

MACRO STORM WATER DRAINAGE STUDY

TRISTAR AT LEE'S SUMMIT

Multi-family Development

Site Acreage: 54.26 Acres

**East of 291 Hwy East Outer Road & South of Shamrock Golf Course
Lee's Summit, MO**

*PREPARED ON:
February 25, 2022
Revised March 29, 2022*

PREPARED BY:



Revision

Date	Comment	By
3-29-2022	Revised Per City Comments	MJS

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3. GENERAL INFORMATION

This storm study has been prepared to evaluate potential hydrologic and hydraulic impacts related to the proposed development and recommend improvements designed to mitigate any anticipated negative downstream impacts. The proposed multi-family development contains 54.26 acres and is to consist of 194 duplex units along with various site amenities. The Development is located east of 291 Highway east outer road and south of Shamrock Golf Course. The eastern portion of the project is located north of the Cobey Creek Development. See Exhibit A for an aerial image of the proposed project site along with an aerial image of the surrounding area. There is an unnamed tributary of Big Creek running through the eastern portion of the property. The existing site does not contain any storm sewer, wetlands nor BMPs. The site is located in Section 29, Township 47N, Range 31W, Lee's Summit, Jackson County, Missouri.

3.1 FEMA FLOODPLAIN DETERMINATION

The property is located in an Area of Minimal Flood Hazard, Zone X, according to FEMA Firm Map Number 29095C0551G, dated January 20, 2017.

See Exhibit B for a FIRMette which includes the proposed project site.

3.2 NRCS SOIL CLASSIFICATION

Soil classifications published by the United States Department of Agriculture/National Resources Conservation Service (USDA/NRCS) website for Jackson County, Missouri, Version 23, September 1, 2021. The existing site contains three major soil types:

10000	Arisburg Silt Loam, 1 to 5 Percent Slopes Hydrologic Soils Group (HSG): Type C
10116	Sampsel Silty Clay Loam, 2 to 5 Percent Slopes HSG: Type C/D
10117	Sampsel Silty Clay Loam, 5 to 9 Percent Slopes HSG: Type C/D

See Exhibit C for a detailed soils report of the proposed project site.

3.3 STREAM BUFFER AREA

A portion of Lot 3 and Lot 4 have an area that will meet the APWA Section 5605.3 "Stream Preservation and Buffer Zones". The drainage area is referred to as Area "B" as shown on Exhibit 1, Existing Drainage Area Map, the area contains 94.73 Acres, which requires a 60-foot Buffer Width on either side of the existing stream. Based on field survey measurements the existing stream varies in width from 5 feet to 10 feet, as a result the minimum width of the stream buffer provided will be 130 feet in total width.



























4. METHODOLOGY

The study utilized existing city contours to create the Pre-Development Drainage Area Map. The study conforms to the requirements of the City of Lee’s Summit, Missouri “Design and Construction Manual” and all applicable codes and criteria referred to therein.

Using the above criteria, the proposed site was evaluated using the Soil Conservation Service, SCS TR-55 method to calculate storm runoff volumes, peak rates of discharge, pre and post developed hydrographs and required storage volumes for detention facilities. TR-55 was first introduced in 1975 by the SCS particularly for small urbanizing watersheds. The analysis contains results for the 2, 10 and 100-year design storms.

Hydraflow Hydrographs Extension for AutoCAD Civil 3D was utilized to model the various SCS TR-55 stormwater rainfall runoff events. The following SCS TR-55 Unit Hydrograph variables were utilized;

- AMC II Soil Moisture Conditions
- 24-Hour SCS Type II Rainfall Distribution (Shape Factor 484)
- SCS Runoff Curve Numbers per SCS TR-55 (Tables 2-2a to 2-2c)

Time of Concentration has been calculated using the following formulas:

- Sheet Flow (Max. 100 LF): APWA 5602.5 Time Inlet, $T_1 = 1.8 * (1.1-C) * L^{1/2} / S^{1/3}$
- Shallow Concentrated Flow: SCS TR-55 Appendix F:

Unpaved	$V=16.1345(S)^{0.5}$
Paved	$V=20.3282(S)^{0.5}$

Shallow Concentrated Travel Time (min): SCS TR-55 Eq-3-1, $T_t = L / V \times 60$

- Channel Flow Improved: Manning’s Equation (Full Flow)
- Channel Flow Unimproved: APWA 5602.7.A. Travel Time, Table 5602-6

<u>Avg. Channel Slope (%)</u>	<u>Velocity (fps)</u>
< 2	7
2 to 5	10
>5	15

5. EXISTING CONDITIONS ANALYSIS

The existing site consists mainly of row-crop land with some trees adjacent to tributaries. The site contains three sub-basins referred to as Sub-basins A, B and C for the purposes of this report. Each sub-basin drains to a Point of Interest (POI) which corresponds to its given sub-basin drainage area. Sub-basin A consists mainly of offsite area with a small portion of property in the west adjacent to 291 outer road. Sub-basin B contains the majority of the development along with a sizable portion of offsite property which includes a portion of Cobey Creek. Sub-basin C is the smallest and is located in the southeast corner of the property just north of Cobey Creek. All three sub-basins consist of both overland and shallow concentrated drainage flow. Sub-basin B contains channelized flow from an unnamed tributary of Big Creek and exits the property in the northeast corner at POI B. The Existing Drainage Area Map is located in Exhibit D.

The following tables summarize the results of the Existing Conditions analysis. Time of concentration calculations by sub-basin may be found in Exhibit E along with proposed composite curve numbers. A complete breakdown of TR-55 unit hydrographs may be found in Exhibit F.

Table 5-1 Existing Conditions Sub-basin Data

Sub-basin	Area (ac.)	CN	Tc (min.)
A	80.04	82	31.0
B	94.73	84	36.5
C	5.20	88	11.0

Per APWA 5608.4 and City of Lee's Summit criteria, post development peak discharge rates from the site shall not exceed those indicated below:

- 50% storm peak rate less than or equal to 0.5 cfs per site acre
- 10% storm peak rate less than or equal to 2.0 cfs per site acre
- 1% storm peak rate less than or equal to 3.0 cfs per site acre

Based on the site geography and corresponding layout Allowable Release Rates were calculated at each POI based on the Allowable Site Peak Rate per APWA combined with the calculated offsite existing storm water runoff. The proposed peak discharge rates shall not be more than the Allowable Flow Rates stated below in Table 5-5.

Table 5-2 Existing Conditions Sub-basin

Sub-basin	Total (ac)	Developed (ac)	Existing (ac)	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
A	80.04	7.92	72.12	124.88	229.3	387.75
B	94.73	36.57	58.16	146.02	260.16	431.22
C	5.20	3.38	1.82	17.76	29.47	46.57

The Development will contribute runoff to three distinct points of interest as detailed in the Existing Drainage Area Map.

Table 5-3 Drainage Basin Site Coverage Breakdown

Sub-basin	Total (ac)	Stream Buffer	Onsite Crop (ac)	Offsite Crop Field (ac)	Golf Course (ac)
A	80.04	0	9.62	34.76	35.66
B	94.73	6.57	34.68	32.02	21.45
C	5.20	0	5.20	0	0

Table 5-4 Runoff Curve Number (Based on TR-55 Tables 2-2a, 2-2b and 2-2c)

Sub-basin	Total (ac)	Stream Buffer CN	Onsite Crop Field CN	Offsite Crop Field CN	Golf Course CN
A	80.04	77	88	88	80
B	94.73	77	88	88	80
C	5.20	77	88	88	80

Table 5-5 Allowable Flow Rates

Sub-basin		2 Year	10 Year	100 Year	Hydrograph No.
A					
	Crop Field	69.23	116.12	184.87	4
	Golf Course	58.31	110.60	191.23	17
	Site Allowable	4.81	19.24	28.86	
Area A Release Rate		132.35	245.96	404.96	
B					
	Crop Field	50.45	84.71	134.98	7
	Golf Course	27.64	52.47	90.85	19
	Site Allowable	20.63	82.50	123.75	
Area B Release Rate		98.72	219.07	349.58	
C					
	Crop Field	0	0	0	N/A
	Golf Course	0	0	0	N/A
	Site Allowable	2.60	10.40	15.60	
Area C Release Rate		2.60	10.40	15.60	

6. PROPOSED CONDITIONS ANALYSIS

The Development will contain multi-family housing and assorted site amenities. The proposed site will continue to drain to POIs A, B and C. Sub-basin A will utilize a new 42" culvert under the entrance road to convey offsite runoff from the south to the north POI A on Shamrock Golf Course. The housing and site amenities for the development will be constructed in Sub-basins B and C. Existing Sub-basin A will be split into two Sub-basins A and A1. Sub-basin A1 will contain an earthen detention basin to attenuate proposed peak discharge rates below allowable at POI A. Existing Sub-basin B will be split into three Sub-basins B, B1 and B2. Sub-basins B1 and B2 will contain earthen detention basins to attenuate proposed peak discharge rates. Sub-basin B1 is located in the north and Sub-basin B2 is located in the south. Existing Sub-basin C located in the southeast corner of the site will be split into two Sub-basins C and C1. Sub-basin C1 will contain an earthen detention basin to attenuate proposed peak discharge rates. Proposed peak discharge rates for each POI must be at or below allowable discharge rates as outlined in Table 5-3. The Proposed Drainage Area Map is located in Exhibit G.

Table 6-1 Drainage Basin Site Coverage Breakdown

Sub-basin	Total (ac)	Impervious (ac)	Pervious Site (ac)	Offsite Crop Field (ac)	Golf Course (ac)
A	79.96	2.40	7.22	34.76	35.66
B	96.62	17.62	27.73	27.93	21.45
C	3.38	1.91	1.47	0	0

Table 6-2 Runoff Curve Number (Based on TR-55 Tables 2-2a, 2-2b and 2-2c)

Sub-basin	Total (ac)	Impervious CN	Pervious CN	Offsite Crop Field CN	Golf Course CN
A	79.96	98	80	88	80
B	96.62	98	80	88	80
C	3.38	98	80	88	80

Onsite Combined CN

Area A1

$$((2.40 * 98) + (7.22 * 80)) / 9.62 = 85$$

Area B1 & B2

$$((17.62 * 98) + (27.73 - 6.57 (\text{Stream Buffer Area}) * 80)) / 38.78 = 88$$

*Impervious area was reduced by the Stream Buffer Area

Area C & C1

$$((1.91 * 98) + (1.47 * 80)) / 3.38 = 90$$

Table 6-1 Proposed Conditions Sub-basin Data

Sub-basin	Area (ac.)	CN	Tc (min.)
A	75.73	88	31.0
A1	4.23	85	5.0
B	52.66	88	35.8
B1	22.98	88	15.2
B2	20.98	88	17.2
C	1.61	90	8.4
C1	1.77	90	7.3

Table 6-2 Proposed Conditions Sub-basin/Point of Interest Peak Discharge Rates

Sub-basin/POI	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
Existing A Crop	69.23	116.12	184.87
Prop A1	15.60	26.81	43.39
Area A Golf Course	58.31	110.60	191.23
Existing B Crop	50.45	84.71	134.98
Prop B1	66.62	110.98	175.83
Prop B2	66.40	110.25	174.28
Area B Golf Course	27.64	52.47	90.85
Prop C	6.13	9.90	15.37
Prop C1	6.99	11.28	17.49
POI A	143.14	253.53	419.49
POI B	211.11	358.41	575.94
POI C	13.12	21.18	32.86

Table 6-3 Developed Flows Compared to Existing Flows & Allowable Flows

Sub-basin A	Developed Flow Rate	Existing Flow Rate	Change	Allowable Flow	Change
2 Year	143.14	124.88	18.26	111.03	32.11
10 Year	253.53	229.30	24.23	213.91	39.62
100 Year	419.49	387.75	31.74	359.88	59.61

Sub-basin B	Developed Flow Rate	Existing Flow Rate	Change	Allowable Flow	Change
2 Year	211.11	146.02	65.09	91.16	119.95
10 Year	358.41	260.16	98.25	209.99	148.42
100 Year	575.94	431.22	144.72	338.41	237.53

Sub-basin C	Developed Flow Rate	Existing Flow Rate	Change	Allowable Flow	Change
2 Year	13.12	17.76	-4.64	2.60	10.52
10 Year	21.18	29.47	-8.29	10.40	10.78
100 Year	32.86	46.57	-13.71	15.60	17.26

Sub-basins tributary to POI B and C will require detention to attenuate peak discharge rates below Allowable Release Rates as shown in Table 5-3.

Sub-basin tributary to POI A will NOT required detention as the only development within this sub-basin is for a public roadway and no future development will be completed within the proposed tracts.

6.1 DETENTION

Three new single stage earthen detention basins are being proposed, one each in Sub-basins B1, B2 and C1 to attenuate proposed peak discharge rates. The detention basin plan for each basin may be found in Exhibit H. Following are a list of design parameters for each detention system.

A new single stage earthen detention basin B1 is being proposed in Sub-basin B1 to attenuate proposed peak discharge rates. Following are a list of design parameters for the proposed detention system.

Designation: Detention Basin B1

Type: Earthen Basin

Side Slopes: 3:1 Max.

Bottom Slope: 1% Min., Turf Lined

Basin Bottom Elevation: 957.00 @ Inlet Pipe

Basin Top Berm Elevation: 968.00

Basin Volume: 185,719 cf @ 968.00

Control Structure: 5'x6' Precast Concrete Box with Interior 6" Baffle/Weir Wall

Baffle Wall Orifices: (6) 1" Diameter on 4" Centers, FL=956.50 (Bottom Orifice)
(1) 60" Wide x 38" High, FL=962.00

Baffle Wall Crest Elevation: N/A

Control Structure Top Elevation: 966.64

Control Structure Overflow Weir Openings: N/A

Control Structure Inlet/Effluent Pipe: TBD

Emergency Spillway: Earthen Broad Crested Weir, Crest Elevation=966.64, Crest Length=275'

Consecutive 100-YR Q=152.72 cfs, Emergency Spillway HGL=967.00, Freeboard=1.00'

See Table 6-5 for a summary of detention basin data.

Table 6-5 Proposed Conditions Detention Basin B1 Data

	Peak Q In (cfs)	Tp In (min.)	Peak Q Out (cfs)	Tp Out (min)	Peak W.S.E.	Max. Storage Vol. (cf)
Basin B1						
2-Year	66.62	723	10.76	741	962.69	60,096
10-Year	110.98	723	47.31	731	964.19	87,592
100-Year	175.83	723	74.71	732	966.14	132,505

As shown in the table above all proposed peak flowrates in Sub-basin B1 have been attenuated.

A new single stage earthen detention basin B2 is being proposed in Sub-basin B2 to attenuate proposed peak discharge rates. Following are a list of design parameters for the proposed detention system.

Designation: Detention Basin B2

Type: Earthen Basin

Side Slopes: 3:1 Max.

Bottom Slope: 1% Min., Turf Lined

Basin Bottom Elevation: 963.00 @ Inlet Pipe

Basin Top Berm Elevation: 976.00

Basin Volume: 334,729 cf @ 976.00

Control Structure: 5'x6' Precast Concrete Box with Interior 6" Baffle/Weir Wall

Baffle Wall Orifices: (9) 1" Diameter on 4" Centers, FL=962.50 (Bottom Orifice)
(1) 24" Diameter, FL=968.00

Baffle Wall Crest Elevation: N/A

Control Structure Top Elevation: 974.50

Control Structure Overflow Weir Openings: N/A

Control Structure Inlet/Effluent Pipe: TBD

Emergency Spillway: Earthen Broad Crested Weir, Crest Elevation=974.50, Crest Length=180'

Consecutive 100-YR Q=165.24 cfs, Emergency Spillway HGL=975.00, Freeboard=1.00'

See Table 6-6 for a summary of detention basin data.

Table 6-6 Proposed Conditions Detention Basin B2 Data

	Peak Q In (cfs)	Tp In (min.)	Peak Q Out (cfs)	Tp Out (min)	Peak W.S.E.	Max. Storage Vol. (cf)
Basin B2						
2-Year	66.62	721	5.45	823	968.57	90,503
10-Year	110.25	721	21.74	737	970.28	134,150
100-Year	174.28	721	33.71	736	973.15	223,880

As shown in the table above all proposed peak discharge rates have been attenuated. See Table 6-7 below for a summary of proposed peak discharge rates at POI B which consists of combined sub-basins B, post detained B1 and post detained B2.

Table 6-7 Proposed Conditions Post Detention Point of Interest Peak Discharge Rates

Point of Interest	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
B	90.48	206.23	334.25

As shown in the above table all peak discharge rates attributable to POI B have been attenuated below both Existing and Allowable Peak Discharge rates as outlined in Tables 5-2 and 5-3, respectively.

A new single stage earthen detention basin C1 is being proposed in Sub-basin C1 to attenuate proposed peak discharge rates. Following are a list of design parameters for the proposed detention system.

Designation: Detention Basin C1

Type: Earthen Basin

Side Slopes: 3:1 Max.

Bottom Slope: 1% Min., Turf Lined

Basin Bottom Elevation: 967.00 @ Influent Pipe

Basin Top Berm Elevation: 974.00

Basin Volume: 29,453 cf @ 974.00

Control Structure: 5'x6' Precast Concrete Box with Interior 6" Baffle/Weir Wall

Baffle Wall Orifices: (7) 1" Diameter on 4" Centers, FL=966.60 (Bottom Orifice)
(1) 6" Diameter, FL=969.00

Baffle Wall Crest Elevation: N/A

Control Structure Top Elevation: 974.50

Control Structure Overflow Weir Openings: N/A

Control Structure Influent/Effluent Pipe: TBD

Emergency Spillway: Earthen Broad Crested Weir, Crest Elevation=972.82, Crest Length=87'

Consecutive 100-YR Q=16.72 cfs, Emergency Spillway HGL=973.00, Freeboard=1.00'

See Table 6-8 for a summary of detention basin data.

Table 6-8 Proposed Conditions Detention Basin C1 Data

	Peak Q In (cfs)	Tp In (min.)	Peak Q Out (cfs)	Tp Out (min)	Peak W.S.E.	Max. Storage Vol. (cf)
Basin C1						
2-Year	8.46	718	0.67	731	969.70	6,344
10-Year	13.63	718	1.52	730	970.89	11,110
100-Year	21.15	718	2.22	731	972.32	18,553

As shown in the table above all proposed peak discharge rates have been attenuated. See Table 6-9 below for a summary of proposed peak discharge rates at POI C which consists of combined sub-basins C and post detained C1.

Table 6-9 Proposed Conditions Post Detention Point of Interest Peak Discharge Rates

Point of Interest	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
C	4.04	7.88	12.86

As shown in the above table all peak discharge rates attributable to POI C have been attenuated below both Existing and Allowable Peak Discharge rates as outlined in Tables 5-2 and 5-3, respectively.

Table 6-10 Point of Interest Peak Discharge Comparison

	Condition	Q2 (cfs)	Q10 (cfs)	Q100 (cfs)
POI A	Proposed	143.14	253.53	419.49
	Existing	124.88	229.30	387.75
	Difference	18.23	24.23	317.74
	Allowable	111.03	213.91	359.88
	Difference	32.11	39.62	59.61
POI B	Proposed	90.48	206.23	334.25
	Existing	146.02	260.16	431.22
	Difference	-55.54	-53.93	-96.97
	Allowable	91.16	209.99	338.41
	Difference	-0.68	-3.76	-4.16
POI C	Proposed	4.04	7.88	12.86
	Existing	17.76	29.47	46.57
	Difference	-13.72	-21.59	-44.71
	Allowable	2.60	10.40	23.00
	Difference	1.44	-2.52	-10.14

Peak discharge rates at Point A will increase, however this is allowed due the development is directly related to public roadway construction and no development will occur within this basin area.

Peak discharge rates at Point B will be reduced below allowable release rates for all design storms.

Peak discharge rates at Point C will be reduced below allowable for all design storms except the 2-year, however a waiver will be requested for the POI C, 2-year event. Post development flows have been reduced 77%.

7. 40 HOUR EXTENDED DETENTION

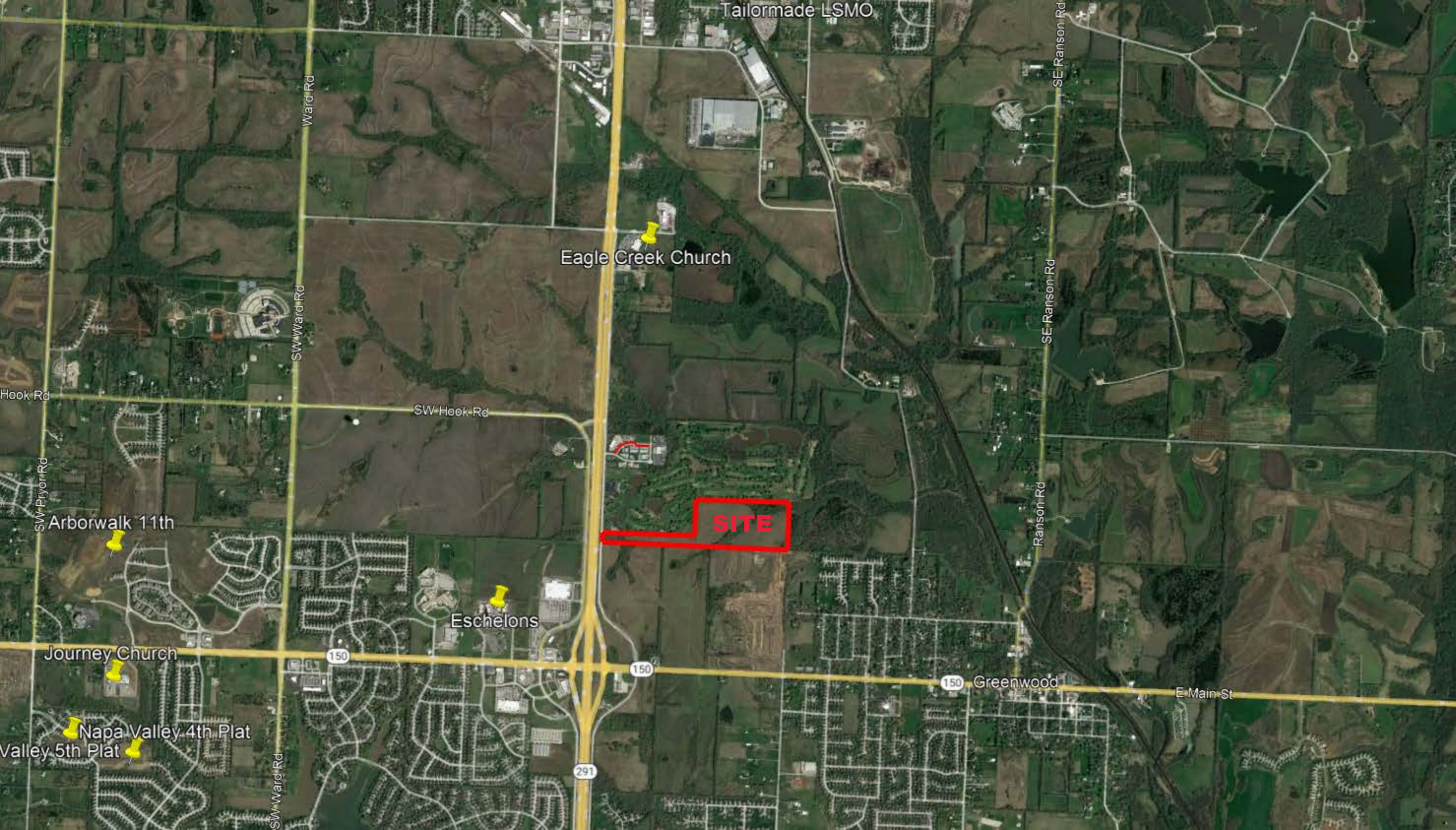
In addition to mitigation of peak flow rates, APWA Section 5608.4 also requires 40 hour extended detention of runoff from the local 90% mean annual event (1.37"/24-hour rainfall). The proposed detention facilities will release the water quality event over a period of 40-72 hours. See Exhibit J for 40 hour extended detention calculations for each basin.

8. CONCLUSIONS & RECOMMENDATIONS

This macro storm water drainage study reveals that the proposed Development will not generate any negative downstream hydraulic impacts. Four new earthen detention basins will be required to provide attenuation of peak discharges for the proposed development.

In conclusion, proposed peak discharge rates for POI B and C are below both existing and allowable peak discharge rates for all regulated rainfall runoff events, with one exception for the POI C 2-year event which will have a 77% reduction from Pre-Development flow rates. POI A will not provide any detention as the development within this area is for public roadway infrastructure only. The study is in conformance with all applicable City of Lee's Summit standards and criteria therefore Engineering Solutions recommends approval of this macro storm water drainage study.

Waiver requested for POI C, 2 year storm event allowable release rate.



SITE

Eagle Creek Church

Eschelons

Journey Church

Arborwalk 11th

Napa Valley 4th Plat

Valley 5th Plat

Tailormade LSMO

Ward Rd

SW Ward Rd

SW Hook Rd

SW Pryor Rd

Ranson Rd

SE Ranson Rd

Greenwood

E Main St

150

150

150

291

291

SW M 291 Hwy

Rte 291

SW M 291 Hwy

PROJECT SITE



Exhibit B

FEMA FIRMeTte

National Flood Hazard Layer FIRMette



94°22'16"W 38°51'52"N



Legend

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

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

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

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

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

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

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/15/2022 at 1:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Exhibit C

NRCS Soil Classification Report

Custom Soil Resource Report for **Jackson County, Missouri**

TRISTAR AT LEE'S SUMMIT



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

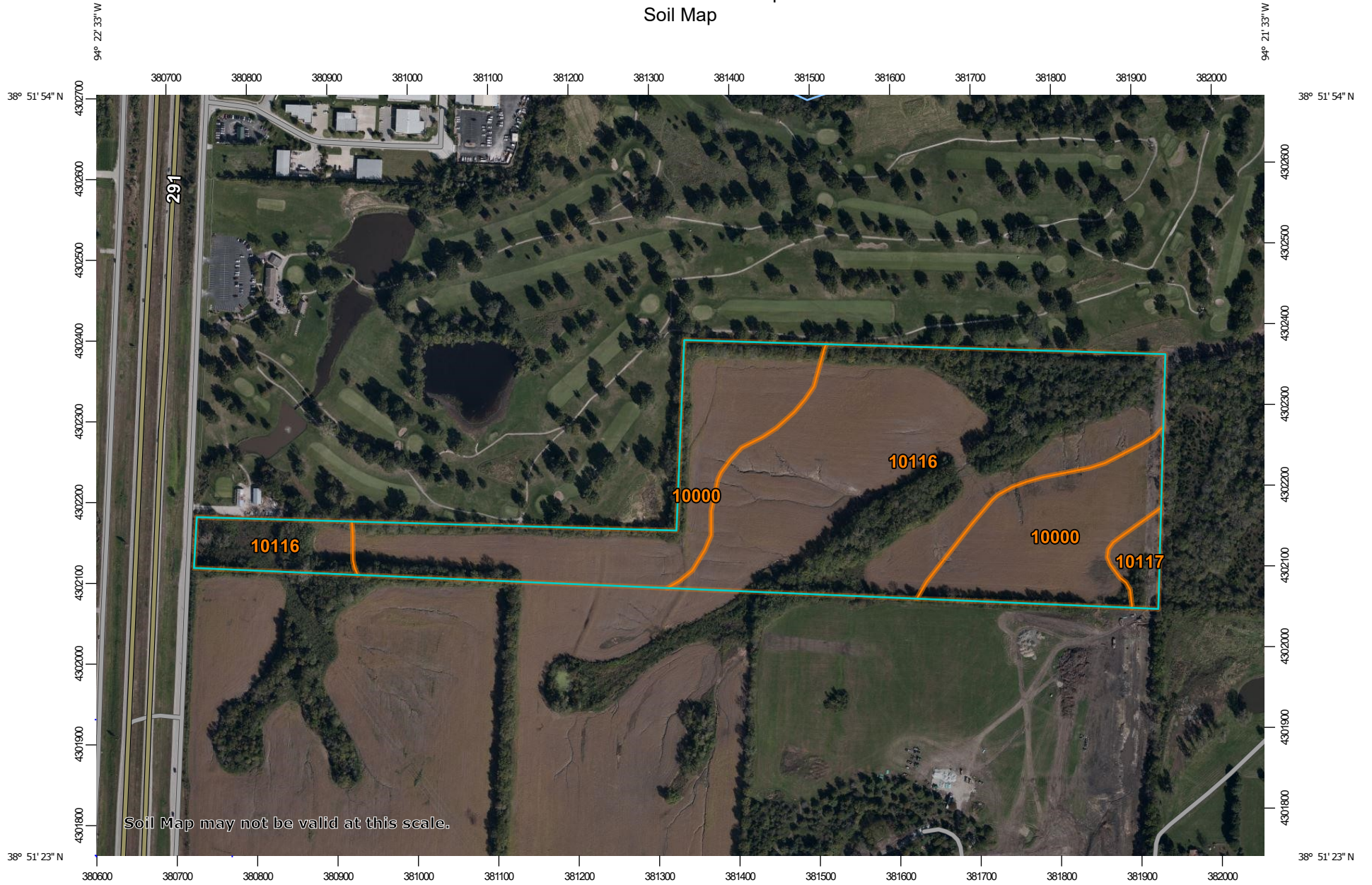
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

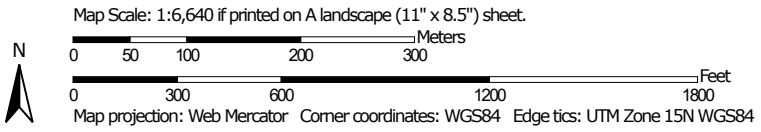
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Jackson County, Missouri
 Survey Area Data: Version 23, Sep 1, 2021

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

Date(s) aerial images were photographed: Sep 6, 2019—Nov 16, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10000	Arisburg silt loam, 1 to 5 percent slopes	22.4	39.8%
10116	Sampsel silty clay loam, 2 to 5 percent slopes	32.7	57.9%
10117	Sampsel silty clay loam, 5 to 9 percent slopes	1.3	2.3%
Totals for Area of Interest		56.4	100.0%

Map Unit Descriptions

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

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

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

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

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landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Jackson County, Missouri

10000—Arisburg silt loam, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w22b
Elevation: 610 to 1,130 feet
Mean annual precipitation: 39 to 43 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Arisburg and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arisburg

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 13 inches: silt loam
Bt - 13 to 19 inches: silty clay loam
Btg - 19 to 56 inches: silty clay loam
BCg - 56 to 79 inches: silty clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107BY007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Sharpsburg

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Greenton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Haig

Percent of map unit: 3 percent
Landform: Flats
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R109XY001MO - Claypan Summit Prairie
Hydric soil rating: Yes

10116—Sampsel silty clay loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2qkzy
Elevation: 600 to 900 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Sampsel and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sampsel

Setting

Landform: Hillslopes

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Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Convex, concave
Parent material: Residuum weathered from shale

Typical profile

Ap - 0 to 11 inches: silty clay loam
Bt - 11 to 80 inches: silty clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: R109XY010MO - Interbedded Sedimentary Upland Savanna
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

10117—Sampsel silty clay loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2qkzz
Elevation: 600 to 900 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Sampsel and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sampsel

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Concave

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Across-slope shape: Convex, concave
Parent material: Residuum weathered from shale

Typical profile

Ap - 0 to 13 inches: silty clay loam
Bt - 13 to 80 inches: silty clay

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: R109XY010MO - Interbedded Sedimentary Upland Savanna
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

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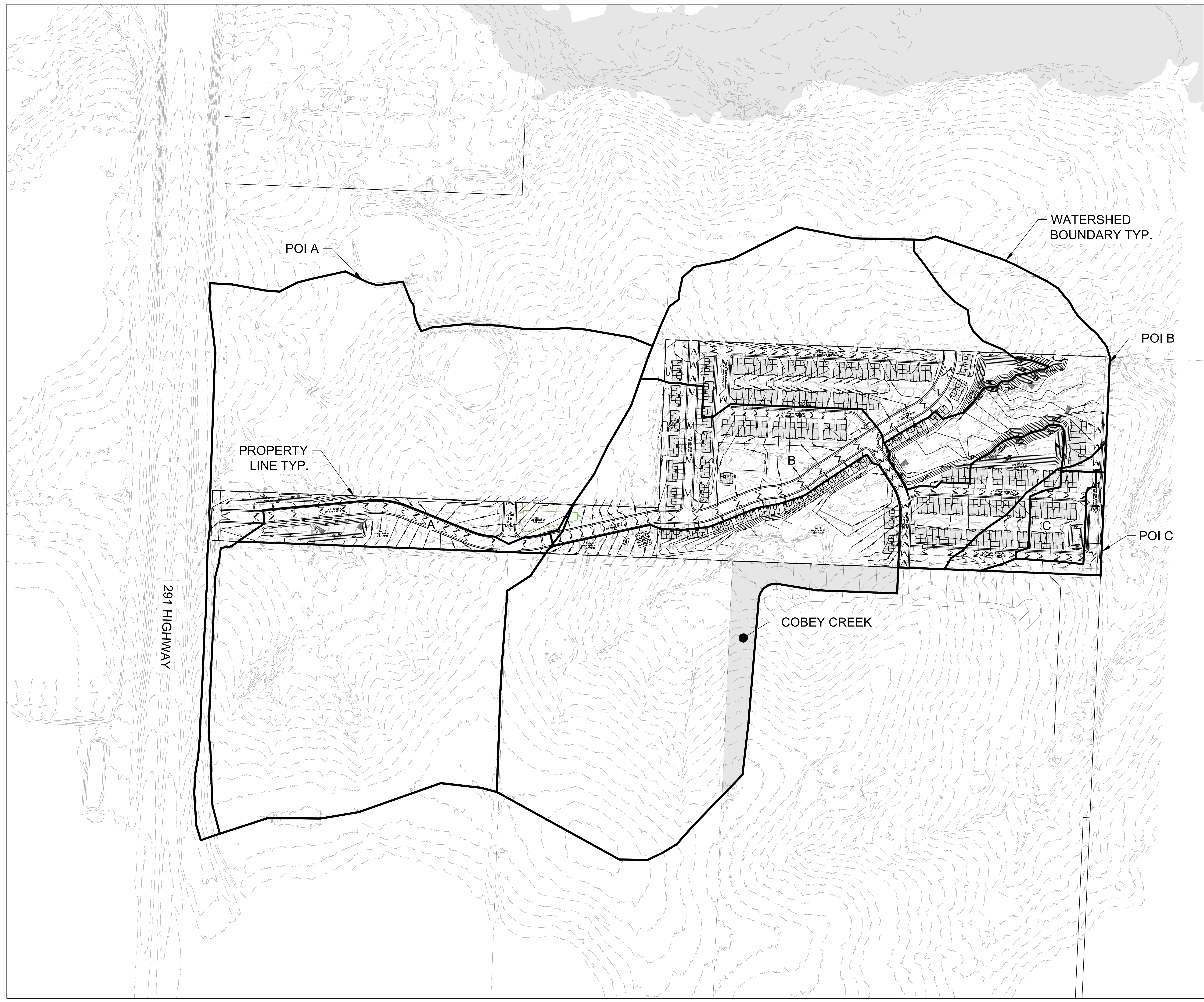
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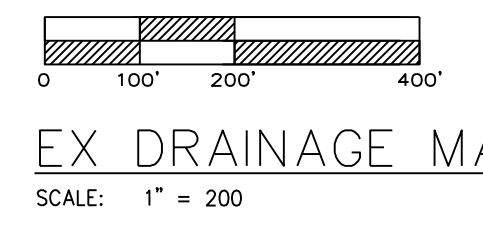
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Exhibit D

Existing Drainage Map



North



EX DRAINAGE MAP
SCALE: 1" = 200'

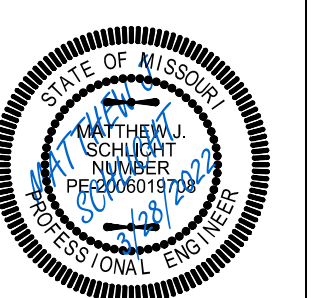


Professional Registration
Missouri
Engineering 200502188-D
Surveying 200500519-D
Kansas
Engineering E-1895
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

TRISTART AT LEE'S SUMMIT
Part of the North 1/2 of
Section 29, Township 47 North, Range 31 West
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

Project:
WEAVER
DEVELOPMENT
Issue Date:
February 25, 2022

Existing Drainage Map
Preliminary Plans for:
TRISTRAR AT LEE'S SUMMIT
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI



Matthew J. Schlicht
MO PE 2006019708
KS PE 19071
OK PE 25226

REVISIONS
REV. 3/28/2022

Exhibit E

Time of Concentration Calculations & Composite Curve Numbers

APWA STORM DRAINAGE "TC" COMPUTATIONS FOR: WEAVER PROPERTY

					Surface types:																						
yellow areas are self computing overwrite if necessary					SURFACE CODES	A	B	D	G	L	M	S	U	Z													
					"C" Values	0.90	0.87	0.60	0.30	0.90	0.66	0.51	0.3	TC COMPUTATION													
TOTAL WATERSHED					Override Length - DnElev or Slope if necessary					SURFACE CODE		P=Paved U=Unpaved		Override Slope or Elevations if necessary					Cal	Used	Cal	Cal					
					OVERLAND FLOW - 100' MAX					P		CHANNEL FLOW - FIRST REACH					Overland	Min 5	Channel	Channel	Total						
AREA ID	TOTAL ACRES	WTRSHD LENGTH	UP ELEV	DN ELEV	SURFACE CODE	"C" VALUE	OVRLND LENGTH	UP ELEV	DN ELEV	SLOPE %	or U	CHANNEL LENGTH	UP ELEV	DN ELEV	SLOPE %	VELOCITY F/S	Flow T(l)	Max 15 T(l)	One T(T)	Two T(T)	Total T@ 10	Intensity 10 I	Intensity 100 I	CFS 10 Q	CFS 100 Q	AREA ID	
EX																										EX	
A	80.04	2769.00	1031.00	976.00	Z	0.30	100.0	1031.0	1029.00	2.0	U	2669.0	1029.0	976.0	1.99	2.3	11.4	11.4	19.6	0.0	31.0	3.8	5.4	91.77	162.88	A	
B	94.73	3786.00	1036.00	949.00	Z	0.30	100.0	1036.0	1034.00	2.0	U	3686.0	1034.0	949.0	2.31	2.5	11.4	11.4	25.1	0.0	36.5	3.5	5.0	98.88	176.81	B	
C	5.20	721.00	998.00	965.00	Z	0.30	100.0	998.0	992.00	6.0	U	621.0	992.0	965.0	4.35	3.4	7.9	7.9	3.1	0.0	11.0	5.9	8.3	9.16	16.21	C	
A	75.73	2769.00	1031.00	976.00	Z	0.30	100.0	1031.0	1029.00	2.0	U	2669.0	1029.0	976.0	1.99	2.3	11.4	11.4	19.6	0.0	31.0	3.8	5.4	86.83	154.11	A	
A1	34.76	1488.00	1031.00	990.00	Z	0.30	100.0	1031.0	1029.00	2.0	U	1388.0	1029.0	990.0	2.81	2.7	11.4	11.4	8.6	0.0	20.0	4.8	6.6	49.61	86.32	A1	
B	52.66	3786.00	1036.00	949.00	Z	0.35	100.0	1036.0	1034.00	2.0	U	3686.0	1034.0	949.0	2.31	2.5	10.7	10.7	25.1	0.0	35.8	3.5	5.0	64.88	115.91	B	
B1	22.98	1490.00	1005.00	966.00	Z	0.45	100.0	1005.0	1002.00	3.0	P	1390.0	1002.0	966.0	2.59	3.3	8.1	8.1	7.1	0.0	15.2	5.3	7.3	55.06	94.67	B1	
B2	20.98	1871.00	1011.00	972.00	Z	0.60	100.0	1011.0	1009.00	2.0	P	1771.0	1009.0	972.0	2.09	2.9	7.1	7.1	10.0	0.0	17.2	5.1	7.0	63.85	110.37	B2	
C	1.61	570.00	990.00	965.00	Z	0.48	100.0	990.0	985.00	5.0	P	470.0	985.0	965.0	4.26	4.2	6.5	6.5	1.9	0.0	8.4	6.4	9.1	4.97	8.77	C	
C1	1.77	347.00	980.00	968.00	Z	0.60	100.0	980.0	977.00	3.0	P	247.0	977.0	968.0	3.64	3.9	6.2	6.2	1.1	0.0	7.3	6.7	9.4	7.12	12.54	C1	
RA1	1.00	1281.00	990.00	976.00							U	1281.0	990.0	976.0	1.09	1.7	0.0	0.0	12.7	0.0	12.7	5.6	7.9	0.00		RA1	

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description Cover type and hydrologic condition	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover type	Cover description		Curve numbers for hydrologic soil group			
	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

^{1/} Average runoff condition, and $I_a=0.2S$

^{2/} Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

^{3/} Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
		A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ^{6/}	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

^{1/} Average runoff condition, and $I_a = 0.2S$.

^{2/} **Poor:** <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

^{3/} **Poor:** <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

^{4/} Actual curve number is less than 30; use CN = 30 for runoff computations.

^{5/} CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

^{6/} **Poor:** Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description	Hydrologic condition ^{2/}	Curve numbers for hydrologic soil group			
		A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

^{1/} Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.

^{2/} Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

^{3/} Curve numbers for group A have been developed only for desert shrub.

