STORMWATER MANAGEMENT CALCULATIONS

BLACK BUFFALO

NEW LIGHT MANUFACTURING & WAREHOUSE FACILITY

Smithfield Township
Monroe County, Pennsylvania

Prepared by:

T&M ASSOCIATES
74 West Broad Street
Suite 530
Bethlehem, PA 18018
610-625-2999
Fax 610-625-2969

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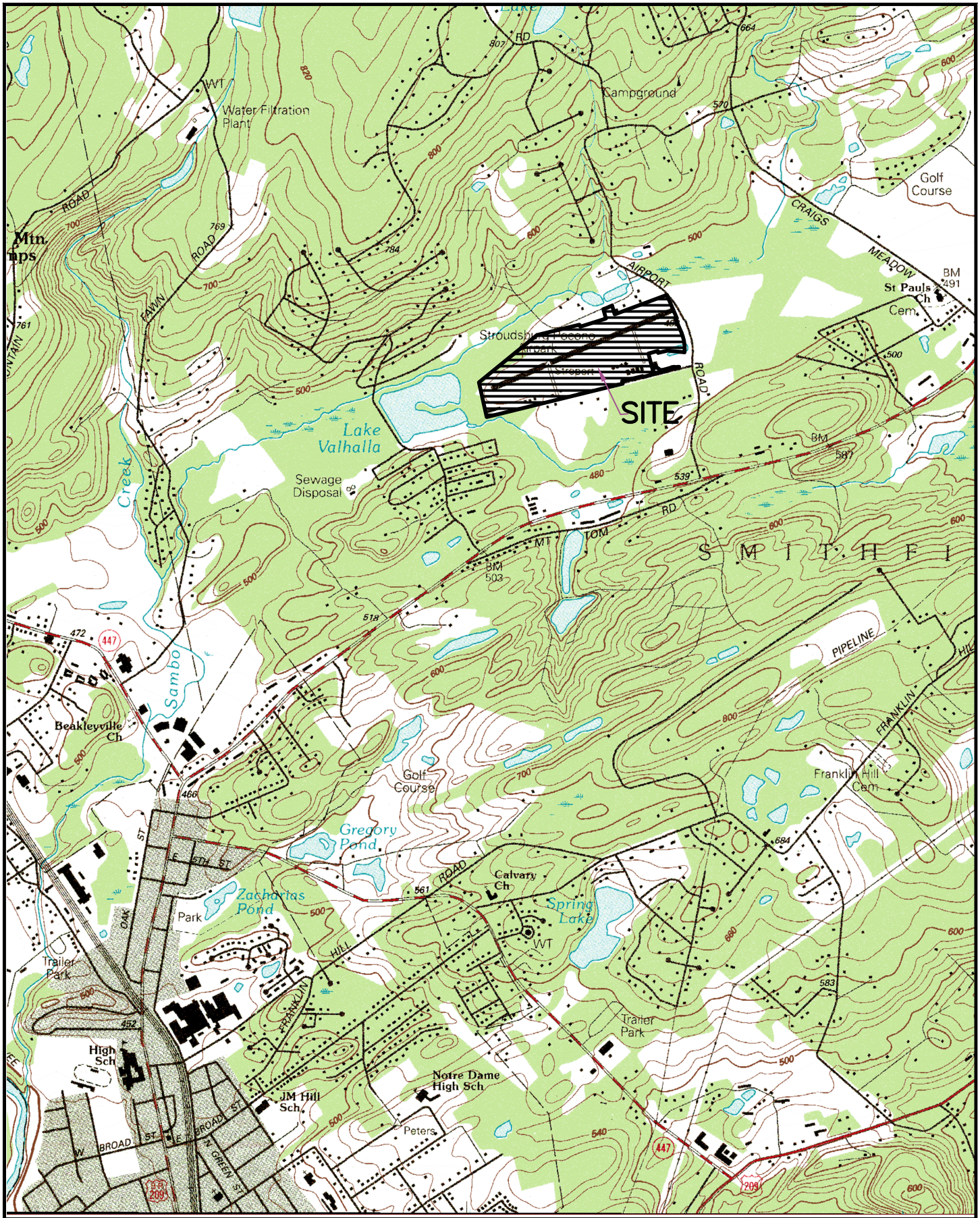

74 WEST BROAD STREET, SUITE 530
BETHLEHEM, PA. 18018
TEL: 610-625-2999
FAX: 610-625-2969

USGS LOCATION MAP - (EAST STROUDSBURG, PA QUAD)

BLACK BUFFALO - AIRSTRIP ROAD

SMITHFIELD TOWNSHIP, MONROE COUNTY, PENNSYLVANIA

SCALE: 1"=2000'

SHEET 1 OF 1

BLACK BUFFALO

NEW LIGHT MANUFACTURING & WAREHOUSE FACILITY

Smithfield Township, Monroe County

STORMWATER RUNOFF CALCULATIONS

PROJECT NARRATIVE

The proposed project consists of the construction of a 131,250 square foot light manufacturing and warehouse facility with associated site improvements on a 68.4 acre parcel located on the north side of Airstrip Road in Smithfield Township, Monroe County. Roadway maintenance / improvements for Airstrip Road are also proposed as a part of this project. The project also includes construction of parking lots with access drives and two above ground storm water management infiltration basins. The site is currently a private airport.

METHODOLOGY

Stormwater management design shall be consistent with the Subdivision and Land Development / Stormwater Management Ordinances for the Township of Smithfield, Monroe County, Pennsylvania and in compliance with the Pennsylvania Clean Streams Law and the Pennsylvania Stormwater Act. The project lies within the B-1 Stormwater Management District as delineated by the "Stormwater Management Ordinance of Smithfield Township". Areas within this district are required to control proposed conditions runoff rates to existing condition runoff rates for the design storms in accordance to the following Table 1.

Table 1
Water Quantity Requirements

Proposed Conditions	Reduce to	Existing Conditions
2-year	``	1-year
5-year	``	2-year
10-year	``	5-year
25-year	``	10-year
50-year	``	25-year
100-year	``	100-year

The project site is divided into two points of study by a modest ridge which basically aligns with the existing runway. Each study area is limited to the areas required to be disturbed for completion of this project. As the proposed site is being constructed on imported fill, there are no areas draining into the study areas.

The North Basin Subarea (POS 001) encompasses a 7.487 acre pre-development area and an 8.334 acre post-development area. Existing condition flows consist of sheet flows which drain northerly into existing delineated wetlands and eventually into an unnamed tributary to the Sambo Creek.
Post-development flows will consist of outfall flows from the proposed infiltration/detention basin and also bypass flows from undetained areas. The post-development flows will drain into the previously mentioned delineated wetlands and unnamed tributary to Sambo Creek.

The South Basin Subarea (POS 002) encompasses a 6.405 acre pre-development area and an 5.558 acre post-development area. Existing condition flows consist of sheet flows which drain southerly into existing delineated wetlands or are captured by an existing storm sewer system which runs parallel to Airstrip Road and eventually into an unnamed tributary to the Sambo Creek.
Post-development flows will consist of outfall flows from the proposed infiltration/detention basin and also bypass flows from undetained areas. Post-development flows from the proposed infiltration/detention basin will drain into the existing storm sewer system or consist of undetained bypass flows which will sheet flow into the previously mentioned delineated wetlands and unnamed tributary to Sambo Creek.

The storm water management aspect of the North POS 001 is the construction of an infiltration/detention basin facility which will control runoff from the majority of the improved site including all roof runoff and runoff from the loading and storage yard areas. The outfall of this basin will consist of a rock scour basin at the edge of the existing wetlands This basin will capture, treat, and infiltrate a majority of the runoff from the improved site and control runoff rates beyond the requirements of the Township Stormwater Management Ordinance. All peak rate reductions as required by the Township ordinance have been met for this study area.

The storm water management aspects of the South POS 002 are similar to that of POS 001 in that construction of an above ground infiltration/detention basin will control rates and volumes as required by the Township Stormwater Management Ordinance. This basin will be constructed from existing grade on up with no excavation proposed to create the basin. This basin will capture, treat, and infiltrate runoff from the proposed parking lot and access drive and also control rates beyond the requirements of the Township Stormwater Management Ordinance. All peak rate reductions as required by the Township ordinance have been met for this study area. Also, comparison of runoff volumes for these storm events shows a reduction for post -development volumes versus existing condition values.

Peak runoff rates and estimated hydrographs are computed for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year frequency rainfall events. Pre- and post-development flows are computed using the Soil Cover Complex (SCS) Method as set forth in the latest edition of Urban Hydrology for Small Watersheds, Technical Release No. 55 (TR-55). Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 software is utilized for the storm water management calculations including storm basin routing.

Existing and proposed condition time of concentrations (Tc) were calculated for each study area.

The following rainfall intensities for frequencies, as shown in Table 2 below, are used for the 24-hour, Type II distribution storm with average antecedent moisture conditions. Values are taken from Point Precipitation Frequency Estimates for Smithfield Twp., Pennsylvania 41.0332 N, -75.158 W "Precipitation-Frequency Atlas of the United States," NOAA Atlas 14, Volume 2, Version 3 (See Appendix).

Table 2
Rainfall Intensities

Return Period	24-hr Rainfall Depth
1-year	2.76 inches
2-year	3.31 inches
5-year	4.12 inches
10-year	4.82 inches
25-year	5.93 inches
50-year	6.96 inches
100-year	8.17 inches

Two (2) year storm runoff volumes from disturbed areas were computed to determine infiltration volume requirements (Delta 2) utilizing the Soil Complex Curve Number method and the DEP PCSM Spreadsheets. The 2-year 24 hour storm event value of 3.31 in. was obtained from above refenced NOAA data. Twenty percent (20%) of existing impervious cover areas are assumed to be a "meadow" condition for the Worksheet 4 existing condition calculations. Parameters used in the calculations are listed in Table 3.
Delta 2 requirements are met in both study areas by construction of above ground infiltration/detention basins.

Table 3
"CN" Values

Ground Cover	Hydrologic Soil Group	SCS Curve Number (CN)
Impervious	n/a	98
Meadow	A	40
Meadow	C	71
Meadow	D	78
Lawn	A	40
Lawn	C	74
Lawn	D	80

SUMMARY

Calculated peak flows for existing and developed conditions are listed in the tables below.

North Basin Subarea – POS 001

POS 001 Peak Flows & Runoff Volumes

	Existing Conditions			Proposed Conditions				
Storm Event	**Peak Flow (cfs)**	**Runoff Volume (cf)**		**Peak Flow into Inf/Det Basin (cfs)**	**Peak Flow Out of Inf/Det Basin (cfs)**	**Bypass Peak Flow (cfs)**	**Total Peak Flow North Basin POS 001 (cfs)**	**Total Runoff Volume POS 001 (cf)**
1 yr	**2.448**	14,311		22.98	0.000	0.604	**0.604**	1,246
2 yr	**3.578**	19,985		28.14	0.000	0.901	**0.901**	1,854
5 yr	**5.421**	29,909		35.82	0.295	1.376	**1.376**	7,176
10 yr	**7.168**	39,751		42.51	1.278	1.815	**1.815**	21,279
25 yr	**10.38**	57,250		53.21	3.807	3.001	**4.378**	46,099
50 yr	**13.78**	75,139		63.20	6.339	4.658	**8.826**	70,786
100 yr	**18.15**	97,737		74.97	8.351	6.898	**13.23**	101,048

Construction of an above ground infiltration/detention basin in the North study area (POS 001) results in reduced peak flow rates and runoff volumes for the post development condition. Post-development volumes for the 2-year storm event are less than existing condition values. As a

result, there should be no impact from the project site on any physical, biological or chemical qualities of the receiving surface waters nor should there be any impact on any downstream watercourses resistance to erosion.

Therefore, requirements for Volume Control Guideline 1 (CG-1,) per the Pennsylvania Stormwater Best Management Practices Manual, have been achieved within this study area.

South Basin Subarea – POS 002

POS 002 Peak Flows & Runoff Volumes

	Existing Conditions			Proposed Conditions				
Storm Event	**Peak Flow (cfs)**	**Runoff Volume (cf)**		**Peak Flow into Inf/Det Basin (cfs)**	**Peak Flow Out of Inf/Det Basin (cfs)**	**Bypass Peak Flow (cfs)**	**Total Peak Flow South Basin POS 002 (cfs)**	**Total Runoff Volume POS 002 (cf)**
1 yr	**4.285**	21,775		8.580	0.000	3.174	**3.174**	8,739
2 yr	**6.190**	30,129		11.23	0.000	4.272	**4.272**	11,591
5 yr	**9.272**	43,652		15.34	0.000	5.985	**5.985**	16,072
10 yr	**12.12**	56,206		19.02	0.087	7.527	**7.527**	20,820
25 yr	**16.89**	77,286		25.00	1.357	10.04	**10.04**	38,845
50 yr	**21.49**	97,772		30.64	4.039	12.42	**14.91**	56,580
100 yr	**27.02**	122,640		37.33	9.428	15.24	**23.38**	78,388

Construction of an above ground infiltration/detention basin in the South study area (POS 002) results in reduced peak flow rates and runoff volumes for the post development condition. Post-development volumes for the 2-year storm event are less than existing condition values. As a result, there should be no impact from the project site on any physical, biological or chemical qualities of the receiving surface waters nor should there be any impact on any downstream watercourses resistance to erosion.

Therefore, requirements for Volume Control Guideline 1 (CG-1,) per the Pennsylvania Stormwater Best Management Practices Manual, have been achieved within this study area.

NOAA Atlas 14, Volume 2, Version 3
Location name: East Stroudsburg, Pennsylvania, USA*
Latitude: 41.0356°, Longitude: -75.16°
Elevation: 475.56 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.330** (0.293-0.370)	**0.395** (0.351-0.444)	**0.476** (0.422-0.535)	**0.543** (0.479-0.608)	**0.636** (0.556-0.711)	**0.717** (0.621-0.801)	**0.806** (0.692-0.903)	**0.906** (0.768-1.02)	**1.06** (0.882-1.20)	**1.19** (0.975-1.36)
10-min	**0.518** (0.461-0.581)	**0.622** (0.554-0.700)	**0.749** (0.663-0.841)	**0.851** (0.751-0.953)	**0.990** (0.865-1.11)	**1.11** (0.961-1.24)	**1.24** (1.06-1.39)	**1.39** (1.17-1.56)	**1.60** (1.33-1.81)	**1.79** (1.47-2.04)
15-min	**0.640** (0.570-0.718)	**0.770** (0.685-0.866)	**0.931** (0.824-1.05)	**1.06** (0.934-1.19)	**1.24** (1.08-1.38)	**1.39** (1.20-1.55)	**1.55** (1.33-1.74)	**1.73** (1.47-1.95)	**2.00** (1.67-2.27)	**2.24** (1.84-2.55)
30-min	**0.860** (0.765-0.964)	**1.04** (0.929-1.17)	**1.30** (1.15-1.46)	**1.50** (1.32-1.68)	**1.78** (1.56-1.99)	**2.03** (1.76-2.27)	**2.30** (1.97-2.57)	**2.60** (2.20-2.92)	**3.06** (2.55-3.47)	**3.47** (2.84-3.95)
60-min	**1.06** (0.943-1.19)	**1.29** (1.15-1.46)	**1.64** (1.45-1.84)	**1.93** (1.70-2.16)	**2.34** (2.04-2.62)	**2.70** (2.35-3.02)	**3.11** (2.67-3.49)	**3.58** (3.03-4.03)	**4.30** (3.59-4.87)	**4.95** (4.06-5.65)
2-hr	**1.28** (1.15-1.43)	**1.56** (1.41-1.74)	**1.98** (1.78-2.21)	**2.33** (2.08-2.59)	**2.86** (2.54-3.19)	**3.35** (2.95-3.74)	**3.93** (3.42-4.38)	**4.60** (3.97-5.15)	**5.67** (4.81-6.41)	**6.67** (5.57-7.59)
3-hr	**1.43** (1.29-1.58)	**1.73** (1.56-1.92)	**2.16** (1.95-2.39)	**2.52** (2.26-2.79)	**3.09** (2.75-3.42)	**3.61** (3.18-3.99)	**4.21** (3.67-4.67)	**4.92** (4.24-5.48)	**6.05** (5.12-6.80)	**7.10** (5.91-8.04)
6-hr	**1.85** (1.68-2.06)	**2.23** (2.02-2.47)	**2.74** (2.48-3.04)	**3.18** (2.88-3.53)	**3.90** (3.48-4.31)	**4.56** (4.03-5.06)	**5.33** (4.66-5.93)	**6.26** (5.39-6.98)	**7.75** (6.55-8.70)	**9.15** (7.59-10.3)
12-hr	**2.31** (2.10-2.57)	**2.79** (2.53-3.10)	**3.45** (3.13-3.83)	**4.04** (3.64-4.48)	**4.97** (4.43-5.50)	**5.84** (5.14-6.48)	**6.87** (5.97-7.63)	**8.09** (6.94-9.03)	**10.1** (8.48-11.3)	**11.9** (9.85-13.5)
24-hr	**2.76** (2.55-3.03)	**3.31** (3.06-3.64)	**4.12** (3.79-4.51)	**4.82** (4.42-5.27)	**5.93** (5.39-6.46)	**6.96** (6.27-7.55)	**8.17** (7.29-8.83)	**9.60** (8.47-10.4)	**11.9** (10.3-12.8)	**14.1** (12.1-15.1)
2-day	**3.24** (3.00-3.54)	**3.89** (3.60-4.26)	**4.82** (4.45-5.27)	**5.63** (5.18-6.14)	**6.91** (6.31-7.52)	**8.09** (7.32-8.78)	**9.47** (8.49-10.3)	**11.1** (9.84-12.0)	**13.8** (12.0-14.8)	**16.2** (13.9-17.4)
3-day	**3.41** (3.15-3.71)	**4.08** (3.78-4.45)	**5.03** (4.66-5.49)	**5.87** (5.41-6.37)	**7.18** (6.57-7.78)	**8.39** (7.62-9.06)	**9.79** (8.81-10.6)	**11.5** (10.2-12.3)	**14.2** (12.4-15.2)	**16.7** (14.4-17.9)
4-day	**3.57** (3.31-3.88)	**4.27** (3.97-4.64)	**5.25** (4.87-5.70)	**6.11** (5.64-6.60)	**7.45** (6.83-8.03)	**8.68** (7.91-9.34)	**10.1** (9.14-10.9)	**11.8** (10.6-12.7)	**14.6** (12.9-15.6)	**17.2** (14.9-18.3)
7-day	**4.22** (3.92-4.59)	**5.05** (4.68-5.49)	**6.16** (5.70-6.68)	**7.12** (6.58-7.71)	**8.63** (7.92-9.31)	**9.99** (9.13-10.8)	**11.6** (10.5-12.4)	**13.4** (12.1-14.4)	**16.4** (14.5-17.5)	**19.1** (16.7-20.4)
10-day	**4.88** (4.55-5.27)	**5.81** (5.41-6.28)	**7.00** (6.52-7.56)	**8.03** (7.45-8.65)	**9.59** (8.86-10.3)	**11.0** (10.1-11.8)	**12.6** (11.5-13.5)	**14.4** (13.1-15.5)	**17.3** (15.5-18.5)	**19.9** (17.6-21.3)
20-day	**6.60** (6.22-7.07)	**7.80** (7.34-8.34)	**9.15** (8.60-9.78)	**10.3** (9.65-11.0)	**12.0** (11.2-12.8)	**13.5** (12.5-14.3)	**15.1** (14.0-16.1)	**17.0** (15.6-18.1)	**19.8** (18.0-21.0)	**22.3** (20.1-23.7)
30-day	**8.22** (7.76-8.74)	**9.66** (9.11-10.3)	**11.1** (10.5-11.8)	**12.4** (11.6-13.1)	**14.2** (13.3-15.0)	**15.8** (14.7-16.7)	**17.5** (16.2-18.5)	**19.3** (17.9-20.4)	**22.1** (20.3-23.4)	**24.5** (22.4-25.9)
45-day	**10.5** (9.95-11.1)	**12.2** (11.6-12.9)	**13.9** (13.2-14.6)	**15.2** (14.5-16.1)	**17.2** (16.3-18.2)	**18.9** (17.8-19.9)	**20.6** (19.4-21.8)	**22.6** (21.1-23.8)	**25.4** (23.6-26.8)	**27.7** (25.7-29.3)
60-day	**12.6** (12.0-13.2)	**14.7** (14.0-15.4)	**16.5** (15.7-17.4)	**18.0** (17.2-19.0)	**20.2** (19.2-21.3)	**22.1** (20.9-23.2)	**24.1** (22.7-25.2)	**26.2** (24.6-27.5)	**29.2** (27.3-30.7)	**31.7** (29.6-33.4)

[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

NOAA Atlas 14, Volume 2, Version 3
Location name: East Stroudsburg, Pennsylvania, USA*
Latitude: 41.0356°, Longitude: -75.16°
Elevation: 475.56 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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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	**3.96** (3.52-4.44)	**4.74** (4.21-5.33)	**5.71** (5.06-6.42)	**6.52** (5.75-7.30)	**7.63** (6.67-8.53)	**8.60** (7.45-9.61)	**9.67** (8.30-10.8)	**10.9** (9.22-12.2)	**12.7** (10.6-14.4)	**14.3** (11.7-16.3)
10-min	**3.11** (2.77-3.49)	**3.73** (3.32-4.20)	**4.49** (3.98-5.05)	**5.11** (4.51-5.72)	**5.94** (5.19-6.64)	**6.65** (5.77-7.44)	**7.43** (6.38-8.32)	**8.31** (7.04-9.35)	**9.60** (8.00-10.9)	**10.7** (8.80-12.2)
15-min	**2.56** (2.28-2.87)	**3.08** (2.74-3.46)	**3.72** (3.30-4.18)	**4.24** (3.74-4.74)	**4.95** (4.32-5.53)	**5.55** (4.81-6.20)	**6.21** (5.33-6.96)	**6.93** (5.87-7.79)	**8.02** (6.68-9.08)	**8.95** (7.34-10.2)
30-min	**1.72** (1.53-1.93)	**2.09** (1.86-2.35)	**2.59** (2.29-2.91)	**3.00** (2.64-3.35)	**3.57** (3.12-3.99)	**4.06** (3.52-4.54)	**4.59** (3.94-5.15)	**5.20** (4.41-5.84)	**6.12** (5.11-6.94)	**6.93** (5.69-7.90)
60-min	**1.06** (0.943-1.19)	**1.29** (1.15-1.46)	**1.64** (1.45-1.84)	**1.93** (1.70-2.16)	**2.34** (2.04-2.62)	**2.70** (2.35-3.02)	**3.11** (2.67-3.49)	**3.58** (3.03-4.03)	**4.30** (3.59-4.87)	**4.95** (4.06-5.65)
2-hr	**0.640** (0.576-0.714)	**0.780** (0.703-0.872)	**0.989** (0.888-1.10)	**1.16** (1.04-1.30)	**1.43** (1.27-1.59)	**1.68** (1.48-1.87)	**1.96** (1.71-2.19)	**2.30** (1.99-2.57)	**2.84** (2.40-3.20)	**3.34** (2.78-3.80)
3-hr	**0.475** (0.430-0.527)	**0.575** (0.520-0.638)	**0.718** (0.648-0.796)	**0.838** (0.754-0.929)	**1.03** (0.916-1.14)	**1.20** (1.06-1.33)	**1.40** (1.22-1.56)	**1.64** (1.41-1.83)	**2.02** (1.70-2.26)	**2.37** (1.97-2.68)
6-hr	**0.309** (0.281-0.343)	**0.372** (0.338-0.412)	**0.457** (0.414-0.507)	**0.532** (0.480-0.590)	**0.651** (0.582-0.720)	**0.761** (0.673-0.844)	**0.890** (0.778-0.990)	**1.05** (0.901-1.17)	**1.29** (1.09-1.45)	**1.53** (1.27-1.73)
12-hr	**0.192** (0.174-0.213)	**0.231** (0.210-0.257)	**0.287** (0.259-0.318)	**0.335** (0.302-0.372)	**0.413** (0.368-0.457)	**0.485** (0.427-0.538)	**0.570** (0.496-0.633)	**0.671** (0.576-0.749)	**0.836** (0.704-0.939)	**0.991** (0.818-1.12)
24-hr	**0.115** (0.106-0.126)	**0.138** (0.127-0.152)	**0.172** (0.158-0.188)	**0.201** (0.184-0.220)	**0.247** (0.225-0.269)	**0.290** (0.261-0.315)	**0.340** (0.304-0.368)	**0.400** (0.353-0.431)	**0.497** (0.431-0.534)	**0.587** (0.502-0.629)
2-day	**0.067** (0.062-0.074)	**0.081** (0.075-0.089)	**0.100** (0.093-0.110)	**0.117** (0.108-0.128)	**0.144** (0.131-0.157)	**0.169** (0.152-0.183)	**0.197** (0.177-0.214)	**0.231** (0.205-0.250)	**0.286** (0.250-0.308)	**0.337** (0.290-0.363)
3-day	**0.047** (0.044-0.052)	**0.057** (0.053-0.062)	**0.070** (0.065-0.076)	**0.082** (0.075-0.089)	**0.100** (0.091-0.108)	**0.116** (0.106-0.126)	**0.136** (0.122-0.147)	**0.159** (0.142-0.171)	**0.197** (0.173-0.211)	**0.232** (0.200-0.248)
4-day	**0.037** (0.035-0.040)	**0.045** (0.041-0.048)	**0.055** (0.051-0.059)	**0.064** (0.059-0.069)	**0.078** (0.071-0.084)	**0.090** (0.082-0.097)	**0.105** (0.095-0.113)	**0.123** (0.110-0.132)	**0.152** (0.134-0.163)	**0.179** (0.155-0.191)
7-day	**0.025** (0.023-0.027)	**0.030** (0.028-0.033)	**0.037** (0.034-0.040)	**0.042** (0.039-0.046)	**0.051** (0.047-0.055)	**0.059** (0.054-0.064)	**0.069** (0.062-0.074)	**0.080** (0.072-0.086)	**0.097** (0.086-0.104)	**0.113** (0.099-0.121)
10-day	**0.020** (0.019-0.022)	**0.024** (0.023-0.026)	**0.029** (0.027-0.031)	**0.033** (0.031-0.036)	**0.040** (0.037-0.043)	**0.046** (0.042-0.049)	**0.052** (0.048-0.056)	**0.060** (0.054-0.064)	**0.072** (0.065-0.077)	**0.083** (0.073-0.089)
20-day	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.019** (0.018-0.020)	**0.021** (0.020-0.023)	**0.025** (0.023-0.027)	**0.028** (0.026-0.030)	**0.032** (0.029-0.034)	**0.035** (0.033-0.038)	**0.041** (0.038-0.044)	**0.046** (0.042-0.049)
30-day	**0.011** (0.011-0.012)	**0.013** (0.013-0.014)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.020** (0.018-0.021)	**0.022** (0.020-0.023)	**0.024** (0.023-0.026)	**0.027** (0.025-0.028)	**0.031** (0.028-0.032)	**0.034** (0.031-0.036)
45-day	**0.010** (0.009-0.010)	**0.011** (0.011-0.012)	**0.013** (0.012-0.014)	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.017** (0.016-0.018)	**0.019** (0.018-0.020)	**0.021** (0.020-0.022)	**0.023** (0.022-0.025)	**0.026** (0.024-0.027)
60-day	**0.009** (0.008-0.009)	**0.010** (0.010-0.011)	**0.011** (0.011-0.012)	**0.013** (0.012-0.013)	**0.014** (0.013-0.015)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.020** (0.019-0.021)	**0.022** (0.021-0.023)

[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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Worksheet 4: Change in Runoff Volume for 2 YR Storm Event

Project: Black Buffalo — POS 001 - North
Drainage Area: Exist. Cond. 7.487 Ac. — Prop. Cond. 8.334 Ac.
2-Year Rainfall: 3.31 in.

Total Site Area: Exist. Cond. 7.487 Ac. — Prop. Cond. 8.334 Ac.
Protected Site Area: 0 Ac.
Managed Area: 8.334 Ac.

Existing Conditions:

Cover Type / Condition	Soil Type	HSG	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft^3)
Meadow	WyA	A	135661	3.114	40	15.000	3.000	0.01	71.0
Meadow	BrA	C	156586	3.595	71	4.085	0.817	0.94	12330.6
Impervious	n/a	n/a	27096	0.622	98	0.204	0.041	3.08	6948.1
Imperv - 20% Mead	n/a	C	6774	0.156	71	4.085	0.817	0.94	533.4
TOTAL:			326117	7.487				.	19883.0

Developed Conditions:

Cover Type / Condition	Soil Type	HSG	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft^3)
Lawn - Bypass	WyA	A	60316	1.385	40	15.000	3.000	0.01	31.6
Lawn - Bypass	BrA	C	19084	0.438	74	3.514	0.703	1.11	1766.3
Lawn - To Basin	WyA	A	2690	0.062	40	15.000	3.000	0.01	1.4
Lawn - To Basin	BrA	C	49261	1.131	74	3.514	0.703	1.11	4559.3
Impervious	n/a	n/a	231690	5.319	98	0.204	0.041	3.08	59411.0
TOTAL:			363041	8.334					65769.5

2-Year Volume Increase (ft^3):		45886

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

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land Use Area (SF)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 4: Change in Runoff Volume for 2 YR Storm Event

Project: Black Buffalo — POS 002 - South
Drainage Area: Exist. Cond. 6.405 Ac. — Prop. Cond. 5.558 Ac.
2-Year Rainfall: 3.31 in.

Total Site Area: Exist. Cond. 6.405 Ac. — Prop. Cond. 5.558 Ac.
Protected Site Area: 0 Ac.
Managed Area: 5.558 Ac.

Existing Conditions:

Cover Type / Condition	Soil Type	HSG	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft^3)
Meadow	BrA	C	200544	4.604	71	4.085	0.817	0.94	15792.1
Meadow	Sh	D	27697	0.636	78	2.821	0.564	1.35	3126.4
Impervious	n/a	n/a	40616	0.932	98	0.204	0.041	3.08	10414.9
Imperv - 20% Mead	n/a	C	10154	0.233	71	4.085	0.817	0.94	799.6
TOTAL:			279011	6.405				.	30133.0

Developed Conditions:

Cover Type / Condition	Soil Type	HSG	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (ft^3)
Lawn - Bypass	BrA	C	47065	1.080	74	3.514	0.703	1.11	4356.0
Lawn - Bypass	Sh	D	16079	0.369	80	2.500	0.500	1.49	1992.5
Imperv - Bypass	BrA	n/a	21177	0.486	98	0.204	0.041	3.08	5430.3
Lawn - To Basin	WyA	A	1519	0.035	40	15.000	3.000	0.01	0.8
Lawn - To Basin	BrA	C	76567	1.758	74	3.514	0.703	1.11	7086.5
Lawn - To Basin	Sh	D	24775	0.569	80	2.500	0.500	1.49	3070.1
Impervious	n/a	n/a	54905	1.260	98	0.204	0.041	3.08	14079.0
TOTAL:			242087	5.558					36015.2

2-Year Volume Increase (ft^3):		5882

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

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land Use Area (SF)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGl. The use of a weighted CN value for volume calculations is not acceptable.

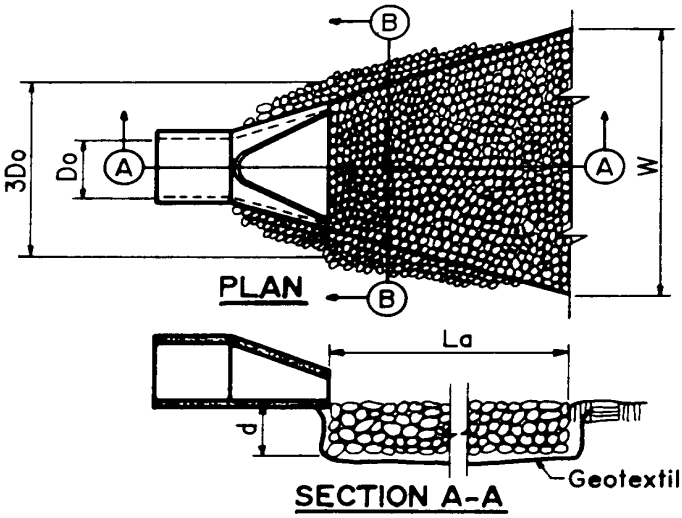
APPENDIX

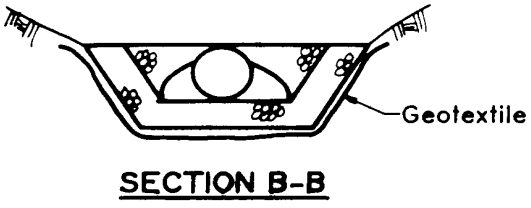
STANDARD WORKSHEET #23
Riprap Apron Outlet Protection

PROJECT NAME: Black Buffalo
LOCATION: Springfield Twsp. , Monroe Co.
PREPARED BY: T&M DATE: April 29, 2022
CHECKED BY: DATE: Rev: June 29, 2022

CONSTRUCTION DETAIL:

NOTE: SHOW ALL DETAILS AND CONSTRUCTIO
DIMENSIONS ON PLAN DRAWINGS





d = 1.5 times the maximum stone diameter but not less than 6 inches.

OUTLET NO.	PIPE DIA. Do (in.)	TAILWATER CONDITION (Max or Min)	Q (CFS)	V* (FPS)	RIPRAP SIZE	d_{50} (IN)	d_{MAX} (IN)	RIPRAP THICK (IN)	La (ft)	INITIAL WIDTH Aiw (ft)	TERM. WIDTH Atw (ft)
19	24	MAX	25.20	8.56	R6	12	24	36	20	6	14
21	18	MAX	7.94	6.81	R5	9	18	27	7	5	8
32	18	MAX	3.31	2.70	R5	9	18	27	7	5	8

The anticipated velocity (V) should not exceed the maximum permissible shown in the Program Manual for the proposed riprap protection.

JGPT00022 **Black Buffalo** 4/29/2022

Rev: 06/22/2022

POS 001 - Infiltration Bed No. 1
Dewatering Calculation

Infiltration Test Locations	Measured Infiltration Rate (in/hr)	Factor of Safety	Design Infiltration Rate (in/hr)
2	1.2	2	0.6
4	2.5	2	1.25
	Total used for design average:		1.85

Average Used For Design	**0.925 in/hr**

Lowest Outlet Elev.	473.5	ft
Basin Bottom Elev.	471.5	ft
Basin Depth	2	ft
Dewatering Time	**25.95**	**Hours**

JGPT00022 **Black Buffalo** 4/29/2022

Rev: 6/22/2022

POS 002 - Infiltration Bed No. 2
Dewatering Calculation

Infiltration Test Locations	Measured Infiltration Rate (in/hr)	Factor of Safety	Design Infiltration Rate (in/hr)
IT#6	0.58	2	0.29
IT#7	1	2	0.5
Total used for design average:			0.79

Average Used For Design	**0.395 in/hr**

Lowest Outlet Elev.	474	ft
Basin Bottom Elev.	472.32	ft
Basin Depth	1.68	ft
Dewatering Time	**51.04**	**Hours**

Emergency Spillway North Basin

Project Description	
Solve For	Headwater Elevation

Input Data		
Discharge	74.97 cfs	=> 100 Yr Storm
Crest Elevation	475.00 ft	
Tailwater Elevation	473.00 ft	
Crest Surface Type	Gravel	
Crest Breadth	10.00 ft	
Crest Length	30.0 ft	

Results	
Headwater Elevation	475.92 ft
Headwater Height Above Crest	0.92 ft
Tailwater Height Above Crest	-2.00 ft
Weir Coefficient	2.81 ft^(1/2)/s
Submergence Factor	1.000
Adjusted Weir Coefficient	2.81 ft^(1/2)/s
Flow Area	27.7 ft²
Velocity	2.70 ft/s
Wetted Perimeter	31.8 ft
Top Width	30.00 ft

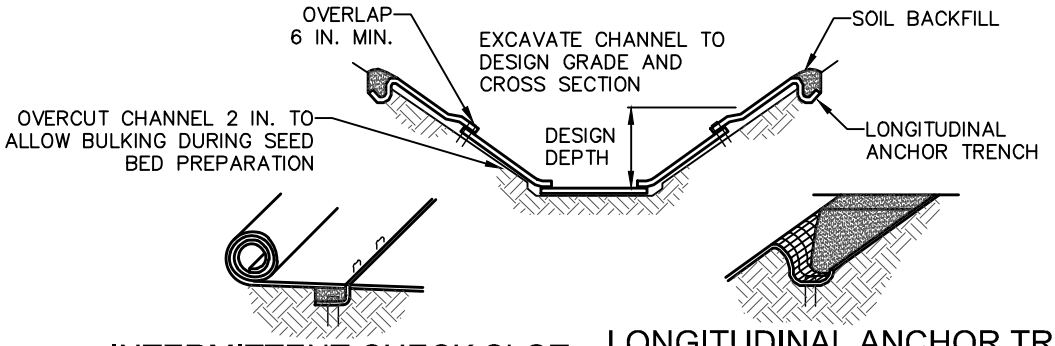
Emergency Spillway- South Basin

Project Description	
Solve For	Headwater Elevation

Input Data		
Discharge	37.33 cfs	=> 100 Yr-Storm
Crest Elevation	474.40 ft	
Tailwater Elevation	471.00 ft	
Crest Surface Type	Gravel	
Crest Breadth	10.00 ft	
Crest Length	40.0 ft	

Results	
Headwater Elevation	474.89 ft
Headwater Height Above Crest	0.49 ft
Tailwater Height Above Crest	-3.40 ft
Weir Coefficient	2.69 ft^(1/2)/s
Submergence Factor	1.000
Adjusted Weir Coefficient	2.69 ft^(1/2)/s
Flow Area	19.7 ft²
Velocity	1.89 ft/s
Wetted Perimeter	41.0 ft
Top Width	40.00 ft

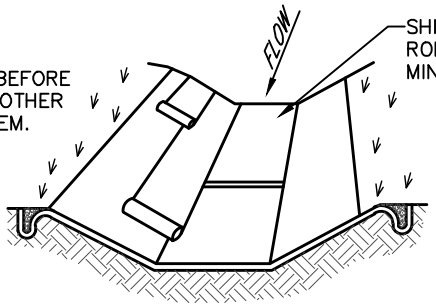
Anti-Seep Collar Design Sheet										6/29/2022
JGPT00022		**Black Buffalo**								
	Outlet	Outlet	Dist. From	Basin	Saturated	15%	Number	Design	Design	Flow
Basin	Pipe Dia.	Pipe	Max 100-Yr	Internal	Zone	Increased	of Collars	Collar	Collar	Length
		Slope	WSEL	SS	Length	Flow		Projection	Dimensions	Provided
			to Inv. Out		Ls	Length		From Pipe	(square)	
	(ft)	(ft/ft)	(ft)	(x:1)	(ft)	(ft)		(ft)	(ft)	(ft)
North	1.50	0.0050	4.30	4	35.2	40.5	2	2.00	6.00	43.2
South	Dual 1.25	0.0200	3.35	5	32.8	37.8	2	2.00	7.00	40.8
Assumed 0.25 ft pipe wall thickness										
Assumed 4:1 phreatic line slope into berm from max WSEL										
Minimum design collar projection from pipe wall is 2 feet										



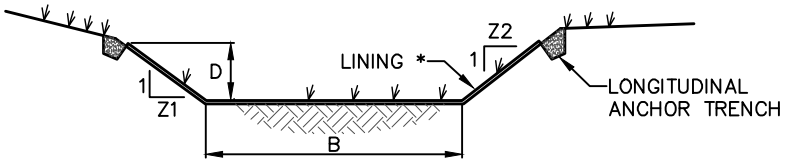
INTERMITTENT CHECK SLOT

LONGITUDINAL ANCHOR TRENCH

PREPARE SOIL AND APPLY SEED BEFORE INSTALLING BLANKETS, MATS, OR OTHER TEMPORARY CHANNEL LINER SYSTEM.



ISOMETRIC VIEW



(LOOKING DOWNSTREAM)

CHANNEL CROSS-SECTION

* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, VEGETATIVE STABILIZATION FOR SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION

CHANNEL NO.	STATIONS	BOTTOM WIDTH B (FT)	DEPTH D (FT)	TOP WIDTH W (FT)	Z1 (FT)	Z2 (FT)	LINING *	STAPLE PATTERN
VEGETATED SWALE S3.2	FULL LENGTH	3	1.25	9.5	3	3	NAG S75	D
VEGETATED SWALE BMP 3	FULL LENGTH	5	1.25	9.5	3	3	NAG S75	D

NOTES:

ANCHOR TRENCHES SHALL BE INSTALLED AT BEGINNING AND END OF CHANNEL IN THE SAME MANNER AS LONGITUDINAL ANCHOR TRENCHES.

CHANNEL DIMENSIONS SHALL BE CONSTANTLY MAINTAINED. CHANNEL SHALL BE CLEANED WHENEVER TOTAL CHANNEL DEPTH IS REDUCED BY 25% AT ANY LOCATION.
SEDIMENT DEPOSITS SHALL BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR AS SOON AS SOIL CONDITIONS PERMIT ACCESS TO CHANNEL WITHOUT FURTHER DAMAGE. DAMAGED LINING SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS OF DISCOVERY.

NO MORE THAN ONE THIRD OF THE SHOOT (GRASS LEAF) SHALL BE REMOVED IN ANY MOWING. GRASS HEIGHT SHALL BE MAINTAINED BETWEEN 2 AND 3 INCHES UNLESS OTHERWISE SPECIFIED. EXCESS VEGETATION SHALL BE REMOVED FROM PERMANENT CHANNELS TO ENSURE SUFFICIENT CHANNEL CAPACITY.

STANDARD CONSTRUCTION DETAIL #6-1
VEGETATED CHANNEL

NOT TO SCALE

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Black Buffalo
LOCATION: Airstrip Road - Smithfield Twsp.
PREPARED BY: meb DATE: 05/17/2022
CHECKED BY: REV: 06/29/2022

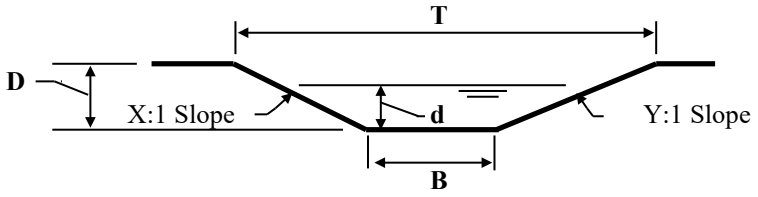
CHANNEL OR CHANNEL SECTION		Swale S3.2		Swale S3.2		Swale S3.2
TEMPORARY OR PERMANENT?	(T OR P)	T		T		P.
DESIGN STORM	(2, 5, OR 10 YR)	2		2		10
ACRES	(AC)	0.33		0.33		0.33
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	1.6		1.6		2.75
Q_r (REQUIRED CAPACITY)	(CFS)	2.40		2.40		4.10
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	2.93		2.46		4.20
PROTECTIVE LINING[2]		Bare Soil		Temp-Erosion Mat		Perm-Veg.
n (MANNING'S COEFFICIENT)[2]		0.025		0.055		0.065
V_a (ALLOWABLE VELOCITY)	(FPS)	3.50		5.00		4.50
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.51		1.37		1.43
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	0.12		1.55		N/A
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	N/A		0.31		N/A
CHANNEL BOTTOM WIDTH	(FT)	3.00		3.00		3.00
CHANNEL SIDE SLOPES	(H:V)	3.00		3.00		3.00
D (TOTAL DEPTH)	(FT)	1.00		1.00		1.25
CHANNEL TOP WIDTH @ D	(FT)	9		9		10.5
d (CALCULATED FLOW DEPTH)	(FT)	0.30		0.42		0.61
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	4.8		5.52		6.66
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	10.00		7.14		4.92
d_{50} STONE SIZE	(IN)	N/A		N/A		N/A
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	1.17		1.79		2.95
R (HYDRAULIC RADIUS)		0.239		0.316		0.430
S (BED SLOPE)[3]	(FT/FT)	1.20		1.20		1.20
S_c (CRITICAL SLOPE)	(FT/FT)	1.50		6.62		8.39
$.7S_c$	(FT/FT)	1.05		4.64		5.88
$1.3S_c$	(FT/FT)	1.95		8.61		10.91
STABLE FLOW?	(Y/N)	N		Y		Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.056407				
FREEBOARD BASED ON STABLE FLOW	(FT)			0.11		0.15
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.50		0.50		0.50
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V		S		V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

SWALE:	**Swale S3.2**	**PROJECT #**	Black Buffalo
SWALE TYPE:	Temporary Diversion	**DATE:**	5/17/2022
LINING TYPE:	Bare Soil	**REVISED:**	6/29/2022

CHANNEL CAPACITY CALCULATIONS

Typical Swale Cross Section



****** DIMENSIONAL DATA******

BOTTOM WIDTH;	B =	3.00	feet	
LEFT SIDE SLOPE RATIO;	X =	3.0	:1	
RIGHT SIDE SLOPE RATIO;	Y =	3.0	:1	
DESIGN FLOW DEPTH;	d =	0.30	feet	
BOTTOM WIDTH: DEPTH RATIO;	(12:1 max)	10.00	:1 [acceptable]	
ROUGHNESS COEFFICIENT;	n =	0.025	Bare Soil	
SLOPE;	S =	1.20	%	
DESIGN CAPACITY	Q_{des} =	2.40	c.f.s.	1.6 cfs x 1.5 ac.

Temp Channels = 1.6 c.f.s./Ac or 2-yr storm

******CALCULATED DESIGN FLOW CHARACTERISTICS******

TOP WIDTH (at water surface);	t =	4.8	feet	
CROSS-SECTIONAL AREA;	A =	1.17	sq. ft.	
WETTED PERIMETER;	P =	4.90	feet	
HYDRAULIC RADIUS;	R =	0.2389		
DESIGN METHOD FOR LINING (VEL./SHEAR)		V		
CALCULATED SHEAR STRESS;	td =	N/A	lb/ft^2	
ALLOWABLE SHEAR STRESS;	ta=	0.12	lb/ft^2	**TOO WEAK!!!**

******CALCULATED CAPACITY (USING MANNING'S EQUATION)******

$\mathbf{Q} = [1.486/n]\,[A]\,[R]^{2/3}\,[S]^{1/2}$ = **2.93 C.F.S.**

$\mathbf{V} = Q / A$ = **2.51 F.P.S.**

******CRITICAL SLOPE CALCULATION******

MEAN DEPTH;	D_m =	0.24	feet
CRITICAL SLOPE;	S_c =	1.50	%

$S_c = [14.56\ n^2\ D_m] / R^{4/3}$

UNSTABLE FLOW ZONE:	0.7 S_c =	1.05	% (lower limit)
	1.3 S_c =	1.95	% (upper limit)

FLOW IS UNSTABLE, REQUIRED FREEBOARD = [0.075][V][d] (or 0.5 ft, if greater)

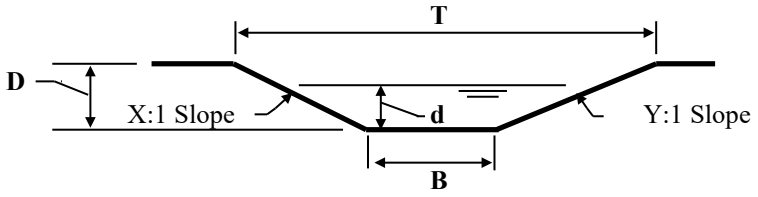
CALCULATED FREEBOARD;	F=	0.06	
REQUIRED FREEBOARD;	**F=**	**0.50**	**FEET**
MINIMUM SWALE DEPTH MUST EQUAL		0.80	feet

USE MINIMUM SWALE DEPTH [D] OF:	**1.00**	**FEET**
BOTTOM SWALE WIDTH REMAINS AT:	**3.0**	**FEET**
TOP WIDTH [T] OF SWALE BECOMES:	**9.0**	**FEET**

SWALE:	**Swale S3.2**	**PROJECT #**	Black Buffalo
SWALE TYPE:	Temp. Clean Water Diversion	**DATE:**	5/17/2022
LINING TYPE:	Temporary-Erosion Mat	**REVISED:**	6/29/2022

CHANNEL CAPACITY CALCULATIONS

Typical Swale Cross Section



****** DIMENSIONAL DATA******

BOTTOM WIDTH;	B =	3.00	feet
LEFT SIDE SLOPE RATIO;	X =	3.0	:1
RIGHT SIDE SLOPE RATIO;	Y =	3.0	:1
DESIGN FLOW DEPTH;	d =	0.42	feet
BOTTOM WIDTH: DEPTH RATIO;	(12:1 max)	7.14	:1 [acceptable]
ROUGHNESS COEFFICIENT;	n =	0.055	Temp-Erosion Mat
SLOPE;	S =	1.20	%
DESIGN CAPACITY	Q_{des} =	2.40	c.f.s. 1.6 cfs x 1.50 ac.

Temp Channels = 1.6 c.f.s./Ac or 2-yr storm

******CALCULATED DESIGN FLOW CHARACTERISTICS******

TOP WIDTH (at water surface);	t =	5.5	feet
CROSS-SECTIONAL AREA;	A =	1.79	sq. ft.
WETTED PERIMETER;	P =	5.66	feet
HYDRAULIC RADIUS;	R =	0.3163	
DESIGN METHOD FOR LINING (VEL./SHEAR)		S	
CALCULATED SHEAR STRESS;	td =	0.31	lb/ft^2
ALLOWABLE SHEAR STRESS;	ta=	1.55	lb/ft^2

******CALCULATED CAPACITY (USING MANNING'S EQUATION)******

$\mathbf{Q} = [1.486/n]\,[A]\,[R]^{2/3}\,[S]^{1/2}$ = **2.46 C.F.S.**

V = Q / A = **1.37 F.P.S.**

******CRITICAL SLOPE CALCULATION******

MEAN DEPTH;	D_m =	0.32	feet
CRITICAL SLOPE;	S_c =	6.62	%

$S_c = [14.56\ n^2\ D_m] / R^{4/3}$

UNSTABLE FLOW ZONE:	0.7 S_c =	4.64	% (lower limit)
	1.3 S_c =	8.61	% (upper limit)

FLOW IS STABLE, REQUIRED FREEBOARD = [0.25][d] (or 0.5 ft. if greater)

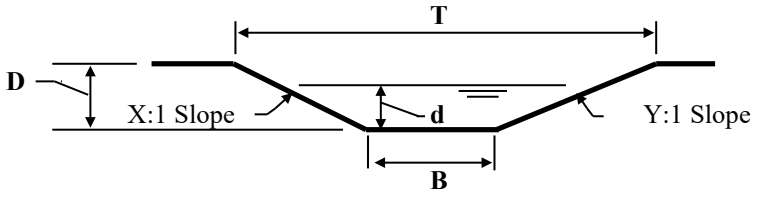
CALCULATED FREEBOARD;	F=	0.11	
REQUIRED FREEBOARD;	**F=**	**0.50**	**FEET**
MINIMUM SWALE DEPTH MUST EQUAL		0.92	feet

USE MINIMUM SWALE DEPTH [D] OF:	**1.00**	**FEET**
BOTTOM SWALE WIDTH REMAINS AT:	**3.0**	**FEET**
TOP WIDTH [T] OF SWALE BECOMES:	**9.0**	**FEET**

SWALE:	**Swale S3.2**	**PROJECT #**	Black Buffalo
SWALE TYPE:	Permanent-Vegetative	**DATE:**	5/17/2022
LINING TYPE:	Permanent-Vegetative	**REVISED:**	6/29/2022

CHANNEL CAPACITY CALCULATIONS

Typical Swale Cross Section



****** DIMENSIONAL DATA******

BOTTOM WIDTH;	B =	3.00	feet	
LEFT SIDE SLOPE RATIO;	X =	3.0	:1	
RIGHT SIDE SLOPE RATIO;	Y =	3.0	:1	
DESIGN FLOW DEPTH;	d =	0.61	feet	
BOTTOM WIDTH: DEPTH RATIO;	(12:1 max)	4.92	:1 [acceptable]	
ROUGHNESS COEFFICIENT;	n =	0.065	Perm-Veg.	
SLOPE;	S =	1.20	%	
DESIGN CAPACITY	Q_{des} =	4.10	c.f.s.	2.75cfs x 1.50 ac.

(based on 2.75 c.f.s. per tributary acre)

******CALCULATED DESIGN FLOW CHARACTERISTICS******

TOP WIDTH (at water surface);	t =	6.7	feet
CROSS-SECTIONAL AREA;	A =	2.95	sq. ft.
WETTED PERIMETER;	P =	6.86	feet
HYDRAULIC RADIUS;	R =	0.4296	
DESIGN METHOD FOR LINING (VEL./SHEAR)		V	
CALCULATED SHEAR STRESS;	td =	N/A	lb/ft^2
ALLOWABLE SHEAR STRESS;	ta=	N/A	lb/ft^2

******CALCULATED CAPACITY (USING MANNING'S EQUATION)******

$\mathbf{Q} = [1.486/n]\,[A]\,[R]^{2/3}\,[S]^{1/2}$ = **4.20 C.F.S.**

V = Q / A = **1.43 F.P.S.**

******CRITICAL SLOPE CALCULATION******

MEAN DEPTH;	D_m =	0.44	feet
CRITICAL SLOPE;	S_c =	8.39	%

$S_c = [14.56\ n^2\ D_m] / R^{4/3}$

UNSTABLE FLOW ZONE:	0.7 S_c =	5.88	% (lower limit)
	1.3 S_c =	10.91	% (upper limit)

FLOW IS STABLE, REQUIRED FREEBOARD = [0.25][d] (or 0.5 ft. if greater)

CALCULATED FREEBOARD;	F=	0.15	
REQUIRED FREEBOARD;	**F=**	**0.50**	**FEET**
MINIMUM SWALE DEPTH MUST EQUAL		1.11	feet

USE MINIMUM SWALE DEPTH [D] OF:	**1.25**	**FEET**
BOTTOM SWALE WIDTH REMAINS AT:	**3.0**	**FEET**
TOP WIDTH [T] OF SWALE BECOMES:	**10.5**	**FEET**

TABLE 8A - SWALE DESIGN

STANDARD WORKSHEET #21

Channel Design Data

Original Design Calculations for
Airstrip Road Improvements
Reference Use Only

STROUDSBURG POCONO
PROJECT NAME: AIRPARK SITE IMPROVEMENTS
LOCATION: Smithfield Township
PREPARED BY: Linder Engineering, Inc.
CHECKED BY: MCCD
DATE: February 2020
REVISED: 04/17/20, 06/12/20, 08/24/20, 09/30/20

See Title Sheet for Swale Design Notes

CHANNEL OR CHANNEL SECTION	**Vegetated Swale S3.2**	**Vegetated Swale S3.2**	**Vegetated Swale S3.2**	**Vegetated Swale S3.2**
VEGETATED CONDITION	**Unvegetated**	**Unvegetated**	**Vegetated**	**Vegetated**
PROTECTIVE LINING **	NAG-BioNet S75BN	NAG-BioNet S75BN	NAG-BioNet S75BN	NAG-BioNet S75BN
CHANNEL TOP WIDTH (FT)@D	8.86	8.26	10.22	8.14
CHANNEL TOP WIDTH (FT)@d	5.86	5.26	7.22	5.14
CHANNEL SIDE SLOPES (H:V)	3	3	3	3
CHANNEL BOTTOM WIDTH (FT)	3	3	3	3
d (FLOW DEPTH IN FT)	0.48	0.38	0.70	0.36
BOTTOM WIDTH:DEPTH RATIO (12:1 MAX)	3	3	2	4
A (AREA IN SQ. FT.) @d	2.11	1.55	3.59	1.45
WP (WETTED PERIMETER) @d	6.01	5.38	7.45	5.26
R (HYDRAULIC RADIUS) @d	0.35	0.29	0.48	0.28
S (BED SLOPE, FT/FT)*	**1.00%**	**5.00%**	**1.00%**	**5.00%**
VEGETATIVE LINING RETARDANCE	C	C	C	C
n (MANNINGS COEFFICIENT)**	0.038	0.055	0.08	0.05
V (AT FLOW DEPTH d, FPS)	**1.9**	**2.6**	**1.1**	**2.8**
Q (AT FLOW DEPTH d, CFS)	4.10	4.10	4.10	4.10
Qr (REQUIRED CAPACITY) CFS	4.10	4.10	4.10	4.10
Sc (CRITICAL SLOPE)	2.0%	4.3%	8.7%	3.6%
.7Sc	1.4%	3.0%	6.1%	2.5%
1.3Sc STABLE FLOW? (Y/N)	2.6%	5.6%	11.3%	4.7%
STABLE FLOW? (Y/N)	Y	N	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW (FT)	N/A	0.50	N/A	N/A
FREEBOARD BASED ON STABLE FLOW (FT)	0.50	N/A	0.50	0.50
MINIMUM FREEBOARD REQUIRED (FT)	0.50	0.50	0.50	0.50
D (TOTAL DEPTH) FT	0.98	0.88	1.20	0.86
d50 STONE SIZE (IN)	N/A	N/A	N/A	N/A
DESIGN METHOD FOR PROTECTIVE LINING**** PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V
Va (ALLOWABLE VELOCITY) FPS	**5**	**5**	**5**	**5**
Td (SHEAR STRESS AT FLOW DEPTH d) LB/FT2	N/A	N/A	N/A	N/A
TA (MAX ALLOWABLE SHEAR STRESS) LB/FT2	**1.6**	**1.6**	**1.6**	**1.6**
Contributing SubArea	S/A S3.2 + Swale S3.1	S/A S3.2 + Swale S3.1	S/A S3.2 + Swale S3.1	S/A S3.2 + Swale S3.1
Contributing Area (ac)	1.50	1.50	1.50	1.50
Design Storm (yr)	100-yr	100-yr	100-yr	100-yr
Design Flow (cfs)	4.10	4.10	4.10	4.10

Notes:

Manning's "n" values were determined as follows:

- All swales (unvegetative) = Manning's "n" for the swale lining per the manufacturer's literature for the calculated depth of water.
- All swales (vegetated) = Manning's "n" from Table 6.3 of the E&S BMP Manual for each swale's min./max. bed slope and flow depth

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Black Buffalo
LOCATION: Airstrip Road - Smithfield Twsp.
PREPARED BY: meb DATE: 05/17/2022
CHECKED BY: REV: 06/29/2022

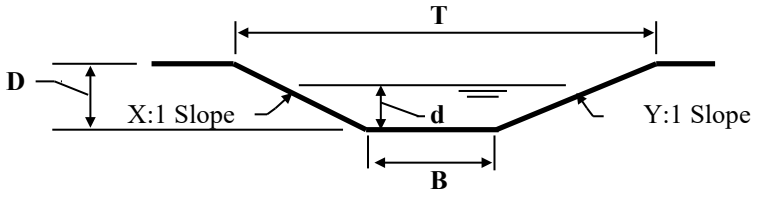
CHANNEL OR CHANNEL SECTION		Swale BMP 3		Swale BMP 3		Swale BMP 3
TEMPORARY OR PERMANENT?	(T OR P)	T		T		P.
DESIGN STORM	(2, 5, OR 10 YR)	2		2		50
ACRES	(AC)	0.33		0.33		0.33
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	1.6		1.6		n/a
Q_r (REQUIRED CAPACITY)	(CFS)	2.80		2.80		10.47
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	7.66		3.48		10.65
PROTECTIVE LINING[2]		Bare Soil		Temp-Erosion Mat		Perm-Veg.
n (MANNING'S COEFFICIENT)[2]		0.025		0.055		0.065
V_a (ALLOWABLE VELOCITY)	(FPS)	3.50		5.00		4.50
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.91		1.32		1.66
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	0.12		1.55		N/A
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	N/A		0.26		N/A
CHANNEL BOTTOM WIDTH	(FT)	5.00		5.00		5.00
CHANNEL SIDE SLOPES	(H:V)	3.00		3.00		3.00
D (TOTAL DEPTH)	(FT)	1.00		1.00		1.50
CHANNEL TOP WIDTH @ D	(FT)	11		11		14
d (CALCULATED FLOW DEPTH)	(FT)	0.42		0.42		0.85
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	7.52		7.52		10.1
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	11.90		11.90		5.88
d_{50} STONE SIZE	(IN)	N/A		N/A		N/A
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	2.63		2.63		6.42
R (HYDRAULIC RADIUS)		0.343		0.343		0.619
S (BED SLOPE)[3]	(FT/FT)	1.00		1.00		1.00
S_c (CRITICAL SLOPE)	(FT/FT)	1.32		6.40		7.42
$.7S_c$	(FT/FT)	0.93		4.48		5.19
$1.3S_c$	(FT/FT)	1.72		8.32		9.64
STABLE FLOW?	(Y/N)	N		Y		Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.091817				
FREEBOARD BASED ON STABLE FLOW	(FT)			0.11		0.21
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.50		0.50		0.50
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V		S		V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater.
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

SWALE:	**Swale BMP 3**	**PROJECT #**	Black Buffalo
SWALE TYPE:	Temporary Diversion	**DATE:**	5/17/2022
LINING TYPE:	Bare Soil	**REVISED:**	

CHANNEL CAPACITY CALCULATIONS

Typical Swale Cross Section



****** DIMENSIONAL DATA******

BOTTOM WIDTH;	B =	5.00	feet	
LEFT SIDE SLOPE RATIO;	X =	3.0	:1	
RIGHT SIDE SLOPE RATIO;	Y =	3.0	:1	
DESIGN FLOW DEPTH;	d =	0.42	feet	
BOTTOM WIDTH: DEPTH RATIO;	(12:1 max)	11.90	:1 [acceptable]	
ROUGHNESS COEFFICIENT;	n =	0.025	Bare Soil	
SLOPE;	S =	1.00	%	
DESIGN CAPACITY	Q_{des} =	2.80	c.f.s.	1.6 cfs x 1.75 ac.

Temp Channels = 1.6 c.f.s./Ac or 2-yr storm

******CALCULATED DESIGN FLOW CHARACTERISTICS******

TOP WIDTH (at water surface);	t =	7.5	feet	
CROSS-SECTIONAL AREA;	A =	2.63	sq. ft.	
WETTED PERIMETER;	P =	7.66	feet	
HYDRAULIC RADIUS;	R =	0.3434		
DESIGN METHOD FOR LINING (VEL./SHEAR)		V		
CALCULATED SHEAR STRESS;	td =	N/A	lb/ft^2	
ALLOWABLE SHEAR STRESS;	ta=	0.12	lb/ft^2	**TOO WEAK!!!**

******CALCULATED CAPACITY (USING MANNING'S EQUATION)******

$\mathbf{Q} = [1.486/n]\,[A]\,[R]^{2/3}\,[S]^{1/2}$ = **7.66 C.F.S.**

V = Q / A = **2.91 F.P.S.**

******CRITICAL SLOPE CALCULATION******

MEAN DEPTH;	D_m =	0.35	feet
CRITICAL SLOPE;	S_c =	1.32	%

$S_c = [14.56\ n^2\ D_m] / R^{4/3}$

UNSTABLE FLOW ZONE:	0.7 S_c =	0.93	% (lower limit)
	1.3 S_c =	1.72	% (upper limit)

FLOW IS UNSTABLE, REQUIRED FREEBOARD = [0.075][V][d] (or 0.5 ft, if greater)

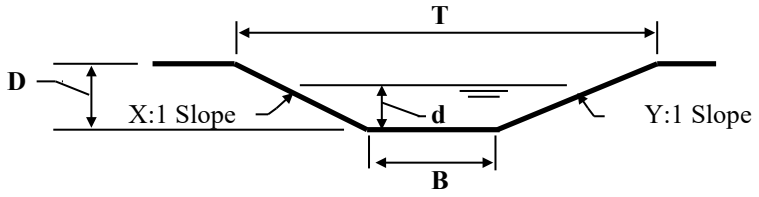
CALCULATED FREEBOARD;	F=	0.09	
REQUIRED FREEBOARD;	**F=**	**0.50**	**FEET**
MINIMUM SWALE DEPTH MUST EQUAL		0.92	feet

USE MINIMUM SWALE DEPTH [D] OF:	**1.00**	**FEET**
BOTTOM SWALE WIDTH REMAINS AT:	**5.0**	**FEET**
TOP WIDTH [T] OF SWALE BECOMES:	**11.0**	**FEET**

SWALE:	**Swale BMP 3**	**PROJECT #**	Black Buffalo
SWALE TYPE:	Temp. Clean Water Diversion	**DATE:**	5/17/2022
LINING TYPE:	Temporary-Erosion Mat	**REVISED:**	

CHANNEL CAPACITY CALCULATIONS

Typical Swale Cross Section



****** DIMENSIONAL DATA******

BOTTOM WIDTH;	B =	5.00	feet
LEFT SIDE SLOPE RATIO;	X =	3.0	:1
RIGHT SIDE SLOPE RATIO;	Y =	3.0	:1
DESIGN FLOW DEPTH;	d =	0.42	feet
BOTTOM WIDTH: DEPTH RATIO;	(12:1 max)	11.90	:1 [acceptable]
ROUGHNESS COEFFICIENT;	n =	0.055	Temp-Erosion Mat
SLOPE;	S =	1.00	%
DESIGN CAPACITY	Q_{des} =	2.80	c.f.s. 1.6 cfs x 1.75 ac.

Temp Channels = 1.6 c.f.s./Ac or 2-yr storm

******CALCULATED DESIGN FLOW CHARACTERISTICS******

TOP WIDTH (at water surface);	t =	7.5	feet
CROSS-SECTIONAL AREA;	A =	2.63	sq. ft.
WETTED PERIMETER;	P =	7.66	feet
HYDRAULIC RADIUS;	R =	0.3434	
DESIGN METHOD FOR LINING (VEL./SHEAR)		S	
CALCULATED SHEAR STRESS;	td =	0.26	lb/ft^2
ALLOWABLE SHEAR STRESS;	ta=	1.55	lb/ft^2

******CALCULATED CAPACITY (USING MANNING'S EQUATION)******

$\mathbf{Q} = [1.486/n]\,[A]\,[R]^{2/3}\,[S]^{1/2}$ = **3.48 C.F.S.**

V = Q / A = **1.32 F.P.S.**

******CRITICAL SLOPE CALCULATION******

MEAN DEPTH;	D_m =	0.35	feet
CRITICAL SLOPE;	S_c =	6.40	%

$S_c = [14.56\ n^2\ D_m] / R^{4/3}$

UNSTABLE FLOW ZONE:	0.7 S_c =	4.48	% (lower limit)
	1.3 S_c =	8.32	% (upper limit)

FLOW IS STABLE, REQUIRED FREEBOARD = [0.25][d] (or 0.5 ft. if greater)

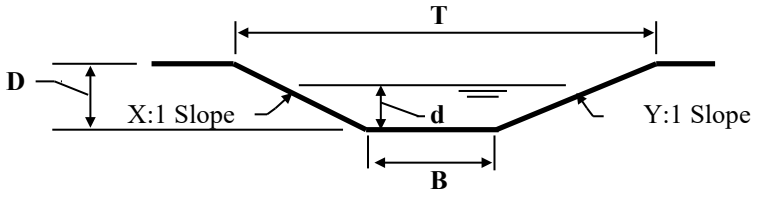
CALCULATED FREEBOARD;	F=	0.11	
REQUIRED FREEBOARD;	**F=**	**0.50**	**FEET**
MINIMUM SWALE DEPTH MUST EQUAL		0.92	feet

USE MINIMUM SWALE DEPTH [D] OF:	**1.00**	**FEET**
BOTTOM SWALE WIDTH REMAINS AT:	**5.0**	**FEET**
TOP WIDTH [T] OF SWALE BECOMES:	**11.0**	**FEET**

SWALE:	**Swale BMP 3**	**PROJECT #**	Black Buffalo
SWALE TYPE:	Permanent-Vegetative	**DATE:**	5/17/2022
LINING TYPE:	Permanent-Vegetative	**REVISED:**	6/29/2022

CHANNEL CAPACITY CALCULATIONS

Typical Swale Cross Section



****** DIMENSIONAL DATA******

BOTTOM WIDTH;	B =	5.00	feet	
LEFT SIDE SLOPE RATIO;	X =	3.0	:1	
RIGHT SIDE SLOPE RATIO;	Y =	3.0	:1	
DESIGN FLOW DEPTH;	d =	0.85	feet	
BOTTOM WIDTH: DEPTH RATIO;	(12:1 max)	5.88	:1 [acceptable]	
ROUGHNESS COEFFICIENT;	n =	0.065	Perm-Veg.	
SLOPE;	S =	1.00	%	
DESIGN CAPACITY	Q_{des} =	10.47	c.f.s.	50 Yr-Storm

******CALCULATED DESIGN FLOW CHARACTERISTICS******

TOP WIDTH (at water surface);	t =	10.1	feet
CROSS-SECTIONAL AREA;	A =	6.42	sq. ft.
WETTED PERIMETER;	P =	10.38	feet
HYDRAULIC RADIUS;	R =	0.6185	
DESIGN METHOD FOR LINING (VEL./SHEAR)		V	
CALCULATED SHEAR STRESS;	td =	N/A	lb/ft^2
ALLOWABLE SHEAR STRESS;	ta=	N/A	lb/ft^2

******CALCULATED CAPACITY (USING MANNING'S EQUATION)******

$\mathbf{Q} = [1.486/n]\,[A]\,[R]^{2/3}\,[S]^{1/2}$ = **10.65 C.F.S.**

V = Q / A = **1.66 F.P.S.**

******CRITICAL SLOPE CALCULATION******

MEAN DEPTH;	D_m =	0.64	feet
CRITICAL SLOPE;	S_c =	7.42	%

$S_c = [14.56\ n^2\ D_m] / R^{4/3}$

UNSTABLE FLOW ZONE:	0.7 S_c =	5.19	% (lower limit)
	1.3 S_c =	9.64	% (upper limit)

FLOW IS STABLE, REQUIRED FREEBOARD = [0.25][d] (or 0.5 ft. if greater)

CALCULATED FREEBOARD;	F=	0.21	
REQUIRED FREEBOARD;	**F=**	**0.50**	**FEET**
MINIMUM SWALE DEPTH MUST EQUAL		1.35	feet

USE MINIMUM SWALE DEPTH [D] OF:	**1.50**	**FEET**
BOTTOM SWALE WIDTH REMAINS AT:	**5.0**	**FEET**
TOP WIDTH [T] OF SWALE BECOMES:	**14.0**	**FEET**

STORMCADD
STORM SEWER DESIGN

Attachment F

RUNOFF COEFFICIENTS FOR THE RATIONAL METHOD* HYDROLOGIC SOIL GROUP AND SLOPE RANGE**												
LAND USE	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Cultivated[A]	[a]0.18 [b]0.23	0.23 0.29	0.28 0.34	0.24 0.30	0.29 0.36	0.33 0.40	0.30 0.36	0.34 0.41	0.38 0.45	0.33 0.39	0.37 0.44	0.41 0.48
Pasture[B]	0.09 0.12	0.13 0.17	0.17 0.23	0.19 0.24	0.24 0.30	0.29 0.36	0.27 0.33	0.31 0.38	0.36 0.43	0.31 0.37	0.35 0.42	0.39 0.46
Meadow, Lawn[C]	0.05 0.07	0.08 0.12	0.12 0.17	0.15 0.19	0.20 0.25	0.24 0.30	0.23 0.28	0.28 0.34	0.32 0.39	0.28 0.33	0.32 0.39	0.36 0.43
Forest, Woods	0.03 0.04	0.05 0.08	0.08 0.12	0.11 0.15	0.16 0.21	0.20 0.26	0.20 0.25	0.25 0.31	0.29 0.36	0.25 0.31	0.30 0.37	0.34 0.41
Gravel	0.24 0.30	0.29 0.36	0.33 0.40	0.32 0.38	0.36 0.43	0.40 0.47	0.35 0.42	0.39 0.46	0.43 0.50	0.37 0.44	0.41 0.48	0.44 0.51
Parking, Other Impervious	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97
Residential, Commercial, Industrial and Other "Developed"	Runoff coefficients should be calculated based upon weighted average of impervious area coefficients and pervious area coefficients from above based upon soil type, slope and the particular development proposal.											

*Coefficients for all land uses except parking and other impervious cover are based on the Rossmiller Equation for translating NRCS curve numbers into Rational Method 'c' values. The source for the parking and other impervious cover coefficients is RAWLS, W.J., S.L. WONG and R.H. McCUEN, 1981. Comparison of urban flood frequency procedures. Preliminary draft report prepared for the Soil Conservation Service, Beltsville, MD.

**Hydrologic Soil Group based on the county soil survey latest edition.

a – Runoff coefficients for storm recurrence intervals less than 25 years.

b – Runoff coefficients for storm recurrence intervals of 25 years or more.

[A]Represents average of cultivated land with and without conservation treatment from TR-55, January 1975. These values are consistent with several categories of cultivated lands from TR-55, June 1986.

[B]Represents grasslands in fair condition with 50% to 75% grass cover.

[C]Represents grasslands in good condition with greater than 75% grass cover.

					HSG		B	C			
					Soil Classification Slope		2-6%	2-6% (C)			
					Rational Coefficient Slope		2-6%	2-6%			
					C < 25		0.86	0.28			
					C ≥ 25		0.96	0.34			
					CN		98	74			1
		CADD	**Struct.**	**Inlet**	**Total Area**		Impervious	Open Space	**Composite C**		**Composite**
check		**ID**	**Notes**	**ID**	**ft^2**	**ac**		(Lawn)	**<25 Years**	**≥25 Years**	**CN**
13915	OK			**10**	**13915**	**0.319**	13915	0	0.860	0.960	98
34970	OK			**11**	**34970**	**0.803**	34970	0	0.860	0.960	98
16672	OK			**13**	**16672**	**0.383**	16672	0	0.860	0.960	98
31250	OK			**14**	**31250**	**0.717**	31250	0	0.860	0.960	98
37500	OK			**15**	**37500**	**0.861**	37500	0	0.860	0.960	98
37500	OK			**16**	**37500**	**0.861**	37500	0	0.860	0.960	98
25000	OK			**17**	**25000**	**0.574**	25000	0	0.860	0.960	98
8128	OK			**18**	**8128**	**0.187**	8128	0	0.860	0.960	98
76216	OK			**20**	**76216**	**1.750**	41861	34355	0.599	0.681	87
5200	OK			**30**	**5200**	**0.119**	5200	0	0.860	0.960	98
19362	OK			**31**	**19362**	**0.444**	19362	0	0.860	0.960	98

Conduit FlexTable: Combined Pipe/Node Report

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Upstream Structure Flow (Total Surface) (ft³/s)	System Rational Flow (ft³/s)	Length (Unified) (ft)	Diameter (in)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Flow (ft³/s)	System Known Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	Velocity (ft/s)	Elevation Ground (Start) (ft)	Cover (Start) (ft)	Elevation Ground (Stop) (ft)	Cover (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
CB-18	OF-19	0.187	0.328	4.400	5.855	0.40	25.97	77.0	24.0	472.28	472.00	0.004	25.97	0.00	13.64	8.27	477.51	3.23	475.00	1.00	474.92	473.83
MH-17	CB-18	0.574	0.960	2.892	6.128	3.62	17.87	129.0	24.0	473.55	472.28	0.010	17.87	0.00	22.45	5.69	480.00	4.45	477.51	3.23	475.73	474.92
MH-15	MH-16	0.861	0.960	1.515	6.360	5.43	9.71	150.0	24.0	475.00	474.25	0.005	9.71	0.00	16.00	5.34	480.00	3.00	480.00	3.75	476.31	476.15
MH-16	MH-17	0.861	0.960	2.341	6.228	5.43	14.70	100.0	24.0	474.15	473.65	0.005	14.70	0.00	16.00	4.68	480.00	3.85	480.00	4.35	476.15	475.73
MH-14	MH-15	0.717	0.960	0.688	6.520	4.52	4.52	150.0	18.0	476.25	475.50	0.005	4.52	0.00	7.43	4.41	480.00	2.25	480.00	3.00	477.10	476.32
CB-31	OF-32	0.444	0.960	0.540	6.069	2.80	3.31	24.0	18.0	472.62	472.00	0.026	3.31	0.00	16.88	7.41	475.84	1.72	475.50	2.00	473.84	473.83
IN 30	CB-31	0.119	0.960	0.114	6.520	0.75	0.75	258.0	18.0	473.50	472.22	0.005	0.75	0.00	7.40	2.69	475.90	0.90	475.84	2.12	473.87	473.84
HW-20	EW-21	1.750	0.690	1.207	6.520	7.94	7.94	45.0	18.0	474.50	474.00	0.011	7.94	0.00	11.07	6.81	477.00	1.00	477.00	1.50	475.59	474.95
CB-10	CB-11	0.319	0.960	0.306	6.520	2.01	2.01	206.0	18.0	475.80	474.75	0.005	2.01	0.00	7.50	3.60	478.29	0.99	477.09	0.84	476.34	475.28
CB-11	CB-12	0.803	0.960	1.077	6.251	5.07	6.79	158.0	24.0	474.25	473.45	0.005	6.79	0.00	16.10	4.91	477.09	0.84	479.79	4.34	475.17	475.12
CB-12	CB-13	0.001	0.960	1.078	6.100	0.01	6.63	137.0	24.0	473.35	472.70	0.005	6.63	0.00	15.58	4.76	479.79	4.44	476.89	2.19	475.12	475.02
CB-13	CB-18	0.383	0.960	1.446	5.964	2.42	8.69	64.0	24.0	472.60	472.28	0.005	8.69	0.00	16.00	2.77	476.89	2.29	477.51	3.23	475.02	474.92

10 Yr-Storm

FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Set Rim to Ground Elevation?	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (ft³/s)
OF-19	475.00	True	472.50	User Defined Tailwater	473.83	473.83	25.77
EW-21	477.00	True	474.00	User Defined Tailwater	473.96	474.95	7.90
OF-32	475.50	True	472.50	User Defined Tailwater	473.83	473.83	3.30

10 Yr-Storm

Conduit FlexTable: Combined Pipe/Node Report

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Upstream Structure Flow (Total Surface) (ft³/s)	System Rational Flow (ft³/s)	Length (Unified) (ft)	Diameter (in)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Flow (ft³/s)	System Known Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	Velocity (ft/s)	Elevation Ground (Start) (ft)	Cover (Start) (ft)	Elevation Ground (Stop) (ft)	Cover (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
CB-18	OF-19	0.187	0.328	4.400	6.721	0.47	29.80	77.0	24.0	472.28	472.00	0.004	29.80	0.00	13.64	9.49	477.51	3.23	475.00	1.00	475.48	474.14
MH-17	CB-18	0.574	0.960	2.892	7.006	4.24	20.43	129.0	24.0	473.55	472.28	0.010	20.43	0.00	22.45	6.50	480.00	4.45	477.51	3.23	476.53	475.48
MH-15	MH-16	0.861	0.960	1.515	7.348	6.36	11.22	150.0	24.0	475.00	474.25	0.005	11.22	0.00	16.00	3.57	480.00	3.00	480.00	3.75	477.45	477.08
MH-16	MH-17	0.861	0.960	2.341	7.111	6.36	16.78	100.0	24.0	474.15	473.65	0.005	16.78	0.00	16.00	5.34	480.00	3.85	480.00	4.35	477.08	476.53
MH-14	MH-15	0.717	0.960	0.688	7.630	5.29	5.29	150.0	18.0	476.25	475.50	0.005	5.29	0.00	7.43	3.00	480.00	2.25	480.00	3.00	477.83	477.45
CB-31	OF-32	0.444	0.960	0.540	7.113	3.28	3.88	24.0	18.0	472.62	472.00	0.026	3.88	0.00	16.88	2.19	475.84	1.72	475.50	2.00	474.17	474.14
IN 30	CB-31	0.119	0.960	0.114	7.630	0.88	0.88	258.0	18.0	473.50	472.22	0.005	0.88	0.00	7.40	2.81	475.90	0.90	475.84	2.12	474.19	474.17
HW-20	EW-21	1.750	0.690	1.207	7.630	9.29	9.29	45.0	18.0	474.50	474.00	0.011	9.29	0.00	11.07	7.02	477.00	1.00	477.00	1.50	475.68	475.06
CB-10	CB-11	0.319	0.960	0.306	7.630	2.36	2.36	206.0	18.0	475.80	474.75	0.005	2.36	0.00	7.50	3.76	478.29	0.99	477.09	0.84	476.38	475.93
CB-11	CB-12	0.803	0.960	1.077	7.321	5.93	7.95	158.0	24.0	474.25	473.45	0.005	7.95	0.00	16.10	5.11	477.09	0.84	479.79	4.34	475.93	475.76
CB-12	CB-13	0.001	0.960	1.078	7.147	0.01	7.77	137.0	24.0	473.35	472.70	0.005	7.77	0.00	15.58	2.47	479.79	4.44	476.89	2.19	475.76	475.60
CB-13	CB-18	0.383	0.960	1.446	6.834	2.83	9.96	64.0	24.0	472.60	472.28	0.005	9.96	0.00	16.00	3.17	476.89	2.29	477.51	3.23	475.60	475.48

25 Yr-Storm

FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Set Rim to Ground Elevation?	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (ft³/s)
OF-19	475.00	True	472.50	User Defined Tailwater	474.14	474.14	29.60
EW-21	477.00	True	474.00	User Defined Tailwater	474.07	475.06	9.24
OF-32	475.50	True	472.50	User Defined Tailwater	474.14	474.14	3.84

25 Yr-Storm

Conduit FlexTable: Combined Pipe/Node Report

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Upstream Structure Flow (Total Surface) (ft³/s)	System Rational Flow (ft³/s)	Length (Unified) (ft)	Diameter (in)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Flow (ft³/s)	System Known Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	Velocity (ft/s)	Elevation Ground (Start) (ft)	Cover (Start) (ft)	Elevation Ground (Stop) (ft)	Cover (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
CB-18	OF-19	0.187	0.328	4.400	7.450	0.53	33.04	77.0	24.0	472.28	472.00	0.004	33.04	0.00	13.64	10.52	477.51	3.23	475.00	1.00	476.18	474.54
MH-17	CB-18	0.574	0.960	2.892	7.963	4.78	23.22	129.0	24.0	473.55	472.28	0.010	23.22	0.00	22.45	7.39	480.00	4.45	477.51	3.23	477.54	476.18
MH-15	MH-16	0.861	0.960	1.515	8.311	7.17	12.69	150.0	24.0	475.00	474.25	0.005	12.69	0.00	16.00	4.04	480.00	3.00	480.00	3.75	478.72	478.25
MH-16	MH-17	0.861	0.960	2.341	8.070	7.17	19.05	100.0	24.0	474.15	473.65	0.005	19.05	0.00	16.00	6.06	480.00	3.85	480.00	4.35	478.25	477.54
MH-14	MH-15	0.717	0.960	0.688	8.600	5.97	5.97	150.0	18.0	476.25	475.50	0.005	5.97	0.00	7.43	3.38	480.00	2.25	480.00	3.00	479.21	478.72
CB-31	OF-32	0.444	0.960	0.540	8.024	3.69	4.37	24.0	18.0	472.62	472.00	0.026	4.37	0.00	16.88	2.47	475.84	1.72	475.50	2.00	474.58	474.54
IN 30	CB-31	0.119	0.960	0.114	8.600	0.99	0.99	258.0	18.0	473.50	472.22	0.005	0.99	0.00	7.40	2.91	475.90	0.90	475.84	2.12	474.60	474.58
HW-20	EW-21	1.750	0.690	1.207	8.600	10.47	10.47	45.0	18.0	474.50	474.00	0.011	10.47	0.00	11.07	7.13	477.00	1.00	477.00	1.50	475.74	475.16
CB-10	CB-11	0.319	0.960	0.306	8.600	2.65	2.65	206.0	18.0	475.80	474.75	0.005	2.65	0.00	7.50	3.88	478.29	0.99	477.09	0.84	476.89	476.78
CB-11	CB-12	0.803	0.960	1.077	8.255	6.68	8.96	158.0	24.0	474.25	473.45	0.005	8.96	0.00	16.10	2.85	477.09	0.84	479.79	4.34	476.78	476.53
CB-12	CB-13	0.001	0.960	1.078	7.895	0.01	8.58	137.0	24.0	473.35	472.70	0.005	8.58	0.00	15.58	2.73	479.79	4.44	476.89	2.19	476.53	476.33
CB-13	CB-18	0.383	0.960	1.446	7.569	3.19	11.03	64.0	24.0	472.60	472.28	0.005	11.03	0.00	16.00	3.51	476.89	2.29	477.51	3.23	476.33	476.18

50 Yr-Storm

FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Set Rim to Ground Elevation?	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (ft³/s)
OF-19	475.00	True	472.50	User Defined Tailwater	474.54	474.54	32.83
EW-21	477.00	True	474.00	User Defined Tailwater	474.22	475.16	10.42
OF-32	475.50	True	472.50	User Defined Tailwater	474.54	474.54	4.34

50 Yr-Storm

Conduit FlexTable: Combined Pipe/Node Report

Start Node	Stop Node	Upstream Inlet Area (acres)	Upstream Inlet C	System CA (acres)	System Intensity (in/h)	Upstream Structure Flow (Total Surface) (ft³/s)	System Rational Flow (ft³/s)	Length (Unified) (ft)	Diameter (in)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Flow (ft³/s)	System Known Flow (ft³/s)	Capacity (Full Flow) (ft³/s)	Velocity (ft/s)	Elevation Ground (Start) (ft)	Cover (Start) (ft)	Elevation Ground (Stop) (ft)	Cover (Stop) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
CB-18	OF-19	0.187	0.328	4.400	8.466	0.60	37.55	77.0	24.0	472.28	472.00	0.004	37.55	0.00	13.64	11.95	477.51	3.23	475.00	1.00	477.12	475.00
MH-17	CB-18	0.574	0.960	2.892	9.020	5.37	26.30	129.0	24.0	473.55	472.28	0.010	26.30	0.00	22.45	8.37	480.00	4.45	477.51	3.23	478.86	477.12
MH-15	MH-16	0.861	0.960	1.515	9.375	8.06	14.32	150.0	24.0	475.00	474.25	0.005	14.32	0.00	16.00	4.56	480.00	3.00	480.00	3.75	480.37	479.77
MH-16	MH-17	0.861	0.960	2.341	9.129	8.06	21.55	100.0	24.0	474.15	473.65	0.005	21.55	0.00	16.00	6.86	480.00	3.85	480.00	4.35	479.77	478.86
MH-14	MH-15	0.717	0.960	0.688	9.670	6.71	6.71	150.0	18.0	476.25	475.50	0.005	6.71	0.00	7.43	3.80	480.00	2.25	480.00	3.00	480.61	480.00
CB-31	OF-32	0.444	0.960	0.540	6.985	4.15	3.81	24.0	18.0	472.62	472.00	0.026	3.81	0.00	16.88	2.15	475.84	1.72	475.50	2.00	475.03	475.00
IN 30	CB-31	0.119	0.960	0.114	9.670	1.11	1.11	258.0	18.0	473.50	472.22	0.005	1.11	0.00	7.40	0.63	475.90	0.90	475.84	2.12	475.06	475.03
HW-20	EW-21	1.750	0.690	1.207	9.670	11.77	11.77	45.0	18.0	474.50	474.00	0.011	11.77	0.00	11.07	7.06	477.00	1.00	477.00	1.50	475.84	475.30
CB-10	CB-11	0.319	0.960	0.306	9.670	2.99	2.99	206.0	18.0	475.80	474.75	0.005	2.99	0.00	7.50	4.00	478.29	0.99	477.09	0.84	477.26	477.09
CB-11	CB-12	0.803	0.960	1.077	9.286	7.51	10.08	158.0	24.0	474.25	473.45	0.005	10.08	0.00	16.10	3.21	477.09	0.84	479.79	4.34	477.46	477.14
CB-12	CB-13	0.001	0.960	1.078	8.918	0.01	9.69	137.0	24.0	473.35	472.70	0.005	9.69	0.00	15.58	3.08	479.79	4.44	476.89	2.19	477.14	476.89
CB-13	CB-18	0.383	0.960	1.446	8.586	3.58	12.51	64.0	24.0	472.60	472.28	0.005	12.51	0.00	16.00	3.98	476.89	2.29	477.51	3.23	477.32	477.12

100 Yr-Storm

FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Set Rim to Ground Elevation?	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (ft³/s)
OF-19	475.00	True	472.50	User Defined Tailwater	475.00	475.00	37.33
EW-21	477.00	True	474.00	User Defined Tailwater	474.38	475.30	11.71
OF-32	475.50	True	472.50	User Defined Tailwater	475.00	475.00	3.78

100 Yr-Storm

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Hydrograph Return Period Recap

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

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.000	0.004	-------	0.025	0.098	0.448	1.056	2.080	Ex North Mdw A
2	SCS Runoff	------	1.346	2.214	-------	3.669	5.046	7.378	9.650	12.40	Ex North Mdw C
3	SCS Runoff	------	1.061	1.279	-------	1.600	1.877	2.315	2.721	3.197	Ex North Imperv
4	SCS Runoff	------	0.058	0.096	-------	0.159	0.219	0.320	0.419	0.538	Ex North Imp-Mdw
5	Combine	1, 2, 3, 4	2.448	3.578	-------	5.421	7.168	10.38	13.78	18.15	POS 001 Exist Total
7	SCS Runoff	------	0.000	0.002	-------	0.012	0.051	0.603	1.527	2.896	Post North Bypass Lawn A
8	SCS Runoff	------	0.604	0.901	-------	1.376	1.811	2.527	3.210	4.029	Post North Bypass Lawn C
9	Combine	7, 8	0.604	0.901	-------	1.376	1.815	3.001	4.658	6.898	Post North Bypass Total
11	SCS Runoff	------	0.000	0.000	-------	0.001	0.002	0.027	0.068	0.130	Post To North Basin Lwn A
12	SCS Runoff	------	1.560	2.326	-------	3.553	4.675	6.526	8.289	10.40	Post To North Basin Lwn C
13	SCS Runoff	------	21.47	25.87	-------	32.32	37.88	46.70	54.86	64.45	Post To North Basin Imp
14	Combine	11, 12, 13	22.98	28.14	-------	35.82	42.51	53.21	63.20	74.97	Total Post To North Basin
16	Reservoir	14	0.000	0.000	-------	0.295	1.278	3.807	6.339	8.351	North Basin
18	Combine	9, 16,	0.604	0.901	-------	1.376	1.815	4.378	8.826	13.23	POS 001 Post Total
20	SCS Runoff	------	1.955	3.210	-------	5.310	7.291	10.64	13.91	17.87	Ex South Mdw C
21	SCS Runoff	------	0.475	0.688	-------	1.026	1.333	1.838	2.316	2.885	Ex South Mdw D
22	SCS Runoff	------	1.780	2.147	-------	2.685	3.149	3.884	4.565	5.364	Ex South Imperv
23	SCS Runoff	------	0.099	0.162	-------	0.269	0.369	0.539	0.704	0.905	Ex South Imp-Mdw
24	Combine	20, 21, 22, 23	4.285	6.190	-------	9.272	12.12	16.89	21.49	27.02	POS 002 Exist Total
26	SCS Runoff	------	1.096	1.653	-------	2.554	3.389	4.775	6.102	7.687	Post South Bypass Lawn C
27	SCS Runoff	------	0.553	0.774	-------	1.118	1.425	1.921	2.387	2.936	Post South Bypass Lawn D
28	SCS Runoff	------	1.536	1.851	-------	2.314	2.713	3.344	3.929	4.616	Post South Bypass Imp
29	Combine	26, 27, 28	3.174	4.272	-------	5.985	7.527	10.04	12.42	15.24	Post South Bypass
31	SCS Runoff	------	0.000	0.000	-------	0.000	0.001	0.015	0.039	0.073	Post To South Basin Lwn A
32	SCS Runoff	------	2.425	3.616	-------	5.522	7.267	10.14	12.88	16.17	Post To South Basin Lwn C
33	SCS Runoff	------	1.138	1.576	-------	2.252	2.853	3.828	4.746	5.828	Post To South Basin Lwn D
34	SCS Runoff	------	5.086	6.127	-------	7.656	8.974	11.06	13.00	15.27	Post To South Basin Imp
35	Combine	31, 32, 33, 34	8.580	11.23	-------	15.34	19.02	25.00	30.64	37.33	Total Post To South Basin
37	Reservoir	35	0.000	0.000	-------	0.000	0.089	1.361	4.052	9.460	South Basin

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
39	Combine	29, 37,	3.174	4.272	-------	5.985	7.527	10.04	14.91	23.38	POS 002 Post Total
42	Combine	9, 14,	23.56	29.02	-------	37.18	44.31	56.07	67.66	81.65	Post North Undetained
43	Combine	29, 35,	11.40	15.06	-------	20.73	25.80	34.06	41.86	51.11	Post South Undetained

Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.000	1	n/a	0	------	------	------	Ex North Mdw A
2	SCS Runoff	1.346	1	741	8,215	------	------	------	Ex North Mdw C
3	SCS Runoff	1.061	1	738	5,739	------	------	------	Ex North Imperv
4	SCS Runoff	0.058	1	741	356	------	------	------	Ex North Imp-Mdw
5	Combine	2.448	1	739	14,311	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	0.000	1	n/a	0	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	0.604	1	718	1,246	------	------	------	Post North Bypass Lawn C
9	Combine	0.604	1	718	1,246	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.000	1	n/a	0	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	1.560	1	718	3,217	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	21.47	1	717	50,363	------	------	------	Post To North Basin Imp
14	Combine	22.98	1	717	53,579	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	0.000	1	561	0	14	472.87	34,154	North Basin
18	Combine	0.604	1	718	1,246	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	1.955	1	736	10,469	------	------	------	Ex South Mdw C
21	SCS Runoff	0.475	1	735	2,219	------	------	------	Ex South Mdw D
22	SCS Runoff	1.780	1	733	8,557	------	------	------	Ex South Imperv
23	SCS Runoff	0.099	1	736	530	------	------	------	Ex South Imp-Mdw
24	Combine	4.285	1	735	21,775	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	1.096	1	722	2,932	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	0.553	1	721	1,415	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	1.536	1	721	4,393	------	------	------	Post South Bypass Imp
29	Combine	3.174	1	721	8,739	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.000	1	n/a	0	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	2.425	1	718	5,000	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	1.138	1	718	2,286	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	5.086	1	717	11,930	------	------	------	Post To South Basin Imp
35	Combine	8.580	1	718	19,216	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	0.000	1	1957	0	35	473.50	11,386	South Basin

Hydrograph Summary Report

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

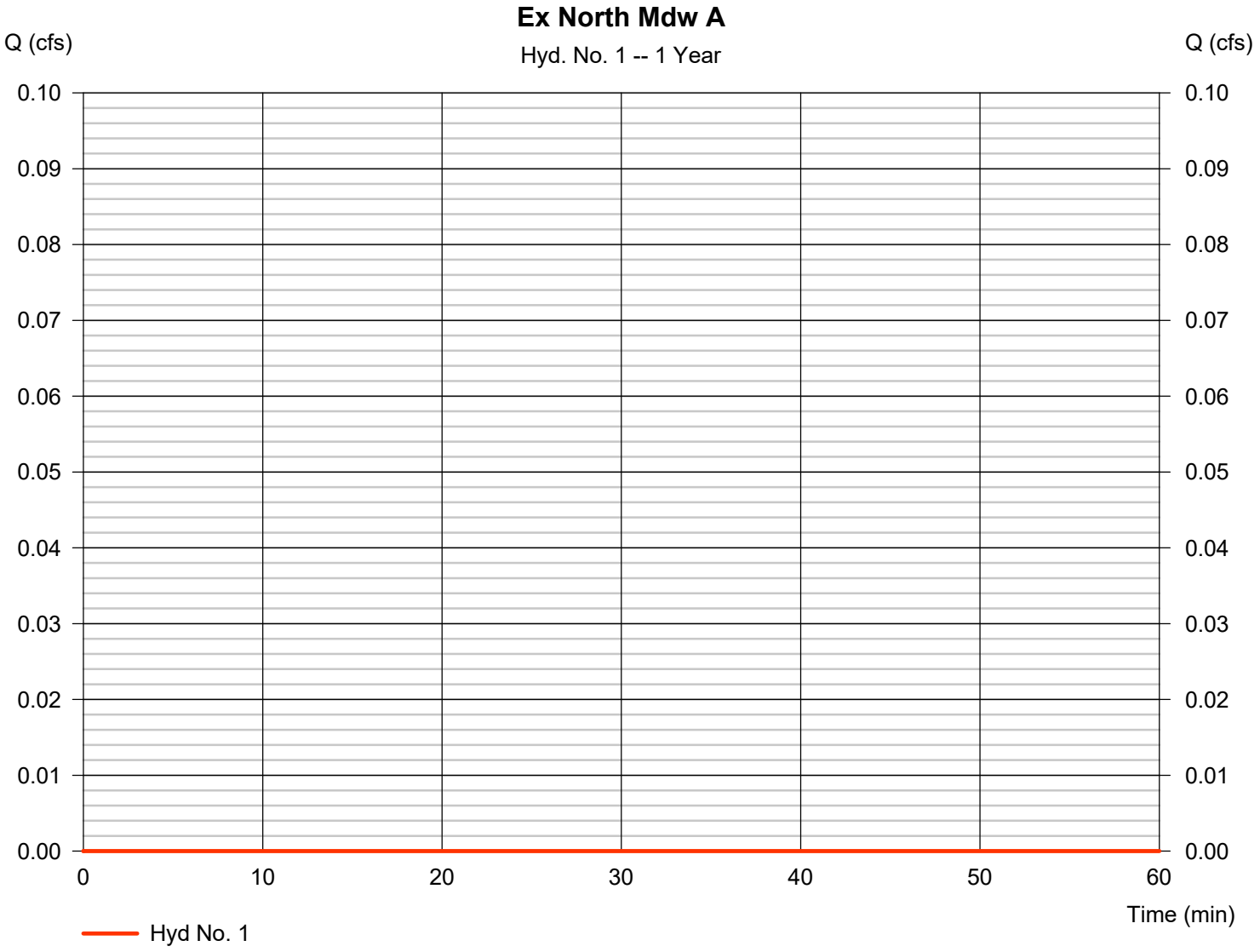
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	3.174	1	721	8,739	29, 37,	------	------	POS 002 Post Total
42	Combine	23.56	1	717	54,825	9, 14,	------	------	Post North Undetained
43	Combine	11.40	1	718	27,955	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 1

Ex North Mdw A

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.31		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 24.43**	**+**	**0.00**	**+**	**0.00**	**=**	**24.43**
Shallow Concentrated Flow							
Flow length (ft)	= 900.00		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)	**= 16.97**	**+**	**0.00**	**+**	**0.00**	**=**	**16.97**
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		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

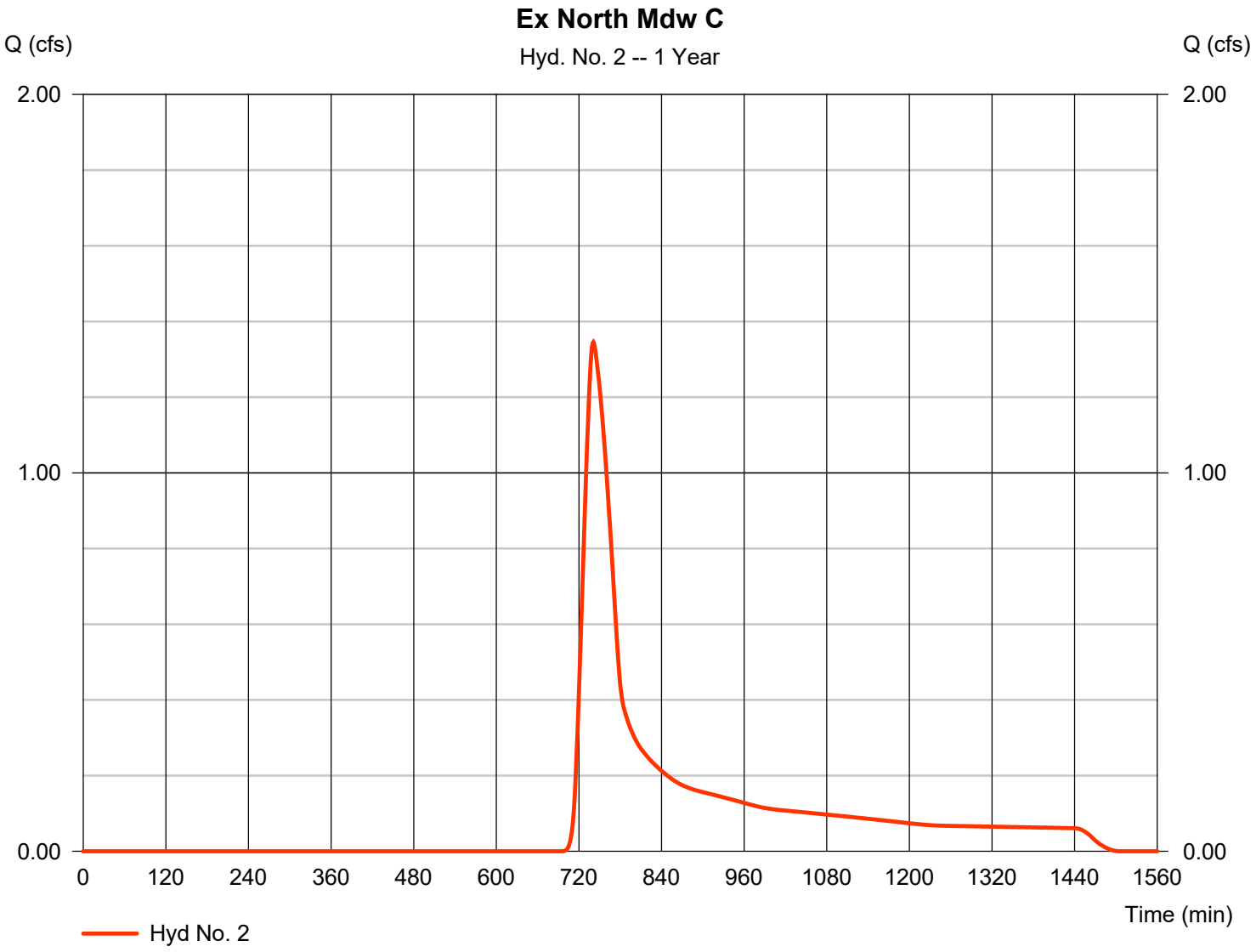
Total Travel Time, Tc ..... 41.40 min

Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.346 cfs
Storm frequency	=	1 yrs	Time to peak	=	741 min
Time interval	=	1 min	Hyd. volume	=	8,215 cuft
Drainage area	=	3.595 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

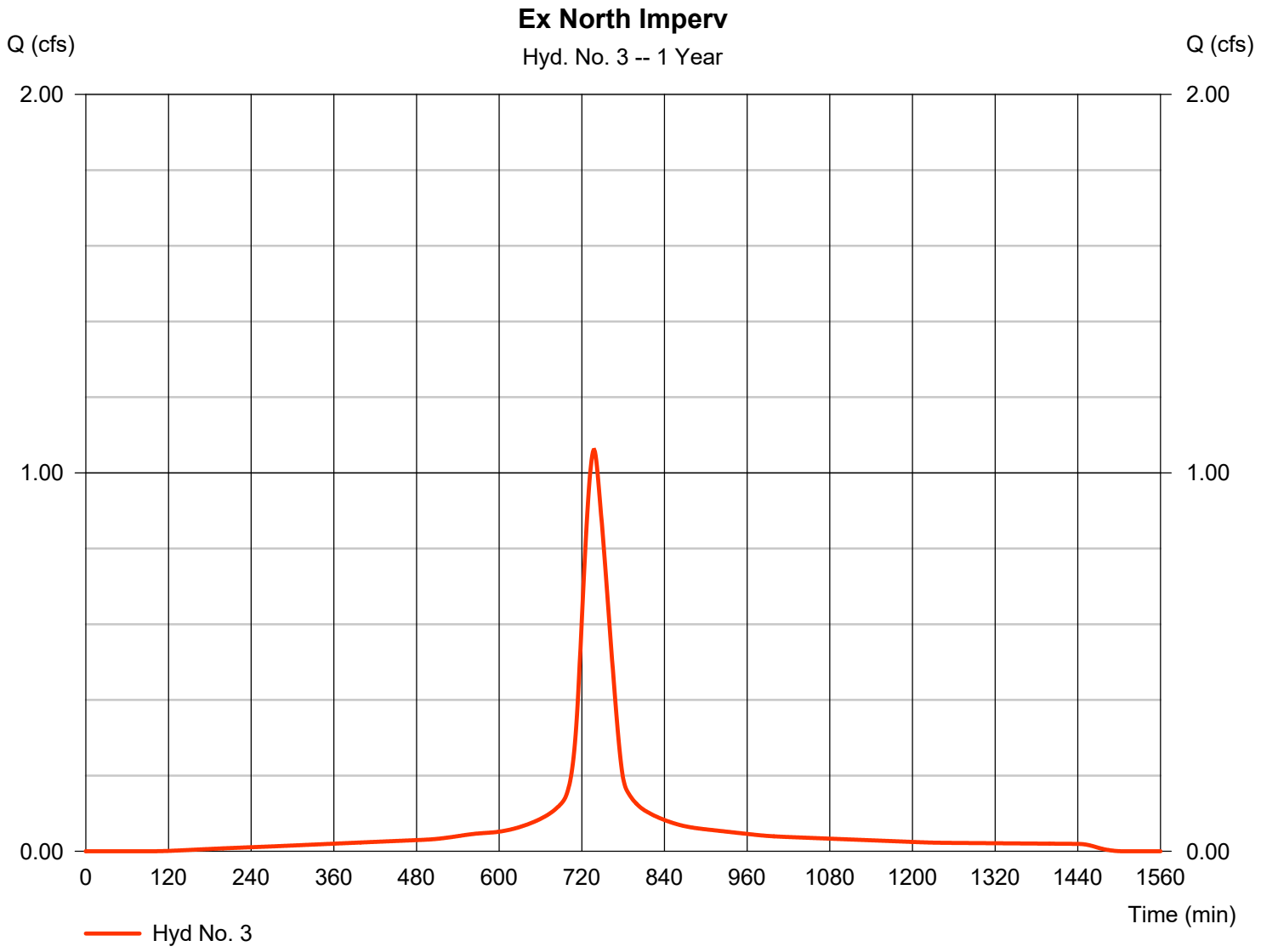


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.061 cfs
Storm frequency	=	1 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	5,739 cuft
Drainage area	=	0.622 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

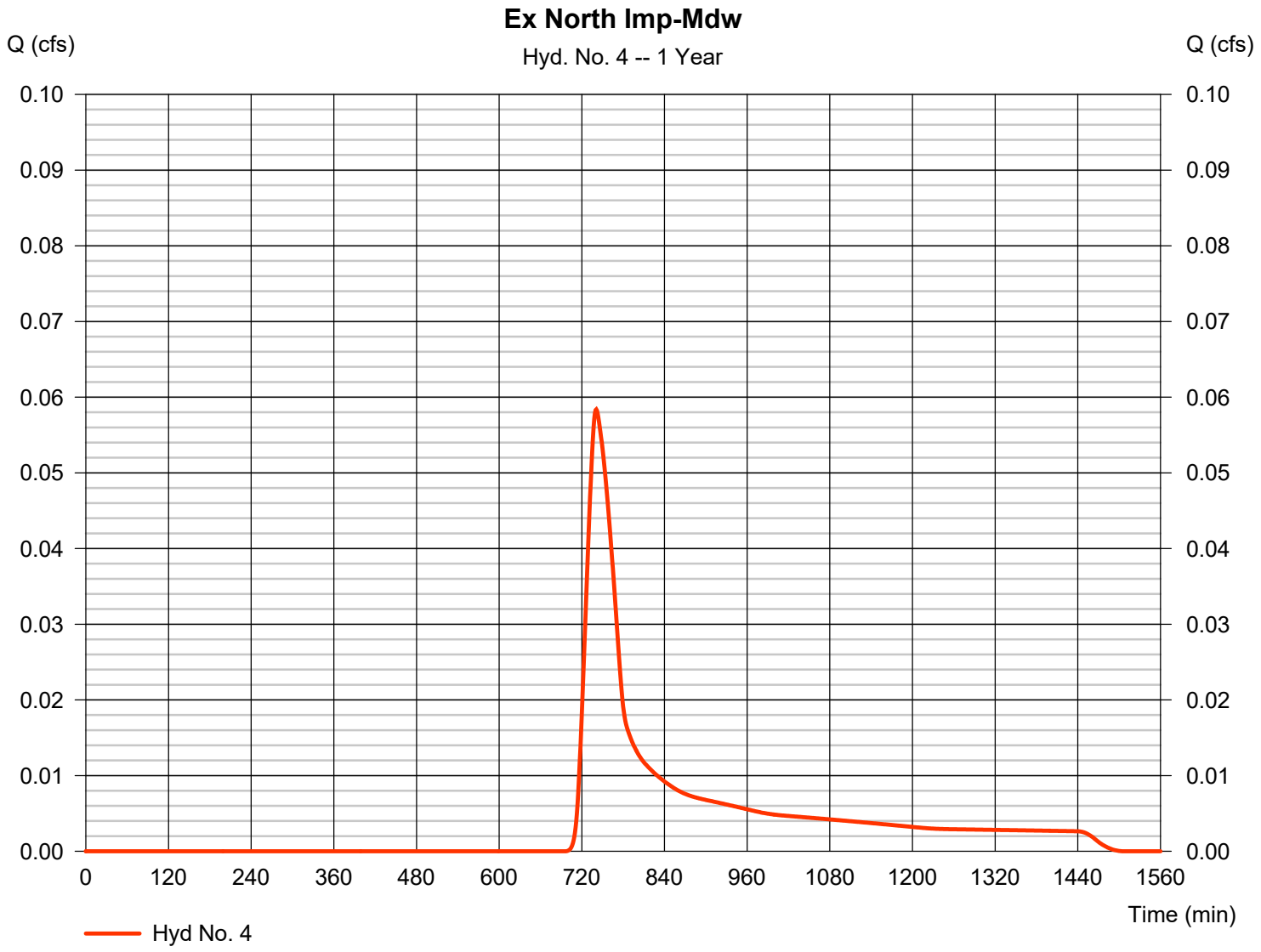


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	= SCS Runoff	Peak discharge	= 0.058 cfs
Storm frequency	= 1 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 356 cuft
Drainage area	= 0.156 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

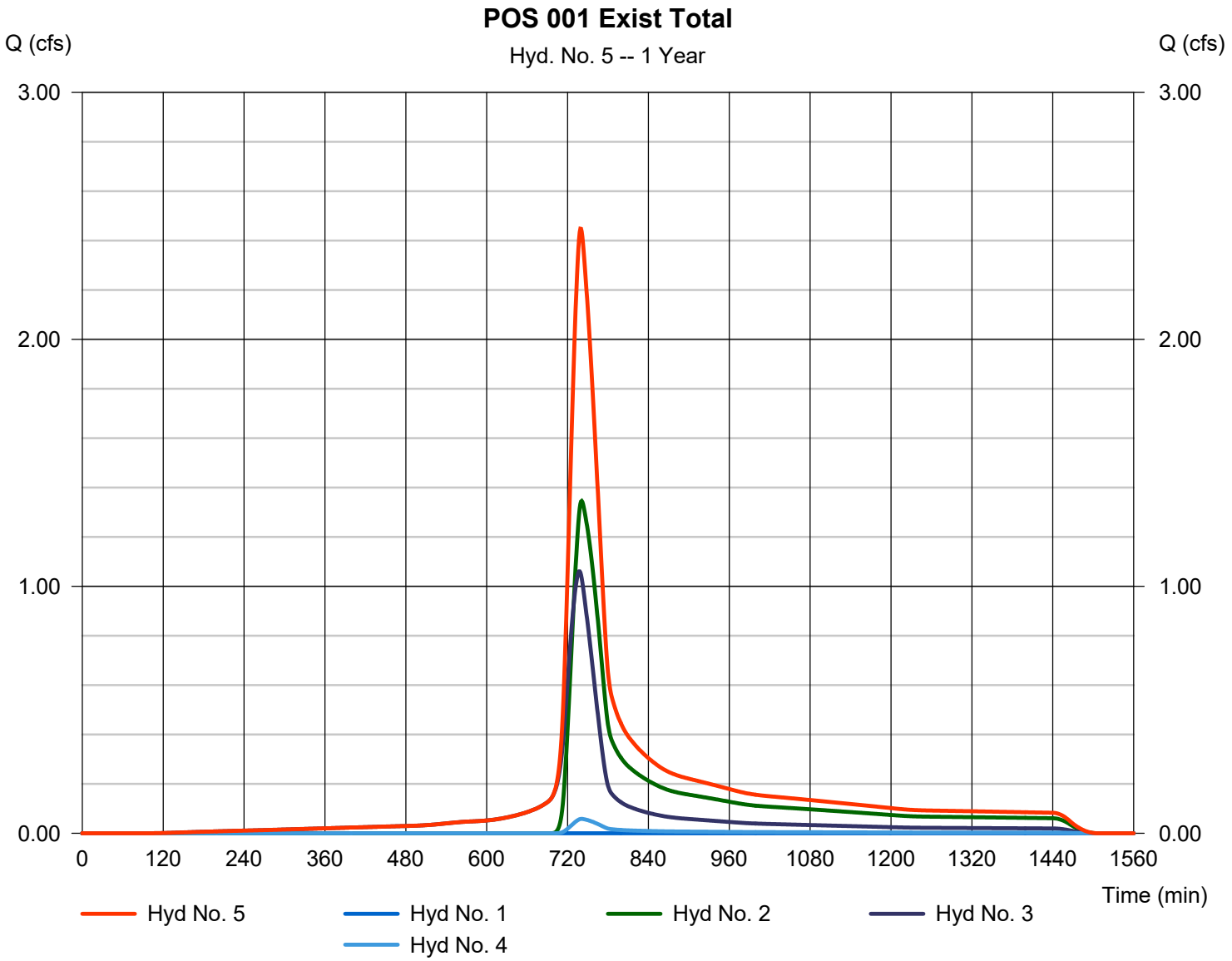


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 2.448 cfs
Storm frequency	= 1 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 14,311 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

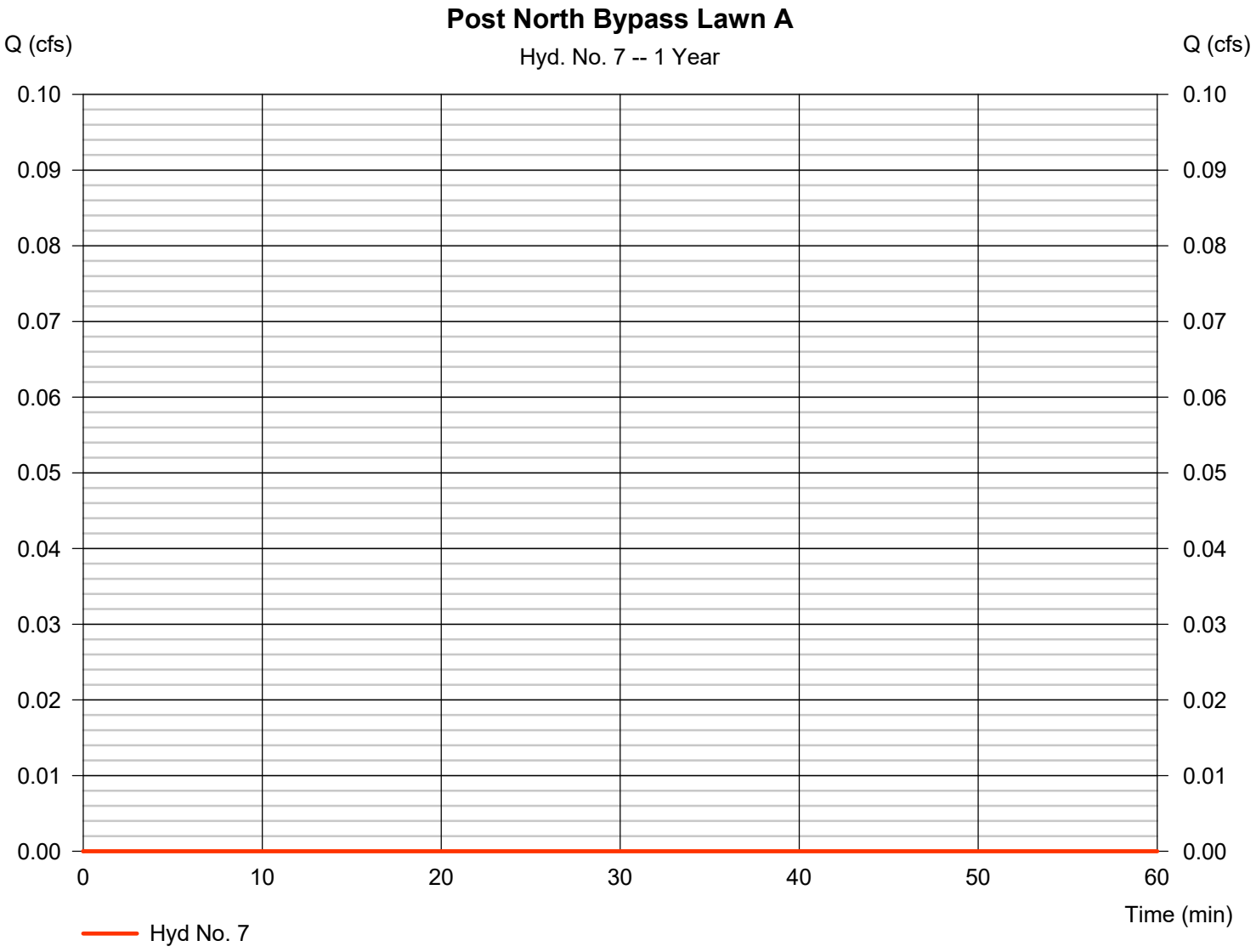


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 1.385 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

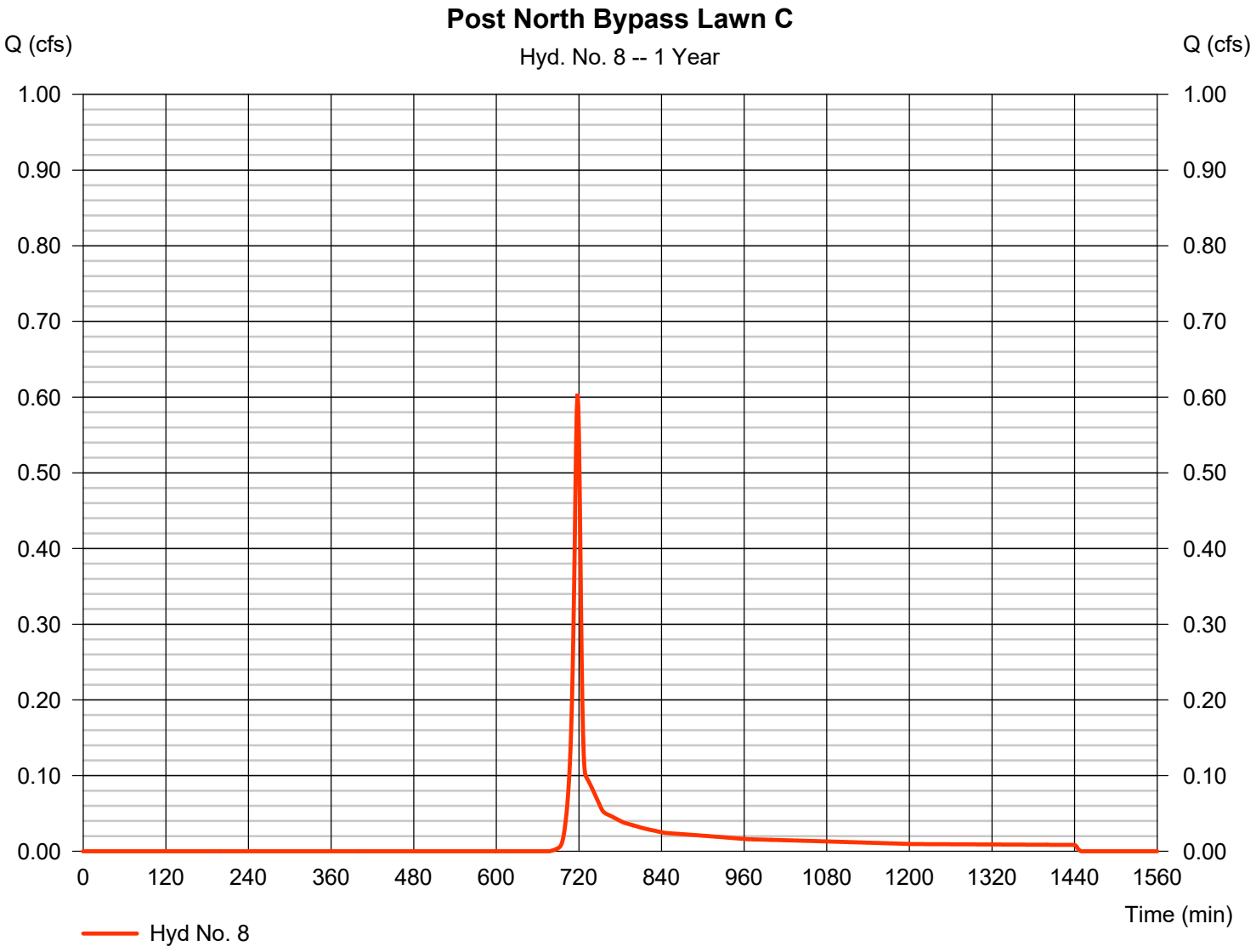


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.604 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	1,246 cuft
Drainage area	=	0.438 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

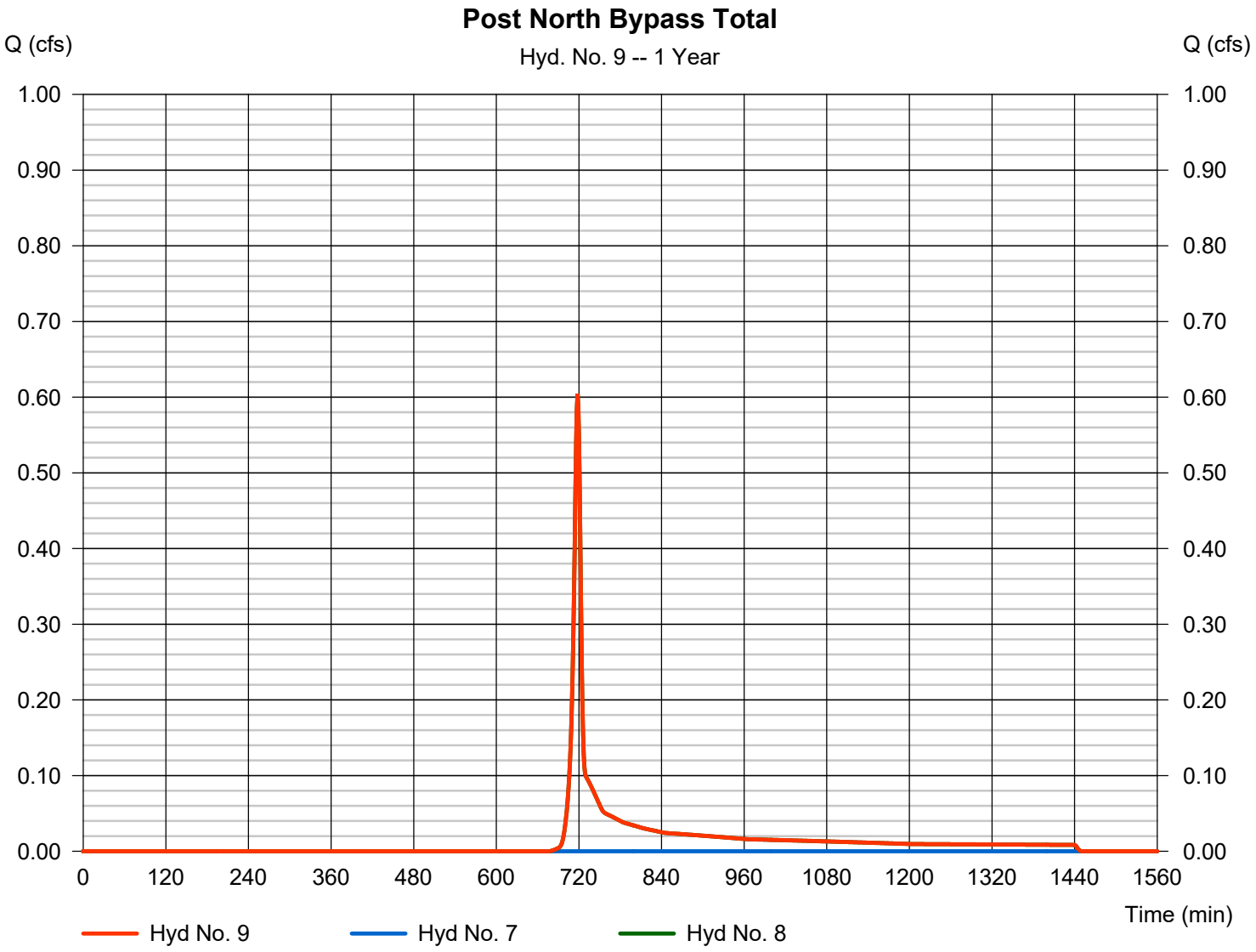


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	= Combine	Peak discharge	= 0.604 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,246 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 1.823 ac



BLACK BUFFALO
NEW LIGHT MANUFACTURING AND WAREHOUSE FACILITY

SMITHFIELD TOWNSHIP, MONROE COUNTY

NORTH BASIN SUBAREA

Time of Concentration

Sheet Flow

150 ft paved surface (n=0.011) at 1.0% slope = 2.17 min.

