TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

STORMWATER REPORT

CIRCLE K – R&R 2720294
CHATHAM COUNTY, NORTH CAROLINA

JULY 7TH, 2023

PREPARED BY:

Timmons Group, NC License No. 023728
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Raleigh, North Carolina 27607
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Stormwater Narrative

Project Background

The Circle K project is located at 11399 US HWY 15 501 N, Chapel Hill, NC. The Chatham County AKPAR numbers are 2642, 2641, 2562, 2564, 2563, 2542, and 2560. The site consists of approximately 6.12 acres post-ROW dedication and is currently an existing gas station and c-store with a large area of wooden land. FIRM Panel #3710977600K indicates the site is not within a special flood hazard area.

Proposed Project Description

This project proposes a c-store and gas canopy, an outparcel building, associated parking lots, and utilities.

There is approximately 0.55 AC of existing impervious cover within the property boundary. The proposed improvements will result in a post-developed onsite impervious cover of 2.04 AC.

Proposed Stormwater Management

This site has been designed with a wet pond stormwater control measure. To the maximum extent possible, the onsite impervious areas are directed toward the proposed wet pond.

Stormwater Runoff Control

The proposed wet pond will improve the quantity and quality of stormwater runoff for the site in compliance with the rules contained in the Chatham County Stormwater Management Ordinance. The wet pond has been designed for 85% TSS removal in accordance with the NCDENR Stormwater Design Manual.

Seasonal High Water Table

A SHWT test wasn't completed for the wet pond since the MDC no longer requires one.

Methodology for Stormwater Modeling

A pre-development and post-development hydrologic analysis was completed for the site using the SCS TR20 method. A hydraulic analysis was completed using Hydraflow modeling software to route these storm events through the proposed SCMs and outlet structures.

Hydrology

The SCS TR20 method was used to determine the peak discharge rates for the pre-development and post-development conditions, develop runoff hydrographs and size the detention storage for the SCM. Rainfall data used in the design was taken from published NOAA data for Chatham County. SCS runoff curve numbers were based on Table 2-2 in the TR55 manual. The Time of Concentration (Tc) values were determined using the TR55 method for sheet, shallow and concentrated flows, with a minimum Tc of 5 minutes.

Hydraulics

Computer simulated reservoir routing using Hydraflow modeling software was completed for the 1-year, 2-year, 5-year, 10-year, 25-year, and 100-year storm events utilizing stage-storage and stage-discharge functions. Stage-storage was determined using the proposed grading contours of the wet pond and stage-discharge functions were developed using the proposed outlet structure. The outlet structure is designed to attenuate the post-development discharge rate up to the 25-year storm event equal to or less than pre-development levels.

Pre & Post Development Runoff Summary

Peak Outflow (cfs)								Hydrograph Description
1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
0.719	1.602	-------	3.265	4.711	6.883	-------	10.74	DA 1.0 - Analysis Point 0
0.554	0.916	-------	1.516	2.014	2.738	-------	3.979	DA 1.1 - Analysis Point 1
0.711	1.774	-------	3.807	5.584	8.267	-------	12.97	DA 1.2 - Analysis Point 2
1.838	4.032	-------	8.160	11.83	17.35	-------	26.99	Pre Total
7.858	10.94	-------	15.81	19.69	25.12	-------	33.90	DA 2.0 - To SCM
0.035	0.073	-------	0.140	0.197	0.282	-------	0.429	DA 2.2 - Offsite To SCM
7.893	11.01	-------	15.94	19.88	25.39	-------	34.33	To SCM
0.089	0.290	-------	1.067	2.286	9.649	-------	22.38	Wet Pond
0.581	1.228	-------	2.389	3.390	4.885	-------	7.474	DA 2.1 - Bypass
0.157	0.311	-------	0.576	0.803	1.139	-------	1.717	DA 2.3 - Bypass - Analysis Point 1
0.116	0.218	-------	0.394	0.544	0.765	-------	1.142	DA 2.4 - Bypass - Analysis Point 0
0.608	1.262	-------	2.733	5.186	14.51	-------	29.85	Post - Analysis Point 2
0.774	1.627	-------	3.224	5.829	15.52	-------	32.16	Post Total

Pre and Post Development Drainage Area and Land Use Exhibits

Pre and post development drainage area and land use exhibits have been included in the Reference Material section of this report.

Reference Material

NOAA Rainfall Data

USGS Map

FEMA Map

Soil Survey Map

Pre/Post Development Drainage Area Maps

NOAA Atlas 14, Volume 2, Version 3
Location name: Chapel Hill, North Carolina, USA*
Latitude: 35.8465°, Longitude: -79.0924°
Elevation: 555 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.414** (0.379-0.453)	**0.488** (0.447-0.534)	**0.563** (0.515-0.615)	**0.620** (0.567-0.677)	**0.681** (0.619-0.743)	**0.723** (0.655-0.789)	**0.761** (0.686-0.830)	**0.793** (0.711-0.867)	**0.829** (0.735-0.905)	**0.856** (0.753-0.936)
10-min	**0.661** (0.605-0.723)	**0.780** (0.715-0.854)	**0.901** (0.825-0.985)	**0.991** (0.906-1.08)	**1.08** (0.987-1.18)	**1.15** (1.04-1.26)	**1.21** (1.09-1.32)	**1.26** (1.13-1.37)	**1.31** (1.16-1.43)	**1.35** (1.19-1.47)
15-min	**0.827** (0.756-0.904)	**0.981** (0.899-1.07)	**1.14** (1.04-1.25)	**1.25** (1.15-1.37)	**1.38** (1.25-1.50)	**1.46** (1.32-1.59)	**1.53** (1.38-1.67)	**1.59** (1.42-1.73)	**1.65** (1.46-1.80)	**1.69** (1.49-1.85)
30-min	**1.13** (1.04-1.24)	**1.36** (1.24-1.48)	**1.62** (1.48-1.77)	**1.82** (1.66-1.98)	**2.04** (1.85-2.22)	**2.20** (1.99-2.40)	**2.34** (2.11-2.56)	**2.47** (2.21-2.70)	**2.62** (2.33-2.87)	**2.74** (2.41-3.00)
60-min	**1.41** (1.29-1.54)	**1.70** (1.56-1.86)	**2.08** (1.90-2.27)	**2.37** (2.16-2.58)	**2.71** (2.47-2.96)	**2.98** (2.70-3.24)	**3.23** (2.91-3.52)	**3.46** (3.10-3.78)	**3.77** (3.34-4.11)	**4.00** (3.52-4.37)
2-hr	**1.68** (1.53-1.85)	**2.03** (1.85-2.23)	**2.50** (2.28-2.75)	**2.87** (2.61-3.16)	**3.34** (3.01-3.66)	**3.70** (3.33-4.06)	**4.06** (3.62-4.45)	**4.41** (3.91-4.84)	**4.87** (4.28-5.34)	**5.24** (4.56-5.76)
3-hr	**1.79** (1.63-1.96)	**2.16** (1.98-2.37)	**2.67** (2.44-2.93)	**3.09** (2.82-3.38)	**3.62** (3.28-3.96)	**4.05** (3.64-4.43)	**4.47** (3.99-4.89)	**4.90** (4.34-5.36)	**5.48** (4.80-6.00)	**5.96** (5.16-6.53)
6-hr	**2.14** (1.97-2.35)	**2.59** (2.38-2.83)	**3.20** (2.94-3.51)	**3.71** (3.39-4.06)	**4.38** (3.97-4.77)	**4.92** (4.43-5.36)	**5.47** (4.89-5.95)	**6.03** (5.34-6.56)	**6.80** (5.93-7.40)	**7.44** (6.40-8.12)
12-hr	**2.54** (2.33-2.77)	**3.06** (2.82-3.34)	**3.80** (3.49-4.15)	**4.43** (4.05-4.83)	**5.27** (4.78-5.73)	**5.98** (5.38-6.47)	**6.69** (5.96-7.24)	**7.45** (6.56-8.05)	**8.50** (7.36-9.19)	**9.39** (8.00-10.2)
24-hr	**2.95** (2.76-3.15)	**3.56** (3.34-3.81)	**4.46** (4.17-4.76)	**5.15** (4.82-5.50)	**6.10** (5.68-6.52)	**6.85** (6.37-7.32)	**7.62** (7.06-8.16)	**8.41** (7.76-9.02)	**9.49** (8.72-10.2)	**10.3** (9.46-11.1)
2-day	**3.45** (3.23-3.68)	**4.15** (3.89-4.44)	**5.15** (4.82-5.51)	**5.93** (5.54-6.34)	**6.97** (6.49-7.46)	**7.79** (7.24-8.34)	**8.63** (7.99-9.26)	**9.49** (8.75-10.2)	**10.7** (9.79-11.5)	**11.6** (10.6-12.5)
3-day	**3.65** (3.42-3.90)	**4.38** (4.11-4.69)	**5.42** (5.07-5.79)	**6.22** (5.82-6.66)	**7.32** (6.81-7.83)	**8.18** (7.58-8.76)	**9.05** (8.37-9.71)	**9.96** (9.17-10.7)	**11.2** (10.3-12.1)	**12.2** (11.1-13.1)
4-day	**3.85** (3.61-4.12)	**4.62** (4.33-4.94)	**5.68** (5.32-6.08)	**6.52** (6.10-6.98)	**7.66** (7.13-8.20)	**8.56** (7.94-9.17)	**9.48** (8.76-10.2)	**10.4** (9.60-11.2)	**11.7** (10.7-12.6)	**12.8** (11.6-13.8)
7-day	**4.43** (4.18-4.72)	**5.28** (4.98-5.63)	**6.42** (6.05-6.84)	**7.33** (6.89-7.80)	**8.56** (8.02-9.12)	**9.53** (8.90-10.2)	**10.5** (9.80-11.2)	**11.6** (10.7-12.4)	**13.0** (11.9-13.9)	**14.1** (12.9-15.1)
10-day	**5.04** (4.76-5.36)	**5.99** (5.65-6.37)	**7.19** (6.78-7.64)	**8.13** (7.65-8.64)	**9.40** (8.82-10.0)	**10.4** (9.73-11.1)	**11.4** (10.6-12.2)	**12.4** (11.6-13.3)	**13.8** (12.8-14.8)	**14.9** (13.8-16.0)
20-day	**6.75** (6.38-7.14)	**7.96** (7.53-8.42)	**9.40** (8.88-9.94)	**10.5** (9.95-11.2)	**12.1** (11.4-12.8)	**13.3** (12.5-14.1)	**14.5** (13.6-15.4)	**15.8** (14.7-16.8)	**17.5** (16.2-18.6)	**18.8** (17.4-20.1)
30-day	**8.37** (7.93-8.85)	**9.85** (9.33-10.4)	**11.4** (10.8-12.1)	**12.7** (12.0-13.4)	**14.3** (13.5-15.1)	**15.6** (14.7-16.5)	**16.8** (15.8-17.8)	**18.1** (16.9-19.2)	**19.7** (18.4-21.0)	**21.0** (19.5-22.4)
45-day	**10.7** (10.2-11.2)	**12.5** (11.9-13.1)	**14.3** (13.6-15.0)	**15.7** (14.9-16.5)	**17.5** (16.6-18.4)	**18.9** (17.9-19.9)	**20.3** (19.1-21.3)	**21.6** (20.3-22.8)	**23.4** (21.9-24.7)	**24.7** (23.1-26.2)
60-day	**12.8** (12.2-13.4)	**14.9** (14.2-15.6)	**16.8** (16.1-17.6)	**18.3** (17.5-19.2)	**20.2** (19.3-21.2)	**21.7** (20.6-22.7)	**23.0** (21.9-24.2)	**24.4** (23.1-25.7)	**26.1** (24.7-27.6)	**27.5** (25.9-29.0)

[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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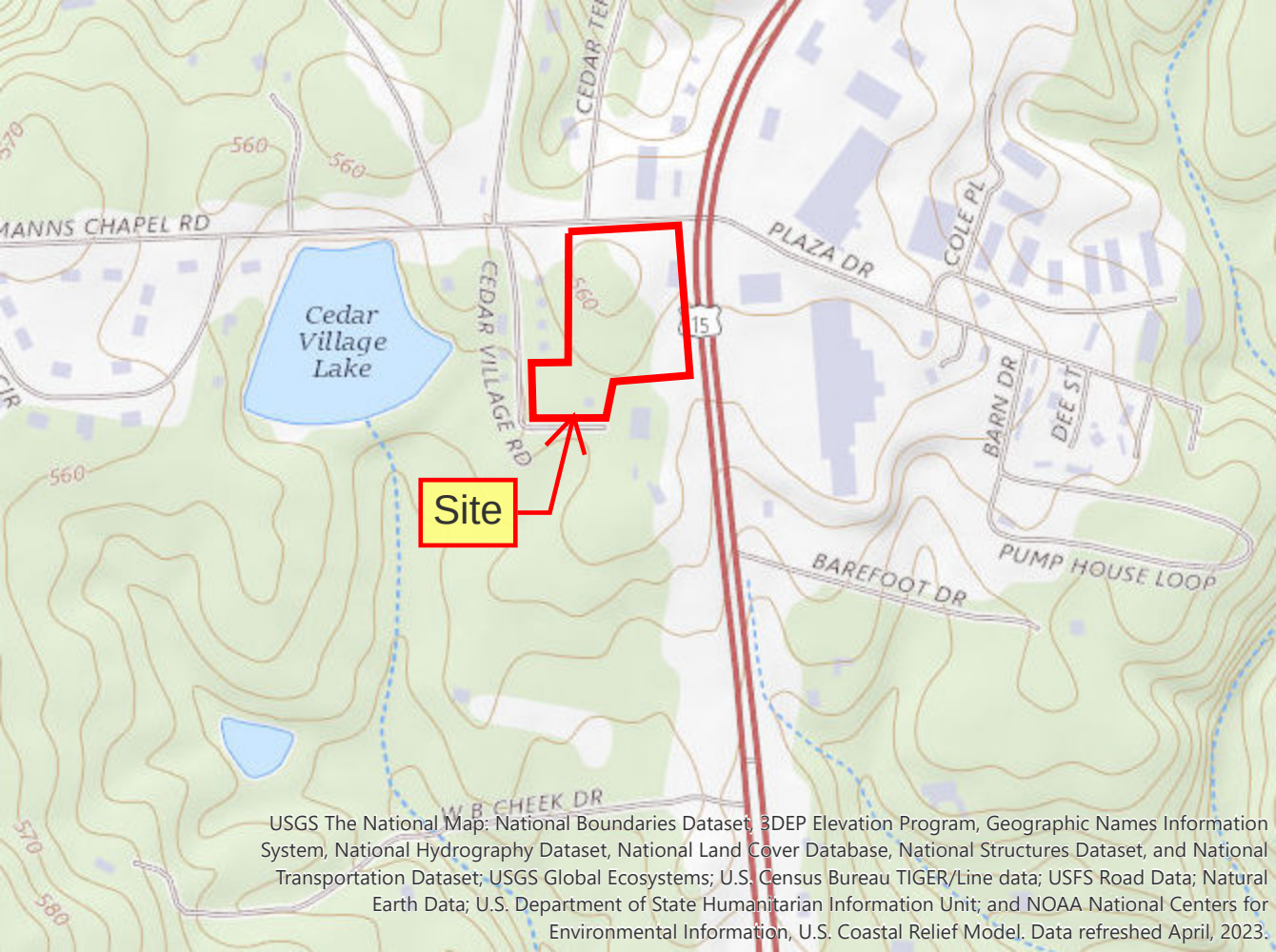
PF graphical

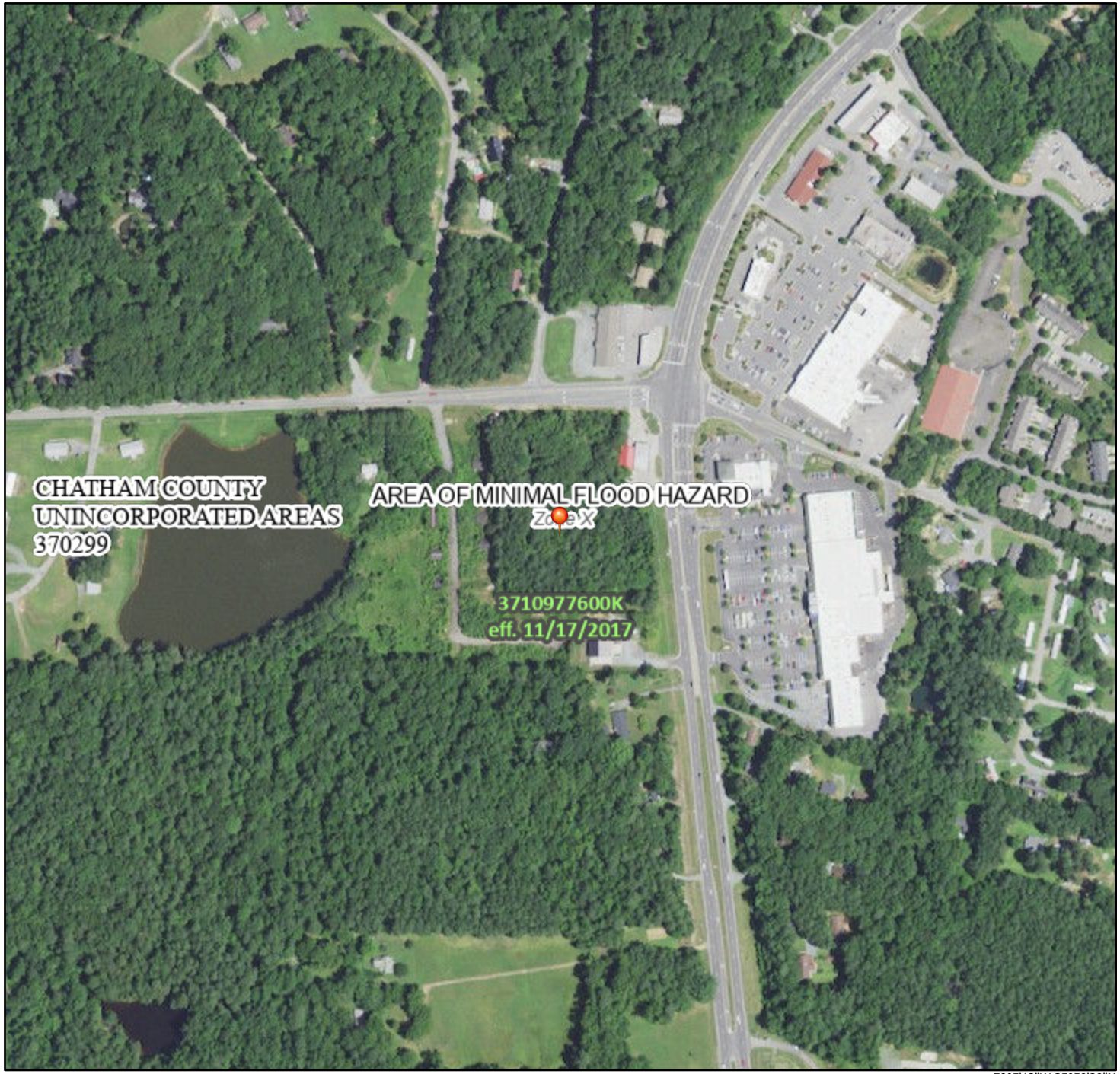


USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed April, 2023.

National Flood Hazard Layer FIRMette

FEMA

79°5'49"W 35°50'58"N



79°5'12"W 35°50'29"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/15/2023 at 3:44 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

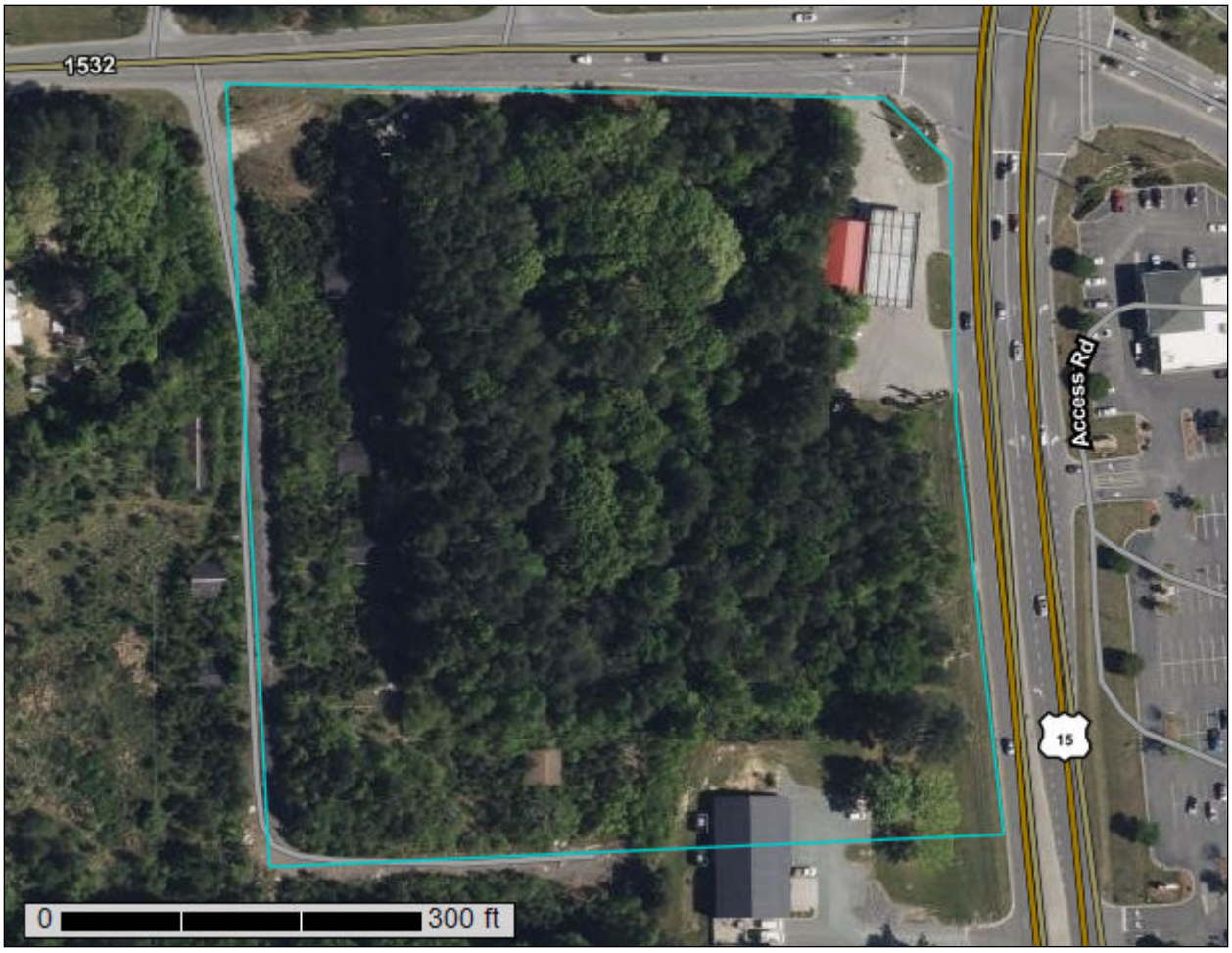
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

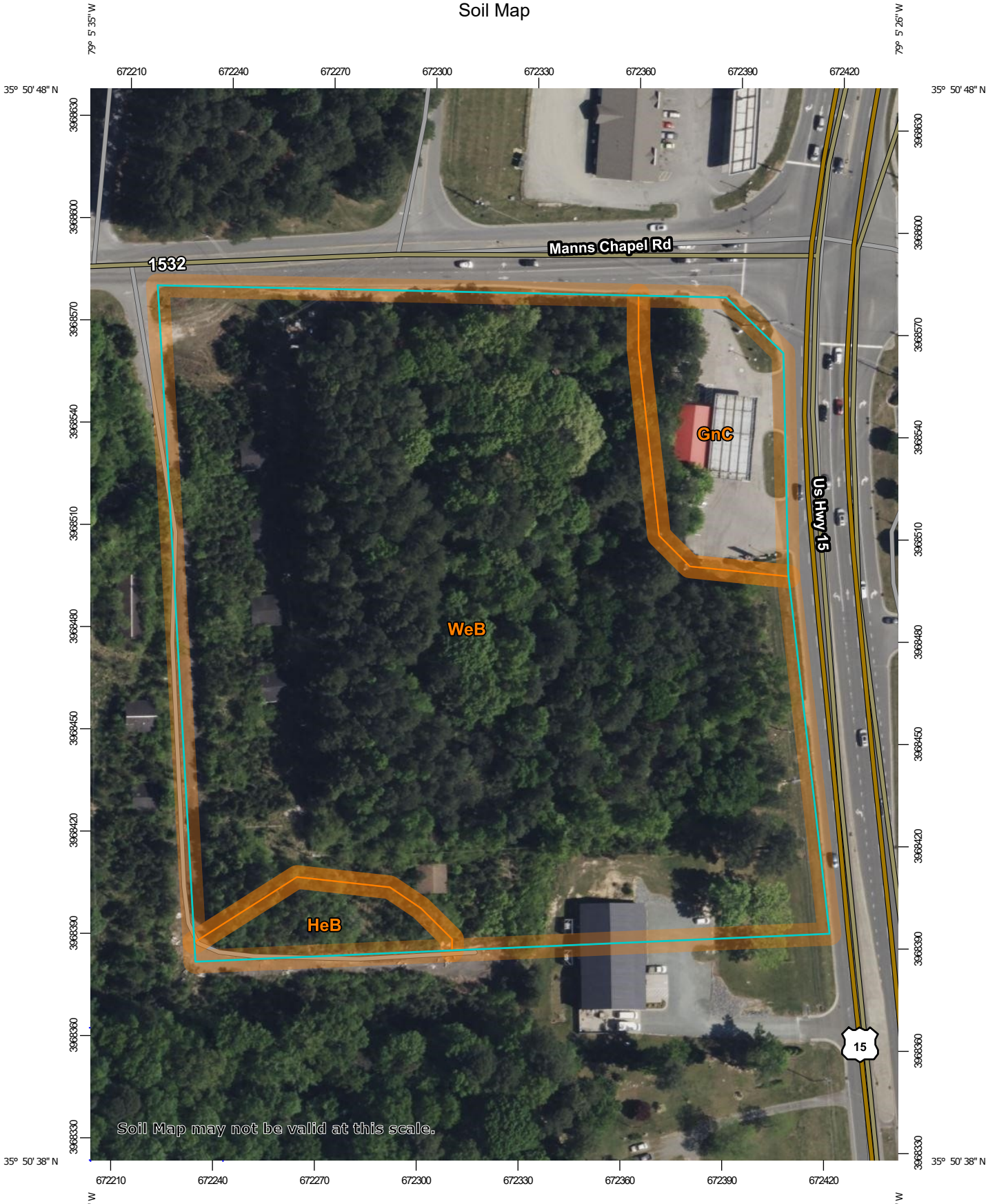
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Chatham County, North Carolina



June 19, 2023

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,530 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: Chatham County, North Carolina
Survey Area Data: Version 26, Sep 8, 2022

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

Date(s) aerial images were photographed: Apr 23, 2022—Apr 27, 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
GnC	Georgeville-Urban land complex, 2 to 10 percent slopes	0.8	8.7%
HeB	Helena sandy loam, 2 to 6 percent slopes	0.3	3.6%
WeB	Wedowee sandy loam, 2 to 6 percent slopes	7.7	87.7%
Totals for Area of Interest		**8.7**	**100.0%**

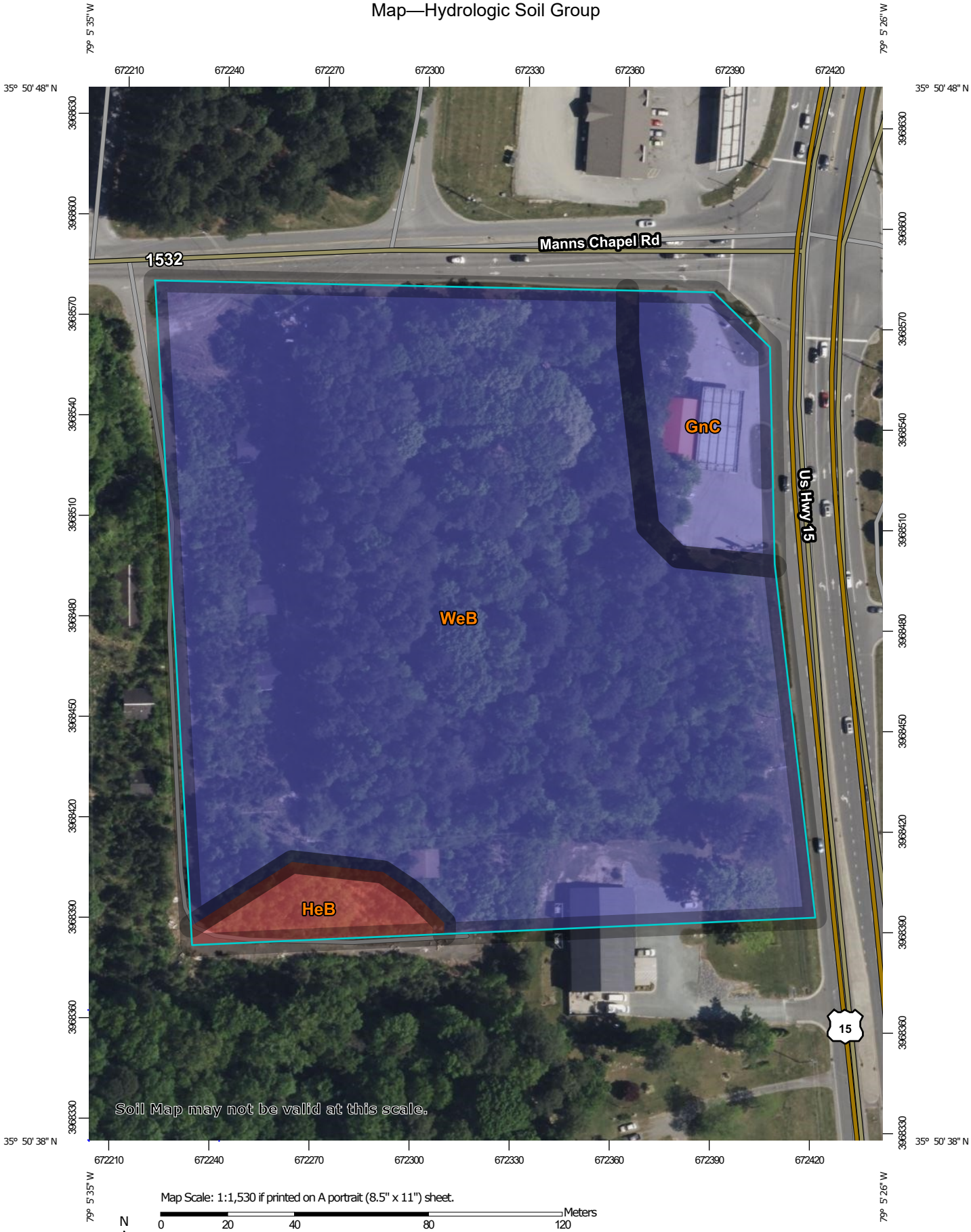
Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or



Map Scale: 1:1,530 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

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

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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Survey Area Data: Version 26, Sep 8, 2022

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

Date(s) aerial images were photographed: Apr 23, 2022—Apr 27, 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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
GnC	Georgeville-Urban land complex, 2 to 10 percent slopes	B	0.8	8.7%
HeB	Helena sandy loam, 2 to 6 percent slopes	D	0.3	3.6%
WeB	Wedowee sandy loam, 2 to 6 percent slopes	B	7.7	87.7%
Totals for Area of Interest			**8.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

PRE-DEVELOPMENT DRAINAGE AREA MAP

CIRCLE K R&R 2720294 - July 7, 2023

ANALYSIS POINT 1

ANALYSIS POINT 2

ANALYSIS POINT 0

DA 1.0

DA 1.1

DA 1.2

CEDAR VILLAGE ROAD
(50' PRIVATE RW PB. 23, PG. 42 - VAR WIDTH PAV.)

US-15 / US-501
(VAR. WIDTH PUBLIC RW - VAR WIDTH PAV.)

#11399
N/F
THE PANTRY INC.
DB. 675, PG. 1074
PB. 95, PG. 407
PID #2642
0.817 AC.±
ZONING: B-1

#11398
N/F
MANNS CHAPEL II, LLC
DB.2020, PG.19
PID #2641
4.431 AC.±
ZONING: CU B-1

N/F
RIDGELY W. COOK JR. &
JULIA A. COOPER
DB. 1152, PG. 283
PID #2639

LEGEND

DRAINAGE AREA BOUNDARY

IMPERVIOUS AREA

Weighted Rational Coefficient Worksheet - PRE-DEVELOPMENT

DA #1.0				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.32	31.68
2	Woods (B)	55	2.24	123.02
3	Managed Open Space(B)	69	0.17	11.73
			2.73	166.43

$\frac{\sum (C_i \times A_i)}{\sum A_i} = 61$

DA #1.1				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.18	18.08
2	Woods (B)	55	0.45	24.50
3	Managed Open Space (B)	69	0.01	0.69
			0.64	43.27

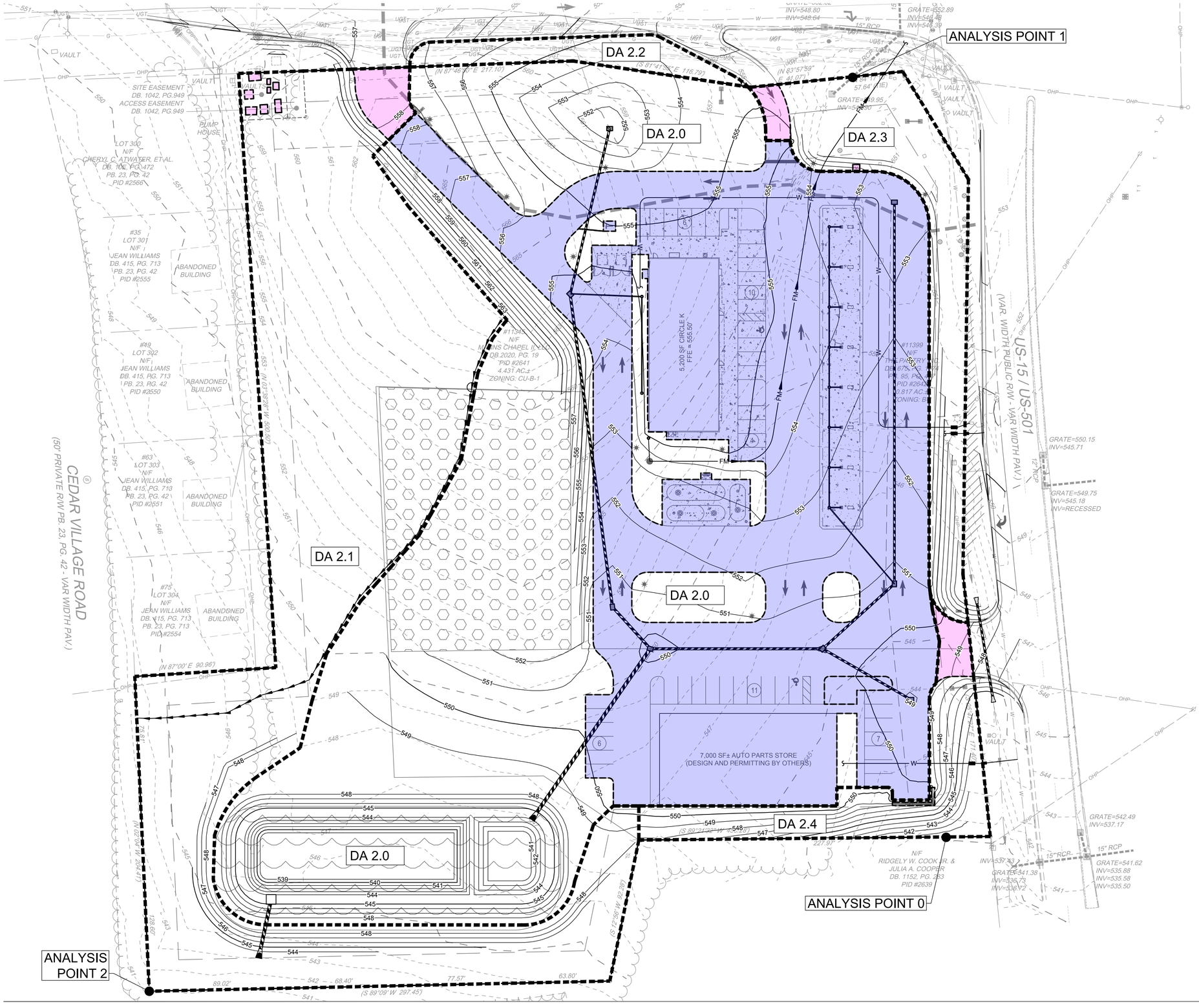
$\frac{\sum (C_i \times A_i)}{\sum A_i} = 68$

DA #1.2				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.05	4.68
2	Woods (D)	79	0.34	26.86
3	Woods (B)	55	2.39	131.57
			2.78	163.11

$\frac{\sum (C_i \times A_i)}{\sum A_i} = 59$

SCALE 1"=30'
0 30' 60'

TIMMONS GROUP



LEGEND

- DRAINAGE AREA BOUNDARY
- IMPERVIOUS AREA TO SCM
- IMPERVIOUS AREA BYPASS

Weighted Rational Coefficient Worksheet - POST DEVELOPMENT

DA #2.0 (To SCM)				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	1.98	194.29
2	Woods (B)	55	0.07	3.76
3	Managed Open Space (B)	61	1.96	119.50
			4.01	317.56
	$\sum (C_i \times A_i)$ = $\sum A_i$	=	79	

DA #2.1 (SCM BYPASS)				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.04	3.92
2	Managed Open Space (B)	61	1.560	95.16
			1.60	99.08
	$\sum (C_i \times A_i)$ = $\sum A_i$	=	62	

DA #2.2 (OFFSITE TO SCM)				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.00	0.00
2	Managed Open Space (B)	61	0.08	4.88
3				0.00
			0.08	4.88
	$\sum (C_i \times A_i)$ = $\sum A_i$	=	61	

DA #2.3 (SCM BYPASS)				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.01	0.98
2	Managed Open Space (B)	61	0.30	18.30
3				0.00
			0.31	19.28
	$\sum (C_i \times A_i)$ = $\sum A_i$	=	62	

DA #2.4 (SCM BYPASS)				
Weighted Rational Coefficient				
Sub-Area	Category	C_i	A_i	$C_i \times A_i$
1	Impervious	98	0.01	0.98
2	Managed Open Space (B)	61	0.19	11.59
3				0.00
			0.20	12.57
	$\sum (C_i \times A_i)$ = $\sum A_i$	=	63	

POST-DEVELOPMENT DRAINAGE AREA MAP

CIRCLE K R&R 2720294 - July 7, 2023

SCALE 1"=30'

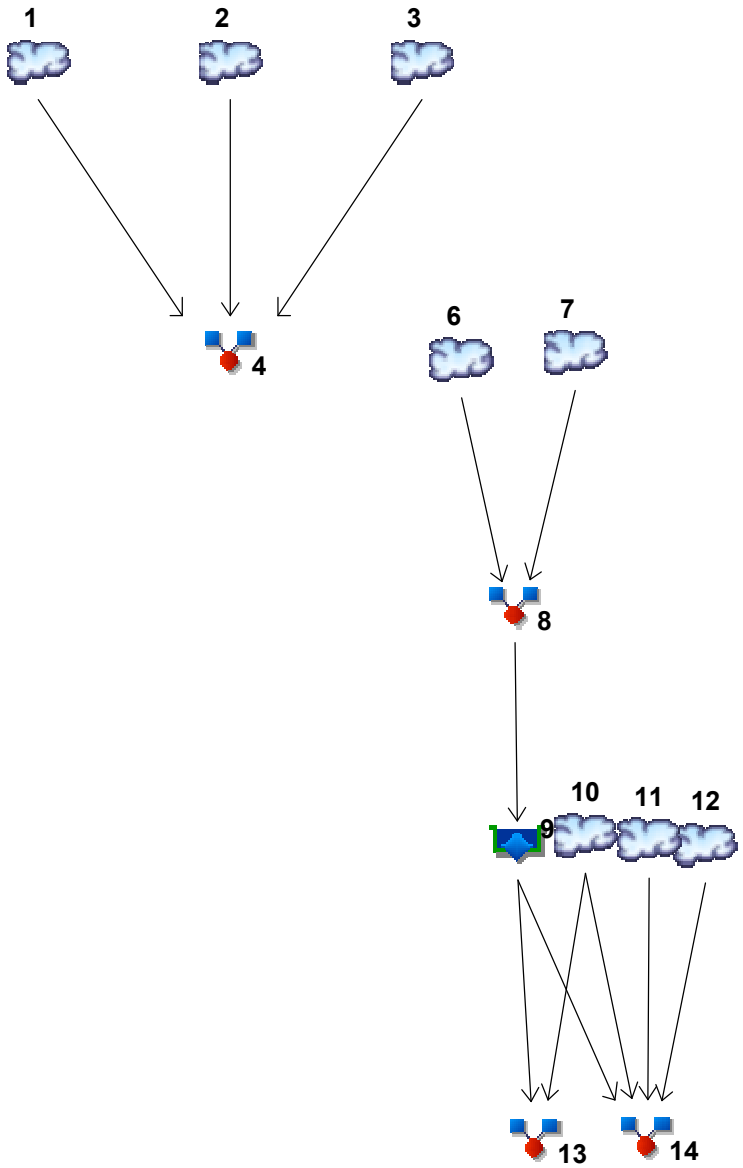
0 30' 60'

TIMMONS GROUP

Peak Flow Analysis

Hydraflow Report

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	DA 1.0 - Analysis Point 0
2	SCS Runoff	DA 1.1 - Analysis Point 1
3	SCS Runoff	DA 1.2 - Analysis Point 2
4	Combine	Pre Total
6	SCS Runoff	DA 2.0 - To SCM
7	SCS Runoff	DA 2.2 - Offsite To SCM
8	Combine	To SCM
9	Reservoir	Wet Pond
10	SCS Runoff	DA 2.1 - Bypass
11	SCS Runoff	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	DA 2.4 - Bypass - Analysis Point 0
13	Combine	Post - Analysis Point 2
14	Combine	Post Total

Hydraflow Table of Contents

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.719	1.602	-------	3.265	4.711	6.883	-------	10.74	DA 1.0 - Analysis Point 0
2	SCS Runoff	------	0.554	0.916	-------	1.516	2.014	2.738	-------	3.979	DA 1.1 - Analysis Point 1
3	SCS Runoff	------	0.711	1.774	-------	3.807	5.584	8.267	-------	12.97	DA 1.2 - Analysis Point 2
4	Combine	1, 2, 3	1.838	4.032	-------	8.160	11.83	17.35	-------	26.99	Pre Total
6	SCS Runoff	------	7.858	10.94	-------	15.81	19.69	25.12	-------	33.90	DA 2.0 - To SCM
7	SCS Runoff	------	0.035	0.073	-------	0.140	0.197	0.282	-------	0.429	DA 2.2 - Offsite To SCM
8	Combine	6, 7	7.893	11.01	-------	15.94	19.88	25.39	-------	34.33	To SCM
9	Reservoir	8	0.089	0.290	-------	1.067	2.286	9.649	-------	22.38	Wet Pond
10	SCS Runoff	------	0.581	1.228	-------	2.389	3.390	4.885	-------	7.474	DA 2.1 - Bypass
11	SCS Runoff	------	0.157	0.311	-------	0.576	0.803	1.139	-------	1.717	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	------	0.116	0.218	-------	0.394	0.544	0.765	-------	1.142	DA 2.4 - Bypass - Analysis Point 0
13	Combine	9, 10,	0.608	1.262	-------	2.733	5.186	14.51	-------	29.85	Post - Analysis Point 2
14	Combine	9, 10, 11, 12,	0.774	1.627	-------	3.224	5.829	15.52	-------	32.16	Post Total

Hydrograph Summary Report

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

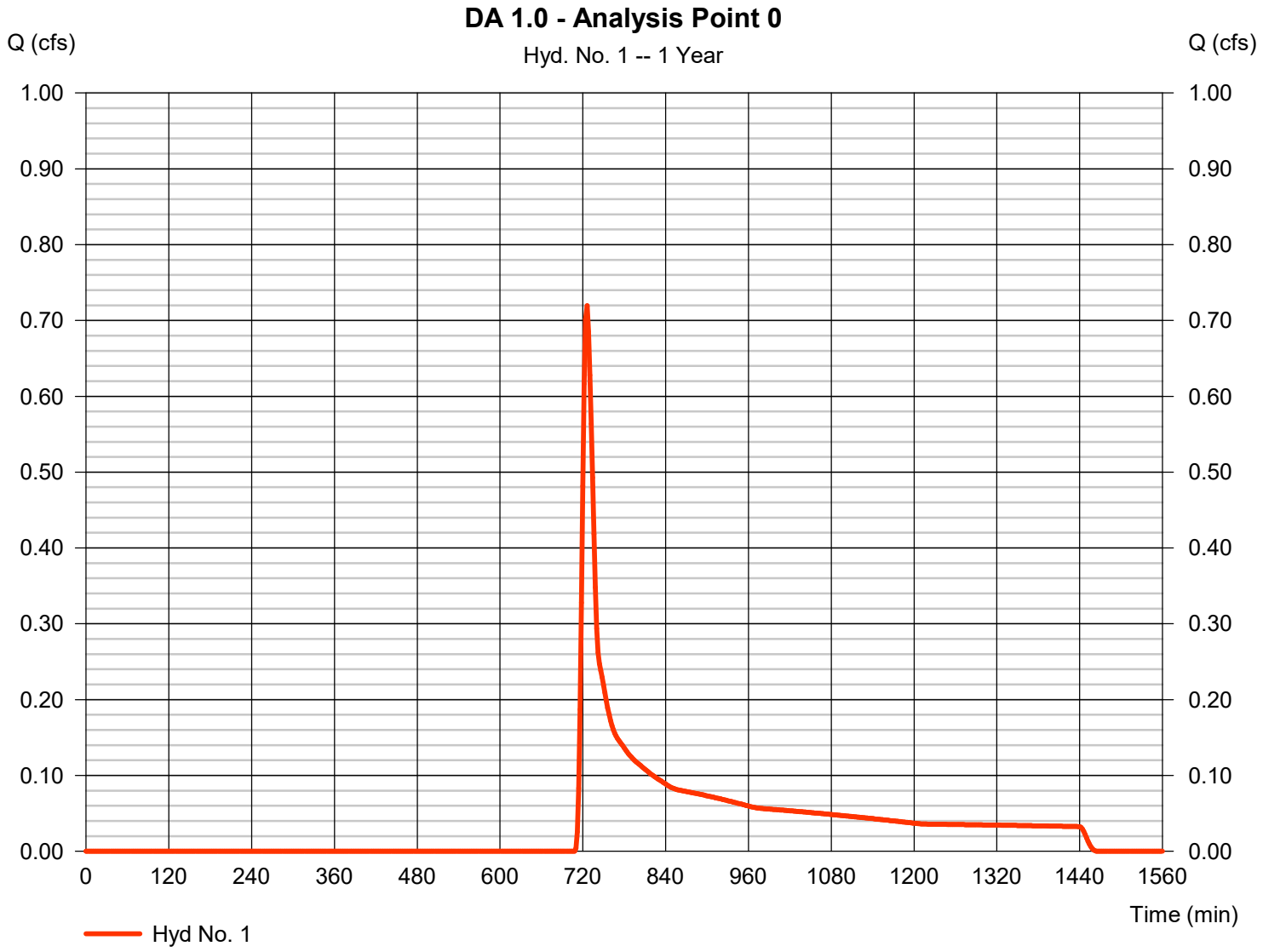
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.719	2	726	3,346	------	------	------	DA 1.0 - Analysis Point 0
2	SCS Runoff	0.554	2	720	1,396	------	------	------	DA 1.1 - Analysis Point 1
3	SCS Runoff	0.711	2	722	2,887	------	------	------	DA 1.2 - Analysis Point 2
4	Combine	1.838	2	722	7,629	1, 2, 3	------	------	Pre Total
6	SCS Runoff	7.858	2	718	15,721	------	------	------	DA 2.0 - To SCM
7	SCS Runoff	0.035	2	718	94	------	------	------	DA 2.2 - Offsite To SCM
8	Combine	7.893	2	718	15,816	6, 7	------	------	To SCM
9	Reservoir	0.089	2	1440	10,644	8	546.02	13,594	Wet Pond
10	SCS Runoff	0.581	2	724	2,265	------	------	------	DA 2.1 - Bypass
11	SCS Runoff	0.157	2	718	399	------	------	------	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	0.116	2	718	280	------	------	------	DA 2.4 - Bypass - Analysis Point 0
13	Combine	0.608	2	724	12,909	9, 10,	------	------	Post - Analysis Point 2
14	Combine	0.774	2	722	13,589	9, 10, 11, 12,	------	------	Post Total

