Hesketh

Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects

F. A. Hesketh & Associates, Inc.

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MEMORANDUM

To: **Tom Grimaldi, P.E.** **Date**: March 24, 2023

From: Guy Hesketh. P.E.

Subject: **Bramble Bush Redevelopment**
Hydrologic Analysis
Our File: **22082**

Tom:

Please find attached our hydrologic analysis of the re-development proposal for the Bramble Bush parcel on East Street. As you are aware, there is a new owner of the parcel, K SFR East Granby Owner, LLC. The new owner is proposing to redevelop the parcel into a multi-family development of 58 duplex units (116 dwelling units), a clubhouse with outdoor pool and gathering amenities, a mail kiosk, and maintenance building. The original subdivision included 66 single-family home lots, a town road right-of-way and dedicated open space areas. Much of the infrastructure has been constructed, including stormwater drainage systems and detention basins, electric and communications infrastructure, sanitary sewer mains and laterals, and water service mains and laterals.

The re-development proposal would include extinguishing the individual lot lines and merging the parcels and open space into a single lot. The former 50-foot town road right-of-way would be re-dedicated as utility easement for water and sewer service and for a newly proposed natural gas service. Currently there is a 70-foot easement in favor of CL&P. This easement would remain in place.

The proposed buildings would utilize the existing utility infrastructure, with new service connections. The existing storm drain systems would also be utilized to serve the development. Expansion of the existing stormwater detention basins are proposed to facilitate the modest increase in impervious area proposed and to account for changes in

MEMORANDUM

rainfall intensity rates resulting from the use of current NOAA Atlas 14 rainfall data. Presented herein are a discussion and results of the hydrologic methodologies utilized in design of the stormwater management basins.

History:

The original subdivision (The Bramble Bush Village) was approved in 2011. The subdivision application included a 15-page plan set prepared by EcoDesign, LLC from Avon, CT. Other application materials included a drainage report, also prepared by EcoDesign, LLC, entitled " PRE-AND POST DEVELOPMENT STORMWATER ANALYSIS AND ROADWAY DRAINAGE DESIGN REPORT, THE BRAMBLE BUSH VILLAGE, Dated August 2006 and Revised September 2006. Copies of the 105-page report are on file in the East Granby Planning Department.

The drainage report showed analysis of both existing and proposed conditions using the SCS Methodology (TR-55) of peak flow analysis using the Hydraflow Hydrogrpahs software. The analysis modeled both the pre-development (2006) existing conditions and proposed condition analysis, including inflow and outflow of stormwater through three proposed stormwater detention basins. Weighted Curve Numbers (CN) were based on soil groups and ground cover characteristics. No reference to rainfall distribution data is provided in the report.

Methodology:

We re-ran the hydrologic analysis, also using the SCS Methodology in the Hydraflow Hydrographs program to compare pre- and post-conditions peak rates and volumes. As you are aware, the site has been partially constructed since 2011 and left in a state of partial completion. This being the case, we referred to the previous study in order to establish a baseline for determining existing condition peak flows. For the existing condition, we utilized the overall watershed limits and subwatersheds used in the previous study, which included analysis of peak flows to the eastern boundary of the site (De Grays Brook) and western boundary of the site (Sanborn Brook). This included routing the flow through the existing 24-inch diameter culvert at the cross culvert of East Street. The previously sed sage storage relationship for storage up-gradient of this culvert was preserved. Rainfall distribution data, however, was obtained from recent NOAA Atlas 14 Data from online sources.

For the proposed site condition, the revised developed-condition parameters were modeled. Weighted Curve Numbers (CN) were based on soil groups and ground cover

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characteristics of the revised proposed condition. This included routing some on-site-generated runoff through one of the three on-site water quality (detention) basins. The basins are proposed to be revised to increase storage volume to provide for one foot of free-board above the 100-year storm levels and to account for the modest net increase in impervious area and the more intense NOAA Atlas 14 rainfall data. Like the revised existing-conditions model, rainfall distribution data was obtained from recent NOAA Atlas 14 Data from online sources.

Results of analysis are summarized below:

Control point CP-E – DeGrays Brook

Return Period	Pre-Development Peak Rate of Discharge (CFS)	Post-Developed Peak Rate of Discharge (CFS)
2-Yr	6.6	5.9
5-Yr	11	8.4
10-Yr	13	10
25-Yr	14	13
50-Yr	16	14
100-Yr	18	16

Control Point CP-W – Sanborn Brook

Return Period	Pre-Development Peak Rate of Discharge (CFS)	Post-Developed Peak Rate of Discharge (CFS)
2-Yr	5.3	4.9
5-Yr	9.7	9.6
10-Yr	14	12
25-Yr	19	15
50-Yr	23	19
100-Yr	28	22

The analysis indicates that there is no increase in peak rate of flow from the proposed re-development to either receiving watershed to the east of west of the development parcel.

Input and output data is attached.

Attachment 1

Watershed Area Maps

DESIGN POINT WEST

WESTERN SLOPE-PRE
A: 1.02 Ac.
CN= 78
Tc= 13.3 Mins.

401' SHALLOW CONC.
FLOW, S=2.12%

CP-W

100' SHEET FLOW,
n=0.06, S=3.5%

100' SHEET FLOW,
n=0.06, S=0.33%

WATERSHED LIMITS (TYPICAL)

1,104' SHALLOW CONC.
FLOW, S=0.89%

MFDR NW-PRE
A: 2.81 Ac.
CN= 73
Tc=6.5 Mins

WESTERN-PRE

634' SHALLOW CONC.
FLOW, S=0.3%

MFDR SW-PRE
A: 1.69
CN= 72
Tc=16 Mins

513' SHALLOW CONC.
FLOW, S=0.3%

MFDR NE-PRE
A: 16.14 Ac.
CN= 74
Tc=21.6 Mins

EASTERN-PRE

EAST STREET
24" CULVERT
HEADWATER STORAGE

NE WETLAND-PRE
A: 4.31 Ac.
CN= 74
Tc= 6.9 Mins

CP-E

EAST STREET
24" CULVERT

DESIGN POINT EAST

50' SHEET FLOW,
n=0.06, S=12%

100' SHEET FLOW,
n=0.06, S=1.3%

170' SHALLOW CONC.
FLOW, S=4.56%

WATERSHED LIMITS
(TYPICAL)

72' SHALLOW CONC.
FLOW, S=0.82%

100' SHEET FLOW,
n=0.06, S=1.0%

SOIL CLASSIFICATIONS *:

9 - SCITICO, SHAKE, & MAYBID SOILS: D RATING
25A - BRANCROFT SILT LOAM , (0-3%): C RATING
28A - ELMRIDGE FINE SANDY LOAM, (0-3%): C RATING
29B - AGAWAM FINE SANDY LOAM, (0-3%): B RATING

* From Soil Web Survey.

Wetlands Delineations depicted are field delineated by XXXX on MONTH DAY YEAR

MAP REFERENCE #1

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

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Revisions:

No.	Date	Description

EXISTING CONDITIONS
WATERSHED AREA MAP
PREPARED FOR
KSFR EAST GRANBY OWNER, LLC
BRAMBLE BUSH CIRCLE
EAST GRANBY, CONNECTICUT

Date: 03-24-2023 | Drawn by: DRT | Job no: 22082
Scale: 1" = 80' | Checked by: GAH | Sheet no: 1 OF 1

DA-1

C:\2022\22082 - Krown Point East Granby\Submitted\2023-03-24\DA-1 2023-03-24.dwg, DA (1), Mar. 22, 2023 - 1:47:19 PM

DESIGN POINT WEST

485' SHALLOW CONC. FLOW, S=1.1%

120' SHEET FLOW, n=0.06, S=1.0%

115' SHEET FLOW, n=0.06, S=1.0%

WATERSHED LIMITS (TYPICAL)

591' SHALLOW CONC. FLOW, S=0.7%

EAST STREET 24" CULVERT HEADWATER STORAGE

WESTERN SLOPE-POST
A: 1.33 Ac.
CN= 78
Tc= 13.9 Mins.

WESTERN-POST

MFDR NW-POST
A: 5.03 Ac.
CN= 85
Tc=11.9 Mins.

MFDR NE-POST
A: 9.49 Ac.
CN= 86
Tc=16.2 Mins.

MFDR SW-POST
A: 5.80 Ac.
CN= 85
Tc=10.0 Mins.

EASTERN-POST

NE-WETLAND-POST
A: 6.96 Ac.
CN= 81
Tc=14.1 Mins.

WQB #3

WQB #2

WQB #1

1,369' CHANNEL FLOW, S=0.37%

295' CHANNEL FLOW, S=1.5%

130' SHEET FLOW, n=0.06, S=1.0%

144' SHEET FLOW, n=0.06, S=1.0%

EAST STREET 24" CULVERT

DESIGN POINT EAST

SOIL CLASSIFICATIONS *:

9	- SCITICO, SHAKE, & MAYBID SOILS: D RATING
25A	- BRANCROFT SILT LOAM , (0-3%): C RATING
28A	- ELMRIDGE FINE SANDY LOAM, (0-3%): C RATING
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* From Soil Web Survey.

Wetlands Delineations depicted are field delineated by XXXX on MONTH DAY YEAR

MAP REFERENCE #1

GRAPHIC SCALE
80 0 40 80 160 320
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Revisions:

No.	Date	Description

PROPOSED CONDITIONS
WATERSHED AREA MAP
PREPARED FOR
KSFR EAST GRANBY OWNER, LLC
BRAMBLE BUSH CIRCLE
EAST GRANBY, CONNECTICUT

Date: 03-24-2023 | Drawn by: DRT | Checked by: GAH | Job no: 22082 | Sheet no: 1 OF 1
Scale: 1" = 80'

DA-2

G:\2022\22082 - Known Point East Granby\Submitted\2023-03-24\DA-1 2023-03-24.dwg, DA (2), Mar 22, 2023 - 1:45:57 PM

Attachment 2

NOAA Atlas 14 Precipitation Data

NOAA Atlas 14, Volume 10, Version 3
Location name: East Granby, Connecticut, USA*
Latitude: 41.9436°, Longitude: -72.7294°
Elevation: 183.58 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

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	**0.348** (0.267-0.452)	**0.417** (0.319-0.541)	**0.529** (0.404-0.689)	**0.621** (0.472-0.816)	**0.749** (0.553-1.03)	**0.846** (0.612-1.19)	**0.947** (0.667-1.38)	**1.06** (0.710-1.58)	**1.22** (0.789-1.89)	**1.35** (0.854-2.13)
10-min	**0.493** (0.378-0.640)	**0.590** (0.452-0.767)	**0.749** (0.572-0.976)	**0.881** (0.670-1.16)	**1.06** (0.783-1.46)	**1.20** (0.867-1.68)	**1.34** (0.945-1.95)	**1.50** (1.00-2.24)	**1.73** (1.12-2.67)	**1.91** (1.21-3.02)
15-min	**0.580** (0.445-0.753)	**0.694** (0.532-0.902)	**0.881** (0.673-1.15)	**1.04** (0.787-1.36)	**1.25** (0.921-1.71)	**1.41** (1.02-1.98)	**1.58** (1.11-2.30)	**1.77** (1.18-2.63)	**2.03** (1.32-3.14)	**2.25** (1.42-3.56)
30-min	**0.780** (0.598-1.01)	**0.939** (0.719-1.22)	**1.20** (0.914-1.56)	**1.41** (1.07-1.85)	**1.71** (1.26-2.34)	**1.93** (1.40-2.71)	**2.17** (1.53-3.15)	**2.42** (1.62-3.62)	**2.79** (1.81-4.32)	**3.09** (1.96-4.88)
60-min	**0.980** (0.751-1.27)	**1.18** (0.906-1.54)	**1.52** (1.16-1.98)	**1.79** (1.36-2.35)	**2.17** (1.60-2.98)	**2.45** (1.78-3.44)	**2.75** (1.94-4.01)	**3.08** (2.07-4.60)	**3.55** (2.30-5.50)	**3.93** (2.49-6.21)
2-hr	**1.26** (0.975-1.63)	**1.52** (1.17-1.96)	**1.93** (1.49-2.50)	**2.28** (1.74-2.97)	**2.75** (2.05-3.76)	**3.11** (2.27-4.35)	**3.49** (2.48-5.08)	**3.92** (2.64-5.83)	**4.57** (2.97-7.04)	**5.11** (3.24-8.03)
3-hr	**1.46** (1.13-1.87)	**1.75** (1.35-2.25)	**2.23** (1.72-2.88)	**2.63** (2.02-3.41)	**3.18** (2.37-4.33)	**3.59** (2.63-5.01)	**4.02** (2.88-5.86)	**4.55** (3.07-6.73)	**5.33** (3.47-8.18)	**6.00** (3.82-9.40)
6-hr	**1.82** (1.42-2.33)	**2.21** (1.72-2.83)	**2.84** (2.21-3.65)	**3.37** (2.60-4.35)	**4.09** (3.08-5.56)	**4.63** (3.42-6.45)	**5.21** (3.76-7.59)	**5.92** (4.01-8.72)	**7.03** (4.59-10.7)	**7.99** (5.10-12.4)
12-hr	**2.23** (1.75-2.83)	**2.75** (2.15-3.48)	**3.59** (2.81-4.57)	**4.29** (3.33-5.50)	**5.26** (3.98-7.11)	**5.96** (4.44-8.28)	**6.74** (4.91-9.81)	**7.72** (5.24-11.3)	**9.27** (6.06-14.1)	**10.6** (6.79-16.4)
24-hr	**2.59** (2.04-3.26)	**3.24** (2.56-4.09)	**4.32** (3.40-5.46)	**5.21** (4.07-6.63)	**6.44** (4.91-8.68)	**7.33** (5.50-10.2)	**8.33** (6.13-12.1)	**9.62** (6.55-14.0)	**11.7** (7.67-17.7)	**13.5** (8.69-20.8)
2-day	**2.88** (2.29-3.61)	**3.67** (2.92-4.60)	**4.96** (3.93-6.23)	**6.03** (4.74-7.62)	**7.50** (5.76-10.1)	**8.57** (6.48-11.9)	**9.77** (7.27-14.2)	**11.4** (7.77-16.5)	**14.1** (9.24-21.1)	**16.4** (10.6-25.2)
3-day	**3.15** (2.51-3.92)	**4.01** (3.20-5.00)	**5.43** (4.32-6.80)	**6.61** (5.22-8.32)	**8.23** (6.35-11.0)	**9.40** (7.14-13.0)	**10.7** (8.02-15.6)	**12.5** (8.57-18.1)	**15.5** (10.2-23.2)	**18.2** (11.8-27.8)
4-day	**3.40** (2.72-4.22)	**4.33** (3.46-5.38)	**5.85** (4.66-7.30)	**7.11** (5.63-8.92)	**8.84** (6.84-11.8)	**10.1** (7.69-13.9)	**11.5** (8.63-16.7)	**13.5** (9.22-19.4)	**16.7** (11.0-24.9)	**19.6** (12.6-29.8)
7-day	**4.09** (3.29-5.05)	**5.15** (4.14-6.36)	**6.88** (5.51-8.54)	**8.32** (6.62-10.4)	**10.3** (8.00-13.7)	**11.7** (8.97-16.0)	**13.4** (10.0-19.3)	**15.5** (10.7-22.3)	**19.1** (12.7-28.4)	**22.4** (14.5-33.9)
10-day	**4.77** (3.85-5.87)	**5.90** (4.75-7.26)	**7.74** (6.22-9.57)	**9.27** (7.40-11.5)	**11.4** (8.85-15.0)	**12.9** (9.87-17.5)	**14.6** (11.0-20.9)	**16.9** (11.7-24.1)	**20.6** (13.7-30.6)	**24.0** (15.5-36.2)
20-day	**6.89** (5.60-8.43)	**8.08** (6.56-9.88)	**10.0** (8.10-12.3)	**11.6** (9.34-14.4)	**13.8** (10.8-18.0)	**15.4** (11.8-20.7)	**17.2** (12.9-24.2)	**19.5** (13.5-27.6)	**23.0** (15.4-33.9)	**26.2** (17.0-39.3)
30-day	**8.70** (7.10-10.6)	**9.90** (8.07-12.1)	**11.9** (9.63-14.5)	**13.5** (10.9-16.6)	**15.7** (12.3-20.3)	**17.4** (13.3-23.0)	**19.2** (14.3-26.5)	**21.3** (14.9-30.1)	**24.5** (16.4-35.9)	**27.3** (17.8-40.8)
45-day	**11.0** (8.97-13.3)	**12.2** (9.98-14.8)	**14.2** (11.6-17.3)	**15.9** (12.9-19.5)	**18.2** (14.2-23.3)	**20.0** (15.3-26.1)	**21.8** (16.1-29.6)	**23.7** (16.6-33.3)	**26.5** (17.8-38.5)	**28.6** (18.7-42.7)
60-day	**12.8** (10.6-15.5)	**14.1** (11.6-17.1)	**16.3** (13.3-19.7)	**18.0** (14.6-22.0)	**20.4** (16.0-25.9)	**22.3** (17.0-28.9)	**24.1** (17.7-32.3)	**25.9** (18.2-36.2)	**28.2** (19.0-41.0)	**29.9** (19.5-44.4)

[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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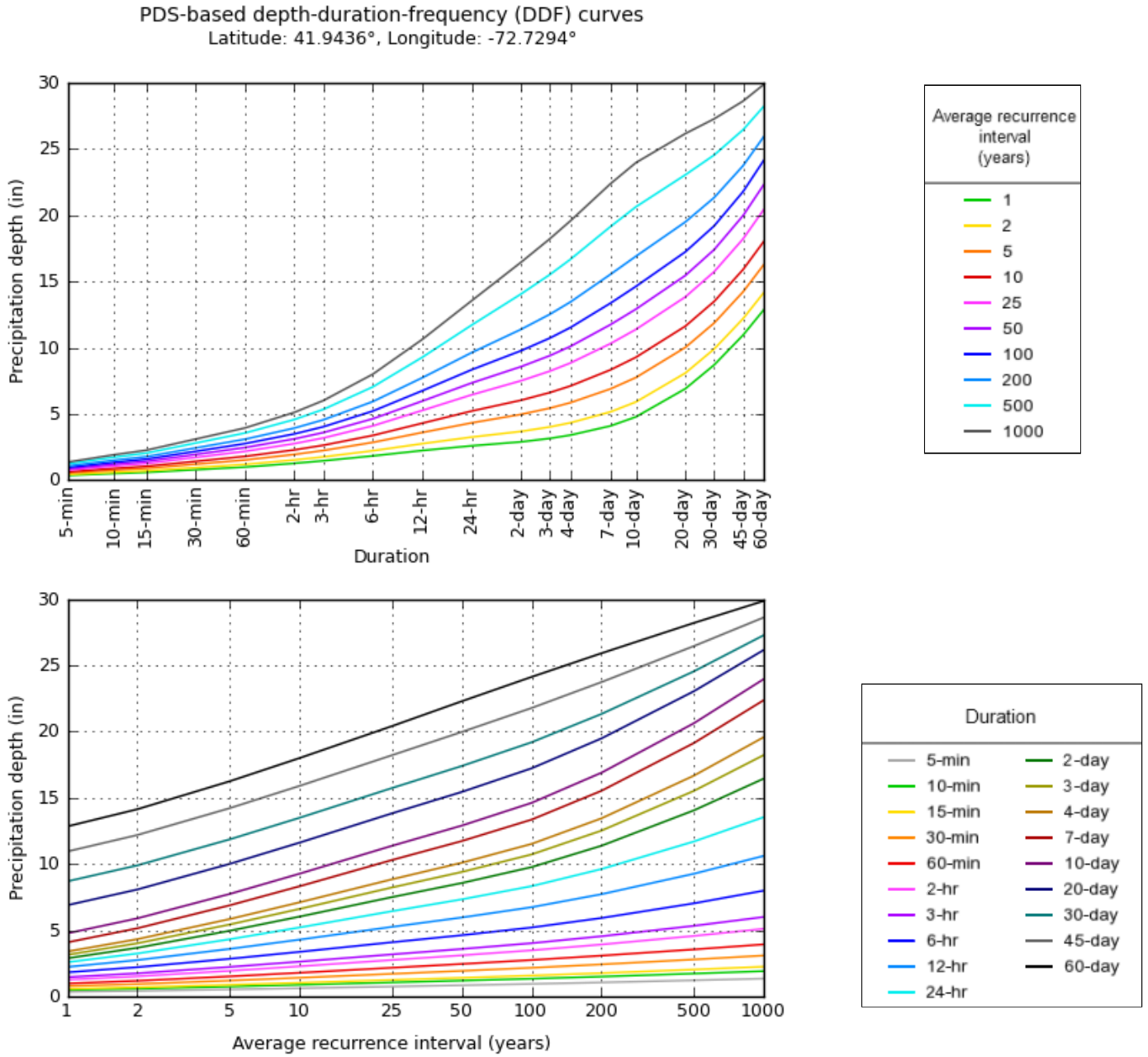
PF graphical



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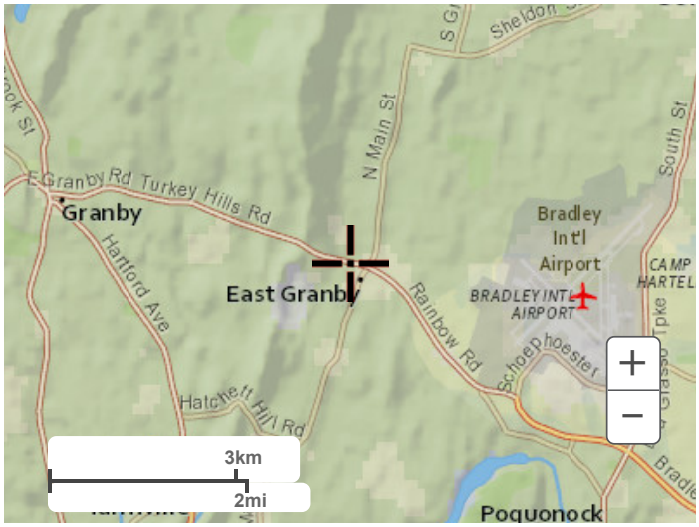
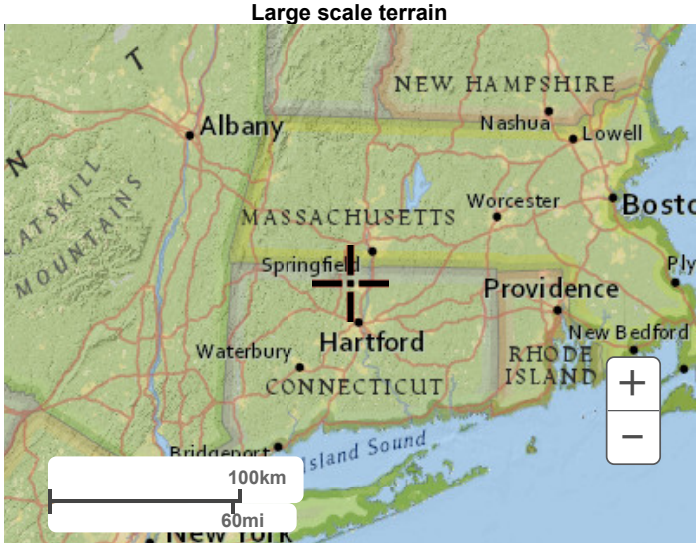
Maps & aerials

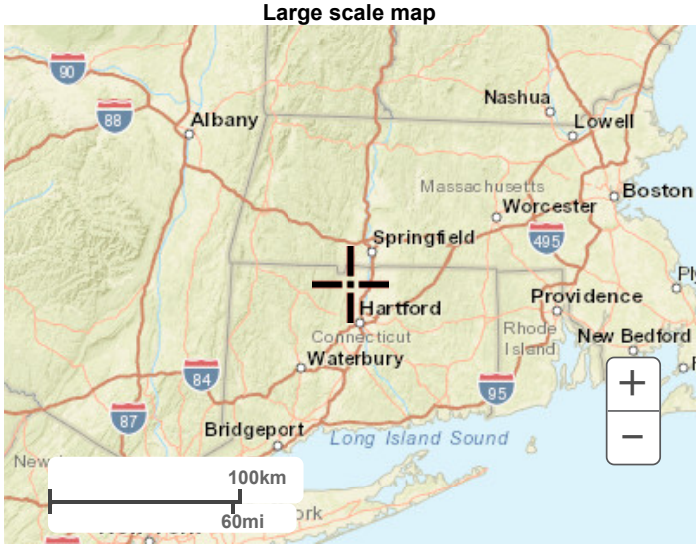
Small scale terrain



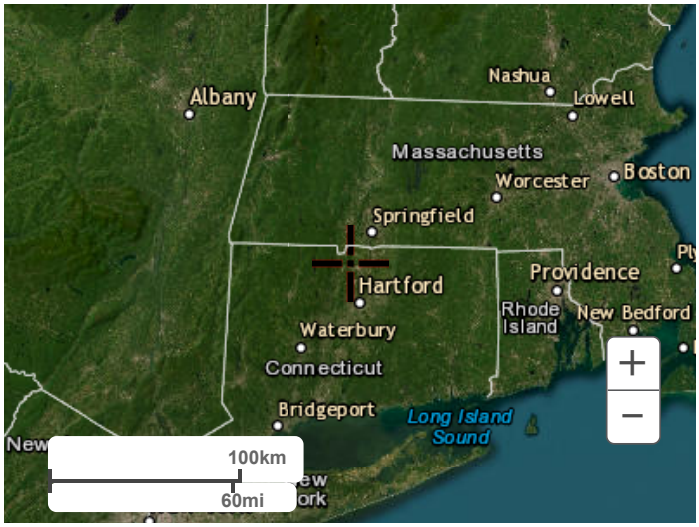
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

NOAA Atlas 14, Volume 10, Version 3
Location name: East Granby, Connecticut, USA*
Latitude: 41.9436°, Longitude: -72.7294°
Elevation: 183.58 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

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/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.18** (3.20-5.42)	**5.00** (3.83-6.49)	**6.35** (4.85-8.27)	**7.45** (5.66-9.79)	**8.99** (6.64-12.3)	**10.2** (7.34-14.2)	**11.4** (8.00-16.5)	**12.7** (8.52-19.0)	**14.6** (9.47-22.6)	**16.2** (10.2-25.6)
10-min	**2.96** (2.27-3.84)	**3.54** (2.71-4.60)	**4.49** (3.43-5.86)	**5.29** (4.02-6.94)	**6.37** (4.70-8.74)	**7.19** (5.20-10.1)	**8.05** (5.67-11.7)	**9.00** (6.03-13.4)	**10.4** (6.71-16.0)	**11.5** (7.26-18.1)
15-min	**2.32** (1.78-3.01)	**2.78** (2.13-3.61)	**3.52** (2.69-4.60)	**4.14** (3.15-5.44)	**5.00** (3.68-6.85)	**5.64** (4.08-7.91)	**6.31** (4.45-9.19)	**7.06** (4.73-10.5)	**8.13** (5.26-12.6)	**9.00** (5.70-14.2)
30-min	**1.56** (1.20-2.02)	**1.88** (1.44-2.44)	**2.40** (1.83-3.12)	**2.83** (2.15-3.71)	**3.42** (2.52-4.69)	**3.86** (2.80-5.42)	**4.33** (3.05-6.30)	**4.85** (3.25-7.23)	**5.58** (3.61-8.64)	**6.18** (3.91-9.77)
60-min	**0.980** (0.751-1.27)	**1.18** (0.906-1.54)	**1.52** (1.16-1.98)	**1.79** (1.36-2.35)	**2.17** (1.60-2.98)	**2.45** (1.78-3.44)	**2.75** (1.94-4.01)	**3.08** (2.07-4.60)	**3.55** (2.30-5.50)	**3.93** (2.49-6.21)
2-hr	**0.632** (0.488-0.814)	**0.759** (0.585-0.980)	**0.967** (0.743-1.25)	**1.14** (0.870-1.48)	**1.38** (1.02-1.88)	**1.55** (1.13-2.17)	**1.74** (1.24-2.54)	**1.96** (1.32-2.91)	**2.29** (1.48-3.52)	**2.56** (1.62-4.01)
3-hr	**0.485** (0.375-0.622)	**0.582** (0.451-0.749)	**0.743** (0.572-0.958)	**0.875** (0.671-1.14)	**1.06** (0.789-1.44)	**1.19** (0.875-1.67)	**1.34** (0.959-1.95)	**1.51** (1.02-2.24)	**1.78** (1.16-2.73)	**2.00** (1.27-3.13)
6-hr	**0.305** (0.237-0.389)	**0.369** (0.288-0.472)	**0.475** (0.369-0.609)	**0.563** (0.434-0.726)	**0.683** (0.514-0.928)	**0.772** (0.571-1.08)	**0.870** (0.628-1.27)	**0.989** (0.669-1.46)	**1.17** (0.766-1.79)	**1.33** (0.851-2.08)
12-hr	**0.185** (0.145-0.234)	**0.228** (0.179-0.289)	**0.298** (0.233-0.380)	**0.356** (0.277-0.456)	**0.436** (0.330-0.590)	**0.495** (0.368-0.687)	**0.560** (0.408-0.814)	**0.641** (0.435-0.939)	**0.769** (0.503-1.17)	**0.881** (0.564-1.36)
24-hr	**0.108** (0.085-0.136)	**0.135** (0.107-0.170)	**0.180** (0.141-0.228)	**0.217** (0.170-0.276)	**0.268** (0.204-0.362)	**0.306** (0.229-0.423)	**0.347** (0.255-0.505)	**0.401** (0.273-0.584)	**0.488** (0.320-0.736)	**0.564** (0.362-0.869)
2-day	**0.060** (0.048-0.075)	**0.076** (0.061-0.096)	**0.103** (0.082-0.130)	**0.126** (0.099-0.159)	**0.156** (0.120-0.210)	**0.178** (0.135-0.247)	**0.203** (0.151-0.297)	**0.237** (0.162-0.344)	**0.293** (0.192-0.440)	**0.343** (0.221-0.525)
3-day	**0.044** (0.035-0.054)	**0.056** (0.044-0.070)	**0.075** (0.060-0.094)	**0.092** (0.072-0.116)	**0.114** (0.088-0.153)	**0.131** (0.099-0.180)	**0.149** (0.111-0.217)	**0.174** (0.119-0.251)	**0.216** (0.142-0.323)	**0.253** (0.163-0.386)
4-day	**0.035** (0.028-0.044)	**0.045** (0.036-0.056)	**0.061** (0.049-0.076)	**0.074** (0.059-0.093)	**0.092** (0.071-0.123)	**0.105** (0.080-0.145)	**0.120** (0.090-0.174)	**0.140** (0.096-0.202)	**0.174** (0.115-0.259)	**0.204** (0.132-0.310)
7-day	**0.024** (0.020-0.030)	**0.031** (0.025-0.038)	**0.041** (0.033-0.051)	**0.050** (0.039-0.062)	**0.061** (0.048-0.081)	**0.070** (0.053-0.095)	**0.079** (0.060-0.115)	**0.092** (0.064-0.133)	**0.114** (0.075-0.169)	**0.133** (0.086-0.202)
10-day	**0.020** (0.016-0.024)	**0.025** (0.020-0.030)	**0.032** (0.026-0.040)	**0.039** (0.031-0.048)	**0.047** (0.037-0.063)	**0.054** (0.041-0.073)	**0.061** (0.046-0.087)	**0.070** (0.049-0.101)	**0.086** (0.057-0.127)	**0.100** (0.065-0.151)
20-day	**0.014** (0.012-0.018)	**0.017** (0.014-0.021)	**0.021** (0.017-0.026)	**0.024** (0.019-0.030)	**0.029** (0.022-0.038)	**0.032** (0.025-0.043)	**0.036** (0.027-0.050)	**0.041** (0.028-0.058)	**0.048** (0.032-0.071)	**0.055** (0.035-0.082)
30-day	**0.012** (0.010-0.015)	**0.014** (0.011-0.017)	**0.016** (0.013-0.020)	**0.019** (0.015-0.023)	**0.022** (0.017-0.028)	**0.024** (0.018-0.032)	**0.027** (0.020-0.037)	**0.030** (0.021-0.042)	**0.034** (0.023-0.050)	**0.038** (0.025-0.057)
45-day	**0.010** (0.008-0.012)	**0.011** (0.009-0.014)	**0.013** (0.011-0.016)	**0.015** (0.012-0.018)	**0.017** (0.013-0.022)	**0.018** (0.014-0.024)	**0.020** (0.015-0.027)	**0.022** (0.015-0.031)	**0.024** (0.016-0.036)	**0.027** (0.017-0.040)
60-day	**0.009** (0.007-0.011)	**0.010** (0.008-0.012)	**0.011** (0.009-0.014)	**0.013** (0.010-0.015)	**0.014** (0.011-0.018)	**0.015** (0.012-0.020)	**0.017** (0.012-0.022)	**0.018** (0.013-0.025)	**0.020** (0.013-0.028)	**0.021** (0.014-0.031)

[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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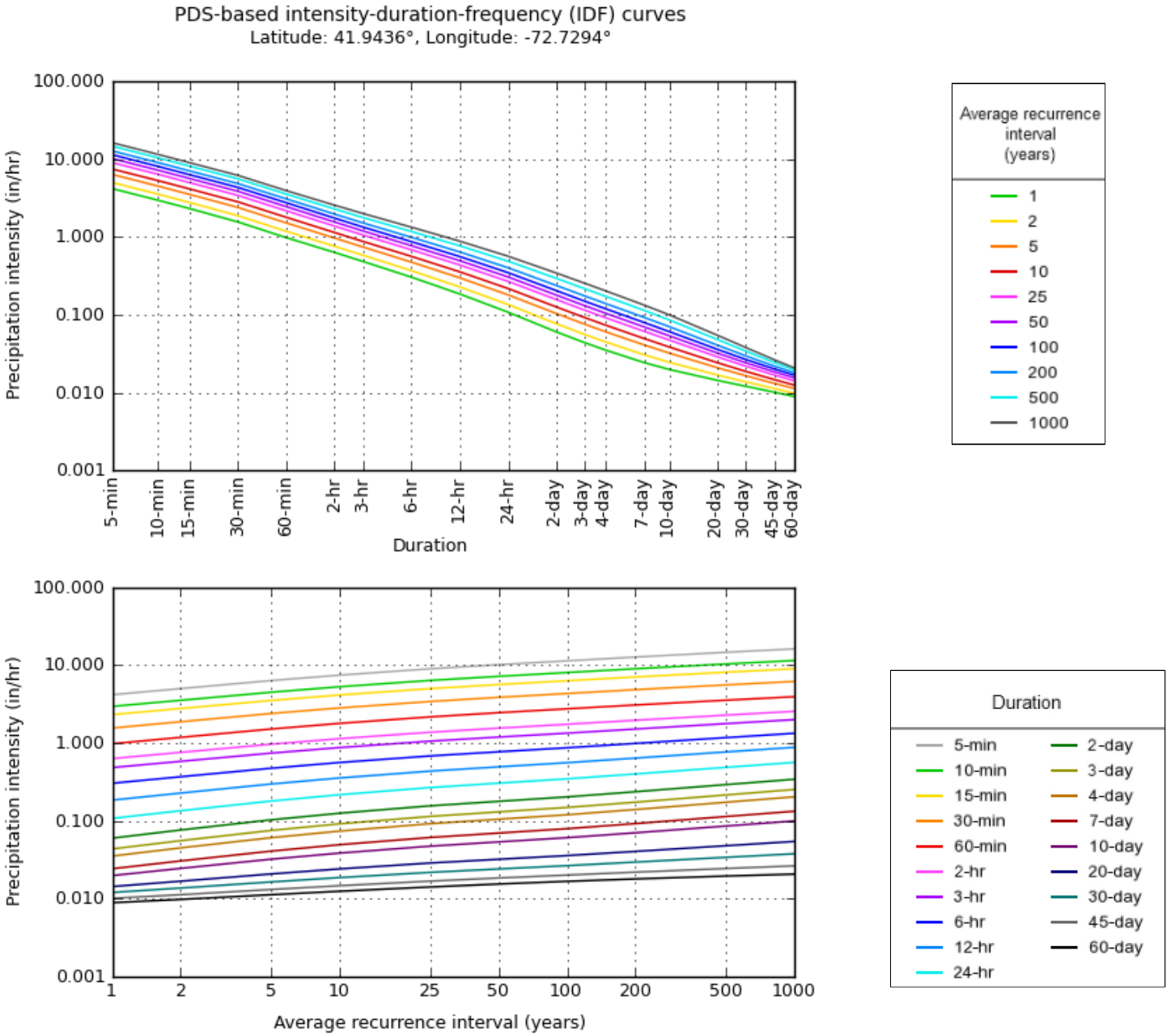
PF graphical



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Created (GMT): Tue Nov 15 18:56:36 2022

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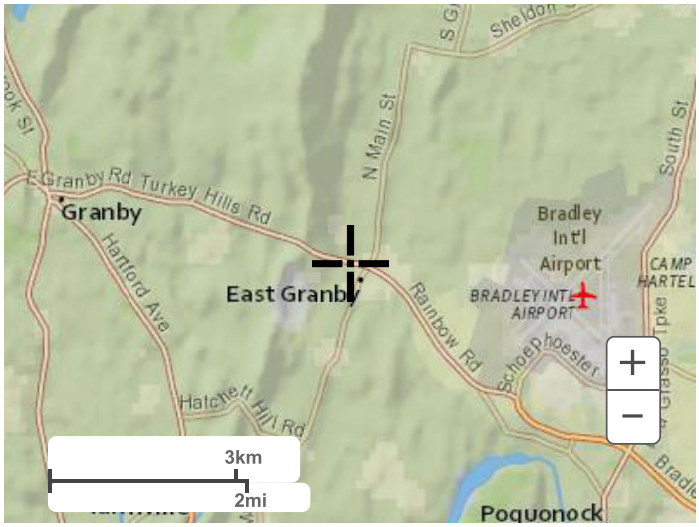
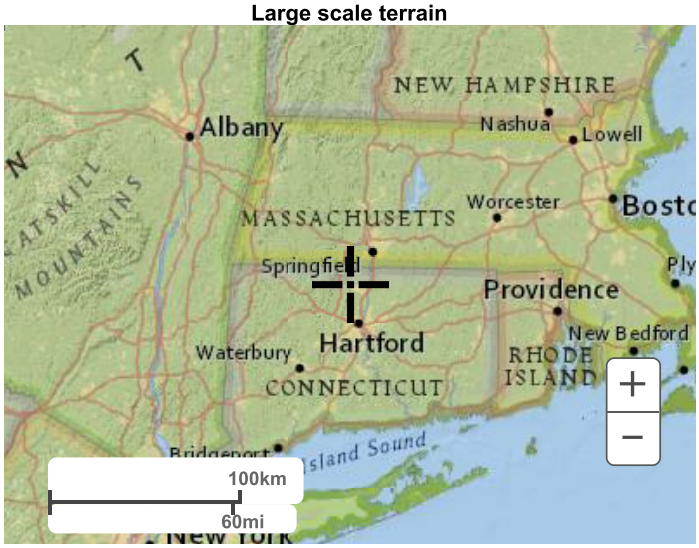
Maps & aerials

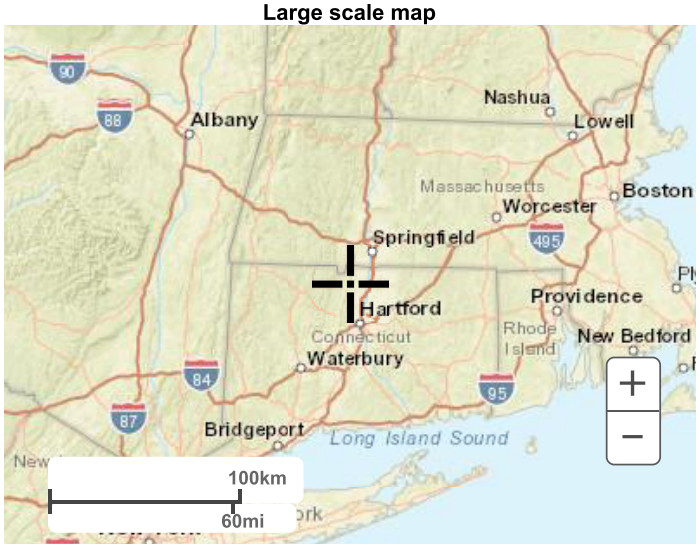
Small scale terrain



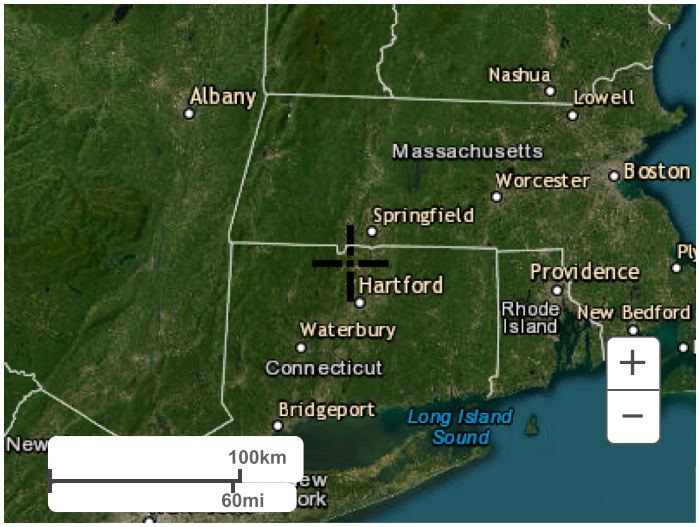
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Attachment 3

Site Soil Data

Soil Map—State of Connecticut
(BRAMBLE BUSH - EAST GRANBY)

72° 43' 26" W
72° 42' 38" W
41° 56' 48" N
41° 56' 28" N

688700 688800 688900 689000 689100 689200 689300 689400 689500 689600 689700

4646300 4646200 4646100 4646000 4645900 4645800

9
28A
9
9
29B
25A
Creamery Brook
East St
20
Crystal Dr

Soil Map may not be valid at this scale.

Map Scale: 1:3,000 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:12,000.

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: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

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

Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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
9	Scitico, Shaker, and Maybid soils	9.0	31.3%
25A	Brancroft silt loam, 0 to 3 percent slopes	0.4	1.6%
28A	Elmridge fine sandy loam, 0 to 3 percent slopes	18.6	64.5%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	0.8	2.7%
Totals for Area of Interest		**28.8**	**100.0%**

State of Connecticut

9—Scitico, Shaker, and Maybid soils

Map Unit Setting

National map unit symbol: 9lrq
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Scitico and similar soils: 40 percent
Shaker and similar soils: 30 percent
Maybid and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scitico

Setting

Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey glaciolacustrine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
Eg - 8 to 11 inches: silt loam
Bg1 - 11 to 18 inches: silty clay loam
Bg2 - 18 to 30 inches: silty clay loam
Bg3 - 30 to 38 inches: silty clay
Cg1 - 38 to 52 inches: silty clay loam
Cg2 - 52 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

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

Hydrologic Soil Group: D
Ecological site: F145XY004CT - Wet Lake Plain
Hydric soil rating: Yes

Description of Shaker

Setting

Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy eolian deposits over clayey glaciolacustrine deposits

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
Ap - 2 to 6 inches: fine sandy loam
Bg - 6 to 20 inches: sandy loam
Bw - 20 to 30 inches: sandy loam
2C - 30 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Description of Maybid

Setting

Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey glaciolacustrine deposits

Typical profile

A - 0 to 9 inches: silt loam
Bg1 - 9 to 18 inches: silty clay loam
Bg2 - 18 to 26 inches: silty clay loam
Cg1 - 26 to 36 inches: silty clay loam
Cg2 - 36 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C/D
Ecological site: F145XY003CT - Very Wet Inland Lake Plain
Hydric soil rating: Yes

Minor Components

Brancroft

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

Elmridge

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

Unnamed, sand or gravel substratum

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 2 percent

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

25A—Brancroft silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9ll6
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 52 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Brancroft

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-silty glaciolacustrine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 17 inches: silt loam
Bw2 - 17 to 22 inches: silty clay loam
Bw3 - 22 to 32 inches: silt loam
C1 - 32 to 43 inches: silty clay loam
C2 - 43 to 66 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

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

Elmridge
Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Maybid
Percent of map unit: 3 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, sand or gravel substratum
Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, till substratum
Percent of map unit: 2 percent
Hydric soil rating: No

Scitico
Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Belgrade
Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

28A—Elmridge fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9lm0
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Elmridge

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy eolian sands over clayey glaciolacustrine deposits

Typical profile

Ap - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 10 inches: fine sandy loam
Bw2 - 10 to 18 inches: fine sandy loam
Bw3 - 18 to 25 inches: sandy loam
2C - 25 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain

Hydric soil rating: No

Minor Components

Brancroft
Percent of map unit: 4 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Belgrade
Percent of map unit: 4 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, red parent material
Percent of map unit: 2 percent
Hydric soil rating: No

Sudbury
Percent of map unit: 2 percent
Landform: Terraces, outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Shaker
Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Ninigret
Percent of map unit: 2 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Scitico
Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Berlin
Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Maybid

Percent of map unit: 1 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

29B—Agawam fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqx
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Agawam

Setting

Landform: Outwash plains, kames, kame terraces, outwash terraces, moraines
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread, rise, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 45 inches: loamy fine sand
2C2 - 45 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 2 percent
Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

Attachment 4

Weighted Curve Number Calculations

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☒ Developed ☐ MDFR - NE - PRE

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
B	PASTURE - GOOD	61	1.34	81.74
C	PASTURE - GOOD	74	13.05	965.70
D	PASTURE - GOOD	80	1.75	140.00
Use only one CN source per line		**Totals**	16.14	1187.44

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1187.44}{16.14} =$ 73.57 **Use CN** **74**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one — Present ☒ Developed ☐ NE WETLAND - PRE

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
C	PASTURE - GOOD	74	4.10	303.40
D	PASTURE - GOOD	80	0.21	16.80
Use only one CN source per line		Totals	4.31	320.20

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{320.20}{4.31} = 74.29$$

Use CN **74**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☐ Developed ☒ MDFR - NE - POST

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS	98	3.55	348.10
B	OPEN SPACE-FAIR CONDITIONS	69	0.63	43.61
C	OPEN SPACE-FAIR CONDITIONS	79	5.07	400.69
D	OPEN SPACE-FAIR CONDITIONS	84	0.23	19.49
Use only one CN source per line		**Totals**	9.49	811.88

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{811.88}{9.49} =$ 85.57 **Use CN** **86**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☒ Developed ☐ NE WETLAND - POST

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS	98	0.66	64.68
C	PASTURE - GOOD	74	1.28	94.72
D	PASTURE - GOOD	80	5.02	401.60
Use only one CN source per line		**Totals**	6.96	561.00

CN (weighted) = total product / total area = 561.00 / 6.96 = 80.60 **Use CN** **81**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one	Present ☐	Developed	☒	MDFR - NW - PRE	

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
C	MEADOW (NON-GRAZED)	71	1.97	139.87
D	MEADOW (NON-GRAZED)	78	0.84	65.52
		Totals	2.81	205.39

Use only one CN source per line

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{205.39}{2.81} = 73.09$ **Use CN** **73**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☐ Developed ☒ WESTERN SLOPE- PRE

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
D	MEADOW (NON-GRAZED)	78	1.02	79.56
Use only one CN source per line		**Totals**	1.02	79.56

CN (weighted) = total product / total area = 79.56 / 1.02 = 78.00 **Use CN** **78**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one   Present ☐   Developed ☒   MDFR - SW - PRE

1. Runoff curve number

Soil name and hydrologic group (appendix A)	**Cover description** (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	**CN**	**Area** ☒ acres ☐ mi^2 ☐ %	**Product of CN x area**
C	MEADOW (NON-GRAZED)	71	1.52	107.92
D	MEADOW (NON-GRAZED)	78	0.17	13.26
Use only one CN source per line		**Totals**	1.69	121.18

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{121.18}{1.69} = 71.70$ **Use CN** **72**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☐ Developed ☒ MDFR - NW - POST

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS	98	2.14	209.72
C	OPEN SPACE-GOOD CONDITIONS	74	2.14	158.36
D	OPEN SPACE-GOOD CONDITIONS	80	0.75	60.00
Use only one CN source per line		**Totals**	5.03	428.08

CN (weighted) = total product / total area = 428.08 / 5.03 = 85.11 **Use CN** **85**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☐ Developed ☒ MDFR - SW - POST

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS	98	1.88	184.24
B	OPEN SPACE-GOOD CONDITIONS	79	0.20	15.80
C	OPEN SPACE-GOOD CONDITIONS	79	3.37	266.23
D	OPEN SPACE-GOOD CONDITIONS	79	0.35	27.65
Use only one CN source per line		**Totals**	5.80	493.92

CN (weighted) = total product / total area = 493.92 / 5.80 = 85.16 **Use CN** **85**

Runoff curve number and runoff

Project:	Bramble Bush - East Granby	By:	DRT	Date:	3/24/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present ☐ Developed ☒ WESTERN SLOPE- POST

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
C	MEADOW (NON-GRAZED)	71	0.08	5.68
D	MEADOW (NON-GRAZED)	78	1.25	97.50
Use only one CN source per line		**Totals**	1.33	103.18

CN (weighted) = total product / total area = 103.18 / 1.33 = 77.58 **Use CN** **78**

Attachment 5

Hydrologic Analysis

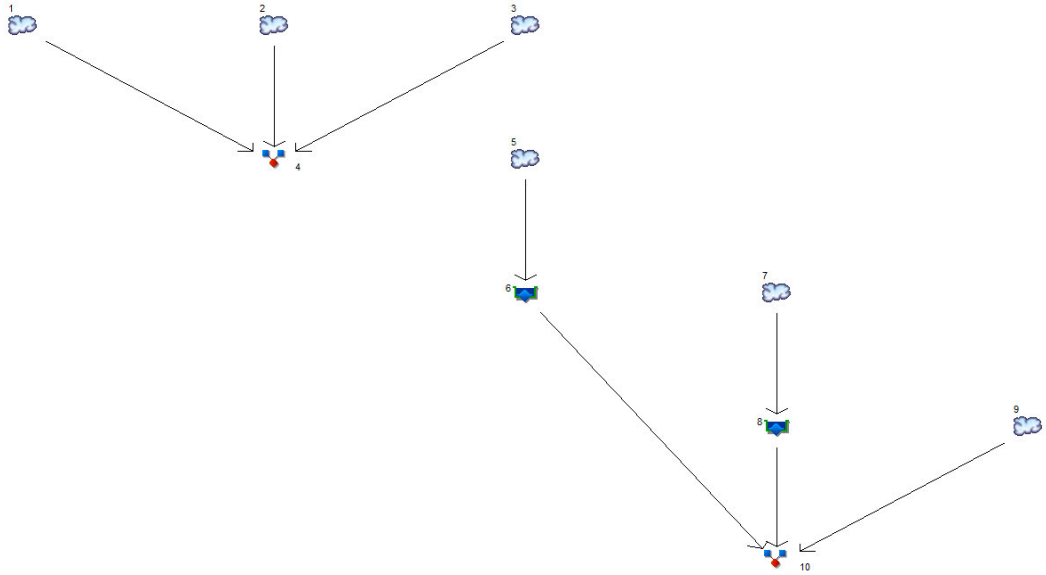
Western Watershed

Eastern Watershed

Hydraflow Table of Contents

Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	SCS Runoff	MDFR NW PRE
2	SCS Runoff	WESTERN SLOPE PRE
3	SCS Runoff	MDFR SW PRE
4	Combine	CP-W - PRE
5	SCS Runoff	MDFR NW POST
6	Reservoir	DET. BASIN NW
7	SCS Runoff	MDFR SW POST
8	Reservoir	DET. BASIN SW
9	SCS Runoff	WESTERN SLOPE POST
10	Combine	CP-W POST

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

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	-------	-------	3.249	-------	5.925	8.325	11.81	14.40	17.35	MDFR NW PRE
2	SCS Runoff	-------	-------	1.236	-------	2.074	2.804	3.840	4.600	5.459	WESTERN SLOPE PRE
3	SCS Runoff	-------	-------	1.328	-------	2.475	3.517	5.037	6.179	7.488	MDFR SW PRE
4	Combine	1, 2, 3	-------	5.314	-------	9.653	13.54	19.18	23.38	28.16	CP-W - PRE
5	SCS Runoff	-------	-------	8.570	-------	13.07	16.84	22.06	25.83	30.05	MDFR NW POST
6	Reservoir	5	-------	3.030	-------	6.268	7.850	9.280	10.19	10.91	DET. BASIN NW
7	SCS Runoff	-------	-------	10.58	-------	16.13	20.78	27.22	31.87	37.08	MDFR SW POST
8	Reservoir	7	-------	1.198	-------	1.739	2.076	4.352	5.149	5.639	DET. BASIN SW
9	SCS Runoff	-------	-------	1.559	-------	2.612	3.534	4.843	5.804	6.890	WESTERN SLOPE POST
10	Combine	6, 8, 9	-------	4.855	-------	9.648	12.33	15.34	18.98	21.59	CP-W POST

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

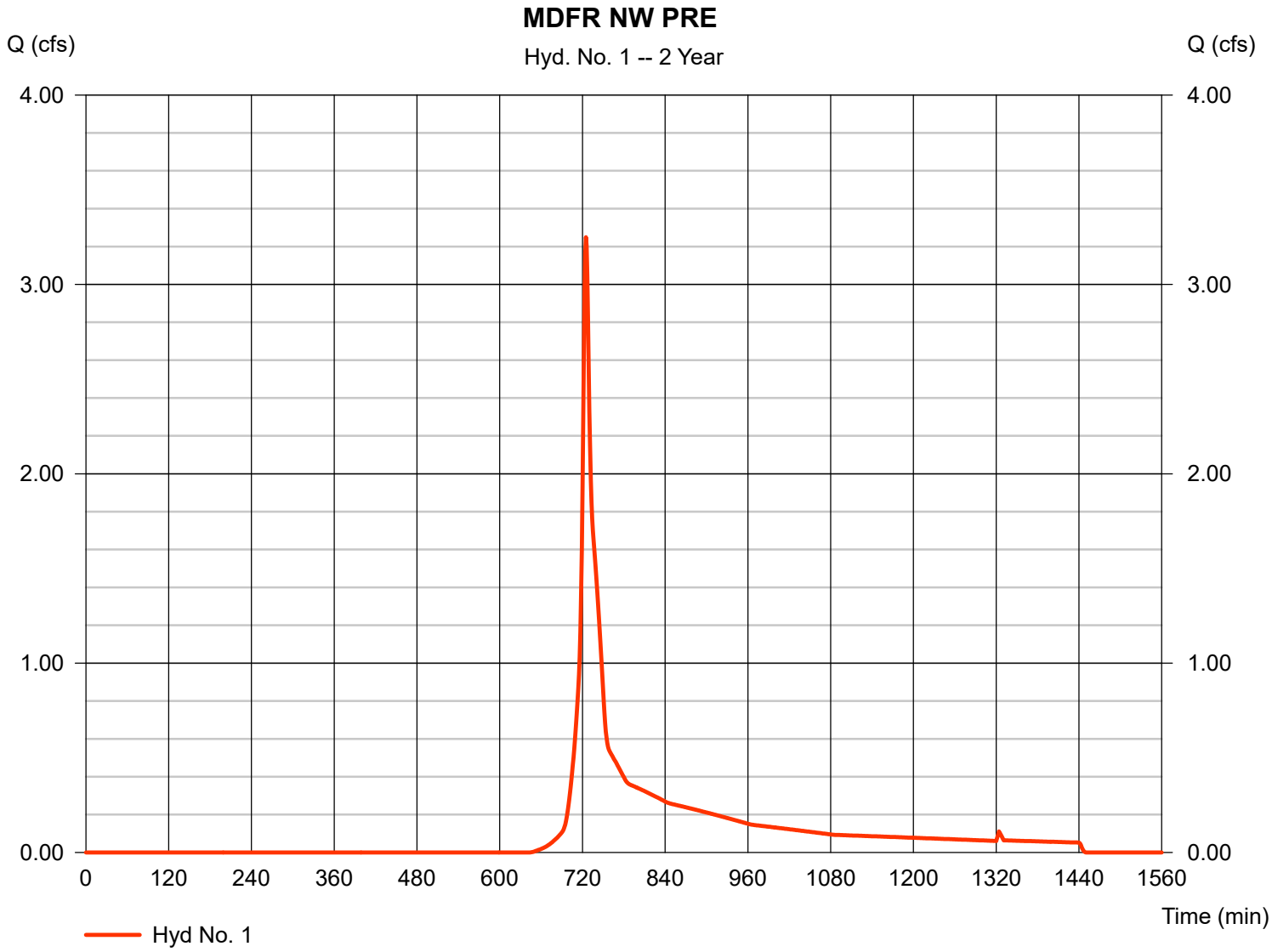
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	3.249	1	725	10,608	----	------	------	MDFR NW PRE
2	SCS Runoff	1.236	1	729	4,748	----	------	------	WESTERN SLOPE PRE
3	SCS Runoff	1.328	1	733	5,929	----	------	------	MDFR SW PRE
4	Combine	5.314	1	726	21,285	1, 2, 3	------	------	CP-W - PRE
5	SCS Runoff	8.570	1	729	32,205	----	------	------	MDFR NW POST
6	Reservoir	3.030	1	750	32,191	5	165.09	11,037	DET. BASIN NW
7	SCS Runoff	10.58	1	728	38,399	----	------	------	MDFR SW POST
8	Reservoir	1.198	1	785	38,340	7	166.41	18,848	DET. BASIN SW
9	SCS Runoff	1.559	1	731	6,290	----	------	------	WESTERN SLOPE POST
10	Combine	4.855	1	748	76,821	6, 8, 9	------	------	CP-W POST

Hydrograph Report

Hyd. No. 1

MDFR NW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.249 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	10,608 cuft
Drainage area	=	2.810 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.50 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 1

MDFR NW PRE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		0.00		0.00		
Land slope (%)	= 3.50		0.00		0.00		
Travel Time (min)	**= 3.68**	**+**	**0.00**	**+**	**0.00**	**=**	**3.68**
Shallow Concentrated Flow							
Flow length (ft)	= 401.00		0.00		0.00		
Watercourse slope (%)	= 2.12		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.35		0.00		0.00		
Travel Time (min)	**= 2.84**	**+**	**0.00**	**+**	**0.00**	**=**	**2.84**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

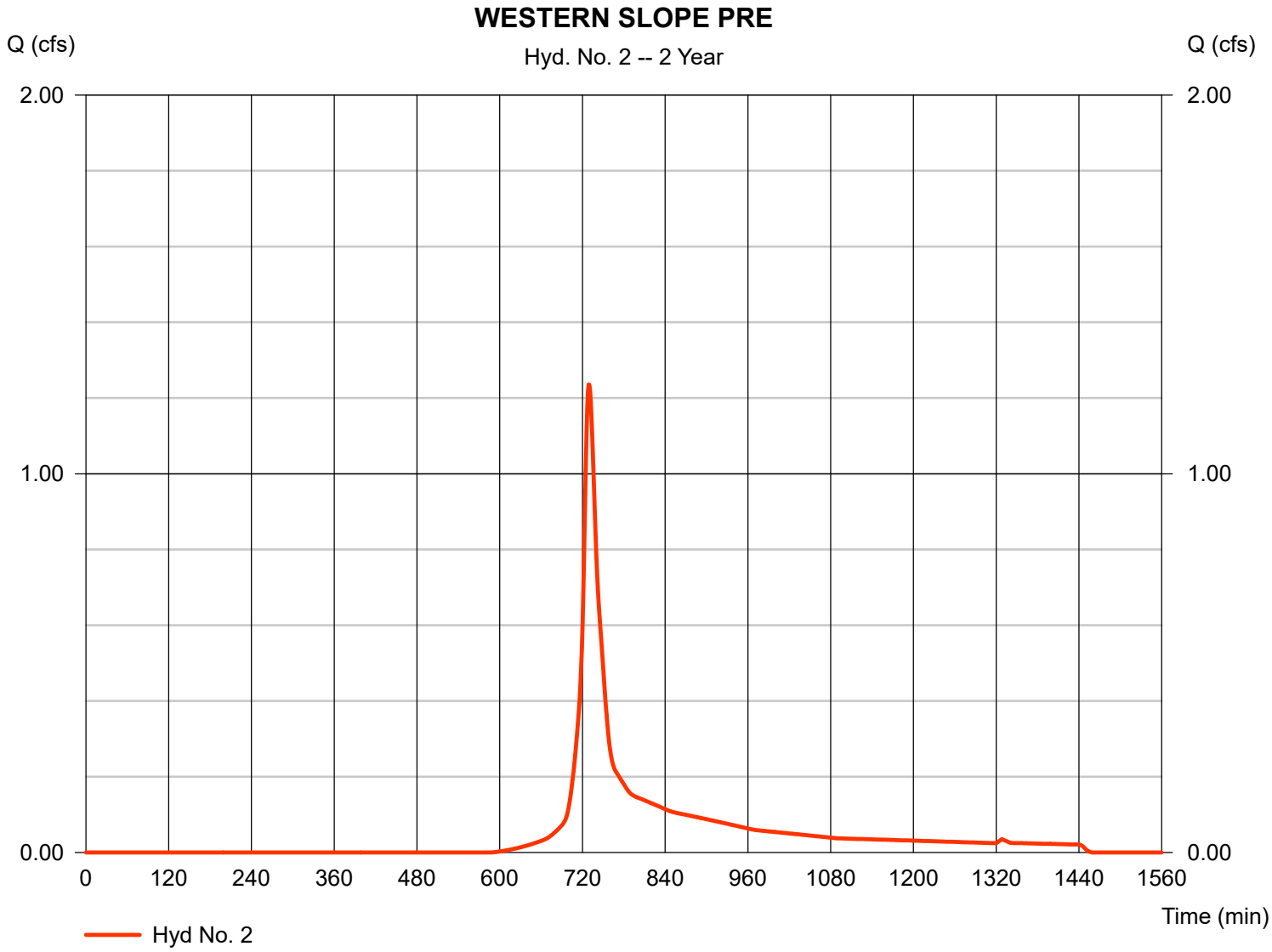
Total Travel Time, Tc ..... 6.50 min

Hydrograph Report

Hyd. No. 2

WESTERN SLOPE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.236 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	4,748 cuft
Drainage area	=	1.020 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.30 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 2

WESTERN SLOPE PRE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 50.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 12.00		0.00		0.00		
Travel Time (min)	**= 1.31**	**+**	**0.00**	**+**	**0.00**	**=**	**1.31**
Shallow Concentrated Flow							
Flow length (ft)	= 634.00		0.00		0.00		
Watercourse slope (%)	= 0.30		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 0.88		0.00		0.00		
Travel Time (min)	**= 11.96**	**+**	**0.00**	**+**	**0.00**	**=**	**11.96**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

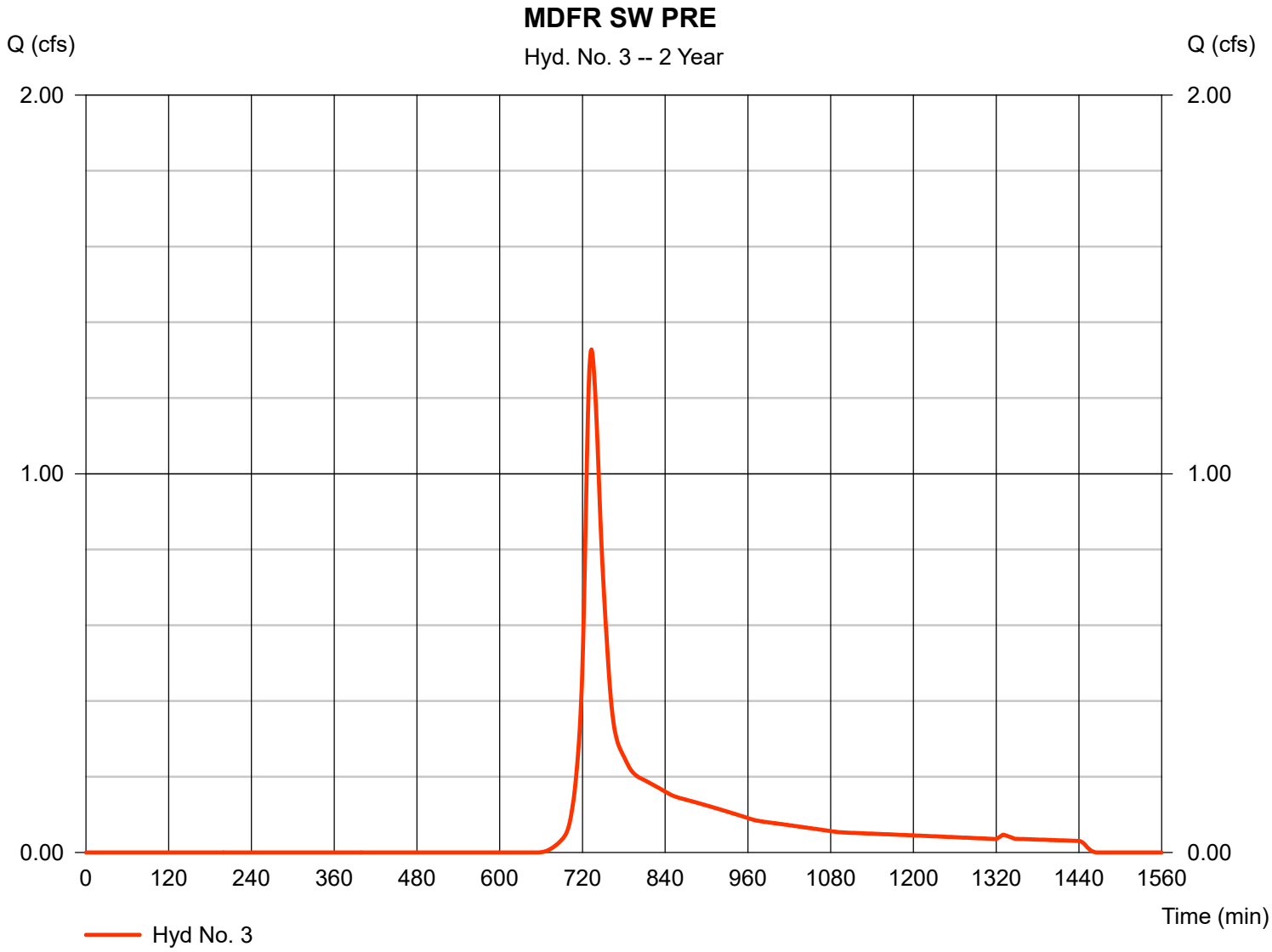
Total Travel Time, Tc ..... 13.30 min

Hydrograph Report

Hyd. No. 3

MDFR SW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.328 cfs
Storm frequency	=	2 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	5,929 cuft
Drainage area	=	1.690 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.00 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 3

MDFR SW PRE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 1.30		0.00		0.00		
Travel Time (min)	**= 5.56**	**+**	**0.00**	**+**	**0.00**	**=**	**5.56**
Shallow Concentrated Flow							
Flow length (ft)	= 170.00		513.00		0.00		
Watercourse slope (%)	= 5.30		0.30		0.00		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	= 3.71		0.88		0.00		
Travel Time (min)	**= 0.76**	**+**	**9.67**	**+**	**0.00**	**=**	**10.44**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