Exhibit F

Complete Hydraflow Report

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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Legend

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	SCS Runoff	Ex POI A
2	SCS Runoff	Ex POI B
3	SCS Runoff	Ex POI C
4	SCS Runoff	Existing A Crop
5	SCS Runoff	Prop A1
6	Combine	Property Line
7	SCS Runoff	EXISTING B CROP
8	SCS Runoff	Prop B1
9	SCS Runoff	Prop B2
10	Reservoir	BASIN B1
11	Reservoir	BASIN B2
12	Combine	Property Line B
13	SCS Runoff	Prop C
14	SCS Runoff	Prop C1
15	Reservoir	BASIN C1
16	Combine	Prop POI C
17	SCS Runoff	AREA A GOLF COURSE
18	Combine	Prop POI A
19	SCS Runoff	Existing B Golf Course
20	Combine	Prop POI B

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	-----	-----	124.88	-----	-----	229.30	-----	-----	387.75	Ex POI A
2	SCS Runoff	-----	-----	146.02	-----	-----	260.16	-----	-----	431.22	Ex POI B
3	SCS Runoff	-----	-----	17.76	-----	-----	29.47	-----	-----	46.57	Ex POI C
4	SCS Runoff	-----	-----	69.23	-----	-----	116.12	-----	-----	184.87	Existing A Crop
5	SCS Runoff	-----	-----	15.60	-----	-----	26.81	-----	-----	43.39	Prop A1
6	Combine	4, 5	-----	71.32	-----	-----	119.57	-----	-----	190.31	Property Line
7	SCS Runoff	-----	-----	50.45	-----	-----	84.71	-----	-----	134.98	EXISTING B CROP
8	SCS Runoff	-----	-----	66.62	-----	-----	110.98	-----	-----	175.83	Prop B1
9	SCS Runoff	-----	-----	66.40	-----	-----	110.25	-----	-----	174.28	Prop B2
10	Reservoir	8	-----	10.76	-----	-----	47.31	-----	-----	74.71	BASIN B1
11	Reservoir	9	-----	5.450	-----	-----	21.74	-----	-----	33.71	BASIN B2
12	Combine	7, 10, 11	-----	63.06	-----	-----	153.76	-----	-----	243.41	Property Line B
13	SCS Runoff	-----	-----	3.840	-----	-----	6.723	-----	-----	11.00	Prop C
14	SCS Runoff	-----	-----	8.455	-----	-----	13.63	-----	-----	21.15	Prop C1
15	Reservoir	14	-----	0.667	-----	-----	1.515	-----	-----	2.223	BASIN C1
16	Combine	13, 15	-----	4.035	-----	-----	7.879	-----	-----	12.86	Prop POI C
17	SCS Runoff	-----	-----	58.31	-----	-----	110.60	-----	-----	191.23	AREA A GOLF COURSE
18	Combine	6, 17	-----	129.57	-----	-----	230.17	-----	-----	381.53	Prop POI A
19	SCS Runoff	-----	-----	27.64	-----	-----	52.47	-----	-----	90.85	Existing B Golf Course
20	Combine	12, 19	-----	90.48	-----	-----	206.23	-----	-----	334.25	Prop POI B

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

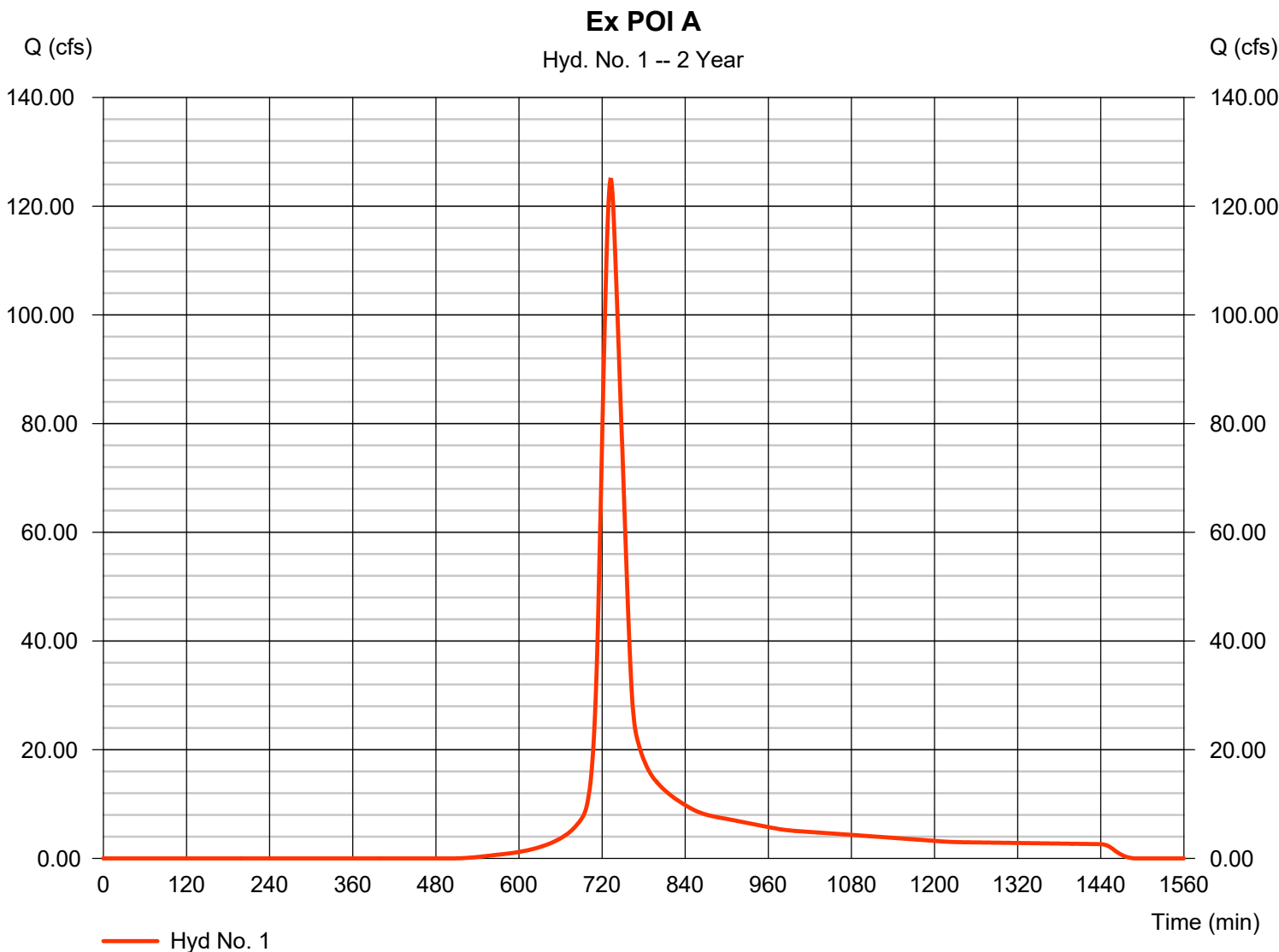
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	124.88	1	732	521,336	-----	-----	-----	Ex POI A
2	SCS Runoff	146.02	1	735	669,678	-----	-----	-----	Ex POI B
3	SCS Runoff	17.76	1	720	43,588	-----	-----	-----	Ex POI C
4	SCS Runoff	69.23	1	732	288,142	-----	-----	-----	Existing A Crop
5	SCS Runoff	15.60	1	718	31,929	-----	-----	-----	Prop A1
6	Combine	71.32	1	732	320,071	4, 5	-----	-----	Property Line
7	SCS Runoff	50.45	1	735	231,319	-----	-----	-----	EXISTING B CROP
8	SCS Runoff	66.62	1	723	191,613	-----	-----	-----	Prop B1
9	SCS Runoff	66.40	1	721	170,077	-----	-----	-----	Prop B2
10	Reservoir	10.76	1	745	157,374	8	964.01	104,086	BASIN B1
11	Reservoir	5.450	1	762	130,622	9	968.93	98,802	BASIN B2
12	Combine	63.06	1	738	519,315	7, 10, 11	-----	-----	Property Line B
13	SCS Runoff	3.840	1	719	8,716	-----	-----	-----	Prop C
14	SCS Runoff	8.455	1	718	18,541	-----	-----	-----	Prop C1
15	Reservoir	0.667	1	752	17,876	14	970.43	10,474	BASIN C1
16	Combine	4.035	1	719	26,592	13, 15	-----	-----	Prop POI C
17	SCS Runoff	58.31	1	733	244,963	-----	-----	-----	AREA A GOLF COURSE
18	Combine	129.57	1	732	565,034	6, 17	-----	-----	Prop POI A
19	SCS Runoff	27.64	1	736	128,137	-----	-----	-----	Existing B Golf Course
20	Combine	90.48	1	737	647,452	12, 19	-----	-----	Prop POI B

Hydrograph Report

Hyd. No. 1

Ex POI A

Hydrograph type	= SCS Runoff	Peak discharge	= 124.88 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 521,336 cuft
Drainage area	= 80.040 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

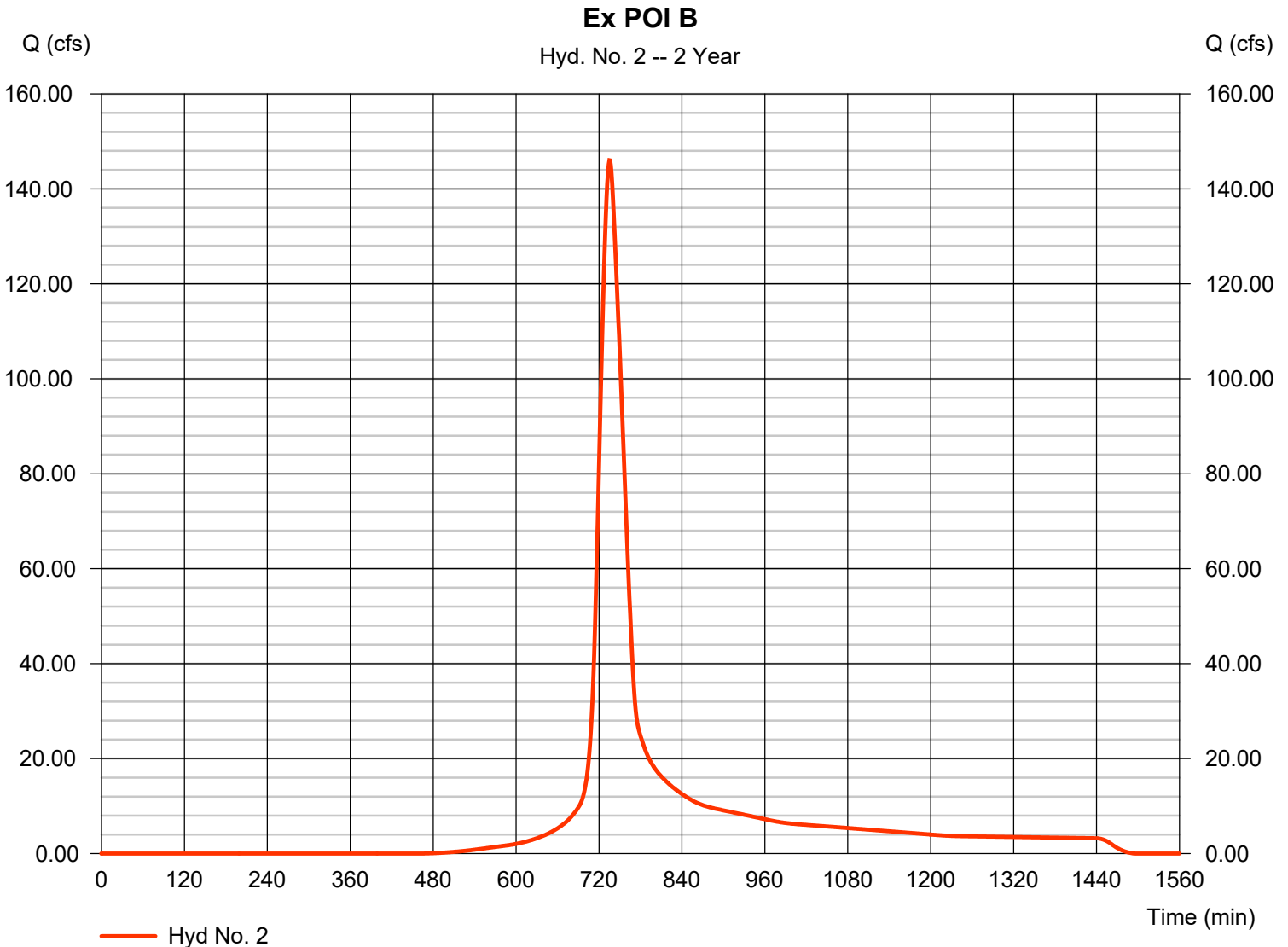
Wednesday, 03 / 30 / 2022

Hyd. No. 2

Ex POI B

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 94.730 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 3.50 in
Storm duration = 24 hrs

Peak discharge = 146.02 cfs
Time to peak = 735 min
Hyd. volume = 669,678 cuft
Curve number = 84
Hydraulic length = 0 ft
Time of conc. (Tc) = 36.50 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

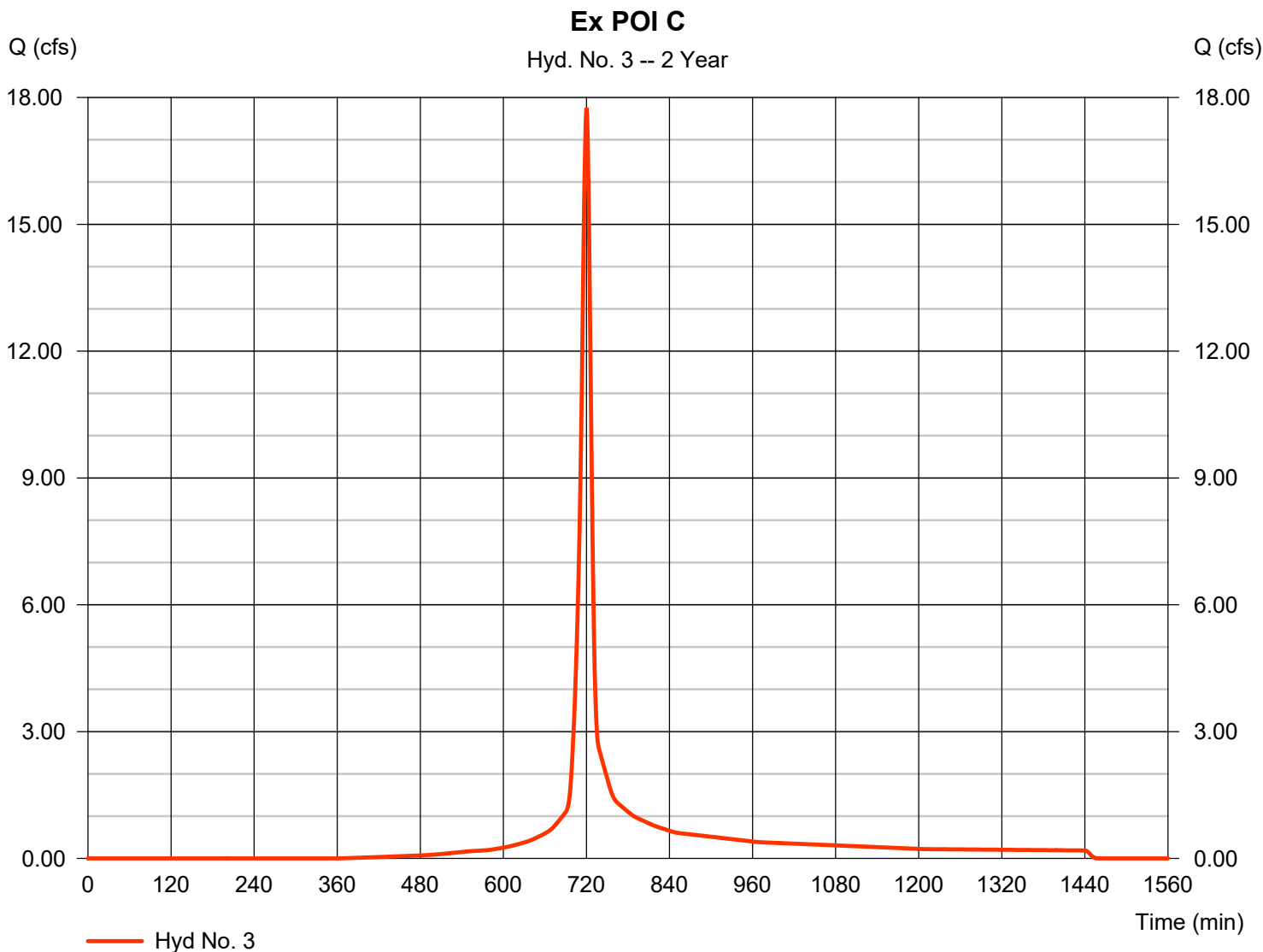
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Wednesday, 03 / 30 / 2022

Hyd. No. 3

Ex POI C

Hydrograph type	= SCS Runoff	Peak discharge	= 17.76 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 43,588 cuft
Drainage area	= 5.200 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

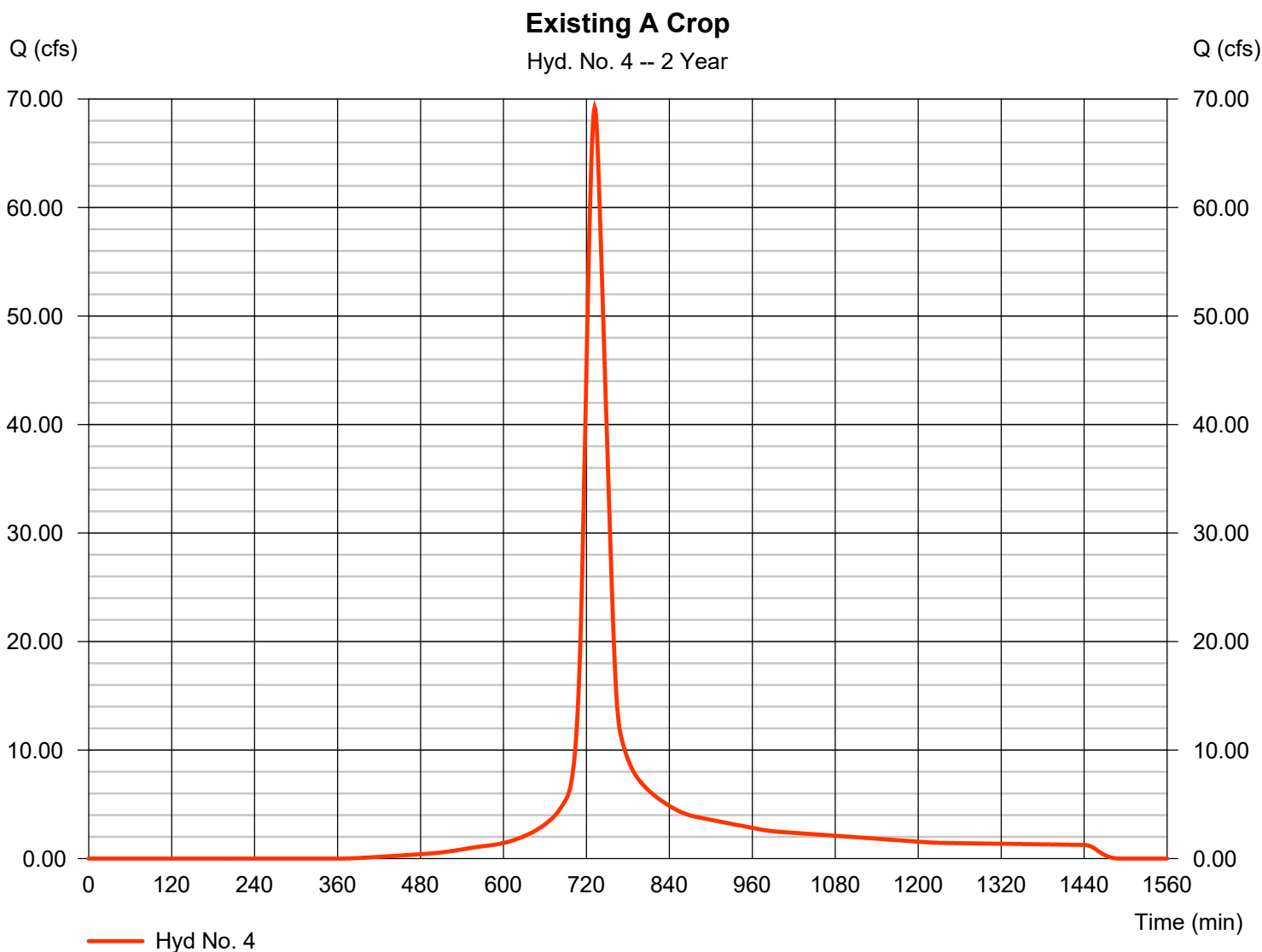
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Wednesday, 03 / 30 / 2022

Hyd. No. 4

Existing A Crop

Hydrograph type	= SCS Runoff	Peak discharge	= 69.23 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 288,142 cuft
Drainage area	= 34.760 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

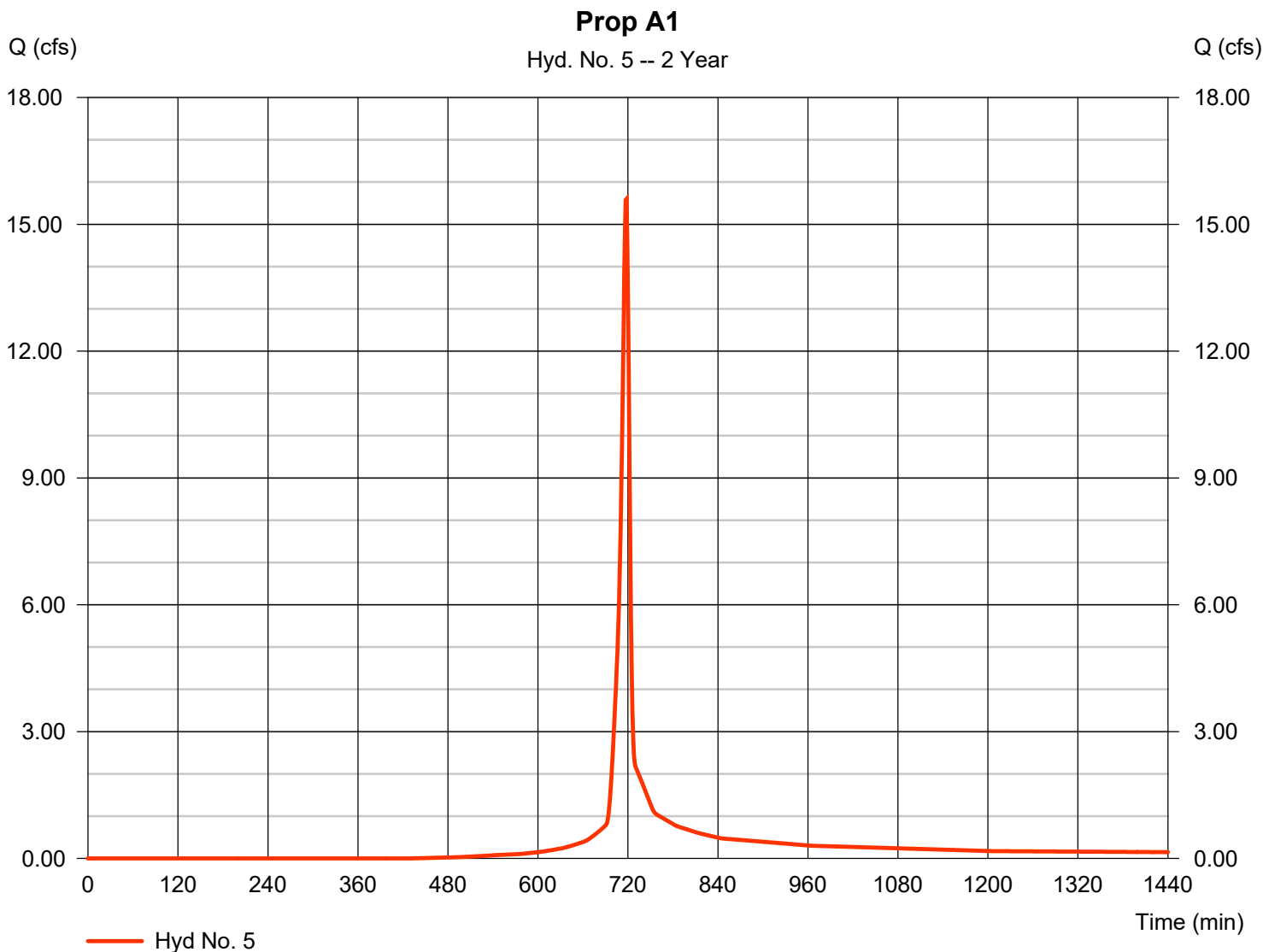
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Wednesday, 03 / 30 / 2022

Hyd. No. 5

Prop A1

Hydrograph type	= SCS Runoff	Peak discharge	= 15.60 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 31,929 cuft
Drainage area	= 4.230 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

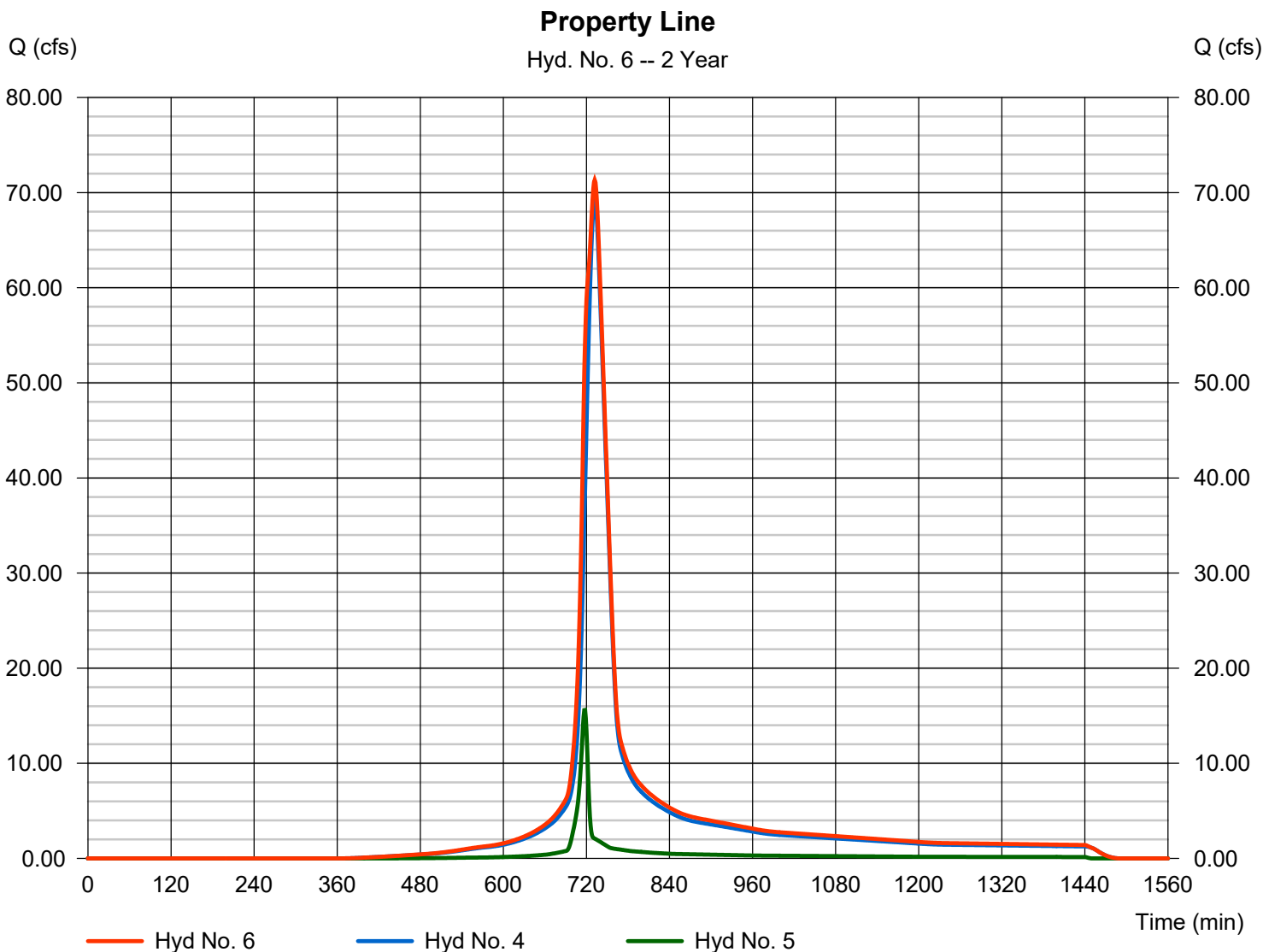
Wednesday, 03 / 30 / 2022

Hyd. No. 6

Property Line

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 4, 5

Peak discharge = 71.32 cfs
Time to peak = 732 min
Hyd. volume = 320,071 cuft
Contrib. drain. area = 38.990 ac



Hydrograph Report

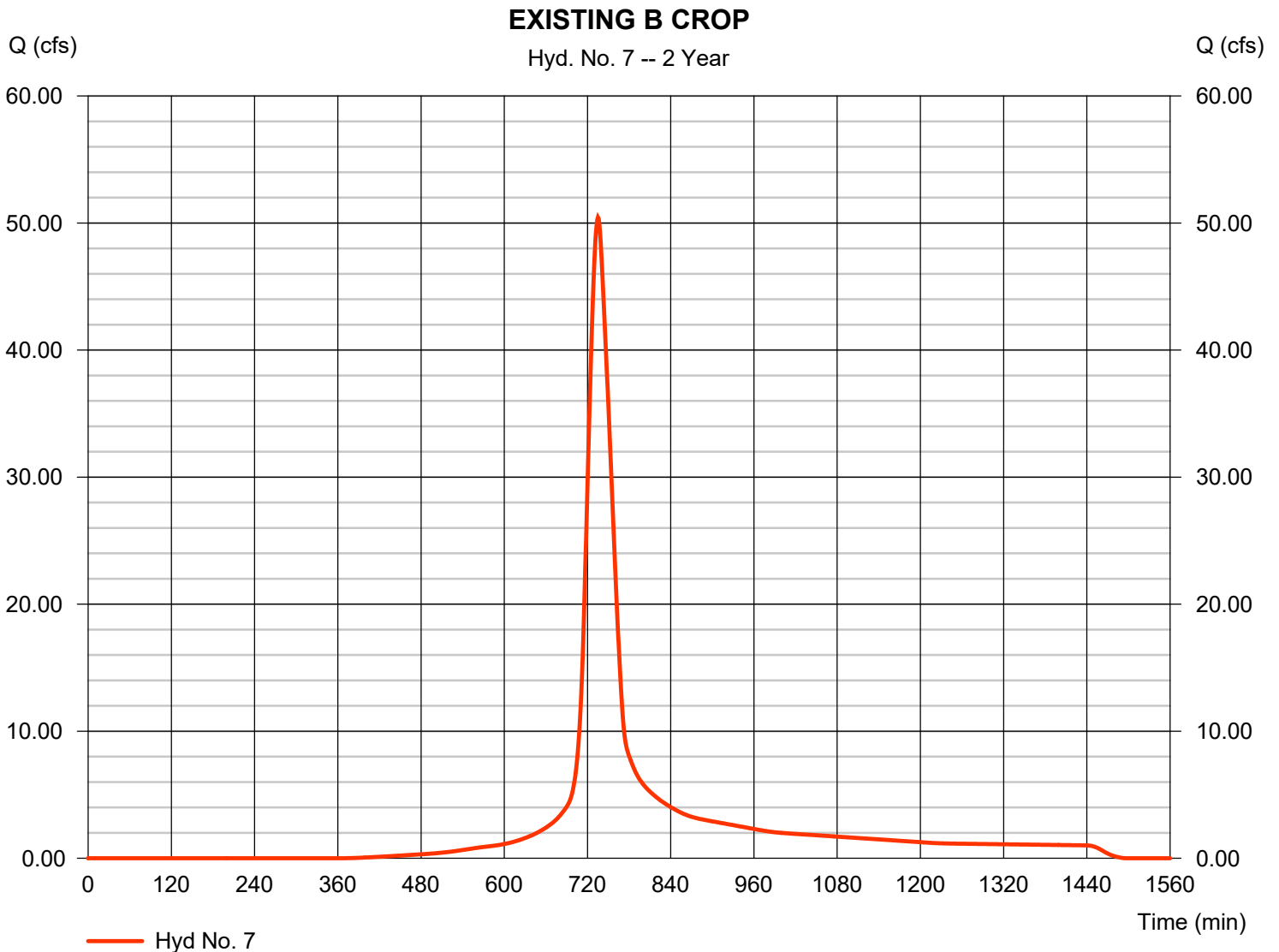
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Wednesday, 03 / 30 / 2022

Hyd. No. 7

EXISTING B CROP

Hydrograph type	= SCS Runoff	Peak discharge	= 50.45 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 231,319 cuft
Drainage area	= 27.930 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 35.80 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

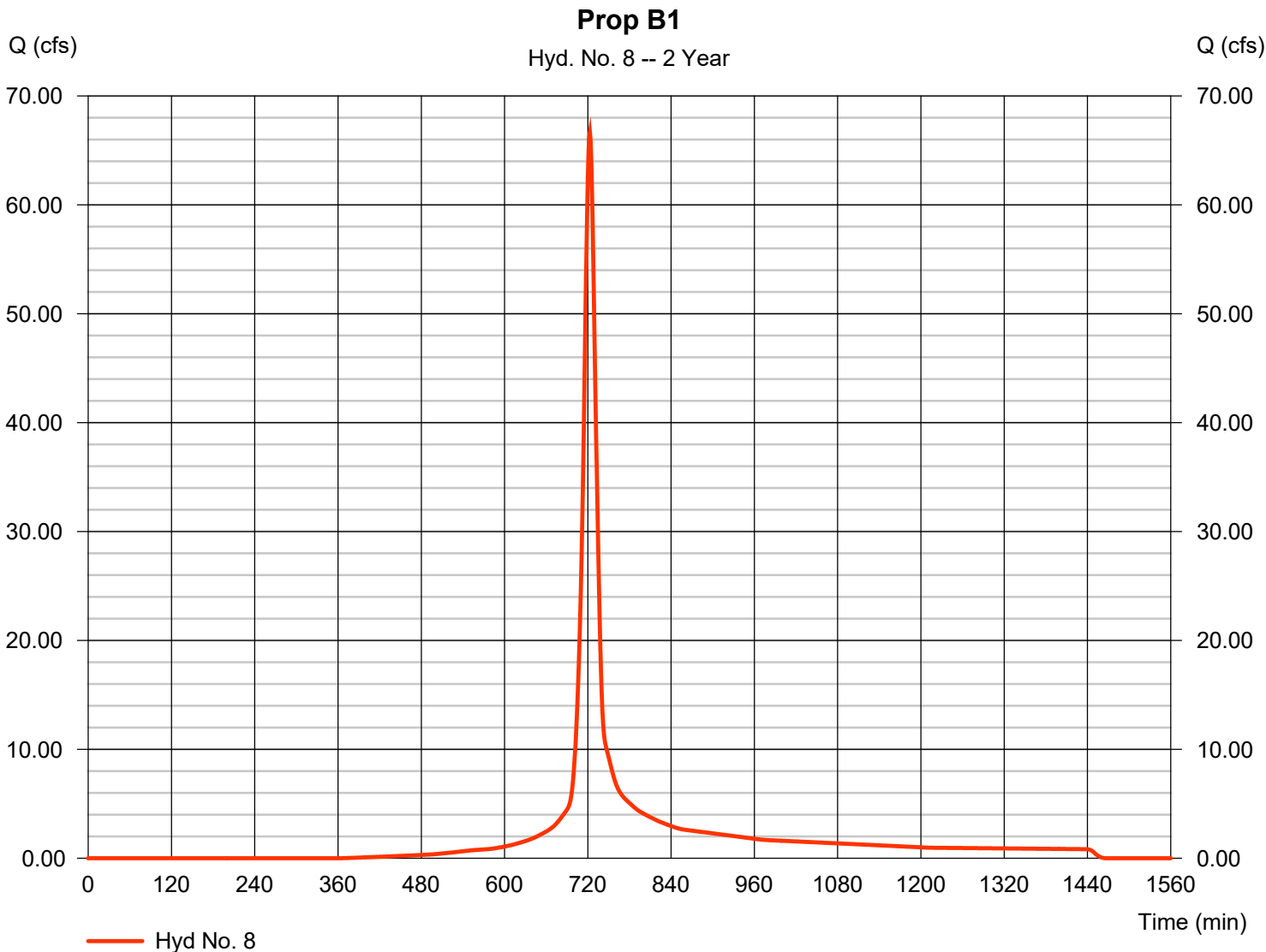
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Wednesday, 03 / 30 / 2022

Hyd. No. 8

Prop B1

Hydrograph type	= SCS Runoff	Peak discharge	= 66.62 cfs
Storm frequency	= 2 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 191,613 cuft
Drainage area	= 22.980 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.20 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

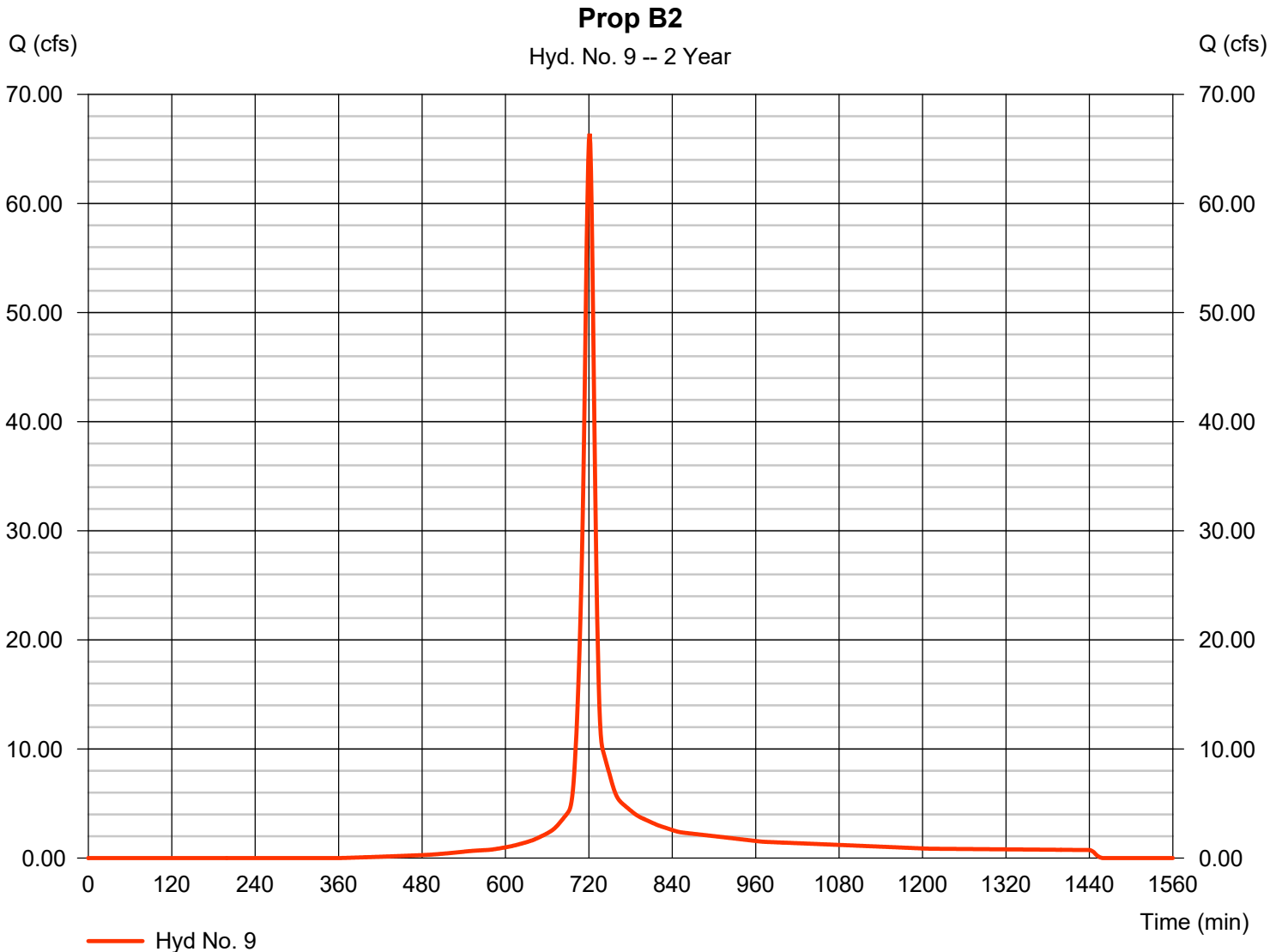
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Wednesday, 03 / 30 / 2022

Hyd. No. 9

Prop B2

Hydrograph type	= SCS Runoff	Peak discharge	= 66.40 cfs
Storm frequency	= 2 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 170,077 cuft
Drainage area	= 20.980 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

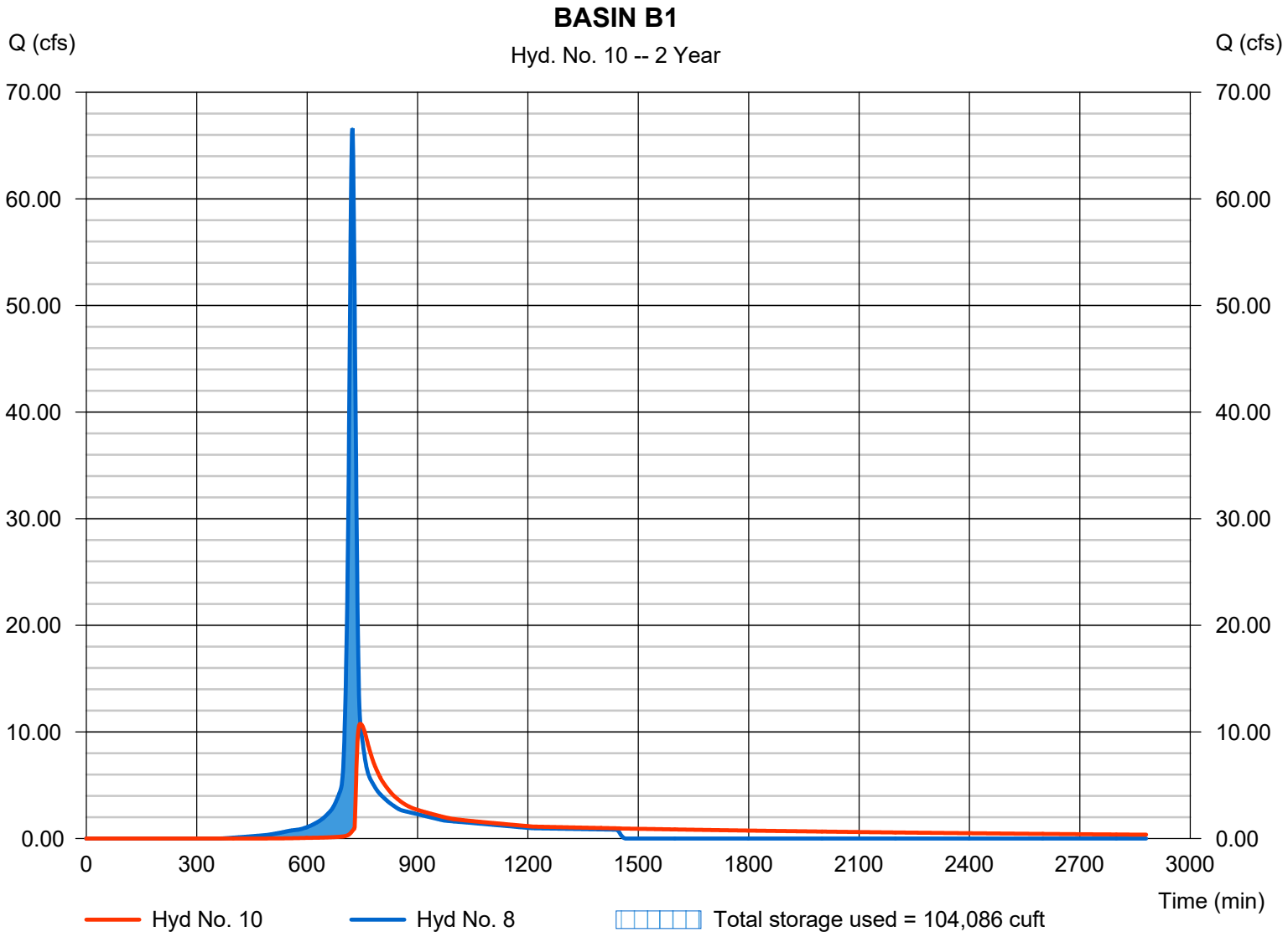
Wednesday, 03 / 30 / 2022

Hyd. No. 10

BASIN B1

Hydrograph type	= Reservoir	Peak discharge	= 10.76 cfs
Storm frequency	= 2 yrs	Time to peak	= 745 min
Time interval	= 1 min	Hyd. volume	= 157,374 cuft
Inflow hyd. No.	= 8 - Prop B1	Max. Elevation	= 964.01 ft
Reservoir name	= Basin B1	Max. Storage	= 104,086 cuft

Storage Indication method used.



