

STORMWATER MANAGEMENT CALCULATIONS

For

PRELIMINARY & FINAL SUBDIVISION PLAN BLOCK 407 - LOTS 1 & 20

Situated in

**TOWN OF DOVER
MORRIS COUNTY, NEW JERSEY**



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July 9, 2026

Project Number 15107

DYKSTRA WALKER DESIGN GROUP

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Project Overview

This report has been prepared to address the impacts to surface water runoff due to the proposed development of properties known as Block 407 - Lots 1 & 20 in the Town of Dover, Morris County, New Jersey. This report should be reviewed along with the complete development package submitted in support of the proposed Preliminary and Final Subdivision Plan.

This project proposes the subdivision of the subject properties into twenty-two (22) building lots for single family residential dwellings. Access to the newly created lots will be from either Ann Street or a proposed cul-de-sac roadway. Water and sanitary sewer service will be provided to the development via connections to existing municipal facilities. Stormwater runoff generated by the proposed road and fourteen (14) of the lots will be directed to a subsurface infiltration basin located in the central portion of the property beneath the proposed roadway. These fourteen (14) lots are also provided with two (2) drywells each, outflow of which will be directed to the subsurface infiltration basin. Stormwater runoff from five (5) of the lots together with outflow from the subsurface basin will be directed to a surface infiltration basin located to the southwest of the proposed lots. Stormwater runoff from the remaining four (4) lots located on the northern side of the subdivision will discharge via overland flow to adjacent wooded areas. The subsurface infiltration basin and surface infiltration basin will provide water quality treatment, groundwater recharge and stormwater runoff quantity attenuation from the development. All runoff from motor vehicle surfaces associated with the proposed roadway will be treated for water quality via a manufactured treatment device (MTD) prior to discharge to the subsurface infiltration basin. Outflow of stormwater from the detained portions of the site will discharge to and extension of the existing stormwater management system located within the Prospect Street right-of-way.

All stormwater management facilities proposed for the subject property have been designed in general accordance with the NJDEP Stormwater Management rules at N.J.A.C. 7:8, and the Standards for Soil Erosion and Sediment Control in New Jersey. Where the above standards provided conflicting requirements, the more restrictive requirement was utilized.

Existing and Proposed Site Conditions

The subject properties are located to the east of Ann Street, in the Town of Dover, Morris County, New Jersey. The property is currently developed one (1) residential dwelling and associated site improvements. The site slopes from west to east towards Prospect Street.

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Under existing conditions, stormwater from the subject and surrounding properties discharges via overland flow across the site toward Prospect Street. Runoff eventually is collected at an existing stormwater management system at the intersection of Prospect Street and Randolph Avenue to the north of the subject property.

Under proposed conditions, stormwater runoff generated by the proposed road and fourteen (14) of the lots will be directed to a subsurface infiltration basin located in the central portion of the property beneath the proposed roadway. These fourteen (14) lots are also provided with two (2) drywells each, outflow of which will be directed to the subsurface infiltration basin. Stormwater runoff from five (5) of the lots together with outflow from the subsurface basin will be directed to a surface infiltration basin located to the southwest of the proposed lots. Stormwater runoff from the remaining four (4) lots located on the northern side of the subdivision will discharge via overland flow to adjacent wooded areas. The subsurface infiltration basin and surface infiltration basin will provide water quality treatment, groundwater recharge and stormwater runoff quantity attenuation from the development. All runoff from motor vehicle surfaces associated with the proposed roadway will be treated for water quality via a manufactured treatment device (MTD) prior to discharge to the subsurface infiltration basin. Outflow of stormwater from the detained portions of the site will discharge to and extension of the existing stormwater management system located within the Prospect Street right-of-way.

Green Infrastructure Standards

N.J.A.C. 7:8-5.3, Table 5-1 specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards. The proposed design incorporates the use of a manufactured treatment device (MTD) to treat stormwater runoff for water quality prior to discharge to a subsurface infiltration basin. The surface infiltration basin will also satisfy the runoff quality standards. Both basins are an approved BMP in accordance with Table 5-1. Water quantity attenuation is being provided via the subsurface and surface infiltration basins which are approved BMP's in accordance with Table 5-2.

Stormwater Quantity Control

In accordance with the NJDEP Stormwater Management Rules at N.J.A.C. 7:8-5.6.(b), stormwater runoff quantity shall be controlled so that for stormwater leaving the site, the post-construction peak runoff rates for the two (2), ten (10) and 100-year storm events are fifty (50), seventy-five (75) and eighty (80) percent, respectively, of the pre-construction peak runoff rates for both current and future precipitation conditions. In order to determine compliance with these requirements, the peak rates of stormwater runoff were calculated using the TR-55 Urban Hydrology for Small Watersheds Methodology. The TR-55 Method is an acceptable methodology for small (less than

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320 acres) drainage areas. Calculations were performed using the Hydraflow Hydrographs Extension for AutoCAD Civil 3D computer software. In accordance with N.J.A.C. 7:8-5.7, rainfall depths at the site were obtained from the National Oceanographic and Atmospheric Administration (NOAA) National Weather Service's Atlas 14, Point Precipitation Frequency Estimates. Rainfall data for the two (2), ten (10) and 100-year storm events were multiplied by precipitation adjustment factors for both current precipitation amounts (per Table 5-5 at N.J.A.C. 7:8-5.7) and anticipated future precipitation amounts (per Table 5-6 at N.J.A.C. 7:8-5.7). Refer to **Appendix B** for the NOAA rainfall data and the adjusted precipitation values based on the adjustment factors for current and future precipitation in Warren County. Refer to **Appendix C** for supporting information from the evaluation of pre- and post-development peak runoff rates, calculations of the allowable peak runoff rates and basin routing calculations with precipitation values adjusted for current conditions per Table 5-5 at N.J.A.C. 7:8-5.7.(c).2. Refer to **Appendix D** for supporting information from the evaluation of pre- and post-development peak runoff rates, calculations of the allowable peak runoff rates and basin routing calculations with precipitation values adjusted for future conditions per Table 5-5 at N.J.A.C. 7:8-5.7.(d).

The following tables summarize the pre- and post-development runoff rates to the associated point of study that demonstrate conformance with N.J.A.C. 7:8:

Summary of CURRENT Peak Runoff Rates to the Existing Drainage System (POS #1)

Storm Event	Existing Conditions	Allowable Runoff Rates	Proposed Conditions
2-Year	9.5 cfs	7.5 cfs	6.7 cfs
10-Year	20.9 cfs	18.7 cfs	15.3 cfs
100-Year	47.5 cfs	43.5 cfs	41.6 cfs

Summary of FUTURE Peak Runoff Rates to the Existing Drainage System (POS #1)

Storm Event	Existing Conditions	Allowable Runoff Rates	Proposed Conditions
2-Year	14.2 cfs	11.2 cfs	10.2 cfs
10-Year	30.6 cfs	27.4 cfs	23.2 cfs
100-Year	76.7 cfs	70.3 cfs	70.3 cfs

Groundwater Recharge & Groundwater Mounding

For groundwater recharge, N.J.A.C. 7:8-5.4(b).1 indicates that either one hundred (100) percent of the average annual pre-construction groundwater recharge volume for the site be maintained, or the increase in stormwater runoff volume from pre-construction to post-construction for the two (2) year storm event be infiltrated. Refer to **Appendix E** for an evaluation of the project groundwater recharge. To meet the requirements of N.J.A.C. 7:8-5.4(b).1, recharge volume to account for this deficit is being provided by

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the proposed infiltration basin systems and this project meets the groundwater recharge requirements at N.J.A.C. 7:8-5.4(a).2.

In accordance with the NJ BMP, an assessment of the hydraulic impact on the groundwater table shall be performed when groundwater recharge is utilized in a stormwater management design. To ensure no impact to the drain time and the functionality of the stormwater management basins, a groundwater mounding analysis was performed utilizing the Hantush USGS Scientific Investigation Report 2010-5102 spreadsheet. Refer to **Appendix F** for results that demonstrate that the drain time at the proposed basins does not exceed 72 hours due to the presence of a groundwater mound.

Stormwater Quality Control

In accordance with the NJDEP Stormwater Management Rules at N.J.A.C. 7:8-5.5, stormwater runoff quality control shall be provided so that the average annual post-construction load of total suspended solids in stormwater runoff generated from the water quality design storm is reduced by eighty (80) percent from the anticipated load from the developed site. Water quality control for the developed site is achieved via the manufactured treatment device and surface infiltration basin which provide for an eighty (80) percent removal of total suspended solids. Refer to **Appendix G** for water quality information and routing calculations of the water quality design storm through the stormwater management basin.

Stormwater Collection and Conveyance System

A stormwater collection and conveyance system has been designed for this project to collect stormwater runoff from impervious surfaces at the property and to control the rate of stormwater runoff from the site. Stormwater facilities proposed at the property include inlet structures, subsurface piping, and infiltration basins. Pipes discharging to the infiltration basins were designed for the twenty-five (25) year storm event. Pipes downstream of the infiltration basins were designed to convey the 100-year outflow. The Rational Method was utilized to determine the quantity of runoff for pipe sizing calculations and Manning's formula was used to determine the required size of the stormwater pipes. Refer to **Appendix H** of this report for pipe conveyance calculations.

Soil Erosion & Sediment Control Plan

Temporary and permanent soil erosion and sediment control measures have been designed for this project in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey, promulgated by the Morris County Soil Conservation District. The permanent measure proposed at the subject property includes scour holes at the pipe discharge locations in the infiltration basin. The pipe design storm was

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utilized for the design of the conduit outlet protection leading to the basin. Refer to **Appendix I** for conduit outlet protection design information.

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APPENDIX A

ON-SITE SOILS INFORMATION

Soil Map—Morris County, New Jersey



Soil Map may not be valid at this scale.

Map Scale: 1:3,070 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

7/9/2026
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Morris County, New Jersey

Survey Area Data: Version 20, Aug 28, 2025

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

Date(s) aerial images were photographed: Oct 10, 2022—Oct 16, 2022

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
PaoC	Parker gravelly sandy loam, 3 to 15 percent slopes	2.7	8.2%
PauCc	Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony	6.7	20.0%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	9.8	29.5%
USGKAC	Urban land-Gladstone complex, 8 to 15 percent slopes	14.1	42.3%
Totals for Area of Interest		33.2	100.0%

SOIL TESTING RESULTS

SOIL TESTING CONDUCTED BY DYKSTRA WALKER DESIGN GROUP ON APRIL 22, 2026

TEST PIT #4: EXISTING GRADE 820.0

0" – 12" TOPSOIL

12" – 36" 10YR3/6 SILT LOAM, 5% GRAVEL, 5% COBBLE, 5% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

36" – 125" 10YR4/6 LOAM, 5% GRAVEL, 15% COBBLE, 5% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

NO WATER

NO SEEPAGE

ROOTS TO 18"

ESHW > 125"

TUBE PERMEAMETER: 1.1 IN/HR @ 80" (LOWEST REPLICATE)

TEST PIT #5: EXISTING GRADE 821.5

0" – 12" TOPSOIL

12" – 66" 10YR4/6 SILT LOAM, 5% GRAVEL, 5% COBBLE, 5% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

66" – 140" 10YR4/6 LOAM, 5% GRAVEL, 10% COBBLE, 10% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

NO WATER

NO SEEPAGE

ROOTS TO 24"

ESHW > 168"

TUBE PERMEAMETER: 1.4 IN/HR @ 72" (LOWEST REPLICATE)

TEST PIT #9: EXISTING GRADE 795.0

0" – 12" TOPSOIL

12" – 36" 10YR5/8 SILT LOAM, 5% GRAVEL, 15% COBBLE, 5% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

36" – 84" 10YR5/6 LOAM, 5% GRAVEL, 15% COBBLE, 10% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

NO WATER

NO SEEPAGE

ROOTS TO 24"

ESHW > 84"

TUBE PERMEAMETER: 1.6 IN/HR @ 65" (LOWEST REPLICATE)

TEST PIT #10: EXISTING GRADE 797.0

0" – 12" TOPSOIL

12" – 60" 10YR5/6 LOAM, 5% GRAVEL, 15% COBBLE, 10% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

60" – 90" 10YR5/6 LOAM, 5% GRAVEL, 15% COBBLE, 15% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

NO WATER

NO SEEPAGE

ROOTS TO 18"

ESHW > 90"

TUBE PERMEAMETER: 1.4 IN/HR @ 70" (LOWEST REPLICATE)

TEST PIT #11: EXISTING GRADE 796.0

0" – 12" TOPSOIL

12" – 66" 10YR4/6 LOAM, 5% GRAVEL, 5% COBBLE, 5% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

66" – 96" 10YR4/6 LOAM, 5% GRAVEL, 15% COBBLE, 5% STONE SUBANGULAR BLOCKY, FRIABLE, NO MOTTLING

NO WATER

NO SEEPAGE

ROOTS TO 18"

ESHW > 96"

TUBE PERMEAMETER: 1.7 IN/HR @ 78" (LOWEST REPLICATE)

NOTE: ALL TUBE PERMEAMETER SAMPLES OBTAINED IN-SITU AND UNDISTURBED

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DESIGN  GROUP

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SOIL TESTING RESULTS – PAGE 1

BLOCK 407–LOT 1, BLOCK 407–LOT 20
ANN STREET
TOWN OF DOVERMORRIS COUNTY
NEW JERSEY

PROJECT NO.: 15107

SCALE: NOT TO SCALE

DATE: 7/9/26

TUBE PERMEAMETER TEST

Project: Dover Subdivision
Project #: 15107
Municipality: Town of Dover
County: Morris

Soil Evaluated by: AM
Date: 4/22/2026
Lab Analysis by: KJR
Date: 4/24/2026
Page: 1 of 1

Sample Number	Length (in)	Time (min)	H1 (in)	H2 (in)	K (in/hr)
4A	3.8125	125.5	2.1875	1.1875	1.1
4B	3.25	70.25	2.75	1.75	1.3
5A	3.25	48.66	2.75	1.75	1.8
5B	3.5	75.25	2.5	1.5	1.4
9A	3.625	75.5	2.375	1.375	1.6
9B	3.75	80.75	2.25	1.25	1.6
10A	3.5	76.33	2.5	1.5	1.4
10B	3.625	64.5	2.375	1.375	1.8
11A	3.75	73.25	2.25	1.25	1.8
11B	3.75	79.66	2.25	1.25	1.7

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APPENDIX B

RAINFALL DATA



NOAA Atlas 14, Volume 2, Version 3
Location name: Dover, New Jersey, USA*
Latitude: 40.8783°, Longitude: -74.5684°
Elevation: 853 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 & aerals](#)

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	0.342 (0.311-0.377)	0.408 (0.371-0.450)	0.482 (0.437-0.531)	0.537 (0.486-0.591)	0.602 (0.543-0.662)	0.651 (0.584-0.715)	0.696 (0.622-0.764)	0.737 (0.655-0.810)	0.792 (0.698-0.872)	0.830 (0.727-0.915)
10-min	0.543 (0.493-0.599)	0.648 (0.589-0.715)	0.768 (0.696-0.846)	0.851 (0.770-0.937)	0.951 (0.857-1.04)	1.02 (0.918-1.12)	1.09 (0.975-1.20)	1.15 (1.02-1.27)	1.23 (1.08-1.35)	1.28 (1.12-1.41)
15-min	0.675 (0.613-0.745)	0.810 (0.736-0.894)	0.964 (0.874-1.06)	1.07 (0.968-1.18)	1.20 (1.08-1.32)	1.29 (1.16-1.42)	1.38 (1.23-1.51)	1.45 (1.29-1.59)	1.55 (1.36-1.70)	1.61 (1.41-1.77)
30-min	0.919 (0.835-1.01)	1.11 (1.01-1.23)	1.36 (1.23-1.50)	1.54 (1.39-1.69)	1.76 (1.58-1.93)	1.92 (1.72-2.11)	2.08 (1.86-2.28)	2.22 (1.98-2.44)	2.42 (2.13-2.66)	2.56 (2.24-2.82)
60-min	1.14 (1.04-1.26)	1.39 (1.26-1.53)	1.73 (1.57-1.91)	1.99 (1.80-2.19)	2.32 (2.10-2.56)	2.58 (2.32-2.84)	2.84 (2.54-3.12)	3.10 (2.75-3.40)	3.44 (3.04-3.79)	3.70 (3.24-4.08)
2-hr	1.39 (1.26-1.53)	1.69 (1.54-1.86)	2.14 (1.94-2.35)	2.49 (2.25-2.73)	2.97 (2.67-3.26)	3.36 (3.00-3.68)	3.77 (3.34-4.12)	4.19 (3.70-4.59)	4.78 (4.17-5.24)	5.26 (4.54-5.77)
3-hr	1.56 (1.43-1.72)	1.90 (1.74-2.10)	2.41 (2.19-2.66)	2.80 (2.54-3.08)	3.35 (3.02-3.67)	3.79 (3.39-4.15)	4.24 (3.78-4.65)	4.72 (4.17-5.17)	5.37 (4.70-5.89)	5.90 (5.11-6.48)
6-hr	2.04 (1.86-2.25)	2.48 (2.26-2.73)	3.13 (2.85-3.44)	3.66 (3.32-4.01)	4.41 (3.97-4.82)	5.04 (4.51-5.51)	5.72 (5.07-6.24)	6.45 (5.66-7.03)	7.50 (6.48-8.19)	8.38 (7.16-9.15)
12-hr	2.57 (2.33-2.85)	3.12 (2.84-3.46)	3.96 (3.60-4.38)	4.67 (4.22-5.15)	5.71 (5.11-6.27)	6.61 (5.86-7.24)	7.59 (6.66-8.30)	8.68 (7.52-9.49)	10.3 (8.75-11.2)	11.7 (9.77-12.8)
24-hr	2.96 (2.73-3.24)	3.57 (3.29-3.90)	4.48 (4.13-4.89)	5.24 (4.81-5.72)	6.35 (5.80-6.90)	7.28 (6.61-7.90)	8.28 (7.48-8.99)	9.38 (8.40-10.2)	11.0 (9.71-11.9)	12.3 (10.8-13.4)
2-day	3.49 (3.23-3.79)	4.21 (3.90-4.58)	5.30 (4.89-5.75)	6.17 (5.69-6.70)	7.43 (6.82-8.05)	8.47 (7.74-9.16)	9.58 (8.70-10.4)	10.8 (9.71-11.7)	12.5 (11.1-13.5)	13.8 (12.2-15.0)
3-day	3.65 (3.39-3.95)	4.41 (4.08-4.77)	5.52 (5.11-5.97)	6.43 (5.94-6.95)	7.72 (7.10-8.33)	8.79 (8.05-9.47)	9.92 (9.04-10.7)	11.1 (10.1-12.0)	12.8 (11.5-13.9)	14.3 (12.6-15.4)
4-day	3.82 (3.55-4.11)	4.60 (4.27-4.96)	5.75 (5.33-6.19)	6.69 (6.19-7.20)	8.02 (7.39-8.61)	9.11 (8.36-9.78)	10.3 (9.37-11.0)	11.5 (10.4-12.4)	13.2 (11.9-14.3)	14.7 (13.1-15.9)
7-day	4.50 (4.17-4.86)	5.39 (5.00-5.82)	6.66 (6.18-7.18)	7.70 (7.13-8.30)	9.19 (8.48-9.90)	10.4 (9.56-11.2)	11.7 (10.7-12.6)	13.1 (11.9-14.1)	15.1 (13.5-16.3)	16.7 (14.8-18.0)
10-day	5.18 (4.84-5.55)	6.19 (5.78-6.63)	7.54 (7.03-8.06)	8.63 (8.04-9.23)	10.1 (9.41-10.8)	11.4 (10.5-12.1)	12.6 (11.6-13.5)	14.0 (12.8-14.9)	15.8 (14.3-16.9)	17.3 (15.5-18.5)
20-day	6.99 (6.55-7.45)	8.29 (7.77-8.84)	9.88 (9.26-10.5)	11.1 (10.4-11.9)	12.8 (12.0-13.7)	14.1 (13.2-15.1)	15.5 (14.4-16.5)	16.8 (15.6-17.9)	18.6 (17.1-19.9)	20.0 (18.3-21.4)
30-day	8.69 (8.20-9.21)	10.2 (9.66-10.9)	12.0 (11.3-12.7)	13.3 (12.5-14.1)	15.0 (14.1-15.9)	16.3 (15.3-17.3)	17.6 (16.4-18.6)	18.8 (17.6-20.0)	20.5 (19.0-21.8)	21.7 (20.1-23.1)
45-day	11.1 (10.4-11.7)	13.0 (12.3-13.7)	14.9 (14.1-15.8)	16.4 (15.5-17.3)	18.2 (17.2-19.3)	19.6 (18.5-20.7)	20.9 (19.7-22.1)	22.1 (20.8-23.4)	23.6 (22.2-25.0)	24.7 (23.1-26.2)
60-day	13.2 (12.5-14.0)	15.5 (14.7-16.4)	17.7 (16.8-18.7)	19.3 (18.3-20.5)	21.4 (20.2-22.6)	22.8 (21.6-24.2)	24.2 (22.8-25.7)	25.5 (24.0-27.0)	27.0 (25.4-28.7)	28.1 (26.4-29.9)

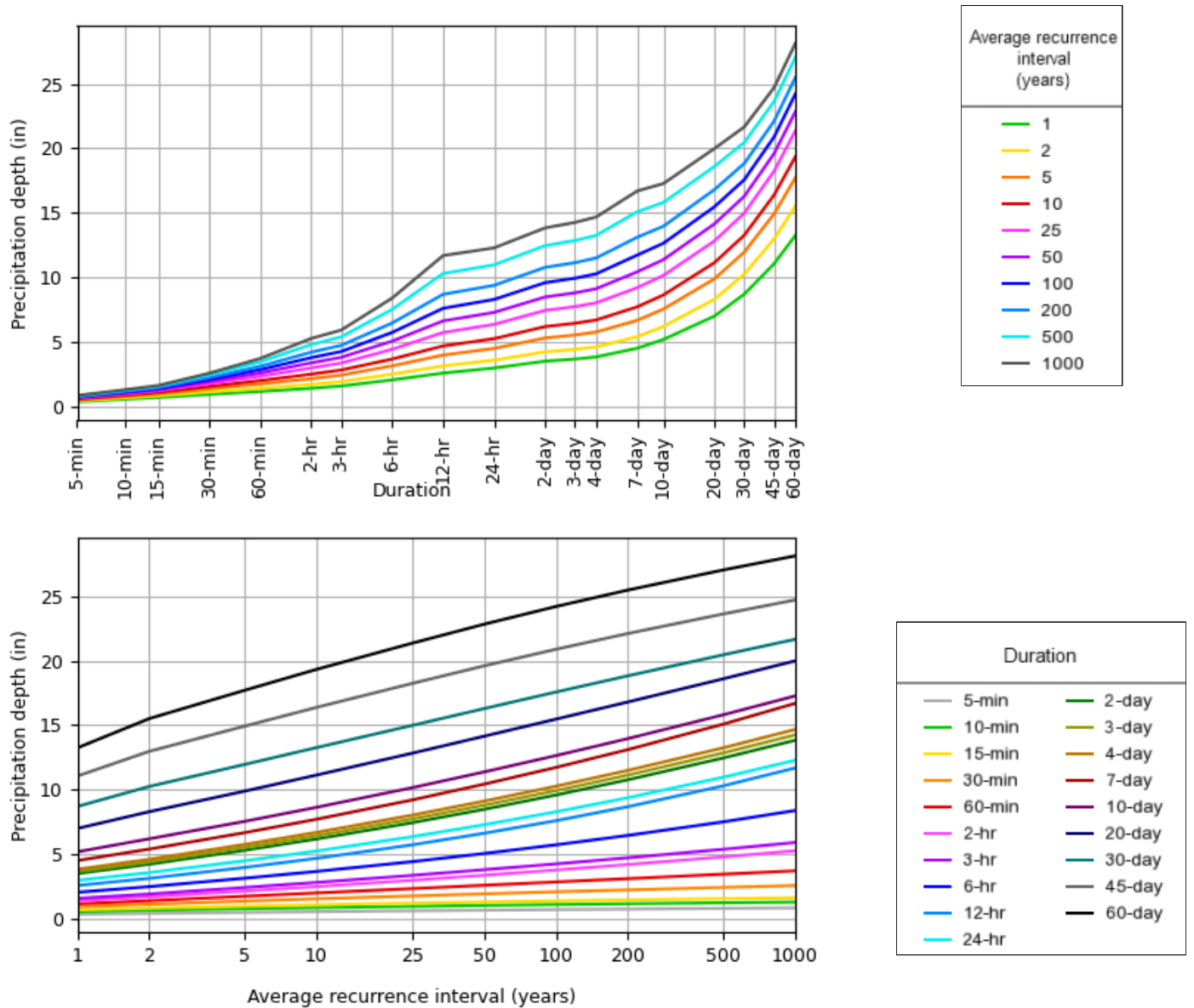
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average 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

PDS-based depth-duration-frequency (DDF) curves

Latitude: 40.8783°, Longitude: -74.5684°



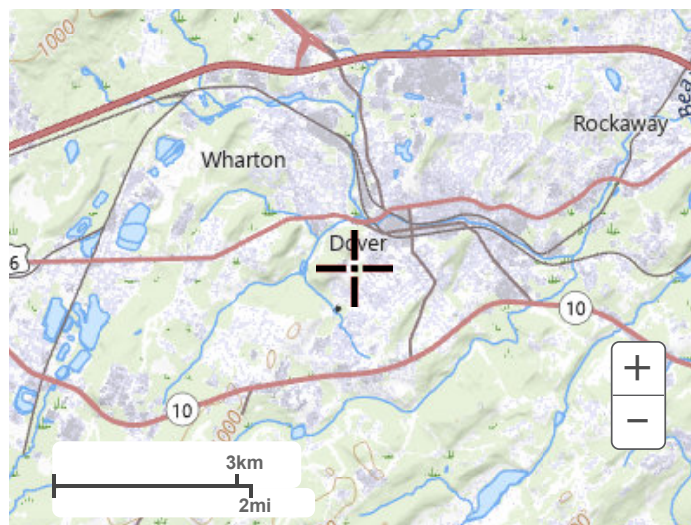
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Fri Apr 17 14:54:49 2026

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Maps & aerials

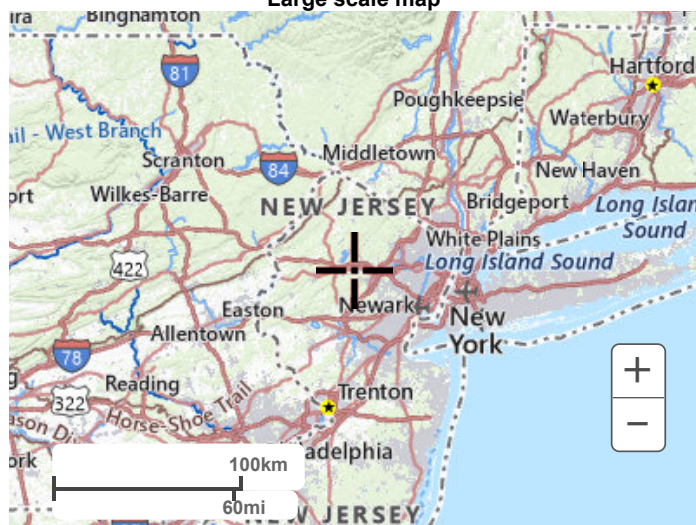
Small scale terrain



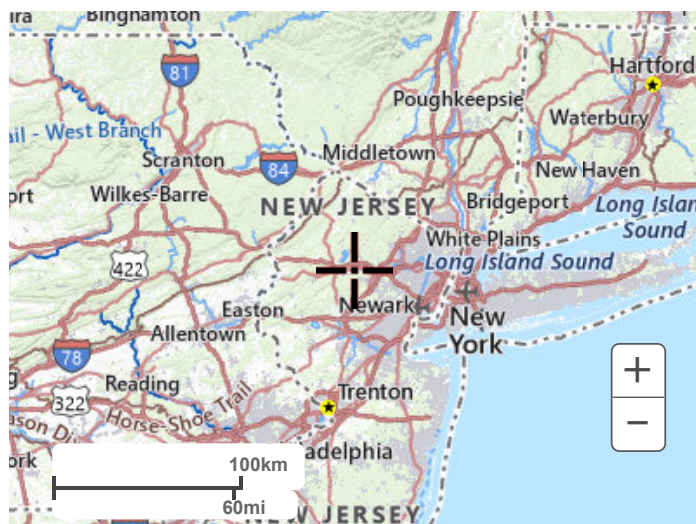
Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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RAINFALL DATA CURRENT PRECIPITATION ADJUSTMENT

RAINFALL DATA OBTAINED FROM THE NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION (NOAA),
NATIONAL WEATHER SERVICES' ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES.

2-YEAR, 24-HOUR STORM: 3.57 INCHES

10-YEAR, 24-HOUR STORM: 5.24 INCHES

100-YEAR, 24-HOUR STORM: 8.28 INCHES

COUNTY: MORRIS

CURRENT ADJUSTMENT FACTORS:

2-YEAR DESIGN STORM: 1.01

10-YEAR DESIGN STORM: 1.03

100-YEAR DESIGN STORM: 1.06

ADJUSTED RAINFALL DATA PER CURRENT ADJUSTMENT FACTORS:

2-YEAR, 24-HOUR STORM: 3.57 IN x 1.01 = **3.61 INCHES**

10-YEAR, 24-HOUR STORM: 5.24 IN x 1.03 = **5.40 INCHES**

100-YEAR, 24-HOUR STORM: 8.28 IN x 1.06 = **8.78 INCHES**

RAINFALL DATA FUTURE PRECIPITATION ADJUSTMENT

RAINFALL DATA OBTAINED FROM THE NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION (NOAA),
NATIONAL WEATHER SERVICES' ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES.

2-YEAR, 24-HOUR STORM: 3.57 INCHES

10-YEAR, 24-HOUR STORM: 5.24 INCHES

100-YEAR, 24-HOUR STORM: 8.28 INCHES

COUNTY: MORRIS

FUTURE CHANGE FACTORS:

2-YEAR DESIGN STORM: 1.23

10-YEAR DESIGN STORM: 1.28

100-YEAR DESIGN STORM: 1.46

ADJUSTED RAINFALL DATA PER FUTURE ADJUSTMENT FACTORS:

2-YEAR, 24-HOUR STORM: 3.57 IN x 1.23 = **4.39 INCHES**

10-YEAR, 24-HOUR STORM: 5.24 IN x 1.28 = **6.71 INCHES**

100-YEAR, 24-HOUR STORM: 8.28 IN x 1.46 = **12.09 INCHES**

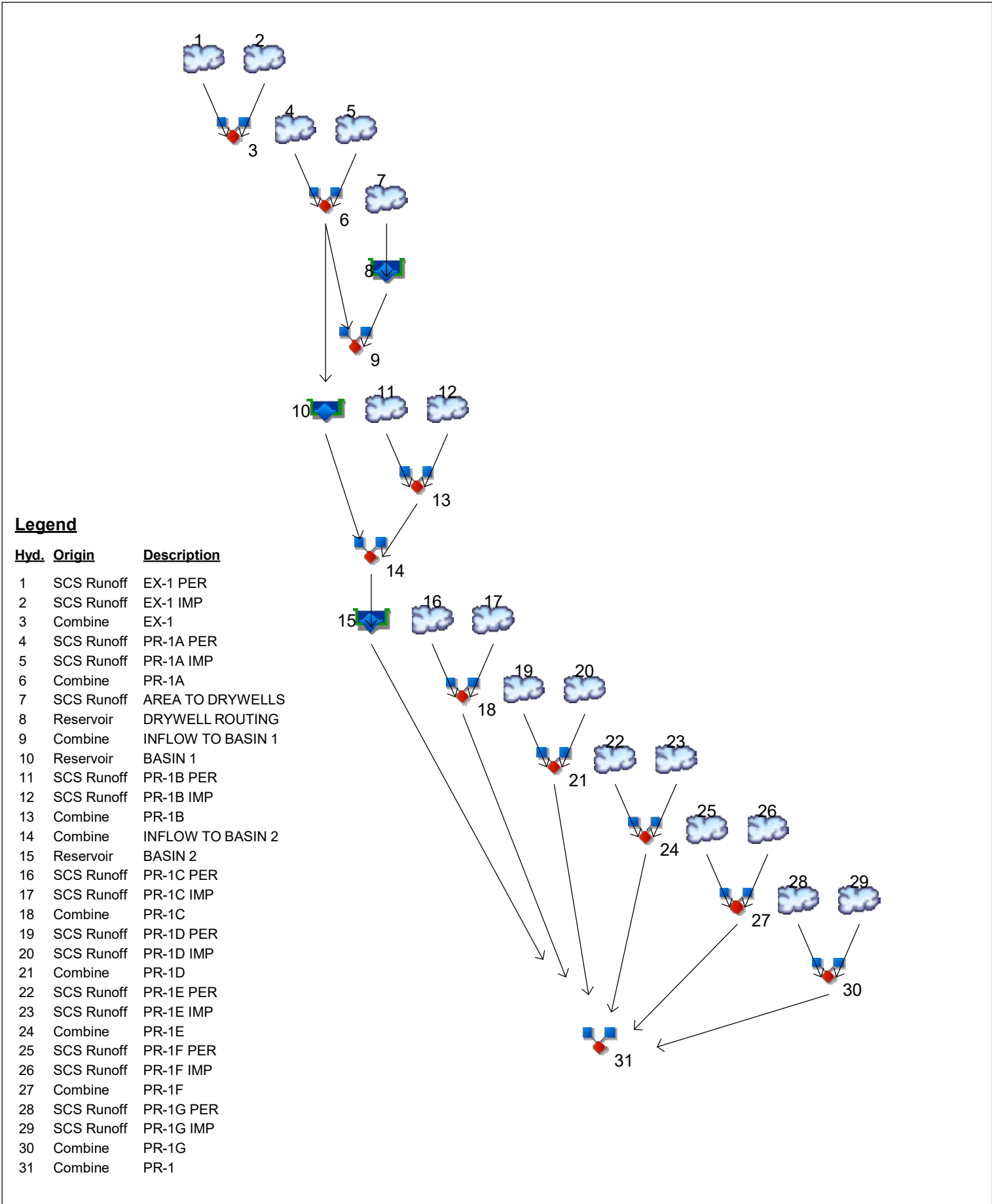
DYKSTRA WALKER DESIGN GROUP

APPENDIX C

DRAINAGE CALCULATIONS (CURRENT FACTOR)

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024



Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

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	-----	-----	4.804	-----	-----	15.36	-----	-----	40.73	EX-1 PER
2	SCS Runoff	-----	-----	7.191	-----	-----	10.81	-----	-----	17.63	EX-1 IMP
3	Combine	1, 2	-----	9.482	-----	-----	20.92	-----	-----	47.52	EX-1
4	SCS Runoff	-----	-----	1.101	-----	-----	3.470	-----	-----	9.167	PR-1A PER
5	SCS Runoff	-----	-----	1.836	-----	-----	2.760	-----	-----	4.498	PR-1A IMP
6	Combine	4, 5	-----	2.576	-----	-----	5.499	-----	-----	12.19	PR-1A
7	SCS Runoff	-----	-----	5.190	-----	-----	7.801	-----	-----	12.72	AREA TO DRYWELLS
8	Reservoir	7	-----	3.770	-----	-----	7.347	-----	-----	11.42	DRYWELL ROUTING
9	Combine	6, 8	-----	6.154	-----	-----	12.85	-----	-----	23.61	INFLOW TO BASIN 1
10	Reservoir	6	-----	0.267	-----	-----	2.153	-----	-----	9.607	BASIN 1
11	SCS Runoff	-----	-----	0.569	-----	-----	1.781	-----	-----	4.688	PR-1B PER
12	SCS Runoff	-----	-----	1.695	-----	-----	2.547	-----	-----	4.152	PR-1B IMP
13	Combine	11, 12	-----	2.124	-----	-----	4.064	-----	-----	8.304	PR-1B
14	Combine	10, 13	-----	2.124	-----	-----	4.399	-----	-----	15.10	INFLOW TO BASIN 2
15	Reservoir	14	-----	0.643	-----	-----	3.040	-----	-----	13.54	BASIN 2
16	SCS Runoff	-----	-----	0.079	-----	-----	0.238	-----	-----	0.620	PR-1C PER
17	SCS Runoff	-----	-----	0.388	-----	-----	0.584	-----	-----	0.952	PR-1C IMP
18	Combine	16, 17	-----	0.465	-----	-----	0.822	-----	-----	1.572	PR-1C
19	SCS Runoff	-----	-----	0.122	-----	-----	0.375	-----	-----	0.981	PR-1D PER
20	SCS Runoff	-----	-----	0.706	-----	-----	1.061	-----	-----	1.730	PR-1D IMP
21	Combine	19, 20	-----	0.816	-----	-----	1.420	-----	-----	2.682	PR-1D
22	SCS Runoff	-----	-----	0.077	-----	-----	0.241	-----	-----	0.633	PR-1E PER
23	SCS Runoff	-----	-----	0.388	-----	-----	0.584	-----	-----	0.952	PR-1E IMP
24	Combine	22, 23	-----	0.446	-----	-----	0.789	-----	-----	1.513	PR-1E
25	SCS Runoff	-----	-----	0.065	-----	-----	0.202	-----	-----	0.528	PR-1F PER
26	SCS Runoff	-----	-----	0.388	-----	-----	0.584	-----	-----	0.952	PR-1F IMP
27	Combine	25, 26	-----	0.443	-----	-----	0.768	-----	-----	1.447	PR-1F
28	SCS Runoff	-----	-----	3.183	-----	-----	9.192	-----	-----	23.27	PR-1G PER
29	SCS Runoff	-----	-----	2.581	-----	-----	3.881	-----	-----	6.328	PR-1G IMP
30	Combine	28, 29	-----	4.350	-----	-----	10.45	-----	-----	25.35	PR-1G
31	Combine	15, 18, 21, 24, 27, 30	-----	6.726	-----	-----	15.26	-----	-----	41.60	PR-1
Proj. file: Current 15107.gpw									Thursday, 07 / 9 / 2026		21

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

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	4.804	1	736	27,609	-----	-----	-----	EX-1 PER
2	SCS Runoff	7.191	1	726	23,898	-----	-----	-----	EX-1 IMP
3	Combine	9.482	1	727	51,507	1, 2	-----	-----	EX-1
4	SCS Runoff	1.101	1	731	5,225	-----	-----	-----	PR-1A PER
5	SCS Runoff	1.836	1	726	5,974	-----	-----	-----	PR-1A IMP
6	Combine	2.576	1	726	11,199	4, 5	-----	-----	PR-1A
7	SCS Runoff	5.190	1	726	16,889	-----	-----	-----	AREA TO DRYWELLS
8	Reservoir	3.770	1	728	8,621	7	6.58	8,814	DRYWELL ROUTING
9	Combine	6.154	1	727	19,820	6, 8	-----	-----	INFLOW TO BASIN 1
10	Reservoir	0.267	1	817	5,608	6	815.25	6,437	BASIN 1
11	SCS Runoff	0.569	1	730	2,510	-----	-----	-----	PR-1B PER
12	SCS Runoff	1.695	1	726	5,515	-----	-----	-----	PR-1B IMP
13	Combine	2.124	1	726	8,025	11, 12	-----	-----	PR-1B
14	Combine	2.124	1	726	13,633	10, 13	-----	-----	INFLOW TO BASIN 2
15	Reservoir	0.643	1	740	12,028	14	792.73	3,353	BASIN 2
16	SCS Runoff	0.079	1	727	271	-----	-----	-----	PR-1C PER
17	SCS Runoff	0.388	1	726	1,264	-----	-----	-----	PR-1C IMP
18	Combine	0.465	1	726	1,535	16, 17	-----	-----	PR-1C
19	SCS Runoff	0.122	1	728	466	-----	-----	-----	PR-1D PER
20	SCS Runoff	0.706	1	726	2,298	-----	-----	-----	PR-1D IMP
21	Combine	0.816	1	726	2,764	19, 20	-----	-----	PR-1D
22	SCS Runoff	0.077	1	730	339	-----	-----	-----	PR-1E PER
23	SCS Runoff	0.388	1	726	1,264	-----	-----	-----	PR-1E IMP
24	Combine	0.446	1	726	1,603	22, 23	-----	-----	PR-1E
25	SCS Runoff	0.065	1	729	265	-----	-----	-----	PR-1F PER
26	SCS Runoff	0.388	1	726	1,264	-----	-----	-----	PR-1F IMP
27	Combine	0.443	1	726	1,528	25, 26	-----	-----	PR-1F
28	SCS Runoff	3.183	1	736	17,011	-----	-----	-----	PR-1G PER
29	SCS Runoff	2.581	1	726	8,579	-----	-----	-----	PR-1G IMP
30	Combine	4.350	1	727	25,590	28, 29	-----	-----	PR-1G
31	Combine	6.726	1	726	45,049	15, 18, 21, 24, 27, 30	-----	-----	PR-1
Current 15107.gpw					Return Period: 2 Year			Thursday, 07 / 9 / 2026	
								22	

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: EX-1 (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	5.00	305.00
WOODS	B	55	5.52	303.60
OPEN SPACE GOOD CONDITION	D	80	0.81	64.80
WOODS	D	77	1.02	78.54
Total			12.35	751.94

$$CN = \frac{751.9}{12.4} = 61$$

DRAINAGE AREA DESIGNATION: EX-1 (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	A	98	1.95	191.10
Total			1.95	191.10

$$CN = \frac{191.1}{2.0} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **EX 1 PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.4			
FLOW LENGTH, L (FT, 100 MAX)=	66 (66 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7			
SHEET FLOW TIME, T _c (MIN.)=	8.8 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	WOODLANDS	SHORT-GRASS	PAVED	
FLOW LENGTH, L (FT)=	250	436	1140	
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	11	15	5	
AVERAGE VELOCITY, V (FT/S)=	1.67	2.70	4.55	
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	2.5 MIN.	2.7 MIN.	4.2 MIN.	

CHANNEL FLOW:

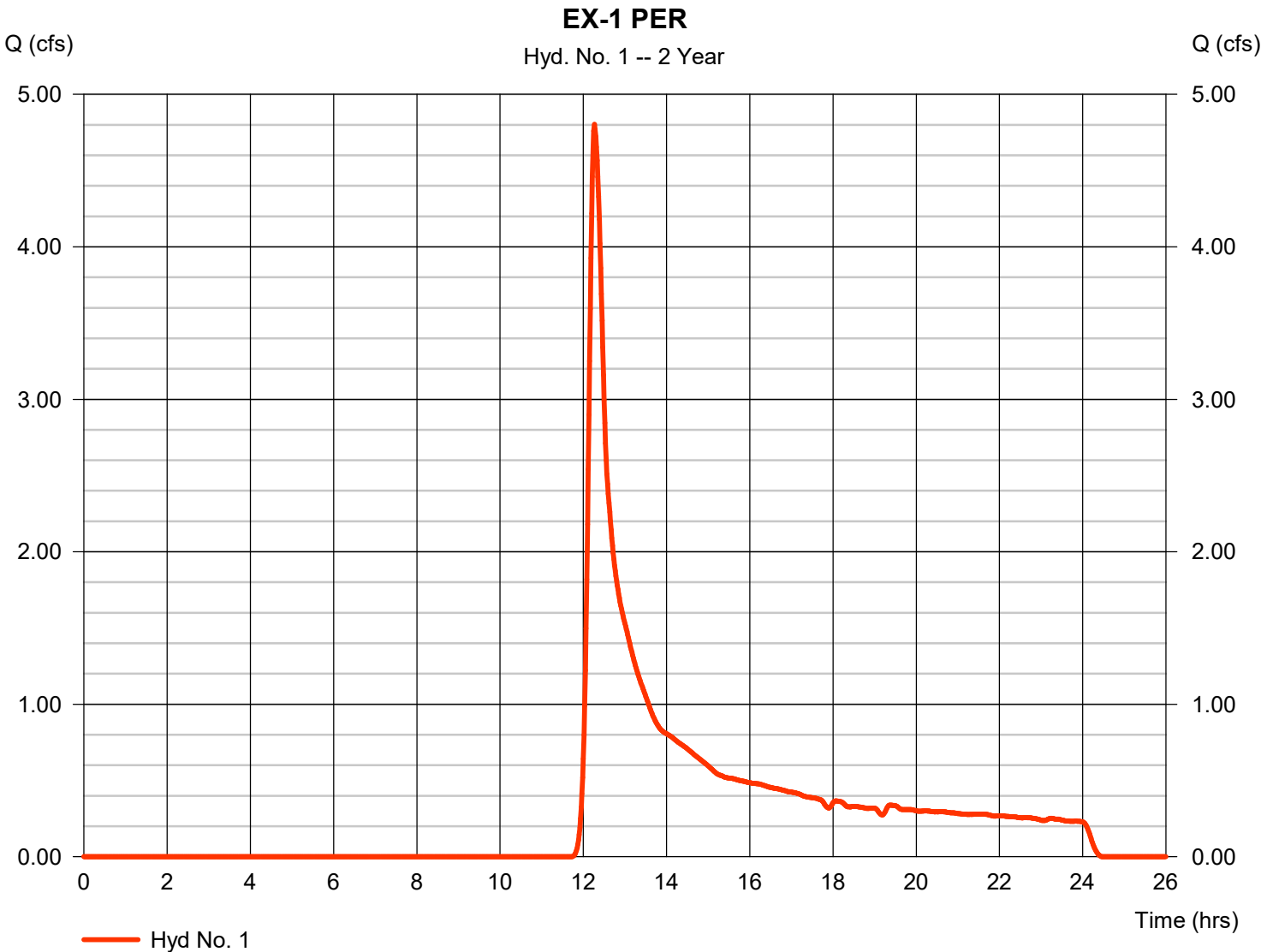
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	8.8 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	9.4 MIN.	TIME OF CONCENTRATION= 18.2 MIN.		
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 1

EX-1 PER

Hydrograph type	= SCS Runoff	Peak discharge	= 4.804 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.27 hrs
Time interval	= 1 min	Hyd. volume	= 27,609 cuft
Drainage area	= 12.350 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **EX 1 IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	0.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	PAVED			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	1090			
LAND SLOPE, S (%)=	5			
AVERAGE VELOCITY, V (FT/S)=	4.55			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	4.0 MIN.			

CHANNEL FLOW:

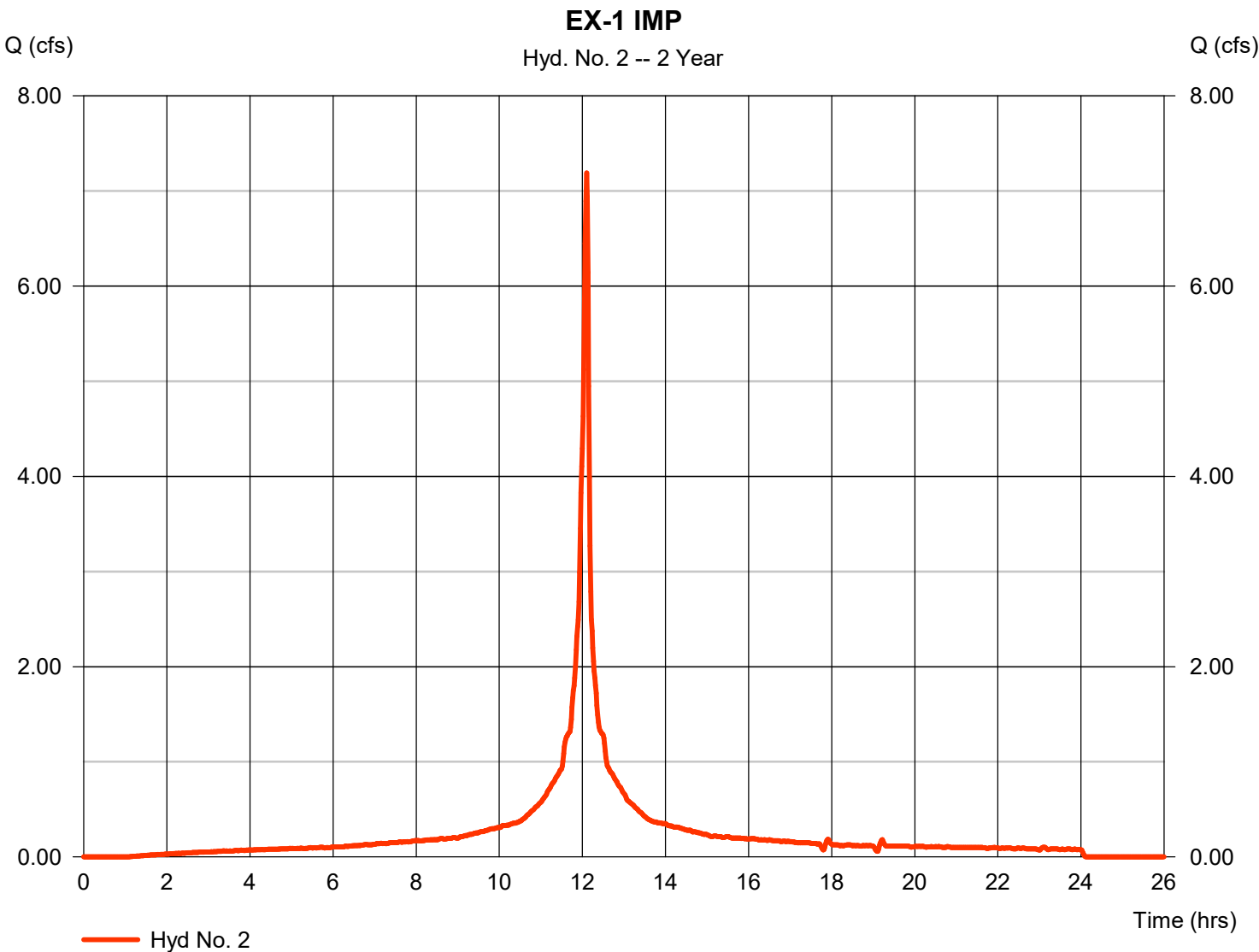
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	4.0 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=		4.7 MIN.

Hydrograph Report

Hyd. No. 2

EX-1 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 7.191 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 23,898 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

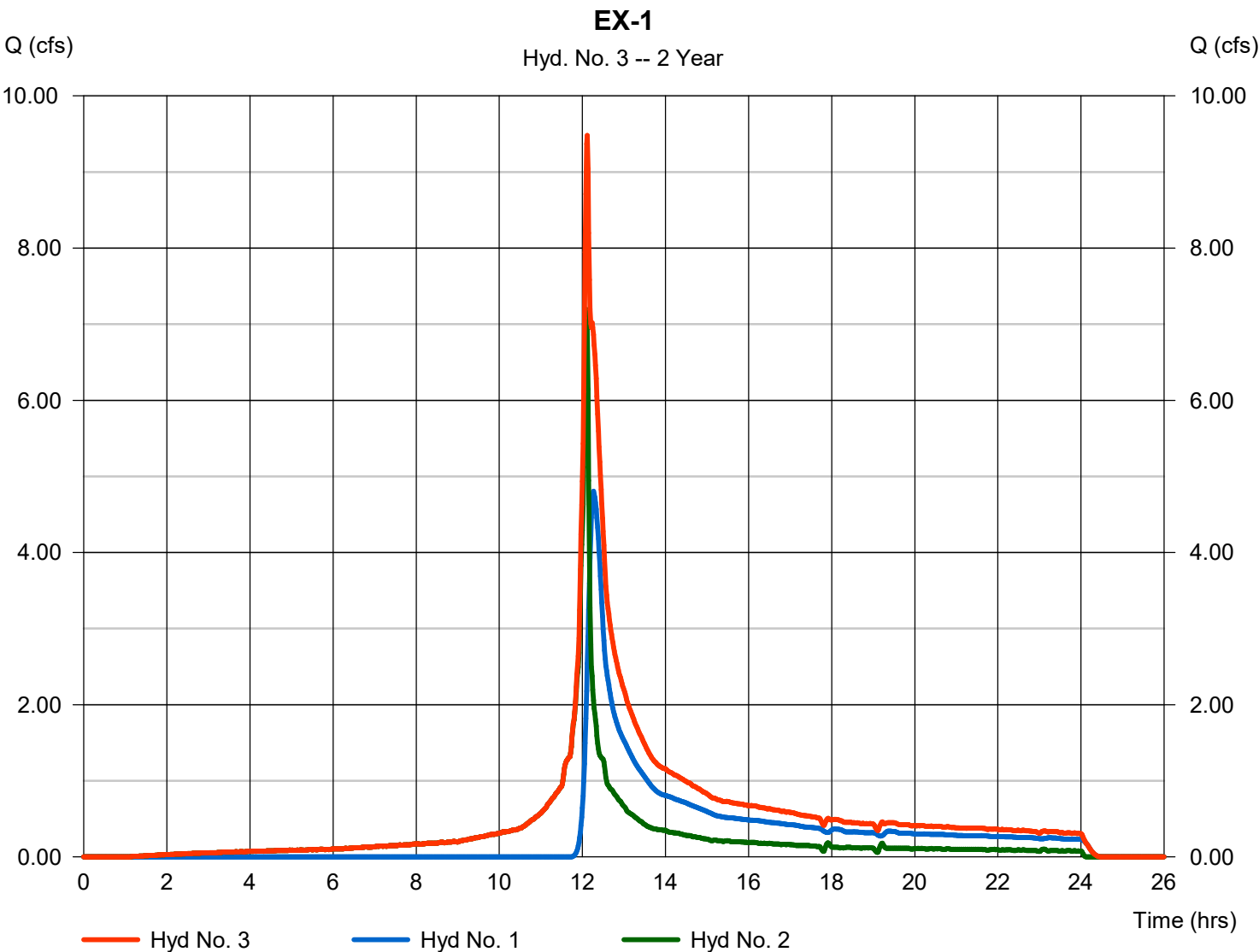


Hydrograph Report

Hyd. No. 3

EX-1

Hydrograph type	= Combine	Peak discharge	= 9.482 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 51,507 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.300 ac



PEAK FLOW REDUCTION CALCULATIONS - CURRENT

TO COMPLY WITH NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER MANAGEMENT REQUIREMENTS, THE POST-DEVELOPMENT PEAK RUNOFF RATES MUST BE REDUCED TO A PERCENTAGE OF PRE-DEVELOPMENT PEAK RUNOFF RATES, AS

$$\text{PROPOSED } Q_2 \leq 50\% \text{ EXISTING } Q_2$$

$$\text{PROPOSED } Q_{10} \leq 75\% \text{ EXISTING } Q_{10}$$

$$\text{PROPOSED } Q_{100} \leq 80\% \text{ EXISTING } Q_{10}$$

REDUCTION FACTORS ARE APPLIED TO THE DISTURBED PORTION OF THE TRIBUTARY DRAINAGE AREA ONLY:

EX 1

DRAINAGE AREA = 14.3 AC

AREA OF DISTURBANCE= 6 AC

PERCENT DISTURBANCE = 42.0%

APPLY REDUCTION FACTORS TO 42% OF EXISTING PEAK FLOWS.

CURRENT PEAK FLOWS:

$$Q_2 = 9.5 \text{ CFS}$$

$$Q_{10} = 20.9 \text{ CFS}$$

$$Q_{100} = 47.5 \text{ CFS}$$

CALCULATE ALLOWABLE RUNOFF:

$$Q_2 = (0.50) \times (0.42) \times (9.5 \text{ CFS}) + (0.58) \times (9.5 \text{ CFS}) = 7.5 \text{ CFS}$$

$$Q_{10} = (0.75) \times (0.42) \times (20.9 \text{ CFS}) + (0.58) \times (20.9 \text{ CFS}) = 18.7 \text{ CFS}$$

$$Q_{100} = (0.80) \times (0.42) \times (47.5 \text{ CFS}) + (0.58) \times (47.5 \text{ CFS}) = 43.5 \text{ CFS}$$

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1A (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	2.17	132.37
WOODS	B	55	0.10	5.50
Total			2.27	137.87

$$CN = \frac{137.9}{2.3} = 61$$

DRAINAGE AREA DESIGNATION: PR-1A (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.52	50.96
Total			0.52	50.96

$$CN = \frac{51.0}{0.5} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1A PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	8.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
FLOW LENGTH, L (FT)=	280			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	6			
AVERAGE VELOCITY, V (FT/S)=	1.71			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	2.7 MIN.			

CHANNEL FLOW:

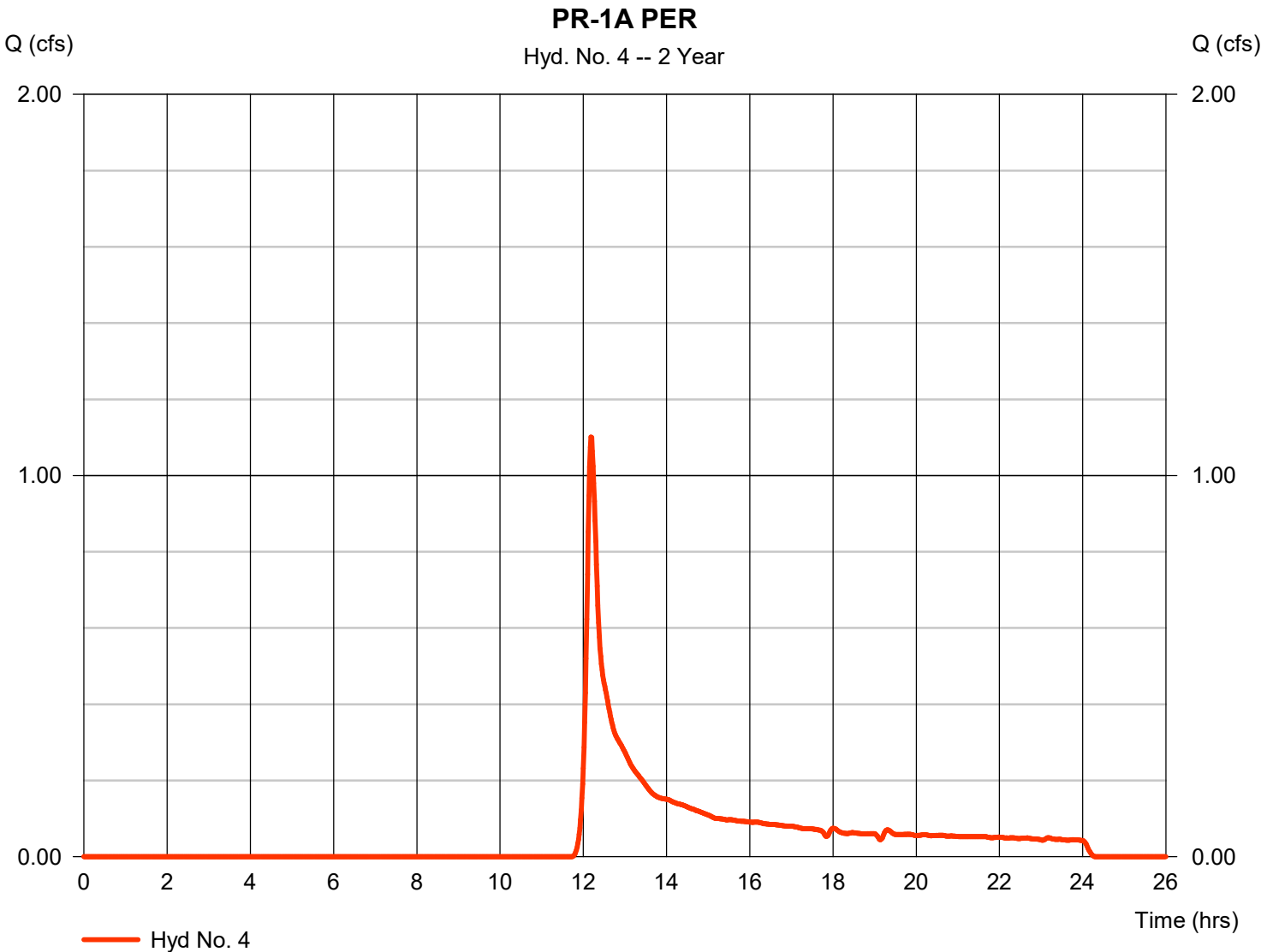
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	8.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	2.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	11.4 MIN.	

Hydrograph Report

Hyd. No. 4

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 1.101 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 5,225 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.40 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1A IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7			
SHEET FLOW TIME, T _c (MIN.)=	0.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	PAVED			
FLOW LENGTH, L (FT)=	210			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	12			
AVERAGE VELOCITY, V (FT/S)=	7.04			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.5 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
CROSS SECTIONAL AREA, a (SF)=				
$r = \frac{a}{P_w}$ WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				

TOTAL SHEET FLOW TIME = **0.7 MIN.**
 TOTAL SHALLOW CONCENTRATED FLOW TIME = **0.5 MIN.**
 TOTAL CHANNEL FLOW TIME = **0.0 MIN.**
TIME OF CONCENTRATION= 1.2 MIN.

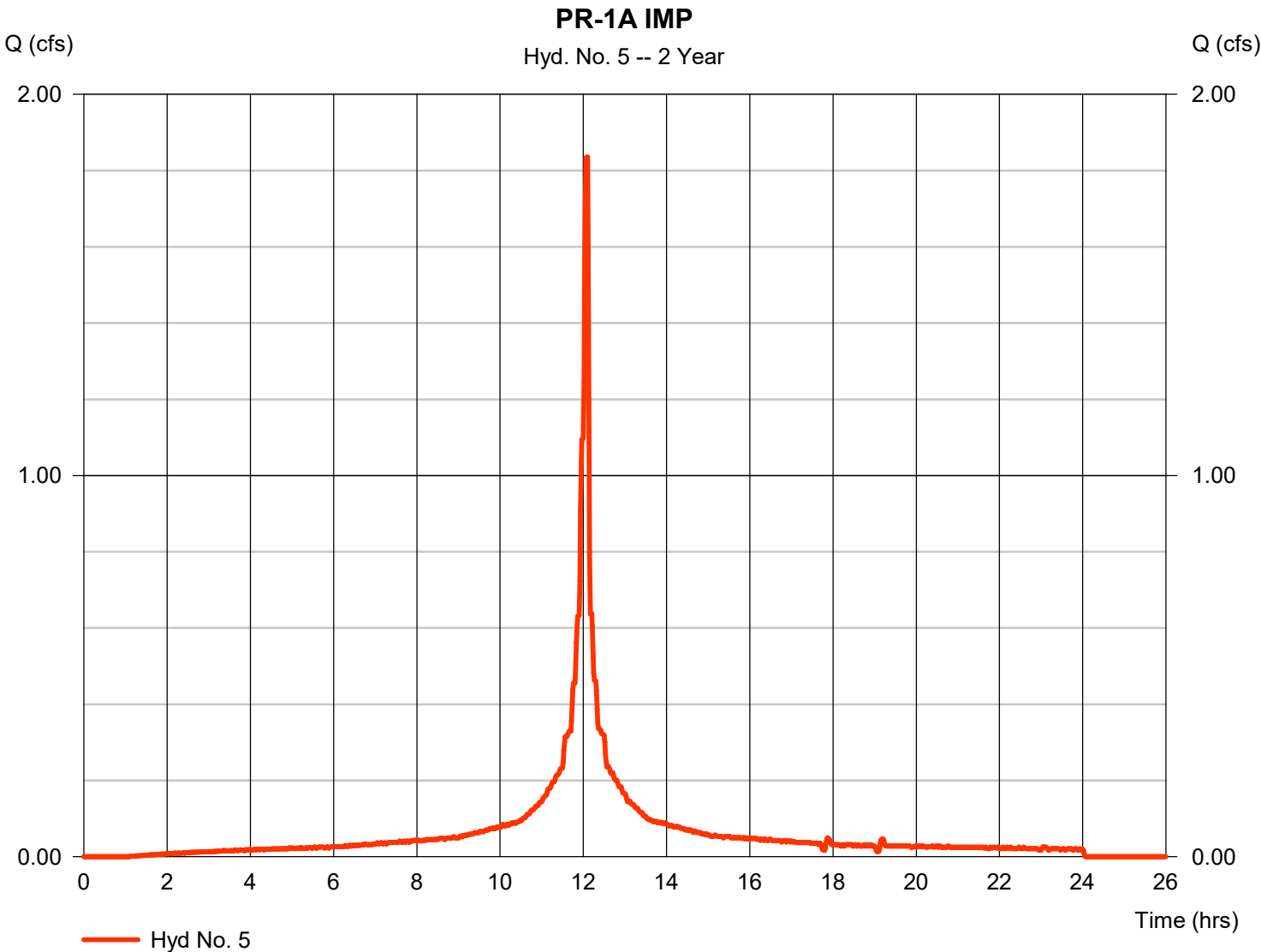
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 5

PR-1A IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.836 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 5,974 cuft
Drainage area	= 0.520 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

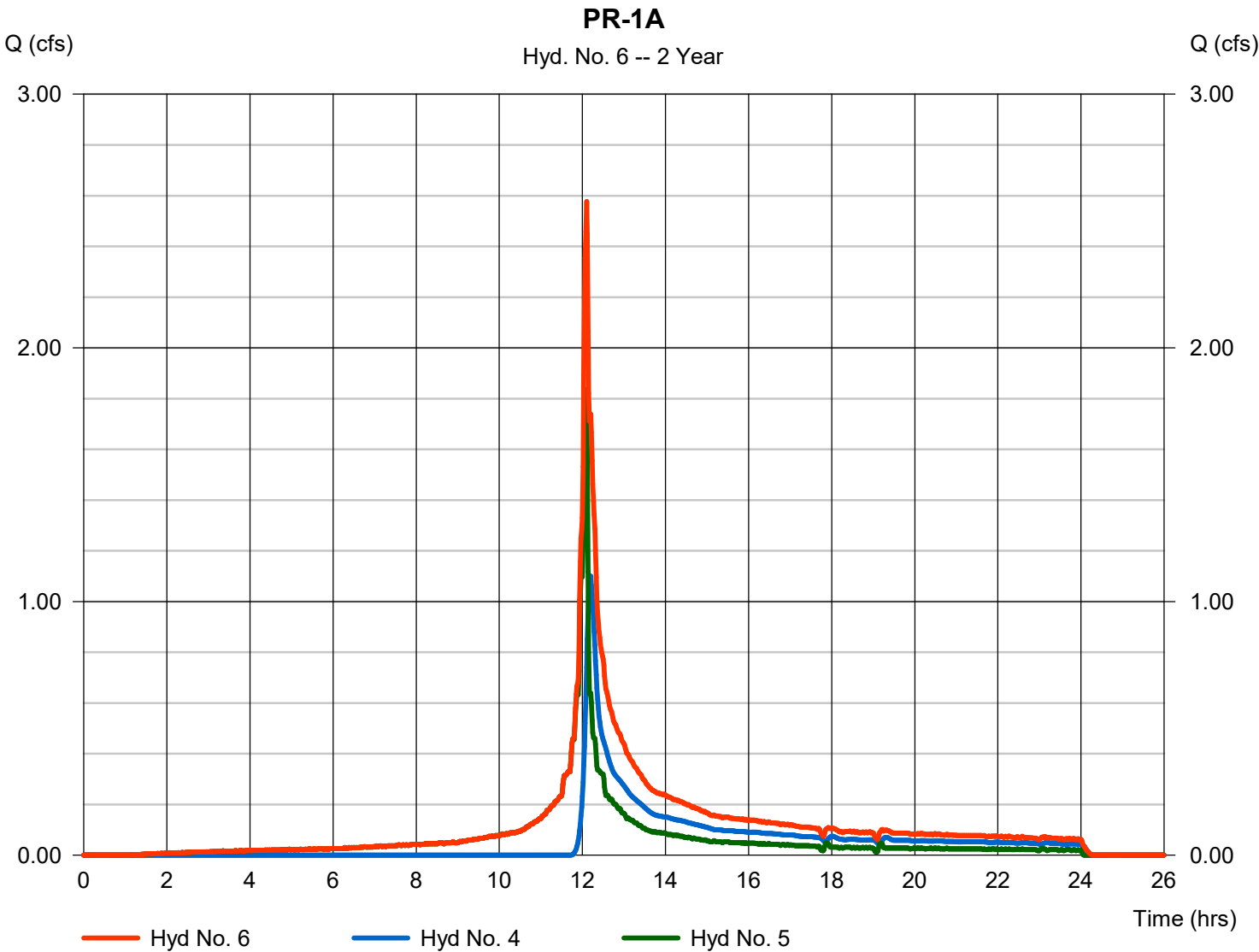


Hydrograph Report

Hyd. No. 6

PR-1A

Hydrograph type	= Combine	Peak discharge	= 2.576 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 11,199 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.790 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: DRYWELLS TO BASIN 1

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.00	0.00
WOODS	B	55	0.00	0.00
OPEN SPACE GOOD CONDITION	D	80	0.00	0.00
WOODS	D	77	0.00	0.00
Total			0.00	0.00

$$CN = \frac{0.0}{0.0} \text{ \#DIV/0!}$$

DRAINAGE AREA DESIGNATION: DRYWELLES TO BASIN 1

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	A	98	1.47	144.06
Total			1.47	144.06

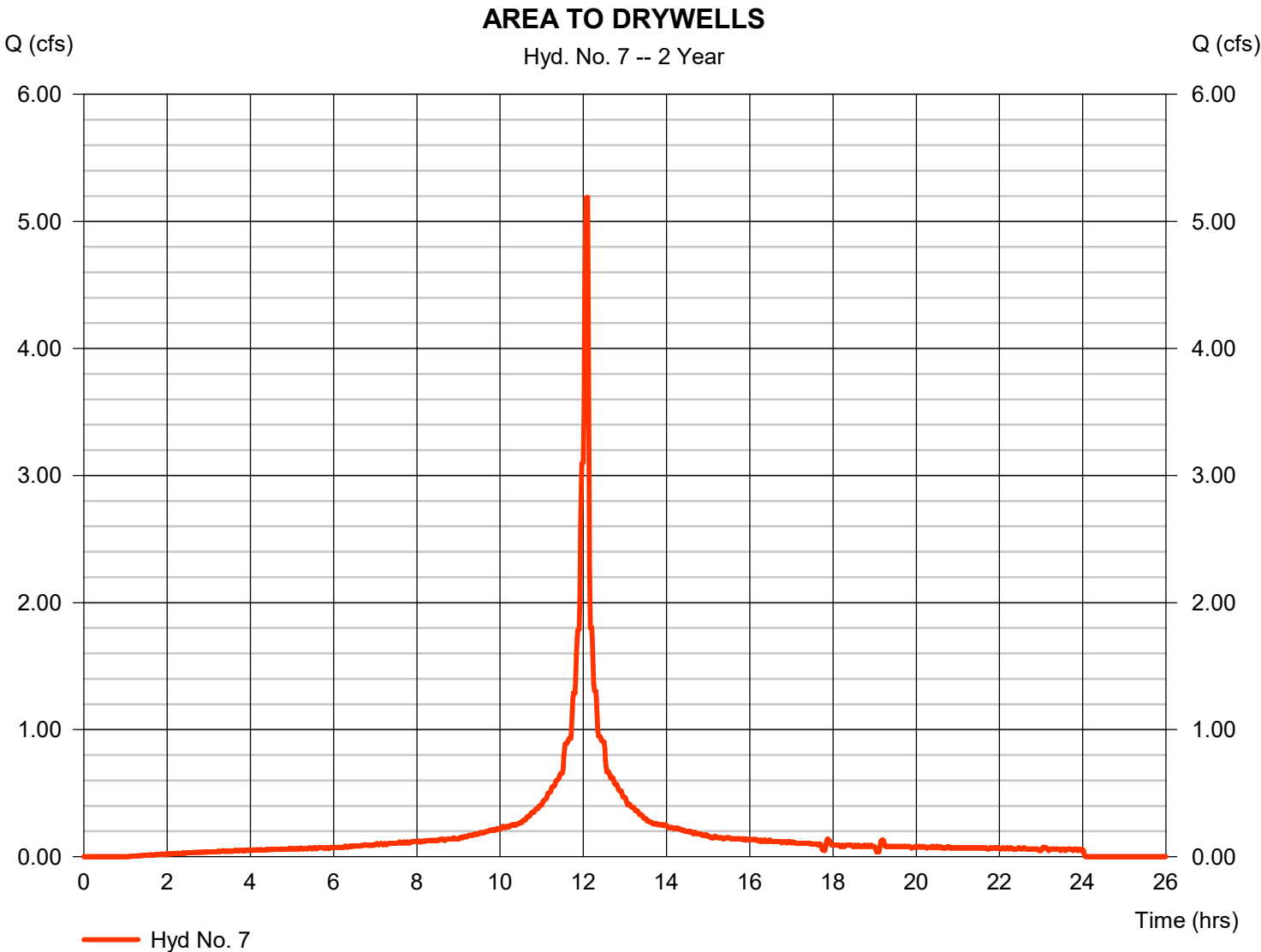
$$CN = \frac{144.1}{1.5} = 98$$

Hydrograph Report

Hyd. No. 7

AREA TO DRYWELLS

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.190 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	16,889 cuft
Drainage area	=	1.470 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	1.60 min
Total precip.	=	3.61 in	Distribution	=	Custom
Storm duration	=	H:\ADMIN\NOAA D.cds	Shape factor	=	484



DRYWELL STORAGE CALCULATIONS

VOLUME OF DRYWELL INTERIC

$$\pi \times 3.00 \text{ FT}^2 \times 3 \text{ FT} = 170 \text{ CF}$$

DRYWELL INTERIOR RADIUS: 3.00 FT

VOLUME OF DRYWELL EXTERIC

$$\pi \times 3.25 \text{ FT}^2 \times 3.25 \text{ FT} = 199 \text{ CF}$$

DRYWELL EXTERIOR RADIUS: 3.25 FT

HEIGHT OF DRYWELL: 6.00 FT

VOLUME OF STONE VOIDS (V_s)

$$[(10.5 \text{ FT} \times 10.5 \text{ FT})(7 \text{ FT}) - 199 \text{ CF}](0.40) = 230 \text{ CF}$$

DEPTH OF STONE: 7.00 FT

WIDTH OF EXCAVATION FOR STONE: 10.50 FT

STORAGE VOLUME PER DRYWI

$$170 \text{ CF} + 230 \text{ CF} = 400 \text{ CF}$$

NUMBER OF DRYWELLS: 28

TOTAL STORAGE VOLUME : 400 CF x 28 = 11,200 CF

STAGE STORAGE:

BOTTOM OF STONE ELEVATION: 1

TOP OF STORAGE ELEVATION: 8

ELEVATION	STORAGE VOLUME	ELEVATION	STORAGE VOLUME	ELEVATION	STORAGE VOLUME	ELEVATION	STORAGE VOLUME
1.00	0 CF	5.25	6,613 CF				
1.25	309 CF	5.50	7,027 CF				
1.50	617 CF	5.75	7,440 CF				
1.75	926 CF	6.00	7,854 CF				
2.00	1,235 CF	6.25	8,268 CF				
2.25	1,649 CF	6.50	8,682 CF				
2.50	2,062 CF	6.75	9,095 CF				
2.75	2,476 CF	7.00	9,509 CF				
3.00	2,890 CF	7.25	9,923 CF				
3.25	3,303 CF	7.50	10,336 CF				
3.50	3,717 CF	7.75	10,750 CF				
3.75	4,131 CF	8.00	11,164 CF				
4.00	4,544 CF						
4.25	4,958 CF						
4.50	5,372 CF						
4.75	5,786 CF						
5.00	6,199 CF						

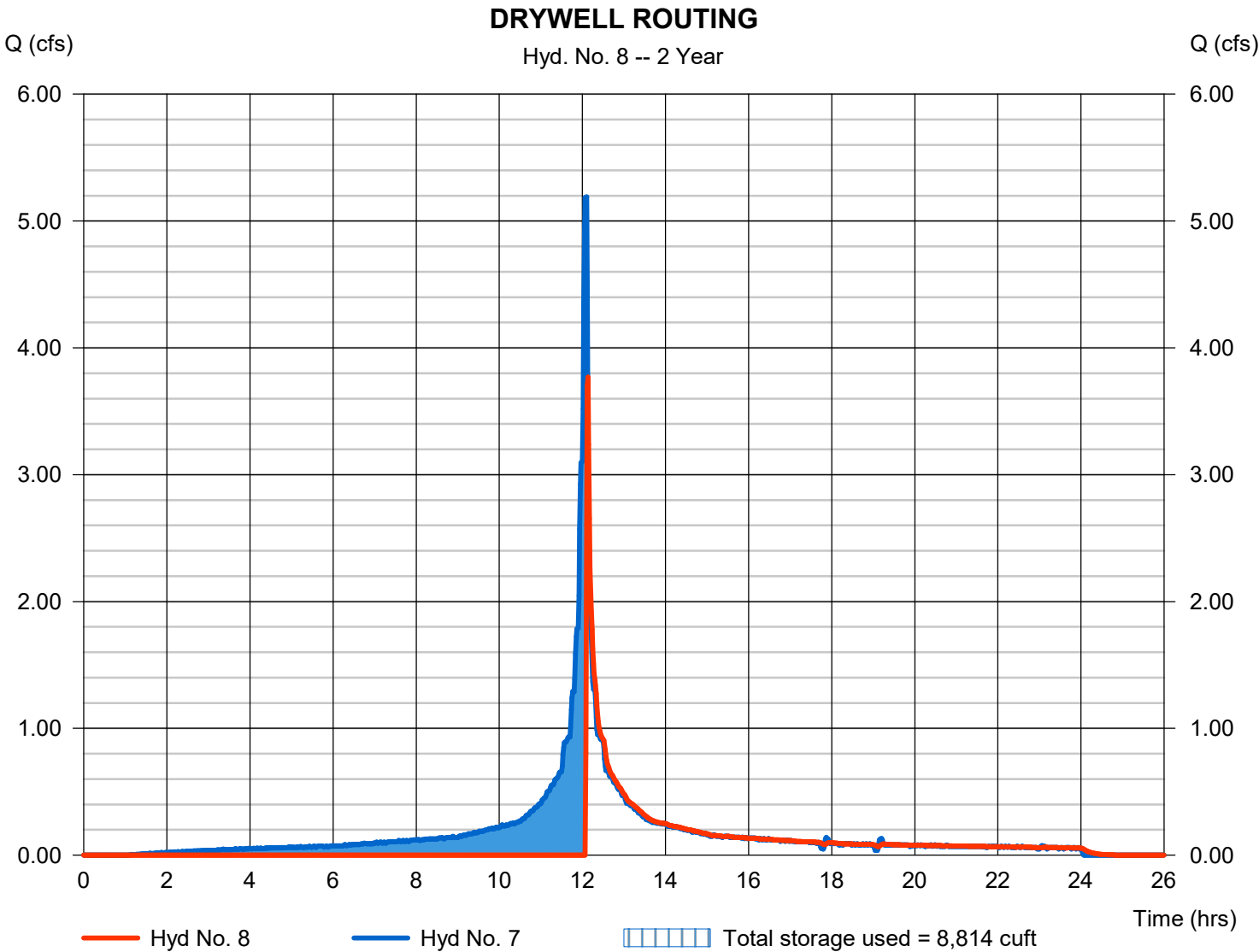
Hydrograph Report

Hyd. No. 8

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 3.770 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 8,621 cuft
Inflow hyd. No.	= 7 - AREA TO DRYWELLS	Max. Elevation	= 6.58 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 8,814 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - DRYWELLS TO BASIN 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1.00	n/a	0	0
0.50	1.50	n/a	617	617
1.00	2.00	n/a	618	1,235
1.50	2.50	n/a	827	2,062
2.00	3.00	n/a	828	2,890
2.50	3.50	n/a	827	3,717
3.00	4.00	n/a	827	4,544
3.50	4.50	n/a	828	5,372
4.00	5.00	n/a	827	6,199
4.50	5.50	n/a	828	7,027
5.00	6.00	n/a	827	7,854
5.50	6.50	n/a	828	8,682
6.00	7.00	n/a	827	9,509
6.50	7.50	n/a	827	10,336
7.00	8.00	n/a	828	11,164

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 14	0	0	0
Invert El. (ft)	= 6.25	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)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.05	62	1.05	0.00	---	---	---	---	---	---	---	---	---	0.000
0.10	123	1.10	0.00	---	---	---	---	---	---	---	---	---	0.000
0.15	185	1.15	0.00	---	---	---	---	---	---	---	---	---	0.000
0.20	247	1.20	0.00	---	---	---	---	---	---	---	---	---	0.000
0.25	309	1.25	0.00	---	---	---	---	---	---	---	---	---	0.000
0.30	370	1.30	0.00	---	---	---	---	---	---	---	---	---	0.000
0.35	432	1.35	0.00	---	---	---	---	---	---	---	---	---	0.000
0.40	494	1.40	0.00	---	---	---	---	---	---	---	---	---	0.000
0.45	555	1.45	0.00	---	---	---	---	---	---	---	---	---	0.000
0.50	617	1.50	0.00	---	---	---	---	---	---	---	---	---	0.000
0.55	679	1.55	0.00	---	---	---	---	---	---	---	---	---	0.000
0.60	741	1.60	0.00	---	---	---	---	---	---	---	---	---	0.000
0.65	802	1.65	0.00	---	---	---	---	---	---	---	---	---	0.000
0.70	864	1.70	0.00	---	---	---	---	---	---	---	---	---	0.000
0.75	926	1.75	0.00	---	---	---	---	---	---	---	---	---	0.000
0.80	988	1.80	0.00	---	---	---	---	---	---	---	---	---	0.000
0.85	1,050	1.85	0.00	---	---	---	---	---	---	---	---	---	0.000
0.90	1,111	1.90	0.00	---	---	---	---	---	---	---	---	---	0.000
0.95	1,173	1.95	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1,235	2.00	0.00	---	---	---	---	---	---	---	---	---	0.000
1.05	1,318	2.05	0.00	---	---	---	---	---	---	---	---	---	0.000
1.10	1,400	2.10	0.00	---	---	---	---	---	---	---	---	---	0.000
1.15	1,483	2.15	0.00	---	---	---	---	---	---	---	---	---	0.000
1.20	1,566	2.20	0.00	---	---	---	---	---	---	---	---	---	0.000
1.25	1,649	2.25	0.00	---	---	---	---	---	---	---	---	---	0.000
1.30	1,731	2.30	0.00	---	---	---	---	---	---	---	---	---	0.000
1.35	1,814	2.35	0.00	---	---	---	---	---	---	---	---	---	0.000
1.40	1,897	2.40	0.00	---	---	---	---	---	---	---	---	---	0.000

DRYWELLS TO BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.45	1,979	2.45	0.00	---	---	---	---	---	---	---	---	---	0.000
1.50	2,062	2.50	0.00	---	---	---	---	---	---	---	---	---	0.000
1.55	2,145	2.55	0.00	---	---	---	---	---	---	---	---	---	0.000
1.60	2,228	2.60	0.00	---	---	---	---	---	---	---	---	---	0.000
1.65	2,310	2.65	0.00	---	---	---	---	---	---	---	---	---	0.000
1.70	2,393	2.70	0.00	---	---	---	---	---	---	---	---	---	0.000
1.75	2,476	2.75	0.00	---	---	---	---	---	---	---	---	---	0.000
1.80	2,559	2.80	0.00	---	---	---	---	---	---	---	---	---	0.000
1.85	2,642	2.85	0.00	---	---	---	---	---	---	---	---	---	0.000
1.90	2,724	2.90	0.00	---	---	---	---	---	---	---	---	---	0.000
1.95	2,807	2.95	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	2,890	3.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.05	2,973	3.05	0.00	---	---	---	---	---	---	---	---	---	0.000
2.10	3,055	3.10	0.00	---	---	---	---	---	---	---	---	---	0.000
2.15	3,138	3.15	0.00	---	---	---	---	---	---	---	---	---	0.000
2.20	3,221	3.20	0.00	---	---	---	---	---	---	---	---	---	0.000
2.25	3,304	3.25	0.00	---	---	---	---	---	---	---	---	---	0.000
2.30	3,386	3.30	0.00	---	---	---	---	---	---	---	---	---	0.000
2.35	3,469	3.35	0.00	---	---	---	---	---	---	---	---	---	0.000
2.40	3,552	3.40	0.00	---	---	---	---	---	---	---	---	---	0.000
2.45	3,634	3.45	0.00	---	---	---	---	---	---	---	---	---	0.000
2.50	3,717	3.50	0.00	---	---	---	---	---	---	---	---	---	0.000
2.55	3,800	3.55	0.00	---	---	---	---	---	---	---	---	---	0.000
2.60	3,882	3.60	0.00	---	---	---	---	---	---	---	---	---	0.000
2.65	3,965	3.65	0.00	---	---	---	---	---	---	---	---	---	0.000
2.70	4,048	3.70	0.00	---	---	---	---	---	---	---	---	---	0.000
2.75	4,131	3.75	0.00	---	---	---	---	---	---	---	---	---	0.000
2.80	4,213	3.80	0.00	---	---	---	---	---	---	---	---	---	0.000
2.85	4,296	3.85	0.00	---	---	---	---	---	---	---	---	---	0.000
2.90	4,379	3.90	0.00	---	---	---	---	---	---	---	---	---	0.000
2.95	4,461	3.95	0.00	---	---	---	---	---	---	---	---	---	0.000
3.00	4,544	4.00	0.00	---	---	---	---	---	---	---	---	---	0.000
3.05	4,627	4.05	0.00	---	---	---	---	---	---	---	---	---	0.000
3.10	4,710	4.10	0.00	---	---	---	---	---	---	---	---	---	0.000
3.15	4,792	4.15	0.00	---	---	---	---	---	---	---	---	---	0.000
3.20	4,875	4.20	0.00	---	---	---	---	---	---	---	---	---	0.000
3.25	4,958	4.25	0.00	---	---	---	---	---	---	---	---	---	0.000
3.30	5,041	4.30	0.00	---	---	---	---	---	---	---	---	---	0.000
3.35	5,124	4.35	0.00	---	---	---	---	---	---	---	---	---	0.000
3.40	5,206	4.40	0.00	---	---	---	---	---	---	---	---	---	0.000
3.45	5,289	4.45	0.00	---	---	---	---	---	---	---	---	---	0.000
3.50	5,372	4.50	0.00	---	---	---	---	---	---	---	---	---	0.000
3.55	5,455	4.55	0.00	---	---	---	---	---	---	---	---	---	0.000
3.60	5,537	4.60	0.00	---	---	---	---	---	---	---	---	---	0.000
3.65	5,620	4.65	0.00	---	---	---	---	---	---	---	---	---	0.000
3.70	5,703	4.70	0.00	---	---	---	---	---	---	---	---	---	0.000
3.75	5,786	4.75	0.00	---	---	---	---	---	---	---	---	---	0.000
3.80	5,868	4.80	0.00	---	---	---	---	---	---	---	---	---	0.000
3.85	5,951	4.85	0.00	---	---	---	---	---	---	---	---	---	0.000
3.90	6,034	4.90	0.00	---	---	---	---	---	---	---	---	---	0.000
3.95	6,116	4.95	0.00	---	---	---	---	---	---	---	---	---	0.000
4.00	6,199	5.00	0.00	---	---	---	---	---	---	---	---	---	0.000
4.05	6,282	5.05	0.00	---	---	---	---	---	---	---	---	---	0.000
4.10	6,365	5.10	0.00	---	---	---	---	---	---	---	---	---	0.000
4.15	6,447	5.15	0.00	---	---	---	---	---	---	---	---	---	0.000
4.20	6,530	5.20	0.00	---	---	---	---	---	---	---	---	---	0.000
4.25	6,613	5.25	0.00	---	---	---	---	---	---	---	---	---	0.000
4.30	6,696	5.30	0.00	---	---	---	---	---	---	---	---	---	0.000
4.35	6,779	5.35	0.00	---	---	---	---	---	---	---	---	---	0.000
4.40	6,861	5.40	0.00	---	---	---	---	---	---	---	---	---	0.000
4.45	6,944	5.45	0.00	---	---	---	---	---	---	---	---	---	0.000
4.50	7,027	5.50	0.00	---	---	---	---	---	---	---	---	---	0.000
4.55	7,110	5.55	0.00	---	---	---	---	---	---	---	---	---	0.000
4.60	7,192	5.60	0.00	---	---	---	---	---	---	---	---	---	0.000
4.65	7,275	5.65	0.00	---	---	---	---	---	---	---	---	---	0.000
4.70	7,358	5.70	0.00	---	---	---	---	---	---	---	---	---	0.000
4.75	7,441	5.75	0.00	---	---	---	---	---	---	---	---	---	0.000
4.80	7,523	5.80	0.00	---	---	---	---	---	---	---	---	---	0.000
4.85	7,606	5.85	0.00	---	---	---	---	---	---	---	---	---	0.000
4.90	7,689	5.90	0.00	---	---	---	---	---	---	---	---	---	0.000
4.95	7,771	5.95	0.00	---	---	---	---	---	---	---	---	---	0.000
5.00	7,854	6.00	0.00	---	---	---	---	---	---	---	---	---	0.000

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DRYWELLS TO BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
5.05	7,937	6.05	0.00	---	---	---	---	---	---	---	---	---	0.000
5.10	8,020	6.10	0.00	---	---	---	---	---	---	---	---	---	0.000
5.15	8,102	6.15	0.00	---	---	---	---	---	---	---	---	---	0.000
5.20	8,185	6.20	0.00	---	---	---	---	---	---	---	---	---	0.000
5.25	8,268	6.25	0.00 ic	---	---	---	---	---	---	---	---	---	0.000
5.30	8,351	6.30	0.11 ic	---	---	---	---	---	---	---	---	---	0.109
5.35	8,434	6.35	0.42 ic	---	---	---	---	---	---	---	---	---	0.423
5.40	8,516	6.40	0.92 ic	---	---	---	---	---	---	---	---	---	0.918
5.45	8,599	6.45	1.56 ic	---	---	---	---	---	---	---	---	---	1.564
5.50	8,682	6.50	2.34 ic	---	---	---	---	---	---	---	---	---	2.344
5.55	8,765	6.55	3.22 ic	---	---	---	---	---	---	---	---	---	3.215
5.60	8,847	6.60	4.14 ic	---	---	---	---	---	---	---	---	---	4.140
5.65	8,930	6.65	5.08 ic	---	---	---	---	---	---	---	---	---	5.078
5.70	9,013	6.70	5.95 ic	---	---	---	---	---	---	---	---	---	5.953
5.75	9,096	6.75	6.62 ic	---	---	---	---	---	---	---	---	---	6.617
5.80	9,178	6.80	7.25 ic	---	---	---	---	---	---	---	---	---	7.249
5.85	9,261	6.85	7.83 ic	---	---	---	---	---	---	---	---	---	7.829
5.90	9,344	6.90	8.37 ic	---	---	---	---	---	---	---	---	---	8.370
5.95	9,426	6.95	8.88 ic	---	---	---	---	---	---	---	---	---	8.878
6.00	9,509	7.00	9.36 ic	---	---	---	---	---	---	---	---	---	9.358
6.05	9,592	7.05	9.81 ic	---	---	---	---	---	---	---	---	---	9.815
6.10	9,674	7.10	10.25 ic	---	---	---	---	---	---	---	---	---	10.25
6.15	9,757	7.15	10.67 ic	---	---	---	---	---	---	---	---	---	10.67
6.20	9,840	7.20	11.07 ic	---	---	---	---	---	---	---	---	---	11.07
6.25	9,923	7.25	11.46 ic	---	---	---	---	---	---	---	---	---	11.46
6.30	10,005	7.30	11.84 ic	---	---	---	---	---	---	---	---	---	11.84
6.35	10,088	7.35	12.20 ic	---	---	---	---	---	---	---	---	---	12.20
6.40	10,171	7.40	12.56 ic	---	---	---	---	---	---	---	---	---	12.56
6.45	10,253	7.45	12.90 ic	---	---	---	---	---	---	---	---	---	12.90
6.50	10,336	7.50	13.23 ic	---	---	---	---	---	---	---	---	---	13.23
6.55	10,419	7.55	13.56 ic	---	---	---	---	---	---	---	---	---	13.56
6.60	10,502	7.60	13.88 ic	---	---	---	---	---	---	---	---	---	13.88
6.65	10,584	7.65	14.19 ic	---	---	---	---	---	---	---	---	---	14.19
6.70	10,667	7.70	14.50 ic	---	---	---	---	---	---	---	---	---	14.50
6.75	10,750	7.75	14.80 ic	---	---	---	---	---	---	---	---	---	14.80
6.80	10,833	7.80	15.09 ic	---	---	---	---	---	---	---	---	---	15.09
6.85	10,916	7.85	15.38 ic	---	---	---	---	---	---	---	---	---	15.38
6.90	10,998	7.90	15.66 ic	---	---	---	---	---	---	---	---	---	15.66
6.95	11,081	7.95	15.94 ic	---	---	---	---	---	---	---	---	---	15.94
7.00	11,164	8.00	16.21 ic	---	---	---	---	---	---	---	---	---	16.21

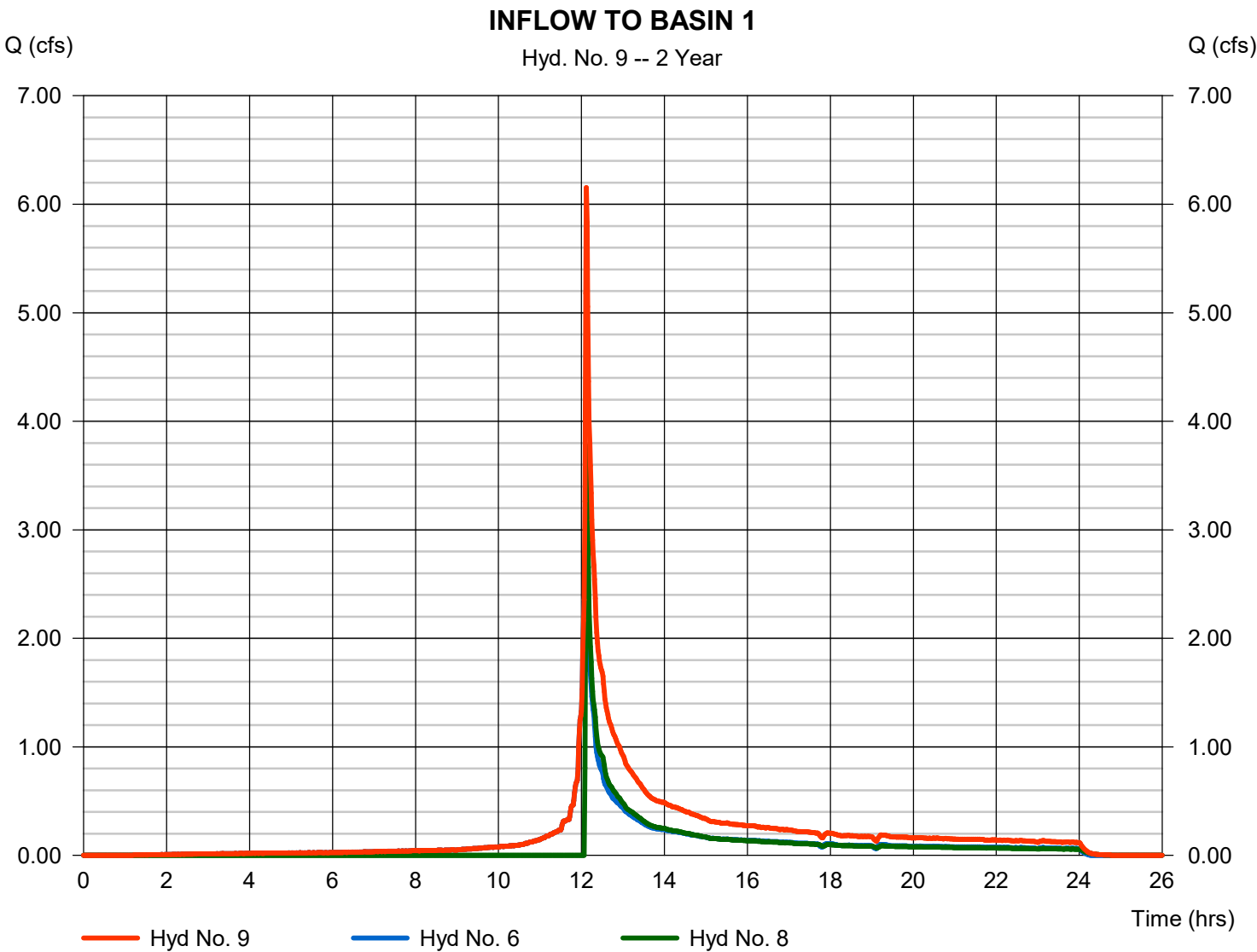
...End

Hydrograph Report

Hyd. No. 9

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 6.154 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 19,820 cuft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 0.000 ac



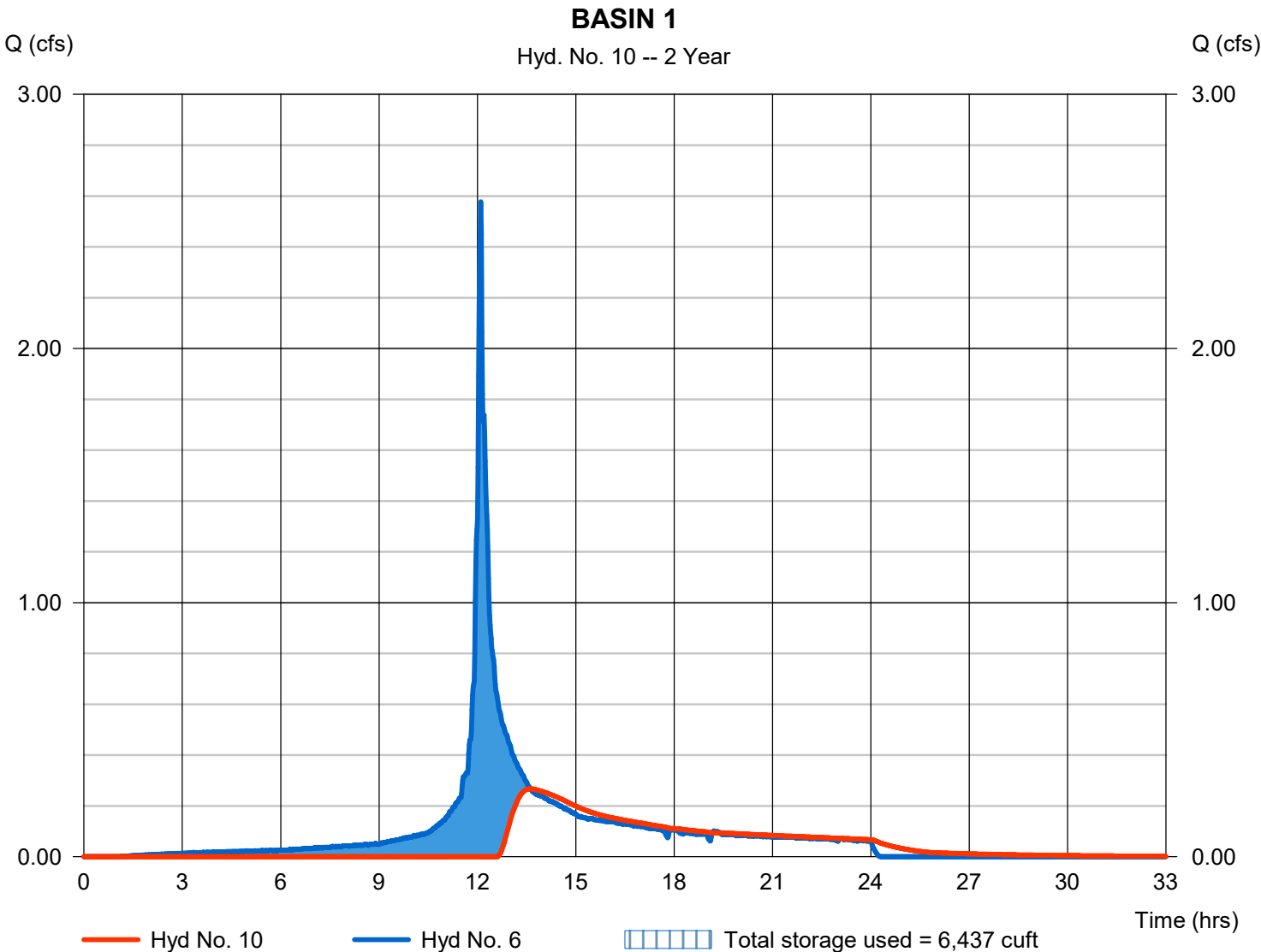
Hydrograph Report

Hyd. No. 10

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 0.267 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.62 hrs
Time interval	= 1 min	Hyd. volume	= 5,608 cuft
Inflow hyd. No.	= 6 - PR-1A	Max. Elevation	= 815.25 ft
Reservoir name	= BASIN 1	Max. Storage	= 6,437 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN 1

Pond Data

UG Chambers -Invert elev. = 814.75 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 185.90 ft, No. Barrels = 5, Slope = 0.00%, Headers = Yes
Encasement -Invert elev. = 812.75 ft, Width = 6.00 ft, Height = 5.25 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	812.75	n/a	0	0
0.52	813.28	n/a	1,247	1,247
1.05	813.80	n/a	1,247	2,494
1.58	814.33	n/a	1,247	3,741
2.10	814.85	n/a	1,290	5,031
2.63	815.38	n/a	1,838	6,869
3.15	815.90	n/a	2,095	8,963
3.67	816.42	n/a	2,176	11,139
4.20	816.95	n/a	2,136	13,275
4.72	817.47	n/a	1,953	15,228
5.25	818.00	n/a	1,439	16,667

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 815.00	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)	= 3.50	0.00	0.00	0.00
Crest El. (ft)	= 816.25	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	812.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.05	125	812.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.10	249	812.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.16	374	812.91	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.21	499	812.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.26	624	813.01	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.31	748	813.06	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.37	873	813.12	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.42	998	813.17	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.47	1,122	813.22	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.52	1,247	813.28	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.58	1,372	813.33	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.63	1,496	813.38	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.68	1,621	813.43	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.74	1,746	813.48	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.79	1,871	813.54	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.84	1,995	813.59	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.89	2,120	813.64	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.95	2,245	813.69	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	2,369	813.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.05	2,494	813.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.10	2,619	813.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.15	2,743	813.91	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.21	2,868	813.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.26	2,993	814.01	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.31	3,118	814.06	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.37	3,242	814.11	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.42	3,367	814.17	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.47	3,492	814.22	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.52	3,616	814.27	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.58	3,741	814.33	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.63	3,870	814.38	0.00	---	---	---	0.00	---	---	---	---	---	0.000

BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.68	3,999	814.43	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.73	4,128	814.48	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.78	4,257	814.53	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.84	4,386	814.59	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.89	4,515	814.64	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.94	4,644	814.69	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	4,773	814.74	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.05	4,902	814.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.10	5,031	814.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.15	5,215	814.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.20	5,399	814.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.26	5,582	815.01	0.00 ic	---	---	---	0.00	---	---	---	---	---	0.000
2.31	5,766	815.06	0.02 ic	---	---	---	0.00	---	---	---	---	---	0.016
2.36	5,950	815.11	0.06 ic	---	---	---	0.00	---	---	---	---	---	0.056
2.41	6,134	815.16	0.12 ic	---	---	---	0.00	---	---	---	---	---	0.117
2.47	6,317	815.22	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.200
2.52	6,501	815.27	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.303
2.57	6,685	815.32	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.423
2.63	6,869	815.38	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.562
2.68	7,078	815.43	0.71 ic	---	---	---	0.00	---	---	---	---	---	0.714
2.73	7,288	815.48	0.88 ic	---	---	---	0.00	---	---	---	---	---	0.880
2.78	7,497	815.53	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.057
2.84	7,707	815.59	1.24 ic	---	---	---	0.00	---	---	---	---	---	1.243
2.89	7,916	815.64	1.44 ic	---	---	---	0.00	---	---	---	---	---	1.438
2.94	8,126	815.69	1.63 ic	---	---	---	0.00	---	---	---	---	---	1.634
2.99	8,335	815.74	1.84 ic	---	---	---	0.00	---	---	---	---	---	1.836
3.05	8,544	815.79	2.03 ic	---	---	---	0.00	---	---	---	---	---	2.033
3.10	8,754	815.85	2.23 ic	---	---	---	0.00	---	---	---	---	---	2.225
3.15	8,963	815.90	2.41 ic	---	---	---	0.00	---	---	---	---	---	2.405
3.20	9,181	815.95	2.56 ic	---	---	---	0.00	---	---	---	---	---	2.565
3.26	9,399	816.01	2.69 ic	---	---	---	0.00	---	---	---	---	---	2.687
3.31	9,616	816.06	2.82 ic	---	---	---	0.00	---	---	---	---	---	2.823
3.36	9,834	816.11	2.95 ic	---	---	---	0.00	---	---	---	---	---	2.953
3.41	10,051	816.16	3.08 ic	---	---	---	0.00	---	---	---	---	---	3.078
3.46	10,269	816.22	3.20 ic	---	---	---	0.00	---	---	---	---	---	3.197
3.52	10,487	816.27	3.31 ic	---	---	---	0.03	---	---	---	---	---	3.340
3.57	10,704	816.32	3.42 ic	---	---	---	0.22	---	---	---	---	---	3.639
3.62	10,922	816.37	3.53 ic	---	---	---	0.50	---	---	---	---	---	4.031
3.67	11,139	816.42	3.64 ic	---	---	---	0.85	---	---	---	---	---	4.490
3.73	11,353	816.48	3.74 ic	---	---	---	1.26	---	---	---	---	---	5.003
3.78	11,567	816.53	3.84 ic	---	---	---	1.73	---	---	---	---	---	5.565
3.83	11,780	816.58	3.93 ic	---	---	---	2.23	---	---	---	---	---	6.169
3.88	11,994	816.63	4.03 ic	---	---	---	2.78	---	---	---	---	---	6.811
3.94	12,207	816.69	4.12 ic	---	---	---	3.37	---	---	---	---	---	7.492
3.99	12,421	816.74	4.21 ic	---	---	---	4.00	---	---	---	---	---	8.207
4.04	12,634	816.79	4.30 ic	---	---	---	4.66	---	---	---	---	---	8.955
4.09	12,848	816.84	4.39 ic	---	---	---	5.35	---	---	---	---	---	9.733
4.15	13,062	816.90	4.47 ic	---	---	---	6.07	---	---	---	---	---	10.54
4.20	13,275	816.95	4.55 ic	---	---	---	6.83	---	---	---	---	---	11.38
4.25	13,470	817.00	4.63 ic	---	---	---	7.61	---	---	---	---	---	12.24
4.30	13,666	817.05	4.72 ic	---	---	---	8.42	---	---	---	---	---	13.13
4.36	13,861	817.11	4.79 ic	---	---	---	9.25	---	---	---	---	---	14.05
4.41	14,056	817.16	4.87 ic	---	---	---	10.12	---	---	---	---	---	14.99
4.46	14,252	817.21	4.95 ic	---	---	---	11.01	---	---	---	---	---	15.95
4.51	14,447	817.27	5.02 ic	---	---	---	11.92	---	---	---	---	---	16.94
4.57	14,642	817.32	5.10 ic	---	---	---	12.85	---	---	---	---	---	17.95
4.62	14,838	817.37	5.17 ic	---	---	---	13.81	---	---	---	---	---	18.98
4.67	15,033	817.42	5.24 ic	---	---	---	14.80	---	---	---	---	---	20.04
4.72	15,228	817.47	5.31 ic	---	---	---	15.80	---	---	---	---	---	21.12
4.78	15,372	817.53	5.38 ic	---	---	---	16.83	---	---	---	---	---	22.21
4.83	15,516	817.58	5.45 ic	---	---	---	17.88	---	---	---	---	---	23.33
4.88	15,660	817.63	5.52 ic	---	---	---	18.94	---	---	---	---	---	24.46
4.93	15,804	817.68	5.59 ic	---	---	---	20.03	---	---	---	---	---	25.62
4.99	15,948	817.74	5.66 ic	---	---	---	21.14	---	---	---	---	---	26.80
5.04	16,092	817.79	5.72 ic	---	---	---	22.27	---	---	---	---	---	27.99
5.09	16,236	817.84	5.79 ic	---	---	---	23.42	---	---	---	---	---	29.21
5.14	16,380	817.89	5.85 ic	---	---	---	24.59	---	---	---	---	---	30.44
5.20	16,524	817.95	5.92 ic	---	---	---	25.77	---	---	---	---	---	31.69
5.25	16,667	818.00	5.98 ic	---	---	---	26.98	---	---	---	---	---	32.96

...End

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1B (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	1.11	67.71
WOODS	B	55	0.00	0.00
Total			1.11	67.71

$$CN = \frac{67.7}{1.1} = 61$$

DRAINAGE AREA DESIGNATION: PR-1B (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.48	47.04
Total			0.48	47.04

$$CN = \frac{47.0}{0.5} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1B PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	8.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
FLOW LENGTH, L (FT)=	180			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	15			
AVERAGE VELOCITY, V (FT/S)=	2.70			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	1.1 MIN.			

CHANNEL FLOW:

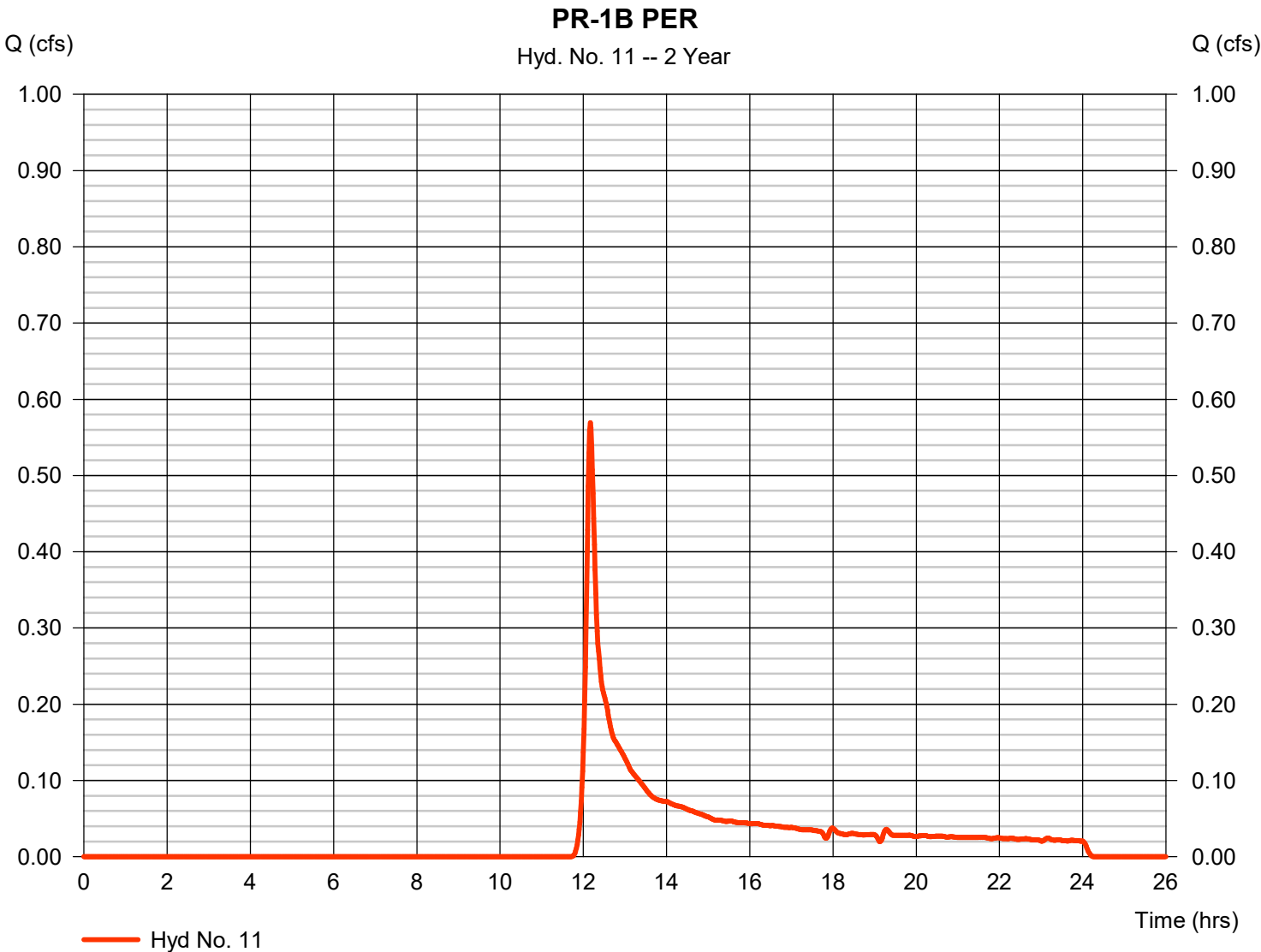
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	8.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	1.1 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	9.8 MIN.	

Hydrograph Report

Hyd. No. 11

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.569 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,510 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1B IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	70 (100 MAX)	30 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61	3.61		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7	20		
SHEET FLOW TIME, T _c (MIN.)=	0.5 MIN.	2.0 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	55			
LAND SLOPE, S (%)=	18			
AVERAGE VELOCITY, V (FT/S)=	2.95			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.3 MIN.			

CHANNEL FLOW:

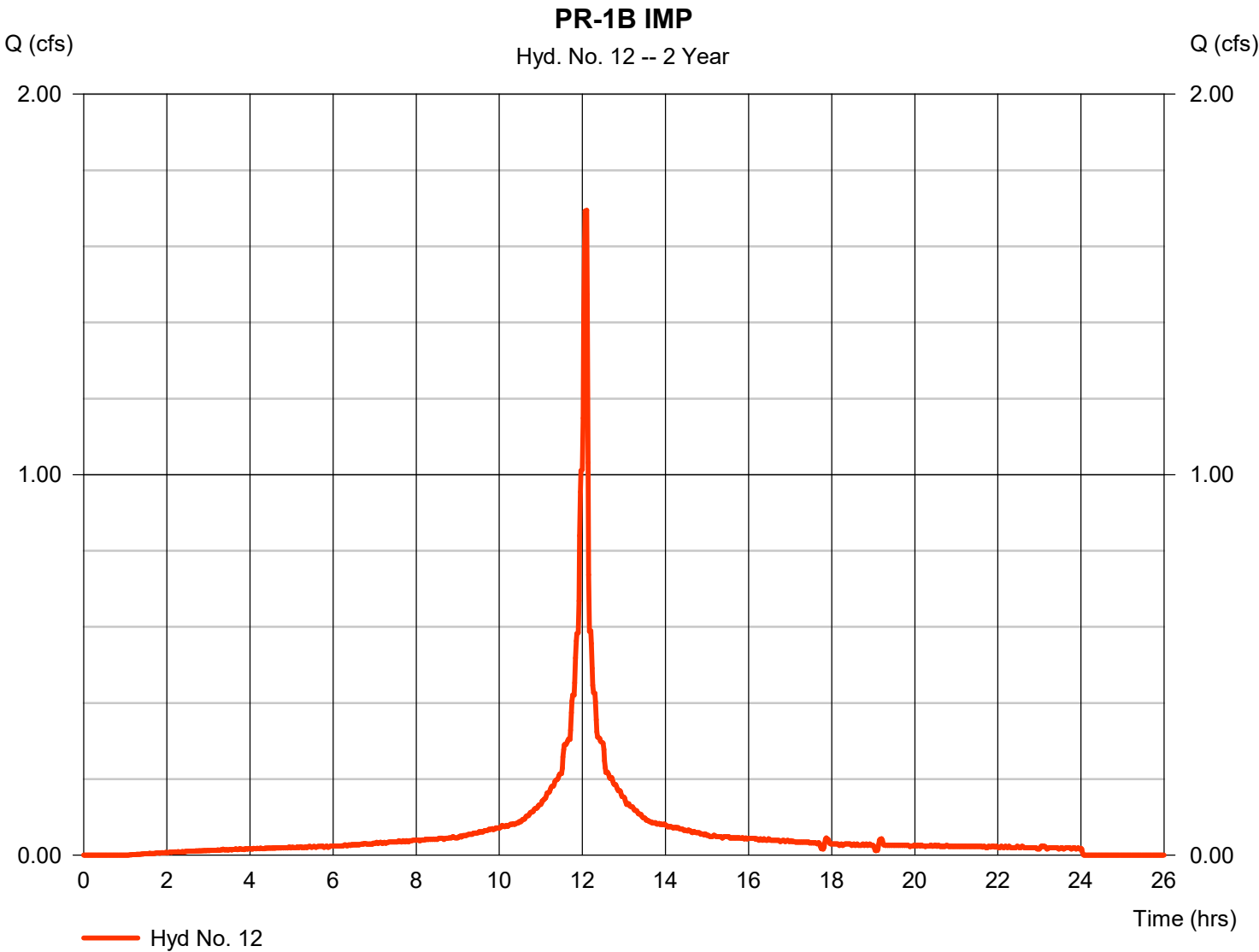
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	2.6 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.3 MIN.	TIME OF CONCENTRATION= 2.9 MIN.		
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 12

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.695 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 5,515 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.90 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

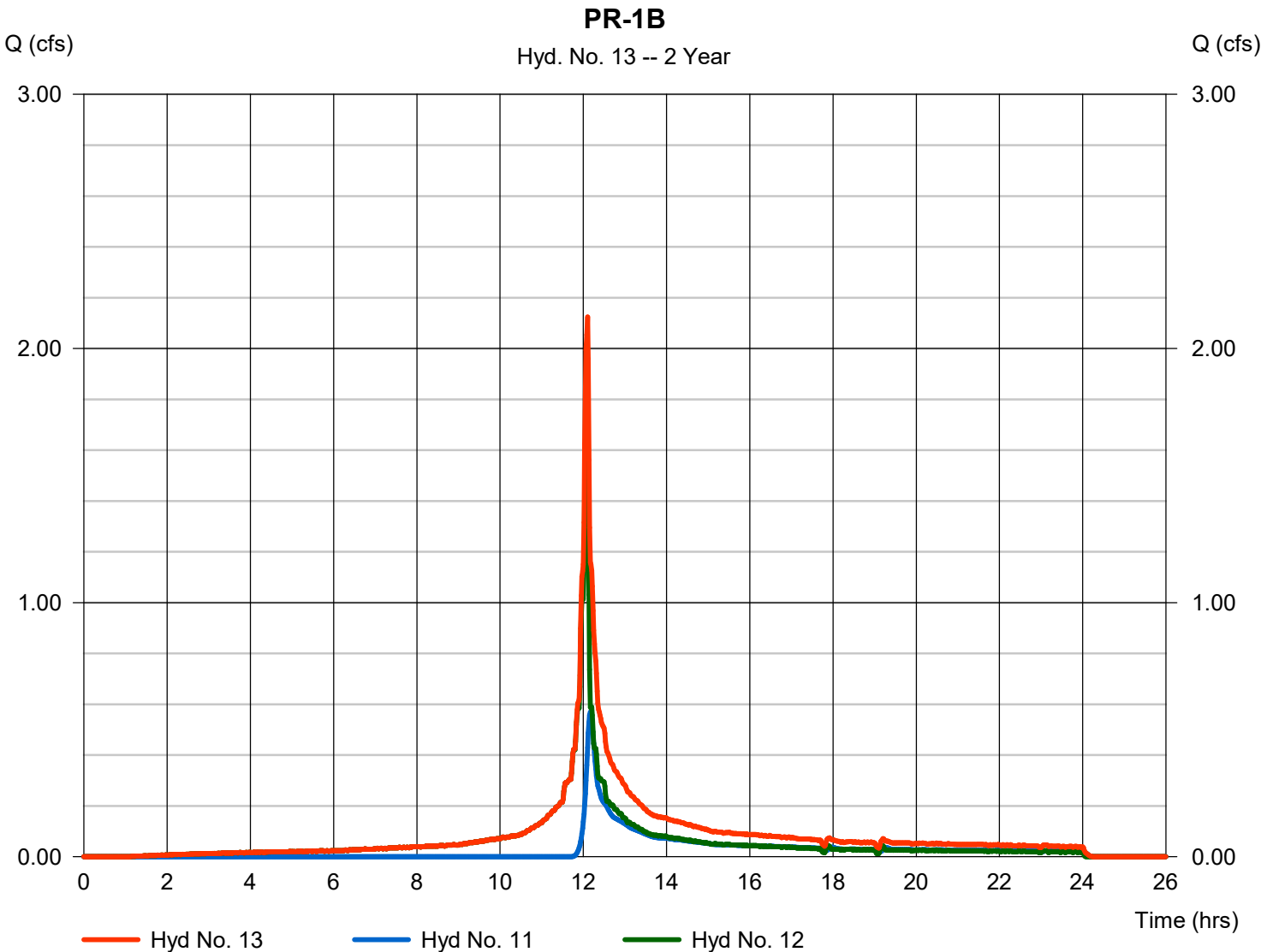


Hydrograph Report

Hyd. No. 13

PR-1B

Hydrograph type	= Combine	Peak discharge	= 2.124 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 8,025 cuft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 1.590 ac

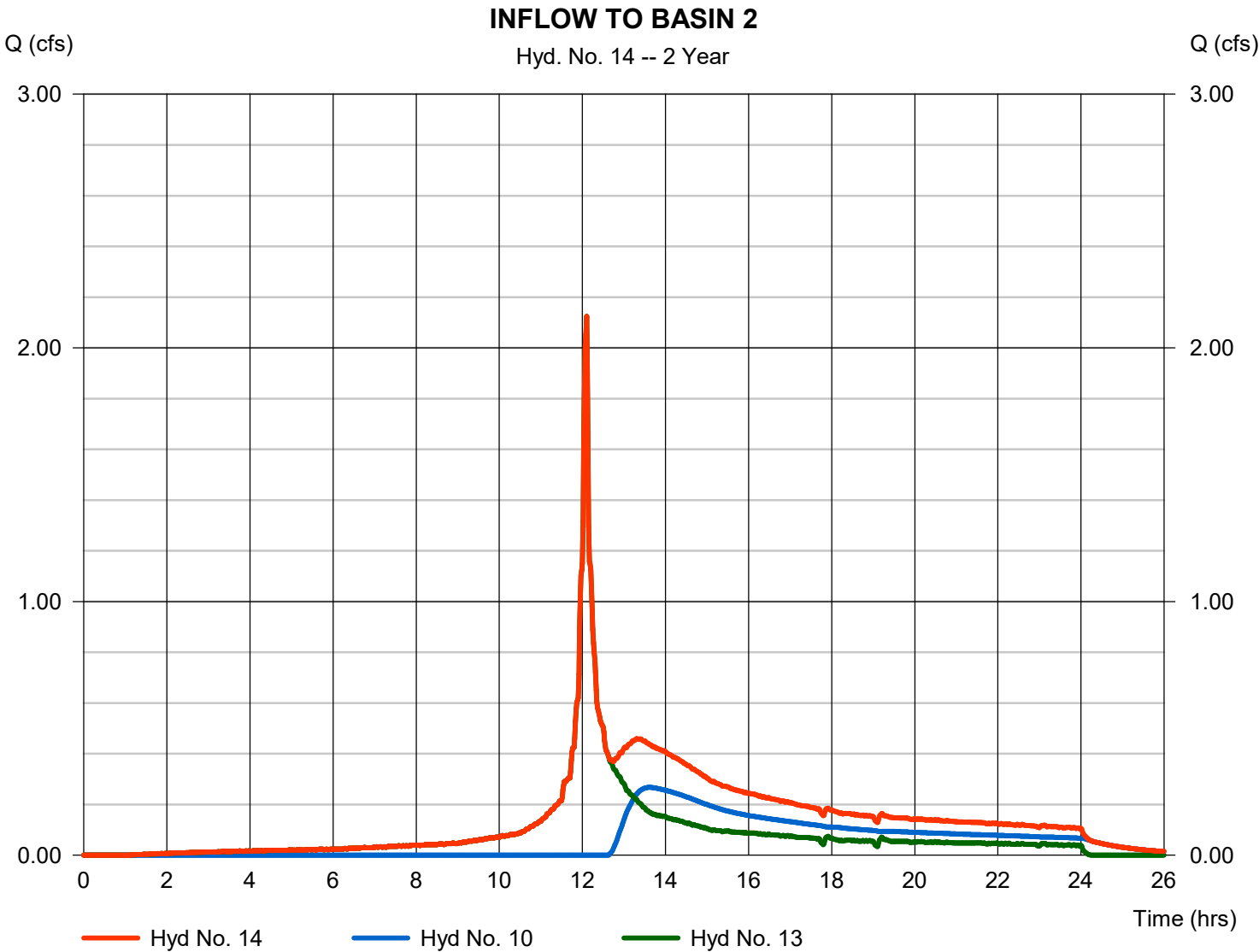


Hydrograph Report

Hyd. No. 14

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 2.124 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 13,633 cuft
Inflow hyds.	= 10, 13	Contrib. drain. area	= 0.000 ac



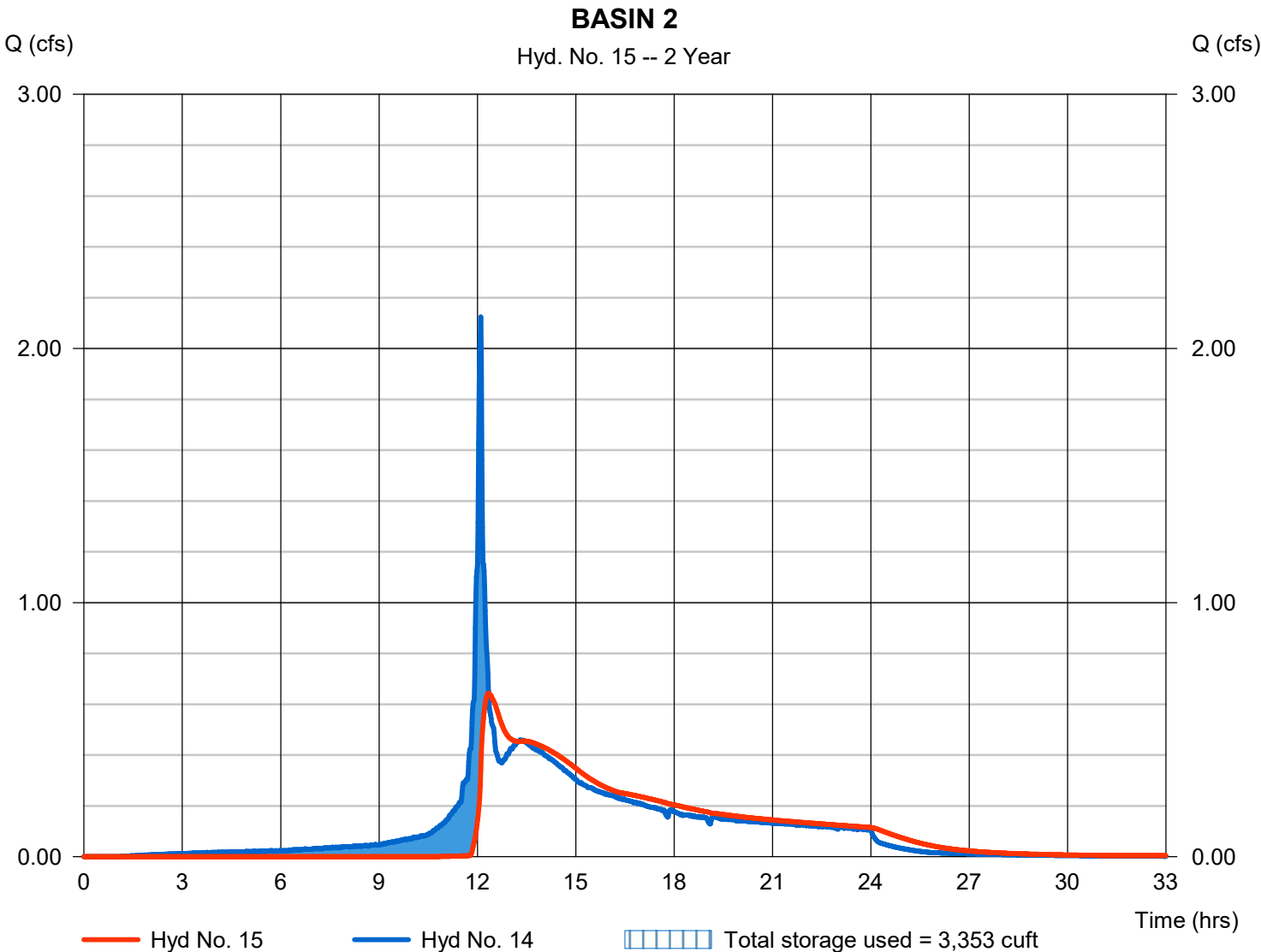
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 0.643 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.33 hrs
Time interval	= 1 min	Hyd. volume	= 12,028 cuft
Inflow hyd. No.	= 14 - INFLOW TO BASIN 2	Max. Elevation	= 792.73 ft
Reservoir name	= BASIN 2	Max. Storage	= 3,353 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Thursday, 07 / 9 / 2026

Pond No. 2 - BASIN 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 792.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	792.00	4,540	0	0
2.00	794.00	4,595	9,134	9,134
4.00	796.00	4,640	9,234	18,368

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 792.37	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)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 793.34	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	792.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.20	913	792.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.40	1,827	792.40	0.00 ic	---	---	---	0.00	---	---	---	---	---	0.005
0.60	2,740	792.60	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.254
0.80	3,654	792.80	0.83 ic	---	---	---	0.00	---	---	---	---	---	0.835
1.00	4,567	793.00	1.68 ic	---	---	---	0.00	---	---	---	---	---	1.678
1.20	5,480	793.20	2.68 ic	---	---	---	0.00	---	---	---	---	---	2.685
1.40	6,394	793.40	3.74 ic	---	---	---	0.15	---	---	---	---	---	3.886
1.60	7,307	793.60	4.62 ic	---	---	---	1.32	---	---	---	---	---	5.943
1.80	8,221	793.80	5.30 ic	---	---	---	3.12	---	---	---	---	---	8.419
2.00	9,134	794.00	5.92 ic	---	---	---	5.36	---	---	---	---	---	11.28
2.20	10,057	794.20	6.49 ic	---	---	---	7.97	---	---	---	---	---	14.45
2.40	10,981	794.40	7.00 ic	---	---	---	10.90	---	---	---	---	---	17.91
2.60	11,904	794.60	7.48 ic	---	---	---	14.13	---	---	---	---	---	21.61
2.80	12,828	794.80	7.94 ic	---	---	---	17.62	---	---	---	---	---	25.56
3.00	13,751	795.00	8.37 ic	---	---	---	21.37	---	---	---	---	---	29.73
3.20	14,674	795.20	8.77 ic	---	---	---	25.34	---	---	---	---	---	34.12
3.40	15,598	795.40	9.16 ic	---	---	---	29.54	---	---	---	---	---	38.70
3.60	16,521	795.60	9.54 ic	---	---	---	33.94	---	---	---	---	---	43.48
3.80	17,445	795.80	9.90 ic	---	---	---	38.55	---	---	---	---	---	48.44
4.00	18,368	796.00	10.24 ic	---	---	---	43.34	---	---	---	---	---	53.58

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1C (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.10	6.10
WOODS	B	55	0.00	0.00
Total			0.10	6.10

$$CN = \frac{6.1}{0.1} = 61$$

DRAINAGE AREA DESIGNATION: PR-1C (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.15	14.70
Total			0.15	14.70

$$CN = \frac{14.7}{0.2} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1C PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	85 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	25			
SHEET FLOW TIME, T _c (MIN.)=	4.3 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=				
FLOW LENGTH, L (FT)=				
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=				
AVERAGE VELOCITY, V (FT/S)=				
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=				

CHANNEL FLOW:

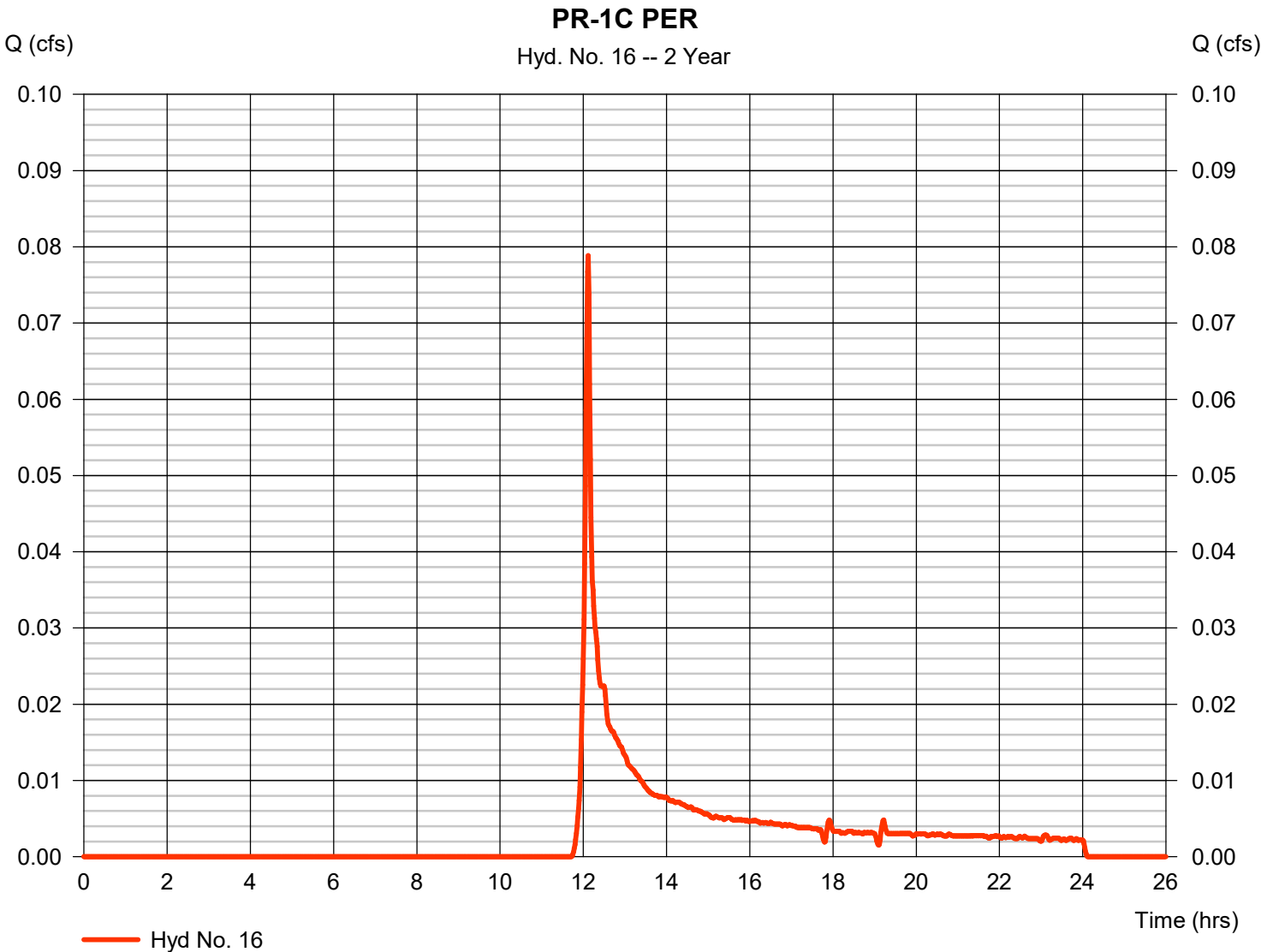
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
CROSS SECTIONAL AREA, a (SF)=				
$r = \frac{a}{P_w}$ WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	4.3 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.0 MIN.	TIME OF CONCENTRATION=	4.3 MIN.	
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 16

PR-1C PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.079 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 271 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.30 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1C IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	10			
SHEET FLOW TIME, T _c (MIN.)=	0.6 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	15			
LAND SLOPE, S (%)=	25			
AVERAGE VELOCITY, V (FT/S)=	3.48			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.1 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.6 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.1 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 0.7 MIN.