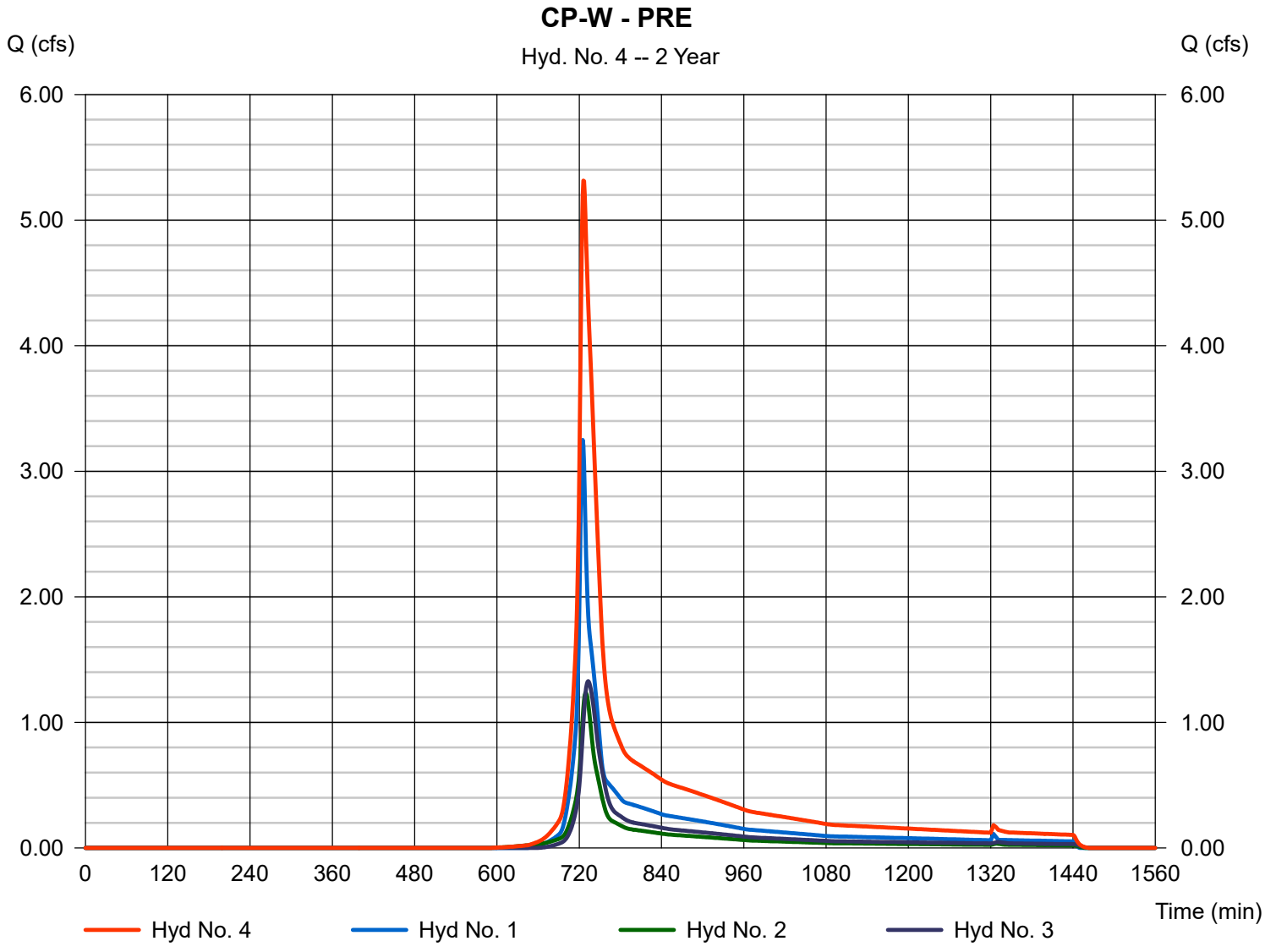
Total Travel Time, Tc ..... 16.00 min

Hydrograph Report

Hyd. No. 4

CP-W - PRE

Hydrograph type	= Combine	Peak discharge	= 5.314 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 21,285 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 5.520 ac

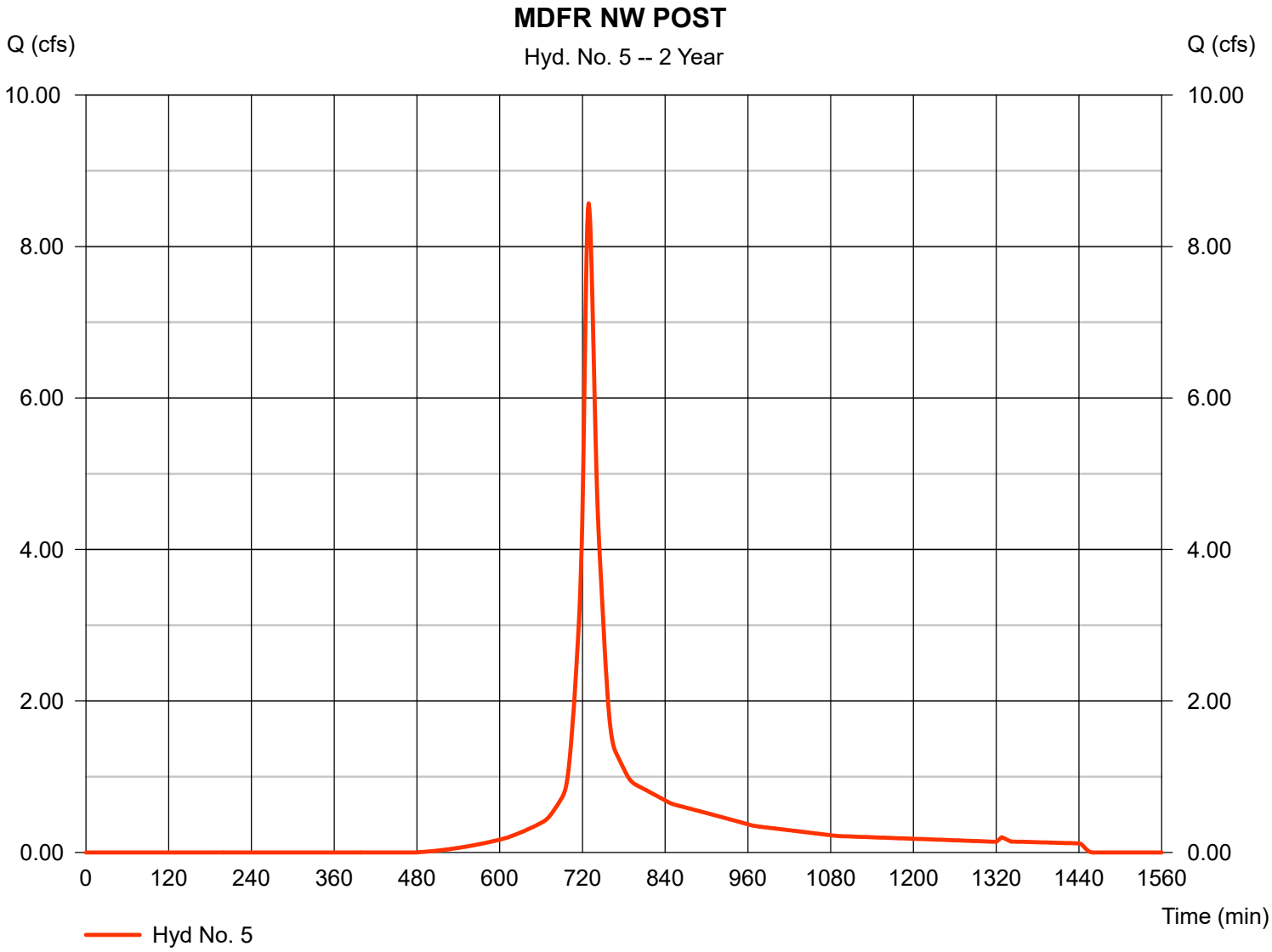


Hydrograph Report

Hyd. No. 5

MDFR NW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.570 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	32,205 cuft
Drainage area	=	5.030 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.90 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 5

MDFR NW POST

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 7.14**	**+**	**0.00**	**+**	**0.00**	**=**	**7.14**
Shallow Concentrated Flow							
Flow length (ft)	= 485.00		0.00		0.00		
Watercourse slope (%)	= 1.10		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 1.69		0.00		0.00		
Travel Time (min)	**= 4.78**	**+**	**0.00**	**+**	**0.00**	**=**	**4.78**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.012		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 11.90 min

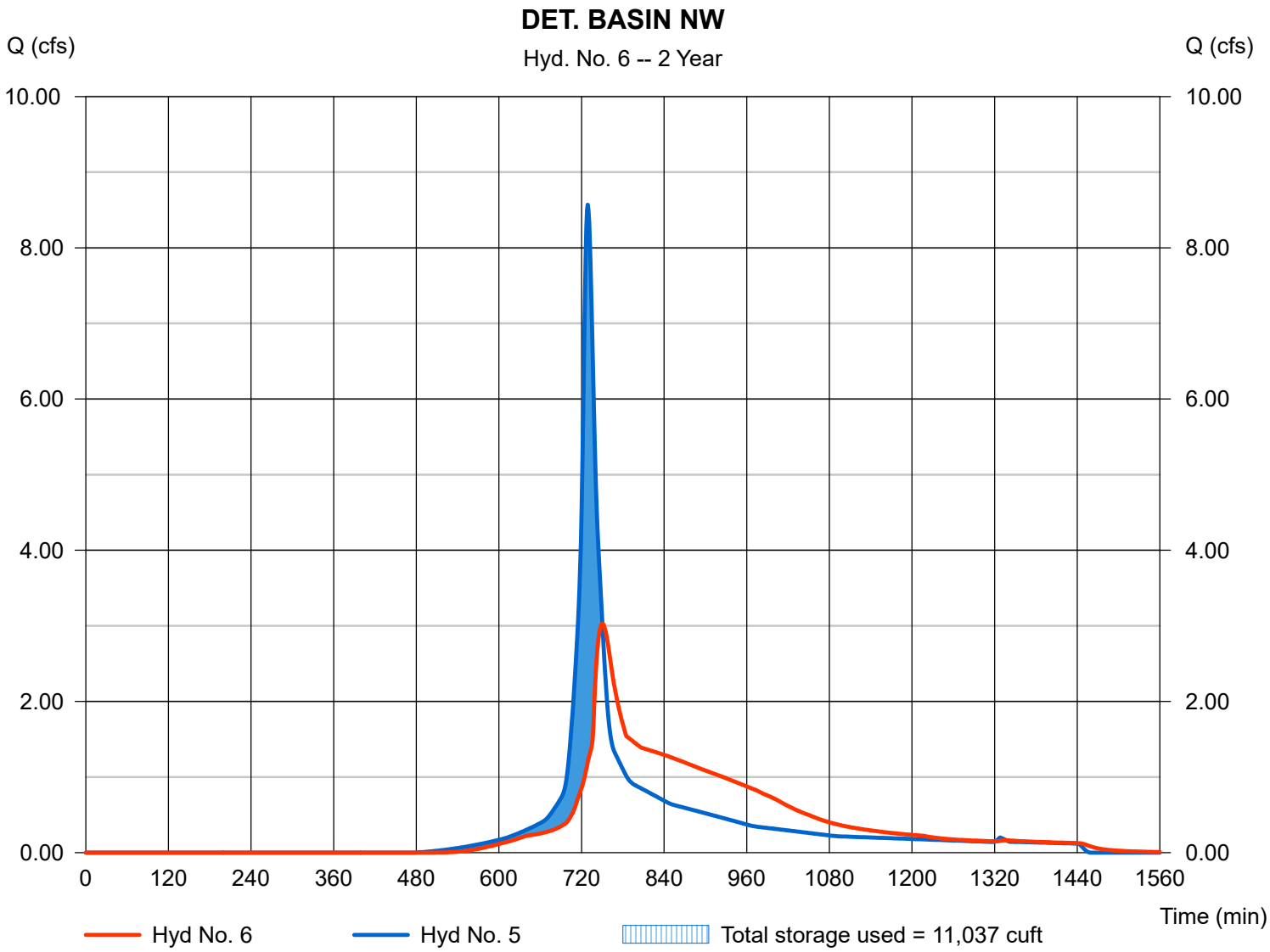
Hydrograph Report

Hyd. No. 6

DET. BASIN NW

Hydrograph type	=	Reservoir	Peak discharge	=	3.030 cfs
Storm frequency	=	2 yrs	Time to peak	=	750 min
Time interval	=	1 min	Hyd. volume	=	32,191 cuft
Inflow hyd. No.	=	5 - MDFR NW POST	Max. Elevation	=	165.09 ft
Reservoir name	=	PROP WQB #3 (MFDR DET. BASIN NW)	Max. Storage	=	11,037 cuft

Storage Indication method used.



Pond No. 2 - PROP WQB #3 (MFDR DET. BASIN NW)

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 163.22 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	163.22	00	0	0
0.28	163.50	4,752	443	443
0.78	164.00	6,285	2,750	3,194
1.78	165.00	7,888	7,071	10,264
2.78	166.00	9,316	8,592	18,856
3.78	167.00	12,648	10,939	29,795
4.78	168.00	16,140	14,357	44,152

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	8.00	0.00	0.00
Span (in)	= 15.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 163.10	163.22	0.00	0.00
Length (ft)	= 45.00	0.00	0.00	0.00
Slope (%)	= 0.13	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.30	4.00	0.00	0.00
Crest El. (ft)	= 166.45	164.83	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

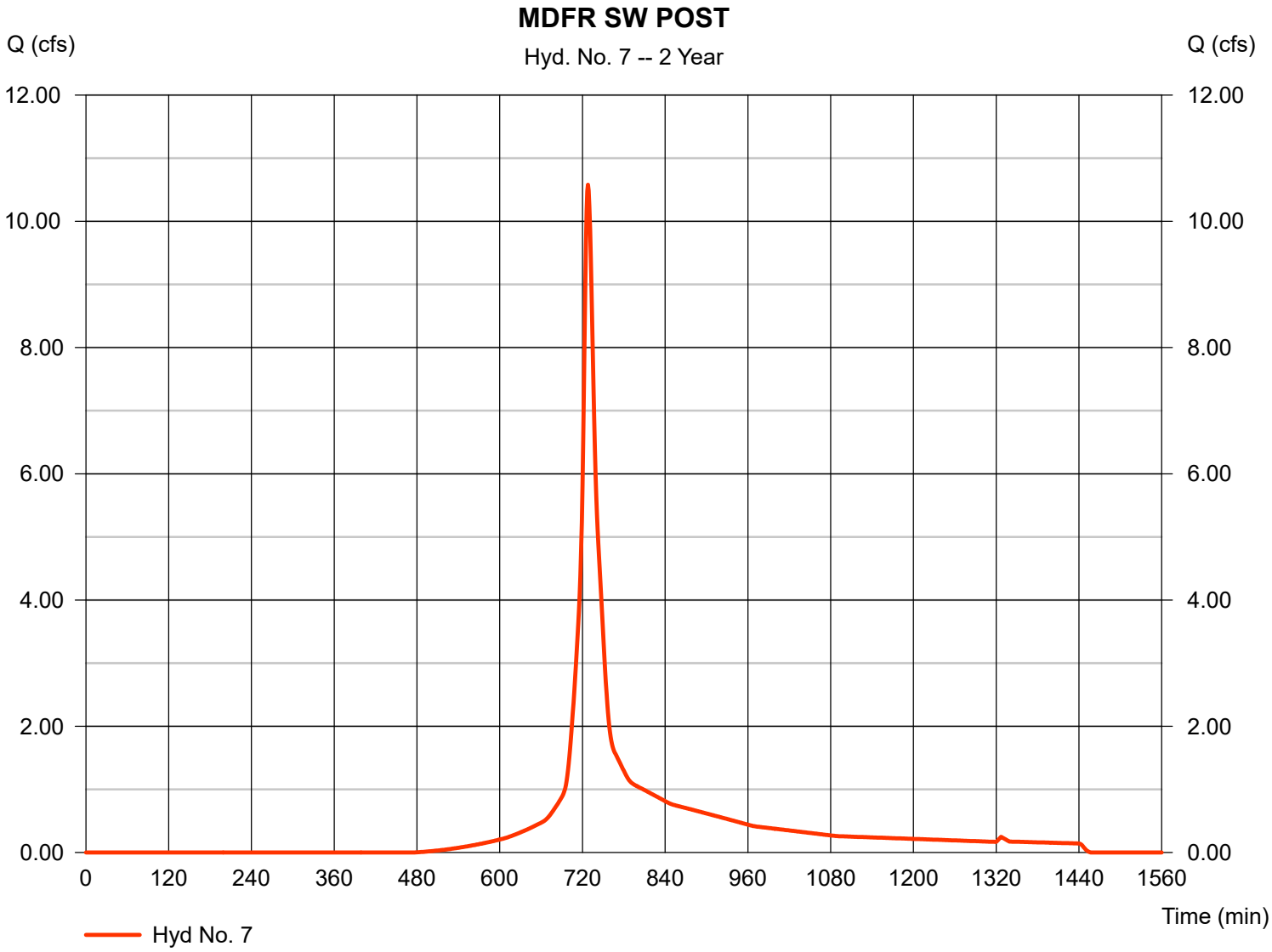
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	163.22	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.00
0.28	443	163.50	0.23 oc	0.22 ic	---	---	0.00	0.00	---	---	---	---	0.22
0.78	3,194	164.00	0.83 oc	0.83 ic	---	---	0.00	0.00	---	---	---	---	0.83
1.78	10,264	165.00	2.22 oc	1.28 ic	---	---	0.00	0.93	---	---	---	---	2.22
2.78	18,856	166.00	7.86 oc	0.51 ic	---	---	0.00	7.35 s	---	---	---	---	7.86
3.78	29,795	167.00	10.15 oc	0.20 ic	---	---	2.81 s	7.13 s	---	---	---	---	10.14
4.78	44,152	168.00	11.90 oc	0.10 ic	---	---	5.28 s	6.43 s	---	---	---	---	11.82

Hydrograph Report

Hyd. No. 7

MDFR SW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.58 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	38,399 cuft
Drainage area	=	5.800 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.10 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 7

MDFR SW POST

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 144.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 8.26**	**+**	**0.00**	**+**	**0.00**	**=**	**8.26**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 2.40		0.00		0.00		
Wetted perimeter (ft)	= 2.00		0.00		0.00		
Channel slope (%)	= 0.33		0.00		0.00		
Manning's n-value	= 0.012		0.015		0.015		
Velocity (ft/s)	= 8.06		0.00		0.00		
Flow length (ft)	= 1369.0		0.0		0.0		
Travel Time (min)	**= 2.83**	**+**	**0.00**	**+**	**0.00**	**=**	**2.83**

Total Travel Time, Tc ..... 11.10 min

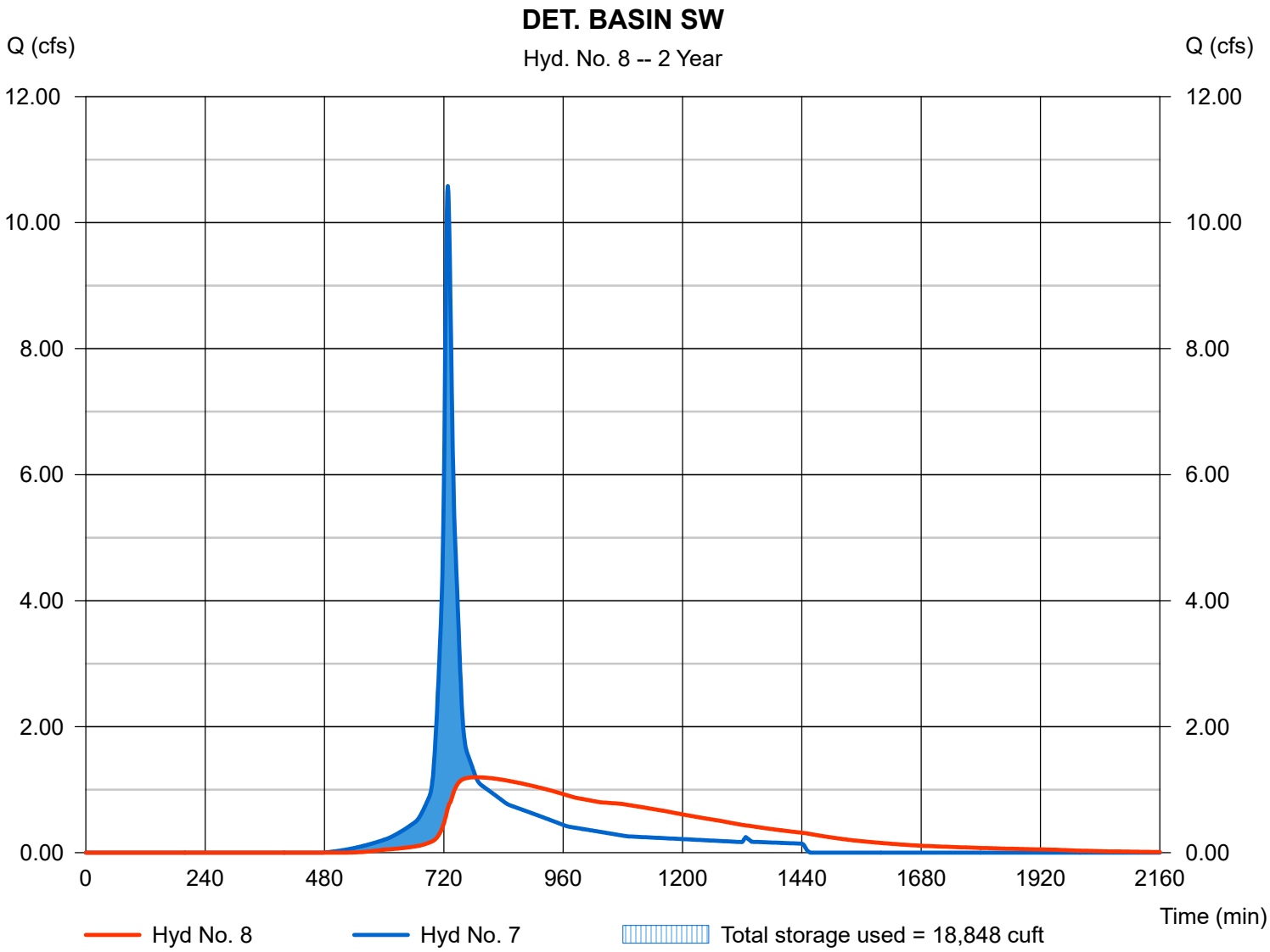
Hydrograph Report

Hyd. No. 8

DET. BASIN SW

Hydrograph type	=	Reservoir	Peak discharge	=	1.198 cfs
Storm frequency	=	2 yrs	Time to peak	=	785 min
Time interval	=	1 min	Hyd. volume	=	38,340 cuft
Inflow hyd. No.	=	7 - MDFR SW POST	Max. Elevation	=	166.41 ft
Reservoir name	=	PROP. WQB #2 (MFDR DET. BASIN SW)	Max. Storage	=	18,848 cuft

Storage Indication method used.



Pond No. 1 - PROP. WQB #2 (MFDR DET. BASIN SW)

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 164.87 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	164.87	00	0	0
0.13	165.00	11,492	498	498
1.13	166.00	13,385	12,425	12,923
2.13	167.00	15,412	14,385	27,308
3.13	168.00	17,573	16,479	43,787
4.13	169.00	19,867	18,706	62,494
5.13	170.00	22,375	21,107	83,600

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	8.00	0.00	0.00
Span (in)	= 12.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 164.81	164.87	0.00	0.00
Length (ft)	= 94.00	0.00	0.00	0.00
Slope (%)	= 0.07	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.30	3.00	0.00	0.00
Crest El. (ft)	= 169.43	167.88	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

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

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

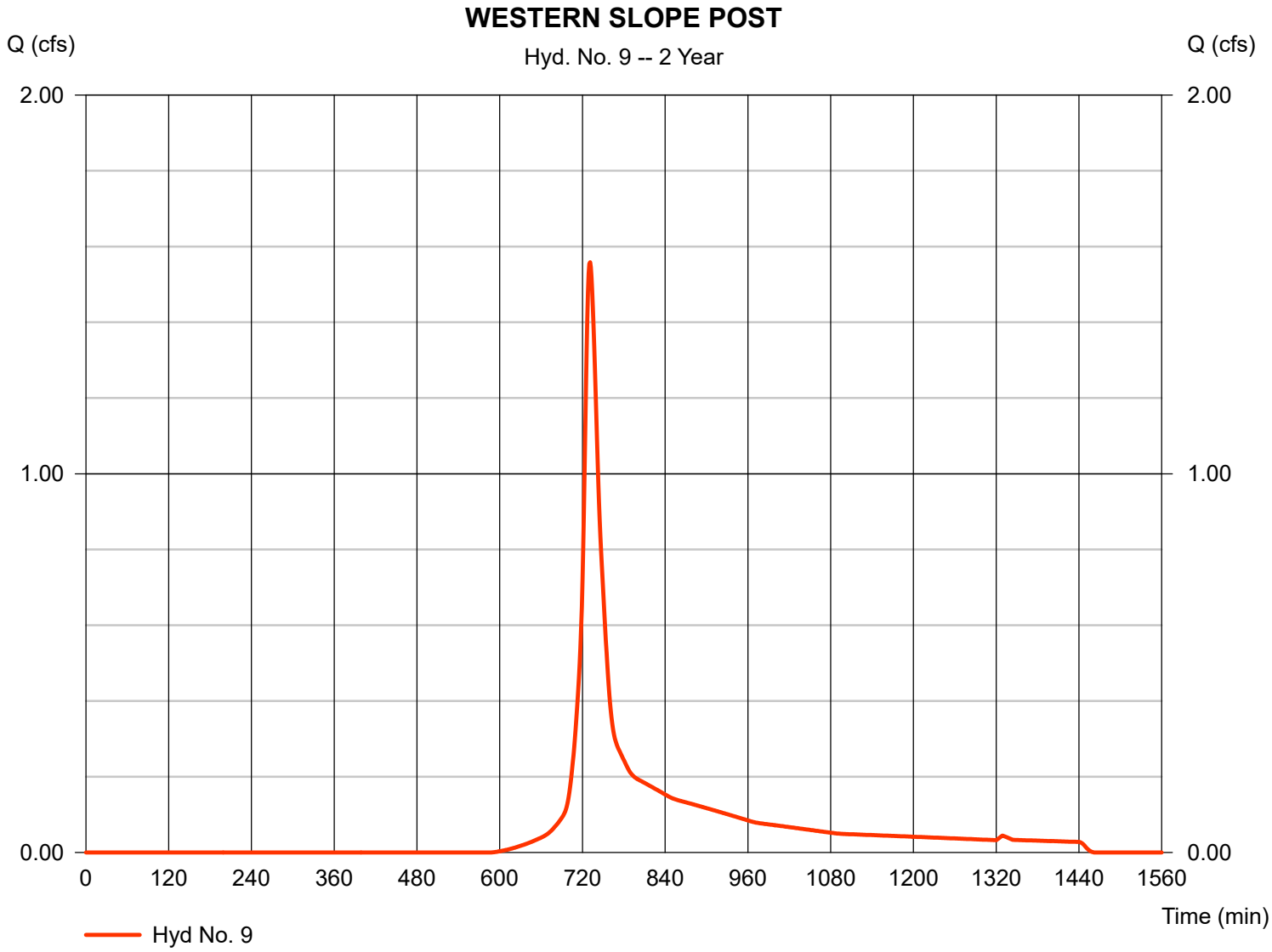
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	164.87	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.00
0.13	498	165.00	0.05 oc	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.05
1.13	12,923	166.00	0.80 oc	0.80 ic	---	---	0.00	0.00	---	---	---	---	0.80
2.13	27,308	167.00	1.64 oc	1.64 ic	---	---	0.00	0.00	---	---	---	---	1.64
3.13	43,787	168.00	2.51 oc	2.10 ic	---	---	0.00	0.42	---	---	---	---	2.51
4.13	62,494	169.00	5.35 oc	0.46 ic	---	---	0.00	4.89 s	---	---	---	---	5.35
5.13	83,600	170.00	6.18 oc	0.13 ic	---	---	2.16 s	3.85 s	---	---	---	---	6.15

Hydrograph Report

Hyd. No. 9

WESTERN SLOPE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.559 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	6,290 cuft
Drainage area	=	1.330 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

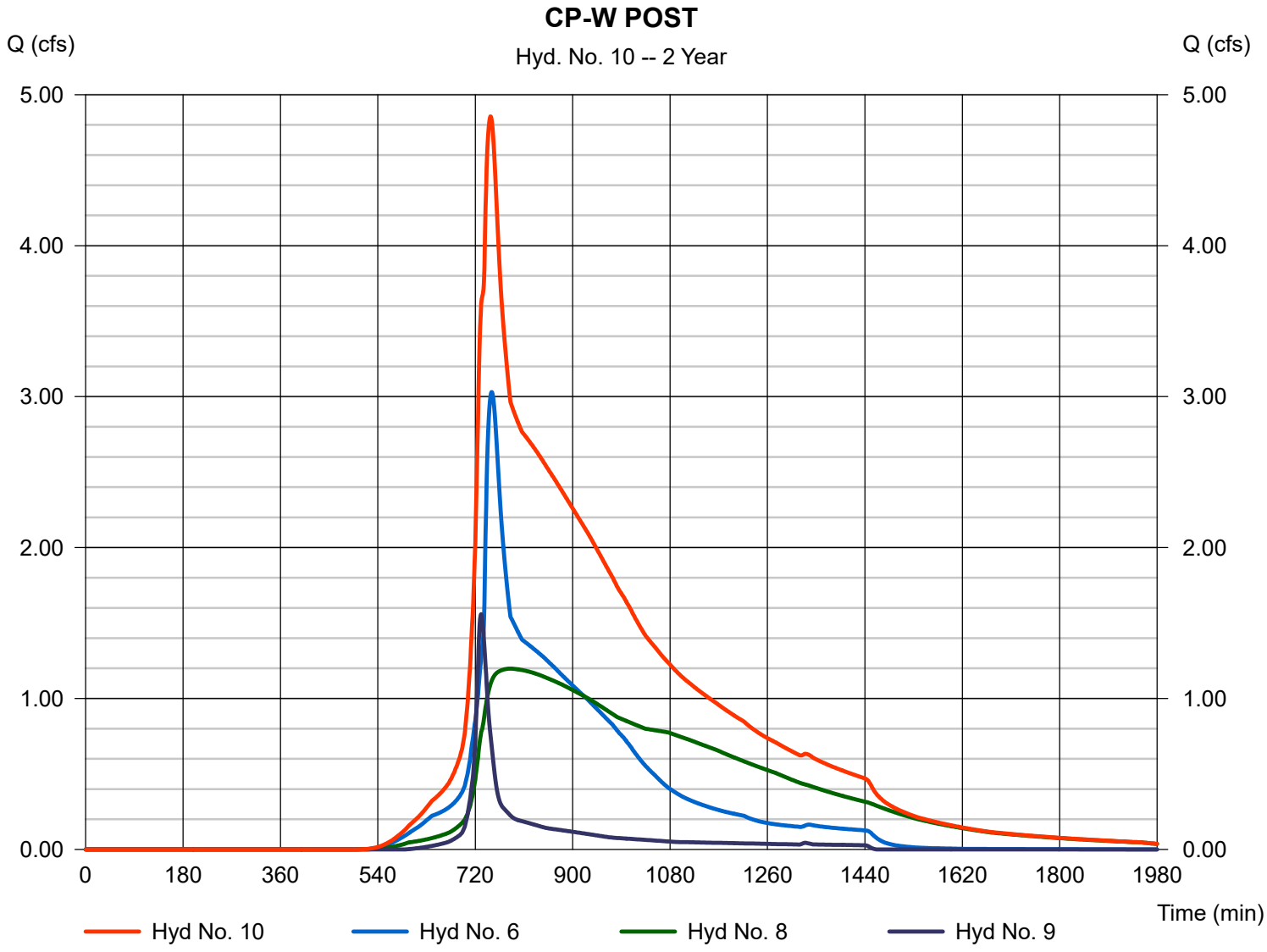


Hydrograph Report

Hyd. No. 10

CP-W POST

Hydrograph type	=	Combine	Peak discharge	=	4.855 cfs
Storm frequency	=	2 yrs	Time to peak	=	748 min
Time interval	=	1 min	Hyd. volume	=	76,821 cuft
Inflow hyds.	=	6, 8, 9	Contrib. drain. area	=	1.330 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

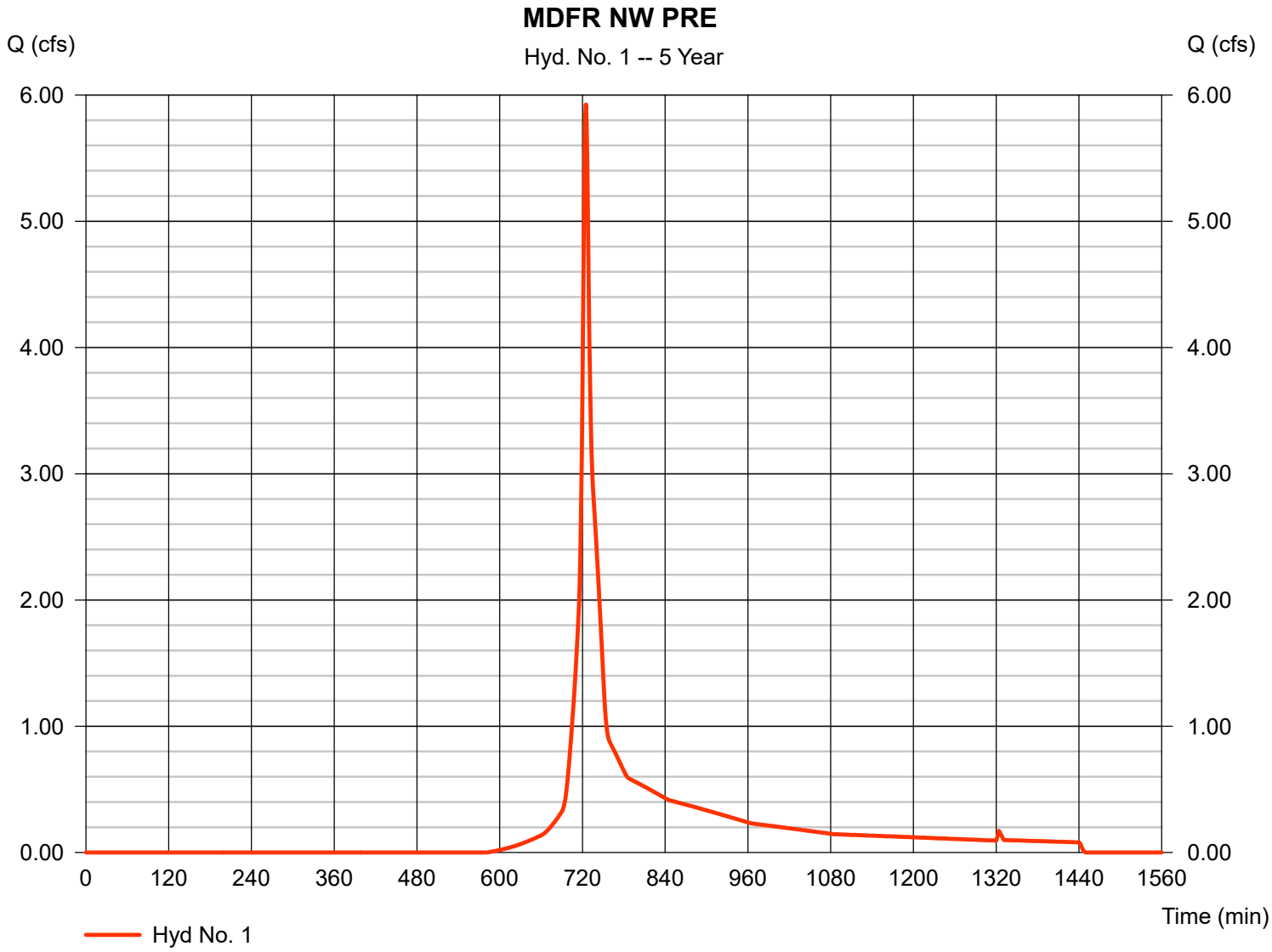
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	5.925	1	725	18,524	----	------	------	MDFR NW PRE
2	SCS Runoff	2.074	1	729	7,818	----	------	------	WESTERN SLOPE PRE
3	SCS Runoff	2.475	1	732	10,488	----	------	------	MDFR SW PRE
4	Combine	9.653	1	726	36,830	1, 2, 3	------	------	CP-W - PRE
5	SCS Runoff	13.07	1	729	49,350	----	------	------	MDFR NW POST
6	Reservoir	6.268	1	743	49,335	5	165.53	14,797	DET. BASIN NW
7	SCS Runoff	16.13	1	728	58,840	----	------	------	MDFR SW POST
8	Reservoir	1.739	1	784	58,775	7	167.15	29,813	DET. BASIN SW
9	SCS Runoff	2.612	1	730	10,356	----	------	------	WESTERN SLOPE POST
10	Combine	9.648	1	738	118,466	6, 8, 9	------	------	CP-W POST

Hydrograph Report

Hyd. No. 1

MDFR NW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.925 cfs
Storm frequency	=	5 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	18,524 cuft
Drainage area	=	2.810 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.50 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

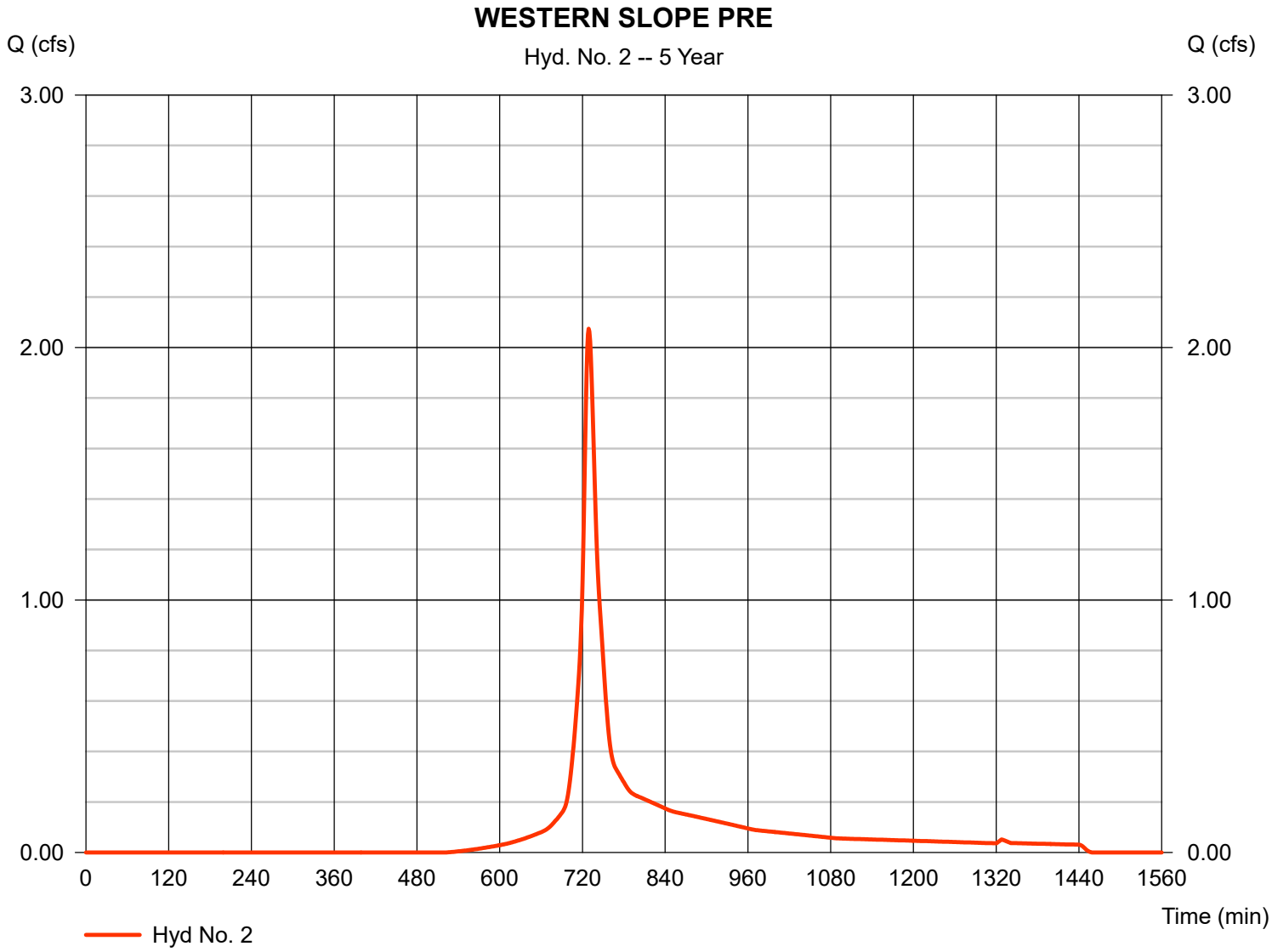


Hydrograph Report

Hyd. No. 2

WESTERN SLOPE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.074 cfs
Storm frequency	=	5 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	7,818 cuft
Drainage area	=	1.020 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.30 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

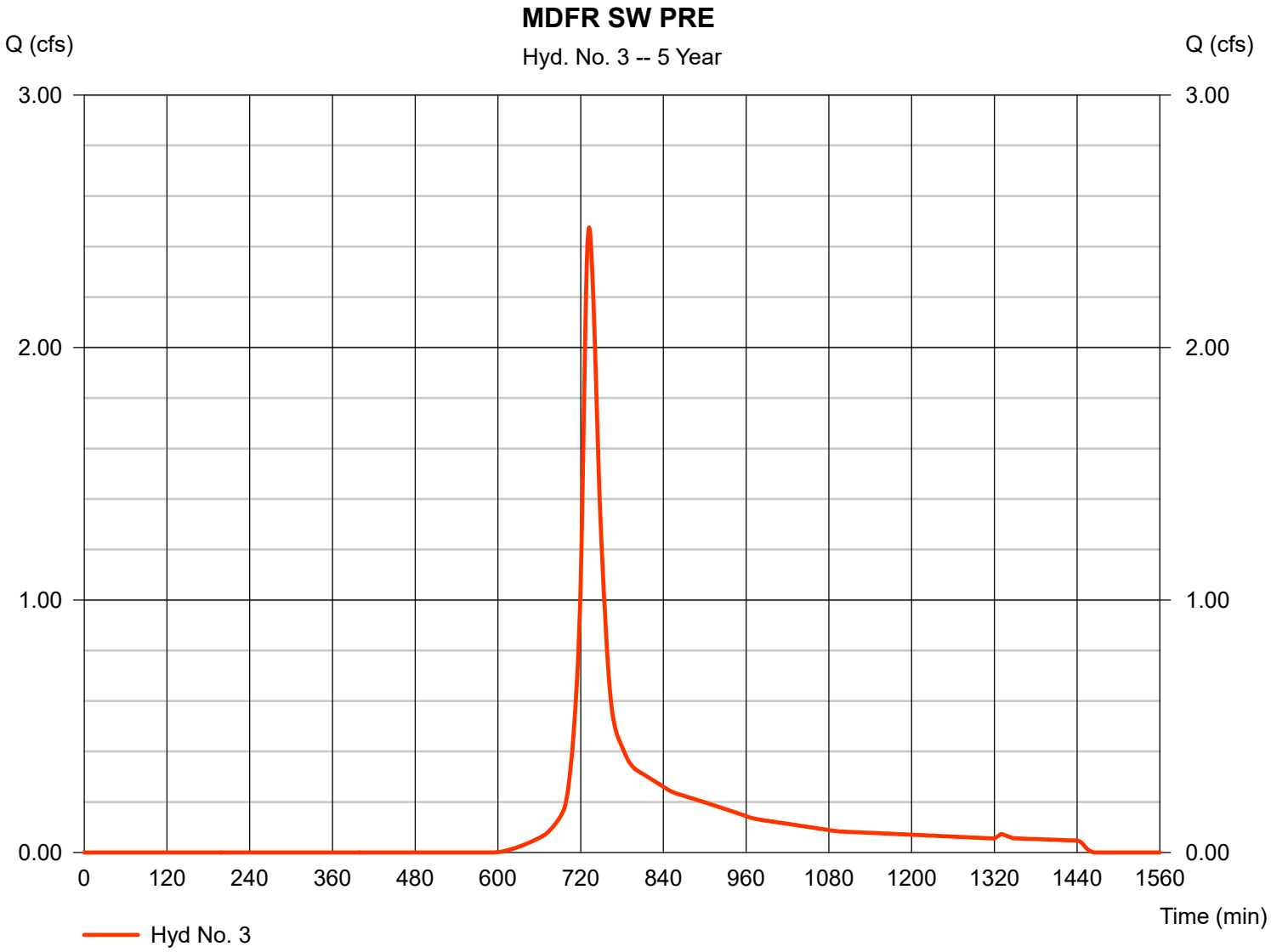


Hydrograph Report

Hyd. No. 3

MDFR SW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.475 cfs
Storm frequency	=	5 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	10,488 cuft
Drainage area	=	1.690 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.00 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

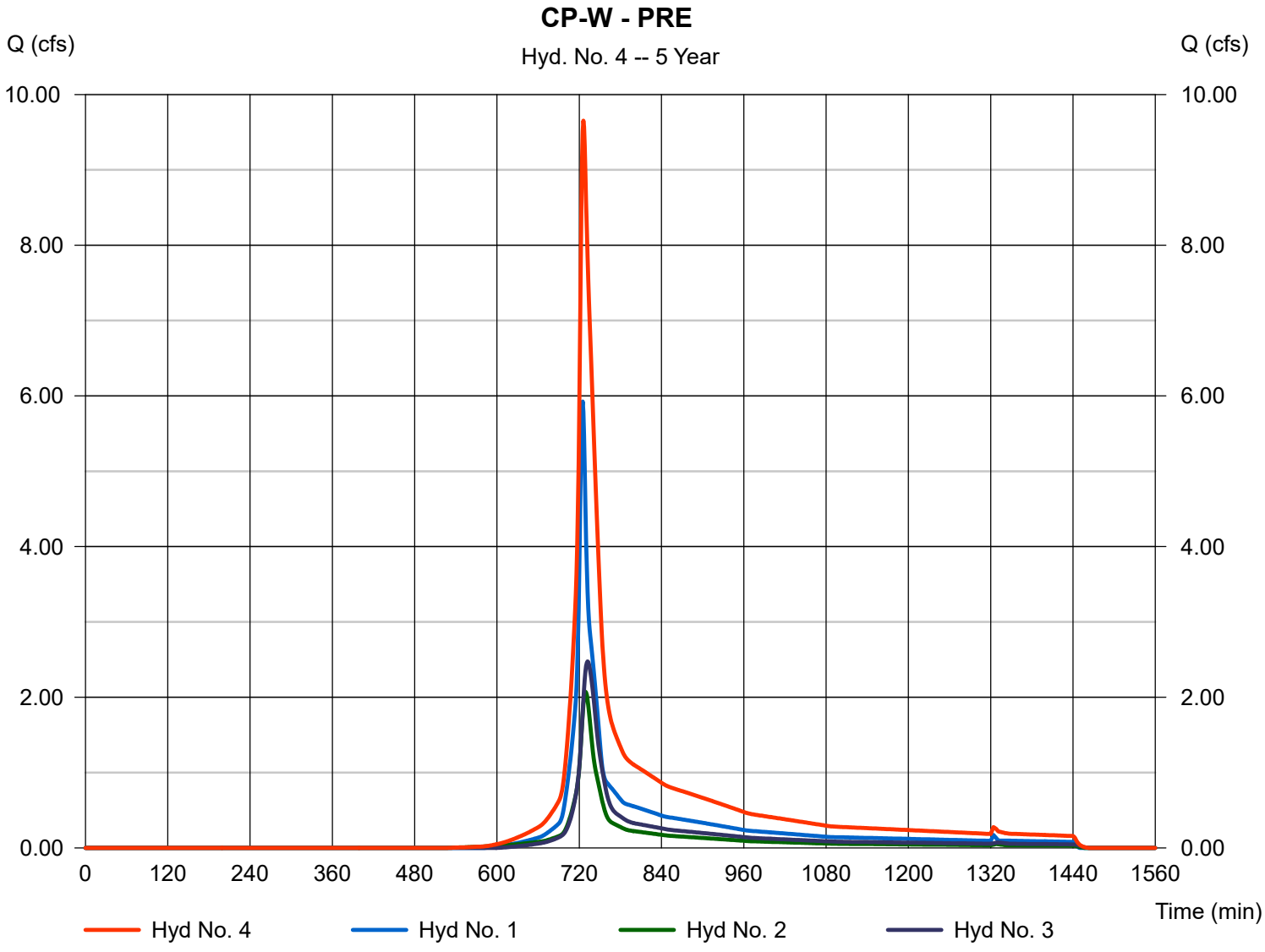


Hydrograph Report

Hyd. No. 4

CP-W - PRE

Hydrograph type	= Combine	Peak discharge	= 9.653 cfs
Storm frequency	= 5 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 36,830 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 5.520 ac

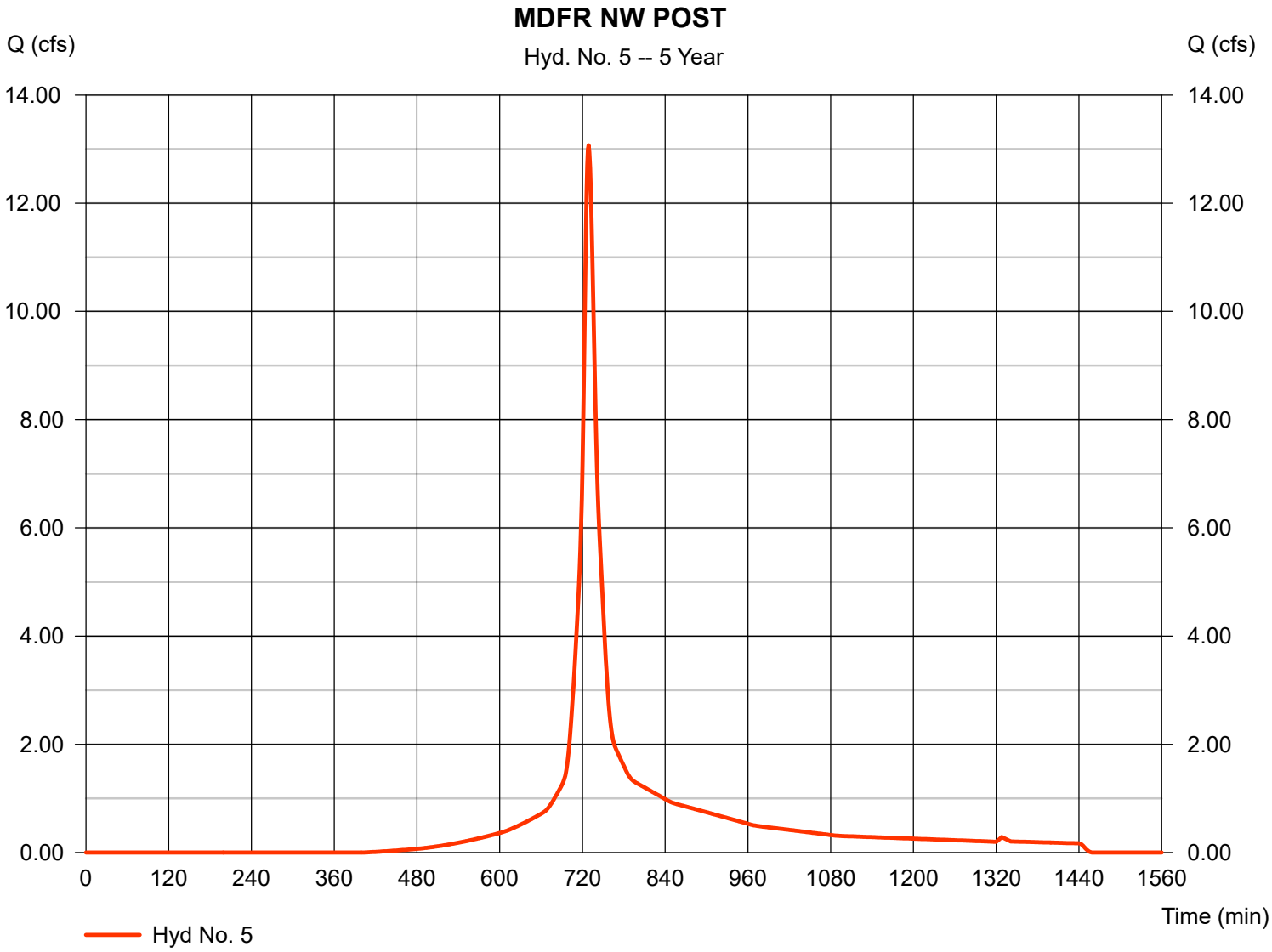


Hydrograph Report

Hyd. No. 5

MDFR NW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.07 cfs
Storm frequency	=	5 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	49,350 cuft
Drainage area	=	5.030 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.90 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



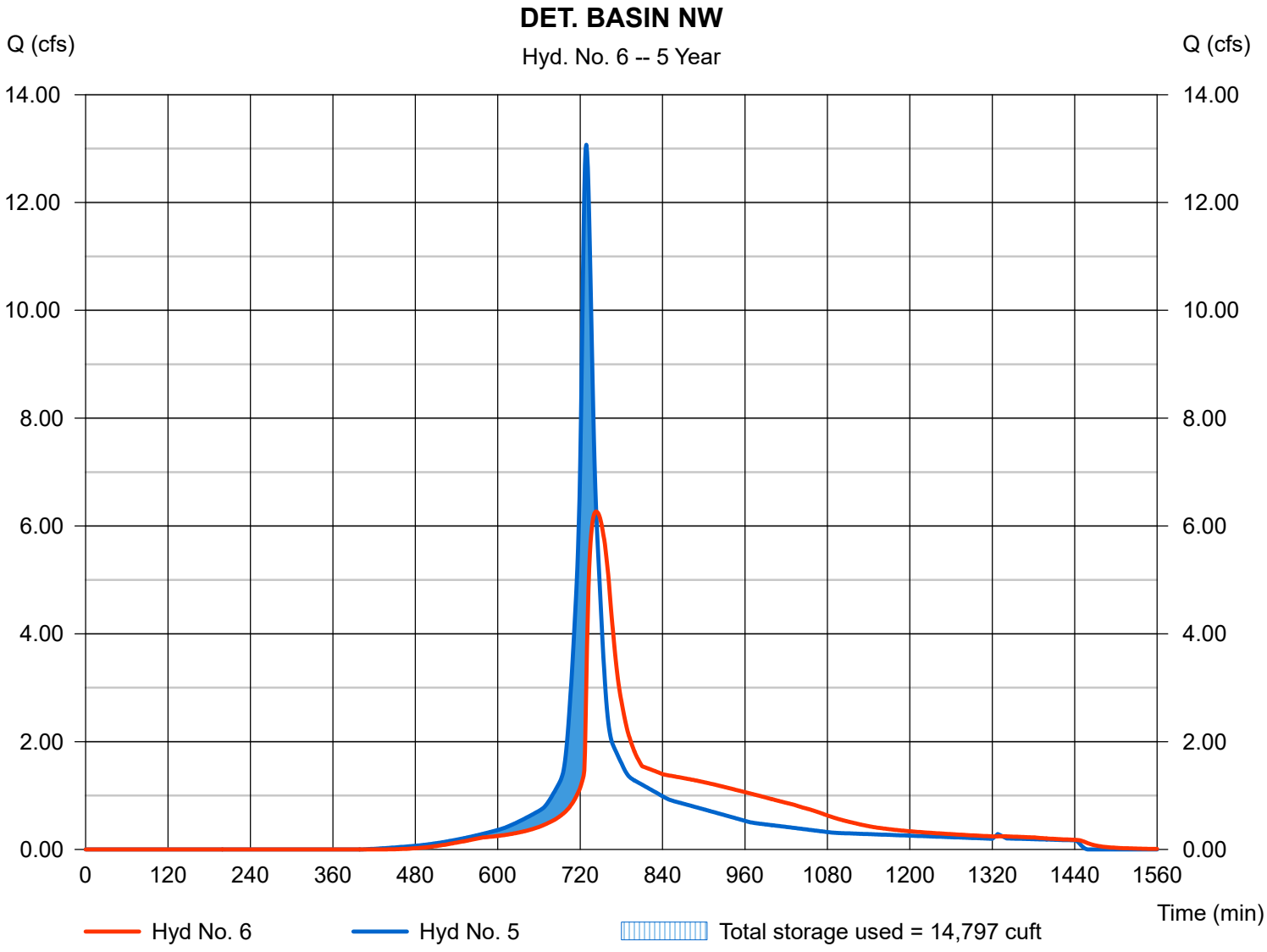
Hydrograph Report

Hyd. No. 6

DET. BASIN NW

Hydrograph type	=	Reservoir	Peak discharge	=	6.268 cfs
Storm frequency	=	5 yrs	Time to peak	=	743 min
Time interval	=	1 min	Hyd. volume	=	49,335 cuft
Inflow hyd. No.	=	5 - MDFR NW POST	Max. Elevation	=	165.53 ft
Reservoir name	=	PROP WQB #3 (MFDR DET. BASIN NW)	Max. Storage	=	14,797 cuft

Storage Indication method used.

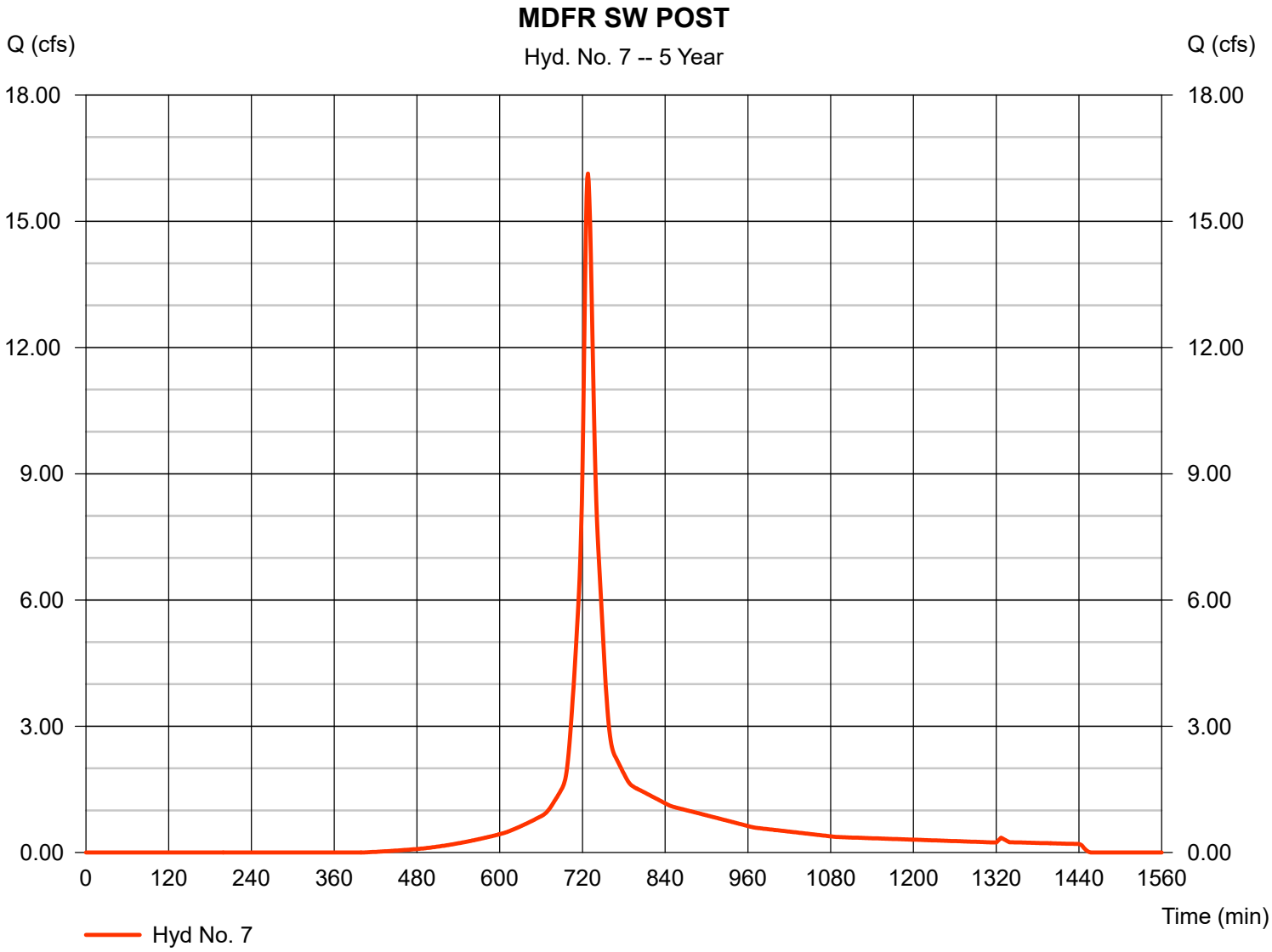


Hydrograph Report

Hyd. No. 7

MDFR SW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.13 cfs
Storm frequency	=	5 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	58,840 cuft
Drainage area	=	5.800 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.10 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



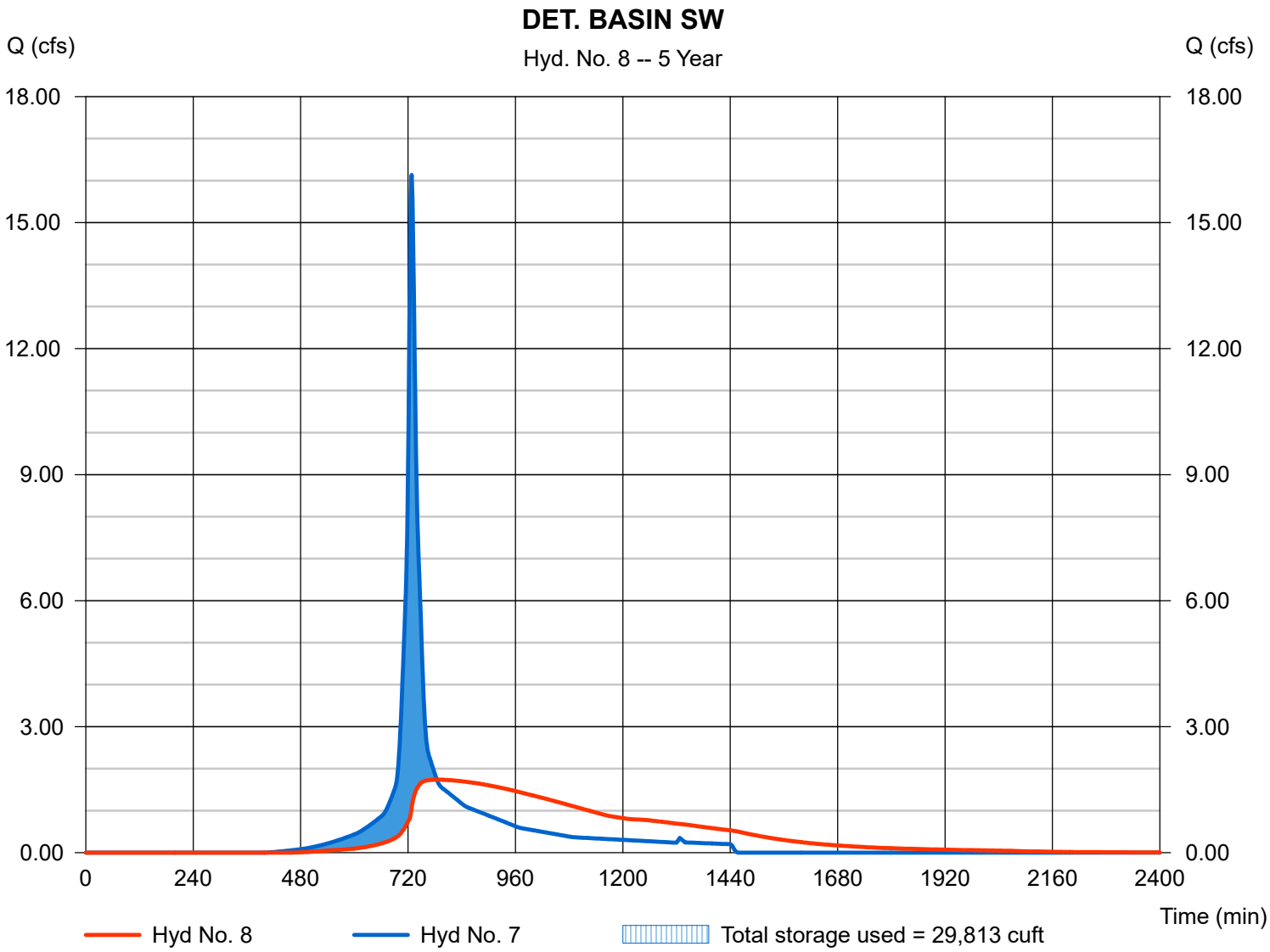
Hydrograph Report

Hyd. No. 8

DET. BASIN SW

Hydrograph type	=	Reservoir	Peak discharge	=	1.739 cfs
Storm frequency	=	5 yrs	Time to peak	=	784 min
Time interval	=	1 min	Hyd. volume	=	58,775 cuft
Inflow hyd. No.	=	7 - MDFR SW POST	Max. Elevation	=	167.15 ft
Reservoir name	=	PROP. WQB #2 (MFDR DET. BASIN SW)	Max. Storage	=	29,813 cuft

Storage Indication method used.

