STORM WATER CALCULATIONS
FOR:

Montessori School
Phase 1 Addition

CITY OF WAUKESHA, WI
Excel Job #: 2053880

BASED ON SCS TR-55 METHOD and MANNINGS EQUATION, AND SLAMM
February 19, 2021

Prepared By:
Eric Drazkowski, P.E.
Excel Engineering Inc.
100 Camelot Drive
Fond du Lac, WI 54935
920-926-9800

Table of Contents

OVERVIEW:

The proposed project is located on the northeast corner of University Avenue and Summit Avenue within the City of Waukesha, WI. This development involves the placement of a 8,585 sf school addition with parking lot reconfiguration. The addition is being constructed as Phase 1 of the overall development plan originally approved in 2019. The stormwater plan has accounted for the original future development shown on the original plans and is designed to connect into the master plans stormwater system in the future. The current design is developed to handle the current flows from the site. The project disturbs less than 1 acre.

The existing site generally drains from north to south into Summit Avenue's storm system. The post developed site will be routed with 100yr storm pipe to drain to the existing discharge point on the site. Stormwater runoff will be routed around the building. Overland discharge routes have been provided to allow emergency overflow around the building until the master plan can be developed. See the attached proposed stormwater calculations in Appendix D. All storm pipes have been sized per the original master plan calculations. The calculations included show the pipe sizing still is sufficient.

SOIL INFORMATION:

Existing Soils data: Soil Type: BsA: Brookston silt loam, 0-2% slopes, Hydro. Soil Rating C/D.
HmB: Hochheim loam, 2-6% slopes, Hydro Soil Rating D.
HmC2: Hochheim loam, 6-12% slopes, Hydro Soil Rating D.

Soil classifications for the proposed property were taken off of the USDA Web Soil Survey. Please see attached hydrologic soil group map showing the soils within the drainage areas in Appendix B.

DRAINAGE CALCULATIONS:

Rainfall depths used for the runoff calculations were referenced from The City of Waukesha Stormwater Ordinance Chapter 32.11(a)2. Calculations use Type II distribution.

1-year: 2.3 inches
2-year: 2.7 inches
10-year: 4.0 inches
100-year: 5.6 inches

Curve Numbers:
Impervious – 98
Lawn (B) – 61
Lawn (C) – 74
Lawn (D) – 80
Woods (C) – 70
Woods (D) – 77

WATER QUANTITY
City of Waukesha Requirements – N/A, less than 30,000sf of impervious is added.

Wisconsin Department of Natural Resources – N/A, less than 1 acre disturbed.

WATER QUALITY
City of Waukesha & Wisconsin DNR Requirements
– N/A less than 1 acre disturbed.

INFILTRATION:
City of Waukesha, Wisconsin and DNR Requirements (Redevelopment) – N/A, less than 1 acre is disturbed.

STORM SEWER PIPE DESIGN & 100-YEAR CONVEYANCE:

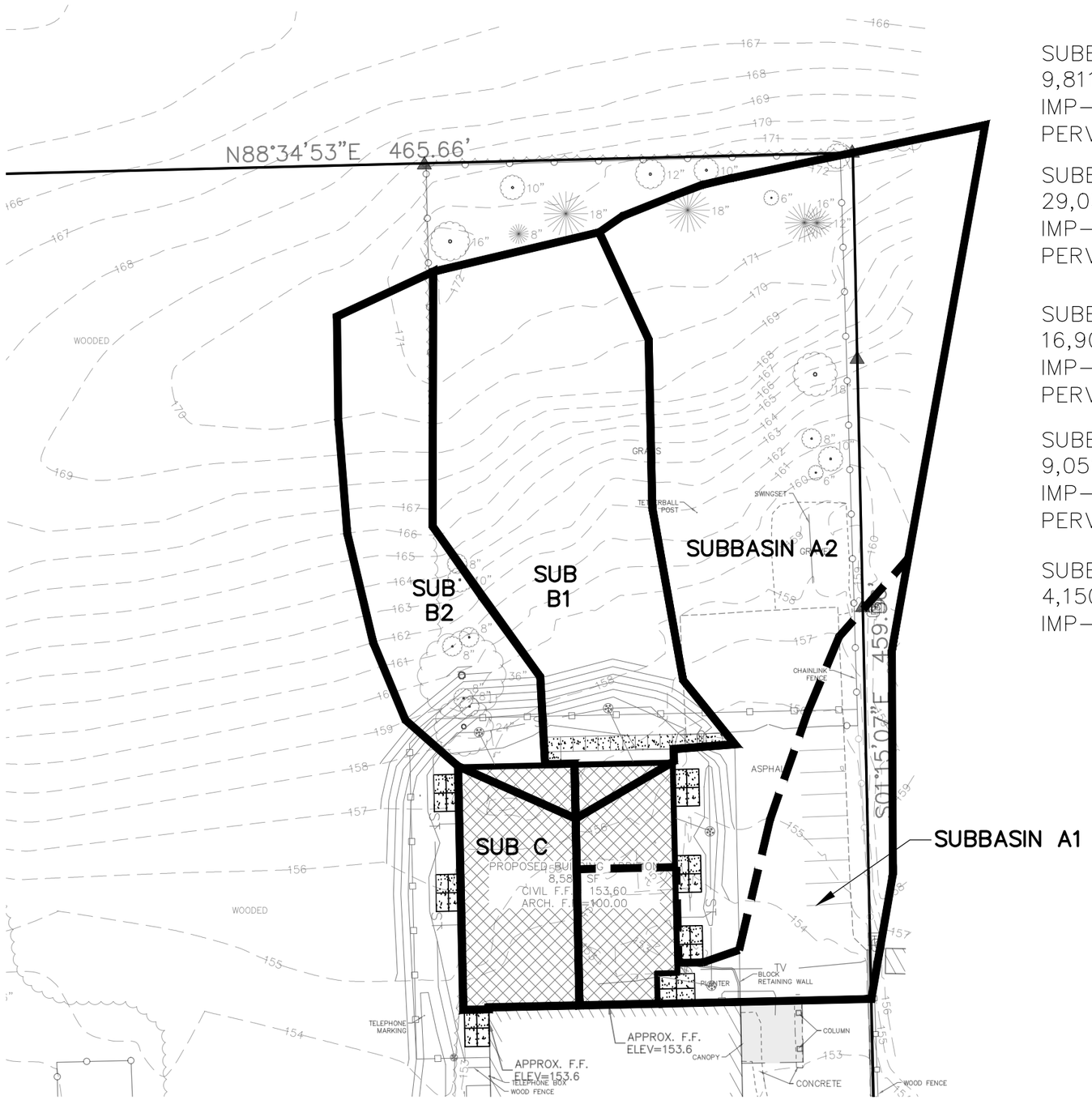
All storm pipes bringing water to the proposed pond were sized to convey the 100-year storm. See Appendix A, C and D for calculations and basin map. The calculated 100-year storm event will be routed around the proposed addition and discharge to the south as it currently does. Emergency overflows routes are provided on the north side of the site to convey runoff to the east and west of the building and ultimately south overland to the existing storm system.

EROSION AND SEDIMENT CONTROL:

The following are practices that will be used to control sediment during construction:
Silt Fence – Silt fence will be placed around the perimeter of the site for perimeter control as well as downhill of any disturbed areas where sheet flow will exist.
Tracking Pads – Stone tracking pads will be placed at all construction entrances to the site to ensure dirt and soil tracked onto public roads is limited.
Ditch Checks – Ditch checks will be provided to reduce the velocity of water flowing in ditch bottoms.
Erosion Matting – Erosion matting will be placed on any steep slopes as well as ditch bottoms to ensure that these areas are permanently stabilized over time.
The erosion control locations, specifications, construction sequence, site stabilization notes, and seeding notes can be seen on civil sheets C1.0 and C1.3.

Appendix A
Post-Development Area(s):

100 Camelot Drive • Fond du Lac, WI 54935
920.926.9800 • www.excelengineer.com



SUBBASIN A1
9,811 SF (0.22 AC)
IMP–6,729 SF (0.15 AC)
PERV–3,082 SF (0.07 AC)

SUBBASIN A2
29,052 SF (0.67 AC)
IMP–5,495 SF (0.13 AC)
PERV–23,557 SF (0.54AC)

SUBBASIN B1
16,904 (0.39 AC)
IMP–910 SF (0.02 AC)
PERV–15,994 (0.37)

SUBBASIN B2
9,051 SF (0.21 AC)
IMP–531 SF (0.01 AC)
PERV–8520 SF (0.20 AC)

SUBBASIN C
4,150 SF (0.10 AC)
IMP–4,150 SF (0.10 AC)

PIPE SIZING MAP

NORTH

1"= 50'

50' 0 50' 100'

SCALE 1"=50' (11X17) FEET

Appendix B
Soil Maps


88° 16' 10" W
88° 15' 57" W
396600
396640
396680
396720
396760
396800
396840
43° 1' 27" N
4764290
4764250
4764210
4764170
4764130
4764090
4764050
4764010
4763970
4763930
43° 1' 15" N
KlA
HmB
LmB
HmC2
BsA
N University Dr
Brentwood Dr
18
Soil Map may not be valid at this scale.
396560
Map Scale: 1:1,830 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 25 50 100 150
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 13, Oct 6, 2017

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

Date(s) aerial images were photographed: Sep 7, 2014—Sep 22, 2014

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BsA	Brookston silt loam, 0 to 2 percent slopes	C/D	5.9	41.0%
HmB	Hochheim loam, 2 to 6 percent slopes	D	2.7	18.8%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	D	3.8	26.6%
KlA	Kendall silt loam, 1 to 3 percent slopes	C	0.6	4.4%
LmB	Lamartine silt loam, 0 to 3 percent slopes	B/D	1.3	9.2%
Totals for Area of Interest			**14.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C
Pipe Capacity Calculations

Excel Engineering Project No. 2053880 Project Name Montessori School Addition Phase 1 - Waukesha

Pipe Data				Pipe Capacity (100-yr)				
Pipe No.	Diameter (FT)	Slope (FT/FT)	Manning's n	Basin No.	Total Flow (cfs)	Total Flow (gpm)	Full Flow Capacity (cfs)	Full Flow Capacity (gpm)
1	0.83	0.005	0.012	A1	1.30	583	1.67	747
2	1.25	0.005	0.012	A1, A2	3.62	1625	4.96	2227
3A	1.5	0.005	0.012	A1,A2,B1	4.72	2118	8.07	3621
4	1	0.005	0.012	A1,A2,B1,B2	5.28	2370	2.74	1228

* Pipe 4 10YR = 2.76 CFS

Full Flow Capacity based off Manning's Equation $Q = \frac{1.49}{n} R^{2/3} S^{1/2} a$

Where:
Q = Full Flow Capacity of Pipe (cfs)
n = manning's roughness coefficient
R = hydraulic radius (ft) (D/4)
s = hydraulic gradient, slope (ft/ft)
a = flow area (sq. ft.)

