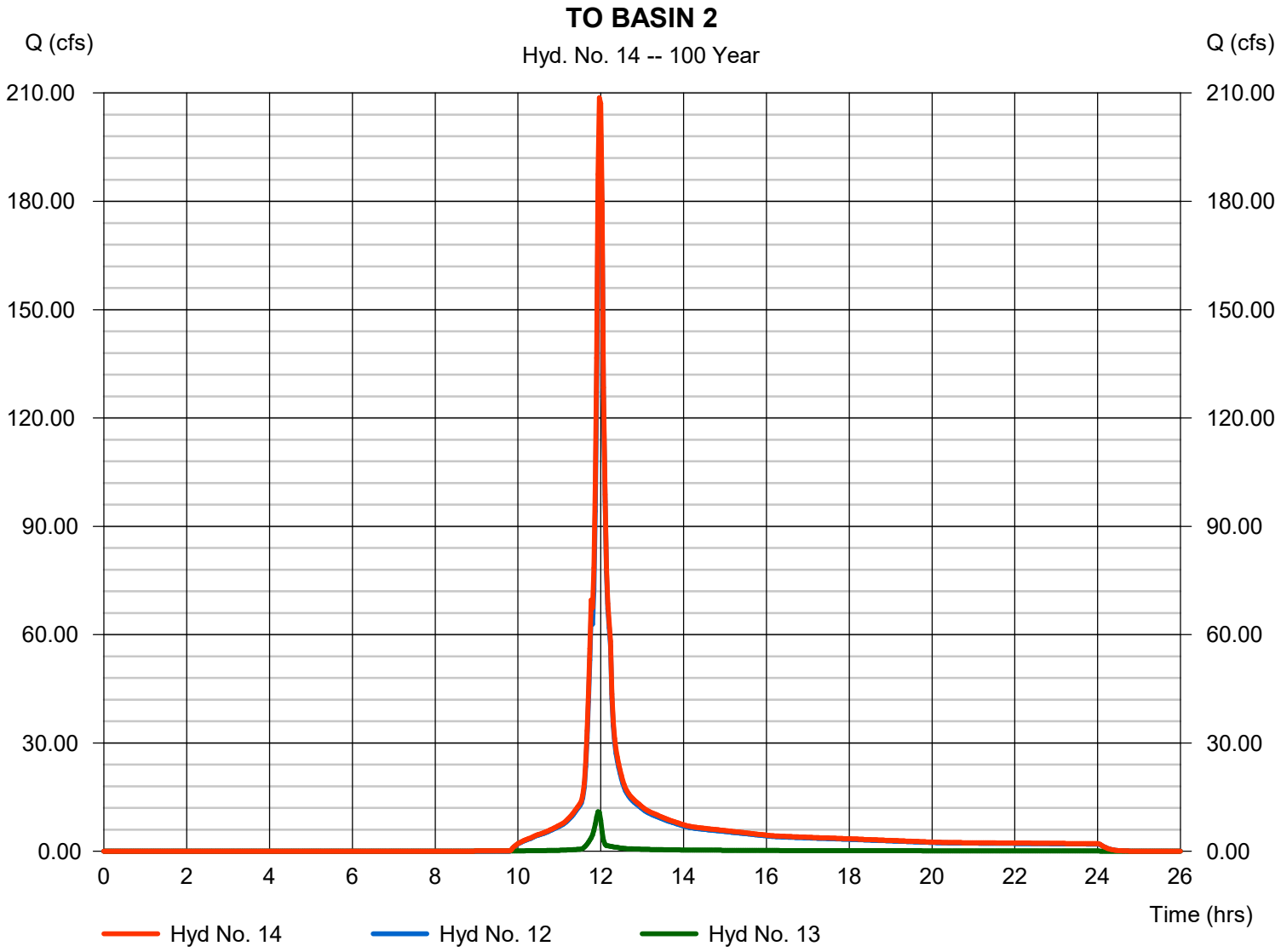


Hydrograph Report

Hyd. No. 14

TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 208.70 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 483,248 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 2.240 ac



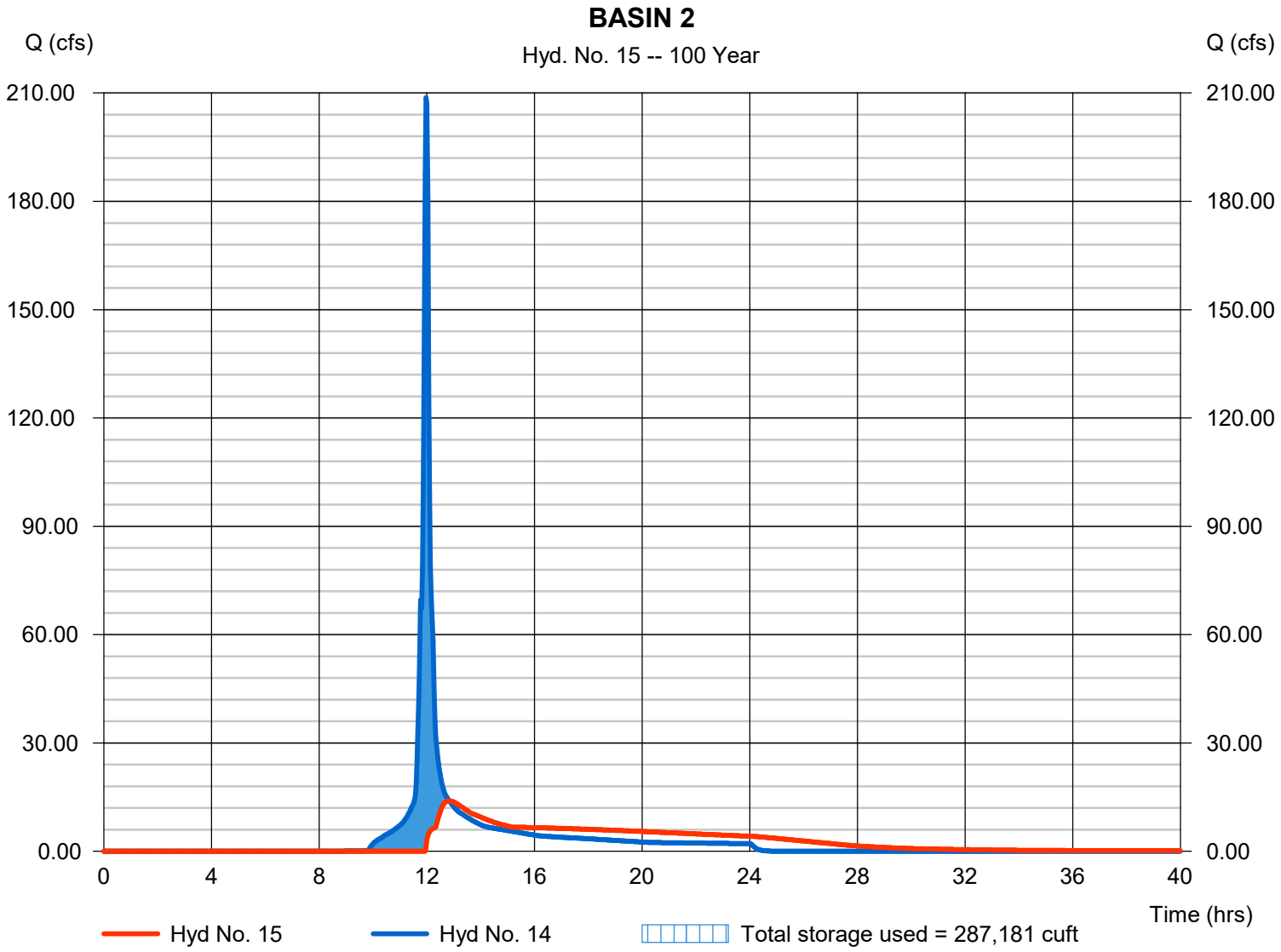
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	=	Reservoir	Peak discharge	=	13.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.83 hrs
Time interval	=	2 min	Hyd. volume	=	350,911 cuft
Inflow hyd. No.	=	14 - TO BASIN 2	Max. Elevation	=	1118.30 ft
Reservoir name	=	BASIN 2	Max. Storage	=	287,181 cuft

Storage Indication method used.

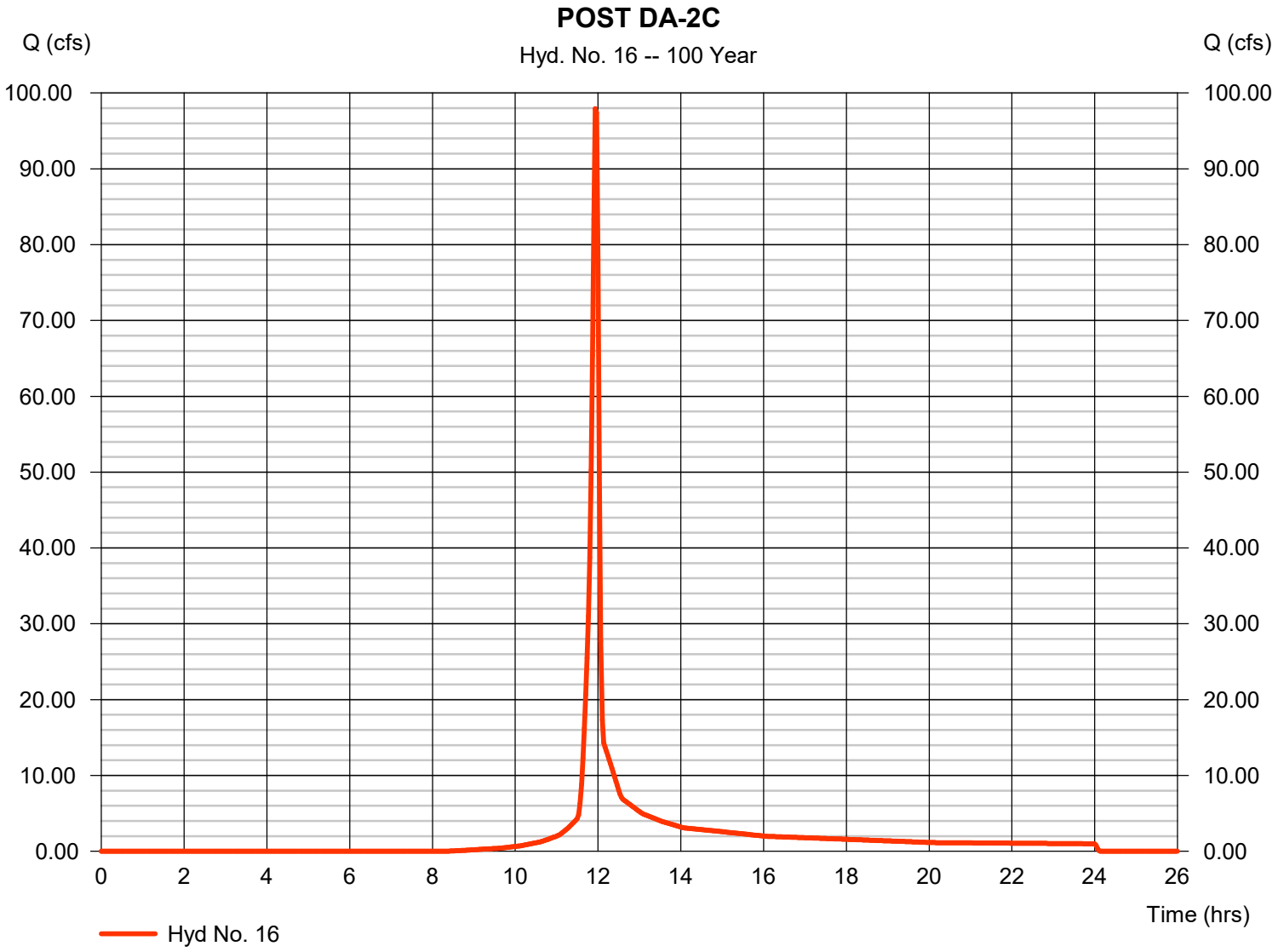


Hydrograph Report

Hyd. No. 16

POST DA-2C

Hydrograph type	= SCS Runoff	Peak discharge	= 97.93 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 197,869 cuft
Drainage area	= 22.710 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.03 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

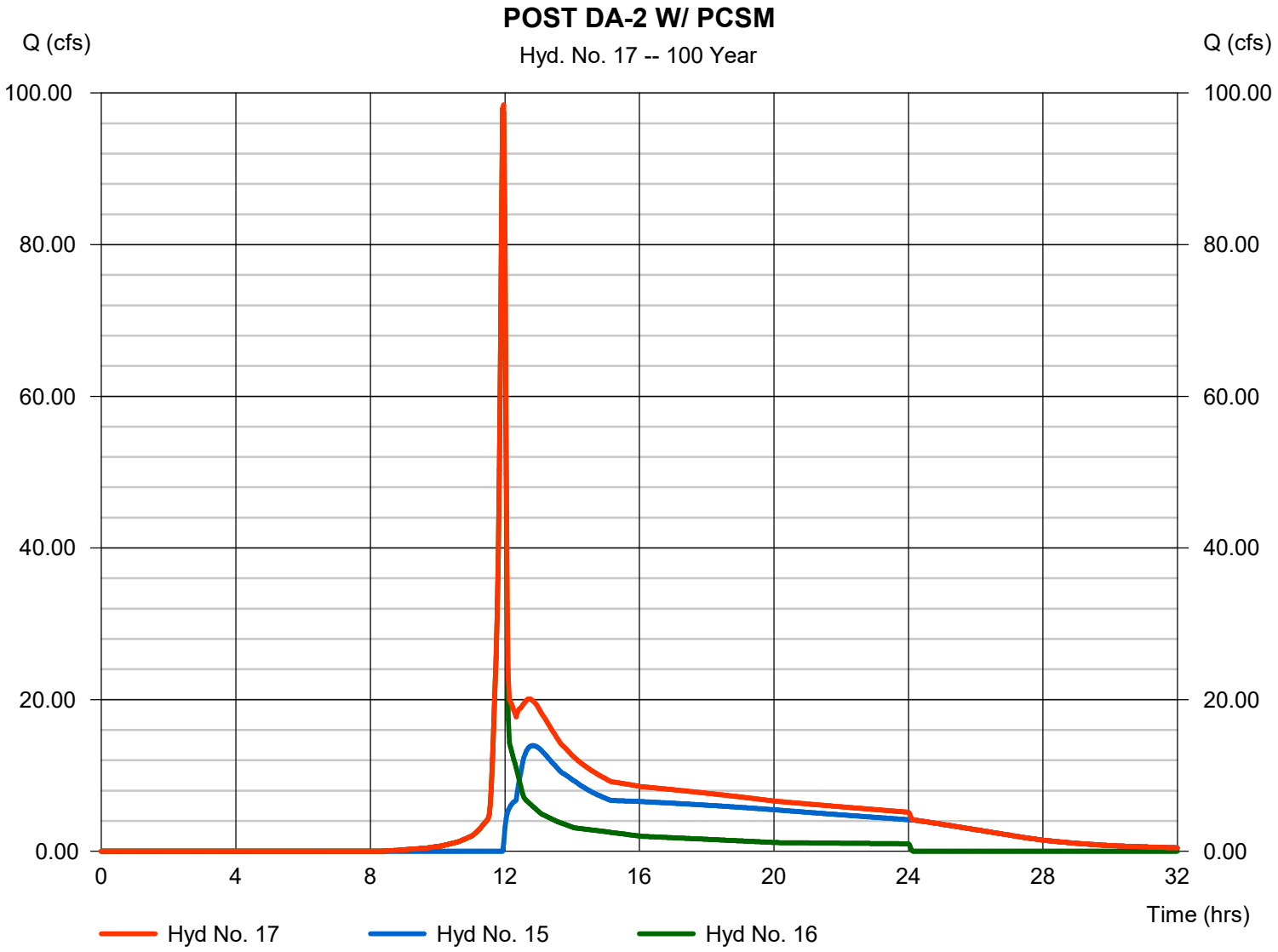


Hydrograph Report

Hyd. No. 17

POST DA-2 W/ PCSM

Hydrograph type	=	Combine	Peak discharge	=	98.42 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	548,776 cuft
Inflow hyds.	=	15, 16	Contrib. drain. area	=	22.710 ac

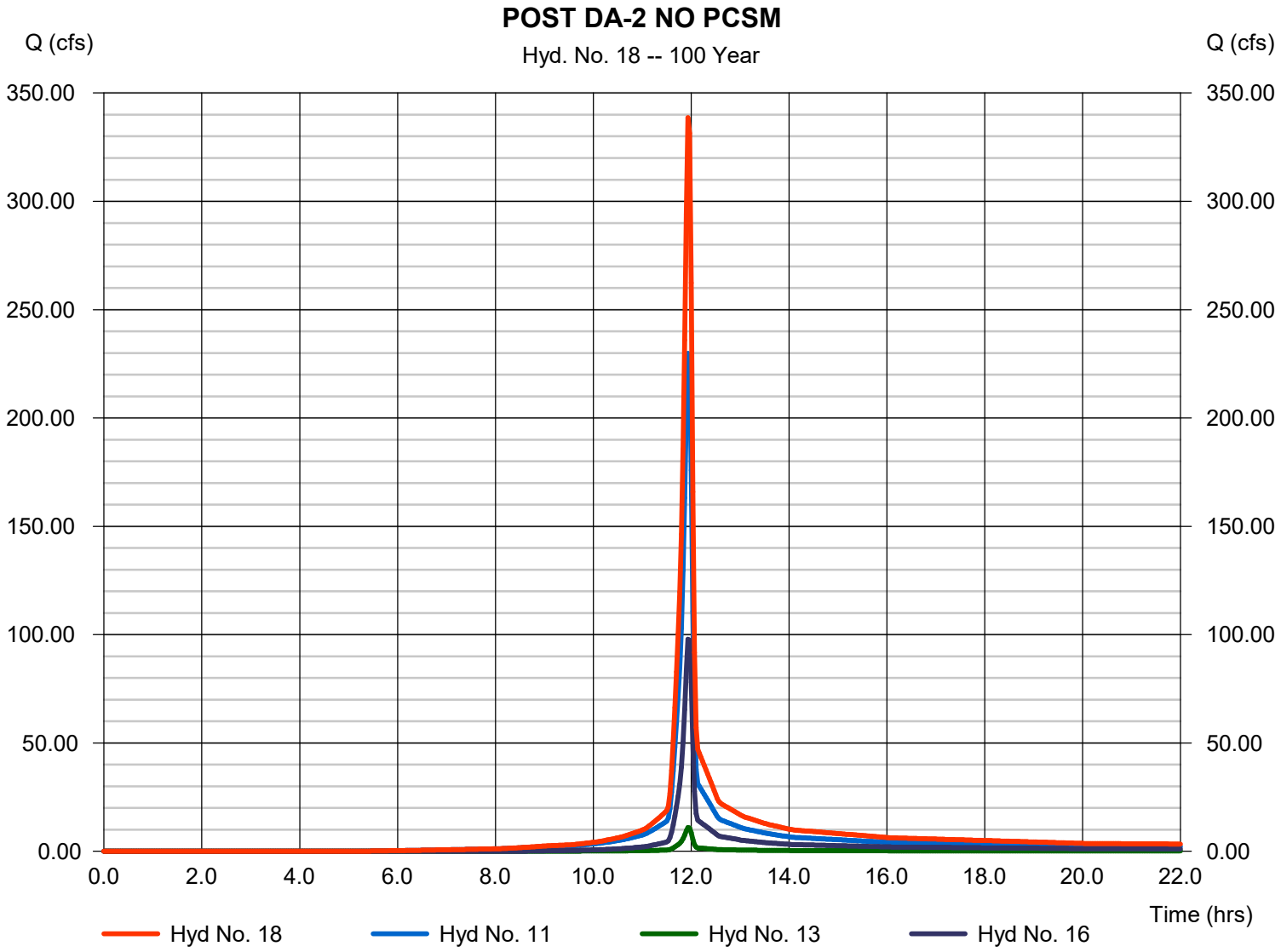


Hydrograph Report

Hyd. No. 18

POST DA-2 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 338.67 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 699,448 cuft
Inflow hyds.	= 11, 13, 16	Contrib. drain. area	= 65.250 ac

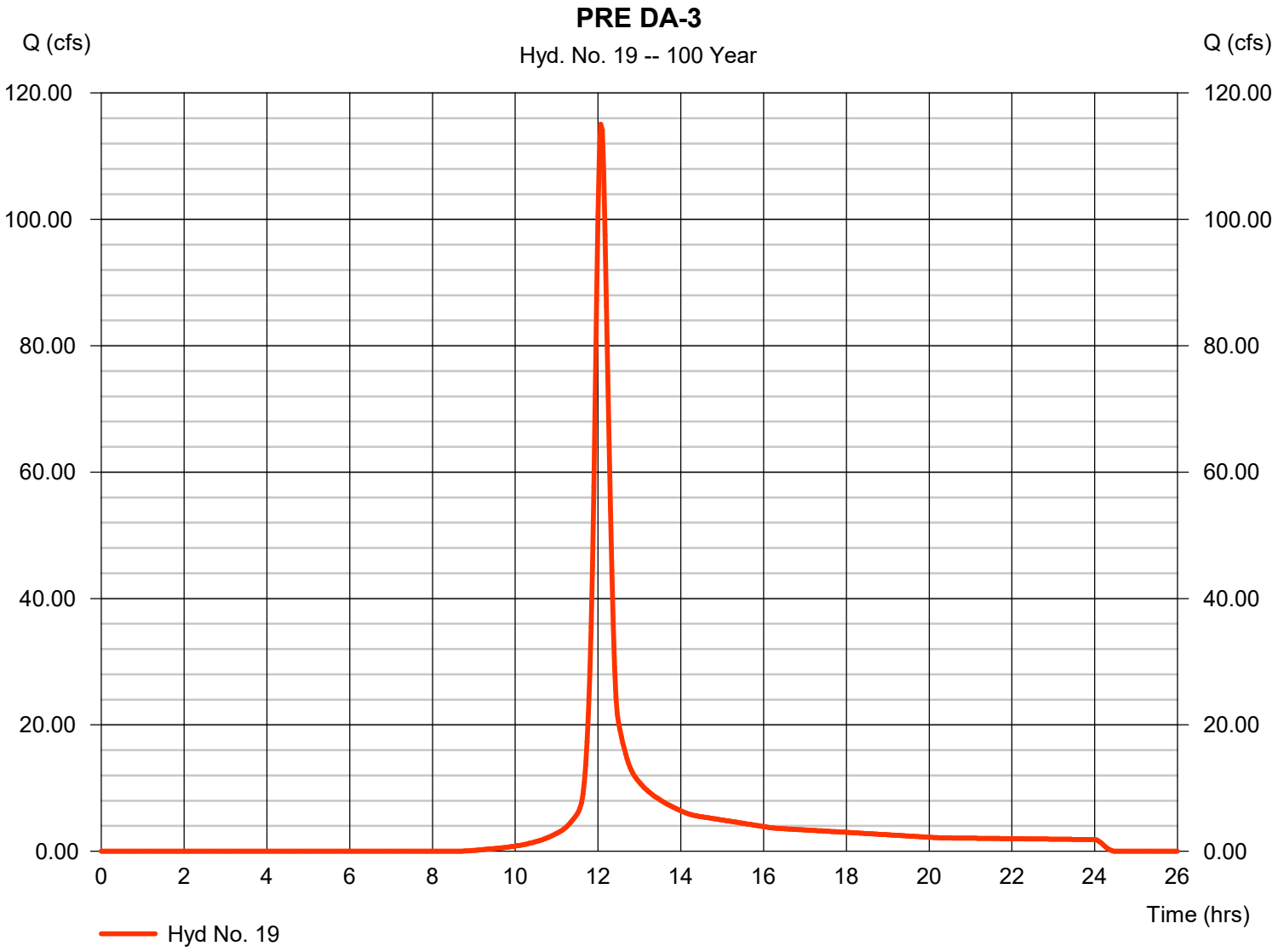


Hydrograph Report

Hyd. No. 19

PRE DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	115.08 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	361,236 cuft
Drainage area	=	40.230 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.20 min
Total precip.	=	5.03 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