Hydrograph Report

Hyd. No. 1

DA 1.0 - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 0.719 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 3,346 cuft
Drainage area	= 2.730 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.30 min
Total precip.	= 2.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

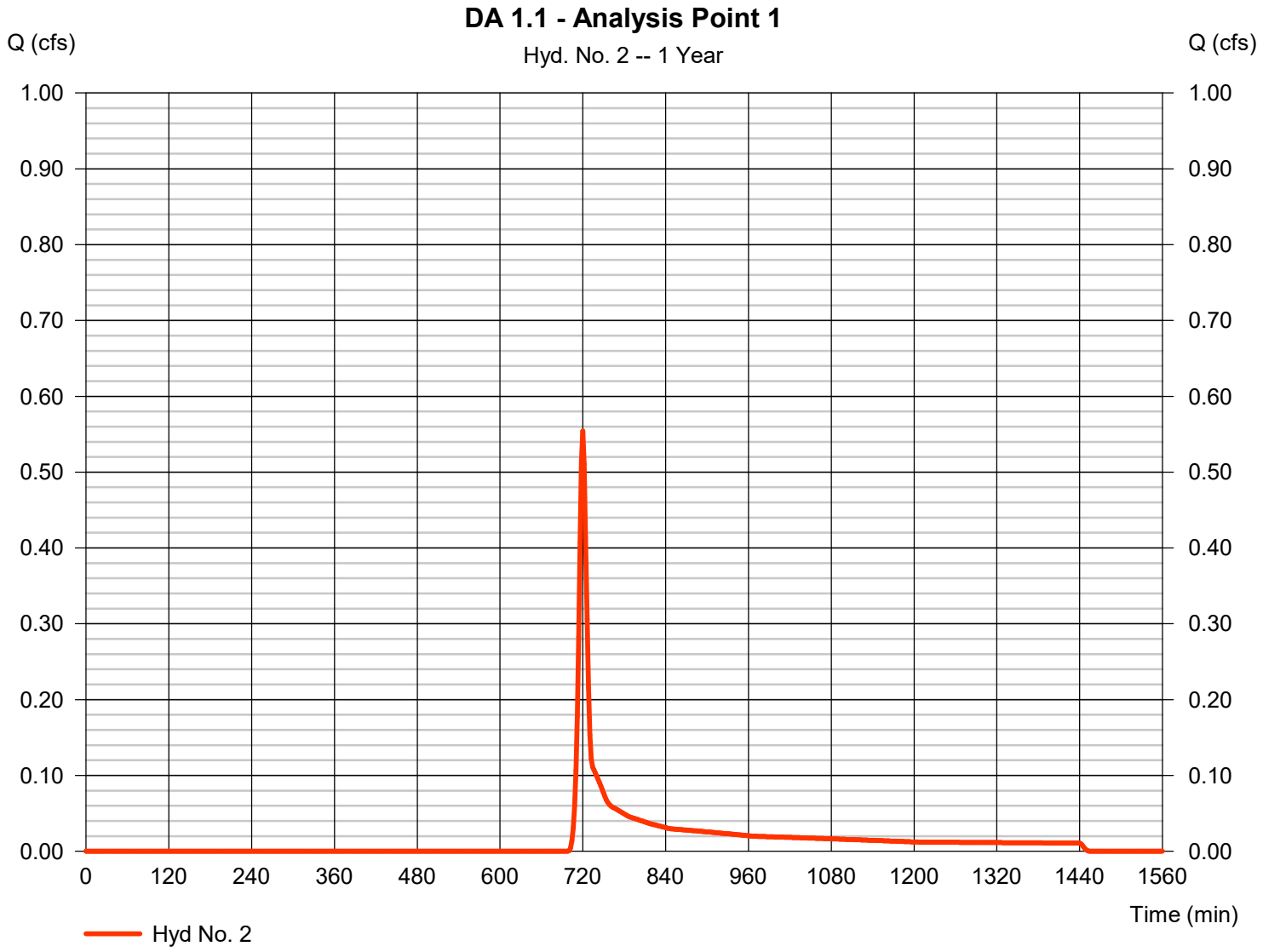


Hydrograph Report

Hyd. No. 2

DA 1.1 - Analysis Point 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.554 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 1,396 cuft
Drainage area	= 0.640 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.80 min
Total precip.	= 2.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

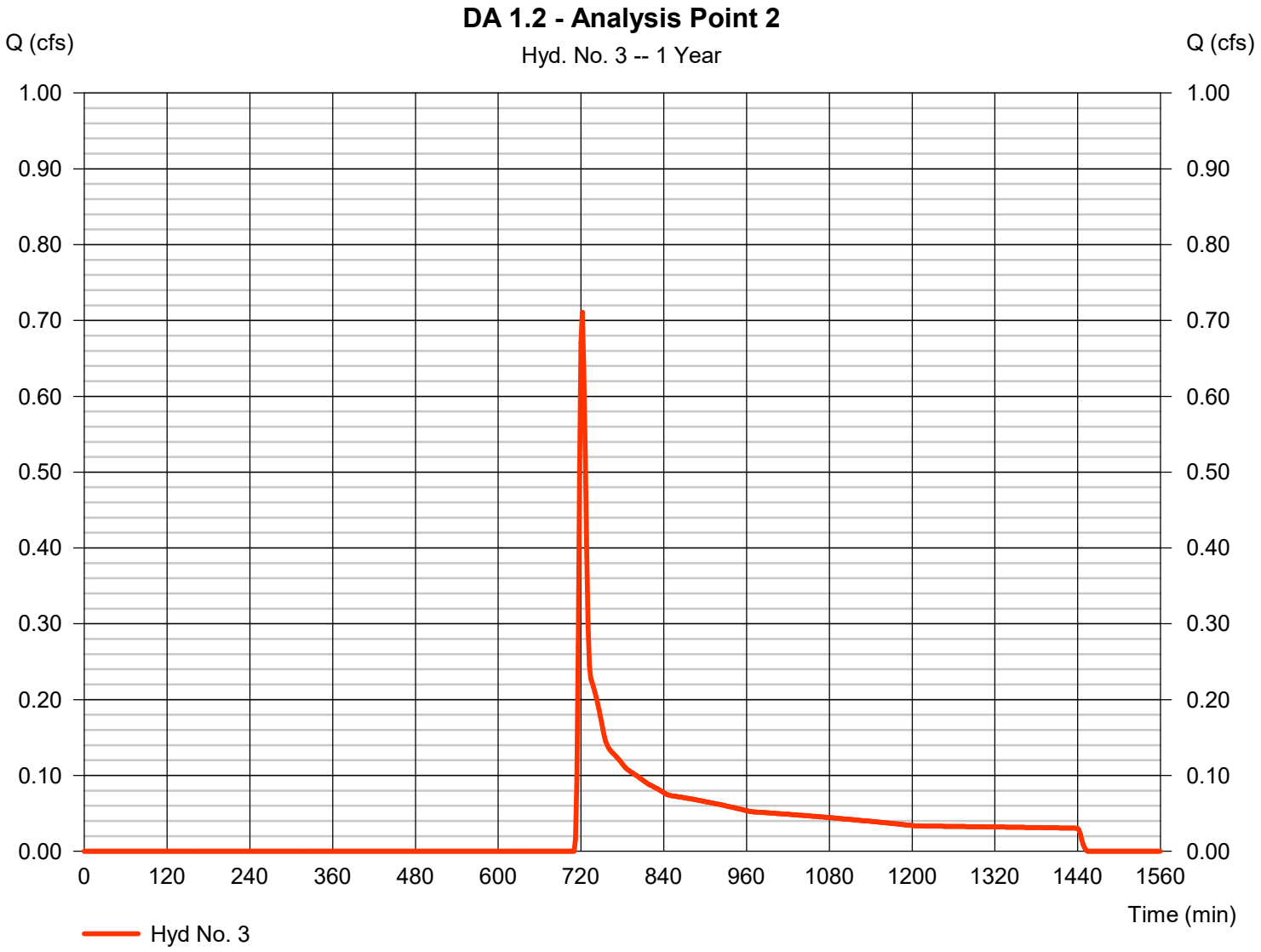


Hydrograph Report

Hyd. No. 3

DA 1.2 - Analysis Point 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.711 cfs
Storm frequency	=	1 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	2,887 cuft
Drainage area	=	2.780 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	2.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

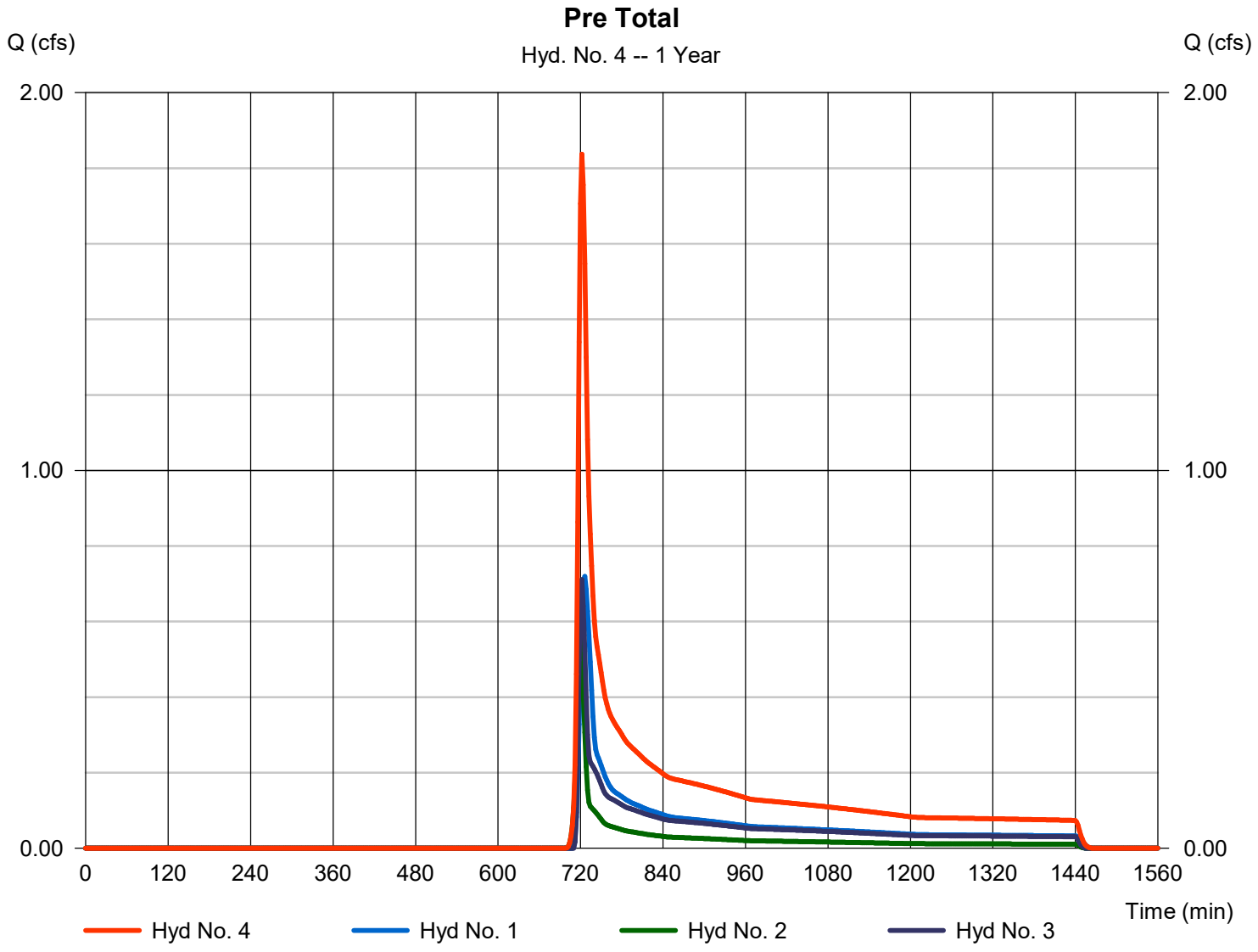


Hydrograph Report

Hyd. No. 4

Pre Total

Hydrograph type	= Combine	Peak discharge	= 1.838 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 7,629 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 6.150 ac

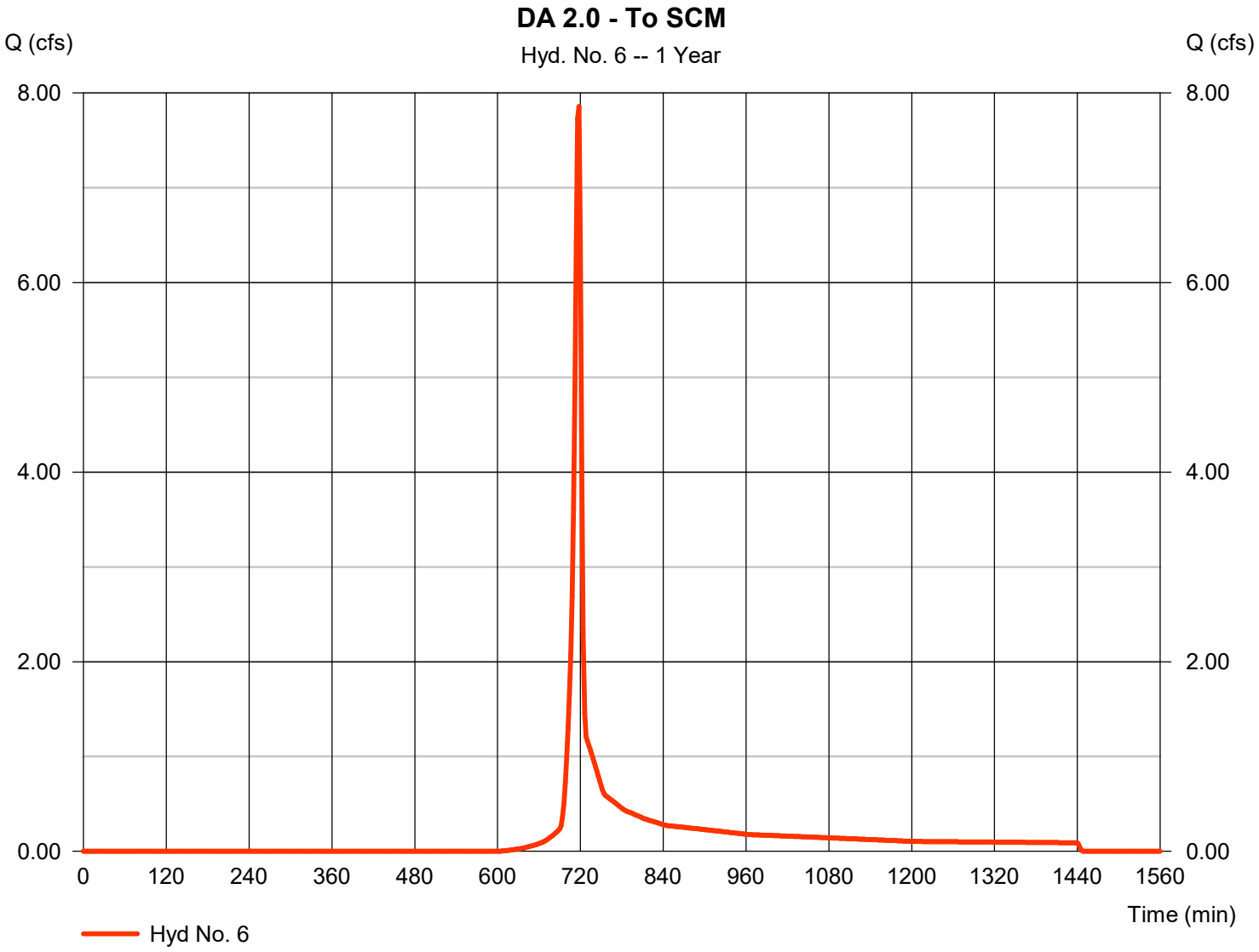


Hydrograph Report

Hyd. No. 6

DA 2.0 - To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.858 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	15,721 cuft
Drainage area	=	4.010 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

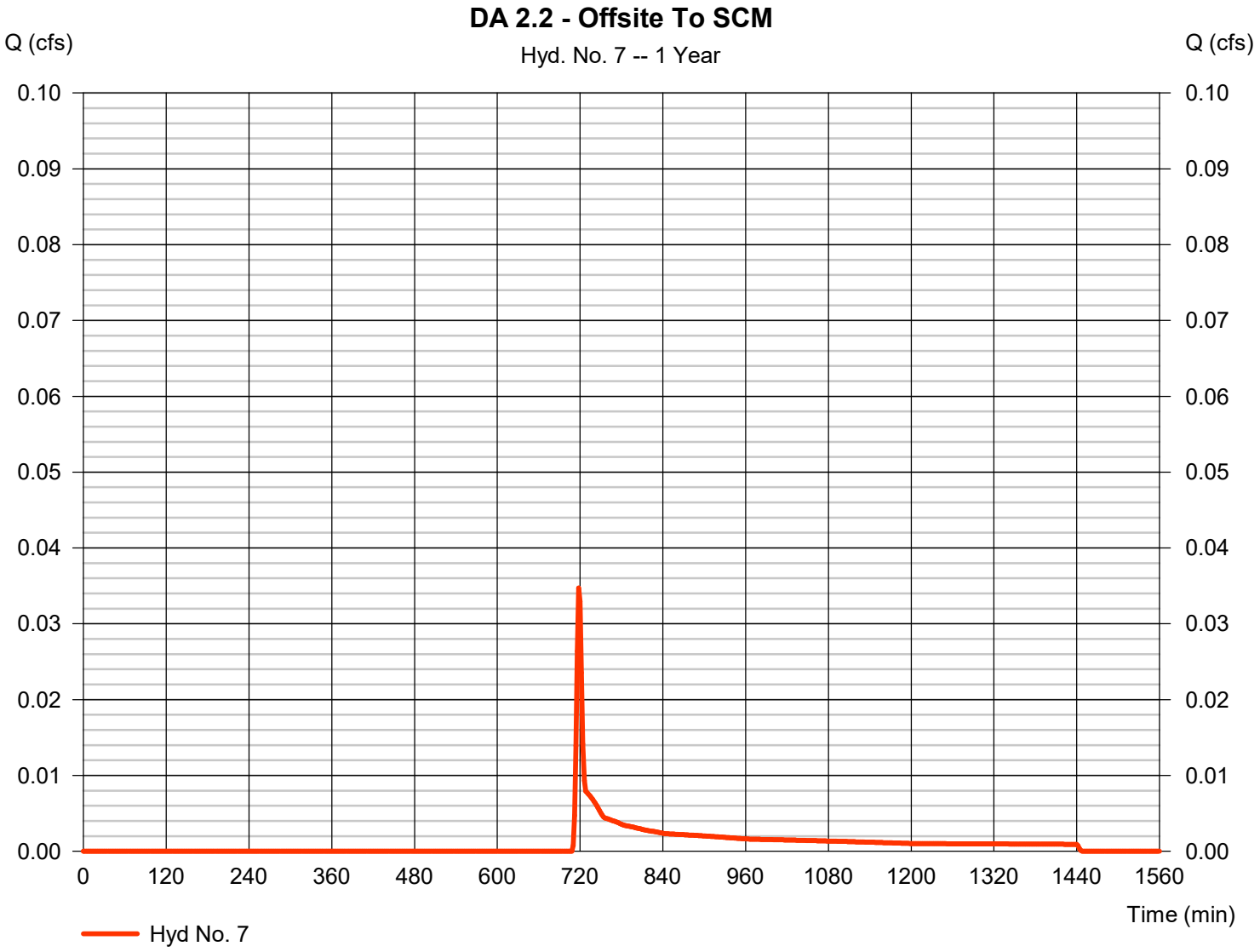


Hydrograph Report

Hyd. No. 7

DA 2.2 - Offsite To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.035 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	94 cuft
Drainage area	=	0.080 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

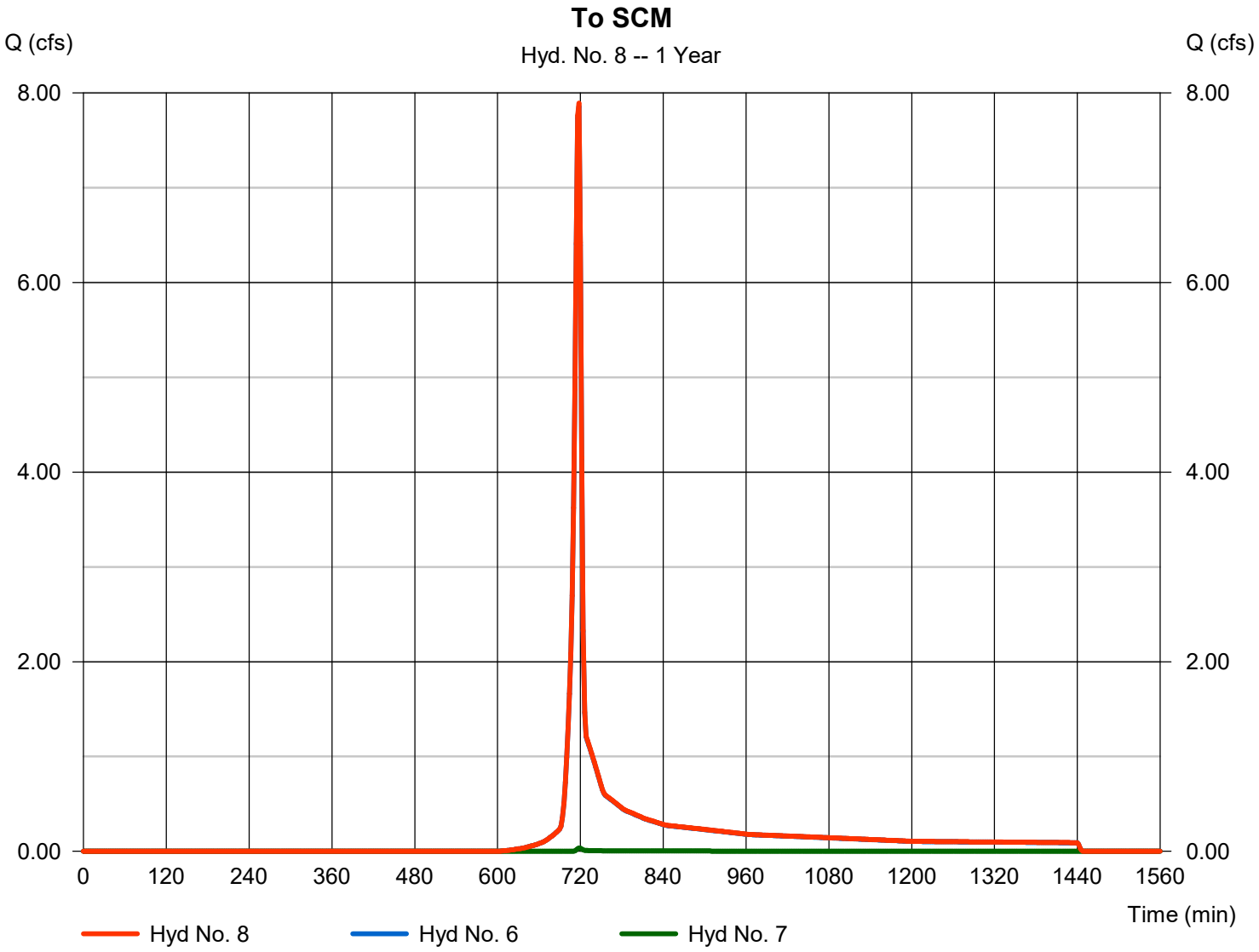


Hydrograph Report

Hyd. No. 8

To SCM

Hydrograph type	= Combine	Peak discharge	= 7.893 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 15,816 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.090 ac



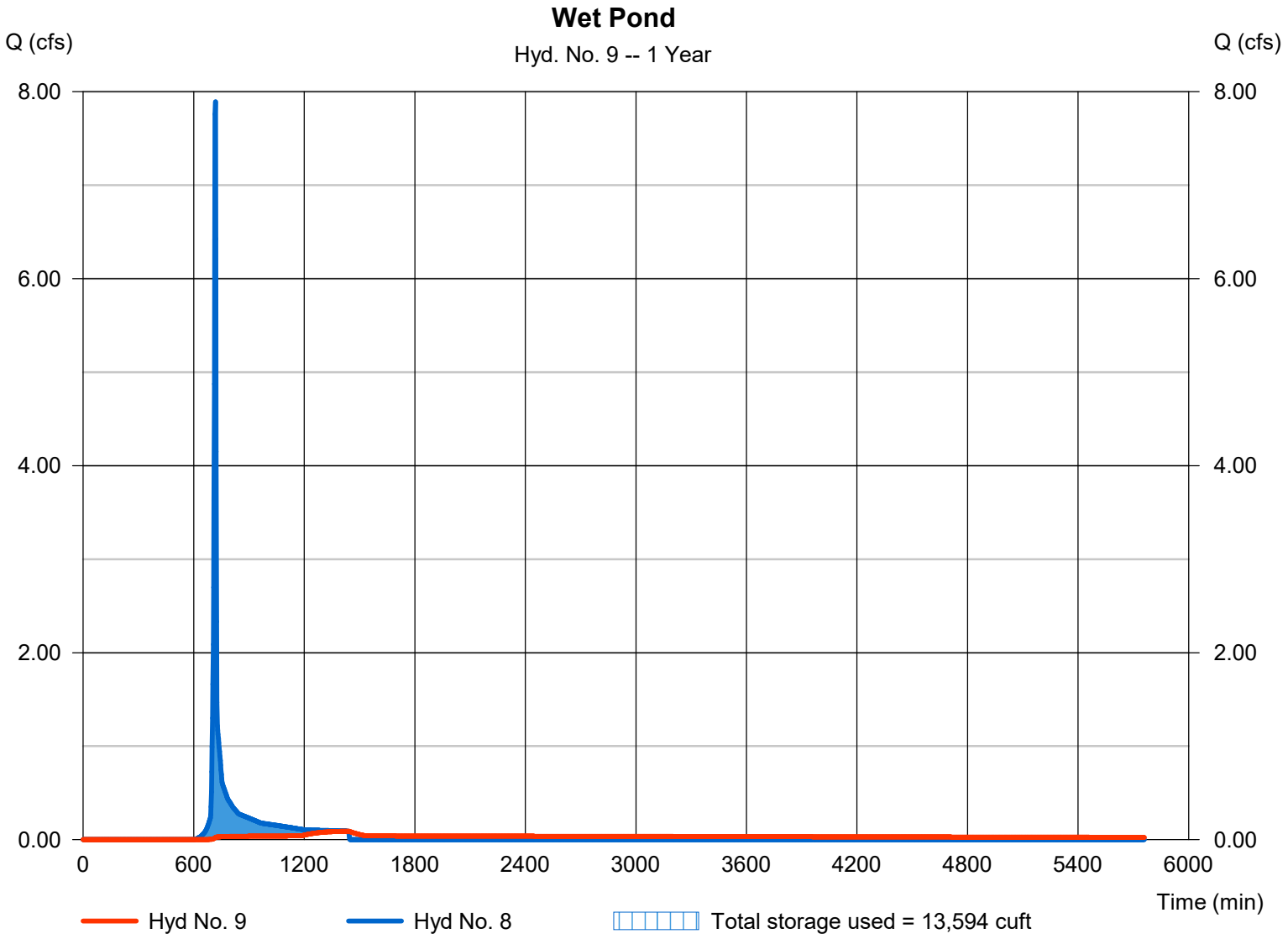
Hydrograph Report

Hyd. No. 9

Wet Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.089 cfs
Storm frequency	=	1 yrs	Time to peak	=	1440 min
Time interval	=	2 min	Hyd. volume	=	10,644 cuft
Inflow hyd. No.	=	8 - To SCM	Max. Elevation	=	546.02 ft
Reservoir name	=	Wet Pond	Max. Storage	=	13,594 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Wet Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 545.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	545.00	12,492	0	0
1.00	546.00	14,026	13,250	13,250
2.00	547.00	15,617	14,813	28,063
3.00	548.00	17,264	16,432	44,495

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	1.25	0.00	0.00
Span (in)	= 24.00	1.25	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 543.50	545.00	0.00	0.00
Length (ft)	= 50.00	1.00	0.00	0.00
Slope (%)	= 1.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

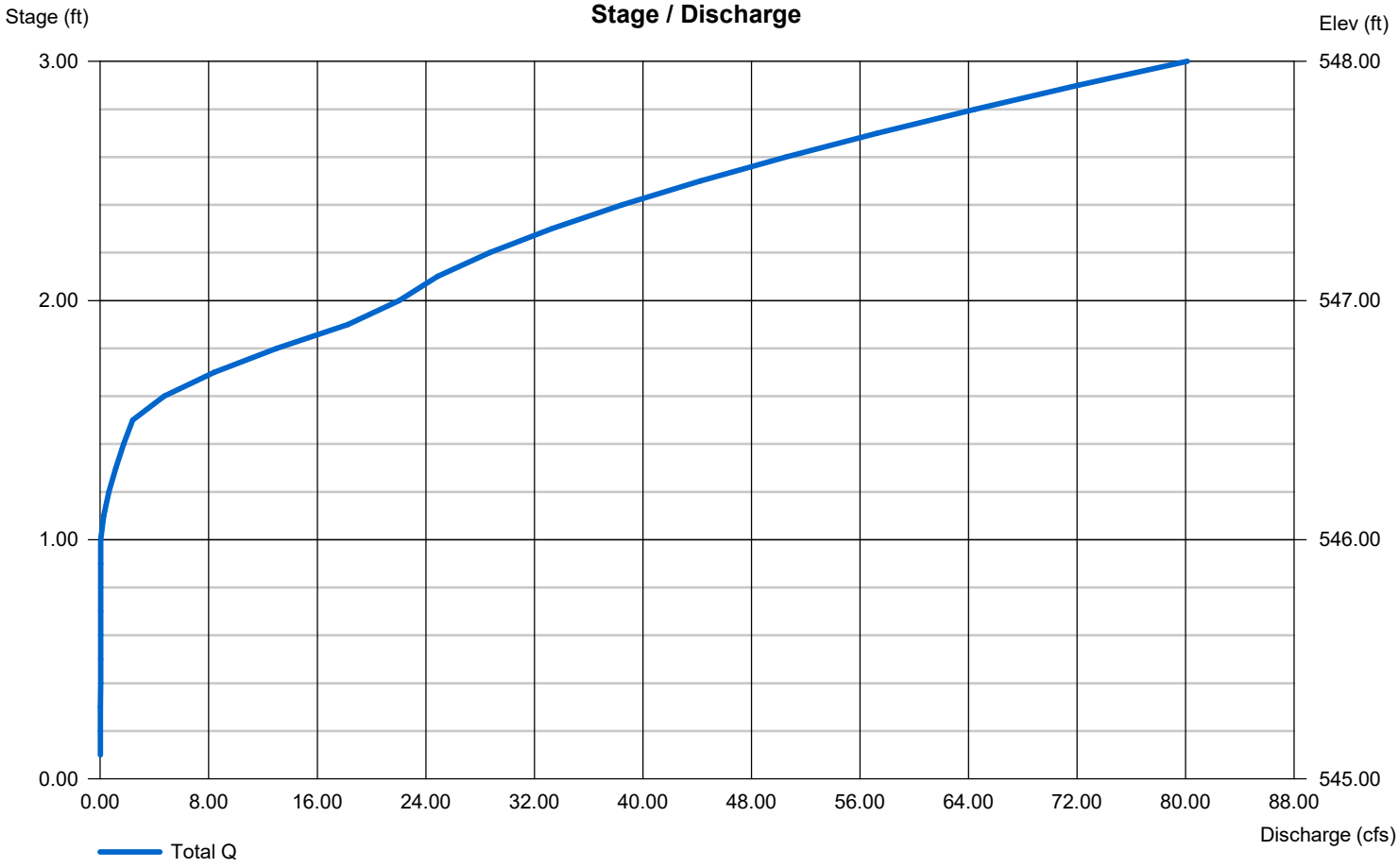
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.00	20.00	2.00	0.00
Crest El. (ft)	= 546.50	547.00	546.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	Rect	---
Multi-Stage	= Yes	No	Yes	No

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

TW Elev. (ft) = 0.00

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

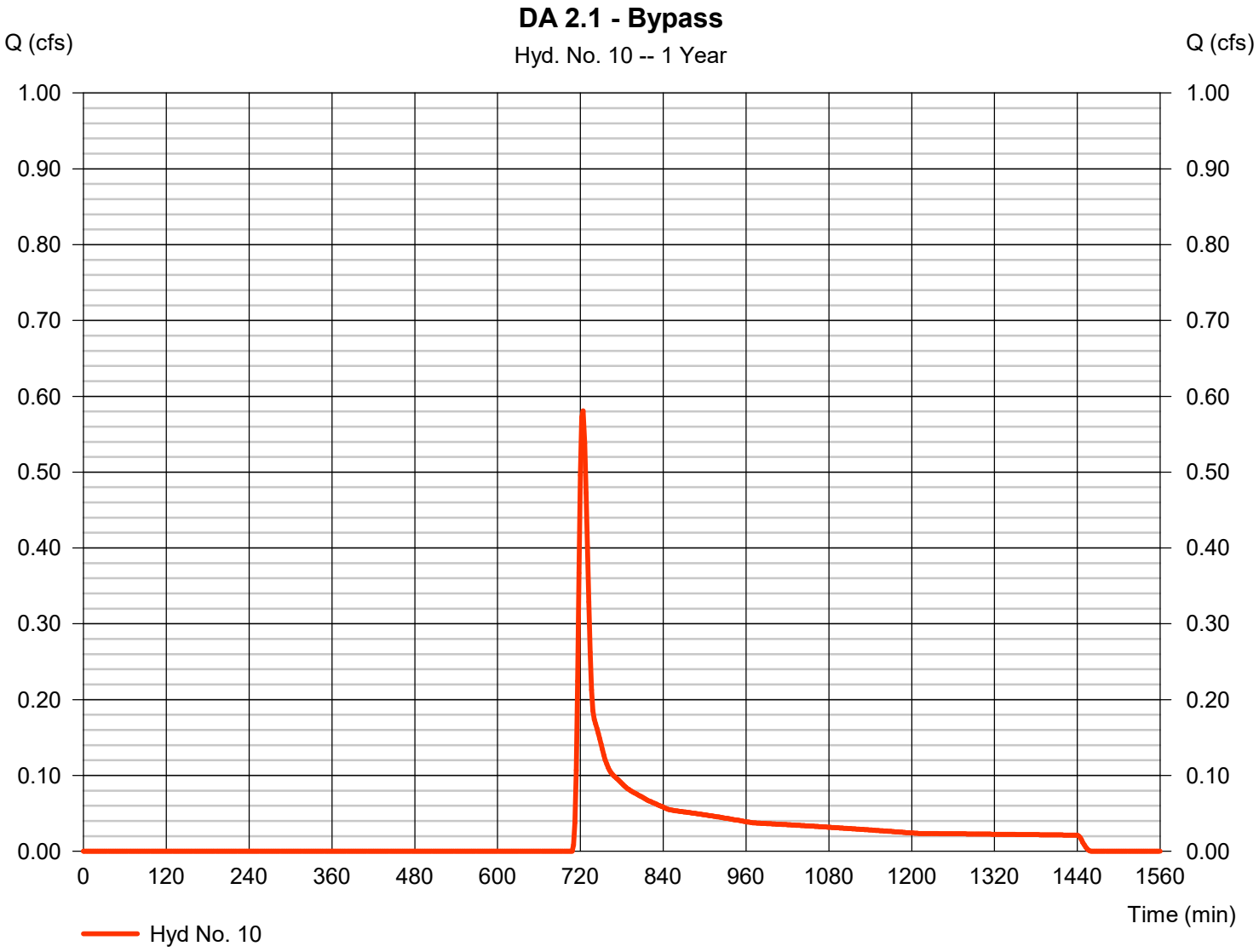


Hydrograph Report

Hyd. No. 10

DA 2.1 - Bypass

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.581 cfs
Storm frequency	=	1 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	2,265 cuft
Drainage area	=	1.600 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	2.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

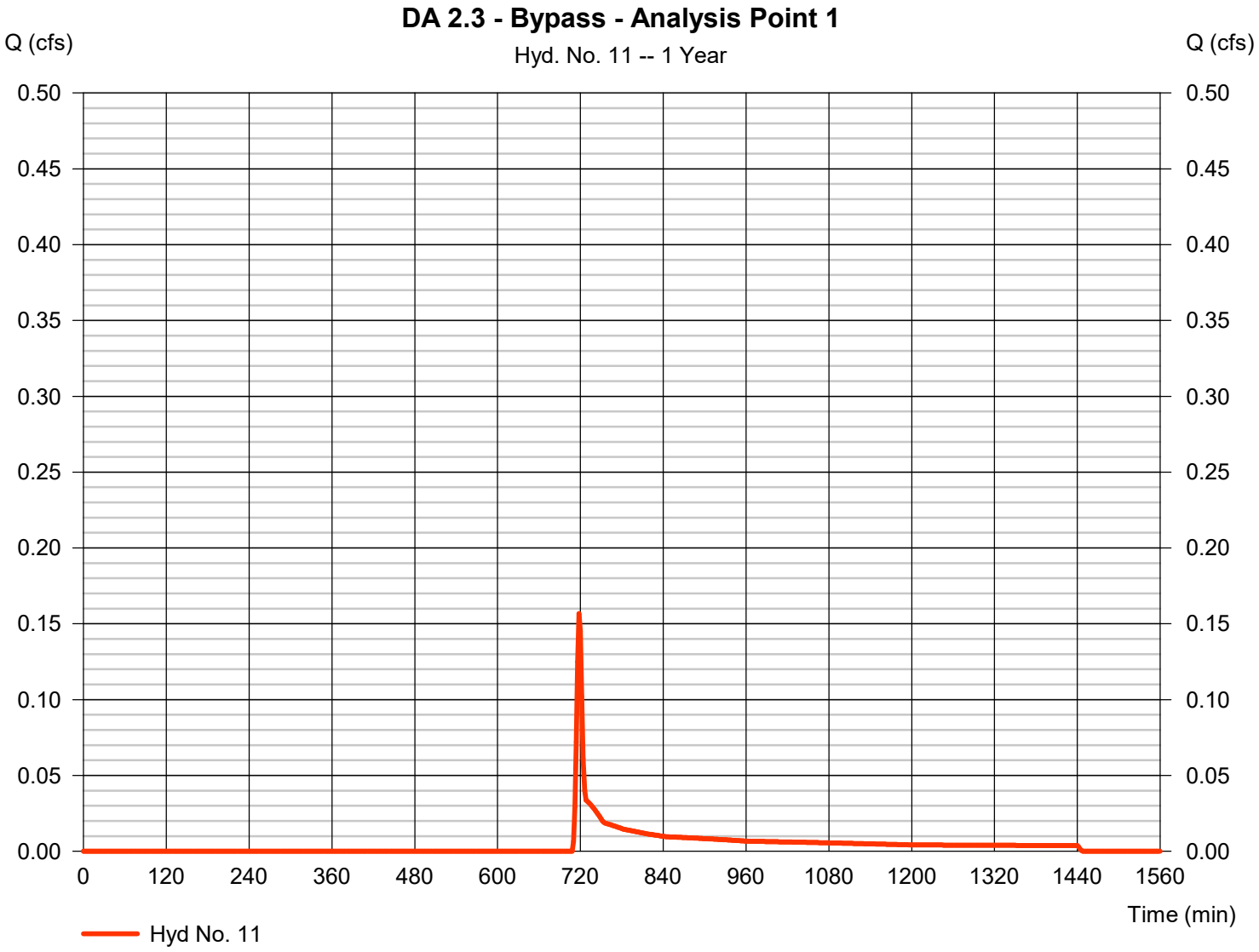


Hydrograph Report

Hyd. No. 11

DA 2.3 - Bypass - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.157 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	399 cuft
Drainage area	=	0.310 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.95 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

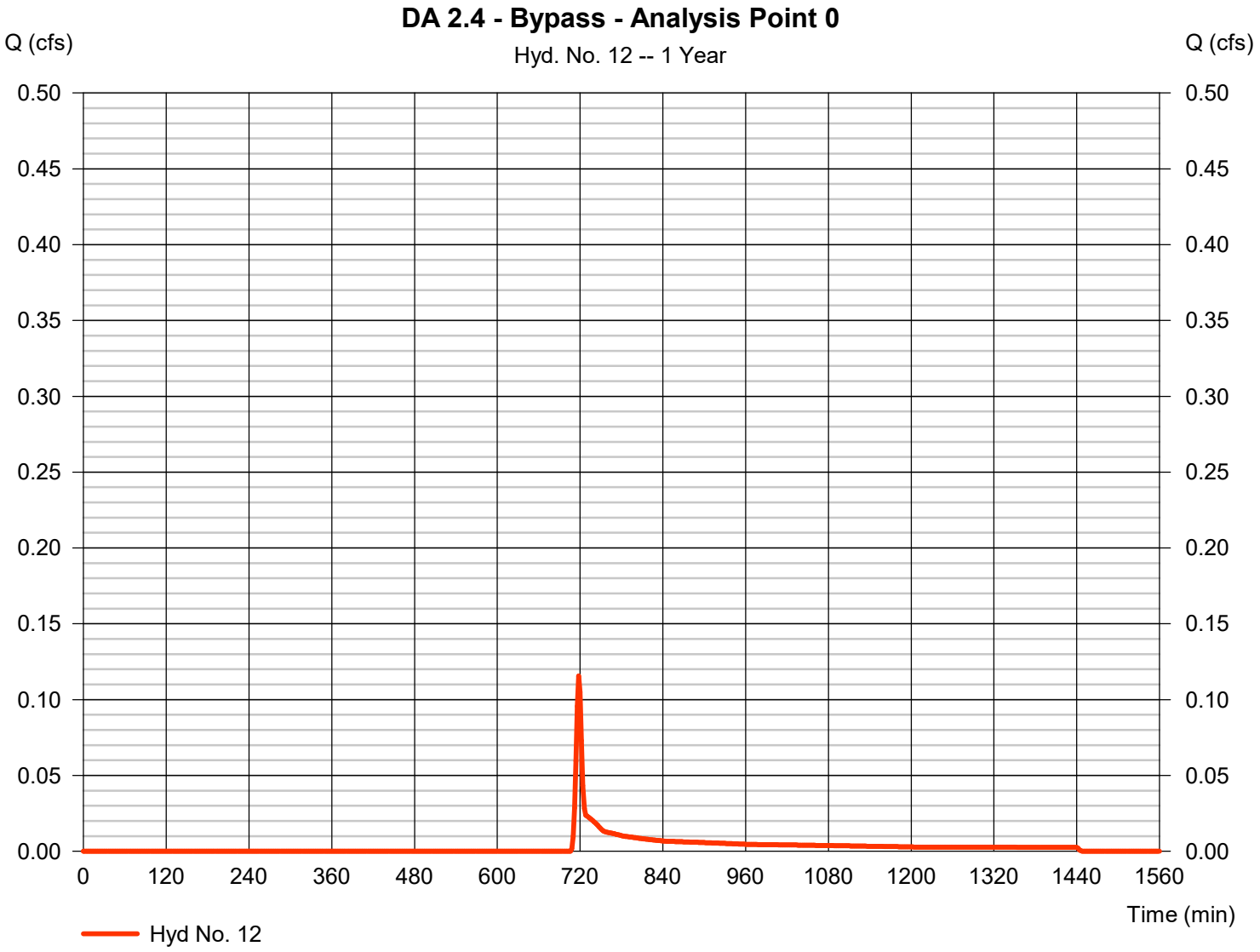


Hydrograph Report

Hyd. No. 12

DA 2.4 - Bypass - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 0.116 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 280 cuft
Drainage area	= 0.200 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.95 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