Pond No. 2 - Basin B1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 957.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	957.00	00	0	0
1.00	958.00	10,520	5,260	5,260
2.00	959.00	12,458	11,489	16,749
3.00	960.00	14,100	13,279	30,028
4.00	961.00	16,250	15,175	45,203
5.00	962.00	18,100	17,175	62,378
6.00	963.00	20,215	19,158	81,536
7.00	964.00	24,352	22,284	103,819
8.00	965.00	28,525	26,439	130,258
9.00	966.00	31,005	29,765	160,023
10.00	967.00	33,250	32,128	192,150
11.00	968.00	37,500	35,375	227,525

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	22.00	0.00	1.00
Span (in)	= 36.00	52.00	0.00	1.00
No. Barrels	= 1	1	0	6
Invert El. (ft)	= 956.40	963.25	0.00	956.50
Length (ft)	= 51.89	0.00	0.00	1.73
Slope (%)	= 0.77	0.00	0.00	n/a
N-Value	= .010	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	Yes

Weir Structures

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

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	957.00	0.00	0.00	---	0.00	---	---	---	---	---	---	0.000
0.10	526	957.10	2.77 ic	0.00	---	0.00	---	---	---	---	---	---	0.002
0.20	1,052	957.20	2.77 ic	0.00	---	0.01	---	---	---	---	---	---	0.005
0.30	1,578	957.30	2.77 ic	0.00	---	0.01	---	---	---	---	---	---	0.010
0.40	2,104	957.40	2.77 ic	0.00	---	0.02	---	---	---	---	---	---	0.015
0.50	2,630	957.50	2.77 ic	0.00	---	0.02	---	---	---	---	---	---	0.021
0.60	3,156	957.60	2.77 ic	0.00	---	0.03	---	---	---	---	---	---	0.028
0.70	3,682	957.70	2.77 ic	0.00	---	0.04	---	---	---	---	---	---	0.036
0.80	4,208	957.80	2.77 ic	0.00	---	0.04	---	---	---	---	---	---	0.043
0.90	4,734	957.90	2.77 ic	0.00	---	0.05	---	---	---	---	---	---	0.052
1.00	5,260	958.00	2.77 ic	0.00	---	0.06	---	---	---	---	---	---	0.061
1.10	6,409	958.10	2.77 ic	0.00	---	0.07	---	---	---	---	---	---	0.070
1.20	7,558	958.20	2.77 ic	0.00	---	0.08	---	---	---	---	---	---	0.080
1.30	8,707	958.30	2.77 ic	0.00	---	0.09	---	---	---	---	---	---	0.090
1.40	9,856	958.40	2.77 ic	0.00	---	0.10	---	---	---	---	---	---	0.101
1.50	11,005	958.50	2.77 ic	0.00	---	0.11	---	---	---	---	---	---	0.112
1.60	12,153	958.60	2.77 ic	0.00	---	0.12	---	---	---	---	---	---	0.123
1.70	13,302	958.70	2.77 ic	0.00	---	0.13	---	---	---	---	---	---	0.135
1.80	14,451	958.80	2.77 ic	0.00	---	0.15	---	---	---	---	---	---	0.147
1.90	15,600	958.90	2.77 ic	0.00	---	0.16	---	---	---	---	---	---	0.159
2.00	16,749	959.00	2.77 ic	0.00	---	0.17	---	---	---	---	---	---	0.172
2.10	18,077	959.10	2.77 ic	0.00	---	0.18	---	---	---	---	---	---	0.185
2.20	19,405	959.20	2.77 ic	0.00	---	0.20	---	---	---	---	---	---	0.198
2.30	20,733	959.30	2.77 ic	0.00	---	0.21	---	---	---	---	---	---	0.212
2.40	22,061	959.40	2.77 ic	0.00	---	0.23	---	---	---	---	---	---	0.226
2.50	23,389	959.50	2.77 ic	0.00	---	0.24	---	---	---	---	---	---	0.240
2.60	24,716	959.60	2.77 ic	0.00	---	0.25	---	---	---	---	---	---	0.255
2.70	26,044	959.70	2.77 ic	0.00	---	0.27	---	---	---	---	---	---	0.269
2.80	27,372	959.80	2.77 ic	0.00	---	0.28	---	---	---	---	---	---	0.284
2.90	28,700	959.90	2.77 ic	0.00	---	0.30	---	---	---	---	---	---	0.300
3.00	30,028	960.00	2.77 ic	0.00	---	0.32	---	---	---	---	---	---	0.315

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Basin B1

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
3.10	31,546	960.10	2.77 ic	0.00	---	0.33	---	---	---	---	---	---	0.331
3.20	33,063	960.20	2.77 ic	0.00	---	0.35	---	---	---	---	---	---	0.348
3.30	34,581	960.30	2.77 ic	0.00	---	0.36	---	---	---	---	---	---	0.364
3.40	36,098	960.40	2.77 ic	0.00	---	0.38	---	---	---	---	---	---	0.381
3.50	37,616	960.50	2.77 ic	0.00	---	0.40	---	---	---	---	---	---	0.398
3.60	39,133	960.60	2.77 ic	0.00	---	0.41	---	---	---	---	---	---	0.415
3.70	40,651	960.70	2.77 ic	0.00	---	0.43	---	---	---	---	---	---	0.432
3.80	42,168	960.80	2.77 ic	0.00	---	0.45	---	---	---	---	---	---	0.450
3.90	43,686	960.90	2.77 ic	0.00	---	0.47	---	---	---	---	---	---	0.468
4.00	45,203	961.00	2.77 ic	0.00	---	0.49	---	---	---	---	---	---	0.486
4.10	46,921	961.10	2.77 ic	0.00	---	0.50	---	---	---	---	---	---	0.504
4.20	48,638	961.20	2.77 ic	0.00	---	0.52	---	---	---	---	---	---	0.523
4.30	50,356	961.30	2.77 ic	0.00	---	0.54	---	---	---	---	---	---	0.541
4.40	52,073	961.40	2.77 ic	0.00	---	0.56	---	---	---	---	---	---	0.560
4.50	53,791	961.50	2.77 ic	0.00	---	0.58	---	---	---	---	---	---	0.580
4.60	55,508	961.60	2.77 ic	0.00	---	0.60	---	---	---	---	---	---	0.599
4.70	57,226	961.70	2.77 ic	0.00	---	0.62	---	---	---	---	---	---	0.619
4.80	58,943	961.80	2.77 ic	0.00	---	0.64	---	---	---	---	---	---	0.638
4.90	60,661	961.90	2.77 ic	0.00	---	0.66	---	---	---	---	---	---	0.658
5.00	62,378	962.00	2.77 ic	0.00	---	0.68	---	---	---	---	---	---	0.679
5.10	64,294	962.10	2.77 ic	0.00	---	0.70	---	---	---	---	---	---	0.699
5.20	66,210	962.20	2.77 ic	0.00	---	0.72	---	---	---	---	---	---	0.720
5.30	68,125	962.30	2.77 ic	0.00	---	0.74	---	---	---	---	---	---	0.741
5.40	70,041	962.40	2.77 ic	0.00	---	0.76	---	---	---	---	---	---	0.762
5.50	71,957	962.50	2.77 ic	0.00	---	0.78	---	---	---	---	---	---	0.783
5.60	73,873	962.60	2.77 ic	0.00	---	0.80	---	---	---	---	---	---	0.805
5.70	75,788	962.70	2.77 ic	0.00	---	0.83	---	---	---	---	---	---	0.826
5.80	77,704	962.80	2.77 ic	0.00	---	0.85	---	---	---	---	---	---	0.848
5.90	79,620	962.90	2.77 ic	0.00	---	0.87	---	---	---	---	---	---	0.870
6.00	81,536	963.00	2.77 ic	0.00	---	0.89	---	---	---	---	---	---	0.892
6.10	83,764	963.10	2.77 ic	0.00	---	0.91	---	---	---	---	---	---	0.915
6.20	85,992	963.20	2.77 ic	0.00	---	0.94	---	---	---	---	---	---	0.937
6.30	88,221	963.30	2.77 ic	0.16 ic	---	0.96	---	---	---	---	---	---	1.125
6.40	90,449	963.40	2.77 ic	0.86 ic	---	0.98	---	---	---	---	---	---	1.839
6.50	92,677	963.50	2.94 ic	1.84 ic	---	1.00	---	---	---	---	---	---	2.845
6.60	94,906	963.60	4.09 ic	3.05 ic	---	1.00	---	---	---	---	---	---	4.051
6.70	97,134	963.70	5.49 ic	4.45 ic	---	0.99	---	---	---	---	---	---	5.443
6.80	99,362	963.80	7.13 ic	6.01 ic	---	0.98	---	---	---	---	---	---	6.999
6.90	101,591	963.90	8.71 ic	7.73 ic	---	0.98	---	---	---	---	---	---	8.708
7.00	103,819	964.00	10.75 ic	9.58 ic	---	0.97	---	---	---	---	---	---	10.56
7.10	106,463	964.10	12.53 oc	11.56 ic	---	0.96	---	---	---	---	---	---	12.53
7.20	109,107	964.20	14.81 oc	13.66 ic	---	0.94	---	---	---	---	---	---	14.60
7.30	111,751	964.30	17.05 oc	15.87 ic	---	0.92	---	---	---	---	---	---	16.80
7.40	114,394	964.40	19.17 oc	18.19 ic	---	0.91	---	---	---	---	---	---	19.10
7.50	117,038	964.50	21.59 oc	20.62 ic	---	0.88	---	---	---	---	---	---	21.49
7.60	119,682	964.60	24.15 oc	23.14 ic	---	0.84	---	---	---	---	---	---	23.98
7.70	122,326	964.70	26.61 oc	25.76 ic	---	0.80	---	---	---	---	---	---	26.55
7.80	124,970	964.80	29.22 oc	28.47 ic	---	0.75	---	---	---	---	---	---	29.22
7.90	127,614	964.90	32.02 oc	31.26 ic	---	0.75	---	---	---	---	---	---	32.02
8.00	130,258	965.00	34.91 oc	34.16 ic	---	0.75	---	---	---	---	---	---	34.91
8.10	133,234	965.10	37.71 oc	36.95 ic	---	0.75	---	---	---	---	---	---	37.70
8.20	136,211	965.20	39.64 oc	38.88 ic	---	0.75	---	---	---	---	---	---	39.64
8.30	139,187	965.30	41.48 oc	40.72 ic	---	0.76	---	---	---	---	---	---	41.48
8.40	142,164	965.40	43.24 oc	42.48 ic	---	0.76	---	---	---	---	---	---	43.24
8.50	145,140	965.50	44.94 oc	44.17 ic	---	0.77	---	---	---	---	---	---	44.93
8.60	148,117	965.60	46.57 oc	45.79 ic	---	0.77	---	---	---	---	---	---	46.56
8.70	151,093	965.70	48.14 oc	47.36 ic	---	0.77	---	---	---	---	---	---	48.14
8.80	154,070	965.80	49.66 oc	48.88 ic	---	0.78	---	---	---	---	---	---	49.66
8.90	157,046	965.90	51.14 oc	50.36 ic	---	0.78	---	---	---	---	---	---	51.14
9.00	160,023	966.00	52.58 oc	51.79 ic	---	0.79	---	---	---	---	---	---	52.58
9.10	163,235	966.10	53.98 oc	53.19 ic	---	0.79	---	---	---	---	---	---	53.98
9.20	166,448	966.20	55.34 oc	54.55 ic	---	0.80	---	---	---	---	---	---	55.34
9.30	169,661	966.30	56.67 oc	55.87 ic	---	0.80	---	---	---	---	---	---	56.67
9.40	172,874	966.40	57.97 ic	57.16 ic	---	0.80	---	---	---	---	---	---	57.97
9.50	176,086	966.50	59.23 ic	58.43 ic	---	0.80	---	---	---	---	---	---	59.23
9.60	179,299	966.60	60.46 ic	59.67 ic	---	0.79	---	---	---	---	---	---	60.46
9.70	182,512	966.70	61.67 ic	60.88 ic	---	0.79	---	---	---	---	---	---	61.67
9.80	185,725	966.80	62.85 ic	62.07 ic	---	0.78	---	---	---	---	---	---	62.85
9.90	188,937	966.90	64.01 ic	63.24 ic	---	0.77	---	---	---	---	---	---	64.01
10.00	192,150	967.00	65.16 ic	64.39 ic	---	0.77	---	---	---	---	---	---	65.16
10.10	195,688	967.10	66.28 ic	65.51 ic	---	0.76	---	---	---	---	---	---	66.28
10.20	199,225	967.20	67.38 ic	66.62 ic	---	0.76	---	---	---	---	---	---	67.38

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Basin B1

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
10.30	202,763	967.30	68.46 ic	67.71 ic	---	0.75	---	---	---	---	---	---	68.46
10.40	206,300	967.40	69.53 ic	68.78 ic	---	0.75	---	---	---	---	---	---	69.53
10.50	209,838	967.50	70.58 ic	69.84 ic	---	0.74	---	---	---	---	---	---	70.58
10.60	213,375	967.60	71.61 ic	70.88 ic	---	0.73	---	---	---	---	---	---	71.61
10.70	216,913	967.70	72.63 ic	71.90 ic	---	0.73	---	---	---	---	---	---	72.63
10.80	220,450	967.80	73.64 ic	72.91 ic	---	0.72	---	---	---	---	---	---	73.64
10.90	223,988	967.90	74.63 ic	73.91 ic	---	0.72	---	---	---	---	---	---	74.63
11.00	227,525	968.00	75.61 ic	74.89 ic	---	0.71	---	---	---	---	---	---	75.61

...End

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

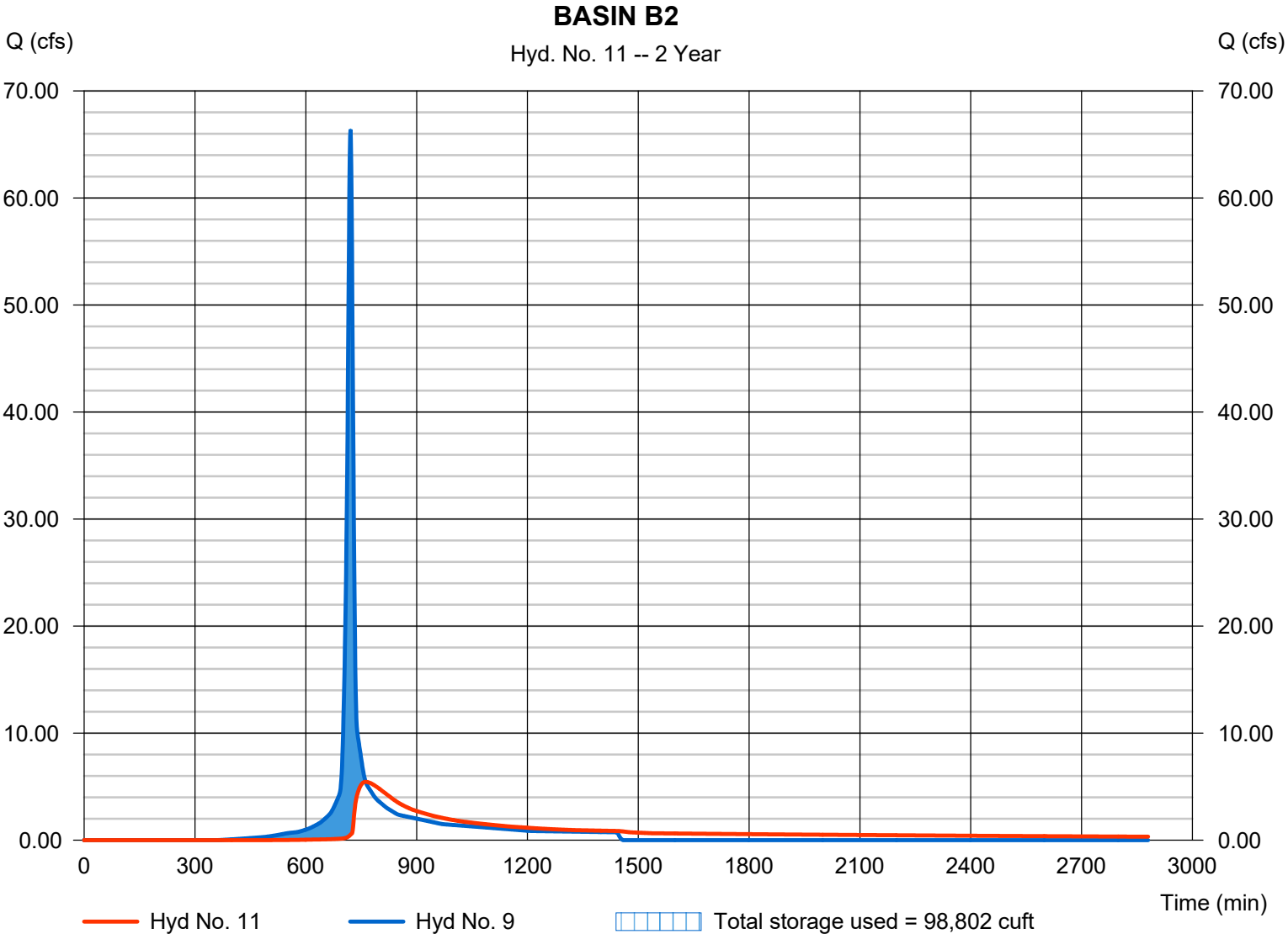
Wednesday, 03 / 30 / 2022

Hyd. No. 11

BASIN B2

Hydrograph type	= Reservoir	Peak discharge	= 5.450 cfs
Storm frequency	= 2 yrs	Time to peak	= 762 min
Time interval	= 1 min	Hyd. volume	= 130,622 cuft
Inflow hyd. No.	= 9 - Prop B2	Max. Elevation	= 968.93 ft
Reservoir name	= Basin B2	Max. Storage	= 98,802 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Basin B2

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 963.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	963.00	00	0	0
1.00	964.00	12,251	6,126	6,126
2.00	965.00	15,193	13,722	19,848
3.00	966.00	18,135	16,664	36,512
4.00	967.00	20,253	19,194	55,706
5.00	968.00	22,370	21,312	77,017
6.00	969.00	24,661	23,516	100,533
7.00	970.00	26,952	25,807	126,339
8.00	971.00	29,439	28,196	154,535
9.00	972.00	31,926	30,683	185,217
10.00	973.00	34,610	33,268	218,485
11.00	974.00	37,294	35,952	254,437
12.00	975.00	40,146	38,720	293,157
13.00	976.00	42,998	41,572	334,729

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	24.00	0.00	1.00
Span (in)	= 24.00	24.00	0.00	1.00
No. Barrels	= 1	1	0	9
Invert El. (ft)	= 962.40	968.00	0.00	962.50
Length (ft)	= 61.87	0.00	0.00	2.72
Slope (%)	= 0.65	0.00	0.00	n/a
N-Value	= .010	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	Yes

Weir Structures

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

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	963.00	0.00	0.00	---	0.00	---	---	---	---	---	---	0.000
0.10	613	963.10	2.10 ic	0.00	---	0.00	---	---	---	---	---	---	0.002
0.20	1,225	963.20	2.10 ic	0.00	---	0.01	---	---	---	---	---	---	0.005
0.30	1,838	963.30	2.10 ic	0.00	---	0.01	---	---	---	---	---	---	0.010
0.40	2,450	963.40	2.10 ic	0.00	---	0.01	---	---	---	---	---	---	0.015
0.50	3,063	963.50	2.10 ic	0.00	---	0.02	---	---	---	---	---	---	0.020
0.60	3,675	963.60	2.10 ic	0.00	---	0.03	---	---	---	---	---	---	0.027
0.70	4,288	963.70	2.10 ic	0.00	---	0.03	---	---	---	---	---	---	0.034
0.80	4,900	963.80	2.10 ic	0.00	---	0.04	---	---	---	---	---	---	0.041
0.90	5,513	963.90	2.10 ic	0.00	---	0.05	---	---	---	---	---	---	0.049
1.00	6,126	964.00	2.10 ic	0.00	---	0.06	---	---	---	---	---	---	0.058
1.10	7,498	964.10	2.10 ic	0.00	---	0.07	---	---	---	---	---	---	0.067
1.20	8,870	964.20	2.10 ic	0.00	---	0.08	---	---	---	---	---	---	0.076
1.30	10,242	964.30	2.10 ic	0.00	---	0.09	---	---	---	---	---	---	0.086
1.40	11,614	964.40	2.10 ic	0.00	---	0.10	---	---	---	---	---	---	0.096
1.50	12,987	964.50	2.10 ic	0.00	---	0.11	---	---	---	---	---	---	0.106
1.60	14,359	964.60	2.10 ic	0.00	---	0.12	---	---	---	---	---	---	0.117
1.70	15,731	964.70	2.10 ic	0.00	---	0.13	---	---	---	---	---	---	0.128
1.80	17,103	964.80	2.10 ic	0.00	---	0.14	---	---	---	---	---	---	0.140
1.90	18,475	964.90	2.10 ic	0.00	---	0.15	---	---	---	---	---	---	0.152
2.00	19,848	965.00	2.10 ic	0.00	---	0.16	---	---	---	---	---	---	0.164
2.10	21,514	965.10	2.10 ic	0.00	---	0.18	---	---	---	---	---	---	0.176
2.20	23,180	965.20	2.10 ic	0.00	---	0.19	---	---	---	---	---	---	0.189
2.30	24,847	965.30	2.10 ic	0.00	---	0.20	---	---	---	---	---	---	0.202
2.40	26,513	965.40	2.10 ic	0.00	---	0.22	---	---	---	---	---	---	0.215
2.50	28,180	965.50	2.10 ic	0.00	---	0.23	---	---	---	---	---	---	0.229
2.60	29,846	965.60	2.10 ic	0.00	---	0.24	---	---	---	---	---	---	0.243
2.70	31,512	965.70	2.10 ic	0.00	---	0.26	---	---	---	---	---	---	0.257
2.80	33,179	965.80	2.10 ic	0.00	---	0.27	---	---	---	---	---	---	0.271

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Basin B2

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
2.90	34,845	965.90	2.10 ic	0.00	---	0.29	---	---	---	---	---	---	0.286
3.00	36,512	966.00	2.10 ic	0.00	---	0.30	---	---	---	---	---	---	0.301
3.10	38,431	966.10	2.10 ic	0.00	---	0.32	---	---	---	---	---	---	0.316
3.20	40,350	966.20	2.10 ic	0.00	---	0.33	---	---	---	---	---	---	0.332
3.30	42,270	966.30	2.10 ic	0.00	---	0.35	---	---	---	---	---	---	0.347
3.40	44,189	966.40	2.10 ic	0.00	---	0.36	---	---	---	---	---	---	0.363
3.50	46,108	966.50	2.10 ic	0.00	---	0.38	---	---	---	---	---	---	0.379
3.60	48,028	966.60	2.10 ic	0.00	---	0.40	---	---	---	---	---	---	0.396
3.70	49,947	966.70	2.10 ic	0.00	---	0.41	---	---	---	---	---	---	0.412
3.80	51,867	966.80	2.10 ic	0.00	---	0.43	---	---	---	---	---	---	0.429
3.90	53,786	966.90	2.10 ic	0.00	---	0.45	---	---	---	---	---	---	0.446
4.00	55,706	967.00	2.10 ic	0.00	---	0.46	---	---	---	---	---	---	0.463
4.10	57,837	967.10	2.10 ic	0.00	---	0.48	---	---	---	---	---	---	0.481
4.20	59,968	967.20	2.10 ic	0.00	---	0.50	---	---	---	---	---	---	0.499
4.30	62,099	967.30	2.10 ic	0.00	---	0.52	---	---	---	---	---	---	0.516
4.40	64,230	967.40	2.10 ic	0.00	---	0.53	---	---	---	---	---	---	0.535
4.50	66,361	967.50	2.10 ic	0.00	---	0.55	---	---	---	---	---	---	0.553
4.60	68,492	967.60	2.10 ic	0.00	---	0.57	---	---	---	---	---	---	0.571
4.70	70,624	967.70	2.10 ic	0.00	---	0.59	---	---	---	---	---	---	0.590
4.80	72,755	967.80	2.10 ic	0.00	---	0.61	---	---	---	---	---	---	0.609
4.90	74,886	967.90	2.10 ic	0.00	---	0.63	---	---	---	---	---	---	0.628
5.00	77,017	968.00	2.10 ic	0.00	---	0.65	---	---	---	---	---	---	0.648
5.10	79,369	968.10	2.10 ic	0.07 ic	---	0.67	---	---	---	---	---	---	0.732
5.20	81,720	968.20	2.10 ic	0.25 ic	---	0.69	---	---	---	---	---	---	0.936
5.30	84,072	968.30	2.10 ic	0.56 ic	---	0.71	---	---	---	---	---	---	1.269
5.40	86,423	968.40	2.10 ic	1.01 ic	---	0.73	---	---	---	---	---	---	1.732
5.50	88,775	968.50	2.28 ic	1.50 ic	---	0.74	---	---	---	---	---	---	2.241
5.60	91,126	968.60	2.92 ic	2.10 ic	---	0.75	---	---	---	---	---	---	2.850
5.70	93,478	968.70	3.64 ic	2.82 ic	---	0.75	---	---	---	---	---	---	3.571
5.80	95,829	968.80	4.44 ic	3.65 ic	---	0.75	---	---	---	---	---	---	4.398
5.90	98,181	968.90	5.31 ic	4.47 ic	---	0.75	---	---	---	---	---	---	5.216
6.00	100,533	969.00	6.10 ic	5.35 ic	---	0.75	---	---	---	---	---	---	6.100
6.10	103,113	969.10	7.16 ic	6.39 ic	---	0.75	---	---	---	---	---	---	7.144
6.20	105,694	969.20	8.21 oc	7.36 ic	---	0.75	---	---	---	---	---	---	8.106
6.30	108,274	969.30	9.24 oc	8.46 ic	---	0.74	---	---	---	---	---	---	9.194
6.40	110,855	969.40	10.31 oc	9.55 ic	---	0.72	---	---	---	---	---	---	10.27
6.50	113,436	969.50	11.32 oc	10.60 ic	---	0.70	---	---	---	---	---	---	11.30
6.60	116,016	969.60	12.28 oc	11.61 ic	---	0.67	---	---	---	---	---	---	12.28
6.70	118,597	969.70	13.36 oc	12.68 ic	---	0.68	---	---	---	---	---	---	13.36
6.80	121,178	969.80	14.33 oc	13.65 ic	---	0.68	---	---	---	---	---	---	14.33
6.90	123,758	969.90	15.17 oc	14.49 ic	---	0.69	---	---	---	---	---	---	15.17
7.00	126,339	970.00	15.82 oc	15.12 ic	---	0.69	---	---	---	---	---	---	15.82
7.10	129,159	970.10	16.56 oc	15.86 ic	---	0.70	---	---	---	---	---	---	16.56
7.20	131,978	970.20	17.27 oc	16.57 ic	---	0.70	---	---	---	---	---	---	17.27
7.30	134,798	970.30	17.95 oc	17.24 ic	---	0.71	---	---	---	---	---	---	17.95
7.40	137,617	970.40	18.61 oc	17.90 ic	---	0.71	---	---	---	---	---	---	18.61
7.50	140,437	970.50	19.24 oc	18.52 ic	---	0.72	---	---	---	---	---	---	19.24
7.60	143,256	970.60	19.86 oc	19.13 ic	---	0.73	---	---	---	---	---	---	19.86
7.70	146,076	970.70	20.45 oc	19.72 ic	---	0.73	---	---	---	---	---	---	20.45
7.80	148,895	970.80	21.03 oc	20.29 ic	---	0.74	---	---	---	---	---	---	21.03
7.90	151,715	970.90	21.59 ic	20.85 ic	---	0.74	---	---	---	---	---	---	21.59
8.00	154,535	971.00	22.13 ic	21.39 ic	---	0.74	---	---	---	---	---	---	22.13
8.10	157,603	971.10	22.66 ic	21.92 ic	---	0.74	---	---	---	---	---	---	22.66
8.20	160,671	971.20	23.17 ic	22.43 ic	---	0.74	---	---	---	---	---	---	23.17
8.30	163,739	971.30	23.67 ic	22.94 ic	---	0.74	---	---	---	---	---	---	23.67
8.40	166,808	971.40	24.17 ic	23.43 ic	---	0.74	---	---	---	---	---	---	24.17
8.50	169,876	971.50	24.65 ic	23.91 ic	---	0.74	---	---	---	---	---	---	24.65
8.60	172,944	971.60	25.12 ic	24.39 ic	---	0.74	---	---	---	---	---	---	25.12
8.70	176,012	971.70	25.59 ic	24.85 ic	---	0.73	---	---	---	---	---	---	25.59
8.80	179,081	971.80	26.04 ic	25.31 ic	---	0.73	---	---	---	---	---	---	26.04
8.90	182,149	971.90	26.49 ic	25.76 ic	---	0.73	---	---	---	---	---	---	26.49
9.00	185,217	972.00	26.93 ic	26.20 ic	---	0.73	---	---	---	---	---	---	26.93
9.10	188,544	972.10	27.36 ic	26.63 ic	---	0.73	---	---	---	---	---	---	27.36
9.20	191,871	972.20	27.79 ic	27.06 ic	---	0.73	---	---	---	---	---	---	27.79
9.30	195,197	972.30	28.21 ic	27.48 ic	---	0.73	---	---	---	---	---	---	28.21
9.40	198,524	972.40	28.62 ic	27.89 ic	---	0.73	---	---	---	---	---	---	28.62
9.50	201,851	972.50	29.03 ic	28.30 ic	---	0.73	---	---	---	---	---	---	29.03
9.60	205,178	972.60	29.43 ic	28.70 ic	---	0.73	---	---	---	---	---	---	29.43
9.70	208,505	972.70	29.82 ic	29.09 ic	---	0.73	---	---	---	---	---	---	29.82
9.80	211,831	972.80	30.21 ic	29.48 ic	---	0.73	---	---	---	---	---	---	30.21
9.90	215,158	972.90	30.60 ic	29.87 ic	---	0.73	---	---	---	---	---	---	30.60
10.00	218,485	973.00	30.98 ic	30.25 ic	---	0.73	---	---	---	---	---	---	30.98

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Basin B2

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
10.10	222,080	973.10	31.35 ic	30.63 ic	---	0.73	---	---	---	---	---	---	31.35
10.20	225,675	973.20	31.72 ic	31.00 ic	---	0.73	---	---	---	---	---	---	31.72
10.30	229,271	973.30	32.09 ic	31.36 ic	---	0.73	---	---	---	---	---	---	32.09
10.40	232,866	973.40	32.45 ic	31.73 ic	---	0.73	---	---	---	---	---	---	32.45
10.50	236,461	973.50	32.81 ic	32.08 ic	---	0.73	---	---	---	---	---	---	32.81
10.60	240,056	973.60	33.16 ic	32.44 ic	---	0.73	---	---	---	---	---	---	33.16
10.70	243,651	973.70	33.51 ic	32.79 ic	---	0.72	---	---	---	---	---	---	33.51
10.80	247,247	973.80	33.86 ic	33.14 ic	---	0.72	---	---	---	---	---	---	33.86
10.90	250,842	973.90	34.20 ic	33.48 ic	---	0.72	---	---	---	---	---	---	34.20
11.00	254,437	974.00	34.54 ic	33.82 ic	---	0.72	---	---	---	---	---	---	34.54
11.10	258,309	974.10	34.88 ic	34.16 ic	---	0.72	---	---	---	---	---	---	34.88
11.20	262,181	974.20	35.21 ic	34.49 ic	---	0.72	---	---	---	---	---	---	35.21
11.30	266,053	974.30	35.54 ic	34.82 ic	---	0.72	---	---	---	---	---	---	35.54
11.40	269,925	974.40	35.83 ic	35.11 ic	---	0.72	---	---	---	---	---	---	35.83
11.50	273,797	974.50	36.00 ic	35.26 ic	---	0.73	---	---	---	---	---	---	36.00
11.60	277,669	974.60	36.16 ic	35.42 ic	---	0.74	---	---	---	---	---	---	36.16
11.70	281,541	974.70	36.33 ic	35.57 ic	---	0.75	---	---	---	---	---	---	36.33
11.80	285,413	974.80	36.49 ic	35.73 ic	---	0.76	---	---	---	---	---	---	36.49
11.90	289,285	974.90	36.65 ic	35.88 ic	---	0.77	---	---	---	---	---	---	36.65
12.00	293,157	975.00	36.81 ic	36.03 ic	---	0.78	---	---	---	---	---	---	36.81
12.10	297,314	975.10	36.98 ic	36.18 ic	---	0.79	---	---	---	---	---	---	36.98
12.20	301,471	975.20	37.14 ic	36.33 ic	---	0.80	---	---	---	---	---	---	37.14
12.30	305,629	975.30	37.30 ic	36.48 ic	---	0.81	---	---	---	---	---	---	37.30
12.40	309,786	975.40	37.46 ic	36.63 ic	---	0.82	---	---	---	---	---	---	37.46
12.50	313,943	975.50	37.62 ic	36.78 ic	---	0.83	---	---	---	---	---	---	37.62
12.60	318,100	975.60	37.77 ic	36.93 ic	---	0.84	---	---	---	---	---	---	37.77
12.70	322,257	975.70	37.93 ic	37.08 ic	---	0.85	---	---	---	---	---	---	37.93
12.80	326,415	975.80	38.09 ic	37.23 ic	---	0.86	---	---	---	---	---	---	38.09
12.90	330,572	975.90	38.25 ic	37.37 ic	---	0.87	---	---	---	---	---	---	38.25
13.00	334,729	976.00	38.40 ic	37.52 ic	---	0.88	---	---	---	---	---	---	38.40

...End

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

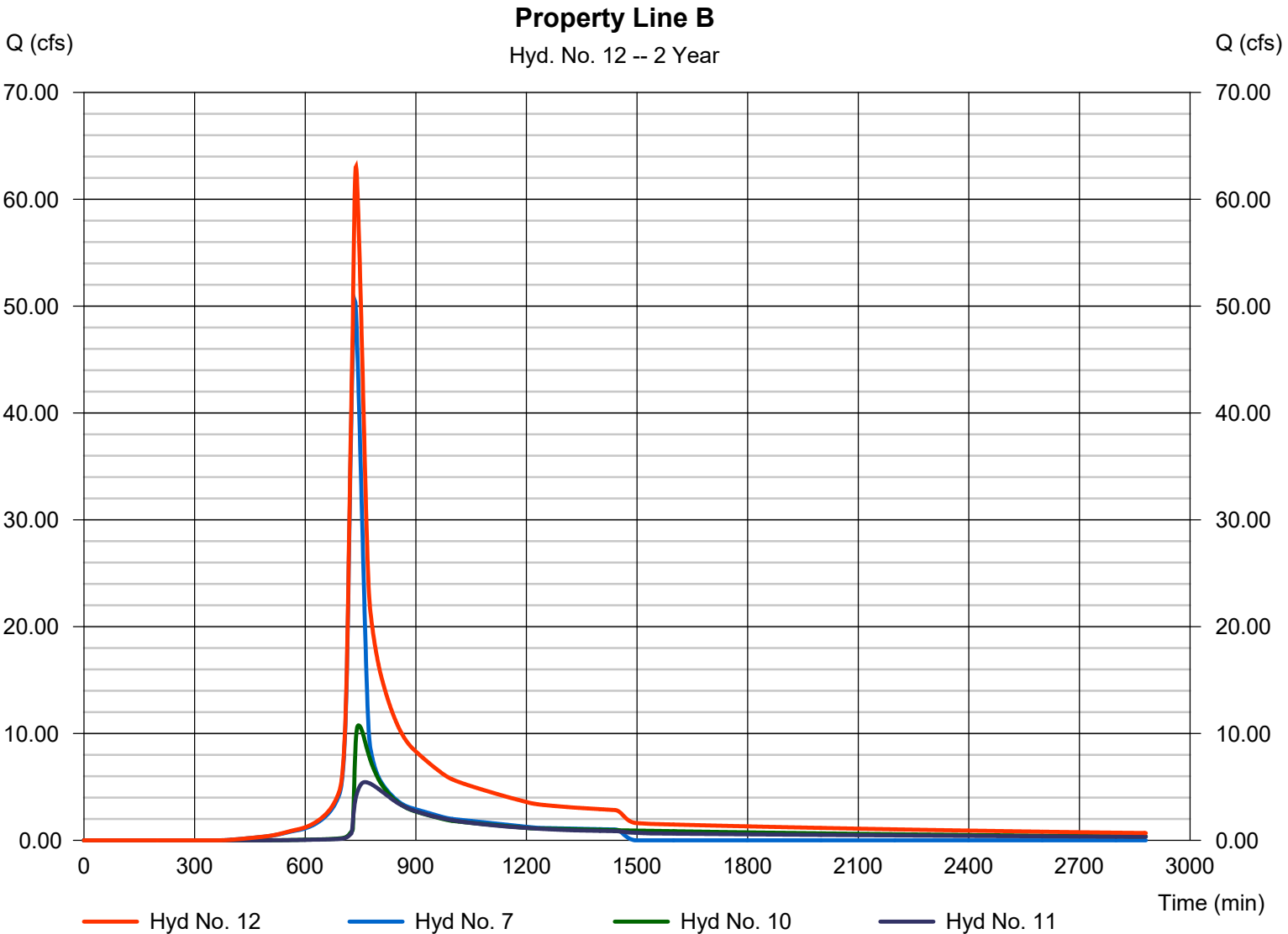
Wednesday, 03 / 30 / 2022

Hyd. No. 12

Property Line B

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 7, 10, 11

Peak discharge = 63.06 cfs
Time to peak = 738 min
Hyd. volume = 519,315 cuft
Contrib. drain. area = 27.930 ac



Hydrograph Report

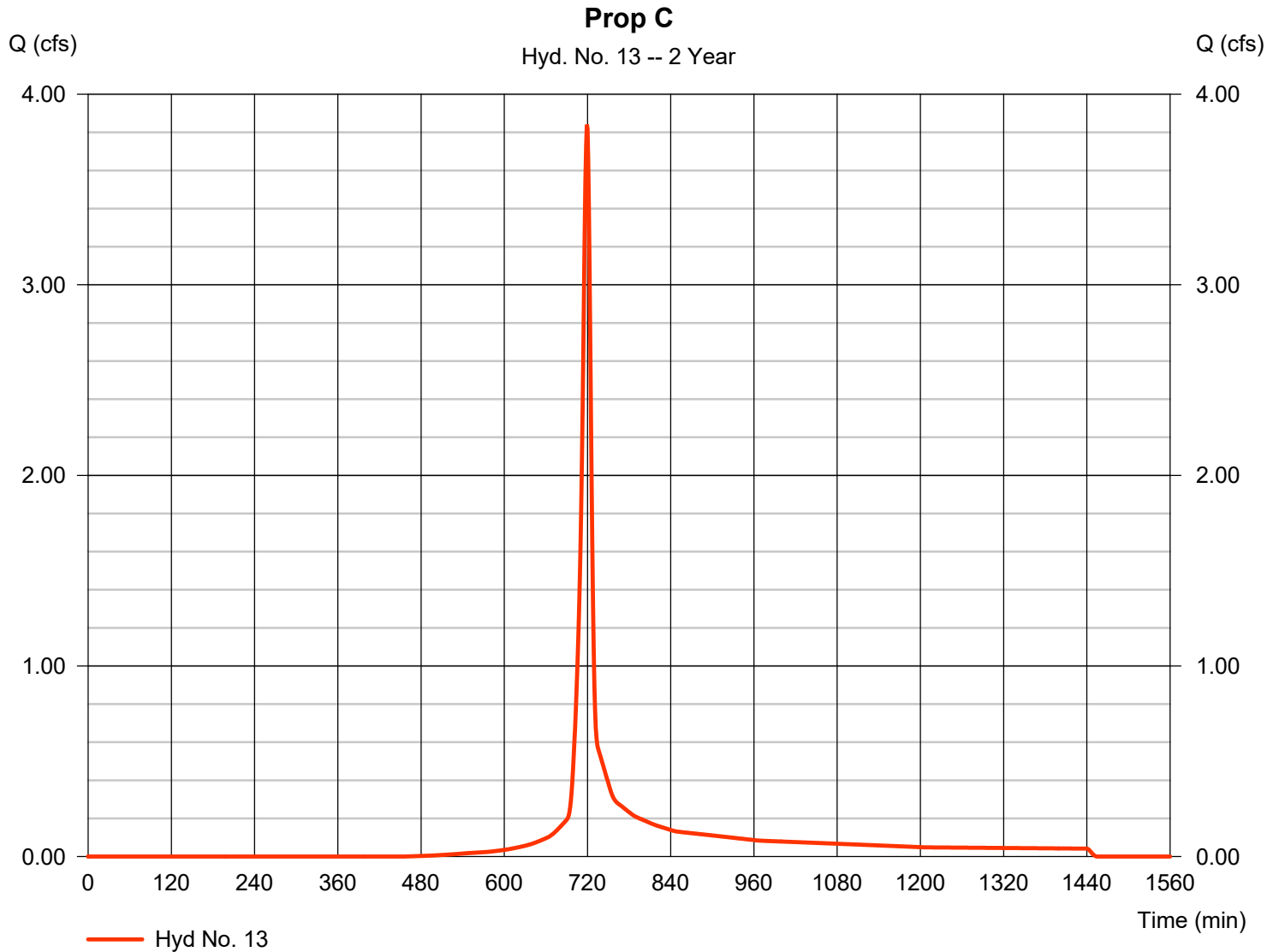
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 13

Prop C

Hydrograph type	= SCS Runoff	Peak discharge	= 3.840 cfs
Storm frequency	= 2 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 8,716 cuft
Drainage area	= 1.240 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

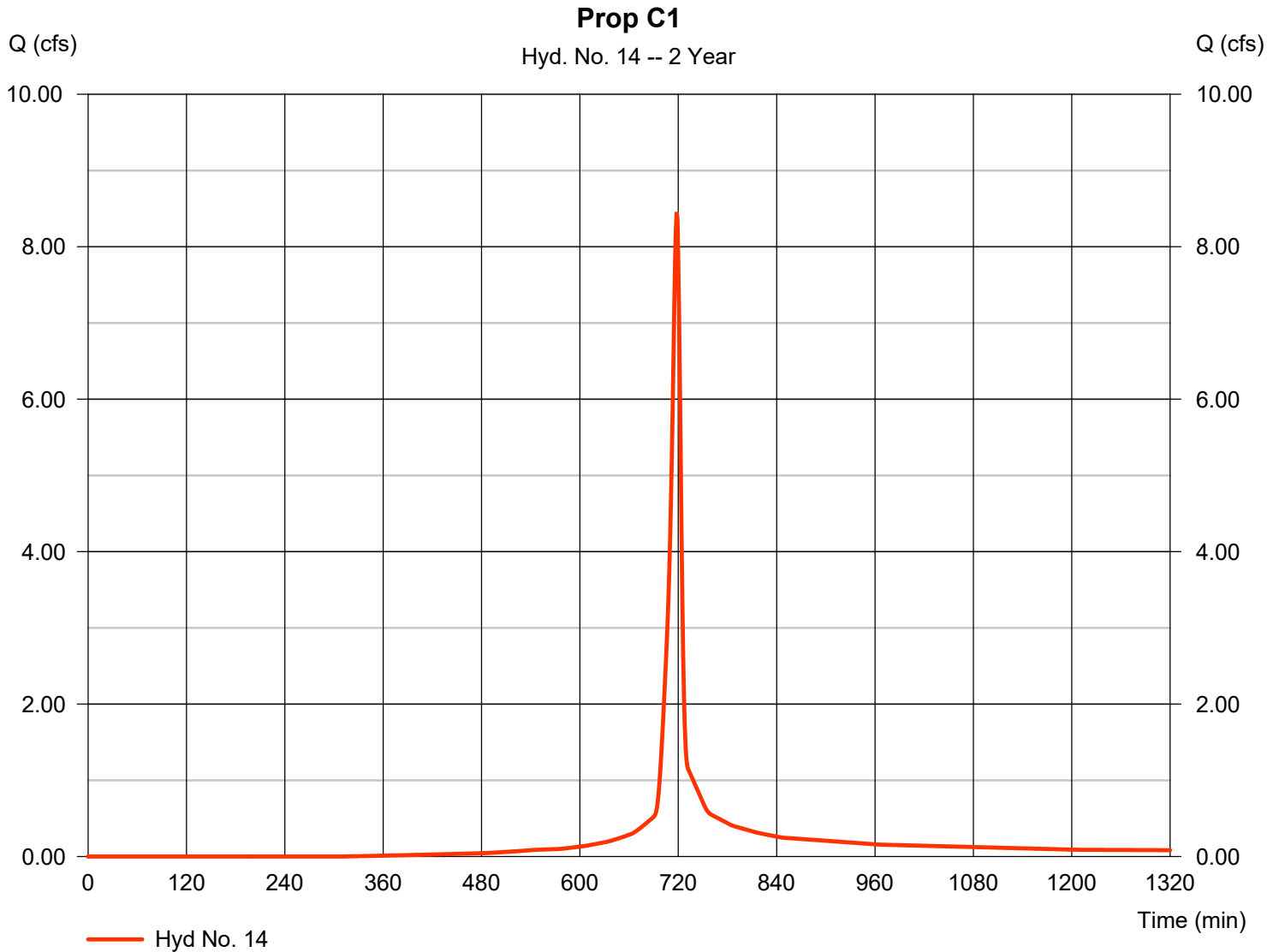
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 14

Prop C1

Hydrograph type	= SCS Runoff	Peak discharge	= 8.455 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 18,541 cuft
Drainage area	= 2.140 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

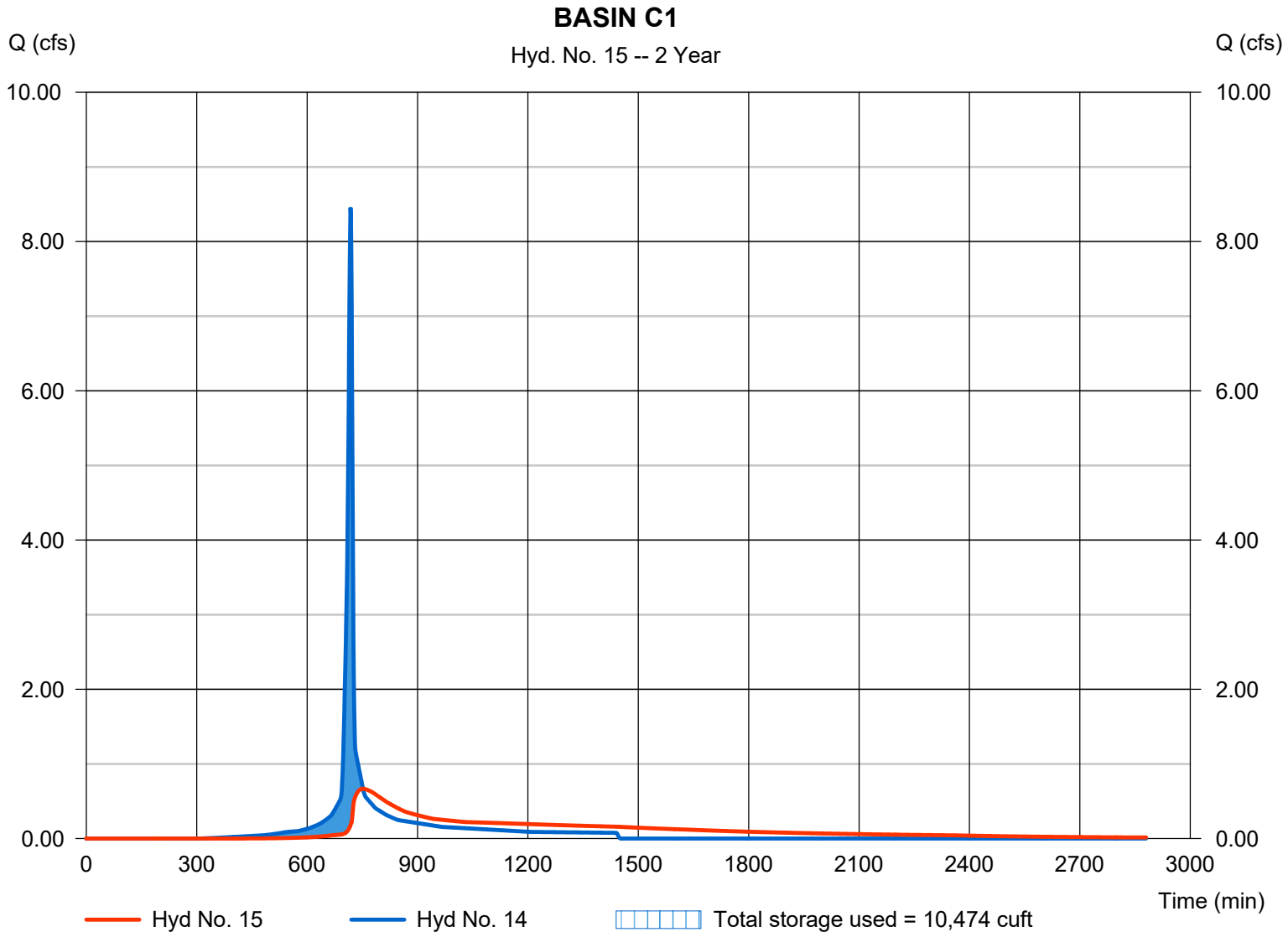
Wednesday, 03 / 30 / 2022

Hyd. No. 15

BASIN C1

Hydrograph type	= Reservoir	Peak discharge	= 0.667 cfs
Storm frequency	= 2 yrs	Time to peak	= 752 min
Time interval	= 1 min	Hyd. volume	= 17,876 cuft
Inflow hyd. No.	= 14 - Prop C1	Max. Elevation	= 970.43 ft
Reservoir name	= Basin C1	Max. Storage	= 10,474 cuft

Storage Indication method used.