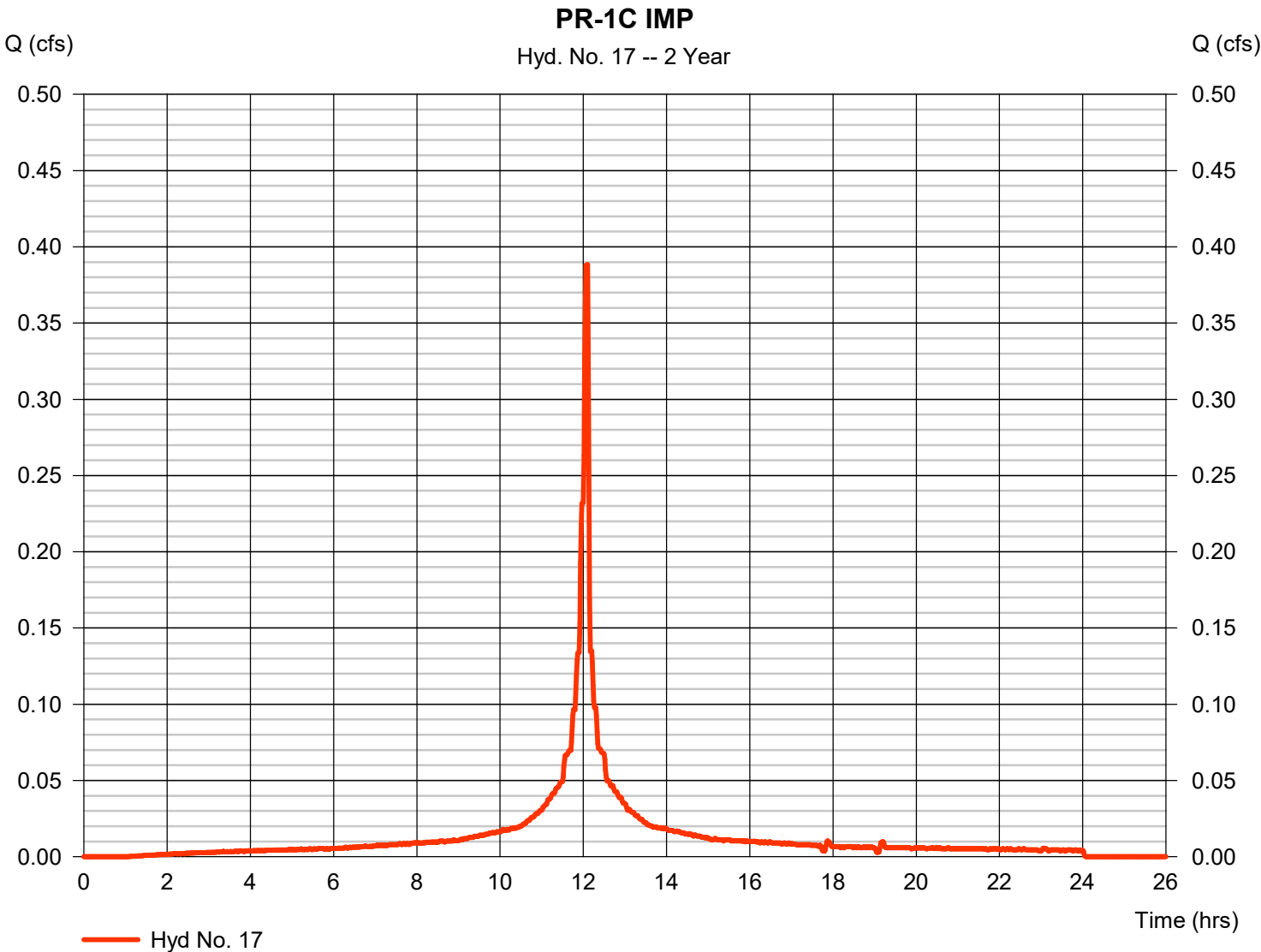
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 17

PR-1C IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.388 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,264 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

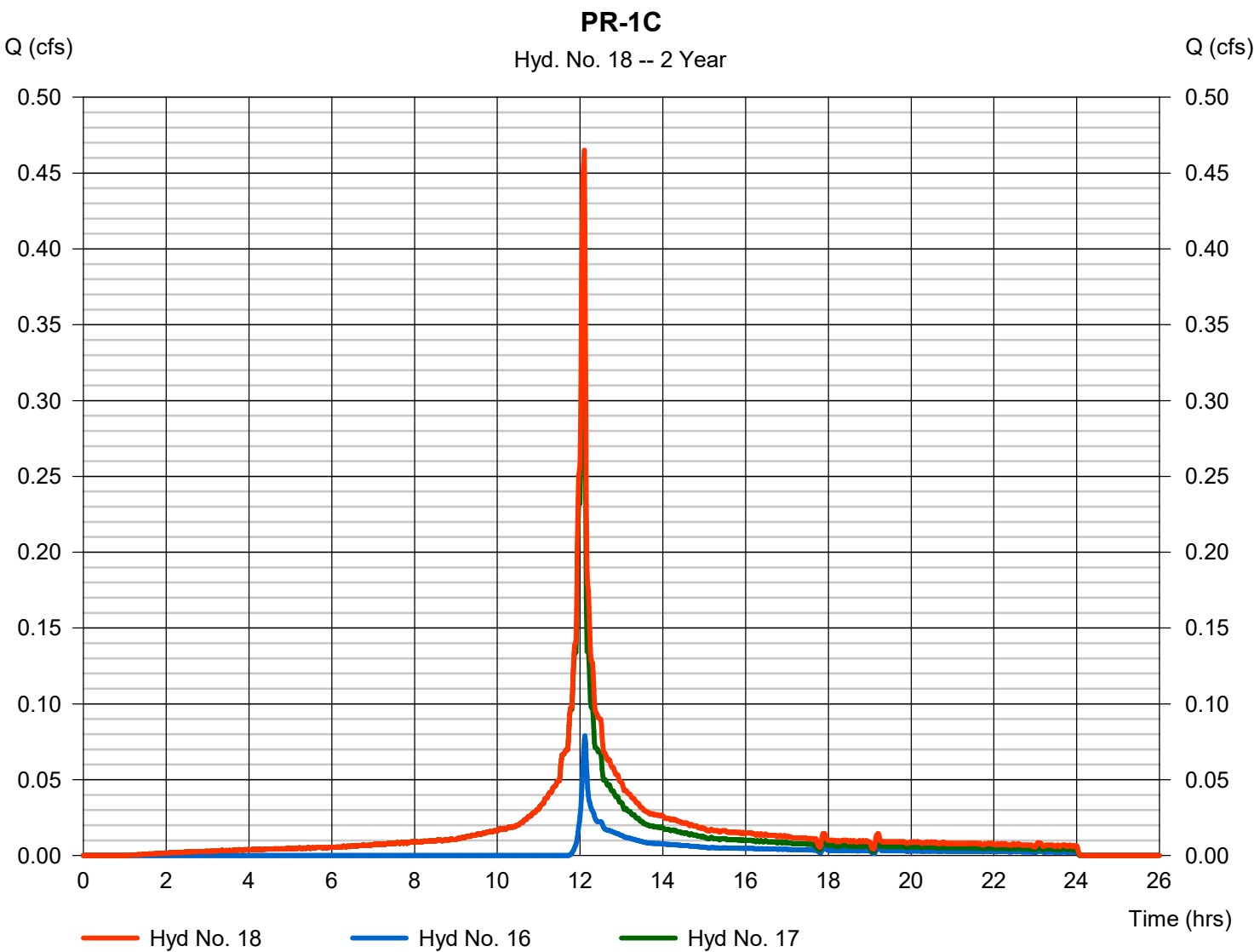


Hydrograph Report

Hyd. No. 18

PR-1C

Hydrograph type	= Combine	Peak discharge	= 0.465 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,535 cuft
Inflow hyds.	= 16, 17	Contrib. drain. area	= 0.230 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1D (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.20	12.20
WOODS	B	55	0.00	0.00
Total			0.20	12.20

$$CN = \frac{12.2}{0.2} = 61$$

DRAINAGE AREA DESIGNATION: PR-1D (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.20	19.60
Total			0.20	19.60

$$CN = \frac{19.6}{0.2} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1D PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	16			
SHEET FLOW TIME, T _c (MIN.)=	5.8 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	90			
LAND SLOPE, S (%)=	10			
AVERAGE VELOCITY, V (FT/S)=	2.20			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.7 MIN.			

CHANNEL FLOW:

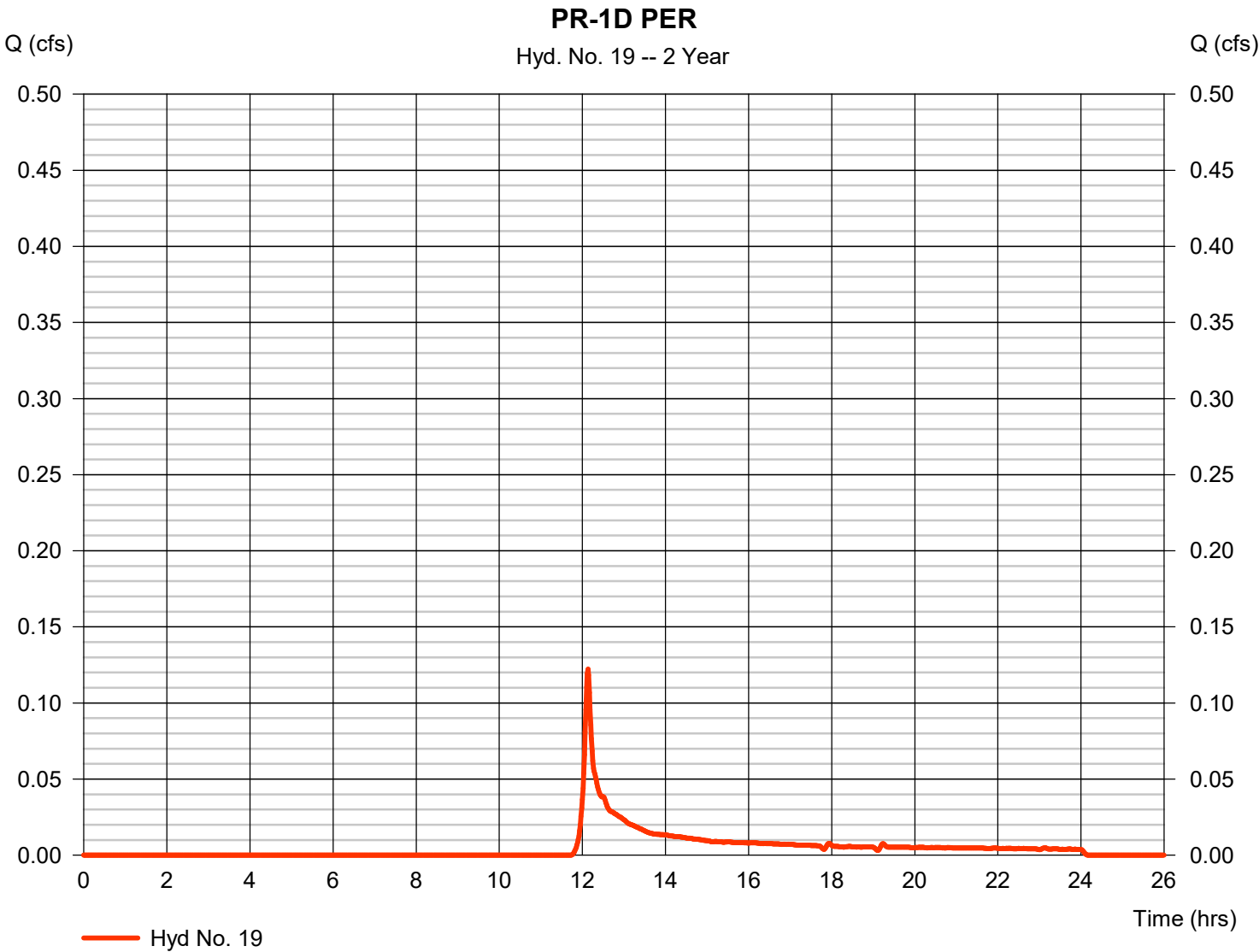
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	5.8 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	6.5 MIN.	

Hydrograph Report

Hyd. No. 19

PR-1D PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.122 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 466 cuft
Drainage area	= 0.200 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.50 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1D IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)	80 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61	3.61		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	20	14		
SHEET FLOW TIME, T _c (MIN.)=	0.5 MIN.	5.2 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
LAND SLOPE, S (%)=				
AVERAGE VELOCITY, V (FT/S)=				
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=				

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN.)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	5.6 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.0 MIN.	TIME OF CONCENTRATION=	5.6 MIN.	
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

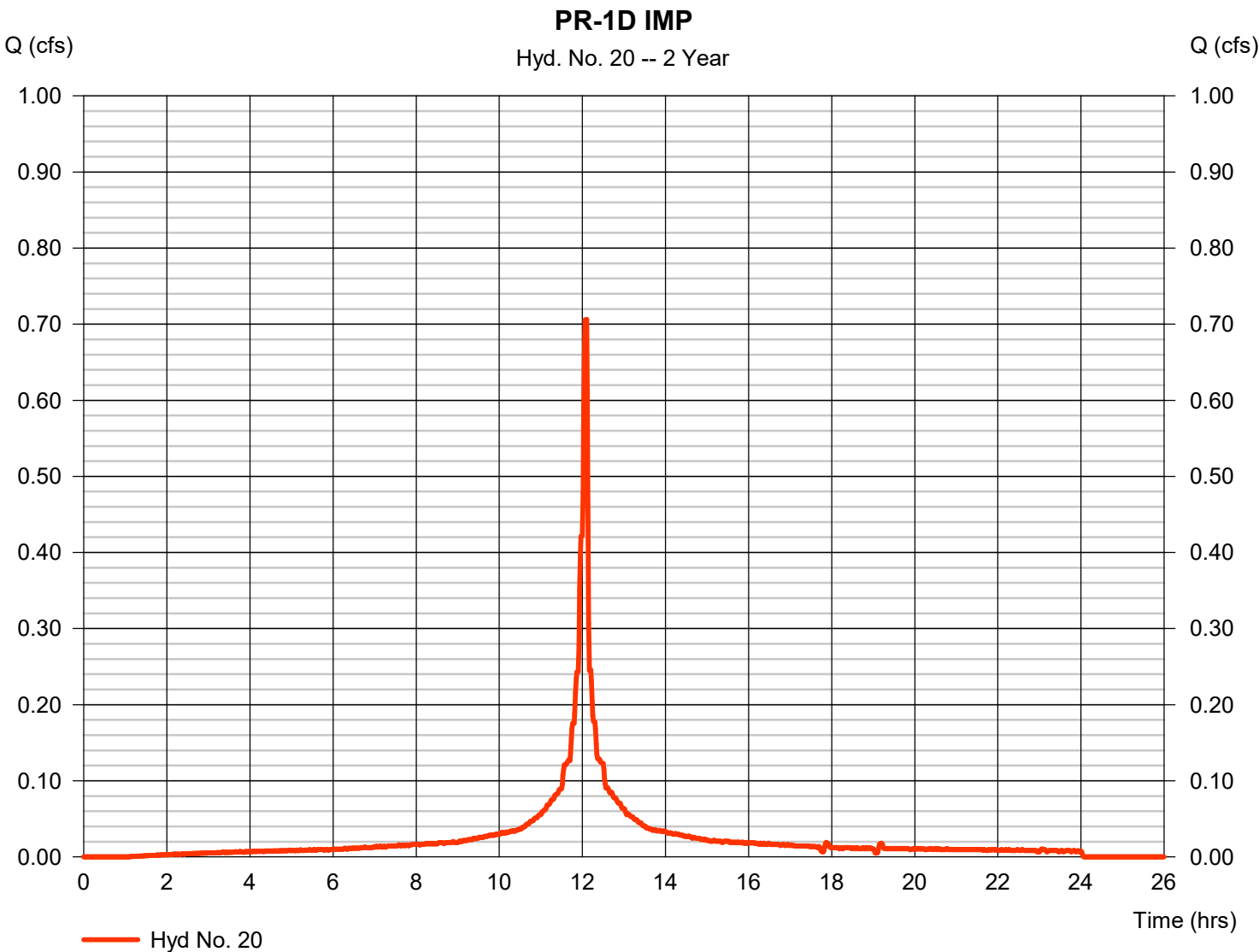
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 20

PR-1D IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.706 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,298 cuft
Drainage area	= 0.200 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

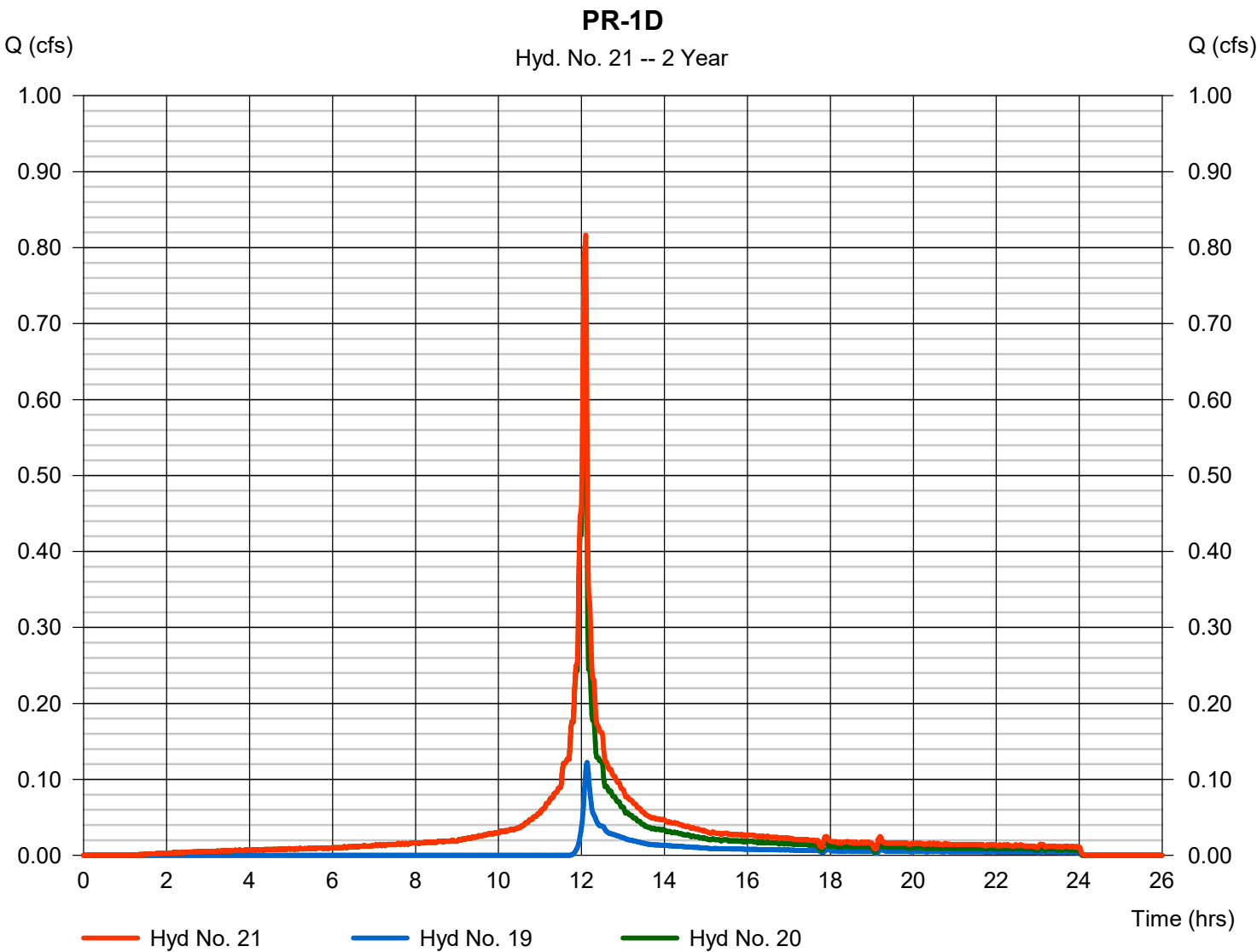


Hydrograph Report

Hyd. No. 21

PR-1D

Hydrograph type	= Combine	Peak discharge	= 0.816 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,764 cuft
Inflow hyds.	= 19, 20	Contrib. drain. area	= 0.400 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1E (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.15	9.15
WOODS	B	55	0.00	0.00
Total			0.15	9.15

$$CN = \frac{9.2}{0.2} = 61$$

DRAINAGE AREA DESIGNATION: PR-1E (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.11	10.78
Total			0.11	10.78

$$CN = \frac{10.8}{0.1} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1E PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	8			
SHEET FLOW TIME, T _c (MIN.)=	7.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	80			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.7 MIN.			

CHANNEL FLOW:

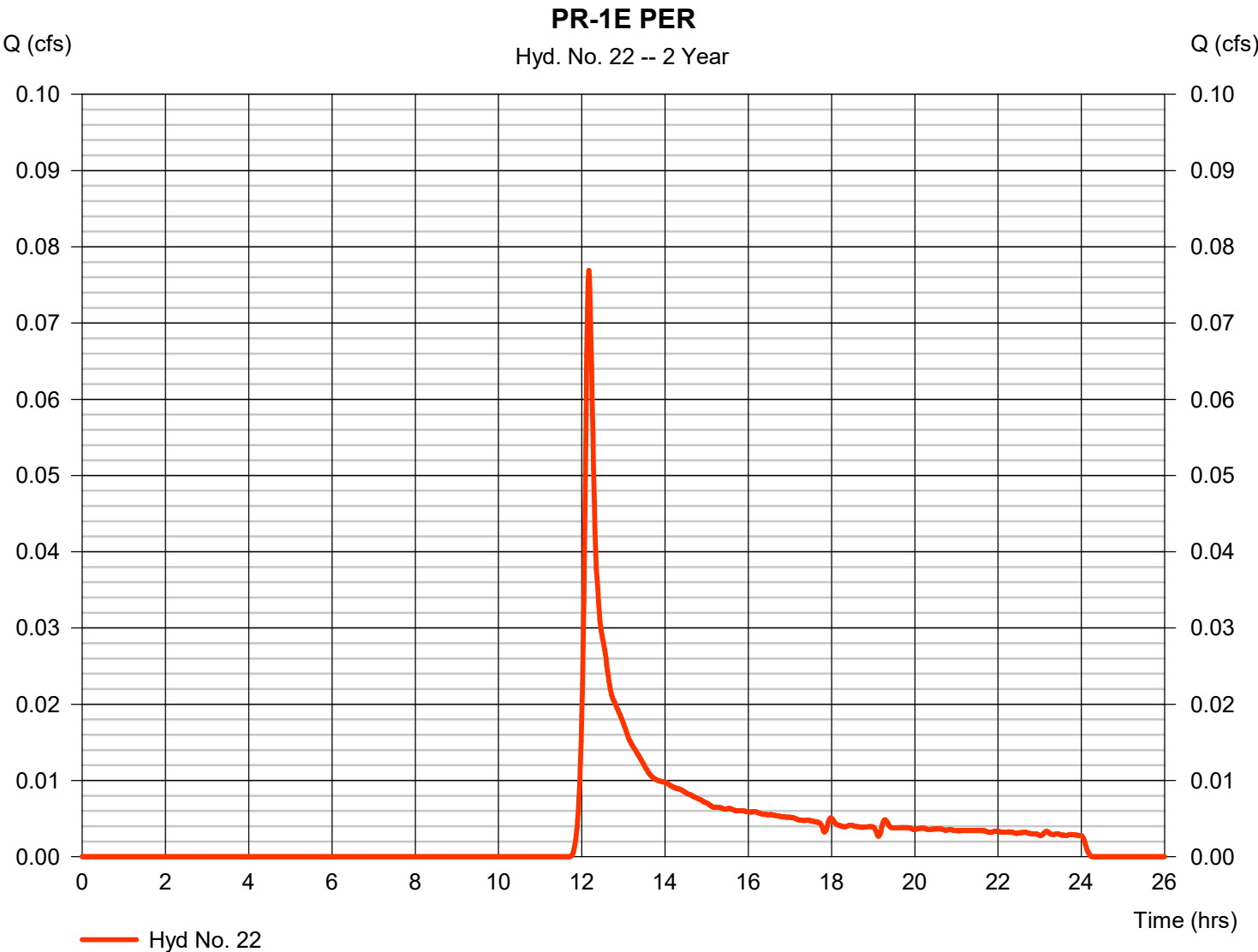
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	7.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	8.4 MIN.	

Hydrograph Report

Hyd. No. 22

PR-1E PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.077 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 339 cuft
Drainage area	= 0.150 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1E IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	30 (100 MAX)	70 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61	3.61		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	2	8		
SHEET FLOW TIME, T _c (MIN.)=	0.4 MIN.	5.8 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	80			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.7 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	6.2 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 6.9 MIN.

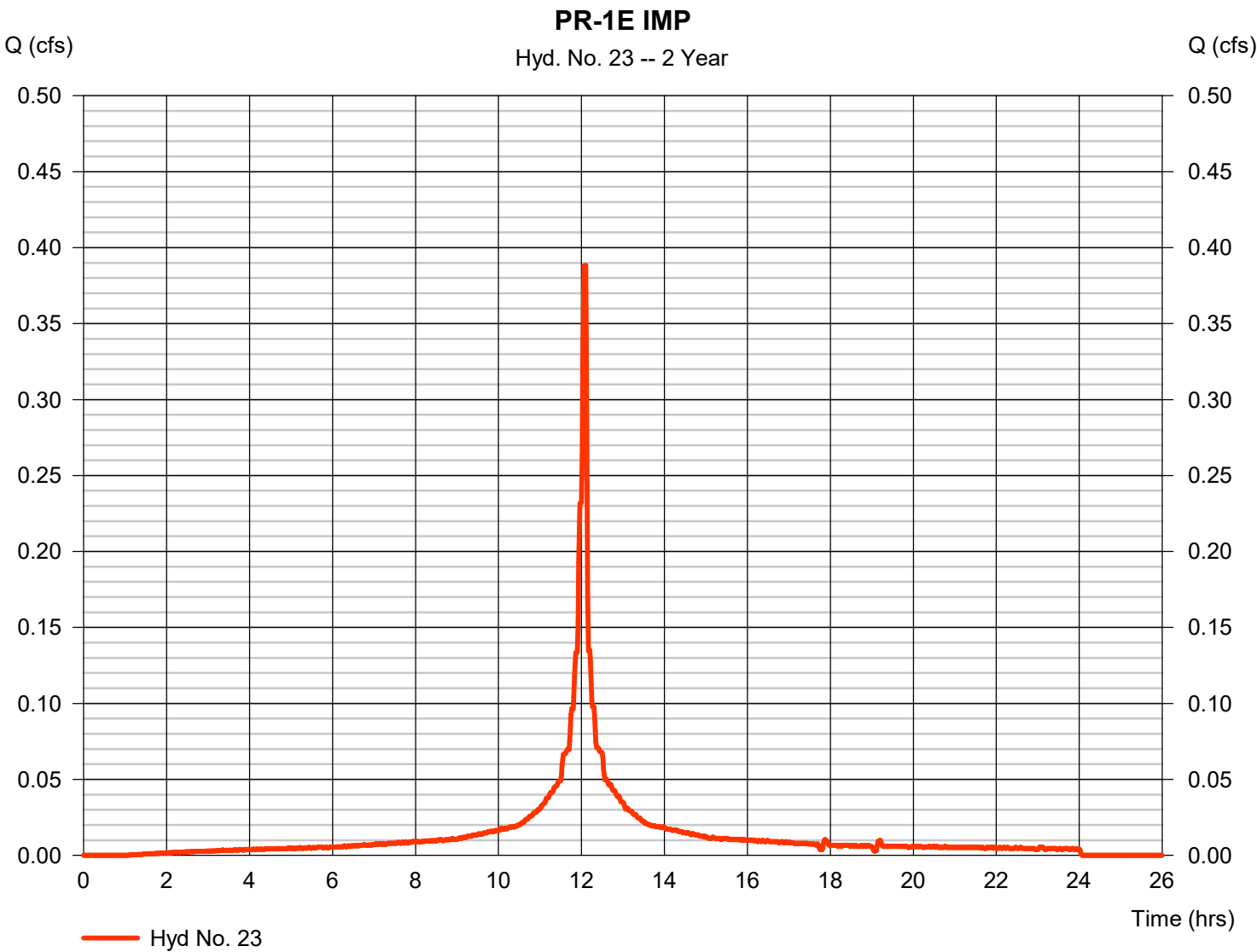
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 23

PR-1E IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.388 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,264 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

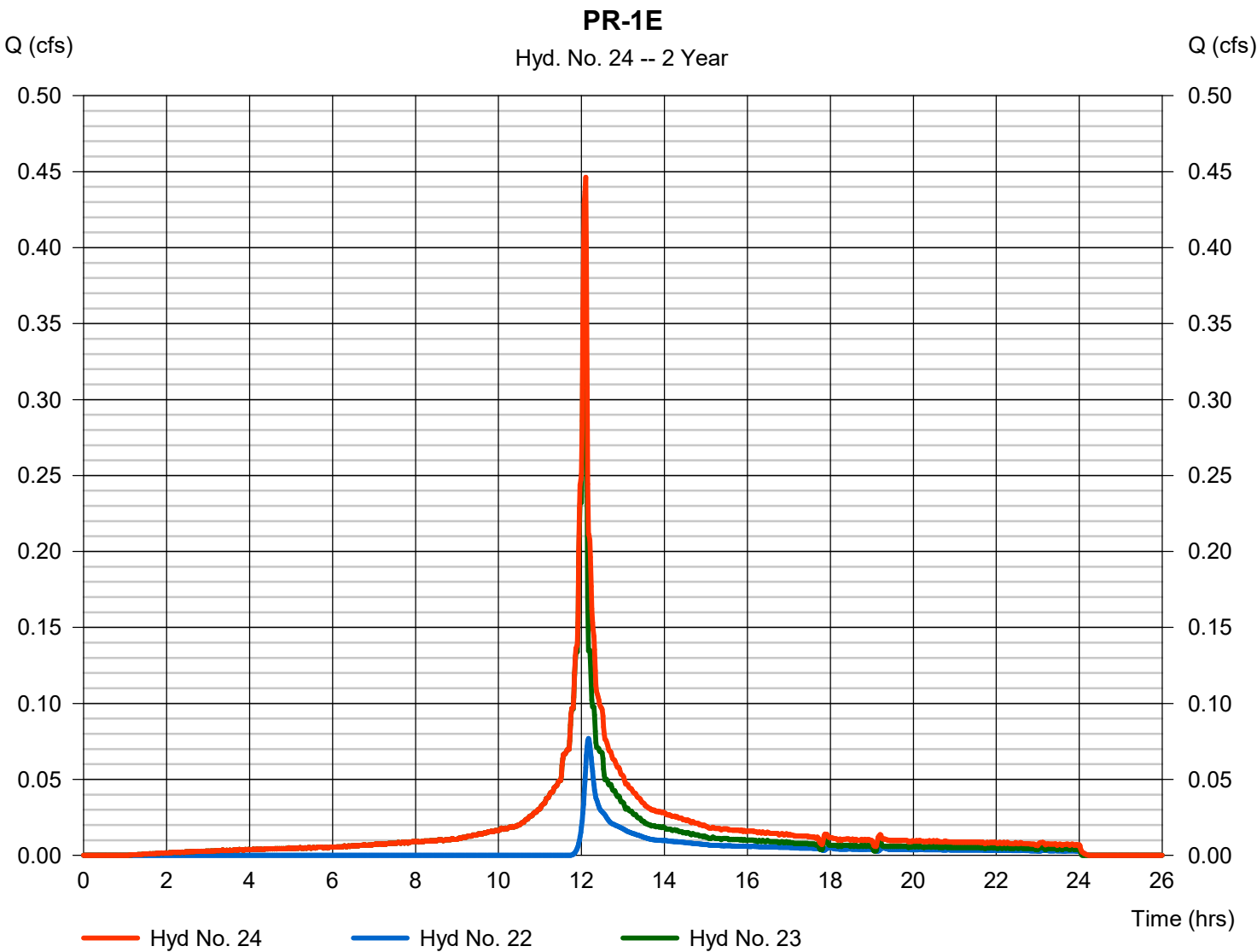


Hydrograph Report

Hyd. No. 24

PR-1E

Hydrograph type	= Combine	Peak discharge	= 0.446 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,603 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.260 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1F (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.12	7.32
WOODS	B	55	0.00	0.00
Total			0.12	7.32

$$CN = \frac{7.3}{0.1} = 61$$

DRAINAGE AREA DESIGNATION: PR-1F (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.11	10.78
Total			0.11	10.78

$$CN = \frac{10.8}{0.1} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1F PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	8			
SHEET FLOW TIME, T _c (MIN.)=	7.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	70			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.6 MIN.			

CHANNEL FLOW:

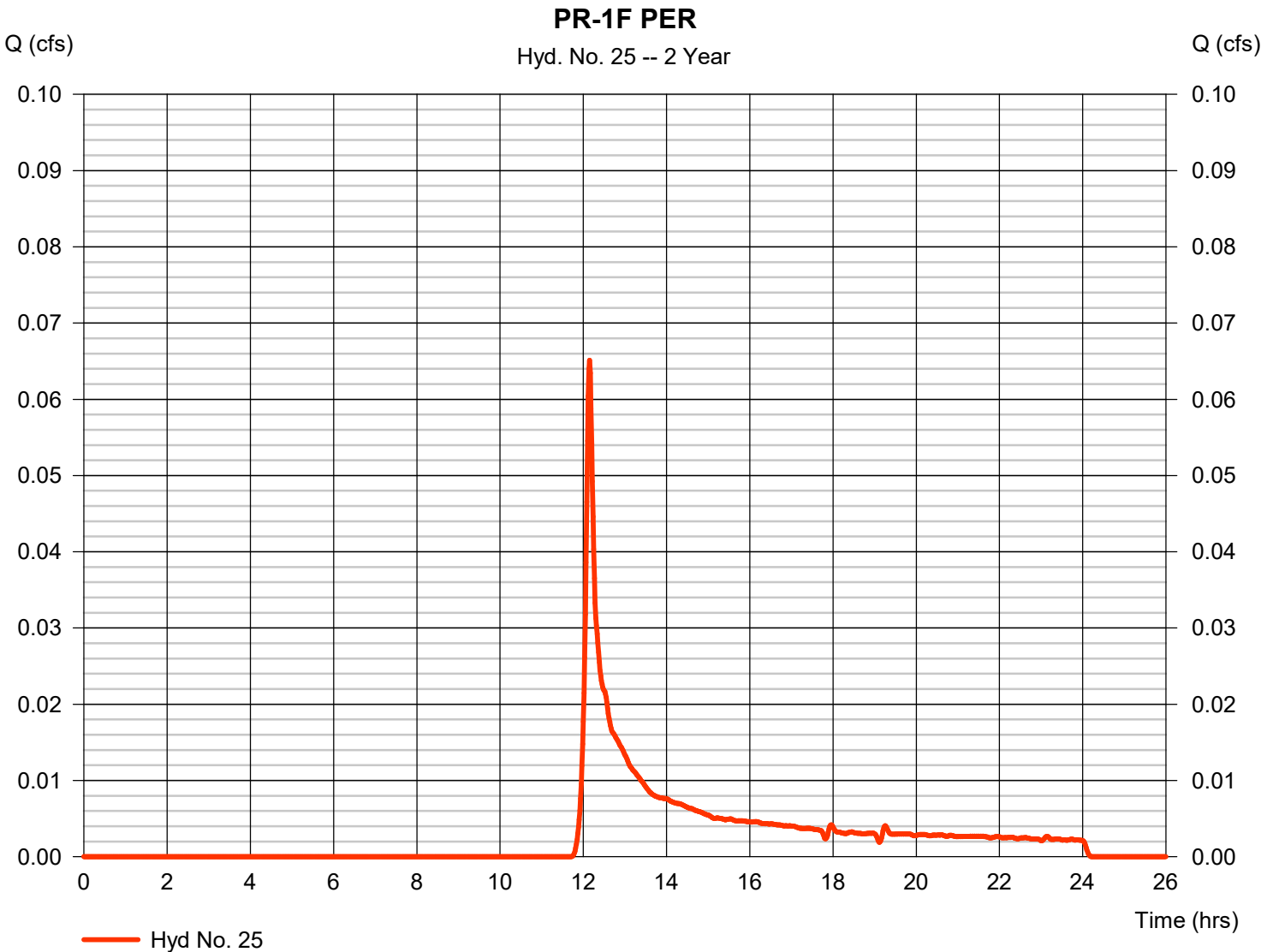
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	7.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.6 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	8.3 MIN.	

Hydrograph Report

Hyd. No. 25

PR-1F PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.065 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 265 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.30 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1F IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	30 (100 MAX)	70 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61	3.61		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	2	8		
SHEET FLOW TIME, T _c (MIN.)=	0.4 MIN.	5.8 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	70			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.6 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	6.2 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.6 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 6.8 MIN.

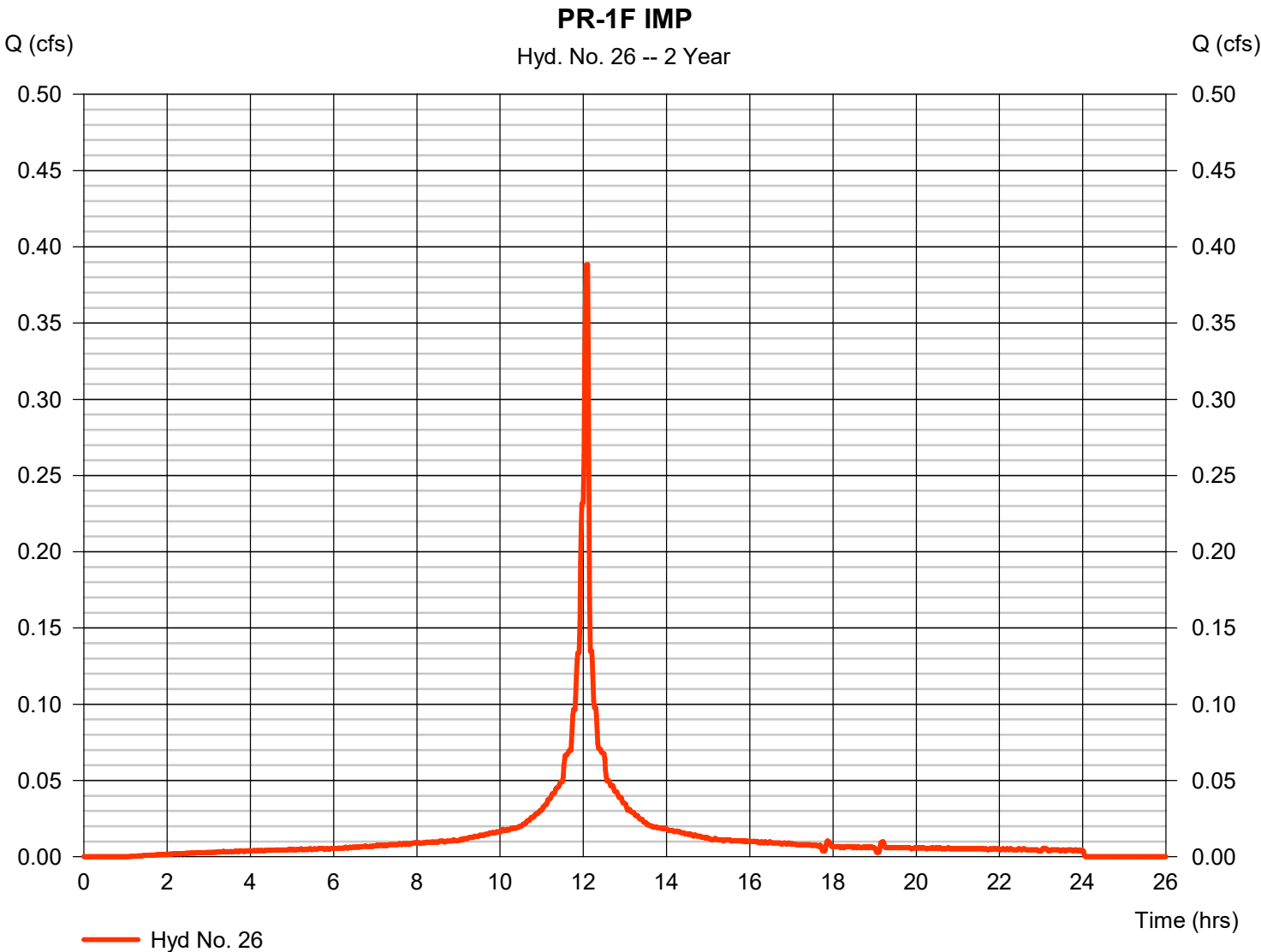
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 26

PR-1F IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.388 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,264 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

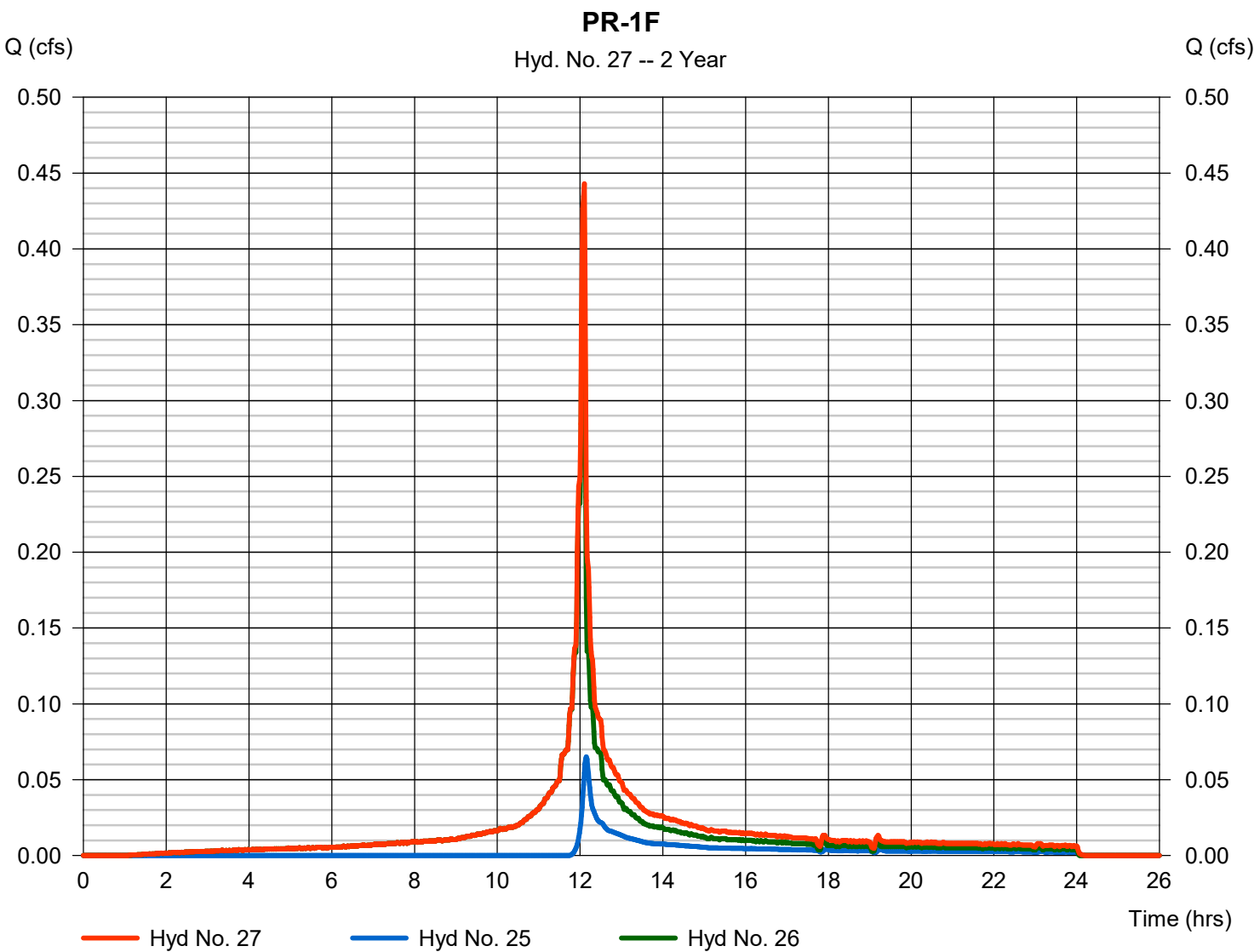


Hydrograph Report

Hyd. No. 27

PR-1F

Hydrograph type	= Combine	Peak discharge	= 0.443 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,528 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 0.230 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1G (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	1.82	111.02
WOODS	B	55	2.95	162.25
OPEN SPACE GOOD CONDITION	D	80	0.85	68.00
WOODS	D	77	1.02	78.54
Total			6.64	419.81

$$CN = \frac{419.8}{6.6} = 63$$

DRAINAGE AREA DESIGNATION: PR-1G (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	A	98	0.70	68.60
Total			0.70	68.60

$$CN = \frac{68.6}{0.7} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1G PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.4			
FLOW LENGTH, L (FT, 100 MAX)=	66 (66 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7			
SHEET FLOW TIME, T _c (MIN.)=	8.8 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	WOODLANDS	SHORT-GRASS	PAVED	
FLOW LENGTH, L (FT)=	250	436	1140	
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	11	15	5	
AVERAGE VELOCITY, V (FT/S)=	1.67	2.70	4.55	
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	2.5 MIN.	2.7 MIN.	4.2 MIN.	

CHANNEL FLOW:

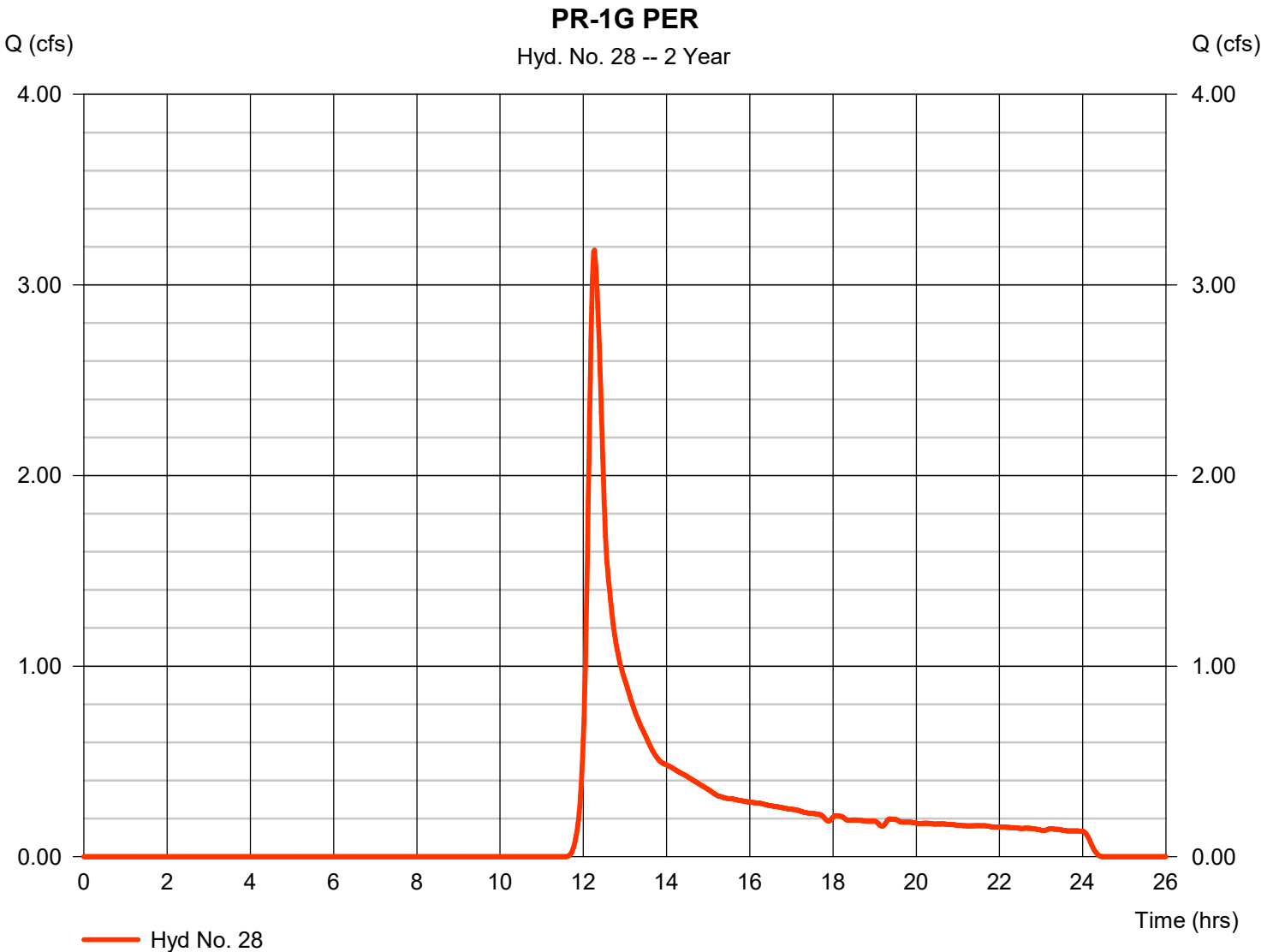
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	8.8 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	9.4 MIN.	TIME OF CONCENTRATION= 18.2 MIN.		
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 28

PR-1G PER

Hydrograph type	= SCS Runoff	Peak discharge	= 3.183 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.27 hrs
Time interval	= 1 min	Hyd. volume	= 17,011 cuft
Drainage area	= 6.640 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1G IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	3.61			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	0.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	PAVED			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	1090			
LAND SLOPE, S (%)=	5			
AVERAGE VELOCITY, V (FT/S)=	4.55			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	4.0 MIN.			

CHANNEL FLOW:

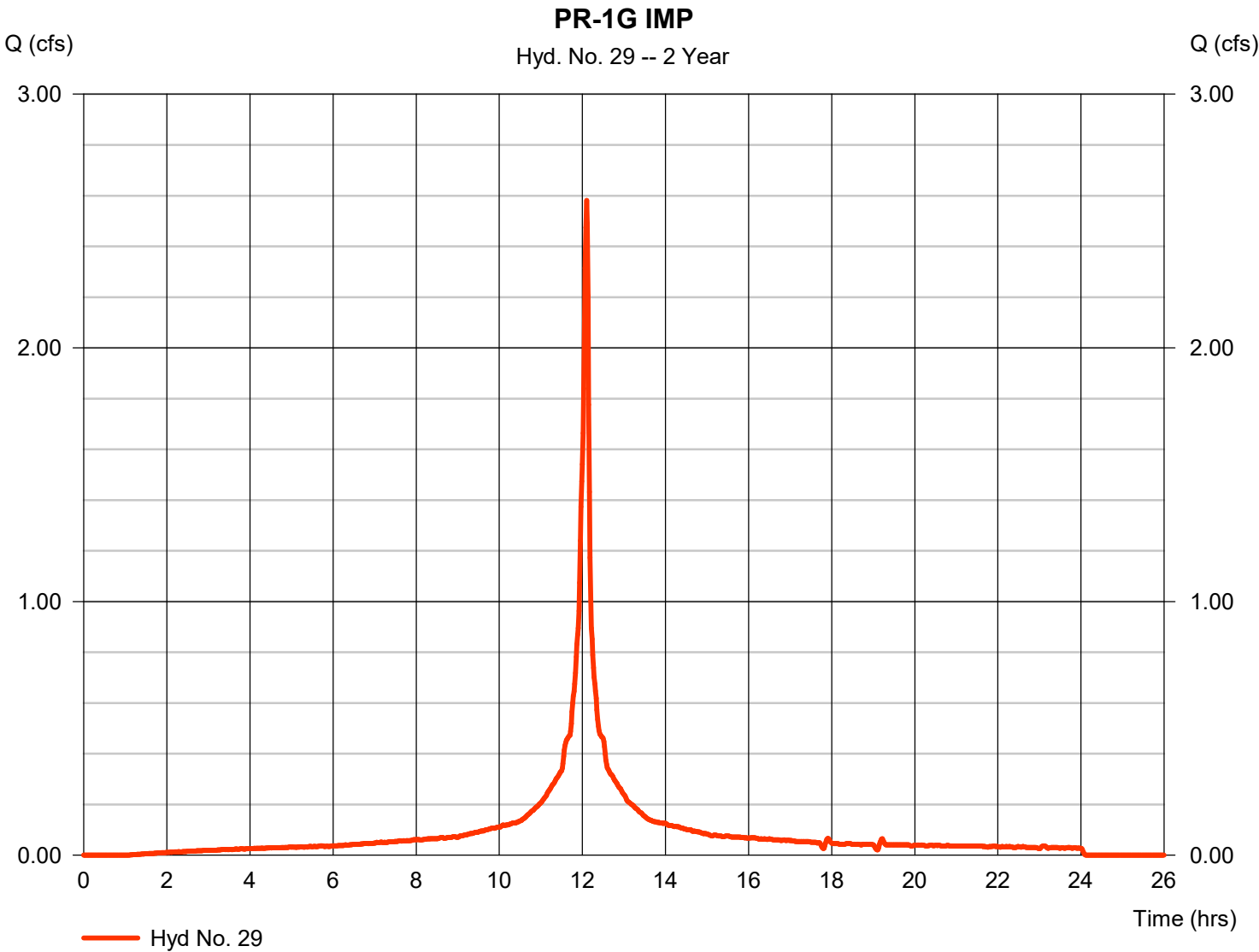
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	4.0 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
TIME OF CONCENTRATION= 4.7 MIN.				

Hydrograph Report

Hyd. No. 29

PR-1G IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 2.581 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 8,579 cuft
Drainage area	= 0.700 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 3.61 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

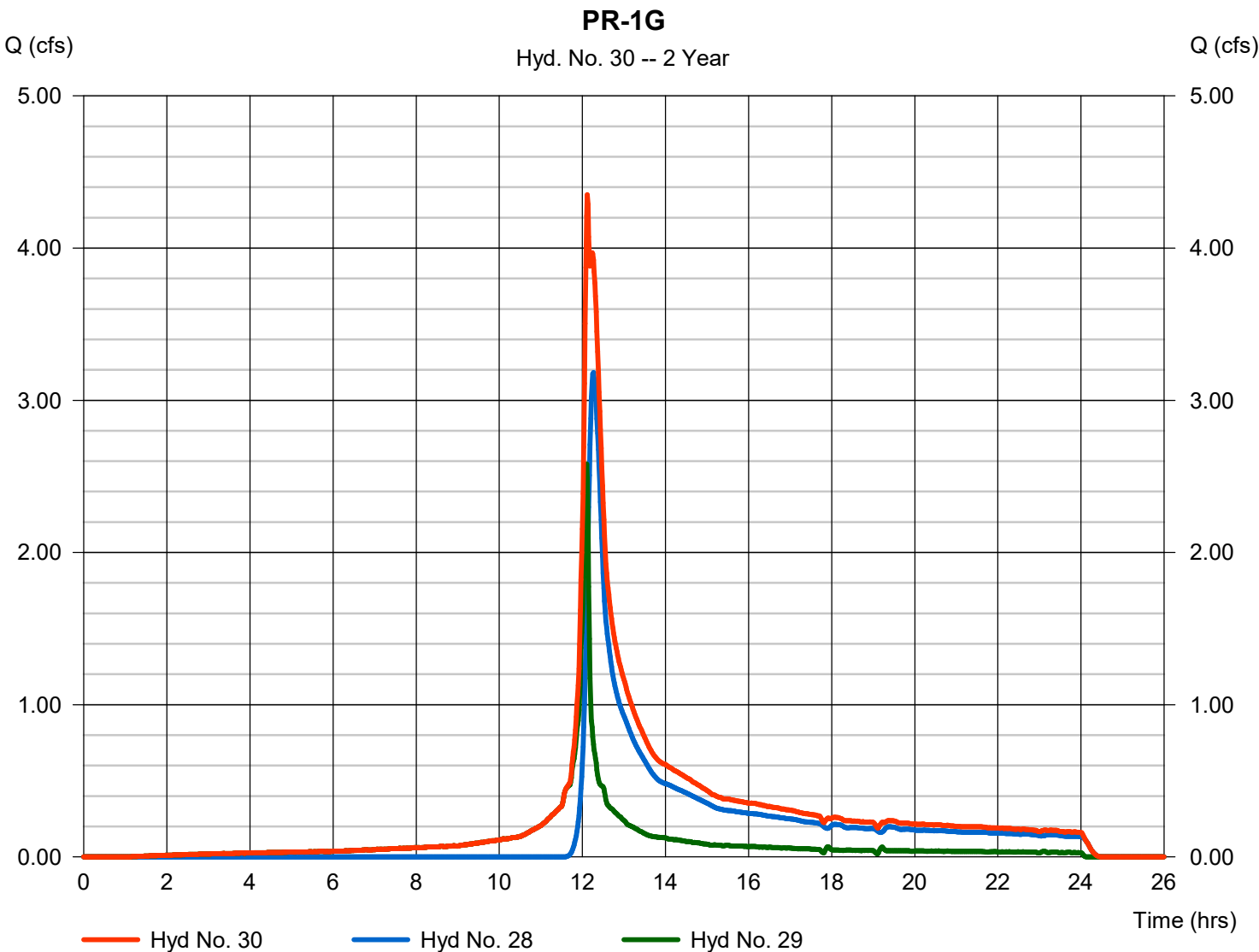


Hydrograph Report

Hyd. No. 30

PR-1G

Hydrograph type	= Combine	Peak discharge	= 4.350 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 25,590 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 7.340 ac

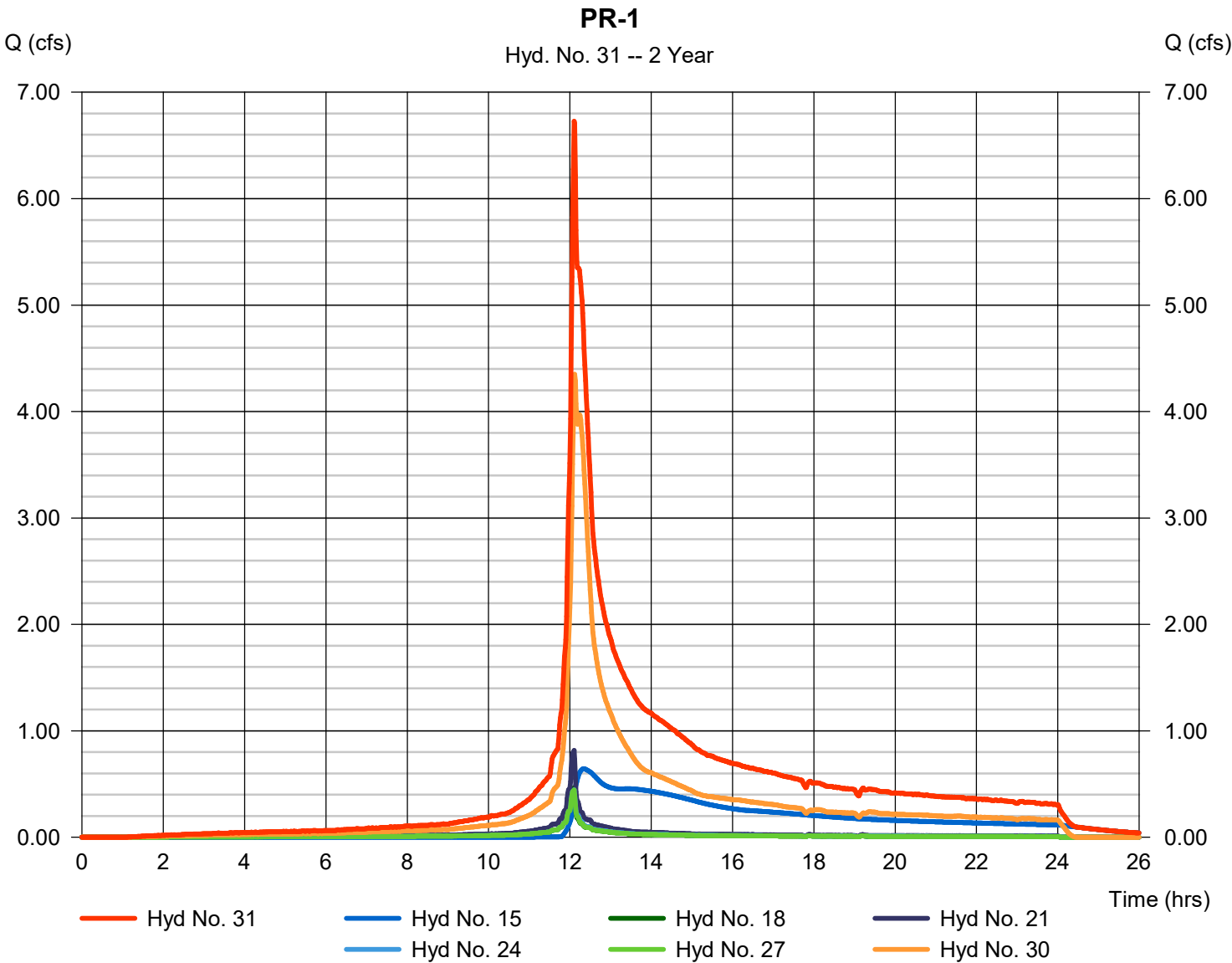


Hydrograph Report

Hyd. No. 31

PR-1

Hydrograph type	= Combine	Peak discharge	= 6.726 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 45,049 cuft
Inflow hyds.	= 15, 18, 21, 24, 27, 30	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

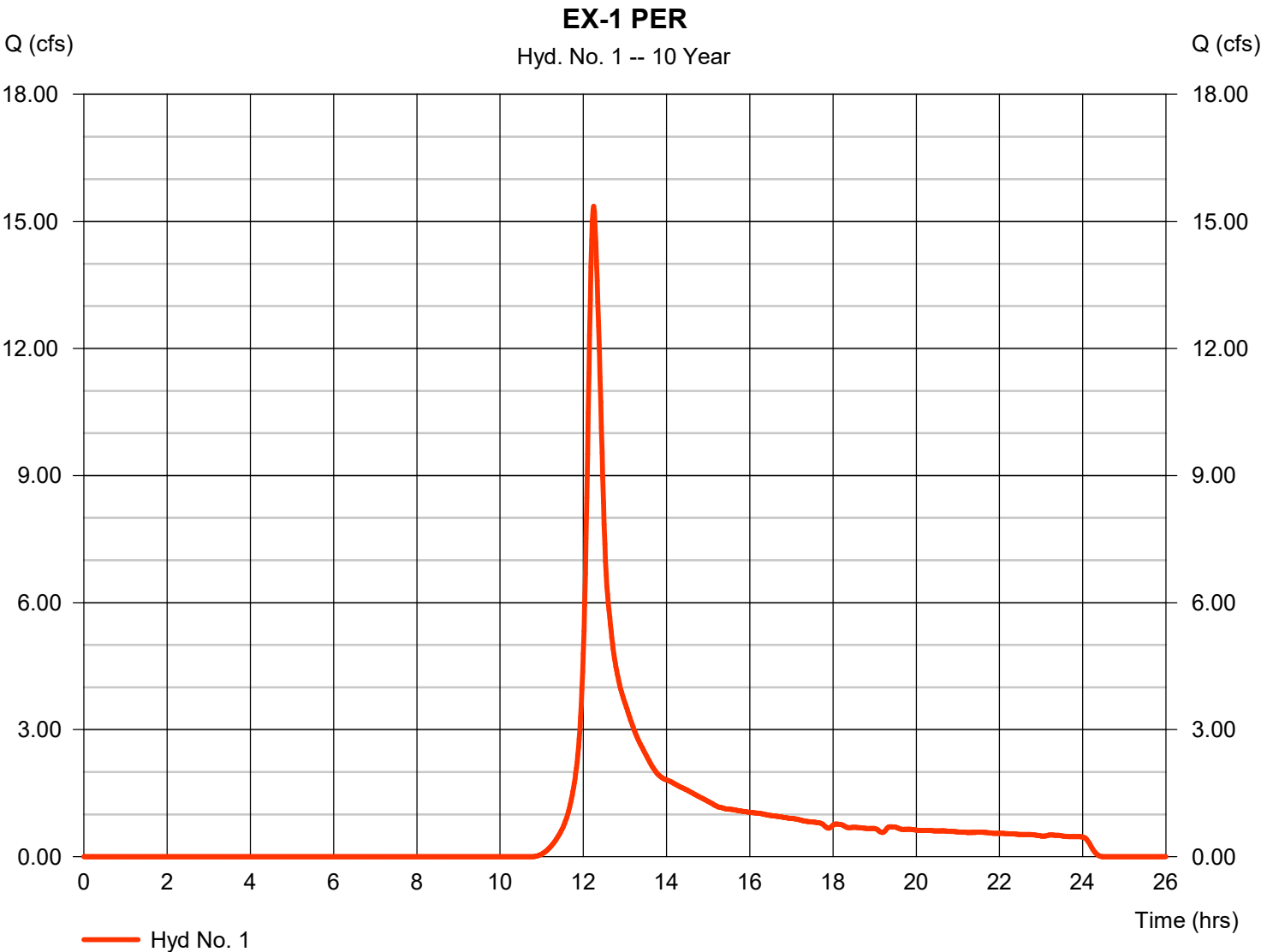
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	15.36	1	735	71,595	-----	-----	-----	EX-1 PER
2	SCS Runoff	10.81	1	726	36,543	-----	-----	-----	EX-1 IMP
3	Combine	20.92	1	727	108,138	1, 2	-----	-----	EX-1
4	SCS Runoff	3.470	1	731	13,548	-----	-----	-----	PR-1A PER
5	SCS Runoff	2.760	1	726	9,136	-----	-----	-----	PR-1A IMP
6	Combine	5.499	1	726	22,684	4, 5	-----	-----	PR-1A
7	SCS Runoff	7.801	1	726	25,826	-----	-----	-----	AREA TO DRYWELLS
8	Reservoir	7.347	1	726	17,558	7	6.81	9,192	DRYWELL ROUTING
9	Combine	12.85	1	726	40,242	6, 8	-----	-----	INFLOW TO BASIN 1
10	Reservoir	2.153	1	742	17,093	6	815.83	8,675	BASIN 1
11	SCS Runoff	1.781	1	729	6,509	-----	-----	-----	PR-1B PER
12	SCS Runoff	2.547	1	726	8,433	-----	-----	-----	PR-1B IMP
13	Combine	4.064	1	726	14,942	11, 12	-----	-----	PR-1B
14	Combine	4.399	1	727	32,035	10, 13	-----	-----	INFLOW TO BASIN 2
15	Reservoir	3.040	1	749	30,424	14	793.26	5,751	BASIN 2
16	SCS Runoff	0.238	1	726	704	-----	-----	-----	PR-1C PER
17	SCS Runoff	0.584	1	726	1,933	-----	-----	-----	PR-1C IMP
18	Combine	0.822	1	726	2,636	16, 17	-----	-----	PR-1C
19	SCS Runoff	0.375	1	727	1,209	-----	-----	-----	PR-1D PER
20	SCS Runoff	1.061	1	726	3,514	-----	-----	-----	PR-1D IMP
21	Combine	1.420	1	726	4,723	19, 20	-----	-----	PR-1D
22	SCS Runoff	0.241	1	729	880	-----	-----	-----	PR-1E PER
23	SCS Runoff	0.584	1	726	1,933	-----	-----	-----	PR-1E IMP
24	Combine	0.789	1	726	2,812	22, 23	-----	-----	PR-1E
25	SCS Runoff	0.202	1	728	686	-----	-----	-----	PR-1F PER
26	SCS Runoff	0.584	1	726	1,933	-----	-----	-----	PR-1F IMP
27	Combine	0.768	1	726	2,619	25, 26	-----	-----	PR-1F
28	SCS Runoff	9.192	1	735	42,130	-----	-----	-----	PR-1G PER
29	SCS Runoff	3.881	1	726	13,118	-----	-----	-----	PR-1G IMP
30	Combine	10.45	1	734	55,248	28, 29	-----	-----	PR-1G
31	Combine	15.26	1	727	98,462	15, 18, 21, 24, 27, 30	-----	-----	PR-1
Current 15107.gpw					Return Period: 10 Year			Thursday, 07 / 9 / 2026	
								87	

Hydrograph Report

Hyd. No. 1

EX-1 PER

Hydrograph type	= SCS Runoff	Peak discharge	= 15.36 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 71,595 cuft
Drainage area	= 12.350 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

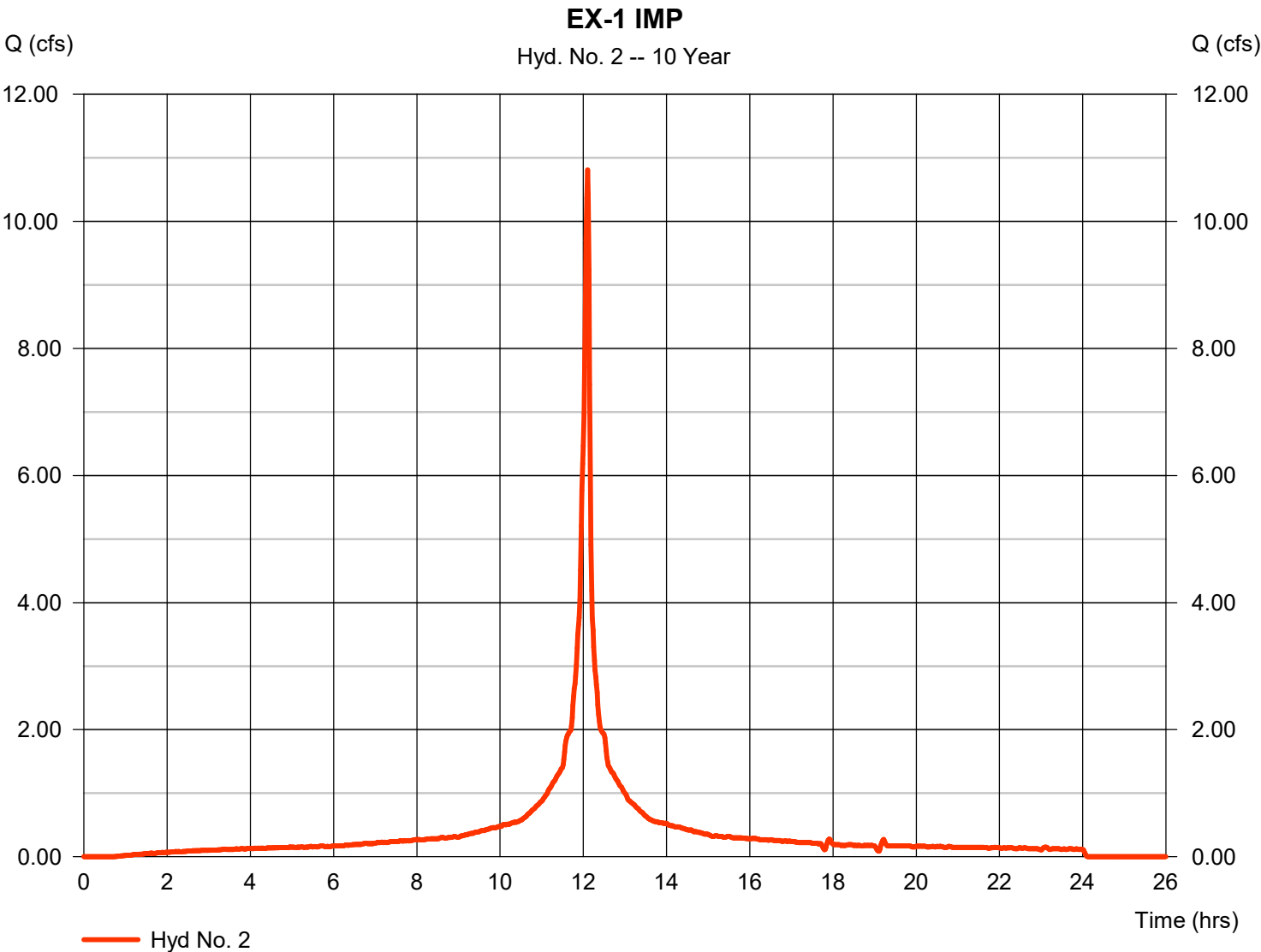


Hydrograph Report

Hyd. No. 2

EX-1 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 10.81 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 36,543 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

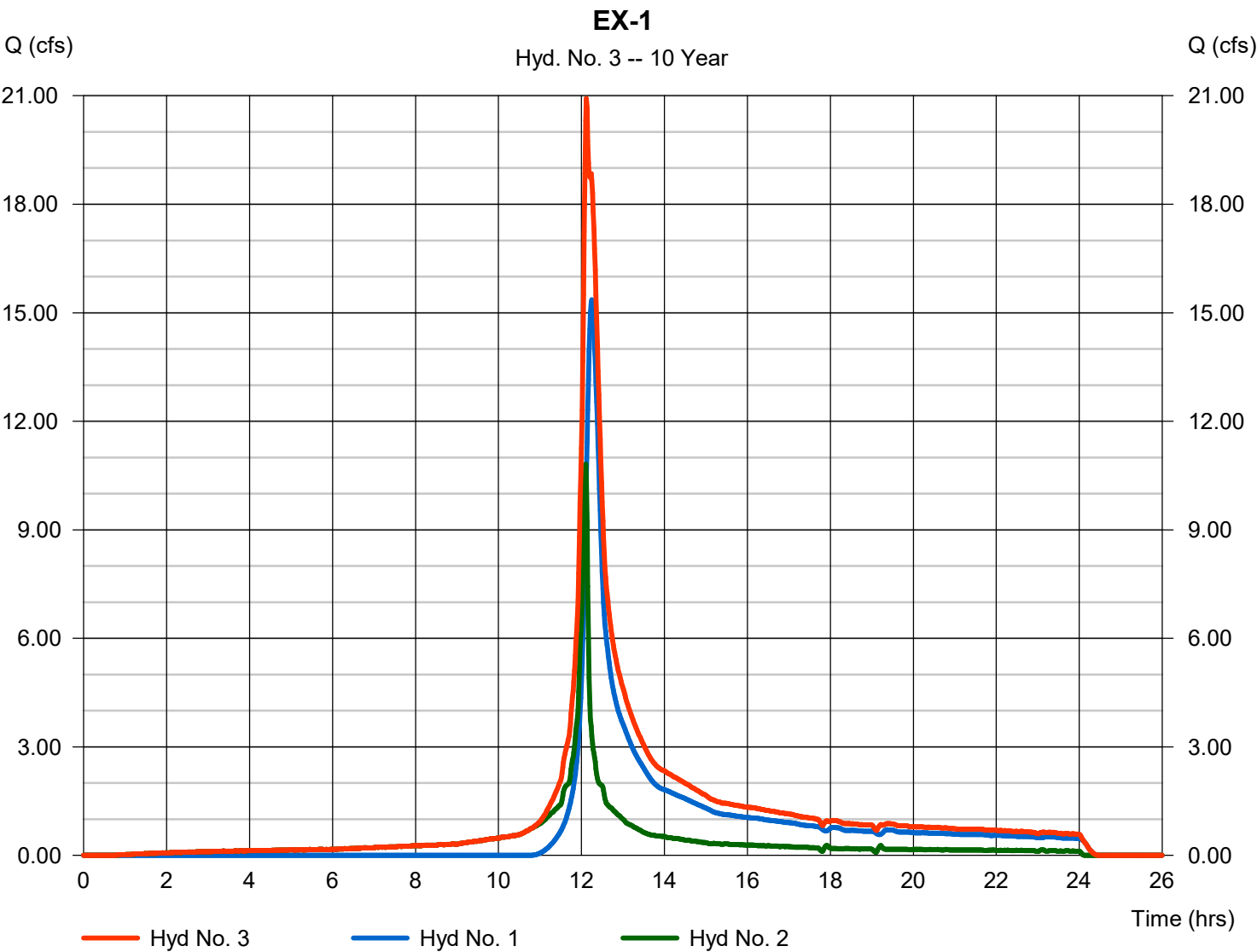


Hydrograph Report

Hyd. No. 3

EX-1

Hydrograph type	= Combine	Peak discharge	= 20.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 108,138 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.300 ac



PEAK FLOW REDUCTION CALCULATIONS - CURRENT

TO COMPLY WITH NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER MANAGEMENT REQUIREMENTS, THE POST-DEVELOPMENT PEAK RUNOFF RATES MUST BE REDUCED TO A PERCENTAGE OF PRE-DEVELOPMENT PEAK RUNOFF RATES, AS

$$\text{PROPOSED } Q_2 \leq 50\% \text{ EXISTING } Q_2$$

$$\text{PROPOSED } Q_{10} \leq 75\% \text{ EXISTING } Q_{10}$$

$$\text{PROPOSED } Q_{100} \leq 80\% \text{ EXISTING } Q_{10}$$

REDUCTION FACTORS ARE APPLIED TO THE DISTURBED PORTION OF THE TRIBUTARY DRAINAGE AREA ONLY:

EX 1

DRAINAGE AREA = 14.3 AC

AREA OF DISTURBANCE= 6 AC

PERCENT DISTURBANCE = 42.0%

APPLY REDUCTION FACTORS TO 42% OF EXISTING PEAK FLOWS.

CURRENT PEAK FLOWS:

$$Q_2 = 9.5 \text{ CFS}$$

$$Q_{10} = 20.9 \text{ CFS}$$

$$Q_{100} = 47.5 \text{ CFS}$$

CALCULATE ALLOWABLE RUNOFF:

$$Q_2 = (0.50) \times (0.42) \times (9.5 \text{ CFS}) + (0.58) \times (9.5 \text{ CFS}) = 7.5 \text{ CFS}$$

$$Q_{10} = (0.75) \times (0.42) \times (20.9 \text{ CFS}) + (0.58) \times (20.9 \text{ CFS}) = 18.7 \text{ CFS}$$

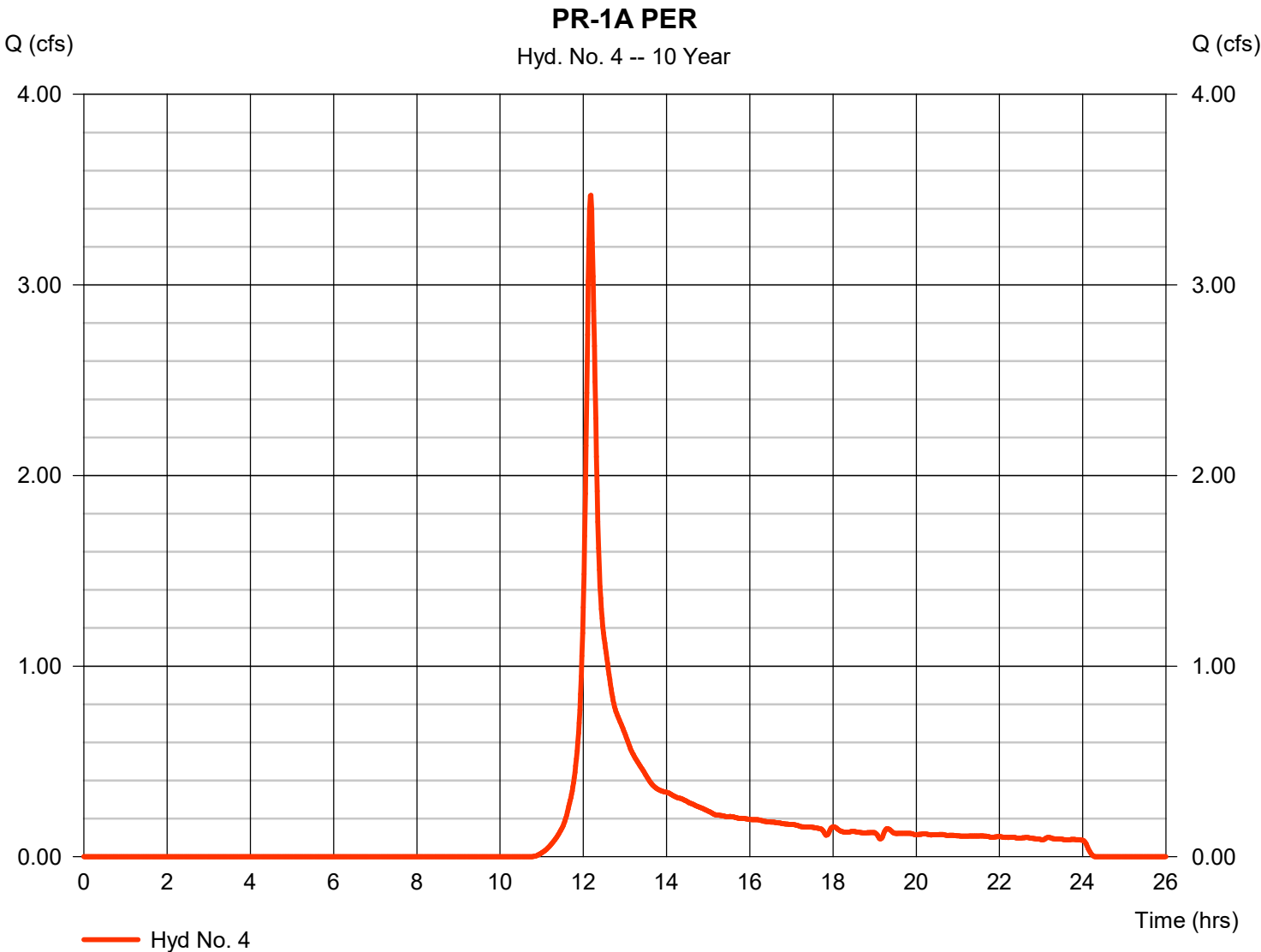
$$Q_{100} = (0.80) \times (0.42) \times (47.5 \text{ CFS}) + (0.58) \times (47.5 \text{ CFS}) = 43.5 \text{ CFS}$$

Hydrograph Report

Hyd. No. 4

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 3.470 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 13,548 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.40 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

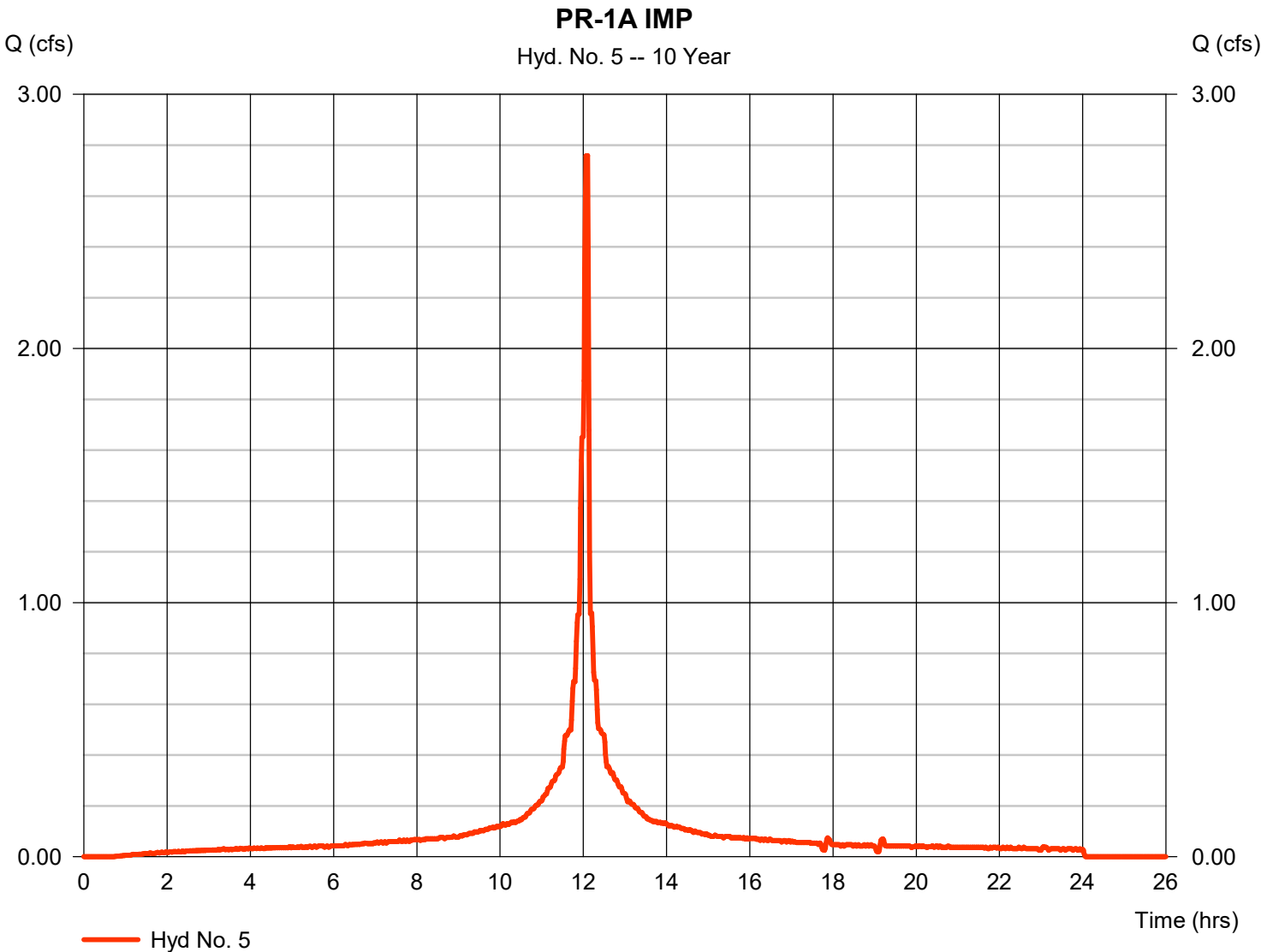


Hydrograph Report

Hyd. No. 5

PR-1A IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 2.760 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 9,136 cuft
Drainage area	= 0.520 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

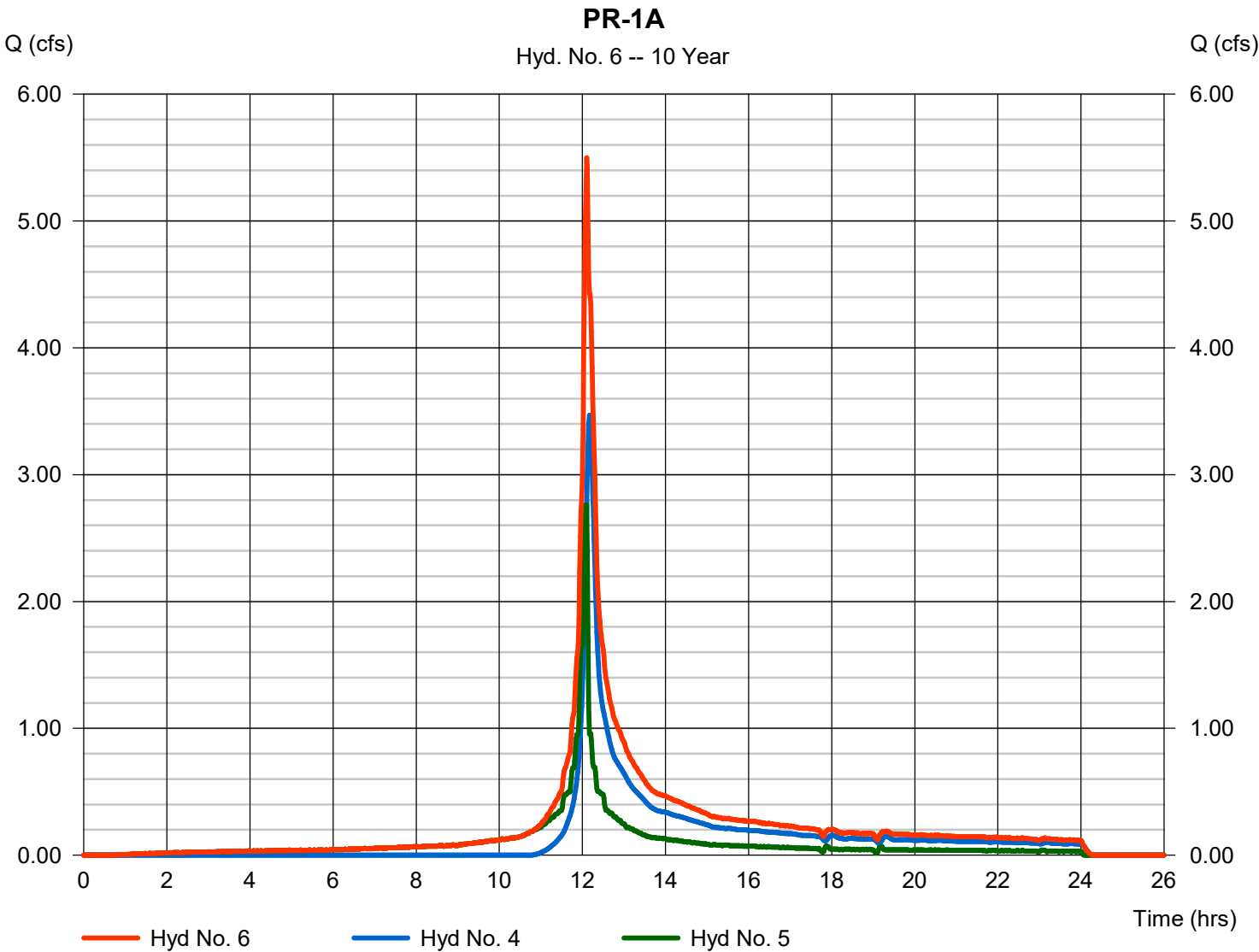


Hydrograph Report

Hyd. No. 6

PR-1A

Hydrograph type	= Combine	Peak discharge	= 5.499 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 22,684 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.790 ac

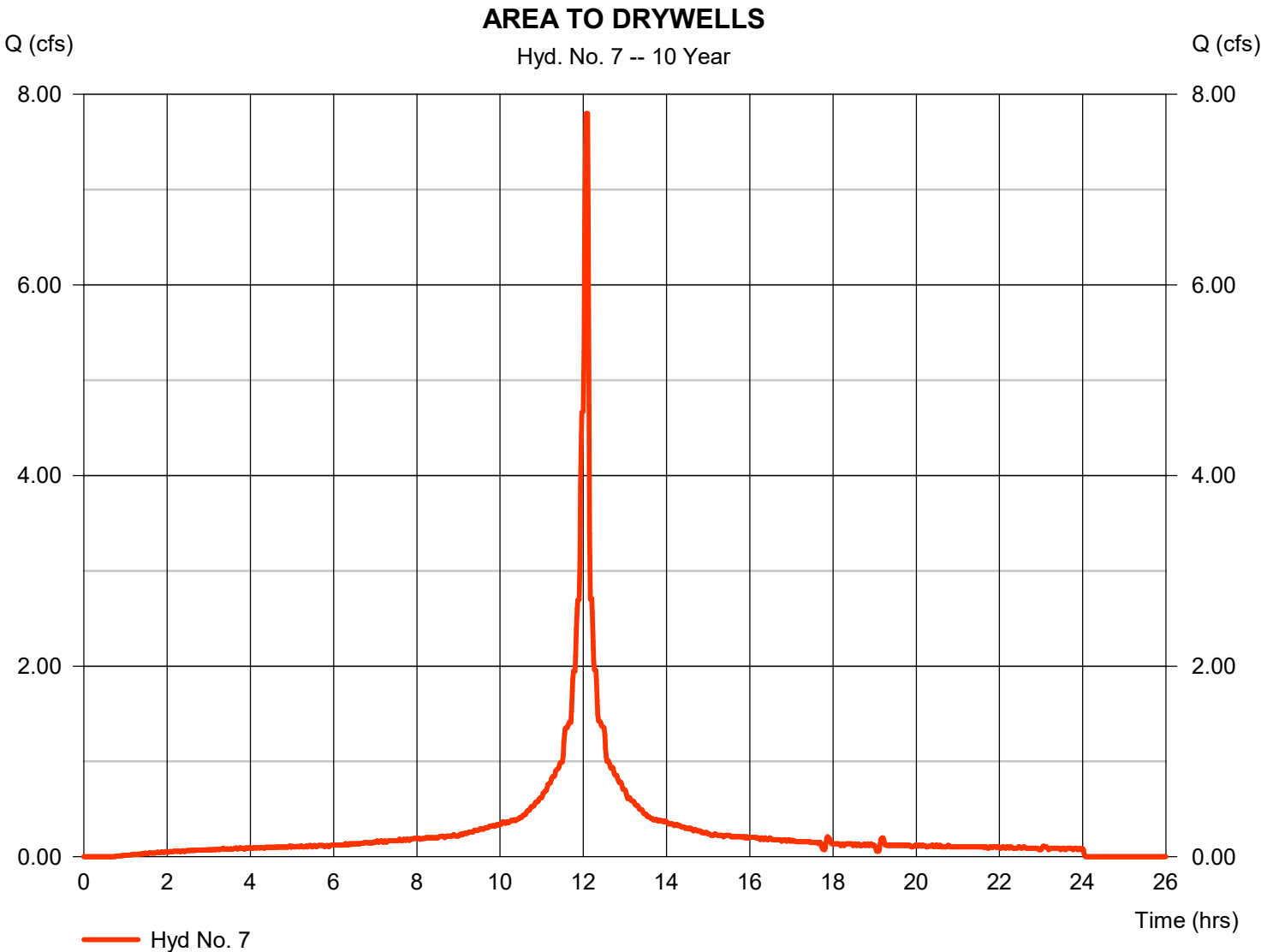


Hydrograph Report

Hyd. No. 7

AREA TO DRYWELLS

Hydrograph type	= SCS Runoff	Peak discharge	= 7.801 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 25,826 cuft
Drainage area	= 1.470 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



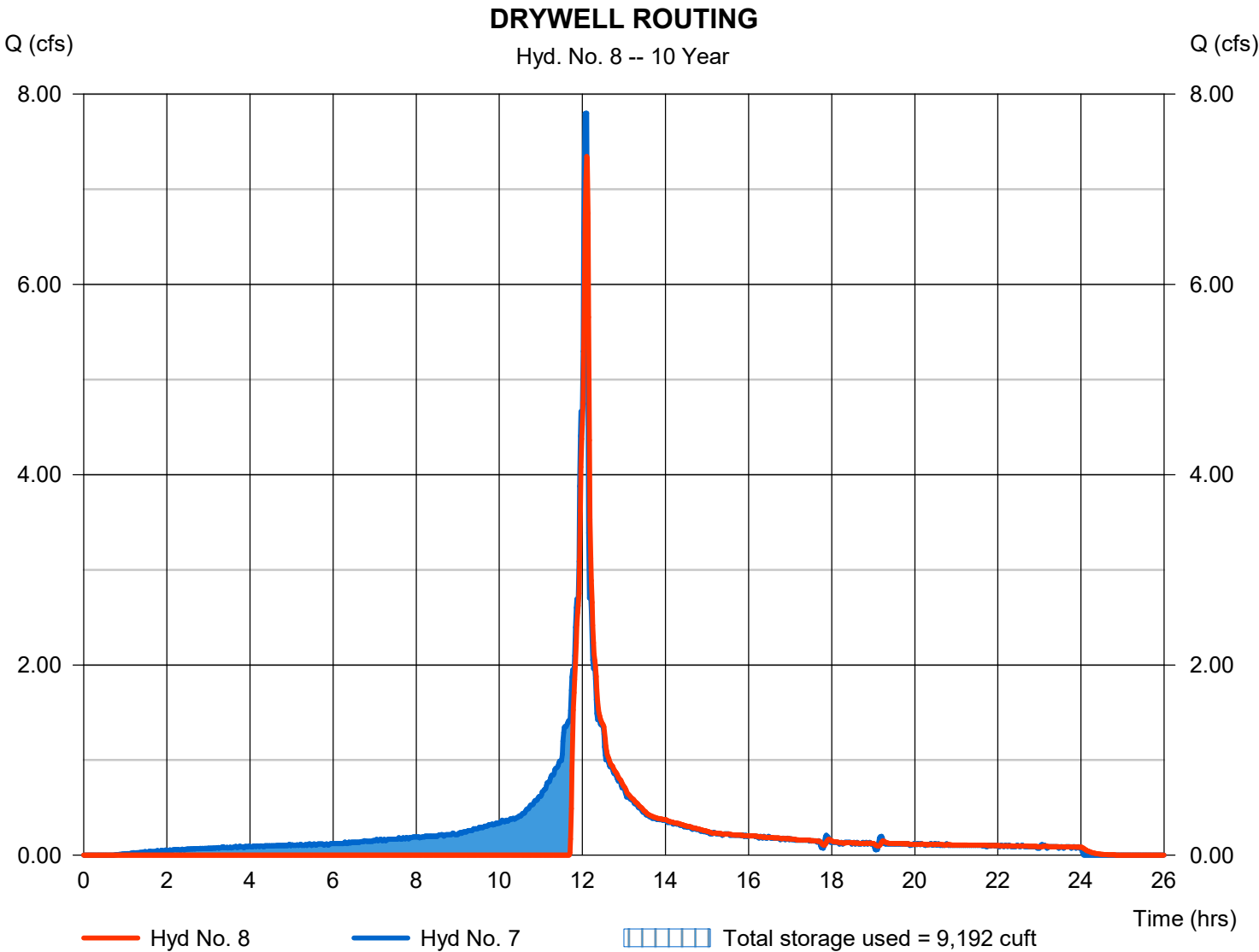
Hydrograph Report

Hyd. No. 8

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 7.347 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 17,558 cuft
Inflow hyd. No.	= 7 - AREA TO DRYWELLS	Max. Elevation	= 6.81 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 9,192 cuft

Storage Indication method used.

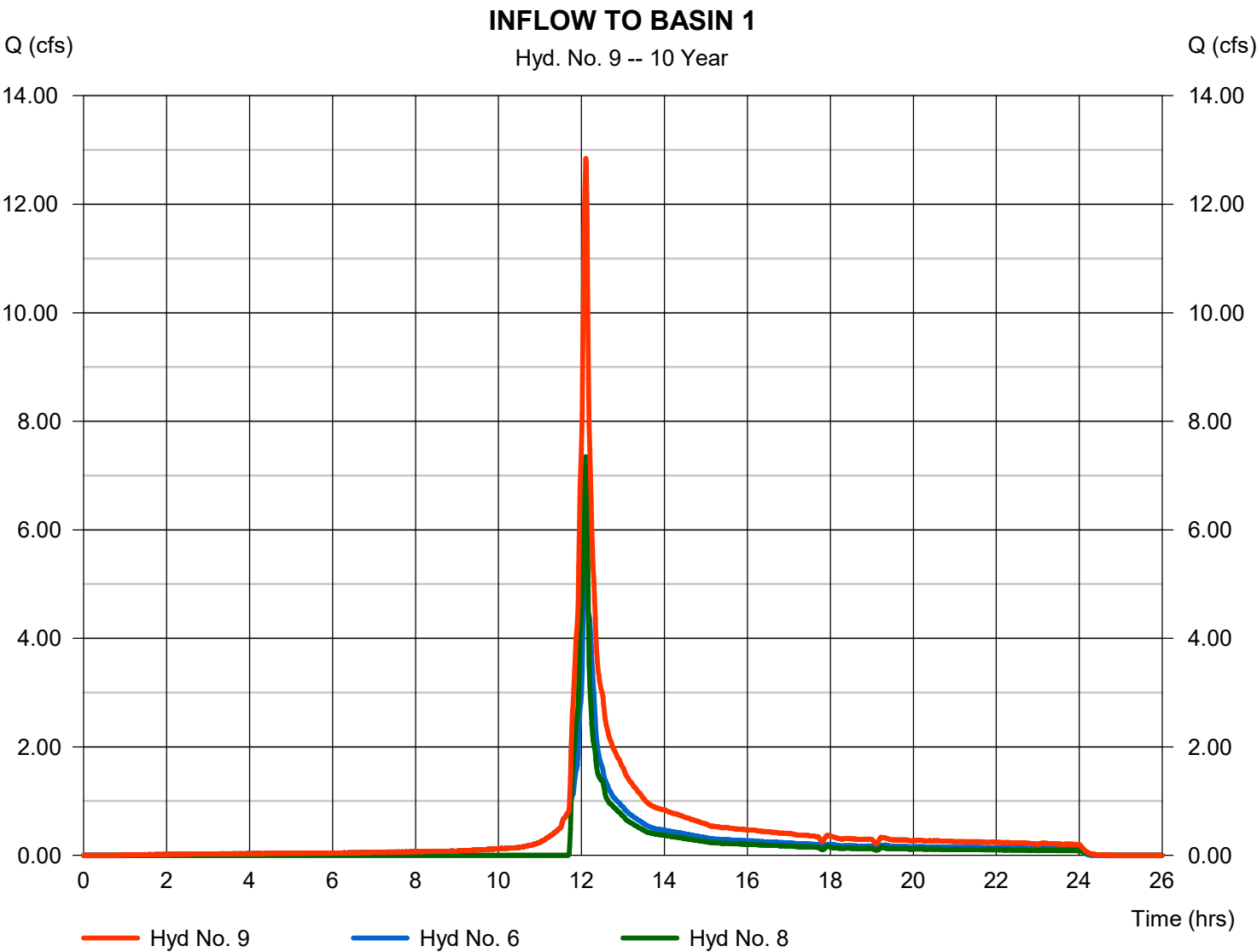


Hydrograph Report

Hyd. No. 9

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 12.85 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 40,242 cuft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 0.000 ac



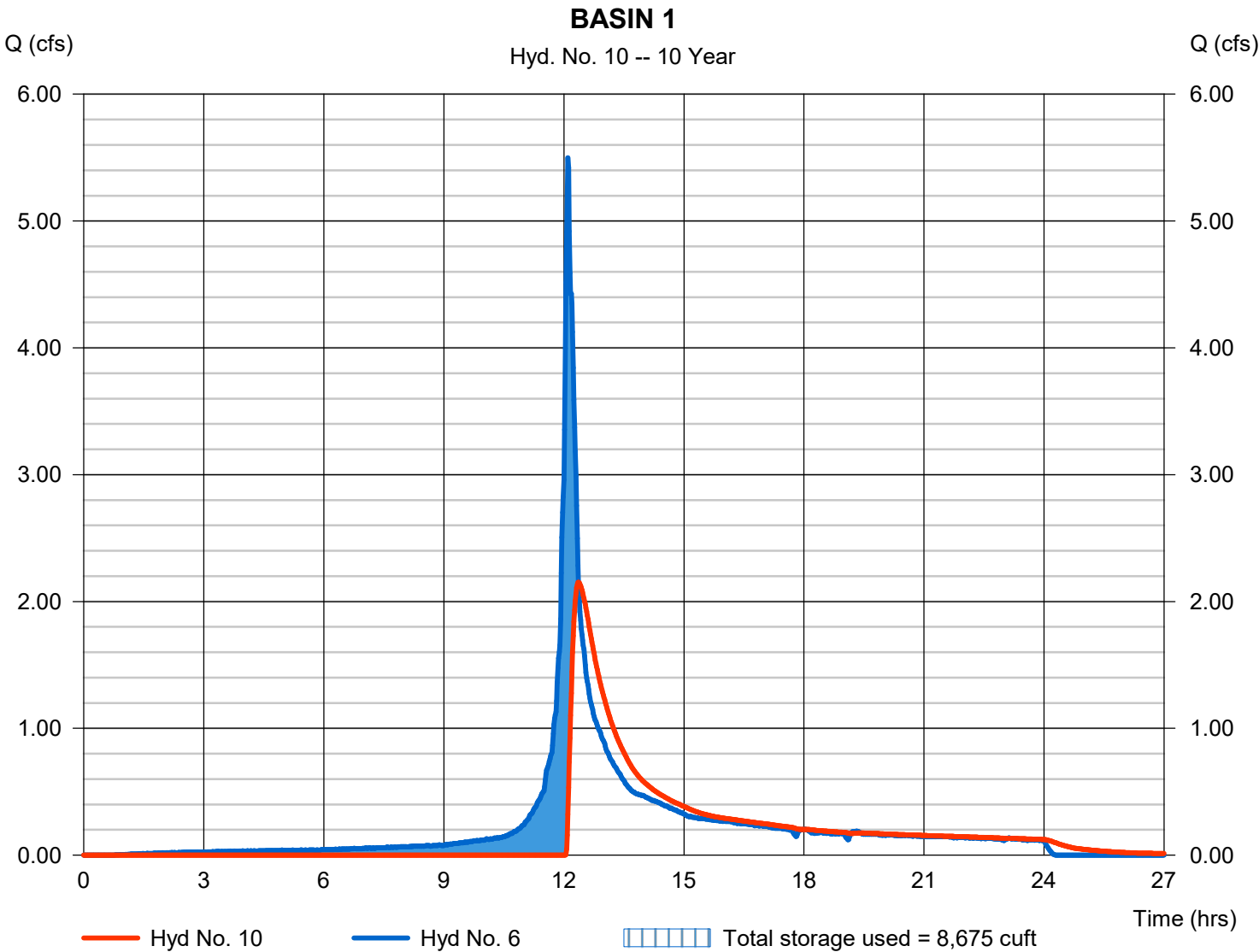
Hydrograph Report

Hyd. No. 10

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 2.153 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.37 hrs
Time interval	= 1 min	Hyd. volume	= 17,093 cuft
Inflow hyd. No.	= 6 - PR-1A	Max. Elevation	= 815.83 ft
Reservoir name	= BASIN 1	Max. Storage	= 8,675 cuft

Storage Indication method used.