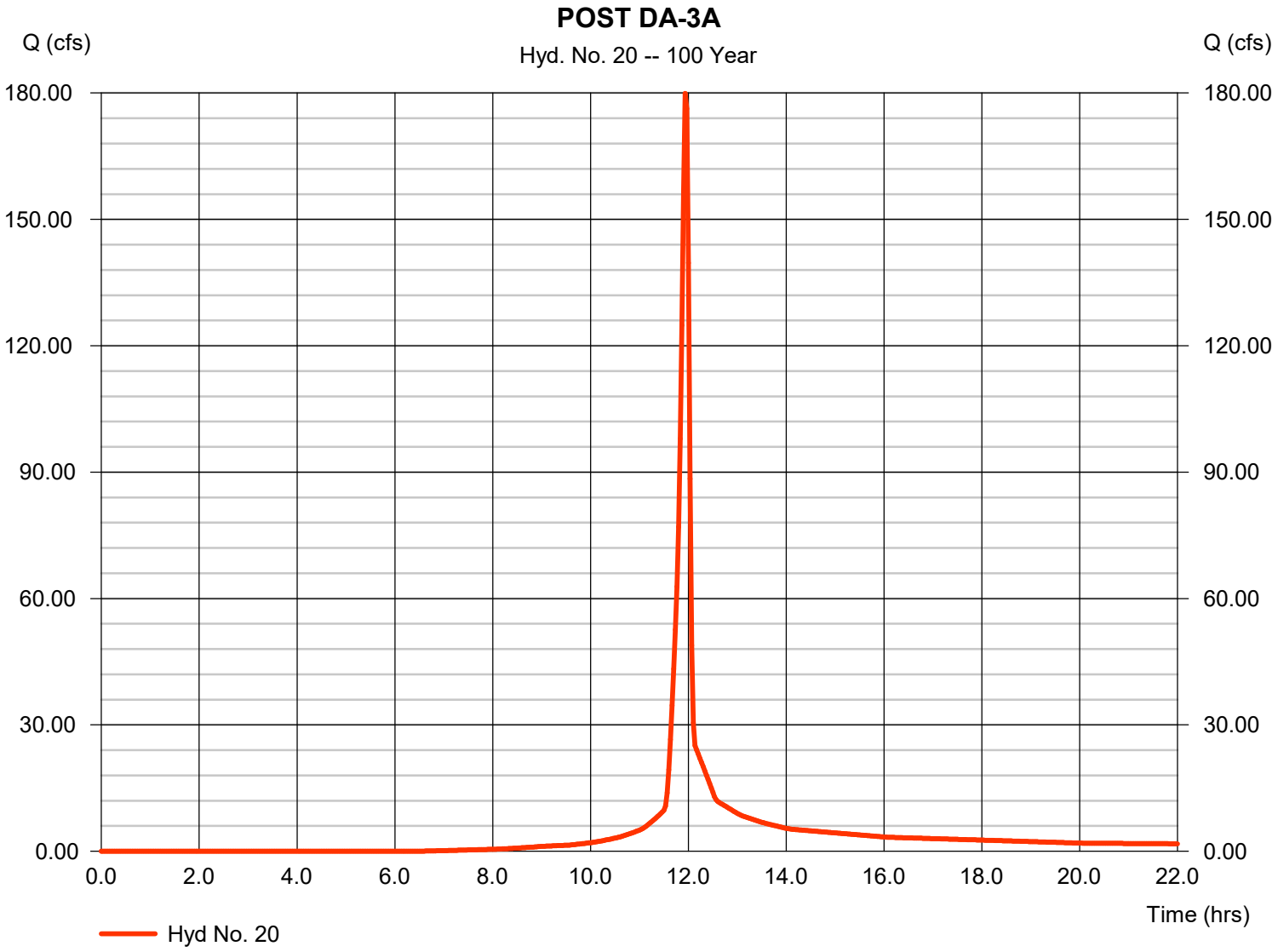


Hydrograph Report

Hyd. No. 20

POST DA-3A

Hydrograph type	= SCS Runoff	Peak discharge	= 179.87 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 368,253 cuft
Drainage area	= 34.840 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.03 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



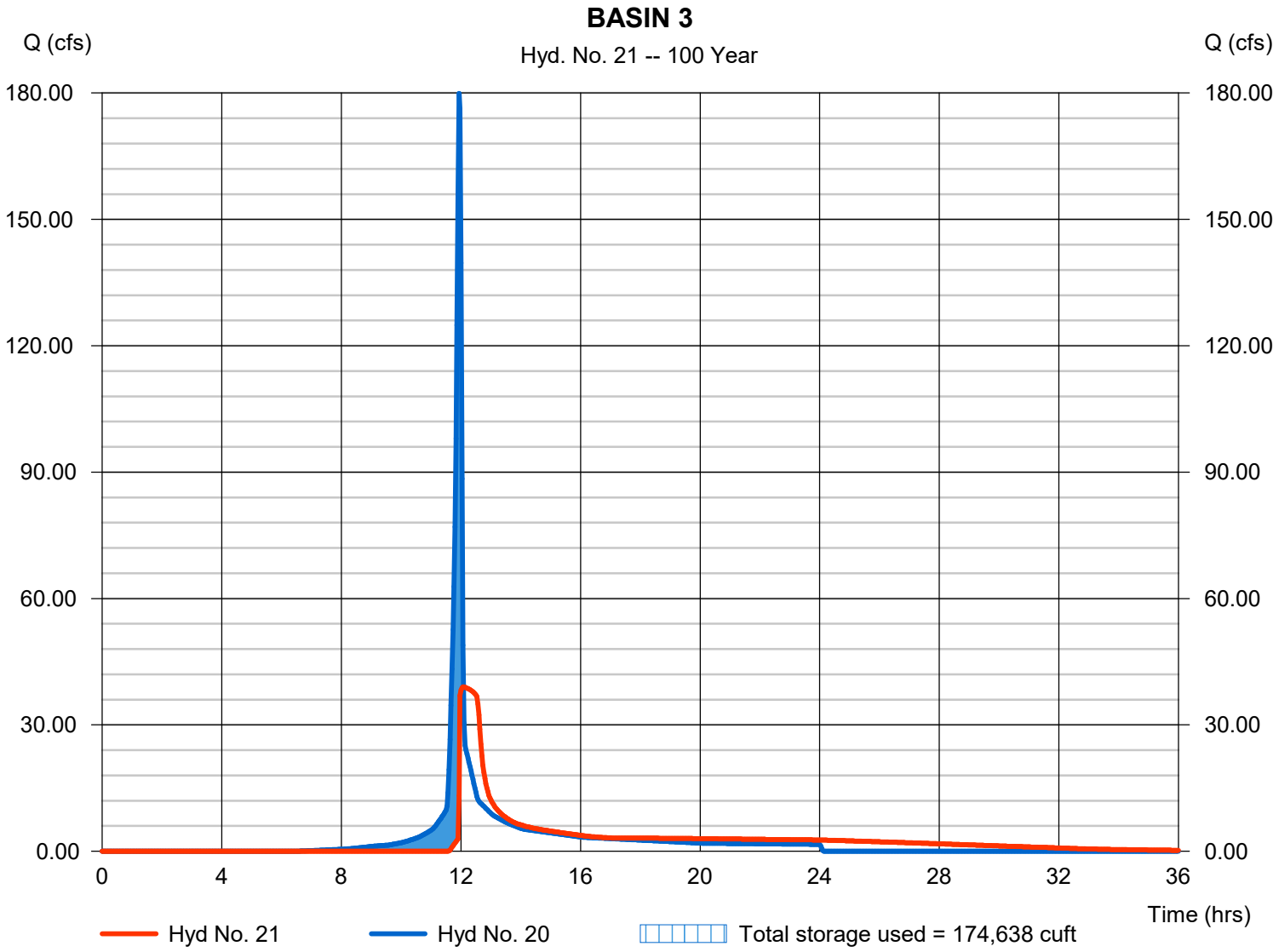
Hydrograph Report

Hyd. No. 21

BASIN 3

Hydrograph type	=	Reservoir	Peak discharge	=	39.01 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	332,659 cuft
Inflow hyd. No.	=	20 - POST DA-3A	Max. Elevation	=	1111.96 ft
Reservoir name	=	BASIN 3	Max. Storage	=	174,638 cuft

Storage Indication method used.

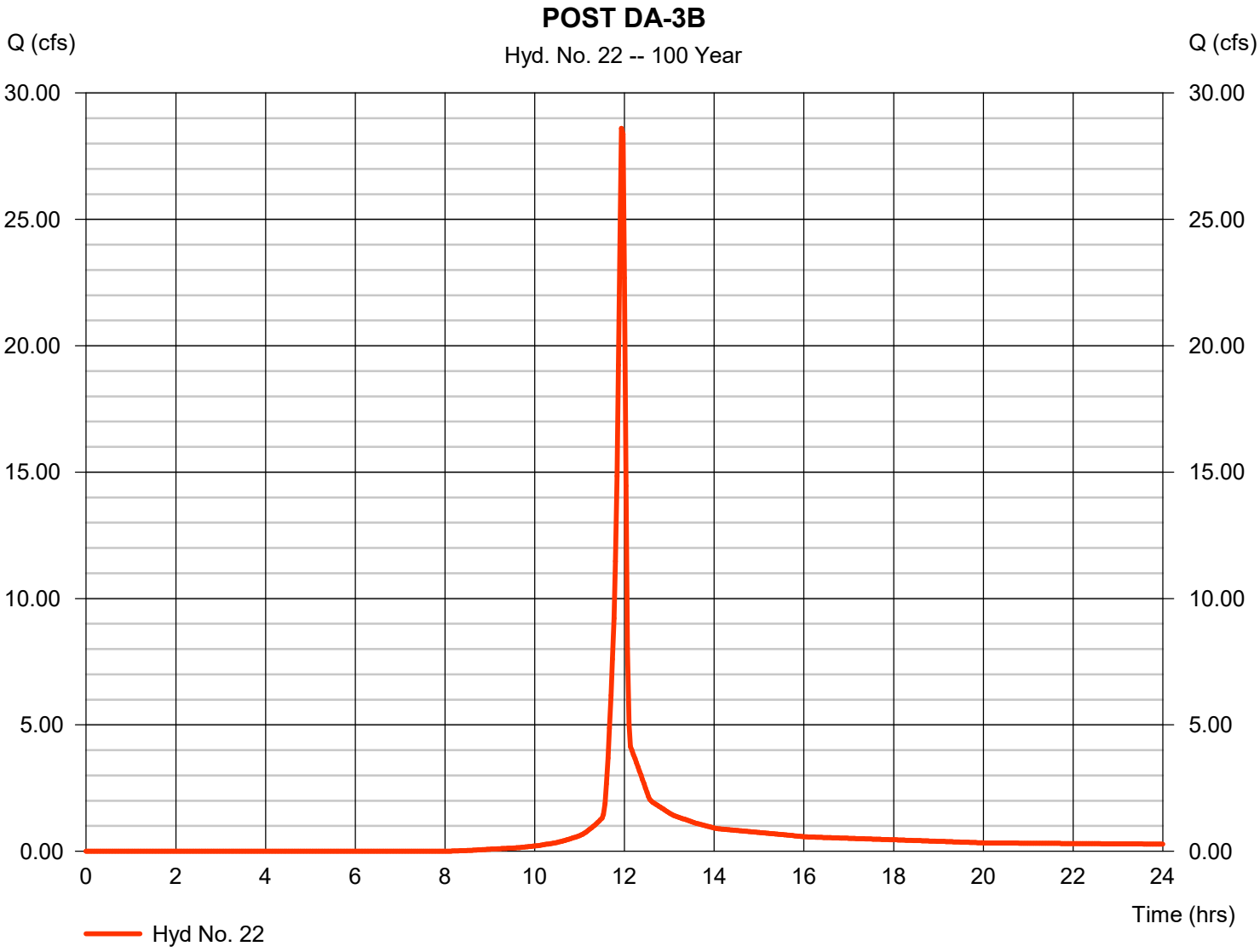


Hydrograph Report

Hyd. No. 22

POST DA-3B

Hydrograph type	= SCS Runoff	Peak discharge	= 28.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 57,856 cuft
Drainage area	= 6.420 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.03 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

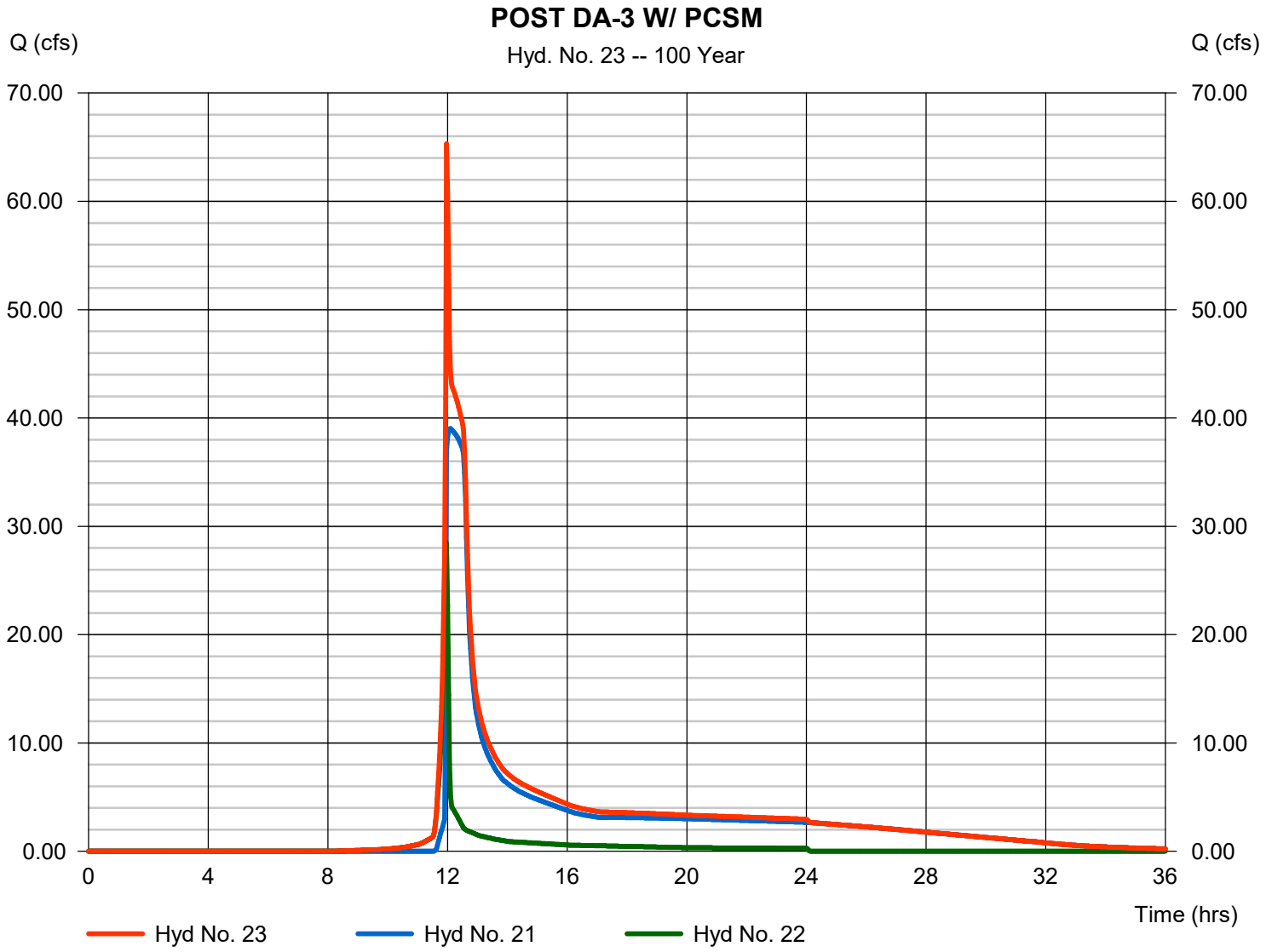


Hydrograph Report

Hyd. No. 23

POST DA-3 W/ PCSM

Hydrograph type	= Combine	Peak discharge	= 65.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 390,515 cuft
Inflow hyds.	= 21, 22	Contrib. drain. area	= 6.420 ac

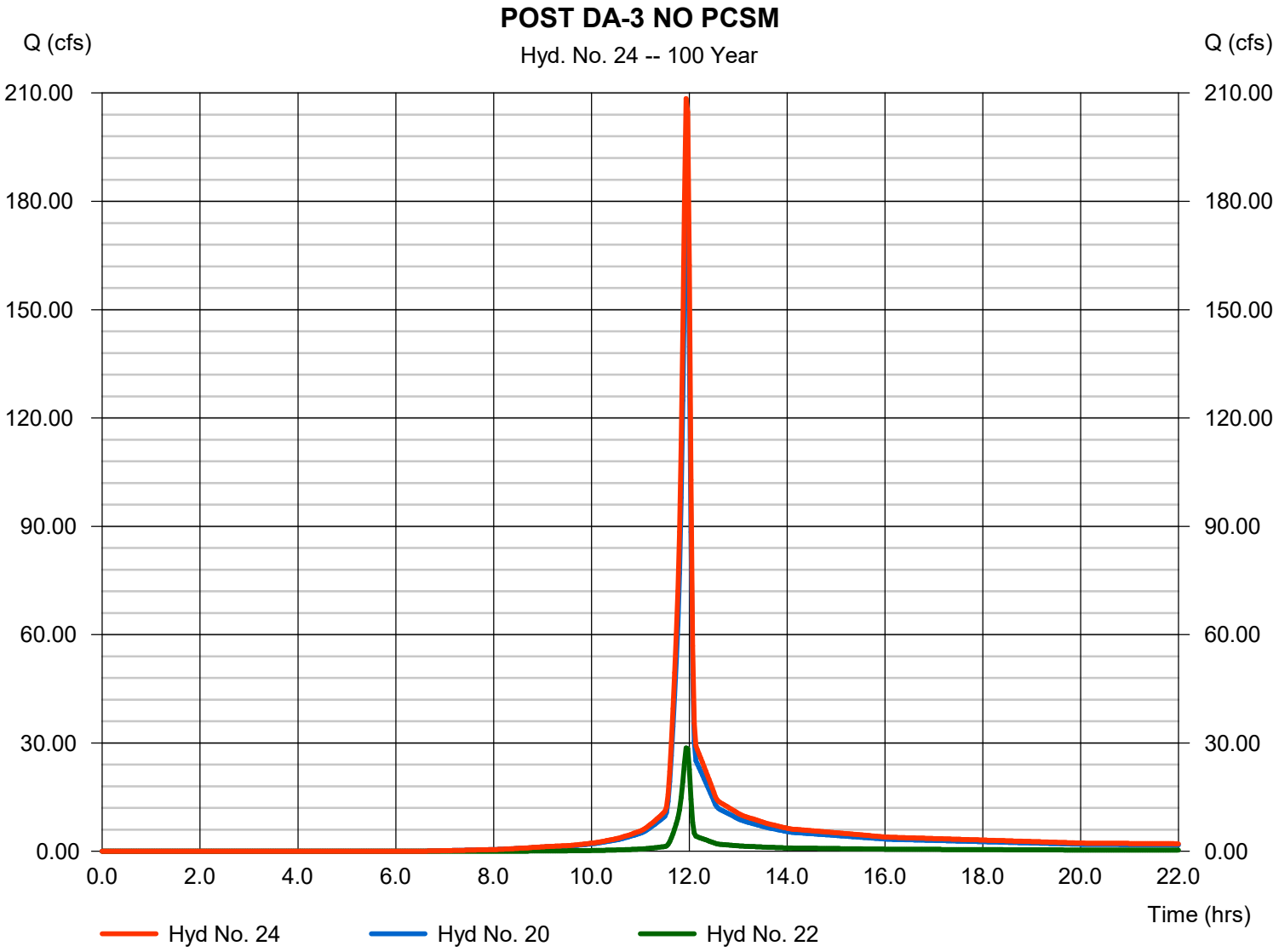


Hydrograph Report

Hyd. No. 24

POST DA-3 NO PCSM

Hydrograph type	= Combine	Peak discharge	= 208.47 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 426,109 cuft
Inflow hyds.	= 20, 22	Contrib. drain. area	= 41.260 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	39.4818	9.7000	0.8725	--------
2	51.9984	10.6000	0.8893	--------
3	0.0000	0.0000	0.0000	--------
5	49.1179	9.4000	0.8228	--------
10	47.0158	8.4000	0.7802	--------
25	46.9359	7.7000	0.7416	--------
50	43.1385	6.5000	0.6974	--------
100	39.8713	5.5000	0.6556	--------

File name: 3771 - Franz - IDF.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	3.78	2.93	2.41	2.05	1.79	1.59	1.43	1.31	1.20	1.11	1.04	0.97
2	4.52	3.53	2.91	2.48	2.17	1.93	1.74	1.59	1.46	1.35	1.26	1.18
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	5.47	4.28	3.55	3.04	2.67	2.39	2.17	1.98	1.83	1.70	1.60	1.50
10	6.21	4.85	4.02	3.45	3.04	2.73	2.48	2.28	2.11	1.97	1.85	1.74
25	7.13	5.57	4.63	4.00	3.53	3.18	2.90	2.67	2.48	2.32	2.18	2.06
50	7.85	6.11	5.08	4.39	3.89	3.51	3.21	2.96	2.76	2.59	2.44	2.31
100	8.53	6.61	5.50	4.77	4.24	3.84	3.52	3.26	3.05	2.86	2.71	2.57

Tc = time in minutes. Values may exceed 60.

09\3789 - Frydrych Apartment Project\Calcs\Civil\PCSM\Site Revision - 09-01-2020\Jackson Township Precipitation.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	2.02	2.41	0.00	0.00	3.38	4.00	4.50	5.03
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00

Weir Report

BASIN 1 EMERGENCY SPILLWAY - 100 YR STORM

Rectangular Weir

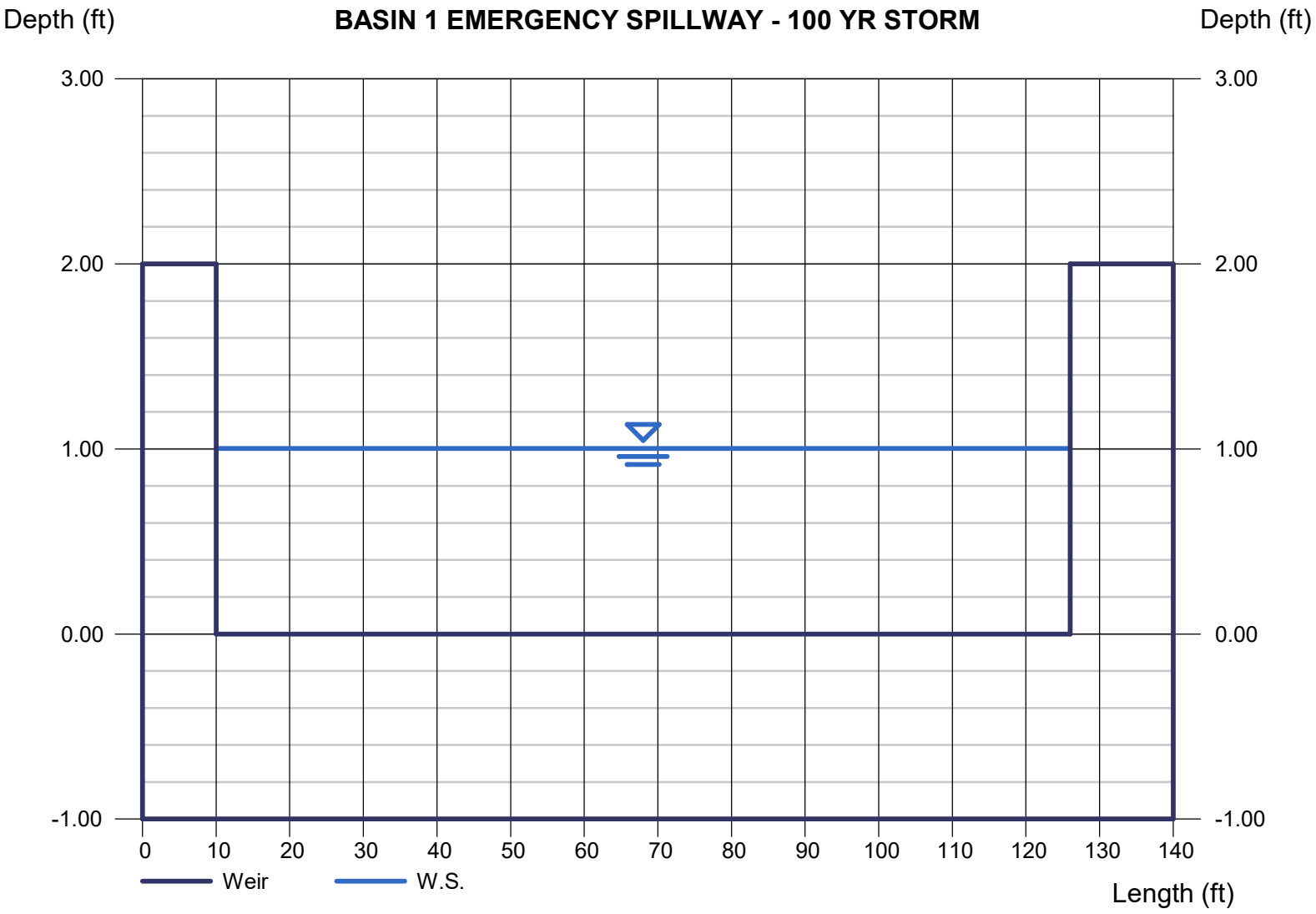
Crest	= Broad
Bottom Length (ft)	= 116.00
Total Depth (ft)	= 2.00

Calculations

Weir Coeff. Cw	= 2.60
Compute by:	Known Q
Known Q (cfs)	= 303.03

Highlighted

Depth (ft)	= 1.00
Q (cfs)	= 303.03
Area (sqft)	= 116.37
Velocity (ft/s)	= 2.60
Top Width (ft)	= 116.00



Hydrograph Report

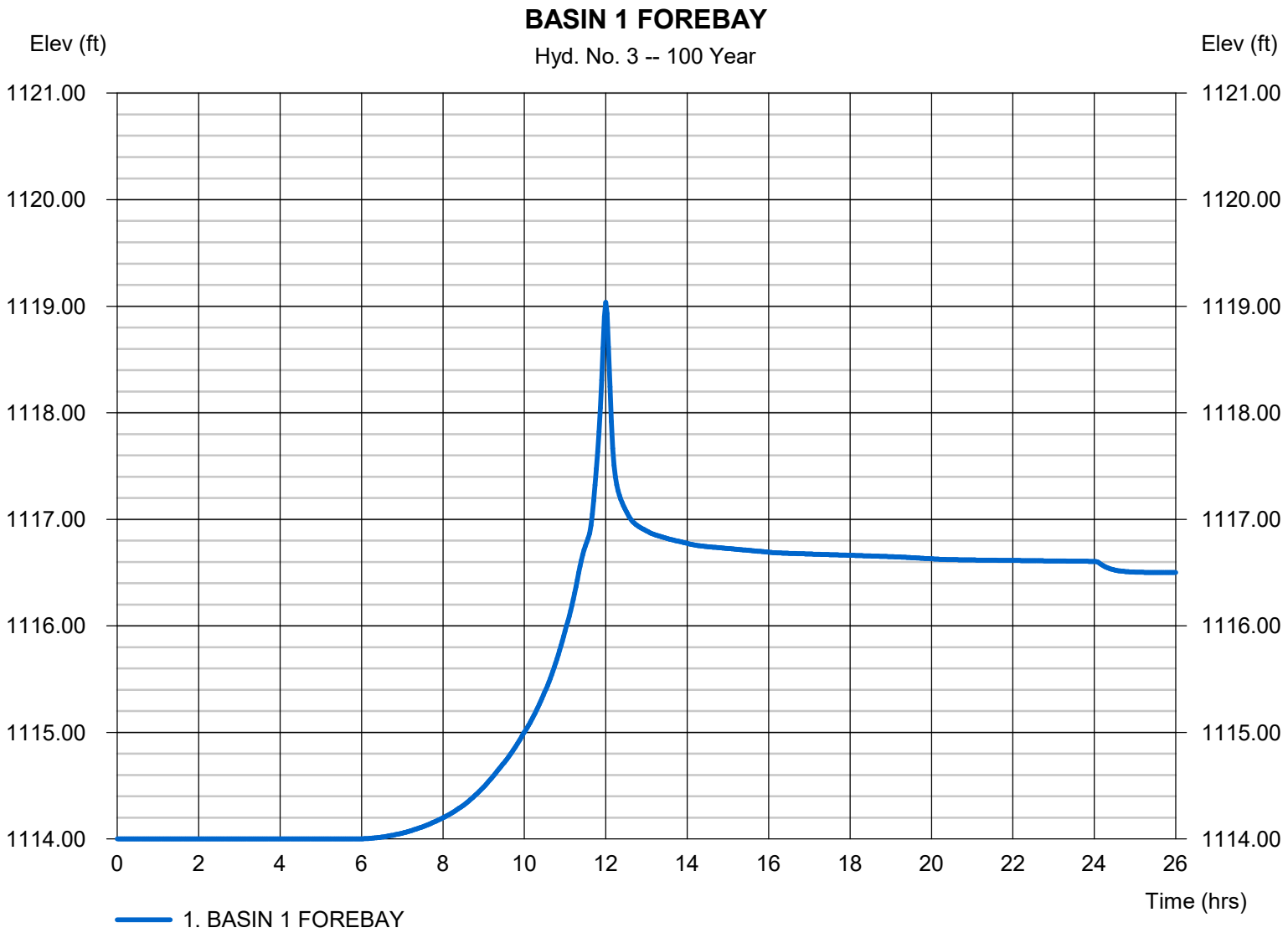
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Friday, 07 / 30 / 2021

Hyd. No. 3

BASIN 1 FOREBAY

Hydrograph type	= Reservoir	Peak discharge	= 195.54 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 425,309 cuft
Inflow hyd. No.	= 2 - POST DA-1A	Max. Elevation	= 1119.04 ft
Reservoir name	= BASIN 1 FOREBAY	Max. Storage	= 95,114 cuft

Storage Indication method used.



Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Jul 30 2021

BASIN 2 FOREBAY EMERGENCY SPILLWAY - 100 YR STORM

Trapezoidal Weir

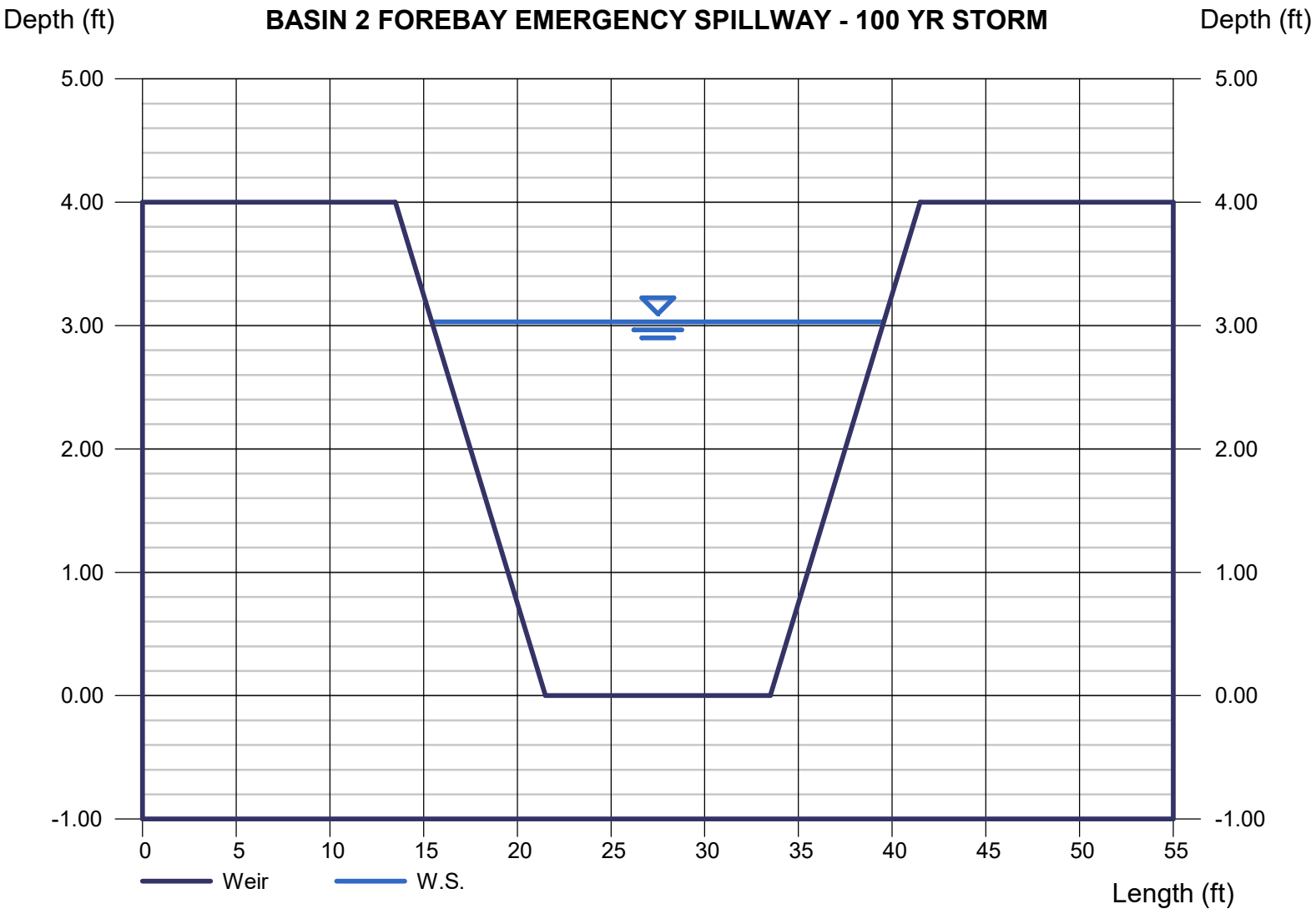
Crest	= Sharp
Bottom Length (ft)	= 12.00
Total Depth (ft)	= 4.00
Side Slope (z:1)	= 2.00

Calculations

Weir Coeff. Cw	= 2.60
Compute by:	Known Q
Known Q (cfs)	= 229.81

Highlighted

Depth (ft)	= 3.03
Q (cfs)	= 229.81
Area (sqft)	= 54.72
Velocity (ft/s)	= 4.20
Top Width (ft)	= 24.12



Weir Report

BASIN 2 EMERGENCY SPILLWAY - 100 YR STORM

Rectangular Weir

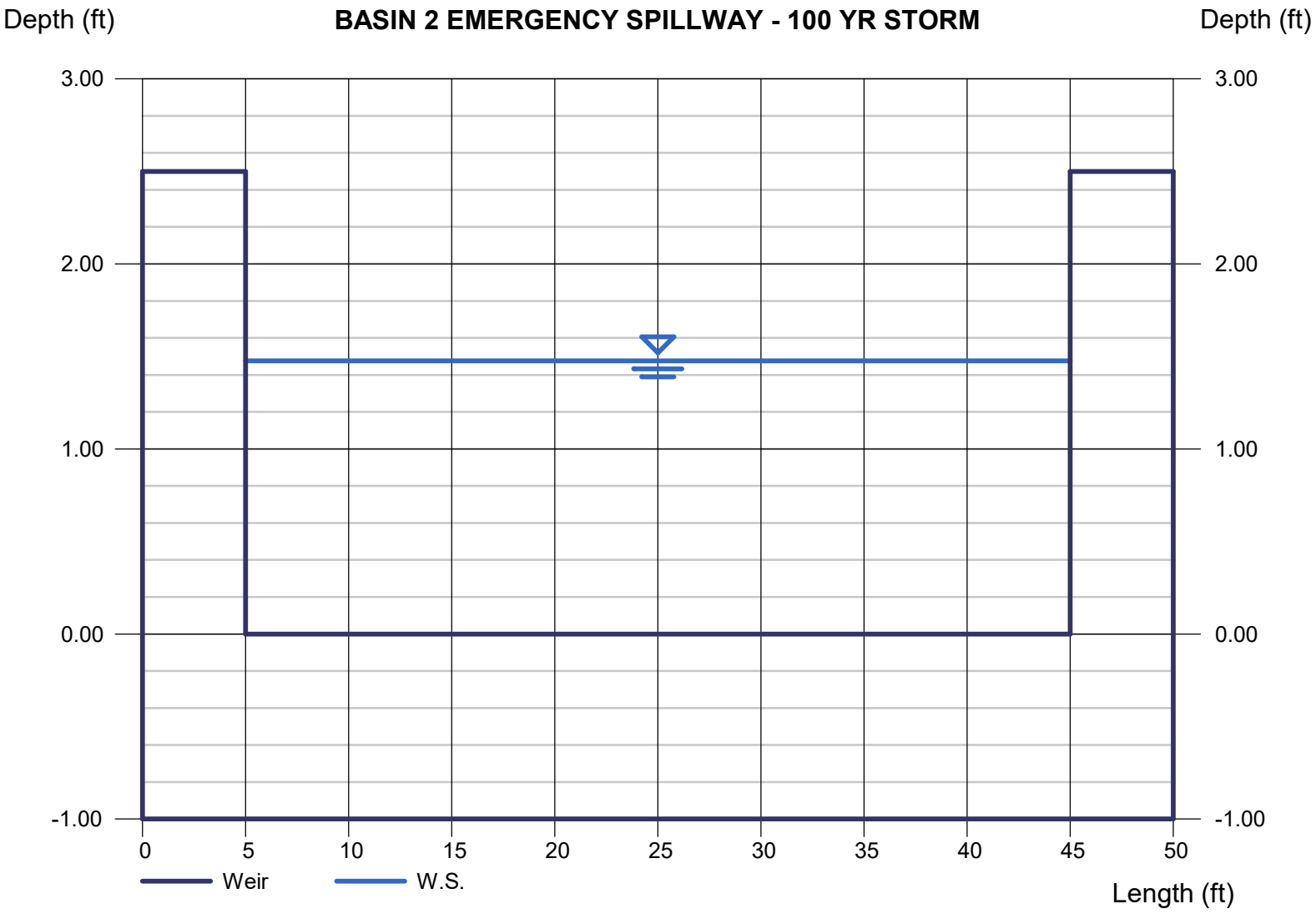
Crest	= Broad
Bottom Length (ft)	= 40.00
Total Depth (ft)	= 2.50

Calculations

Weir Coeff. Cw	= 2.60
Compute by:	Known Q
Known Q (cfs)	= 186.55

Highlighted

Depth (ft)	= 1.48
Q (cfs)	= 186.55
Area (sqft)	= 59.06
Velocity (ft/s)	= 3.16
Top Width (ft)	= 40.00



Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, May 12 2021

BASIN 3 EMERGENCY SPILLWAY - 100 YR STORM

Rectangular Weir

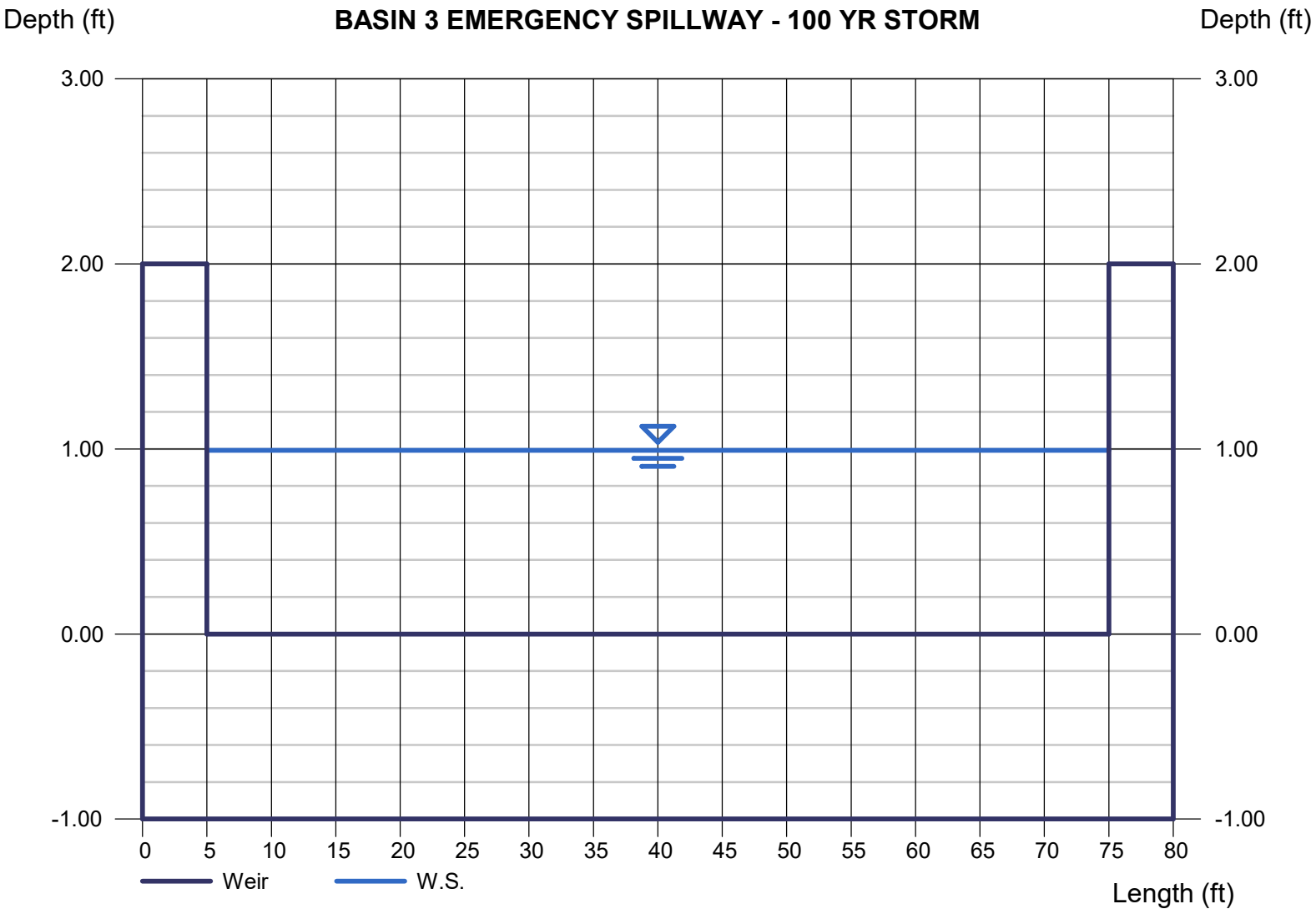
Crest	= Broad
Bottom Length (ft)	= 70.00
Total Depth (ft)	= 2.00

Calculations

Weir Coeff. Cw	= 2.60
Compute by:	Known Q
Known Q (cfs)	= 179.87

Highlighted

Depth (ft)	= 0.99
Q (cfs)	= 179.87
Area (sqft)	= 69.45
Velocity (ft/s)	= 2.59
Top Width (ft)	= 70.00



APPENDIX E

PA DEP BMP WORKSHEETS

Volume Management

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.41** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **5**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	0.07	A	30	4.667	0.00	0
Pervious as Meadow	1.83	B	58	1.448	0.11	749
Pervious as Meadow	14.46	C	71	0.817	0.45	23,464
Pervious as Meadow	47.18	D	78	0.564	0.73	125,054
Forested (Good Condition)	17.89	D	77	0.597	0.68	44,454
TOTAL (ACRES):	**81.43**				**TOTAL (CF):**	**193,721**

Post-Construction Conditions: *No. Rows:* **7**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	20.37	N/A	98	0.041	2.18	161,291
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	35.01	D	80	0.500	0.83	105,130
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.07	A	30	4.667	0.00	0

Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.59	B	58	1.448	0.11	651
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	10.62	C	71	0.817	0.45	17,233
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	9.51	D	78	0.564	0.73	25,207
Woods (Good Condition)	0.48	D	77	0.597	0.68	1,193
TOTAL (ACRES):	**77.65**				**TOTAL (CF):**	**310,704**

NET CHANGE IN VOLUME TO MANAGE (CF): **116,984**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **2** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Infiltration Basin	-	Off-Site	19.52	203,322	41,195	0.00	72	Yes	4.8	0	**0**	**48,050**
001	2	Infiltration Basin	-	to BMP No. 1	40.94	145,813	14,647	0.90	72	Yes	4.8	41,682	**53,546**	**17,084**
												Totals:	**53,546**	**65,134**

INFILTRATION & ET CREDITS (CF): **118,680**

NET CHANGE IN VOLUME TO MANAGE (CF): **116,984**

TOTAL CREDITS (CF): **118,680**

VOLUME REQUIREMENT SATISFIED

Rate Control

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**2.41**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):	**3.38**	Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):	**4.5**	Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):	**5.03**	Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**54.64**	**16.44**	**-38.20**	***Rate Control Satisfied***
10-Year Storm:	**116.42**	**61.64**	**-54.78**	***Rate Control Satisfied***
50-Year Storm:	**198.38**	**124.18**	**-74.20**	***Rate Control Satisfied***
100-Year Storm:	**239.49**	**146.60**	**-92.89**	***Rate Control Satisfied***

Water Quality

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	0.07	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	1.83	B	749	48.8	0.22	2.30	2.28	0.01	0.11
Pervious as Meadow	Grassland/Herbaceous	14.46	C	23,464	48.8	0.22	2.30	71.50	0.32	3.37
Pervious as Meadow	Grassland/Herbaceous	47.18	D	125,054	48.8	0.22	2.30	381.06	1.72	17.96
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	17.89	D	44,454	45.0	0.13	1.05	124.91	0.36	2.91
	TOTAL (ACRES):	**81.43**					**TOTALS:**	**579.76**	**2.41**	**24.35**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN

Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	20.37	N/A	161,291	65.0	0.29	2.05	654.64	2.92	20.65
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	35.01	D	105,130	78.0	0.25	1.25	512.04	1.64	8.21
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.07	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.59	B	651	48.8	0.22	2.30	1.98	0.01	0.09
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	10.62	C	17,233	48.8	0.22	2.30	52.51	0.24	2.47
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	9.51	D	25,207	48.8	0.22	2.30	76.81	0.35	3.62
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.48	D	1,193	45.0	0.13	1.05	3.35	0.01	0.08
	TOTAL (ACRES):	**77.65**					**TOTALS:**	**######**	**5.16**	**35.12**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**721.58**	**2.75**	**10.77**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **5**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**1.37**	**D**	**80**	**0.500**	**0.83**	**4,114**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**0.07**	**A**	**30**	**4.667**	**0.00**	**0**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**1.59**	**B**	**58**	**1.448**	**0.11**	**651**

Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**7.99**	**C**	**71**	**0.817**	**0.45**	**12,965**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**5.88**	**D**	**78**	**0.564**	**0.73**	**15,585**

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☑ Other (attach calculations)

Description: **NS BMP 5.9.1 - Street Sweeping**

TSS	TP	TN
175.40	**0.53**	**1.94**

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Infiltration Basin	-	19.52	203,322	48,050		155,272	10.00	0.24	1.04	96.96	2.33	10.08
001	2	Infiltration Basin	-	40.94	145,813	70,630		75,183	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**96.96**	**2.33**	**10.08**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**109.02**	**0.47**	**4.51**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	**175.40**	**0.53**	**1.94**
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**30.57**	**2.26**	**12.66**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**579.76**	**2.41**	**24.35**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

ALB	5/12/2021
Spreadsheet User Name	Date

NON-STRUCTURAL BMP POLUTANT LOAD REDUCTION CALCULATION

PROJECT: Meadows Landing
Drainage Area:
2-Year Rainfall: 2.41 in

NS BMP 5.9.1 - Street Sweeping / Vacuuming

Cover Type Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Initial Runoff Volume[2] (ft^3)
Impervious	D	128,937.6	2.96	98	0.20	0.04	2.18	23,437
TOTAL:			2.96					23,437

2-Year Volume Increase (ft3):	23,437

Event Mean Pollutant Concentrations	
Impervious Areas: Streets and Roads - Paved; Open Ditches (Including ROW)	
TSS (mg/L)	141
TP (mg/L)	0.43
TN (mg/L)	2.65

Pollutant Loads	
TSS (lbs)	206.35
TP (lbs)	0.63
TN (lbs)	3.88

From Stormwater BMP Manual - Appendix A - Table A-4:

	TSS (%)	TP (%)	TN (%)
Pollutant Removal Efficiency	85	85	50

Pollutant Load Reduction Credits	
TSS (lbs)	175.40
TP (lbs)	0.53
TN (lbs)	1.94

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P+0.8S)$ where

P = 2-Year Rainfall (in)

S = (1000/CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12

Q = Runoff (in)

Area = Land use area (sq. ft)

Pollutant Loads are calculated by the equation:

Event Mean Pollutant Concentration (mg/L) x (Runoff Volume (CF) / 43,560 CF/acre-ft) x 2.72 (conversion factor)

Note:

Runoff Volume must be calculated for EACH land use type/condition and HSG.

The use of a weighted CN value for volume calculations is not acceptable.

A minimum of 20% of existing impervious coverage MUST be designated as meadow, per PaDEP BMP Guidelines.

Volume Management

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.41** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* 6 ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	0.19	B	58	1.448	0.11	78
Pervious as Meadow	11.88	C	71	0.817	0.45	19,277
Pervious as Meadow	9.74	D	78	0.564	0.73	25,817
Forested (Good Condition)	3.25	B	55	1.636	0.07	788
Forested (Good Condition)	1.54	C	70	0.857	0.41	2,309
Forested (Good Condition)	36.28	D	77	0.597	0.68	90,151
TOTAL (ACRES):	**62.88**				**TOTAL (CF):**	**138,420**

Post-Construction Conditions: *No. Rows:* 6

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	13.97	N/A	98	0.041	2.18	110,615
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	27.39	D	80	0.500	0.83	82,233

Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.03	B	58	1.448	0.11	12
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	5.01	C	71	0.817	0.45	8,130
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.84	D	78	0.564	0.73	2,226
Woods (Good Condition)	15.49	D	77	0.597	0.68	38,491
TOTAL (ACRES):	**62.73**				**TOTAL (CF):**	**241,708**

NET CHANGE IN VOLUME TO MANAGE (CF): **103,288**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **2** *Start BMP Numbering at:* **3**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
002	3	Infiltration Basin	-	Off-Site	2.24	148,488	25,324	0.40	72	Yes	3.0	118,213	**54,700**	**19,221**
002	4	Infiltration Basin	-	to BMP No. 1	40.30	160,512	7,830	0.60	72	Yes	3.5	18,330	**22,558**	**6,824**
												Totals:	**77,258**	**26,045**

INFILTRATION & ET CREDITS (CF): **103,303**

NET CHANGE IN VOLUME TO MANAGE (CF): **103,288**

TOTAL CREDITS (CF): **103,303**

VOLUME REQUIREMENT SATISFIED

Rate Control

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**2.41**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):		Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):		Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):		Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**38.99**	**24.37**	**-14.62**	***Rate Control Satisfied***
10-Year Storm:	**85.79**	**49.42**	**-36.37**	***Rate Control Satisfied***
50-Year Storm:	**148.27**	**81.67**	**-66.60**	***Rate Control Satisfied***
100-Year Storm:	**179.87**	**99.83**	**-80.04**	***Rate Control Satisfied***

Water Quality

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	0.19	B	78	48.8	0.22	2.30	0.24	0.00	0.01
Pervious as Meadow	Grassland/Herbaceous	11.88	C	19,277	48.8	0.22	2.30	58.74	0.26	2.77
Pervious as Meadow	Grassland/Herbaceous	9.74	D	25,817	48.8	0.22	2.30	78.67	0.35	3.71
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	3.25	B	788	45.0	0.13	1.05	2.22	0.01	0.05
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	1.54	C	2,309	45.0	0.13	1.05	6.49	0.02	0.15
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	36.28	D	90,151	45.0	0.13	1.05	253.32	0.73	5.91
	TOTAL (ACRES):	**62.88**					**TOTALS:**	**399.67**	**1.38**	**12.60**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water	Area	Soil	Runoff Volume	Pollutant Conc. (mg/L)	Pollutant Loads (lbs)

Land Cover (from Volume Worksheet)	Quality	(acres)	Group	Volume (cf)	TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	13.97	N/A	110,615	65.0	0.29	2.05	448.96	2.00	14.16
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	27.39	D	82,233	78.0	0.25	1.25	400.52	1.28	6.42
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.03	B	12	48.8	0.22	2.30	0.04	0.00	0.00
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	5.01	C	8,130	48.8	0.22	2.30	24.77	0.11	1.17
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.84	D	2,226	48.8	0.22	2.30	6.78	0.03	0.32
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	15.49	D	38,491	45.0	0.13	1.05	108.16	0.31	2.52
	TOTAL (ACRES):	**62.73**					**TOTALS:**	**989.23**	**3.74**	**24.59**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS): | **589.57** | **2.36** | **11.99**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **4**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**4.74**	**D**	**80**	**0.500**	**0.83**	**14,234**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**5.01**	**C**	**71**	**0.817**	**0.45**	**8,130**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**0.69**	**D**	**78**	**0.564**	**0.73**	**1,829**

Woods (Good Condition)	**11.98**	**D**	**77**	**0.597**	**0.68**	**29,769**

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☑ Other (attach calculations)

Description: **NS BMP 5.9.1 - Street Sweeping**

TSS	TP	TN
135.11	**0.41**	**1.49**

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
002	3	Infiltration Basin	-	2.24	148,488	73,921		74,567	10.00	0.24	1.04	46.56	1.12	4.84
002	4	Infiltration Basin	-	40.30	160,512	29,382		131,130	-	-	-	-	-	-

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**46.56**	**1.12**	**4.84**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**183.32**	**0.60**	**4.49**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	**135.11**	**0.41**	**1.49**
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**94.77**	**1.31**	**7.85**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**399.67**	**1.38**	**12.60**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

ALB	5/12/2021
Spreadsheet User Name	Date

NON-STRUCTURAL BMP POLUTANT LOAD REDUCTION CALCULATION

PROJECT: Meadows Landing
Drainage Area:
2-Year Rainfall: 2.41 in

NS BMP 5.9.1 - Street Sweeping / Vacuuming

Cover Type Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Initial Runoff Volume[2] (ft^3)
Impervious	D	99,316.8	2.28	98	0.20	0.04	2.18	18,053
TOTAL:			*2.28*					18,053

2-Year Volume Increase (ft3):	**18,053**

Event Mean Pollutant Concentrations	
Impervious Areas: Streets and Roads - Paved; Open Ditches (Including ROW)	
TSS (mg/L)	141
TP (mg/L)	0.43
TN (mg/L)	2.65

Pollutant Loads	
TSS (lbs)	158.95
TP (lbs)	0.48
TN (lbs)	2.99

From Stormwater BMP Manual - Appendix A - Table A-4:

	TSS (%)	TP (%)	TN (%)
Pollutant Removal Efficiency	85	85	50

Pollutant Load Reduction Credits	
TSS (lbs)	135.11
TP (lbs)	0.41
TN (lbs)	1.49

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P+0.8S)$ where

P = 2-Year Rainfall (in)

S = (1000/CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12

Q = Runoff (in)

Area = Land use area (sq. ft)

Pollutant Loads are calculated by the equation:

Event Mean Pollutant Concentration (mg/L) x (Runoff Volume (CF) / 43,560 CF/acre-ft) x 2.72 (conversion factor)

Note:

Runoff Volume must be calculated for EACH land use type/condition and HSG.