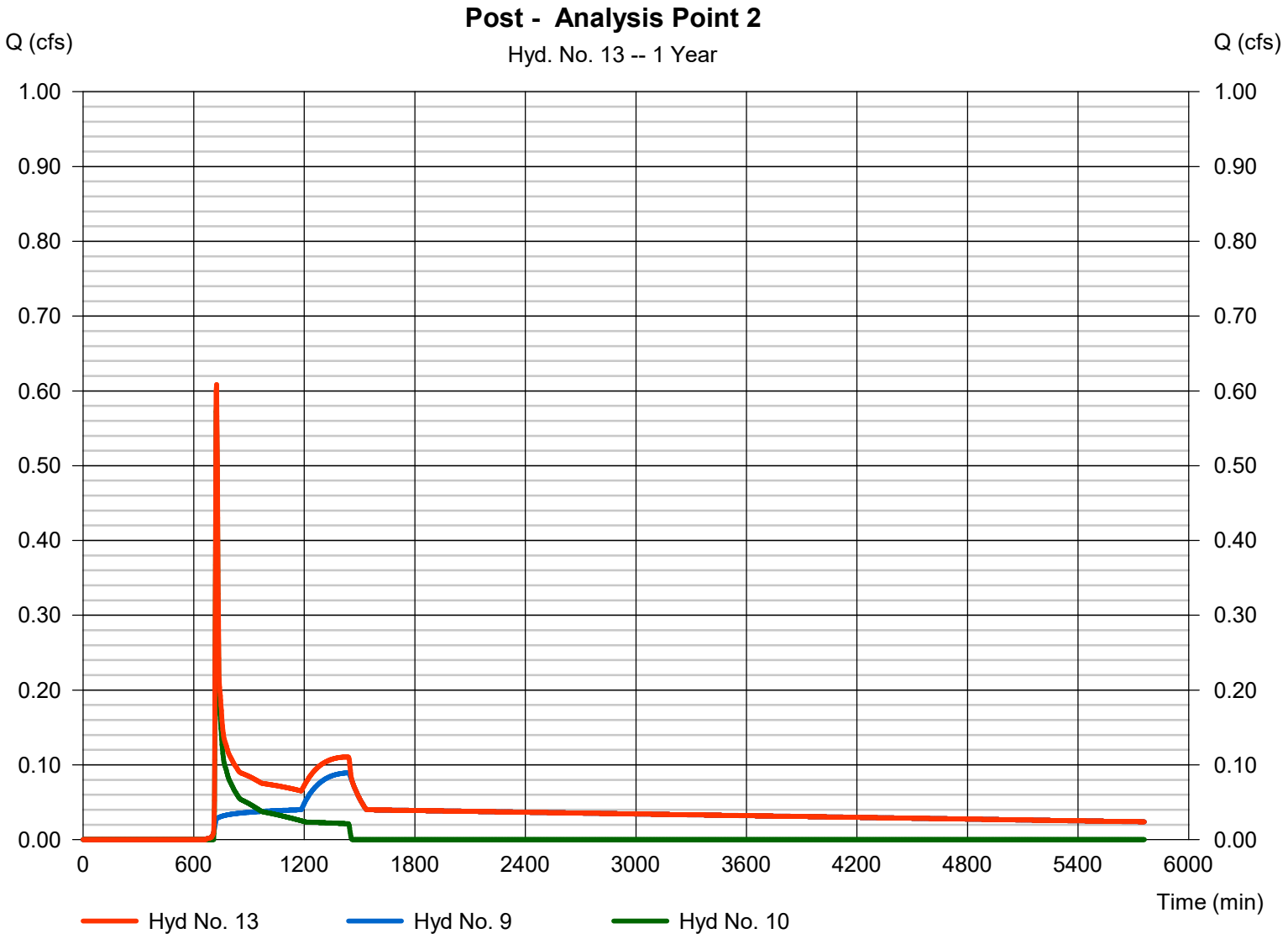


Hydrograph Report

Hyd. No. 13

Post - Analysis Point 2

Hydrograph type	= Combine	Peak discharge	= 0.608 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 12,909 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.600 ac

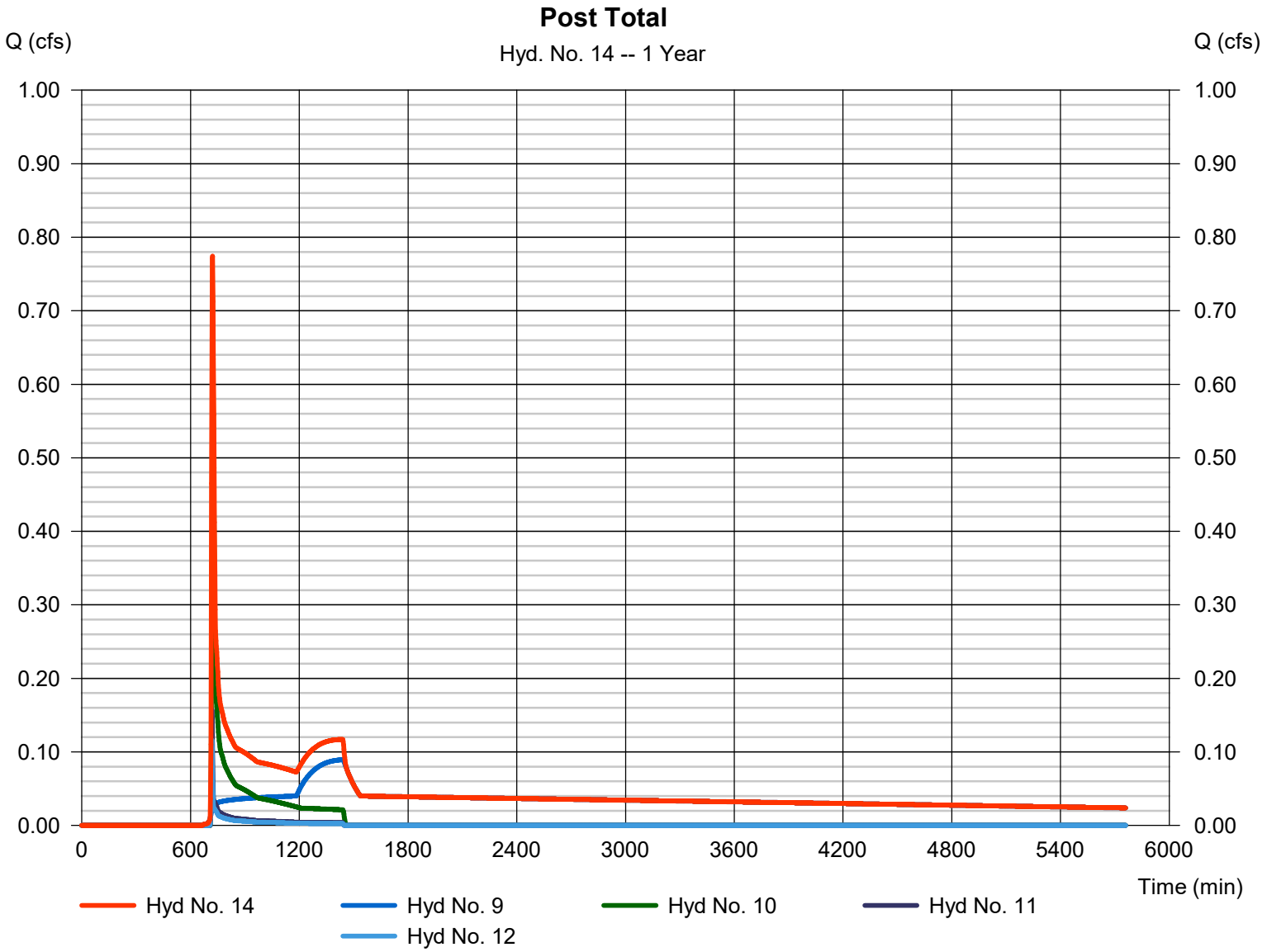


Hydrograph Report

Hyd. No. 14

Post Total

Hydrograph type	= Combine	Peak discharge	= 0.774 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 13,589 cuft
Inflow hyds.	= 9, 10, 11, 12	Contrib. drain. area	= 2.110 ac



Hydrograph Summary Report

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

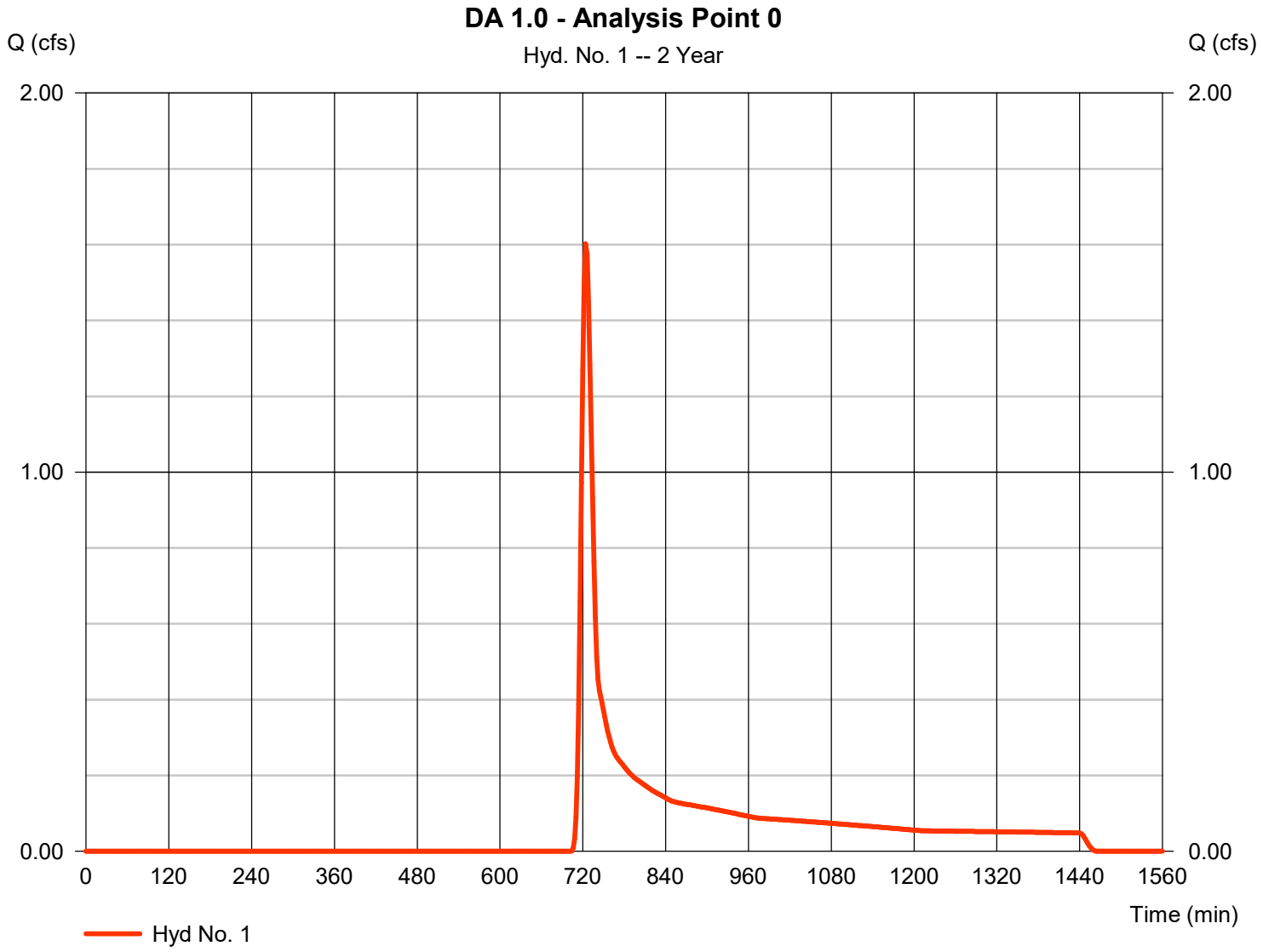
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.602	2	724	5,796	------	------	------	DA 1.0 - Analysis Point 0
2	SCS Runoff	0.916	2	720	2,175	------	------	------	DA 1.1 - Analysis Point 1
3	SCS Runoff	1.774	2	720	5,210	------	------	------	DA 1.2 - Analysis Point 2
4	Combine	4.032	2	722	13,182	1, 2, 3	------	------	Pre Total
6	SCS Runoff	10.94	2	718	22,008	------	------	------	DA 2.0 - To SCM
7	SCS Runoff	0.073	2	718	163	------	------	------	DA 2.2 - Offsite To SCM
8	Combine	11.01	2	718	22,172	6, 7	------	------	To SCM
9	Reservoir	0.290	2	914	16,936	8	546.11	14,876	Wet Pond
10	SCS Runoff	1.228	2	722	3,855	------	------	------	DA 2.1 - Bypass
11	SCS Runoff	0.311	2	718	679	------	------	------	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	0.218	2	718	469	------	------	------	DA 2.4 - Bypass - Analysis Point 0
13	Combine	1.262	2	722	20,791	9, 10,	------	------	Post - Analysis Point 2
14	Combine	1.627	2	720	21,939	9, 10, 11, 12,	------	------	Post Total

Hydrograph Report

Hyd. No. 1

DA 1.0 - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 1.602 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 5,796 cuft
Drainage area	= 2.730 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.30 min
Total precip.	= 3.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

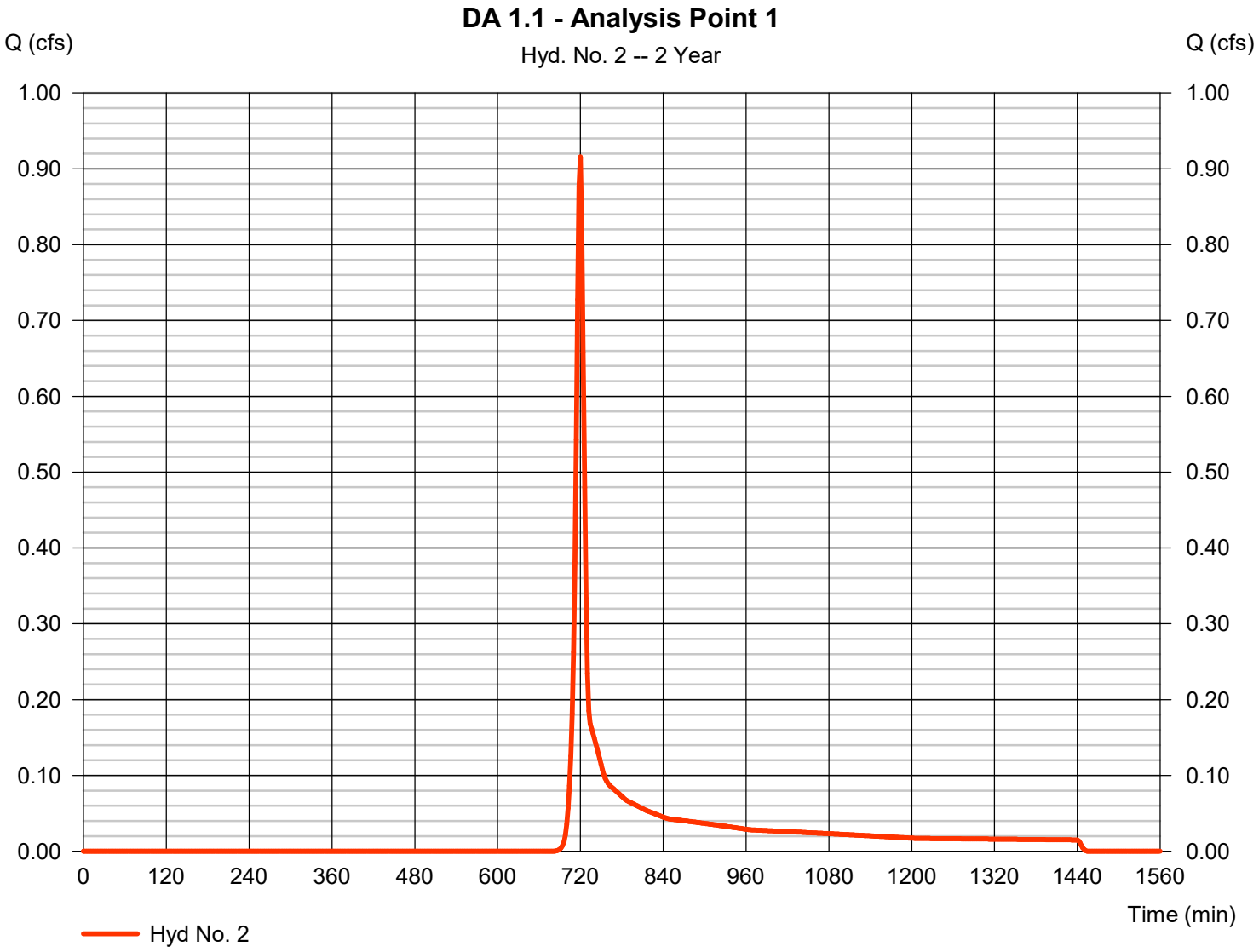


Hydrograph Report

Hyd. No. 2

DA 1.1 - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.916 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	2,175 cuft
Drainage area	=	0.640 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.80 min
Total precip.	=	3.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

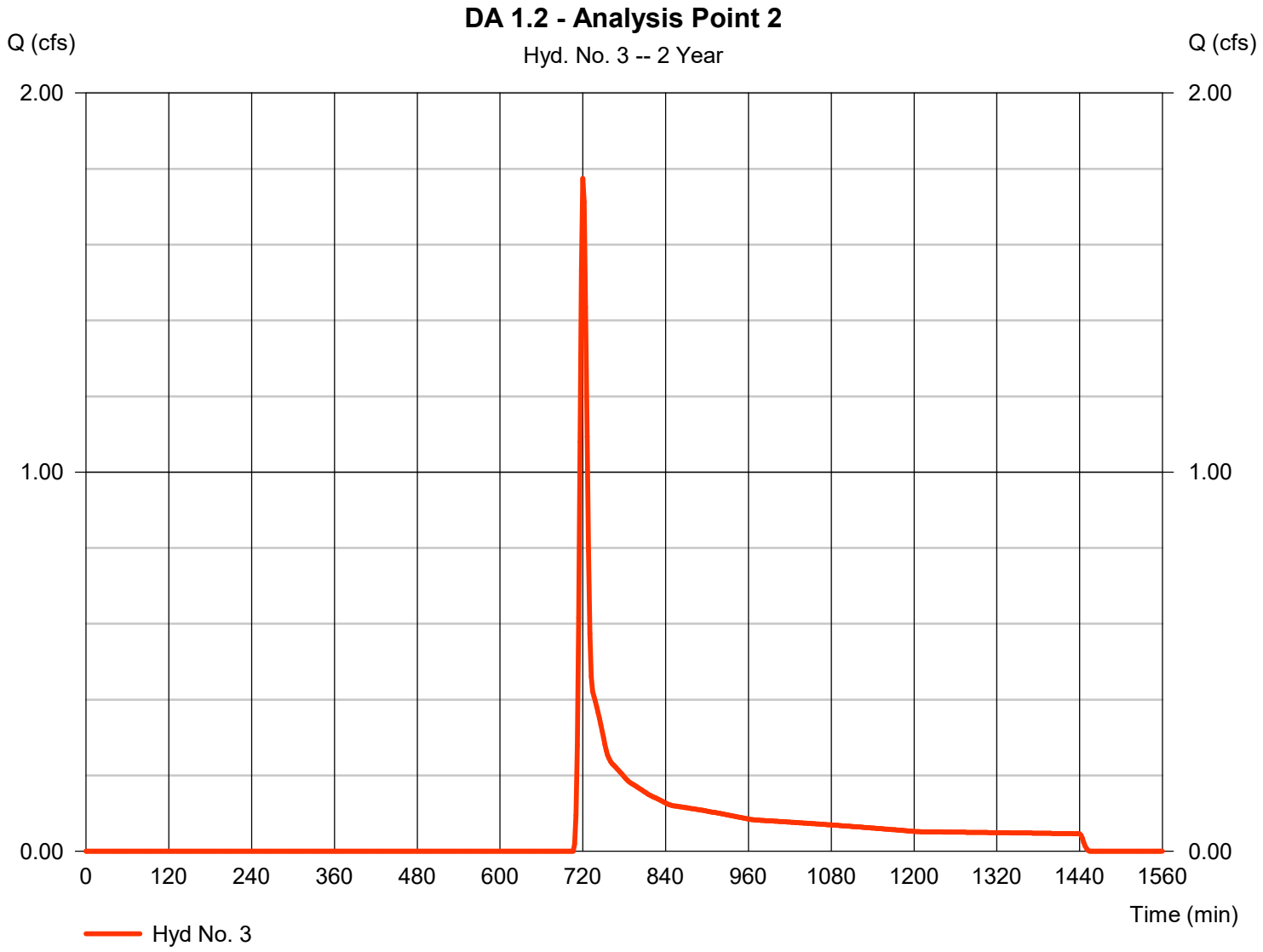


Hydrograph Report

Hyd. No. 3

DA 1.2 - Analysis Point 2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.774 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 5,210 cuft
Drainage area	= 2.780 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.20 min
Total precip.	= 3.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

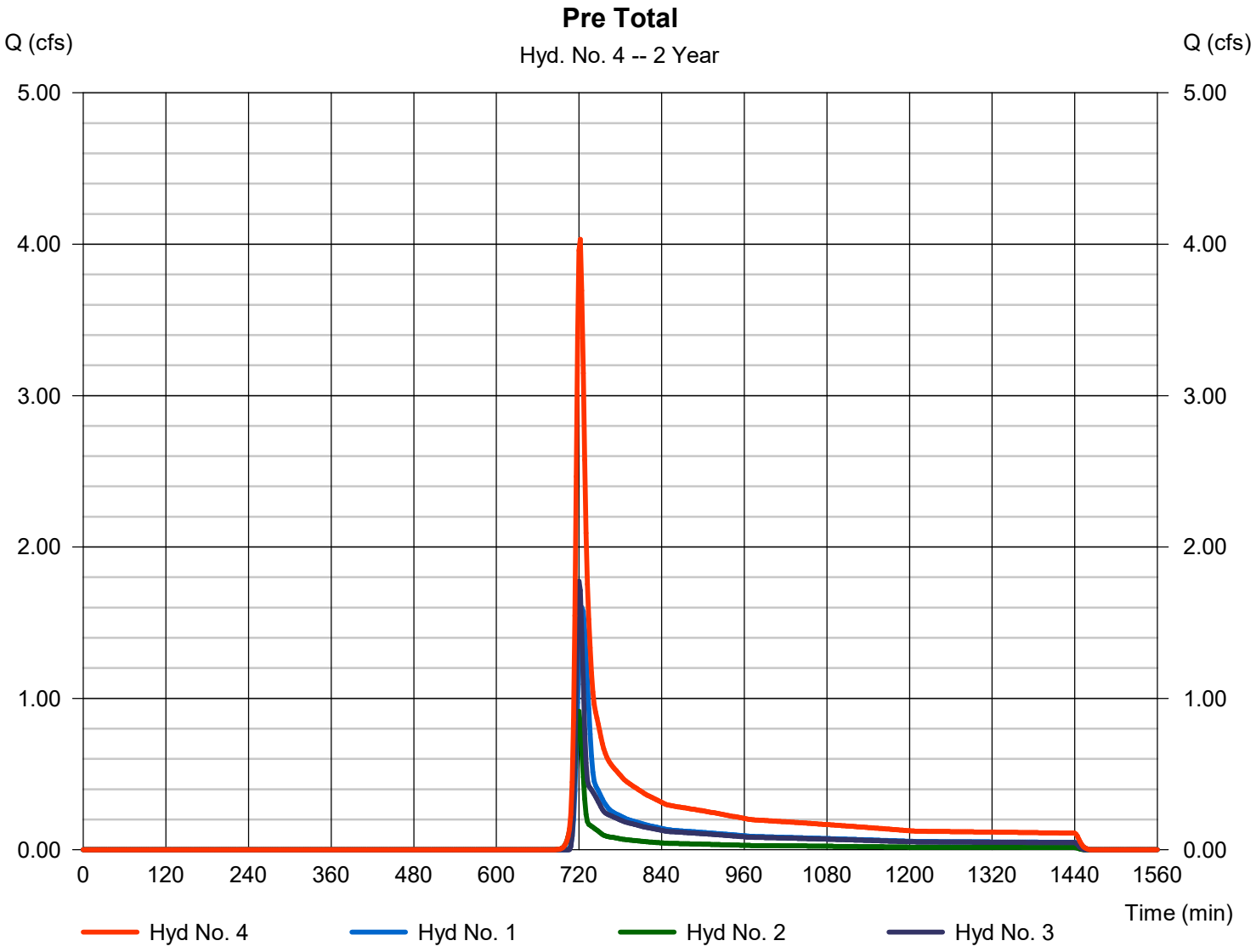


Hydrograph Report

Hyd. No. 4

Pre Total

Hydrograph type	= Combine	Peak discharge	= 4.032 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 13,182 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 6.150 ac

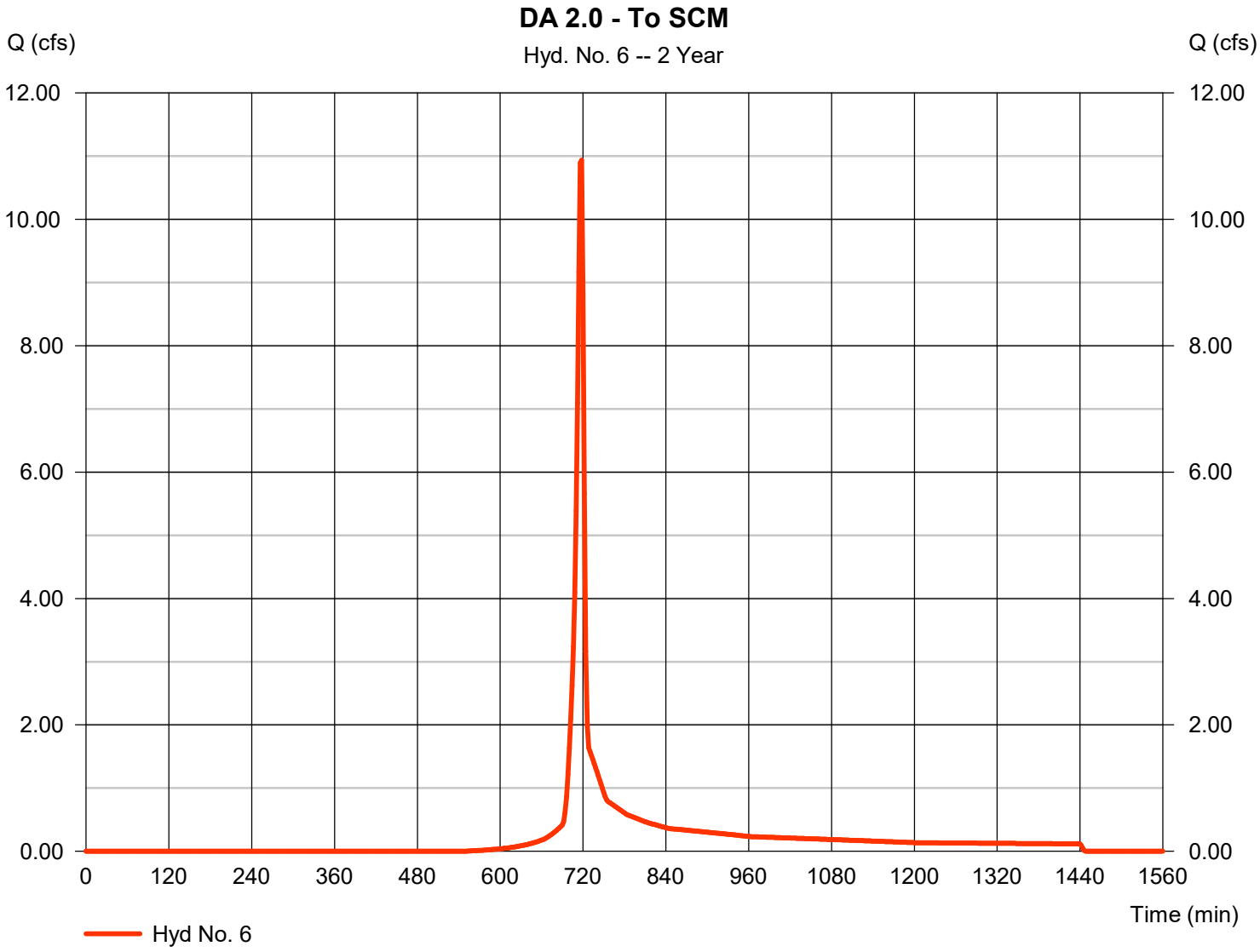


Hydrograph Report

Hyd. No. 6

DA 2.0 - To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.94 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	22,008 cuft
Drainage area	=	4.010 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

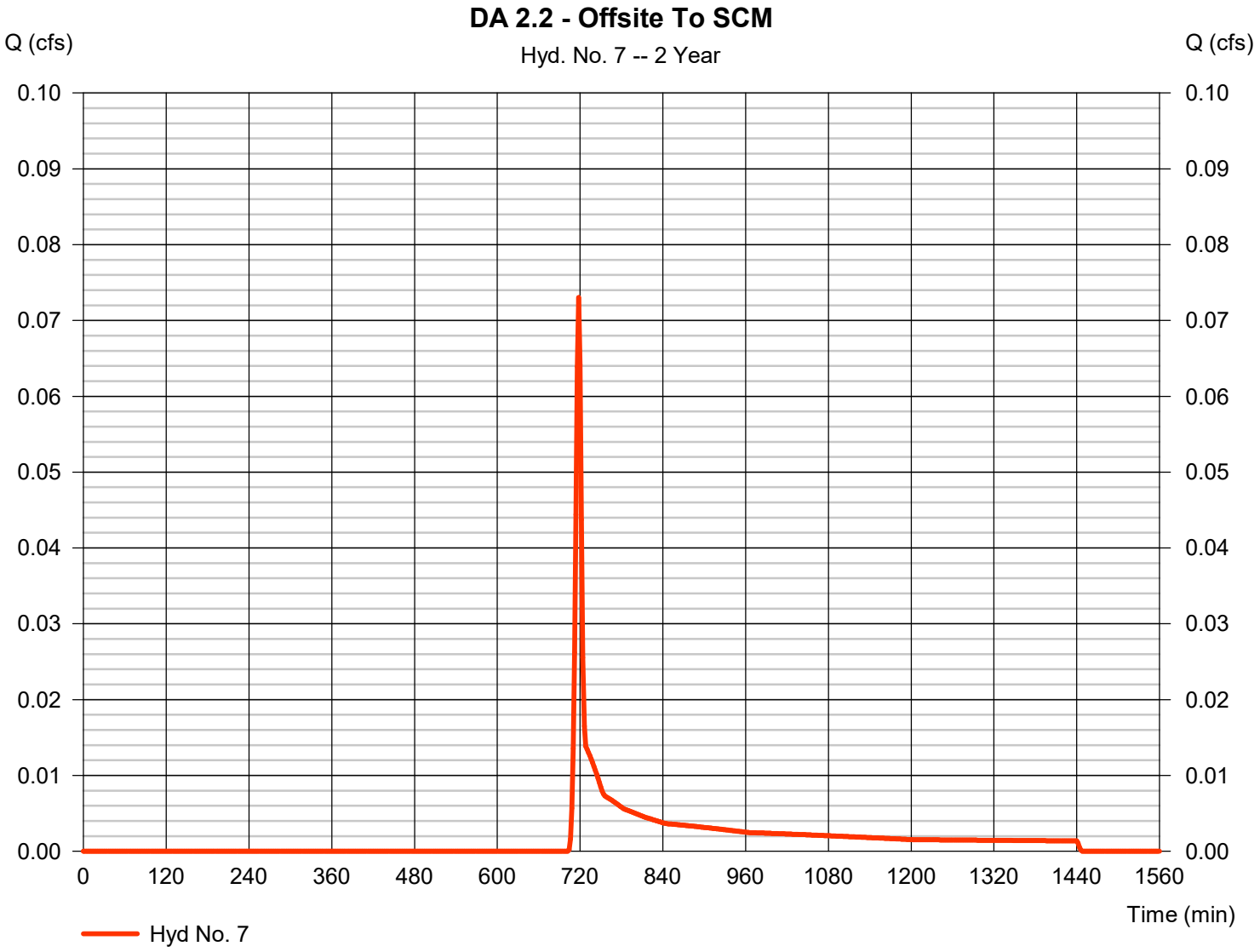


Hydrograph Report

Hyd. No. 7

DA 2.2 - Offsite To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.073 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	163 cuft
Drainage area	=	0.080 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

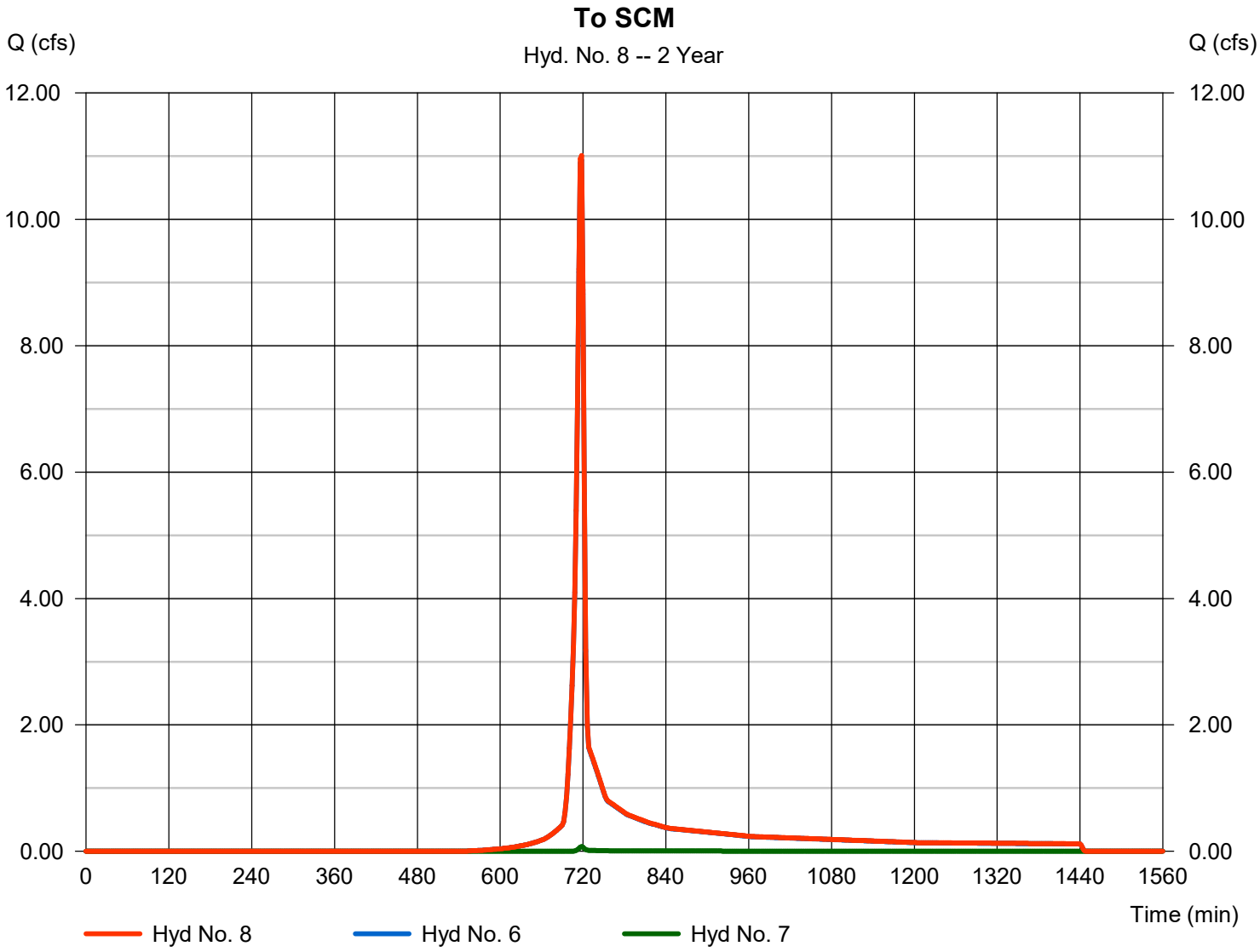


Hydrograph Report

Hyd. No. 8

To SCM

Hydrograph type	= Combine	Peak discharge	= 11.01 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 22,172 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.090 ac



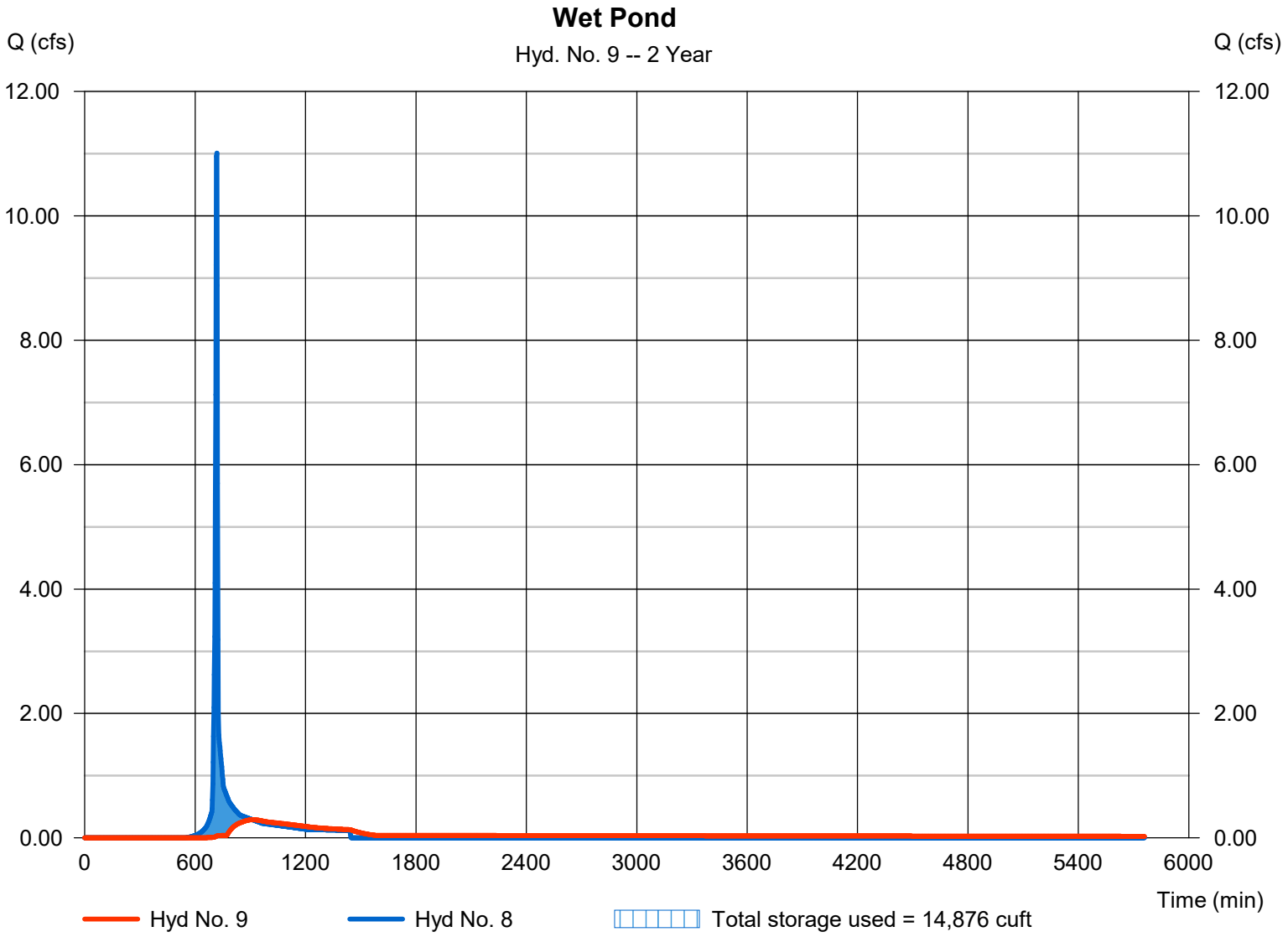
Hydrograph Report

Hyd. No. 9

Wet Pond

Hydrograph type	=	Reservoir	Peak discharge	=	0.290 cfs
Storm frequency	=	2 yrs	Time to peak	=	914 min
Time interval	=	2 min	Hyd. volume	=	16,936 cuft
Inflow hyd. No.	=	8 - To SCM	Max. Elevation	=	546.11 ft
Reservoir name	=	Wet Pond	Max. Storage	=	14,876 cuft

Storage Indication method used.

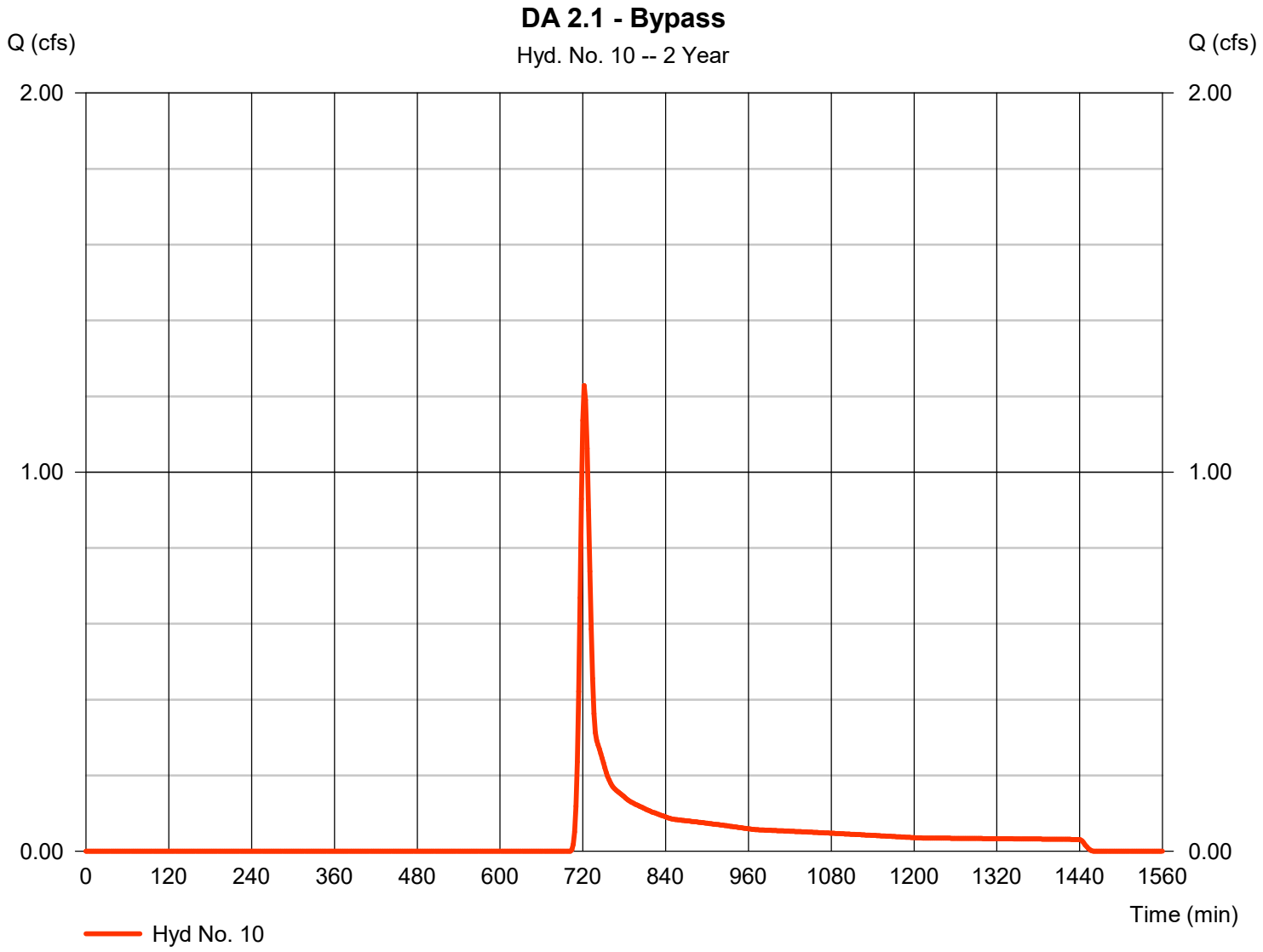


Hydrograph Report

Hyd. No. 10

DA 2.1 - Bypass

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.228 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	3,855 cuft
Drainage area	=	1.600 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	3.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

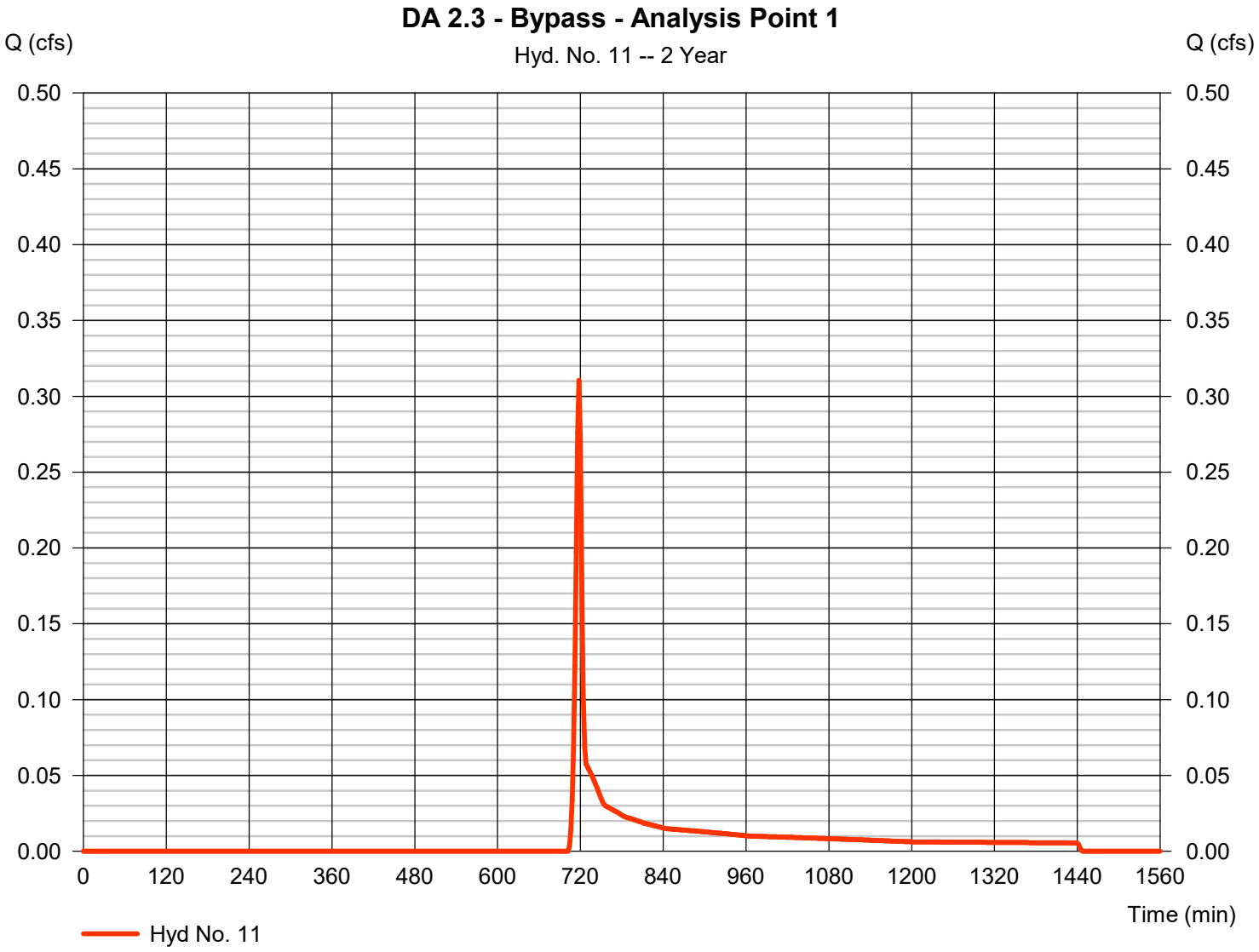


Hydrograph Report

Hyd. No. 11

DA 2.3 - Bypass - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.311 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	679 cuft
Drainage area	=	0.310 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.56 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