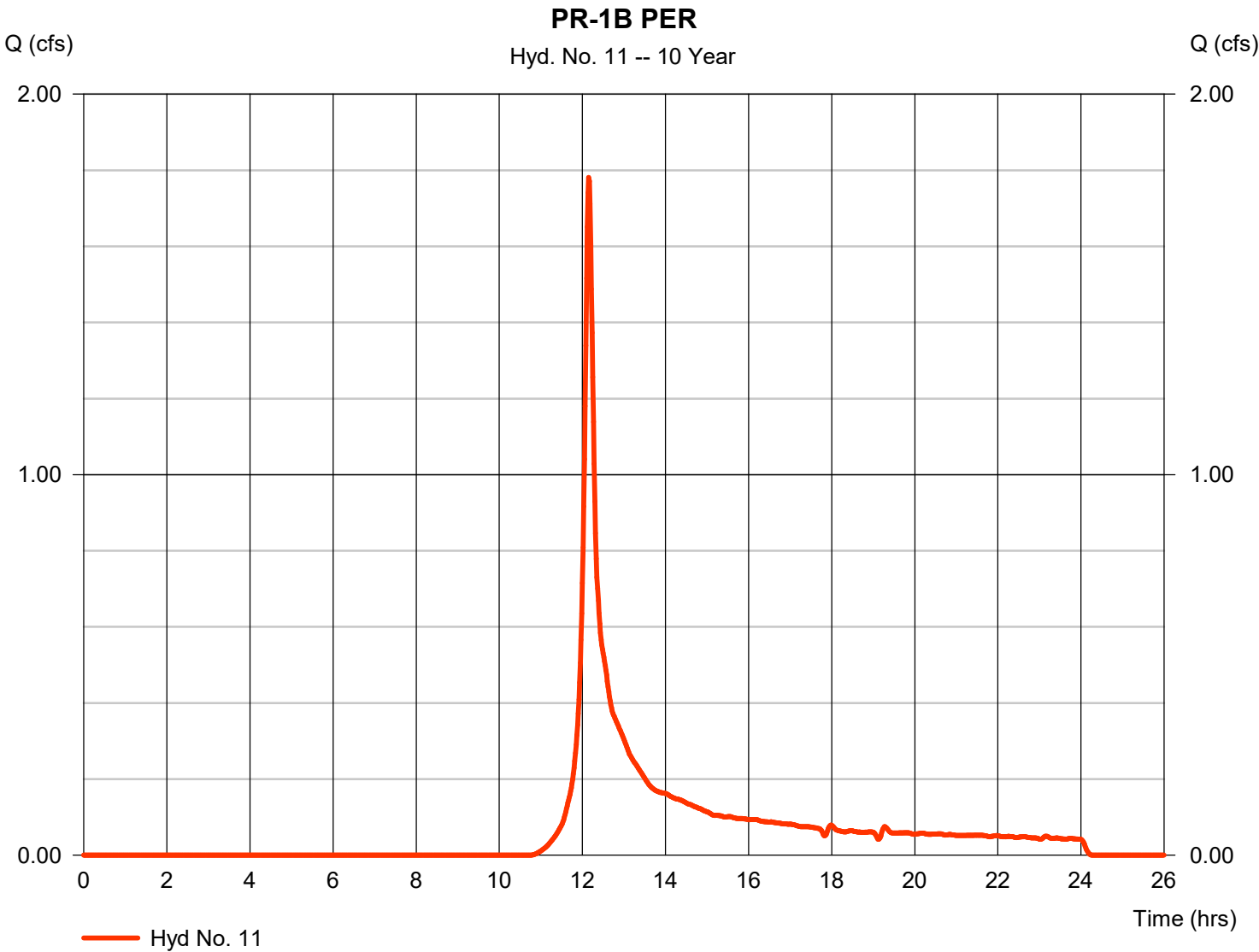


Hydrograph Report

Hyd. No. 11

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 1.781 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 6,509 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

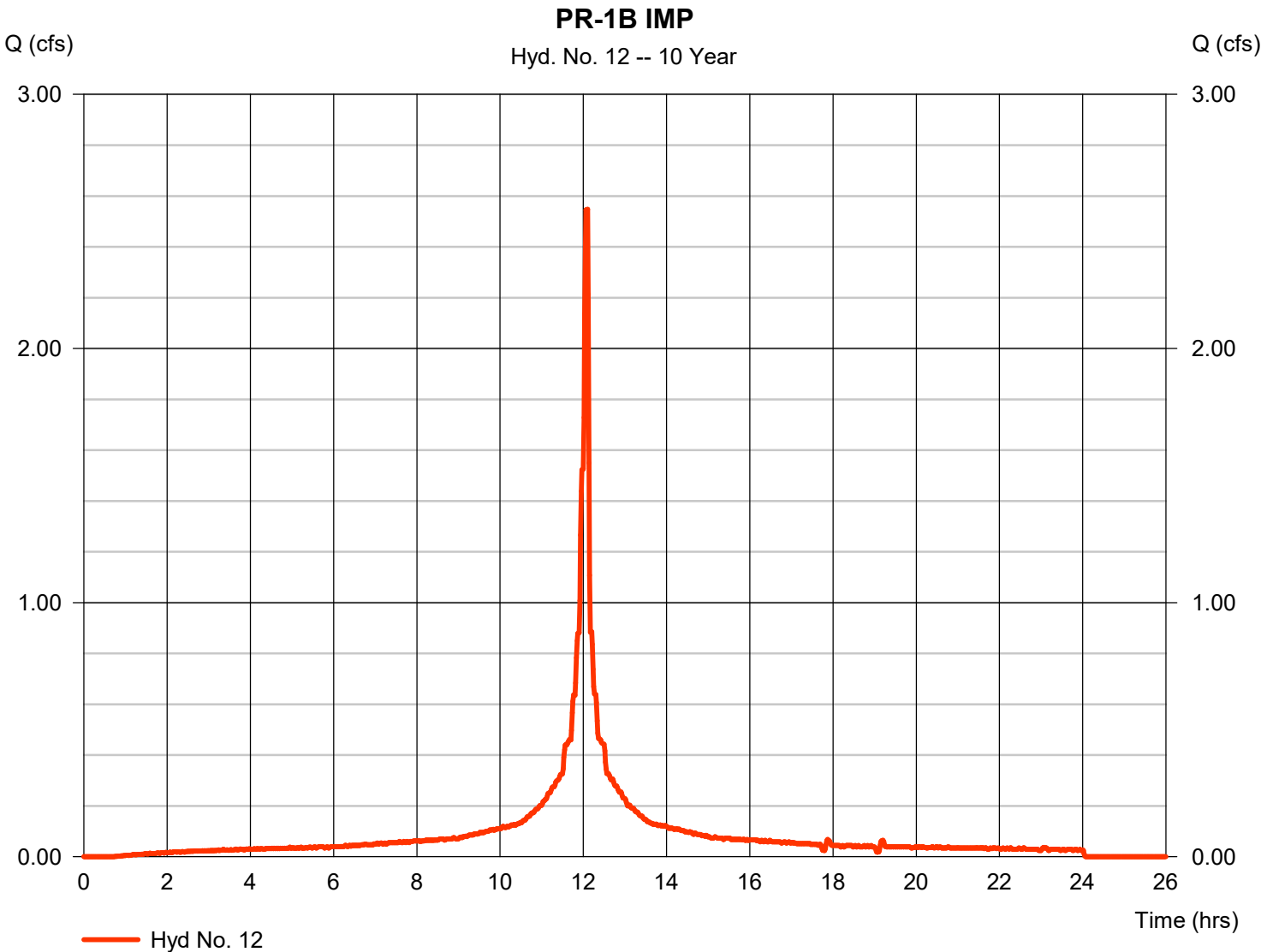


Hydrograph Report

Hyd. No. 12

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 2.547 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 8,433 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.90 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

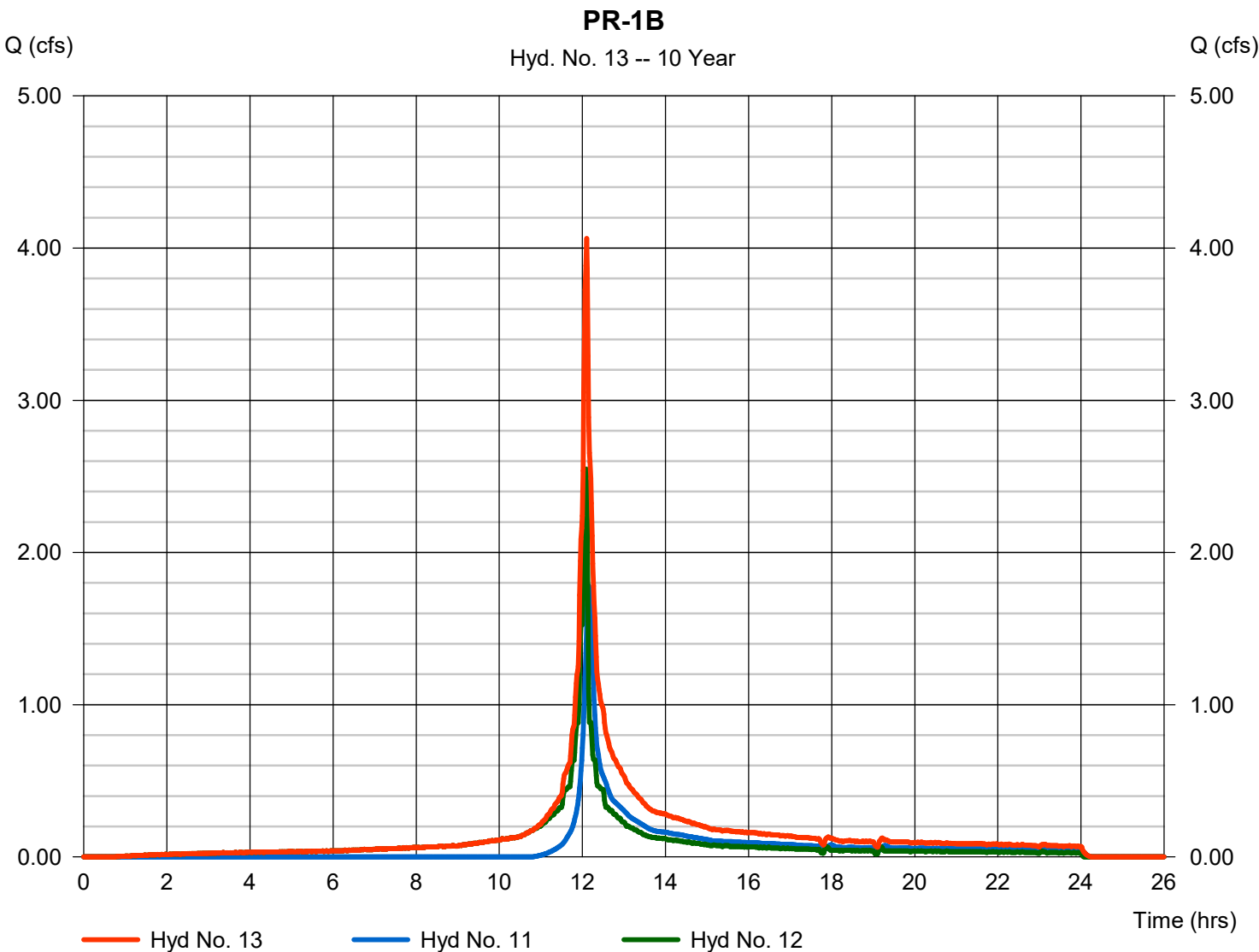


Hydrograph Report

Hyd. No. 13

PR-1B

Hydrograph type	= Combine	Peak discharge	= 4.064 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 14,942 cuft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 1.590 ac

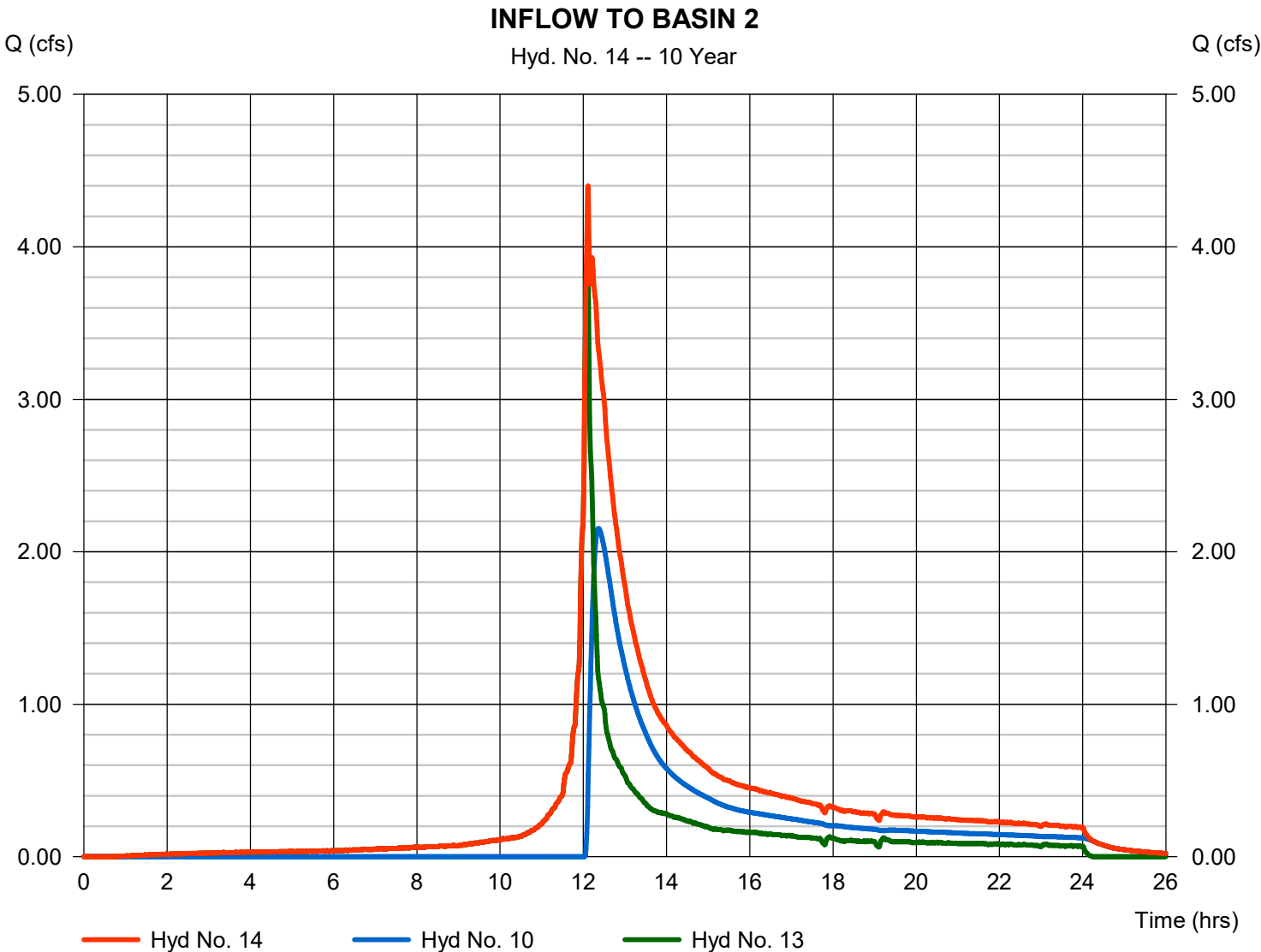


Hydrograph Report

Hyd. No. 14

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 4.399 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 32,035 cuft
Inflow hyds.	= 10, 13	Contrib. drain. area	= 0.000 ac



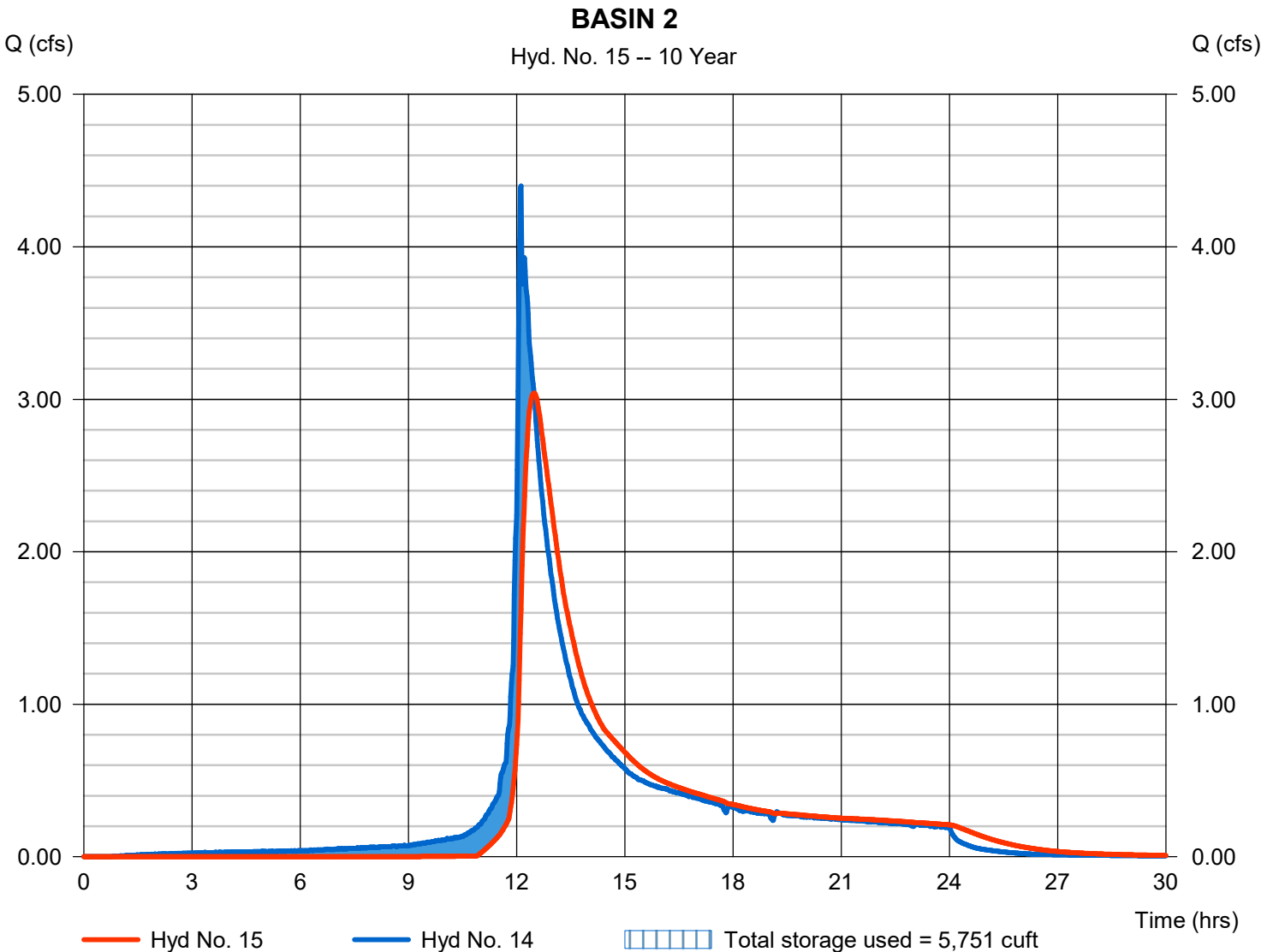
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 3.040 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.48 hrs
Time interval	= 1 min	Hyd. volume	= 30,424 cuft
Inflow hyd. No.	= 14 - INFLOW TO BASIN 2	Max. Elevation	= 793.26 ft
Reservoir name	= BASIN 2	Max. Storage	= 5,751 cuft

Storage Indication method used.

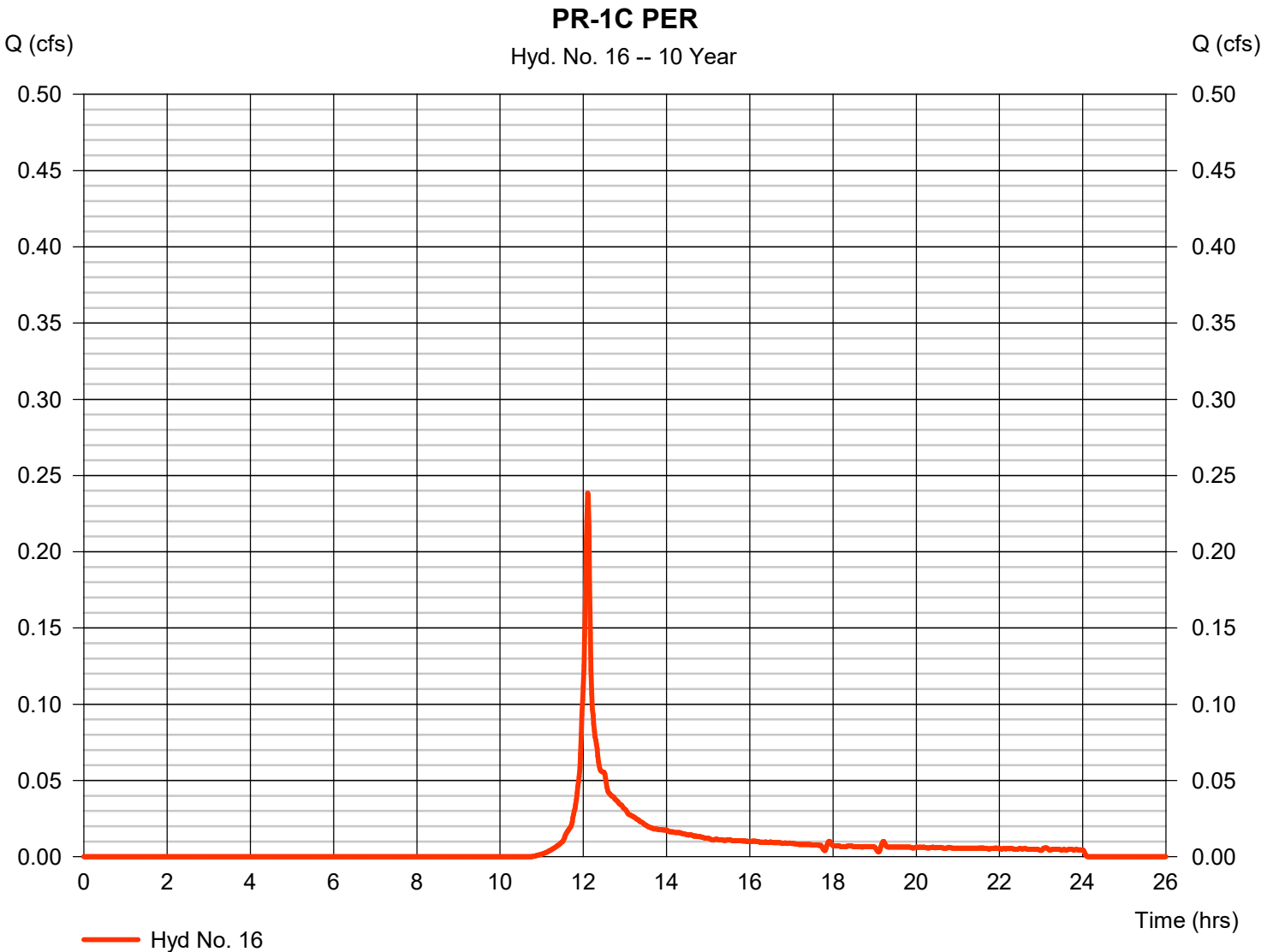


Hydrograph Report

Hyd. No. 16

PR-1C PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.238 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 704 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.30 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

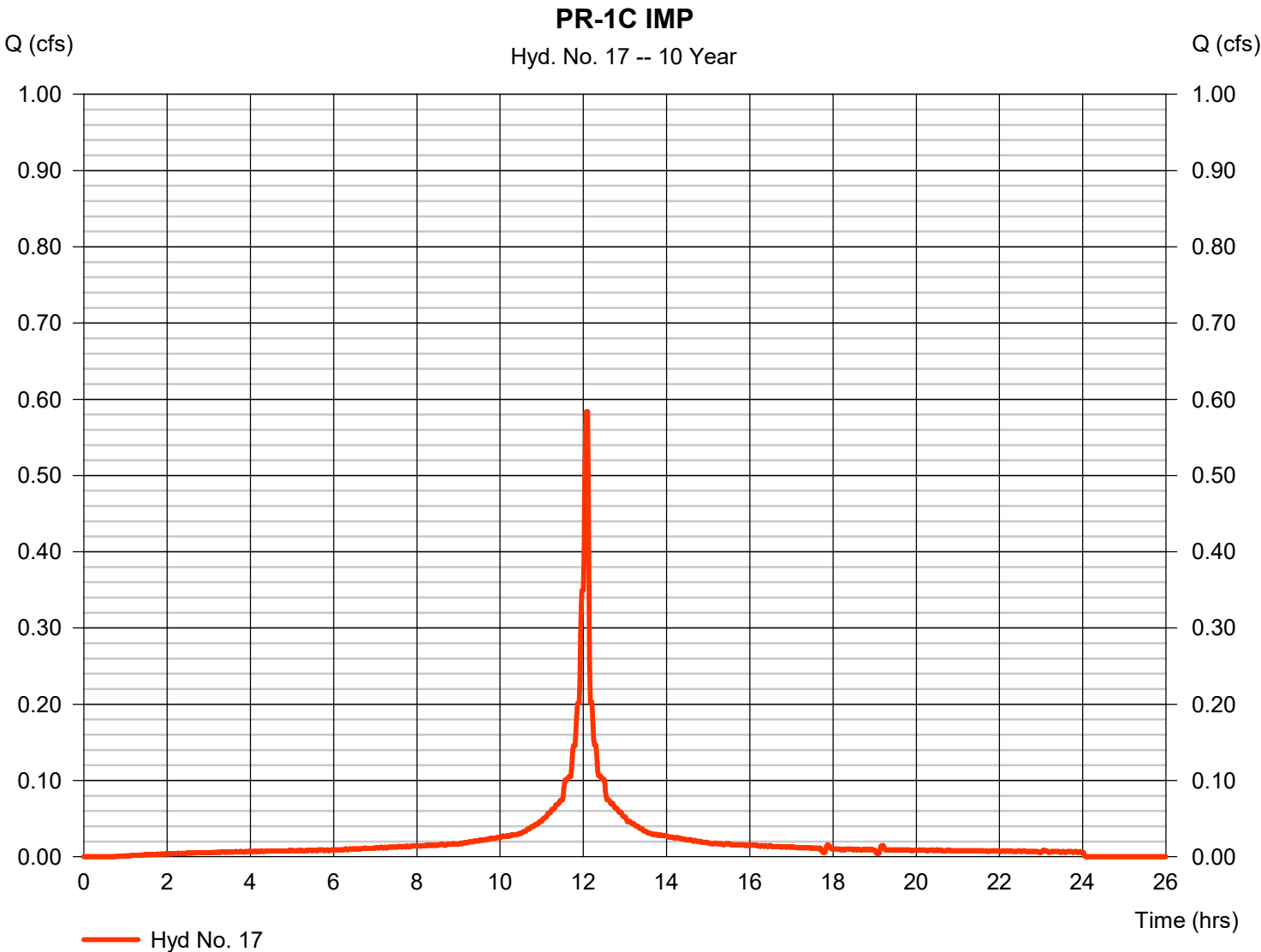


Hydrograph Report

Hyd. No. 17

PR-1C IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.584 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,933 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

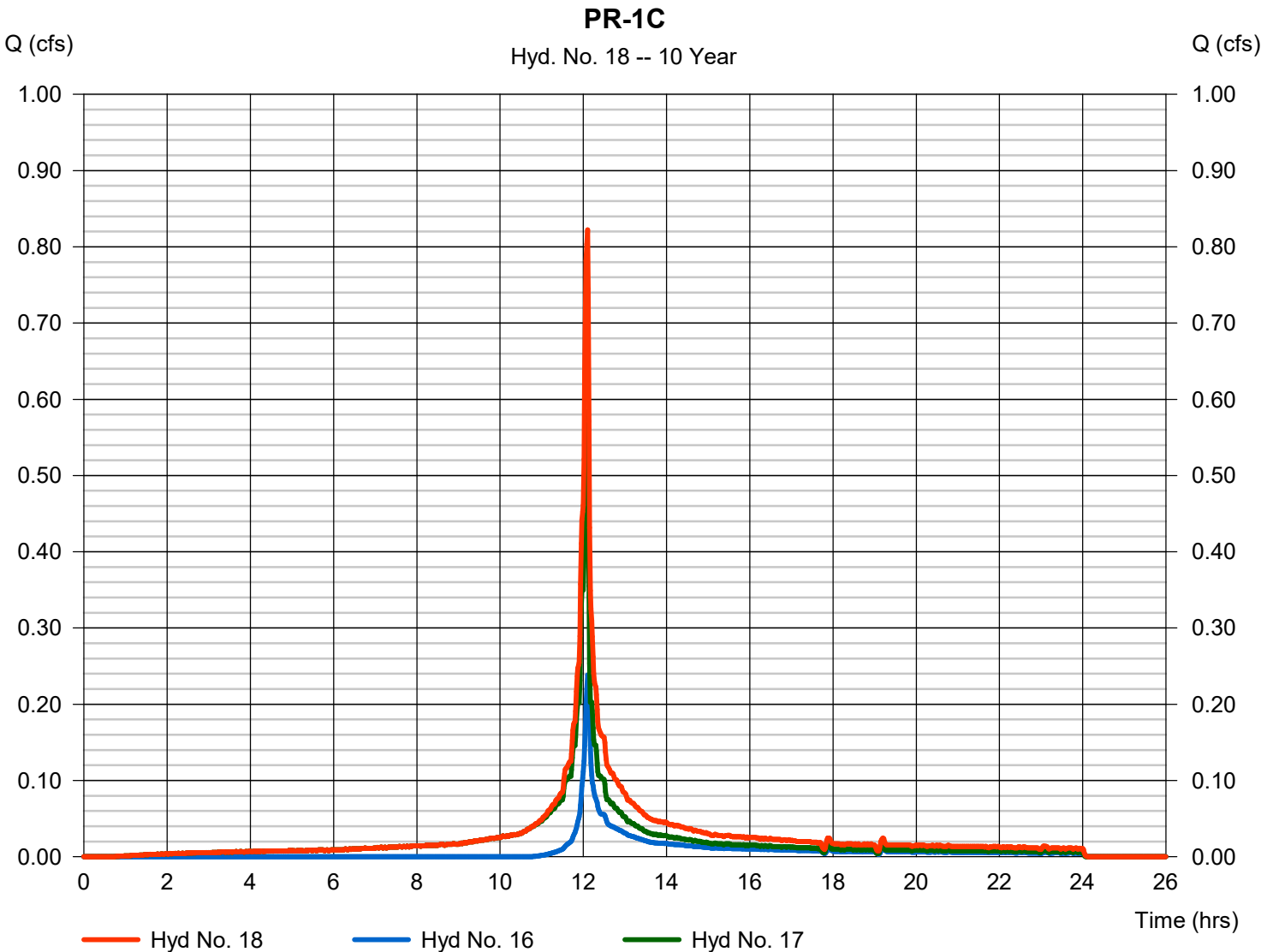


Hydrograph Report

Hyd. No. 18

PR-1C

Hydrograph type	= Combine	Peak discharge	= 0.822 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,636 cuft
Inflow hyds.	= 16, 17	Contrib. drain. area	= 0.230 ac

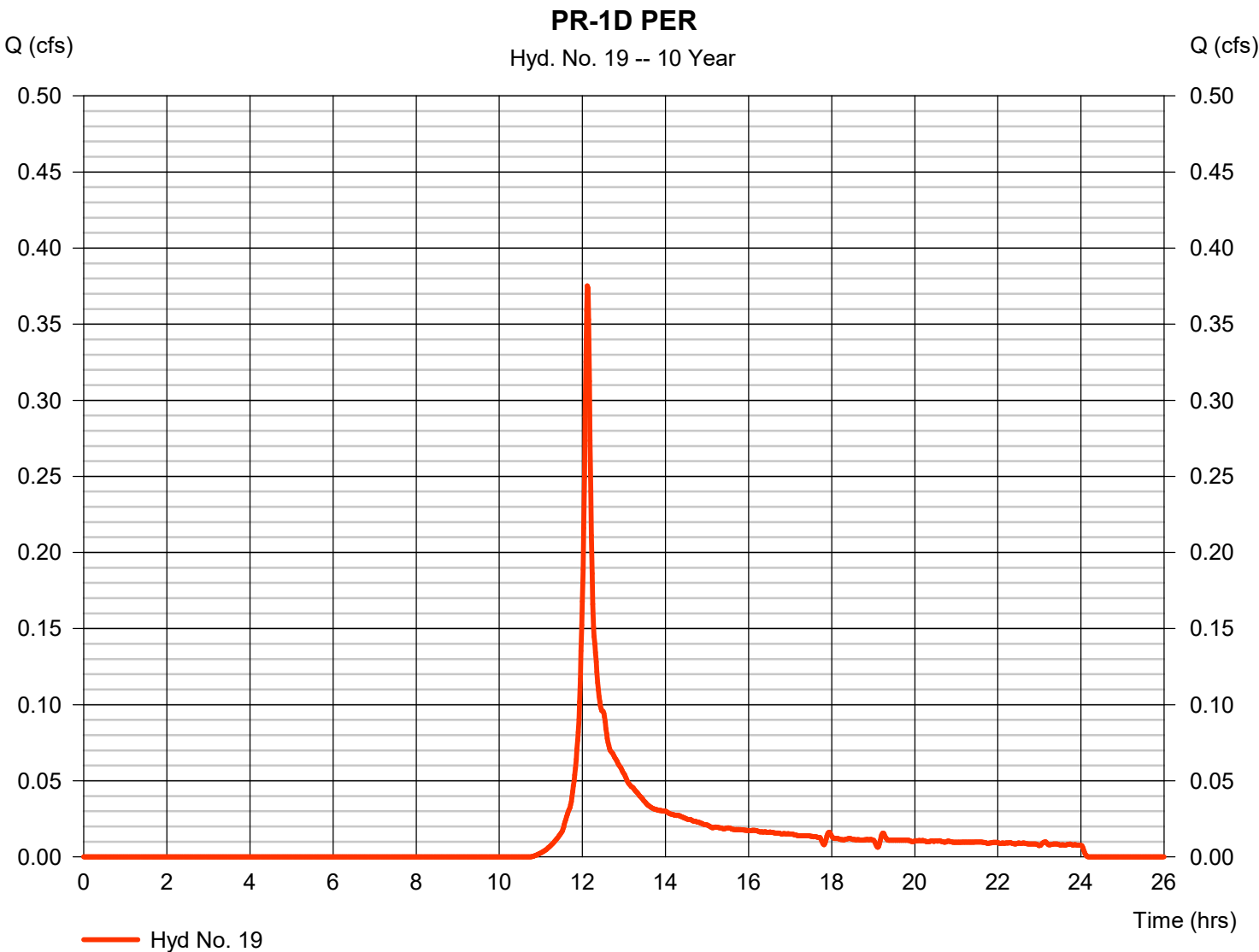


Hydrograph Report

Hyd. No. 19

PR-1D PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.375 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 1,209 cuft
Drainage area	= 0.200 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.50 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

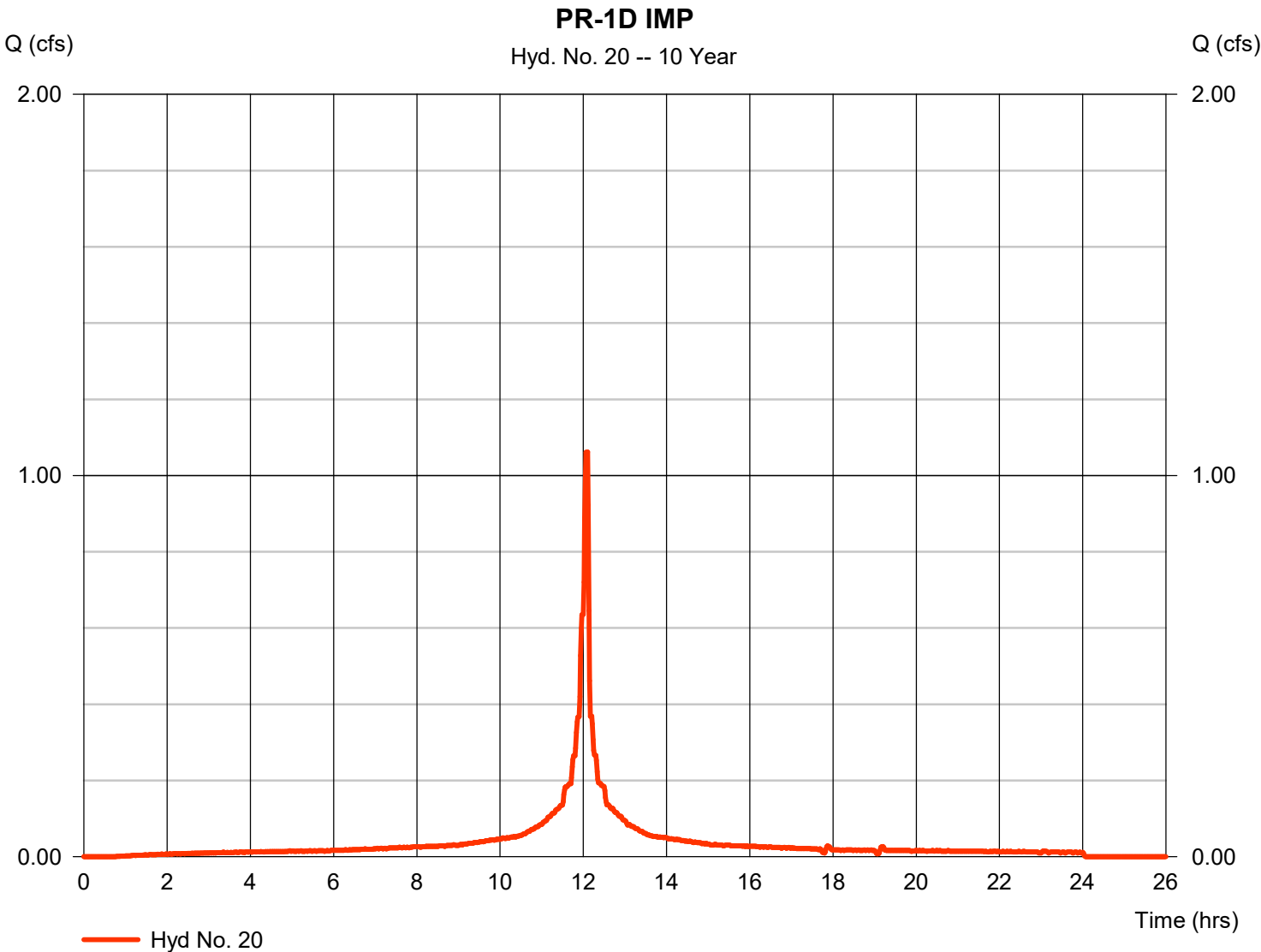


Hydrograph Report

Hyd. No. 20

PR-1D IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.061 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 3,514 cuft
Drainage area	= 0.200 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

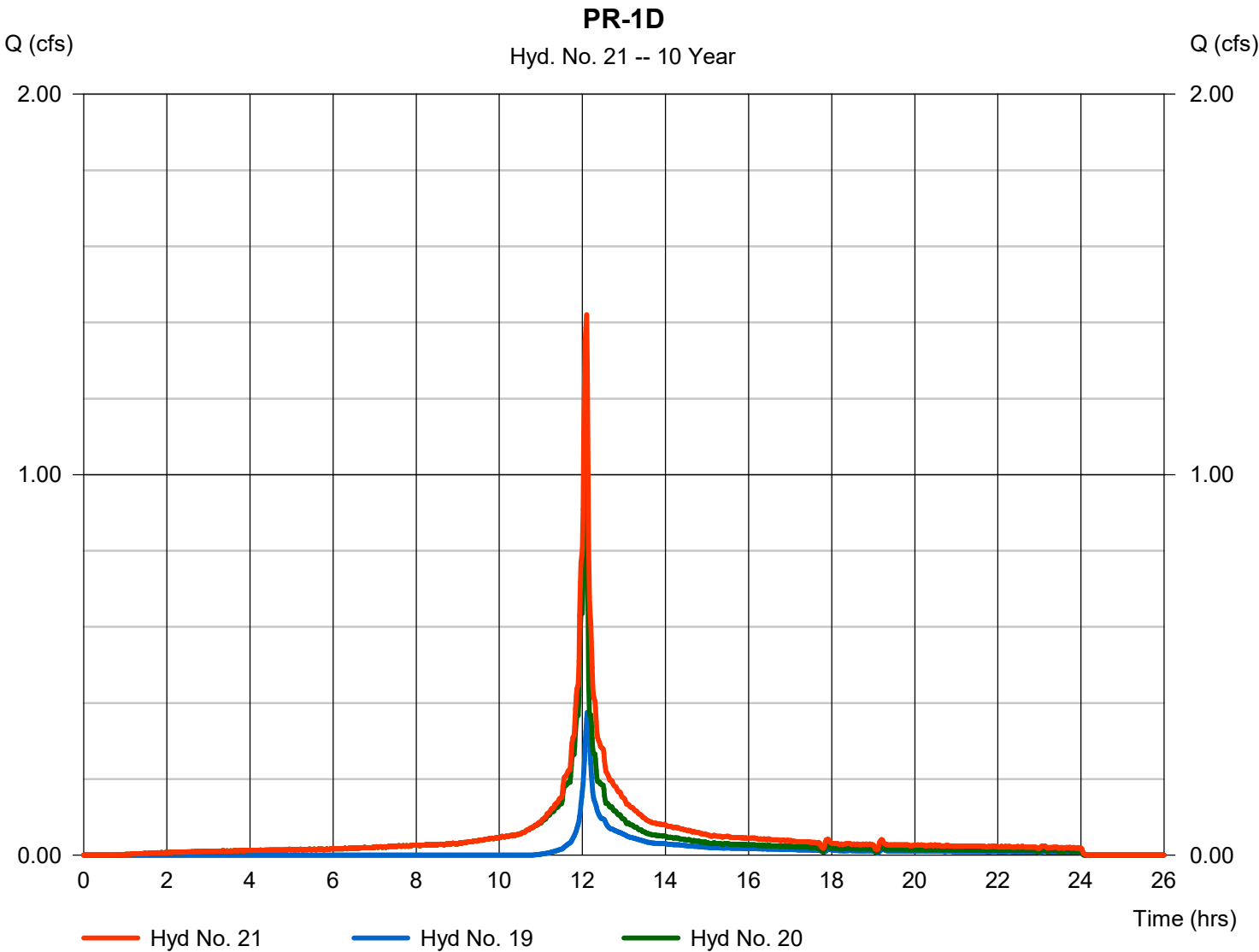


Hydrograph Report

Hyd. No. 21

PR-1D

Hydrograph type	= Combine	Peak discharge	= 1.420 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 4,723 cuft
Inflow hyds.	= 19, 20	Contrib. drain. area	= 0.400 ac

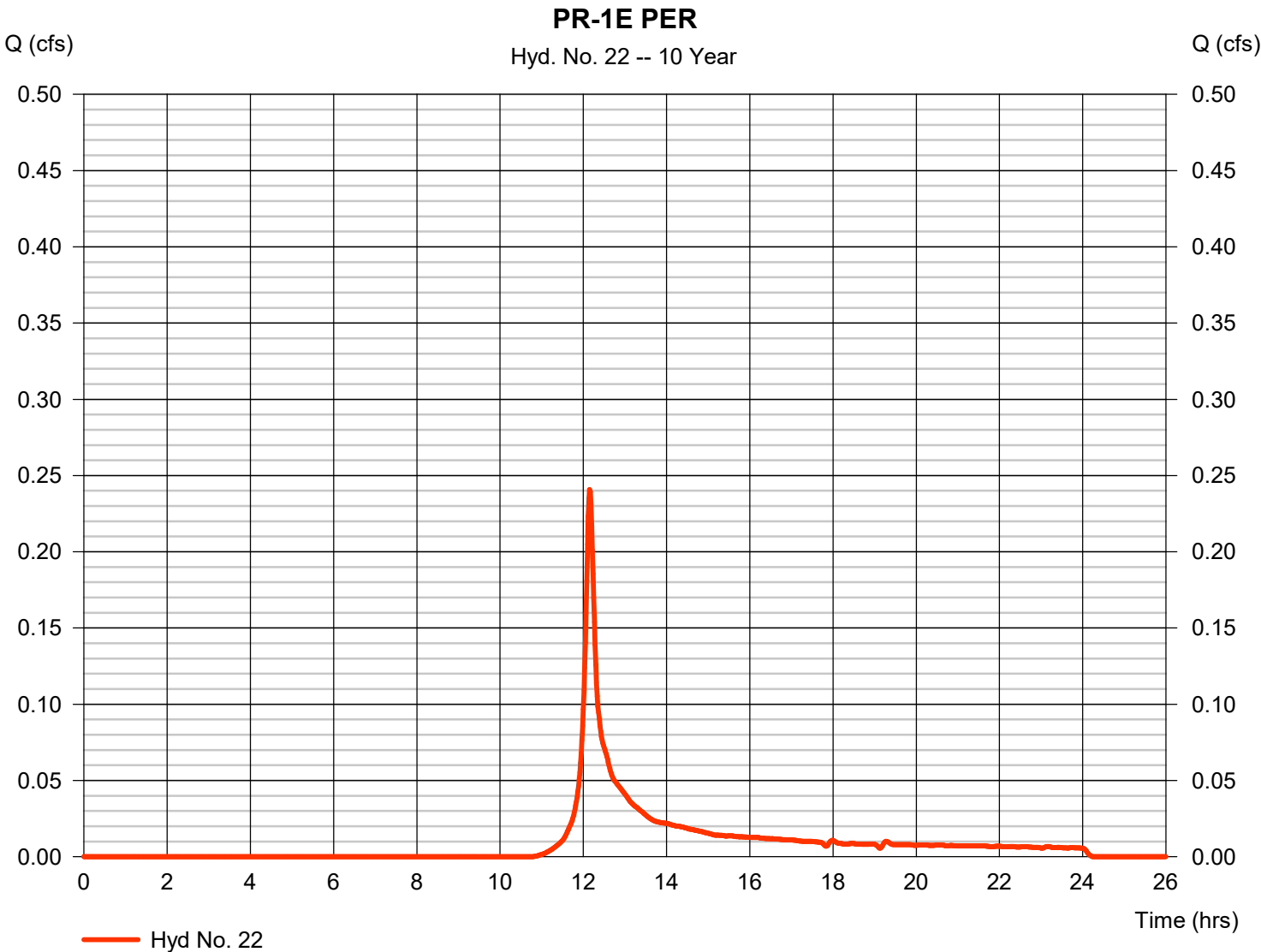


Hydrograph Report

Hyd. No. 22

PR-1E PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.241 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 880 cuft
Drainage area	= 0.150 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

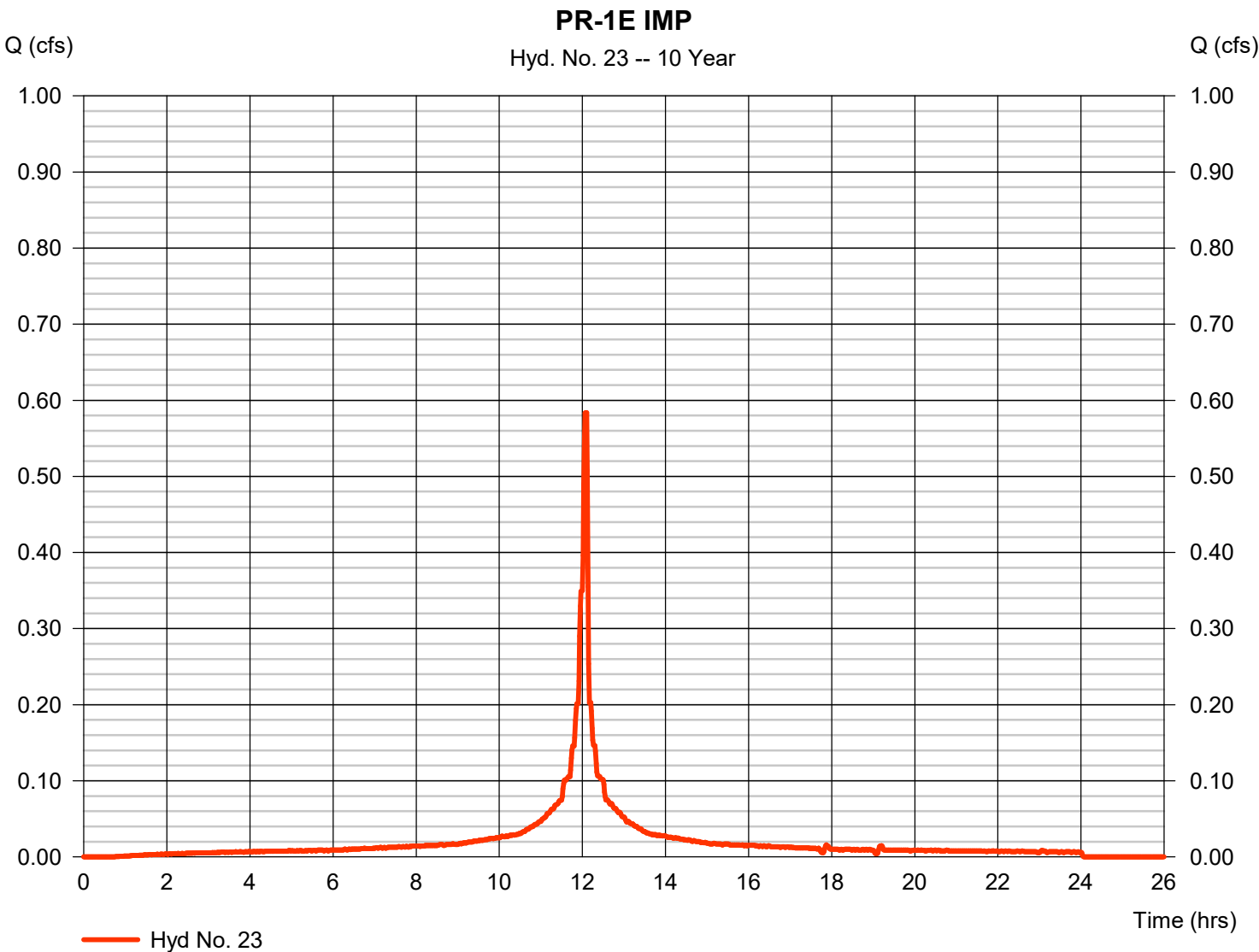


Hydrograph Report

Hyd. No. 23

PR-1E IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.584 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,933 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

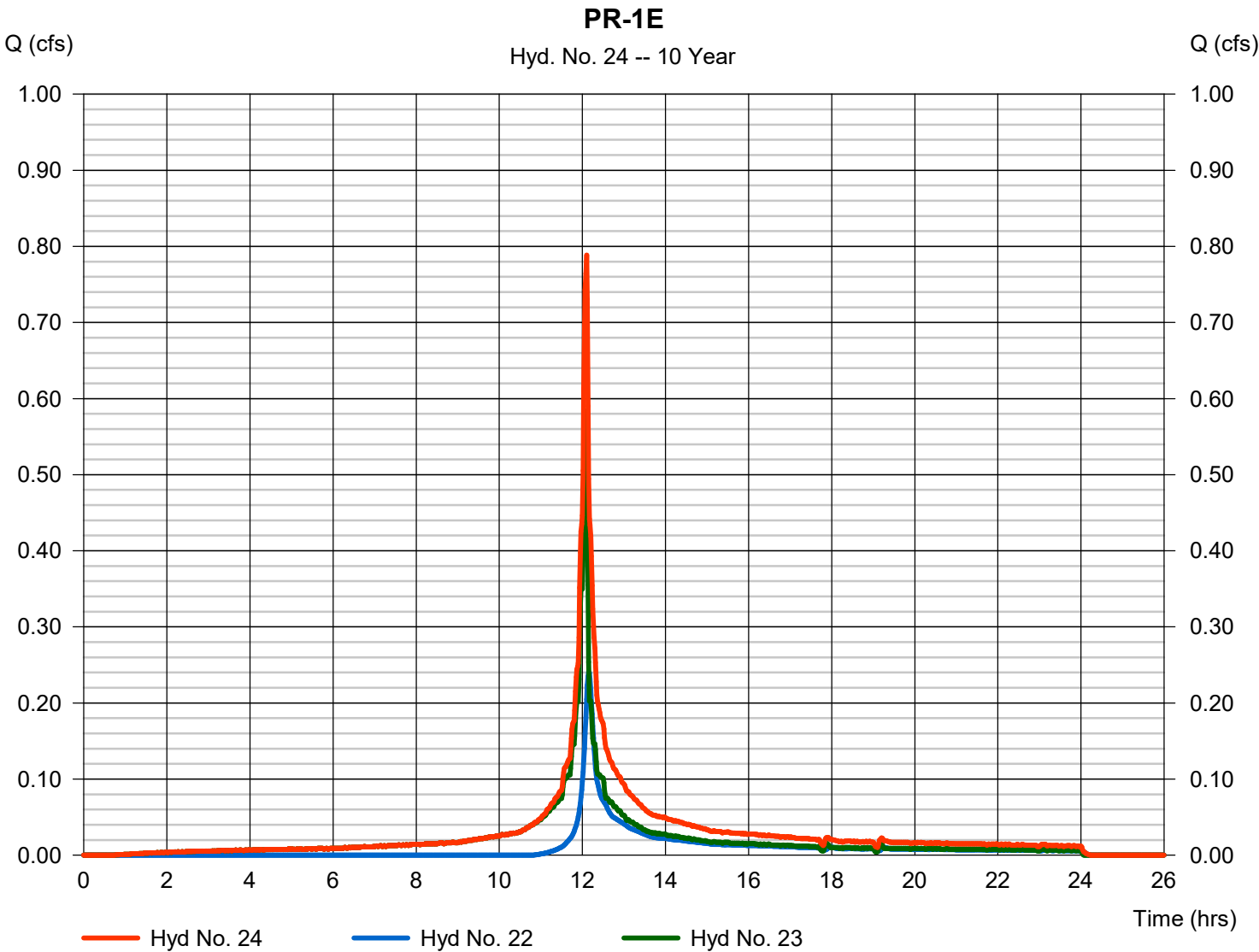


Hydrograph Report

Hyd. No. 24

PR-1E

Hydrograph type	= Combine	Peak discharge	= 0.789 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,812 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.260 ac

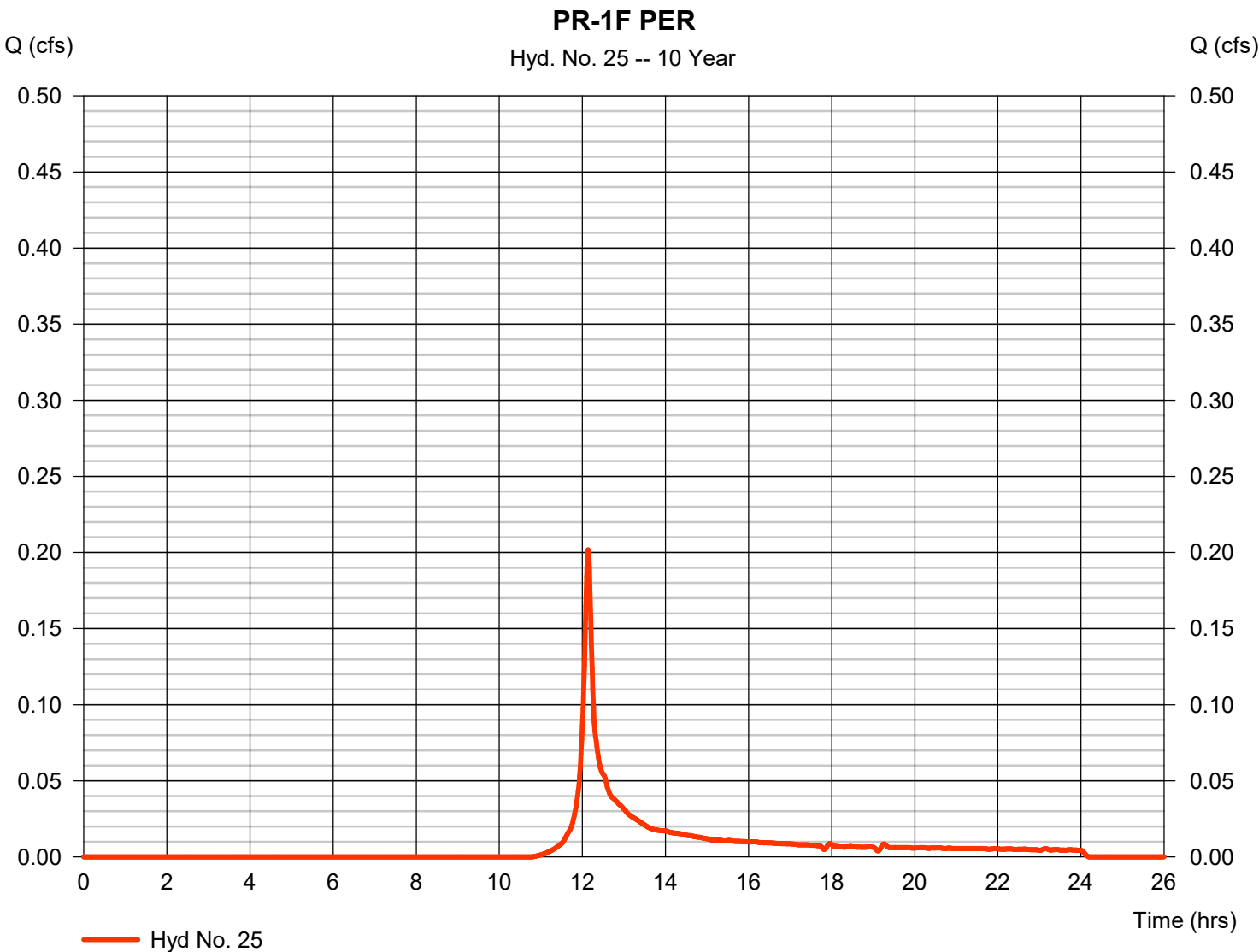


Hydrograph Report

Hyd. No. 25

PR-1F PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.202 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 686 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.30 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

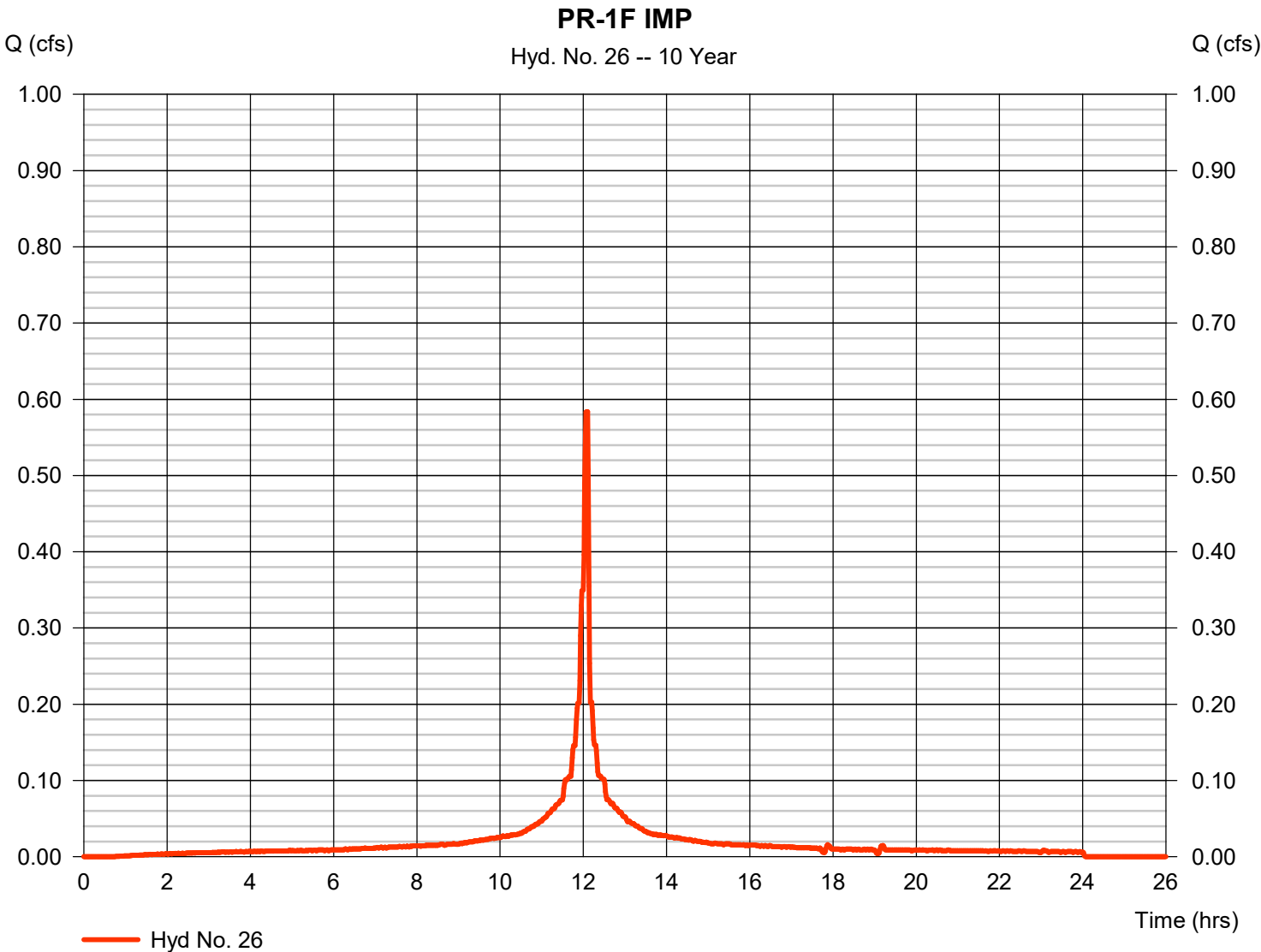


Hydrograph Report

Hyd. No. 26

PR-1F IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.584 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,933 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

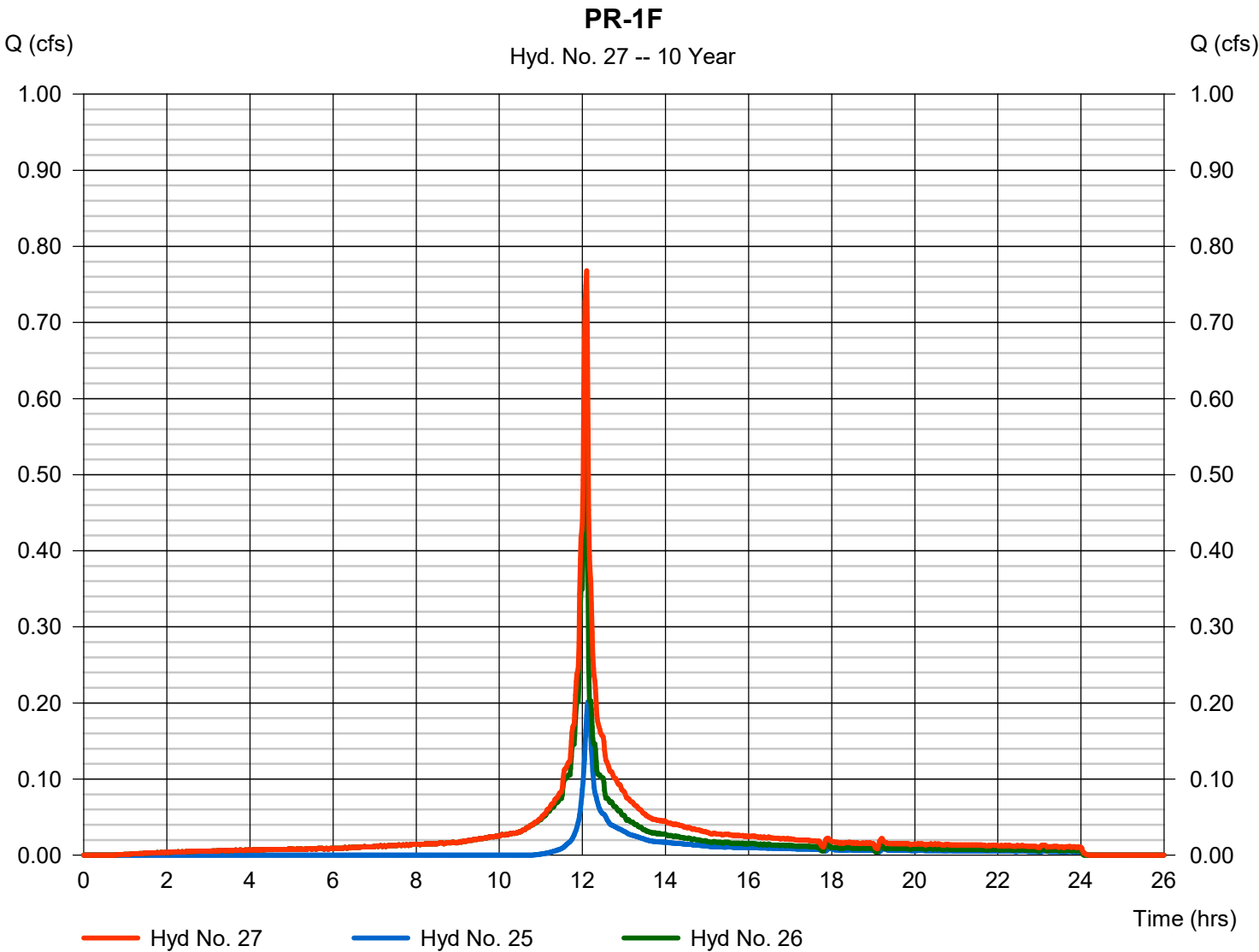


Hydrograph Report

Hyd. No. 27

PR-1F

Hydrograph type	= Combine	Peak discharge	= 0.768 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 2,619 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 0.230 ac

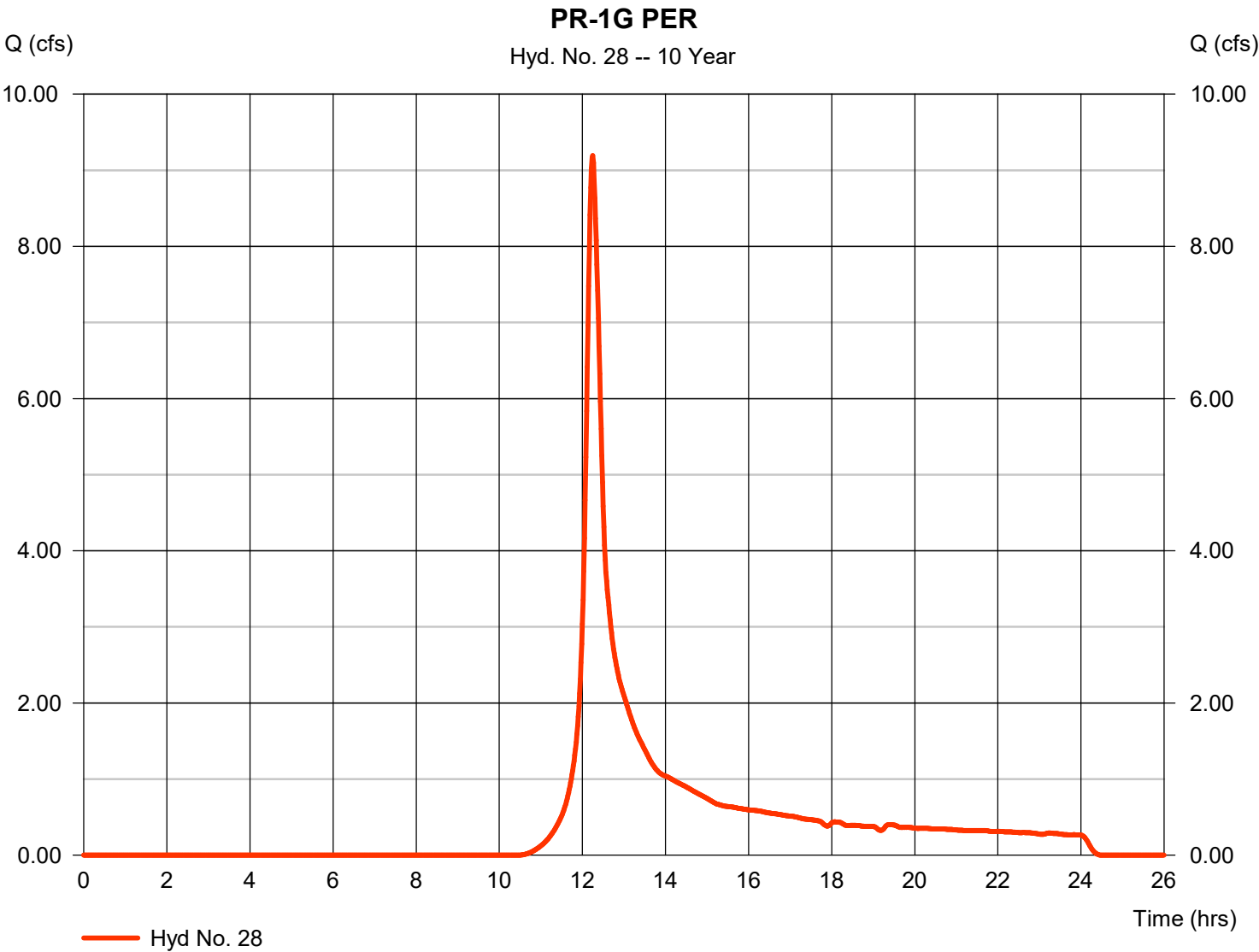


Hydrograph Report

Hyd. No. 28

PR-1G PER

Hydrograph type	= SCS Runoff	Peak discharge	= 9.192 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 42,130 cuft
Drainage area	= 6.640 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

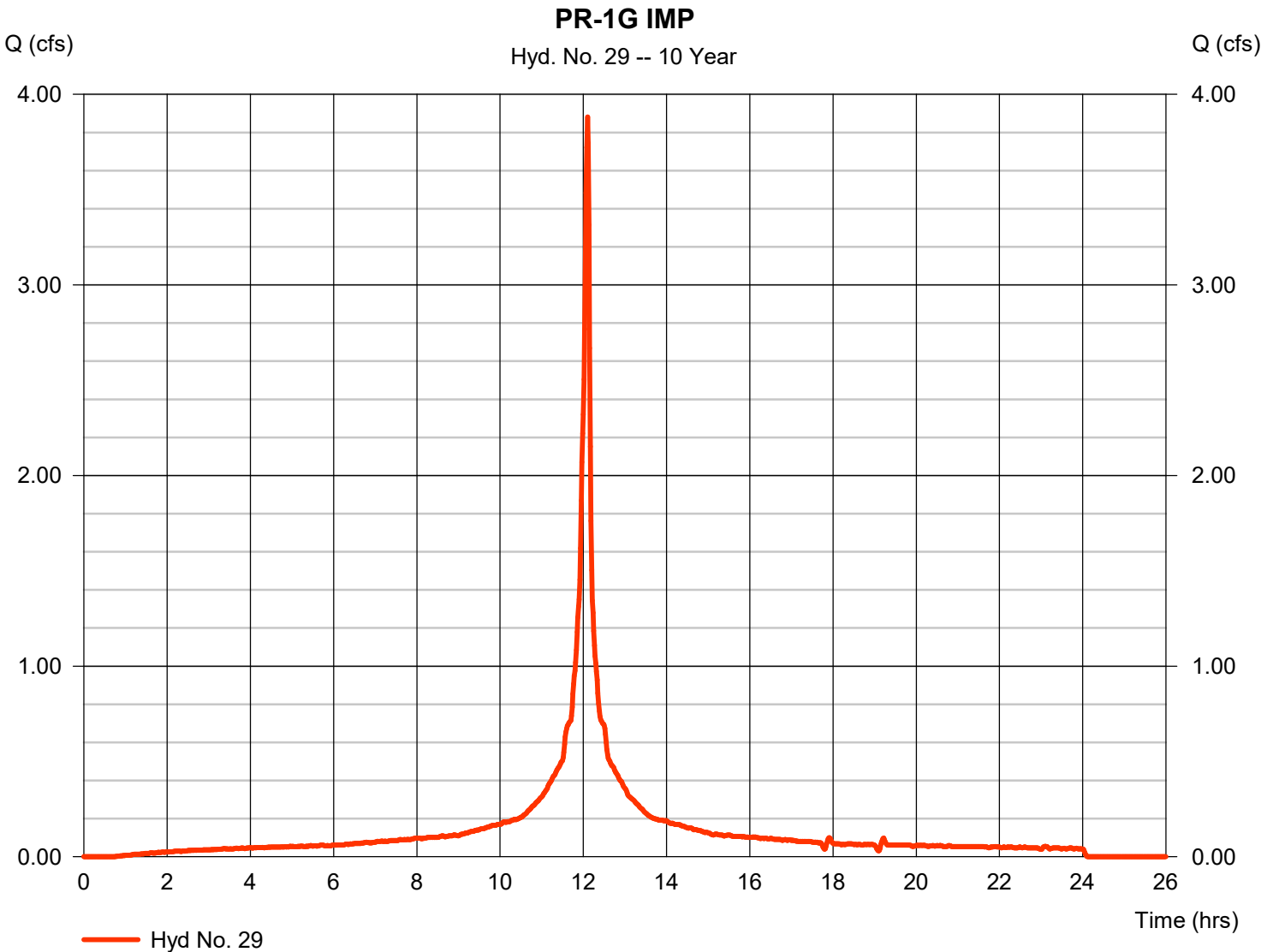


Hydrograph Report

Hyd. No. 29

PR-1G IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 3.881 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 13,118 cuft
Drainage area	= 0.700 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 5.40 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

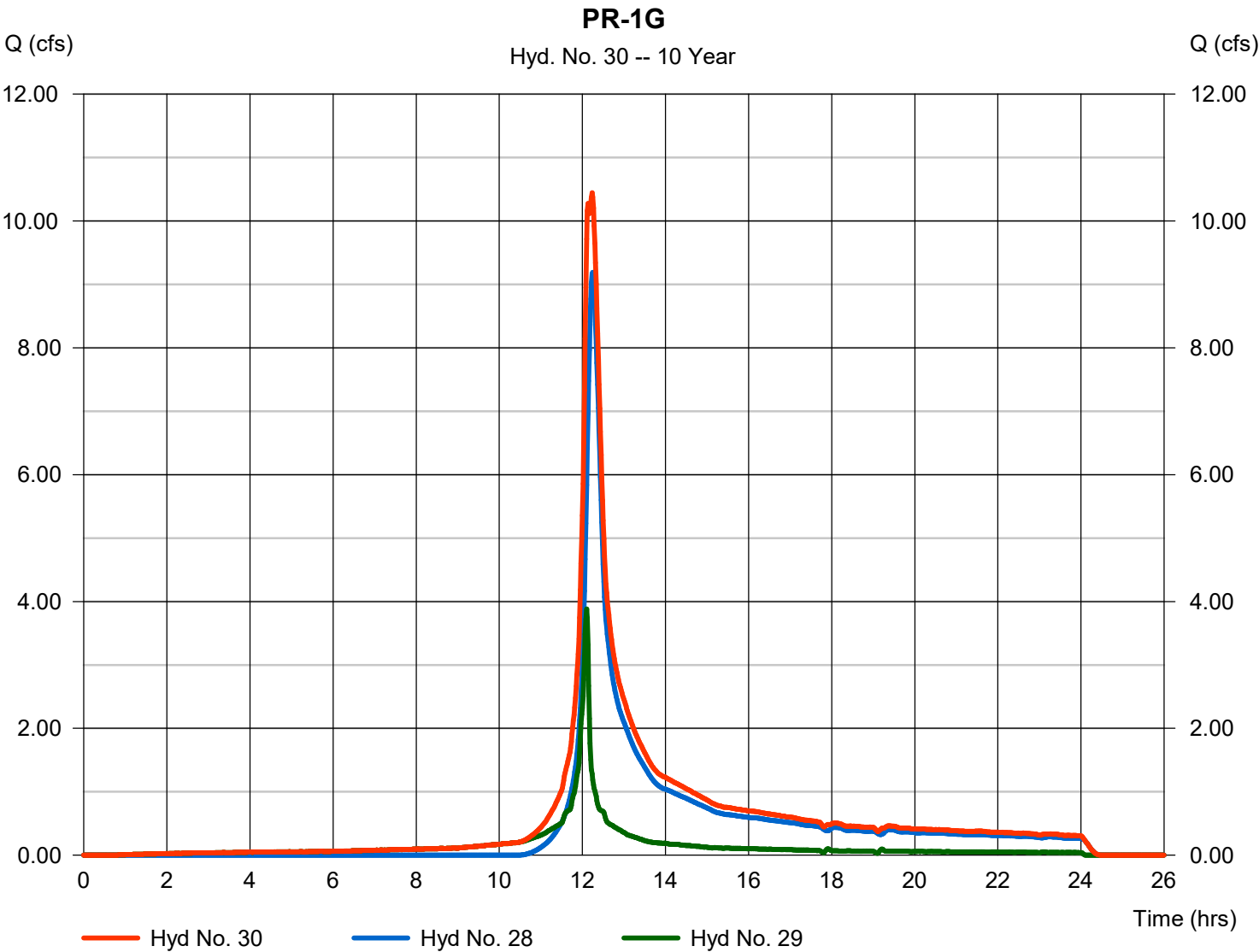


Hydrograph Report

Hyd. No. 30

PR-1G

Hydrograph type	= Combine	Peak discharge	= 10.45 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 55,248 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 7.340 ac

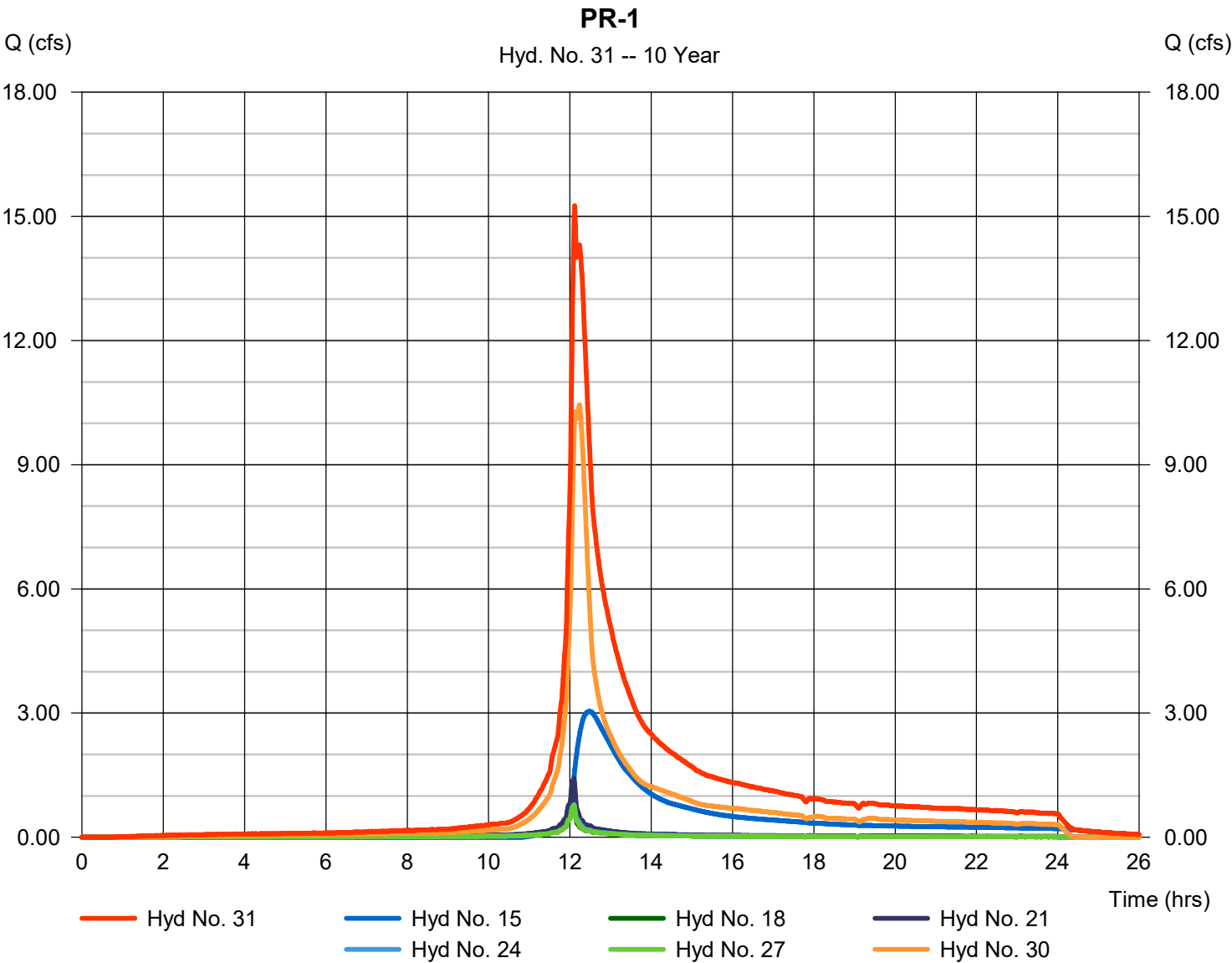


Hydrograph Report

Hyd. No. 31

PR-1

Hydrograph type	= Combine	Peak discharge	= 15.26 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 98,462 cuft
Inflow hyds.	= 15, 18, 21, 24, 27, 30	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

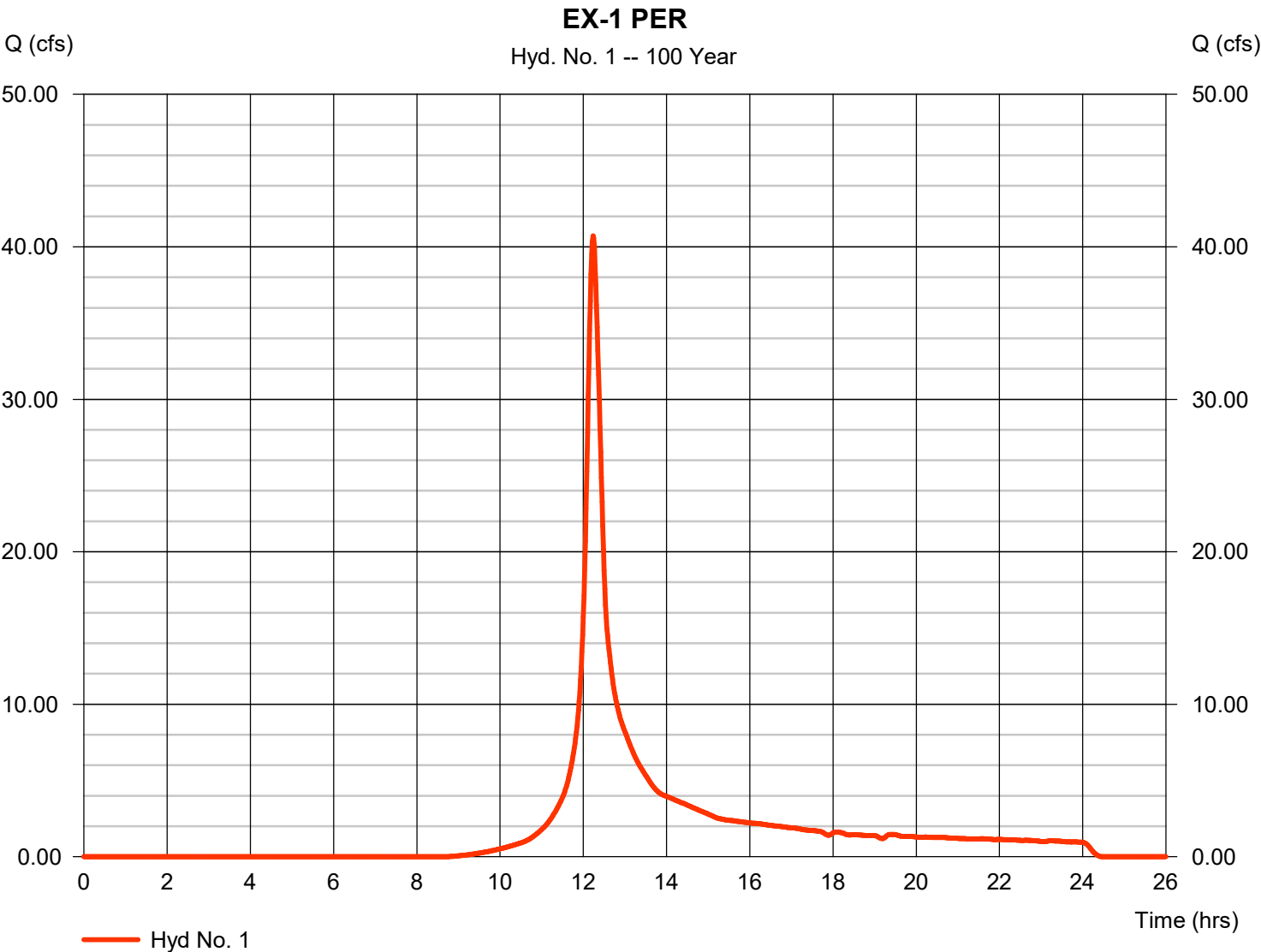
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	40.73	1	734	179,487	-----	-----	-----	EX-1 PER
2	SCS Runoff	17.63	1	726	60,449	-----	-----	-----	EX-1 IMP
3	Combine	47.52	1	728	239,936	1, 2	-----	-----	EX-1
4	SCS Runoff	9.167	1	730	33,966	-----	-----	-----	PR-1A PER
5	SCS Runoff	4.498	1	726	15,112	-----	-----	-----	PR-1A IMP
6	Combine	12.19	1	727	49,078	4, 5	-----	-----	PR-1A
7	SCS Runoff	12.72	1	726	42,721	-----	-----	-----	AREA TO DRYWELLS
8	Reservoir	11.42	1	727	34,452	7	7.25	9,915	DRYWELL ROUTING
9	Combine	23.61	1	727	83,530	6, 8	-----	-----	INFLOW TO BASIN 1
10	Reservoir	9.607	1	733	43,487	6	816.84	12,813	BASIN 1
11	SCS Runoff	4.688	1	729	16,317	-----	-----	-----	PR-1B PER
12	SCS Runoff	4.152	1	726	13,950	-----	-----	-----	PR-1B IMP
13	Combine	8.304	1	726	30,267	11, 12	-----	-----	PR-1B
14	Combine	15.10	1	731	73,754	10, 13	-----	-----	INFLOW TO BASIN 2
15	Reservoir	13.54	1	735	72,138	14	794.14	9,791	BASIN 2
16	SCS Runoff	0.620	1	726	1,764	-----	-----	-----	PR-1C PER
17	SCS Runoff	0.952	1	726	3,197	-----	-----	-----	PR-1C IMP
18	Combine	1.572	1	726	4,961	16, 17	-----	-----	PR-1C
19	SCS Runoff	0.981	1	727	3,032	-----	-----	-----	PR-1D PER
20	SCS Runoff	1.730	1	726	5,812	-----	-----	-----	PR-1D IMP
21	Combine	2.682	1	726	8,844	19, 20	-----	-----	PR-1D
22	SCS Runoff	0.633	1	729	2,205	-----	-----	-----	PR-1E PER
23	SCS Runoff	0.952	1	726	3,197	-----	-----	-----	PR-1E IMP
24	Combine	1.513	1	726	5,402	22, 23	-----	-----	PR-1E
25	SCS Runoff	0.528	1	728	1,720	-----	-----	-----	PR-1F PER
26	SCS Runoff	0.952	1	726	3,197	-----	-----	-----	PR-1F IMP
27	Combine	1.447	1	726	4,917	25, 26	-----	-----	PR-1F
28	SCS Runoff	23.27	1	734	102,263	-----	-----	-----	PR-1G PER
29	SCS Runoff	6.328	1	726	21,699	-----	-----	-----	PR-1G IMP
30	Combine	25.35	1	734	123,962	28, 29	-----	-----	PR-1G
31	Combine	41.60	1	733	220,224	15, 18, 21, 24, 27, 30	-----	-----	PR-1
Current 15107.gpw					Return Period: 100 Year			Thursday, 07 / 9 / 2026120	

Hydrograph Report

Hyd. No. 1

EX-1 PER

Hydrograph type	= SCS Runoff	Peak discharge	= 40.73 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 179,487 cuft
Drainage area	= 12.350 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

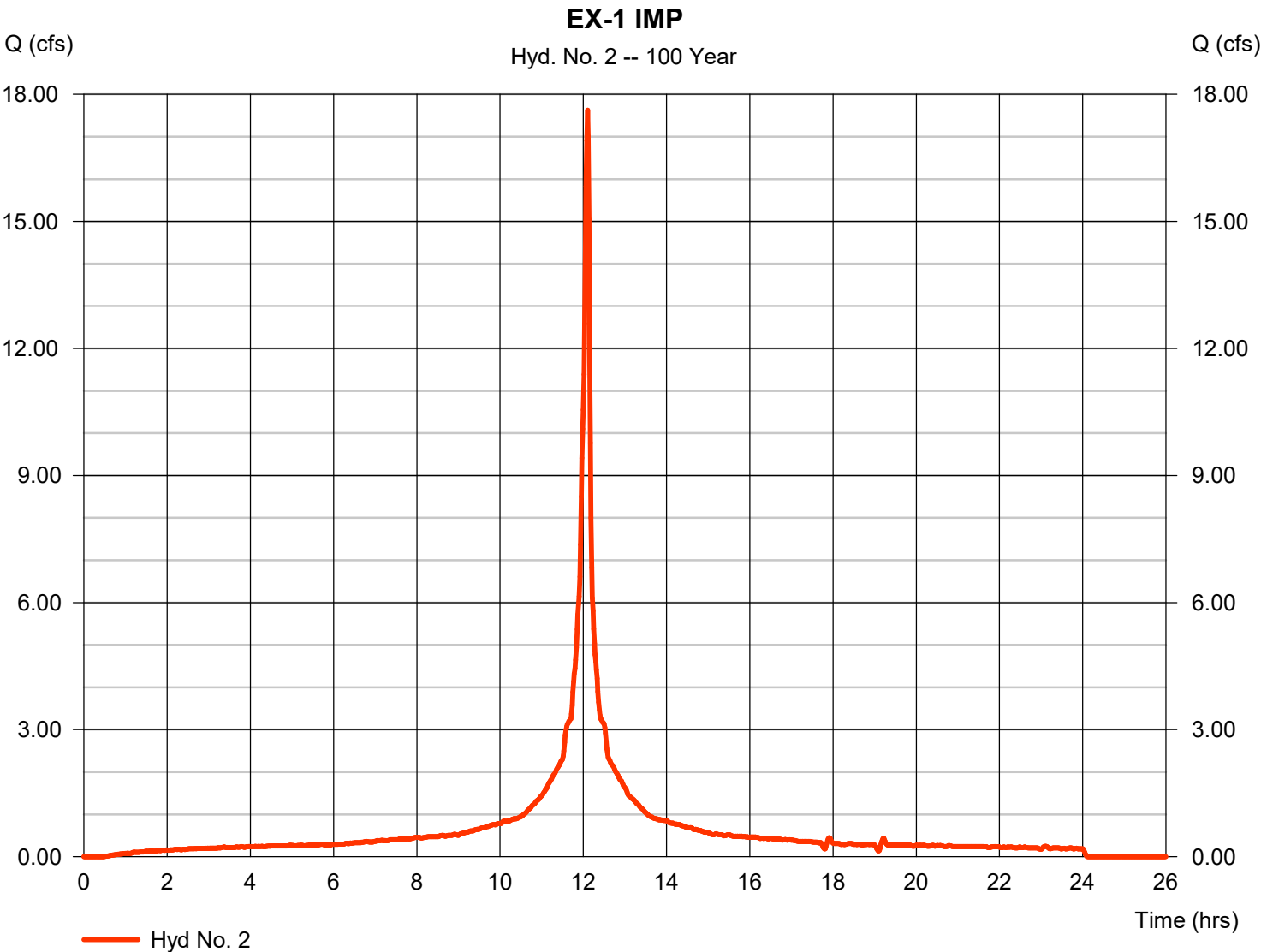


Hydrograph Report

Hyd. No. 2

EX-1 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 17.63 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 60,449 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

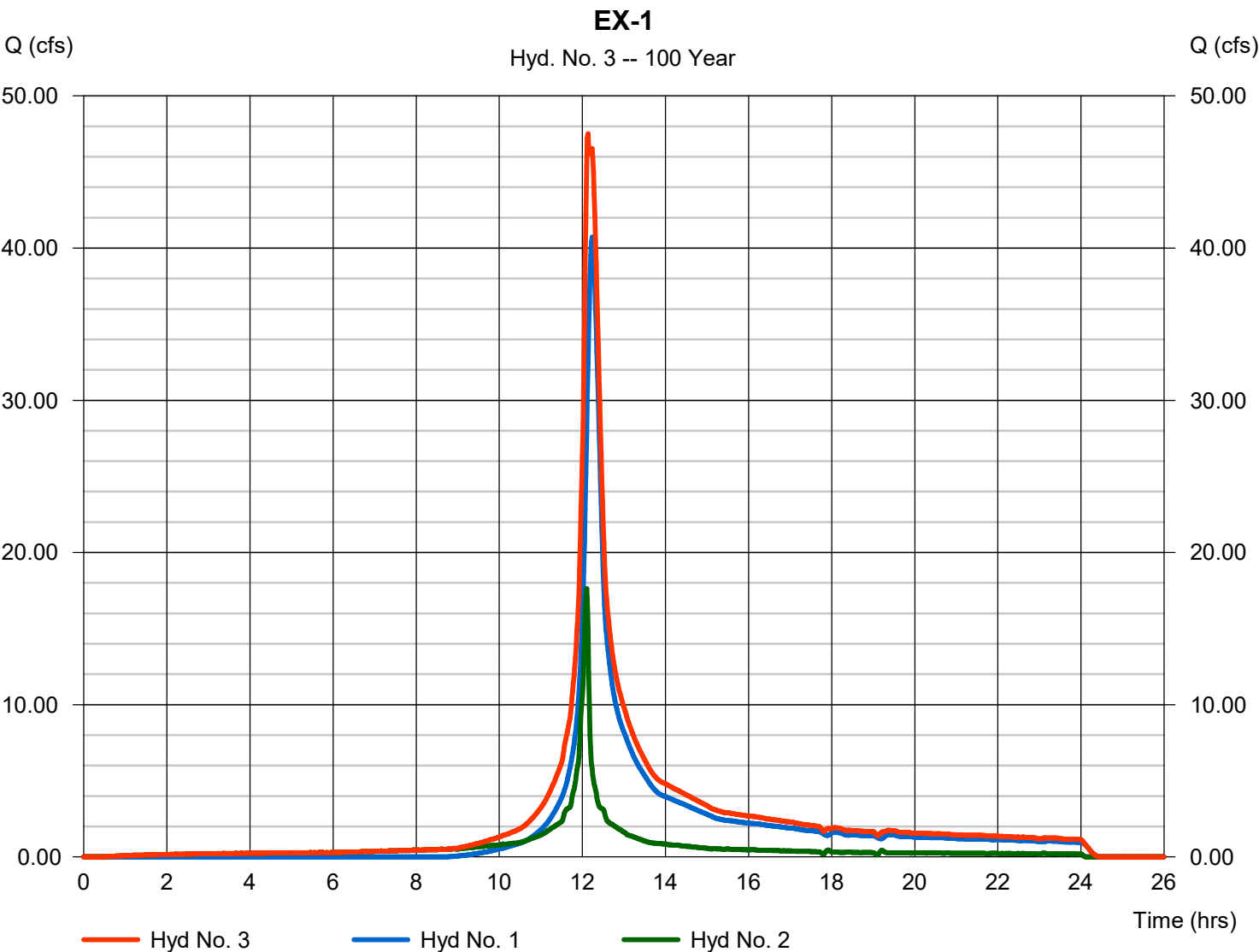


Hydrograph Report

Hyd. No. 3

EX-1

Hydrograph type	= Combine	Peak discharge	= 47.52 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 239,936 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.300 ac



PEAK FLOW REDUCTION CALCULATIONS - CURRENT

TO COMPLY WITH NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER MANAGEMENT REQUIREMENTS, THE POST-DEVELOPMENT PEAK RUNOFF RATES MUST BE REDUCED TO A PERCENTAGE OF PRE-DEVELOPMENT PEAK RUNOFF RATES, AS

$$\text{PROPOSED } Q_2 \leq 50\% \text{ EXISTING } Q_2$$

$$\text{PROPOSED } Q_{10} \leq 75\% \text{ EXISTING } Q_{10}$$

$$\text{PROPOSED } Q_{100} \leq 80\% \text{ EXISTING } Q_{10}$$

REDUCTION FACTORS ARE APPLIED TO THE DISTURBED PORTION OF THE TRIBUTARY DRAINAGE AREA ONLY:

EX 1

DRAINAGE AREA = 14.3 AC

AREA OF DISTURBANCE= 6 AC

PERCENT DISTURBANCE = 42.0%

APPLY REDUCTION FACTORS TO 42% OF EXISTING PEAK FLOWS.

CURRENT PEAK FLOWS:

$$Q_2 = 9.5 \text{ CFS}$$

$$Q_{10} = 20.9 \text{ CFS}$$

$$Q_{100} = 47.5 \text{ CFS}$$

CALCULATE ALLOWABLE RUNOFF:

$$Q_2 = (0.50) \times (0.42) \times (9.5 \text{ CFS}) + (0.58) \times (9.5 \text{ CFS}) = 7.5 \text{ CFS}$$

$$Q_{10} = (0.75) \times (0.42) \times (20.9 \text{ CFS}) + (0.58) \times (20.9 \text{ CFS}) = 18.7 \text{ CFS}$$

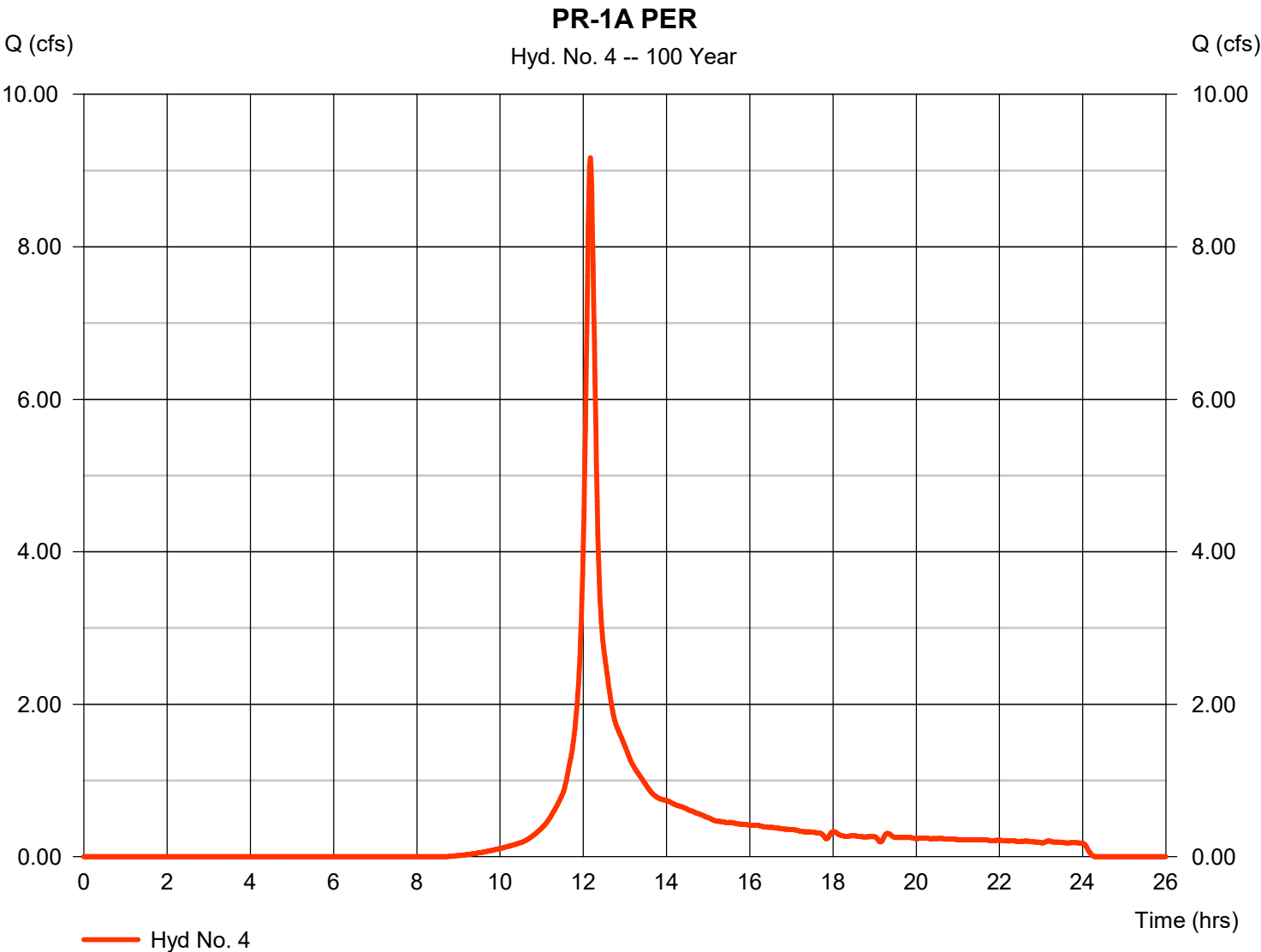
$$Q_{100} = (0.80) \times (0.42) \times (47.5 \text{ CFS}) + (0.58) \times (47.5 \text{ CFS}) = 43.5 \text{ CFS}$$

Hydrograph Report

Hyd. No. 4

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 9.167 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 33,966 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.40 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

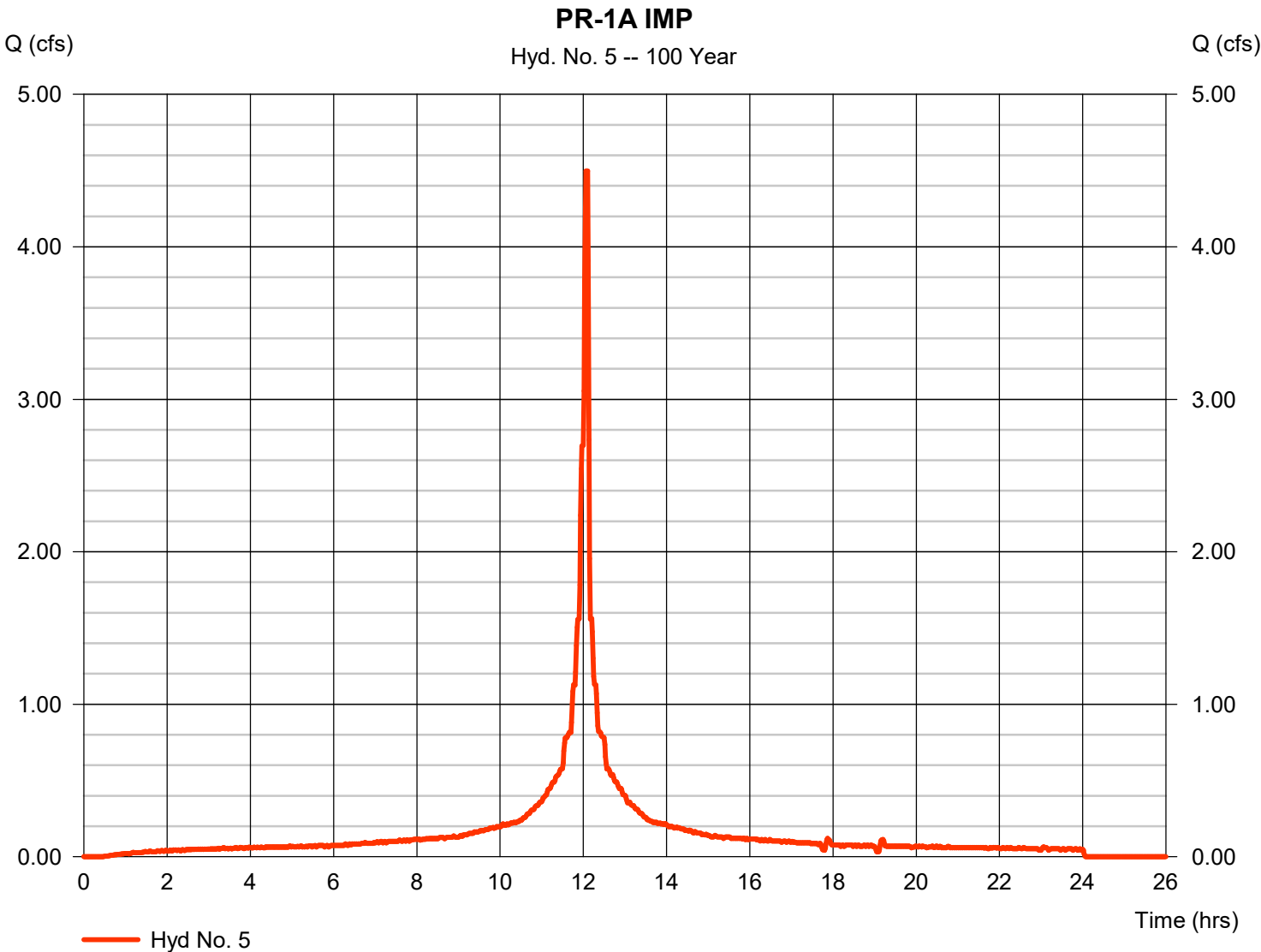


Hydrograph Report

Hyd. No. 5

PR-1A IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 4.498 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 15,112 cuft
Drainage area	= 0.520 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

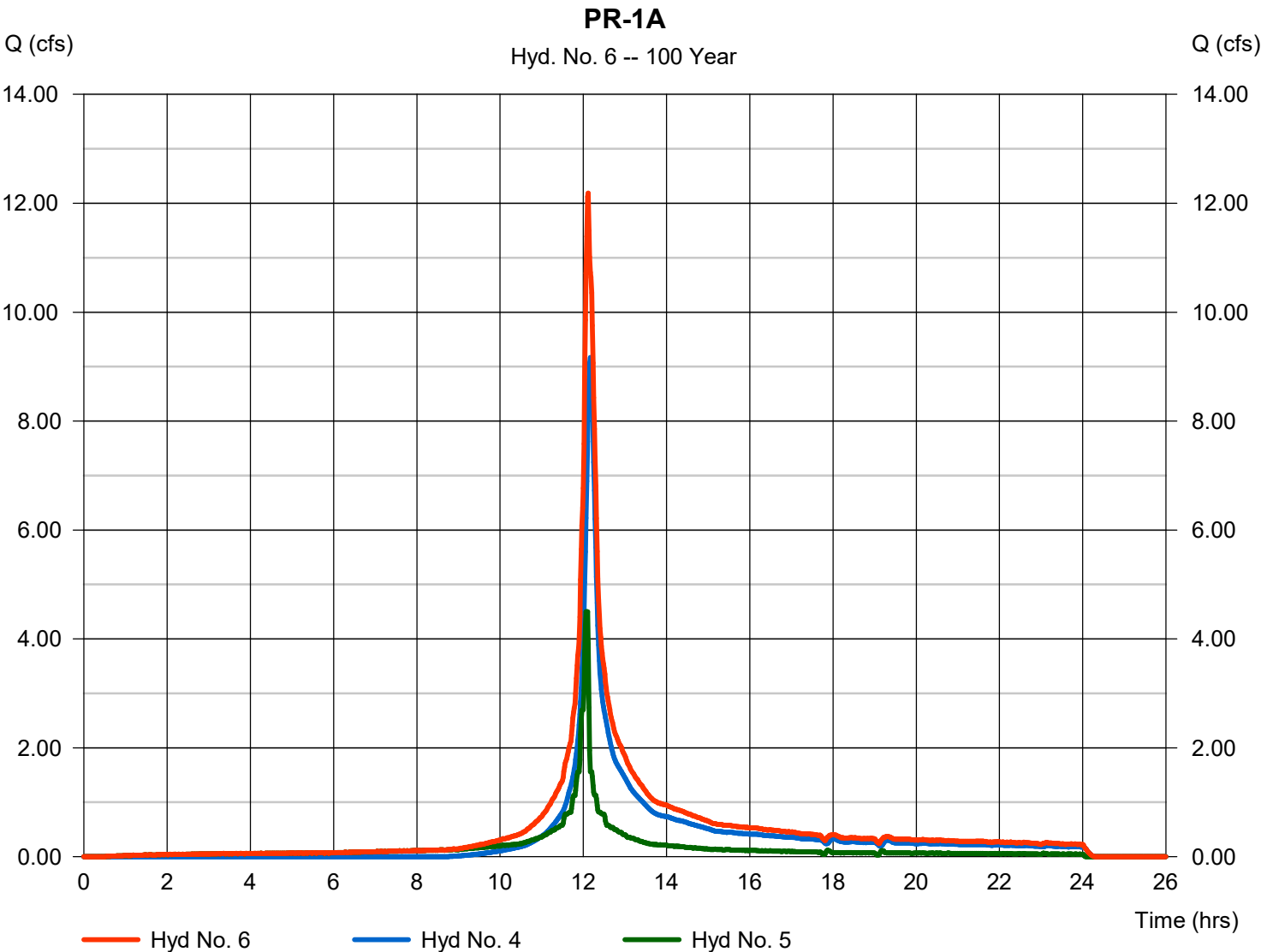


Hydrograph Report

Hyd. No. 6

PR-1A

Hydrograph type	= Combine	Peak discharge	= 12.19 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 49,078 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.790 ac

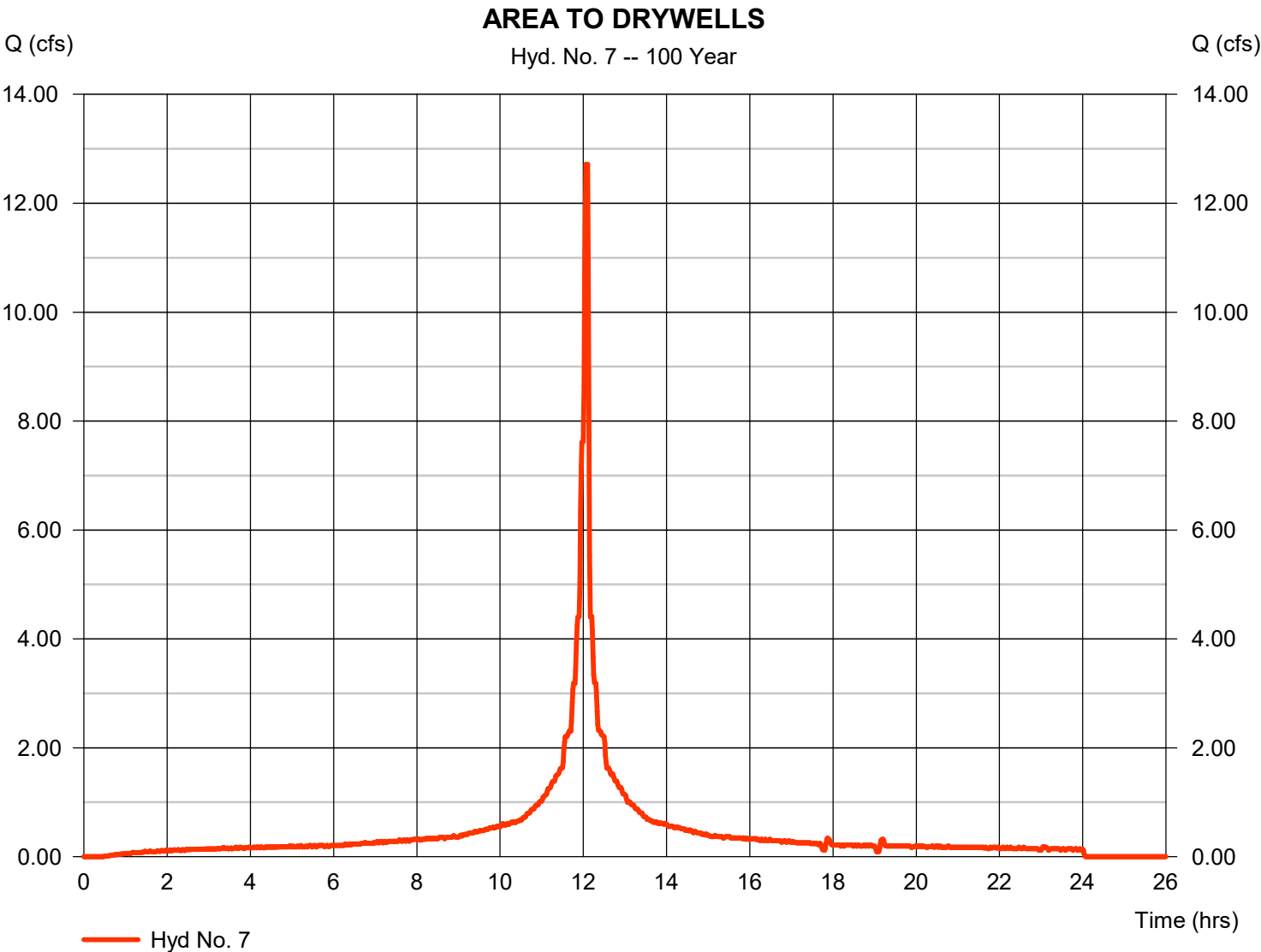


Hydrograph Report

Hyd. No. 7

AREA TO DRYWELLS

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.72 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	1 min	Hyd. volume	=	42,721 cuft
Drainage area	=	1.470 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	1.60 min
Total precip.	=	8.78 in	Distribution	=	Custom
Storm duration	=	H:\ADMIN\NOAA D.cds	Shape factor	=	484



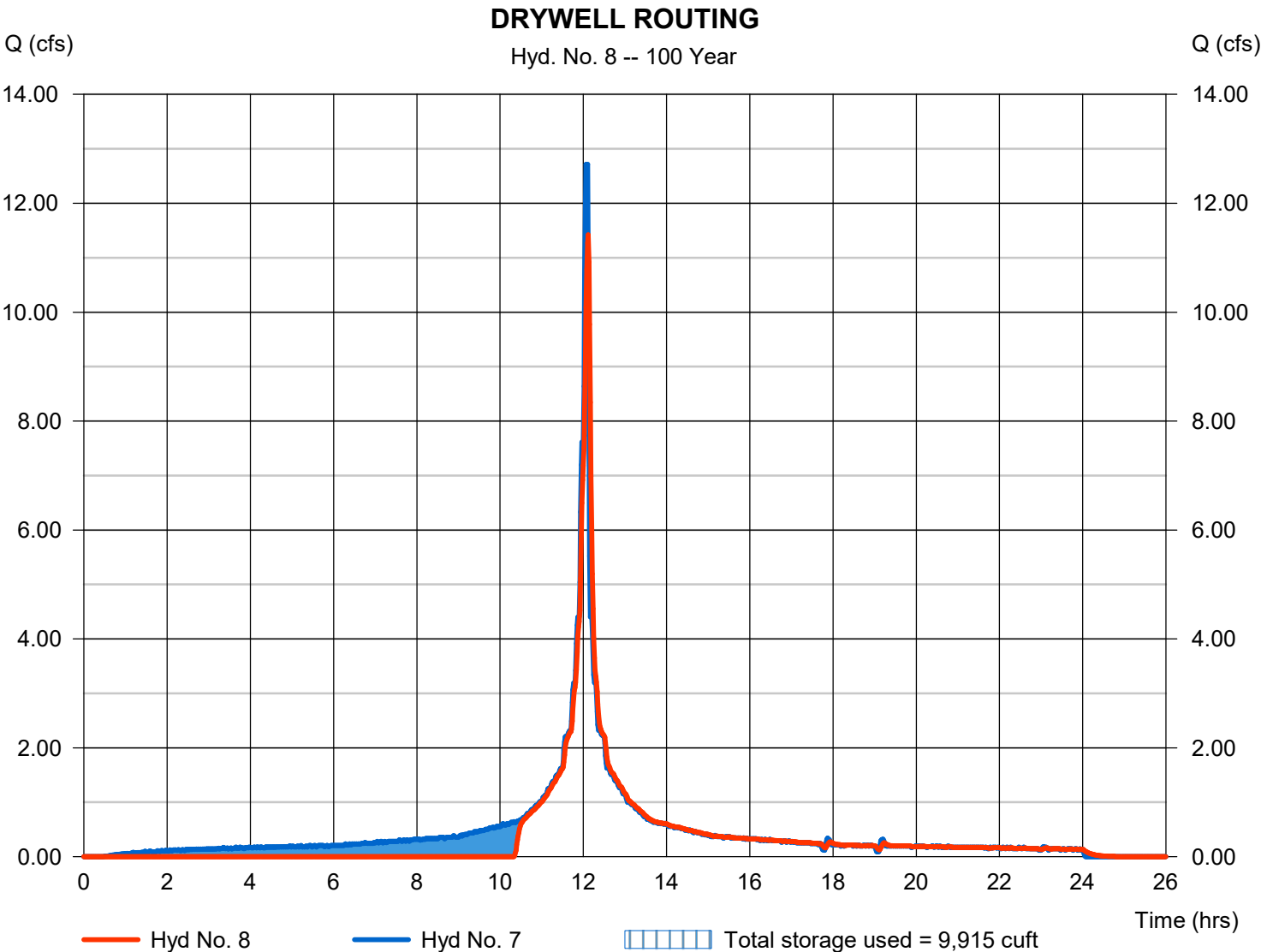
Hydrograph Report

Hyd. No. 8

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 11.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 34,452 cuft
Inflow hyd. No.	= 7 - AREA TO DRYWELLS	Max. Elevation	= 7.25 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 9,915 cuft

Storage Indication method used.

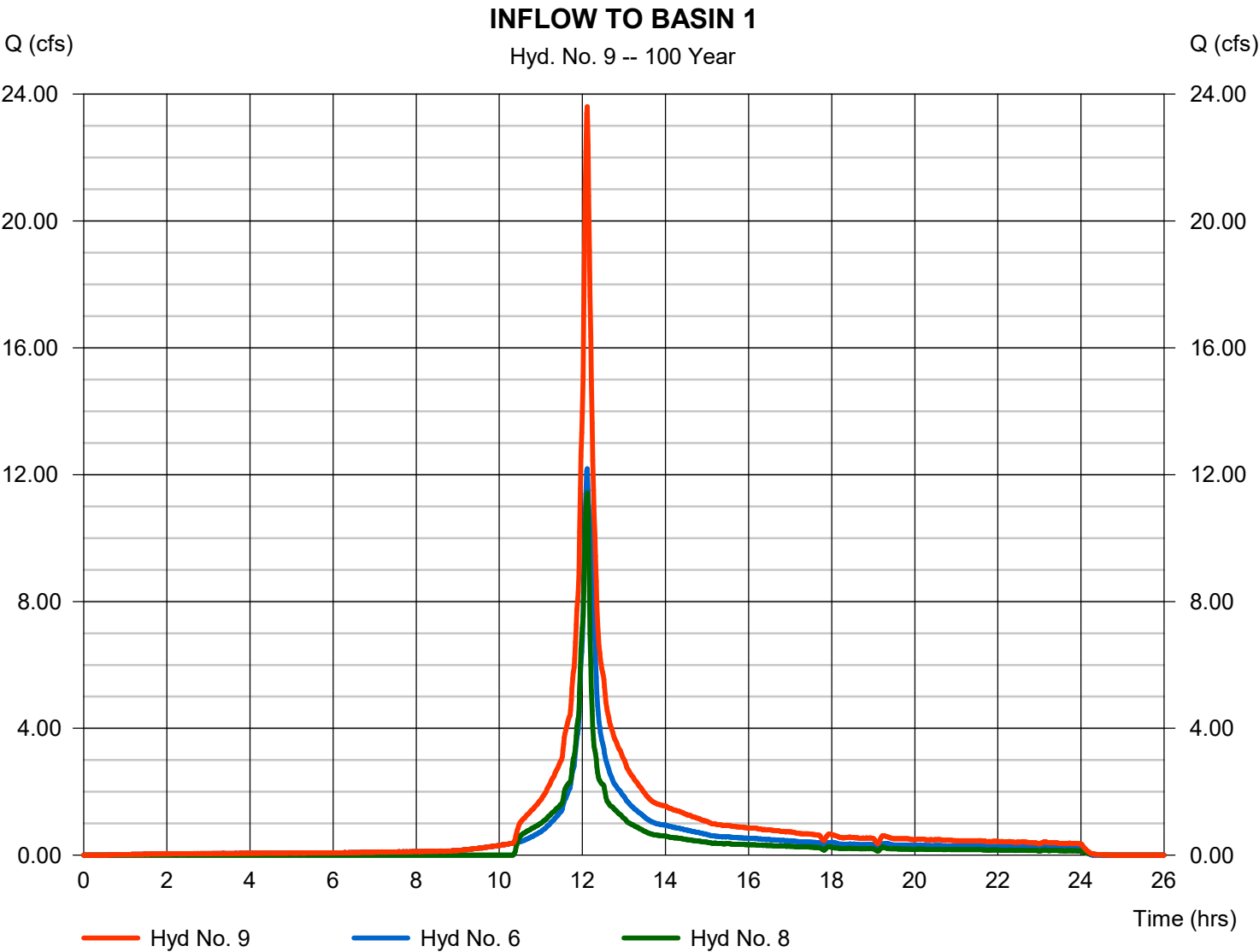


Hydrograph Report

Hyd. No. 9

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 23.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 83,530 cuft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 0.000 ac



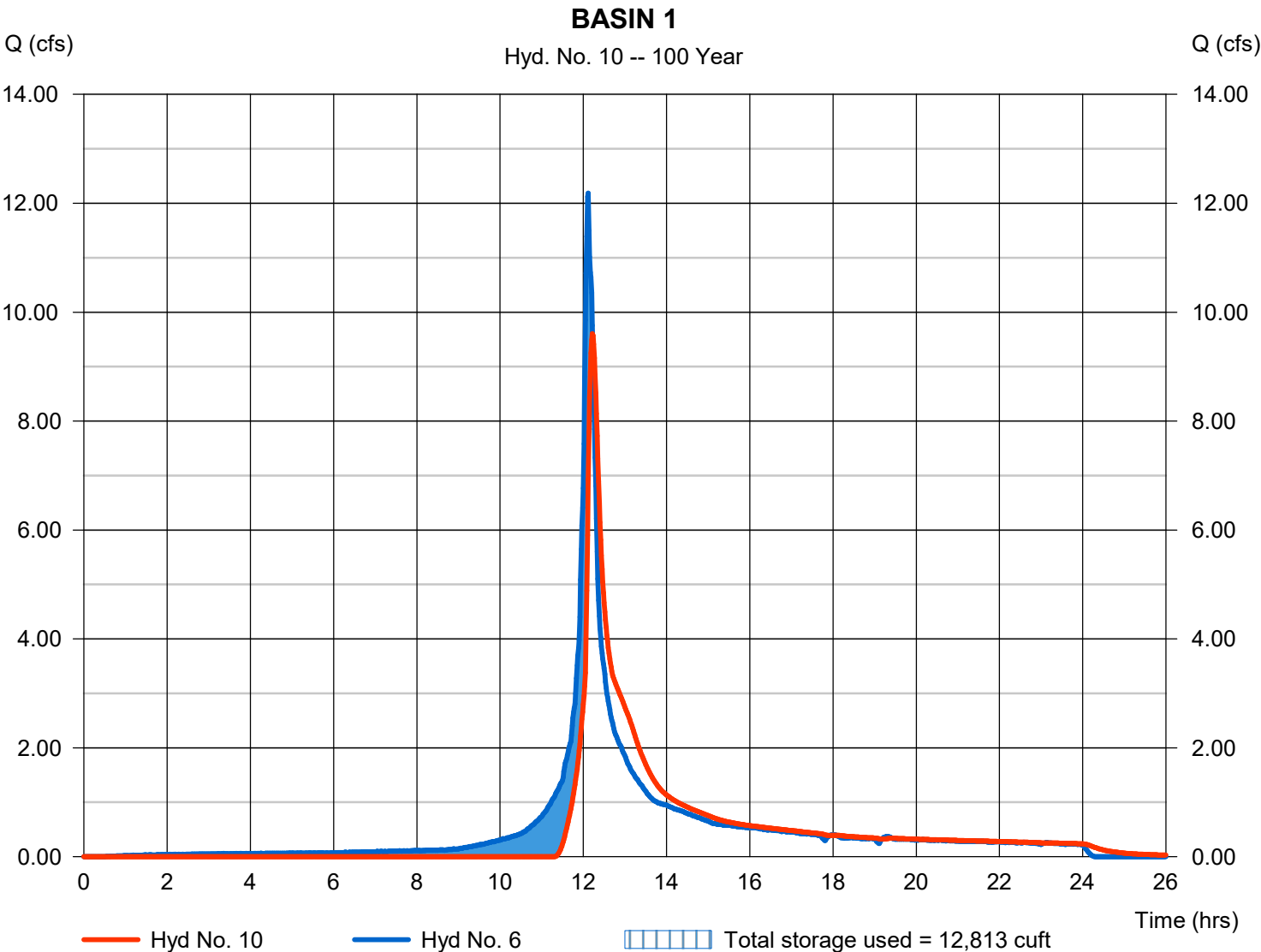
Hydrograph Report

Hyd. No. 10

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 9.607 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 43,487 cuft
Inflow hyd. No.	= 6 - PR-1A	Max. Elevation	= 816.84 ft
Reservoir name	= BASIN 1	Max. Storage	= 12,813 cuft

Storage Indication method used.