Typical Manning's n	
HDPE	0.012
PVC	0.012
Concrete	0.013
CMP	0.024

*Total Flow calculated via TR-55 hydrologic calculations. Reference Storm Pipe Basin Map & TR-55 Calculations

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Feb 18 2021

Overflow Weir (NW Corner) 100yr Flow = 5.28cfs

Trapezoidal

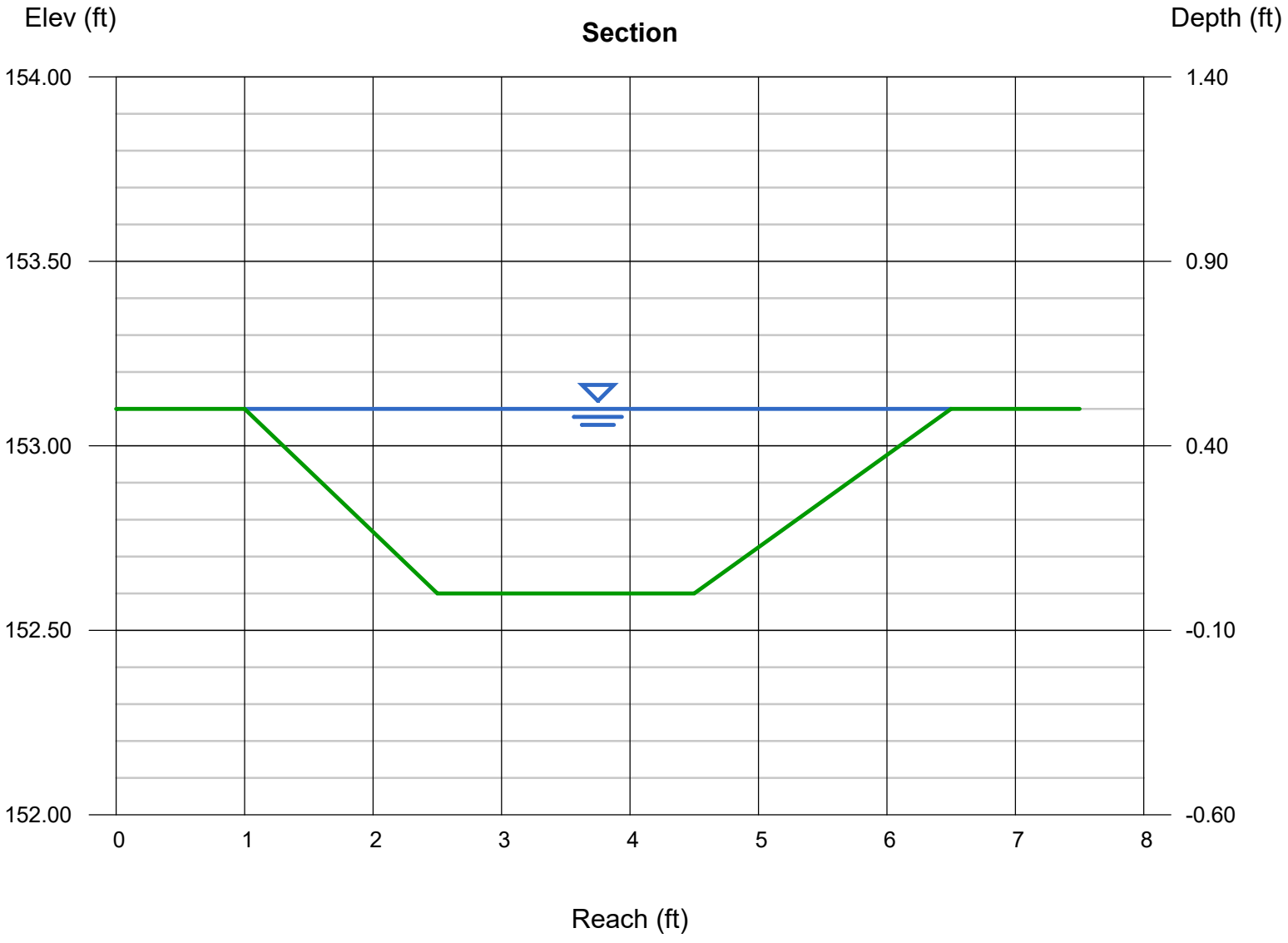
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 3.00, 4.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 152.60
Slope (%)	= 1.00
N-Value	= 0.017

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

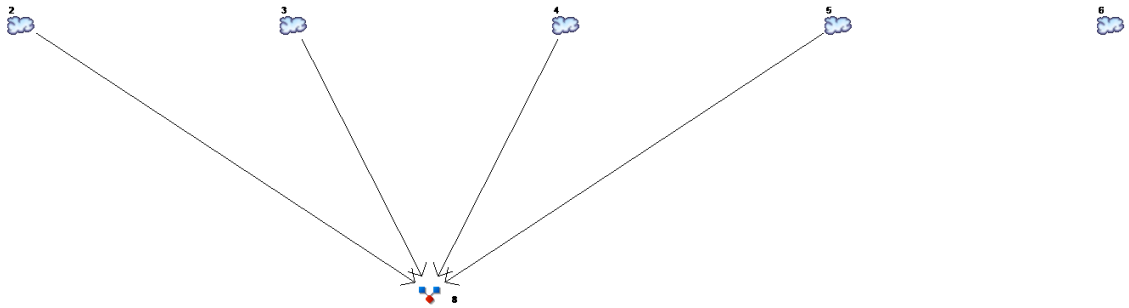
Highlighted

Depth (ft)	= 0.50
Q (cfs)	= 7.860
Area (sqft)	= 1.88
Velocity (ft/s)	= 4.19
Wetted Perim (ft)	= 5.64
Crit Depth, Yc (ft)	= 0.50
Top Width (ft)	= 5.50
EGL (ft)	= 0.77



Appendix D
SCS TR55
Stormwater Management
Calculations:

- Hydrograph Return Period Recap
- Hydrograph Summary Reports
- Hydrograph Plots
- Hydrograph Tc Worksheets



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	
2	SCS Runoff	------	0.358	0.467	-------	-------	0.836	-------	-------	1.298	SUBBASIN A1
3	SCS Runoff	------	0.235	0.426	-------	-------	1.186	-------	-------	2.318	SUBBASIN A2
4	SCS Runoff	------	0.046	0.128	-------	-------	0.508	-------	-------	1.097	SUBBASIN B1
5	SCS Runoff	------	0.025	0.069	-------	-------	0.273	-------	-------	0.591	SUBBASIN B2
6	SCS Runoff	------	0.280	0.330	-------	-------	0.494	-------	-------	0.694	SUBBASIN C
8	Combine	2, 3, 4, 5,	0.655	1.076	-------	-------	2.763	-------	-------	5.280	Overflow Discharge

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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
2	SCS Runoff	0.467	3	717	1,055	------	------	------	SUBBASIN A1
3	SCS Runoff	0.426	3	720	1,091	------	------	------	SUBBASIN A2
4	SCS Runoff	0.128	3	720	417	------	------	------	SUBBASIN B1
5	SCS Runoff	0.069	3	720	225	------	------	------	SUBBASIN B2
6	SCS Runoff	0.330	3	717	840	------	------	------	SUBBASIN C
8	Combine	1.076	3	720	2,788	2, 3, 4, 5,	------	------	Overflow Discharge

Hydrograph Report

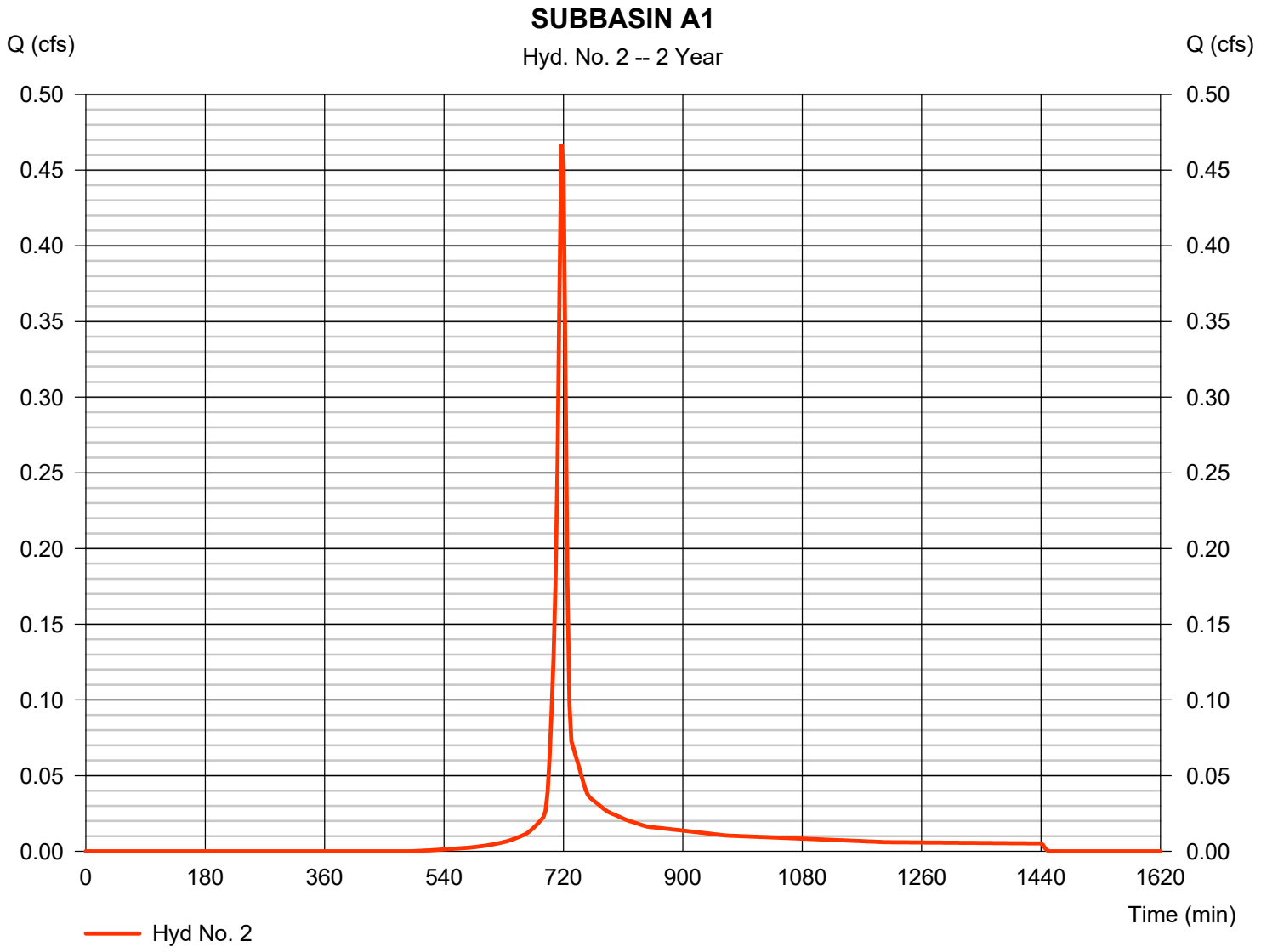
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 2