Pipe Flow (25 yr-storm)

Pipe Section	Length	Velocity	Flow Time
10-11	206 ft	3.76 fps	54.8 sec.
11-12	158 ft	5.11 fps	30.9 sec.
12-13	137 ft	2.47 fps	55.5 sec.
13-18	64 ft	3.17 fps	20.2 sec.
18-19	77 ft	9.49 fps	8.1 sec.
			Total: 169.5 sec. => 2.83 min.

Time of Concentration = Sheet Flow + Pipe Flow

= 2.17 min + 2.83 min = 5.00 min

USE 6 min.

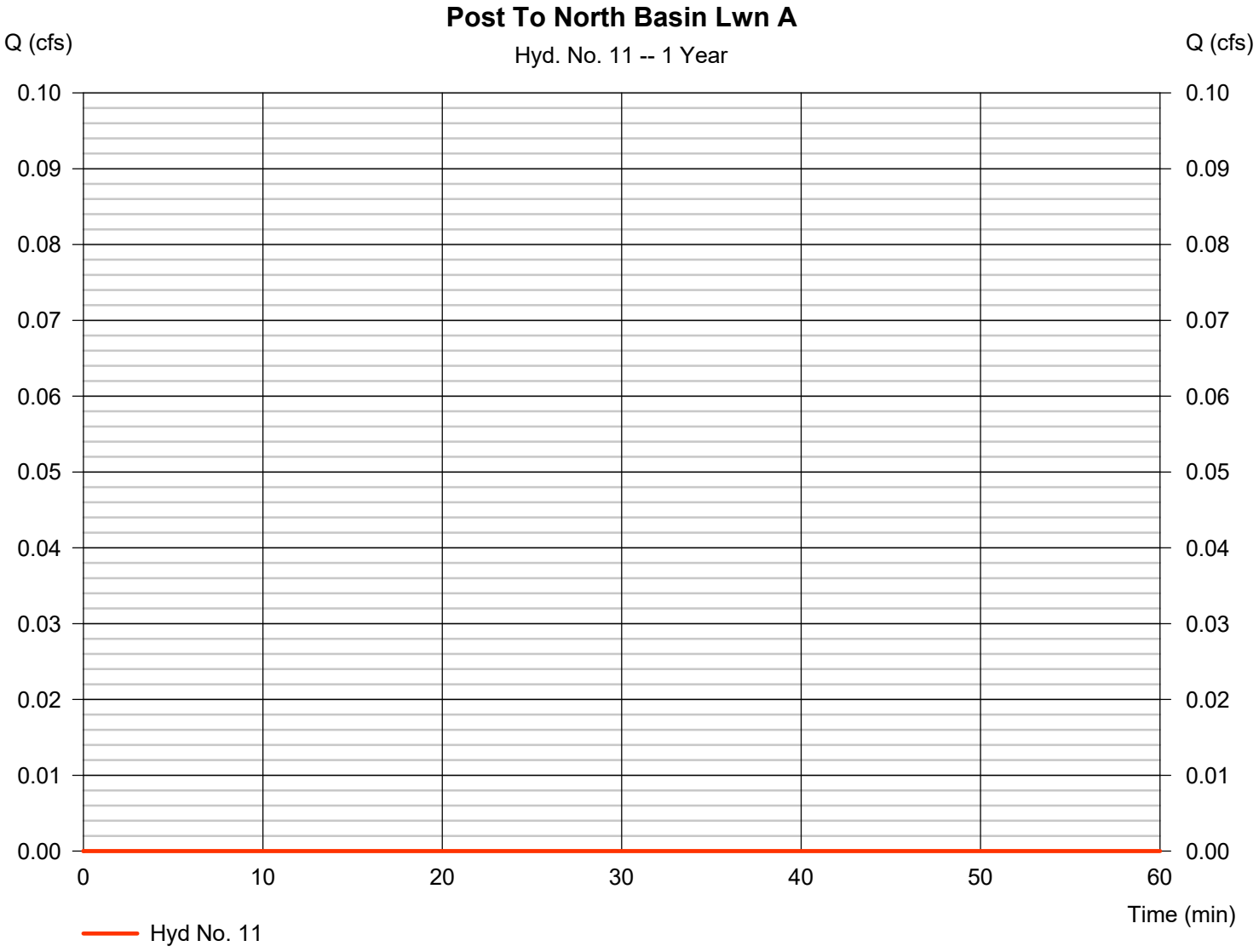
Hydrograph Report

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 0.062 ac	Curve number	= 40*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



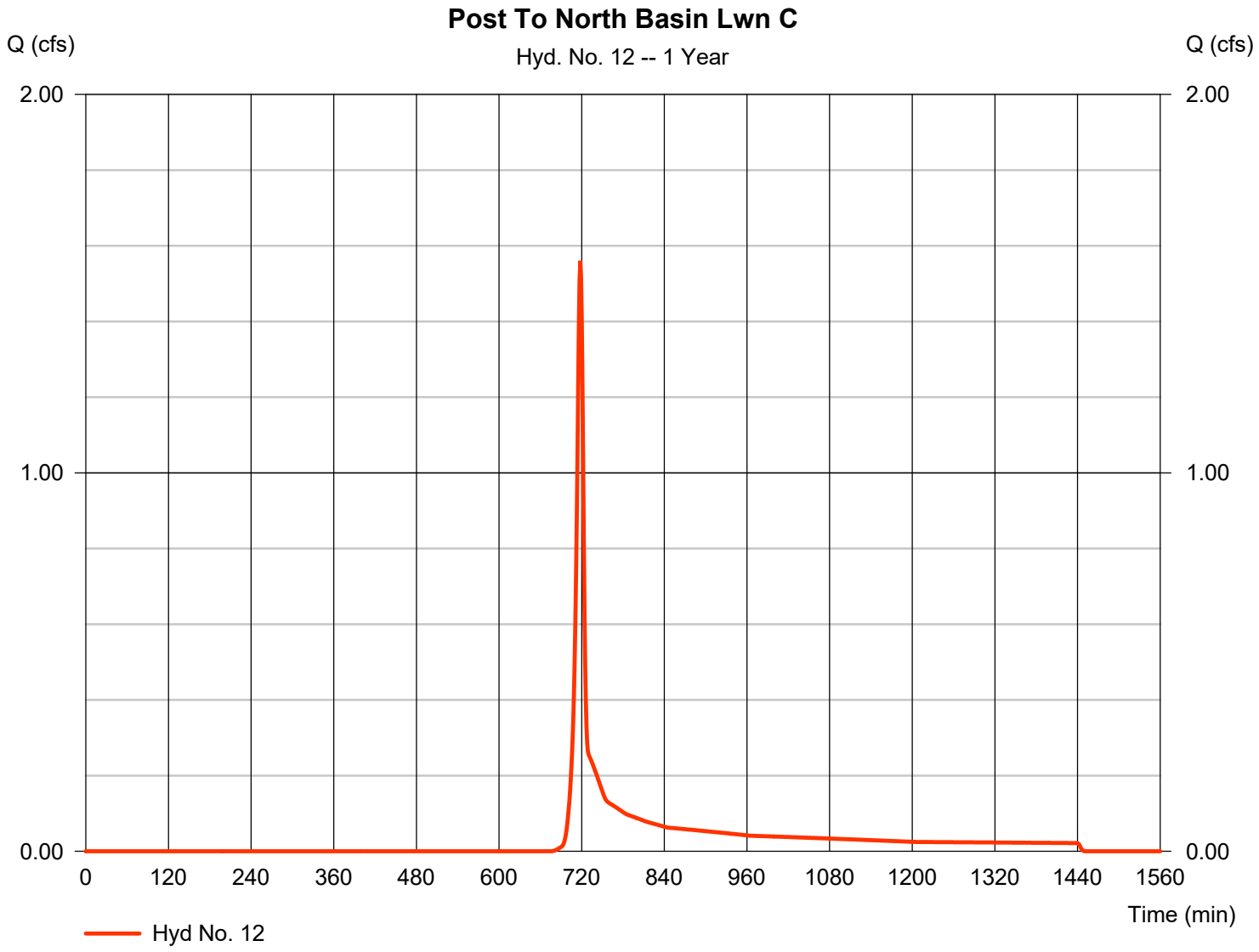
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.560 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	3,217 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



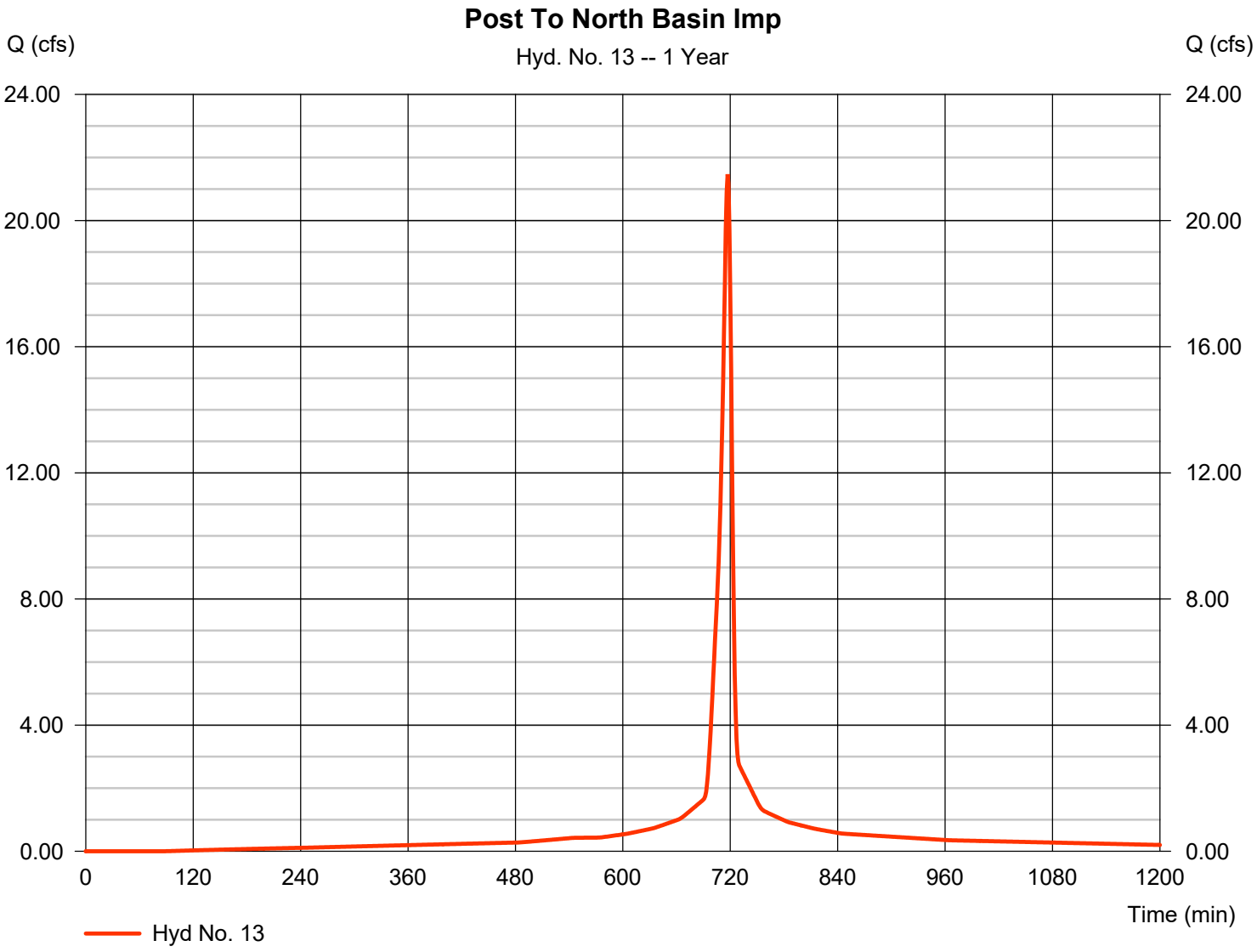
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.47 cfs
Storm frequency	=	1 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	50,363 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

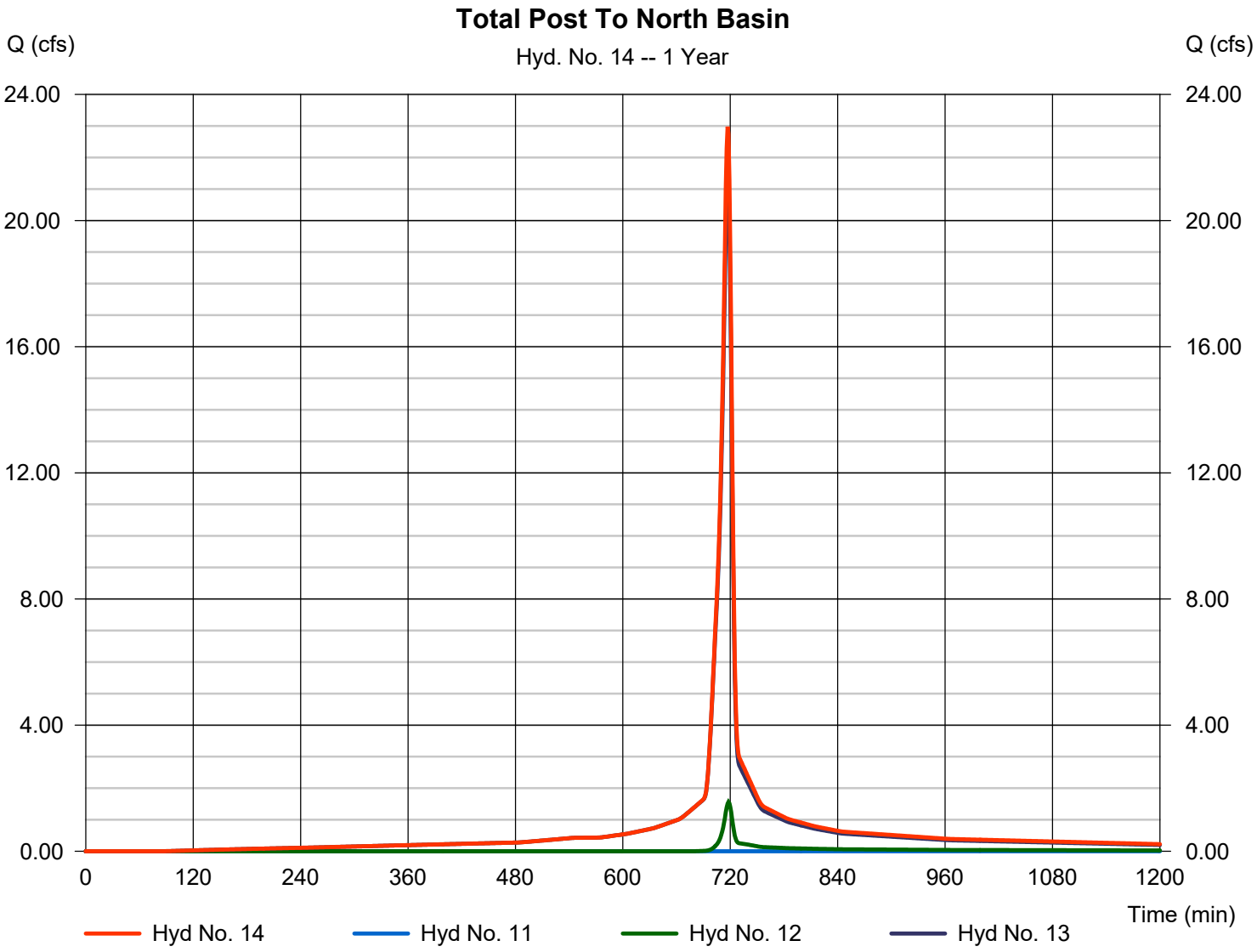


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	=	Combine	Peak discharge	=	22.98 cfs
Storm frequency	=	1 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	53,579 cuft
Inflow hyds.	=	11, 12, 13	Contrib. drain. area	=	6.512 ac



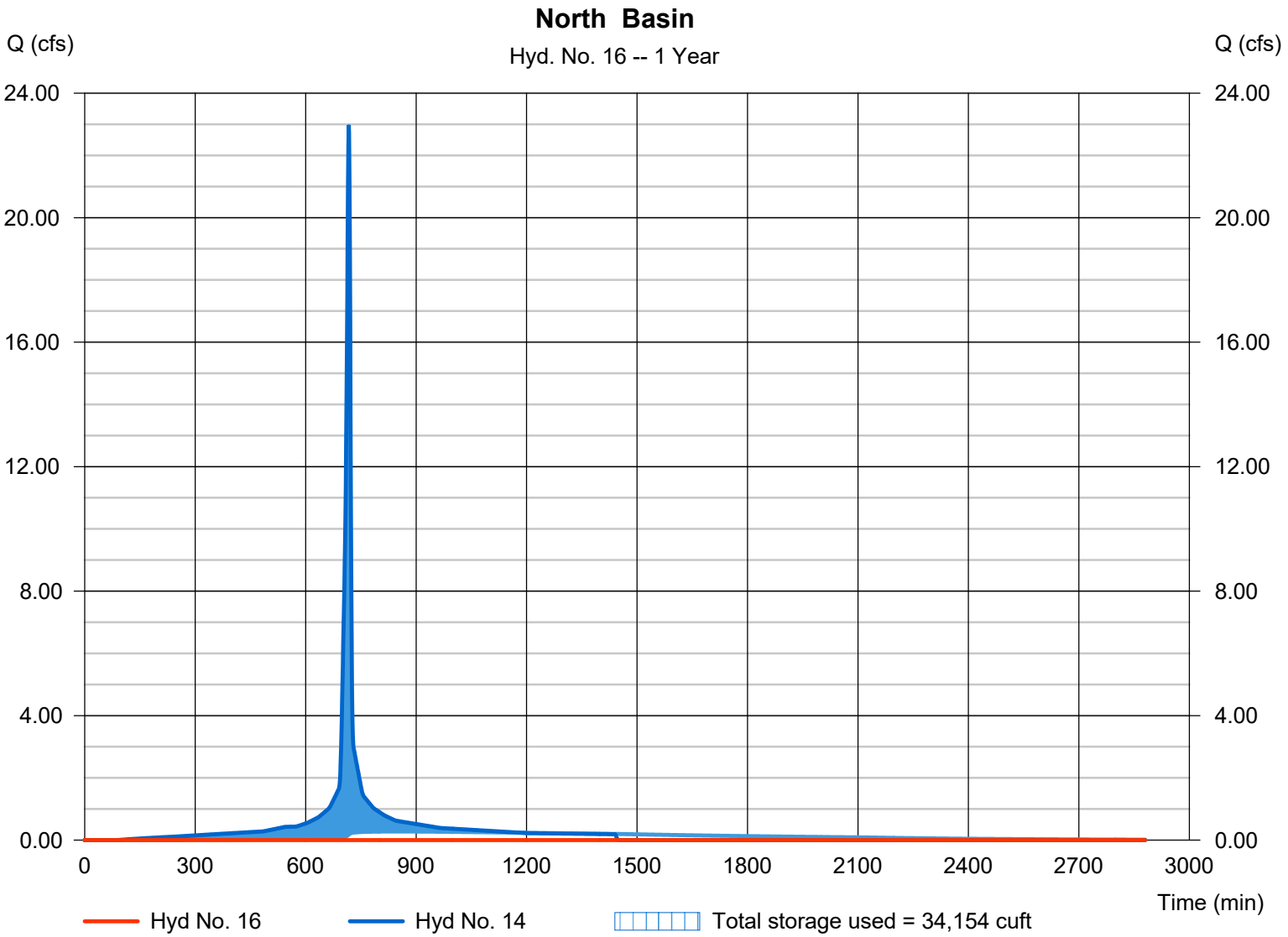
Hydrograph Report

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	561 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	472.87 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	34,154 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 2 - POS 001 North Basin

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 471.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	471.50	22,789	0	0
0.50	472.00	24,354	11,782	11,782
1.00	472.50	25,831	12,543	24,326
1.50	473.00	27,220	13,260	37,586
2.00	473.50	28,651	13,965	51,550
2.50	474.00	30,077	14,679	66,229
3.00	474.50	31,575	15,410	81,639
3.50	475.00	34,057	16,402	98,042
4.50	476.00	36,482	35,259	133,301

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	10.00	0.00	0.00
Span (in)	= 18.00	24.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 470.70	473.50	0.00	0.00
Length (ft)	= 140.00	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	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 475.00	475.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.930 (by Contour)

TW Elev. (ft) = 0.00

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

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	471.50	0.00	0.00	---	---	0.00	0.00	---	---	0.000	---	0.000
0.05	1,178	471.55	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.052	---	0.052
0.10	2,356	471.60	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.105	---	0.105
0.15	3,535	471.65	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.157	---	0.157
0.20	4,713	471.70	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.210	---	0.210
0.25	5,891	471.75	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.262	---	0.262
0.30	7,069	471.80	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.315	---	0.315
0.35	8,248	471.85	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.367	---	0.367
0.40	9,426	471.90	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.419	---	0.419
0.45	10,604	471.95	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.472	---	0.472
0.50	11,782	472.00	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.524	---	0.524
0.55	13,037	472.05	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.527	---	0.527
0.60	14,291	472.10	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.531	---	0.531
0.65	15,545	472.15	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.534	---	0.534
0.70	16,800	472.20	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.537	---	0.537
0.75	18,054	472.25	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.540	---	0.540
0.80	19,308	472.30	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.543	---	0.543
0.85	20,563	472.35	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.547	---	0.547
0.90	21,817	472.40	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.550	---	0.550
0.95	23,071	472.45	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.553	---	0.553
1.00	24,326	472.50	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.556	---	0.556
1.05	25,652	472.55	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.559	---	0.559
1.10	26,978	472.60	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.562	---	0.562
1.15	28,304	472.65	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.565	---	0.565
1.20	29,630	472.70	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.568	---	0.568
1.25	30,956	472.75	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.571	---	0.571
1.30	32,282	472.80	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.574	---	0.574
1.35	33,608	472.85	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.577	---	0.577
1.40	34,934	472.90	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.580	---	0.580
1.45	36,260	472.95	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.583	---	0.583
1.50	37,586	473.00	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.586	---	0.586
1.55	38,982	473.05	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.589	---	0.589
1.60	40,378	473.10	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.592	---	0.592
1.65	41,775	473.15	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.595	---	0.595

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POS 001 North Basin

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	43,171	473.20	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.598	---	0.598
1.75	44,568	473.25	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.601	---	0.601
1.80	45,964	473.30	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.604	---	0.604
1.85	47,361	473.35	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.608	---	0.608
1.90	48,757	473.40	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.611	---	0.611
1.95	50,154	473.45	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.614	---	0.614
2.00	51,550	473.50	2.96 ic	0.00	---	---	0.00	0.00	---	---	0.617	---	0.617
2.05	53,018	473.55	2.96 ic	0.08 ic	---	---	0.00	0.00	---	---	0.620	---	0.696
2.10	54,486	473.60	2.96 ic	0.22 ic	---	---	0.00	0.00	---	---	0.623	---	0.838
2.15	55,954	473.65	2.96 ic	0.40 ic	---	---	0.00	0.00	---	---	0.626	---	1.021
2.20	57,422	473.70	2.96 ic	0.61 ic	---	---	0.00	0.00	---	---	0.629	---	1.238
2.25	58,890	473.75	2.96 ic	0.85 ic	---	---	0.00	0.00	---	---	0.632	---	1.483
2.30	60,358	473.80	2.96 ic	1.12 ic	---	---	0.00	0.00	---	---	0.635	---	1.754
2.35	61,826	473.85	2.96 ic	1.41 ic	---	---	0.00	0.00	---	---	0.638	---	2.048
2.40	63,294	473.90	2.96 ic	1.72 ic	---	---	0.00	0.00	---	---	0.641	---	2.363
2.45	64,762	473.95	2.96 ic	2.05 ic	---	---	0.00	0.00	---	---	0.644	---	2.699
2.50	66,229	474.00	2.96 ic	2.41 ic	---	---	0.00	0.00	---	---	0.647	---	3.055
2.55	67,770	474.05	2.96 ic	2.78 ic	---	---	0.00	0.00	---	---	0.651	---	3.428
2.60	69,311	474.10	3.18 ic	3.16 ic	---	---	0.00	0.00	---	---	0.654	---	3.818
2.65	70,852	474.15	3.57 ic	3.57 ic	---	---	0.00	0.00	---	---	0.657	---	4.225
2.70	72,393	474.20	4.03 ic	3.99 ic	---	---	0.00	0.00	---	---	0.660	---	4.648
2.75	73,934	474.25	4.42 ic	4.42 ic	---	---	0.00	0.00	---	---	0.664	---	5.086
2.80	75,475	474.30	4.87 ic	4.87 ic	---	---	0.00	0.00	---	---	0.667	---	5.539
2.85	77,016	474.35	5.30 oc	5.28 ic	---	---	0.00	0.00	---	---	0.670	---	5.952
2.90	78,557	474.40	5.60 oc	5.58 ic	---	---	0.00	0.00	---	---	0.673	---	6.252
2.95	80,098	474.45	5.88 oc	5.86 ic	---	---	0.00	0.00	---	---	0.677	---	6.537
3.00	81,639	474.50	6.13 oc	6.13 ic	---	---	0.00	0.00	---	---	0.680	---	6.809
3.05	83,280	474.55	6.39 oc	6.39 ic	---	---	0.00	0.00	---	---	0.685	---	7.071
3.10	84,920	474.60	6.63 oc	6.63 ic	---	---	0.00	0.00	---	---	0.690	---	7.324
3.15	86,560	474.65	6.87 oc	6.87 ic	---	---	0.00	0.00	---	---	0.696	---	7.568
3.20	88,200	474.70	7.10 oc	7.10 ic	---	---	0.00	0.00	---	---	0.701	---	7.803
3.25	89,841	474.75	7.33 oc	7.33 ic	---	---	0.00	0.00	---	---	0.706	---	8.032
3.30	91,481	474.80	7.54 oc	7.54 ic	---	---	0.00	0.00	---	---	0.712	---	8.254
3.35	93,121	474.85	7.75 oc	7.75 ic	---	---	0.00	0.00	---	---	0.717	---	8.470
3.40	94,761	474.90	7.96 oc	7.96 ic	---	---	0.00	0.00	---	---	0.722	---	8.680
3.45	96,402	474.95	8.16 oc	8.16 ic	---	---	0.00	0.00	---	---	0.728	---	8.885
3.50	98,042	475.00	8.35 oc	8.35 ic	---	---	0.00	0.00	---	---	0.733	---	9.086
3.60	101,568	475.10	11.52 oc	7.79 ic	---	---	1.26	2.47	---	---	0.738	---	12.26
3.70	105,094	475.20	13.30 oc	3.17 ic	---	---	3.43 s	6.69 s	---	---	0.744	---	14.04
3.80	108,620	475.30	13.67 oc	1.92 ic	---	---	3.98 s	7.77 s	---	---	0.749	---	14.41
3.90	112,145	475.40	13.90 oc	1.36 ic	---	---	4.25 s	8.29 s	---	---	0.754	---	14.65
4.00	115,671	475.50	14.10 oc	1.03 ic	---	---	4.42 s	8.63 s	---	---	0.759	---	14.85
4.10	119,197	475.60	14.28 oc	0.82 ic	---	---	4.56 s	8.89 s	---	---	0.764	---	15.04
4.20	122,723	475.70	14.46 oc	0.67 ic	---	---	4.66 s	9.09 s	---	---	0.770	---	15.19
4.30	126,249	475.80	14.64 oc	0.57 ic	---	---	4.75 s	9.27 s	---	---	0.775	---	15.37
4.40	129,775	475.90	14.81 oc	0.49 ic	---	---	4.82 s	9.41 s	---	---	0.780	---	15.51
4.50	133,301	476.00	14.98 oc	0.43 ic	---	---	4.90 s	9.56 s	---	---	0.785	---	15.67

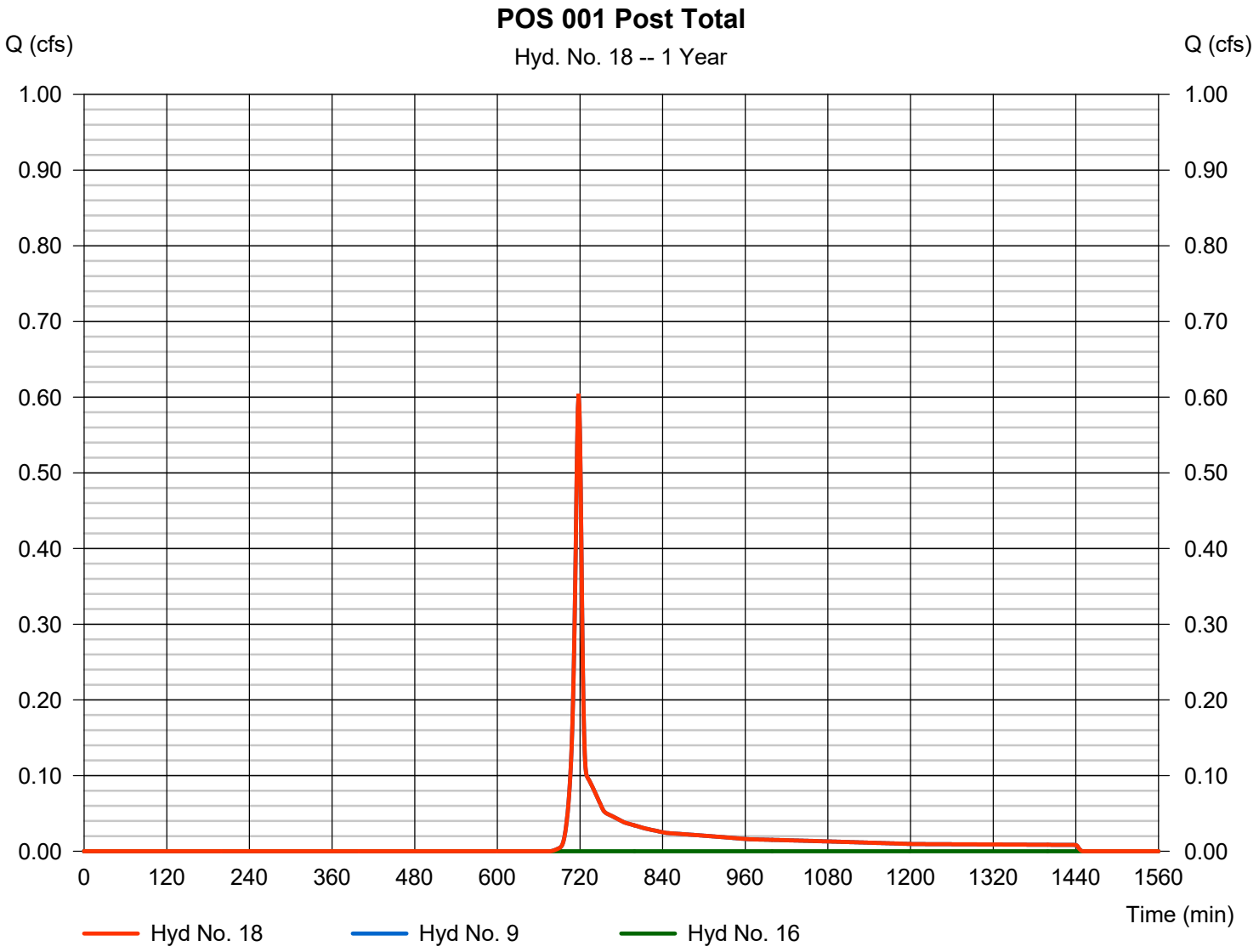
...End

Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	=	Combine	Peak discharge	=	0.604 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	1,246 cuft
Inflow hyds.	=	9, 16	Contrib. drain. area	=	0.000 ac



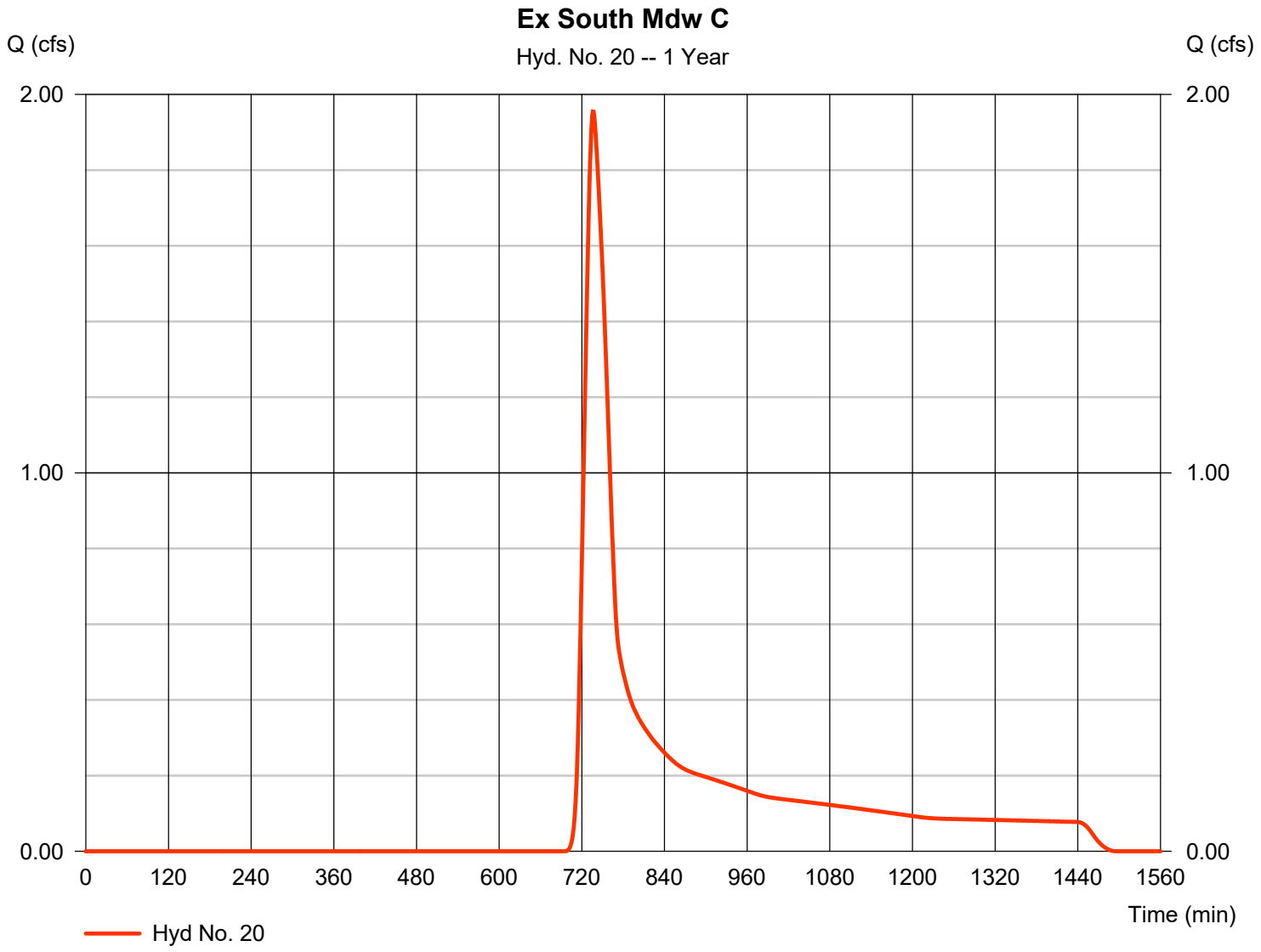
Hydrograph Report

Hyd. No. 20

Ex South Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.955 cfs
Storm frequency	=	1 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	10,469 cuft
Drainage area	=	4.604 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	33.93 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



TR55 Tc Worksheet

Hyd. No. 20

Ex South Mdw C

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.31		3.31		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 24.43**	**+**	**0.00**	**+**	**0.00**	**=**	**24.43**
Shallow Concentrated Flow							
Flow length (ft)	= 650.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.14		0.00		0.00		
Travel Time (min)	**= 9.50**	**+**	**0.00**	**+**	**0.00**	**=**	**9.50**
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		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 33.93 min

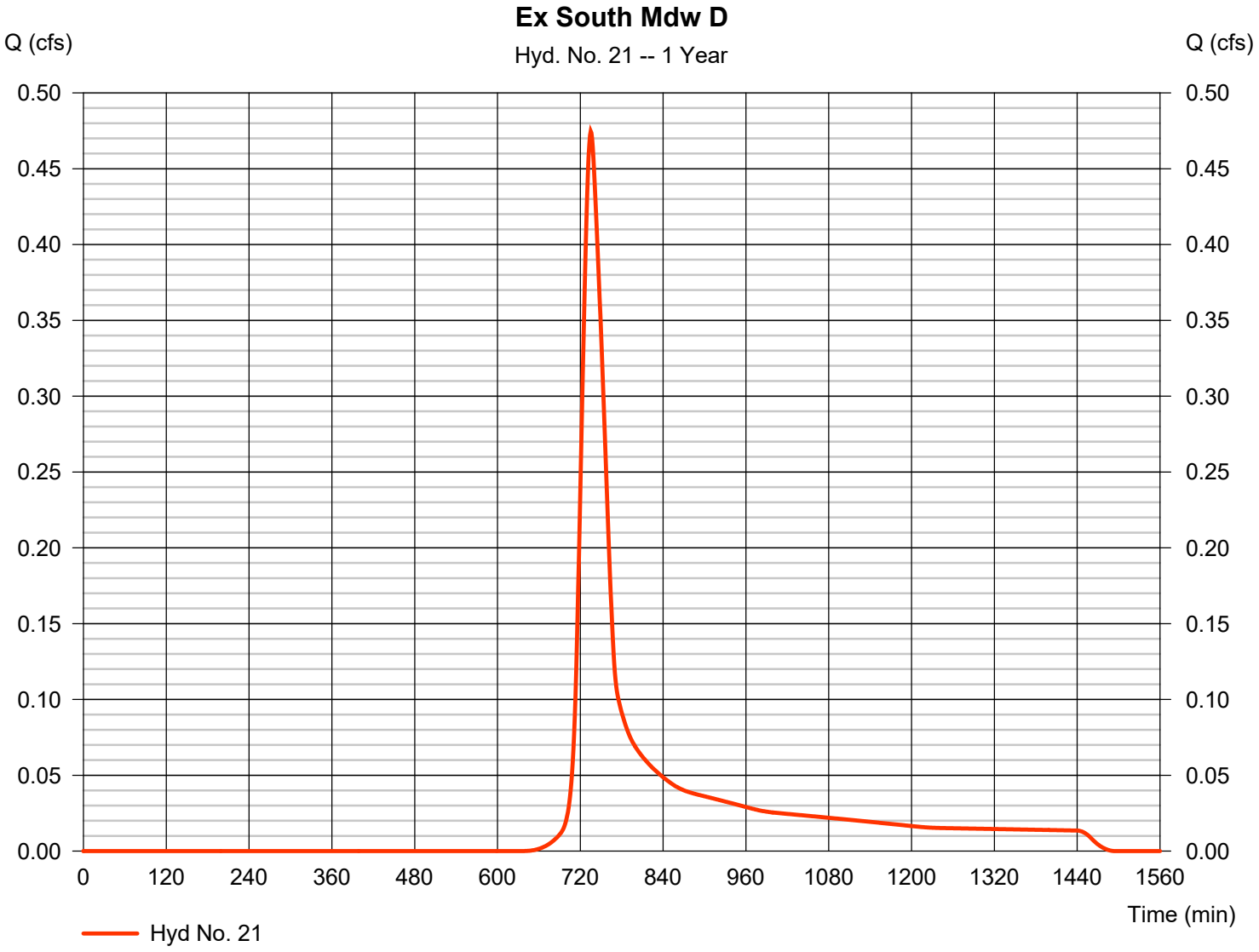
Hydrograph Report

Hyd. No. 21

Ex South Mdw D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.475 cfs
Storm frequency	= 1 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 2,219 cuft
Drainage area	= 0.636 ac	Curve number	= 78*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.93 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



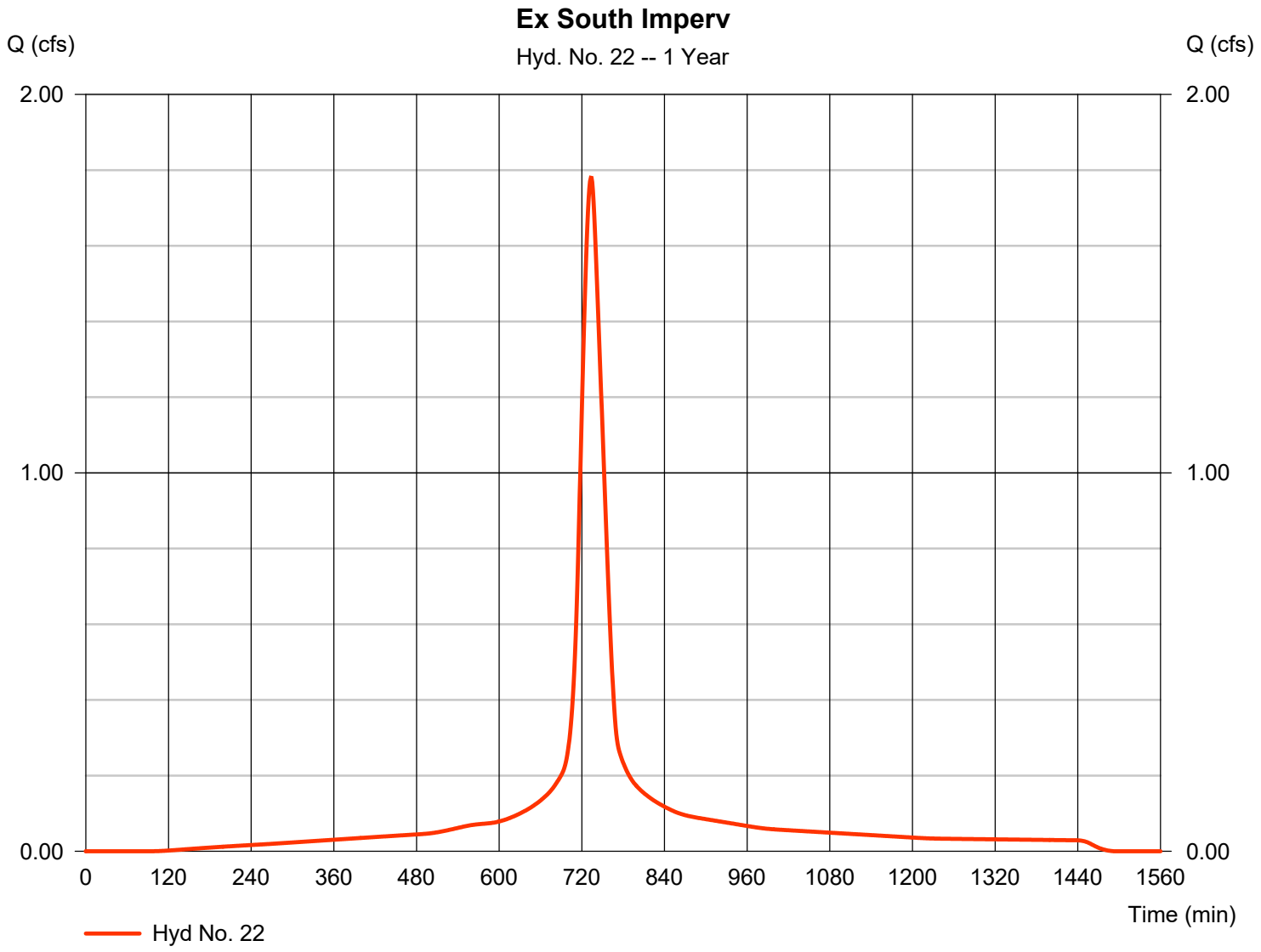
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.780 cfs
Storm frequency	=	1 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	8,557 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



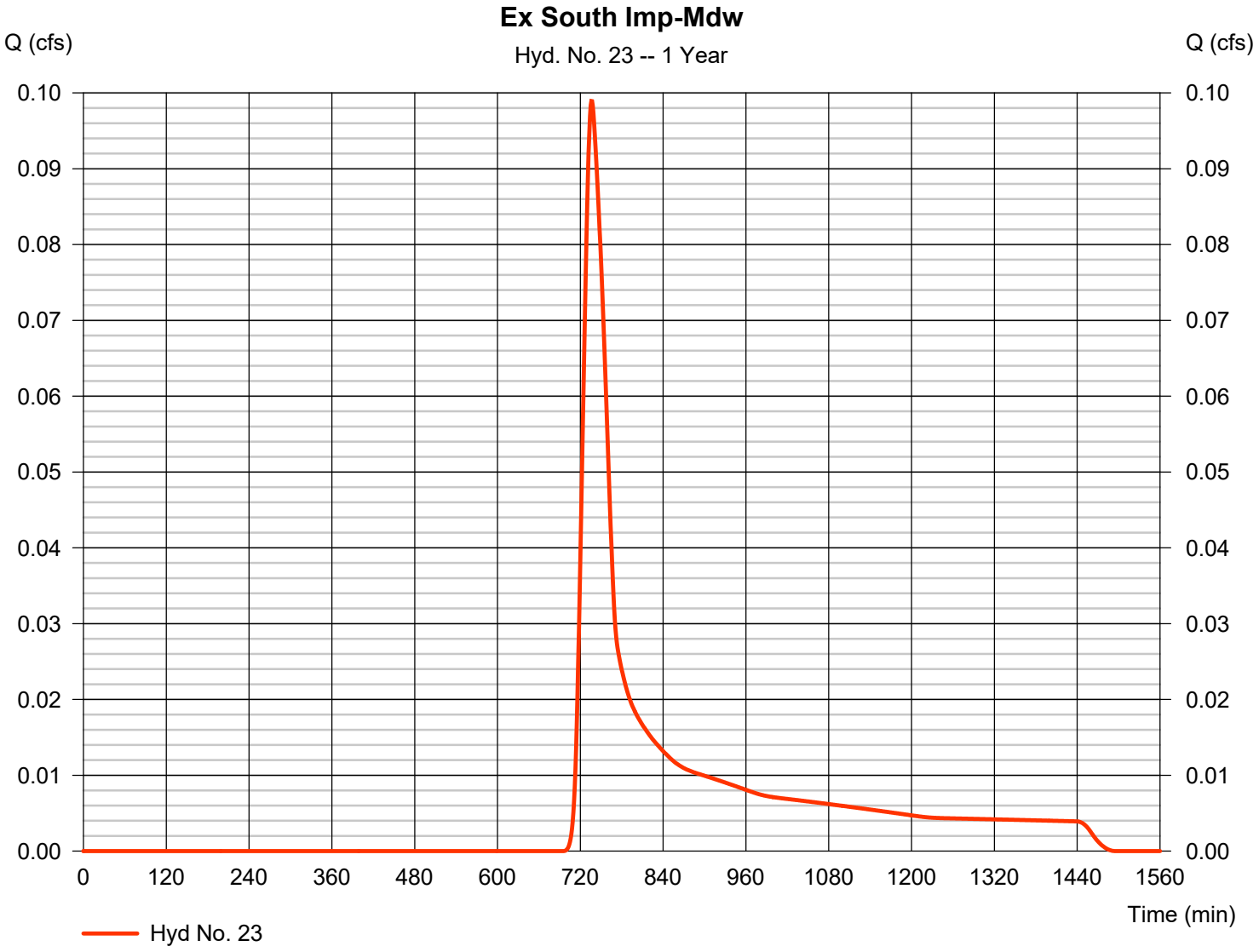
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.099 cfs
Storm frequency	=	1 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	530 cuft
Drainage area	=	0.233 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

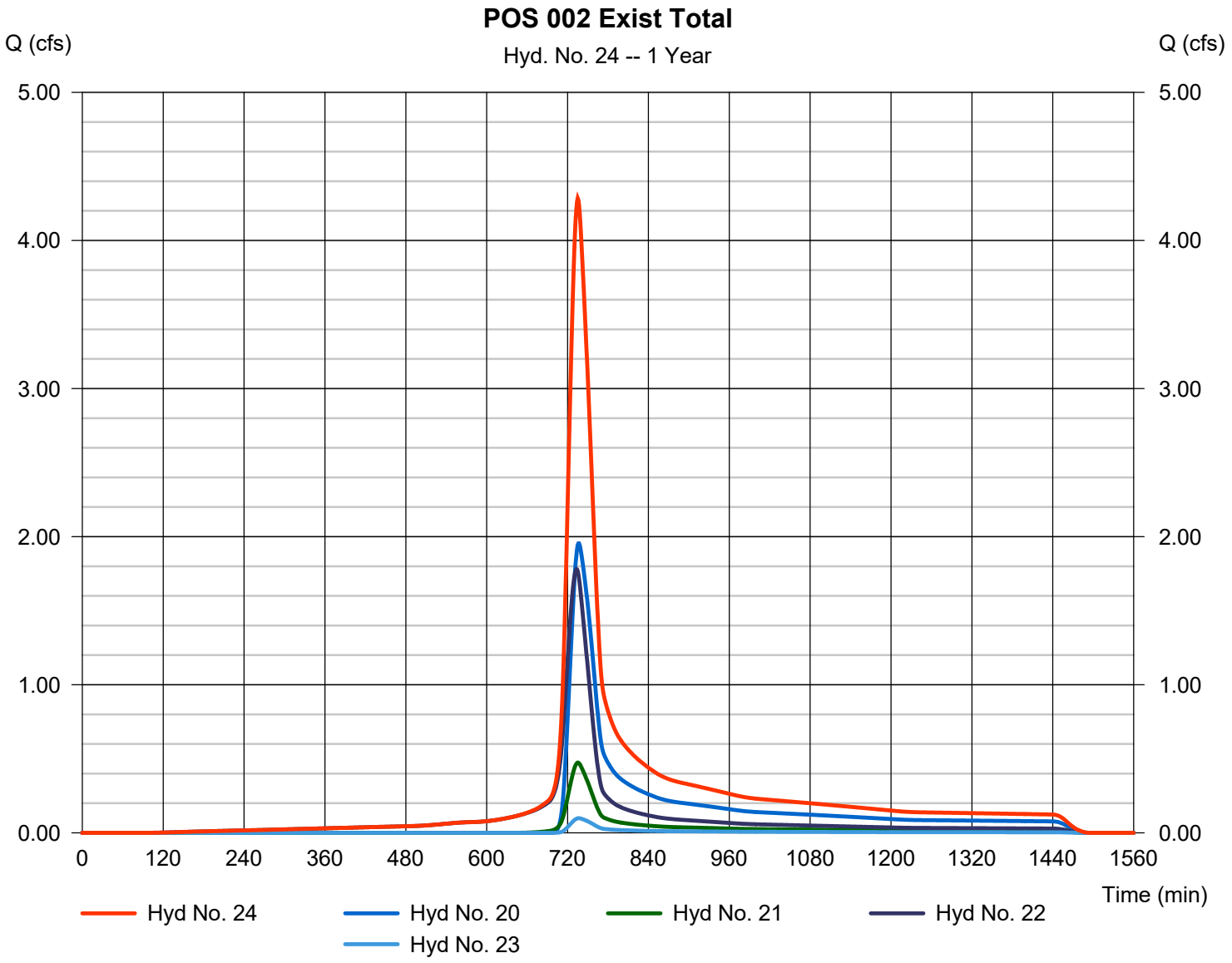


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	= Combine	Peak discharge	= 4.285 cfs
Storm frequency	= 1 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 21,775 cuft
Inflow hyds.	= 20, 21, 22, 23	Contrib. drain. area	= 6.405 ac

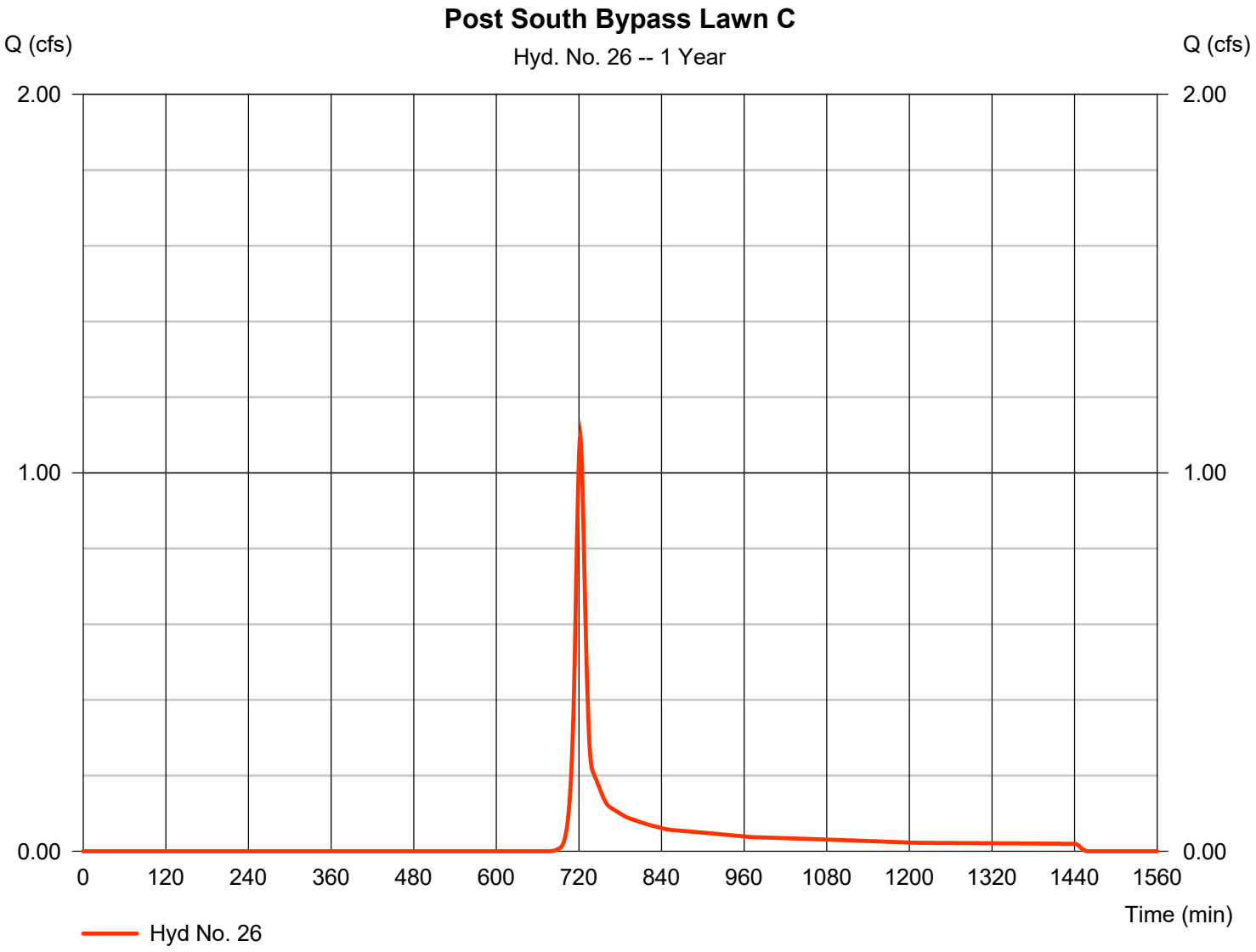


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 1.096 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 2,932 cuft
Drainage area	= 1.080 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.90 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 26

Post South Bypass Lawn C

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 110.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.31		0.00		0.00		
Land slope (%)	= 5.50		0.00		0.00		
Travel Time (min)	**= 10.10**	**+**	**0.00**	**+**	**0.00**	**=**	**10.10**
Shallow Concentrated Flow							
Flow length (ft)	= 190.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.14		0.00		0.00		
Travel Time (min)	**= 2.78**	**+**	**0.00**	**+**	**0.00**	**=**	**2.78**
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	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

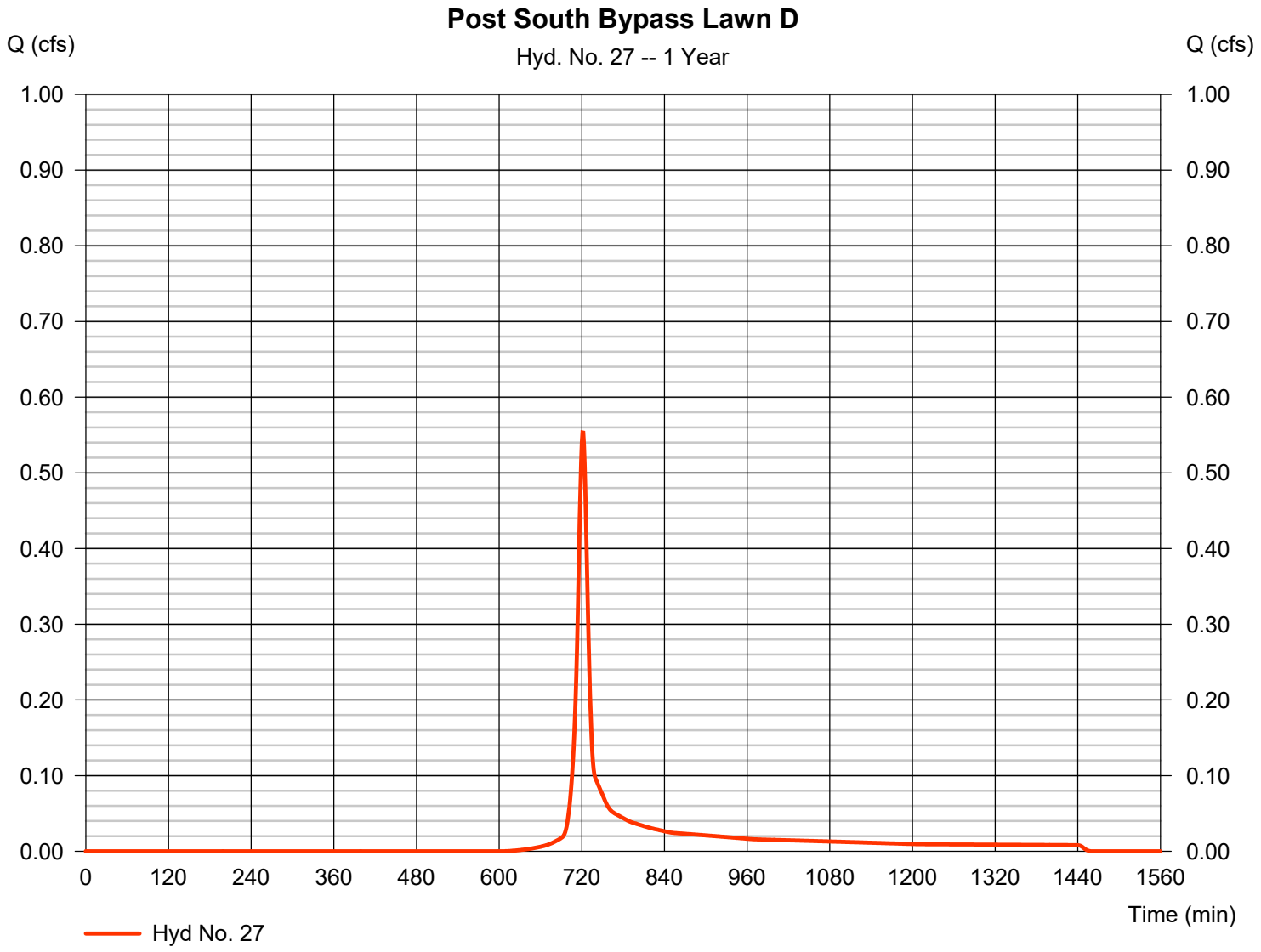
Total Travel Time, Tc ..... 12.90 min

Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.553 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 1,415 cuft
Drainage area	= 0.369 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

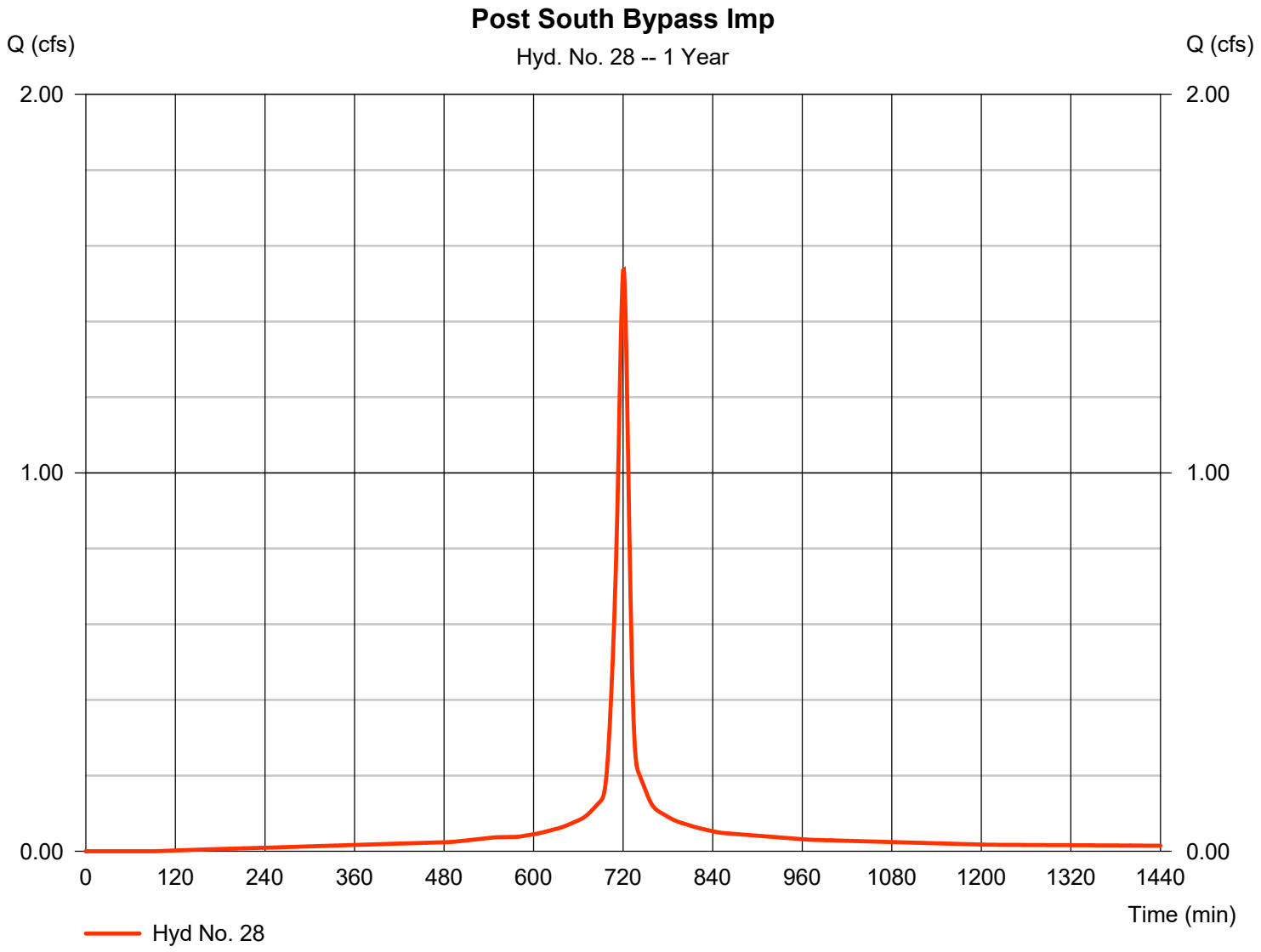


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 1.536 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 4,393 cuft
Drainage area	= 0.486 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

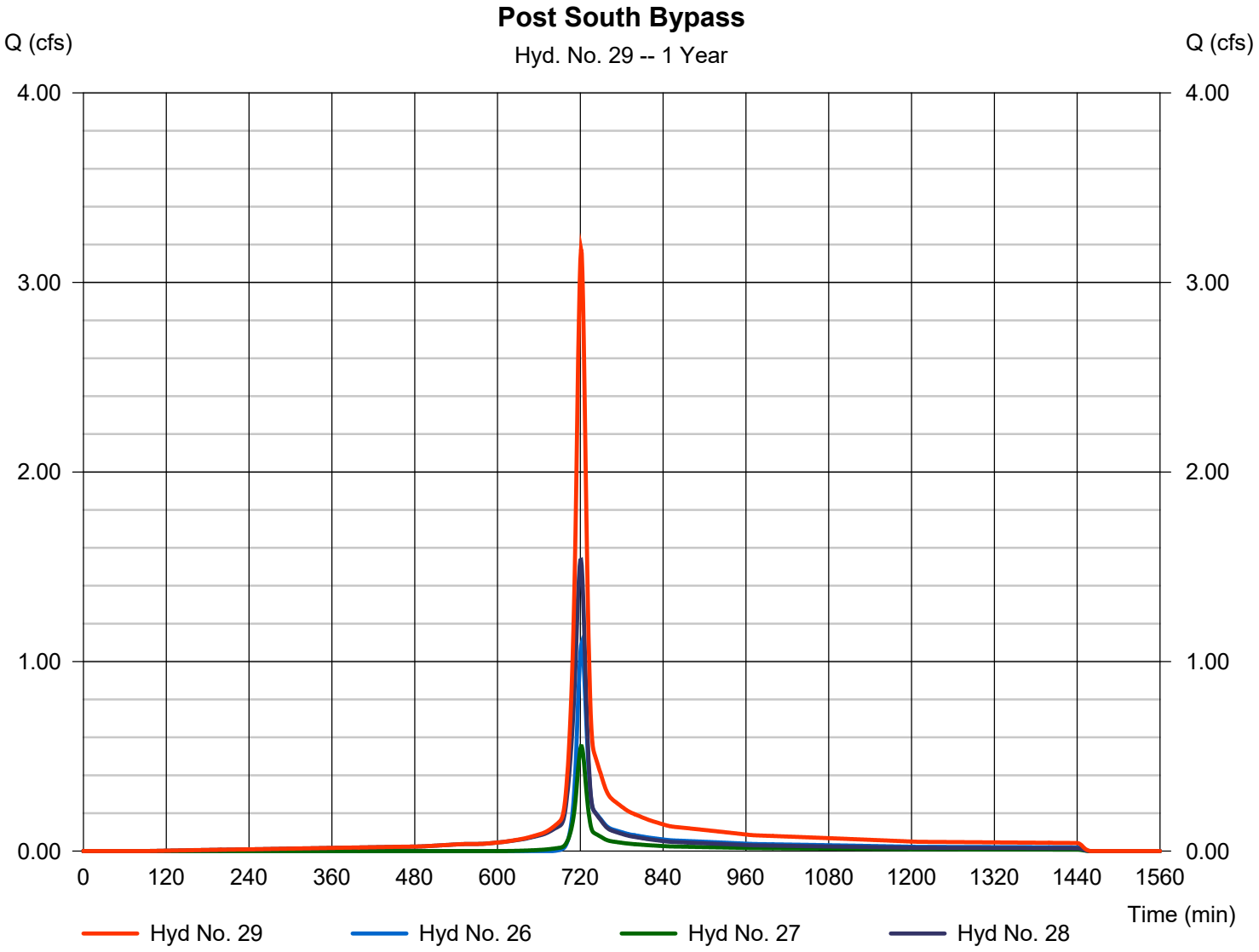


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	=	Combine	Peak discharge	=	3.174 cfs
Storm frequency	=	1 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	8,739 cuft
Inflow hyds.	=	26, 27, 28	Contrib. drain. area	=	1.935 ac



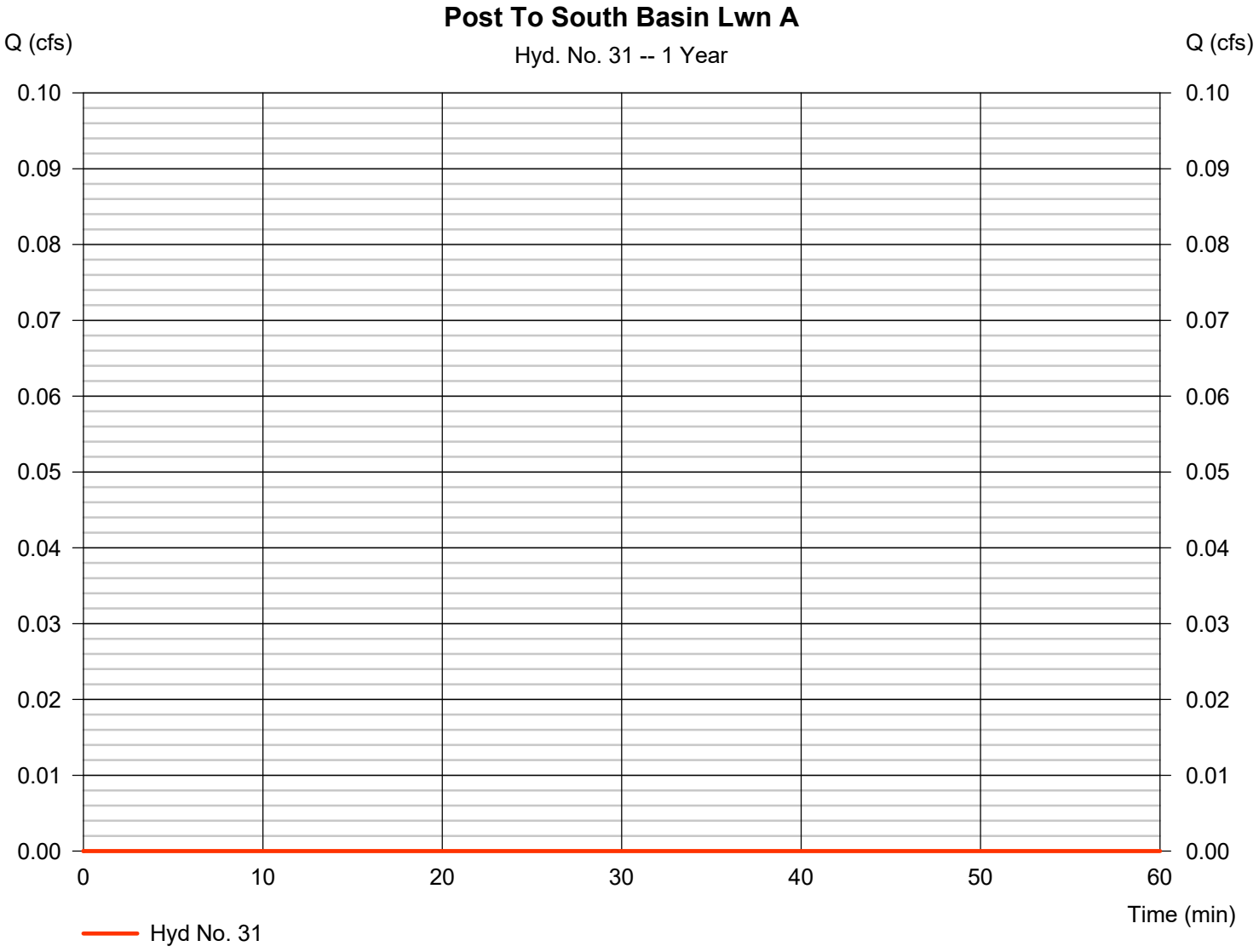
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Drainage area	= 0.035 ac	Curve number	= 40*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.60 min
Total precip.	= 2.76 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



TR55 Tc Worksheet

Hyd. No. 31

Post To South Basin Lwn A

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 110.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.31		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 2.24**	**+**	**0.00**	**+**	**0.00**	**=**	**2.24**
Shallow Concentrated Flow							
Flow length (ft)	= 100.00		350.00		0.00		
Watercourse slope (%)	= 1.34		1.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=2.35		1.61		0.00		
Travel Time (min)	**= 0.71**	**+**	**3.62**	**+**	**0.00**	**=**	**4.32**
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		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 6.60 min

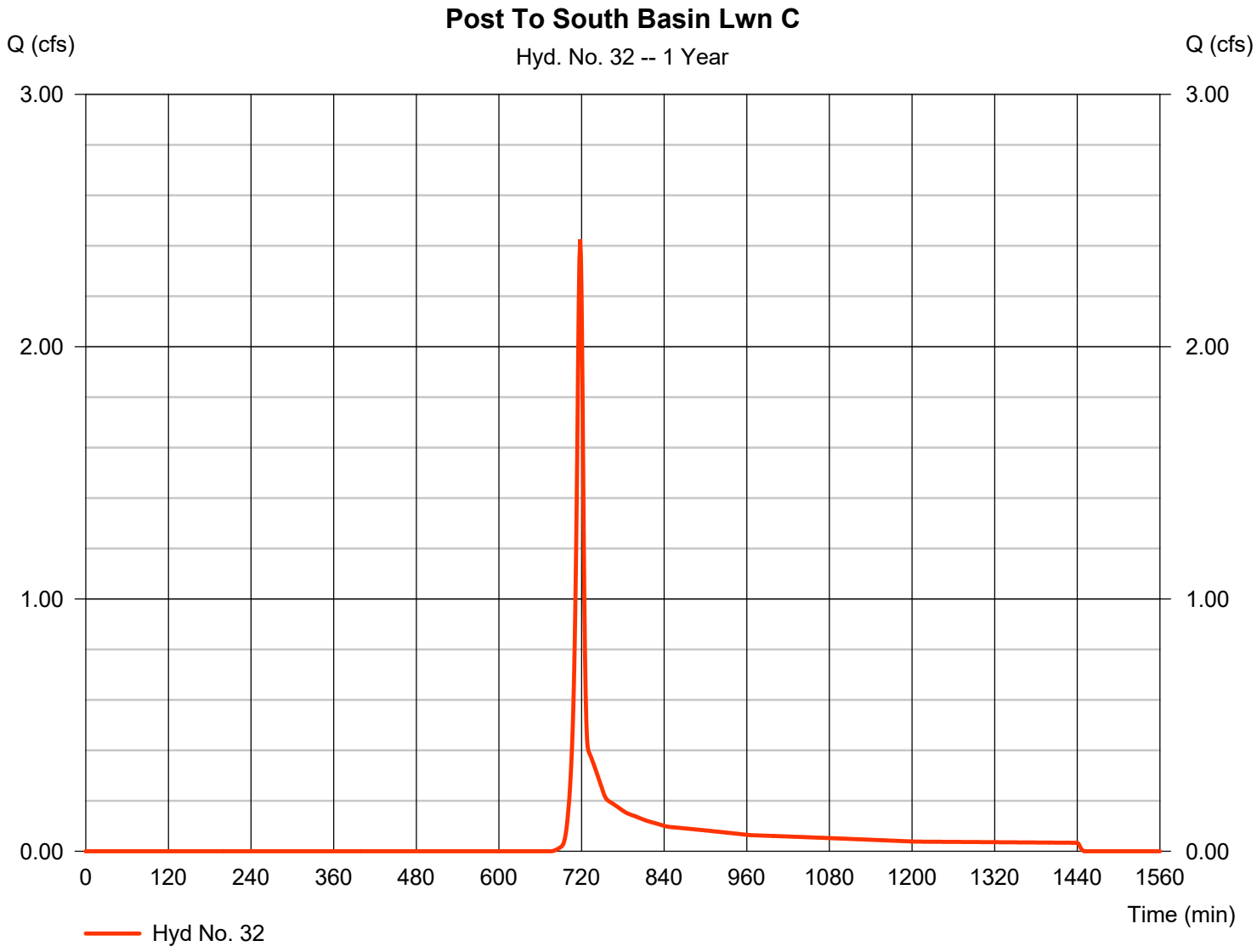
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.425 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	5,000 cuft
Drainage area	=	1.758 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



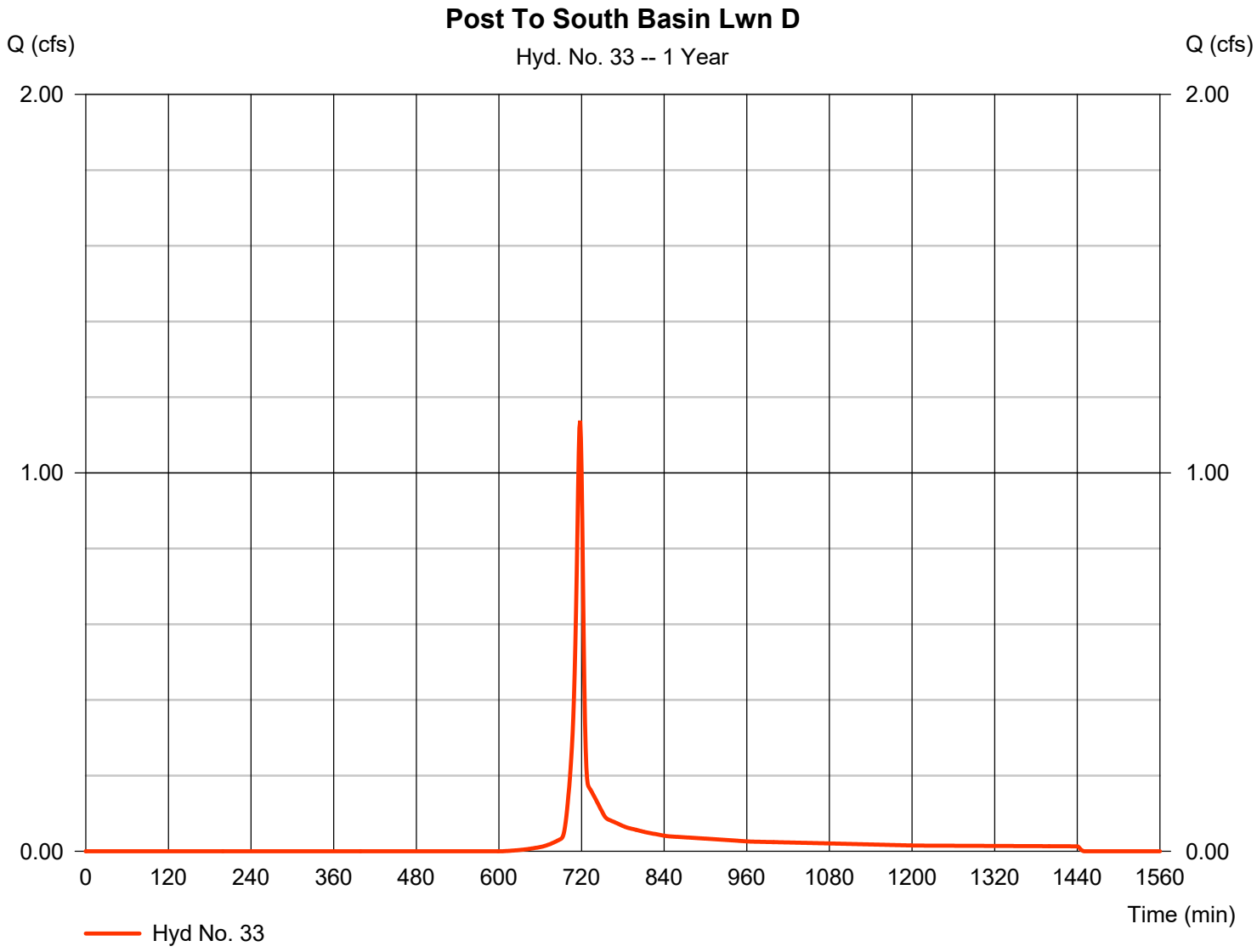
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.138 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	2,286 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



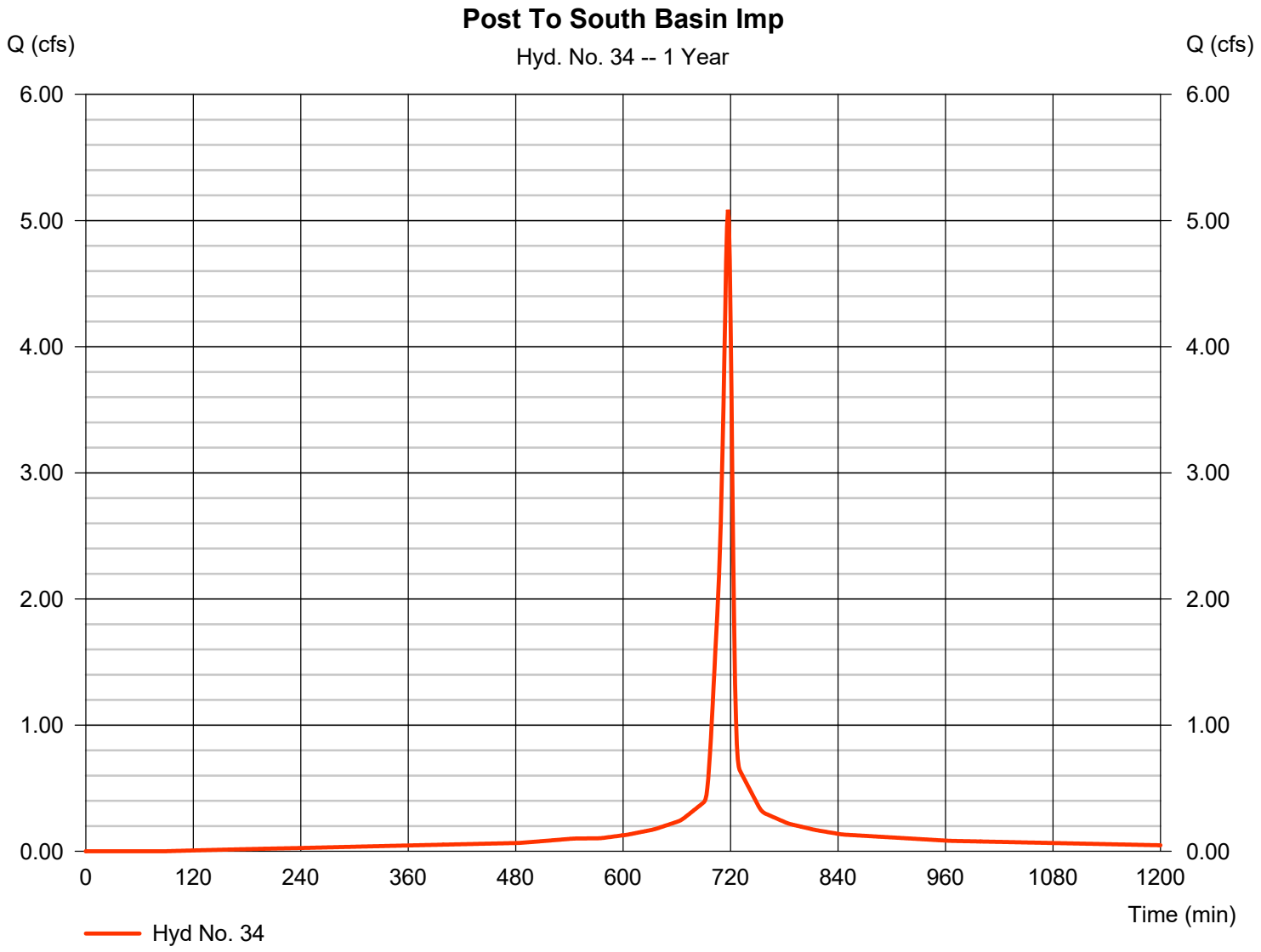
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.086 cfs
Storm frequency	=	1 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	11,930 cuft
Drainage area	=	1.260 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	2.76 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

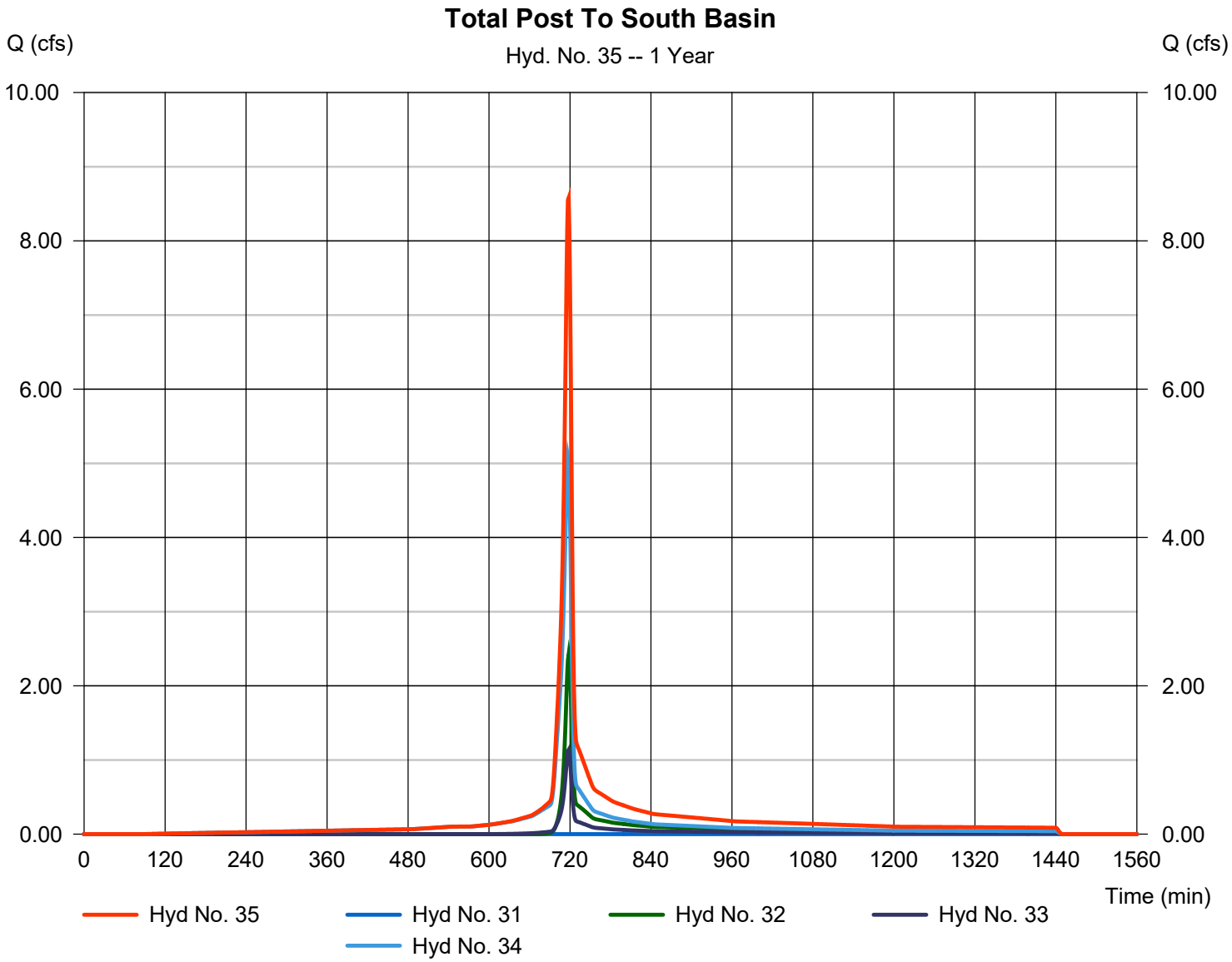


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	8.580 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	19,216 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



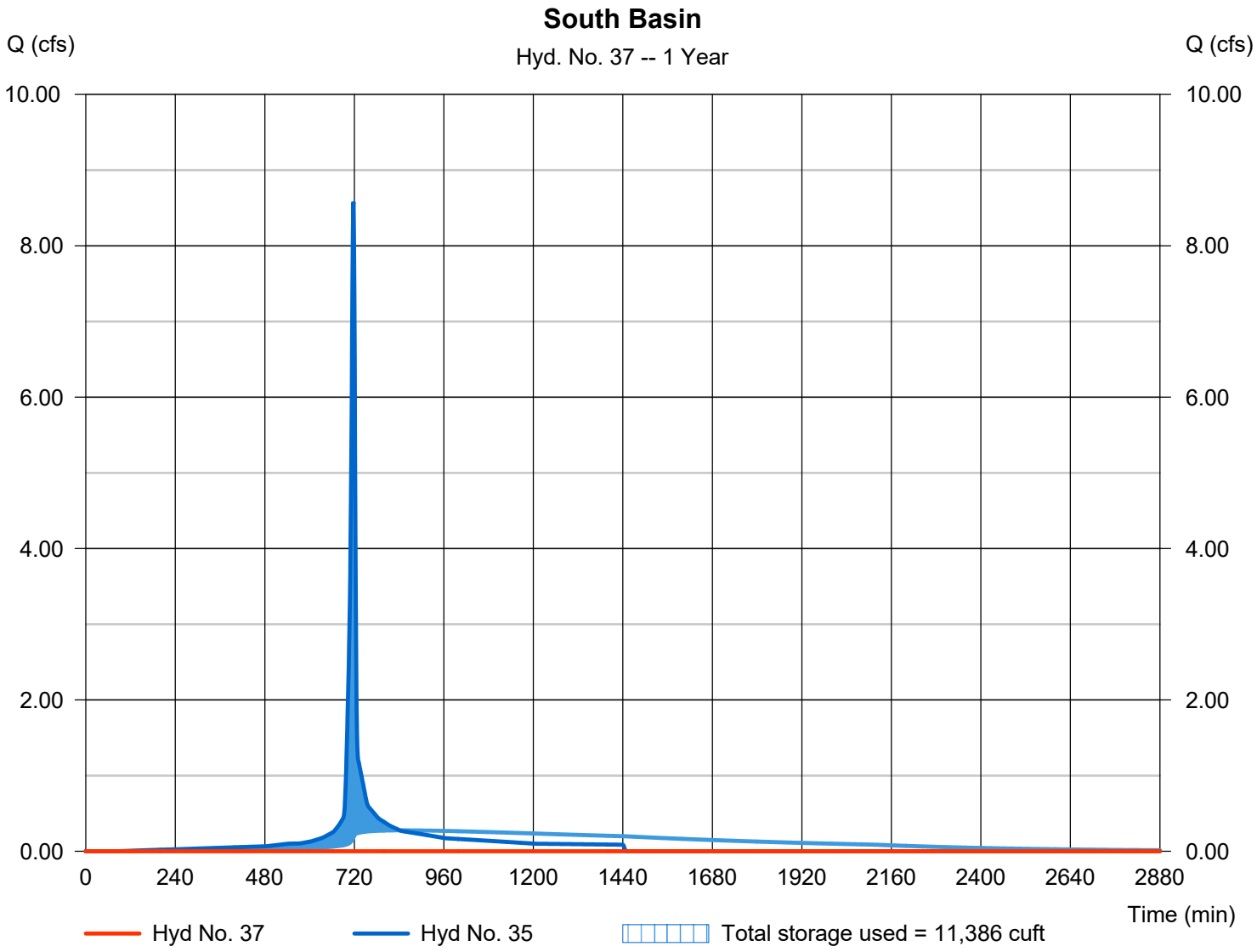
Hydrograph Report

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	1957 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	473.50 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	11,386 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 3 - POS 002 South Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 472.32 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	472.32	00	0	0
0.68	473.00	9,339	2,117	2,117
1.18	473.50	30,011	9,348	11,464
1.68	474.00	35,678	16,400	27,864
2.18	474.50	37,467	18,283	46,147
2.68	475.00	39,306	19,189	65,337
3.68	476.00	42,812	41,042	106,379

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	= 2	0	0	0
Invert El. (ft)	= 471.00	0.00	0.00	0.00
Length (ft)	= 38.00	0.00	0.00	0.00
Slope (%)	= 2.00	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)	= 12.00	40.00	0.00	0.00
Crest El. (ft)	= 474.00	474.40	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.400 (by Contour)

TW Elev. (ft) = 0.00

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

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	472.32	0.00	---	---	---	0.00	0.00	---	---	0.000	---	0.000
0.07	212	472.39	9.85 ic	---	---	---	0.00	0.00	---	---	0.009	---	0.009
0.14	423	472.46	9.85 ic	---	---	---	0.00	0.00	---	---	0.017	---	0.017
0.20	635	472.52	9.85 ic	---	---	---	0.00	0.00	---	---	0.026	---	0.026
0.27	847	472.59	9.85 ic	---	---	---	0.00	0.00	---	---	0.035	---	0.035
0.34	1,058	472.66	9.85 ic	---	---	---	0.00	0.00	---	---	0.043	---	0.043
0.41	1,270	472.73	9.85 ic	---	---	---	0.00	0.00	---	---	0.052	---	0.052
0.48	1,482	472.80	9.85 ic	---	---	---	0.00	0.00	---	---	0.061	---	0.061
0.54	1,693	472.86	9.85 ic	---	---	---	0.00	0.00	---	---	0.069	---	0.069
0.61	1,905	472.93	9.85 ic	---	---	---	0.00	0.00	---	---	0.078	---	0.078
0.68	2,117	473.00	9.85 ic	---	---	---	0.00	0.00	---	---	0.086	---	0.086
0.73	3,051	473.05	9.85 ic	---	---	---	0.00	0.00	---	---	0.106	---	0.106
0.78	3,986	473.10	9.85 ic	---	---	---	0.00	0.00	---	---	0.125	---	0.125
0.83	4,921	473.15	9.85 ic	---	---	---	0.00	0.00	---	---	0.144	---	0.144
0.88	5,856	473.20	9.85 ic	---	---	---	0.00	0.00	---	---	0.163	---	0.163
0.93	6,790	473.25	9.85 ic	---	---	---	0.00	0.00	---	---	0.182	---	0.182
0.98	7,725	473.30	9.85 ic	---	---	---	0.00	0.00	---	---	0.201	---	0.201
1.03	8,660	473.35	9.85 ic	---	---	---	0.00	0.00	---	---	0.220	---	0.220
1.08	9,595	473.40	9.85 ic	---	---	---	0.00	0.00	---	---	0.240	---	0.240
1.13	10,529	473.45	9.85 ic	---	---	---	0.00	0.00	---	---	0.259	---	0.259
1.18	11,464	473.50	9.85 ic	---	---	---	0.00	0.00	---	---	0.278	---	0.278
1.23	13,104	473.55	9.85 ic	---	---	---	0.00	0.00	---	---	0.283	---	0.283
1.28	14,744	473.60	9.85 ic	---	---	---	0.00	0.00	---	---	0.288	---	0.288
1.33	16,384	473.65	9.85 ic	---	---	---	0.00	0.00	---	---	0.294	---	0.294
1.38	18,024	473.70	9.85 ic	---	---	---	0.00	0.00	---	---	0.299	---	0.299
1.43	19,664	473.75	9.85 ic	---	---	---	0.00	0.00	---	---	0.304	---	0.304
1.48	21,304	473.80	9.85 ic	---	---	---	0.00	0.00	---	---	0.309	---	0.309
1.53	22,944	473.85	9.85 ic	---	---	---	0.00	0.00	---	---	0.315	---	0.315
1.58	24,584	473.90	9.85 ic	---	---	---	0.00	0.00	---	---	0.320	---	0.320
1.63	26,224	473.95	9.85 ic	---	---	---	0.00	0.00	---	---	0.325	---	0.325
1.68	27,864	474.00	9.85 ic	---	---	---	0.00	0.00	---	---	0.330	---	0.330
1.73	29,693	474.05	9.85 ic	---	---	---	0.45	0.00	---	---	0.332	---	0.779
1.78	31,521	474.10	9.85 ic	---	---	---	1.26	0.00	---	---	0.334	---	1.597
1.83	33,349	474.15	9.85 ic	---	---	---	2.32	0.00	---	---	0.335	---	2.656
1.88	35,177	474.20	9.85 ic	---	---	---	3.57	0.00	---	---	0.337	---	3.910
1.93	37,006	474.25	9.85 ic	---	---	---	4.99	0.00	---	---	0.339	---	5.332

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POS 002 South Pond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.98	38,834	474.30	9.85 ic	---	---	---	6.56	0.00	---	---	0.340	---	6.904
2.03	40,662	474.35	9.85 ic	---	---	---	8.27	0.00	---	---	0.342	---	8.613
2.08	42,491	474.40	10.11 ic	---	---	---	10.11	0.00	---	---	0.344	---	10.45
2.13	44,319	474.45	13.22 ic	---	---	---	12.06	1.16	---	---	0.345	---	13.56
2.18	46,147	474.50	17.42 ic	---	---	---	14.13	3.29	---	---	0.347	---	17.76
2.23	48,066	474.55	19.34 ic	---	---	---	13.30 s	6.04	---	---	0.349	---	19.69
2.28	49,985	474.60	19.95 ic	---	---	---	11.57 s	8.38 s	---	---	0.350	---	20.30
2.33	51,904	474.65	20.28 ic	---	---	---	10.80 s	9.47 s	---	---	0.352	---	20.63
2.38	53,823	474.70	20.53 ic	---	---	---	10.26 s	10.26 s	---	---	0.354	---	20.87
2.43	55,742	474.75	20.75 ic	---	---	---	9.85 s	10.89 s	---	---	0.355	---	21.09
2.48	57,661	474.80	20.95 ic	---	---	---	9.54 s	11.41 s	---	---	0.357	---	21.31
2.53	59,580	474.85	21.14 ic	---	---	---	9.27 s	11.85 s	---	---	0.359	---	21.48
2.58	61,499	474.90	21.32 ic	---	---	---	9.06 s	12.23 s	---	---	0.361	---	21.65
2.63	63,418	474.95	21.50 ic	---	---	---	8.90 s	12.57 s	---	---	0.362	---	21.83
2.68	65,337	475.00	21.67 ic	---	---	---	8.75 s	12.87 s	---	---	0.364	---	21.98
2.78	69,441	475.10	22.00 ic	---	---	---	8.55 s	13.44 s	---	---	0.367	---	22.36
2.88	73,545	475.20	22.32 ic	---	---	---	8.40 s	13.90 s	---	---	0.370	---	22.67
2.98	77,649	475.30	22.64 ic	---	---	---	8.29 s	14.31 s	---	---	0.374	---	22.97
3.08	81,753	475.40	22.95 ic	---	---	---	8.21 s	14.69 s	---	---	0.377	---	23.28
3.18	85,858	475.50	23.25 ic	---	---	---	8.16 s	15.03 s	---	---	0.380	---	23.57
3.28	89,962	475.60	23.55 ic	---	---	---	8.12 s	15.33 s	---	---	0.383	---	23.83
3.38	94,066	475.70	23.85 ic	---	---	---	8.03 s	15.50 s	---	---	0.387	---	23.92
3.48	98,170	475.80	24.14 ic	---	---	---	8.08 s	15.90 s	---	---	0.390	---	24.37
3.58	102,275	475.90	24.43 ic	---	---	---	8.04 s	16.08 s	---	---	0.393	---	24.51
3.68	106,379	476.00	24.71 ic	---	---	---	7.95 s	16.14 s	---	---	0.396	---	24.49

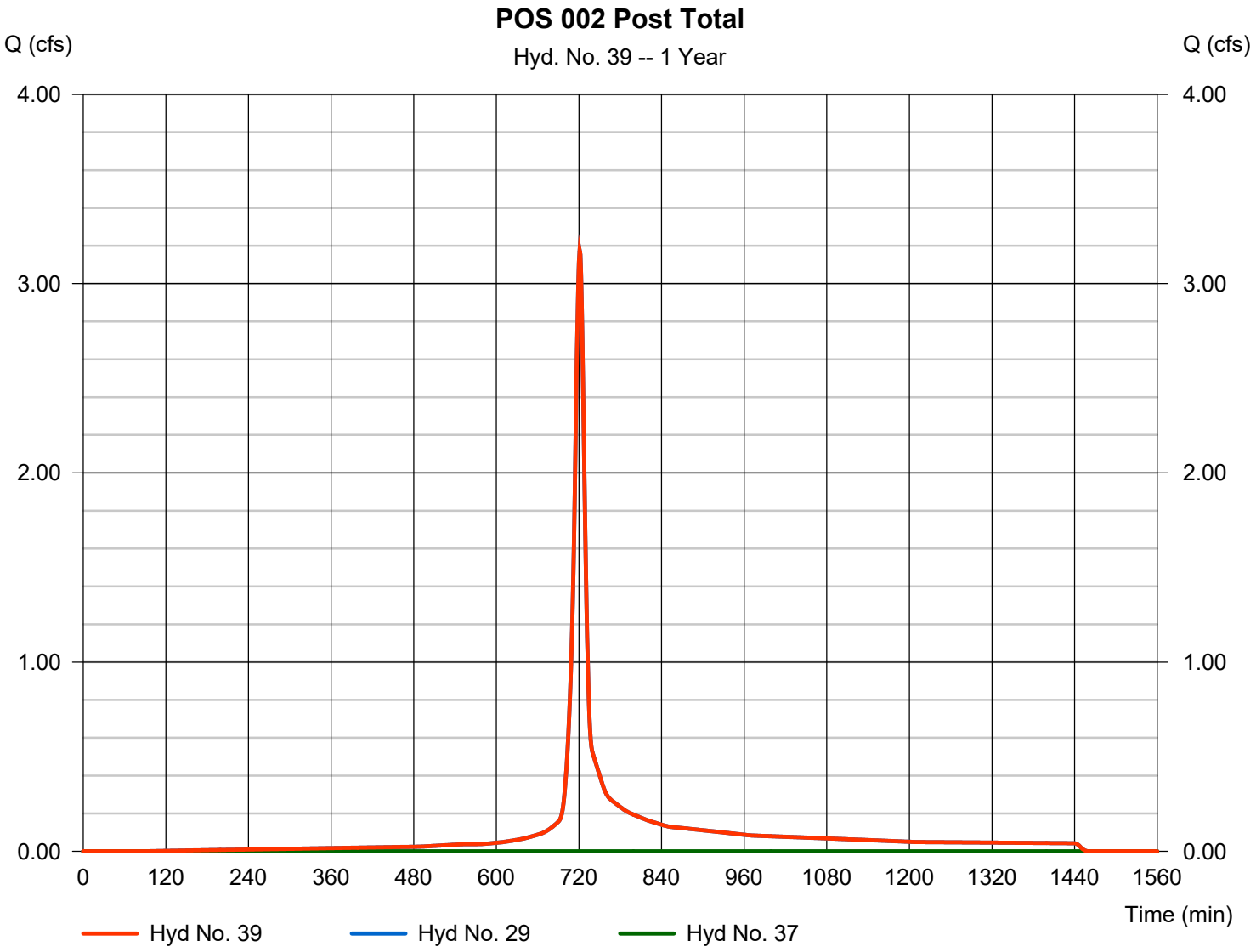
...End

Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	= Combine	Peak discharge	= 3.174 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 8,739 cuft
Inflow hyds.	= 29, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.004	1	1441	71	------	------	------	Ex North Mdw A
2	SCS Runoff	2.214	1	740	12,393	------	------	------	Ex North Mdw C
3	SCS Runoff	1.279	1	738	6,982	------	------	------	Ex North Imperv
4	SCS Runoff	0.096	1	740	538	------	------	------	Ex North Imp-Mdw
5	Combine	3.578	1	739	19,985	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	0.002	1	1440	33	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	0.901	1	718	1,821	------	------	------	Post North Bypass Lawn C
9	Combine	0.901	1	718	1,854	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.000	1	1440	1	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	2.326	1	718	4,702	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	25.87	1	717	61,269	------	------	------	Post To North Basin Imp
14	Combine	28.14	1	717	65,973	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	0.000	1	762	0	14	473.20	43,232	North Basin
18	Combine	0.901	1	718	1,854	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	3.210	1	736	15,793	------	------	------	Ex South Mdw C
21	SCS Runoff	0.688	1	735	3,127	------	------	------	Ex South Mdw D
22	SCS Runoff	2.147	1	733	10,410	------	------	------	Ex South Imperv
23	SCS Runoff	0.162	1	736	799	------	------	------	Ex South Imp-Mdw
24	Combine	6.190	1	735	30,129	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	1.653	1	722	4,286	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	0.774	1	721	1,961	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	1.851	1	721	5,344	------	------	------	Post South Bypass Imp
29	Combine	4.272	1	721	11,591	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.000	1	1440	1	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	3.616	1	718	7,309	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	1.576	1	718	3,167	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	6.127	1	717	14,514	------	------	------	Post To South Basin Imp
35	Combine	11.23	1	718	24,991	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	0.000	1	2224	0	35	473.62	15,473	South Basin

Hydrograph Summary Report

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

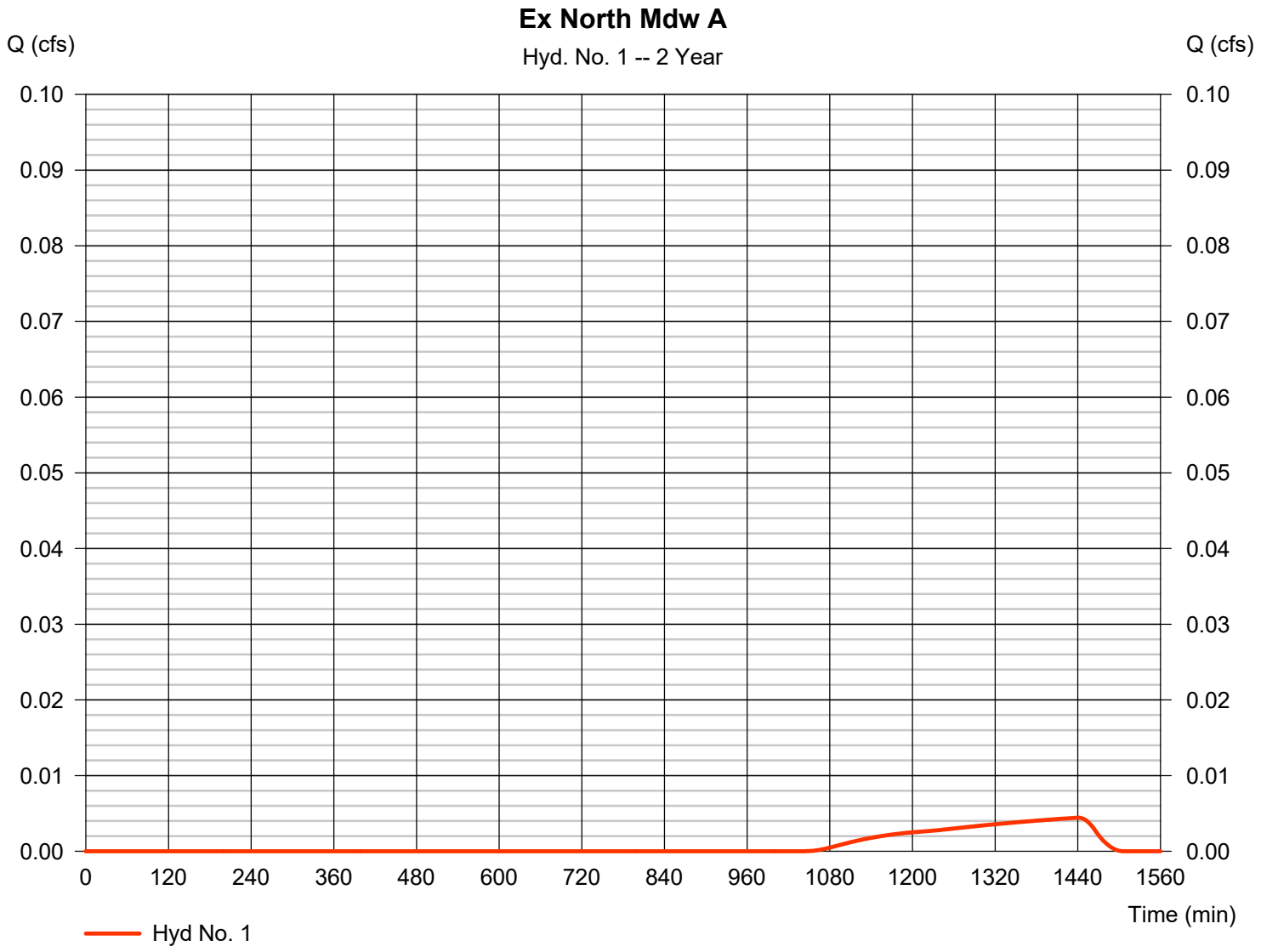
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	4.272	1	721	11,591	29, 37,	------	------	POS 002 Post Total
42	Combine	29.02	1	717	67,826	9, 14,	------	------	Post North Undetained
43	Combine	15.06	1	718	36,582	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.004 cfs
Storm frequency	= 2 yrs	Time to peak	= 1441 min
Time interval	= 1 min	Hyd. volume	= 71 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

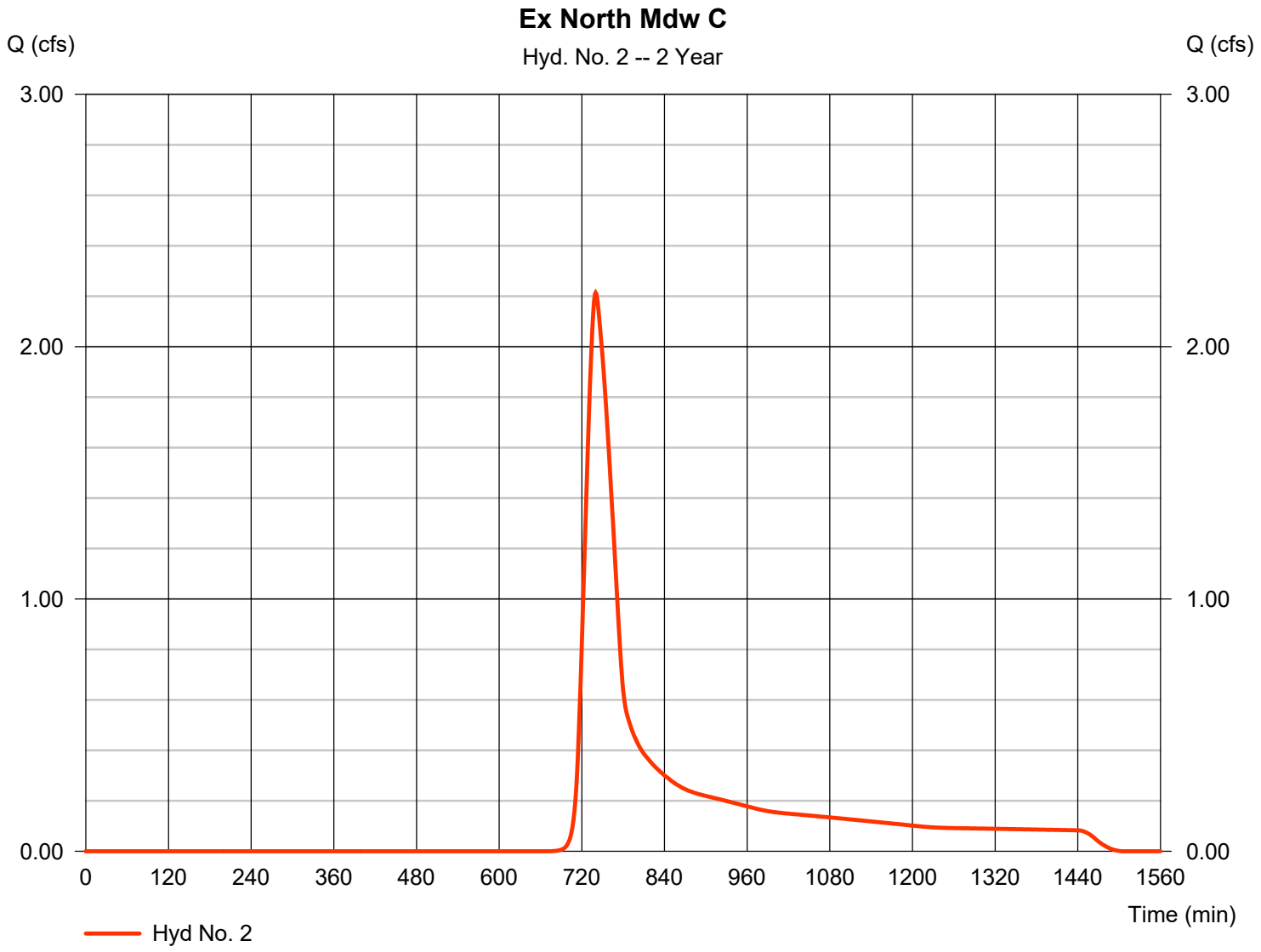


Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.214 cfs
Storm frequency	=	2 yrs	Time to peak	=	740 min
Time interval	=	1 min	Hyd. volume	=	12,393 cuft
Drainage area	=	3.595 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