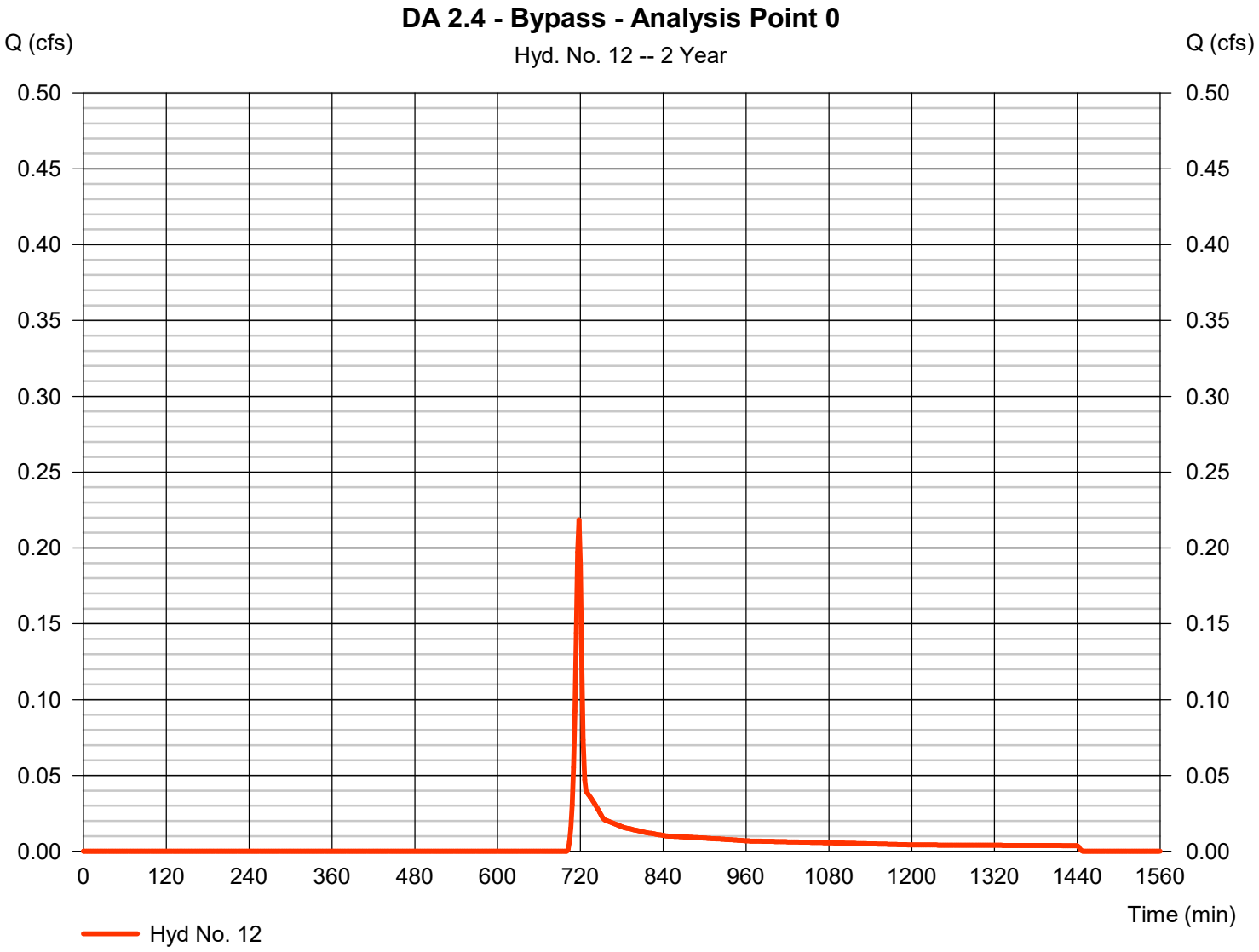


Hydrograph Report

Hyd. No. 12

DA 2.4 - Bypass - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 0.218 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 469 cuft
Drainage area	= 0.200 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

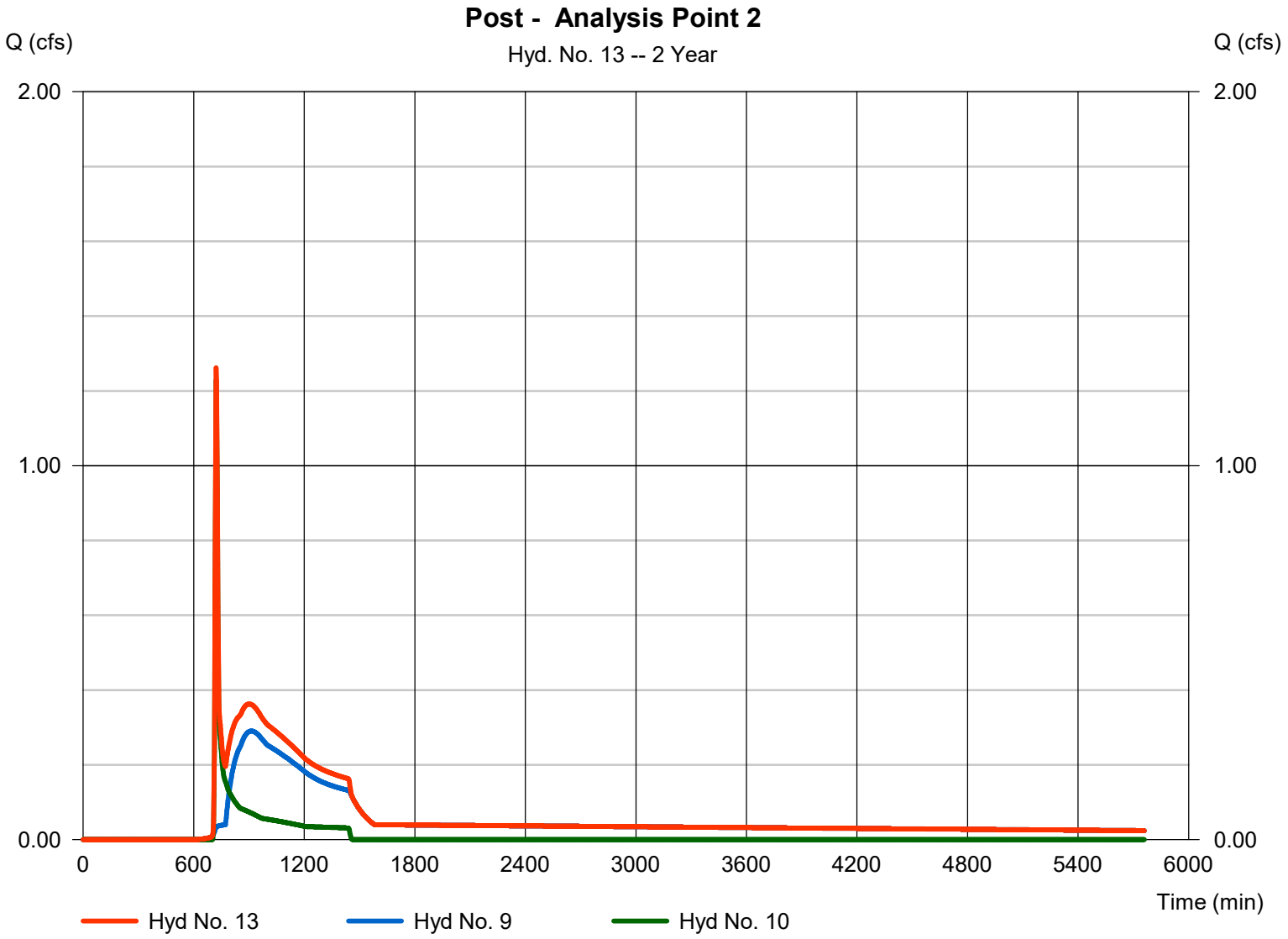


Hydrograph Report

Hyd. No. 13

Post - Analysis Point 2

Hydrograph type	= Combine	Peak discharge	= 1.262 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 20,791 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.600 ac

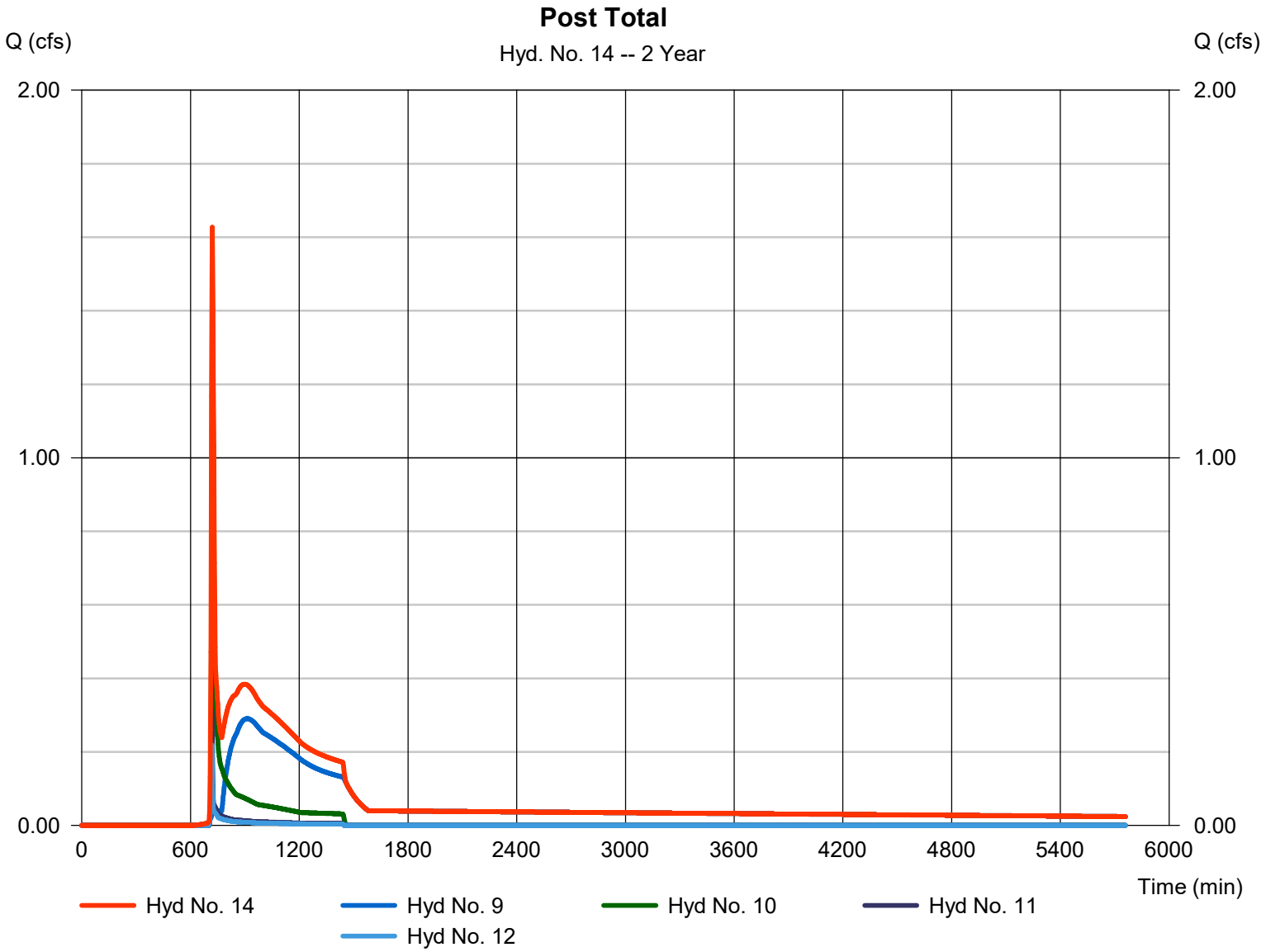


Hydrograph Report

Hyd. No. 14

Post Total

Hydrograph type	= Combine	Peak discharge	= 1.627 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 21,939 cuft
Inflow hyds.	= 9, 10, 11, 12	Contrib. drain. area	= 2.110 ac



Hydrograph Summary Report

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

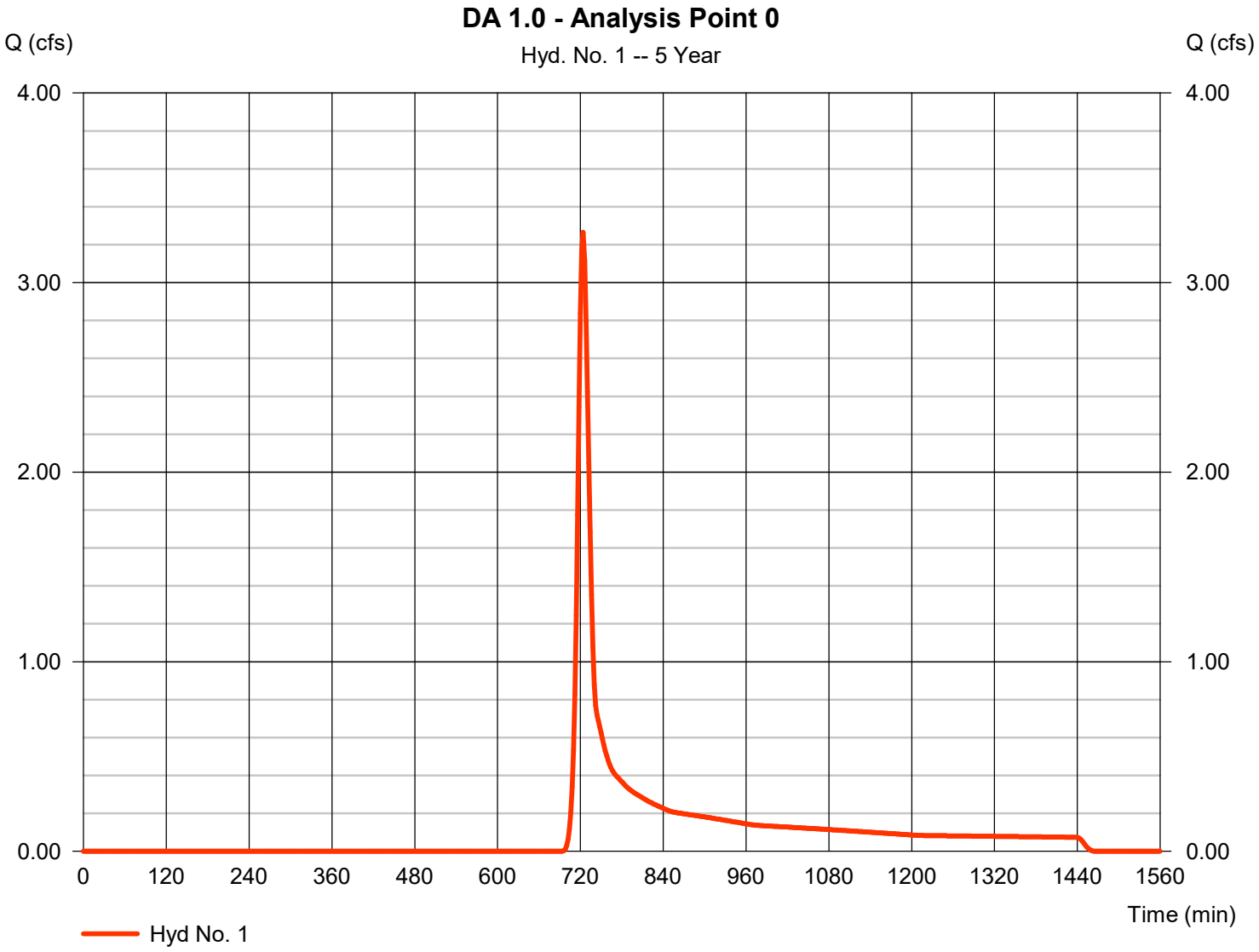
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.265	2	724	10,213	------	------	------	DA 1.0 - Analysis Point 0
2	SCS Runoff	1.516	2	720	3,498	------	------	------	DA 1.1 - Analysis Point 1
3	SCS Runoff	3.807	2	720	9,493	------	------	------	DA 1.2 - Analysis Point 2
4	Combine	8.160	2	720	23,204	1, 2, 3	------	------	Pre Total
6	SCS Runoff	15.81	2	716	31,973	------	------	------	DA 2.0 - To SCM
7	SCS Runoff	0.140	2	718	288	------	------	------	DA 2.2 - Offsite To SCM
8	Combine	15.94	2	716	32,261	6, 7	------	------	To SCM
9	Reservoir	1.067	2	760	26,977	8	546.29	17,480	Wet Pond
10	SCS Runoff	2.389	2	722	6,691	------	------	------	DA 2.1 - Bypass
11	SCS Runoff	0.576	2	718	1,179	------	------	------	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	0.394	2	718	802	------	------	------	DA 2.4 - Bypass - Analysis Point 0
13	Combine	2.733	2	724	33,668	9, 10,	------	------	Post - Analysis Point 2
14	Combine	3.224	2	722	35,649	9, 10, 11, 12,	------	------	Post Total

Hydrograph Report

Hyd. No. 1

DA 1.0 - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 3.265 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 10,213 cuft
Drainage area	= 2.730 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.30 min
Total precip.	= 4.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

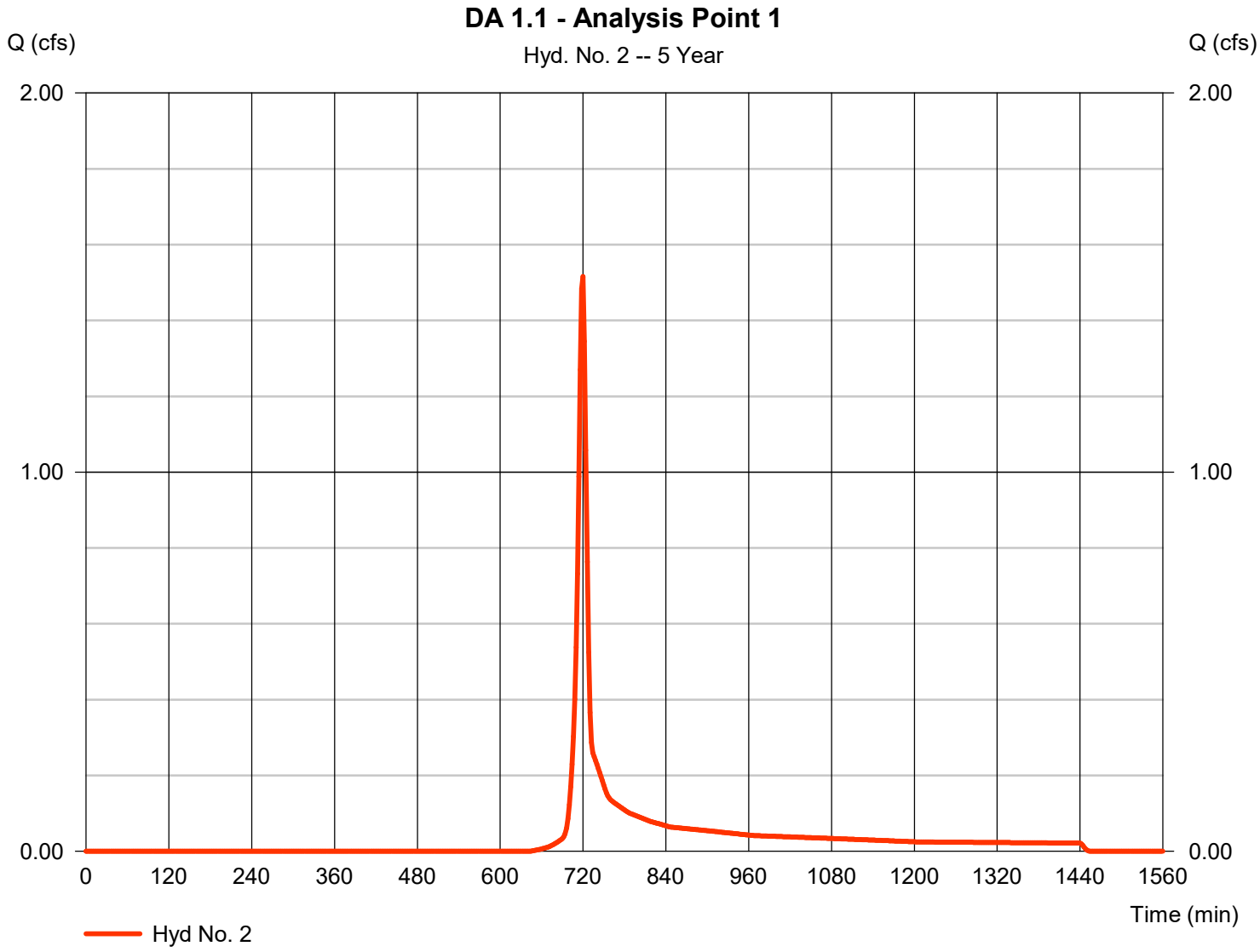


Hydrograph Report

Hyd. No. 2

DA 1.1 - Analysis Point 1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.516 cfs
Storm frequency	= 5 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 3,498 cuft
Drainage area	= 0.640 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.80 min
Total precip.	= 4.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

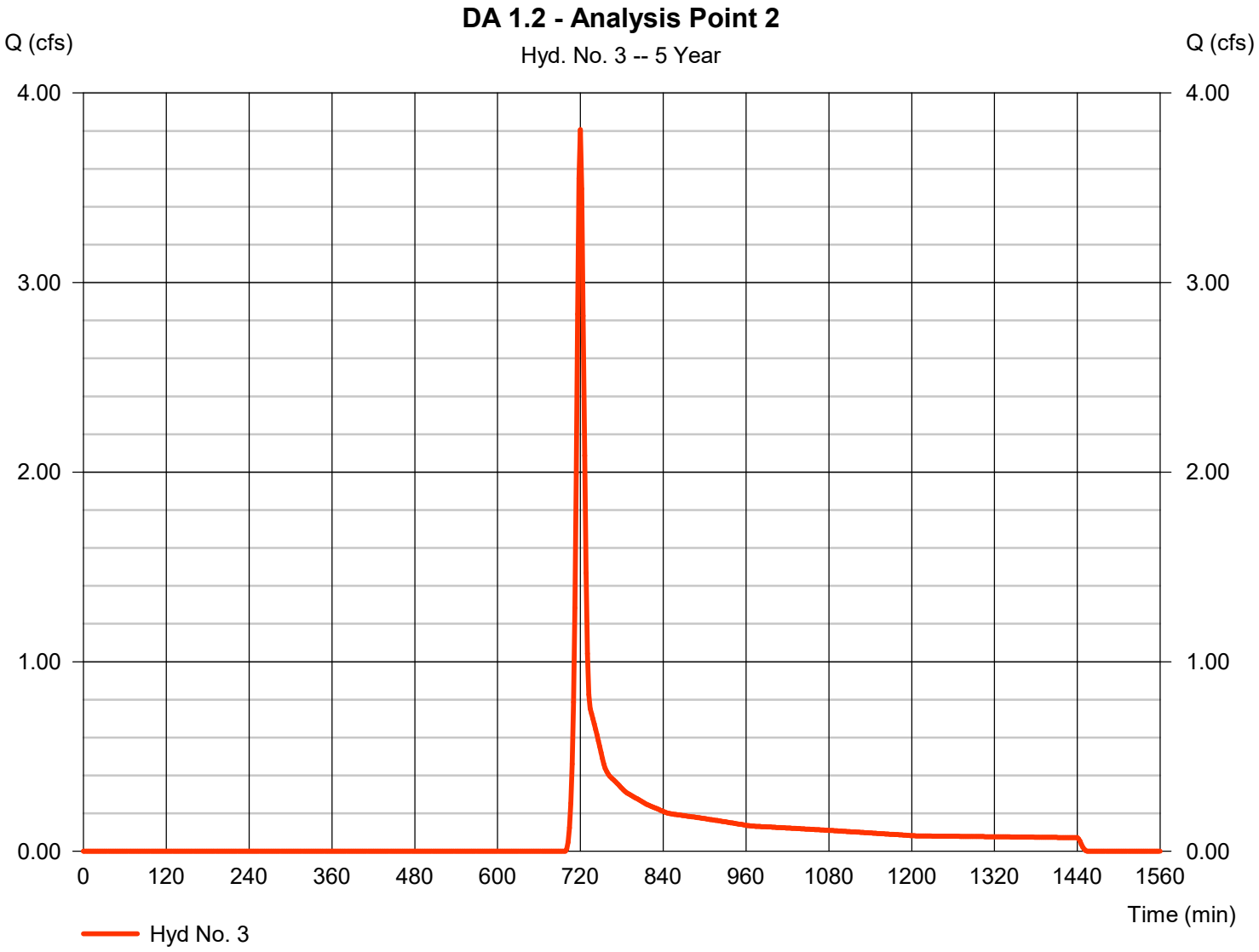


Hydrograph Report

Hyd. No. 3

DA 1.2 - Analysis Point 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.807 cfs
Storm frequency	=	5 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	9,493 cuft
Drainage area	=	2.780 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	4.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

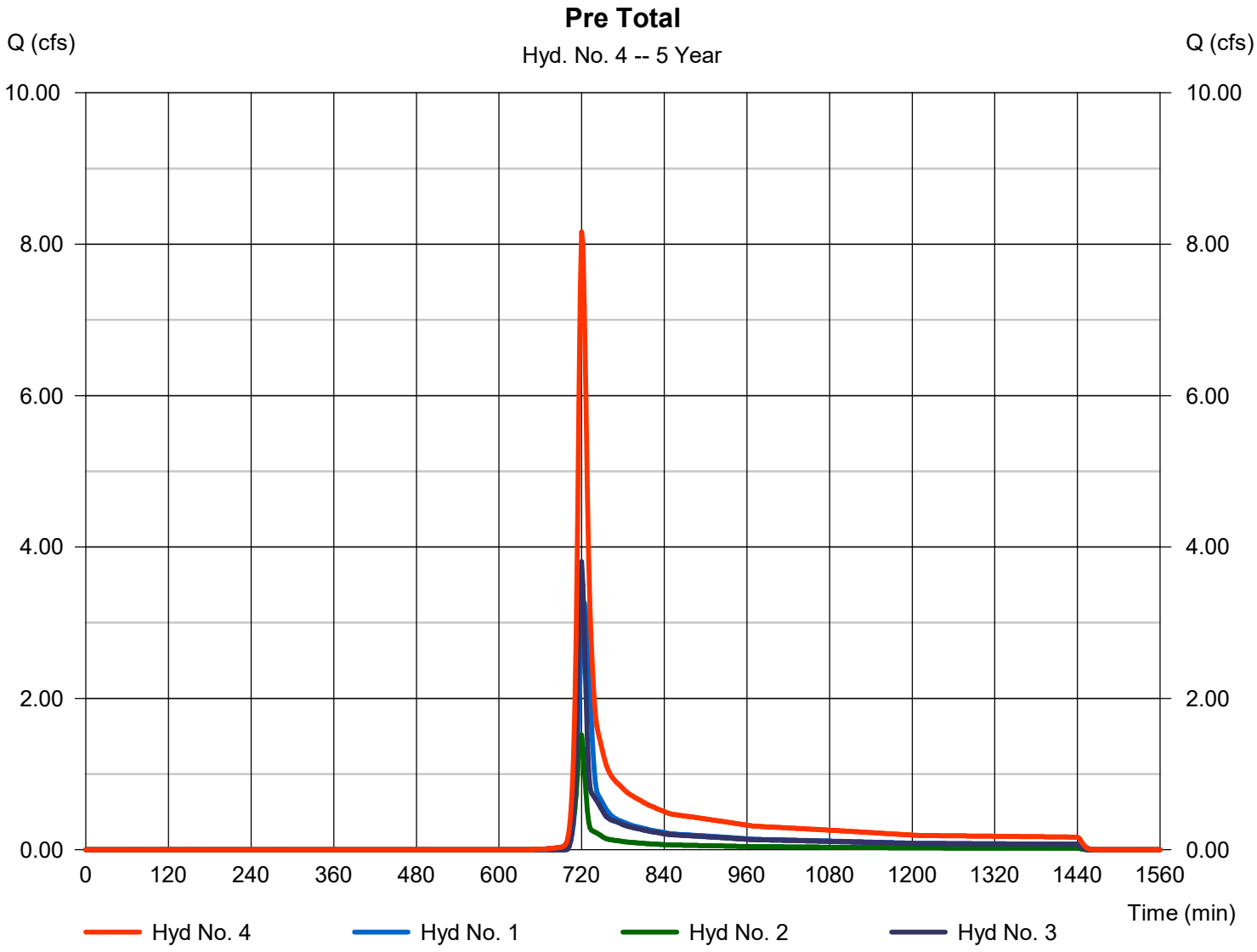


Hydrograph Report

Hyd. No. 4

Pre Total

Hydrograph type	= Combine	Peak discharge	= 8.160 cfs
Storm frequency	= 5 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 23,204 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 6.150 ac

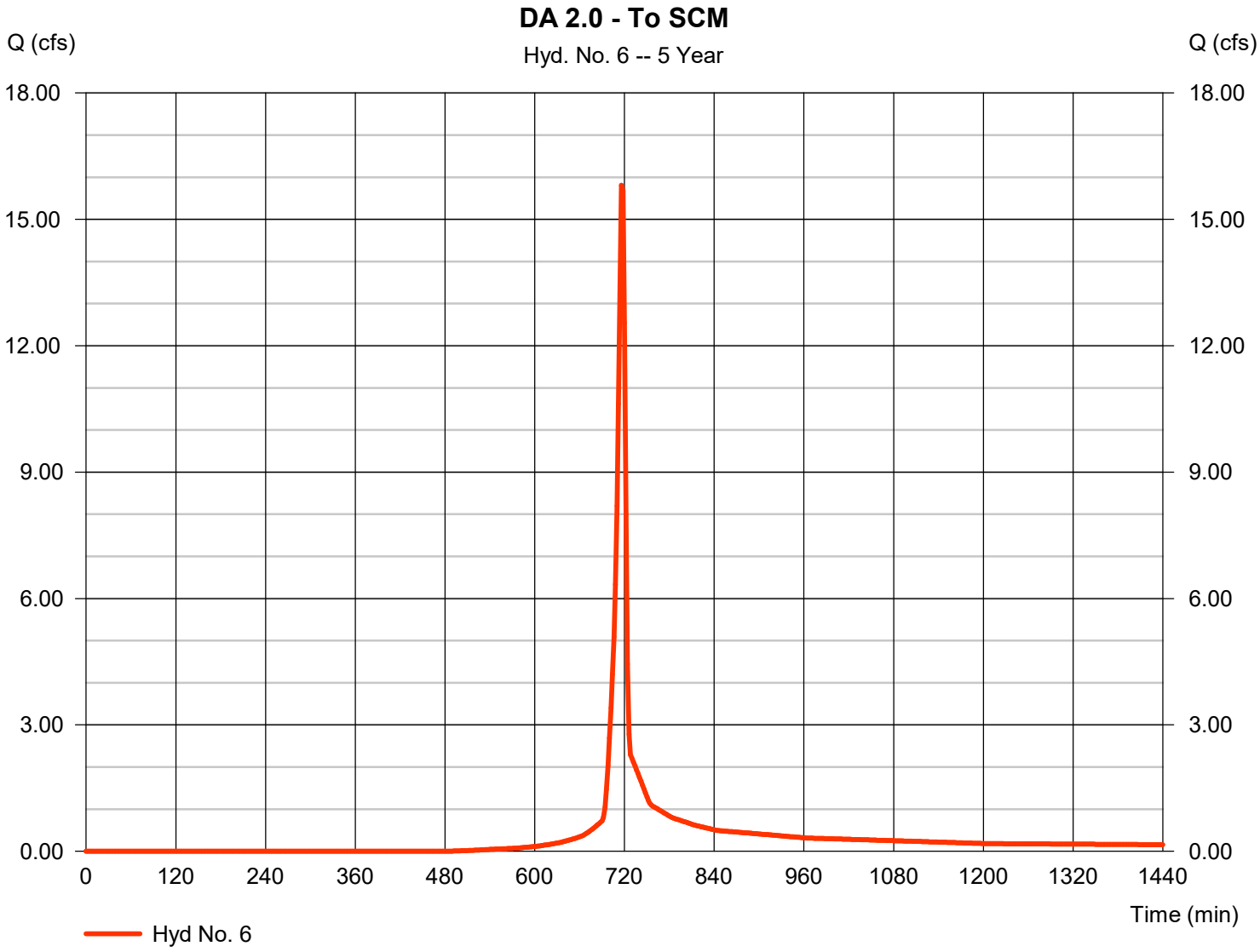


Hydrograph Report

Hyd. No. 6

DA 2.0 - To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.81 cfs
Storm frequency	=	5 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	31,973 cuft
Drainage area	=	4.010 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

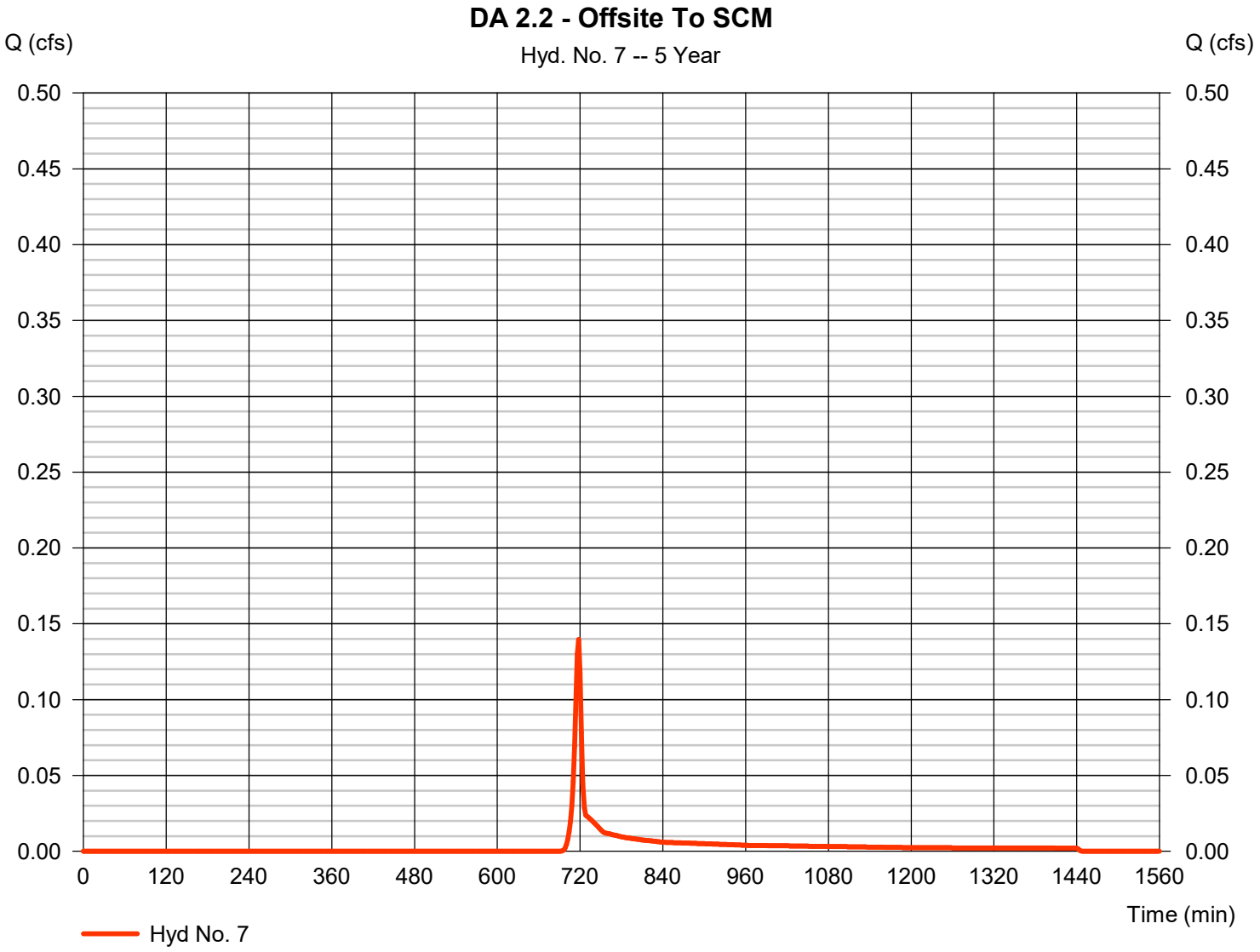


Hydrograph Report

Hyd. No. 7

DA 2.2 - Offsite To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.140 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	288 cuft
Drainage area	=	0.080 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

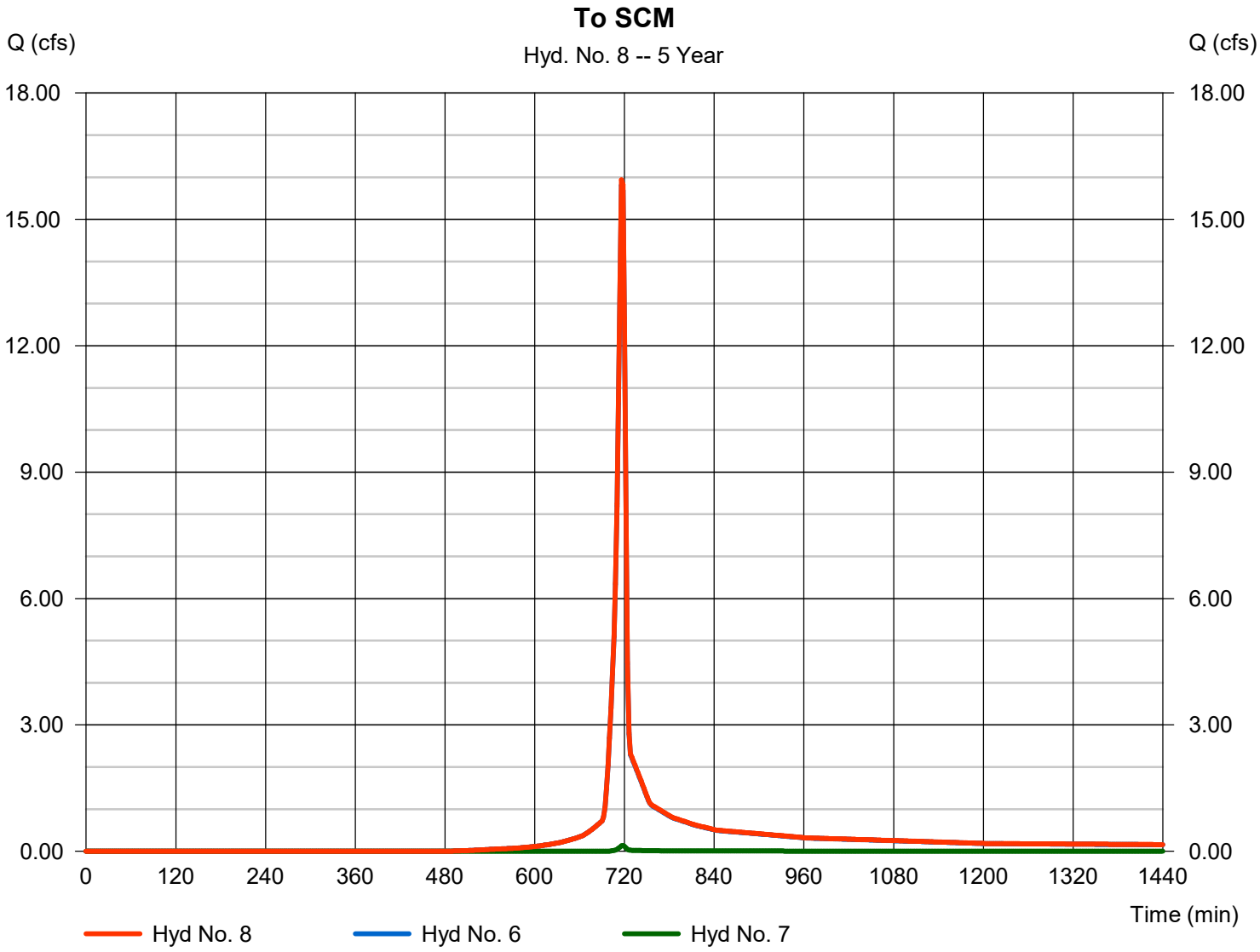


Hydrograph Report

Hyd. No. 8

To SCM

Hydrograph type	= Combine	Peak discharge	= 15.94 cfs
Storm frequency	= 5 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 32,261 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.090 ac



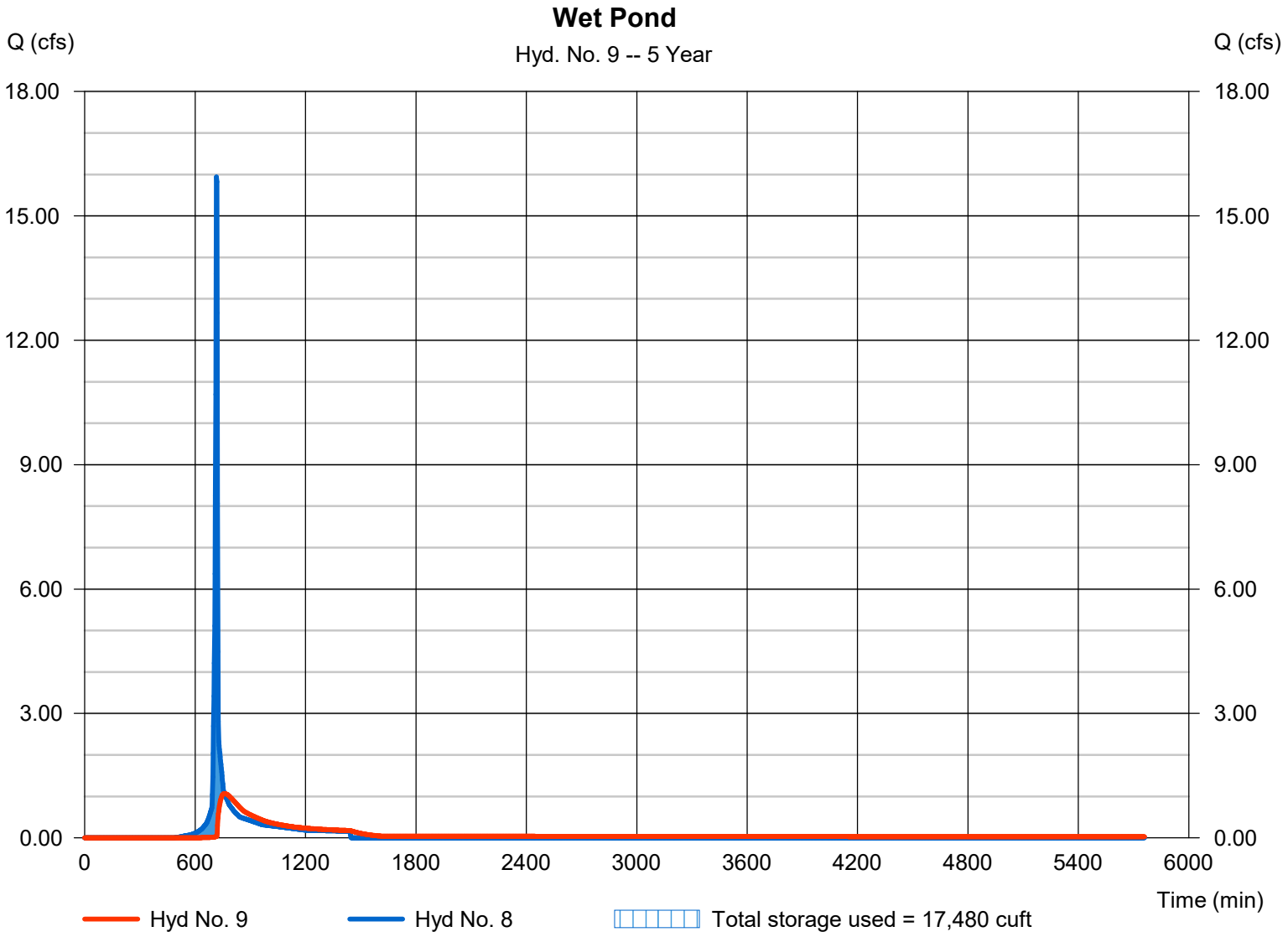
Hydrograph Report

Hyd. No. 9

Wet Pond

Hydrograph type	=	Reservoir	Peak discharge	=	1.067 cfs
Storm frequency	=	5 yrs	Time to peak	=	760 min
Time interval	=	2 min	Hyd. volume	=	26,977 cuft
Inflow hyd. No.	=	8 - To SCM	Max. Elevation	=	546.29 ft
Reservoir name	=	Wet Pond	Max. Storage	=	17,480 cuft

Storage Indication method used.