SUBBASIN A1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.467 cfs
Storm frequency	= 2 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 1,055 cuft
Drainage area	= 0.220 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.150 x 98) + (0.070 x 61)] / 0.220



Hydrograph Report

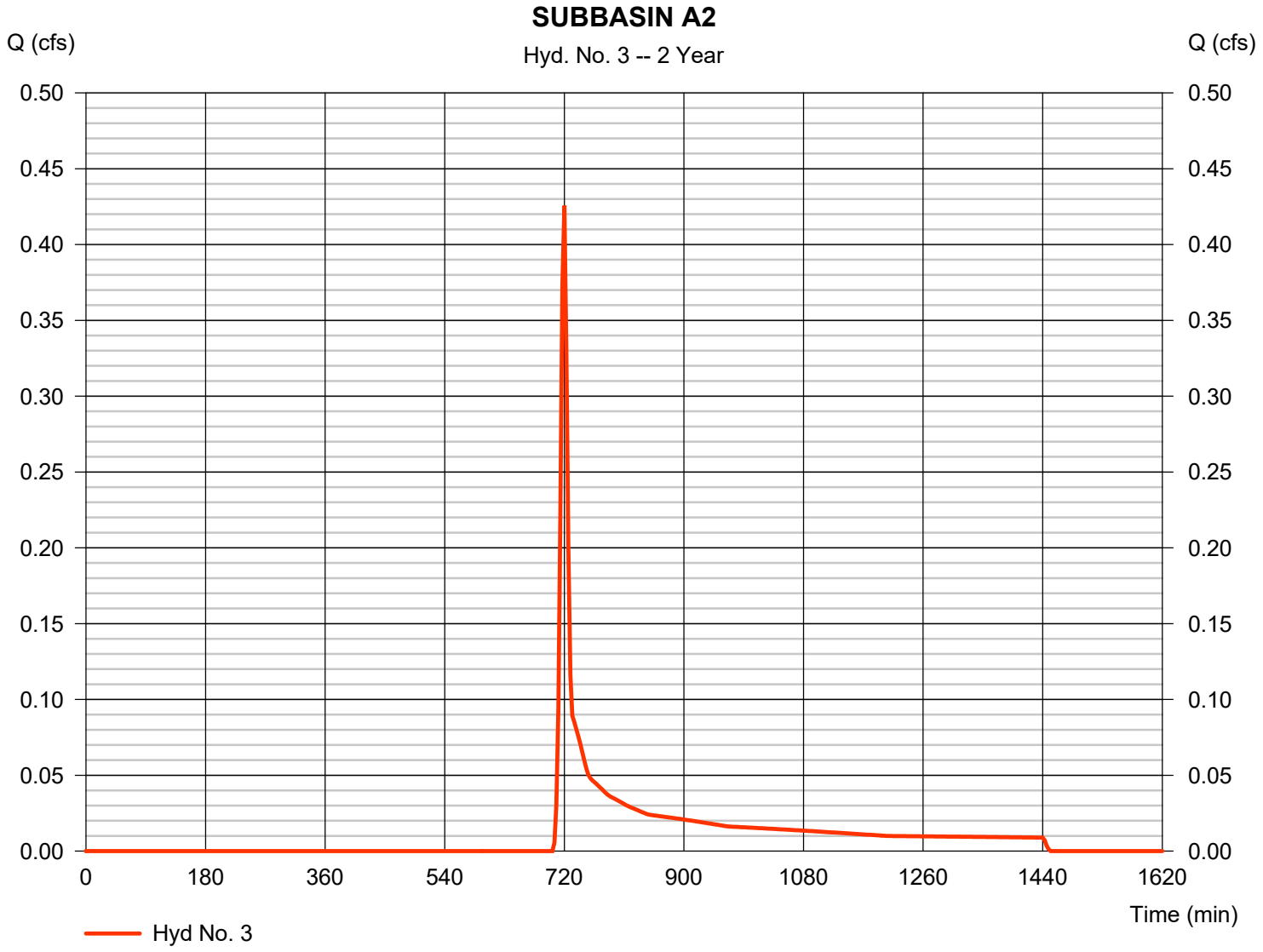
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 3

SUBBASIN A2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.426 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	1,091 cuft
Drainage area	=	0.670 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.130 x 98) + (0.540 x 61)] / 0.670



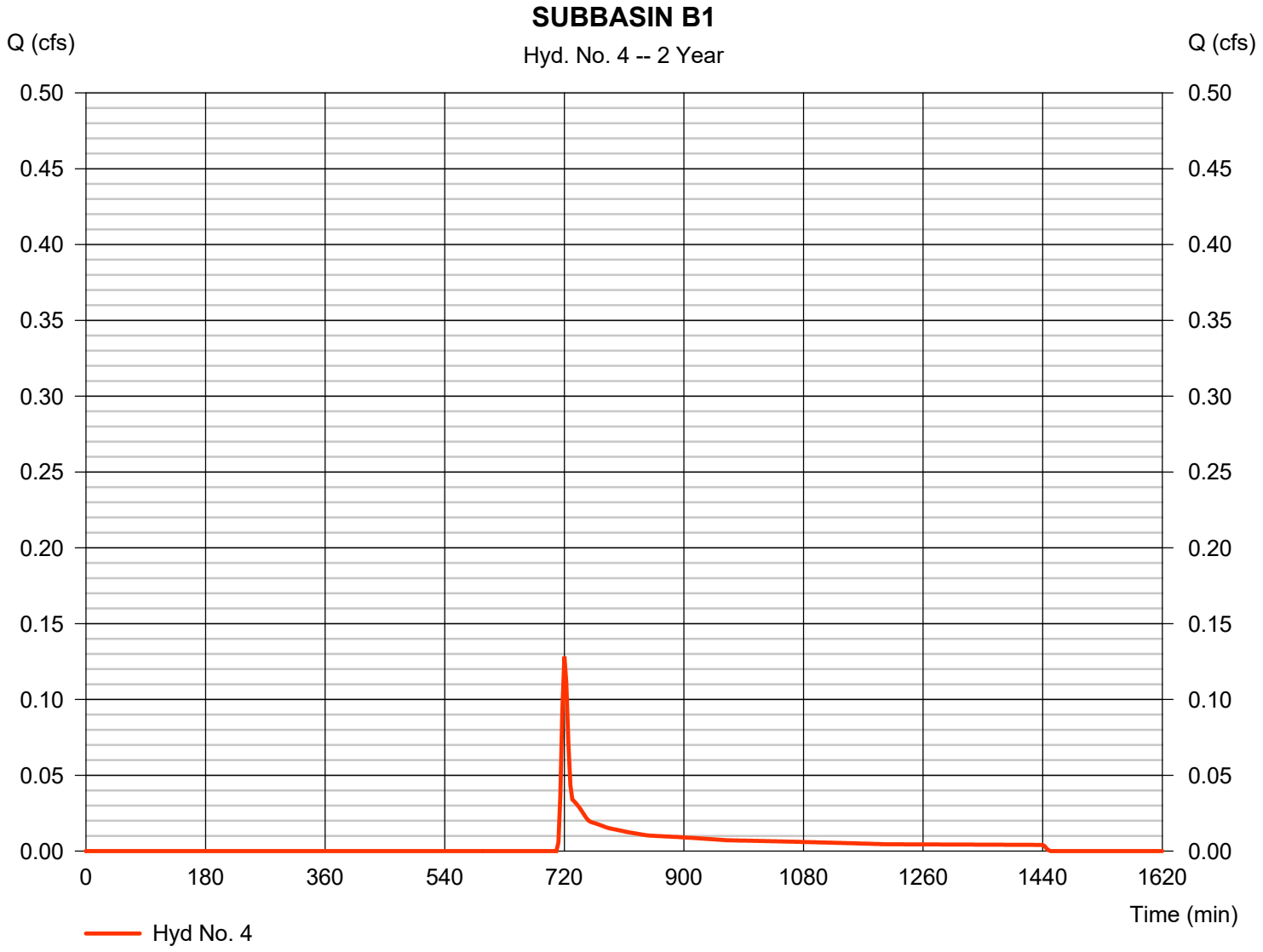
Hydrograph Report

Hyd. No. 4

SUBBASIN B1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.128 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	417 cuft
Drainage area	=	0.390 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.70 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.020 x 98) + (0.370 x 61)] / 0.390



Hydrograph Report

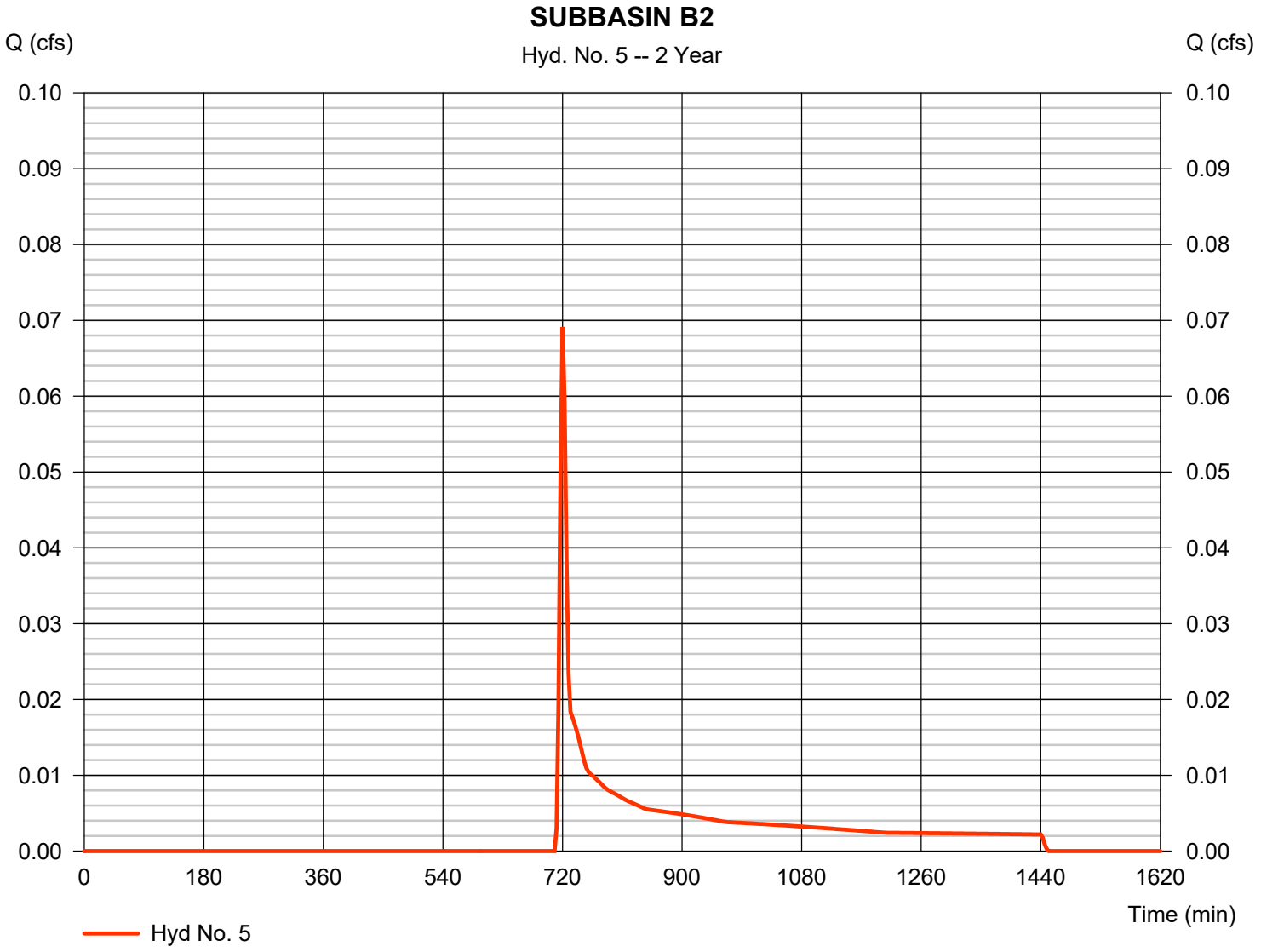
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 5