The use of a weighted CN value for volume calculations is not acceptable.

A minimum of 20% of existing impervious coverage MUST be designated as meadow, per PaDEP BMP Guidelines.

Volume Management

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.41** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **4**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Pervious as Meadow	4.60	B	58	1.448	0.11	1,883
Pervious as Meadow	0.04	C	71	0.817	0.45	65
Pervious as Meadow	21.79	D	78	0.564	0.73	57,756
Forested (Good Condition)	13.80	D	77	0.597	0.68	34,291
TOTAL (ACRES):	**40.23**				**TOTAL (CF):**	**93,995**

Post-Construction Conditions: *No. Rows:* **6**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	7.67	N/A	98	0.041	2.18	60,732
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	9.33	D	80	0.500	0.83	28,017
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.32	B	58	1.448	0.11	540
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	12.67	D	78	0.564	0.73	33,583

Woods (Good Condition)	0.01	B	55	1.636	0.07	2
Woods (Good Condition)	10.26	D	77	0.597	0.68	25,495
TOTAL (ACRES):	**41.26**				**TOTAL (CF):**	**148,368**

NET CHANGE IN VOLUME TO MANAGE (CF): **54,374**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **1** *Start BMP Numbering at:* **5**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
003	5	Infiltration Basin	-	Off-Site	34.84	78,481	16,343	0.80	72	Yes	2.0	35,563	**47,330**	**8,596**
												Totals:	**47,330**	**8,596**

INFILTRATION & ET CREDITS (CF): **55,926**

NET CHANGE IN VOLUME TO MANAGE (CF): **54,374**

TOTAL CREDITS (CF): **55,926**

VOLUME REQUIREMENT SATISFIED

Rate Control

Instructions | General | Volume | *Rate* | Quality

Precipitation Amounts:

NOAA 2-Year 24-Hour Storm Event (in):	**2.41**	Alternative 2-Year 24-Hour Storm Event (in):	
NOAA 10-Year 24-Hour Storm Event (in):		Alternative 10-Year 24-Hour Storm Event (in):	
NOAA 50-Year 24-Hour Storm Event (in):		Alternative 50-Year 24-Hour Storm Event (in):	
NOAA 100-Year 24-Hour Storm Event (in):		Alternative 100-Year 24-Hour Storm Event (in):	

☑ **Report Summary of Peak Rates Only**

Attach model input and output data or other calculations to support the rates reported below.

	Peak Discharge Rates (cfs)			
	Pre-Construction	**Post-Construction**	**Net Change**	
2-Year Storm:	**24.94**	**7.40**	**-17.54**	***Rate Control Satisfied***
10-Year Storm:	**54.89**	**16.66**	**-38.23**	***Rate Control Satisfied***
50-Year Storm:	**94.86**	**48.97**	**-45.89**	***Rate Control Satisfied***
100-Year Storm:	**115.08**	**65.32**	**-49.76**	***Rate Control Satisfied***

Water Quality

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Pervious as Meadow	Grassland/Herbaceous	4.60	B	1,883	48.8	0.22	2.30	5.74	0.03	0.27
Pervious as Meadow	Grassland/Herbaceous	0.04	C	65	48.8	0.22	2.30	0.20	0.00	0.01
Pervious as Meadow	Grassland/Herbaceous	21.79	D	57,756	48.8	0.22	2.30	175.99	0.79	8.29
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	13.80	D	34,291	45.0	0.13	1.05	96.36	0.28	2.25
	TOTAL (ACRES):	**40.23**					**TOTALS:**	**278.28**	**1.10**	**10.82**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	7.67	N/A	60,732	65.0	0.29	2.05	246.50	1.10	7.77

Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	9.33	D	28,017	78.0	0.25	1.25	136.46	0.44	2.19
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.32	B	540	48.8	0.22	2.30	1.65	0.01	0.08
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	12.67	D	33,583	48.8	0.22	2.30	102.33	0.46	4.82
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.01	B	2	45.0	0.13	1.05	0.01	0.00	0.00
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	10.26	D	25,495	45.0	0.13	1.05	71.64	0.21	1.67
	TOTAL (ACRES):	**41.26**					**TOTALS:**	**558.58**	**2.21**	**16.53**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**280.29**	**1.11**	**5.71**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **5**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**0.6**	**D**	**80**	**0.500**	**0.83**	**1,802**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**0.19**	**B**	**58**	**1.448**	**0.11**	**78**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**1.3**	**D**	**78**	**0.564**	**0.73**	**3,446**
Woods (Good Condition)	**0**	**B**	**55**	**1.636**	**0.07**	**0**
Woods (Good Condition)	**4.33**	**D**	**77**	**0.597**	**0.68**	**10,759**

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
003	5	Infiltration Basin	-	34.84	78,481	55,926		22,555	10.00	0.24	1.04	14.08	0.34	1.46

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**14.08**	**0.34**	**1.46**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**49.75**	**0.16**	**1.35**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**63.83**	**0.50**	**2.82**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**278.28**	**1.10**	**10.82**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

ALB	5/12/2021
Spreadsheet User Name	Date

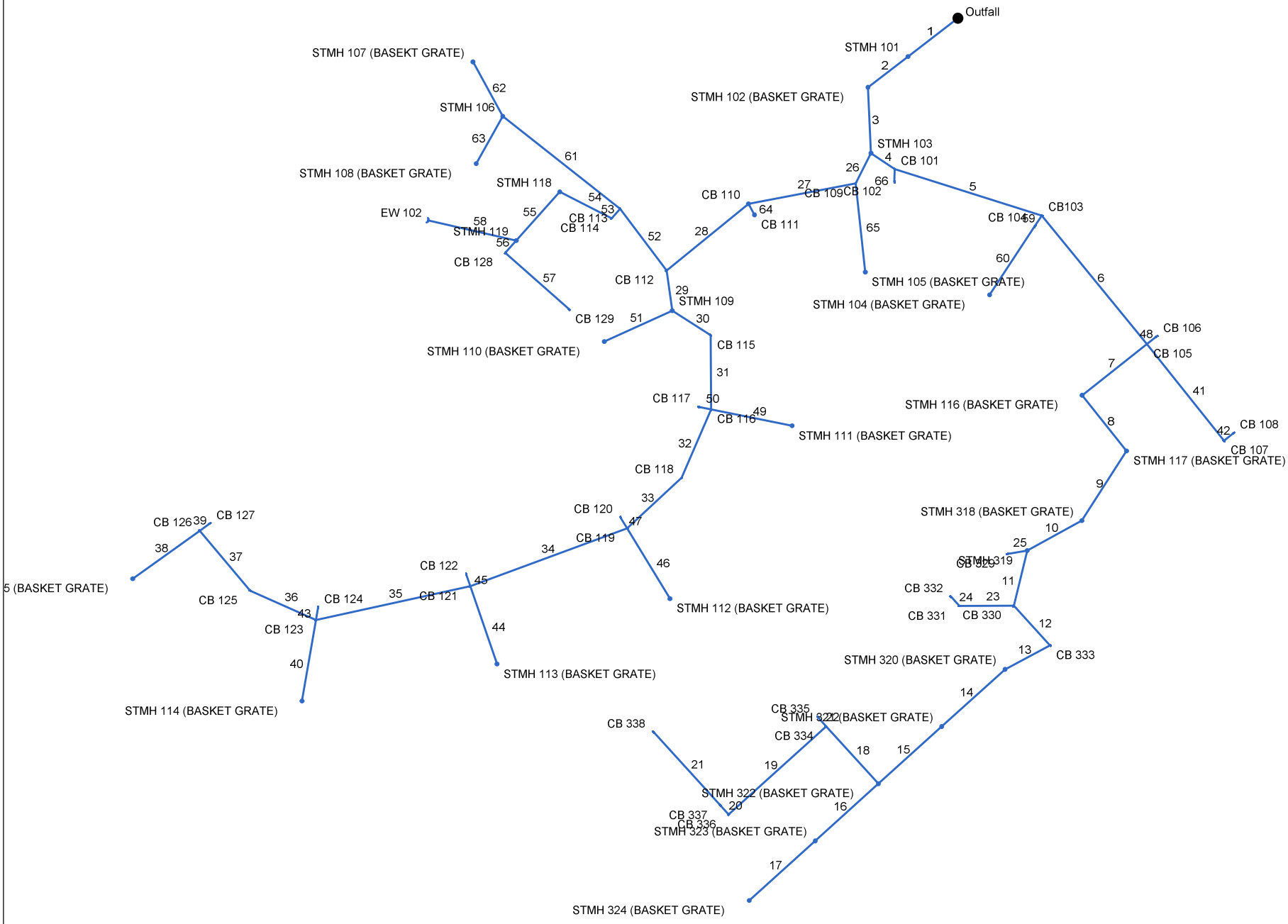
APPENDIX F

PIPE AND STORM SEWER CALCULATIONS

100-yr Storm Sewer Analysis

Tributary to Basin 1

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



Project File: BASIN 1 - 7-1-21.stm	Number of lines: 66	Date: 7/1/2021

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	EW to STMH 101	123.6	36	Cir	90.000	1110.00	1118.27	9.189	1112.98	1121.22	n/a	1121.22	End	Manhole
2	STMH 101 to STMH 102	123.7	30	Cir	72.256	1118.47	1131.84	18.504	1121.22	1134.33	n/a	1134.33	1	Manhole
3	STMH 102 to STMH 103	113.4	30	Cir	94.500	1132.04	1138.46	6.794	1134.33	1140.95	6.89	1140.95	2	Manhole
4	STMH 103 to CB 101	38.69	24	Cir	41.000	1138.66	1140.16	3.659	1140.95	1142.11	n/a	1142.11 j	3	Generic
5	CB 101 to CB 103	35.26	24	Cir	220.133	1140.37	1149.17	3.998	1142.11	1151.09	3.02	1151.09	4	Generic
6	CB 103 to CB 105	30.60	24	Cir	237.735	1148.87	1174.02	10.579	1151.09	1175.89	n/a	1175.89 j	5	Generic
7	CB 105 to STMH 116	25.72	24	Cir	118.000	1174.72	1175.90	1.000	1176.47	1177.68	1.18	1177.68	6	Manhole
8	STMH 116 to STMH 117	24.33	18	Cir	102.000	1176.10	1180.18	4.000	1177.68*	1182.35*	2.83	1185.18	7	Manhole
9	STMH 117 to STMH 318	23.85	18	Cir	118.650	1182.13	1227.93	38.601	1185.18	1229.41	n/a	1229.41 j	8	Manhole
10	STMH 318 to STMH 319	16.20	18	Cir	89.000	1229.88	1237.58	8.652	1230.62	1239.01	n/a	1239.01	9	Manhole
11	STMH 319 to CB 330	14.26	18	Cir	81.471	1237.78	1238.54	0.933	1239.28*	1240.56*	1.48	1242.04	10	Generic
12	CB 330 to CB 333	11.39	18	Cir	77.000	1238.74	1239.51	1.000	1242.04*	1242.81*	0.97	1243.78	11	Generic
13	CB 333 to STMH 320	10.80	18	Cir	72.975	1239.71	1240.44	1.000	1243.78*	1244.44*	0.17	1244.61	12	Manhole
14	STMH 320 to STMH 321	9.99	18	Cir	122.000	1240.64	1245.91	4.320	1244.61	1247.13	n/a	1247.13 j	13	Manhole
15	STMH 321 to STMH 322	8.65	18	Cir	122.000	1246.11	1250.37	3.492	1247.13	1251.51	n/a	1251.51	14	Manhole
16	STMH 322 to STMH 323	3.38	18	Cir	122.000	1250.57	1257.32	5.533	1251.51	1258.02	n/a	1258.02 j	15	Manhole
17	STMH 323 to STMH 324	1.99	18	Cir	127.204	1257.52	1259.79	1.785	1258.02	1260.32	0.20	1260.32	16	Manhole
18	STMH 322 to CB 334	4.36	18	Cir	111.000	1250.57	1254.04	3.126	1251.51	1254.84	n/a	1254.84 j	15	Generic
19	CB 334 to CB 336	2.64	18	Cir	188.120	1254.24	1256.12	0.999	1254.84	1256.74	n/a	1256.74	18	Generic
20	CB 336 to CB 337	1.94	18	Cir	18.001	1256.32	1256.50	1.000	1256.74	1257.03	n/a	1257.03	19	Generic
21	CB 337 to CB 338	1.62	18	Cir	142.000	1256.70	1258.12	1.000	1257.08	1258.60	0.17	1258.60	20	Generic
22	CB 334 to CB 335	1.04	18	Cir	18.001	1254.24	1255.94	9.444	1254.84	1256.32	n/a	1256.32 j	18	Generic
23	CB 330 to CB 331	3.16	18	Cir	77.740	1238.74	1243.38	5.969	1242.04	1244.06	n/a	1244.06 j	11	Generic
24	CB 331 to CB 332	1.64	18	Cir	18.001	1243.58	1244.38	4.445	1244.06	1244.86	0.17	1244.86	23	Generic

Project File: BASIN 1 - 7-1-21.stm | Number of lines: 66 | Run Date: 7/1/2021

NOTES: Return period = 100 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	STMH 319 to CB 329	2.48	18	Cir	28.561	1237.78	1239.79	7.038	1239.01	1240.39	n/a	1240.39 j	10	Generic
26	STMH 103 to CB 109	77.02	36	Cir	48.562	1138.66	1139.15	1.009	1141.33	1141.89	n/a	1141.89	3	Generic
27	CB 109 to CB 110	68.07	36	Cir	155.896	1138.85	1143.44	2.944	1141.89	1146.07	2.51	1146.07	26	Generic
28	CB 110 to CB 112	66.91	36	Cir	151.088	1143.89	1145.40	0.999	1146.17	1148.01	n/a	1148.01	27	Generic
29	CB 112 to STMH 109	36.96	30	Cir	58.151	1145.35	1152.69	12.622	1148.01	1154.75	n/a	1154.75 j	28	Manhole
30	STMH 109 to CB 115	28.78	24	Cir	65.091	1154.19	1160.49	9.679	1155.04	1162.33	n/a	1162.33	29	Generic
31	CB 115 to CB 116	28.36	24	Cir	106.480	1160.69	1165.78	4.780	1162.33	1167.61	n/a	1167.61	30	Generic
32	CB 116 to CB 118	21.74	24	Cir	106.499	1165.48	1178.00	11.756	1167.61	1179.67	n/a	1179.67 j	31	Generic
33	CB 118 to CB 119	21.17	24	Cir	106.462	1178.20	1181.28	2.893	1179.67	1182.93	1.37	1182.93	32	Generic
34	CB 119 to CB 121	17.68	18	Cir	239.000	1181.98	1188.78	2.845	1183.12	1190.23	n/a	1190.23	33	Generic
35	CB 121 to CB 123	10.44	18	Cir	225.652	1188.98	1192.78	1.684	1190.23	1194.02	n/a	1194.02 j	34	Generic
36	CB 123 to CB 125	4.96	18	Cir	102.864	1192.98	1195.46	2.411	1194.02	1196.32	n/a	1196.32 j	35	Generic
37	CB 125 to CB 126	4.39	18	Cir	112.218	1195.66	1196.78	0.998	1196.32	1197.58	0.48	1197.58	36	Generic
38	CB 126 to STMH 115	2.43	18	Cir	118.000	1196.98	1198.75	1.500	1197.58	1199.34	n/a	1199.34 j	37	Manhole
39	CB 126 to CB 127	1.09	18	Cir	18.001	1196.98	1198.21	6.833	1197.58	1198.60	n/a	1198.60 j	37	Generic
40	CB 123 to STMH 114	4.56	18	Cir	118.000	1192.98	1194.75	1.500	1194.02	1195.57	n/a	1195.57 j	35	Manhole
41	CB 105 to CB 107	3.43	18	Cir	177.015	1174.72	1193.22	10.451	1175.89	1193.93	n/a	1193.93 j	6	Generic
42	CB 107 to CB 108	0.67	18	Cir	18.001	1193.42	1193.69	1.499	1193.93	1193.99	n/a	1193.99 j	41	Generic
43	CB 123 to CB 124	1.06	18	Cir	18.001	1192.98	1195.02	11.333	1194.02	1195.41	n/a	1195.41 j	35	Generic
44	CB 121 to STMH 113	5.34	18	Cir	117.999	1188.98	1190.75	1.500	1190.23	1191.64	n/a	1191.64 j	34	Manhole
45	CB 121 to CB 122	1.49	18	Cir	18.001	1188.98	1190.54	8.667	1190.23	1191.00	n/a	1191.00 j	34	Generic
46	CB 119 to STMH 112	1.68	18	Cir	118.000	1181.98	1183.75	1.500	1182.93	1184.24	n/a	1184.24 j	33	Manhole
47	CB 119 to CB 120	1.35	18	Cir	18.001	1181.98	1183.58	8.888	1182.93	1184.02	n/a	1184.02 j	33	Generic
48	CB 105 to CB 106	1.10	18	Cir	18.001	1174.72	1176.75	11.277	1175.89	1177.14	n/a	1177.14 j	6	Generic

Project File: BASIN 1 - 7-1-21.stm | Number of lines: 66 | Run Date: 7/1/2021

NOTES: Return period = 100 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
49	CB 116 to STMH 111	6.00	18	Cir	118.000	1165.98	1167.75	1.500	1167.61	1168.70	n/a	1168.70 j	31	Manhole
50	CB 116 to CB 117	1.13	18	Cir	18.001	1165.98	1166.97	5.500	1167.61	1167.59	0.04	1167.63	31	Generic
51	STMH 109 to STMH 110	9.64	18	Cir	106.737	1154.19	1155.79	1.499	1155.11	1156.99	n/a	1156.99	29	Manhole
52	CB 112 to CB 113	29.89	24	Cir	110.523	1145.86	1146.96	0.995	1148.01*	1149.66*	2.14	1151.80	28	Generic
53	CB 113 to CB 114	19.75	24	Cir	18.001	1147.16	1149.09	10.721	1151.80*	1151.91*	0.90	1152.81	52	Generic
54	CB 114 to STMH 118	15.95	24	Cir	83.299	1149.29	1151.69	2.881	1152.81	1153.13	n/a	1153.13 j	53	Manhole
55	STMH 118 to STMH 119	16.11	24	Cir	93.500	1151.89	1152.82	0.995	1153.13	1154.27	0.61	1154.27	54	Manhole
56	STMH 119 to CB 128	11.10	24	Cir	23.500	1153.02	1153.25	0.979	1154.27	1154.44	n/a	1154.44 j	55	Generic
57	CB 128 to CB 129	5.45	18	Cir	122.000	1153.45	1154.67	1.000	1154.44	1155.57	n/a	1155.57 j	56	Generic
58	STMH 119 to EW 102	5.19	18	Cir	129.209	1153.02	1159.50	5.015	1154.27	1160.38	n/a	1160.38 j	55	OpenHeadwall
59	CB 103 to CB 104	4.71	18	Cir	18.001	1149.37	1149.55	1.000	1151.09*	1151.12*	0.06	1151.18	5	Generic
60	CB 104 to STMH 104	3.43	18	Cir	118.000	1149.75	1151.52	1.500	1151.18	1152.23	n/a	1152.23 j	59	Manhole
61	CB 113 to STMH 106	10.91	18	Cir	213.675	1147.16	1149.22	0.964	1151.80*	1153.76*	0.59	1154.35	52	Manhole
62	STMH 106 to STMH 107	12.77	15	Cir	89.000	1149.42	1150.39	1.090	1154.35*	1157.32*	1.68	1159.01	61	Manhole
63	STMH 106 to STMH 108	0.39	18	Cir	77.766	1153.72	1155.28	2.006	1154.35	1155.51	n/a	1155.51 j	61	Manhole
64	CB 110 to CB 111	1.38	18	Cir	18.000	1144.14	1145.43	7.167	1146.07	1146.02	0.07	1146.09	27	Generic
65	CB 109 to STMH 105	10.88	18	Cir	128.014	1139.35	1140.95	1.250	1141.89*	1143.06*	0.59	1143.65	26	Manhole
66	CB 101 to CB 102	1.83	15	Cir	18.001	1140.36	1141.82	8.111	1142.11	1142.36	n/a	1142.36 j	4	Generic

Project File: BASIN 1 - 7-1-21.stm | Number of lines: 66 | Run Date: 7/1/2021

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	90.000	0.00	36.03	0.00	0.00	16.21	0.0	13.3	7.6	123.6	219.0	17.52	36	9.19	1110.00	1118.27	1112.98	1121.22	1112.13	1125.31	EW to STMH 101
2	1	72.256	2.10	36.03	0.66	1.39	16.21	5.0	13.3	7.6	123.7	191.1	25.22	30	18.50	1118.47	1131.84	1121.22	1134.33	1125.31	1144.12	STMH 101 to ST
3	2	94.500	0.00	33.93	0.00	0.00	14.83	0.0	13.2	7.6	113.4	115.8	23.57	30	6.79	1132.04	1138.46	1134.33	1140.95	1144.12	1149.70	STMH 102 to ST
4	3	41.000	0.63	10.96	0.48	0.30	5.05	5.0	13.1	7.7	38.69	46.87	12.36	24	3.66	1138.66	1140.16	1140.95	1142.11	1149.70	1148.82	STMH 103 to CB
5	4	220.133	0.30	9.95	0.50	0.15	4.56	5.0	12.8	7.7	35.26	48.99	11.78	24	4.00	1140.37	1149.17	1142.11	1151.09	1148.82	1158.77	CB 101 to CB 103
6	5	237.735	0.39	8.41	0.45	0.18	3.92	5.0	12.4	7.8	30.60	79.70	9.88	24	10.58	1148.87	1174.02	1151.09	1175.89	1158.77	1181.75	CB 103 to CB 105
7	6	118.000	0.49	6.80	0.38	0.19	3.27	5.0	12.2	7.9	25.72	24.50	8.77	24	1.00	1174.72	1175.90	1176.47	1177.68	1181.75	1180.84	CB 105 to STMH
8	7	102.000	0.25	6.31	0.29	0.07	3.08	5.0	12.0	7.9	24.33	22.75	13.77	18	4.00	1176.10	1180.18	1177.68	1182.35	1180.84	1192.50	STMH 116 to ST
9	8	118.650	1.68	6.06	0.58	0.97	3.01	5.0	11.9	7.9	23.85	70.68	13.51	18	38.60	1182.13	1227.93	1185.18	1229.41	1192.50	1241.94	STMH 117 to ST
10	9	89.000	0.00	4.38	0.00	0.00	2.04	0.0	11.7	8.0	16.20	33.46	14.06	18	8.65	1229.88	1237.58	1230.62	1239.01	1241.94	1247.07	STMH 318 to ST
11	10	81.471	0.12	3.93	0.35	0.04	1.78	5.0	11.6	8.0	14.26	10.99	8.07	18	0.93	1237.78	1238.54	1239.28	1240.56	1247.07	1248.44	STMH 319 to CB
12	11	77.000	0.27	3.16	0.30	0.08	1.42	5.0	11.4	8.0	11.39	11.38	6.45	18	1.00	1238.74	1239.51	1242.04	1242.81	1248.44	1249.80	CB 330 to CB 333
13	12	72.975	0.37	2.89	0.30	0.11	1.34	5.0	11.2	8.1	10.80	11.38	6.11	18	1.00	1239.71	1240.44	1243.78	1244.44	1249.80	1250.04	CB 333 to STMH
14	13	122.000	0.43	2.52	0.41	0.18	1.23	5.0	10.9	8.2	9.99	23.64	6.08	18	4.32	1240.64	1245.91	1244.61	1247.13	1250.04	1255.54	STMH 320 to ST
15	14	122.000	0.40	2.09	0.41	0.16	1.05	5.0	10.5	8.2	8.65	21.26	6.40	18	3.49	1246.11	1250.37	1247.13	1251.51	1255.54	1261.03	STMH 321 to ST
16	15	122.000	0.39	0.78	0.42	0.16	0.37	5.0	6.9	9.2	3.38	26.76	3.54	18	5.53	1250.57	1257.32	1251.51	1258.02	1261.03	1266.26	STMH 322 to ST
17	16	127.204	0.39	0.39	0.52	0.20	0.20	5.0	5.0	9.8	1.99	15.20	3.71	18	1.78	1257.52	1259.79	1258.02	1260.32	1266.26	1269.76	STMH 323 to ST
18	15	111.000	0.24	0.91	0.49	0.12	0.52	5.0	9.8	8.4	4.36	20.11	4.15	18	3.13	1250.57	1254.04	1251.51	1254.84	1261.03	1261.94	STMH 322 to CB
19	18	188.120	0.16	0.47	0.50	0.08	0.30	5.0	7.8	8.9	2.64	11.37	3.93	18	1.00	1254.24	1256.12	1254.84	1256.74	1261.94	1269.18	CB 334 to CB 336
20	19	18.001	0.06	0.31	0.84	0.05	0.22	5.0	7.6	9.0	1.94	11.38	4.16	18	1.00	1256.32	1256.50	1256.74	1257.03	1269.18	1269.18	CB 336 to CB 337
21	20	142.000	0.25	0.25	0.66	0.17	0.17	5.0	5.0	9.8	1.62	11.38	3.95	18	1.00	1256.70	1258.12	1257.08	1258.60	1269.18	1264.12	CB 337 to CB 338
22	18	18.001	0.20	0.20	0.53	0.11	0.11	5.0	5.0	9.8	1.04	34.96	2.27	18	9.44	1254.24	1255.94	1254.84	1256.32	1261.94	1261.94	CB 334 to CB 335