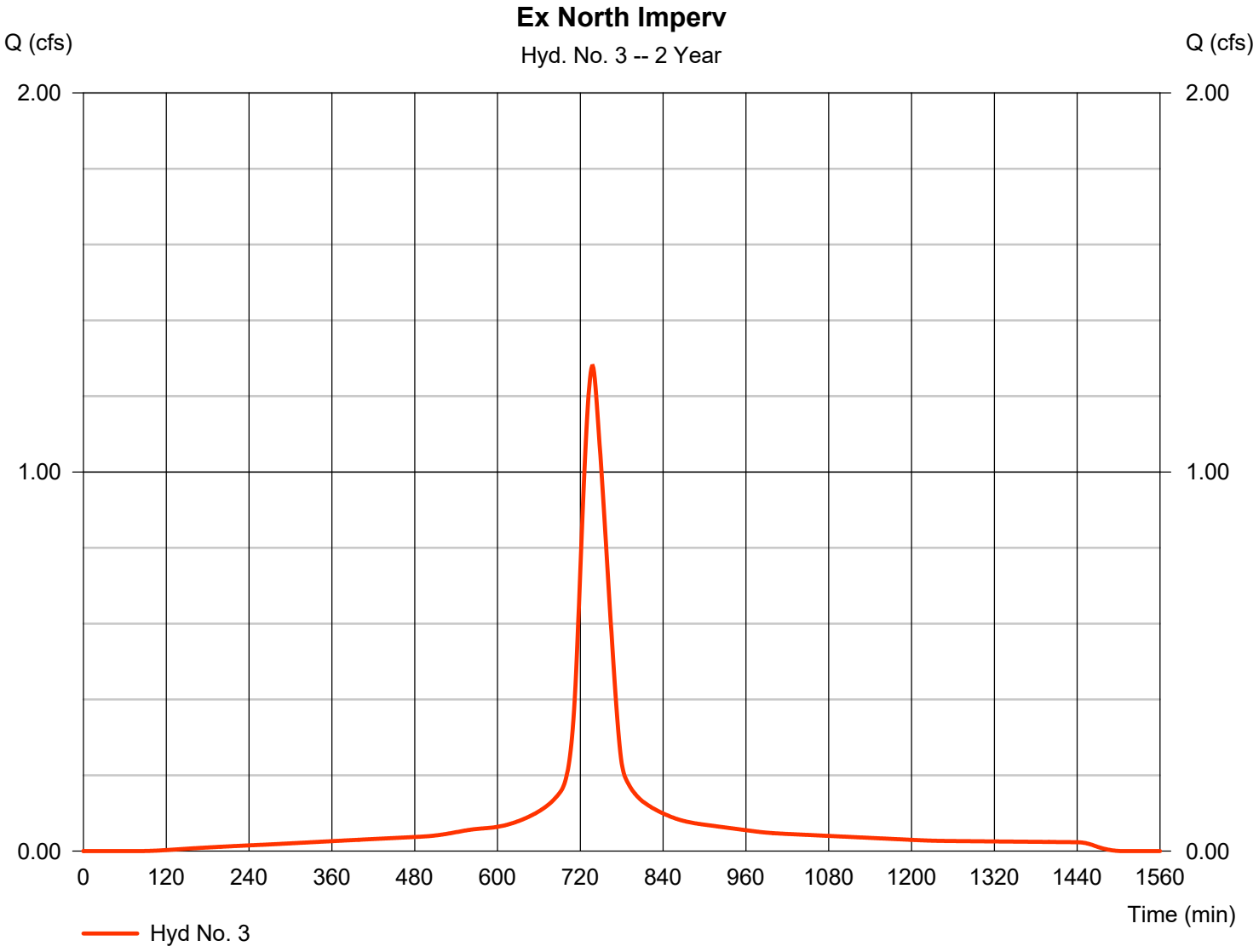


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.279 cfs
Storm frequency	=	2 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	6,982 cuft
Drainage area	=	0.622 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

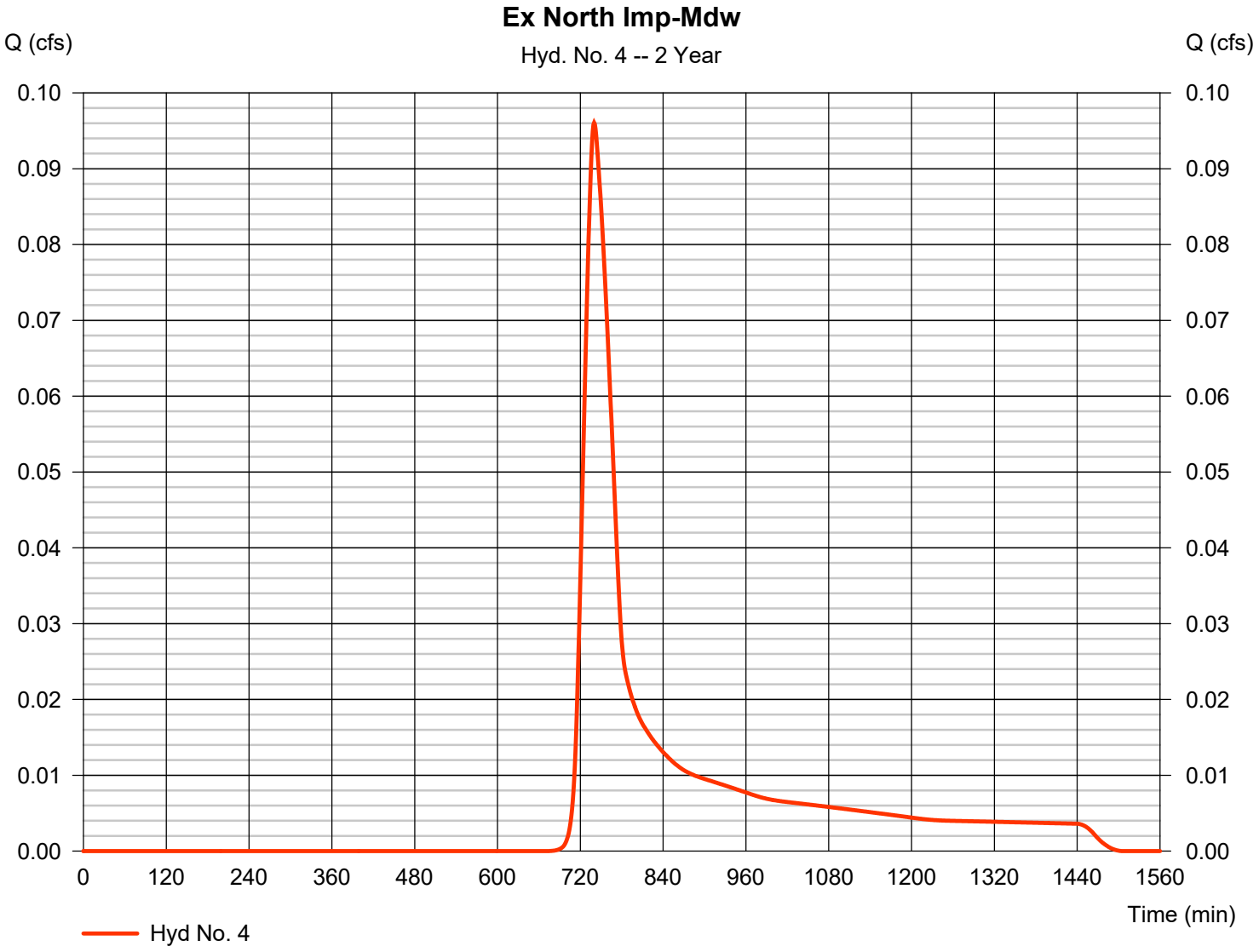


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.096 cfs
Storm frequency	=	2 yrs	Time to peak	=	740 min
Time interval	=	1 min	Hyd. volume	=	538 cuft
Drainage area	=	0.156 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

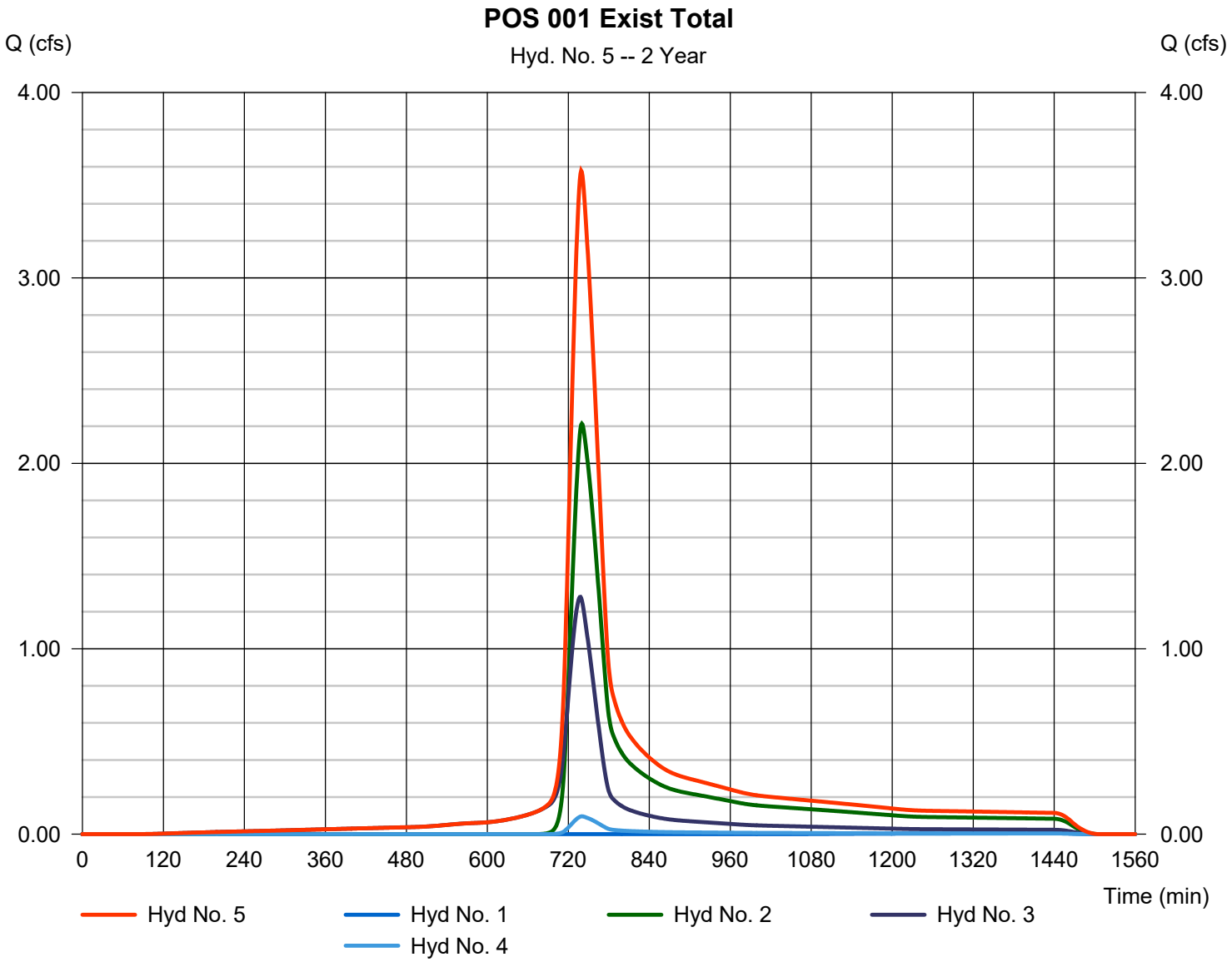


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 3.578 cfs
Storm frequency	= 2 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 19,985 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

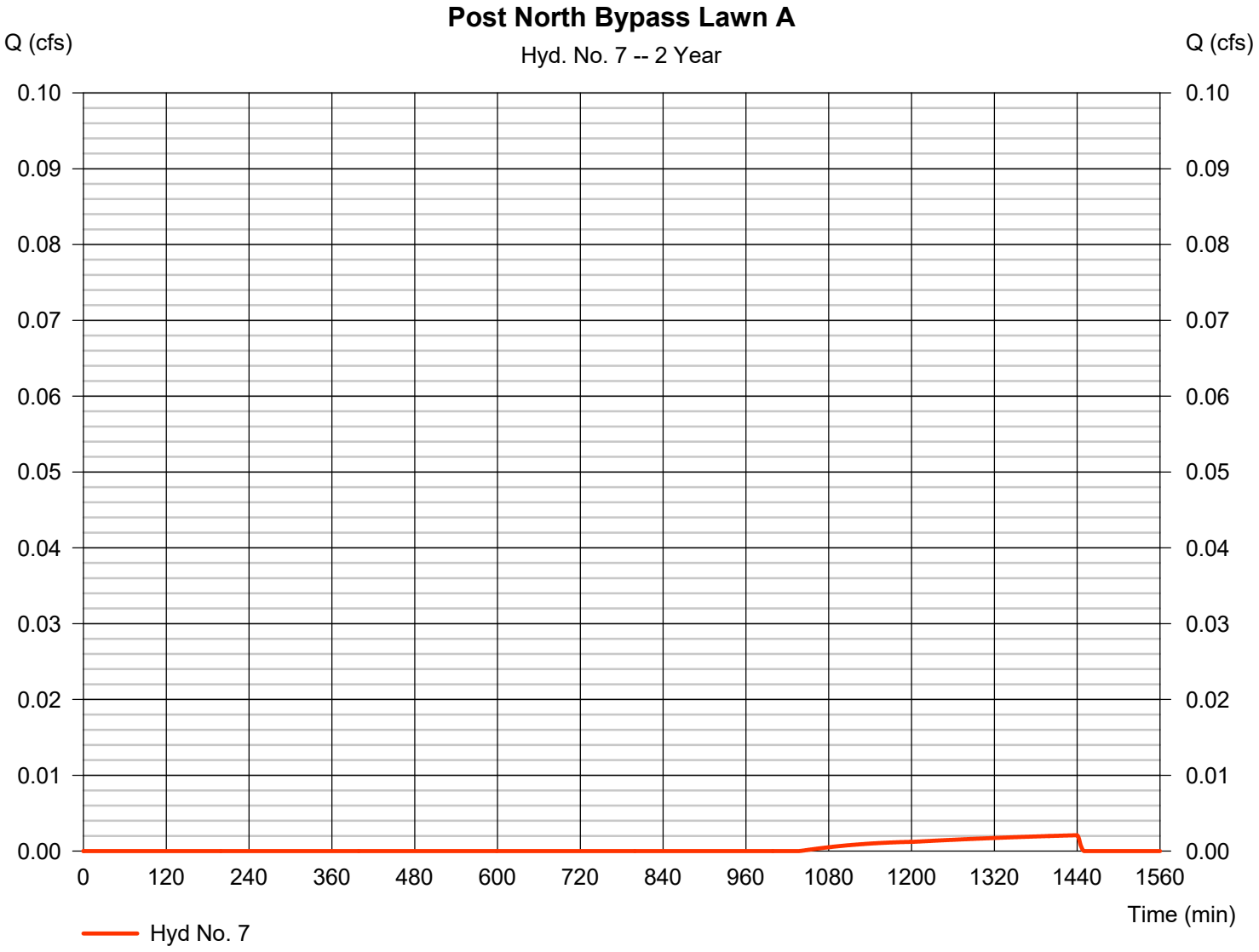


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.002 cfs
Storm frequency	= 2 yrs	Time to peak	= 1440 min
Time interval	= 1 min	Hyd. volume	= 33 cuft
Drainage area	= 1.385 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

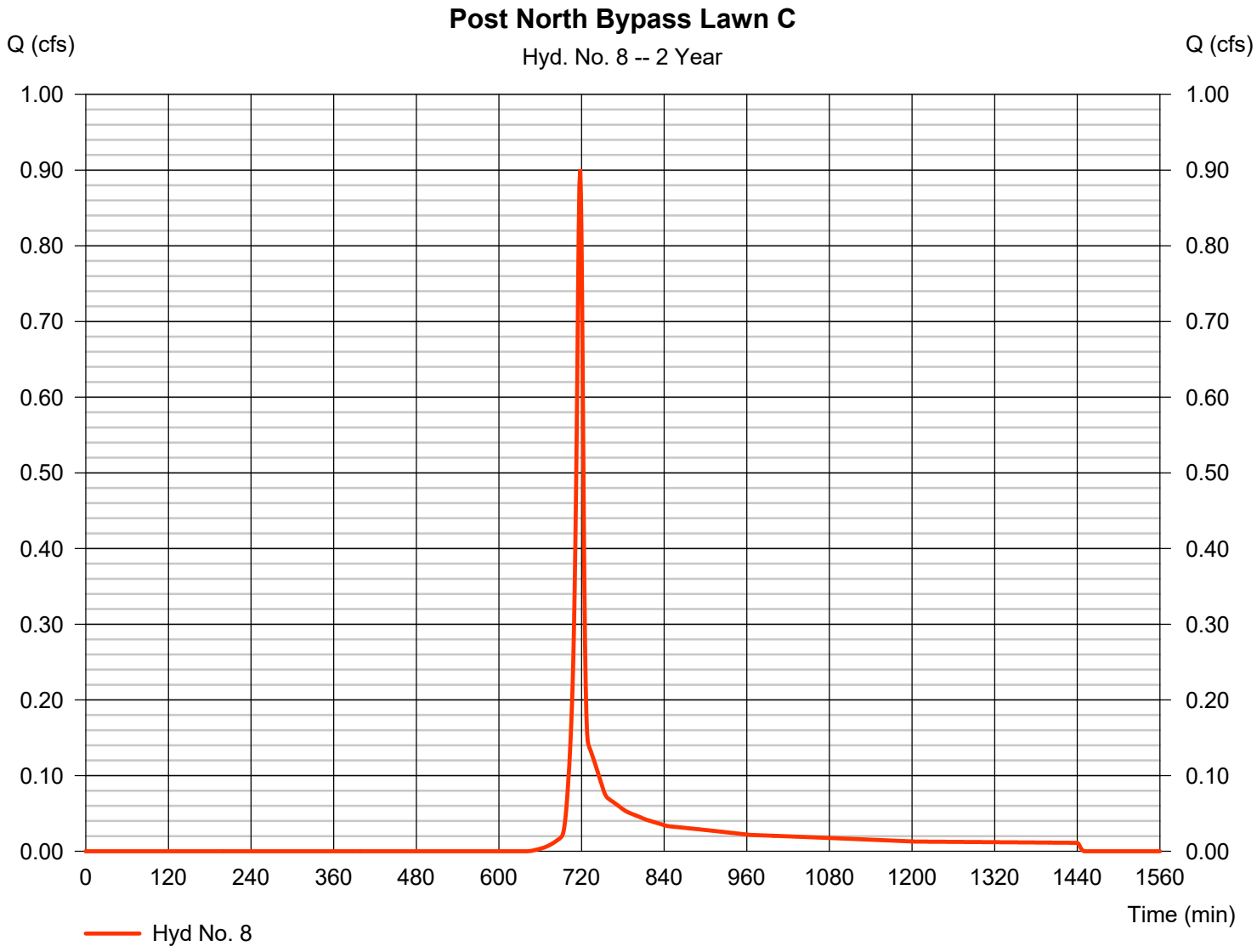


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.901 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	1,821 cuft
Drainage area	=	0.438 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

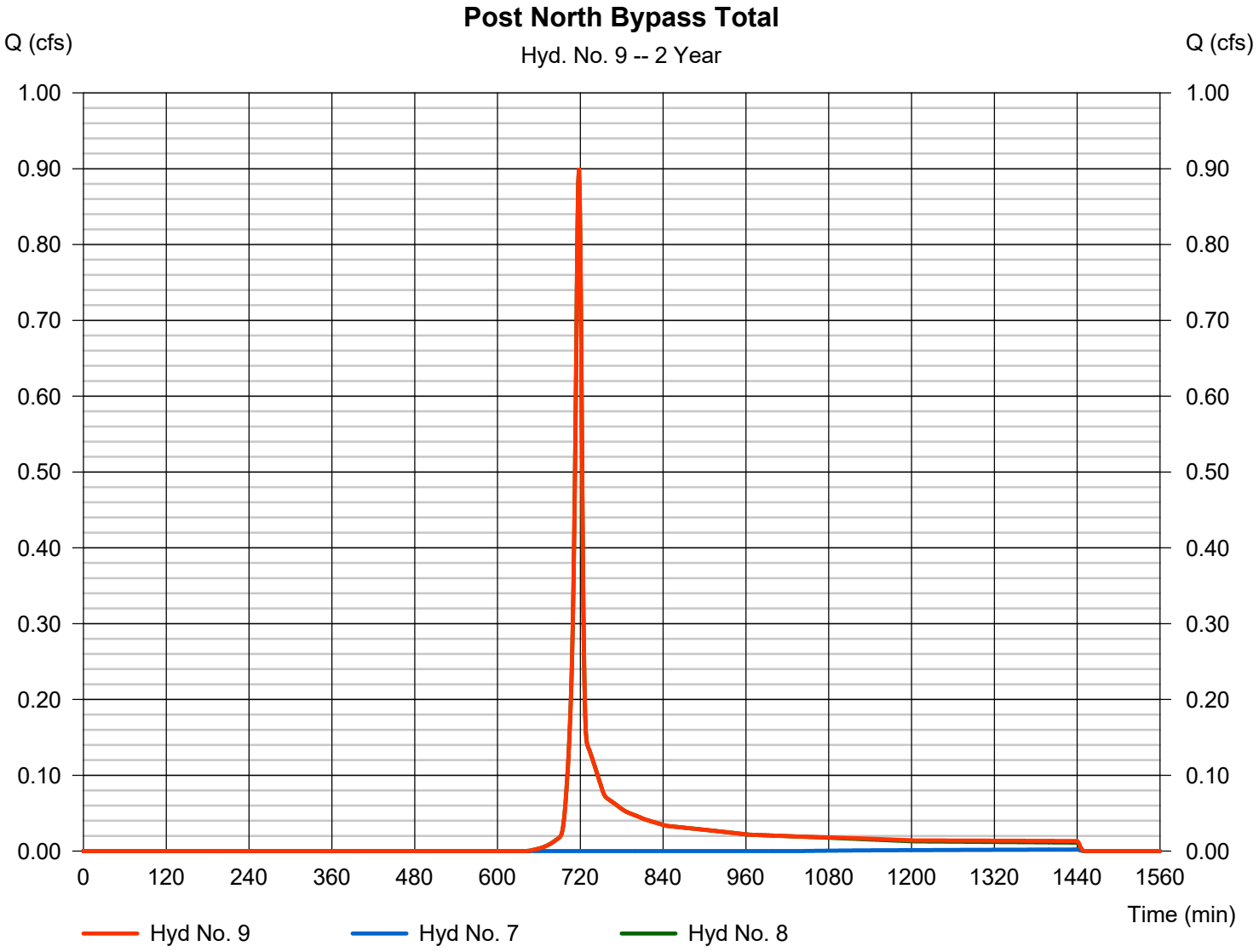


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	= Combine	Peak discharge	= 0.901 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,854 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 1.823 ac



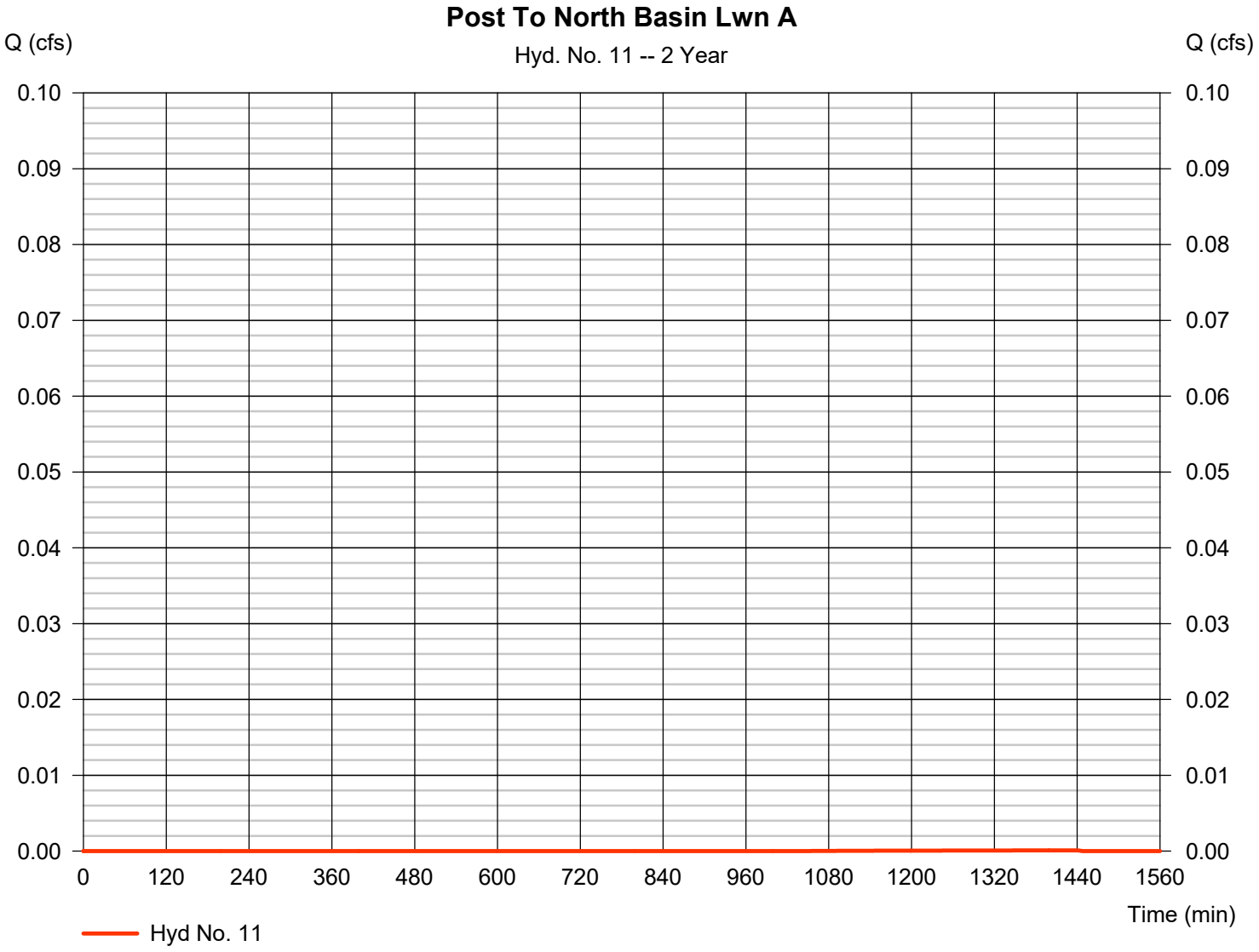
Hydrograph Report

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 1440 min
Time interval	= 1 min	Hyd. volume	= 1 cuft
Drainage area	= 0.062 ac	Curve number	= 40*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



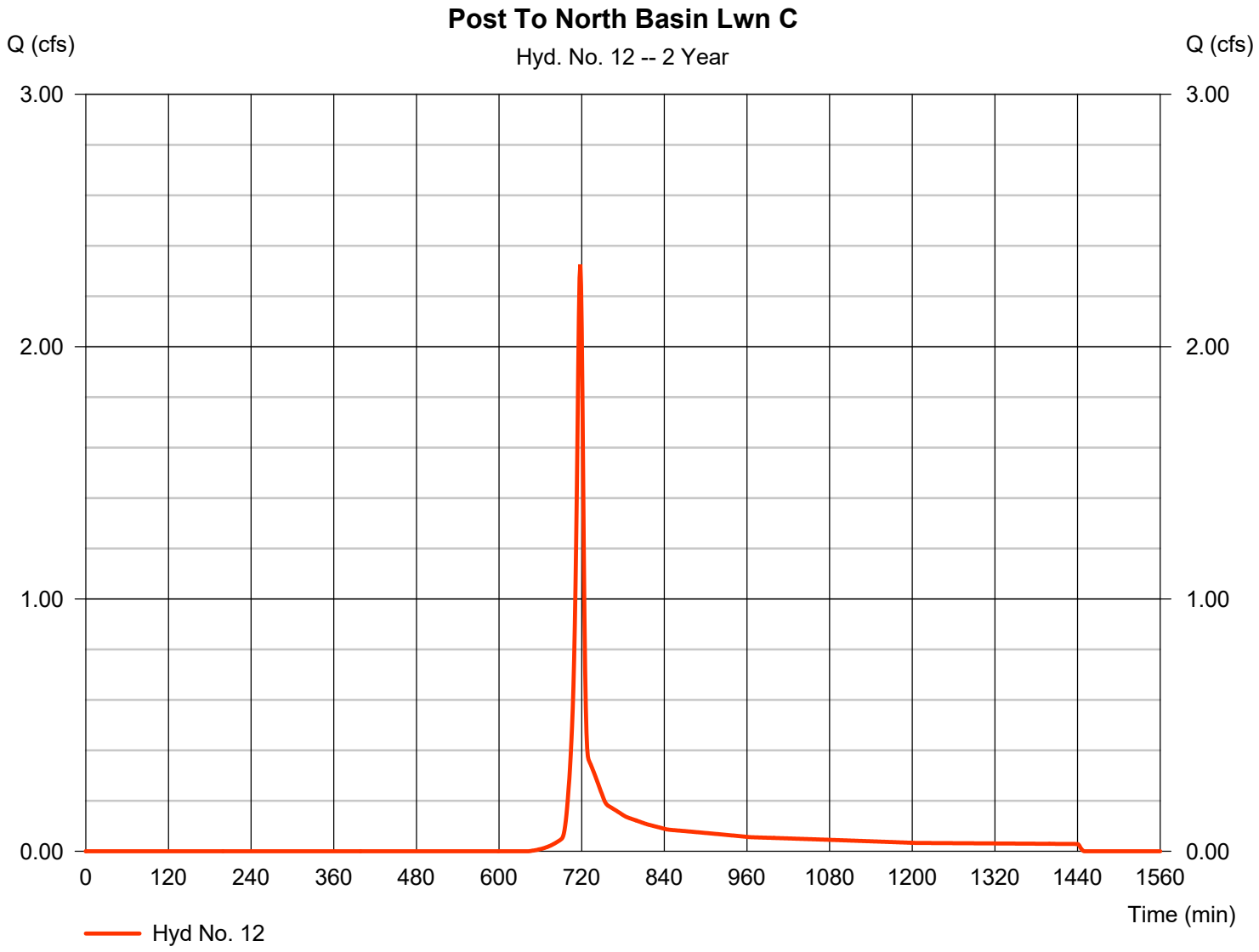
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.326 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	4,702 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



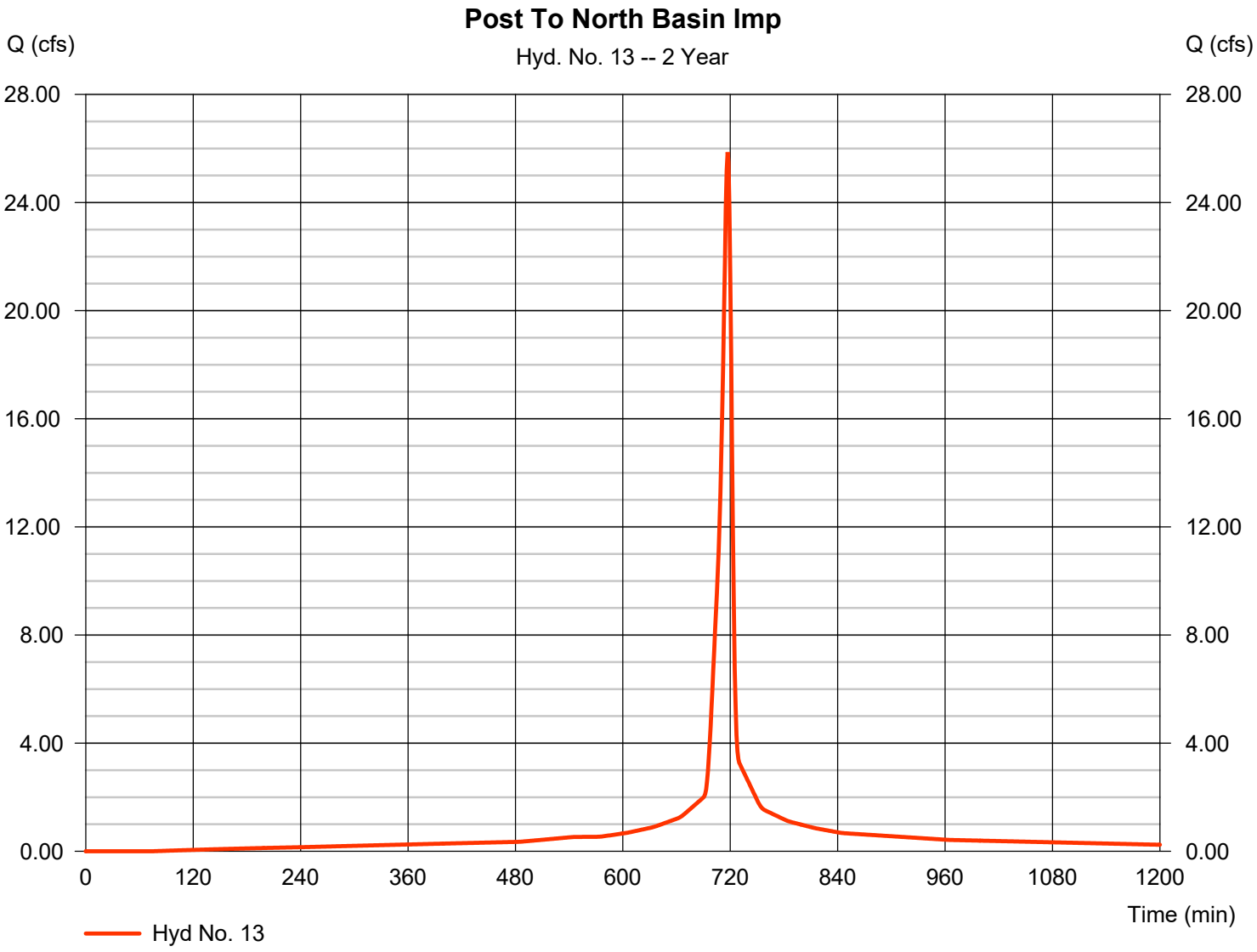
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.87 cfs
Storm frequency	=	2 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	61,269 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

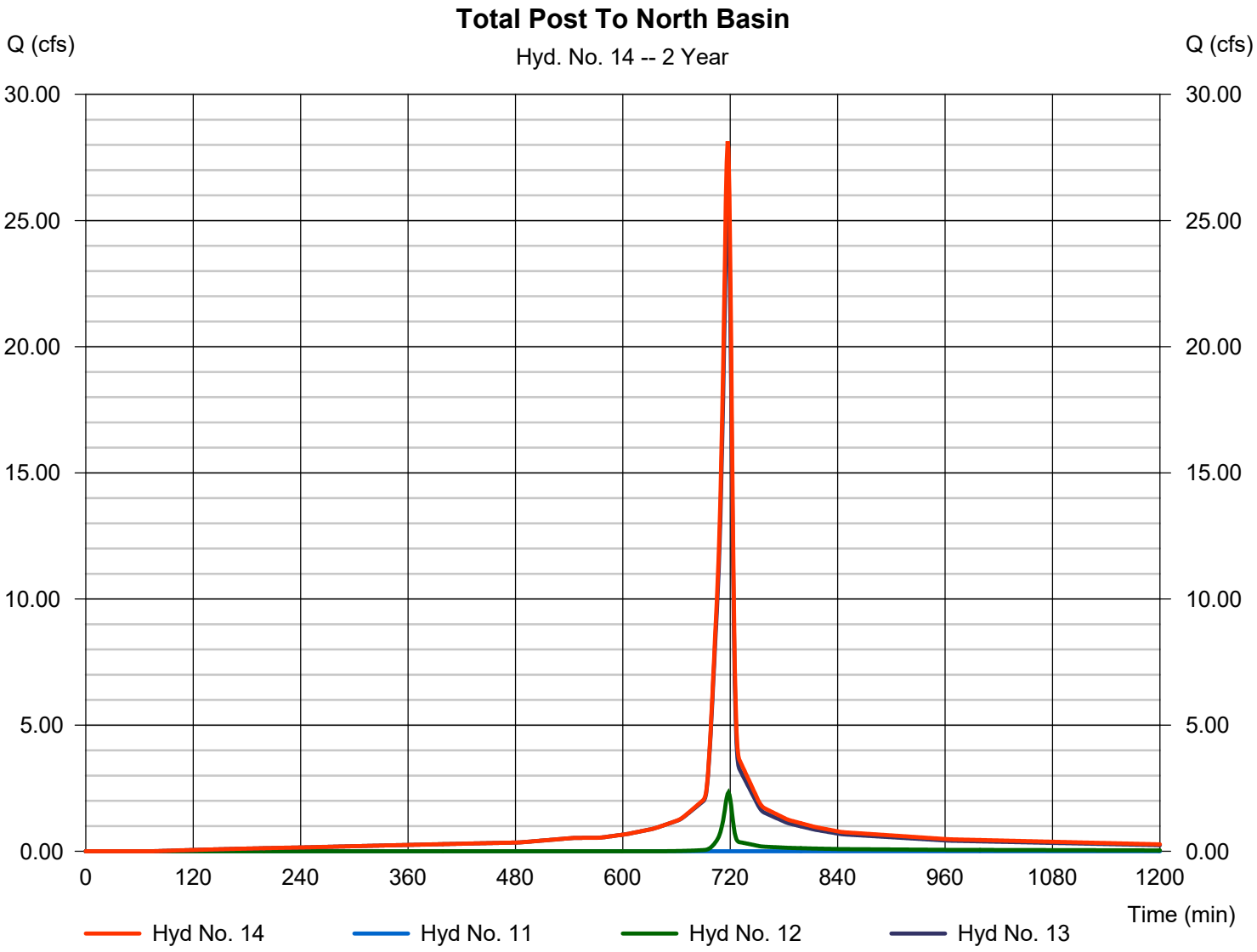


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	=	Combine	Peak discharge	=	28.14 cfs
Storm frequency	=	2 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	65,973 cuft
Inflow hyds.	=	11, 12, 13	Contrib. drain. area	=	6.512 ac



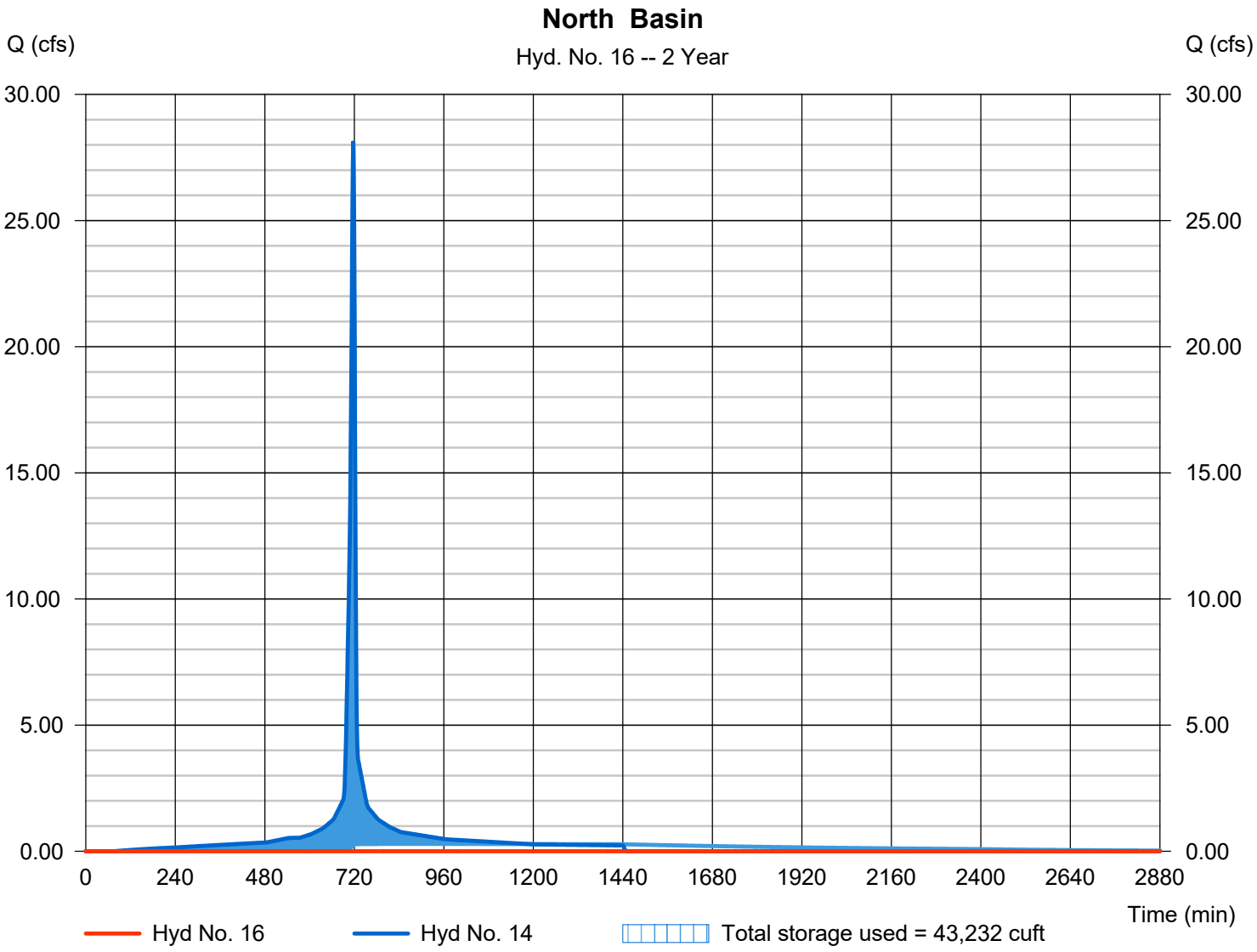
Hydrograph Report

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	762 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	473.20 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	43,232 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

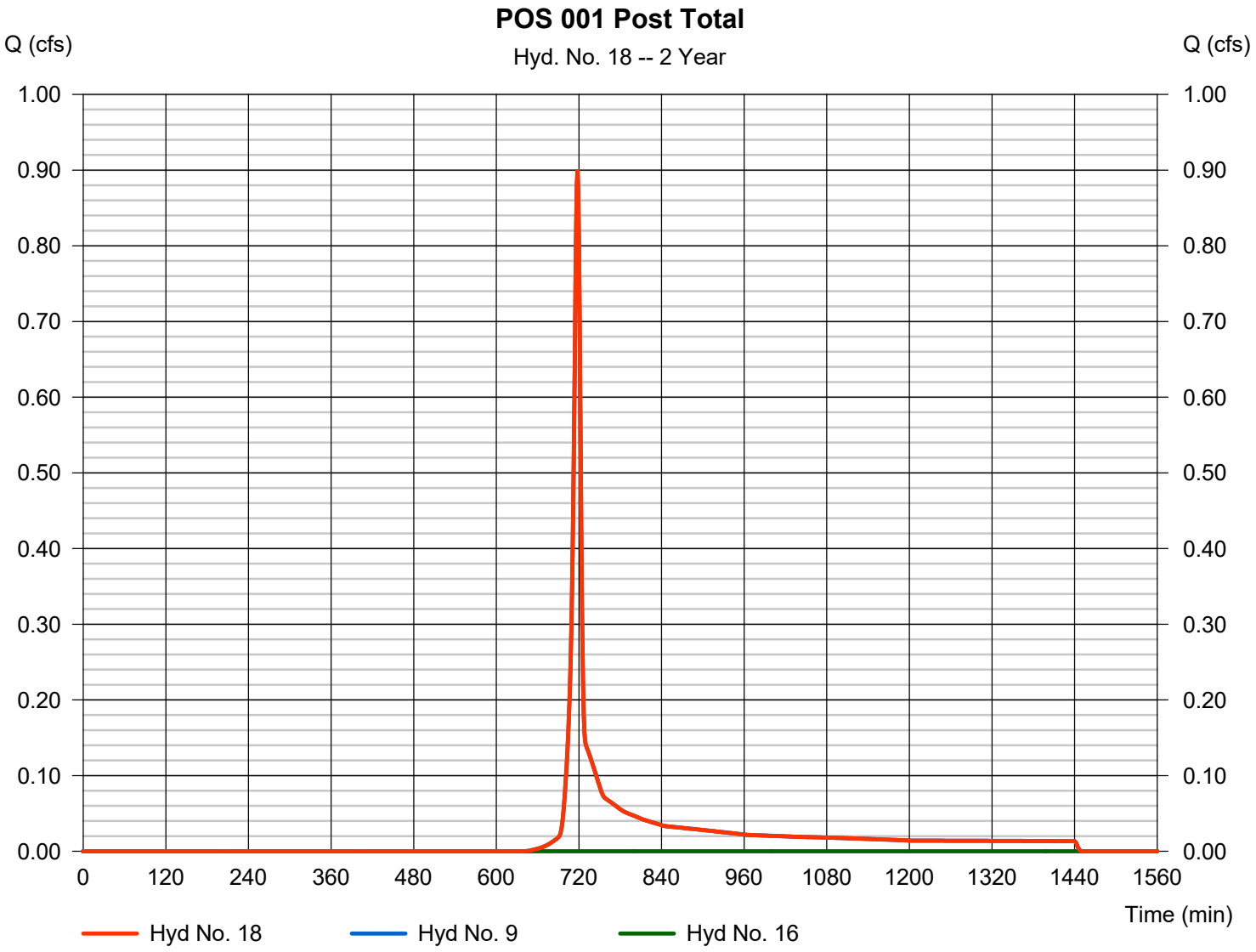


Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	= Combine	Peak discharge	= 0.901 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,854 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 0.000 ac



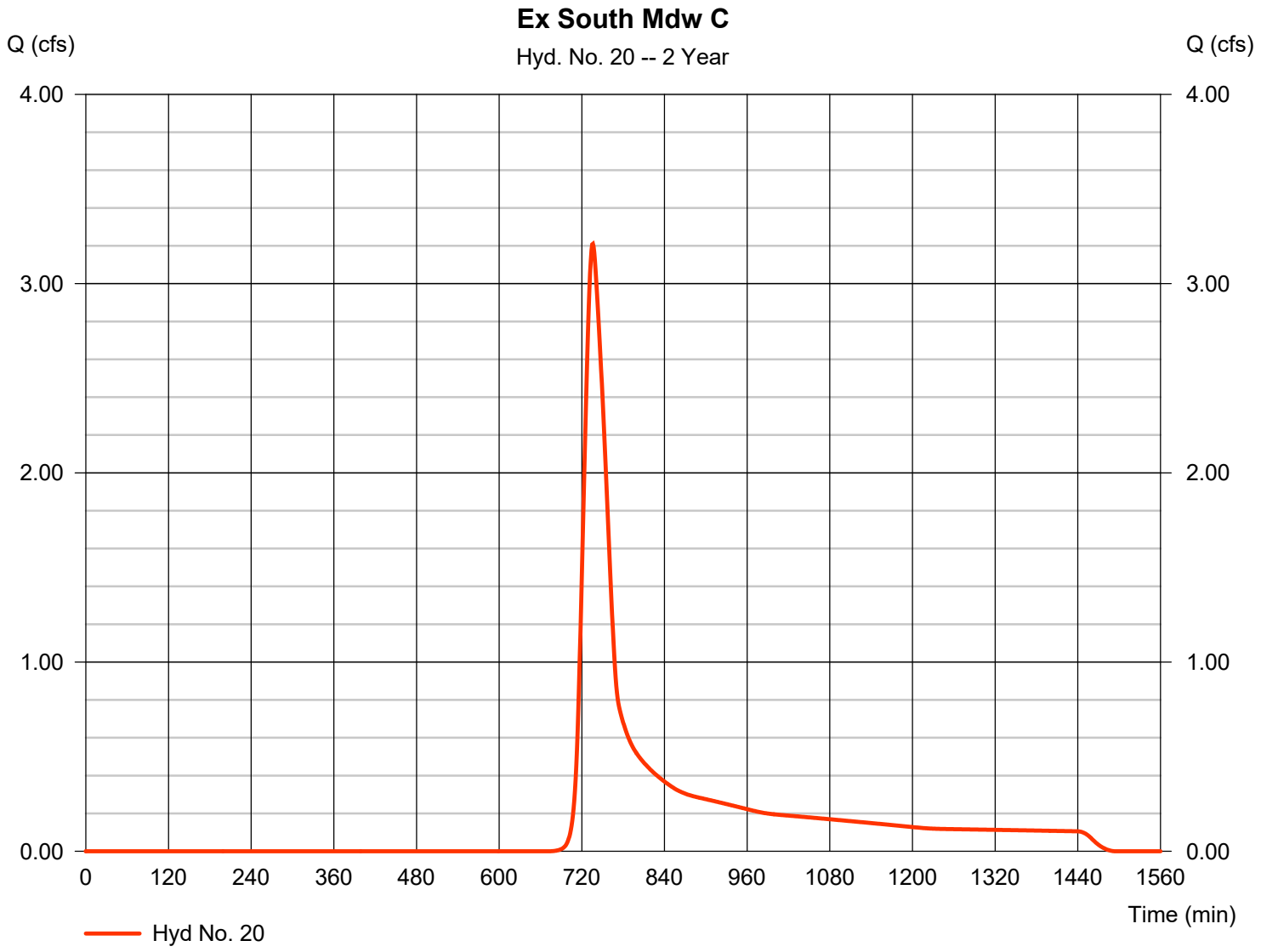
Hydrograph Report

Hyd. No. 20

Ex South Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 3.210 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 15,793 cuft
Drainage area	= 4.604 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 33.93 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



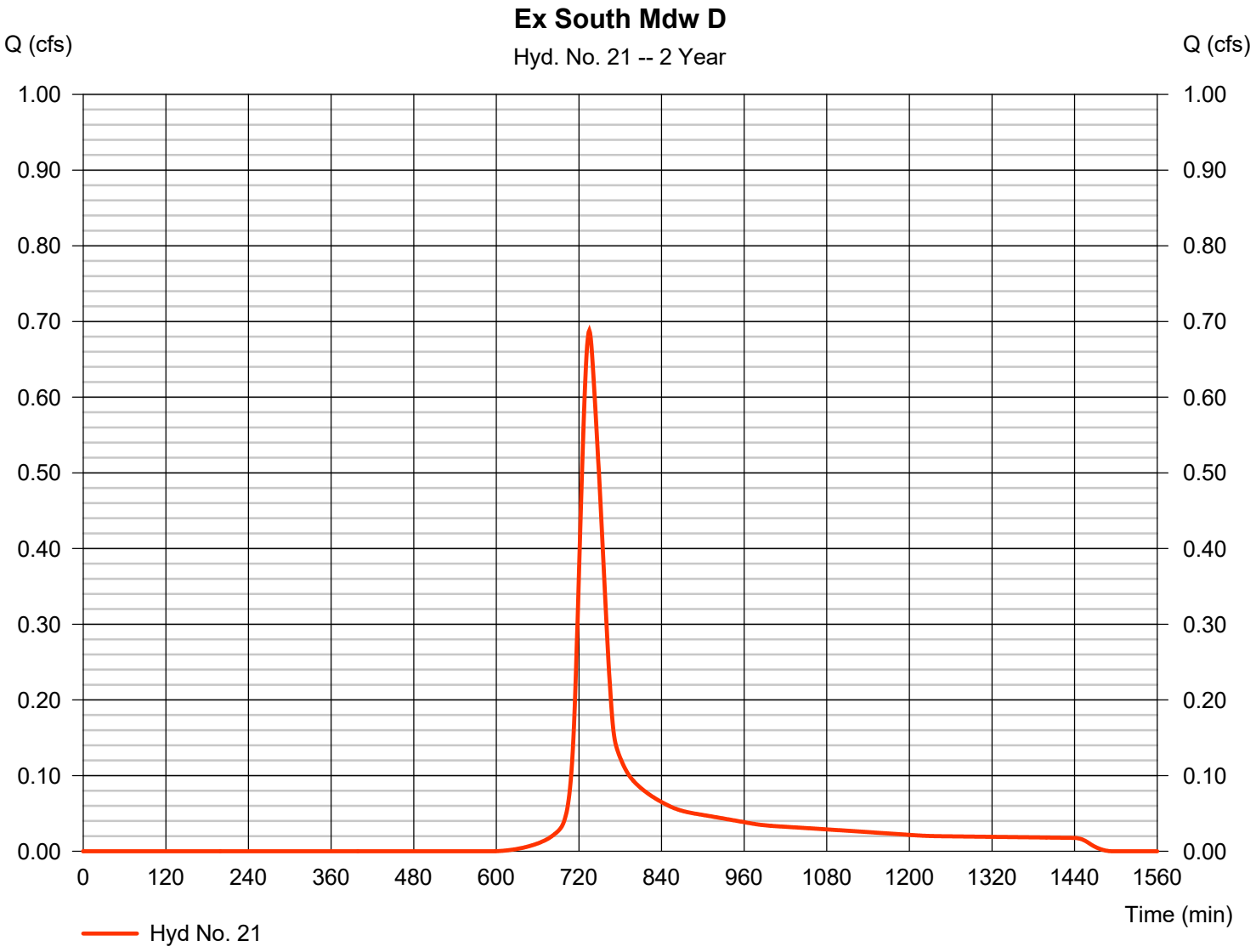
Hydrograph Report

Hyd. No. 21

Ex South Mdw D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.688 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 3,127 cuft
Drainage area	= 0.636 ac	Curve number	= 78*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.93 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



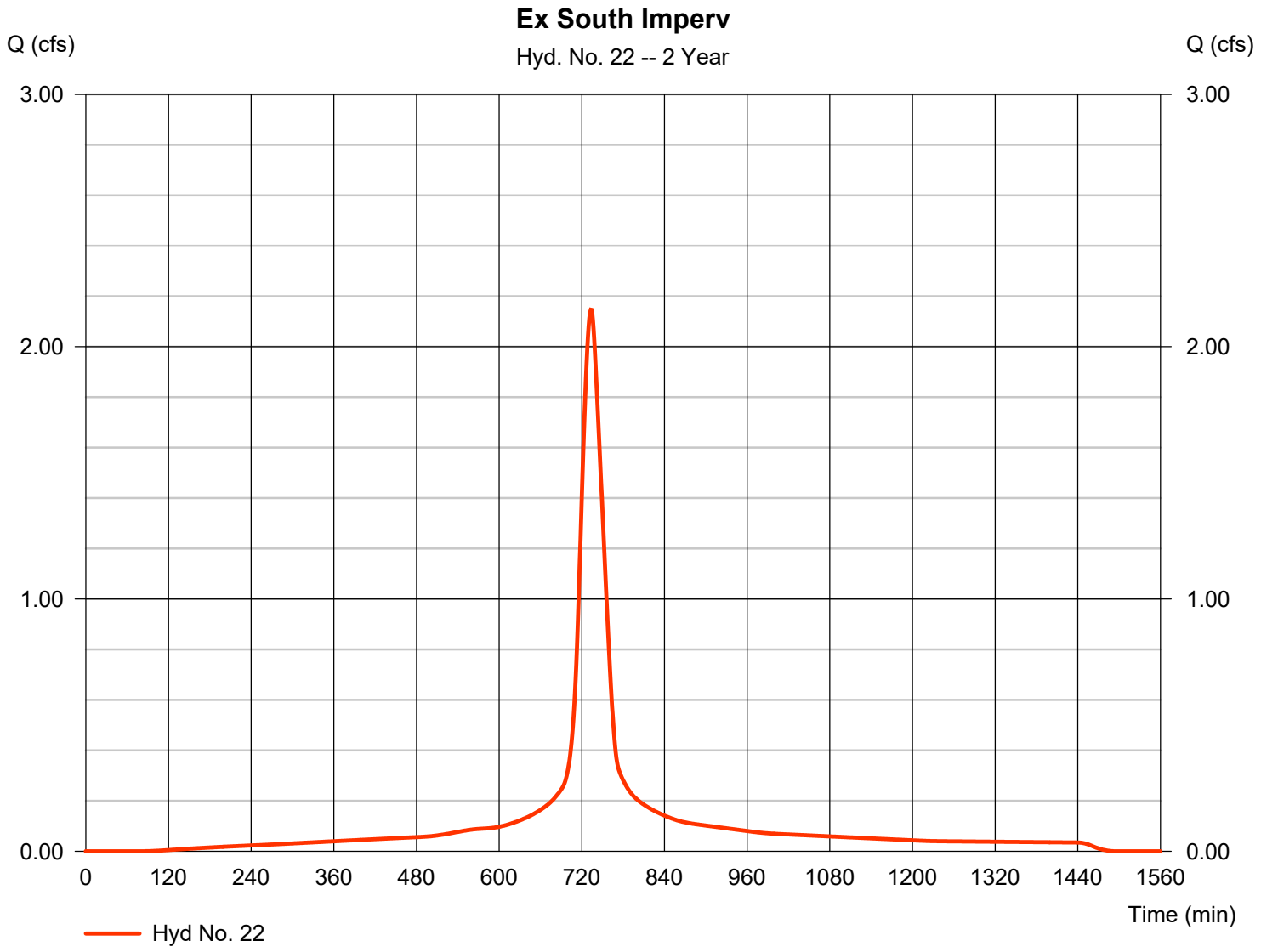
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.147 cfs
Storm frequency	=	2 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	10,410 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



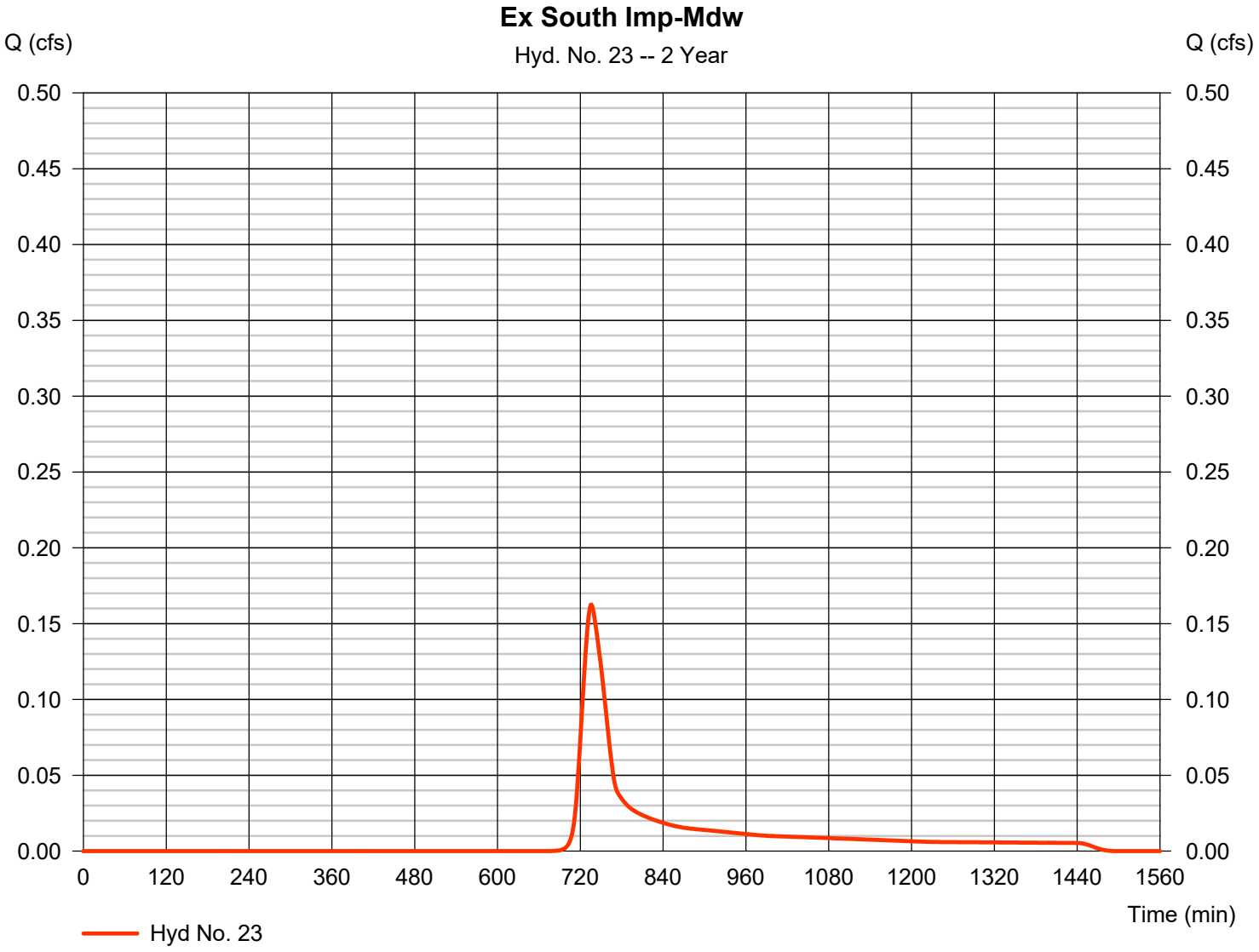
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	= SCS Runoff	Peak discharge	= 0.162 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 1 min	Hyd. volume	= 799 cuft
Drainage area	= 0.233 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 33.93 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

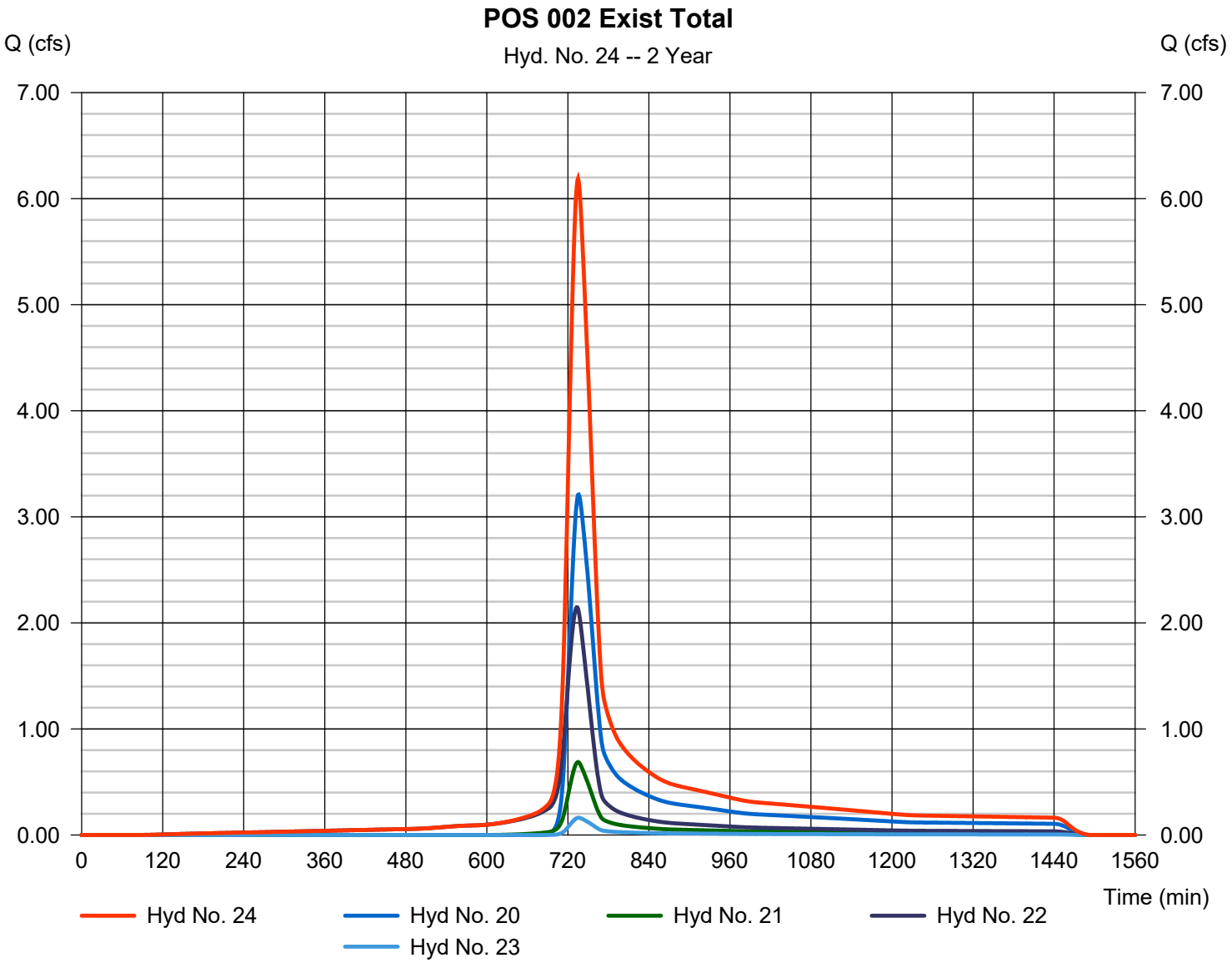


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	= Combine	Peak discharge	= 6.190 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 30,129 cuft
Inflow hyds.	= 20, 21, 22, 23	Contrib. drain. area	= 6.405 ac

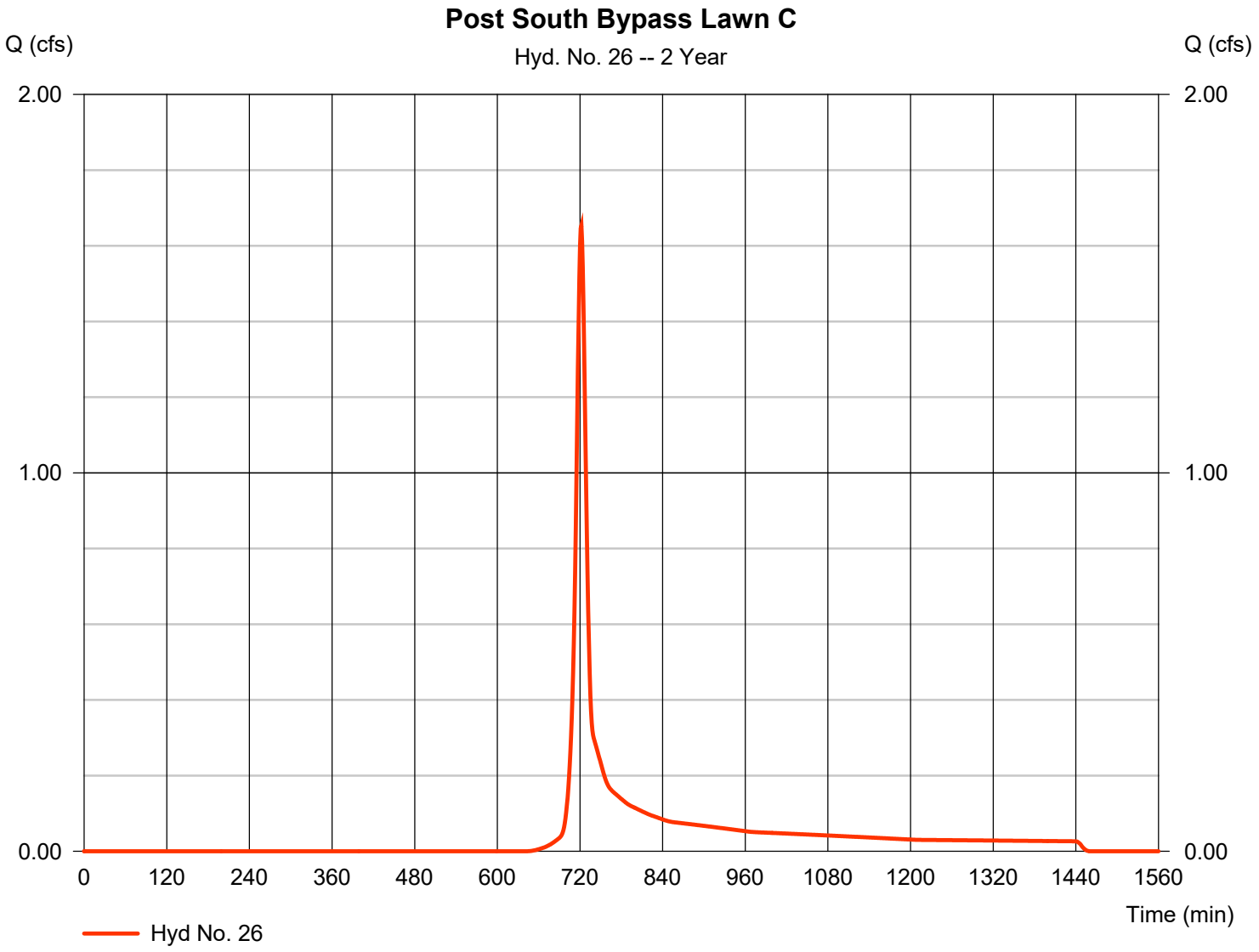


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.653 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	4,286 cuft
Drainage area	=	1.080 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.90 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

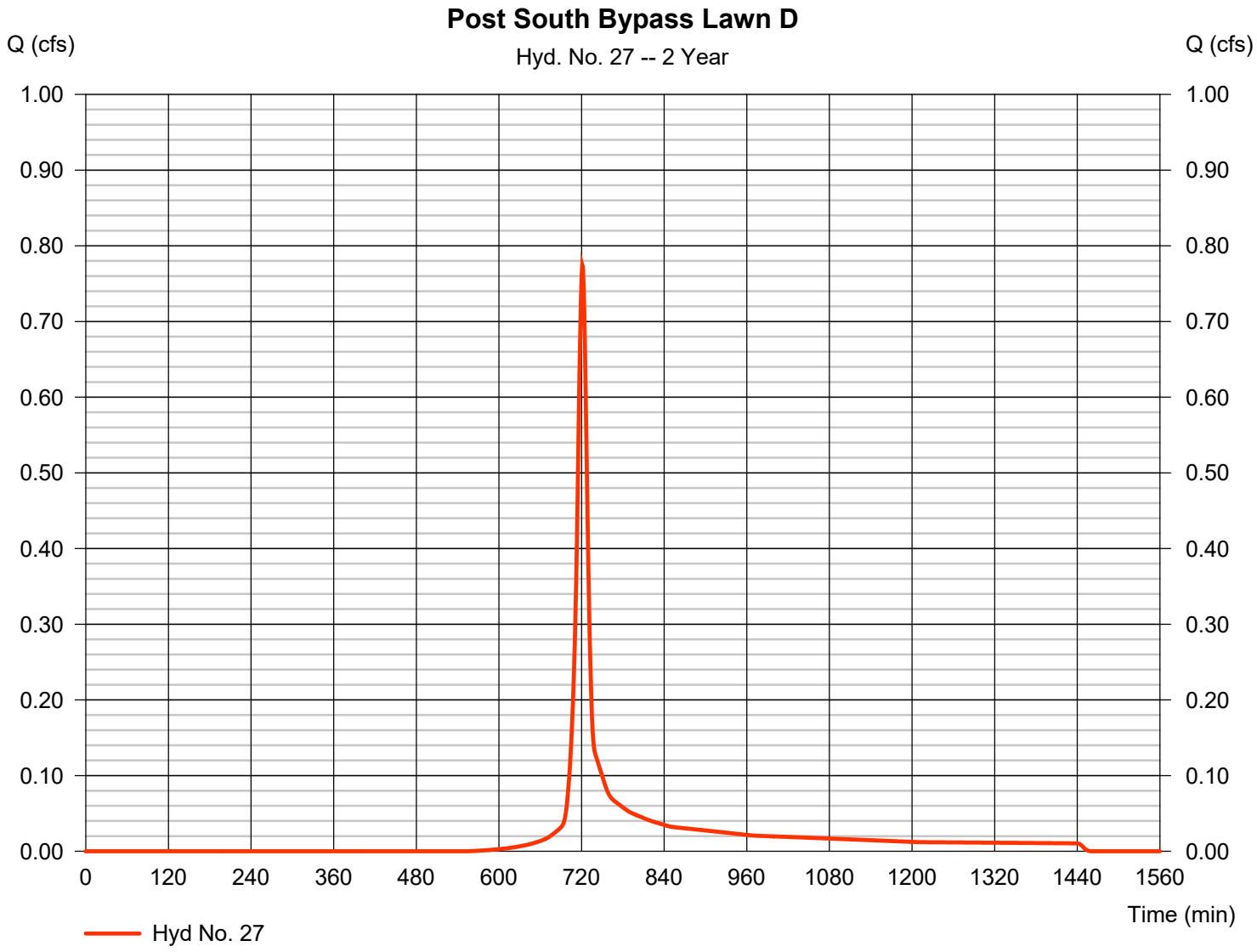


Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.774 cfs
Storm frequency	= 2 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 1,961 cuft
Drainage area	= 0.369 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

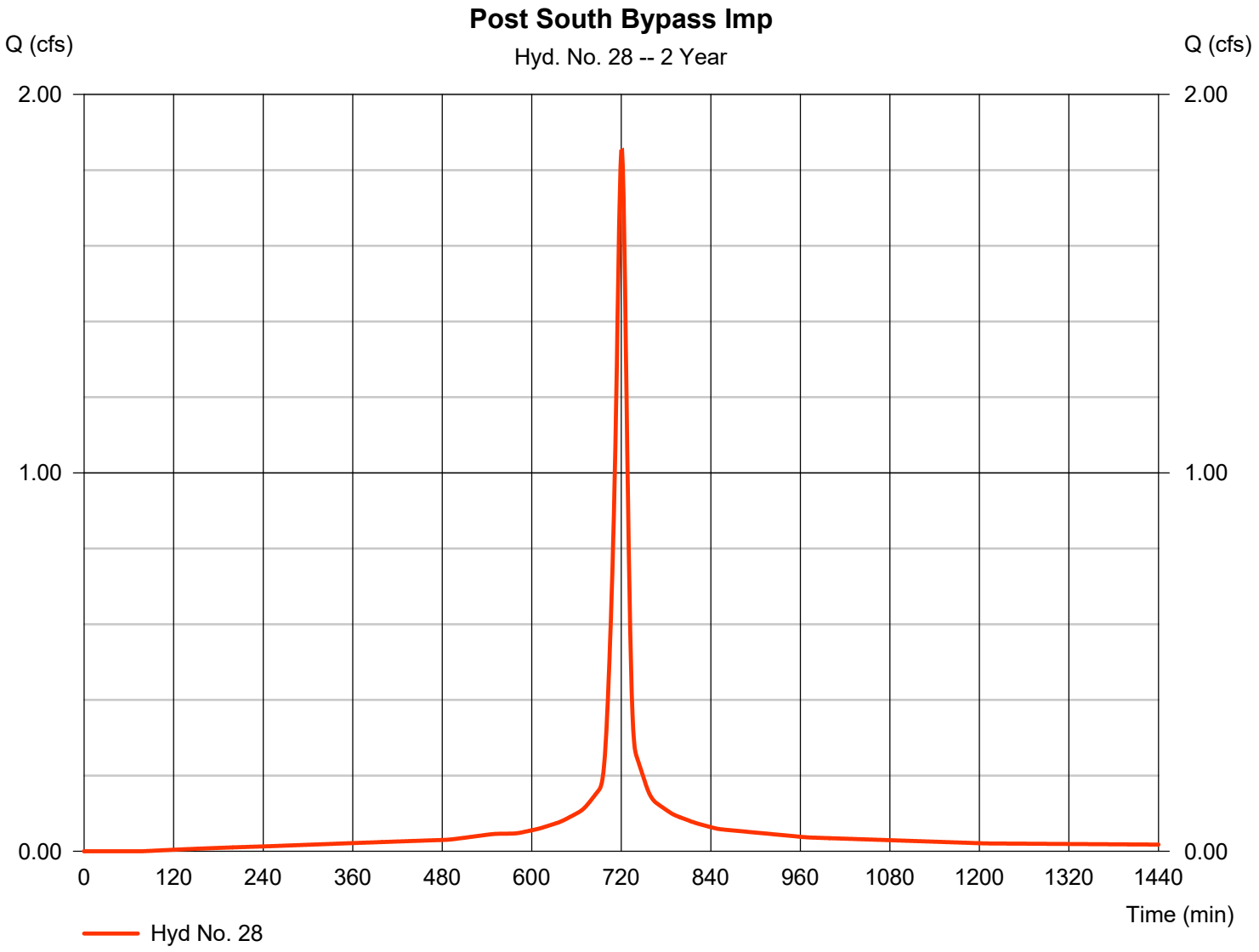


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 1.851 cfs
Storm frequency	= 2 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 5,344 cuft
Drainage area	= 0.486 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

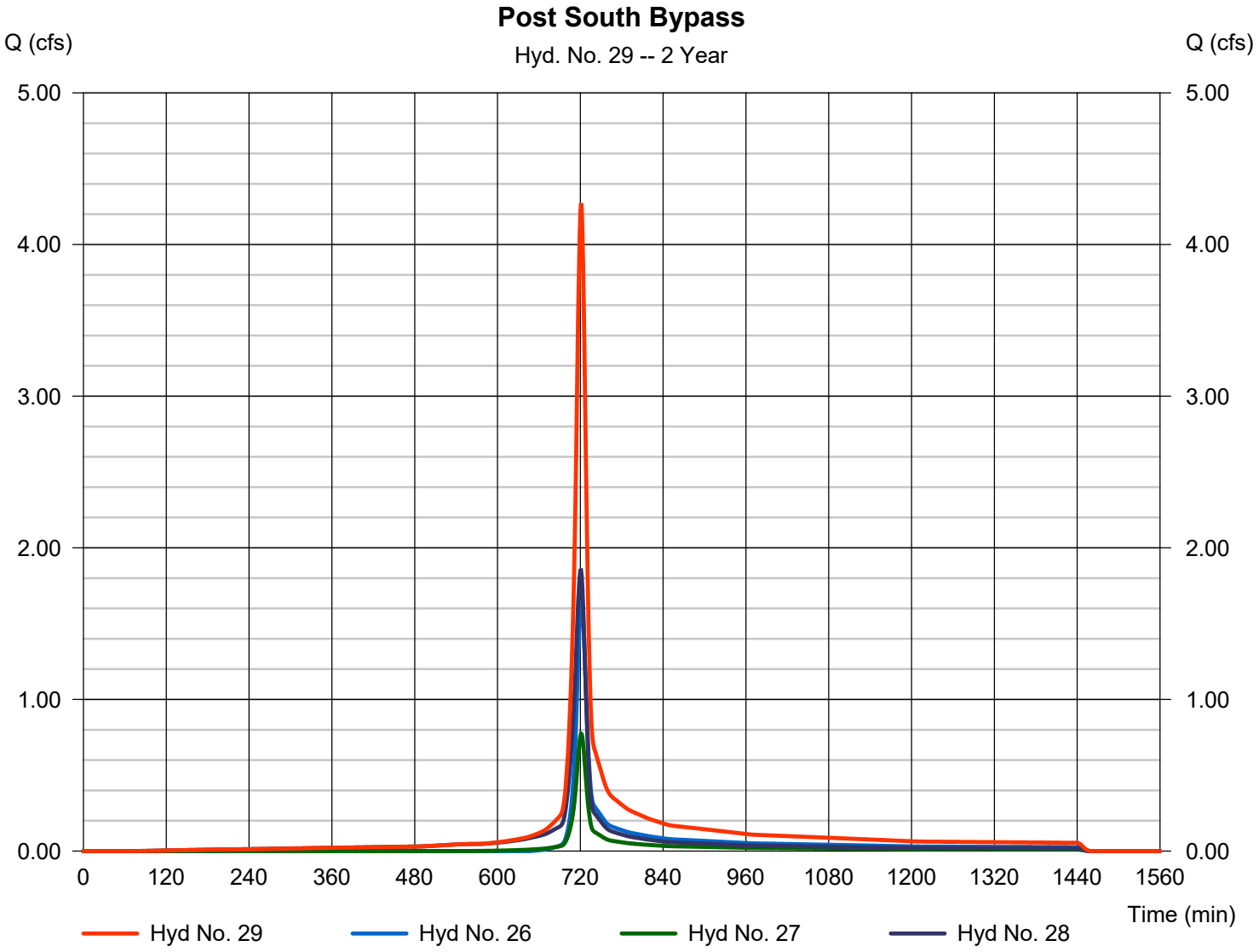


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	= Combine	Peak discharge	= 4.272 cfs
Storm frequency	= 2 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 11,591 cuft
Inflow hyds.	= 26, 27, 28	Contrib. drain. area	= 1.935 ac



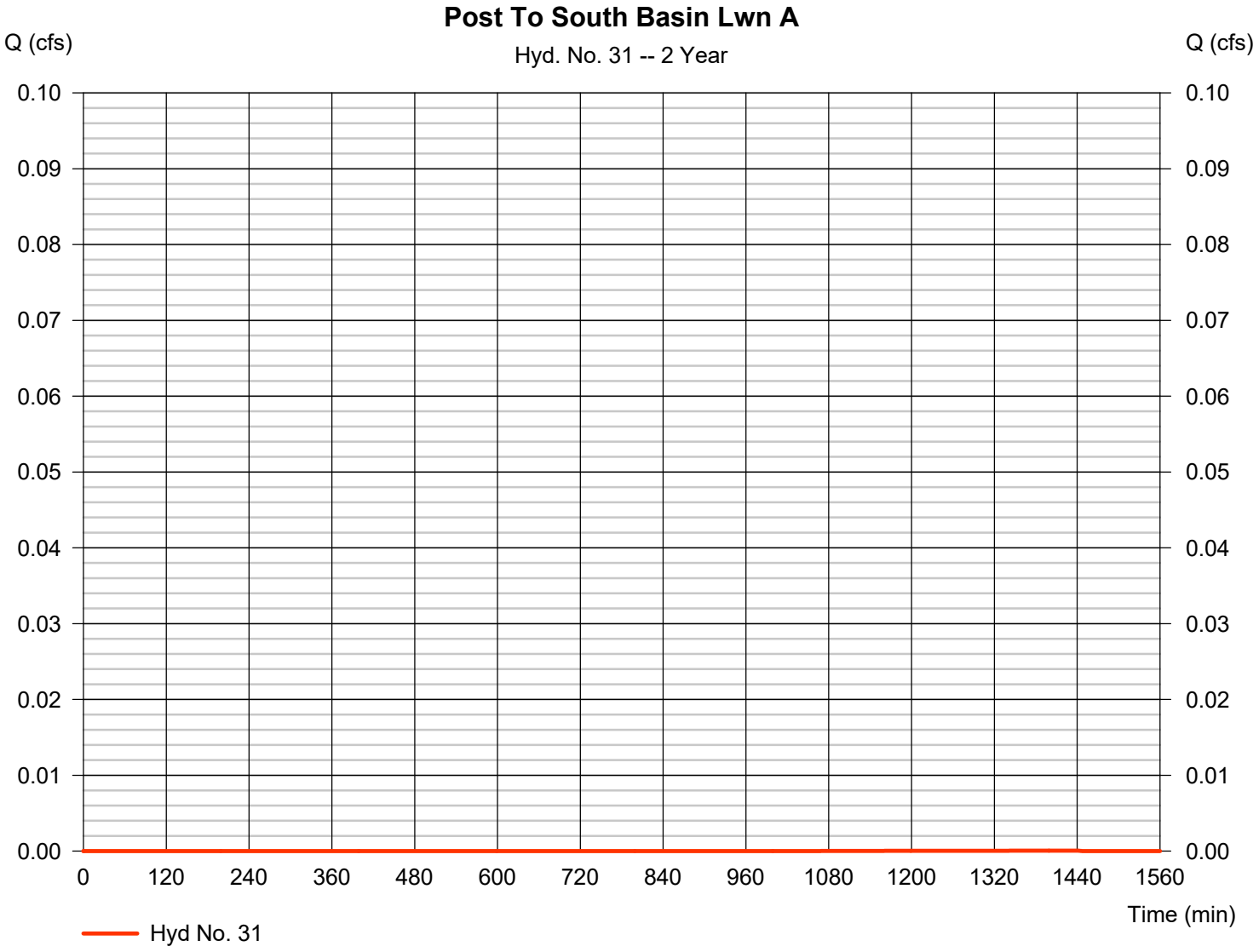
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 1440 min
Time interval	= 1 min	Hyd. volume	= 1 cuft
Drainage area	= 0.035 ac	Curve number	= 40*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.60 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



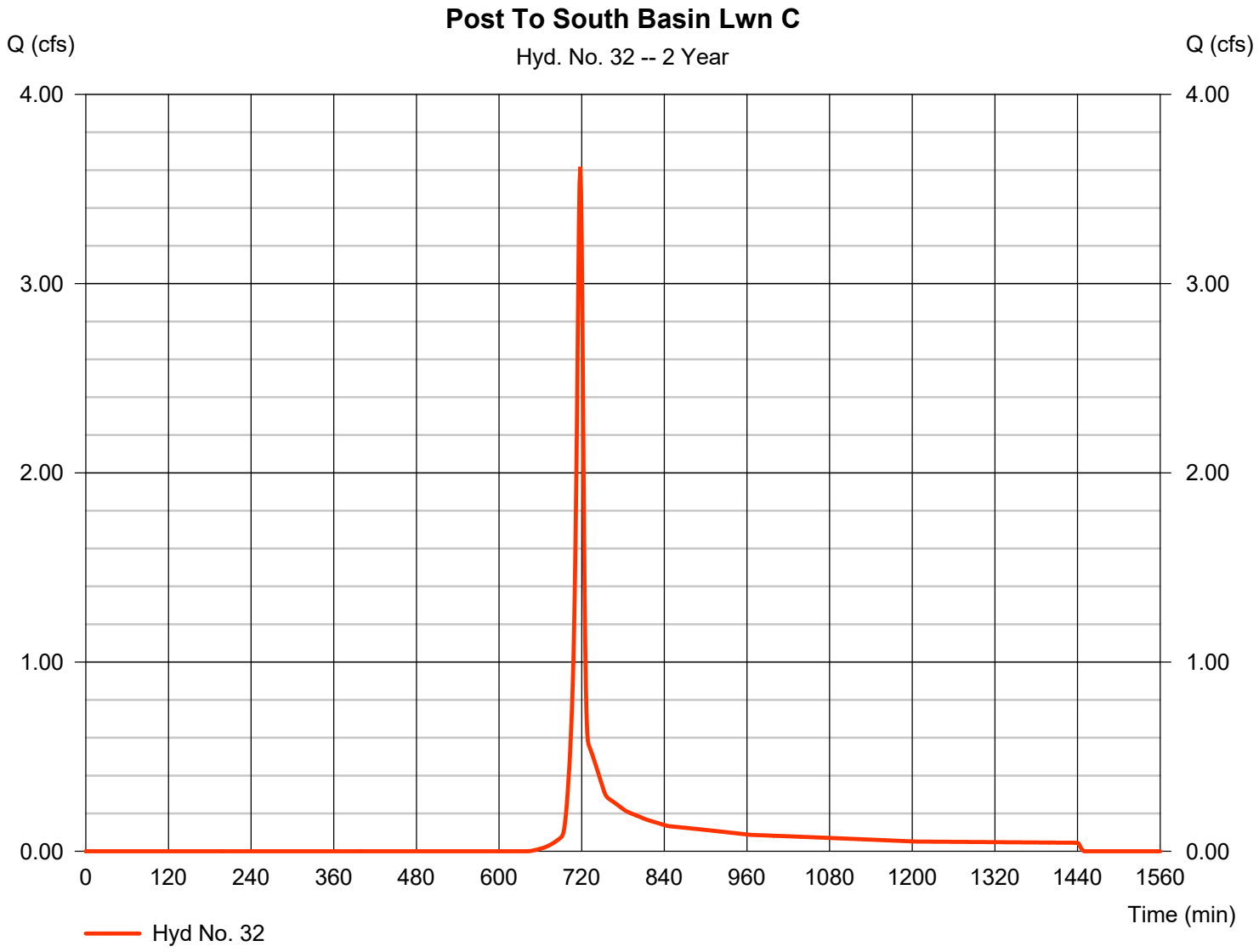
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	= SCS Runoff	Peak discharge	= 3.616 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 7,309 cuft
Drainage area	= 1.758 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



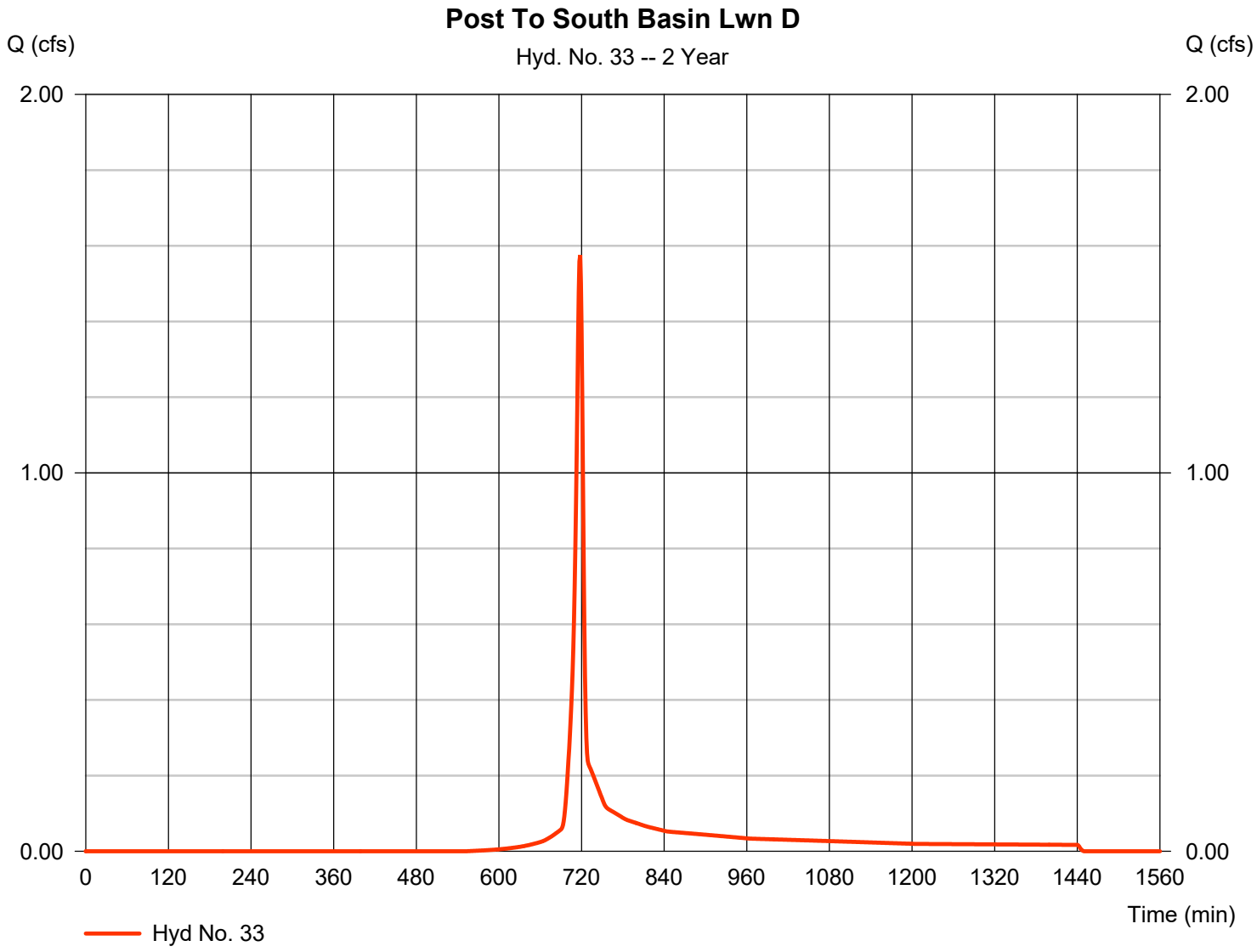
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.576 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	3,167 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	3.31 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



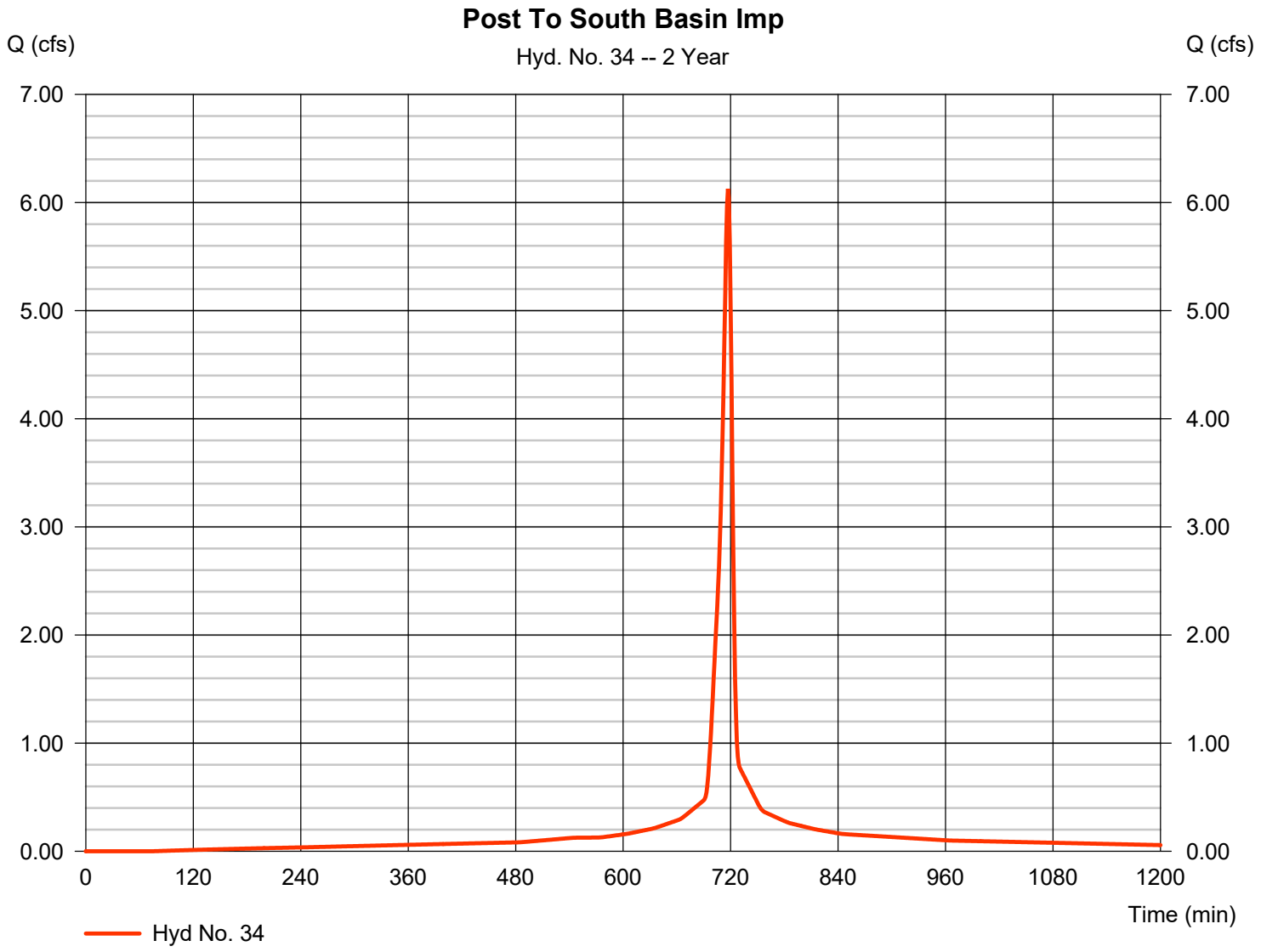
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 6.127 cfs
Storm frequency	= 2 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 14,514 cuft
Drainage area	= 1.260 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 3.31 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

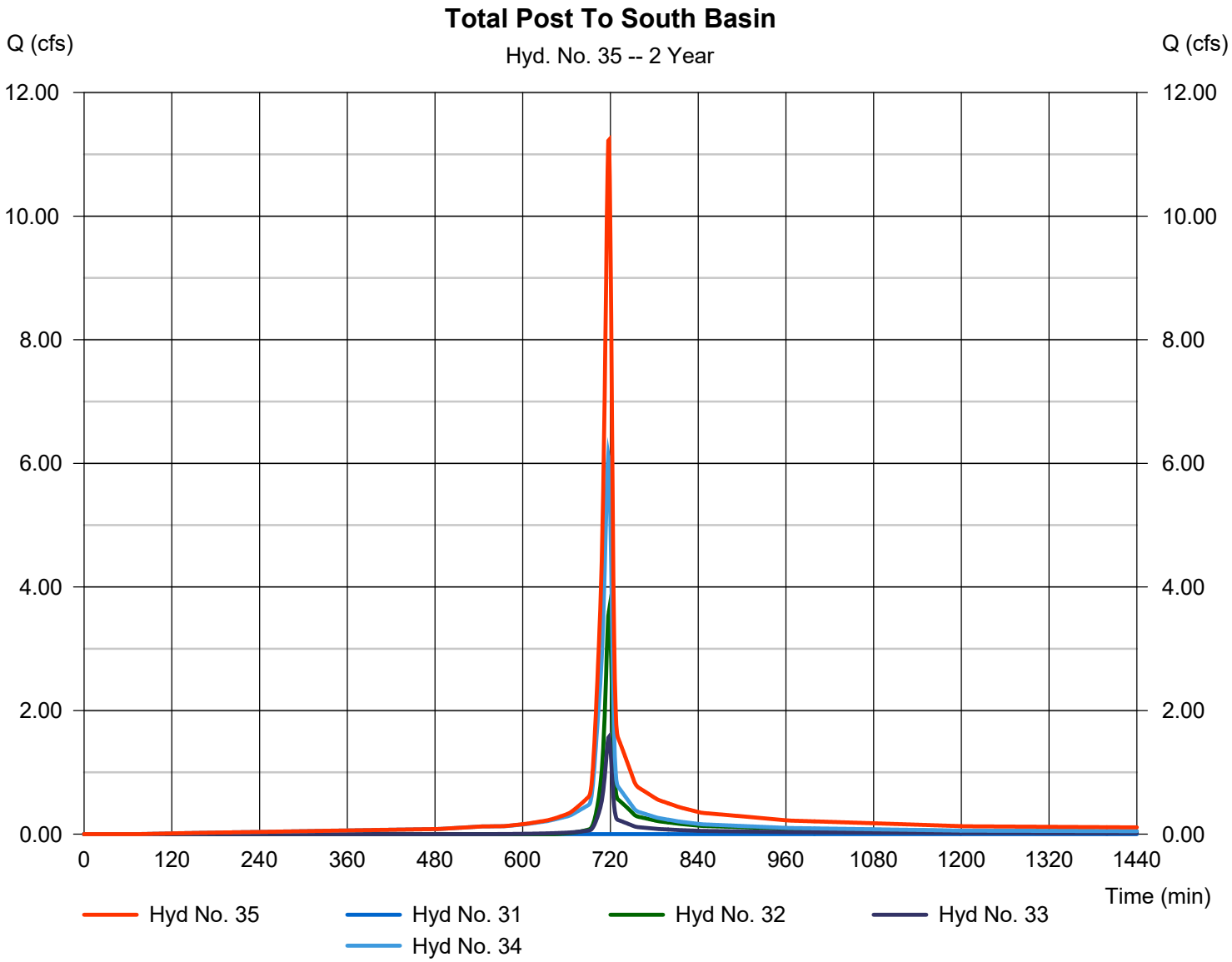


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	11.23 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	24,991 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



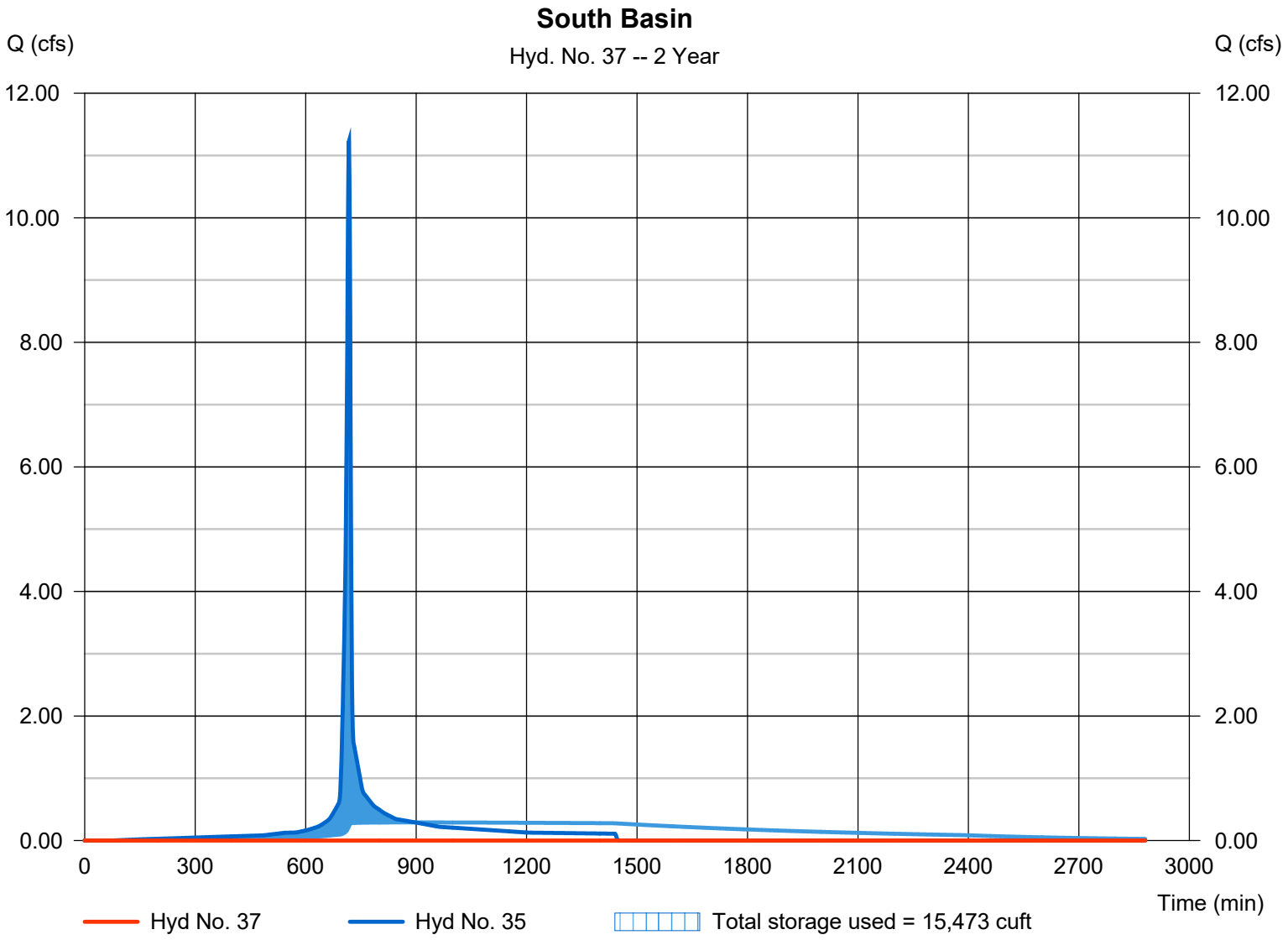
Hydrograph Report

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	2224 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	473.62 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	15,473 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

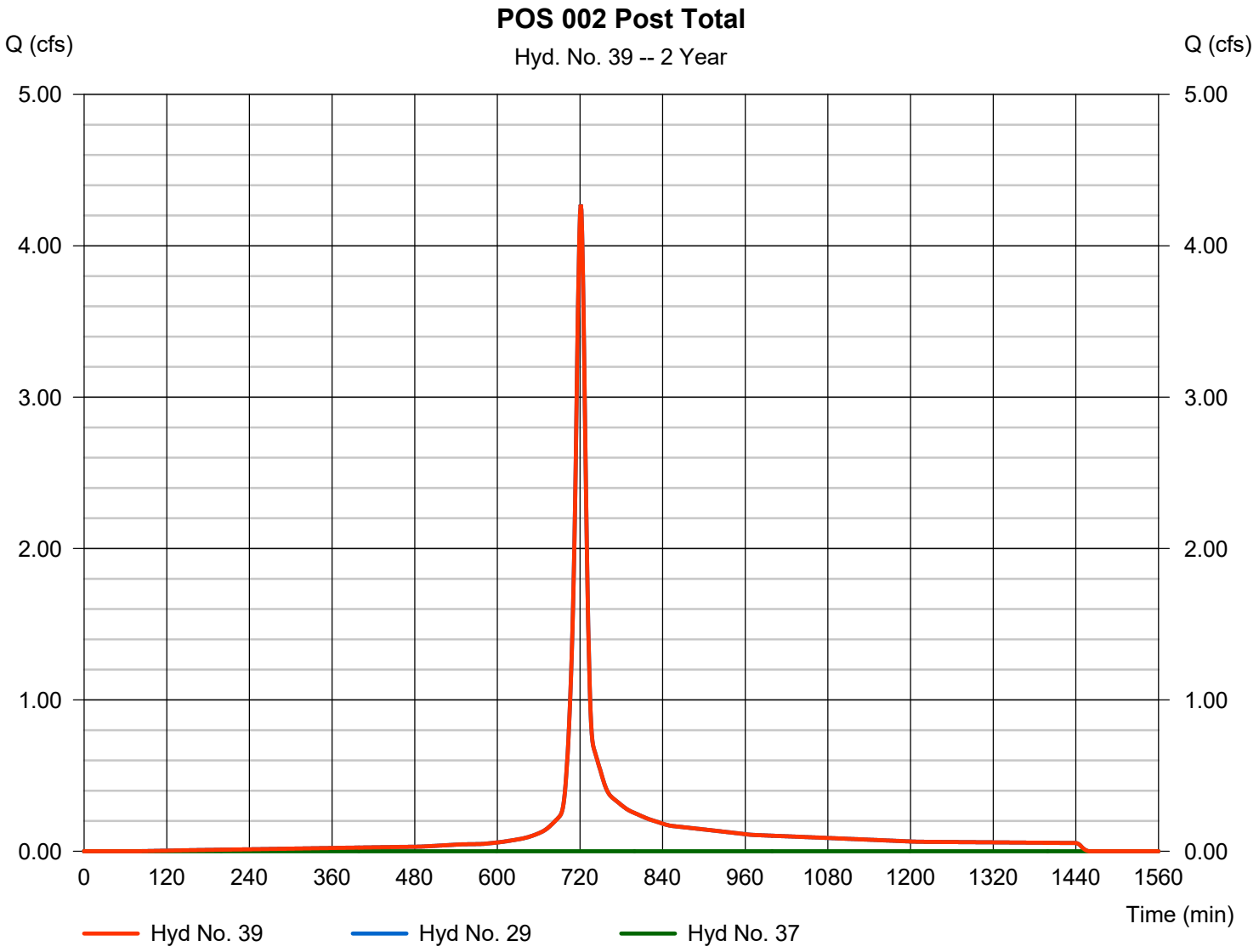


Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	=	Combine	Peak discharge	=	4.272 cfs
Storm frequency	=	2 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	11,591 cuft
Inflow hyds.	=	29, 37	Contrib. drain. area	=	0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.025	1	928	884	------	------	------	Ex North Mdw A
2	SCS Runoff	3.669	1	739	19,369	------	------	------	Ex North Mdw C
3	SCS Runoff	1.600	1	738	8,815	------	------	------	Ex North Imperv
4	SCS Runoff	0.159	1	739	840	------	------	------	Ex North Imp-Mdw
5	Combine	5.421	1	739	29,909	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	0.012	1	903	403	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	1.376	1	718	2,763	------	------	------	Post North Bypass Lawn C
9	Combine	1.376	1	718	3,166	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.001	1	903	18	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	3.553	1	718	7,134	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	32.32	1	717	77,352	------	------	------	Post To North Basin Imp
14	Combine	35.82	1	717	84,504	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	0.295	1	859	4,010	14	473.62	55,136	North Basin
18	Combine	1.376	1	718	7,176	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	5.310	1	735	24,682	------	------	------	Ex South Mdw C
21	SCS Runoff	1.026	1	735	4,578	------	------	------	Ex South Mdw D
22	SCS Runoff	2.685	1	733	13,143	------	------	------	Ex South Imperv
23	SCS Runoff	0.269	1	735	1,249	------	------	------	Ex South Imp-Mdw
24	Combine	9.272	1	735	43,652	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	2.554	1	721	6,502	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	1.118	1	721	2,823	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	2.314	1	721	6,746	------	------	------	Post South Bypass Imp
29	Combine	5.985	1	721	16,072	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.000	1	903	10	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	5.522	1	718	11,088	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	2.252	1	718	4,561	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	7.656	1	717	18,324	------	------	------	Post To South Basin Imp
35	Combine	15.34	1	717	33,983	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	0.000	1	676	0	35	473.83	22,290	South Basin

Hydrograph Summary Report

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

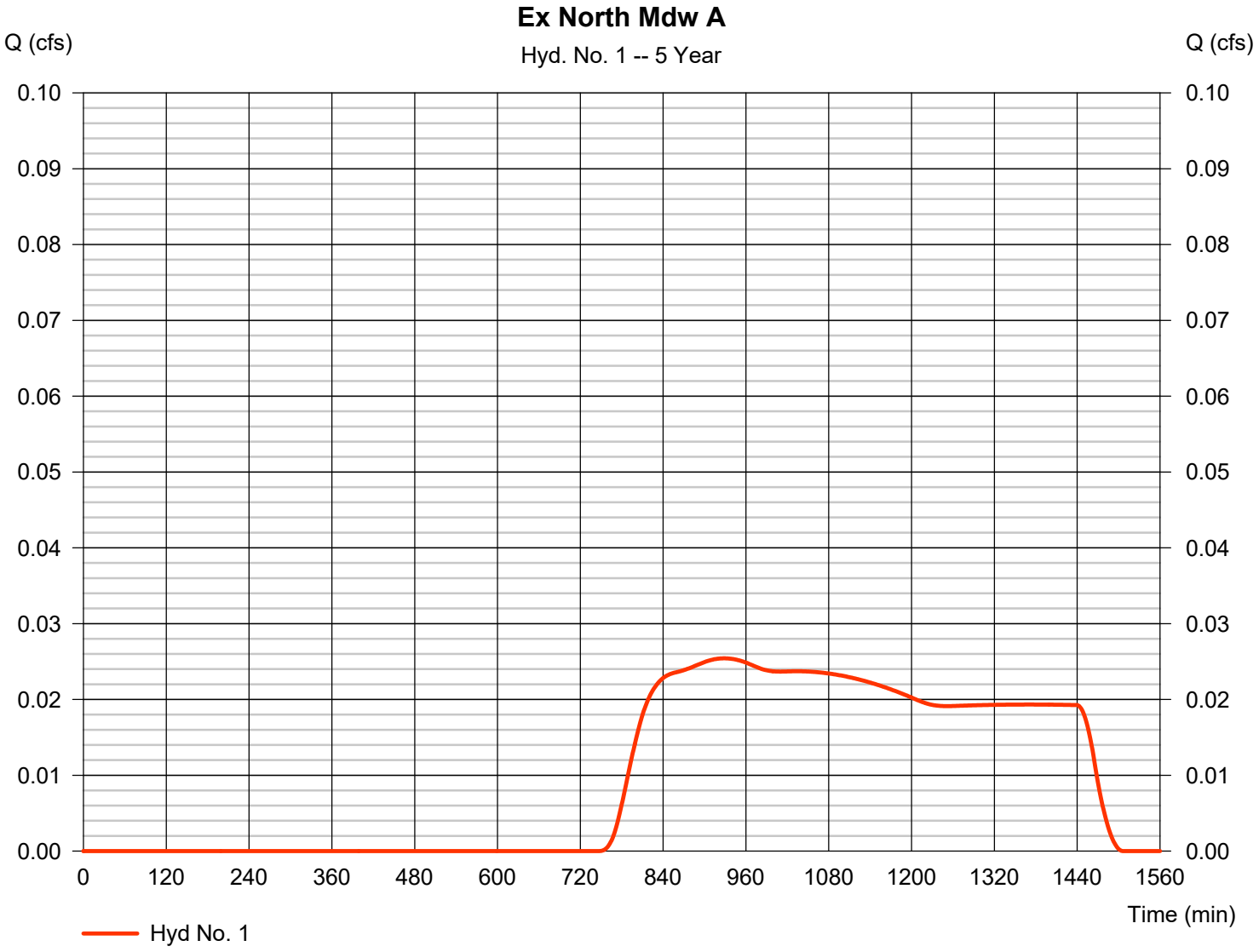
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	5.985	1	721	16,072	29, 37,	------	------	POS 002 Post Total
42	Combine	37.18	1	717	87,670	9, 14,	------	------	Post North Undetained
43	Combine	20.73	1	718	50,055	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.025 cfs
Storm frequency	= 5 yrs	Time to peak	= 928 min
Time interval	= 1 min	Hyd. volume	= 884 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

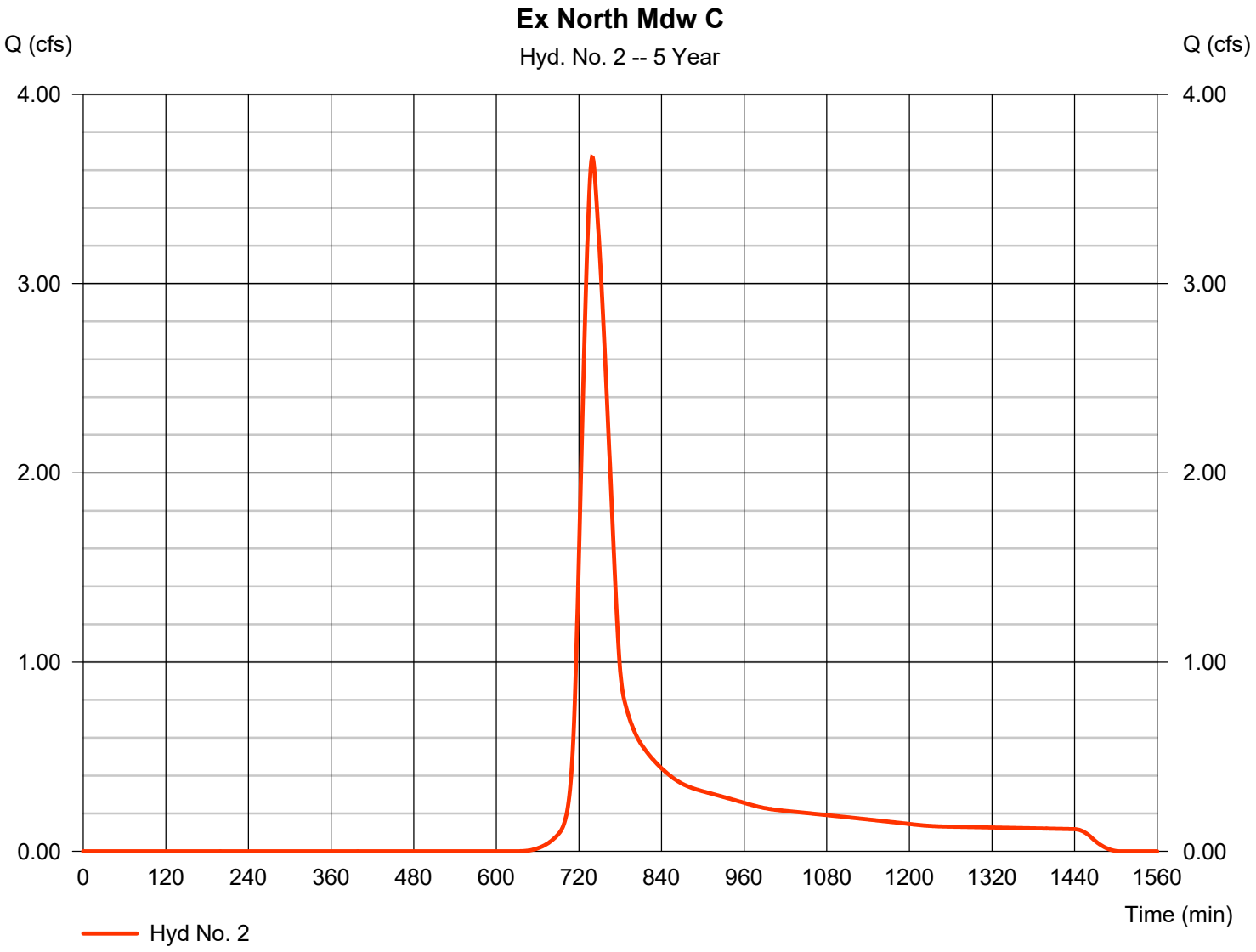


Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 3.669 cfs
Storm frequency	= 5 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 19,369 cuft
Drainage area	= 3.595 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

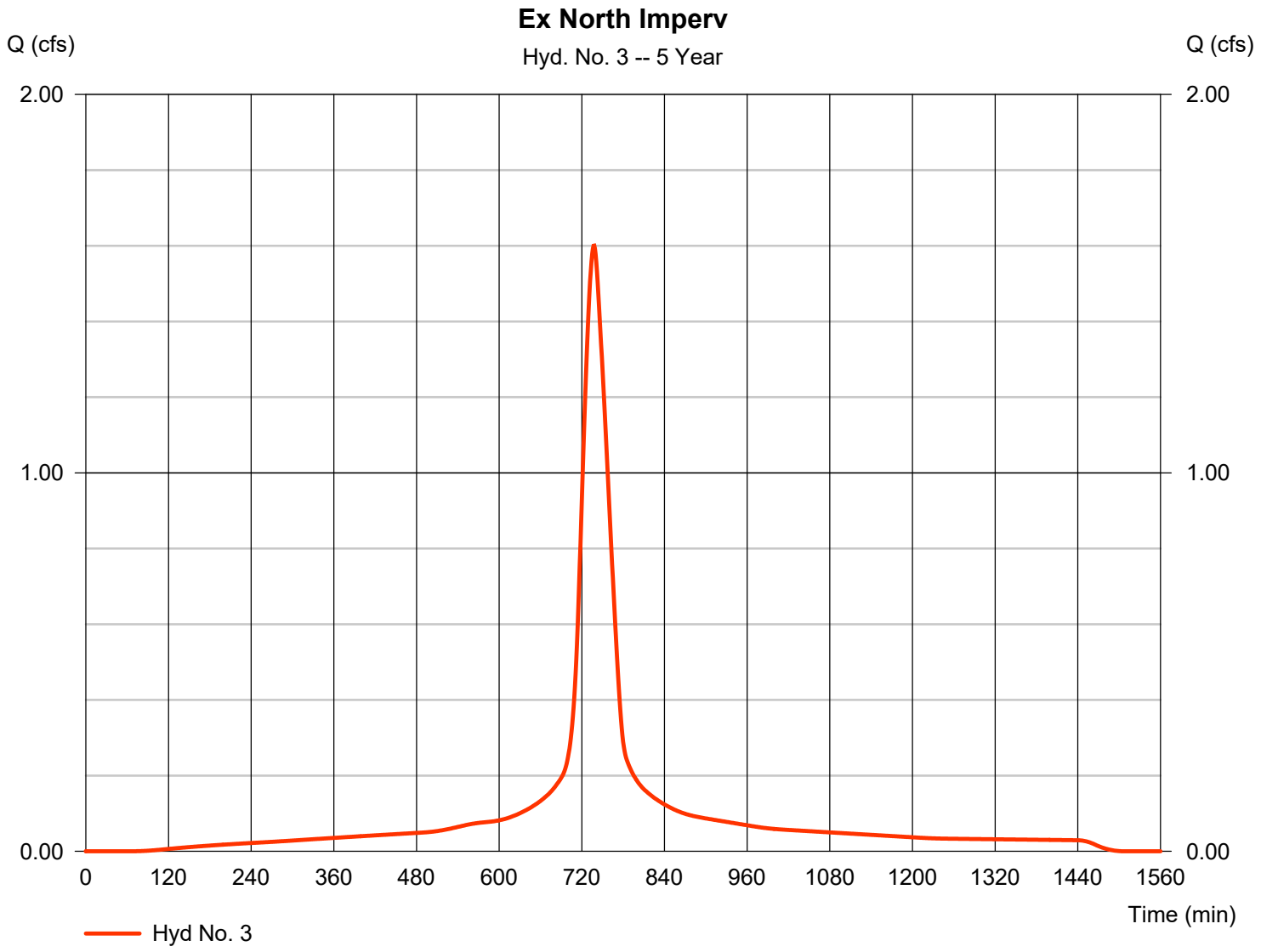


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	= SCS Runoff	Peak discharge	= 1.600 cfs
Storm frequency	= 5 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 8,815 cuft
Drainage area	= 0.622 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