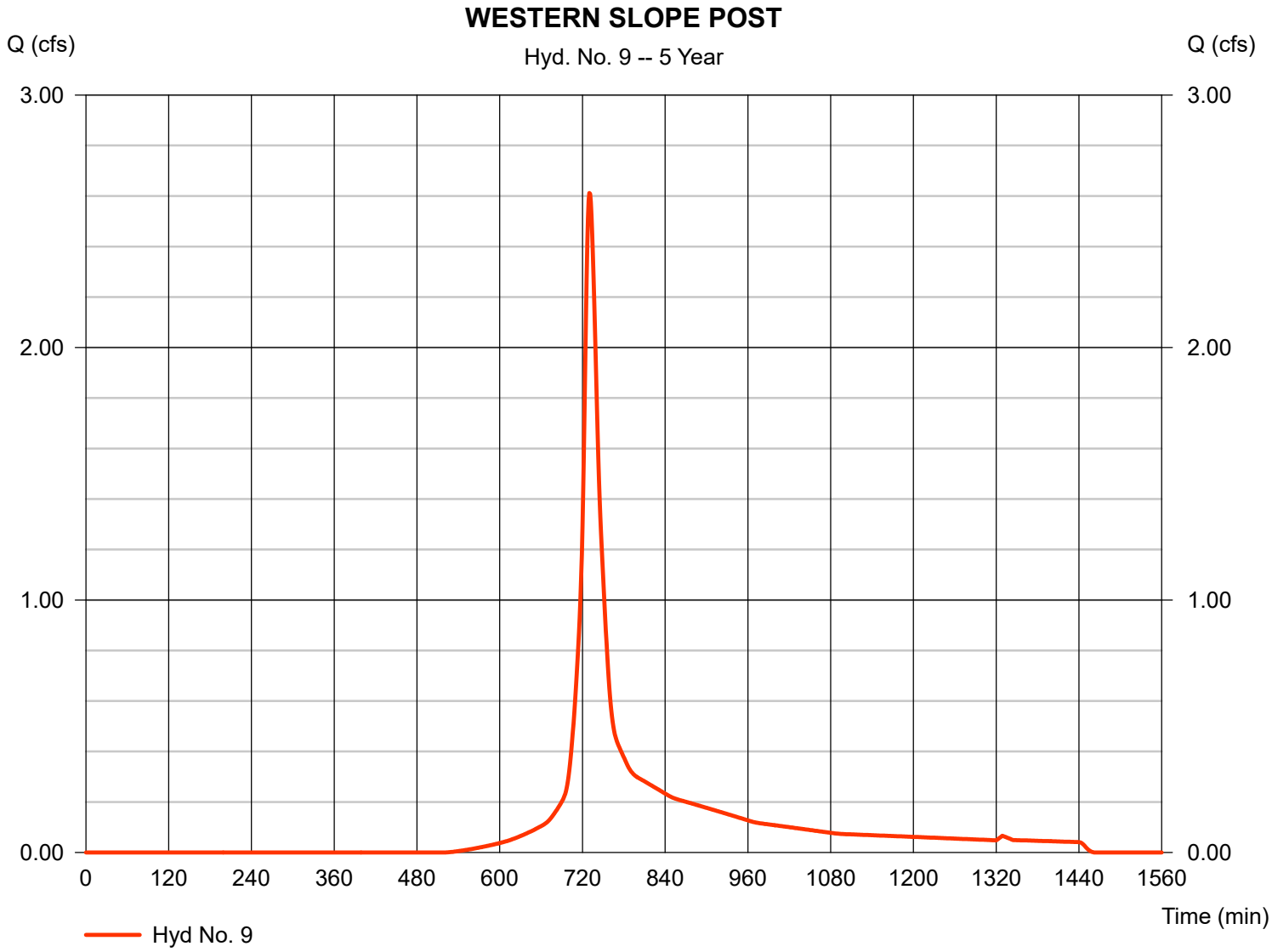


Hydrograph Report

Hyd. No. 9

WESTERN SLOPE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.612 cfs
Storm frequency	=	5 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	10,356 cuft
Drainage area	=	1.330 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

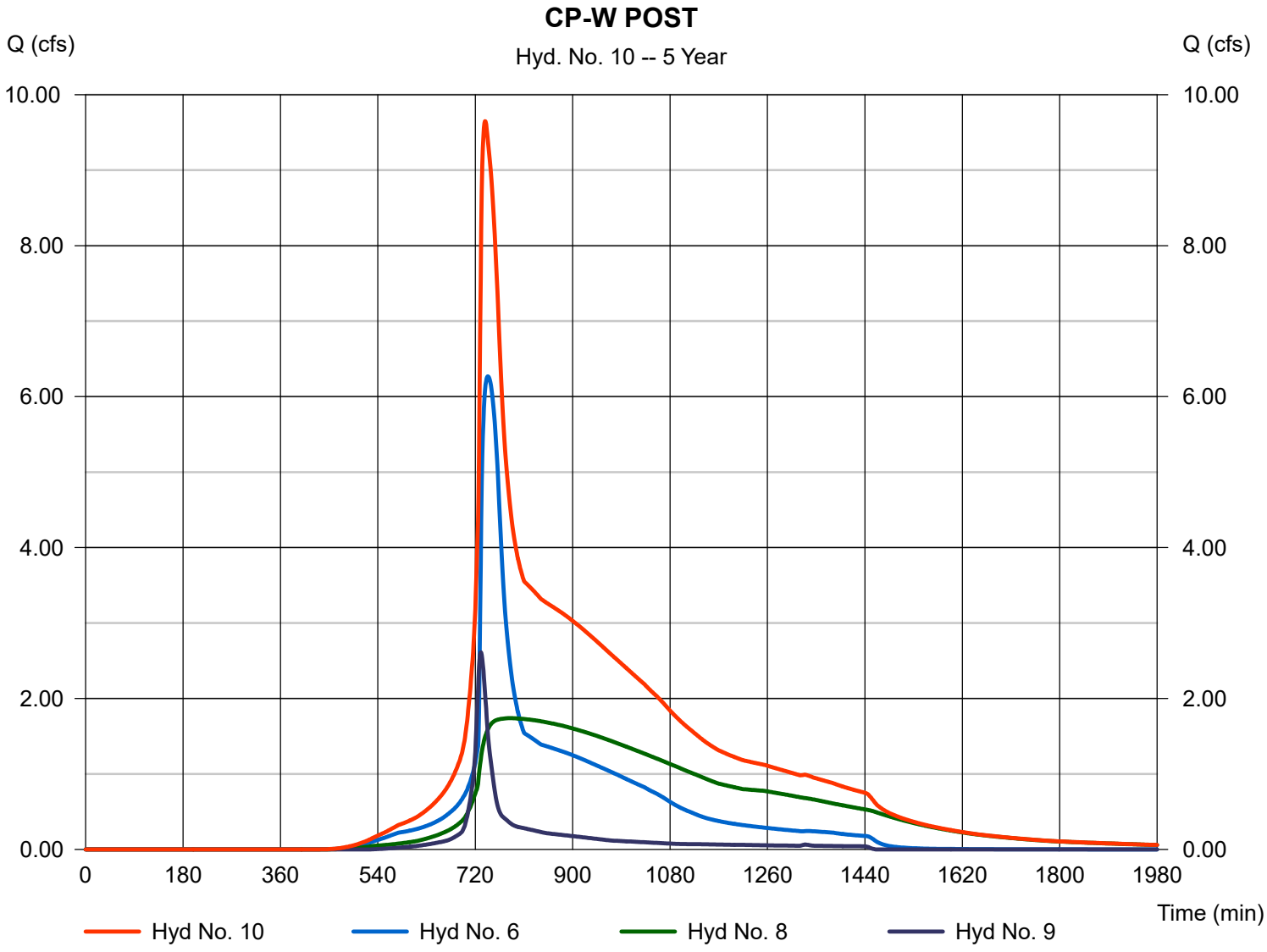


Hydrograph Report

Hyd. No. 10

CP-W POST

Hydrograph type	=	Combine	Peak discharge	=	9.648 cfs
Storm frequency	=	5 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	118,466 cuft
Inflow hyds.	=	6, 8, 9	Contrib. drain. area	=	1.330 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

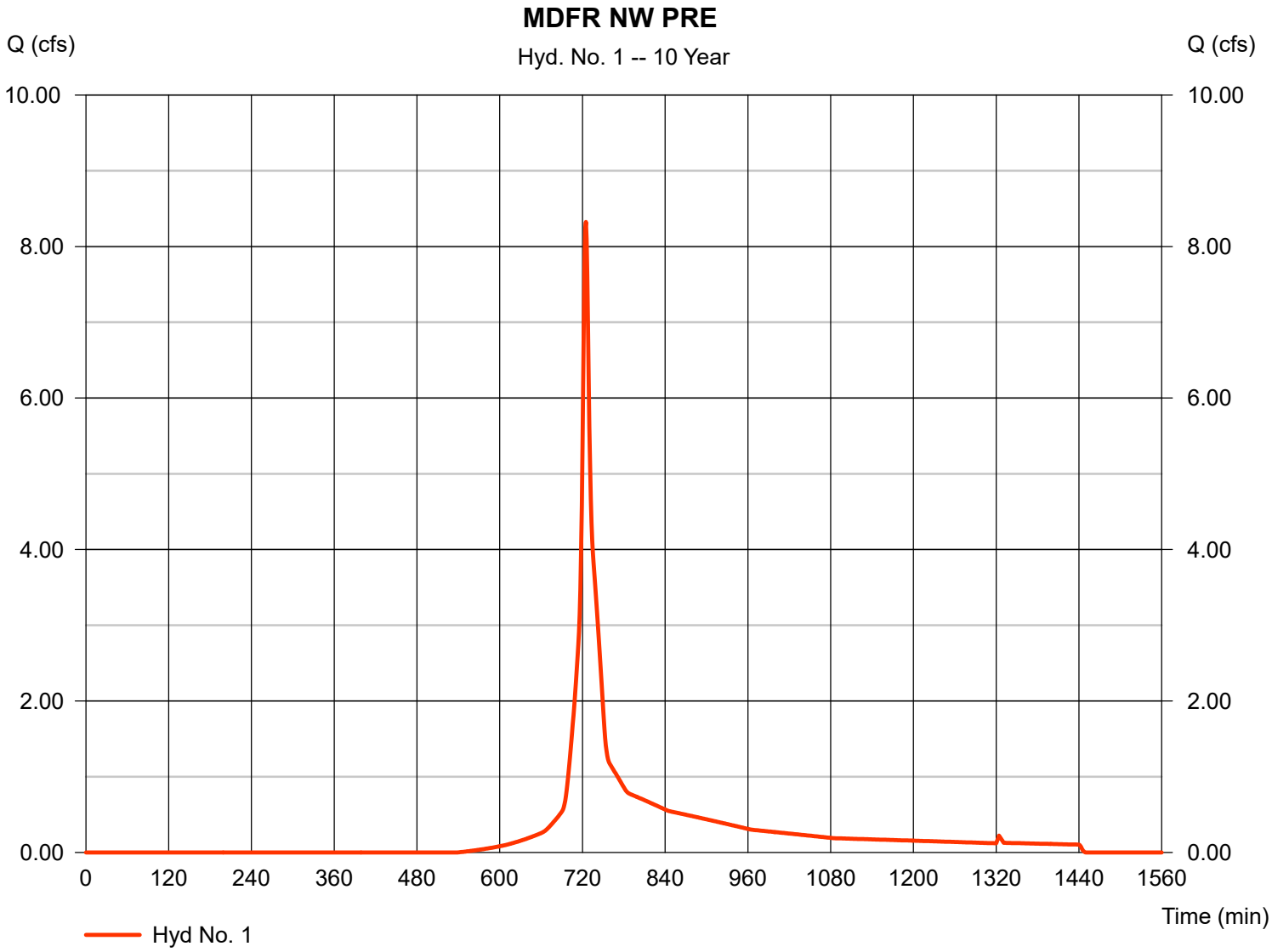
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	8.325	1	725	25,732	----	------	------	MDFR NW PRE
2	SCS Runoff	2.804	1	729	10,536	----	------	------	WESTERN SLOPE PRE
3	SCS Runoff	3.517	1	732	14,664	----	------	------	MDFR SW PRE
4	Combine	13.54	1	726	50,933	1, 2, 3	------	------	CP-W - PRE
5	SCS Runoff	16.84	1	729	64,034	----	------	------	MDFR NW POST
6	Reservoir	7.850	1	744	64,019	5	166.00	18,820	DET. BASIN NW
7	SCS Runoff	20.78	1	728	76,347	----	------	------	MDFR SW POST
8	Reservoir	2.076	1	788	76,276	7	167.75	39,645	DET. BASIN SW
9	SCS Runoff	3.534	1	730	13,957	----	------	------	WESTERN SLOPE POST
10	Combine	12.33	1	736	154,252	6, 8, 9	------	------	CP-W POST

Hydrograph Report

Hyd. No. 1

MDFR NW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.325 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	25,732 cuft
Drainage area	=	2.810 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.50 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

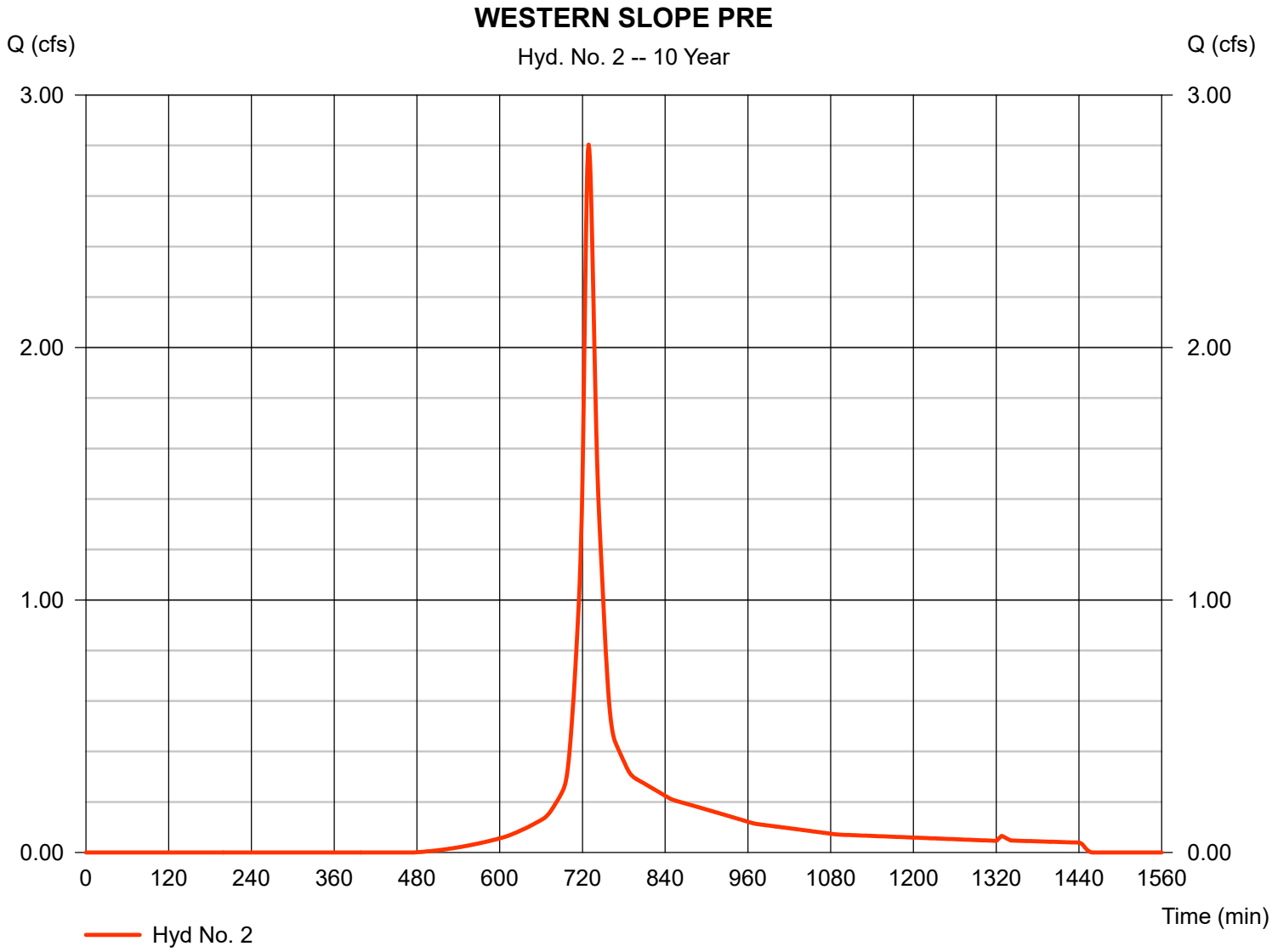


Hydrograph Report

Hyd. No. 2

WESTERN SLOPE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.804 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	10,536 cuft
Drainage area	=	1.020 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.30 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

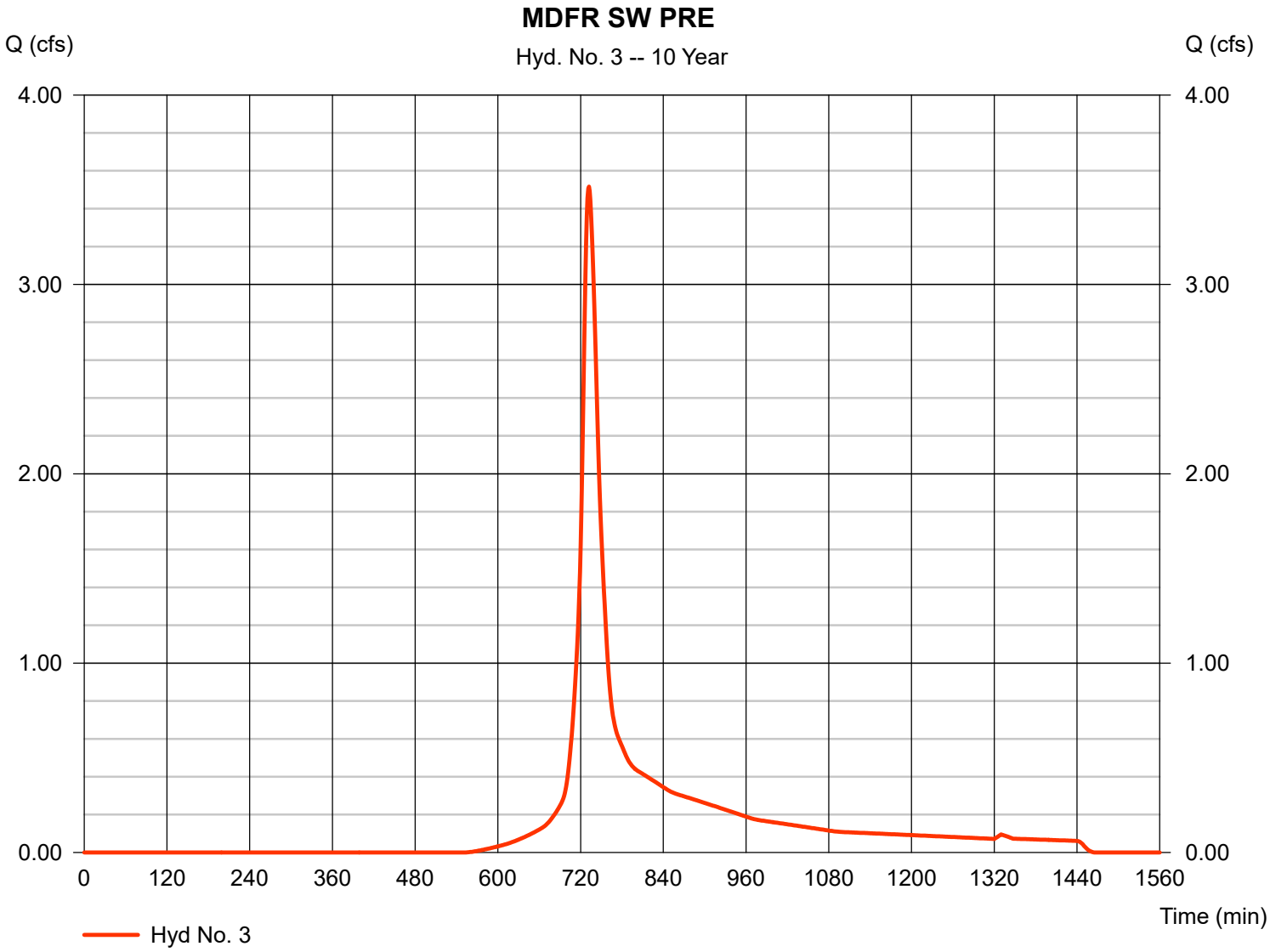


Hydrograph Report

Hyd. No. 3

MDFR SW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.517 cfs
Storm frequency	=	10 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	14,664 cuft
Drainage area	=	1.690 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.00 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

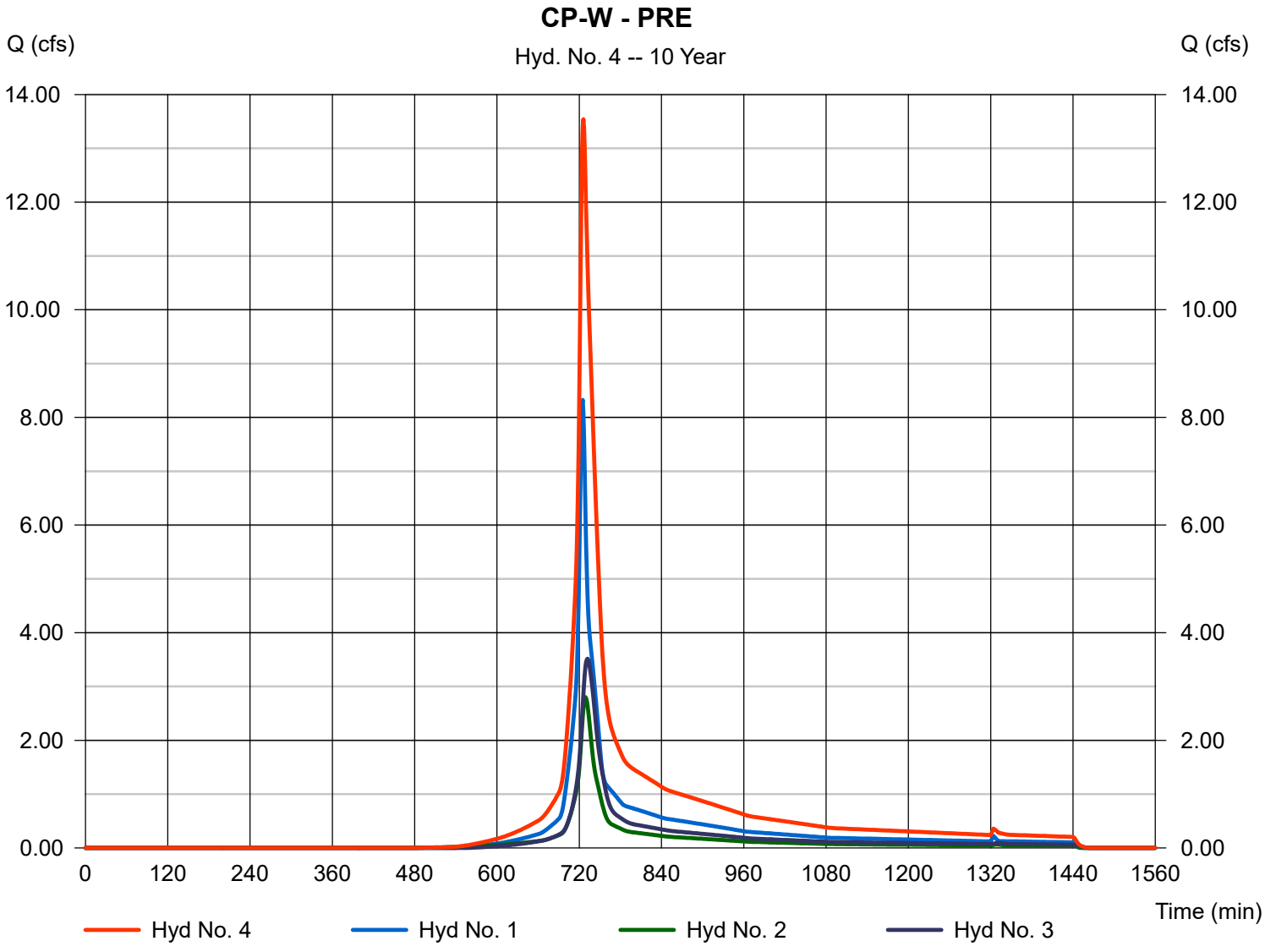


Hydrograph Report

Hyd. No. 4

CP-W - PRE

Hydrograph type	= Combine	Peak discharge	= 13.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 50,933 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 5.520 ac

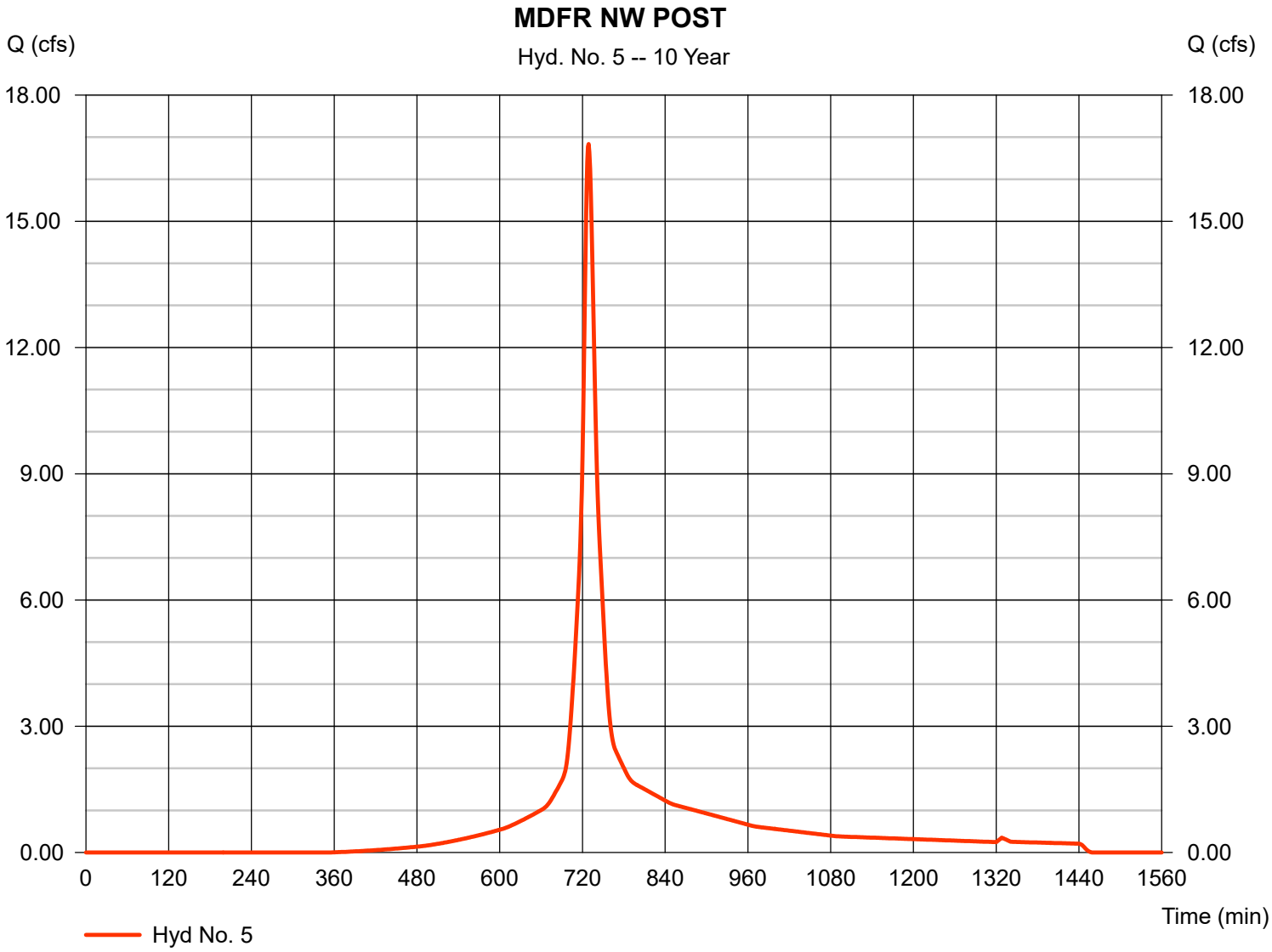


Hydrograph Report

Hyd. No. 5

MDFR NW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.84 cfs
Storm frequency	=	10 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	64,034 cuft
Drainage area	=	5.030 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.90 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



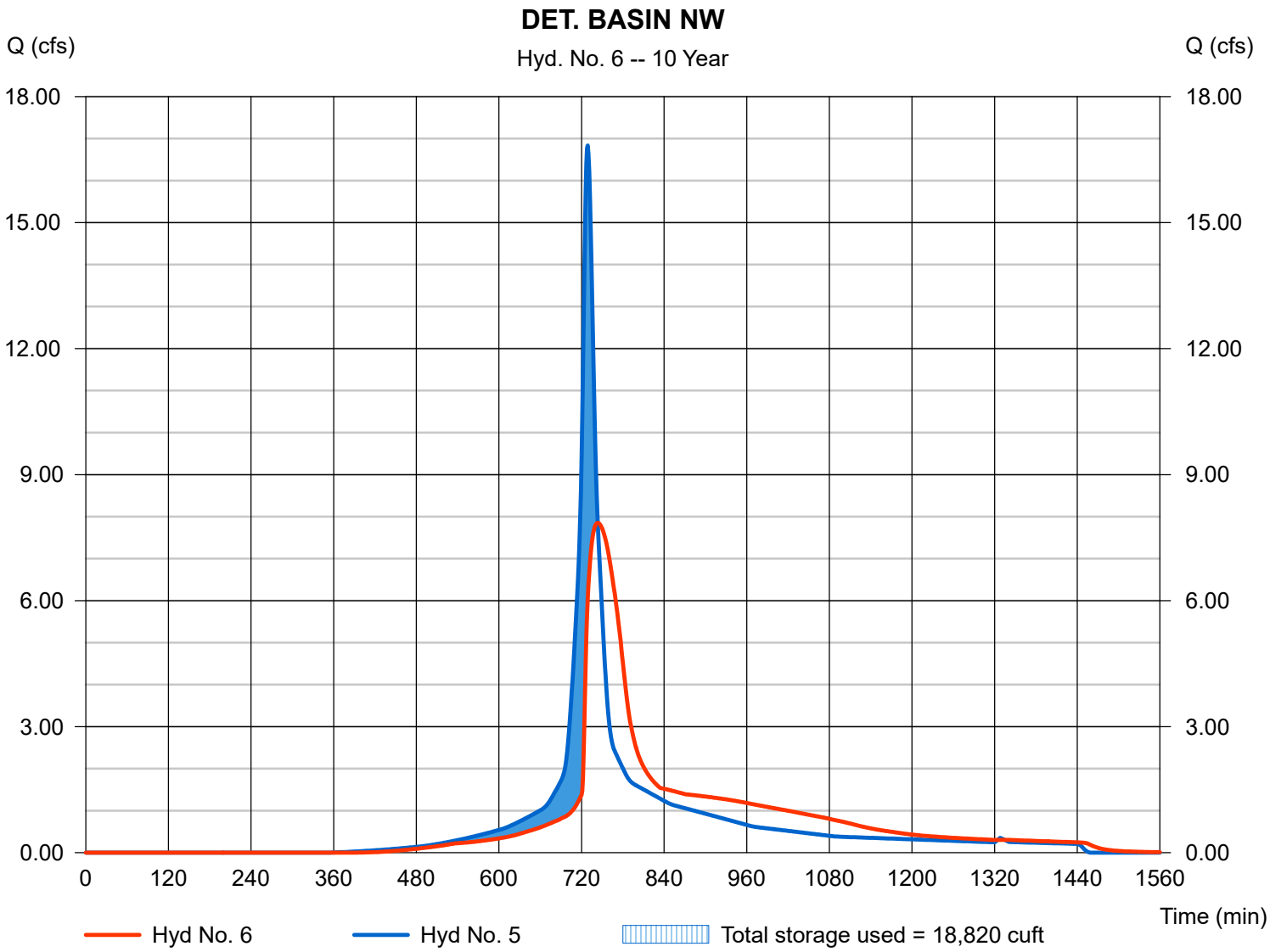
Hydrograph Report

Hyd. No. 6

DET. BASIN NW

Hydrograph type	=	Reservoir	Peak discharge	=	7.850 cfs
Storm frequency	=	10 yrs	Time to peak	=	744 min
Time interval	=	1 min	Hyd. volume	=	64,019 cuft
Inflow hyd. No.	=	5 - MDFR NW POST	Max. Elevation	=	166.00 ft
Reservoir name	=	PROP WQB #3 (MFDR DET. BASIN NW)	Max. Storage	=	18,820 cuft

Storage Indication method used.

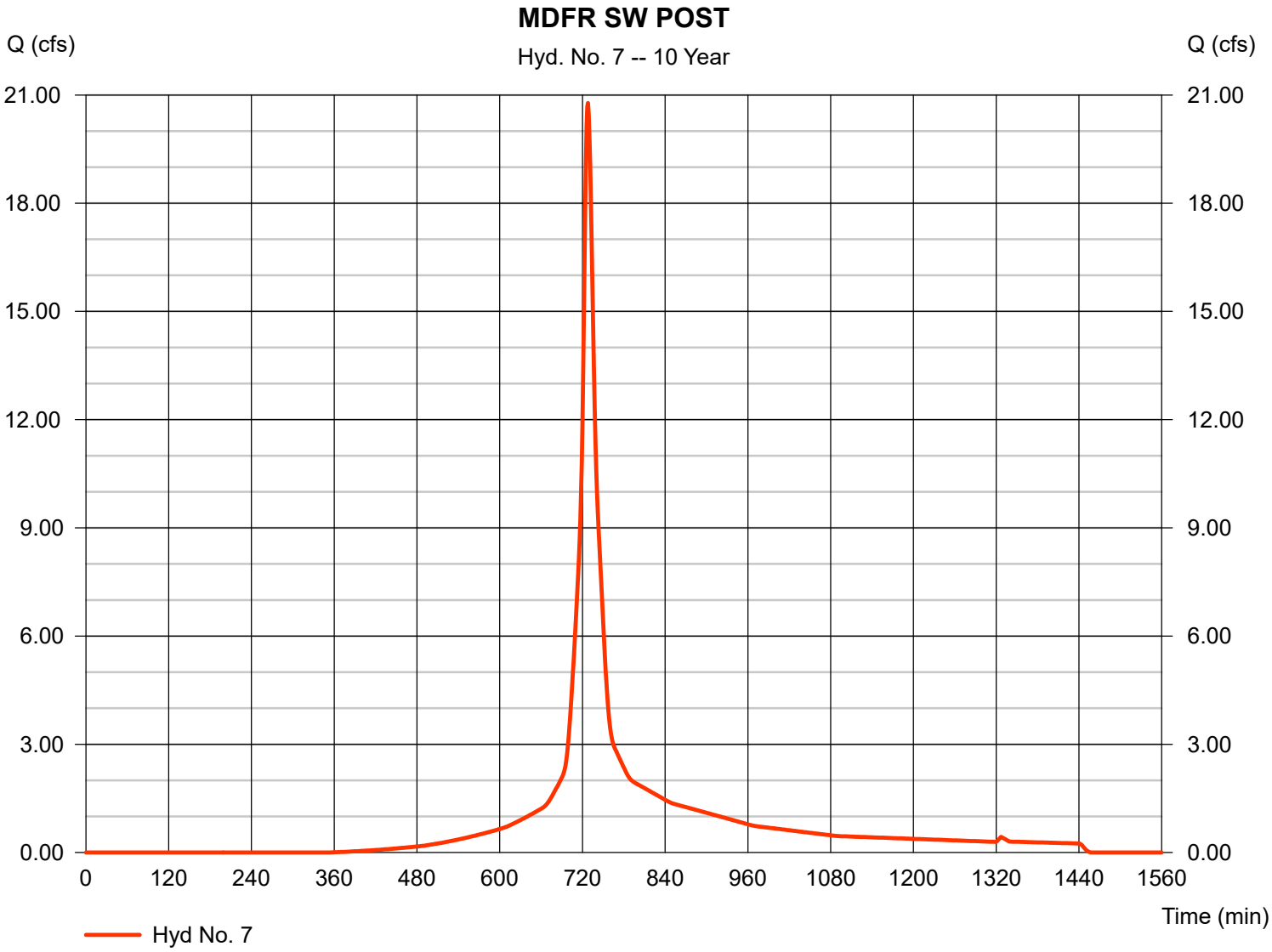


Hydrograph Report

Hyd. No. 7

MDFR SW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.78 cfs
Storm frequency	=	10 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	76,347 cuft
Drainage area	=	5.800 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.10 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



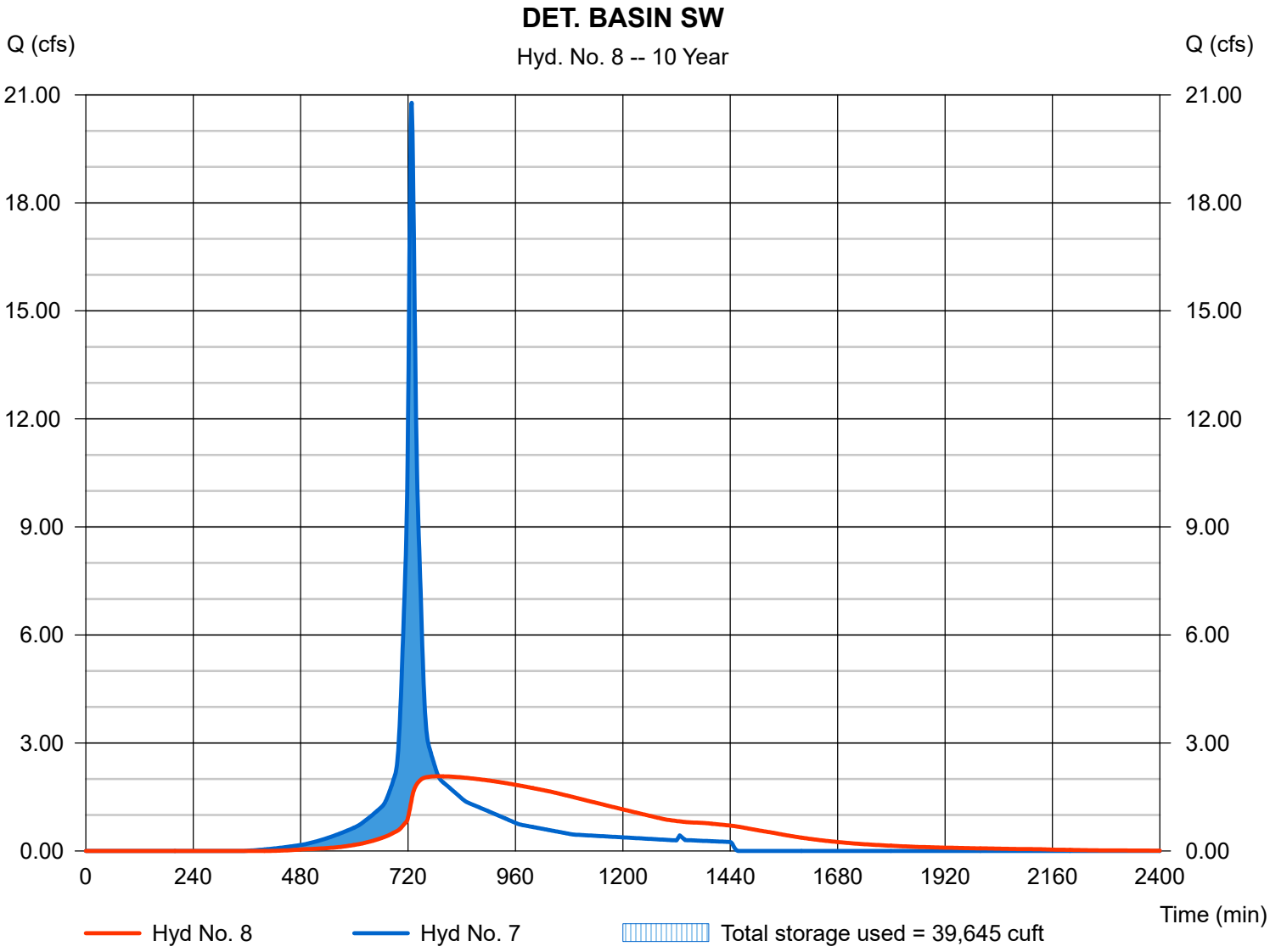
Hydrograph Report

Hyd. No. 8

DET. BASIN SW

Hydrograph type	=	Reservoir	Peak discharge	=	2.076 cfs
Storm frequency	=	10 yrs	Time to peak	=	788 min
Time interval	=	1 min	Hyd. volume	=	76,276 cuft
Inflow hyd. No.	=	7 - MDFR SW POST	Max. Elevation	=	167.75 ft
Reservoir name	=	PROP. WQB #2 (MFDR DET. BASIN SW)	Max. Storage	=	39,645 cuft

Storage Indication method used.

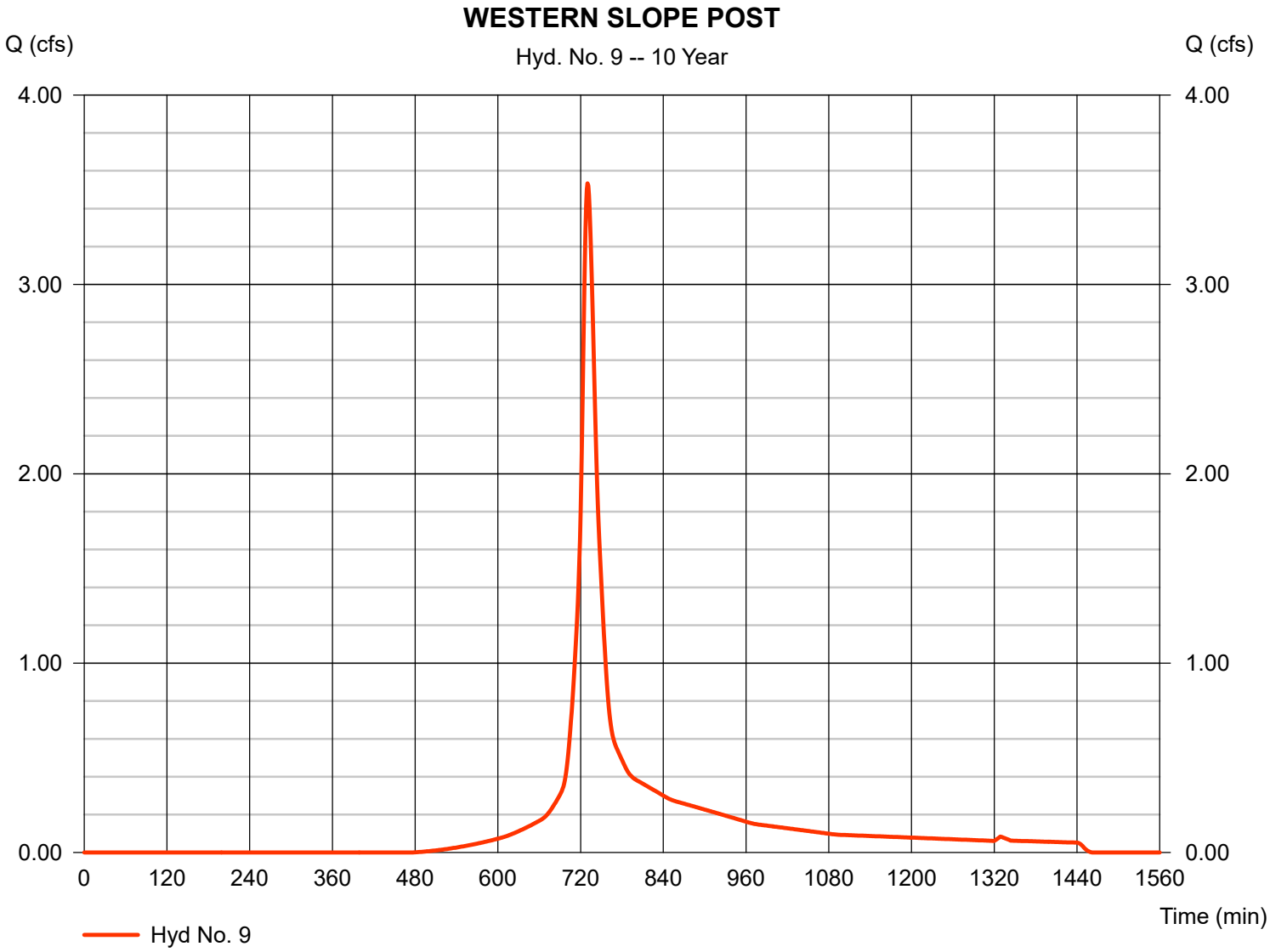


Hydrograph Report

Hyd. No. 9

WESTERN SLOPE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.534 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	13,957 cuft
Drainage area	=	1.330 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

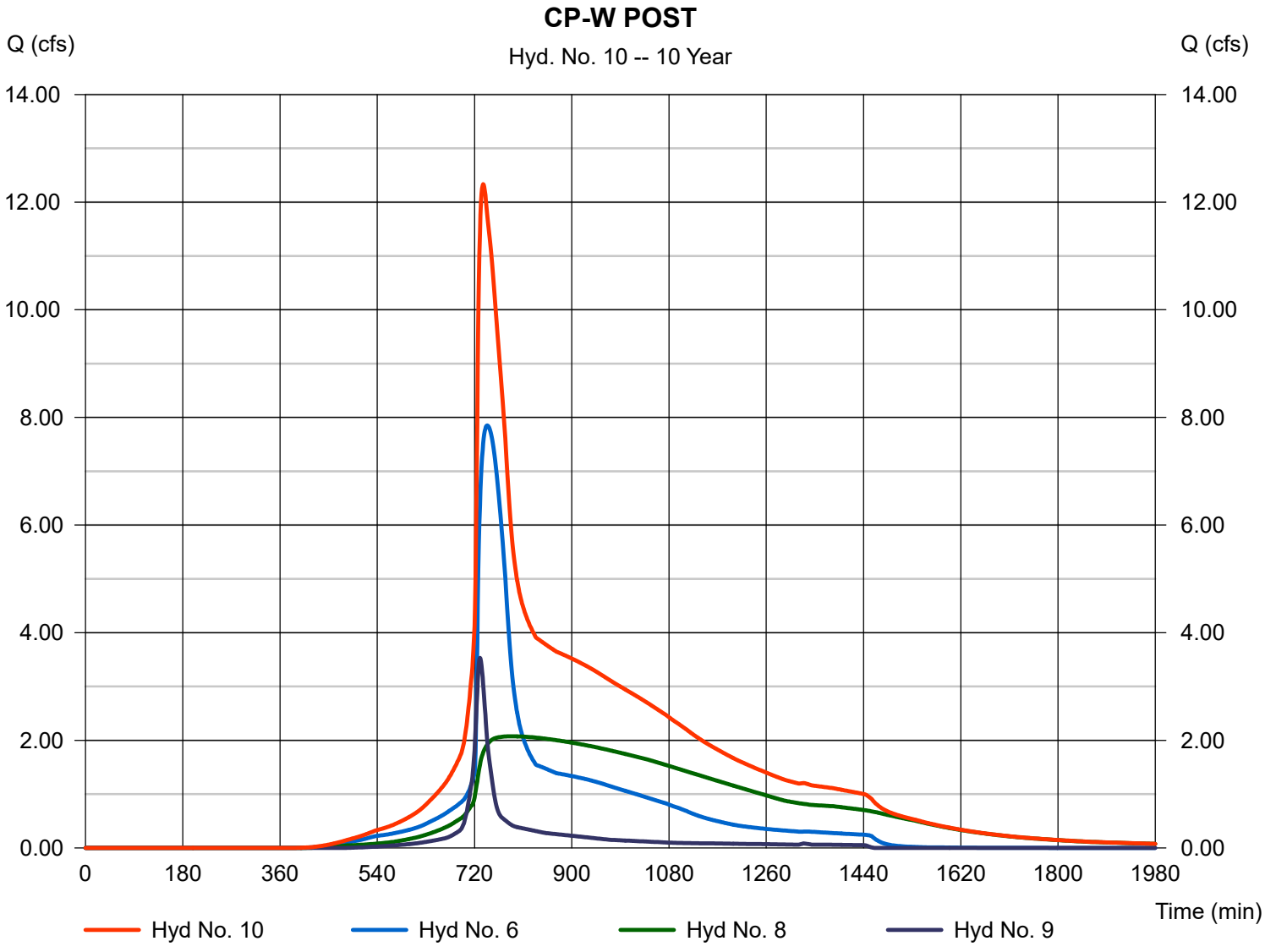


Hydrograph Report

Hyd. No. 10

CP-W POST

Hydrograph type	= Combine	Peak discharge	= 12.33 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 154,252 cuft
Inflow hyds.	= 6, 8, 9	Contrib. drain. area	= 1.330 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

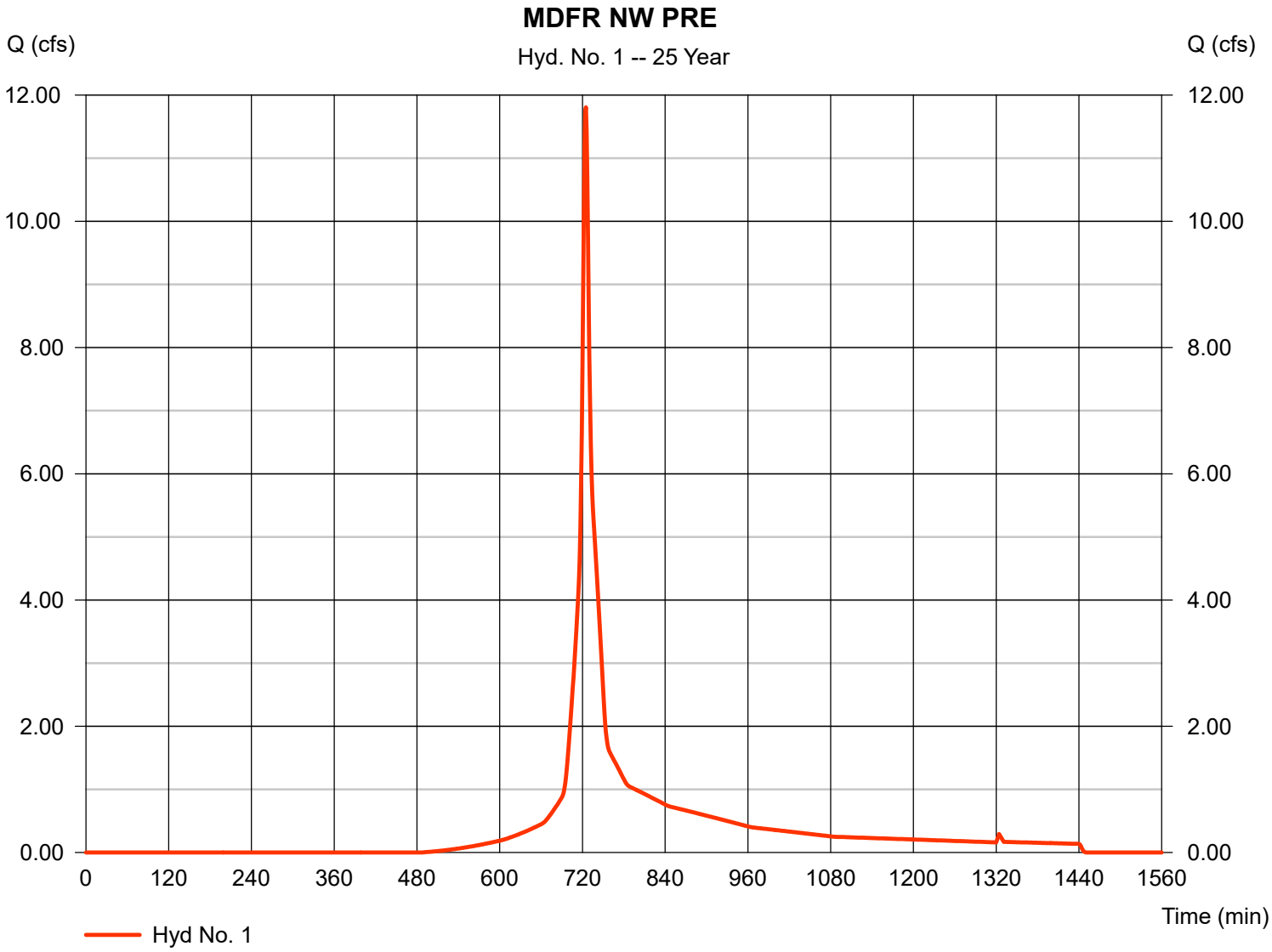
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	11.81	1	725	36,366	----	------	------	MDFR NW PRE
2	SCS Runoff	3.840	1	729	14,470	----	------	------	WESTERN SLOPE PRE
3	SCS Runoff	5.037	1	732	20,850	----	------	------	MDFR SW PRE
4	Combine	19.18	1	726	71,686	1, 2, 3	------	------	CP-W - PRE
5	SCS Runoff	22.06	1	729	84,817	----	------	------	MDFR NW POST
6	Reservoir	9.280	1	745	84,803	5	166.58	25,227	DET. BASIN NW
7	SCS Runoff	27.22	1	728	101,128	----	------	------	MDFR SW POST
8	Reservoir	4.352	1	761	101,049	7	168.36	50,471	DET. BASIN SW
9	SCS Runoff	4.843	1	730	19,168	----	------	------	WESTERN SLOPE POST
10	Combine	15.34	1	740	205,019	6, 8, 9	------	------	CP-W POST

Hydrograph Report

Hyd. No. 1

MDFR NW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.81 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	36,366 cuft
Drainage area	=	2.810 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.50 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

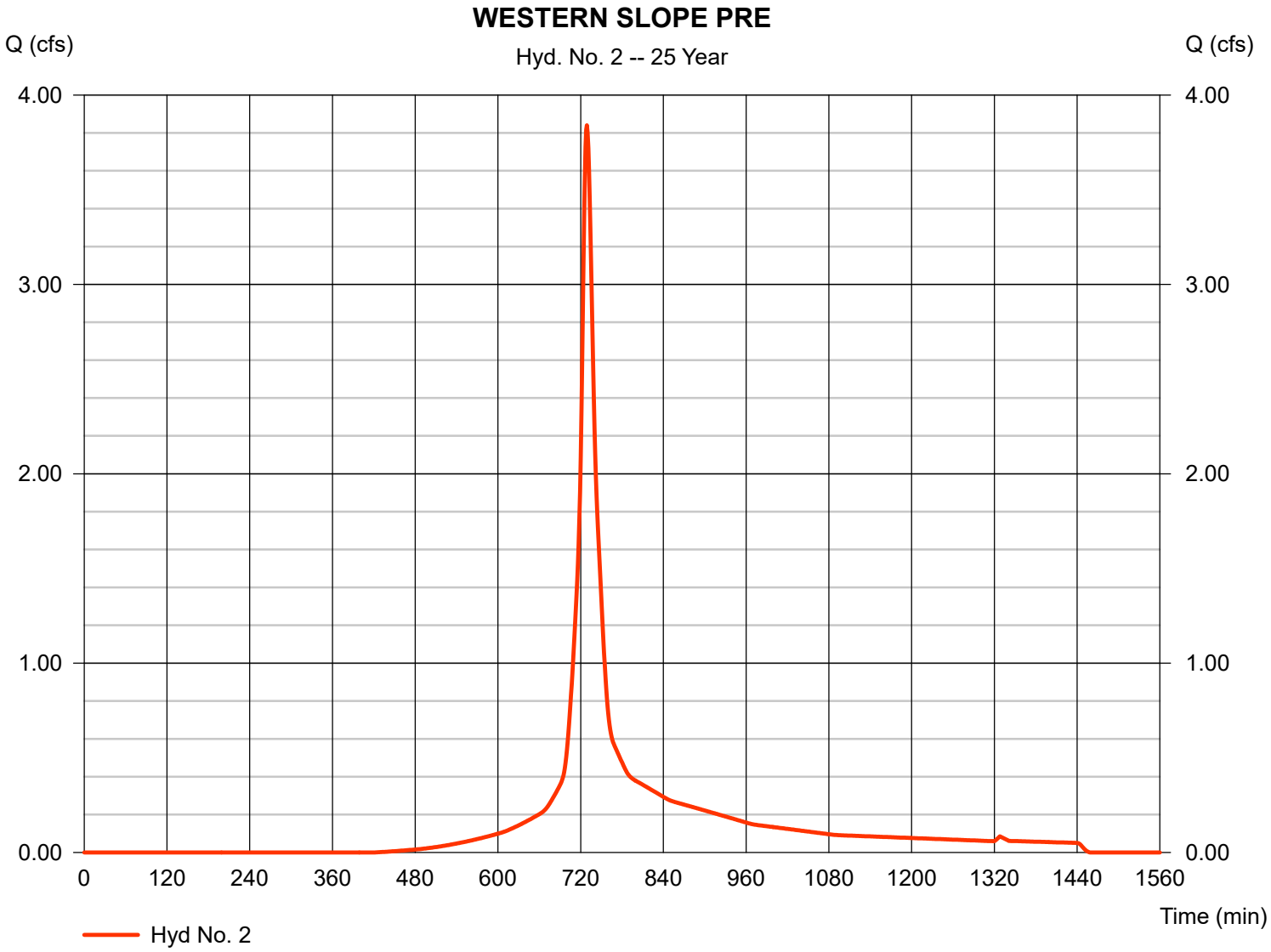


Hydrograph Report

Hyd. No. 2

WESTERN SLOPE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.840 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	14,470 cuft
Drainage area	=	1.020 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.30 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

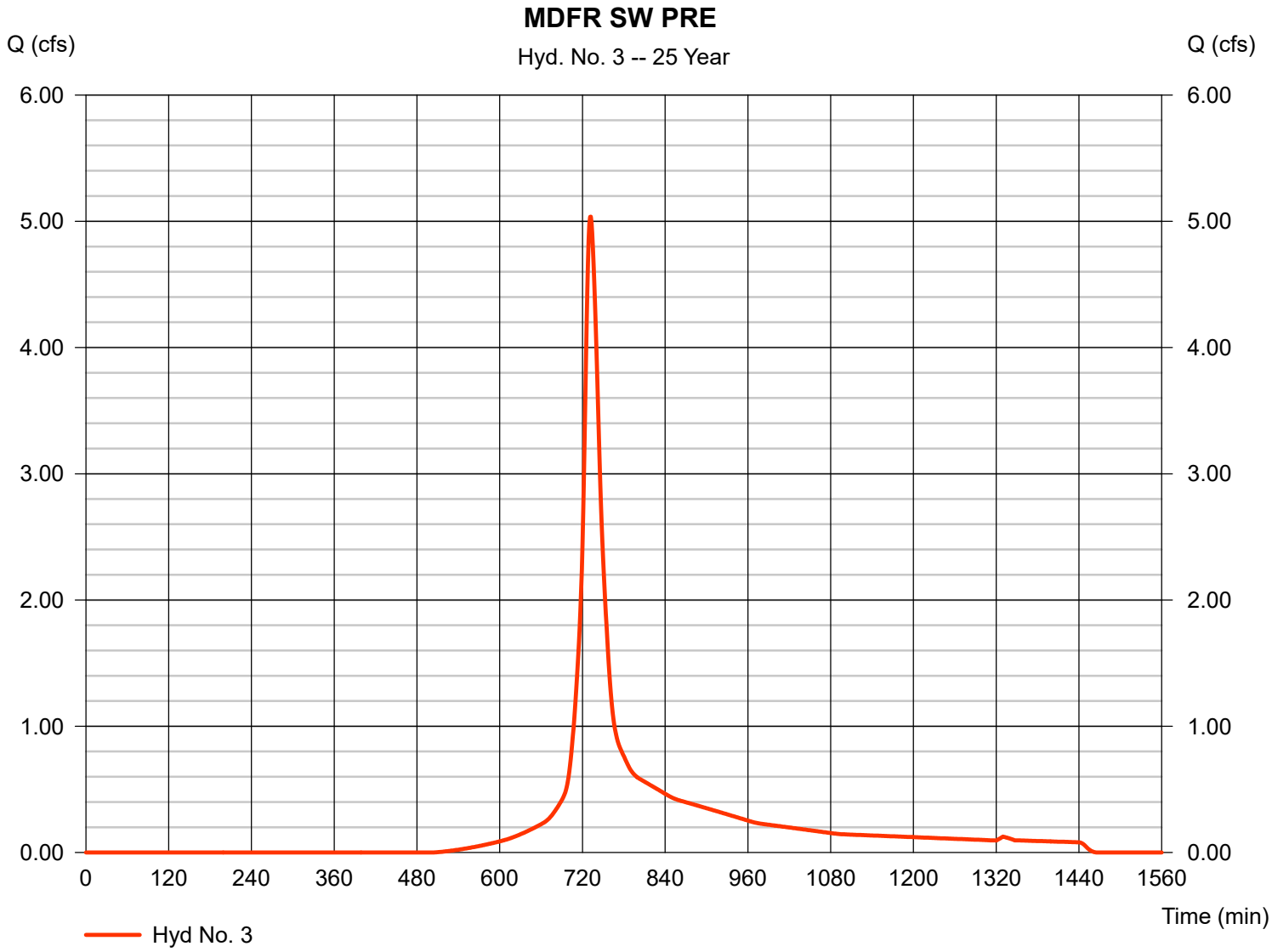


Hydrograph Report

Hyd. No. 3

MDFR SW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.037 cfs
Storm frequency	=	25 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	20,850 cuft
Drainage area	=	1.690 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.00 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

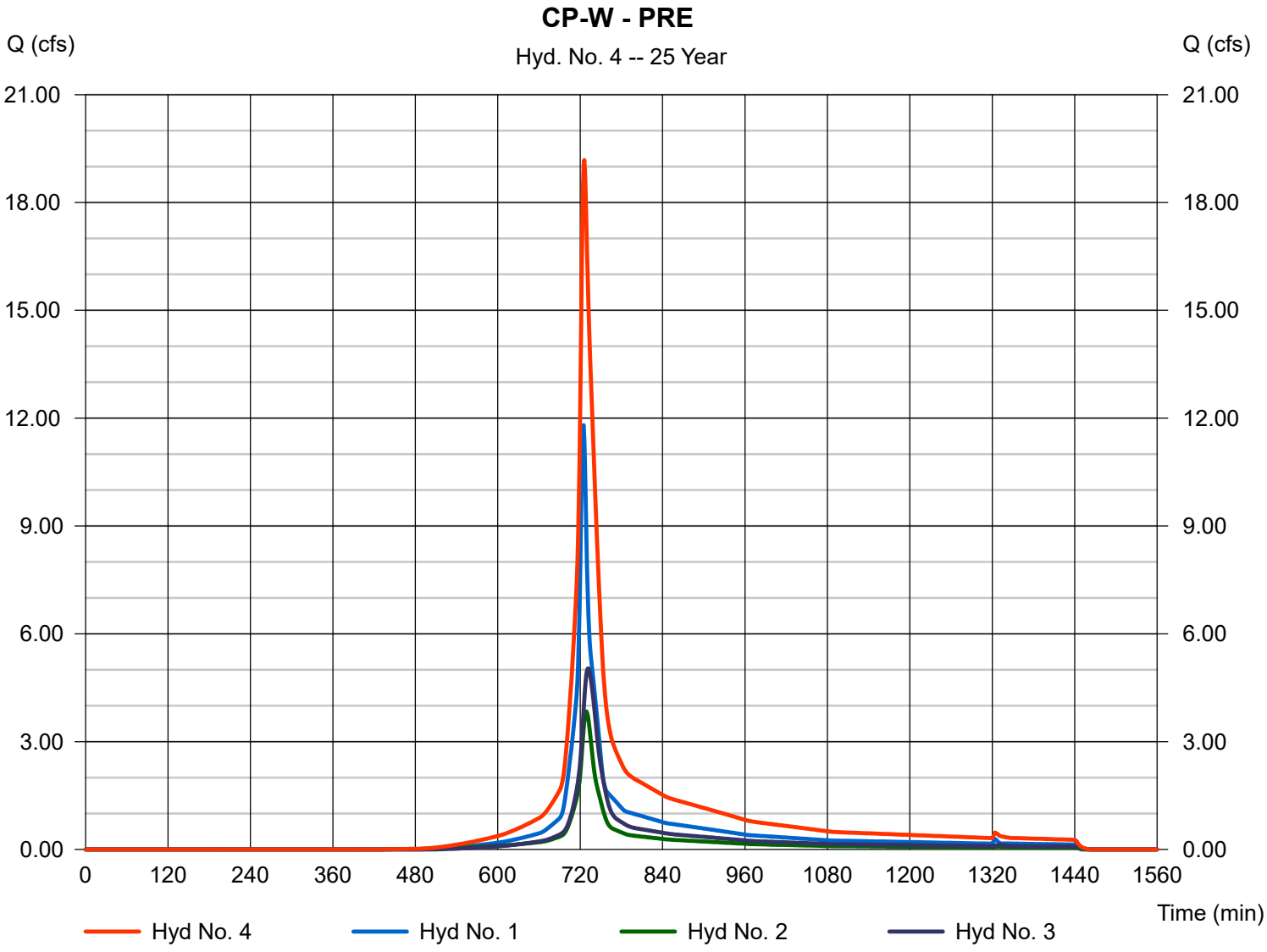


Hydrograph Report

Hyd. No. 4

CP-W - PRE

Hydrograph type	=	Combine	Peak discharge	=	19.18 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	71,686 cuft
Inflow hyds.	=	1, 2, 3	Contrib. drain. area	=	5.520 ac

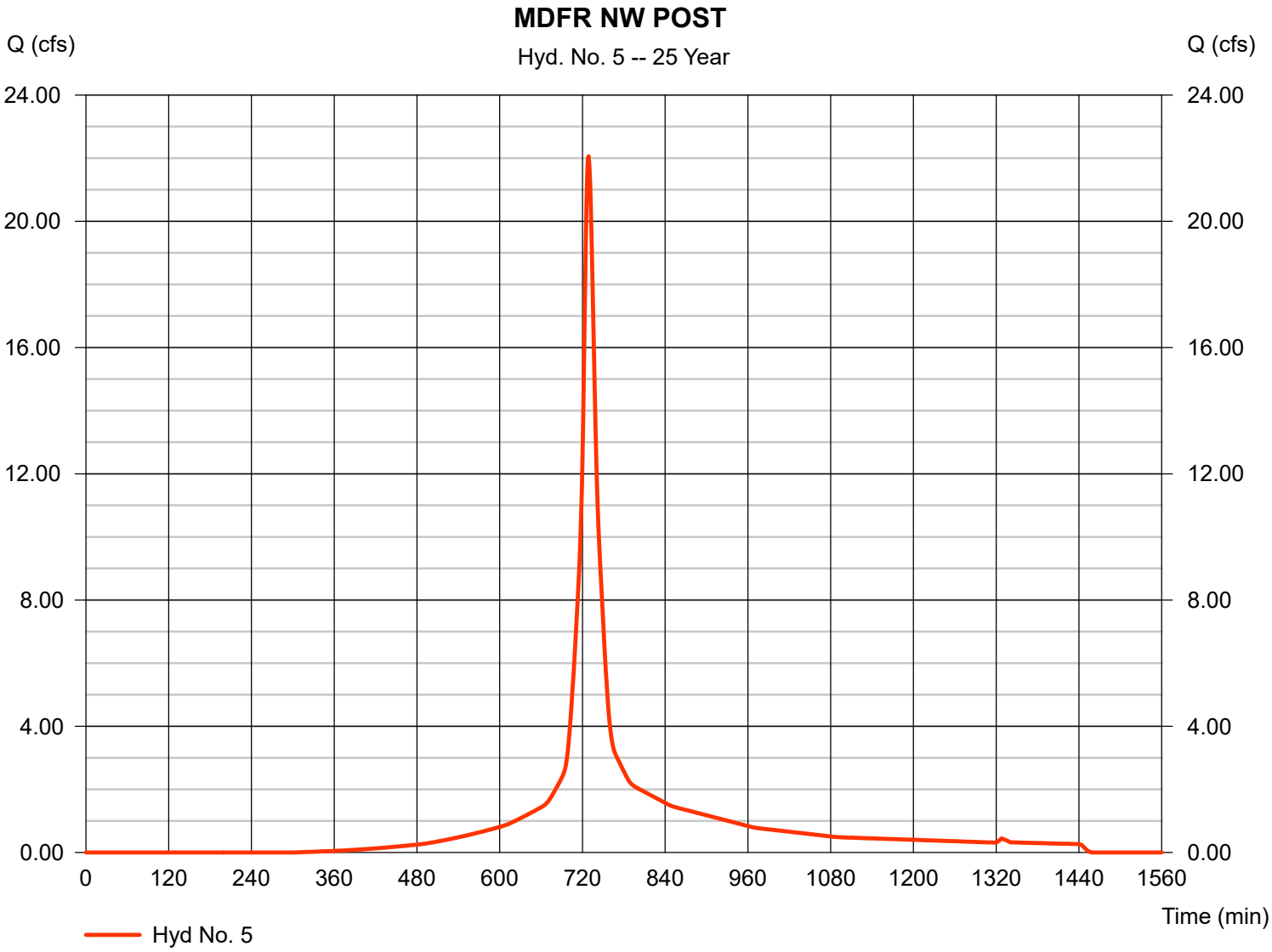


Hydrograph Report

Hyd. No. 5

MDFR NW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.06 cfs
Storm frequency	=	25 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	84,817 cuft
Drainage area	=	5.030 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.90 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



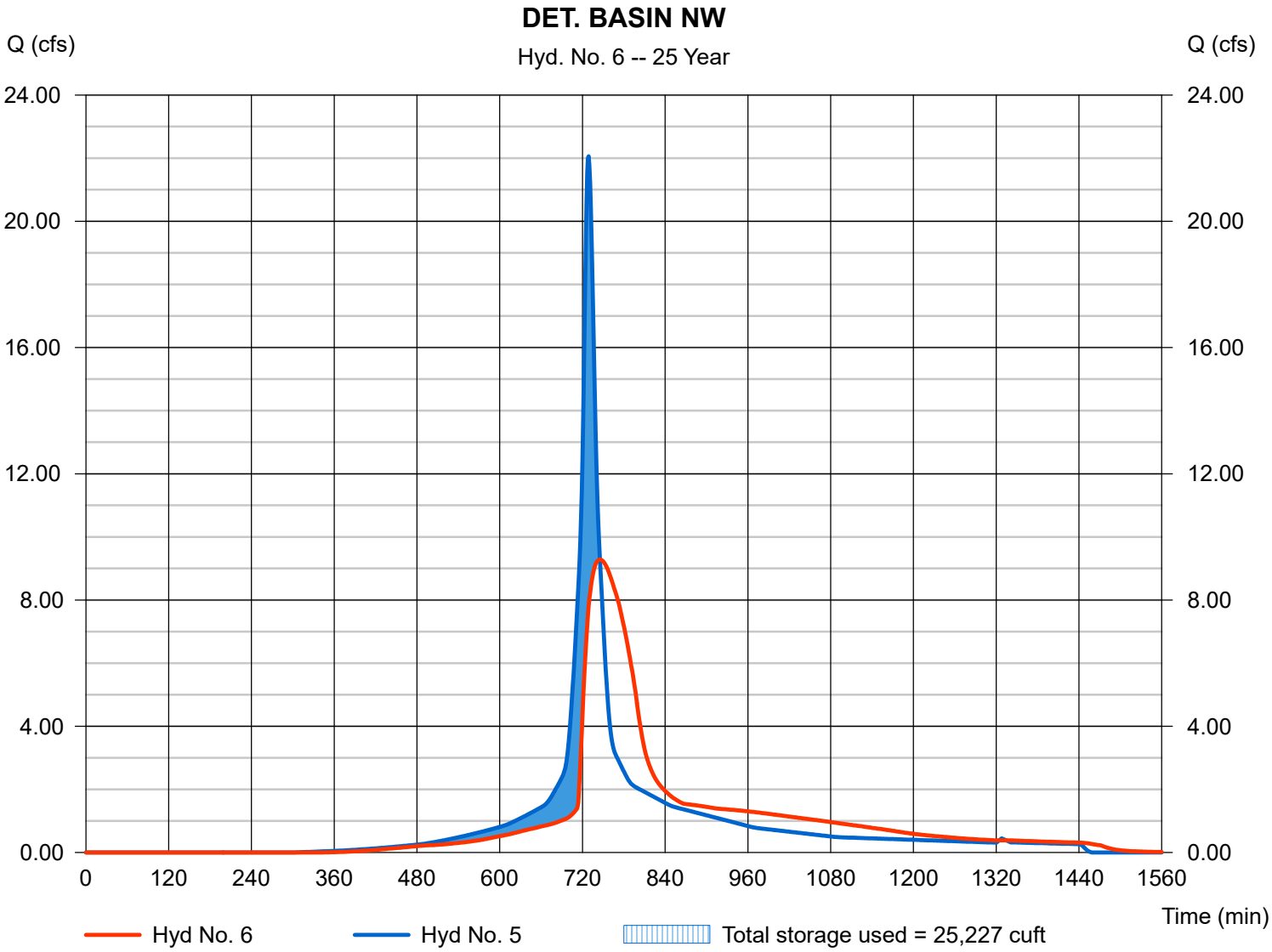
Hydrograph Report

Hyd. No. 6

DET. BASIN NW

Hydrograph type	=	Reservoir	Peak discharge	=	9.280 cfs
Storm frequency	=	25 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	84,803 cuft
Inflow hyd. No.	=	5 - MDFR NW POST	Max. Elevation	=	166.58 ft
Reservoir name	=	PROP WQB #3 (MFDR DET. BASIN NW)	Max. Storage	=	25,227 cuft

Storage Indication method used.