Project File: BASIN 1 - 7-1-21.stm

Number of lines: 66

Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	11	77.740	0.31	0.65	0.51	0.16	0.32	5.0	5.3	9.7	3.16	27.79	2.94	18	5.97	1238.74	1243.38	1242.04	1244.06	1248.44	1250.38	CB 330 to CB 331
24	23	18.001	0.34	0.34	0.49	0.17	0.17	5.0	5.0	9.8	1.64	23.98	3.38	18	4.44	1243.58	1244.38	1244.06	1244.86	1250.38	1250.38	CB 331 to CB 332
25	10	28.561	0.45	0.45	0.56	0.25	0.25	5.0	5.0	9.8	2.48	30.18	2.70	18	7.04	1237.78	1239.79	1239.01	1240.39	1247.07	1245.79	STMH 319 to CB
26	3	48.562	0.18	22.97	0.52	0.09	9.77	5.0	12.1	7.9	77.02	72.58	11.48	36	1.01	1138.66	1139.15	1141.33	1141.89	1149.70	1149.50	STMH 103 to CB
27	26	155.896	0.12	20.09	0.57	0.07	8.57	5.0	11.8	7.9	68.07	124.0	10.00	36	2.94	1138.85	1143.44	1141.89	1146.07	1149.50	1156.41	CB 109 to CB 110
28	27	151.088	0.31	19.70	0.88	0.27	8.37	5.0	11.5	8.0	66.91	72.23	10.92	36	1.00	1143.89	1145.40	1146.17	1148.01	1156.41	1160.17	CB 110 to CB 112
29	28	58.151	0.00	9.18	0.00	0.00	4.37	0.0	9.6	8.5	36.96	157.8	8.04	30	12.62	1145.35	1152.69	1148.01	1154.75	1160.17	1163.73	CB 112 to STMH
30	29	65.091	0.15	7.49	0.47	0.07	3.39	5.0	9.5	8.5	28.78	76.23	16.03	24	9.68	1154.19	1160.49	1155.04	1162.33	1163.73	1166.49	STMH 109 to CB
31	30	106.480	0.15	7.34	0.47	0.07	3.32	5.0	9.3	8.5	28.36	53.57	9.84	24	4.78	1160.69	1165.78	1162.33	1167.61	1166.49	1174.97	CB 115 to CB 116
32	31	106.499	0.20	5.31	0.43	0.09	2.53	5.0	9.0	8.6	21.74	84.01	7.35	24	11.76	1165.48	1178.00	1167.61	1179.67	1174.97	1183.53	CB 116 to CB 118
33	32	106.462	0.27	5.11	0.44	0.12	2.44	5.0	8.8	8.7	21.17	41.68	8.12	24	2.89	1178.20	1181.28	1179.67	1182.93	1183.53	1191.58	CB 118 to CB 119
34	33	239.000	0.31	4.40	0.49	0.15	2.01	5.0	8.4	8.8	17.68	19.19	11.22	18	2.85	1181.98	1188.78	1183.12	1190.23	1191.58	1199.54	CB 119 to CB 121
35	34	225.652	0.08	2.33	0.63	0.05	1.17	5.0	7.8	9.0	10.44	14.76	6.66	18	1.68	1188.98	1192.78	1190.23	1194.02	1199.54	1204.02	CB 121 to CB 123
36	35	102.864	0.16	0.87	0.46	0.07	0.54	5.0	7.2	9.1	4.96	17.66	4.27	18	2.41	1192.98	1195.46	1194.02	1196.32	1204.02	1206.01	CB 123 to CB 125
37	36	112.218	0.22	0.71	0.51	0.11	0.47	5.0	6.4	9.4	4.39	11.37	5.24	18	1.00	1195.66	1196.78	1196.32	1197.58	1206.01	1208.21	CB 125 to CB 126
38	37	118.000	0.26	0.26	0.95	0.25	0.25	5.0	5.0	9.8	2.43	13.93	3.71	18	1.50	1196.98	1198.75	1197.58	1199.34	1208.21	1207.19	CB 126 to STMH
39	37	18.001	0.23	0.23	0.48	0.11	0.11	5.0	5.0	9.8	1.09	29.74	2.31	18	6.83	1196.98	1198.21	1197.58	1198.60	1208.21	1208.21	CB 126 to CB 127
40	35	118.000	1.19	1.19	0.39	0.46	0.46	5.0	5.0	9.8	4.56	13.93	4.05	18	1.50	1192.98	1194.75	1194.02	1195.57	1204.02	1203.57	CB 123 to STMH
41	6	177.015	0.88	1.00	0.33	0.29	0.36	5.0	5.8	9.6	3.43	36.78	3.26	18	10.45	1174.72	1193.22	1175.89	1193.93	1181.75	1198.69	CB 105 to CB 107
42	41	18.001	0.12	0.12	0.57	0.07	0.07	5.0	5.0	9.8	0.67	13.93	1.95	18	1.50	1193.42	1193.69	1193.93	1193.99	1198.69	1198.69	CB 107 to CB 108
43	35	18.001	0.19	0.19	0.57	0.11	0.11	5.0	5.0	9.8	1.06	38.30	1.89	18	11.33	1192.98	1195.02	1194.02	1195.41	1204.02	1204.02	CB 123 to CB 124
44	34	117.999	1.43	1.43	0.38	0.54	0.54	5.0	5.0	9.8	5.34	13.93	4.15	18	1.50	1188.98	1190.75	1190.23	1191.64	1199.54	1199.11	CB 121 to STMH

Project File: BASIN 1 - 7-1-21.stm

Number of lines: 66

Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	34	18.001	0.33	0.33	0.46	0.15	0.15	5.0	5.0	9.8	1.49	33.49	2.11	18	8.67	1188.98	1190.54	1190.23	1191.00	1199.54	1199.54	CB 121 to CB 122
46	33	118.000	0.18	0.18	0.95	0.17	0.17	5.0	5.0	9.8	1.68	13.93	2.41	18	1.50	1181.98	1183.75	1182.93	1184.24	1191.58	1191.63	CB 119 to STMH
47	33	18.001	0.26	0.26	0.53	0.14	0.14	5.0	5.0	9.8	1.35	33.92	2.17	18	8.89	1181.98	1183.58	1182.93	1184.02	1191.58	1191.58	CB 119 to CB 120
48	6	18.001	0.22	0.22	0.51	0.11	0.11	5.0	5.0	9.8	1.10	38.20	1.87	18	11.28	1174.72	1176.75	1175.89	1177.14	1181.75	1181.75	CB 105 to CB 106
49	31	118.000	1.65	1.65	0.37	0.61	0.61	5.0	5.0	9.8	6.00	13.93	4.26	18	1.50	1165.98	1167.75	1167.61	1168.70	1174.97	1175.08	CB 116 to STMH
50	31	18.001	0.23	0.23	0.50	0.12	0.12	5.0	5.0	9.8	1.13	26.68	1.15	18	5.50	1165.98	1166.97	1167.61	1167.59	1174.97	1174.97	CB 116 to CB 117
51	29	106.737	1.69	1.69	0.58	0.98	0.98	5.0	5.0	9.8	9.64	13.93	7.44	18	1.50	1154.19	1155.79	1155.11	1156.99	1163.73	1160.79	STMH 109 to ST
52	28	110.523	0.55	10.21	0.50	0.28	3.72	5.0	11.4	8.0	29.89	24.44	9.52	24	1.00	1145.86	1146.96	1148.01	1149.66	1160.17	1158.10	CB 112 to CB 113
53	52	18.001	0.68	5.73	0.62	0.42	2.11	5.0	6.4	9.4	19.75	80.23	6.29	24	10.72	1147.16	1149.09	1151.80	1151.91	1158.10	1158.10	CB 113 to CB 114
54	53	83.299	0.00	5.05	0.00	0.00	1.68	0.0	6.1	9.5	15.95	41.59	5.84	24	2.88	1149.29	1151.69	1152.81	1153.13	1158.10	1159.98	CB 114 to STMH
55	54	93.500	0.00	5.05	0.00	0.00	1.68	0.0	5.8	9.6	16.11	24.44	7.26	24	0.99	1151.89	1152.82	1153.13	1154.27	1159.98	1160.07	STMH 118 to ST
56	55	23.500	1.77	3.40	0.34	0.60	1.16	5.0	5.7	9.6	11.10	24.24	5.54	24	0.98	1153.02	1153.25	1154.27	1154.44	1160.07	1160.09	STMH 119 to CB
57	56	122.000	1.63	1.63	0.34	0.55	0.55	5.0	5.0	9.8	5.45	11.38	4.66	18	1.00	1153.45	1154.67	1154.44	1155.57	1160.09	1159.67	CB 128 to CB 129
58	55	129.209	1.65	1.65	0.32	0.53	0.53	5.0	5.0	9.8	5.19	25.48	4.07	18	5.02	1153.02	1159.50	1154.27	1160.38	1160.07	1161.63	STMH 119 to EW
59	5	18.001	0.39	1.24	0.38	0.15	0.50	5.0	6.0	9.5	4.71	11.38	2.67	18	1.00	1149.37	1149.55	1151.09	1151.12	1158.77	1158.77	CB 103 to CB 104
60	59	118.000	0.85	0.85	0.41	0.35	0.35	5.0	5.0	9.8	3.43	13.93	3.09	18	1.50	1149.75	1151.52	1151.18	1152.23	1158.77	1157.52	CB 104 to STMH
61	52	213.675	0.00	3.93	0.00	0.00	1.34	0.0	10.9	8.1	10.91	11.17	6.17	18	0.96	1147.16	1149.22	1151.80	1153.76	1158.10	1162.75	CB 113 to STMH
62	61	89.000	3.82	3.82	0.34	1.30	1.30	5.0	5.0	9.8	12.77	7.30	10.41	15	1.09	1149.42	1150.39	1154.35	1157.32	1162.75	1161.74	STMH 106 to ST
63	61	77.766	0.11	0.11	0.36	0.04	0.04	5.0	5.0	9.8	0.39	16.11	1.41	18	2.01	1153.72	1155.28	1154.35	1155.51	1162.75	1162.29	STMH 106 to ST
64	27	18.000	0.27	0.27	0.52	0.14	0.14	5.0	5.0	9.8	1.38	30.46	1.45	18	7.17	1144.14	1145.43	1146.07	1146.02	1156.41	1156.41	CB 110 to CB 111
65	26	128.014	2.70	2.70	0.41	1.11	1.11	5.0	5.0	9.8	10.88	12.72	6.16	18	1.25	1139.35	1140.95	1141.89	1143.06	1149.50	1149.99	CB 109 to STMH
66	4	18.001	0.38	0.38	0.49	0.19	0.19	5.0	5.0	9.8	1.83	19.92	2.56	15	8.11	1140.36	1141.82	1142.11	1142.36	1148.82	1148.82	CB 101 to CB 102

Project File: BASIN 1 - 7-1-21.stm

Number of lines: 66

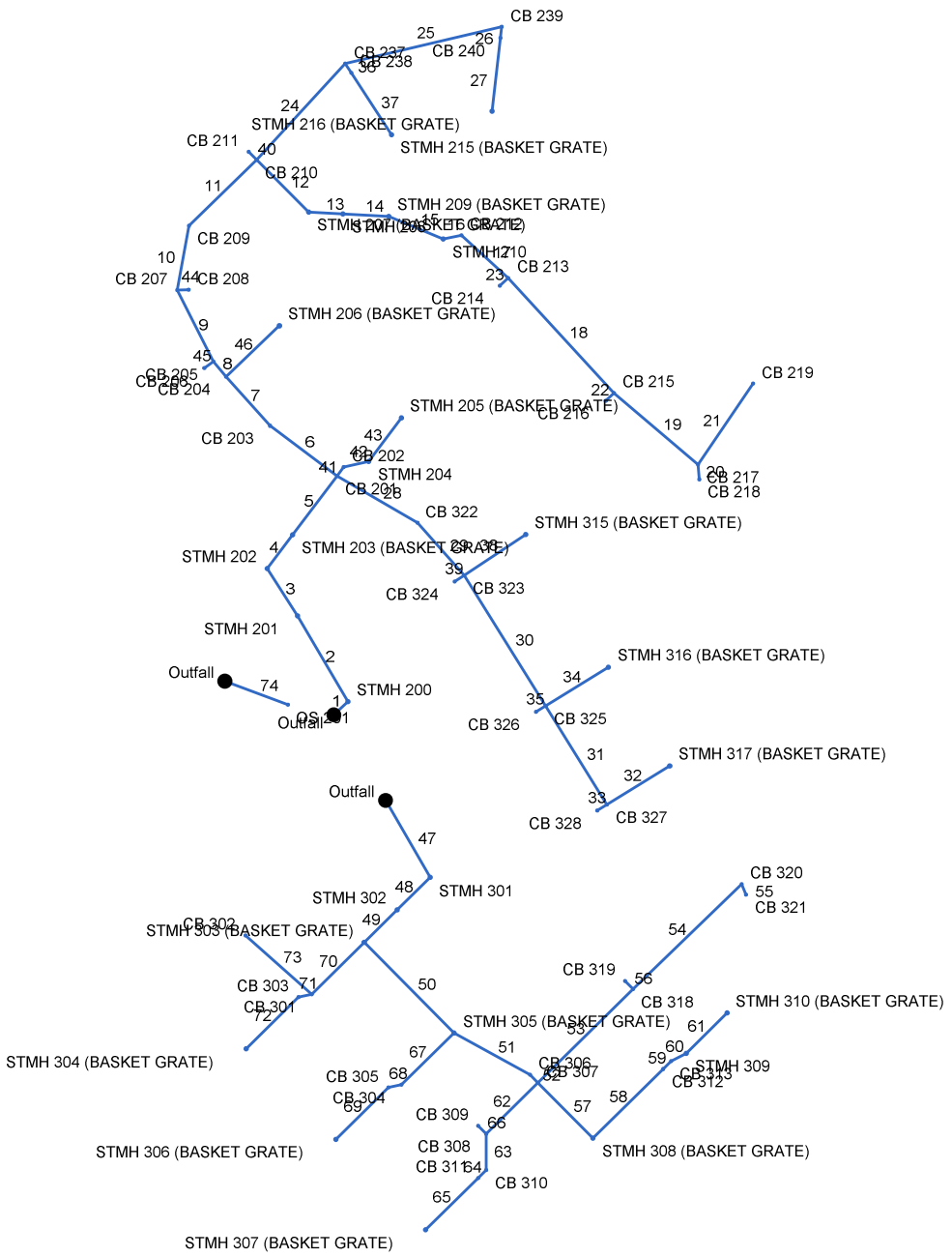
Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

100-yr Storm Sewer Analysis

Tributary to Basin 2

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



Project File: BASIN 2 - 7-1-21.stm	Number of lines: 74	Date: 7/1/2021

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	EW TO STMH200	91.63	36	Cir	30.850	1118.00	1118.62	2.010	1124.86*	1125.36*	2.56	1127.92	End	Manhole
2	STMH200 TO STMH201	92.17	36	Cir	159.537	1120.52	1135.61	9.459	1127.92	1138.47	n/a	1138.47	1	Manhole
3	STMH201 TO STMH202	92.48	36	Cir	89.872	1136.61	1150.21	15.133	1138.47	1153.07	n/a	1153.07	2	Manhole
4	STMH202 TO STMH203	92.70	36	Cir	67.587	1151.21	1151.89	1.006	1154.21*	1155.32*	0.40	1155.73	3	Manhole
5	STMH203 TO CB201	76.76	36	Cir	118.000	1152.09	1153.27	1.000	1155.73*	1157.06*	1.83	1158.89	4	Manhole
6	CB201 TO CB203	54.01	36	Cir	134.000	1153.47	1154.14	0.500	1158.89*	1159.64*	0.22	1159.86	5	Manhole
7	CB203 TO CB204	53.66	36	Cir	105.080	1154.35	1154.87	0.495	1159.86*	1160.44*	0.90	1161.34	6	Manhole
8	CB204 TO CB205	45.83	30	Cir	31.801	1155.87	1159.24	10.597	1161.34	1161.56	1.45	1163.01	7	Manhole
9	CB205 TO CB207	43.61	30	Cir	128.122	1159.44	1161.53	1.631	1163.01*	1164.24*	1.23	1165.47	8	Manhole
10	CB207 TO CB209	42.25	30	Cir	104.840	1161.73	1165.13	3.243	1165.47	1167.30	0.85	1167.30	9	Manhole
11	CB209 TO CB210	41.61	24	Cir	151.106	1165.33	1169.51	2.766	1167.30	1171.47	2.75	1171.47	10	Manhole
12	CB210 TO STMH207	31.32	24	Cir	118.000	1169.71	1170.75	0.881	1171.71*	1173.64*	1.11	1174.75	11	Manhole
13	STMH207 TO STMH208	29.11	18	Cir	54.596	1170.95	1174.99	7.400	1174.75*	1178.33*	0.63	1178.96	12	Manhole
14	STMH208 TO STMH209	29.17	18	Cir	73.512	1175.99	1203.23	37.055	1178.96	1204.72	n/a	1204.72 j	13	Manhole
15	STMH209 TO STMH210	17.17	18	Cir	94.000	1204.23	1214.80	11.245	1204.94	1216.24	n/a	1216.24	14	Manhole
16	STMH210 TO CB212	17.20	18	Cir	29.654	1215.00	1215.30	1.012	1216.50*	1217.18*	1.24	1218.42	15	Manhole
17	CB212 TO CB213	14.94	18	Cir	101.400	1215.50	1219.69	4.132	1218.42	1221.09	n/a	1221.09 j	16	Manhole
18	CB213 TO CB215	12.64	18	Cir	249.662	1219.89	1230.94	4.426	1221.09	1232.28	n/a	1232.28	17	Manhole
19	CB215 TO CB217	10.94	18	Cir	177.056	1231.14	1236.65	3.112	1232.28	1237.92	n/a	1237.92	18	Manhole
20	CB217 TO CB218	7.22	15	Cir	23.492	1240.31	1240.84	2.256	1241.07	1241.91	0.65	1241.91	19	Manhole
21	CB217 TO CB219	0.70	15	Cir	156.734	1236.90	1239.42	1.608	1237.92	1239.75	n/a	1239.75 j	19	Manhole
22	CB215 TO CB216	1.18	15	Cir	18.001	1231.19	1231.94	4.167	1232.28	1232.37	n/a	1232.37 j	18	Manhole
23	CB213 TO CB214	1.40	15	Cir	18.001	1219.94	1220.69	4.167	1221.09	1221.16	n/a	1221.16 j	17	Manhole
24	CB210 TO CB237	9.19	18	Cir	209.117	1169.71	1181.70	5.734	1171.47	1182.87	n/a	1182.87 j	11	Manhole

Project File: BASIN 2 - 7-1-21.stm | Number of lines: 74 | Run Date: 7/1/2021

NOTES: Return period = 100 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	CB237 TO CB239	4.70	18	Cir	257.102	1181.90	1195.70	5.367	1182.87	1196.53	n/a	1196.53 j	24	Manhole
26	CB239 TO CB240	3.93	18	Cir	18.001	1195.90	1196.08	1.000	1196.53	1196.84	0.04	1196.84	25	Manhole
27	CB240 TO STMH216	2.87	18	Cir	118.000	1196.28	1197.75	1.246	1196.84	1198.39	0.24	1198.39	26	Manhole
28	CB201 TO CB322	20.02	18	Cir	148.797	1160.58	1172.48	7.997	1161.44	1173.95	n/a	1173.95	5	Manhole
29	CB322 TO CB323	19.59	18	Cir	112.435	1172.68	1174.08	1.245	1174.18*	1177.52*	1.91	1179.43	28	Manhole
30	CB323 TO CB325	11.74	18	Cir	246.683	1174.28	1185.08	4.378	1179.43	1186.38	n/a	1186.38 j	29	Manhole
31	CB325 TO CB327	6.49	18	Cir	186.000	1185.28	1193.07	4.188	1186.38	1194.06	n/a	1194.06 j	30	Manhole
32	CB327 TO STMH317	3.76	18	Cir	118.000	1193.27	1194.74	1.246	1194.06	1195.48	n/a	1195.48 j	31	Manhole
33	CB327 TO CB328	1.13	15	Cir	18.001	1193.32	1194.95	9.055	1194.06	1195.37	n/a	1195.37 j	31	Manhole
34	CB325 TO STMH316	3.46	18	Cir	118.000	1185.28	1186.75	1.246	1186.38	1187.46	n/a	1187.46 j	30	Manhole
35	CB325 TO CB326	1.16	15	Cir	18.001	1185.33	1186.58	6.944	1186.38	1187.00	n/a	1187.00 j	30	Manhole
36	CB237 TO CB238	3.31	18	Cir	18.001	1181.90	1182.08	1.000	1182.87	1182.77	0.04	1182.77	24	Manhole
37	CB238 TO STMH215	2.02	18	Cir	118.000	1182.28	1183.75	1.246	1182.77	1184.29	n/a	1184.29	36	Manhole
38	CB323 TO STMH315	5.75	18	Cir	118.000	1174.28	1175.75	1.246	1179.43*	1179.73*	0.16	1179.89	29	Manhole
39	CB323 TO CB324	1.51	18	Cir	18.001	1174.28	1175.49	6.722	1179.43*	1179.43*	0.01	1179.44	29	Manhole
40	CB210 TO CB211	1.30	15	Cir	18.001	1170.26	1170.99	4.055	1171.47	1171.44	n/a	1171.44 j	11	Manhole
41	CB201 TO CB202	5.56	18	Cir	18.001	1154.77	1157.51	15.222	1158.89	1158.92	0.11	1159.04	5	Manhole
42	CB202 TO STMH204	4.59	18	Cir	40.751	1158.51	1163.46	12.147	1159.04	1164.28	0.23	1164.28	41	Manhole
43	STMH204 TO STMH205	4.68	18	Cir	87.000	1163.66	1164.75	1.253	1164.29	1165.58	n/a	1165.58	42	Manhole
44	CB207 TO CB208	1.27	18	Cir	18.001	1161.73	1161.91	1.000	1165.47*	1165.47*	0.01	1165.48	9	Manhole
45	CB205 TO CB206	1.89	18	Cir	18.001	1160.24	1160.47	1.278	1163.01*	1163.01*	0.02	1163.03	8	Manhole
46	CB204 TO STMH206	8.30	18	Cir	118.000	1155.87	1157.05	1.000	1161.34*	1161.96*	0.34	1162.31	7	Manhole
47	EW TO STMH301	44.46	30	Cir	142.514	1122.00	1122.71	0.498	1124.22*	1125.74*	1.24	1126.98	End	Manhole
48	STMH301 TO STMH302	44.60	30	Cir	74.067	1122.91	1123.28	0.500	1126.98*	1127.73*	0.19	1127.92	47	Manhole

Project File: BASIN 2 - 7-1-21.stm | Number of lines: 74 | Run Date: 7/1/2021

NOTES: Return period = 100 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
49	STMH302 TO STMH303	44.65	18	Cir	74.067	1124.28	1145.48	28.623	1127.92	1146.98	n/a	1146.98 j	48	Manhole
50	STMH303 TO STMH305	34.35	18	Cir	203.955	1146.48	1165.93	9.536	1147.68	1167.43	5.88	1167.43	49	Manhole
51	STMH305 TO CB306	26.69	18	Cir	138.701	1166.13	1172.94	4.910	1167.46	1174.43	n/a	1174.43	50	Manhole
52	CB306 TO CB307	24.91	18	Cir	18.001	1173.14	1173.32	1.000	1174.64*	1175.51*	3.09	1178.60	51	Manhole
53	CB307 TO CB318	2.38	18	Cir	213.358	1179.44	1196.51	8.001	1179.72	1197.09	n/a	1197.09	52	Manhole
54	CB318 TO CB320	1.26	18	Cir	241.600	1196.71	1208.67	4.950	1197.09	1209.09	0.15	1209.09	53	Manhole
55	CB320 TO CB321	0.62	18	Cir	18.001	1208.87	1209.33	2.555	1209.09	1209.62	n/a	1209.62	54	Manhole
56	CB318 TO CB319	0.74	18	Cir	18.001	1196.72	1196.92	1.111	1197.09	1197.24	n/a	1197.24 j	53	Manhole
57	CB307 TO STMH308	17.75	18	Cir	124.850	1173.52	1174.77	1.001	1178.60*	1181.64*	1.57	1183.21	52	Manhole
58	STMH308 TO CB312	11.13	18	Cir	157.357	1174.97	1185.69	6.813	1183.21	1186.97	n/a	1186.97 j	57	Manhole
59	CB312 TO CB313	8.59	18	Cir	18.001	1185.89	1186.07	1.000	1186.97	1187.20	0.20	1187.20	58	Manhole
60	CB313 TO STMH309	6.31	18	Cir	27.247	1186.27	1186.54	0.991	1187.20	1187.51	0.15	1187.51	59	Manhole
61	STMH309 TO STMH310	6.40	18	Cir	92.000	1186.74	1187.89	1.250	1187.51	1188.87	0.43	1188.87	60	Manhole
62	CB307 TO CB308	9.80	18	Cir	116.387	1173.52	1177.56	3.471	1178.60*	1179.46*	0.48	1179.94	52	Manhole
63	CB308 TO CB310	7.16	18	Cir	58.413	1177.76	1178.34	0.993	1179.94*	1180.17*	0.19	1180.36	62	Manhole
64	CB310 TO CB311	5.59	18	Cir	18.001	1178.54	1178.72	1.000	1180.36*	1180.41*	0.02	1180.43	63	Manhole
65	CB311 TO STMH307	3.87	18	Cir	118.000	1178.92	1180.69	1.500	1180.43	1181.44	n/a	1181.44 j	64	Manhole
66	CB308 TO CB309	0.62	18	Cir	18.001	1177.76	1179.38	9.000	1179.94	1179.93	0.02	1179.94	62	Manhole
67	STMH305 TO CB304	4.27	18	Cir	118.000	1166.13	1167.31	1.000	1167.43	1168.10	n/a	1168.10 j	50	Manhole
68	CB304 TO CB305	3.31	18	Cir	21.288	1167.51	1167.72	0.986	1168.10	1168.41	0.16	1168.41	67	Manhole
69	CB305 TO STMH306	2.24	18	Cir	118.000	1167.92	1169.69	1.500	1168.41	1170.26	n/a	1170.26	68	Manhole
70	STMH303 TO CB301	7.26	18	Cir	118.000	1146.48	1152.24	4.881	1147.03	1153.28	n/a	1153.28	49	Manhole
71	CB301 TO CB303	3.31	18	Cir	21.312	1152.44	1154.75	10.839	1153.28	1155.44	n/a	1155.44 j	70	Manhole
72	CB303 TO STMH304	2.24	18	Cir	118.000	1154.95	1157.69	2.322	1155.44	1158.26	n/a	1158.26	71	Manhole