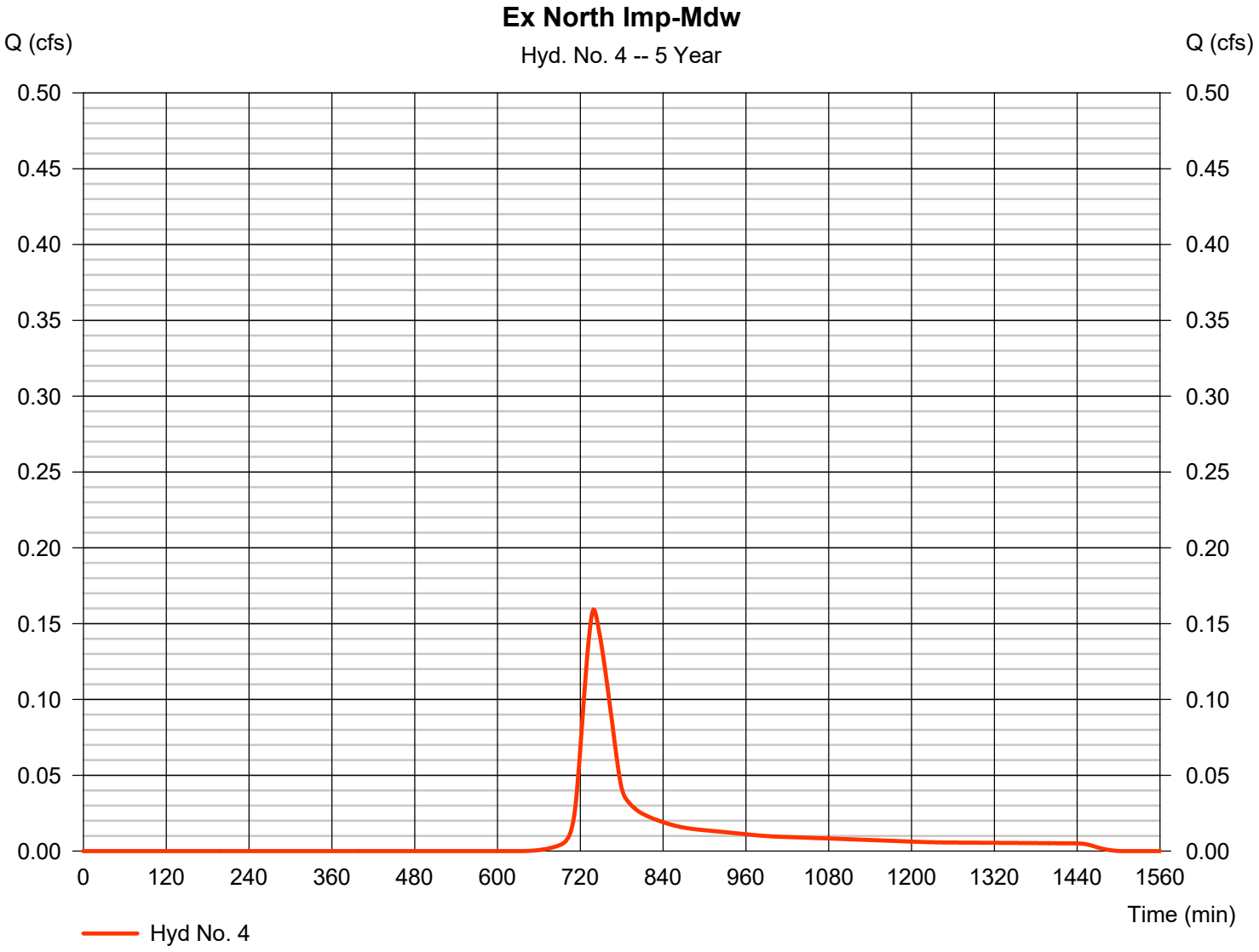


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	= SCS Runoff	Peak discharge	= 0.159 cfs
Storm frequency	= 5 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 840 cuft
Drainage area	= 0.156 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

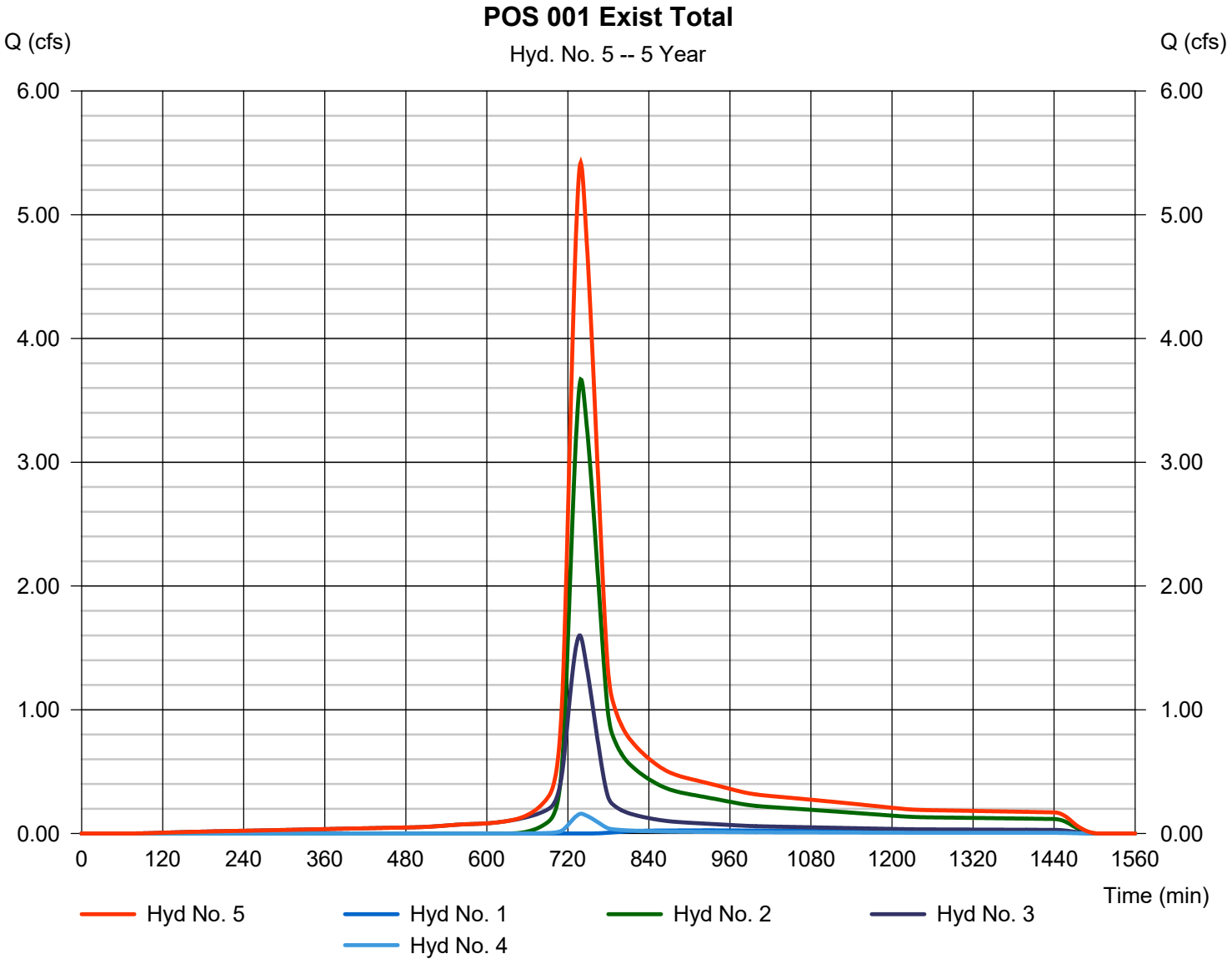


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 5.421 cfs
Storm frequency	= 5 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 29,909 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

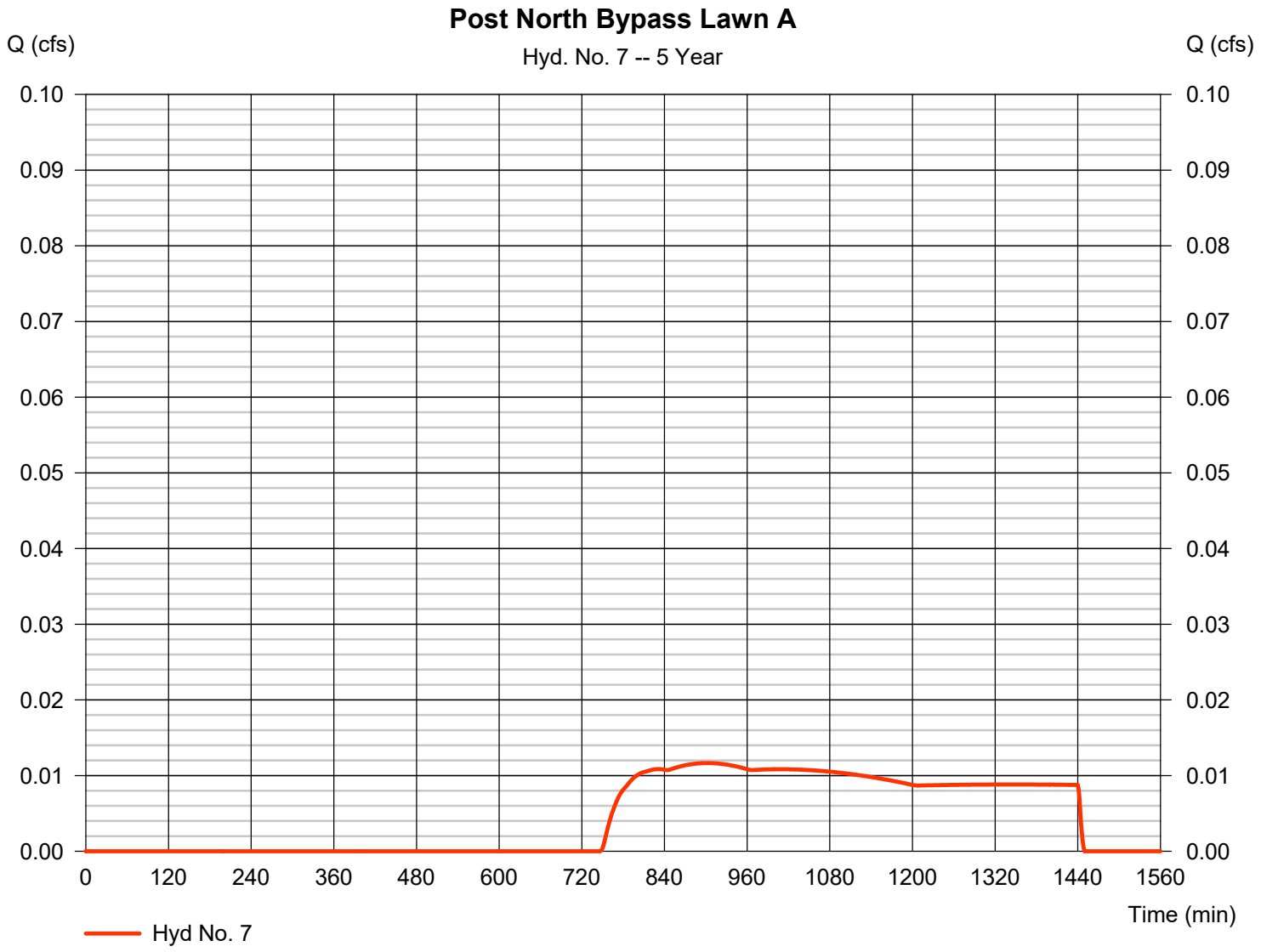


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.012 cfs
Storm frequency	= 5 yrs	Time to peak	= 903 min
Time interval	= 1 min	Hyd. volume	= 403 cuft
Drainage area	= 1.385 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

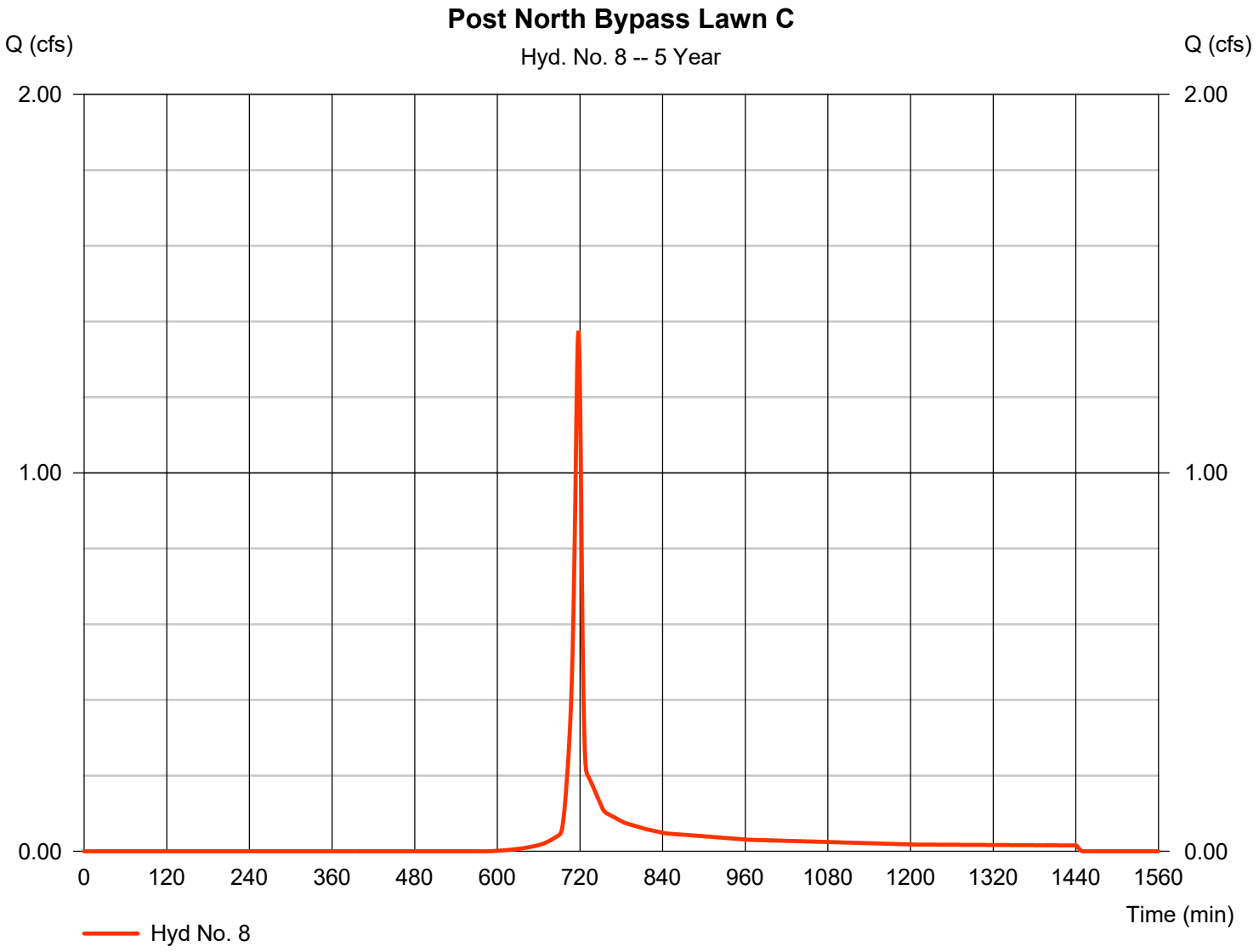


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.376 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	2,763 cuft
Drainage area	=	0.438 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

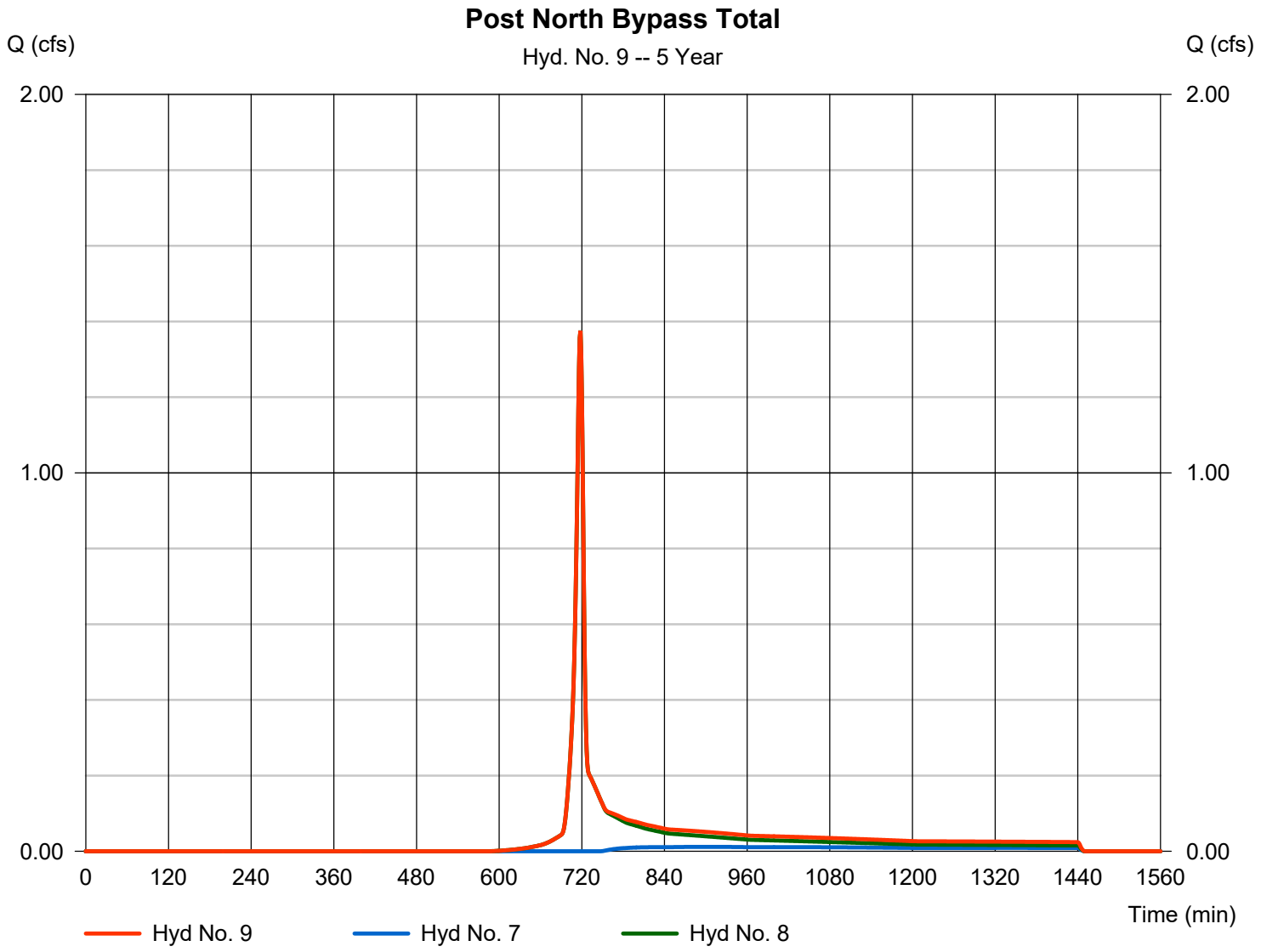


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	= Combine	Peak discharge	= 1.376 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 3,166 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 1.823 ac



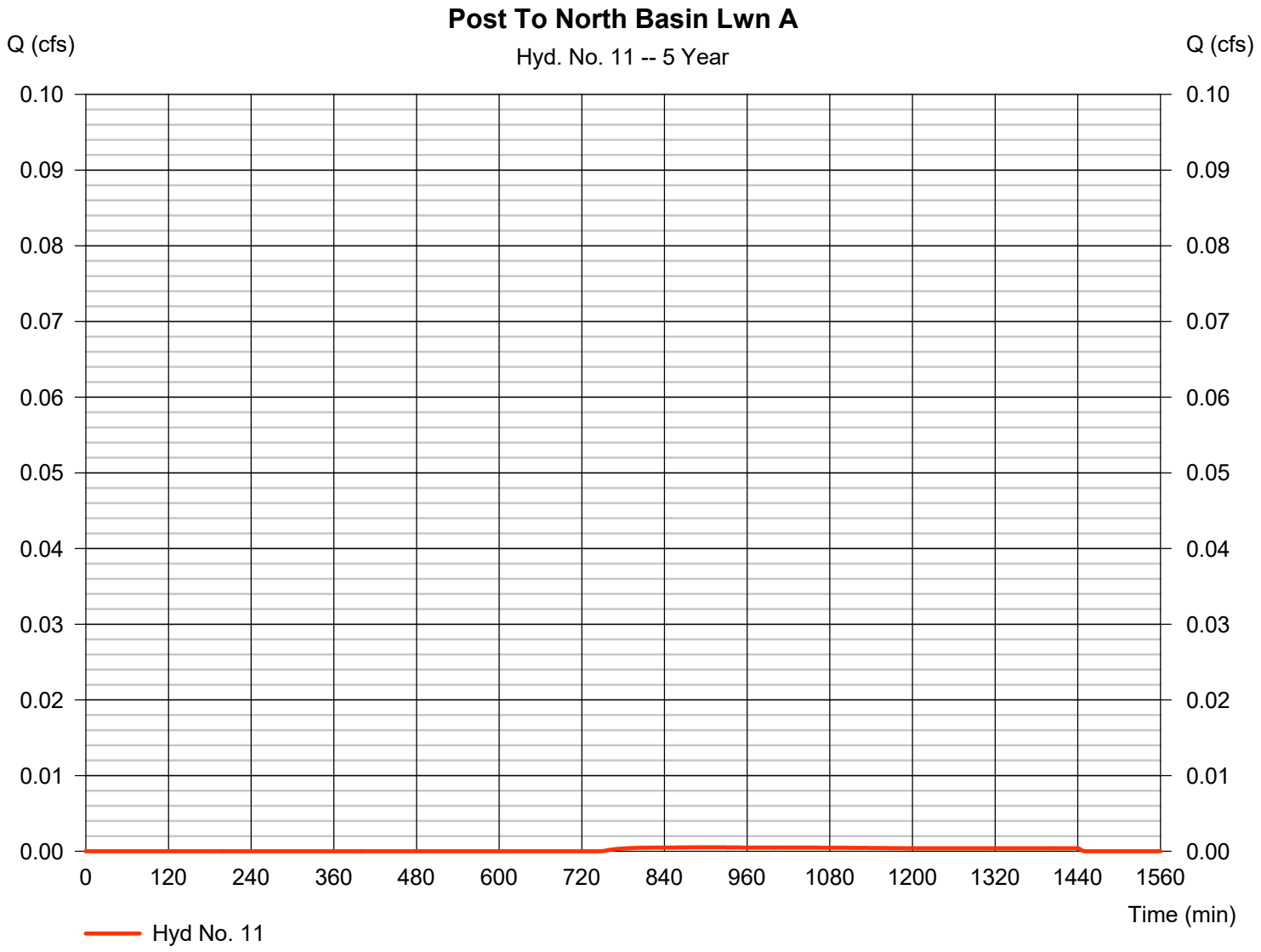
Hydrograph Report

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.001 cfs
Storm frequency	=	5 yrs	Time to peak	=	903 min
Time interval	=	1 min	Hyd. volume	=	18 cuft
Drainage area	=	0.062 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



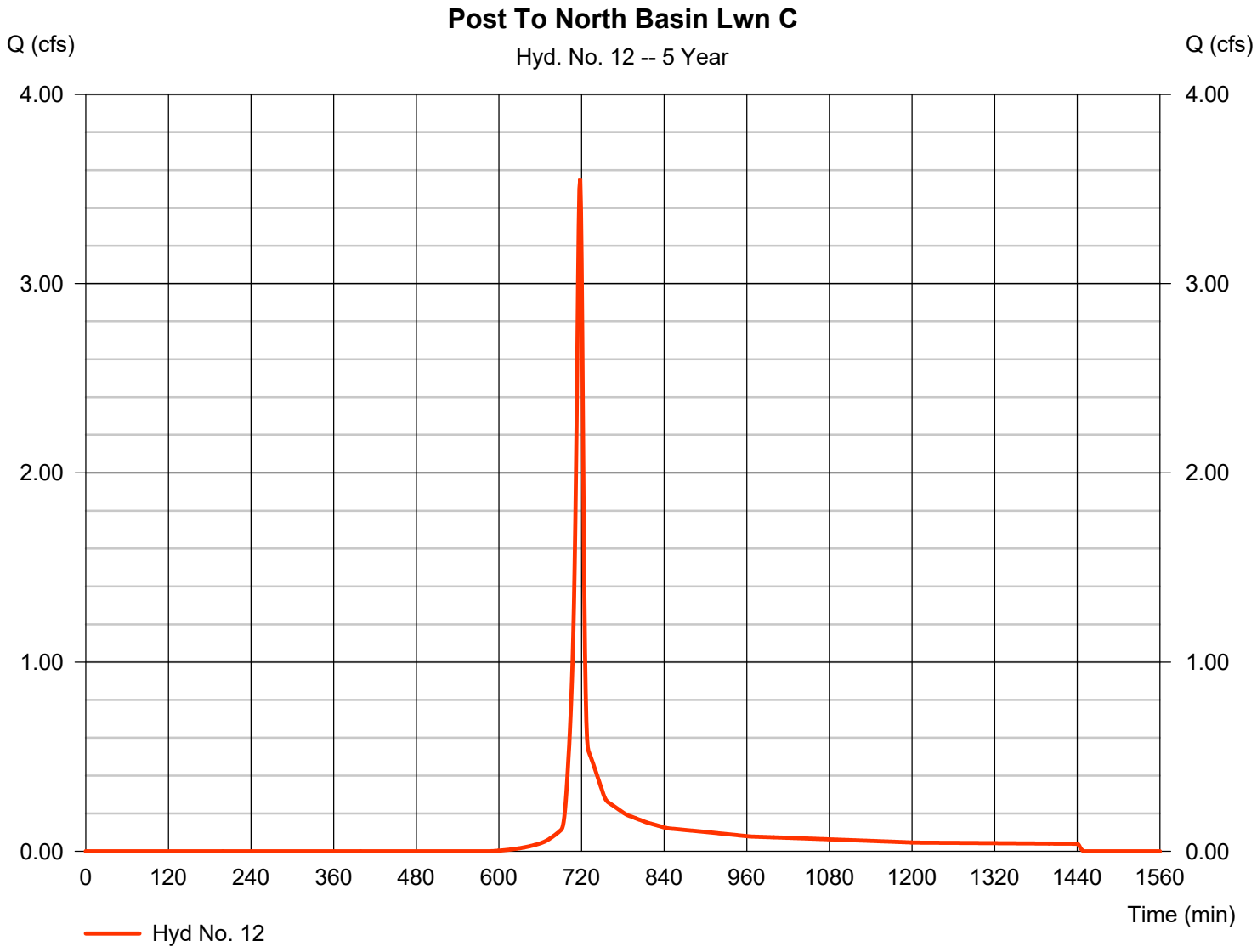
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.553 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	7,134 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



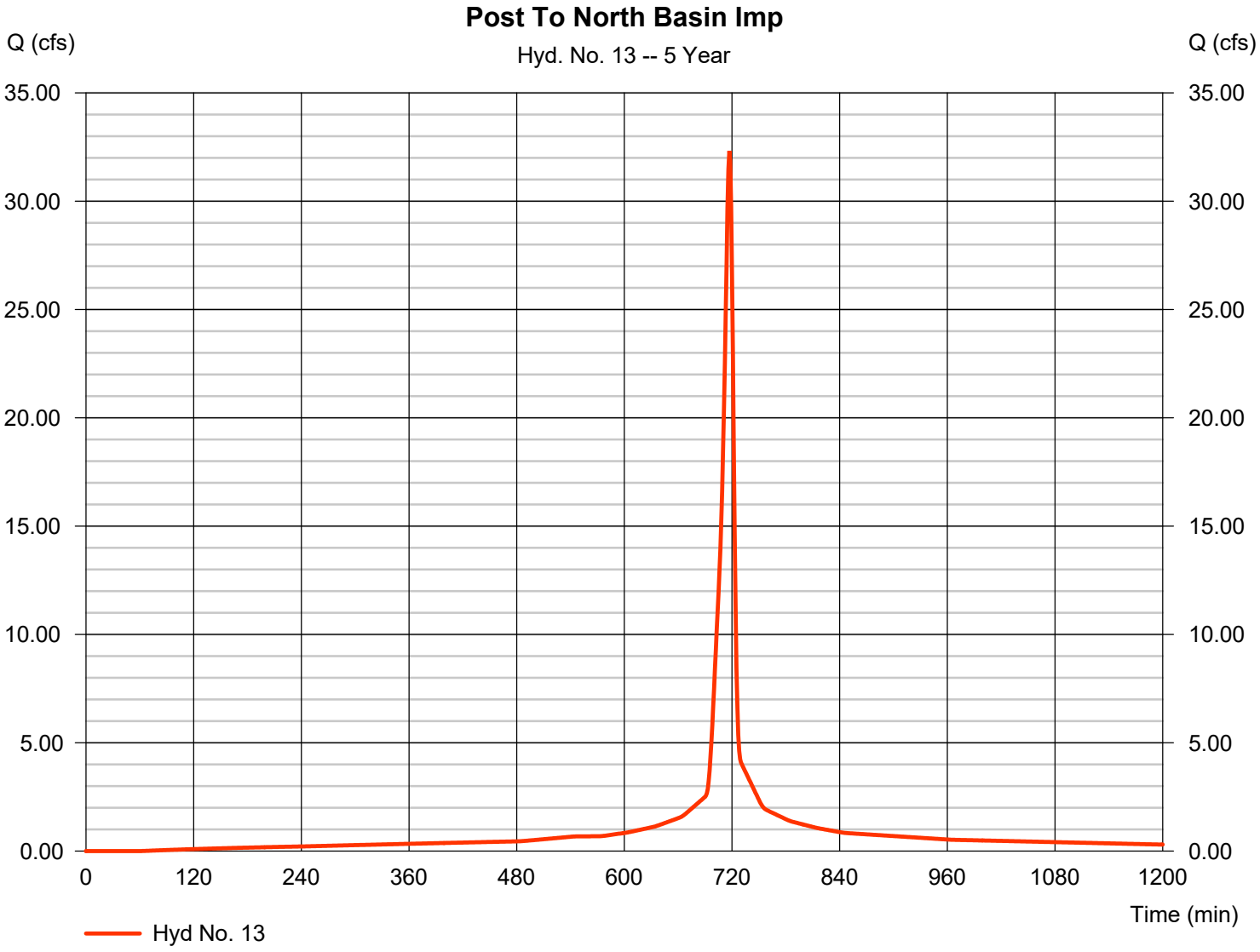
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.32 cfs
Storm frequency	=	5 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	77,352 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

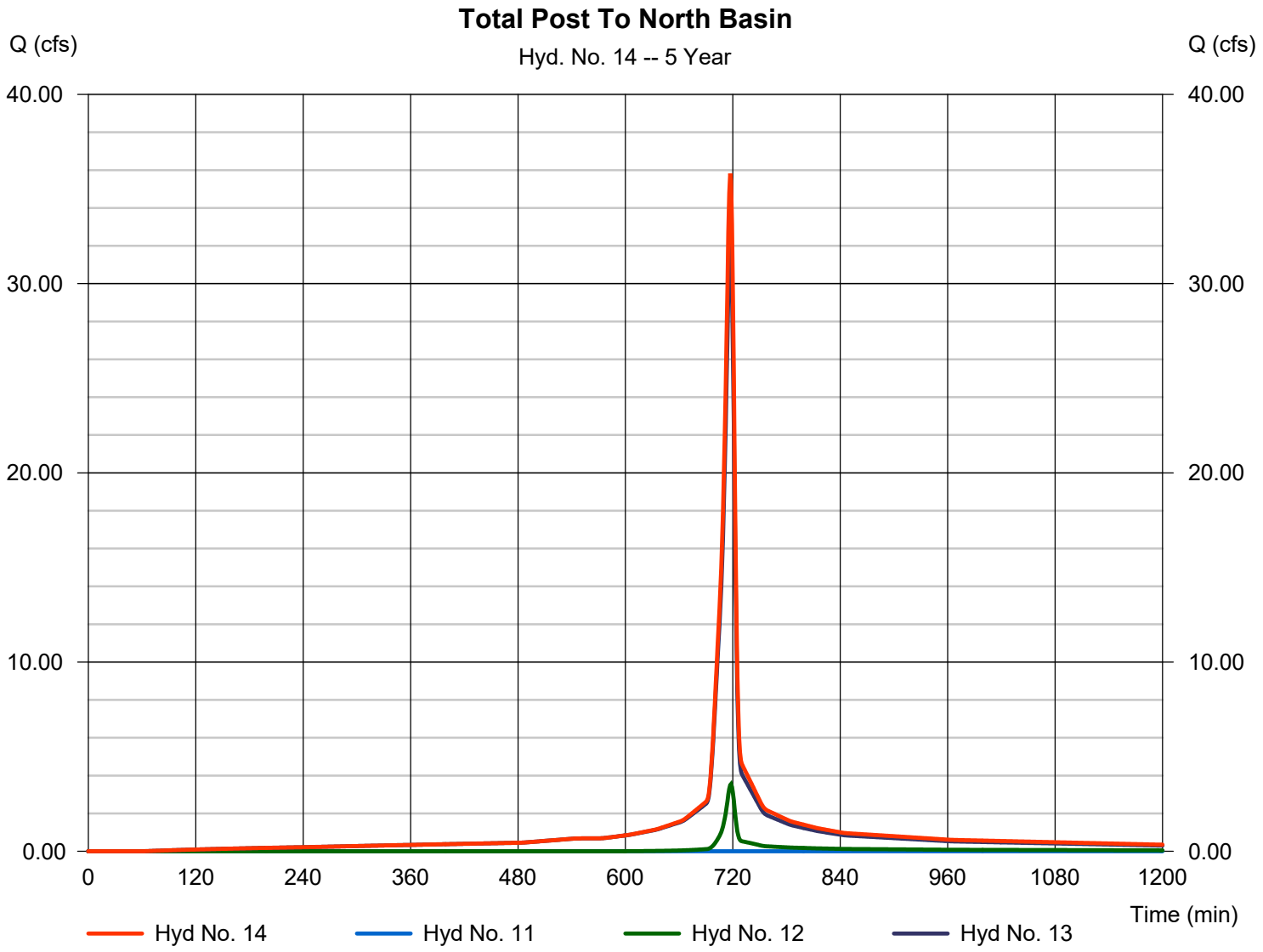


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	=	Combine	Peak discharge	=	35.82 cfs
Storm frequency	=	5 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	84,504 cuft
Inflow hyds.	=	11, 12, 13	Contrib. drain. area	=	6.512 ac



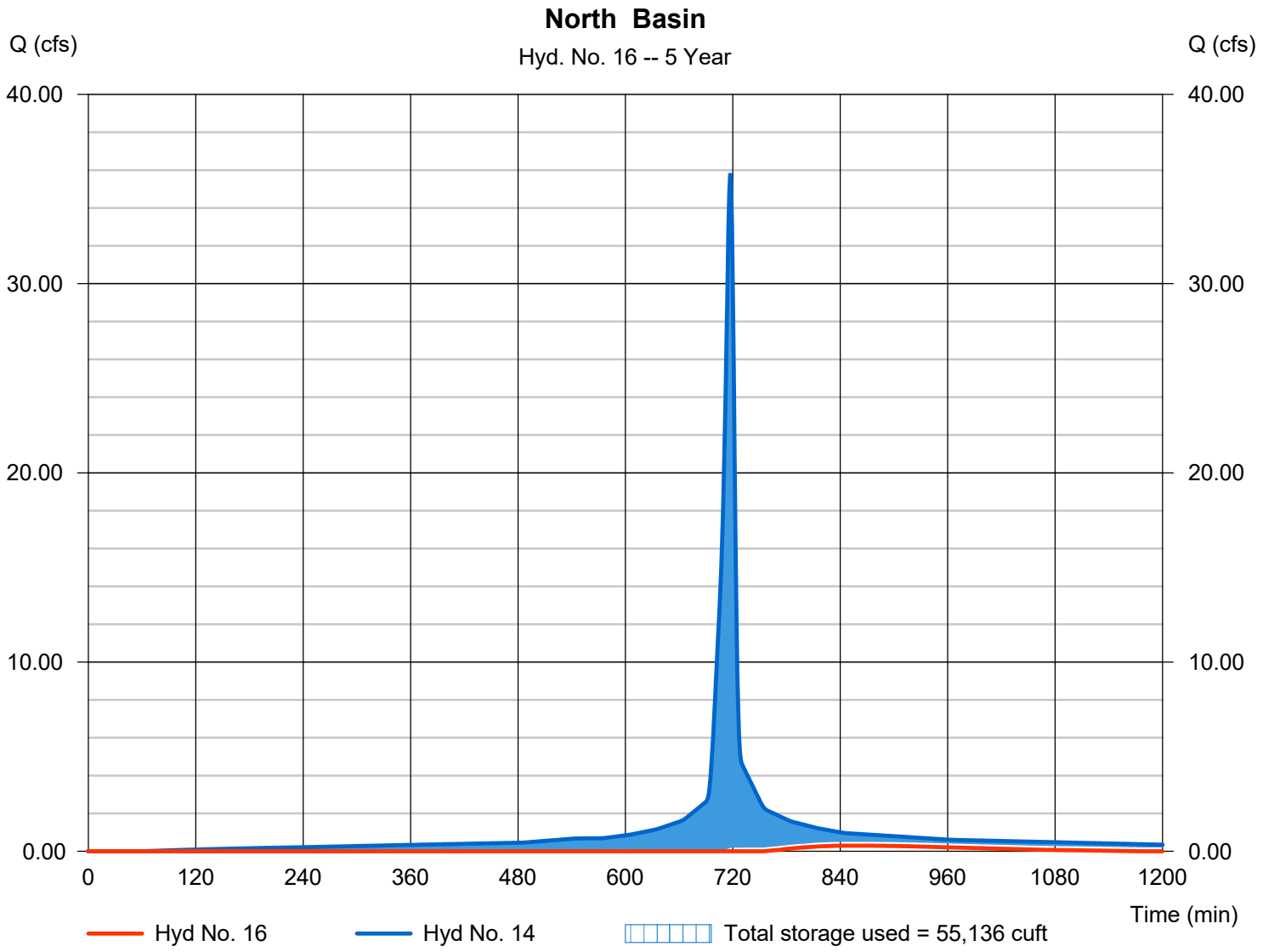
Hydrograph Report

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.295 cfs
Storm frequency	=	5 yrs	Time to peak	=	859 min
Time interval	=	1 min	Hyd. volume	=	4,010 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	473.62 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	55,136 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

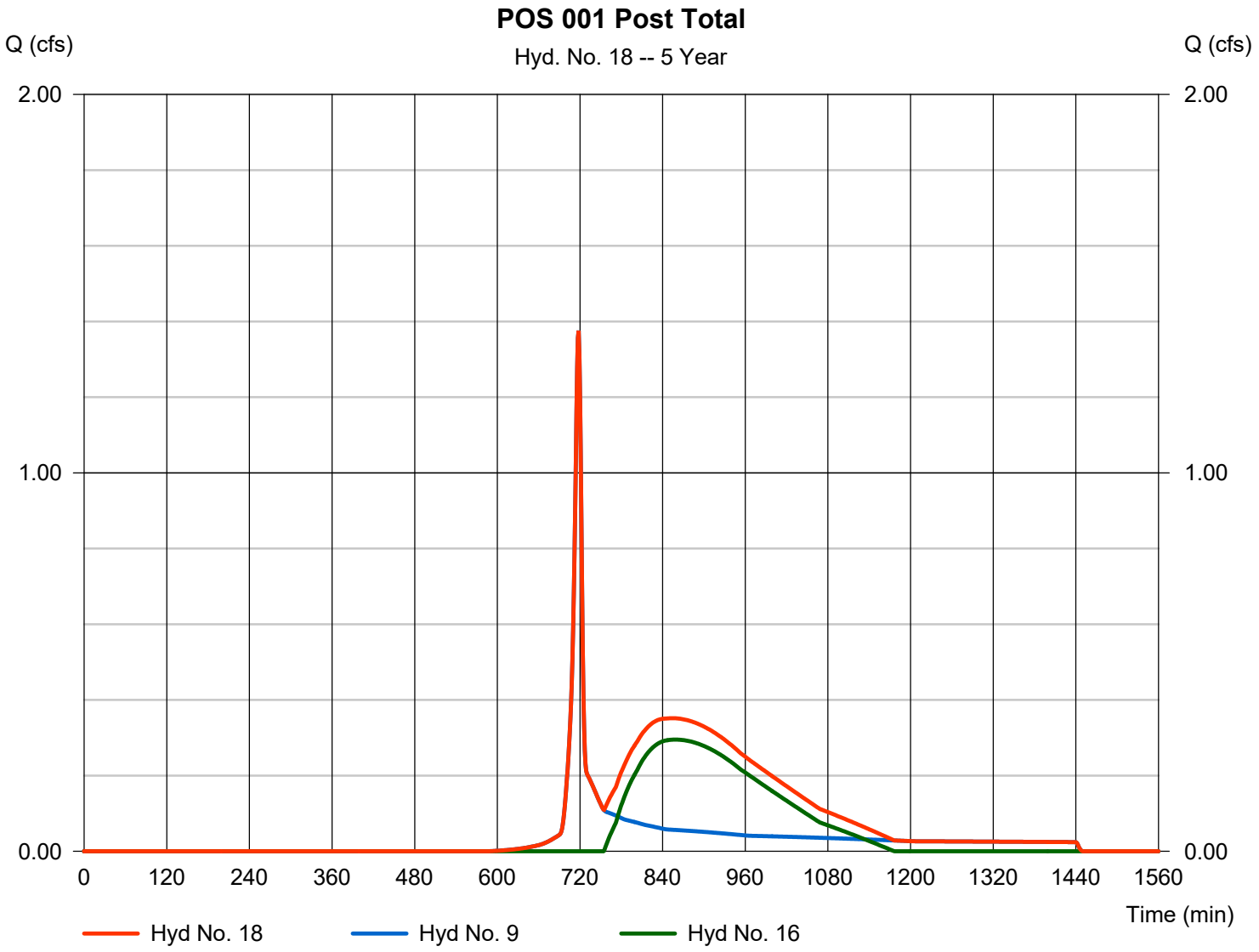


Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	= Combine	Peak discharge	= 1.376 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 7,176 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 0.000 ac



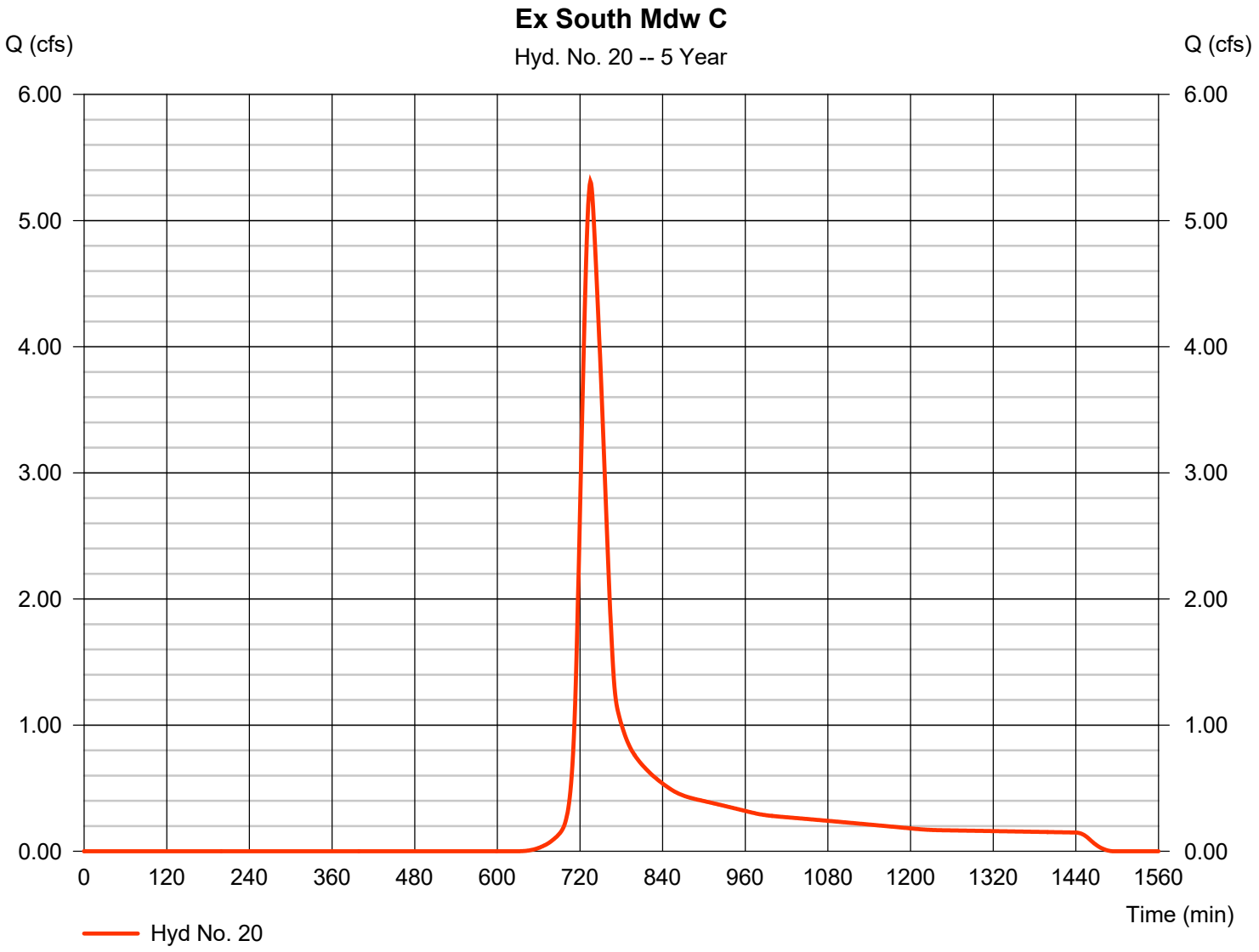
Hydrograph Report

Hyd. No. 20

Ex South Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.310 cfs
Storm frequency	=	5 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	24,682 cuft
Drainage area	=	4.604 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



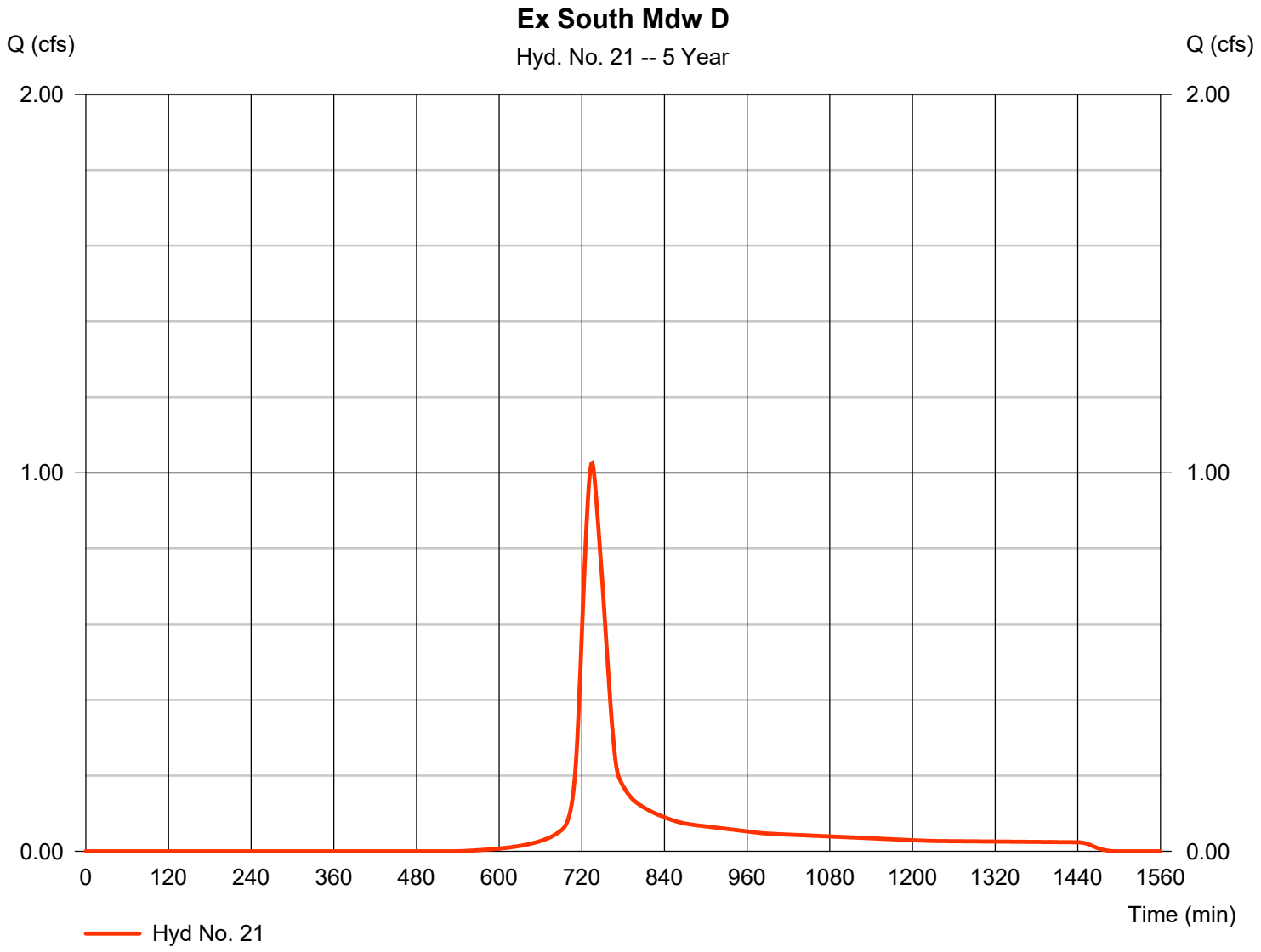
Hydrograph Report

Hyd. No. 21

Ex South Mdw D

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.026 cfs
Storm frequency	=	5 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	4,578 cuft
Drainage area	=	0.636 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



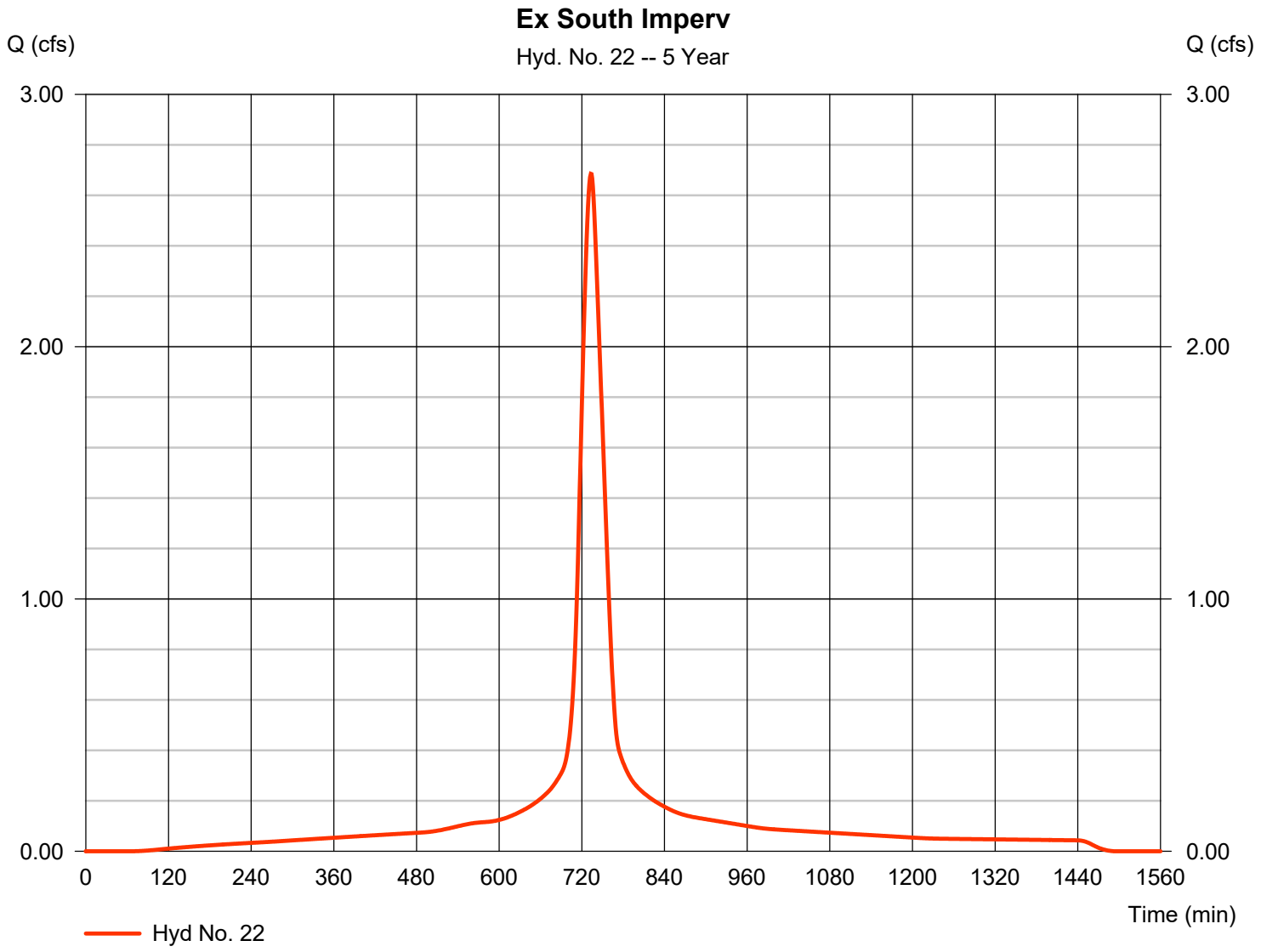
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.685 cfs
Storm frequency	=	5 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	13,143 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



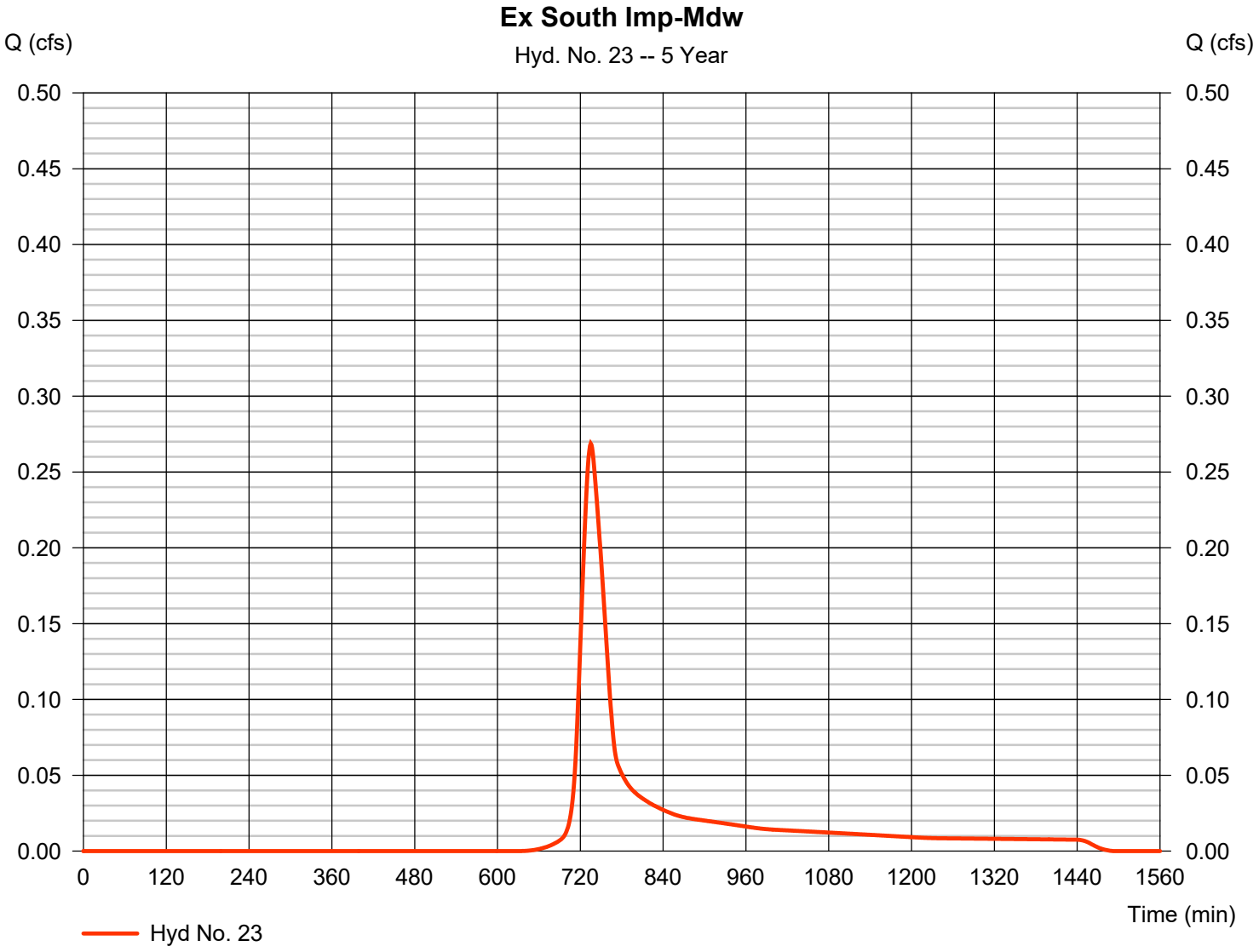
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.269 cfs
Storm frequency	=	5 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	1,249 cuft
Drainage area	=	0.233 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

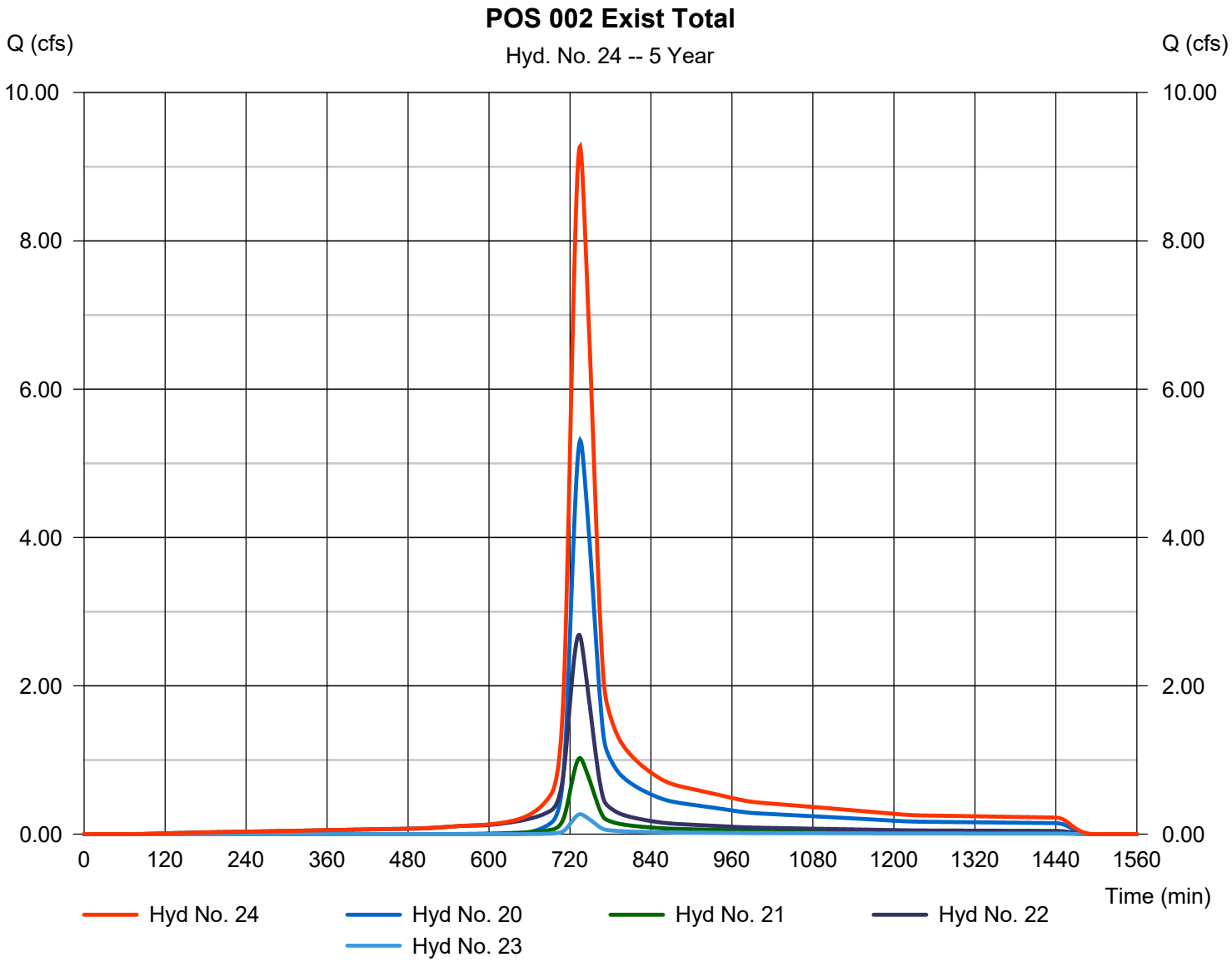


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	=	Combine	Peak discharge	=	9.272 cfs
Storm frequency	=	5 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	43,652 cuft
Inflow hyds.	=	20, 21, 22, 23	Contrib. drain. area	=	6.405 ac

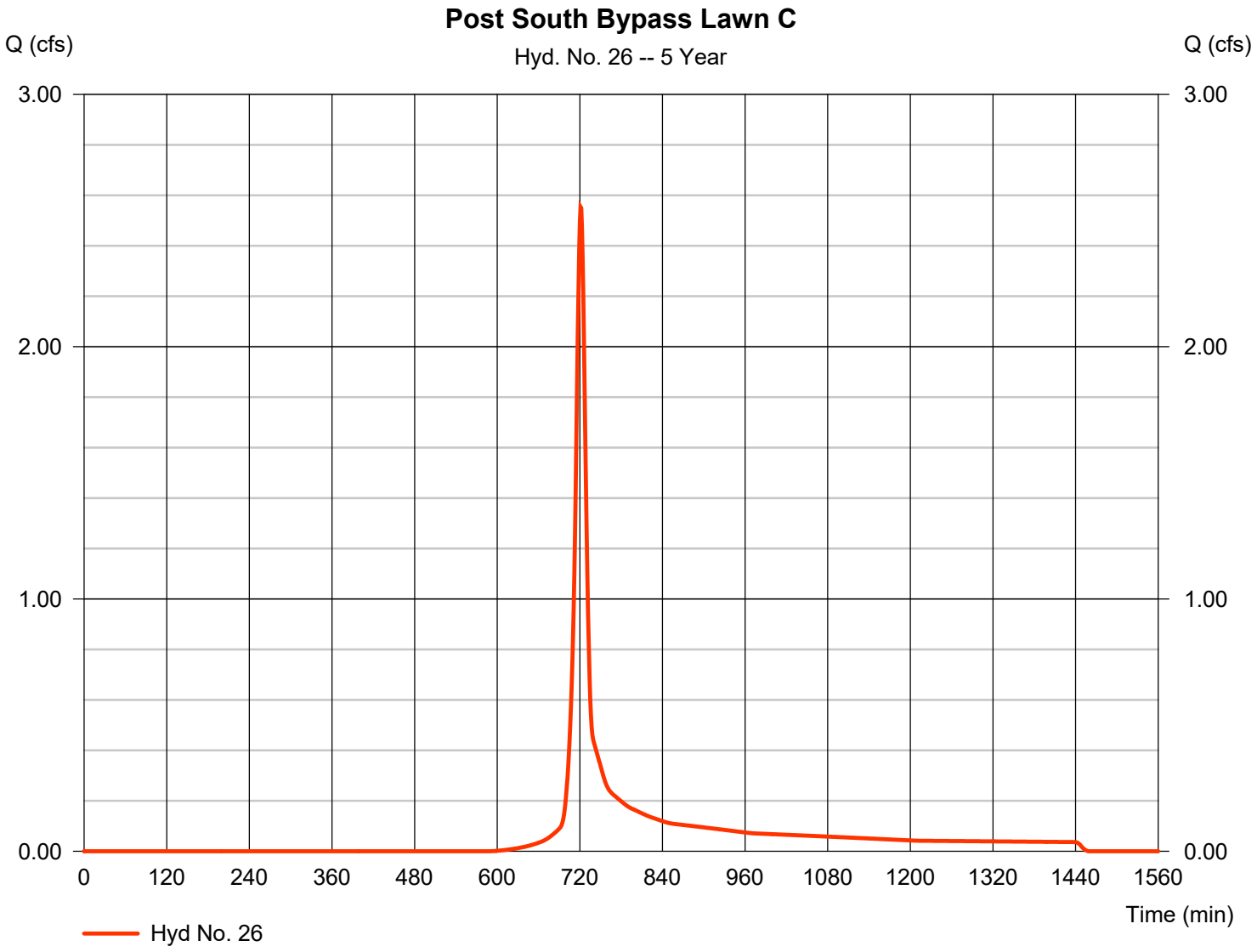


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.554 cfs
Storm frequency	=	5 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	6,502 cuft
Drainage area	=	1.080 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.90 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

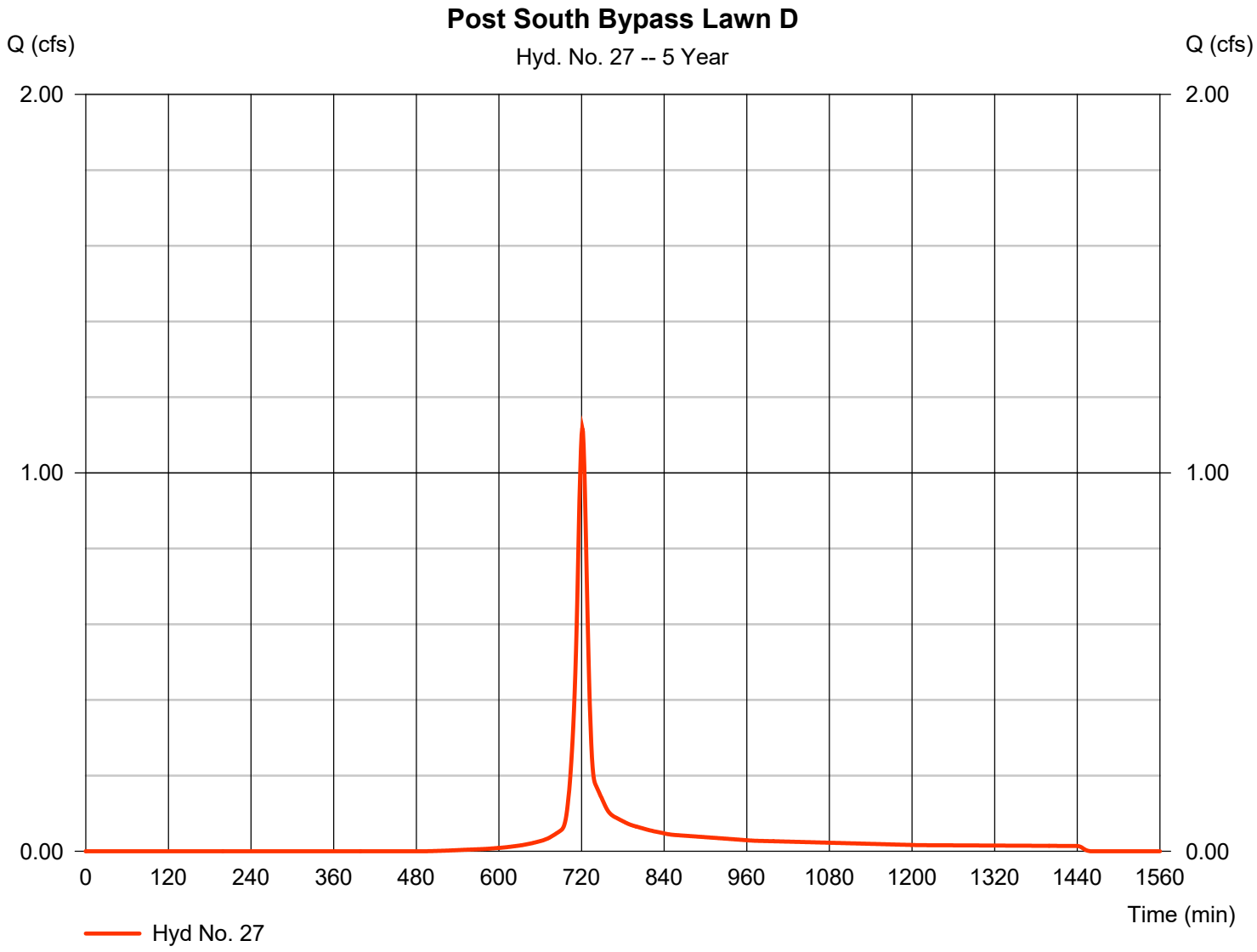


Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	= SCS Runoff	Peak discharge	= 1.118 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 2,823 cuft
Drainage area	= 0.369 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

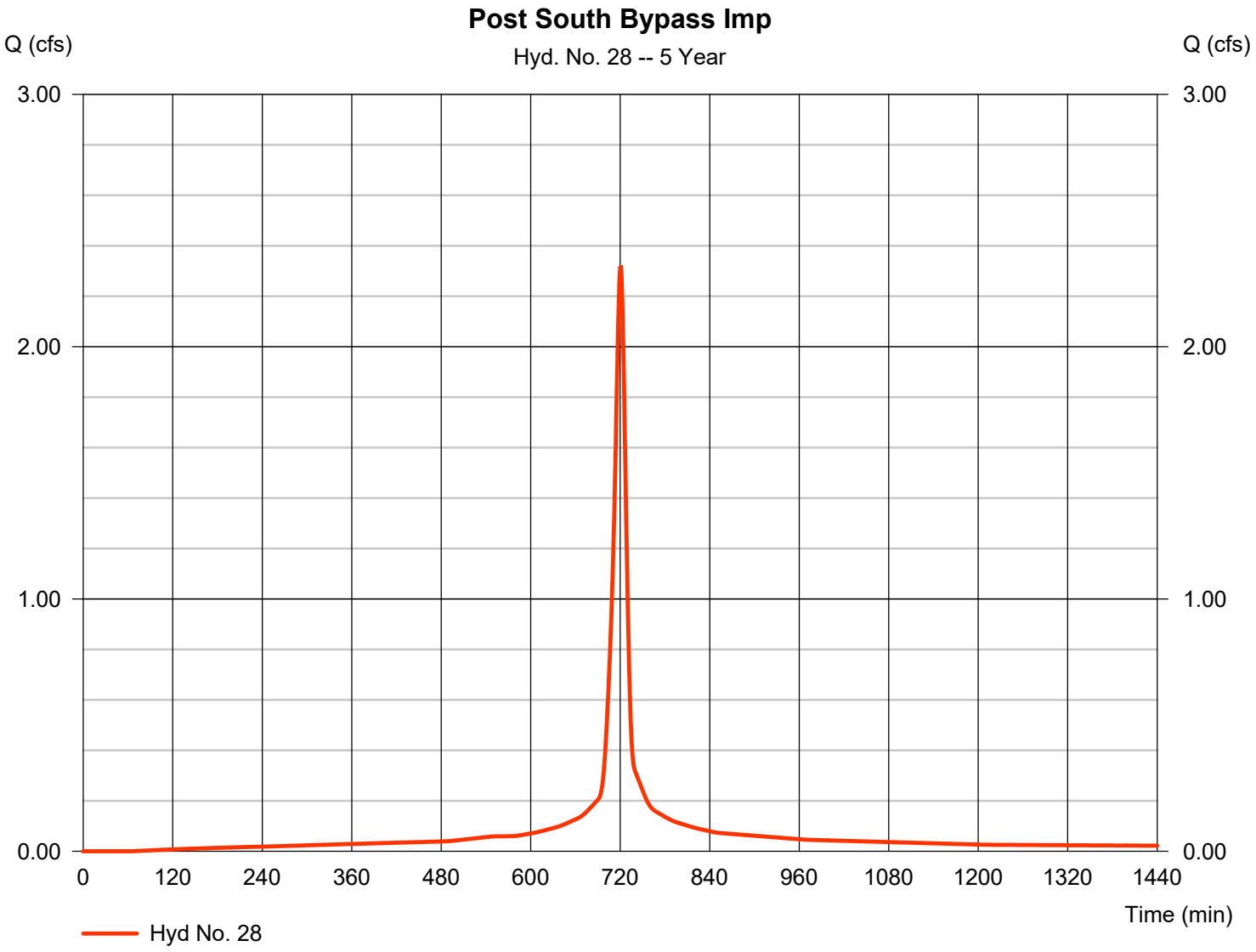


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 2.314 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 6,746 cuft
Drainage area	= 0.486 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

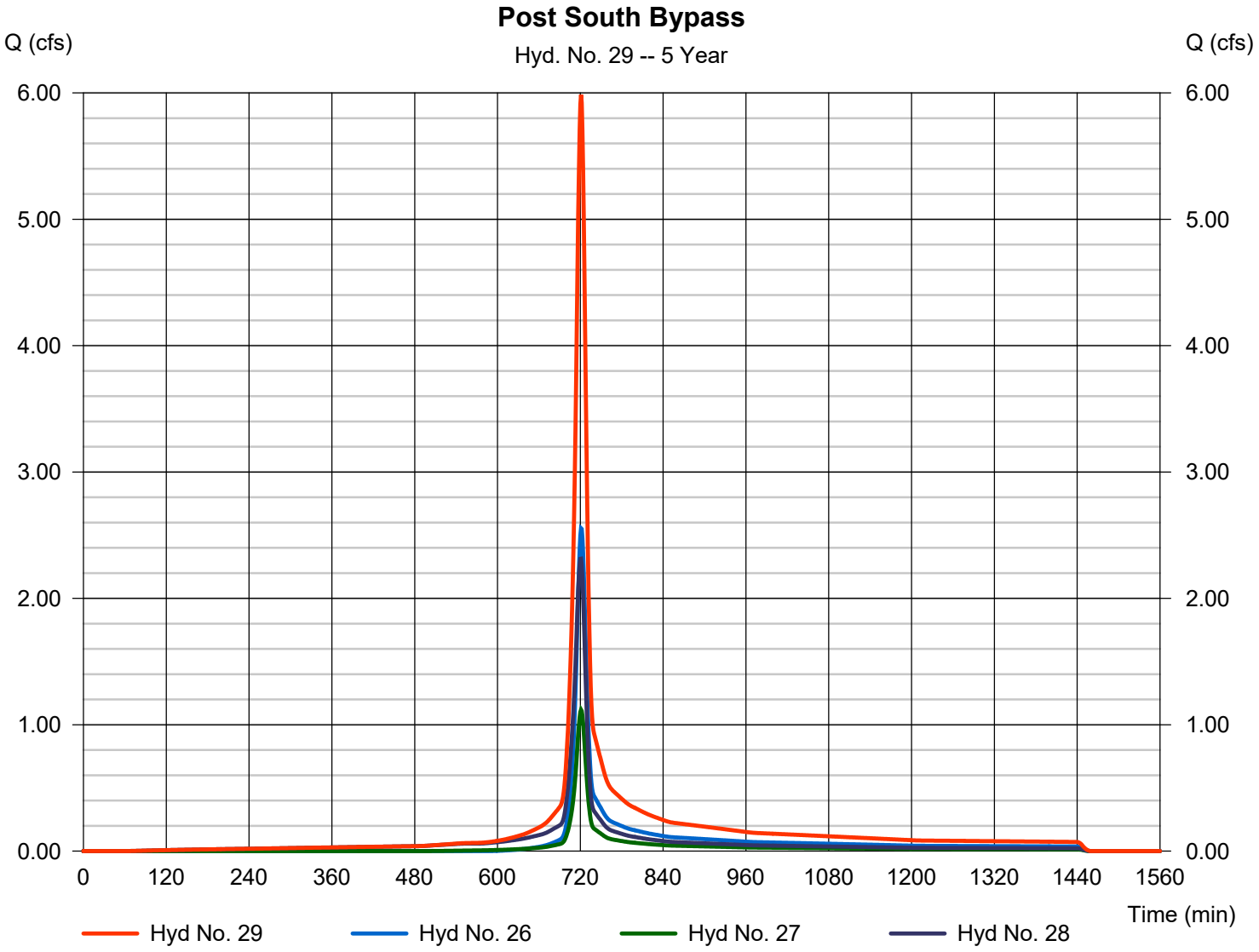


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	= Combine	Peak discharge	= 5.985 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 16,072 cuft
Inflow hyds.	= 26, 27, 28	Contrib. drain. area	= 1.935 ac



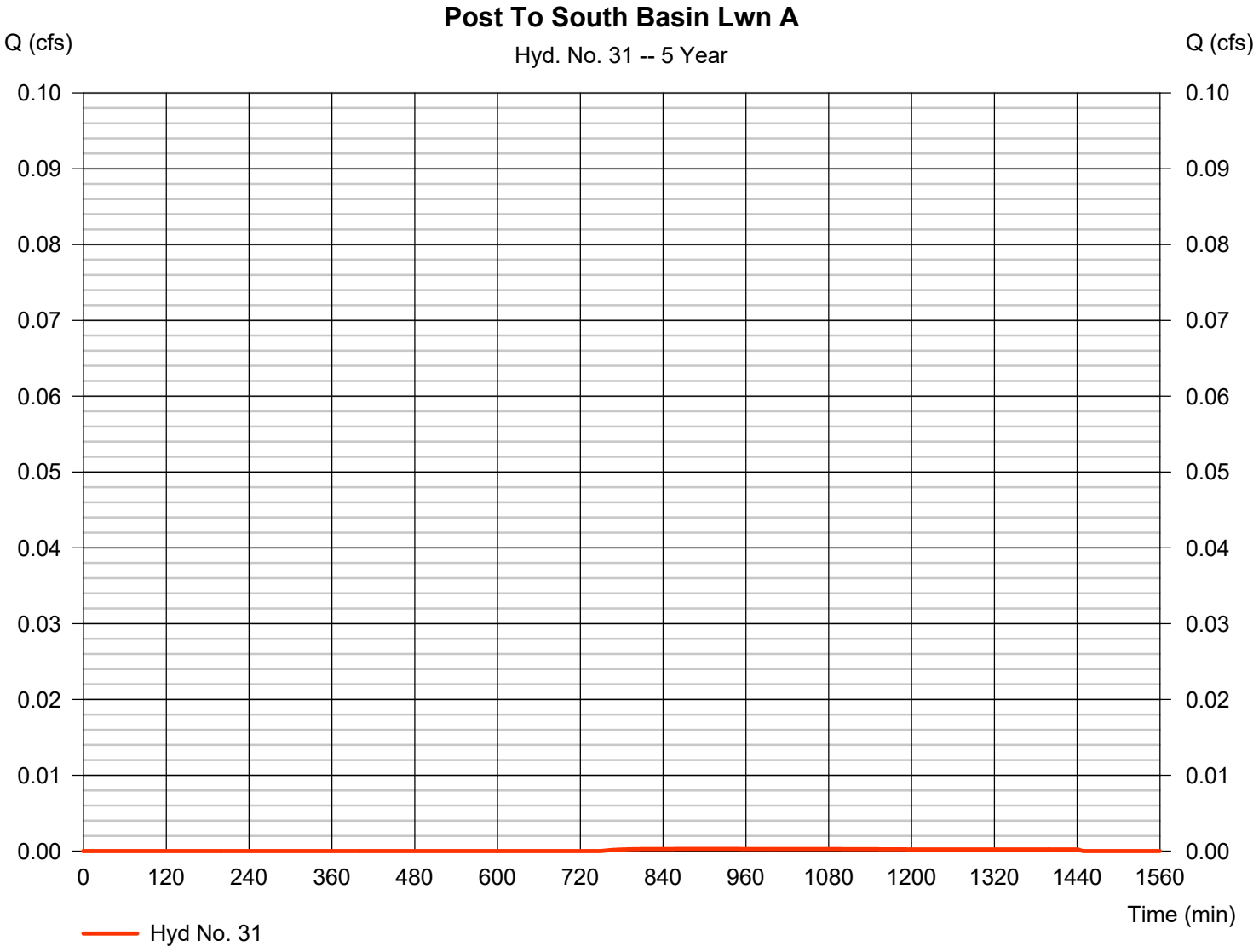
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 5 yrs	Time to peak	= 903 min
Time interval	= 1 min	Hyd. volume	= 10 cuft
Drainage area	= 0.035 ac	Curve number	= 40*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.60 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



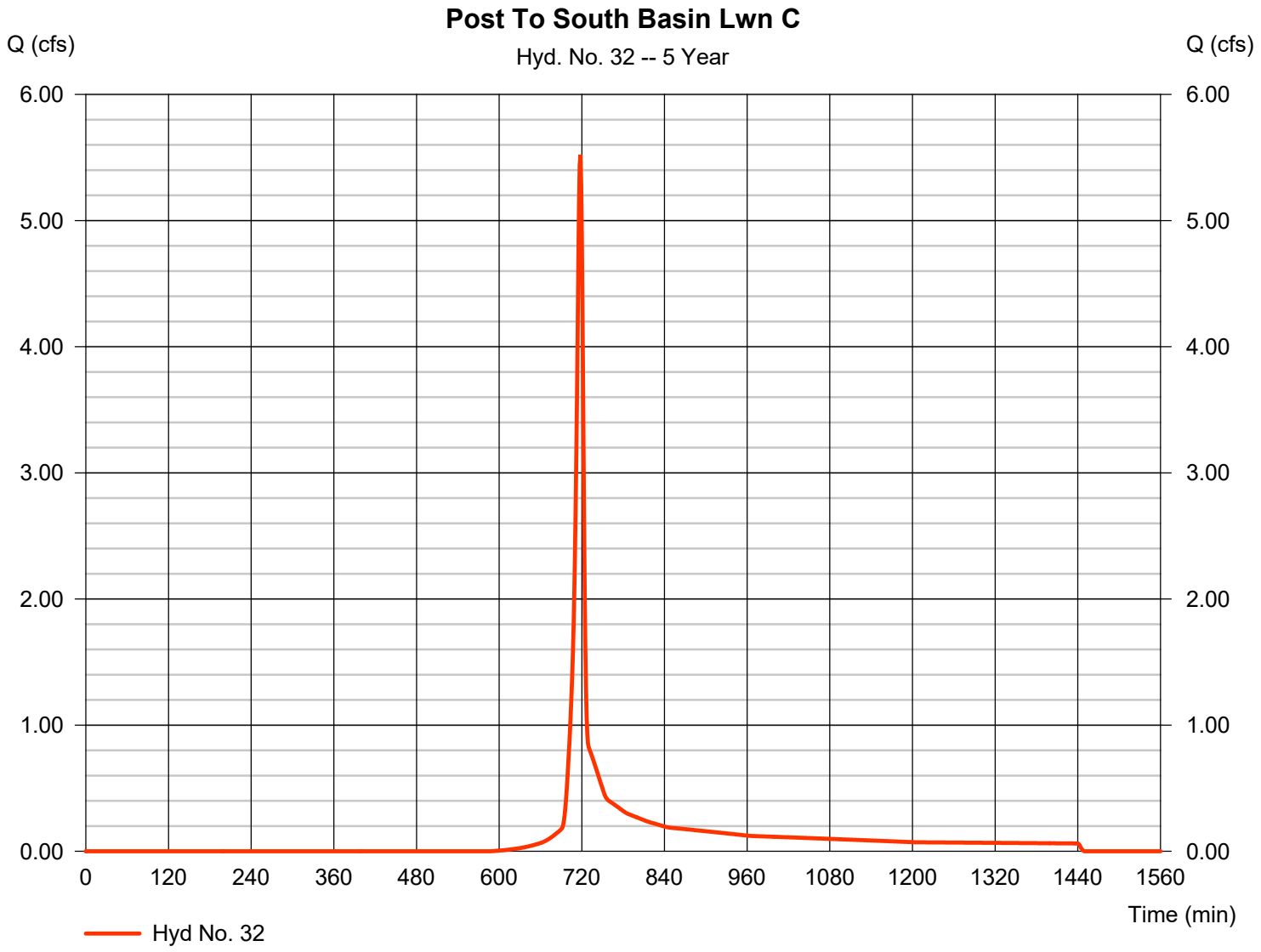
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.522 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	11,088 cuft
Drainage area	=	1.758 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



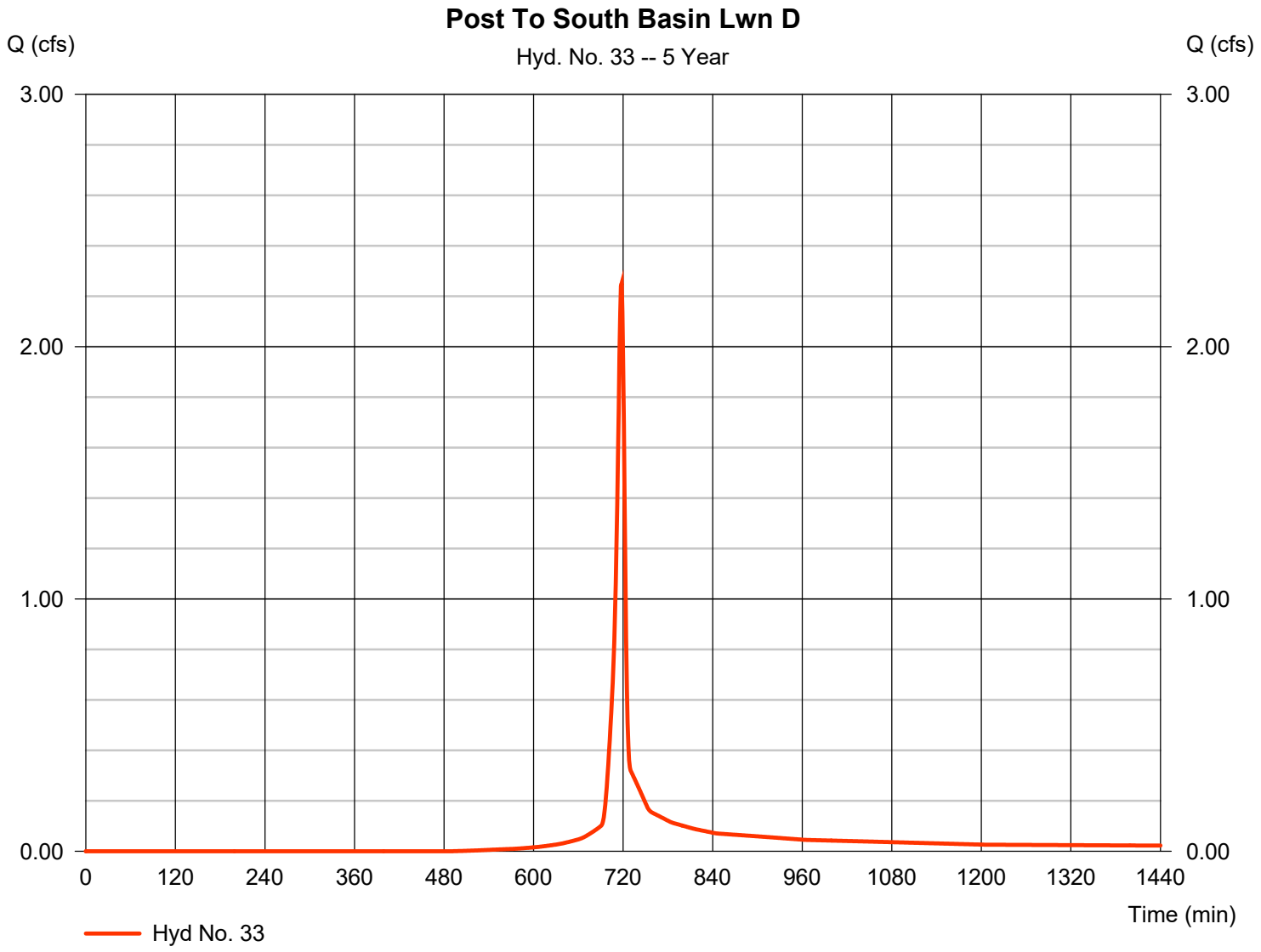
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.252 cfs
Storm frequency	=	5 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	4,561 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	4.12 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



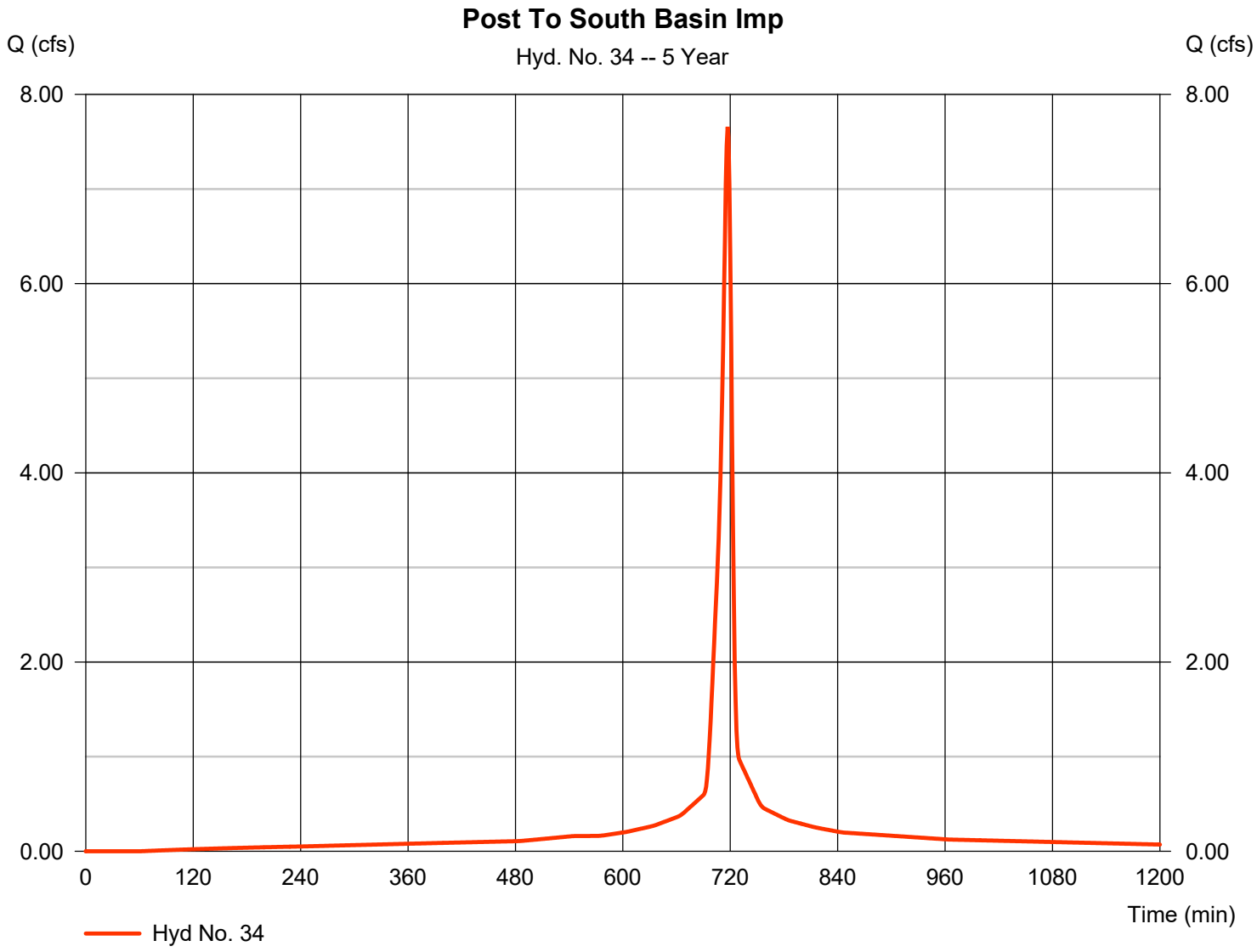
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 7.656 cfs
Storm frequency	= 5 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 18,324 cuft
Drainage area	= 1.260 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 4.12 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

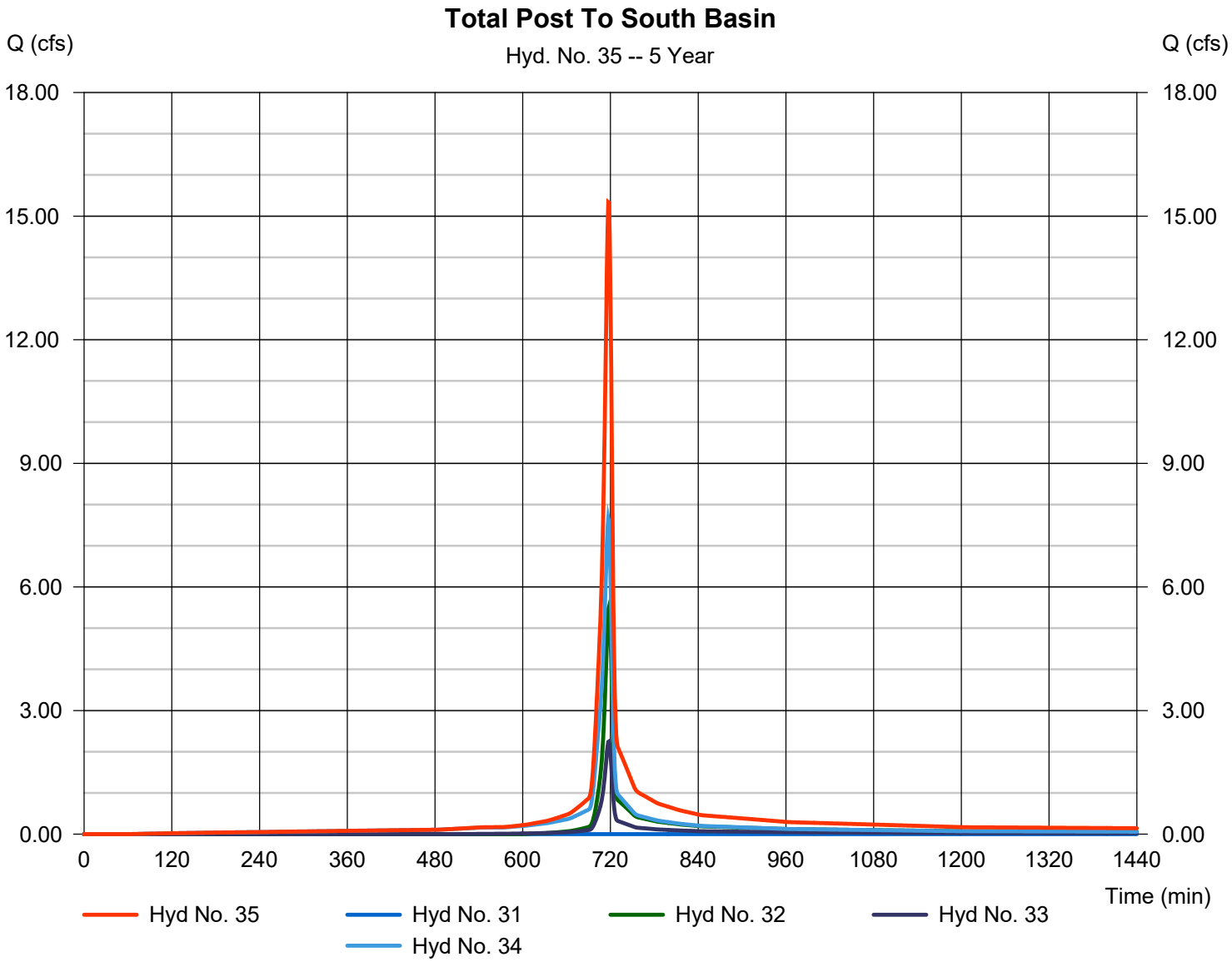


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	15.34 cfs
Storm frequency	=	5 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	33,983 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



Hydrograph Report

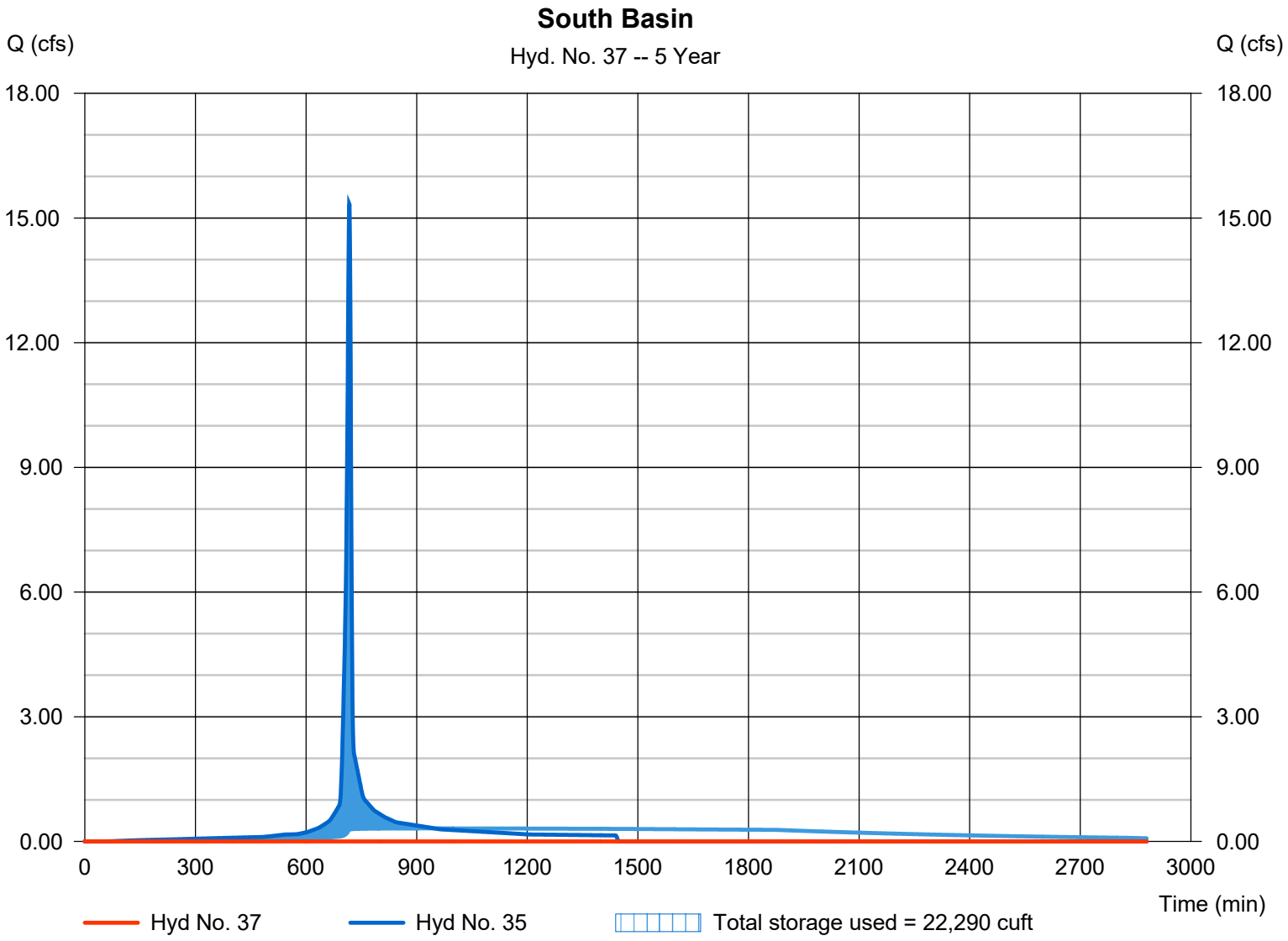
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	5 yrs	Time to peak	=	676 min
Time interval	=	1 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	473.83 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	22,290 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

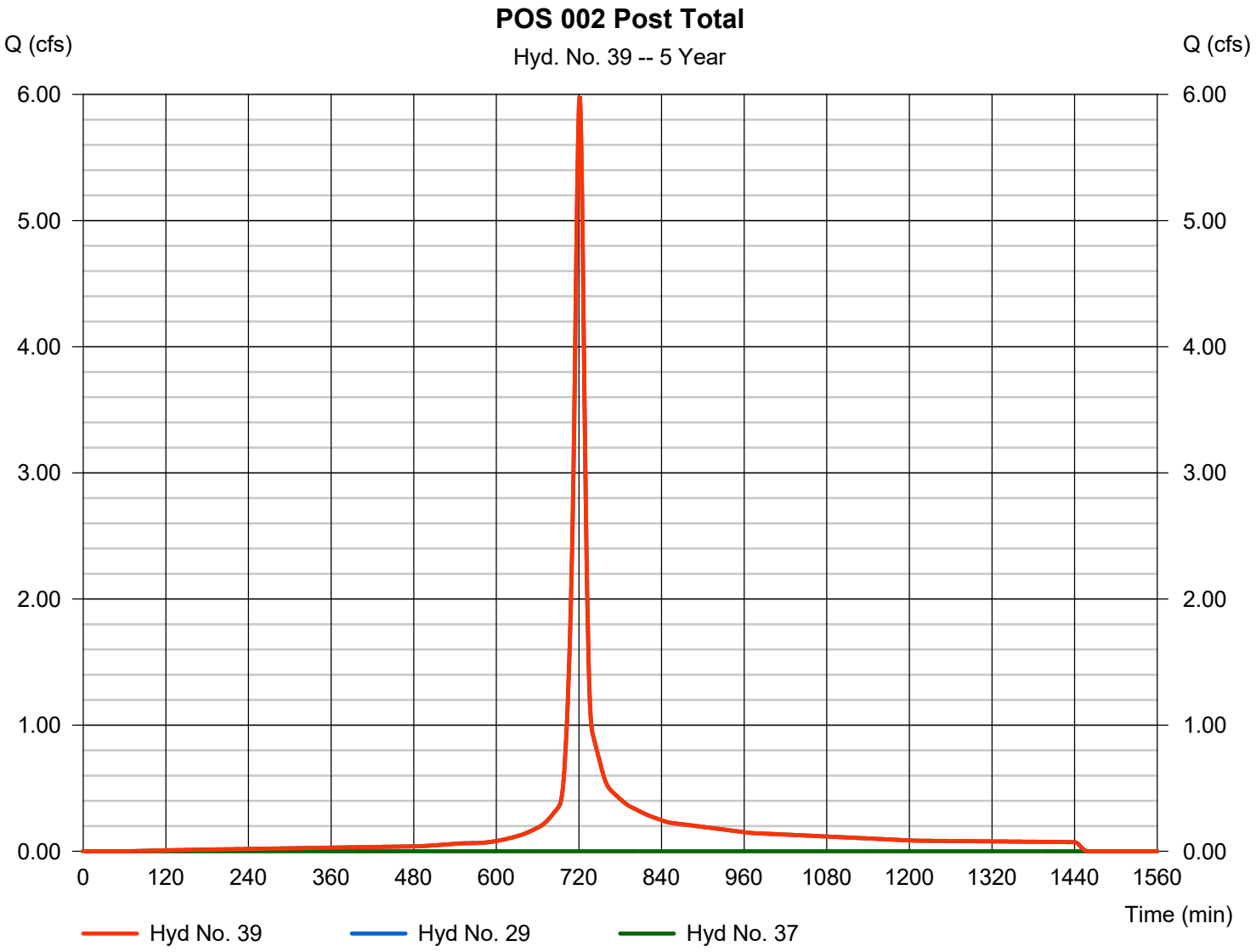


Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	= Combine	Peak discharge	= 5.985 cfs
Storm frequency	= 5 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 16,072 cuft
Inflow hyds.	= 29, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.098	1	777	2,237	------	------	------	Ex North Mdw A
2	SCS Runoff	5.046	1	739	25,986	------	------	------	Ex North Mdw C
3	SCS Runoff	1.877	1	738	10,401	------	------	------	Ex North Imperv
4	SCS Runoff	0.219	1	739	1,128	------	------	------	Ex North Imp-Mdw
5	Combine	7.168	1	739	39,751	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	0.051	1	740	1,021	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	1.811	1	718	3,642	------	------	------	Post North Bypass Lawn C
9	Combine	1.815	1	718	4,663	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.002	1	740	46	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	4.675	1	718	9,406	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	37.88	1	717	91,263	------	------	------	Post To North Basin Imp
14	Combine	42.51	1	717	100,714	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	1.278	1	783	16,616	14	473.83	61,165	North Basin
18	Combine	1.815	1	718	21,279	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	7.291	1	735	33,114	------	------	------	Ex South Mdw C
21	SCS Runoff	1.333	1	734	5,909	------	------	------	Ex South Mdw D
22	SCS Runoff	3.149	1	733	15,507	------	------	------	Ex South Imperv
23	SCS Runoff	0.369	1	735	1,676	------	------	------	Ex South Imp-Mdw
24	Combine	12.12	1	735	56,206	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	3.389	1	721	8,573	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	1.425	1	721	3,608	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	2.713	1	721	7,960	------	------	------	Post South Bypass Imp
29	Combine	7.527	1	721	20,141	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.001	1	740	26	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	7.267	1	718	14,620	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	2.853	1	718	5,829	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	8.974	1	717	21,619	------	------	------	Post To South Basin Imp
35	Combine	19.02	1	717	42,093	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	0.089	1	926	679	35	474.01	28,227	South Basin

Hydrograph Summary Report

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

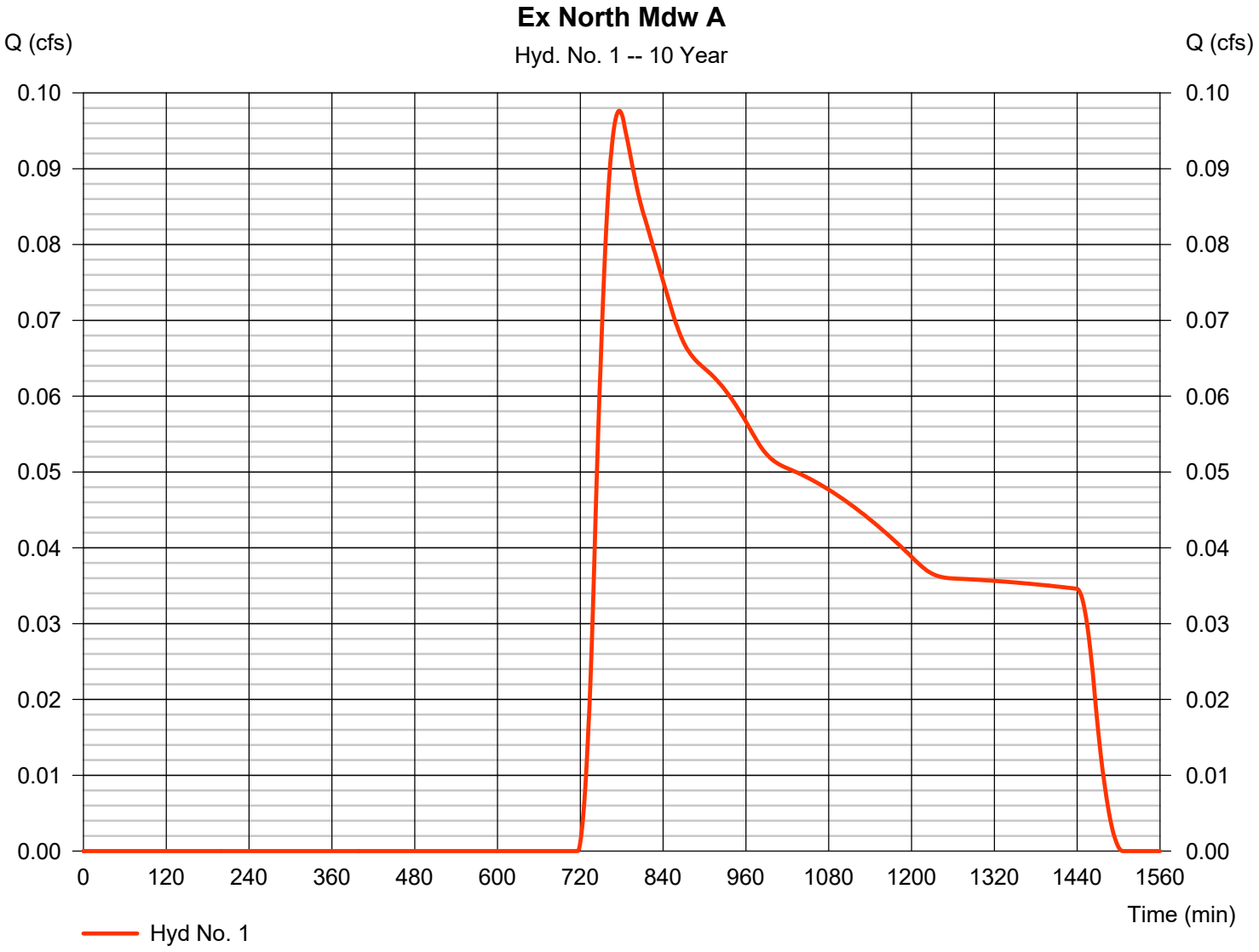
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	7.527	1	721	20,820	29, 37,	------	------	POS 002 Post Total
42	Combine	44.31	1	717	105,377	9, 14,	------	------	Post North Undetained
43	Combine	25.80	1	718	62,234	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.098 cfs
Storm frequency	= 10 yrs	Time to peak	= 777 min
Time interval	= 1 min	Hyd. volume	= 2,237 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

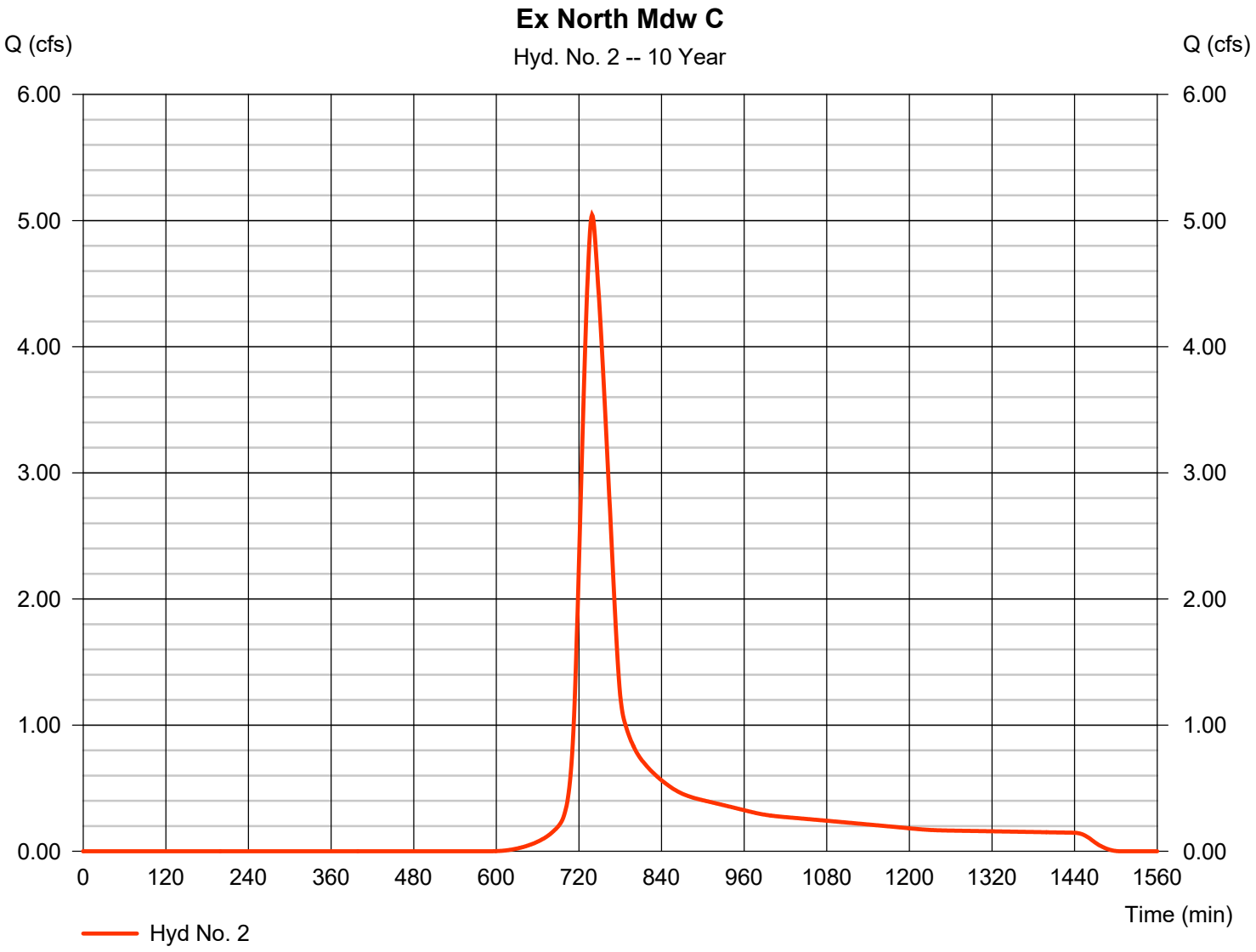


Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.046 cfs
Storm frequency	=	10 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	25,986 cuft
Drainage area	=	3.595 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

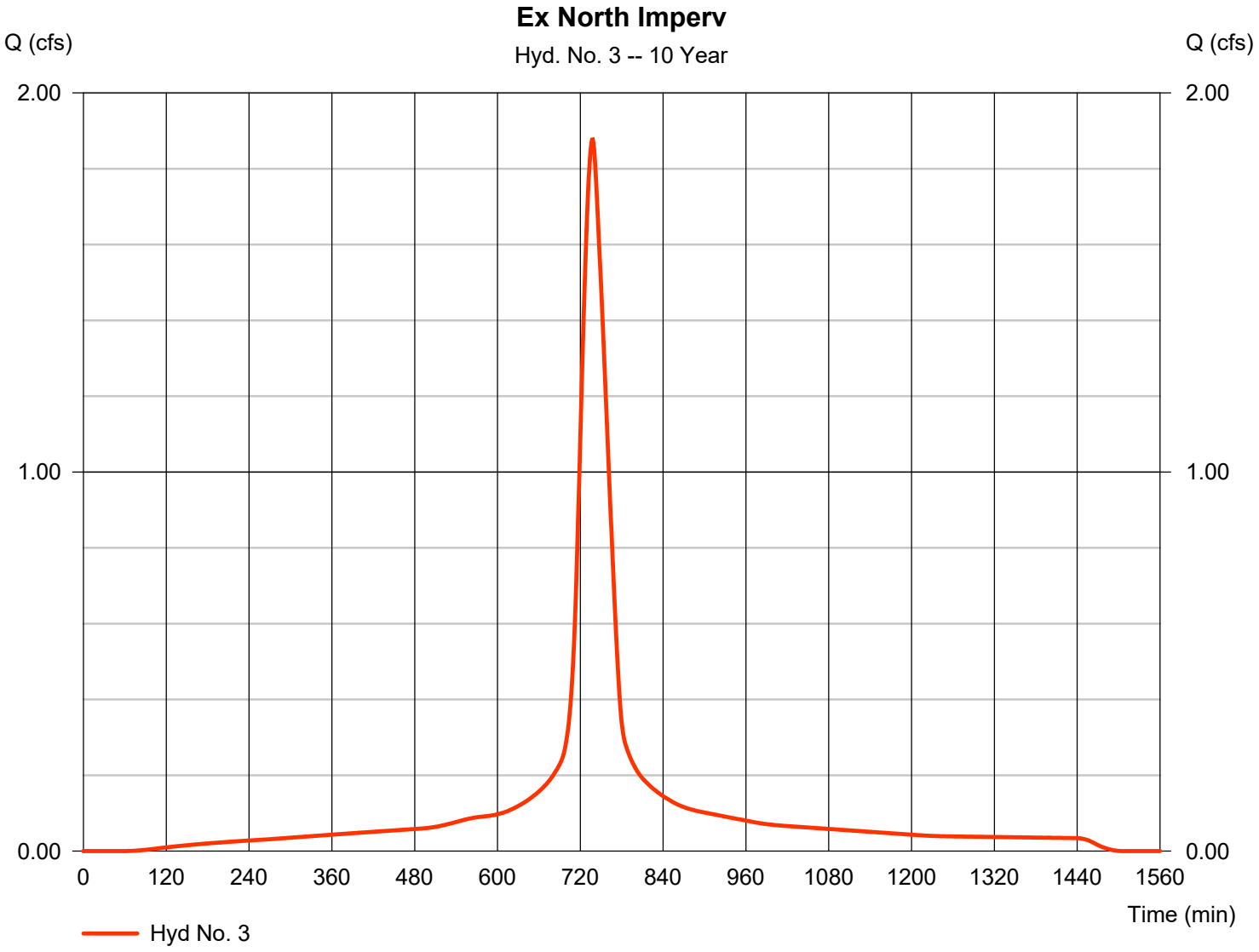


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.877 cfs
Storm frequency	=	10 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	10,401 cuft
Drainage area	=	0.622 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