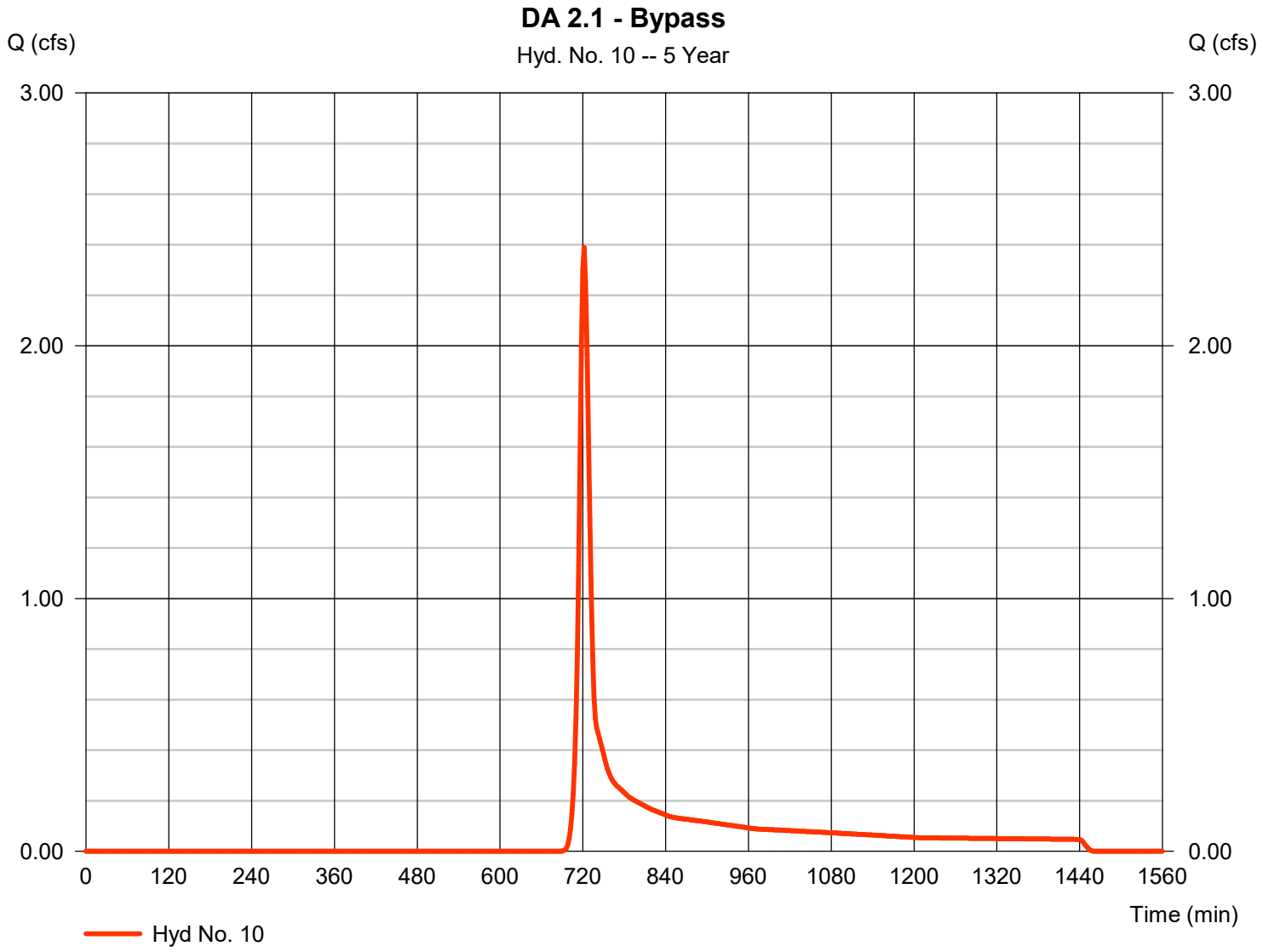


Hydrograph Report

Hyd. No. 10

DA 2.1 - Bypass

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.389 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	6,691 cuft
Drainage area	=	1.600 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	4.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

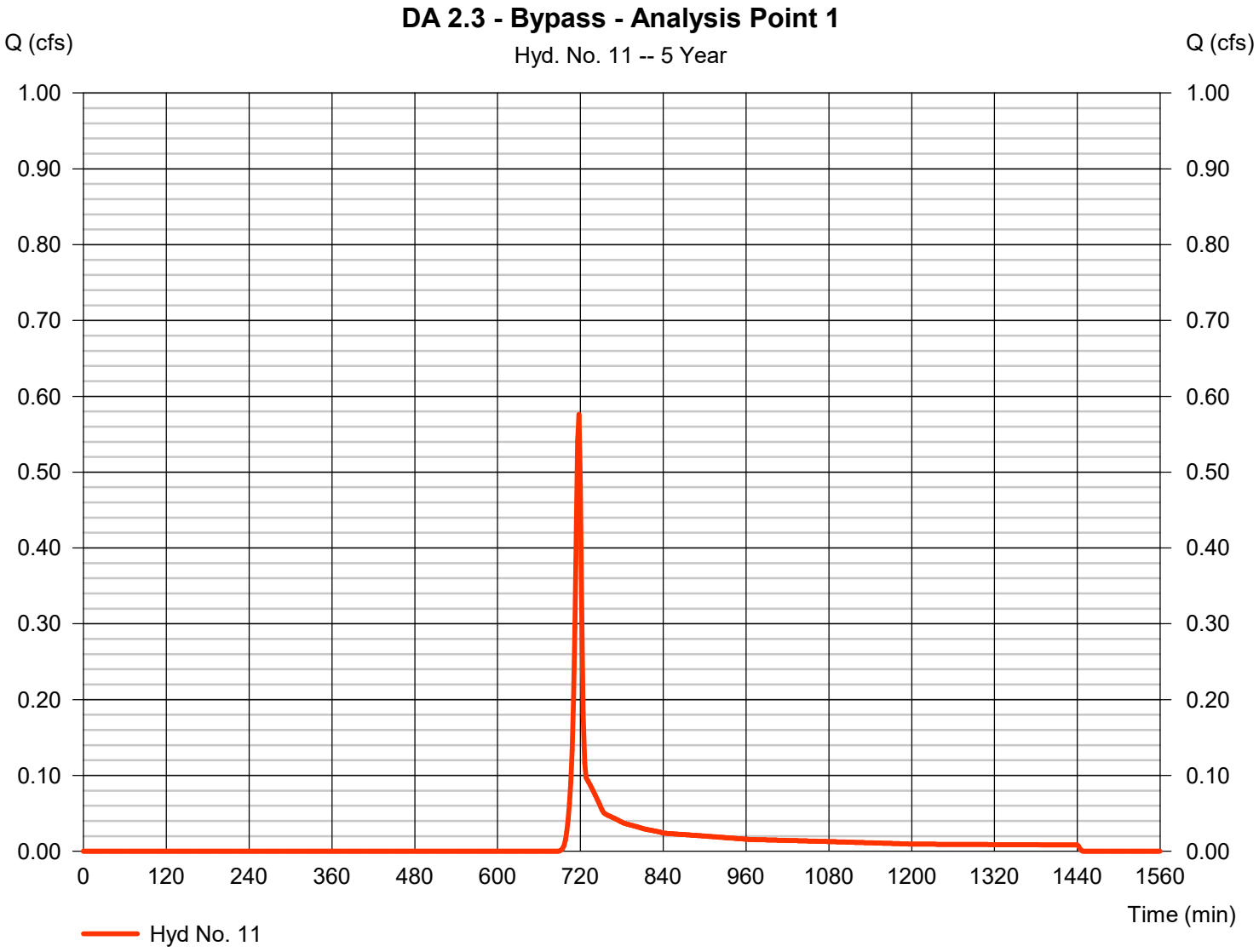


Hydrograph Report

Hyd. No. 11

DA 2.3 - Bypass - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.576 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1,179 cuft
Drainage area	=	0.310 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.46 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

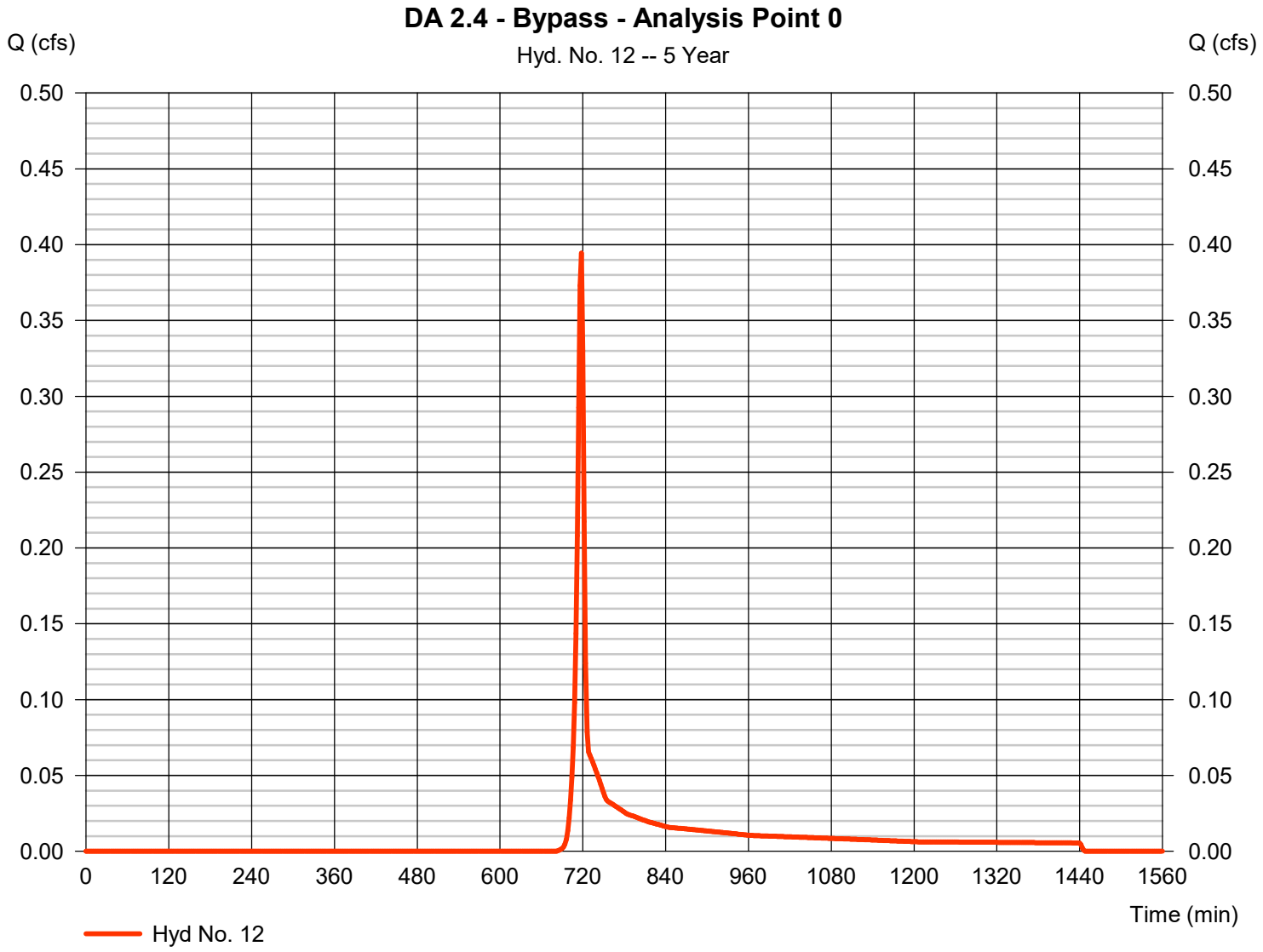


Hydrograph Report

Hyd. No. 12

DA 2.4 - Bypass - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 0.394 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 802 cuft
Drainage area	= 0.200 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.46 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

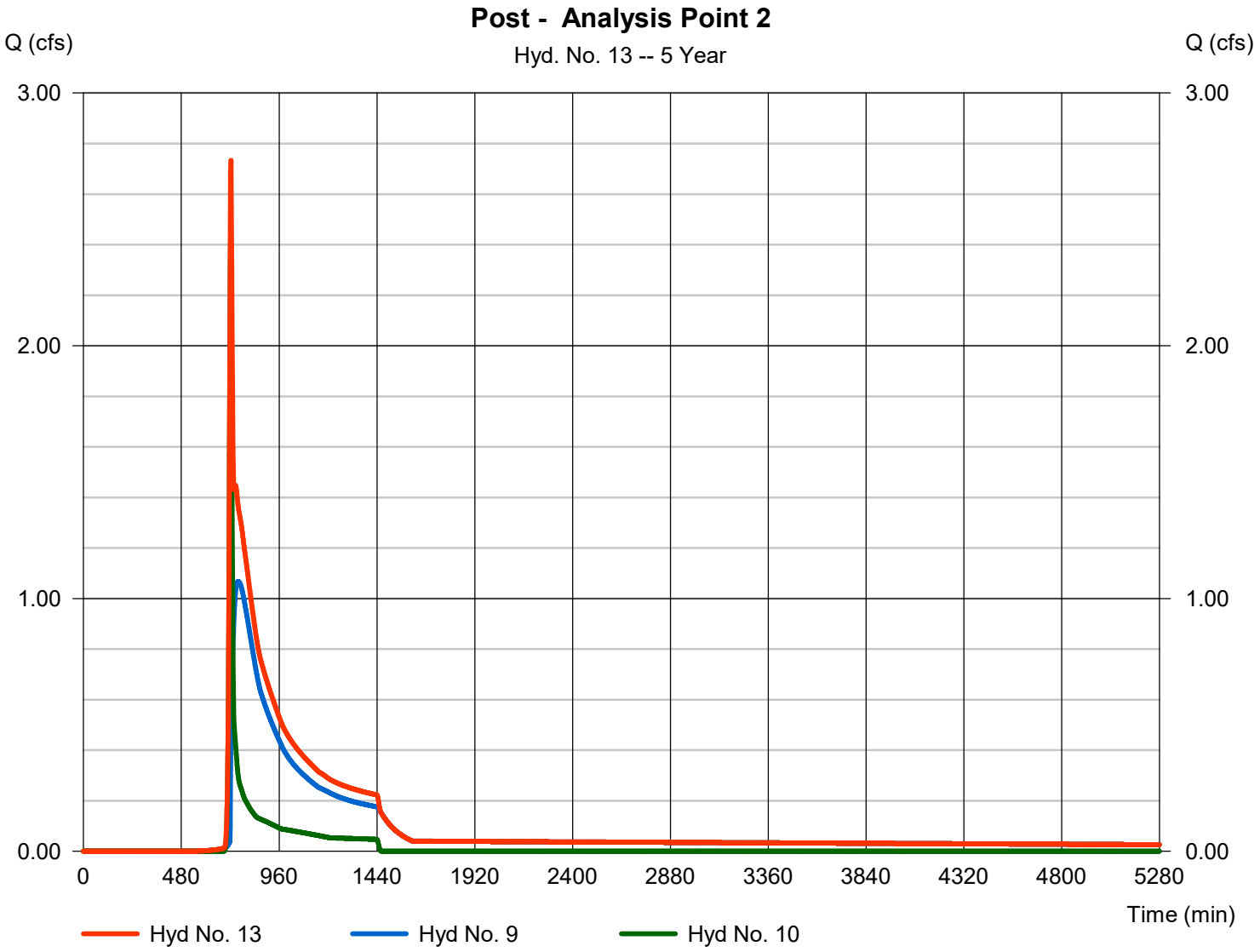


Hydrograph Report

Hyd. No. 13

Post - Analysis Point 2

Hydrograph type	= Combine	Peak discharge	= 2.733 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 33,668 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.600 ac

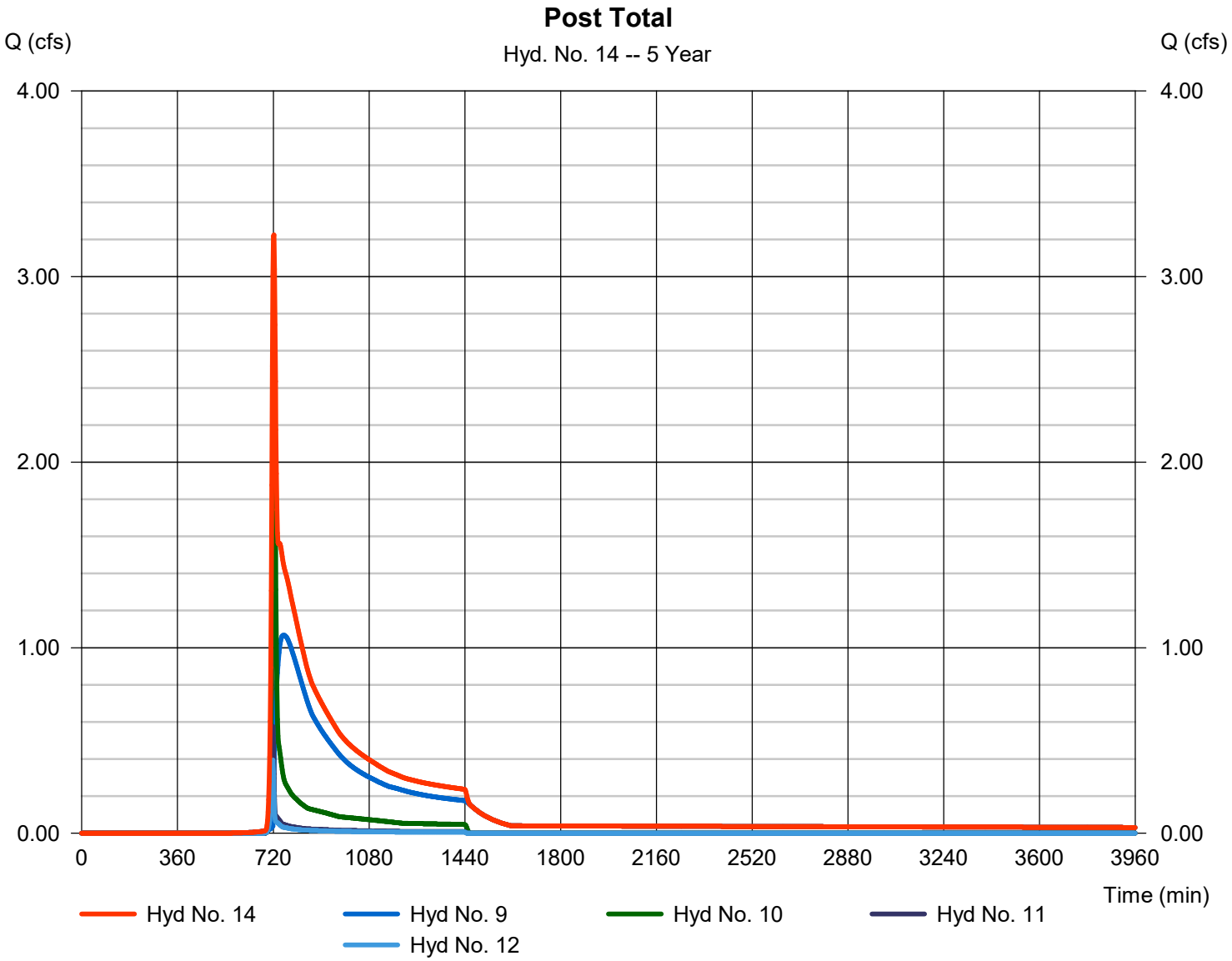


Hydrograph Report

Hyd. No. 14

Post Total

Hydrograph type	= Combine	Peak discharge	= 3.224 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 35,649 cuft
Inflow hyds.	= 9, 10, 11, 12	Contrib. drain. area	= 2.110 ac



Hydrograph Summary Report

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

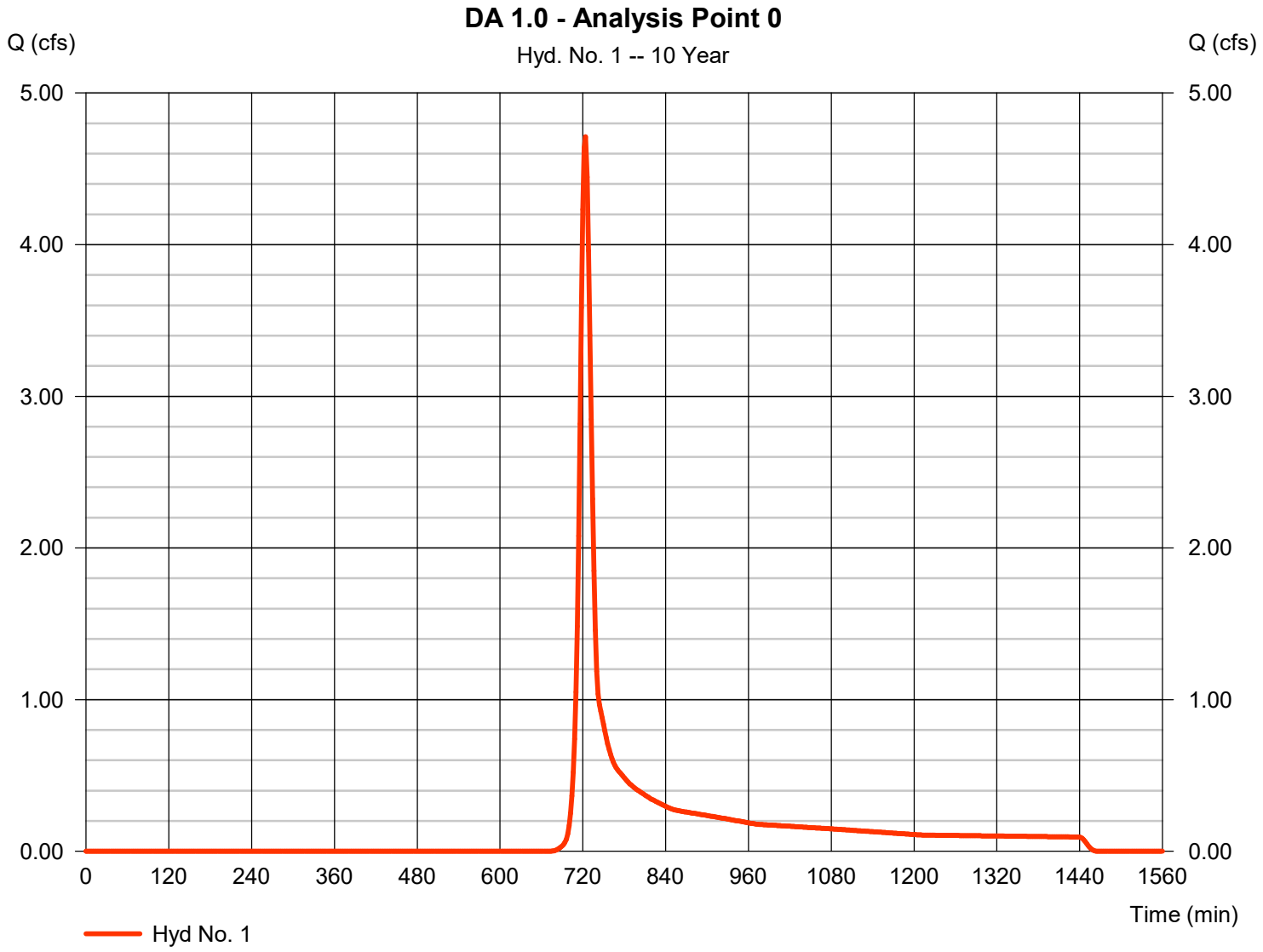
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.711	2	724	14,107	------	------	------	DA 1.0 - Analysis Point 0
2	SCS Runoff	2.014	2	720	4,616	------	------	------	DA 1.1 - Analysis Point 1
3	SCS Runoff	5.584	2	720	13,323	------	------	------	DA 1.2 - Analysis Point 2
4	Combine	11.83	2	720	32,047	1, 2, 3	------	------	Pre Total
6	SCS Runoff	19.69	2	716	40,001	------	------	------	DA 2.0 - To SCM
7	SCS Runoff	0.197	2	718	397	------	------	------	DA 2.2 - Offsite To SCM
8	Combine	19.88	2	716	40,398	6, 7	------	------	To SCM
9	Reservoir	2.286	2	738	35,086	8	546.48	20,398	Wet Pond
10	SCS Runoff	3.390	2	722	9,175	------	------	------	DA 2.1 - Bypass
11	SCS Runoff	0.803	2	718	1,616	------	------	------	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	0.544	2	718	1,092	------	------	------	DA 2.4 - Bypass - Analysis Point 0
13	Combine	5.186	2	724	44,261	9, 10,	------	------	Post - Analysis Point 2
14	Combine	5.829	2	722	46,969	9, 10, 11, 12,	------	------	Post Total

Hydrograph Report

Hyd. No. 1

DA 1.0 - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 4.711 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 14,107 cuft
Drainage area	= 2.730 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.30 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

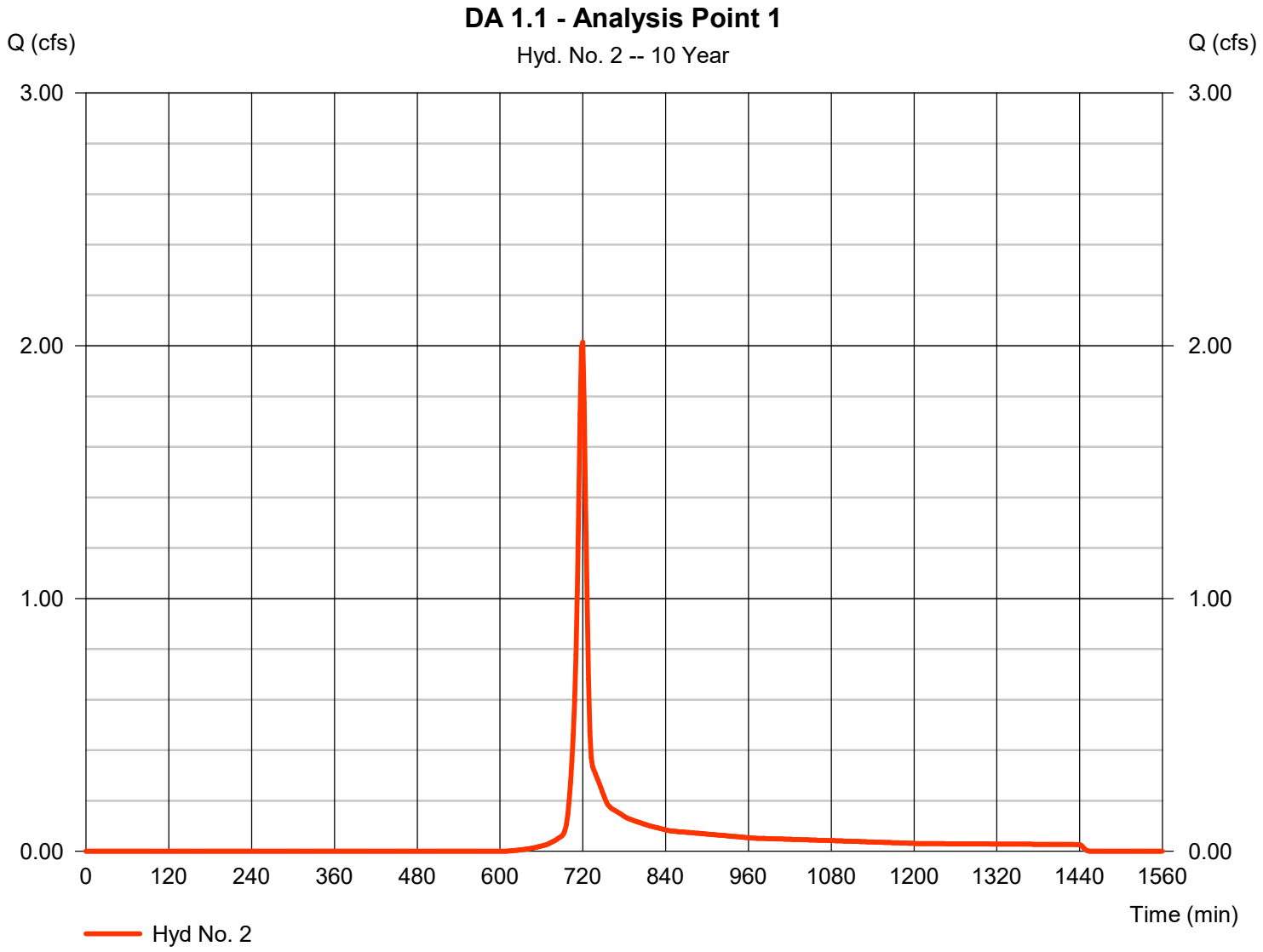


Hydrograph Report

Hyd. No. 2

DA 1.1 - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.014 cfs
Storm frequency	=	10 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	4,616 cuft
Drainage area	=	0.640 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.80 min
Total precip.	=	5.15 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

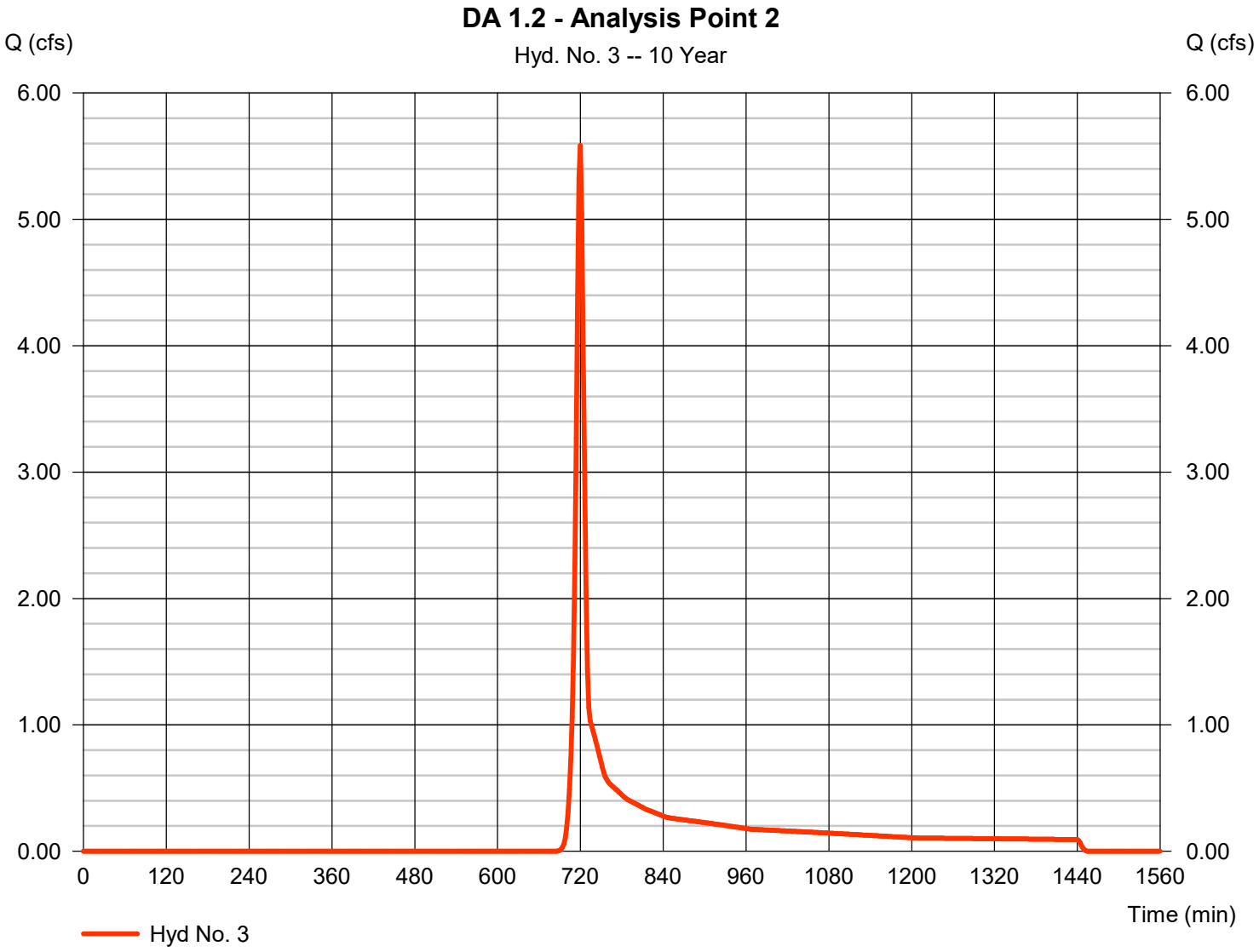


Hydrograph Report

Hyd. No. 3

DA 1.2 - Analysis Point 2

Hydrograph type	= SCS Runoff	Peak discharge	= 5.584 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 13,323 cuft
Drainage area	= 2.780 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.20 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

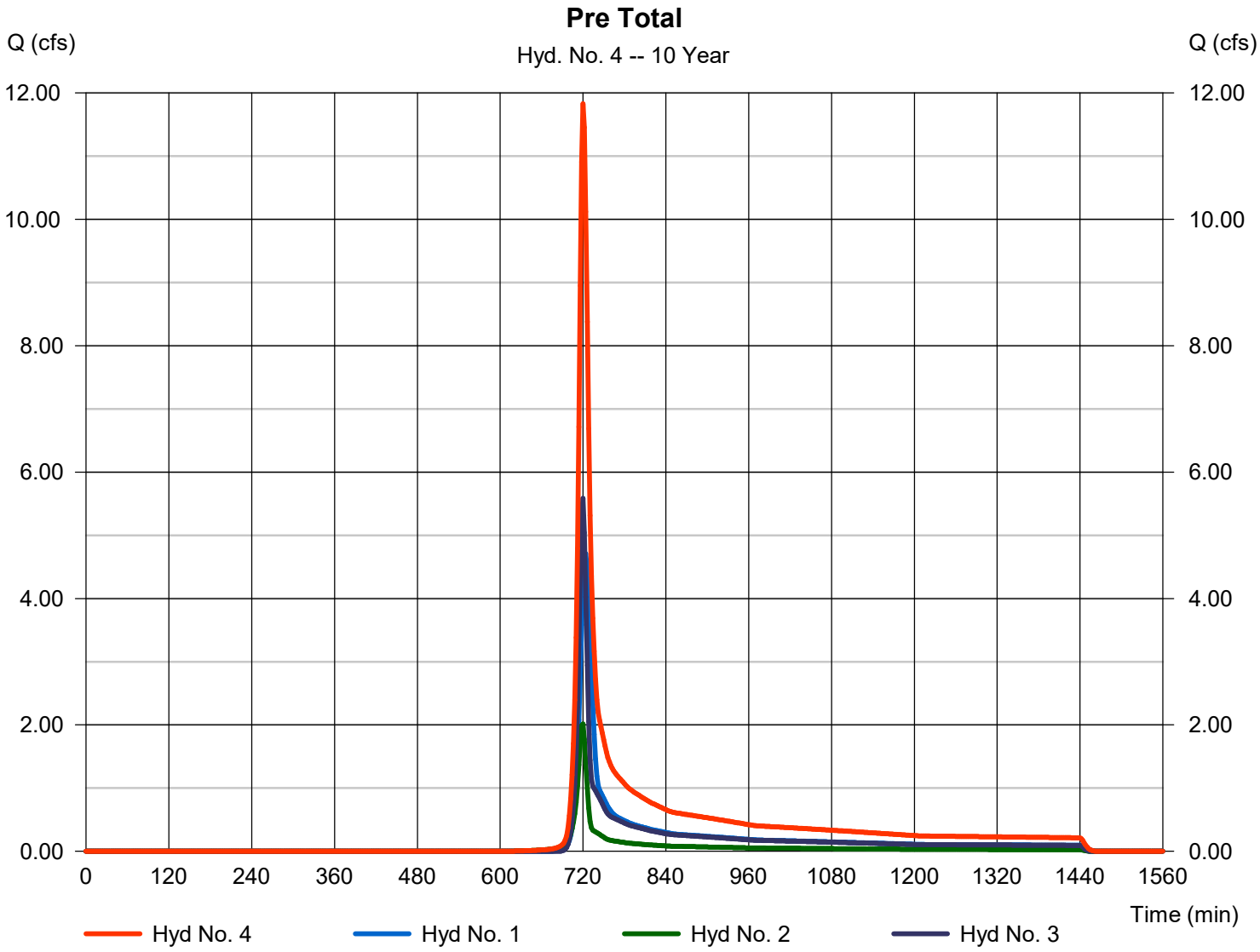


Hydrograph Report

Hyd. No. 4

Pre Total

Hydrograph type	= Combine	Peak discharge	= 11.83 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 32,047 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 6.150 ac

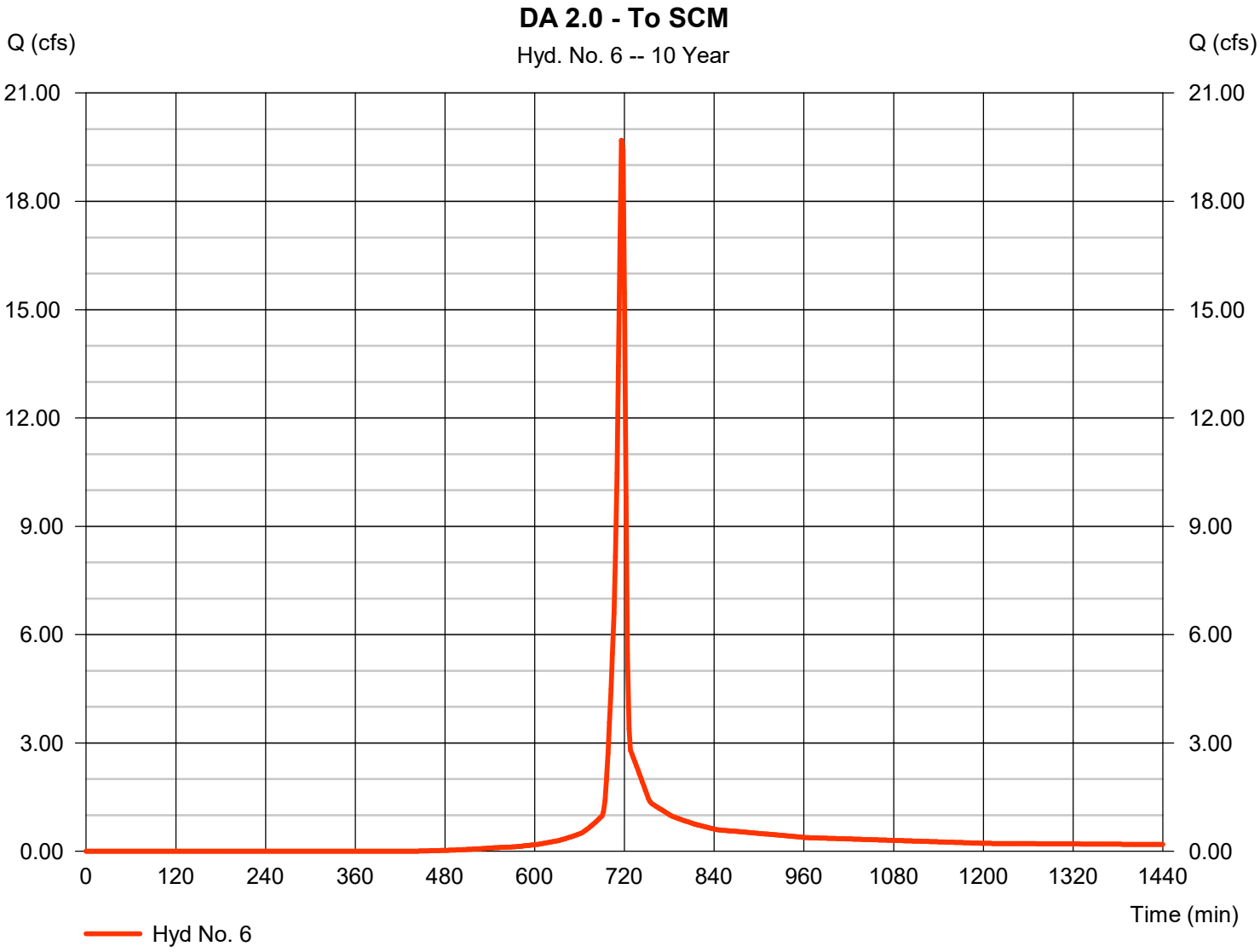


Hydrograph Report

Hyd. No. 6

DA 2.0 - To SCM

Hydrograph type	= SCS Runoff	Peak discharge	= 19.69 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 40,001 cuft
Drainage area	= 4.010 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

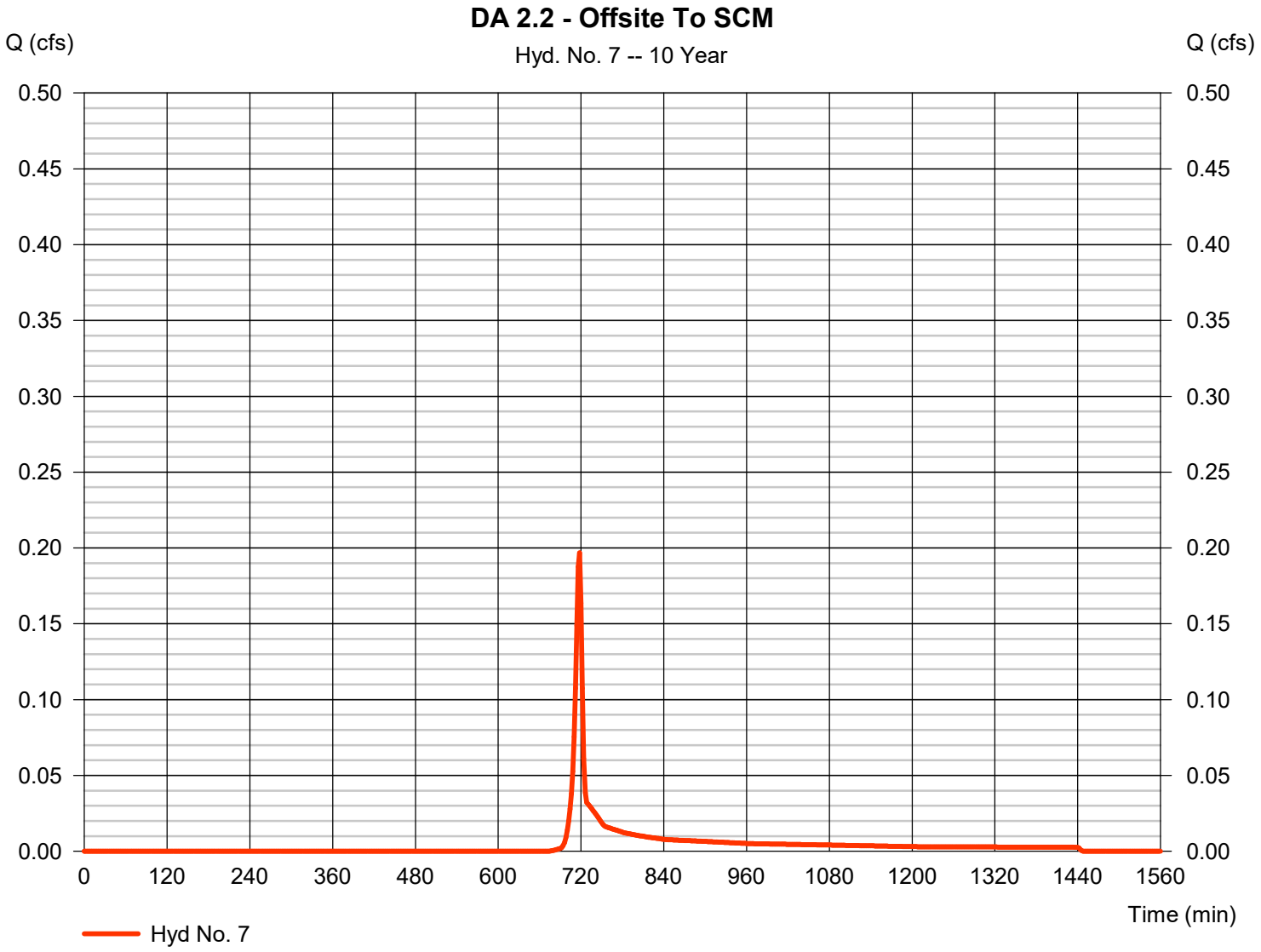


Hydrograph Report

Hyd. No. 7

DA 2.2 - Offsite To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.197 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	397 cuft
Drainage area	=	0.080 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.15 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

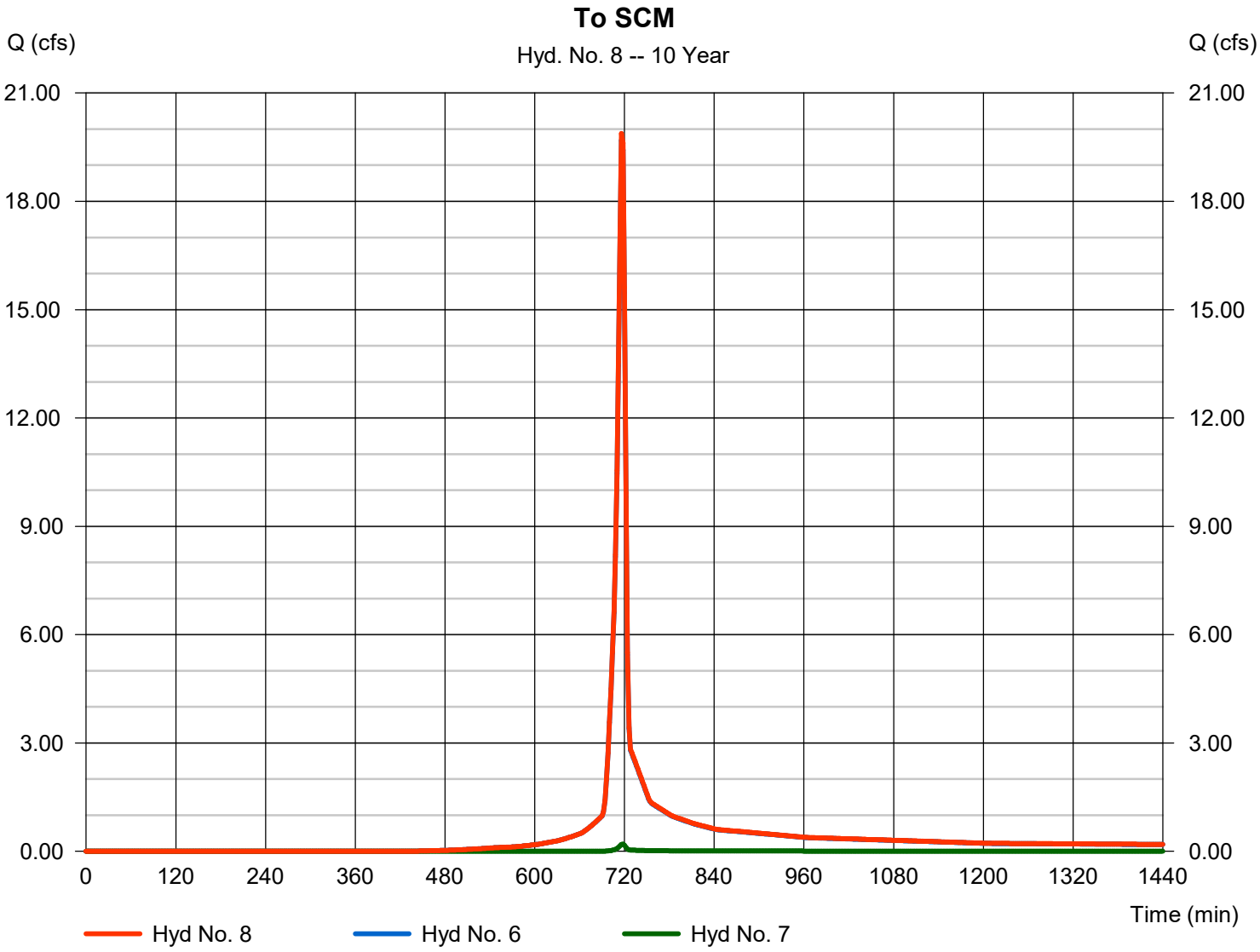


Hydrograph Report

Hyd. No. 8

To SCM

Hydrograph type	= Combine	Peak discharge	= 19.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 40,398 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 4.090 ac



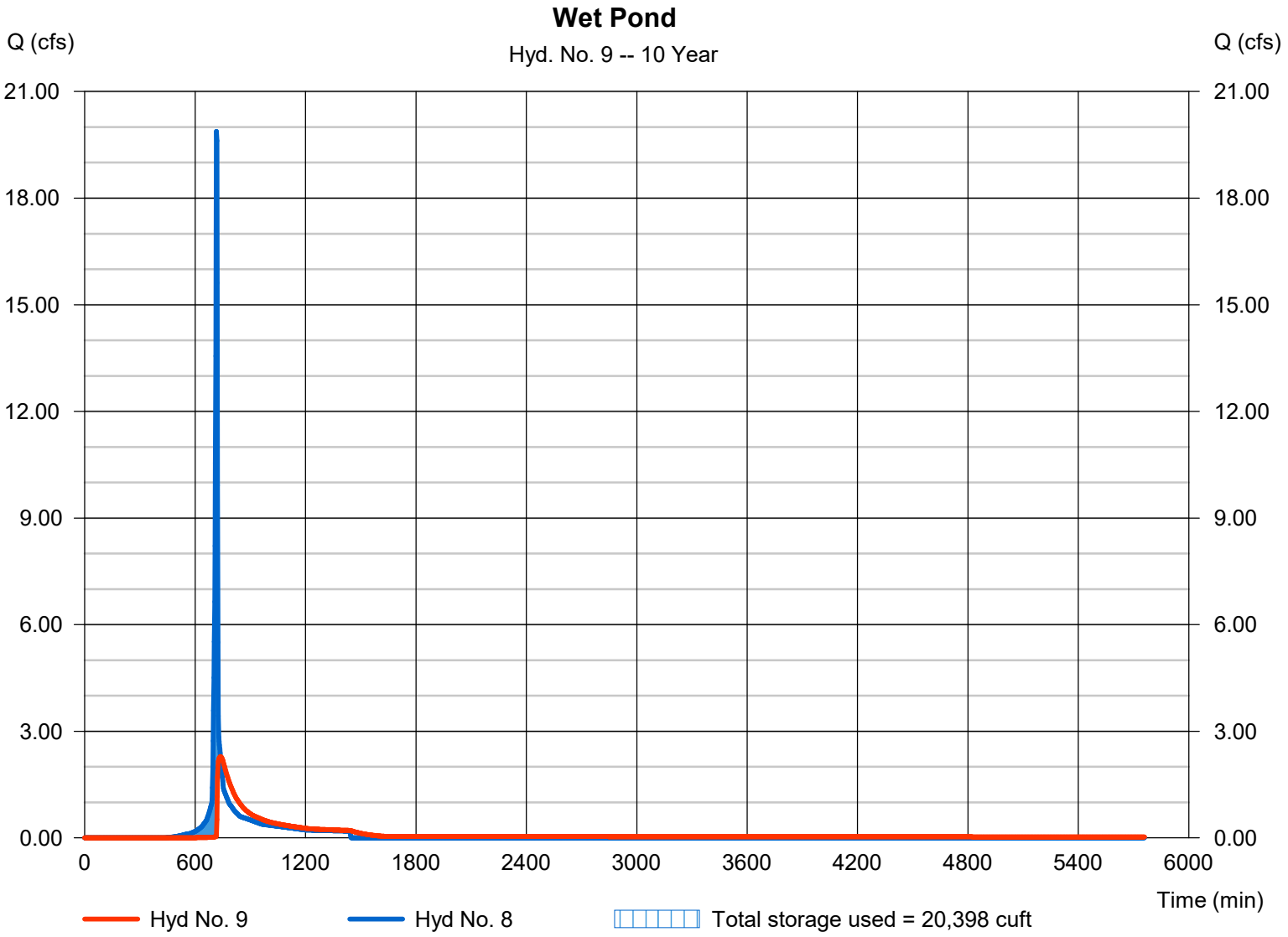
Hydrograph Report

Hyd. No. 9

Wet Pond

Hydrograph type	=	Reservoir	Peak discharge	=	2.286 cfs
Storm frequency	=	10 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	35,086 cuft
Inflow hyd. No.	=	8 - To SCM	Max. Elevation	=	546.48 ft
Reservoir name	=	Wet Pond	Max. Storage	=	20,398 cuft

Storage Indication method used.