Project File: BASIN 2 - 7-1-21.stm | Number of lines: 74 | Run Date: 7/1/2021

NOTES: Return period = 100 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
73	CB301 TO CB302	2.97	18	Cir	141.603	1152.44	1154.56	1.497	1153.28	1155.21	n/a	1155.21 j	70	Manhole
74	OF TO OS201	10.00	48	Cir	107.664	1110.00	1112.00	1.858	1111.36	1112.92	n/a	1112.92 j	End	Manhole

Project File: BASIN 2 - 7-1-21.stm | Number of lines: 74 | Run Date: 7/1/2021

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	30.850	0.00	24.14	0.00	0.00	11.95	0.0	13.1	7.7	91.63	102.4	12.96	36	2.01	1118.00	1118.62	1124.86	1125.36	1121.71	1131.62	EW TO STMH200
2	1	159.537	0.00	24.14	0.00	0.00	11.95	0.0	12.9	7.7	92.17	222.2	13.16	36	9.46	1120.52	1135.61	1127.92	1138.47	1131.62	1149.61	STMH200 TO ST
3	2	89.872	0.00	24.14	0.00	0.00	11.95	0.0	12.7	7.7	92.48	281.1	16.71	36	15.13	1136.61	1150.21	1138.47	1153.07	1149.61	1162.26	STMH201 TO ST
4	3	67.587	3.76	24.14	0.56	2.11	11.95	5.0	12.6	7.8	92.70	72.47	13.12	36	1.01	1151.21	1151.89	1154.21	1155.32	1162.26	1168.90	STMH202 TO ST
5	4	118.000	0.35	20.38	0.49	0.17	9.84	5.0	12.5	7.8	76.76	72.25	10.86	36	1.00	1152.09	1153.27	1155.73	1157.06	1168.90	1171.90	STMH203 TO CB
6	5	134.000	0.19	13.39	0.47	0.09	6.87	5.0	12.2	7.9	54.01	51.09	7.64	36	0.50	1153.47	1154.14	1158.89	1159.64	1171.90	1167.13	CB201 TO CB203
7	6	105.080	0.32	13.20	0.48	0.15	6.78	5.0	11.9	7.9	53.66	50.83	7.59	36	0.49	1154.35	1154.87	1159.86	1160.44	1167.13	1165.56	CB203 TO CB204
8	7	31.801	0.29	10.82	0.43	0.12	5.78	5.0	11.9	7.9	45.83	144.6	9.50	30	10.60	1155.87	1159.24	1161.34	1161.56	1165.56	1165.47	CB204 TO CB205
9	8	128.122	0.15	10.12	0.47	0.07	5.46	5.0	11.6	8.0	43.61	56.75	8.89	30	1.63	1159.44	1161.53	1163.01	1164.24	1165.47	1166.91	CB205 TO CB207
10	9	104.840	0.23	9.73	0.47	0.11	5.26	5.0	11.4	8.0	42.25	80.01	8.97	30	3.24	1161.73	1165.13	1165.47	1167.30	1166.91	1170.11	CB207 TO CB209
11	10	151.106	0.27	9.50	0.49	0.13	5.15	5.0	11.2	8.1	41.61	40.75	13.29	24	2.77	1165.33	1169.51	1167.30	1171.47	1170.11	1177.99	CB209 TO CB210
12	11	118.000	0.63	6.46	0.44	0.28	3.86	5.0	11.0	8.1	31.32	23.00	9.97	24	0.88	1169.71	1170.75	1171.71	1173.64	1177.99	1177.62	CB210 TO STMH
13	12	54.596	0.00	5.83	0.00	0.00	3.58	0.0	11.0	8.1	29.11	30.95	16.47	18	7.40	1170.95	1174.99	1174.75	1178.33	1177.62	1185.49	STMH207 TO ST
14	13	73.512	2.43	5.83	0.61	1.48	3.58	5.0	10.9	8.1	29.17	69.25	16.51	18	37.06	1175.99	1203.23	1178.96	1204.72	1185.49	1216.23	STMH208 TO ST
15	14	94.000	0.00	3.40	0.00	0.00	2.10	0.0	10.7	8.2	17.17	38.15	15.42	18	11.24	1204.23	1214.80	1204.94	1216.24	1216.23	1222.58	STMH209 TO ST
16	15	29.654	0.56	3.40	0.51	0.29	2.10	5.0	10.7	8.2	17.20	11.44	9.73	18	1.01	1215.00	1215.30	1216.50	1217.18	1222.58	1221.30	STMH210 TO CB
17	16	101.400	0.34	2.84	0.47	0.16	1.81	5.0	10.5	8.2	14.94	23.13	8.57	18	4.13	1215.50	1219.69	1218.42	1221.09	1221.30	1225.69	CB212 TO CB213
18	17	249.662	0.18	2.22	0.55	0.10	1.51	5.0	10.0	8.4	12.64	23.93	7.95	18	4.43	1219.89	1230.94	1221.09	1232.28	1225.69	1236.94	CB213 TO CB215
19	18	177.056	0.60	1.79	0.81	0.49	1.29	5.0	9.6	8.5	10.94	20.07	7.24	18	3.11	1231.14	1236.65	1232.28	1237.92	1236.94	1244.65	CB215 TO CB217
20	19	23.492	1.08	1.08	0.68	0.73	0.73	5.0	5.0	9.8	7.22	10.51	7.83	15	2.26	1240.31	1240.84	1241.07	1241.91	1244.65	1245.18	CB217 TO CB218
21	19	156.734	0.11	0.11	0.65	0.07	0.07	5.0	5.0	9.8	0.70	8.87	1.70	15	1.61	1236.90	1239.42	1237.92	1239.75	1244.65	1244.14	CB217 TO CB219
22	18	18.001	0.25	0.25	0.48	0.12	0.12	5.0	5.0	9.8	1.18	14.28	2.11	15	4.17	1231.19	1231.94	1232.28	1232.37	1236.94	1236.94	CB215 TO CB216

Project File: BASIN 2 - 7-1-21.stm

Number of lines: 74

Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	17	18.001	0.28	0.28	0.51	0.14	0.14	5.0	5.0	9.8	1.40	14.28	2.27	15	4.17	1219.94	1220.69	1221.09	1221.16	1225.69	1225.69	CB213 TO CB214
24	11	209.117	0.36	2.47	0.48	0.17	1.03	5.0	7.9	8.9	9.19	27.24	5.70	18	5.73	1169.71	1181.70	1171.47	1182.87	1177.99	1190.44	CB210 TO CB237
25	24	257.102	0.28	1.31	0.30	0.08	0.50	5.0	6.3	9.4	4.70	26.36	4.28	18	5.37	1181.90	1195.70	1182.87	1196.53	1190.44	1205.57	CB237 TO CB239
26	25	18.001	0.24	1.03	0.52	0.12	0.42	5.0	6.2	9.4	3.93	11.37	4.97	18	1.00	1195.90	1196.08	1196.53	1196.84	1205.57	1205.57	CB239 TO CB240
27	26	118.000	0.79	0.79	0.37	0.29	0.29	5.0	5.0	9.8	2.87	12.70	4.38	18	1.25	1196.28	1197.75	1196.84	1198.39	1205.57	1205.45	CB240 TO STMH
28	5	148.797	0.11	5.23	0.54	0.06	2.22	5.0	7.6	9.0	20.02	32.17	15.29	18	8.00	1160.58	1172.48	1161.44	1173.95	1171.90	1178.53	CB201 TO CB322
29	28	112.435	0.32	5.12	0.48	0.15	2.16	5.0	7.4	9.1	19.59	12.69	11.09	18	1.25	1172.68	1174.08	1174.18	1177.52	1178.53	1183.49	CB322 TO CB323
30	29	246.683	0.24	2.90	0.49	0.12	1.27	5.0	6.8	9.3	11.74	23.80	6.93	18	4.38	1174.28	1185.08	1179.43	1186.38	1183.49	1194.58	CB323 TO CB325
31	30	186.000	0.33	1.54	0.56	0.18	0.68	5.0	5.9	9.5	6.49	23.28	4.97	18	4.19	1185.28	1193.07	1186.38	1194.06	1194.58	1202.95	CB325 TO CB327
32	31	118.000	0.98	0.98	0.39	0.38	0.38	5.0	5.0	9.8	3.76	12.70	4.17	18	1.25	1193.27	1194.74	1194.06	1195.48	1202.95	1201.93	CB327 TO STMH
33	31	18.001	0.23	0.23	0.50	0.12	0.12	5.0	5.0	9.8	1.13	21.05	2.32	15	9.06	1193.32	1194.95	1194.06	1195.37	1202.95	1202.95	CB327 TO CB328
34	30	118.000	0.88	0.88	0.40	0.35	0.35	5.0	5.0	9.8	3.46	12.70	3.35	18	1.25	1185.28	1186.75	1186.38	1187.46	1194.58	1193.54	CB325 TO STMH
35	30	18.001	0.24	0.24	0.49	0.12	0.12	5.0	5.0	9.8	1.16	18.43	2.10	15	6.94	1185.33	1186.58	1186.38	1187.00	1194.58	1194.58	CB325 TO CB326
36	24	18.001	0.31	0.80	0.49	0.15	0.36	5.0	6.7	9.3	3.31	11.37	3.44	18	1.00	1181.90	1182.08	1182.87	1182.77	1190.44	1190.44	CB237 TO CB238
37	36	118.000	0.49	0.49	0.42	0.21	0.21	5.0	5.0	9.8	2.02	12.70	3.78	18	1.25	1182.28	1183.75	1182.77	1184.29	1190.44	1190.83	CB238 TO STMH
38	29	118.000	1.58	1.58	0.37	0.58	0.58	5.0	5.0	9.8	5.75	12.70	3.25	18	1.25	1174.28	1175.75	1179.43	1179.73	1183.49	1183.10	CB323 TO STMH
39	29	18.001	0.32	0.32	0.48	0.15	0.15	5.0	5.0	9.8	1.51	29.49	0.85	18	6.72	1174.28	1175.49	1179.43	1179.43	1183.49	1183.49	CB323 TO CB324
40	11	18.001	0.30	0.30	0.44	0.13	0.13	5.0	5.0	9.8	1.30	14.09	2.17	15	4.06	1170.26	1170.99	1171.47	1171.44	1177.99	1177.99	CB210 TO CB211
41	5	18.001	0.22	1.41	0.48	0.11	0.58	5.0	5.8	9.6	5.56	44.38	3.18	18	15.22	1154.77	1157.51	1158.89	1158.92	1171.90	1171.90	CB201 TO CB202
42	41	40.751	0.00	1.19	0.00	0.00	0.48	0.0	5.5	9.6	4.59	39.65	6.46	18	12.15	1158.51	1163.46	1159.04	1164.28	1171.90	1173.77	CB202 TO STMH
43	42	87.000	1.19	1.19	0.40	0.48	0.48	5.0	5.0	9.8	4.68	12.73	5.66	18	1.25	1163.66	1164.75	1164.29	1165.58	1173.77	1172.35	STMH204 TO ST
44	9	18.001	0.24	0.24	0.54	0.13	0.13	5.0	5.0	9.8	1.27	11.38	0.72	18	1.00	1161.73	1161.91	1165.47	1165.47	1166.91	1166.91	CB207 TO CB208

Project File: BASIN 2 - 7-1-21.stm

Number of lines: 74

Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	8	18.001	0.41	0.41	0.47	0.19	0.19	5.0	5.0	9.8	1.89	12.86	1.07	18	1.28	1160.24	1160.47	1163.01	1163.01	1165.47	1165.47	CB205 TO CB206
46	7	118.000	2.06	2.06	0.41	0.84	0.84	5.0	5.0	9.8	8.30	11.38	4.70	18	1.00	1155.87	1157.05	1161.34	1161.96	1165.56	1166.00	CB204 TO STMH
47	End	142.514	0.00	11.07	0.00	0.00	5.95	0.0	14.1	7.5	44.46	31.36	9.35	30	0.50	1122.00	1122.71	1124.22	1125.74	1125.21	1129.04	EW TO STMH301
48	47	74.067	0.00	11.07	0.00	0.00	5.95	0.0	14.0	7.5	44.60	31.40	9.09	30	0.50	1122.91	1123.28	1126.98	1127.73	1129.04	1135.99	STMH301 TO ST
49	48	74.067	1.19	11.07	0.51	0.61	5.95	5.0	13.9	7.5	44.65	60.86	25.27	18	28.62	1124.28	1145.48	1127.92	1146.98	1135.99	1160.30	STMH302 TO ST
50	49	203.955	0.86	8.45	0.66	0.57	4.56	5.0	13.8	7.5	34.35	35.13	21.05	18	9.54	1146.48	1165.93	1147.68	1167.43	1160.30	1176.69	STMH303 TO ST
51	50	138.701	0.40	6.81	0.59	0.24	3.53	5.0	13.6	7.6	26.69	25.21	15.61	18	4.91	1166.13	1172.94	1167.46	1174.43	1176.69	1190.12	STMH305 TO CB
52	51	18.001	0.16	6.41	0.54	0.09	3.30	5.0	13.6	7.6	24.91	11.37	14.10	18	1.00	1173.14	1173.32	1174.64	1175.51	1190.12	1190.12	CB306 TO CB307
53	52	213.358	0.14	0.46	0.63	0.09	0.30	5.0	11.4	8.0	2.38	32.18	7.19	18	8.00	1179.44	1196.51	1179.72	1197.09	1190.12	1202.92	CB307 TO CB318
54	53	241.600	0.10	0.20	0.69	0.07	0.13	5.0	5.9	9.5	1.26	25.31	3.33	18	4.95	1196.71	1208.67	1197.09	1209.09	1202.92	1217.33	CB318 TO CB320
55	54	18.001	0.10	0.10	0.63	0.06	0.06	5.0	5.0	9.8	0.62	18.19	3.21	18	2.56	1208.87	1209.33	1209.09	1209.62	1217.33	1217.33	CB320 TO CB321
56	53	18.001	0.12	0.12	0.63	0.08	0.08	5.0	5.0	9.8	0.74	11.99	2.43	18	1.11	1196.72	1196.92	1197.09	1197.24	1202.92	1202.92	CB318 TO CB319
57	52	124.850	1.30	3.73	0.55	0.72	1.87	5.0	6.0	9.5	17.75	11.38	10.05	18	1.00	1173.52	1174.77	1178.60	1181.64	1190.12	1189.90	CB307 TO STMH
58	57	157.357	0.41	2.43	0.65	0.27	1.16	5.0	5.6	9.6	11.13	29.69	6.63	18	6.81	1174.97	1185.69	1183.21	1186.97	1189.90	1198.01	STMH308 TO CB
59	58	18.001	0.47	2.02	0.51	0.24	0.89	5.0	5.6	9.6	8.59	11.37	6.16	18	1.00	1185.89	1186.07	1186.97	1187.20	1198.01	1198.01	CB312 TO CB313
60	59	27.247	0.00	1.55	0.00	0.00	0.65	0.0	5.4	9.7	6.31	11.32	5.33	18	0.99	1186.27	1186.54	1187.20	1187.51	1198.01	1198.63	CB313 TO STMH
61	60	92.000	1.55	1.55	0.42	0.65	0.65	5.0	5.0	9.8	6.40	12.72	6.13	18	1.25	1186.74	1187.89	1187.51	1188.87	1198.63	1198.00	STMH309 TO ST
62	52	116.387	0.59	2.06	0.38	0.22	1.04	5.0	6.2	9.4	9.80	21.20	5.55	18	3.47	1173.52	1177.56	1178.60	1179.46	1190.12	1185.38	CB307 TO CB308
63	62	58.413	0.32	1.39	0.52	0.17	0.75	5.0	6.0	9.5	7.16	11.34	4.05	18	0.99	1177.76	1178.34	1179.94	1180.17	1185.38	1189.08	CB308 TO CB310
64	63	18.001	0.38	1.07	0.51	0.19	0.59	5.0	5.9	9.5	5.59	11.37	3.17	18	1.00	1178.54	1178.72	1180.36	1180.41	1189.08	1189.08	CB310 TO CB311
65	64	118.000	0.69	0.69	0.57	0.39	0.39	5.0	5.0	9.8	3.87	13.93	3.28	18	1.50	1178.92	1180.69	1180.43	1181.44	1189.08	1188.12	CB311 TO STMH
66	62	18.001	0.08	0.08	0.79	0.06	0.06	5.0	5.0	9.8	0.62	34.13	0.71	18	9.00	1177.76	1179.38	1179.94	1179.93	1185.38	1185.38	CB308 TO CB309

Project File: BASIN 2 - 7-1-21.stm | Number of lines: 74 | Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
67	50	118.000	0.18	0.78	0.59	0.11	0.46	5.0	6.7	9.3	4.27	11.38	3.57	18	1.00	1166.13	1167.31	1167.43	1168.10	1176.69	1177.61	STMH305 TO CB
68	67	21.288	0.25	0.60	0.51	0.13	0.36	5.0	6.6	9.3	3.31	11.30	4.63	18	0.99	1167.51	1167.72	1168.10	1168.41	1177.61	1176.93	CB304 TO CB305
69	68	118.000	0.35	0.35	0.65	0.23	0.23	5.0	5.0	9.8	2.24	13.93	4.05	18	1.50	1167.92	1169.69	1168.41	1170.26	1176.93	1175.89	CB305 TO STMH
70	49	118.000	0.25	1.43	0.51	0.13	0.78	5.0	6.7	9.3	7.26	25.13	8.92	18	4.88	1146.48	1152.24	1147.03	1153.28	1160.30	1166.32	STMH303 TO CB
71	70	21.312	0.25	0.60	0.51	0.13	0.36	5.0	6.6	9.3	3.31	37.45	3.69	18	10.84	1152.44	1154.75	1153.28	1155.44	1166.32	1165.75	CB301 TO CB303
72	71	118.000	0.35	0.35	0.65	0.23	0.23	5.0	5.0	9.8	2.24	17.34	4.05	18	2.32	1154.95	1157.69	1155.44	1158.26	1165.75	1164.58	CB303 TO STMH
73	70	141.603	0.58	0.58	0.52	0.30	0.30	5.0	5.0	9.8	2.97	13.92	3.45	18	1.50	1152.44	1154.56	1153.28	1155.21	1166.32	1159.41	CB301 TO CB302
74	End	107.664	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	10.00	212.1	3.62	48	1.86	1110.00	1112.00	1111.36	1112.92	1114.74	1120.00	OF TO OS201

Project File: BASIN 2 - 7-1-21.stm

Number of lines: 74

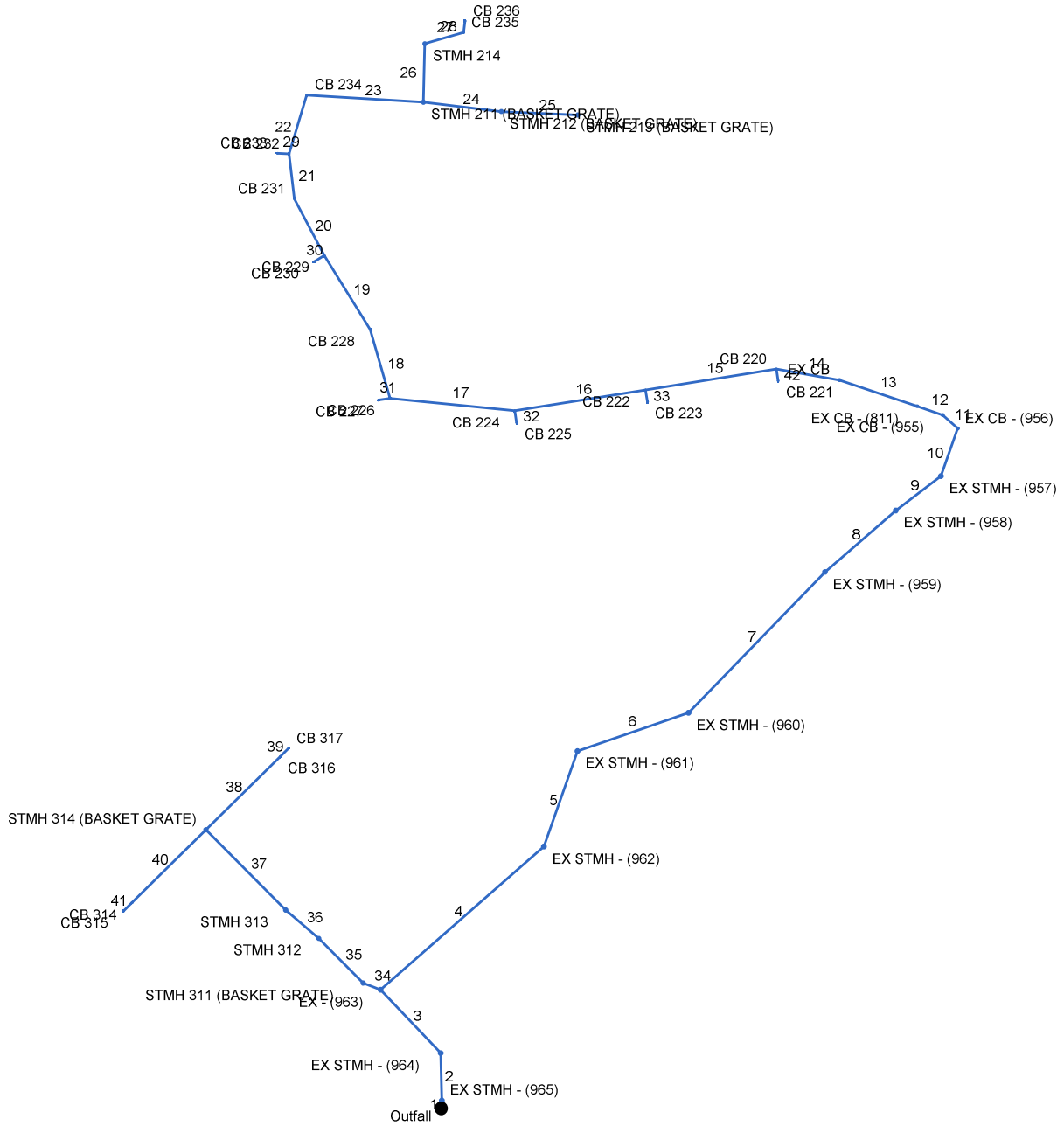
Run Date: 7/1/2021

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

100-yr Storm Sewer Analysis

Tributary to Basin 3

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



Project File: BASIN 3 - 7-1-21.stm	Number of lines: 42	Date: 7/1/2021

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	EX - (2151)	17.06	48	Cir	11.837	1109.21	1111.13	16.221	1111.82	1112.34	n/a	1112.34	End	Manhole
2	EX - (2150)	17.27	48	Cir	72.030	1112.49	1122.30	13.619	1112.99	1123.52	n/a	1123.52	1	Manhole
3	EX - (2149)	17.66	48	Cir	132.245	1123.00	1165.85	32.402	1123.52	1167.08	n/a	1167.08	2	Manhole
4	EX - (2148)	11.38	48	Cir	328.625	1166.01	1169.03	0.919	1167.08	1170.01	n/a	1170.01 j	3	Manhole
5	EX - (2147)	11.98	48	Cir	153.196	1169.22	1170.01	0.516	1170.14	1171.02	0.29	1171.02	4	Manhole
6	EX - (2146)	12.76	48	Cir	177.419	1170.30	1172.14	1.037	1171.10	1173.18	0.19	1173.18	5	Manhole
7	EX - (2145)	14.30	48	Cir	296.795	1172.14	1175.16	1.018	1173.18	1176.27	n/a	1176.27	6	Manhole
8	EX - (2144)	15.20	48	Cir	141.829	1175.23	1176.40	0.825	1176.27	1177.54	n/a	1177.54	7	Manhole
9	EX - (2143)	15.81	48	Cir	85.934	1176.51	1177.41	1.047	1177.54	1178.58	n/a	1178.58	8	Manhole
10	EX - (2142)	16.40	48	Cir	76.692	1177.41	1178.20	1.030	1178.58	1179.39	n/a	1179.39	9	Manhole
11	EX - (2141)	16.49	30	Cir	30.404	1178.40	1178.70	0.986	1179.51	1180.07	n/a	1180.07	10	Manhole
12	EX - (2140)	16.62	30	Cir	40.956	1178.90	1181.28	5.811	1180.07	1182.66	n/a	1182.66	11	Manhole
13	Pipe - (1503)	17.02	30	Cir	123.648	1181.37	1184.68	2.677	1182.66	1186.07	0.11	1186.07	12	Manhole
14	EX CB to CB 220	17.23	24	Cir	97.008	1184.96	1191.90	7.154	1186.07	1193.40	1.09	1193.40	13	Generic
15	CB 220 to CB 222	16.63	18	Cir	200.000	1192.10	1205.90	6.900	1193.40	1207.33	n/a	1207.33	14	Generic
16	CB 222 to CB 224	14.31	18	Cir	200.000	1206.10	1212.55	3.225	1207.33	1213.94	n/a	1213.94	15	Generic
17	CB 224 to CB 226	13.75	18	Cir	189.253	1212.75	1214.65	1.004	1214.25*	1217.02*	1.44	1218.46	16	Generic
18	CB 226 to CB 228	11.17	18	Cir	108.631	1214.85	1219.28	4.078	1218.46	1220.56	n/a	1220.56 j	17	Generic
19	CB 228 to CB 229	10.00	18	Cir	131.788	1219.48	1226.10	5.023	1220.56	1227.32	n/a	1227.32	18	Generic
20	CB 229 to CB 231	8.59	18	Cir	97.002	1226.30	1233.06	6.969	1227.32	1234.19	n/a	1234.19	19	Generic
21	CB 231 to CB 232	8.20	18	Cir	68.479	1233.26	1235.37	3.081	1234.19	1236.48	0.79	1236.48	20	Generic
22	CB 232 to CB 234	7.50	18	Cir	93.205	1235.57	1239.97	4.721	1236.48	1241.03	0.72	1241.03	21	Generic
23	CB 234 to STMH 211	6.06	18	Cir	176.662	1240.17	1249.01	5.004	1241.03	1249.96	0.41	1249.96	22	Manhole
24	STMH 211 to STMH 212	2.98	18	Cir	118.544	1249.21	1256.74	6.352	1249.96	1257.40	n/a	1257.40 j	23	Manhole