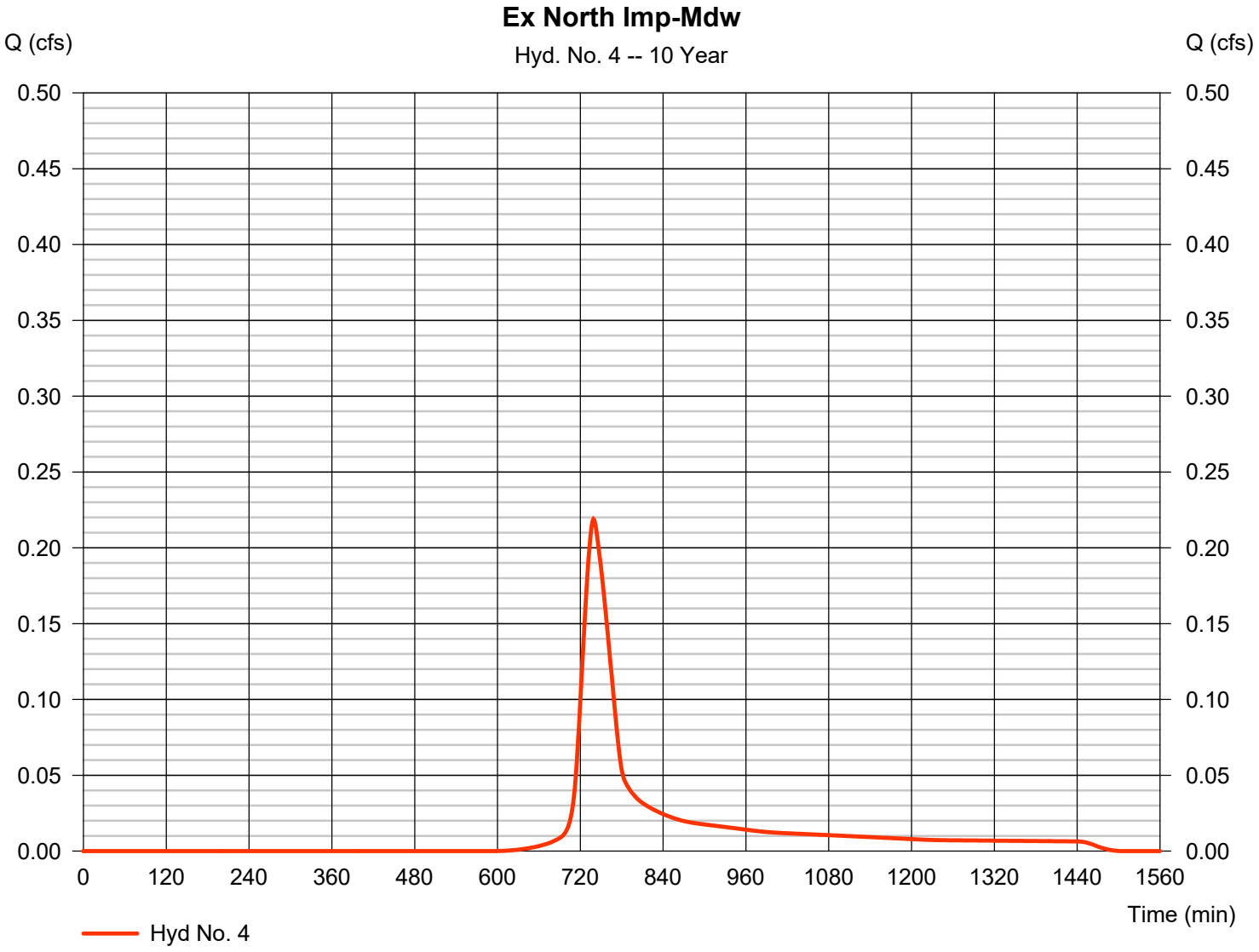


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.219 cfs
Storm frequency	=	10 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	1,128 cuft
Drainage area	=	0.156 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

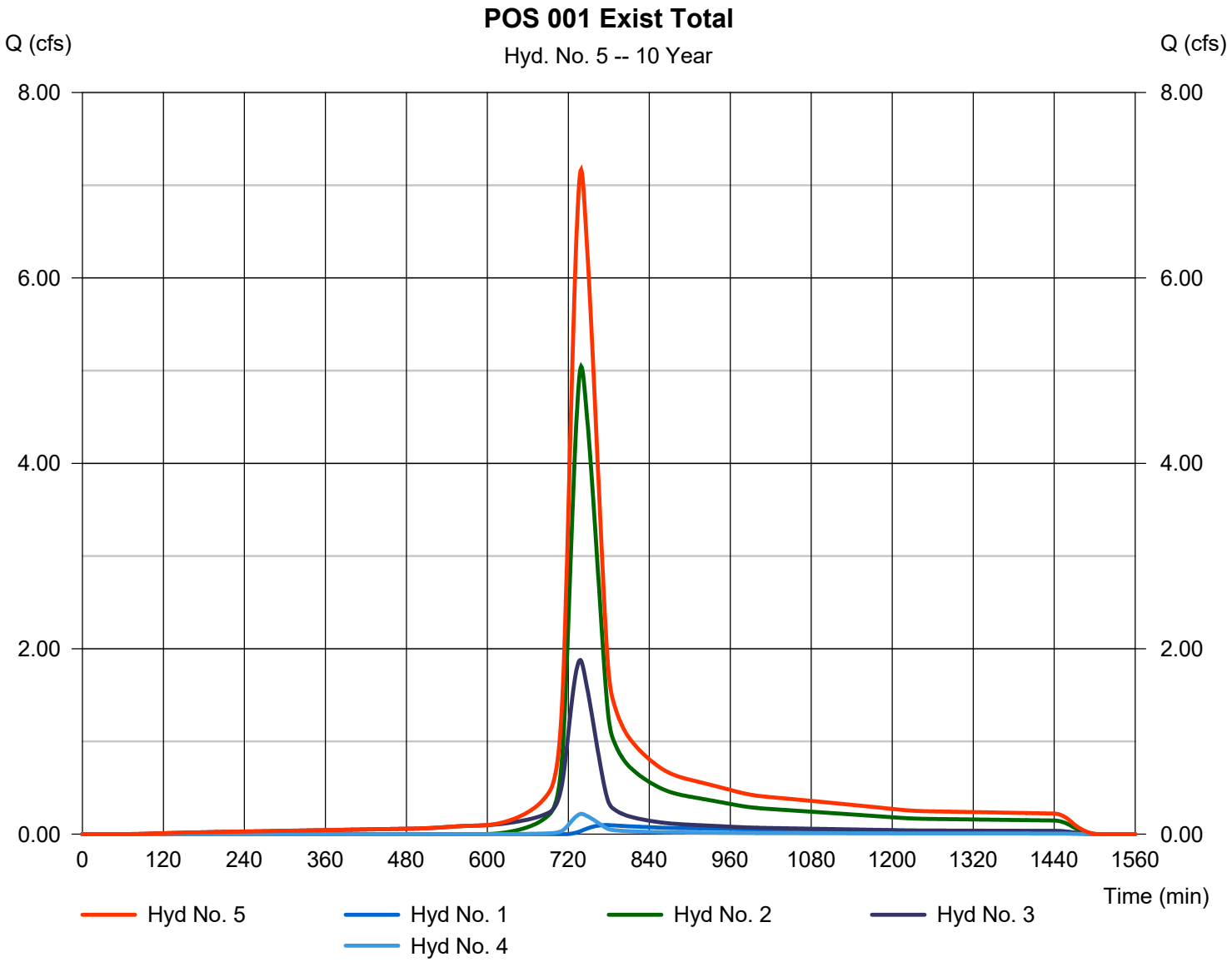


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 7.168 cfs
Storm frequency	= 10 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 39,751 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

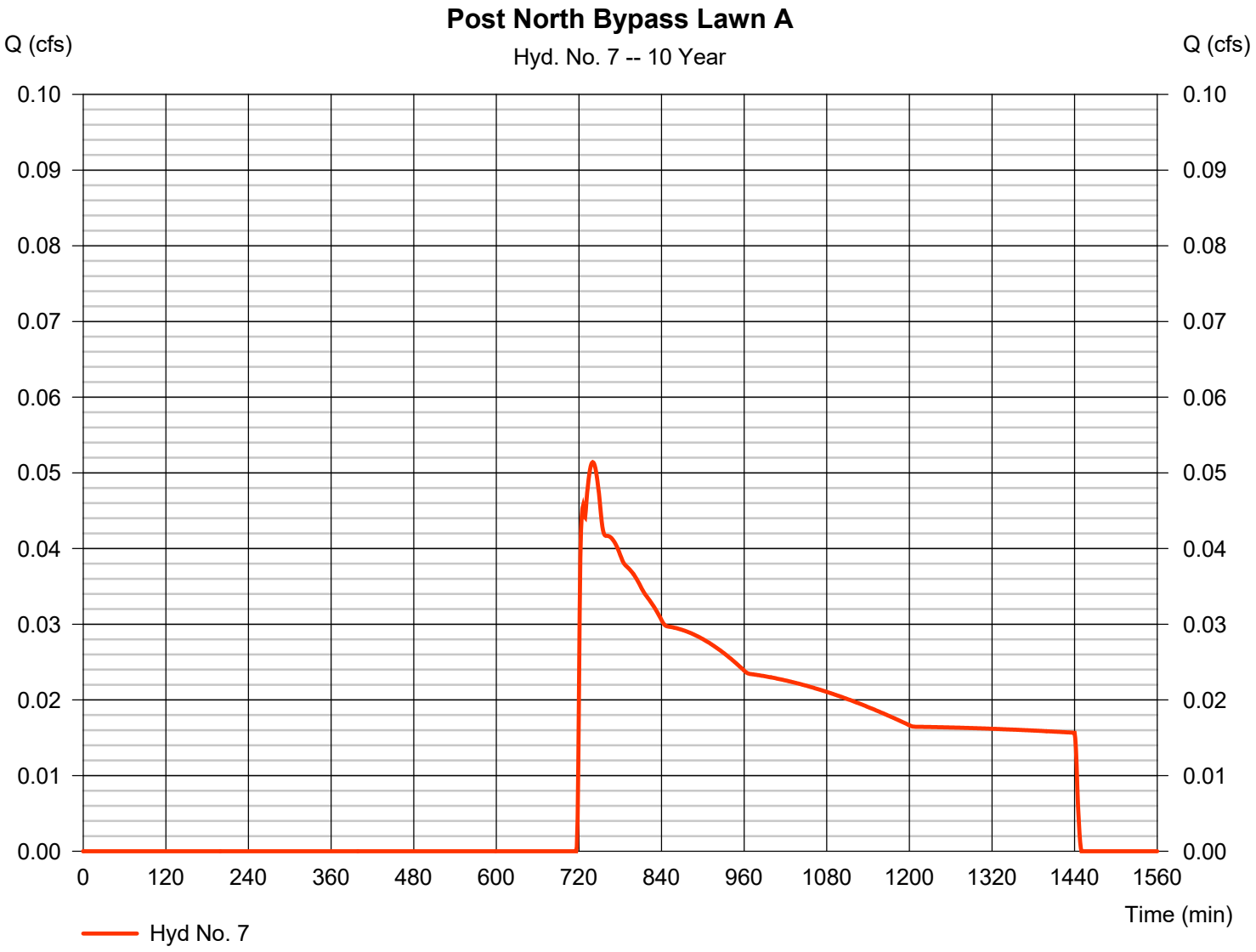


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.051 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 1,021 cuft
Drainage area	= 1.385 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

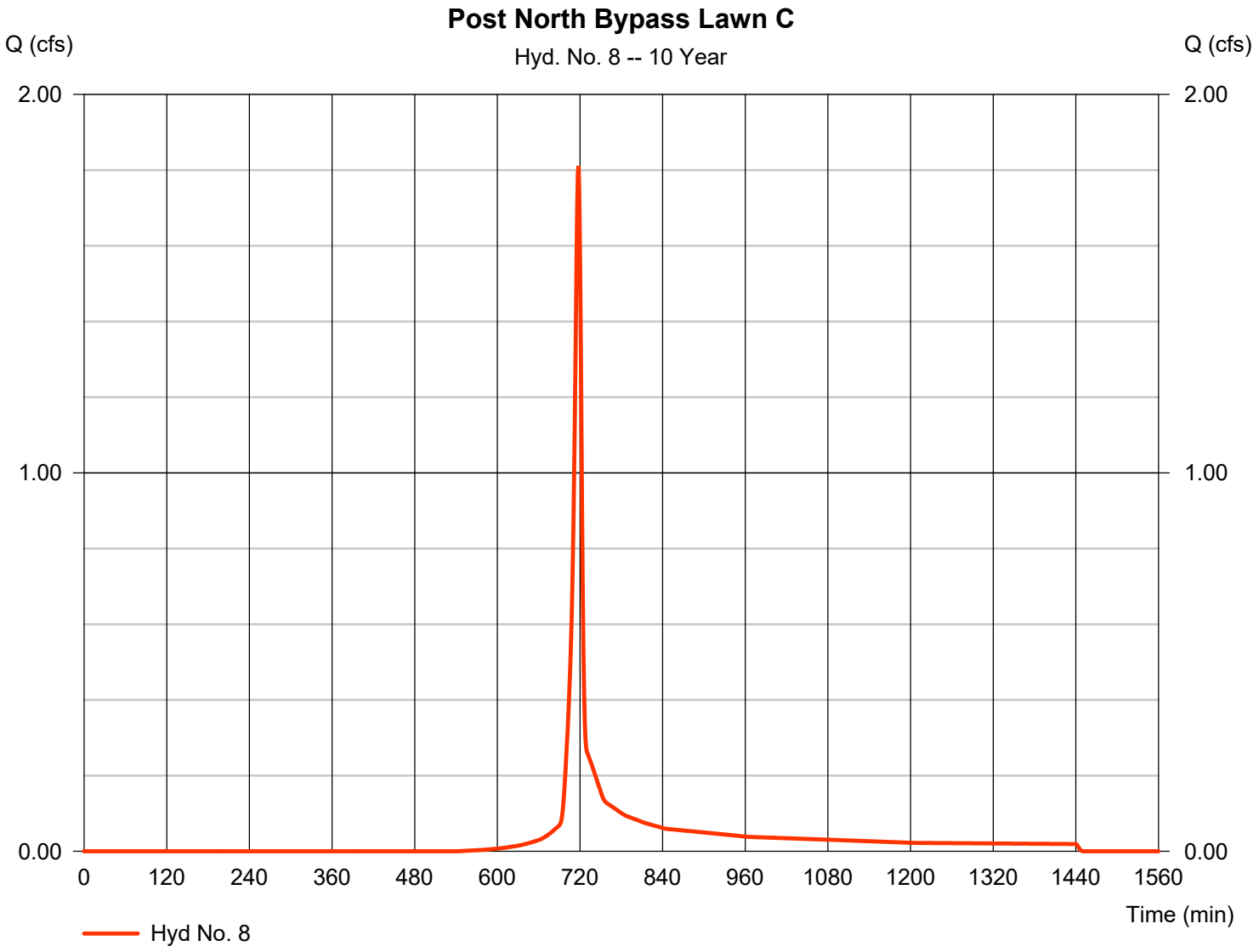


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.811 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	3,642 cuft
Drainage area	=	0.438 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

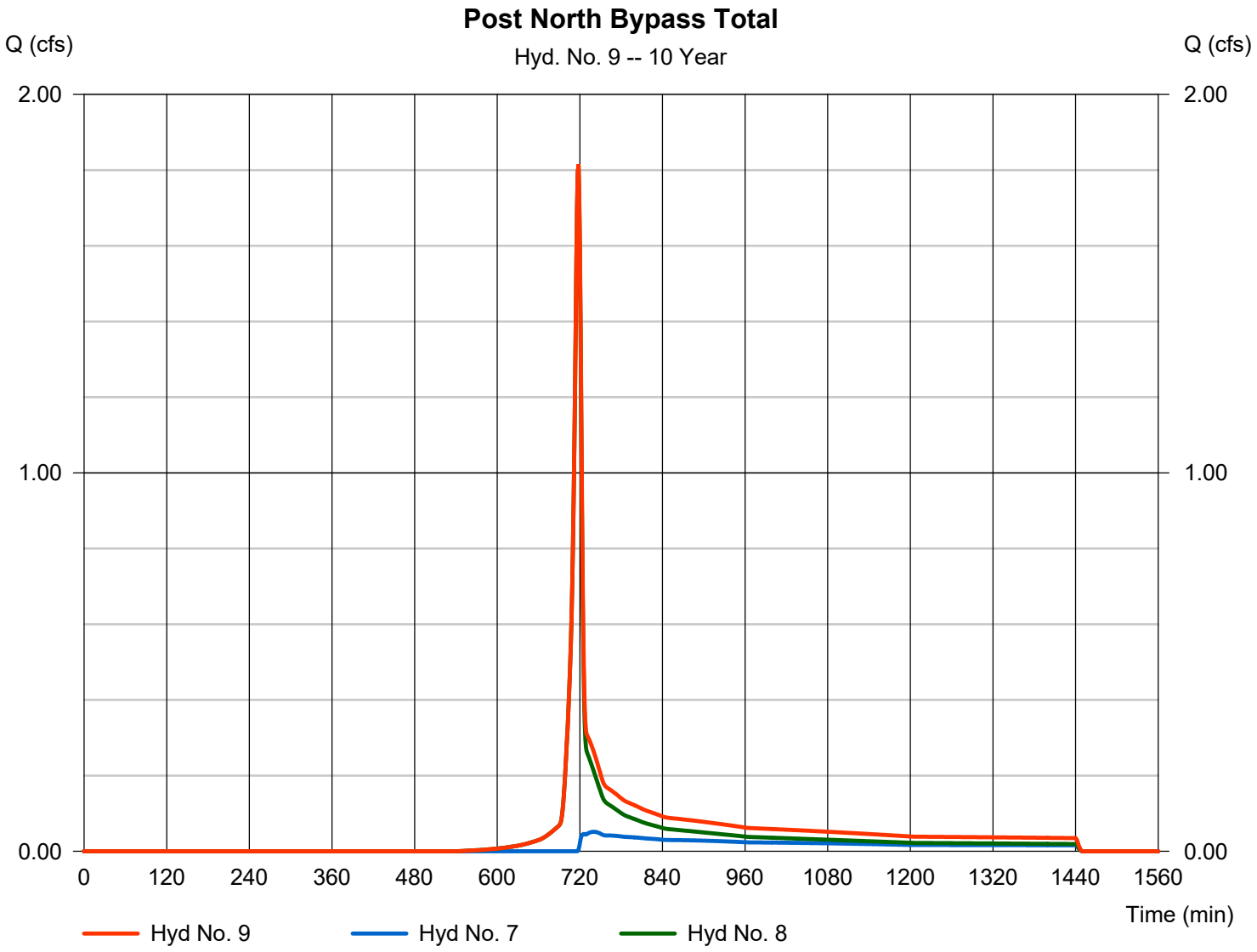


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	= Combine	Peak discharge	= 1.815 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 4,663 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 1.823 ac



Hydrograph Report

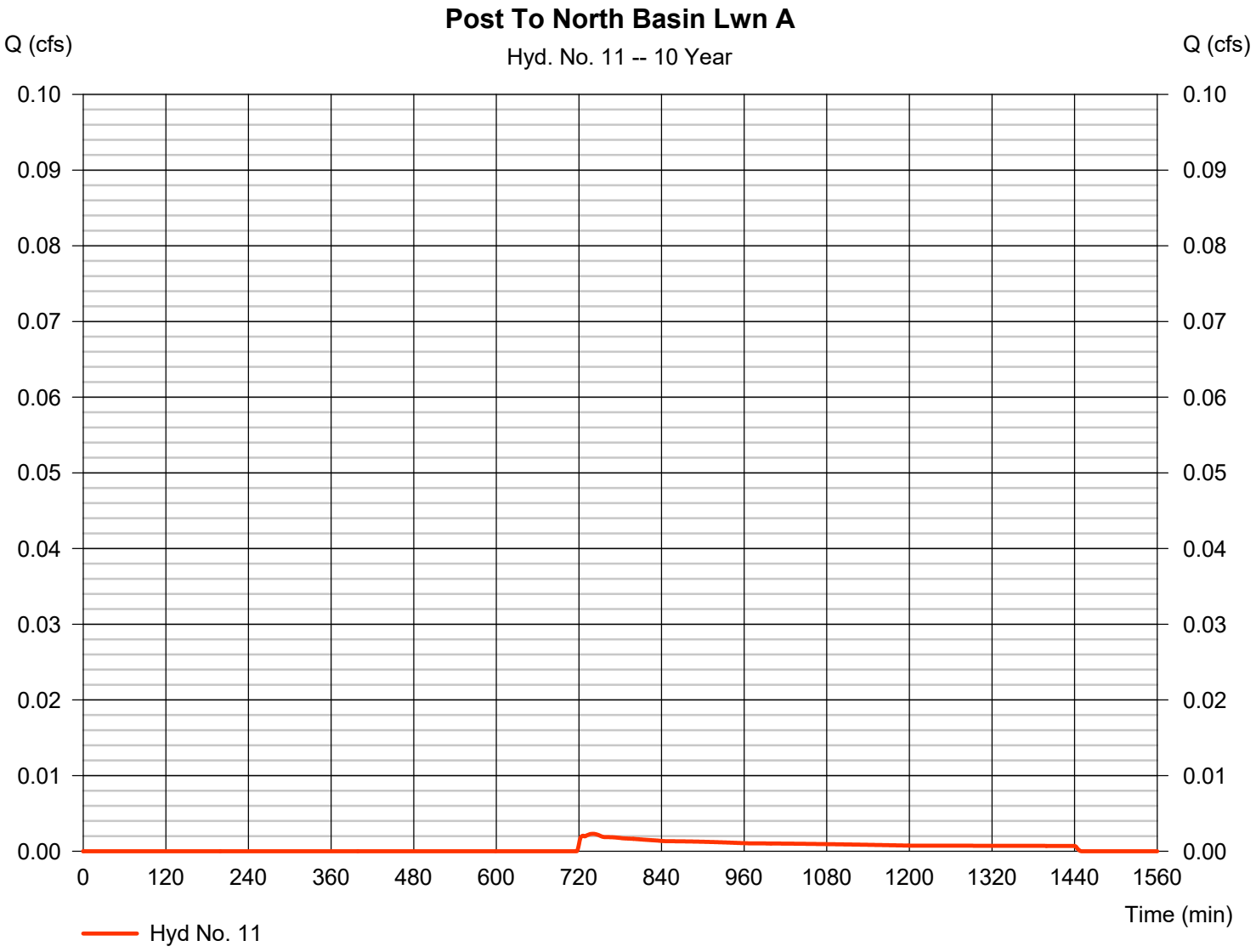
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.002 cfs
Storm frequency	=	10 yrs	Time to peak	=	740 min
Time interval	=	1 min	Hyd. volume	=	46 cuft
Drainage area	=	0.062 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



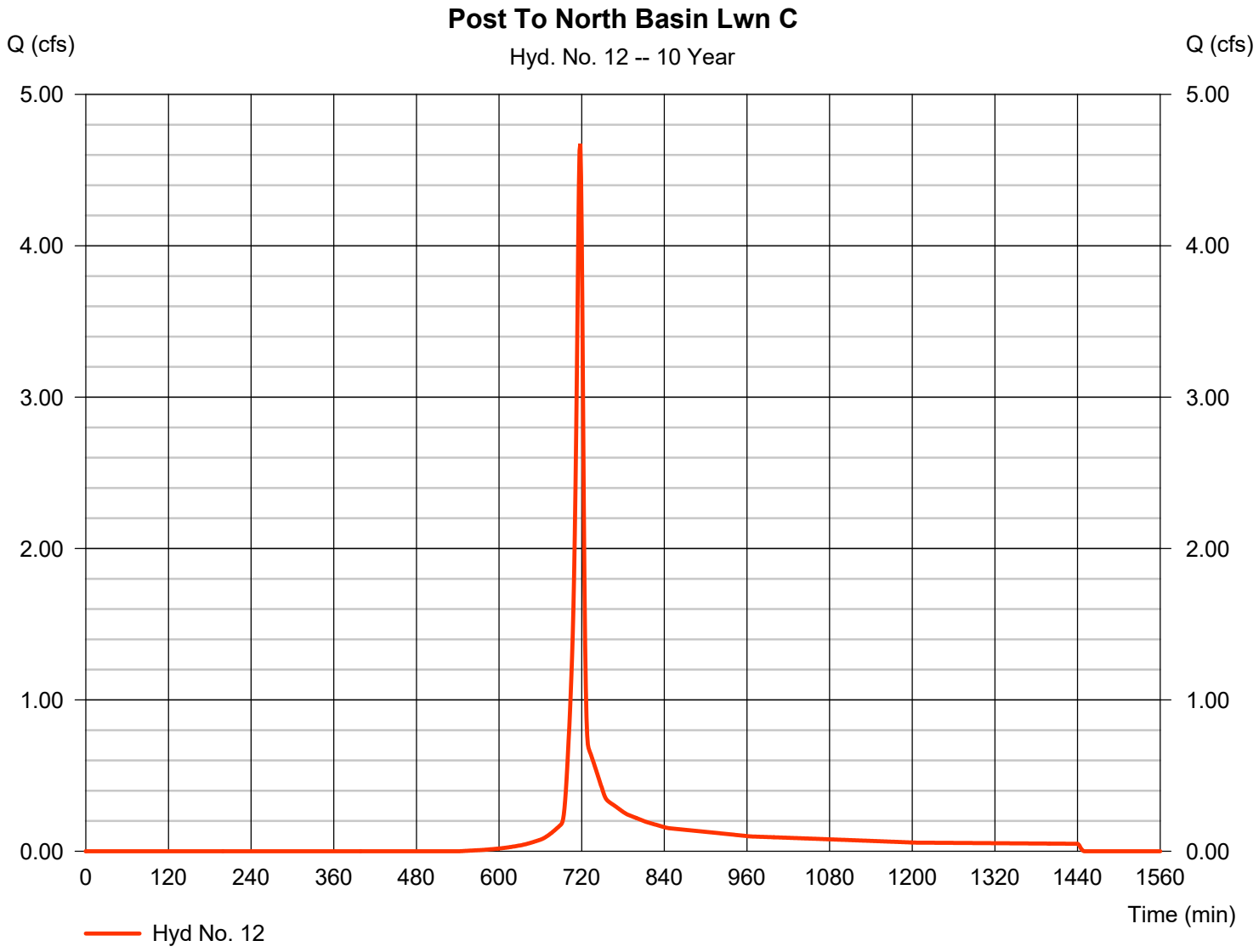
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.675 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	9,406 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



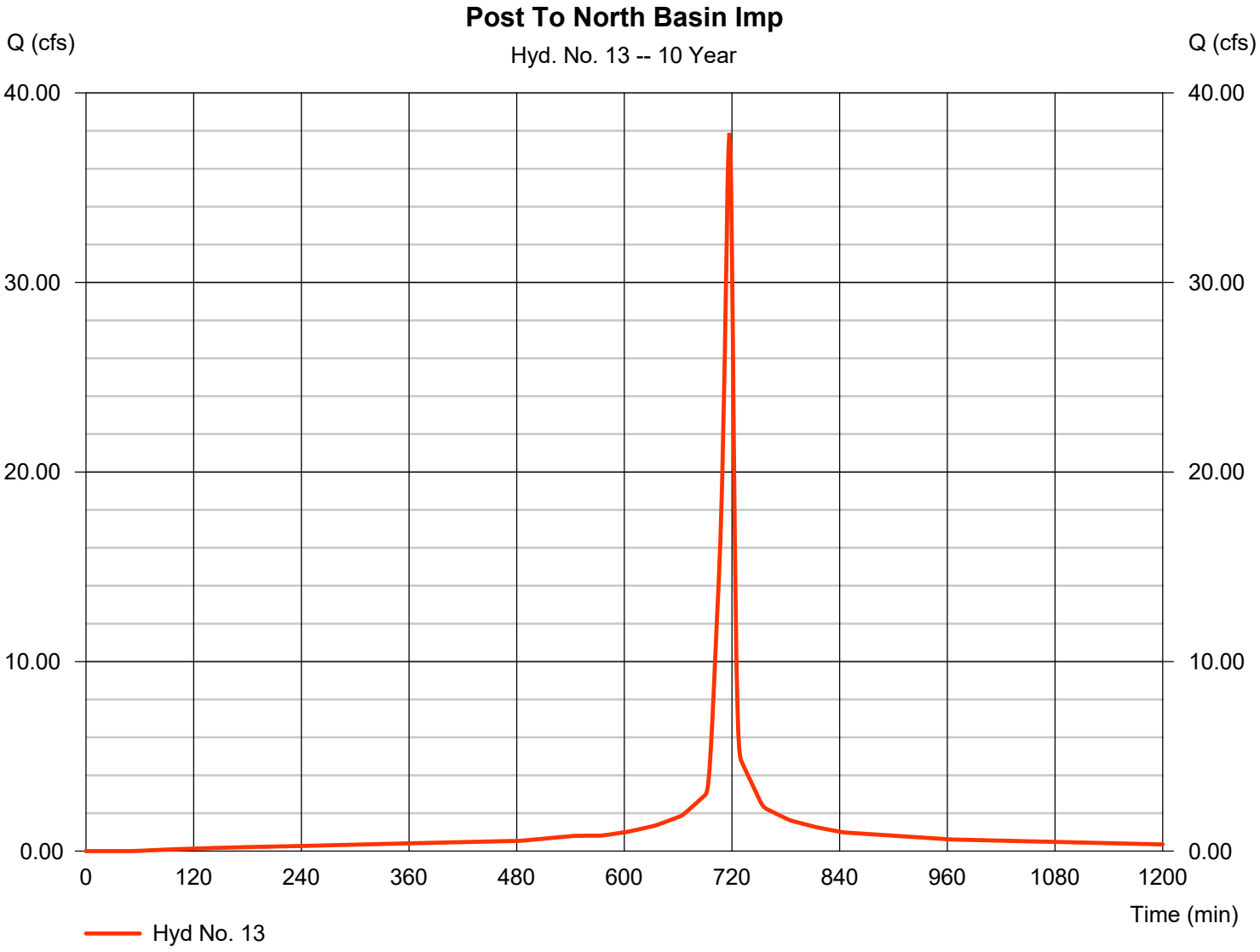
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.88 cfs
Storm frequency	=	10 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	91,263 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

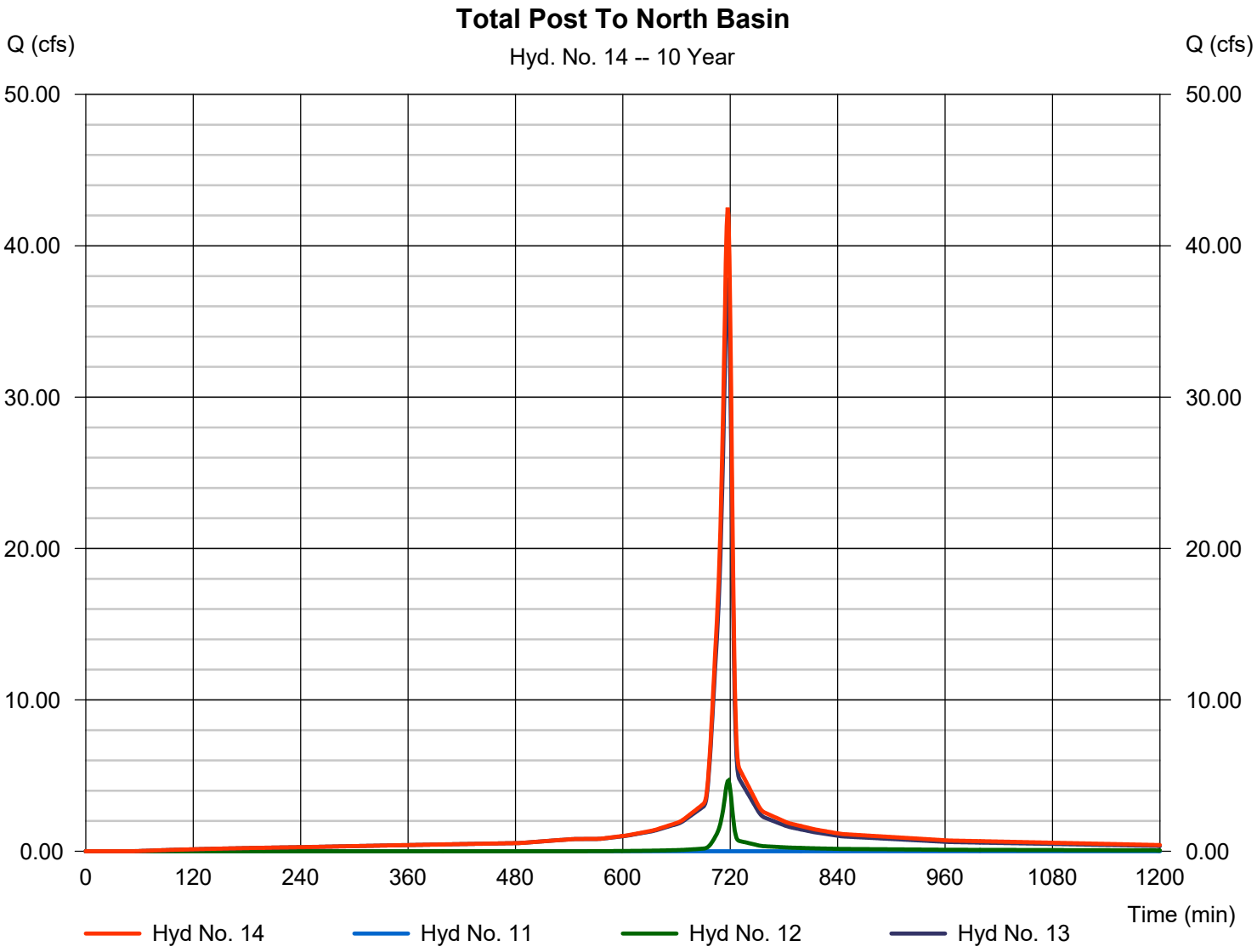


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	= Combine	Peak discharge	= 42.51 cfs
Storm frequency	= 10 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 100,714 cuft
Inflow hyds.	= 11, 12, 13	Contrib. drain. area	= 6.512 ac



Hydrograph Report

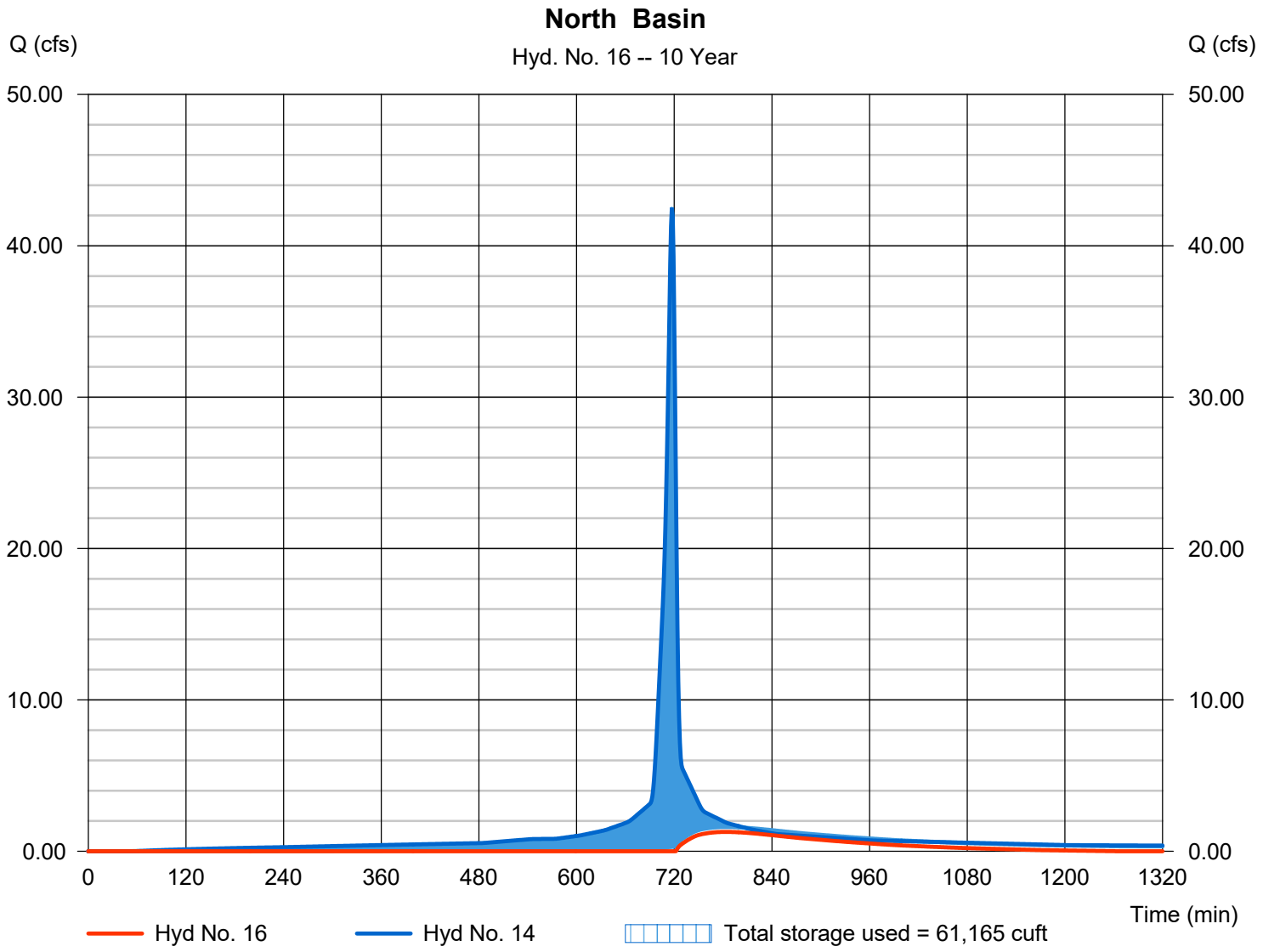
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	1.278 cfs
Storm frequency	=	10 yrs	Time to peak	=	783 min
Time interval	=	1 min	Hyd. volume	=	16,616 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	473.83 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	61,165 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

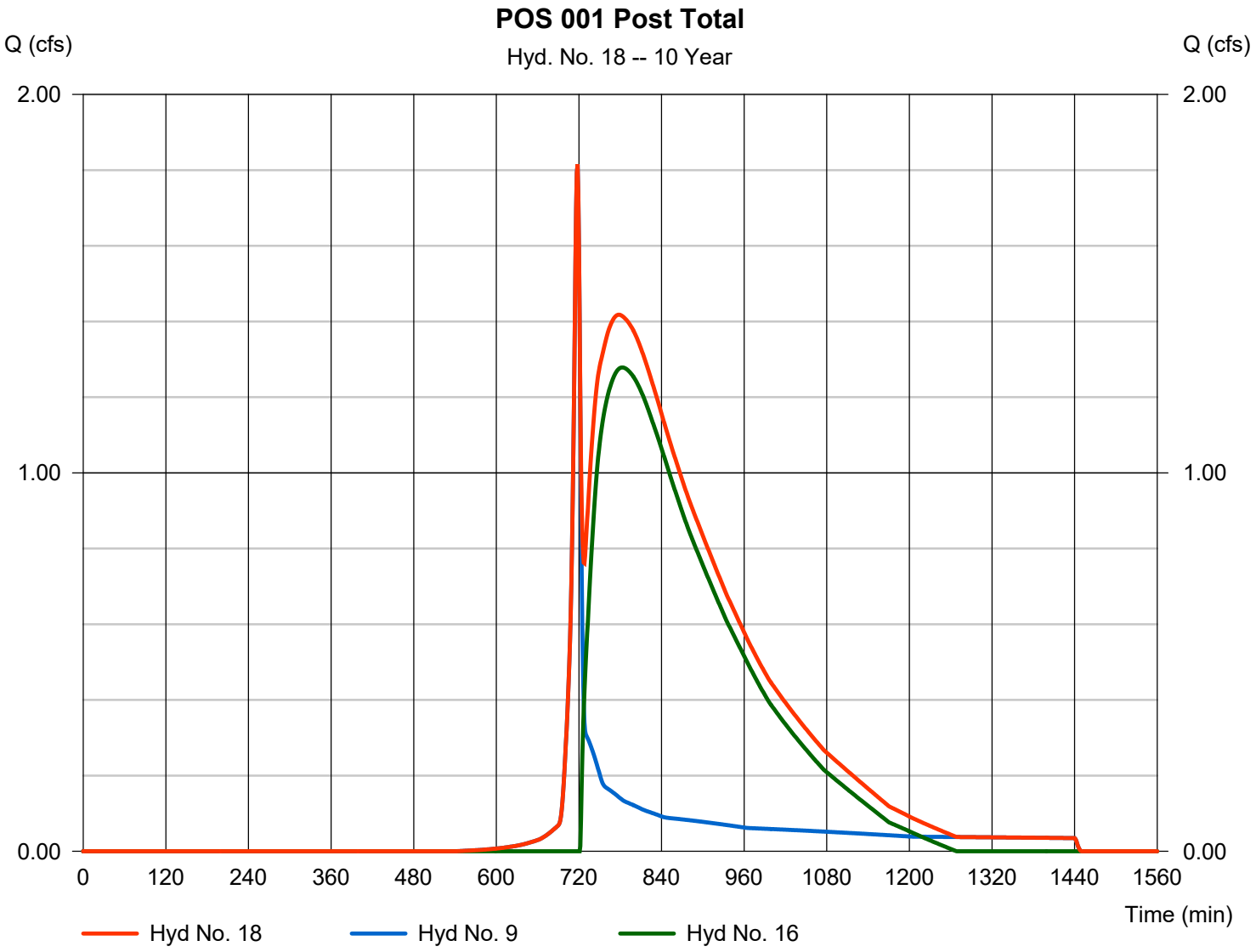


Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	= Combine	Peak discharge	= 1.815 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 21,279 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 0.000 ac



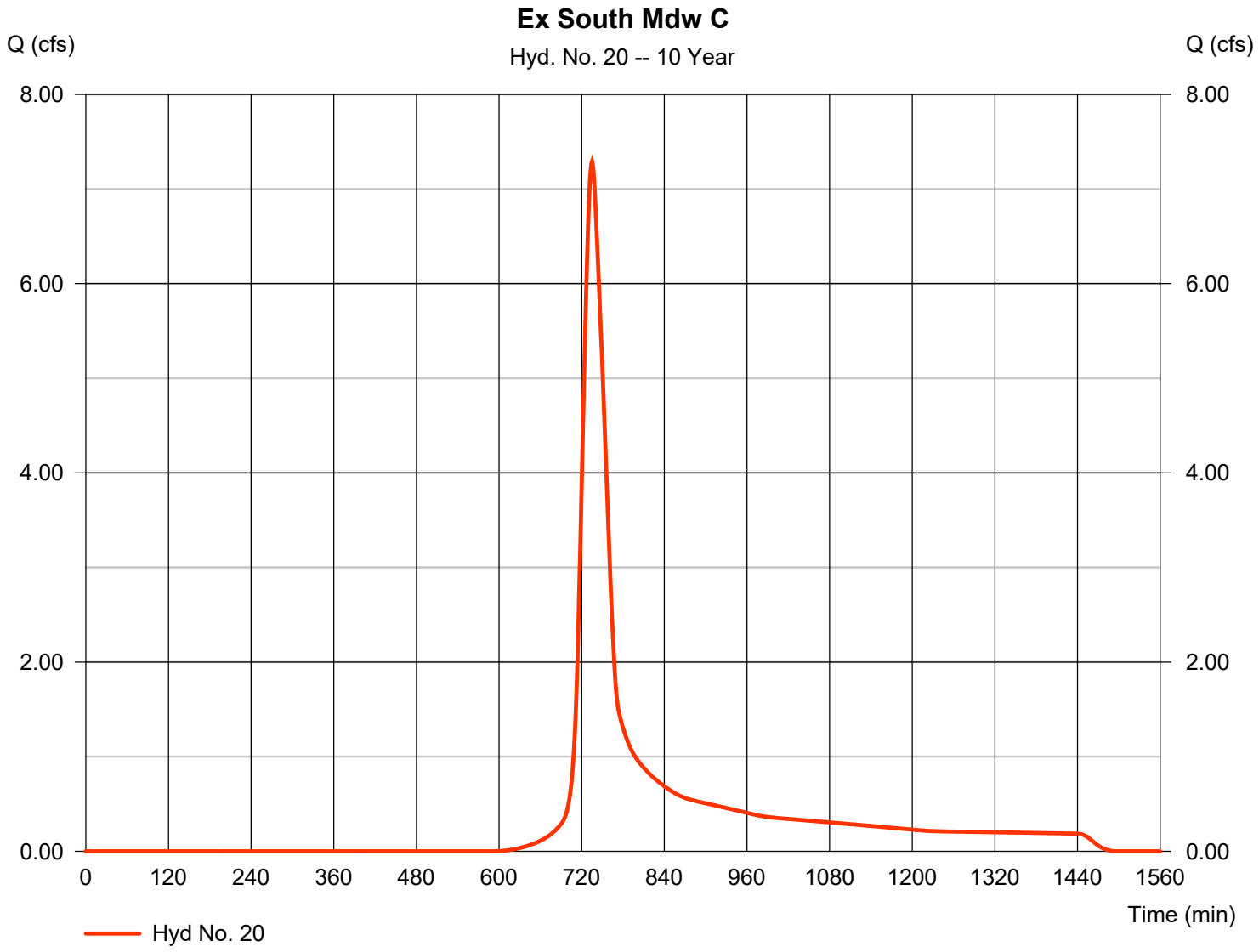
Hydrograph Report

Hyd. No. 20

Ex South Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 7.291 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 33,114 cuft
Drainage area	= 4.604 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 33.93 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



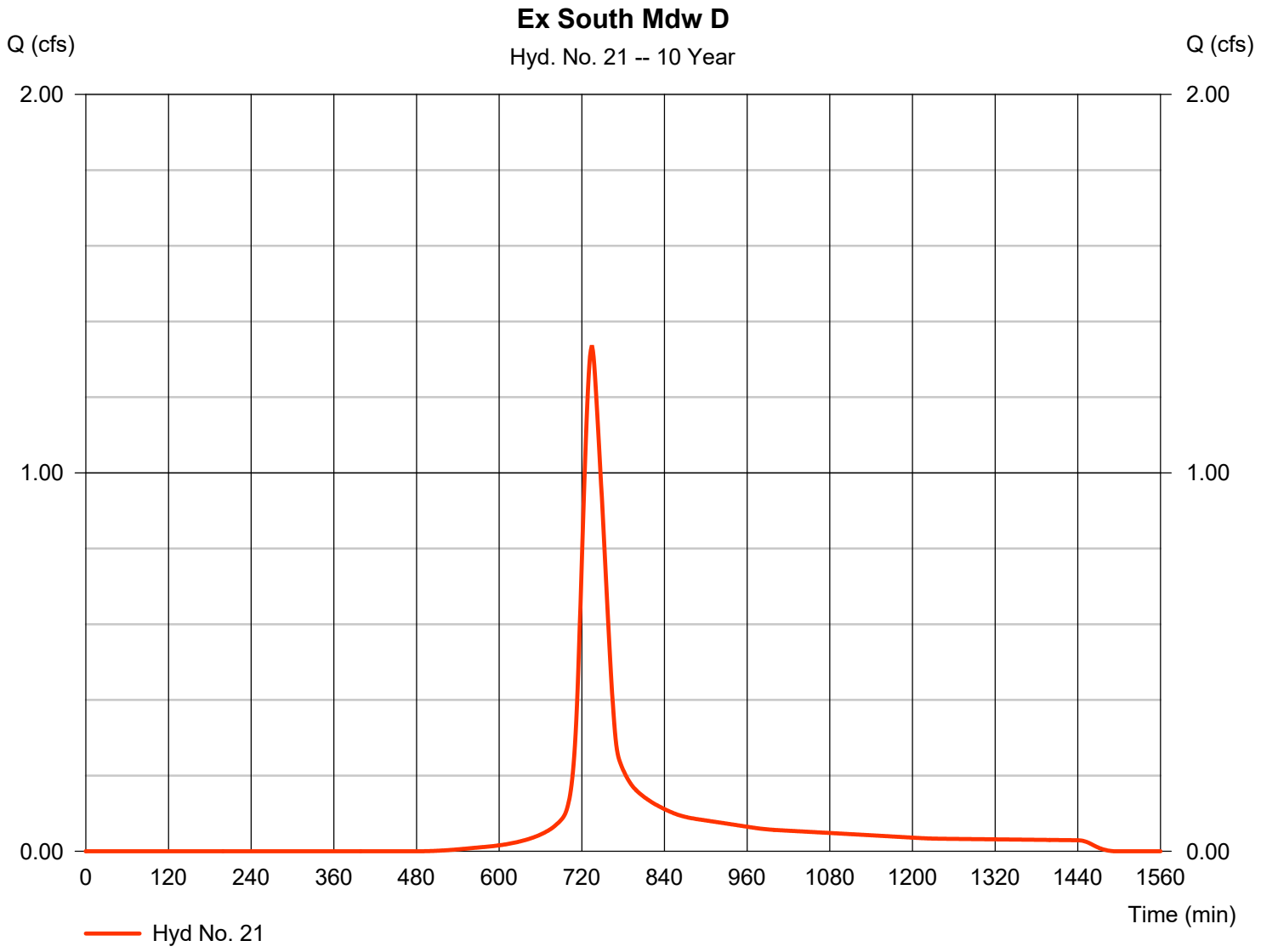
Hydrograph Report

Hyd. No. 21

Ex South Mdw D

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.333 cfs
Storm frequency	=	10 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	5,909 cuft
Drainage area	=	0.636 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



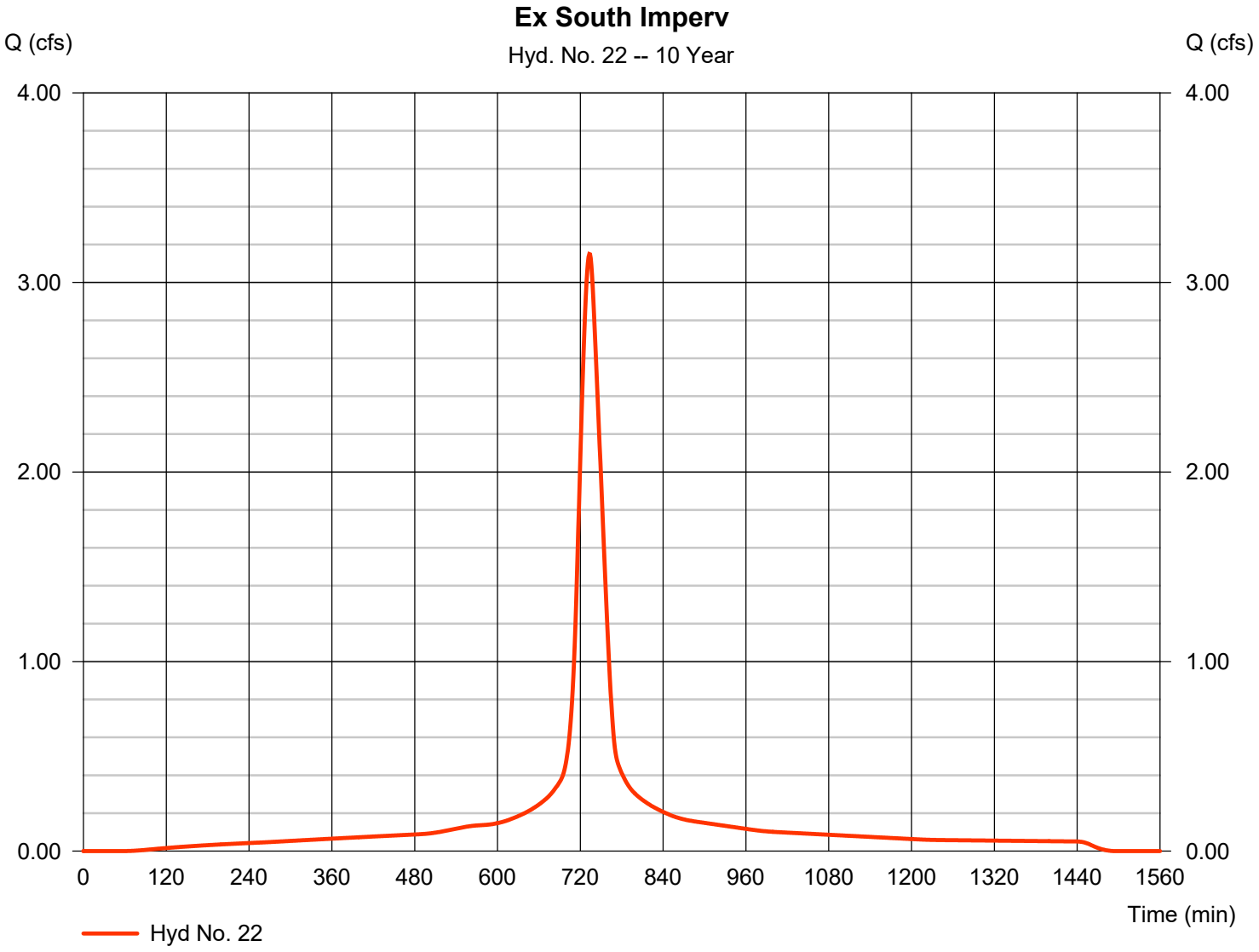
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.149 cfs
Storm frequency	=	10 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	15,507 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



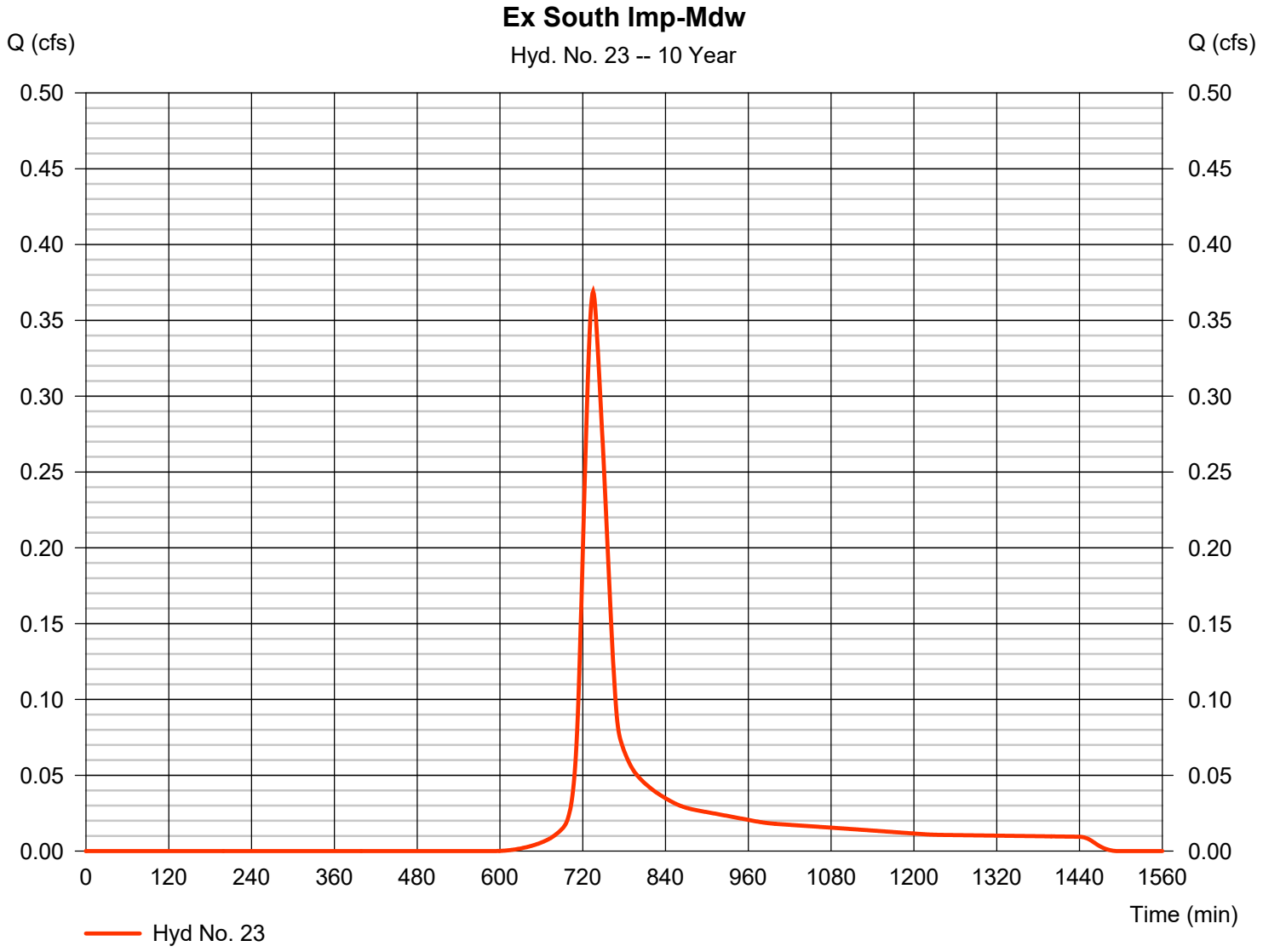
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.369 cfs
Storm frequency	=	10 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	1,676 cuft
Drainage area	=	0.233 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

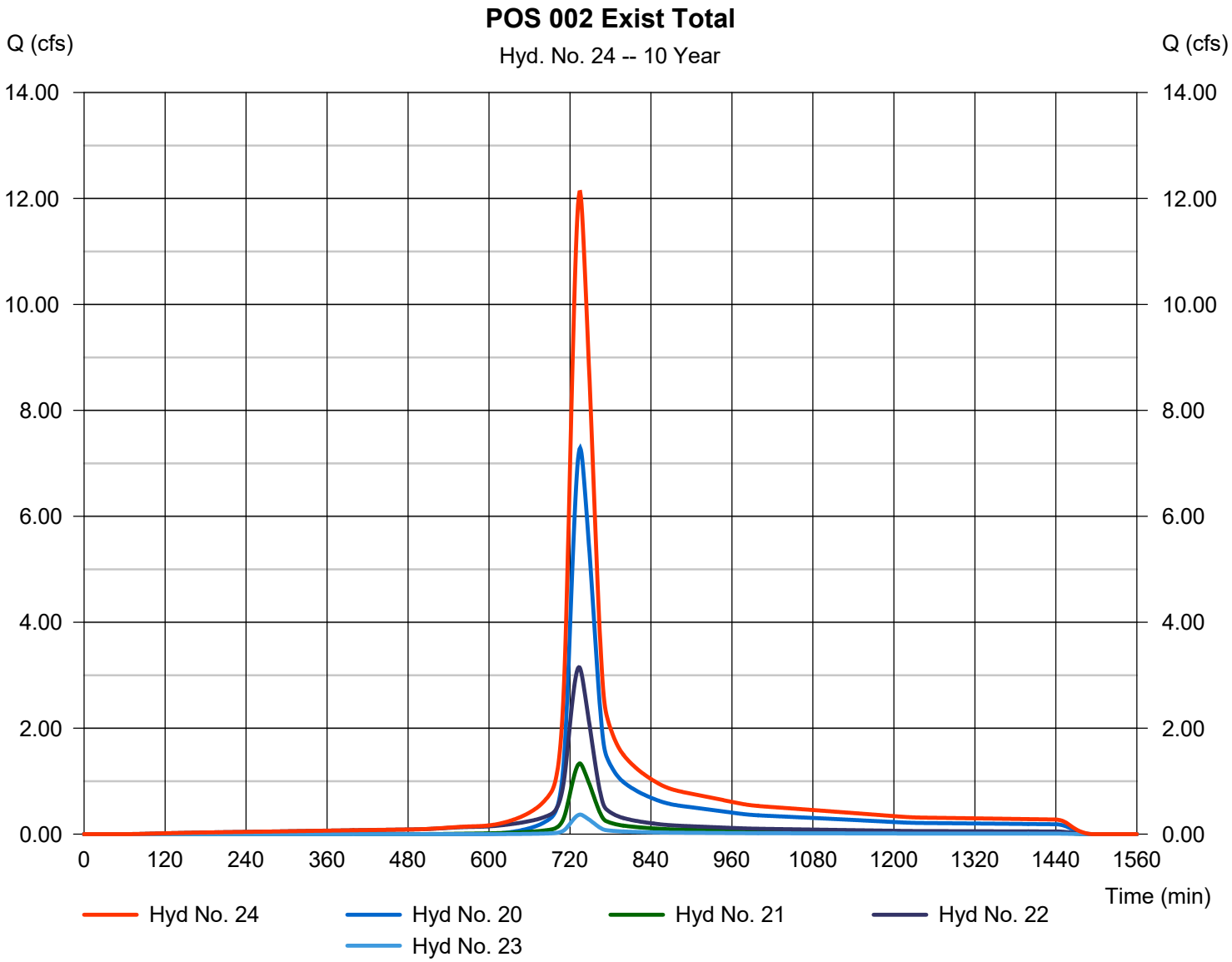


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	= Combine	Peak discharge	= 12.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 56,206 cuft
Inflow hyds.	= 20, 21, 22, 23	Contrib. drain. area	= 6.405 ac

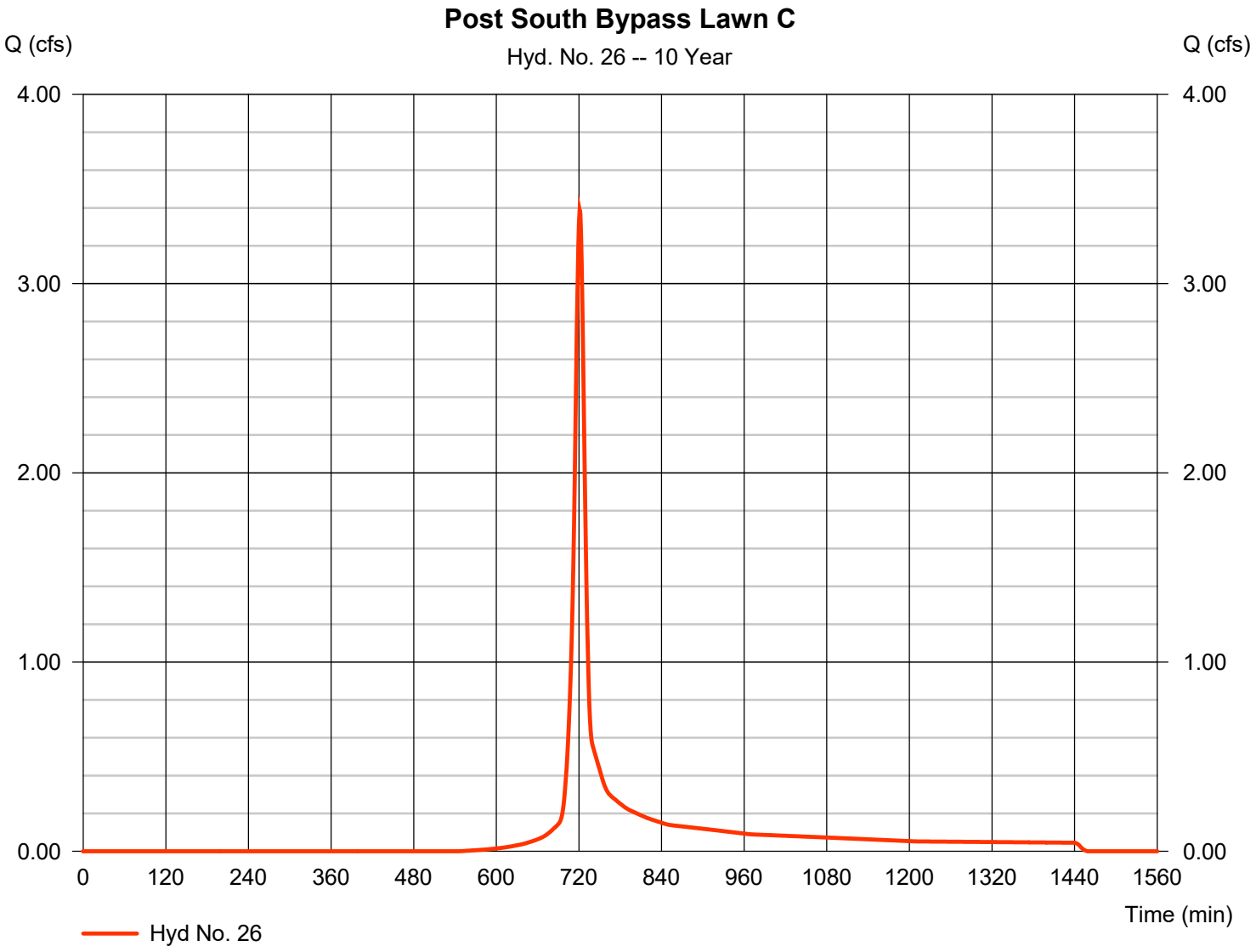


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 3.389 cfs
Storm frequency	= 10 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 8,573 cuft
Drainage area	= 1.080 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.90 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

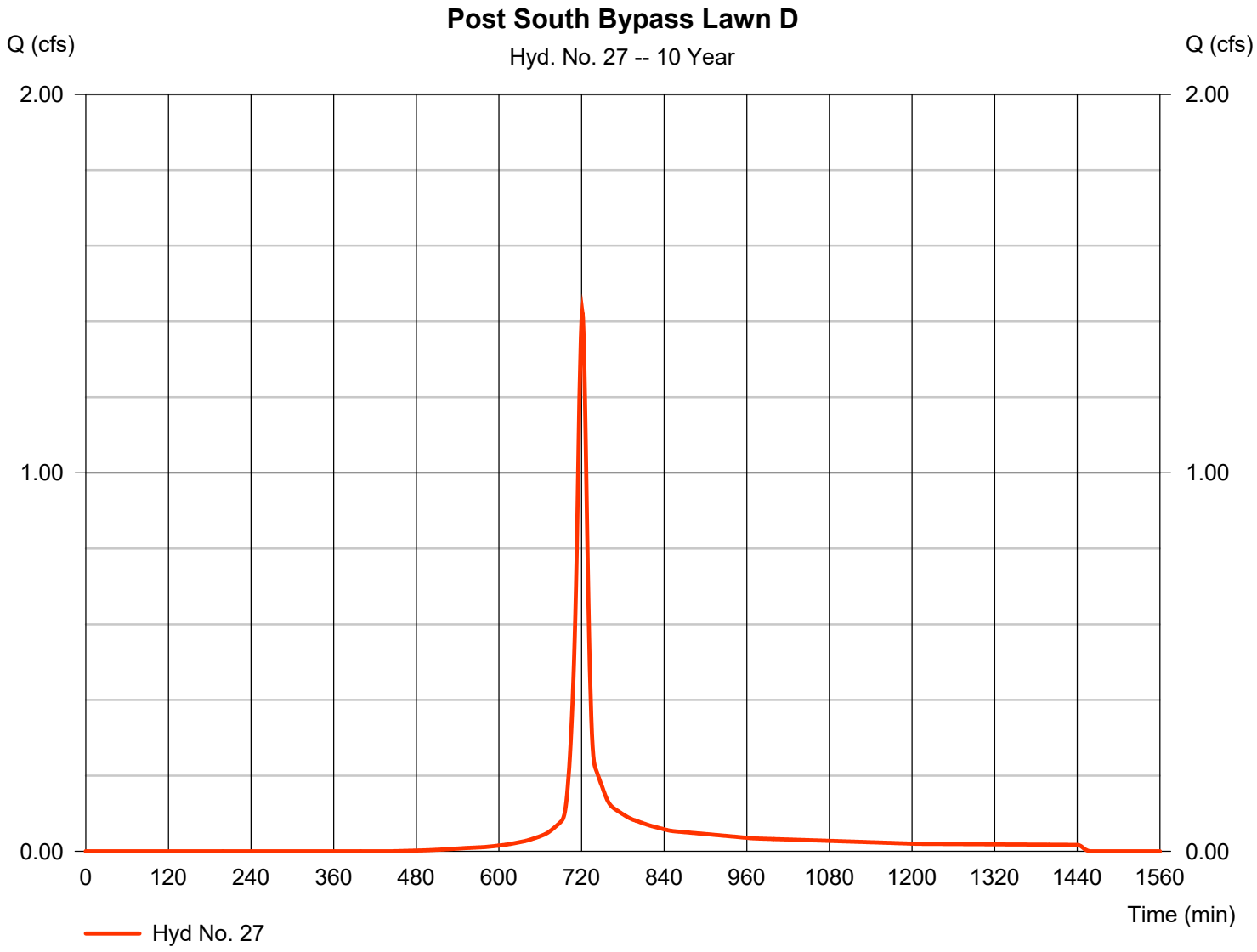


Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	= SCS Runoff	Peak discharge	= 1.425 cfs
Storm frequency	= 10 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 3,608 cuft
Drainage area	= 0.369 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

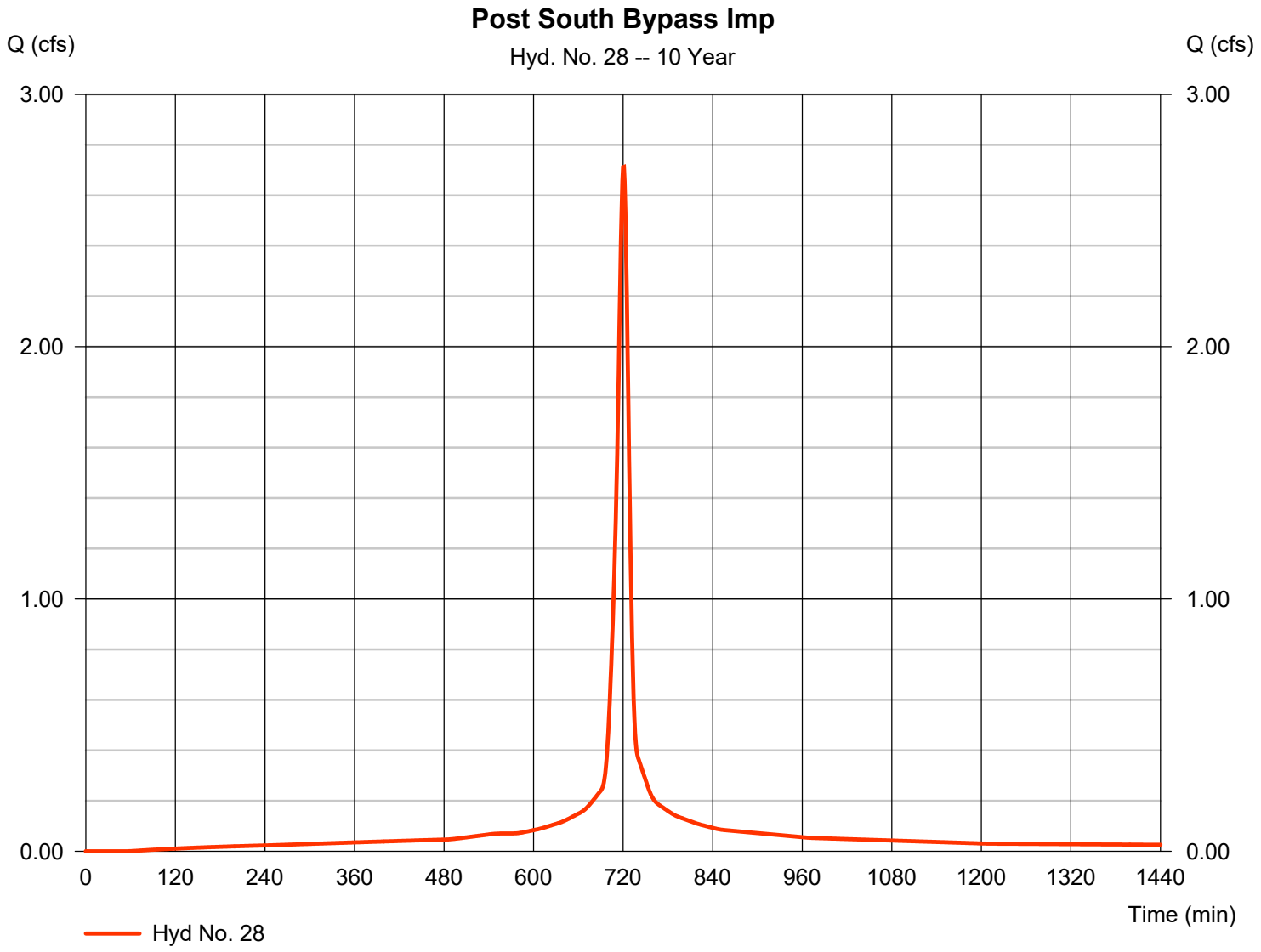


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.713 cfs
Storm frequency	=	10 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	7,960 cuft
Drainage area	=	0.486 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.90 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

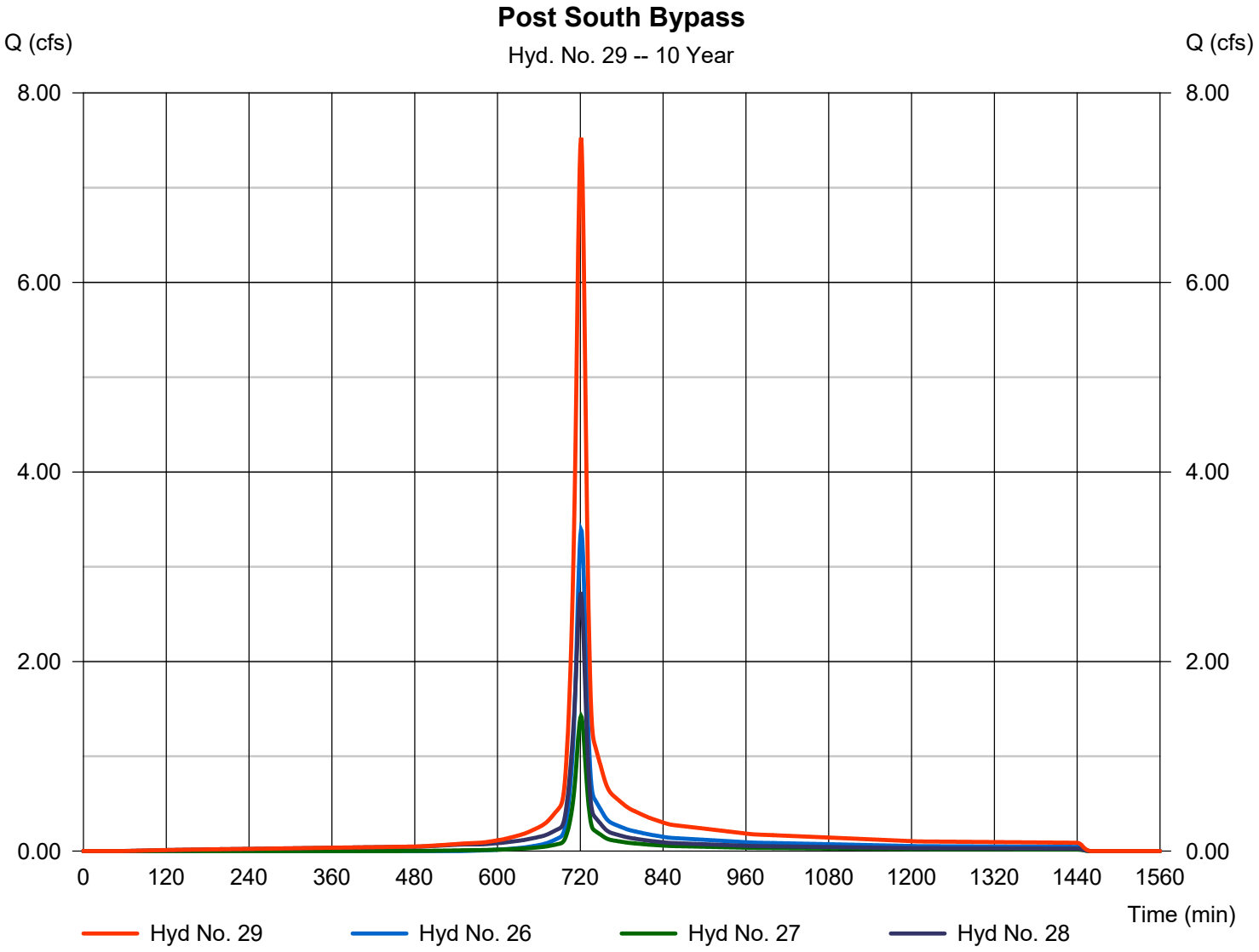


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	= Combine	Peak discharge	= 7.527 cfs
Storm frequency	= 10 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 20,141 cuft
Inflow hyds.	= 26, 27, 28	Contrib. drain. area	= 1.935 ac



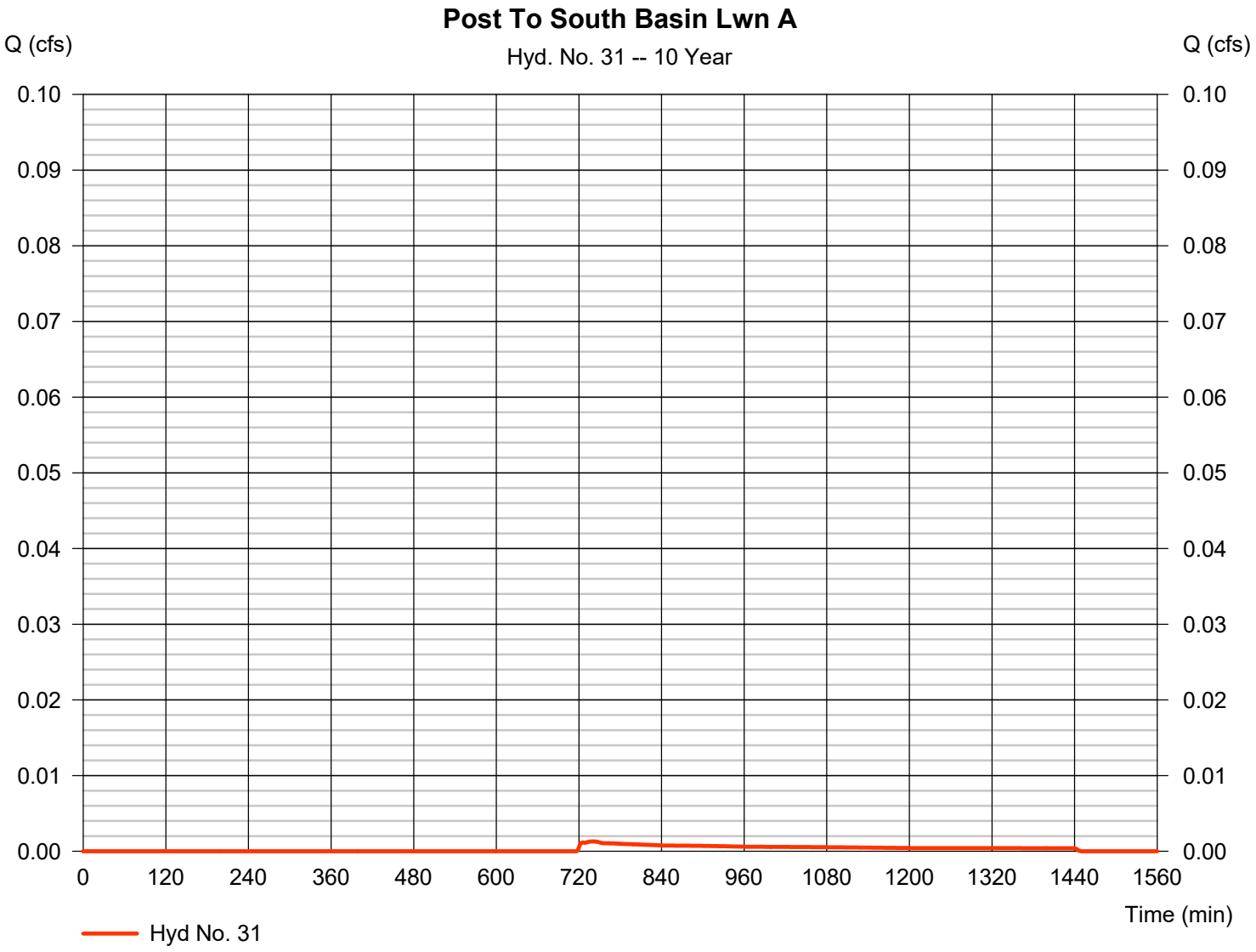
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.001 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 26 cuft
Drainage area	= 0.035 ac	Curve number	= 40*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.60 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



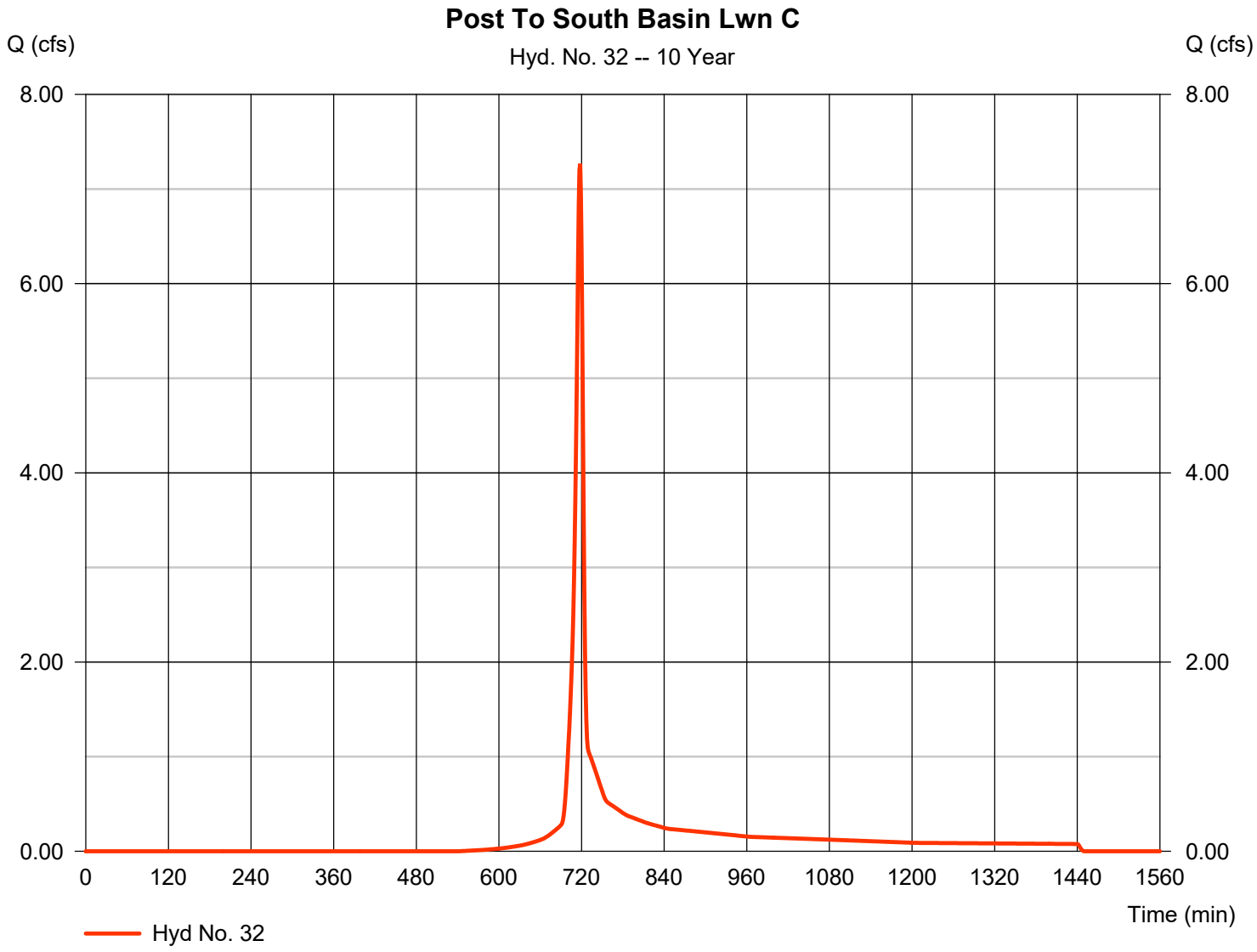
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.267 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	14,620 cuft
Drainage area	=	1.758 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



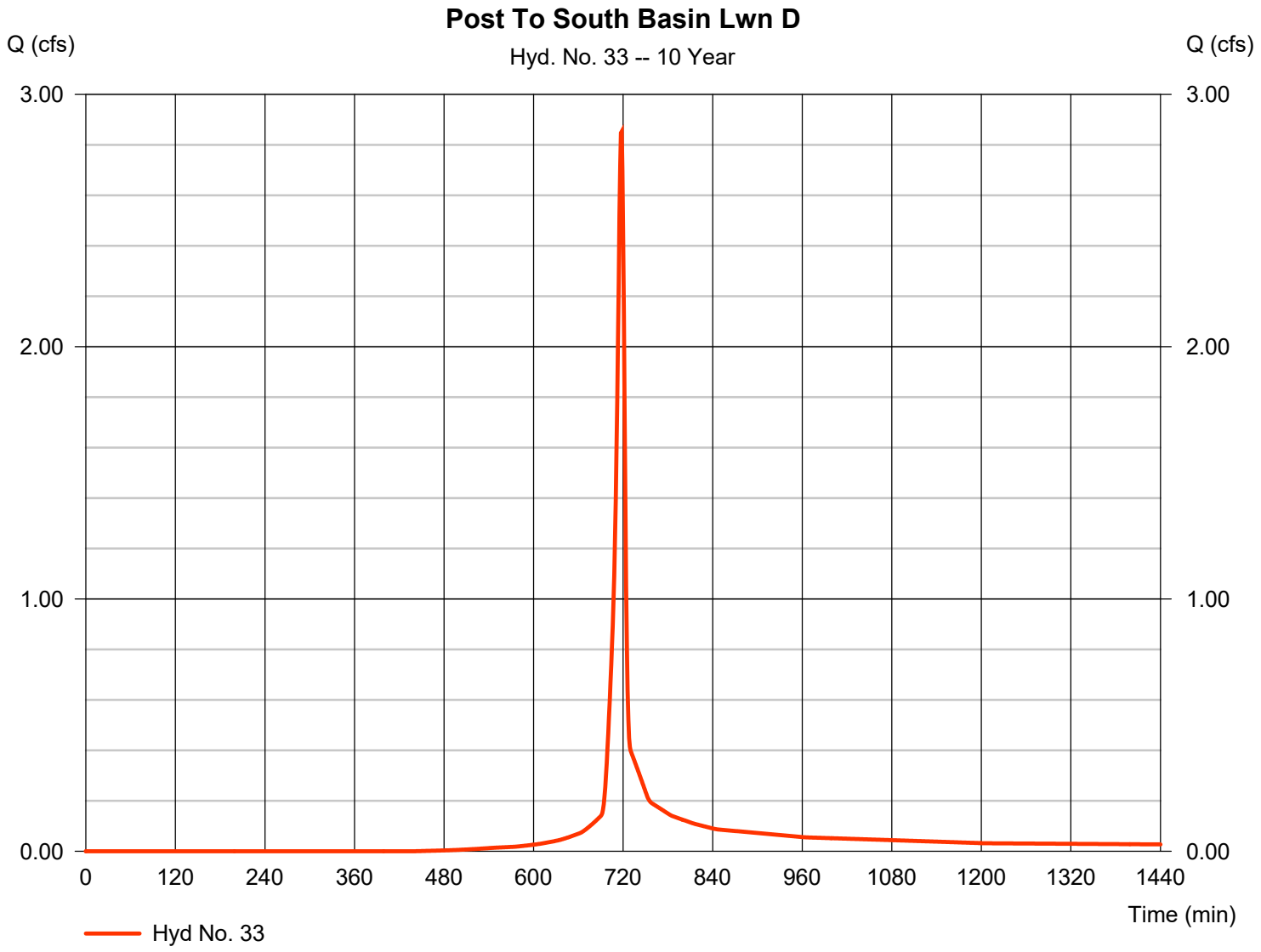
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.853 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	5,829 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	4.82 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



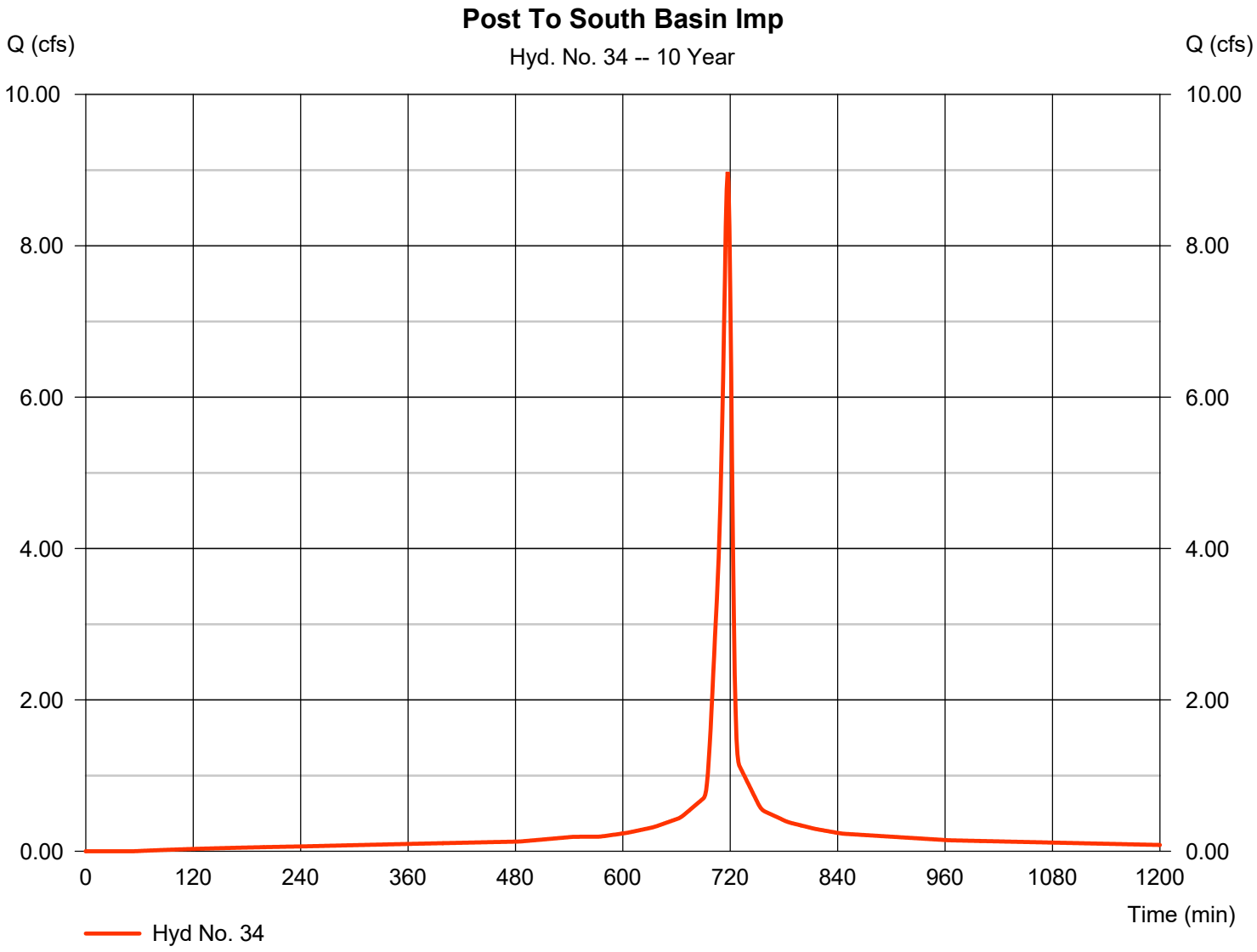
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 8.974 cfs
Storm frequency	= 10 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 21,619 cuft
Drainage area	= 1.260 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 4.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

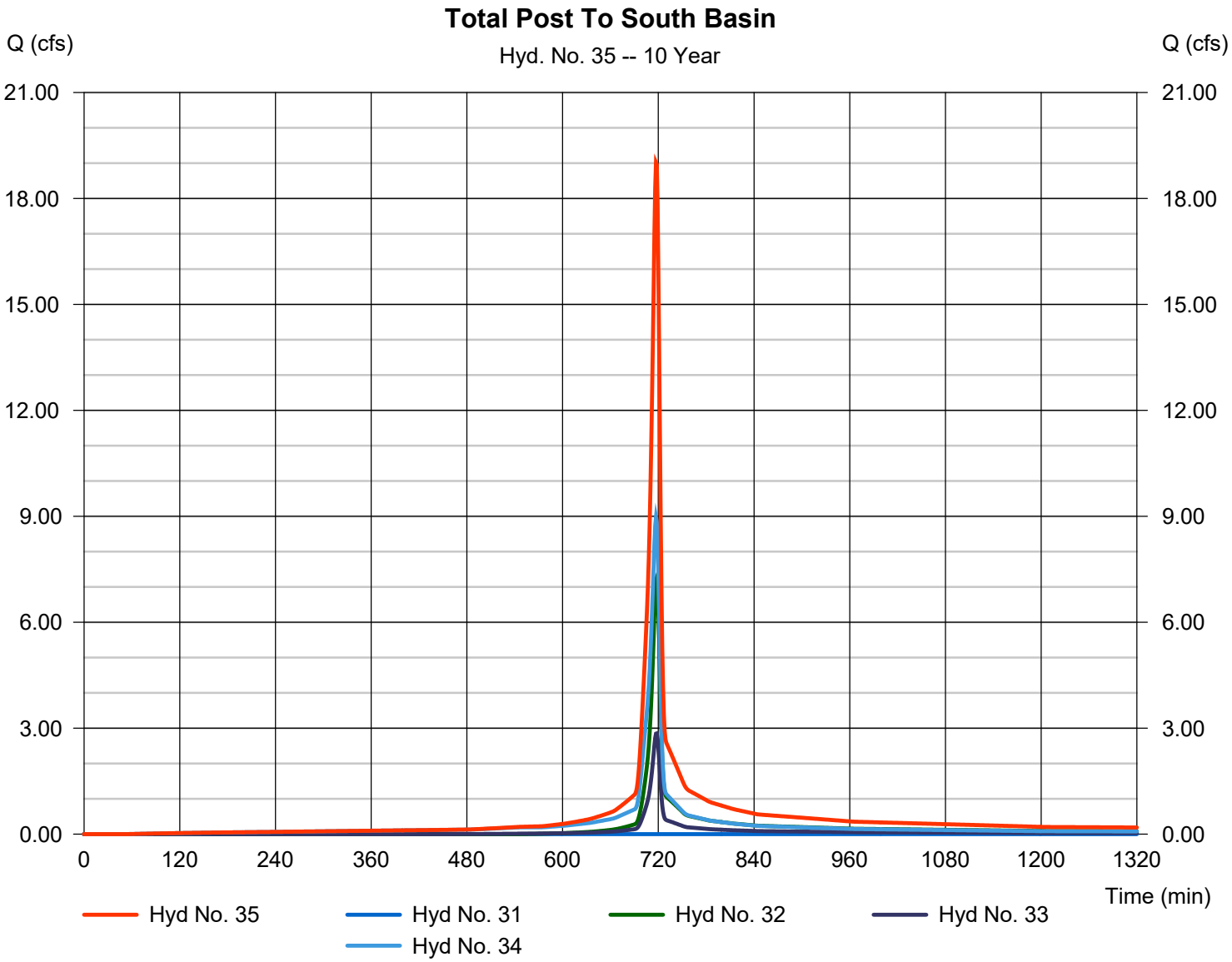


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	19.02 cfs
Storm frequency	=	10 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	42,093 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



Hydrograph Report

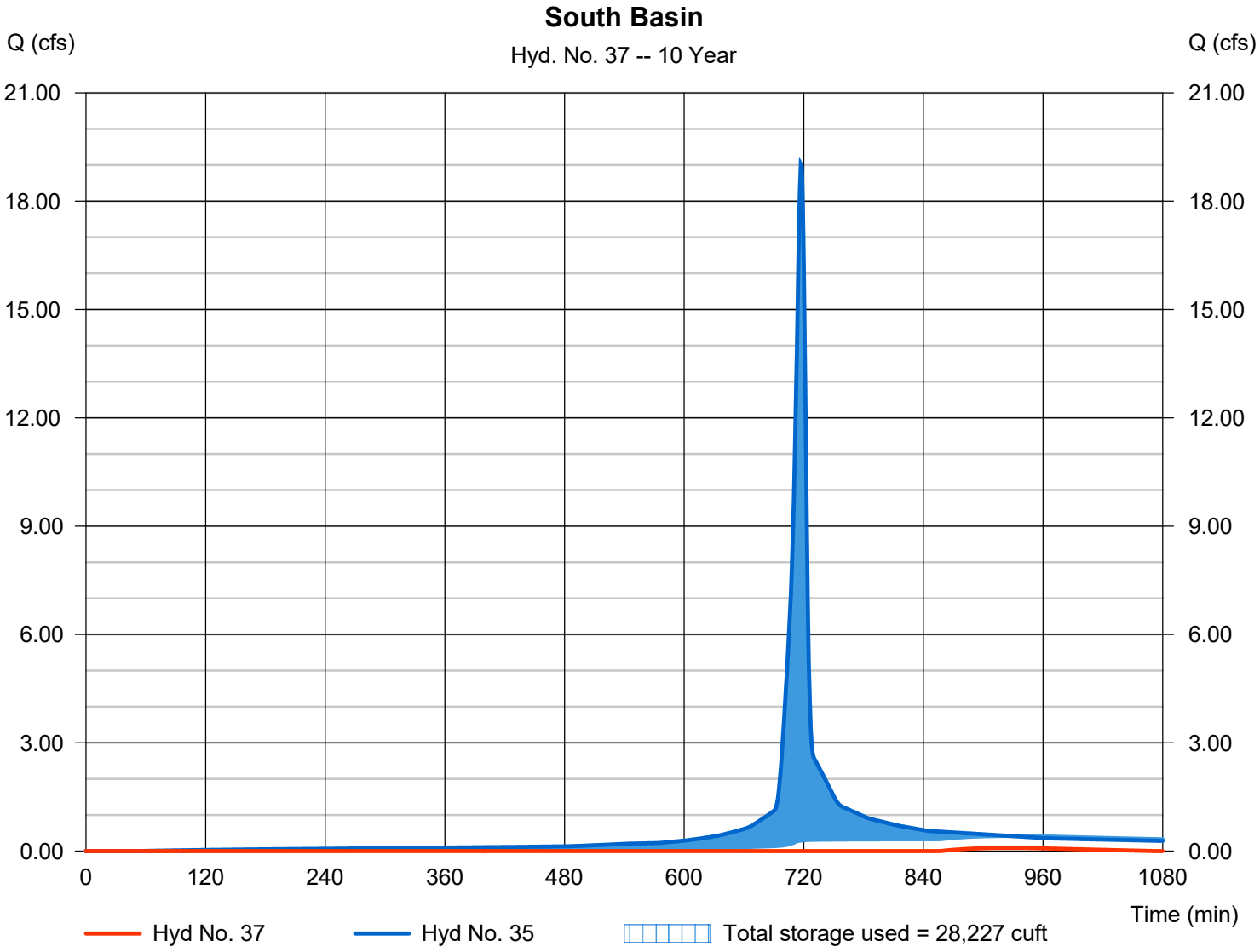
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.089 cfs
Storm frequency	=	10 yrs	Time to peak	=	926 min
Time interval	=	1 min	Hyd. volume	=	679 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	474.01 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	28,227 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

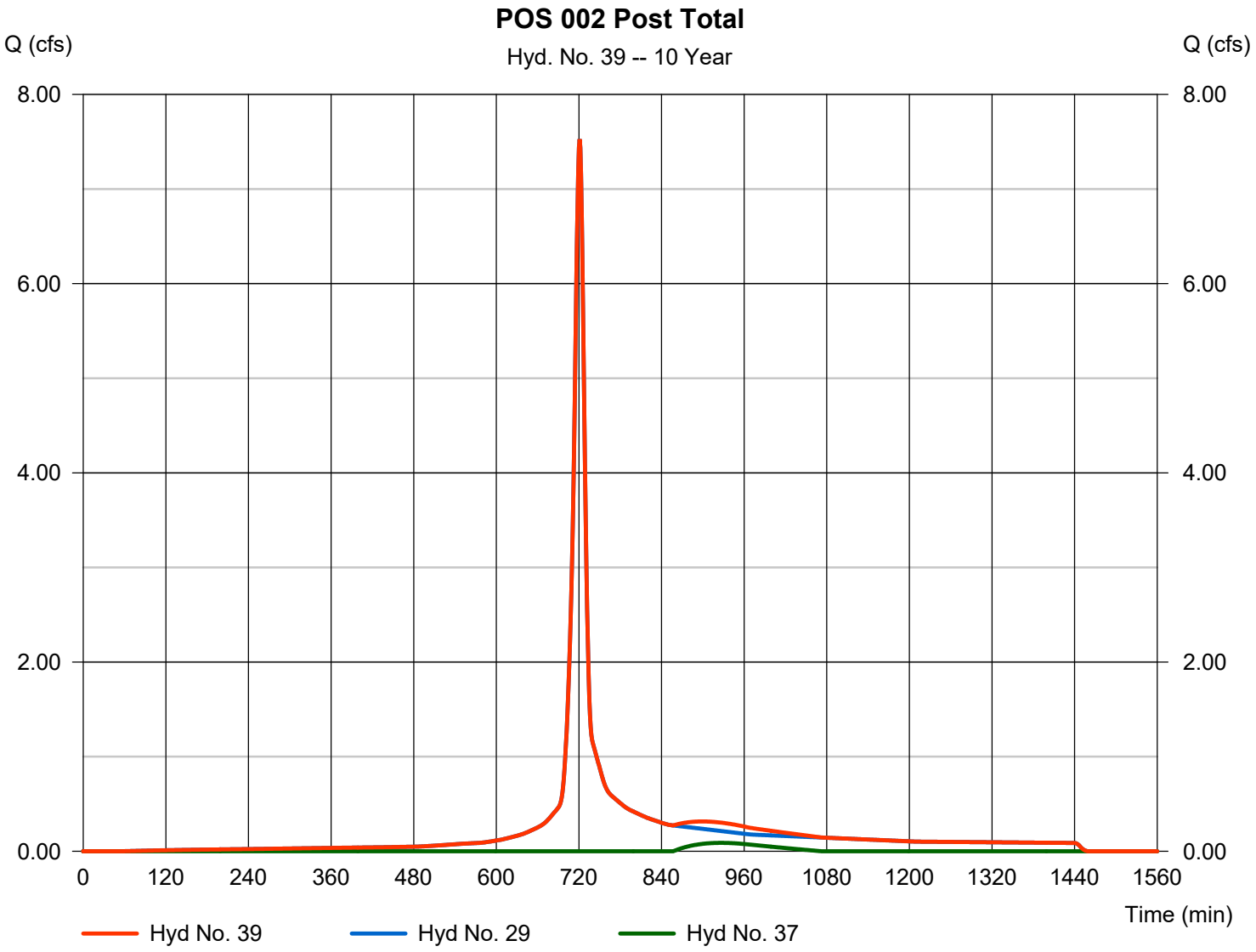


Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	= Combine	Peak discharge	= 7.527 cfs
Storm frequency	= 10 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 20,820 cuft
Inflow hyds.	= 29, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.448	1	753	5,437	------	------	------	Ex North Mdw A
2	SCS Runoff	7.378	1	739	37,279	------	------	------	Ex North Mdw C
3	SCS Runoff	2.315	1	738	12,916	------	------	------	Ex North Imperv
4	SCS Runoff	0.320	1	739	1,618	------	------	------	Ex North Imp-Mdw
5	Combine	10.38	1	739	57,250	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	0.603	1	720	2,481	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	2.527	1	718	5,126	------	------	------	Post North Bypass Lawn C
9	Combine	3.001	1	718	7,607	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.027	1	720	111	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	6.526	1	718	13,235	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	46.70	1	717	113,334	------	------	------	Post To North Basin Imp
14	Combine	53.21	1	717	126,681	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	3.807	1	747	38,492	14	474.18	71,728	North Basin
18	Combine	4.378	1	722	46,099	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	10.64	1	735	47,505	------	------	------	Ex South Mdw C
21	SCS Runoff	1.838	1	734	8,120	------	------	------	Ex South Mdw D
22	SCS Runoff	3.884	1	733	19,257	------	------	------	Ex South Imperv
23	SCS Runoff	0.539	1	735	2,404	------	------	------	Ex South Imp-Mdw
24	Combine	16.89	1	734	77,286	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	4.775	1	721	12,064	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	1.921	1	721	4,903	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	3.344	1	721	9,885	------	------	------	Post South Bypass Imp
29	Combine	10.04	1	721	26,851	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.015	1	720	63	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	10.14	1	718	20,573	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	3.828	1	717	7,920	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	11.06	1	717	26,847	------	------	------	Post To South Basin Imp
35	Combine	25.00	1	717	55,402	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	1.361	1	755	11,994	35	474.10	31,690	South Basin

Hydrograph Summary Report

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

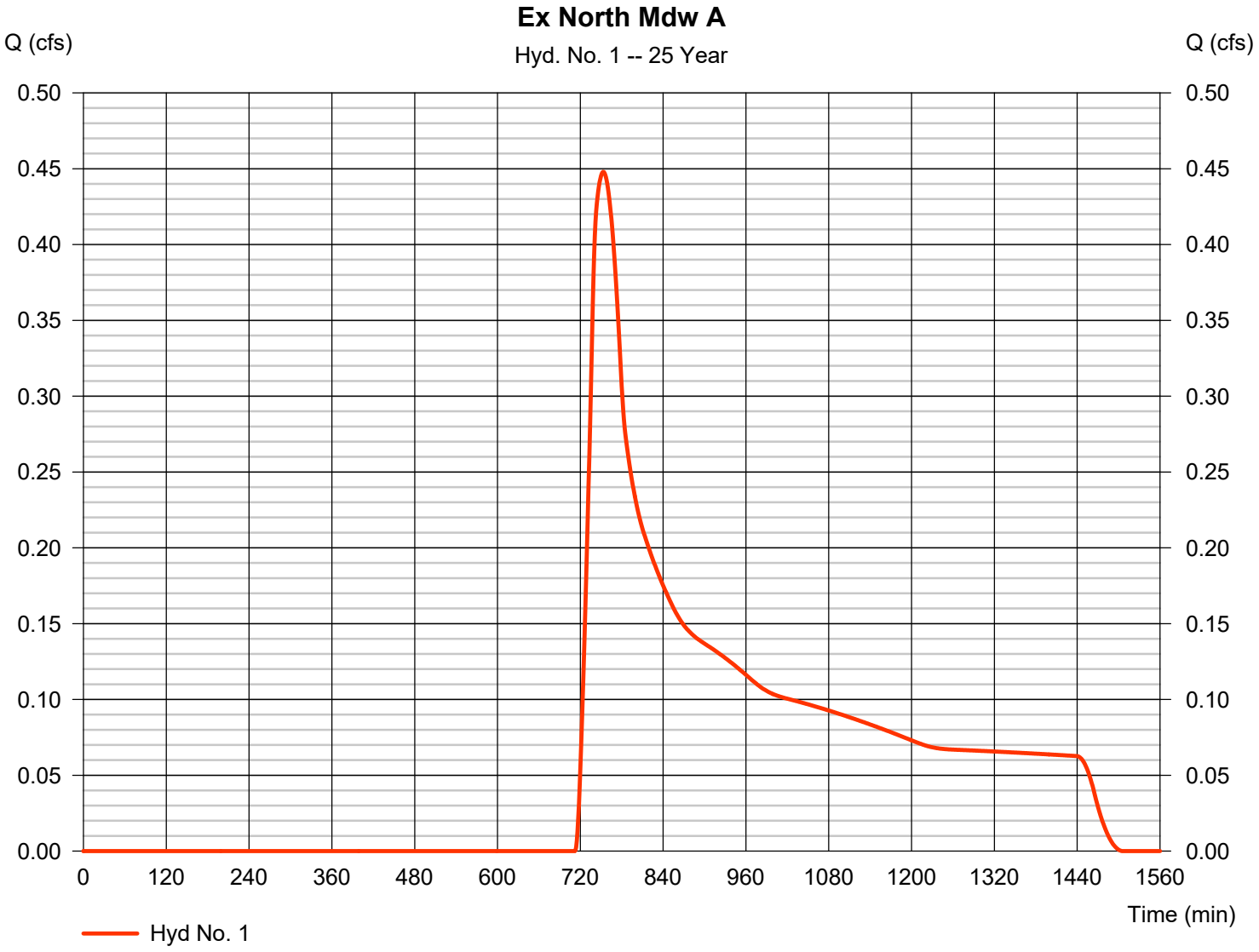
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	10.04	1	721	38,845	29, 37,	------	------	POS 002 Post Total
42	Combine	56.07	1	717	134,288	9, 14,	------	------	Post North Undetained
43	Combine	34.06	1	718	82,254	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.448 cfs
Storm frequency	= 25 yrs	Time to peak	= 753 min
Time interval	= 1 min	Hyd. volume	= 5,437 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

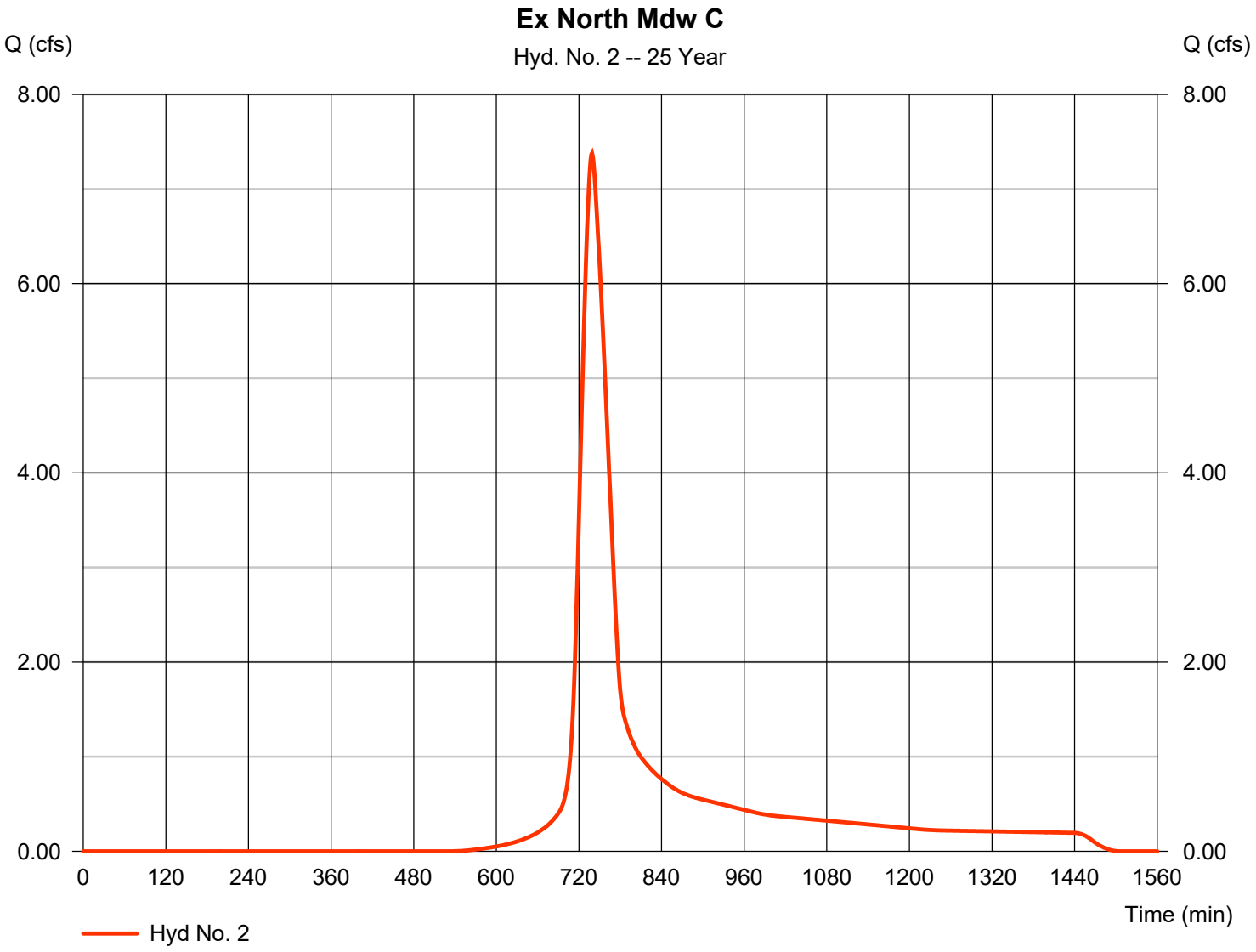


Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 7.378 cfs
Storm frequency	= 25 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 37,279 cuft
Drainage area	= 3.595 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

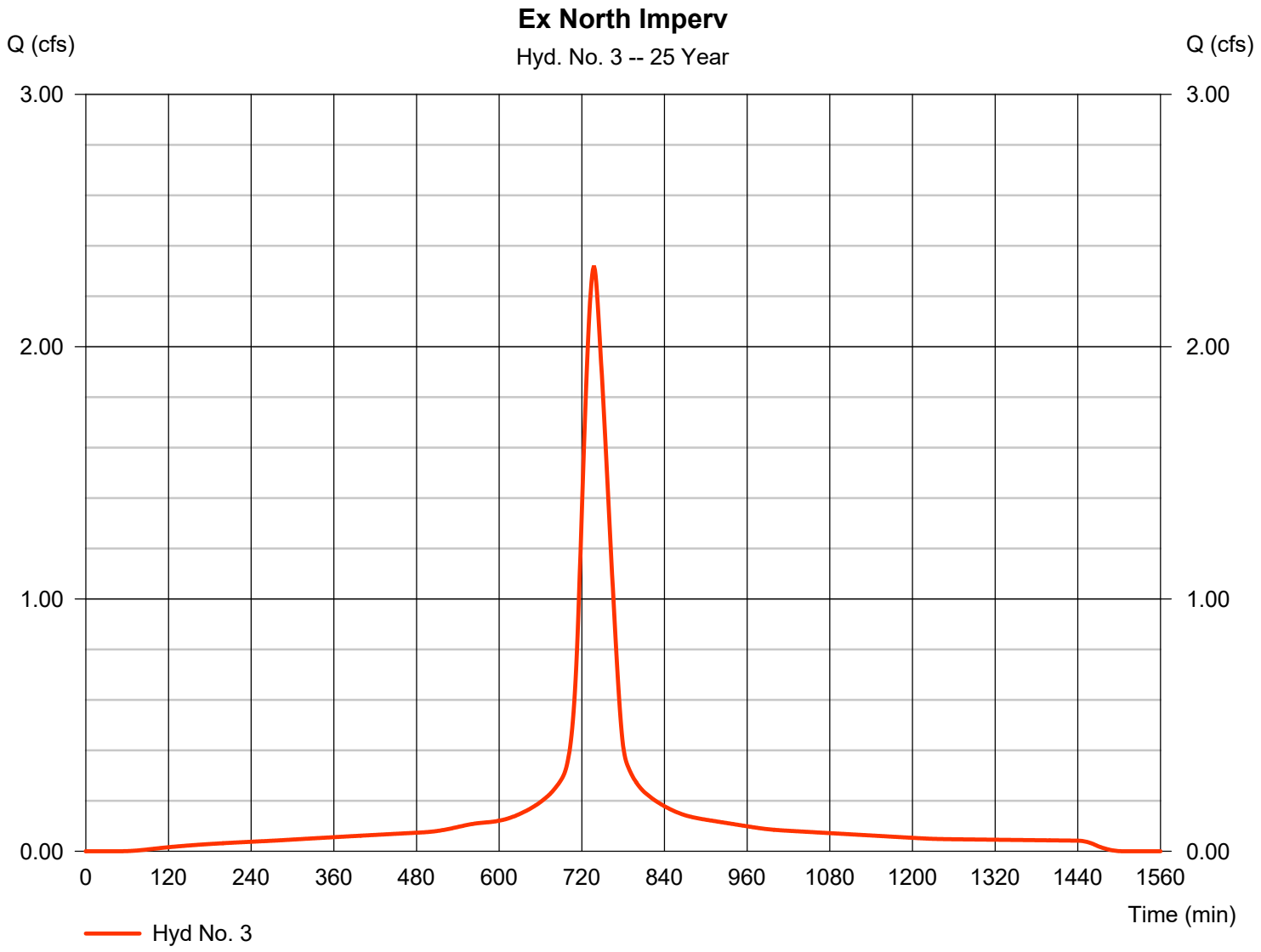


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.315 cfs
Storm frequency	=	25 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	12,916 cuft
Drainage area	=	0.622 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

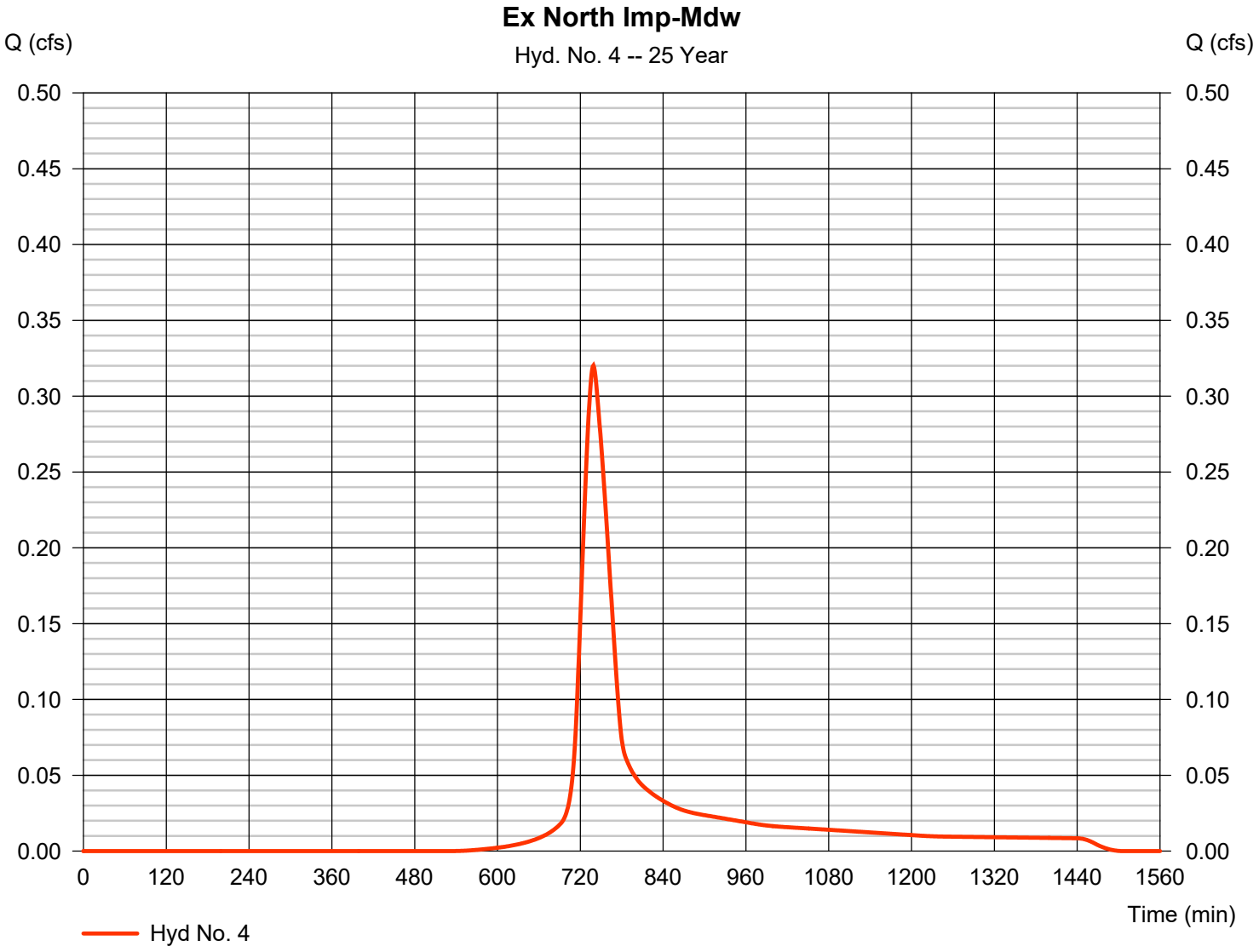


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	= SCS Runoff	Peak discharge	= 0.320 cfs
Storm frequency	= 25 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 1,618 cuft
Drainage area	= 0.156 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