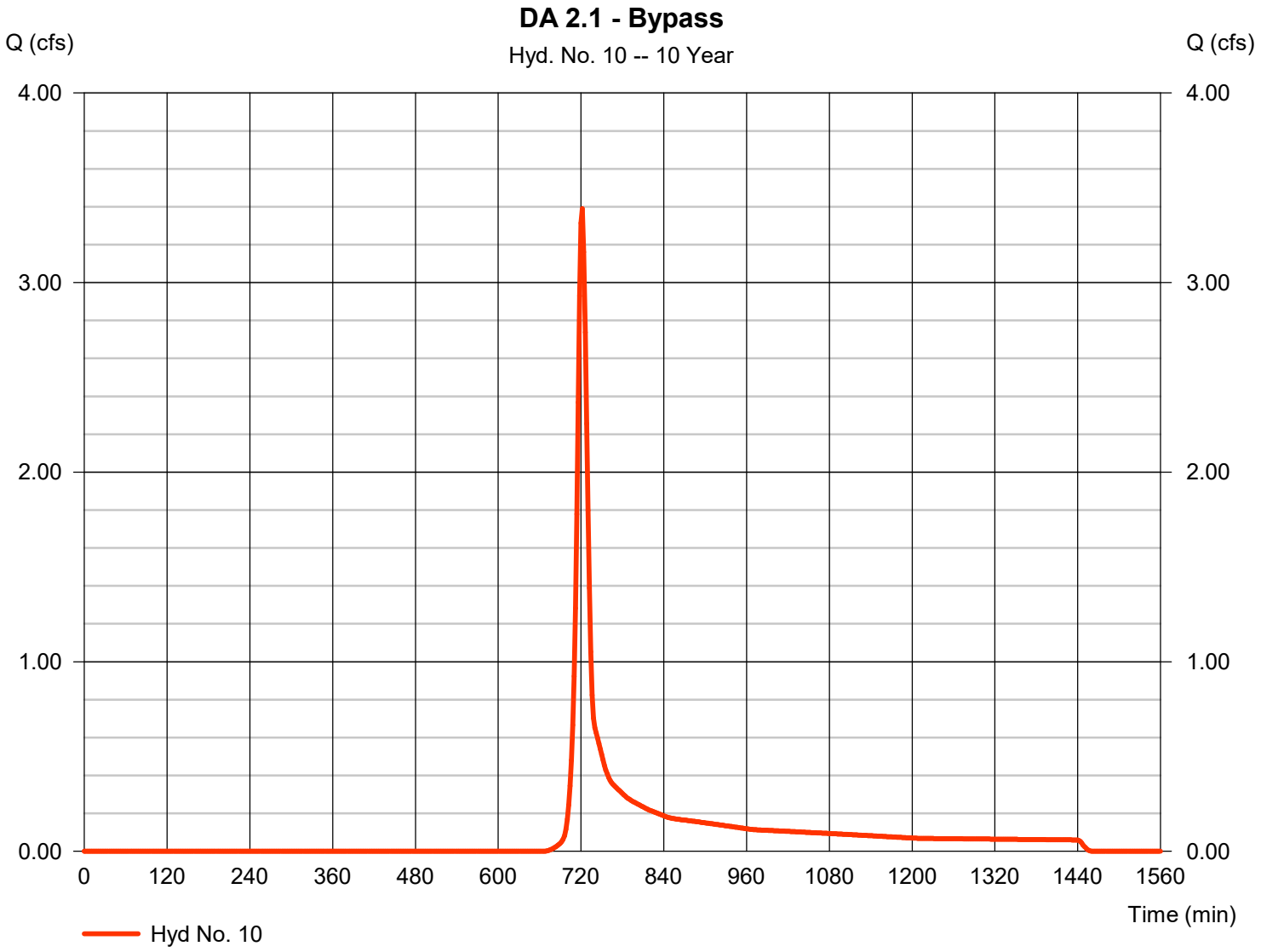


Hydrograph Report

Hyd. No. 10

DA 2.1 - Bypass

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.390 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	9,175 cuft
Drainage area	=	1.600 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	5.15 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

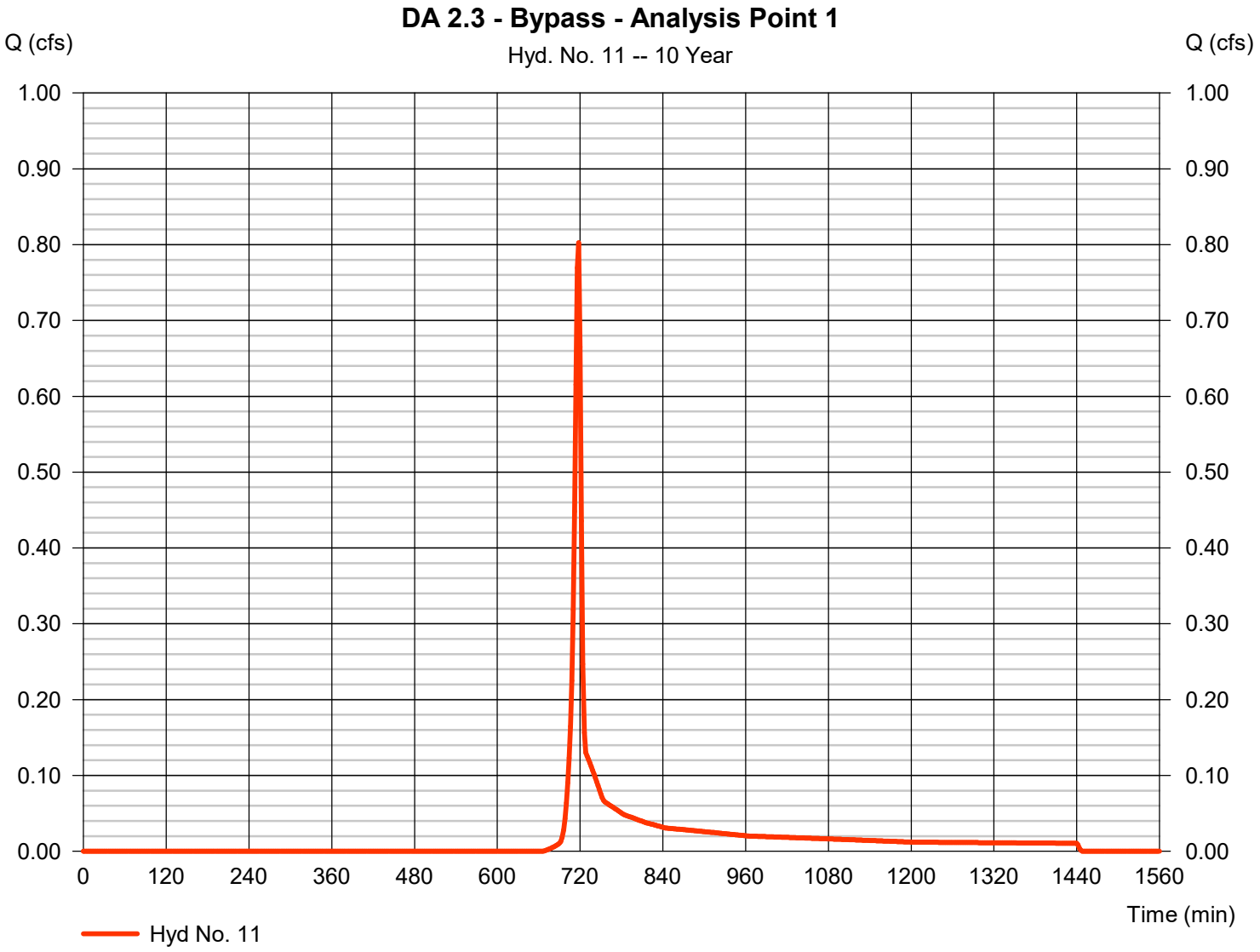


Hydrograph Report

Hyd. No. 11

DA 2.3 - Bypass - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.803 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1,616 cuft
Drainage area	=	0.310 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.15 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

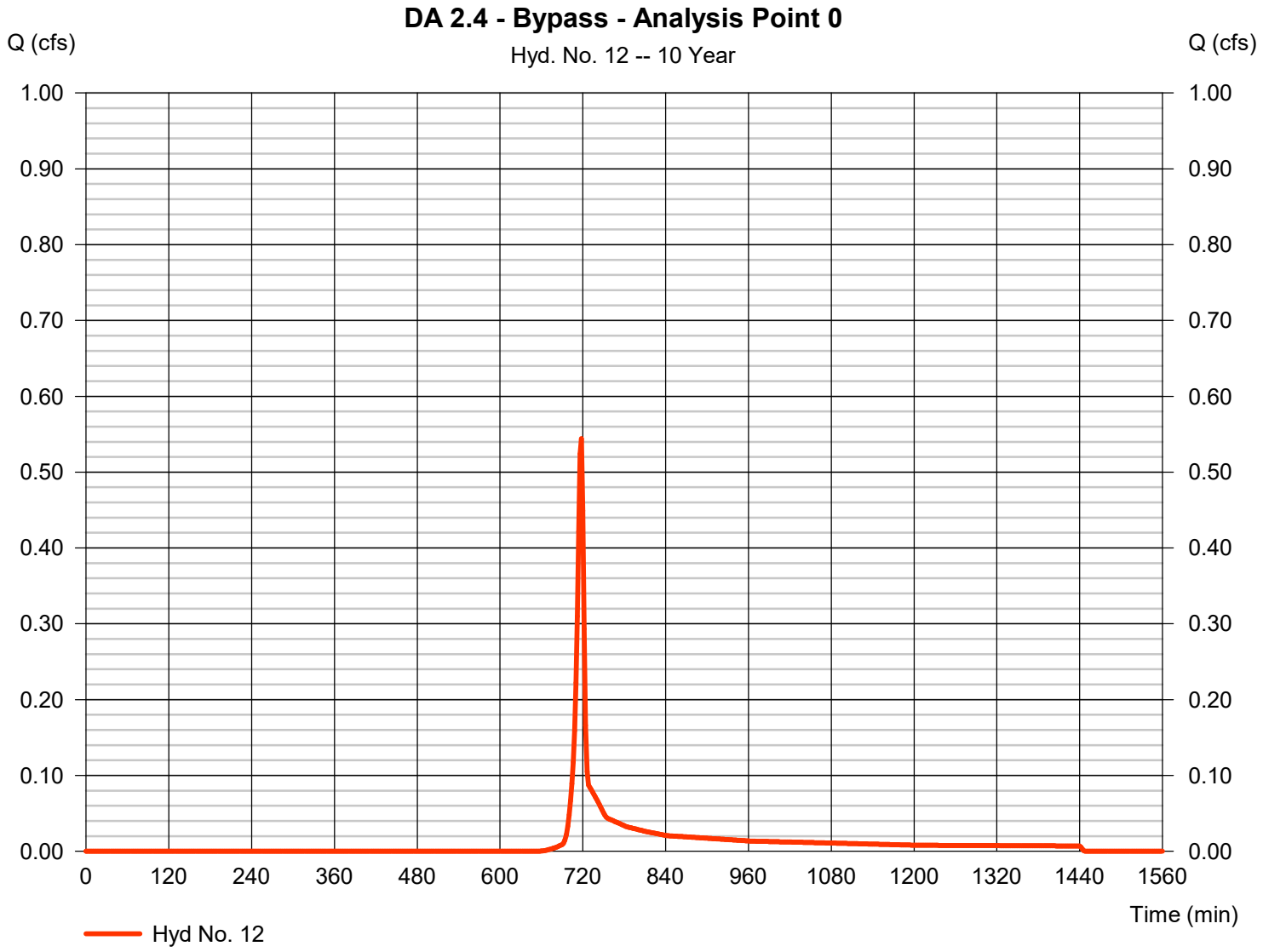


Hydrograph Report

Hyd. No. 12

DA 2.4 - Bypass - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 0.544 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,092 cuft
Drainage area	= 0.200 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.15 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

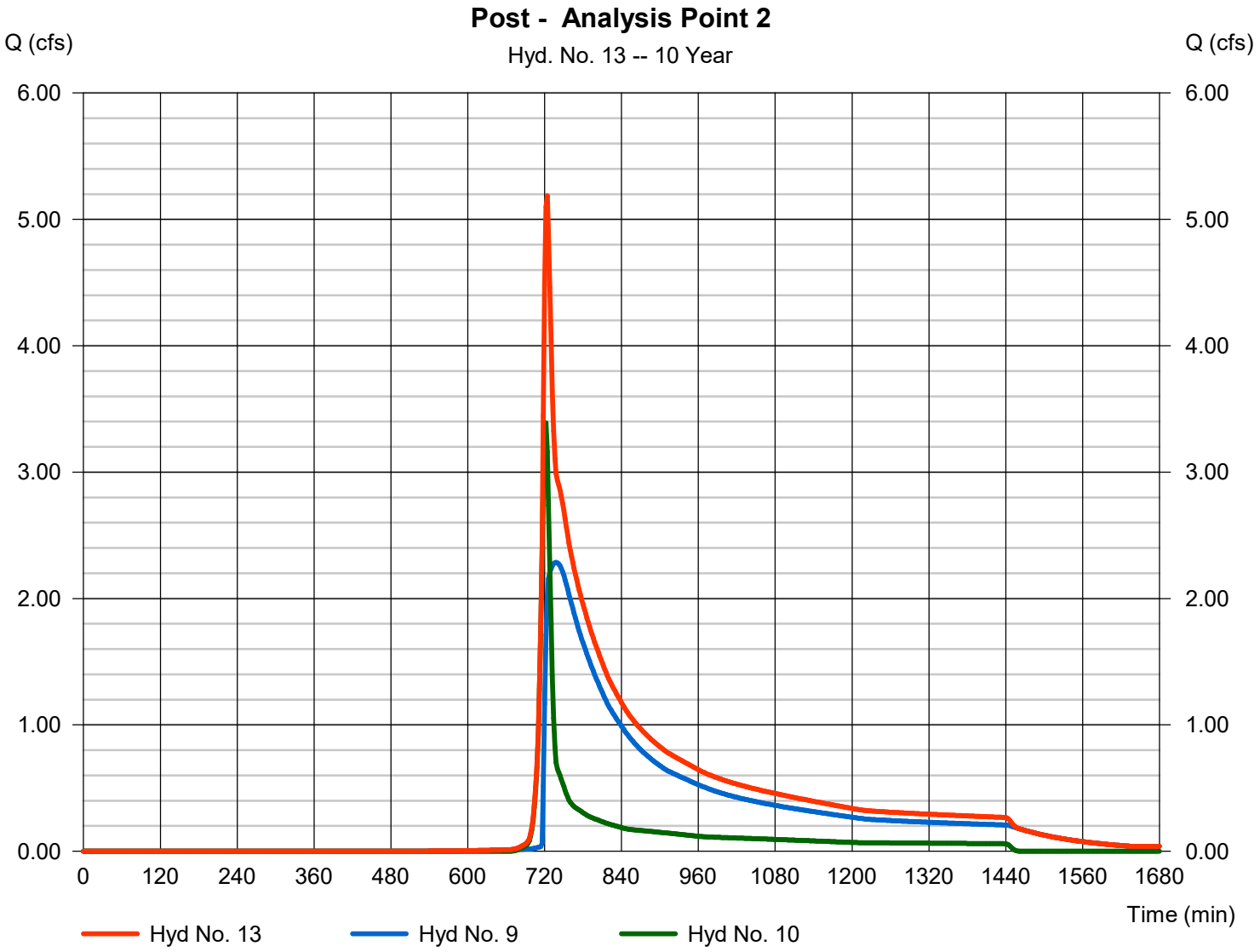


Hydrograph Report

Hyd. No. 13

Post - Analysis Point 2

Hydrograph type	= Combine	Peak discharge	= 5.186 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 44,261 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.600 ac

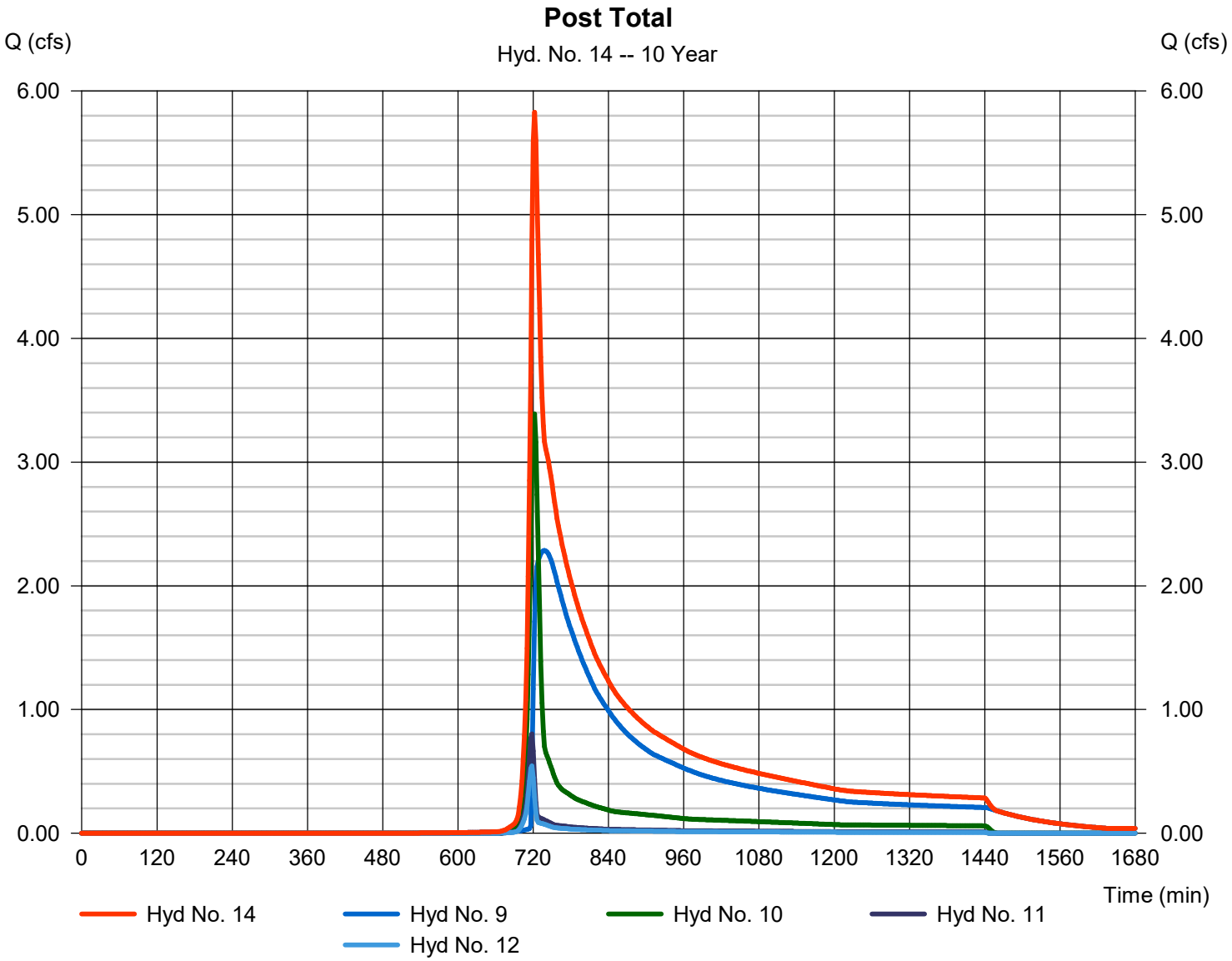


Hydrograph Report

Hyd. No. 14

Post Total

Hydrograph type	= Combine	Peak discharge	= 5.829 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 46,969 cuft
Inflow hyds.	= 9, 10, 11, 12	Contrib. drain. area	= 2.110 ac



Hydrograph Summary Report

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

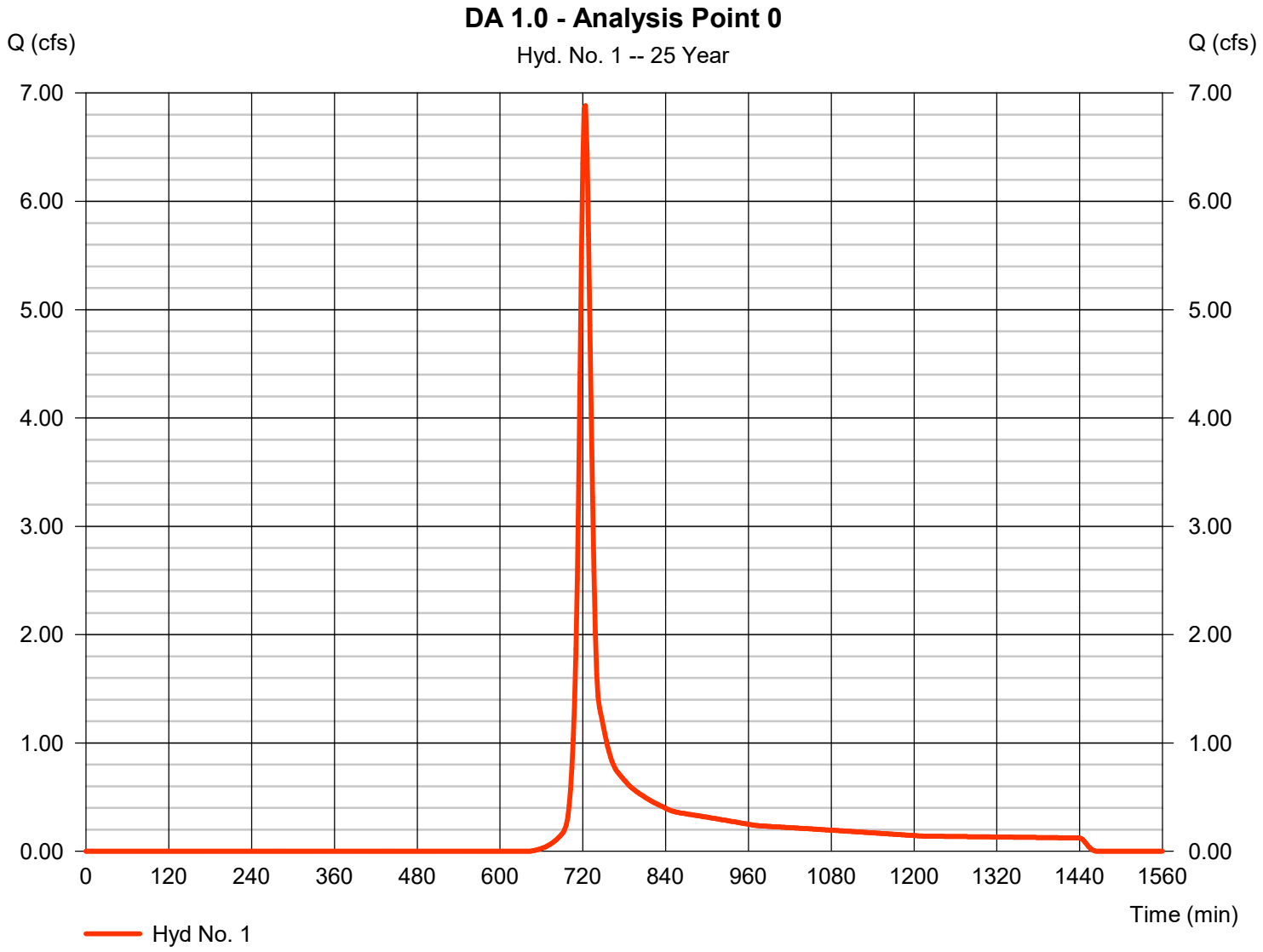
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	6.883	2	724	20,027	------	------	------	DA 1.0 - Analysis Point 0
2	SCS Runoff	2.738	2	720	6,268	------	------	------	DA 1.1 - Analysis Point 1
3	SCS Runoff	8.267	2	720	19,202	------	------	------	DA 1.2 - Analysis Point 2
4	Combine	17.35	2	720	45,497	1, 2, 3	------	------	Pre Total
6	SCS Runoff	25.12	2	716	51,435	------	------	------	DA 2.0 - To SCM
7	SCS Runoff	0.282	2	718	564	------	------	------	DA 2.2 - Offsite To SCM
8	Combine	25.39	2	716	51,999	6, 7	------	------	To SCM
9	Reservoir	9.649	2	724	46,657	8	546.73	24,018	Wet Pond
10	SCS Runoff	4.885	2	722	12,932	------	------	------	DA 2.1 - Bypass
11	SCS Runoff	1.139	2	718	2,278	------	------	------	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	0.765	2	718	1,529	------	------	------	DA 2.4 - Bypass - Analysis Point 0
13	Combine	14.51	2	722	59,590	9, 10,	------	------	Post - Analysis Point 2
14	Combine	15.52	2	722	63,397	9, 10, 11, 12,	------	------	Post Total

Hydrograph Report

Hyd. No. 1

DA 1.0 - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 6.883 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 20,027 cuft
Drainage area	= 2.730 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.30 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

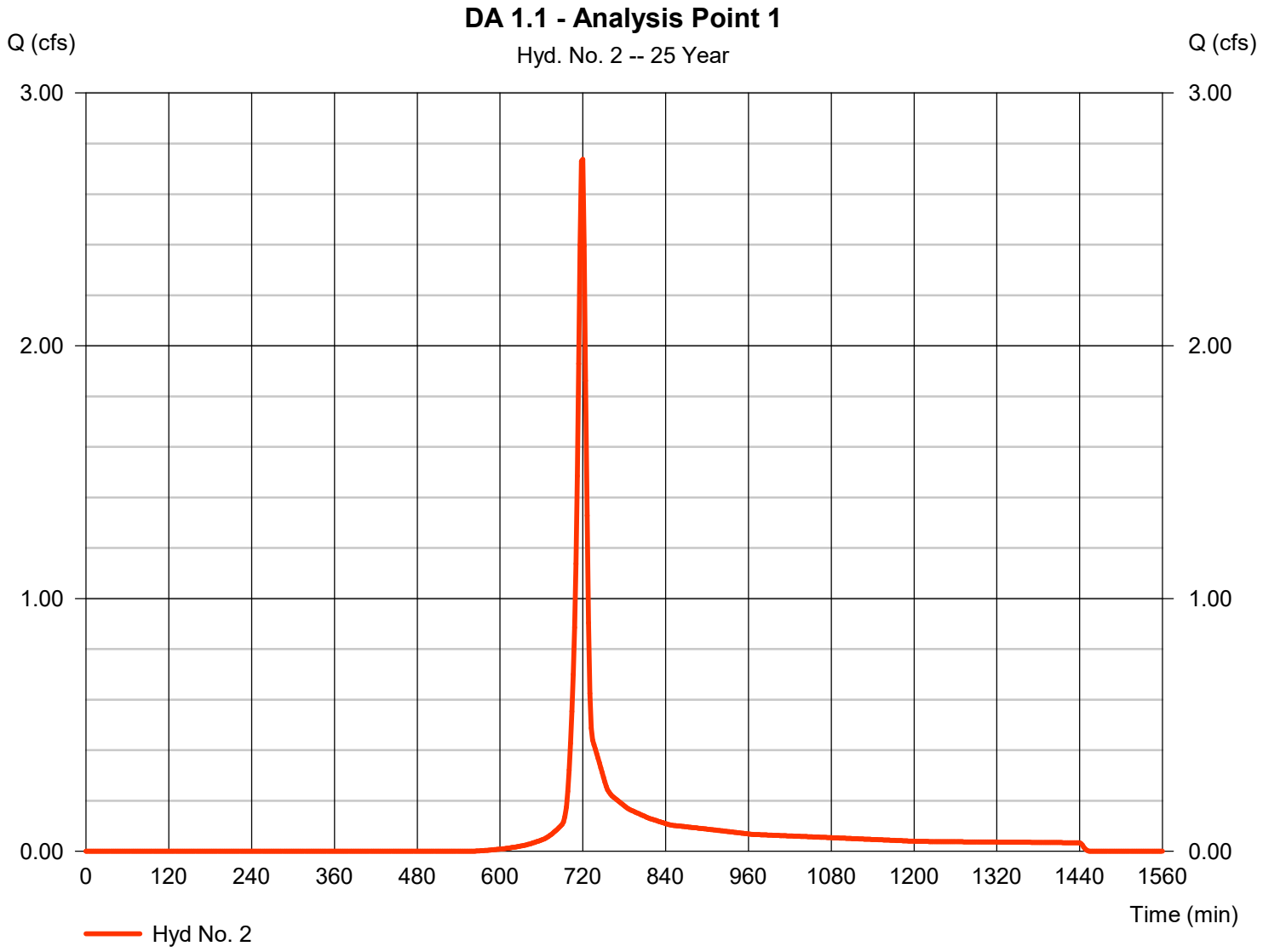


Hydrograph Report

Hyd. No. 2

DA 1.1 - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.738 cfs
Storm frequency	=	25 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	6,268 cuft
Drainage area	=	0.640 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.80 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

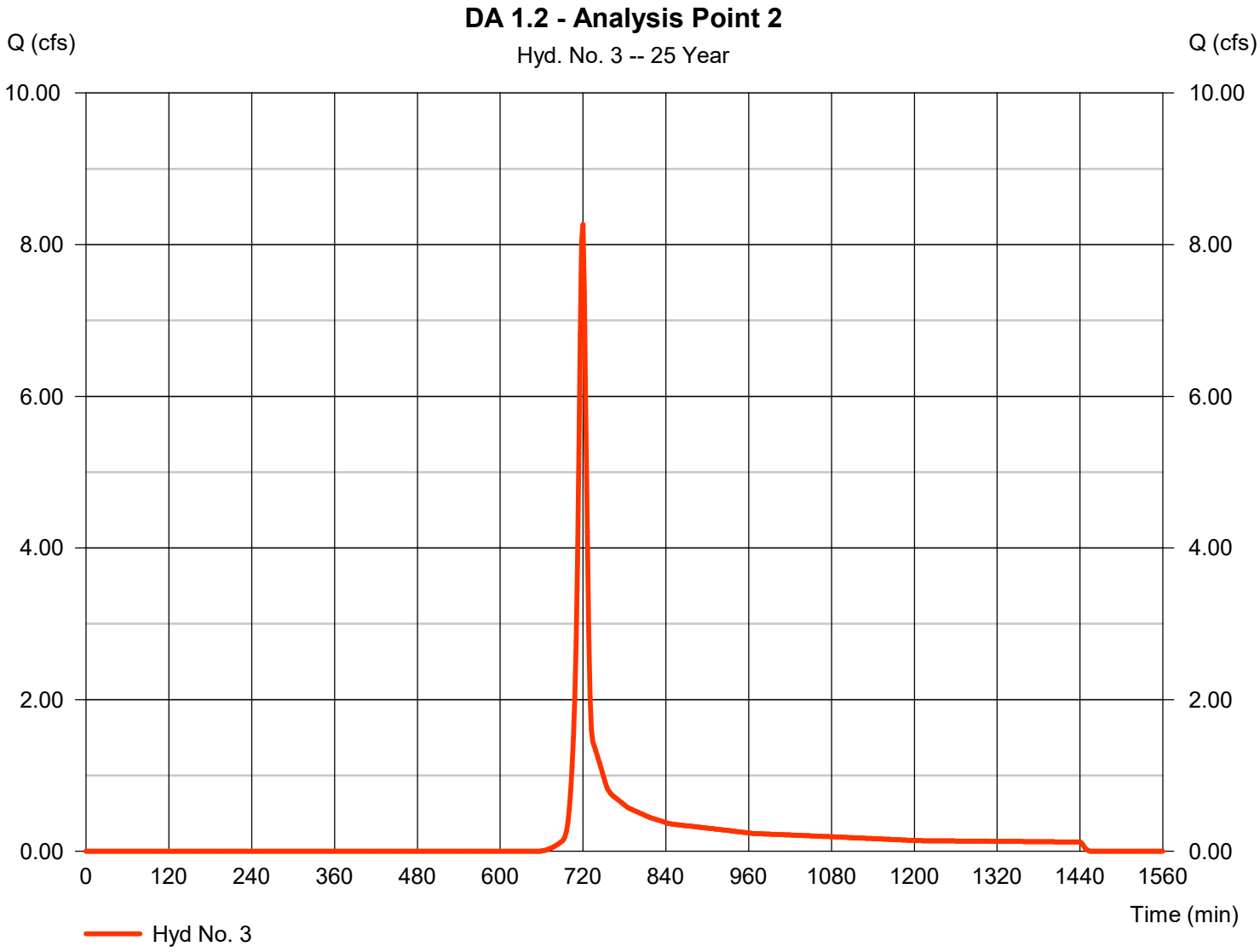


Hydrograph Report

Hyd. No. 3

DA 1.2 - Analysis Point 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.267 cfs
Storm frequency	=	25 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	19,202 cuft
Drainage area	=	2.780 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

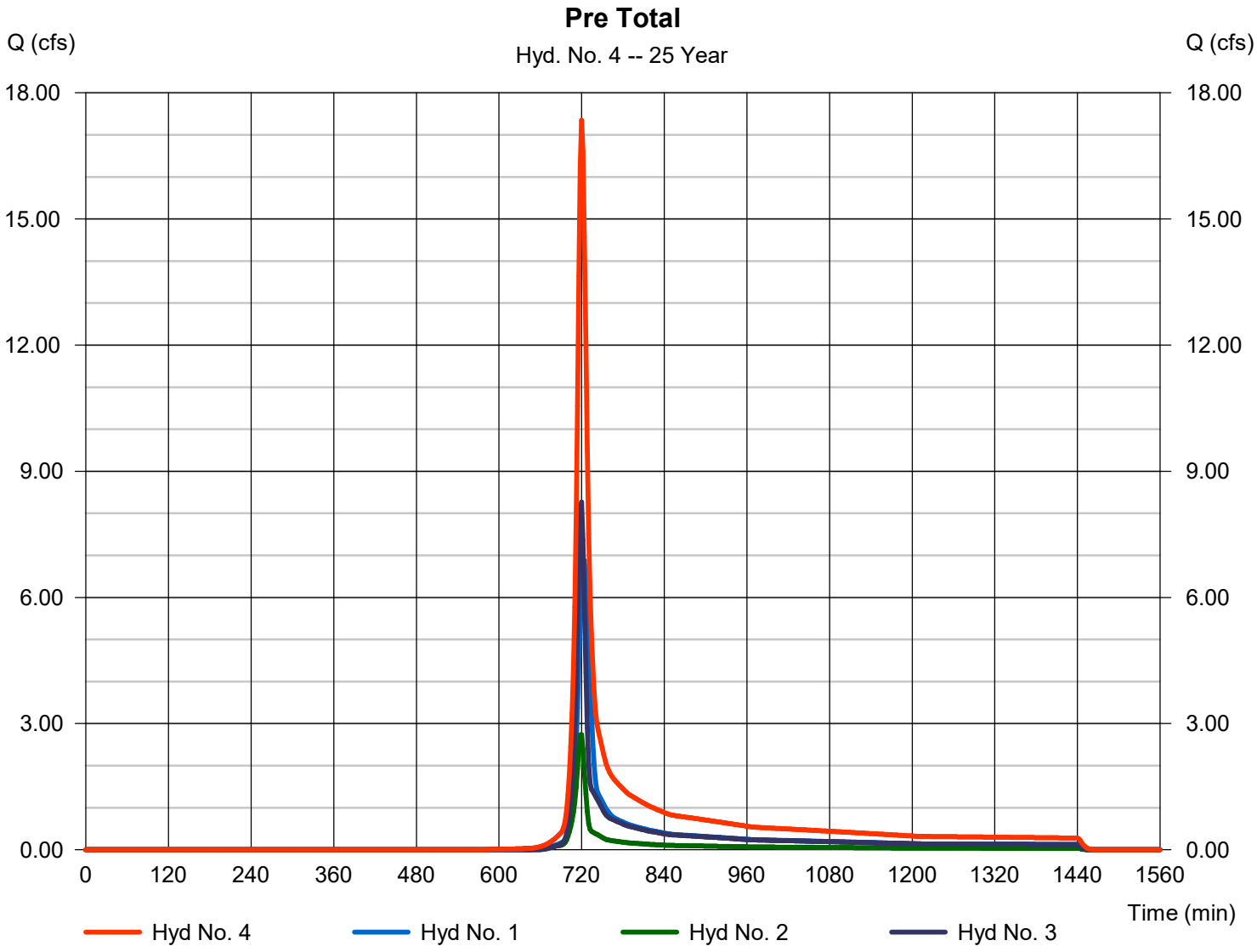


Hydrograph Report

Hyd. No. 4

Pre Total

Hydrograph type	= Combine	Peak discharge	= 17.35 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 45,497 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 6.150 ac

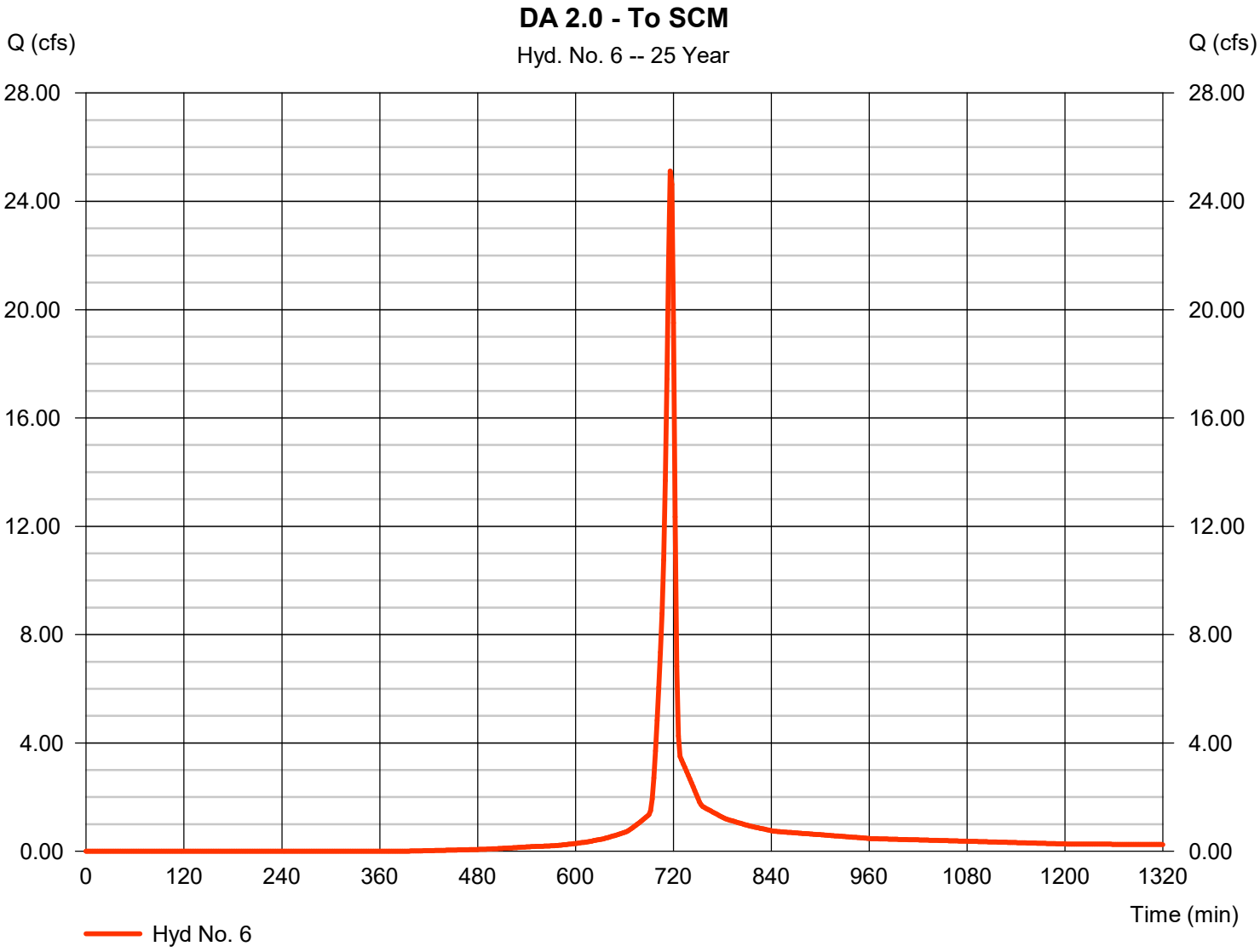


Hydrograph Report

Hyd. No. 6

DA 2.0 - To SCM

Hydrograph type	= SCS Runoff	Peak discharge	= 25.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 51,435 cuft
Drainage area	= 4.010 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

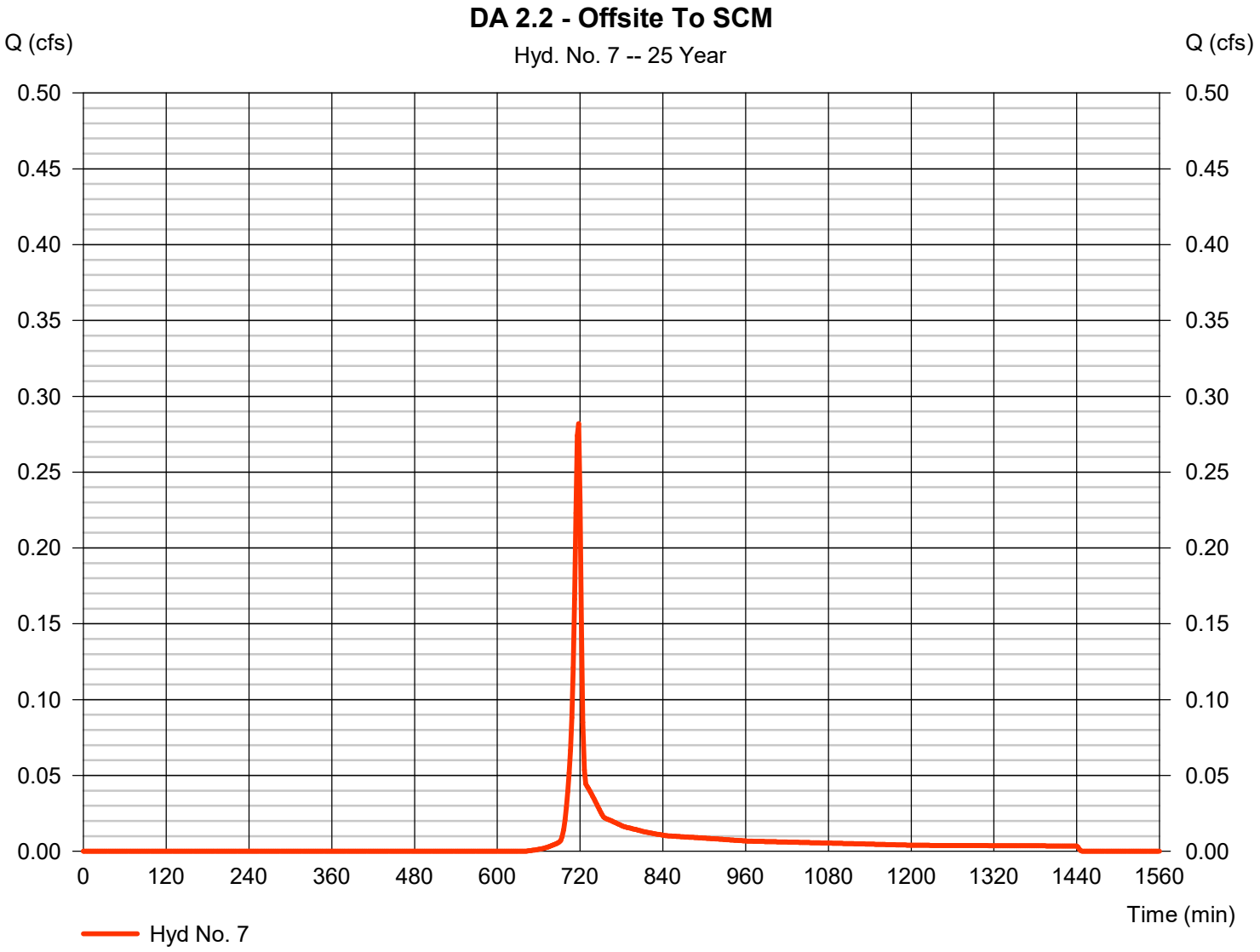


Hydrograph Report

Hyd. No. 7

DA 2.2 - Offsite To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.282 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	564 cuft
Drainage area	=	0.080 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