Project File: BASIN 3 - 7-1-21.stm | Number of lines: 42 | Run Date: 7/1/2021

NOTES: Return period = 100 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	STMH 212 to STMH 213	1.84	18	Cir	115.567	1256.94	1259.80	2.475	1257.40	1260.31	n/a	1260.31	24	Manhole
26	STMH 211 to STMH 214	2.52	18	Cir	88.578	1249.21	1255.19	6.751	1249.96	1255.79	n/a	1255.79 j	23	Manhole
27	STMH 214 to CB 235	2.62	18	Cir	60.988	1255.39	1257.83	4.001	1255.79	1258.44	n/a	1258.44	26	Generic
28	CB 235 to CB 236	1.28	18	Cir	18.001	1258.03	1259.83	9.999	1258.44	1260.25	n/a	1260.25	27	Generic
29	CB 232 to CB 233	0.63	18	Cir	18.001	1235.57	1236.36	4.389	1236.48	1236.66	n/a	1236.66 j	21	Generic
30	CB 229 to CB 230	0.98	18	Cir	18.001	1226.30	1227.08	4.333	1227.32	1227.45	n/a	1227.45 j	19	Generic
31	CB 226 to CB 227	1.60	18	Cir	18.001	1214.85	1215.63	4.333	1218.46*	1218.46*	0.01	1218.47	17	Generic
32	CB 224 to CB 225	0.58	18	Cir	18.001	1212.75	1214.43	9.333	1213.94	1214.71	n/a	1214.71 j	16	Generic
33	CB 222 to CB 223	0.56	18	Cir	18.001	1206.10	1206.90	4.445	1207.33	1207.18	0.10	1207.18	15	Generic
34	EX INLET MH to STMH 311	13.90	18	Cir	28.153	1170.00	1180.00	35.521	1170.46	1181.38	0.49	1181.38	3	Manhole
35	STMH 311 to STMH 312	7.98	18	Cir	95.000	1180.20	1187.70	7.895	1181.38	1188.79	n/a	1188.79 j	34	Manhole
36	STMH 312 to STMH 313	8.06	18	Cir	66.217	1187.90	1188.56	0.997	1188.83	1189.66	0.08	1189.66	35	Manhole
37	STMH 313 to STMH 314	8.29	18	Cir	171.111	1188.76	1190.47	0.999	1189.71	1191.58	n/a	1191.58	36	Manhole
38	STMH 314 to CB 316	2.21	18	Cir	157.358	1190.67	1196.53	3.724	1191.58	1197.09	n/a	1197.09 j	37	Generic
39	CB 316 to CB 317	1.31	18	Cir	18.000	1196.73	1197.53	4.445	1197.09	1197.96	0.15	1197.96	38	Generic
40	STMH 314 to CB 314	4.03	18	Cir	157.358	1190.67	1192.24	0.998	1191.58	1193.01	n/a	1193.01 j	37	Generic
41	CB 314 to CB 315	2.34	18	Cir	18.001	1192.44	1193.24	4.445	1193.01	1193.82	0.22	1193.82	40	Generic
42	CB 220 to CB 221	0.58	18	Cir	18.001	1192.10	1192.90	4.445	1193.40	1193.18	0.10	1193.18	14	Generic

Project File: BASIN 3 - 7-1-21.stm | Number of lines: 42 | Run Date: 7/1/2021

NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	11.837	0.00	9.95	0.00	0.00	4.73	0.0	33.7	3.6	17.06	578.5	3.64	48	16.22	1109.21	1111.13	1111.82	1112.34	1141.29	1149.38	EX - (2151)
2	1	72.030	0.00	9.95	0.00	0.00	4.73	0.0	32.9	3.7	17.27	530.1	12.33	48	13.62	1112.49	1122.30	1112.99	1123.52	1149.38	1152.67	EX - (2150)
3	2	132.245	0.00	9.95	0.00	0.00	4.73	0.0	31.7	3.7	17.66	817.7	11.91	48	32.40	1123.00	1165.85	1123.52	1167.08	1152.67	1195.08	EX - (2149)
4	3	328.625	0.00	6.53	0.00	0.00	2.76	0.0	26.4	4.1	11.38	137.7	4.47	48	0.92	1166.01	1169.03	1167.08	1170.01	1195.08	1195.43	EX - (2148)
5	4	153.196	0.00	6.53	0.00	0.00	2.76	0.0	24.0	4.3	11.98	103.2	5.14	48	0.52	1169.22	1170.01	1170.14	1171.02	1195.43	1197.37	EX - (2147)
6	5	177.419	0.00	6.53	0.00	0.00	2.76	0.0	21.3	4.6	12.76	146.3	6.02	48	1.04	1170.30	1172.14	1171.10	1173.18	1197.37	1196.69	EX - (2146)
7	6	296.795	0.00	6.53	0.00	0.00	2.76	0.0	17.1	5.2	14.30	144.9	5.27	48	1.02	1172.14	1175.16	1173.18	1176.27	1196.69	1198.59	EX - (2145)
8	7	141.829	0.00	6.53	0.00	0.00	2.76	0.0	15.0	5.5	15.20	130.5	5.51	48	0.82	1175.23	1176.40	1176.27	1177.54	1198.59	1198.03	EX - (2144)
9	8	85.934	0.00	6.53	0.00	0.00	2.76	0.0	13.8	5.7	15.81	147.0	5.68	48	1.05	1176.51	1177.41	1177.54	1178.58	1198.03	1197.72	EX - (2143)
10	9	76.692	0.00	6.53	0.00	0.00	2.76	0.0	12.8	5.9	16.40	145.8	5.32	48	1.03	1177.41	1178.20	1178.58	1179.39	1197.72	1197.78	EX - (2142)
11	10	30.404	0.00	6.53	0.00	0.00	2.76	0.0	12.6	6.0	16.49	40.73	6.92	30	0.99	1178.40	1178.70	1179.51	1180.07	1197.78	1197.60	EX - (2141)
12	11	40.956	0.00	6.53	0.00	0.00	2.76	0.0	12.4	6.0	16.62	98.86	6.68	30	5.81	1178.90	1181.28	1180.07	1182.66	1197.60	1197.43	EX - (2140)
13	12	123.648	0.00	6.53	0.00	0.00	2.76	0.0	11.8	6.2	17.02	72.69	6.37	30	2.68	1181.37	1184.68	1182.66	1186.07	1197.43	1190.34	Pipe - (1503)
14	13	97.008	0.11	6.53	0.60	0.07	2.76	5.0	11.5	6.2	17.23	65.54	8.21	24	7.15	1184.96	1191.90	1186.07	1193.40	1190.34	1197.90	EX CB to CB 220
15	14	200.000	1.02	6.30	0.33	0.34	2.62	5.0	11.1	6.3	16.63	29.88	9.90	18	6.90	1192.10	1205.90	1193.40	1207.33	1197.90	1211.90	CB 220 to CB 222
16	15	200.000	0.09	5.17	0.59	0.05	2.22	5.0	10.7	6.4	14.31	20.43	8.79	18	3.23	1206.10	1212.55	1207.33	1213.94	1211.90	1219.43	CB 222 to CB 224
17	16	189.253	0.63	4.96	0.36	0.23	2.10	5.0	10.3	6.6	13.75	11.40	7.78	18	1.00	1212.75	1214.65	1214.25	1217.02	1219.43	1221.63	CB 224 to CB 226
18	17	108.631	0.57	3.97	0.35	0.20	1.68	5.0	10.0	6.6	11.17	22.97	6.64	18	4.08	1214.85	1219.28	1218.46	1220.56	1221.63	1224.28	CB 226 to CB 228
19	18	131.788	0.31	3.40	0.36	0.11	1.49	5.0	9.6	6.7	10.00	25.50	6.94	18	5.02	1219.48	1226.10	1220.56	1227.32	1224.28	1232.08	CB 228 to CB 229
20	19	97.002	0.19	2.85	0.37	0.07	1.26	5.0	9.3	6.8	8.59	30.03	6.36	18	6.97	1226.30	1233.06	1227.32	1234.19	1232.08	1238.04	CB 229 to CB 231
21	20	68.479	0.08	2.66	0.54	0.04	1.19	5.0	9.1	6.9	8.20	19.97	6.47	18	3.08	1233.26	1235.37	1234.19	1236.48	1238.04	1242.38	CB 231 to CB 232
22	21	93.205	0.58	2.44	0.41	0.24	1.07	5.0	8.7	7.0	7.50	24.72	6.16	18	4.72	1235.57	1239.97	1236.48	1241.03	1242.38	1248.27	CB 232 to CB 234

Project File: BASIN 3 - 7-1-21.stm

Number of lines: 42

Run Date: 7/1/2021

NOTES:Intensity = 41.42 / (Inlet time + 5.80) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	176.662	0.35	1.86	0.37	0.13	0.83	5.0	7.9	7.3	6.06	25.45	5.46	18	5.00	1240.17	1249.01	1241.03	1249.96	1248.27	1261.76	CB 234 to STMH
24	23	118.544	0.42	0.88	0.41	0.17	0.39	5.0	6.8	7.7	2.98	28.67	3.70	18	6.35	1249.21	1256.74	1249.96	1257.40	1261.76	1267.52	STMH 211 to ST
25	24	115.567	0.46	0.46	0.47	0.22	0.22	5.0	5.0	8.5	1.84	17.90	3.77	18	2.47	1256.94	1259.80	1257.40	1260.31	1267.52	1270.19	STMH 212 to ST
26	23	88.578	0.00	0.63	0.00	0.00	0.32	0.0	6.1	8.0	2.52	29.56	3.33	18	6.75	1249.21	1255.19	1249.96	1255.79	1261.76	1262.49	STMH 211 to ST
27	26	60.988	0.33	0.63	0.50	0.17	0.32	5.0	5.4	8.3	2.62	22.75	5.38	18	4.00	1255.39	1257.83	1255.79	1258.44	1262.49	1264.83	STMH 214 to CB
28	27	18.001	0.30	0.30	0.50	0.15	0.15	5.0	5.0	8.5	1.28	35.97	3.18	18	10.00	1258.03	1259.83	1258.44	1260.25	1264.83	1264.83	CB 235 to CB 236
29	21	18.001	0.14	0.14	0.53	0.07	0.07	5.0	5.0	8.5	0.63	23.83	1.57	18	4.39	1235.57	1236.36	1236.48	1236.66	1242.38	1242.36	CB 232 to CB 233
30	19	18.001	0.24	0.24	0.48	0.12	0.12	5.0	5.0	8.5	0.98	23.68	1.84	18	4.33	1226.30	1227.08	1227.32	1227.45	1232.08	1232.08	CB 229 to CB 230
31	17	18.001	0.36	0.36	0.52	0.19	0.19	5.0	5.0	8.5	1.60	23.68	0.90	18	4.33	1214.85	1215.63	1218.46	1218.46	1221.63	1221.63	CB 226 to CB 227
32	16	18.001	0.12	0.12	0.57	0.07	0.07	5.0	5.0	8.5	0.58	34.75	1.46	18	9.33	1212.75	1214.43	1213.94	1214.71	1219.43	1219.43	CB 224 to CB 225
33	15	18.001	0.11	0.11	0.60	0.07	0.07	5.0	5.0	8.5	0.56	23.98	1.43	18	4.44	1206.10	1206.90	1207.33	1207.18	1211.90	1211.90	CB 222 to CB 223
34	3	28.153	1.19	3.42	0.72	0.86	1.97	5.0	8.6	7.1	13.90	67.80	19.17	18	35.52	1170.00	1180.00	1170.46	1181.38	1195.08	1202.12	EX INLET MH to
35	34	95.000	0.00	2.23	0.00	0.00	1.11	0.0	8.3	7.2	7.98	31.96	5.57	18	7.89	1180.20	1187.70	1181.38	1188.79	1202.12	1207.54	STMH 311 to ST
36	35	66.217	0.00	2.23	0.00	0.00	1.11	0.0	8.0	7.2	8.06	11.36	6.39	18	1.00	1187.90	1188.56	1188.83	1189.66	1207.54	1207.17	STMH 312 to ST
37	36	171.111	0.82	2.23	0.45	0.37	1.11	5.0	7.5	7.4	8.29	11.37	6.46	18	1.00	1188.76	1190.47	1189.71	1191.58	1207.17	1198.94	STMH 313 to ST
38	37	157.358	0.20	0.52	0.56	0.11	0.27	5.0	5.4	8.3	2.21	21.95	2.81	18	3.72	1190.67	1196.53	1191.58	1197.09	1198.94	1203.53	STMH 314 to CB
39	38	18.000	0.32	0.32	0.48	0.15	0.15	5.0	5.0	8.5	1.31	23.98	3.57	18	4.44	1196.73	1197.53	1197.09	1197.96	1203.53	1203.53	CB 316 to CB 317
40	37	157.358	0.33	0.89	0.62	0.20	0.48	5.0	5.2	8.4	4.03	11.36	4.00	18	1.00	1190.67	1192.24	1191.58	1193.01	1198.94	1199.24	STMH 314 to CB
41	40	18.001	0.56	0.56	0.49	0.27	0.27	5.0	5.0	8.5	2.34	23.98	3.77	18	4.44	1192.44	1193.24	1193.01	1193.82	1199.24	1199.24	CB 314 to CB 315
42	14	18.001	0.12	0.12	0.57	0.07	0.07	5.0	5.0	8.5	0.58	23.98	1.44	18	4.44	1192.10	1192.90	1193.40	1193.18	1197.90	1197.90	CB 220 to CB 221

Project File: BASIN 3 - 7-1-21.stm

Number of lines: 42

Run Date: 7/1/2021

NOTES:Intensity = 41.42 / (Inlet time + 5.80) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

NOAA Atlas 14, Volume 2, Version 3
Location name: Washington, Pennsylvania, USA*
Latitude: 40.2047°, Longitude: -80.2083°
Elevation: 1121 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.317 (0.285-0.352)	0.378 (0.341-0.420)	0.458 (0.412-0.509)	0.518 (0.465-0.574)	0.596 (0.533-0.660)	0.656 (0.585-0.724)	0.712 (0.633-0.786)	0.770 (0.681-0.849)	0.849 (0.747-0.934)	0.905 (0.794-0.996)
10-min	0.492 (0.443-0.547)	0.591 (0.532-0.656)	0.712 (0.640-0.791)	0.800 (0.717-0.886)	0.912 (0.815-1.01)	0.994 (0.887-1.10)	1.07 (0.953-1.18)	1.15 (1.02-1.27)	1.25 (1.10-1.37)	1.32 (1.16-1.45)
15-min	0.604 (0.543-0.670)	0.722 (0.651-0.802)	0.875 (0.786-0.971)	0.984 (0.882-1.09)	1.13 (1.01-1.25)	1.23 (1.10-1.36)	1.33 (1.18-1.47)	1.43 (1.26-1.58)	1.56 (1.37-1.71)	1.65 (1.45-1.81)
30-min	0.799 (0.718-0.887)	0.967 (0.871-1.07)	1.20 (1.08-1.33)	1.37 (1.23-1.51)	1.59 (1.42-1.76)	1.76 (1.57-1.94)	1.92 (1.71-2.12)	2.09 (1.85-2.30)	2.31 (2.03-2.54)	2.47 (2.17-2.72)
60-min	0.975 (0.877-1.08)	1.19 (1.07-1.32)	1.50 (1.35-1.67)	1.74 (1.56-1.93)	2.06 (1.85-2.28)	2.32 (2.07-2.56)	2.57 (2.29-2.84)	2.83 (2.50-3.12)	3.19 (2.81-3.51)	3.47 (3.04-3.82)
2-hr	1.12 (1.01-1.24)	1.36 (1.23-1.51)	1.71 (1.54-1.89)	1.98 (1.78-2.19)	2.36 (2.12-2.60)	2.67 (2.38-2.93)	2.98 (2.65-3.27)	3.30 (2.92-3.61)	3.74 (3.28-4.09)	4.09 (3.57-4.47)
3-hr	1.19 (1.08-1.33)	1.44 (1.30-1.60)	1.81 (1.63-2.01)	2.10 (1.89-2.33)	2.50 (2.25-2.78)	2.83 (2.53-3.13)	3.18 (2.82-3.50)	3.53 (3.12-3.89)	4.03 (3.53-4.42)	4.42 (3.85-4.84)
6-hr	1.42 (1.29-1.57)	1.70 (1.55-1.89)	2.12 (1.93-2.35)	2.47 (2.24-2.72)	2.95 (2.66-3.24)	3.34 (3.00-3.66)	3.75 (3.35-4.10)	4.19 (3.72-4.56)	4.81 (4.22-5.22)	5.30 (4.62-5.74)
12-hr	1.68 (1.53-1.84)	2.00 (1.83-2.19)	2.48 (2.26-2.71)	2.86 (2.60-3.12)	3.42 (3.09-3.72)	3.88 (3.49-4.20)	4.36 (3.90-4.71)	4.88 (4.34-5.25)	5.62 (4.94-6.03)	6.22 (5.43-6.65)
24-hr	1.99 (1.84-2.18)	2.38 (2.19-2.60)	2.91 (2.68-3.18)	3.34 (3.06-3.65)	3.96 (3.62-4.31)	4.46 (4.06-4.85)	4.99 (4.52-5.42)	5.55 (5.01-6.01)	6.33 (5.67-6.85)	6.97 (6.20-7.53)
2-day	2.33 (2.15-2.55)	2.78 (2.56-3.04)	3.37 (3.11-3.68)	3.85 (3.54-4.20)	4.51 (4.14-4.91)	5.06 (4.62-5.50)	5.62 (5.12-6.10)	6.20 (5.62-6.72)	7.00 (6.31-7.59)	7.64 (6.84-8.30)
3-day	2.51 (2.33-2.71)	2.97 (2.76-3.22)	3.58 (3.32-3.87)	4.07 (3.77-4.40)	4.75 (4.39-5.13)	5.30 (4.88-5.71)	5.86 (5.39-6.32)	6.44 (5.90-6.94)	7.25 (6.59-7.80)	7.88 (7.13-8.49)
4-day	2.68 (2.50-2.88)	3.17 (2.96-3.40)	3.79 (3.54-4.07)	4.29 (4.00-4.60)	4.99 (4.64-5.34)	5.54 (5.14-5.93)	6.11 (5.66-6.54)	6.69 (6.18-7.15)	7.49 (6.87-8.01)	8.12 (7.41-8.69)
7-day	3.20 (3.02-3.40)	3.78 (3.56-4.02)	4.46 (4.19-4.74)	5.00 (4.70-5.31)	5.74 (5.38-6.09)	6.32 (5.91-6.70)	6.90 (6.44-7.30)	7.49 (6.96-7.93)	8.28 (7.65-8.75)	8.88 (8.17-9.39)
10-day	3.69 (3.49-3.92)	4.34 (4.11-4.61)	5.07 (4.80-5.39)	5.66 (5.34-6.01)	6.44 (6.07-6.83)	7.04 (6.62-7.46)	7.65 (7.17-8.10)	8.25 (7.71-8.73)	9.03 (8.41-9.57)	9.63 (8.94-10.2)
20-day	5.19 (4.90-5.48)	6.07 (5.74-6.43)	7.00 (6.62-7.41)	7.73 (7.30-8.18)	8.70 (8.20-9.19)	9.44 (8.88-9.96)	10.2 (9.54-10.7)	10.9 (10.2-11.4)	11.8 (11.0-12.4)	12.4 (11.6-13.1)
30-day	6.51 (6.18-6.89)	7.61 (7.22-8.05)	8.69 (8.24-9.20)	9.54 (9.04-10.1)	10.7 (10.1-11.2)	11.5 (10.9-12.1)	12.3 (11.6-13.0)	13.1 (12.3-13.8)	14.1 (13.2-14.9)	14.8 (13.9-15.6)
45-day	8.34 (7.95-8.74)	9.71 (9.27-10.2)	11.0 (10.5-11.5)	11.9 (11.4-12.5)	13.2 (12.5-13.8)	14.1 (13.4-14.7)	14.9 (14.2-15.7)	15.7 (14.9-16.5)	16.7 (15.8-17.5)	17.4 (16.5-18.3)
60-day	10.0 (9.57-10.5)	11.7 (11.1-12.2)	13.1 (12.4-13.7)	14.1 (13.5-14.8)	15.5 (14.7-16.2)	16.4 (15.7-17.2)	17.3 (16.5-18.2)	18.2 (17.3-19.0)	19.2 (18.2-20.1)	19.9 (18.8-20.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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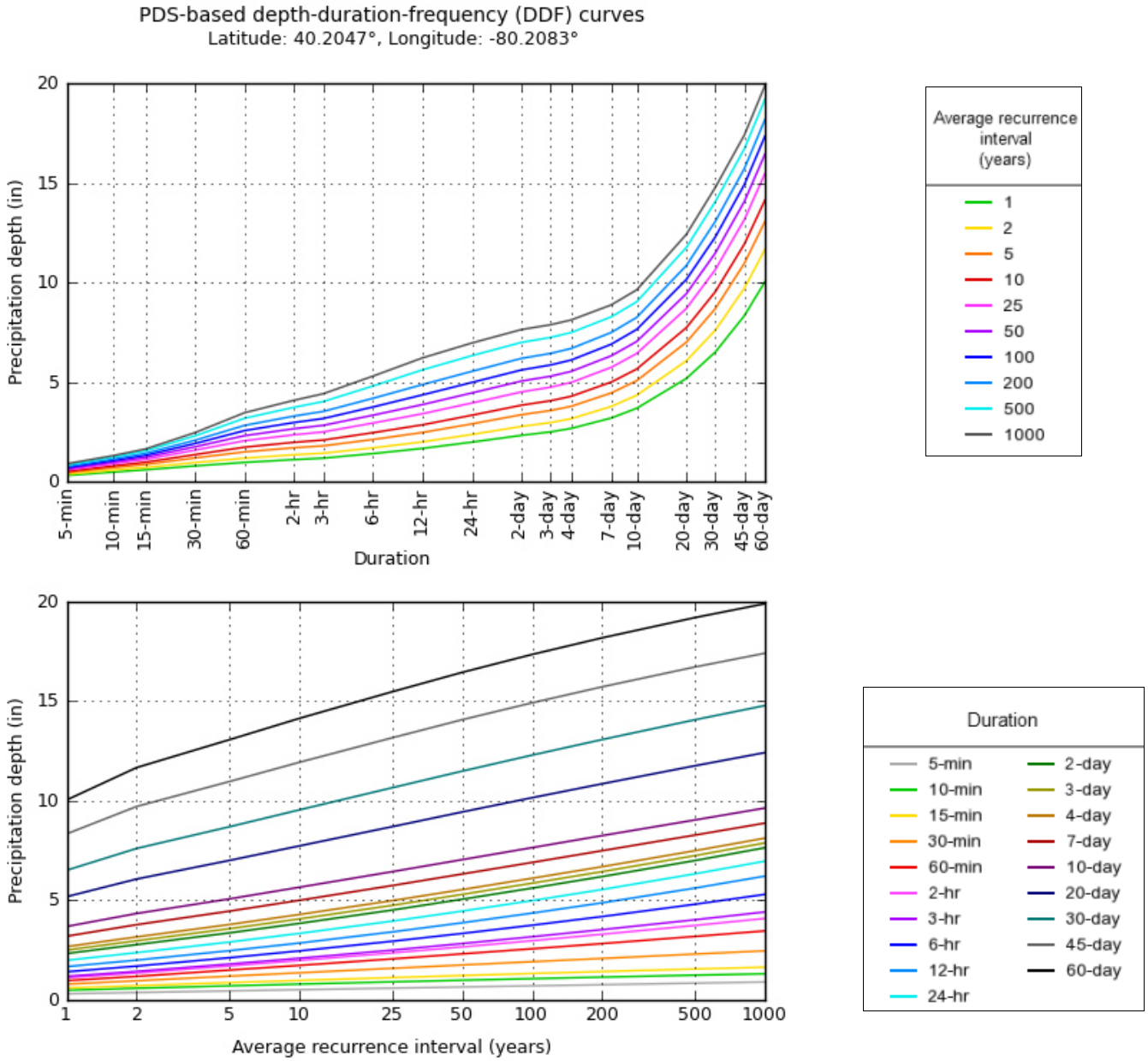
PF graphical



NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Tue May 11 17:11:57 2021

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Maps & aerials

Small scale terrain

APPENDIX G

LONG TERM OPERATION AND MAINTENANCE PLAN

OPERATION, MAINTENANCE, AND INSPECTION SCHEDULE

General

Stormwater facilities and permanent BMPs must be inspected in accordance with this document. All documentation on scheduled inspections, times of inspections, maintenance completed, remedial actions taken to make repairs, and any modifications or reconstruction of the storm system shall be maintained and available for review at all times.