Pond Report

Pond No. 5 - Basin C1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 967.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	967.00	00	0	0
1.00	968.00	2,850	1,425	1,425
2.00	969.00	3,525	3,188	4,613
3.00	970.00	4,152	3,839	8,451
4.00	971.00	5,230	4,691	13,142
5.00	972.00	6,453	5,842	18,984
6.00	973.00	7,135	6,794	25,778
7.00	974.00	8,125	7,630	33,408

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	1.00
Span (in)	= 15.00	6.00	0.00	1.00
No. Barrels	= 1	1	0	5
Invert El. (ft)	= 966.50	970.00	0.00	966.60
Length (ft)	= 65.70	0.00	0.00	2.06
Slope (%)	= 0.76	0.00	0.00	n/a
N-Value	= .010	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	Yes

Weir Structures

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

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ 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	967.00	0.00	0.00	---	0.00	---	---	---	---	---	---	0.000
0.10	143	967.10	1.13 ic	0.00	---	0.00	---	---	---	---	---	---	0.001
0.20	285	967.20	1.13 ic	0.00	---	0.00	---	---	---	---	---	---	0.004
0.30	428	967.30	1.13 ic	0.00	---	0.01	---	---	---	---	---	---	0.007
0.40	570	967.40	1.13 ic	0.00	---	0.01	---	---	---	---	---	---	0.011
0.50	713	967.50	1.13 ic	0.00	---	0.02	---	---	---	---	---	---	0.015
0.60	855	967.60	1.13 ic	0.00	---	0.02	---	---	---	---	---	---	0.020
0.70	998	967.70	1.13 ic	0.00	---	0.02	---	---	---	---	---	---	0.025
0.80	1,140	967.80	1.13 ic	0.00	---	0.03	---	---	---	---	---	---	0.030
0.90	1,283	967.90	1.13 ic	0.00	---	0.04	---	---	---	---	---	---	0.036
1.00	1,425	968.00	1.13 ic	0.00	---	0.04	---	---	---	---	---	---	0.042
1.10	1,744	968.10	1.13 ic	0.00	---	0.05	---	---	---	---	---	---	0.049
1.20	2,063	968.20	1.13 ic	0.00	---	0.06	---	---	---	---	---	---	0.056
1.30	2,381	968.30	1.13 ic	0.00	---	0.06	---	---	---	---	---	---	0.063
1.40	2,700	968.40	1.13 ic	0.00	---	0.06	---	---	---	---	---	---	0.070
1.50	3,019	968.50	1.13 ic	0.00	---	0.08	---	---	---	---	---	---	0.078
1.60	3,338	968.60	1.13 ic	0.00	---	0.09	---	---	---	---	---	---	0.086
1.70	3,656	968.70	1.13 ic	0.00	---	0.09	---	---	---	---	---	---	0.094
1.80	3,975	968.80	1.13 ic	0.00	---	0.10	---	---	---	---	---	---	0.103
1.90	4,294	968.90	1.13 ic	0.00	---	0.11	---	---	---	---	---	---	0.111
2.00	4,613	969.00	1.13 ic	0.00	---	0.12	---	---	---	---	---	---	0.120
2.10	4,996	969.10	1.13 ic	0.00	---	0.13	---	---	---	---	---	---	0.129
2.20	5,380	969.20	1.13 ic	0.00	---	0.14	---	---	---	---	---	---	0.139
2.30	5,764	969.30	1.13 ic	0.00	---	0.15	---	---	---	---	---	---	0.148
2.40	6,148	969.40	1.13 ic	0.00	---	0.16	---	---	---	---	---	---	0.158
2.50	6,532	969.50	1.13 ic	0.00	---	0.17	---	---	---	---	---	---	0.168
2.60	6,916	969.60	1.13 ic	0.00	---	0.18	---	---	---	---	---	---	0.178
2.70	7,299	969.70	1.13 ic	0.00	---	0.19	---	---	---	---	---	---	0.188
2.80	7,683	969.80	1.13 ic	0.00	---	0.20	---	---	---	---	---	---	0.199
2.90	8,067	969.90	1.13 ic	0.00	---	0.21	---	---	---	---	---	---	0.210
3.00	8,451	970.00	1.13 ic	0.00	---	0.22	---	---	---	---	---	---	0.221
3.10	8,920	970.10	1.13 ic	0.03 ic	---	0.23	---	---	---	---	---	---	0.263
3.20	9,389	970.20	1.13 ic	0.11 ic	---	0.24	---	---	---	---	---	---	0.357
3.30	9,858	970.30	1.13 ic	0.23 ic	---	0.25	---	---	---	---	---	---	0.485
3.40	10,327	970.40	1.13 ic	0.36 ic	---	0.27	---	---	---	---	---	---	0.629

Continues on next page...

Basin C1

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
3.50	10,797	970.50	1.13 ic	0.47 ic	---	0.28	---	---	---	---	---	---	0.751
3.60	11,266	970.60	1.13 ic	0.56 ic	---	0.29	---	---	---	---	---	---	0.849
3.70	11,735	970.70	1.13 ic	0.63 ic	---	0.30	---	---	---	---	---	---	0.936
3.80	12,204	970.80	1.13 ic	0.70 ic	---	0.31	---	---	---	---	---	---	1.016
3.90	12,673	970.90	1.13 ic	0.76 ic	---	0.33	---	---	---	---	---	---	1.089
4.00	13,142	971.00	1.16 ic	0.82 ic	---	0.34	---	---	---	---	---	---	1.158
4.10	13,726	971.10	1.25 ic	0.87 ic	---	0.35	---	---	---	---	---	---	1.221
4.20	14,310	971.20	1.29 ic	0.92 ic	---	0.36	---	---	---	---	---	---	1.282
4.30	14,894	971.30	1.34 ic	0.97 ic	---	0.37	---	---	---	---	---	---	1.340
4.40	15,479	971.40	1.42 ic	1.01 ic	---	0.38	---	---	---	---	---	---	1.397
4.50	16,063	971.50	1.46 ic	1.06 ic	---	0.40	---	---	---	---	---	---	1.452
4.60	16,647	971.60	1.51 ic	1.10 ic	---	0.41	---	---	---	---	---	---	1.506
4.70	17,231	971.70	1.56 ic	1.14 ic	---	0.42	---	---	---	---	---	---	1.557
4.80	17,815	971.80	1.64 ic	1.18 ic	---	0.43	---	---	---	---	---	---	1.608
4.90	18,399	971.90	1.68 ic	1.21 ic	---	0.44	---	---	---	---	---	---	1.657
5.00	18,984	972.00	1.73 ic	1.25 ic	---	0.46	---	---	---	---	---	---	1.706
5.10	19,663	972.10	1.78 ic	1.29 ic	---	0.47	---	---	---	---	---	---	1.754
5.20	20,342	972.20	1.83 ic	1.32 ic	---	0.48	---	---	---	---	---	---	1.802
5.30	21,022	972.30	1.87 ic	1.35 ic	---	0.49	---	---	---	---	---	---	1.848
5.40	21,701	972.40	1.92 ic	1.39 ic	---	0.51	---	---	---	---	---	---	1.894
5.50	22,381	972.50	1.97 ic	1.42 ic	---	0.52	---	---	---	---	---	---	1.939
5.60	23,060	972.60	2.02 ic	1.45 ic	---	0.53	---	---	---	---	---	---	1.983
5.70	23,739	972.70	2.03 ic	1.48 ic	---	0.55	---	---	---	---	---	---	2.027
5.80	24,419	972.80	2.07 ic	1.51 ic	---	0.56	---	---	---	---	---	---	2.071
5.90	25,098	972.90	2.11 ic	1.54 ic	---	0.58	---	---	---	---	---	---	2.115
6.00	25,778	973.00	2.16 ic	1.57 ic	---	0.59	---	---	---	---	---	---	2.158
6.10	26,541	973.10	2.21 ic	1.60 ic	---	0.60	---	---	---	---	---	---	2.200
6.20	27,304	973.20	2.26 ic	1.62 ic	---	0.62	---	---	---	---	---	---	2.241
6.30	28,067	973.30	2.31 ic	1.65 ic	---	0.63	---	---	---	---	---	---	2.283
6.40	28,830	973.40	2.32 ic	1.68 ic	---	0.65	---	---	---	---	---	---	2.324
6.50	29,593	973.50	2.37 ic	1.70 ic	---	0.66	---	---	---	---	---	---	2.366
6.60	30,356	973.60	2.41 ic	1.73 ic	---	0.68	---	---	---	---	---	---	2.407
6.70	31,119	973.70	2.46 ic	1.76 ic	---	0.69	---	---	---	---	---	---	2.447
6.80	31,882	973.80	2.51 ic	1.78 ic	---	0.71	---	---	---	---	---	---	2.487
6.90	32,645	973.90	2.56 ic	1.81 ic	---	0.72	---	---	---	---	---	---	2.526
7.00	33,408	974.00	2.57 ic	1.83 ic	---	0.74	---	---	---	---	---	---	2.567

...End

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

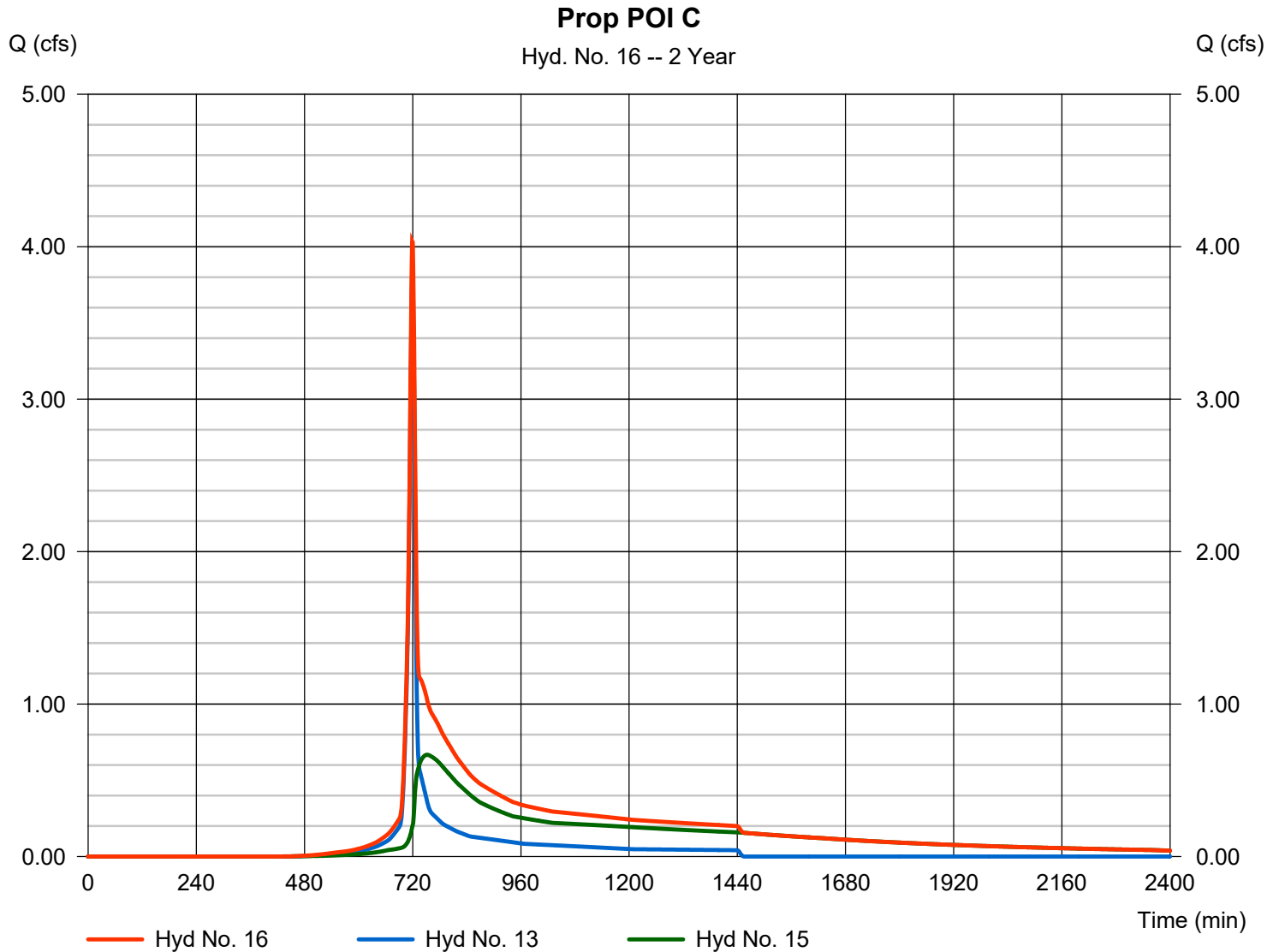
Wednesday, 03 / 30 / 2022

Hyd. No. 16

Prop POI C

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 13, 15

Peak discharge = 4.035 cfs
Time to peak = 719 min
Hyd. volume = 26,592 cuft
Contrib. drain. area = 1.240 ac



Hydrograph Report

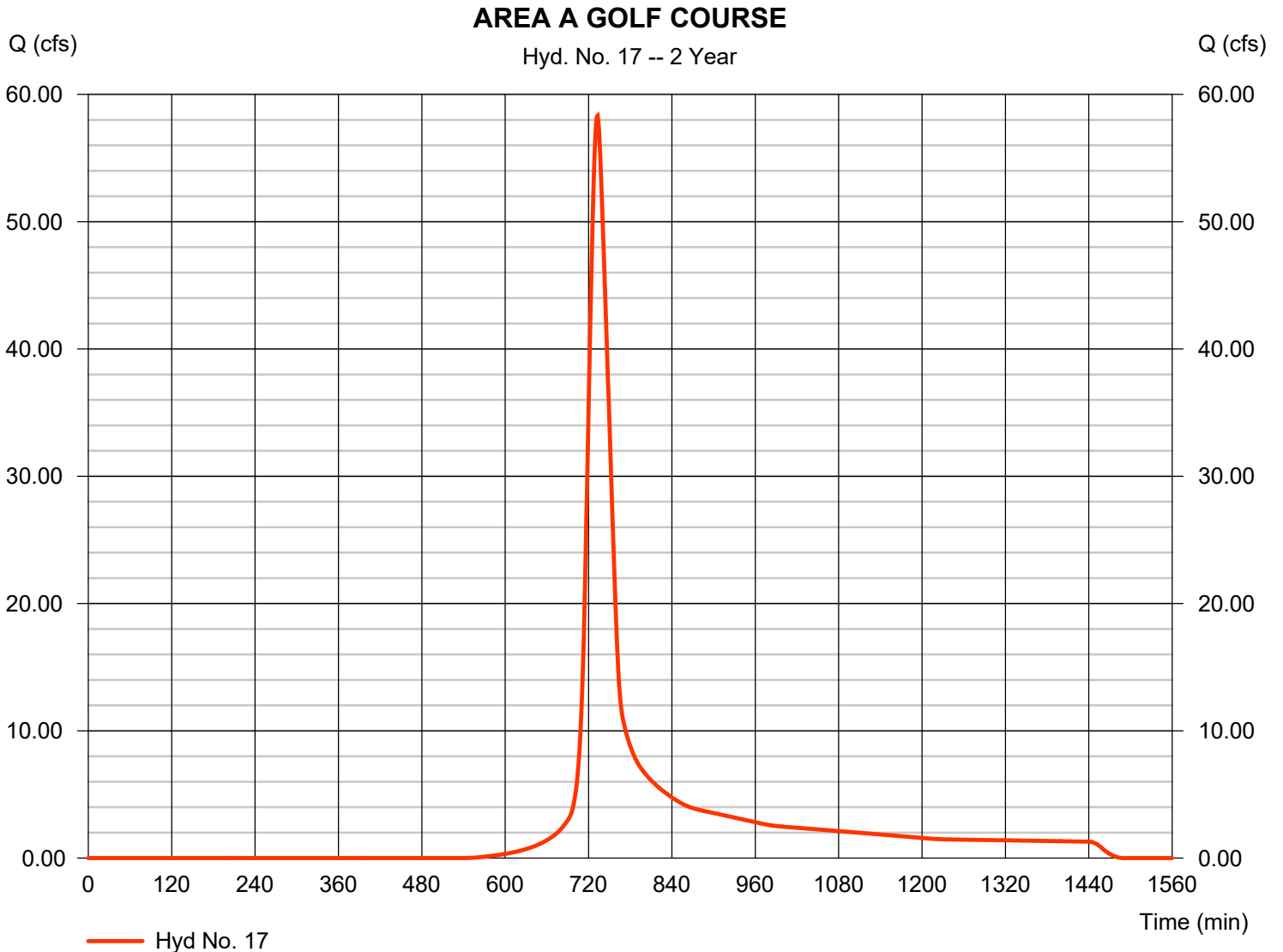
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Wednesday, 03 / 30 / 2022

Hyd. No. 17

AREA A GOLF COURSE

Hydrograph type	= SCS Runoff	Peak discharge	= 58.31 cfs
Storm frequency	= 2 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 244,963 cuft
Drainage area	= 40.970 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.00 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

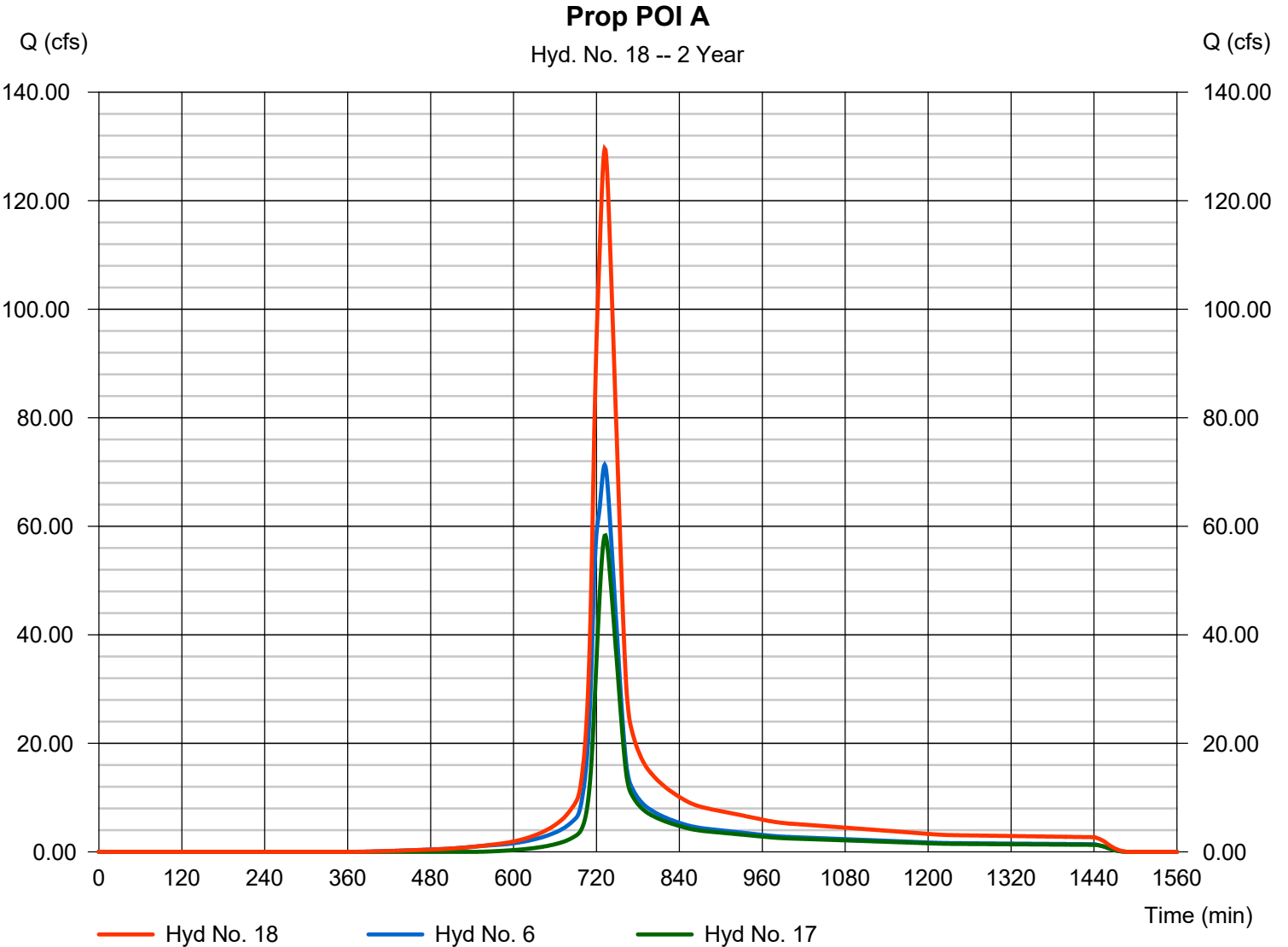
Wednesday, 03 / 30 / 2022

Hyd. No. 18

Prop POI A

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 6, 17

Peak discharge = 129.57 cfs
Time to peak = 732 min
Hyd. volume = 565,034 cuft
Contrib. drain. area = 40.970 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

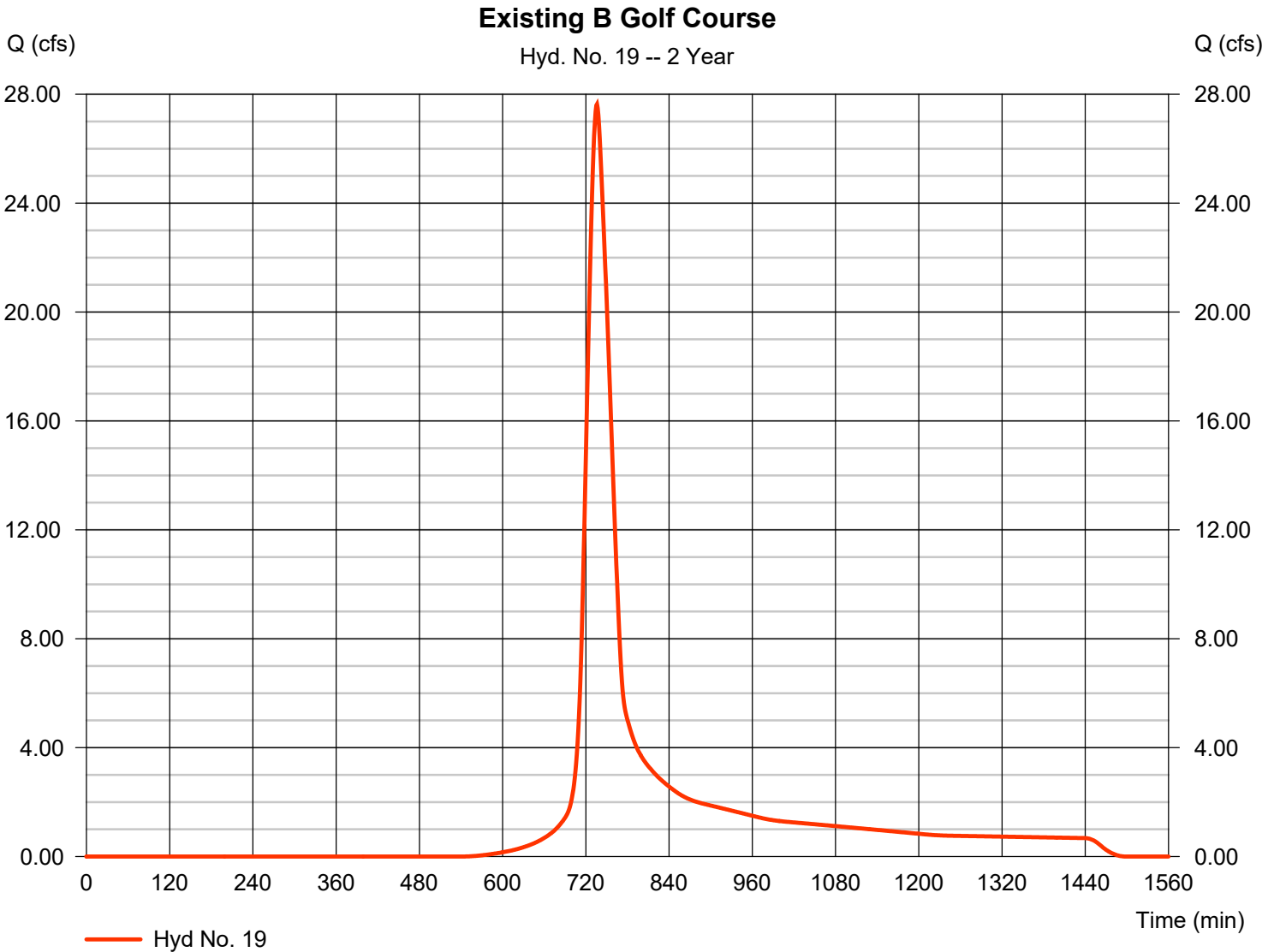
Wednesday, 03 / 30 / 2022

Hyd. No. 19

Existing B Golf Course

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 21.450 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.50 in
 Storm duration = 24 hrs

Peak discharge = 27.64 cfs
 Time to peak = 736 min
 Hyd. volume = 128,137 cuft
 Curve number = 80
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 36.50 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

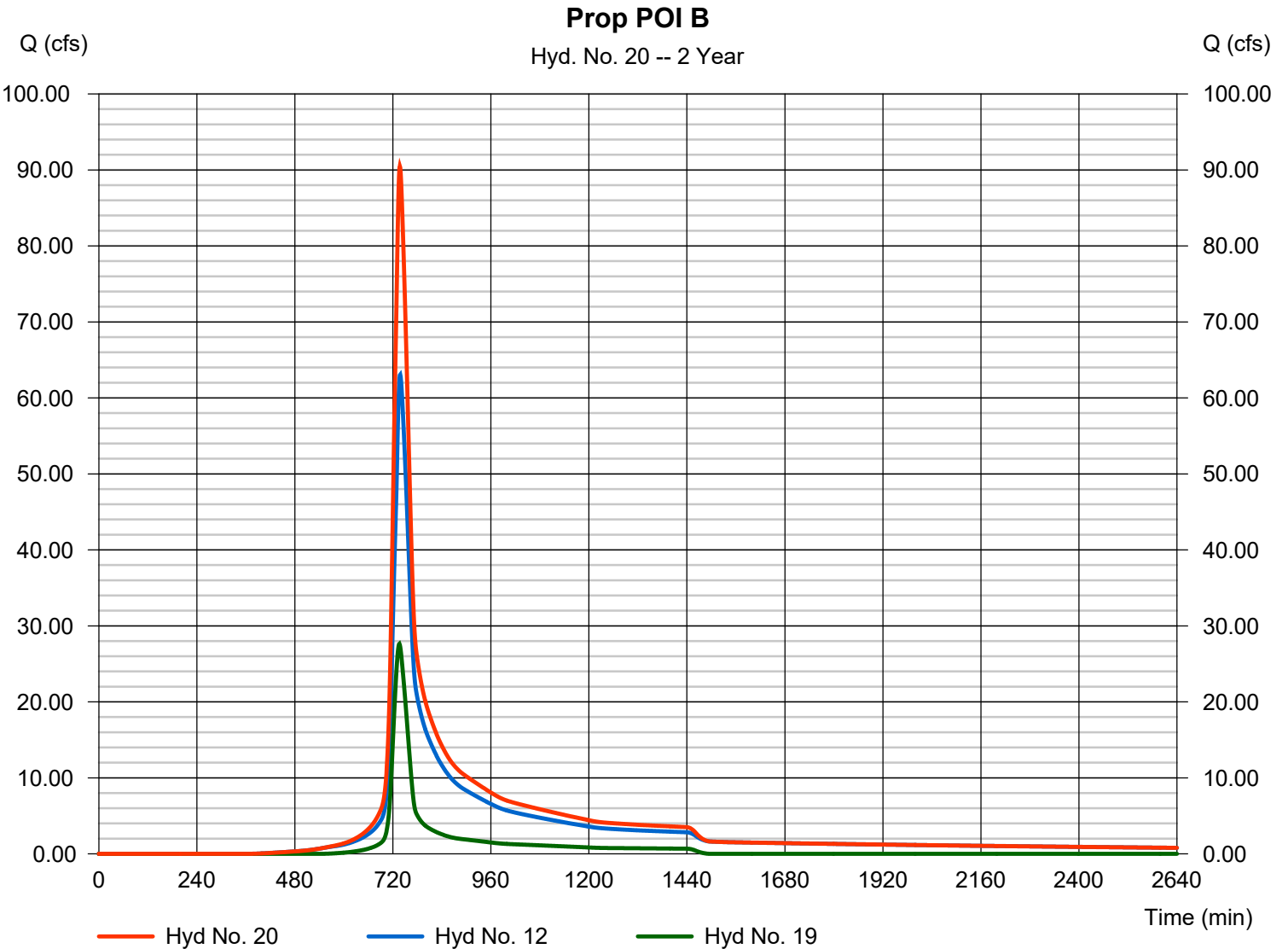
Wednesday, 03 / 30 / 2022

Hyd. No. 20

Prop POI B

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 12, 19

Peak discharge = 90.48 cfs
Time to peak = 737 min
Hyd. volume = 647,452 cuft
Contrib. drain. area = 21.450 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	229.30	1	732	952,990	-----	-----	-----	Ex POI A	
2	SCS Runoff	260.16	1	735	1,194,433	-----	-----	-----	Ex POI B	
3	SCS Runoff	29.47	1	720	74,147	-----	-----	-----	Ex POI C	
4	SCS Runoff	116.12	1	732	490,156	-----	-----	-----	Existing A Crop	
5	SCS Runoff	26.81	1	717	56,267	-----	-----	-----	Prop A1	
6	Combine	119.57	1	732	546,422	4, 5	-----	-----	Property Line	
7	SCS Runoff	84.71	1	735	393,494	-----	-----	-----	EXISTING B CROP	
8	SCS Runoff	110.98	1	723	325,950	-----	-----	-----	Prop B1	
9	SCS Runoff	110.25	1	721	289,316	-----	-----	-----	Prop B2	
10	Reservoir	47.31	1	735	290,800	8	965.65	149,517	BASIN B1	
11	Reservoir	21.74	1	735	248,875	9	970.93	152,531	BASIN B2	
12	Combine	153.76	1	735	933,170	7, 10, 11	-----	-----	Property Line B	
13	SCS Runoff	6.723	1	719	15,547	-----	-----	-----	Prop C	
14	SCS Runoff	13.63	1	718	30,822	-----	-----	-----	Prop C1	
15	Reservoir	1.515	1	740	30,059	14	971.62	16,752	BASIN C1	
16	Combine	7.879	1	720	45,605	13, 15	-----	-----	Prop POI C	
17	SCS Runoff	110.60	1	732	459,287	-----	-----	-----	AREA A GOLF COURSE	
18	Combine	230.17	1	732	1,005,709	6, 17	-----	-----	Prop POI A	
19	SCS Runoff	52.47	1	735	240,247	-----	-----	-----	Existing B Golf Course	
20	Combine	206.23	1	735	1,173,416	12, 19	-----	-----	Prop POI B	
WEAVER DEVELOPMENT 220325.gpw					Return Period: 10 Year			Wednesday, 03 / 30 / 2022		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

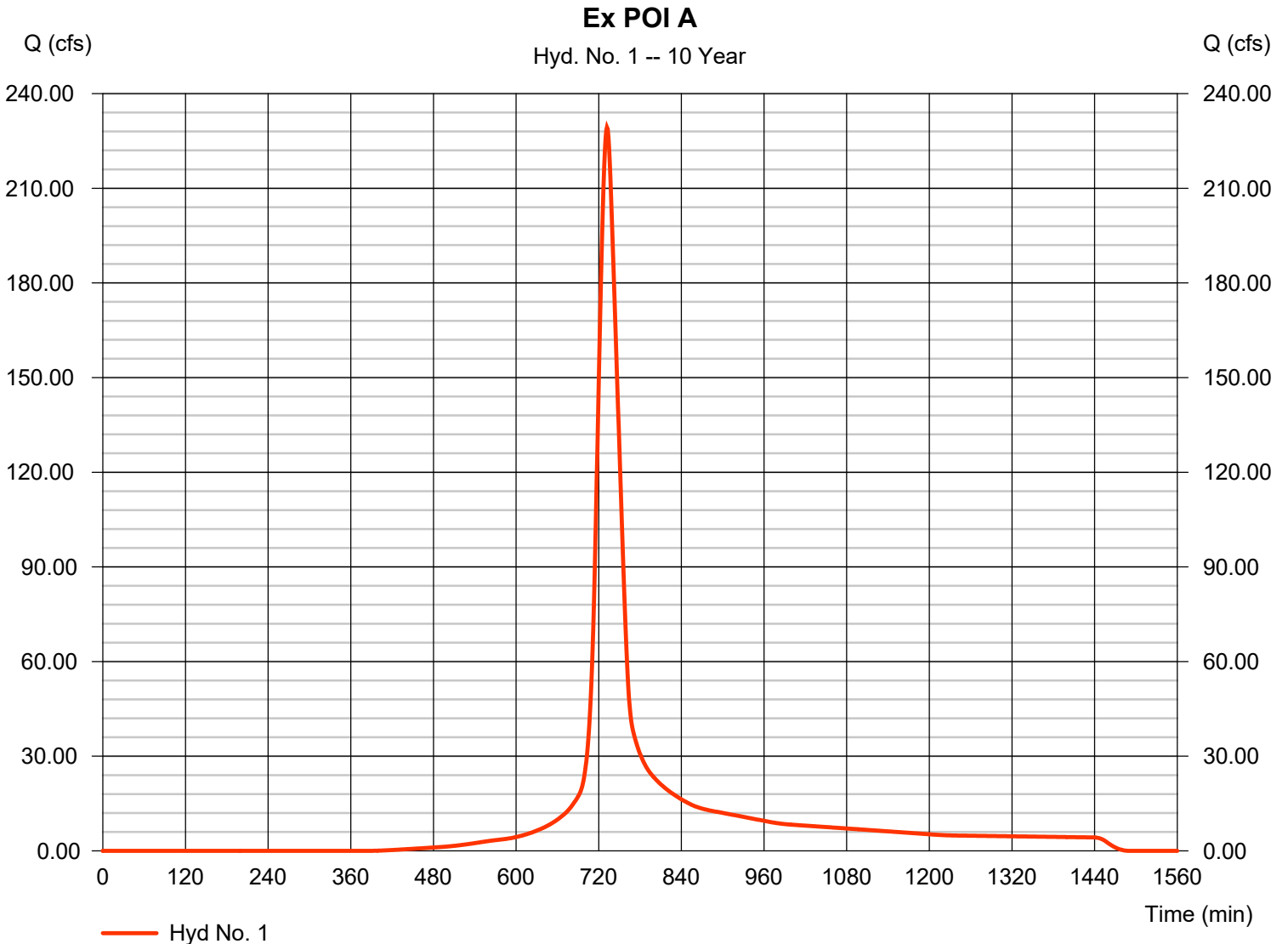
Wednesday, 03 / 30 / 2022

Hyd. No. 1

Ex POI A

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 80.040 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 5.20 in
 Storm duration = 24 hrs

Peak discharge = 229.30 cfs
 Time to peak = 732 min
 Hyd. volume = 952,990 cuft
 Curve number = 82
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 31.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

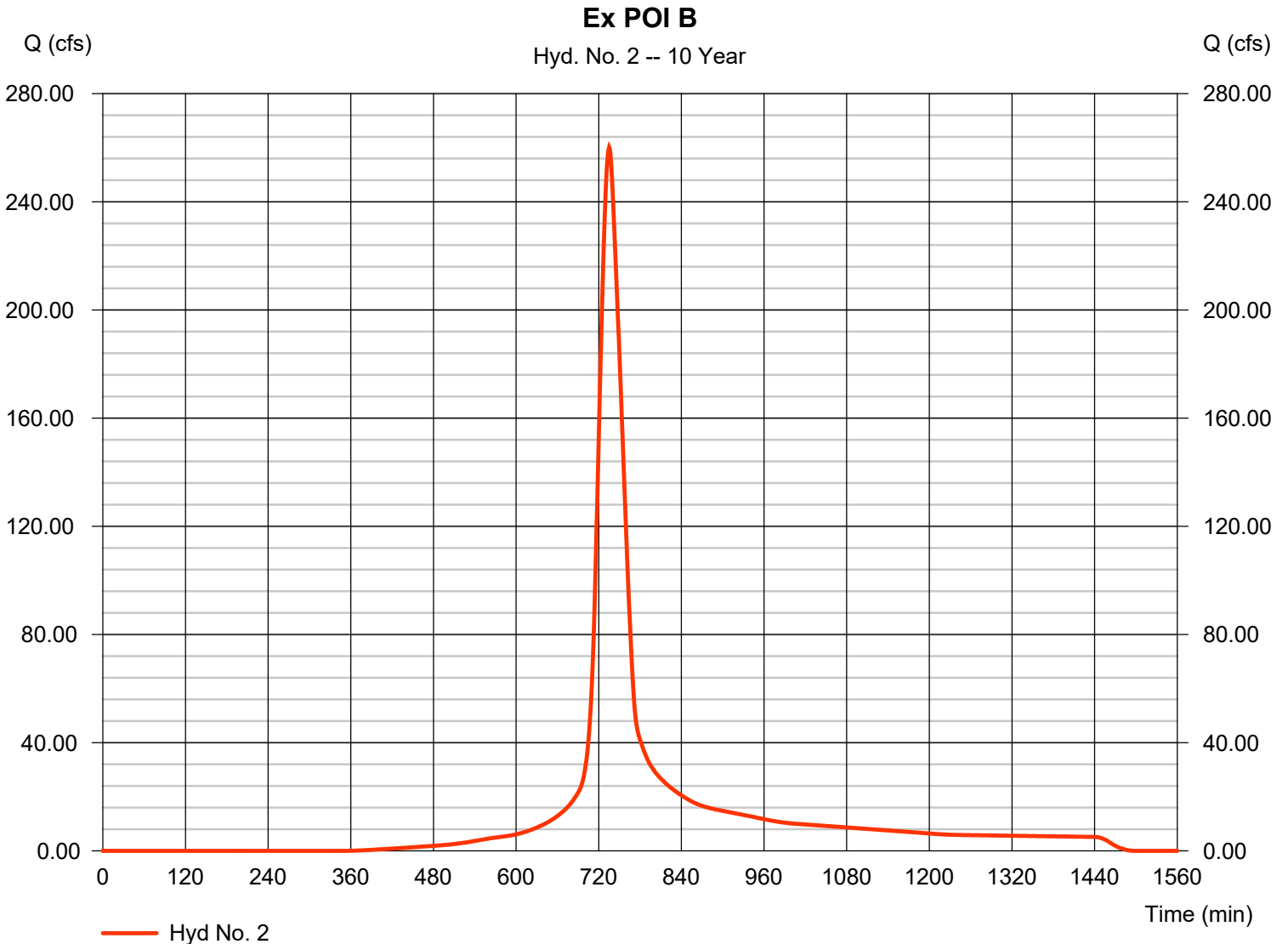
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Wednesday, 03 / 30 / 2022

Hyd. No. 2

Ex POI B

Hydrograph type	= SCS Runoff	Peak discharge	= 260.16 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 1,194,433 cuft
Drainage area	= 94.730 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 36.50 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

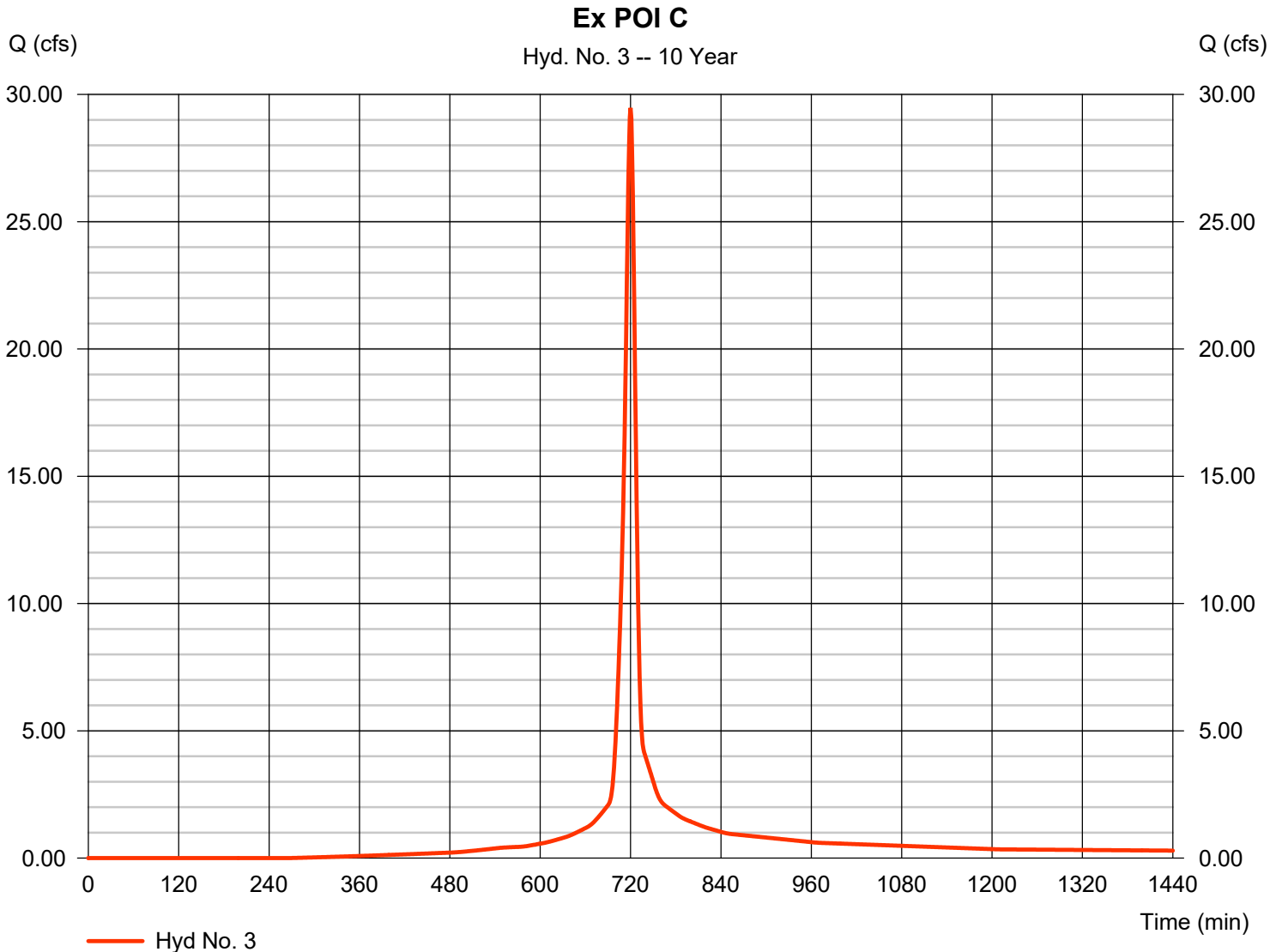
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 3