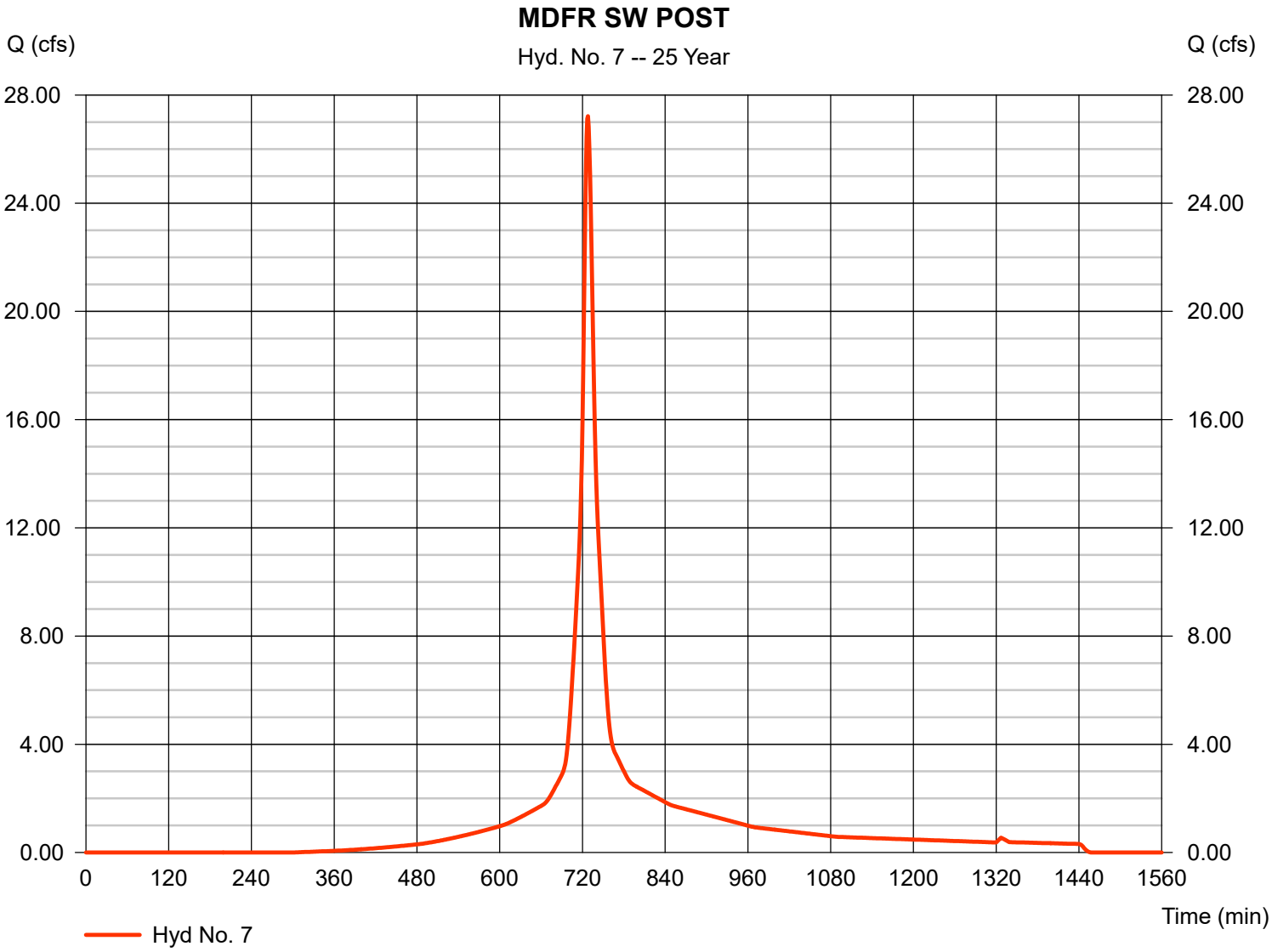


Hydrograph Report

Hyd. No. 7

MDFR SW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.22 cfs
Storm frequency	=	25 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	101,128 cuft
Drainage area	=	5.800 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.10 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



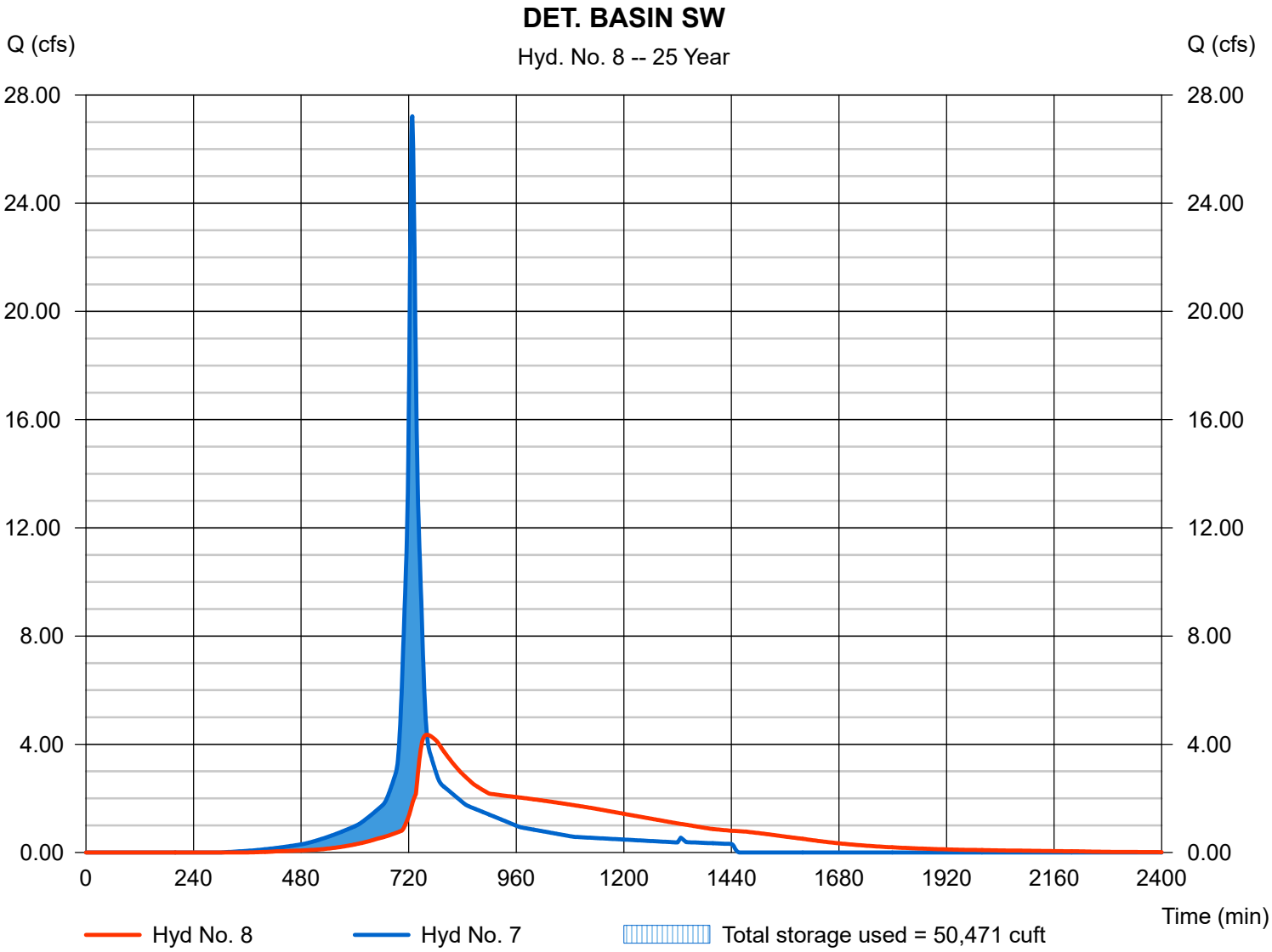
Hydrograph Report

Hyd. No. 8

DET. BASIN SW

Hydrograph type	=	Reservoir	Peak discharge	=	4.352 cfs
Storm frequency	=	25 yrs	Time to peak	=	761 min
Time interval	=	1 min	Hyd. volume	=	101,049 cuft
Inflow hyd. No.	=	7 - MDFR SW POST	Max. Elevation	=	168.36 ft
Reservoir name	=	PROP. WQB #2 (MFDR DET. BASIN SW)	Max. Storage	=	50,471 cuft

Storage Indication method used.

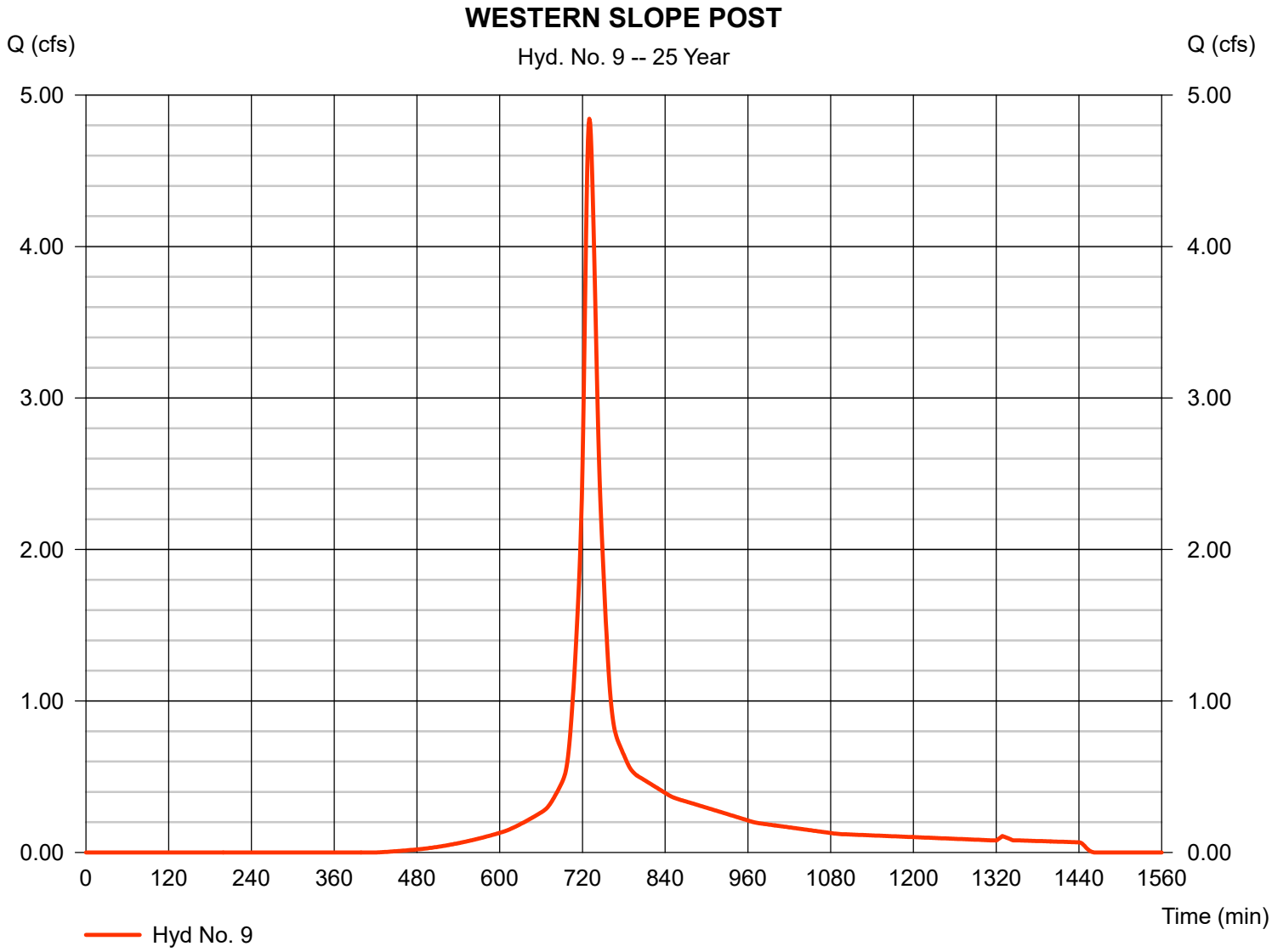


Hydrograph Report

Hyd. No. 9

WESTERN SLOPE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.843 cfs
Storm frequency	=	25 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	19,168 cuft
Drainage area	=	1.330 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

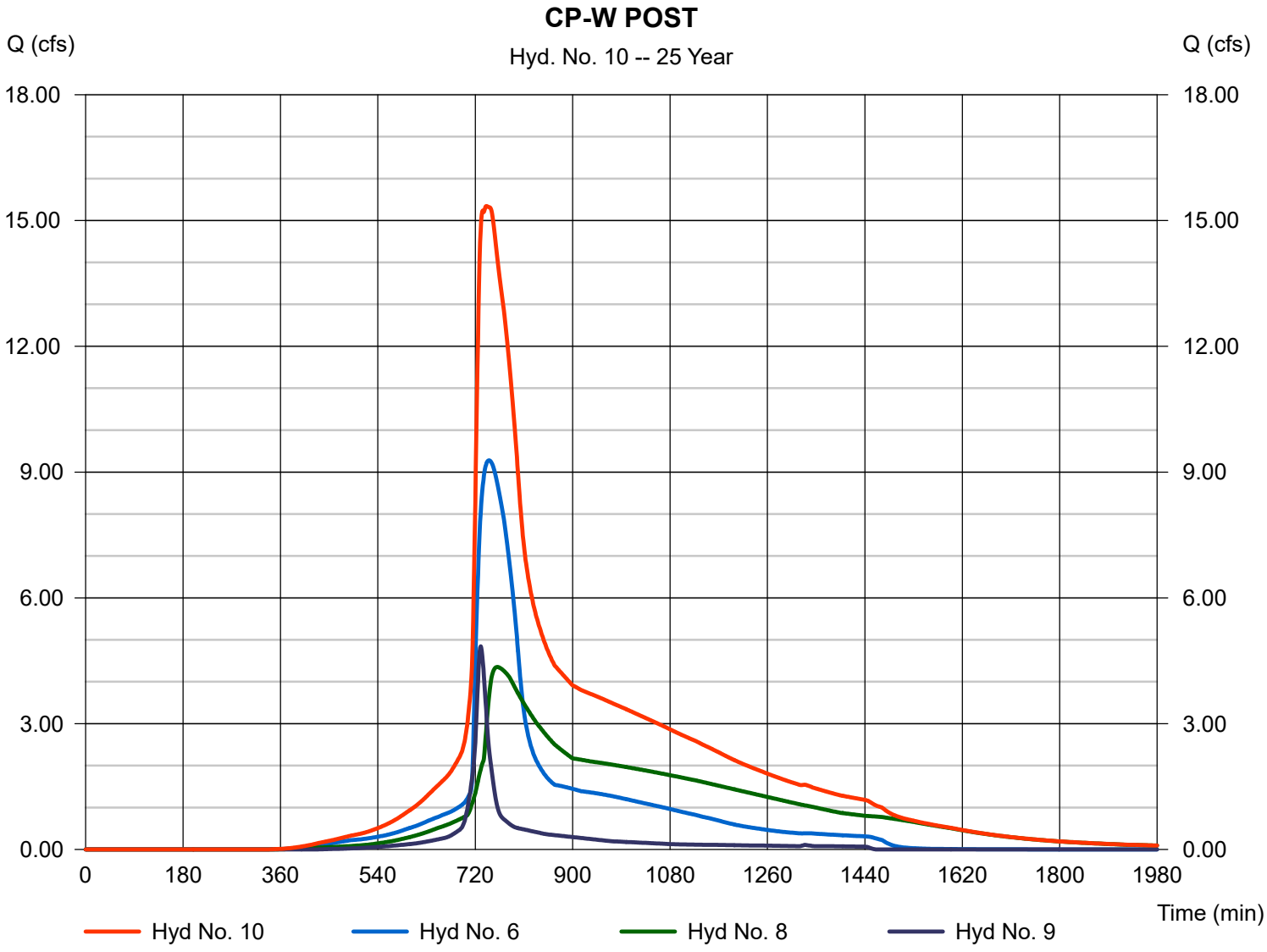


Hydrograph Report

Hyd. No. 10

CP-W POST

Hydrograph type	= Combine	Peak discharge	= 15.34 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 205,019 cuft
Inflow hyds.	= 6, 8, 9	Contrib. drain. area	= 1.330 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

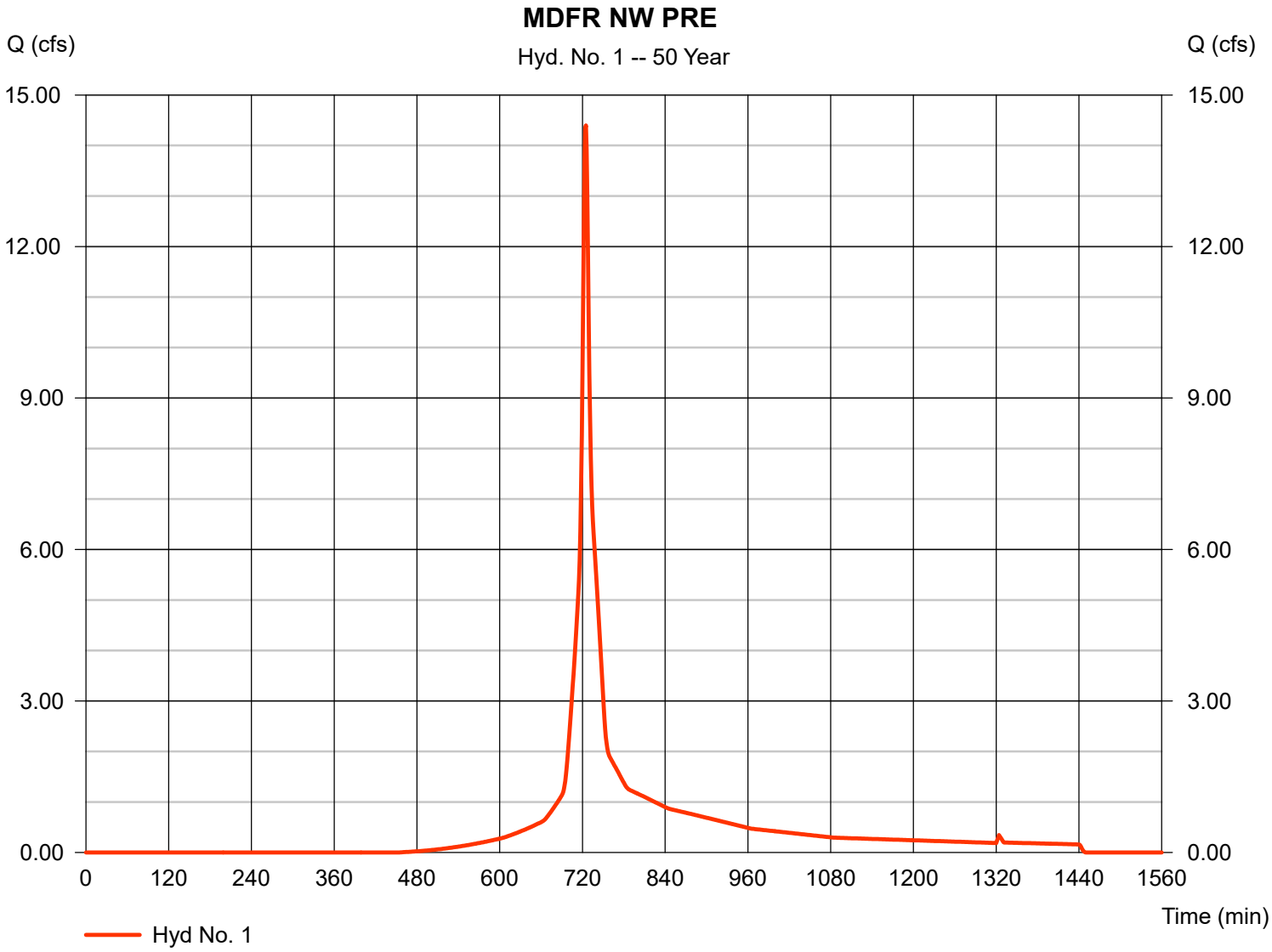
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	14.40	1	725	44,403	----	------	------	MDFR NW PRE
2	SCS Runoff	4.600	1	729	17,405	----	------	------	WESTERN SLOPE PRE
3	SCS Runoff	6.179	1	731	25,540	----	------	------	MDFR SW PRE
4	Combine	23.38	1	726	87,348	1, 2, 3	------	------	CP-W - PRE
5	SCS Runoff	25.83	1	729	100,088	----	------	------	MDFR NW POST
6	Reservoir	10.19	1	747	100,074	5	167.02	30,128	DET. BASIN NW
7	SCS Runoff	31.87	1	728	119,335	----	------	------	MDFR SW POST
8	Reservoir	5.149	1	760	119,253	7	168.81	58,848	DET. BASIN SW
9	SCS Runoff	5.804	1	730	23,054	----	------	------	WESTERN SLOPE POST
10	Combine	18.98	1	737	242,381	6, 8, 9	------	------	CP-W POST

Hydrograph Report

Hyd. No. 1

MDFR NW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.40 cfs
Storm frequency	=	50 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	44,403 cuft
Drainage area	=	2.810 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.50 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

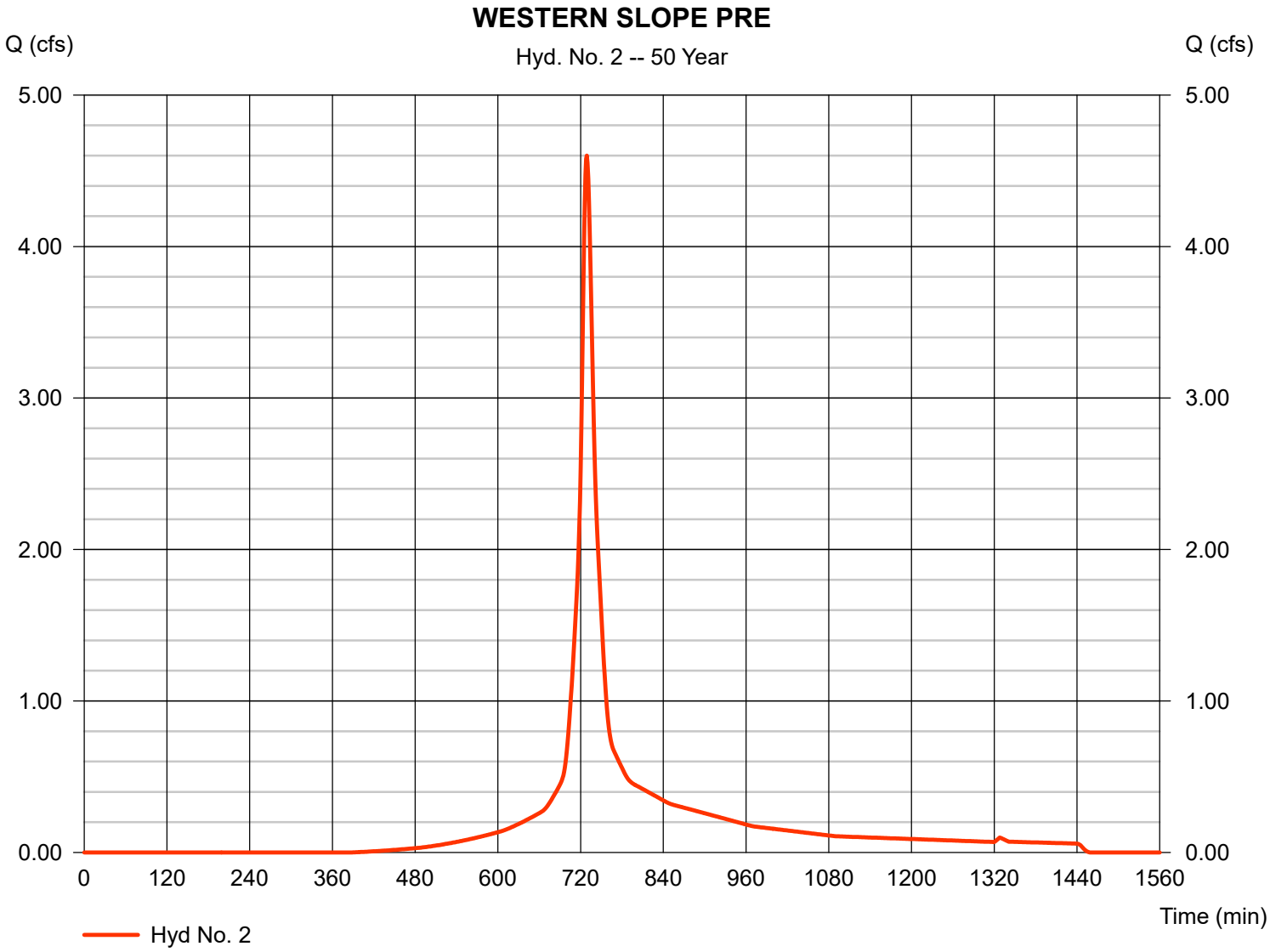


Hydrograph Report

Hyd. No. 2

WESTERN SLOPE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.600 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	17,405 cuft
Drainage area	=	1.020 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.30 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

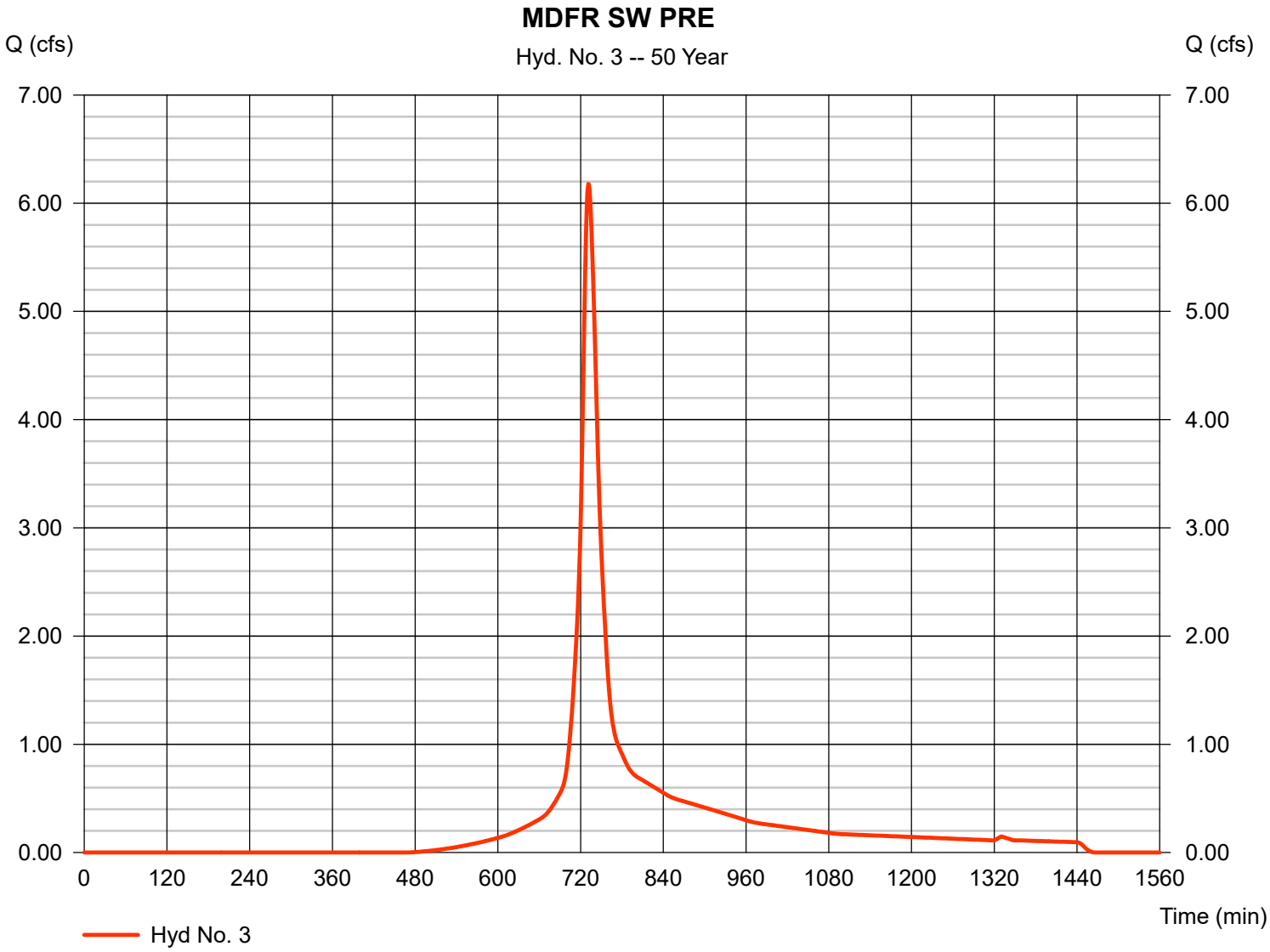


Hydrograph Report

Hyd. No. 3

MDFR SW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.179 cfs
Storm frequency	=	50 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	25,540 cuft
Drainage area	=	1.690 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.00 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

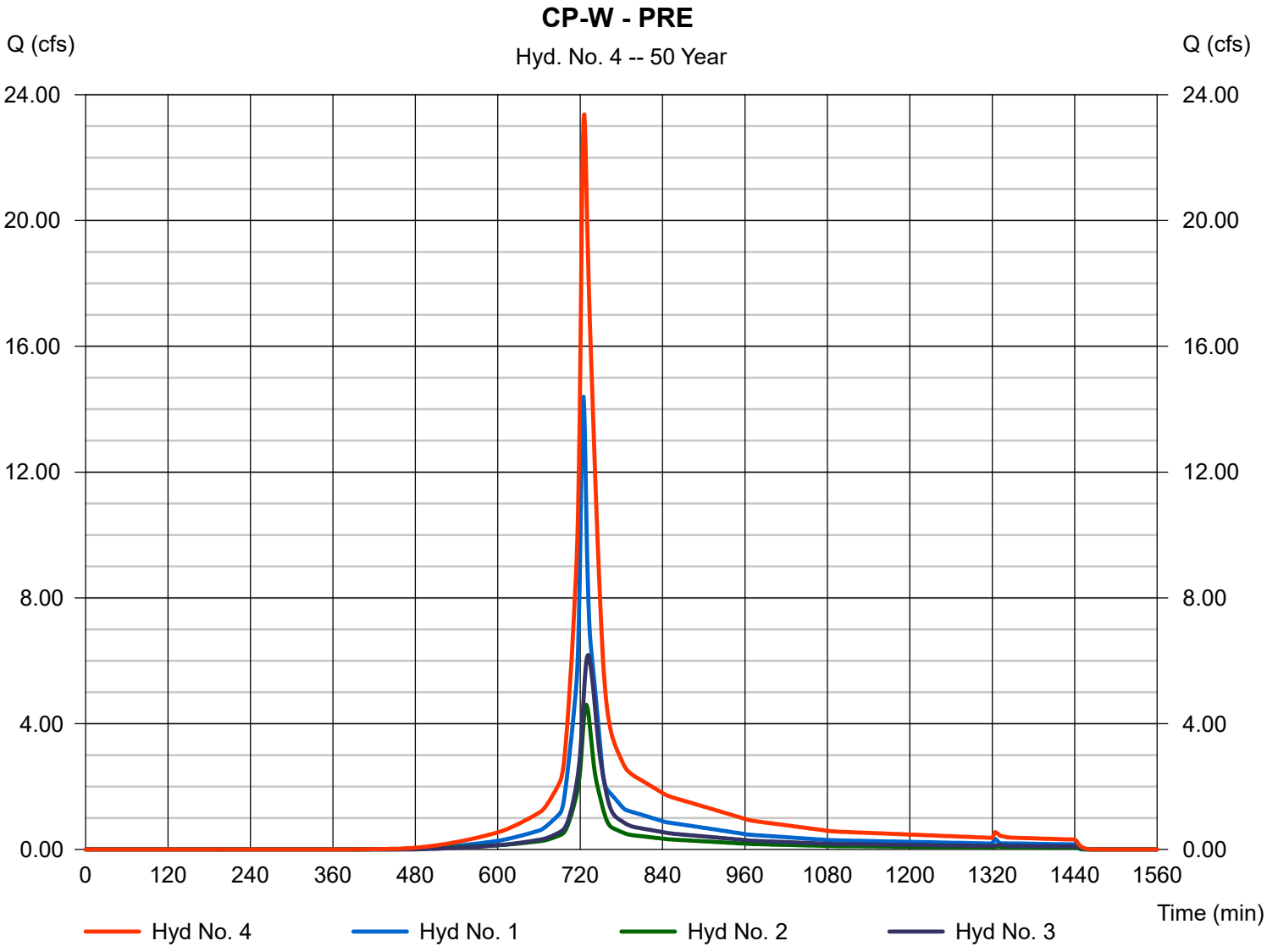


Hydrograph Report

Hyd. No. 4

CP-W - PRE

Hydrograph type	=	Combine	Peak discharge	=	23.38 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	87,348 cuft
Inflow hyds.	=	1, 2, 3	Contrib. drain. area	=	5.520 ac

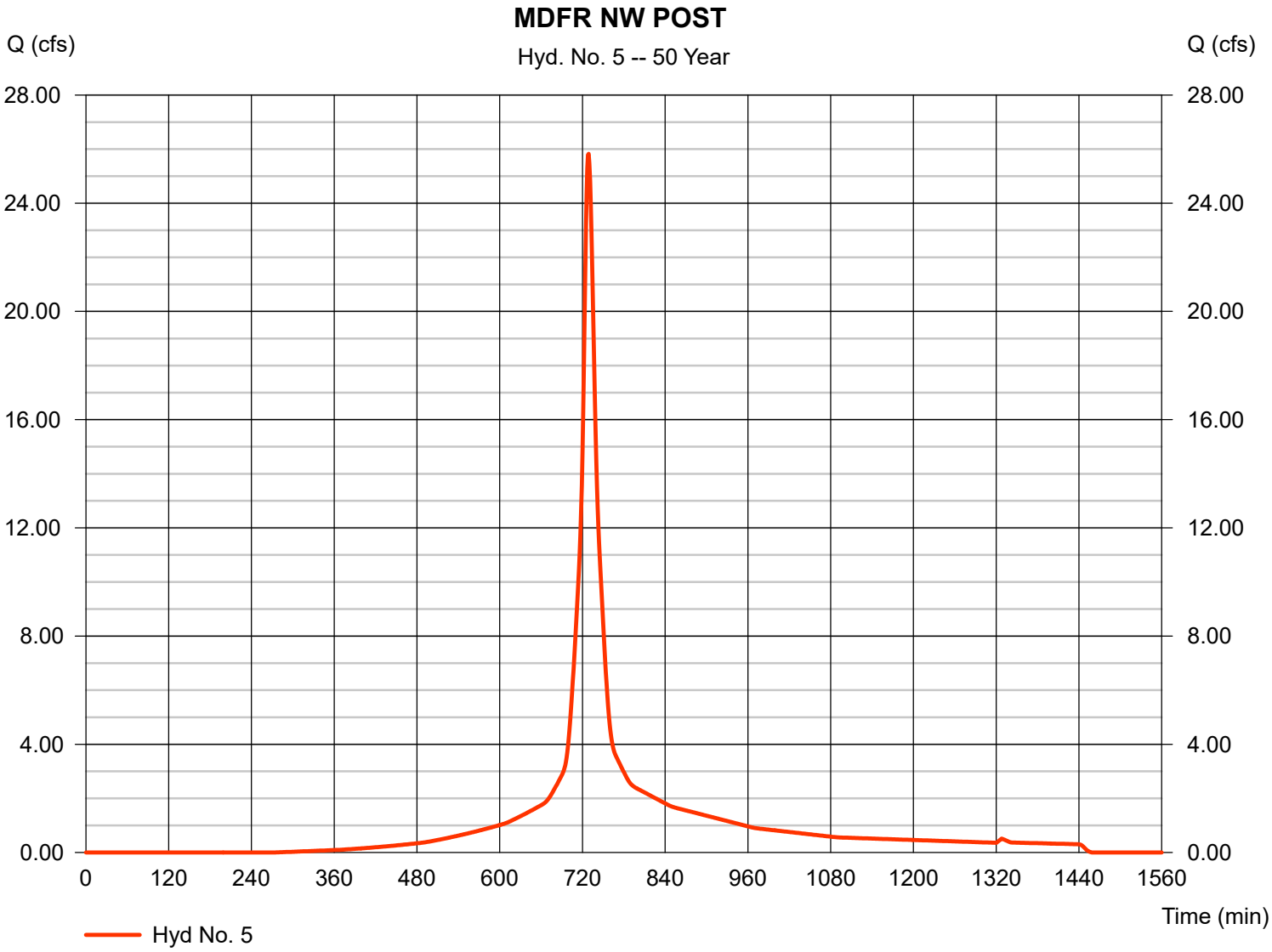


Hydrograph Report

Hyd. No. 5

MDFR NW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.83 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	100,088 cuft
Drainage area	=	5.030 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.90 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



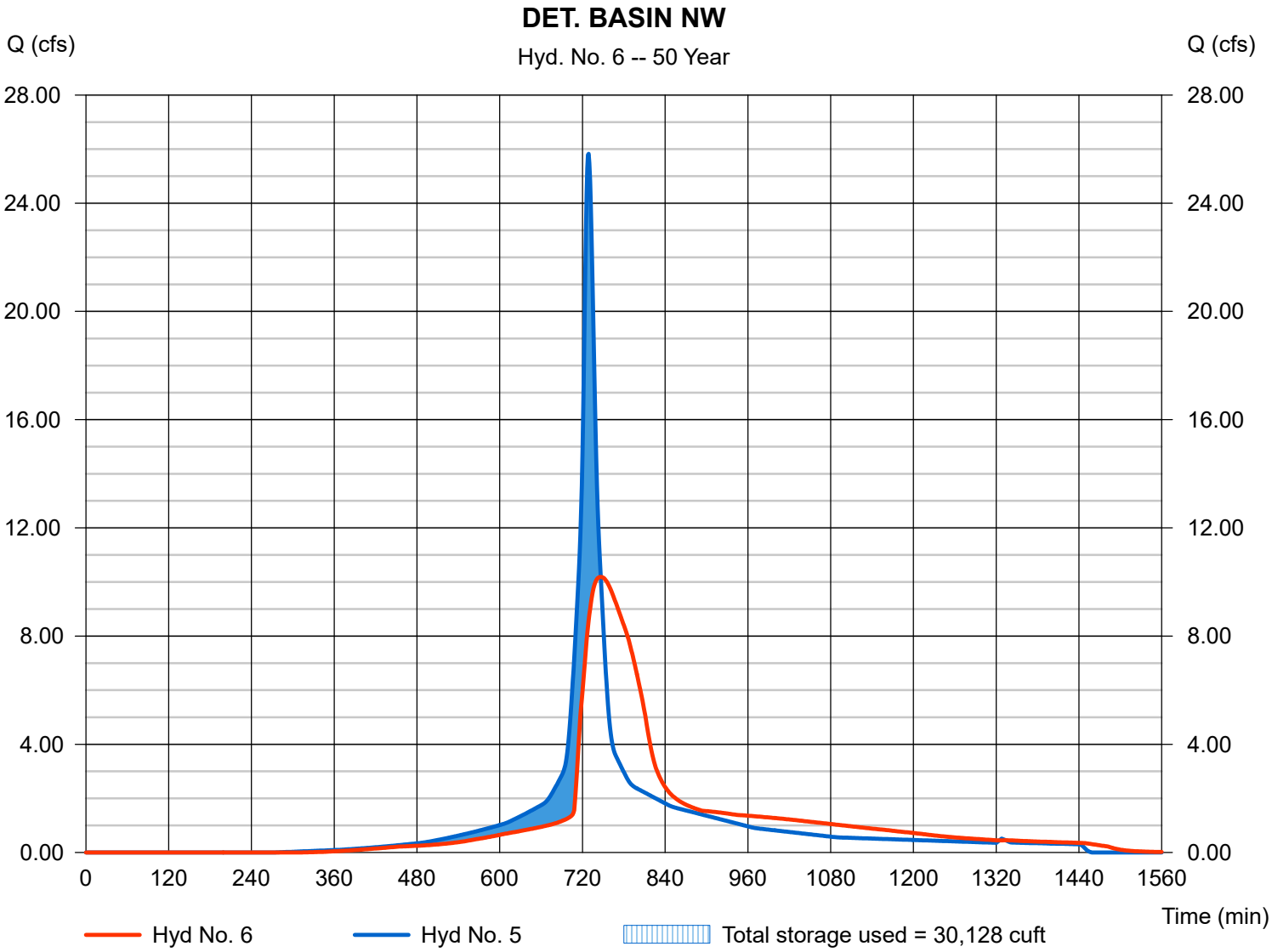
Hydrograph Report

Hyd. No. 6

DET. BASIN NW

Hydrograph type	=	Reservoir	Peak discharge	=	10.19 cfs
Storm frequency	=	50 yrs	Time to peak	=	747 min
Time interval	=	1 min	Hyd. volume	=	100,074 cuft
Inflow hyd. No.	=	5 - MDFR NW POST	Max. Elevation	=	167.02 ft
Reservoir name	=	PROP WQB #3 (MFDR DET. BASIN NW)	Max. Storage	=	30,128 cuft

Storage Indication method used.

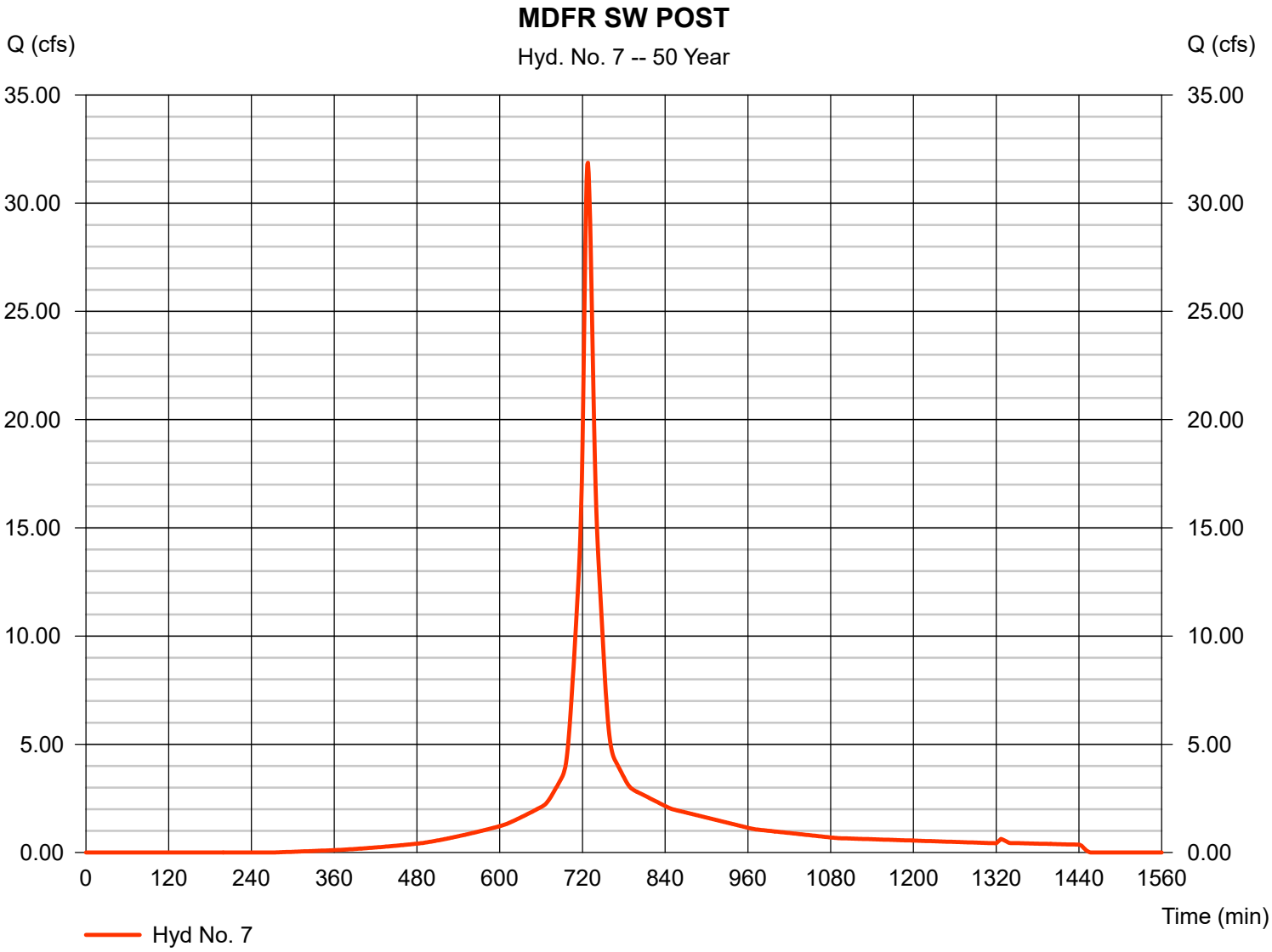


Hydrograph Report

Hyd. No. 7

MDFR SW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.87 cfs
Storm frequency	=	50 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	119,335 cuft
Drainage area	=	5.800 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.10 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



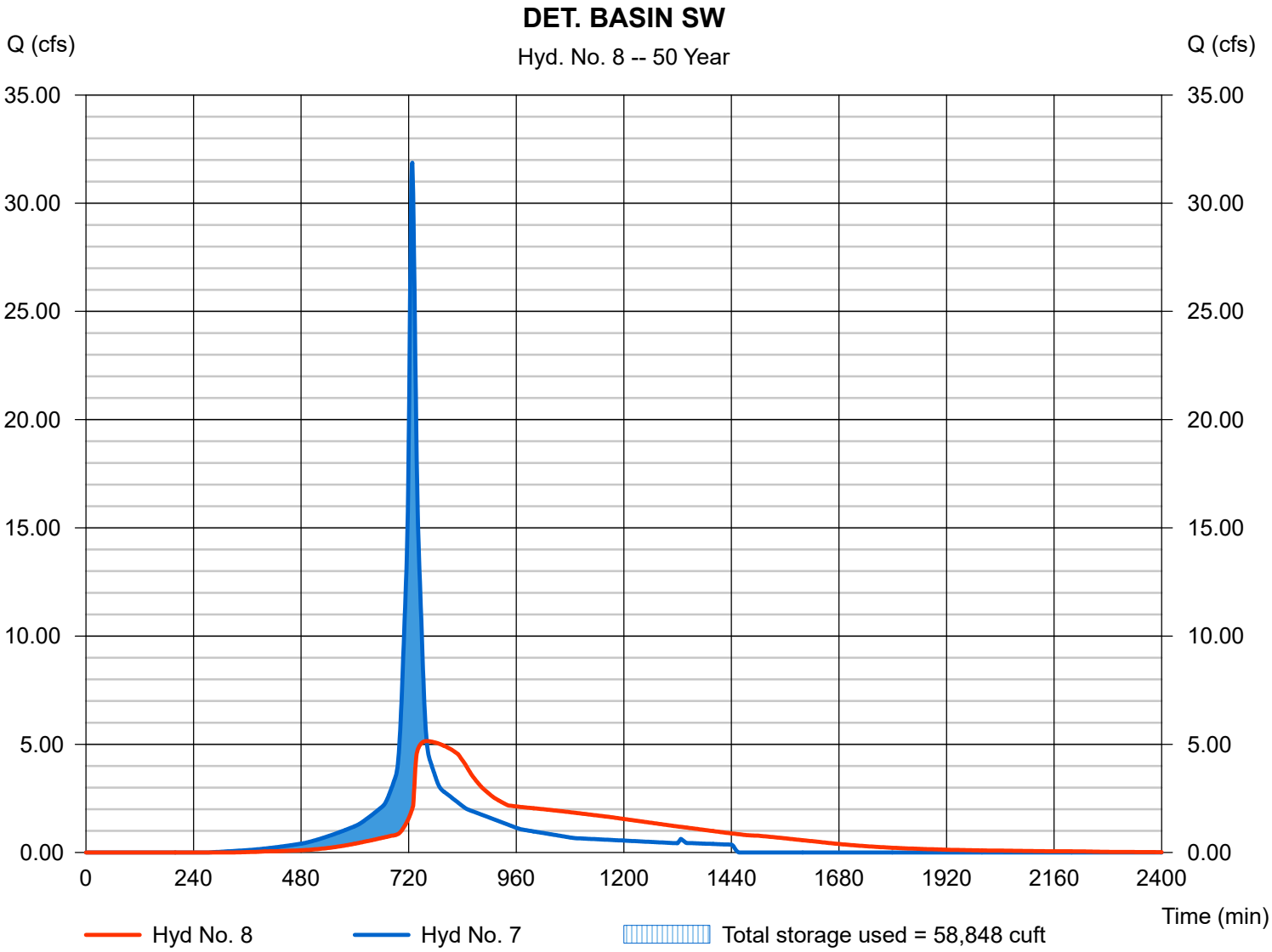
Hydrograph Report

Hyd. No. 8

DET. BASIN SW

Hydrograph type	=	Reservoir	Peak discharge	=	5.149 cfs
Storm frequency	=	50 yrs	Time to peak	=	760 min
Time interval	=	1 min	Hyd. volume	=	119,253 cuft
Inflow hyd. No.	=	7 - MDFR SW POST	Max. Elevation	=	168.81 ft
Reservoir name	=	PROP. WQB #2 (MFDR DET. BASIN SW)	Max. Storage	=	58,848 cuft

Storage Indication method used.

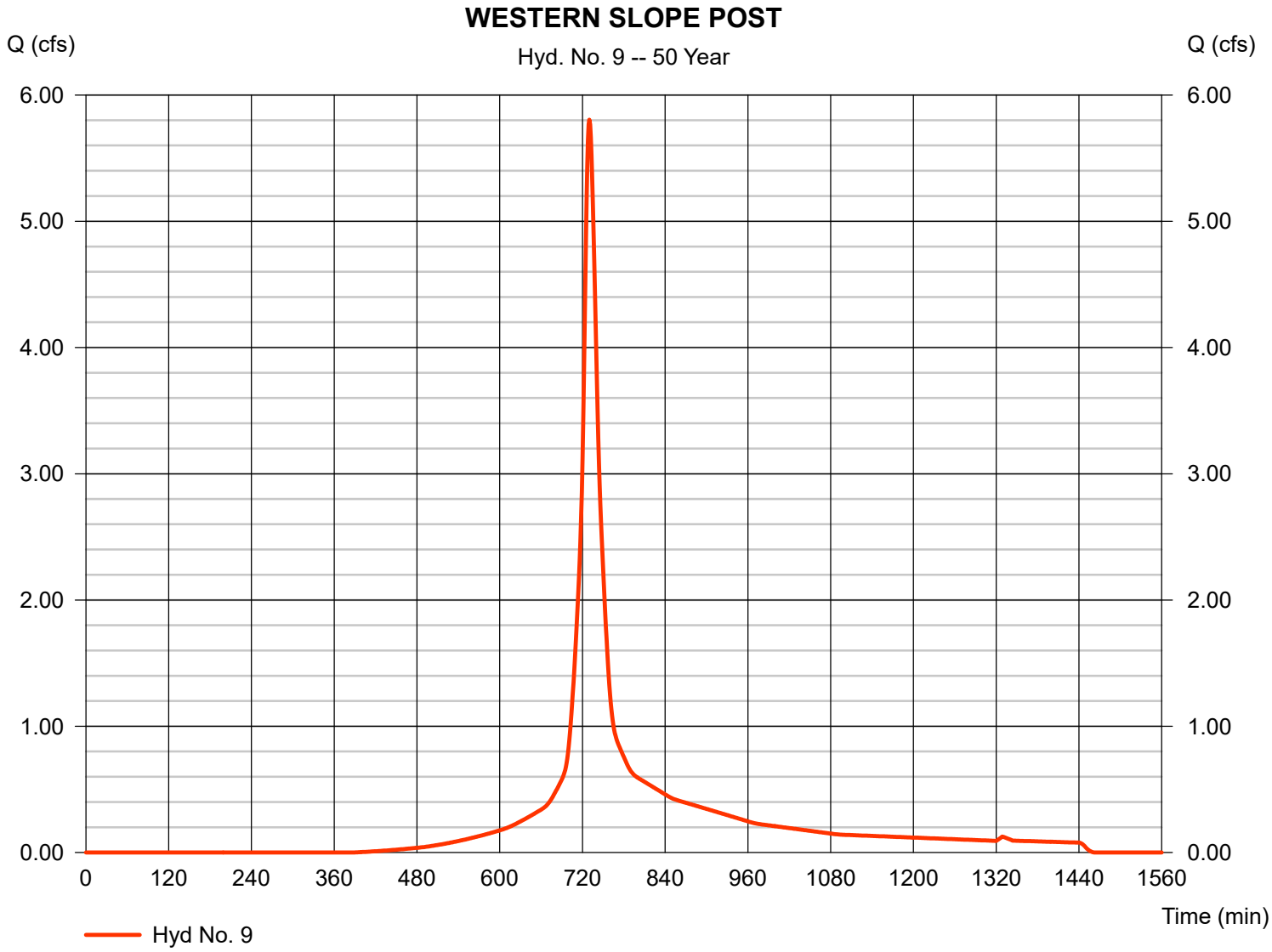


Hydrograph Report

Hyd. No. 9

WESTERN SLOPE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.804 cfs
Storm frequency	=	50 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	23,054 cuft
Drainage area	=	1.330 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

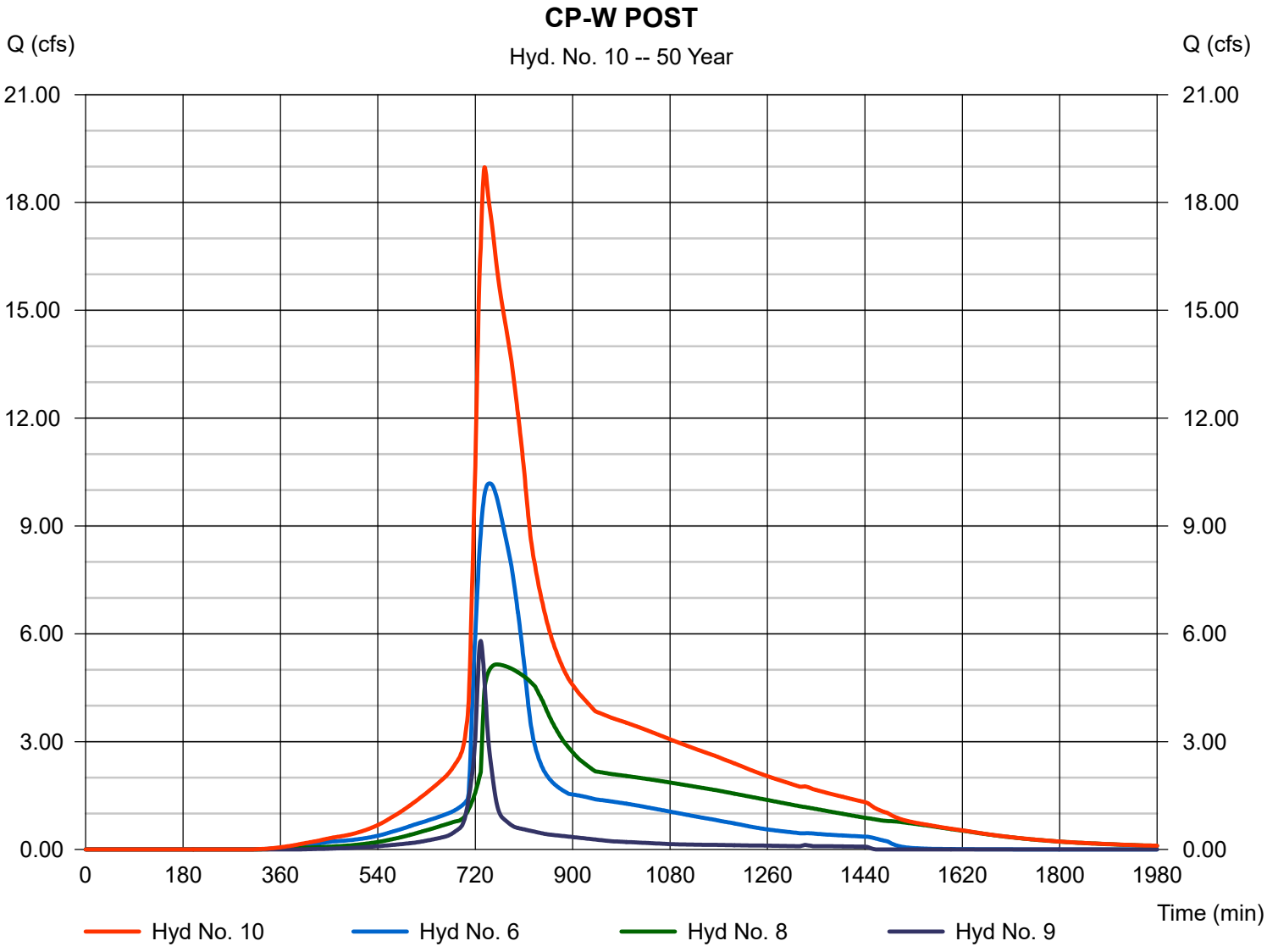


Hydrograph Report

Hyd. No. 10

CP-W POST

Hydrograph type	=	Combine	Peak discharge	=	18.98 cfs
Storm frequency	=	50 yrs	Time to peak	=	737 min
Time interval	=	1 min	Hyd. volume	=	242,381 cuft
Inflow hyds.	=	6, 8, 9	Contrib. drain. area	=	1.330 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

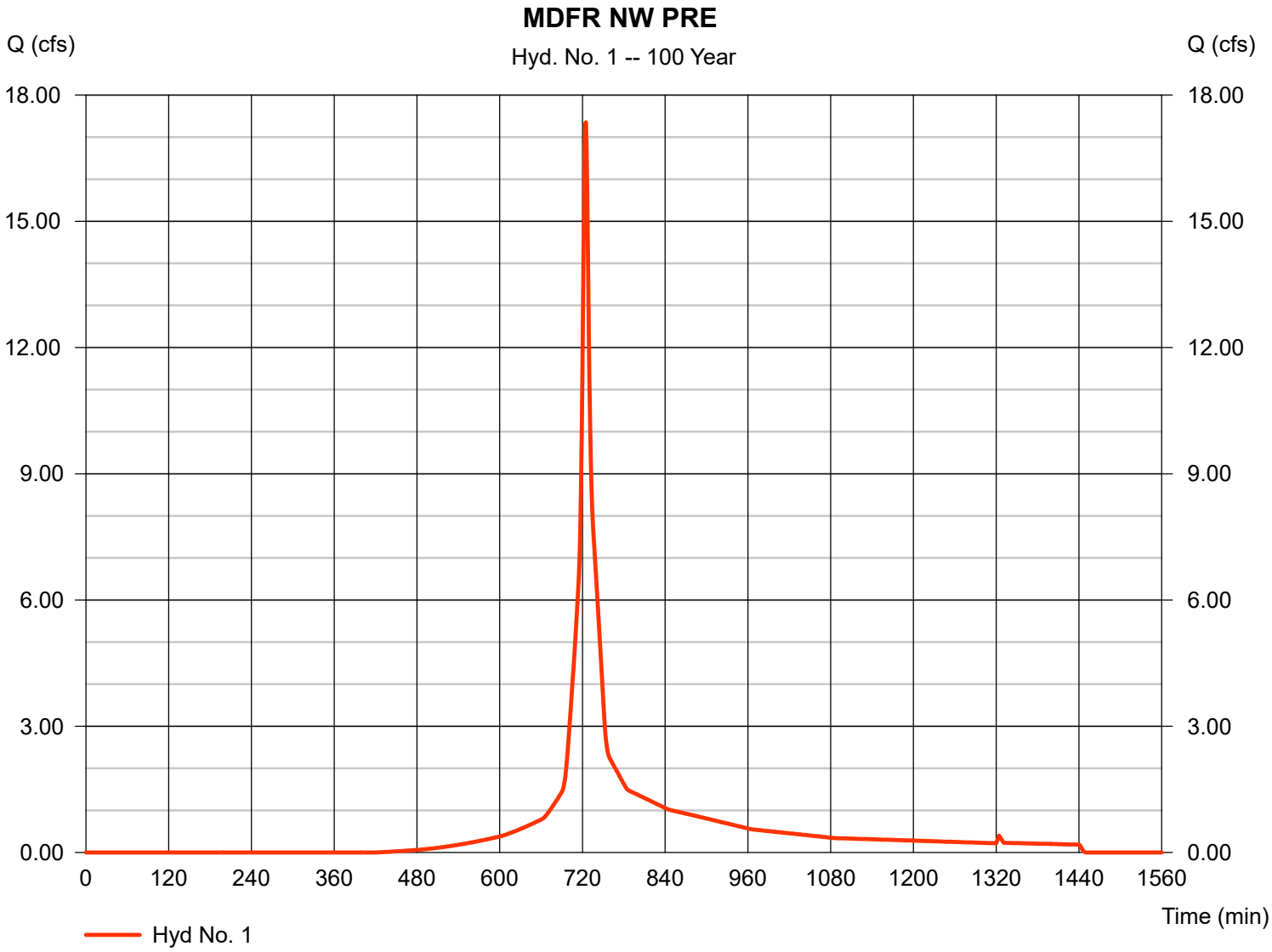
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	17.35	1	725	53,683	----	------	------	MDFR NW PRE
2	SCS Runoff	5.459	1	729	20,764	----	------	------	WESTERN SLOPE PRE
3	SCS Runoff	7.488	1	731	30,965	----	------	------	MDFR SW PRE
4	Combine	28.16	1	726	105,412	1, 2, 3	------	------	CP-W - PRE
5	SCS Runoff	30.05	1	729	117,404	----	------	------	MDFR NW POST
6	Reservoir	10.91	1	748	117,390	5	167.43	35,964	DET. BASIN NW
7	SCS Runoff	37.08	1	728	139,981	----	------	------	MDFR SW POST
8	Reservoir	5.639	1	761	139,896	7	169.33	69,383	DET. BASIN SW
9	SCS Runoff	6.890	1	730	27,504	----	------	------	WESTERN SLOPE POST
10	Combine	21.59	1	734	284,789	6, 8, 9	------	------	CP-W POST

Hydrograph Report

Hyd. No. 1

MDFR NW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.35 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	53,683 cuft
Drainage area	=	2.810 ac	Curve number	=	73
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.50 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

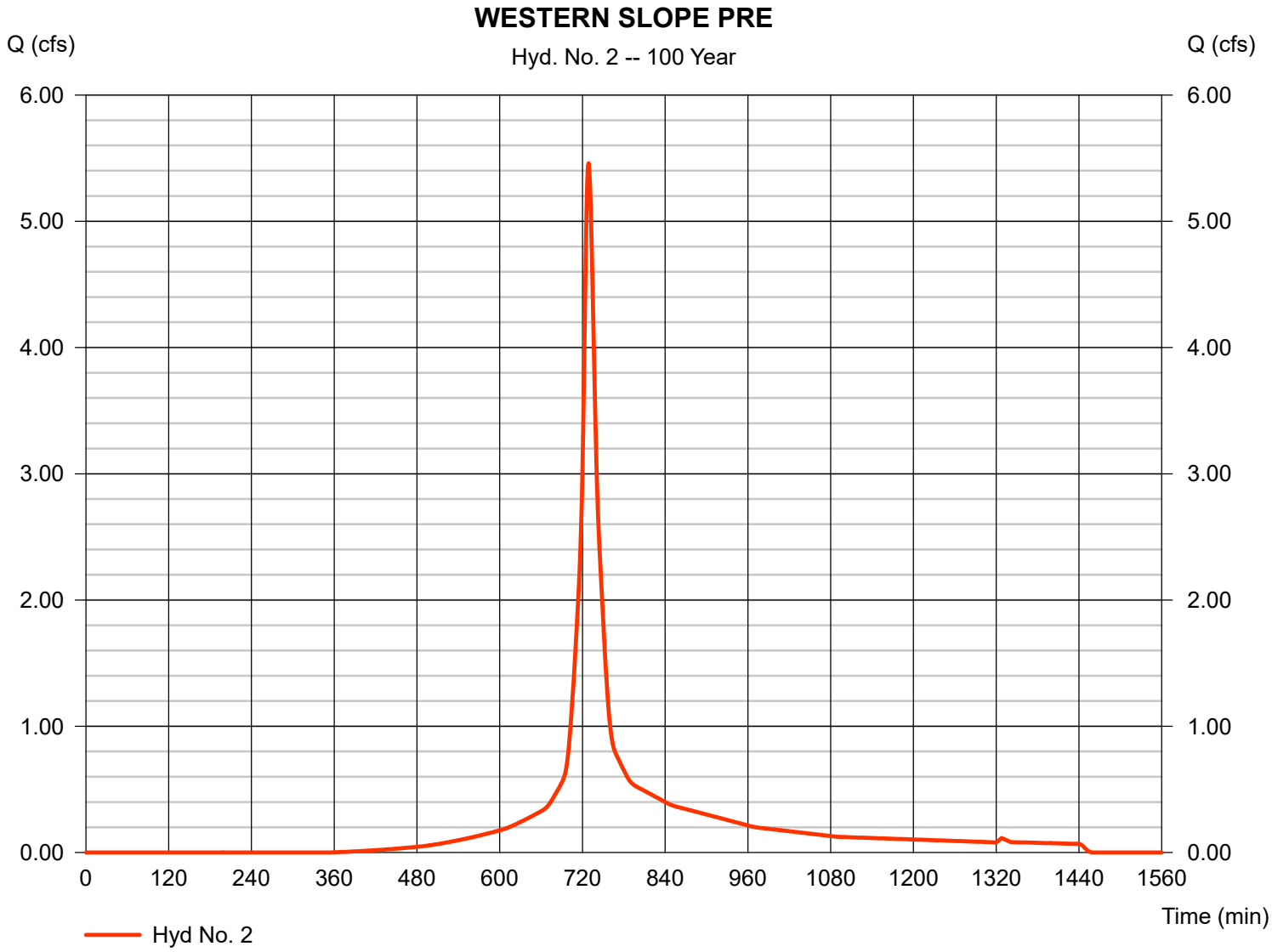


Hydrograph Report

Hyd. No. 2

WESTERN SLOPE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.459 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	20,764 cuft
Drainage area	=	1.020 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.30 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