Disposal of the accumulated sediment must be in accordance with all applicable local, state, and federal guidelines and regulations. If any drainage structure or outfall indicates the presence of petroleum it shall be removed and disposed of immediately in accordance with applicable regulations.

Detention facilities

This section includes any detention facilities (if present), as well as associated pipes, catch basins and the outlet structures that enter and exit the detention basin.

It is important to regularly inspect the structural elements (inlet/outlet pipes and animal grates) of the detention basin in order to ensure that storm water is flowing in and out of the pond as originally designed.

Debris and sediment commonly clog detention basins and reduce the pond's overall effectiveness.

1. Inspect the inlet pipes and outlet pipes for structural integrity on an annual basis. Check inlet/outlet pipes for structural integrity to ensure they are not crumbling or broken.

    a. Inspect riprap at the inlet pipes. Replace when the riprap is clogged with sediment and debris.

2. Conduct routine inspections for trash or other debris that may be blocking the inlet or outlet pipes or emergency spillway monthly and after all rain events. Remove all trash and debris from the basin as necessary. Improperly maintained ponds can harbor breeding area for mosquitos and reduce the storage volume of the pond.

3. Inspect and clean the storm sewer system and catch basins upstream from the detention basin every 5 years or as needed

4. Inspect for sediment accumulation at the inlet pipes (semiannually and after rain events), as it is important to clean out sediment that might be restricting water flow. Remove accumulated sediment with a shovel and wheelbarrow if it is blocking water flow. Small amounts of removed sediment can be spread evenly on upland areas and seeded with natural vegetation.

5. Inspect the stone around the riser/standpipe/outlet pipe (semiannually and after rain events). If stone has accumulated sediment, vegetation and/or debris to an extent that water is not flowing through the stone and out of the pond as originally designed, then stone should be replaced with clean 3" diameter stone choked with clean 6a stone.

6. Inspect for excess sediment accumulation in the pond (annually). Remove every 5-10 years or when the sediment accumulation is more than 6-12".

7. Have a professional civil engineer inspect the pond to ensure it is functioning properly (annually). Compare existing conditions to as-built engineering plans.

Infiltration basins/facilities

Regular and effective maintenance is crucial to ensure effective infiltration basin (if present) performance.

1. General maintenance

    a. Proper and timely maintenance is essential to continuous, effective operation; therefore, an access route must be incorporated into the design, and it must be properly maintained.

    b. All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion and deterioration.

    c. Components expected to receive and/or trap debris and sediment must be inspected for clogging at least four times annually, as well as after every storm exceeding 1 inch of rainfall.

    d. Sediment removal should take place when all runoff has drained from the planting bed and the basin is dry.

    e. Disposal of debris, trash, sediment and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

    f. Access points for maintenance are required on all enclosed areas within an infiltration basin; these access points must be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks, such as confined space entry, must be included in the plan.

    g. Stormwater BMPs may not be used for stockpiling of plowed snow and ice, compost, or any other material.

2. Drain time

    a. The basin must be inspected at least twice annually to determine if the permeability of the basin has decreased.

    b. The design drain time for the maximum design storm runoff volume must be indicated in the maintenance manual.

    c. If the actual drain time is longer than the design drain time, the components must be evaluated, and appropriate measures taken to return the infiltration basin to the original tested as-built condition.

    d. If the infiltration basin fails to drain the water quality design storm within 72 hours, corrective action must be taken, and the maintenance manual revised accordingly to prevent similar failures in the future. Note that annual tilling of the sand layer, using lightweight equipment, may assist in maintaining the infiltration capacity of a surface type system by breaking up clogged surfaces.

Catch basins

All catch basins (if present) shall be inspected to ensure they have adequate sump capacity, oil/grease hoods are in place, frames and grates are not damaged, and access manhole brick and mortar is intact.

1. Inspect catch basins four times per year.

2. Clean sump annually or whenever basin sump becomes filled with sediment to half its depth (2').

If inspection indicates the presence of petroleum, it shall be removed and disposed of immediately in accordance with applicable regulations.

Drain manholes/overflow control structures

All drain manholes (if present) and overflow control structures (if present) shall be inspected to ensure manhole frames and covers are not damaged, inlet and outlet pipes are draining freely, and access manhole brick and mortar is intact.

1. Inspect structures annually.

2. Clean structures as field determined.

If inspection indicates the presence of petroleum, it shall be removed and disposed of immediately in accordance with applicable regulations.

Water quality structures (Stormceptor drain inlets & separator unit)

All water quality structures (if present) shall be inspected to ensure manhole frames and covers are not damaged, and unit is draining freely.

1. Inspect every (6) months for the first year, and no less then annually thereafter.

2. Inspect unit immediately after any fuel, oil or chemical spill.

3. Clean unit once sediment depth reaches 15%, approximately 8”, of storage capacity.

If inspection indicates the presence of petroleum, it shall be removed and disposed of immediately in accordance with applicable regulations.

Bio-retention areas

All bio-retention areas (if present) shall be inspected to ensure plant material is maintained and pruned, and area is free of trash. Do not store snow in bio-retention area.

1. Inspect area every three (3) months.

2. Remove any accumulated trash.

3. Remove and replace any dead vegetation in spring or fall.

4. Prune plantings in spring and fall as necessary.

5. Inspect sod filter strip for erosion.

6. Replace hardwood mulch every two (2) years.

7. Replace entire media and all vegetation as needed should system fail.

If inspection indicates the presence of petroleum, it shall be removed and disposed of immediately in accordance with applicable regulations.

Pavement sweeping & vacuuming

1. Street sweeping should occur in the spring immediately following the last anticipated snowfall.

2. Street sweeping should be scheduled during non-winter months and conducted once per month during April, May, June, July, August, and September, at a minimum.

Drainage swales

Grass drainage swales shall be inspected for any slope erosion, ponding, or sedimentation. Inspect basin twice a year, or after a major storm event (1" rainfall in 24-hour period).

1. Remove trash and debris.

2. Remove accumulated sediment in swale.

3. Mow side slopes at least twice a year. Grass shall not be cut shorter than 4" tall.

Stone spillways and level spreaders

Inspect all rip-rap spillways and level spreaders (if present) twice a year, or after a major storm event (1" rainfall in 24-hour period). Inspect if rip-rap has been damaged and note any type of erosion. Remove any trash, debris, and accumulated sediment.

Underground storm water volume mitigation facility

The owner of the proposed underground storm water control facilities (if present) shall at all times operate and maintain the facilities in a safe and operable condition so as not to imperil life, health, safety, or property located above or below the facility.

The owner of the facility shall be responsible for the evaluation of the safety and operational status of the facility and all appurtenant structures and the modification thereof in accordance with the requirement to ensure protection of life and property as specified above.

The owner of the facility shall inspect the facilities and all appurtenant works according to the following schedule:

1. Perform cleaning during the installation of work and upon completion of the work.

2. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

    a. Removal of any excess materials, debris, and equipment shall be done in a manner that is both in compliance with any and all local, state, and federal regulations, as well as ultimate disposal occurring only a site deemed approved and acceptable by the Pennsylvania Department of Environmental Protection.

In addition, the on-going maintenance and operations of this facility is also required. Any storm water devices that are part of this project, shall be inspected twice annually, at a minimum. The necessary maintenance measures shall be implemented as outlined above.

Vegetation notes

All areas to be stabilized by vegetation shall be inspected for rills or gullies, bare soil patches or accumulation of sediment at the toe of slopes. Eroded areas shall be regraded, and substandard vegetated areas shall be re-seeded and mulched as specified on the plans.

Project wastes and recycling criteria

Provide convenient, well-maintained, and properly located toilet facilities. Provide for regular inspections, service, and disposal. Locate toilet facilities away from storm drain inlets and waterways to prevent accidental spills and contamination of storm water. Treat or dispose of sanitary and septic waste in accordance with state or local regulations.

Proper material use, storage, waste disposal, and training of employees and subcontractors can prevent or reduce the discharge of hazardous and toxic wastes to storm water. Implement a comprehensive set of waste-management practices for hazardous or toxic materials, such as paints, solvents, petroleum products, pesticides, wood preservatives, acids, roofing tar, and other materials.

Solid or construction waste

1. Designate trash and bulk waste-collection areas on-site

2. Recycle materials whenever possible (e.g., paper, wood, concrete, oil)

3. Segregate and provide proper disposal options for hazardous material wastes

4. Clean up litter and debris from the construction site daily

5. Locate waste-collection areas away from streets, gutters, watercourses, and storm drains.

6. Waste-collection areas (dumpsters, and such) are often best located near construction site entrances to minimize traffic on disturbed soils. Consider secondary containment around waste collection areas to further minimize the likelihood of contaminated discharges.

Sanitary and septic waste

1. Provide restroom facilities on-site.

2. Maintain clean restroom facilities and empty porta-johns regularly.

3. Provide secondary containment pans under porta-johns, where possible.

4. Provide tie-downs or stake downs for porta-johns in areas of high winds.

5. Educate employees, subcontractors, and suppliers on locations of facilities.

6. Do not discharge or bury wastewater at the construction site.

7. Inspect facilities for leaks, repair or replace immediately.

Hazardous materials and wastes

1. Develop and implement employee and subcontractor education, as needed, on Hazardous and toxic waste handling, storage, disposal, and cleanup.

2. Designate hazardous waste-collection areas on-site.

3. Place all hazardous and toxic material wastes in secondary containment.

4. Hazardous waste containers should be inspected to ensure that all containers.

5. Are labeled properly and that no leaks are present.

On-going post development issues

1. Follow manufacturer's recommended maintenance procedures for all BMPs

2. Maintenance of BMPs will vary according to the specific area and site conditions

3. Remove sediment from BMPs as appropriate and properly dispose of sediment into Controlled areas to prevent soil from returning to the BMP during subsequent Rain events

4. Remove sediment from paved roadways and from around BMPs protecting storm Drain inlets

5. Removal of all organic materials (leaves, grass clippings, mulch, tree branches, Etc.) Shall be conducted immediate upon observation, and per all necessary local, State, and federal regulations.

Removal of any excess materials, debris, and equipment shall be done in a manner that is both in compliance with any and all local, state, and federal regulations, as well as ultimate disposal occurring only a site deemed approved and acceptable by the Pennsylvania Department of Environmental Protection.

Housekeeping operations:

1. Good housekeeping and material management reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

    a. All materials stored on-site must be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.

    b. Products shall be kept in their original containers with the original manufacturer's label.

    c. Substances should not be mixed with one another unless recommended by the manufacturer.

    d. Whenever possible, all of a product will be used up before disposing of a container.

    e. Original materials labels and material safety data sheets (MSDS) shall be kept by the owner.

    f. Petroleum products:

        i. All on-site vehicles and parking areas shall be monitored weekly for leaks and spills. Spills shall be cleaned immediately.

        ii. Petroleum products shall be stored under cover and shall be in tightly sealed containers that are clearly labeled.

    g. Fertilizers:

        i. Fertilizers shall only be used in the minimum amounts as recommended by the manufacturer.

        ii. The contents of any un-used fertilizer shall be transferred to a clearly labeled, sealable plastic bin, to avoid spillage.

    h. Paints solvents.

        i. All paints and solvents shall be stored in original manufacturer's containers in a covered location.

        ii. The use of paints and solvents shall, whenever possible, be limited to service or storage bays. Where not possible, the work area shall be protected with impermeable drop clothes or tarps. At no point shall material be used in parking or access ways that are tributaries to the drainage system.

2. Spill control practices:

    a. Manufacturer's recommended methods shall be clearly posted for spill clean-up and school personnel shall be made aware of the procedures and the locations of cleanup information and supplies.

b. Material and equipment necessary for spill clean-up will be kept on-site in a designated material storage area. Equipment will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, absorbent materials, sand, sawdust and plastic & metal trash containers specifically kept and labeled for this purpose.

c. All spills must be cleaned-up immediately after discovery.

d. Spills of toxic or hazardous material must be reported to the appropriate state, local or federal agency, as required by-law.

3. The washing of vehicles shall be limited to areas within the buildings that are served by a floor drain system and on-site tight tank. Wash water with its combination of solvents, detergents and oil/greases should not be allowed to enter any part of the on-site drainage system.

4. Snow plowing operations shall stockpile snow, ice and accumulated materials in areas where snow melt will flow into the on-site drainage systems, including drainage basins. No plowing or storage of snow is allowed in bio-retention areas or wetland resource areas.

5. During winter conditions sand use site-wide shall be applied to the minimum extent possible to maintain safe conditions.

6. Winter treatment of porous pavement areas shall be limited to plowing.

Recycling Parameters for Post Construction Storm Water Management:

NOTE: This section applies to all housekeeping and recycling removal of foreign debris and related items/components during the Post Construction Storm Water phase of the project and applies to all previous mentions of such within this document.

Differentiation must be identified between construction waste (waste generated before the site is entirely stabilized, completed, and converted) to the post construction phase.

Erosion control wastes differ from post construction generated materials and must be addressed and handled separately from the traditional form of recycling criteria that often is outlined in erosion and sedimentation control plan guidelines:

Regarding wastes generated after the plan is fully operational, all wastes from post construction BMPs, such as silt/gravel, trash/litter/floatables, grass clippings, branches, leaves, etc., shall be removed from the site and recycled or disposed of in accordance with the department's solid waste management regulations at **Title 25 PA. Code 260.1 et seq., 271.1., and 287.1 et seq**. No wastes or other materials shall be burned, buried, dumped, or discharged at the site.

APPENDIX H

INFILTRATION TESTING

Double-ring infiltrometer test procedure:

Locate testing area and prepare level testing area at elevation of final BMP

Drive ring into soil approximately two inches, ensuring inner and outer rings are level

Presoak area prior to testing by filling both rings with water to level indicator mark

Continue pre-soak for 30 minutes
Minimum water depth should be four inches

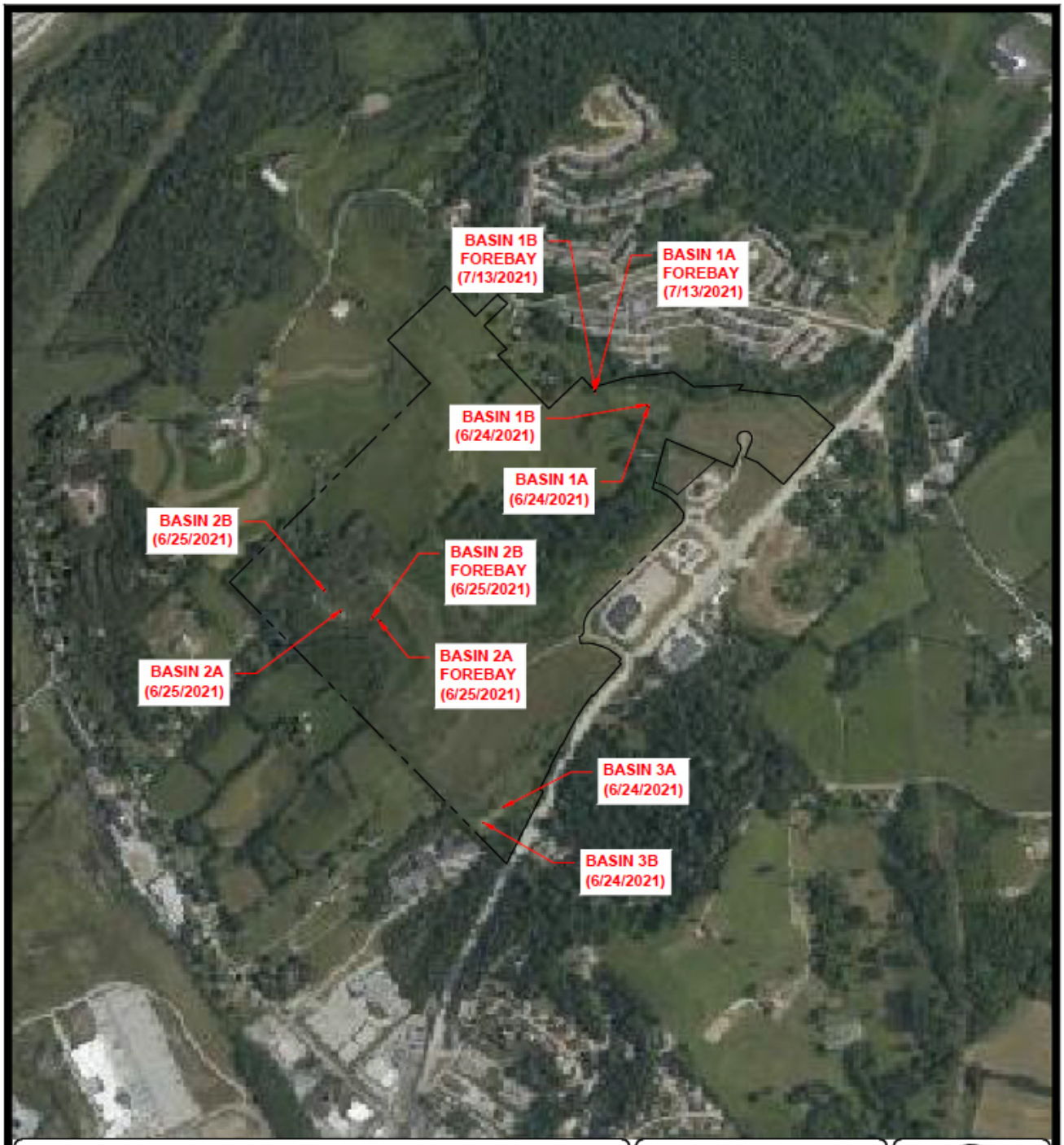
Using the water level drop of under two inches at each testing location, 30-minute intervals are used for measurements

After each time interval (30 minutes) elapses, obtain a drop reading in the center ring

Refill to water level mark after each reading

This process is repeated eight consecutive times and a stabilized rate drop is achieved after each interval

The drop occurring in the center ring over each interval is the averaged as the stabilized rate, and then is reported as inches per hour for that test site location



Infiltration Test Locations

Sheffler & Company, Inc.
ENGINEERING • SURVEYING

DRAWN BY:	ASB
REVIEWED BY:	
DATE:	
SCALE:	1"=1000'
PROJECT NUMBER:	3992

Infiltration Testing Worksheet

Test Number: **Basin 1A**
Date: **June 24, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.00*
1:00	*0.00*
1:30	*0.00*
2:00	*0.00*
2:30	*0.00*

0.00 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.0** In/Hr

No Infiltration Observed

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 1B**
Date: **June 24, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.00*
1:00	*0.00*
1:30	*0.00*
2:00	*0.00*
2:30	*0.00*

0.00 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.0** In/Hr

No Infiltration Observed

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 1 Forebay A**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.25*
1:00	*0.25*
1:30	*0.25*
2:00	*0.13*
2:30	*0.13*

0.19 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.2** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 1 Forebay B**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*1.50*
1:00	*1.50*
1:30	*1.60*
2:00	*1.50*
2:30	*1.55*

1.53 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **1.5** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 2 Forebay A**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.50*
1:00	*0.63*
1:30	*0.50*
2:00	*0.50*
2:30	*0.50*

0.53 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.5** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 2 Forebay B**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.70*
1:00	*0.60*
1:30	*0.40*
2:00	*0.60*
2:30	*0.50*

0.56 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.6** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 2A**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.75*
1:00	*0.25*
1:30	*0.31*
2:00	*0.25*
2:30	*0.25*

0.27 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.3** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 2B**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.80*
1:00	*0.20*
1:30	*0.20*
2:00	*0.60*
2:30	*0.30*

0.42 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.4** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 3A**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*1.19*
1:00	*1.31*
1:30	*1.38*
2:00	*1.31*
2:30	*1.31*

1.33 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **1.3** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

Infiltration Testing Worksheet

Test Number: **Basin 3B**
Date: **June 25, 2021**
Location: **Meadows Landing**
Project: **3992**

Time Increment:	Drop (In)
0:00[1]	-
0:30	*0.20*
1:00	*0.30*
1:30	*0.40*
2:00	*0.30*
2:30	*0.30*

0.30 Final Infiltration Rate (per 30 mins)

∴ Rate[2] = **0.3** In/Hr

1 - Initial Pre-Soak Period
2 - Safety Factor of 2 Applied to Rate (Minimum SF of 2 Required)
Weather conditions dry, no water encountered

APPENDIX I

QUALIFICATIONS AND EXPERIENCE

Sheffler & Company, Inc.
ENGINEERING • SURVEYING

Graham L. Ferry, *PE, PMP, LEED AP BD+C, ENV SP, CPESC, CPSWQ, CESSWI*

Project Manager/Senior Civil Engineer

EDUCATION

Point Park University
Master of Science Degree, Engineering Management, 2004

Point Park University
Bachelor of Science Degree, Civil Engineering Technology, 2002

Pittsburgh Technical College
Associate of Specialized Technology Degree, CAD Computer Systems Management, 1995

Pittsburgh Technical College
Associate of Specialized Technology Degree, Architectural CADD, 1995

REGISTRATION

Professional Engineer, Commonwealth of Pennsylvania, 2007
Professional Engineer, State of Ohio, 2008
Professional Engineer, State of West Virginia, 2008
Professional Engineer, State of New York, 2008
Professional Engineer, State of Maryland, 2012
PMP - Project Management Professional, 2010
LEED AP BD+C, 2009
ENV SP - Envision Sustainability Professional, 2016
CPSWQ - Certified Professional in Storm Water Quality, 2009
CPESC - Certified Professional in Erosion and Sedimentation Control, 2007
CESSWI –Certified Erosion, Sedimentation, and Storm Water Inspector, 2014

PROFESSIONAL EXPERIENCE

Sheffler & Company, Inc., Sewickley, Pennsylvania
Project Manager/Senior Engineer - 2017 to Present

Mr. Ferry is a project manager and senior level civil engineer with over 26 years of experience in the field of civil engineering and academia. He has extensive experience in the design, coordination, and management of various commercial/residential land development and energy related projects. His experience in energy services projects includes well pad design and layout, mid-stream project environmental protection, permitting, site inspection and project management and coordination for numerous sites in Pennsylvania, Maryland, and Ohio. Mr. Ferry's experience in commercial and residential land development includes multiple residential developments (single- and multi-family) along with retail, commercial and industrial projects throughout Pennsylvania, Ohio, and West Virginia. He possesses experience in providing civil engineering, permitting, and land development services to the university and K-12 markets as well. He also possesses extensive experience in both large and small-scale hydrologic and hydraulic modeling and design and has contributed on the development and preparation of several Pennsylvania Act 167, county-wide storm water management plans, and model ordinances. He has additional experience in sanitary sewage collection and conveyance system design and construction management, sanitary sewage planning and permitting, and various other areas.

Sheffler & Company, Inc.
ENGINEERING • SURVEYING

Point Park University, Pittsburgh, Pennsylvania
Adjunct Instructor of Civil Engineering Technology and Mathematics - 2015 to Present

Responsible for teaching and instruction in various civil engineering areas, as well as mathematics:

- Environmental Engineering I - Environmental Engineering II - Elementary Statistics

S&ME, Inc., Pittsburgh, Pennsylvania
Project Engineer - 2013 to 2016

Responsible for the design, management and oversight of energy/oil and gas related projects throughout Pennsylvania, Maryland, Georgia, West Virginia, and Ohio

- Convert greenfield sites by designing and developing well pads, compressor facilities, and gas plants
- Work closely with Environmental team to obtain various engineering, environmental and traffic-related permits, experienced with PA DEP permitting for both land development projects as well as oil and gas related projects, as well as Ohio, West Virginia, Maryland and Georgia
- Create land development plans, specifications and calculations for Oil and Gas clients
- Perpetuate the safe culture and quality assurance of work products developed by the team in Pittsburgh and other supporting market offices and responsibility for QA/QC reviews and professional sealing of design packages

URS/AECOM, Inc., Pittsburgh, Pennsylvania
Senior Civil and Environmental Engineer - 2013 to 2013

- Position involved interaction with senior engineers and environmental staff, for providing engineering and environmental services for natural gas E&P operations and midstream pipeline operators
- Performed engineering and environmental consulting services for all operations relevant to well pad design, compressor station design, and valve site design

Herbert, Rowland, and Grubic, Inc., Cranberry Township, Pennsylvania
Land Development Project Manager – 2012 to 2013

- Responsible for the management of land and site development projects and oversight and coordination of engineering teams
- Responsible for delivering high quality land development designs in a timely manner, within budget, all within a fast-paced environment

L. Robert Kimball and Associates, Inc., Moon Township, Pennsylvania
Project Manager - 1996 to 2012

- A diverse experience in various aspects of civil engineering
- Provided significant civil engineering, permitting, and land development services to the university and K-12 market segments, with a large focus serving the

Pittsburgh Public Schools (PPS) and Bethel Park School District, as well as other regional locations

- Worked on a broad range of projects with the heaviest focus on land development, storm water management, watershed management, extensive permitting, and sanitary sewer conveyance and collection systems
- Provided in-house permitting services to the Pittsburgh Water and Sewer Authority (PWSA) to assist in organizing existing and active permits

ADDITIONAL TRAINING:

- Attended various seminars on storm water management, erosion & sedimentation control and PADEP permitting, including ESCGP-2 workshop, LEED related issues, and Low Impact Development.
- PACP/MACP/LACP - NASSCO Pipeline, Manhole, and Lateral Assessment and Certification Programs
- OSHA - Confined Space Entry and Rescue Certified