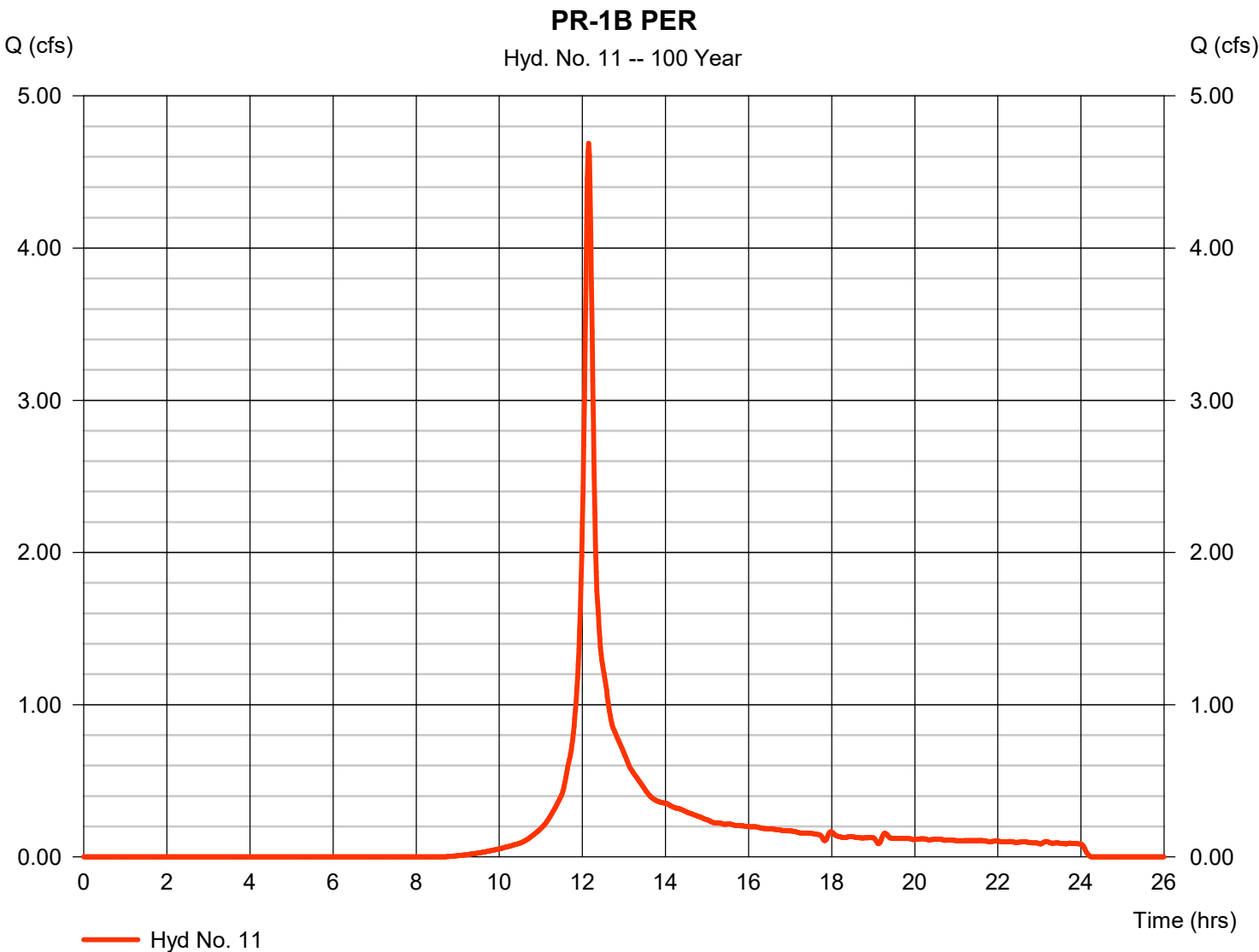


Hydrograph Report

Hyd. No. 11

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 4.688 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 16,317 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

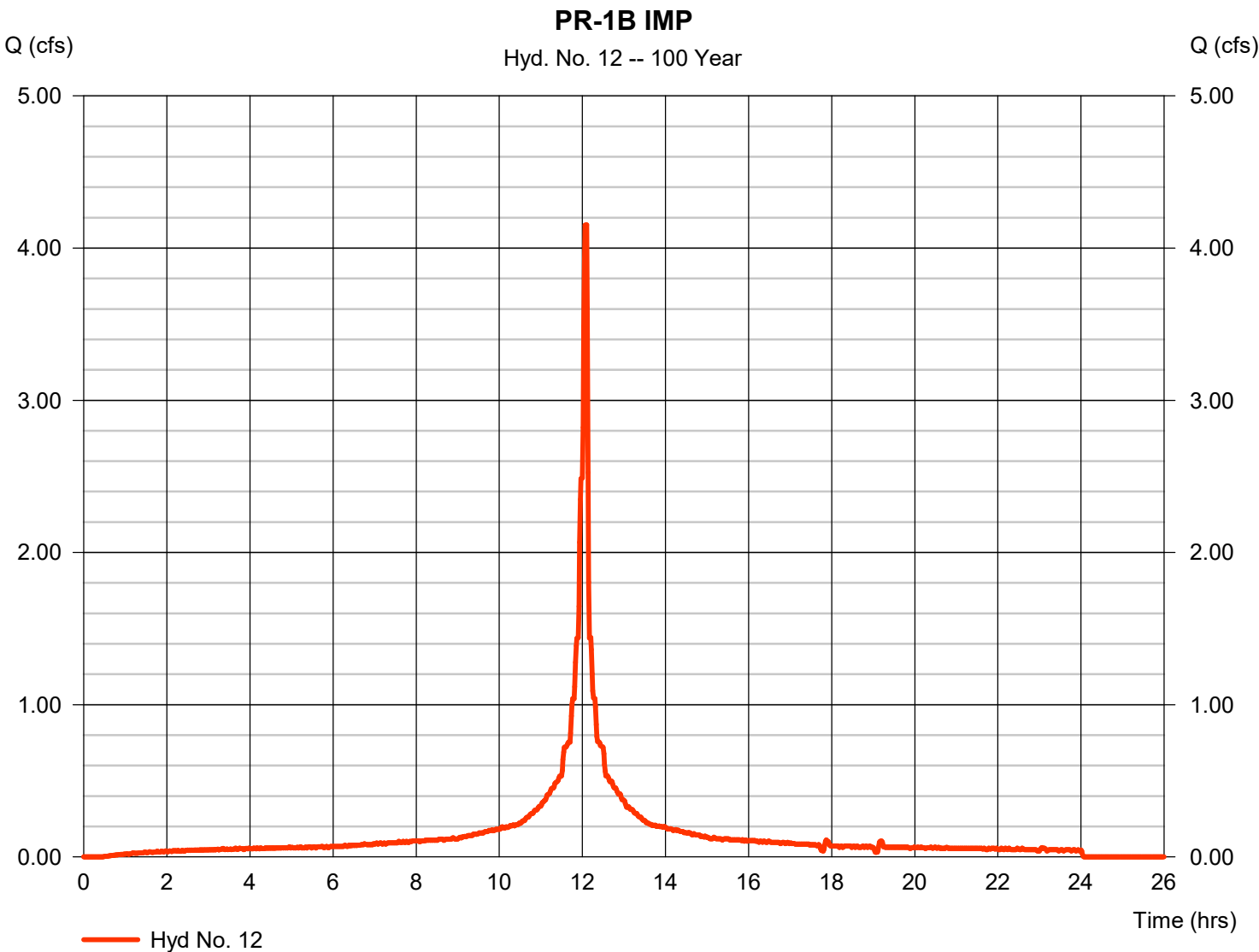


Hydrograph Report

Hyd. No. 12

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 4.152 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 13,950 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.90 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

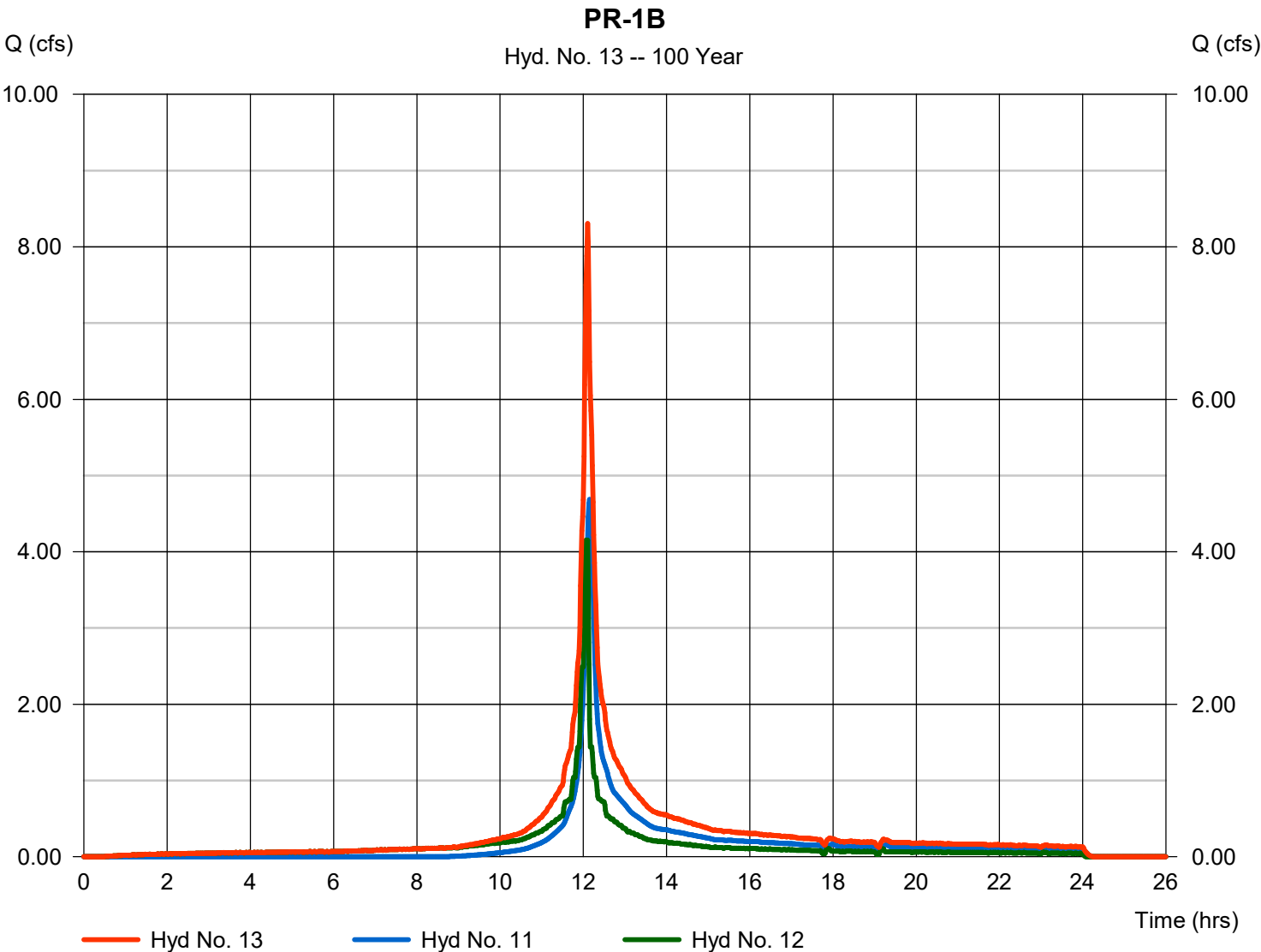


Hydrograph Report

Hyd. No. 13

PR-1B

Hydrograph type	= Combine	Peak discharge	= 8.304 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 30,267 cuft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 1.590 ac

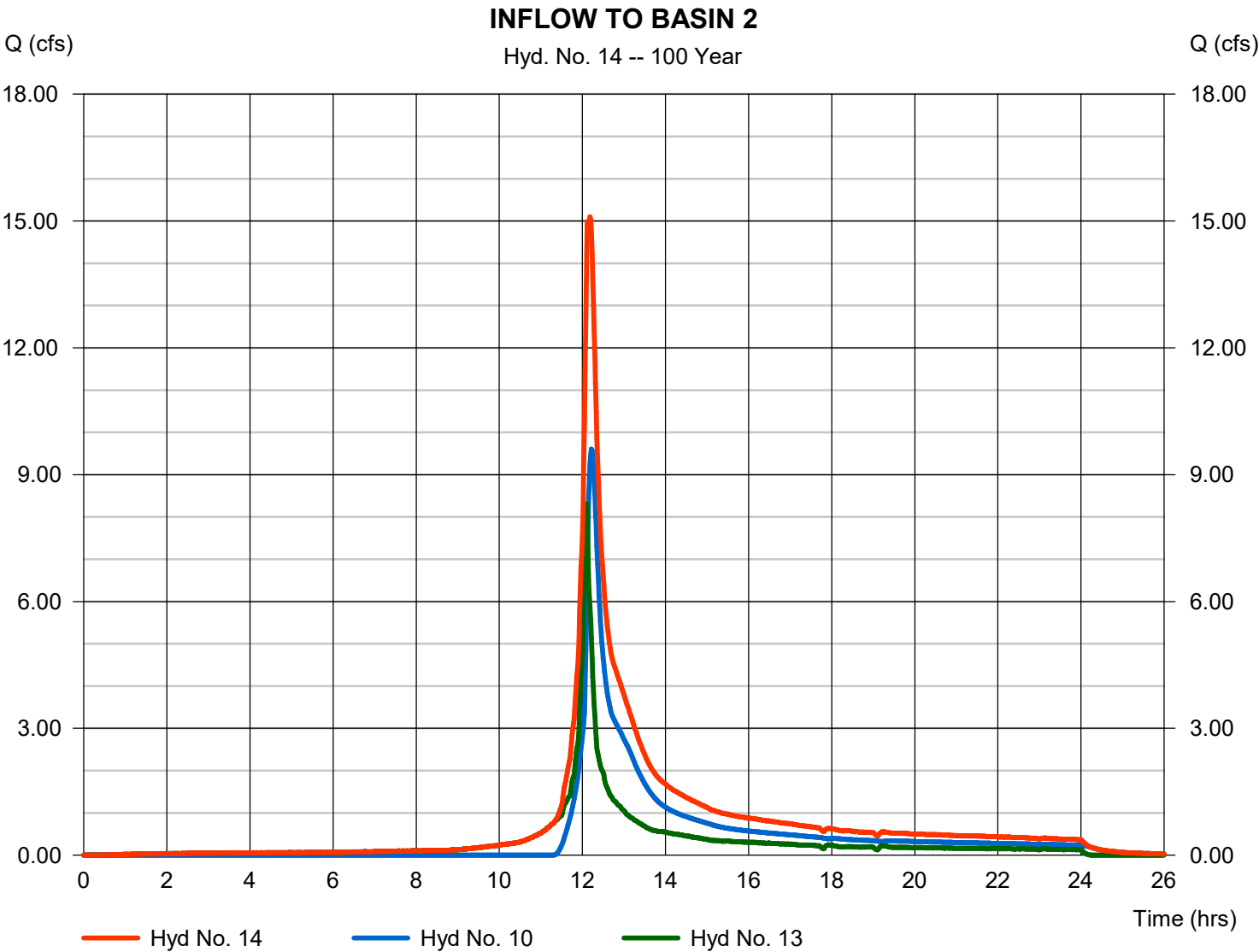


Hydrograph Report

Hyd. No. 14

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 15.10 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 73,754 cuft
Inflow hyds.	= 10, 13	Contrib. drain. area	= 0.000 ac



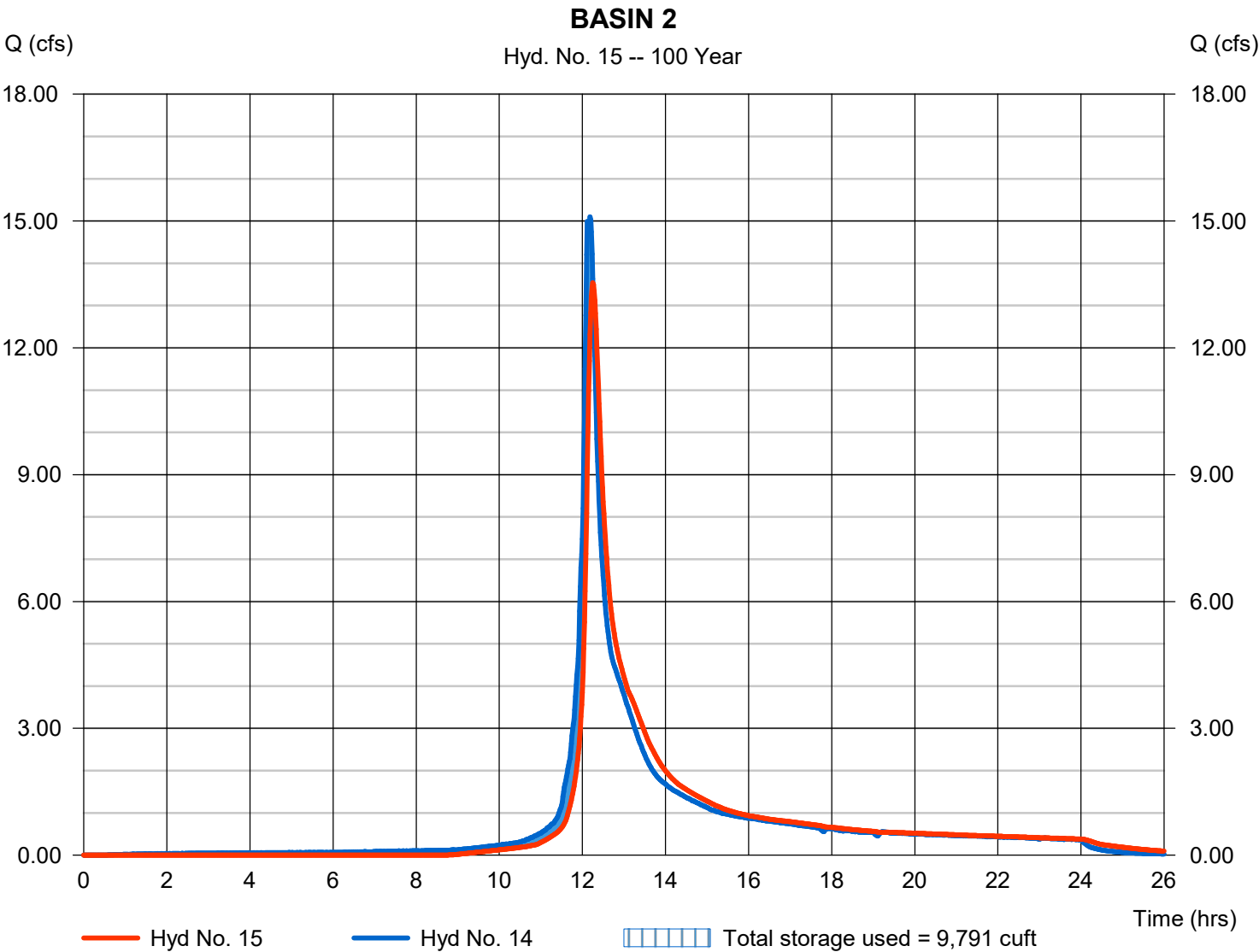
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 13.54 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 72,138 cuft
Inflow hyd. No.	= 14 - INFLOW TO BASIN 2	Max. Elevation	= 794.14 ft
Reservoir name	= BASIN 2	Max. Storage	= 9,791 cuft

Storage Indication method used.

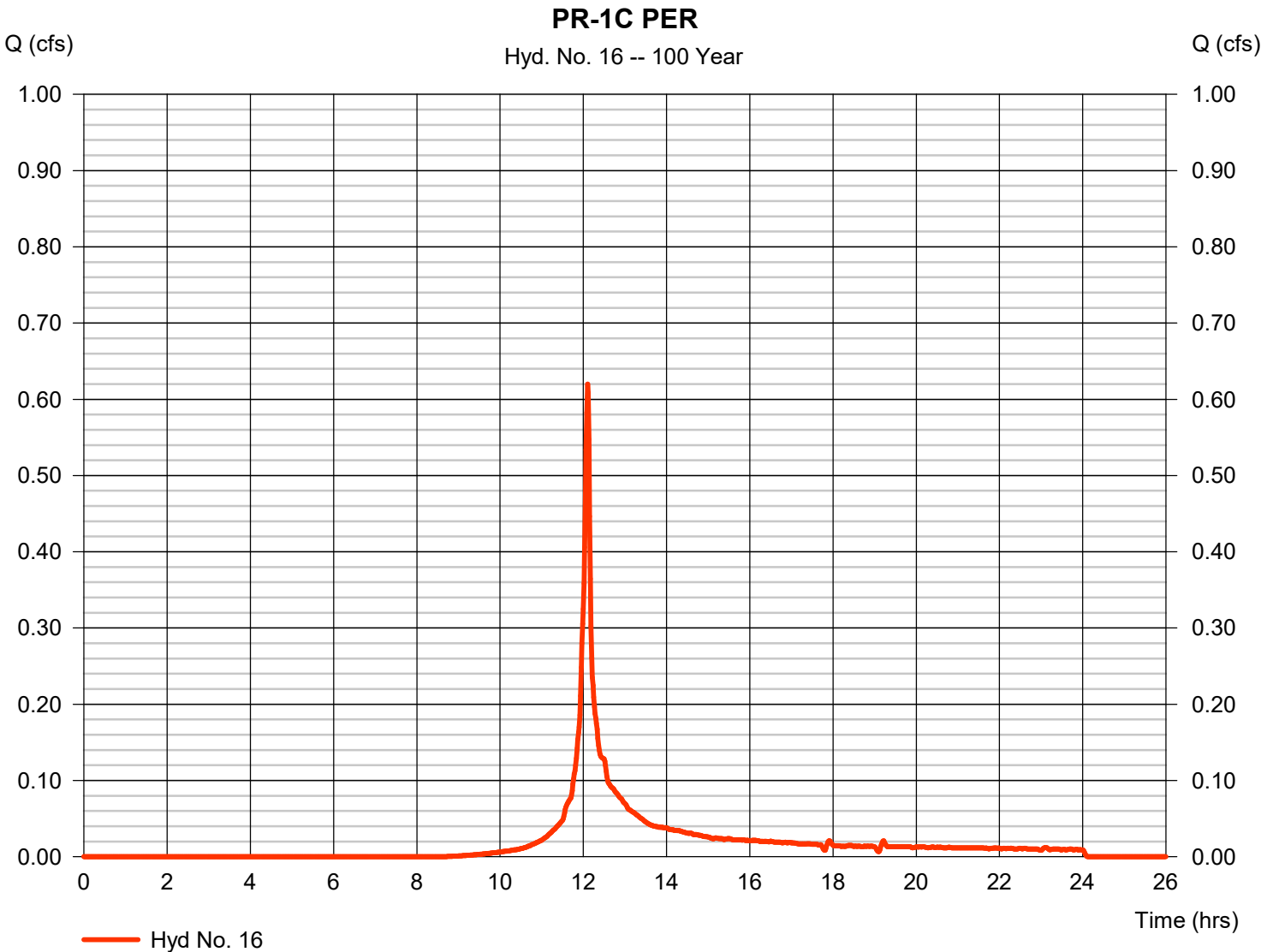


Hydrograph Report

Hyd. No. 16

PR-1C PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.620 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 1,764 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.30 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

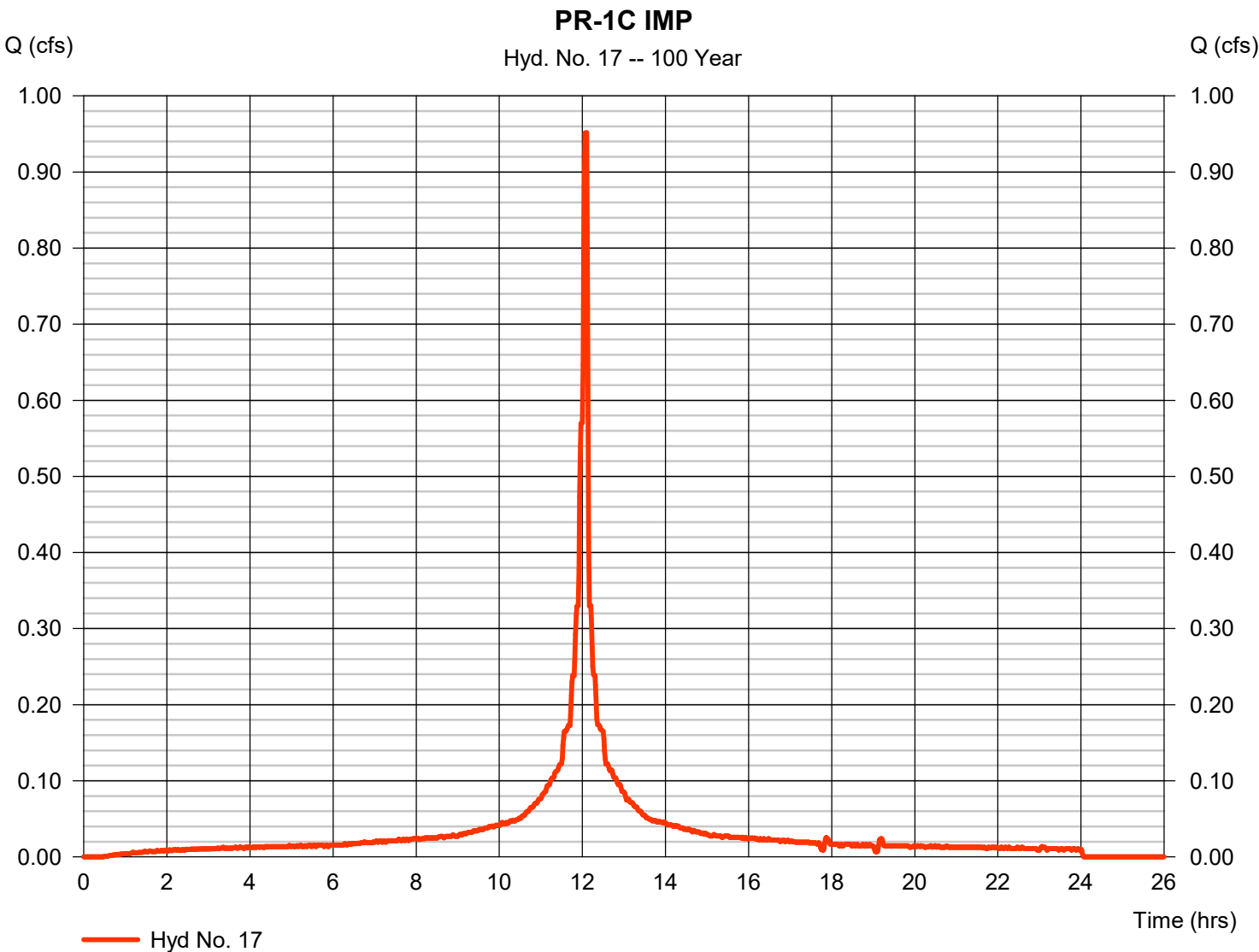


Hydrograph Report

Hyd. No. 17

PR-1C IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.952 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 3,197 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

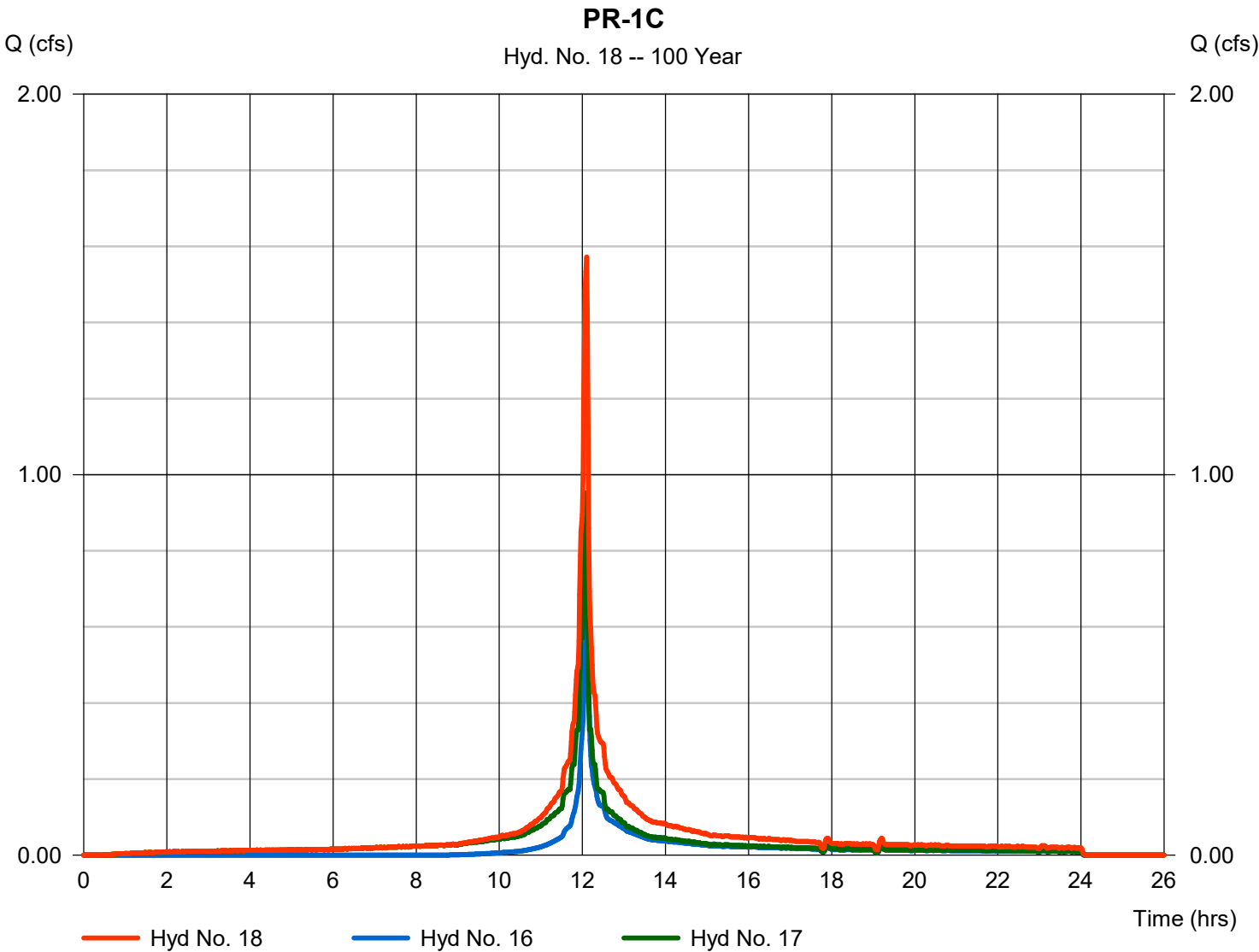


Hydrograph Report

Hyd. No. 18

PR-1C

Hydrograph type	= Combine	Peak discharge	= 1.572 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 4,961 cuft
Inflow hyds.	= 16, 17	Contrib. drain. area	= 0.230 ac

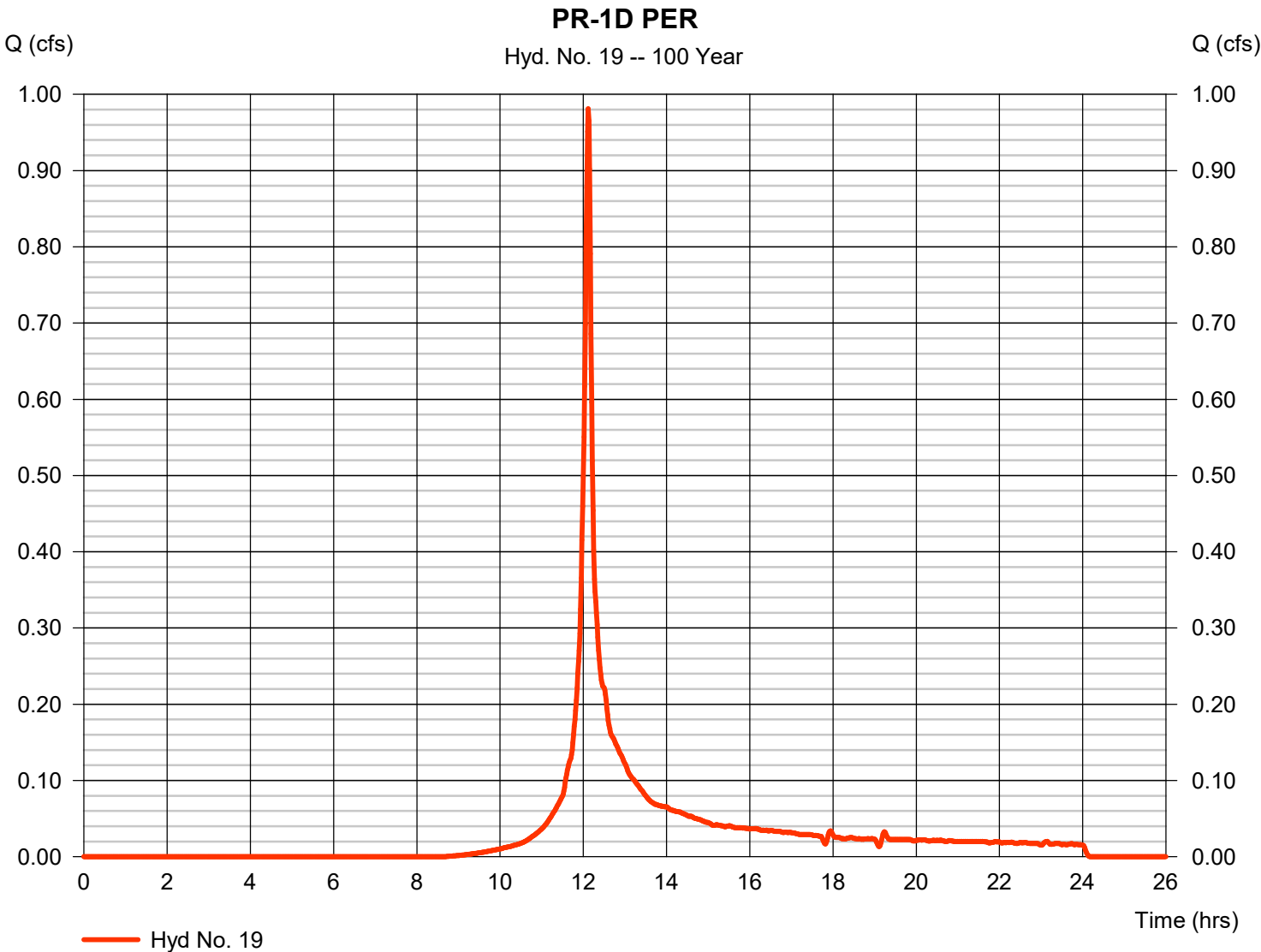


Hydrograph Report

Hyd. No. 19

PR-1D PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.981 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 3,032 cuft
Drainage area	= 0.200 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.50 min
Total precip.	= 8.78 in	Distribution	= Custom
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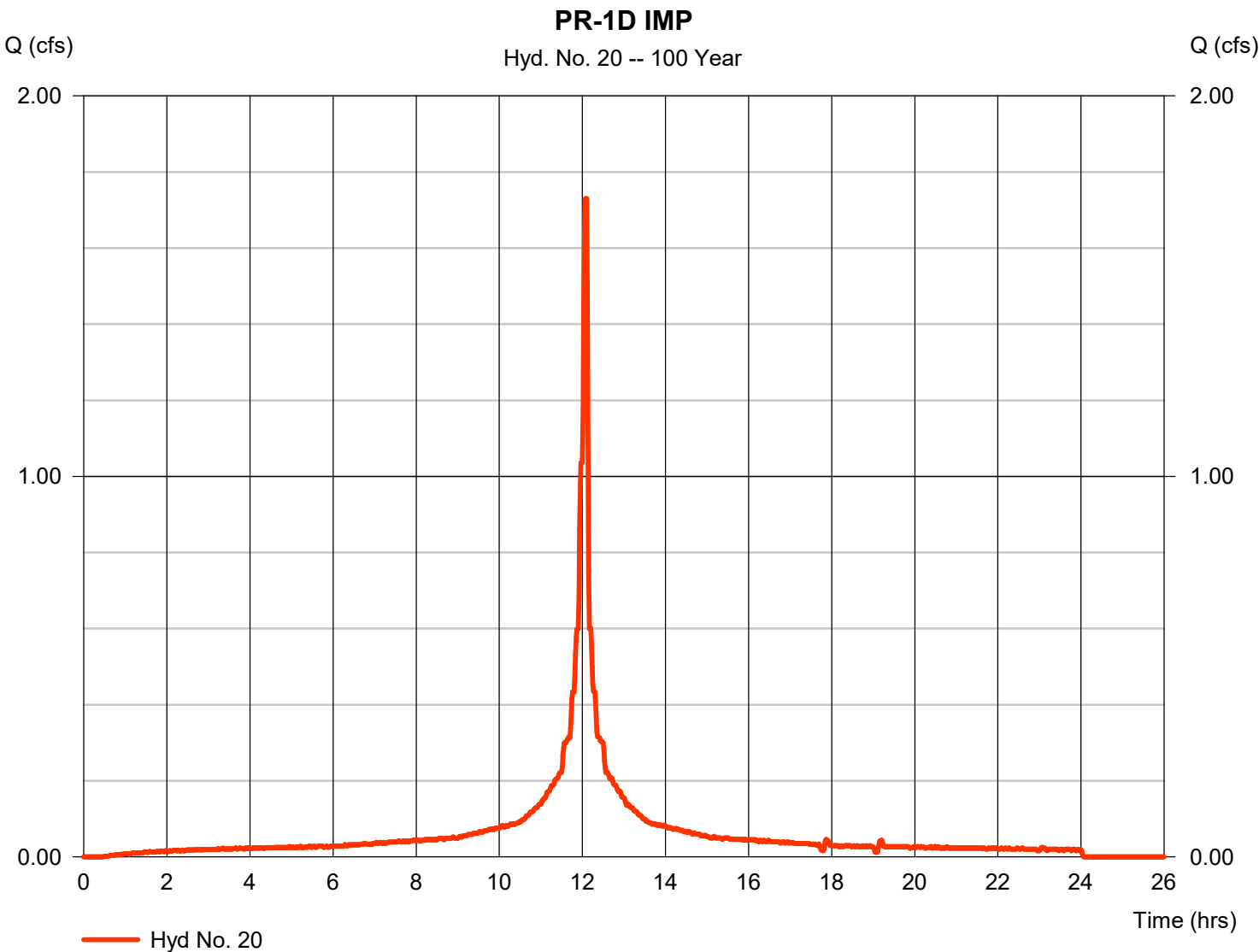


Hydrograph Report

Hyd. No. 20

PR-1D IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.730 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 5,812 cuft
Drainage area	= 0.200 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

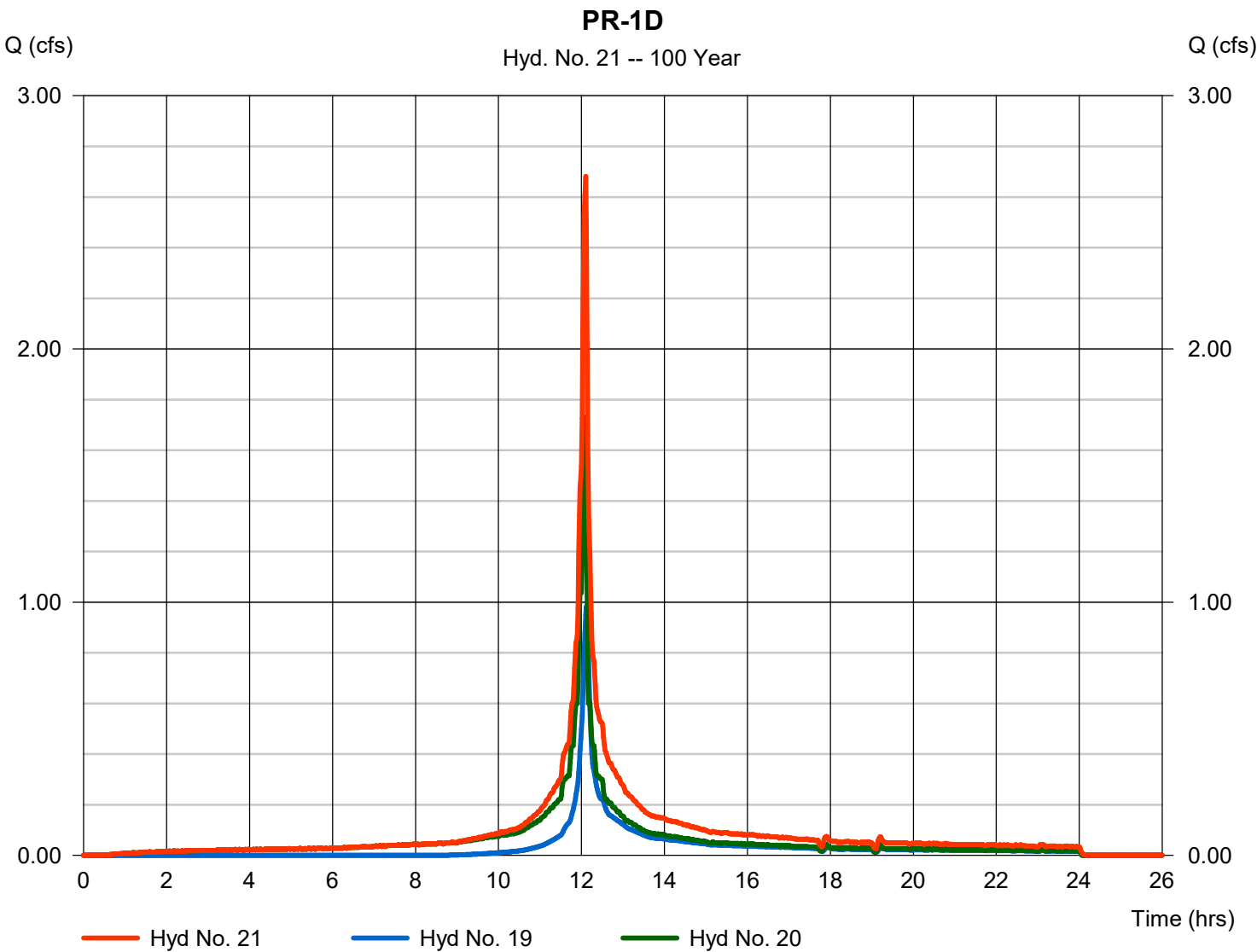


Hydrograph Report

Hyd. No. 21

PR-1D

Hydrograph type	= Combine	Peak discharge	= 2.682 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 8,844 cuft
Inflow hyds.	= 19, 20	Contrib. drain. area	= 0.400 ac

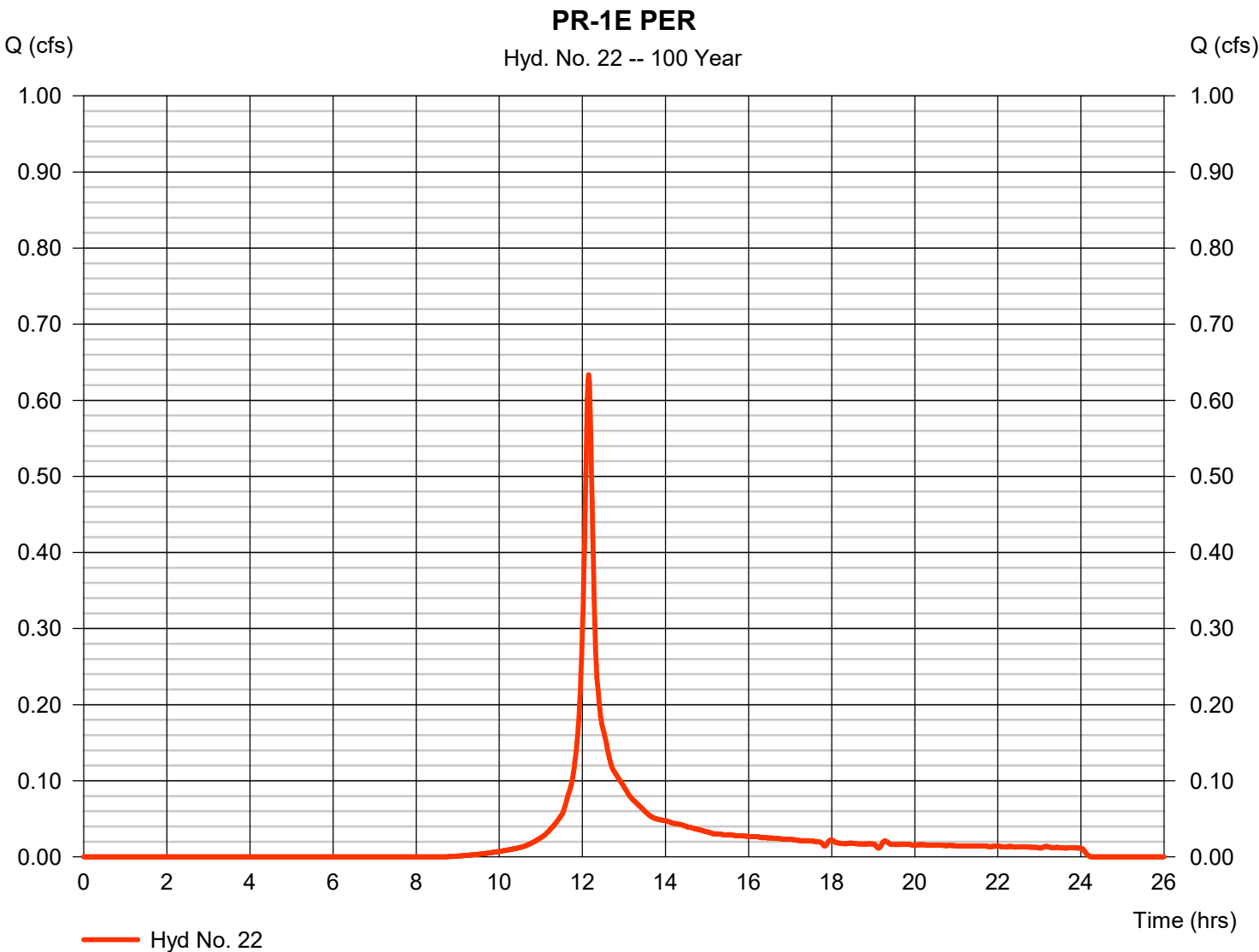


Hydrograph Report

Hyd. No. 22

PR-1E PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.633 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 2,205 cuft
Drainage area	= 0.150 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

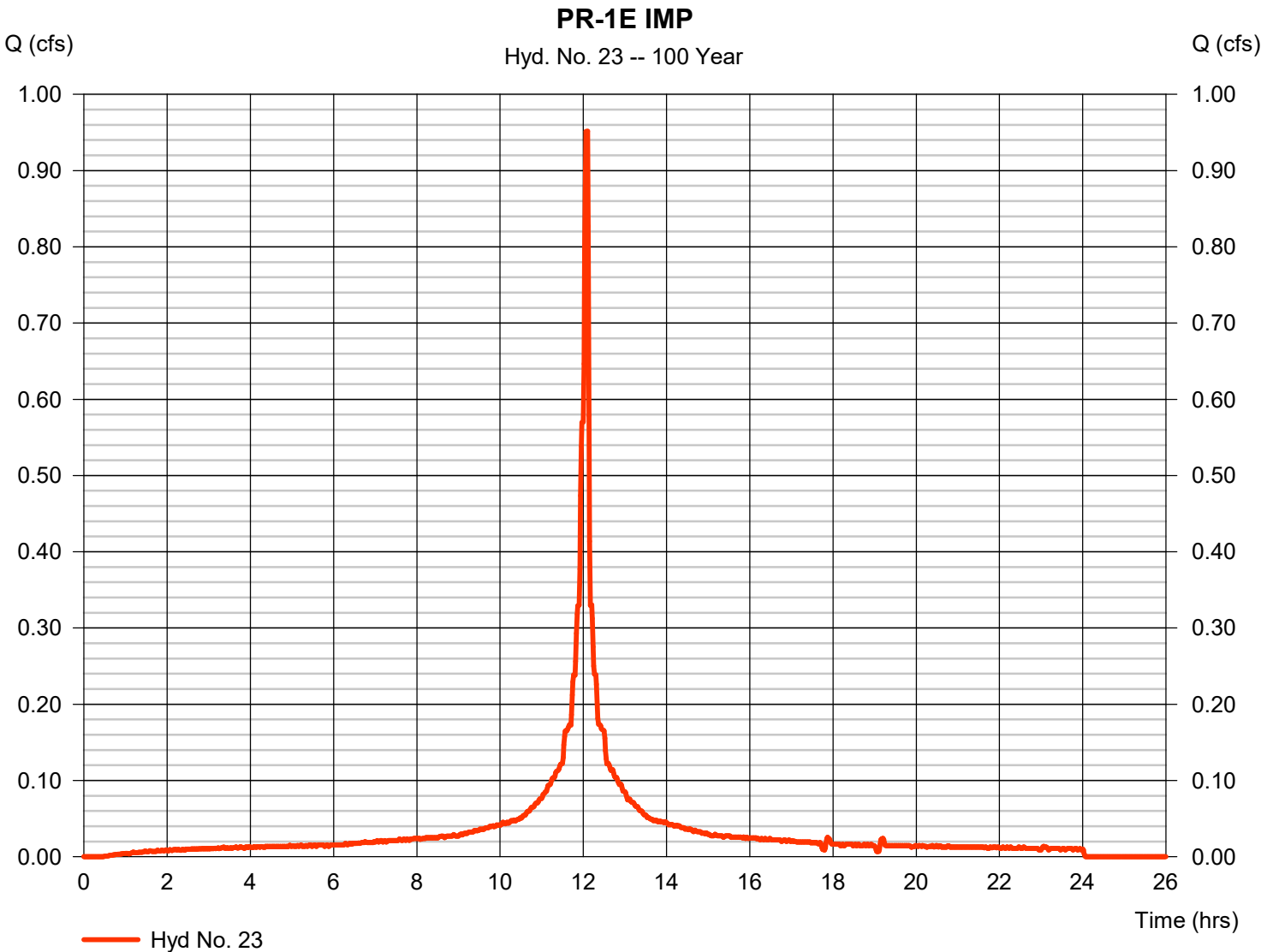


Hydrograph Report

Hyd. No. 23

PR-1E IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.952 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 3,197 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

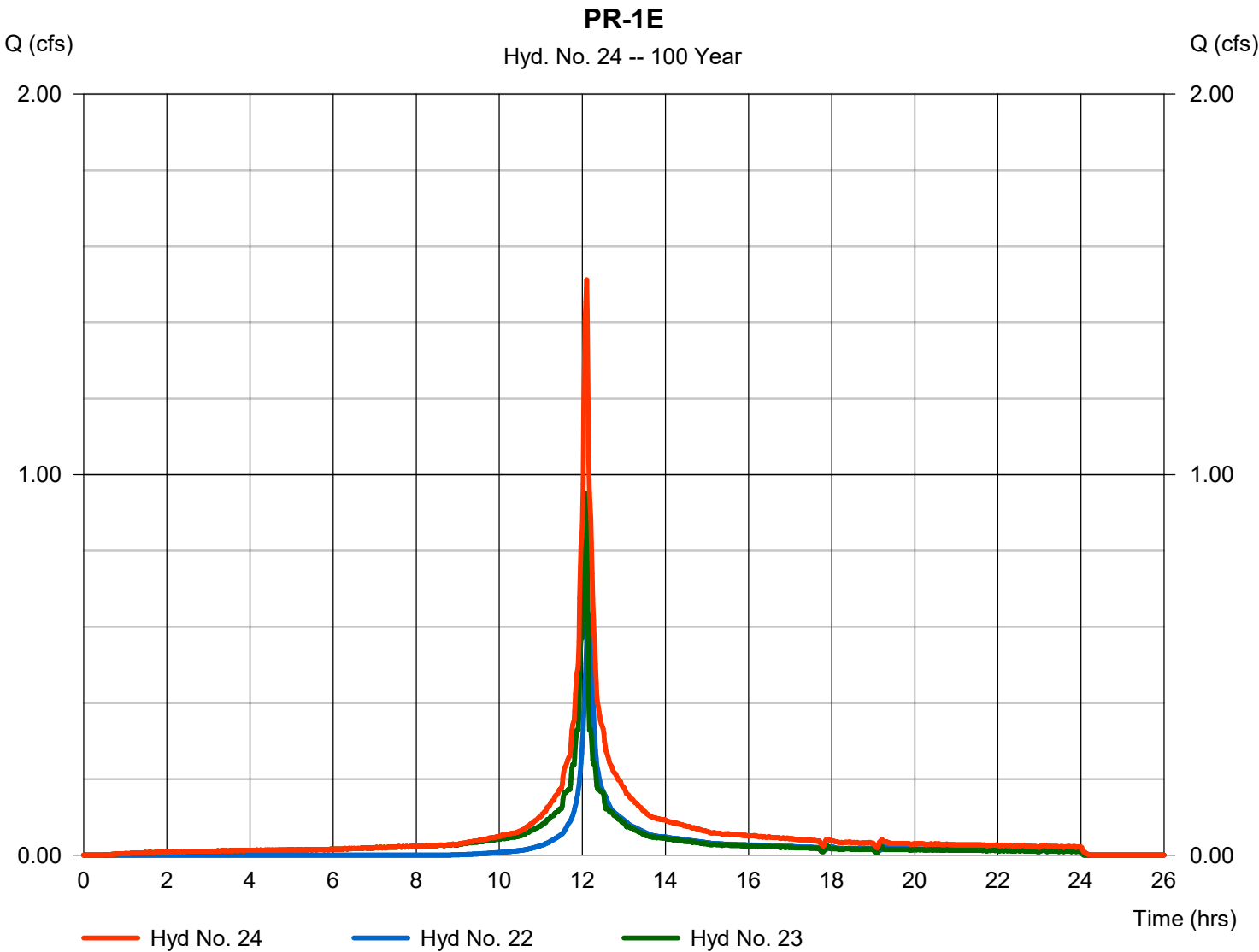


Hydrograph Report

Hyd. No. 24

PR-1E

Hydrograph type	= Combine	Peak discharge	= 1.513 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 5,402 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.260 ac

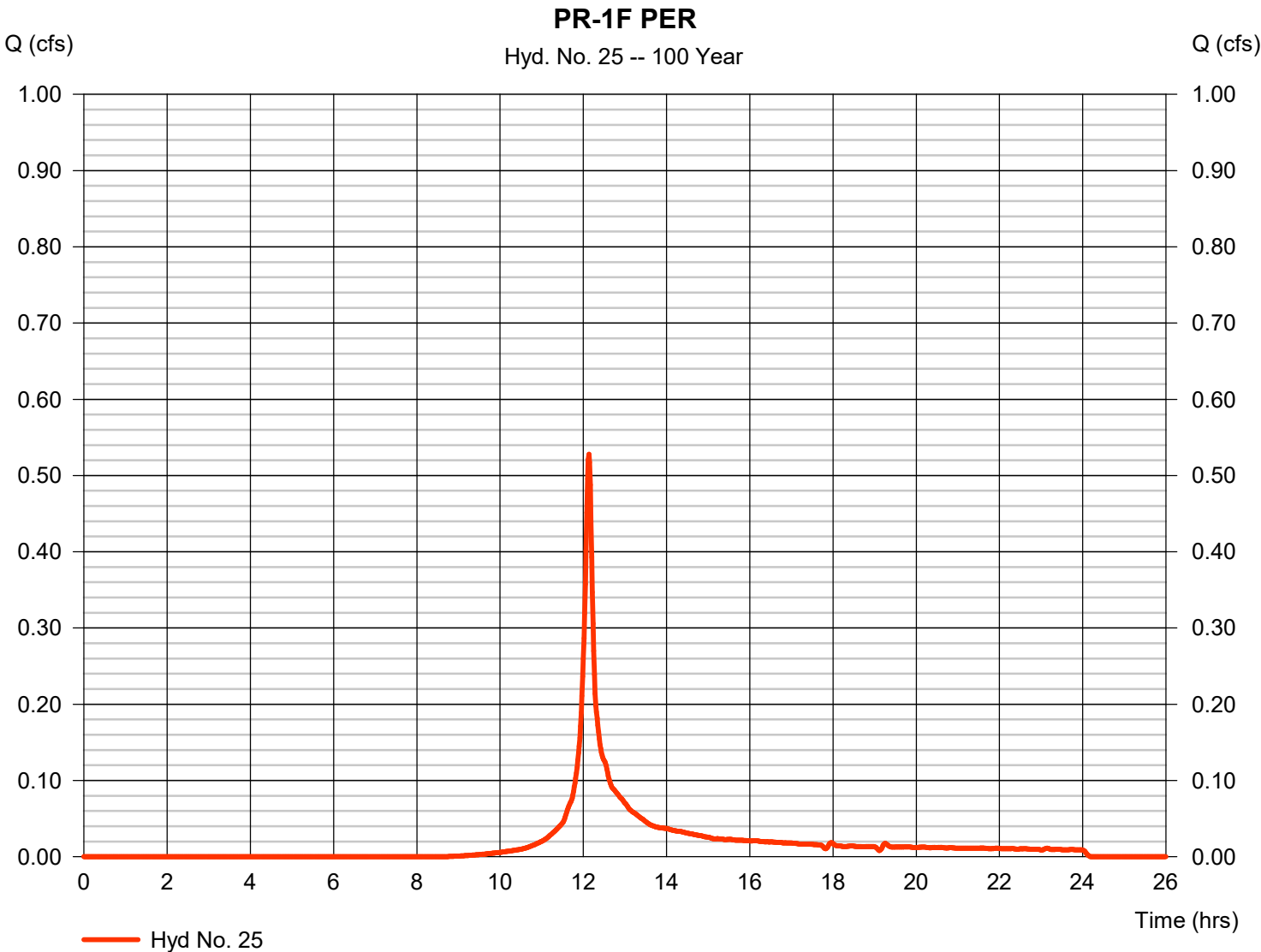


Hydrograph Report

Hyd. No. 25

PR-1F PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.528 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 1,720 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.30 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

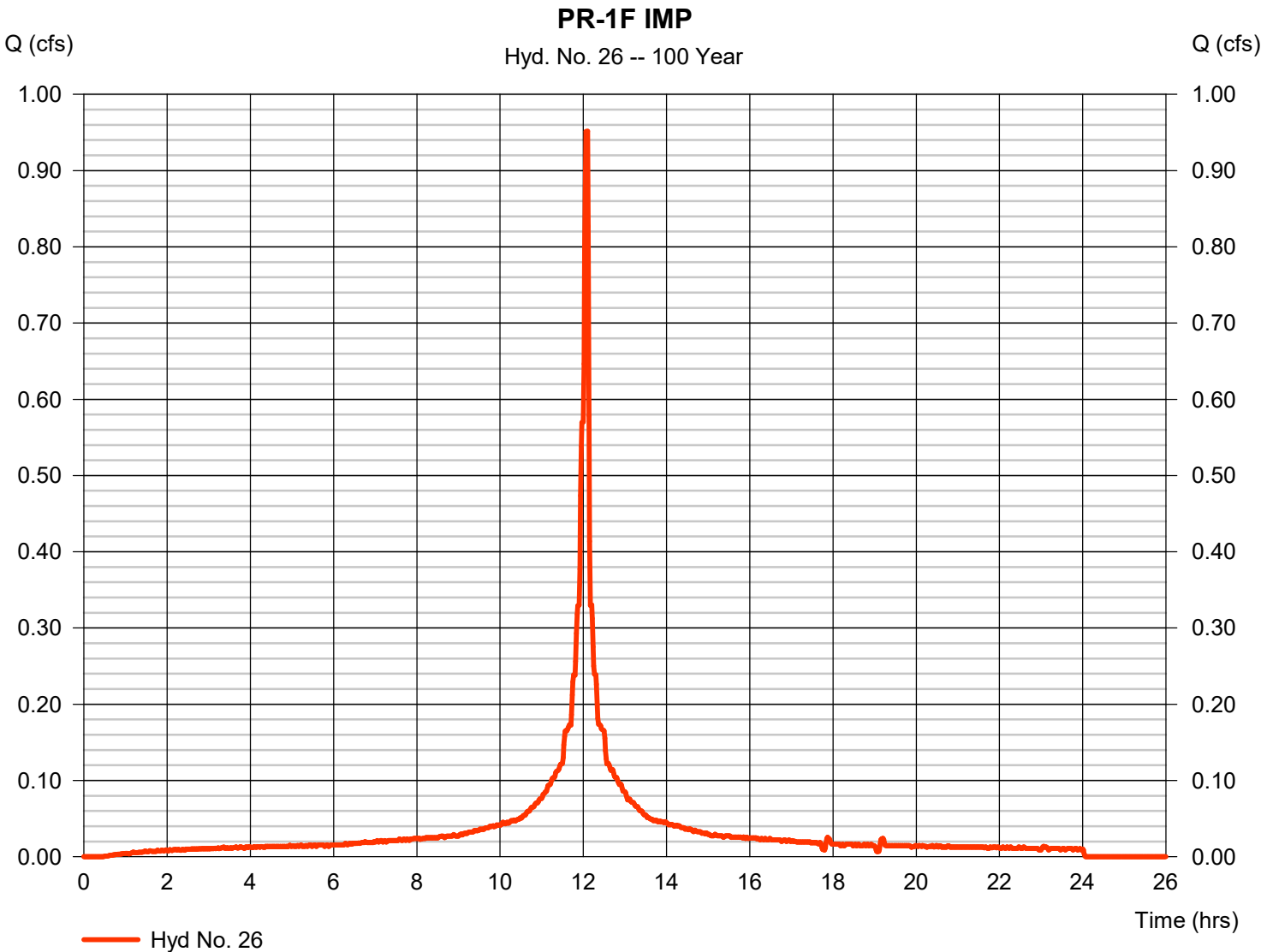


Hydrograph Report

Hyd. No. 26

PR-1F IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.952 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 3,197 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

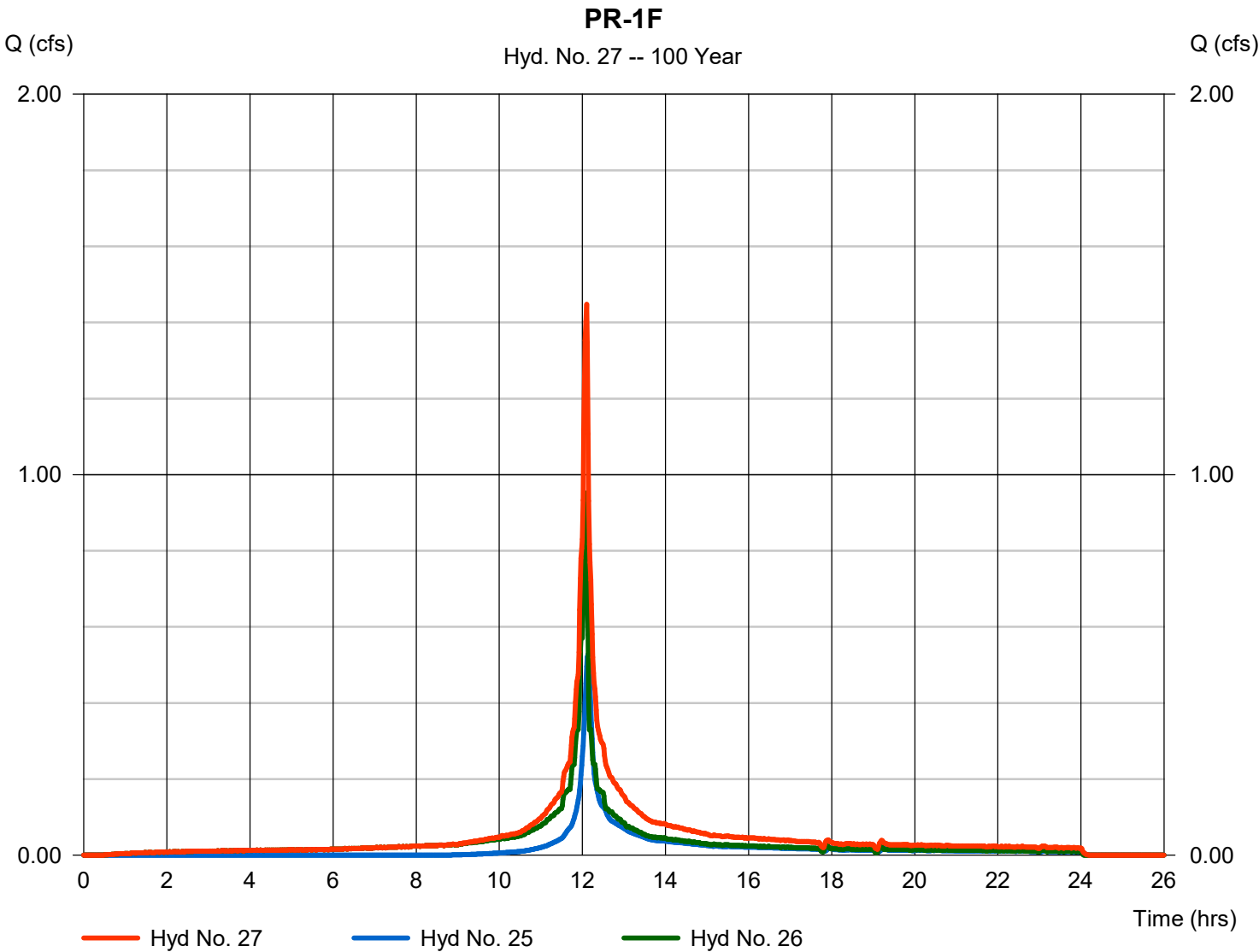


Hydrograph Report

Hyd. No. 27

PR-1F

Hydrograph type	= Combine	Peak discharge	= 1.447 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 4,917 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 0.230 ac

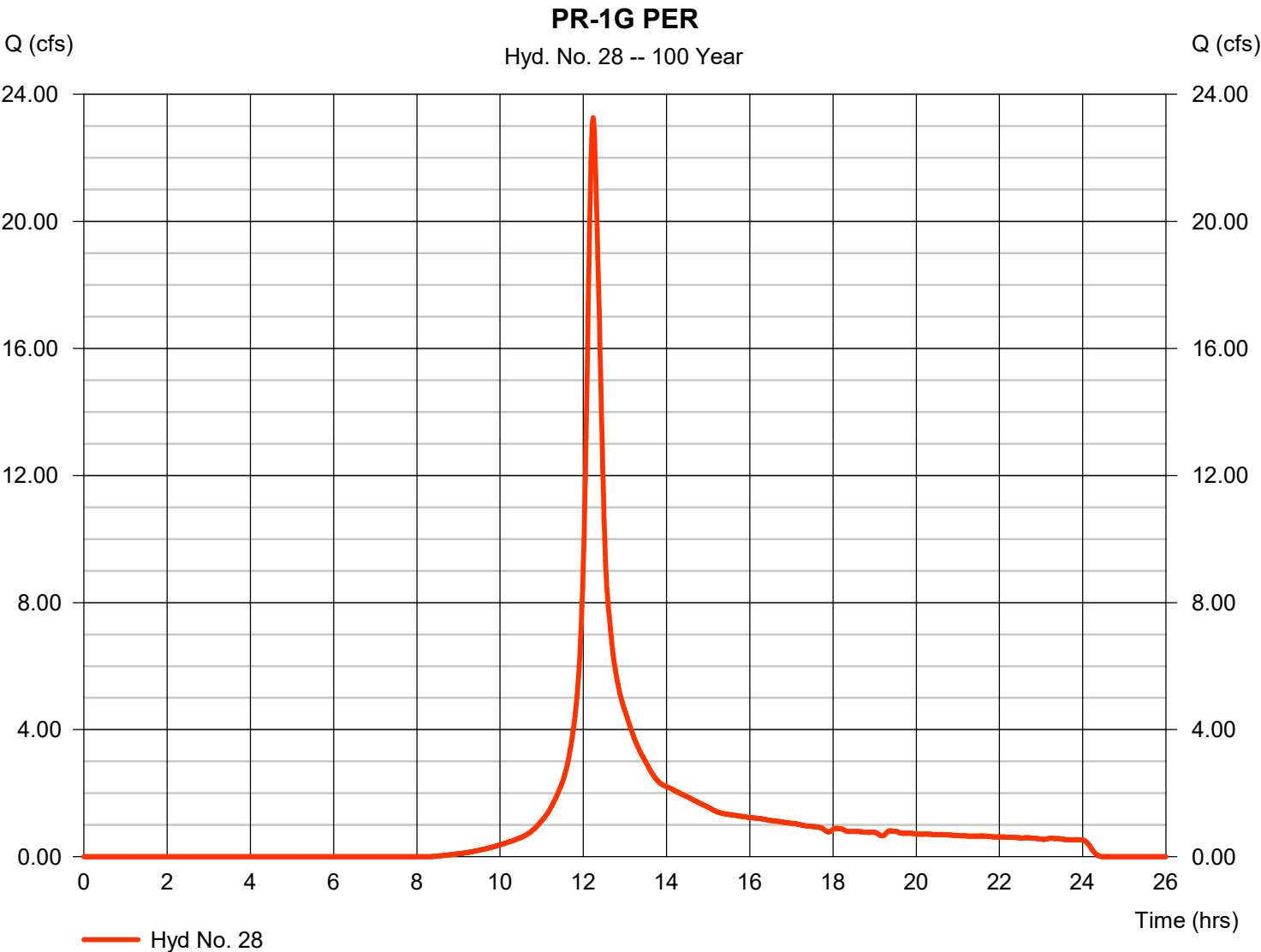


Hydrograph Report

Hyd. No. 28

PR-1G PER

Hydrograph type	= SCS Runoff	Peak discharge	= 23.27 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 102,263 cuft
Drainage area	= 6.640 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.20 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

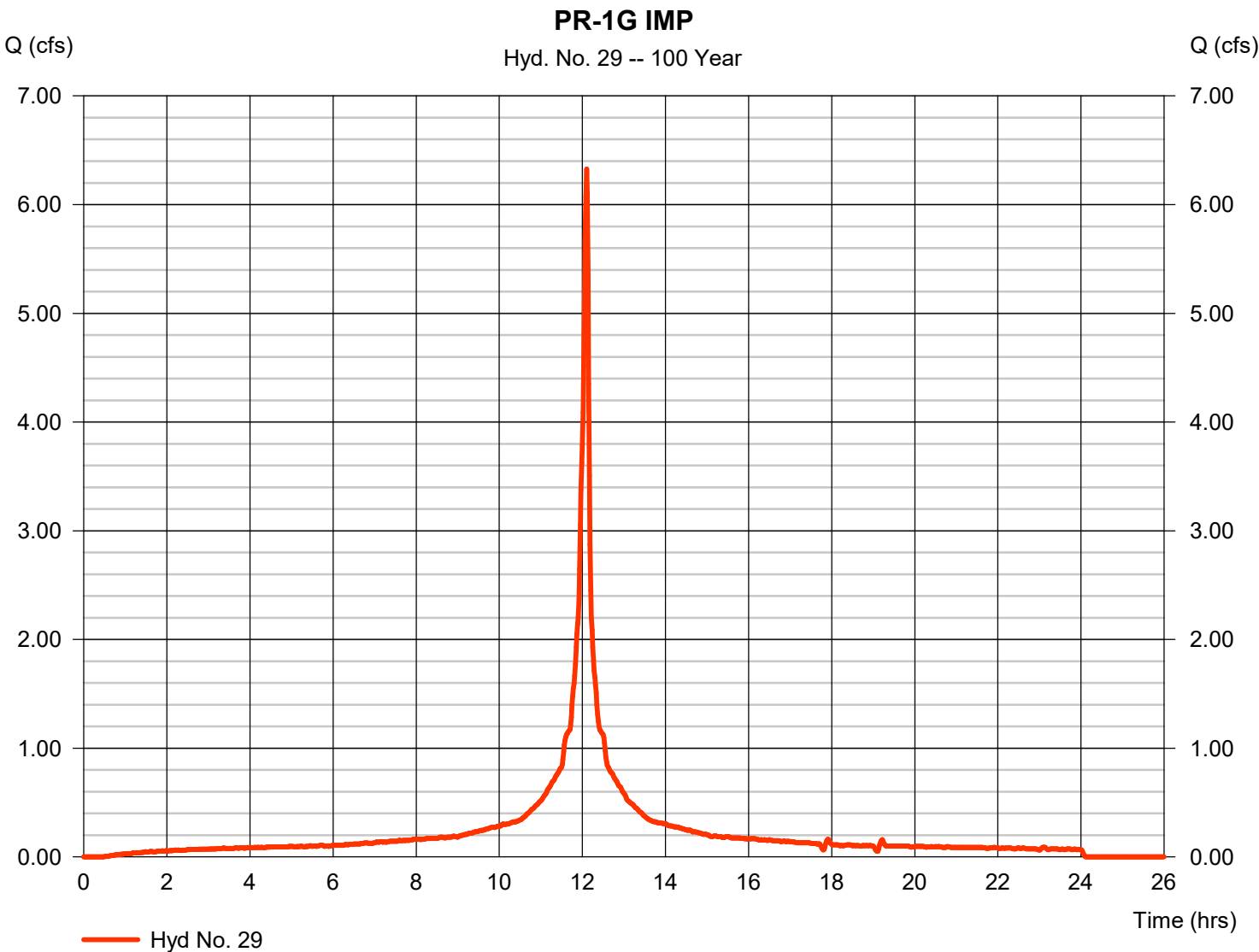


Hydrograph Report

Hyd. No. 29

PR-1G IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 6.328 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 21,699 cuft
Drainage area	= 0.700 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 8.78 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

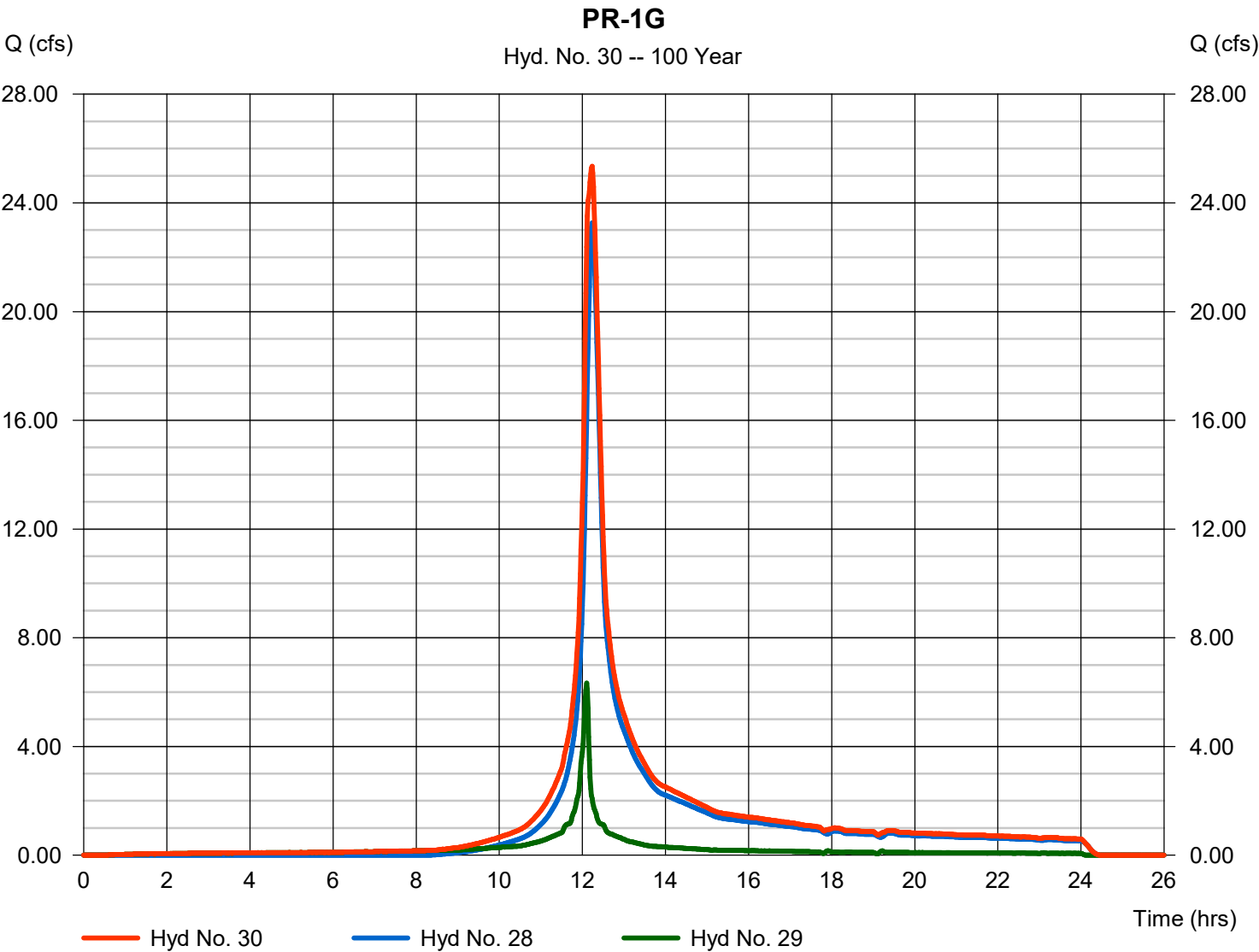


Hydrograph Report

Hyd. No. 30

PR-1G

Hydrograph type	= Combine	Peak discharge	= 25.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 123,962 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 7.340 ac

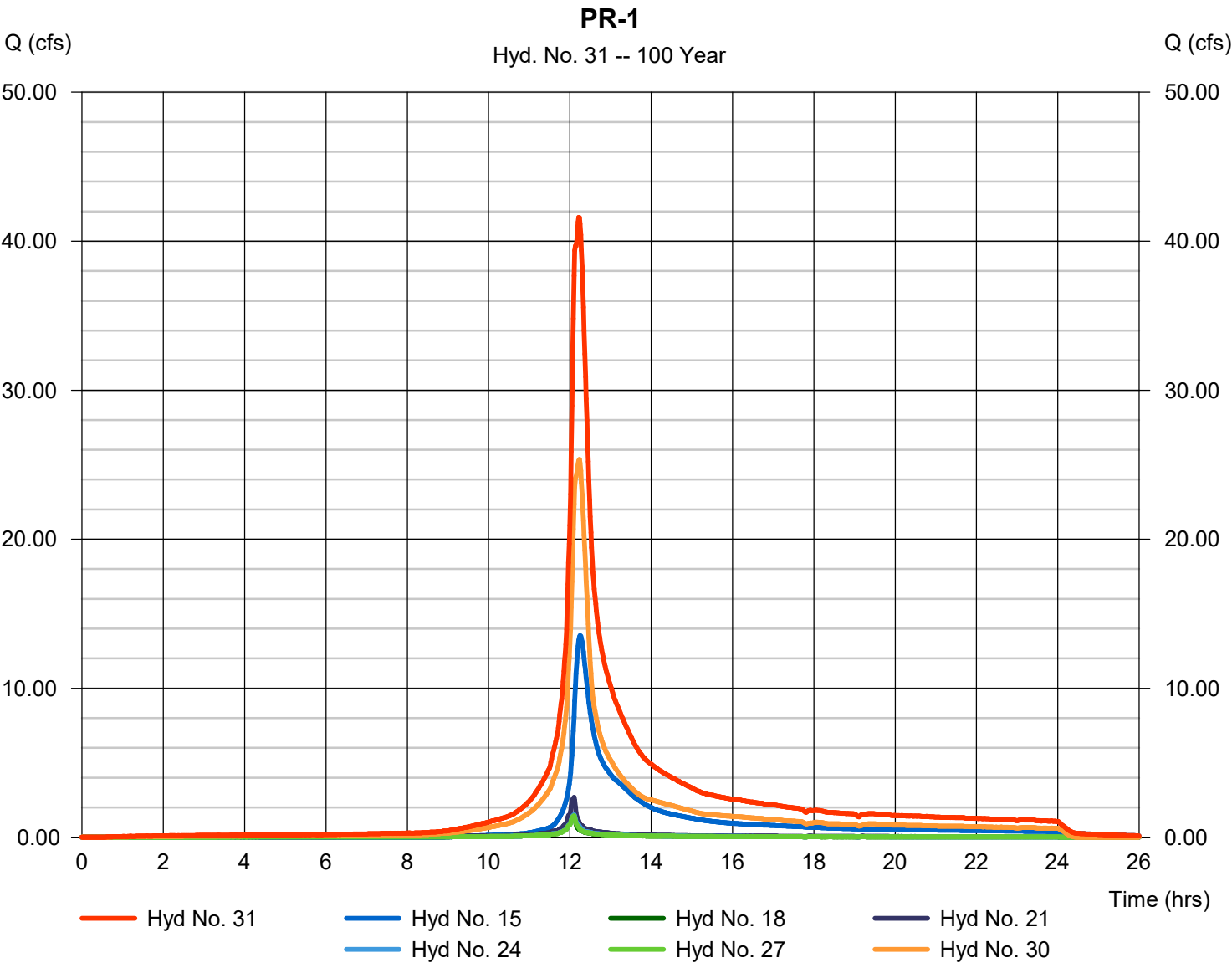


Hydrograph Report

Hyd. No. 31

PR-1

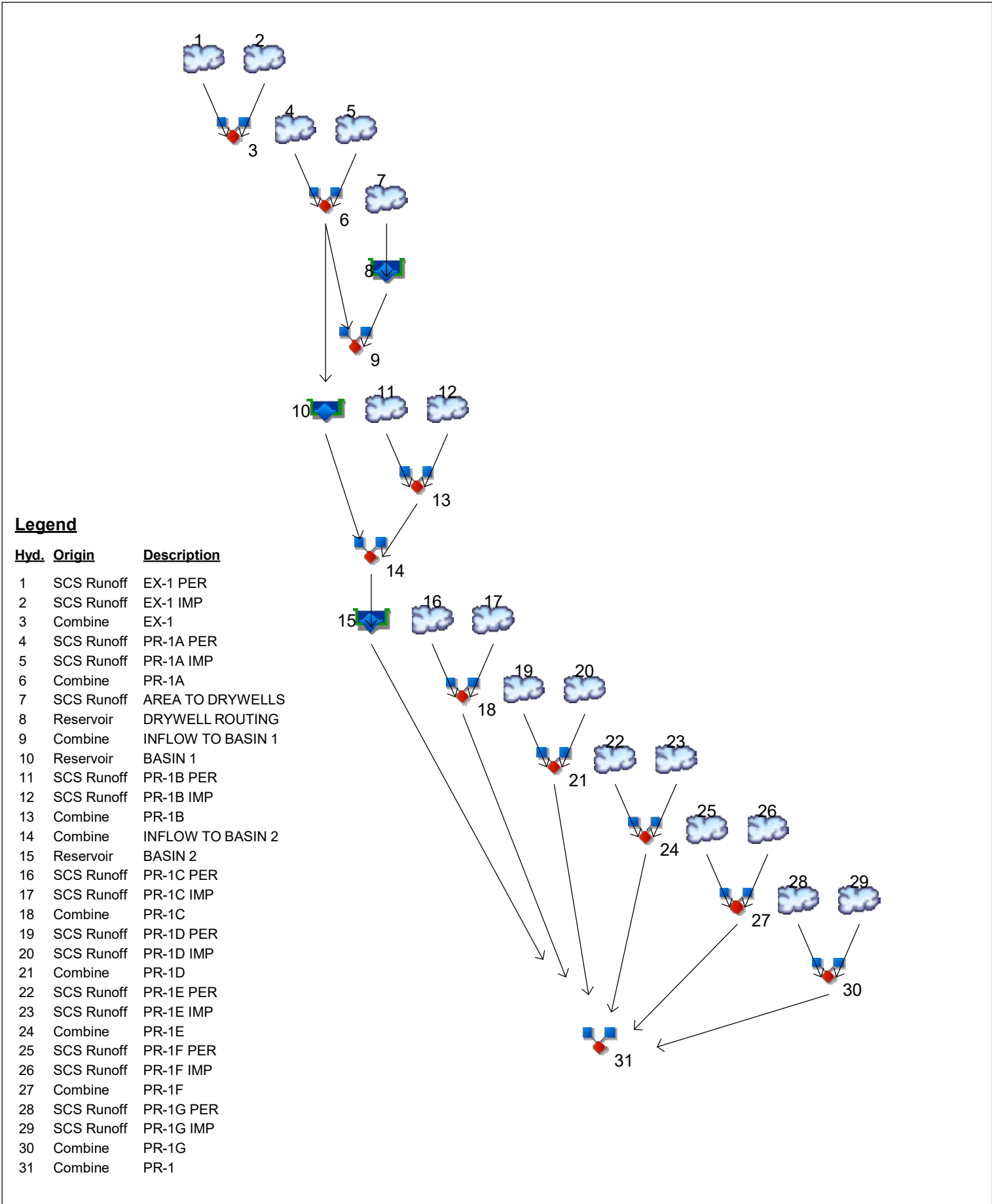
Hydrograph type	= Combine	Peak discharge	= 41.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 220,224 cuft
Inflow hyds.	= 15, 18, 21, 24, 27, 30	Contrib. drain. area	= 0.000 ac



APPENDIX D

DRAINAGE CALCULATIONS (FUTURE FACTOR)

Watershed Model Schematic



Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

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	-----	-----	9.015	-----	-----	24.57	-----	-----	68.57	EX-1 PER
2	SCS Runoff	-----	-----	8.771	-----	-----	13.46	-----	-----	24.30	EX-1 IMP
3	Combine	1, 2	-----	14.15	-----	-----	30.59	-----	-----	76.68	EX-1
4	SCS Runoff	-----	-----	2.054	-----	-----	5.550	-----	-----	15.39	PR-1A PER
5	SCS Runoff	-----	-----	2.239	-----	-----	3.434	-----	-----	6.199	PR-1A IMP
6	Combine	4, 5	-----	3.775	-----	-----	7.943	-----	-----	19.47	PR-1A
7	SCS Runoff	-----	-----	6.329	-----	-----	9.707	-----	-----	17.52	AREA TO DRYWELLS
8	Reservoir	7	-----	6.077	-----	-----	8.966	-----	-----	15.07	DRYWELL ROUTING
9	Combine	6, 8	-----	9.852	-----	-----	16.88	-----	-----	34.54	INFLOW TO BASIN 1
10	Reservoir	6	-----	0.817	-----	-----	4.214	-----	-----	17.21	BASIN 1
11	SCS Runoff	-----	-----	1.053	-----	-----	2.844	-----	-----	7.854	PR-1B PER
12	SCS Runoff	-----	-----	2.067	-----	-----	3.170	-----	-----	5.722	PR-1B IMP
13	Combine	11, 12	-----	2.930	-----	-----	5.644	-----	-----	12.78	PR-1B
14	Combine	10, 13	-----	2.930	-----	-----	8.025	-----	-----	27.98	INFLOW TO BASIN 2
15	Reservoir	14	-----	1.331	-----	-----	5.925	-----	-----	24.44	BASIN 2
16	SCS Runoff	-----	-----	0.143	-----	-----	0.378	-----	-----	1.034	PR-1C PER
17	SCS Runoff	-----	-----	0.474	-----	-----	0.726	-----	-----	1.311	PR-1C IMP
18	Combine	16, 17	-----	0.615	-----	-----	1.105	-----	-----	2.346	PR-1C
19	SCS Runoff	-----	-----	0.224	-----	-----	0.597	-----	-----	1.639	PR-1D PER
20	SCS Runoff	-----	-----	0.861	-----	-----	1.321	-----	-----	2.384	PR-1D IMP
21	Combine	19, 20	-----	1.071	-----	-----	1.896	-----	-----	3.983	PR-1D
22	SCS Runoff	-----	-----	0.149	-----	-----	0.401	-----	-----	1.103	PR-1E PER
23	SCS Runoff	-----	-----	0.474	-----	-----	0.726	-----	-----	1.311	PR-1E IMP
24	Combine	22, 23	-----	0.607	-----	-----	1.099	-----	-----	2.358	PR-1E
25	SCS Runoff	-----	-----	0.119	-----	-----	0.321	-----	-----	0.883	PR-1F PER
26	SCS Runoff	-----	-----	0.474	-----	-----	0.726	-----	-----	1.311	PR-1F IMP
27	Combine	25, 26	-----	0.580	-----	-----	1.024	-----	-----	2.149	PR-1F
28	SCS Runoff	-----	-----	5.611	-----	-----	14.35	-----	-----	38.45	PR-1G PER
29	SCS Runoff	-----	-----	3.148	-----	-----	4.830	-----	-----	8.721	PR-1G IMP
30	Combine	28, 29	-----	6.727	-----	-----	15.94	-----	-----	41.33	PR-1G
31	Combine	15, 18, 21, 24, 27, 30	-----	10.18	-----	-----	23.17	-----	-----	70.31	PR-1
Proj. file: Future 15107.gpw									Thursday, 07 / 9 / 2026		155

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.015	1	735	45,139	-----	-----	-----	EX-1 PER
2	SCS Runoff	8.771	1	726	29,406	-----	-----	-----	EX-1 IMP
3	Combine	14.15	1	727	74,545	1, 2	-----	-----	EX-1
4	SCS Runoff	2.054	1	731	8,542	-----	-----	-----	PR-1A PER
5	SCS Runoff	2.239	1	726	7,351	-----	-----	-----	PR-1A IMP
6	Combine	3.775	1	726	15,894	4, 5	-----	-----	PR-1A
7	SCS Runoff	6.329	1	726	20,782	-----	-----	-----	AREA TO DRYWELLS
8	Reservoir	6.077	1	726	12,513	7	6.71	9,028	DRYWELL ROUTING
9	Combine	9.852	1	726	28,407	6, 8	-----	-----	INFLOW TO BASIN 1
10	Reservoir	0.817	1	762	10,303	6	815.46	7,207	BASIN 1
11	SCS Runoff	1.053	1	730	4,104	-----	-----	-----	PR-1B PER
12	SCS Runoff	2.067	1	726	6,786	-----	-----	-----	PR-1B IMP
13	Combine	2.930	1	726	10,890	11, 12	-----	-----	PR-1B
14	Combine	2.930	1	726	21,192	10, 13	-----	-----	INFLOW TO BASIN 2
15	Reservoir	1.331	1	759	19,584	14	792.92	4,191	BASIN 2
16	SCS Runoff	0.143	1	727	444	-----	-----	-----	PR-1C PER
17	SCS Runoff	0.474	1	726	1,555	-----	-----	-----	PR-1C IMP
18	Combine	0.615	1	726	1,999	16, 17	-----	-----	PR-1C
19	SCS Runoff	0.224	1	728	763	-----	-----	-----	PR-1D PER
20	SCS Runoff	0.861	1	726	2,827	-----	-----	-----	PR-1D IMP
21	Combine	1.071	1	726	3,590	19, 20	-----	-----	PR-1D
22	SCS Runoff	0.149	1	729	541	-----	-----	-----	PR-1E PER
23	SCS Runoff	0.474	1	726	1,555	-----	-----	-----	PR-1E IMP
24	Combine	0.607	1	726	2,096	22, 23	-----	-----	PR-1E
25	SCS Runoff	0.119	1	729	433	-----	-----	-----	PR-1F PER
26	SCS Runoff	0.474	1	726	1,555	-----	-----	-----	PR-1F IMP
27	Combine	0.580	1	726	1,988	25, 26	-----	-----	PR-1F
28	SCS Runoff	5.611	1	735	27,108	-----	-----	-----	PR-1G PER
29	SCS Runoff	3.148	1	726	10,556	-----	-----	-----	PR-1G IMP
30	Combine	6.727	1	728	37,664	28, 29	-----	-----	PR-1G
31	Combine	10.18	1	727	66,919	15, 18, 21, 24, 27, 30	-----	-----	PR-1
Future 15107.gpw					Return Period: 2 Year			Thursday, 07 / 9 / 2026 156	

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: EX-1 (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	5.00	305.00
WOODS	B	55	5.52	303.60
OPEN SPACE GOOD CONDITION	D	80	0.81	64.80
WOODS	D	77	1.02	78.54
Total			12.35	751.94

$$CN = \frac{751.9}{12.4} = 61$$

DRAINAGE AREA DESIGNATION: EX-1 (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	A	98	1.95	191.10
Total			1.95	191.10

$$CN = \frac{191.1}{2.0} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **EX 1 PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.4			
FLOW LENGTH, L (FT, 100 MAX)=	66 (66 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7			
SHEET FLOW TIME, T _c (MIN.)=	8.0 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	WOODLANDS	SHORT-GRASS	PAVED	
FLOW LENGTH, L (FT)=	250	436	1140	
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	11	15	5	
AVERAGE VELOCITY, V (FT/S)=	1.67	2.70	4.55	
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	2.5 MIN.	2.7 MIN.	4.2 MIN.	

CHANNEL FLOW:

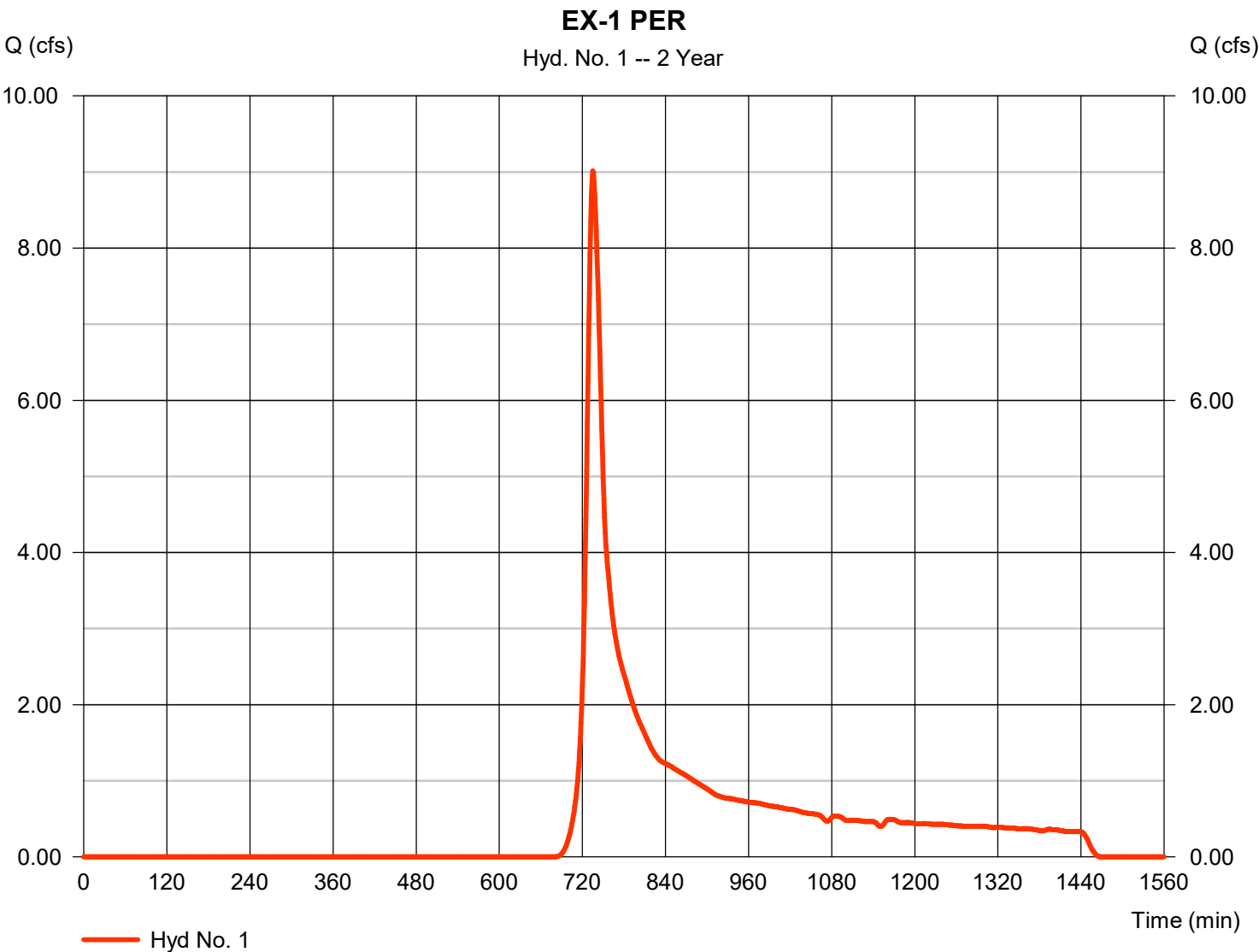
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	8.0 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	9.4 MIN.	TIME OF CONCENTRATION= 17.3 MIN.		
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 1

EX-1 PER

Hydrograph type	= SCS Runoff	Peak discharge	= 9.015 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 45,139 cuft
Drainage area	= 12.350 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

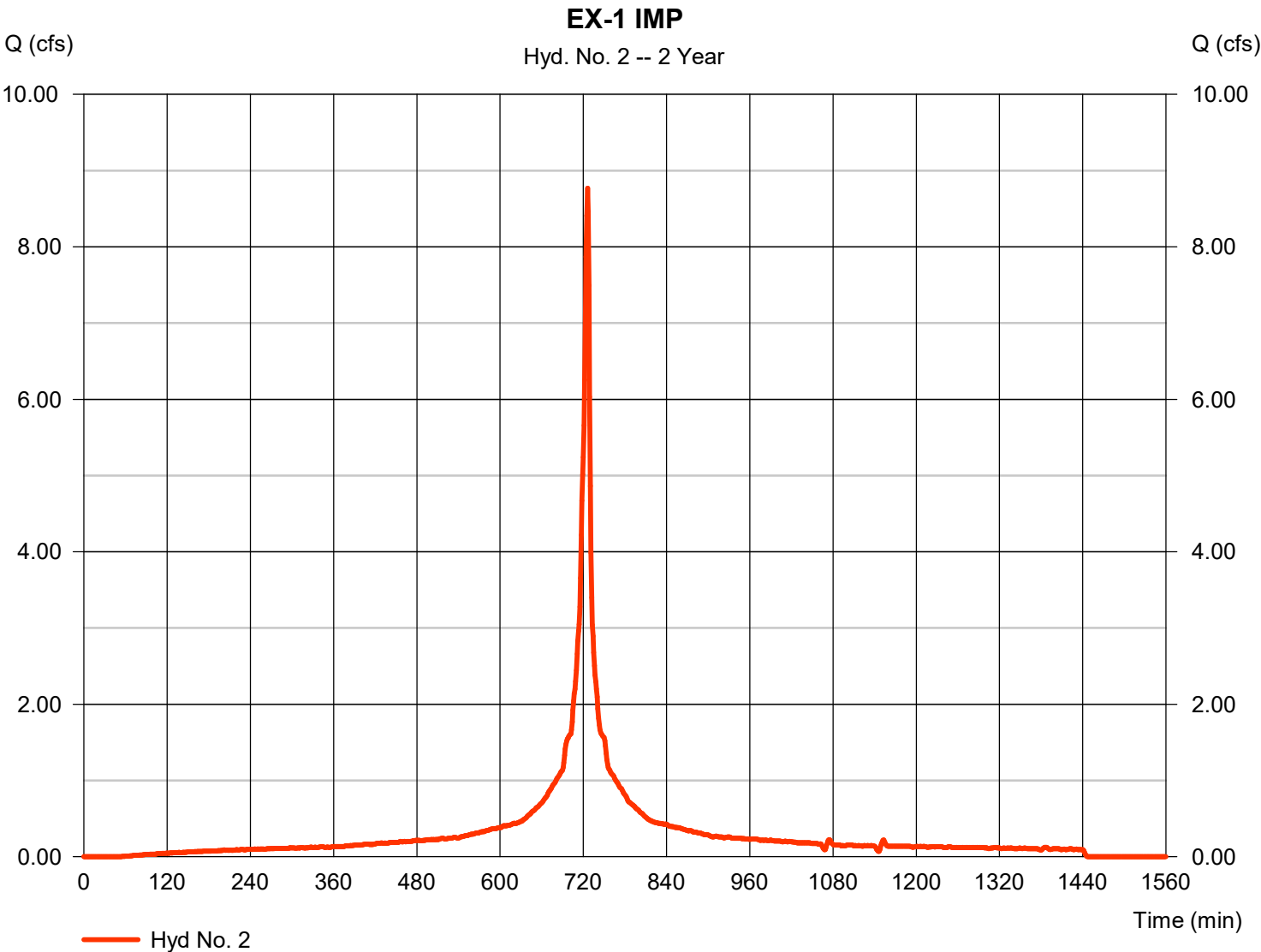


Hydrograph Report

Hyd. No. 2

EX-1 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 8.771 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 29,406 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **EX 1 IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	0.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	PAVED			
FLOW LENGTH, L (FT)=	1090			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	5			
AVERAGE VELOCITY, V (FT/S)=	4.55			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	4.0 MIN.			

CHANNEL FLOW:

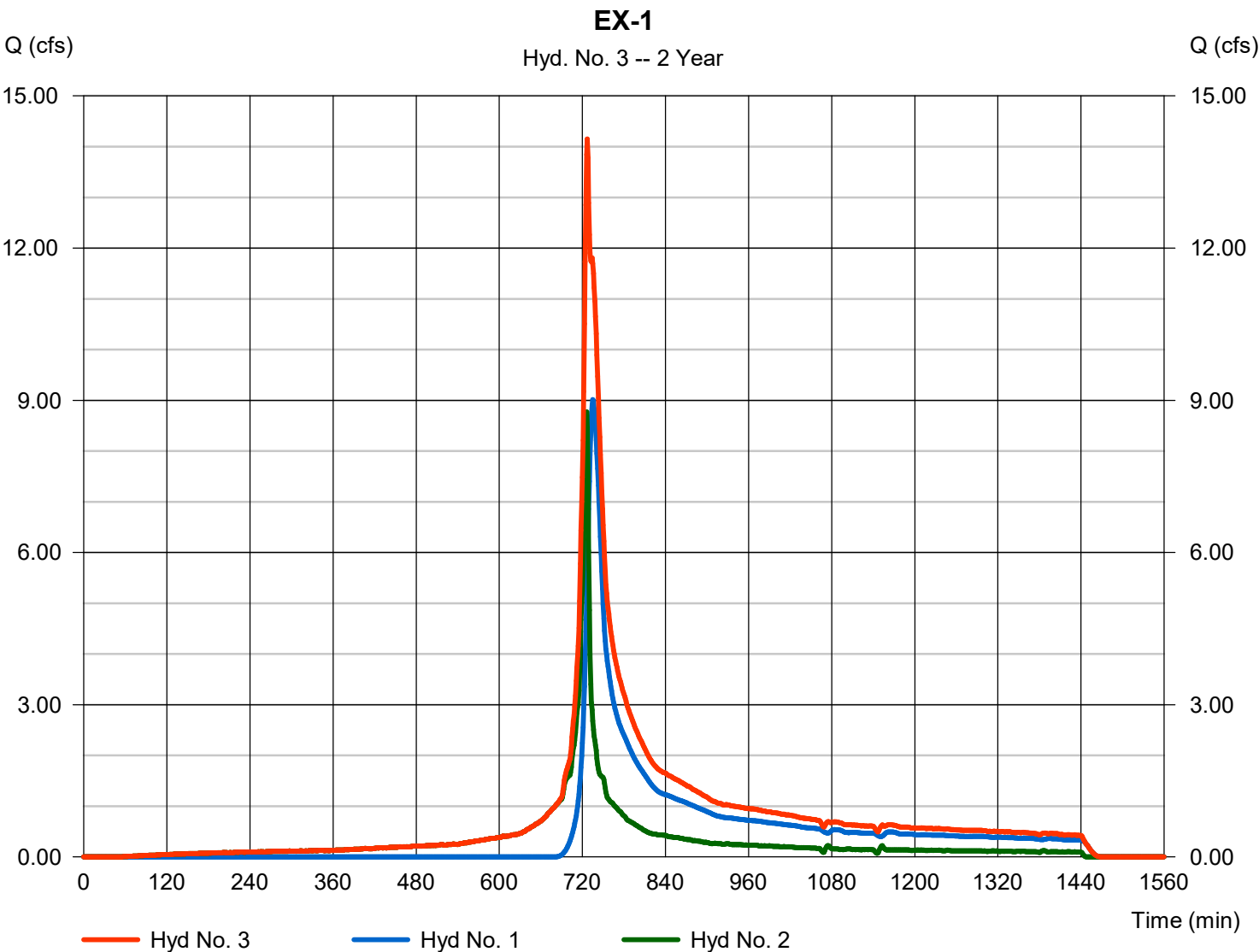
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	4.0 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
TIME OF CONCENTRATION= 4.7 MIN.				

Hydrograph Report

Hyd. No. 3

EX-1

Hydrograph type	= Combine	Peak discharge	= 14.15 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 74,545 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.300 ac



PEAK FLOW REDUCTION CALCULATIONS - FUTURE

TO COMPLY WITH NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER MANAGEMENT REQUIREMENTS, THE POST-DEVELOPMENT PEAK RUNOFF RATES MUST BE REDUCED TO A PERCENTAGE OF PRE-DEVELOPMENT PEAK RUNOFF RATES, AS

$$\text{PROPOSED } Q_2 \leq 50\% \text{ EXISTING } Q_2$$

$$\text{PROPOSED } Q_{10} \leq 75\% \text{ EXISTING } Q_{10}$$

$$\text{PROPOSED } Q_{100} \leq 80\% \text{ EXISTING } Q_{10}$$

REDUCTION FACTORS ARE APPLIED TO THE DISTURBED PORTION OF THE TRIBUTARY DRAINAGE AREA ONLY:

EX 1

DRAINAGE AREA = 14.3 AC

AREA OF DISTURBANCE= 6 AC

PERCENT DISTURBANCE = 42.0%

APPLY REDUCTION FACTORS TO 42% OF EXISTING PEAK FLOWS.

PROJECTED PEAK FLOWS:

$$Q_2 = 14.2 \text{ CFS}$$

$$Q_{10} = 30.6 \text{ CFS}$$

$$Q_{100} = 76.7 \text{ CFS}$$

CALCULATE ALLOWABLE RUNOFF:

$$Q_2 = (0.50) \times (0.42) \times (14.2 \text{ CFS}) + (0.58) \times (14.2 \text{ CFS}) = 11.2 \text{ CFS}$$

$$Q_{10} = (0.75) \times (0.42) \times (30.6 \text{ CFS}) + (0.58) \times (30.6 \text{ CFS}) = 27.4 \text{ CFS}$$

$$Q_{100} = (0.80) \times (0.42) \times (76.7 \text{ CFS}) + (0.58) \times (76.7 \text{ CFS}) = 70.3 \text{ CFS}$$

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1A (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	2.17	132.37
WOODS	B	55	0.10	5.50
Total			2.27	137.87

$$CN = \frac{137.9}{2.3} = 61$$

DRAINAGE AREA DESIGNATION: PR-1A (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.52	50.96
Total			0.52	50.96

$$CN = \frac{51.0}{0.5} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1A PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	7.9 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
FLOW LENGTH, L (FT)=	280			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	6			
AVERAGE VELOCITY, V (FT/S)=	1.71			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	2.7 MIN.			

CHANNEL FLOW:

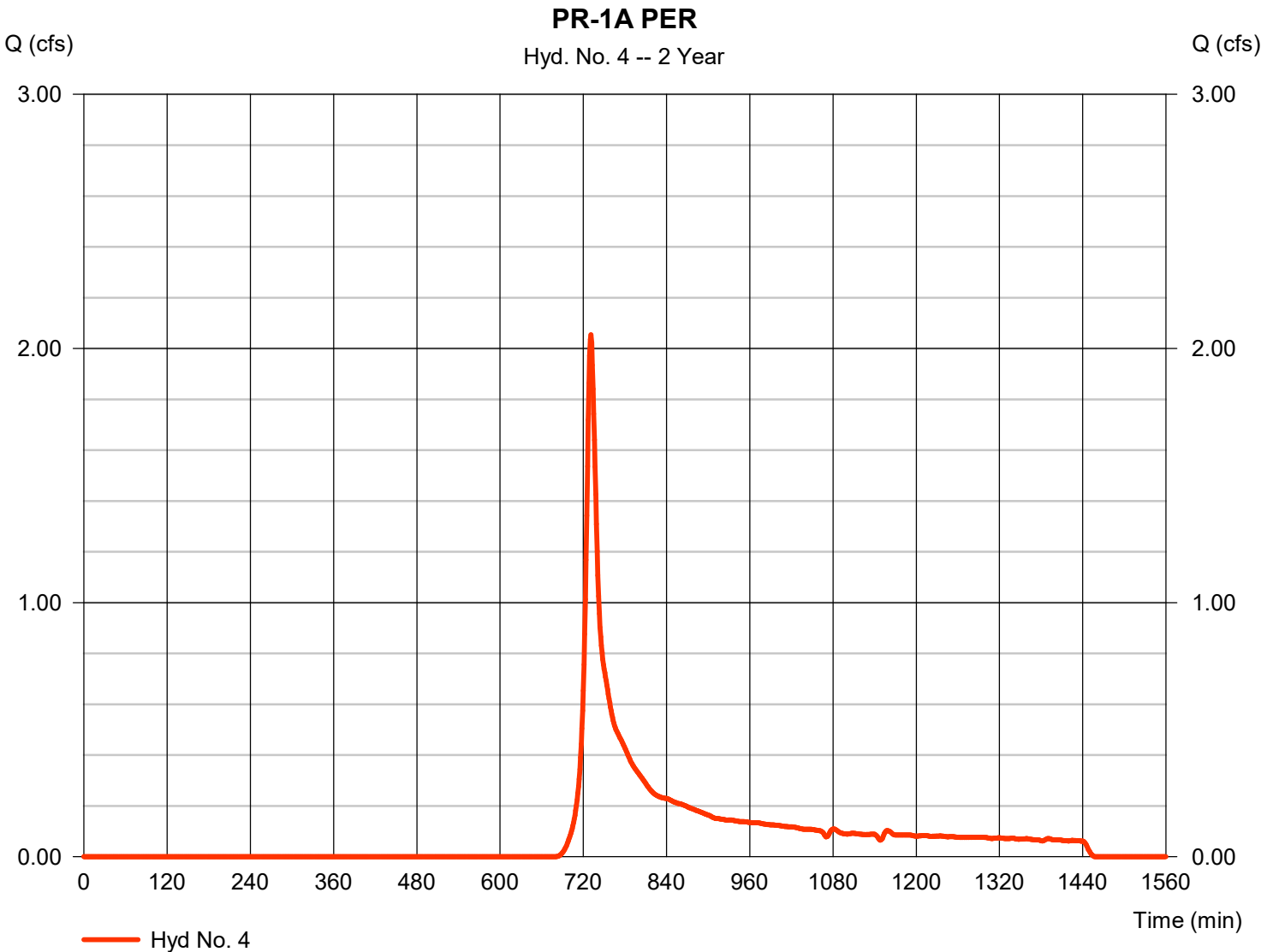
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	7.9 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	2.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
TIME OF CONCENTRATION= 10.6 MIN.				

Hydrograph Report

Hyd. No. 4

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 2.054 cfs
Storm frequency	= 2 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 8,542 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1A IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7			
SHEET FLOW TIME, T _c (MIN.)=	0.6 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	PAVED			
FLOW LENGTH, L (FT)=	210			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	12			
AVERAGE VELOCITY, V (FT/S)=	7.04			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.5 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.6 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.5 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 1.1 MIN.

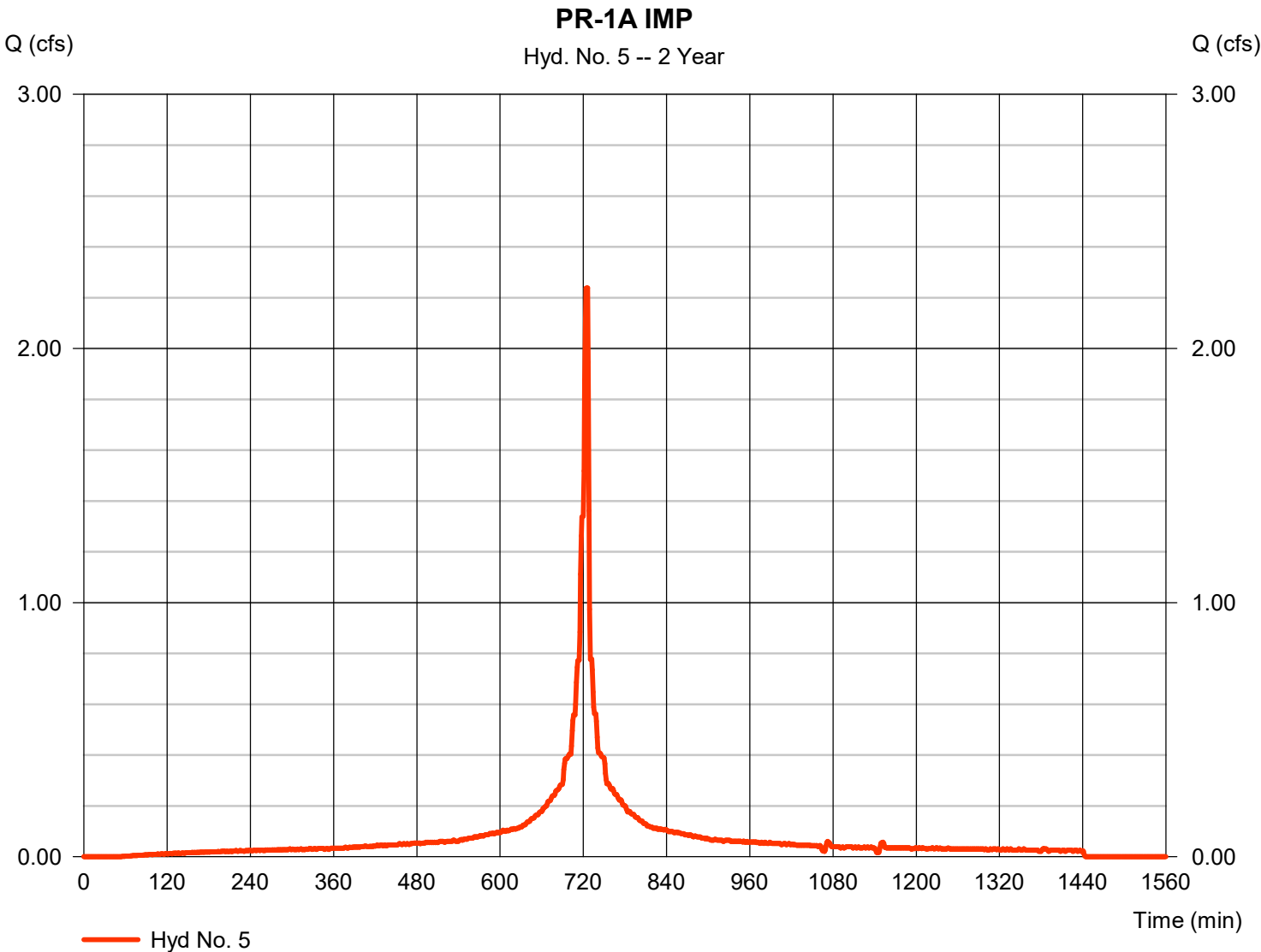
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 5

PR-1A IMP

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.239 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	7,351 cuft
Drainage area	=	0.520 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	1.60 min
Total precip.	=	4.39 in	Distribution	=	Custom
Storm duration	=	H:\ADMIN\NOAA D.cds	Shape factor	=	484

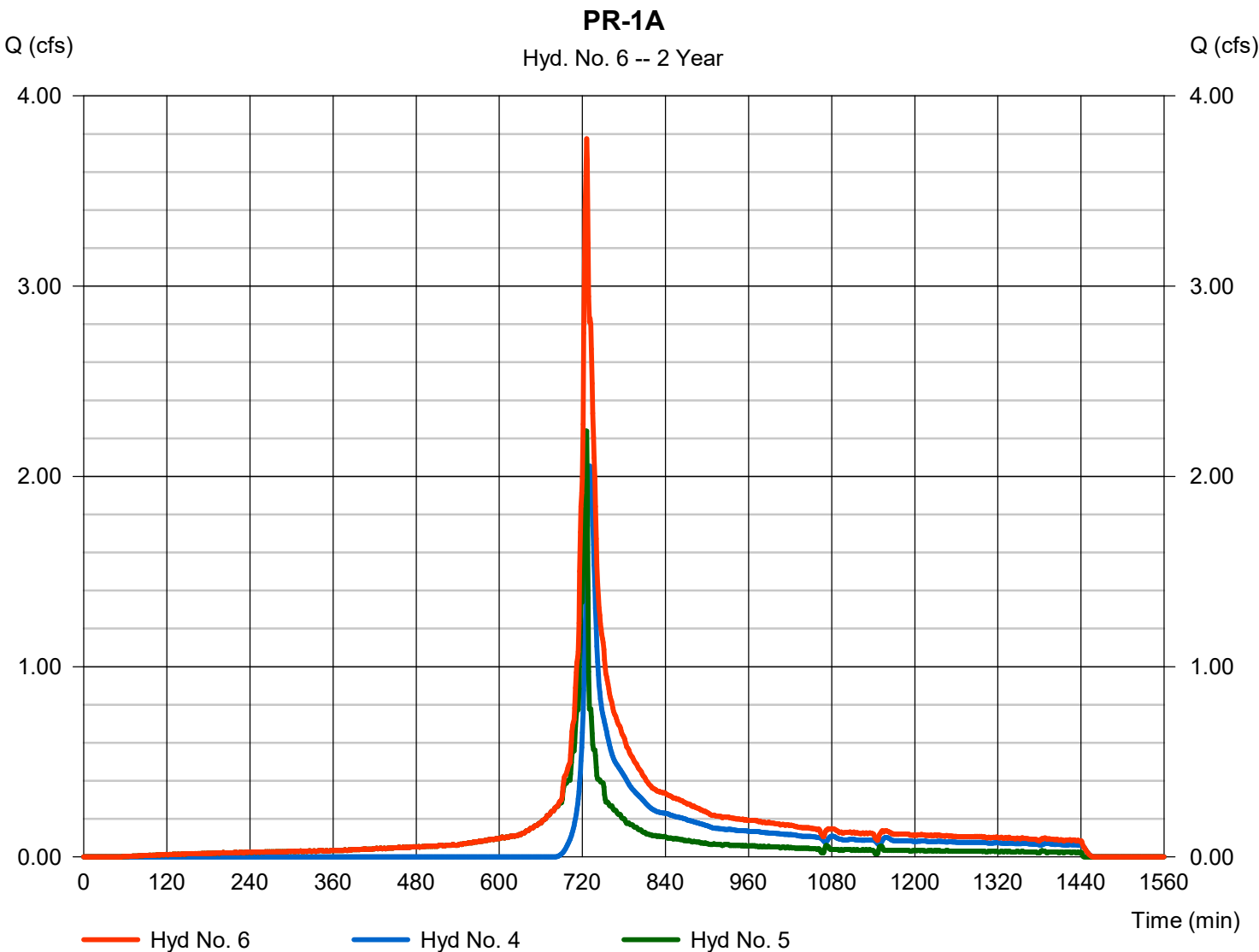


Hydrograph Report

Hyd. No. 6

PR-1A

Hydrograph type	= Combine	Peak discharge	= 3.775 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 15,894 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.790 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: DRYWELLS TO BASIN 1

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.00	0.00
WOODS	B	55	0.00	0.00
OPEN SPACE GOOD CONDITION	D	80	0.00	0.00
WOODS	D	77	0.00	0.00
Total			0.00	0.00

$$CN = \frac{0.0}{0.0} \text{ \#DIV/0!}$$

DRAINAGE AREA DESIGNATION: DRYWELLES TO BASIN 1

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	A	98	1.47	144.06
Total			1.47	144.06

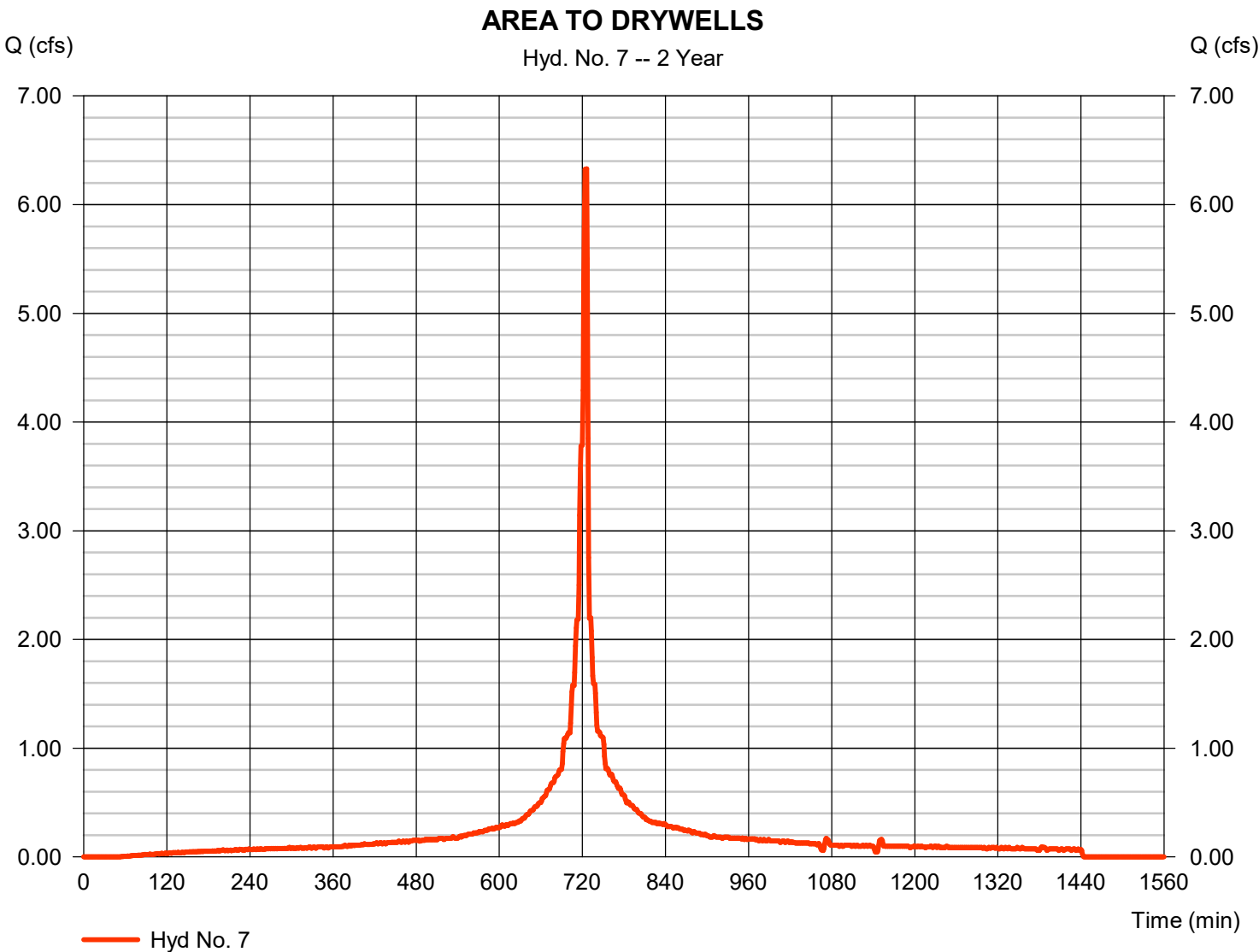
$$CN = \frac{144.1}{1.5} = 98$$

Hydrograph Report

Hyd. No. 7

AREA TO DRYWELLS

Hydrograph type	= SCS Runoff	Peak discharge	= 6.329 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 20,782 cuft
Drainage area	= 1.470 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



DRYWELL STORAGE CALCULATIONS

VOLUME OF DRYWELL INTERIC

$$\pi \times 3.00 \text{ FT}^2 \times 3 \text{ FT} = 170 \text{ CF}$$

DRYWELL INTERIOR RADIUS: 3.00 FT

VOLUME OF DRYWELL EXTERIC

$$\pi \times 3.25 \text{ FT}^2 \times 3.25 \text{ FT} = 199 \text{ CF}$$

DRYWELL EXTERIOR RADIUS: 3.25 FT

HEIGHT OF DRYWELL: 6.00 FT

VOLUME OF STONE VOIDS (V_s)

$$[(10.5 \text{ FT} \times 10.5 \text{ FT})(7 \text{ FT}) - 199 \text{ CF}](0.40) = 230 \text{ CF}$$

DEPTH OF STONE: 7.00 FT

WIDTH OF EXCAVATION FOR STONE: 10.50 FT

STORAGE VOLUME PER DRYWI

$$170 \text{ CF} + 230 \text{ CF} = 400 \text{ CF}$$

NUMBER OF DRYWELLS: 28

TOTAL STORAGE VOLUME : 400 CF x 28 = 11,200 CF

STAGE STORAGE:

BOTTOM OF STONE ELEVATION: 1

TOP OF STORAGE ELEVATION: 8

ELEVATION	STORAGE VOLUME	ELEVATION	STORAGE VOLUME	ELEVATION	STORAGE VOLUME	ELEVATION	STORAGE VOLUME
1.00	0 CF	5.25	6,613 CF				
1.25	309 CF	5.50	7,027 CF				
1.50	617 CF	5.75	7,440 CF				
1.75	926 CF	6.00	7,854 CF				
2.00	1,235 CF	6.25	8,268 CF				
2.25	1,649 CF	6.50	8,682 CF				
2.50	2,062 CF	6.75	9,095 CF				
2.75	2,476 CF	7.00	9,509 CF				
3.00	2,890 CF	7.25	9,923 CF				
3.25	3,303 CF	7.50	10,336 CF				
3.50	3,717 CF	7.75	10,750 CF				
3.75	4,131 CF	8.00	11,164 CF				
4.00	4,544 CF						
4.25	4,958 CF						
4.50	5,372 CF						
4.75	5,786 CF						
5.00	6,199 CF						

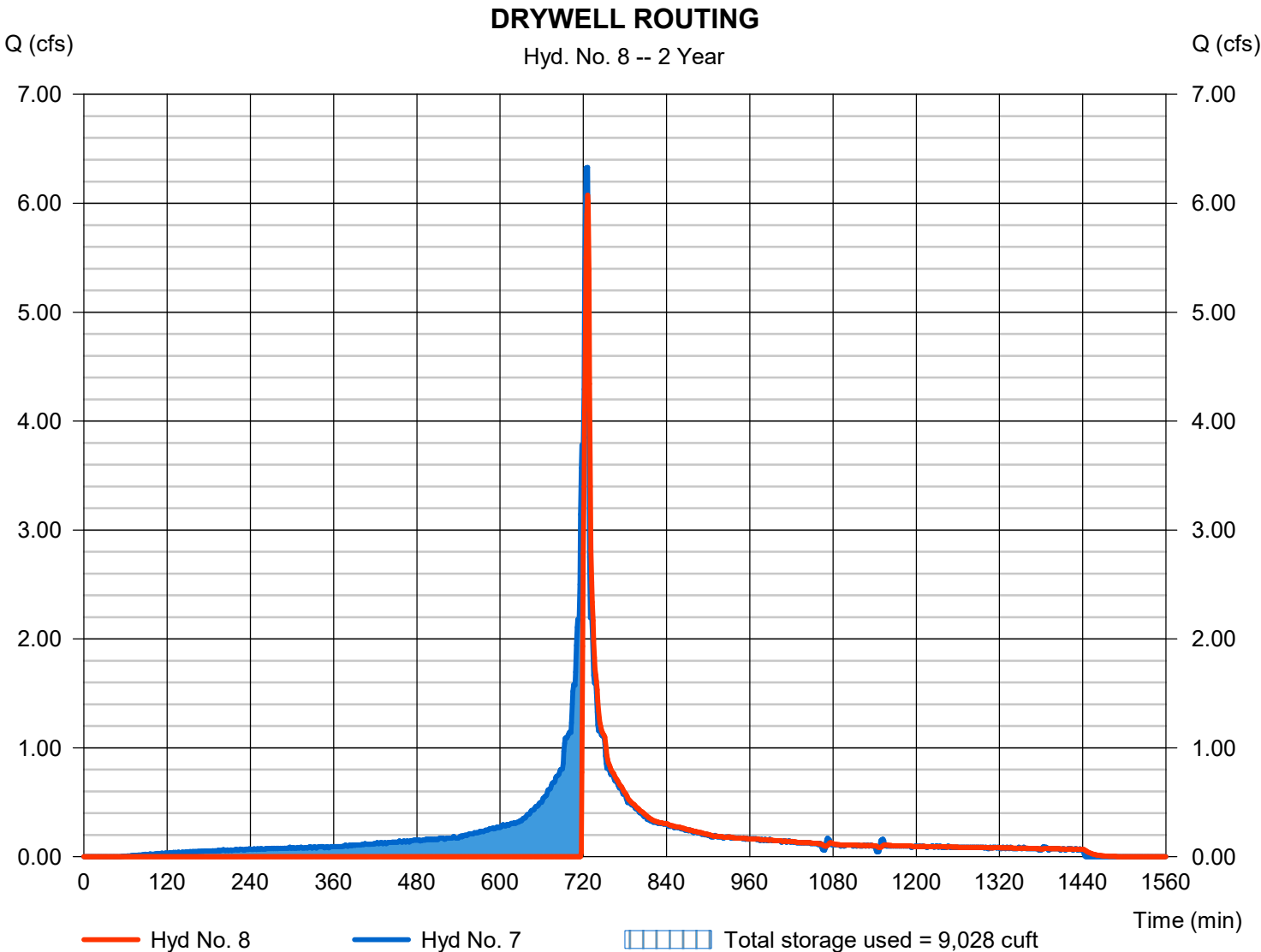
Hydrograph Report

Hyd. No. 8

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 6.077 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 12,513 cuft
Inflow hyd. No.	= 7 - AREA TO DRYWELLS	Max. Elevation	= 6.71 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 9,028 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - DRYWELLS TO BASIN 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1.00	n/a	0	0
0.50	1.50	n/a	617	617
1.00	2.00	n/a	618	1,235
1.50	2.50	n/a	827	2,062
2.00	3.00	n/a	828	2,890
2.50	3.50	n/a	827	3,717
3.00	4.00	n/a	827	4,544
3.50	4.50	n/a	828	5,372
4.00	5.00	n/a	827	6,199
4.50	5.50	n/a	828	7,027
5.00	6.00	n/a	827	7,854
5.50	6.50	n/a	828	8,682
6.00	7.00	n/a	827	9,509
6.50	7.50	n/a	827	10,336
7.00	8.00	n/a	828	11,164

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 14	0	0	0
Invert El. (ft)	= 6.25	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)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.05	62	1.05	0.00	---	---	---	---	---	---	---	---	---	0.000
0.10	123	1.10	0.00	---	---	---	---	---	---	---	---	---	0.000
0.15	185	1.15	0.00	---	---	---	---	---	---	---	---	---	0.000
0.20	247	1.20	0.00	---	---	---	---	---	---	---	---	---	0.000
0.25	309	1.25	0.00	---	---	---	---	---	---	---	---	---	0.000
0.30	370	1.30	0.00	---	---	---	---	---	---	---	---	---	0.000
0.35	432	1.35	0.00	---	---	---	---	---	---	---	---	---	0.000
0.40	494	1.40	0.00	---	---	---	---	---	---	---	---	---	0.000
0.45	555	1.45	0.00	---	---	---	---	---	---	---	---	---	0.000
0.50	617	1.50	0.00	---	---	---	---	---	---	---	---	---	0.000
0.55	679	1.55	0.00	---	---	---	---	---	---	---	---	---	0.000
0.60	741	1.60	0.00	---	---	---	---	---	---	---	---	---	0.000
0.65	802	1.65	0.00	---	---	---	---	---	---	---	---	---	0.000
0.70	864	1.70	0.00	---	---	---	---	---	---	---	---	---	0.000
0.75	926	1.75	0.00	---	---	---	---	---	---	---	---	---	0.000
0.80	988	1.80	0.00	---	---	---	---	---	---	---	---	---	0.000
0.85	1,050	1.85	0.00	---	---	---	---	---	---	---	---	---	0.000
0.90	1,111	1.90	0.00	---	---	---	---	---	---	---	---	---	0.000
0.95	1,173	1.95	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1,235	2.00	0.00	---	---	---	---	---	---	---	---	---	0.000
1.05	1,318	2.05	0.00	---	---	---	---	---	---	---	---	---	0.000
1.10	1,400	2.10	0.00	---	---	---	---	---	---	---	---	---	0.000
1.15	1,483	2.15	0.00	---	---	---	---	---	---	---	---	---	0.000
1.20	1,566	2.20	0.00	---	---	---	---	---	---	---	---	---	0.000
1.25	1,649	2.25	0.00	---	---	---	---	---	---	---	---	---	0.000
1.30	1,731	2.30	0.00	---	---	---	---	---	---	---	---	---	0.000
1.35	1,814	2.35	0.00	---	---	---	---	---	---	---	---	---	0.000
1.40	1,897	2.40	0.00	---	---	---	---	---	---	---	---	---	0.000