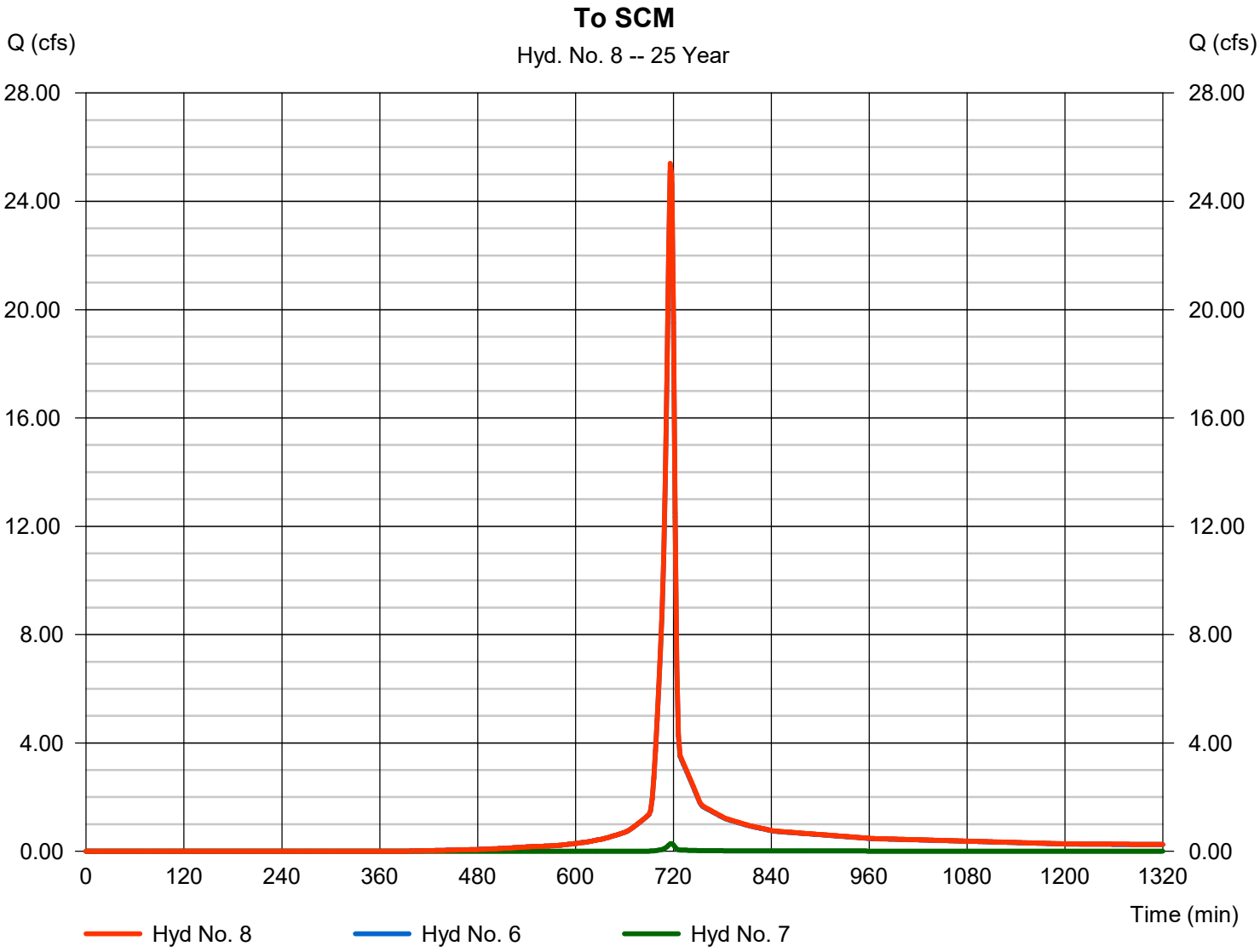


Hydrograph Report

Hyd. No. 8

To SCM

Hydrograph type	=	Combine	Peak discharge	=	25.39 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	51,999 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	4.090 ac



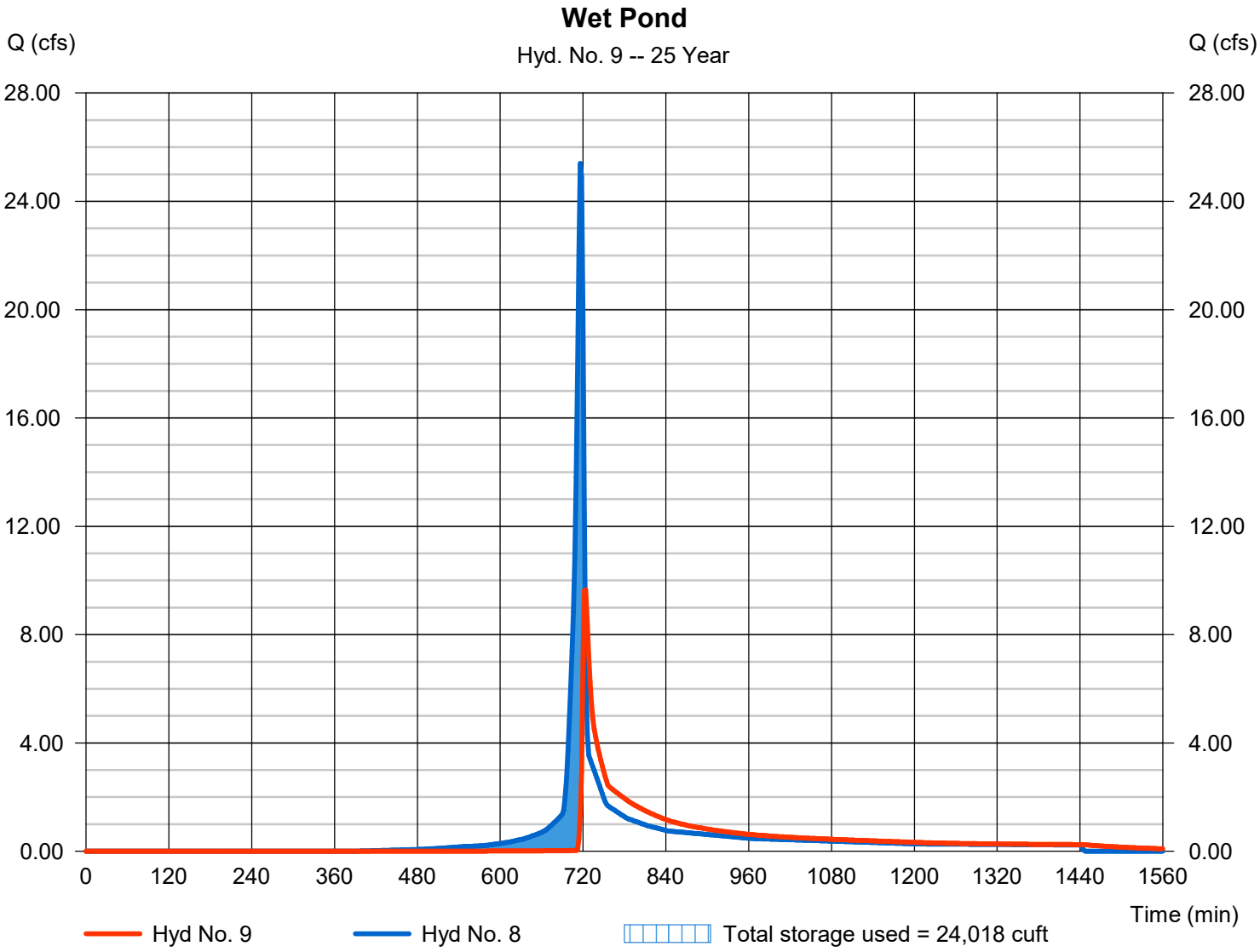
Hydrograph Report

Hyd. No. 9

Wet Pond

Hydrograph type	=	Reservoir	Peak discharge	=	9.649 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	46,657 cuft
Inflow hyd. No.	=	8 - To SCM	Max. Elevation	=	546.73 ft
Reservoir name	=	Wet Pond	Max. Storage	=	24,018 cuft

Storage Indication method used.

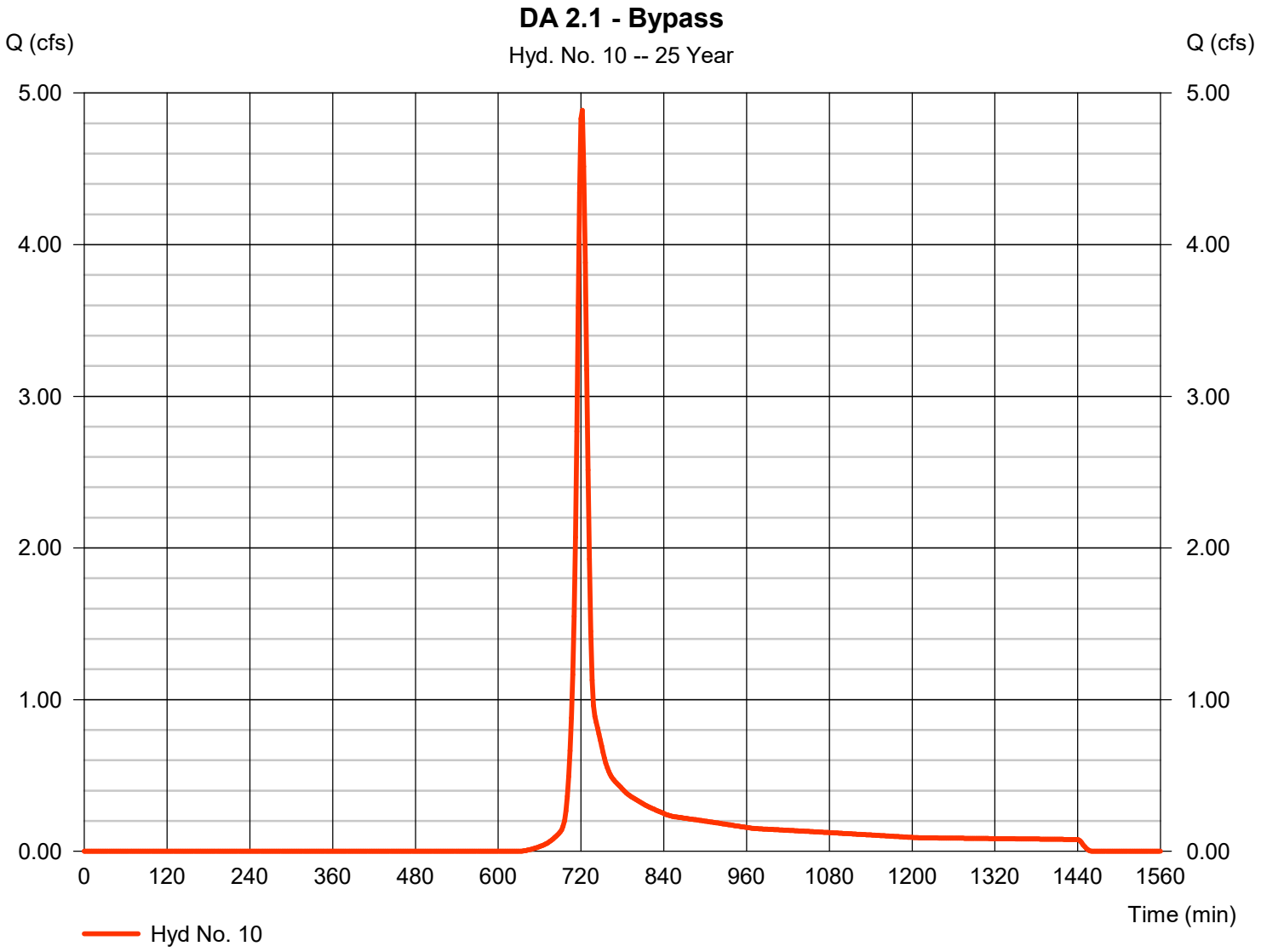


Hydrograph Report

Hyd. No. 10

DA 2.1 - Bypass

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.885 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	12,932 cuft
Drainage area	=	1.600 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

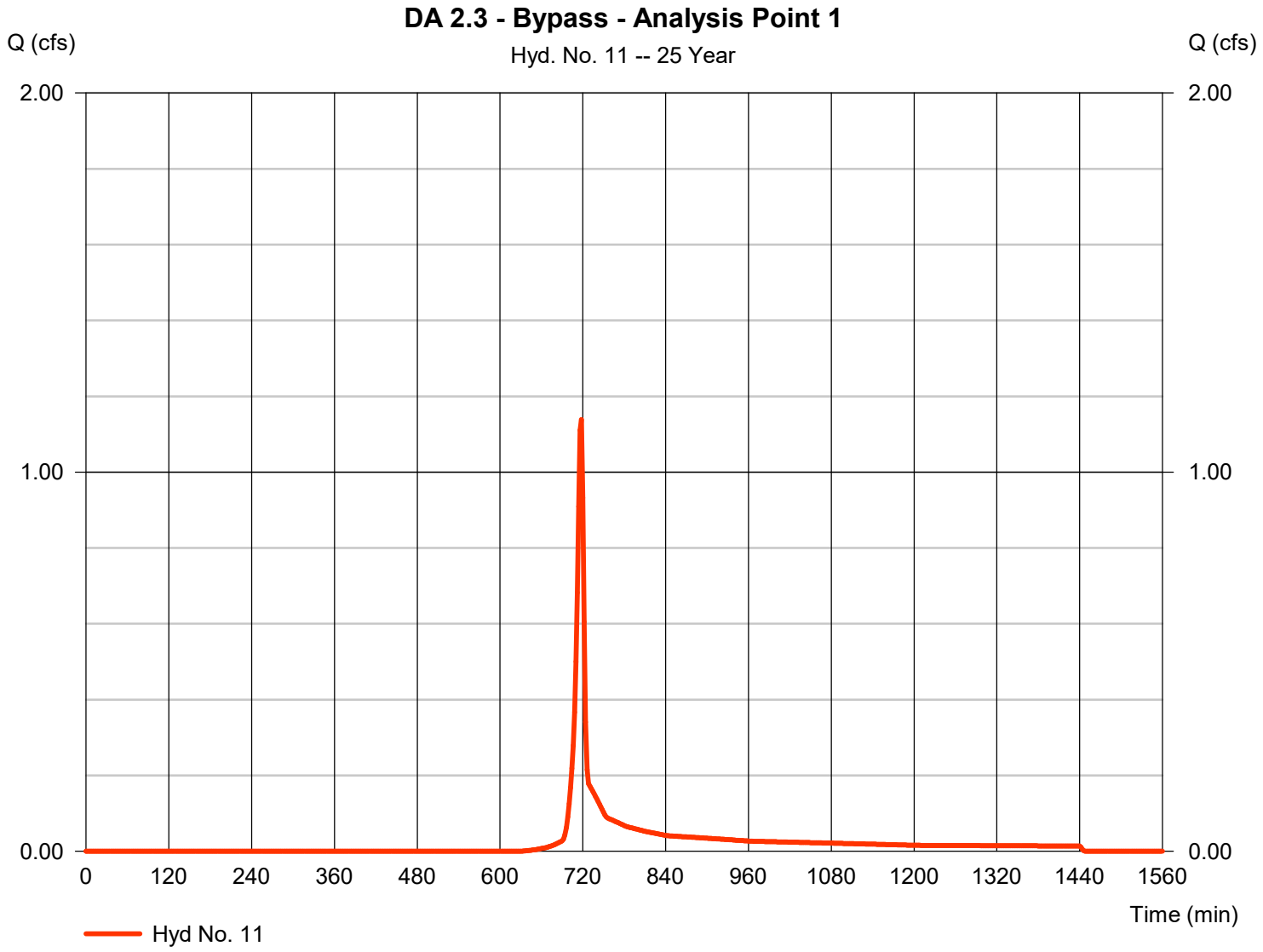


Hydrograph Report

Hyd. No. 11

DA 2.3 - Bypass - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.139 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	2,278 cuft
Drainage area	=	0.310 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

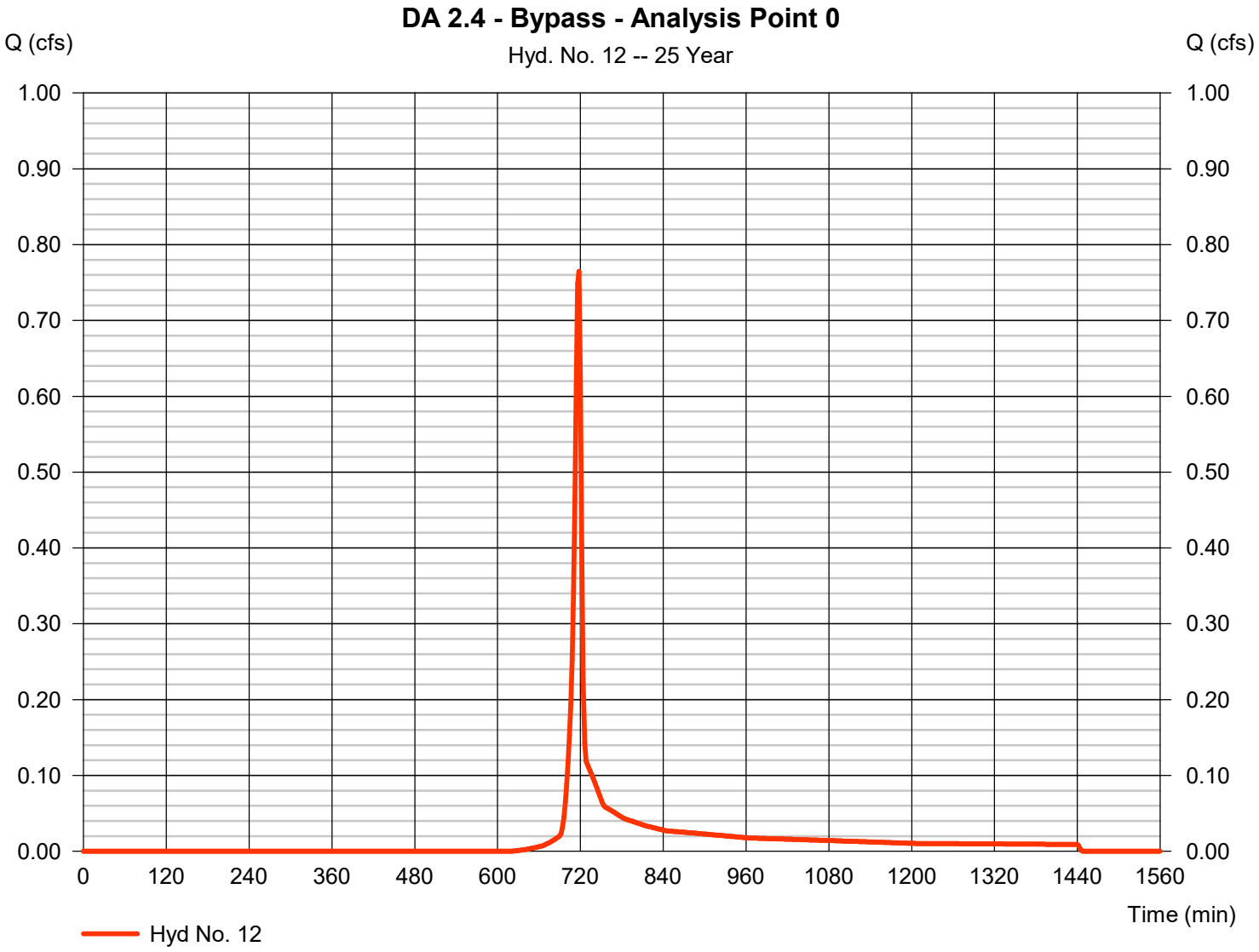


Hydrograph Report

Hyd. No. 12

DA 2.4 - Bypass - Analysis Point 0

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.765 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	1,529 cuft
Drainage area	=	0.200 ac	Curve number	=	63
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

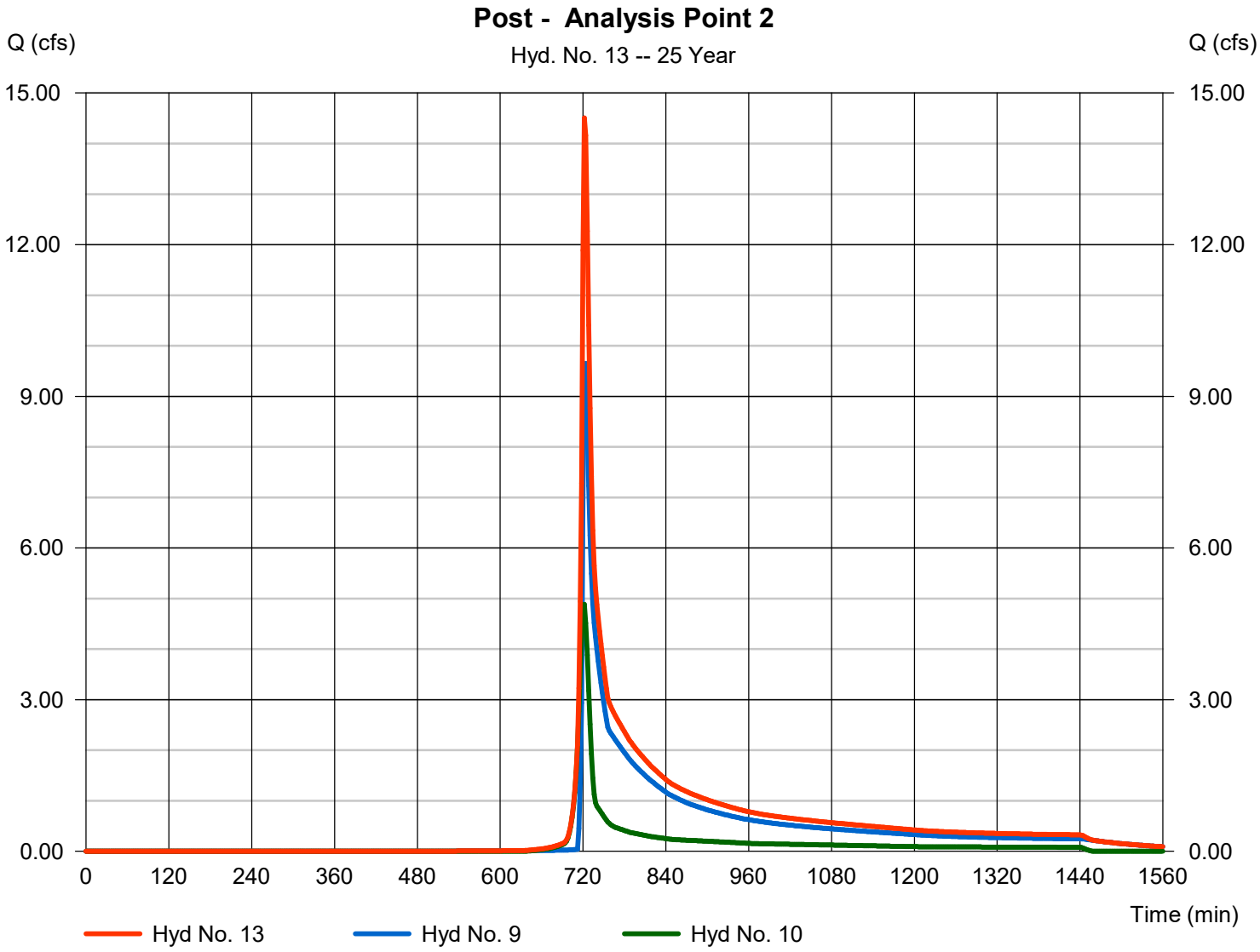


Hydrograph Report

Hyd. No. 13

Post - Analysis Point 2

Hydrograph type	= Combine	Peak discharge	= 14.51 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 59,590 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.600 ac

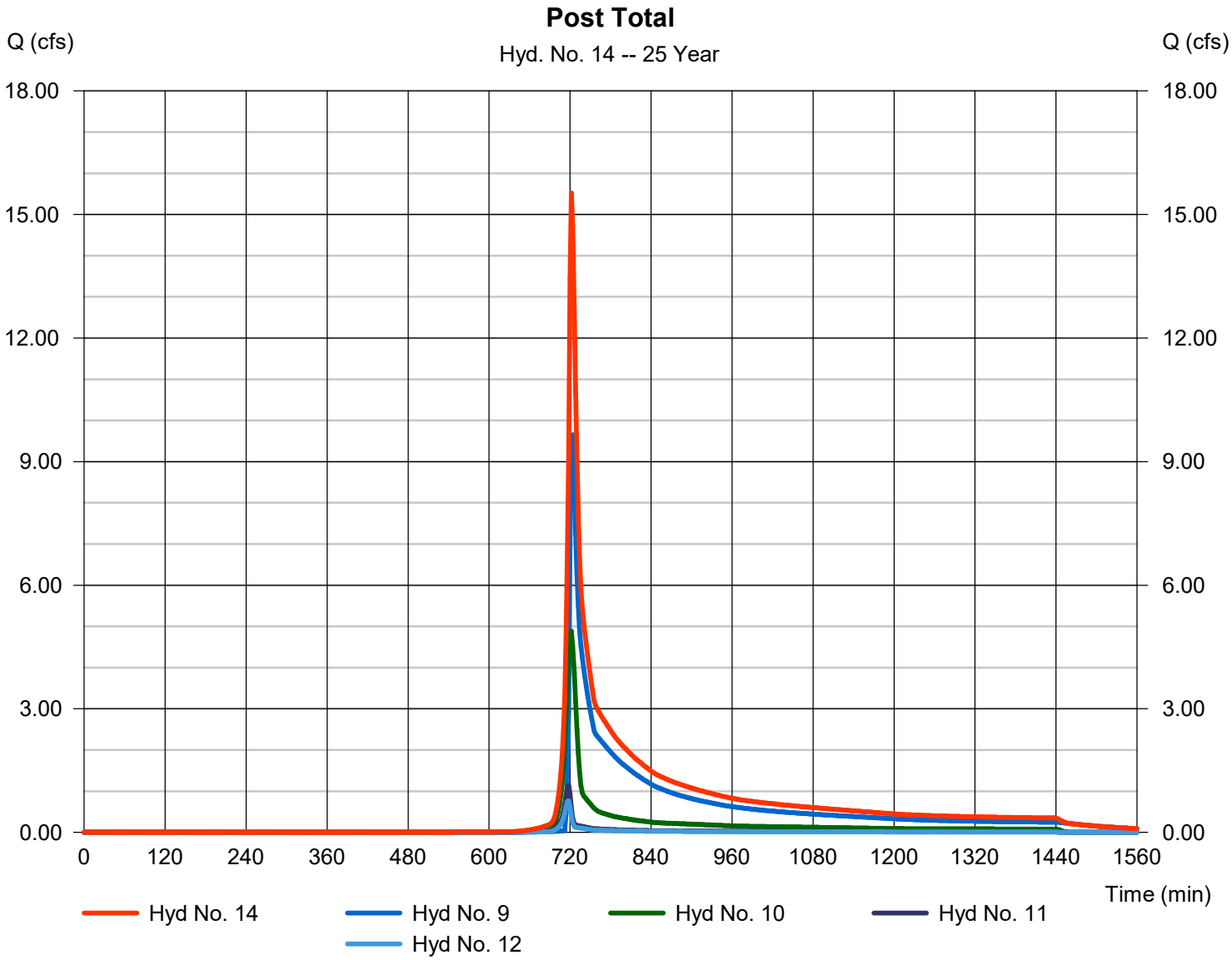


Hydrograph Report

Hyd. No. 14

Post Total

Hydrograph type	=	Combine	Peak discharge	=	15.52 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	63,397 cuft
Inflow hyds.	=	9, 10, 11, 12	Contrib. drain. area	=	2.110 ac



Hydrograph Summary Report

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

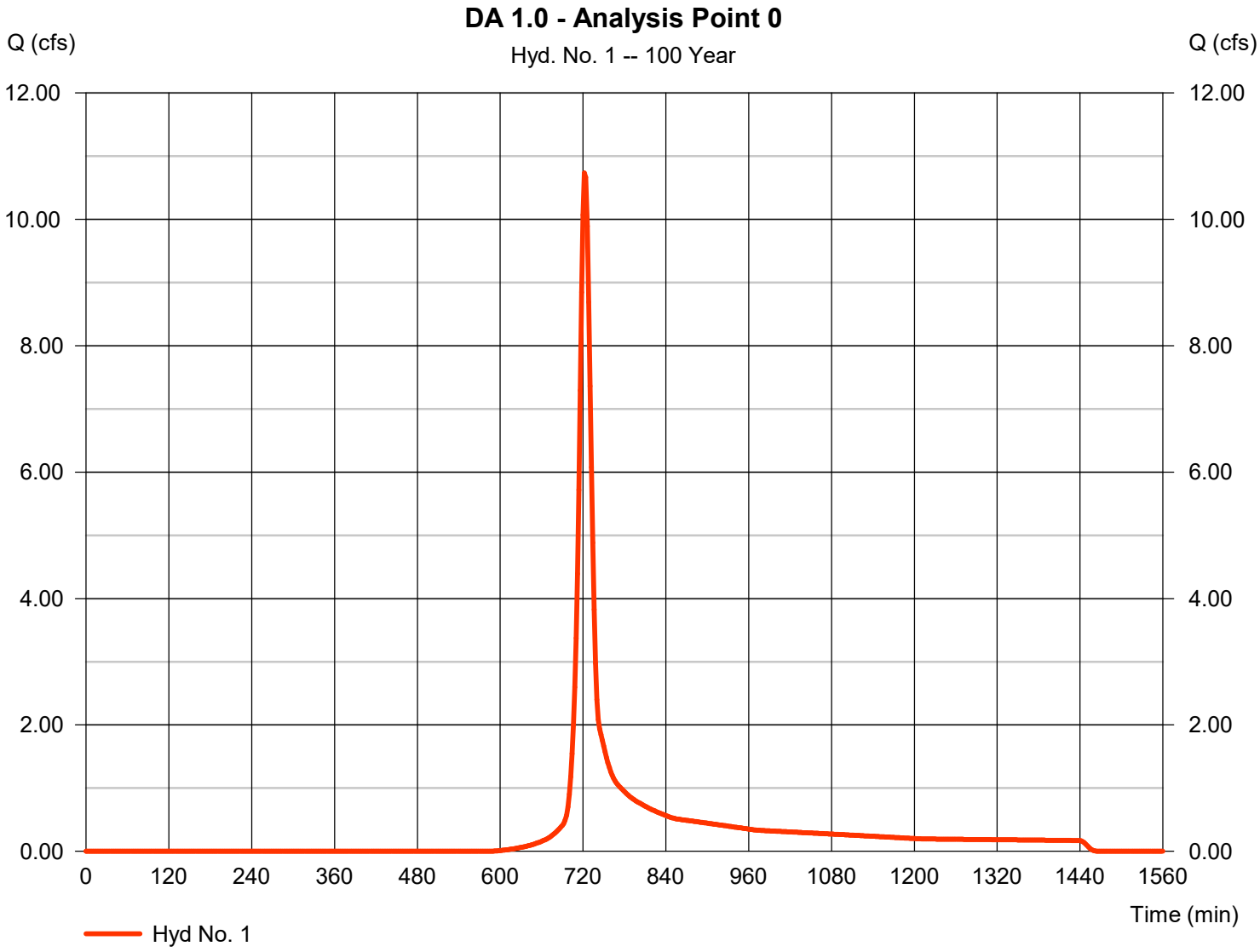
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	10.74	2	722	30,510	------	------	------	DA 1.0 - Analysis Point 0
2	SCS Runoff	3.979	2	718	9,103	------	------	------	DA 1.1 - Analysis Point 1
3	SCS Runoff	12.97	2	720	29,721	------	------	------	DA 1.2 - Analysis Point 2
4	Combine	26.99	2	720	69,333	1, 2, 3	------	------	Pre Total
6	SCS Runoff	33.90	2	716	70,349	------	------	------	DA 2.0 - To SCM
7	SCS Runoff	0.429	2	718	860	------	------	------	DA 2.2 - Offsite To SCM
8	Combine	34.33	2	716	71,209	6, 7	------	------	To SCM
9	Reservoir	22.38	2	720	65,843	8	547.01	28,273	Wet Pond
10	SCS Runoff	7.474	2	722	19,554	------	------	------	DA 2.1 - Bypass
11	SCS Runoff	1.717	2	718	3,444	------	------	------	DA 2.3 - Bypass - Analysis Point 1
12	SCS Runoff	1.142	2	718	2,295	------	------	------	DA 2.4 - Bypass - Analysis Point 0
13	Combine	29.85	2	720	85,397	9, 10,	------	------	Post - Analysis Point 2
14	Combine	32.16	2	720	91,137	9, 10, 11, 12,	------	------	Post Total

Hydrograph Report

Hyd. No. 1

DA 1.0 - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 10.74 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 30,510 cuft
Drainage area	= 2.730 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 14.30 min
Total precip.	= 7.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

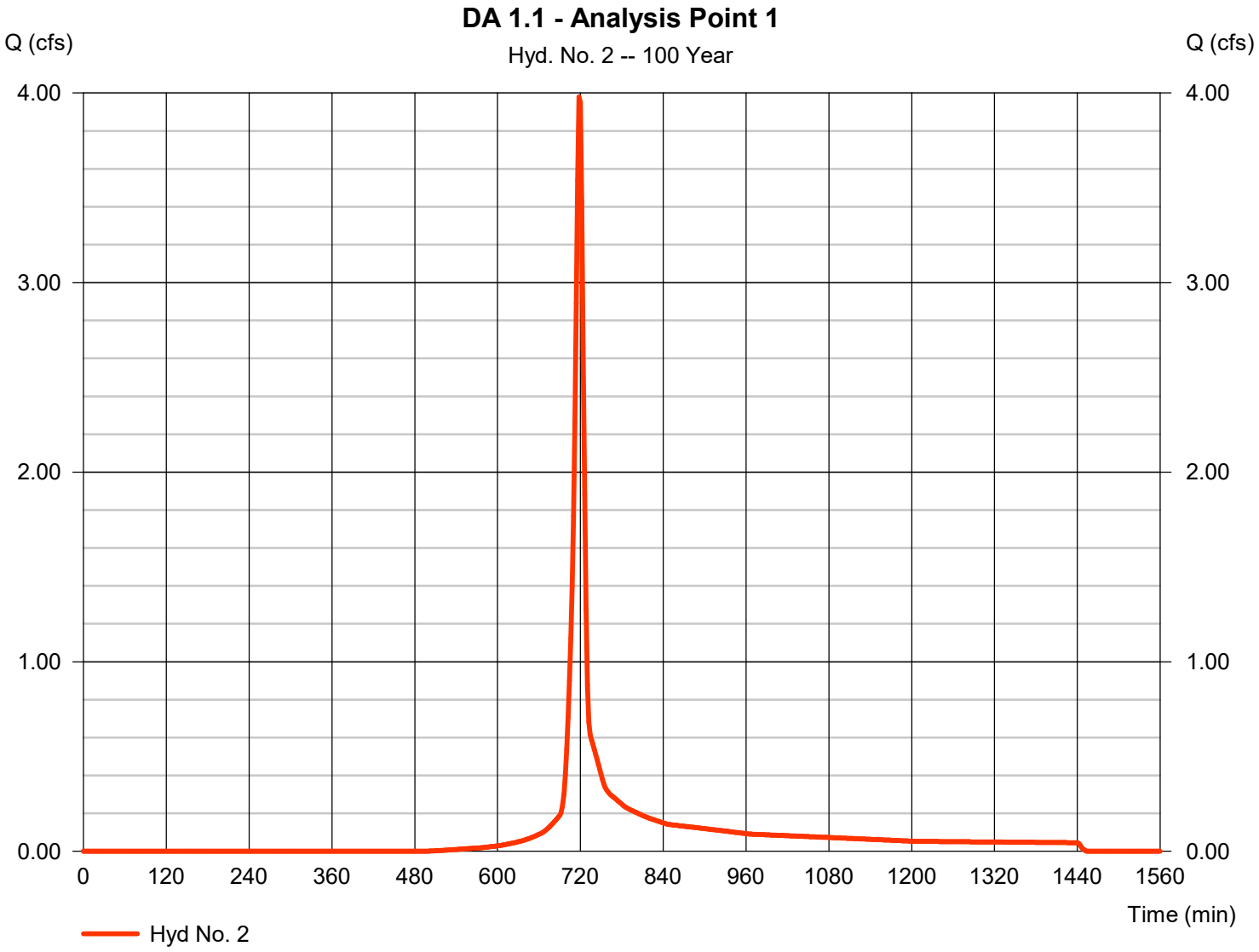


Hydrograph Report

Hyd. No. 2

DA 1.1 - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.979 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	9,103 cuft
Drainage area	=	0.640 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.80 min
Total precip.	=	7.62 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

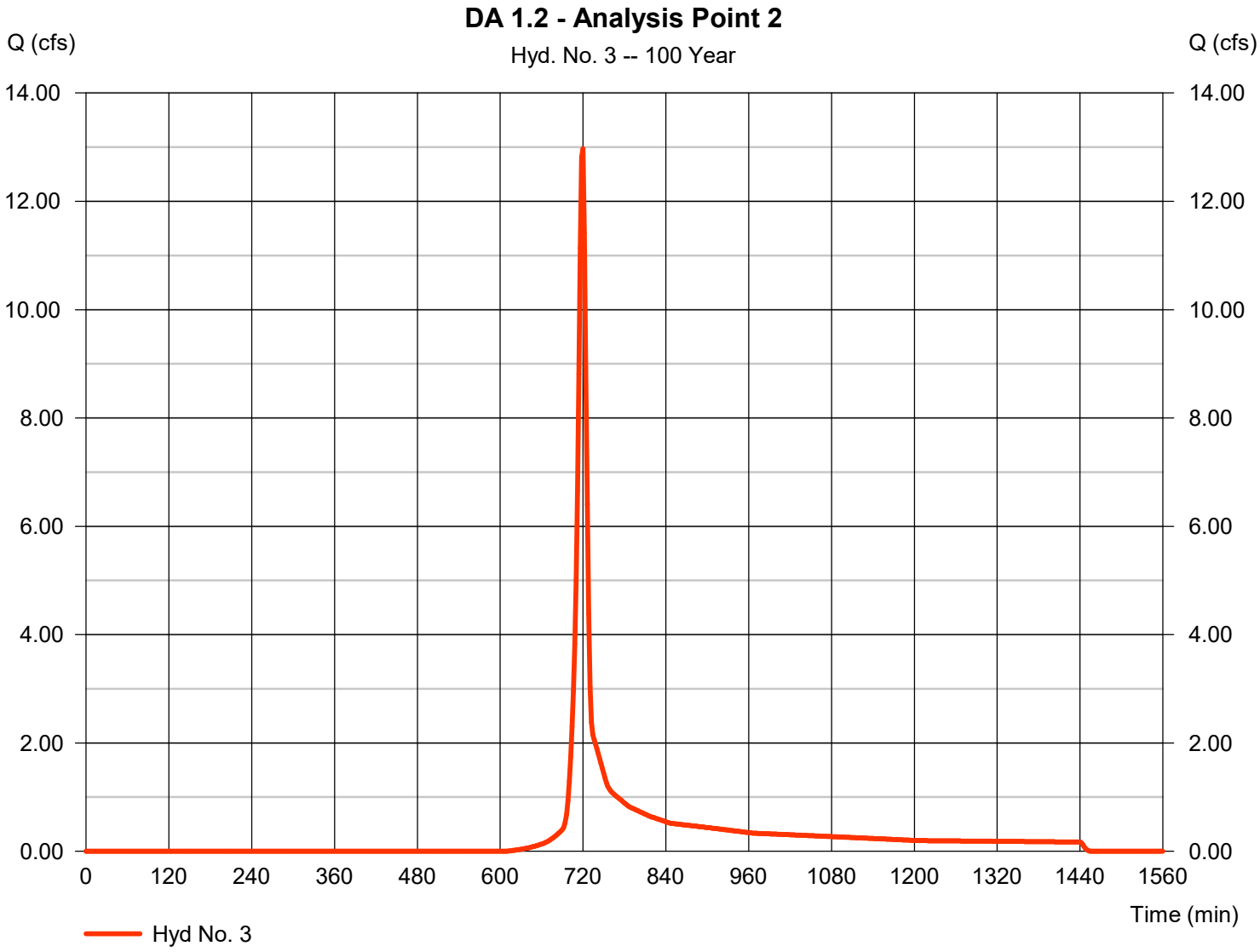


Hydrograph Report

Hyd. No. 3

DA 1.2 - Analysis Point 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.97 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	29,721 cuft
Drainage area	=	2.780 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.20 min
Total precip.	=	7.62 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

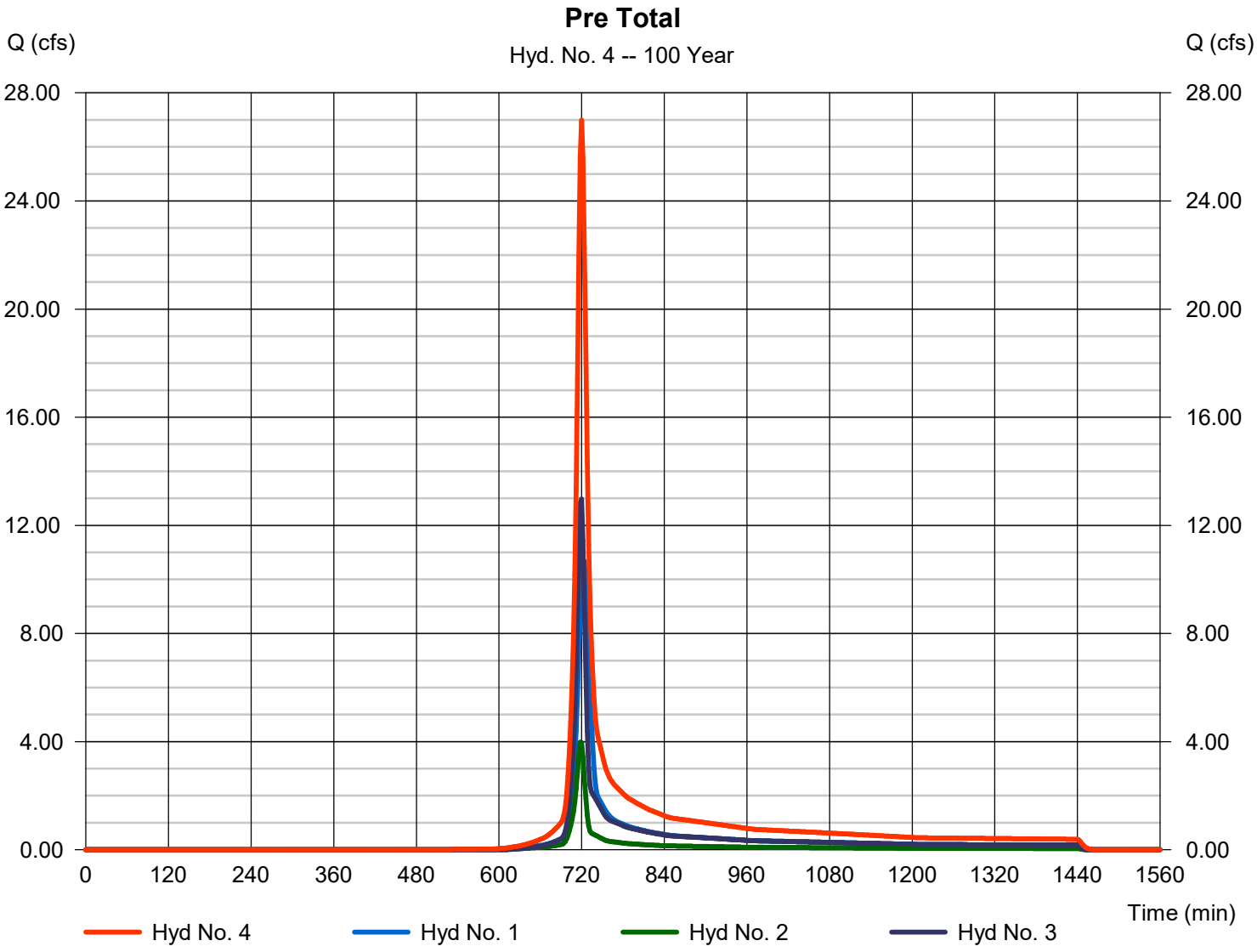


Hydrograph Report

Hyd. No. 4

Pre Total

Hydrograph type	= Combine	Peak discharge	= 26.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 69,333 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 6.150 ac