SUBBASIN B2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.069 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 225 cuft
Drainage area	= 0.210 ac	Curve number	= 63*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.010 x 98) + (0.200 x 61)] / 0.210



Hydrograph Report

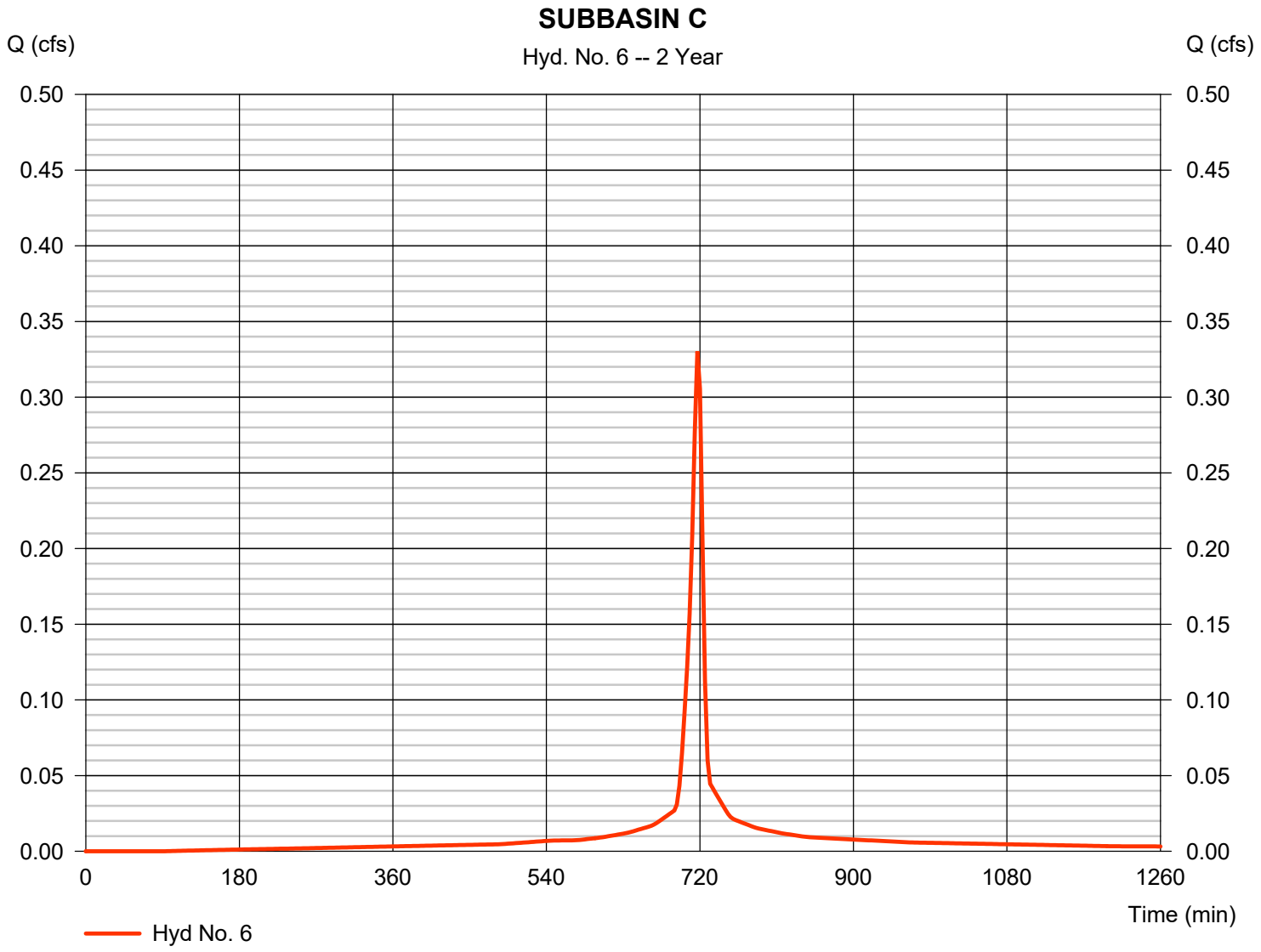
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 6

SUBBASIN C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.330 cfs
Storm frequency	= 2 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 840 cuft
Drainage area	= 0.100 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 98)] / 0.100

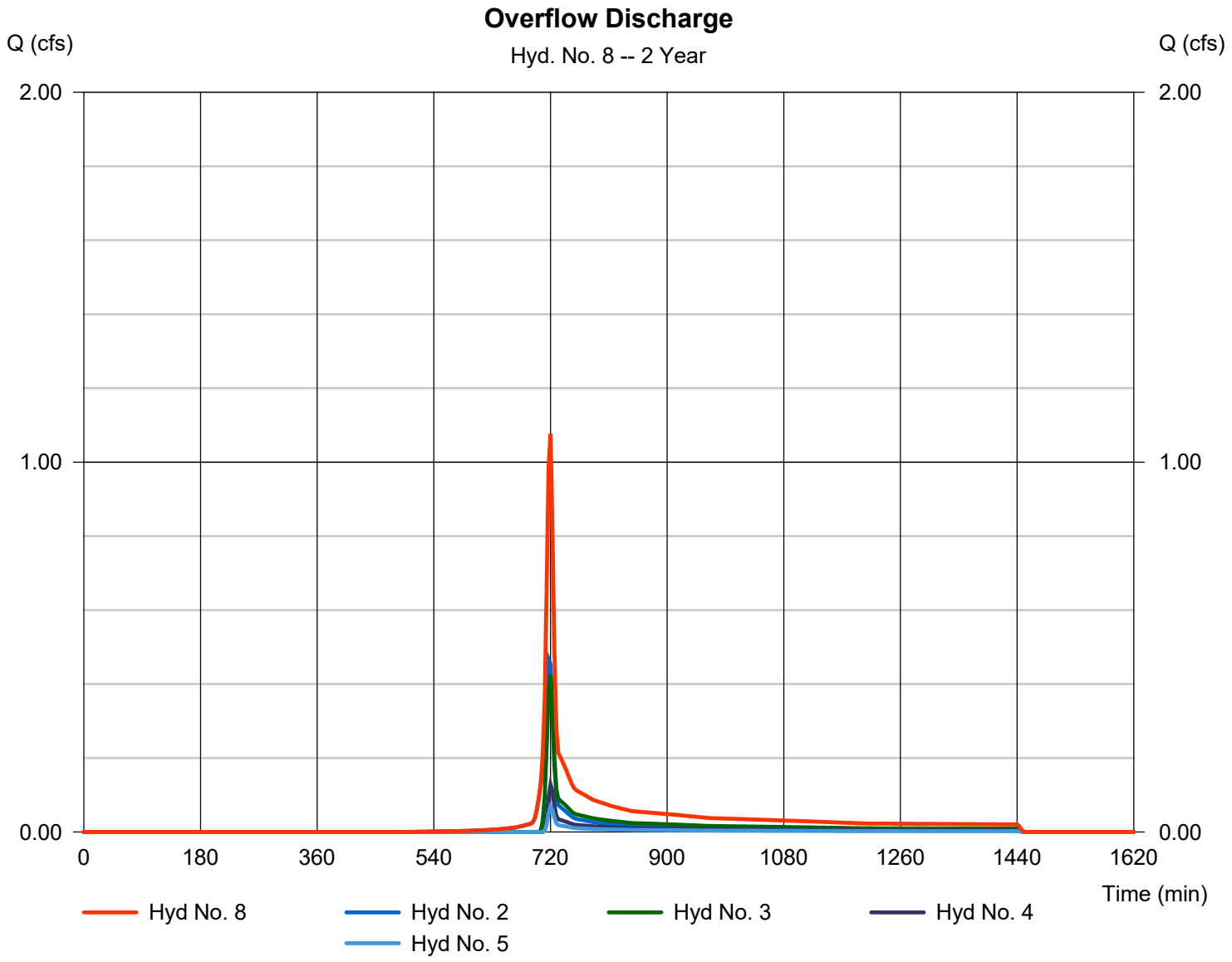


Hydrograph Report

Hyd. No. 8

Overflow Discharge

Hydrograph type	=	Combine	Peak discharge	=	1.076 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	2,788 cuft
Inflow hyds.	=	2, 3, 4, 5	Contrib. drain. area	=	1.490 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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
2	SCS Runoff	0.836	3	717	1,906	------	------	------	SUBBASIN A1
3	SCS Runoff	1.186	3	720	2,747	------	------	------	SUBBASIN A2
4	SCS Runoff	0.508	3	720	1,218	------	------	------	SUBBASIN B1
5	SCS Runoff	0.273	3	720	656	------	------	------	SUBBASIN B2
6	SCS Runoff	0.494	3	717	1,281	------	------	------	SUBBASIN C
8	Combine	2.763	3	720	6,528	2, 3, 4, 5,	------	------	Overflow Discharge