DRYWELLS TO BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.45	1,979	2.45	0.00	---	---	---	---	---	---	---	---	---	0.000
1.50	2,062	2.50	0.00	---	---	---	---	---	---	---	---	---	0.000
1.55	2,145	2.55	0.00	---	---	---	---	---	---	---	---	---	0.000
1.60	2,228	2.60	0.00	---	---	---	---	---	---	---	---	---	0.000
1.65	2,310	2.65	0.00	---	---	---	---	---	---	---	---	---	0.000
1.70	2,393	2.70	0.00	---	---	---	---	---	---	---	---	---	0.000
1.75	2,476	2.75	0.00	---	---	---	---	---	---	---	---	---	0.000
1.80	2,559	2.80	0.00	---	---	---	---	---	---	---	---	---	0.000
1.85	2,642	2.85	0.00	---	---	---	---	---	---	---	---	---	0.000
1.90	2,724	2.90	0.00	---	---	---	---	---	---	---	---	---	0.000
1.95	2,807	2.95	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	2,890	3.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.05	2,973	3.05	0.00	---	---	---	---	---	---	---	---	---	0.000
2.10	3,055	3.10	0.00	---	---	---	---	---	---	---	---	---	0.000
2.15	3,138	3.15	0.00	---	---	---	---	---	---	---	---	---	0.000
2.20	3,221	3.20	0.00	---	---	---	---	---	---	---	---	---	0.000
2.25	3,304	3.25	0.00	---	---	---	---	---	---	---	---	---	0.000
2.30	3,386	3.30	0.00	---	---	---	---	---	---	---	---	---	0.000
2.35	3,469	3.35	0.00	---	---	---	---	---	---	---	---	---	0.000
2.40	3,552	3.40	0.00	---	---	---	---	---	---	---	---	---	0.000
2.45	3,634	3.45	0.00	---	---	---	---	---	---	---	---	---	0.000
2.50	3,717	3.50	0.00	---	---	---	---	---	---	---	---	---	0.000
2.55	3,800	3.55	0.00	---	---	---	---	---	---	---	---	---	0.000
2.60	3,882	3.60	0.00	---	---	---	---	---	---	---	---	---	0.000
2.65	3,965	3.65	0.00	---	---	---	---	---	---	---	---	---	0.000
2.70	4,048	3.70	0.00	---	---	---	---	---	---	---	---	---	0.000
2.75	4,131	3.75	0.00	---	---	---	---	---	---	---	---	---	0.000
2.80	4,213	3.80	0.00	---	---	---	---	---	---	---	---	---	0.000
2.85	4,296	3.85	0.00	---	---	---	---	---	---	---	---	---	0.000
2.90	4,379	3.90	0.00	---	---	---	---	---	---	---	---	---	0.000
2.95	4,461	3.95	0.00	---	---	---	---	---	---	---	---	---	0.000
3.00	4,544	4.00	0.00	---	---	---	---	---	---	---	---	---	0.000
3.05	4,627	4.05	0.00	---	---	---	---	---	---	---	---	---	0.000
3.10	4,710	4.10	0.00	---	---	---	---	---	---	---	---	---	0.000
3.15	4,792	4.15	0.00	---	---	---	---	---	---	---	---	---	0.000
3.20	4,875	4.20	0.00	---	---	---	---	---	---	---	---	---	0.000
3.25	4,958	4.25	0.00	---	---	---	---	---	---	---	---	---	0.000
3.30	5,041	4.30	0.00	---	---	---	---	---	---	---	---	---	0.000
3.35	5,124	4.35	0.00	---	---	---	---	---	---	---	---	---	0.000
3.40	5,206	4.40	0.00	---	---	---	---	---	---	---	---	---	0.000
3.45	5,289	4.45	0.00	---	---	---	---	---	---	---	---	---	0.000
3.50	5,372	4.50	0.00	---	---	---	---	---	---	---	---	---	0.000
3.55	5,455	4.55	0.00	---	---	---	---	---	---	---	---	---	0.000
3.60	5,537	4.60	0.00	---	---	---	---	---	---	---	---	---	0.000
3.65	5,620	4.65	0.00	---	---	---	---	---	---	---	---	---	0.000
3.70	5,703	4.70	0.00	---	---	---	---	---	---	---	---	---	0.000
3.75	5,786	4.75	0.00	---	---	---	---	---	---	---	---	---	0.000
3.80	5,868	4.80	0.00	---	---	---	---	---	---	---	---	---	0.000
3.85	5,951	4.85	0.00	---	---	---	---	---	---	---	---	---	0.000
3.90	6,034	4.90	0.00	---	---	---	---	---	---	---	---	---	0.000
3.95	6,116	4.95	0.00	---	---	---	---	---	---	---	---	---	0.000
4.00	6,199	5.00	0.00	---	---	---	---	---	---	---	---	---	0.000
4.05	6,282	5.05	0.00	---	---	---	---	---	---	---	---	---	0.000
4.10	6,365	5.10	0.00	---	---	---	---	---	---	---	---	---	0.000
4.15	6,447	5.15	0.00	---	---	---	---	---	---	---	---	---	0.000
4.20	6,530	5.20	0.00	---	---	---	---	---	---	---	---	---	0.000
4.25	6,613	5.25	0.00	---	---	---	---	---	---	---	---	---	0.000
4.30	6,696	5.30	0.00	---	---	---	---	---	---	---	---	---	0.000
4.35	6,779	5.35	0.00	---	---	---	---	---	---	---	---	---	0.000
4.40	6,861	5.40	0.00	---	---	---	---	---	---	---	---	---	0.000
4.45	6,944	5.45	0.00	---	---	---	---	---	---	---	---	---	0.000
4.50	7,027	5.50	0.00	---	---	---	---	---	---	---	---	---	0.000
4.55	7,110	5.55	0.00	---	---	---	---	---	---	---	---	---	0.000
4.60	7,192	5.60	0.00	---	---	---	---	---	---	---	---	---	0.000
4.65	7,275	5.65	0.00	---	---	---	---	---	---	---	---	---	0.000
4.70	7,358	5.70	0.00	---	---	---	---	---	---	---	---	---	0.000
4.75	7,441	5.75	0.00	---	---	---	---	---	---	---	---	---	0.000
4.80	7,523	5.80	0.00	---	---	---	---	---	---	---	---	---	0.000
4.85	7,606	5.85	0.00	---	---	---	---	---	---	---	---	---	0.000
4.90	7,689	5.90	0.00	---	---	---	---	---	---	---	---	---	0.000
4.95	7,771	5.95	0.00	---	---	---	---	---	---	---	---	---	0.000
5.00	7,854	6.00	0.00	---	---	---	---	---	---	---	---	---	0.000

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DRYWELLS TO BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
5.05	7,937	6.05	0.00	---	---	---	---	---	---	---	---	---	0.000
5.10	8,020	6.10	0.00	---	---	---	---	---	---	---	---	---	0.000
5.15	8,102	6.15	0.00	---	---	---	---	---	---	---	---	---	0.000
5.20	8,185	6.20	0.00	---	---	---	---	---	---	---	---	---	0.000
5.25	8,268	6.25	0.00 ic	---	---	---	---	---	---	---	---	---	0.000
5.30	8,351	6.30	0.11 ic	---	---	---	---	---	---	---	---	---	0.109
5.35	8,434	6.35	0.42 ic	---	---	---	---	---	---	---	---	---	0.423
5.40	8,516	6.40	0.92 ic	---	---	---	---	---	---	---	---	---	0.918
5.45	8,599	6.45	1.56 ic	---	---	---	---	---	---	---	---	---	1.564
5.50	8,682	6.50	2.34 ic	---	---	---	---	---	---	---	---	---	2.344
5.55	8,765	6.55	3.22 ic	---	---	---	---	---	---	---	---	---	3.215
5.60	8,847	6.60	4.14 ic	---	---	---	---	---	---	---	---	---	4.140
5.65	8,930	6.65	5.08 ic	---	---	---	---	---	---	---	---	---	5.078
5.70	9,013	6.70	5.95 ic	---	---	---	---	---	---	---	---	---	5.953
5.75	9,096	6.75	6.62 ic	---	---	---	---	---	---	---	---	---	6.617
5.80	9,178	6.80	7.25 ic	---	---	---	---	---	---	---	---	---	7.249
5.85	9,261	6.85	7.83 ic	---	---	---	---	---	---	---	---	---	7.829
5.90	9,344	6.90	8.37 ic	---	---	---	---	---	---	---	---	---	8.370
5.95	9,426	6.95	8.88 ic	---	---	---	---	---	---	---	---	---	8.878
6.00	9,509	7.00	9.36 ic	---	---	---	---	---	---	---	---	---	9.358
6.05	9,592	7.05	9.81 ic	---	---	---	---	---	---	---	---	---	9.815
6.10	9,674	7.10	10.25 ic	---	---	---	---	---	---	---	---	---	10.25
6.15	9,757	7.15	10.67 ic	---	---	---	---	---	---	---	---	---	10.67
6.20	9,840	7.20	11.07 ic	---	---	---	---	---	---	---	---	---	11.07
6.25	9,923	7.25	11.46 ic	---	---	---	---	---	---	---	---	---	11.46
6.30	10,005	7.30	11.84 ic	---	---	---	---	---	---	---	---	---	11.84
6.35	10,088	7.35	12.20 ic	---	---	---	---	---	---	---	---	---	12.20
6.40	10,171	7.40	12.56 ic	---	---	---	---	---	---	---	---	---	12.56
6.45	10,253	7.45	12.90 ic	---	---	---	---	---	---	---	---	---	12.90
6.50	10,336	7.50	13.23 ic	---	---	---	---	---	---	---	---	---	13.23
6.55	10,419	7.55	13.56 ic	---	---	---	---	---	---	---	---	---	13.56
6.60	10,502	7.60	13.88 ic	---	---	---	---	---	---	---	---	---	13.88
6.65	10,584	7.65	14.19 ic	---	---	---	---	---	---	---	---	---	14.19
6.70	10,667	7.70	14.50 ic	---	---	---	---	---	---	---	---	---	14.50
6.75	10,750	7.75	14.80 ic	---	---	---	---	---	---	---	---	---	14.80
6.80	10,833	7.80	15.09 ic	---	---	---	---	---	---	---	---	---	15.09
6.85	10,916	7.85	15.38 ic	---	---	---	---	---	---	---	---	---	15.38
6.90	10,998	7.90	15.66 ic	---	---	---	---	---	---	---	---	---	15.66
6.95	11,081	7.95	15.94 ic	---	---	---	---	---	---	---	---	---	15.94
7.00	11,164	8.00	16.21 ic	---	---	---	---	---	---	---	---	---	16.21

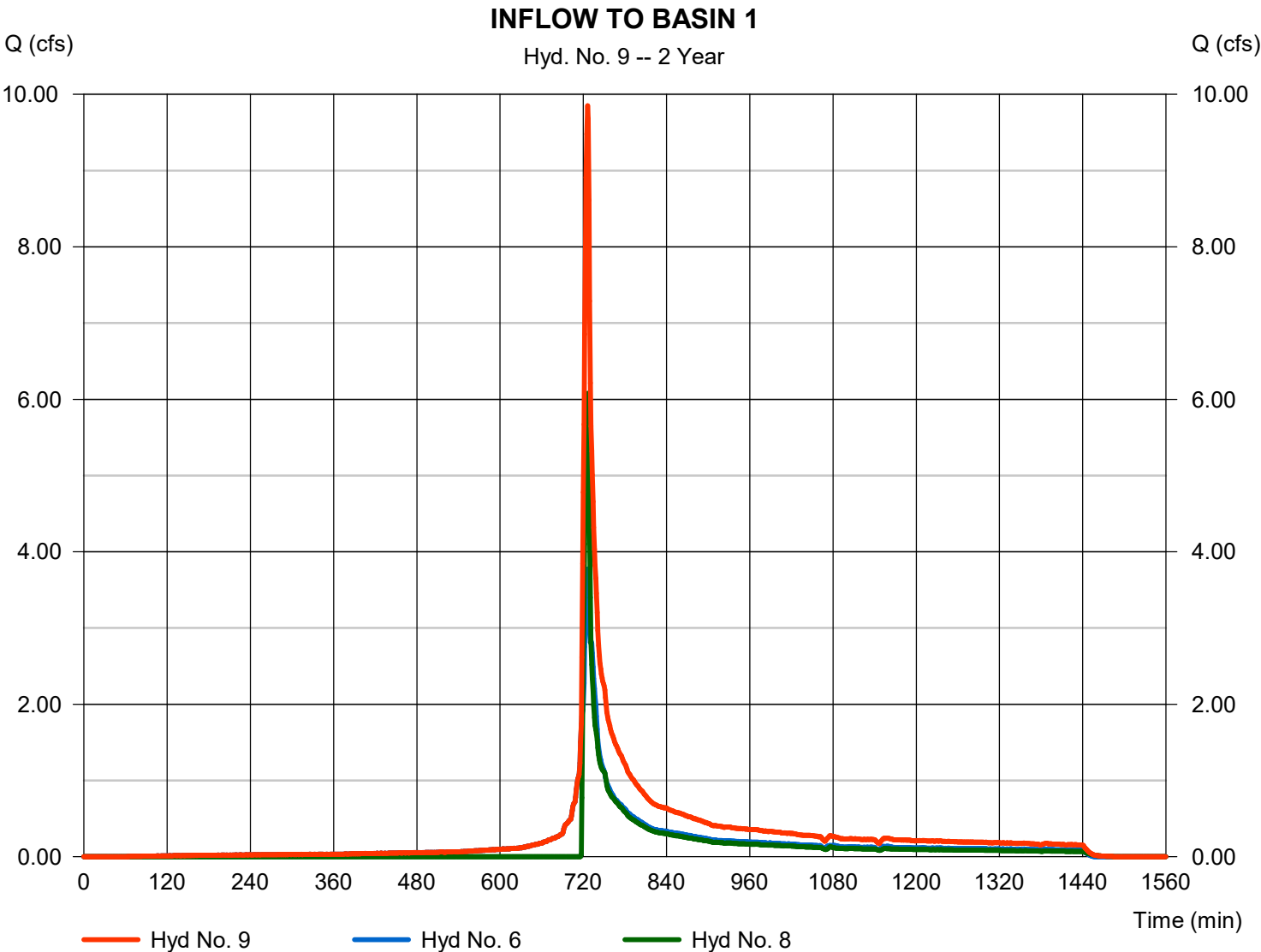
...End

Hydrograph Report

Hyd. No. 9

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 9.852 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 28,407 cuft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 0.000 ac



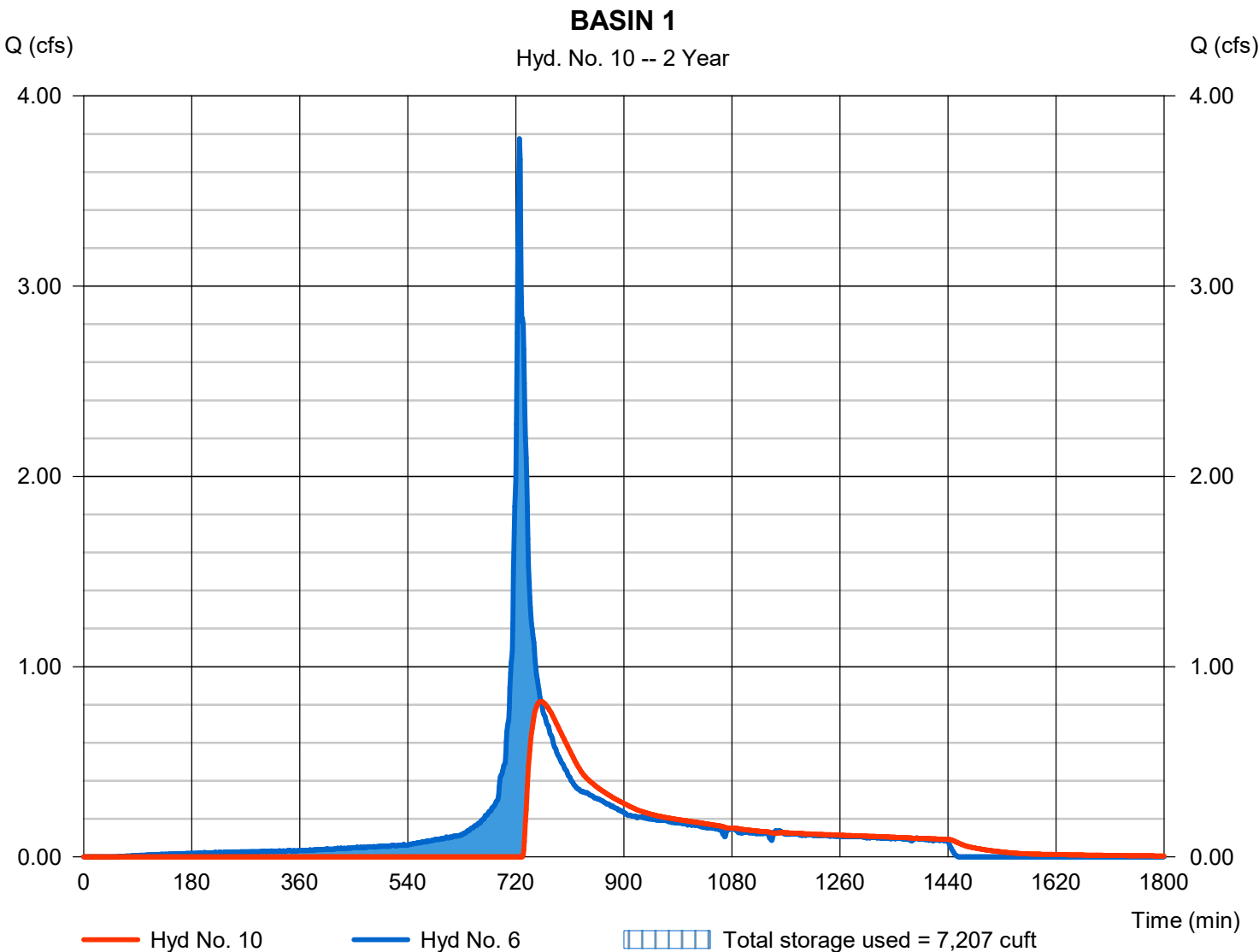
Hydrograph Report

Hyd. No. 10

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 0.817 cfs
Storm frequency	= 2 yrs	Time to peak	= 762 min
Time interval	= 1 min	Hyd. volume	= 10,303 cuft
Inflow hyd. No.	= 6 - PR-1A	Max. Elevation	= 815.46 ft
Reservoir name	= BASIN 1	Max. Storage	= 7,207 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BASIN 1

Pond Data

UG Chambers -Invert elev. = 814.75 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 185.90 ft, No. Barrels = 5, Slope = 0.00%, Headers = Yes
Encasement -Invert elev. = 812.75 ft, Width = 6.00 ft, Height = 5.25 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	812.75	n/a	0	0
0.52	813.28	n/a	1,247	1,247
1.05	813.80	n/a	1,247	2,494
1.58	814.33	n/a	1,247	3,741
2.10	814.85	n/a	1,290	5,031
2.63	815.38	n/a	1,838	6,869
3.15	815.90	n/a	2,095	8,963
3.67	816.42	n/a	2,176	11,139
4.20	816.95	n/a	2,136	13,275
4.72	817.47	n/a	1,953	15,228
5.25	818.00	n/a	1,439	16,667

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 815.00	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)	= 3.50	0.00	0.00	0.00
Crest El. (ft)	= 816.25	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	812.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.05	125	812.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.10	249	812.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.16	374	812.91	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.21	499	812.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.26	624	813.01	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.31	748	813.06	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.37	873	813.12	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.42	998	813.17	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.47	1,122	813.22	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.52	1,247	813.28	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.58	1,372	813.33	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.63	1,496	813.38	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.68	1,621	813.43	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.74	1,746	813.48	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.79	1,871	813.54	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.84	1,995	813.59	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.89	2,120	813.64	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.95	2,245	813.69	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	2,369	813.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.05	2,494	813.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.10	2,619	813.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.15	2,743	813.91	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.21	2,868	813.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.26	2,993	814.01	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.31	3,118	814.06	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.37	3,242	814.11	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.42	3,367	814.17	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.47	3,492	814.22	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.52	3,616	814.27	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.58	3,741	814.33	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.63	3,870	814.38	0.00	---	---	---	0.00	---	---	---	---	---	0.000

BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.68	3,999	814.43	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.73	4,128	814.48	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.78	4,257	814.53	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.84	4,386	814.59	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.89	4,515	814.64	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.94	4,644	814.69	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	4,773	814.74	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.05	4,902	814.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.10	5,031	814.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.15	5,215	814.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.20	5,399	814.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.26	5,582	815.01	0.00 ic	---	---	---	0.00	---	---	---	---	---	0.000
2.31	5,766	815.06	0.02 ic	---	---	---	0.00	---	---	---	---	---	0.016
2.36	5,950	815.11	0.06 ic	---	---	---	0.00	---	---	---	---	---	0.056
2.41	6,134	815.16	0.12 ic	---	---	---	0.00	---	---	---	---	---	0.117
2.47	6,317	815.22	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.200
2.52	6,501	815.27	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.303
2.57	6,685	815.32	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.423
2.63	6,869	815.38	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.562
2.68	7,078	815.43	0.71 ic	---	---	---	0.00	---	---	---	---	---	0.714
2.73	7,288	815.48	0.88 ic	---	---	---	0.00	---	---	---	---	---	0.880
2.78	7,497	815.53	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.057
2.84	7,707	815.59	1.24 ic	---	---	---	0.00	---	---	---	---	---	1.243
2.89	7,916	815.64	1.44 ic	---	---	---	0.00	---	---	---	---	---	1.438
2.94	8,126	815.69	1.63 ic	---	---	---	0.00	---	---	---	---	---	1.634
2.99	8,335	815.74	1.84 ic	---	---	---	0.00	---	---	---	---	---	1.836
3.05	8,544	815.79	2.03 ic	---	---	---	0.00	---	---	---	---	---	2.033
3.10	8,754	815.85	2.23 ic	---	---	---	0.00	---	---	---	---	---	2.225
3.15	8,963	815.90	2.41 ic	---	---	---	0.00	---	---	---	---	---	2.405
3.20	9,181	815.95	2.56 ic	---	---	---	0.00	---	---	---	---	---	2.565
3.26	9,399	816.01	2.69 ic	---	---	---	0.00	---	---	---	---	---	2.687
3.31	9,616	816.06	2.82 ic	---	---	---	0.00	---	---	---	---	---	2.823
3.36	9,834	816.11	2.95 ic	---	---	---	0.00	---	---	---	---	---	2.953
3.41	10,051	816.16	3.08 ic	---	---	---	0.00	---	---	---	---	---	3.078
3.46	10,269	816.22	3.20 ic	---	---	---	0.00	---	---	---	---	---	3.197
3.52	10,487	816.27	3.31 ic	---	---	---	0.03	---	---	---	---	---	3.340
3.57	10,704	816.32	3.42 ic	---	---	---	0.22	---	---	---	---	---	3.639
3.62	10,922	816.37	3.53 ic	---	---	---	0.50	---	---	---	---	---	4.031
3.67	11,139	816.42	3.64 ic	---	---	---	0.85	---	---	---	---	---	4.490
3.73	11,353	816.48	3.74 ic	---	---	---	1.26	---	---	---	---	---	5.003
3.78	11,567	816.53	3.84 ic	---	---	---	1.73	---	---	---	---	---	5.565
3.83	11,780	816.58	3.93 ic	---	---	---	2.23	---	---	---	---	---	6.169
3.88	11,994	816.63	4.03 ic	---	---	---	2.78	---	---	---	---	---	6.811
3.94	12,207	816.69	4.12 ic	---	---	---	3.37	---	---	---	---	---	7.492
3.99	12,421	816.74	4.21 ic	---	---	---	4.00	---	---	---	---	---	8.207
4.04	12,634	816.79	4.30 ic	---	---	---	4.66	---	---	---	---	---	8.955
4.09	12,848	816.84	4.39 ic	---	---	---	5.35	---	---	---	---	---	9.733
4.15	13,062	816.90	4.47 ic	---	---	---	6.07	---	---	---	---	---	10.54
4.20	13,275	816.95	4.55 ic	---	---	---	6.83	---	---	---	---	---	11.38
4.25	13,470	817.00	4.63 ic	---	---	---	7.61	---	---	---	---	---	12.24
4.30	13,666	817.05	4.72 ic	---	---	---	8.42	---	---	---	---	---	13.13
4.36	13,861	817.11	4.79 ic	---	---	---	9.25	---	---	---	---	---	14.05
4.41	14,056	817.16	4.87 ic	---	---	---	10.12	---	---	---	---	---	14.99
4.46	14,252	817.21	4.95 ic	---	---	---	11.01	---	---	---	---	---	15.95
4.51	14,447	817.27	5.02 ic	---	---	---	11.92	---	---	---	---	---	16.94
4.57	14,642	817.32	5.10 ic	---	---	---	12.85	---	---	---	---	---	17.95
4.62	14,838	817.37	5.17 ic	---	---	---	13.81	---	---	---	---	---	18.98
4.67	15,033	817.42	5.24 ic	---	---	---	14.80	---	---	---	---	---	20.04
4.72	15,228	817.47	5.31 ic	---	---	---	15.80	---	---	---	---	---	21.12
4.78	15,372	817.53	5.38 ic	---	---	---	16.83	---	---	---	---	---	22.21
4.83	15,516	817.58	5.45 ic	---	---	---	17.88	---	---	---	---	---	23.33
4.88	15,660	817.63	5.52 ic	---	---	---	18.94	---	---	---	---	---	24.46
4.93	15,804	817.68	5.59 ic	---	---	---	20.03	---	---	---	---	---	25.62
4.99	15,948	817.74	5.66 ic	---	---	---	21.14	---	---	---	---	---	26.80
5.04	16,092	817.79	5.72 ic	---	---	---	22.27	---	---	---	---	---	27.99
5.09	16,236	817.84	5.79 ic	---	---	---	23.42	---	---	---	---	---	29.21
5.14	16,380	817.89	5.85 ic	---	---	---	24.59	---	---	---	---	---	30.44
5.20	16,524	817.95	5.92 ic	---	---	---	25.77	---	---	---	---	---	31.69
5.25	16,667	818.00	5.98 ic	---	---	---	26.98	---	---	---	---	---	32.96

...End

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1B (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	1.11	67.71
WOODS	B	55	0.00	0.00
Total			1.11	67.71

$$CN = \frac{67.7}{1.1} = 61$$

DRAINAGE AREA DESIGNATION: PR-1B (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.48	47.04
Total			0.48	47.04

$$CN = \frac{47.0}{0.5} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1B PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	7.9 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
FLOW LENGTH, L (FT)=	180			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	15			
AVERAGE VELOCITY, V (FT/S)=	2.70			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	1.1 MIN.			

CHANNEL FLOW:

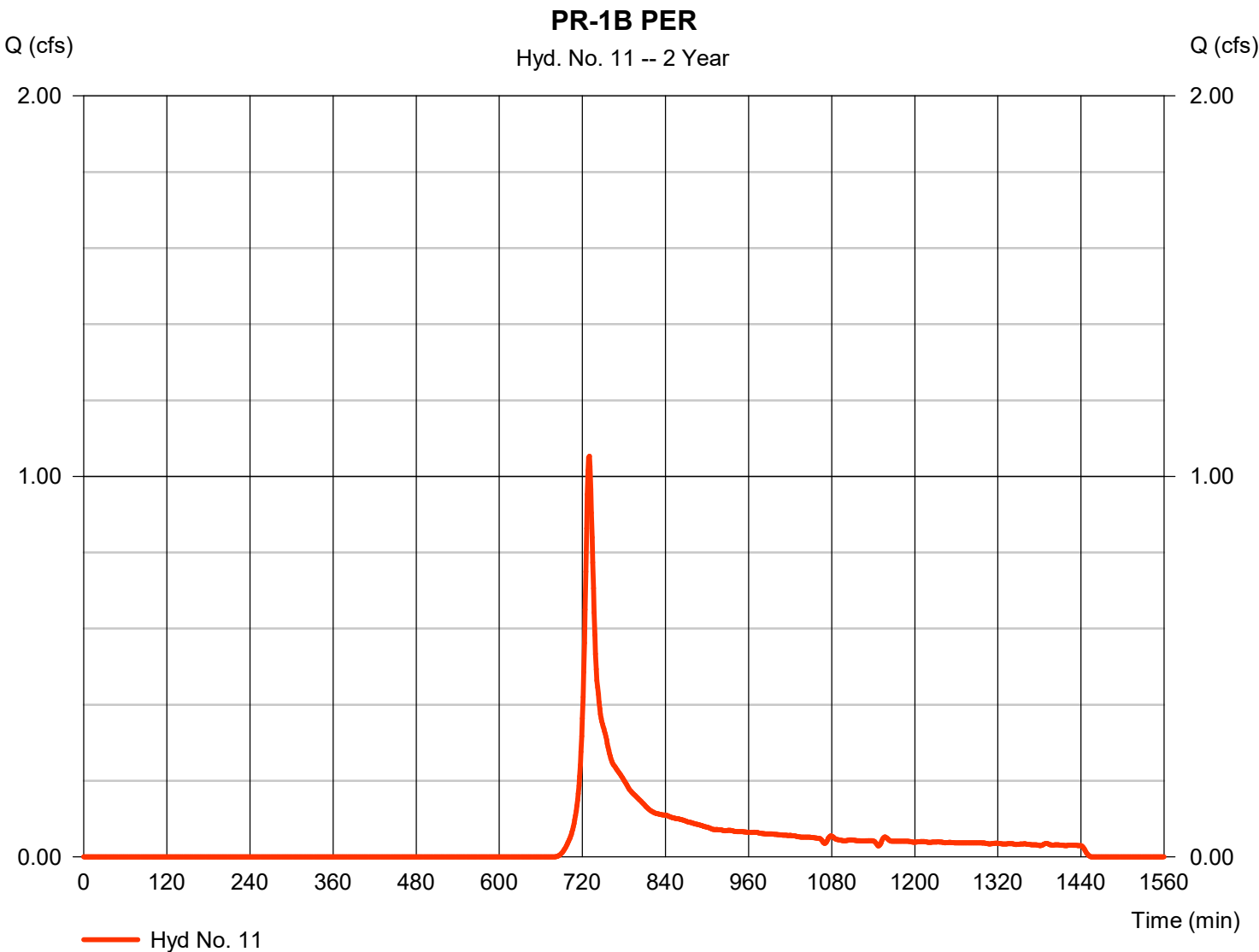
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	7.9 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	1.1 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	9.0 MIN.	

Hydrograph Report

Hyd. No. 11

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 1.053 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 4,104 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1B IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	70 (100 MAX)	30 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39	4.39		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7	20		
SHEET FLOW TIME, T _c (MIN.)=	0.5 MIN.	1.9 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	55			
LAND SLOPE, S (%)=	18			
AVERAGE VELOCITY, V (FT/S)=	2.95			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.3 MIN.			

CHANNEL FLOW:

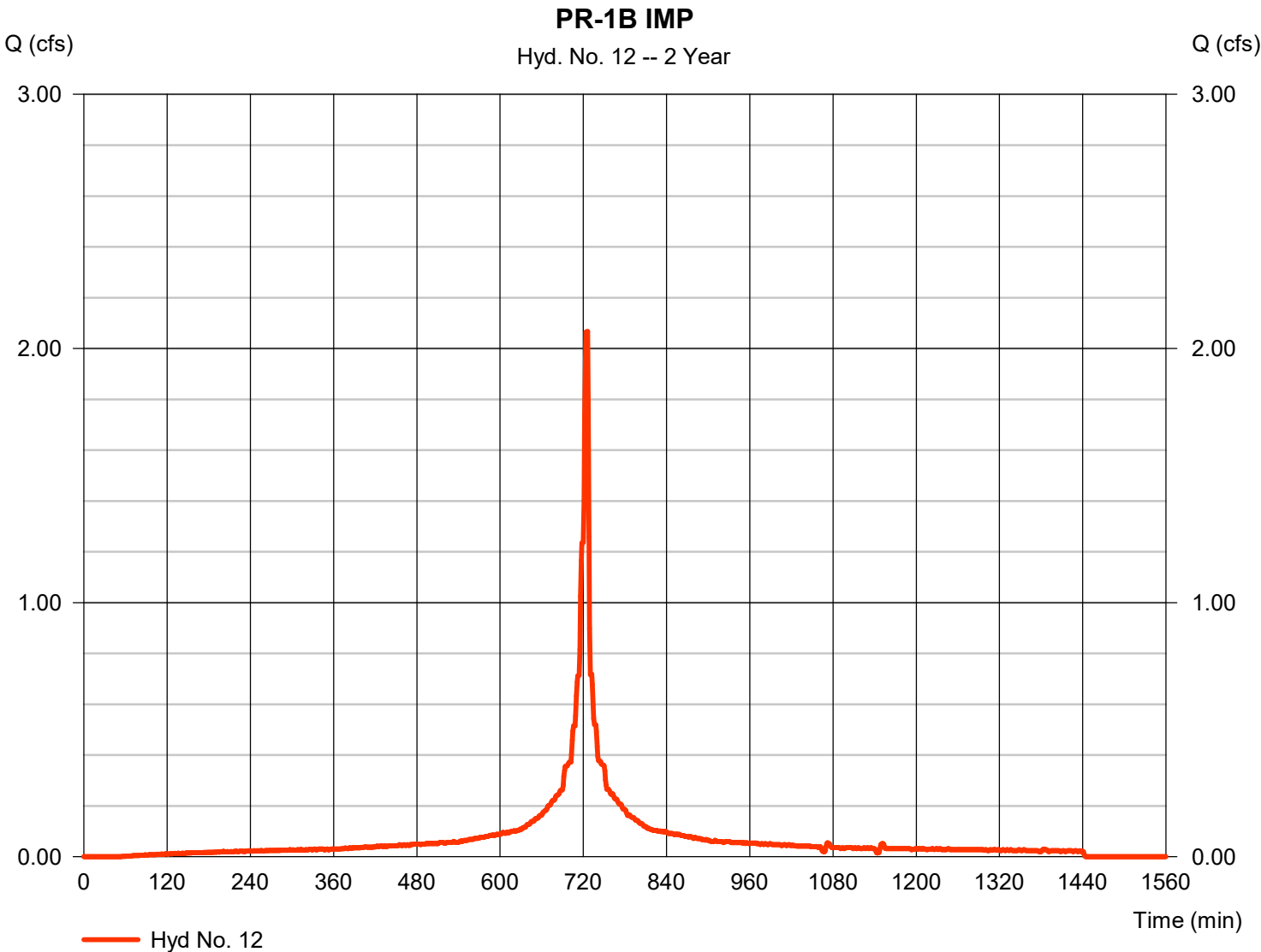
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	2.3 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.3 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	2.6 MIN.	

Hydrograph Report

Hyd. No. 12

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 2.067 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 6,786 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

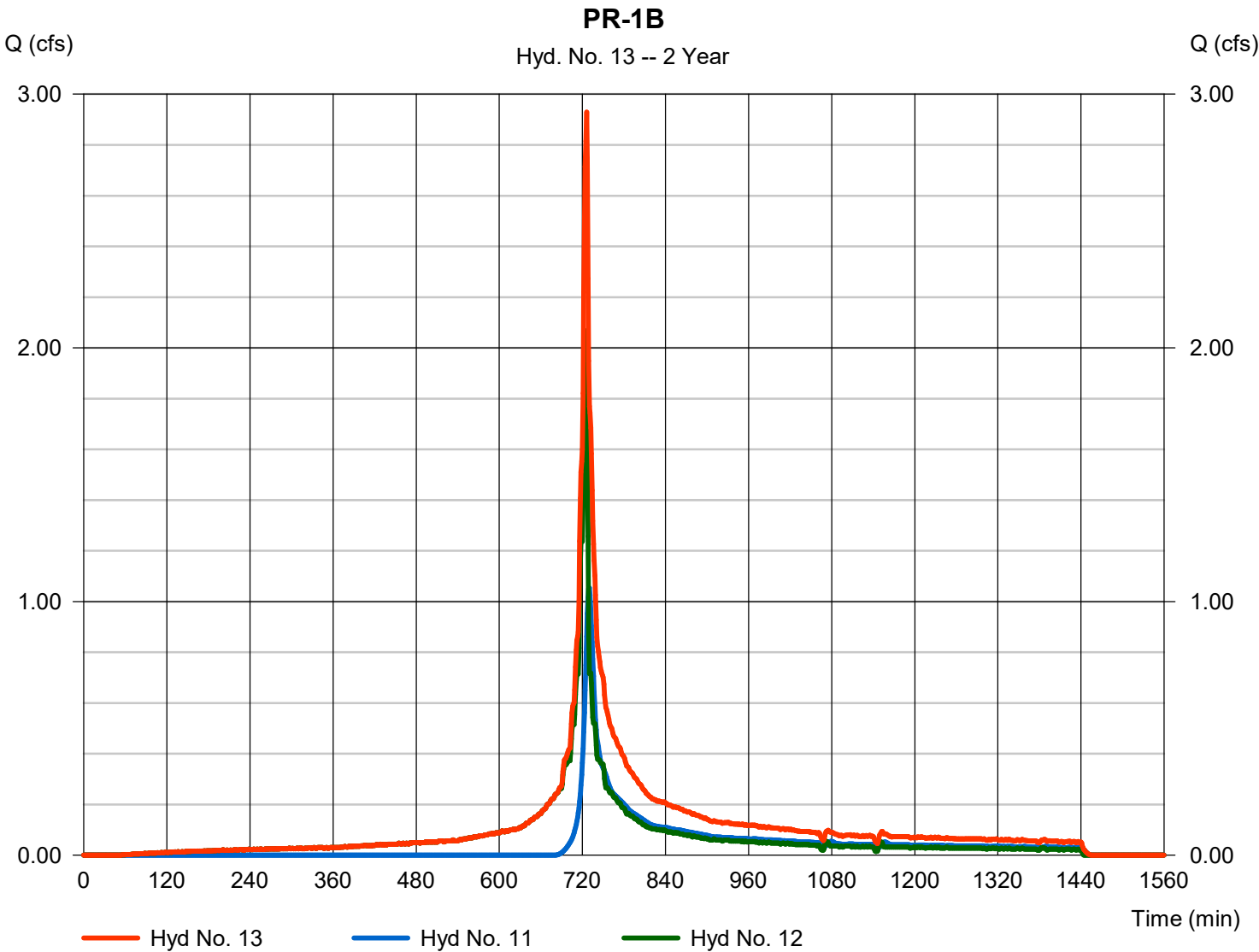


Hydrograph Report

Hyd. No. 13

PR-1B

Hydrograph type	= Combine	Peak discharge	= 2.930 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 10,890 cuft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 1.590 ac

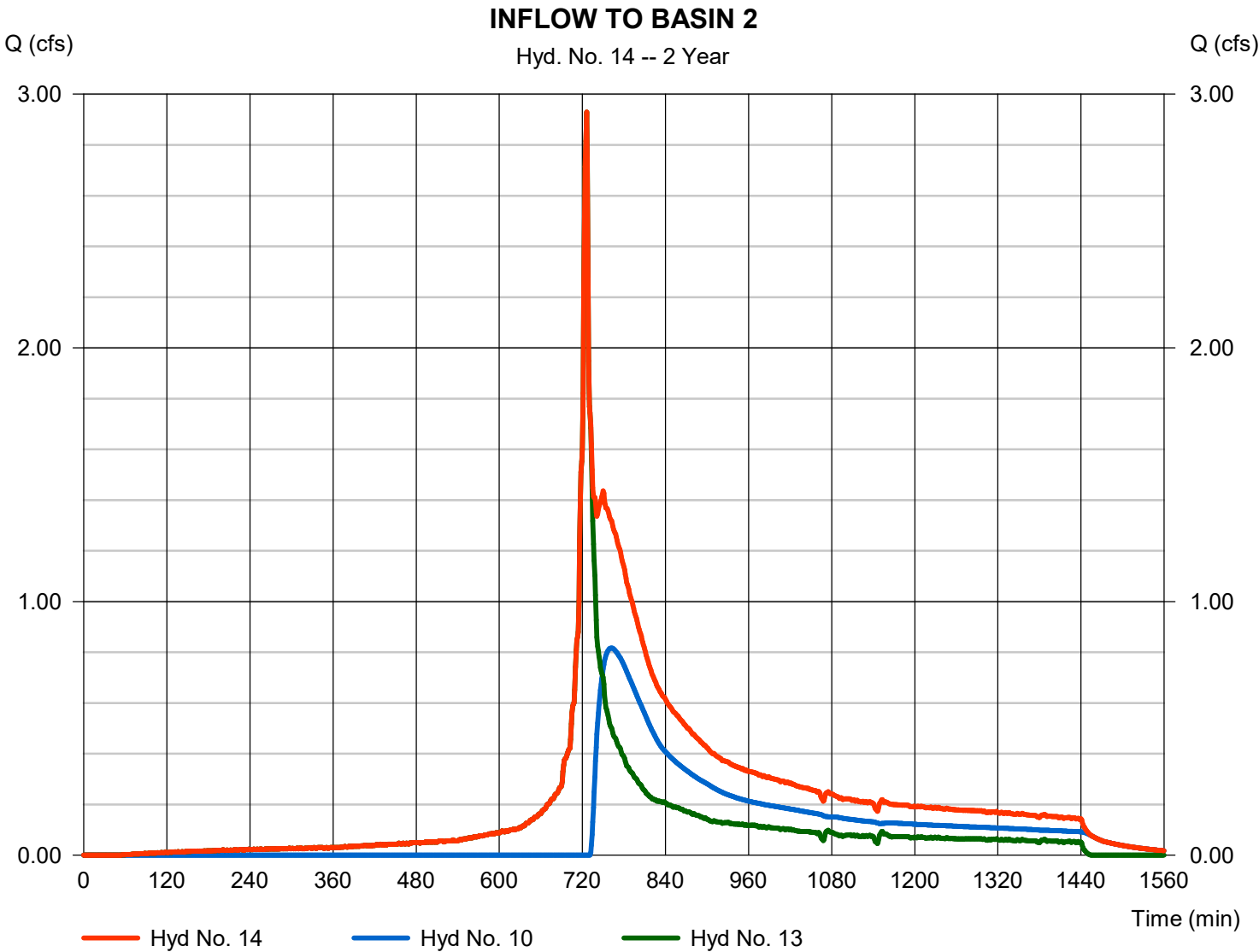


Hydrograph Report

Hyd. No. 14

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 2.930 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 21,192 cuft
Inflow hyds.	= 10, 13	Contrib. drain. area	= 0.000 ac



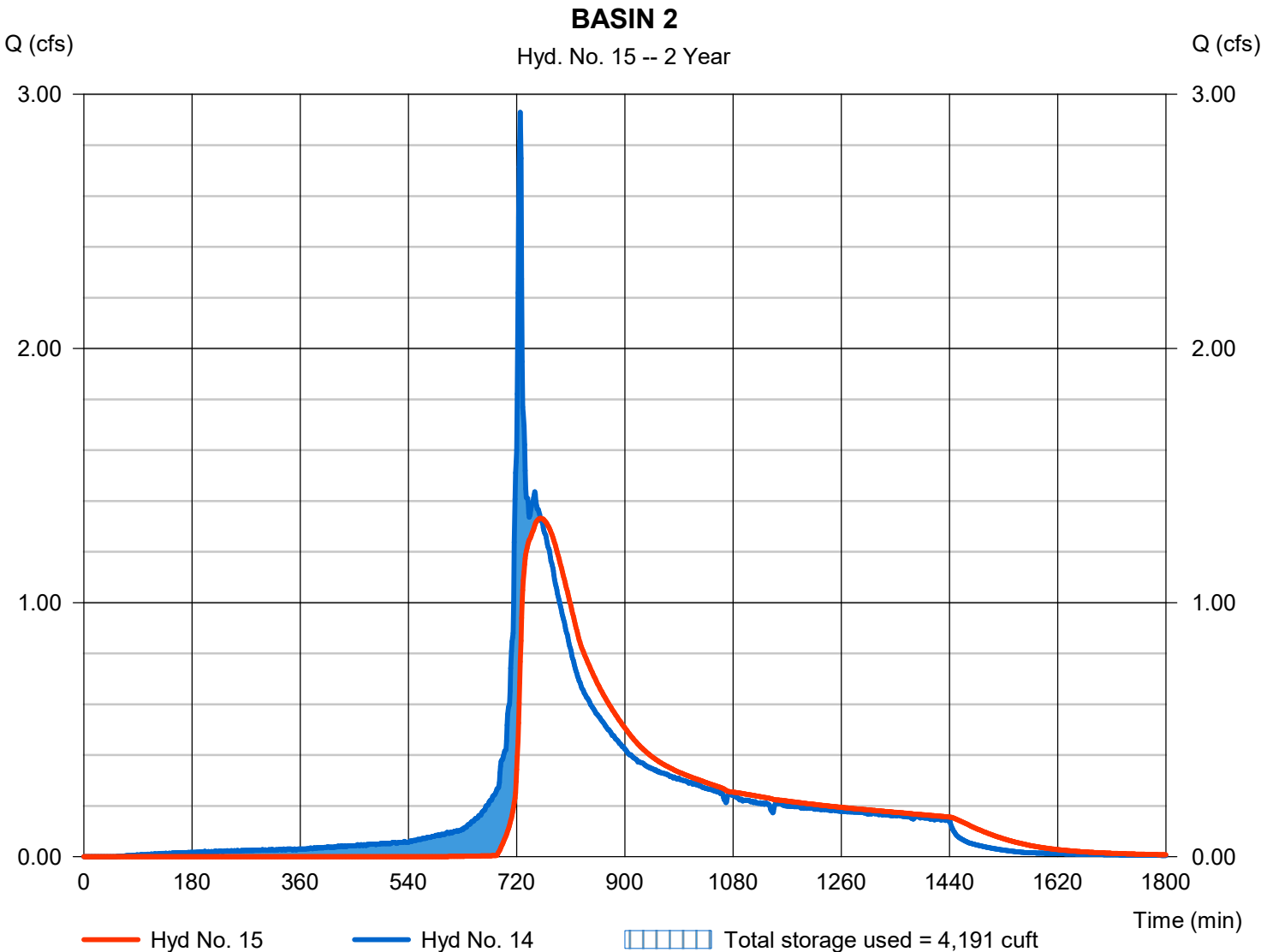
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 1.331 cfs
Storm frequency	= 2 yrs	Time to peak	= 759 min
Time interval	= 1 min	Hyd. volume	= 19,584 cuft
Inflow hyd. No.	= 14 - INFLOW TO BASIN 2	Max. Elevation	= 792.92 ft
Reservoir name	= BASIN 2	Max. Storage	= 4,191 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Thursday, 07 / 9 / 2026

Pond No. 2 - BASIN 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 792.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	792.00	4,540	0	0
2.00	794.00	4,595	9,134	9,134
4.00	796.00	4,640	9,234	18,368

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 792.37	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)	= 2.33	0.00	0.00	0.00
Crest El. (ft)	= 793.34	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	792.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.20	913	792.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.40	1,827	792.40	0.00 ic	---	---	---	0.00	---	---	---	---	---	0.005
0.60	2,740	792.60	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.254
0.80	3,654	792.80	0.83 ic	---	---	---	0.00	---	---	---	---	---	0.835
1.00	4,567	793.00	1.68 ic	---	---	---	0.00	---	---	---	---	---	1.678
1.20	5,480	793.20	2.68 ic	---	---	---	0.00	---	---	---	---	---	2.685
1.40	6,394	793.40	3.74 ic	---	---	---	0.11	---	---	---	---	---	3.853
1.60	7,307	793.60	4.62 ic	---	---	---	1.03	---	---	---	---	---	5.647
1.80	8,221	793.80	5.30 ic	---	---	---	2.42	---	---	---	---	---	7.723
2.00	9,134	794.00	5.92 ic	---	---	---	4.16	---	---	---	---	---	10.08
2.20	10,057	794.20	6.49 ic	---	---	---	6.19	---	---	---	---	---	12.67
2.40	10,981	794.40	7.00 ic	---	---	---	8.47	---	---	---	---	---	15.47
2.60	11,904	794.60	7.48 ic	---	---	---	10.97	---	---	---	---	---	18.46
2.80	12,828	794.80	7.94 ic	---	---	---	13.69	---	---	---	---	---	21.62
3.00	13,751	795.00	8.37 ic	---	---	---	16.60	---	---	---	---	---	24.96
3.20	14,674	795.20	8.77 ic	---	---	---	19.68	---	---	---	---	---	28.46
3.40	15,598	795.40	9.16 ic	---	---	---	22.94	---	---	---	---	---	32.10
3.60	16,521	795.60	9.54 ic	---	---	---	26.36	---	---	---	---	---	35.90
3.80	17,445	795.80	9.90 ic	---	---	---	29.94	---	---	---	---	---	39.83
4.00	18,368	796.00	10.24 ic	---	---	---	33.66	---	---	---	---	---	43.90

CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1C (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.10	6.10
WOODS	B	55	0.00	0.00
Total			0.10	6.10

$$CN = \frac{6.1}{0.1} = 61$$

DRAINAGE AREA DESIGNATION: PR-1C (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.15	14.70
Total			0.15	14.70

$$CN = \frac{14.7}{0.2} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1C PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	85 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	25			
SHEET FLOW TIME, T _c (MIN.)=	3.9 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=				
FLOW LENGTH, L (FT)=				
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=				
AVERAGE VELOCITY, V (FT/S)=				
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=				

CHANNEL FLOW:

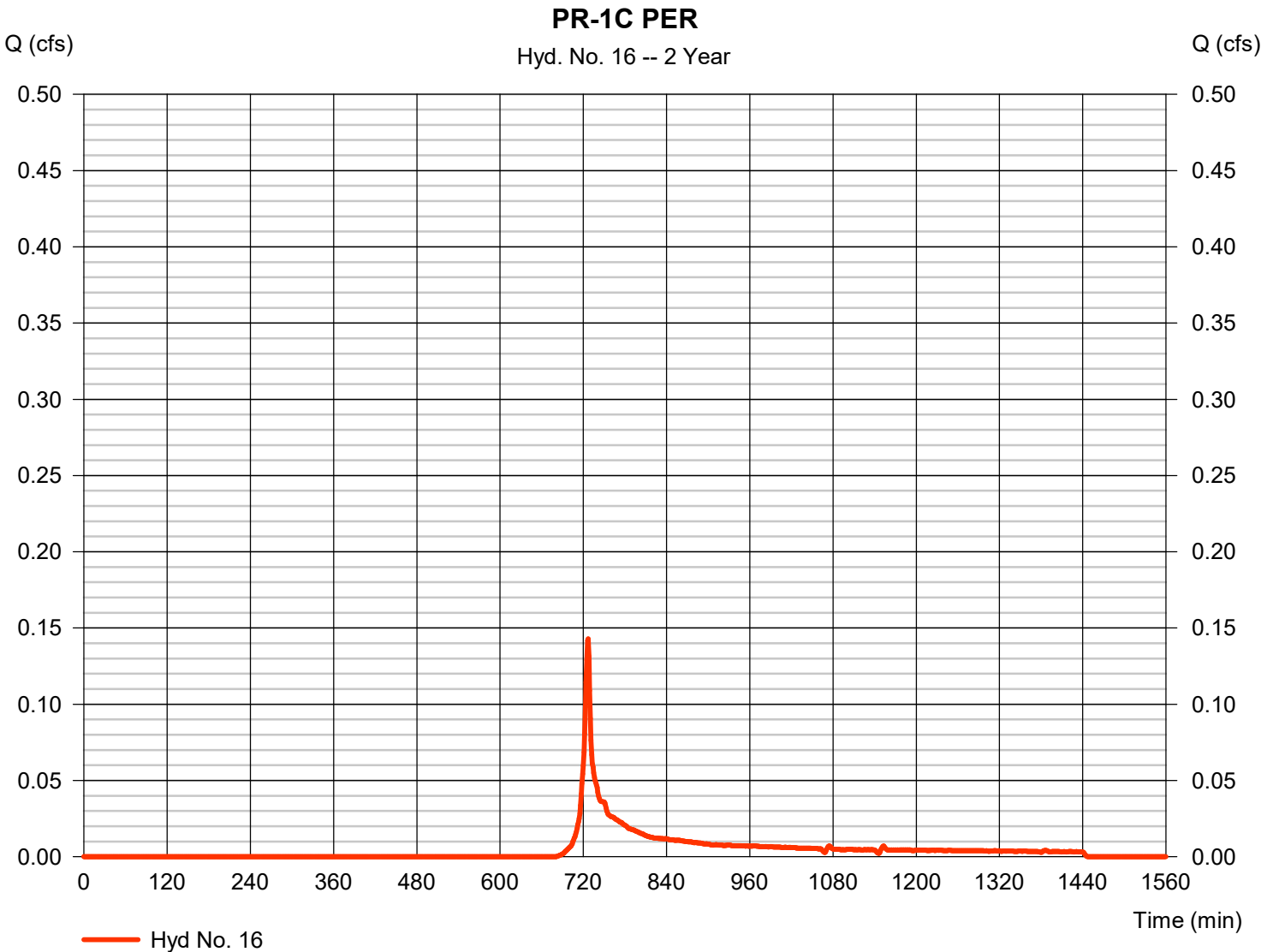
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	3.9 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.0 MIN.	TIME OF CONCENTRATION=	3.9 MIN.	
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 16

PR-1C PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.143 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 444 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 3.90 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1C IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	10			
SHEET FLOW TIME, T _c (MIN.)=	0.5 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
FLOW LENGTH, L (FT)=	15			
$T_c = \frac{L}{3600V}$ LAND SLOPE, S (%)=	25			
AVERAGE VELOCITY, V (FT/S)=	3.48			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.1 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
CHANNEL SLOPE, S (%)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.5 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.1 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 0.6 MIN.

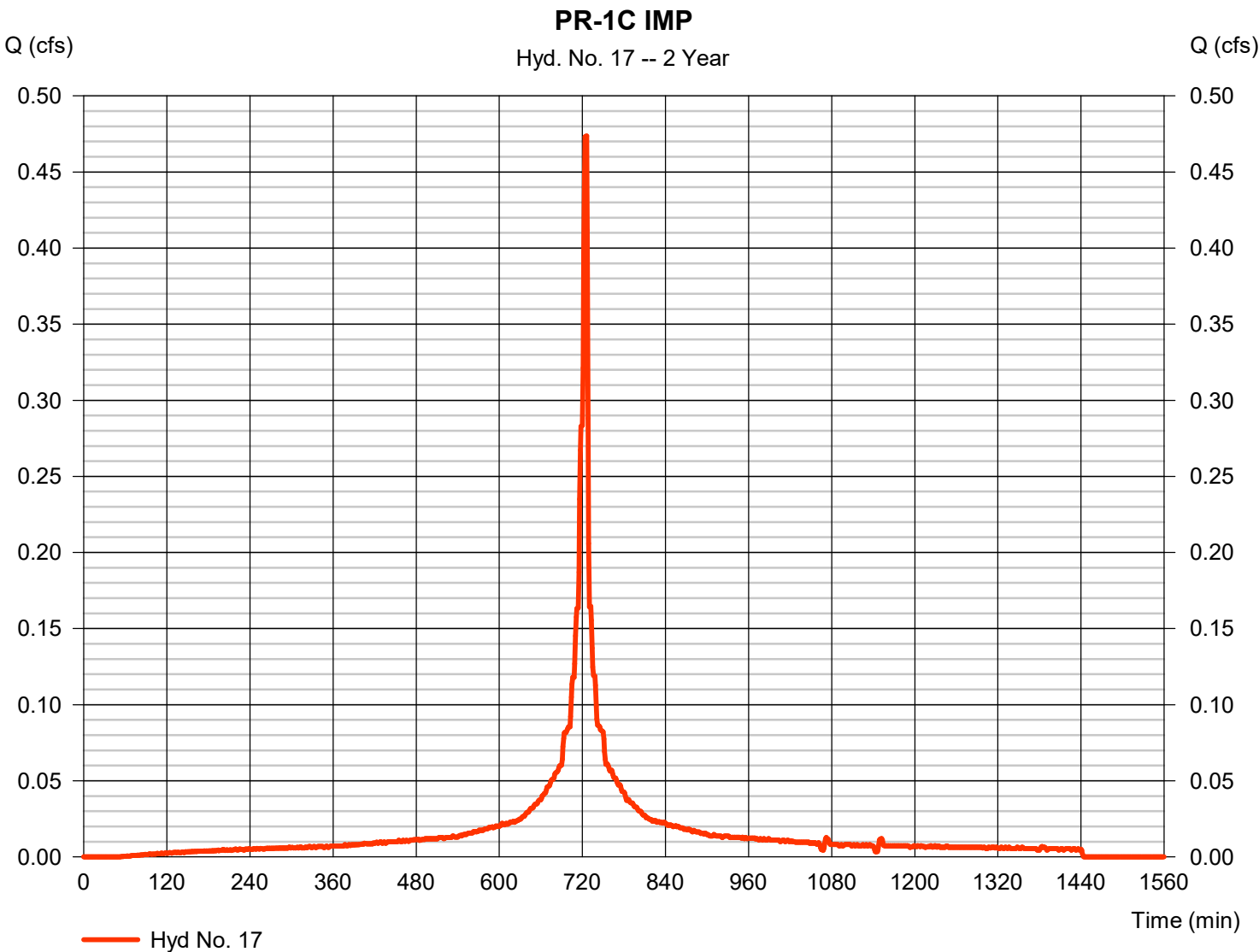
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 17

PR-1C IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.474 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,555 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

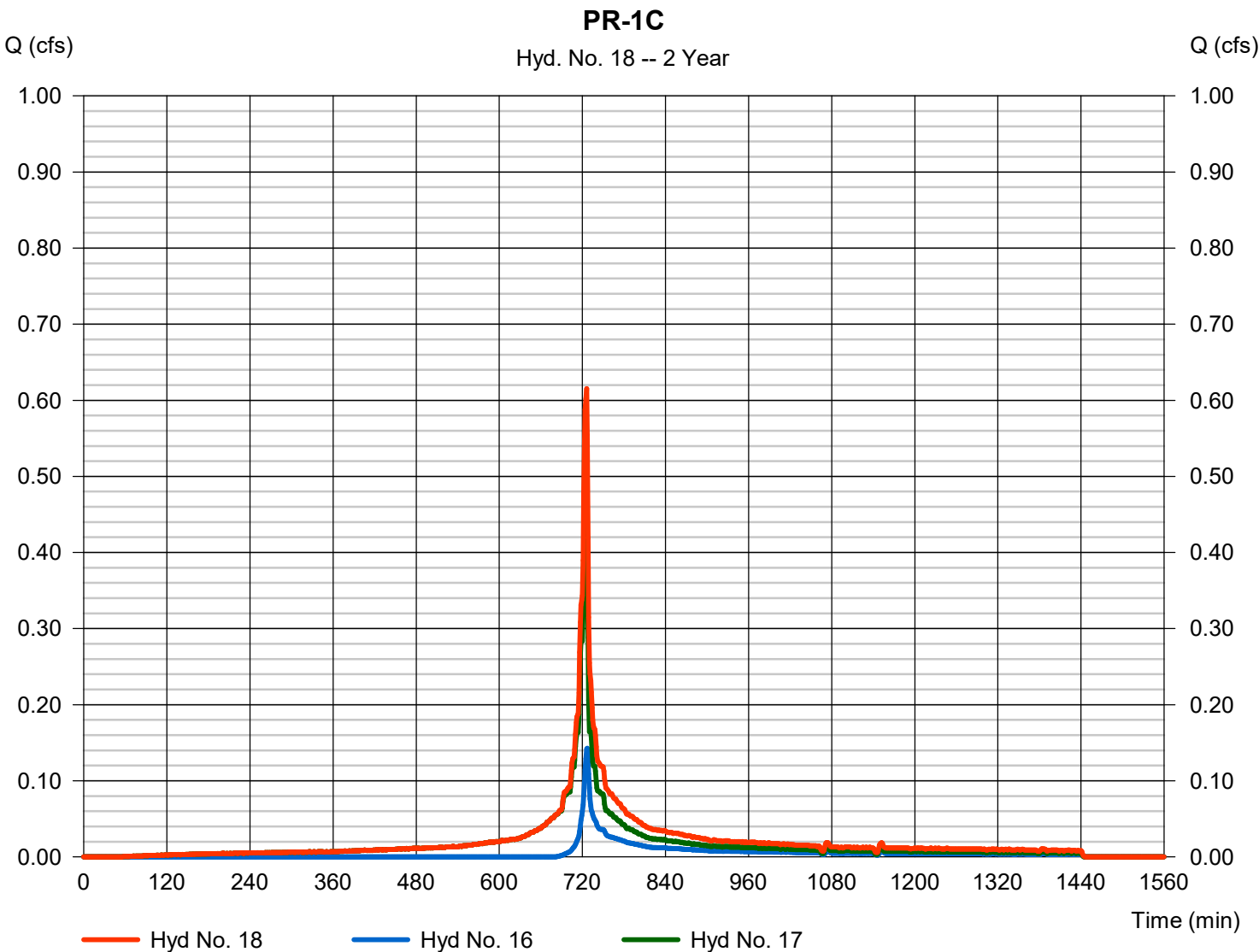


Hydrograph Report

Hyd. No. 18

PR-1C

Hydrograph type	= Combine	Peak discharge	= 0.615 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,999 cuft
Inflow hyds.	= 16, 17	Contrib. drain. area	= 0.230 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1D (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.20	12.20
WOODS	B	55	0.00	0.00
Total			0.20	12.20

$$CN = \frac{12.2}{0.2} = 61$$

DRAINAGE AREA DESIGNATION: PR-1D (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.20	19.60
Total			0.20	19.60

$$CN = \frac{19.6}{0.2} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1D PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	16			
SHEET FLOW TIME, T _c (MIN.)=	5.3 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	90			
LAND SLOPE, S (%)=	10			
AVERAGE VELOCITY, V (FT/S)=	2.20			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.7 MIN.			

CHANNEL FLOW:

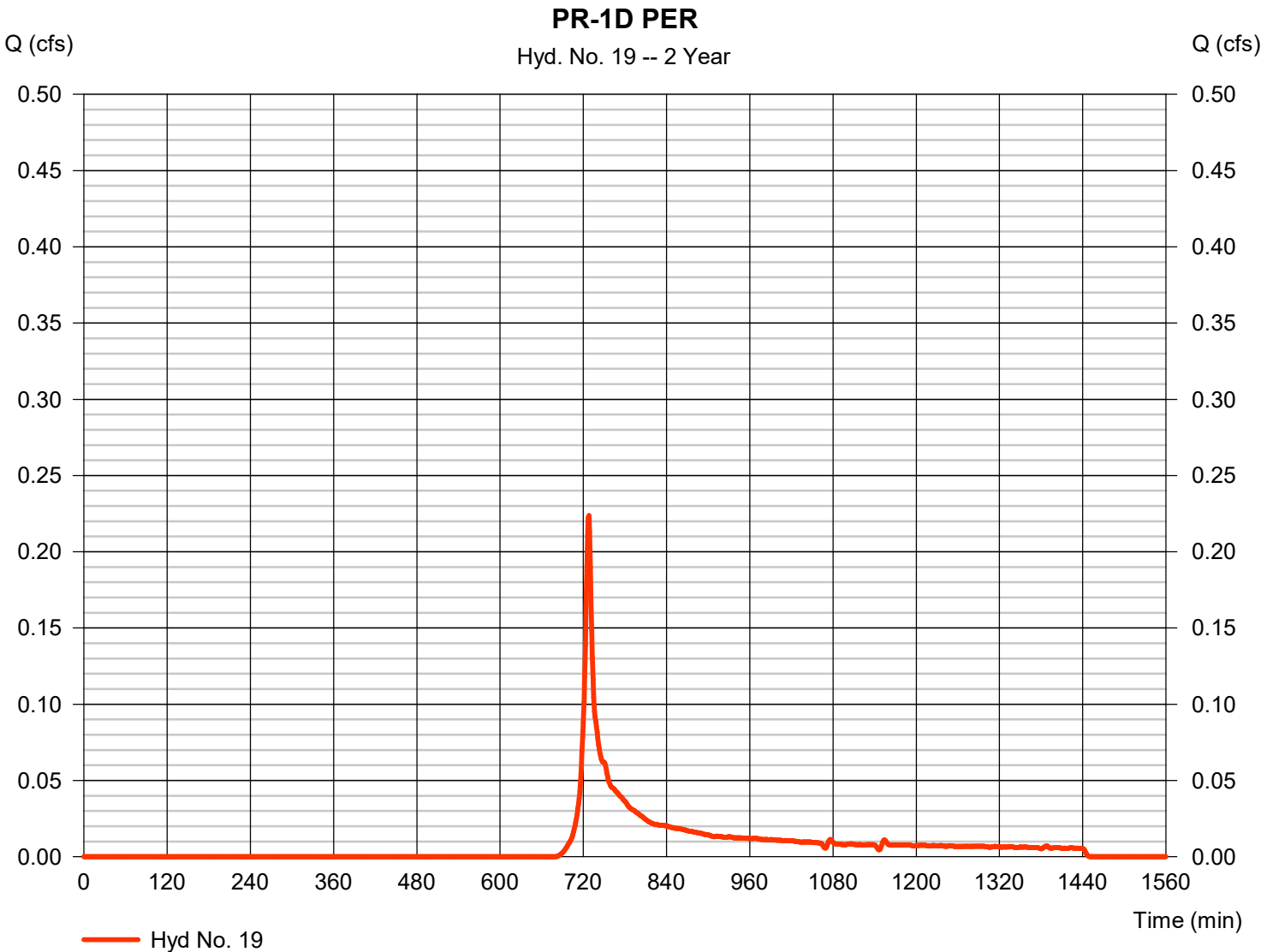
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	5.3 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	6.0 MIN.	

Hydrograph Report

Hyd. No. 19

PR-1D PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.224 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 763 cuft
Drainage area	= 0.200 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1D IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)	80 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39	4.39		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	20	14		
SHEET FLOW TIME, T _c (MIN.)=	0.4 MIN.	4.7 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
LAND SLOPE, S (%)=				
AVERAGE VELOCITY, V (FT/S)=				
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=				

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	5.1 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.0 MIN.	TIME OF CONCENTRATION=	5.1 MIN.	
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

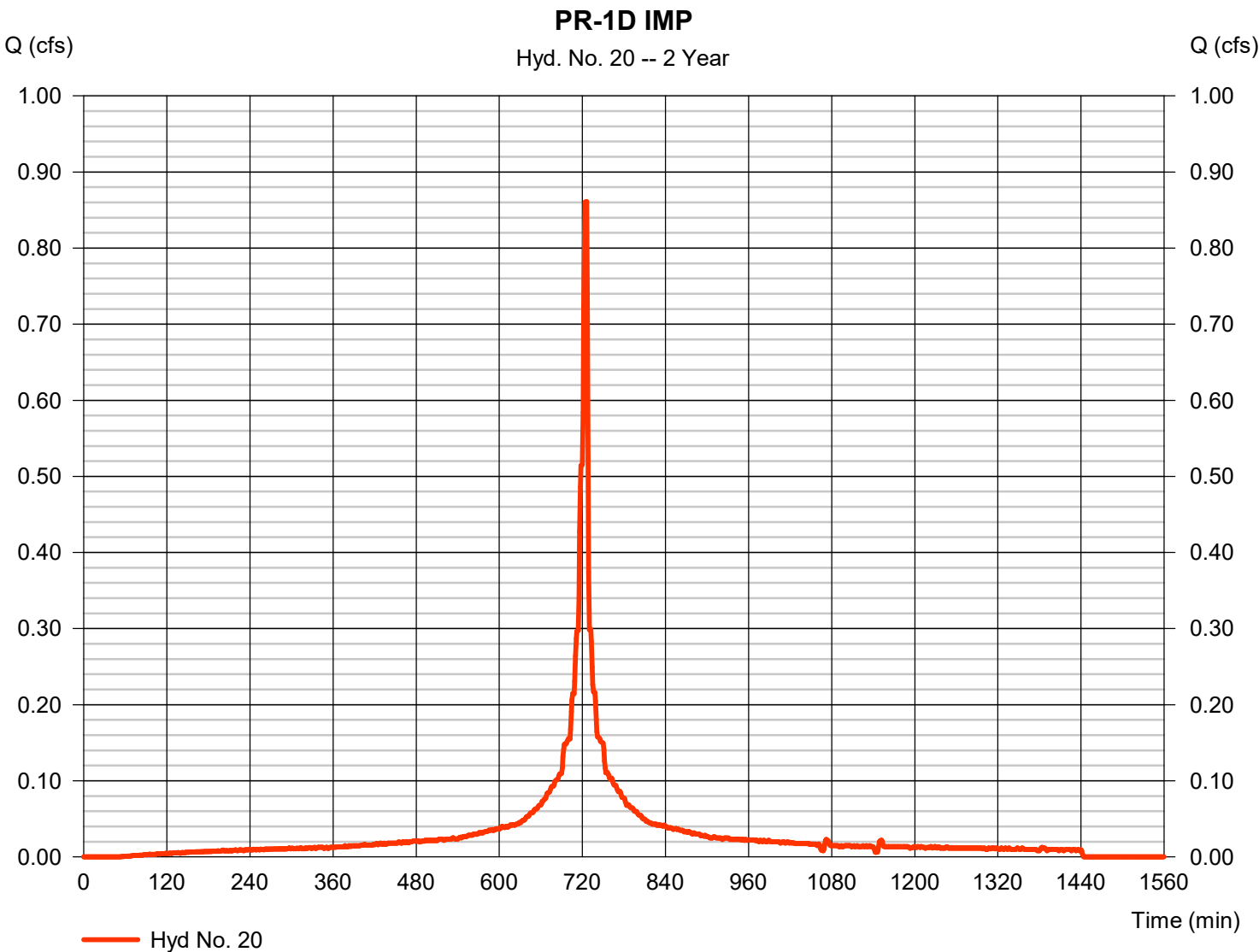
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 20

PR-1D IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.861 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,827 cuft
Drainage area	= 0.200 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

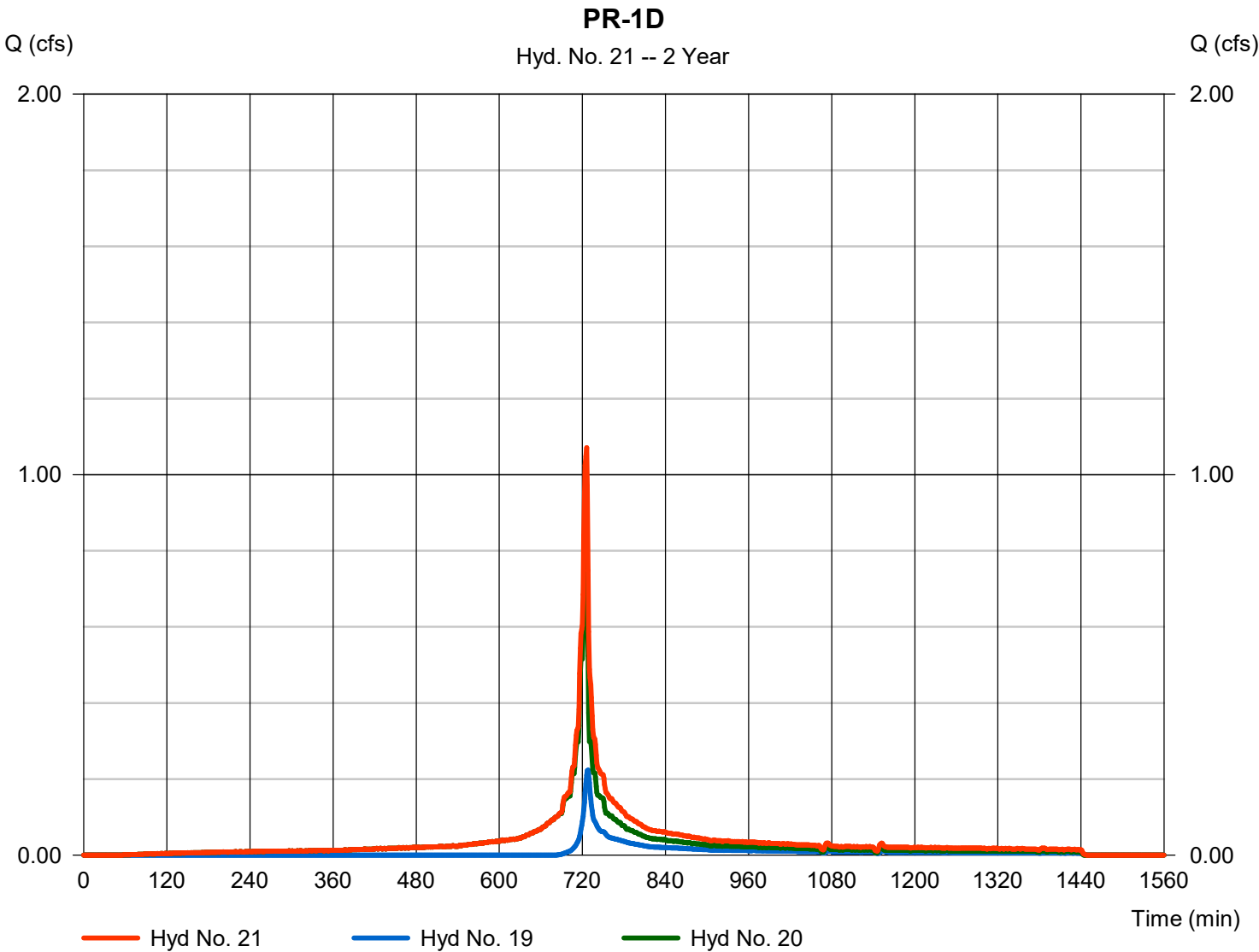


Hydrograph Report

Hyd. No. 21

PR-1D

Hydrograph type	= Combine	Peak discharge	= 1.071 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,590 cuft
Inflow hyds.	= 19, 20	Contrib. drain. area	= 0.400 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1E (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.15	9.15
WOODS	B	55	0.00	0.00
Total			0.15	9.15

$$CN = \frac{9.2}{0.2} = 61$$

DRAINAGE AREA DESIGNATION: PR-1E (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.11	10.78
Total			0.11	10.78

$$CN = \frac{10.8}{0.1} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1E PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	8			
SHEET FLOW TIME, T _c (MIN.)=	7.0 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	80			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.7 MIN.			

CHANNEL FLOW:

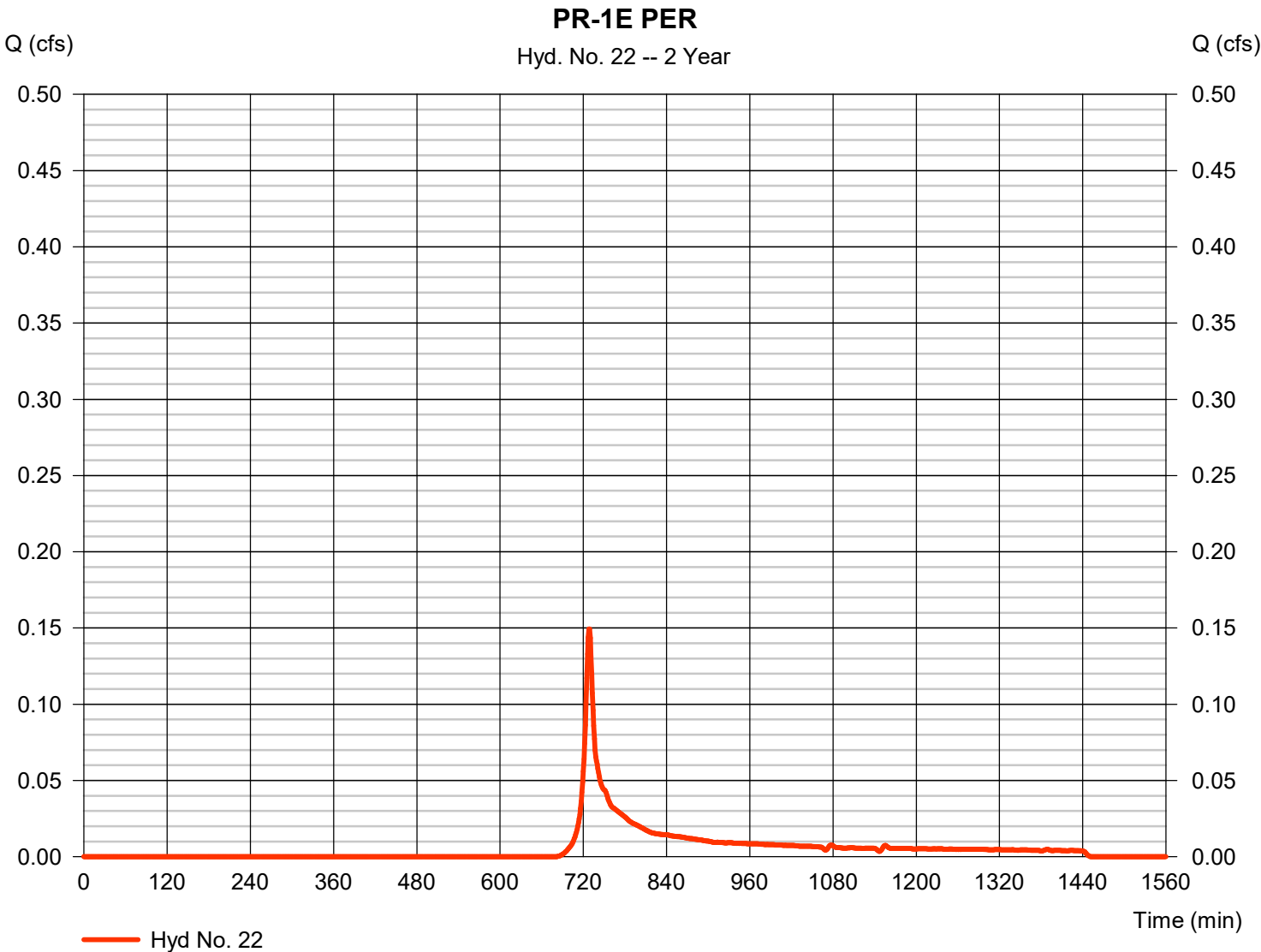
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	7.0 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	7.7 MIN.	

Hydrograph Report

Hyd. No. 22

PR-1E PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.149 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 541 cuft
Drainage area	= 0.150 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.70 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1E IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	30 (100 MAX)	70 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39	4.39		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	2	8		
SHEET FLOW TIME, T _c (MIN.)=	0.4 MIN.	5.3 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	80			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.7 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	5.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.7 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 6.3 MIN.

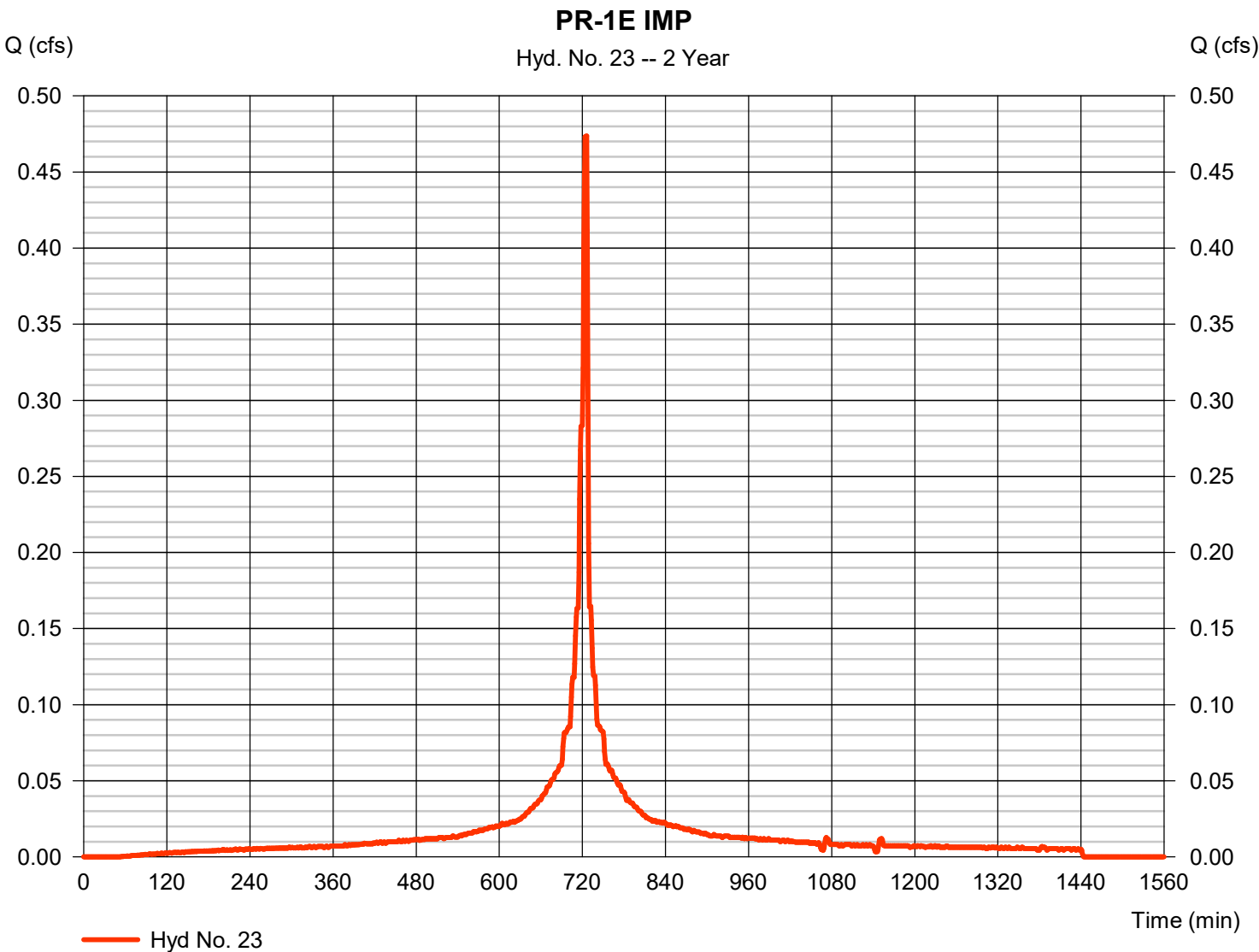
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 23

PR-1E IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.474 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,555 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

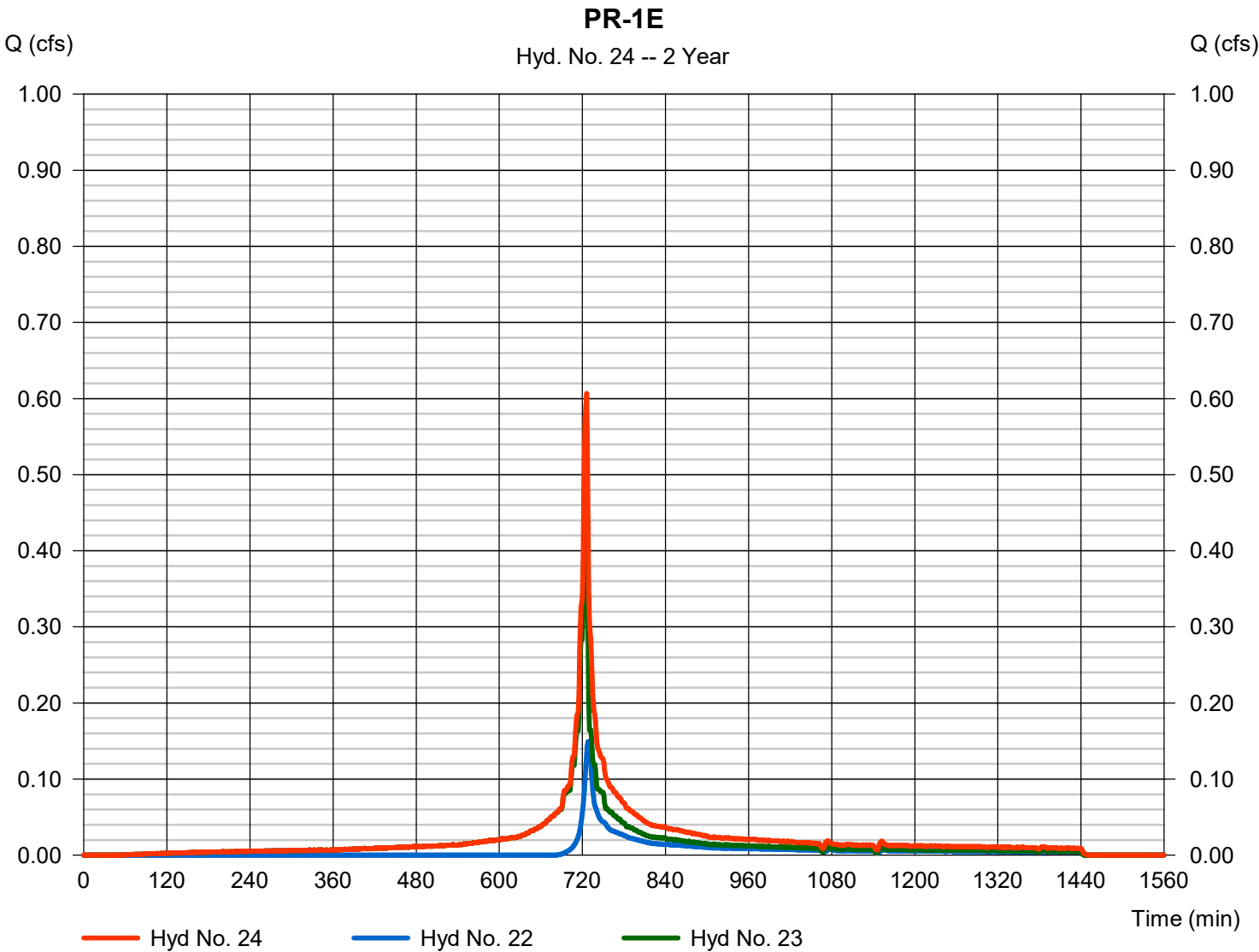


Hydrograph Report

Hyd. No. 24

PR-1E

Hydrograph type	= Combine	Peak discharge	= 0.607 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,096 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.260 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1F (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	0.12	7.32
WOODS	B	55	0.00	0.00
Total			0.12	7.32

$$CN = \frac{7.3}{0.1} = 61$$

DRAINAGE AREA DESIGNATION: PR-1F (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	B	98	0.11	10.78
Total			0.11	10.78

$$CN = \frac{10.8}{0.1} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1E PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.24			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	8			
SHEET FLOW TIME, T _c (MIN.)=	7.0 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	70			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.6 MIN.			

CHANNEL FLOW:

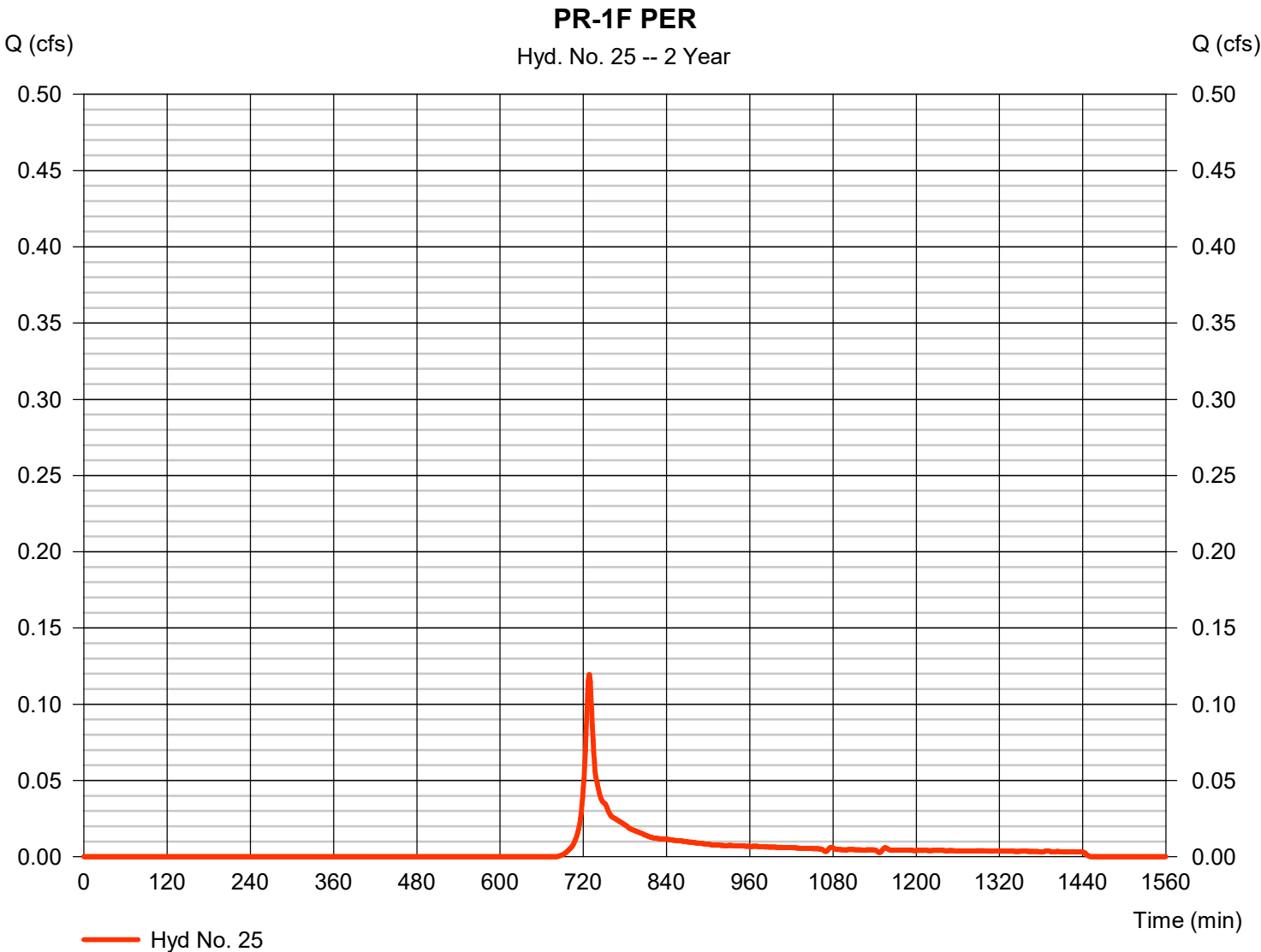
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	7.0 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.6 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
		TIME OF CONCENTRATION=	7.6 MIN.	

Hydrograph Report

Hyd. No. 25

PR-1F PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.119 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 433 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1F IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011	0.24		
FLOW LENGTH, L (FT, 100 MAX)=	30 (100 MAX)	70 (100 MAX)		
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39	4.39		
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	2	8		
SHEET FLOW TIME, T _c (MIN.)=	0.4 MIN.	5.3 MIN.		

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	SHORT-GRASS			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	70			
LAND SLOPE, S (%)=	8			
AVERAGE VELOCITY, V (FT/S)=	1.97			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	0.6 MIN.			

CHANNEL FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	5.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	0.6 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

TIME OF CONCENTRATION= 6.2 MIN.

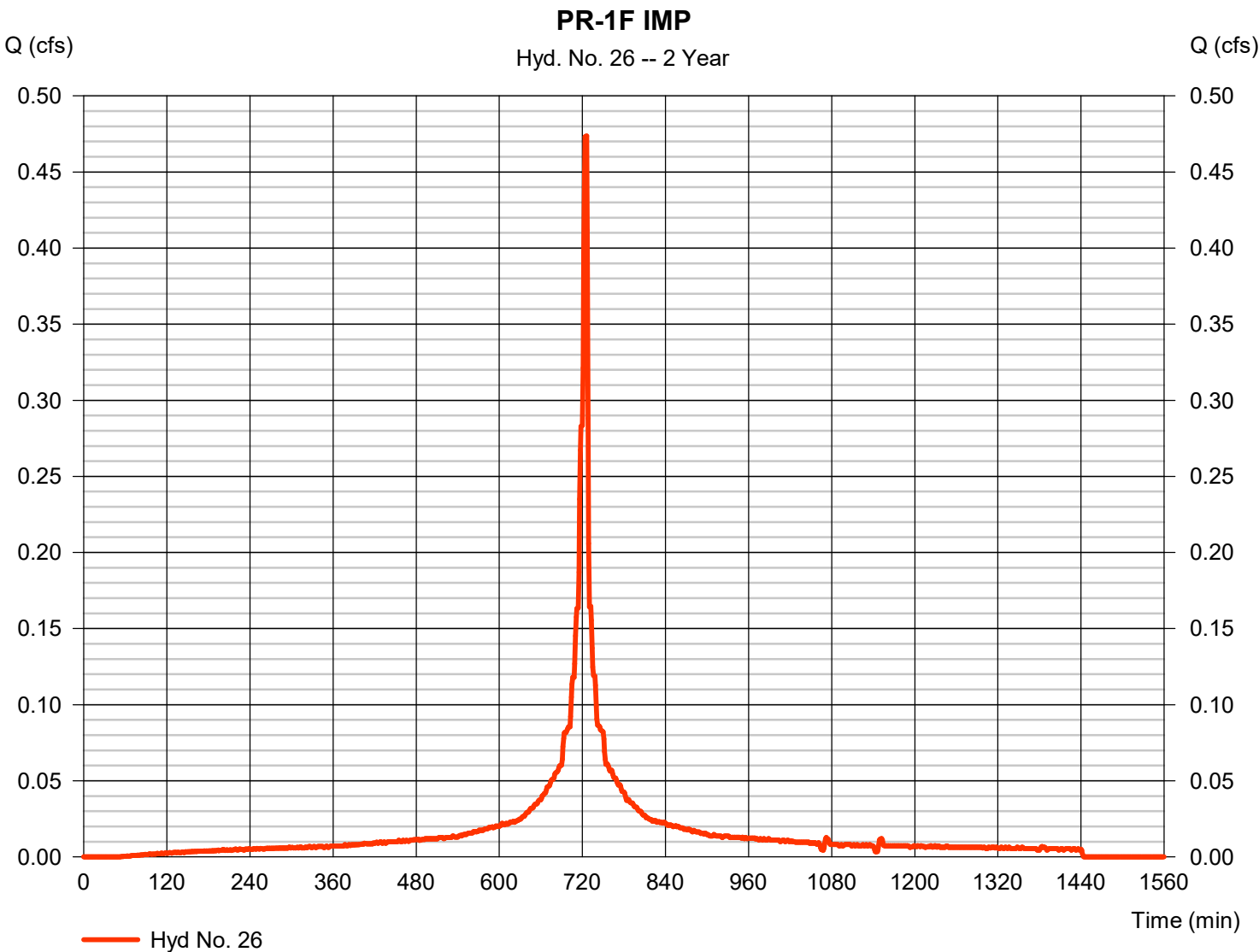
Use Default T_c = 1.6 min for 1 min. interval

Hydrograph Report

Hyd. No. 26

PR-1F IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.474 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,555 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

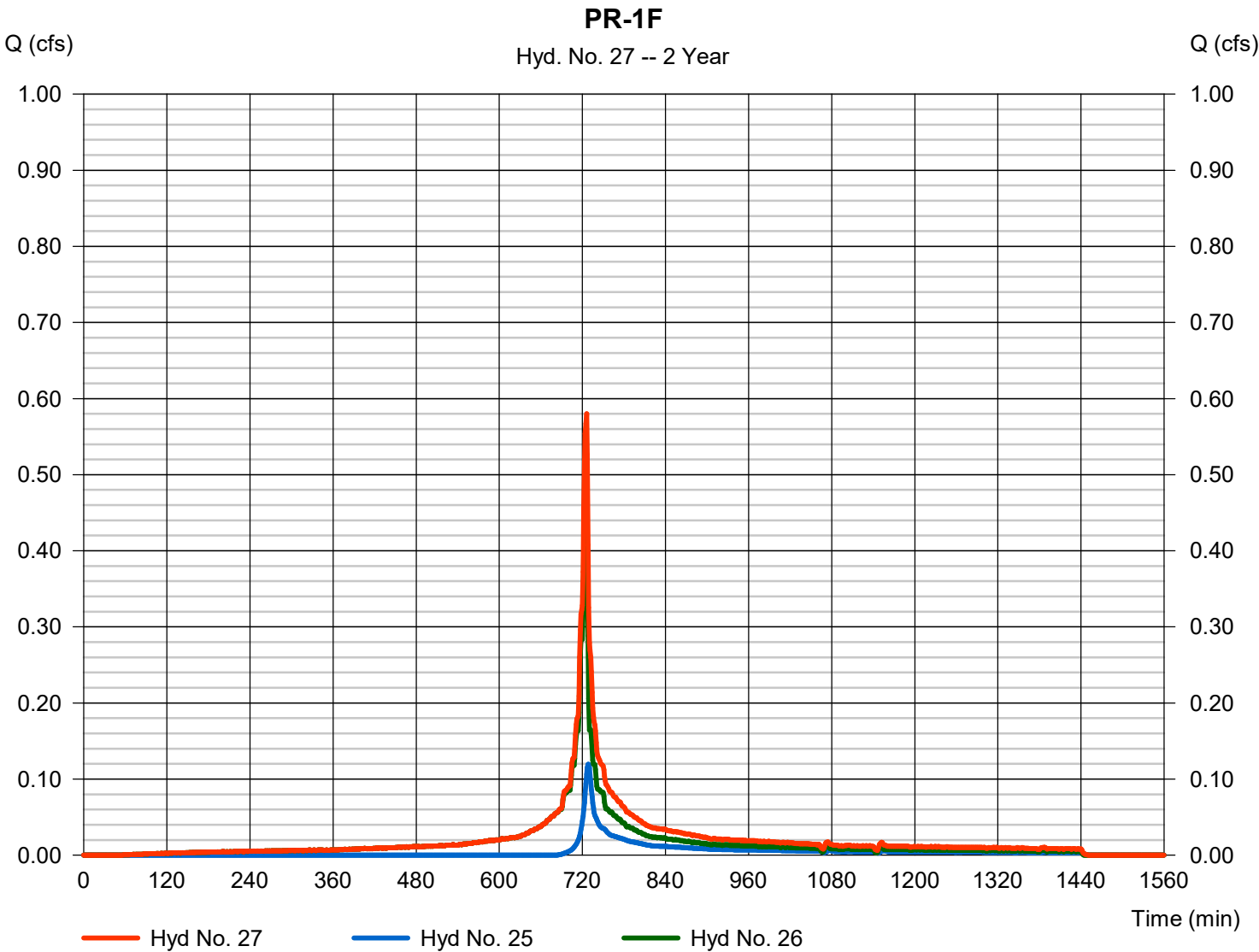


Hydrograph Report

Hyd. No. 27

PR-1F

Hydrograph type	= Combine	Peak discharge	= 0.580 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,988 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 0.230 ac



CURVE NUMBER CALCULATIONS:

*REFER TO THE ATTACHED WEB SOIL SURVEY MAP AND INFORMATION.

DRAINAGE AREA DESIGNATION: PR-1G (PERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
OPEN SPACE GOOD CONDITION	B	61	1.82	111.02
WOODS	B	55	2.95	162.25
OPEN SPACE GOOD CONDITION	D	80	0.85	68.00
WOODS	D	77	1.02	78.54
Total			6.64	419.81

$$CN = \frac{419.8}{6.6} = 63$$

DRAINAGE AREA DESIGNATION: PR-1G (IMPERVIOUS)

COVER TYPE	SOIL GROUP	CN	AREA	A x CN
IMPERVIOUS AREA	A	98	0.70	68.60
Total			0.70	68.60

$$CN = \frac{68.6}{0.7} = 98$$

TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1G PER**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.4			
FLOW LENGTH, L (FT, 100 MAX)=	66 (66 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	7			
SHEET FLOW TIME, T _c (MIN.)=	8.0 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	WOODLANDS	SHORT-GRASS	PAVED	
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	250	436	1140	
LAND SLOPE, S (%)=	11	15	5	
AVERAGE VELOCITY, V (FT/S)=	1.67	2.70	4.55	
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	2.5 MIN.	2.7 MIN.	4.2 MIN.	

CHANNEL FLOW:

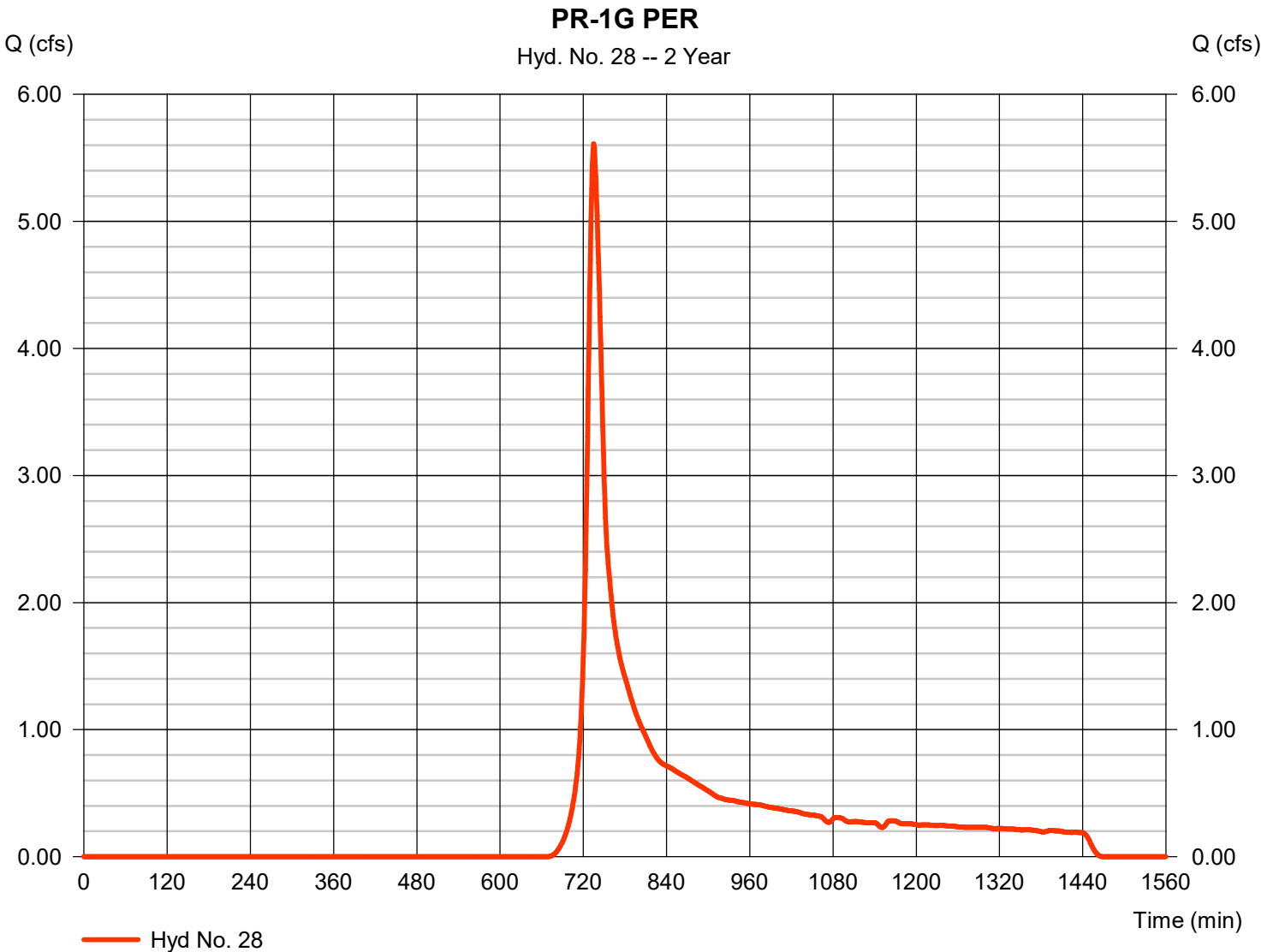
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	8.0 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	9.4 MIN.	TIME OF CONCENTRATION= 17.3 MIN.		
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			

Hydrograph Report

Hyd. No. 28

PR-1G PER

Hydrograph type	= SCS Runoff	Peak discharge	= 5.611 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 27,108 cuft
Drainage area	= 6.640 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484



TIME OF CONCENTRATION CALCULATIONS

DRAINAGE AREA: **PR 1G IMP**

SHEET FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
MANNINGS N-VALUE, n=	0.011			
FLOW LENGTH, L (FT, 100 MAX)=	100 (100 MAX)			
2-YR, 24 HR RAIN, P ₂ (IN.)=	4.39			
$T_c = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$ LAND SLOPE, S (%)=	6			
SHEET FLOW TIME, T _c (MIN.)=	0.7 MIN.			

SHALLOW CONCENTRATED FLOW:

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
FLOW TYPE PER NEH-4 PART 630, TABLE 15-3=	PAVED			
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=	1090			
LAND SLOPE, S (%)=	5			
AVERAGE VELOCITY, V (FT/S)=	4.55			
SHALLOW CONCENTRATED FLOW TIME, T _c (MIN.)=	4.0 MIN.			

CHANNEL FLOW:

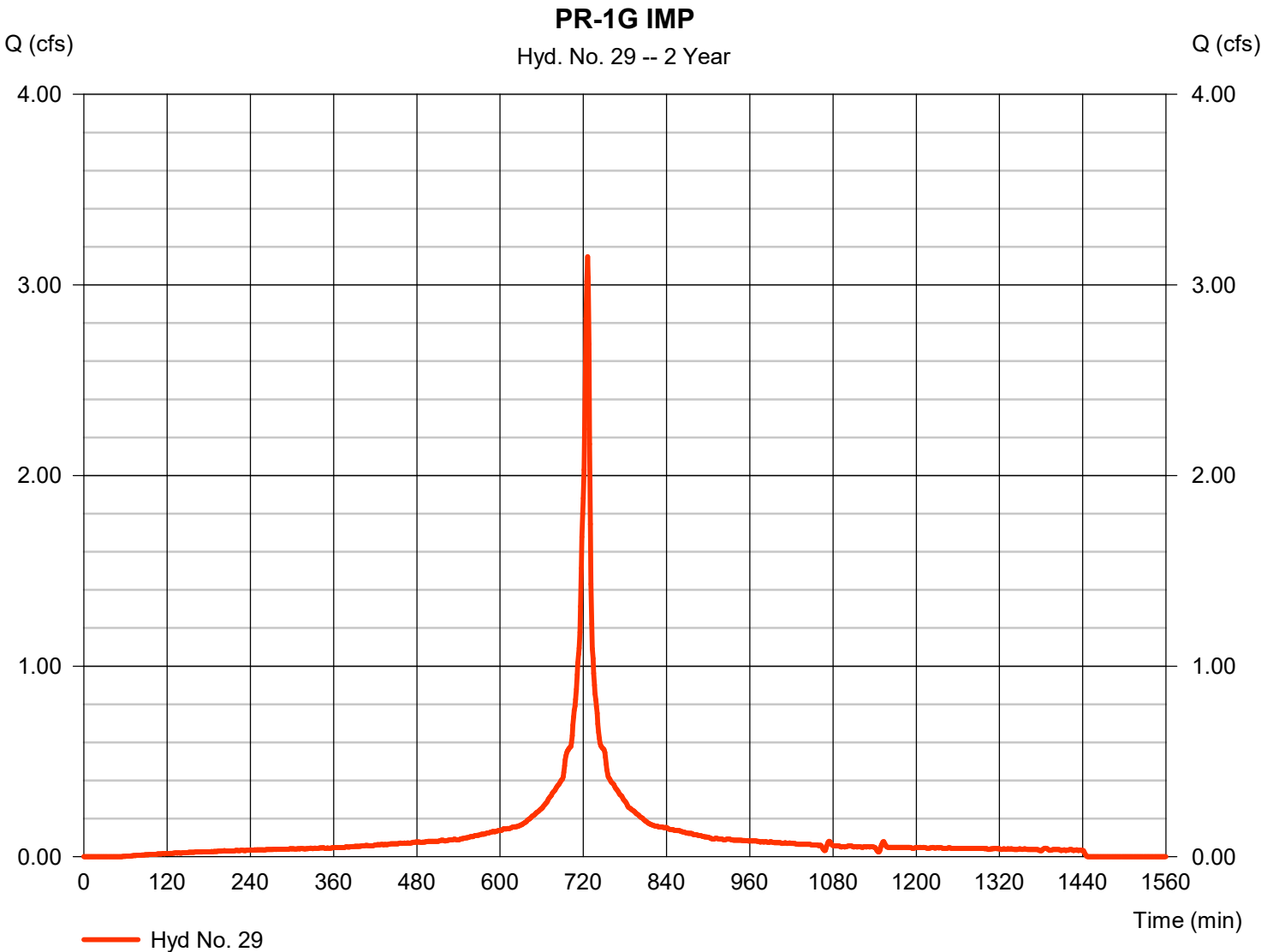
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
PIPE DIAMETER, D (IN)=				
$r = \frac{a}{P_w}$ CROSS SECTIONAL AREA, a (SF)=				
WETTER PERIMETER, P _w (FT)=				
HYDRAULIC RADIUS, r (FT)=				
$V = \frac{1.49r^{2/3}S^{1/2}}{n}$ CHANNEL SLOPE, S (%)=				
MANNINGS N-VALUE (n)=				
VELOCITY, V (FT/S)=				
$T_c = \frac{L}{3600V}$ FLOW LENGTH, L (FT)=				
CHANNEL FLOW TIME, T _c (MIN.)=				
TOTAL SHEET FLOW TIME =	0.7 MIN.			
TOTAL SHALLOW CONCENTRATED FLOW TIME =	4.0 MIN.			
TOTAL CHANNEL FLOW TIME =	0.0 MIN.			
TIME OF CONCENTRATION= 4.7 MIN.				

Hydrograph Report

Hyd. No. 29

PR-1G IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 3.148 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 10,556 cuft
Drainage area	= 0.700 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 4.39 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

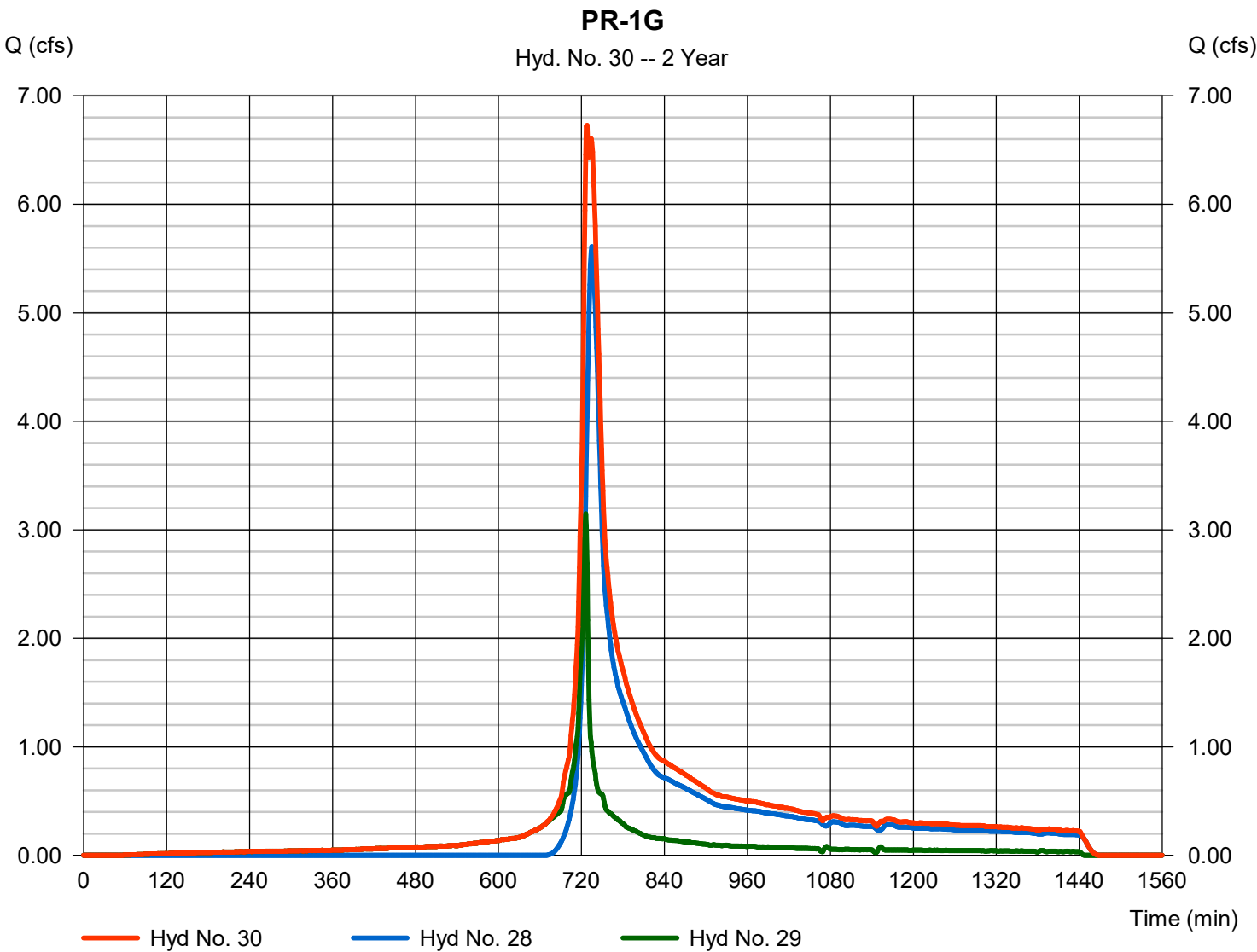


Hydrograph Report

Hyd. No. 30

PR-1G

Hydrograph type	= Combine	Peak discharge	= 6.727 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 37,664 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 7.340 ac

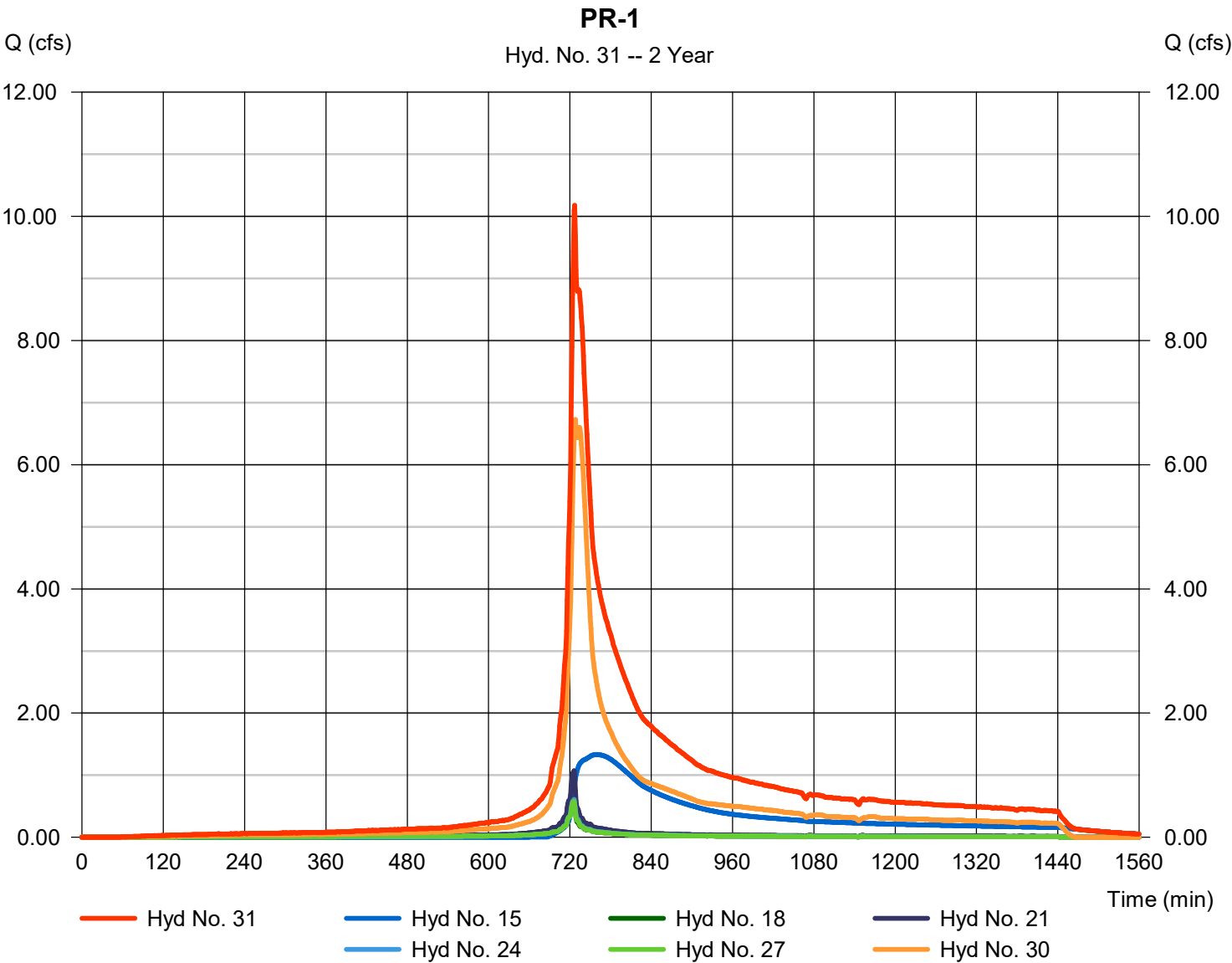


Hydrograph Report

Hyd. No. 31

PR-1

Hydrograph type	= Combine	Peak discharge	= 10.18 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 66,919 cuft
Inflow hyds.	= 15, 18, 21, 24, 27, 30	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

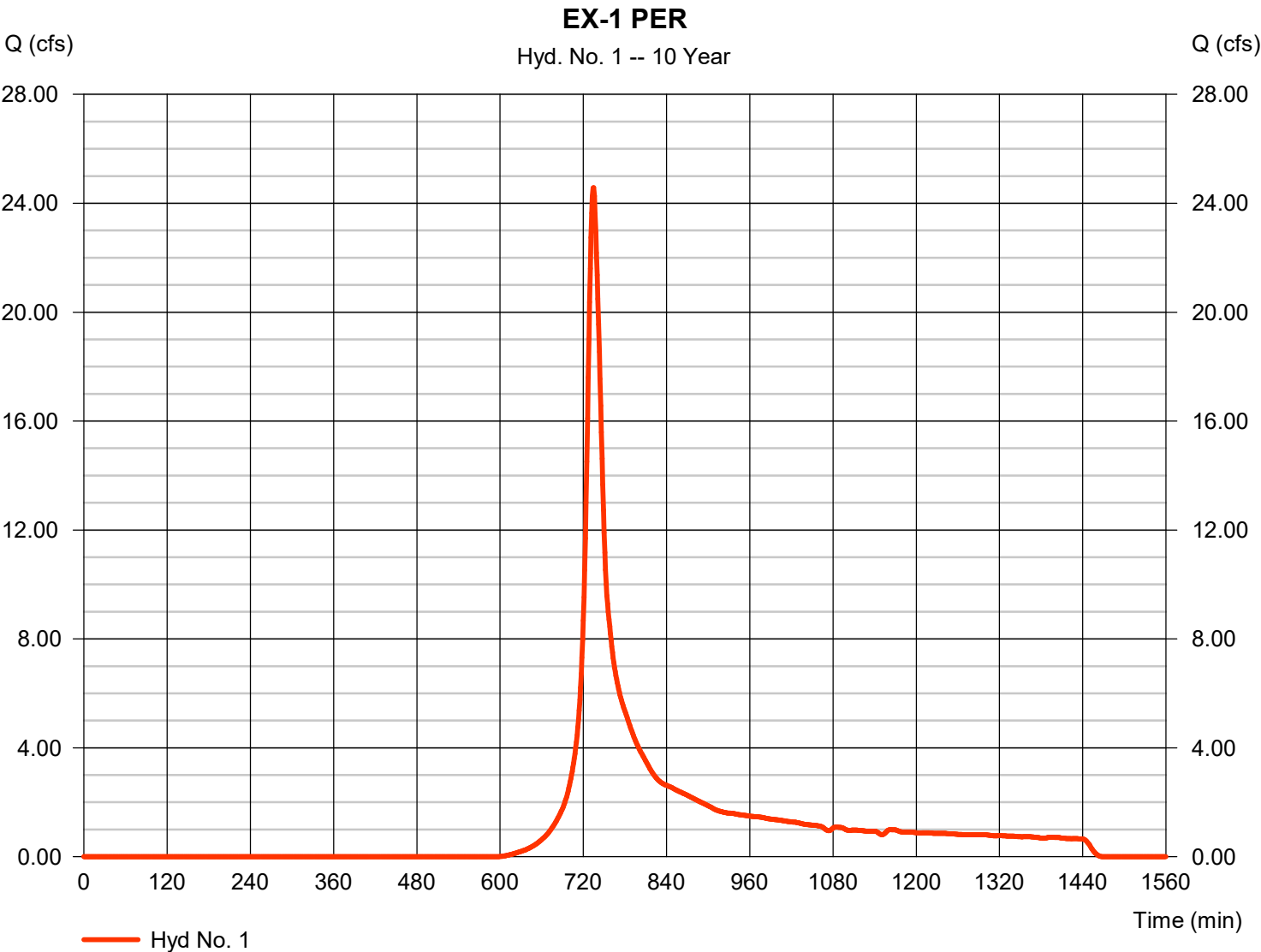
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	24.57	1	735	110,568	-----	-----	-----	EX-1 PER
2	SCS Runoff	13.46	1	726	45,806	-----	-----	-----	EX-1 IMP
3	Combine	30.59	1	727	156,374	1, 2	-----	-----	EX-1
4	SCS Runoff	5.550	1	730	20,924	-----	-----	-----	PR-1A PER
5	SCS Runoff	3.434	1	726	11,452	-----	-----	-----	PR-1A IMP
6	Combine	7.943	1	726	32,375	4, 5	-----	-----	PR-1A
7	SCS Runoff	9.707	1	726	32,373	-----	-----	-----	AREA TO DRYWELLS
8	Reservoir	8.966	1	727	24,104	7	6.96	9,441	DRYWELL ROUTING
9	Combine	16.88	1	727	56,479	6, 8	-----	-----	INFLOW TO BASIN 1
10	Reservoir	4.214	1	739	26,784	6	816.39	11,009	BASIN 1
11	SCS Runoff	2.844	1	729	10,052	-----	-----	-----	PR-1B PER
12	SCS Runoff	3.170	1	726	10,571	-----	-----	-----	PR-1B IMP
13	Combine	5.644	1	726	20,623	11, 12	-----	-----	PR-1B
14	Combine	8.025	1	727	47,407	10, 13	-----	-----	INFLOW TO BASIN 2
15	Reservoir	5.925	1	740	45,793	14	793.63	7,429	BASIN 2
16	SCS Runoff	0.378	1	726	1,087	-----	-----	-----	PR-1C PER
17	SCS Runoff	0.726	1	726	2,422	-----	-----	-----	PR-1C IMP
18	Combine	1.105	1	726	3,509	16, 17	-----	-----	PR-1C
19	SCS Runoff	0.597	1	727	1,868	-----	-----	-----	PR-1D PER
20	SCS Runoff	1.321	1	726	4,404	-----	-----	-----	PR-1D IMP
21	Combine	1.896	1	726	6,272	19, 20	-----	-----	PR-1D
22	SCS Runoff	0.401	1	728	1,324	-----	-----	-----	PR-1E PER
23	SCS Runoff	0.726	1	726	2,422	-----	-----	-----	PR-1E IMP
24	Combine	1.099	1	726	3,747	22, 23	-----	-----	PR-1E
25	SCS Runoff	0.321	1	728	1,060	-----	-----	-----	PR-1F PER
26	SCS Runoff	0.726	1	726	2,422	-----	-----	-----	PR-1F IMP
27	Combine	1.024	1	726	3,482	25, 26	-----	-----	PR-1F
28	SCS Runoff	14.35	1	734	64,001	-----	-----	-----	PR-1G PER
29	SCS Runoff	4.830	1	726	16,443	-----	-----	-----	PR-1G IMP
30	Combine	15.94	1	734	80,444	28, 29	-----	-----	PR-1G
31	Combine	23.17	1	727	143,247	15, 18, 21, 24, 27, 30	-----	-----	PR-1
Future 15107.gpw					Return Period: 10 Year			Thursday, 07 / 9 / 2026 221	

Hydrograph Report

Hyd. No. 1

EX-1 PER

Hydrograph type	= SCS Runoff	Peak discharge	= 24.57 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 110,568 cuft
Drainage area	= 12.350 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

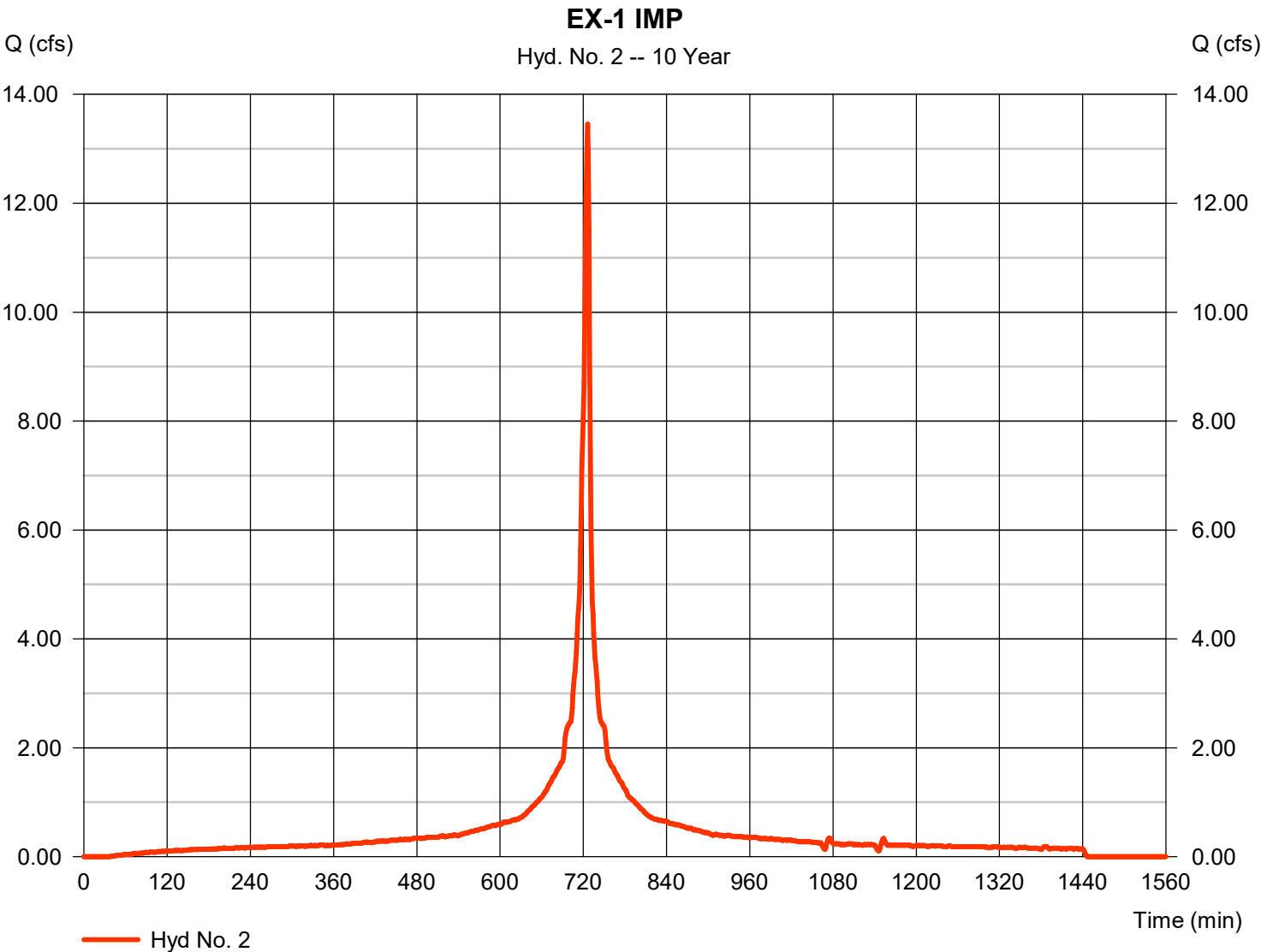


Hydrograph Report

Hyd. No. 2

EX-1 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 13.46 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 45,806 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

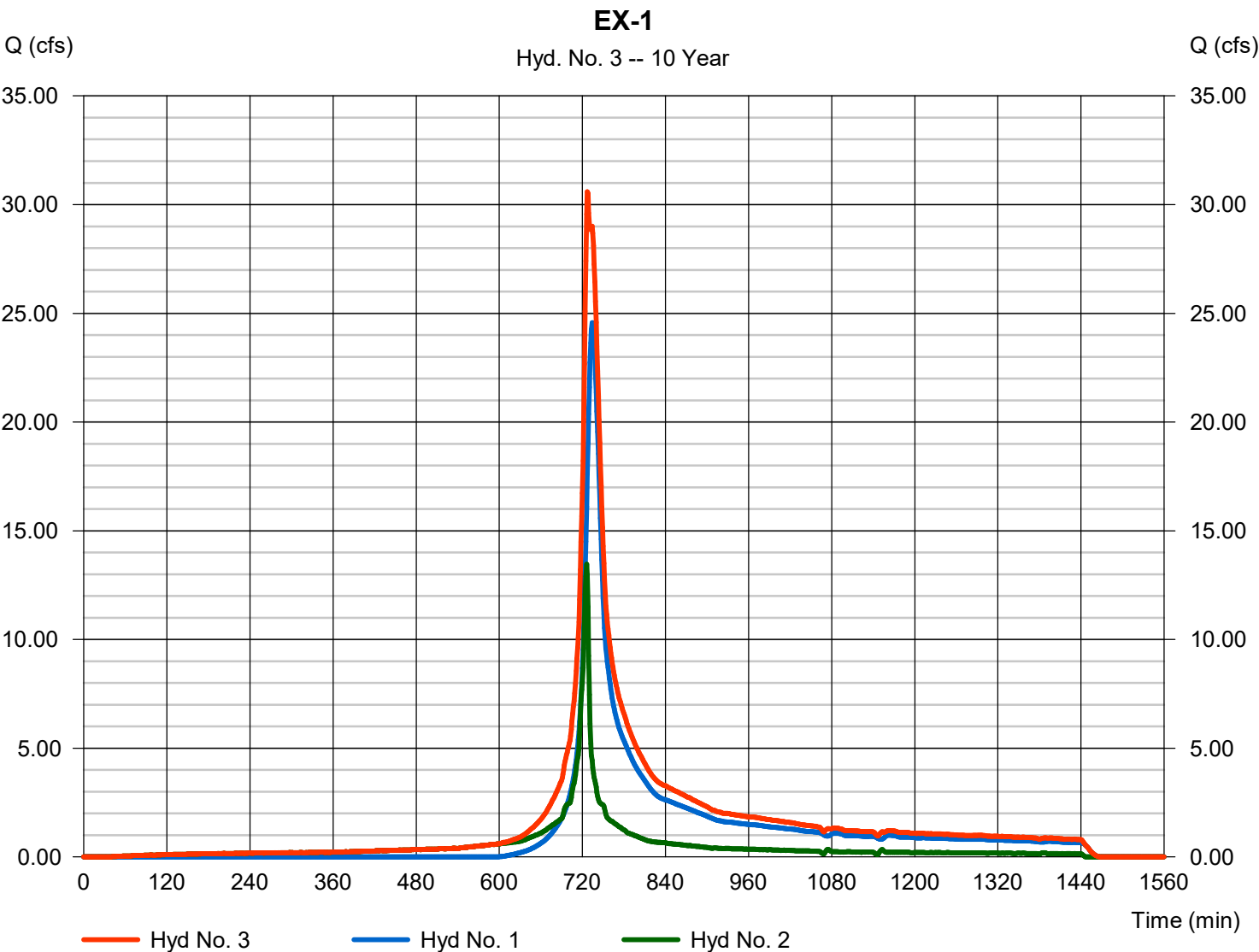


Hydrograph Report

Hyd. No. 3

EX-1

Hydrograph type	= Combine	Peak discharge	= 30.59 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 156,374 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.300 ac



PEAK FLOW REDUCTION CALCULATIONS - FUTURE

TO COMPLY WITH NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER MANAGEMENT REQUIREMENTS, THE POST-DEVELOPMENT PEAK RUNOFF RATES MUST BE REDUCED TO A PERCENTAGE OF PRE-DEVELOPMENT PEAK RUNOFF RATES, AS

$$\text{PROPOSED } Q_2 \leq 50\% \text{ EXISTING } Q_2$$

$$\text{PROPOSED } Q_{10} \leq 75\% \text{ EXISTING } Q_{10}$$

$$\text{PROPOSED } Q_{100} \leq 80\% \text{ EXISTING } Q_{10}$$

REDUCTION FACTORS ARE APPLIED TO THE DISTURBED PORTION OF THE TRIBUTARY DRAINAGE AREA ONLY:

EX 1

DRAINAGE AREA = 14.3 AC

AREA OF DISTURBANCE= 6 AC

PERCENT DISTURBANCE = 42.0%

APPLY REDUCTION FACTORS TO 42% OF EXISTING PEAK FLOWS.