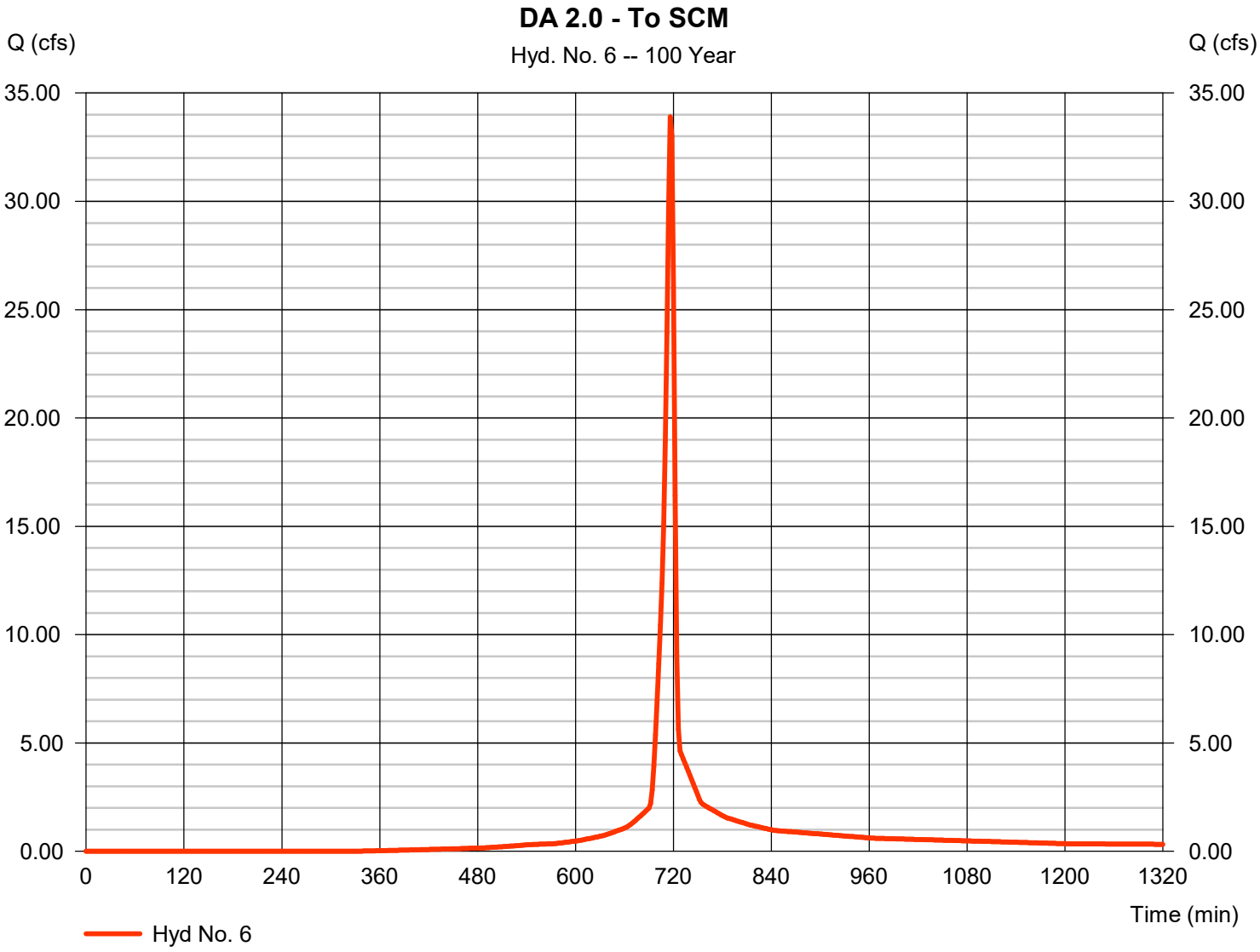


Hydrograph Report

Hyd. No. 6

DA 2.0 - To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	70,349 cuft
Drainage area	=	4.010 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.62 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

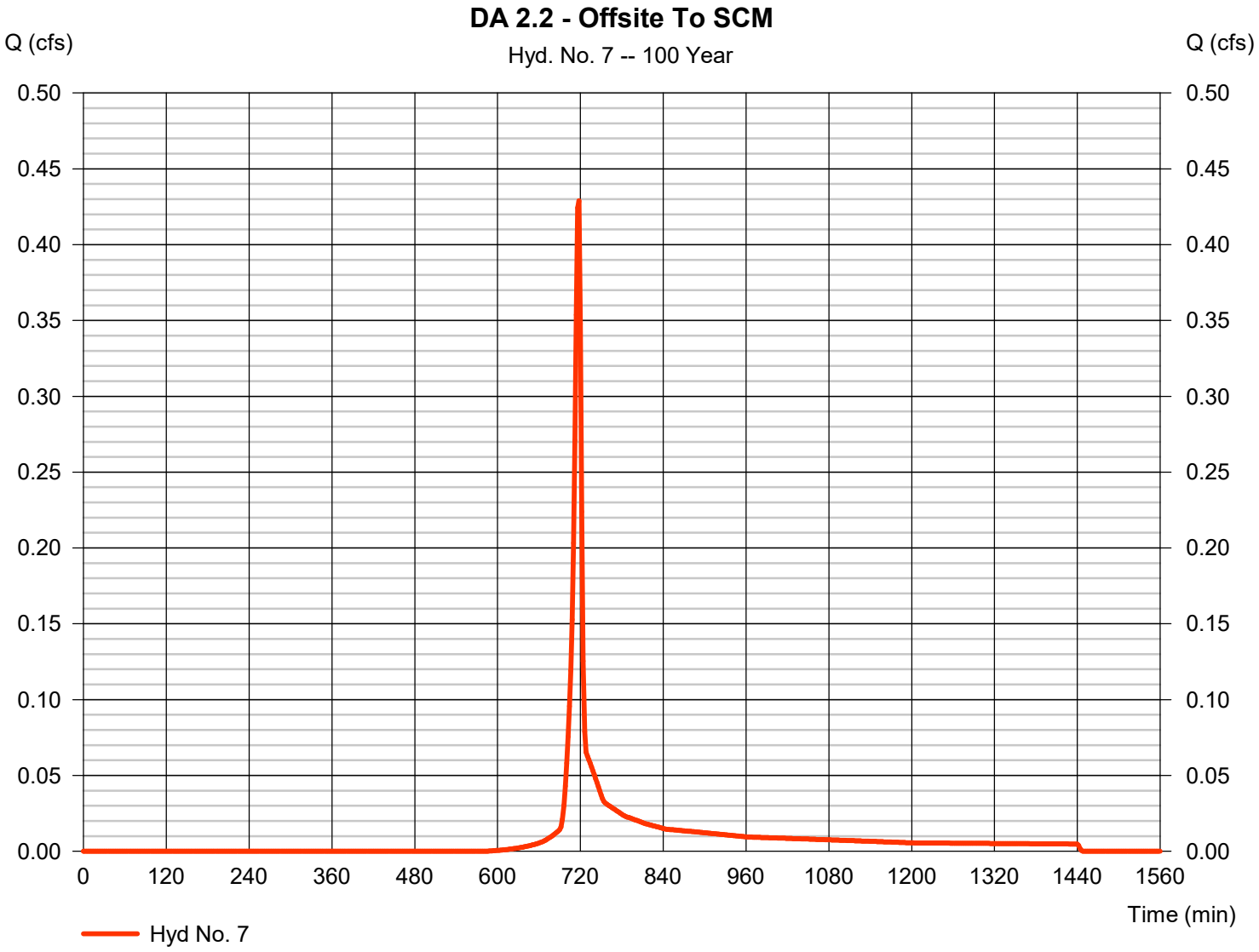


Hydrograph Report

Hyd. No. 7

DA 2.2 - Offsite To SCM

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.429 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	860 cuft
Drainage area	=	0.080 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.62 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

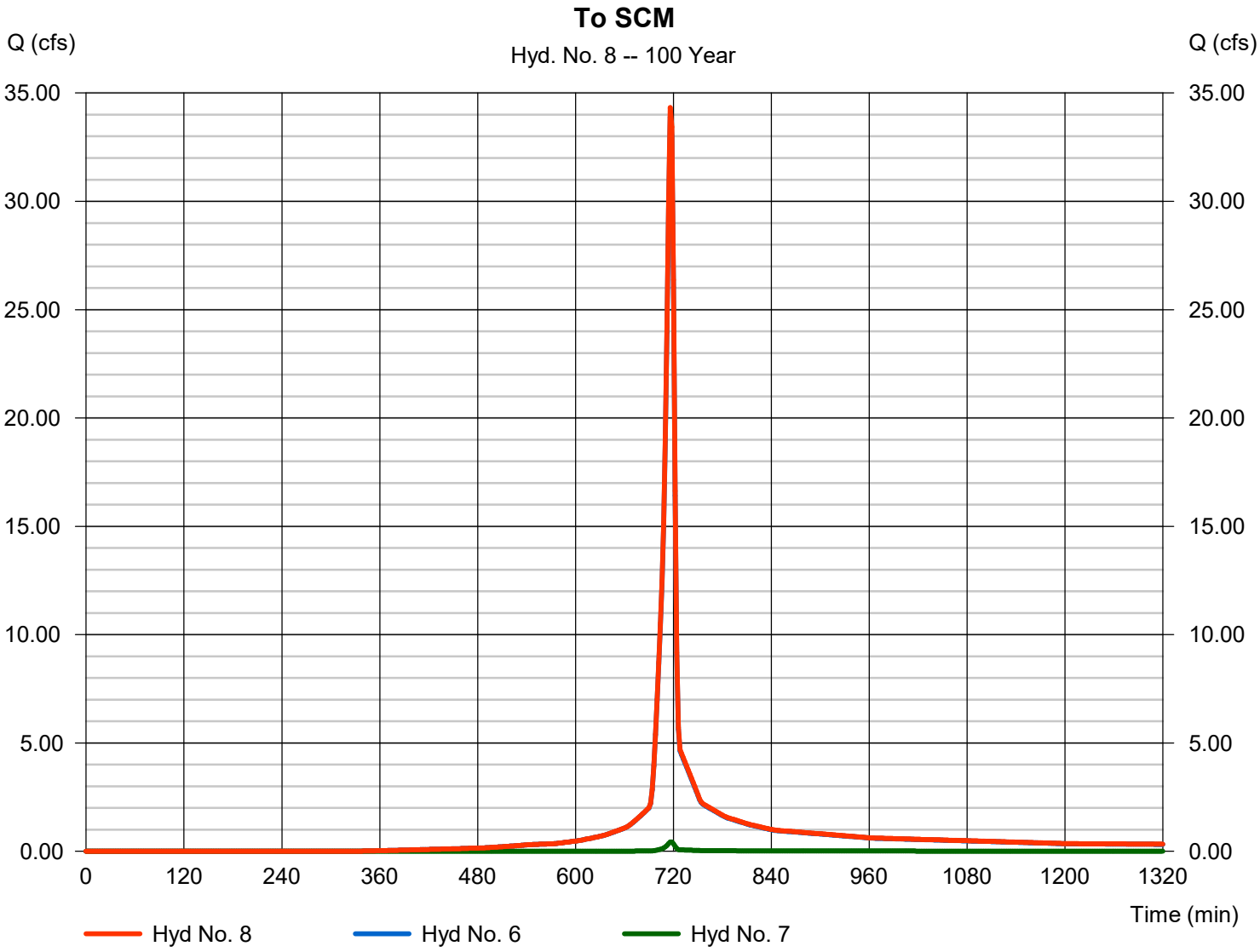


Hydrograph Report

Hyd. No. 8

To SCM

Hydrograph type	=	Combine	Peak discharge	=	34.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	71,209 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	4.090 ac



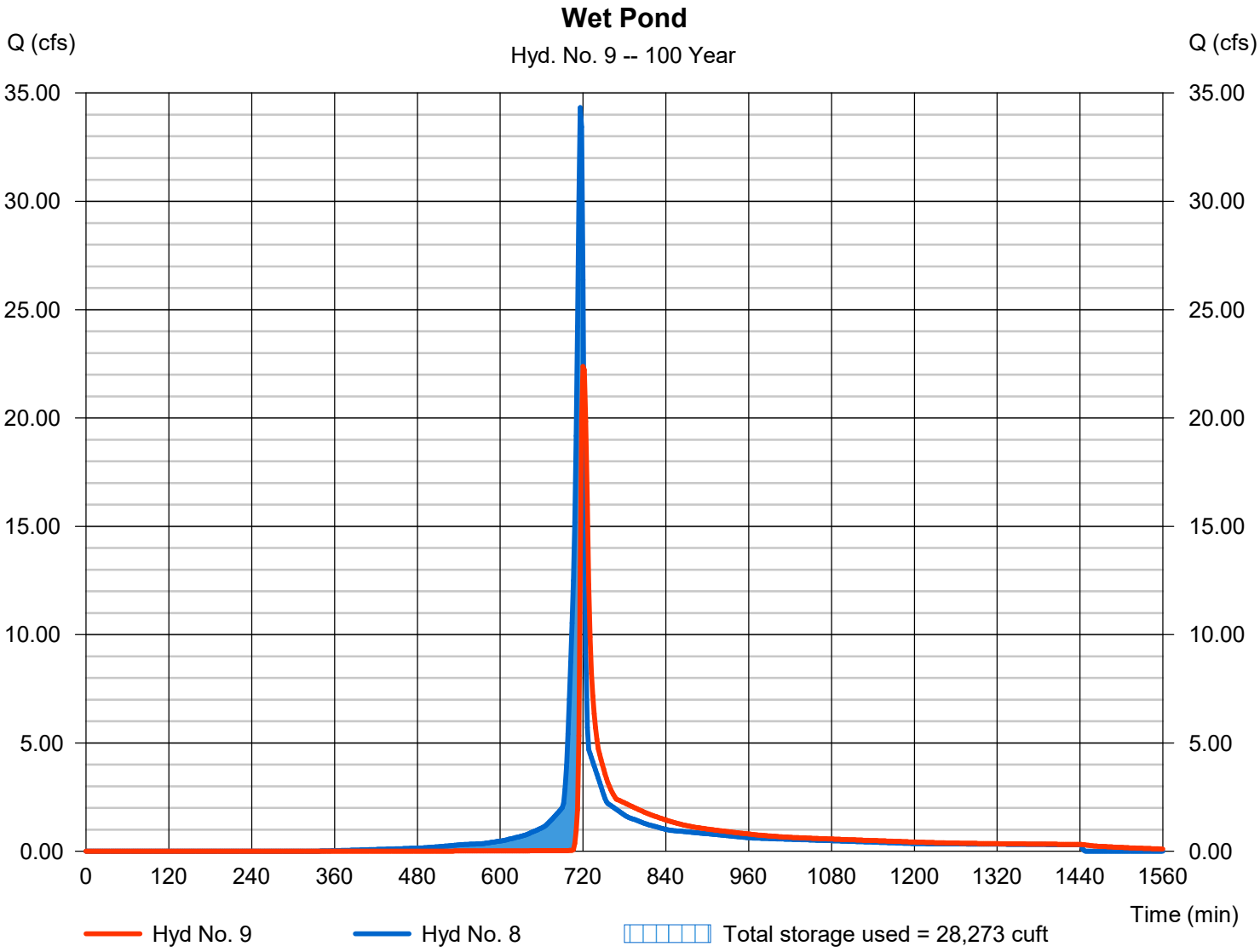
Hydrograph Report

Hyd. No. 9

Wet Pond

Hydrograph type	=	Reservoir	Peak discharge	=	22.38 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	65,843 cuft
Inflow hyd. No.	=	8 - To SCM	Max. Elevation	=	547.01 ft
Reservoir name	=	Wet Pond	Max. Storage	=	28,273 cuft

Storage Indication method used.

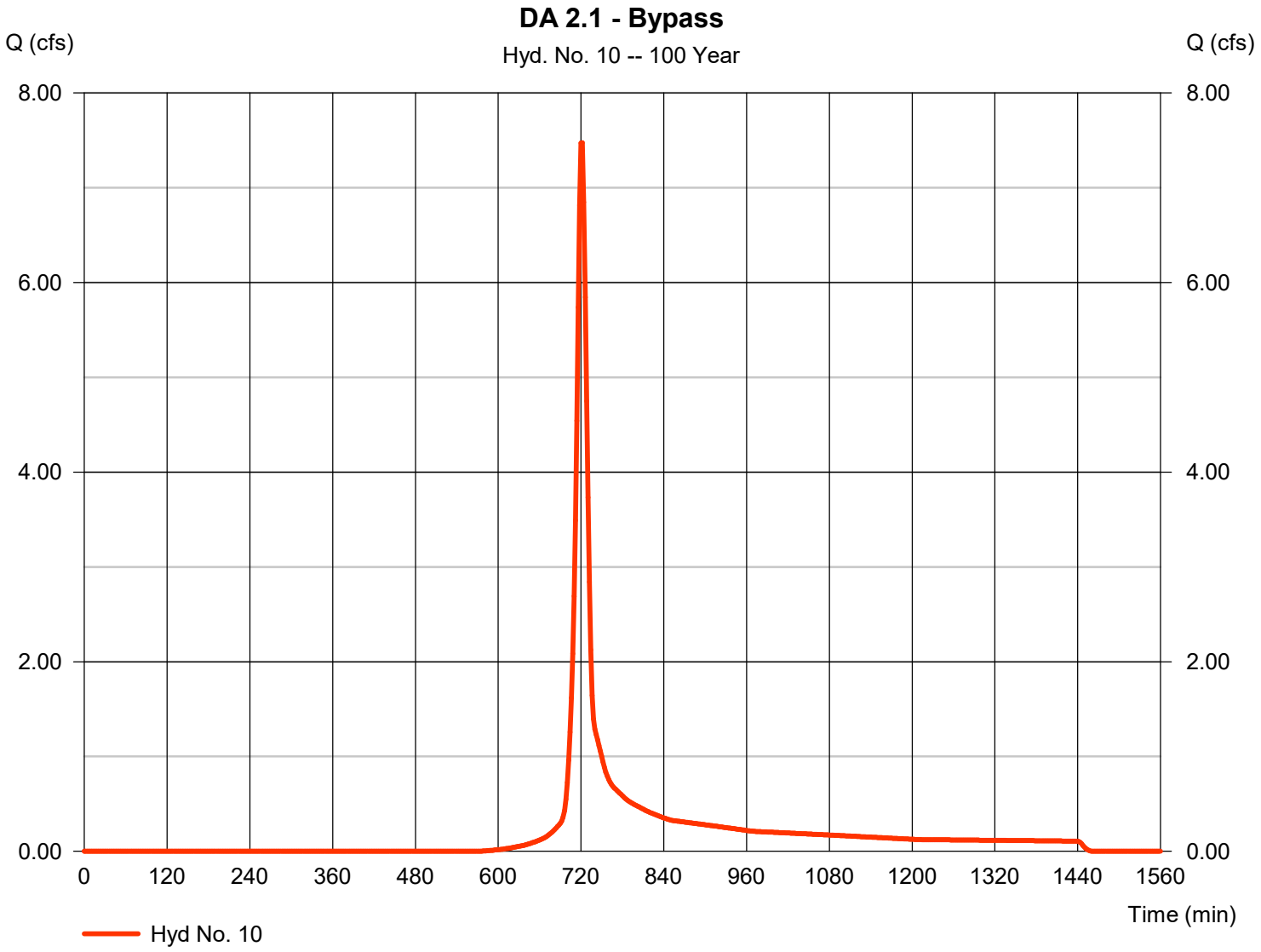


Hydrograph Report

Hyd. No. 10

DA 2.1 - Bypass

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.474 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	19,554 cuft
Drainage area	=	1.600 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	10.30 min
Total precip.	=	7.62 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

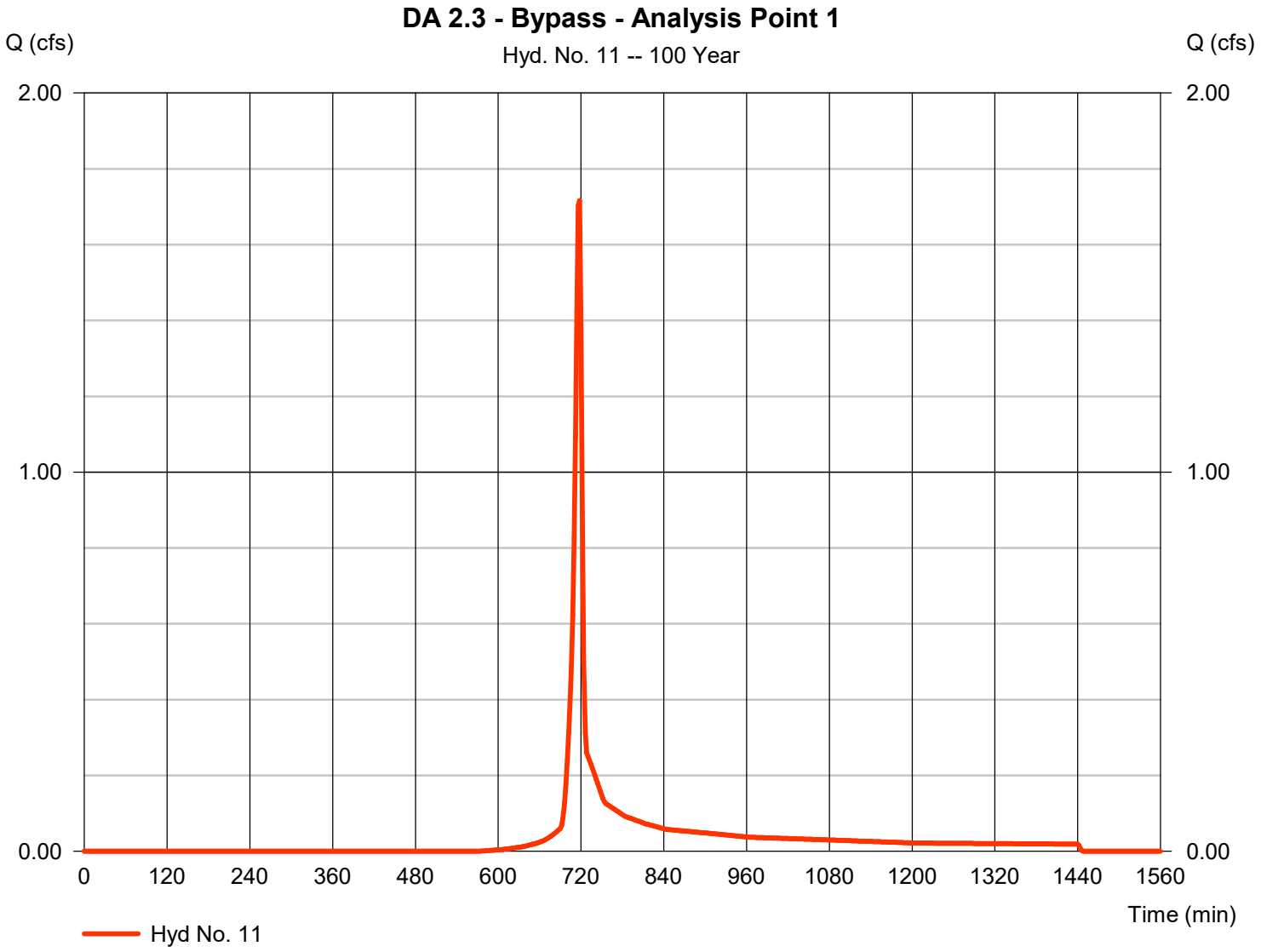


Hydrograph Report

Hyd. No. 11

DA 2.3 - Bypass - Analysis Point 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.717 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	3,444 cuft
Drainage area	=	0.310 ac	Curve number	=	62
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.62 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

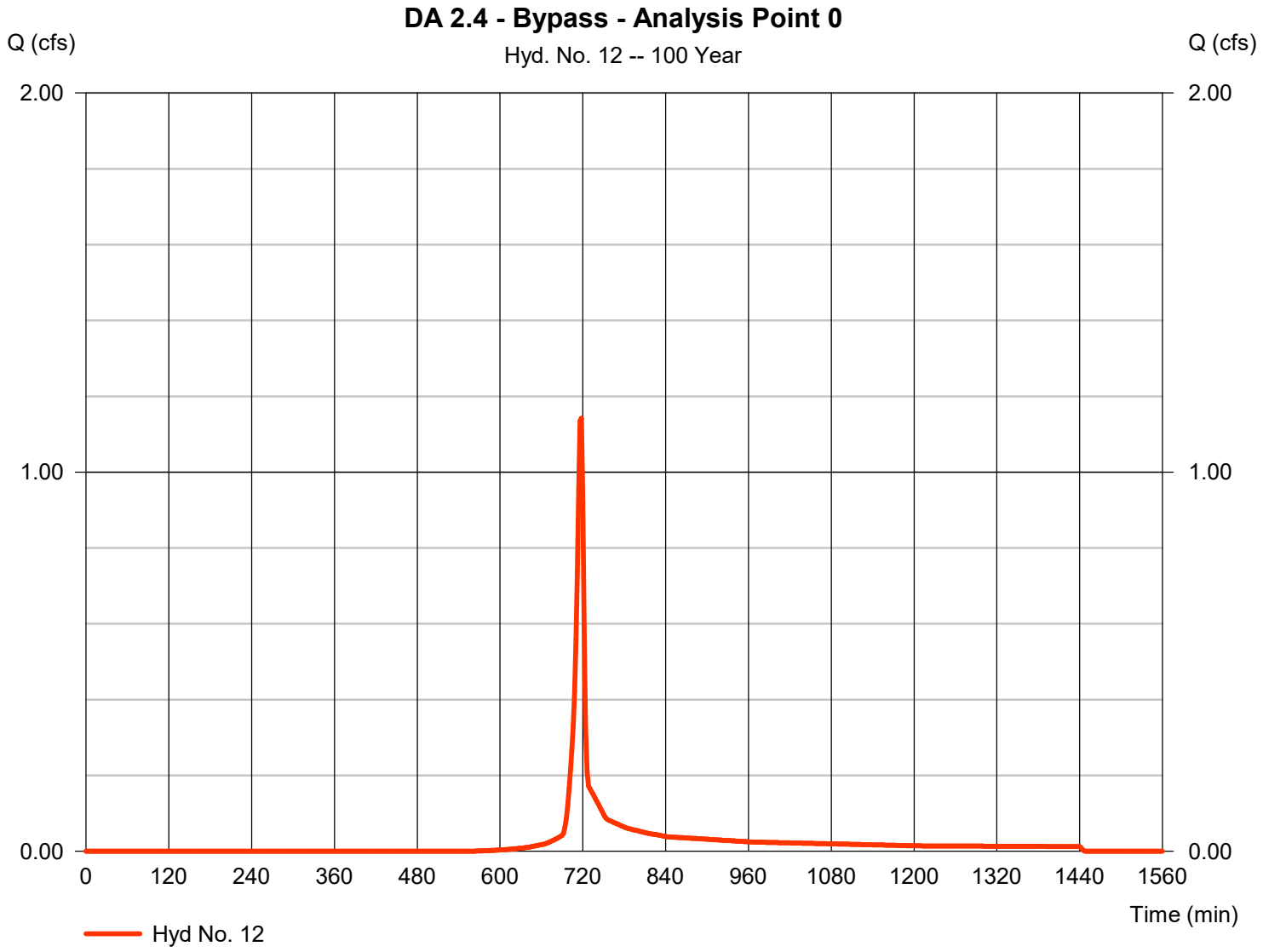


Hydrograph Report

Hyd. No. 12

DA 2.4 - Bypass - Analysis Point 0

Hydrograph type	= SCS Runoff	Peak discharge	= 1.142 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,295 cuft
Drainage area	= 0.200 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

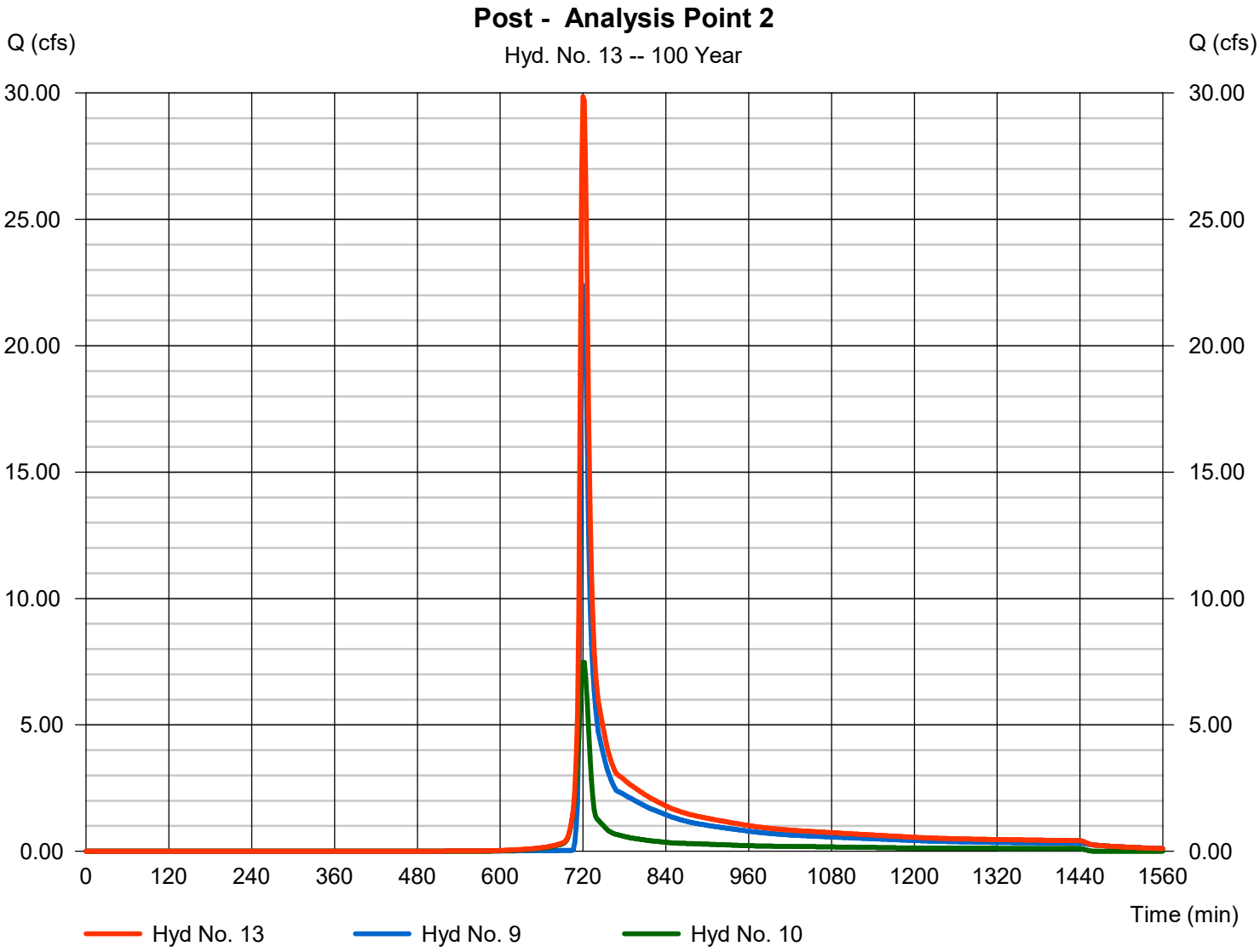


Hydrograph Report

Hyd. No. 13

Post - Analysis Point 2

Hydrograph type	= Combine	Peak discharge	= 29.85 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 85,397 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.600 ac

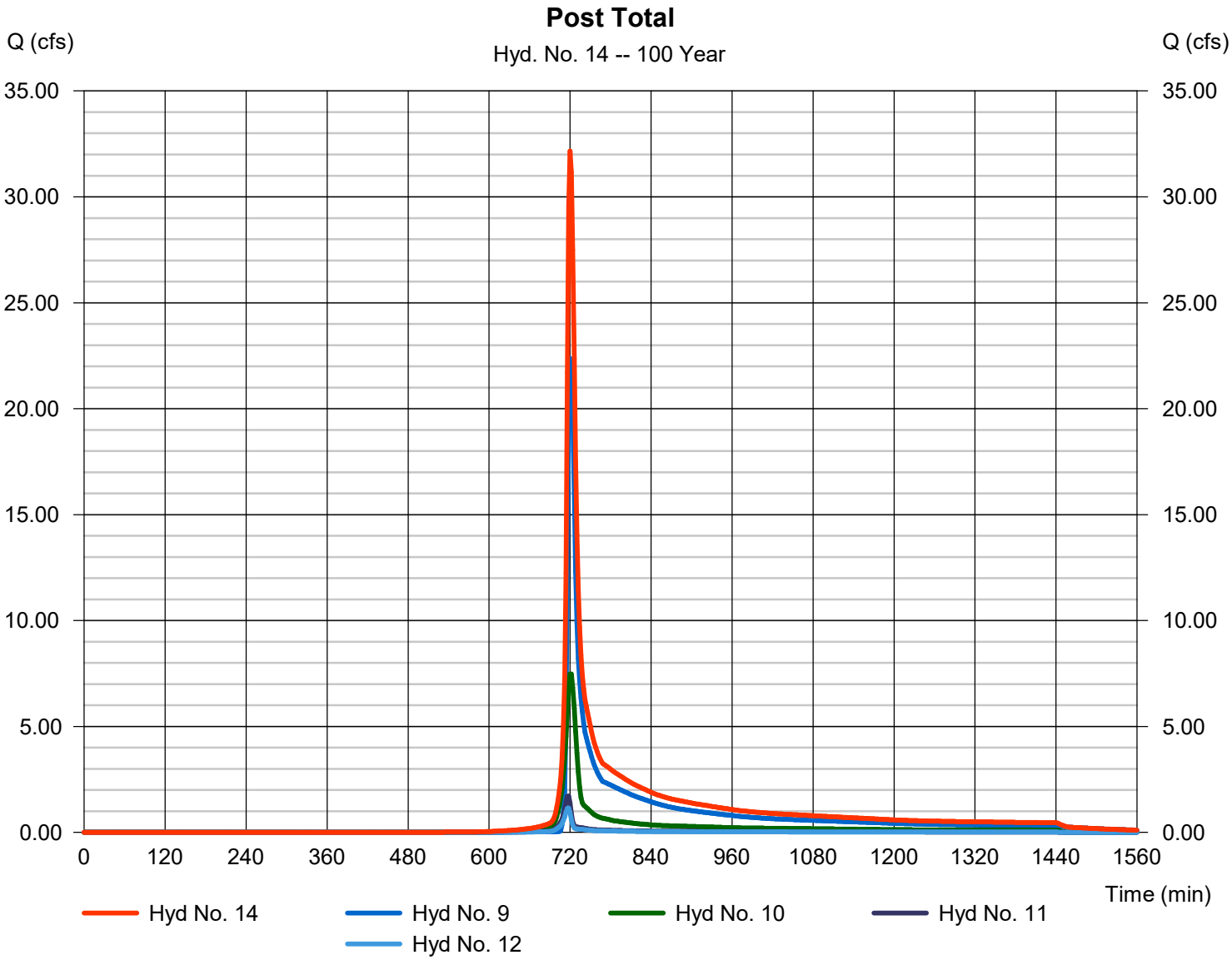


Hydrograph Report

Hyd. No. 14

Post Total

Hydrograph type	= Combine	Peak discharge	= 32.16 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 91,137 cuft
Inflow hyds.	= 9, 10, 11, 12	Contrib. drain. area	= 2.110 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	57.5660	12.2000	0.8735	--------
2	71.2172	12.9000	0.8806	--------
3	0.0000	0.0000	0.0000	--------
5	72.4895	12.9000	0.8394	--------
10	70.9628	12.4000	0.8039	--------
25	61.7951	11.1000	0.7421	--------
50	56.2815	10.2000	0.7000	--------
100	49.9718	9.1000	0.6548	--------

File name: CARY.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.80	3.84	3.21	2.77	2.45	2.19	1.99	1.82	1.68	1.56	1.46	1.37
2	5.61	4.52	3.80	3.28	2.90	2.60	2.36	2.16	2.00	1.86	1.74	1.63
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.44	5.23	4.43	3.86	3.43	3.09	2.82	2.59	2.40	2.24	2.10	1.98
10	7.14	5.83	4.96	4.33	3.86	3.49	3.19	2.94	2.74	2.56	2.40	2.27
25	7.86	6.43	5.49	4.82	4.32	3.92	3.60	3.34	3.11	2.92	2.76	2.61
50	8.38	6.86	5.88	5.18	4.65	4.24	3.91	3.63	3.40	3.20	3.02	2.87
100	8.83	7.24	6.22	5.50	4.95	4.53	4.19	3.90	3.66	3.46	3.28	3.12

Tc = time in minutes. Values may exceed 60.

Precip. file name: K:\300\332 - Raleigh Commercial\Reference\HYDRAFLOW\Rainfall Data\RALEIGH.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.95	3.56	0.00	4.46	5.15	6.10	6.74	7.62
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SCM Design Calculations

Wet Pond Worksheet

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Project:
Calculated By:

Project No.: 37630.073
Date: 07/07/2023

Wet Pond Design Calculations — SCM 1

Pollutant / Nutrient Removal

Total Suspended Solids (TSS)	85%
Nitrogen	30%
Phosphorus	n/a

Basin Characteristics

Post-Development Drainage Area

Area to Pond

Description	Acres
Impervious Lots	1.98
Impervious R/W	0.00
Managed Pervious	2.04
Wooded	0.07
Total to Pond	4.09
Pond Basin CN	79

Estimated Impervious

Lots

Description	Qty	Inc Area	Total Area
Subtotal			0.00

Streets and SW

Description	Length	Imp/Ft	Total Area
Subtotal			0.00

Other

Grand Total			0.00

Surface Area to Drainage Area Ratio for Permanent Pool Sizing

Drainage Area to SCM

Impervious Area	Acres
Offsite Impervious Area	0.00
Onsite Impervious Area	1.98
Total Impervious Area	1.98
Total Drainage Area To SCM	4.09
Percent Impervious Area	48%

Required Surface Area of Permanent Pool
(Forebay & Main Pond Combined)

Average Depth (ft) =	4.0
SA/DA Ratio =	1.46
Required SA (ft2) =	2,601
SA as Shown (ft2) =	9,348

SA/DA Ratio from latest NCDENR BMP Manual

SA / DA Pond Volumes and Areas (Below Permanent / Normal Pool)

Elevation (ft)	Main Area (sf)	Forebay Area (sf)	Depth (ft)	Main Inc. Vol (cf)	Forebay Inc. Vol (cf)	Total Vol (cf)
539.0				Bottom of Sediment Storage		
540.0	4,422	-	0.0	Top of Sediment Storage		
541.0	5,079	326	1.0	4,751	0	4,751
542.0	5,766	779	2.0	5,423	553	10,726
543.0	6,482	1,410	3.0	6,124	1,095	17,944
544.0	7,225	2,220	4.0	6,854	1,815	26,613
545.0	9,348	3,143	5.0	8,287	2,682	37,581
Total			5.0	31,437	6,144	37,581
Verify the Forebay Volume Is Approximately (15% - 20%) of the Permanent Pool Volume.						**20%**

Water Quality and Quantity Volumes (Above Permanent / Normal Pool)

Elevation (ft)	Main Area (sf)	Forebay Area (sf)	Depth (ft)	Inc Total Vol (cf)	Accum' Total Vol (cf)	
545.0	12,492	-	0.00	Permanent Pool Elevation		Notes
546.0	14,026	-	1.00	13,259	13,259	WQE / TPE
547.0	15,617	-	2.00	14,822	28,081	
548.0	17,264	-	3.00	16,441	44,521	
			0.00	0	44,521	
				0	44,521	
				0	44,521	
				0	44,521	

Verify the Average Depth of Pool (D_{avg}) - Equation 3.

$d_{avg} = [V_{perm\ pool} - [0.5 \times Depth_{max\ over\ shelf} \times Perimeter_{perm\ pool} \times Width_{submerged\ part\ of\ shelf}] / A_{bottom\ of\ shelf}$

V_{perm} =	31,437	C.F. (Main Pond)
$A_{bottom\ shelf}$ =	7,225	S.F. (Main Pond)
Depth of Water $_{over\ shelf}$ =	1.0	FT
Perimeter $_{perm\ pool}$ =	413	L.F. (Main Pond)
Width $_{submerged\ part\ of\ shelf}$ =	6.0	FT
D_{avg} =	4.18	FT
Depth for SA/DA =	**4.00**	**FT (Round D_{av} down to nearest 0.5 ft)**

1.0" Water Quality Runoff Volume Calculation

Using the runoff volume calculations in the "Simple Method" as described by Schueler (1987)

Where: Rv = Runoff Coefficient, in/in

I = Percent Impervious	I=	48.4%
Rv = 0.05 + 0.009(I)	Rv =	0.486
1.0 inch runoff volume (Required)		
Runoff volume, S=(Design rainfall) (Rv) (Drainage Area)		
Design Rainfall =	1.0	inch
Drainage Area =	4.09	acres
Storage Required =	**7,211**	**cu. ft.**

Volume Storage For 1.0" Runoff Above Permanent Pool (Provided)

Depth	PPE SA (SF)	Top Temp Pool SA (SF)	Volume (CF)	Elevation
1.00	9,348	15,617	13,259	546.00

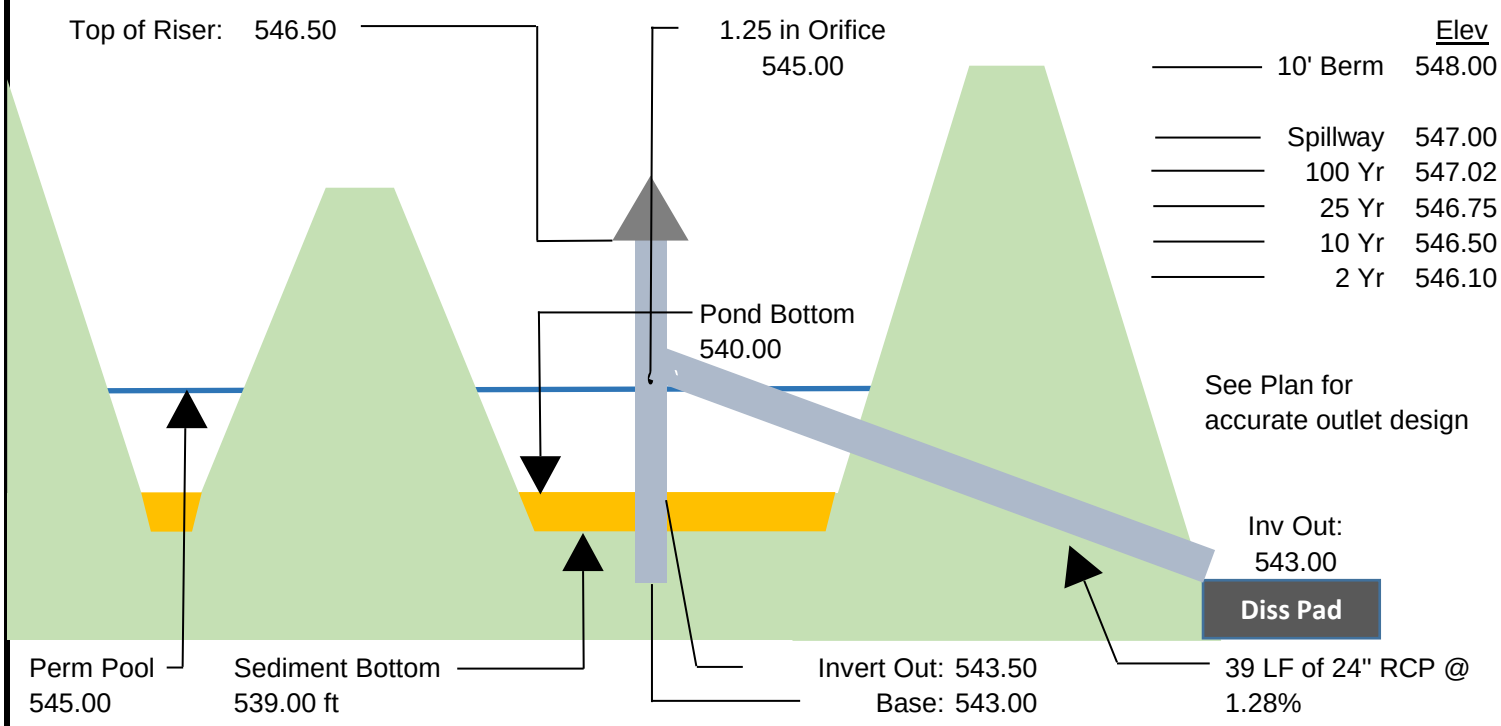
Size Water Quality Orifice for (2-5) Day Drawdown for 1" Runoff Volume

$Q_{1"} = CdA(2gh)^{1/2}$	(Orifice Equation; Cd=0.60)
1.25	Orfice Diameter (inches)
0.32	Driving Head to Centroid of Orfice (ft) (H/3)
0.02	Q1.0" Drawdown Rate (cfs)
7,211	Water Quality Volume (V_{WQ})
$V_{WQ}/(Q1" \times 86{,}400)$	Drawdown Time (days)
3.6	**Drawdown Time (days) (2 - 5 days)**

Pond / Riser Data & Elevations

Pond Type	Wet Detention		
TSS Removal			
Top of Pond / Berm	548.00 ft		
Secondary Spillway Width	20.00 ft		
Bottom of Secondary Spillway	547.00 ft		
Top of Riser	546.50 ft		
Riser Type / Size	4x4 ft		
Top of Water Quality / Temp Pool Elev	n/a ft		
Top of Shelf	545.00 ft		
Permanent Pool Elevation (Normal Pool)	545.00 ft		
Orifice Elevation & Size	545.00 ft		1.25 in
Secondary Orifice Elevation & Size	n/a ft		n/a in
Bottom of Shelf	544.00 ft		
Top of Sediment Storage / Pond Bottom	540.00 ft		
Bottom of Sediment Storage	539.00 ft	(Min 1 ft)	
Invert Out of Riser	543.50 ft		
Outlet Pipe Size	24.00 in	Diameter RCP	
Outlet Pipe Length & Slope	39.00 ft		1.29 %
Downstream Outlet Elevation	543.00 ft		
2 Yr Water Surface Elev / Peak Flow (CFS)	546.10 ft		0.33 CFS
10 Yr Water Surface Elev Peak Flow (CFS)	546.50 ft		2.59 CFS
25 Yr Water Surface Elev Peak Flow (CFS)	546.75 ft		10.59 CFS
100 Yr Water Surface Elev Peak Flow (CFS)	547.02 ft		22.65 CFS

Pond Detail



Anti-Bouyancy Calculations for the Riser Structure

Riser Dimensions		Weight of Structure		Displaced Volume	
Outside Width	5.00 ft	Walls =	4,050 LBS	V = LxWx(HT+Base) = C.F.	
Inside Width	4.00 ft	Base =	3,675 LBS		
Outside Length	5.00 ft			Displaced Water =	
Inside Length	4.00 ft			C.F. * 62.4 PCF = LBS	
Height	3.00 ft	Outlet Pipe =	236 LBS		
Base Thick' (ft)	0.50 ft	WQ Orifice =	1 LBS	Add 15% Factor of Safety	
Wall Thick' (ft)	0.50 ft				
Ext Base (ft)	1.00 ft	Weir #1 =	0 LBS	V =	75 C.F.
Areas Removed from Riser		Weir #2 =	0 LBS	Disp. Water =	4,680 LBS
Outlet Pipe	3.14 ft	Weir #3 =	0 LBS	15% F.S. =	702 LBS
WQ Orifice	0.01 ft	Weir #4 =	0 LBS		
Orifice #1	0.00 ft	Other #1 =	0 LBS	Saftety Factor	60.02%
Orifice #2	0.00 ft				
Orifice #3	0.00 ft	**Weight =**	**7,489 LBS**	**Weight =**	**5,382 LBS**
Orifice #4	0.00 ft	**Precast Concrete Riser Structure to be 4 ft x 4 ft x 3 ft Tall, With a 0.5 ft Thick Precast Extended Base**			
Other	0.00 ft				