Hydrograph Report

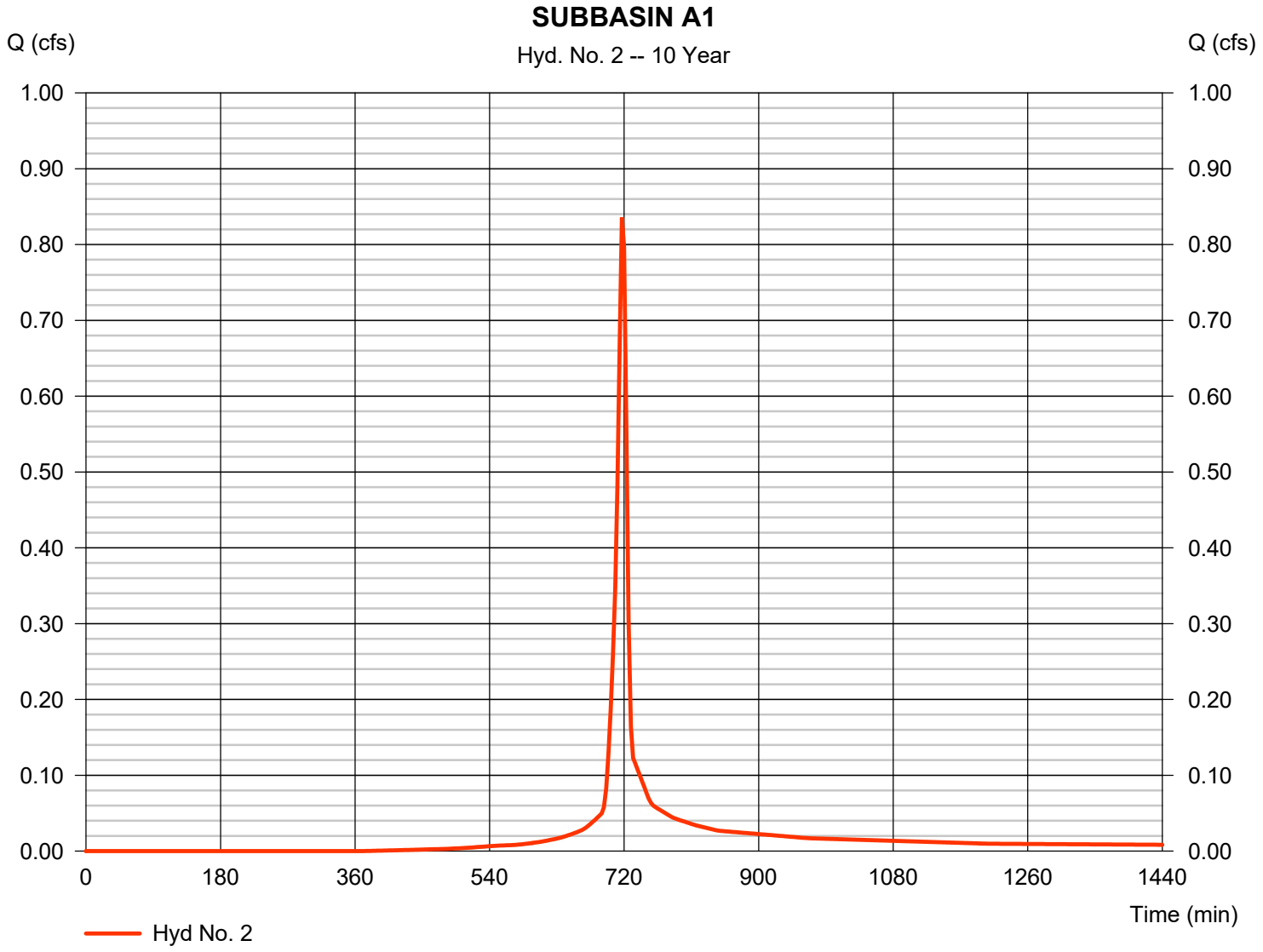
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 2

SUBBASIN A1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.836 cfs
Storm frequency	=	10 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	1,906 cuft
Drainage area	=	0.220 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.150 x 98) + (0.070 x 61)] / 0.220



Hydrograph Report

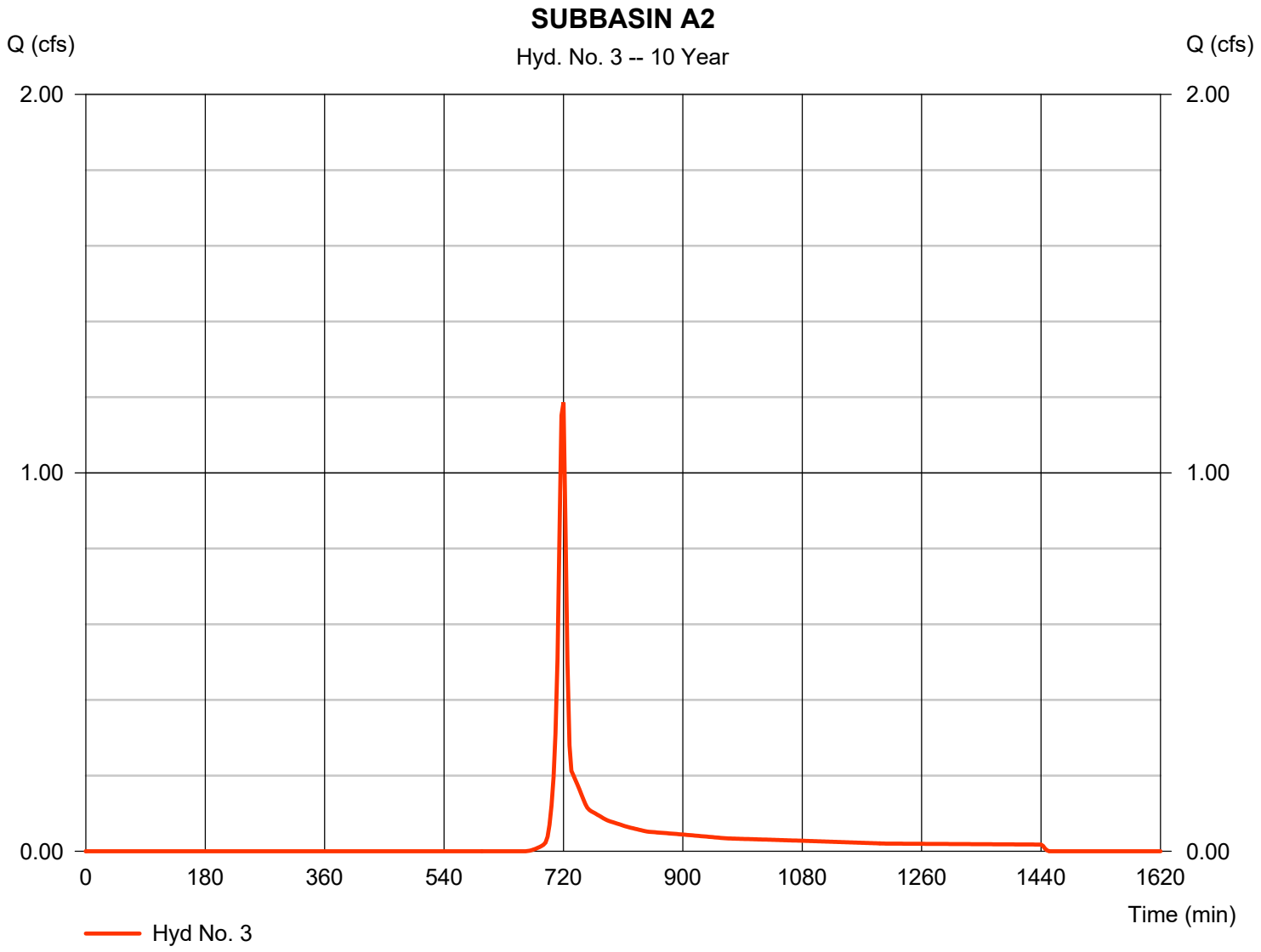
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 3

SUBBASIN A2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.186 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 2,747 cuft
Drainage area	= 0.670 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.130 x 98) + (0.540 x 61)] / 0.670



Hydrograph Report

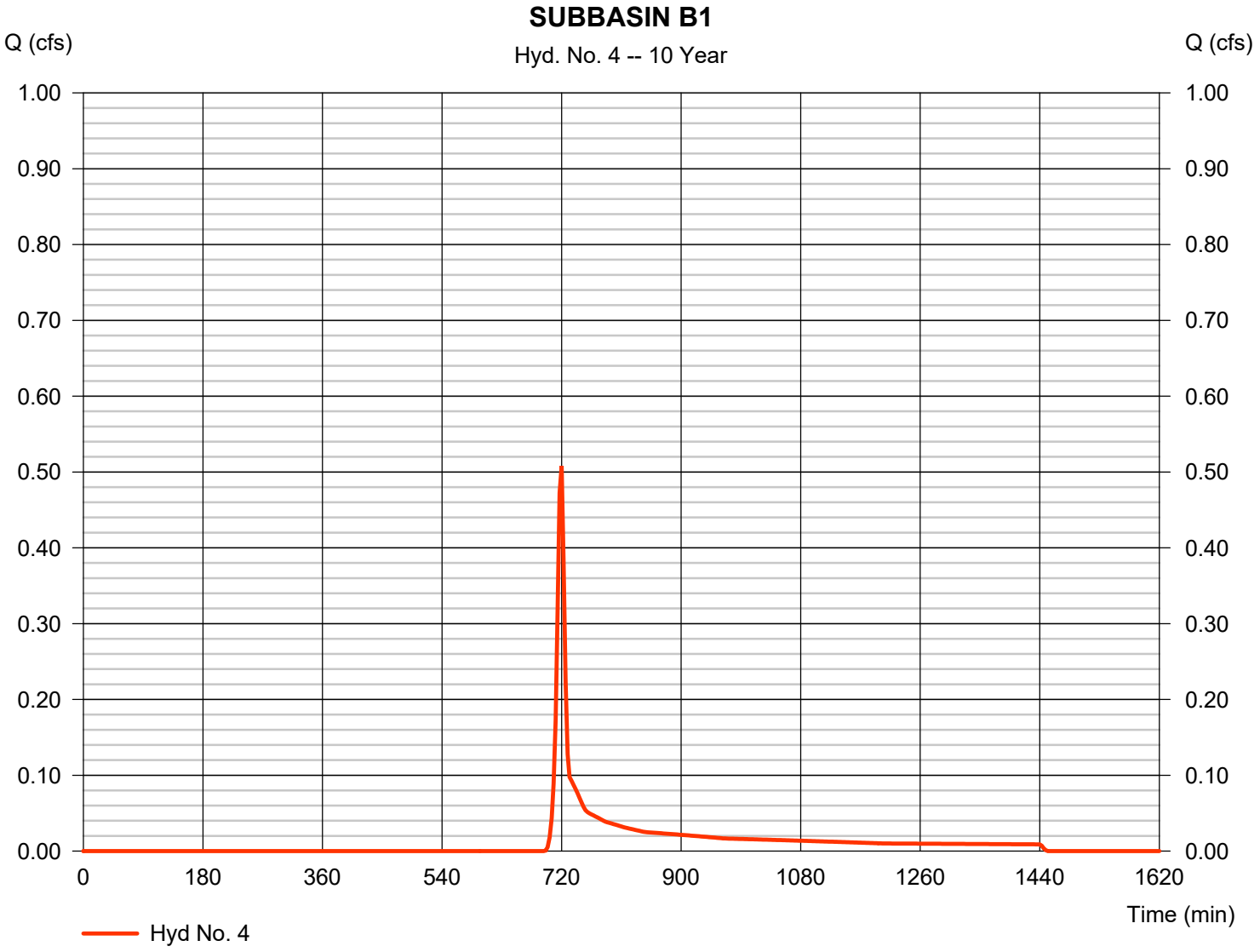
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 4

SUBBASIN B1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.508 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 1,218 cuft
Drainage area	= 0.390 ac	Curve number	= 63*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98) + (0.370 x 61)] / 0.390