PROJECTED PEAK FLOWS:

$$Q_2 = 14.2 \text{ CFS}$$

$$Q_{10} = 30.6 \text{ CFS}$$

$$Q_{100} = 76.7 \text{ CFS}$$

CALCULATE ALLOWABLE RUNOFF:

$$Q_2 = (0.50) \times (0.42) \times (14.2 \text{ CFS}) + (0.58) \times (14.2 \text{ CFS}) = 11.2 \text{ CFS}$$

$$Q_{10} = (0.75) \times (0.42) \times (30.6 \text{ CFS}) + (0.58) \times (30.6 \text{ CFS}) = 27.4 \text{ CFS}$$

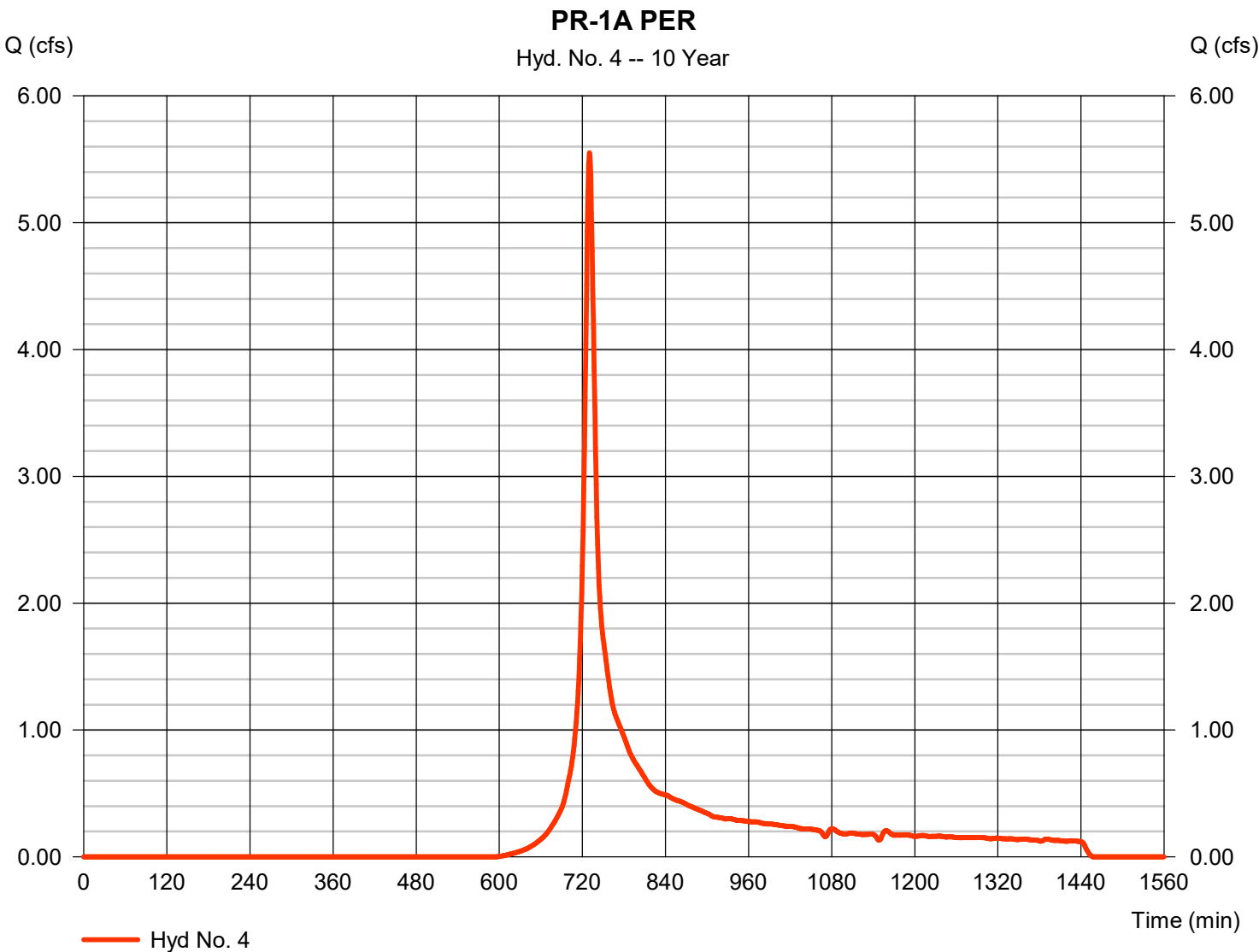
$$Q_{100} = (0.80) \times (0.42) \times (76.7 \text{ CFS}) + (0.58) \times (76.7 \text{ CFS}) = 70.3 \text{ CFS}$$

Hydrograph Report

Hyd. No. 4

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 5.550 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 20,924 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

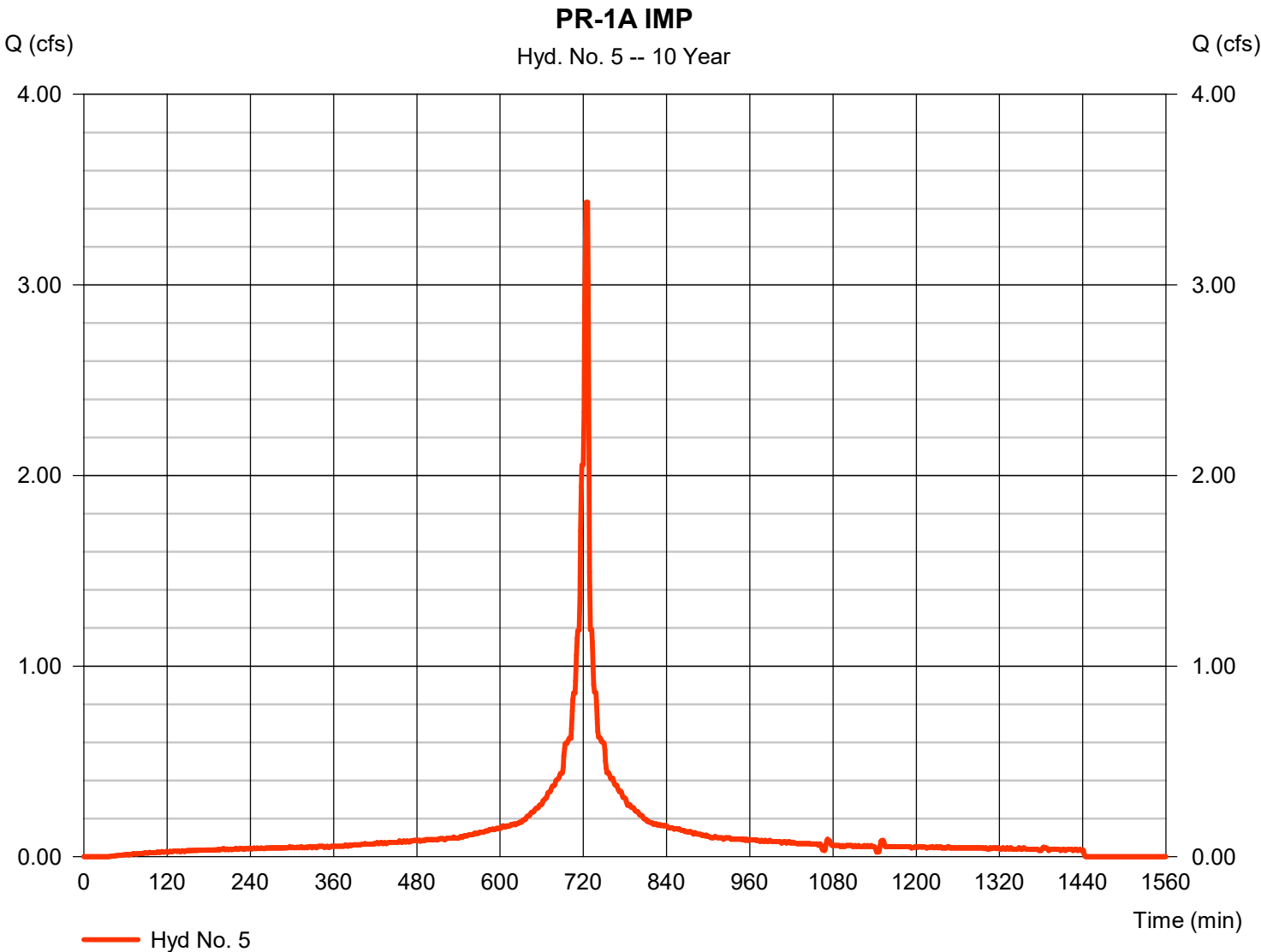


Hydrograph Report

Hyd. No. 5

PR-1A IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 3.434 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 11,452 cuft
Drainage area	= 0.520 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

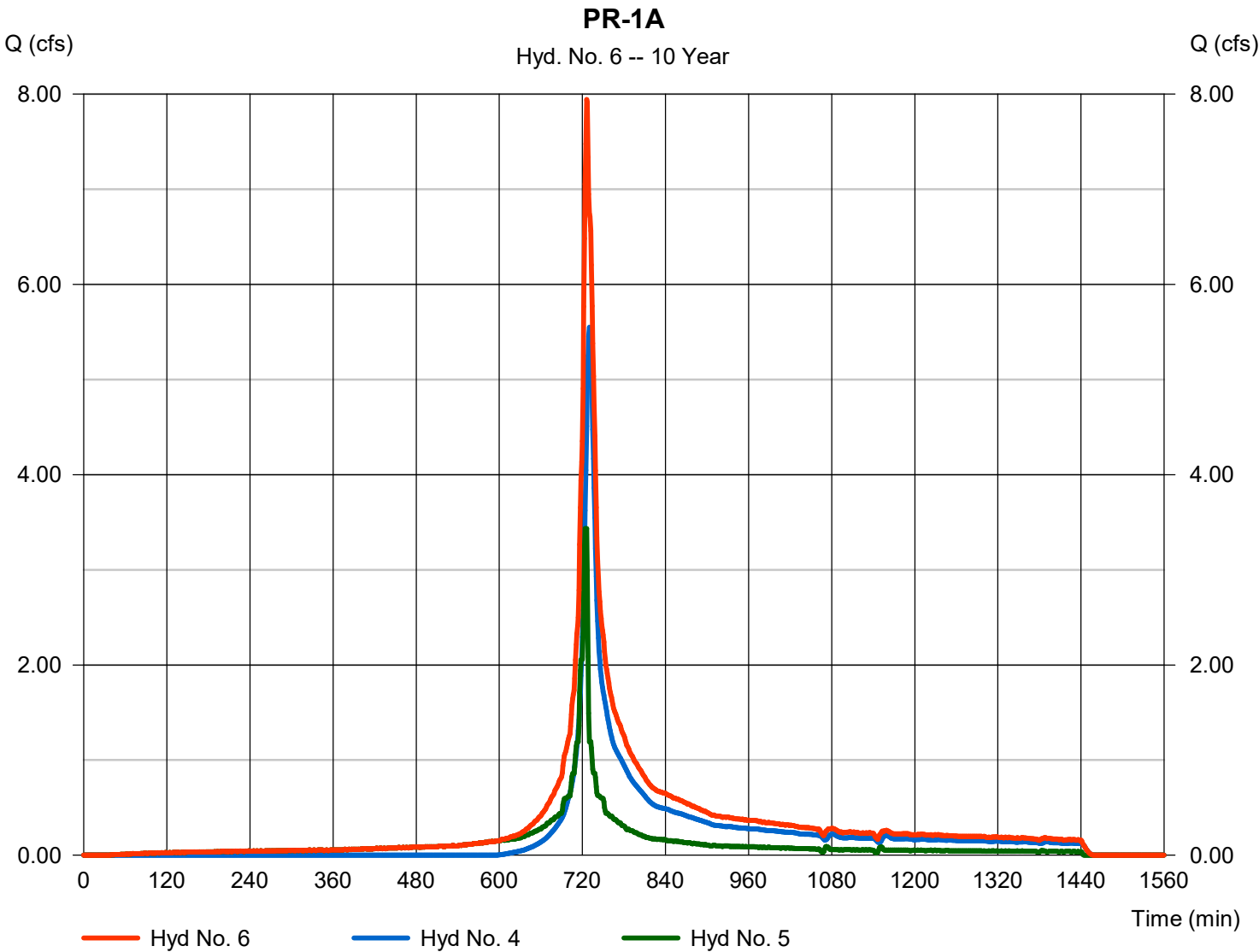


Hydrograph Report

Hyd. No. 6

PR-1A

Hydrograph type	= Combine	Peak discharge	= 7.943 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 32,375 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.790 ac

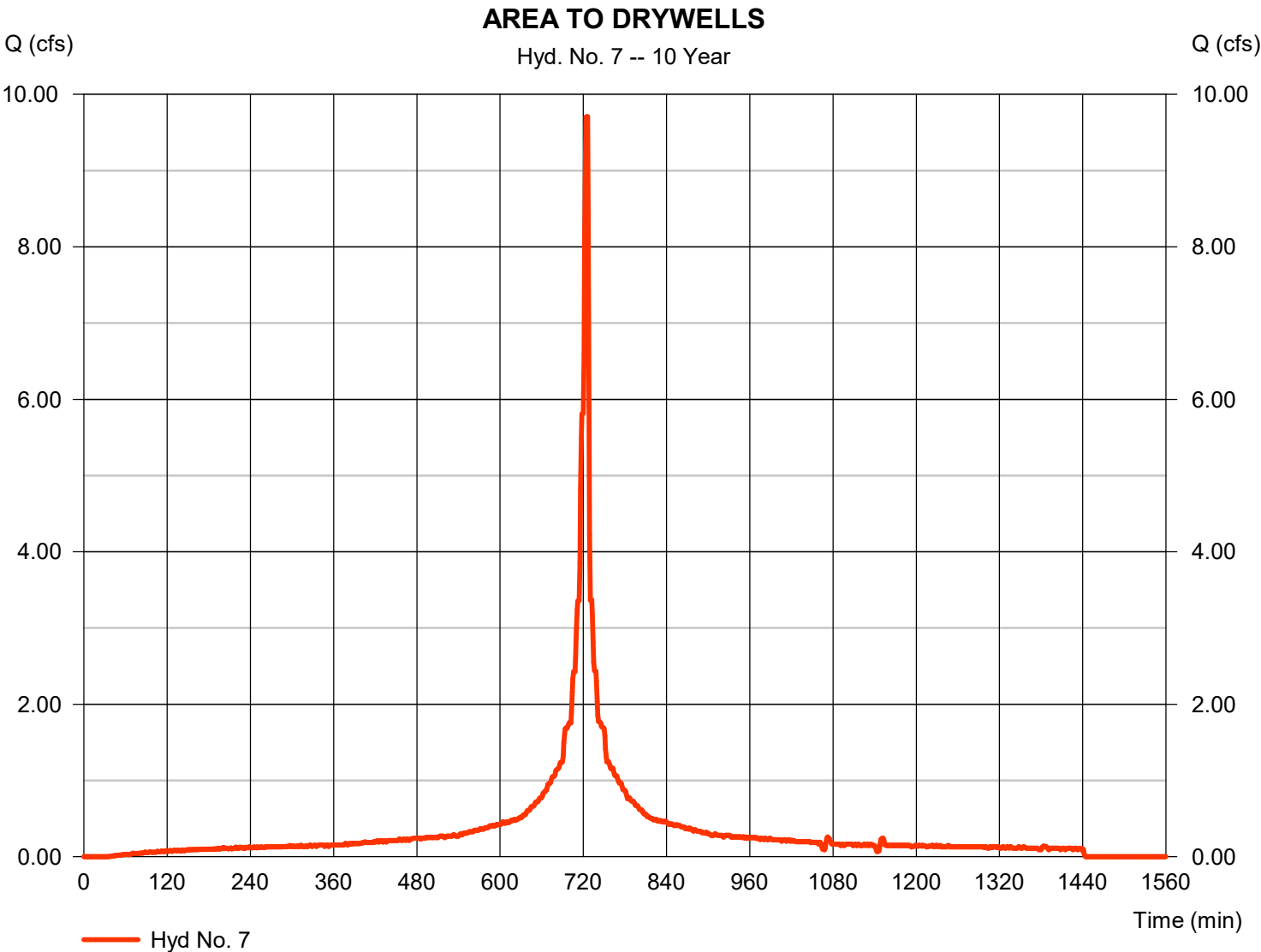


Hydrograph Report

Hyd. No. 7

AREA TO DRYWELLS

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.707 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	32,373 cuft
Drainage area	=	1.470 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	1.60 min
Total precip.	=	6.71 in	Distribution	=	Custom
Storm duration	=	H:\ADMIN\NOAA D.cds	Shape factor	=	484



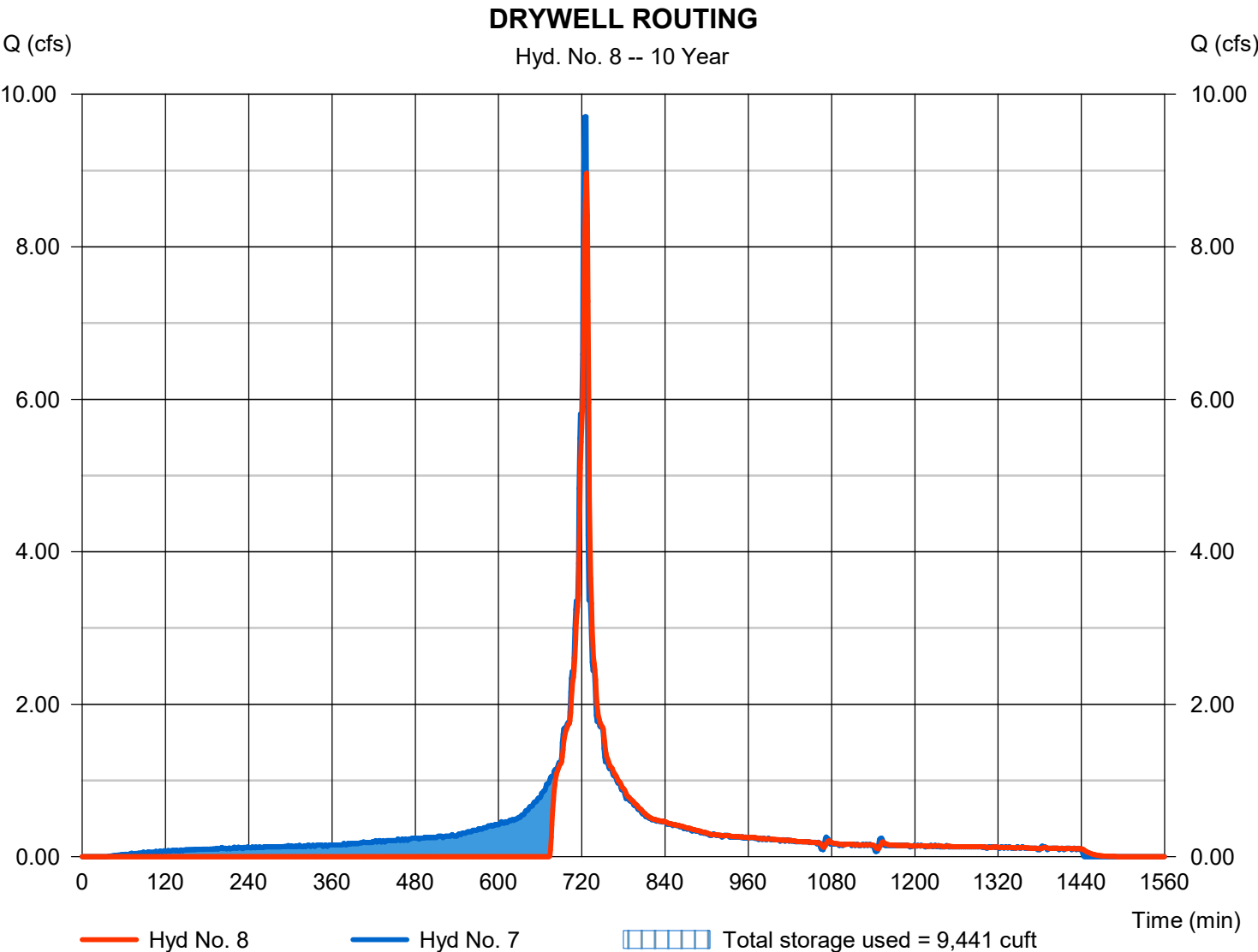
Hydrograph Report

Hyd. No. 8

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 8.966 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 24,104 cuft
Inflow hyd. No.	= 7 - AREA TO DRYWELLS	Max. Elevation	= 6.96 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 9,441 cuft

Storage Indication method used.

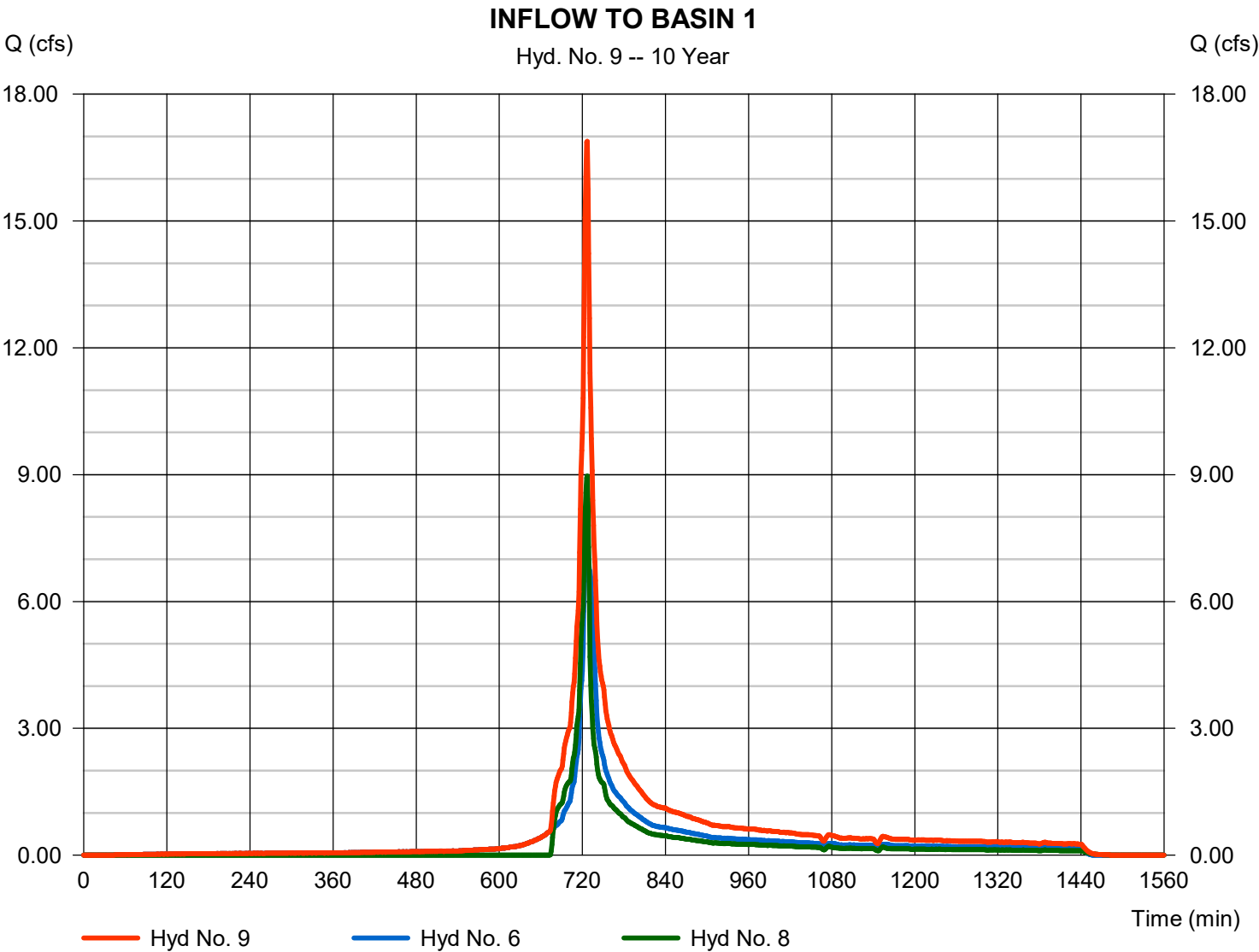


Hydrograph Report

Hyd. No. 9

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 16.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 56,479 cuft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 0.000 ac



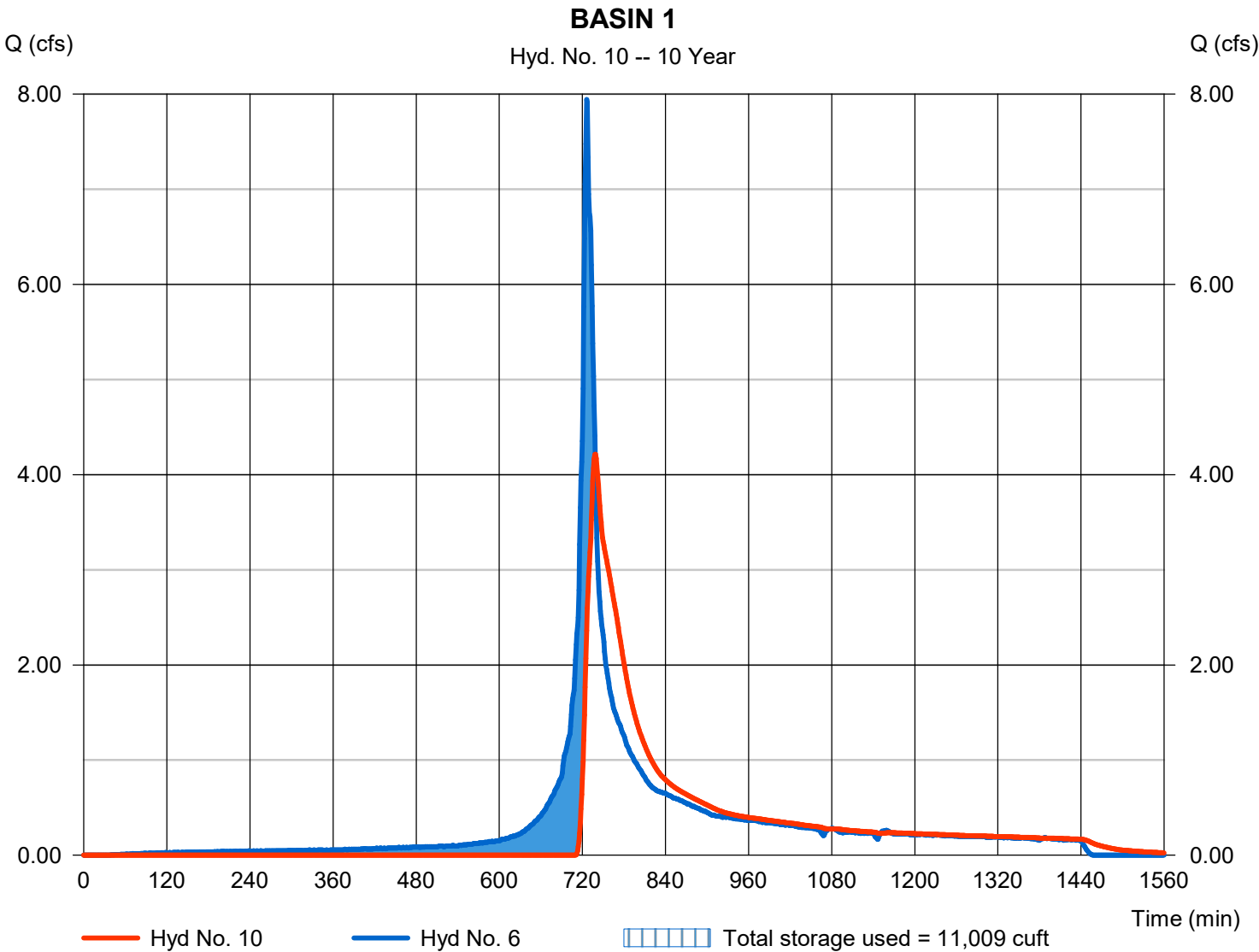
Hydrograph Report

Hyd. No. 10

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 4.214 cfs
Storm frequency	= 10 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 26,784 cuft
Inflow hyd. No.	= 6 - PR-1A	Max. Elevation	= 816.39 ft
Reservoir name	= BASIN 1	Max. Storage	= 11,009 cuft

Storage Indication method used.

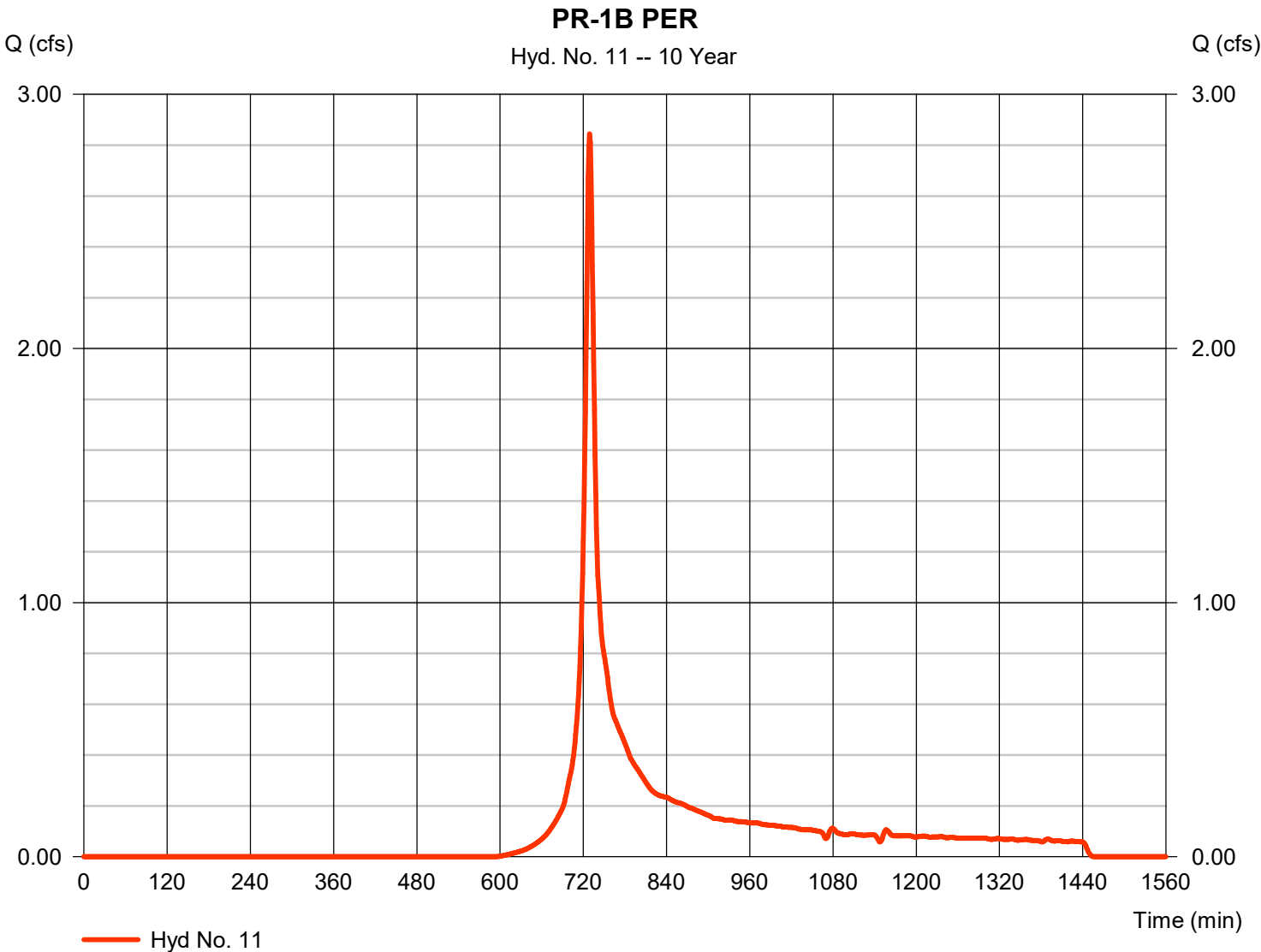


Hydrograph Report

Hyd. No. 11

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 2.844 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 10,052 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

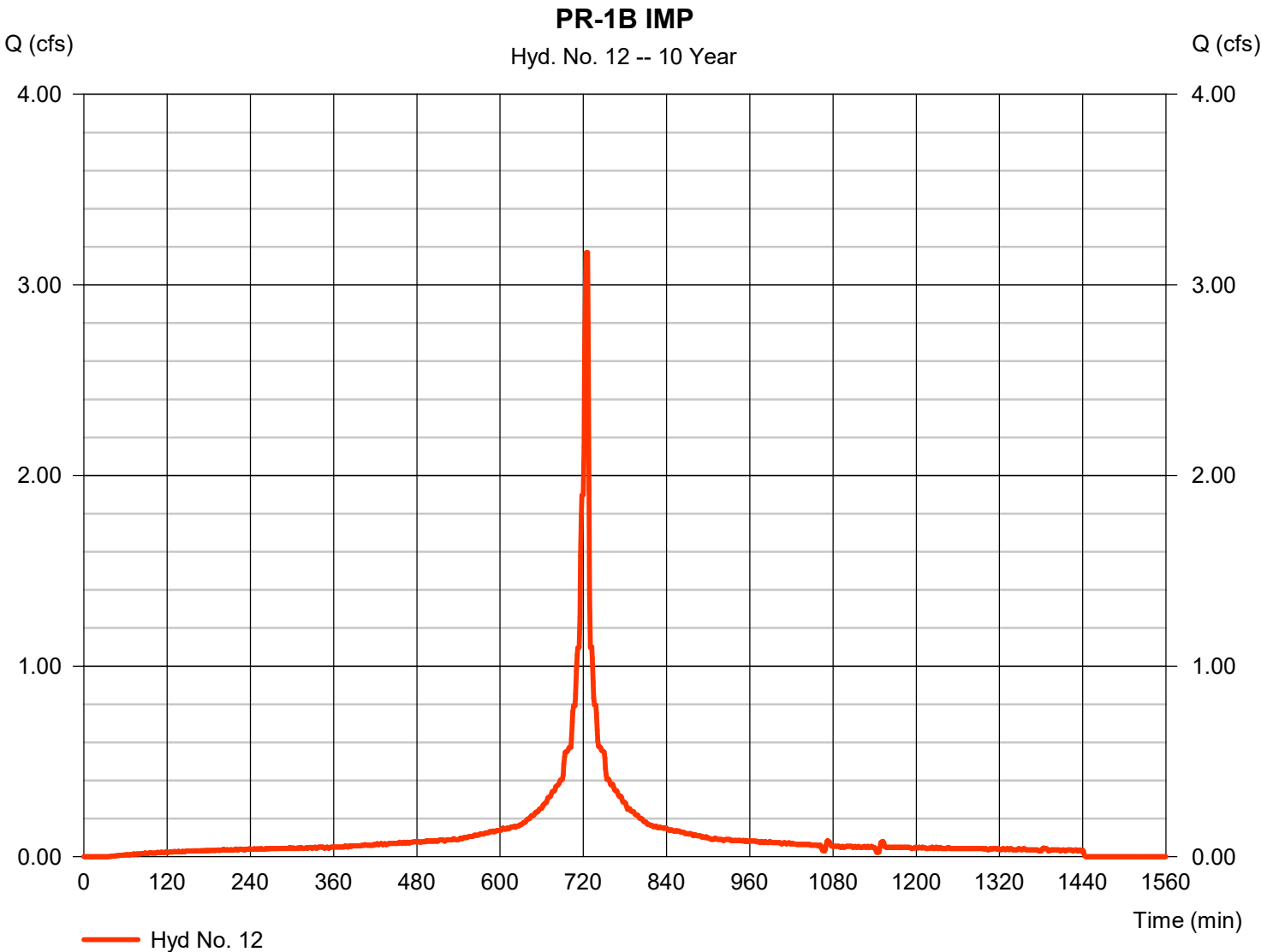


Hydrograph Report

Hyd. No. 12

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 3.170 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 10,571 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

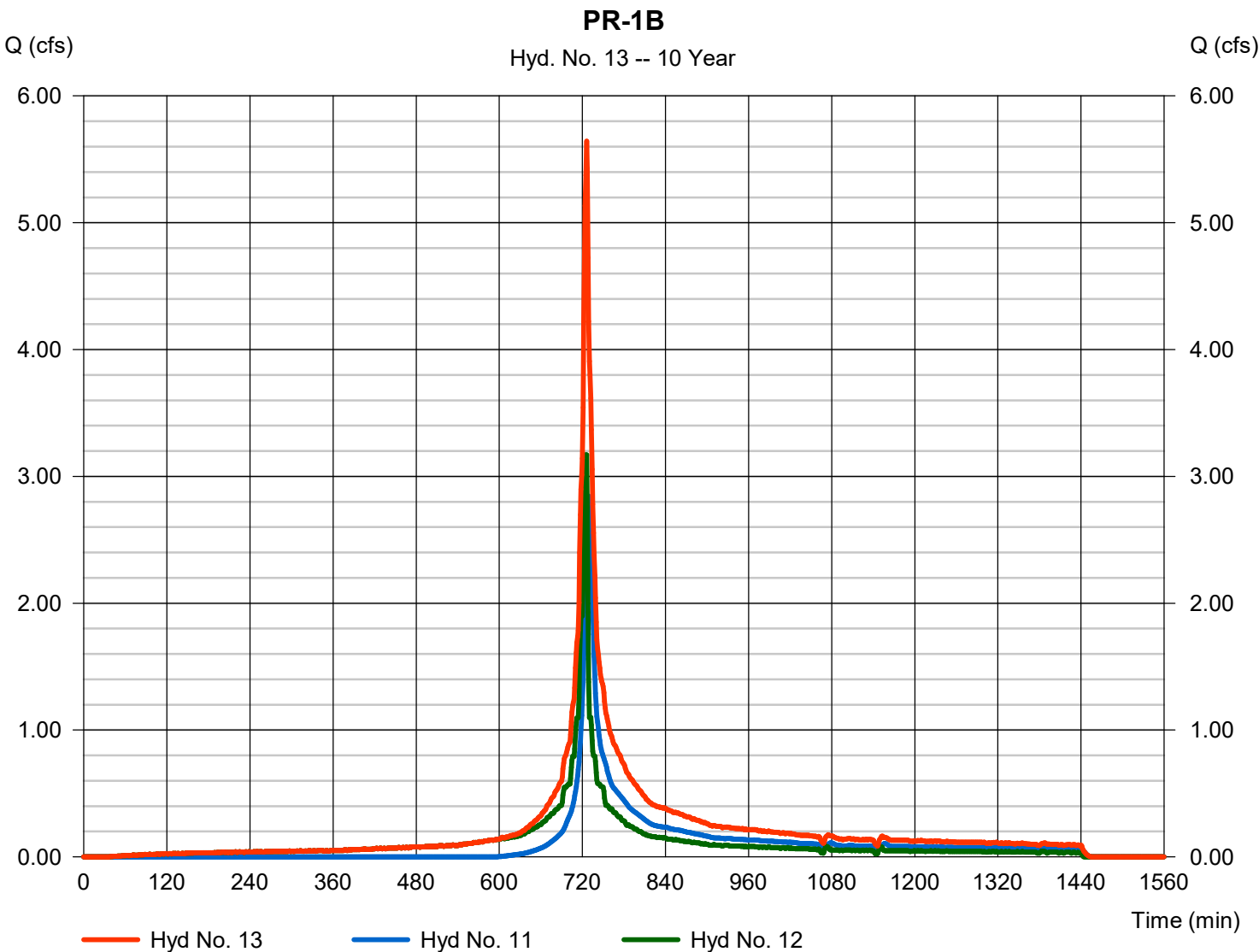


Hydrograph Report

Hyd. No. 13

PR-1B

Hydrograph type	= Combine	Peak discharge	= 5.644 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 20,623 cuft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 1.590 ac

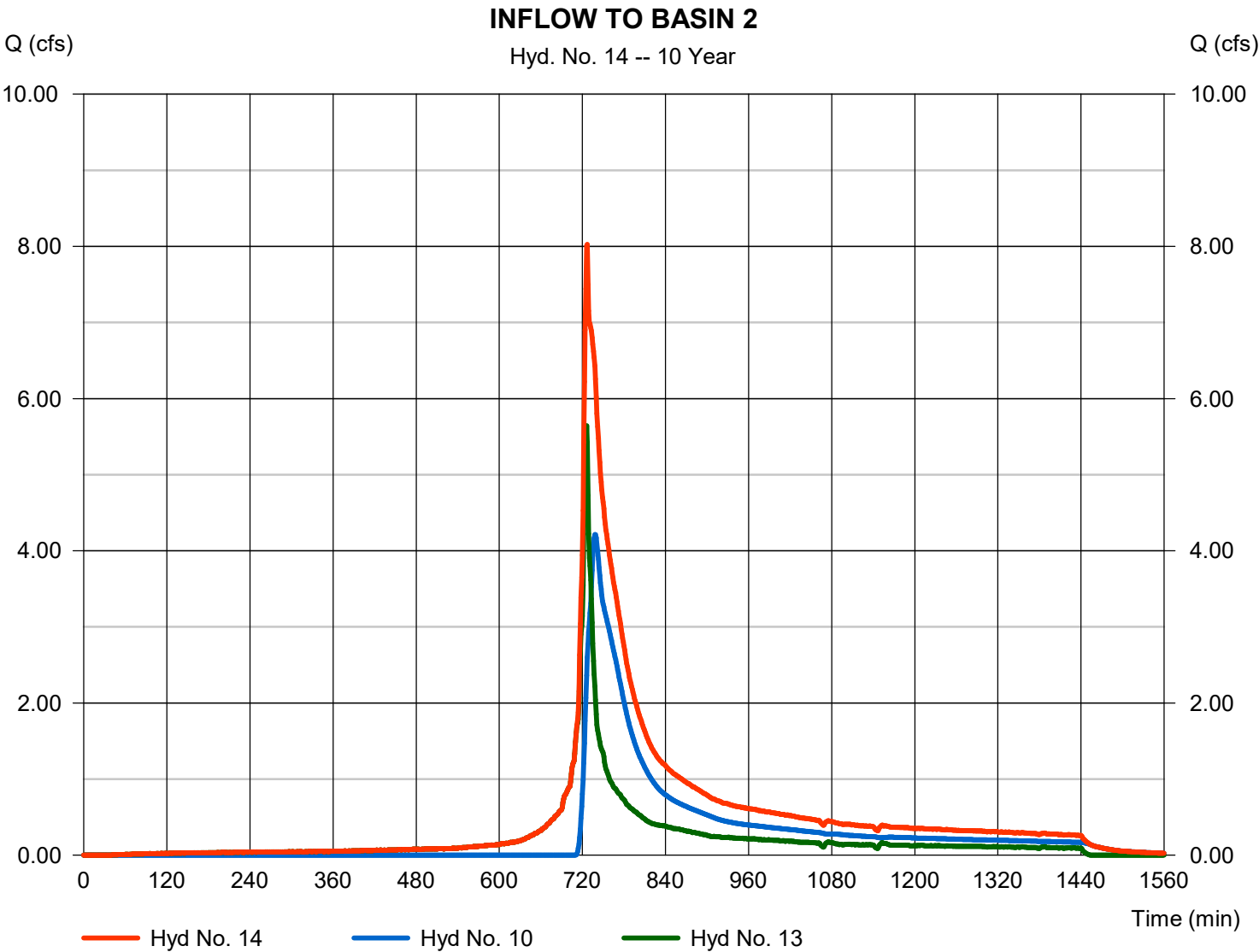


Hydrograph Report

Hyd. No. 14

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 8.025 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 47,407 cuft
Inflow hyds.	= 10, 13	Contrib. drain. area	= 0.000 ac



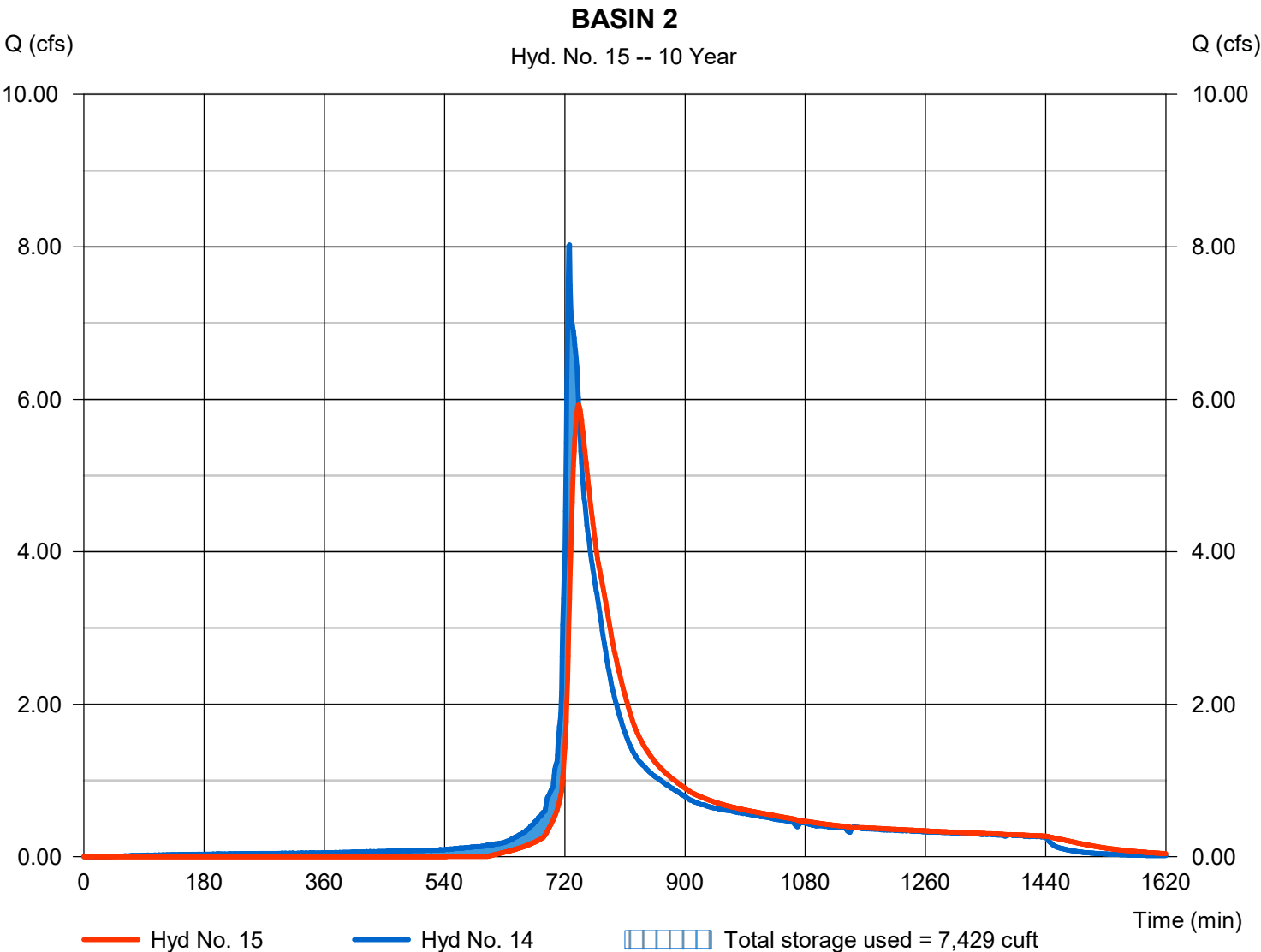
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 5.925 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 45,793 cuft
Inflow hyd. No.	= 14 - INFLOW TO BASIN 2	Max. Elevation	= 793.63 ft
Reservoir name	= BASIN 2	Max. Storage	= 7,429 cuft

Storage Indication method used.

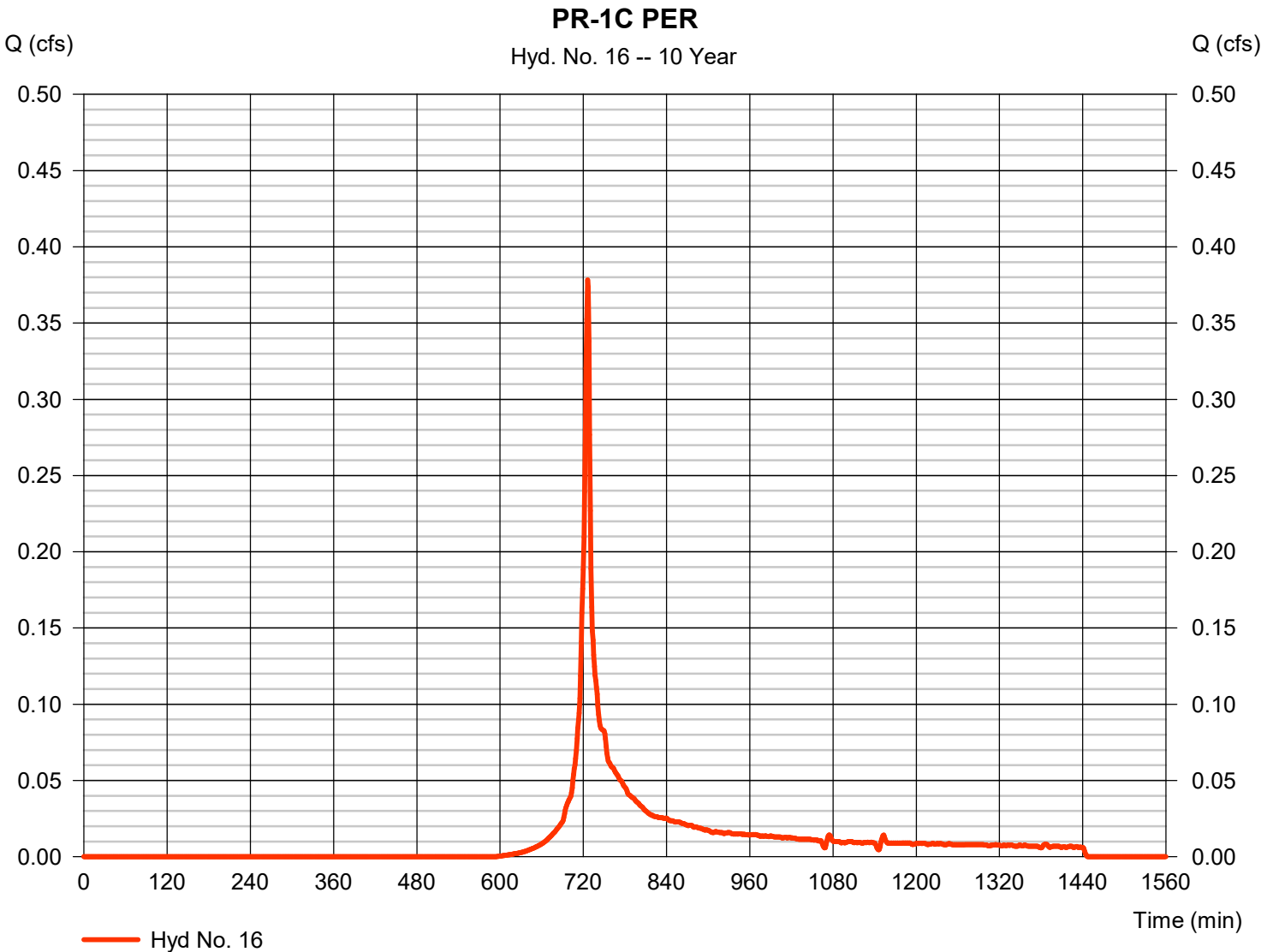


Hydrograph Report

Hyd. No. 16

PR-1C PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.378 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,087 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 3.90 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

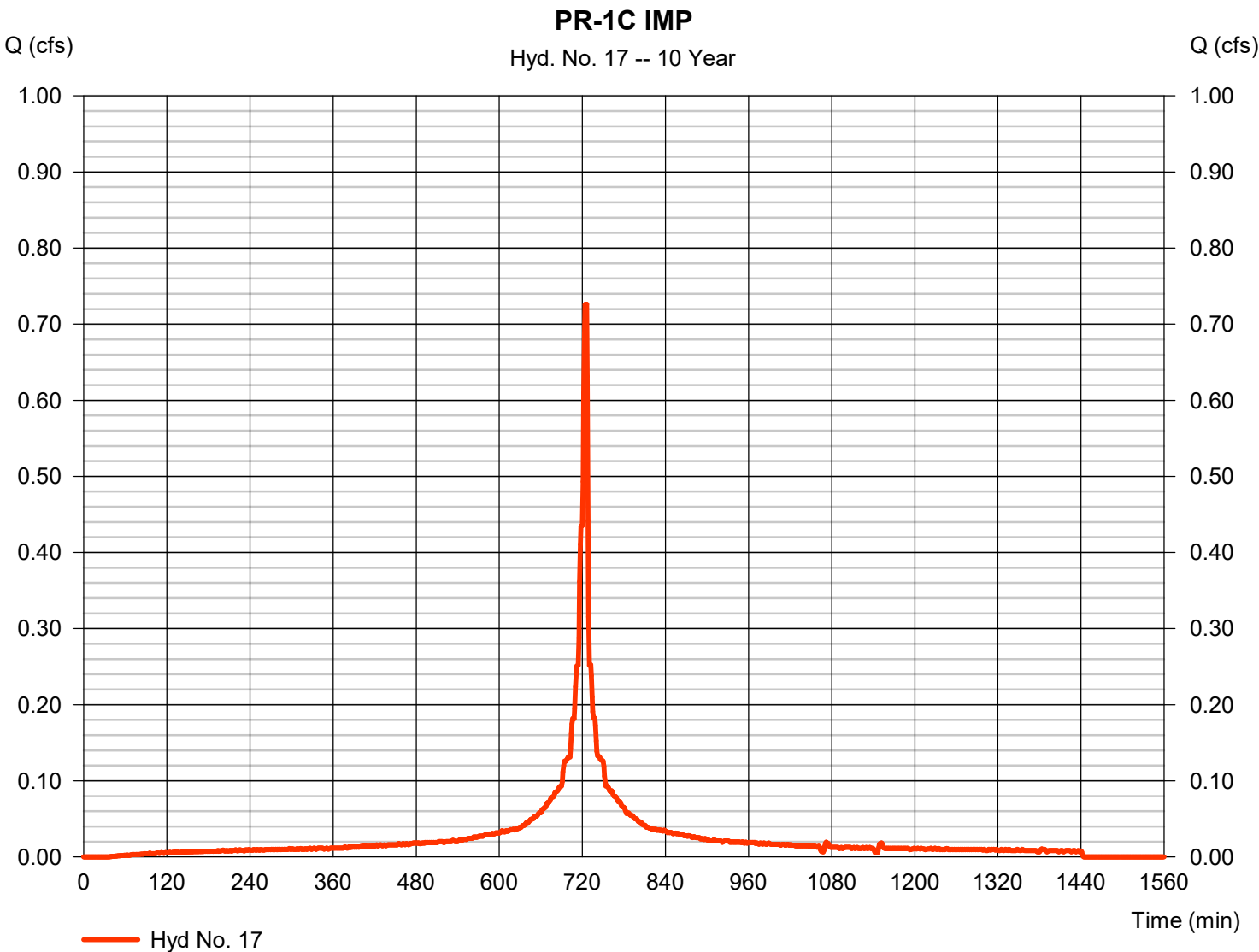


Hydrograph Report

Hyd. No. 17

PR-1C IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.726 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,422 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

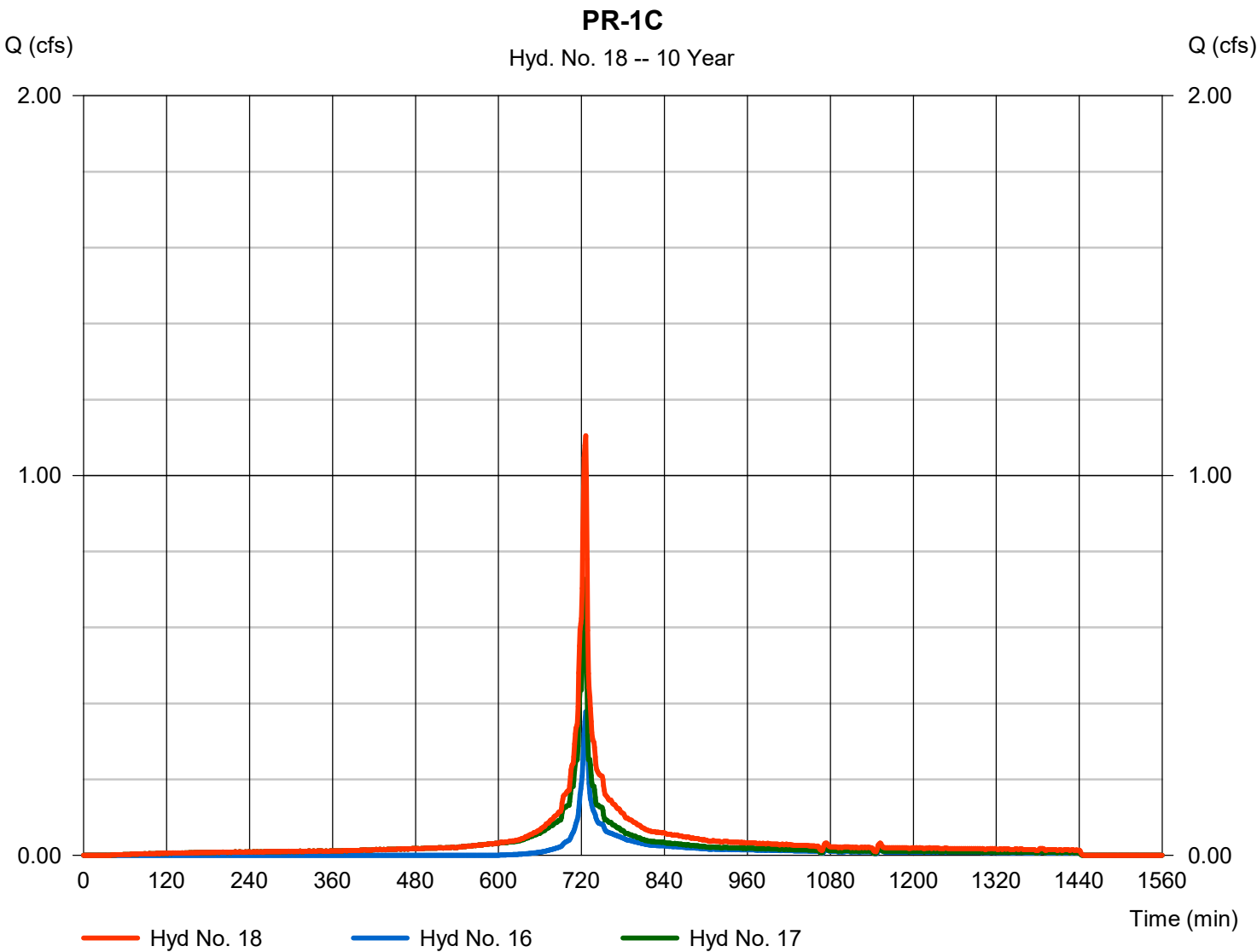


Hydrograph Report

Hyd. No. 18

PR-1C

Hydrograph type	= Combine	Peak discharge	= 1.105 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,509 cuft
Inflow hyds.	= 16, 17	Contrib. drain. area	= 0.230 ac

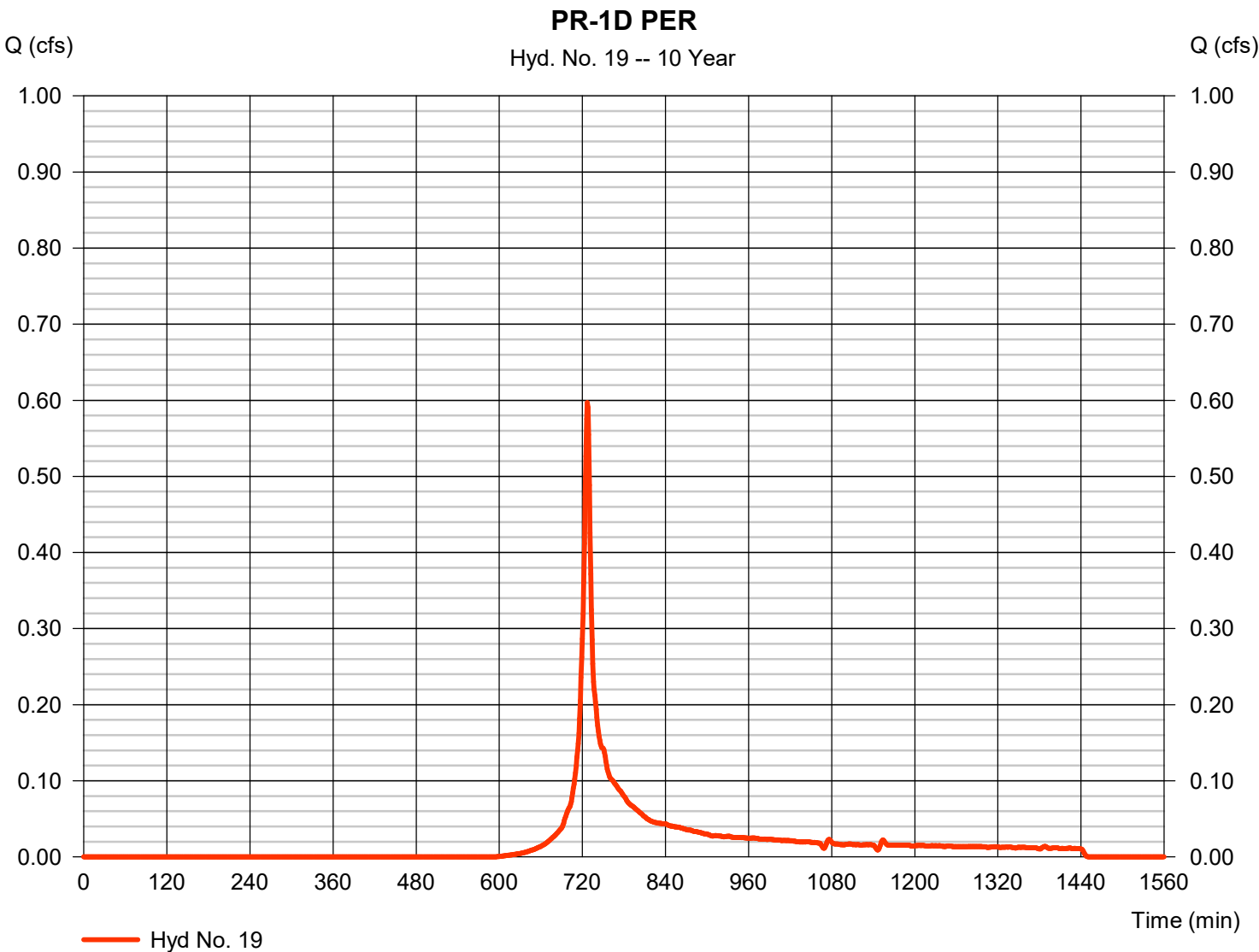


Hydrograph Report

Hyd. No. 19

PR-1D PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.597 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,868 cuft
Drainage area	= 0.200 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

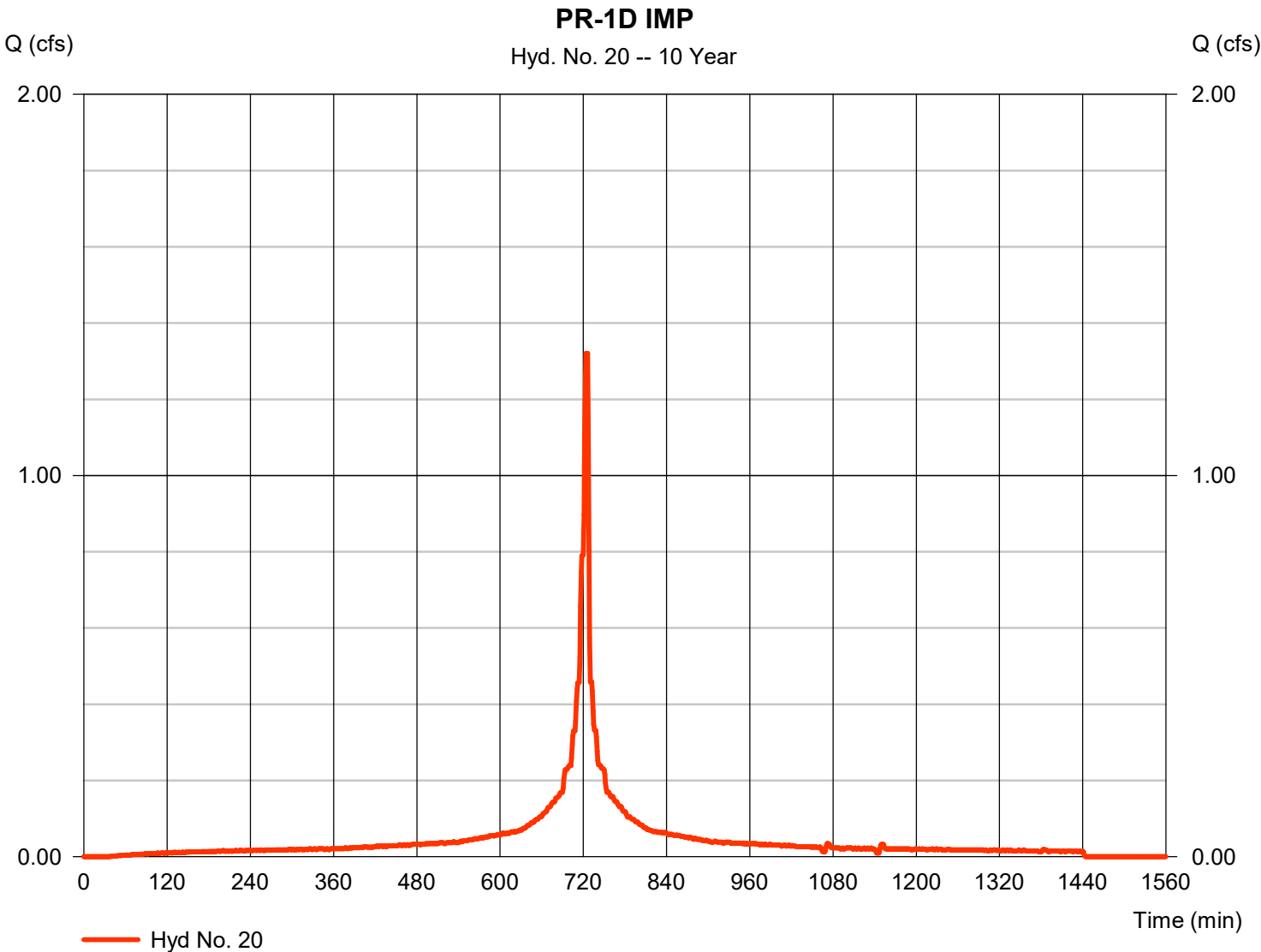


Hydrograph Report

Hyd. No. 20

PR-1D IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.321 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 4,404 cuft
Drainage area	= 0.200 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

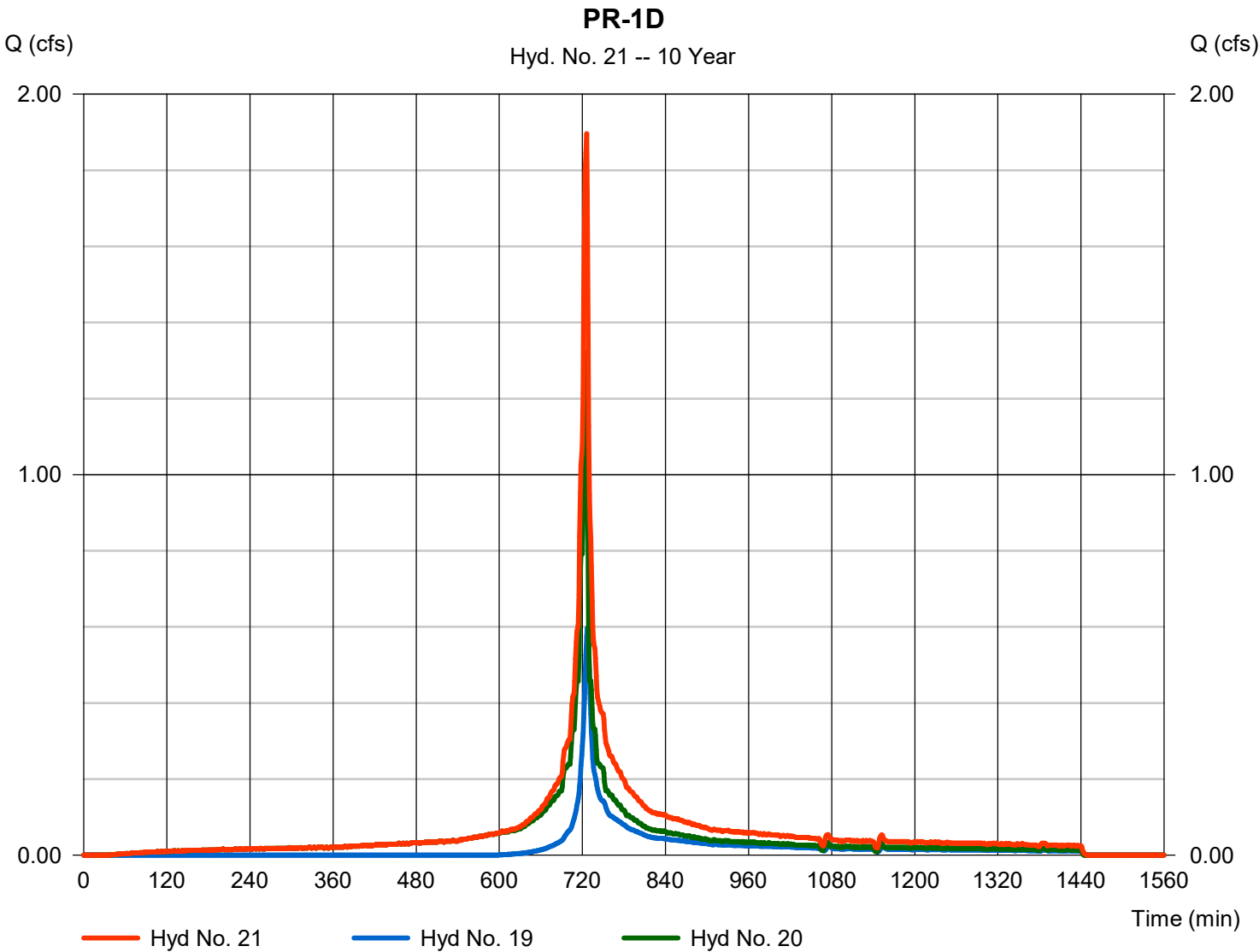


Hydrograph Report

Hyd. No. 21

PR-1D

Hydrograph type	= Combine	Peak discharge	= 1.896 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 6,272 cuft
Inflow hyds.	= 19, 20	Contrib. drain. area	= 0.400 ac

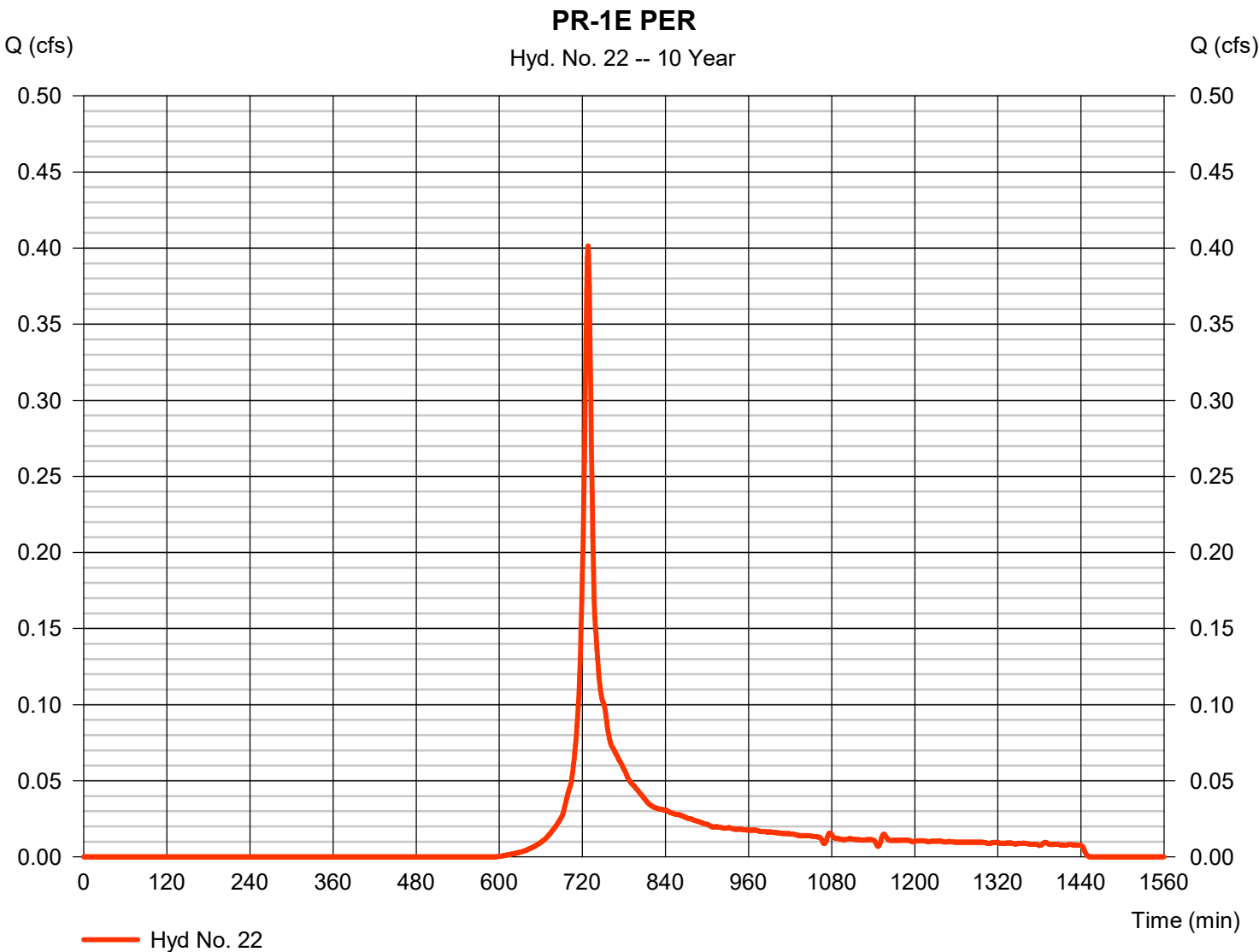


Hydrograph Report

Hyd. No. 22

PR-1E PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.401 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 1,324 cuft
Drainage area	= 0.150 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.70 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

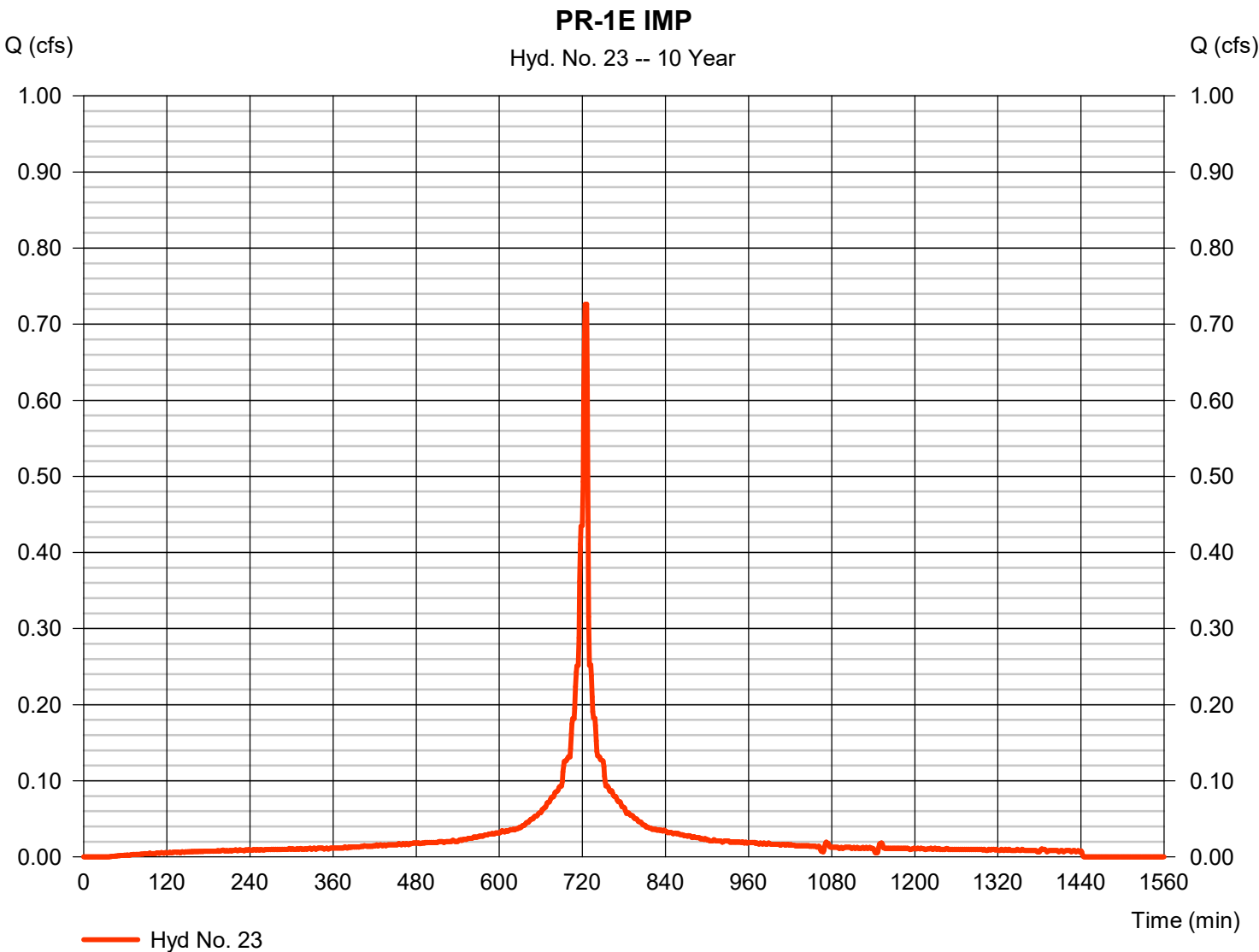


Hydrograph Report

Hyd. No. 23

PR-1E IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.726 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,422 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

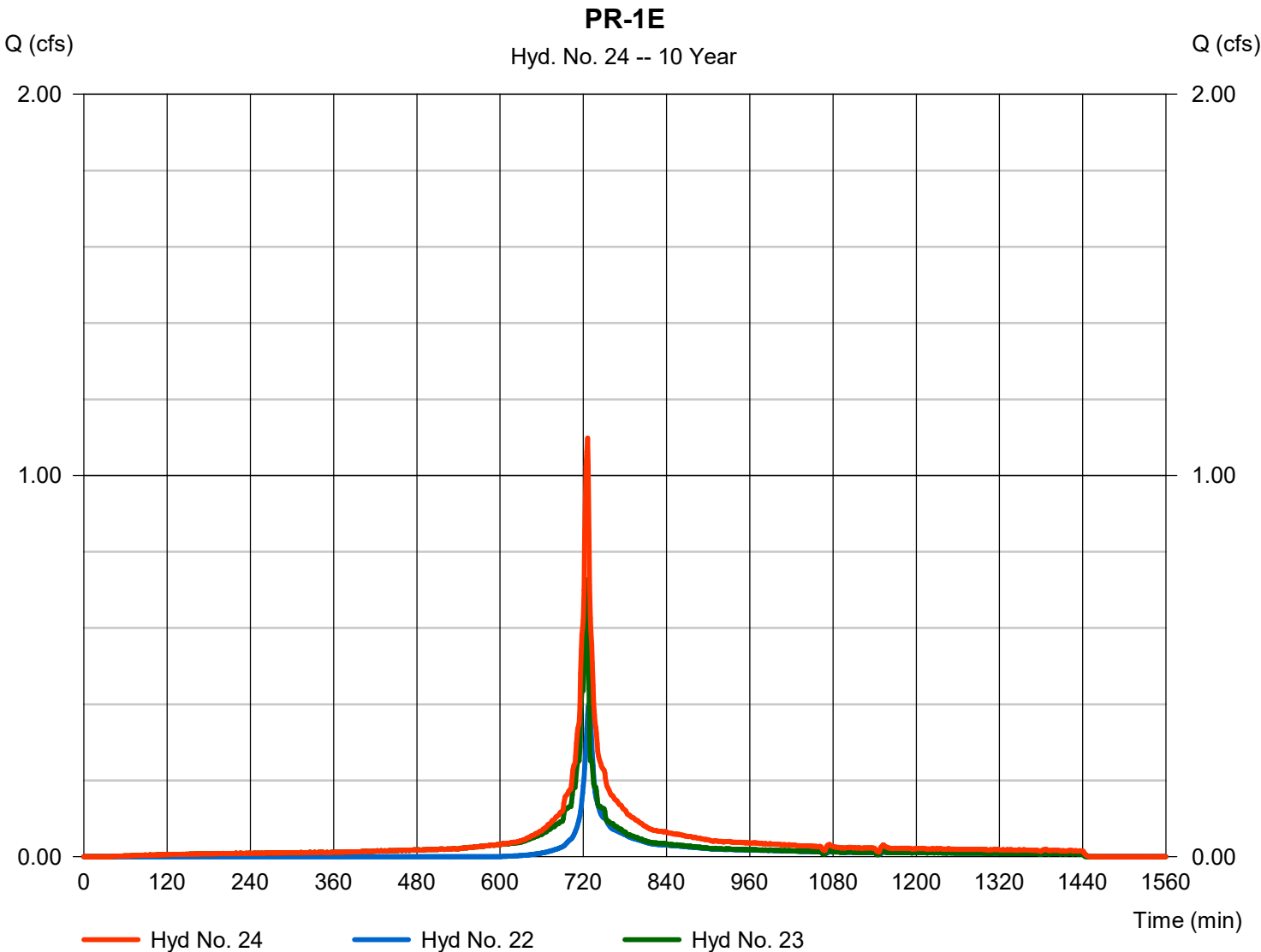


Hydrograph Report

Hyd. No. 24

PR-1E

Hydrograph type	= Combine	Peak discharge	= 1.099 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,747 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.260 ac

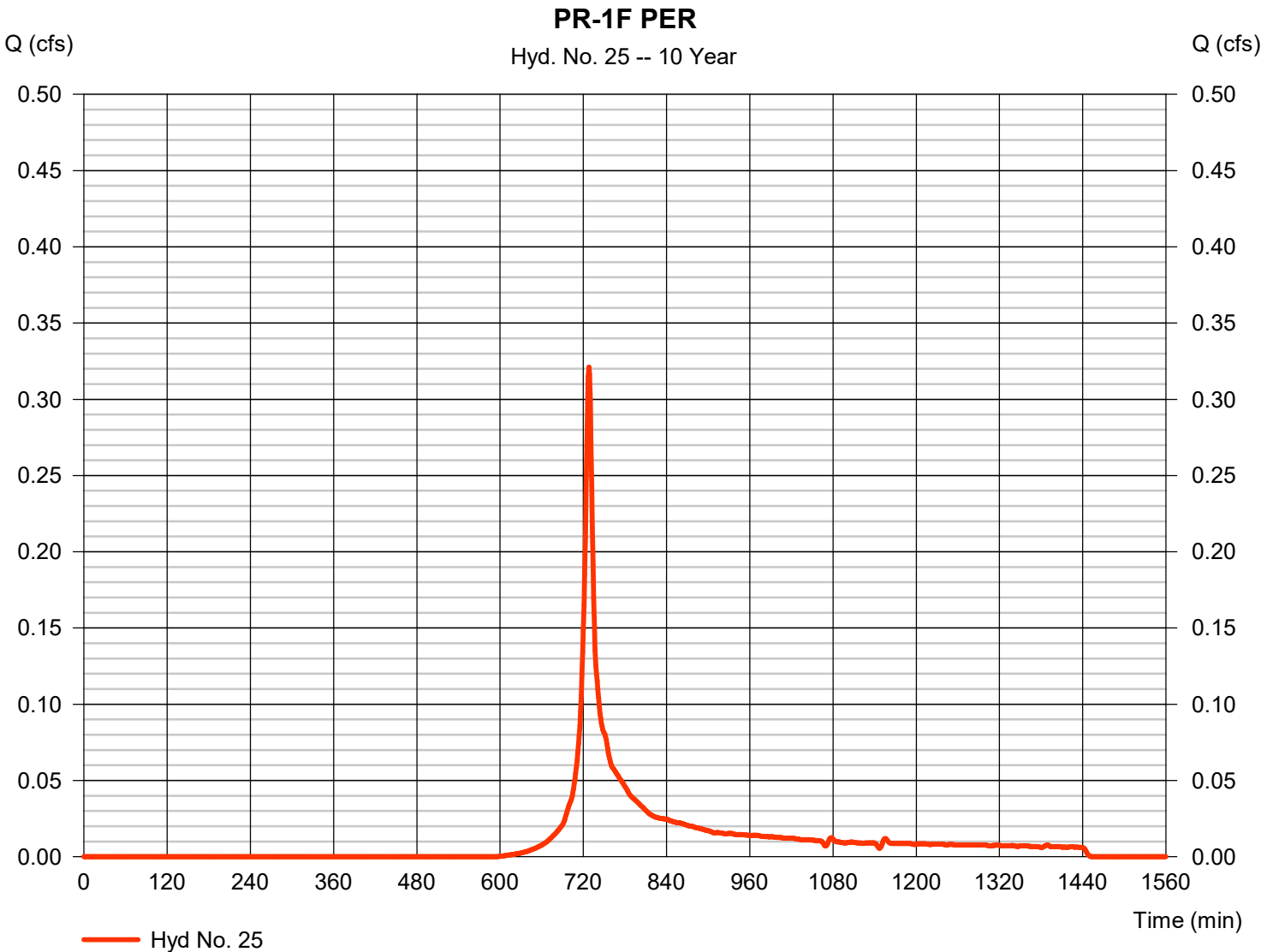


Hydrograph Report

Hyd. No. 25

PR-1F PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.321 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 1,060 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

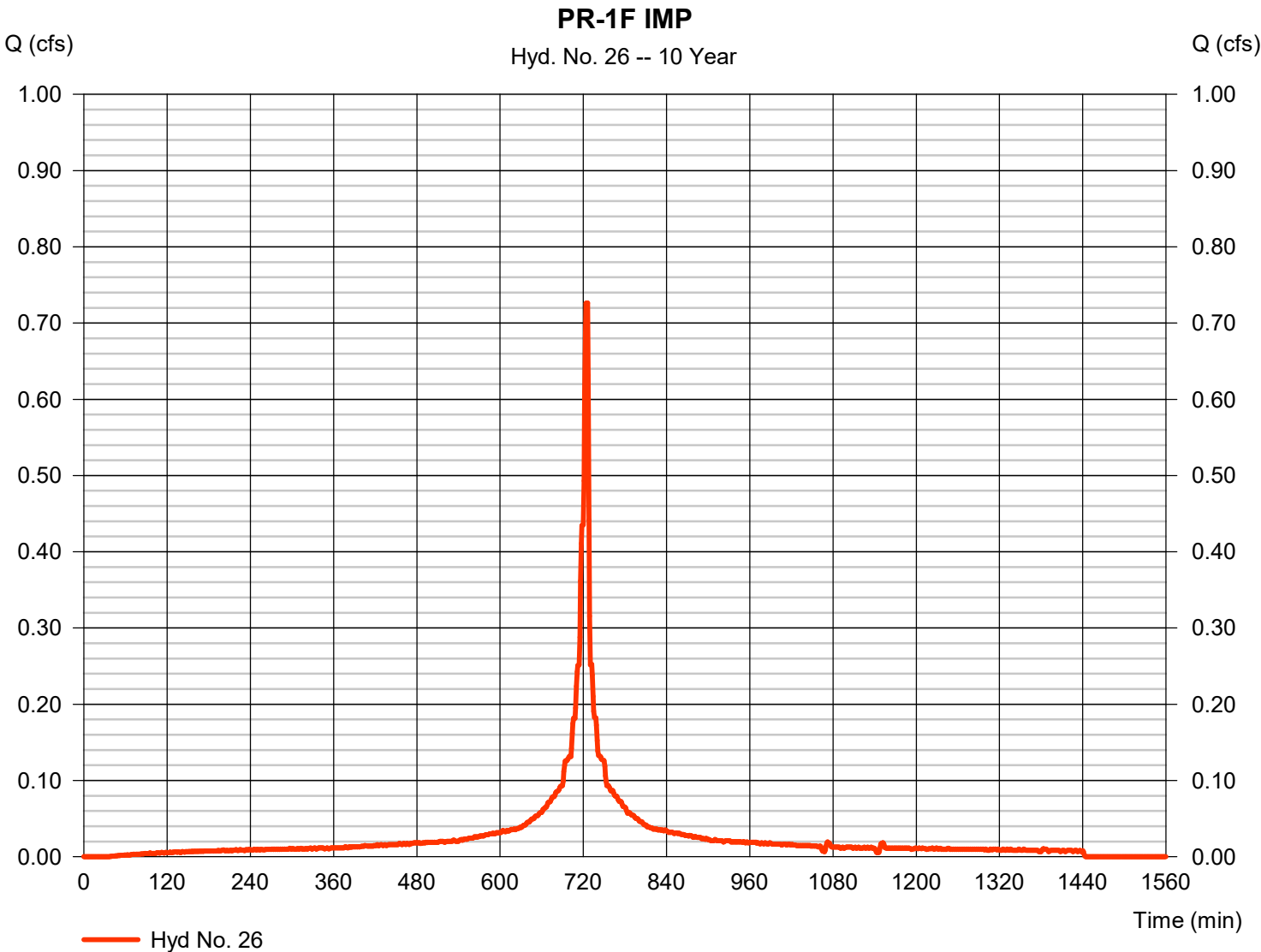


Hydrograph Report

Hyd. No. 26

PR-1F IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.726 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,422 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

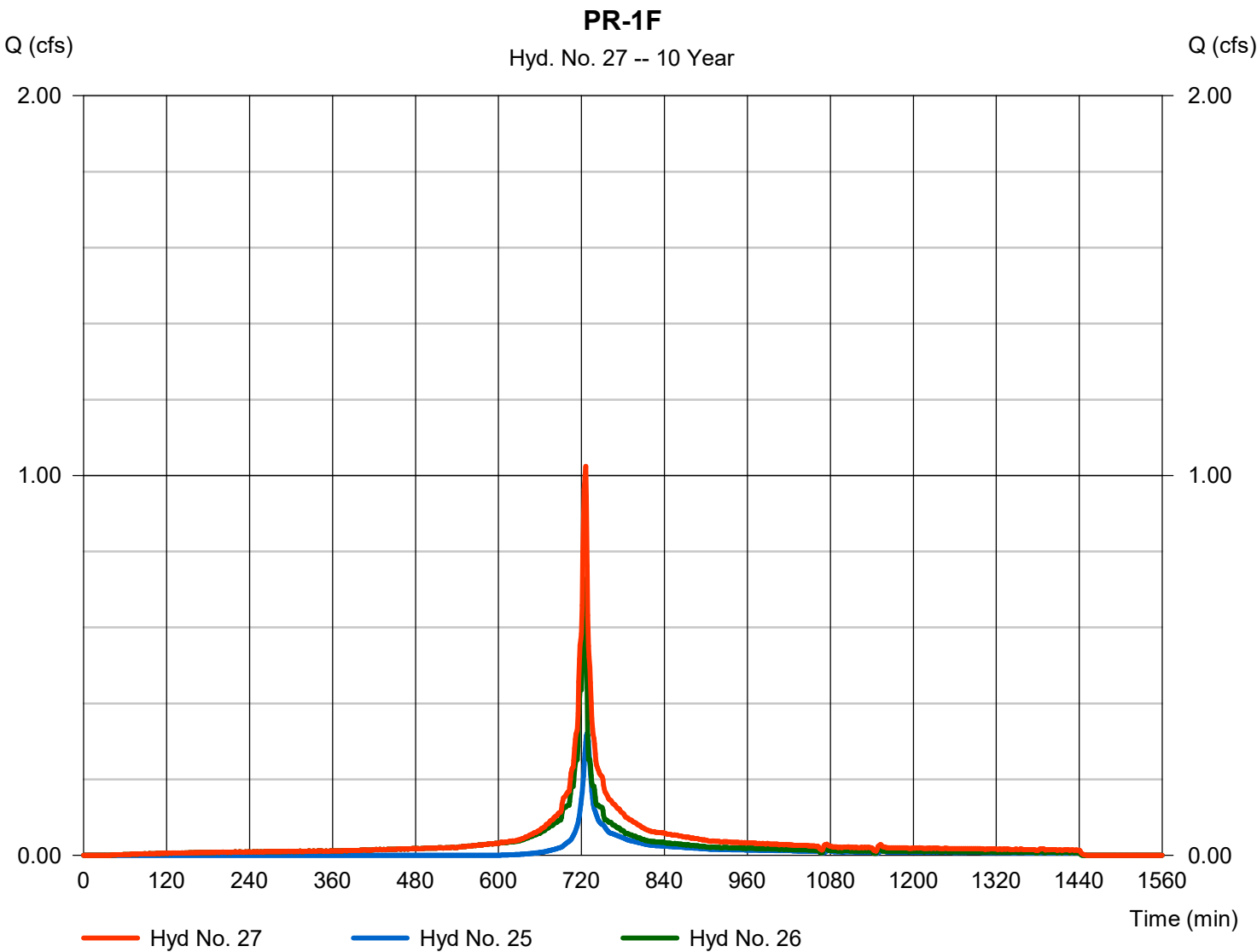


Hydrograph Report

Hyd. No. 27

PR-1F

Hydrograph type	= Combine	Peak discharge	= 1.024 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,482 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 0.230 ac

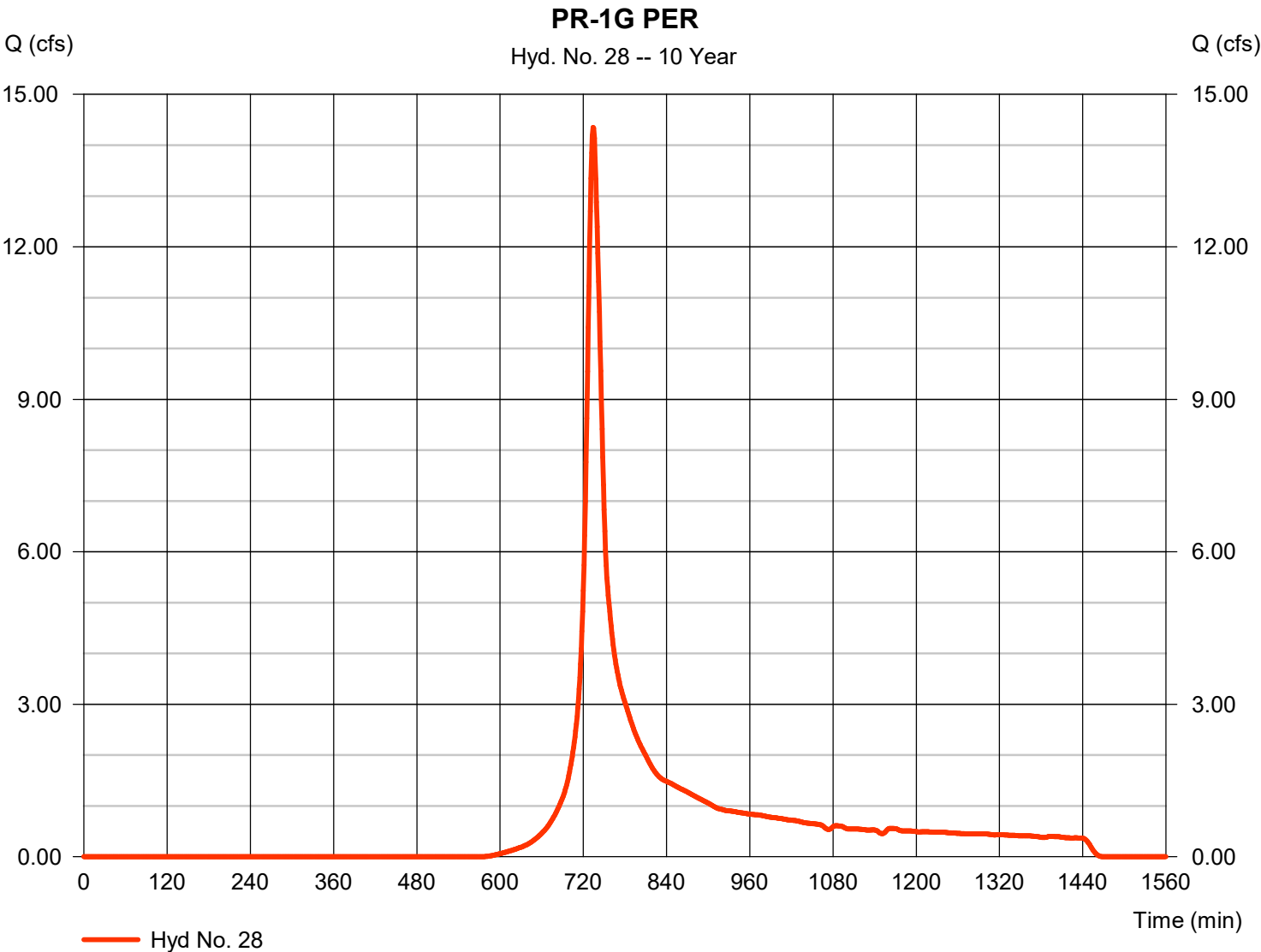


Hydrograph Report

Hyd. No. 28

PR-1G PER

Hydrograph type	= SCS Runoff	Peak discharge	= 14.35 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 64,001 cuft
Drainage area	= 6.640 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

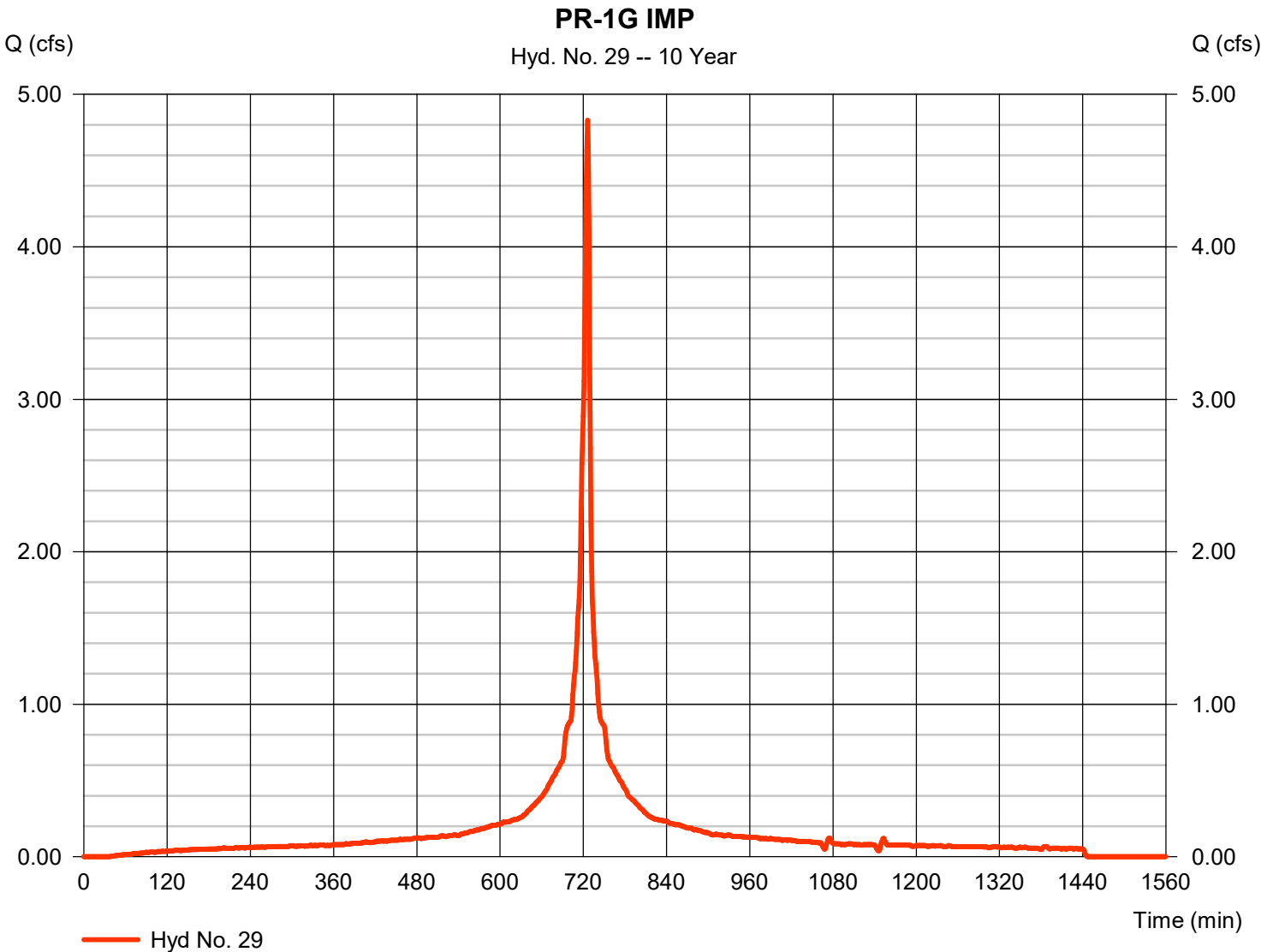


Hydrograph Report

Hyd. No. 29

PR-1G IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 4.830 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 16,443 cuft
Drainage area	= 0.700 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 6.71 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

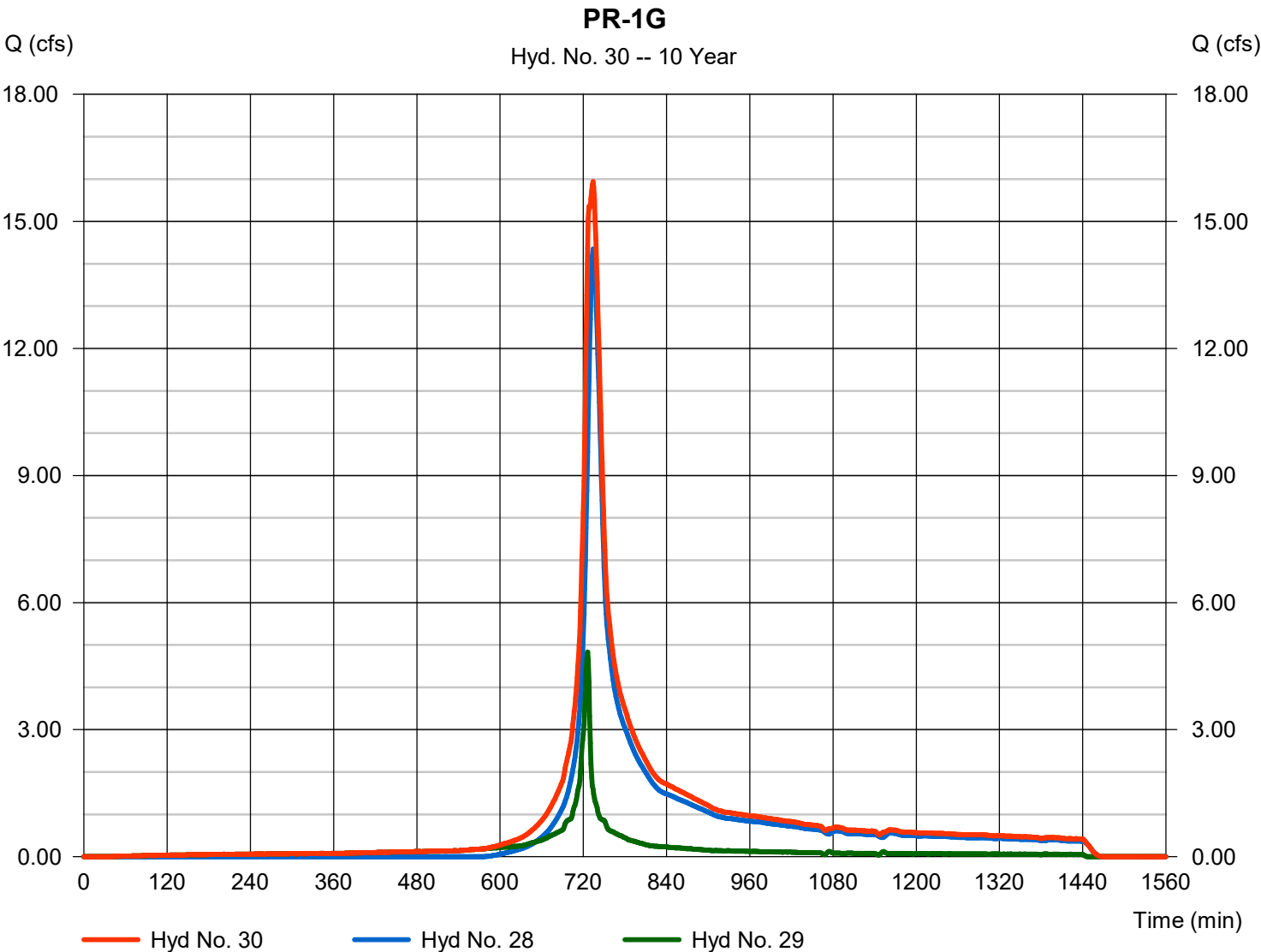


Hydrograph Report

Hyd. No. 30

PR-1G

Hydrograph type	= Combine	Peak discharge	= 15.94 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 80,444 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 7.340 ac

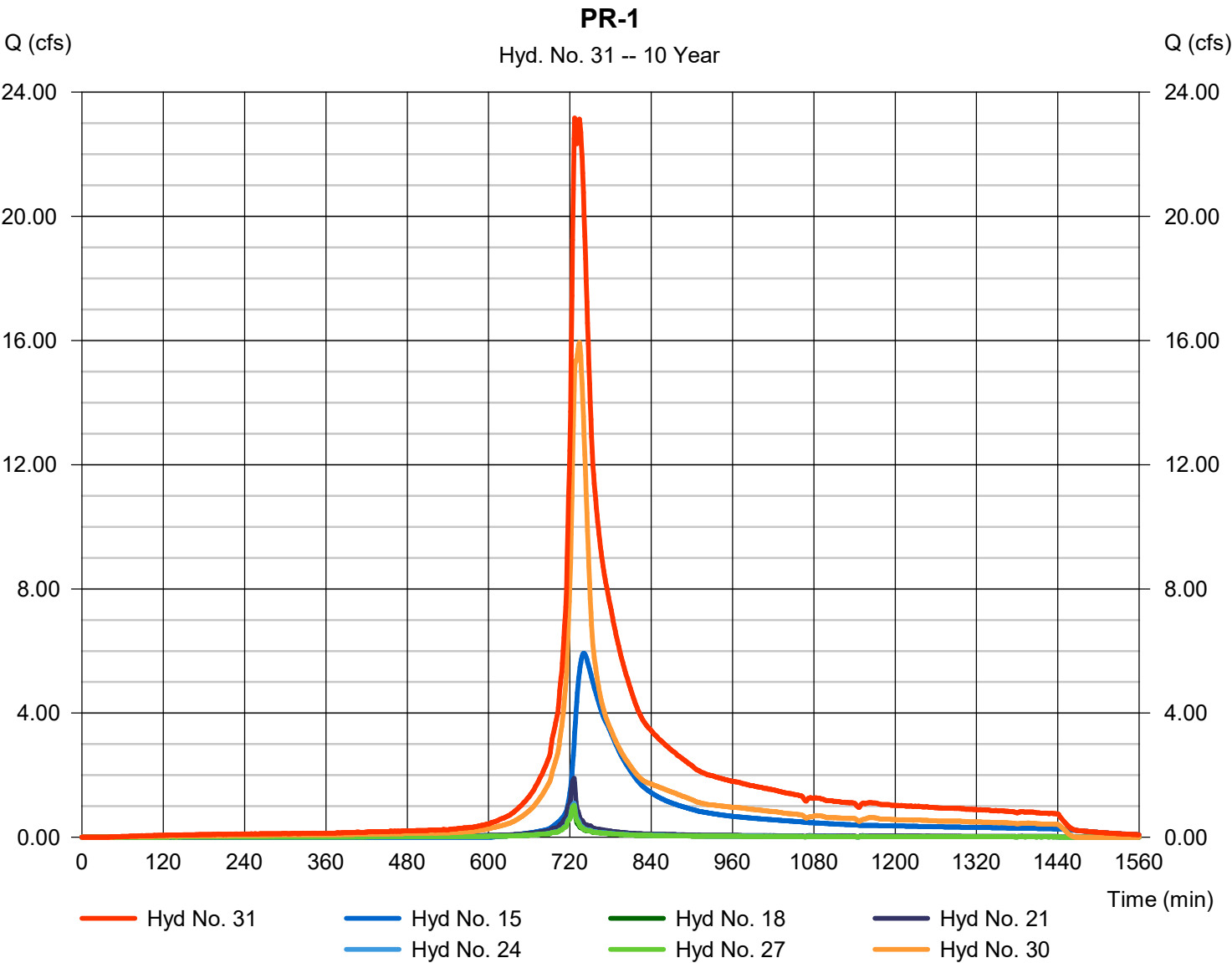


Hydrograph Report

Hyd. No. 31

PR-1

Hydrograph type	= Combine	Peak discharge	= 23.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 143,247 cuft
Inflow hyds.	= 15, 18, 21, 24, 27, 30	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

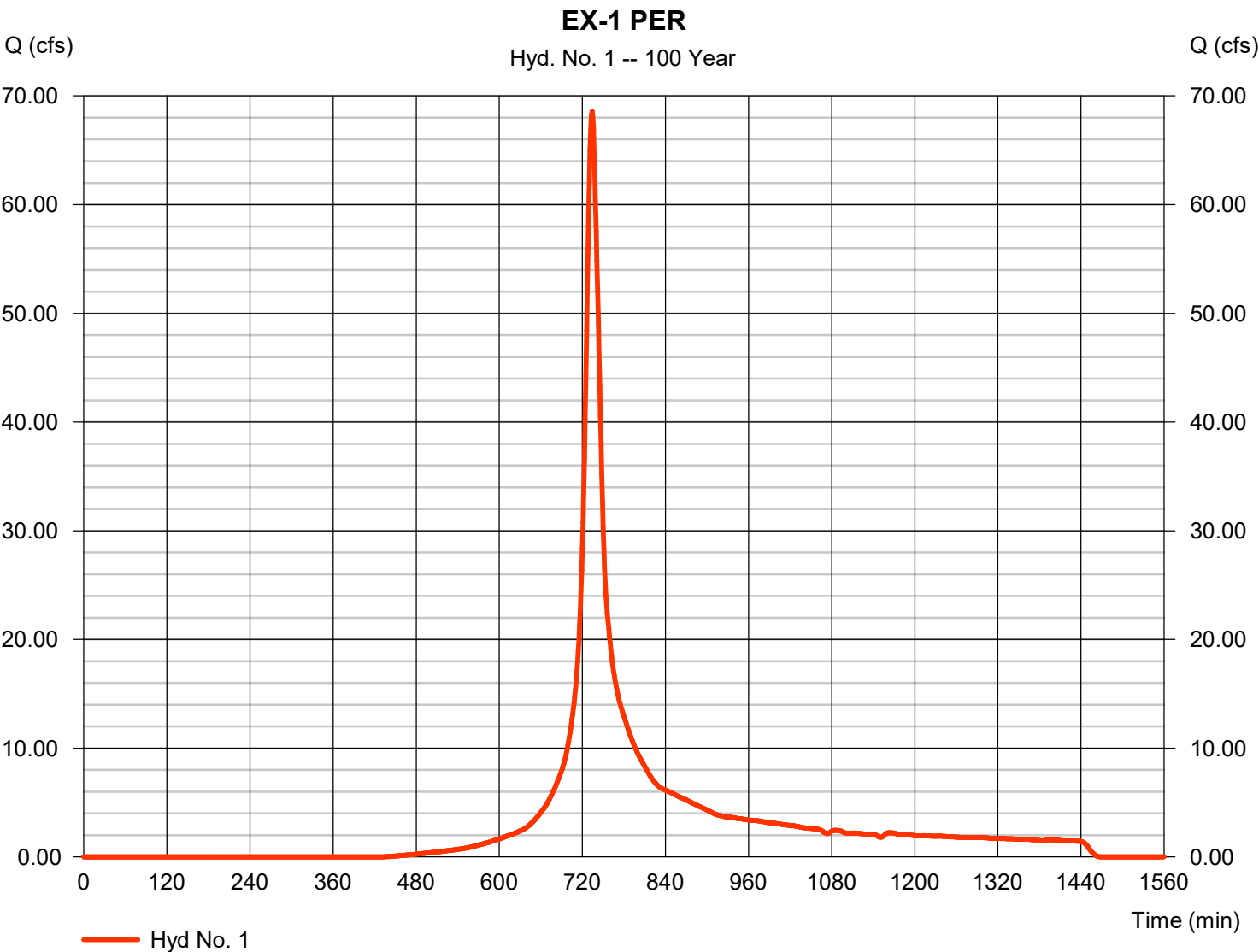
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	68.57	1	734	301,105	-----	-----	-----	EX-1 PER
2	SCS Runoff	24.30	1	726	83,869	-----	-----	-----	EX-1 IMP
3	Combine	76.68	1	728	384,975	1, 2	-----	-----	EX-1
4	SCS Runoff	15.39	1	730	56,981	-----	-----	-----	PR-1A PER
5	SCS Runoff	6.199	1	726	20,967	-----	-----	-----	PR-1A IMP
6	Combine	19.47	1	727	77,948	4, 5	-----	-----	PR-1A
7	SCS Runoff	17.52	1	726	59,273	-----	-----	-----	AREA TO DRYWELLS
8	Reservoir	15.07	1	727	51,004	7	7.80	10,827	DRYWELL ROUTING
9	Combine	34.54	1	727	128,953	6, 8	-----	-----	INFLOW TO BASIN 1
10	Reservoir	17.21	1	731	72,357	6	817.28	14,498	BASIN 1
11	SCS Runoff	7.854	1	729	27,374	-----	-----	-----	PR-1B PER
12	SCS Runoff	5.722	1	726	19,355	-----	-----	-----	PR-1B IMP
13	Combine	12.78	1	726	46,728	11, 12	-----	-----	PR-1B
14	Combine	27.98	1	727	119,085	10, 13	-----	-----	INFLOW TO BASIN 2
15	Reservoir	24.44	1	733	117,466	14	794.97	13,608	BASIN 2
16	SCS Runoff	1.034	1	726	2,959	-----	-----	-----	PR-1C PER
17	SCS Runoff	1.311	1	726	4,435	-----	-----	-----	PR-1C IMP
18	Combine	2.346	1	726	7,395	16, 17	-----	-----	PR-1C
19	SCS Runoff	1.639	1	727	5,086	-----	-----	-----	PR-1D PER
20	SCS Runoff	2.384	1	726	8,064	-----	-----	-----	PR-1D IMP
21	Combine	3.983	1	726	13,151	19, 20	-----	-----	PR-1D
22	SCS Runoff	1.103	1	728	3,607	-----	-----	-----	PR-1E PER
23	SCS Runoff	1.311	1	726	4,435	-----	-----	-----	PR-1E IMP
24	Combine	2.358	1	726	8,042	22, 23	-----	-----	PR-1E
25	SCS Runoff	0.883	1	728	2,885	-----	-----	-----	PR-1F PER
26	SCS Runoff	1.311	1	726	4,435	-----	-----	-----	PR-1F IMP
27	Combine	2.149	1	726	7,321	25, 26	-----	-----	PR-1F
28	SCS Runoff	38.45	1	734	169,115	-----	-----	-----	PR-1G PER
29	SCS Runoff	8.721	1	726	30,107	-----	-----	-----	PR-1G IMP
30	Combine	41.33	1	734	199,222	28, 29	-----	-----	PR-1G
31	Combine	70.31	1	733	352,597	15, 18, 21, 24, 27, 30	-----	-----	PR-1
Future 15107.gpw					Return Period: 100 Year			Thursday, 07 / 9 / 2026 254	

Hydrograph Report

Hyd. No. 1

EX-1 PER

Hydrograph type	= SCS Runoff	Peak discharge	= 68.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 301,105 cuft
Drainage area	= 12.350 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

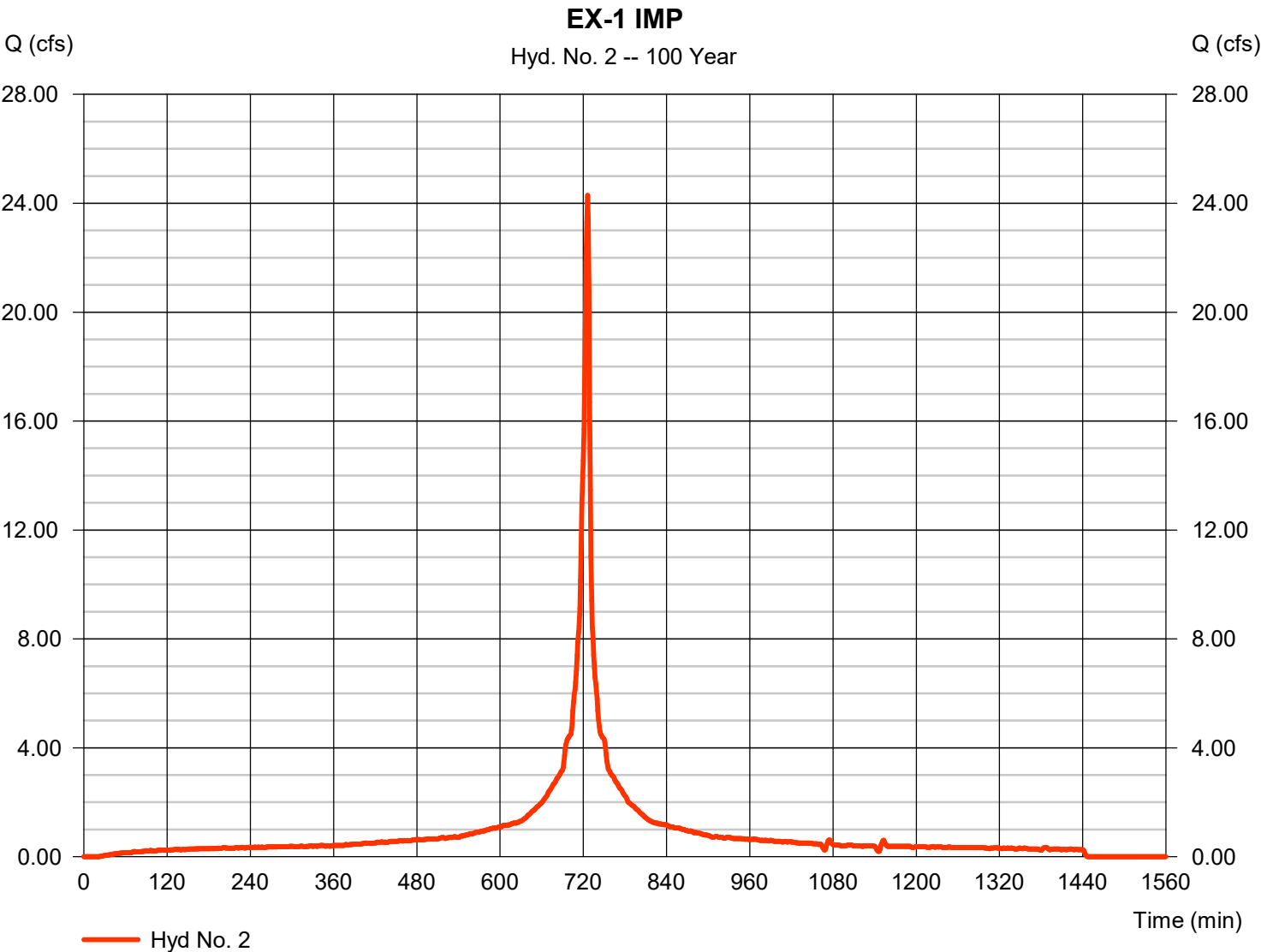


Hydrograph Report

Hyd. No. 2

EX-1 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 24.30 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 83,869 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

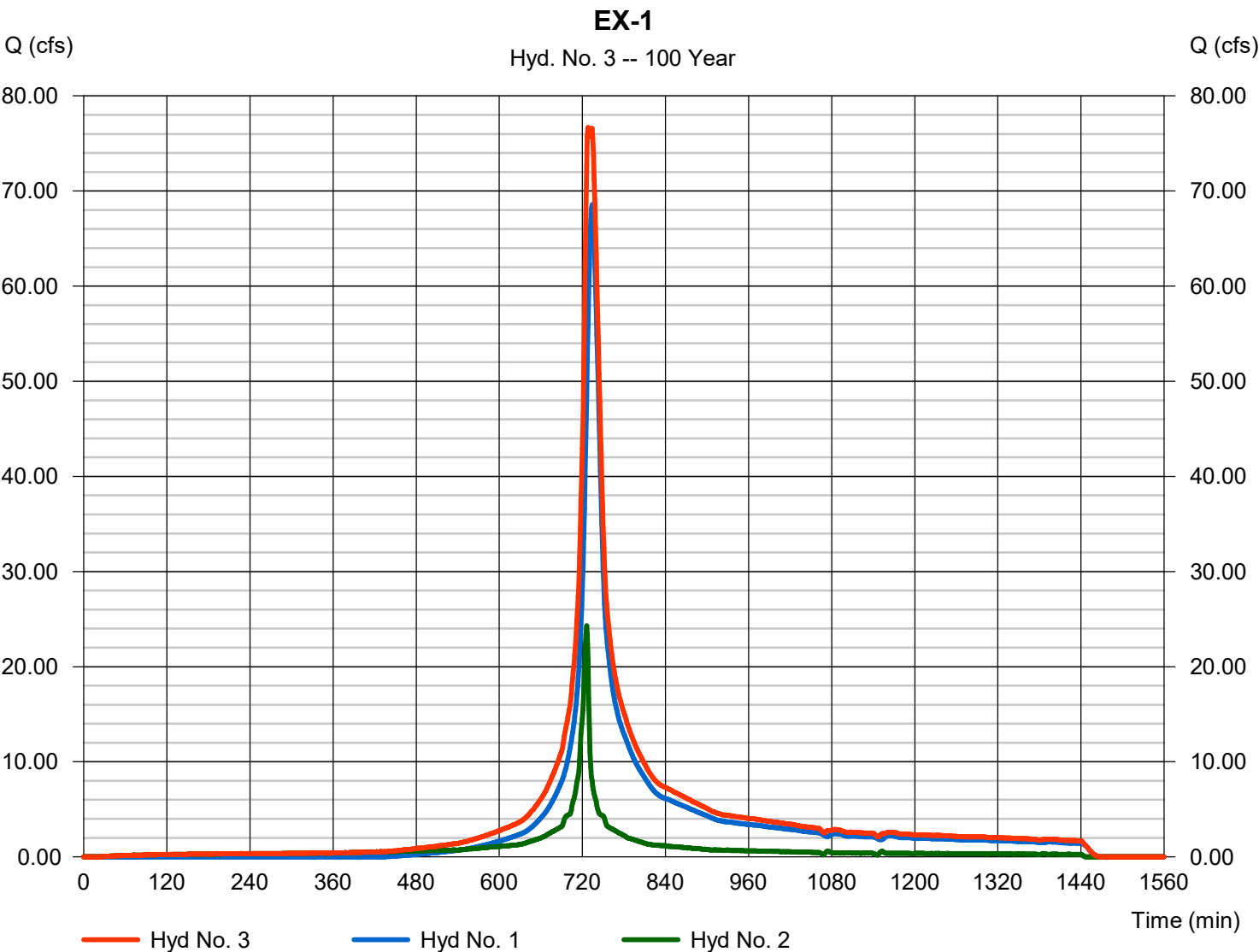


Hydrograph Report

Hyd. No. 3

EX-1

Hydrograph type	= Combine	Peak discharge	= 76.68 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 384,975 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.300 ac



PEAK FLOW REDUCTION CALCULATIONS - FUTURE

TO COMPLY WITH NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER MANAGEMENT REQUIREMENTS, THE POST-DEVELOPMENT PEAK RUNOFF RATES MUST BE REDUCED TO A PERCENTAGE OF PRE-DEVELOPMENT PEAK RUNOFF RATES, AS

$$\text{PROPOSED } Q_2 \leq 50\% \text{ EXISTING } Q_2$$

$$\text{PROPOSED } Q_{10} \leq 75\% \text{ EXISTING } Q_{10}$$

$$\text{PROPOSED } Q_{100} \leq 80\% \text{ EXISTING } Q_{10}$$

REDUCTION FACTORS ARE APPLIED TO THE DISTURBED PORTION OF THE TRIBUTARY DRAINAGE AREA ONLY:

EX 1

DRAINAGE AREA = 14.3 AC

AREA OF DISTURBANCE= 6 AC

PERCENT DISTURBANCE = 42.0%

APPLY REDUCTION FACTORS TO 42% OF EXISTING PEAK FLOWS.