Ex POI C

Hydrograph type	= SCS Runoff	Peak discharge	= 29.47 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 74,147 cuft
Drainage area	= 5.200 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

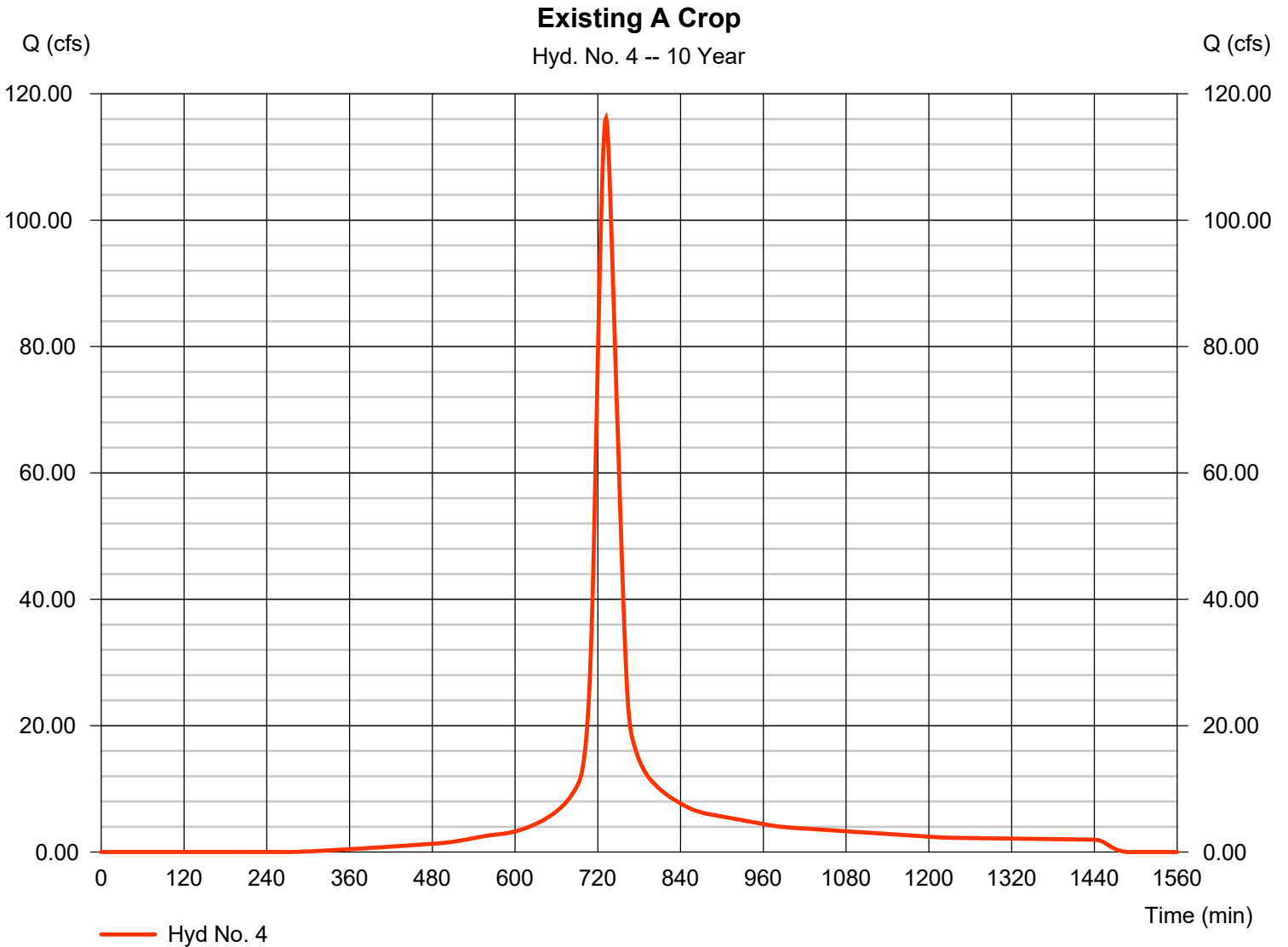
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Wednesday, 03 / 30 / 2022

Hyd. No. 4

Existing A Crop

Hydrograph type	= SCS Runoff	Peak discharge	= 116.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 490,156 cuft
Drainage area	= 34.760 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

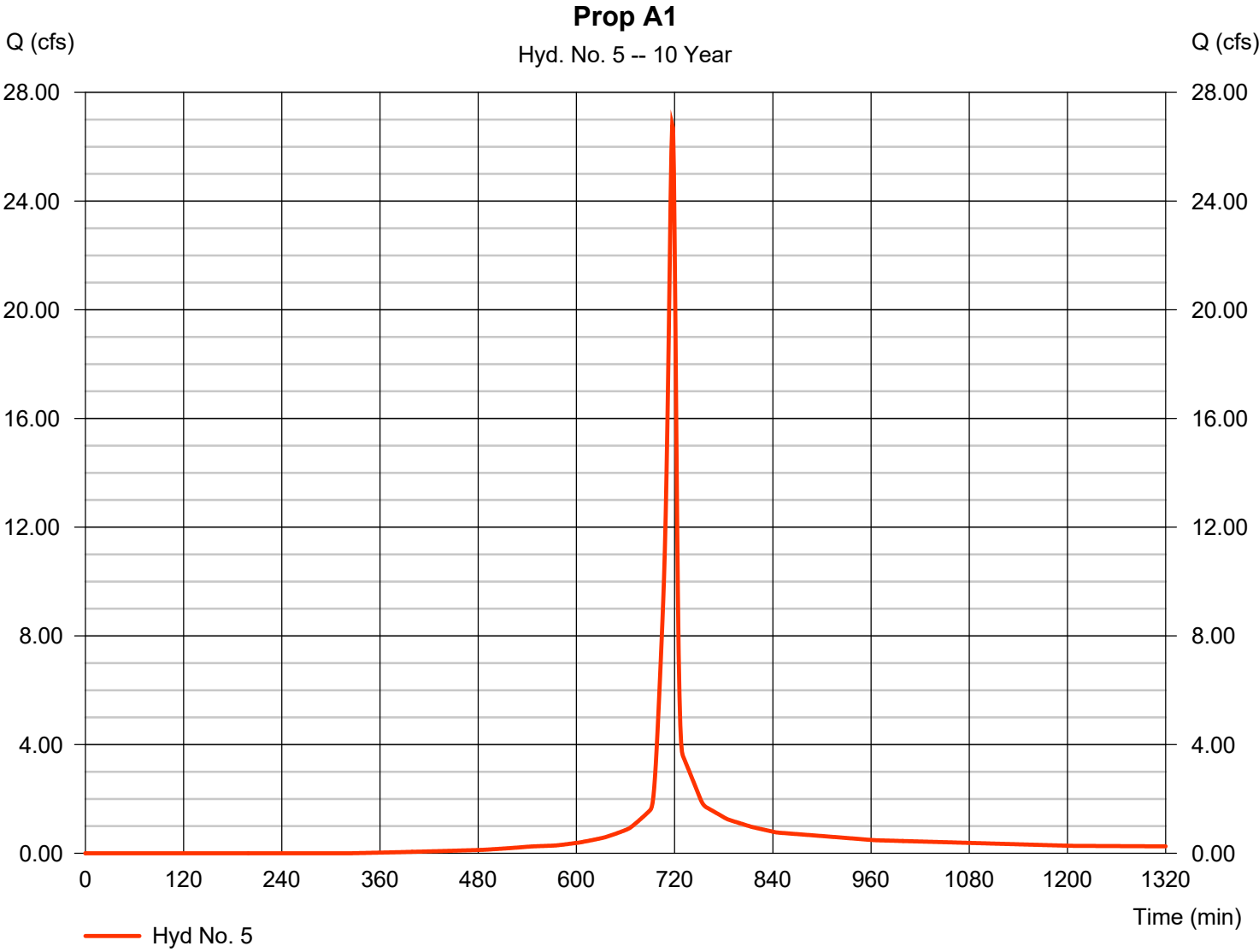
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Wednesday, 03 / 30 / 2022

Hyd. No. 5

Prop A1

Hydrograph type	= SCS Runoff	Peak discharge	= 26.81 cfs
Storm frequency	= 10 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 56,267 cuft
Drainage area	= 4.230 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

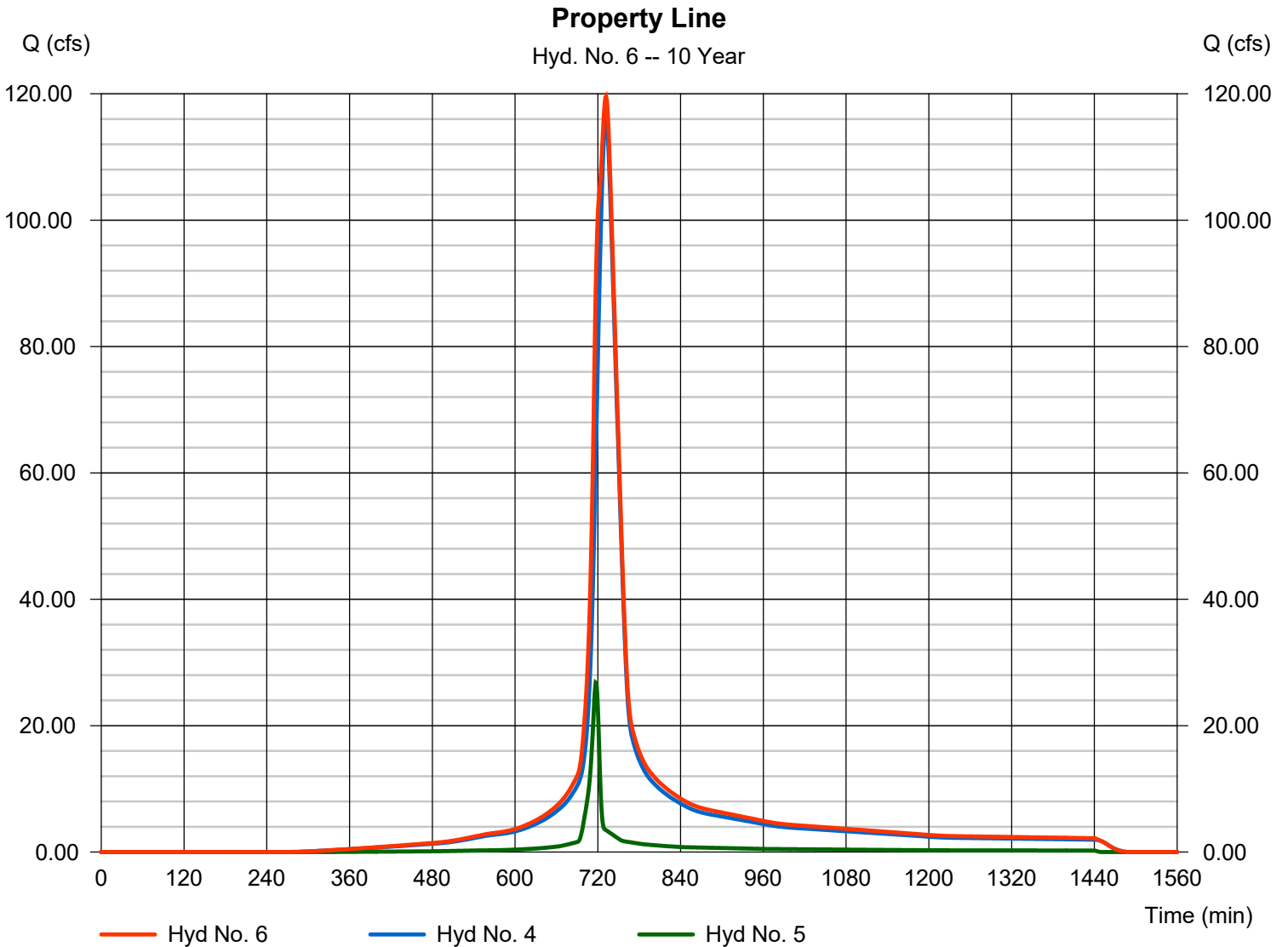
Wednesday, 03 / 30 / 2022

Hyd. No. 6

Property Line

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 4, 5

Peak discharge = 119.57 cfs
Time to peak = 732 min
Hyd. volume = 546,422 cuft
Contrib. drain. area = 38.990 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

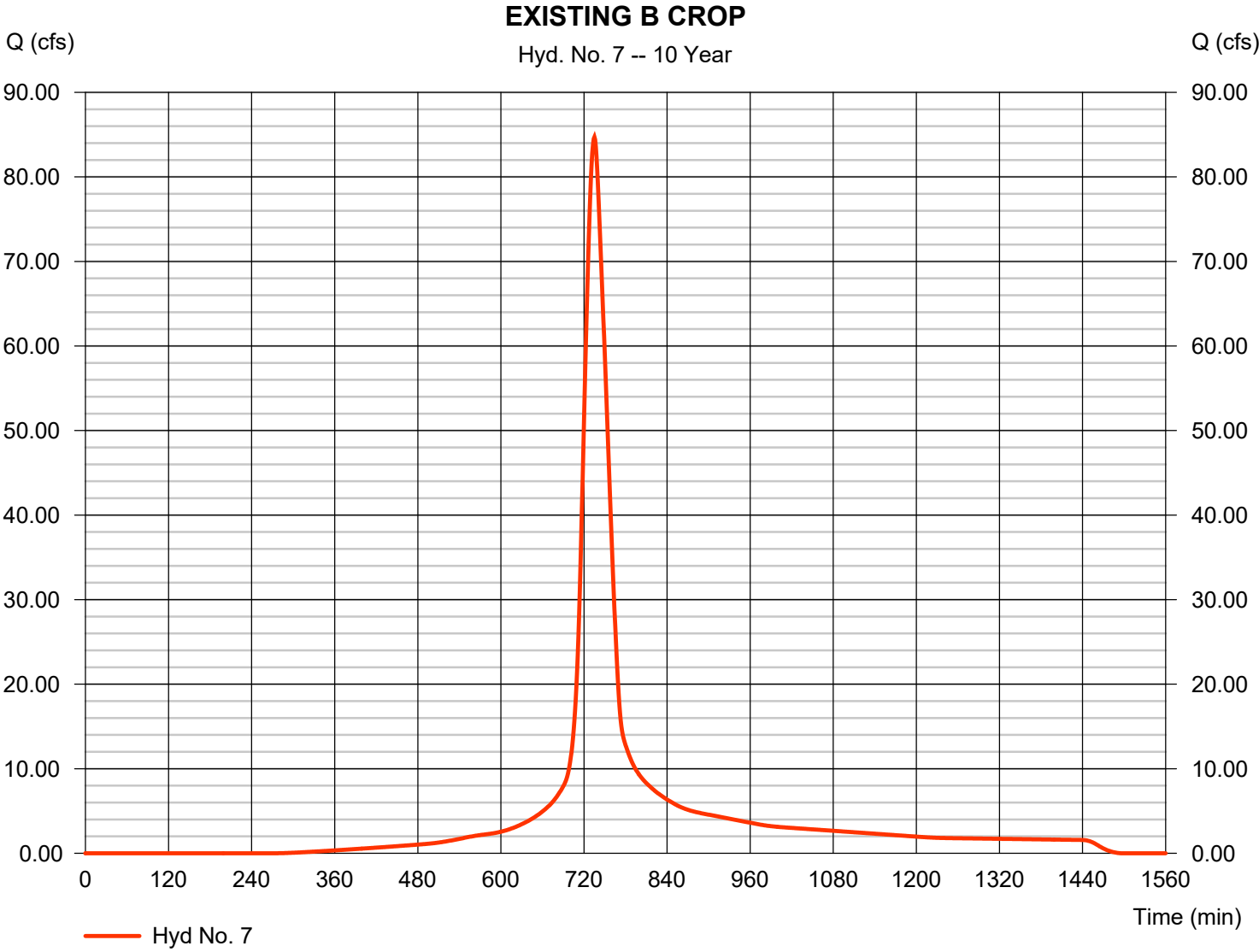
Wednesday, 03 / 30 / 2022

Hyd. No. 7

EXISTING B CROP

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 27.930 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.20 in
Storm duration = 24 hrs

Peak discharge = 84.71 cfs
Time to peak = 735 min
Hyd. volume = 393,494 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 35.80 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

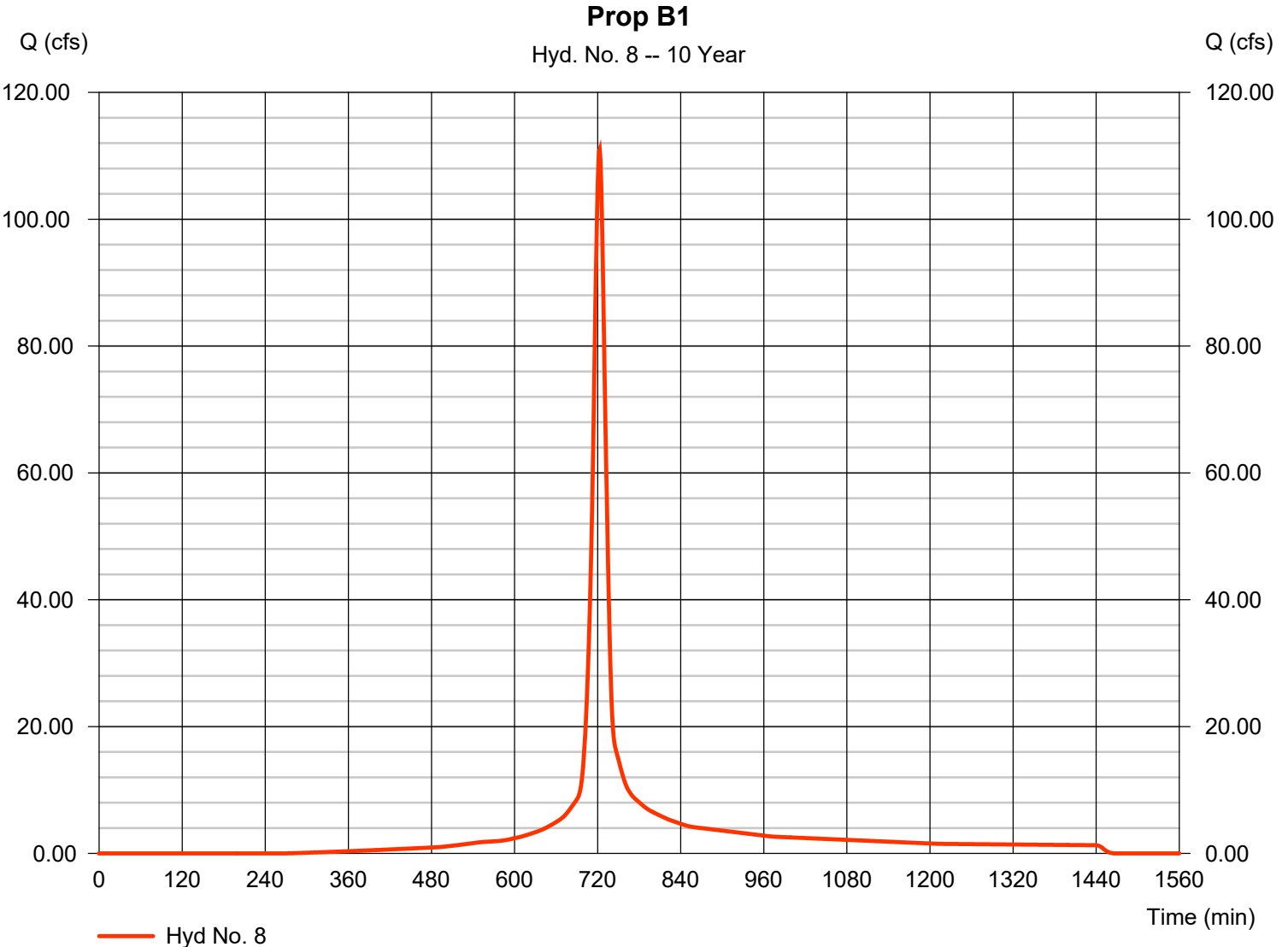
Wednesday, 03 / 30 / 2022

Hyd. No. 8

Prop B1

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 22.980 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.20 in
Storm duration = 24 hrs

Peak discharge = 110.98 cfs
Time to peak = 723 min
Hyd. volume = 325,950 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 15.20 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

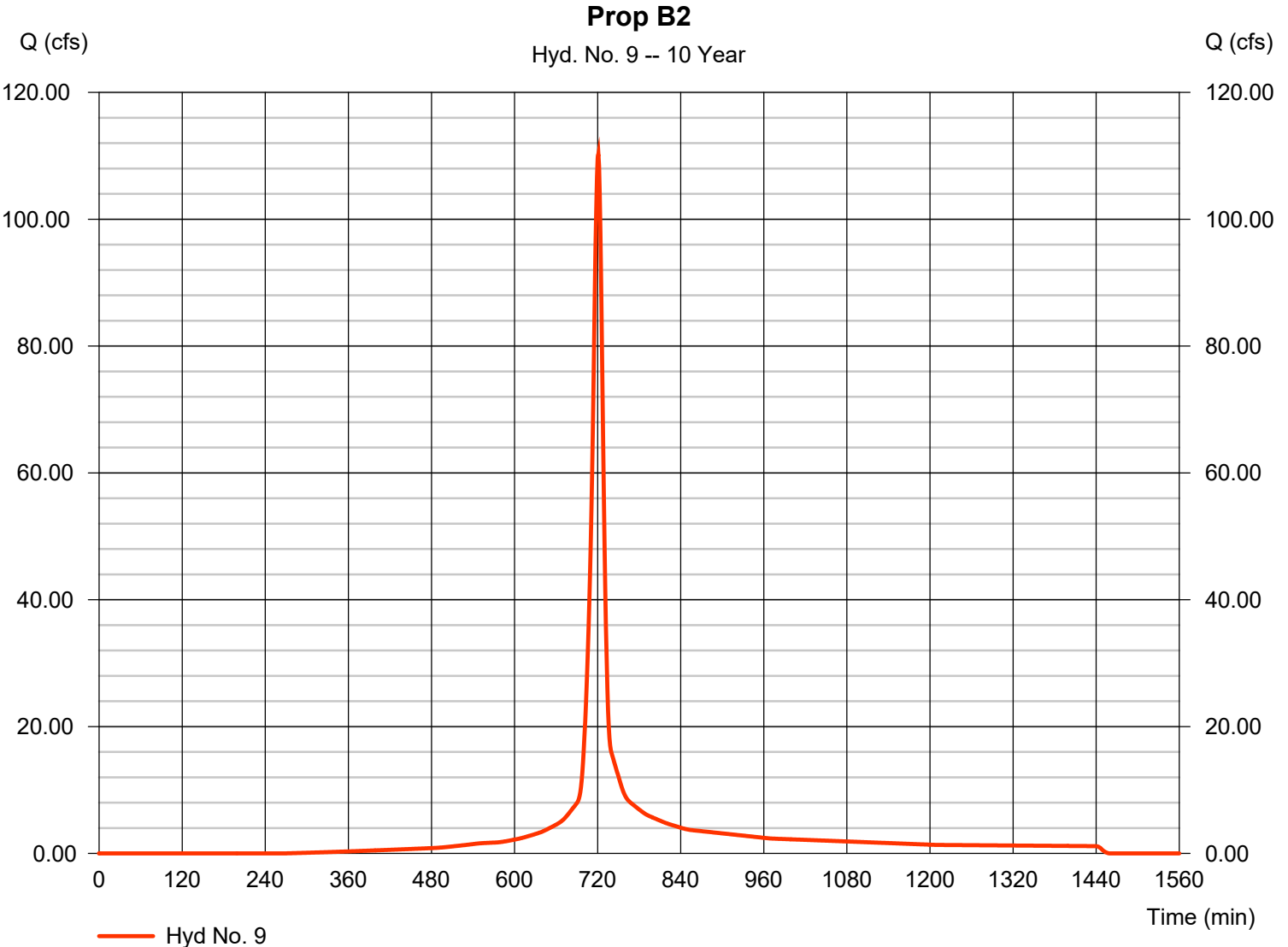
Wednesday, 03 / 30 / 2022

Hyd. No. 9

Prop B2

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 20.980 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.20 in
Storm duration = 24 hrs

Peak discharge = 110.25 cfs
Time to peak = 721 min
Hyd. volume = 289,316 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 13.00 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

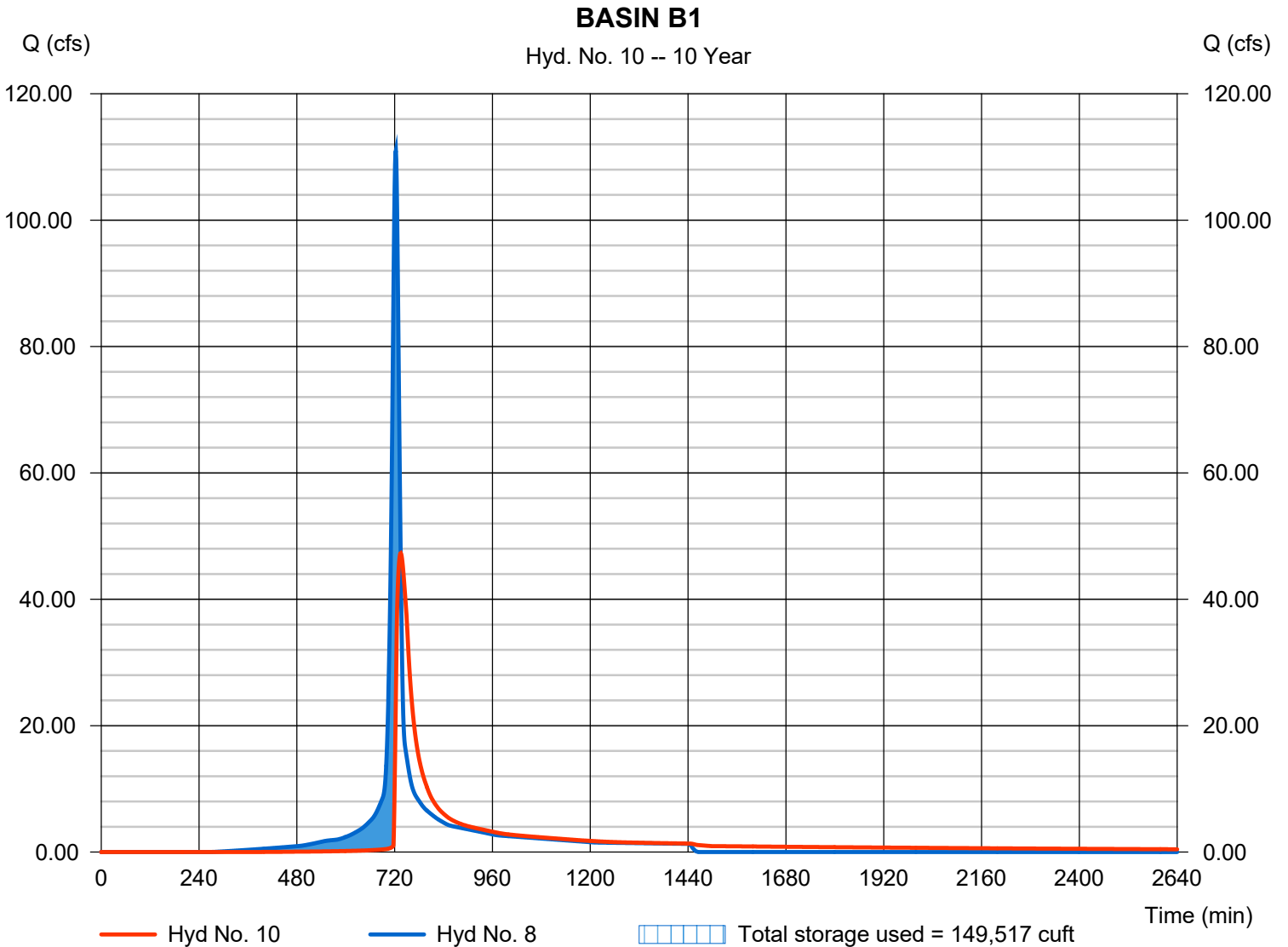
Wednesday, 03 / 30 / 2022

Hyd. No. 10

BASIN B1

Hydrograph type	= Reservoir	Peak discharge	= 47.31 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 290,800 cuft
Inflow hyd. No.	= 8 - Prop B1	Max. Elevation	= 965.65 ft
Reservoir name	= Basin B1	Max. Storage	= 149,517 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

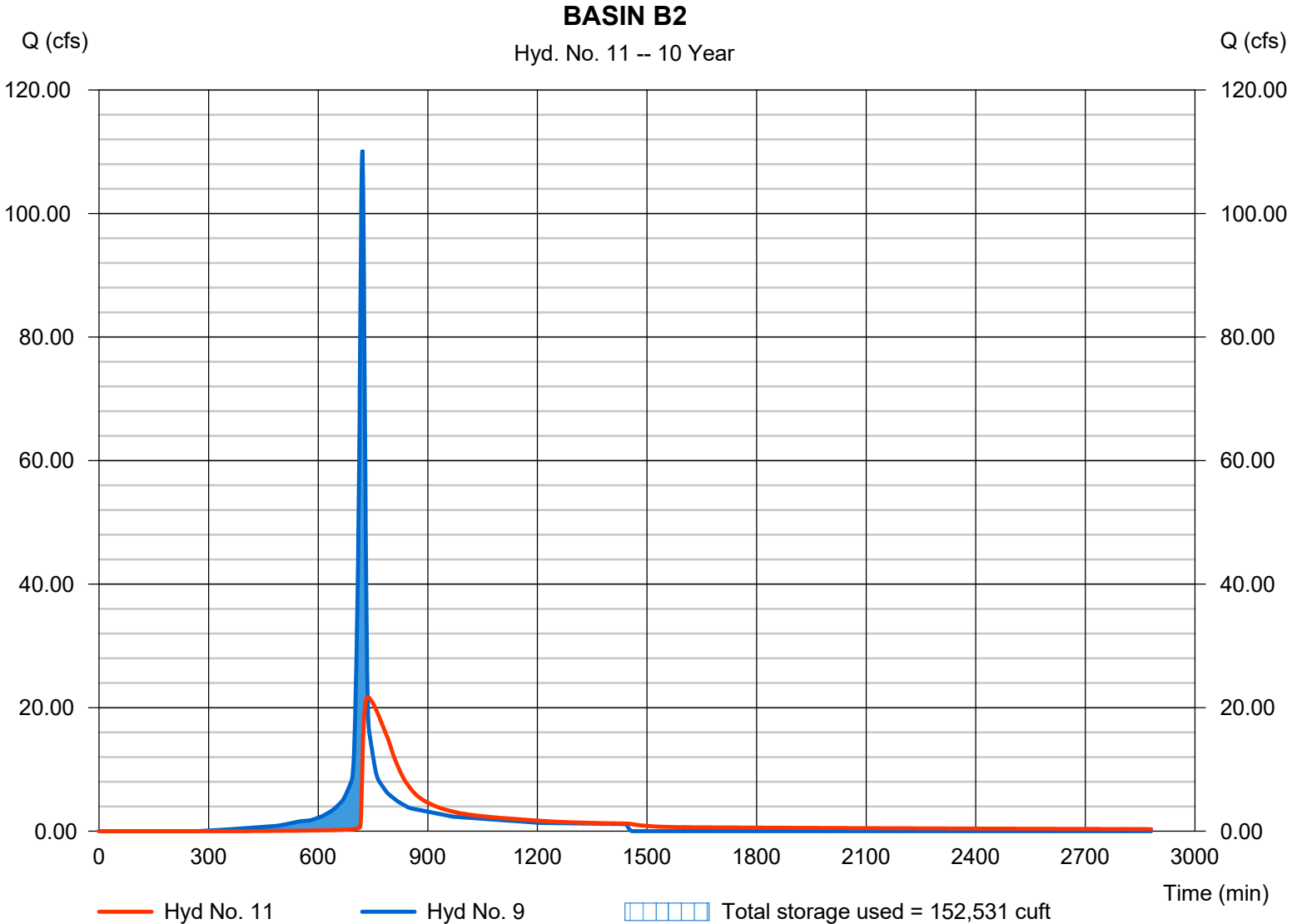
Wednesday, 03 / 30 / 2022

Hyd. No. 11

BASIN B2

Hydrograph type	= Reservoir	Peak discharge	= 21.74 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 248,875 cuft
Inflow hyd. No.	= 9 - Prop B2	Max. Elevation	= 970.93 ft
Reservoir name	= Basin B2	Max. Storage	= 152,531 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

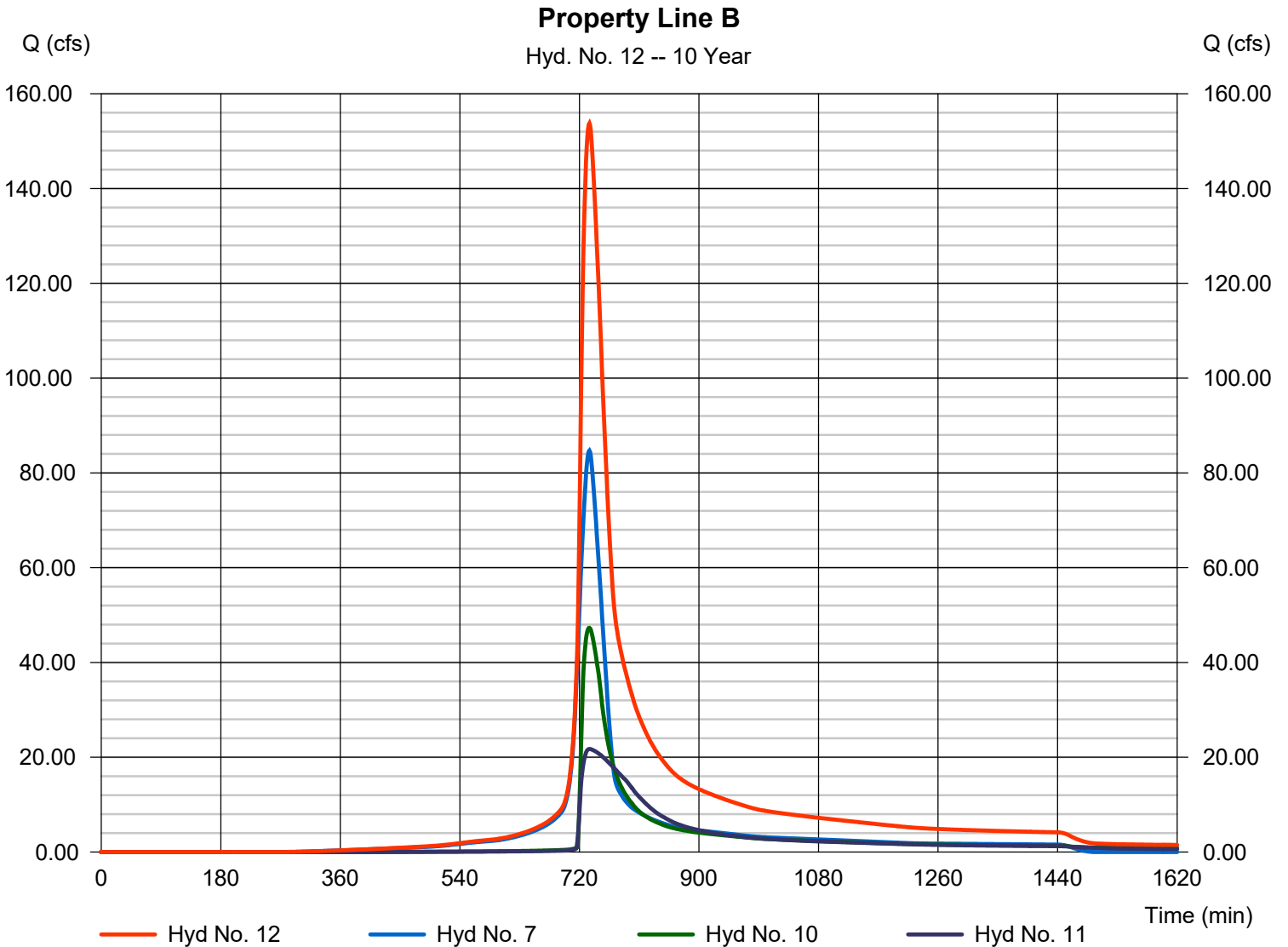
Wednesday, 03 / 30 / 2022

Hyd. No. 12

Property Line B

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 7, 10, 11

Peak discharge = 153.76 cfs
Time to peak = 735 min
Hyd. volume = 933,170 cuft
Contrib. drain. area = 27.930 ac



Hydrograph Report

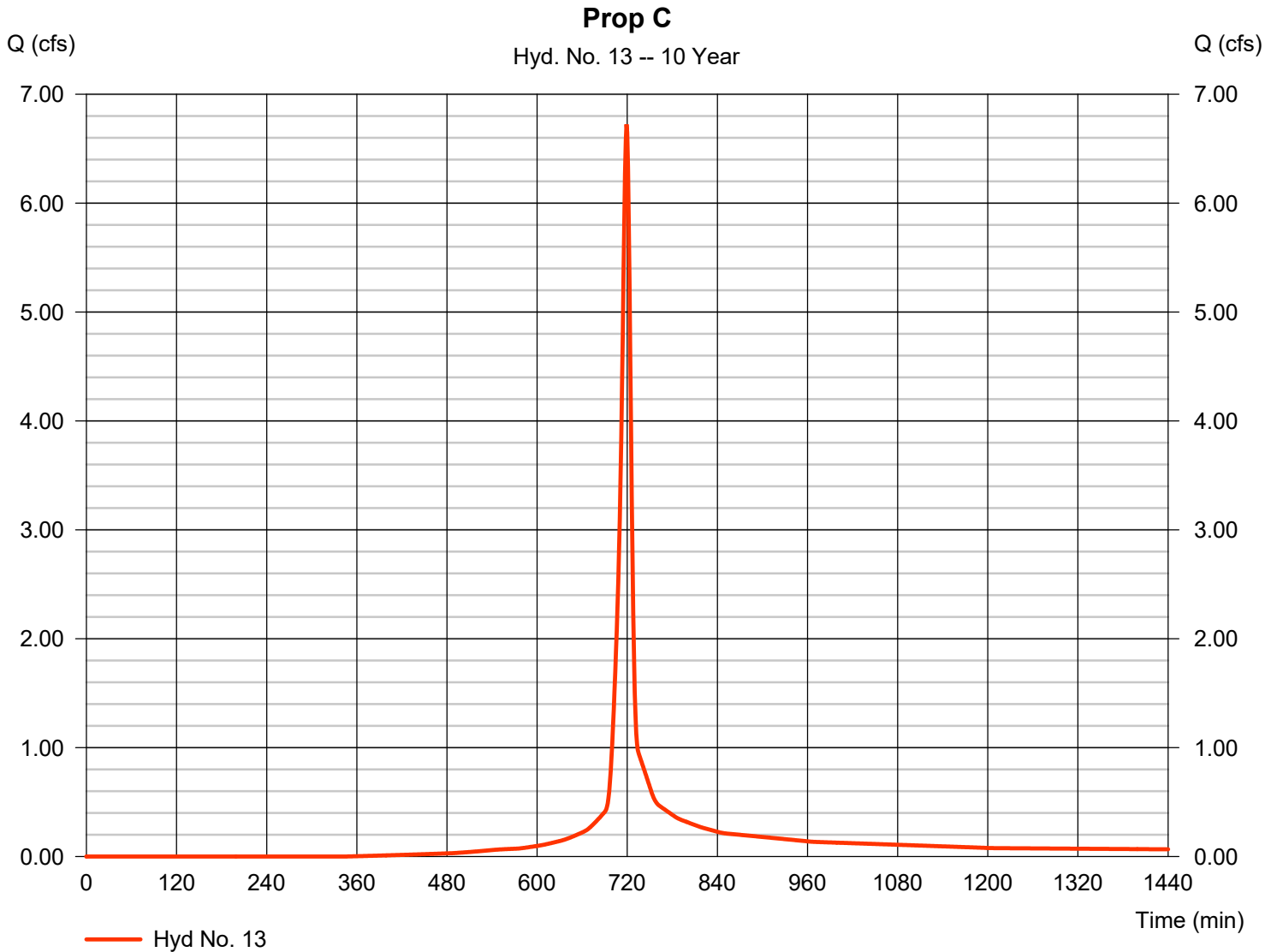
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Wednesday, 03 / 30 / 2022

Hyd. No. 13

Prop C

Hydrograph type	= SCS Runoff	Peak discharge	= 6.723 cfs
Storm frequency	= 10 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 15,547 cuft
Drainage area	= 1.240 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

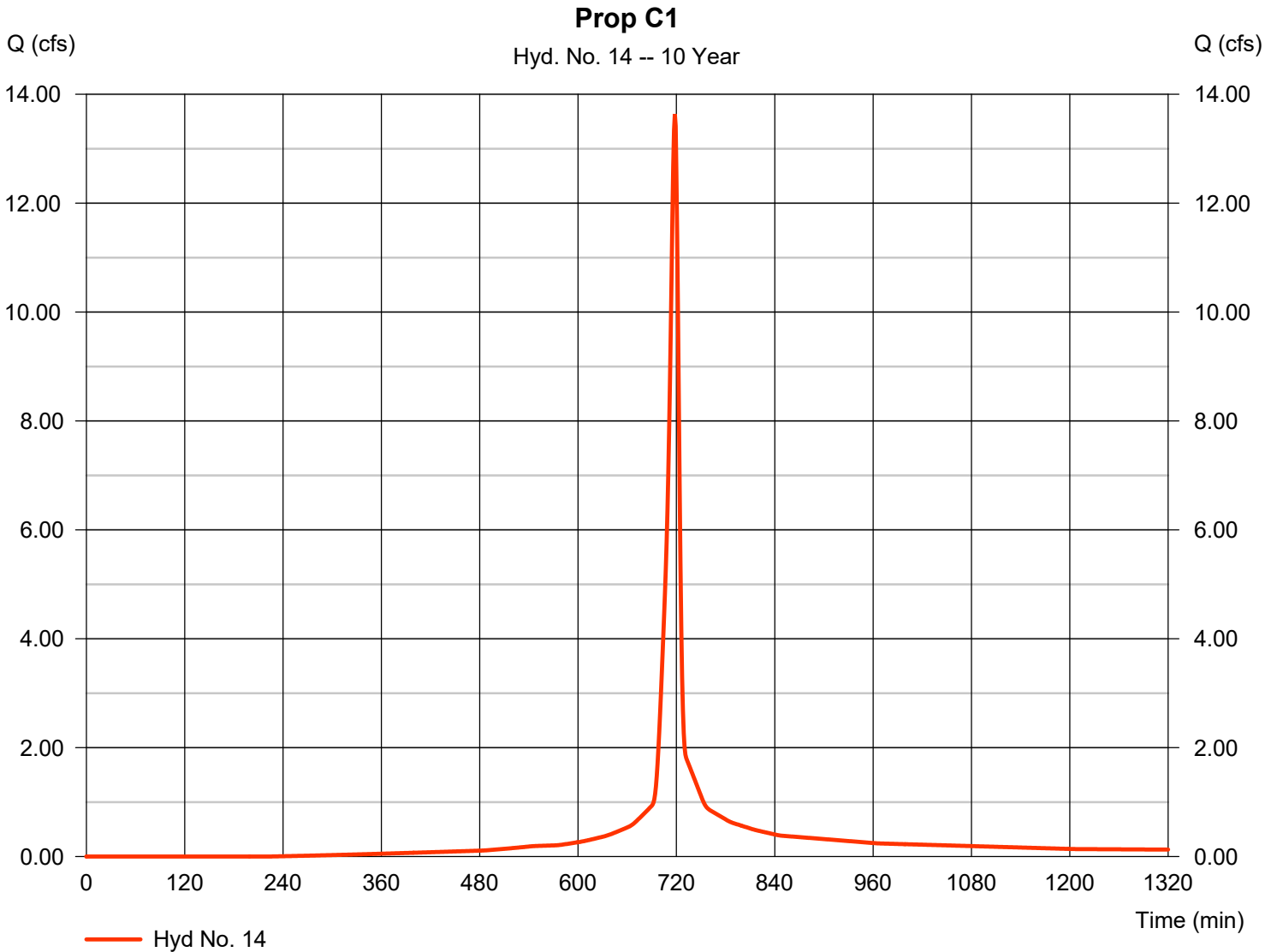
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 14

Prop C1

Hydrograph type	= SCS Runoff	Peak discharge	= 13.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 30,822 cuft
Drainage area	= 2.140 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

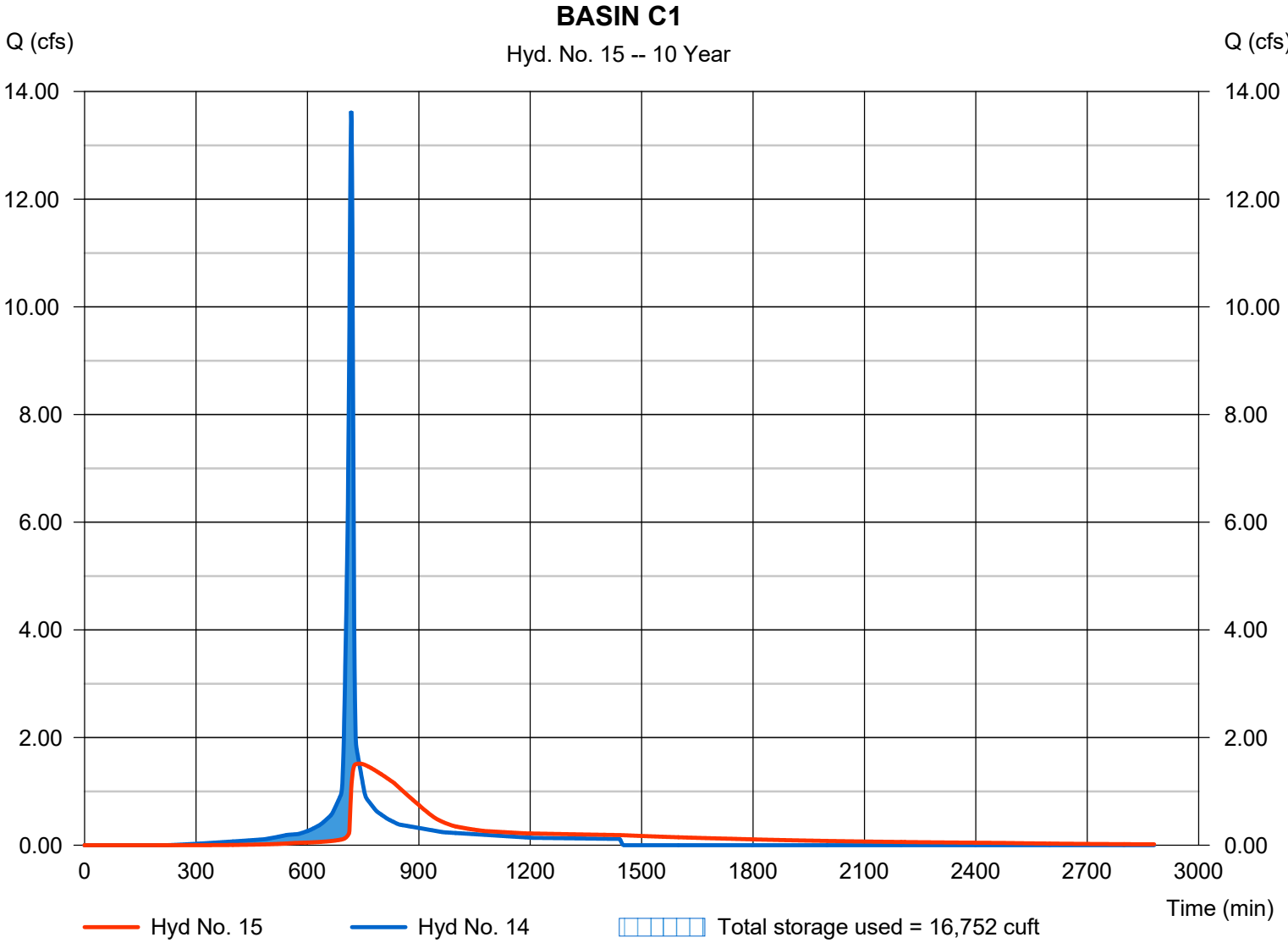
Wednesday, 03 / 30 / 2022

Hyd. No. 15

BASIN C1

Hydrograph type	= Reservoir	Peak discharge	= 1.515 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 1 min	Hyd. volume	= 30,059 cuft
Inflow hyd. No.	= 14 - Prop C1	Max. Elevation	= 971.62 ft
Reservoir name	= Basin C1	Max. Storage	= 16,752 cuft

Storage Indication method used.