Hydrograph Report

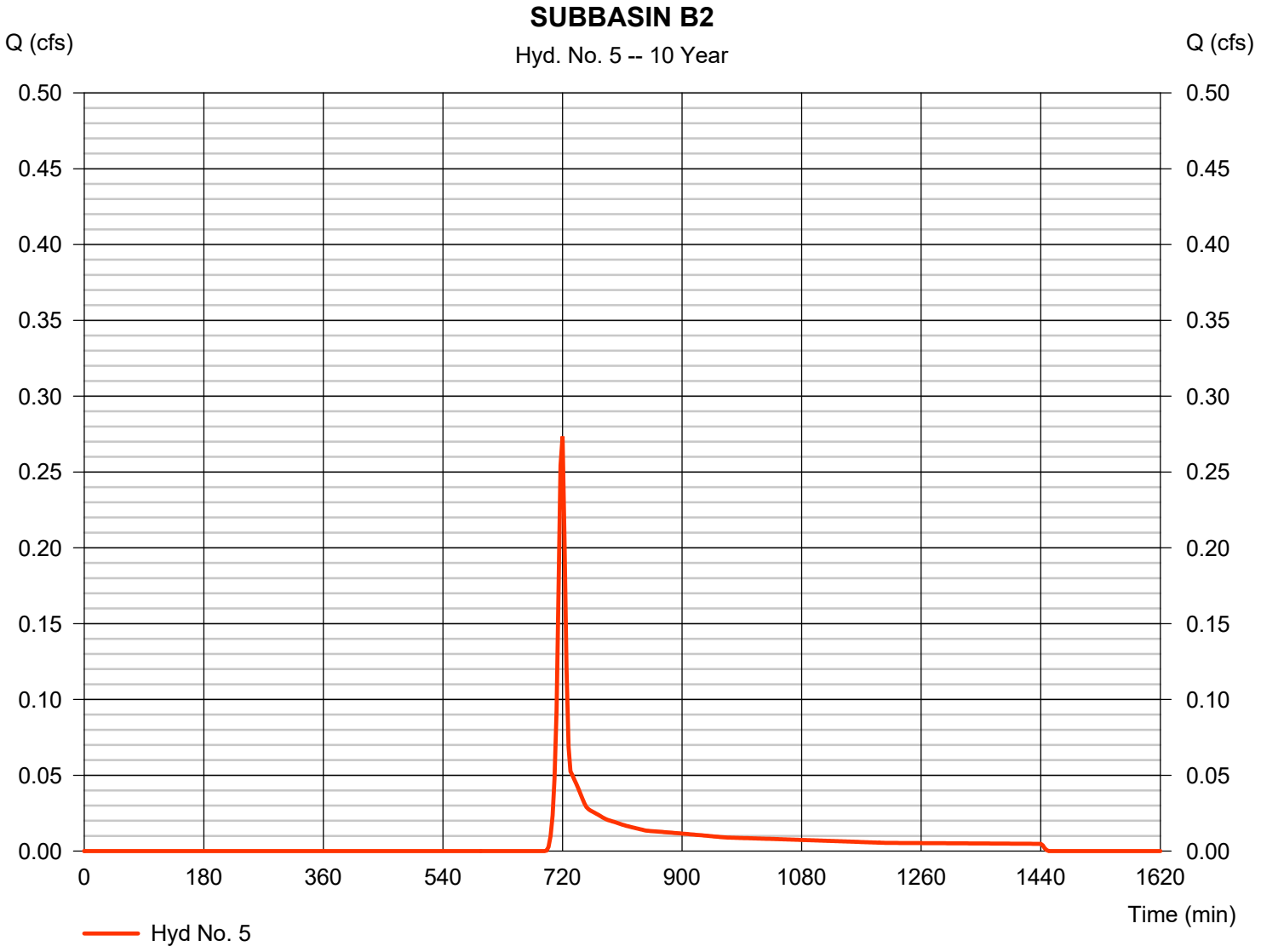
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 5

SUBBASIN B2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.273 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 656 cuft
Drainage area	= 0.210 ac	Curve number	= 63*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.010 x 98) + (0.200 x 61)] / 0.210



Hydrograph Report

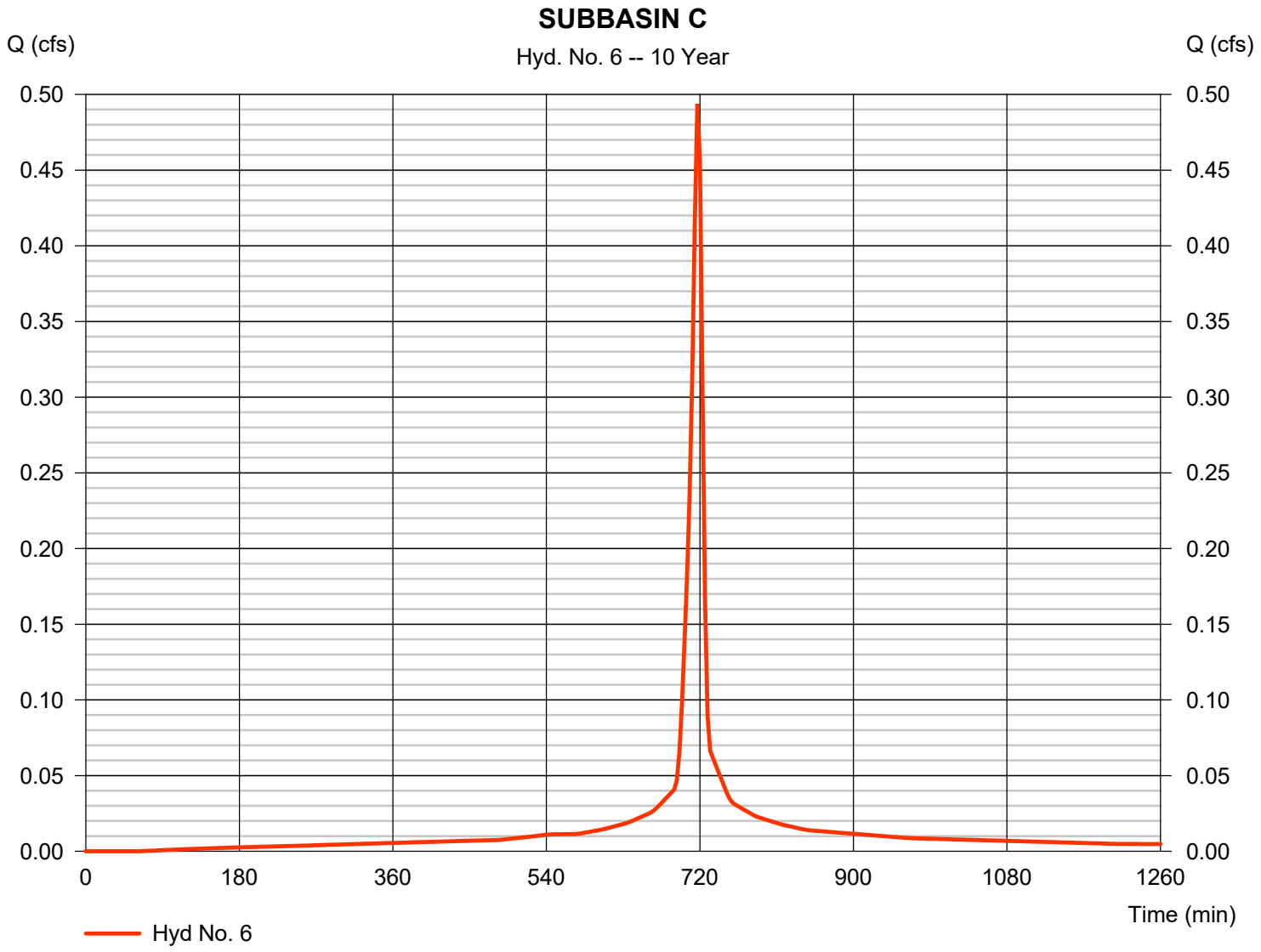
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 6

SUBBASIN C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.494 cfs
Storm frequency	= 10 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 1,281 cuft
Drainage area	= 0.100 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.100 x 98)] / 0.100



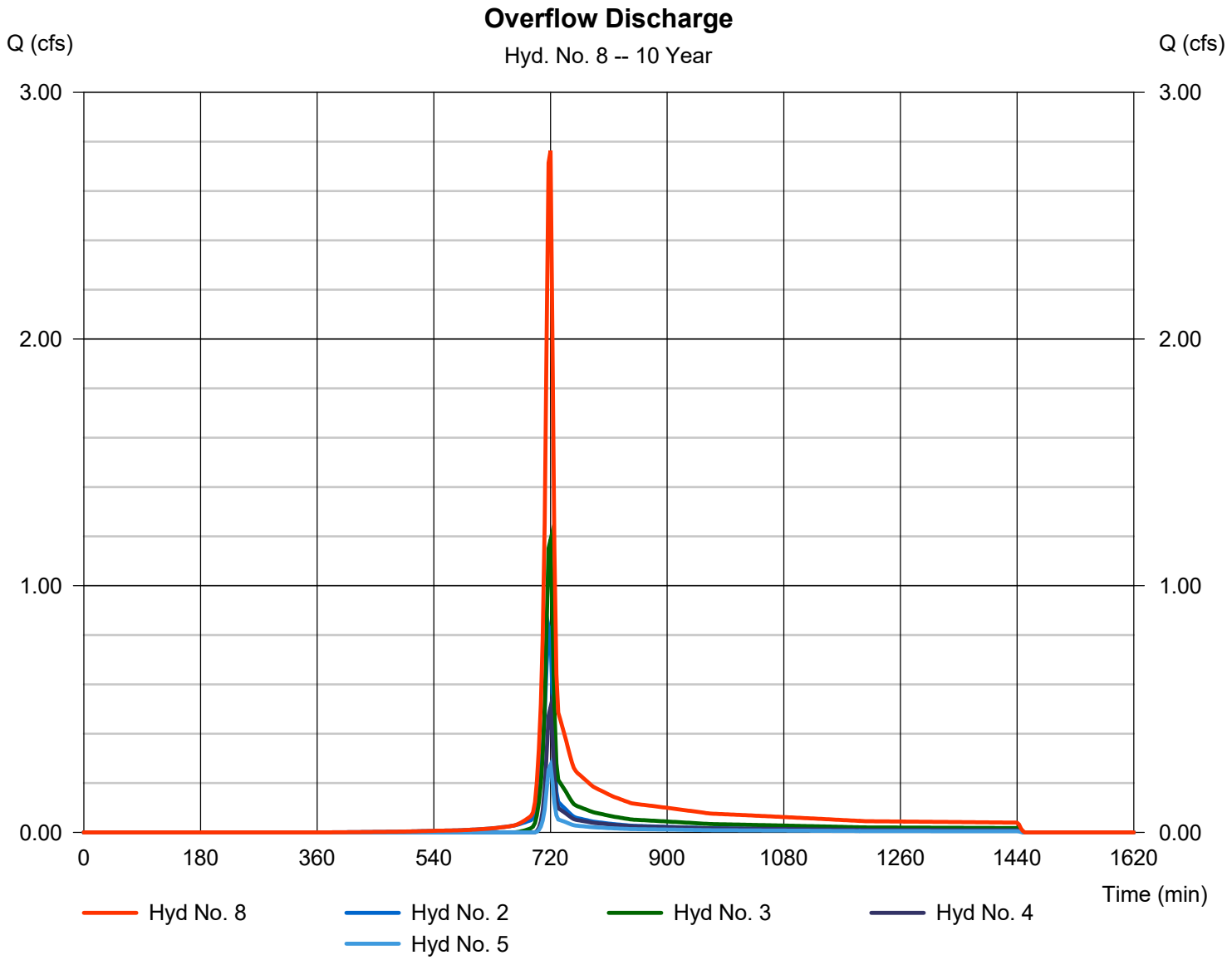
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 8