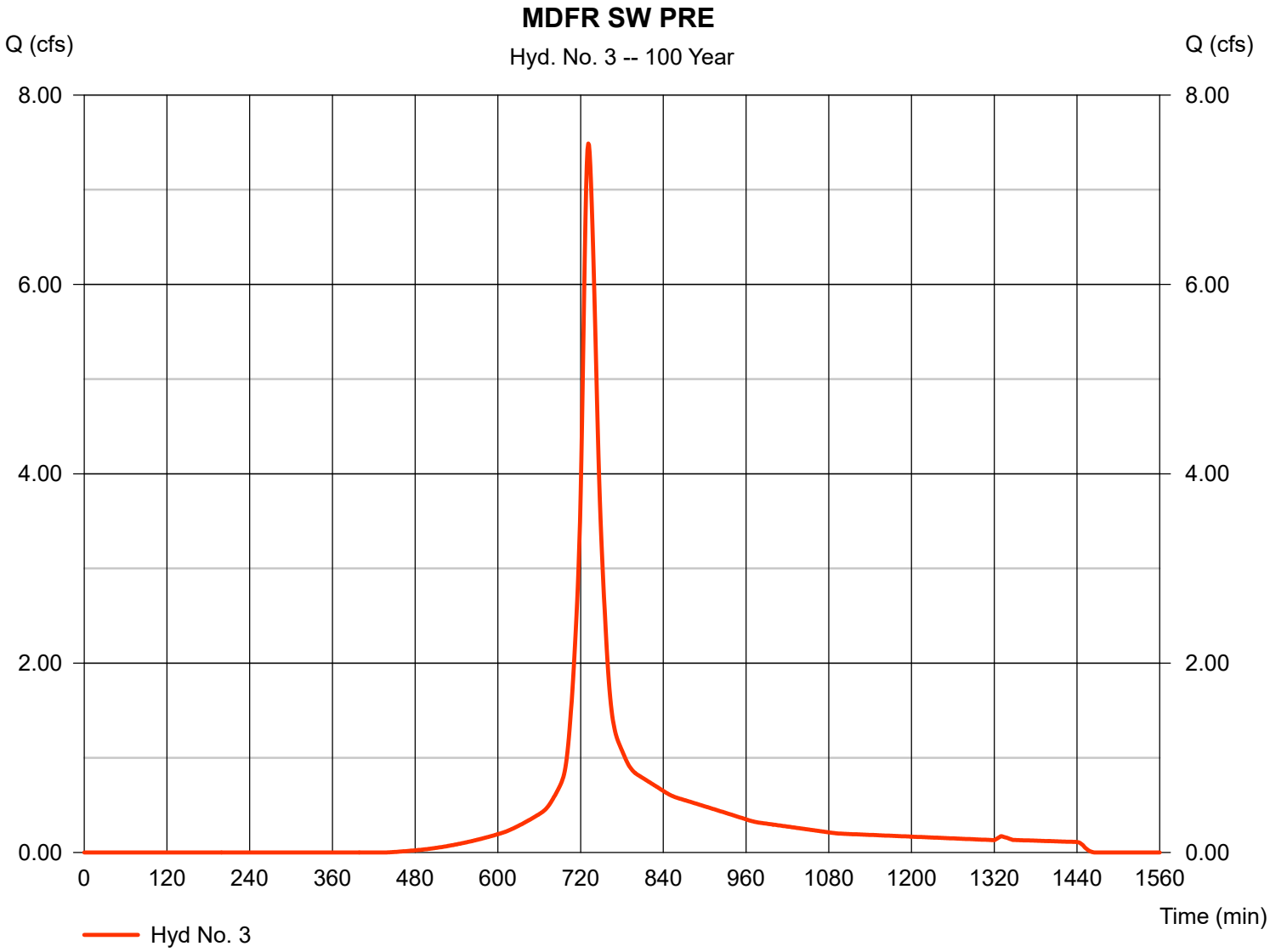


Hydrograph Report

Hyd. No. 3

MDFR SW PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.488 cfs
Storm frequency	=	100 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	30,965 cuft
Drainage area	=	1.690 ac	Curve number	=	72
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.00 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

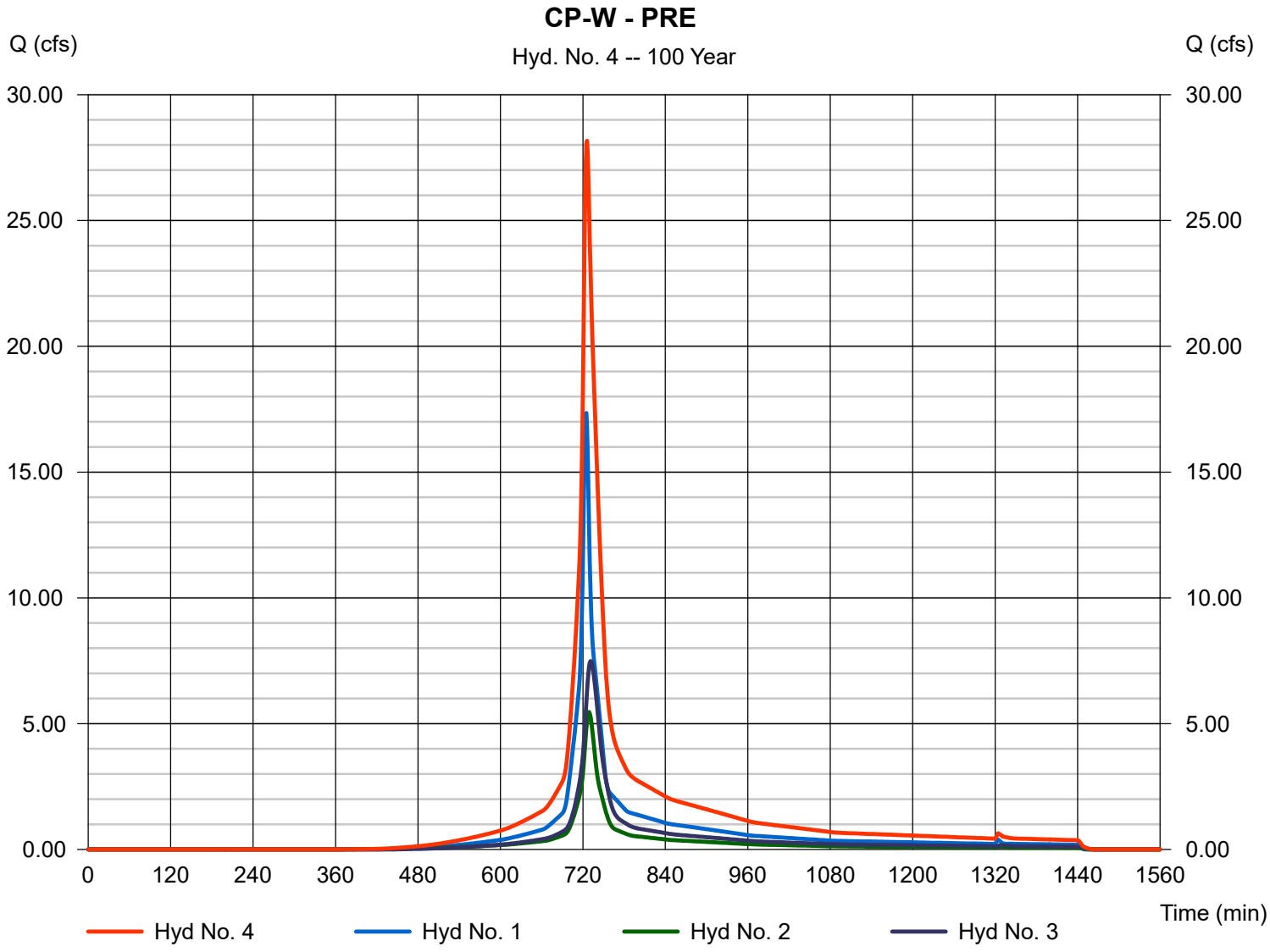


Hydrograph Report

Hyd. No. 4

CP-W - PRE

Hydrograph type	= Combine	Peak discharge	= 28.16 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 105,412 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 5.520 ac

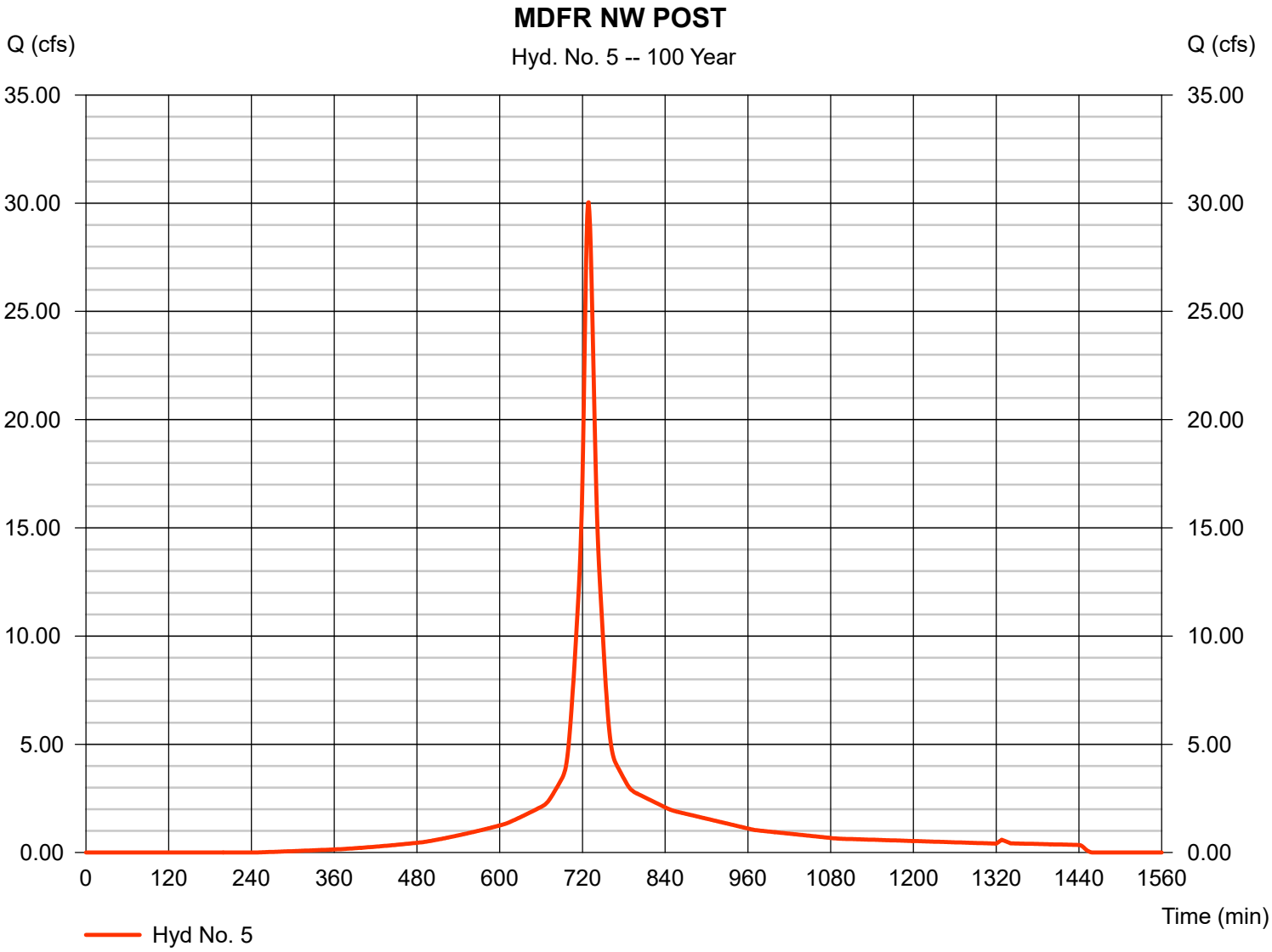


Hydrograph Report

Hyd. No. 5

MDFR NW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.05 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	117,404 cuft
Drainage area	=	5.030 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.90 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

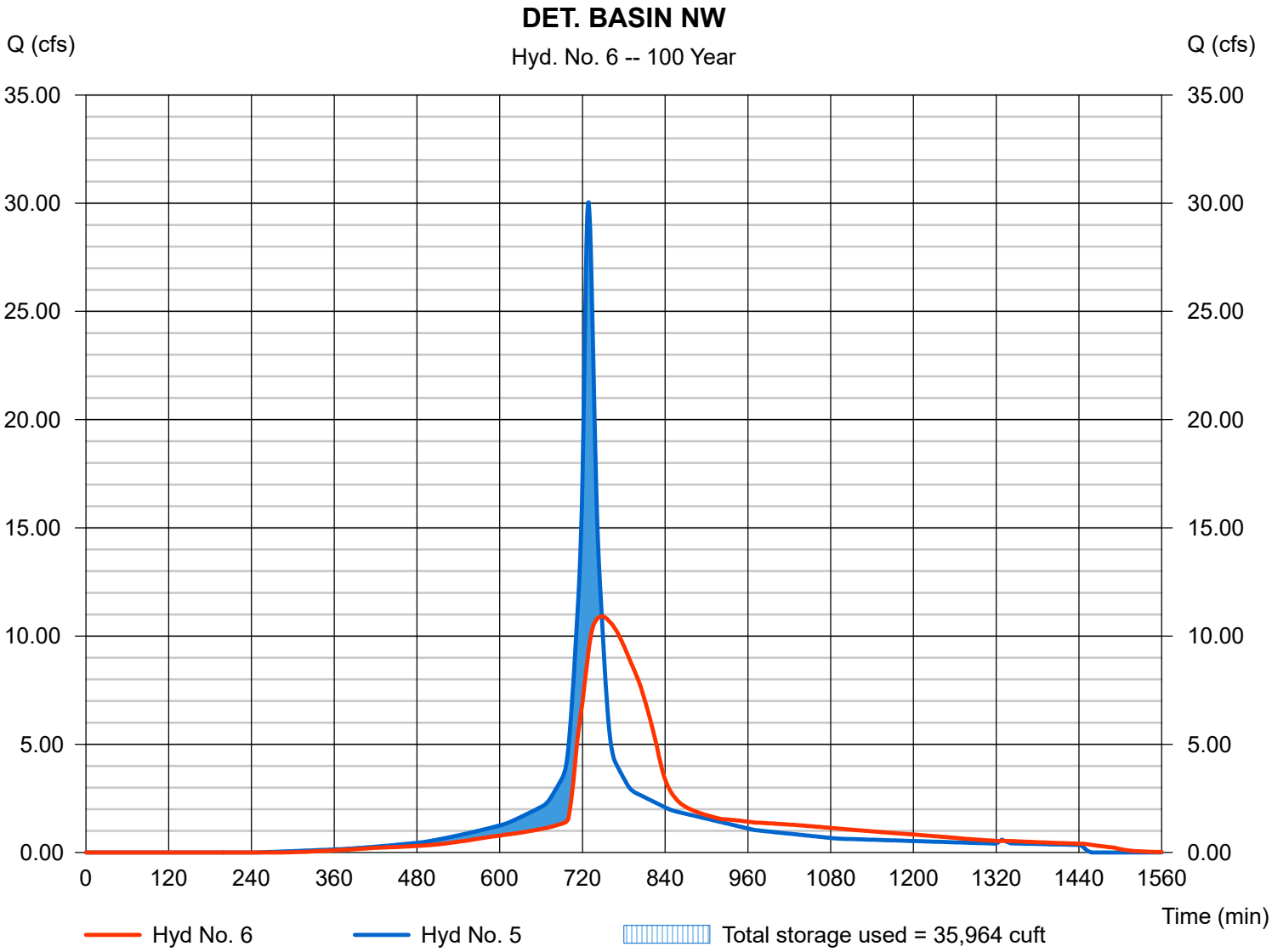
Hydraflow Hydrographs by Intelisolve v9.1 Wednesday, Mar 22, 2023

Hyd. No. 6

DET. BASIN NW

Hydrograph type	=	Reservoir	Peak discharge	=	10.91 cfs
Storm frequency	=	100 yrs	Time to peak	=	748 min
Time interval	=	1 min	Hyd. volume	=	117,390 cuft
Inflow hyd. No.	=	5 - MDFR NW POST	Max. Elevation	=	167.43 ft
Reservoir name	=	PROP WQB #3 (MFDR DET. BASIN NW)	Max. Storage	=	35,964 cuft

Storage Indication method used.

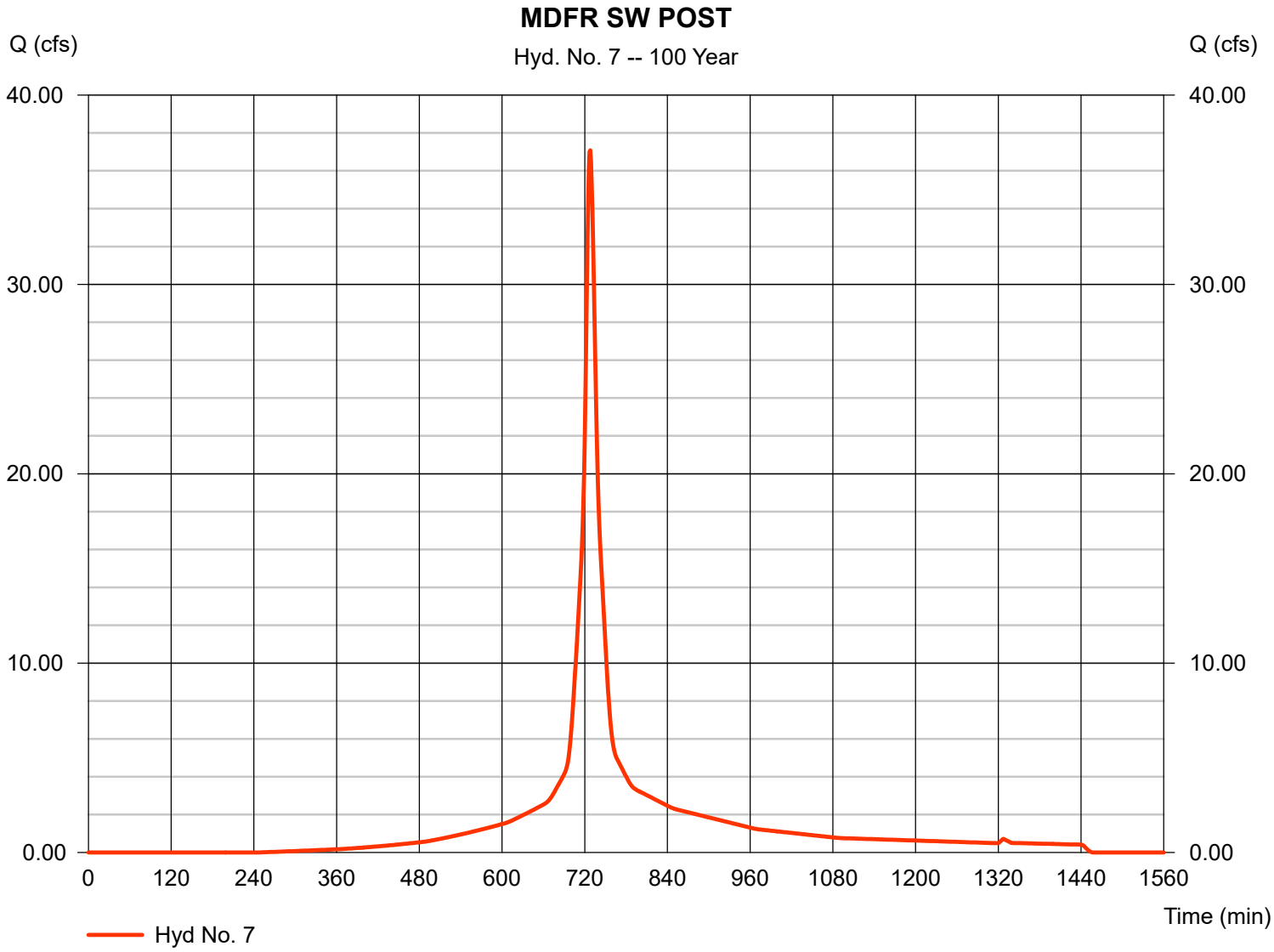


Hydrograph Report

Hyd. No. 7

MDFR SW POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.08 cfs
Storm frequency	=	100 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	139,981 cuft
Drainage area	=	5.800 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	11.10 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

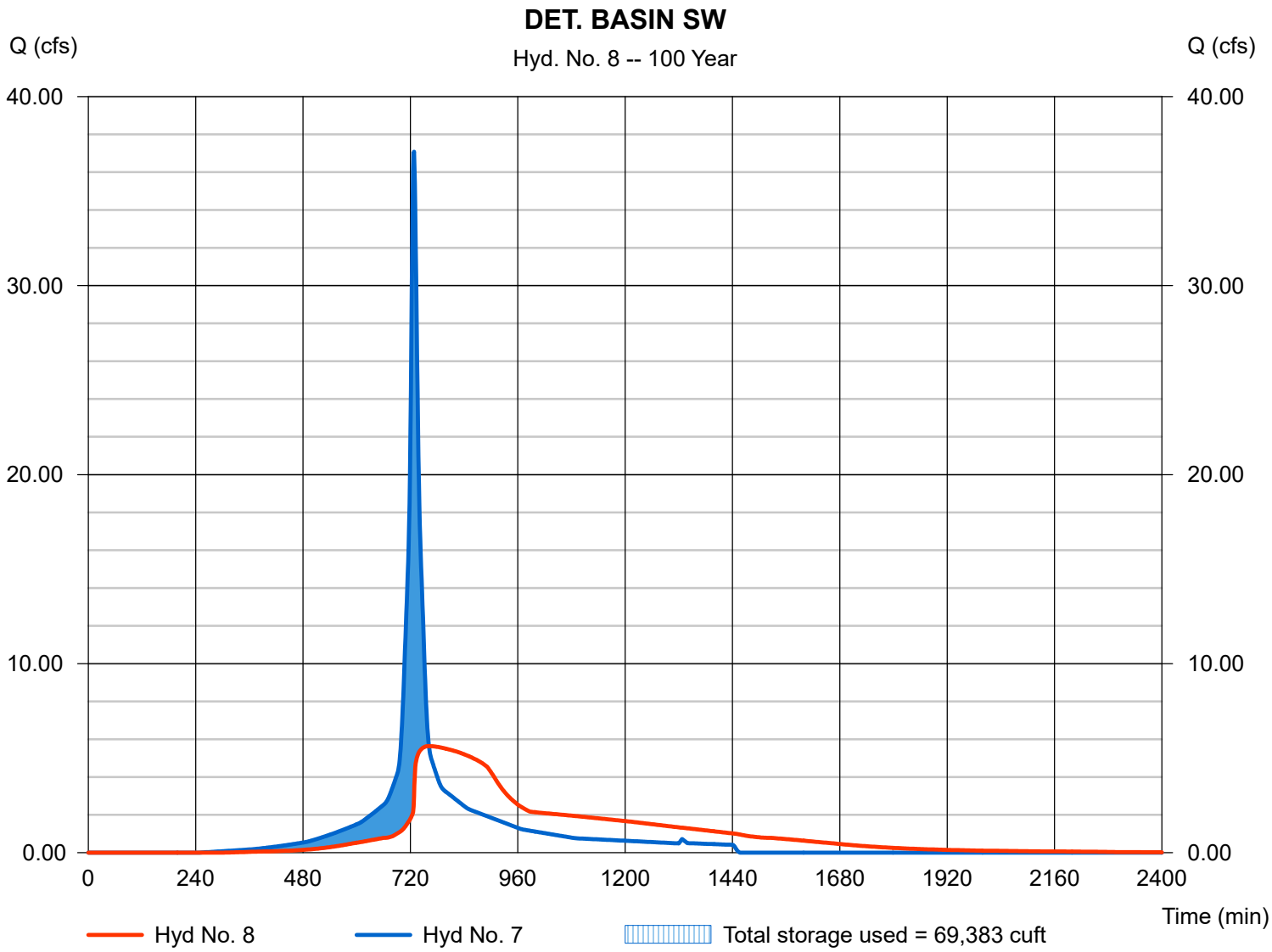
Hydraflow Hydrographs by Intelisolve v9.1 Wednesday, Mar 22, 2023

Hyd. No. 8

DET. BASIN SW

Hydrograph type	=	Reservoir	Peak discharge	=	5.639 cfs
Storm frequency	=	100 yrs	Time to peak	=	761 min
Time interval	=	1 min	Hyd. volume	=	139,896 cuft
Inflow hyd. No.	=	7 - MDFR SW POST	Max. Elevation	=	169.33 ft
Reservoir name	=	PROP. WQB #2 (MFDR DET. BASIN SW)	Max. Storage	=	69,383 cuft

Storage Indication method used.

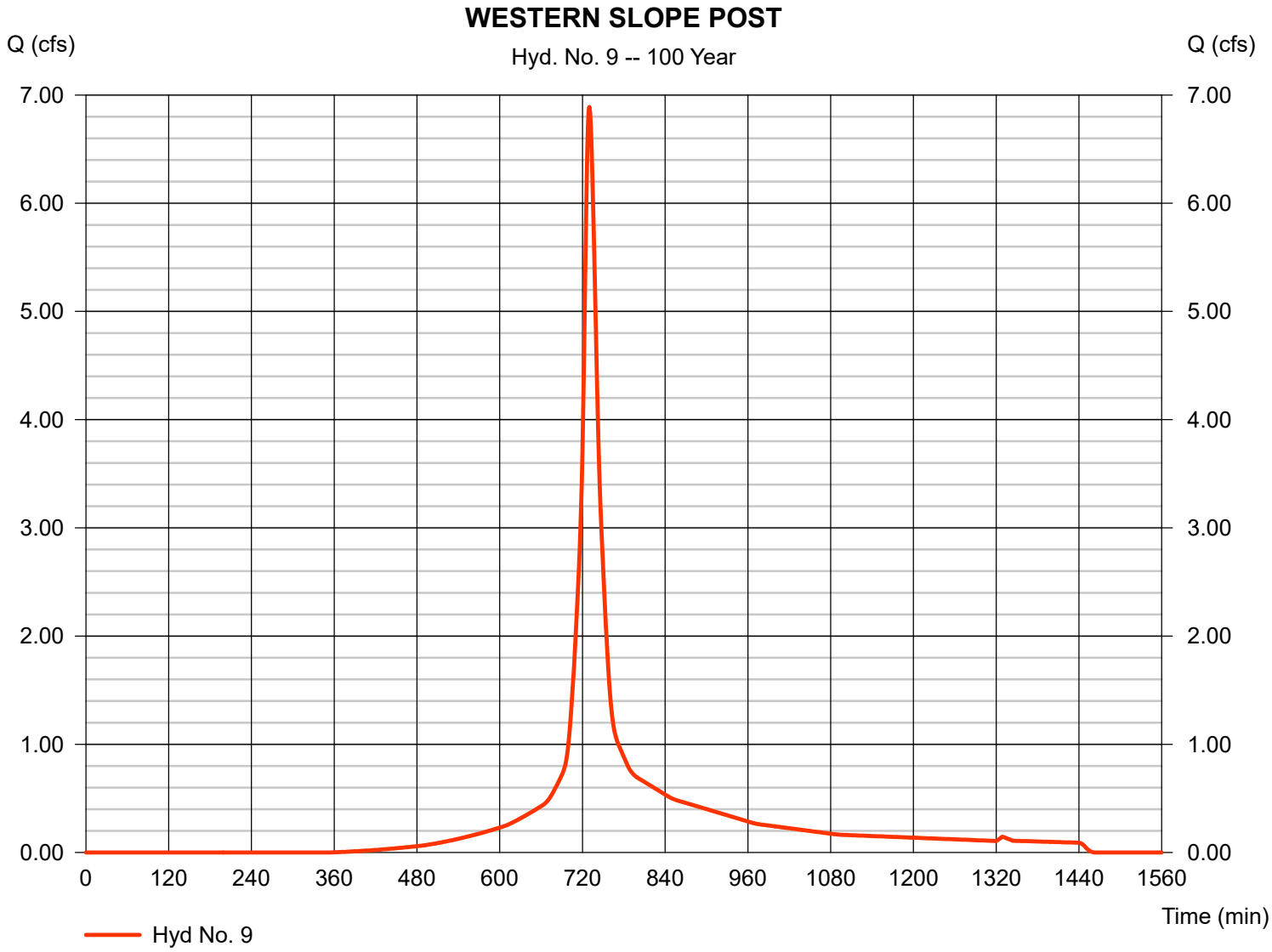


Hydrograph Report

Hyd. No. 9

WESTERN SLOPE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.890 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	27,504 cuft
Drainage area	=	1.330 ac	Curve number	=	78
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	13.90 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

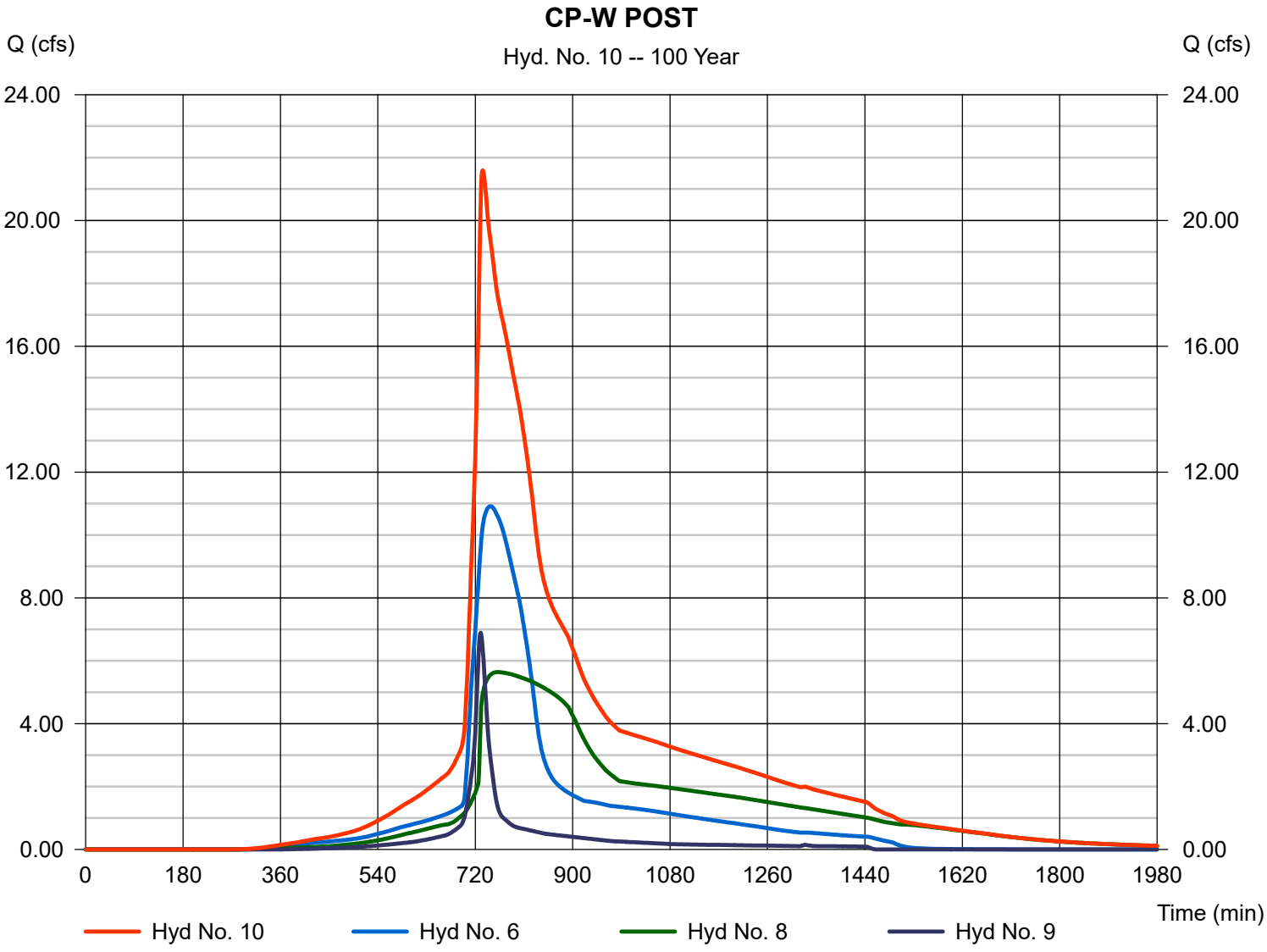


Hydrograph Report

Hyd. No. 10

CP-W POST

Hydrograph type	= Combine	Peak discharge	= 21.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 284,789 cuft
Inflow hyds.	= 6, 8, 9	Contrib. drain. area	= 1.330 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	20.5089	3.8000	0.7318	--------
2	25.4250	4.1000	0.7380	--------
3	0.0000	0.0000	0.0000	--------
5	29.9317	3.7000	0.7174	--------
10	36.1004	3.9000	0.7226	--------
25	42.5438	3.8000	0.7161	--------
50	49.0391	4.1000	0.7202	--------
100	53.1753	3.7000	0.7130	--------

File name: BRAMBLE BUSH 2022-11-16.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	4.18	3.00	2.40	2.02	1.75	1.56	1.41	1.29	1.19	1.11	1.04	0.98
2	4.98	3.61	2.88	2.43	2.11	1.88	1.70	1.56	1.44	1.34	1.25	1.18
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.34	4.58	3.66	3.09	2.69	2.40	2.17	1.99	1.84	1.72	1.61	1.52
10	7.44	5.39	4.32	3.64	3.18	2.83	2.56	2.35	2.17	2.02	1.90	1.79
25	8.96	6.50	5.21	4.40	3.84	3.42	3.10	2.84	2.63	2.45	2.30	2.17
50	10.00	7.29	5.86	4.96	4.33	3.86	3.50	3.21	2.97	2.77	2.60	2.45
100	11.37	8.23	6.59	5.57	4.86	4.33	3.92	3.60	3.33	3.11	2.92	2.75

Tc = time in minutes. Values may exceed 60.

Precip. file name: BRAMBLE BUSH 2022-11-16.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	2.59	3.24	0.00	4.32	5.21	6.44	7.33	8.33
SCS 6-Hr	1.82	2.21	0.00	2.84	3.37	4.09	4.63	5.21
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

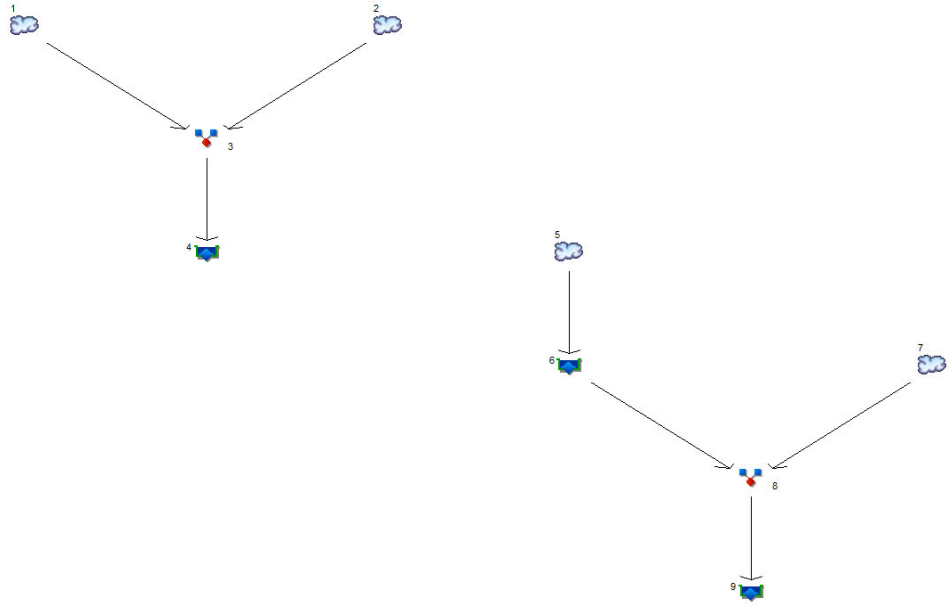
Hydraflow Table of Contents

25 - Year

50 - Year

100 - Year

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	MDFR NE PRE
2	SCS Runoff	NE WETLAND PRE
3	Combine	INFLOW WETLAND STORAGE EAST ST. CULVERT
4	Reservoir	CP-E PRE
5	SCS Runoff	MDFR NE POST
6	Reservoir	OUTFLOW DET. BASIN NE
7	SCS Runoff	NE WETLAND POST
8	Combine	INFLOW WET STORAGE
9	Reservoir	CP-E POST

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

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	-------	-------	13.03	-------	23.35	32.61	46.03	56.01	67.37	MDFR NE PRE
2	SCS Runoff	-------	-------	4.814	-------	8.613	12.00	16.89	20.51	24.64	NE WETLAND PRE
3	Combine	1, 2	-------	15.68	-------	28.06	39.19	55.32	67.36	81.07	INFLOW WETLAND STORAGE EAS
4	Reservoir	3	-------	6.551	-------	10.57	13.04	14.45	16.19	18.02	CP-E PRE
5	SCS Runoff	-------	-------	15.78	-------	23.82	30.52	39.78	46.47	53.95	MDFR NE POST
6	Reservoir	5	-------	4.678	-------	6.846	8.174	21.30	34.33	46.90	OUTFLOW DET. BASIN NE
7	SCS Runoff	-------	-------	9.516	-------	15.31	20.26	27.21	32.28	37.97	NE WETLAND POST
8	Combine	6, 7	-------	12.39	-------	19.74	26.02	34.63	56.43	78.42	INFLOW WET STORAGE
9	Reservoir	8	-------	5.929	-------	8.390	10.35	13.11	13.84	15.72	CP-E POST

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

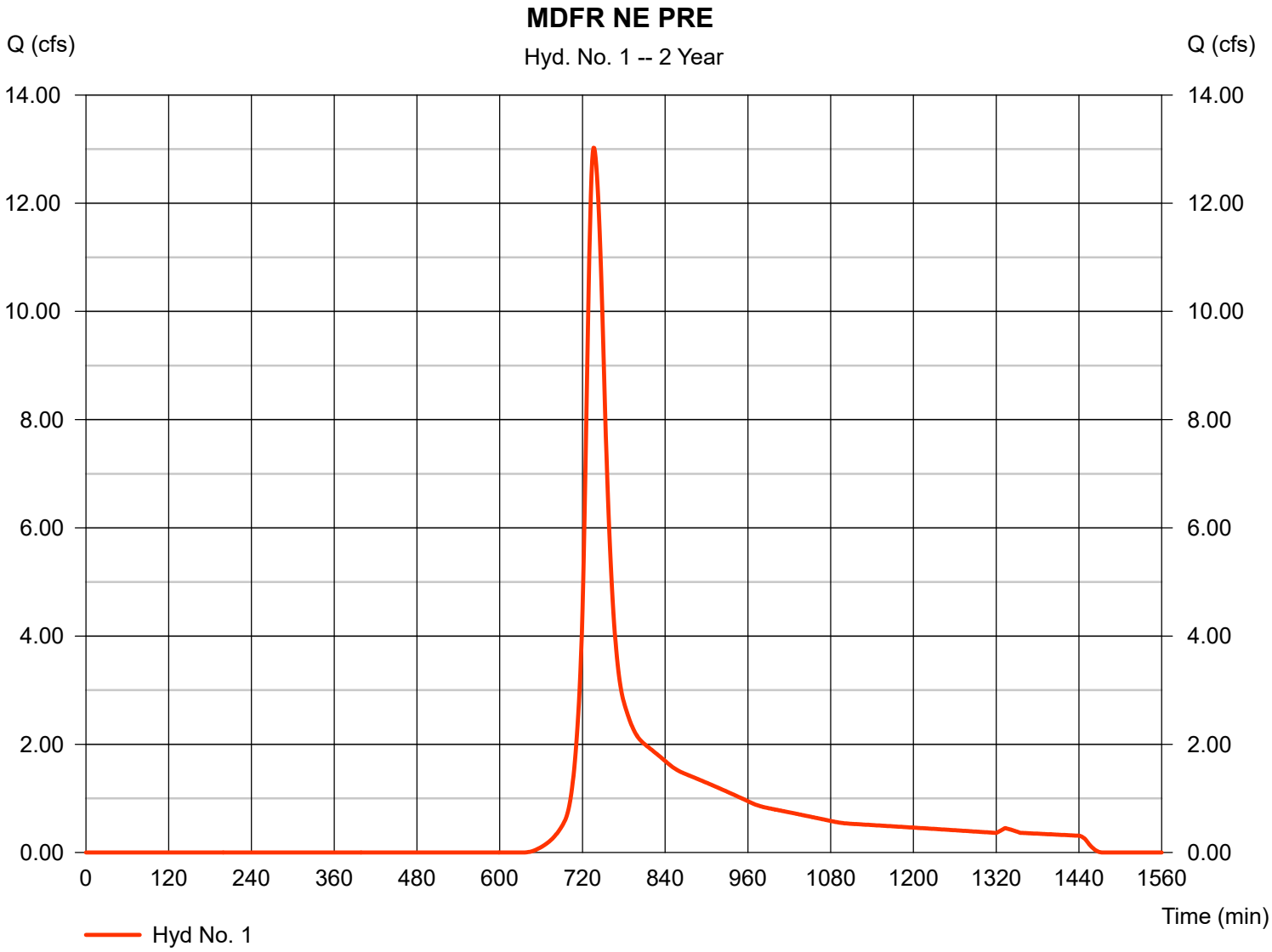
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	13.03	1	736	62,935	----	------	------	MDFR NE PRE
2	SCS Runoff	4.814	1	726	16,230	----	------	------	NE WETLAND PRE
3	Combine	15.68	1	735	79,165	1, 2	------	------	INFLOW WETLAND STORAGE EAS
4	Reservoir	6.551	1	760	78,096	3	164.21	22,265	CP-E PRE
5	SCS Runoff	15.78	1	731	65,222	----	------	------	MDFR NE POST
6	Reservoir	4.678	1	758	65,153	5	165.45	24,735	OUTFLOW DET. BASIN NE
7	SCS Runoff	9.516	1	731	37,911	----	------	------	NE WETLAND POST
8	Combine	12.39	1	731	103,064	6, 7	------	------	INFLOW WET STORAGE
9	Reservoir	5.929	1	774	101,994	8	164.15	18,813	CP-E POST

Hydrograph Report

Hyd. No. 1

MDFR NE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.03 cfs
Storm frequency	=	2 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	62,935 cuft
Drainage area	=	16.140 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.60 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 1

MDFR NE PRE

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.060	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	0.00	0.00	
Land slope (%)	= 0.33	0.00	0.00	
Travel Time (min)	**= 9.47 +**	**0.00 +**	**0.00 =**	**9.47**
Shallow Concentrated Flow				
Flow length (ft)	= 1104.00	0.00	0.00	
Watercourse slope (%)	= 0.89	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 1.52	0.00	0.00	
Travel Time (min)	**= 12.09 +**	**0.00 +**	**0.00 =**	**12.09**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

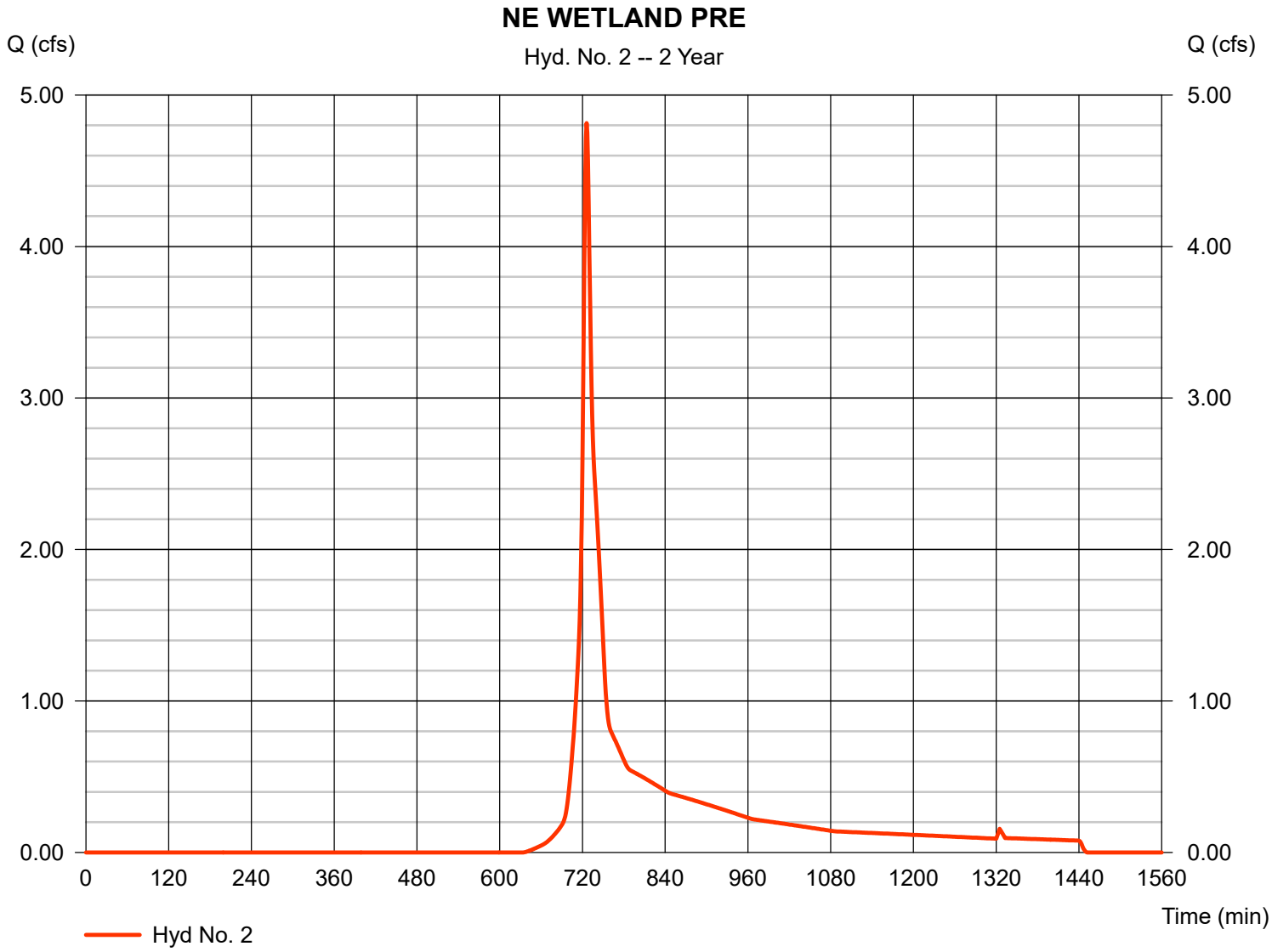
Total Travel Time, Tc ..... 21.60 min

Hydrograph Report

Hyd. No. 2

NE WETLAND PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.814 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	16,230 cuft
Drainage area	=	4.310 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 2

NE WETLAND PRE

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		0.00		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 6.08**	**+**	**0.00**	**+**	**0.00**	**=**	**6.08**
Shallow Concentrated Flow							
Flow length (ft)	= 72.00		0.00		0.00		
Watercourse slope (%)	= 0.82		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 1.46		0.00		0.00		
Travel Time (min)	**= 0.82**	**+**	**0.00**	**+**	**0.00**	**=**	**0.82**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

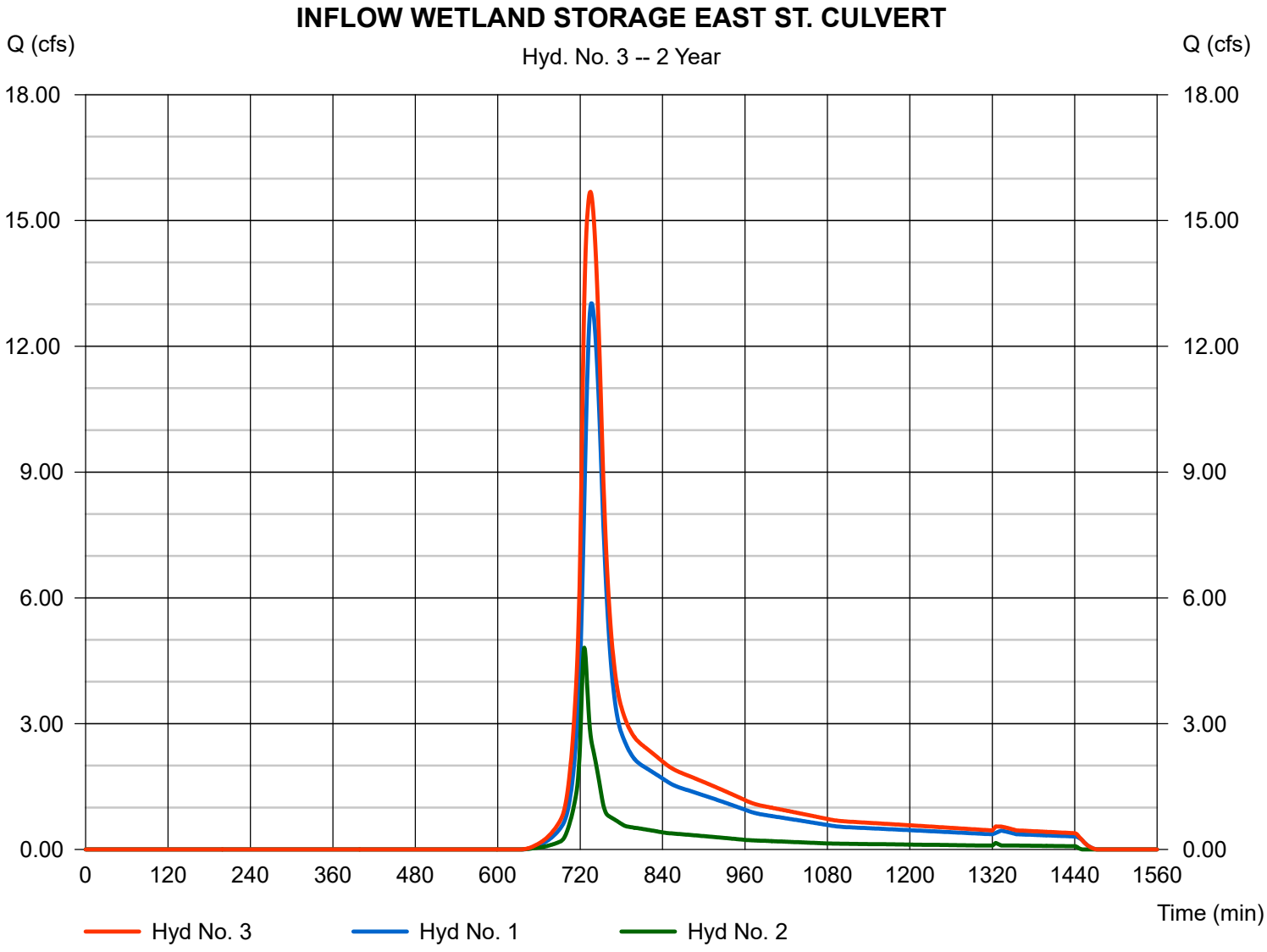
Total Travel Time, Tc ..... 6.90 min

Hydrograph Report

Hyd. No. 3

INFLOW WETLAND STORAGE EAST ST. CULVERT

Hydrograph type	= Combine	Peak discharge	= 15.68 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 79,165 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 20.450 ac



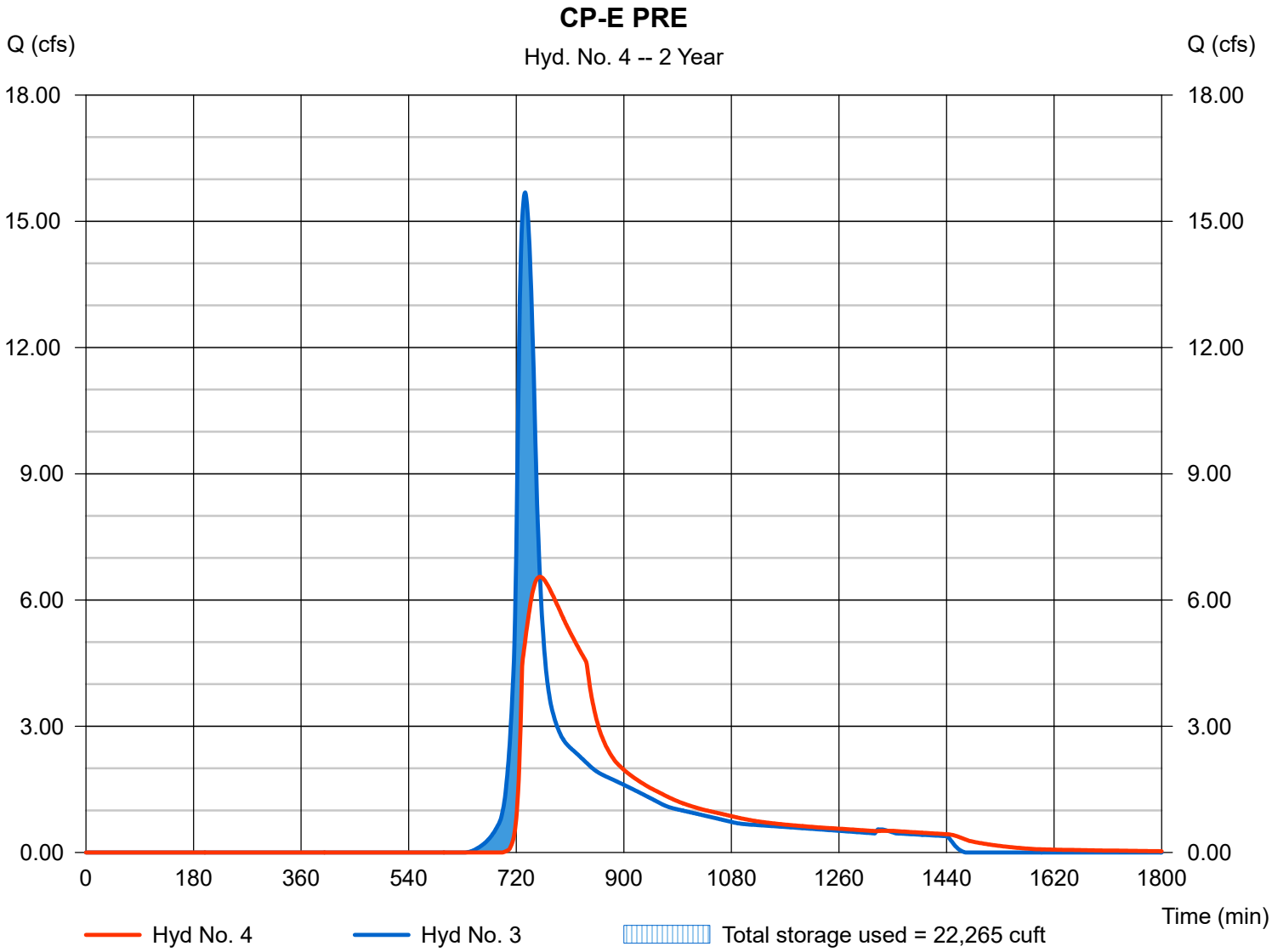
Hydrograph Report

Hyd. No. 4

CP-E PRE

Hydrograph type	=	Reservoir	Peak discharge	=	6.551 cfs
Storm frequency	=	2 yrs	Time to peak	=	760 min
Time interval	=	1 min	Hyd. volume	=	78,096 cuft
Inflow hyd. No.	=	3 - INFLOW WETLAND STORAGE EAST ST CULVERT	Max. Elevation	=	164.21 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	22,265 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - East St. Culvert Headwater Storage

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	163.00	n/a	0	0
1.00	164.00	n/a	10,650	10,650
2.00	165.00	n/a	54,850	65,500
3.00	166.00	n/a	136,000	201,500

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 163.09	0.00	0.00	0.00
Length (ft)	= 60.00	0.00	0.00	0.00
Slope (%)	= 1.00	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

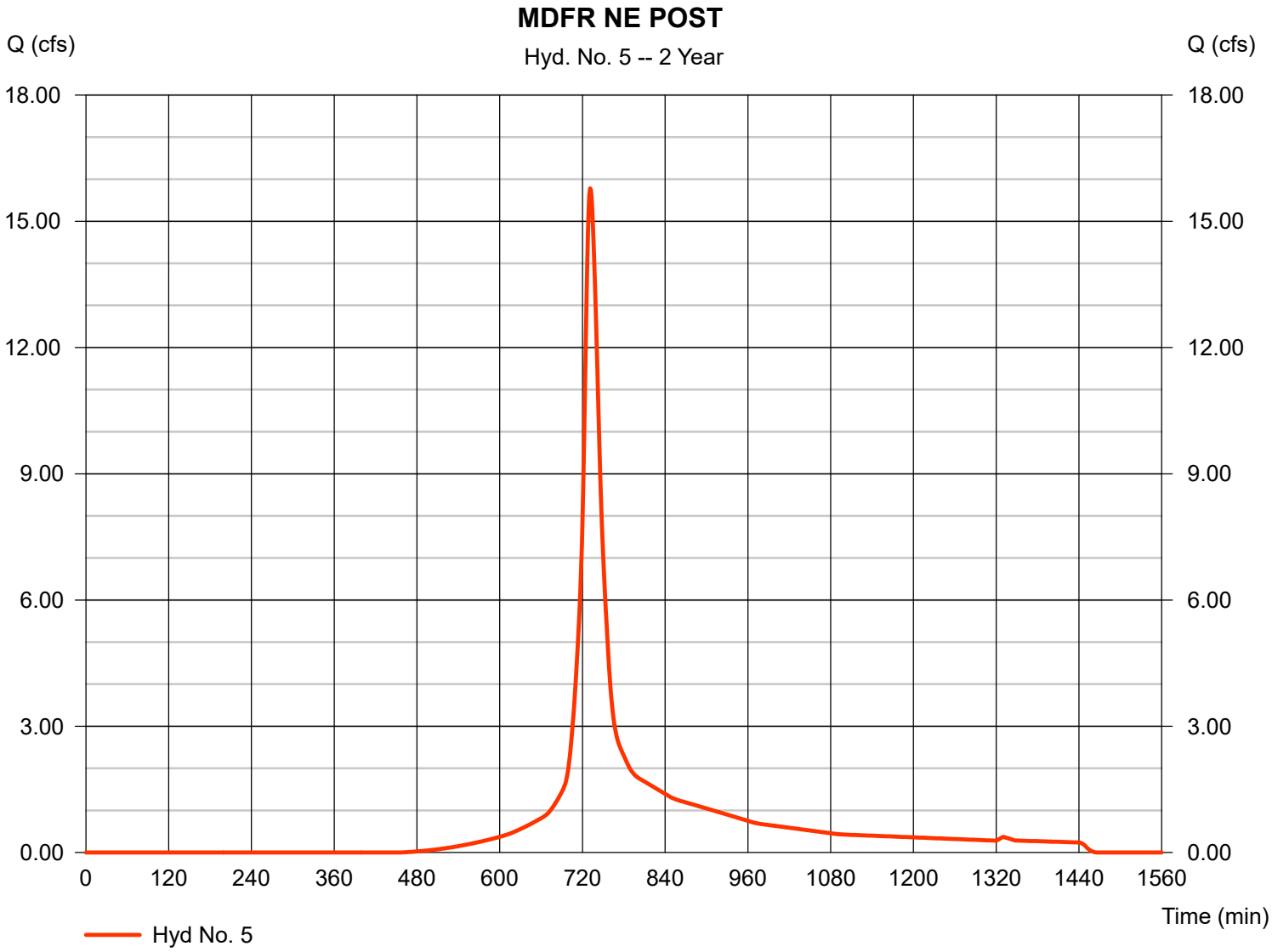
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	163.00	0.00	---	---	---	---	---	---	---	---	---	0.00
1.00	10,650	164.00	4.52 ic	---	---	---	---	---	---	---	---	---	4.52
2.00	65,500	165.00	13.19 oc	---	---	---	---	---	---	---	---	---	13.19
3.00	201,500	166.00	20.70 oc	---	---	---	---	---	---	---	---	---	20.70

Hydrograph Report

Hyd. No. 5

MDFR NE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.78 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	65,222 cuft
Drainage area	=	9.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.20 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 5

MDFR NE POST

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 130.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.24		3.24		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 15.85**	**+**	**0.00**	**+**	**0.00**	**=**	**15.85**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 1.00		1.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 1.61		2.03		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 4.90		0.00		0.00		
Wetted perimeter (ft)	= 4.00		0.00		0.00		
Channel slope (%)	= 1.50		0.00		0.00		
Manning's n-value	= 0.013		0.015		0.015		
Velocity (ft/s)	= 16.08		0.00		0.00		
Flow length (ft)	= 295.0		0.0		0.0		
Travel Time (min)	**= 0.31**	**+**	**0.00**	**+**	**0.00**	**=**	**0.31**

Total Travel Time, Tc ..... 16.20 min

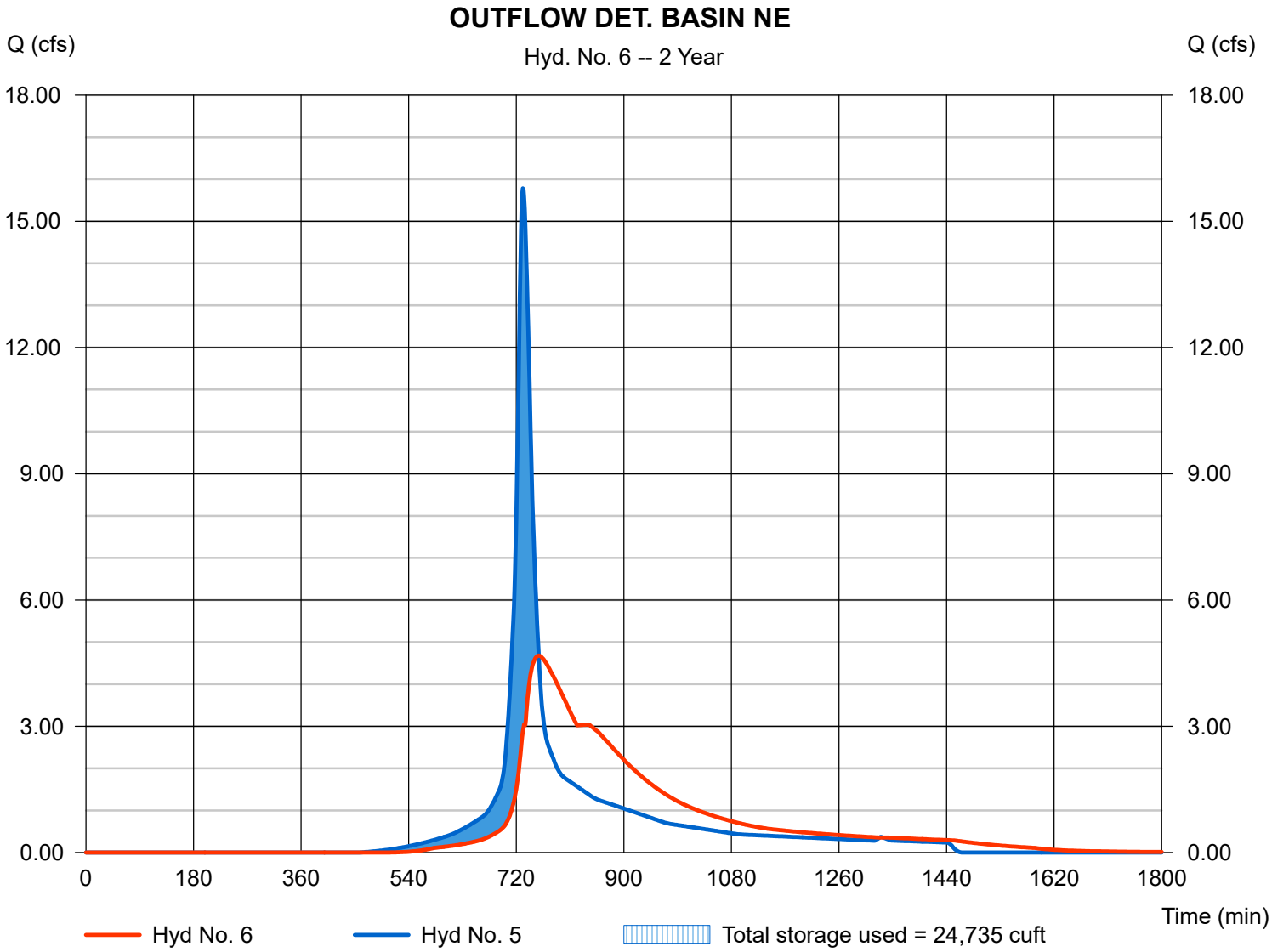
Hydrograph Report

Hyd. No. 6

OUTFLOW DET. BASIN NE

Hydrograph type	=	Reservoir	Peak discharge	=	4.678 cfs
Storm frequency	=	2 yrs	Time to peak	=	758 min
Time interval	=	1 min	Hyd. volume	=	65,153 cuft
Inflow hyd. No.	=	5 - MDFR NE POST	Max. Elevation	=	165.45 ft
Reservoir name	=	MFDR DET. BASIN NE	Max. Storage	=	24,735 cuft

Storage Indication method used.