Hydrograph Report

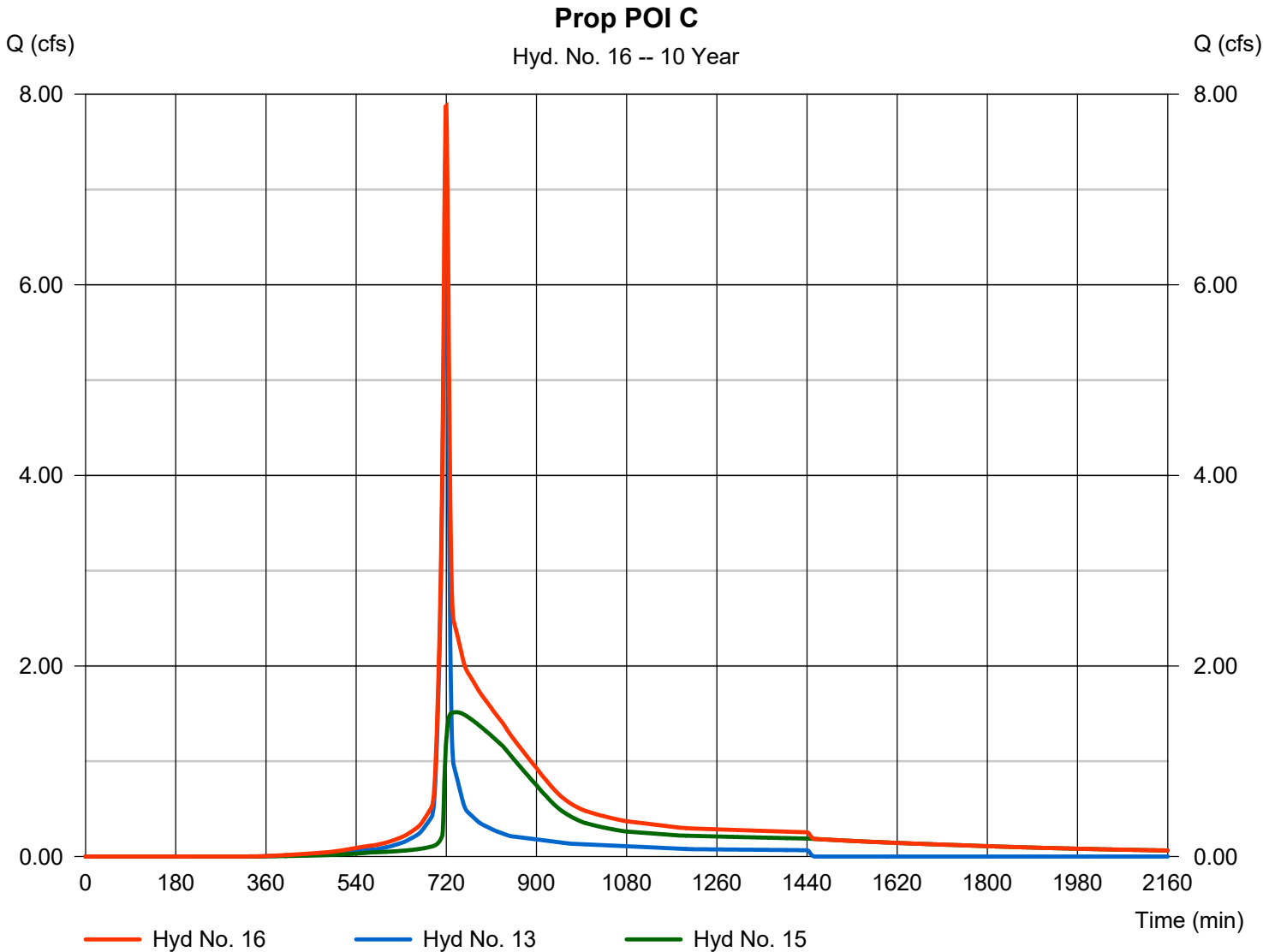
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 16

Prop POI C

Hydrograph type	= Combine	Peak discharge	= 7.879 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 45,605 cuft
Inflow hyds.	= 13, 15	Contrib. drain. area	= 1.240 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 17

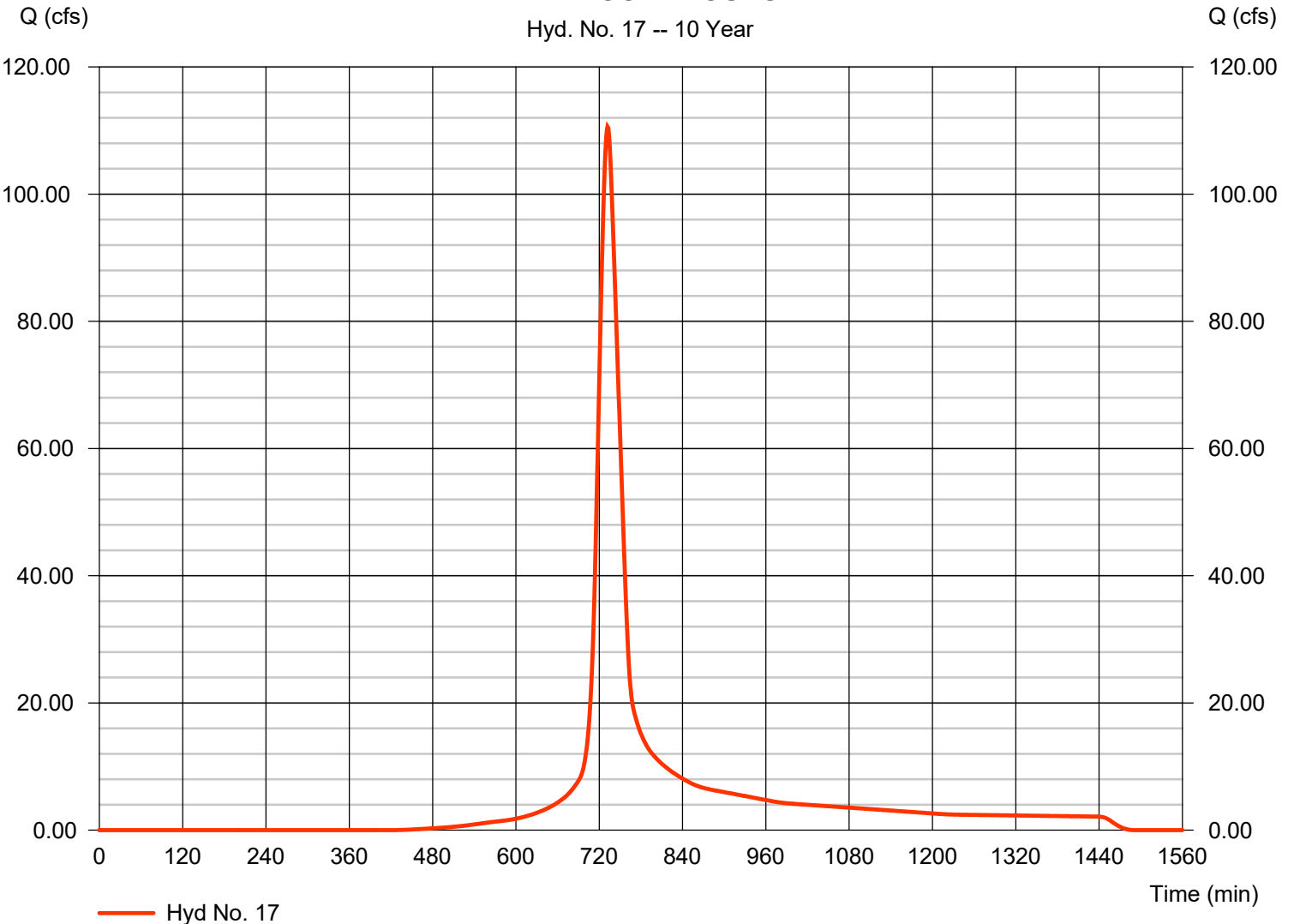
AREA A GOLF COURSE

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 40.970 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.20 in
Storm duration = 24 hrs

Peak discharge = 110.60 cfs
Time to peak = 732 min
Hyd. volume = 459,287 cuft
Curve number = 80
Hydraulic length = 0 ft
Time of conc. (Tc) = 31.00 min
Distribution = Type II
Shape factor = 484

AREA A GOLF COURSE

Hyd. No. 17 -- 10 Year



Hydrograph Report

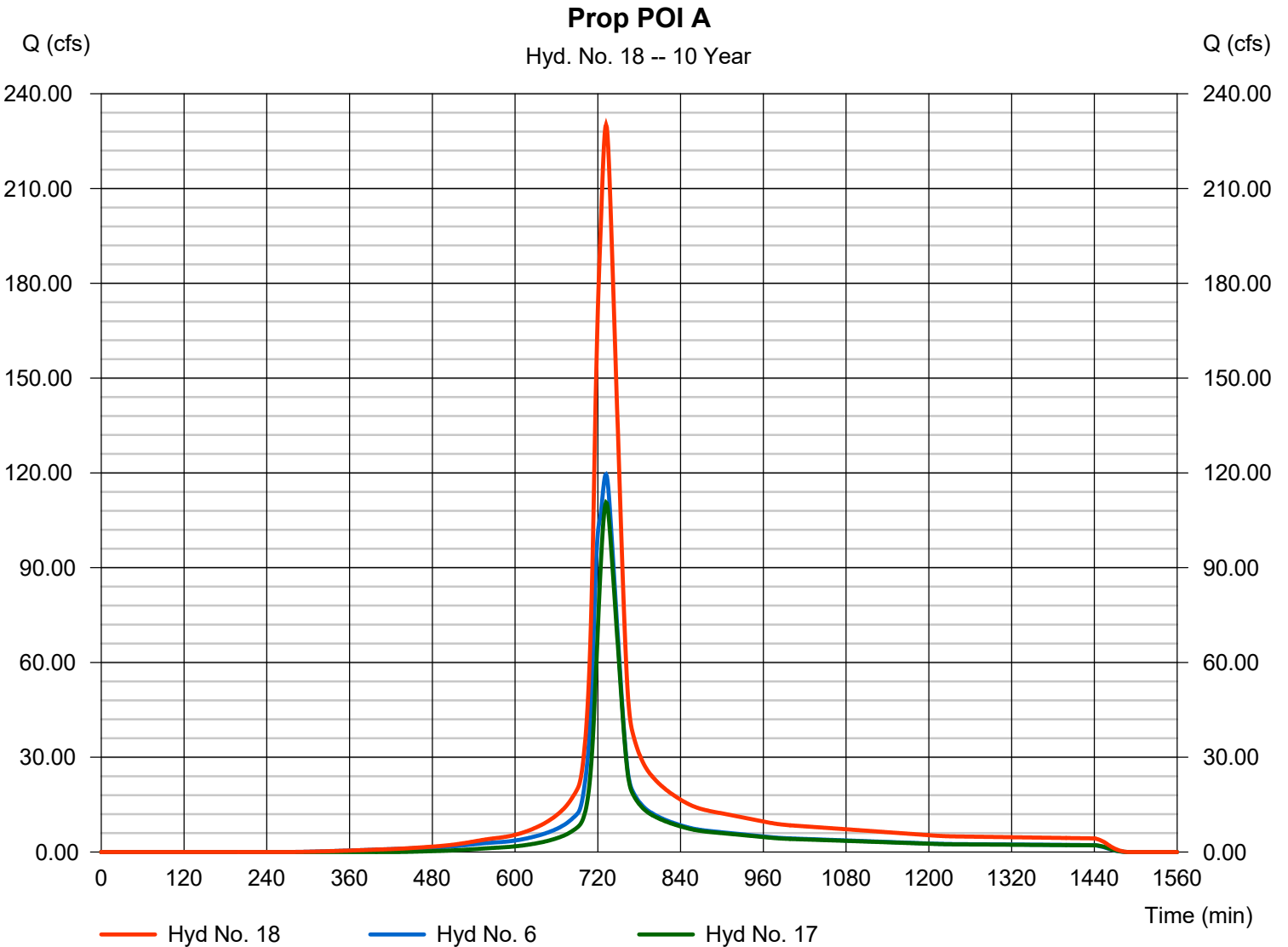
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 18

Prop POI A

Hydrograph type	= Combine	Peak discharge	= 230.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 1,005,709 cuft
Inflow hyds.	= 6, 17	Contrib. drain. area	= 40.970 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

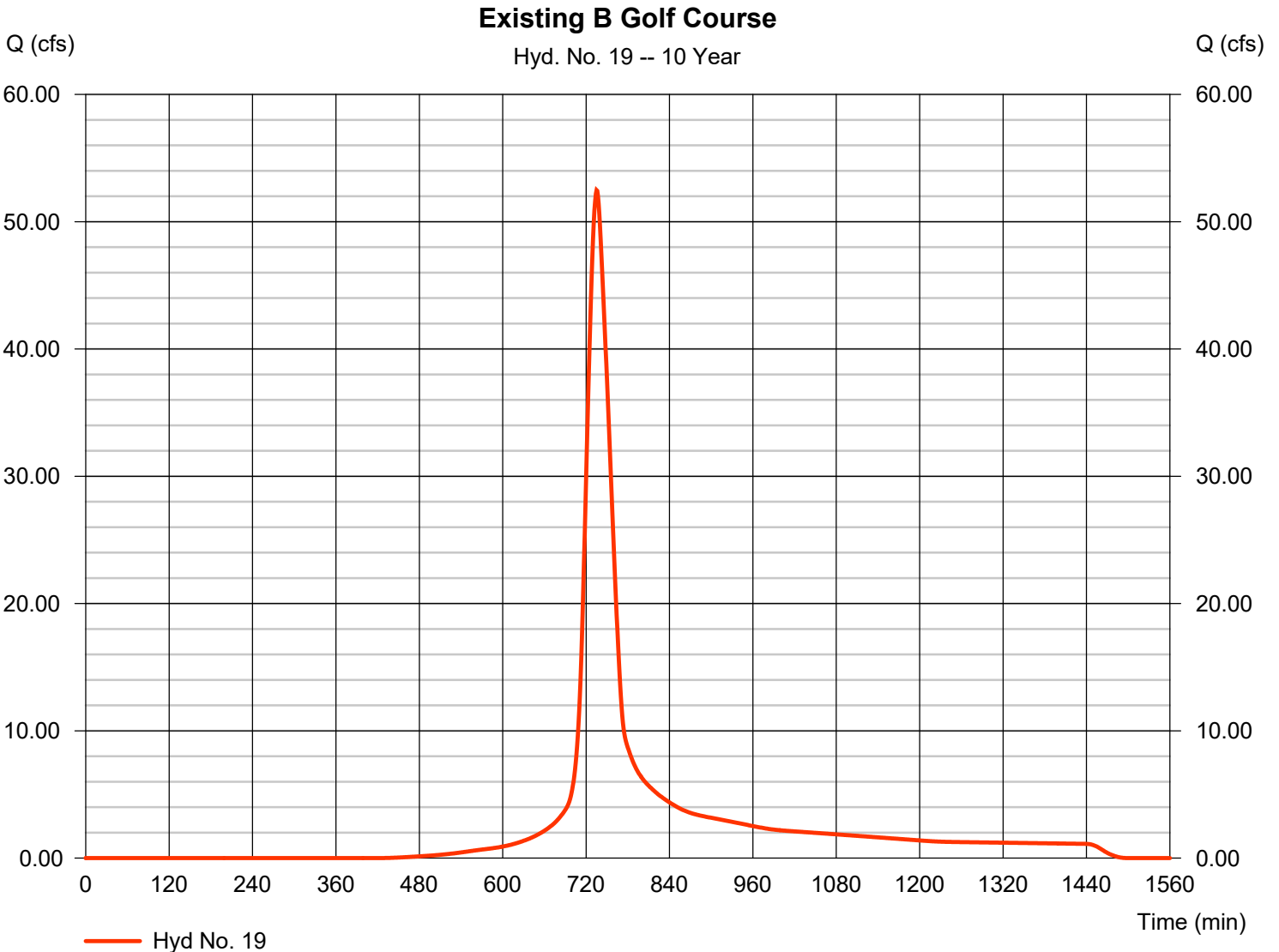
Wednesday, 03 / 30 / 2022

Hyd. No. 19

Existing B Golf Course

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 21.450 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 5.20 in
Storm duration = 24 hrs

Peak discharge = 52.47 cfs
Time to peak = 735 min
Hyd. volume = 240,247 cuft
Curve number = 80
Hydraulic length = 0 ft
Time of conc. (Tc) = 36.50 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

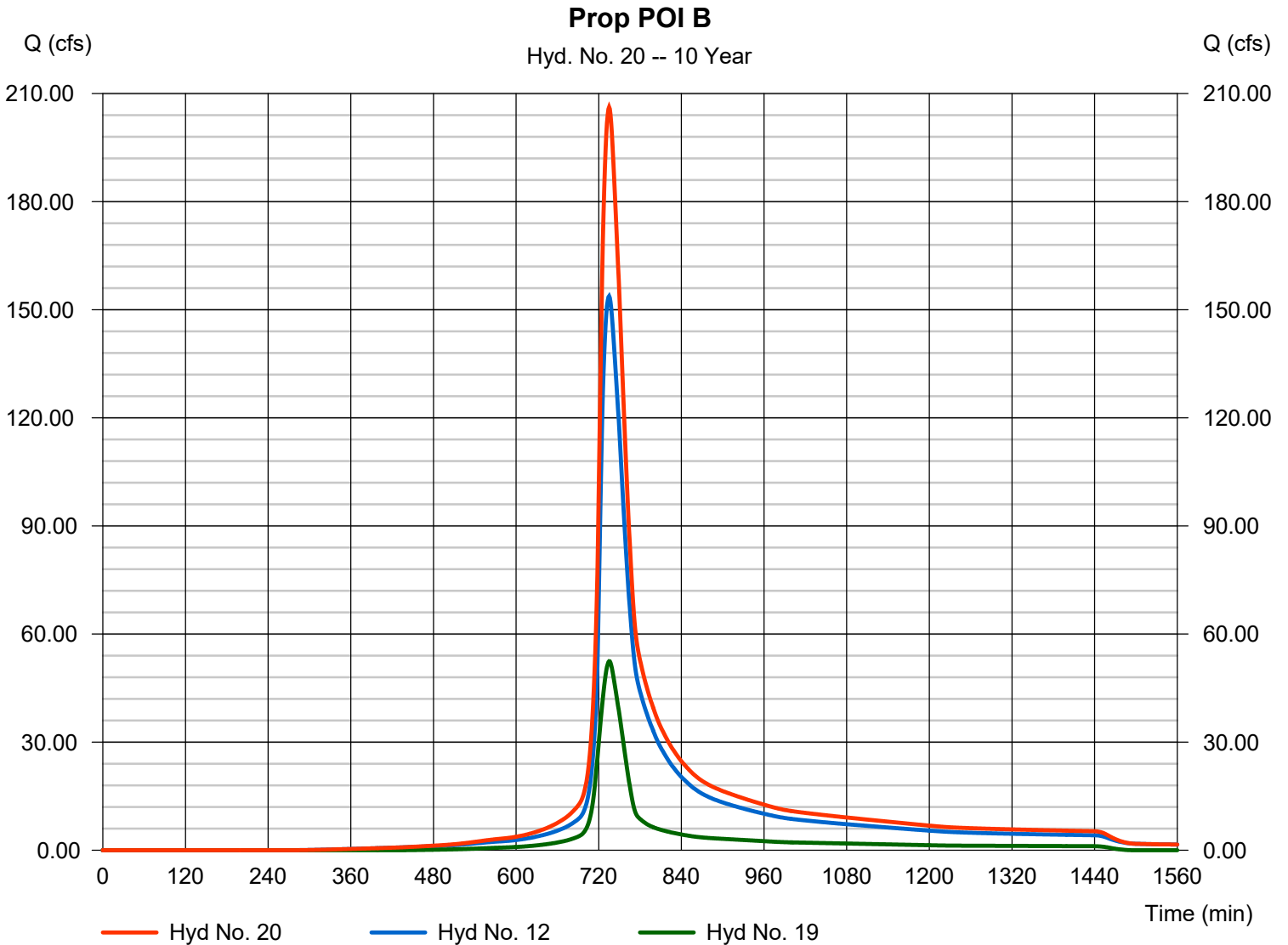
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 20

Prop POI B

Hydrograph type	= Combine	Peak discharge	= 206.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 1,173,416 cuft
Inflow hyds.	= 12, 19	Contrib. drain. area	= 21.450 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

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	387.75	1	732	1,630,570	-----	-----	-----	Ex POI A	
2	SCS Runoff	431.22	1	735	2,008,415	-----	-----	-----	Ex POI B	
3	SCS Runoff	46.57	1	720	120,565	-----	-----	-----	Ex POI C	
4	SCS Runoff	184.87	1	732	797,002	-----	-----	-----	Existing A Crop	
5	SCS Runoff	43.39	1	717	93,807	-----	-----	-----	Prop A1	
6	Combine	190.31	1	732	890,809	4, 5	-----	-----	Property Line	
7	SCS Runoff	134.98	1	735	639,828	-----	-----	-----	EXISTING B CROP	
8	SCS Runoff	175.83	1	723	530,001	-----	-----	-----	Prop B1	
9	SCS Runoff	174.28	1	721	470,433	-----	-----	-----	Prop B2	
10	Reservoir	74.71	1	735	494,406	8	967.91	224,290	BASIN B1	
11	Reservoir	33.71	1	735	429,307	9	973.76	245,701	BASIN B2	
12	Combine	243.41	1	735	1,563,540	7, 10, 11	-----	-----	Property Line B	
13	SCS Runoff	11.00	1	719	26,141	-----	-----	-----	Prop C	
14	SCS Runoff	21.15	1	718	49,310	-----	-----	-----	Prop C1	
15	Reservoir	2.223	1	741	48,451	14	973.16	26,972	BASIN C1	
16	Combine	12.86	1	719	74,592	13, 15	-----	-----	Prop POI C	
17	SCS Runoff	191.23	1	732	800,044	-----	-----	-----	AREA A GOLF COURSE	
18	Combine	381.53	1	732	1,690,853	6, 17	-----	-----	Prop POI A	
19	SCS Runoff	90.85	1	735	418,492	-----	-----	-----	Existing B Golf Course	
20	Combine	334.25	1	735	1,982,034	12, 19	-----	-----	Prop POI B	
WEAVER DEVELOPMENT 220325.gpw					Return Period: 100 Year			Wednesday, 03 / 30 / 2022		

Hydrograph Report

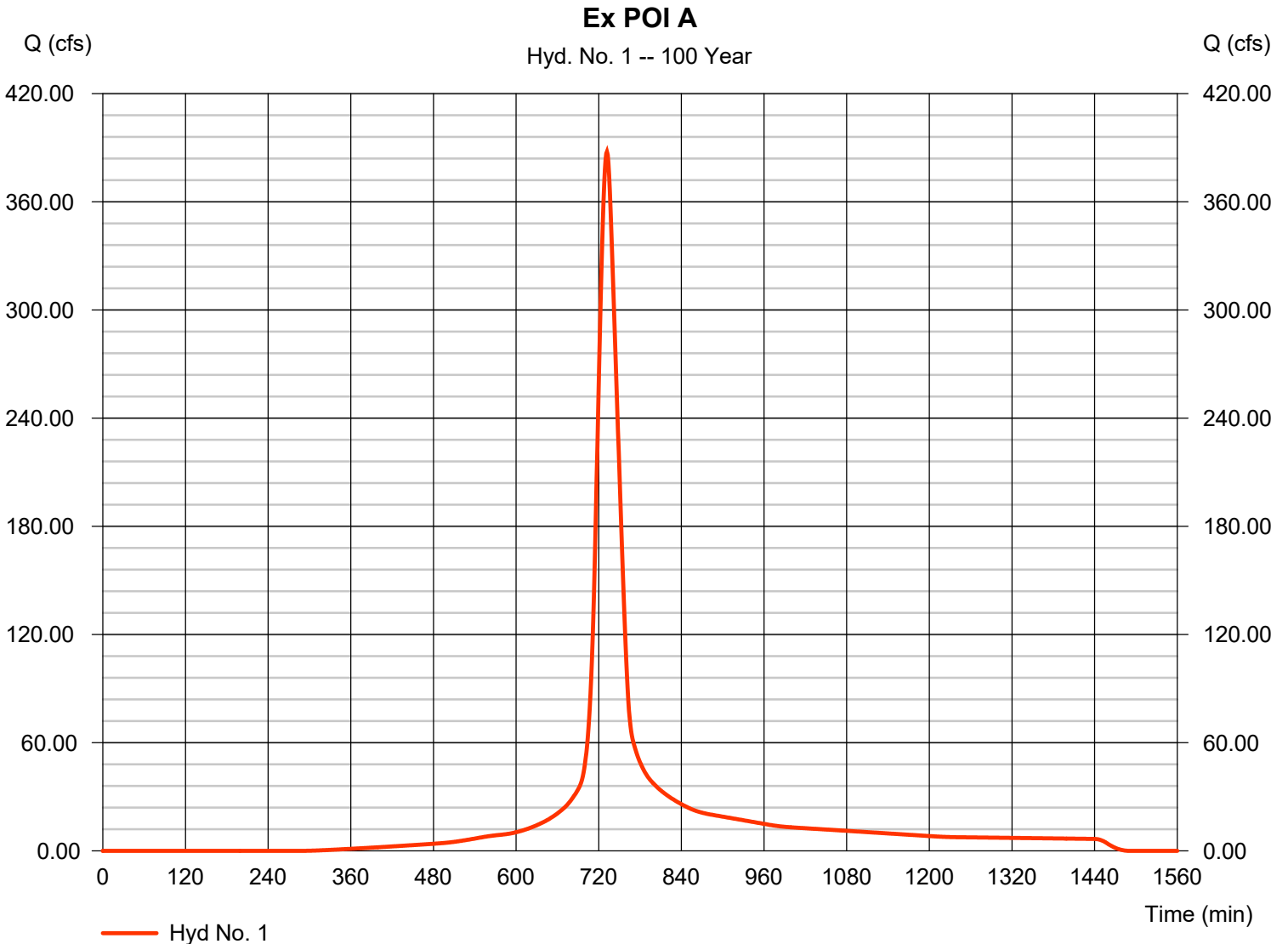
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 1

Ex POI A

Hydrograph type	= SCS Runoff	Peak discharge	= 387.75 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 1,630,570 cuft
Drainage area	= 80.040 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.00 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

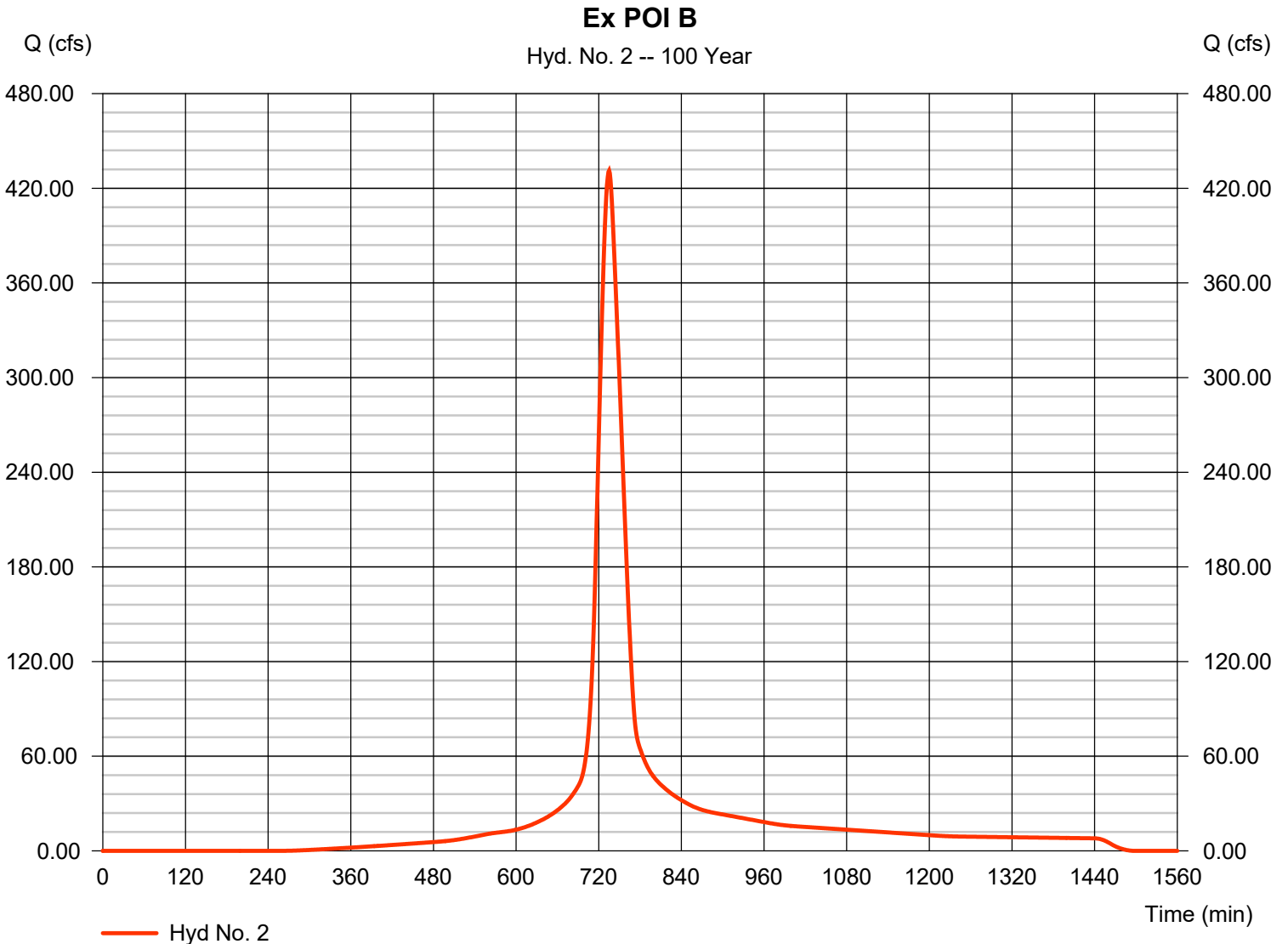
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 2

Ex POI B

Hydrograph type	= SCS Runoff	Peak discharge	= 431.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 2,008,415 cuft
Drainage area	= 94.730 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 36.50 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

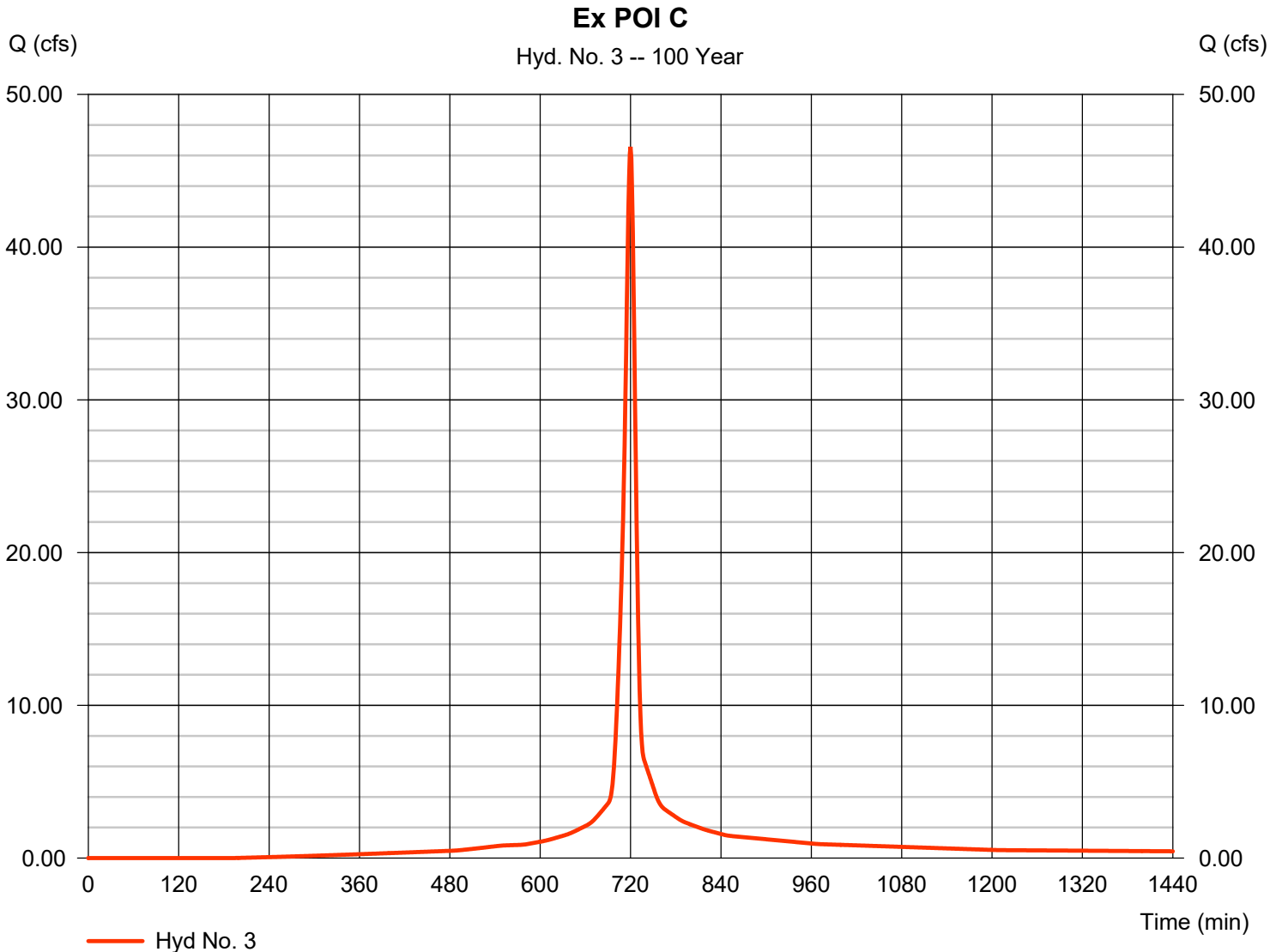
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 3

Ex POI C

Hydrograph type	= SCS Runoff	Peak discharge	= 46.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 120,565 cuft
Drainage area	= 5.200 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 11.00 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

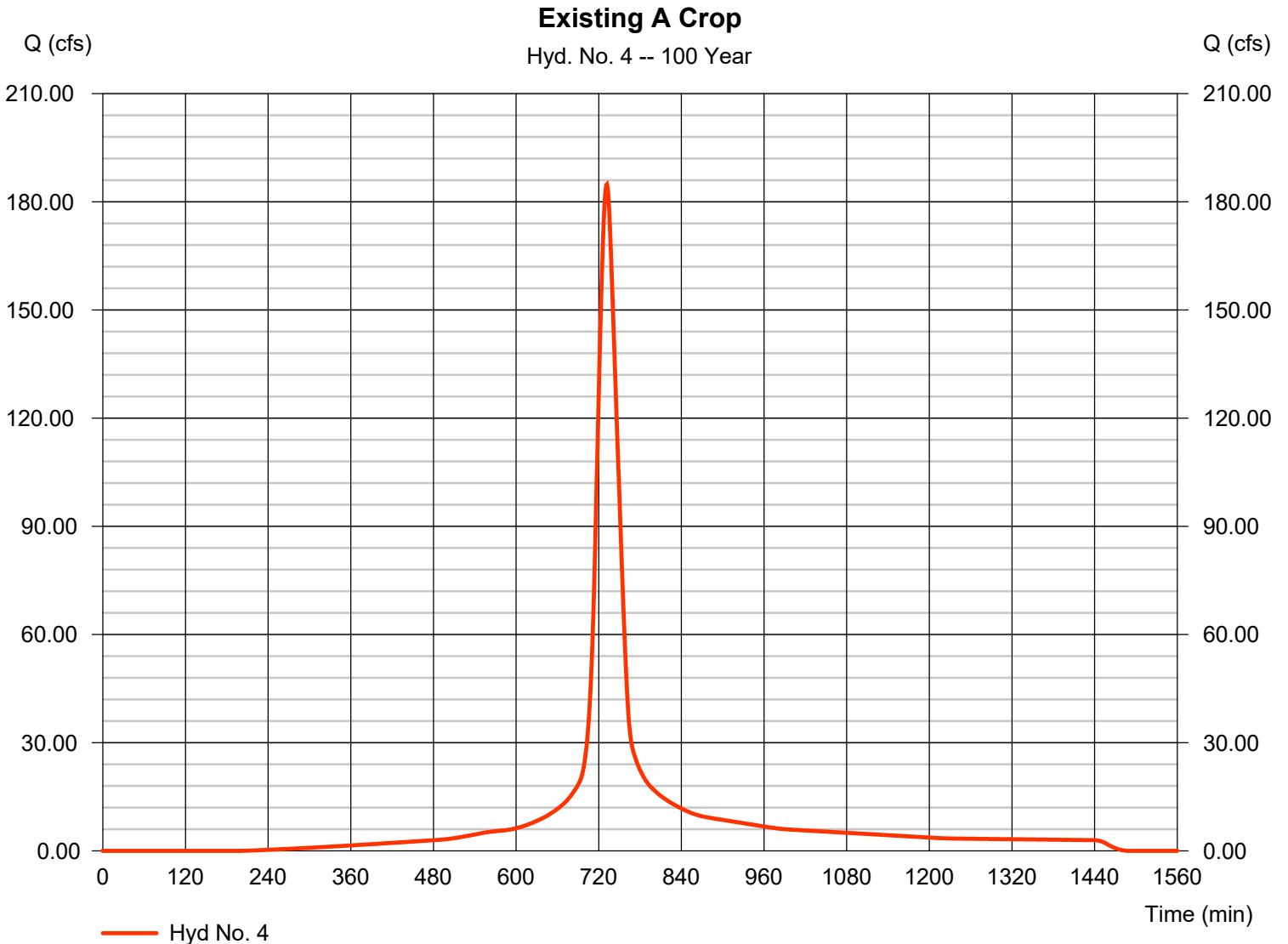
Wednesday, 03 / 30 / 2022

Hyd. No. 4

Existing A Crop

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 34.760 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 7.70 in
 Storm duration = 24 hrs

Peak discharge = 184.87 cfs
 Time to peak = 732 min
 Hyd. volume = 797,002 cuft
 Curve number = 88
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 31.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