Overflow Discharge

Hydrograph type	=	Combine	Peak discharge	=	2.763 cfs
Storm frequency	=	10 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	6,528 cuft
Inflow hyds.	=	2, 3, 4, 5	Contrib. drain. area	=	1.490 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2

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
2	SCS Runoff	1.298	3	717	3,018	------	------	------	SUBBASIN A1
3	SCS Runoff	2.318	3	717	5,285	------	------	------	SUBBASIN A2
4	SCS Runoff	1.097	3	720	2,524	------	------	------	SUBBASIN B1
5	SCS Runoff	0.591	3	720	1,359	------	------	------	SUBBASIN B2
6	SCS Runoff	0.694	3	717	1,825	------	------	------	SUBBASIN C
8	Combine	5.280	3	717	12,185	2, 3, 4, 5,	------	------	Overflow Discharge

Hydrograph Report

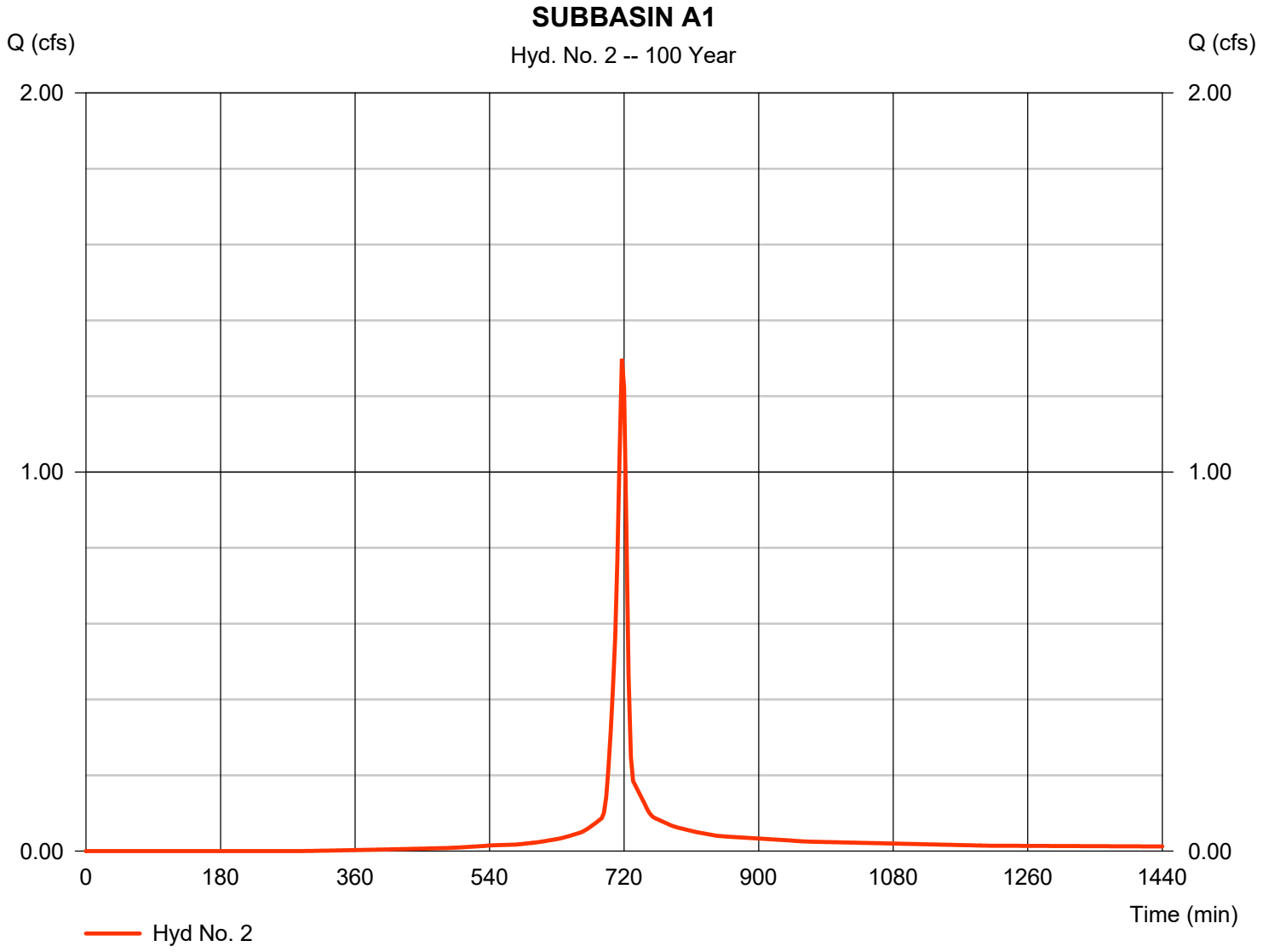
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 2

SUBBASIN A1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.298 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	3,018 cuft
Drainage area	=	0.220 ac	Curve number	=	86*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.150 x 98) + (0.070 x 61)] / 0.220



Hydrograph Report

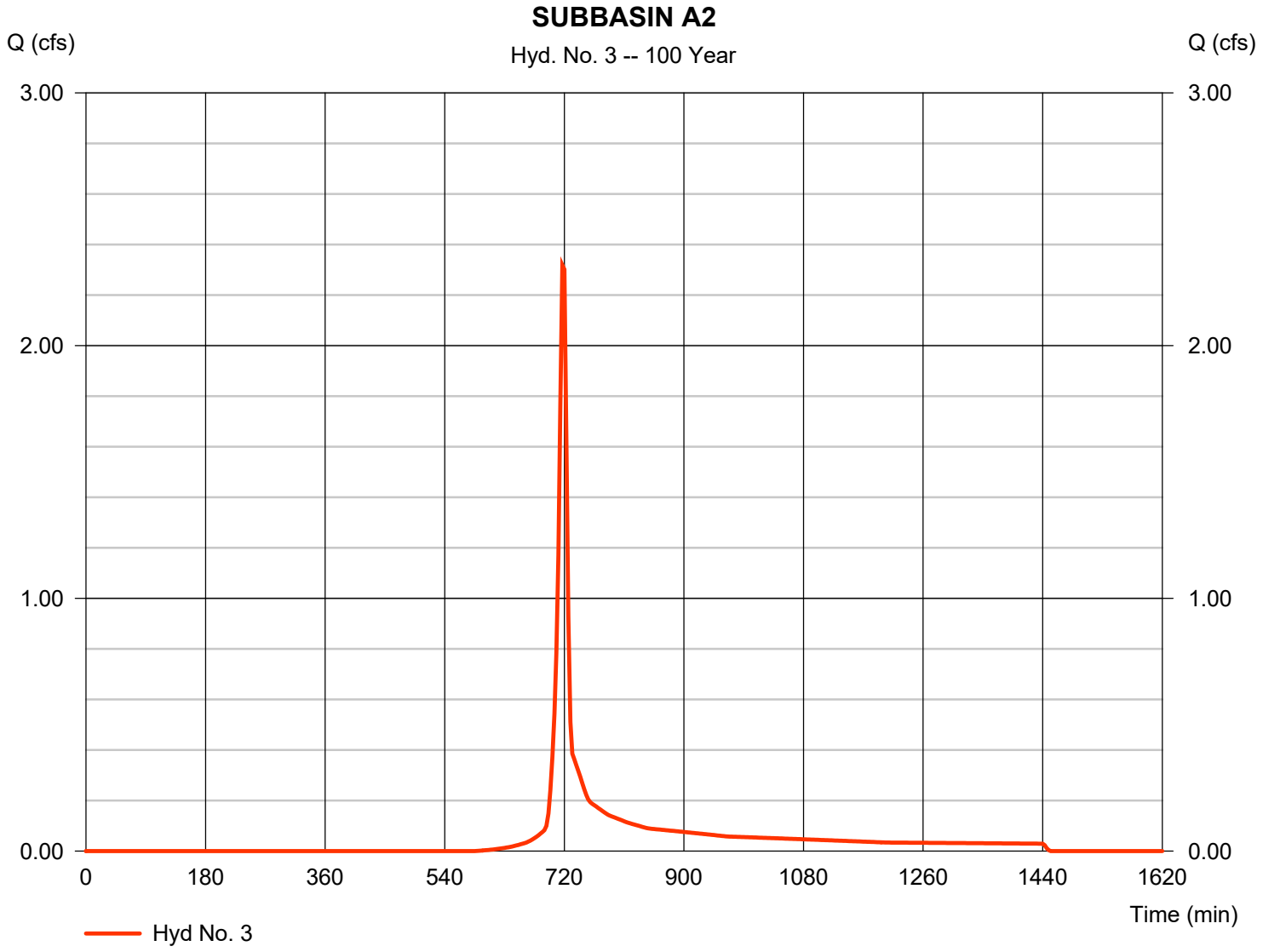
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 3

SUBBASIN A2

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.318 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	5,285 cuft
Drainage area	=	0.670 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.130 x 98) + (0.540 x 61)] / 0.670