PROJECTED PEAK FLOWS:

$$Q_2 = 14.2 \text{ CFS}$$

$$Q_{10} = 30.6 \text{ CFS}$$

$$Q_{100} = 76.7 \text{ CFS}$$

CALCULATE ALLOWABLE RUNOFF:

$$Q_2 = (0.50) \times (0.42) \times (14.2 \text{ CFS}) + (0.58) \times (14.2 \text{ CFS}) = 11.2 \text{ CFS}$$

$$Q_{10} = (0.75) \times (0.42) \times (30.6 \text{ CFS}) + (0.58) \times (30.6 \text{ CFS}) = 27.4 \text{ CFS}$$

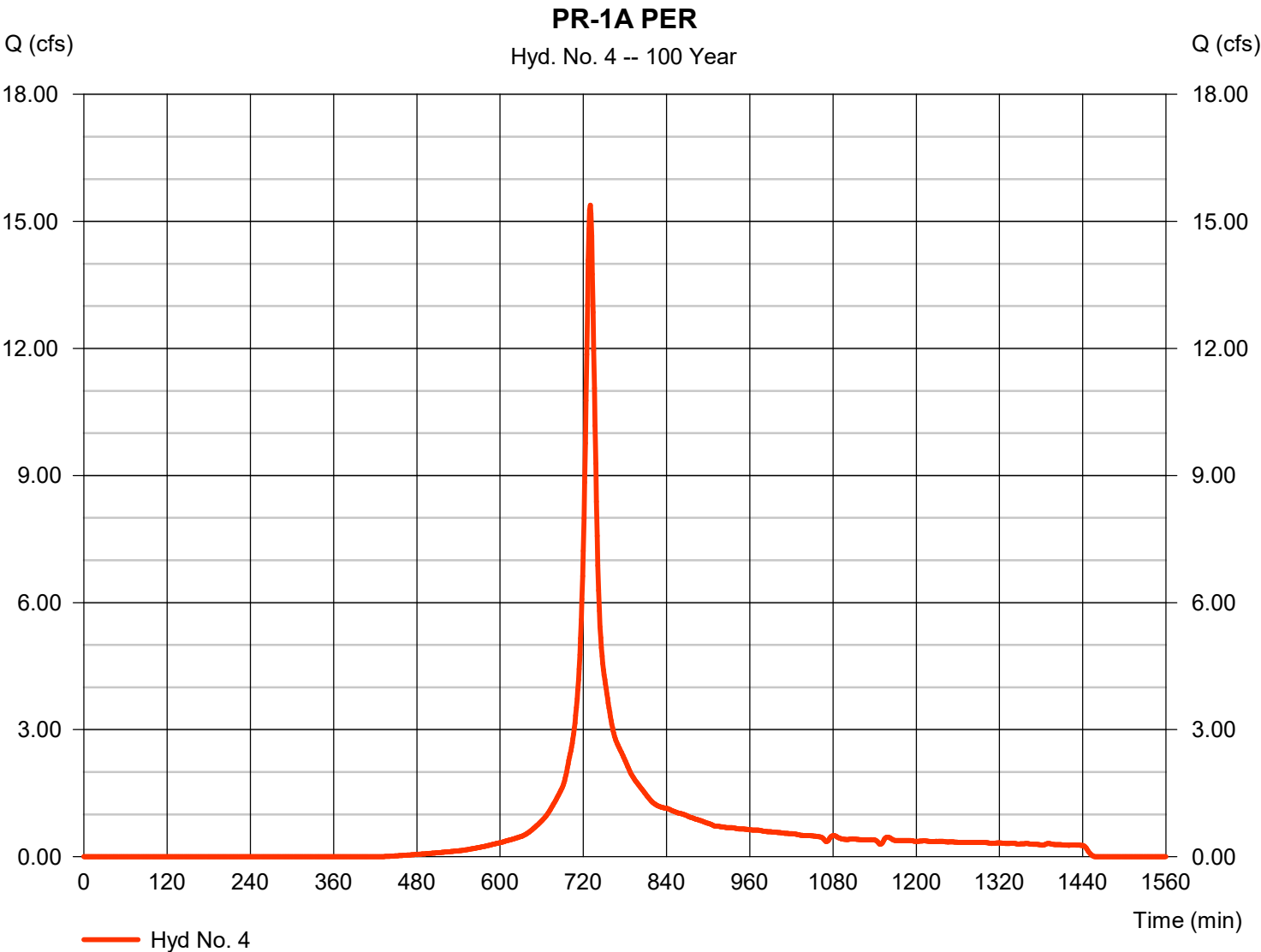
$$Q_{100} = (0.80) \times (0.42) \times (76.7 \text{ CFS}) + (0.58) \times (76.7 \text{ CFS}) = 70.3 \text{ CFS}$$

Hydrograph Report

Hyd. No. 4

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 15.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 56,981 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

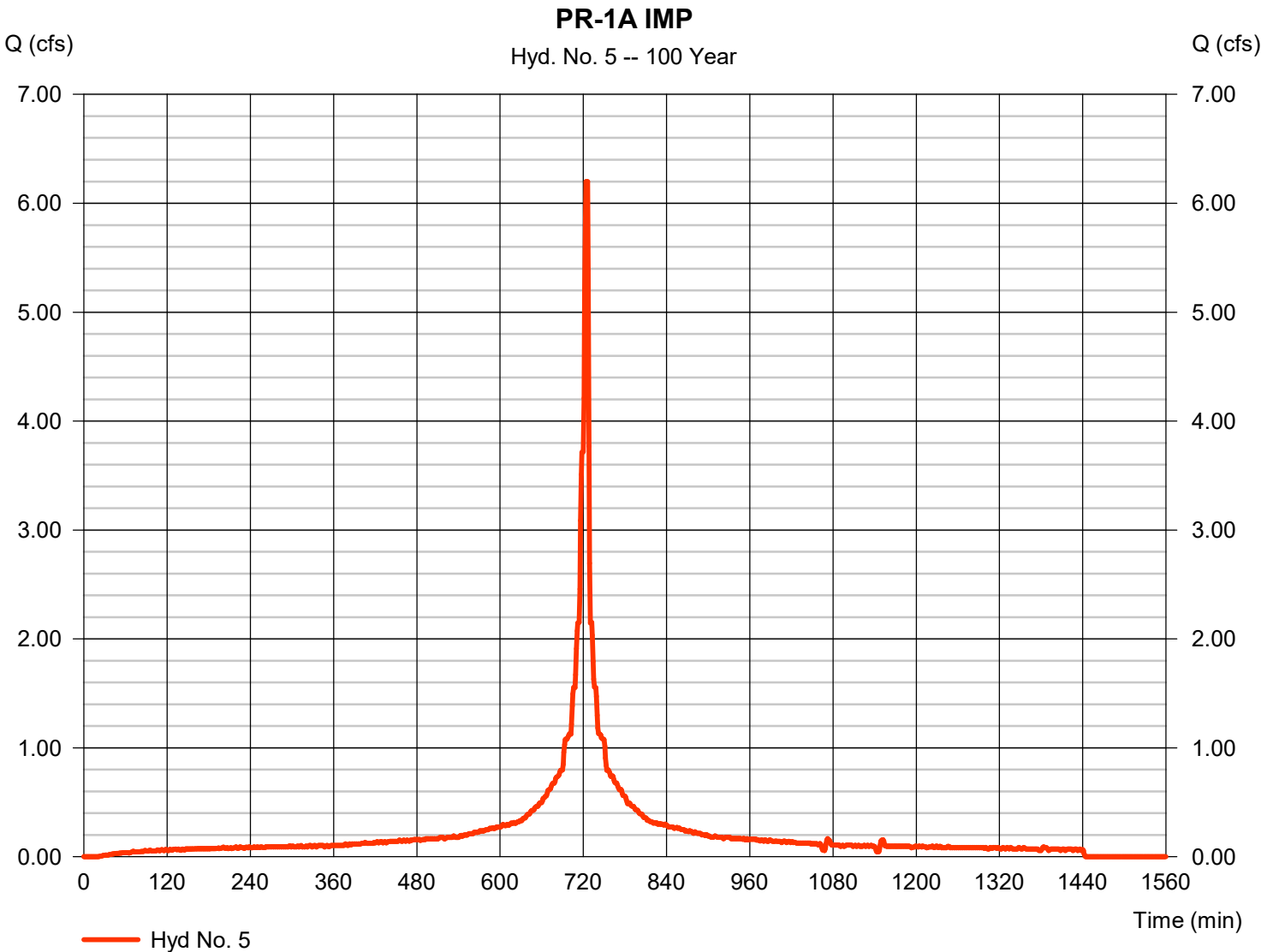


Hydrograph Report

Hyd. No. 5

PR-1A IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 6.199 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 20,967 cuft
Drainage area	= 0.520 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

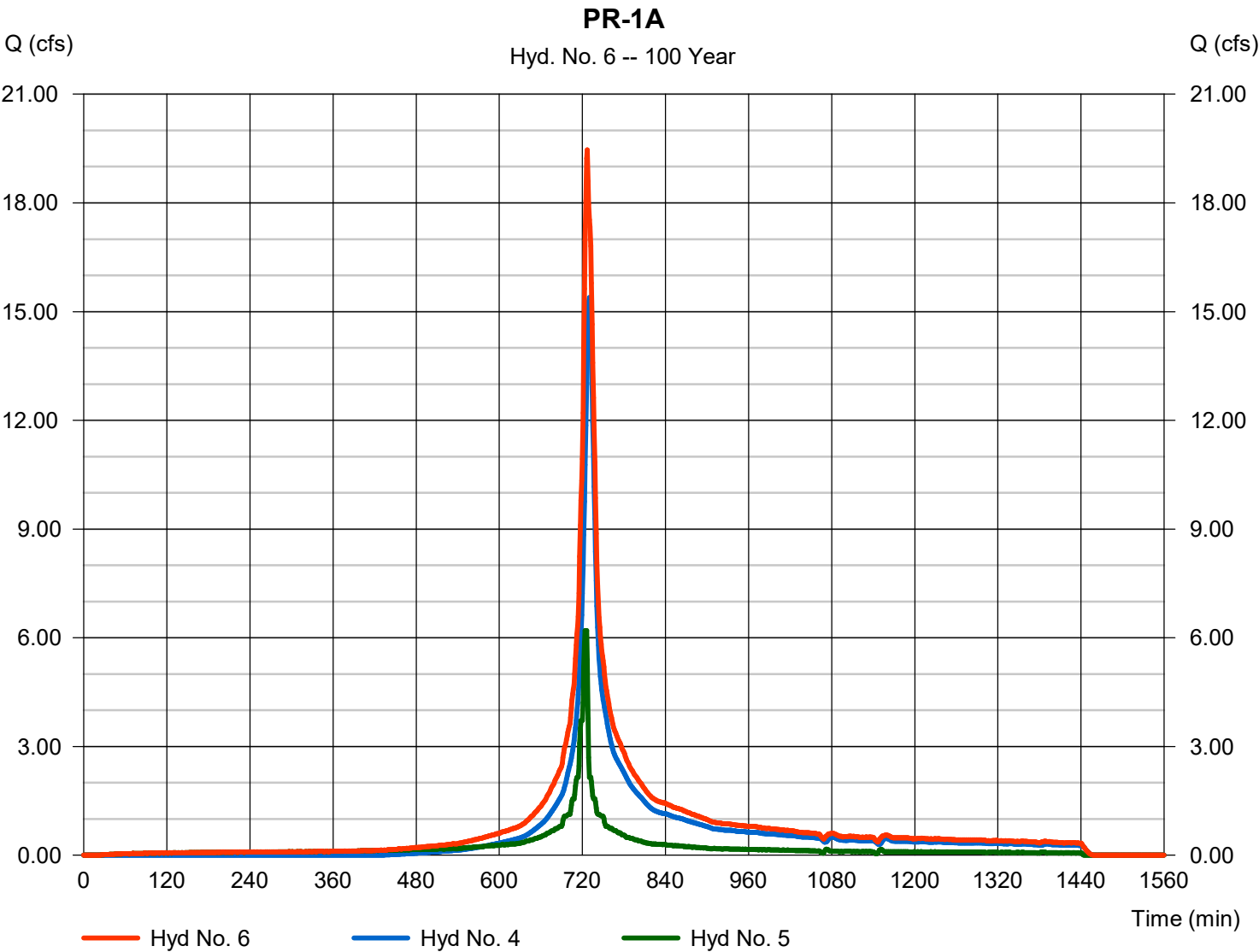


Hydrograph Report

Hyd. No. 6

PR-1A

Hydrograph type	= Combine	Peak discharge	= 19.47 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 77,948 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 2.790 ac

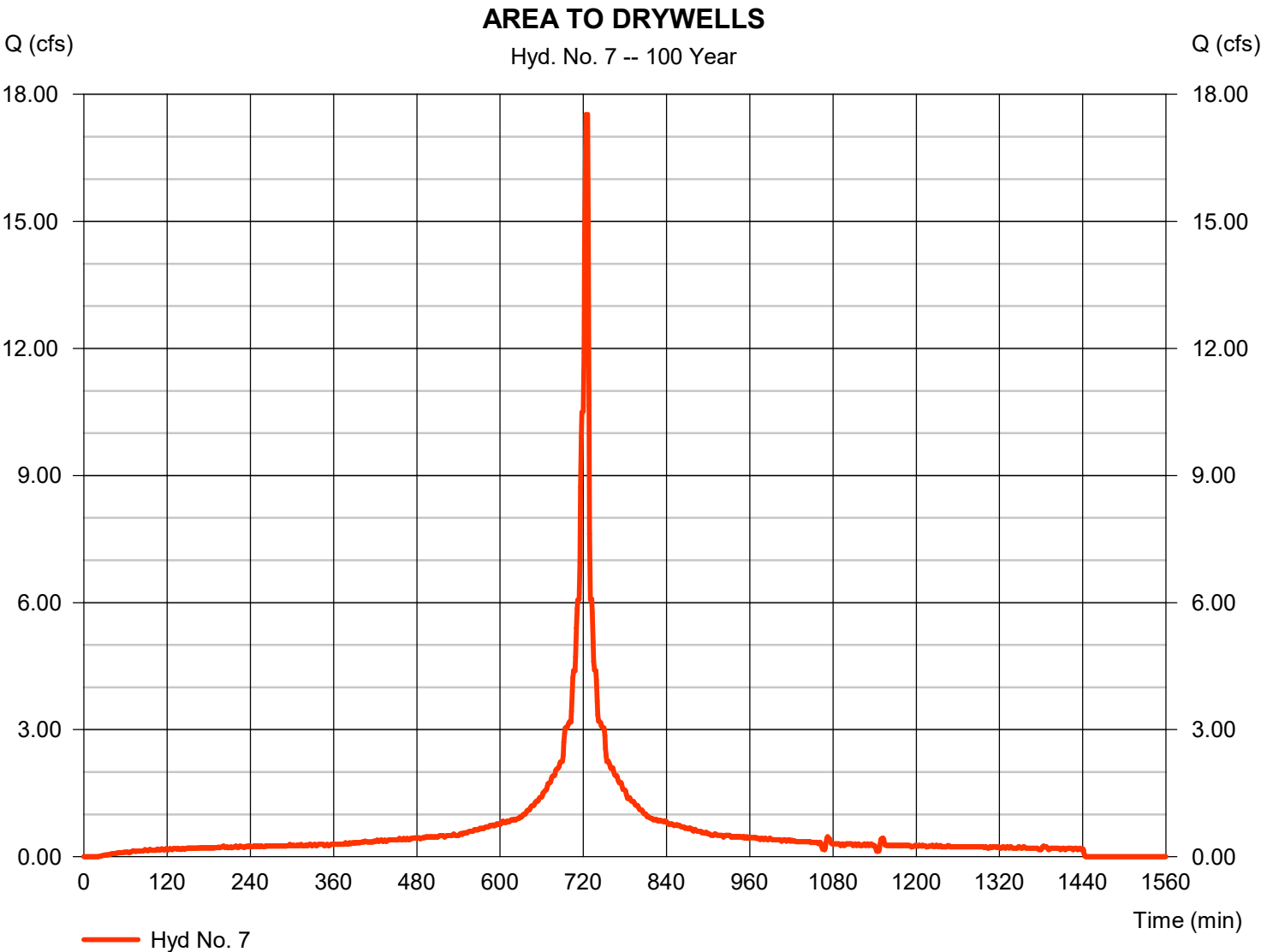


Hydrograph Report

Hyd. No. 7

AREA TO DRYWELLS

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.52 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	59,273 cuft
Drainage area	=	1.470 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	1.60 min
Total precip.	=	12.09 in	Distribution	=	Custom
Storm duration	=	H:\ADMIN\NOAA D.cds	Shape factor	=	484



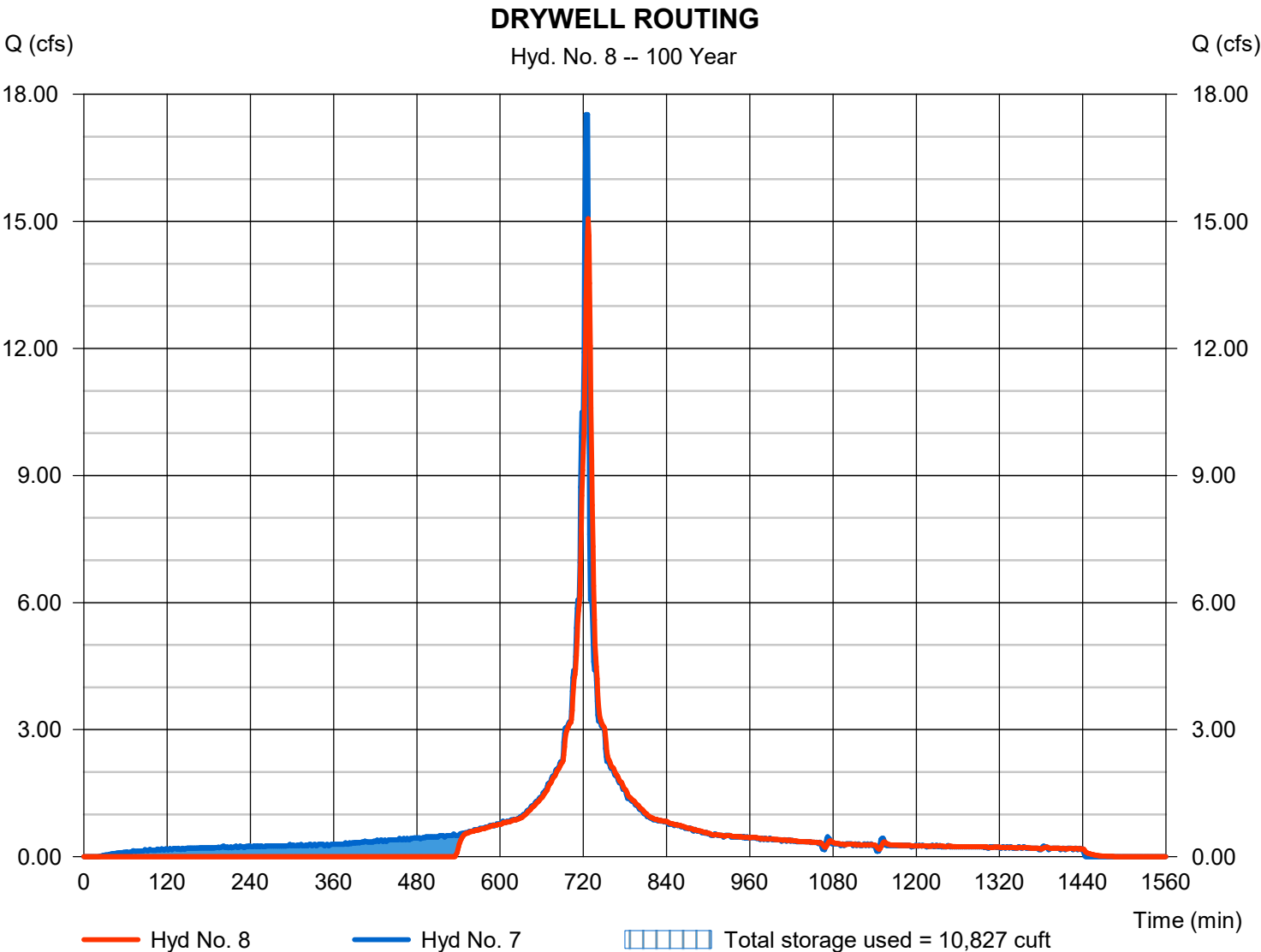
Hydrograph Report

Hyd. No. 8

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 15.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 51,004 cuft
Inflow hyd. No.	= 7 - AREA TO DRYWELLS	Max. Elevation	= 7.80 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 10,827 cuft

Storage Indication method used.

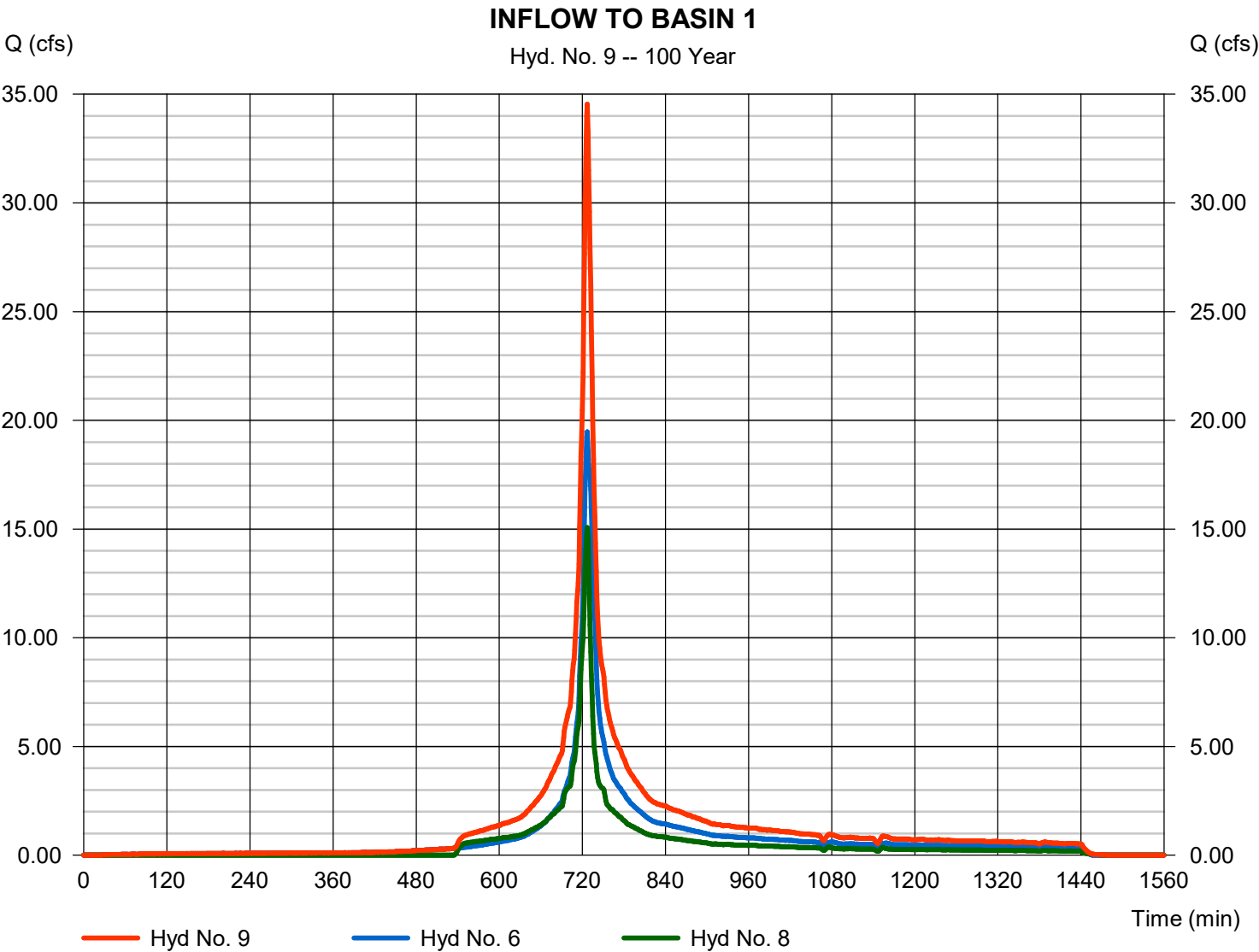


Hydrograph Report

Hyd. No. 9

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 34.54 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 128,953 cuft
Inflow hyds.	= 6, 8	Contrib. drain. area	= 0.000 ac



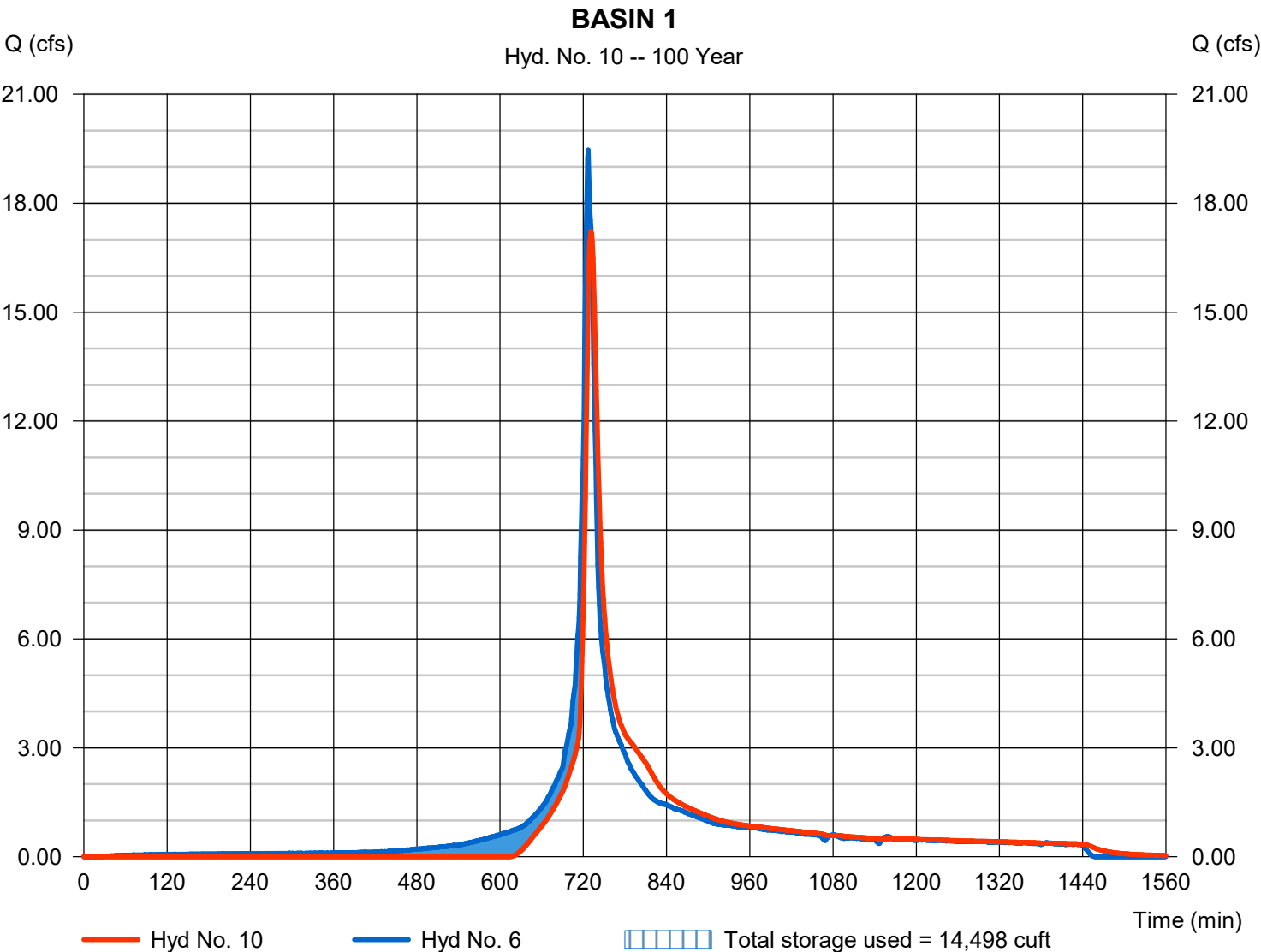
Hydrograph Report

Hyd. No. 10

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 17.21 cfs
Storm frequency	= 100 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 72,357 cuft
Inflow hyd. No.	= 6 - PR-1A	Max. Elevation	= 817.28 ft
Reservoir name	= BASIN 1	Max. Storage	= 14,498 cuft

Storage Indication method used.

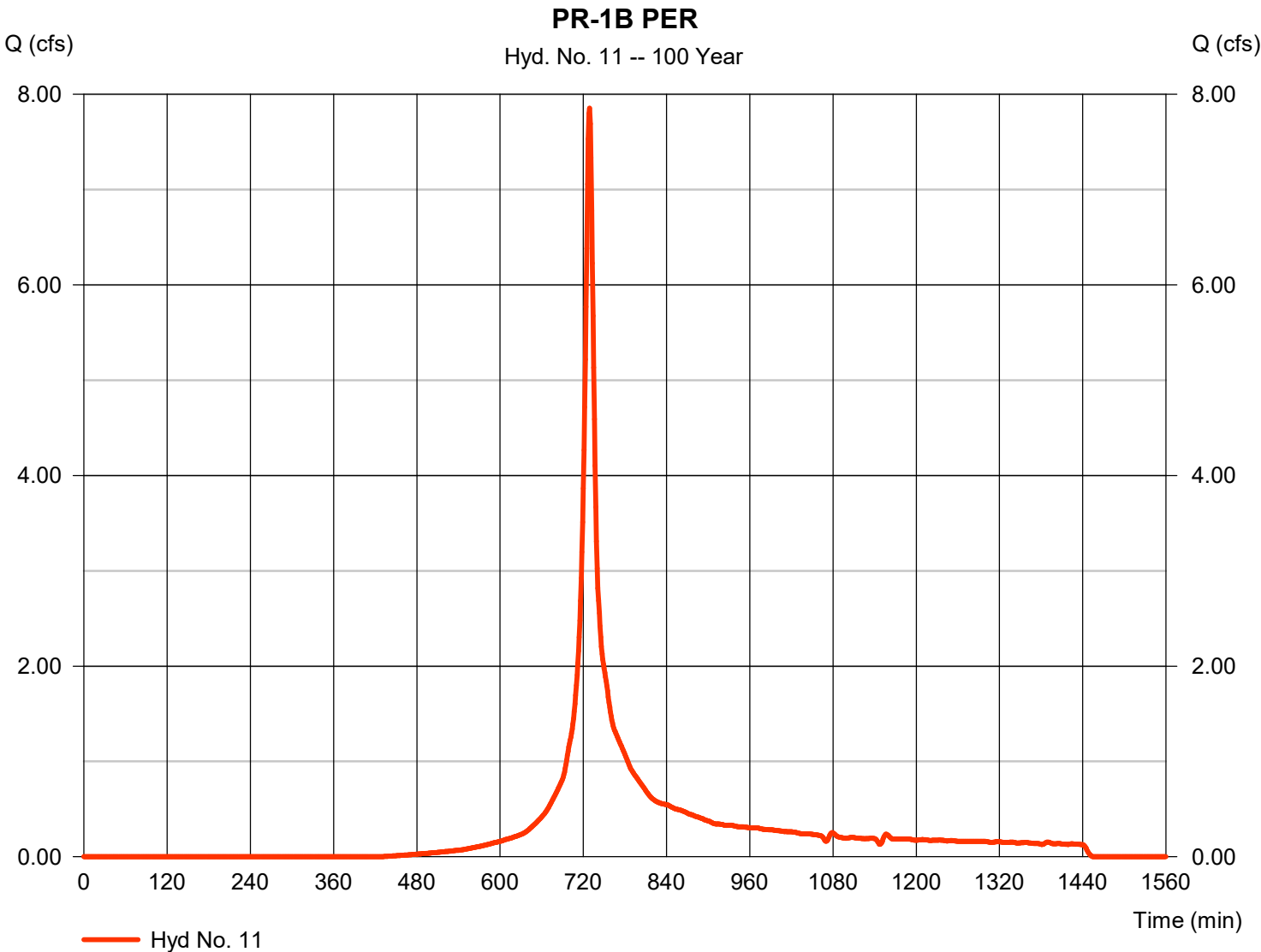


Hydrograph Report

Hyd. No. 11

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 7.854 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 27,374 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.00 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

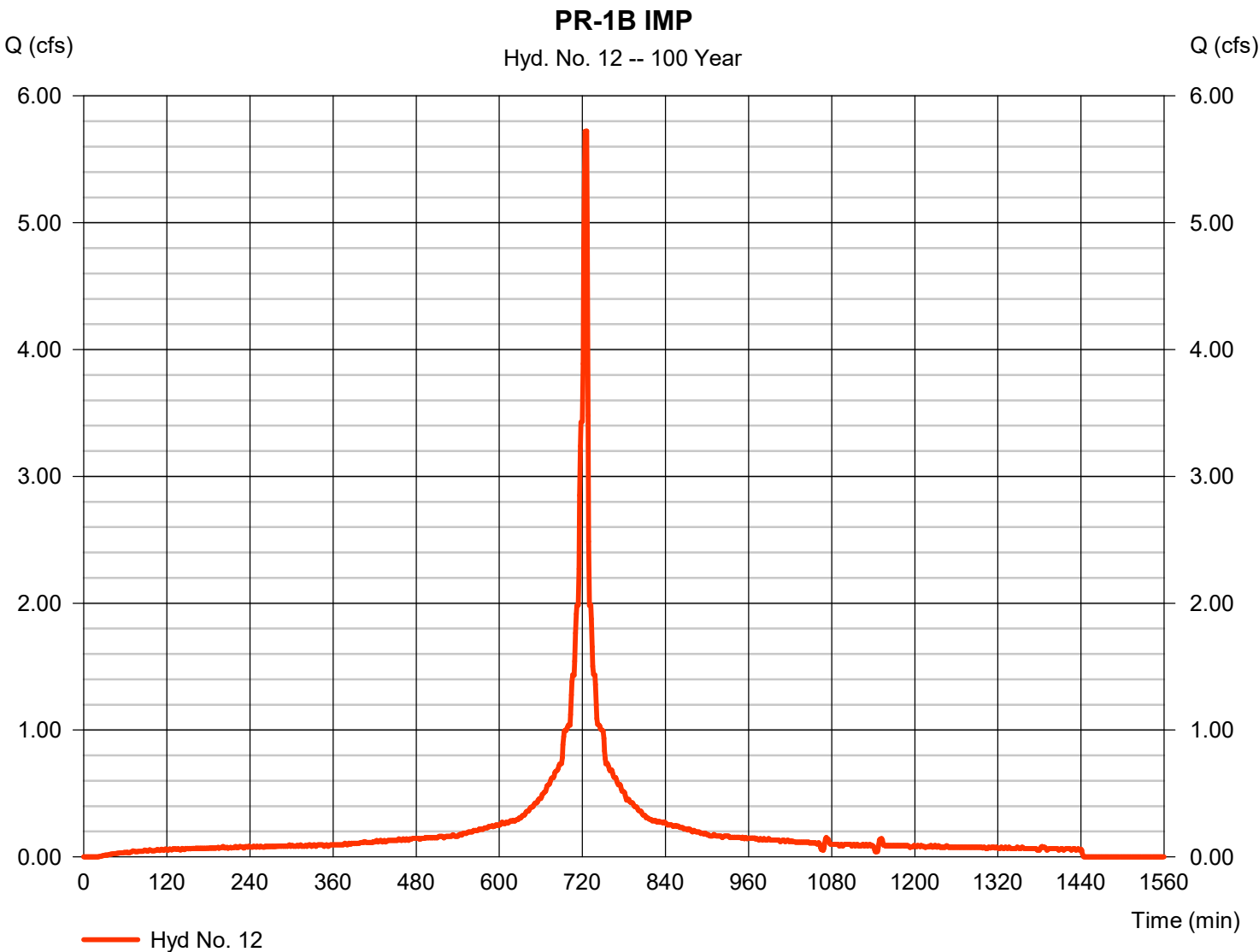


Hydrograph Report

Hyd. No. 12

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 5.722 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 19,355 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

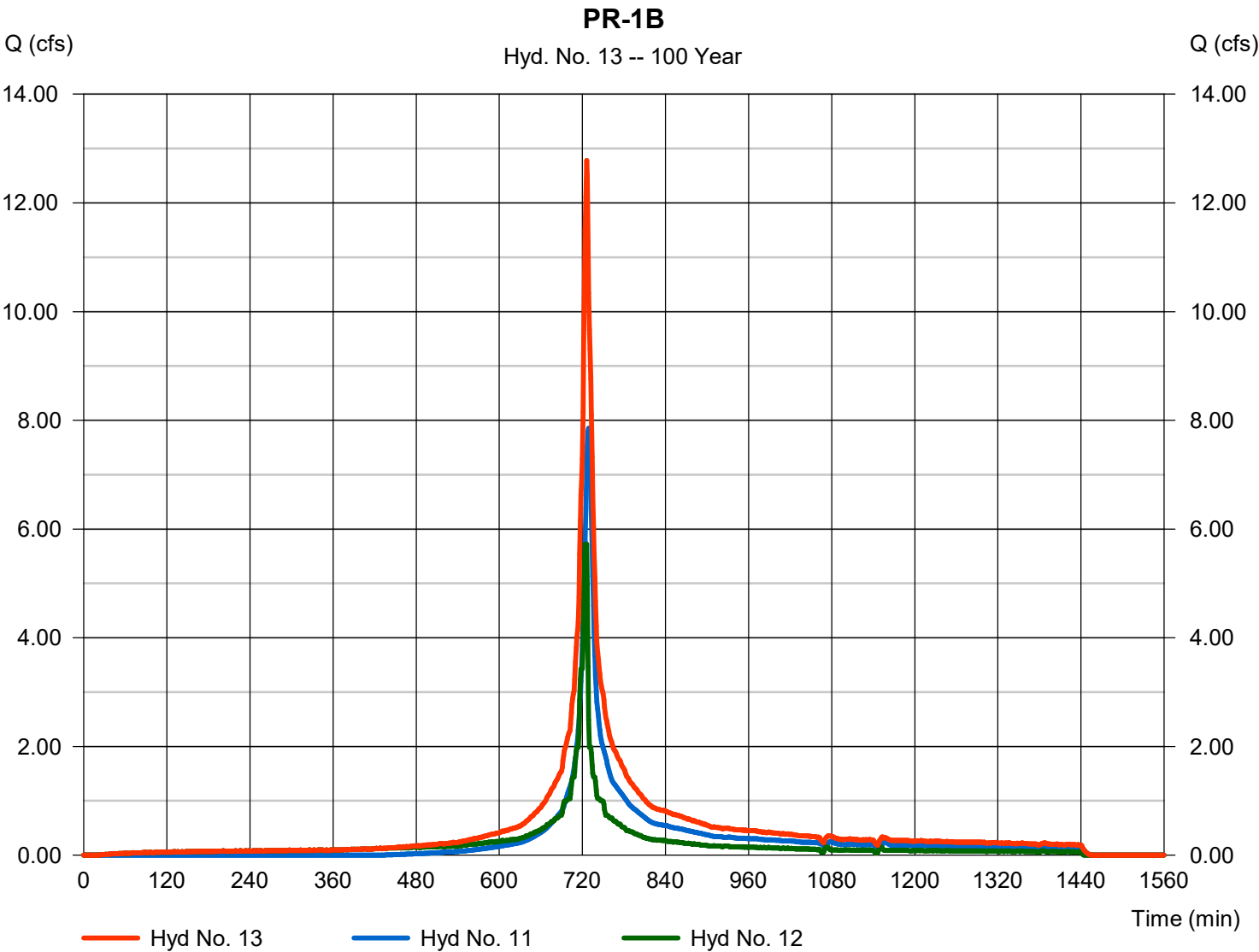


Hydrograph Report

Hyd. No. 13

PR-1B

Hydrograph type	= Combine	Peak discharge	= 12.78 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 46,728 cuft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 1.590 ac

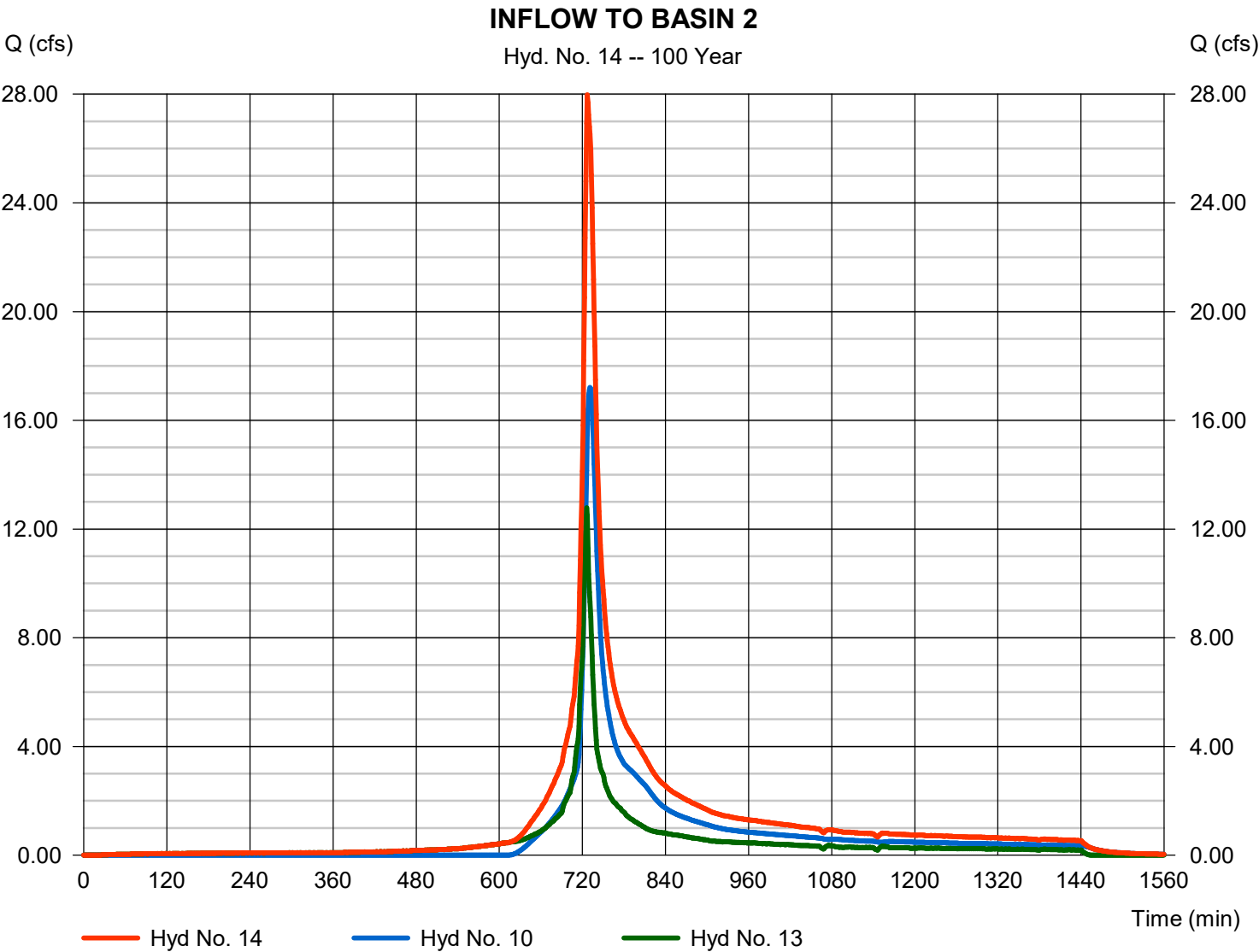


Hydrograph Report

Hyd. No. 14

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 27.98 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 119,085 cuft
Inflow hyds.	= 10, 13	Contrib. drain. area	= 0.000 ac



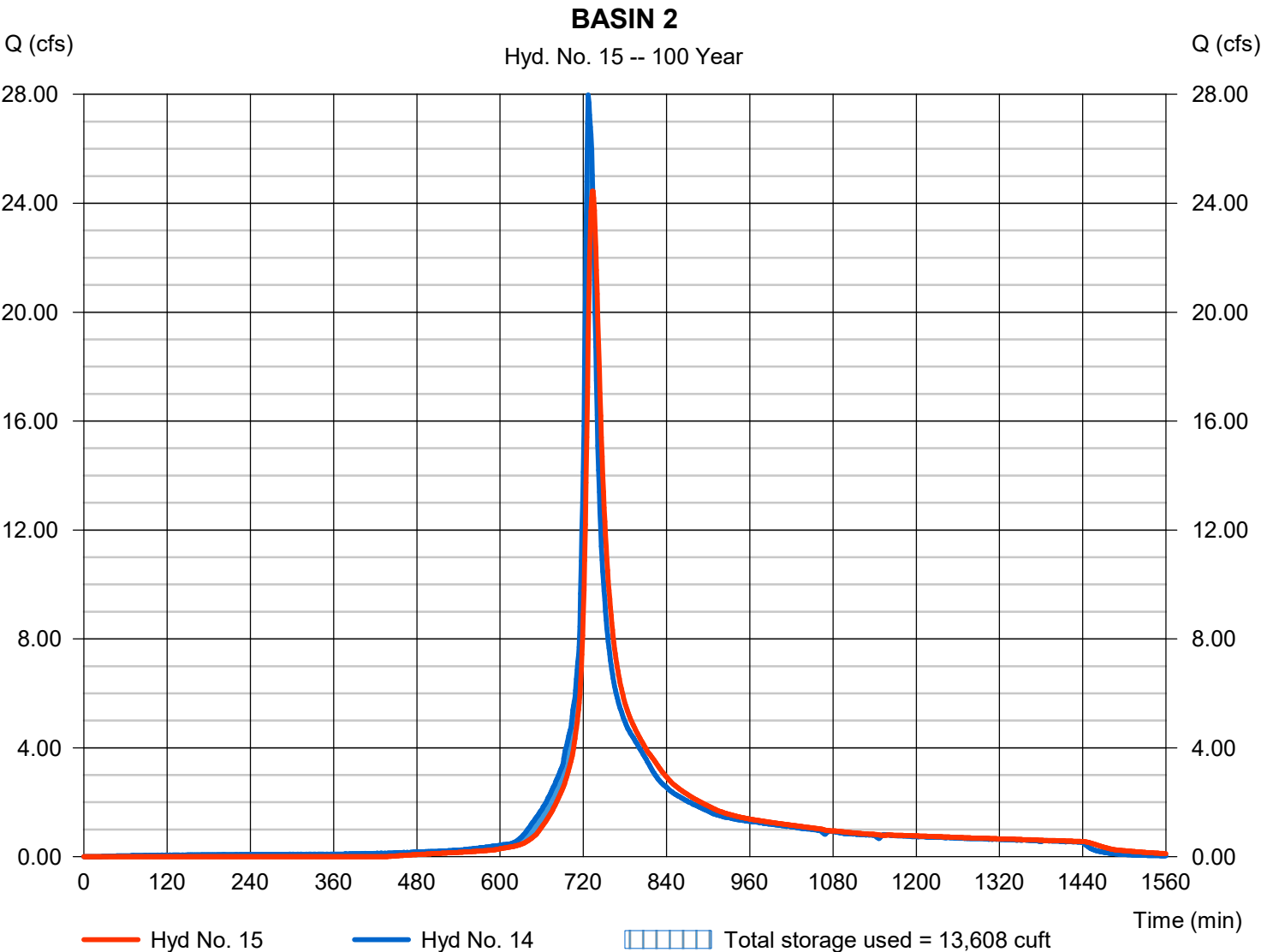
Hydrograph Report

Hyd. No. 15

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 24.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 117,466 cuft
Inflow hyd. No.	= 14 - INFLOW TO BASIN 2	Max. Elevation	= 794.97 ft
Reservoir name	= BASIN 2	Max. Storage	= 13,608 cuft

Storage Indication method used.

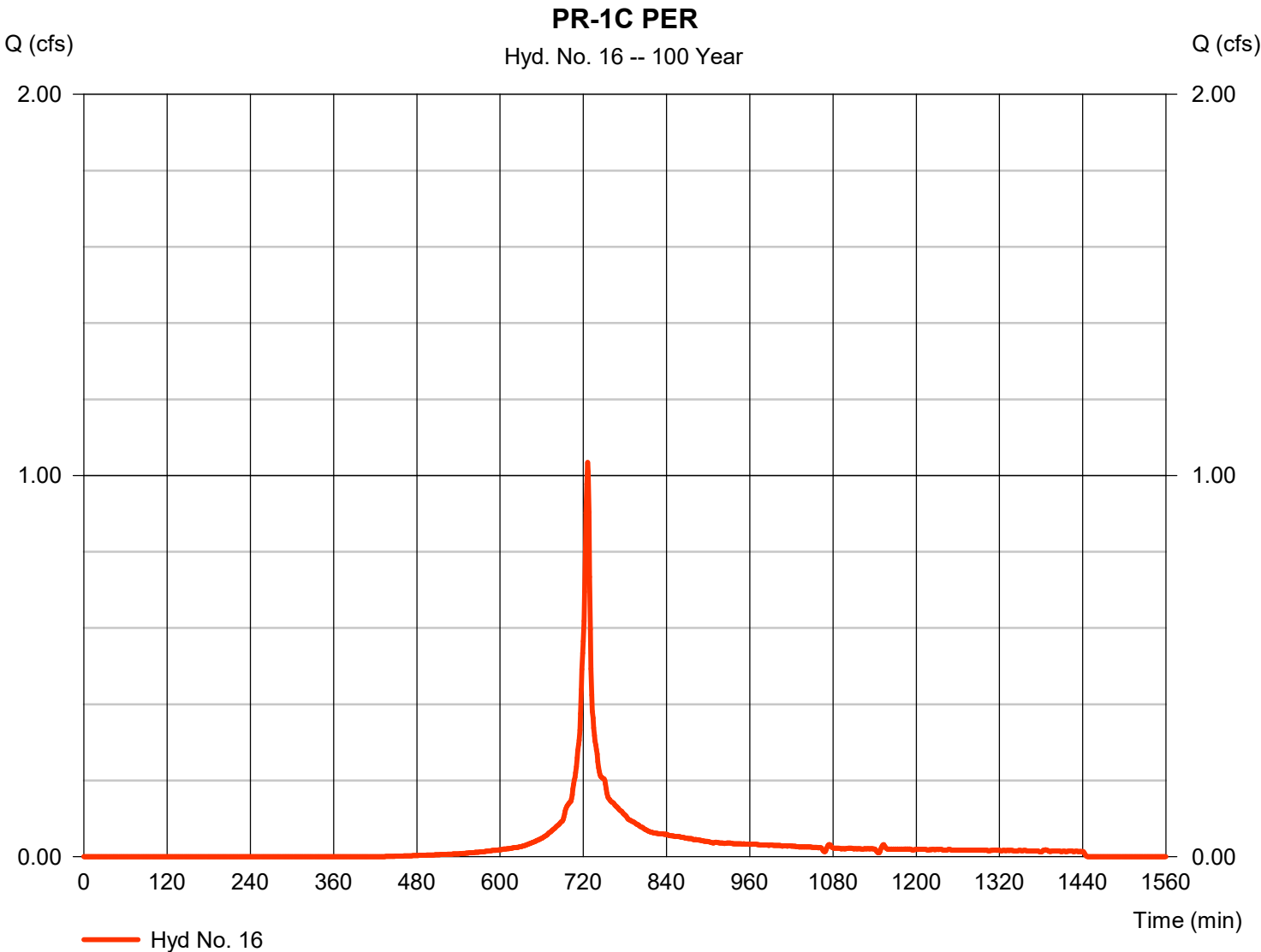


Hydrograph Report

Hyd. No. 16

PR-1C PER

Hydrograph type	= SCS Runoff	Peak discharge	= 1.034 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,959 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 3.90 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

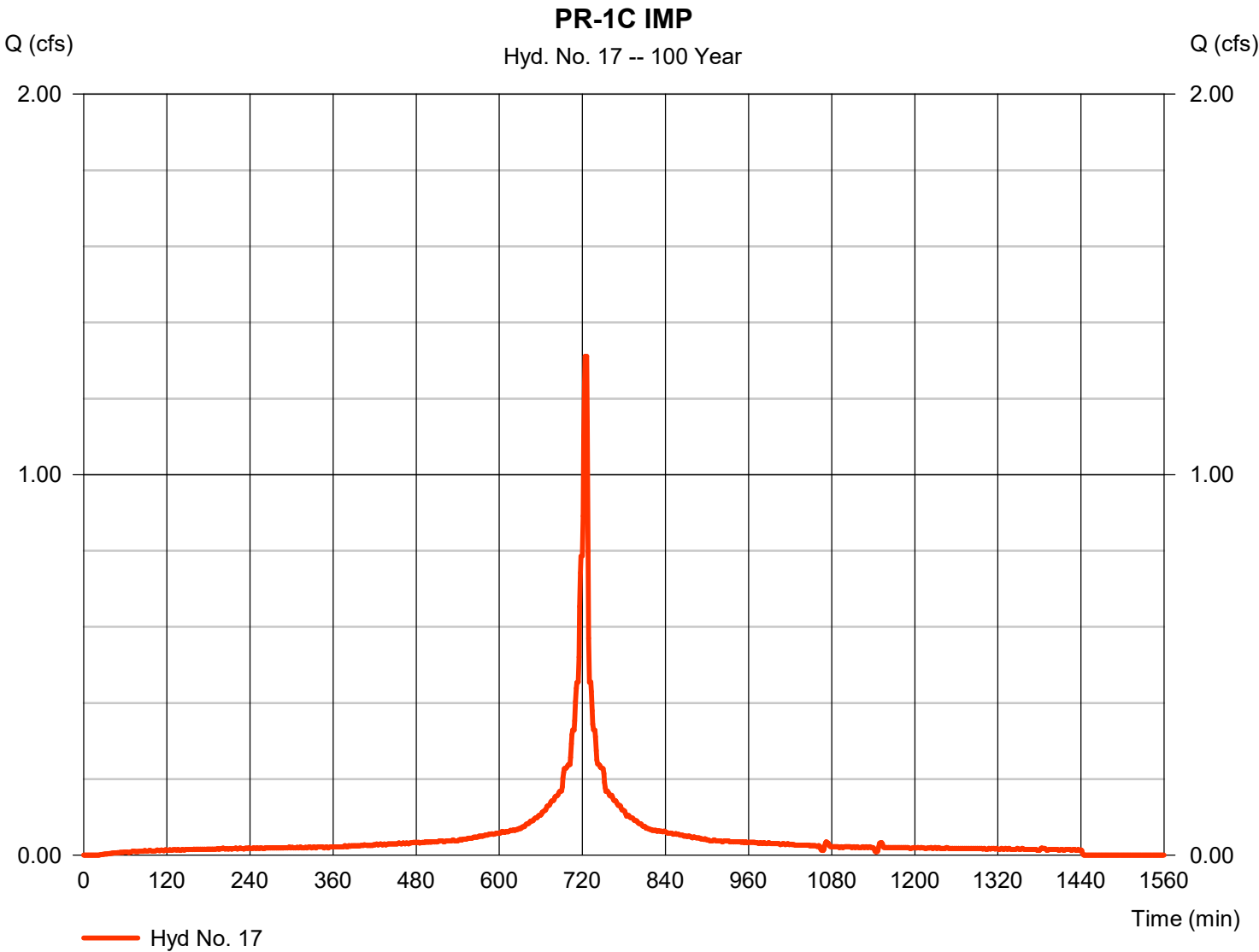


Hydrograph Report

Hyd. No. 17

PR-1C IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.311 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 4,435 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

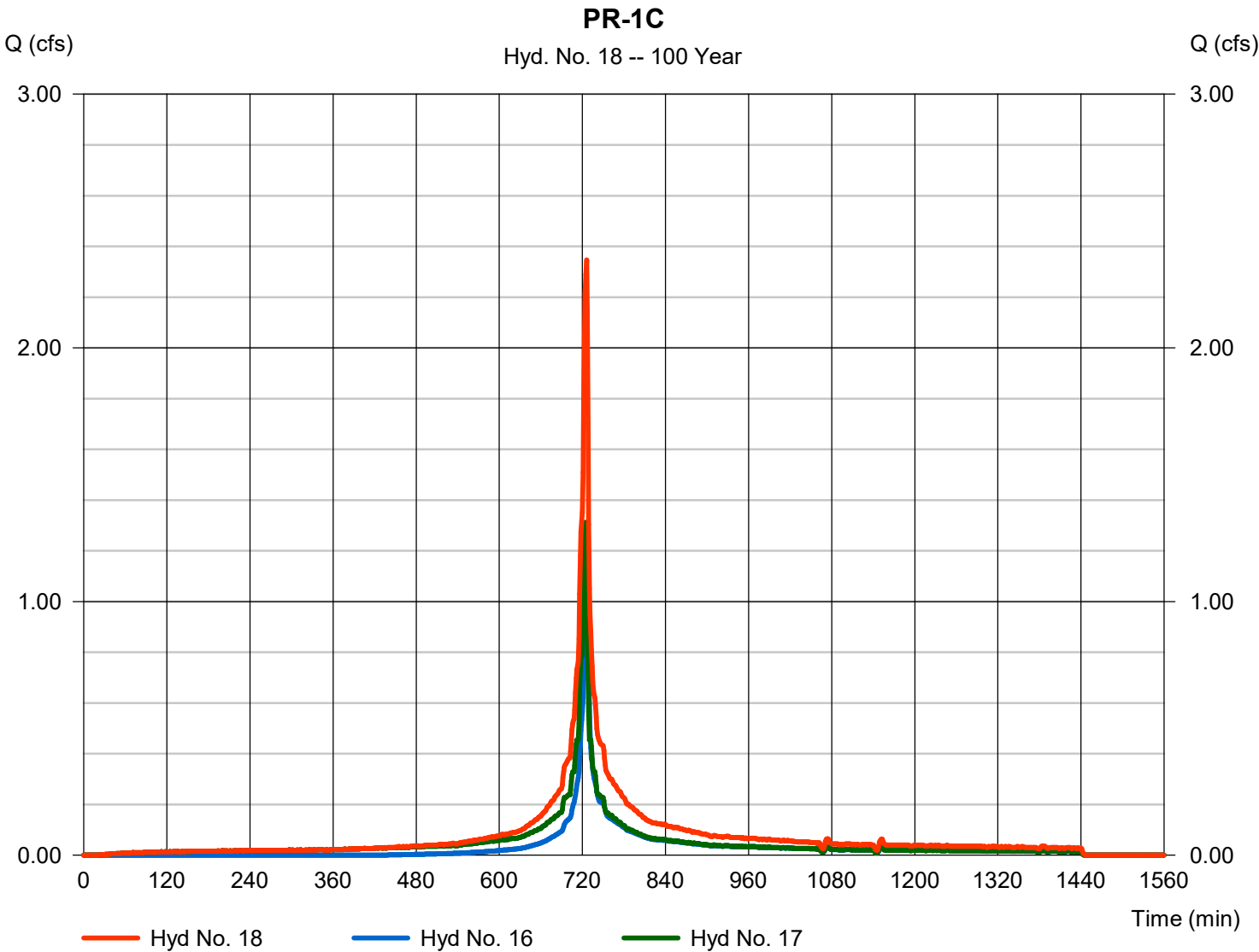


Hydrograph Report

Hyd. No. 18

PR-1C

Hydrograph type	= Combine	Peak discharge	= 2.346 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 7,395 cuft
Inflow hyds.	= 16, 17	Contrib. drain. area	= 0.230 ac

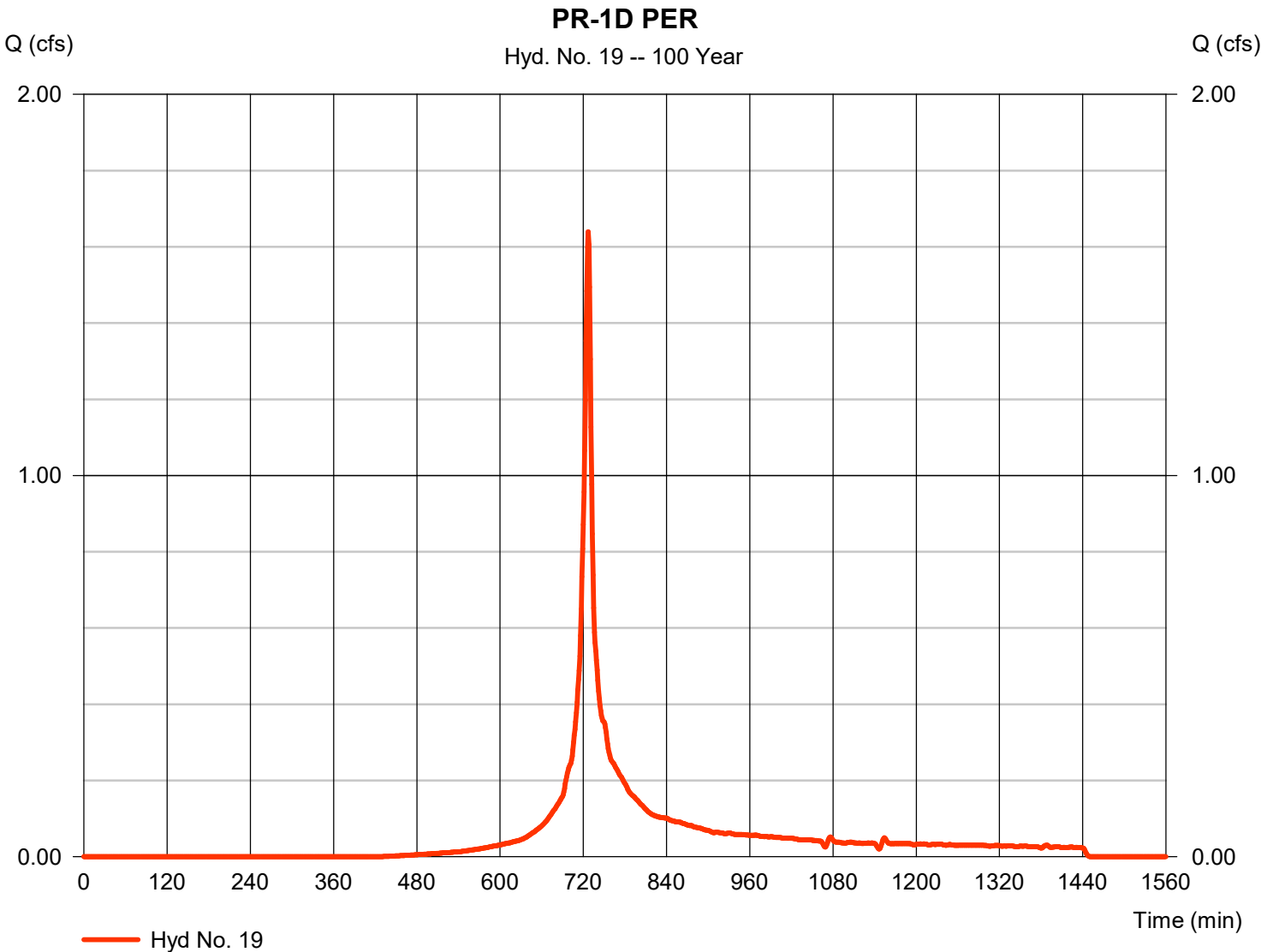


Hydrograph Report

Hyd. No. 19

PR-1D PER

Hydrograph type	= SCS Runoff	Peak discharge	= 1.639 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 5,086 cuft
Drainage area	= 0.200 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

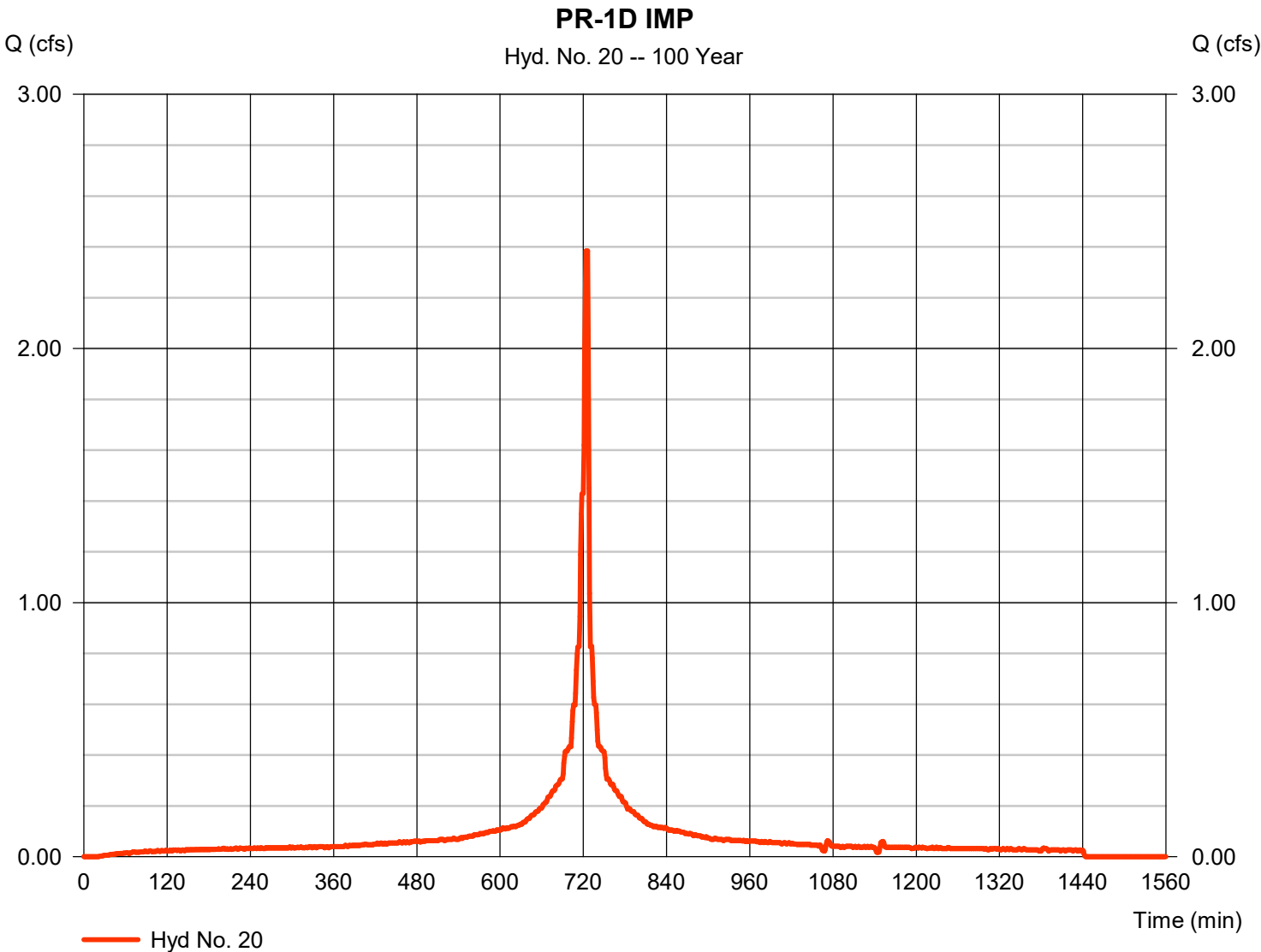


Hydrograph Report

Hyd. No. 20

PR-1D IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 2.384 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 8,064 cuft
Drainage area	= 0.200 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

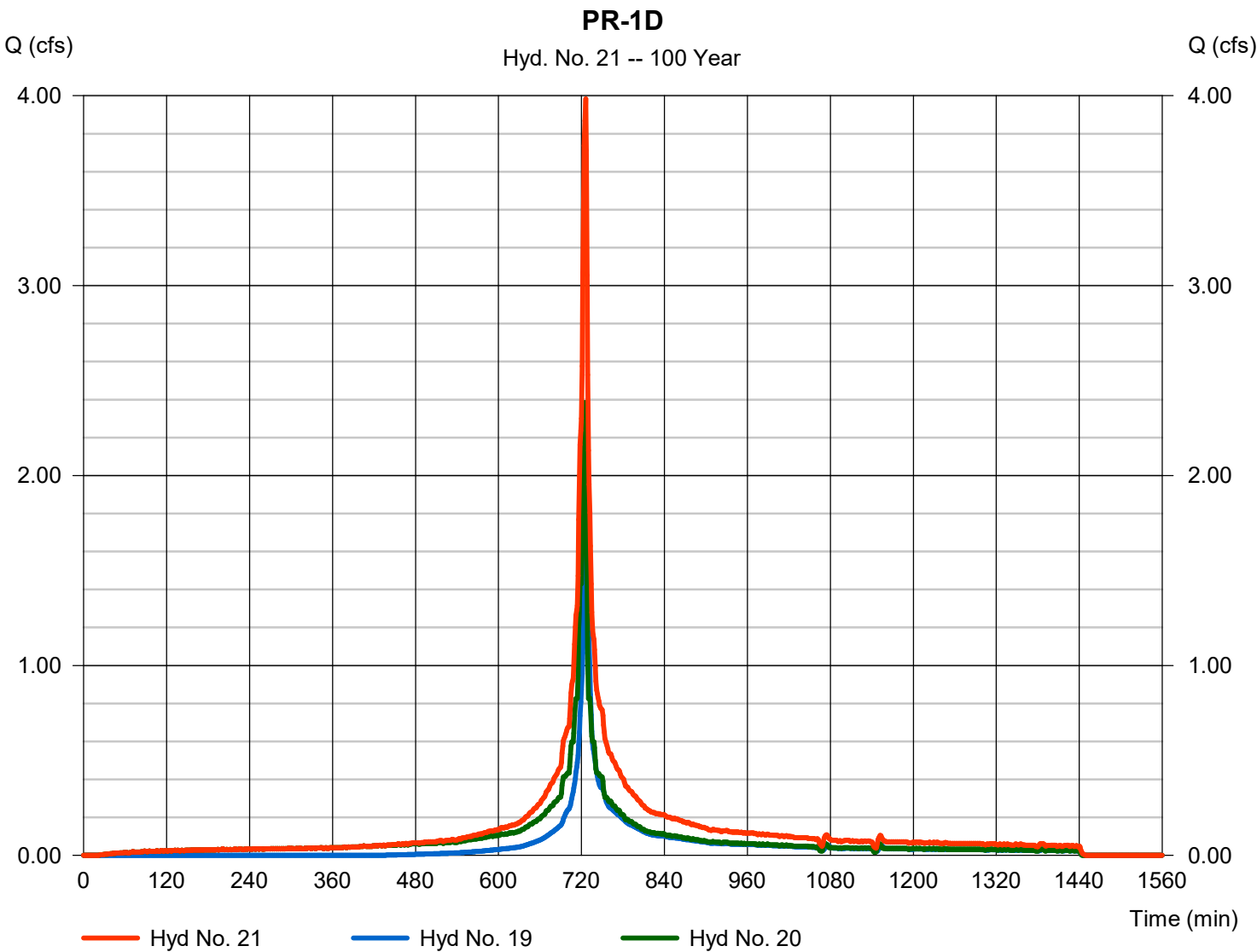


Hydrograph Report

Hyd. No. 21

PR-1D

Hydrograph type	= Combine	Peak discharge	= 3.983 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 13,151 cuft
Inflow hyds.	= 19, 20	Contrib. drain. area	= 0.400 ac

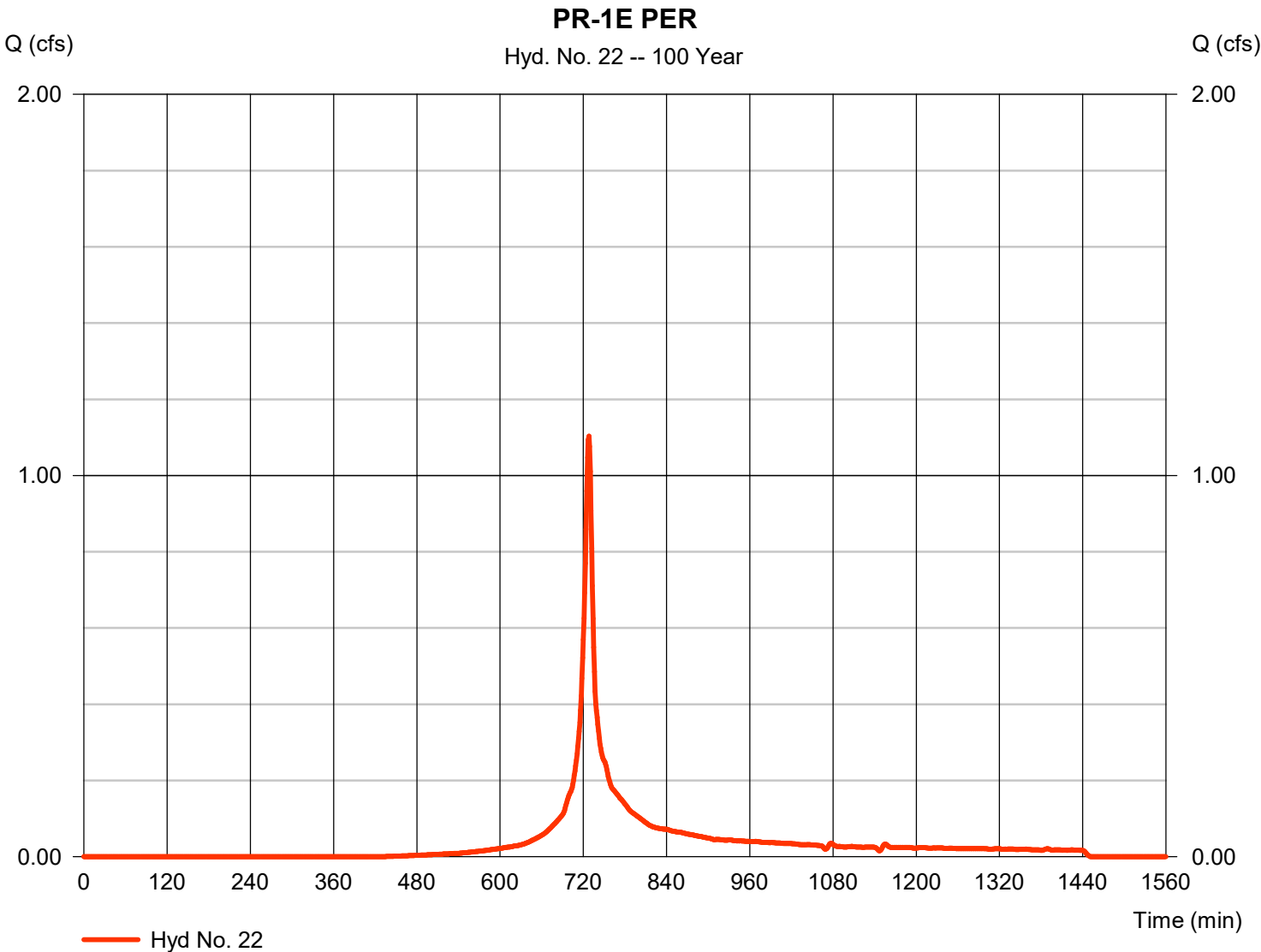


Hydrograph Report

Hyd. No. 22

PR-1E PER

Hydrograph type	= SCS Runoff	Peak discharge	= 1.103 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 3,607 cuft
Drainage area	= 0.150 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.70 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

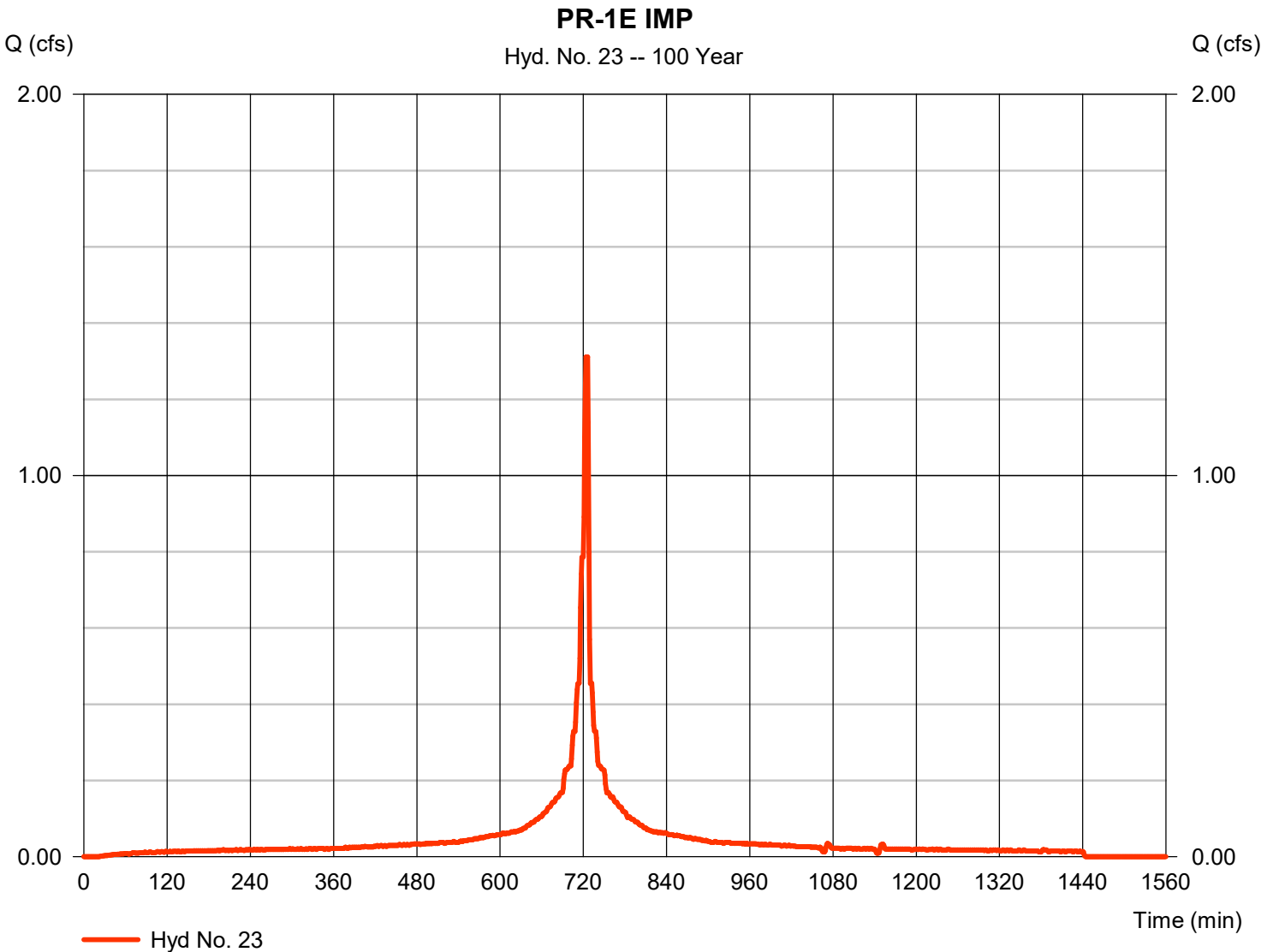


Hydrograph Report

Hyd. No. 23

PR-1E IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.311 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 4,435 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

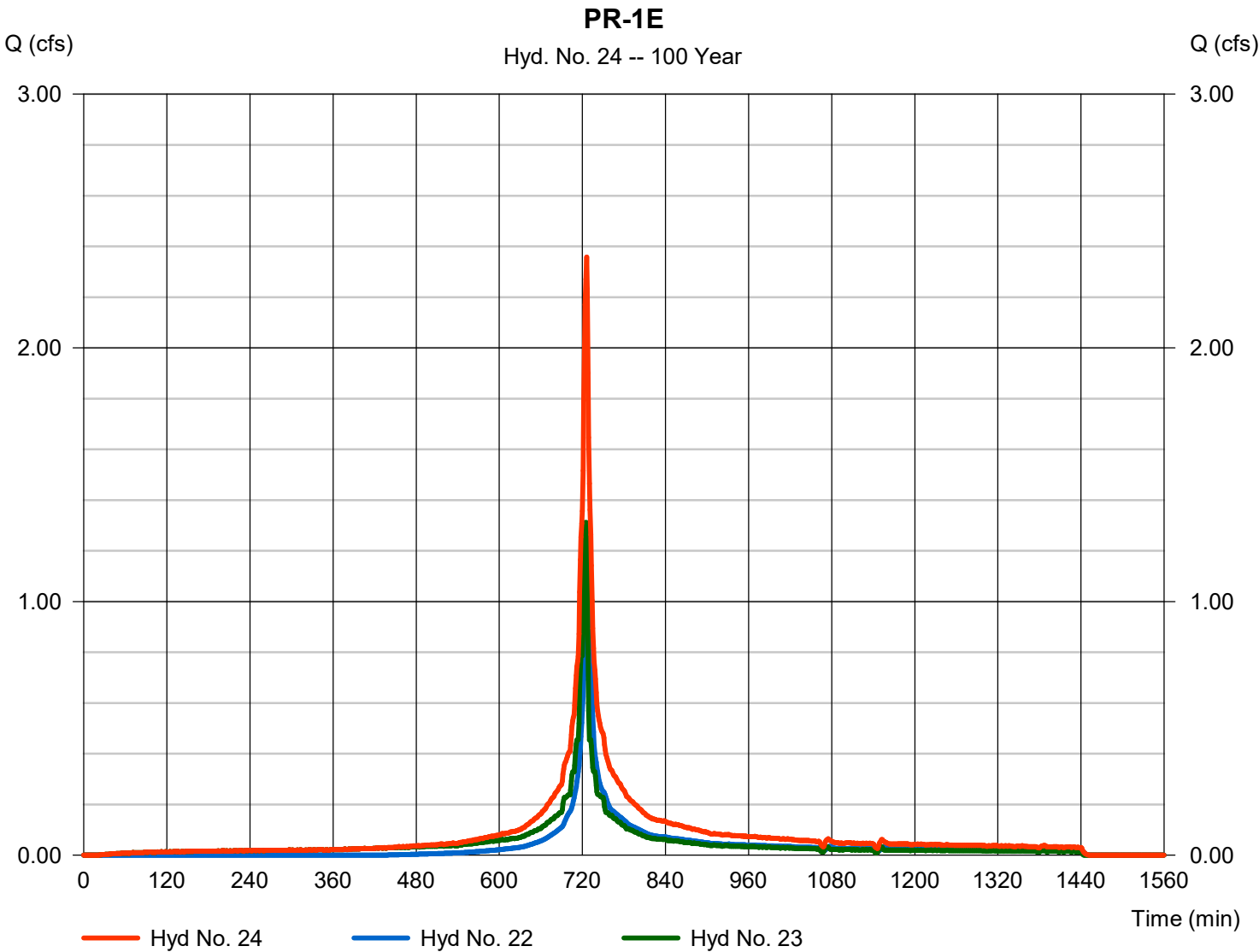


Hydrograph Report

Hyd. No. 24

PR-1E

Hydrograph type	= Combine	Peak discharge	= 2.358 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 8,042 cuft
Inflow hyds.	= 22, 23	Contrib. drain. area	= 0.260 ac

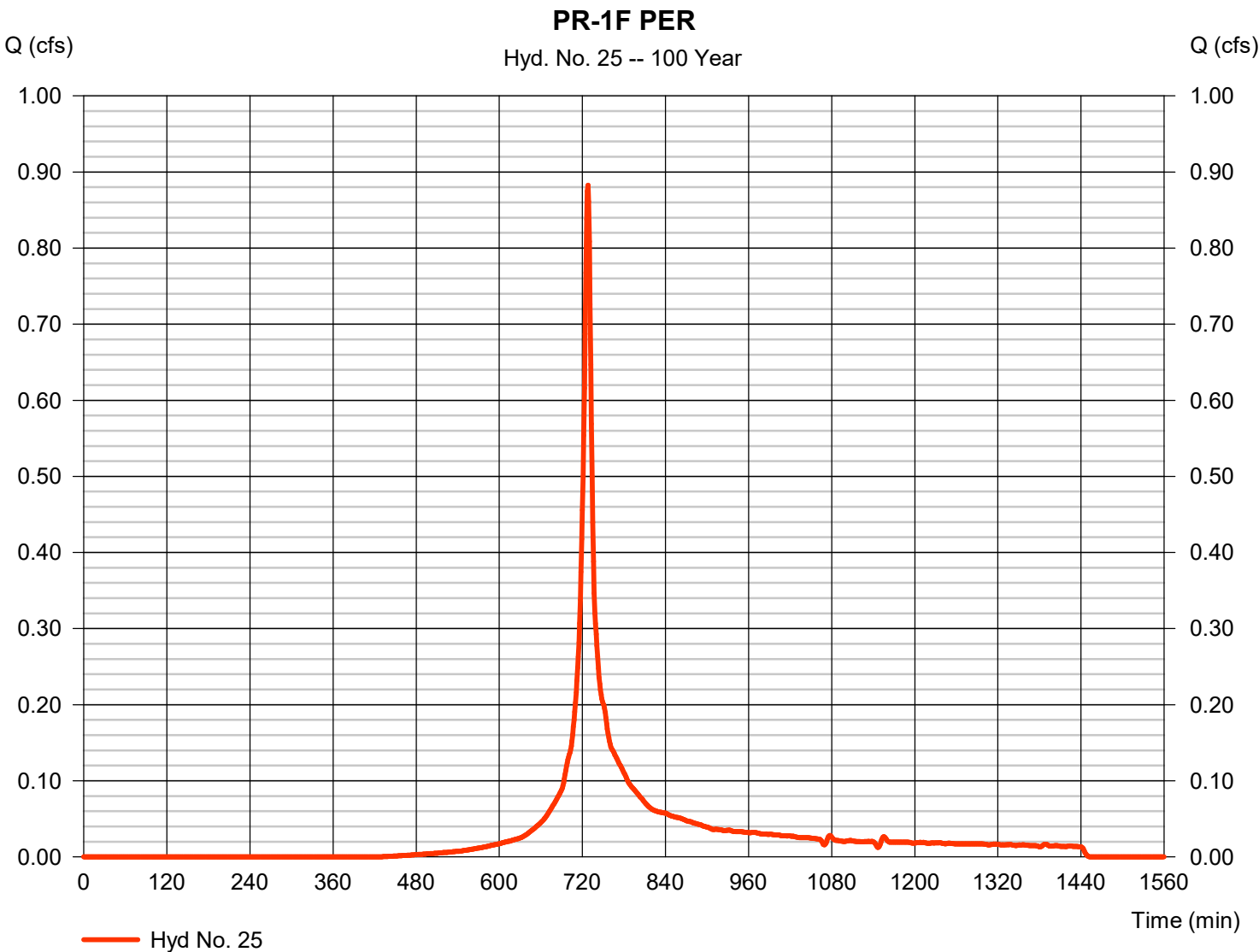


Hydrograph Report

Hyd. No. 25

PR-1F PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.883 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 2,885 cuft
Drainage area	= 0.120 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

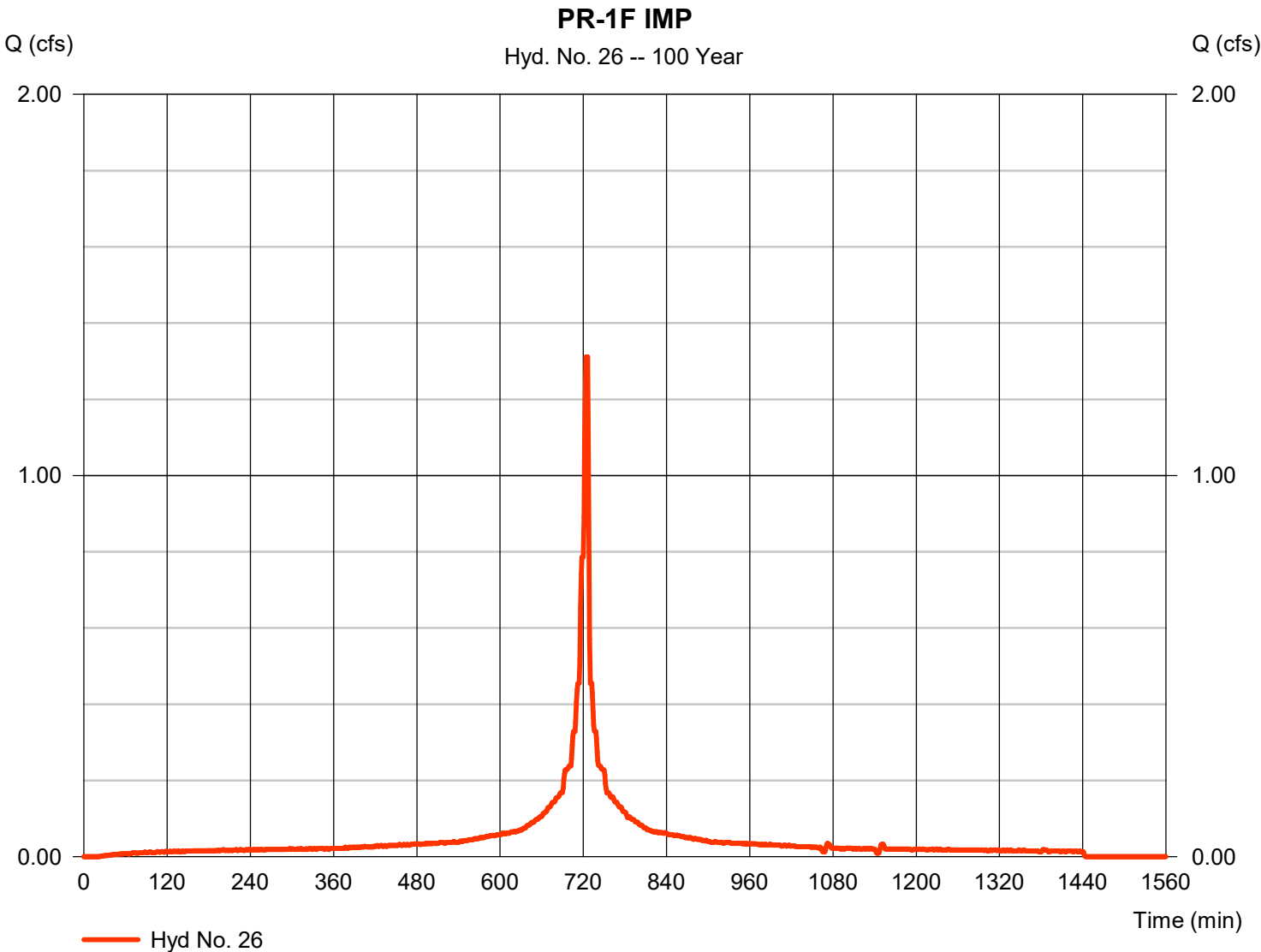


Hydrograph Report

Hyd. No. 26

PR-1F IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.311 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 4,435 cuft
Drainage area	= 0.110 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

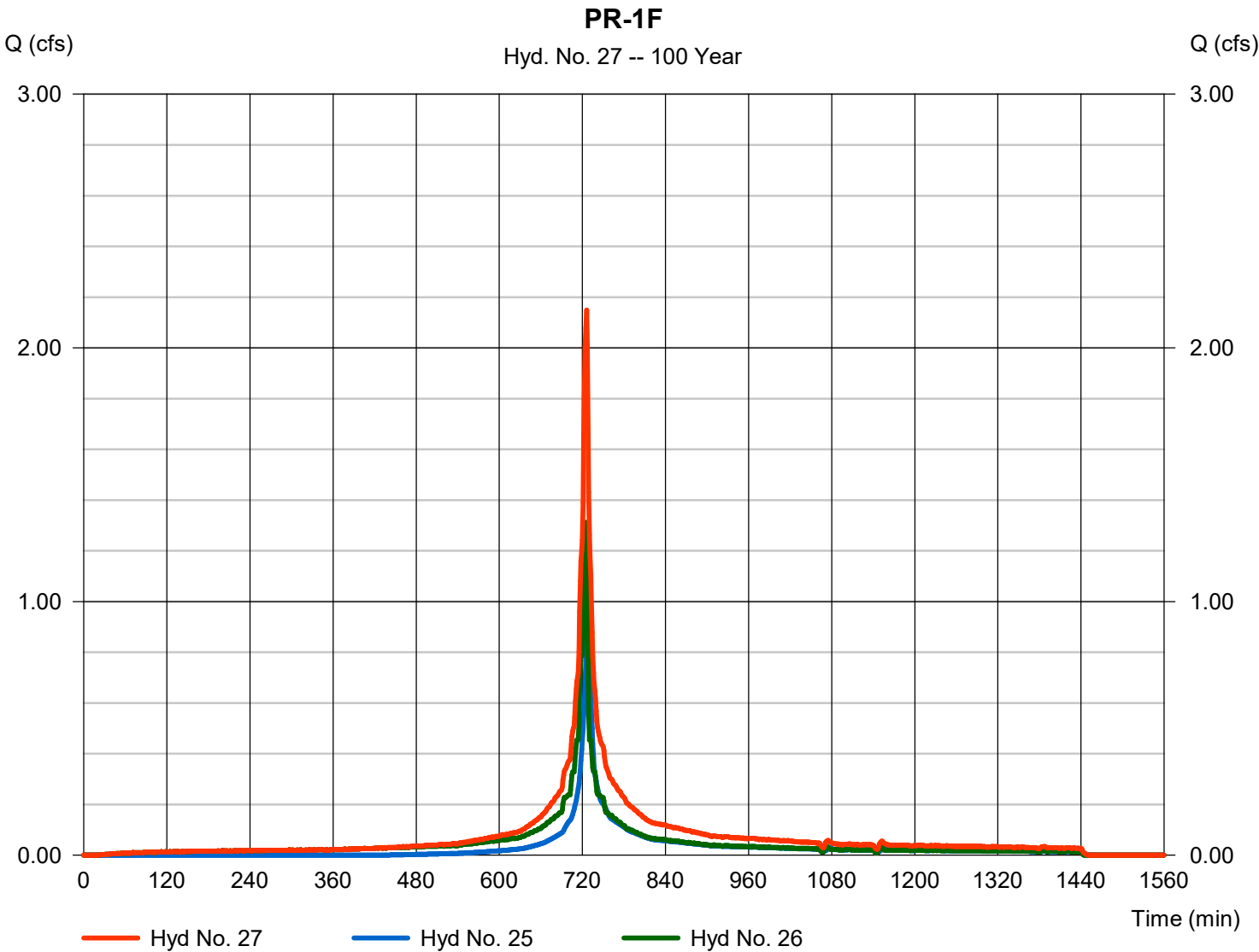


Hydrograph Report

Hyd. No. 27

PR-1F

Hydrograph type	= Combine	Peak discharge	= 2.149 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 7,321 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 0.230 ac

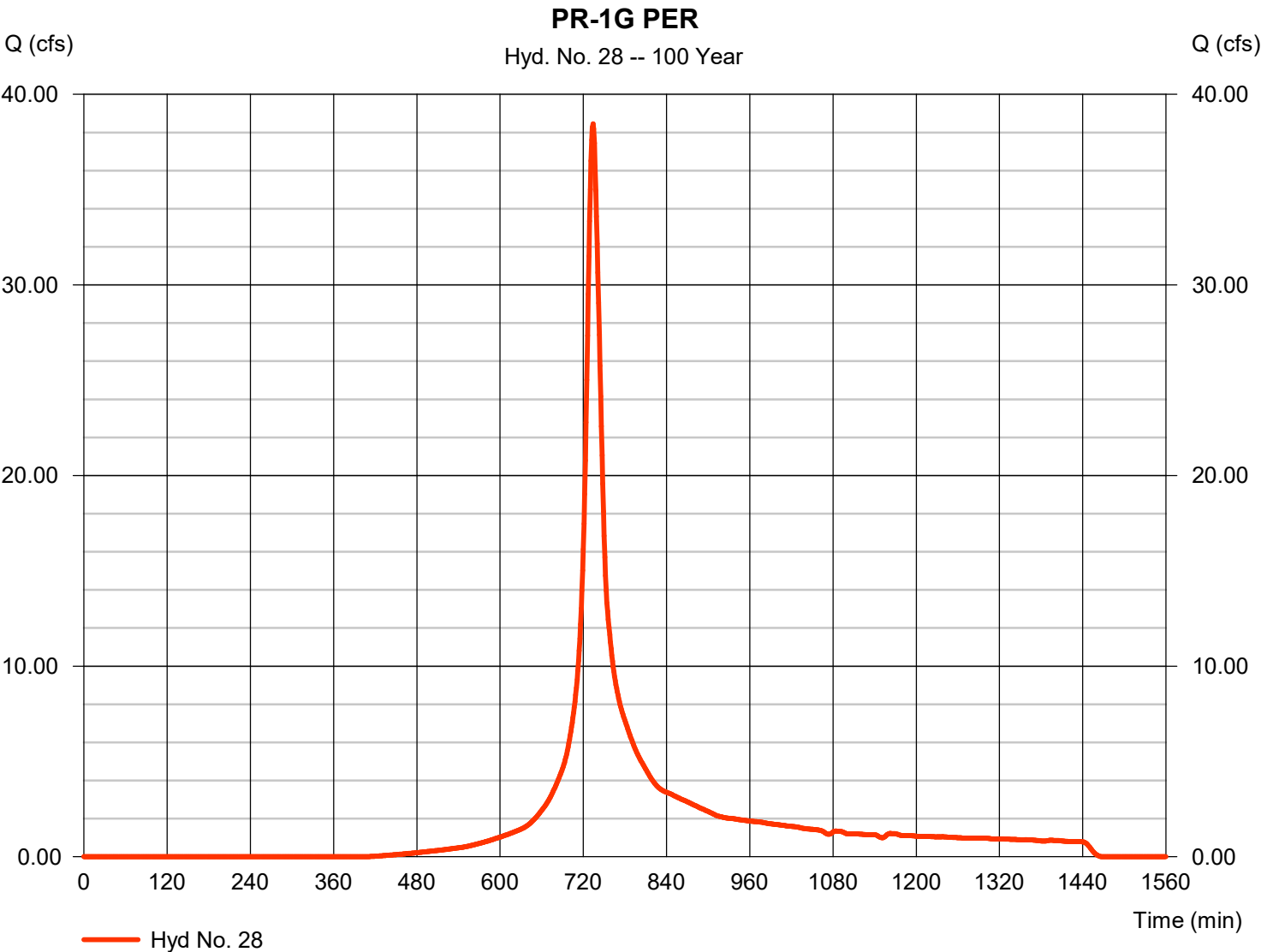


Hydrograph Report

Hyd. No. 28

PR-1G PER

Hydrograph type	= SCS Runoff	Peak discharge	= 38.45 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 169,115 cuft
Drainage area	= 6.640 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 17.30 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

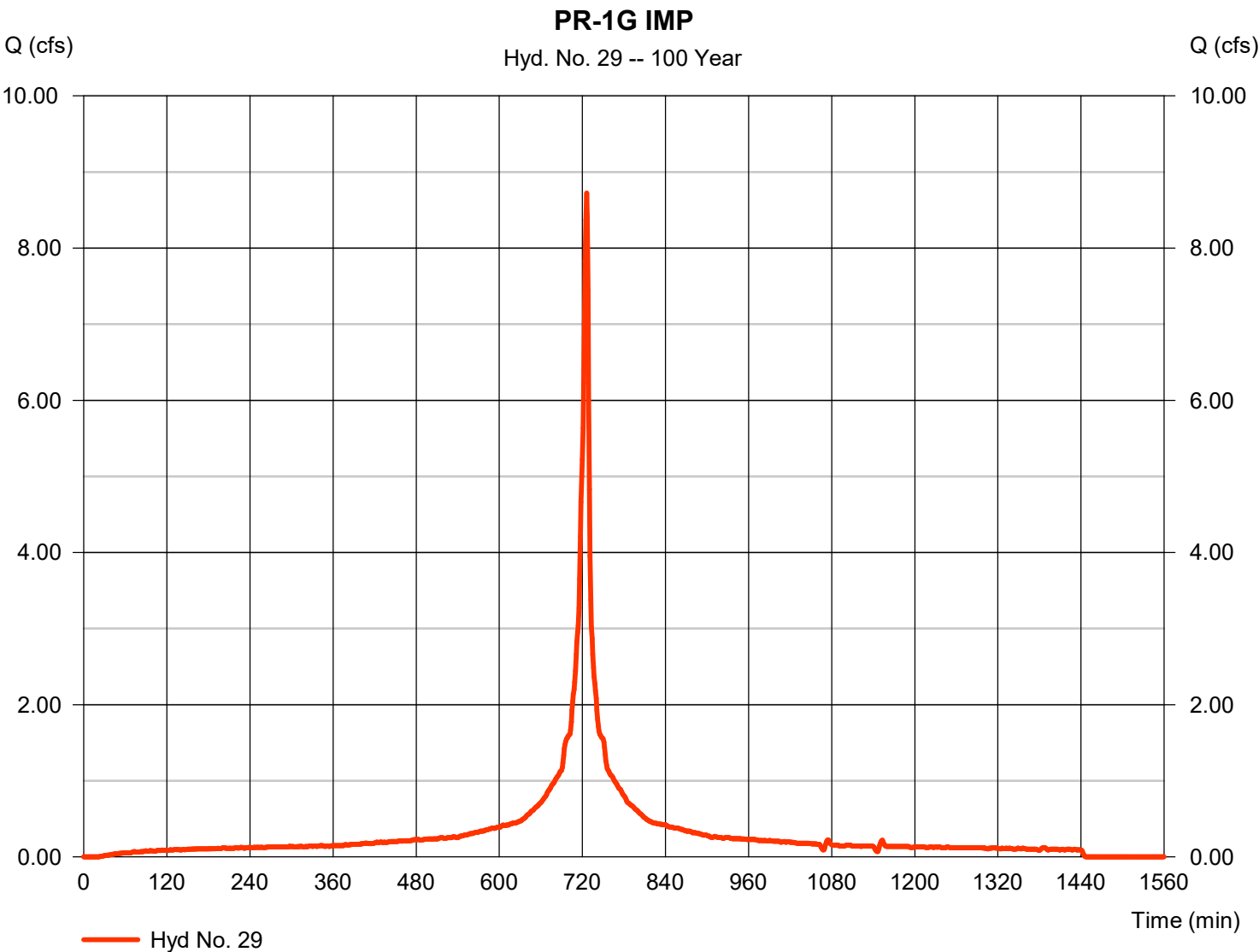


Hydrograph Report

Hyd. No. 29

PR-1G IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 8.721 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 30,107 cuft
Drainage area	= 0.700 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 4.70 min
Total precip.	= 12.09 in	Distribution	= Custom
Storm duration	= H:\ADMIN\NOAA D.cds	Shape factor	= 484

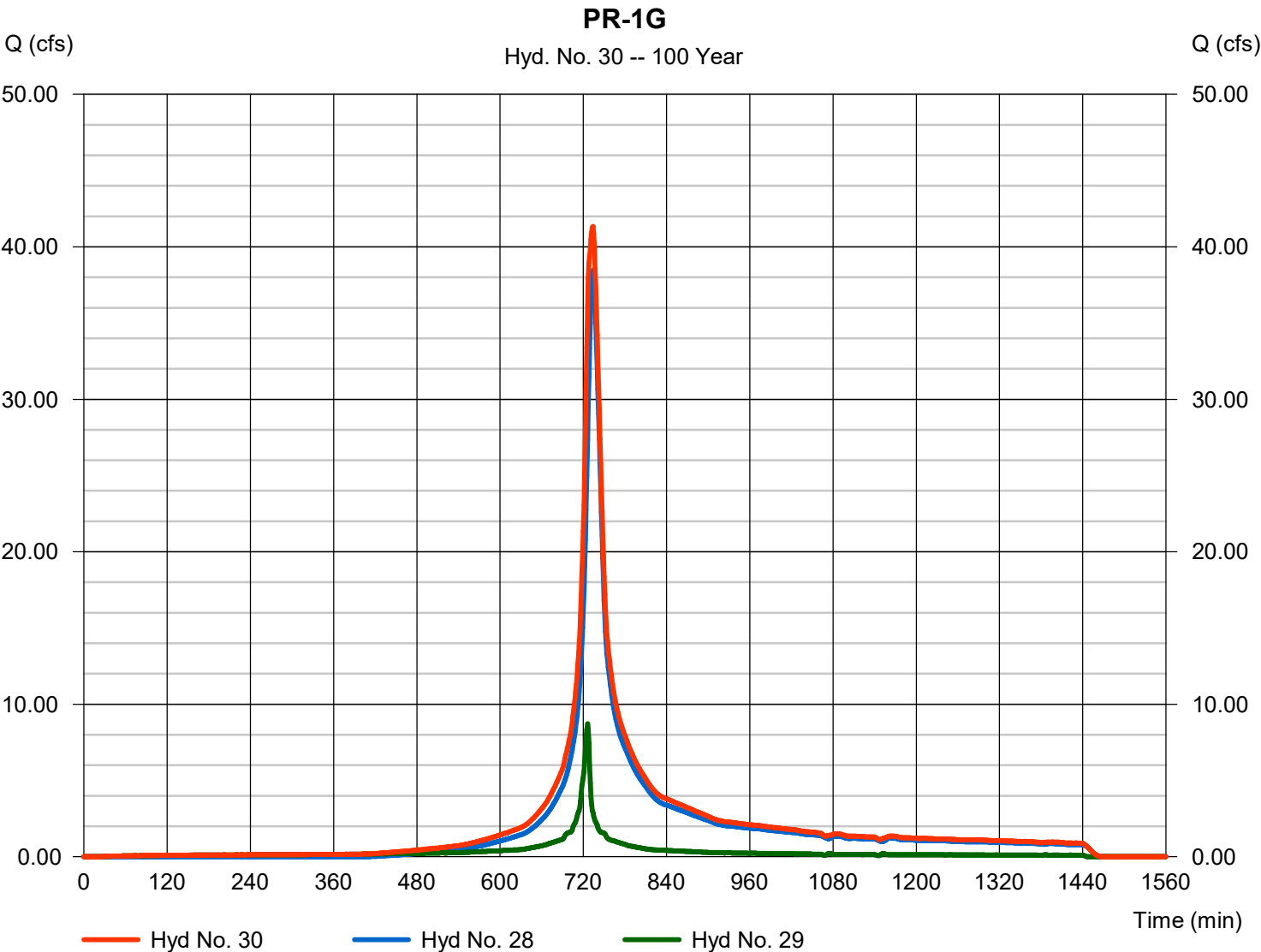


Hydrograph Report

Hyd. No. 30

PR-1G

Hydrograph type	= Combine	Peak discharge	= 41.33 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 199,222 cuft
Inflow hyds.	= 28, 29	Contrib. drain. area	= 7.340 ac

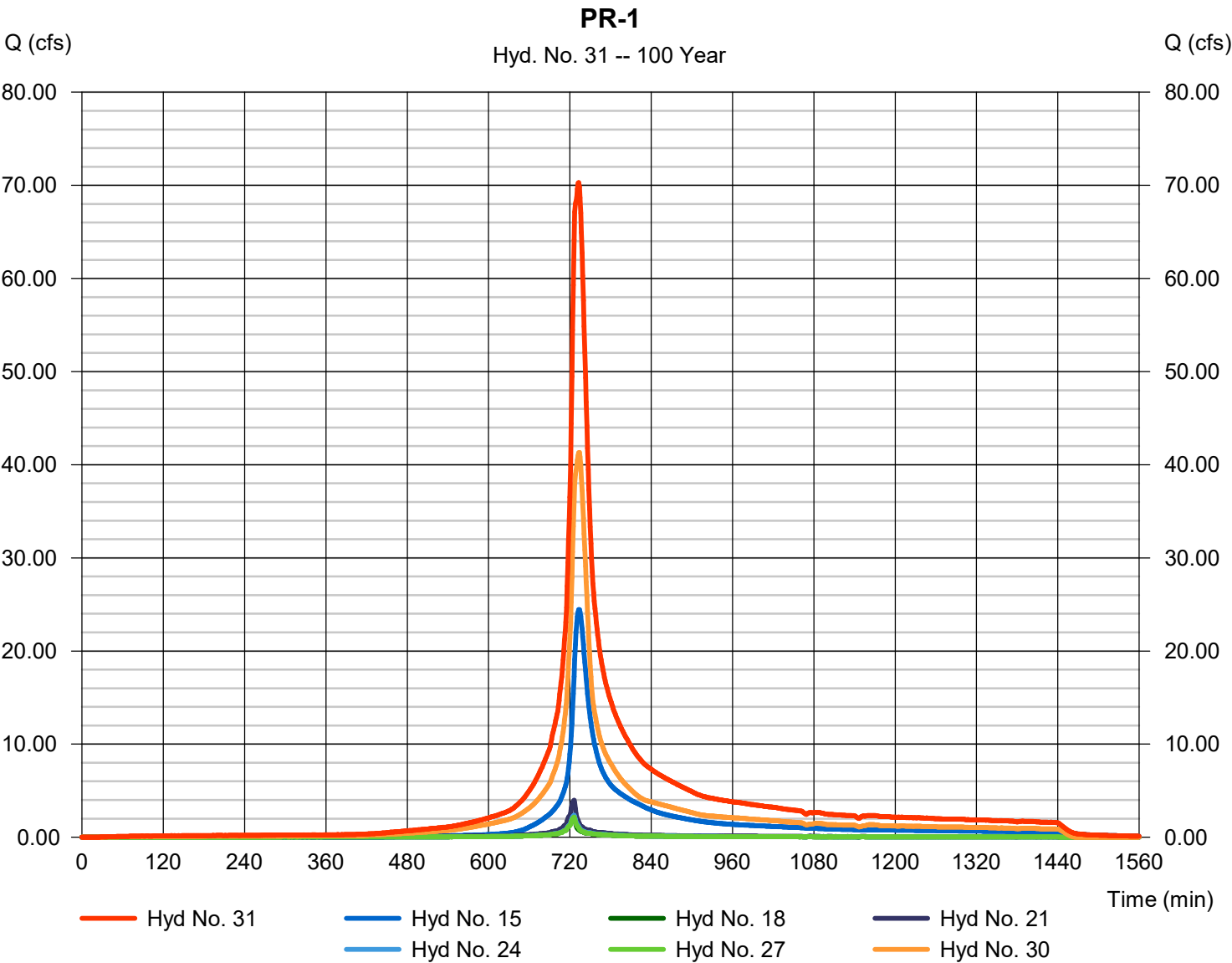


Hydrograph Report

Hyd. No. 31

PR-1

Hydrograph type	= Combine	Peak discharge	= 70.31 cfs
Storm frequency	= 100 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 352,597 cuft
Inflow hyds.	= 15, 18, 21, 24, 27, 30	Contrib. drain. area	= 0.000 ac



APPENDIX E
GROUNDWATER RECHARGE ANALYSIS

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MORRIS CO., DOVER TOWN	50.1	1.73

Project Name: 15107

Description: Dover Subdivision

Analysis Date: 07/09/26

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.43	Impervious areas	Parker	0.0	-
2	0.92	Open space	Parker	19.0	63,409
3	0.12	Open space	Urban Land*	0.0	-
4	6.81	Woods	Parker	19.6	484,167
5	1.03	Woods	Urban Land*	0.0	-
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	9.3			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				16.2	547,576

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	2.69	Impervious areas	Parker	0.0	-
2	4	Open space	Parker	19.0	275,693
3	0.16	Open space	Urban Land*	0.0	-
4	1.47	Woods	Parker	19.6	104,512
5	0.99	Woods	Urban Land*	0.0	-
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	9.3			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				11.3	380,204

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =

100%

Post-Development Annual Recharge Deficit=

167,372

(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	3.03	(in)	DRWC=	0.00	(in)
ERWC =	0.41	(in)	EDRWC=	0.00	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
15107	Dover Subdivision	07/09/26	SUBSURFACE BASIN #1

Recharge BMP Input Parameters				Root Zone Water capacity Calculated Parameters				Recharge Design Parameters			
Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit
BMP Area	ABMP	5720.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.53	in	Inches of Runoff to capture	Qdesign	0.24	in
BMP Effective Depth, this is the design variable	dBMP	3.5	in	ERWC Modified to consider dEXC	EDRWC	0.00	in	Inches of Rainfall to capture	Pdesign	0.32	in
Upper level of the BMP surface (negative if above ground)	dBMPu	27.0	in	Empty Portion of RWC under Infiltr. BMP	RERWC	0.00	in	Recharge Provided Avg. over Imp. Area		15.1	in
Depth of lower surface of BMP, must be >= dBMPu	dEXC	87.0	in					Runoff Captured Avg. over imp. Area		15.1	in
Post-development Land Segment Location of BMP, Input Zero if Location is distributed or undetermined	SegBMP	2	unitless								

BMP Calculated Size Parameters				CALCULATION CHECK MESSAGES	
ABMP/Aimp	Aratio	0.07	unitless	Volume Balance-->	OK
BMP Volume	VBMP	1,684	cu.ft	dBMP Check-->	OK
				dEXC Check-->	OK

Parameters from Annual Recharge Worksheet				System Performance Calculated Parameters			
Post-D Deficit Recharge (or desired recharge volume)	Vdef	108,767	cu.ft	Annual BMP Recharge Volume		108,767	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	86,685	sq.ft	Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
Root Zone Water Capacity	RWC	3.92	in	%Rainfall became Runoff		78.7%	%
RWC Modified to consider dEXC	DRWC	0.00	in	%Runoff Infiltrated		38.2%	%
Climatic Factor	C-factor	1.73	no units	%Runoff Recharged		28.3%	%
Average Annual P	Pavg	50.1	in	%Rainfall Recharged		22.2%	%
Recharge Requirement over Imp. Area	dr	11.1	in				

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensitive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP. To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration click the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
15107	Dover Subdivision	07/09/26	SURFACE BASIN #2

Recharge BMP Input Parameters				Root Zone Water capacity Calculated Parameters				Recharge Design Parameters			
Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit
BMP Area	ABMP	4540.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.53	in	Inches of Runoff to capture	Qdesign	0.92	in
BMP Effective Depth, this is the design variable	dBMP	4.4	in	ERWC Modified to consider dEXC	EDRWC	0.00	in	Inches of Rainfall to capture	Pdesign	1.12	in
Upper level of the BMP surface (negative if above ground)	dBMPu	12.0	in	Empty Portion of RWC under Infiltr. BMP	RERWC	0.00	in	Recharge Provided Avg. over Imp. Area		32.3	in
Depth of lower surface of BMP, must be >= dBMPu	dEXC	72.0	in					Runoff Captured Avg. over imp. Area		32.3	in
Post-development Land Segment Location of BMP, Input Zero if Location is distributed or undetermined	SegBMP	2	unitless								

BMP Calculated Size Parameters				CALCULATION CHECK MESSAGES	
ABMP/Aimp	Aratio	0.21	unitless	Volume Balance-->	Solve Problem to satisfy Annual Recharge
BMP Volume	VBMP	1,665	cu.ft	dBMP Check-->	OK
				dEXC Check-->	OK
				BMP Location-->	OK

Parameters from Annual Recharge Worksheet				System Performance Calculated Parameters			
Post-D Deficit Recharge (or desired recharge volume)	Vdef	167,372	cu.ft	Annual BMP Recharge Volume		58,605	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	21,780	sq.ft	Avg BMP Recharge Efficiency		100.0%	Represents % Infiltration Recharged
Root Zone Water Capacity	RWC	3.92	in	%Rainfall became Runoff		78.7%	%
RWC Modified to consider dEXC	DRWC	0.00	in	%Runoff Infiltrated		81.9%	%
Climatic Factor	C-factor	1.73	no units	%Runoff Recharged		15.2%	%
Average Annual P	Pavg	50.1	in	%Rainfall Recharged		12.0%	%
Recharge Requirement over Imp. Area	dr	17.1	in				

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensitive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP. To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration click the "Default Vdef & Aimp" button.

GROUNDWATER RECHARGE SUMMARY

Post Development Recharge Deficit = 167,372 CF

GROUNDWATER RECHARGE PER BASIN:

Basin #1:	108,767 CF Min.
Infiltration Basin #2:	58605 CF Min.
Total Recharge Provided:	167,372 CF $\geq$ 167,372 CF [OK]

APPENDIX F
GROUNDWATER MOUNDING ANALYSIS

GROUNDWATER MOUNDING ANALYSIS

- ANALYSIS PERFORMED USING NJDEP MODIFIED HANTUSH GROUNDWATER SPREADSHEET.