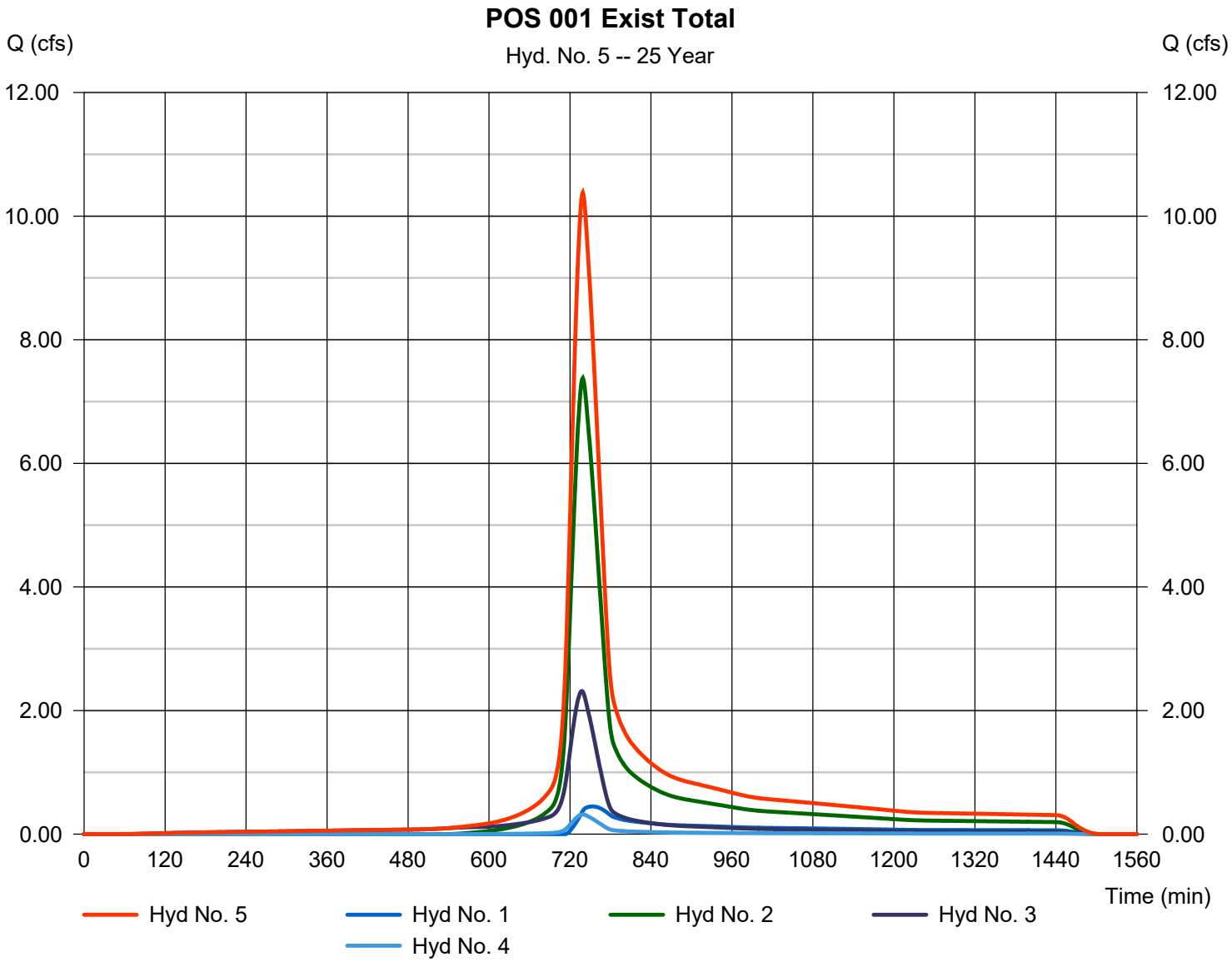


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 10.38 cfs
Storm frequency	= 25 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 57,250 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

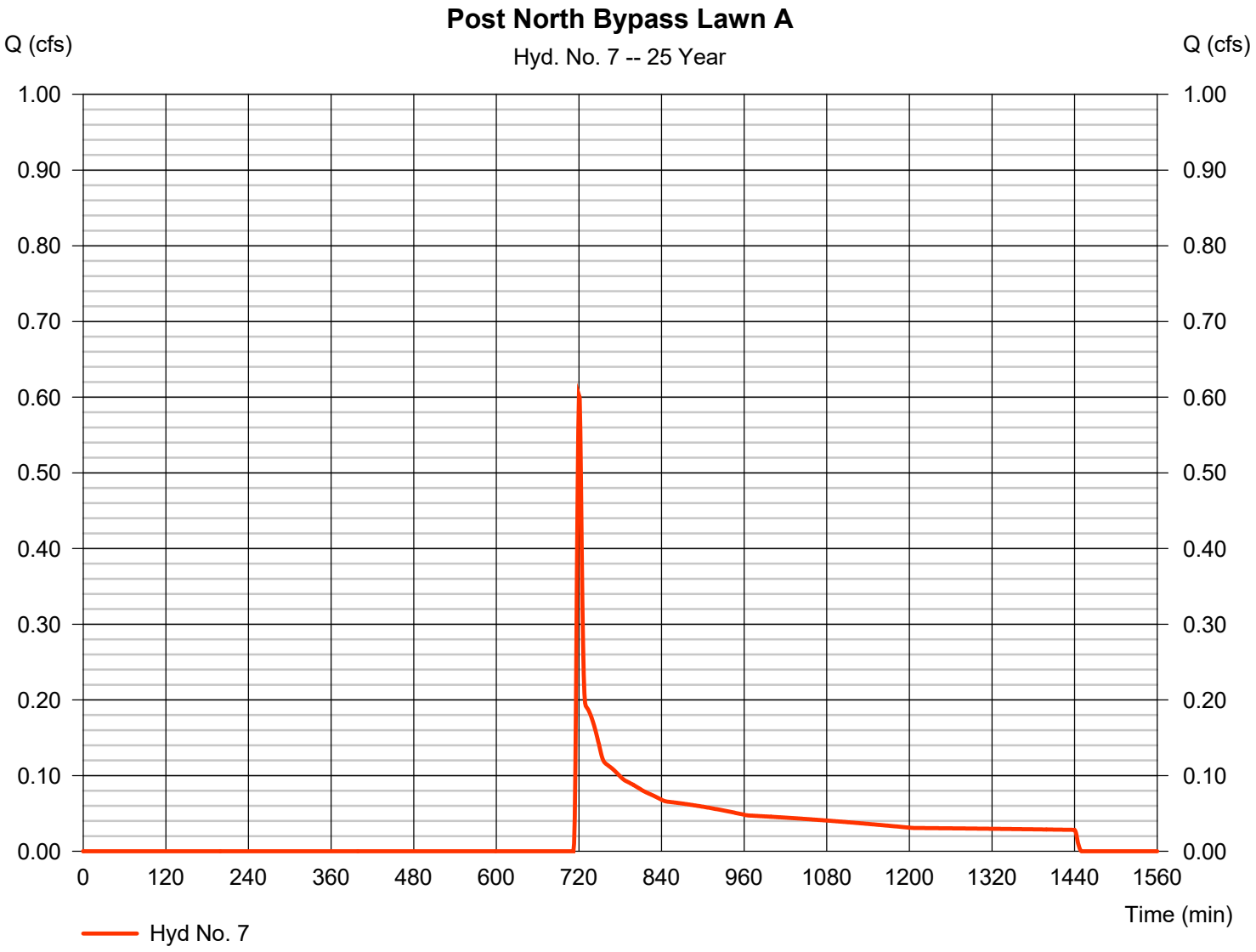


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.603 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 2,481 cuft
Drainage area	= 1.385 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

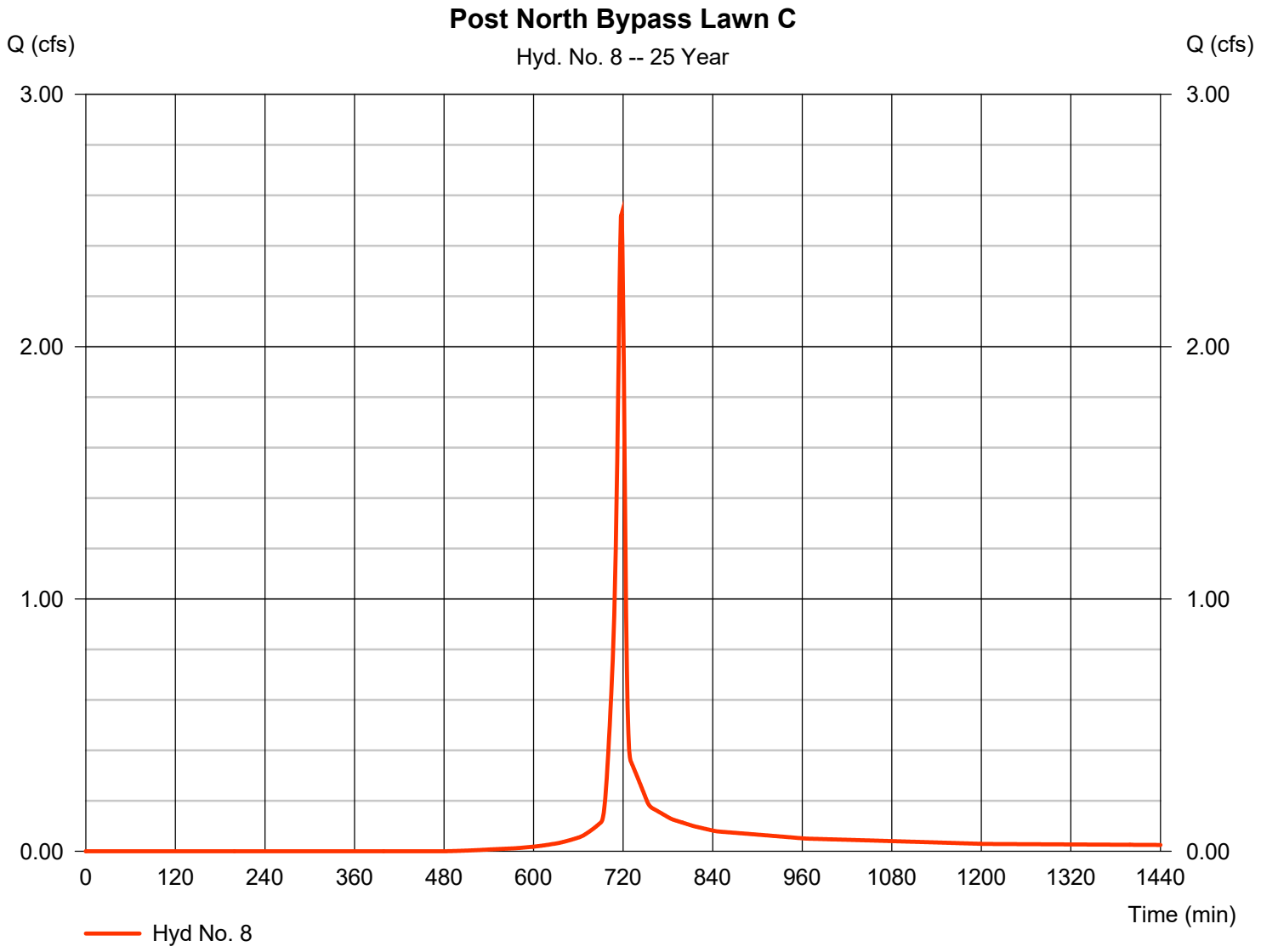


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 2.527 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 5,126 cuft
Drainage area	= 0.438 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

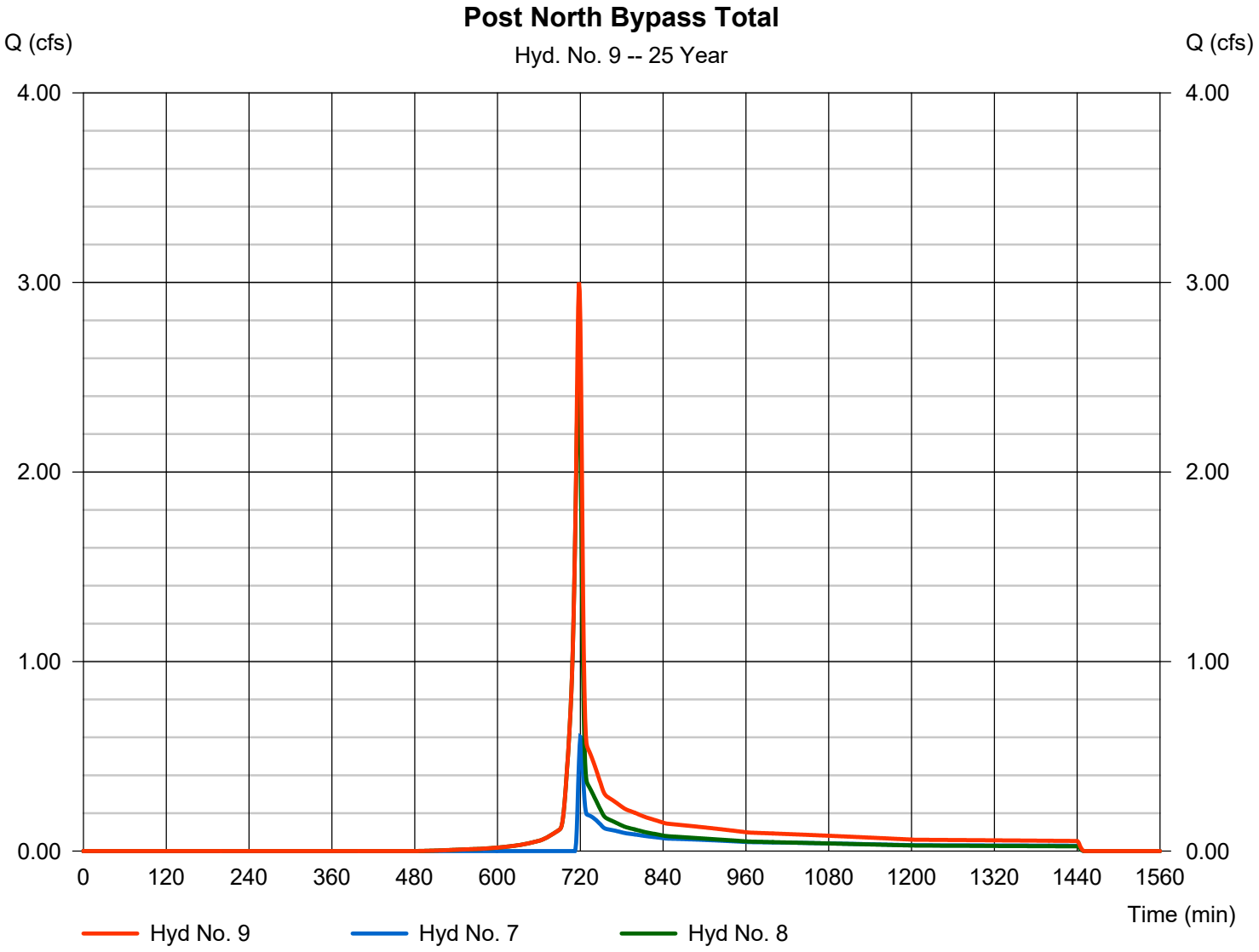


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	= Combine	Peak discharge	= 3.001 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 7,607 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 1.823 ac



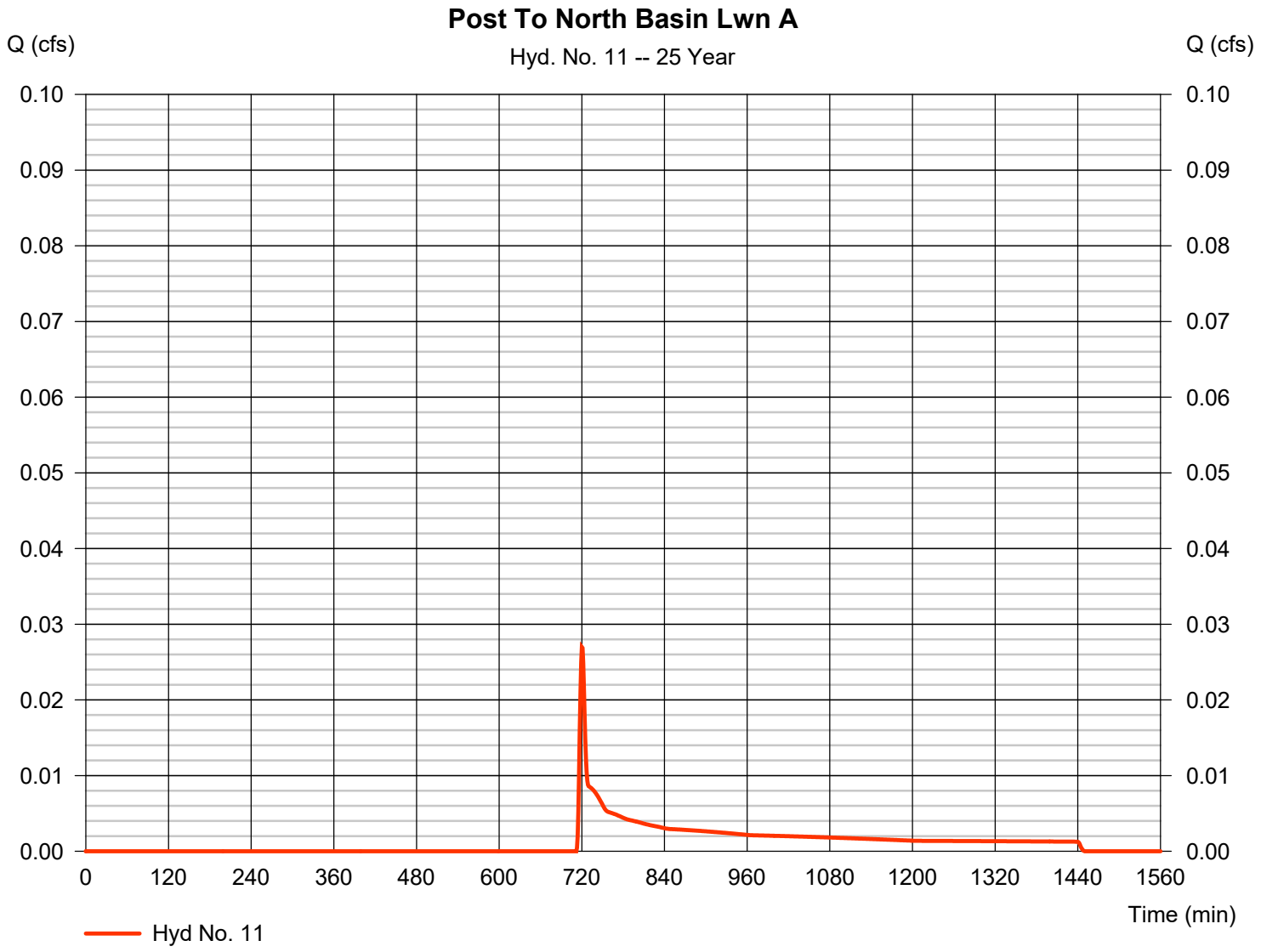
Hydrograph Report

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.027 cfs
Storm frequency	=	25 yrs	Time to peak	=	720 min
Time interval	=	1 min	Hyd. volume	=	111 cuft
Drainage area	=	0.062 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



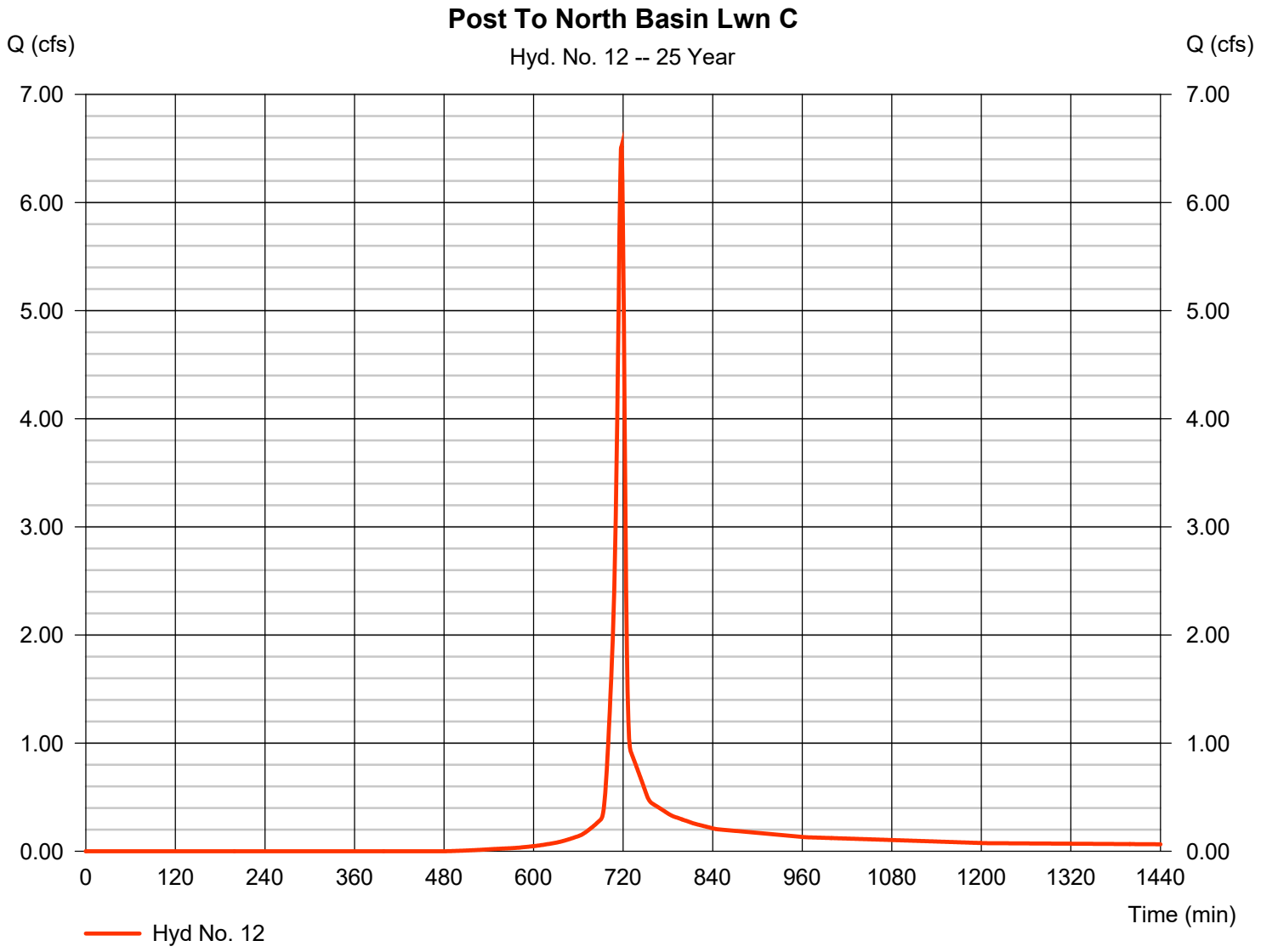
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.526 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	13,235 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



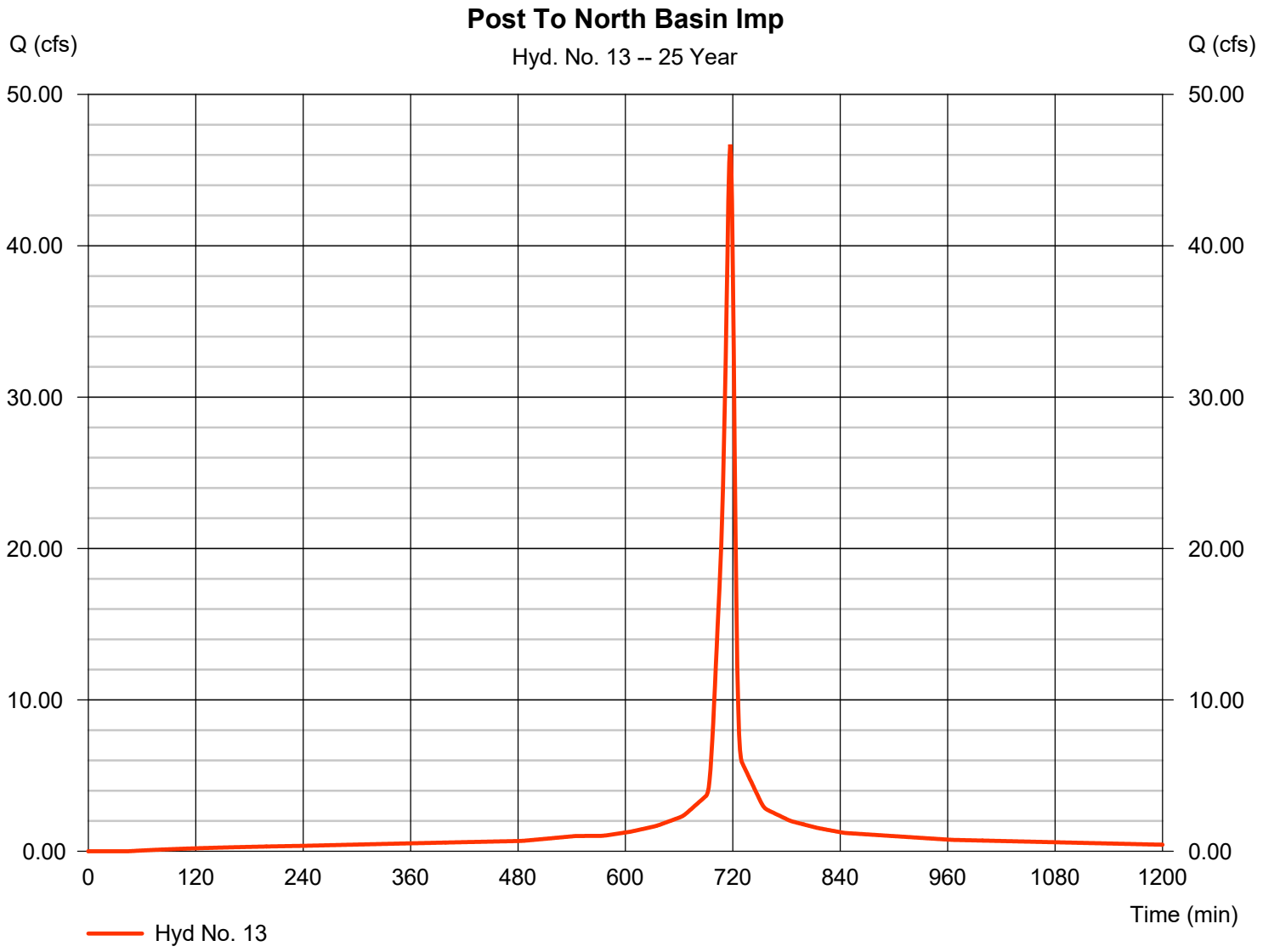
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.70 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	113,334 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

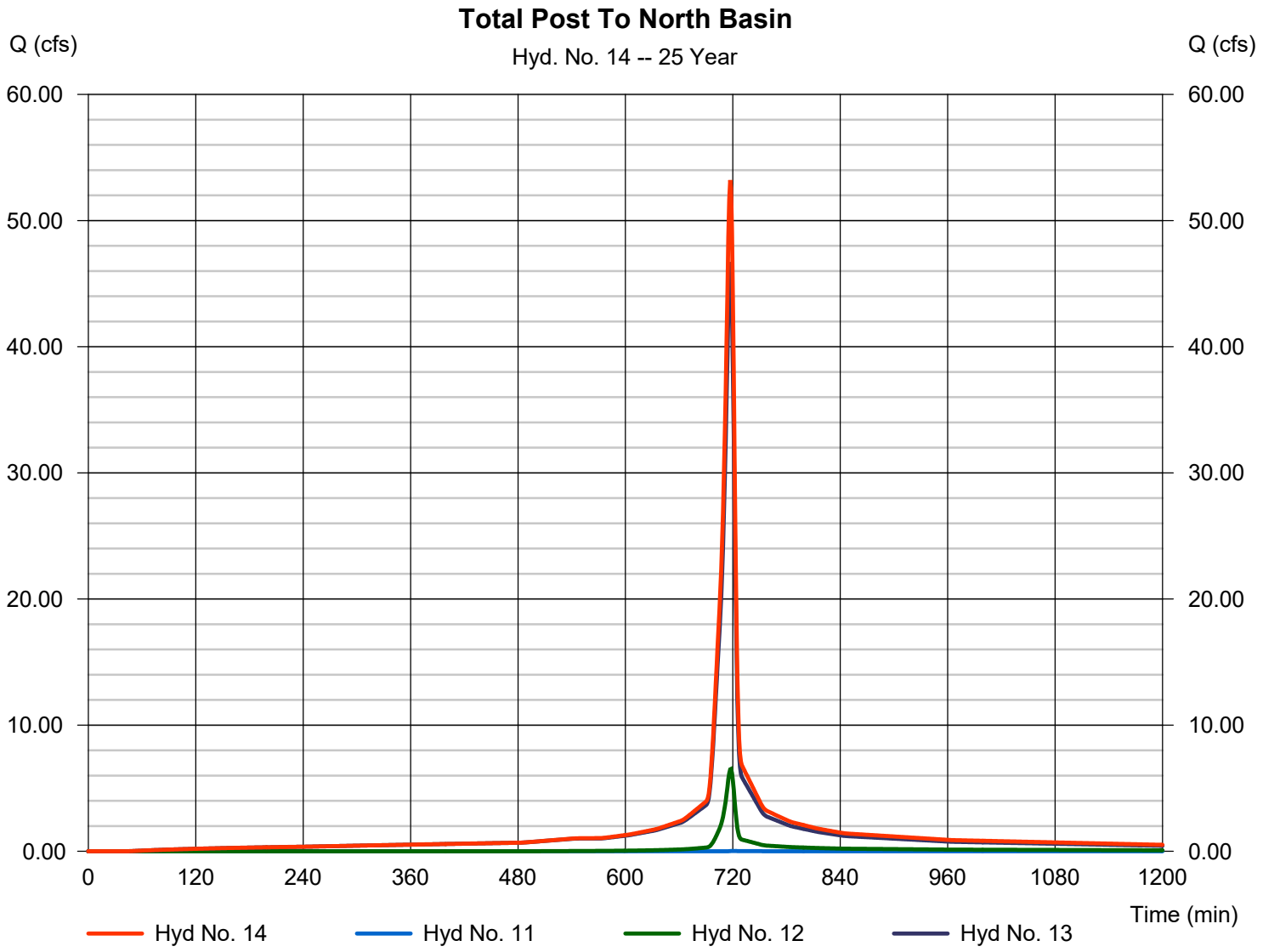


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	=	Combine	Peak discharge	=	53.21 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	126,681 cuft
Inflow hyds.	=	11, 12, 13	Contrib. drain. area	=	6.512 ac



Hydrograph Report

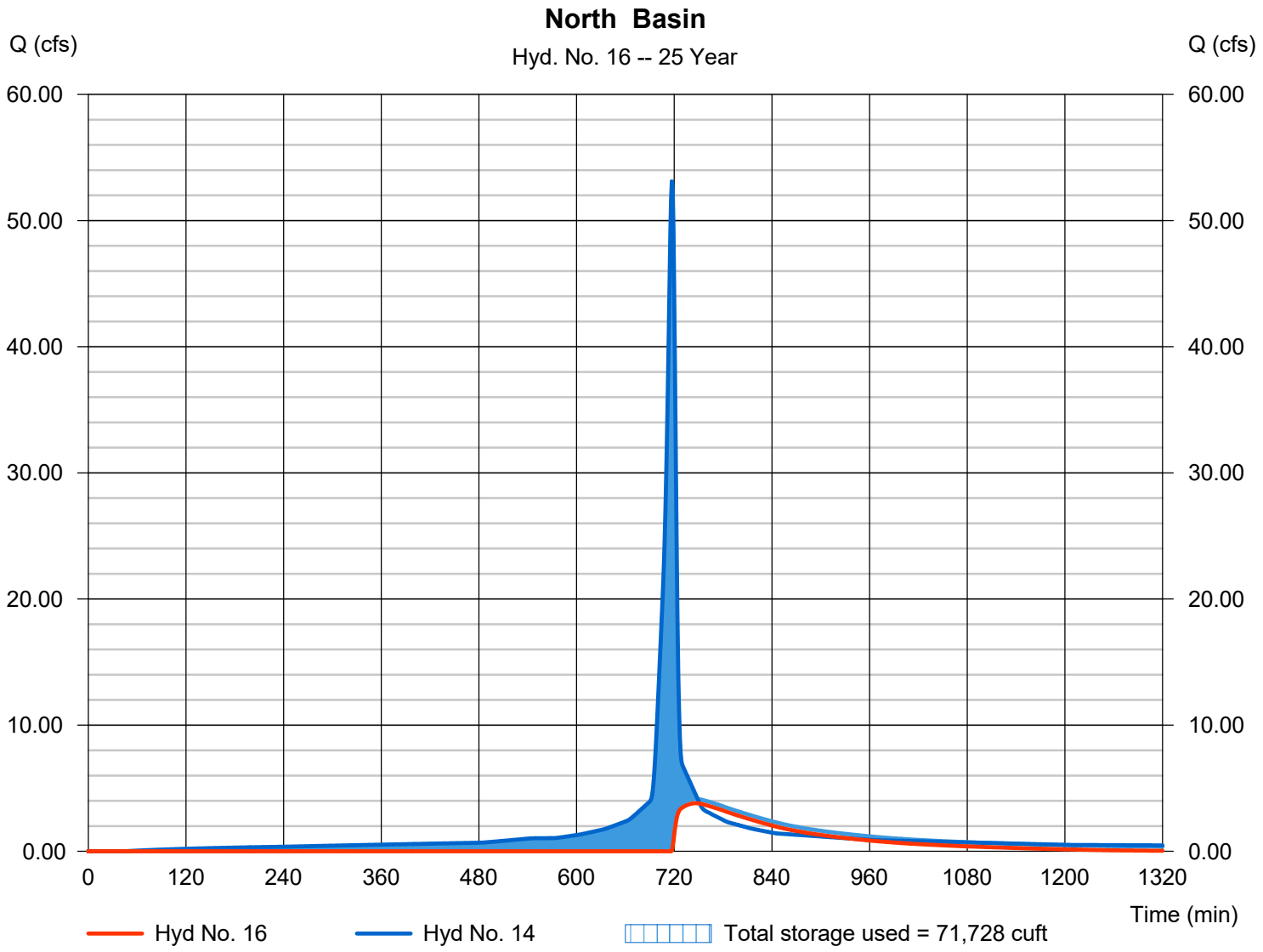
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	3.807 cfs
Storm frequency	=	25 yrs	Time to peak	=	747 min
Time interval	=	1 min	Hyd. volume	=	38,492 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	474.18 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	71,728 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

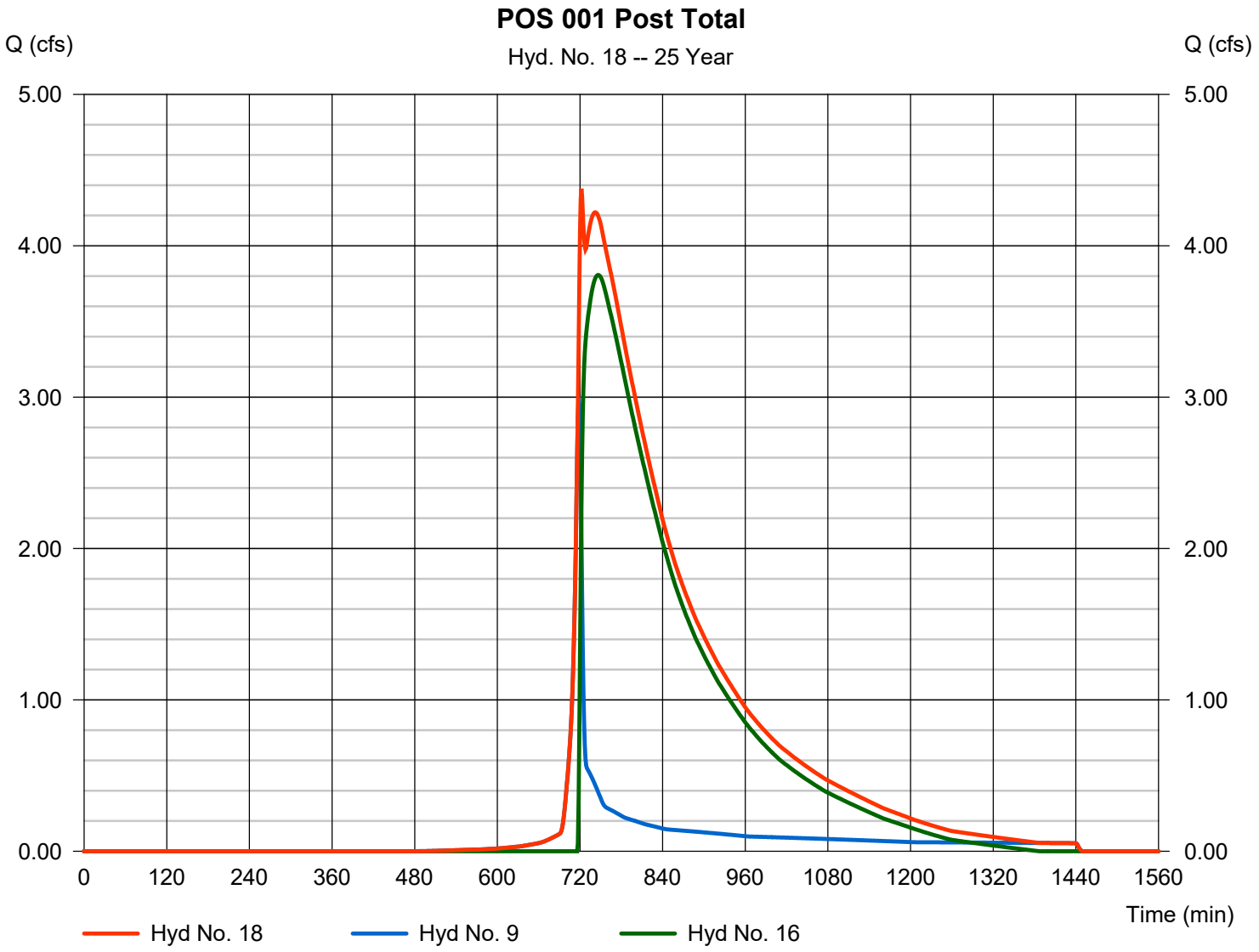


Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	= Combine	Peak discharge	= 4.378 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 46,099 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 0.000 ac



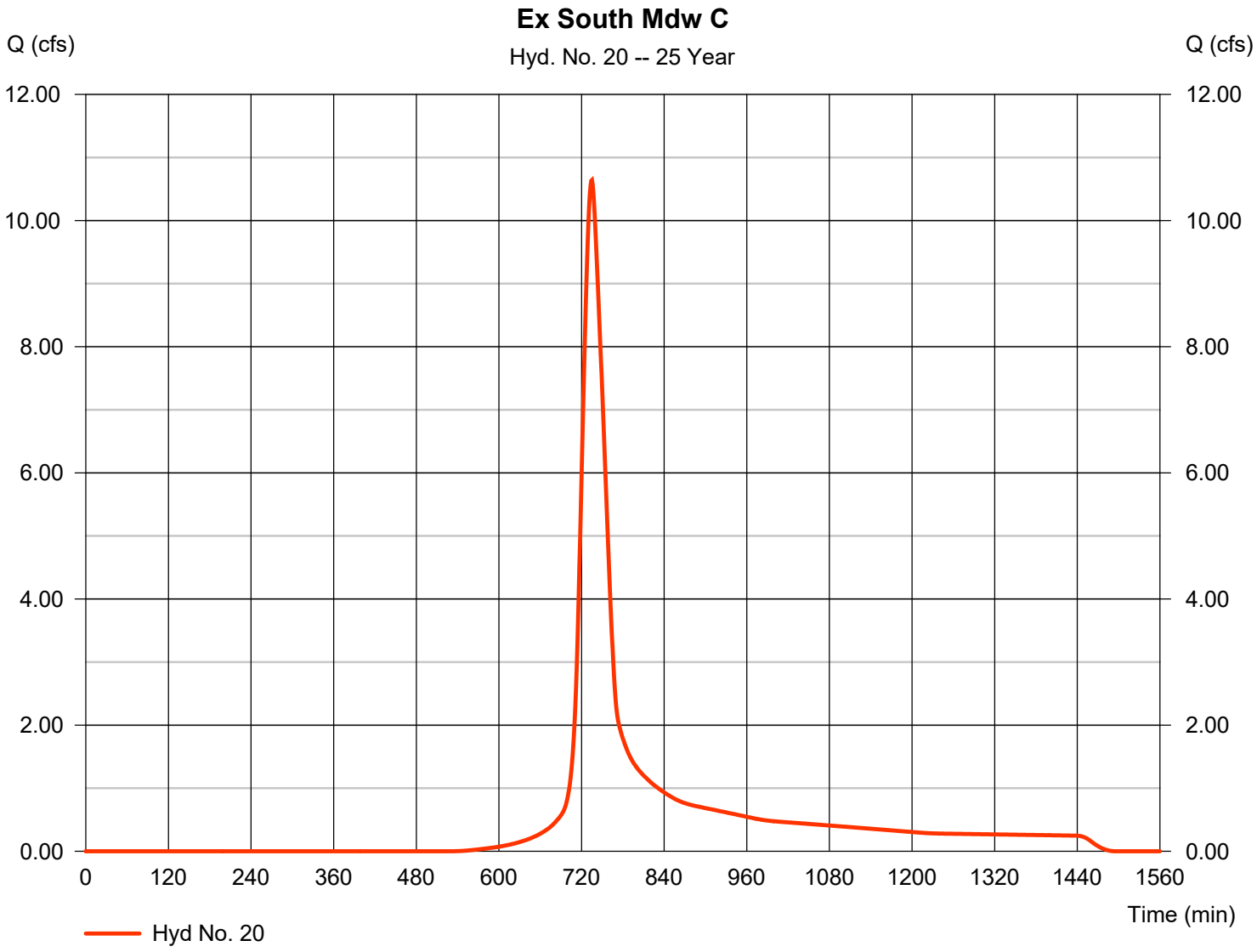
Hydrograph Report

Hyd. No. 20

Ex South Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.64 cfs
Storm frequency	=	25 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	47,505 cuft
Drainage area	=	4.604 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	33.93 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



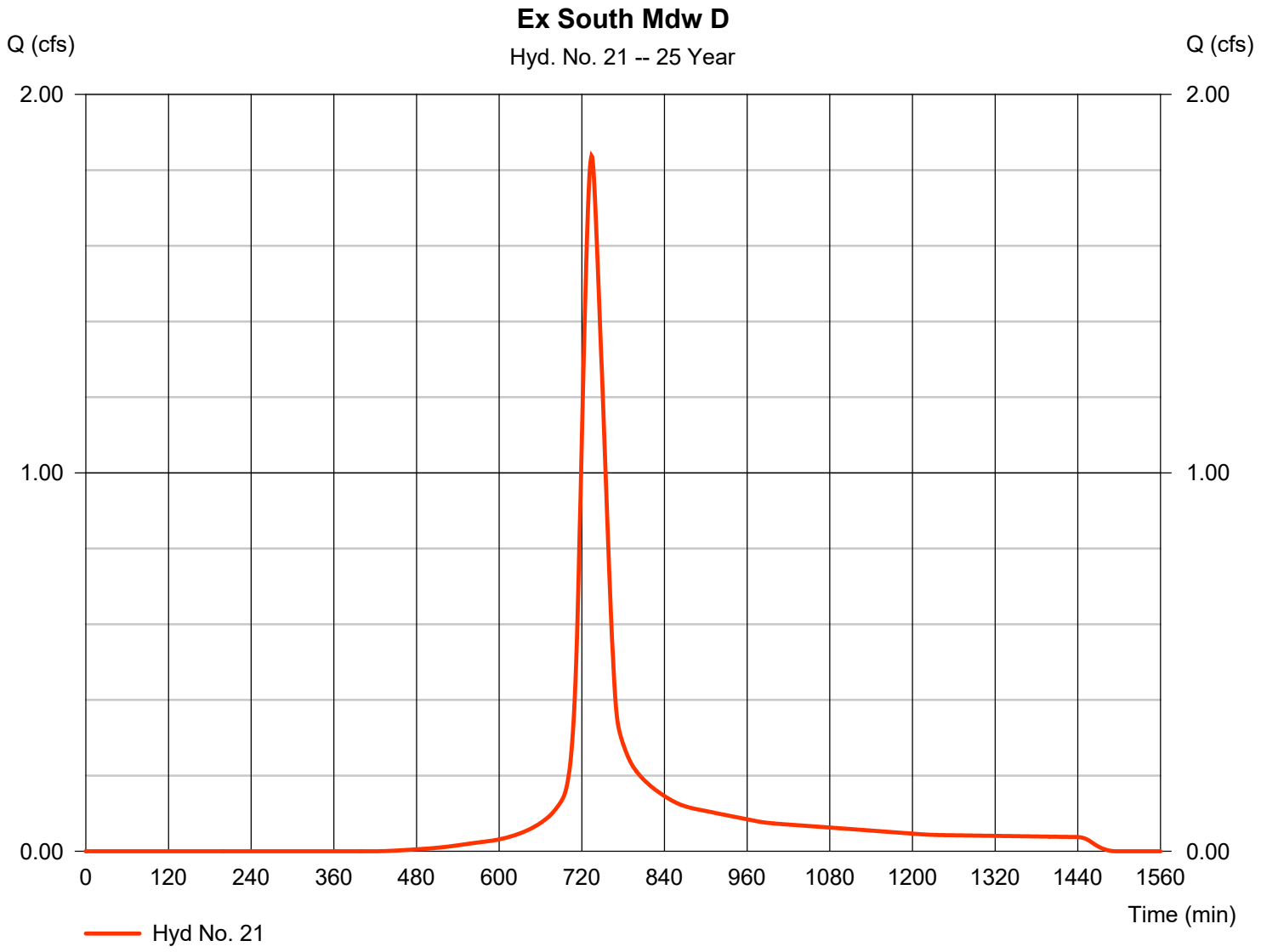
Hydrograph Report

Hyd. No. 21

Ex South Mdw D

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.838 cfs
Storm frequency	=	25 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	8,120 cuft
Drainage area	=	0.636 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



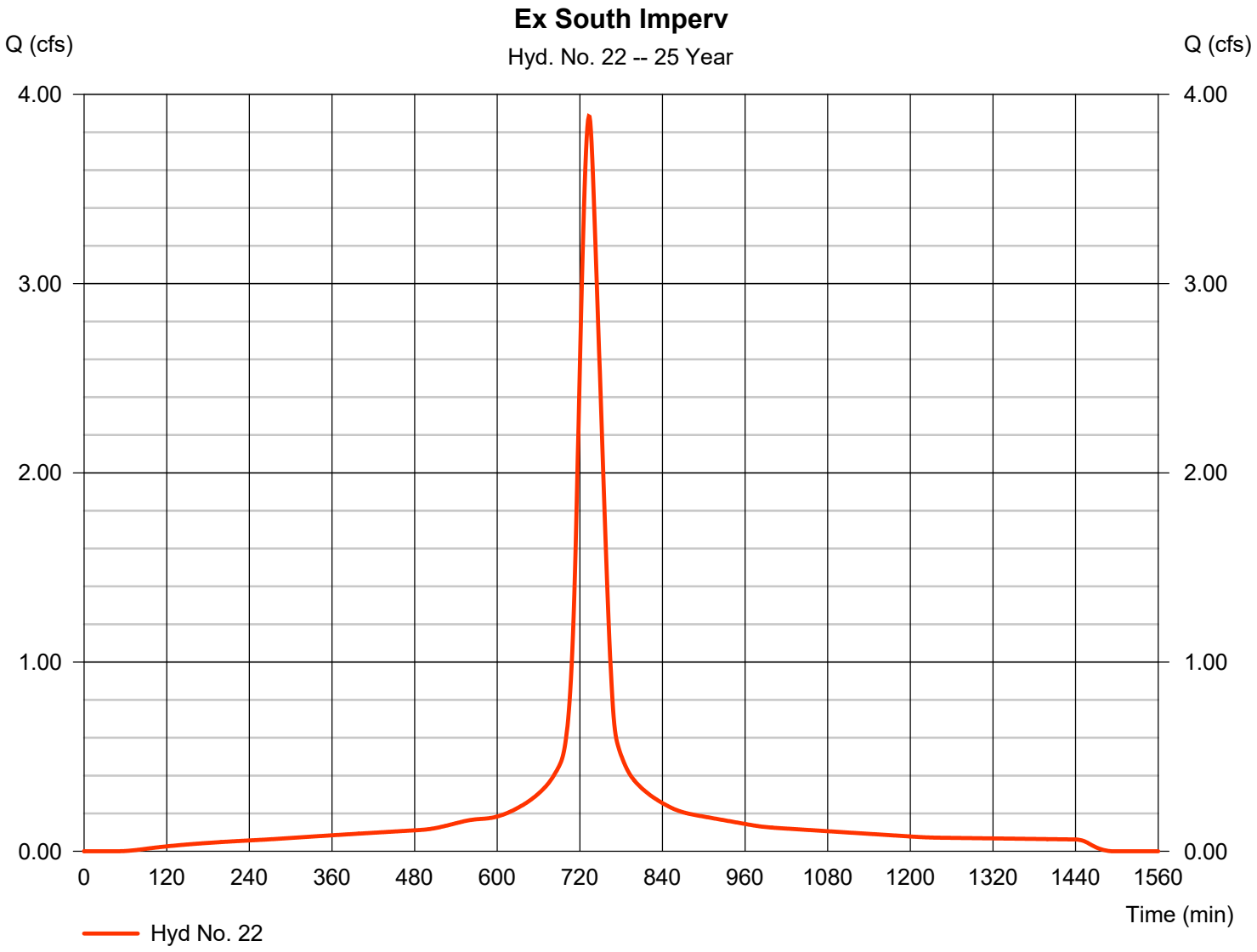
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.884 cfs
Storm frequency	=	25 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	19,257 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



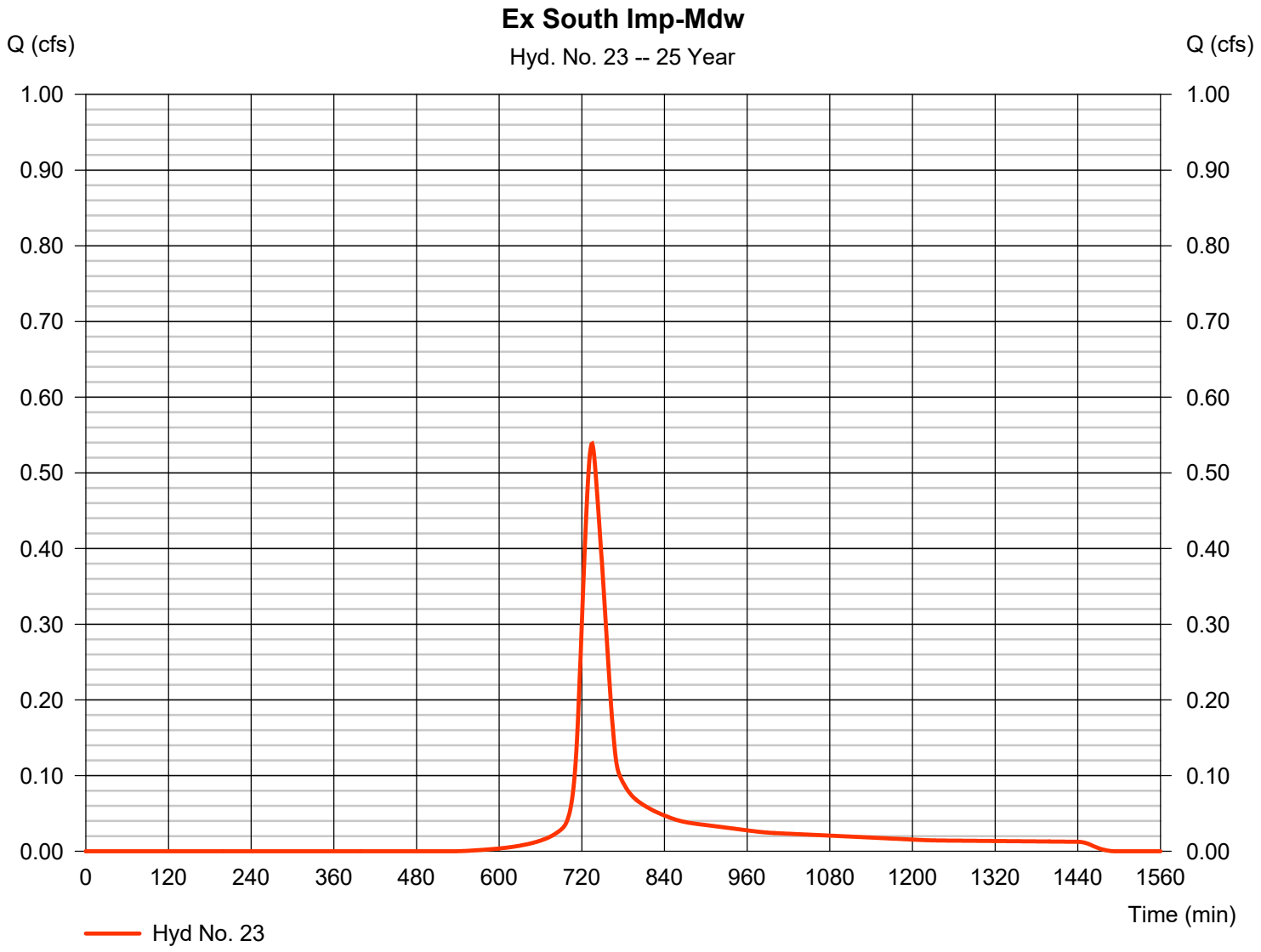
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.539 cfs
Storm frequency	=	25 yrs	Time to peak	=	735 min
Time interval	=	1 min	Hyd. volume	=	2,404 cuft
Drainage area	=	0.233 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

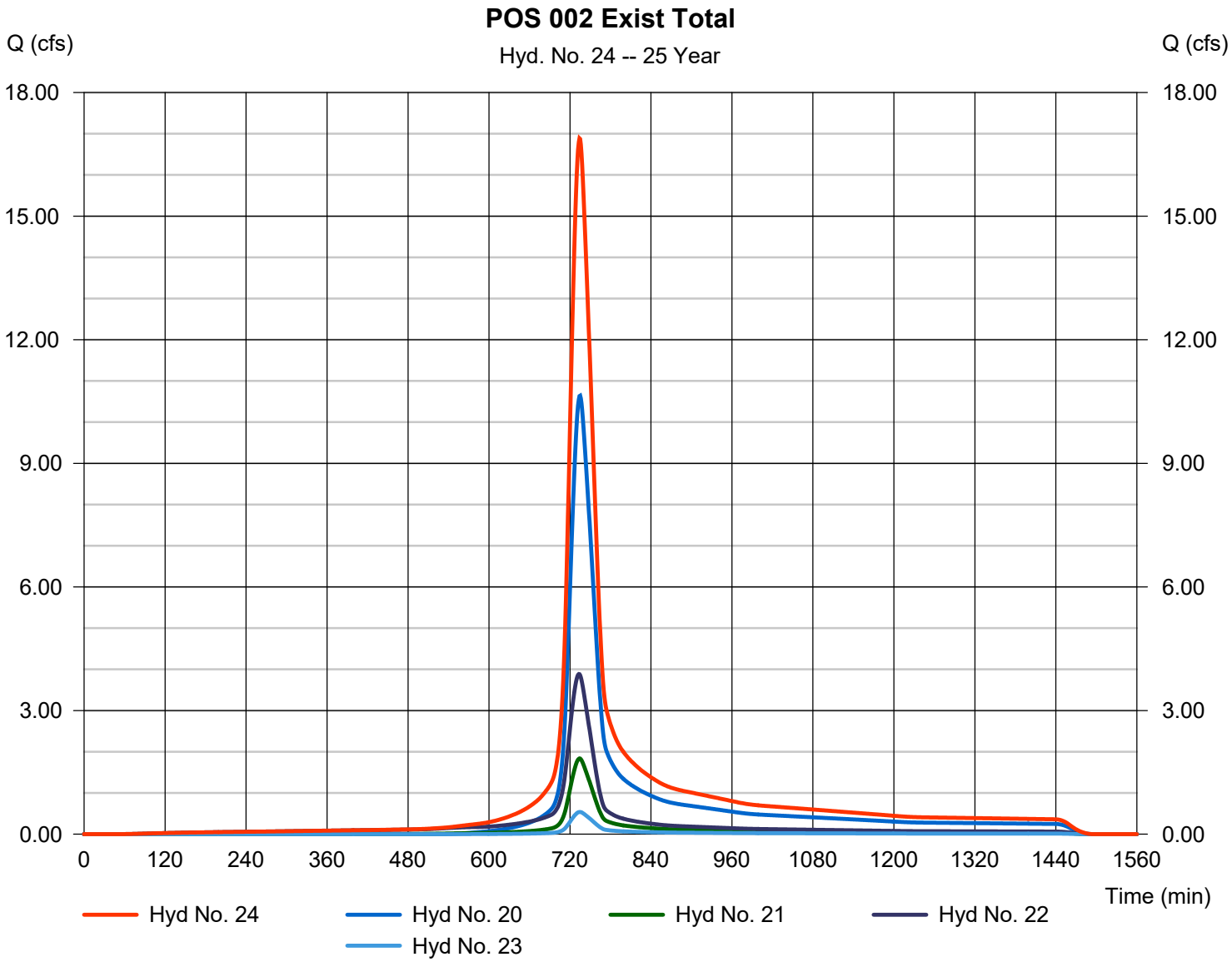


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	= Combine	Peak discharge	= 16.89 cfs
Storm frequency	= 25 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 77,286 cuft
Inflow hyds.	= 20, 21, 22, 23	Contrib. drain. area	= 6.405 ac

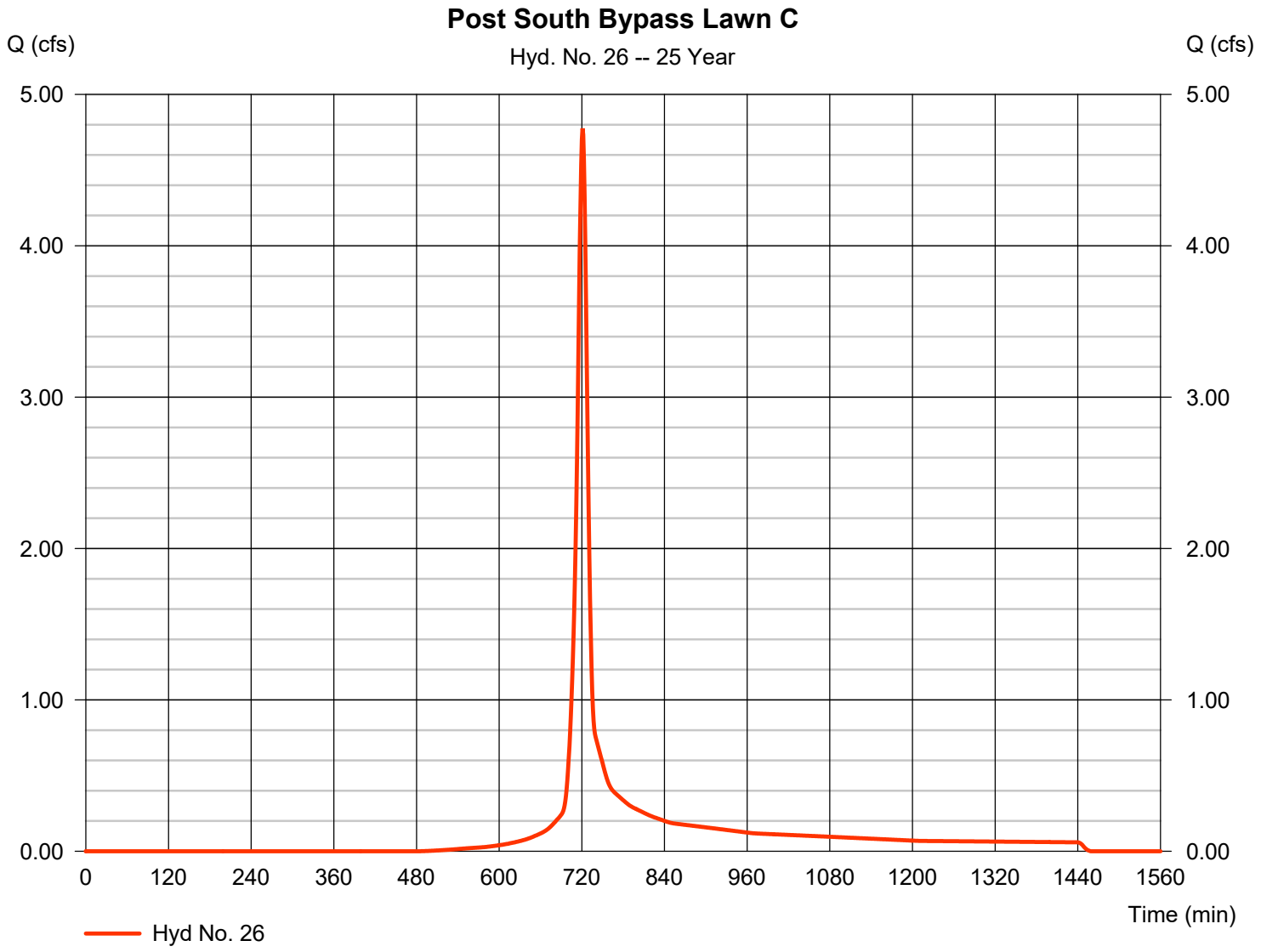


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 4.775 cfs
Storm frequency	= 25 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 12,064 cuft
Drainage area	= 1.080 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.90 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

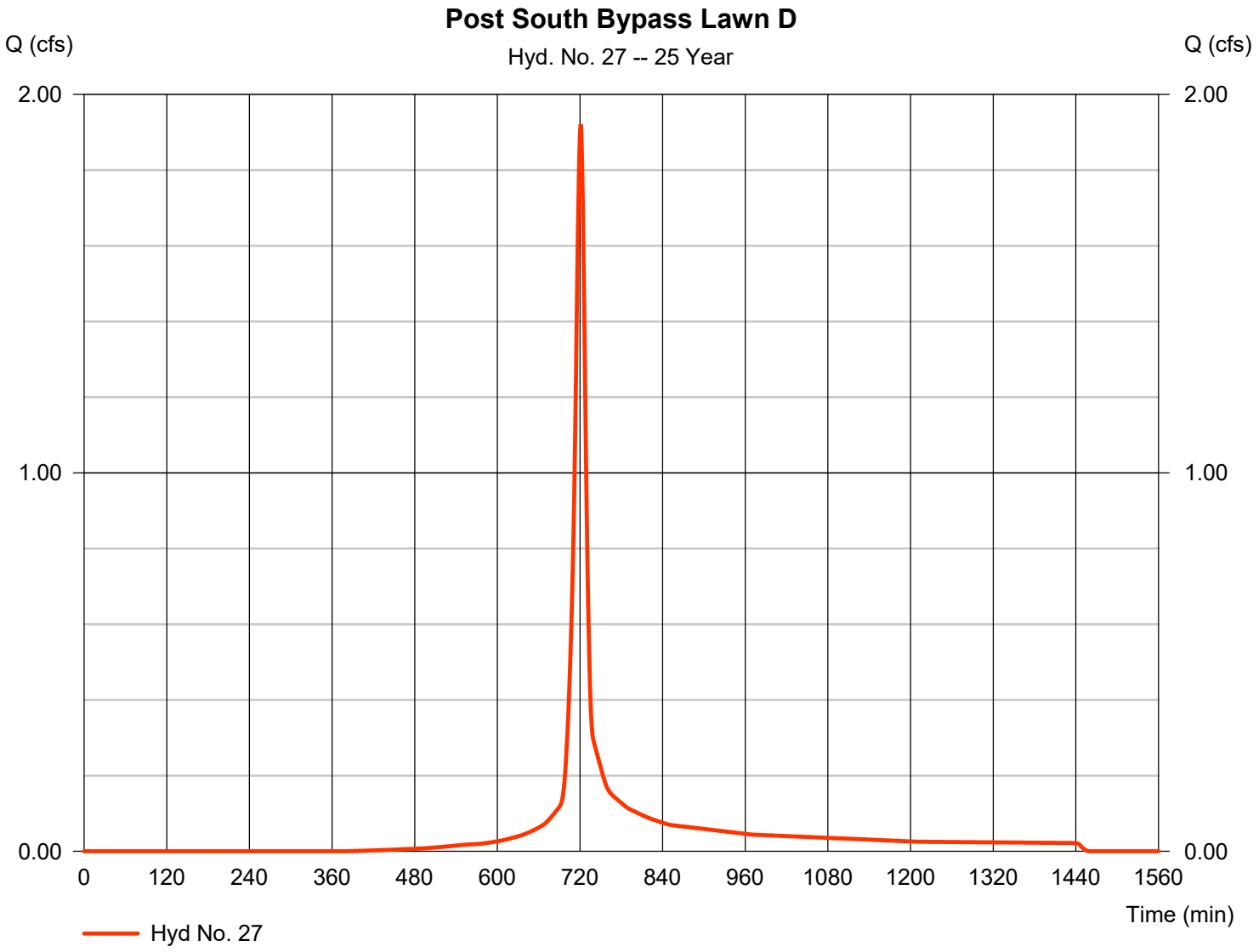


Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.921 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	4,903 cuft
Drainage area	=	0.369 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.90 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

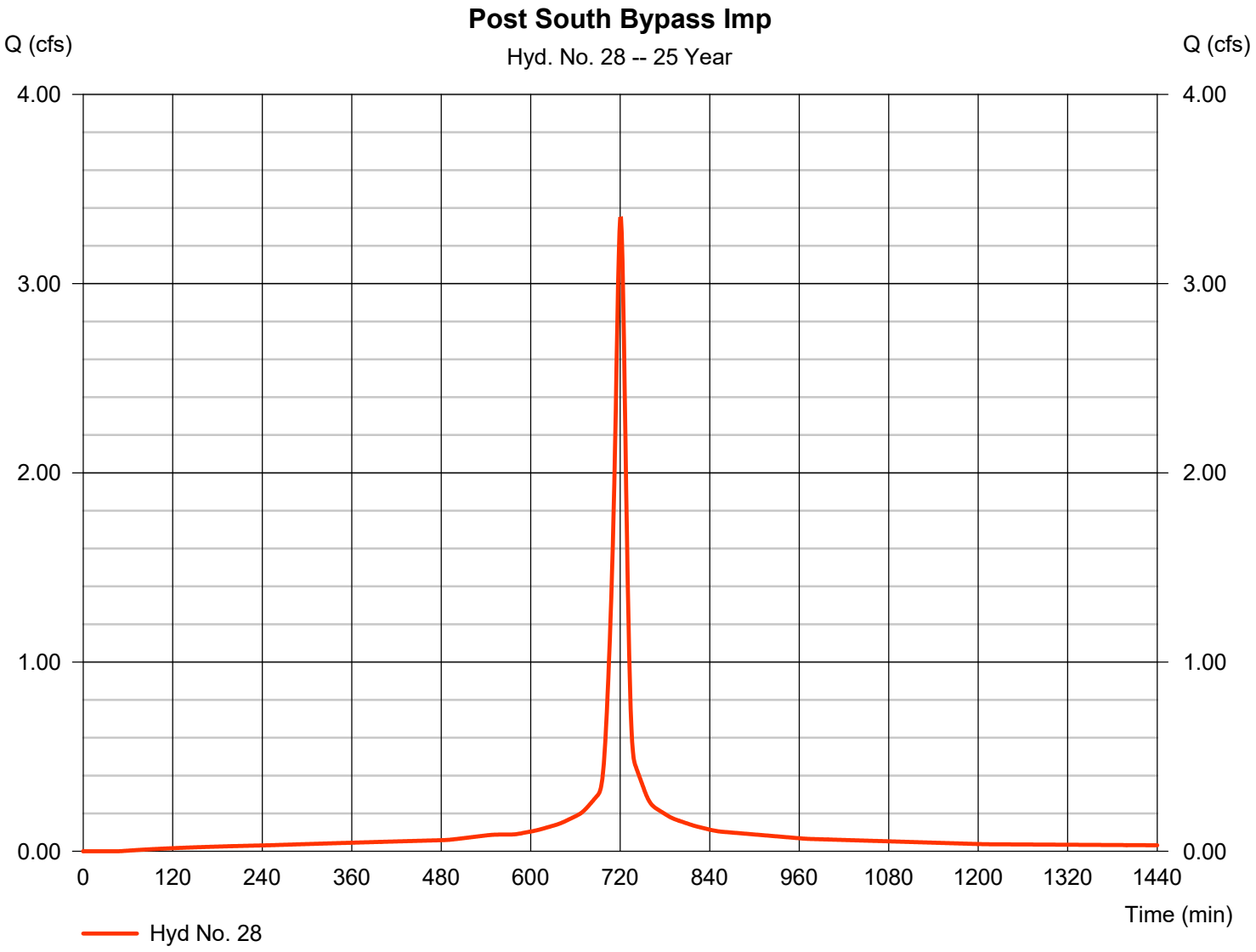


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.344 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	9,885 cuft
Drainage area	=	0.486 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.90 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

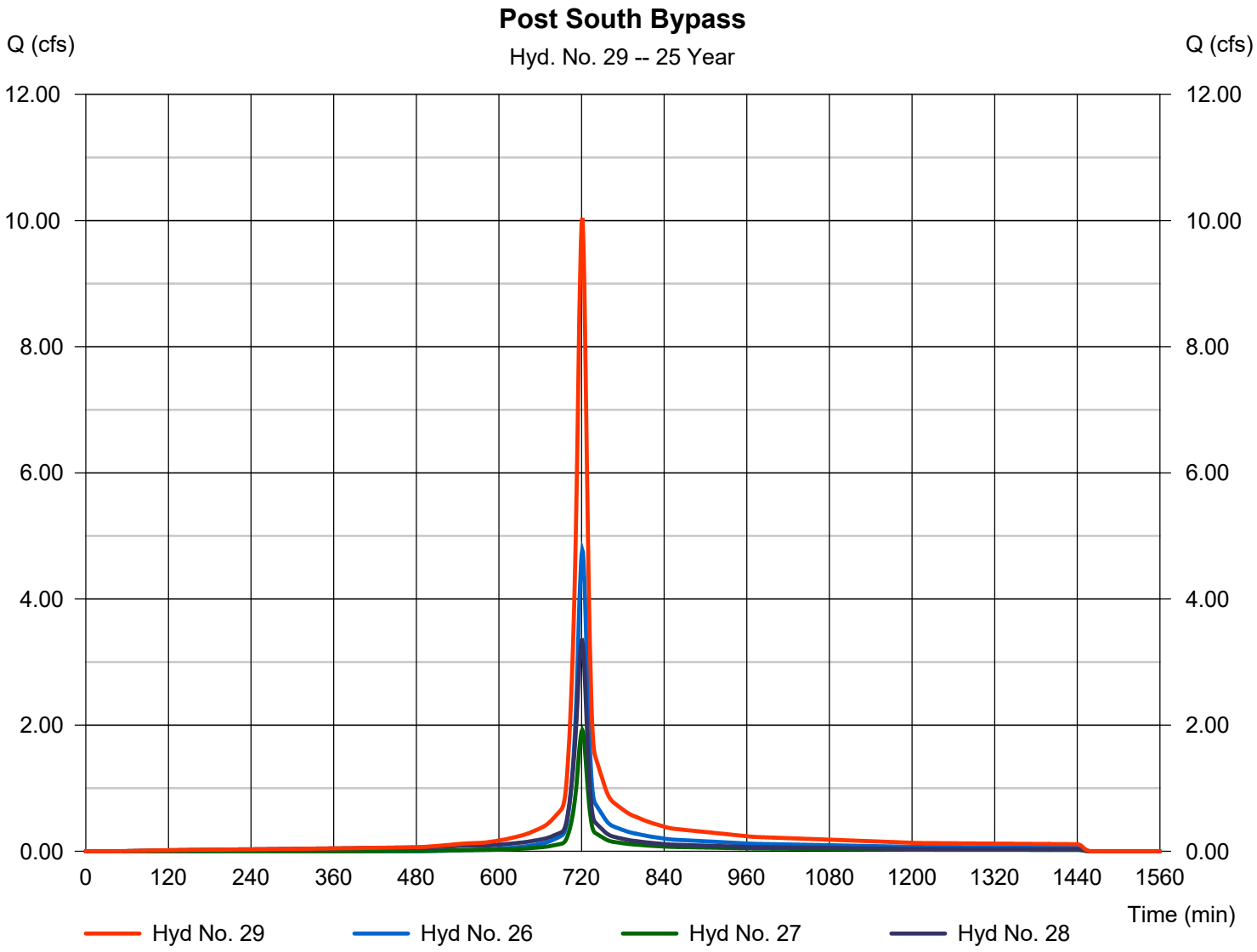


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	= Combine	Peak discharge	= 10.04 cfs
Storm frequency	= 25 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 26,851 cuft
Inflow hyds.	= 26, 27, 28	Contrib. drain. area	= 1.935 ac



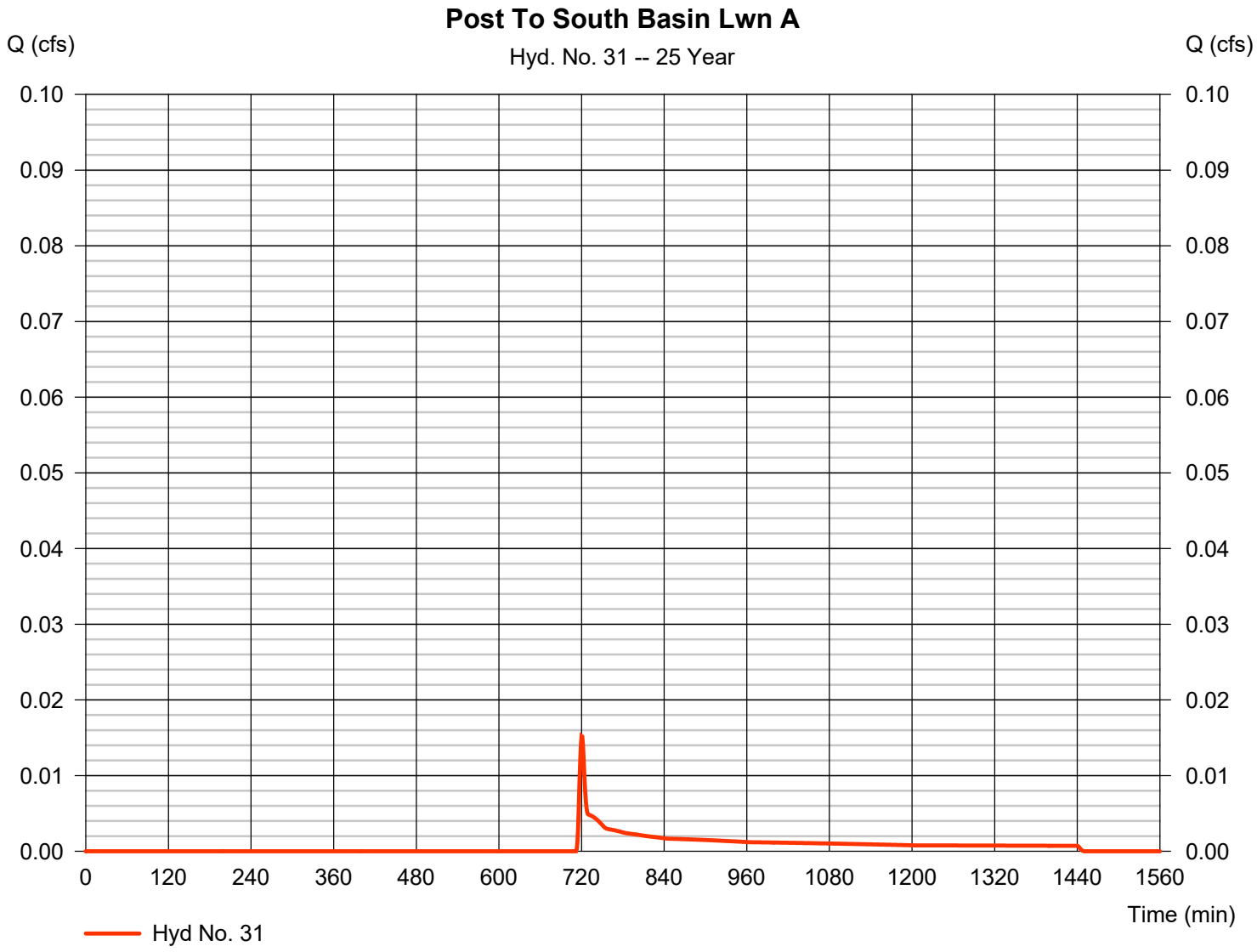
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.015 cfs
Storm frequency	=	25 yrs	Time to peak	=	720 min
Time interval	=	1 min	Hyd. volume	=	63 cuft
Drainage area	=	0.035 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



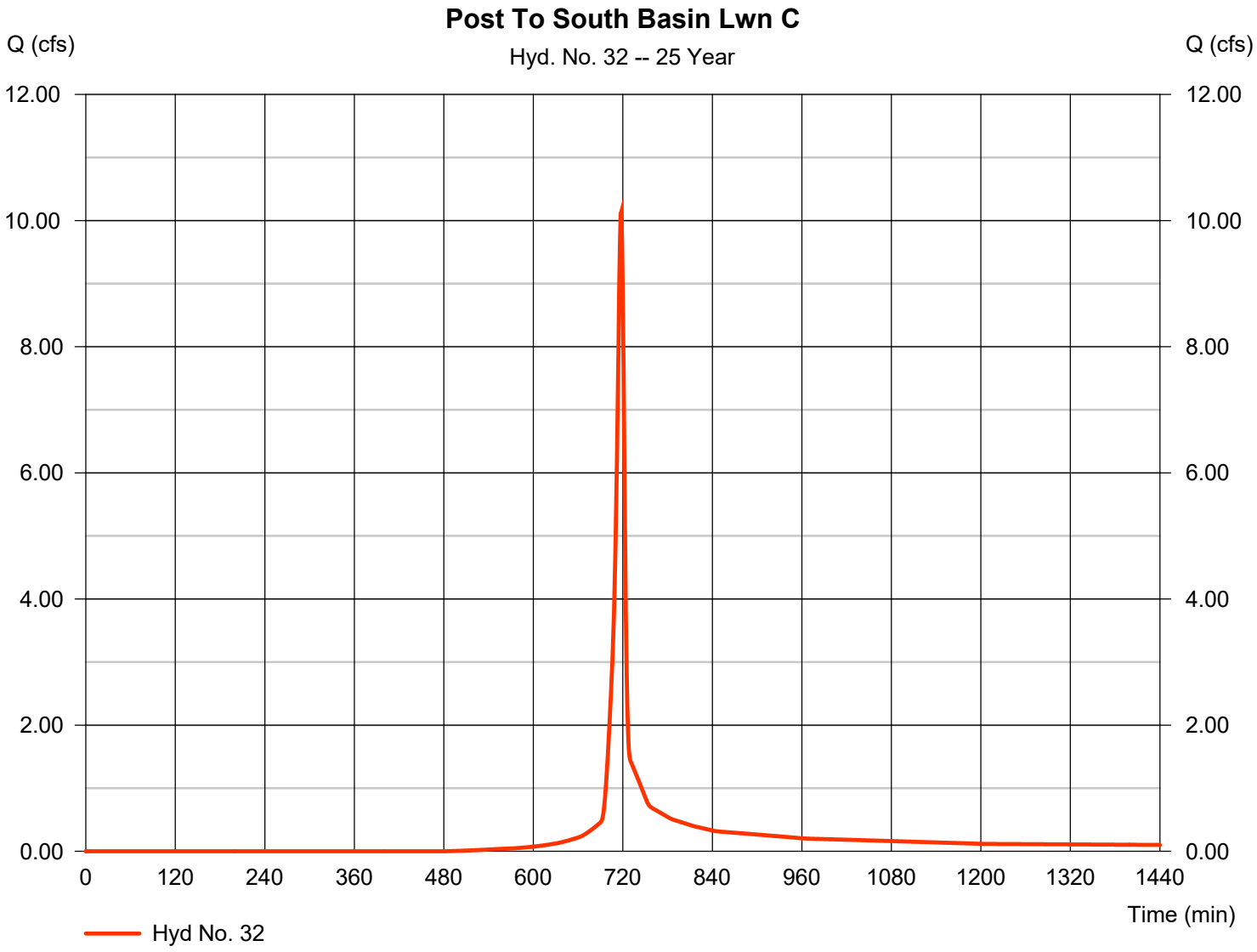
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.14 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	20,573 cuft
Drainage area	=	1.758 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



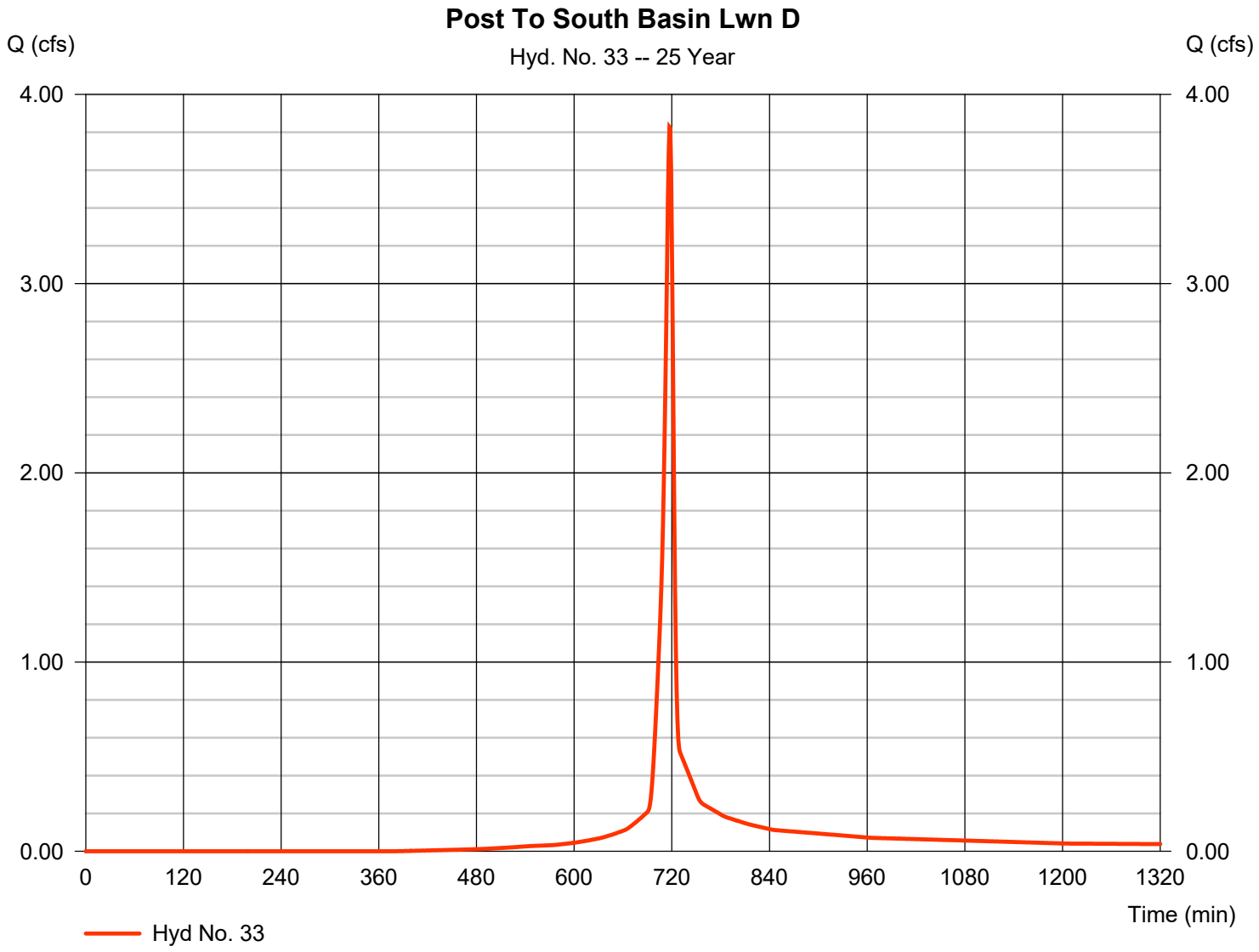
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.828 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	7,920 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



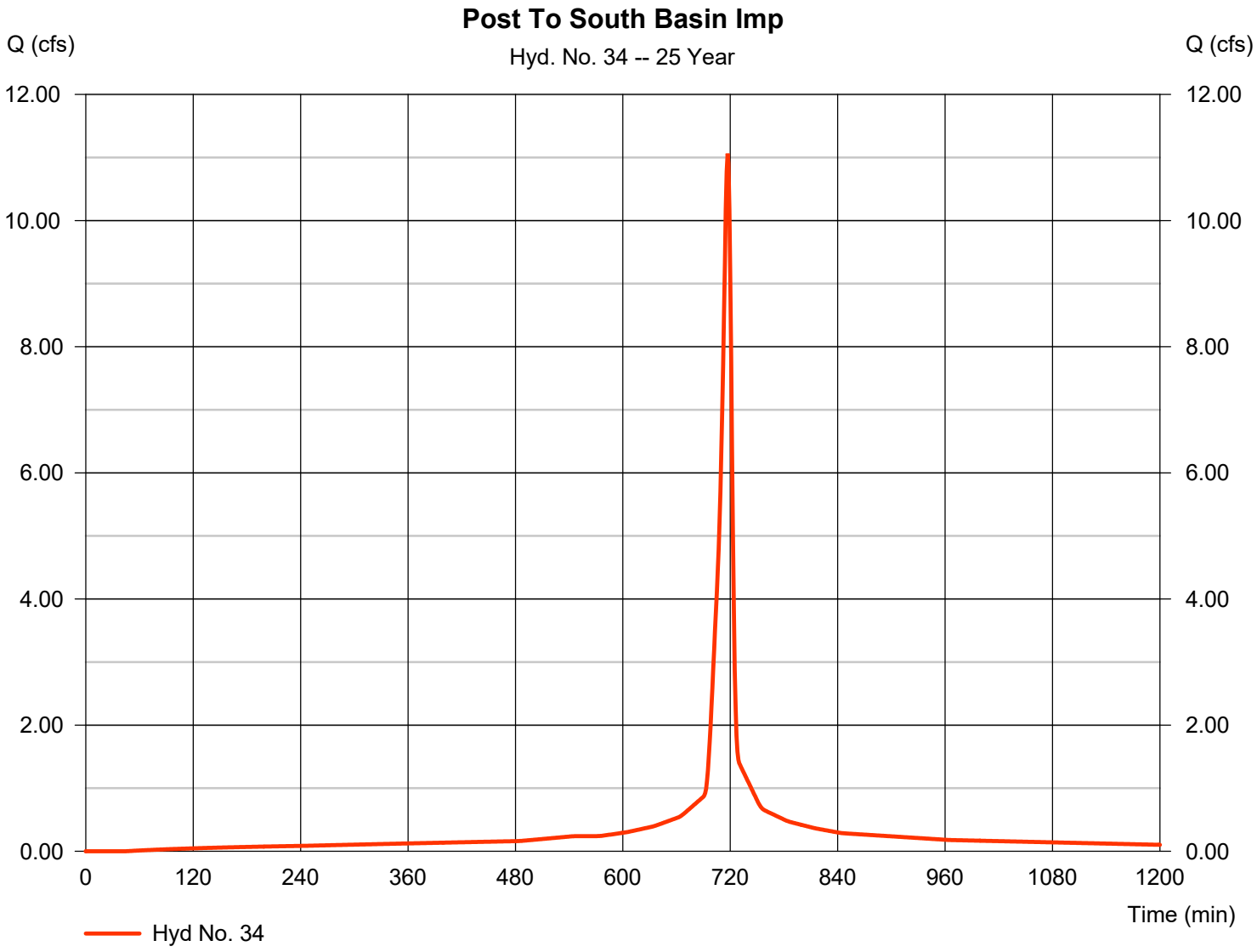
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 11.06 cfs
Storm frequency	= 25 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 26,847 cuft
Drainage area	= 1.260 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

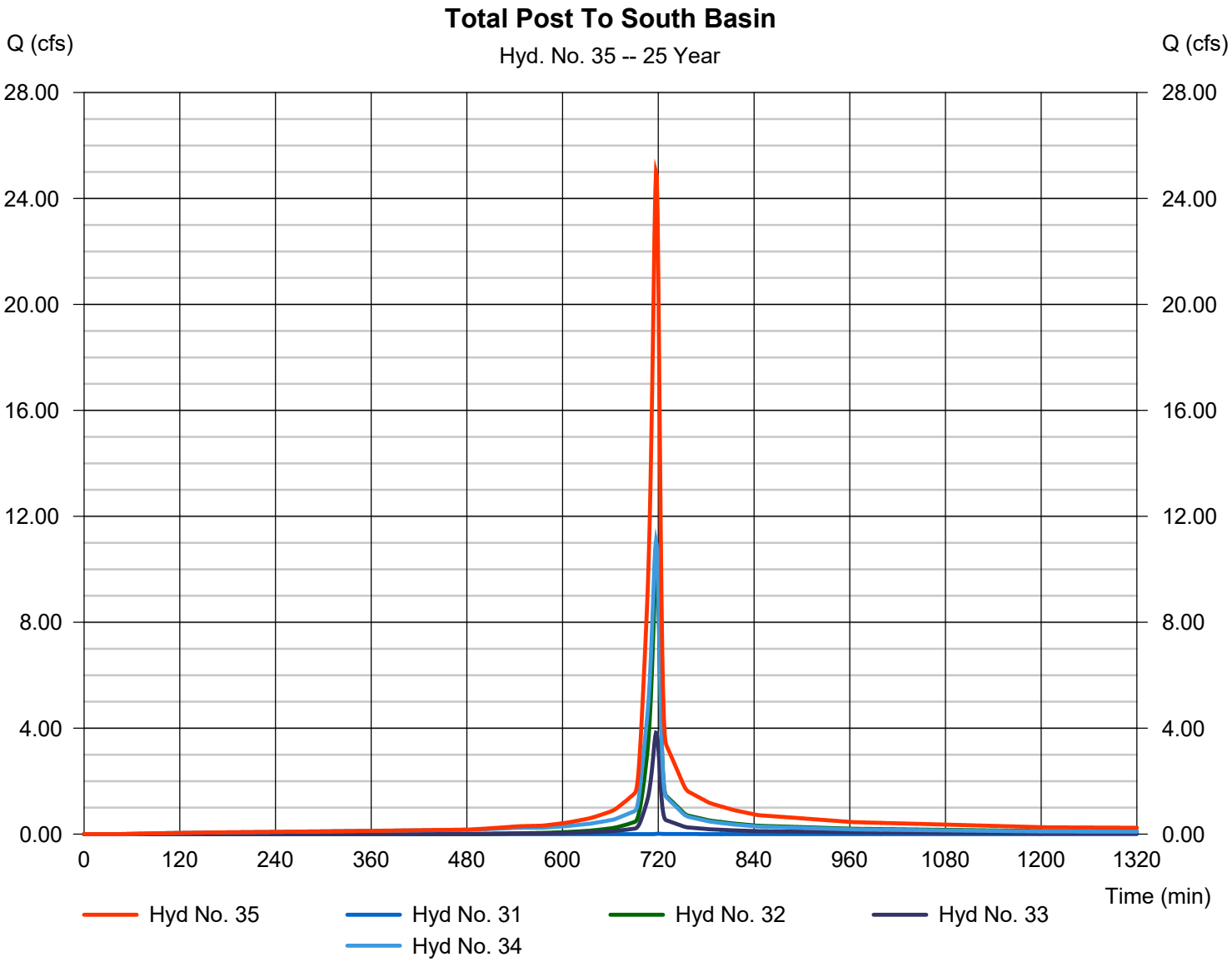


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	25.00 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	55,402 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



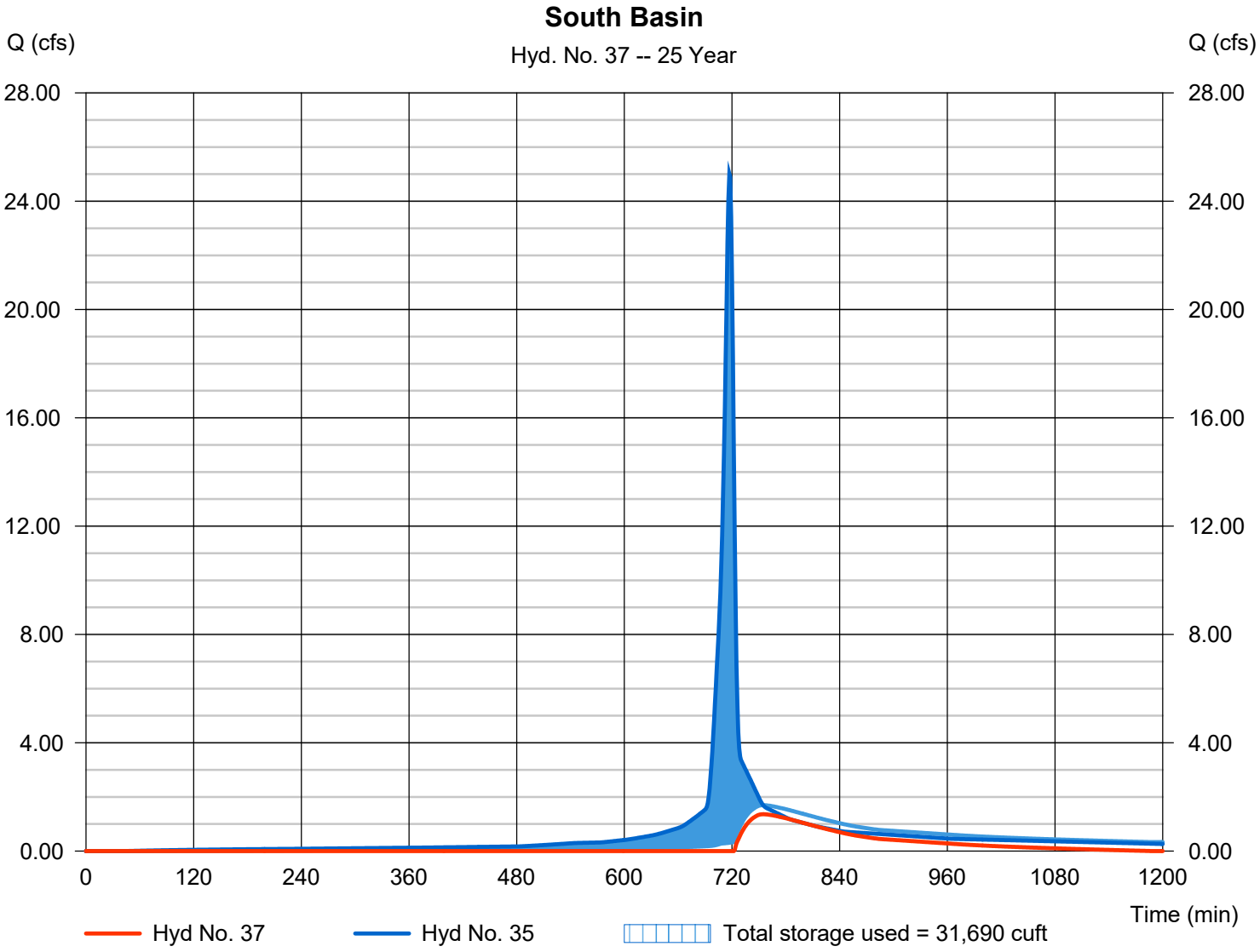
Hydrograph Report

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	1.361 cfs
Storm frequency	=	25 yrs	Time to peak	=	755 min
Time interval	=	1 min	Hyd. volume	=	11,994 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	474.10 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	31,690 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

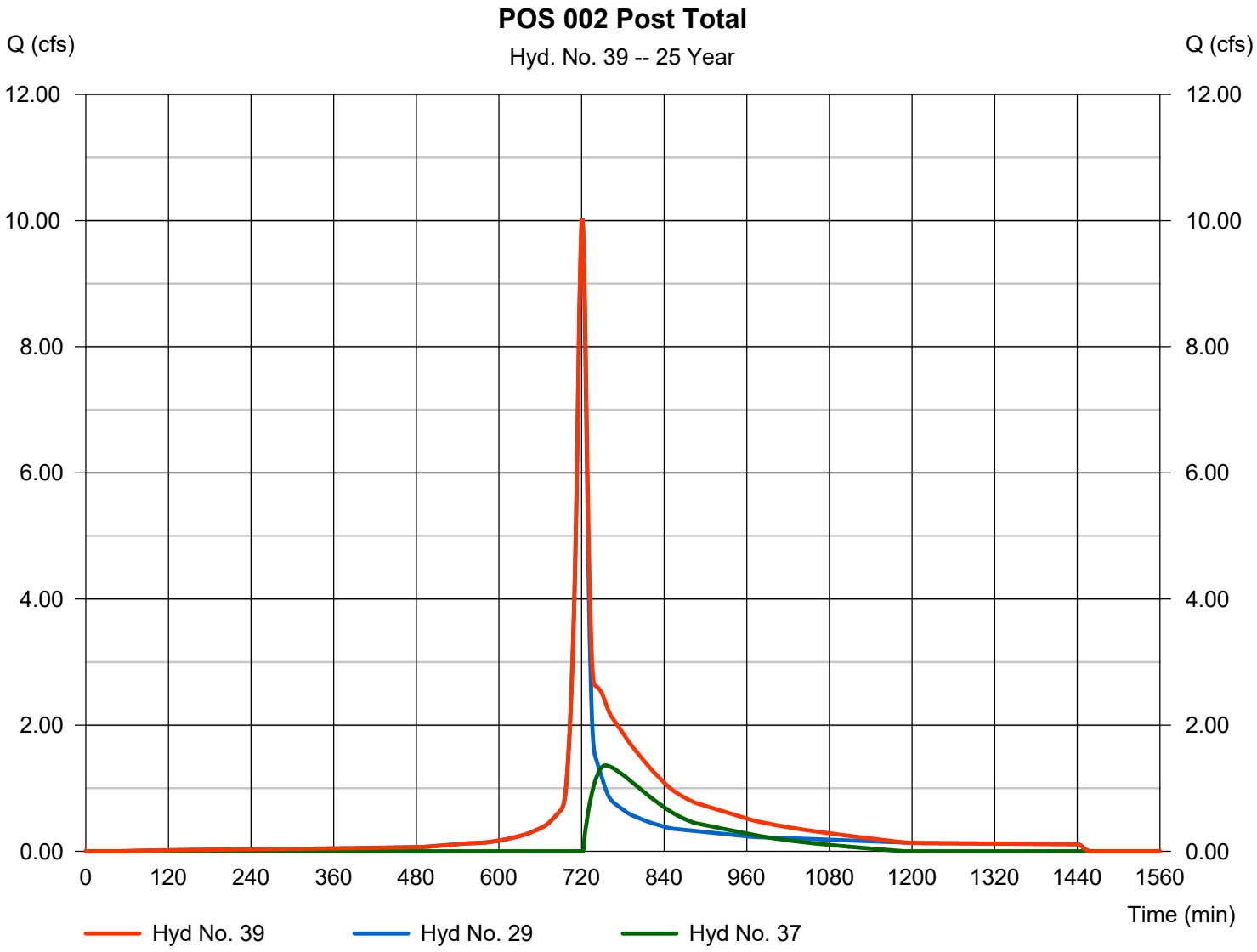


Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	= Combine	Peak discharge	= 10.04 cfs
Storm frequency	= 25 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 38,845 cuft
Inflow hyds.	= 29, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.056	1	744	9,396	------	------	------	Ex North Mdw A
2	SCS Runoff	9.650	1	739	48,392	------	------	------	Ex North Mdw C
3	SCS Runoff	2.721	1	738	15,251	------	------	------	Ex North Imperv
4	SCS Runoff	0.419	1	739	2,100	------	------	------	Ex North Imp-Mdw
5	Combine	13.78	1	739	75,139	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	1.527	1	719	4,288	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	3.210	1	718	6,570	------	------	------	Post North Bypass Lawn C
9	Combine	4.658	1	718	10,859	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.068	1	719	192	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	8.289	1	718	16,966	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	54.86	1	717	133,823	------	------	------	Post To North Basin Imp
14	Combine	63.20	1	717	150,981	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	6.339	1	736	59,928	14	474.54	82,980	North Basin
18	Combine	8.826	1	721	70,786	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	13.91	1	734	61,666	------	------	------	Ex South Mdw C
21	SCS Runoff	2.316	1	734	10,247	------	------	------	Ex South Mdw D
22	SCS Runoff	4.565	1	733	22,738	------	------	------	Ex South Imperv
23	SCS Runoff	0.704	1	734	3,121	------	------	------	Ex South Imp-Mdw
24	Combine	21.49	1	734	97,772	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	6.102	1	721	15,464	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	2.387	1	721	6,141	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	3.929	1	721	11,672	------	------	------	Post South Bypass Imp
29	Combine	12.42	1	721	33,277	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.039	1	719	108	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	12.88	1	718	26,371	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	4.746	1	717	9,921	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	13.00	1	717	31,701	------	------	------	Post To South Basin Imp
35	Combine	30.64	1	717	68,101	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	4.052	1	729	23,303	35	474.22	35,794	South Basin

Hydrograph Summary Report

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

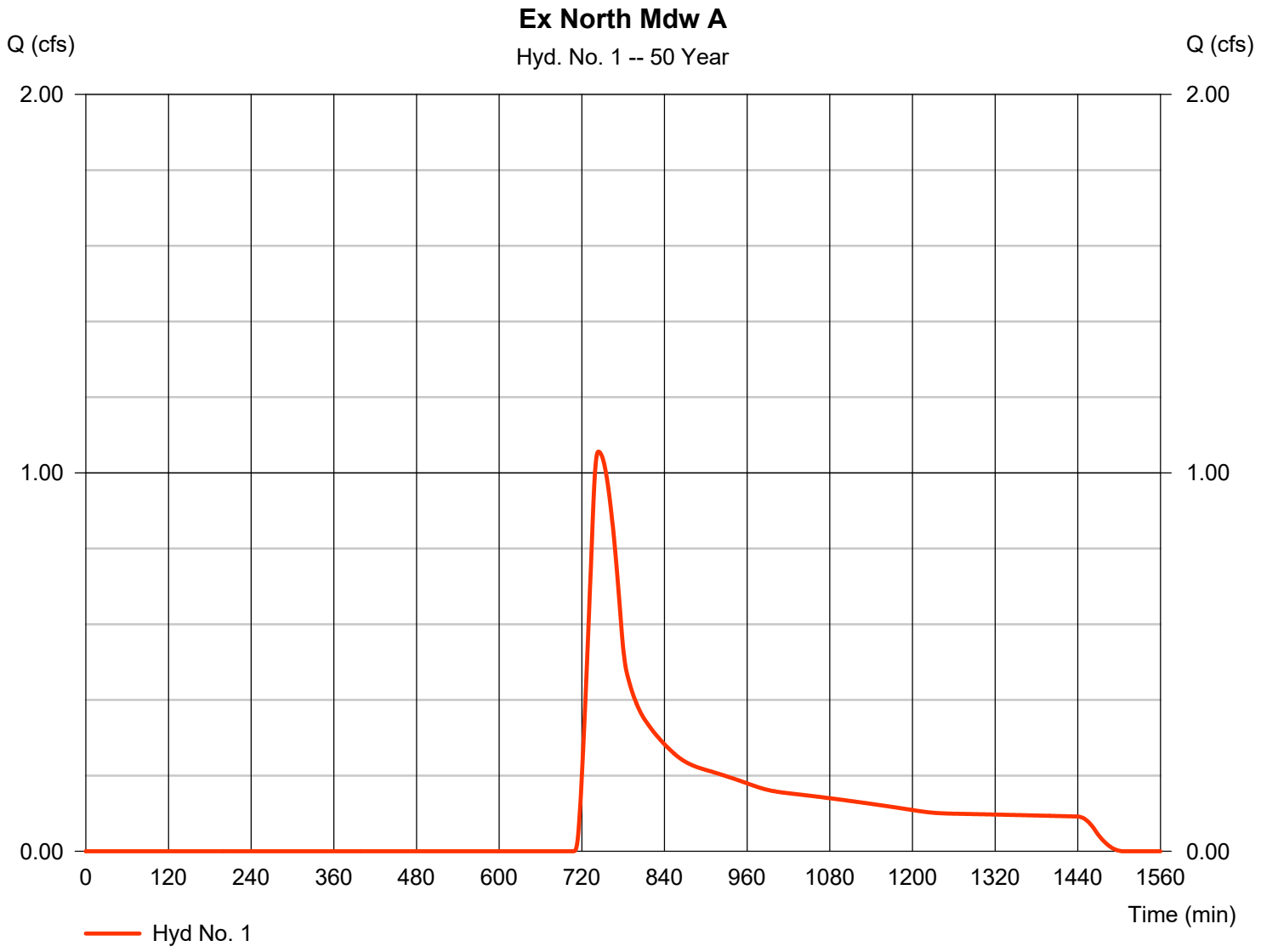
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	14.91	1	723	56,580	29, 37,	------	------	POS 002 Post Total
42	Combine	67.66	1	717	161,840	9, 14,	------	------	Post North Undetained
43	Combine	41.86	1	718	101,379	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.056 cfs
Storm frequency	= 50 yrs	Time to peak	= 744 min
Time interval	= 1 min	Hyd. volume	= 9,396 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

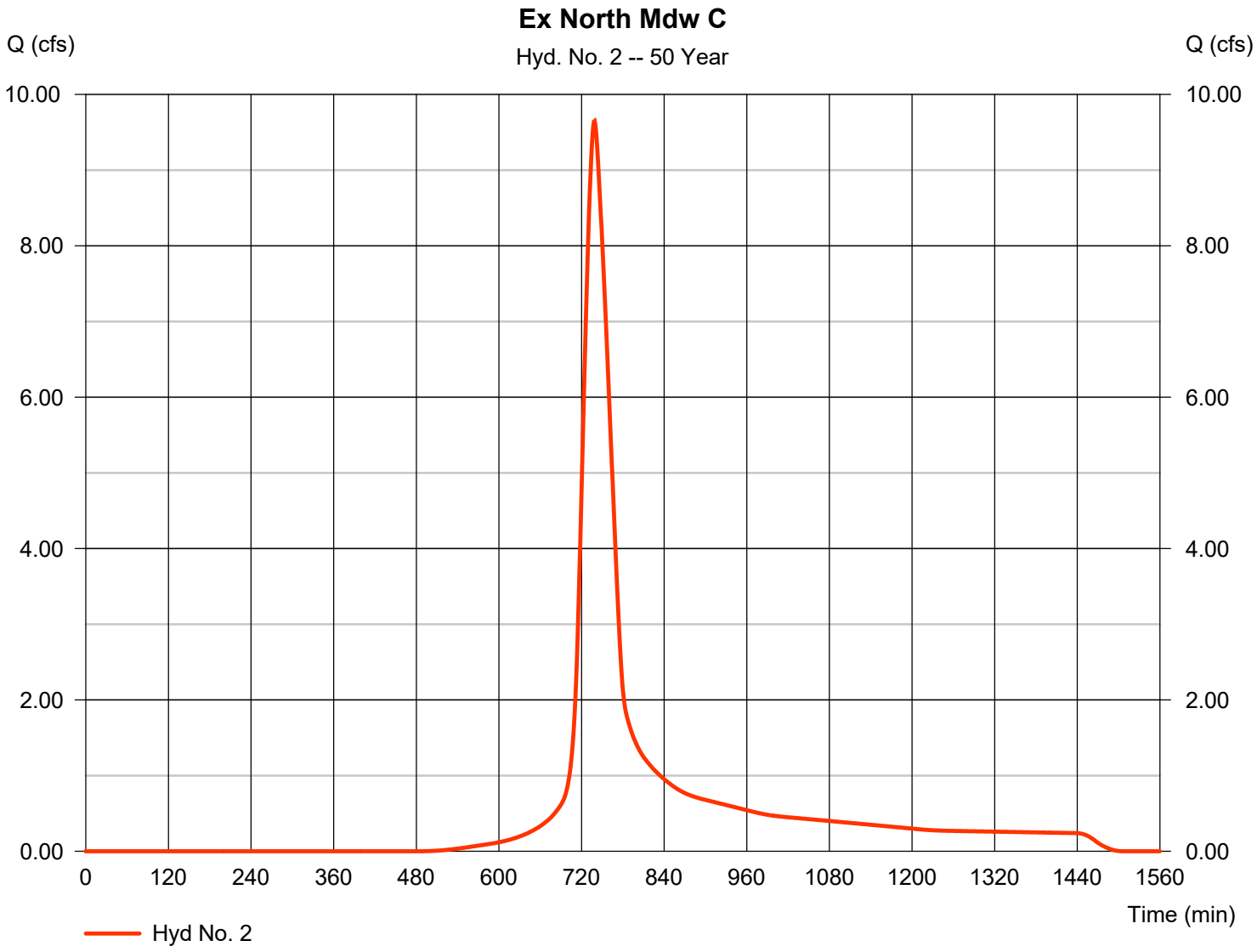


Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 9.650 cfs
Storm frequency	= 50 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 48,392 cuft
Drainage area	= 3.595 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

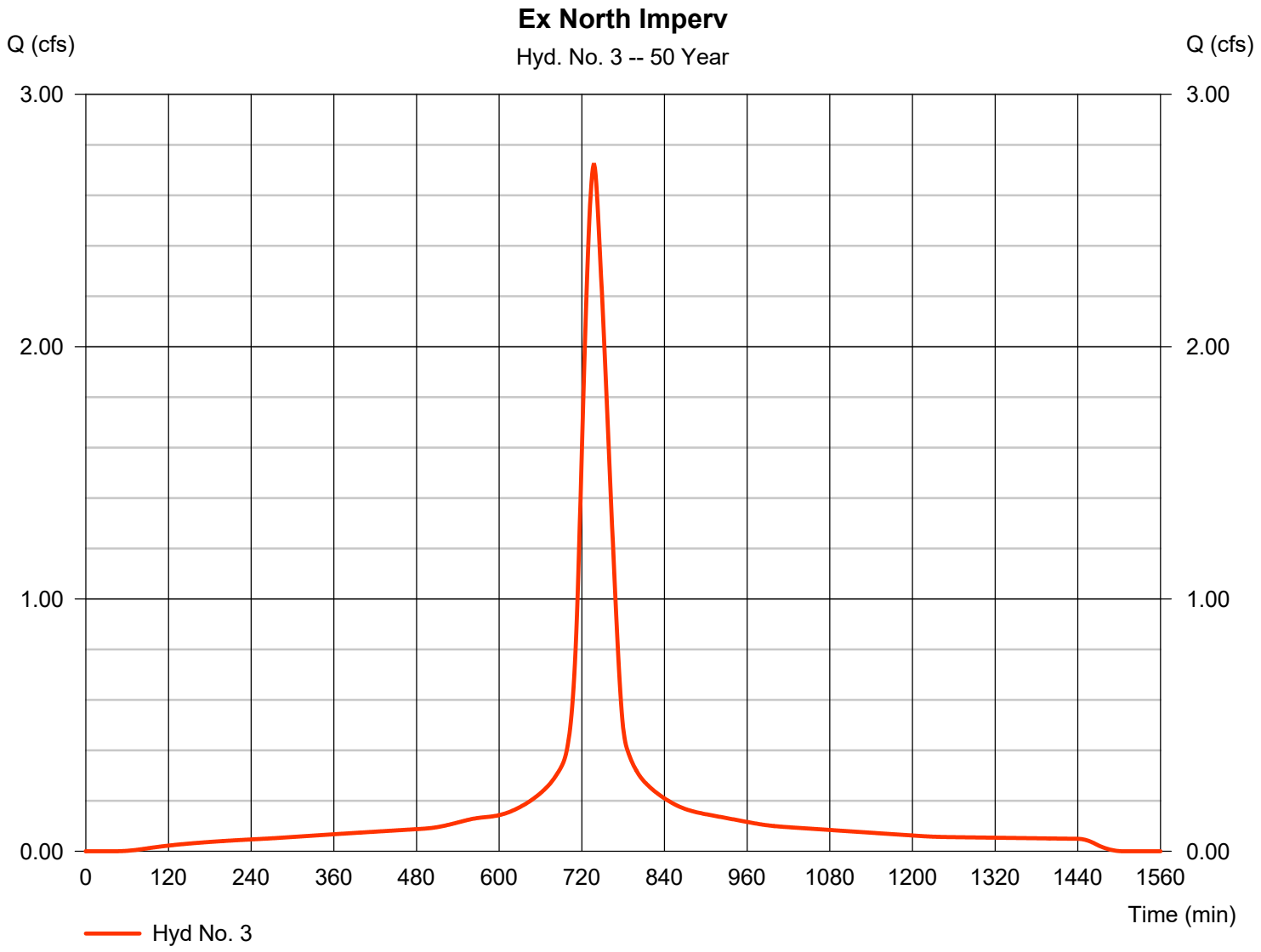


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.721 cfs
Storm frequency	=	50 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	15,251 cuft
Drainage area	=	0.622 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

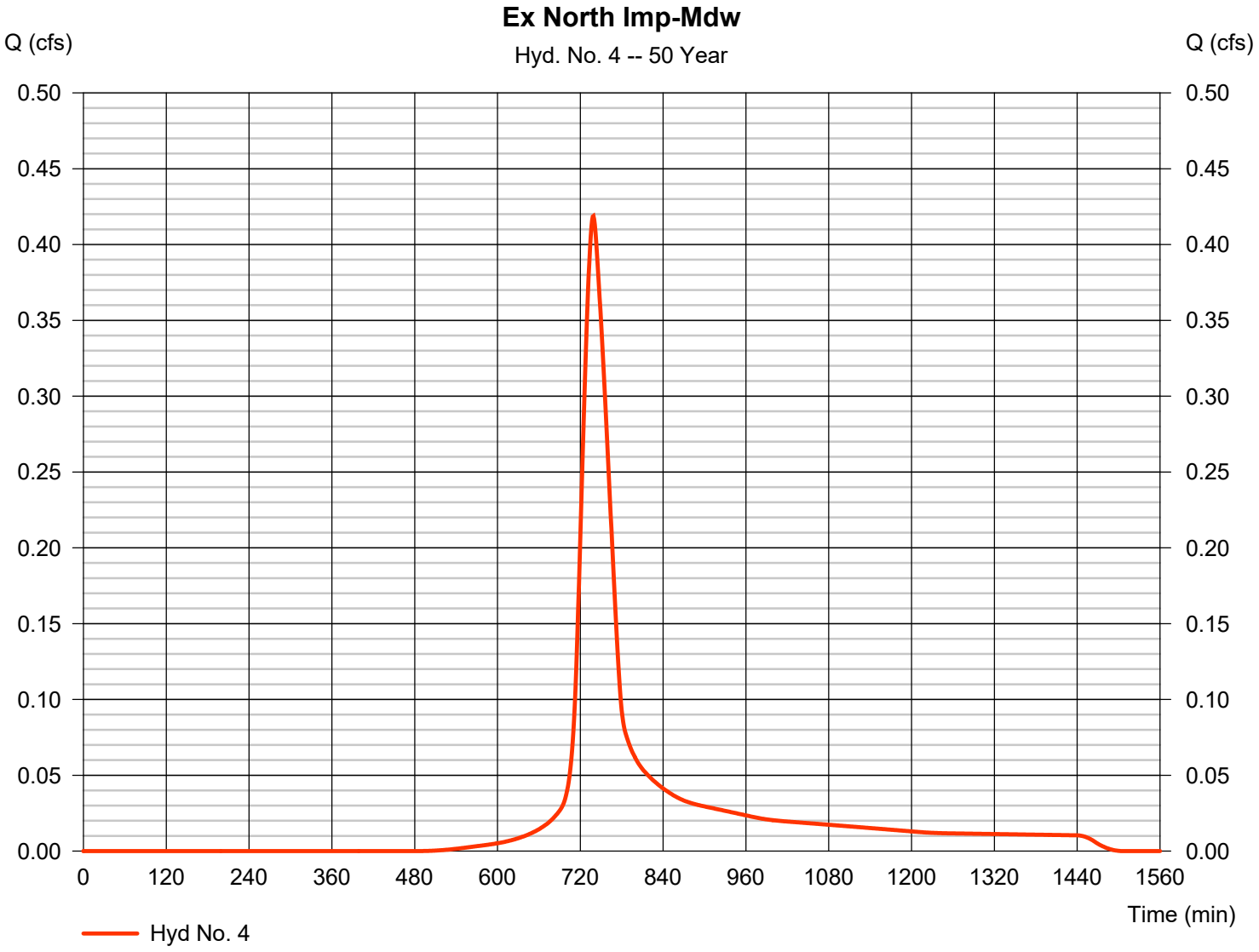


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.419 cfs
Storm frequency	=	50 yrs	Time to peak	=	739 min
Time interval	=	1 min	Hyd. volume	=	2,100 cuft
Drainage area	=	0.156 ac	Curve number	=	71
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