Hydrograph Report

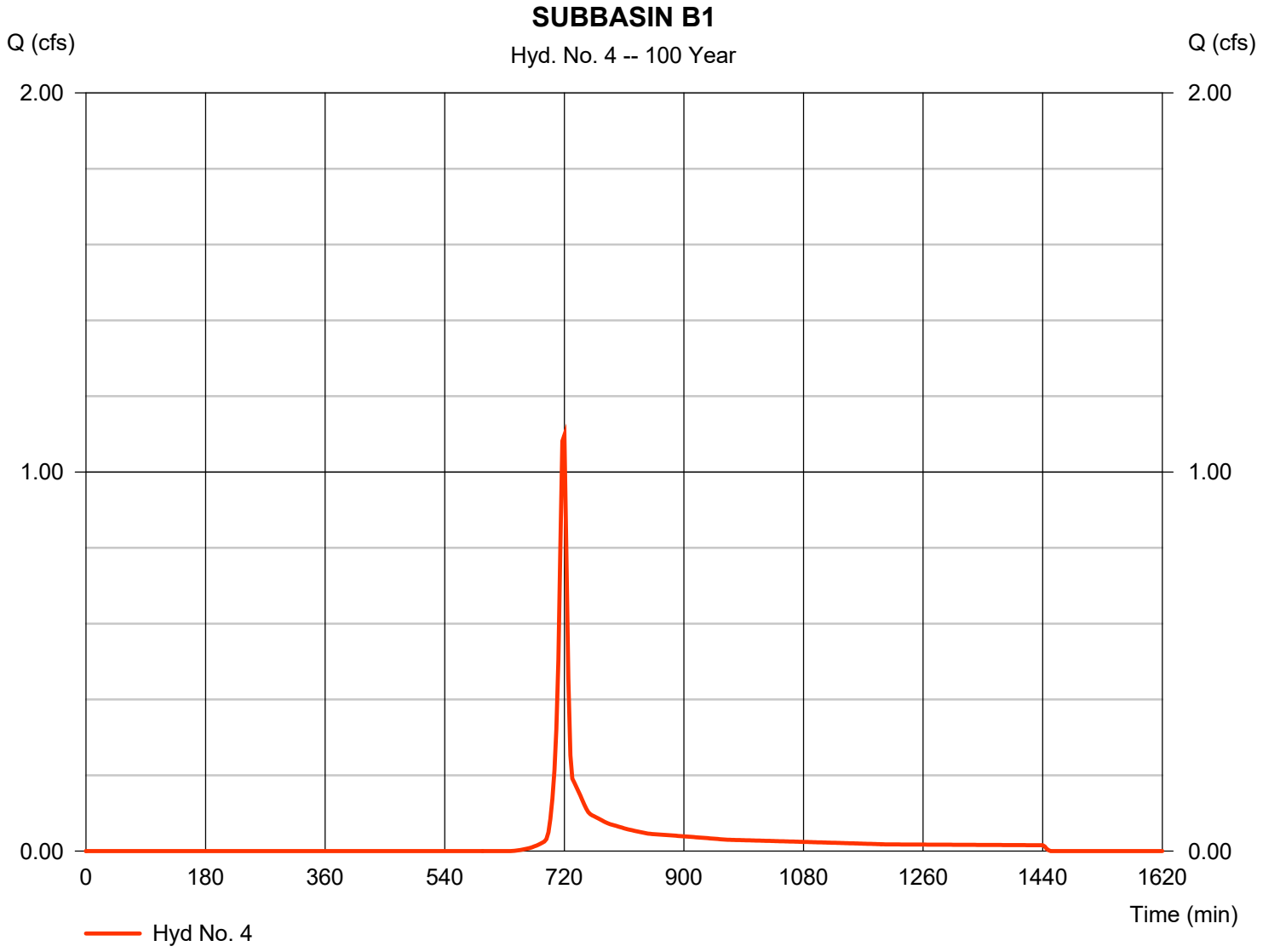
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 4

SUBBASIN B1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.097 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	2,524 cuft
Drainage area	=	0.390 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.020 x 98) + (0.370 x 61)] / 0.390



Hydrograph Report

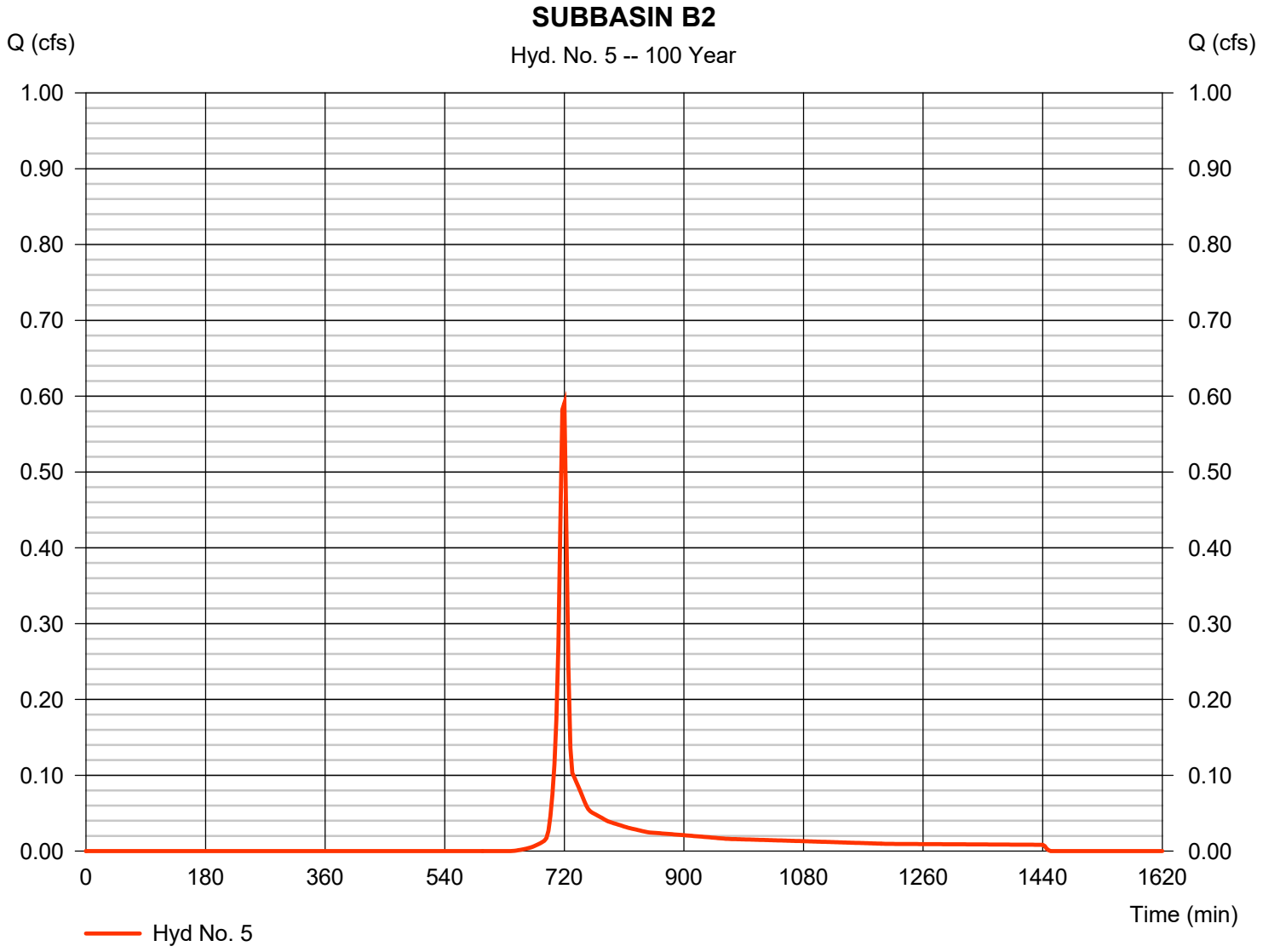
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 5

SUBBASIN B2

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.591 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	1,359 cuft
Drainage area	=	0.210 ac	Curve number	=	63*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.010 x 98) + (0.200 x 61)] / 0.210



Hydrograph Report

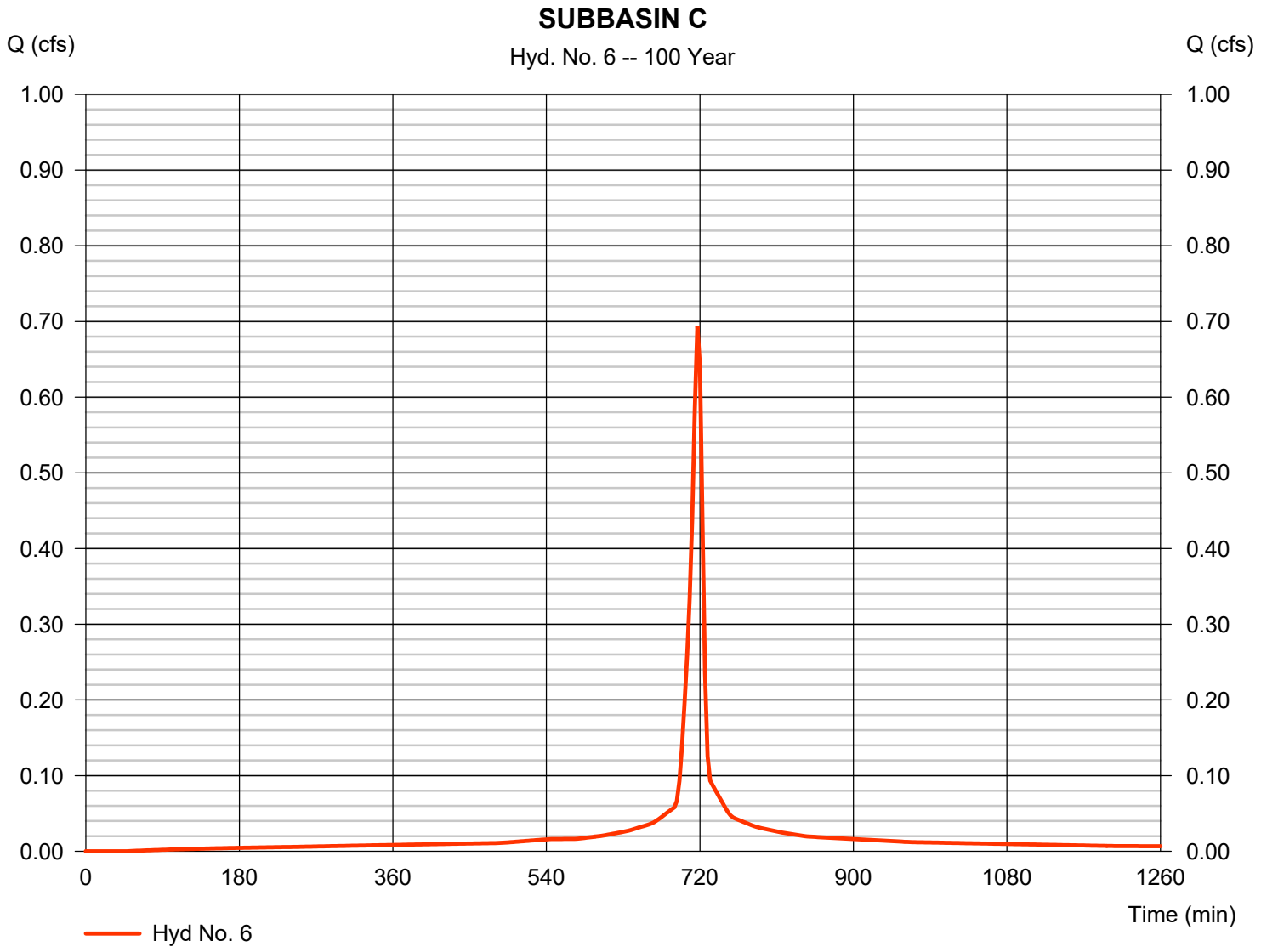
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2019.2 Thursday, 02 / 18 / 2021

Hyd. No. 6

SUBBASIN C

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.694 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	1,825 cuft
Drainage area	=	0.100 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.60 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.100 x 98)] / 0.100



Hydrograph Report

Hyd. No. 8

Overflow Discharge

Hydrograph type	=	Combine	Peak discharge	=	5.280 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	12,185 cuft
Inflow hyds.	=	2, 3, 4, 5	Contrib. drain. area	=	1.490 ac