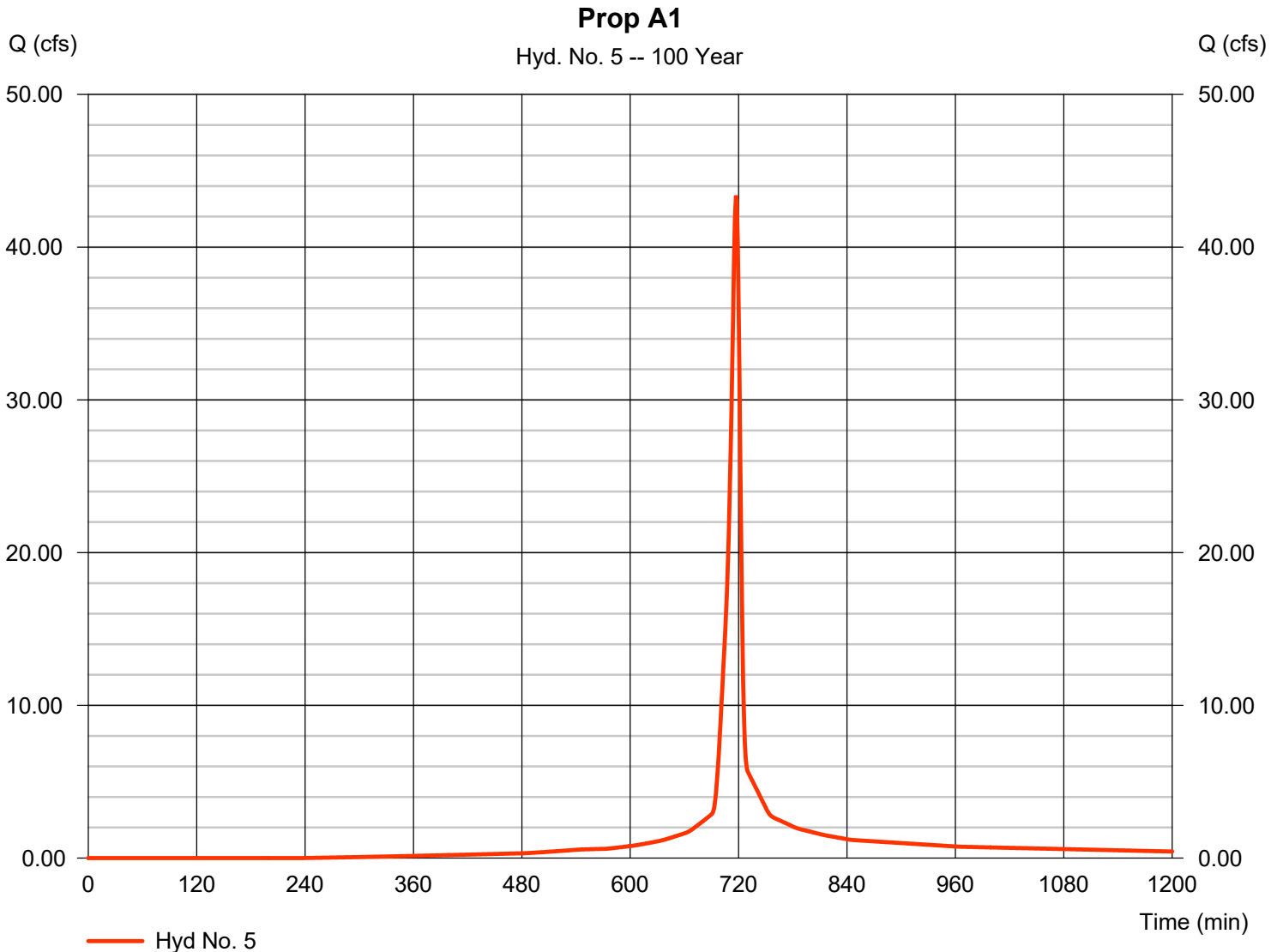
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 5

Prop A1

Hydrograph type	= SCS Runoff	Peak discharge	= 43.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 93,807 cuft
Drainage area	= 4.230 ac	Curve number	= 85
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

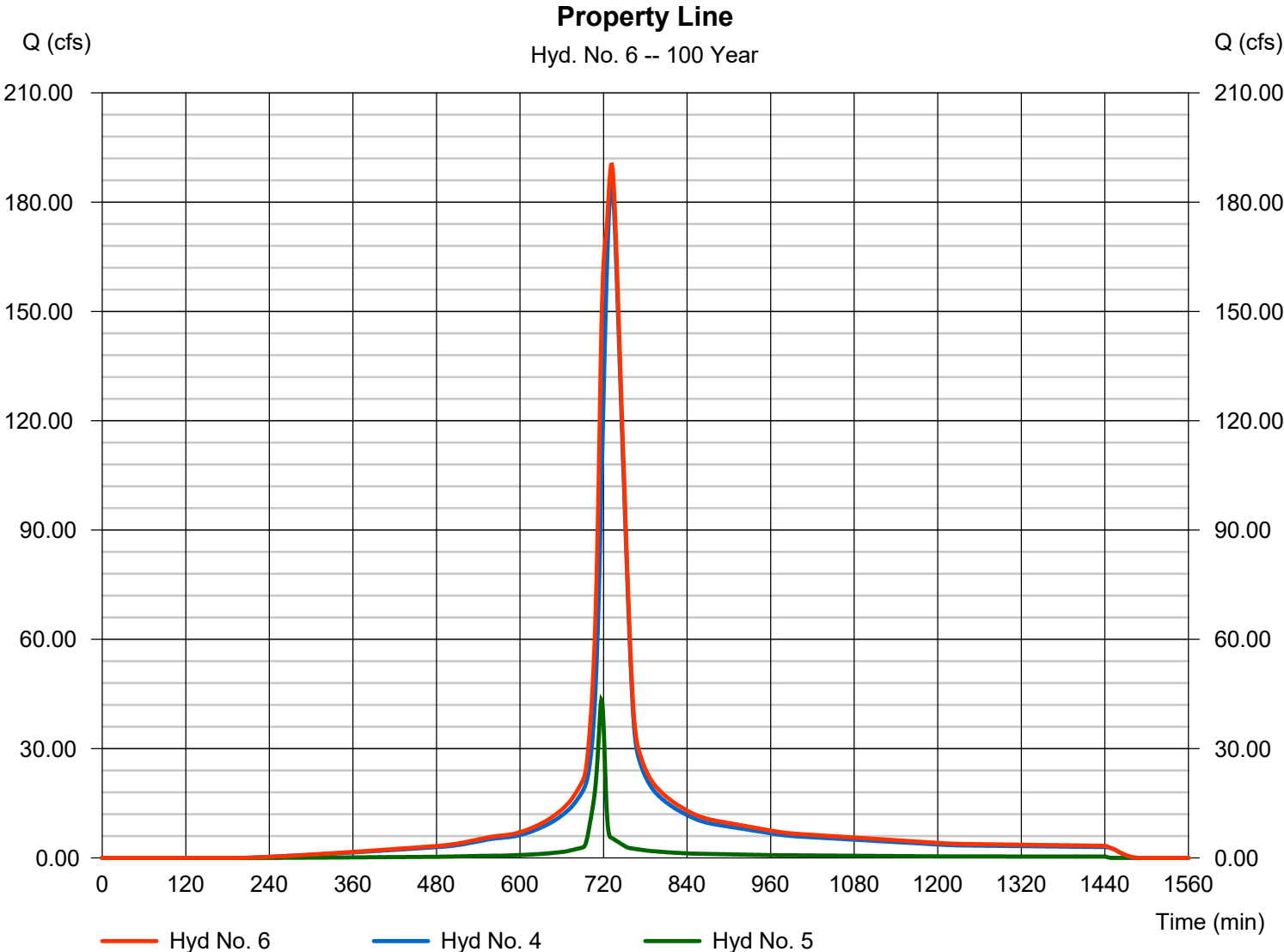
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 6

Property Line

Hydrograph type	= Combine	Peak discharge	= 190.31 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 890,809 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 38.990 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

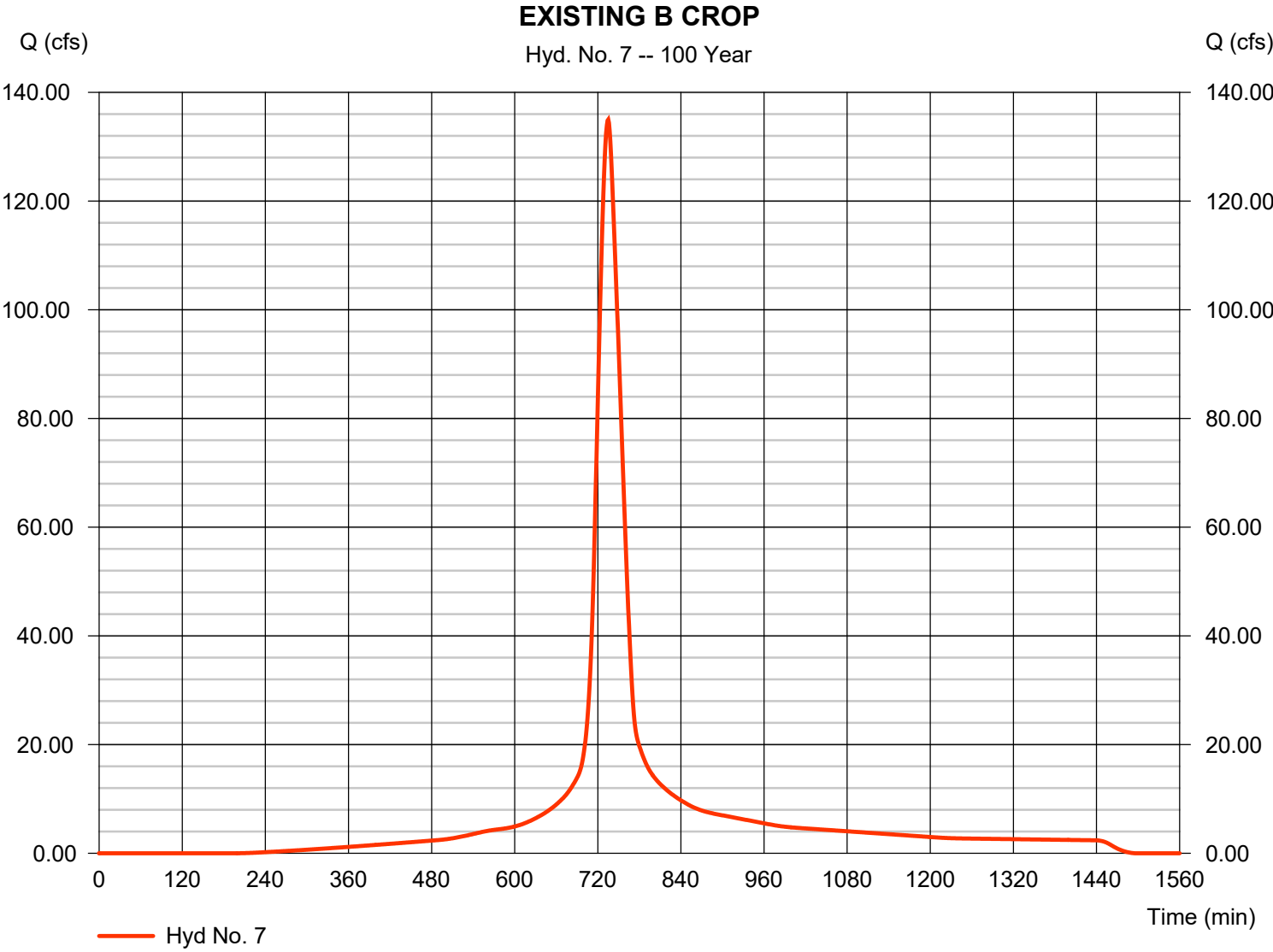
Wednesday, 03 / 30 / 2022

Hyd. No. 7

EXISTING B CROP

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 27.930 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 7.70 in
Storm duration = 24 hrs

Peak discharge = 134.98 cfs
Time to peak = 735 min
Hyd. volume = 639,828 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 35.80 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

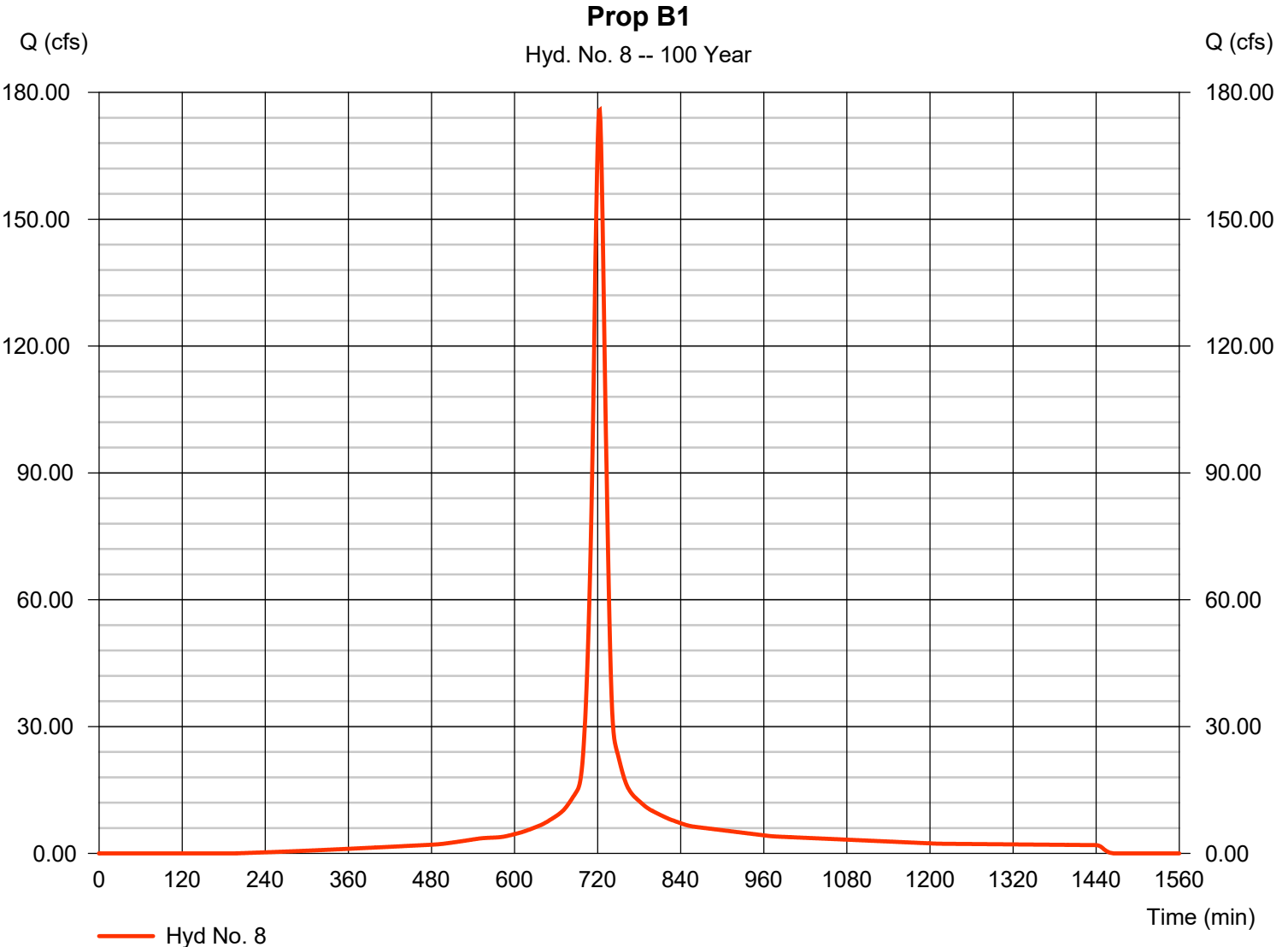
Wednesday, 03 / 30 / 2022

Hyd. No. 8

Prop B1

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 22.980 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 7.70 in
Storm duration = 24 hrs

Peak discharge = 175.83 cfs
Time to peak = 723 min
Hyd. volume = 530,001 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 15.20 min
Distribution = Type II
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

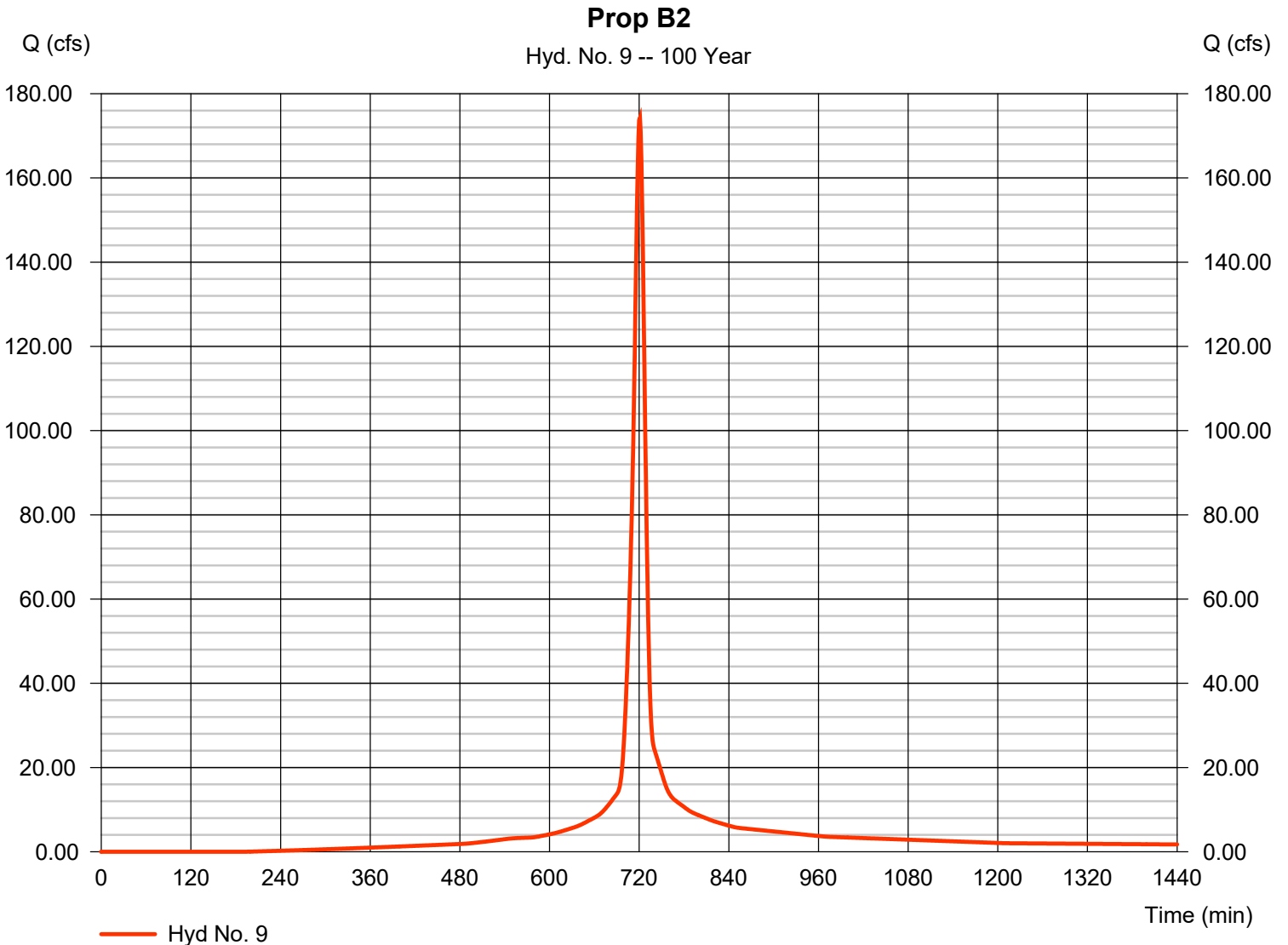
Wednesday, 03 / 30 / 2022

Hyd. No. 9

Prop B2

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 20.980 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 7.70 in
 Storm duration = 24 hrs

Peak discharge = 174.28 cfs
 Time to peak = 721 min
 Hyd. volume = 470,433 cuft
 Curve number = 88
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 13.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

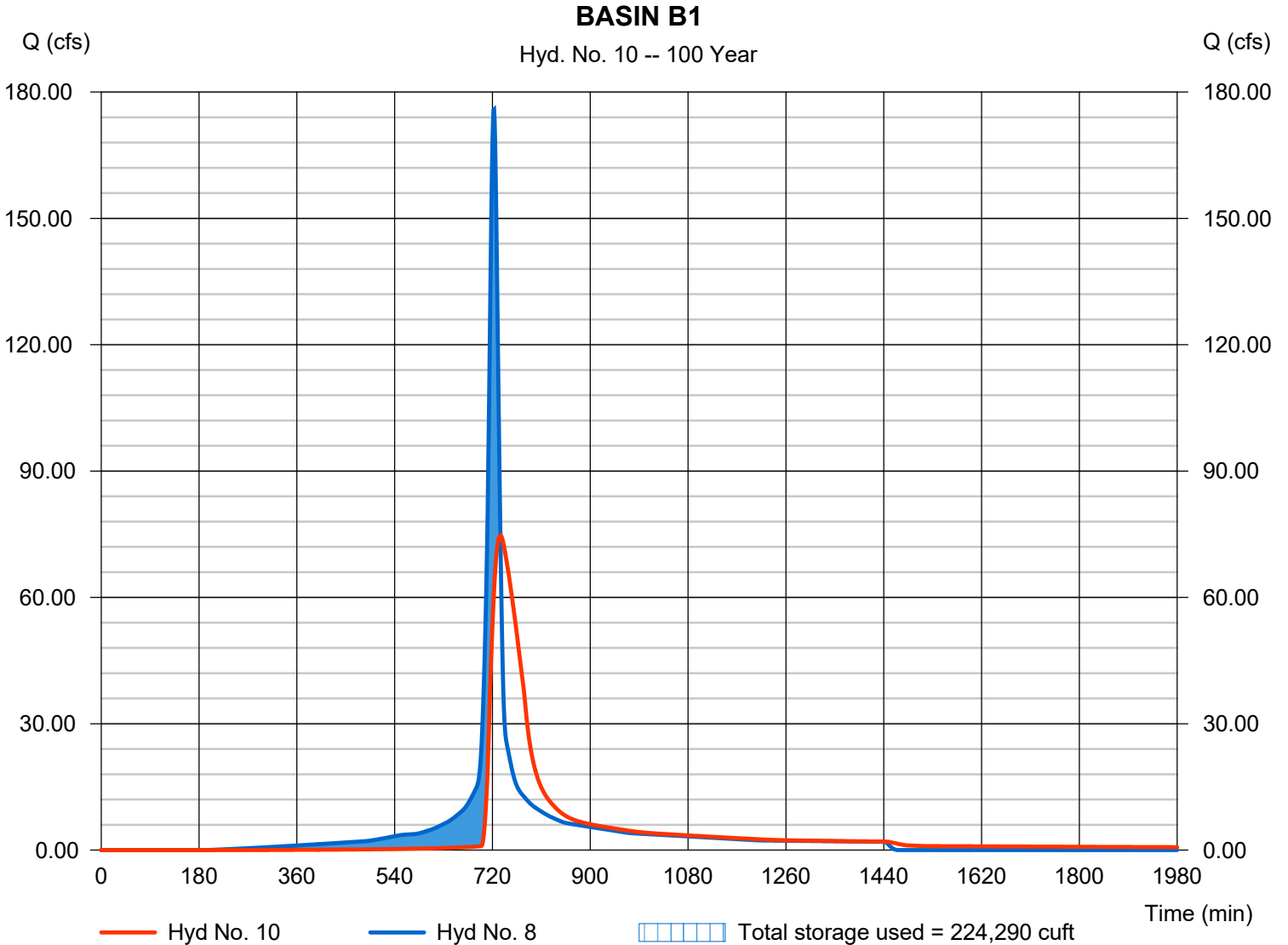
Wednesday, 03 / 30 / 2022

Hyd. No. 10

BASIN B1

Hydrograph type	= Reservoir	Peak discharge	= 74.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 494,406 cuft
Inflow hyd. No.	= 8 - Prop B1	Max. Elevation	= 967.91 ft
Reservoir name	= Basin B1	Max. Storage	= 224,290 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

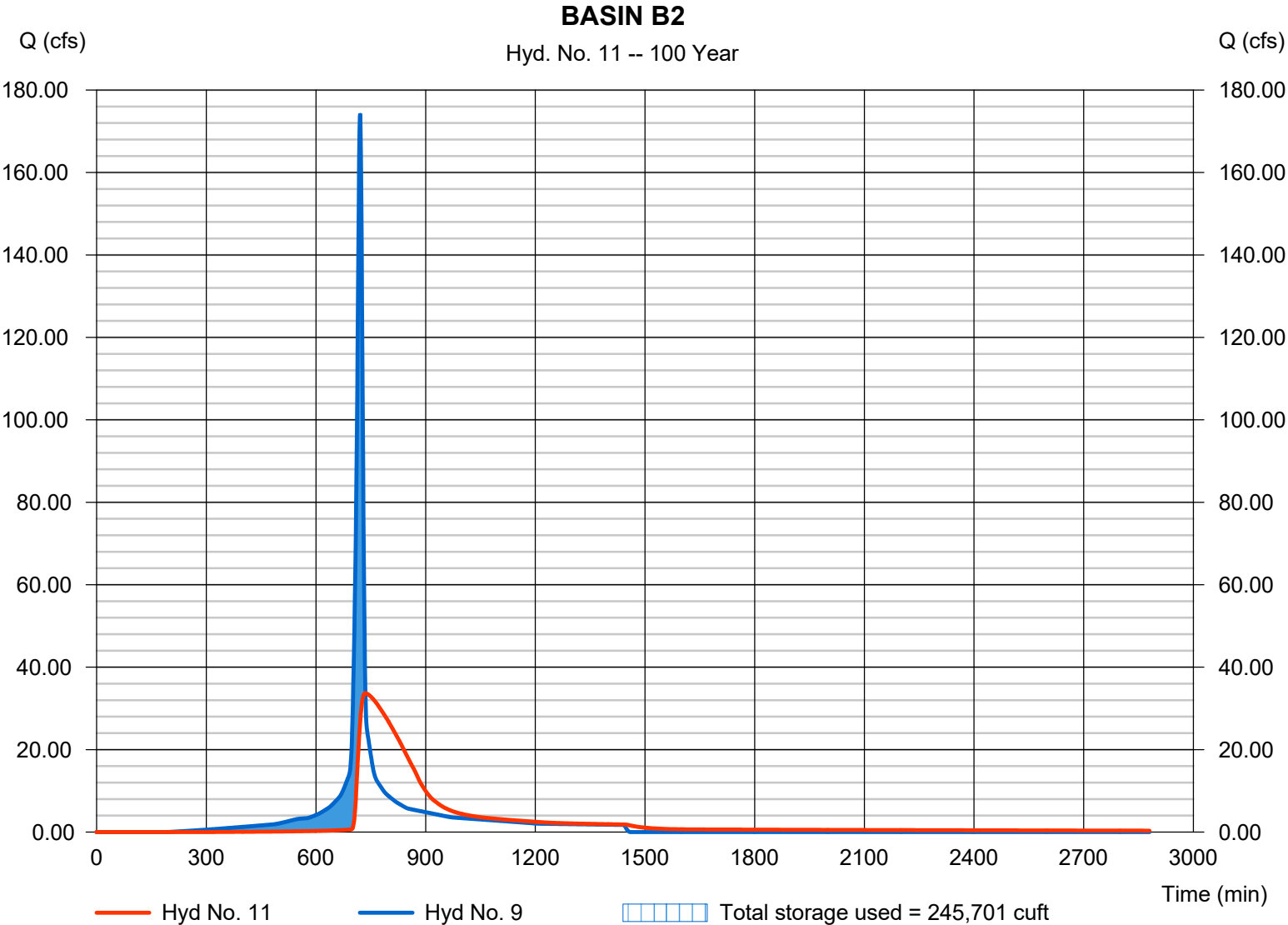
Wednesday, 03 / 30 / 2022

Hyd. No. 11

BASIN B2

Hydrograph type	= Reservoir	Peak discharge	= 33.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 429,307 cuft
Inflow hyd. No.	= 9 - Prop B2	Max. Elevation	= 973.76 ft
Reservoir name	= Basin B2	Max. Storage	= 245,701 cuft

Storage Indication method used.



Hydrograph Report

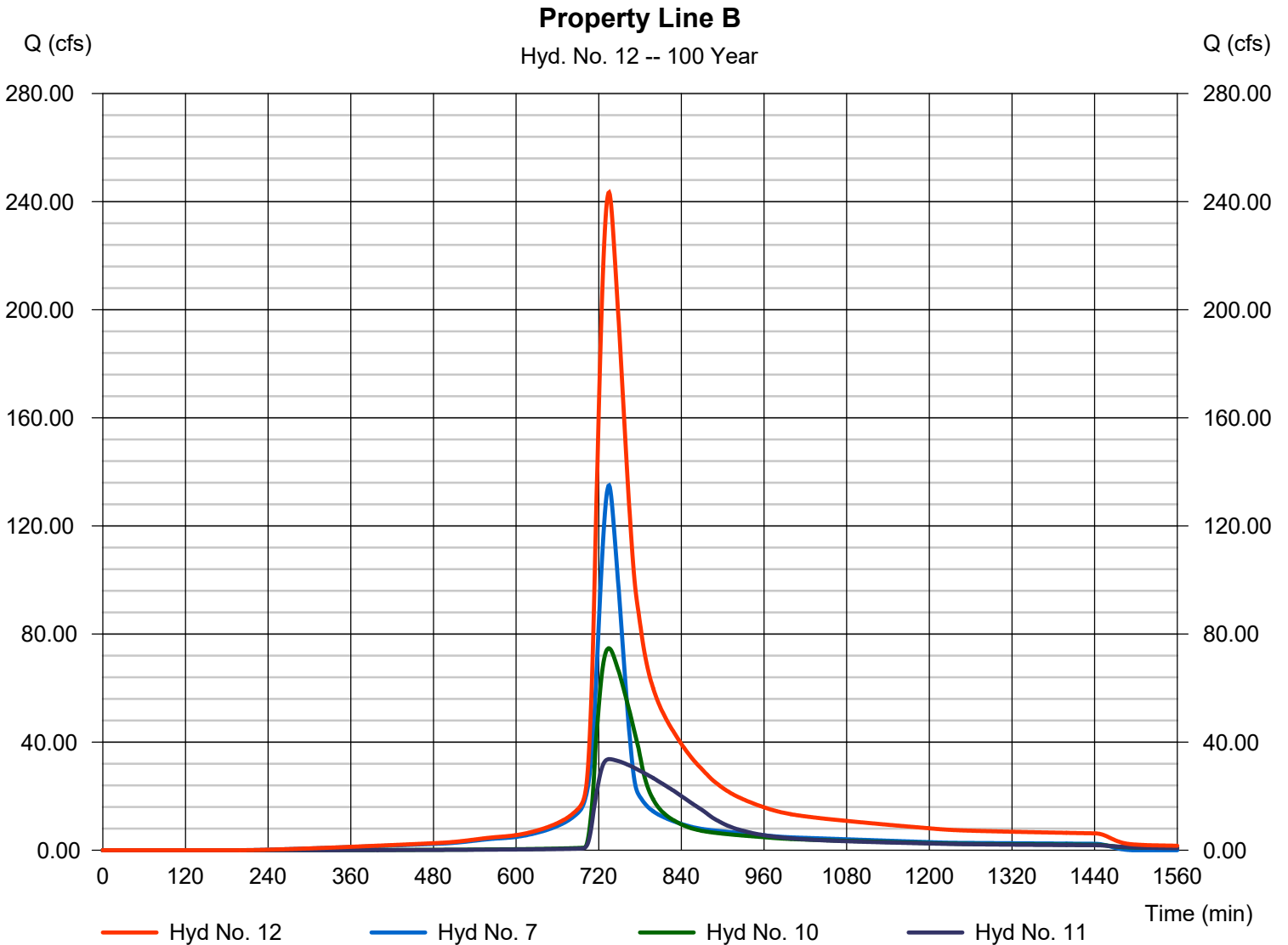
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 12

Property Line B

Hydrograph type	= Combine	Peak discharge	= 243.41 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 1,563,540 cuft
Inflow hyds.	= 7, 10, 11	Contrib. drain. area	= 27.930 ac



Hydrograph Report

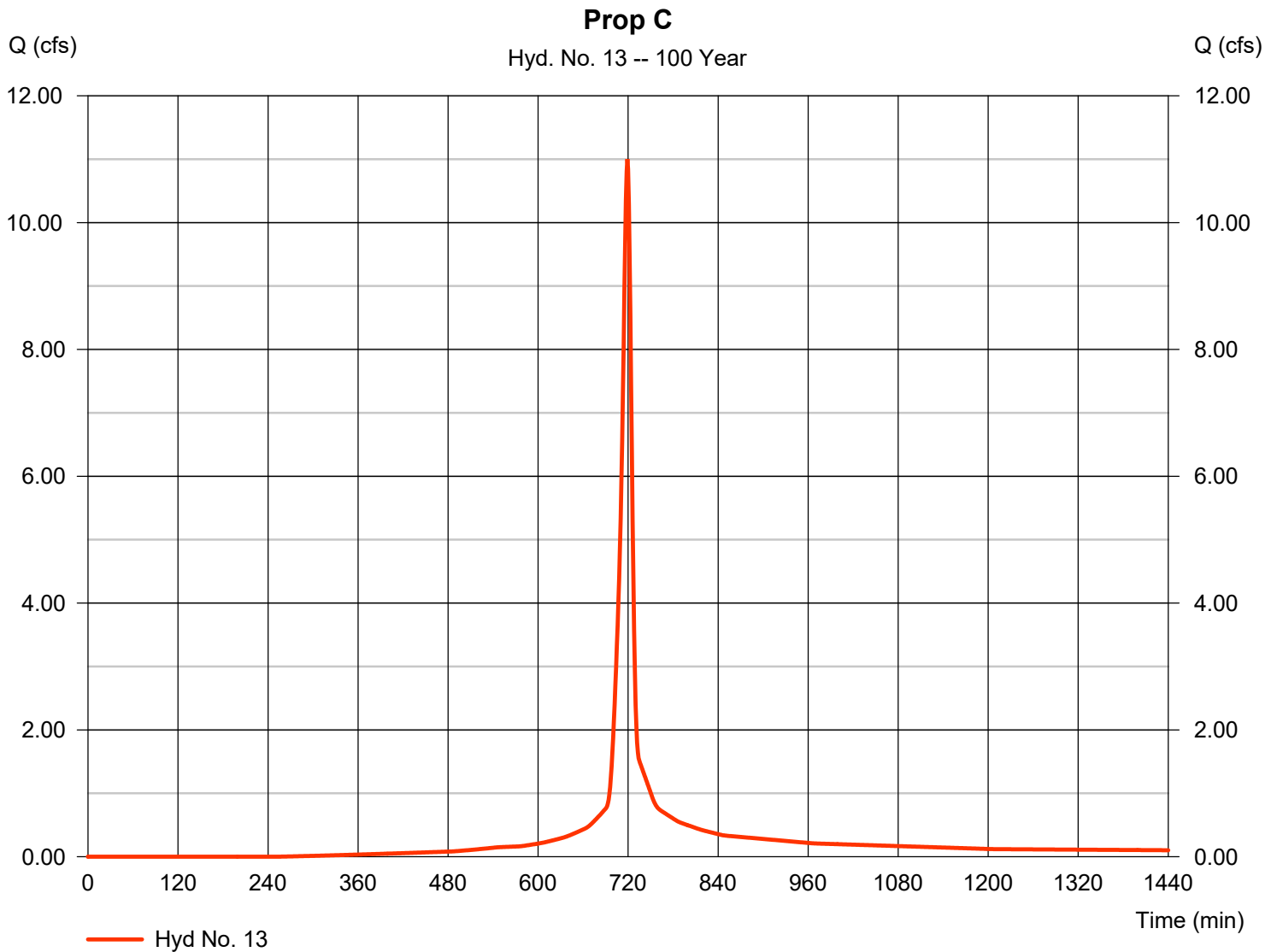
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 13

Prop C

Hydrograph type	= SCS Runoff	Peak discharge	= 11.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 26,141 cuft
Drainage area	= 1.240 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

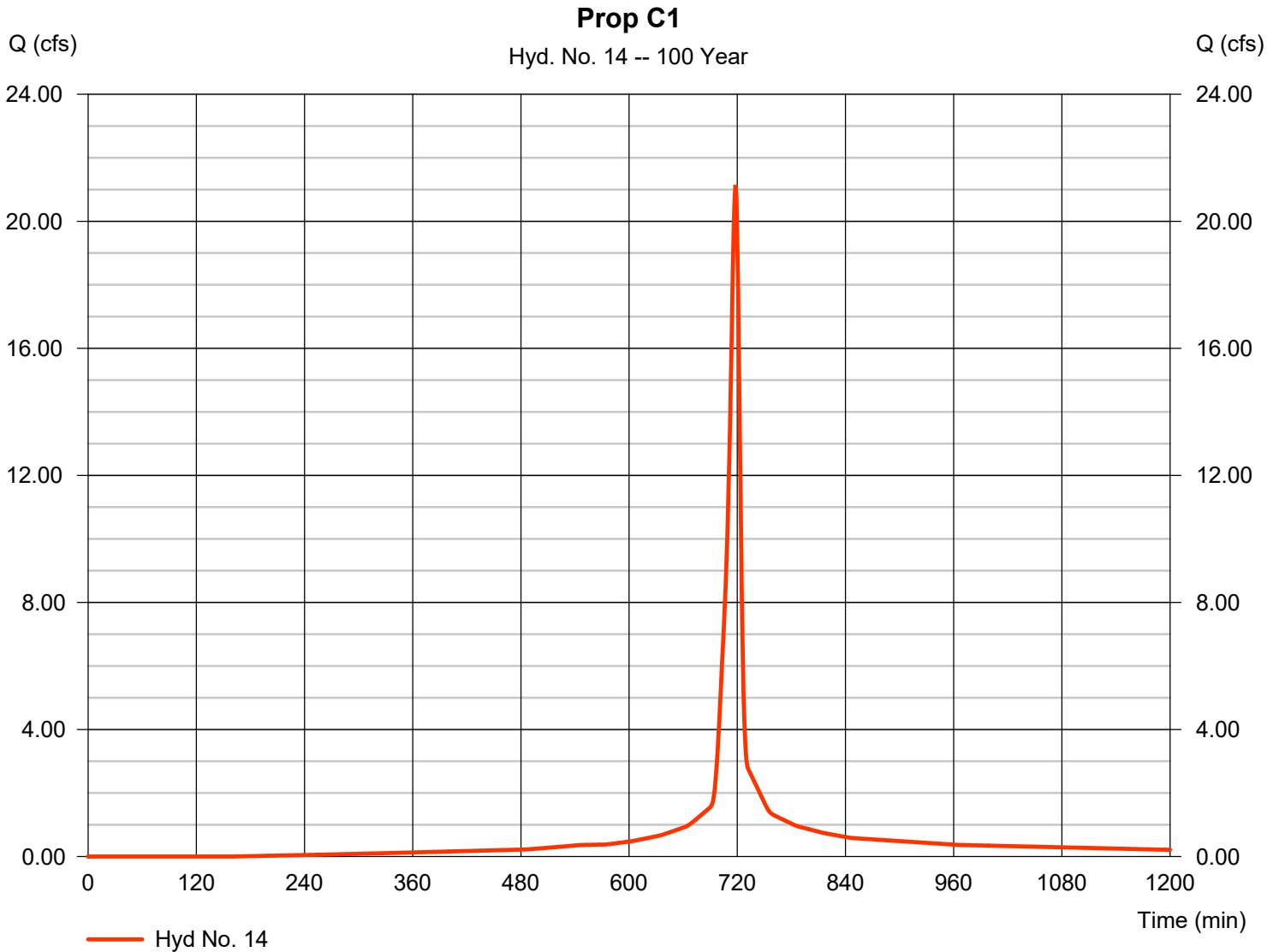
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 14

Prop C1

Hydrograph type	= SCS Runoff	Peak discharge	= 21.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 49,310 cuft
Drainage area	= 2.140 ac	Curve number	= 90
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

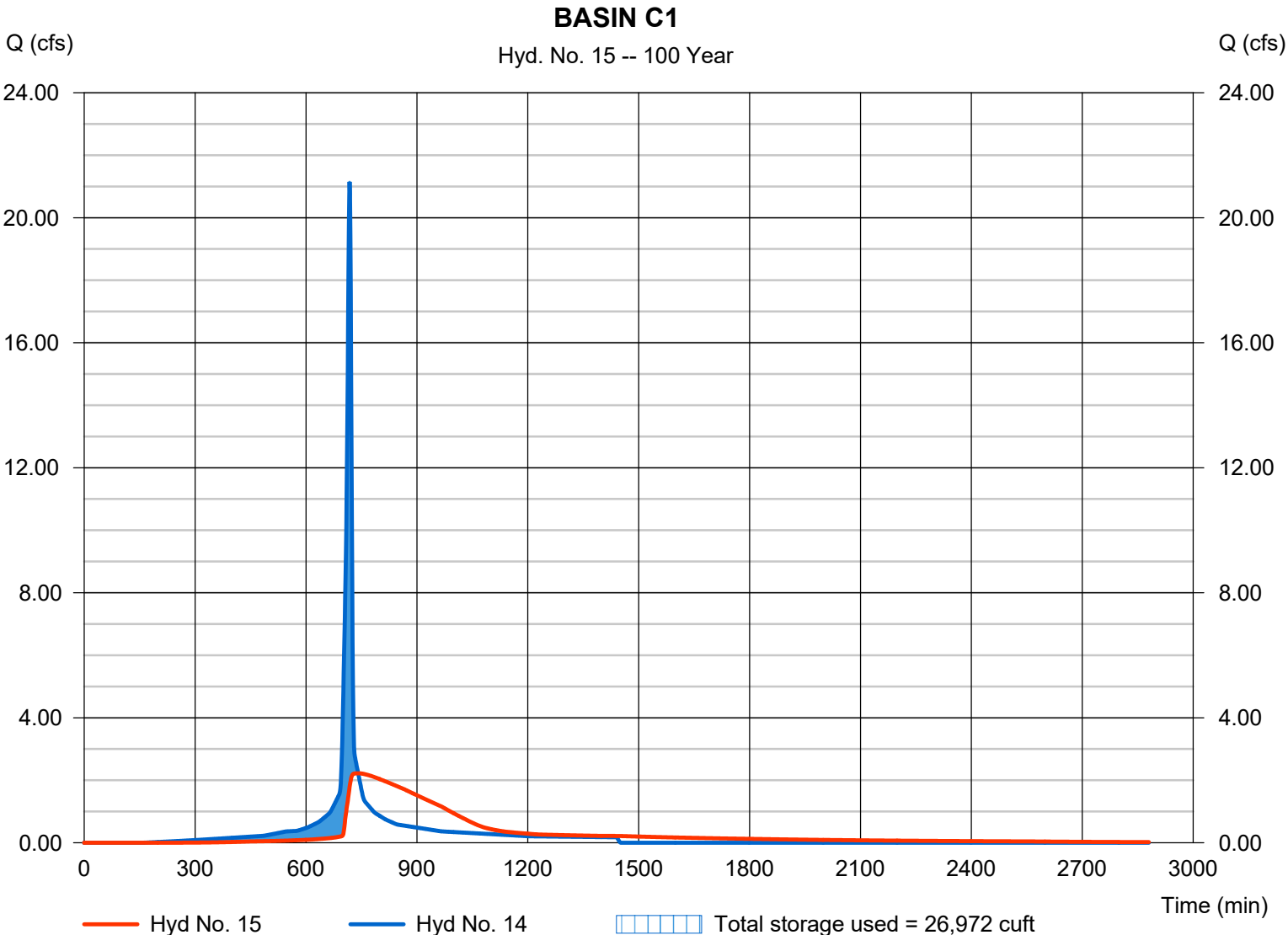
Wednesday, 03 / 30 / 2022

Hyd. No. 15

BASIN C1

Hydrograph type	= Reservoir	Peak discharge	= 2.223 cfs
Storm frequency	= 100 yrs	Time to peak	= 741 min
Time interval	= 1 min	Hyd. volume	= 48,451 cuft
Inflow hyd. No.	= 14 - Prop C1	Max. Elevation	= 973.16 ft
Reservoir name	= Basin C1	Max. Storage	= 26,972 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