Pond No. 1 - MFDR DET. BASIN NE

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 163.85 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	163.85	00	0	0
0.15	164.00	14,244	712	712
1.15	165.00	17,136	15,666	16,378
2.15	166.00	20,087	18,590	34,968
3.15	167.00	23,009	21,529	56,498
4.15	168.00	26,172	24,571	81,069

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	1	0	0
Invert El. (ft)	= 163.85	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	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)	= 100.00	Inactive	Inactive	Inactive
Crest El. (ft)	= 167.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
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

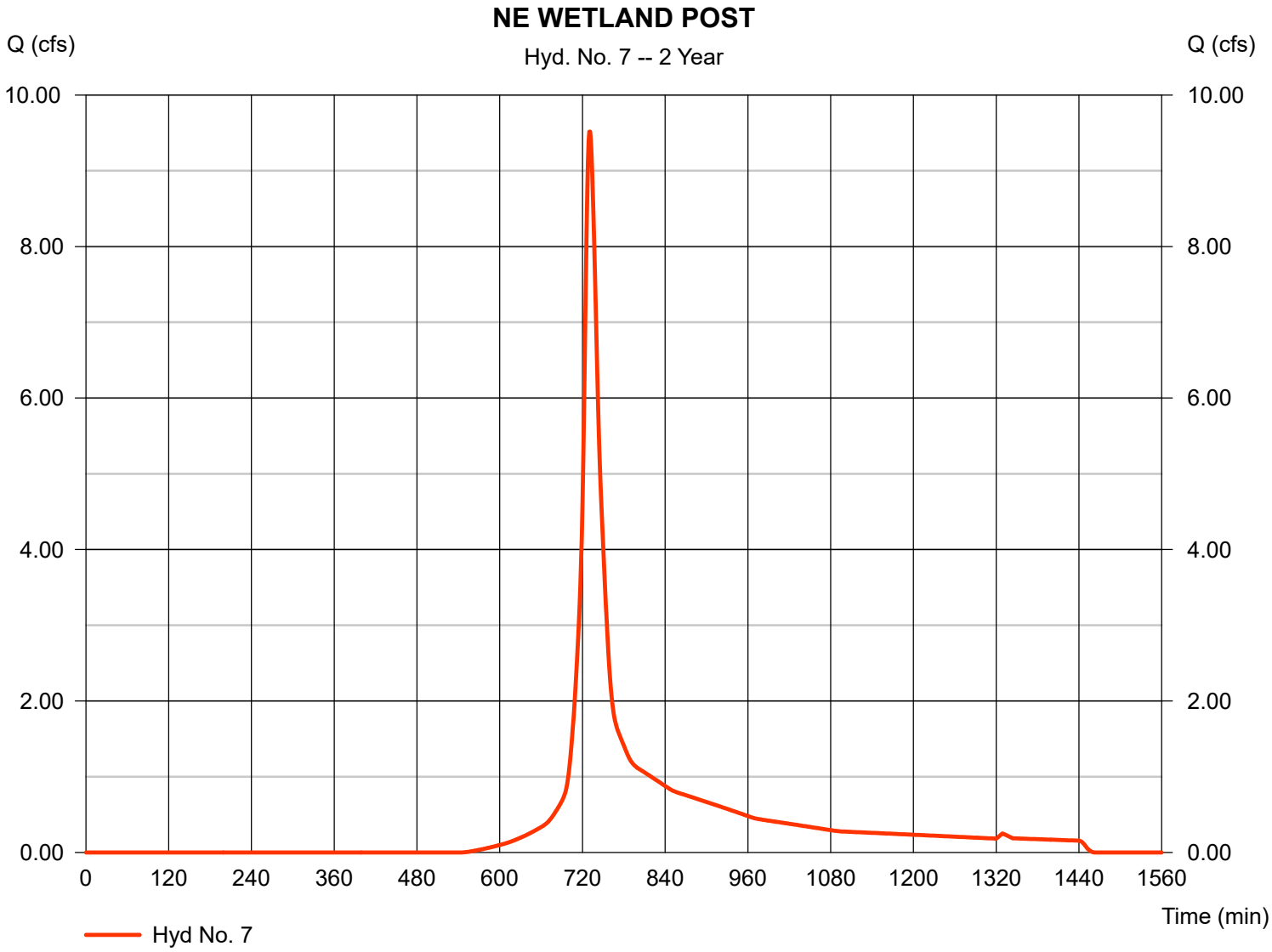
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	163.85	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.15	712	164.00	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
1.15	16,378	165.00	3.04 oc	---	---	---	0.00	---	---	---	---	---	3.04
2.15	34,968	166.00	6.49 oc	---	---	---	0.00	---	---	---	---	---	6.49
3.15	56,498	167.00	8.87 oc	---	---	---	0.00	---	---	---	---	---	8.87
4.15	81,069	168.00	10.73 oc	---	---	---	260.00	---	---	---	---	---	270.73

Hydrograph Report

Hyd. No. 7

NE WETLAND POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	9.516 cfs
Storm frequency	=	2 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	37,911 cuft
Drainage area	=	6.960 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.10 min
Total precip.	=	3.24 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 7

NE WETLAND POST

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.060		0.011		0.011		
Flow length (ft)	= 115.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		3.24		0.00		
Land slope (%)	= 1.00		0.00		0.00		
Travel Time (min)	**= 6.80**	**+**	**0.00**	**+**	**0.00**	**=**	**6.80**
Shallow Concentrated Flow							
Flow length (ft)	= 591.00		0.00		0.00		
Watercourse slope (%)	= 0.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 1.35		0.00		0.00		
Travel Time (min)	**= 7.30**	**+**	**0.00**	**+**	**0.00**	**=**	**7.30**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

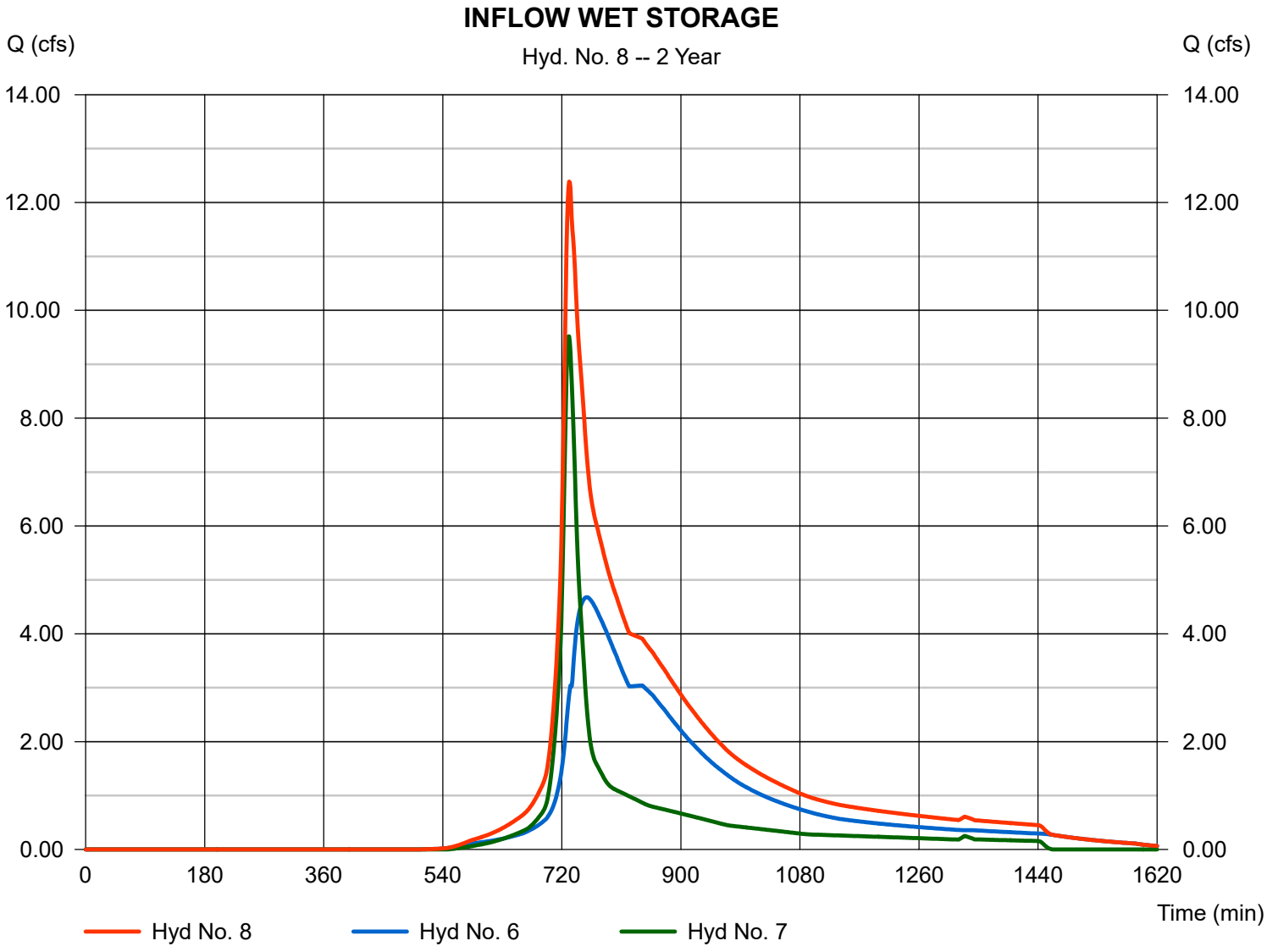
Total Travel Time, Tc ..... 14.10 min

Hydrograph Report

Hyd. No. 8

INFLOW WET STORAGE

Hydrograph type	= Combine	Peak discharge	= 12.39 cfs
Storm frequency	= 2 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 103,064 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 6.960 ac



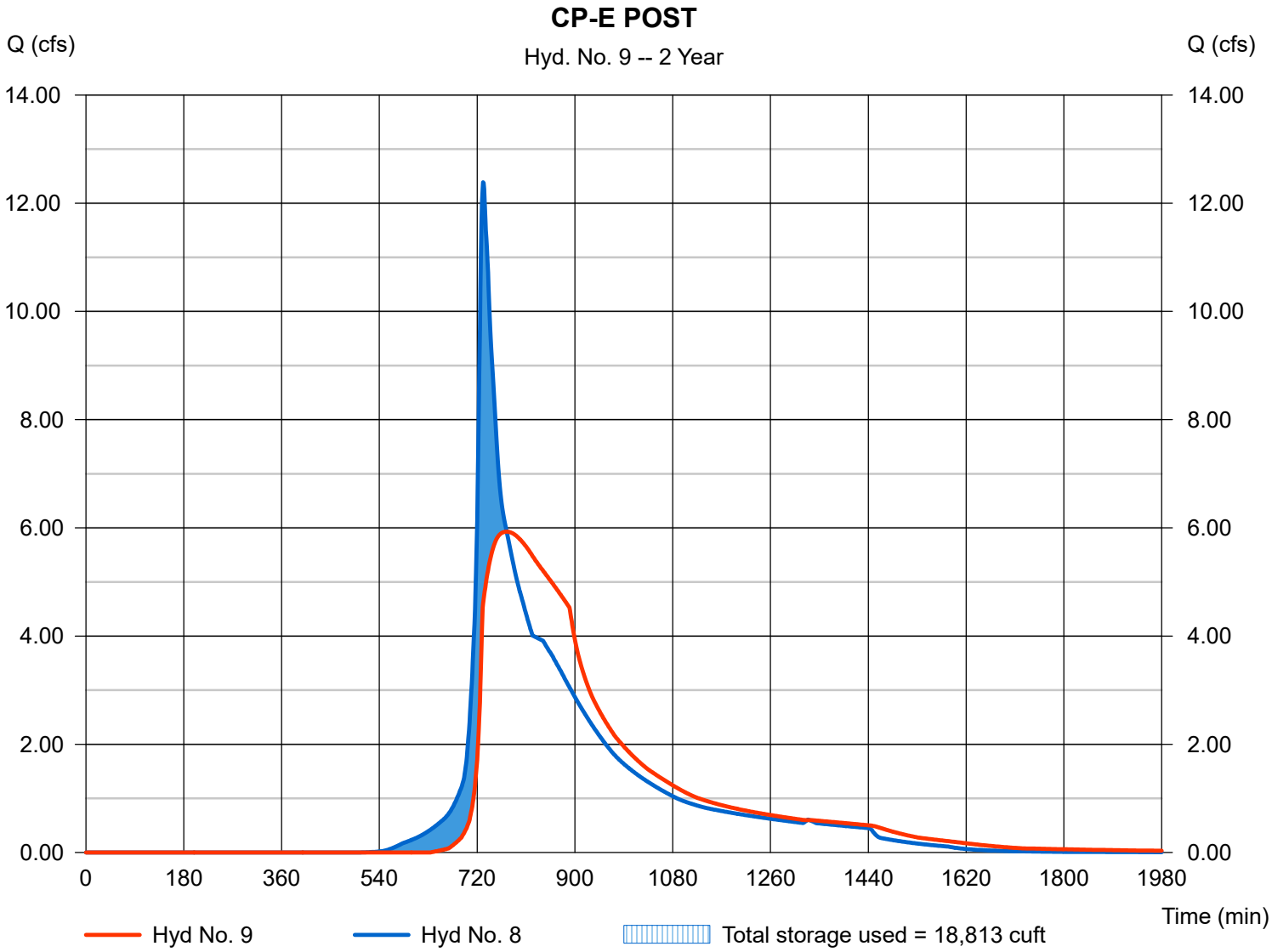
Hydrograph Report

Hyd. No. 9

CP-E POST

Hydrograph type	=	Reservoir	Peak discharge	=	5.929 cfs
Storm frequency	=	2 yrs	Time to peak	=	774 min
Time interval	=	1 min	Hyd. volume	=	101,994 cuft
Inflow hyd. No.	=	8 - INFLOW WET STORAGE	Max. Elevation	=	164.15 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	18,813 cuft

Storage Indication method used.



Pond No. 2 - East St. Culvert Headwater Storage

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	163.00	n/a	0	0
1.00	164.00	n/a	10,650	10,650
2.00	165.00	n/a	54,850	65,500
3.00	166.00	n/a	136,000	201,500

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 163.09	0.00	0.00	0.00
Length (ft)	= 60.00	0.00	0.00	0.00
Slope (%)	= 1.00	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	163.00	0.00	---	---	---	---	---	---	---	---	---	0.00
1.00	10,650	164.00	4.52 ic	---	---	---	---	---	---	---	---	---	4.52
2.00	65,500	165.00	13.19 oc	---	---	---	---	---	---	---	---	---	13.19
3.00	201,500	166.00	20.70 oc	---	---	---	---	---	---	---	---	---	20.70

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

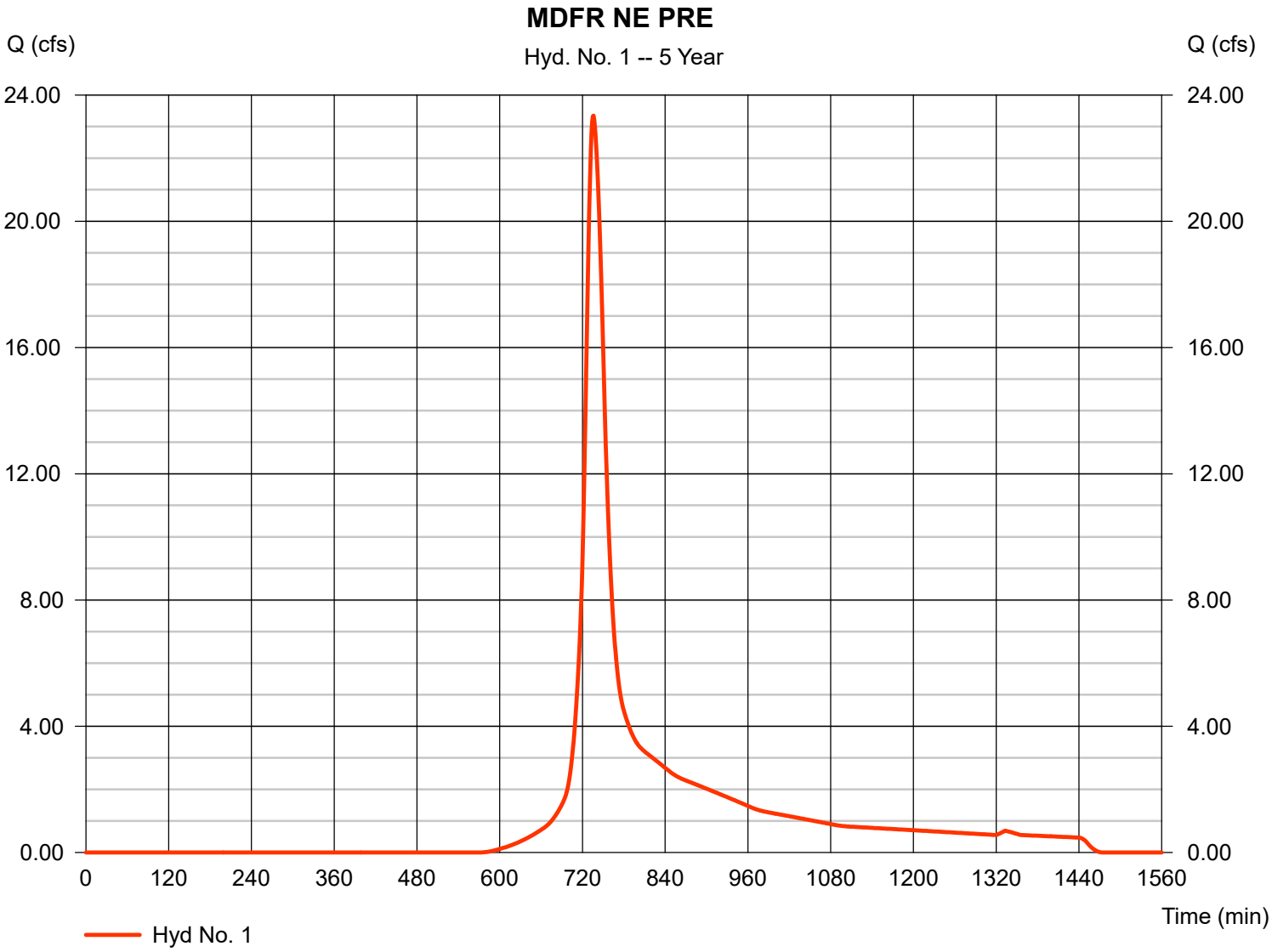
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	23.35	1	736	108,541	----	------	------	MDFR NE PRE
2	SCS Runoff	8.613	1	726	27,991	----	------	------	NE WETLAND PRE
3	Combine	28.06	1	733	136,533	1, 2	------	------	INFLOW WETLAND STORAGE EAS
4	Reservoir	10.57	1	760	135,463	3	164.59	43,153	CP-E PRE
5	SCS Runoff	23.82	1	731	98,983	----	------	------	MDFR NE POST
6	Reservoir	6.846	1	757	98,914	5	166.13	37,808	OUTFLOW DET. BASIN NE
7	SCS Runoff	15.31	1	730	60,462	----	------	------	NE WETLAND POST
8	Combine	19.74	1	732	159,376	6, 7	------	------	INFLOW WET STORAGE
9	Reservoir	8.390	1	783	158,304	8	164.39	32,008	CP-E POST

Hydrograph Report

Hyd. No. 1

MDFR NE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.35 cfs
Storm frequency	=	5 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	108,541 cuft
Drainage area	=	16.140 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.60 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

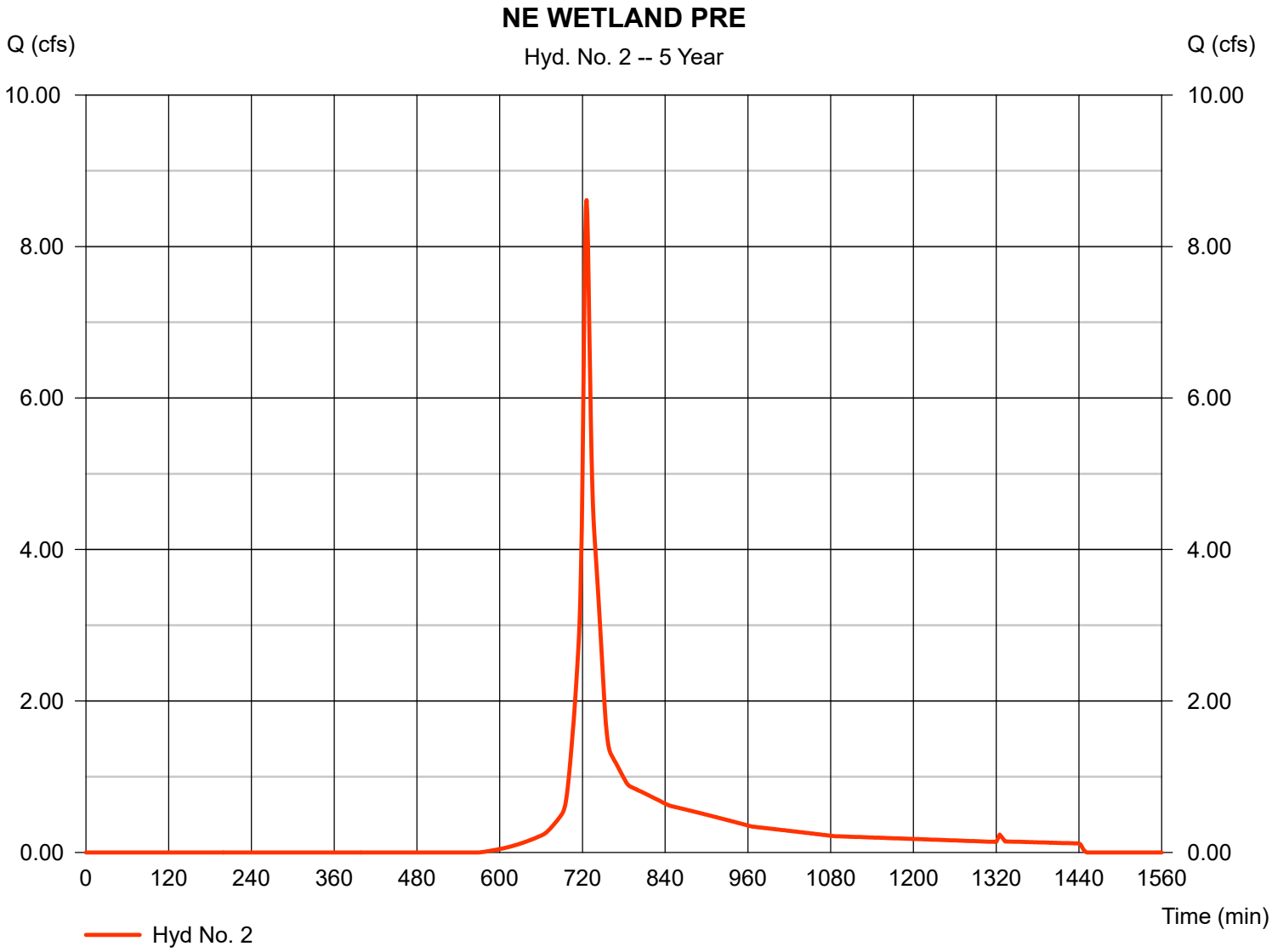


Hydrograph Report

Hyd. No. 2

NE WETLAND PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.613 cfs
Storm frequency	=	5 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	27,991 cuft
Drainage area	=	4.310 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

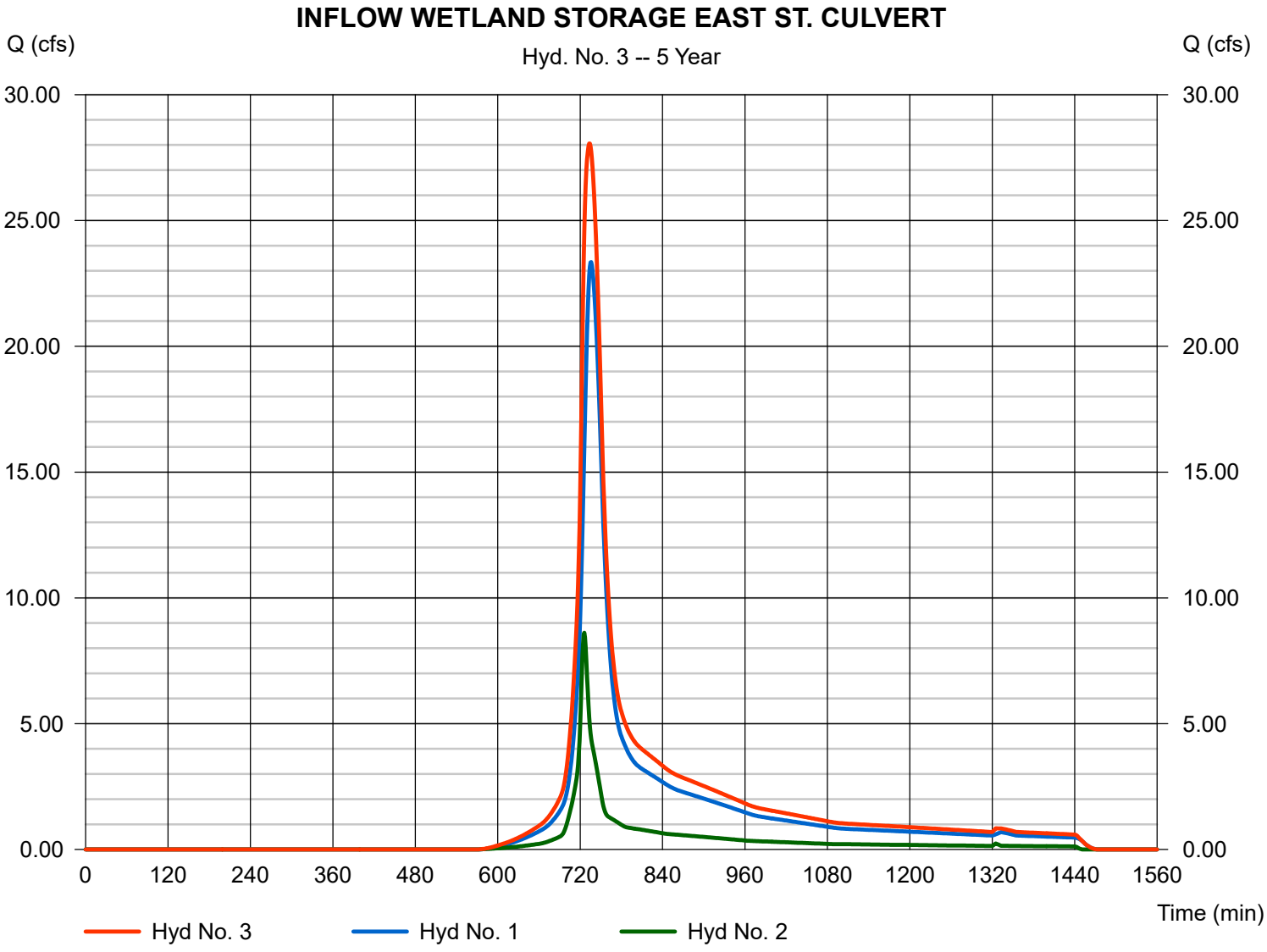


Hydrograph Report

Hyd. No. 3

INFLOW WETLAND STORAGE EAST ST. CULVERT

Hydrograph type	= Combine	Peak discharge	= 28.06 cfs
Storm frequency	= 5 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 136,533 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 20.450 ac



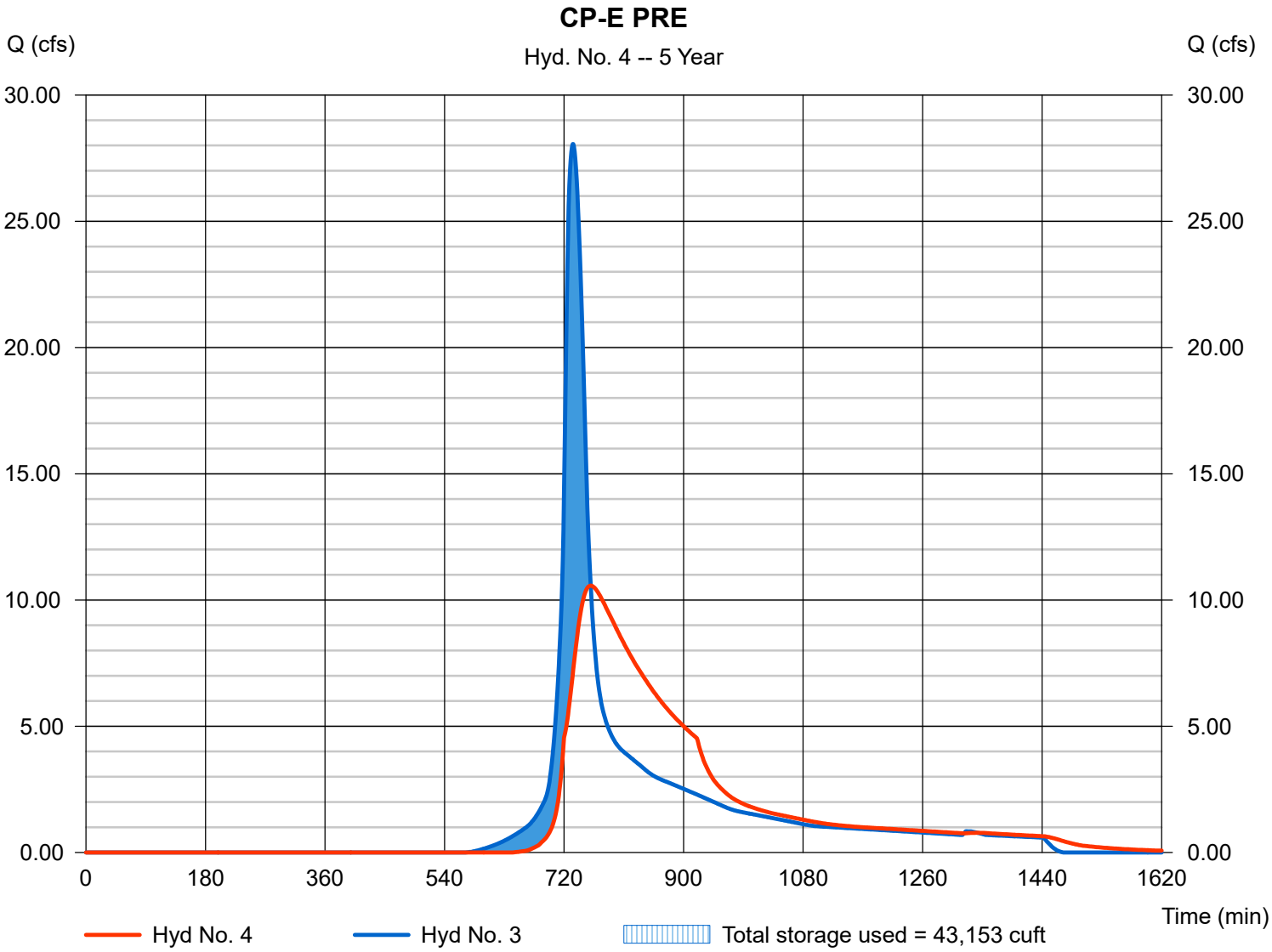
Hydrograph Report

Hyd. No. 4

CP-E PRE

Hydrograph type	=	Reservoir	Peak discharge	=	10.57 cfs
Storm frequency	=	5 yrs	Time to peak	=	760 min
Time interval	=	1 min	Hyd. volume	=	135,463 cuft
Inflow hyd. No.	=	3 - INFLOW WETLAND STORAGE EAST CULVERT	Max. Elevation	=	164.59 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	43,153 cuft

Storage Indication method used.

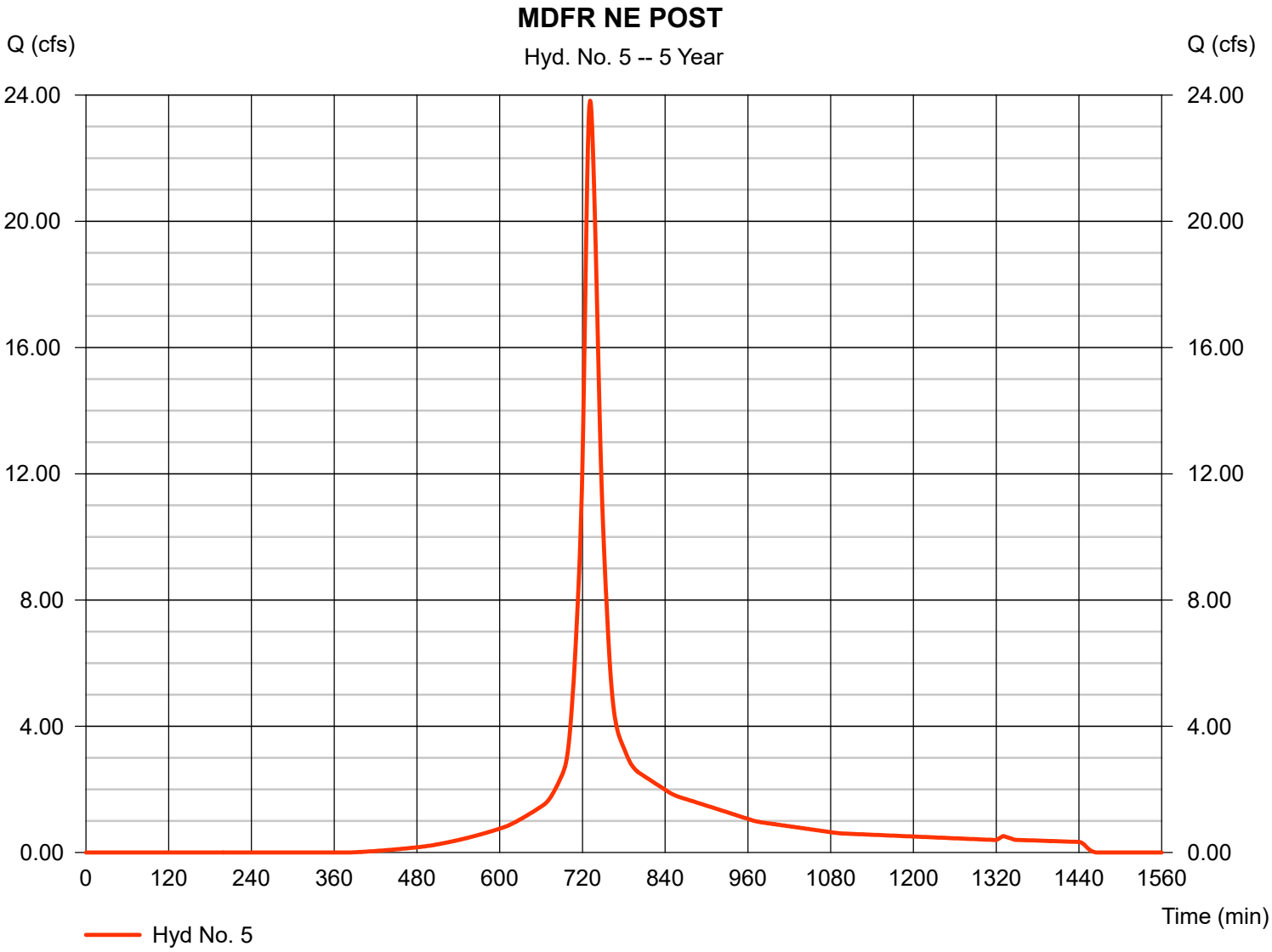


Hydrograph Report

Hyd. No. 5

MDFR NE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.82 cfs
Storm frequency	=	5 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	98,983 cuft
Drainage area	=	9.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.20 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



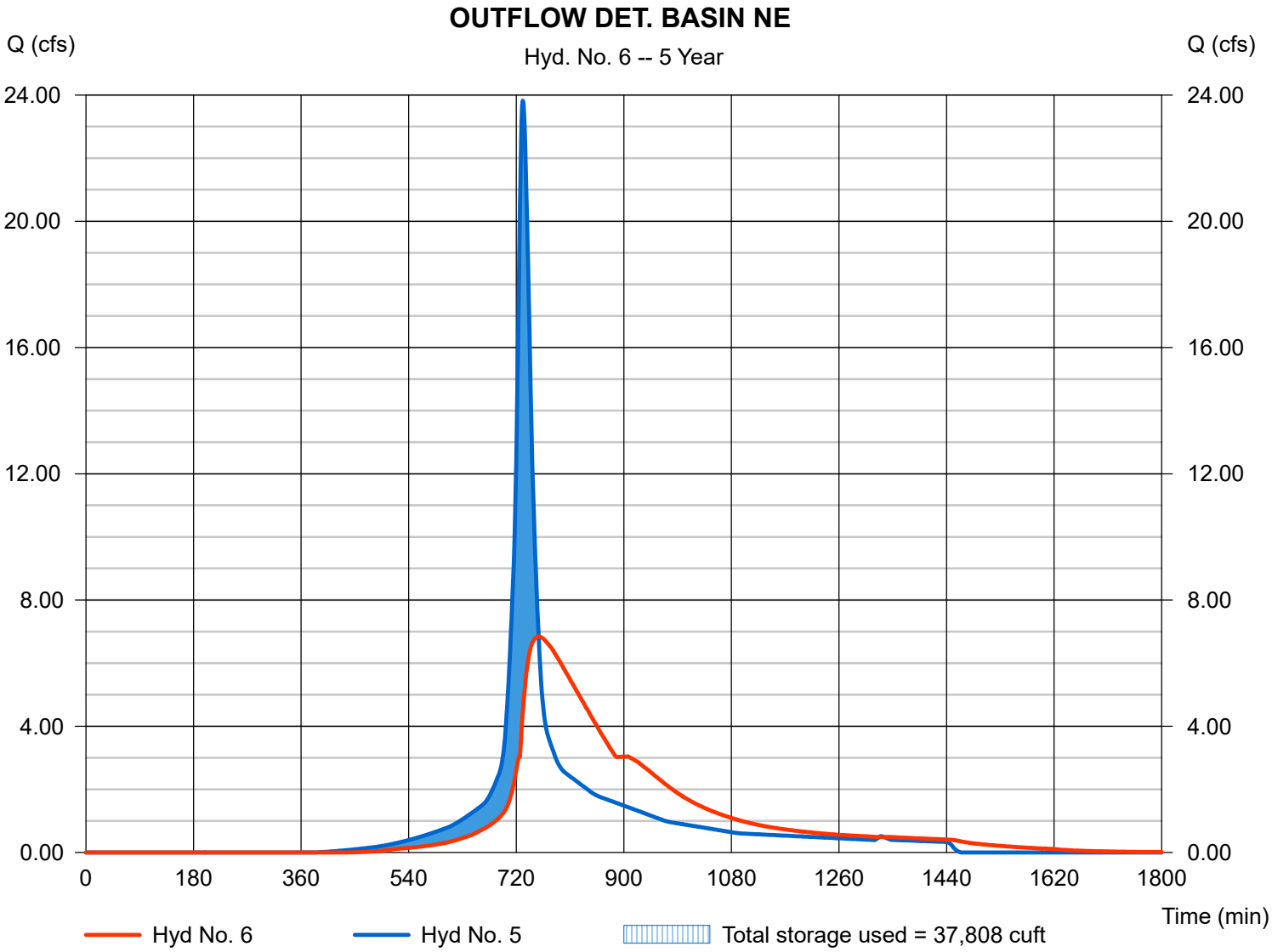
Hydrograph Report

Hyd. No. 6

OUTFLOW DET. BASIN NE

Hydrograph type	=	Reservoir	Peak discharge	=	6.846 cfs
Storm frequency	=	5 yrs	Time to peak	=	757 min
Time interval	=	1 min	Hyd. volume	=	98,914 cuft
Inflow hyd. No.	=	5 - MDFR NE POST	Max. Elevation	=	166.13 ft
Reservoir name	=	MFDR DET. BASIN NE	Max. Storage	=	37,808 cuft

Storage Indication method used.

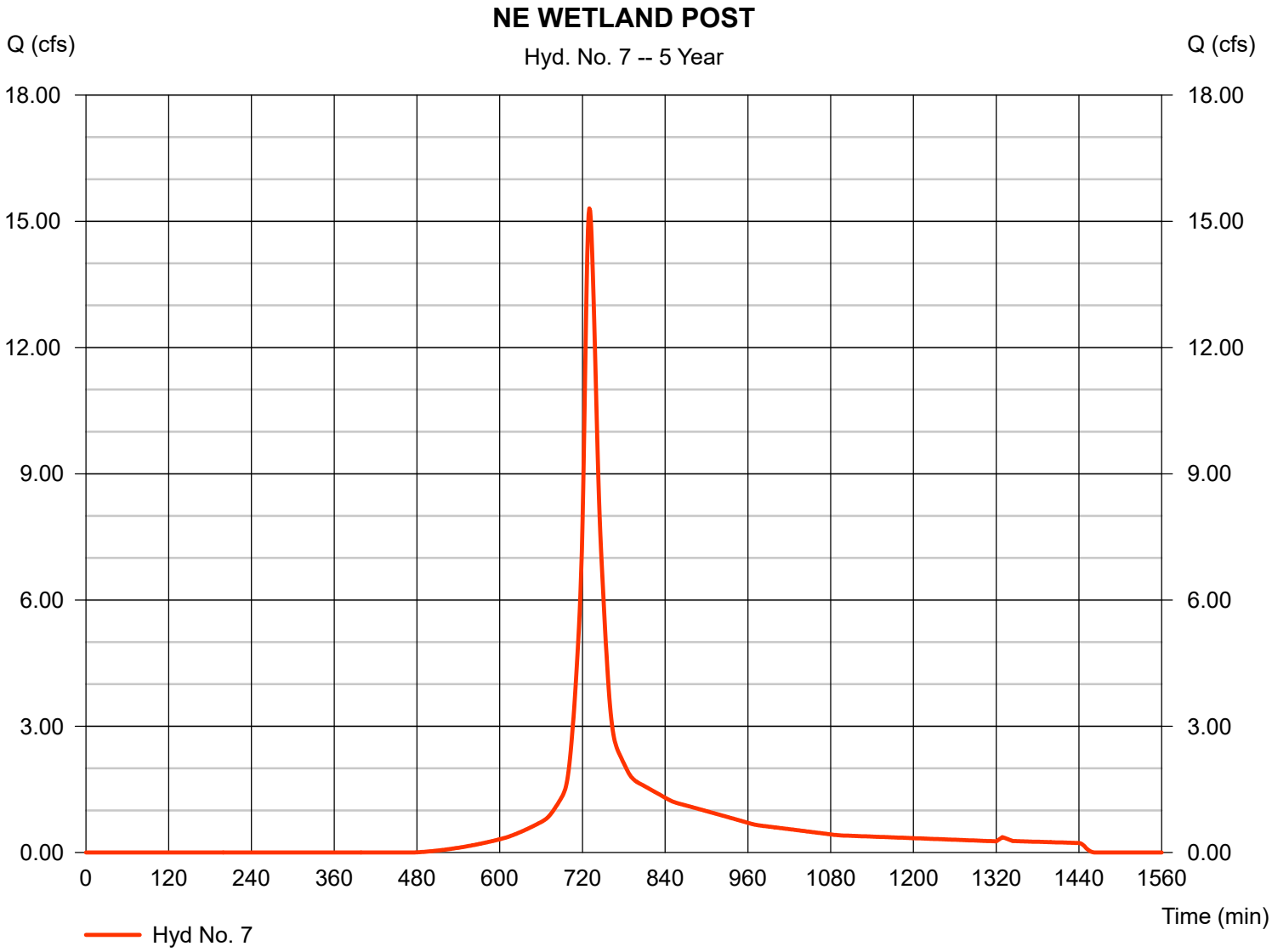


Hydrograph Report

Hyd. No. 7

NE WETLAND POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.31 cfs
Storm frequency	=	5 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	60,462 cuft
Drainage area	=	6.960 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.10 min
Total precip.	=	4.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

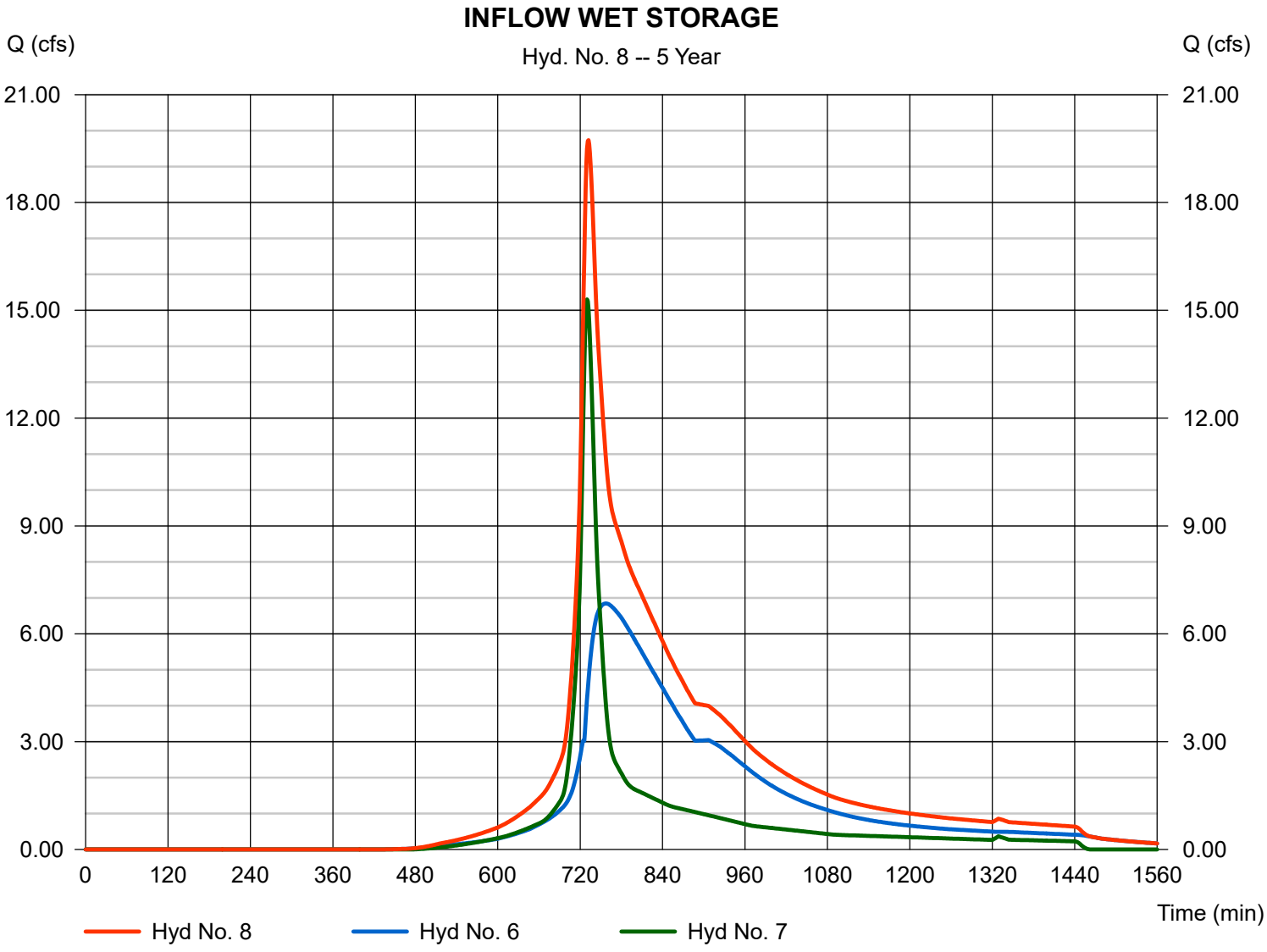


Hydrograph Report

Hyd. No. 8

INFLOW WET STORAGE

Hydrograph type	= Combine	Peak discharge	= 19.74 cfs
Storm frequency	= 5 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 159,376 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 6.960 ac



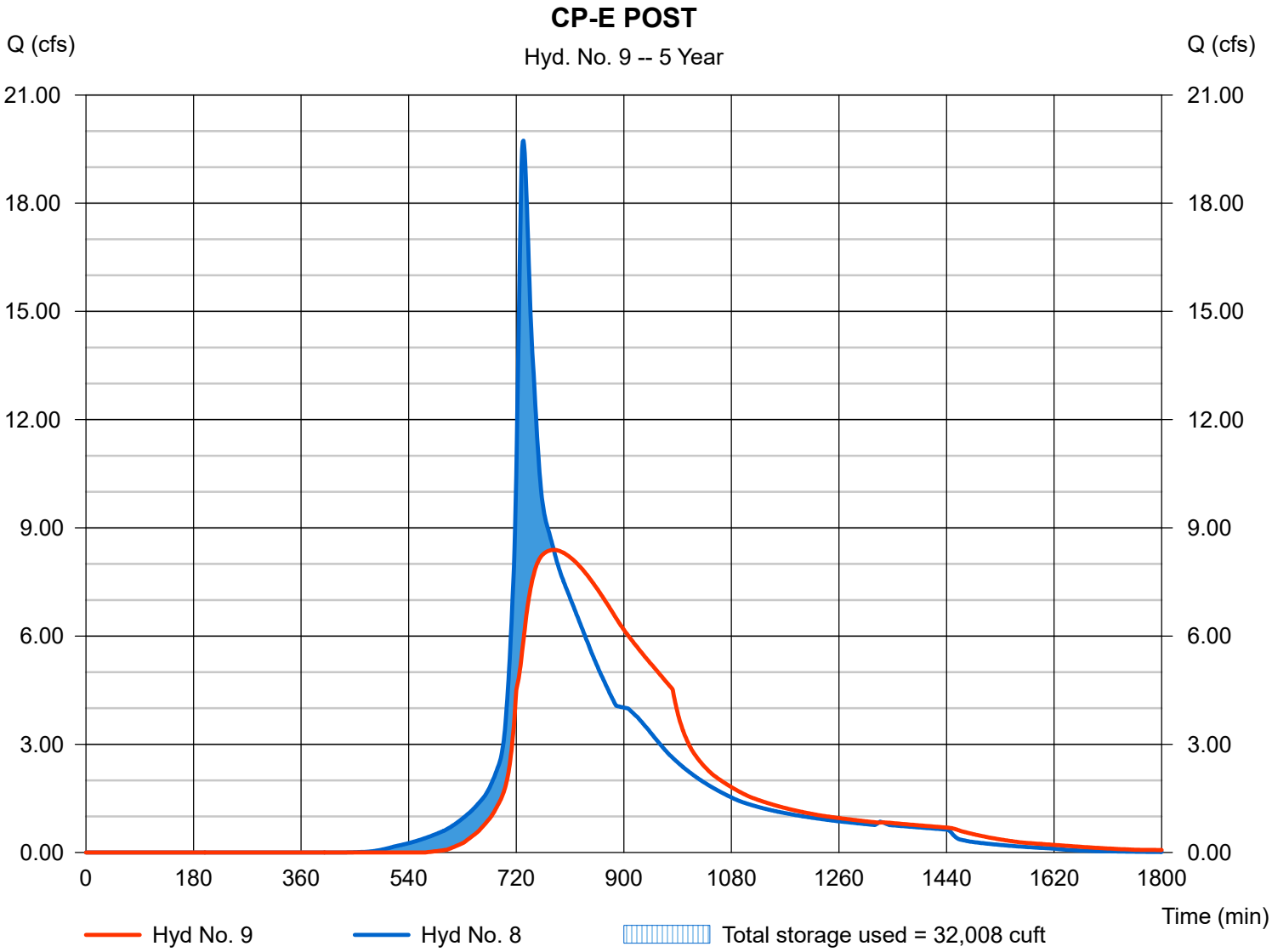
Hydrograph Report

Hyd. No. 9

CP-E POST

Hydrograph type	=	Reservoir	Peak discharge	=	8.390 cfs
Storm frequency	=	5 yrs	Time to peak	=	783 min
Time interval	=	1 min	Hyd. volume	=	158,304 cuft
Inflow hyd. No.	=	8 - INFLOW WET STORAGE	Max. Elevation	=	164.39 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	32,008 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

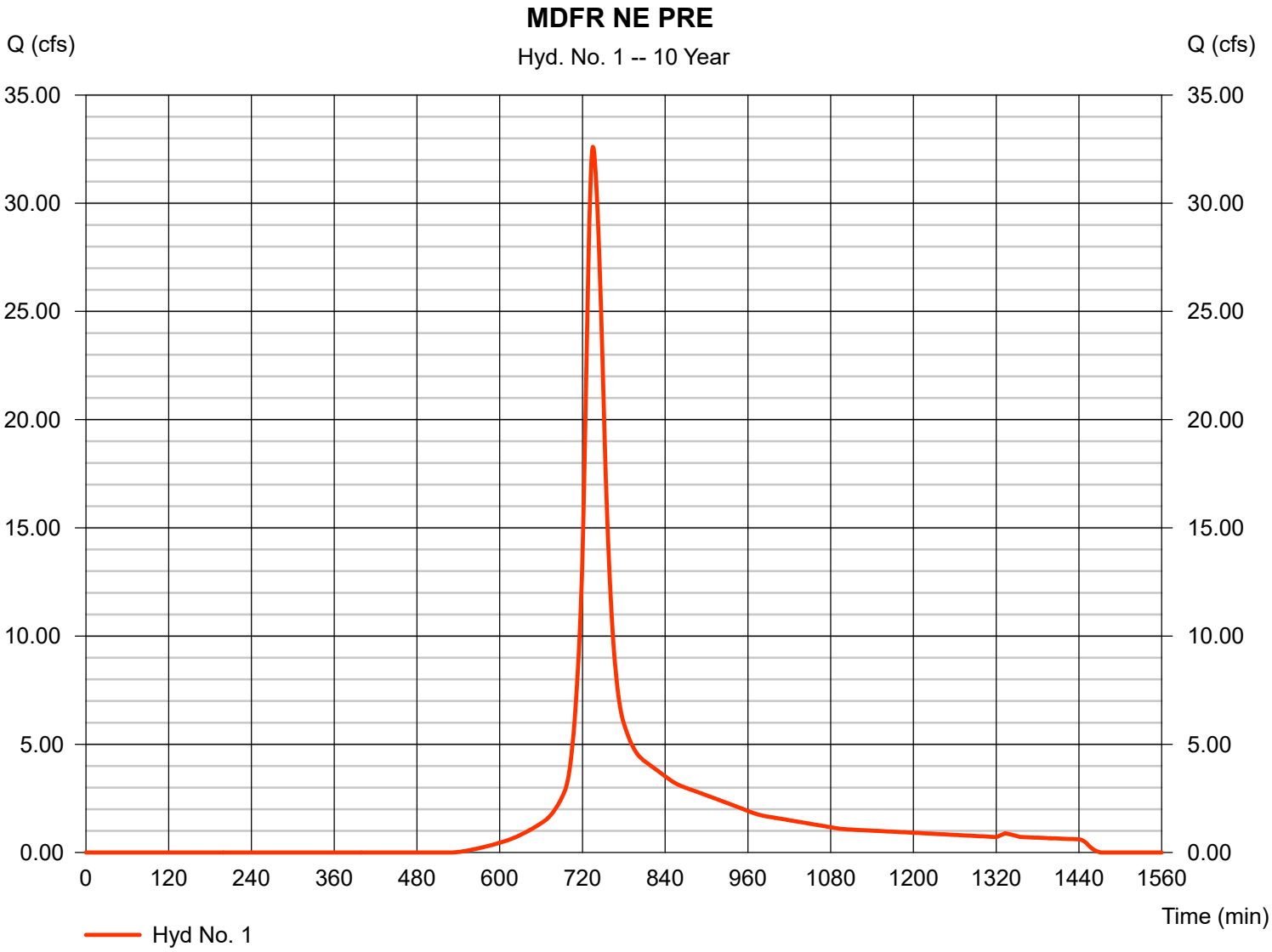
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	32.61	1	735	149,824	----	------	------	MDFR NE PRE
2	SCS Runoff	12.00	1	726	38,637	----	------	------	NE WETLAND PRE
3	Combine	39.19	1	733	188,461	1, 2	------	------	INFLOW WETLAND STORAGE EAS
4	Reservoir	13.04	1	762	187,391	3	164.95	62,848	CP-E PRE
5	SCS Runoff	30.52	1	731	127,778	----	------	------	MDFR NE POST
6	Reservoir	8.174	1	758	127,710	5	166.68	49,547	OUTFLOW DET. BASIN NE
7	SCS Runoff	20.26	1	730	80,130	----	------	------	NE WETLAND POST
8	Combine	26.02	1	731	207,840	6, 7	------	------	INFLOW WET STORAGE
9	Reservoir	10.35	1	782	206,766	8	164.57	42,038	CP-E POST

Hydrograph Report

Hyd. No. 1

MDFR NE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.61 cfs
Storm frequency	=	10 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	149,824 cuft
Drainage area	=	16.140 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.60 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

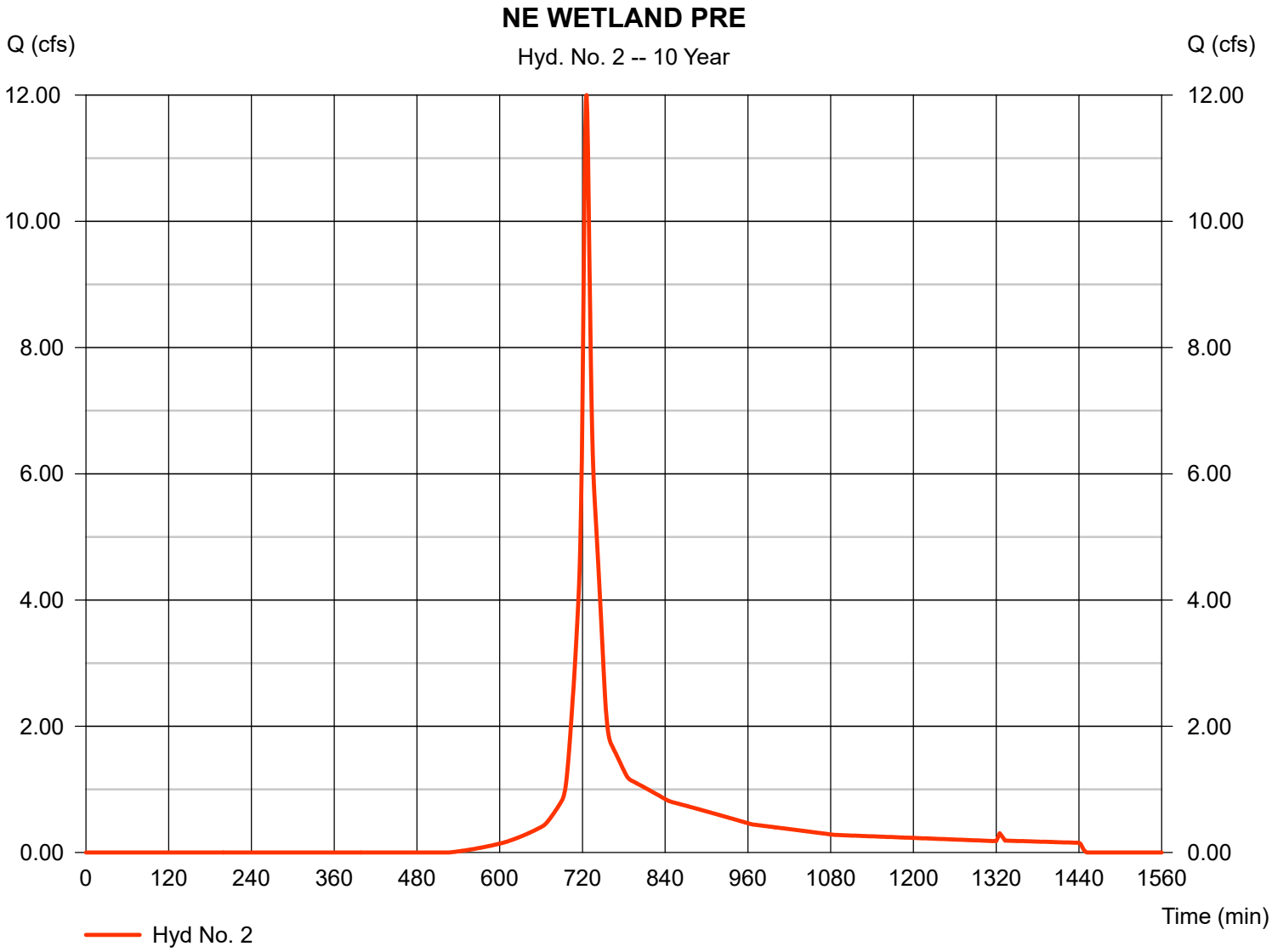


Hydrograph Report

Hyd. No. 2

NE WETLAND PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.00 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	38,637 cuft
Drainage area	=	4.310 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

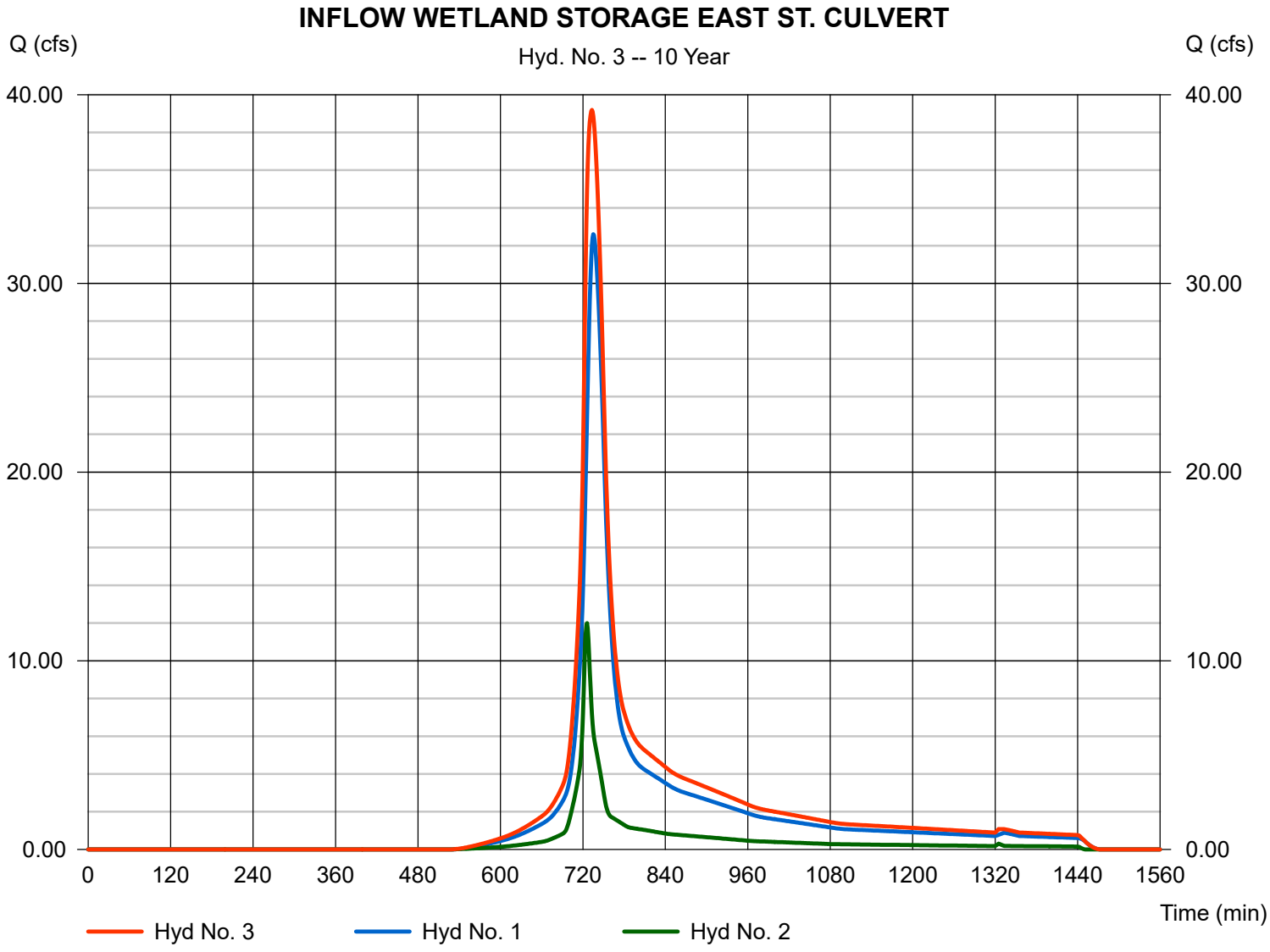


Hydrograph Report

Hyd. No. 3

INFLOW WETLAND STORAGE EAST ST. CULVERT

Hydrograph type	= Combine	Peak discharge	= 39.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 188,461 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 20.450 ac



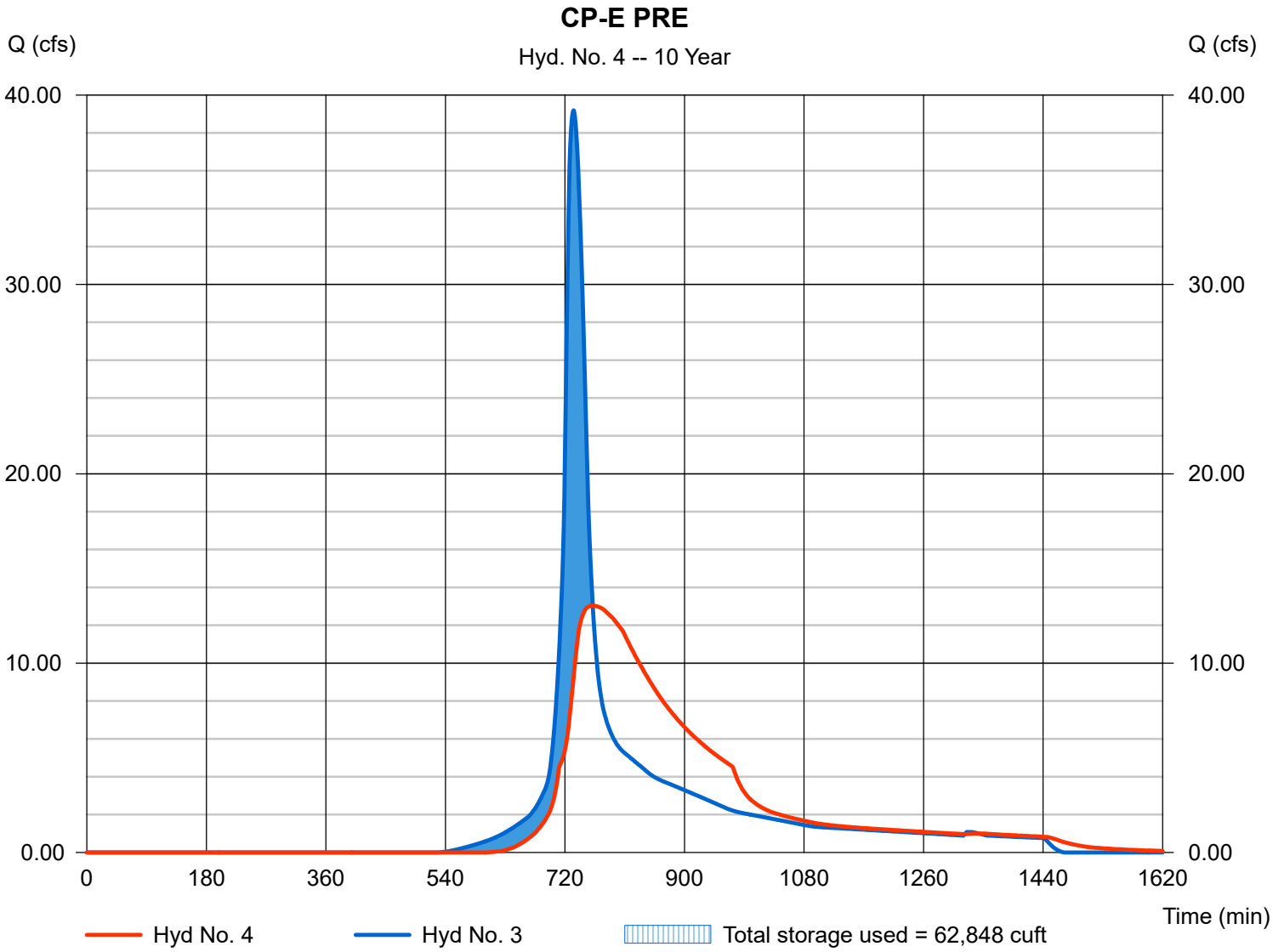
Hydrograph Report

Hyd. No. 4

CP-E PRE

Hydrograph type	=	Reservoir	Peak discharge	=	13.04 cfs
Storm frequency	=	10 yrs	Time to peak	=	762 min
Time interval	=	1 min	Hyd. volume	=	187,391 cuft
Inflow hyd. No.	=	3 - INFLOW WETLAND STORAGE EAST SIDE CULVERT	Max. Elevation	=	164.95 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	62,848 cuft

Storage Indication method used.