- INPUT DATA PER NJ BEST MANAGEMENT PRACTICES MANUAL.

SUBSURFACE INFILTRATION BASIN #1

RECHARGE (R) = 1.1 IN/HR x 0.5 = 0.55 IN/HR

USE $S_y = 0.15$ (DEFAULT)

$H_i = 10$ FT (DEFAULT)

HORIZONTAL HYDRAULIC CONDUCTIVITY (K_h) = R = 0.55 IN/HR (OUTSIDE THE COSTAL PLAN)

BASIN DIMENSIONS 1/2(X,Y) = X = 96 FT Y = 15 FT

DURATION OF INFILTRATION (t) :

BASIN BOTTOM AREA= 5,720 SF

VOLUME AT ORIFICE (V) = 1,831 CF

$$t = \frac{V \times 12 \text{ IN/FT}}{\text{AREA} \times R} = \frac{1831 \text{ CF} \times 12 \text{ IN/FT}}{5720 \text{ SF} \times 0.55 \text{ IN/HR}} = 7 \text{ HOURS}$$

SUBSURFACE BASIN #1

Input Values

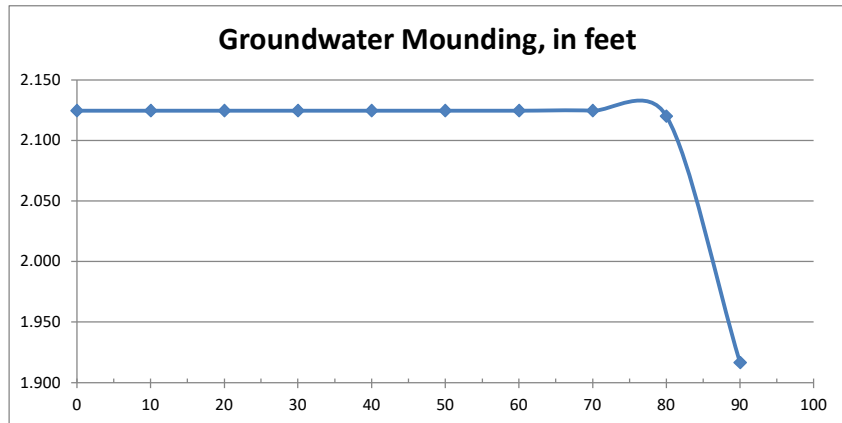
0.55	R	Recharge rate (permeability rate) (in/hr)
0.150	Sy	Specific yield, Sy (dimensionless) default value is 0.15; max value is 0.2 provided that a lab test data is submitted
0.55	Kh	Horizontal hydraulic conductivity (in/hr) Kh = 5xRecharge Rate (R) in the costal plan; Kh=R outside the coastal plan
96.000	x	1/2 length of basin (x direction, in feet)
15.000	y	1/2 width of basin (y direction, in feet)
7.00	t	Duration of infiltration period (hours)
10.00	hi(0)	Initial thickness of saturated zone (feet)

12.125	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
2.125	$\Delta h(\max)$	Maximum groundwater mounding (beneath center of basin at end of infiltration period)
Distance from		
Ground-water center of basin in x		
Mounding, in feet direction, in feet		

2.125	0
2.125	10
2.125	20
2.125	30
2.125	40
2.125	50
2.125	60
2.125	70
2.120	80
1.917	90



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

GROUNDWATER MOUNDING ANALYSIS

SUBSURFACE INFILTRATION BASIN #1:

SEASONAL HIGH GROUNDWATER ELEVATION= 809.6 PER SOIL TESTING

MOUND AT BASIN = 2.1 (PER HANTUSH SPREADSHEET)

GROUNDWATER MOUND ELEVATION= 811.70

BOTTOM OF MEDIA ELEV.= 812.75 > 811.7 [OK]

GROUNDWATER MOUNDING ANALYSIS

- ANALYSIS PERFORMED USING NJDEP MODIFIED HANTUSH GROUNDWATER SPREADSHEET.

- INPUT DATA PER NJ BEST MANAGEMENT PRACTICES MANUAL.

SUBSURFACE INFILTRATION BASIN #2

RECHARGE (R) = 1.4 IN/HR x 0.5 = 0.7 IN/HR

USE $S_y = 0.15$ (DEFAULT)

$H_i = 10$ FT (DEFAULT)

HORIZONTAL HYDRAULIC CONDUCTIVITY (K_h) = R = 0.7 IN/HR (OUTSIDE THE COSTAL PLAN)

BASIN DIMENSIONS 1/2(X,Y) = X = 100 FT Y = 12 FT

DURATION OF INFILTRATION (t) :

BASIN BOTTOM AREA= 4,540 SF

VOLUME AT ORIFICE (V) = 1,680 CF

$$t = \frac{V \times 12 \text{ IN/FT}}{\text{AREA} \times R} = \frac{1680 \text{ CF} \times 12 \text{ IN/FT}}{4540 \text{ SF} \times 0.7 \text{ IN/HR}} = 6.3 \text{ HOURS}$$

SURFACE BASIN #2

Input Values

0.70	R	Recharge rate (permeability rate) (in/hr)
0.150	Sy	Specific yield, Sy (dimensionless) default value is 0.15; max value is 0.2 provided that a lab test data is submitted
0.70	Kh	Horizontal hydraulic conductivity (in/hr) Kh = 5xRecharge Rate (R) in the costal plan; Kh=R outside the coastal plan
100.000	x	1/2 length of basin (x direction, in feet)
12.000	y	1/2 width of basin (y direction, in feet)
6.30	t	Duration of infiltration period (hours)
10.00	hi(0)	Initial thickness of saturated zone (feet)

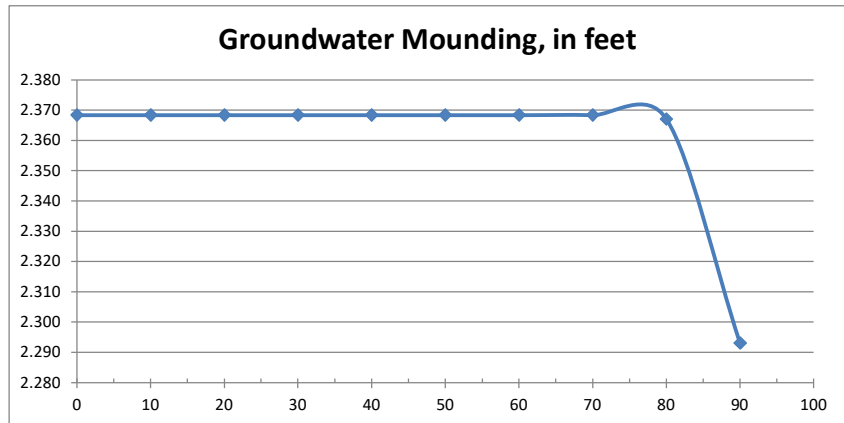
12.368	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
2.368	$\Delta h(\max)$	Maximum groundwater mounding (beneath center of basin at end of infiltration period)

Distance from
center of basin in x
direction, in feet

2.368	0
2.368	10
2.368	20
2.368	30
2.368	40
2.368	50
2.368	60
2.368	70
2.367	80
2.293	90



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

GROUNDWATER MOUNDING ANALYSIS

SUBSURFACE INFILTRATION BASIN #2:

SEASONAL HIGH GROUNDWATER ELEVATION= 788 PER SOIL TESTING

MOUND AT BASIN = 2.4 (PER HANTUSH SPREADSHEET)

GROUNDWATER MOUND ELEVATION= 790.40

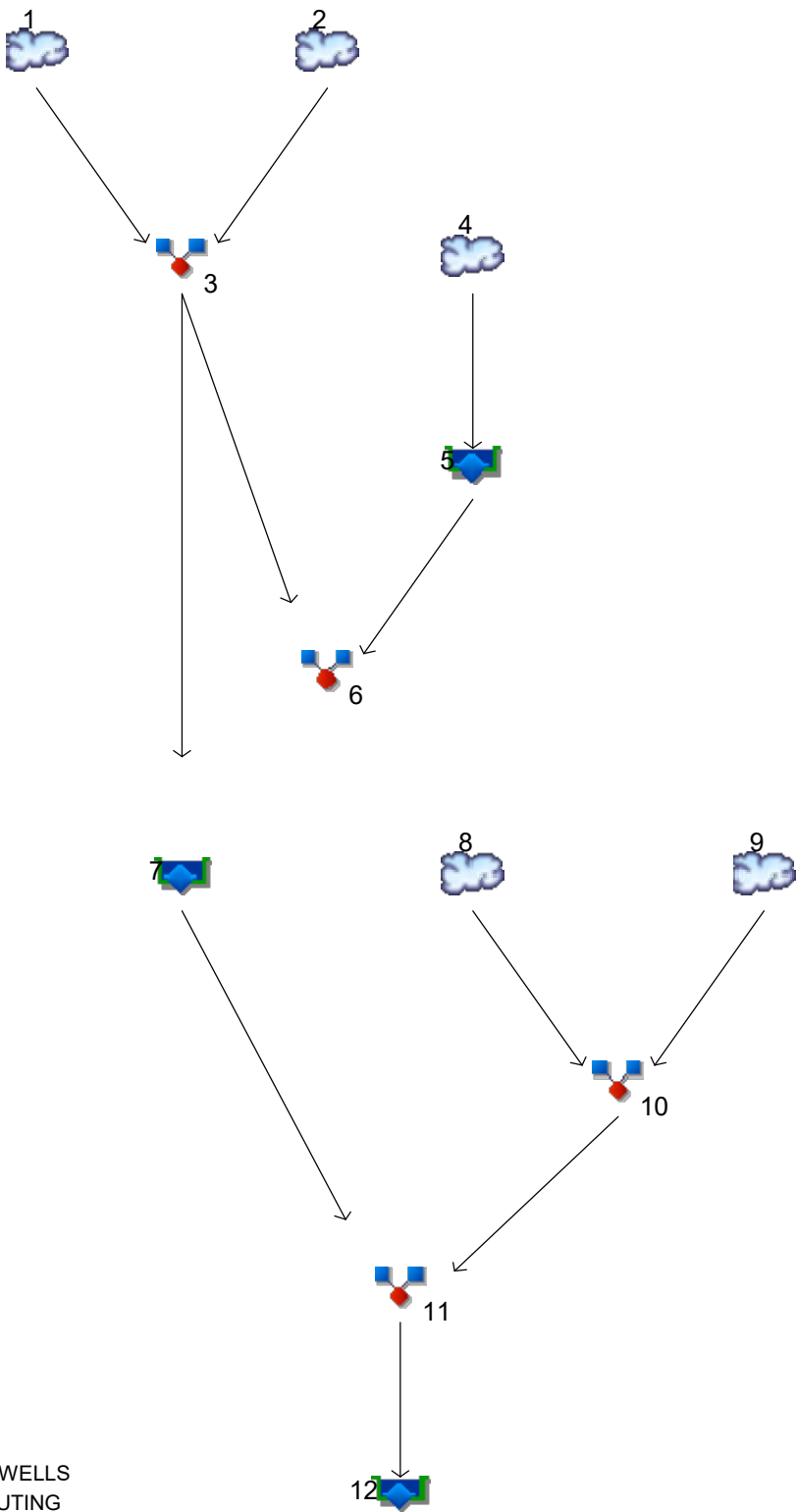
BOTTOM OF BASIN ELEV.= 792.00 > 790.4 [OK]

APPENDIX G

WATER QUALITY DESIGN INFORMATION

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024



Legend

Hyd.	Origin	Description
1	SCS Runoff	PR-1A PER
2	SCS Runoff	PR-1A IMP
3	Combine	PR-1A
4	SCS Runoff	AREA TO DRYWELLS
5	Reservoir	DRYWELL ROUTING
6	Combine	INFLOW TO BASIN 1
7	Reservoir	BASIN 1
8	SCS Runoff	PR-1B PER
9	SCS Runoff	PR-1B IMP
10	Combine	PR-1B
11	Combine	INFLOW TO BASIN 2
12	Reservoir	BASIN 2

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

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	-----	0.000	-----	-----	-----	-----	-----	-----	-----	PR-1A PER
2	SCS Runoff	-----	1.502	-----	-----	-----	-----	-----	-----	-----	PR-1A IMP
3	Combine	1, 2	1.502	-----	-----	-----	-----	-----	-----	-----	PR-1A
4	SCS Runoff	-----	4.245	-----	-----	-----	-----	-----	-----	-----	AREA TO DRYWELLS
5	Reservoir	4	0.000	-----	-----	-----	-----	-----	-----	-----	DRYWELL ROUTING
6	Combine	3, 5	1.502	-----	-----	-----	-----	-----	-----	-----	INFLOW TO BASIN 1
7	Reservoir	3	0.000	-----	-----	-----	-----	-----	-----	-----	BASIN 1
8	SCS Runoff	-----	0.000	-----	-----	-----	-----	-----	-----	-----	PR-1B PER
9	SCS Runoff	-----	1.386	-----	-----	-----	-----	-----	-----	-----	PR-1B IMP
10	Combine	8, 9	1.386	-----	-----	-----	-----	-----	-----	-----	PR-1B
11	Combine	7, 10	1.386	-----	-----	-----	-----	-----	-----	-----	INFLOW TO BASIN 2
12	Reservoir	11	0.004	-----	-----	-----	-----	-----	-----	-----	BASIN 2
Proj. file: WQ 15107.gpw										Thursday, 07 / 9 / 2026	301

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

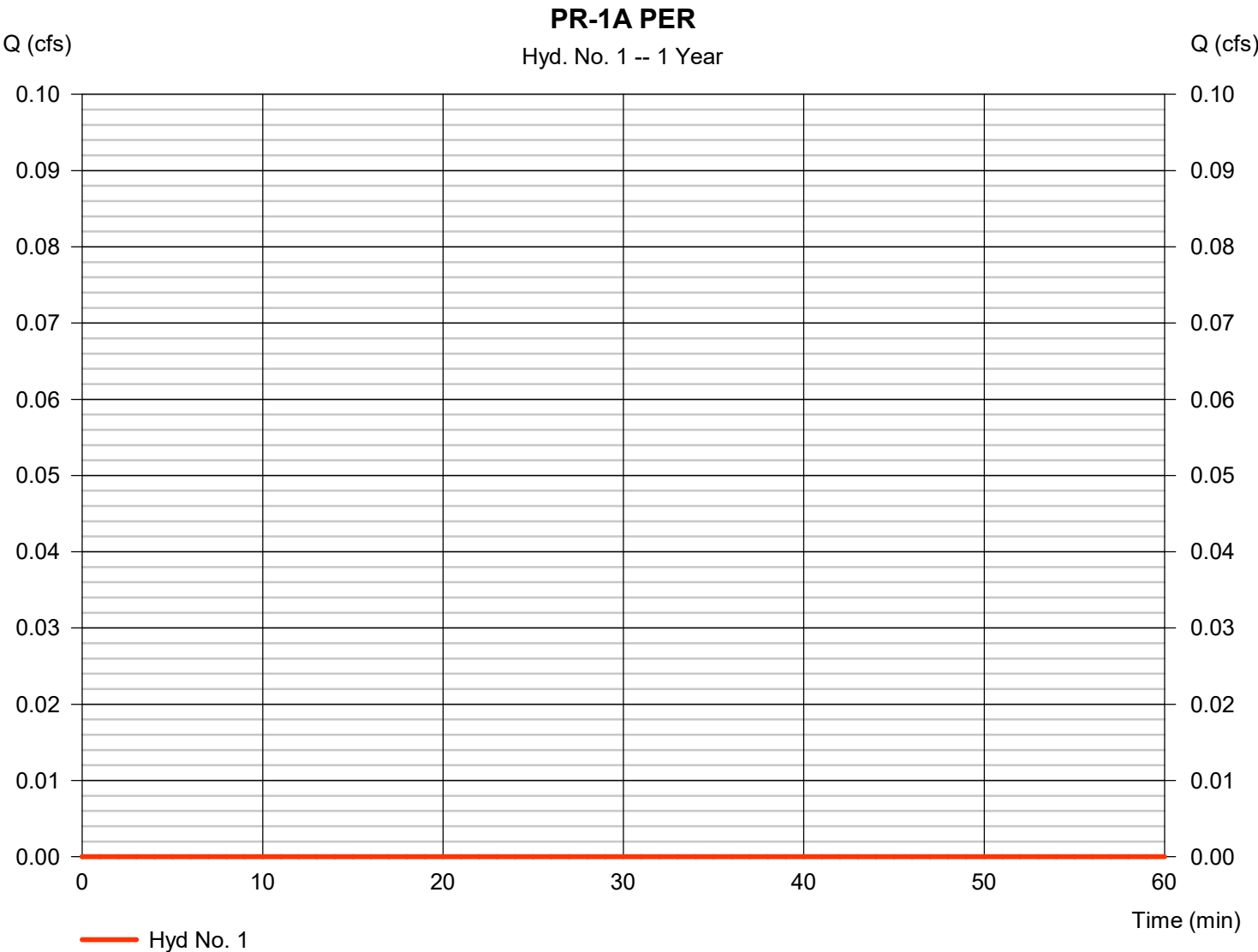
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	PR-1A PER
2	SCS Runoff	1.502	1	65	1,831	-----	-----	-----	PR-1A IMP
3	Combine	1.502	1	65	1,831	1, 2	-----	-----	PR-1A
4	SCS Runoff	4.245	1	65	5,176	-----	-----	-----	AREA TO DRYWELLS
5	Reservoir	0.000	1	n/a	0	4	4.38	5,176	DRYWELL ROUTING
6	Combine	1.502	1	65	1,831	3, 5	-----	-----	INFLOW TO BASIN 1
7	Reservoir	0.000	1	n/a	0	3	813.52	1,831	BASIN 1
8	SCS Runoff	0.000	1	n/a	0	-----	-----	-----	PR-1B PER
9	SCS Runoff	1.386	1	65	1,690	-----	-----	-----	PR-1B IMP
10	Combine	1.386	1	65	1,690	8, 9	-----	-----	PR-1B
11	Combine	1.386	1	65	1,690	7, 10	-----	-----	INFLOW TO BASIN 2
12	Reservoir	0.004	1	123	444	11	792.37	1,680	BASIN 2
WQ 15107.gpw					Return Period: 1 Year			Thursday, 07 / 9 / 2026 302	

Hydrograph Report

Hyd. No. 1

PR-1A PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 2.270 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.40 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= H:\ADMIN\WQ.cds	Shape factor	= 484

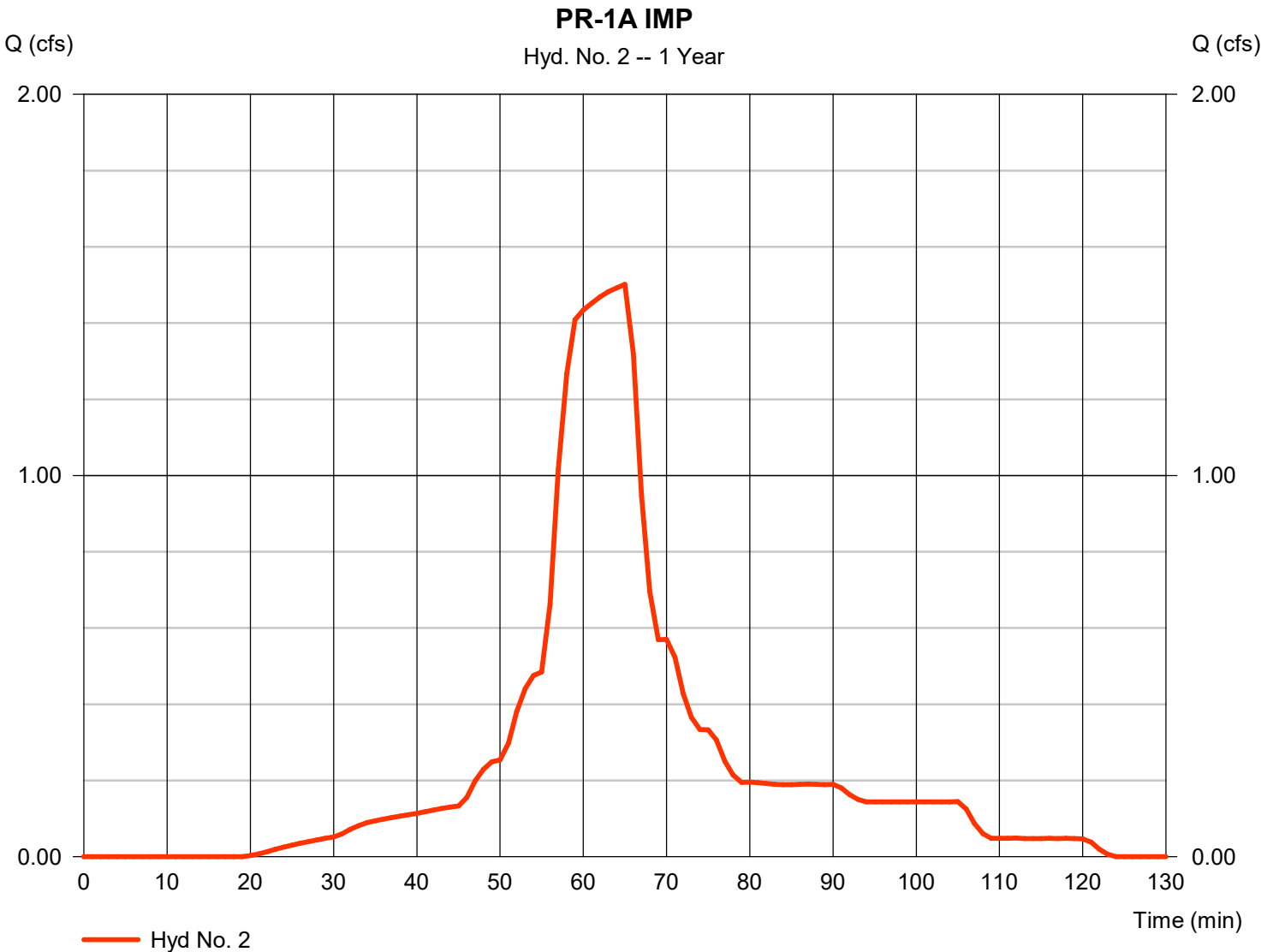


Hydrograph Report

Hyd. No. 2

PR-1A IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.502 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 1,831 cuft
Drainage area	= 0.520 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 1.60 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= H:\ADMIN\WQ.cds	Shape factor	= 484

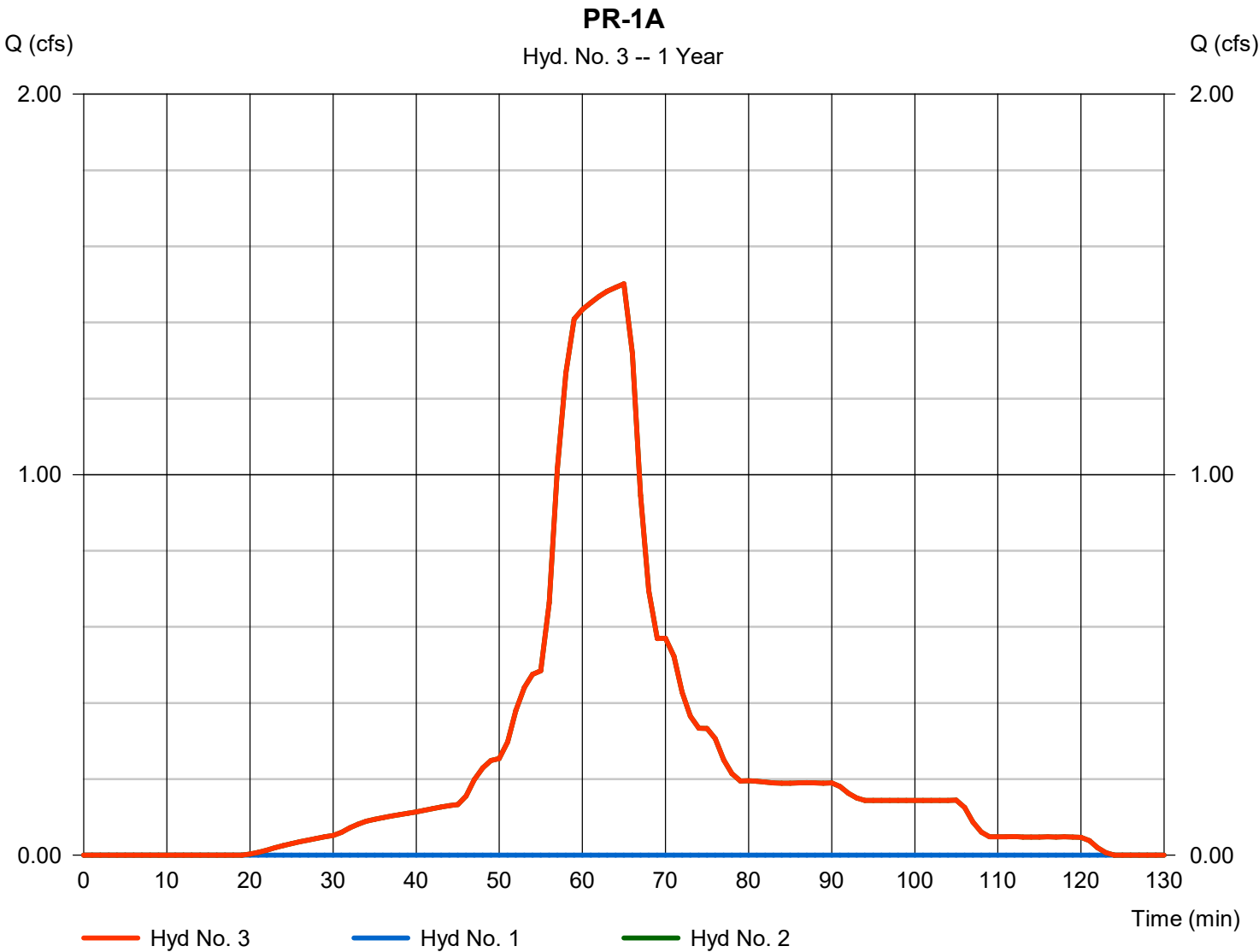


Hydrograph Report

Hyd. No. 3

PR-1A

Hydrograph type	= Combine	Peak discharge	= 1.502 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 1,831 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 2.790 ac

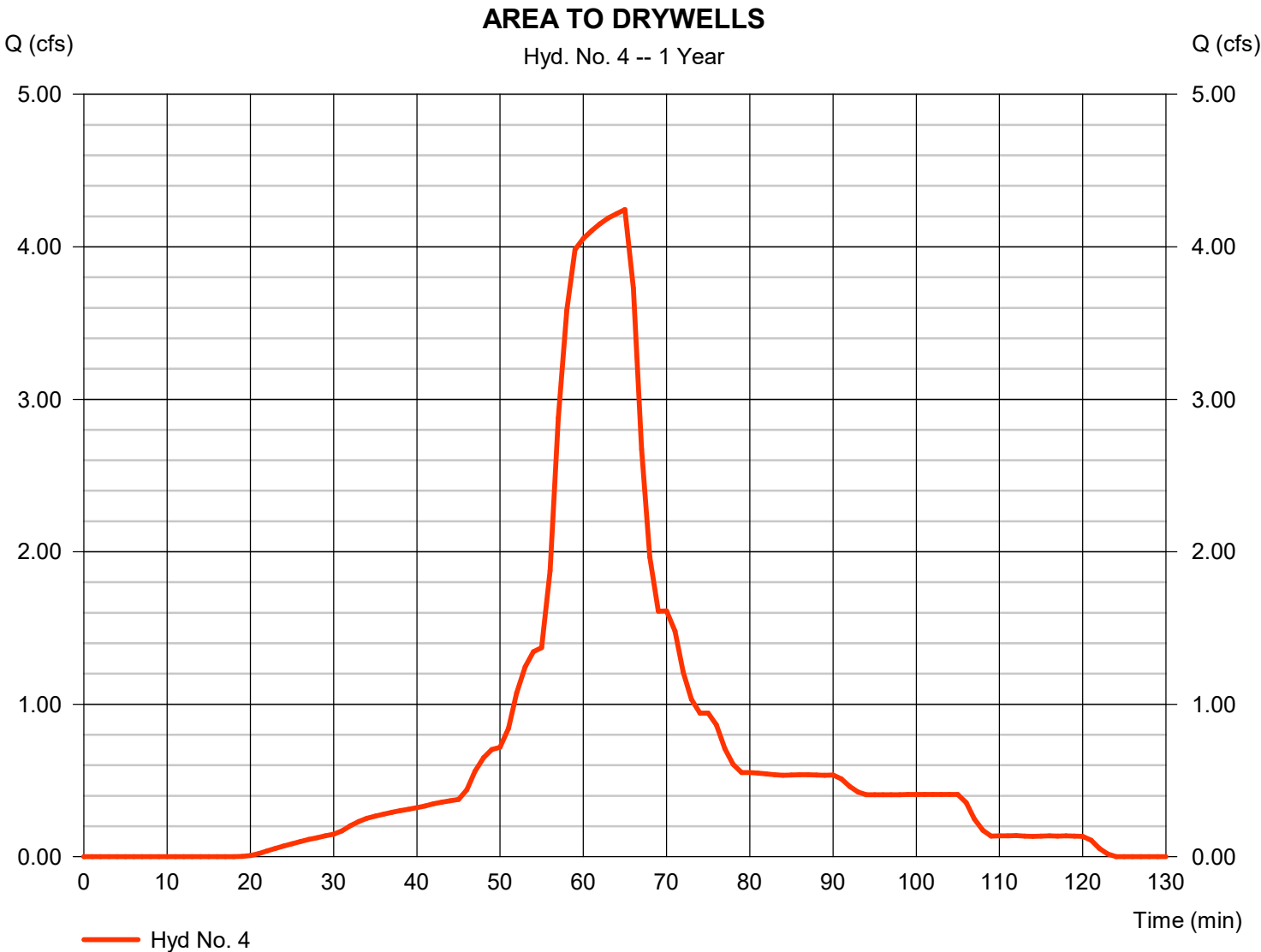


Hydrograph Report

Hyd. No. 4

AREA TO DRYWELLS

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.245 cfs
Storm frequency	=	1 yrs	Time to peak	=	65 min
Time interval	=	1 min	Hyd. volume	=	5,176 cuft
Drainage area	=	1.470 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	1.60 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	H:\ADMIN\WQ.cds	Shape factor	=	484



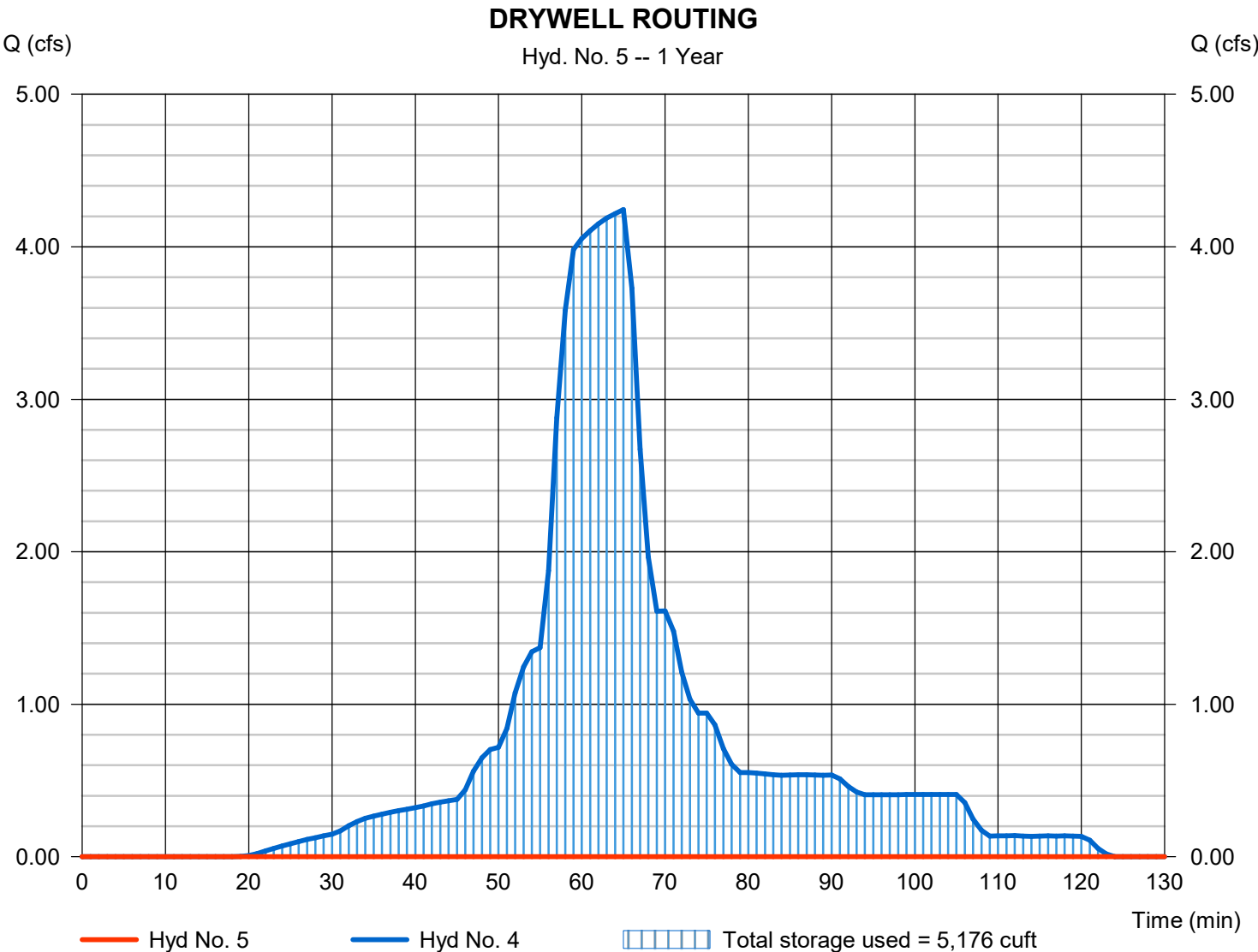
Hydrograph Report

Hyd. No. 5

DRYWELL ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - AREA TO DRYWELLS	Max. Elevation	= 4.38 ft
Reservoir name	= DRYWELLS TO BASIN 1	Max. Storage	= 5,176 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Thursday, 07 / 9 / 2026

Pond No. 3 - DRYWELLS TO BASIN 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1.00	n/a	0	0
0.50	1.50	n/a	617	617
1.00	2.00	n/a	618	1,235
1.50	2.50	n/a	827	2,062
2.00	3.00	n/a	828	2,890
2.50	3.50	n/a	827	3,717
3.00	4.00	n/a	827	4,544
3.50	4.50	n/a	828	5,372
4.00	5.00	n/a	827	6,199
4.50	5.50	n/a	828	7,027
5.00	6.00	n/a	827	7,854
5.50	6.50	n/a	828	8,682
6.00	7.00	n/a	827	9,509
6.50	7.50	n/a	827	10,336
7.00	8.00	n/a	828	11,164

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 14	0	0	0
Invert El. (ft)	= 6.25	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)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.05	62	1.05	0.00	---	---	---	---	---	---	---	---	---	0.000
0.10	123	1.10	0.00	---	---	---	---	---	---	---	---	---	0.000
0.15	185	1.15	0.00	---	---	---	---	---	---	---	---	---	0.000
0.20	247	1.20	0.00	---	---	---	---	---	---	---	---	---	0.000
0.25	309	1.25	0.00	---	---	---	---	---	---	---	---	---	0.000
0.30	370	1.30	0.00	---	---	---	---	---	---	---	---	---	0.000
0.35	432	1.35	0.00	---	---	---	---	---	---	---	---	---	0.000
0.40	494	1.40	0.00	---	---	---	---	---	---	---	---	---	0.000
0.45	555	1.45	0.00	---	---	---	---	---	---	---	---	---	0.000
0.50	617	1.50	0.00	---	---	---	---	---	---	---	---	---	0.000
0.55	679	1.55	0.00	---	---	---	---	---	---	---	---	---	0.000
0.60	741	1.60	0.00	---	---	---	---	---	---	---	---	---	0.000
0.65	802	1.65	0.00	---	---	---	---	---	---	---	---	---	0.000
0.70	864	1.70	0.00	---	---	---	---	---	---	---	---	---	0.000
0.75	926	1.75	0.00	---	---	---	---	---	---	---	---	---	0.000
0.80	988	1.80	0.00	---	---	---	---	---	---	---	---	---	0.000
0.85	1,050	1.85	0.00	---	---	---	---	---	---	---	---	---	0.000
0.90	1,111	1.90	0.00	---	---	---	---	---	---	---	---	---	0.000
0.95	1,173	1.95	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1,235	2.00	0.00	---	---	---	---	---	---	---	---	---	0.000
1.05	1,318	2.05	0.00	---	---	---	---	---	---	---	---	---	0.000
1.10	1,400	2.10	0.00	---	---	---	---	---	---	---	---	---	0.000
1.15	1,483	2.15	0.00	---	---	---	---	---	---	---	---	---	0.000
1.20	1,566	2.20	0.00	---	---	---	---	---	---	---	---	---	0.000
1.25	1,649	2.25	0.00	---	---	---	---	---	---	---	---	---	0.000
1.30	1,731	2.30	0.00	---	---	---	---	---	---	---	---	---	0.000
1.35	1,814	2.35	0.00	---	---	---	---	---	---	---	---	---	0.000
1.40	1,897	2.40	0.00	---	---	---	---	---	---	---	---	---	0.000

Continues on next page...

DRYWELLS TO BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.45	1,979	2.45	0.00	---	---	---	---	---	---	---	---	---	0.000
1.50	2,062	2.50	0.00	---	---	---	---	---	---	---	---	---	0.000
1.55	2,145	2.55	0.00	---	---	---	---	---	---	---	---	---	0.000
1.60	2,228	2.60	0.00	---	---	---	---	---	---	---	---	---	0.000
1.65	2,310	2.65	0.00	---	---	---	---	---	---	---	---	---	0.000
1.70	2,393	2.70	0.00	---	---	---	---	---	---	---	---	---	0.000
1.75	2,476	2.75	0.00	---	---	---	---	---	---	---	---	---	0.000
1.80	2,559	2.80	0.00	---	---	---	---	---	---	---	---	---	0.000
1.85	2,642	2.85	0.00	---	---	---	---	---	---	---	---	---	0.000
1.90	2,724	2.90	0.00	---	---	---	---	---	---	---	---	---	0.000
1.95	2,807	2.95	0.00	---	---	---	---	---	---	---	---	---	0.000
2.00	2,890	3.00	0.00	---	---	---	---	---	---	---	---	---	0.000
2.05	2,973	3.05	0.00	---	---	---	---	---	---	---	---	---	0.000
2.10	3,055	3.10	0.00	---	---	---	---	---	---	---	---	---	0.000
2.15	3,138	3.15	0.00	---	---	---	---	---	---	---	---	---	0.000
2.20	3,221	3.20	0.00	---	---	---	---	---	---	---	---	---	0.000
2.25	3,304	3.25	0.00	---	---	---	---	---	---	---	---	---	0.000
2.30	3,386	3.30	0.00	---	---	---	---	---	---	---	---	---	0.000
2.35	3,469	3.35	0.00	---	---	---	---	---	---	---	---	---	0.000
2.40	3,552	3.40	0.00	---	---	---	---	---	---	---	---	---	0.000
2.45	3,634	3.45	0.00	---	---	---	---	---	---	---	---	---	0.000
2.50	3,717	3.50	0.00	---	---	---	---	---	---	---	---	---	0.000
2.55	3,800	3.55	0.00	---	---	---	---	---	---	---	---	---	0.000
2.60	3,882	3.60	0.00	---	---	---	---	---	---	---	---	---	0.000
2.65	3,965	3.65	0.00	---	---	---	---	---	---	---	---	---	0.000
2.70	4,048	3.70	0.00	---	---	---	---	---	---	---	---	---	0.000
2.75	4,131	3.75	0.00	---	---	---	---	---	---	---	---	---	0.000
2.80	4,213	3.80	0.00	---	---	---	---	---	---	---	---	---	0.000
2.85	4,296	3.85	0.00	---	---	---	---	---	---	---	---	---	0.000
2.90	4,379	3.90	0.00	---	---	---	---	---	---	---	---	---	0.000
2.95	4,461	3.95	0.00	---	---	---	---	---	---	---	---	---	0.000
3.00	4,544	4.00	0.00	---	---	---	---	---	---	---	---	---	0.000
3.05	4,627	4.05	0.00	---	---	---	---	---	---	---	---	---	0.000
3.10	4,710	4.10	0.00	---	---	---	---	---	---	---	---	---	0.000
3.15	4,792	4.15	0.00	---	---	---	---	---	---	---	---	---	0.000
3.20	4,875	4.20	0.00	---	---	---	---	---	---	---	---	---	0.000
3.25	4,958	4.25	0.00	---	---	---	---	---	---	---	---	---	0.000
3.30	5,041	4.30	0.00	---	---	---	---	---	---	---	---	---	0.000
3.35	5,124	4.35	0.00	---	---	---	---	---	---	---	---	---	0.000
3.40	5,206	4.40	0.00	---	---	---	---	---	---	---	---	---	0.000
3.45	5,289	4.45	0.00	---	---	---	---	---	---	---	---	---	0.000
3.50	5,372	4.50	0.00	---	---	---	---	---	---	---	---	---	0.000
3.55	5,455	4.55	0.00	---	---	---	---	---	---	---	---	---	0.000
3.60	5,537	4.60	0.00	---	---	---	---	---	---	---	---	---	0.000
3.65	5,620	4.65	0.00	---	---	---	---	---	---	---	---	---	0.000
3.70	5,703	4.70	0.00	---	---	---	---	---	---	---	---	---	0.000
3.75	5,786	4.75	0.00	---	---	---	---	---	---	---	---	---	0.000
3.80	5,868	4.80	0.00	---	---	---	---	---	---	---	---	---	0.000
3.85	5,951	4.85	0.00	---	---	---	---	---	---	---	---	---	0.000
3.90	6,034	4.90	0.00	---	---	---	---	---	---	---	---	---	0.000
3.95	6,116	4.95	0.00	---	---	---	---	---	---	---	---	---	0.000
4.00	6,199	5.00	0.00	---	---	---	---	---	---	---	---	---	0.000
4.05	6,282	5.05	0.00	---	---	---	---	---	---	---	---	---	0.000
4.10	6,365	5.10	0.00	---	---	---	---	---	---	---	---	---	0.000
4.15	6,447	5.15	0.00	---	---	---	---	---	---	---	---	---	0.000
4.20	6,530	5.20	0.00	---	---	---	---	---	---	---	---	---	0.000
4.25	6,613	5.25	0.00	---	---	---	---	---	---	---	---	---	0.000
4.30	6,696	5.30	0.00	---	---	---	---	---	---	---	---	---	0.000
4.35	6,779	5.35	0.00	---	---	---	---	---	---	---	---	---	0.000
4.40	6,861	5.40	0.00	---	---	---	---	---	---	---	---	---	0.000
4.45	6,944	5.45	0.00	---	---	---	---	---	---	---	---	---	0.000
4.50	7,027	5.50	0.00	---	---	---	---	---	---	---	---	---	0.000
4.55	7,110	5.55	0.00	---	---	---	---	---	---	---	---	---	0.000
4.60	7,192	5.60	0.00	---	---	---	---	---	---	---	---	---	0.000
4.65	7,275	5.65	0.00	---	---	---	---	---	---	---	---	---	0.000
4.70	7,358	5.70	0.00	---	---	---	---	---	---	---	---	---	0.000
4.75	7,441	5.75	0.00	---	---	---	---	---	---	---	---	---	0.000
4.80	7,523	5.80	0.00	---	---	---	---	---	---	---	---	---	0.000
4.85	7,606	5.85	0.00	---	---	---	---	---	---	---	---	---	0.000
4.90	7,689	5.90	0.00	---	---	---	---	---	---	---	---	---	0.000
4.95	7,771	5.95	0.00	---	---	---	---	---	---	---	---	---	0.000
5.00	7,854	6.00	0.00	---	---	---	---	---	---	---	---	---	0.000

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DRYWELLS TO BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
5.05	7,937	6.05	0.00	---	---	---	---	---	---	---	---	---	0.000
5.10	8,020	6.10	0.00	---	---	---	---	---	---	---	---	---	0.000
5.15	8,102	6.15	0.00	---	---	---	---	---	---	---	---	---	0.000
5.20	8,185	6.20	0.00	---	---	---	---	---	---	---	---	---	0.000
5.25	8,268	6.25	0.00 ic	---	---	---	---	---	---	---	---	---	0.000
5.30	8,351	6.30	0.11 ic	---	---	---	---	---	---	---	---	---	0.109
5.35	8,434	6.35	0.42 ic	---	---	---	---	---	---	---	---	---	0.423
5.40	8,516	6.40	0.92 ic	---	---	---	---	---	---	---	---	---	0.918
5.45	8,599	6.45	1.56 ic	---	---	---	---	---	---	---	---	---	1.564
5.50	8,682	6.50	2.34 ic	---	---	---	---	---	---	---	---	---	2.344
5.55	8,765	6.55	3.22 ic	---	---	---	---	---	---	---	---	---	3.215
5.60	8,847	6.60	4.14 ic	---	---	---	---	---	---	---	---	---	4.140
5.65	8,930	6.65	5.08 ic	---	---	---	---	---	---	---	---	---	5.078
5.70	9,013	6.70	5.95 ic	---	---	---	---	---	---	---	---	---	5.953
5.75	9,096	6.75	6.62 ic	---	---	---	---	---	---	---	---	---	6.617
5.80	9,178	6.80	7.25 ic	---	---	---	---	---	---	---	---	---	7.249
5.85	9,261	6.85	7.83 ic	---	---	---	---	---	---	---	---	---	7.829
5.90	9,344	6.90	8.37 ic	---	---	---	---	---	---	---	---	---	8.370
5.95	9,426	6.95	8.88 ic	---	---	---	---	---	---	---	---	---	8.878
6.00	9,509	7.00	9.36 ic	---	---	---	---	---	---	---	---	---	9.358
6.05	9,592	7.05	9.81 ic	---	---	---	---	---	---	---	---	---	9.815
6.10	9,674	7.10	10.25 ic	---	---	---	---	---	---	---	---	---	10.25
6.15	9,757	7.15	10.67 ic	---	---	---	---	---	---	---	---	---	10.67
6.20	9,840	7.20	11.07 ic	---	---	---	---	---	---	---	---	---	11.07
6.25	9,923	7.25	11.46 ic	---	---	---	---	---	---	---	---	---	11.46
6.30	10,005	7.30	11.84 ic	---	---	---	---	---	---	---	---	---	11.84
6.35	10,088	7.35	12.20 ic	---	---	---	---	---	---	---	---	---	12.20
6.40	10,171	7.40	12.56 ic	---	---	---	---	---	---	---	---	---	12.56
6.45	10,253	7.45	12.90 ic	---	---	---	---	---	---	---	---	---	12.90
6.50	10,336	7.50	13.23 ic	---	---	---	---	---	---	---	---	---	13.23
6.55	10,419	7.55	13.56 ic	---	---	---	---	---	---	---	---	---	13.56
6.60	10,502	7.60	13.88 ic	---	---	---	---	---	---	---	---	---	13.88
6.65	10,584	7.65	14.19 ic	---	---	---	---	---	---	---	---	---	14.19
6.70	10,667	7.70	14.50 ic	---	---	---	---	---	---	---	---	---	14.50
6.75	10,750	7.75	14.80 ic	---	---	---	---	---	---	---	---	---	14.80
6.80	10,833	7.80	15.09 ic	---	---	---	---	---	---	---	---	---	15.09
6.85	10,916	7.85	15.38 ic	---	---	---	---	---	---	---	---	---	15.38
6.90	10,998	7.90	15.66 ic	---	---	---	---	---	---	---	---	---	15.66
6.95	11,081	7.95	15.94 ic	---	---	---	---	---	---	---	---	---	15.94
7.00	11,164	8.00	16.21 ic	---	---	---	---	---	---	---	---	---	16.21

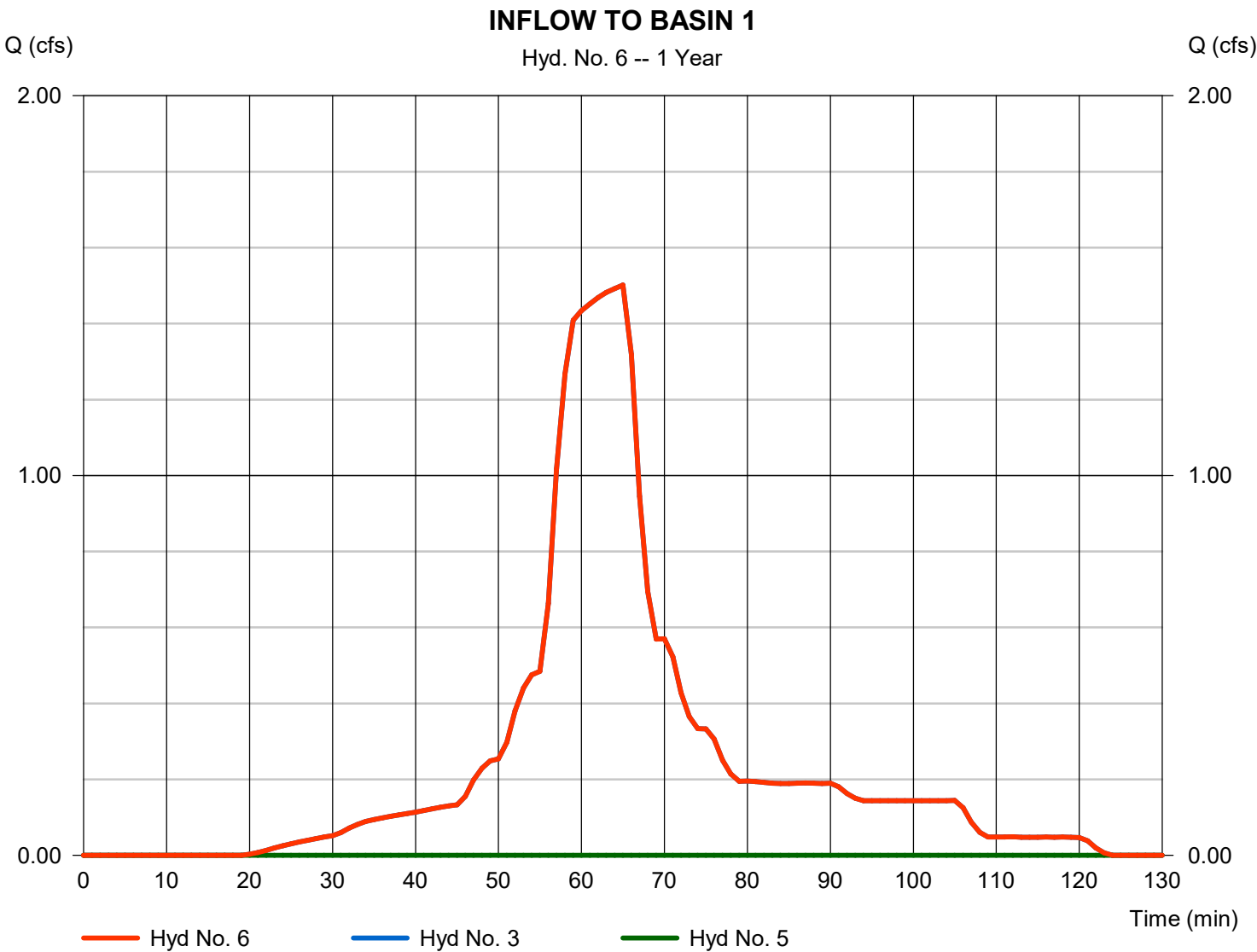
...End

Hydrograph Report

Hyd. No. 6

INFLOW TO BASIN 1

Hydrograph type	= Combine	Peak discharge	= 1.502 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 1,831 cuft
Inflow hyds.	= 3, 5	Contrib. drain. area	= 0.000 ac



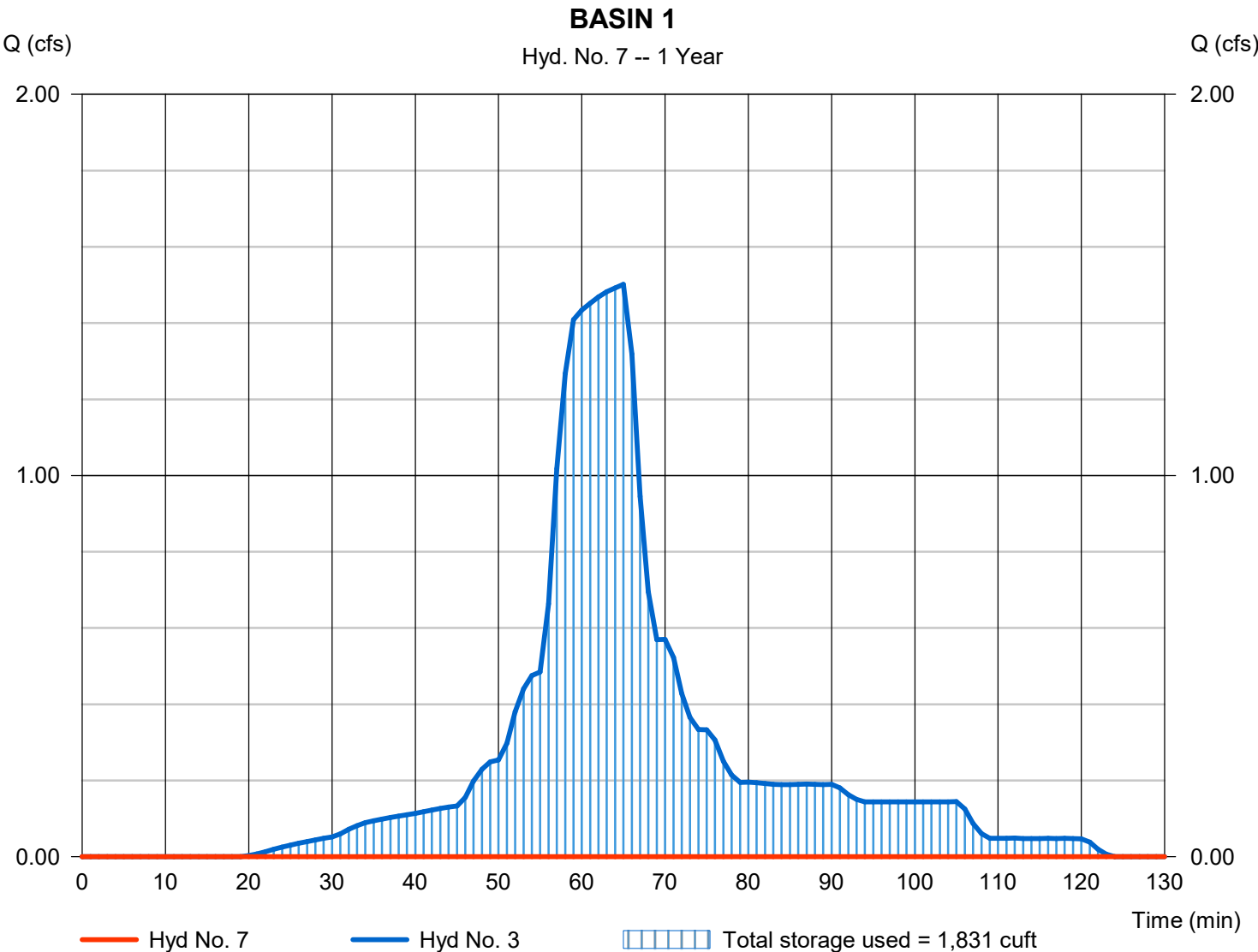
Hydrograph Report

Hyd. No. 7

BASIN 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - PR-1A	Max. Elevation	= 813.52 ft
Reservoir name	= BASIN 1	Max. Storage	= 1,831 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

Thursday, 07 / 9 / 2026

Pond No. 1 - BASIN 1

Pond Data

UG Chambers -Invert elev. = 814.75 ft, Rise x Span = 3.00 x 3.00 ft, Barrel Len = 185.90 ft, No. Barrels = 5, Slope = 0.00%, Headers = Yes
Encasement -Invert elev. = 812.75 ft, Width = 6.00 ft, Height = 5.25 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	812.75	n/a	0	0
0.52	813.28	n/a	1,247	1,247
1.05	813.80	n/a	1,247	2,494
1.58	814.33	n/a	1,247	3,741
2.10	814.85	n/a	1,290	5,031
2.63	815.38	n/a	1,838	6,869
3.15	815.90	n/a	2,095	8,963
3.67	816.42	n/a	2,176	11,139
4.20	816.95	n/a	2,136	13,275
4.72	817.47	n/a	1,953	15,228
5.25	818.00	n/a	1,439	16,667

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 815.00	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)	= 3.50	0.00	0.00	0.00
Crest El. (ft)	= 816.25	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	812.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.05	125	812.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.10	249	812.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.16	374	812.91	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.21	499	812.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.26	624	813.01	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.31	748	813.06	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.37	873	813.12	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.42	998	813.17	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.47	1,122	813.22	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.52	1,247	813.28	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.58	1,372	813.33	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.63	1,496	813.38	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.68	1,621	813.43	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.74	1,746	813.48	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.79	1,871	813.54	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.84	1,995	813.59	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.89	2,120	813.64	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.95	2,245	813.69	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	2,369	813.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.05	2,494	813.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.10	2,619	813.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.15	2,743	813.91	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.21	2,868	813.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.26	2,993	814.01	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.31	3,118	814.06	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.37	3,242	814.11	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.42	3,367	814.17	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.47	3,492	814.22	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.52	3,616	814.27	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.58	3,741	814.33	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.63	3,870	814.38	0.00	---	---	---	0.00	---	---	---	---	---	0.000

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BASIN 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.68	3,999	814.43	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.73	4,128	814.48	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.78	4,257	814.53	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.84	4,386	814.59	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.89	4,515	814.64	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.94	4,644	814.69	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	4,773	814.74	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.05	4,902	814.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.10	5,031	814.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.15	5,215	814.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.20	5,399	814.96	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.26	5,582	815.01	0.00 ic	---	---	---	0.00	---	---	---	---	---	0.000
2.31	5,766	815.06	0.02 ic	---	---	---	0.00	---	---	---	---	---	0.016
2.36	5,950	815.11	0.06 ic	---	---	---	0.00	---	---	---	---	---	0.056
2.41	6,134	815.16	0.12 ic	---	---	---	0.00	---	---	---	---	---	0.117
2.47	6,317	815.22	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.200
2.52	6,501	815.27	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.303
2.57	6,685	815.32	0.42 ic	---	---	---	0.00	---	---	---	---	---	0.423
2.63	6,869	815.38	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.562
2.68	7,078	815.43	0.71 ic	---	---	---	0.00	---	---	---	---	---	0.714
2.73	7,288	815.48	0.88 ic	---	---	---	0.00	---	---	---	---	---	0.880
2.78	7,497	815.53	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.057
2.84	7,707	815.59	1.24 ic	---	---	---	0.00	---	---	---	---	---	1.243
2.89	7,916	815.64	1.44 ic	---	---	---	0.00	---	---	---	---	---	1.438
2.94	8,126	815.69	1.63 ic	---	---	---	0.00	---	---	---	---	---	1.634
2.99	8,335	815.74	1.84 ic	---	---	---	0.00	---	---	---	---	---	1.836
3.05	8,544	815.79	2.03 ic	---	---	---	0.00	---	---	---	---	---	2.033
3.10	8,754	815.85	2.23 ic	---	---	---	0.00	---	---	---	---	---	2.225
3.15	8,963	815.90	2.41 ic	---	---	---	0.00	---	---	---	---	---	2.405
3.20	9,181	815.95	2.56 ic	---	---	---	0.00	---	---	---	---	---	2.565
3.26	9,399	816.01	2.69 ic	---	---	---	0.00	---	---	---	---	---	2.687
3.31	9,616	816.06	2.82 ic	---	---	---	0.00	---	---	---	---	---	2.823
3.36	9,834	816.11	2.95 ic	---	---	---	0.00	---	---	---	---	---	2.953
3.41	10,051	816.16	3.08 ic	---	---	---	0.00	---	---	---	---	---	3.078
3.46	10,269	816.22	3.20 ic	---	---	---	0.00	---	---	---	---	---	3.197
3.52	10,487	816.27	3.31 ic	---	---	---	0.03	---	---	---	---	---	3.340
3.57	10,704	816.32	3.42 ic	---	---	---	0.22	---	---	---	---	---	3.639
3.62	10,922	816.37	3.53 ic	---	---	---	0.50	---	---	---	---	---	4.031
3.67	11,139	816.42	3.64 ic	---	---	---	0.85	---	---	---	---	---	4.490
3.73	11,353	816.48	3.74 ic	---	---	---	1.26	---	---	---	---	---	5.003
3.78	11,567	816.53	3.84 ic	---	---	---	1.73	---	---	---	---	---	5.565
3.83	11,780	816.58	3.93 ic	---	---	---	2.23	---	---	---	---	---	6.169
3.88	11,994	816.63	4.03 ic	---	---	---	2.78	---	---	---	---	---	6.811
3.94	12,207	816.69	4.12 ic	---	---	---	3.37	---	---	---	---	---	7.492
3.99	12,421	816.74	4.21 ic	---	---	---	4.00	---	---	---	---	---	8.207
4.04	12,634	816.79	4.30 ic	---	---	---	4.66	---	---	---	---	---	8.955
4.09	12,848	816.84	4.39 ic	---	---	---	5.35	---	---	---	---	---	9.733
4.15	13,062	816.90	4.47 ic	---	---	---	6.07	---	---	---	---	---	10.54
4.20	13,275	816.95	4.55 ic	---	---	---	6.83	---	---	---	---	---	11.38
4.25	13,470	817.00	4.63 ic	---	---	---	7.61	---	---	---	---	---	12.24
4.30	13,666	817.05	4.72 ic	---	---	---	8.42	---	---	---	---	---	13.13
4.36	13,861	817.11	4.79 ic	---	---	---	9.25	---	---	---	---	---	14.05
4.41	14,056	817.16	4.87 ic	---	---	---	10.12	---	---	---	---	---	14.99
4.46	14,252	817.21	4.95 ic	---	---	---	11.01	---	---	---	---	---	15.95
4.51	14,447	817.27	5.02 ic	---	---	---	11.92	---	---	---	---	---	16.94
4.57	14,642	817.32	5.10 ic	---	---	---	12.85	---	---	---	---	---	17.95
4.62	14,838	817.37	5.17 ic	---	---	---	13.81	---	---	---	---	---	18.98
4.67	15,033	817.42	5.24 ic	---	---	---	14.80	---	---	---	---	---	20.04
4.72	15,228	817.47	5.31 ic	---	---	---	15.80	---	---	---	---	---	21.12
4.78	15,372	817.53	5.38 ic	---	---	---	16.83	---	---	---	---	---	22.21
4.83	15,516	817.58	5.45 ic	---	---	---	17.88	---	---	---	---	---	23.33
4.88	15,660	817.63	5.52 ic	---	---	---	18.94	---	---	---	---	---	24.46
4.93	15,804	817.68	5.59 ic	---	---	---	20.03	---	---	---	---	---	25.62
4.99	15,948	817.74	5.66 ic	---	---	---	21.14	---	---	---	---	---	26.80
5.04	16,092	817.79	5.72 ic	---	---	---	22.27	---	---	---	---	---	27.99
5.09	16,236	817.84	5.79 ic	---	---	---	23.42	---	---	---	---	---	29.21
5.14	16,380	817.89	5.85 ic	---	---	---	24.59	---	---	---	---	---	30.44
5.20	16,524	817.95	5.92 ic	---	---	---	25.77	---	---	---	---	---	31.69
5.25	16,667	818.00	5.98 ic	---	---	---	26.98	---	---	---	---	---	32.96

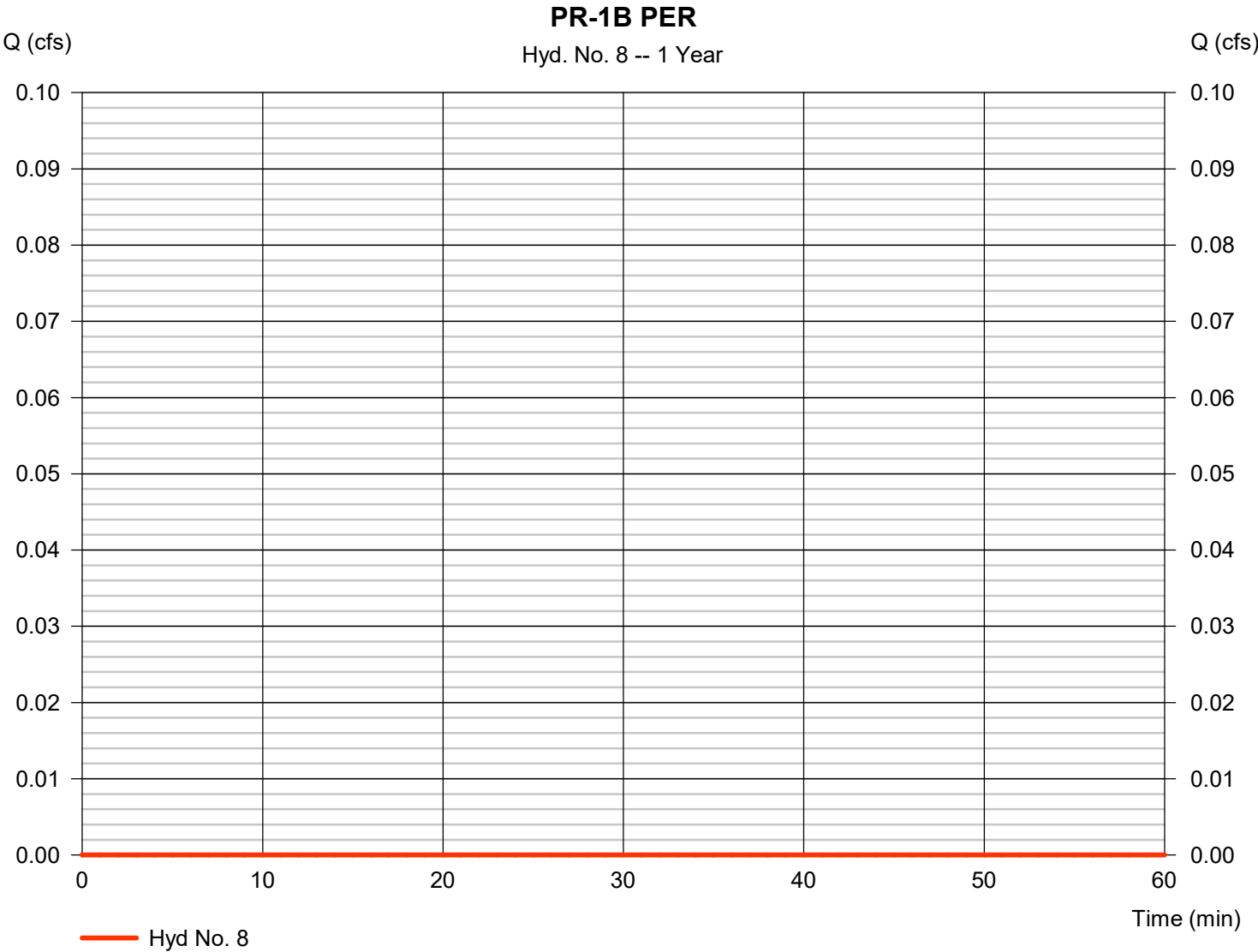
...End

Hydrograph Report

Hyd. No. 8

PR-1B PER

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 1.110 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 9.80 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= H:\ADMIN\WQ.cds	Shape factor	= 484

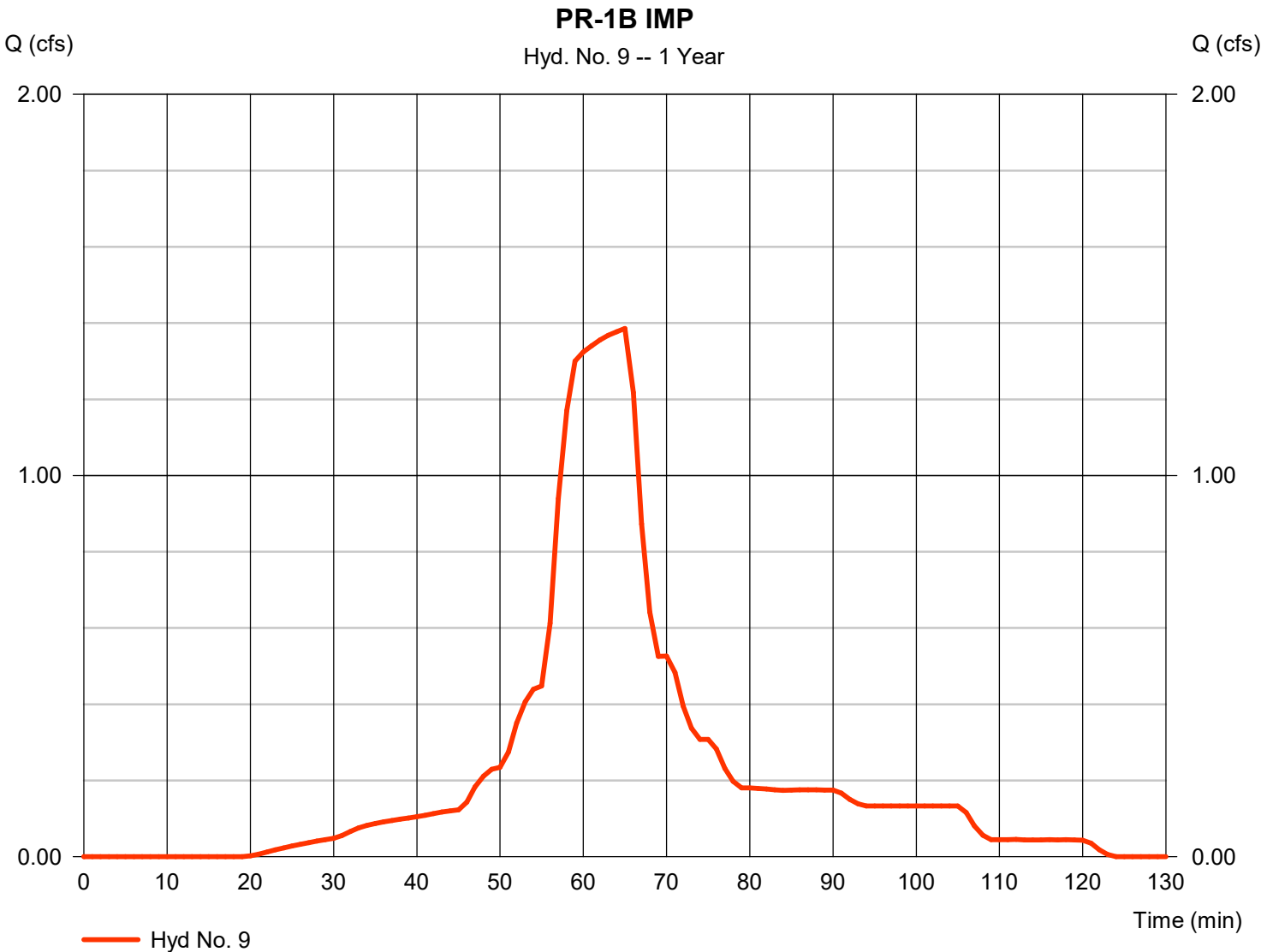


Hydrograph Report

Hyd. No. 9

PR-1B IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 1.386 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 1,690 cuft
Drainage area	= 0.480 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.90 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= H:\ADMIN\WQ.cds	Shape factor	= 484

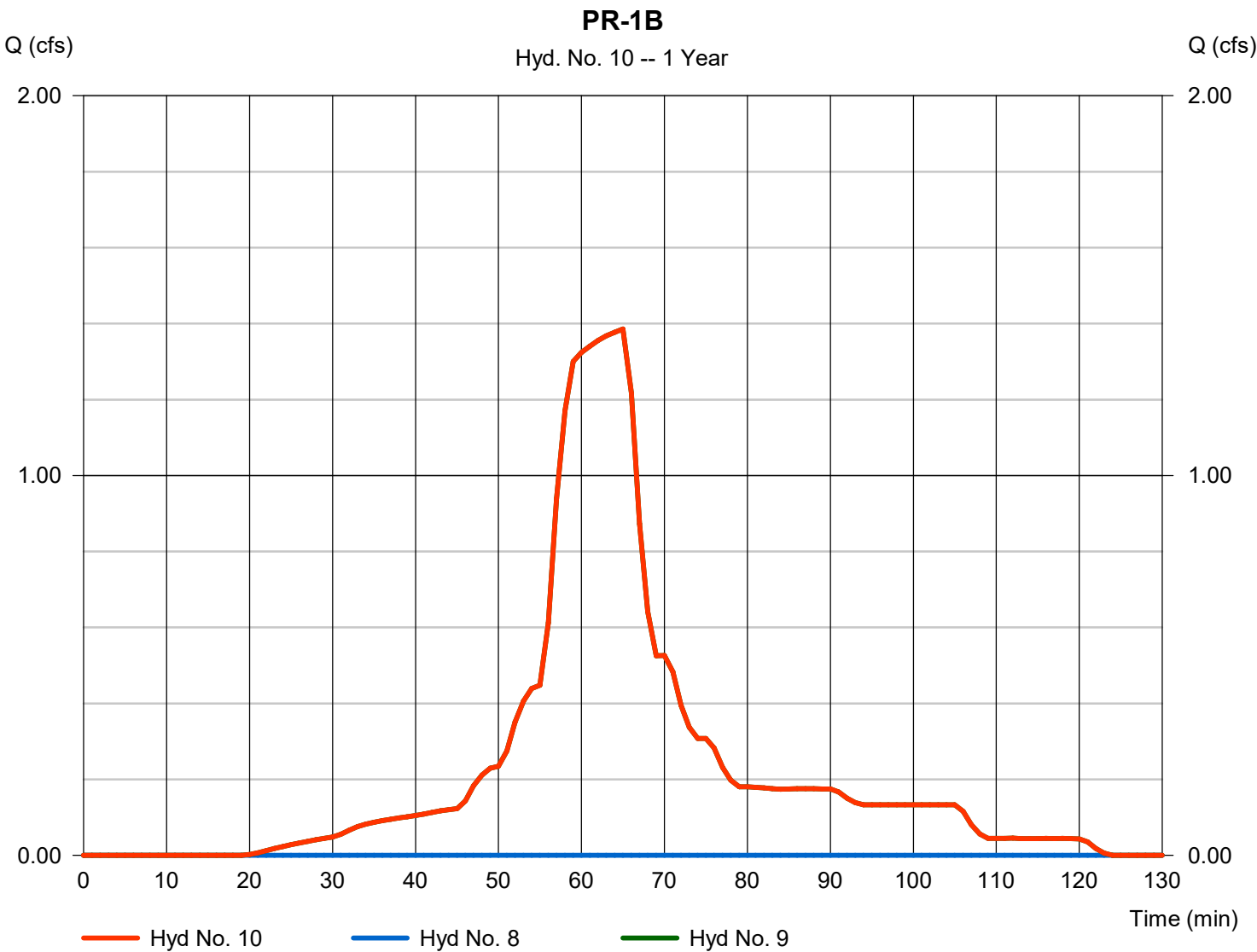


Hydrograph Report

Hyd. No. 10

PR-1B

Hydrograph type	= Combine	Peak discharge	= 1.386 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 1,690 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 1.590 ac

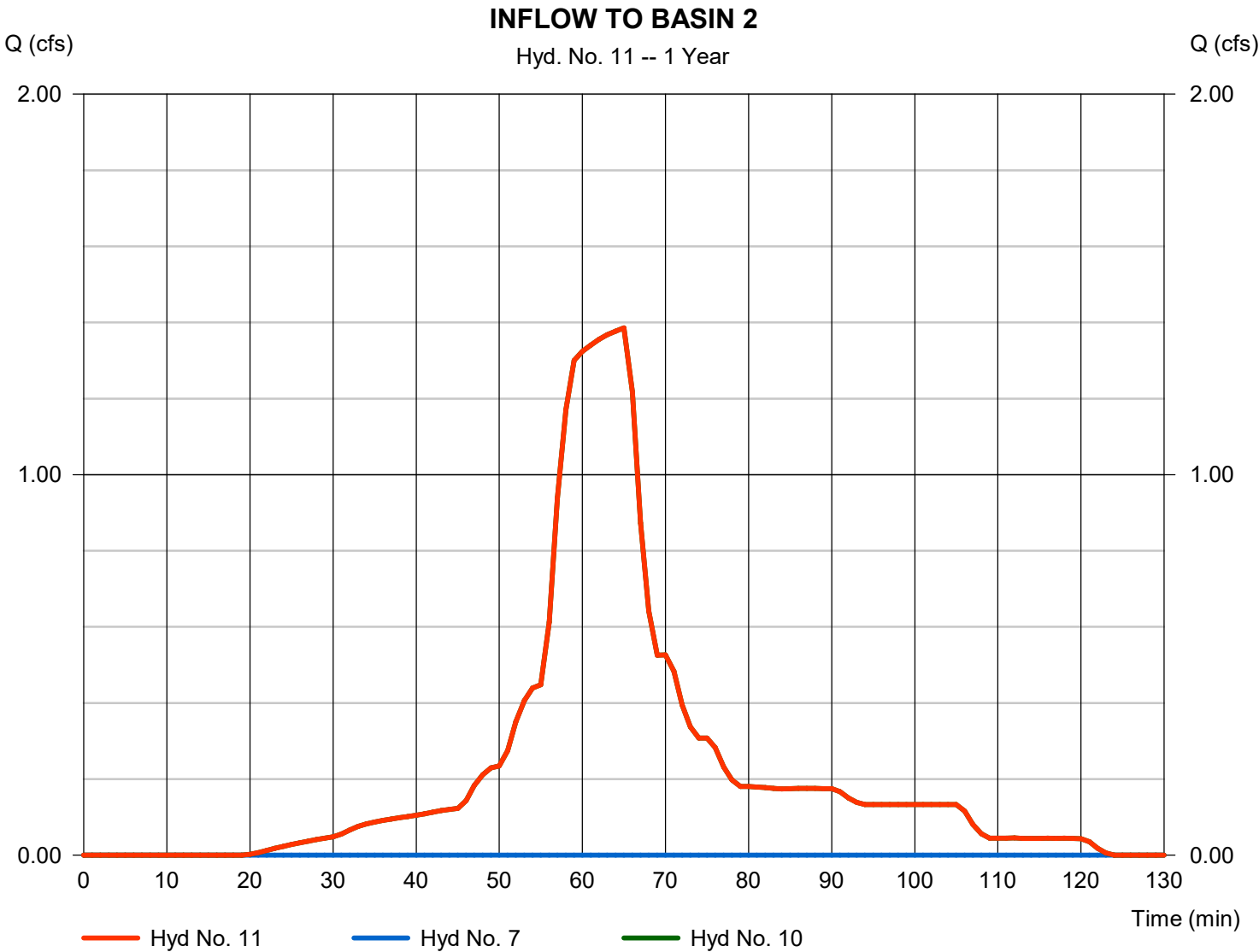


Hydrograph Report

Hyd. No. 11

INFLOW TO BASIN 2

Hydrograph type	= Combine	Peak discharge	= 1.386 cfs
Storm frequency	= 1 yrs	Time to peak	= 65 min
Time interval	= 1 min	Hyd. volume	= 1,690 cuft
Inflow hyds.	= 7, 10	Contrib. drain. area	= 0.000 ac



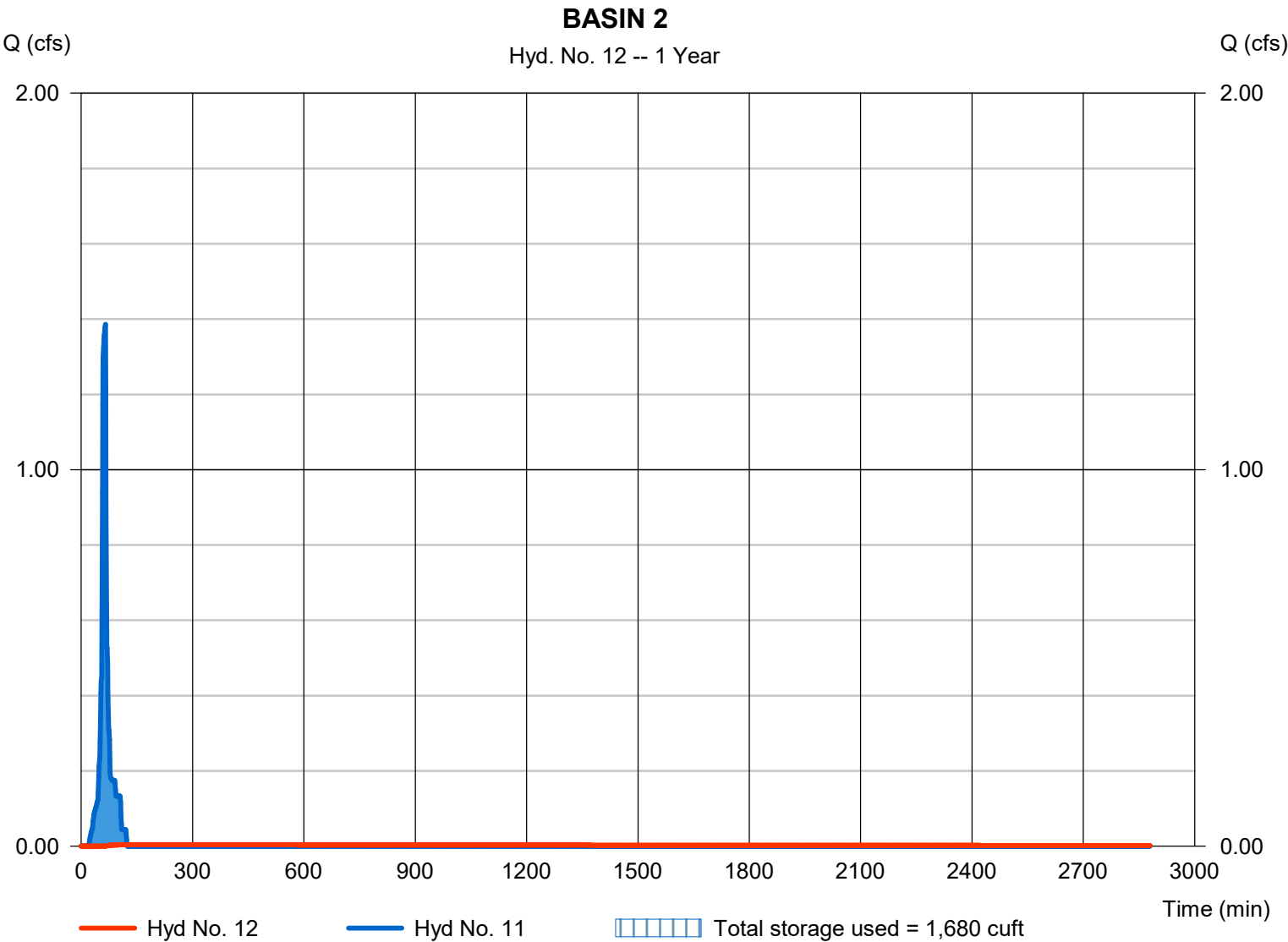
Hydrograph Report

Hyd. No. 12

BASIN 2

Hydrograph type	= Reservoir	Peak discharge	= 0.004 cfs
Storm frequency	= 1 yrs	Time to peak	= 123 min
Time interval	= 1 min	Hyd. volume	= 444 cuft
Inflow hyd. No.	= 11 - INFLOW TO BASIN 2	Max. Elevation	= 792.37 ft
Reservoir name	= BASIN 2	Max. Storage	= 1,680 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BASIN 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 792.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	792.00	4,540	0	0
2.00	794.00	4,595	9,134	9,134
4.00	796.00	4,640	9,234	18,368

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 792.37	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

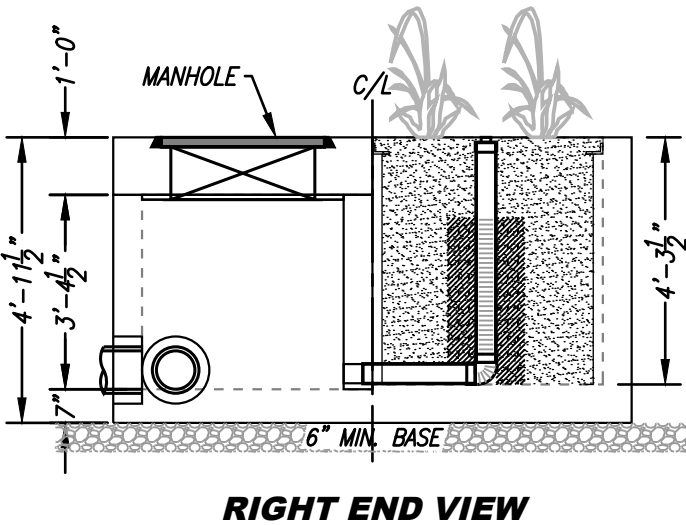
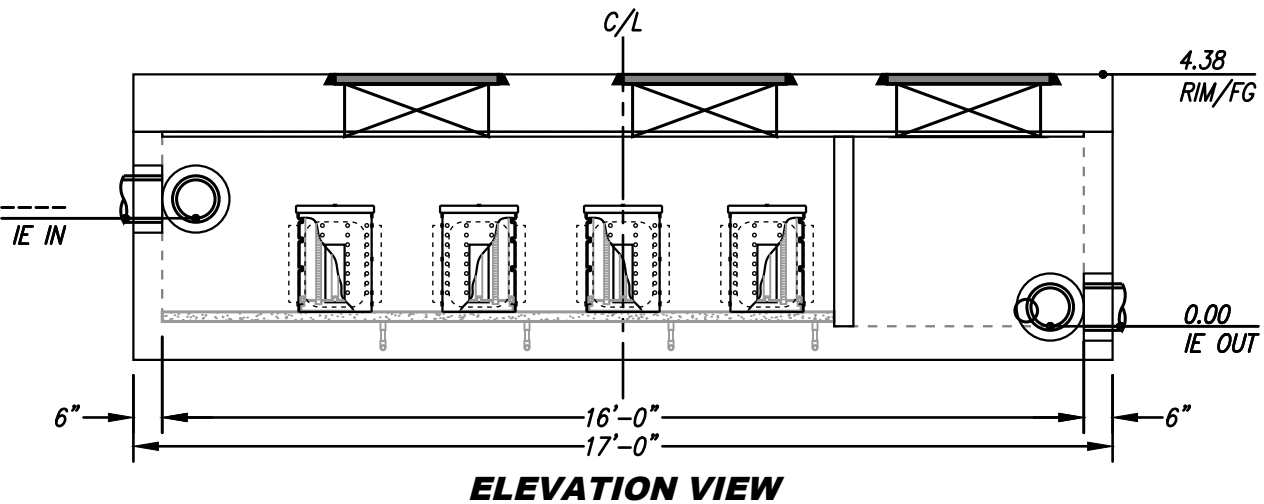
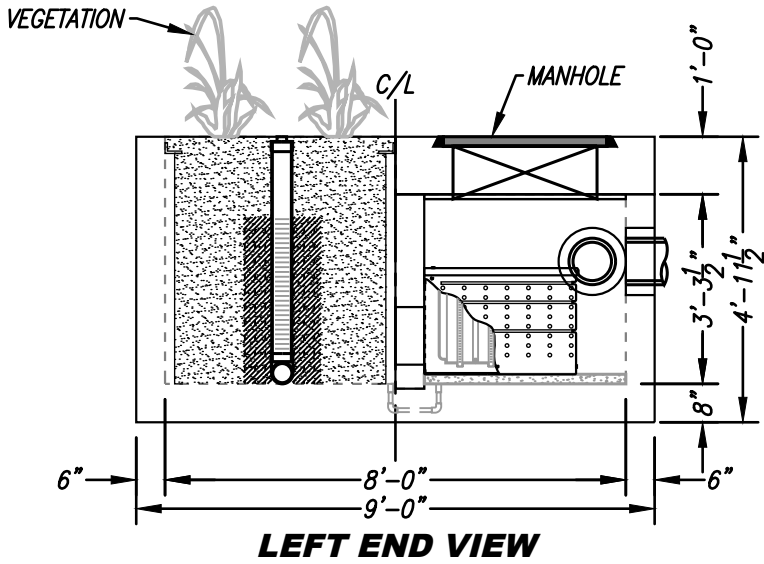
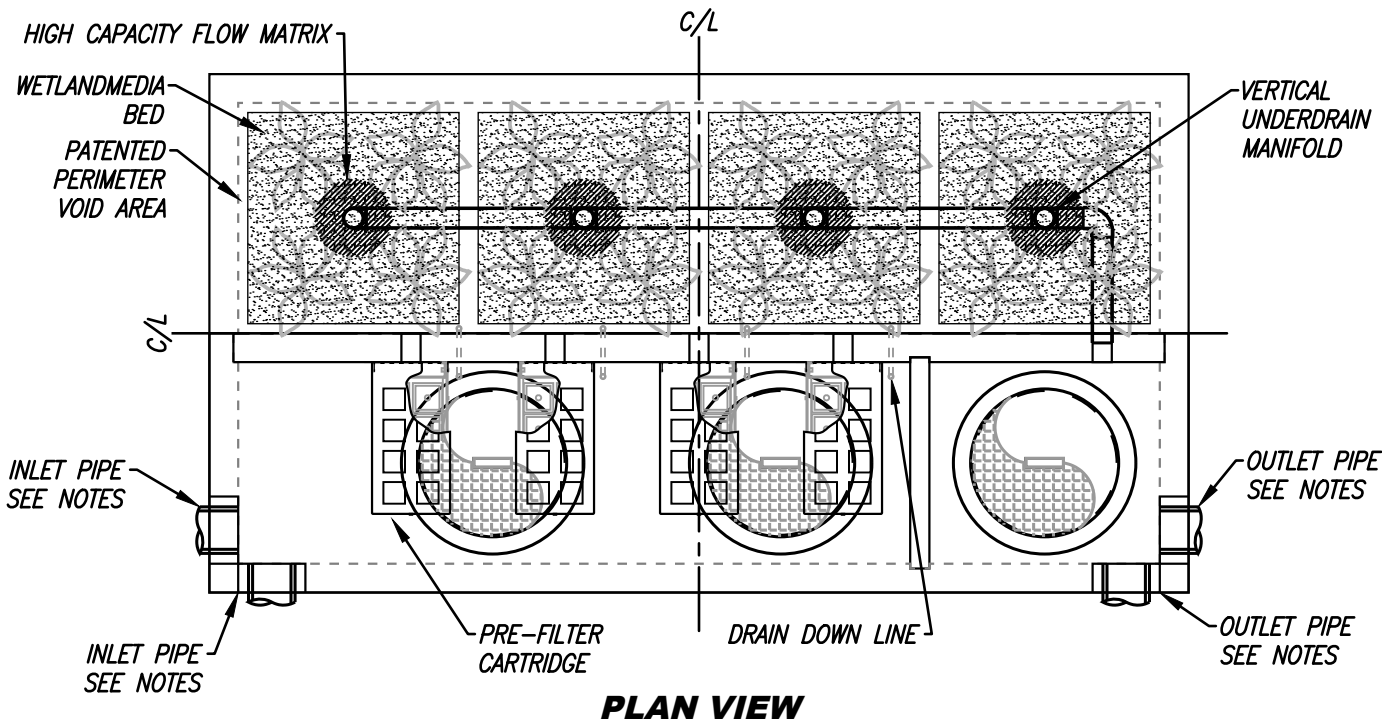
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 793.34	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	792.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.20	913	792.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.40	1,827	792.40	0.00 ic	---	---	---	0.00	---	---	---	---	---	0.005
0.60	2,740	792.60	0.25 ic	---	---	---	0.00	---	---	---	---	---	0.254
0.80	3,654	792.80	0.83 ic	---	---	---	0.00	---	---	---	---	---	0.835
1.00	4,567	793.00	1.68 ic	---	---	---	0.00	---	---	---	---	---	1.678
1.20	5,480	793.20	2.68 ic	---	---	---	0.00	---	---	---	---	---	2.685
1.40	6,394	793.40	3.74 ic	---	---	---	0.15	---	---	---	---	---	3.886
1.60	7,307	793.60	4.62 ic	---	---	---	1.32	---	---	---	---	---	5.943
1.80	8,221	793.80	5.30 ic	---	---	---	3.12	---	---	---	---	---	8.419
2.00	9,134	794.00	5.92 ic	---	---	---	5.36	---	---	---	---	---	11.28
2.20	10,057	794.20	6.49 ic	---	---	---	7.97	---	---	---	---	---	14.45
2.40	10,981	794.40	7.00 ic	---	---	---	10.90	---	---	---	---	---	17.91
2.60	11,904	794.60	7.48 ic	---	---	---	14.13	---	---	---	---	---	21.61
2.80	12,828	794.80	7.94 ic	---	---	---	17.62	---	---	---	---	---	25.56
3.00	13,751	795.00	8.37 ic	---	---	---	21.37	---	---	---	---	---	29.73
3.20	14,674	795.20	8.77 ic	---	---	---	25.34	---	---	---	---	---	34.12
3.40	15,598	795.40	9.16 ic	---	---	---	29.54	---	---	---	---	---	38.70
3.60	16,521	795.60	9.54 ic	---	---	---	33.94	---	---	---	---	---	43.48
3.80	17,445	795.80	9.90 ic	---	---	---	38.55	---	---	---	---	---	48.44
4.00	18,368	796.00	10.24 ic	---	---	---	43.34	---	---	---	---	---	53.58

SITE SPECIFIC DATA			
PROJECT NUMBER		----	
PROJECT NAME		-----	
PROJECT LOCATION		NEW JERSEY	
STRUCTURE ID		-----	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		1.113	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			0.00
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	----	PVC	8”
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	0.00	PVC	8”
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.38	4.38	4.38
SURFACE LOAD	PEDESTRIAN	N/A	PEDESTRIAN
FRAME & COVER	2EA ø30”	OPEN PLANTER	ø30”
WETLANDMEDIA VOLUME (CY)			8.70
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



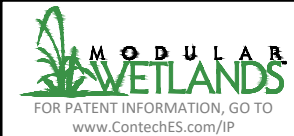
INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

TREATMENT FLOW (CFS)	1.113
OPERATING HEAD (FT)	2.9
PRETREATMENT LOADING RATE (GPM/SF)	4.9
WETLAND MEDIA LOADING RATE (GPM/SF)	2.9



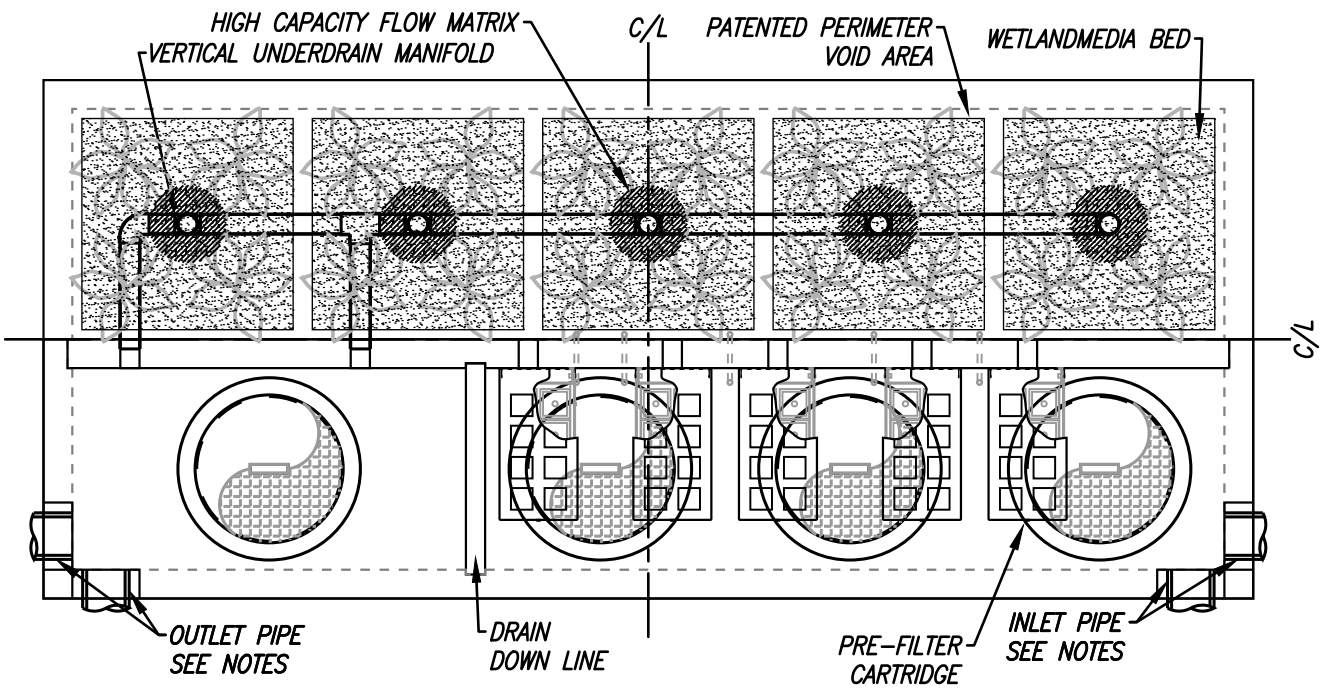
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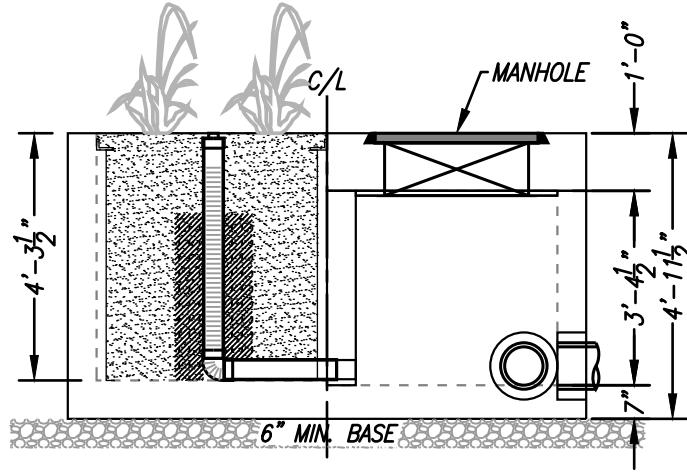
MWS-L-8-16-4'-3.5\"
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL 321

7/27/23SCOTT.SERTICH

SITE SPECIFIC DATA			
PROJECT NUMBER		----	
PROJECT NAME		-----	
PROJECT LOCATION		NEW JERSEY	
STRUCTURE ID		-----	
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
N/A		1.391	
TREATMENT HGL AVAILABLE (FT)			N/K
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			N/A
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	----	PVC	8”
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE	0.00	PVC	8”
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.38	4.38	4.38
SURFACE LOAD	PEDESTRIAN	N/A	PEDESTRIAN
FRAME & COVER	3EA Ø30”	OPEN PLANTER	Ø30”
WETLANDMEDIA VOLUME (CY)			10.88
NOTES: PRELIMINARY NOT FOR CONSTRUCTION.			



PLAN VIEW



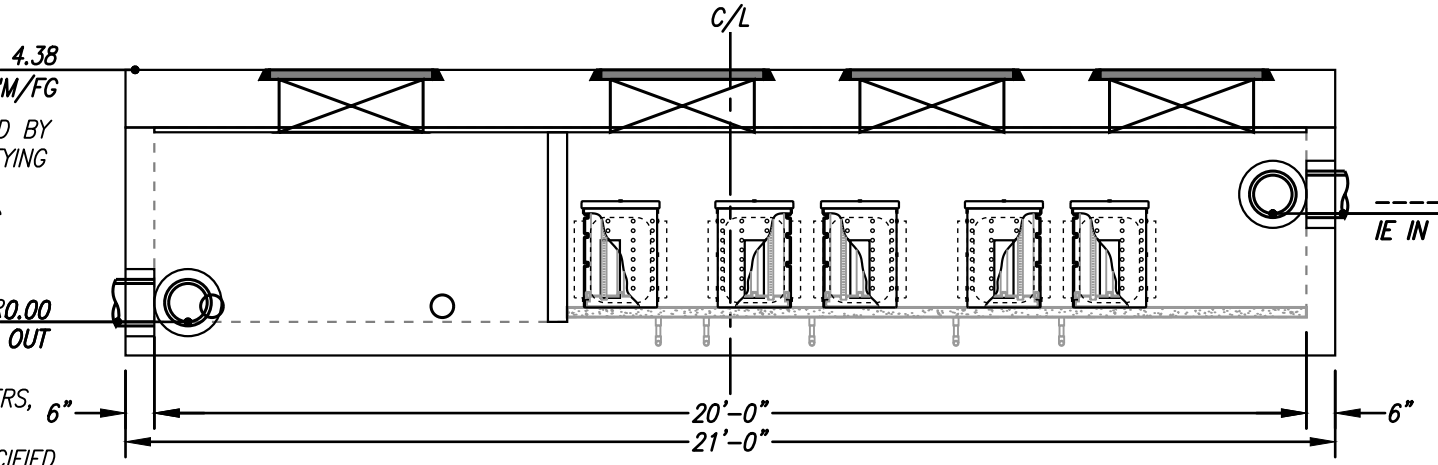
LEFT END VIEW

INSTALLATION NOTES

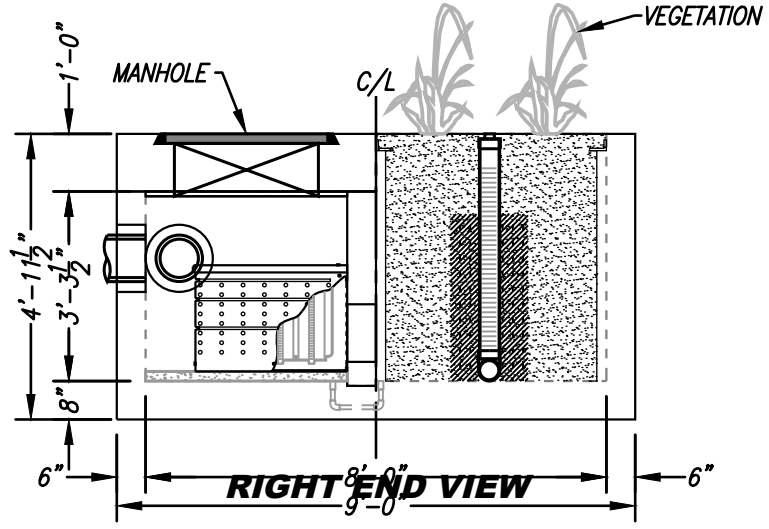
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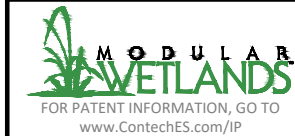


ELEVATION VIEW



RIGHT END VIEW

TREATMENT FLOW (CFS)	1.391
OPERATING HEAD (FT)	2.9
PRETREATMENT LOADING RATE (GPM/SF)	4.9
WETLAND MEDIA LOADING RATE (GPM/SF)	2.9



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MWS-L-8-20-4'-3.5"-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL 322

6/12/23 ARON BROWN



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHILIP D. MURPHY
Governor

DIVISION OF WATERSHED PROTECTION AND RESTORATION
BUREAU OF NJPDES STORMWATER PERMITTING & WATER QUALITY MANAGEMENT

SHAWN M. LATOURETTE
Commissioner

SHEILA Y. OLIVER
Lt. Governor

P.O. Box 420 Mail Code 501-02A
Trenton, New Jersey 08625-0420
609-633-7021 / Fax: 609-777-0432

www.njstormwater.org

June 1, 2022

Zachariha J. Kent
Vice President of Product Management
Bio Clean Environmental Services, Inc., a Forterra Company
398 Via El Centro
Oceanside, CA 92058

Re: MTD Lab Certification
Bio Clean Modular Wetlands Linear Stormwater Treatment Device
Online Installation

TSS Removal Rate 80%

Dear Mr. Kent:

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Bio Clean Environmental Services, Inc., a Forterra company, has requested a Laboratory Certification for the Bio Clean Modular Wetlands Linear Stormwater Treatment Device (Bio Clean MW-L).

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated May 2022) for this device is published online at <http://www.njcat.org/verification-process/technology-verification-database.html>.

The NJDEP certifies the use of the Bio Clean MW-L by Bio Clean Environmental Services, Inc. at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 2.91 gpm/ft² of effective wetland media surface area and 4.88 gpm/ft of effective pre-filter media surface area.
2. The Bio Clean MW-L shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 8 below.
3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in Chapter 9.5 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at www.njstormwater.org.
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Bio Clean MW-L. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://biocleanenvironmental.com/wp-content/uploads/2022/04/Modular-Wetlands-Operation-Maintenance-Manual_4-20-22.pdf for any changes to the maintenance requirements.
6. For an MTD to be considered “green infrastructure” in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) infiltrate into the subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil. Any configuration that uses a bio-filtration media and can be configured "above ground" and incorporate a tree box, planter box, or shrubs, etc., would meet the GI definition. Any MTD with bio-filtration media that would be placed "below ground" as a vault without any vegetation can be considered GI (for NJ purposes) only if the device infiltrates the entire Water Quality Design Storm into the subsoil. Further, the below ground device (vault) would need to meet the NJDEP Stormwater BMP Manual conditions of having the soil below the MTD meet the minimum tested infiltration rate of one inch per hour, have at least two feet of separation from the seasonal high water table, and infiltrate into the subsoil.
7. Sizing Requirement:

The example below demonstrates the sizing procedure for the Bio Clean MW-L:

Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using a Bio Clean MW-L. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs or 354.58 gpm.

The selection of the appropriate model of a Bio Clean MW-L is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the Bio Clean MW-L in this example is 0.25 acres. Based upon the information in Table 1 below, all of the Bio Clean MW-L models would be able to treat runoff without exceeding the maximum allowable drainage area.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

time of concentration = 10 minutes

i = 3.2 in/hr (page 21, Fig. 5-10 of Chapter 5 of the NJ Stormwater BMP Manual)

c = 0.99 (runoff coefficient for impervious)

$Q = ciA = 0.99 \times 3.2 \times 0.25 = 0.79 \text{ cfs (354.58 gpm)}$

(Note: 1 cfs = 448.83 gpm)

Given the site runoff is 0.79 cfs and based on Table 1 below, the Bio Clean MW-L-8-12 model would be the smallest model able to treat the impervious area without exceeding the MTFR of the individual model.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the NJCAT Verification Report in the Verification Appendix under Table A-1.

**Table 1. Bio Clean Modular Wetlands Linear Stormwater Treatment Device
Model MTFRs and Maximum Allowable Drainage Area.**

Model #	Maximum Treatment Flow Rate (MTFR) (cfs)	Maximum Allowable Drainage Area (acres)	Number of Pre-Filter Cartridges
MW-L-4-4	0.13	0.47	0.5
MW-L-4-6.5	0.17	0.65	1
MW-L-4-8	0.28	1.04	1
MW-L-6-8	0.35	1.32	1.5
MW-L-8-8	0.56	2.07	2
MW-L-8-12	0.83	3.11	3
MW-L-8-16	1.11	4.15	4
MW-L-8-20	1.39	5.19	5

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of

inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Lisa Schaefer of my office at lisa.schaefer@dep.nj.gov.

Sincerely,

A handwritten signature in blue ink that reads "Gabriel Mahon". The signature is written in a cursive, flowing style.

Gabriel Mahon, Chief
Bureau of NJPDES Stormwater Permitting & Water Quality Management
Division of Watershed Protection and Restoration
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

cc: Richard Magee, NJCAT

Modular Wetlands[®] Linear Operation & Maintenance Manual



**MODULAR WETLANDS® LINEAR
OPERATION & MAINTENANCE MANUAL**

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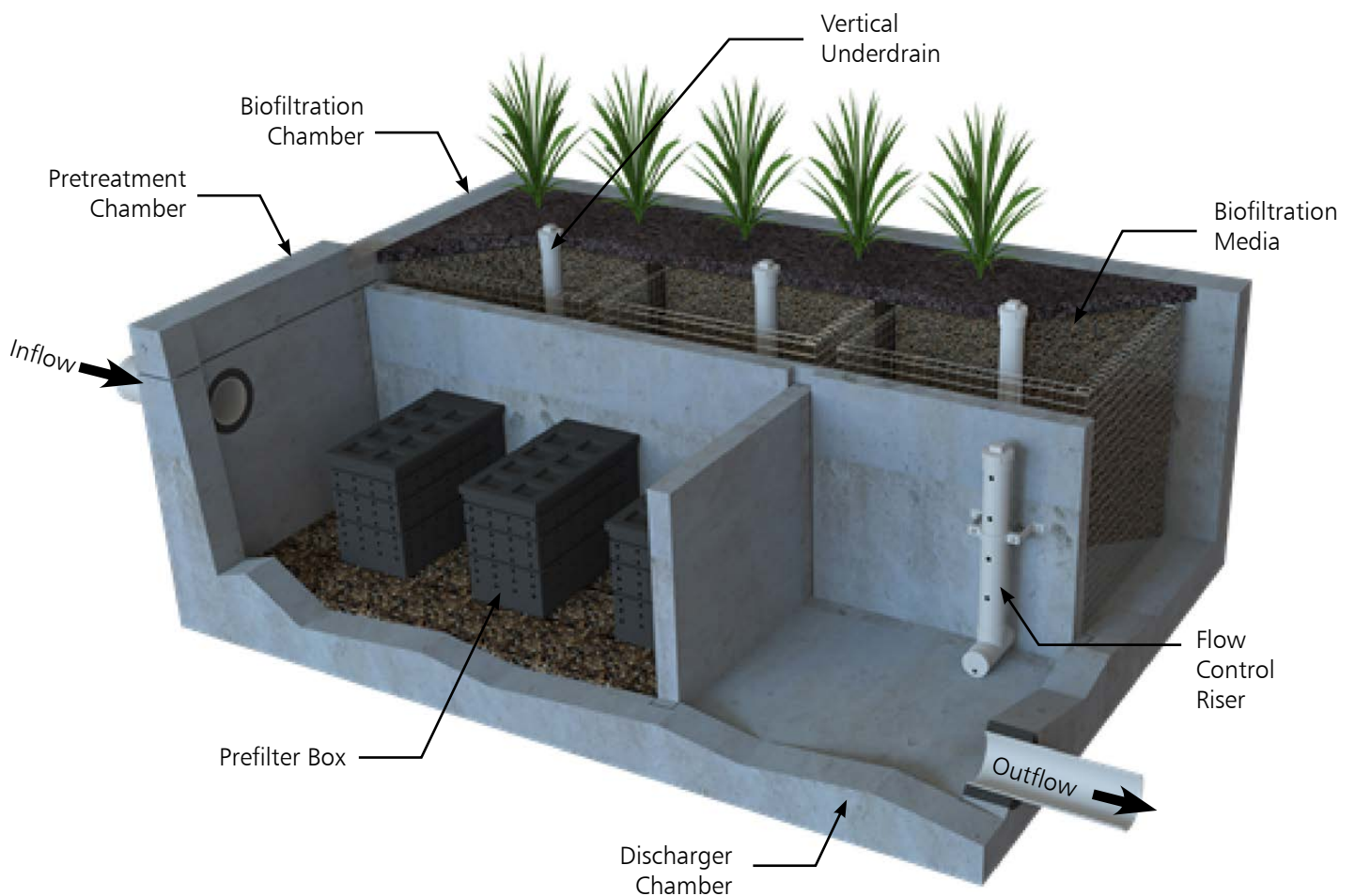
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OVERVIEW

The Modular Wetlands® Linear Biofilter is designed to remove high levels of trash, debris, sediments, nutrients, metals, and hydrocarbons. Its simple design allows for quick and easy installation. The system is housed in a standard precast structure and can be installed at various depths to meet site-specific conditions.

INTRODUCTION

This is the Modular Wetlands Linear Biofilter operation and maintenance manual. Before starting, read the instructions and equipment lists closely. It is important to follow all necessary safety procedures associated with state and local regulations. Some steps required confined space entry. Please contact Contech for more information on pre-authorized third party contractors who can provide installation services in your area. For a list of service providers in your area please visit: www.conteches.com/maintenance.



INSTRUCTIONS

INSPECTION SUMMARY

Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided.

- Inspect pre-treatment, biofiltration, and discharge chambers an average of once every six to twelve months. Varies based on site specific and local conditions.
- Average inspection time is approximately 15 minutes. Always ensure appropriate safety protocol and procedures are followed.

The following is a list of equipment required to allow for simple and effective inspection of the Modular Wetlands Linear:

- Modular Wetlands Linear Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure
- Protective clothing and eye protection
- 7/16" open or closed ended wrench
- Large permanent black marker (initial inspections only - first year)

Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system

INSPECTION AND MAINTENANCE NOTES

1. Following maintenance and/or inspection, it is recommended that the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics, and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the biofiltration chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

INSPECTION PROCESS

1. Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other information (see inspection form).
2. Observe the inside of the system through the access covers. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the system and all of its chambers.
3. Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
4. Through observation and/or digital photographs, estimate the amount of trash, debris accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick, estimate the amount of sediment in this chamber. Record this depth on the inspection form.
5. Through visual observation, inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediment on the cartridges, any build-up on the tops of the cartridges, or clogging of the holes. Record this information on the inspection form. The prefilter cartridges can be further inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber - see notes previous notes regarding confined space entry). Record the color of the material. New material is a light green color. As the media becomes clogged, it will turn darker in color, eventually becoming dark brown or black. The closer to black the media is the higher percentage that the media is exhausted and is in need of replacement.

New
BioMediaGREEN
0%

Exhausted
BioMediaGREEN
100%

85%



6. The biofiltration chamber is generally maintenance-free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation, it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection form and indicate through visual observation or digital photographs if trimming of the vegetation is required.
7. The discharge chamber houses the orifice control structure, drain down filter (only in California - older models), and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the pre-filter cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak HGL - top of bypass weir). The water level of the flowing water should be compared to the watermark level on the side walls, which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form if there is any difference in level from the watermark in inches.

NOTE: During the first few storms, the water level in the outflow chamber should be observed and a 6" long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where the line should be drawn. This line is a reference point for future inspections of the system.

Water level in the discharge chamber is a function of flow rate and pipe size. Observation of the water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when the system is at 100% capacity (water level at maximum level in the pre-treatment chamber). If future water levels are below this mark when the system is at 100% capacity, this is an indicator that maintenance to the pre-filter cartridges may be needed.

8. Finalize the inspection report for analysis by the maintenance manager to determine if maintenance is required.



MAINTENANCE INDICATORS

Based upon the observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges
- Obstructions in the system or its inlet and/or outlet pipes
- Excessive accumulation of floatables in the pretreatment chamber in which the length and width of the chamber is fully impacted more than 18". See photo below.
- Excessive accumulation of sediment in the pretreatment chamber of more than 6" in depth.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged, replacement is required.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. When media is more than 85% clogged, replacement is required. The darker the BioMediaGREEN, the more clogged it is and in need of replacement.



INSPECTION PROCESS

- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter (California only - older models). The following photos show the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged, replacement is required.



- Overgrown vegetation.



- Water level in the discharge chamber during 100% operating capacity (pretreatment chamber water level at max height) is lower than the water mark by 20%.

MAINTENANCE SUMMARY

The time has come to maintain your Modular Wetlands® Linear. All necessary pre-maintenance steps must be carried out before maintenance occurs. Once traffic control has been set up per local and state regulations and access covers have been safely opened, the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition, the following is recommended:

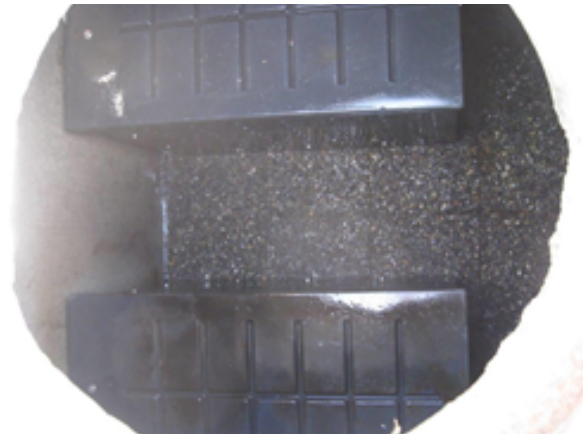
- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepared pre-checks (OSHA, safety, confined space entry) are performed.

The following is a list of equipment to required for maintenance of the Modular Wetlands® Linear:

- Modular Wetlands Linear Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight, and eye protection
- 7/16" open or closed ended wrench
- Vacuum assisted truck with pressure washer
- Replacement BioMediaGREEN for pre-filter cartridges if required (order from one of Contech's Maintenance Team members at <https://www.conteches.com/maintenance>).

MAINTENANCE | PRETREATMENT CHAMBER

1. Remove access cover over pre-treatment chamber and position vacuum truck accordingly.
2. With a pressure washer, spray down pollutants accumulated on walls and pre-filter cartridges.
3. Vacuum out pre-treatment chamber and remove all accumulated pollutants including trash, debris, and sediments. Be sure to vacuum the floor until the pervious pavers are visible and clean.
4. If pre-filter cartridges require media replacement, continue to step 5. If not, replace access cover and move to step 11.



MAINTENANCE | PREFILTER CARTRIDGES

5. After successfully cleaning out the pre-treatment chamber (previous page) enter the pre-treatment chamber.
6. Unscrew the two bolts (circles shown below) holding the lid on each cartridge filter and remove lid.



7. Place the vacuum hose over each individual media filter to suck out filter media.



8. Once filter media has been sucked out, use a pressure washer to spray down the inside of the cartridge and it's media cages. Remove cleaned media cages and place to the side. Once removed, the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.
9. Reinstall media cages and fill with new media from the manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture-provided refilling tray and place on top of the cartridge. Fill the tray with new bulk media and shake down into place. Using your hands, lightly compact the media into each filter cage. Once the cages are full, remove the refilling tray and replace the cartridge top, ensuring bolts are properly tightened.



10. Exit the pre-treatment chamber. Replace access hatch or manhole cover.

MAINTENANCE | BIOFILTRATION CHAMBER

11. In general, the biofiltration chamber is maintenance-free with the exception of maintaining the vegetation. The Modular Wetlands Linear utilizes vegetation similar to surrounding landscape areas, therefore trim vegetation to match surrounding vegetation. If any plants have died, replace them with new ones.



12. Each vertical under drain on the biofiltration chamber has a removable (threaded cap) that can be taken off to check any blockages or root growth. Once removed, a jetting attachment can be used to clean out the under drain and orifice riser.
13. As with all biofilter systems, at some point the biofiltration media (WetlandMedia) will need to be replaced. Either because of physical clogging of sorptive exhaustion of the media ion exchange capacity (to remove dissolved metals and phosphorous). The general life of this media is 10 to 20 years based on site specific conditions and pollutant loading. Utilize the vacuum truck to vacuum out the media by placing the hose into the chamber. Once all the media is removed use the power washer to spray down all the netting on the outer metal cage. Inspect the netting for any damage or holes. If the netting is damaged it can be repaired or replaced with guidance by the manufacturer.
14. Contact one of Contech's Maintenance Team members at <https://www.conteches.com/maintenance> to order new WetlandMedia. The quantity of media needed can be determined by providing the model number and unit depth. Media will be provided in super sacks for easy installation. Each sack will weigh between 1000 and 2000 lbs. A lifting apparatus (backhoe, boom truck, or other) is recommended to position the super sack over the biofiltration chamber. Fill the media cages up to the same level as the old media. Replant with vegetation.



MAINTENANCE | DISCHARGE CHAMBER

15. Remove access hatch or manhole cover over discharge chamber.
16. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and lift up drain down filter housing to remove used BioMediaGREEN filter block as shown below. *NOTE: Drain down filter is only found on units installed in California prior to 2023. If no drain down filter is present, skip steps 16 and 17.*



17. Insert a new BioMediaGREEN filter block and lock drain down filter housing back in place.
18. Replace access hatch or manhole cover over discharge chamber.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Inspection Report Modular Wetlands Linear

Project Name _____		For Office Use Only
Project Address _____ (city) (Zip Code)		
Owner / Management Company _____		
Contact _____	Phone () - _____	
Inspector Name _____	Date ____ / ____ / ____	Time ____ AM / PM
Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes		
Weather Condition _____		Additional Notes _____

For Office Use Only

 (Reviewed By) _____

 (Date) _____
 Office personnel to complete section to the left.

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____



Cleaning and Maintenance Report Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____

Phone () -

Inspector Name _____

Date ____ / ____ / ____ Time ____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint

☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____

Additional Notes _____

For Office Use Only
(Reviewed By)
(Date) Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat:	MWS Catch Basins						
	Long:							
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:



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SUPPORT

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT WWW.CONTECHES.COM

Modular Wetlands Maintenance Guide 1/2023

APPENDIX H
PIPE CONVEYANCE
CALCULATIONS

Job #: 15107
Job Description: Dover Subdivision
Designed By: JY
Checked By: KJR
Date: July 9, 2026
Location: DOVER
Design Storm: 25

						Surface		"C"	
						Impervious	0.99		
						Grassed Area	0.51		
						1/3 acre Residential	0.67		
						Woods	0.45		
						Runoff Coefficient Adjustment Factor =		0.88	
INLET	TOTAL	Impervious	Grassed Area	1/3 acre Residential	Woods	WEIGHTED	ADJUSTED	A X C	TC
#	AREA	Area (Ac)	Area (Ac)	Area (Ac)	Area (Ac)	C	WEIGHTED		
	(AC)	C =	C =	C =	C =		C (*)		
		0.99	0.51	0.67	0.45				
1	0.56	0.43	0.13			0.88	0.86	0.49	10.0
2	0.39	0.10	0.29			0.63	0.59	0.25	10.0
3	0.26	0.11	0.15			0.71	0.68	0.19	10.0
4									10.0
5	2.18	0.82	1.36			0.69	0.65	1.51	10.0
6									10.0
7									10.0
8	0.77	0.34	0.43			0.72	0.69	0.56	10.0
9									10.0
10									10.0
11									10.0
12									10.0
13									10.0
14									10.0
15									10.0
16									10.0
17									10.0
18									10.0
19									10.0
20									10.0
21									10.0
22									10.0
23									10.0
24									10.0
25									10.0

Total
Impervious Area (Ac.) 1.80 $\Sigma A =$ 4.16 $\Sigma CxA =$ 2.99
Percent Impervious 43.3% Total Composite 'C' 0.72



Fax: (973) 663-0042

Location: **DOVER**

25 yr

Sheet 1

345
7/10/2026 9:43 AM

APPENDIX I

CONDUIT OUTLET PROTECTION CALCULATIONS

SCOUR HOLE CALCULATIONS

15107

Lesch

JY

KJR

Structure: 14

$$Q = 17.40 \text{ C.F.S.}$$

$$D_o = 2.00 \text{ FT.}$$

$$T_w = .2 \times D_o = 0.4 \text{ FT.}$$

d50 Stone size formula

Where $Y = 1/2 D_o$

$$\frac{d_{50} = 0.0125 * Q^{4/3}}{T_w D_o} = 0.56 \text{ F.T.}$$

8 " STONE USED
1.000 Ft. Y

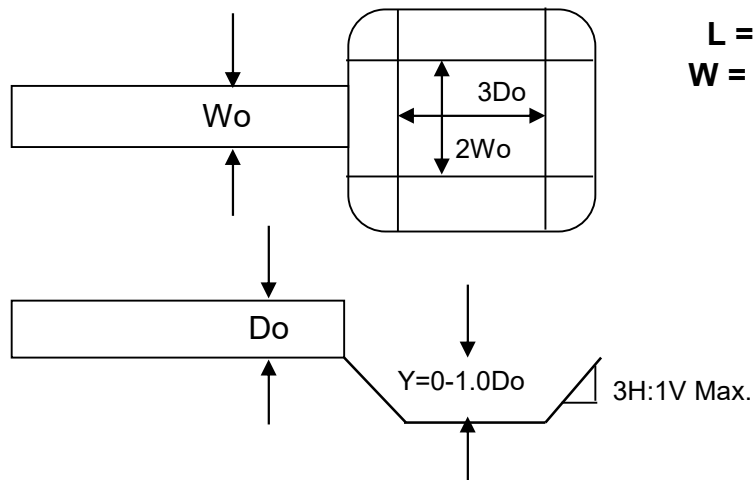
d50 Stone size formula

Where $Y = D_o$

$$\frac{d_{50} = 0.0082 * Q^{4/3}}{T_w D_o} = 0.36 \text{ F.T.}$$

6 " STONE USED
2.00 Ft. Y

Y = Depth of scour hole below culvert invert



$$L = 3 D_o = 6 \text{ Ft.}$$

$$W = 2 W_o = 4 \text{ Ft.}$$