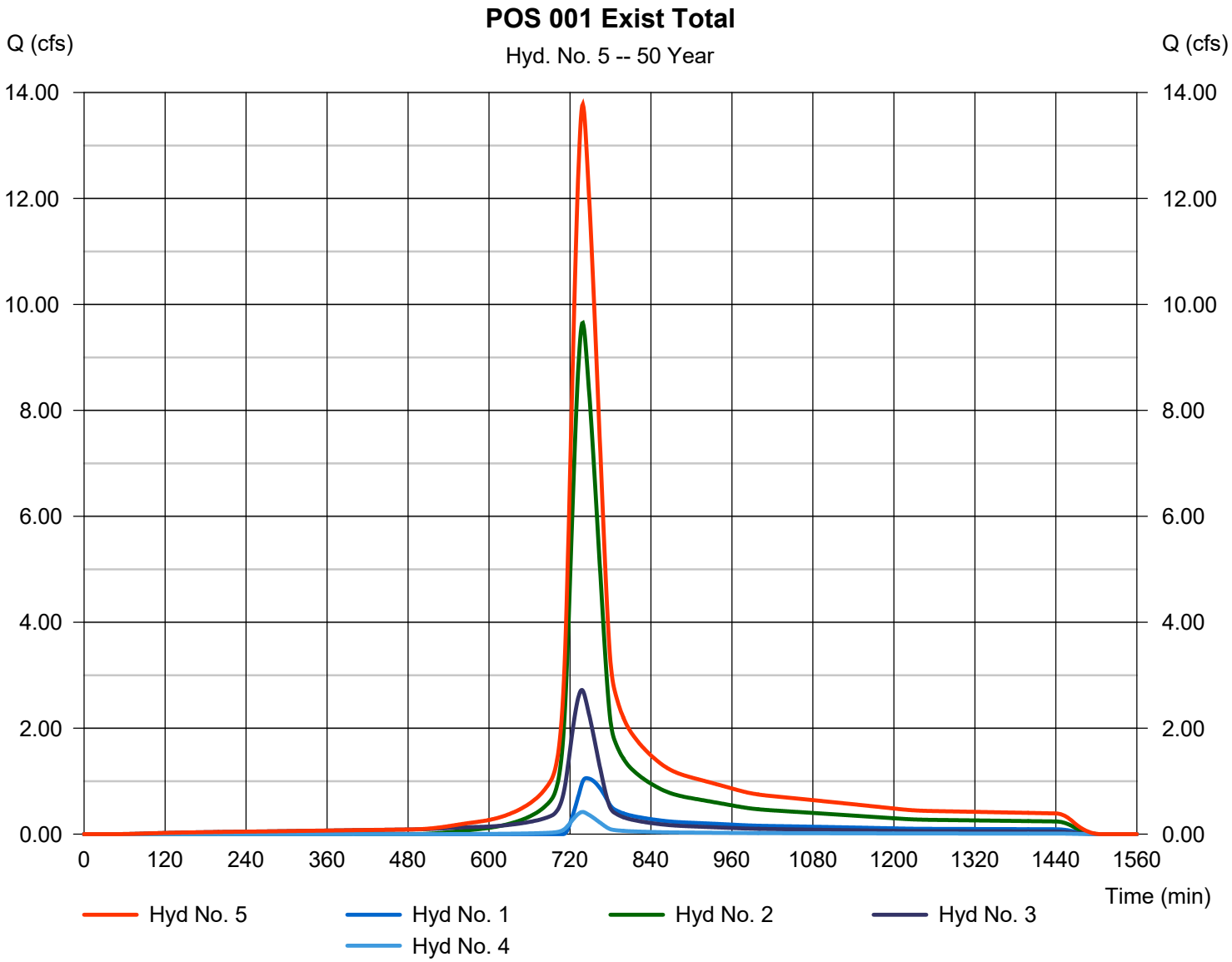


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 13.78 cfs
Storm frequency	= 50 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 75,139 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

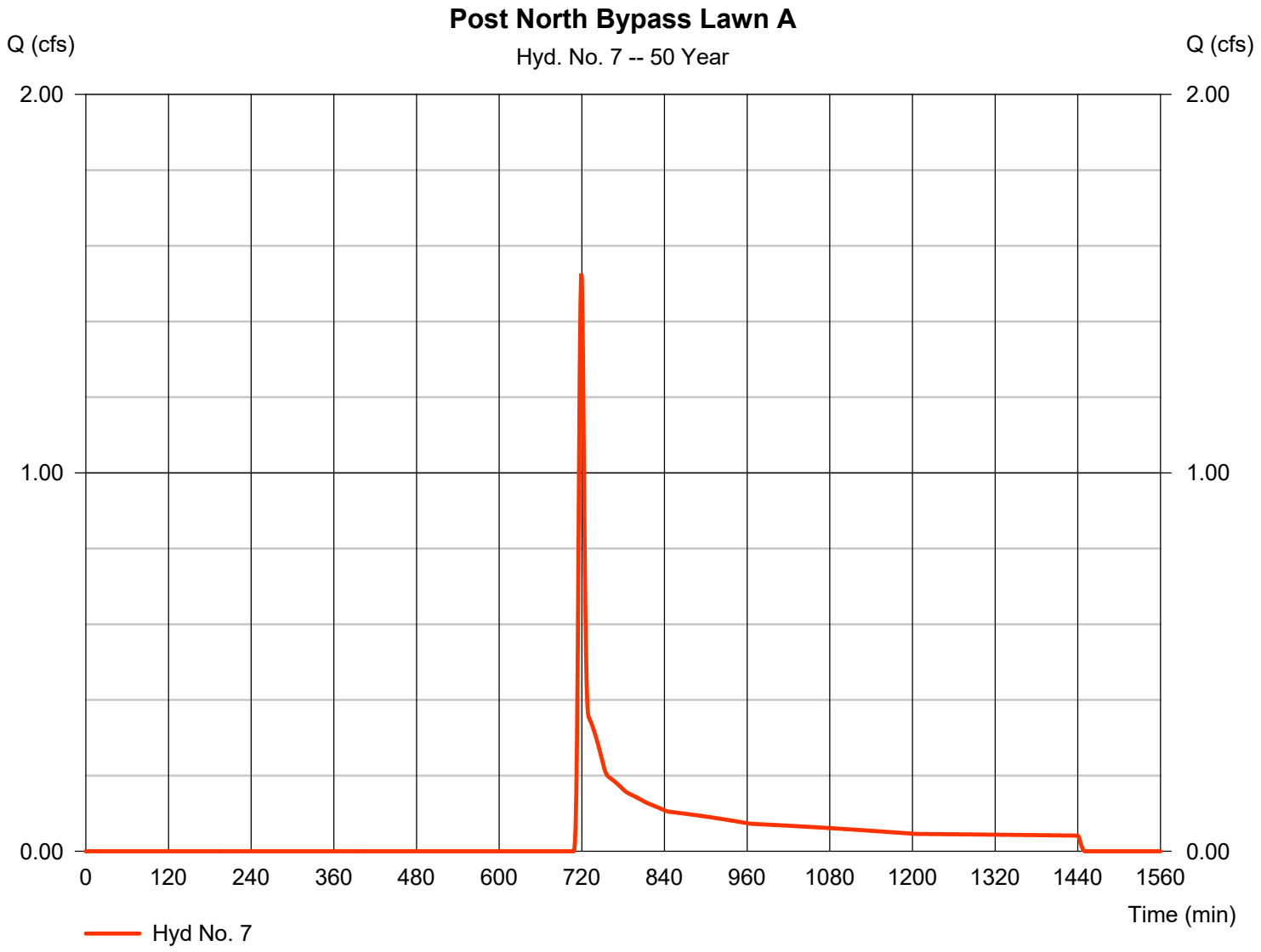


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.527 cfs
Storm frequency	= 50 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 4,288 cuft
Drainage area	= 1.385 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

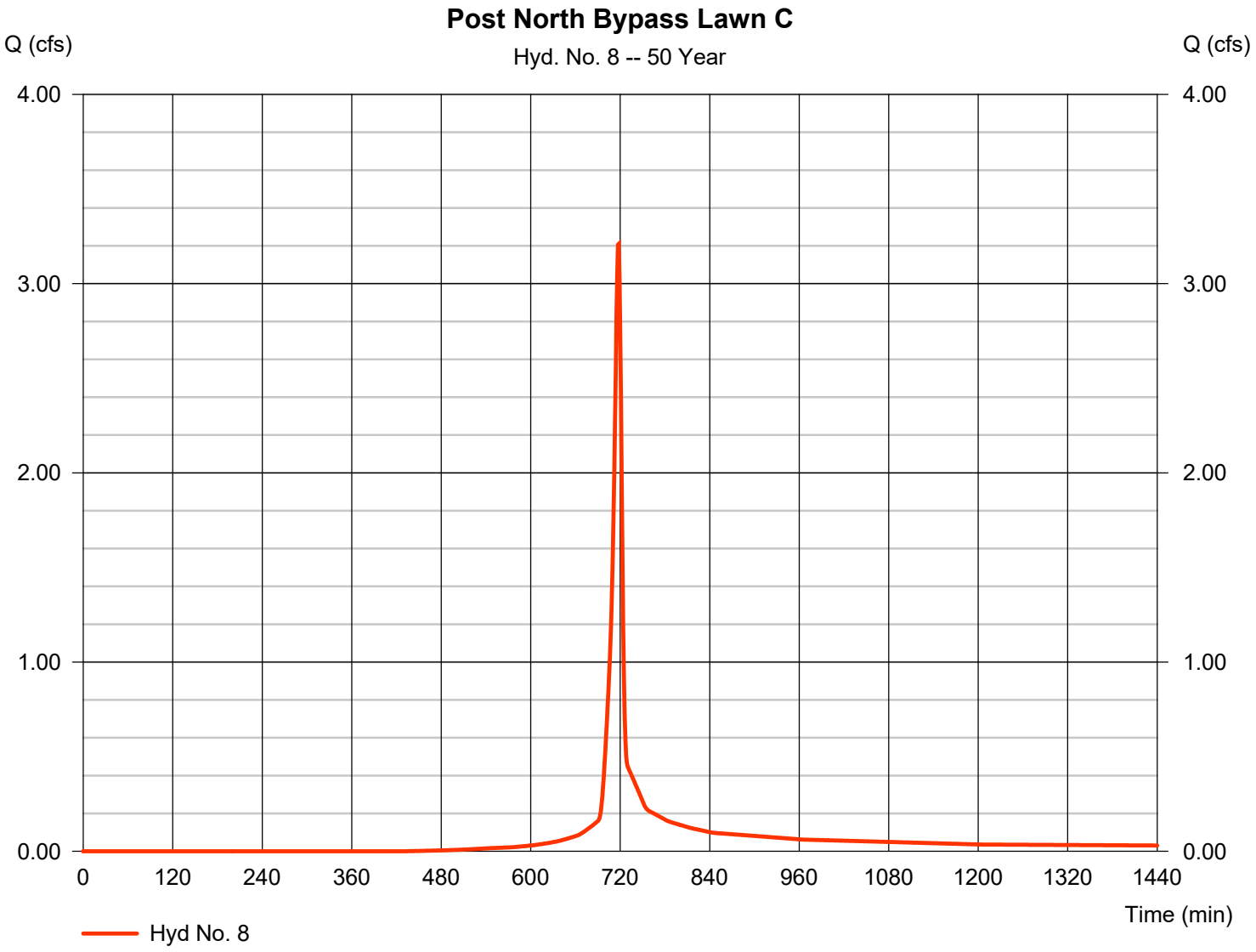


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 3.210 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 6,570 cuft
Drainage area	= 0.438 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

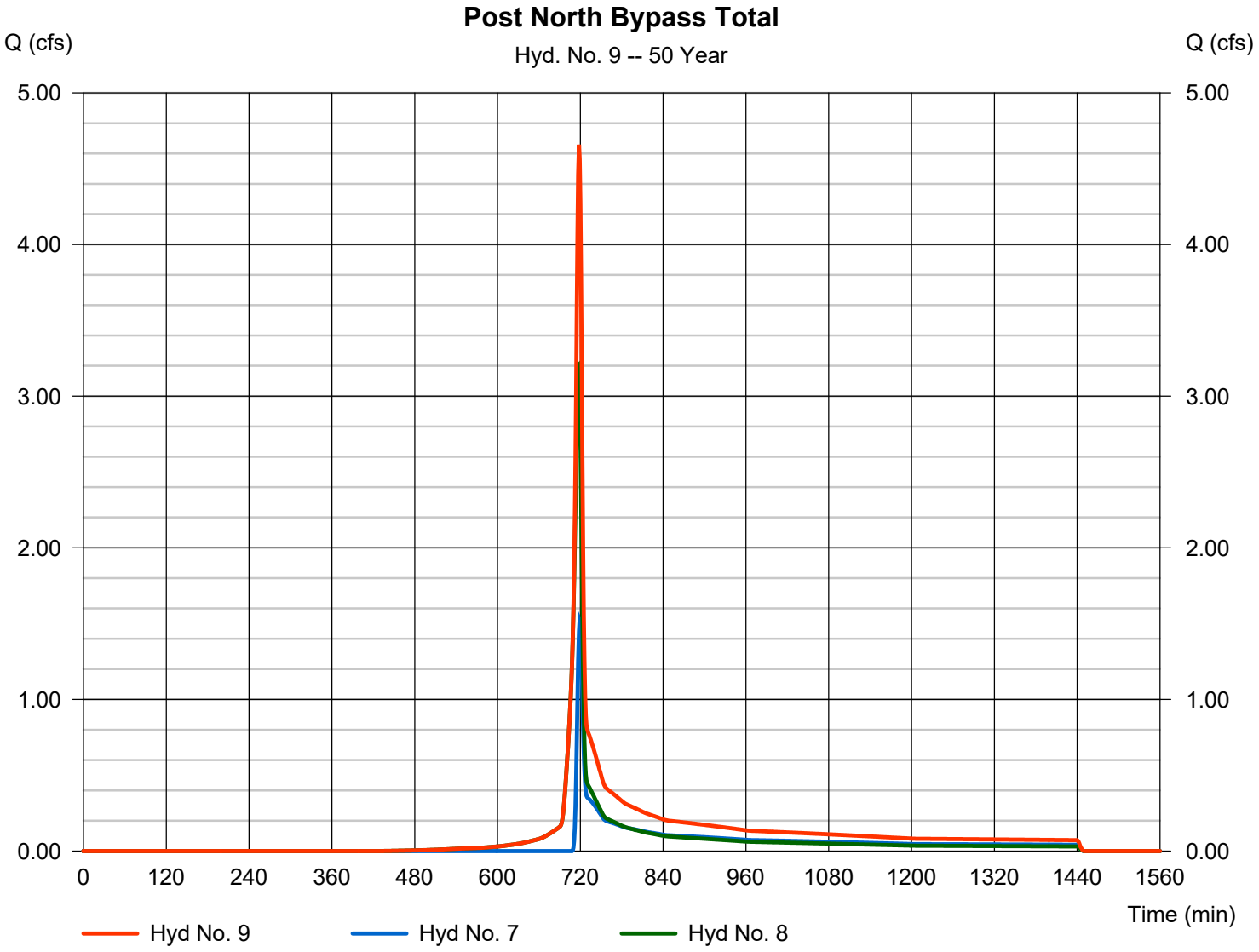


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	= Combine	Peak discharge	= 4.658 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 10,859 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 1.823 ac



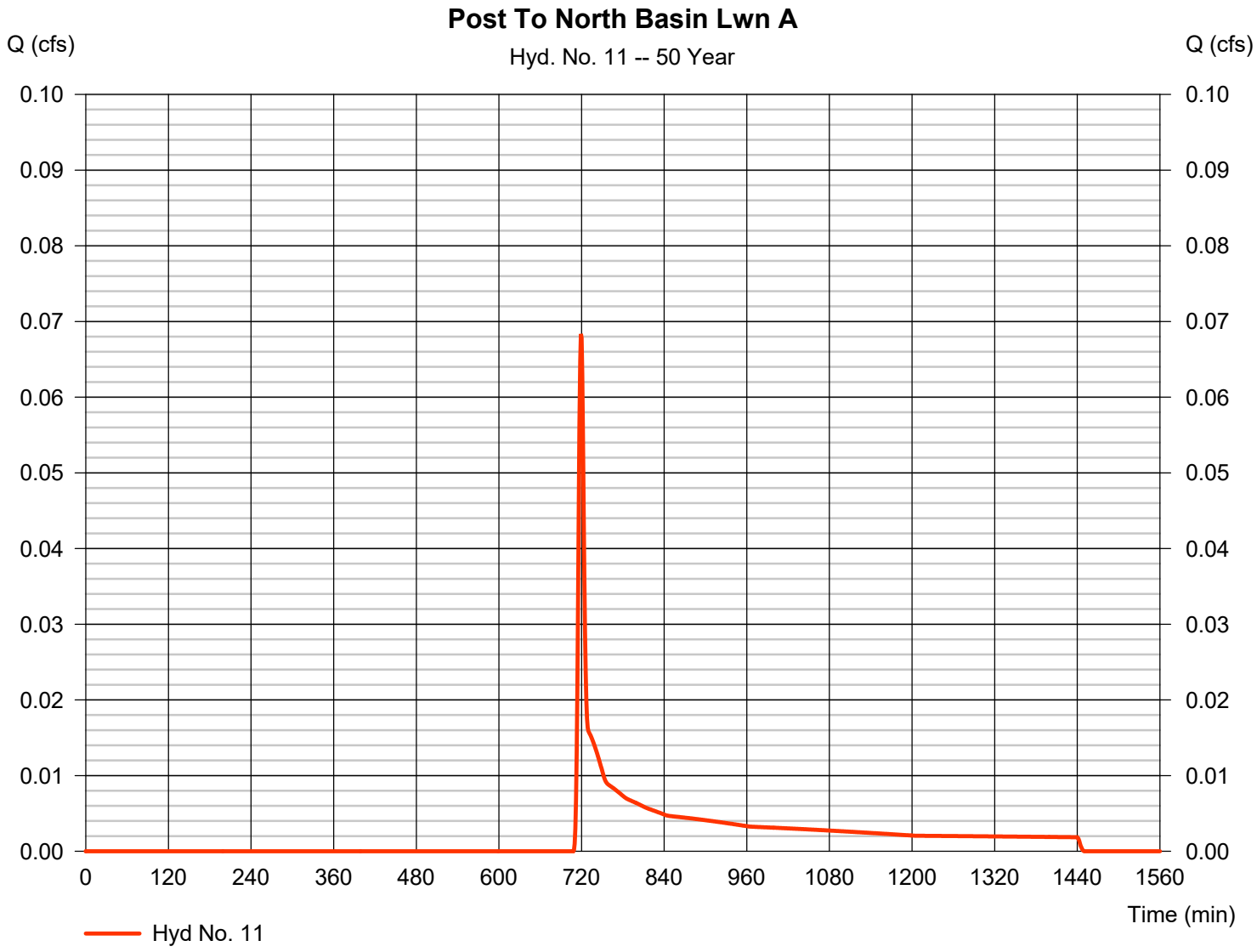
Hydrograph Report

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.068 cfs
Storm frequency	=	50 yrs	Time to peak	=	719 min
Time interval	=	1 min	Hyd. volume	=	192 cuft
Drainage area	=	0.062 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



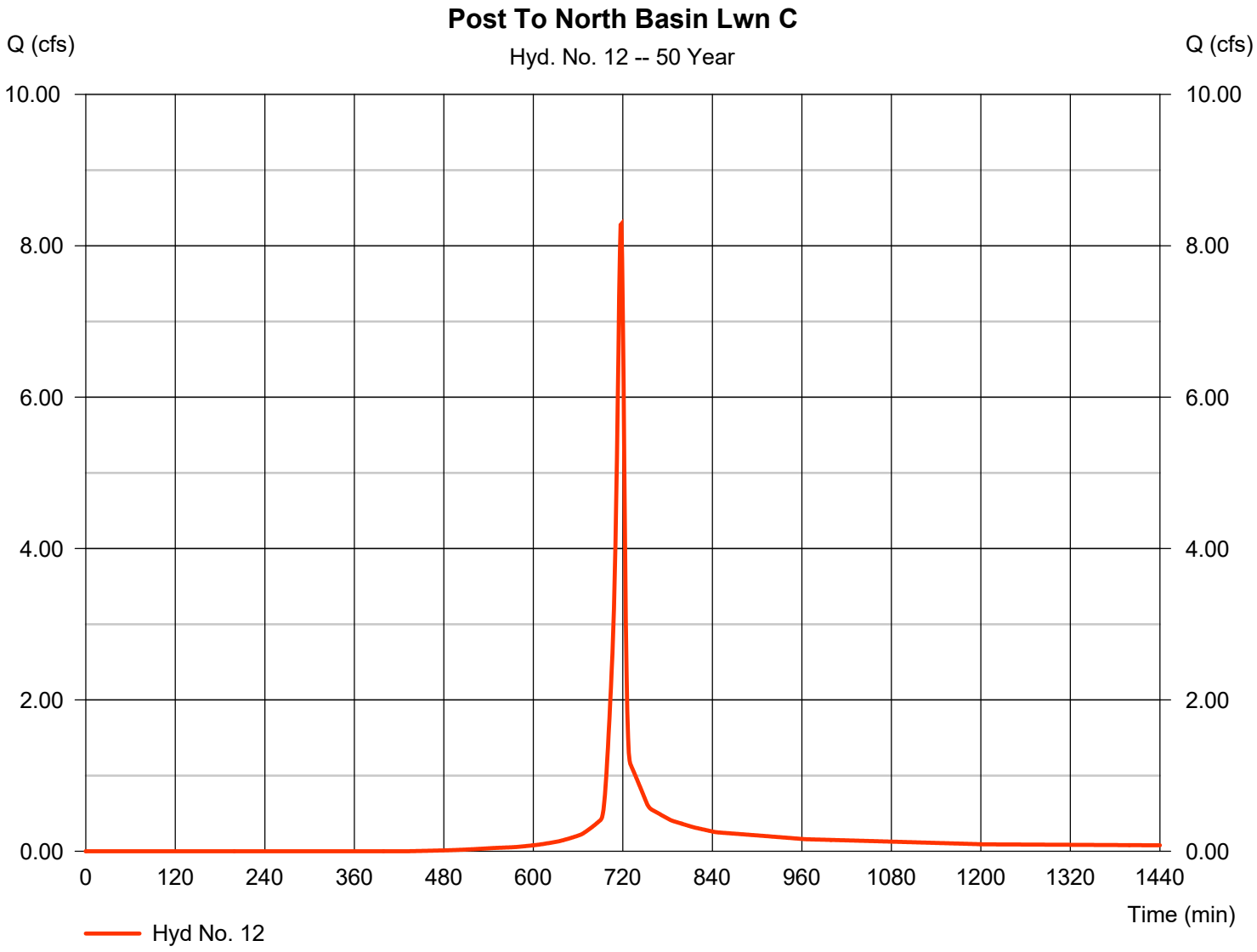
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.289 cfs
Storm frequency	=	50 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	16,966 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



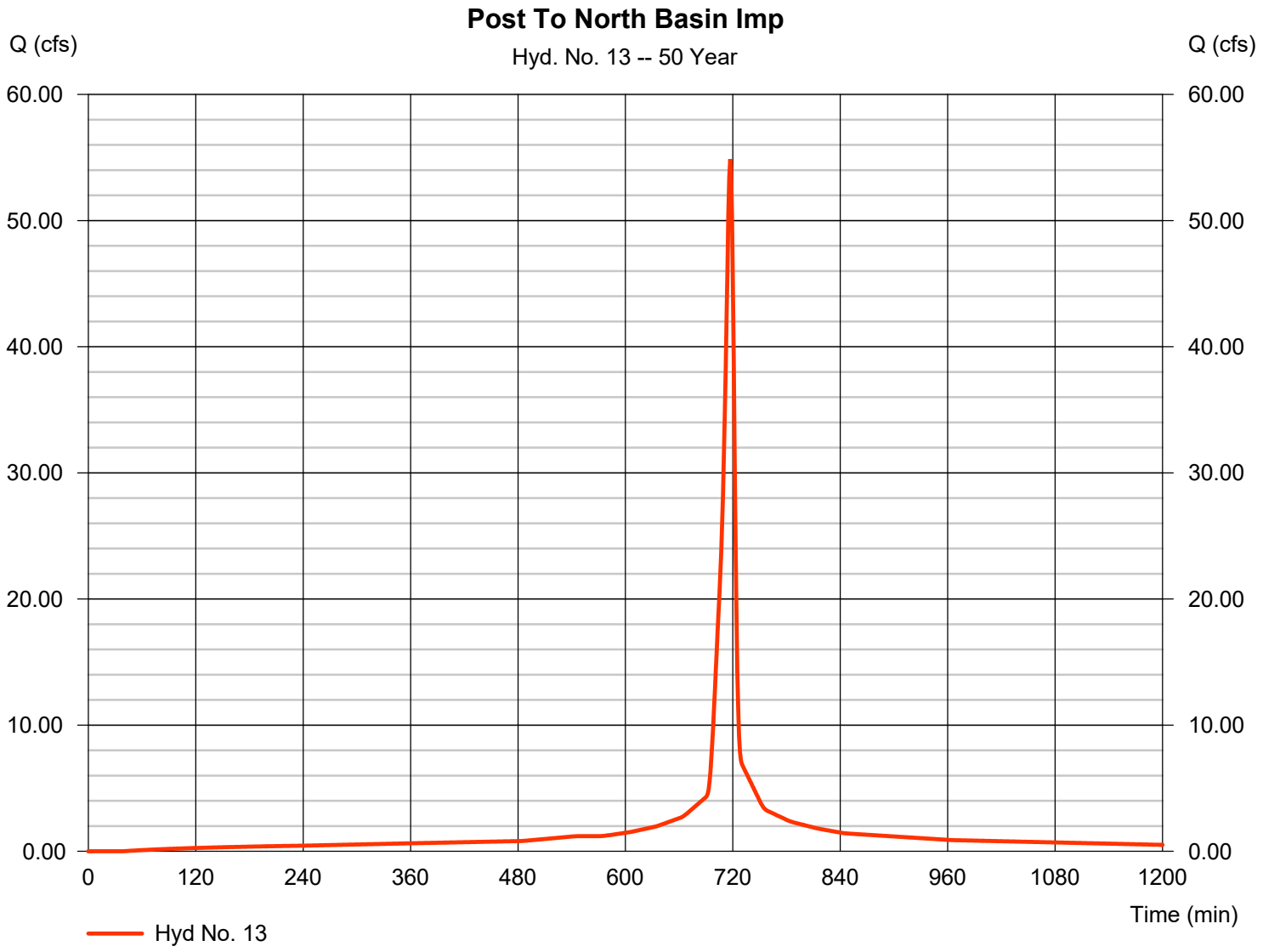
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.86 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	133,823 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

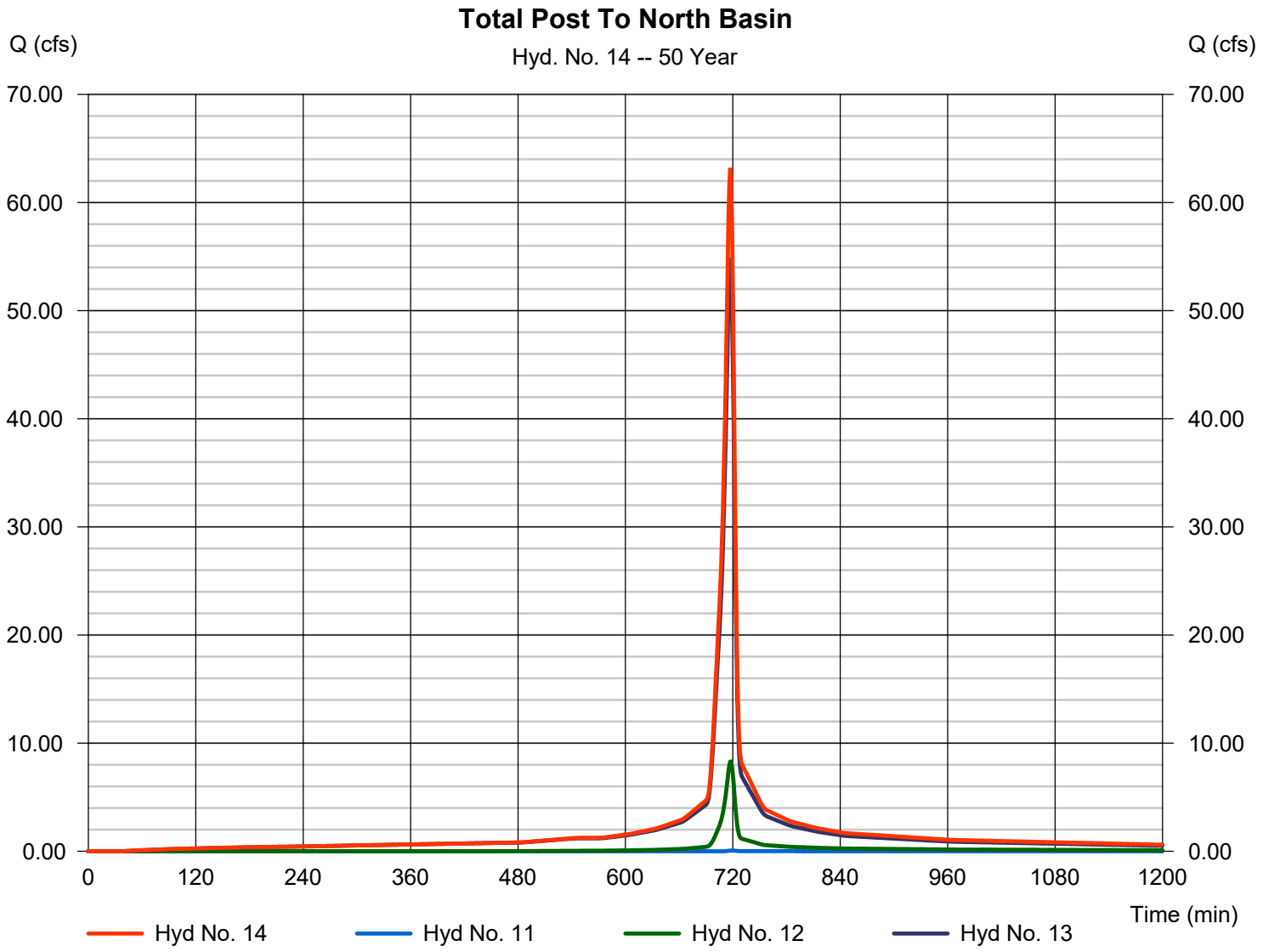


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	=	Combine	Peak discharge	=	63.20 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	150,981 cuft
Inflow hyds.	=	11, 12, 13	Contrib. drain. area	=	6.512 ac



Hydrograph Report

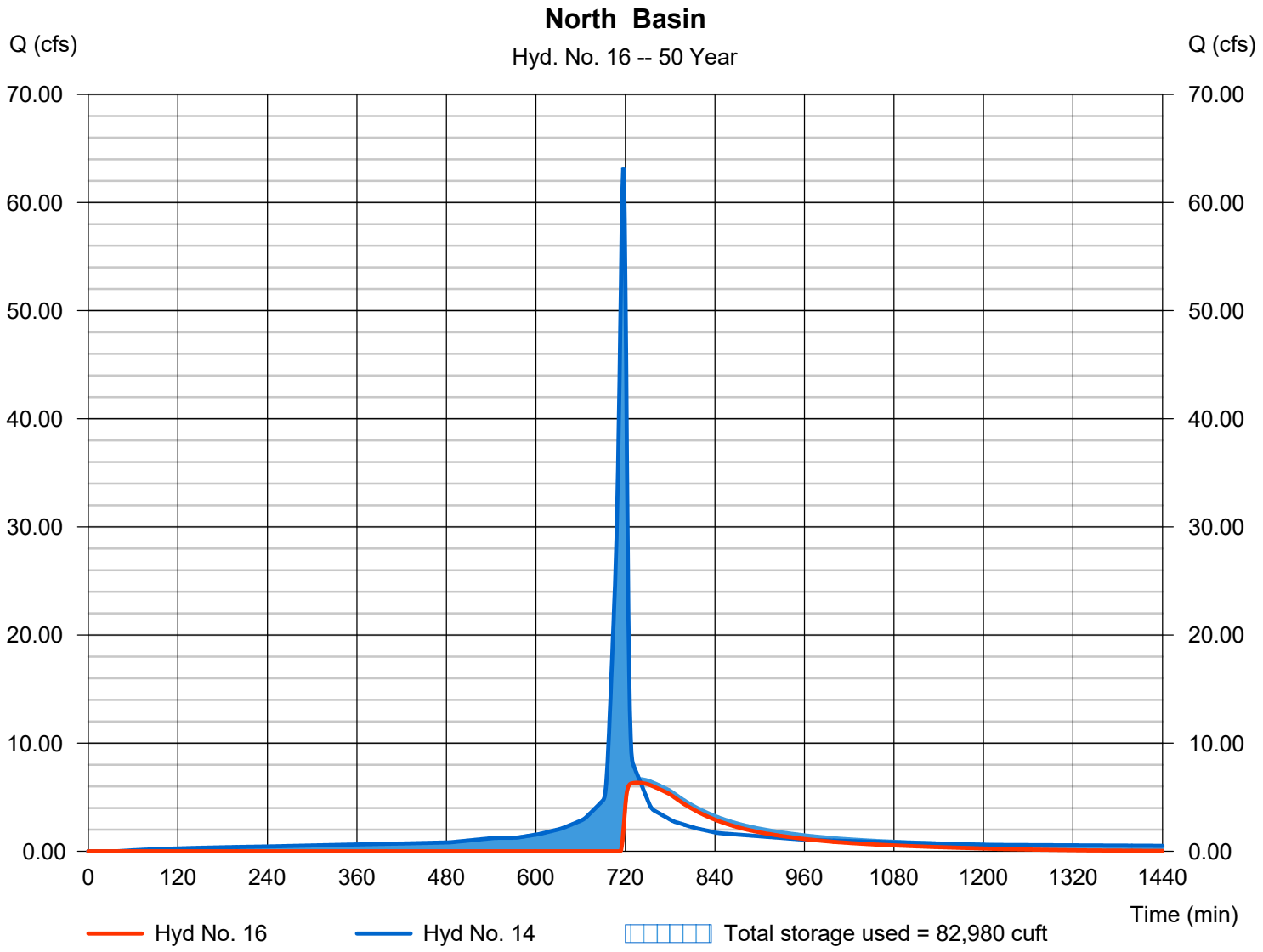
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	6.339 cfs
Storm frequency	=	50 yrs	Time to peak	=	736 min
Time interval	=	1 min	Hyd. volume	=	59,928 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	474.54 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	82,980 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

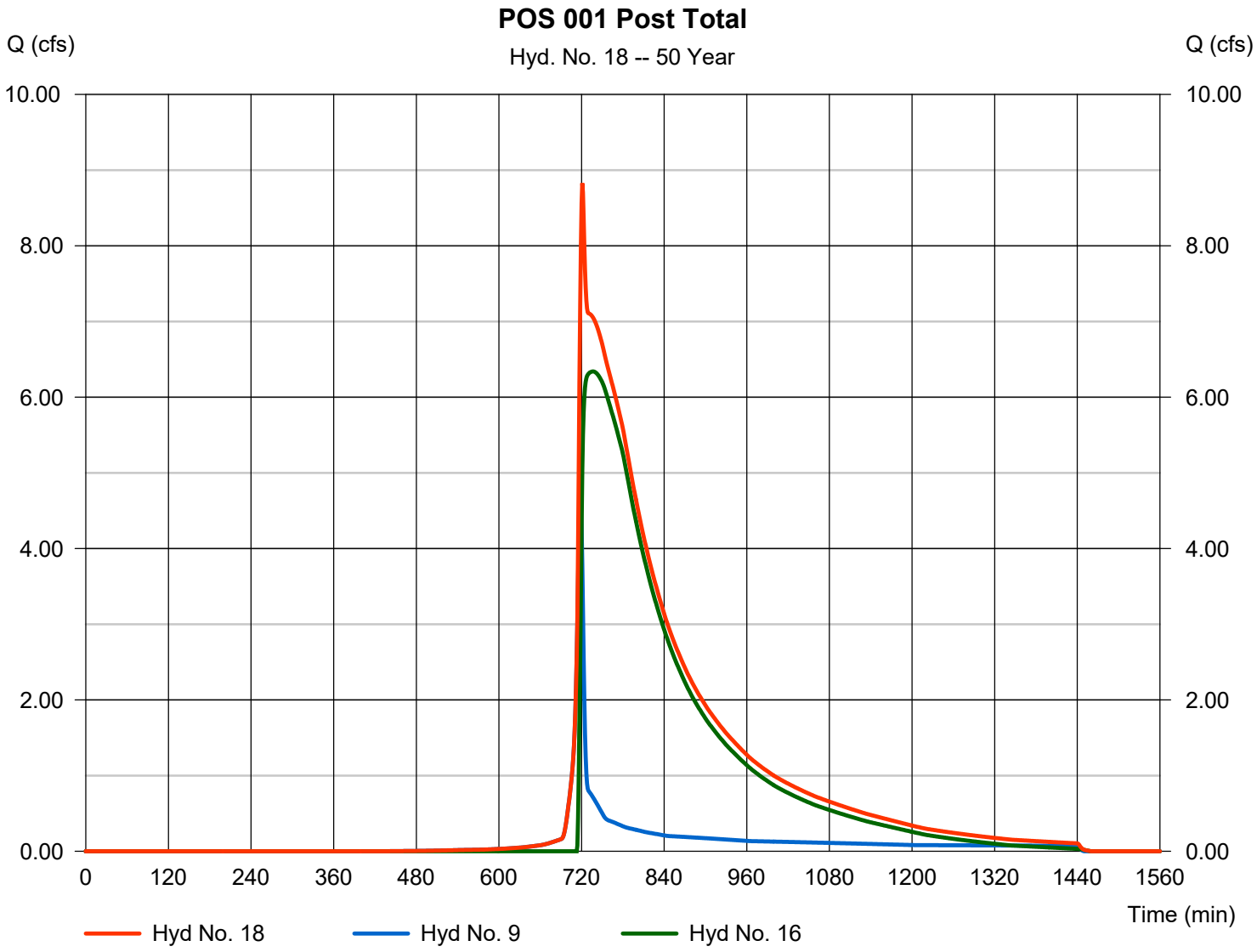


Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	=	Combine	Peak discharge	=	8.826 cfs
Storm frequency	=	50 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	70,786 cuft
Inflow hyds.	=	9, 16	Contrib. drain. area	=	0.000 ac



Hydrograph Report

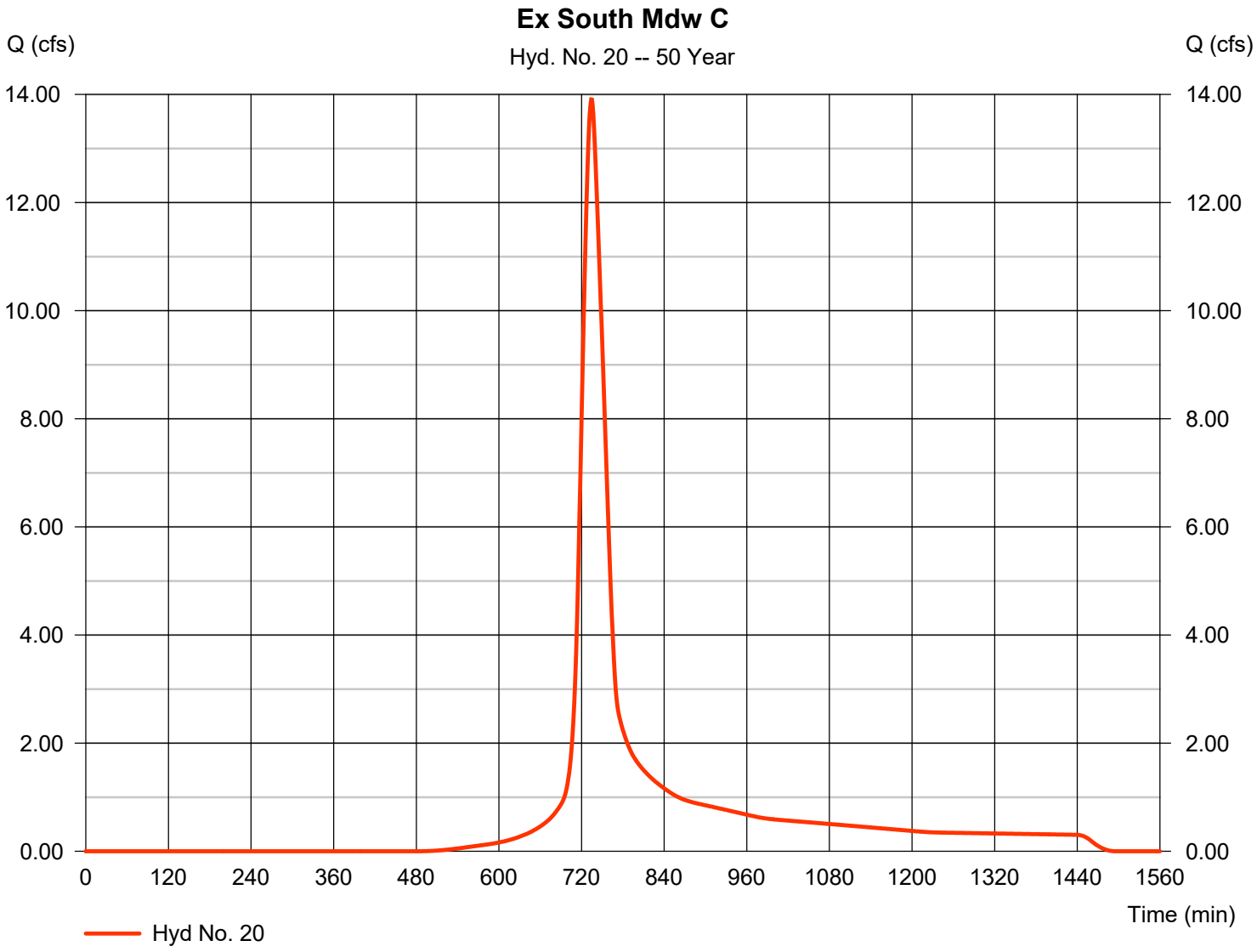
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 20

Ex South Mdw C

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.91 cfs
Storm frequency	=	50 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	61,666 cuft
Drainage area	=	4.604 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	33.93 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



Hydrograph Report

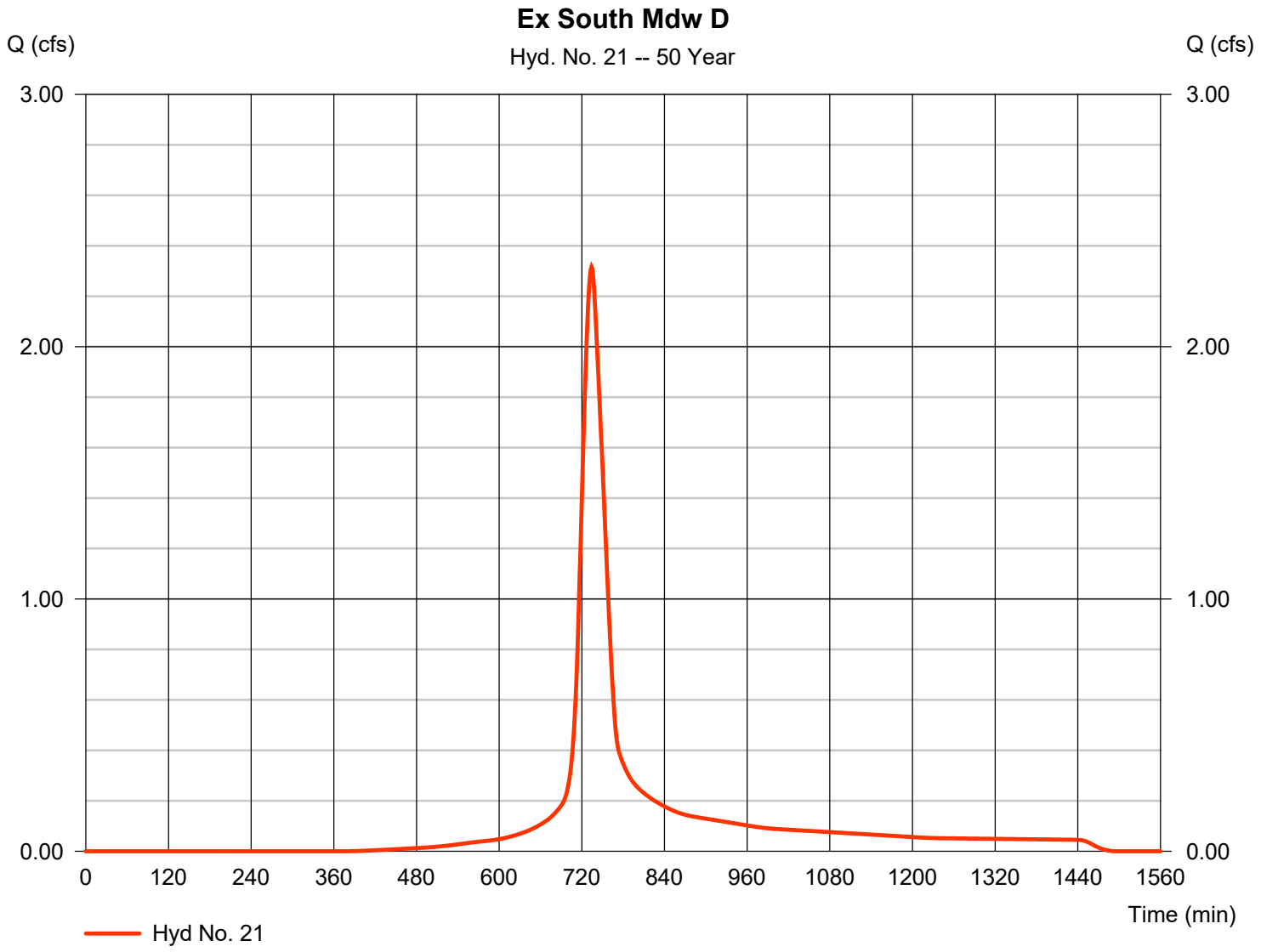
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 21

Ex South Mdw D

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.316 cfs
Storm frequency	=	50 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	10,247 cuft
Drainage area	=	0.636 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



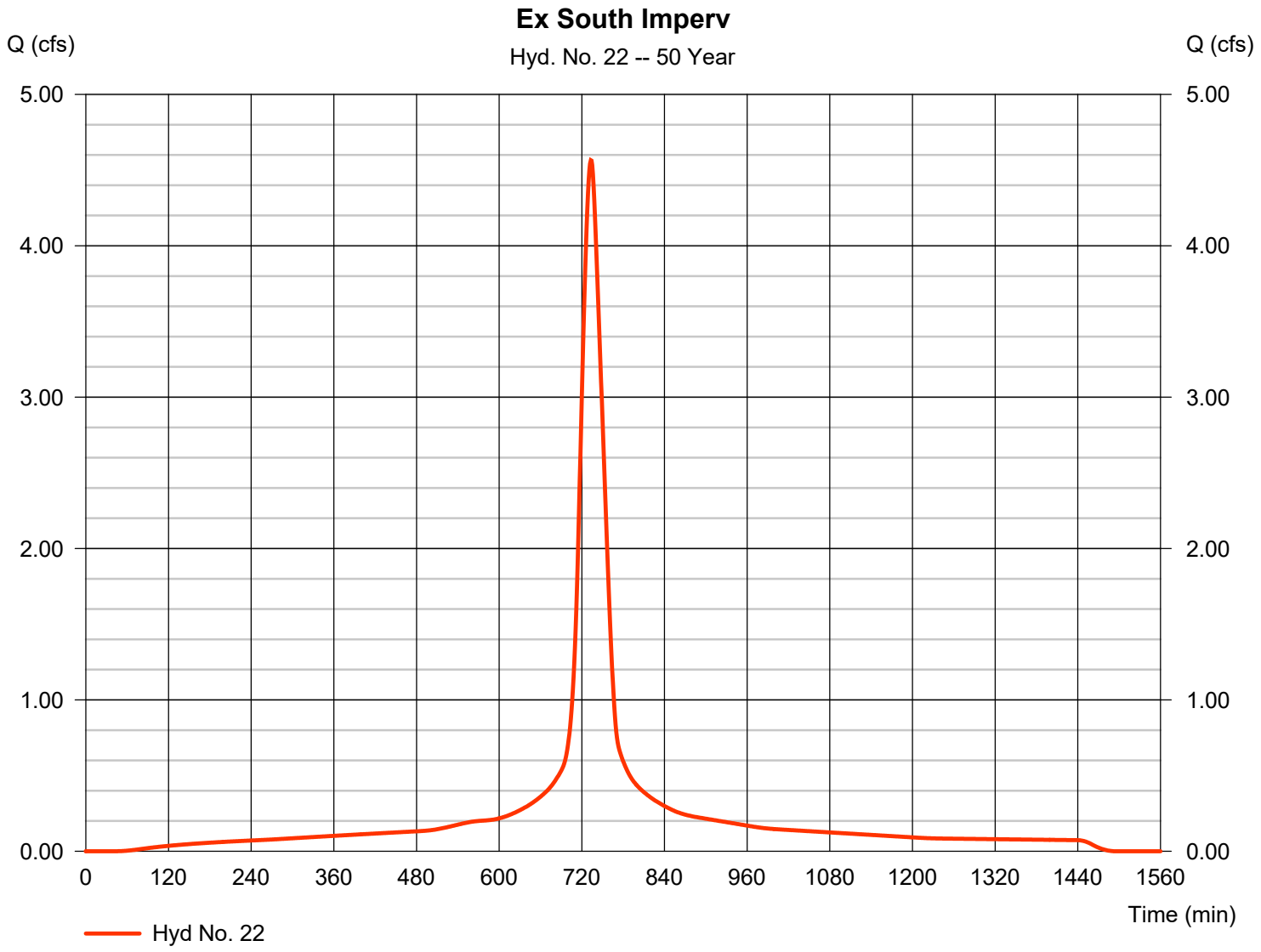
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.565 cfs
Storm frequency	=	50 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	22,738 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



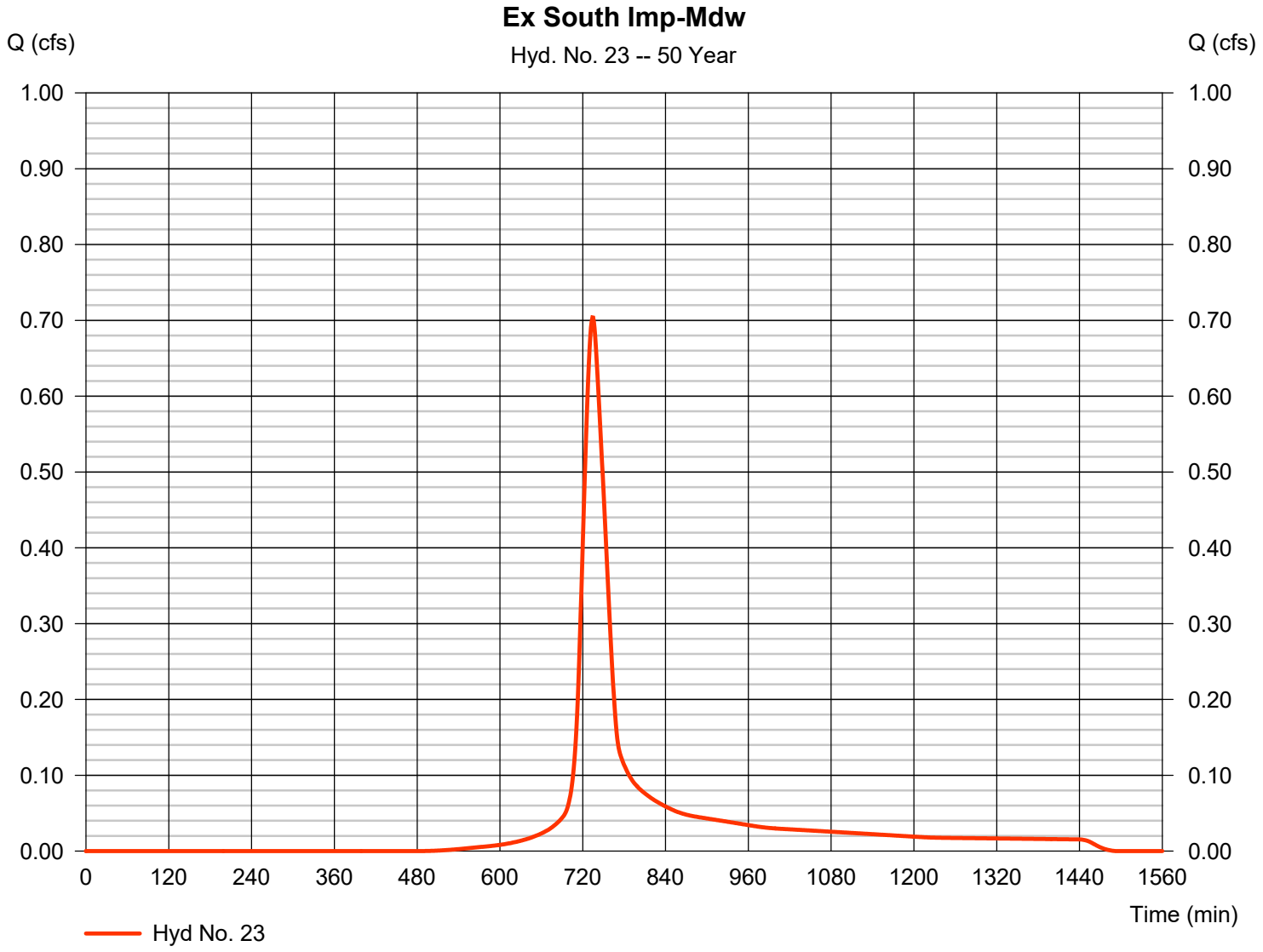
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.704 cfs
Storm frequency	=	50 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	3,121 cuft
Drainage area	=	0.233 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

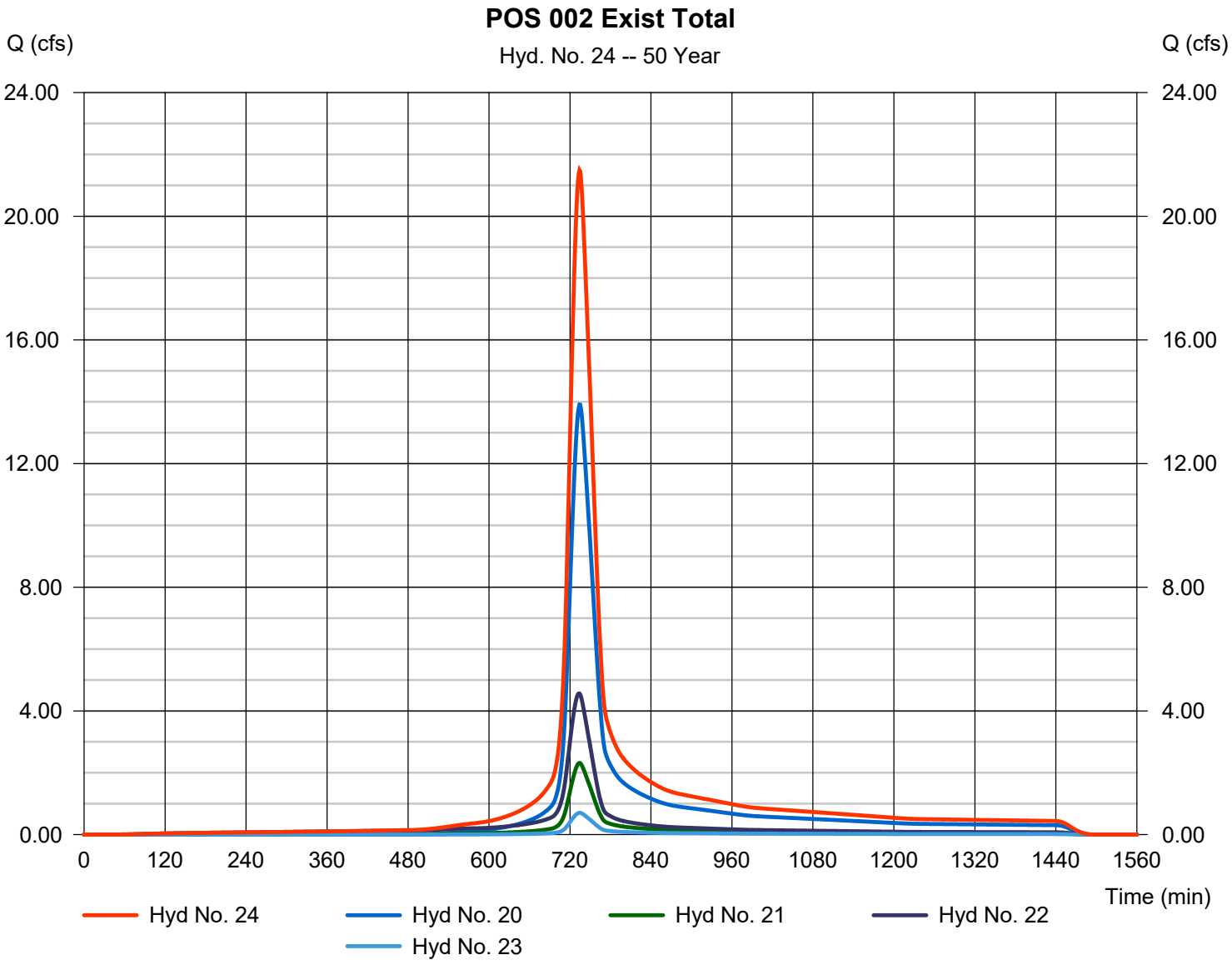


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	= Combine	Peak discharge	= 21.49 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 97,772 cuft
Inflow hyds.	= 20, 21, 22, 23	Contrib. drain. area	= 6.405 ac

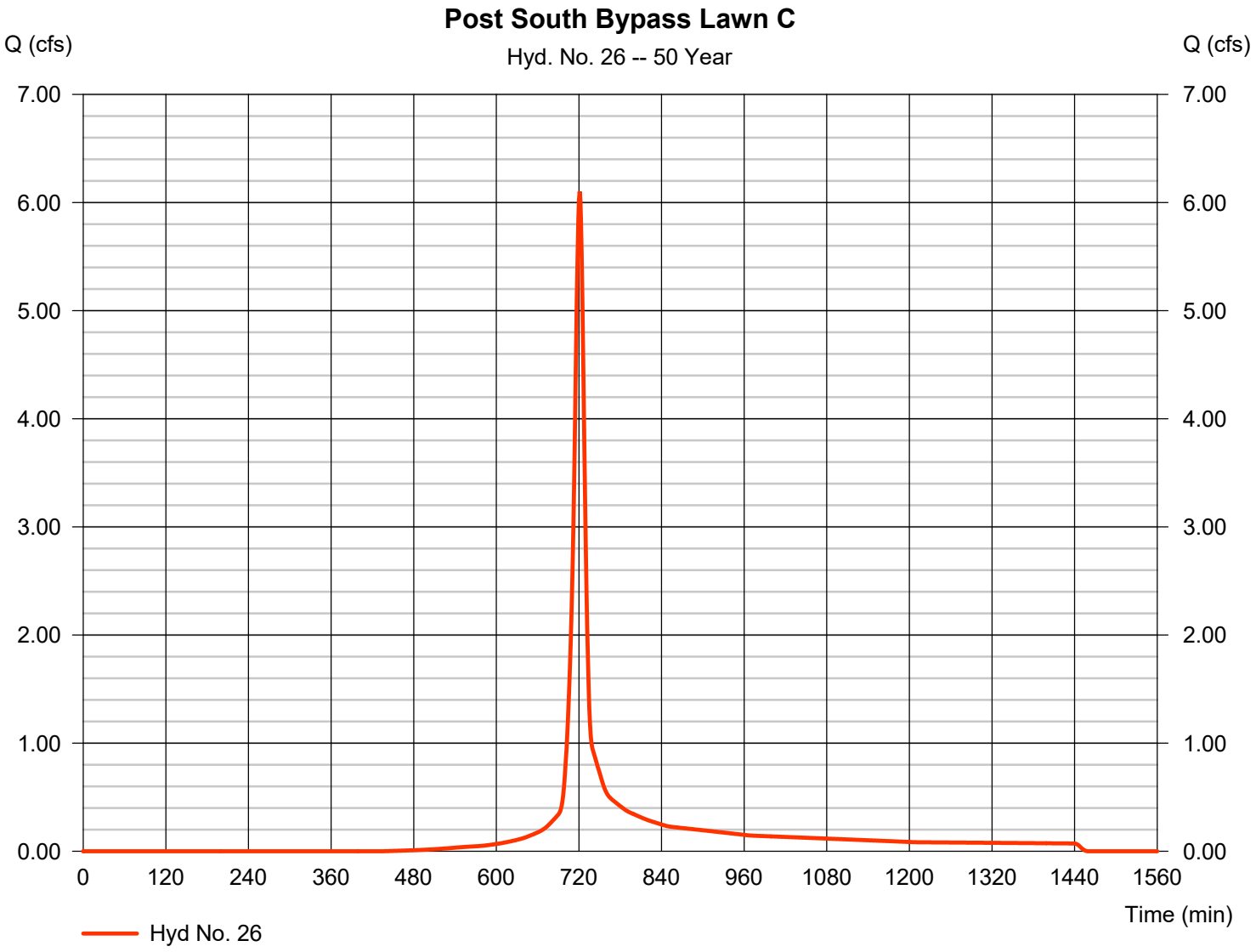


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 6.102 cfs
Storm frequency	= 50 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 15,464 cuft
Drainage area	= 1.080 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.90 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

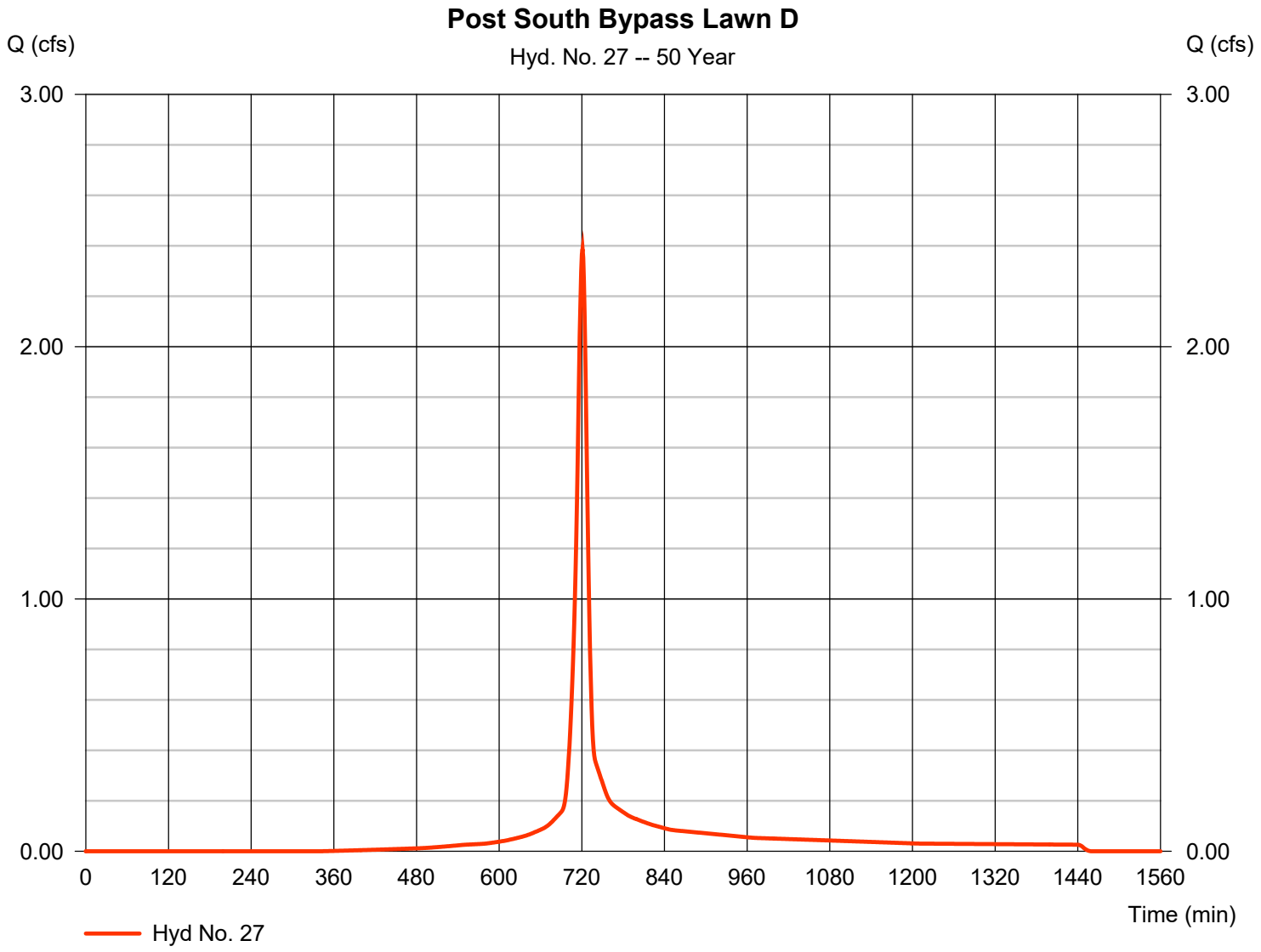


Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	= SCS Runoff	Peak discharge	= 2.387 cfs
Storm frequency	= 50 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 6,141 cuft
Drainage area	= 0.369 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

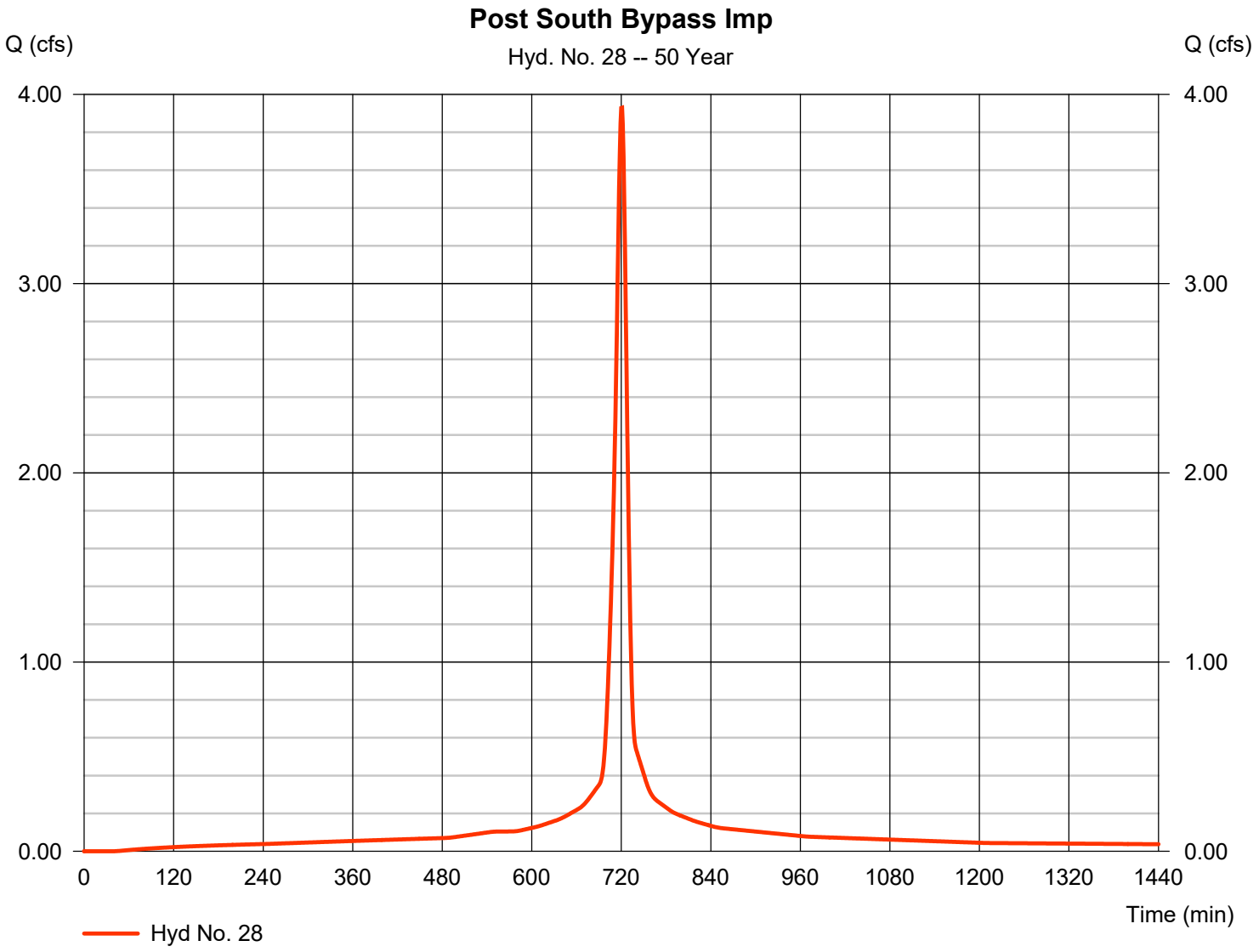


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 3.929 cfs
Storm frequency	= 50 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 11,672 cuft
Drainage area	= 0.486 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

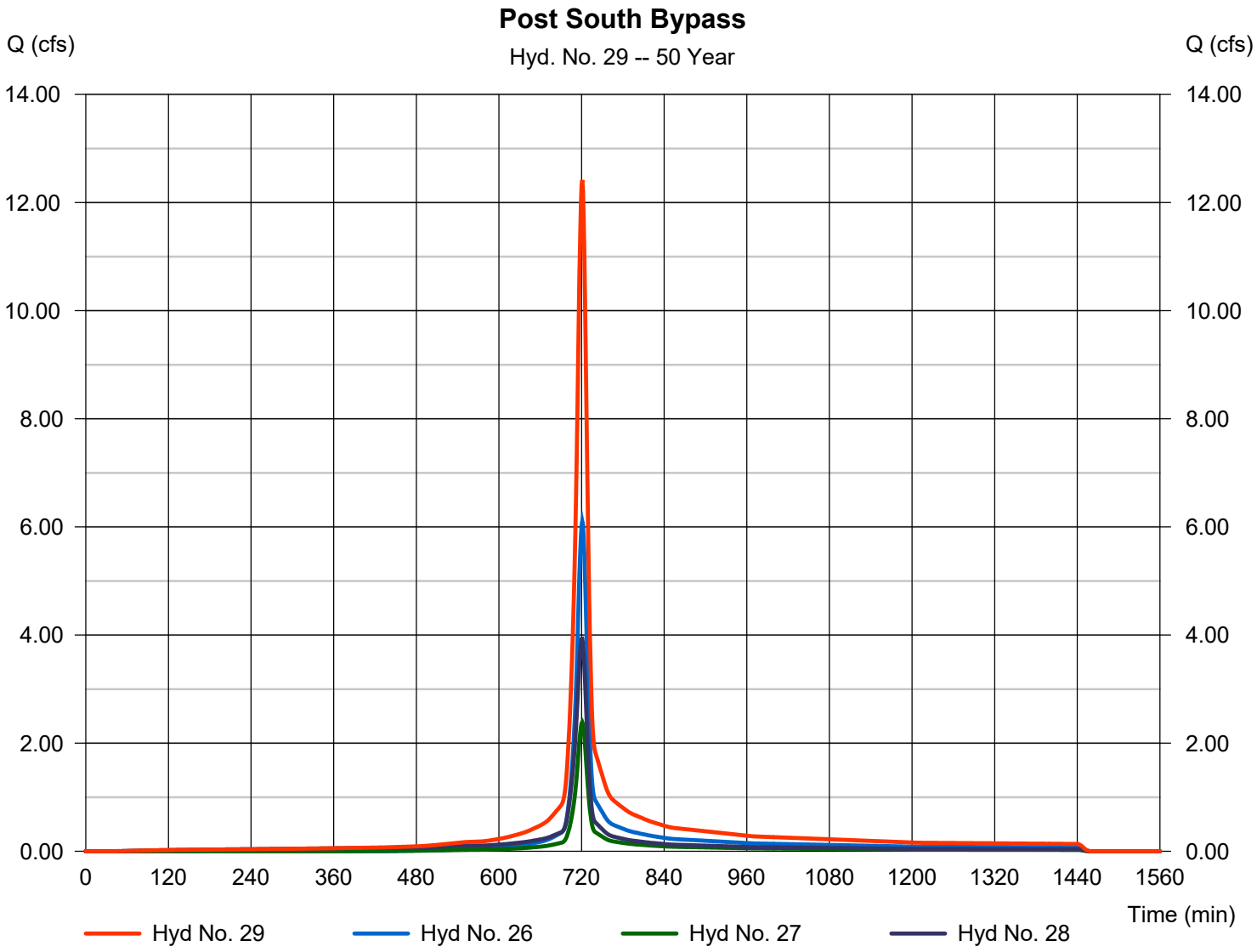


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	=	Combine	Peak discharge	=	12.42 cfs
Storm frequency	=	50 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	33,277 cuft
Inflow hyds.	=	26, 27, 28	Contrib. drain. area	=	1.935 ac



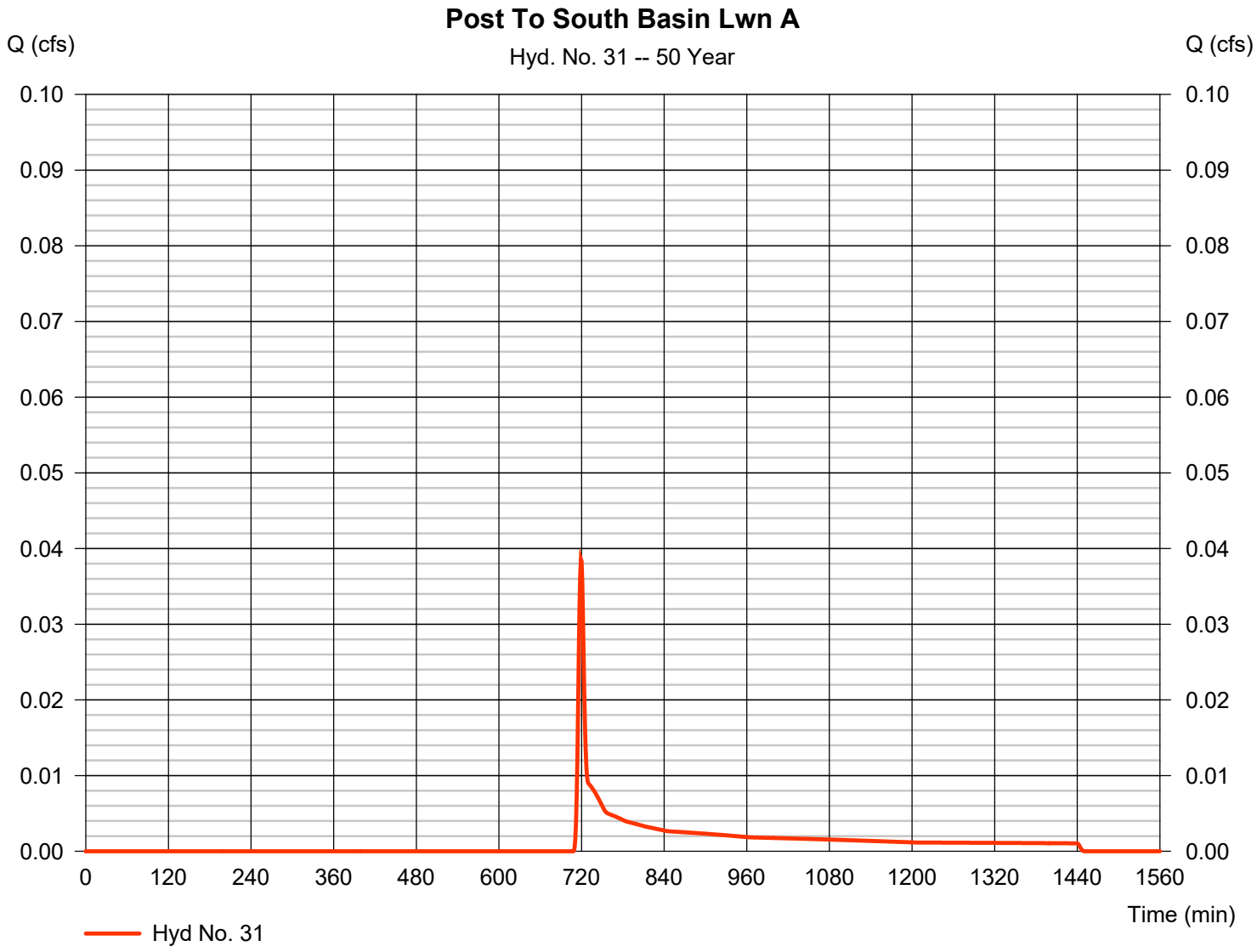
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.039 cfs
Storm frequency	=	50 yrs	Time to peak	=	719 min
Time interval	=	1 min	Hyd. volume	=	108 cuft
Drainage area	=	0.035 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



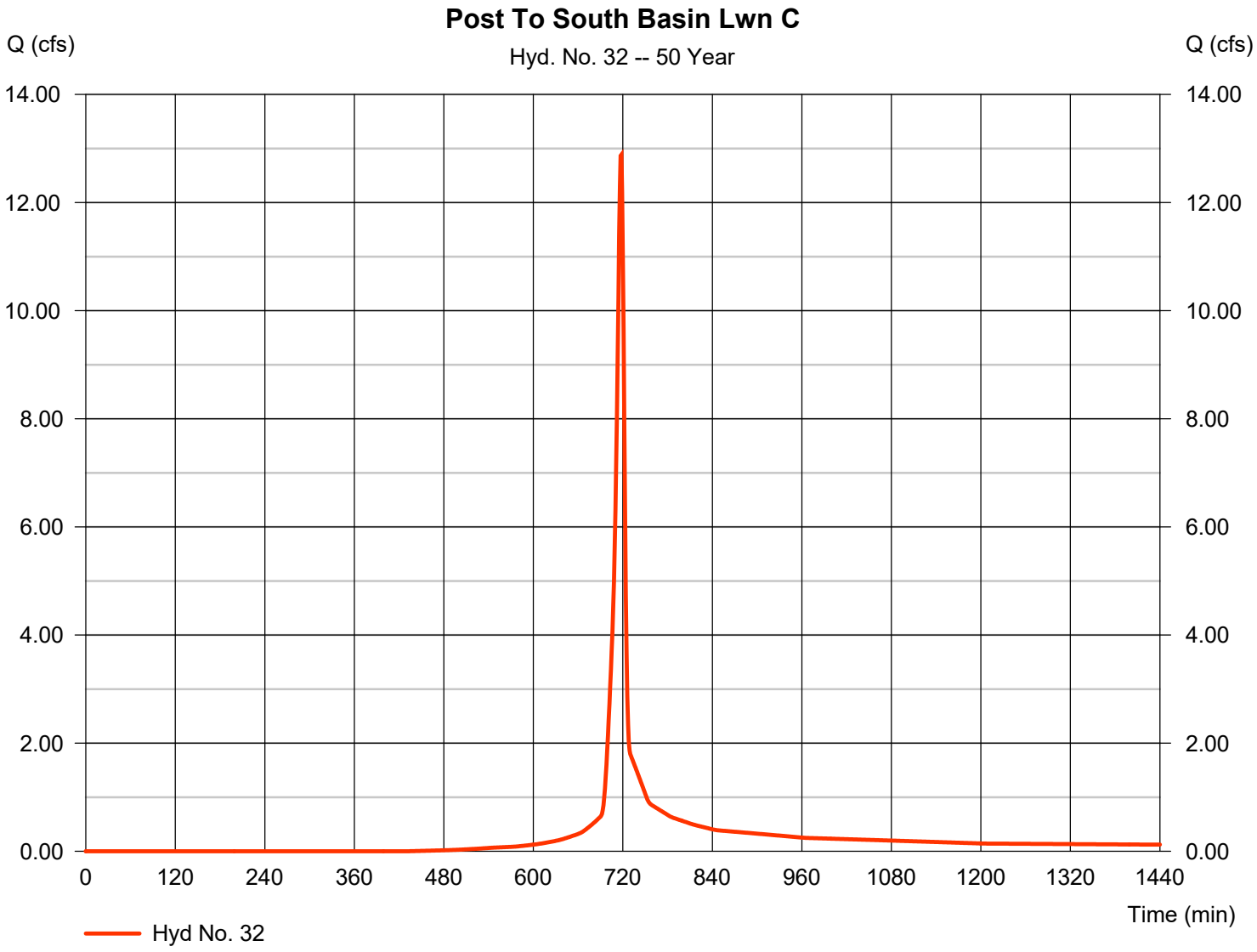
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	= SCS Runoff	Peak discharge	= 12.88 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 26,371 cuft
Drainage area	= 1.758 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 6.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



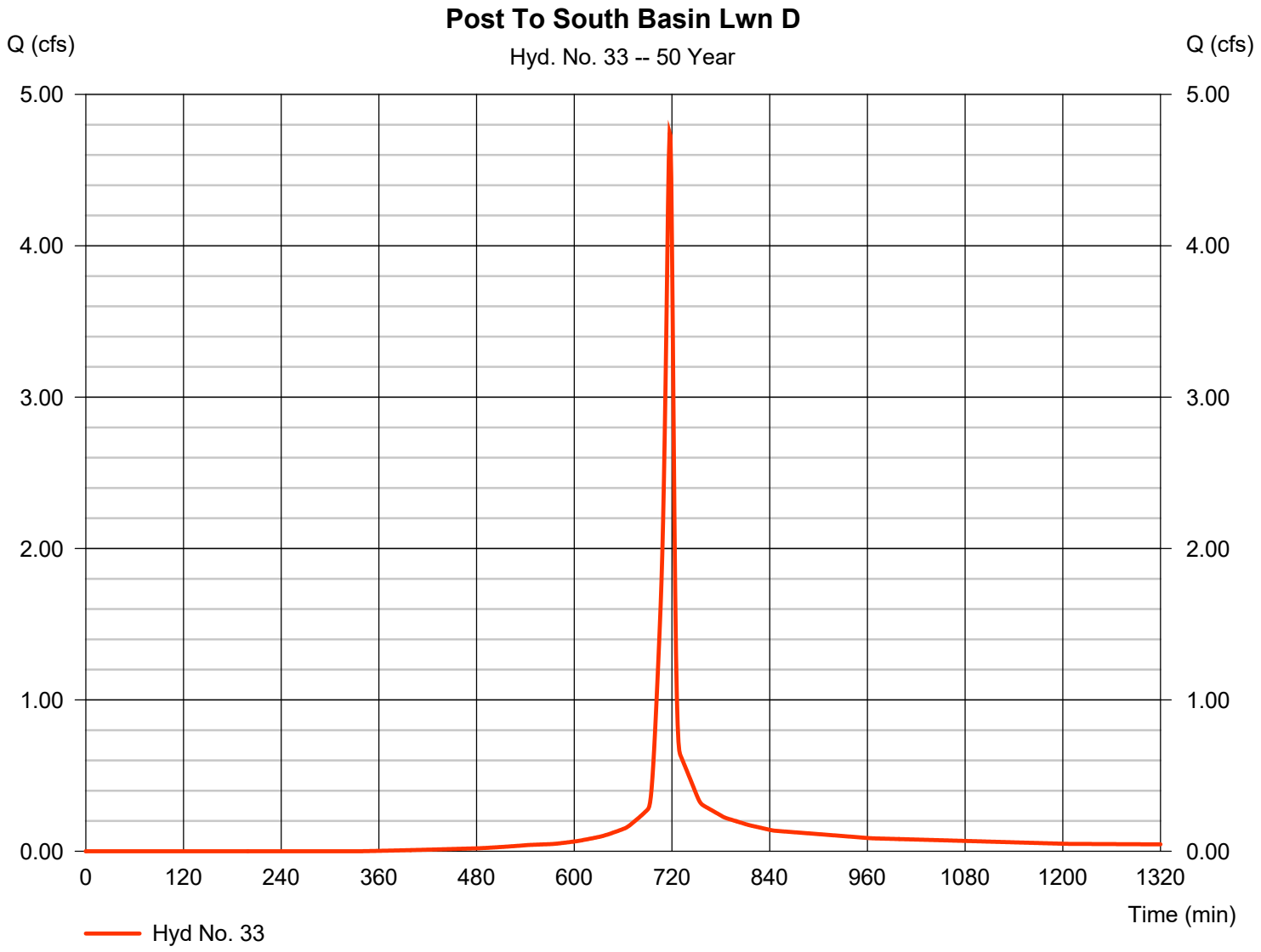
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.746 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	9,921 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



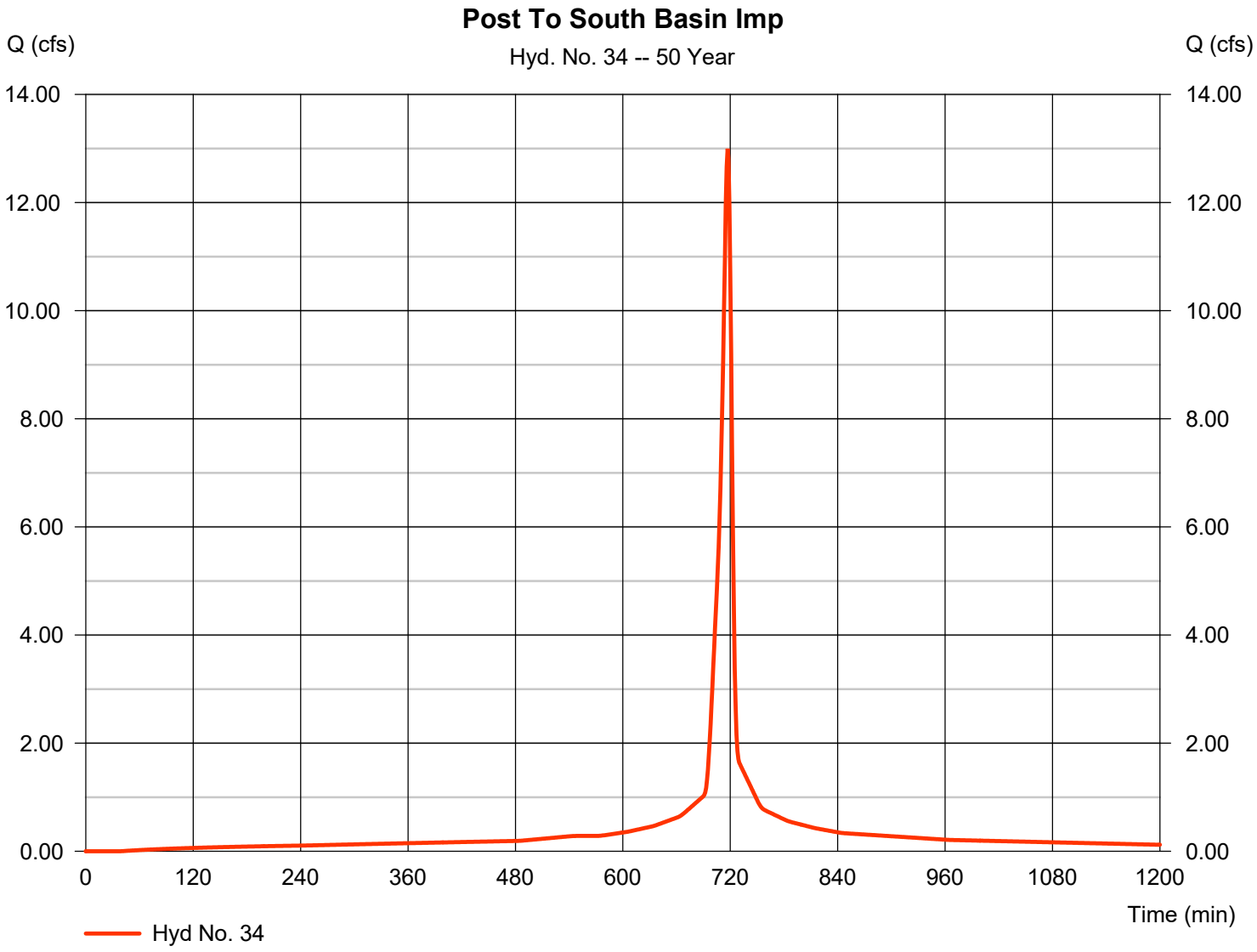
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.00 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	31,701 cuft
Drainage area	=	1.260 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	6.96 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

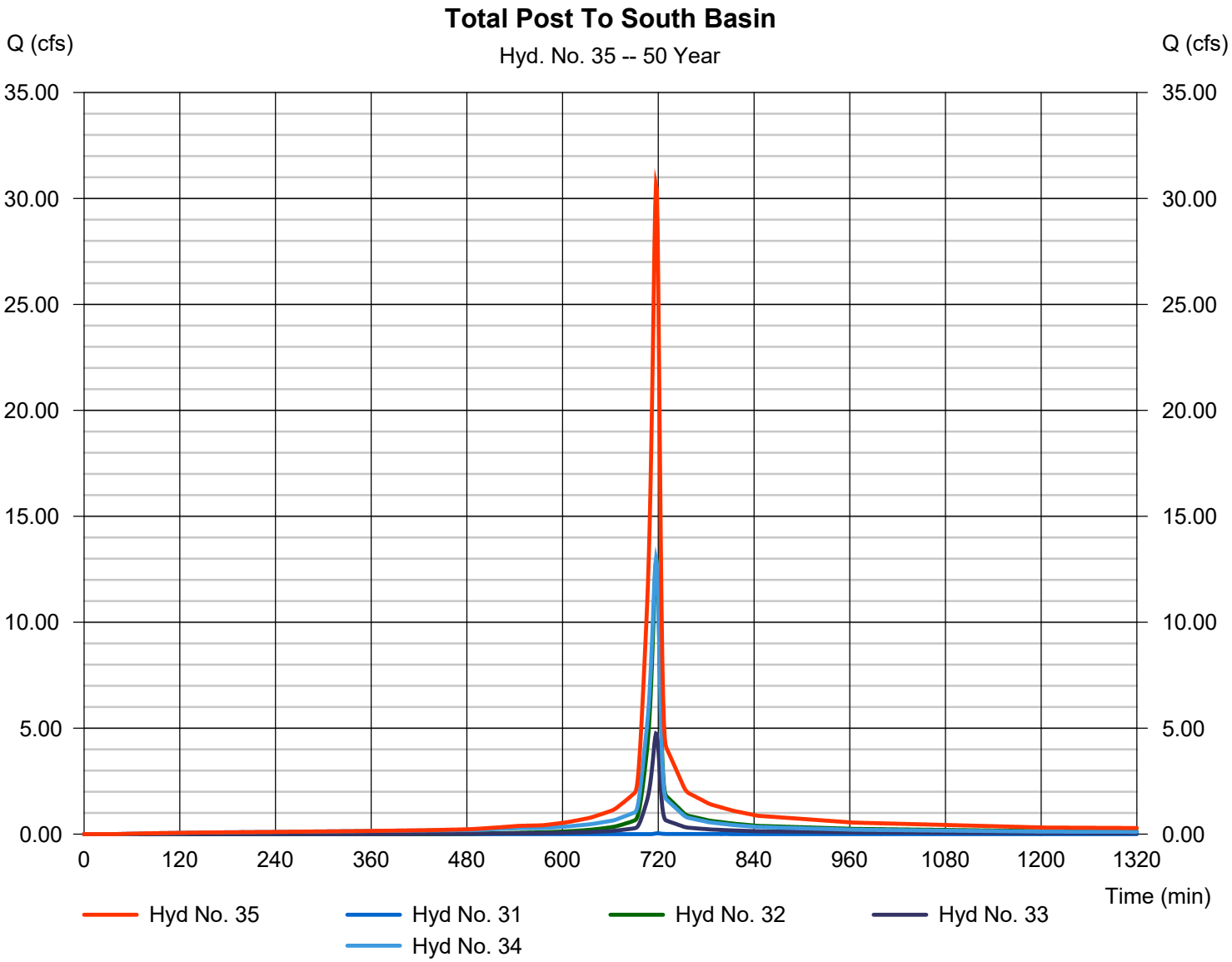


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	30.64 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	68,101 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



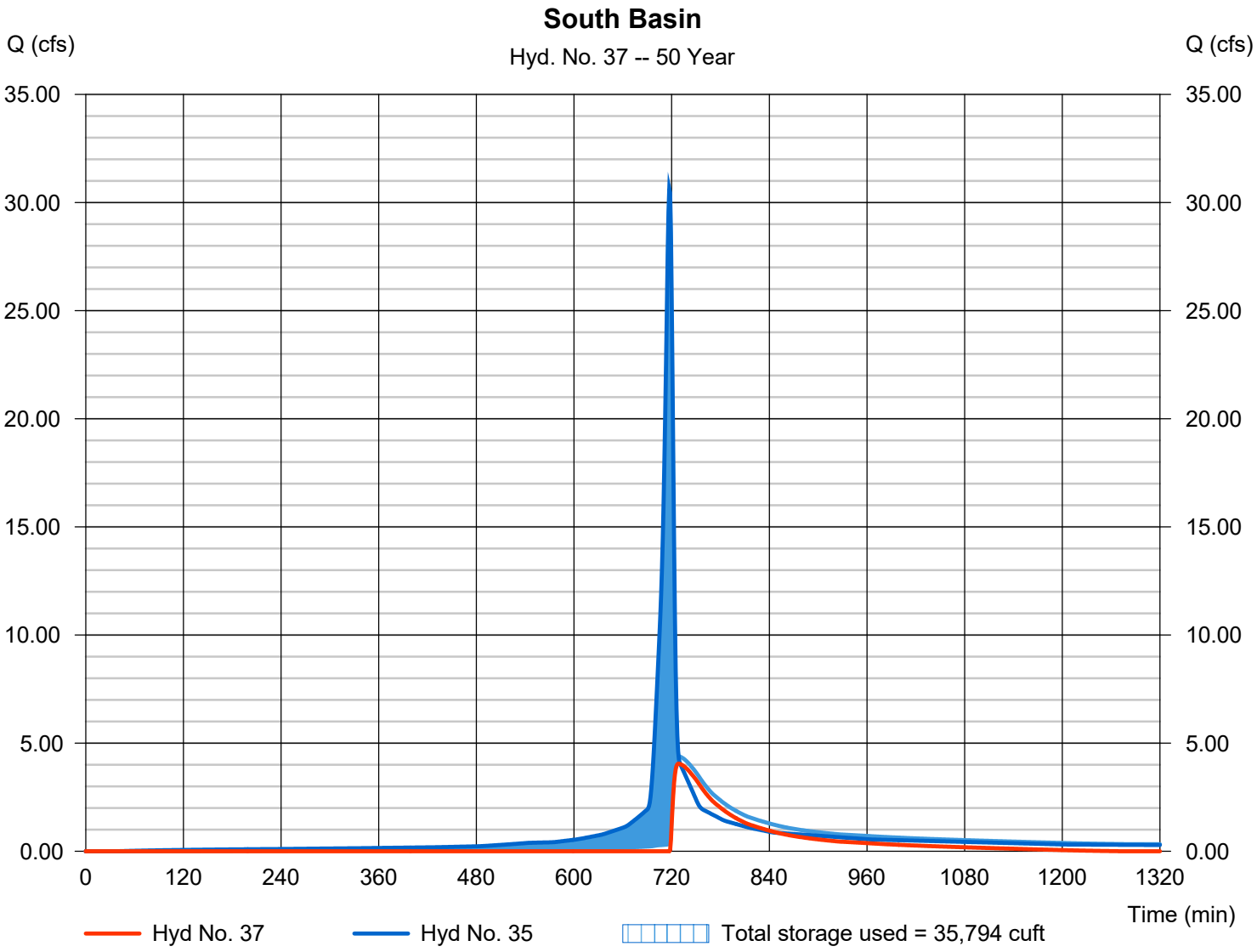
Hydrograph Report

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	4.052 cfs
Storm frequency	=	50 yrs	Time to peak	=	729 min
Time interval	=	1 min	Hyd. volume	=	23,303 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	474.22 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	35,794 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

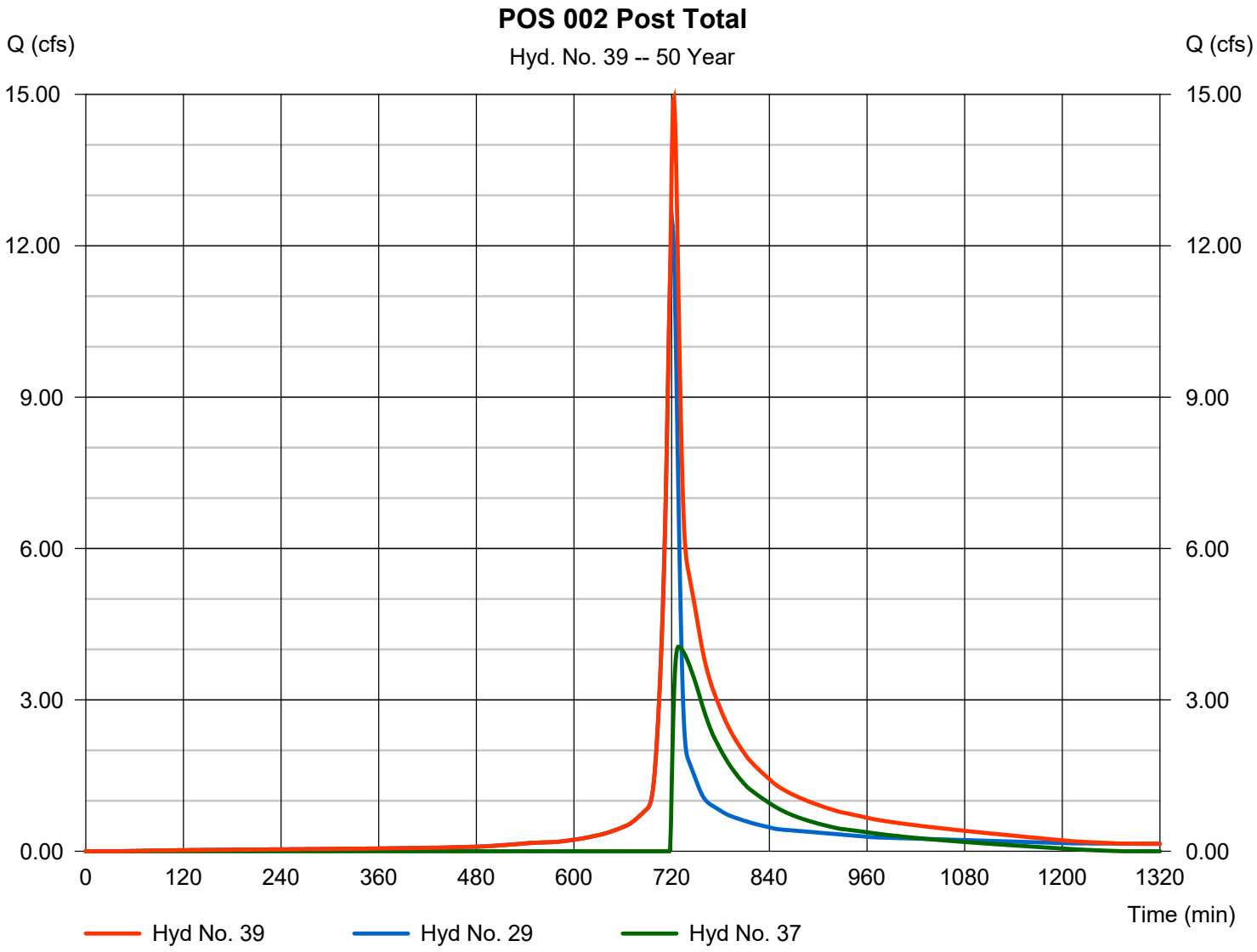


Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	= Combine	Peak discharge	= 14.91 cfs
Storm frequency	= 50 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 56,580 cuft
Inflow hyds.	= 29, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

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

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	2.080	1	742	15,054	------	------	------	Ex North Mdw A
2	SCS Runoff	12.40	1	738	61,998	------	------	------	Ex North Mdw C
3	SCS Runoff	3.197	1	738	17,995	------	------	------	Ex North Imperv
4	SCS Runoff	0.538	1	738	2,690	------	------	------	Ex North Imp-Mdw
5	Combine	18.15	1	739	97,737	1, 2, 3, 4	------	------	POS 001 Exist Total
7	SCS Runoff	2.896	1	719	6,870	------	------	------	Post North Bypass Lawn A
8	SCS Runoff	4.029	1	717	8,326	------	------	------	Post North Bypass Lawn C
9	Combine	6.898	1	718	15,196	7, 8	------	------	Post North Bypass Total
11	SCS Runoff	0.130	1	719	308	------	------	------	Post To North Basin Lwn A
12	SCS Runoff	10.40	1	717	21,499	------	------	------	Post To North Basin Lwn C
13	SCS Runoff	64.45	1	717	157,899	------	------	------	Post To North Basin Imp
14	Combine	74.97	1	717	179,706	11, 12, 13	------	------	Total Post To North Basin
16	Reservoir	8.351	1	732	85,851	14	475.00	98,029	North Basin
18	Combine	13.23	1	720	101,048	9, 16,	------	------	POS 001 Post Total
20	SCS Runoff	17.87	1	734	79,004	------	------	------	Ex South Mdw C
21	SCS Runoff	2.885	1	734	12,809	------	------	------	Ex South Mdw D
22	SCS Runoff	5.364	1	733	26,829	------	------	------	Ex South Imperv
23	SCS Runoff	0.905	1	734	3,998	------	------	------	Ex South Imp-Mdw
24	Combine	27.02	1	734	122,640	20, 21, 22, 23	------	------	POS 002 Exist Total
26	SCS Runoff	7.687	1	721	19,597	------	------	------	Post South Bypass Lawn C
27	SCS Runoff	2.936	1	721	7,627	------	------	------	Post South Bypass Lawn D
28	SCS Runoff	4.616	1	721	13,772	------	------	------	Post South Bypass Imp
29	Combine	15.24	1	721	40,995	26, 27, 28	------	------	Post South Bypass
31	SCS Runoff	0.073	1	719	174	------	------	------	Post To South Basin Lwn A
32	SCS Runoff	16.17	1	717	33,418	------	------	------	Post To South Basin Lwn C
33	SCS Runoff	5.828	1	717	12,321	------	------	------	Post To South Basin Lwn D
34	SCS Runoff	15.27	1	717	37,404	------	------	------	Post To South Basin Imp
35	Combine	37.33	1	717	83,317	31, 32, 33, 34	------	------	Total Post To South Basin
37	Reservoir	9.460	1	725	37,393	35	474.38	41,847	South Basin

Hydrograph Summary Report

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

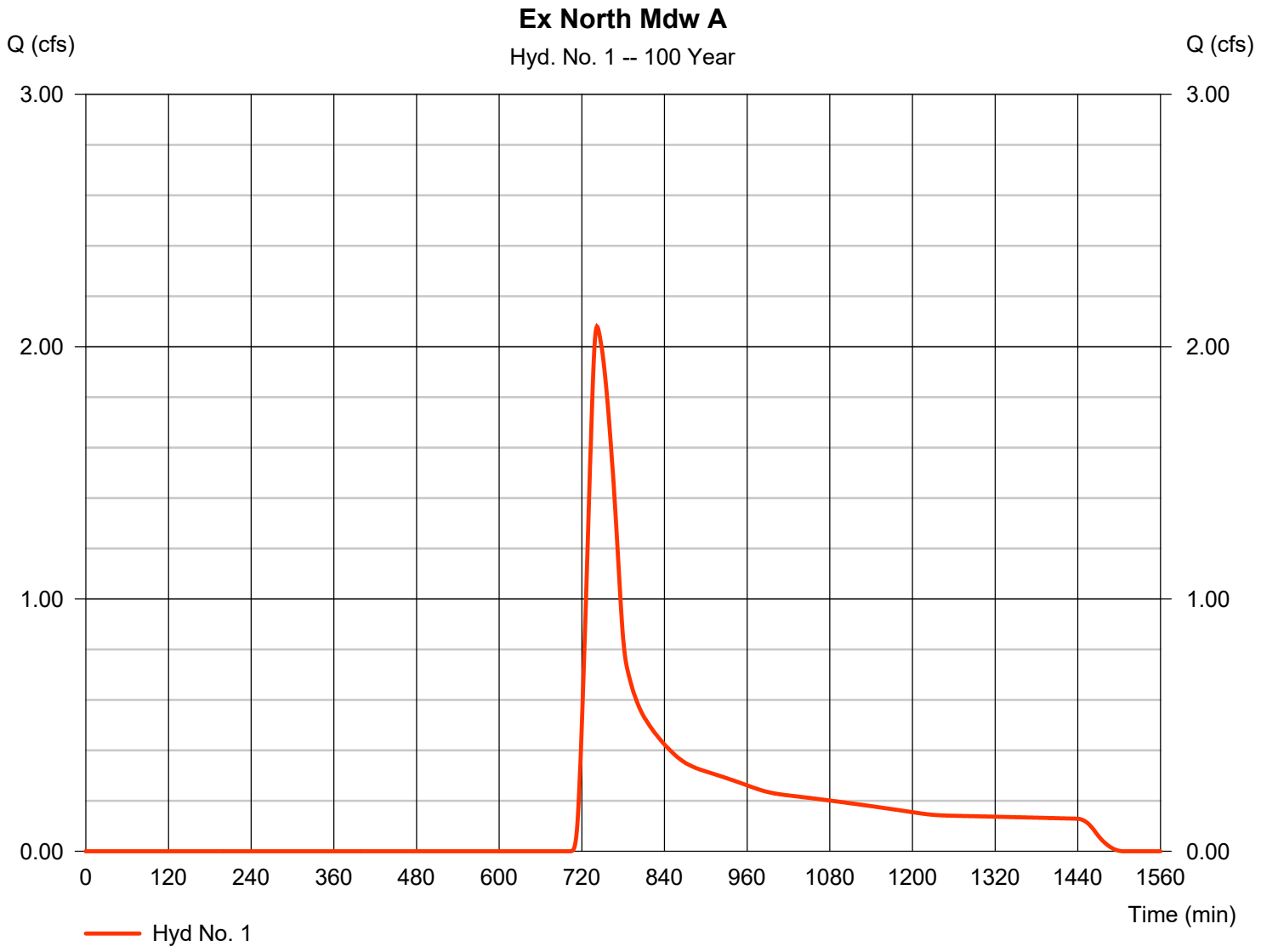
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
39	Combine	23.38	1	723	78,388	29, 37,	------	------	POS 002 Post Total
42	Combine	81.65	1	717	194,902	9, 14,	------	------	Post North Undetained
43	Combine	51.11	1	718	124,312	29, 35,	------	------	Post South Undetained

Hydrograph Report

Hyd. No. 1

Ex North Mdw A

Hydrograph type	= SCS Runoff	Peak discharge	= 2.080 cfs
Storm frequency	= 100 yrs	Time to peak	= 742 min
Time interval	= 1 min	Hyd. volume	= 15,054 cuft
Drainage area	= 3.114 ac	Curve number	= 40
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 41.40 min
Total precip.	= 8.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

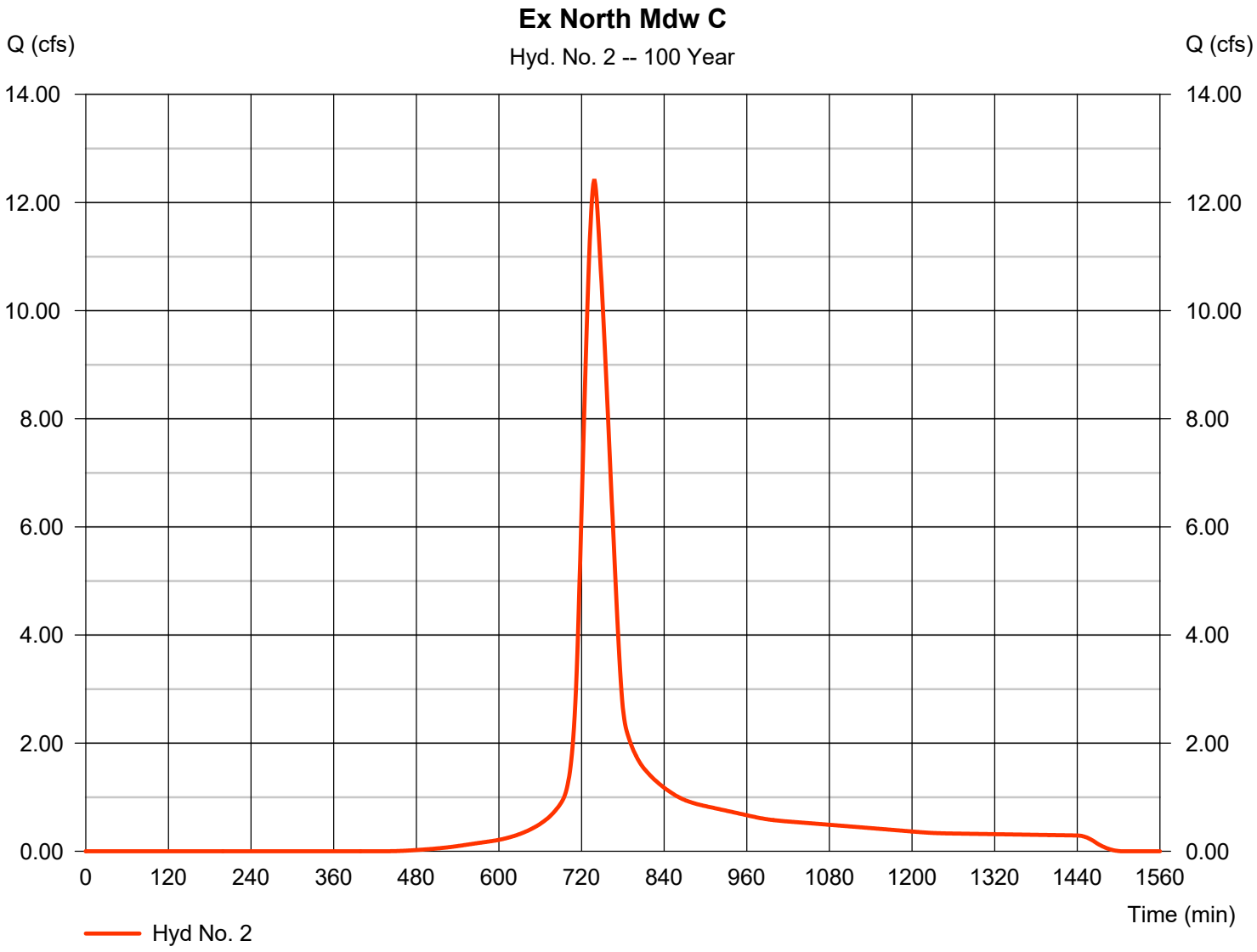


Hydrograph Report

Hyd. No. 2

Ex North Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 12.40 cfs
Storm frequency	= 100 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 61,998 cuft
Drainage area	= 3.595 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 8.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

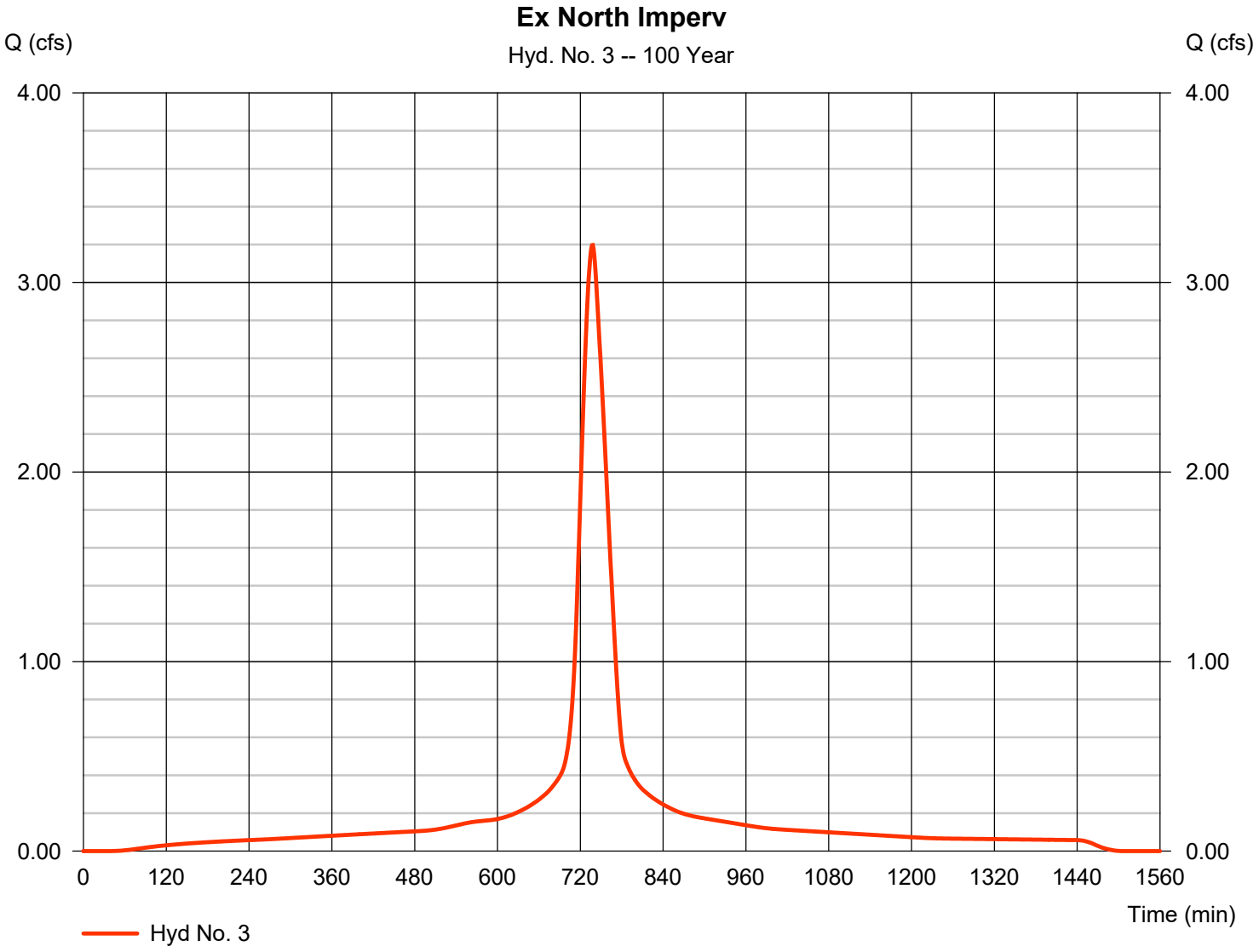


Hydrograph Report

Hyd. No. 3

Ex North Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.197 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	1 min	Hyd. volume	=	17,995 cuft
Drainage area	=	0.622 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	41.40 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

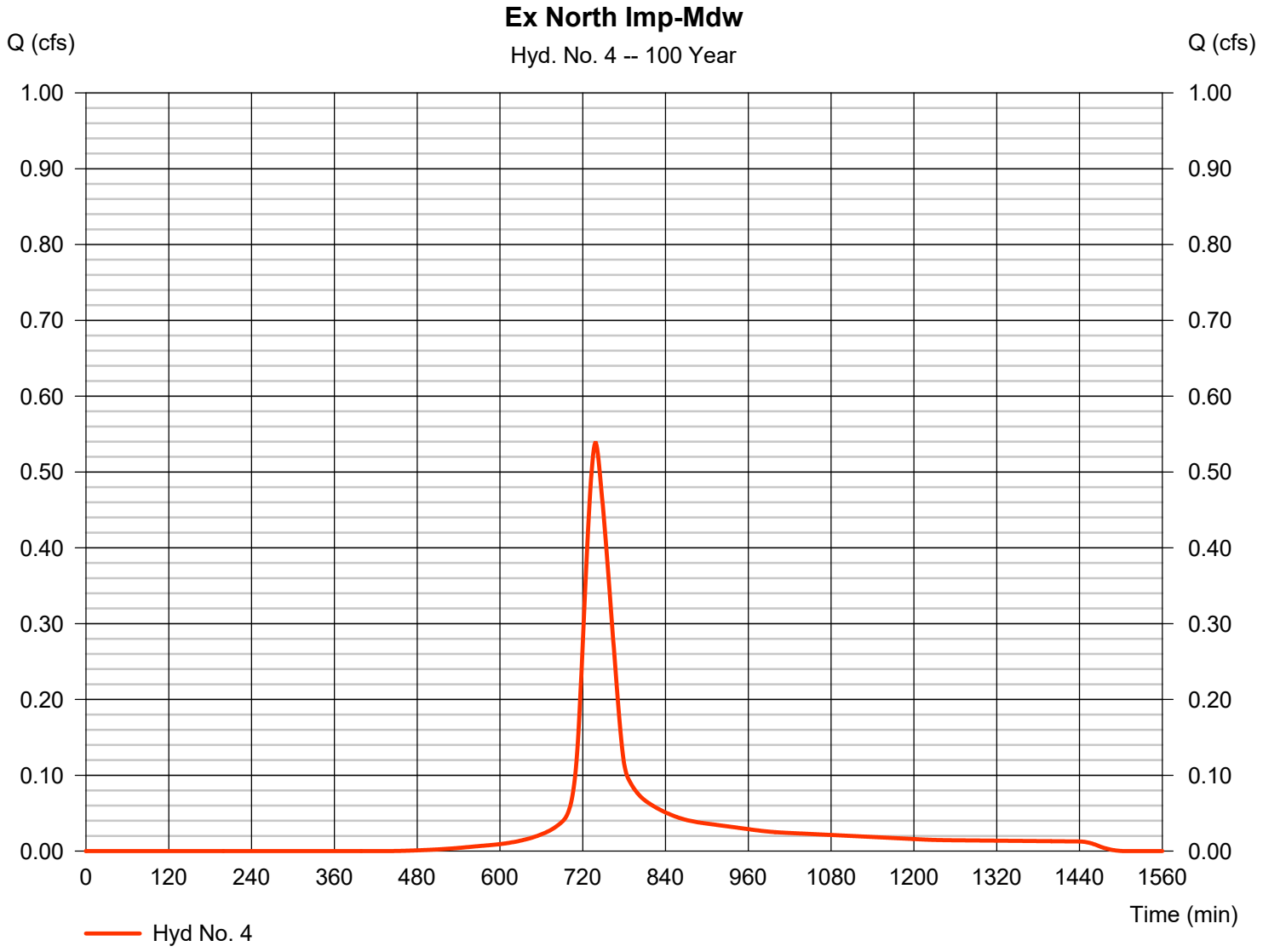


Hydrograph Report

Hyd. No. 4

Ex North Imp-Mdw

Hydrograph type	= SCS Runoff	Peak discharge	= 0.538 cfs
Storm frequency	= 100 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 2,690 cuft
Drainage area	= 0.156 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 41.40 min
Total precip.	= 8.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