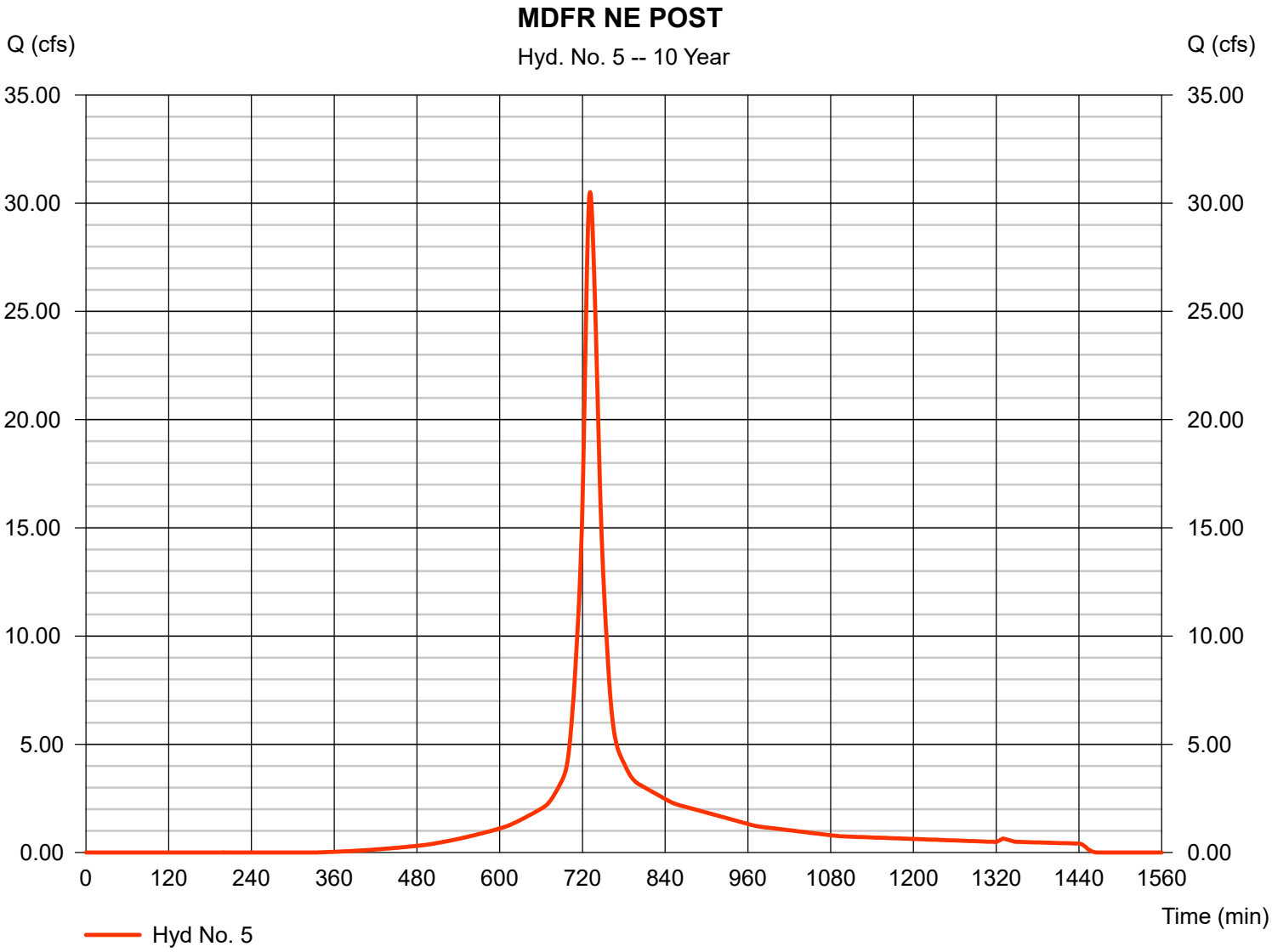


Hydrograph Report

Hyd. No. 5

MDFR NE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.52 cfs
Storm frequency	=	10 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	127,778 cuft
Drainage area	=	9.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.20 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



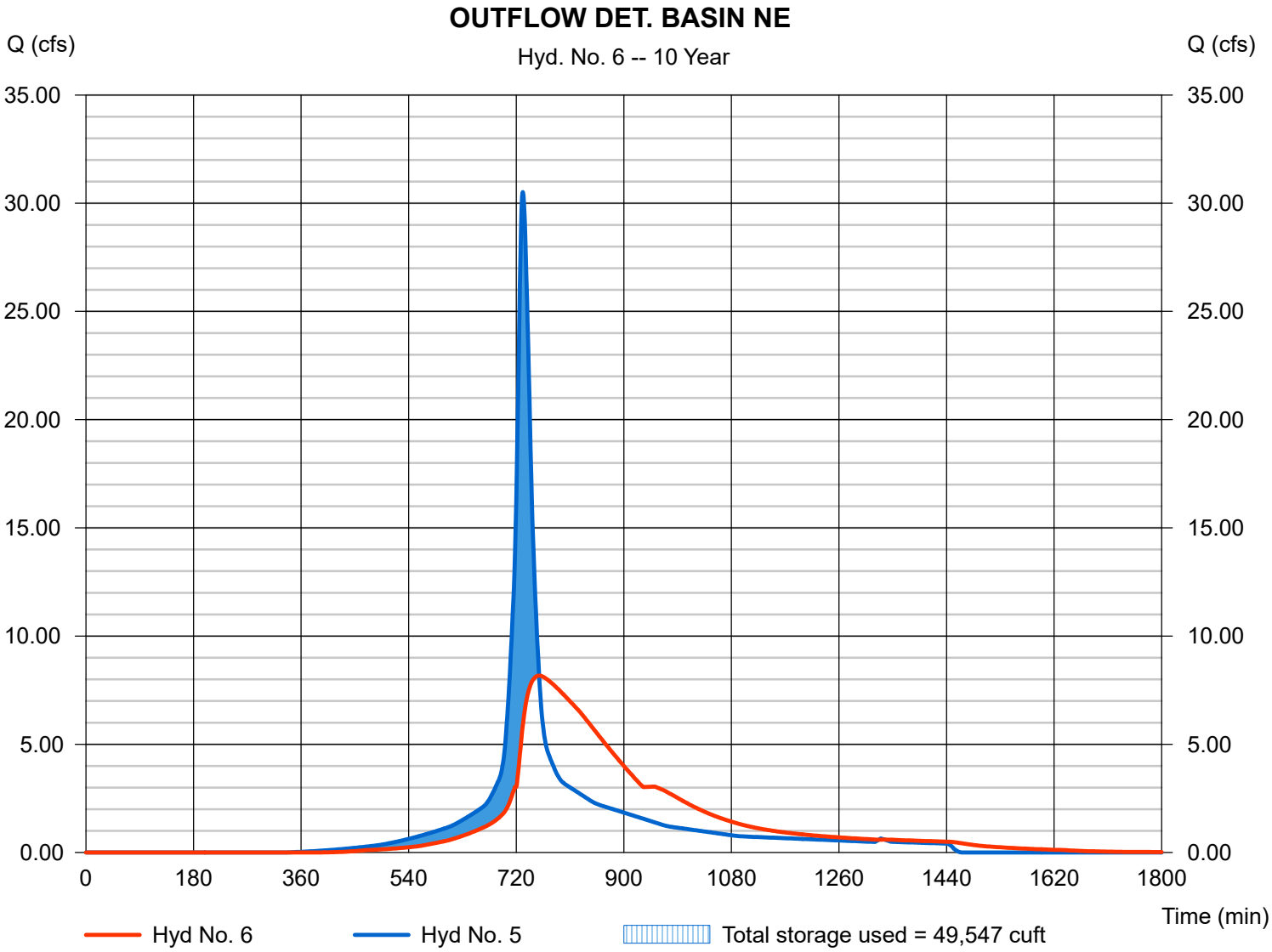
Hydrograph Report

Hyd. No. 6

OUTFLOW DET. BASIN NE

Hydrograph type	=	Reservoir	Peak discharge	=	8.174 cfs
Storm frequency	=	10 yrs	Time to peak	=	758 min
Time interval	=	1 min	Hyd. volume	=	127,710 cuft
Inflow hyd. No.	=	5 - MDFR NE POST	Max. Elevation	=	166.68 ft
Reservoir name	=	MFDR DET. BASIN NE	Max. Storage	=	49,547 cuft

Storage Indication method used.

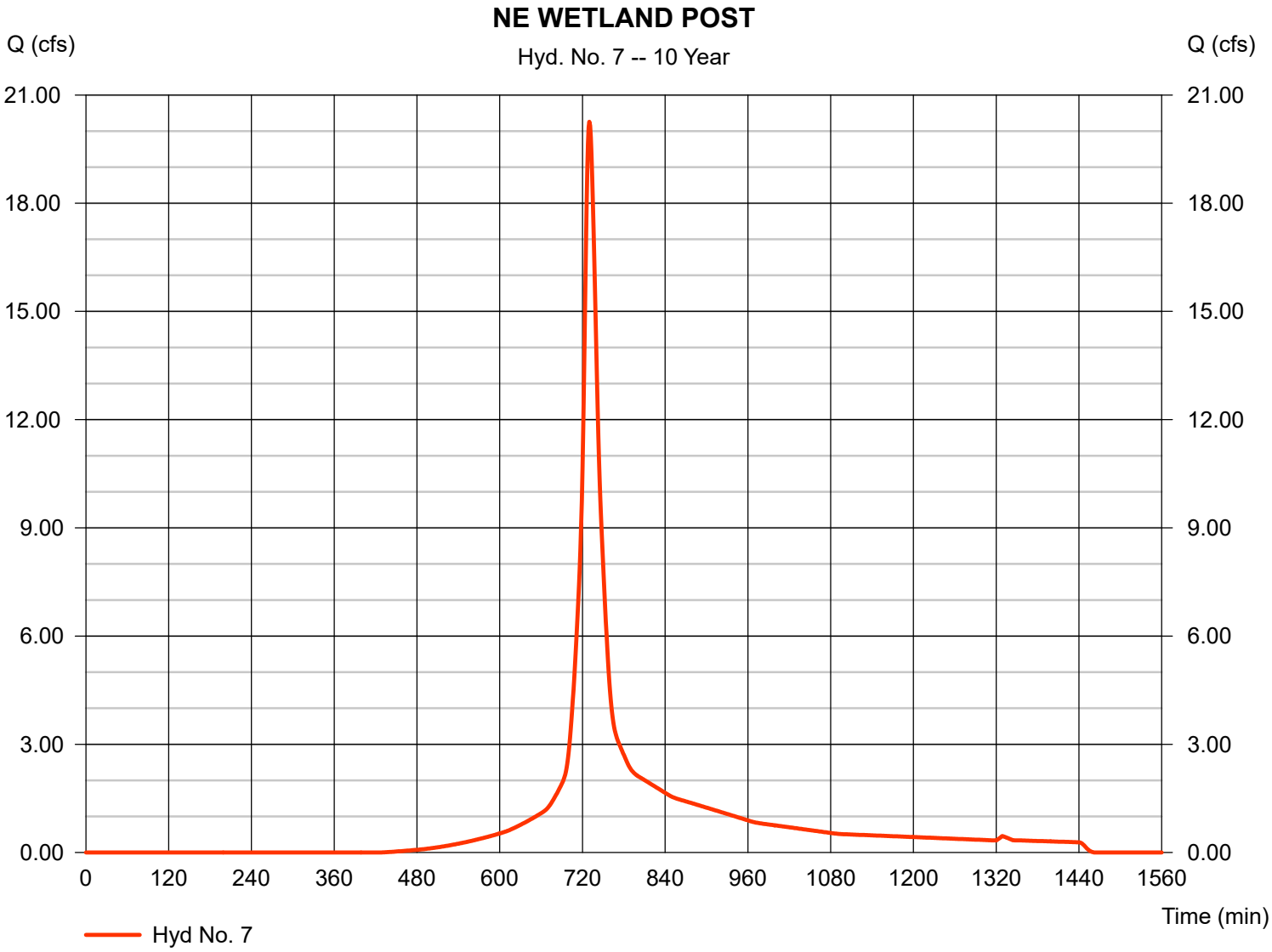


Hydrograph Report

Hyd. No. 7

NE WETLAND POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.26 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	80,130 cuft
Drainage area	=	6.960 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.10 min
Total precip.	=	5.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

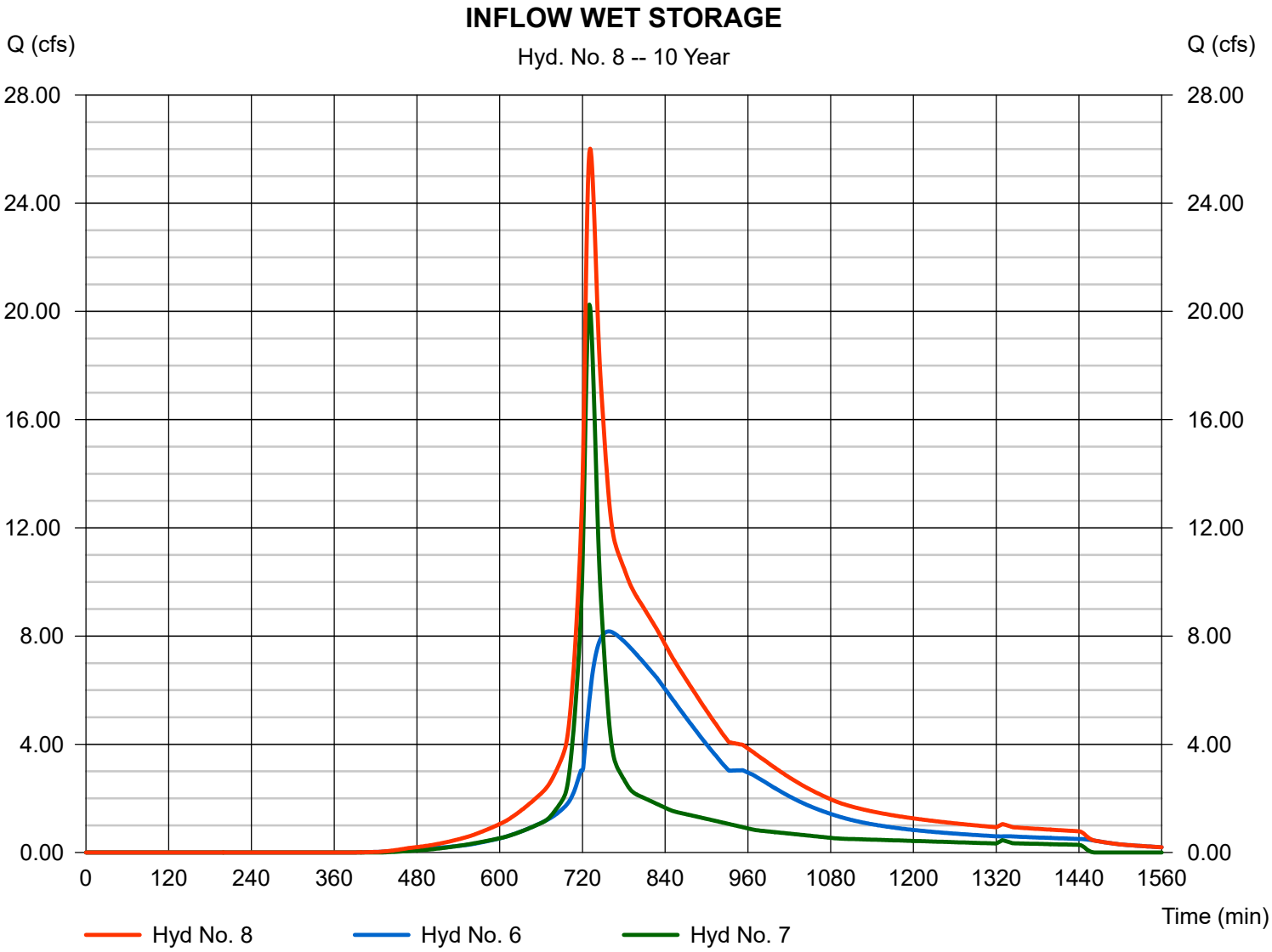


Hydrograph Report

Hyd. No. 8

INFLOW WET STORAGE

Hydrograph type	= Combine	Peak discharge	= 26.02 cfs
Storm frequency	= 10 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 207,840 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 6.960 ac



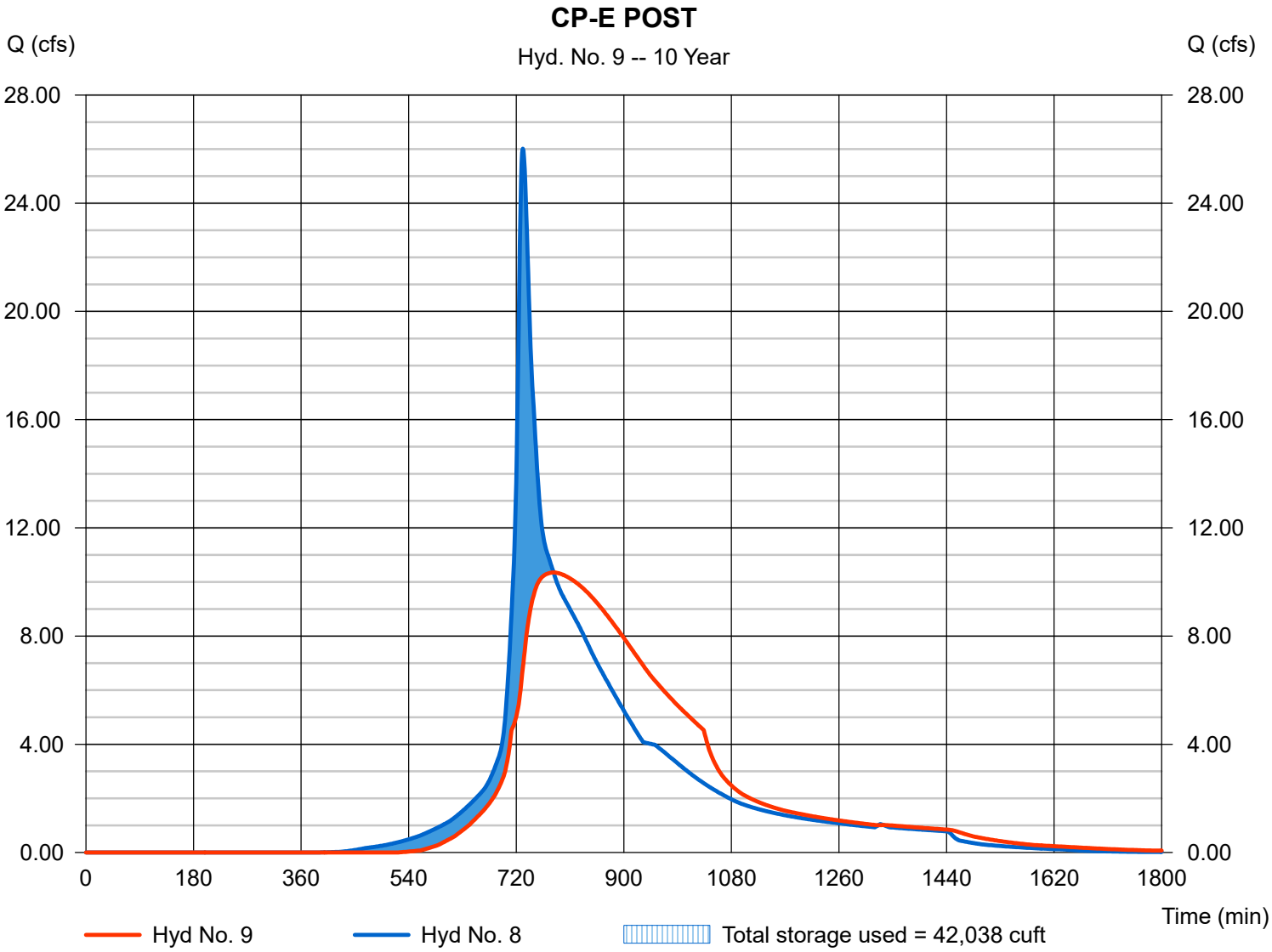
Hydrograph Report

Hyd. No. 9

CP-E POST

Hydrograph type	=	Reservoir	Peak discharge	=	10.35 cfs
Storm frequency	=	10 yrs	Time to peak	=	782 min
Time interval	=	1 min	Hyd. volume	=	206,766 cuft
Inflow hyd. No.	=	8 - INFLOW WET STORAGE	Max. Elevation	=	164.57 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	42,038 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

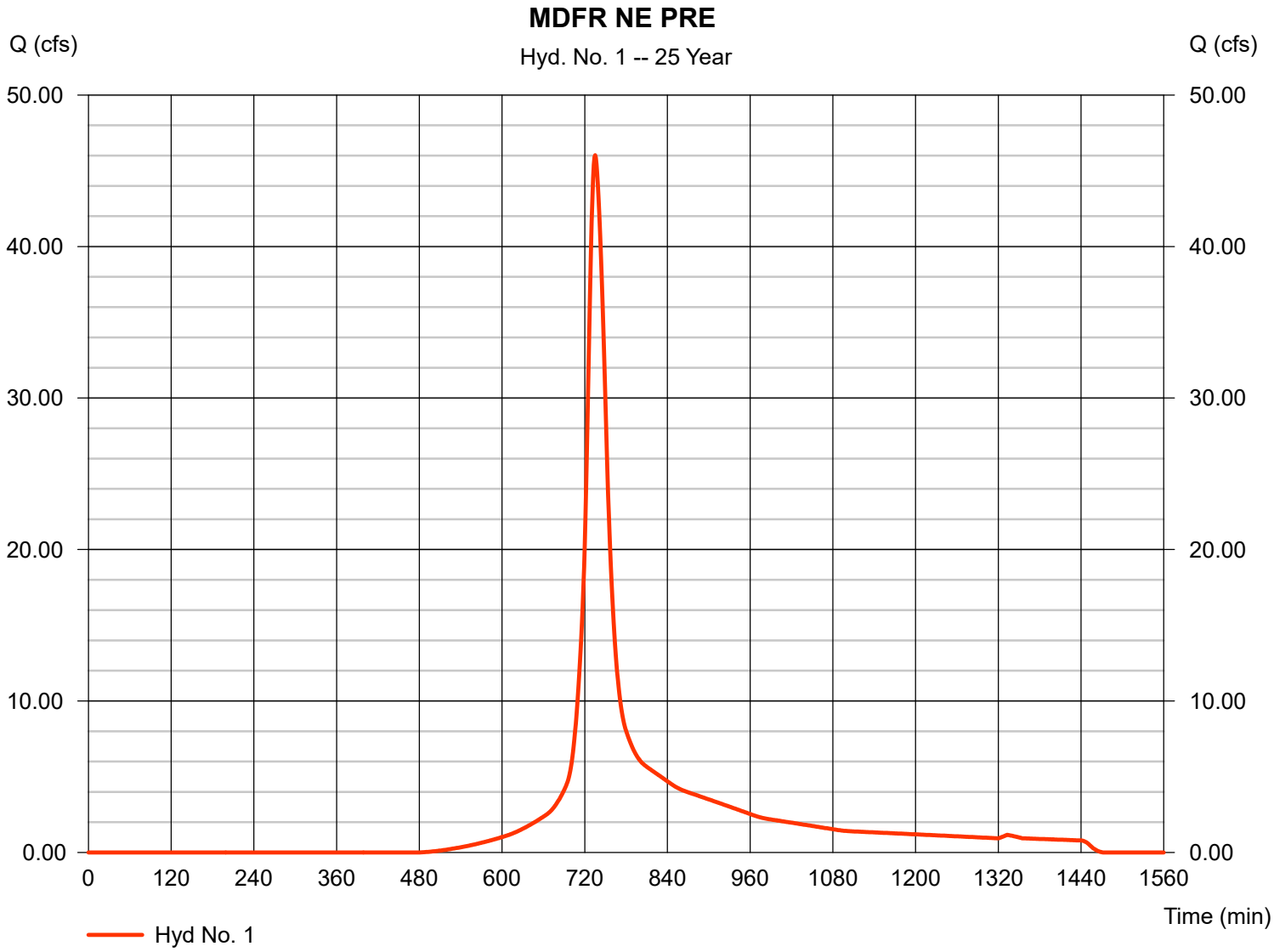
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	46.03	1	735	210,475	----	------	------	MDFR NE PRE
2	SCS Runoff	16.89	1	726	54,278	----	------	------	NE WETLAND PRE
3	Combine	55.32	1	732	264,753	1, 2	------	------	INFLOW WETLAND STORAGE EAS
4	Reservoir	14.45	1	766	263,683	3	165.23	96,311	CP-E PRE
5	SCS Runoff	39.78	1	731	168,425	----	------	------	MDFR NE POST
6	Reservoir	21.30	1	746	168,356	5	167.13	59,601	OUTFLOW DET. BASIN NE
7	SCS Runoff	27.21	1	730	108,305	----	------	------	NE WETLAND POST
8	Combine	34.63	1	745	276,661	6, 7	------	------	INFLOW WET STORAGE
9	Reservoir	13.11	1	768	275,586	8	164.97	64,025	CP-E POST

Hydrograph Report

Hyd. No. 1

MDFR NE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.03 cfs
Storm frequency	=	25 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	210,475 cuft
Drainage area	=	16.140 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.60 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

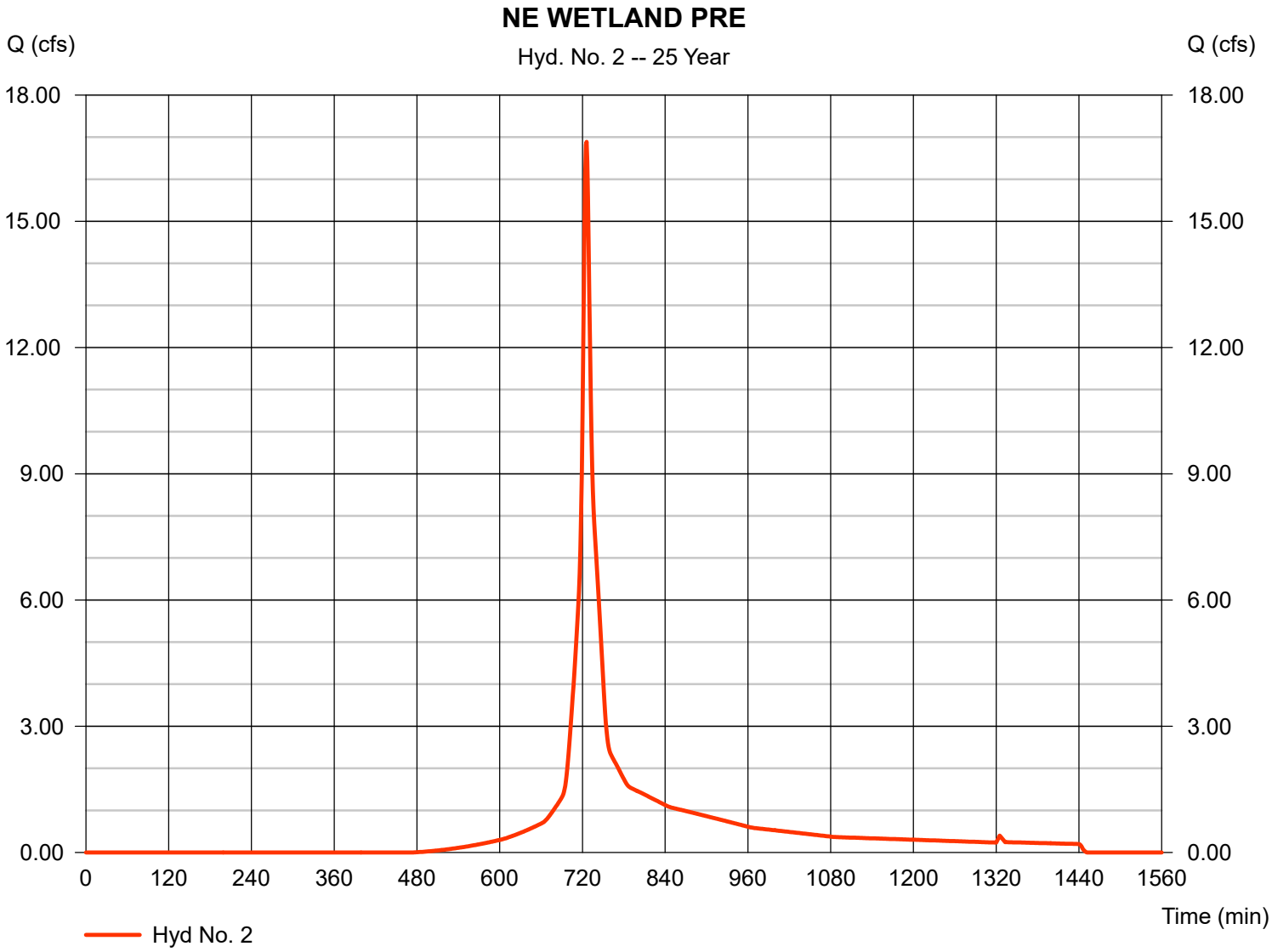


Hydrograph Report

Hyd. No. 2

NE WETLAND PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.89 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	54,278 cuft
Drainage area	=	4.310 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

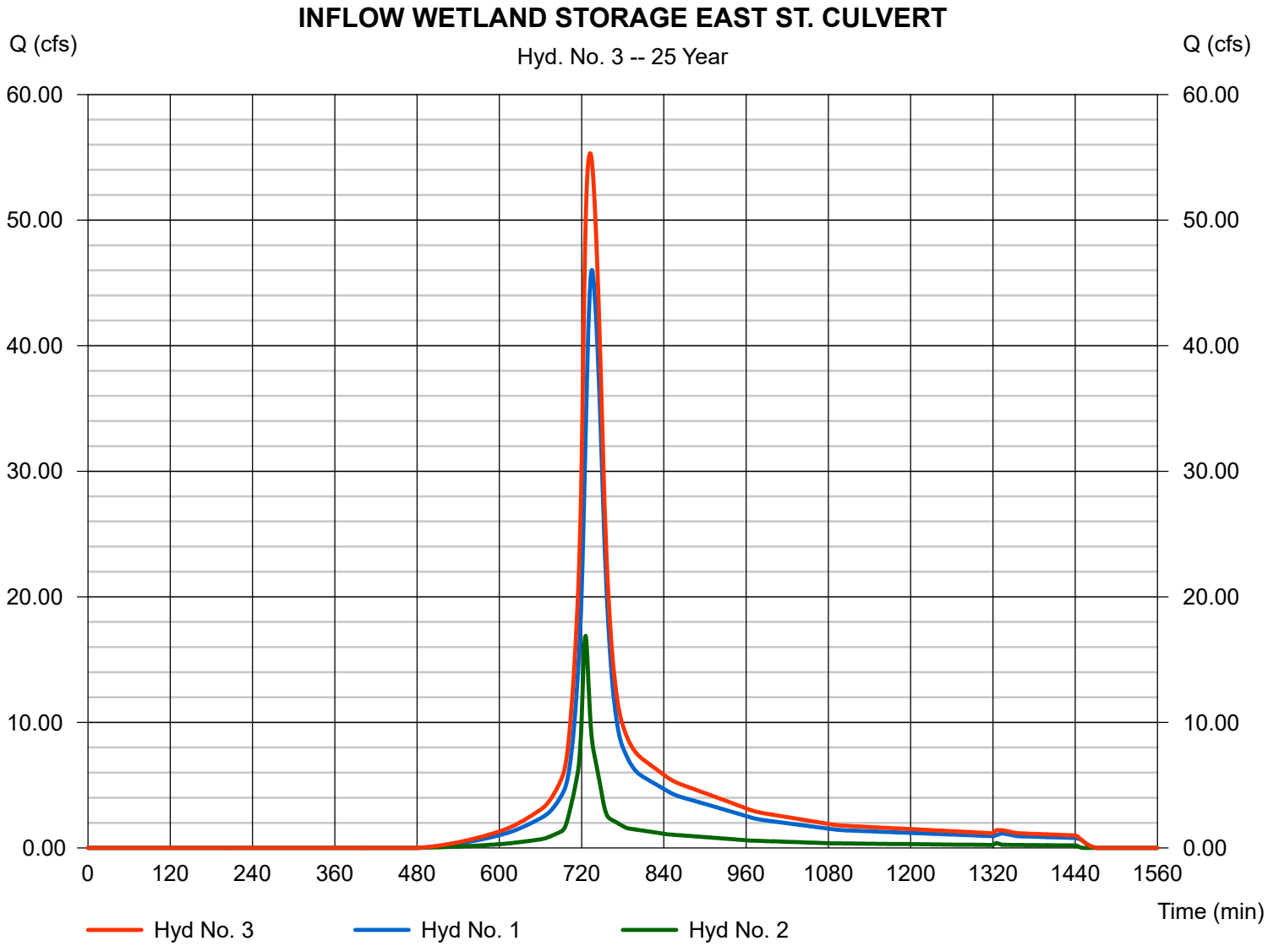


Hydrograph Report

Hyd. No. 3

INFLOW WETLAND STORAGE EAST ST. CULVERT

Hydrograph type	= Combine	Peak discharge	= 55.32 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 264,753 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 20.450 ac



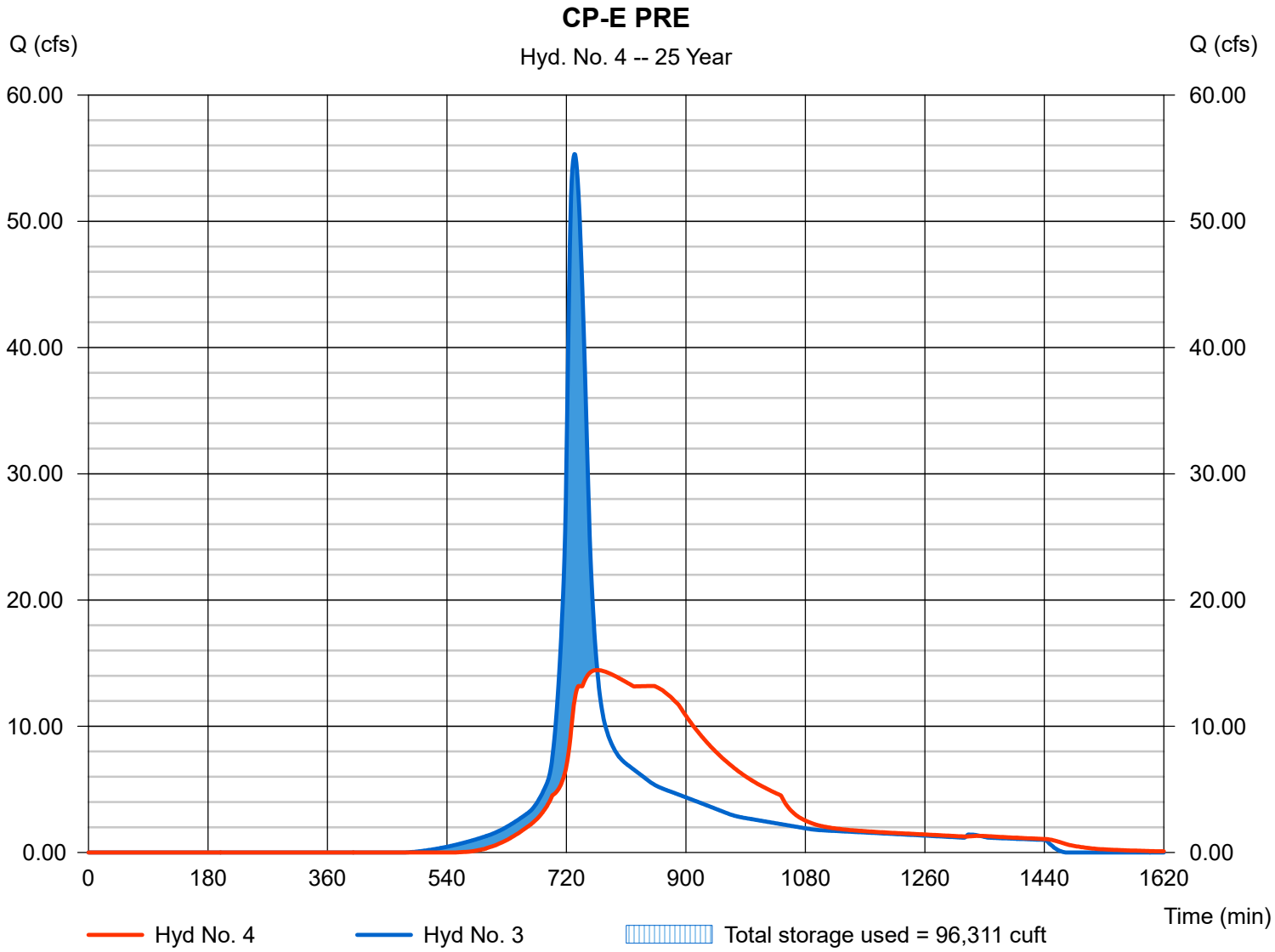
Hydrograph Report

Hyd. No. 4

CP-E PRE

Hydrograph type	=	Reservoir	Peak discharge	=	14.45 cfs
Storm frequency	=	25 yrs	Time to peak	=	766 min
Time interval	=	1 min	Hyd. volume	=	263,683 cuft
Inflow hyd. No.	=	3 - INFLOW WETLAND STORAGE EAST CULVERT	Max. Elevation	=	165.23 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	96,311 cuft

Storage Indication method used.

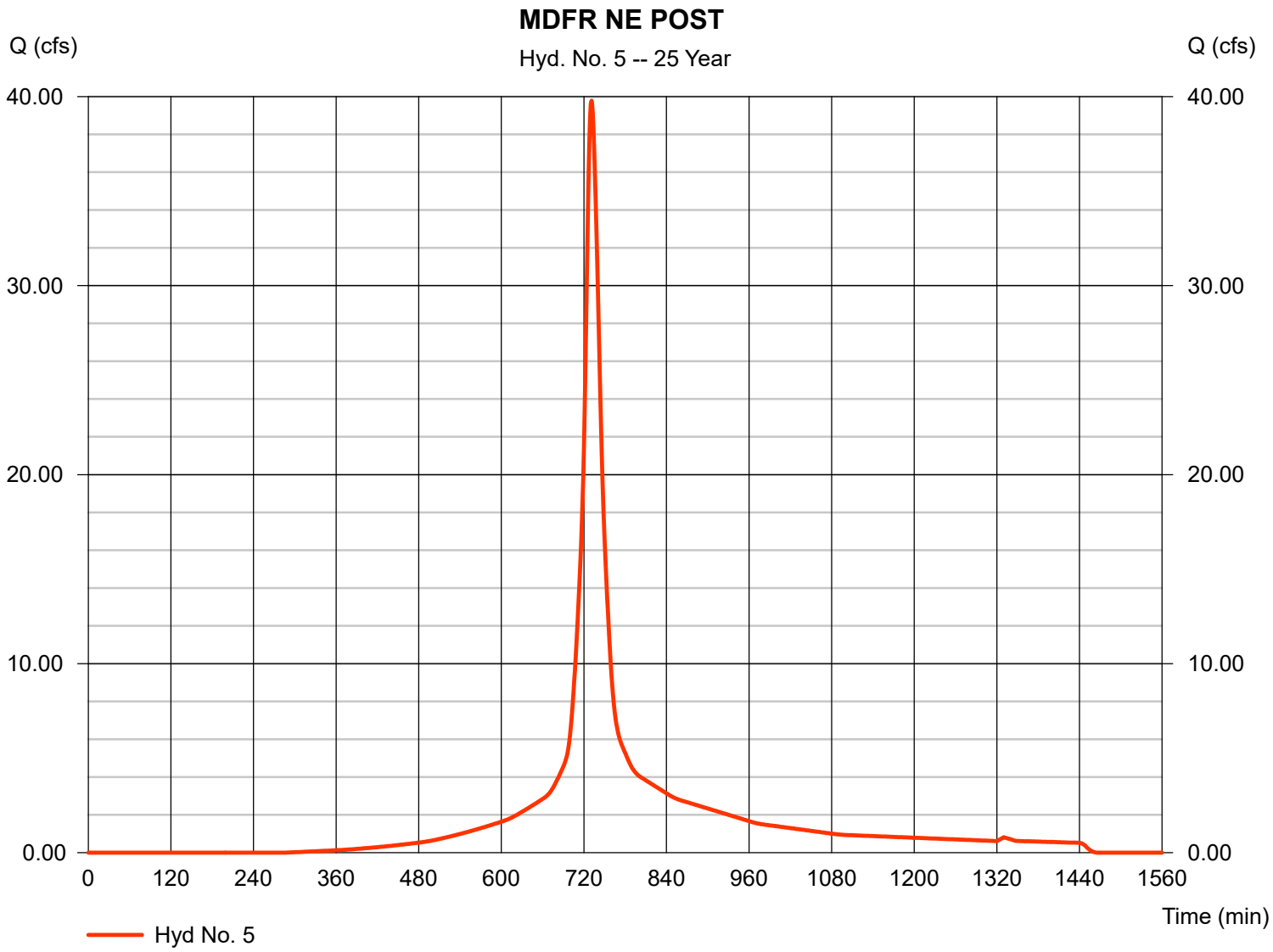


Hydrograph Report

Hyd. No. 5

MDFR NE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	39.78 cfs
Storm frequency	=	25 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	168,425 cuft
Drainage area	=	9.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.20 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



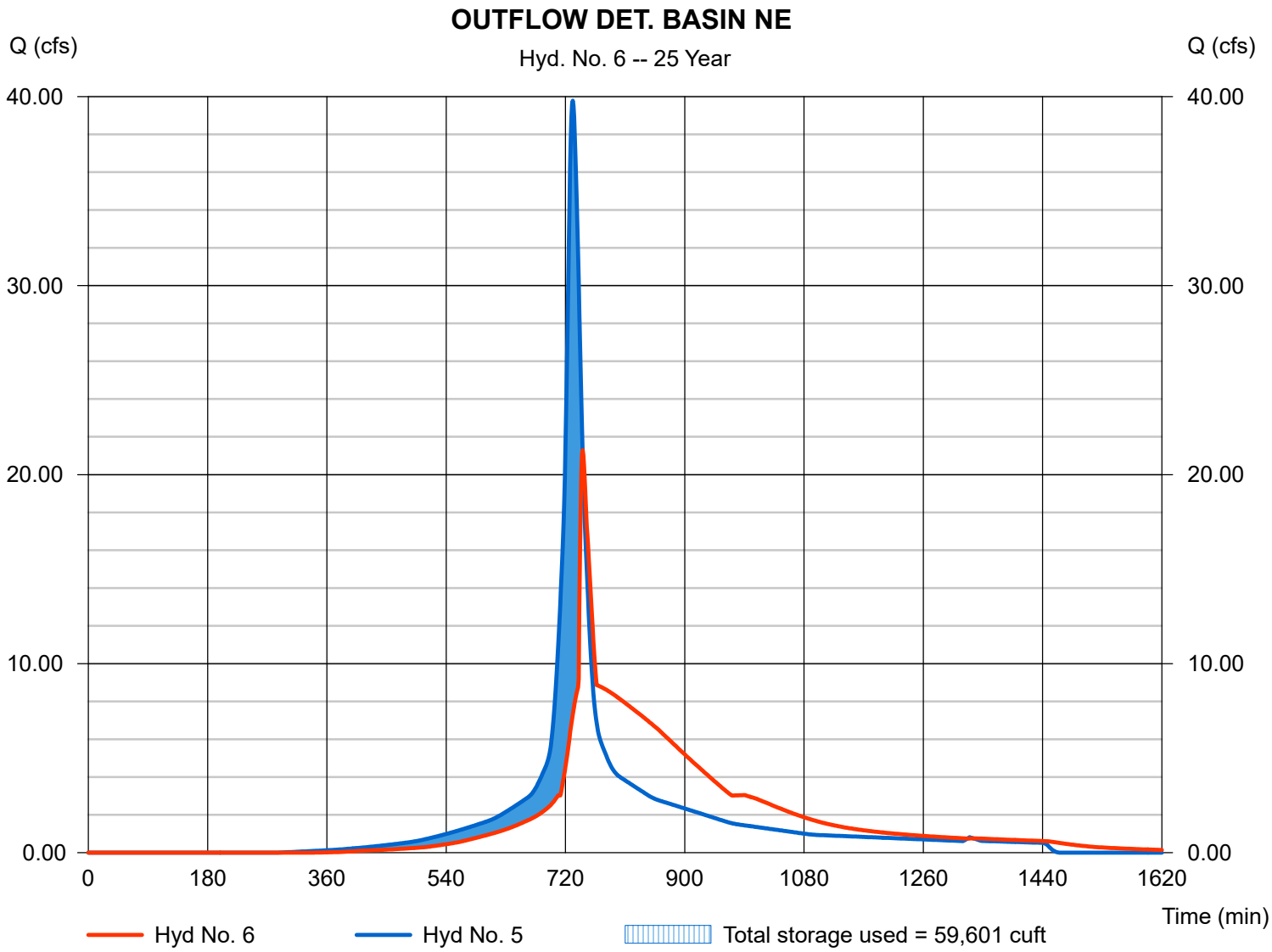
Hydrograph Report

Hyd. No. 6

OUTFLOW DET. BASIN NE

Hydrograph type	=	Reservoir	Peak discharge	=	21.30 cfs
Storm frequency	=	25 yrs	Time to peak	=	746 min
Time interval	=	1 min	Hyd. volume	=	168,356 cuft
Inflow hyd. No.	=	5 - MDFR NE POST	Max. Elevation	=	167.13 ft
Reservoir name	=	MFDR DET. BASIN NE	Max. Storage	=	59,601 cuft

Storage Indication method used.

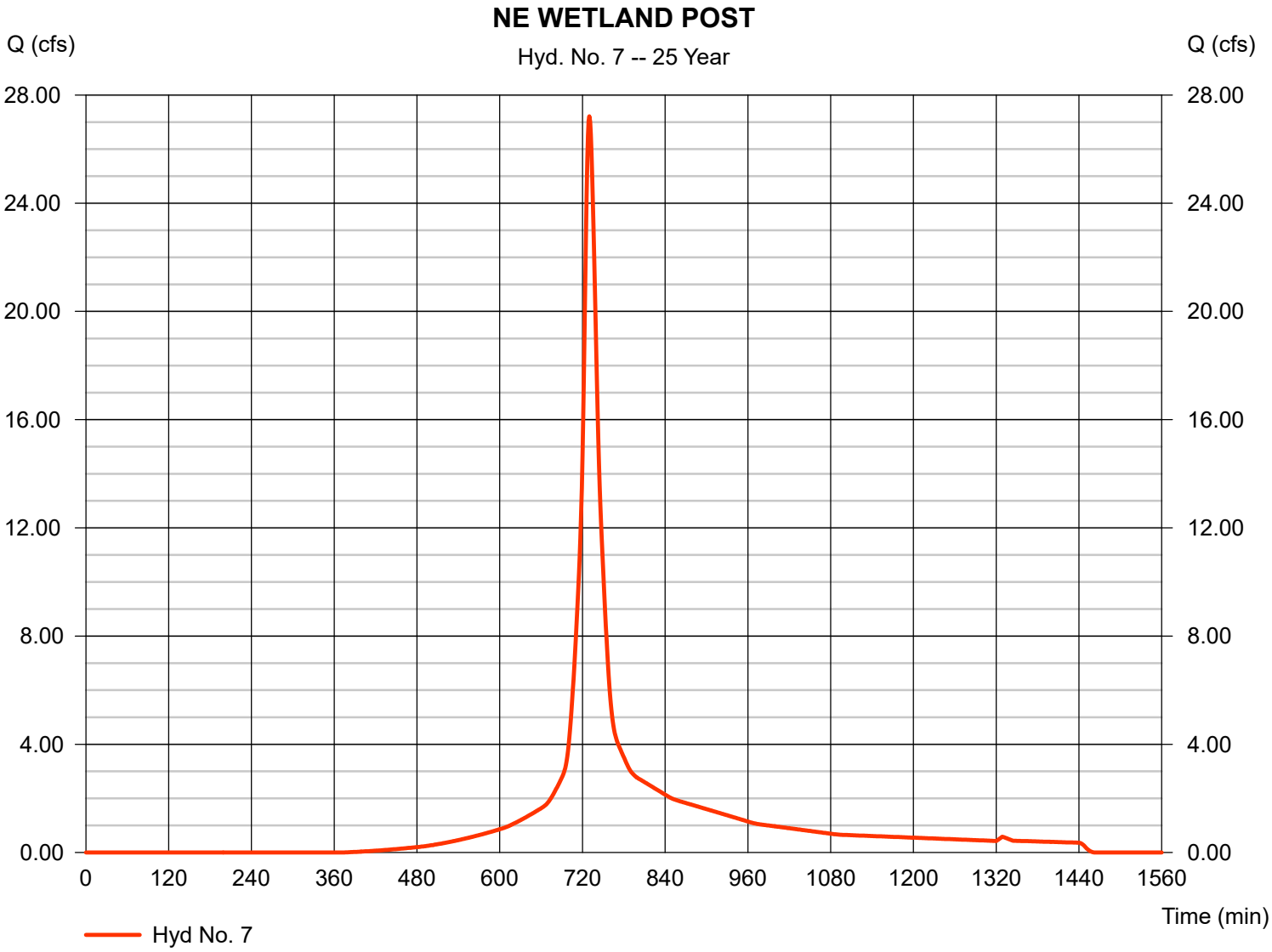


Hydrograph Report

Hyd. No. 7

NE WETLAND POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.21 cfs
Storm frequency	=	25 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	108,305 cuft
Drainage area	=	6.960 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.10 min
Total precip.	=	6.44 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

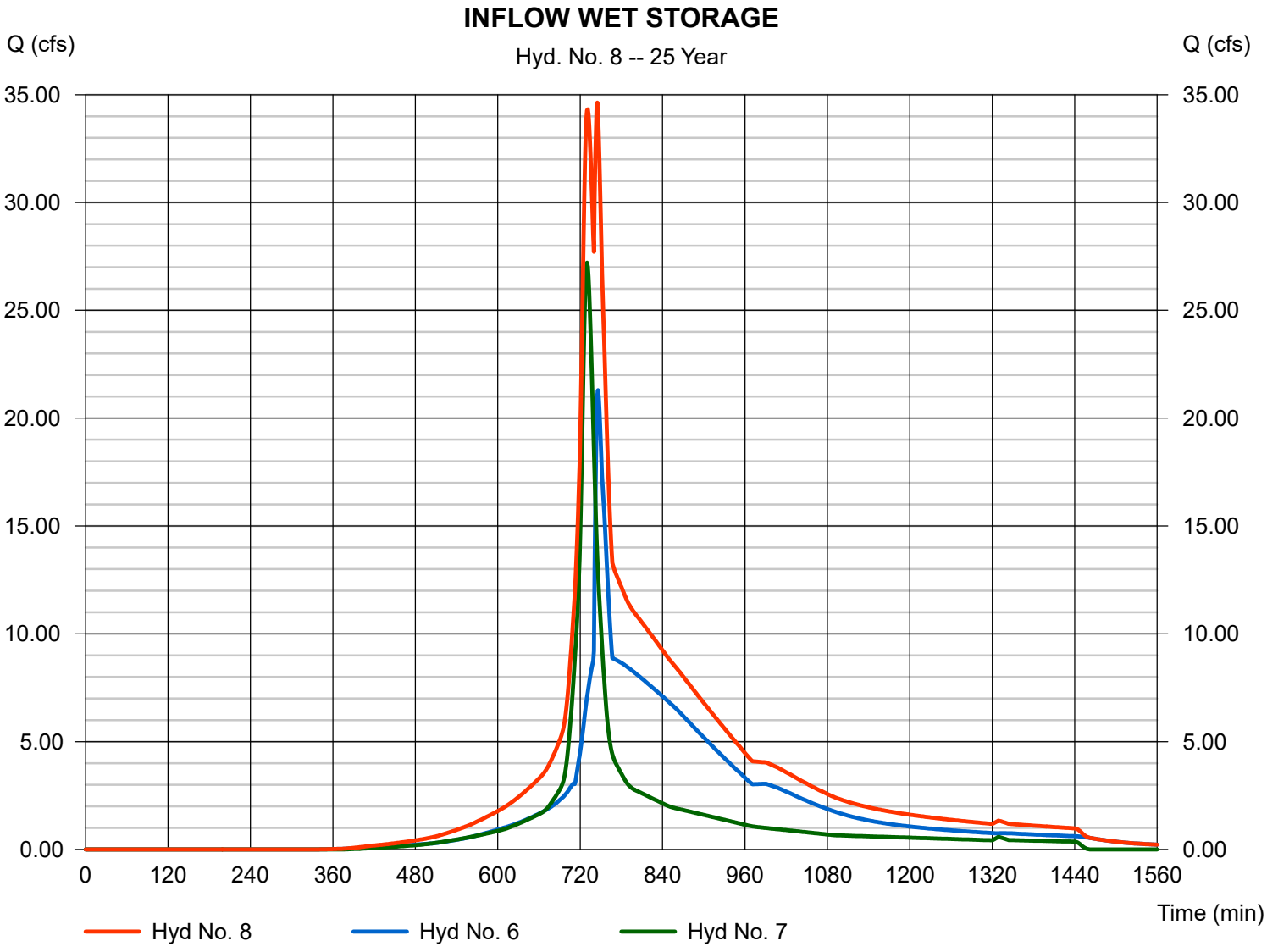


Hydrograph Report

Hyd. No. 8

INFLOW WET STORAGE

Hydrograph type	= Combine	Peak discharge	= 34.63 cfs
Storm frequency	= 25 yrs	Time to peak	= 745 min
Time interval	= 1 min	Hyd. volume	= 276,661 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 6.960 ac



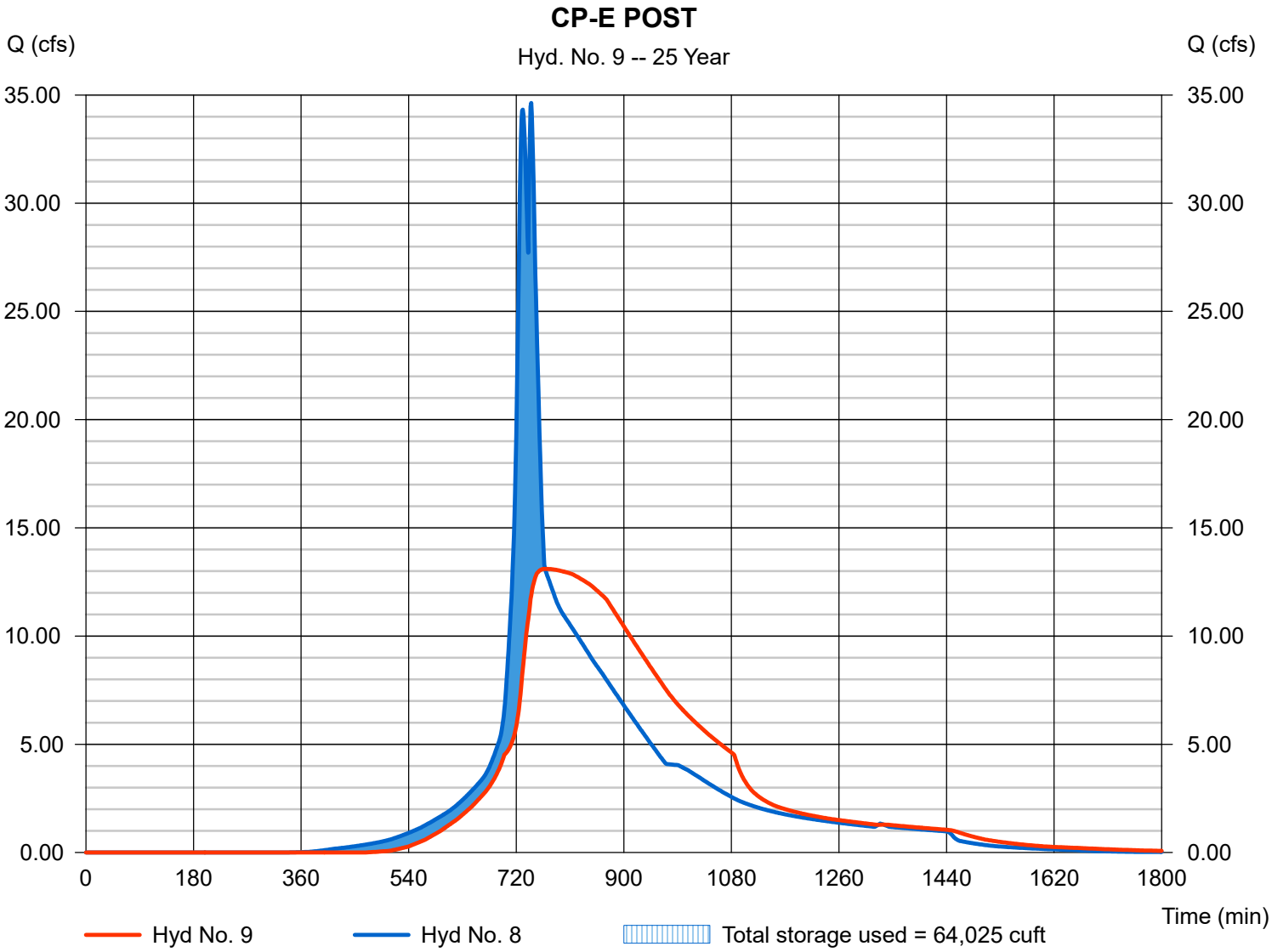
Hydrograph Report

Hyd. No. 9

CP-E POST

Hydrograph type	=	Reservoir	Peak discharge	=	13.11 cfs
Storm frequency	=	25 yrs	Time to peak	=	768 min
Time interval	=	1 min	Hyd. volume	=	275,586 cuft
Inflow hyd. No.	=	8 - INFLOW WET STORAGE	Max. Elevation	=	164.97 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	64,025 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

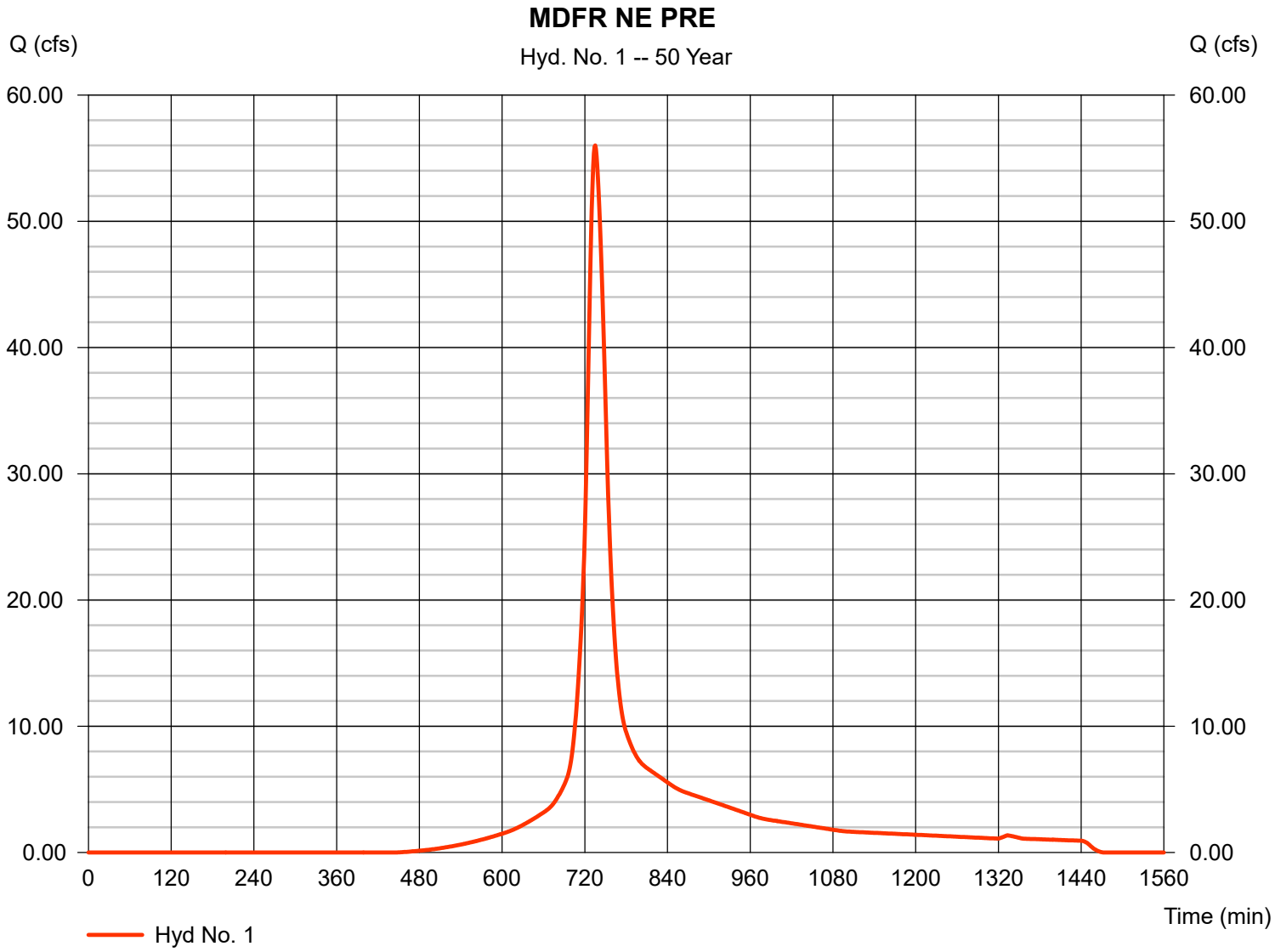
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	56.01	1	735	256,192	----	------	------	MDFR NE PRE
2	SCS Runoff	20.51	1	726	66,068	----	------	------	NE WETLAND PRE
3	Combine	67.36	1	732	322,260	1, 2	------	------	INFLOW WETLAND STORAGE EAS
4	Reservoir	16.19	1	768	321,190	3	165.41	121,769	CP-E PRE
5	SCS Runoff	46.47	1	731	198,237	----	------	------	MDFR NE POST
6	Reservoir	34.33	1	740	198,168	5	167.21	61,637	OUTFLOW DET. BASIN NE
7	SCS Runoff	32.28	1	730	129,175	----	------	------	NE WETLAND POST
8	Combine	56.43	1	739	327,342	6, 7	------	------	INFLOW WET STORAGE
9	Reservoir	13.84	1	770	326,267	8	165.17	88,016	CP-E POST

Hydrograph Report

Hyd. No. 1

MDFR NE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	56.01 cfs
Storm frequency	=	50 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	256,192 cuft
Drainage area	=	16.140 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.60 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

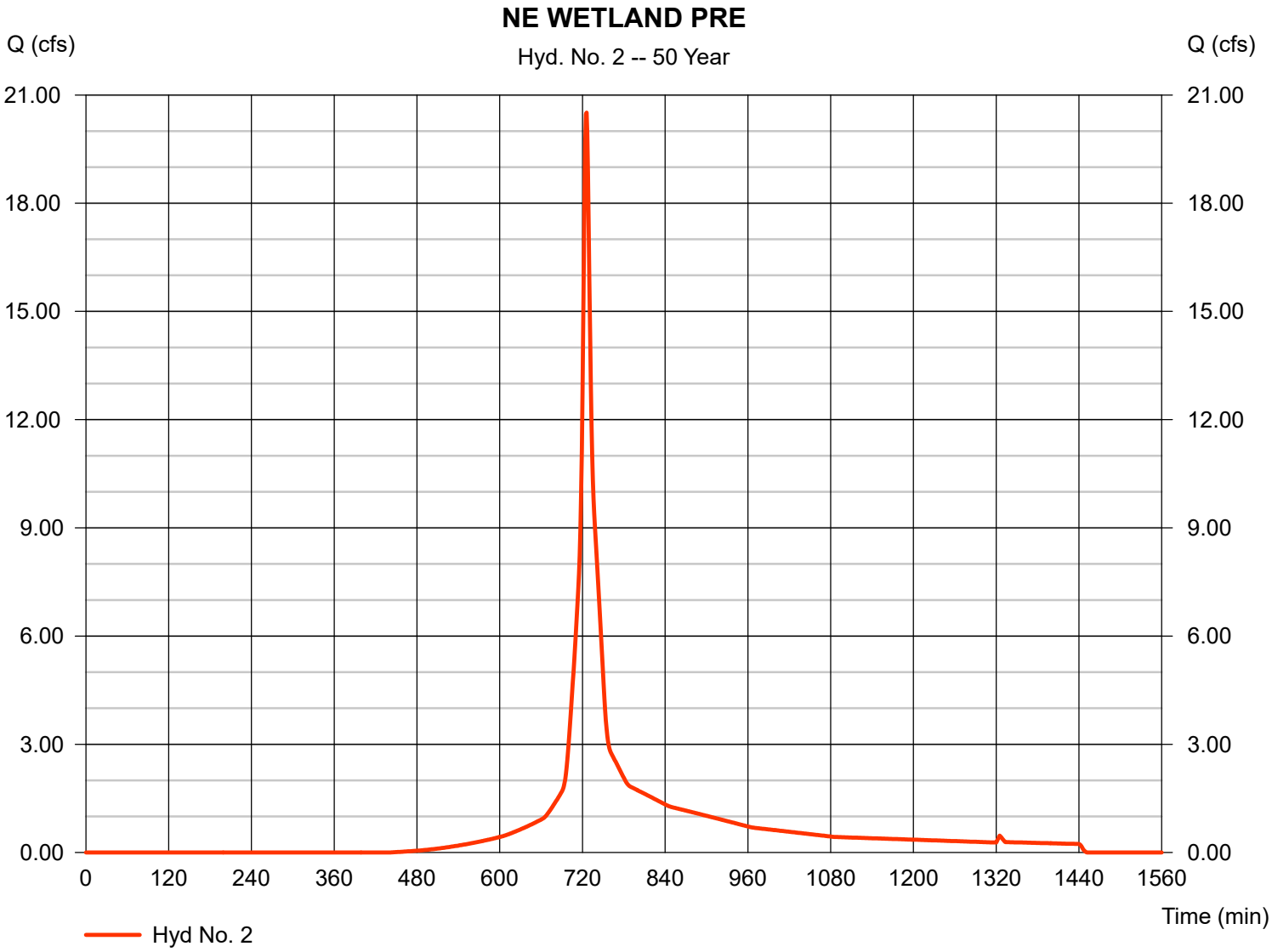


Hydrograph Report

Hyd. No. 2

NE WETLAND PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	20.51 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	66,068 cuft
Drainage area	=	4.310 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

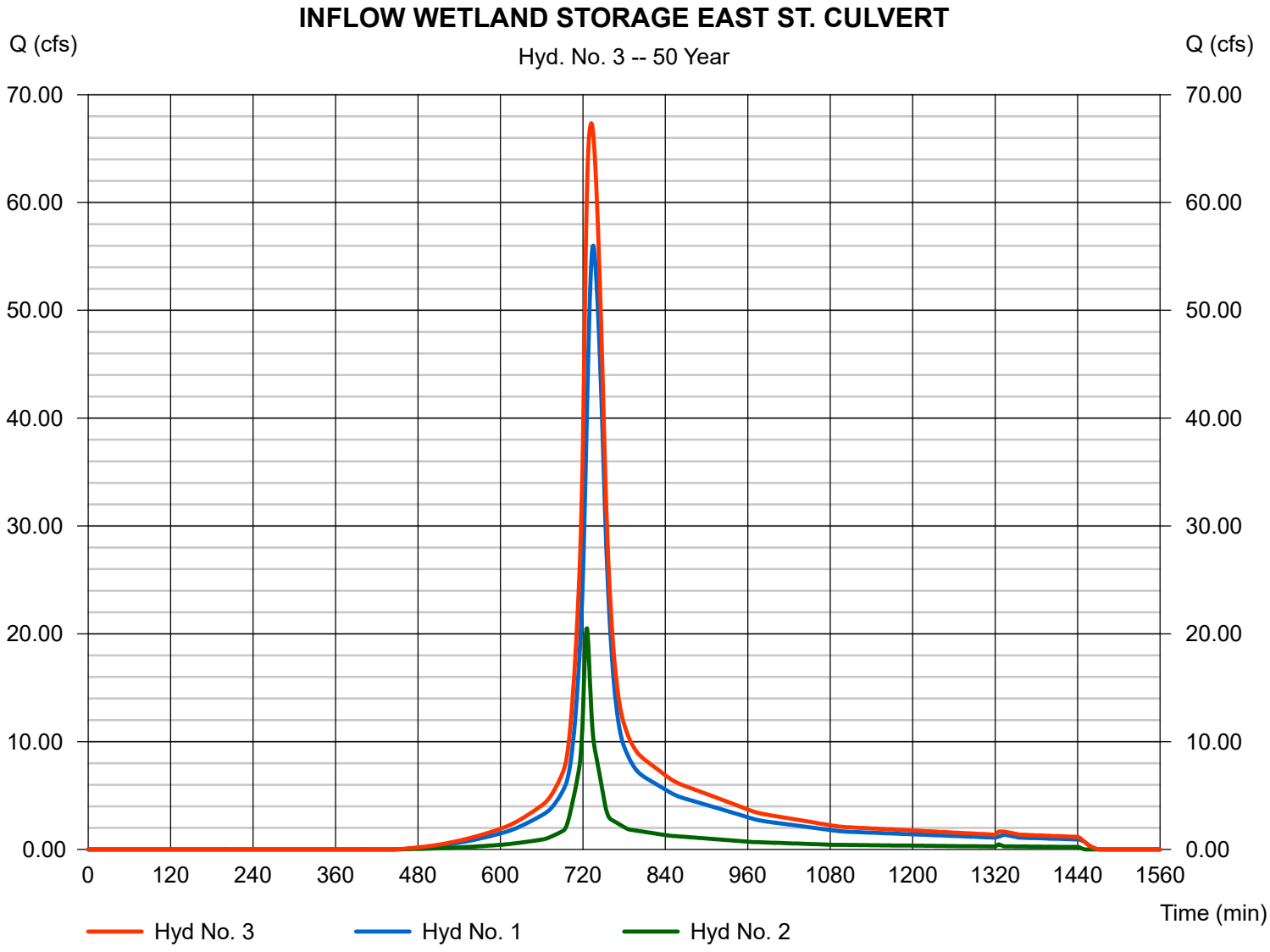


Hydrograph Report

Hyd. No. 3

INFLOW WETLAND STORAGE EAST ST. CULVERT

Hydrograph type	= Combine	Peak discharge	= 67.36 cfs
Storm frequency	= 50 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 322,260 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 20.450 ac



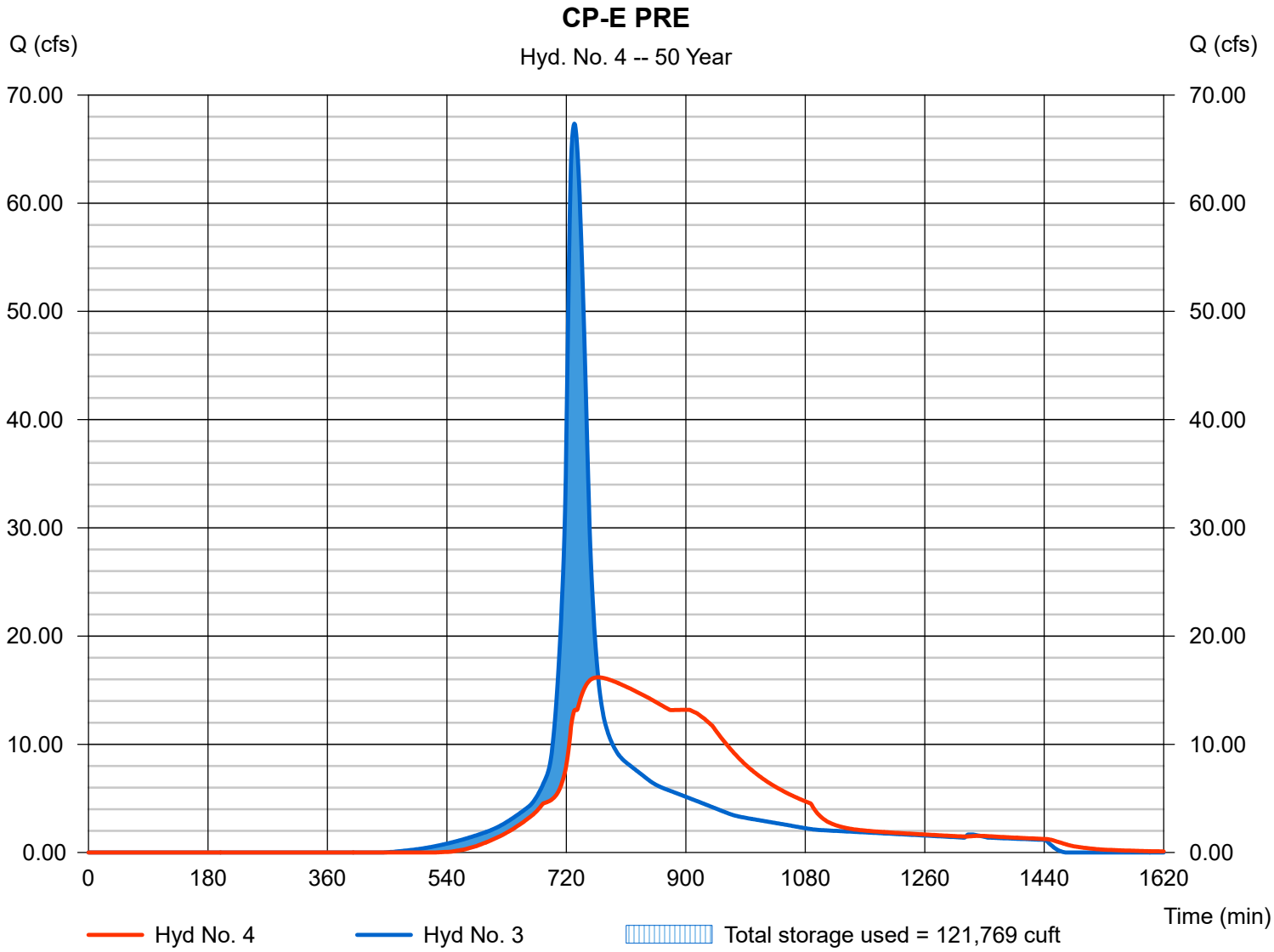
Hydrograph Report

Hyd. No. 4

CP-E PRE

Hydrograph type	=	Reservoir	Peak discharge	=	16.19 cfs
Storm frequency	=	50 yrs	Time to peak	=	768 min
Time interval	=	1 min	Hyd. volume	=	321,190 cuft
Inflow hyd. No.	=	3 - INFLOW WETLAND STORAGE EAST SIDE CULVERT	Max. Elevation	=	165.41 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	121,769 cuft

Storage Indication method used.