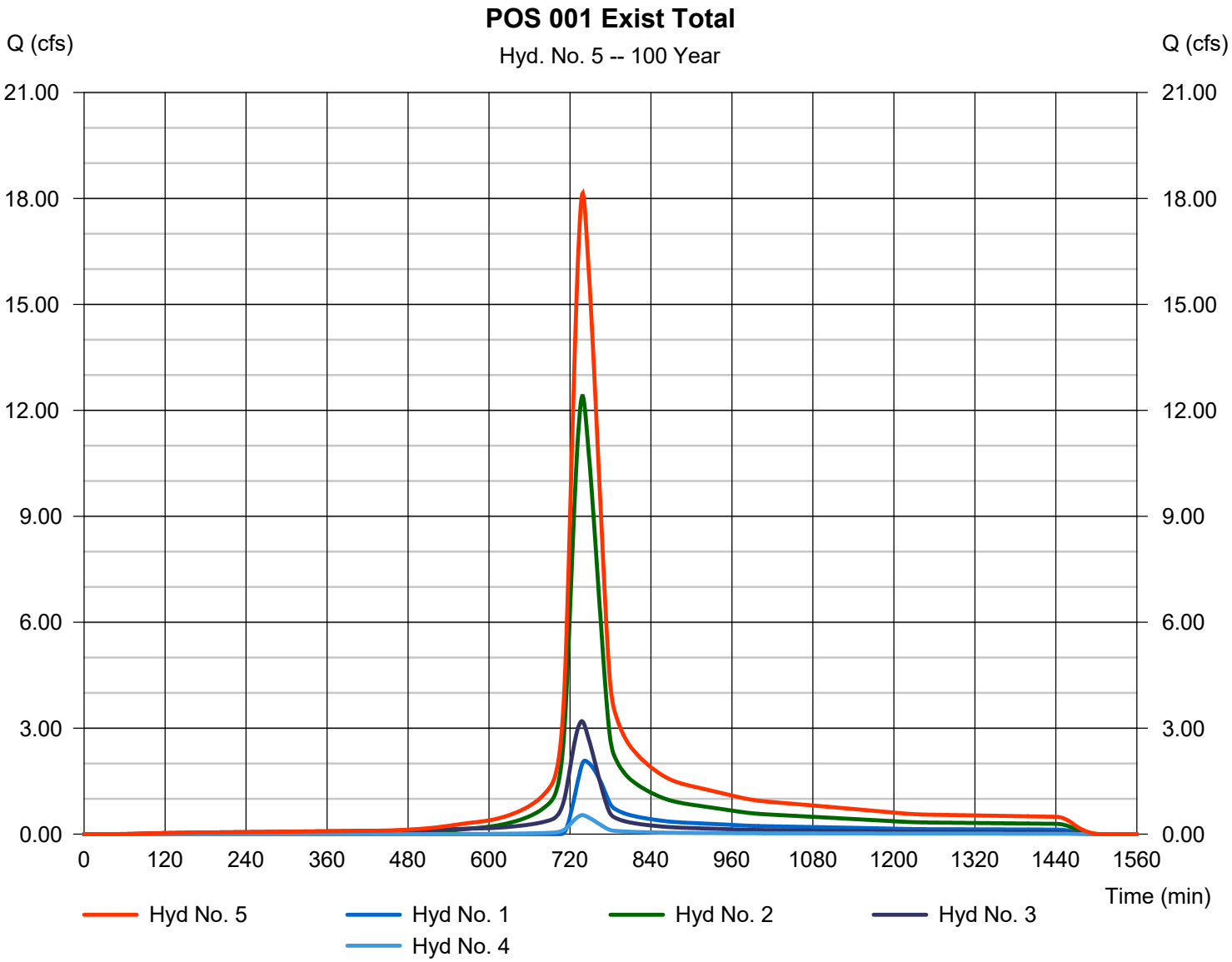


Hydrograph Report

Hyd. No. 5

POS 001 Exist Total

Hydrograph type	= Combine	Peak discharge	= 18.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 97,737 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 7.487 ac

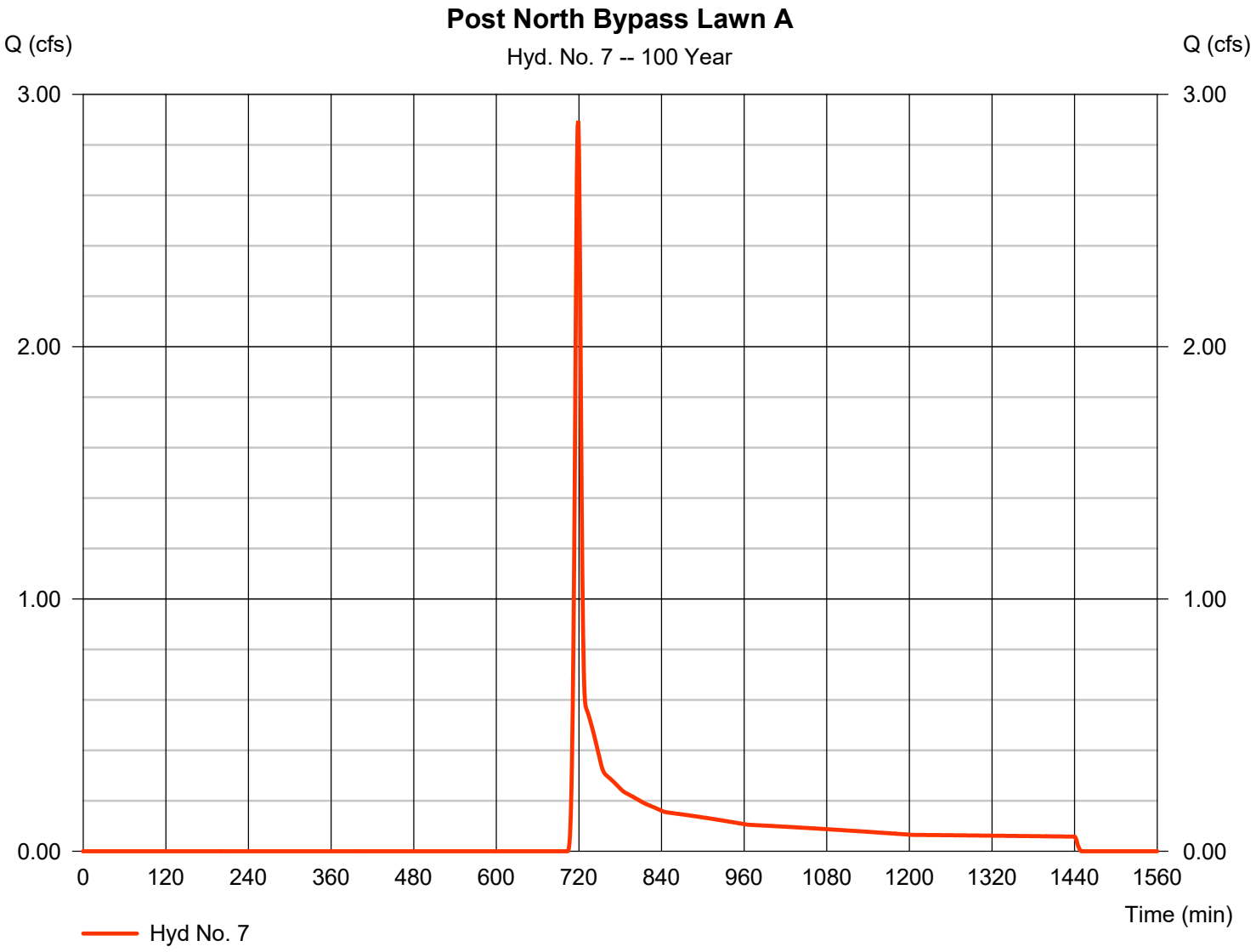


Hydrograph Report

Hyd. No. 7

Post North Bypass Lawn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.896 cfs
Storm frequency	=	100 yrs	Time to peak	=	719 min
Time interval	=	1 min	Hyd. volume	=	6,870 cuft
Drainage area	=	1.385 ac	Curve number	=	40
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

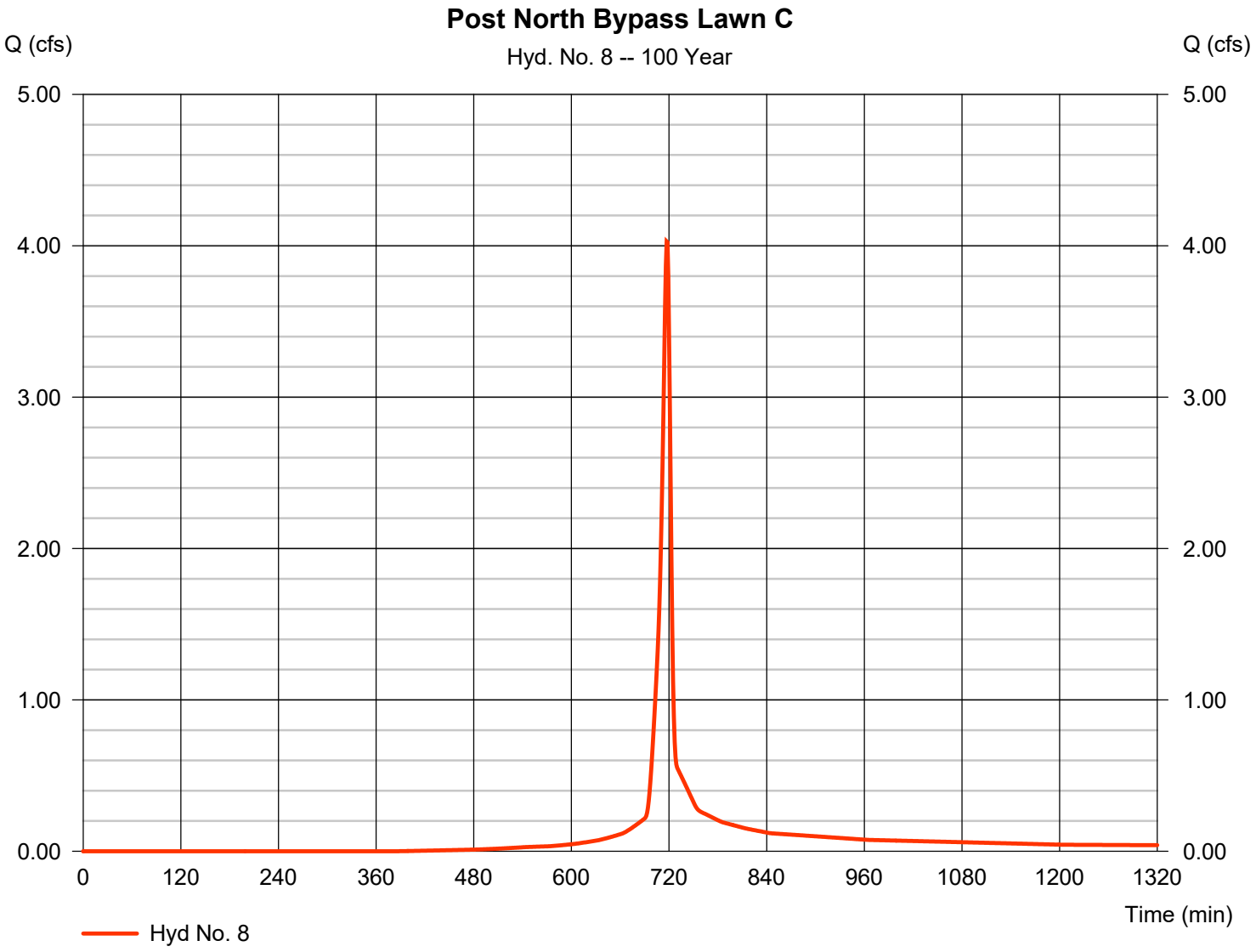


Hydrograph Report

Hyd. No. 8

Post North Bypass Lawn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.029 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	8,326 cuft
Drainage area	=	0.438 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

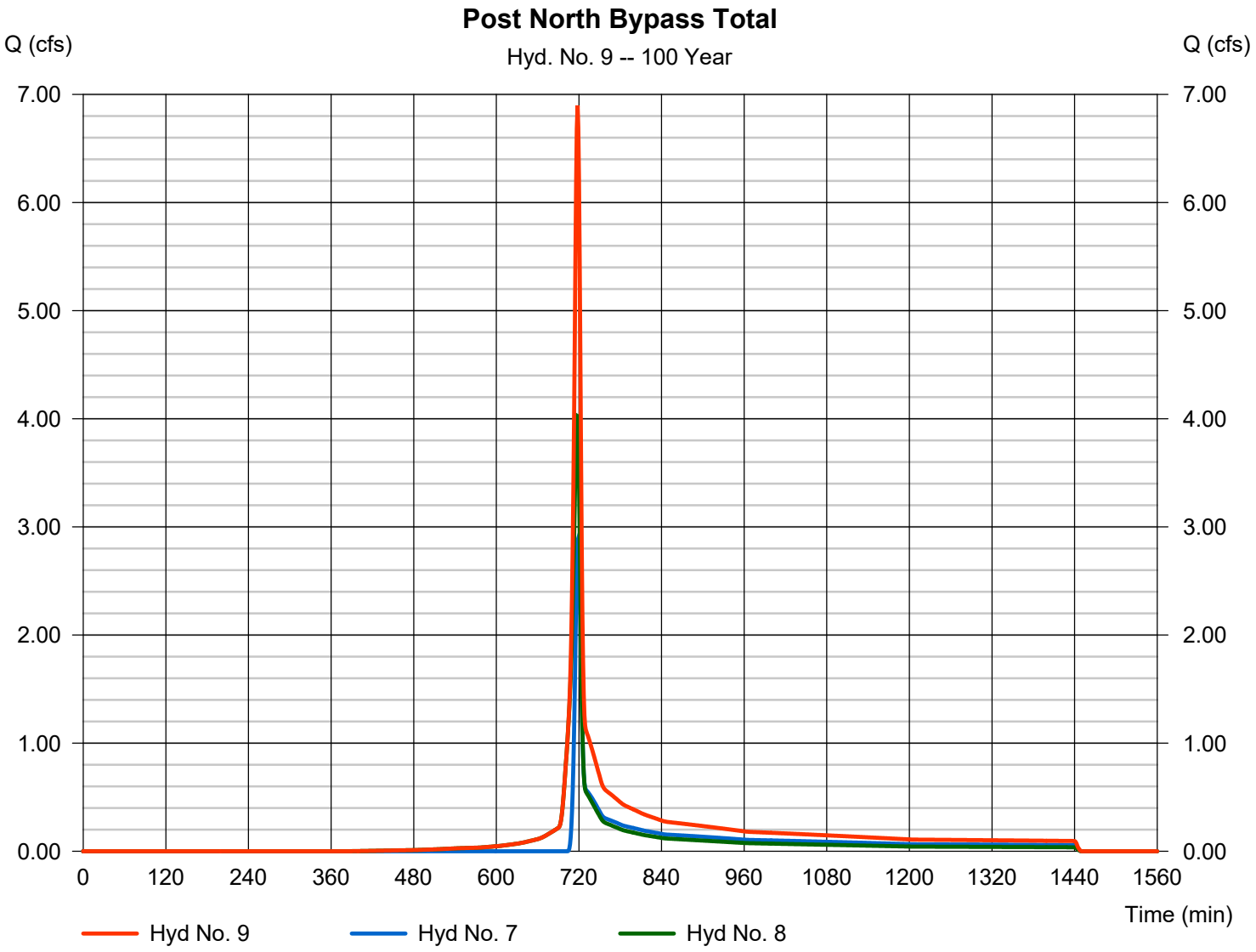


Hydrograph Report

Hyd. No. 9

Post North Bypass Total

Hydrograph type	=	Combine	Peak discharge	=	6.898 cfs
Storm frequency	=	100 yrs	Time to peak	=	718 min
Time interval	=	1 min	Hyd. volume	=	15,196 cuft
Inflow hyds.	=	7, 8	Contrib. drain. area	=	1.823 ac



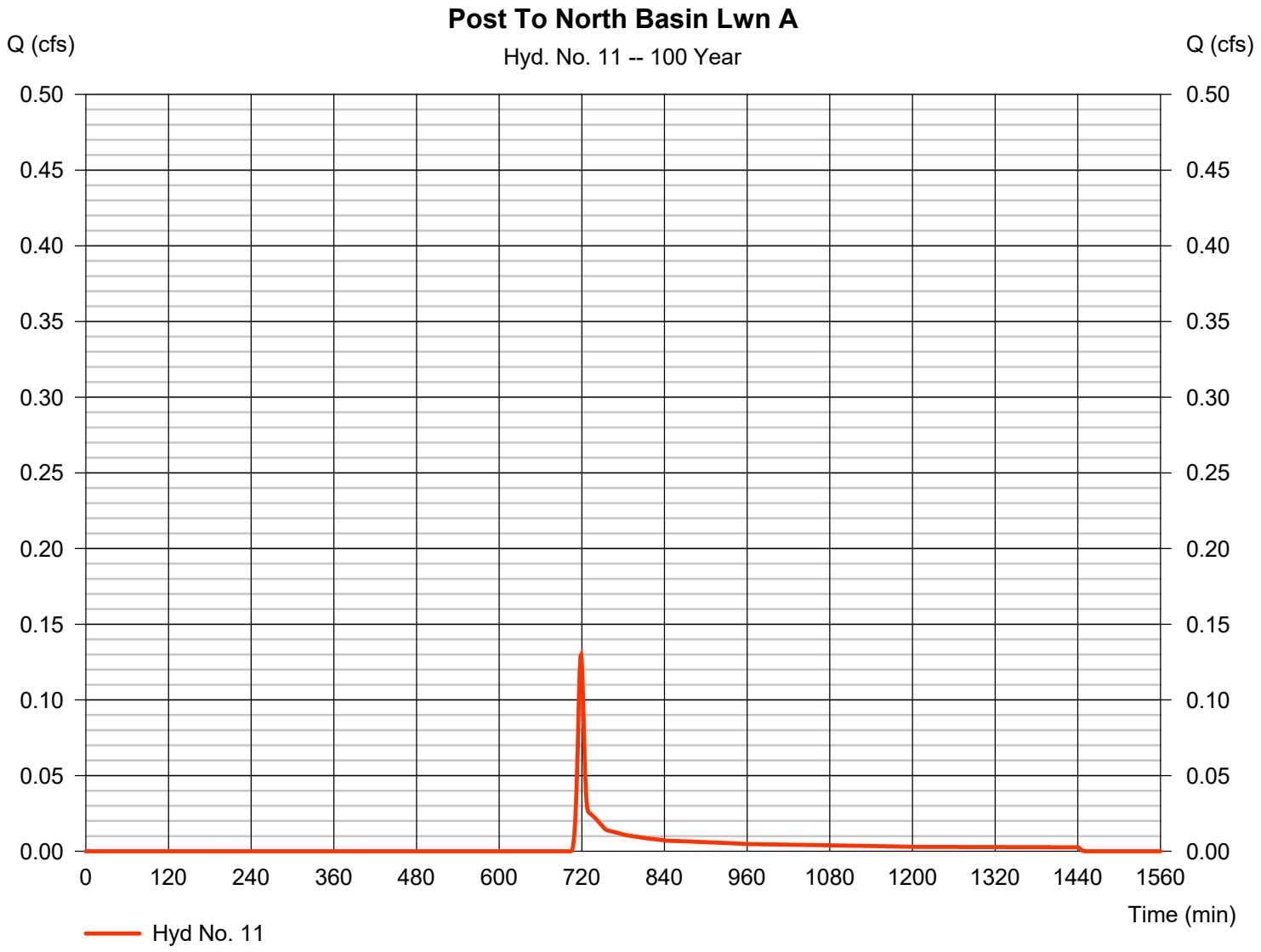
Hydrograph Report

Hyd. No. 11

Post To North Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.130 cfs
Storm frequency	=	100 yrs	Time to peak	=	719 min
Time interval	=	1 min	Hyd. volume	=	308 cuft
Drainage area	=	0.062 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 0.062



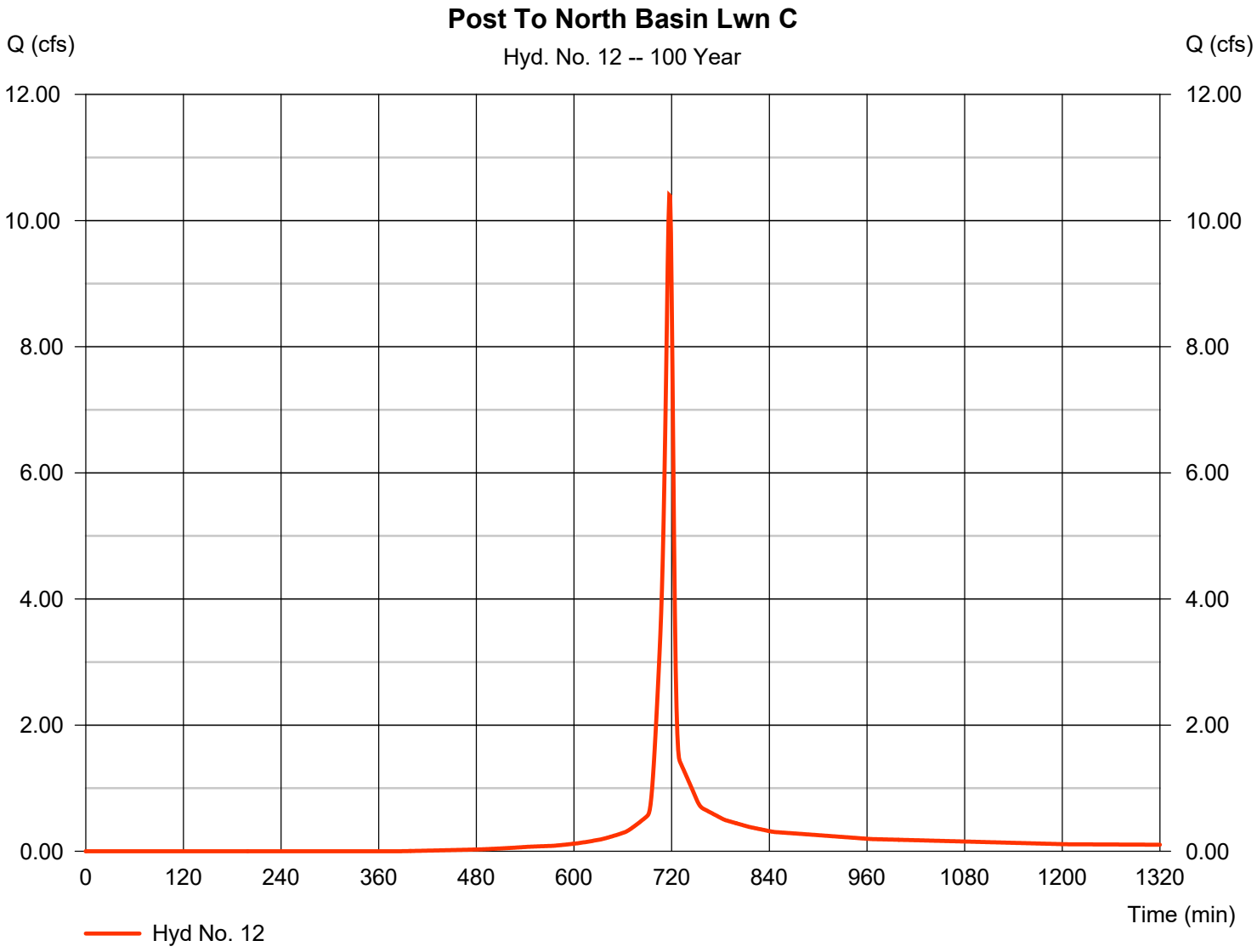
Hydrograph Report

Hyd. No. 12

Post To North Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.40 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	21,499 cuft
Drainage area	=	1.131 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 1.131



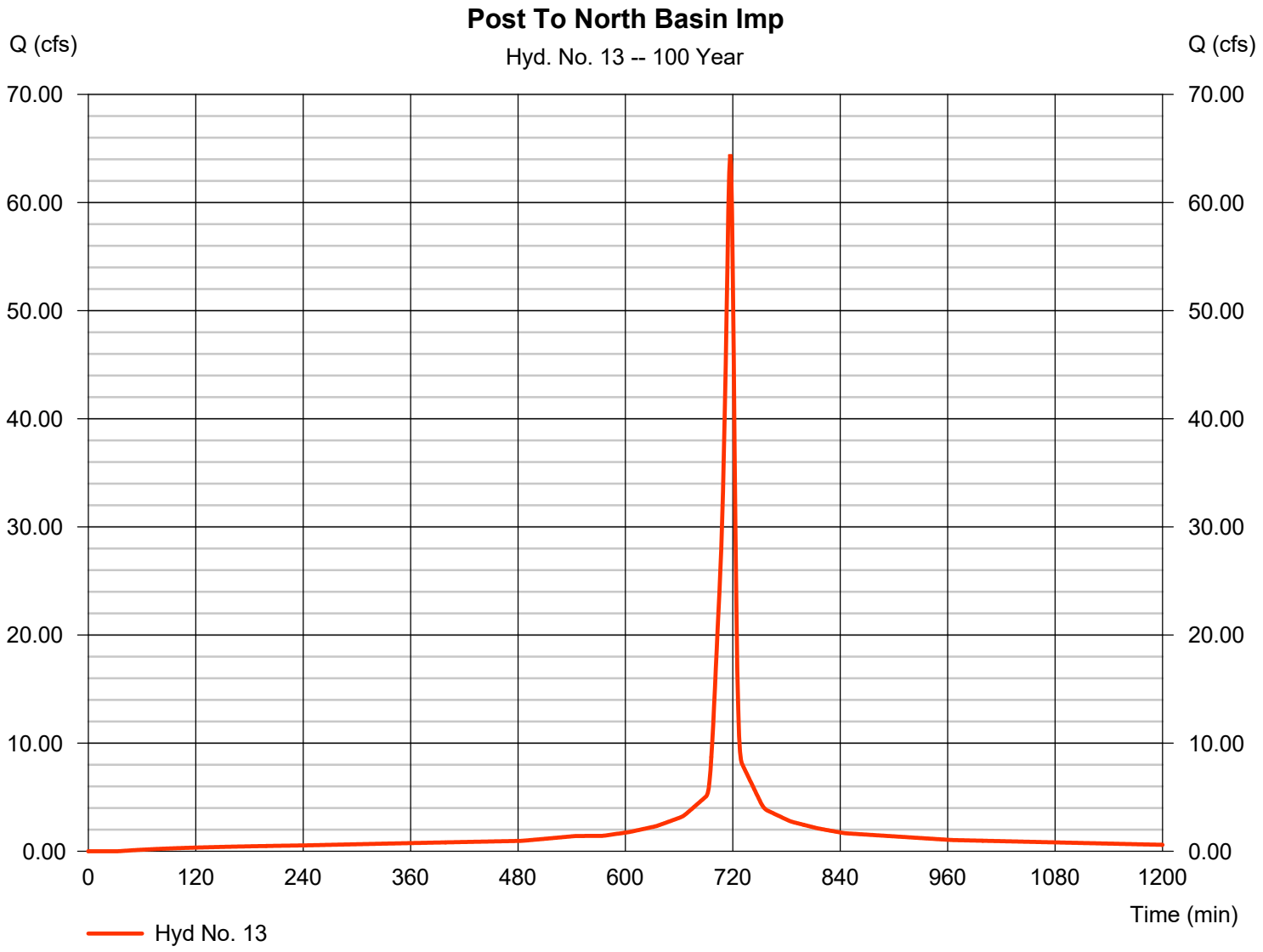
Hydrograph Report

Hyd. No. 13

Post To North Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	64.45 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	157,899 cuft
Drainage area	=	5.319 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.950 x 74) + (0.560 x 80) + (0.270 x 98)] / 5.319

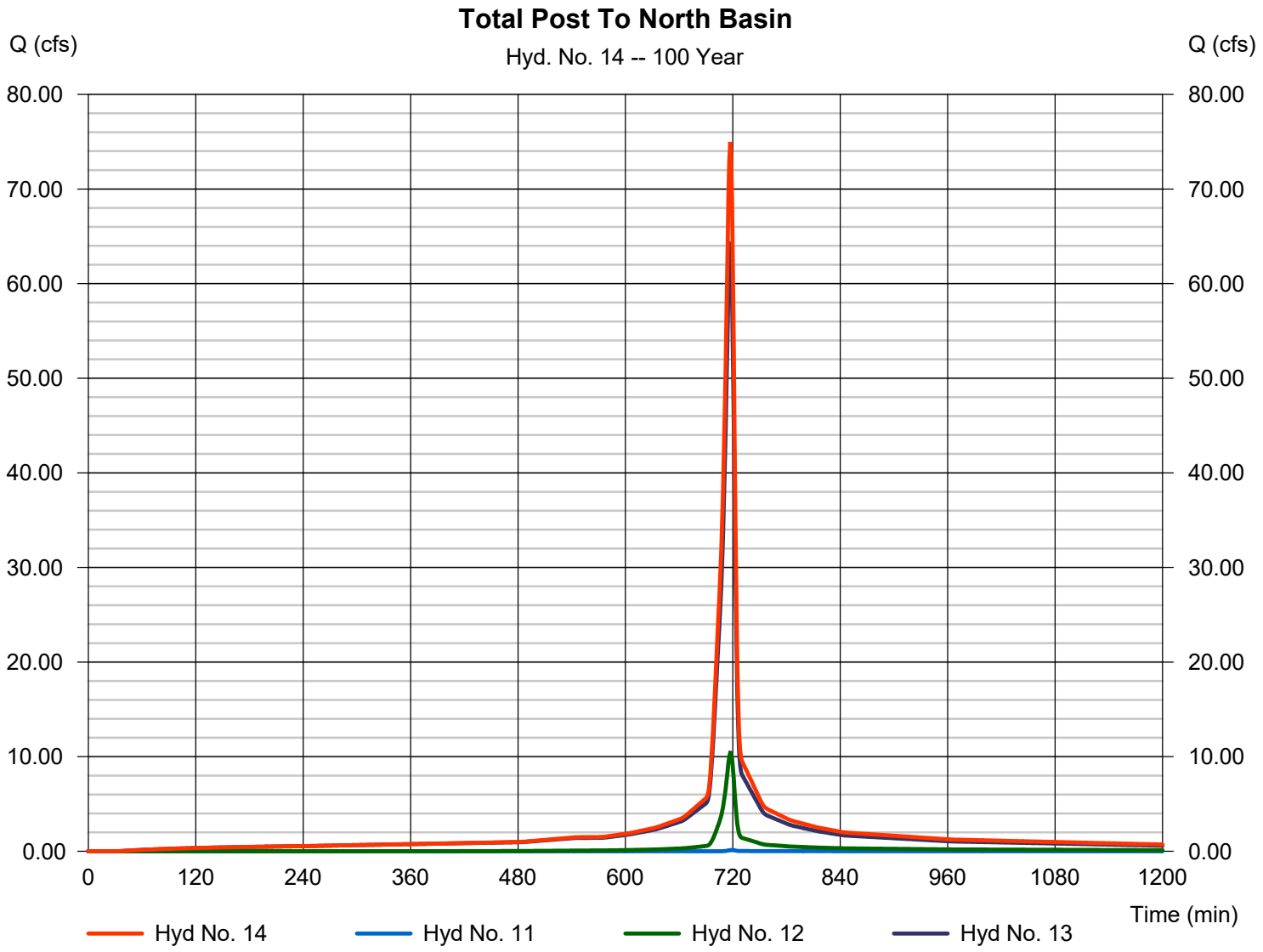


Hydrograph Report

Hyd. No. 14

Total Post To North Basin

Hydrograph type	=	Combine	Peak discharge	=	74.97 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	179,706 cuft
Inflow hyds.	=	11, 12, 13	Contrib. drain. area	=	6.512 ac



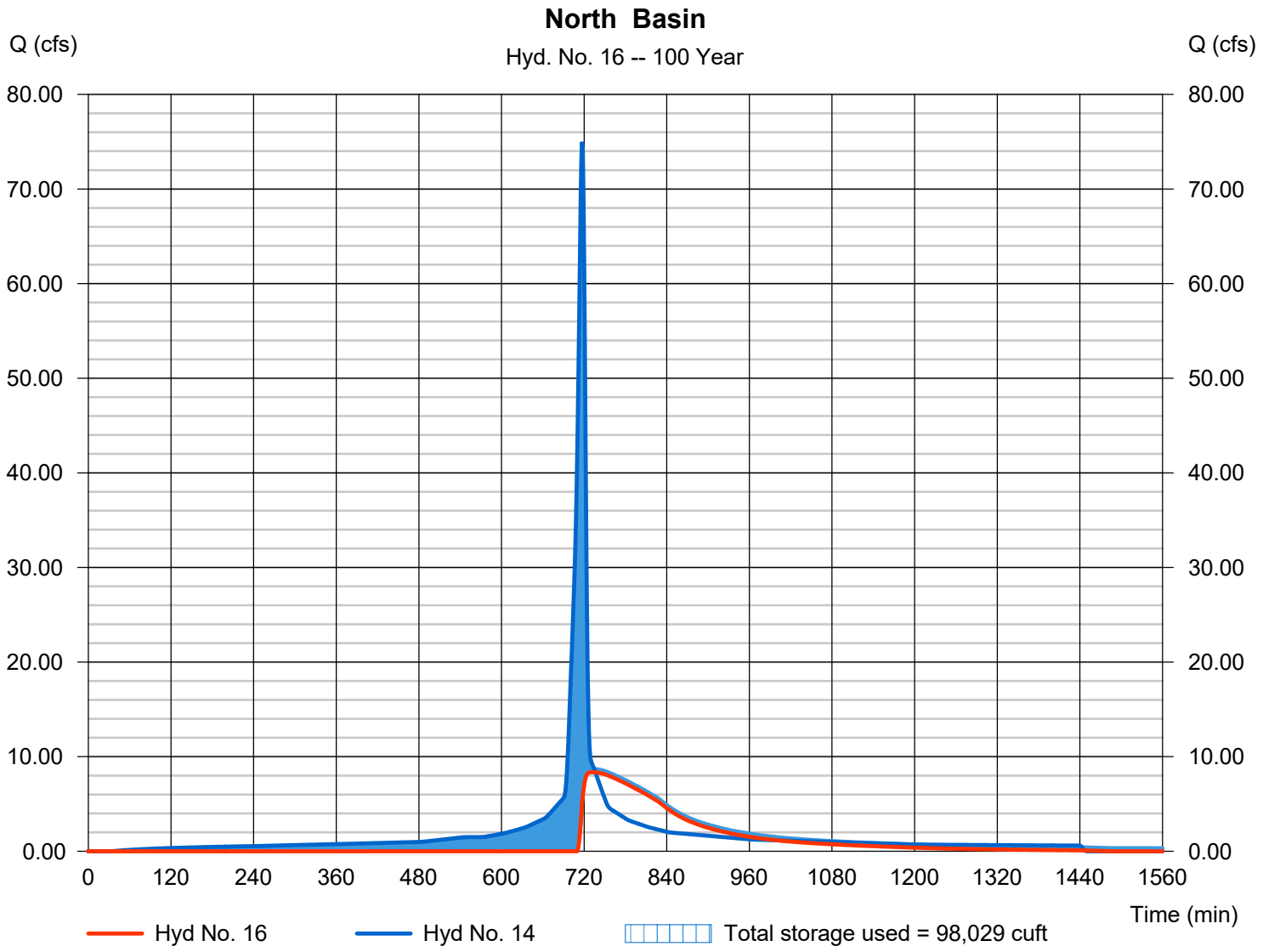
Hydrograph Report

Hyd. No. 16

North Basin

Hydrograph type	=	Reservoir	Peak discharge	=	8.351 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	1 min	Hyd. volume	=	85,851 cuft
Inflow hyd. No.	=	14 - Total Post To North Basin	Max. Elevation	=	475.00 ft
Reservoir name	=	POS 001 North Basin	Max. Storage	=	98,029 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

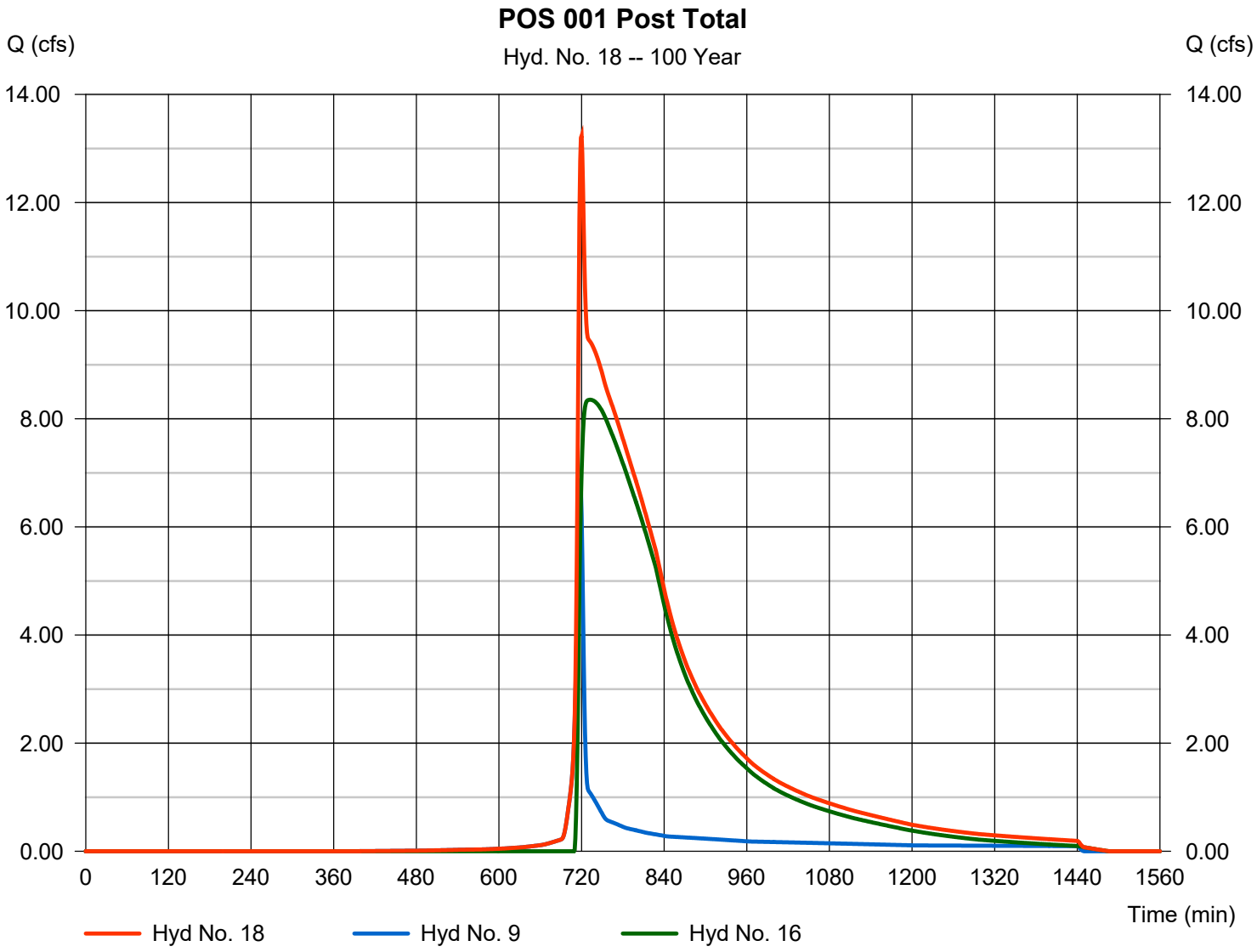


Hydrograph Report

Hyd. No. 18

POS 001 Post Total

Hydrograph type	= Combine	Peak discharge	= 13.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 101,048 cuft
Inflow hyds.	= 9, 16	Contrib. drain. area	= 0.000 ac



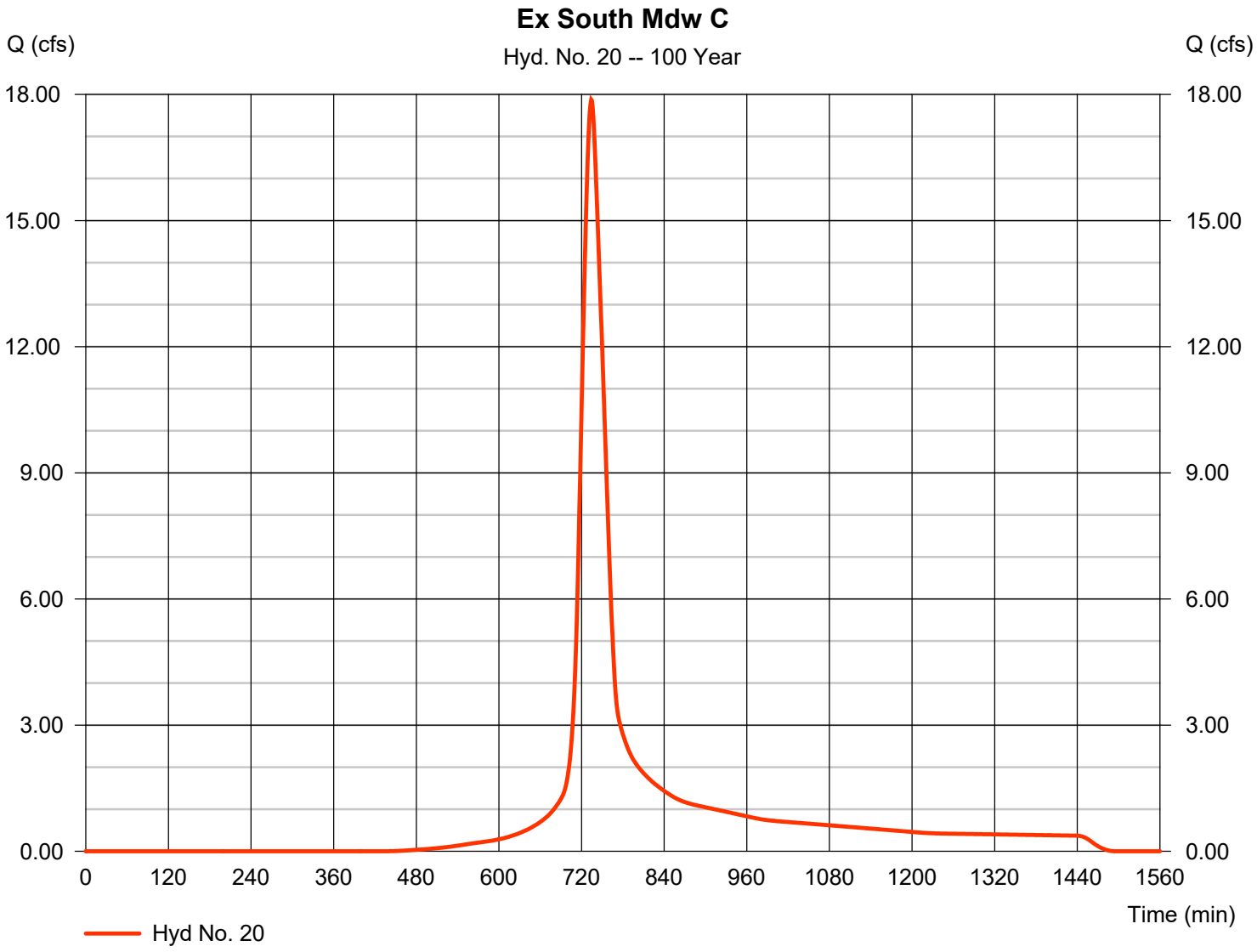
Hydrograph Report

Hyd. No. 20

Ex South Mdw C

Hydrograph type	= SCS Runoff	Peak discharge	= 17.87 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 79,004 cuft
Drainage area	= 4.604 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 33.93 min
Total precip.	= 8.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 4.604



Hydrograph Report

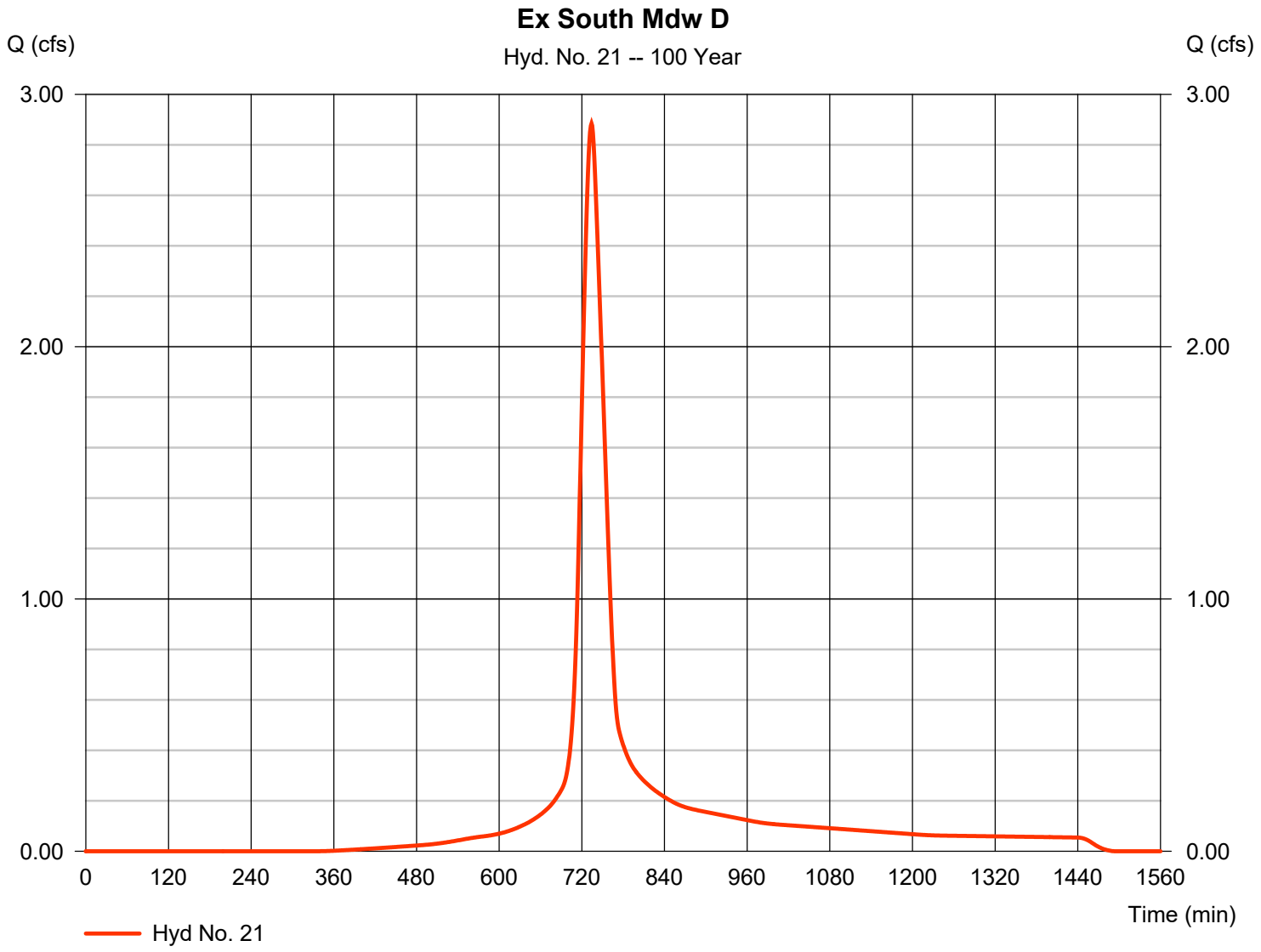
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 06 / 28 / 2022

Hyd. No. 21

Ex South Mdw D

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.885 cfs
Storm frequency	=	100 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	12,809 cuft
Drainage area	=	0.636 ac	Curve number	=	78*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.636



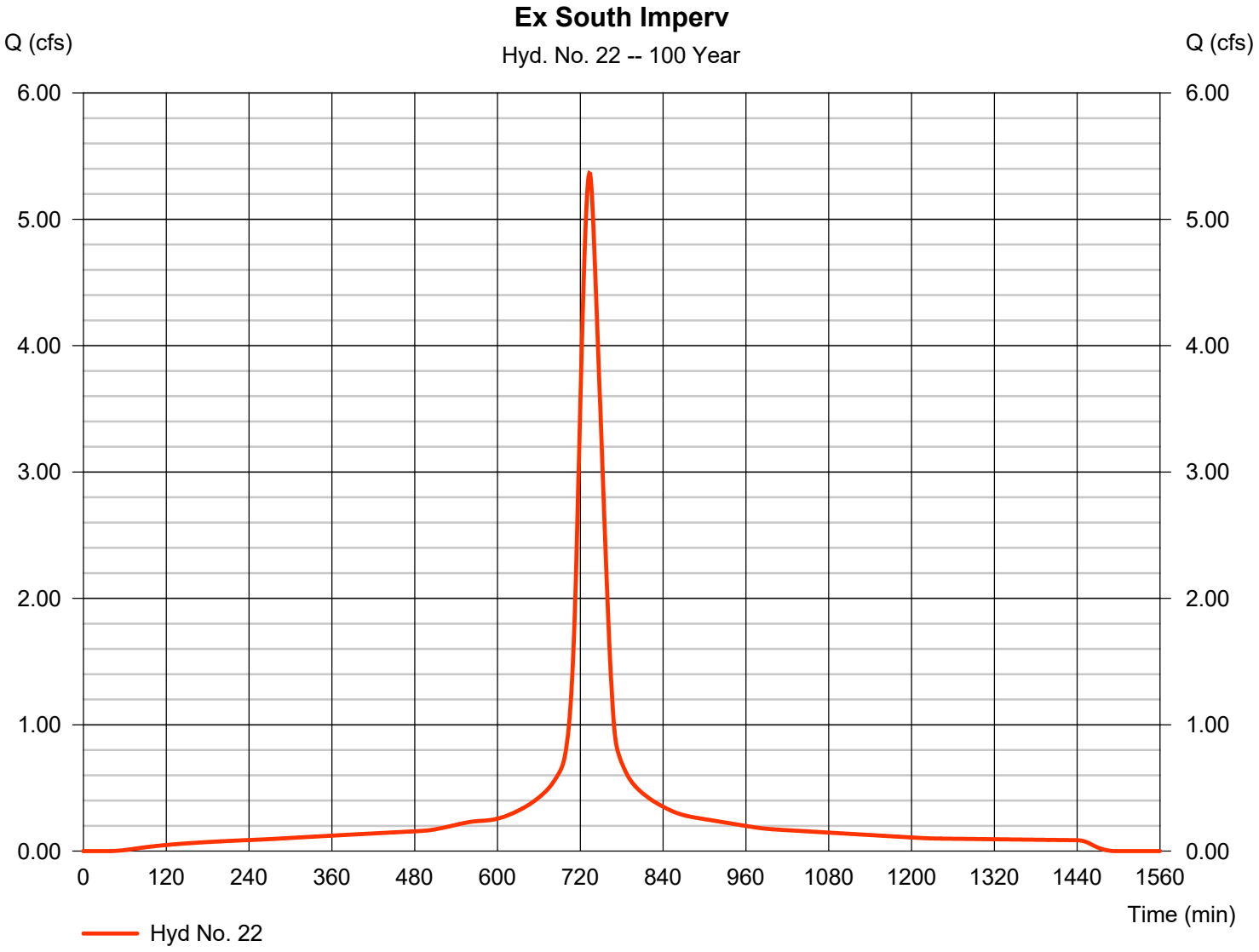
Hydrograph Report

Hyd. No. 22

Ex South Imperv

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.364 cfs
Storm frequency	=	100 yrs	Time to peak	=	733 min
Time interval	=	1 min	Hyd. volume	=	26,829 cuft
Drainage area	=	0.932 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.932



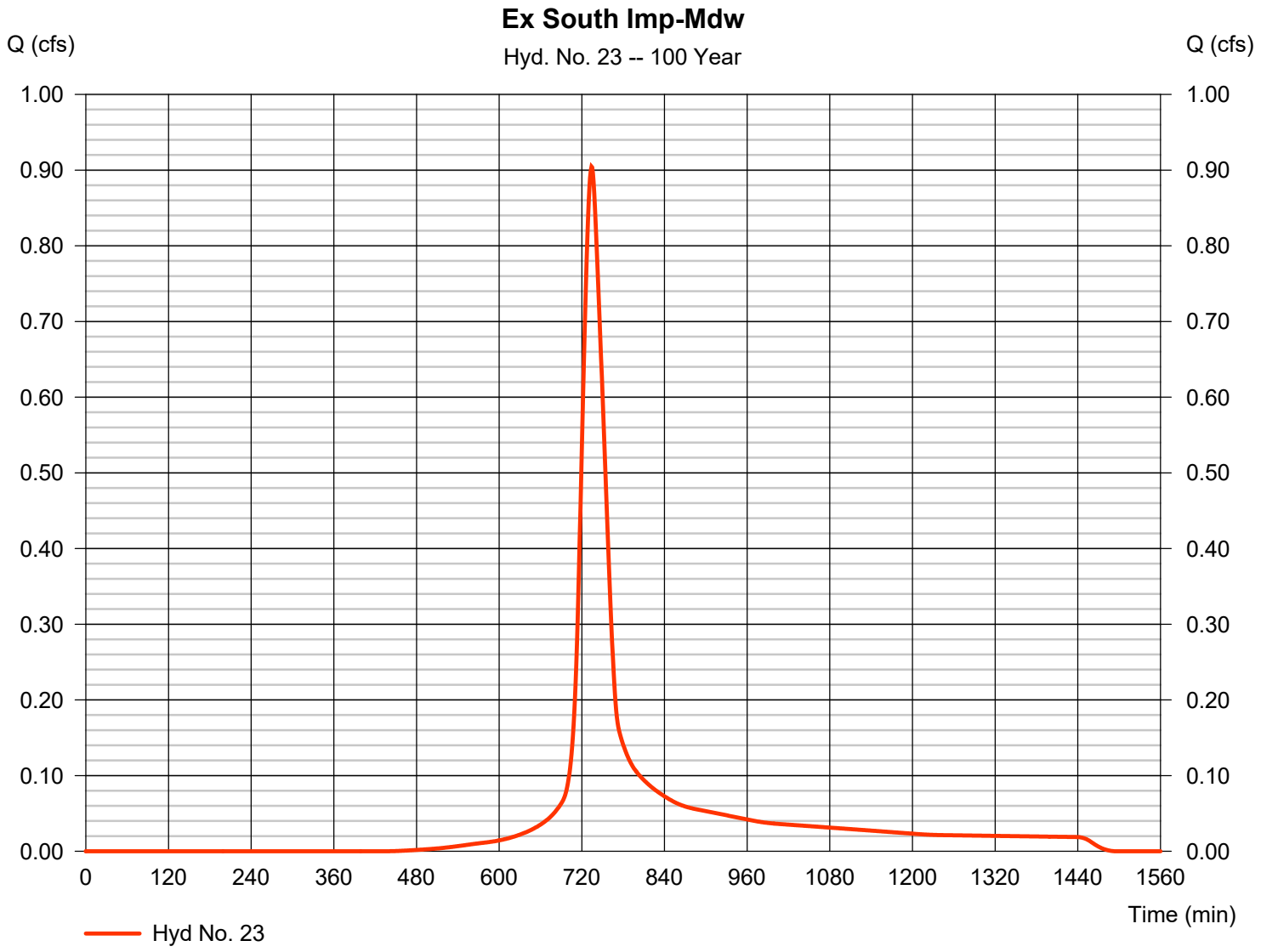
Hydrograph Report

Hyd. No. 23

Ex South Imp-Mdw

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.905 cfs
Storm frequency	=	100 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	3,998 cuft
Drainage area	=	0.233 ac	Curve number	=	71*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.93 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(6.100 x 40) + (4.660 x 71) + (0.460 x 78) + (0.730 x 73) + (1.280 x 79)] / 0.233

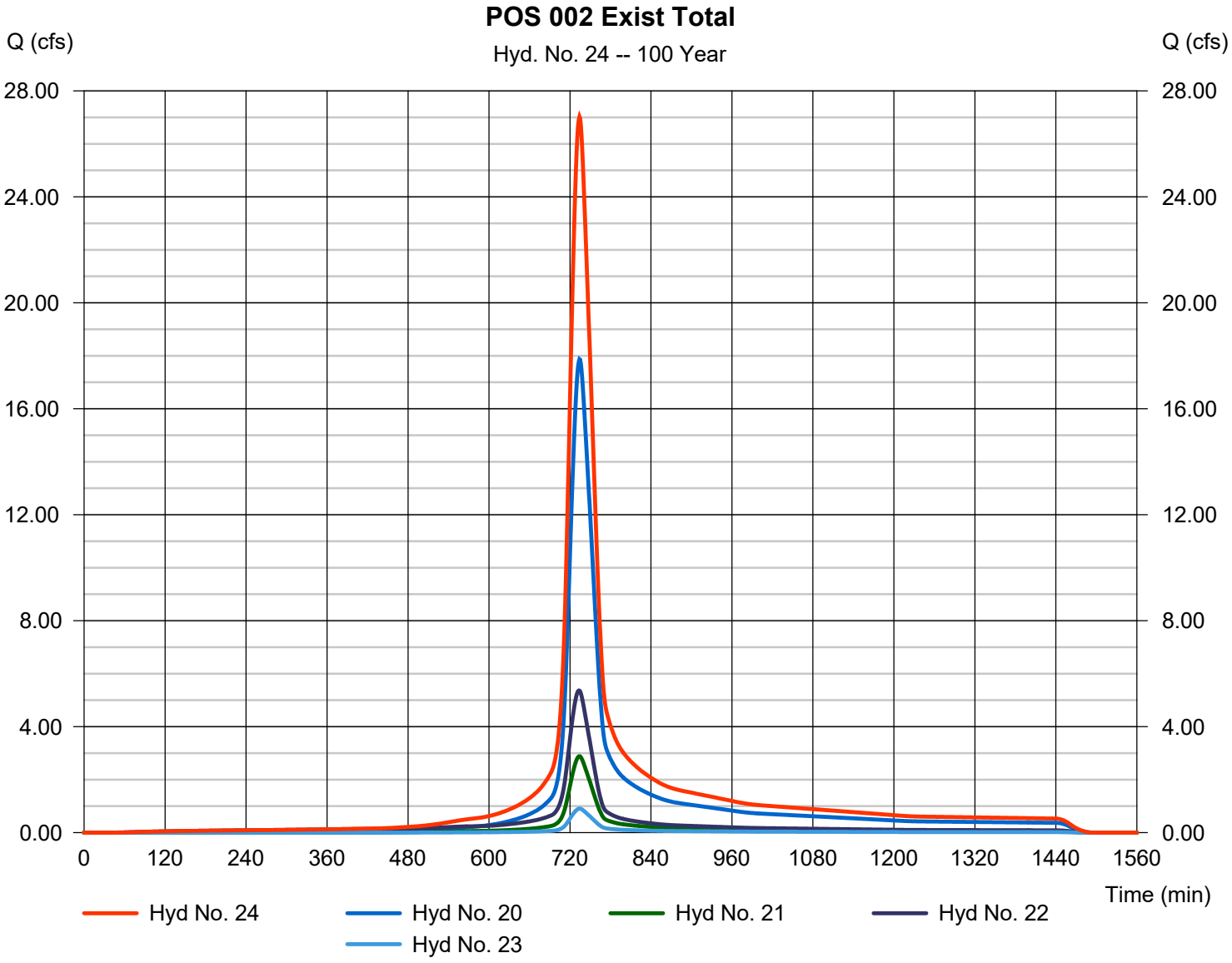


Hydrograph Report

Hyd. No. 24

POS 002 Exist Total

Hydrograph type	= Combine	Peak discharge	= 27.02 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 122,640 cuft
Inflow hyds.	= 20, 21, 22, 23	Contrib. drain. area	= 6.405 ac

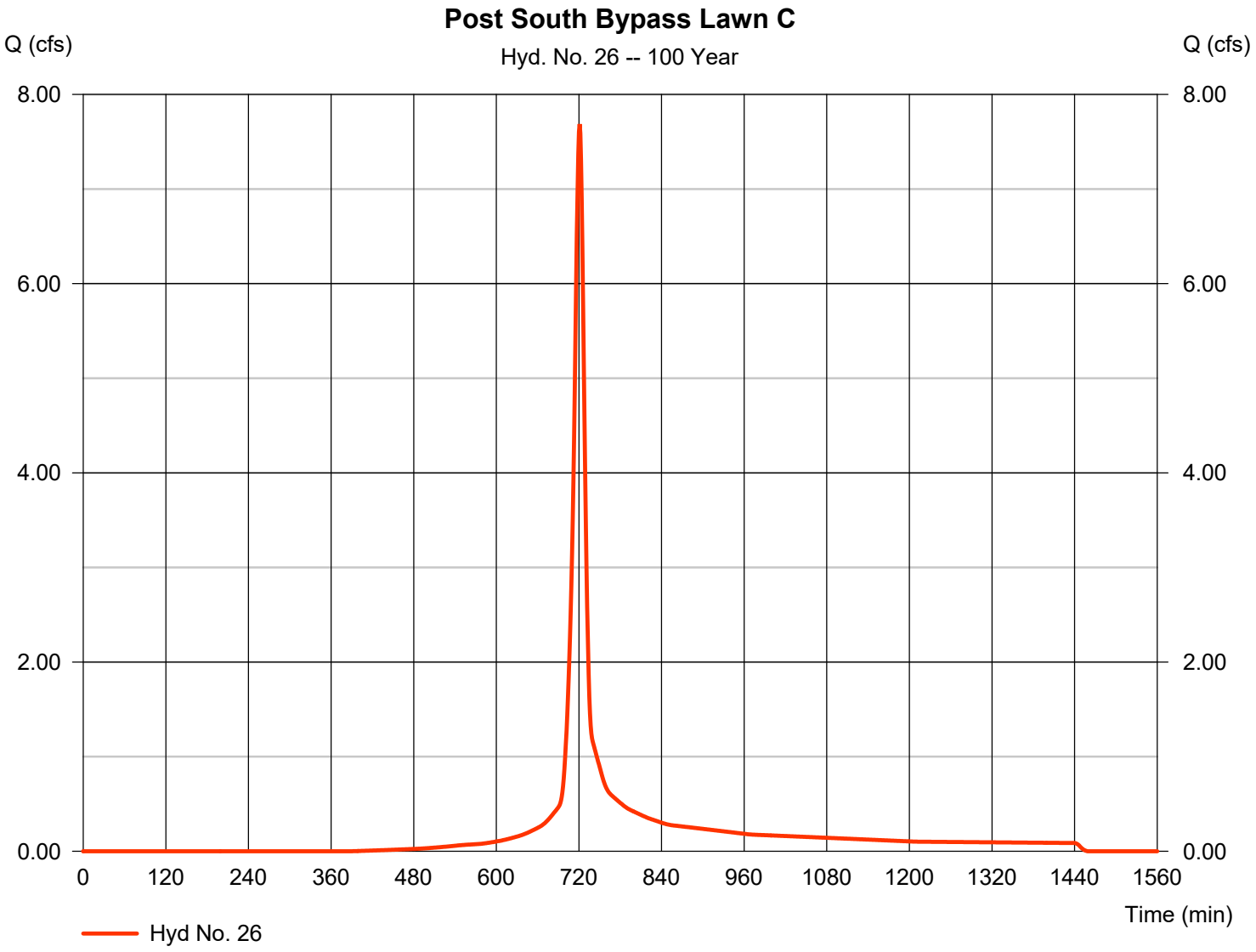


Hydrograph Report

Hyd. No. 26

Post South Bypass Lawn C

Hydrograph type	= SCS Runoff	Peak discharge	= 7.687 cfs
Storm frequency	= 100 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 19,597 cuft
Drainage area	= 1.080 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.90 min
Total precip.	= 8.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

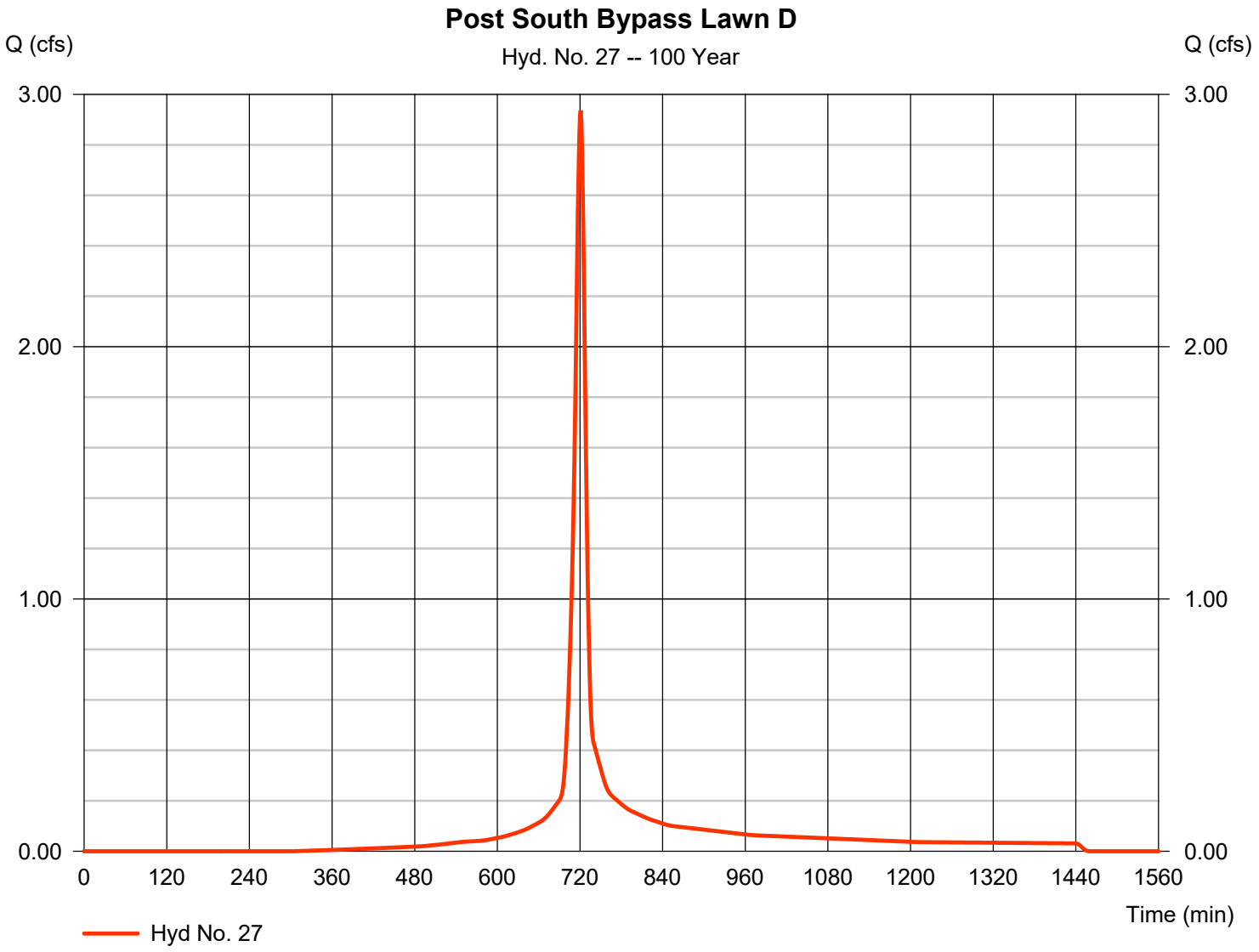


Hydrograph Report

Hyd. No. 27

Post South Bypass Lawn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.936 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	7,627 cuft
Drainage area	=	0.369 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	12.90 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

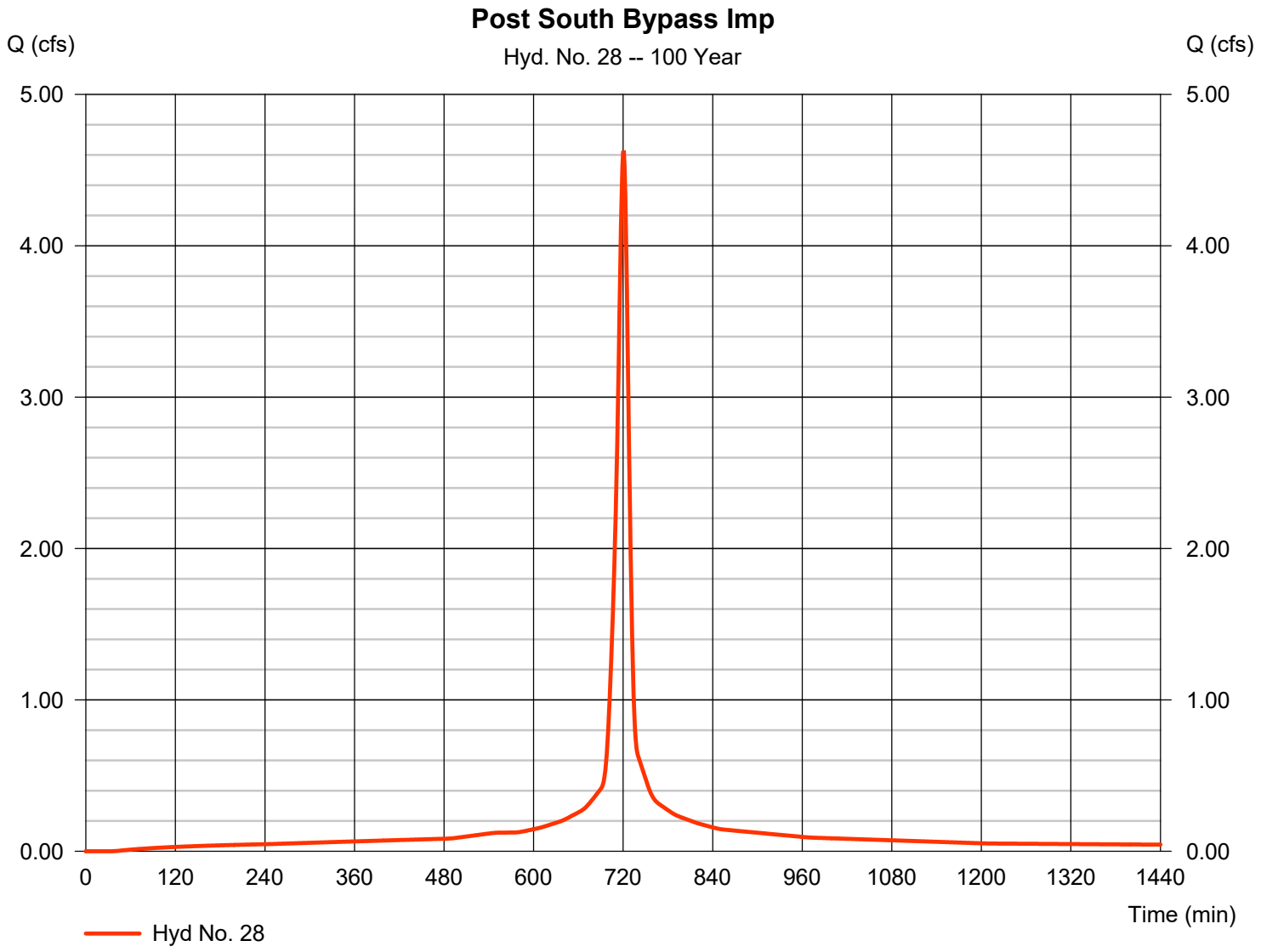


Hydrograph Report

Hyd. No. 28

Post South Bypass Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 4.616 cfs
Storm frequency	= 100 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 13,772 cuft
Drainage area	= 0.486 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.90 min
Total precip.	= 8.17 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

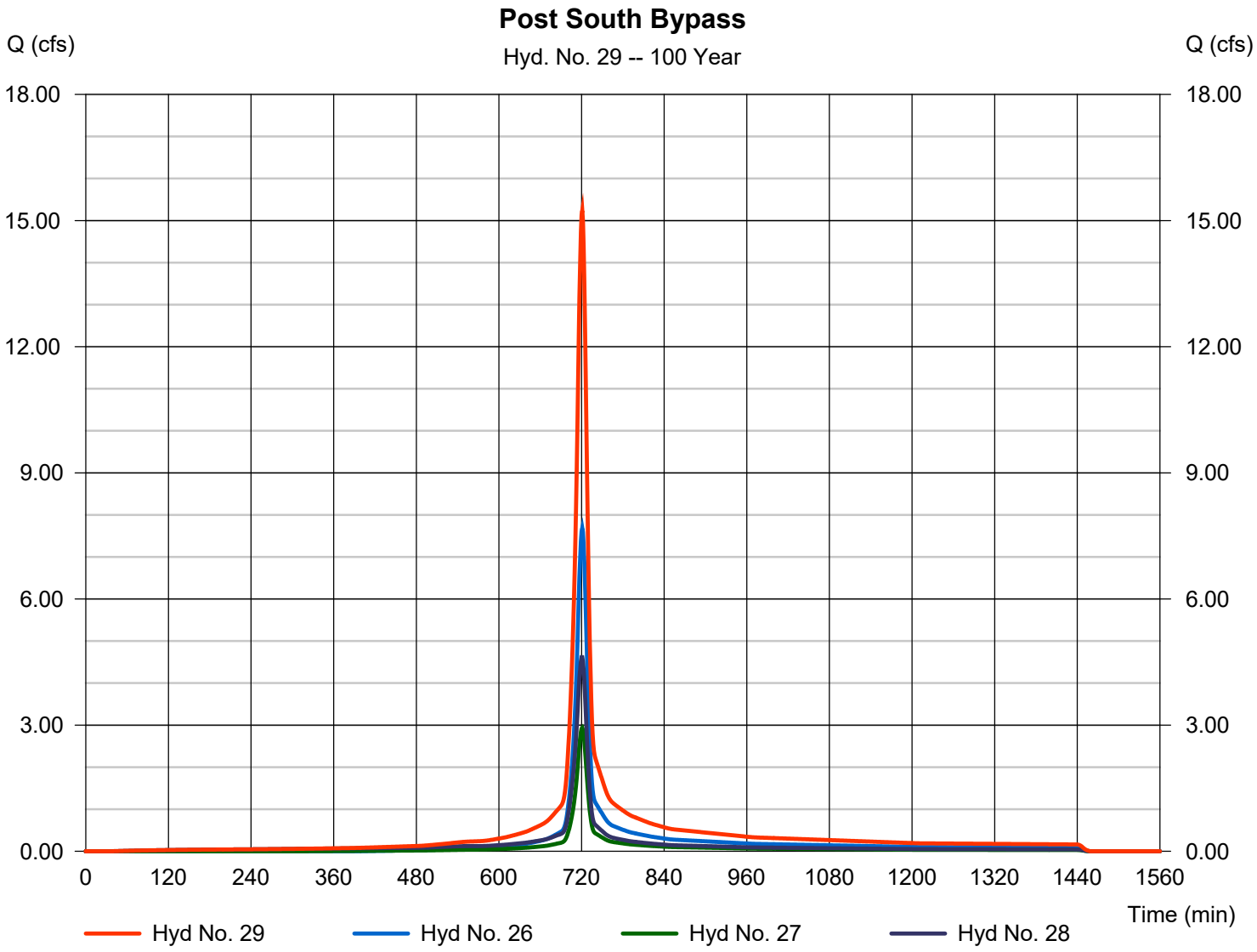


Hydrograph Report

Hyd. No. 29

Post South Bypass

Hydrograph type	= Combine	Peak discharge	= 15.24 cfs
Storm frequency	= 100 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 40,995 cuft
Inflow hyds.	= 26, 27, 28	Contrib. drain. area	= 1.935 ac



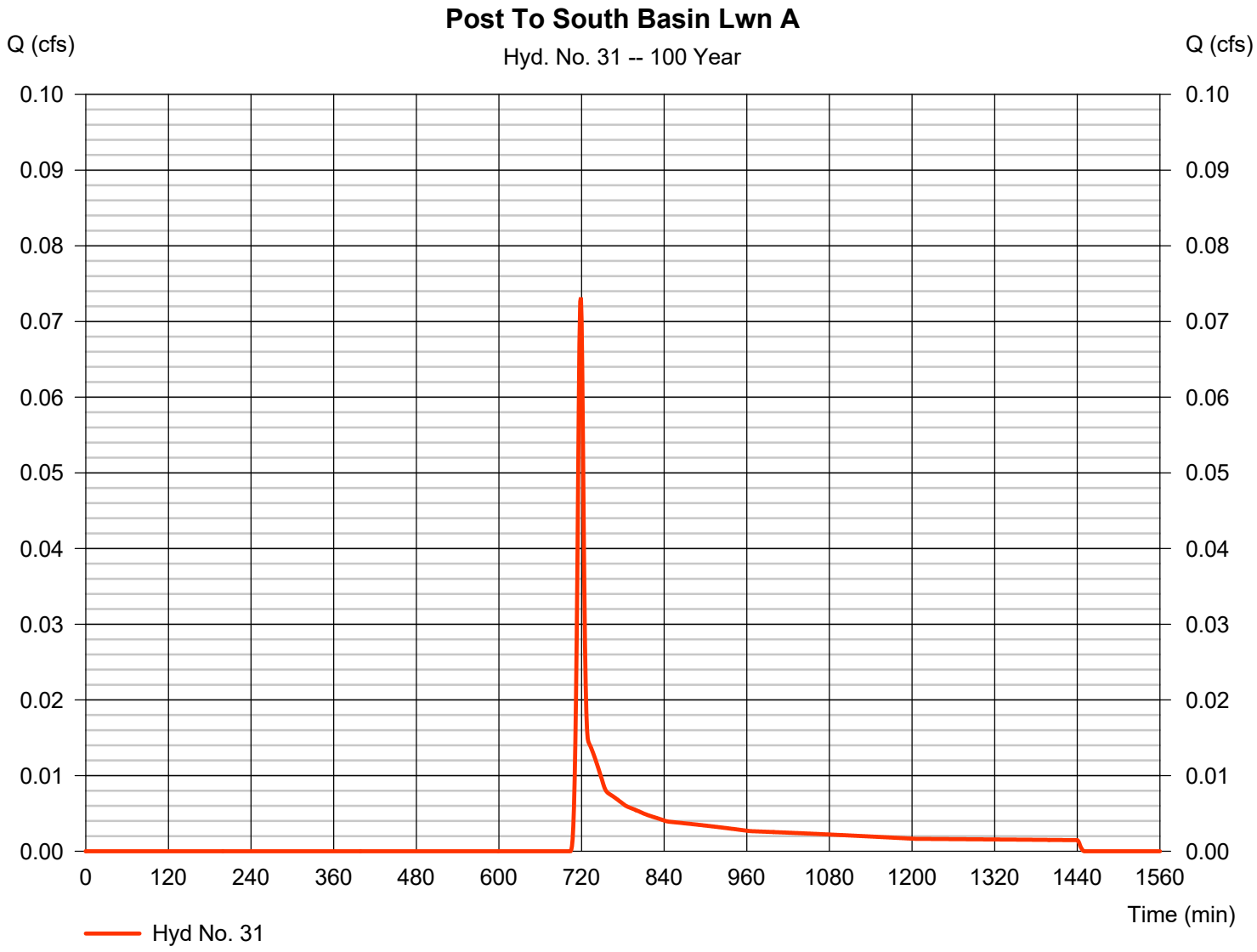
Hydrograph Report

Hyd. No. 31

Post To South Basin Lwn A

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.073 cfs
Storm frequency	=	100 yrs	Time to peak	=	719 min
Time interval	=	1 min	Hyd. volume	=	174 cuft
Drainage area	=	0.035 ac	Curve number	=	40*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	6.60 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.035



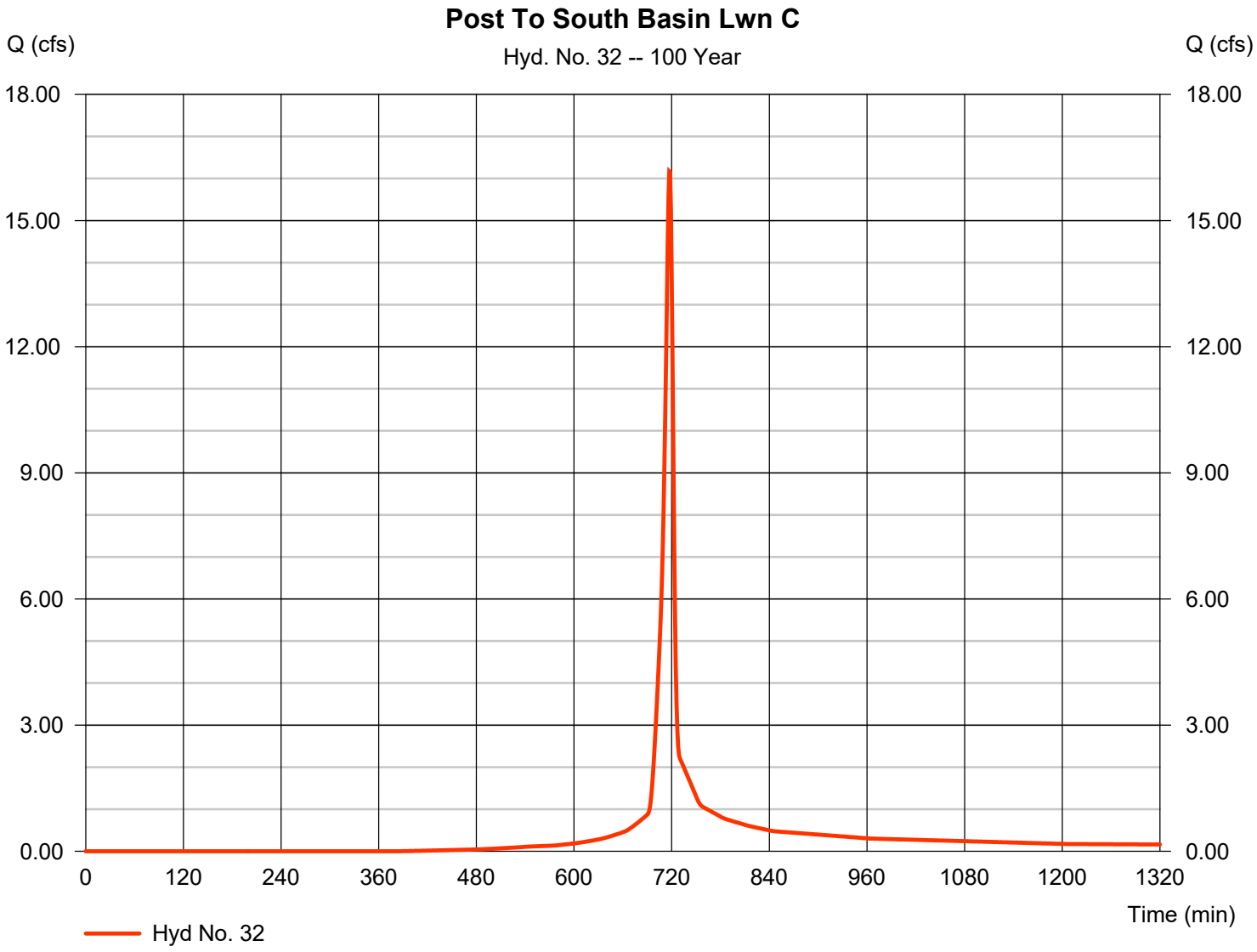
Hydrograph Report

Hyd. No. 32

Post To South Basin Lwn C

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.17 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	33,418 cuft
Drainage area	=	1.758 ac	Curve number	=	74*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.758



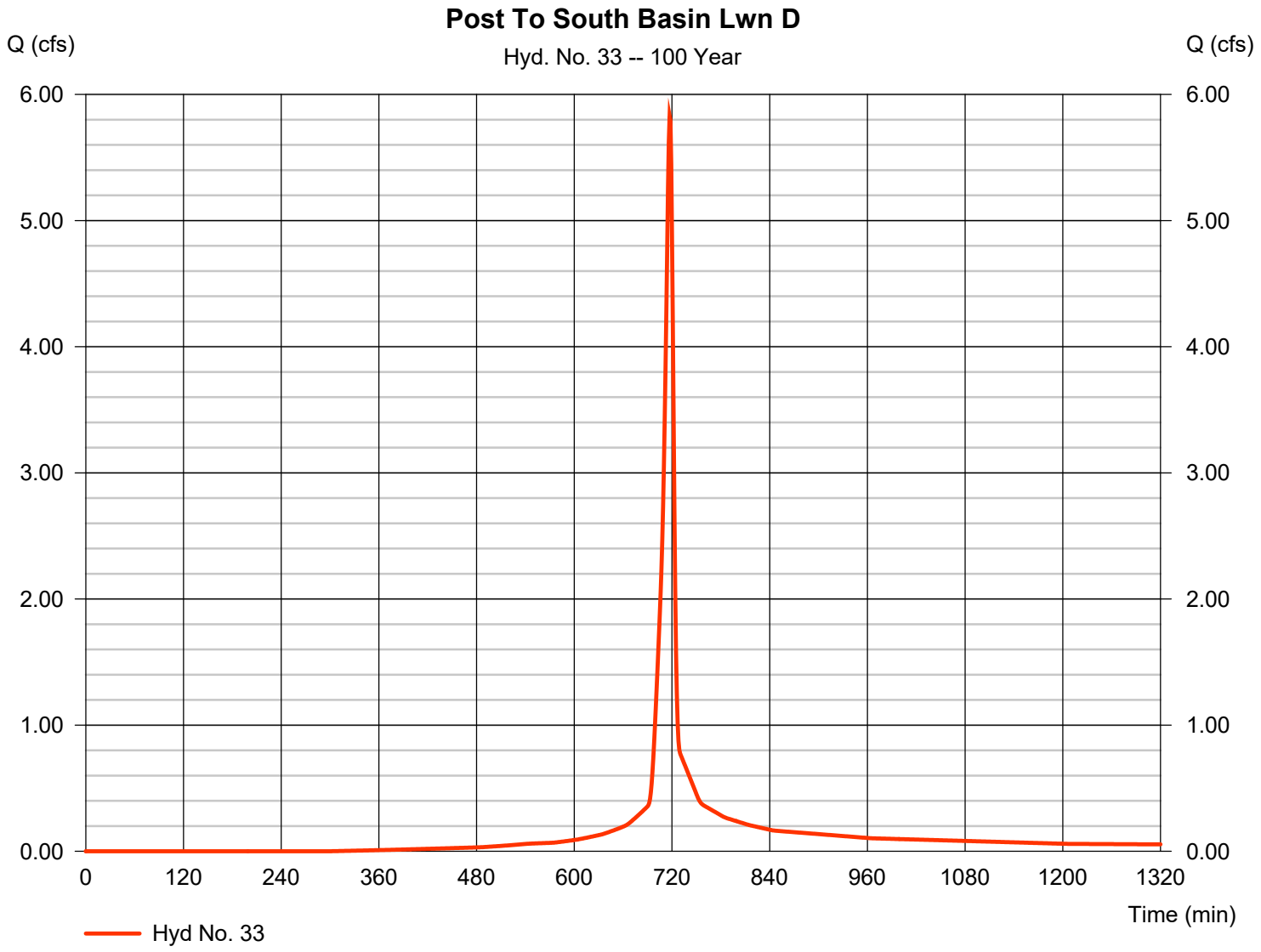
Hydrograph Report

Hyd. No. 33

Post To South Basin Lwn D

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.828 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	12,321 cuft
Drainage area	=	0.569 ac	Curve number	=	80*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 0.569



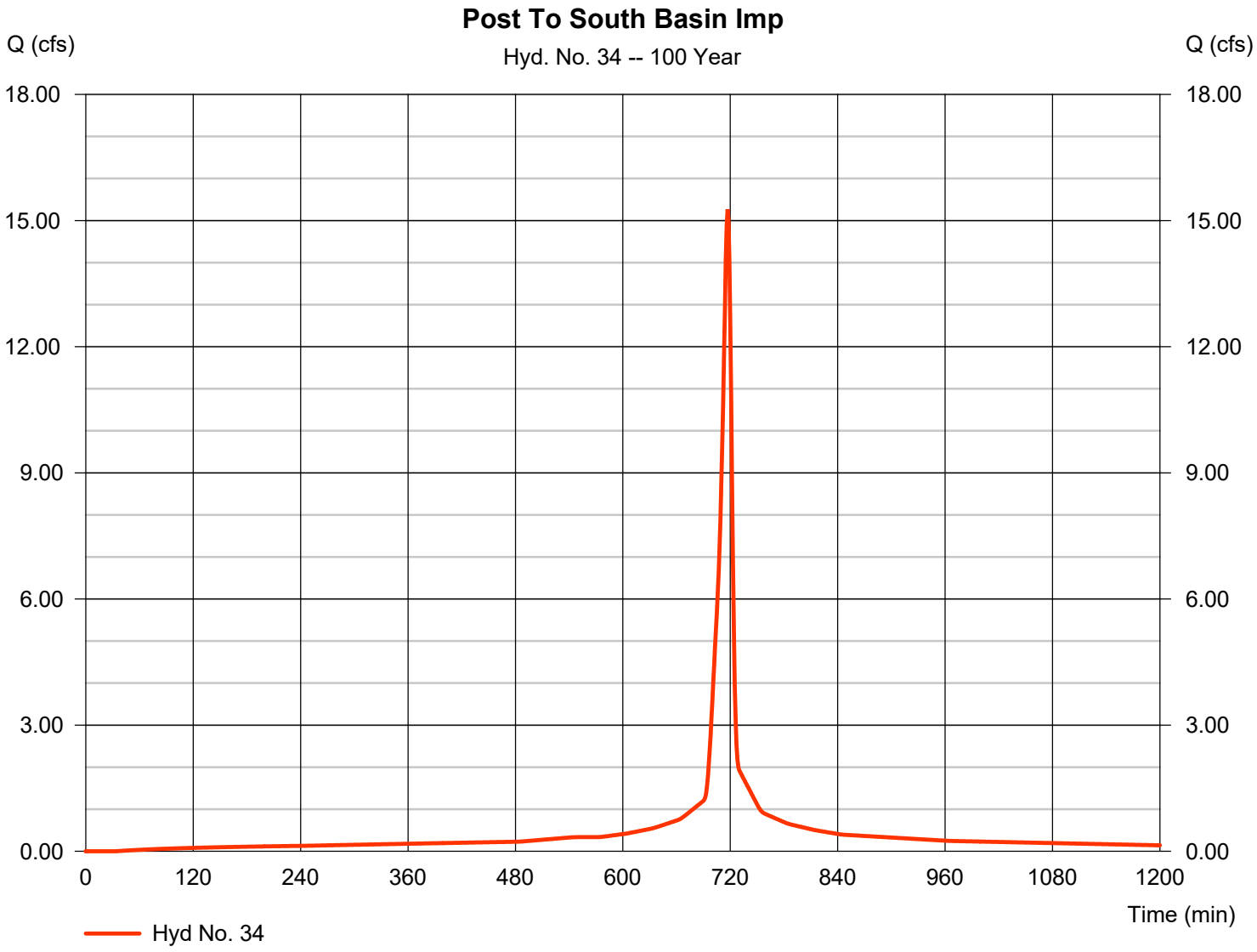
Hydrograph Report

Hyd. No. 34

Post To South Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.27 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	37,404 cuft
Drainage area	=	1.260 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	8.17 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(7.980 x 98)] / 1.260

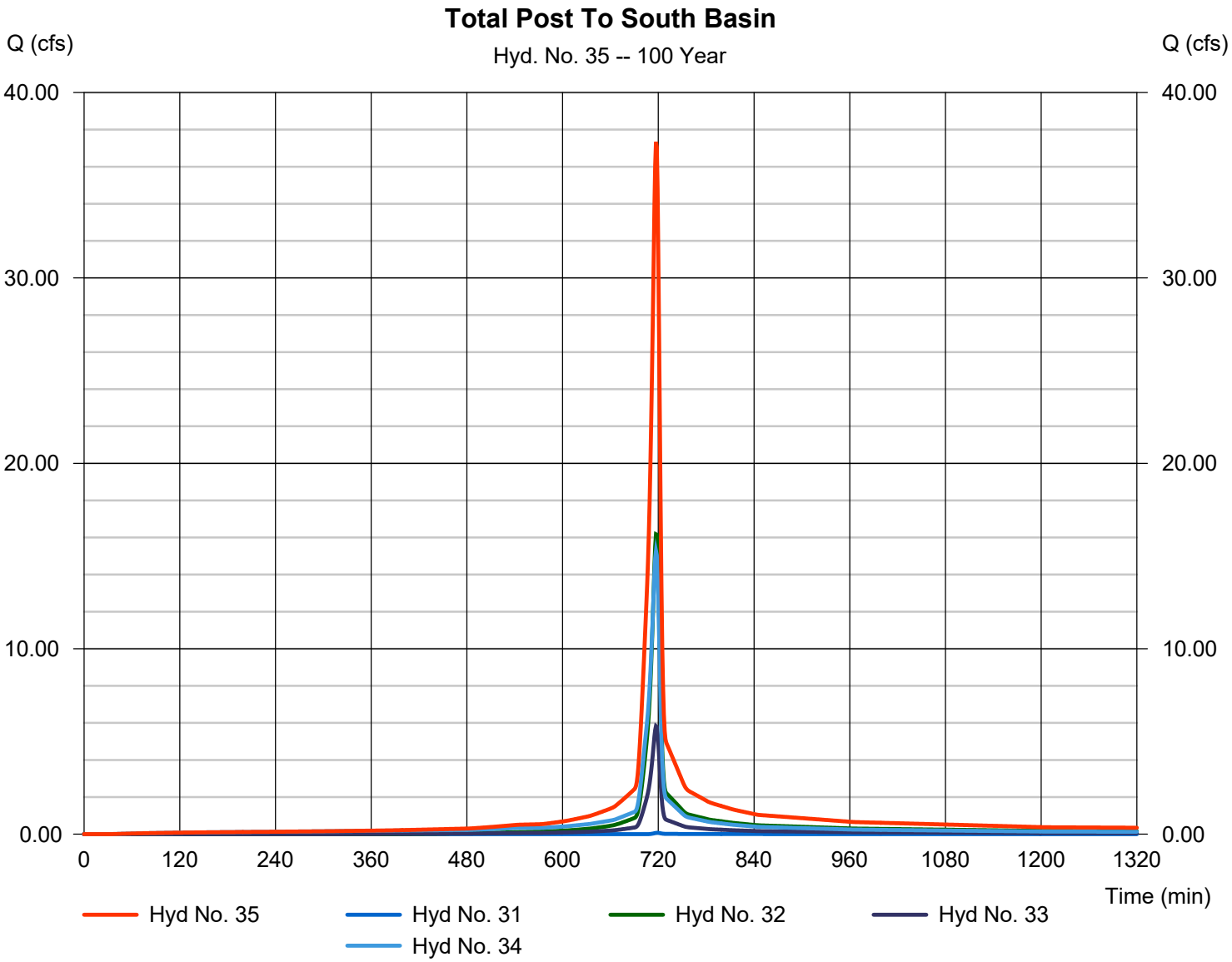


Hydrograph Report

Hyd. No. 35

Total Post To South Basin

Hydrograph type	=	Combine	Peak discharge	=	37.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	1 min	Hyd. volume	=	83,317 cuft
Inflow hyds.	=	31, 32, 33, 34	Contrib. drain. area	=	3.622 ac



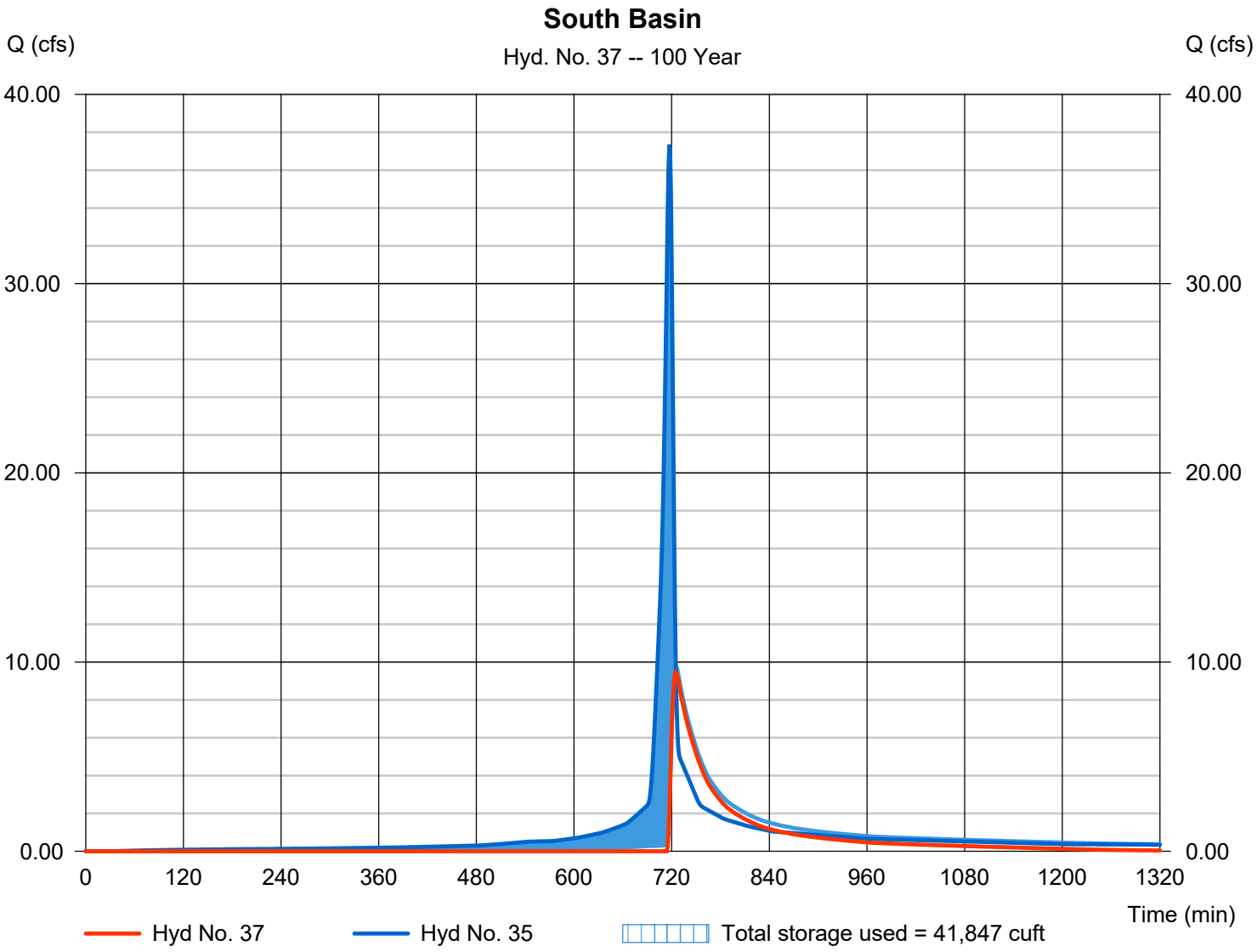
Hydrograph Report

Hyd. No. 37

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	9.460 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	37,393 cuft
Inflow hyd. No.	=	35 - Total Post To South Basin	Max. Elevation	=	474.38 ft
Reservoir name	=	POS 002 South Pond	Max. Storage	=	41,847 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

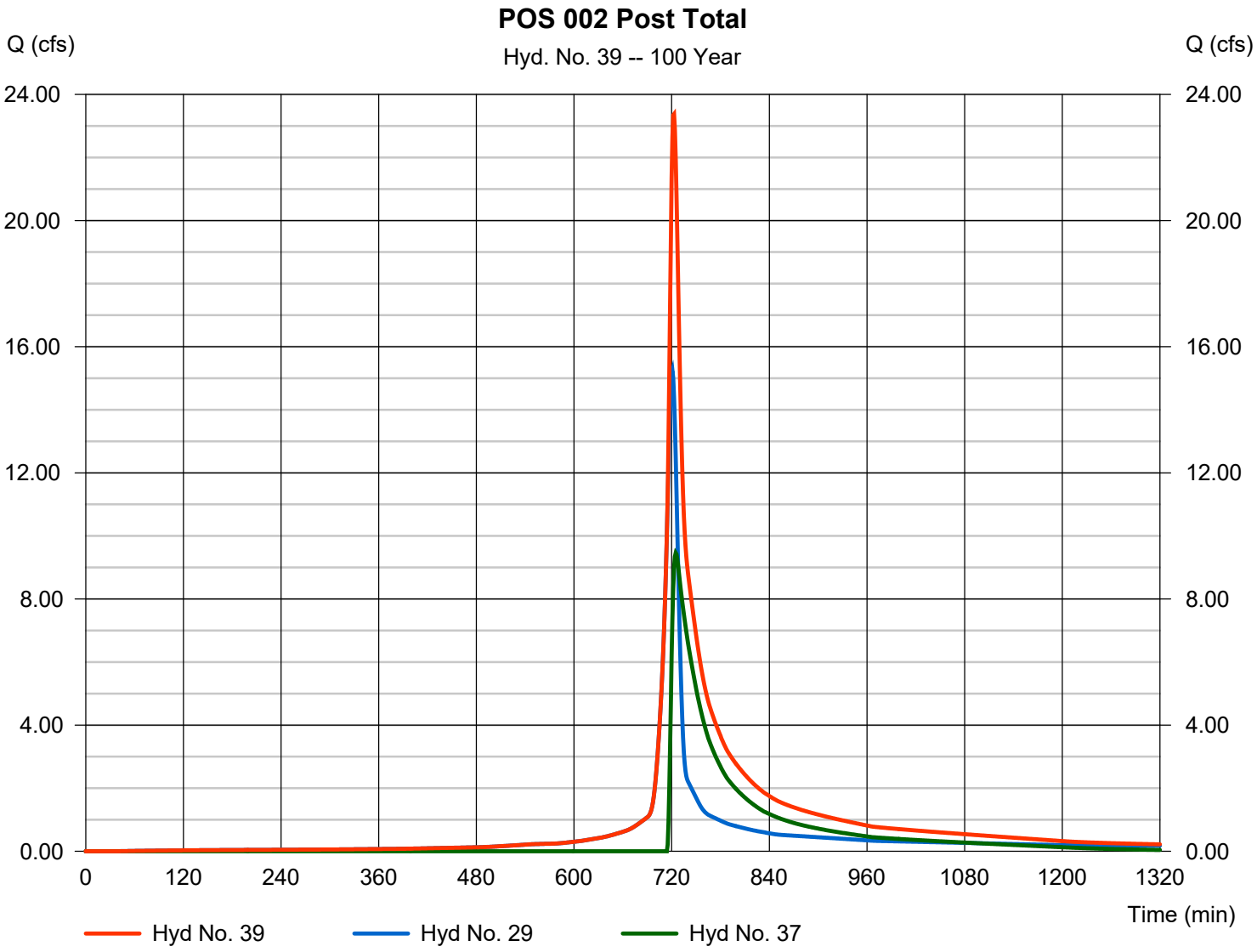


Hydrograph Report

Hyd. No. 39

POS 002 Post Total

Hydrograph type	=	Combine	Peak discharge	=	23.38 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	78,388 cuft
Inflow hyds.	=	29, 37	Contrib. drain. area	=	0.000 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	44.6730	10.8000	0.8782	--------
2	56.9280	11.5000	0.8870	--------
3	0.0000	0.0000	0.0000	--------
5	55.1884	10.6000	0.8259	--------
10	54.5257	9.9000	0.7867	--------
25	53.7831	9.0000	0.7404	--------
50	52.3572	8.1000	0.7024	--------
100	48.0041	6.7000	0.6516	--------

File name: Smithfield Twsp PA NOAA.IDF

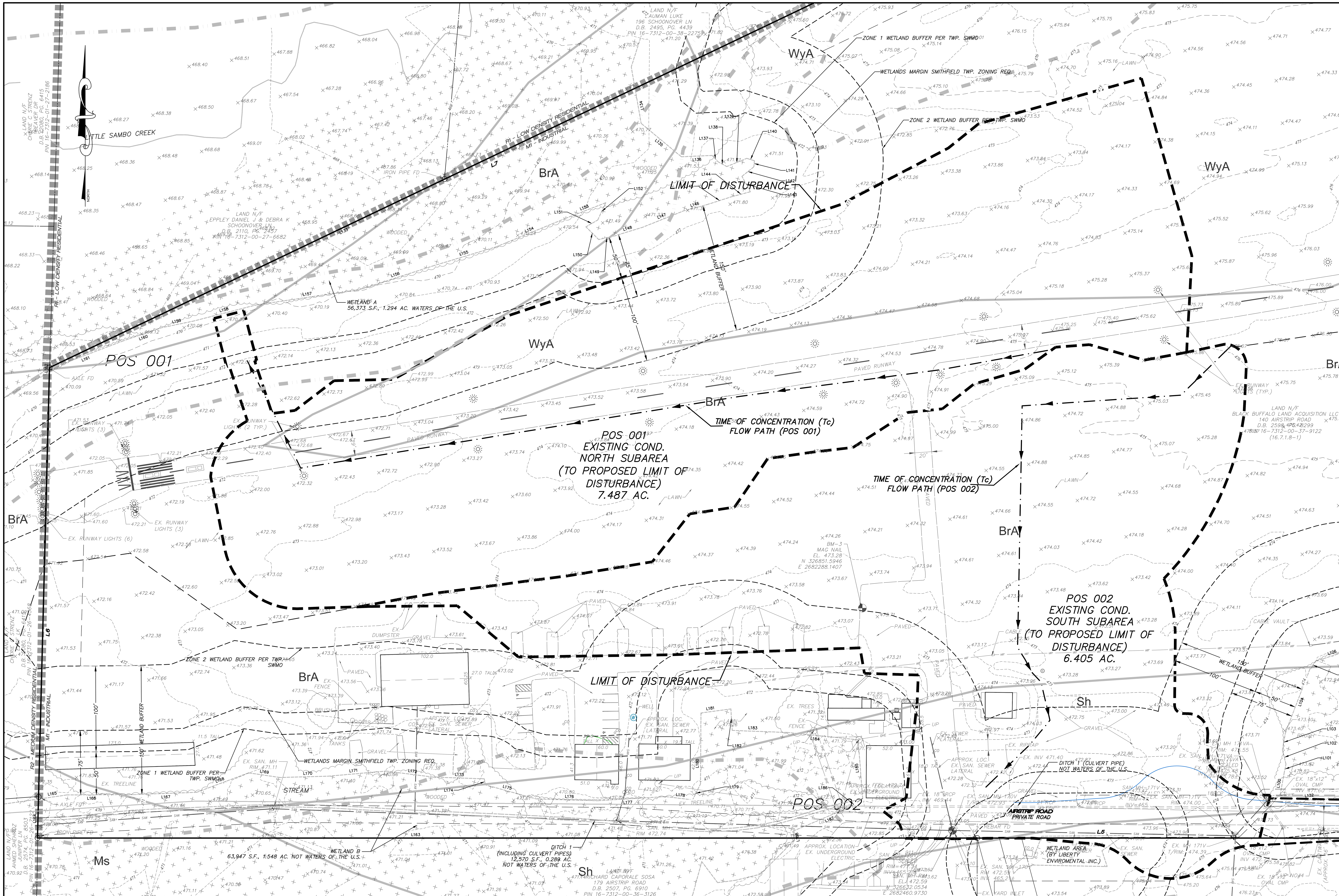
Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.96	3.11	2.57	2.20	1.93	1.72	1.55	1.42	1.31	1.21	1.13	1.06
2	4.74	3.75	3.11	2.67	2.34	2.09	1.89	1.73	1.59	1.47	1.38	1.29
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.71	4.54	3.79	3.27	2.89	2.59	2.35	2.16	2.00	1.86	1.74	1.64
10	6.51	5.19	4.35	3.76	3.33	3.00	2.73	2.52	2.33	2.18	2.05	1.93
25	7.62	6.08	5.11	4.45	3.95	3.57	3.26	3.01	2.81	2.63	2.47	2.34
50	8.59	6.85	5.77	5.03	4.48	4.06	3.72	3.45	3.22	3.02	2.85	2.70
100	9.67	7.67	6.46	5.65	5.05	4.59	4.22	3.92	3.67	3.46	3.27	3.11

Tc = time in minutes. Values may exceed 60.

Precip. file name: Smithfield PA.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	2.76	3.31	0.00	4.12	4.82	5.93	6.96	8.17
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
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	1.75	0.00	2.80	3.90	5.25	6.00	7.10



NOT FOR CONSTRUCTION

GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

NO.	BY	REVISIONS	DATE
2	dch, meb, cgg	REVISED PER TWP REVIEW LETTER DATED 06/07/2022	06/29/22
1	meb	SUBMITTAL TO MCCD	05/27/22

COMMONWEALTH OF PENNSYLVANIA
MARK J. BUCHVALT
REGISTERED PROFESSIONAL ENGINEER
NO. PE061130

MARK BUCHVALT, P.E.
LICENSED PROFESSIONAL ENGINEER

COMMONWEALTH OF PENNSYLVANIA
LICENSE NO. PE061130

DATE

PRELIMINARY/FINAL LAND DEVELOPMENT
BLACK BUFFALO
NEW LIGHT MANUFACTURING & WAREHOUSE FACILITY
SMITHFIELD TOWNSHIP, MONROE COUNTY, PENNSYLVANIA

EXISTING CONDITIONS DRAINAGE AREA PLAN

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DESIGNED BY	MEB, DCH
CHECKED BY	MJB
DRAWN BY	DCH, MEB
DATE	04/29/2022
SCALE	
PROJ. NO.	JGPT00022
DRAWING	F-PRE
SHEET	1 OF 3

PROJECT INFORMATION:
FILE PATH: G:\Projects\JGPT\00022\Plans\
FILE NAME: f-swm-pre.dwg
LAST SAVED DATE AND TIME: 23 Jun 2022, 3:54PM
LAST SAVE BY: MBarthol

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POS 001
PROPOSED COND.
NORTH BYPASS SUBAREA
1.823 AC.

INF/DET
BASIN 001
POS 001
PROPOSED COND.
NORTH BASIN SUBAREA
6.511 AC.

POS 002
PROPOSED COND.
SOUTH BYPASS SUBAREA 2
1.655 AC.
(2.035 AC. TOTAL)

POS 002
PROPOSED COND.
SOUTH BYPASS SUBAREA 1
0.380 AC.
(2.035 AC. TOTAL)

POS 002
PROPOSED COND.
SOUTH BASIN SUBAREA
3.522 AC.

INF/DET
BASIN 002

LIMIT OF DISTURBANCE

TIME OF CONCENTRATION (Tc)
FLOW PATH (TYP)

FACTORY
125'x500'

TOTAL BUILDING
131,250 SF

LOADING DOCK

MATERIAL WAREHOUSE
125'x300'

FINISHED PRODUCT WAREHOUSE
125'x100'

3D PRINTING
125'x100'

MODEL DISPLAY AREA

2-STORY OFFICE
125'x50'

YARD
200'x100'

PROP. 5' CONC. SIDEWALK (TYP.)

PROP. TYPE I ADA RAMP (0" REVEAL DEP. CURB)

PROP. RETAINING WALL (TYP.)

PROP. BASIN FENCE (TYP.)

ZONE 1 WETLAND BUFFER PER TWP. SWMO

ZONE 2 WETLAND BUFFER PER TWP. SWMO

WETLANDS MARGIN SMITHFIELD TWP. ZONING REQ.

WETLAND A
56,373 S.F., 1.294 AC. WATERS OF THE U.S.

WETLAND B
63,947 S.F., 1.548 AC. NOT WATERS OF THE U.S.

WETLAND AREA
(BY LIBERTY ENVIRONMENTAL INC.)

DITCH 1
(INCLUDING CULVERT PIPES)
12,570 S.F., 0.289 AC.
NOT WATERS OF THE U.S.

DITCH 1 (CULVERT PIPE)
NOT WATERS OF THE U.S.

STREAM

ARBITER ROAD
PRIVATE ROAD

PROPOSED TO BE DEDICATED TO TWP.

ADJACENT PROPERTY IMPROVEMENTS UNDER SEPARATE PROJECT & APPLICATION

PROP. RD. IMPROVEMENTS UNDER SEPARATE PROJECT & APPLICATION (SEE NOTES)

LAND N/F
LAUMAN LUKE
196 SCHOONOVER LN
D.B. 2495, PG. 4439
PIN 16-7312-00-38-2275

LAND N/F
CHERI C. STRENZ
BEAVER DR.
D.B. 2580, PG. 6415
PIN 16-7312-00-27-7186

LAND N/F
EPPLEY DANIEL J & DEBRA K
SCHOONOVER LN
D.B. 2110, PG. 2457
PIN 16-7312-00-27-6682

LAND N/F
BLACK BUFFALO LAND ACQUISITION LLC
140 AIRSTRIP ROAD
D.B. 2596, PG. 8299
PIN 16-7312-00-37-9122
(16.7.1.8-1)

LAND N/F
AHMED MOHAMED ALHROZ
JUNIPER LN
D.B. 2574, PG. 8503
PIN 16-7312-00-27-8186

LAND N/F
RICHARD CAPORALE SOSA
179 AIRSTRIP ROAD
D.B. 2507, PG. 6910
PIN 16-7312-00-36-3126

LITTLE SAMBO CREEK

RI - LOW DENSITY RESIDENTIAL

MI - INDUSTRIAL

WyA | BrA | Ms | Sh

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GRAPHIC SCALE
50 0 25 50 100
(IN FEET)
1 inch = 50 ft.

NO.	BY	SUBMITTAL TO MCCD REVISIONS	DATE
2	dch, mvh, rgb	REVISED PER TWP REVIEW LETTER DATED 06/07/2022	06/29/22
1	meb		05/27/22

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL MARK J. BUCHVALT ENGINEER NO. PE061130

MARK BUCHVALT, P.E.
LICENSED PROFESSIONAL ENGINEER
COMMONWEALTH OF PENNSYLVANIA
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DESIGNED BY	MEB, DCH
CHECKED BY	MJB
DRAWN BY	DCH, MEB
DATE	04/29/2022
SCALE	
PROJ. NO.	JGPT00022
DRAWING	F-POST
SHEET	2 OF 3

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PROJECT INFORMATION:
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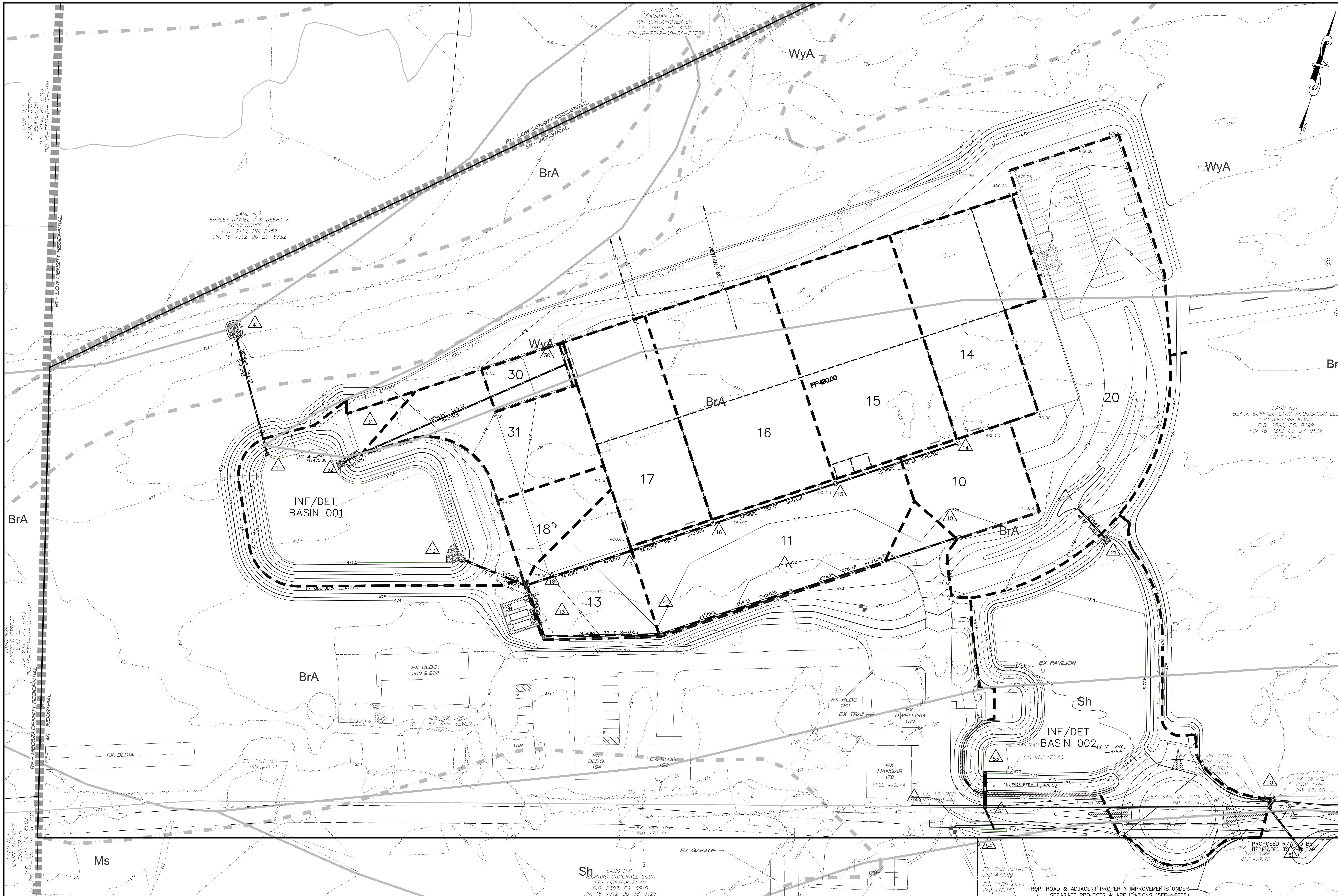
FILE NAME: Proposed Conditions.dwg
LAST SAVED DATE AND TIME: 27 Jun 2022, 1:49PM
LAST SAVE BY: MBorthol



NOT FOR CONSTRUCTION

GRAPHIC SCALE

50 0 25 50 100

(IN FEET)
1 inch = 50 ft.

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1	meb	SUBMITTAL TO MCCD	05/27/22

MARK BUCHVALT, P.E.
LICENSED PROFESSIONAL ENGINEER

COMMONWEALTH OF PENNSYLVANIA
LICENSE NO. PE061130

DATE

COMMONWEALTH OF PENNSYLVANIA · REGISTERED PROFESSIONAL ENGINEER · MARK J. BUCHVALT · ENGINEER NO. PE061130

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DESIGNED BY	MEB, DCH
CHECKED BY	MJB
DRAWN BY	DCH, MEB
DATE	04/29/2022
SCALE	
PROJ. NO.	JGPT00022
DRAWING	F-INLET
SHEET	3 OF 3

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