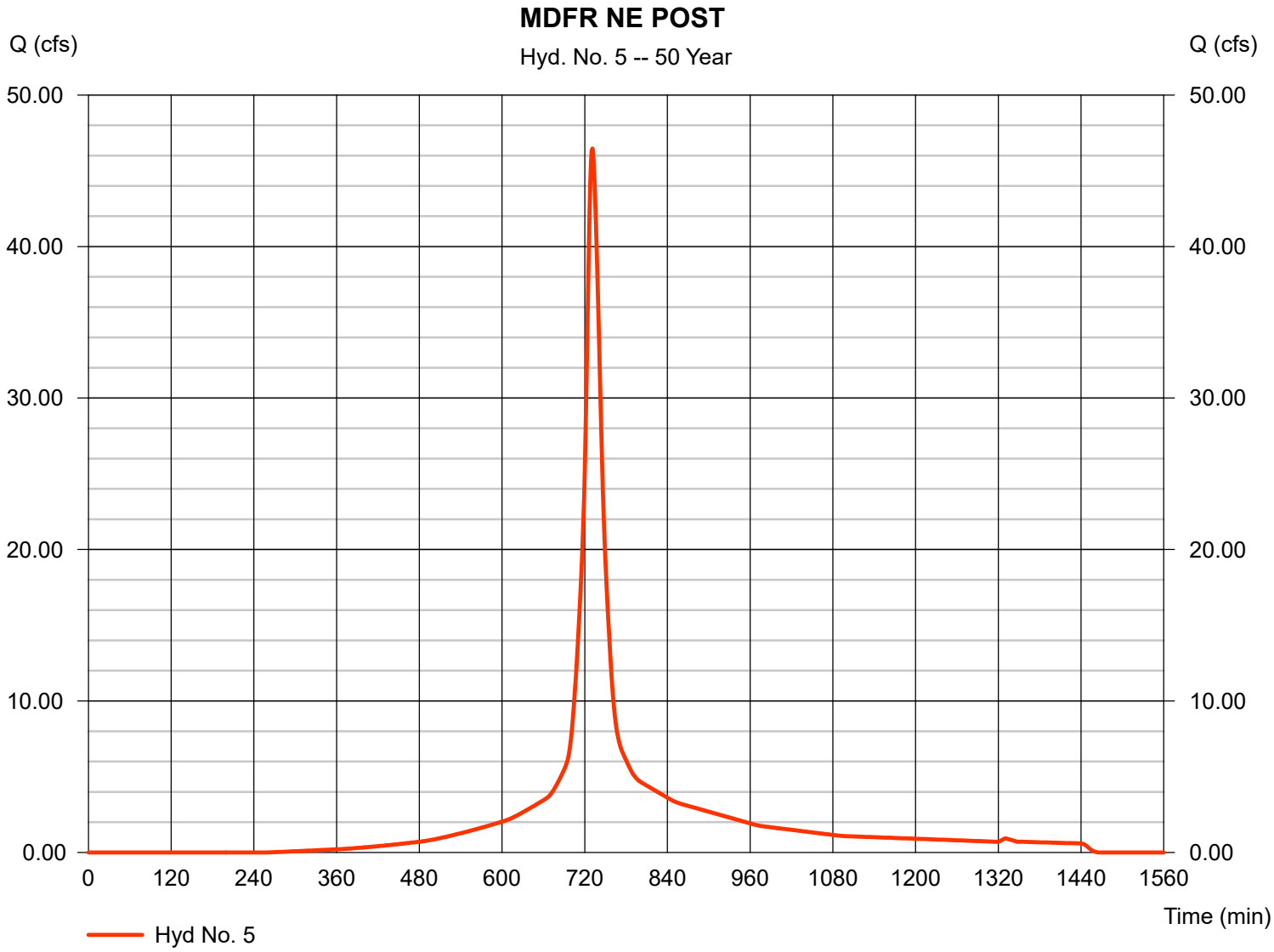


Hydrograph Report

Hyd. No. 5

MDFR NE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.47 cfs
Storm frequency	=	50 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	198,237 cuft
Drainage area	=	9.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.20 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



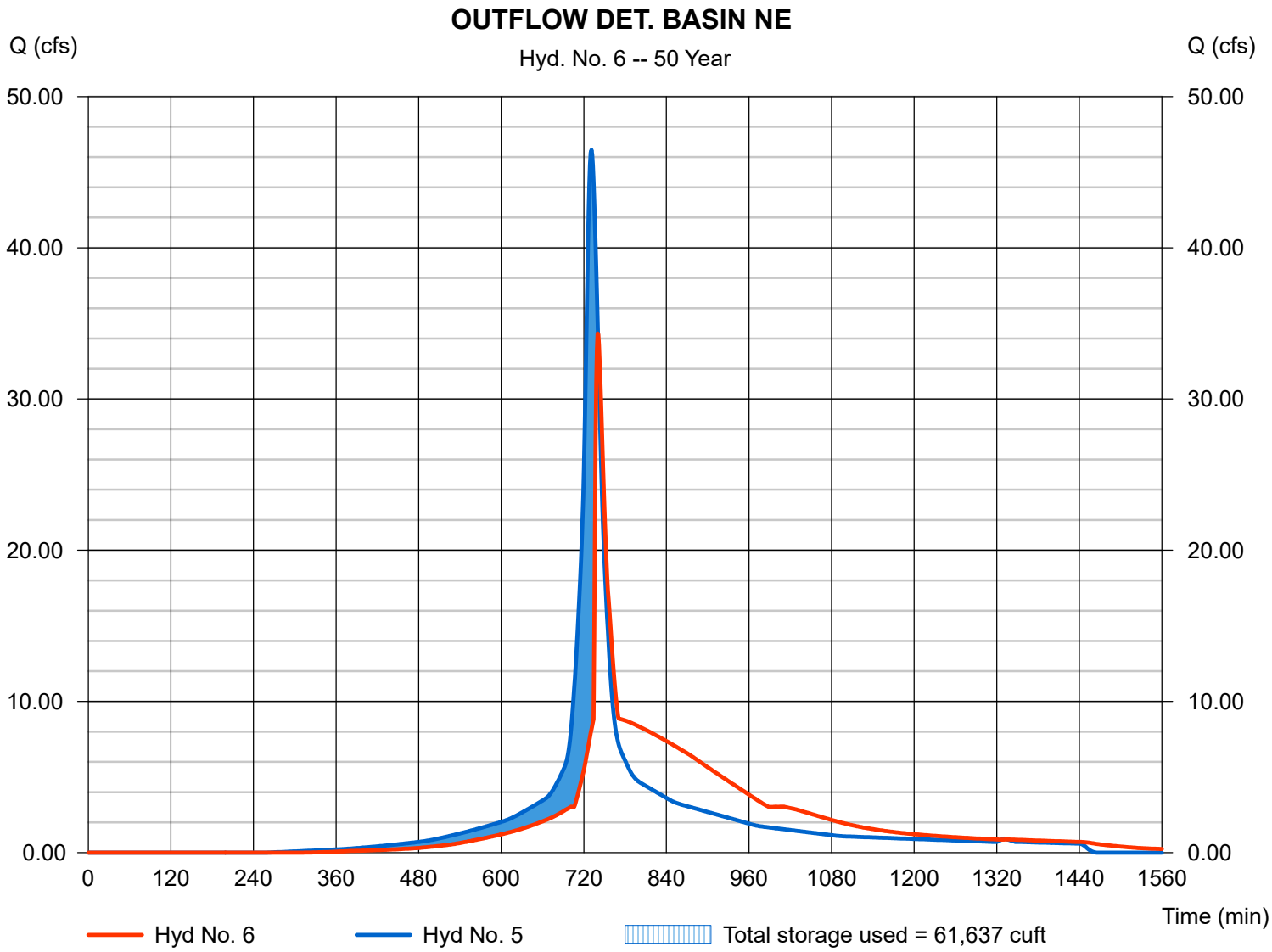
Hydrograph Report

Hyd. No. 6

OUTFLOW DET. BASIN NE

Hydrograph type	=	Reservoir	Peak discharge	=	34.33 cfs
Storm frequency	=	50 yrs	Time to peak	=	740 min
Time interval	=	1 min	Hyd. volume	=	198,168 cuft
Inflow hyd. No.	=	5 - MDFR NE POST	Max. Elevation	=	167.21 ft
Reservoir name	=	MFDR DET. BASIN NE	Max. Storage	=	61,637 cuft

Storage Indication method used.

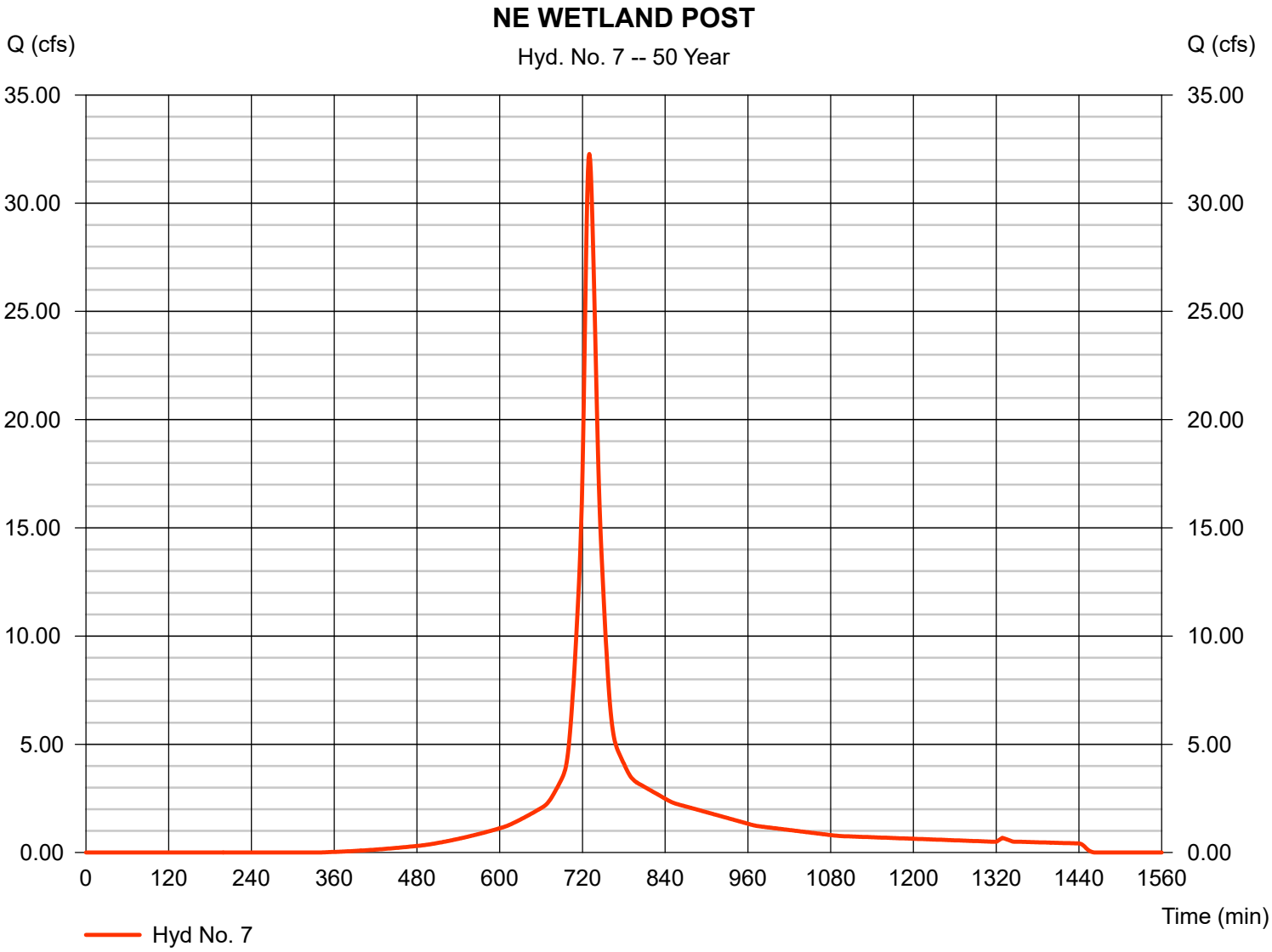


Hydrograph Report

Hyd. No. 7

NE WETLAND POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.28 cfs
Storm frequency	=	50 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	129,175 cuft
Drainage area	=	6.960 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.10 min
Total precip.	=	7.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

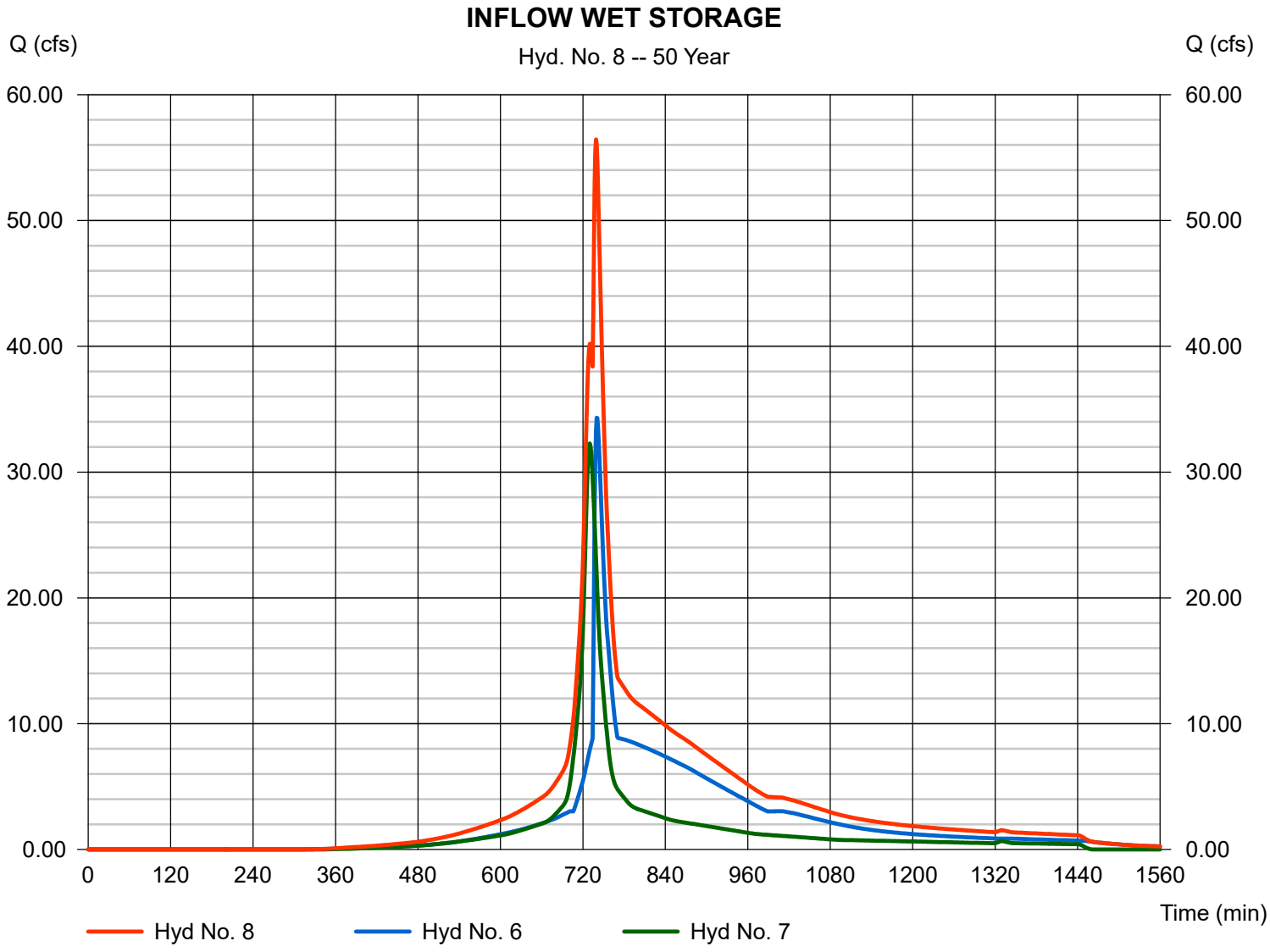


Hydrograph Report

Hyd. No. 8

INFLOW WET STORAGE

Hydrograph type	=	Combine	Peak discharge	=	56.43 cfs
Storm frequency	=	50 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	327,342 cuft
Inflow hyds.	=	6, 7	Contrib. drain. area	=	6.960 ac



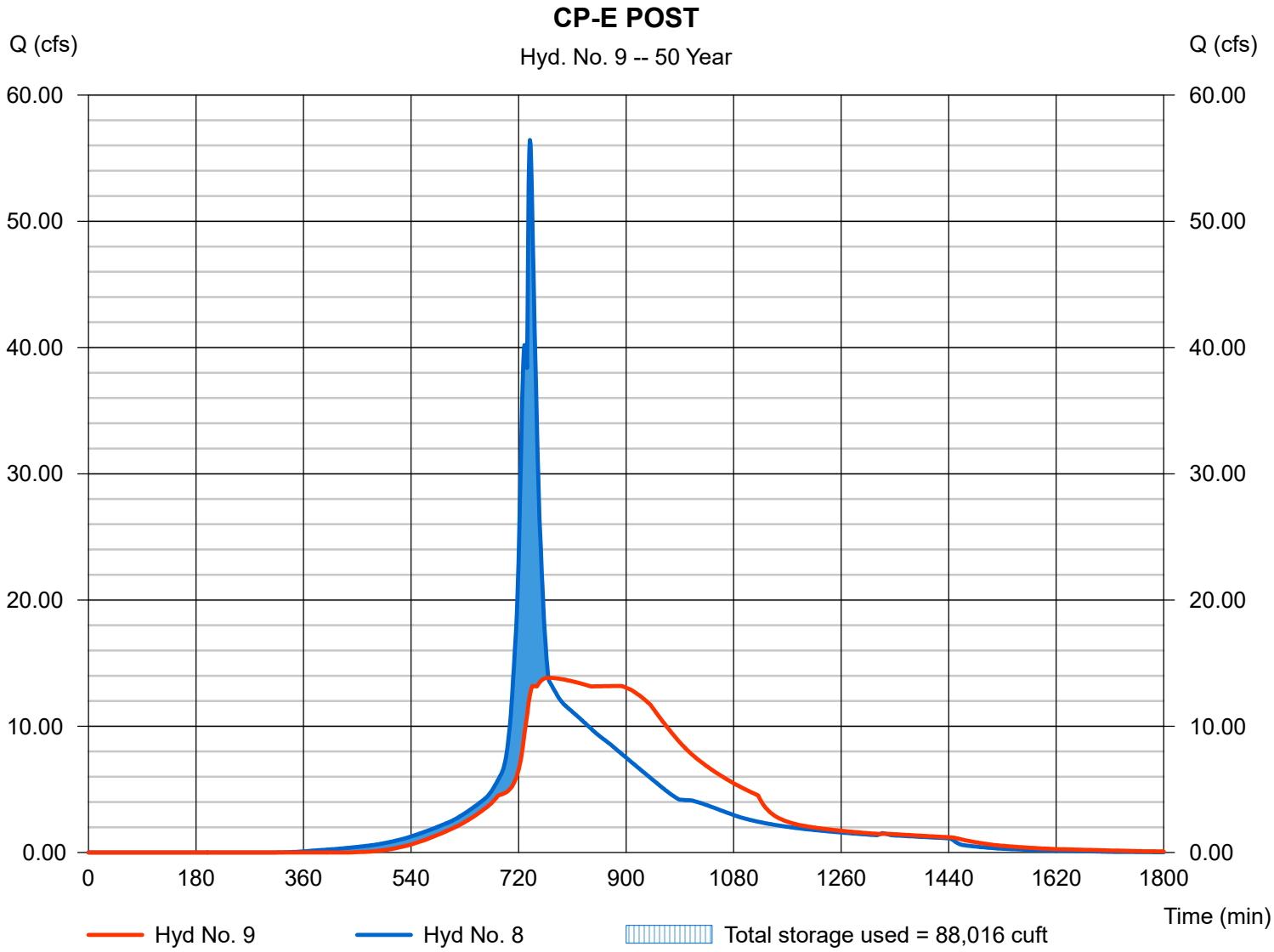
Hydrograph Report

Hyd. No. 9

CP-E POST

Hydrograph type	=	Reservoir	Peak discharge	=	13.84 cfs
Storm frequency	=	50 yrs	Time to peak	=	770 min
Time interval	=	1 min	Hyd. volume	=	326,267 cuft
Inflow hyd. No.	=	8 - INFLOW WET STORAGE	Max. Elevation	=	165.17 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	88,016 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

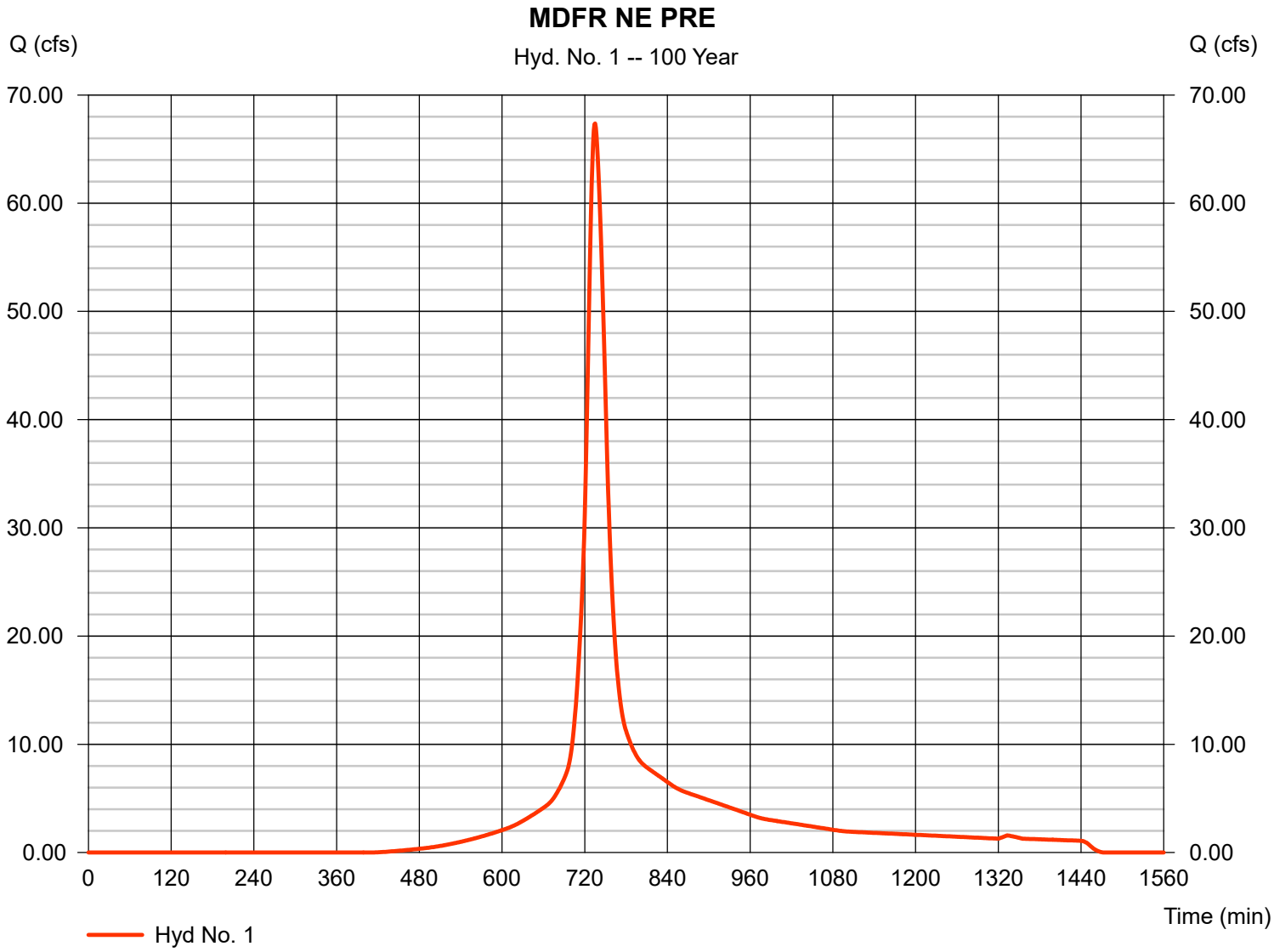
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	67.37	1	735	308,881	----	------	------	MDFR NE PRE
2	SCS Runoff	24.64	1	726	79,655	----	------	------	NE WETLAND PRE
3	Combine	81.07	1	732	388,535	1, 2	------	------	INFLOW WETLAND STORAGE EAS
4	Reservoir	18.02	1	769	387,466	3	165.63	151,828	CP-E PRE
5	SCS Runoff	53.95	1	731	232,004	----	------	------	MDFR NE POST
6	Reservoir	46.90	1	737	231,935	5	167.27	63,208	OUTFLOW DET. BASIN NE
7	SCS Runoff	37.97	1	730	152,960	----	------	------	NE WETLAND POST
8	Combine	78.42	1	736	384,895	6, 7	------	------	INFLOW WET STORAGE
9	Reservoir	15.72	1	770	383,819	8	165.36	114,723	CP-E POST

Hydrograph Report

Hyd. No. 1

MDFR NE PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	67.37 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	308,881 cuft
Drainage area	=	16.140 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	21.60 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

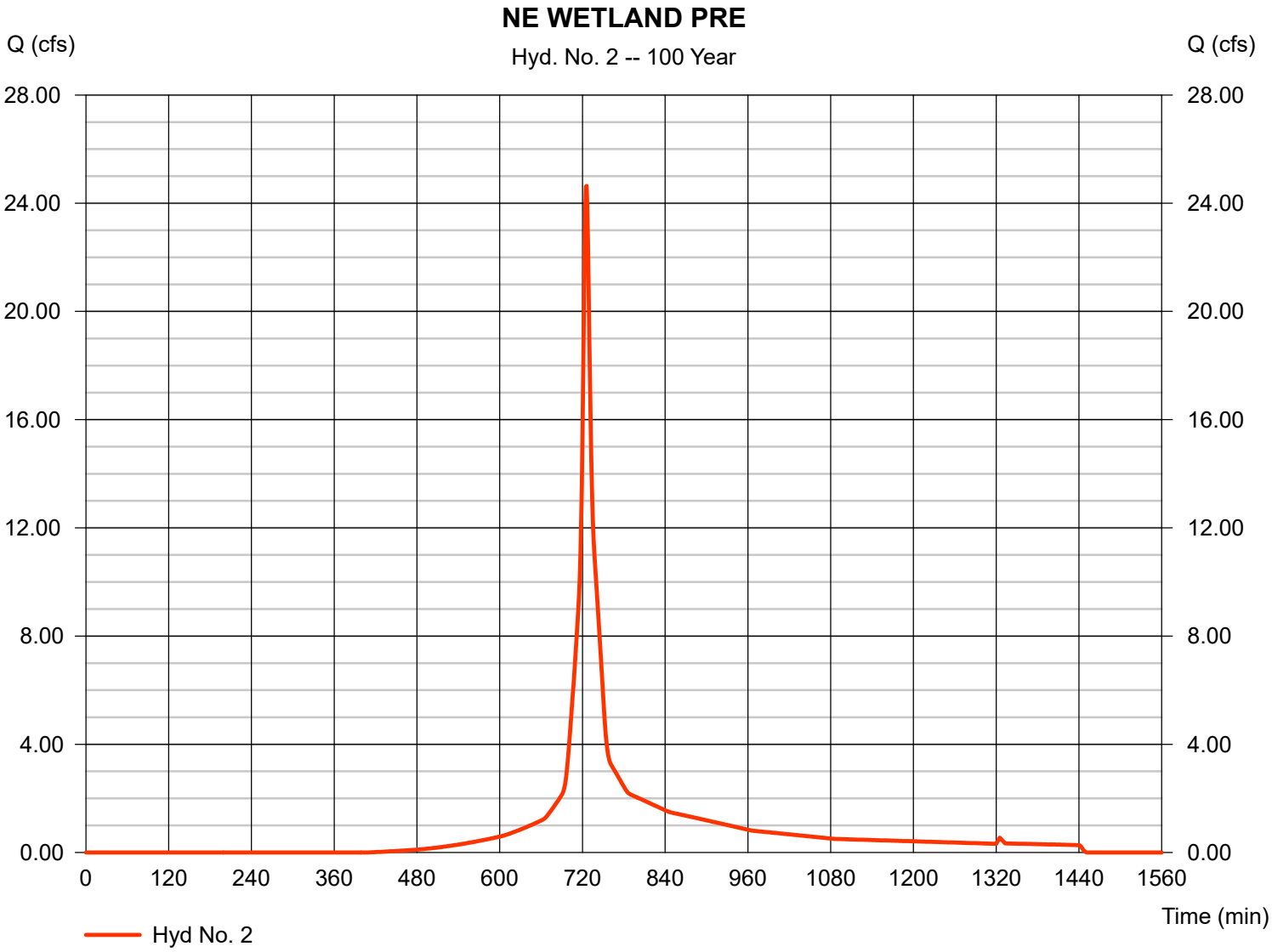


Hydrograph Report

Hyd. No. 2

NE WETLAND PRE

Hydrograph type	=	SCS Runoff	Peak discharge	=	24.64 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	79,655 cuft
Drainage area	=	4.310 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.90 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

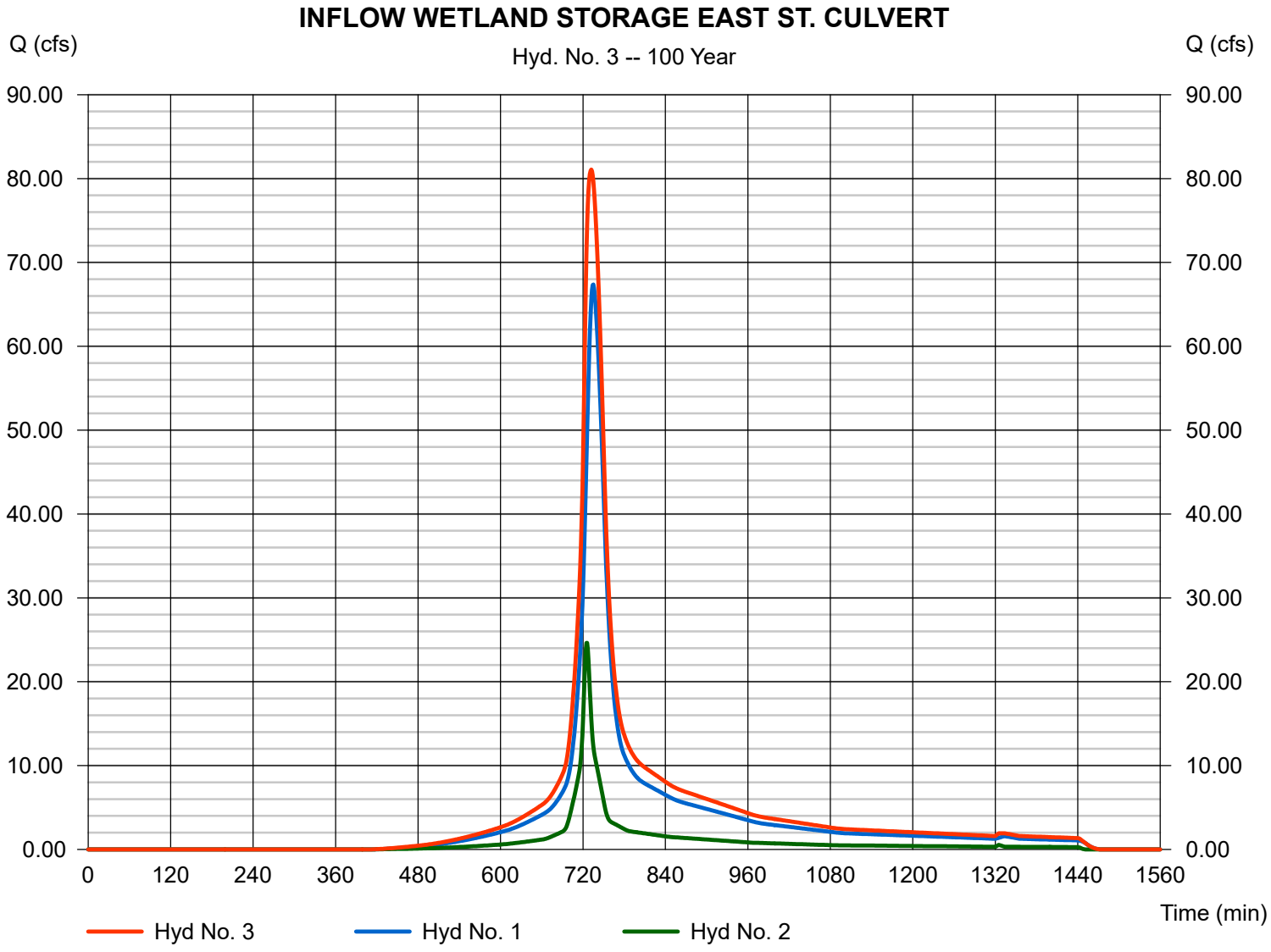


Hydrograph Report

Hyd. No. 3

INFLOW WETLAND STORAGE EAST ST. CULVERT

Hydrograph type	= Combine	Peak discharge	= 81.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 388,535 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 20.450 ac



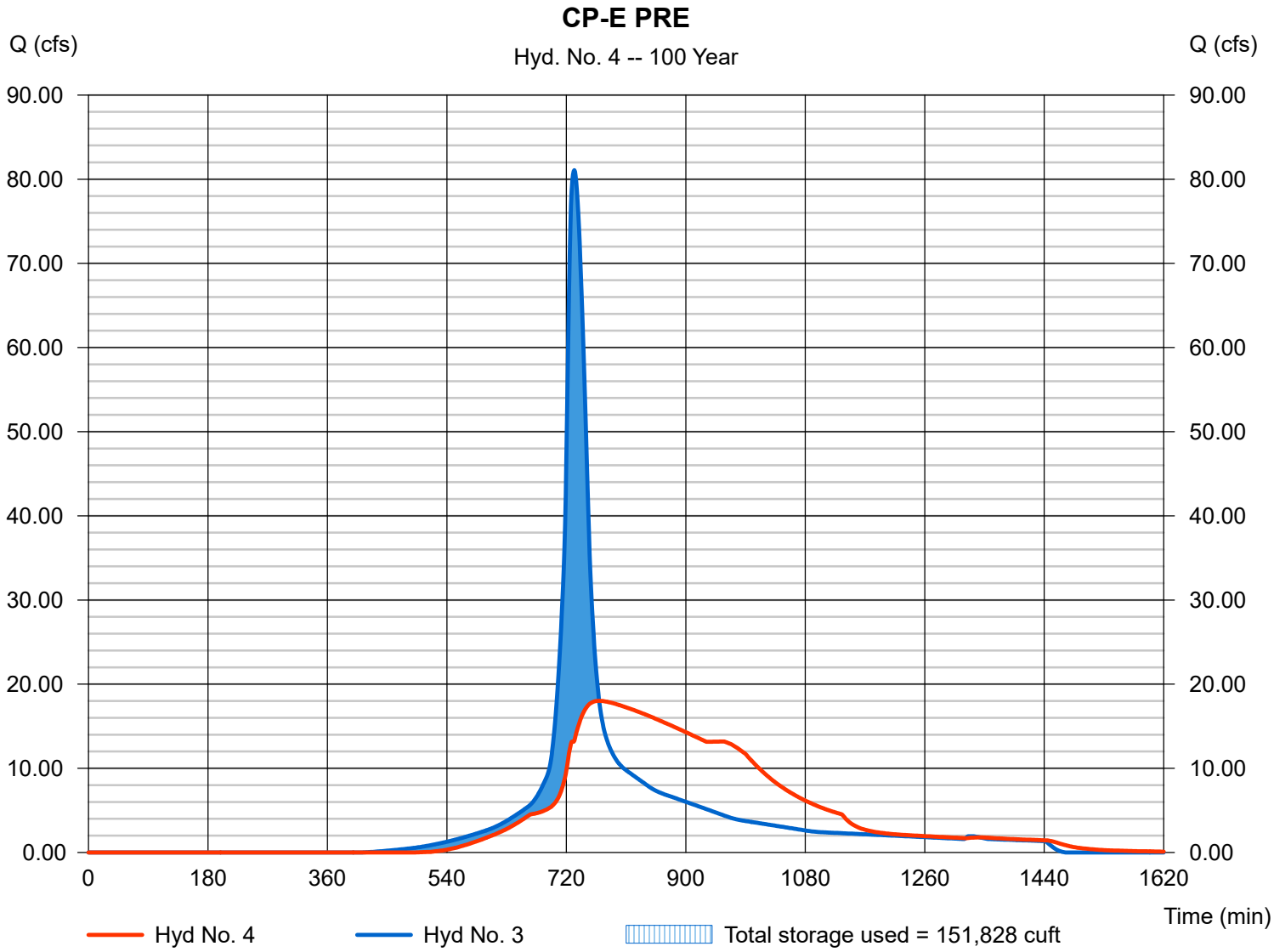
Hydrograph Report

Hyd. No. 4

CP-E PRE

Hydrograph type	=	Reservoir	Peak discharge	=	18.02 cfs
Storm frequency	=	100 yrs	Time to peak	=	769 min
Time interval	=	1 min	Hyd. volume	=	387,466 cuft
Inflow hyd. No.	=	3 - INFLOW WETLAND STORAGE EAST SIDE CULVERT	Max. Elevation	=	165.63 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	151,828 cuft

Storage Indication method used.

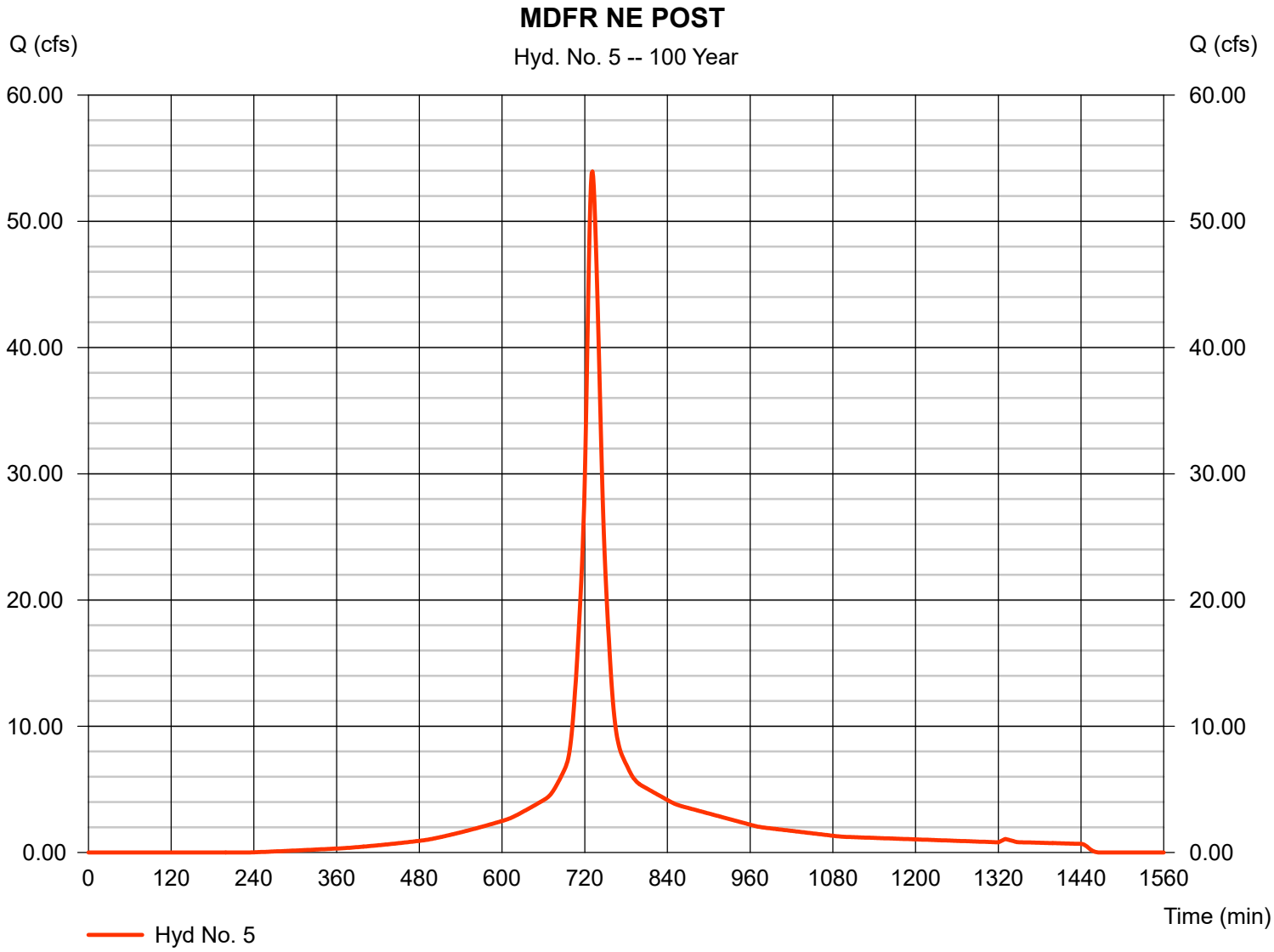


Hydrograph Report

Hyd. No. 5

MDFR NE POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	53.95 cfs
Storm frequency	=	100 yrs	Time to peak	=	731 min
Time interval	=	1 min	Hyd. volume	=	232,004 cuft
Drainage area	=	9.490 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	16.20 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



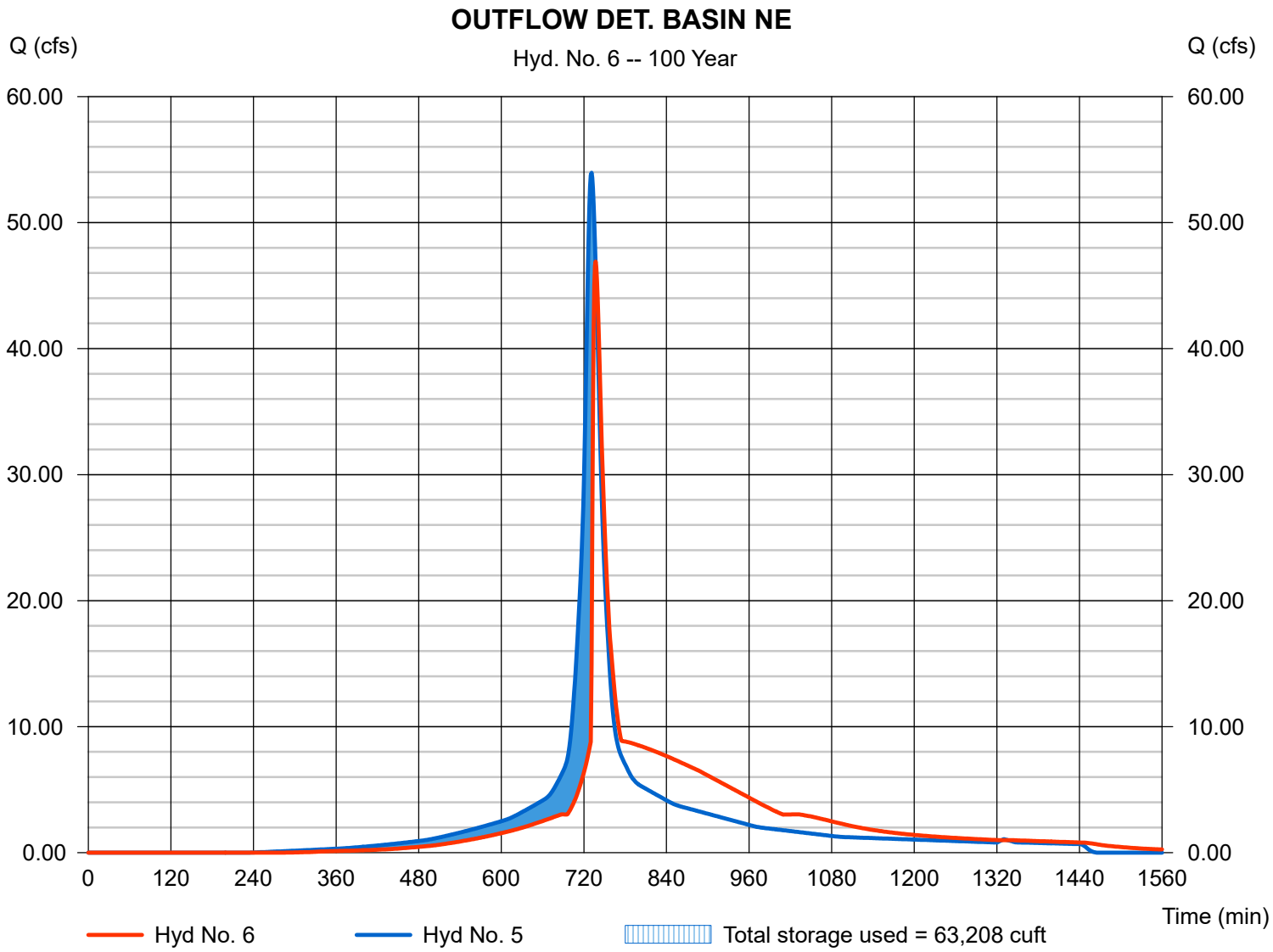
Hydrograph Report

Hyd. No. 6

OUTFLOW DET. BASIN NE

Hydrograph type	=	Reservoir	Peak discharge	=	46.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	737 min
Time interval	=	1 min	Hyd. volume	=	231,935 cuft
Inflow hyd. No.	=	5 - MDFR NE POST	Max. Elevation	=	167.27 ft
Reservoir name	=	MFDR DET. BASIN NE	Max. Storage	=	63,208 cuft

Storage Indication method used.

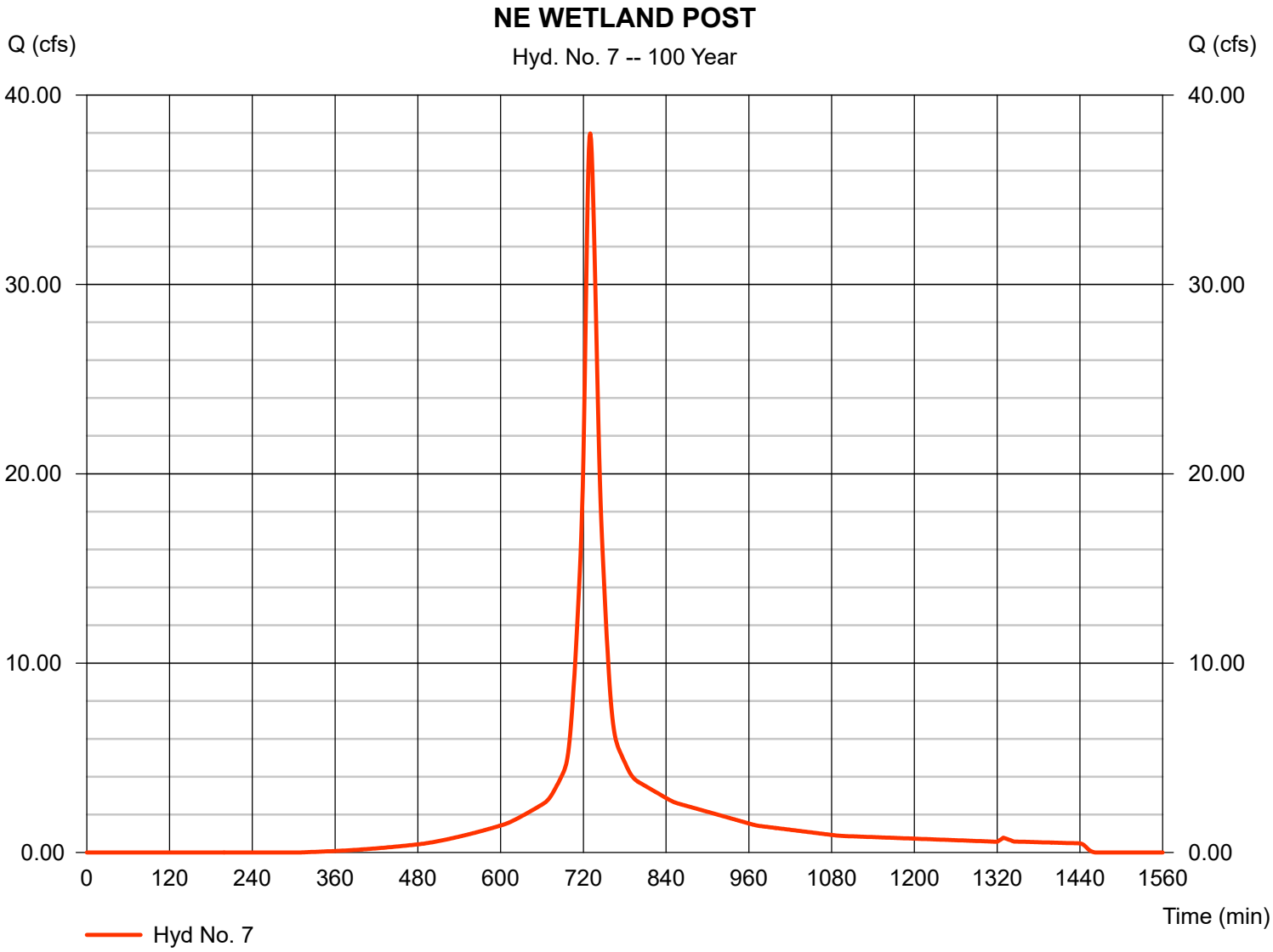


Hydrograph Report

Hyd. No. 7

NE WETLAND POST

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.97 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	1 min	Hyd. volume	=	152,960 cuft
Drainage area	=	6.960 ac	Curve number	=	81
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.10 min
Total precip.	=	8.33 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

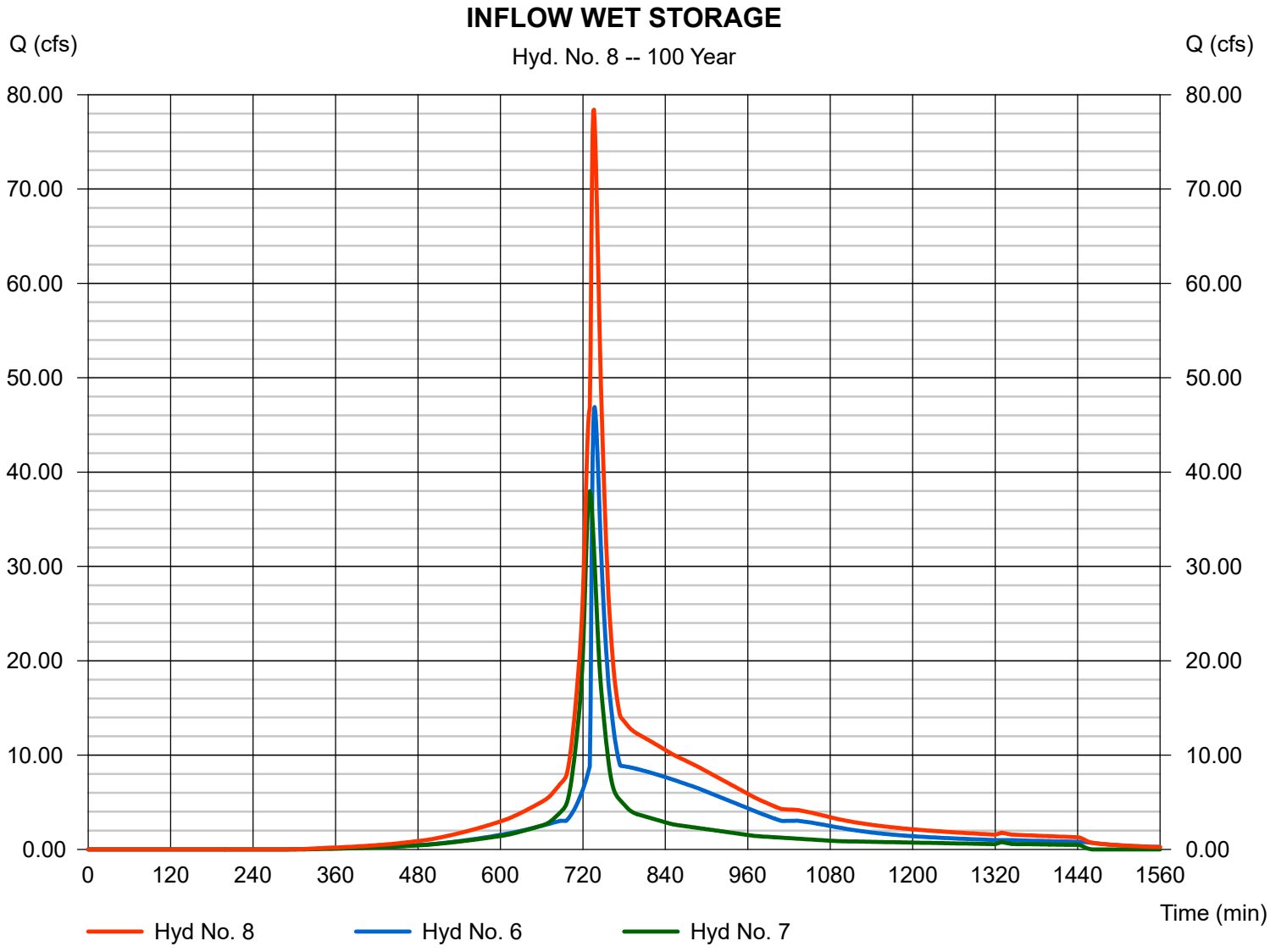


Hydrograph Report

Hyd. No. 8

INFLOW WET STORAGE

Hydrograph type	= Combine	Peak discharge	= 78.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 384,895 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 6.960 ac



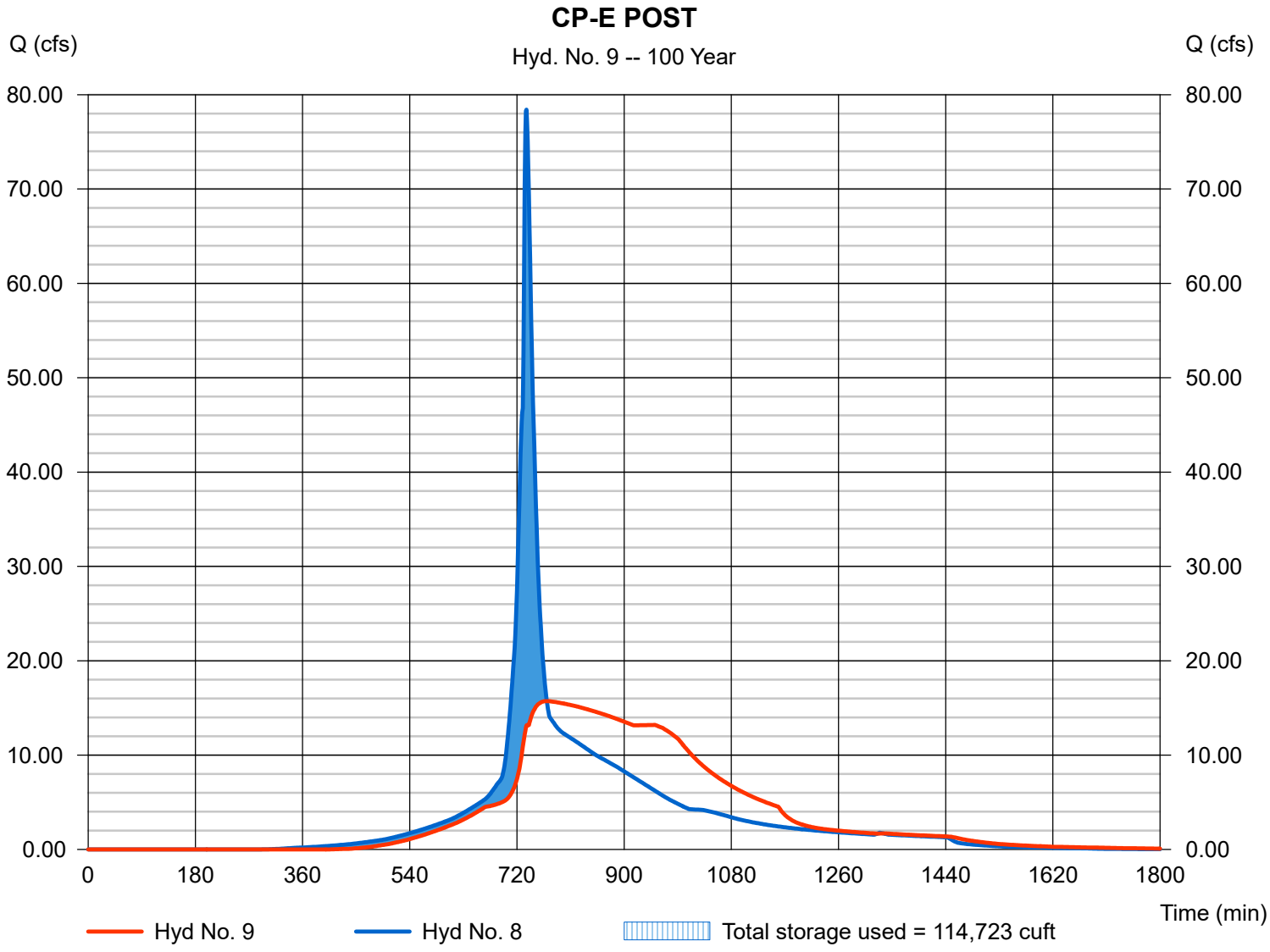
Hydrograph Report

Hyd. No. 9

CP-E POST

Hydrograph type	=	Reservoir	Peak discharge	=	15.72 cfs
Storm frequency	=	100 yrs	Time to peak	=	770 min
Time interval	=	1 min	Hyd. volume	=	383,819 cuft
Inflow hyd. No.	=	8 - INFLOW WET STORAGE	Max. Elevation	=	165.36 ft
Reservoir name	=	East St. Culvert Headwater Storage	Max. Storage	=	114,723 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	20.5089	3.8000	0.7318	--------
2	25.4250	4.1000	0.7380	--------
3	0.0000	0.0000	0.0000	--------
5	29.9317	3.7000	0.7174	--------
10	36.1004	3.9000	0.7226	--------
25	42.5438	3.8000	0.7161	--------
50	49.0391	4.1000	0.7202	--------
100	53.1753	3.7000	0.7130	--------

File name: BRAMBLE BUSH 2022-11-16.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	4.18	3.00	2.40	2.02	1.75	1.56	1.41	1.29	1.19	1.11	1.04	0.98
2	4.98	3.61	2.88	2.43	2.11	1.88	1.70	1.56	1.44	1.34	1.25	1.18
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.34	4.58	3.66	3.09	2.69	2.40	2.17	1.99	1.84	1.72	1.61	1.52
10	7.44	5.39	4.32	3.64	3.18	2.83	2.56	2.35	2.17	2.02	1.90	1.79
25	8.96	6.50	5.21	4.40	3.84	3.42	3.10	2.84	2.63	2.45	2.30	2.17
50	10.00	7.29	5.86	4.96	4.33	3.86	3.50	3.21	2.97	2.77	2.60	2.45
100	11.37	8.23	6.59	5.57	4.86	4.33	3.92	3.60	3.33	3.11	2.92	2.75

Tc = time in minutes. Values may exceed 60.

Precip. file name: BRAMBLE BUSH 2022-11-16.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	2.59	3.24	0.00	4.32	5.21	6.44	7.33	8.33
SCS 6-Hr	1.82	2.21	0.00	2.84	3.37	4.09	4.63	5.21
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

Attachment 6

Water Quality Volume Computations

Bramble Bush - East Granby, CT
Water Quality Volume Size Calculations

March 24, 2023

Minimum-Recommended Water Quality Volume (WQV)

Watershed	Total Area (Ac)	Impervious Area - I (Ac)	Impervious (%)	Runoff (R)	Min. Rec. WQV (ac-ft)	Min. Rec. WQV (Cu.Ft.)
MFDR NE-POST	9.22	3.54	38.4	0.3956	0.30392	13,239
MFDR NW-POST	5.03	2.14	42.5	0.4329	0.18146	7,904
MFDR SW-POST	5.80	1.88	32.4	0.3417	0.16517	7,195

$$WQV = \frac{(1")(R)(A)}{12}$$

WQV = water quality volume (ac-ft)

R = volumetric runoff coefficient
0.05+0.009(I)

I = percent impervious cover

Provided Water Quality Volume

Water Quality Basins

Water Quality Basin ID (Watershed)	Elevations *(Ft.)*	Area *(Sq. Ft.)*	Avg. Area *(Sq. Ft.)*	Avg. Depth *(FT)*	Avg. Vol *(Cu. Ft.)*	Total Provided *(Cu. Ft.)*
WQB #1 (MFDR N.E.-POST)	163.85	0				**34,645**
			7,122	0.15	**1,068**	
	164.00	14,244				
			15,690	1.00	**15,690**	
	165.00	17,136				
			18,612	1.00	**18,612**	
	166.00	20,087				
			21,044	0.85	**17,887**	
	166.85	22,000				
WQB #3 (MFDR N.W.-POST)	163.22	0				**9,320**
			2,376	0.28	**665**	
	163.50	4,752				
			5,591	0.50	**2,796**	
	164.00	6,431				
			6,893	0.85	**5,859**	
	164.85	7,356				
WQB #2 (MFDR S.W.-POST)	164.87	0				**27,584**
			5,746	0.13	**747**	
	165.00	11,492				
			12,439	1.00	**12,439**	
	166.00	13,385				
			14,399	1.00	**14,399**	
	167.00	15,412				