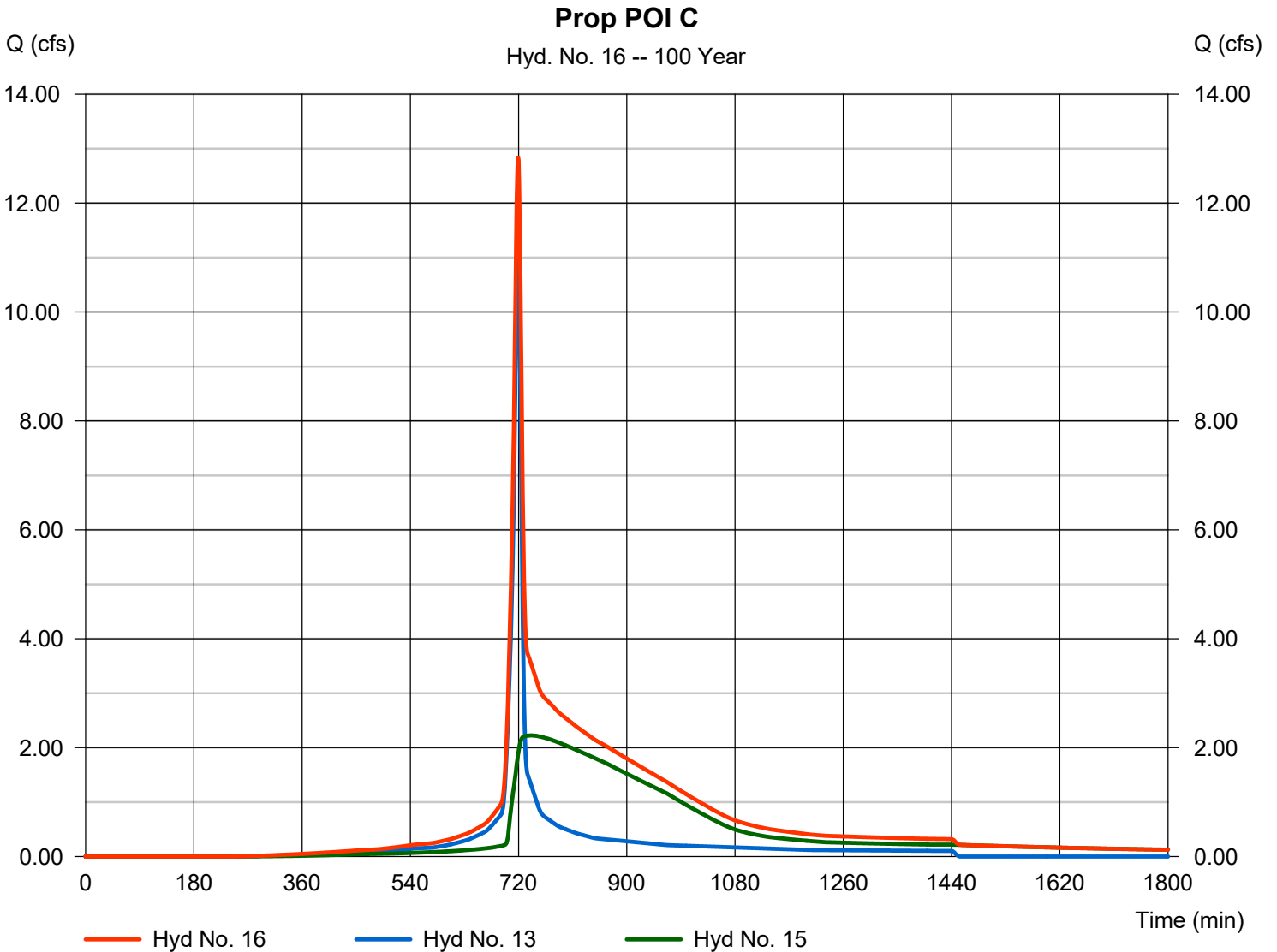
Wednesday, 03 / 30 / 2022

Hyd. No. 16

Prop POI C

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 13, 15

Peak discharge = 12.86 cfs
Time to peak = 719 min
Hyd. volume = 74,592 cuft
Contrib. drain. area = 1.240 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 17

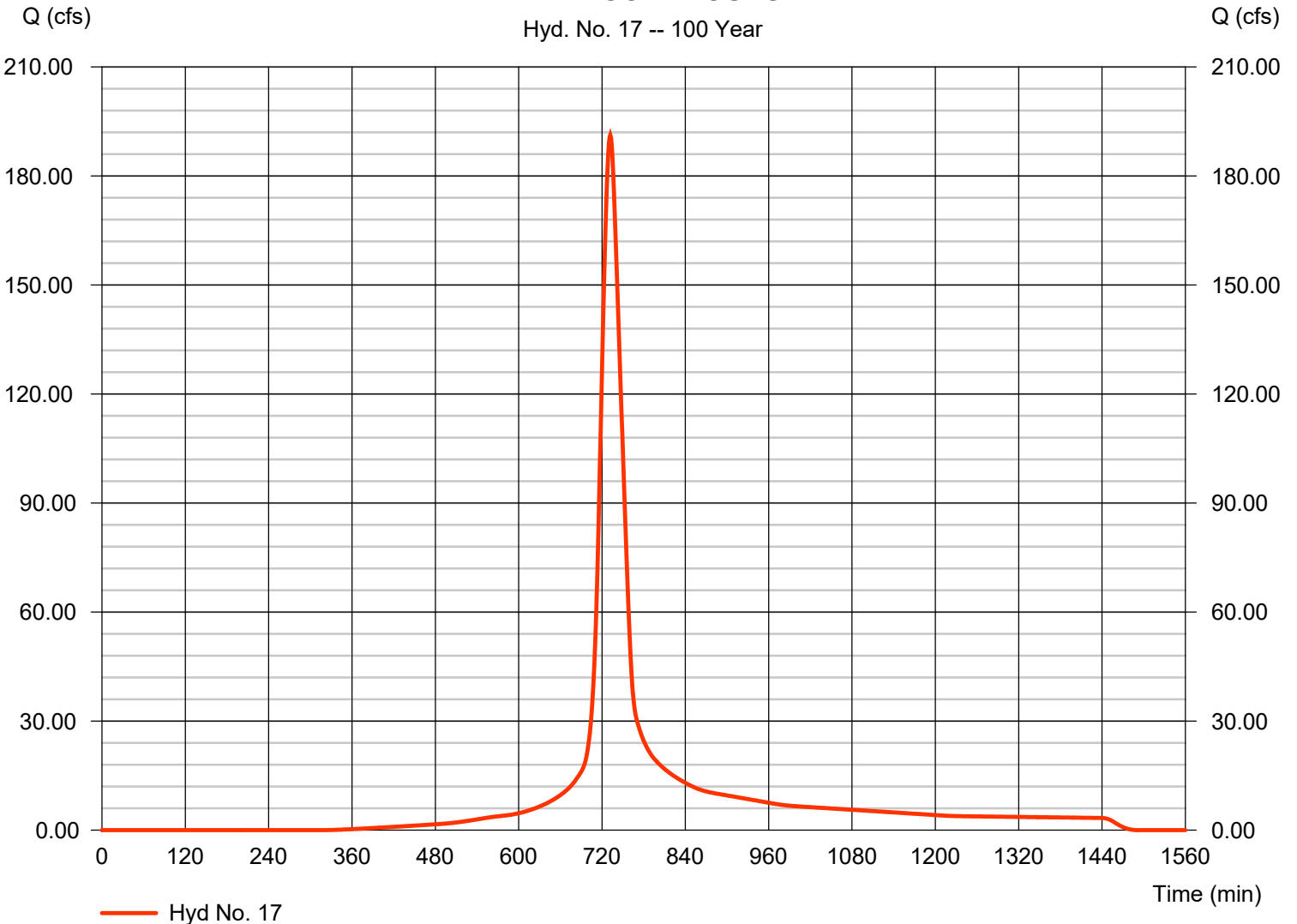
AREA A GOLF COURSE

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 40.970 ac
Basin Slope = 0.0 %
Tc method = User
Total precip. = 7.70 in
Storm duration = 24 hrs

Peak discharge = 191.23 cfs
Time to peak = 732 min
Hyd. volume = 800,044 cuft
Curve number = 80
Hydraulic length = 0 ft
Time of conc. (Tc) = 31.00 min
Distribution = Type II
Shape factor = 484

AREA A GOLF COURSE

Hyd. No. 17 -- 100 Year



Hydrograph Report

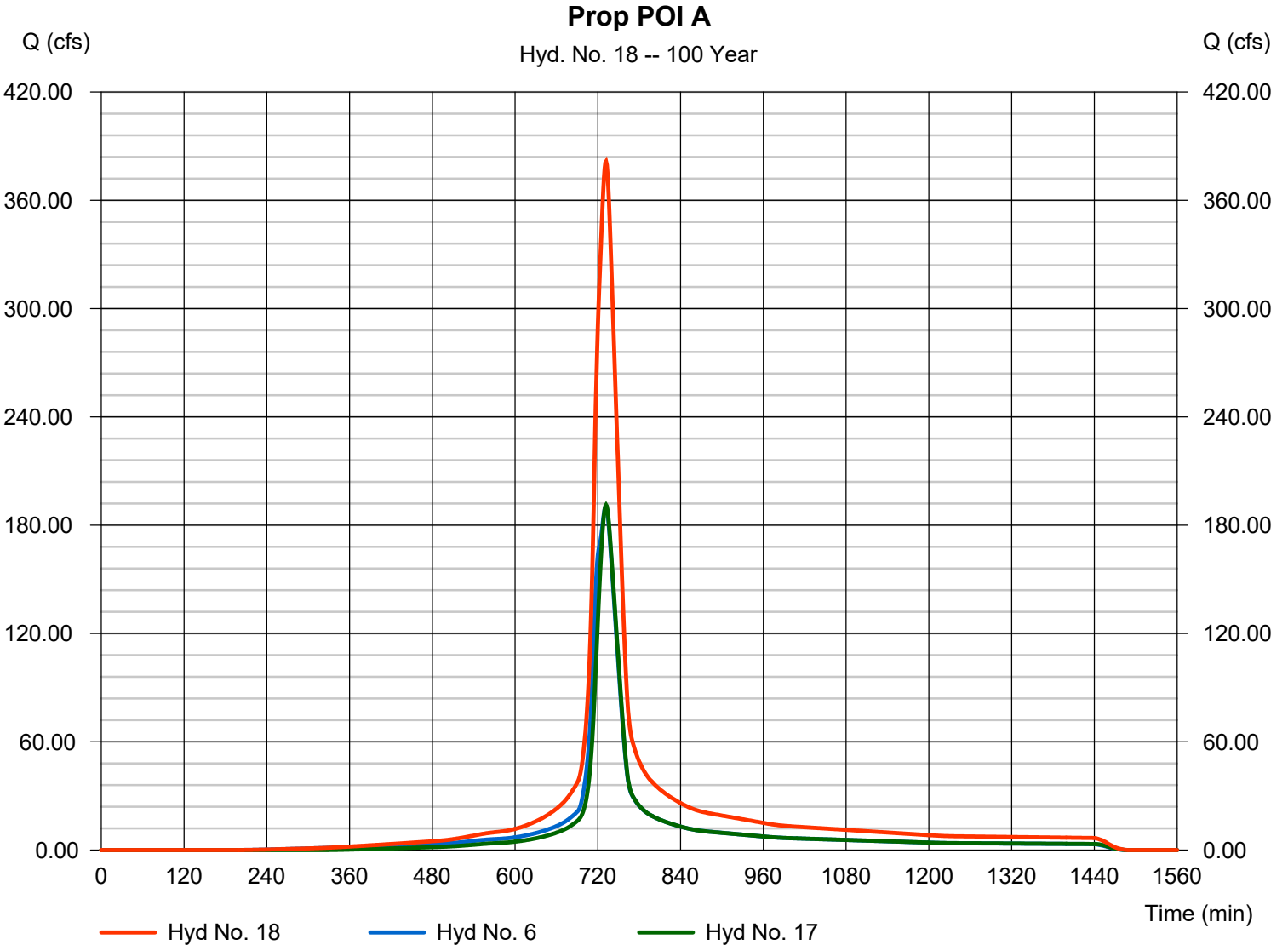
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Hyd. No. 18

Prop POI A

Hydrograph type	= Combine	Peak discharge	= 381.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 1,690,853 cuft
Inflow hyds.	= 6, 17	Contrib. drain. area	= 40.970 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

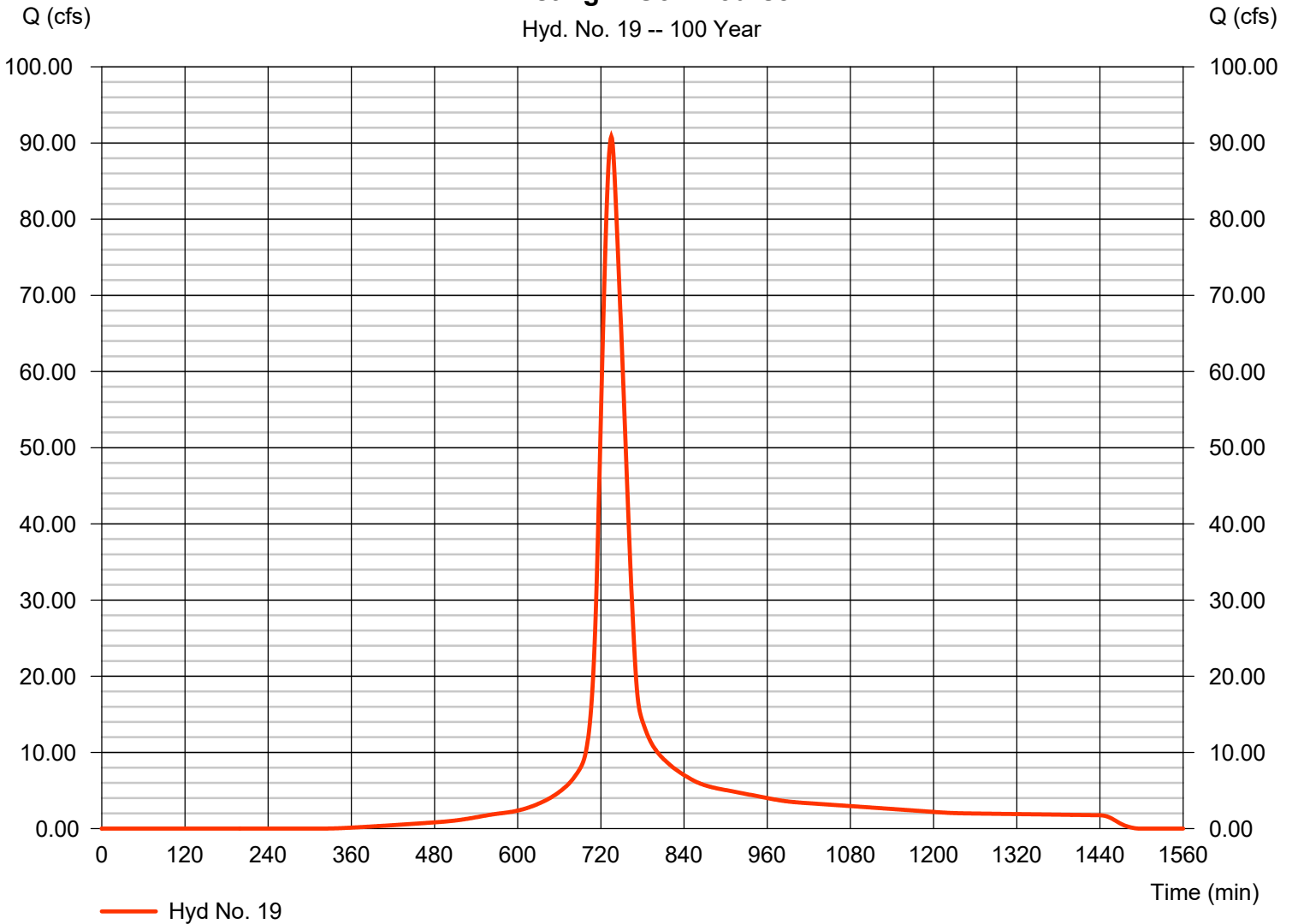
Hyd. No. 19

Existing B Golf Course

Hydrograph type	= SCS Runoff	Peak discharge	= 90.85 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 418,492 cuft
Drainage area	= 21.450 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 36.50 min
Total precip.	= 7.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Existing B Golf Course

Hyd. No. 19 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

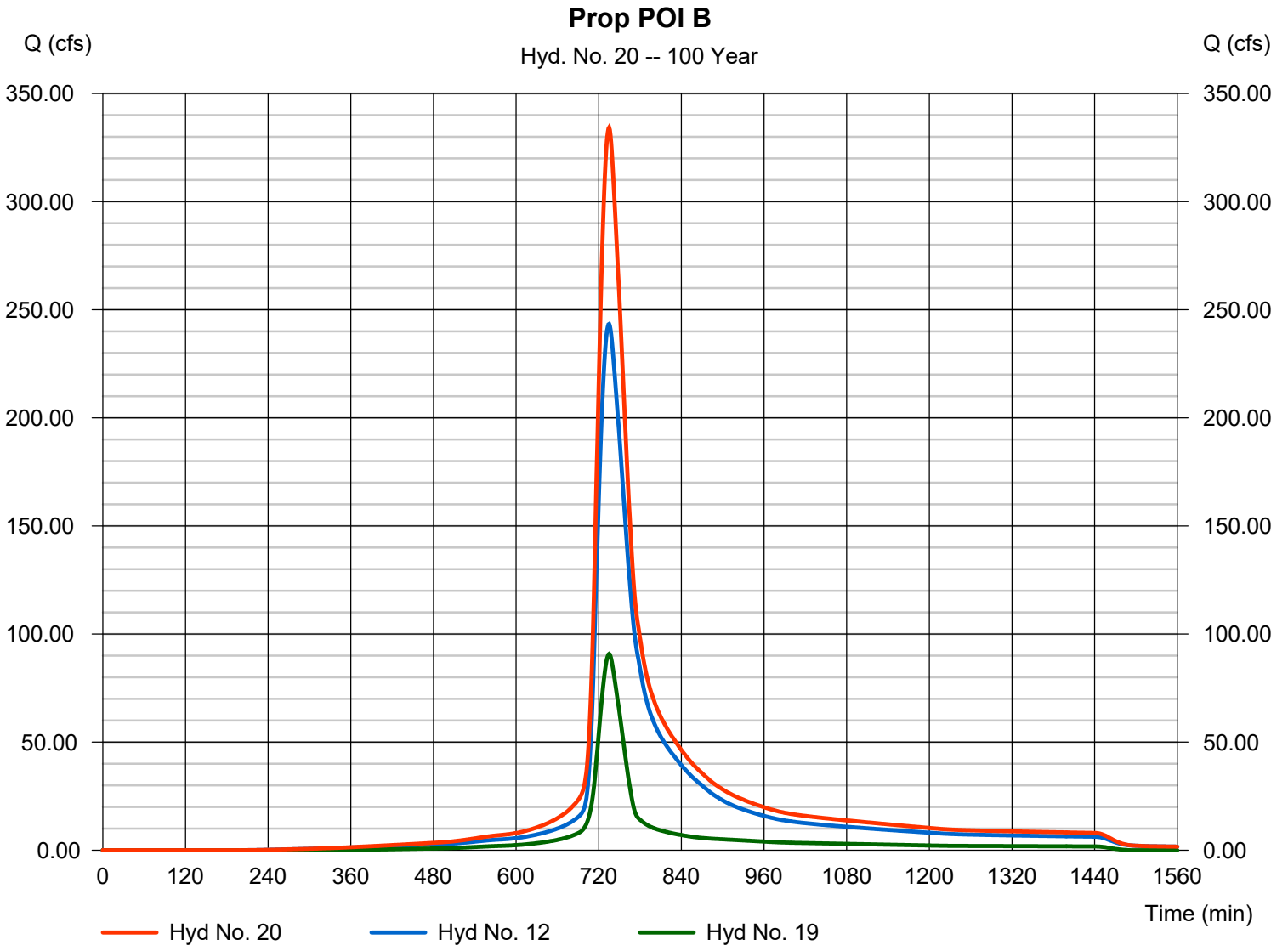
Wednesday, 03 / 30 / 2022

Hyd. No. 20

Prop POI B

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 12, 19

Peak discharge = 334.25 cfs
Time to peak = 735 min
Hyd. volume = 1,982,034 cuft
Contrib. drain. area = 21.450 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Wednesday, 03 / 30 / 2022

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	64.1474	17.7000	0.8922	-----
2	95.7859	19.2000	0.9317	-----
3	0.0000	0.0000	0.0000	-----
5	118.7799	19.1000	0.9266	-----
10	125.1300	18.2000	0.9051	-----
25	158.9867	18.7000	0.9180	-----
50	171.2459	18.3000	0.9078	-----
100	187.3624	18.1000	0.9031	-----

File name: KCMO.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	3.96	3.31	2.86	2.52	2.25	2.04	1.87	1.72	1.60	1.49	1.40	1.32
2	4.92	4.13	3.56	3.14	2.81	2.54	2.32	2.14	1.98	1.85	1.73	1.63
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.23	5.23	4.51	3.98	3.56	3.22	2.94	2.71	2.52	2.35	2.20	2.07
10	7.27	6.09	5.26	4.63	4.14	3.75	3.43	3.16	2.93	2.74	2.57	2.42
25	8.70	7.30	6.30	5.54	4.96	4.49	4.10	3.78	3.51	3.27	3.07	2.89
50	9.83	8.24	7.11	6.26	5.60	5.07	4.64	4.27	3.97	3.70	3.47	3.27
100	11.00	9.21	7.95	7.00	6.26	5.67	5.19	4.78	4.44	4.14	3.89	3.66

T_c = time in minutes. Values may exceed 60.

Precip. file name: Z:\acad\KCMO.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	3.50	3.50	0.00	3.30	5.20	6.00	6.80	7.70
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	3.25	3.10	0.00	4.01	4.64	5.52	6.21	6.90
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	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

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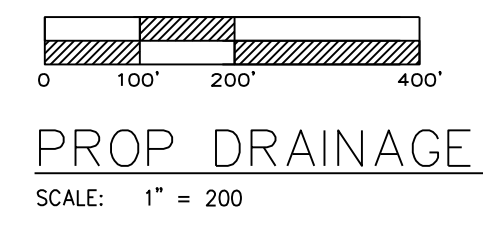
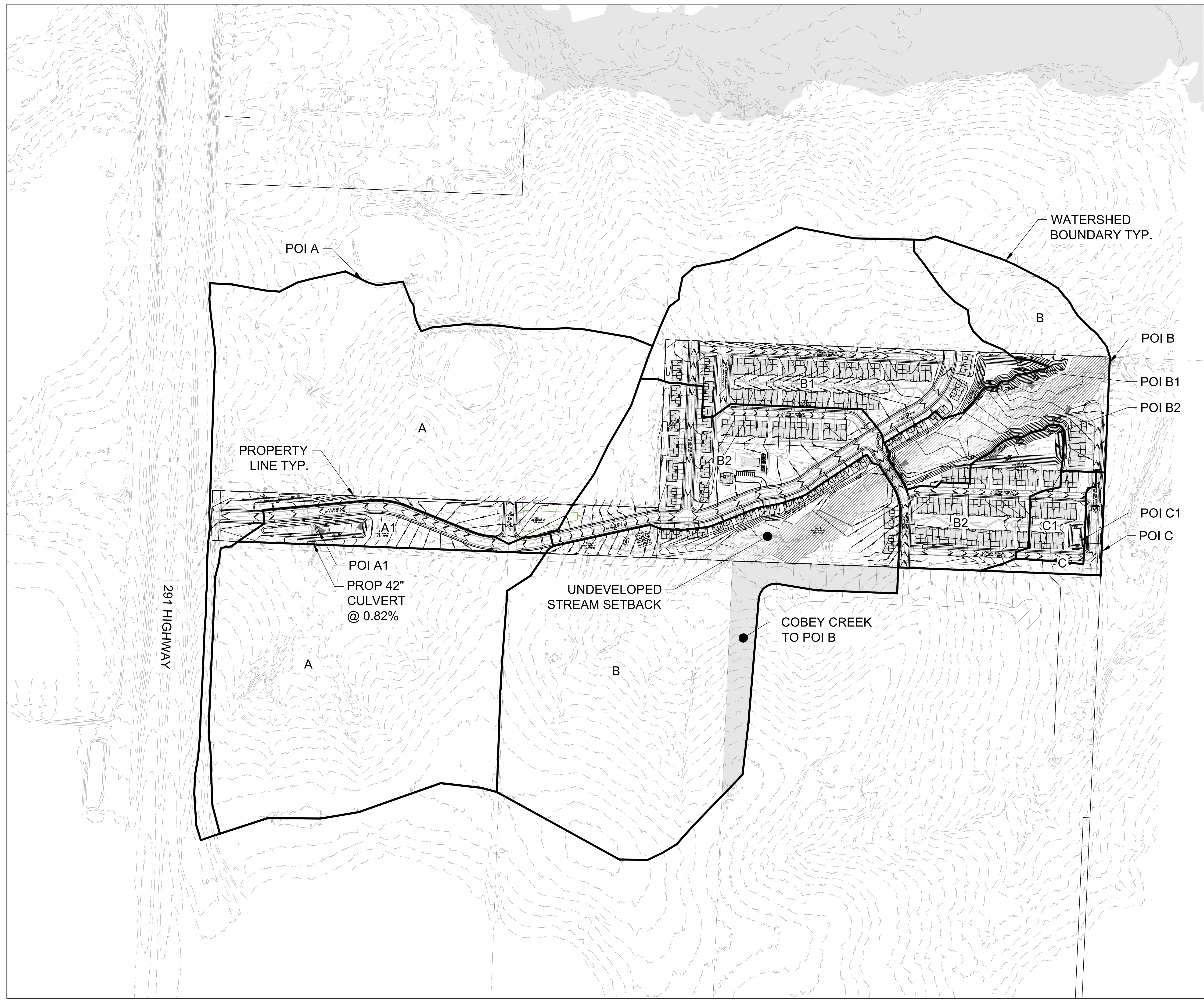
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Exhibit G

Proposed Drainage Area Map



PROP DRAINAGE MAP
SCALE: 1" = 200'



Professional Registration
Missouri
Engineering 2005602168-D
Surveying 2005060519-D
Kansas
Engineering E-1695
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

Project:
WEAVER
DEVELOPMENT
Issue Date:
February 25, 2022

Proposed Drainage Map
Preliminary Plans for:
TRISTRAR AT LEE'S SUMMIT
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

Project:
WEAVER
DEVELOPMENT
Issue Date:
February 25, 2022

Proposed Drainage Map
Preliminary Plans for:
TRISTRAR AT LEE'S SUMMIT
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

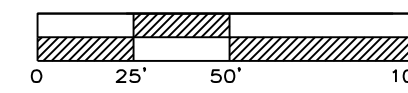


Matthew J. Schlicht
MO PE 2006019708
KS PE 19071
OK PE 25226

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Exhibit G

Proposed Drainage Area Map

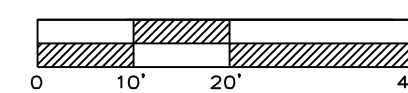
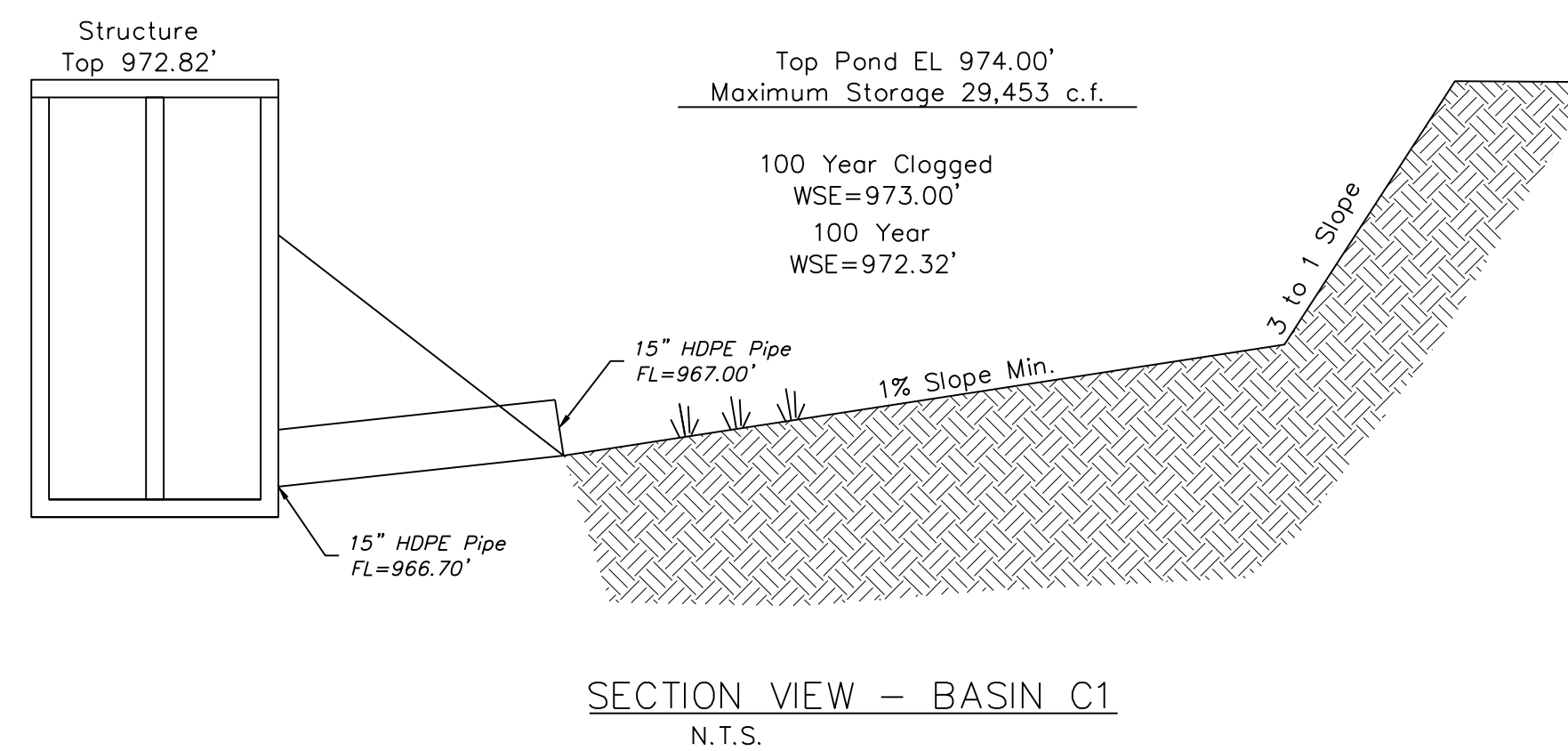
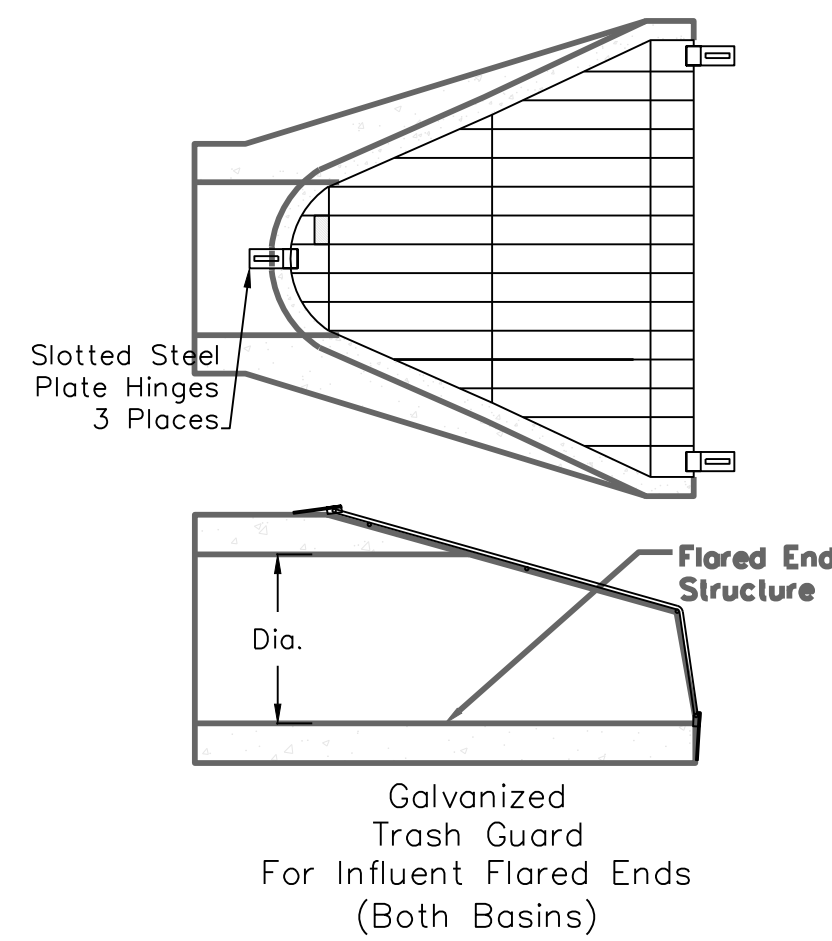
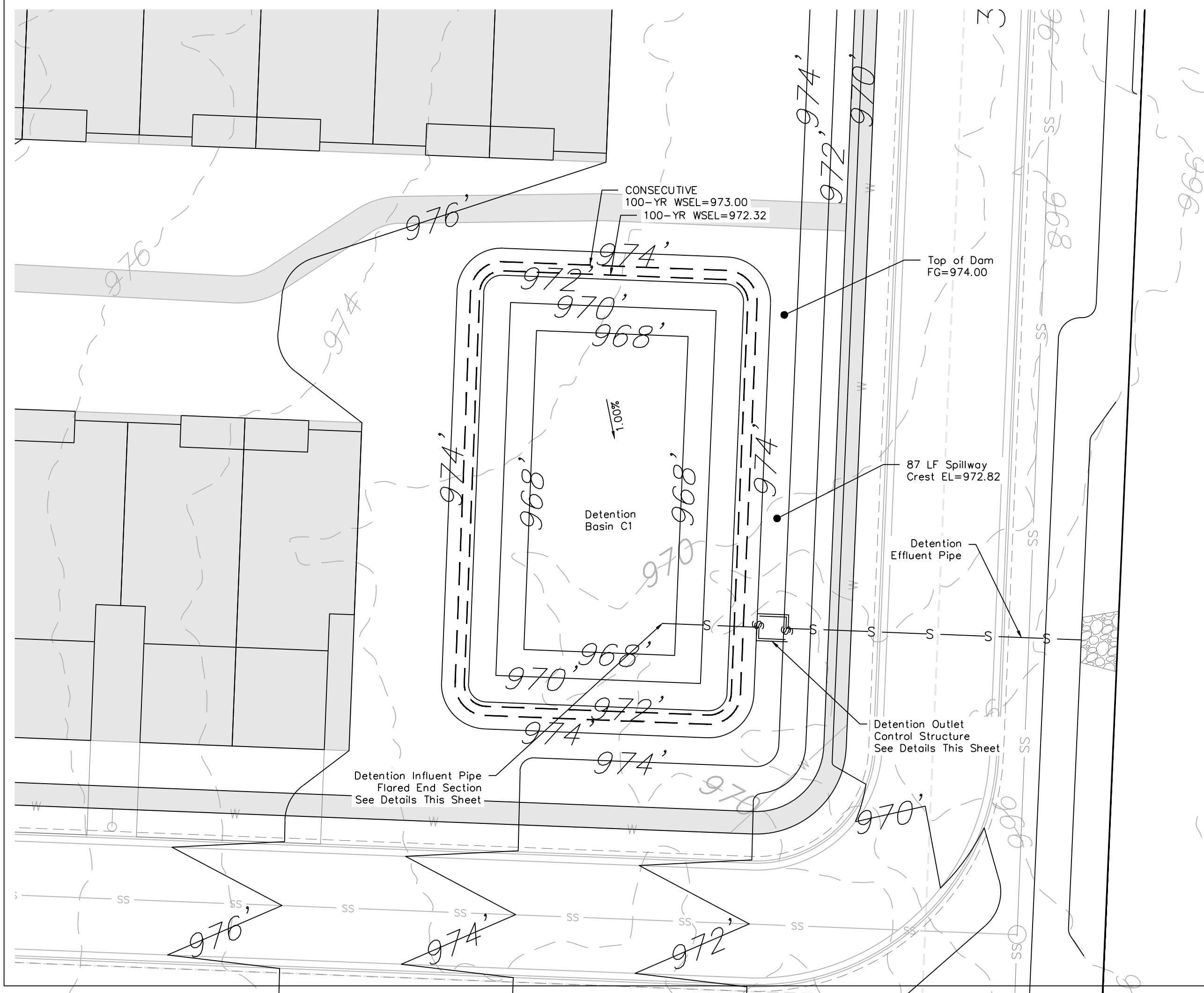


DETENTION BASIN PLAN

SCALE: 1" = 50'

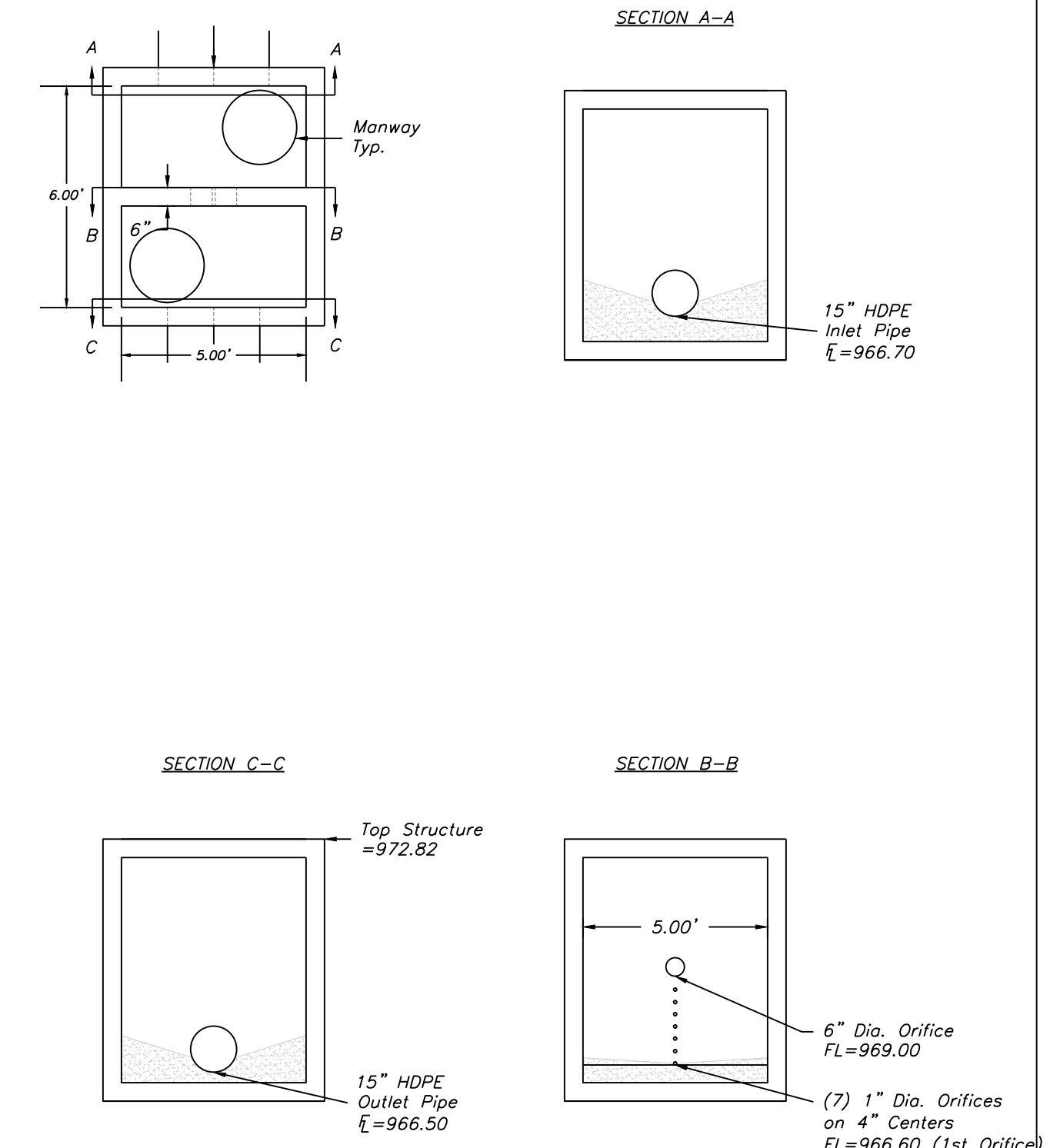
NOTES:

- BOTH BASINS SHALL BE CONSTRUCTED WITH THE EROSION AND SEDIMENT CONTROL MEASURES.
- AN AS-BUILT DETENTION BASIN PLAN SHALL BE SUBMITTED AND ACCEPTED PRIOR TO ISSUANCE OF A CERTIFICATE OF SUBSTANTIAL COMPLETION, WITH AS-BUILT VERSUS PROPOSED STORAGE.



DETENTION BASIN PLAN

SCALE: 1" = 20'



CONTROL STRUCTURE - BASIN C1
1" = 1'-0"

Professional Registration
Missouri
Engineering 2005602188-D
Surveying 200506319-D
Kansas
Engineering E-1895
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

Project: TRISTRAR AT LEE'S SUMMIT
WEAVER DEVELOPMENT
Issue Date: February 25, 2022
Part of the North 1/2 of Section 29, Township 47 North, Range 31 West, LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

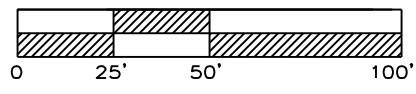
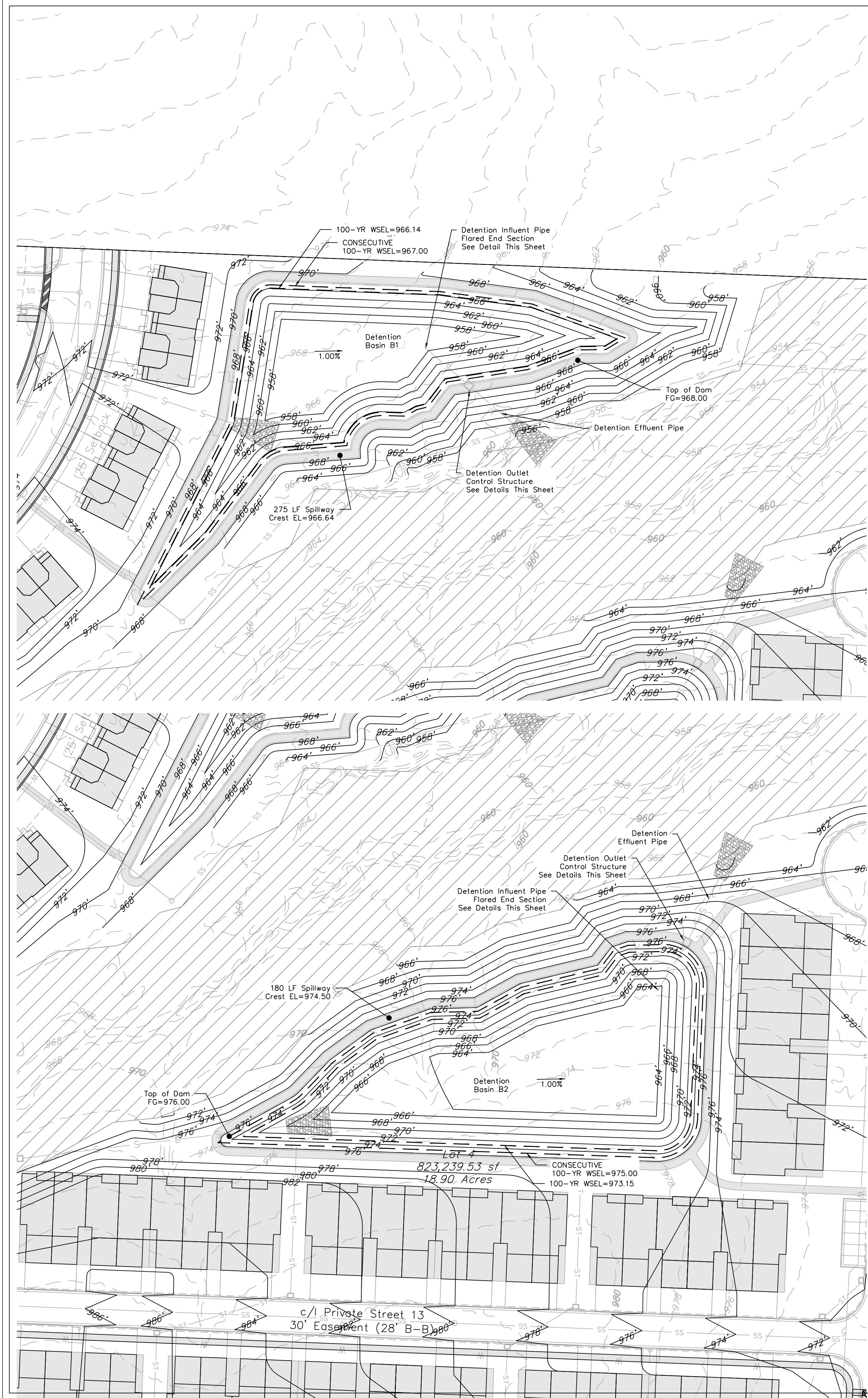
Project: TRISTRAR AT LEE'S SUMMIT
WEAVER DEVELOPMENT
Issue Date: February 25, 2022

Detention Basin Plan - C1
Preliminary Plans for:
TRISTRAR AT LEE'S SUMMIT
LEE'S SUMMIT, JACKSON COUNTY, MISSOURI



Matthew J. Schlicht
MO PE 2006019708
KS PE 19071
OK PE 25226

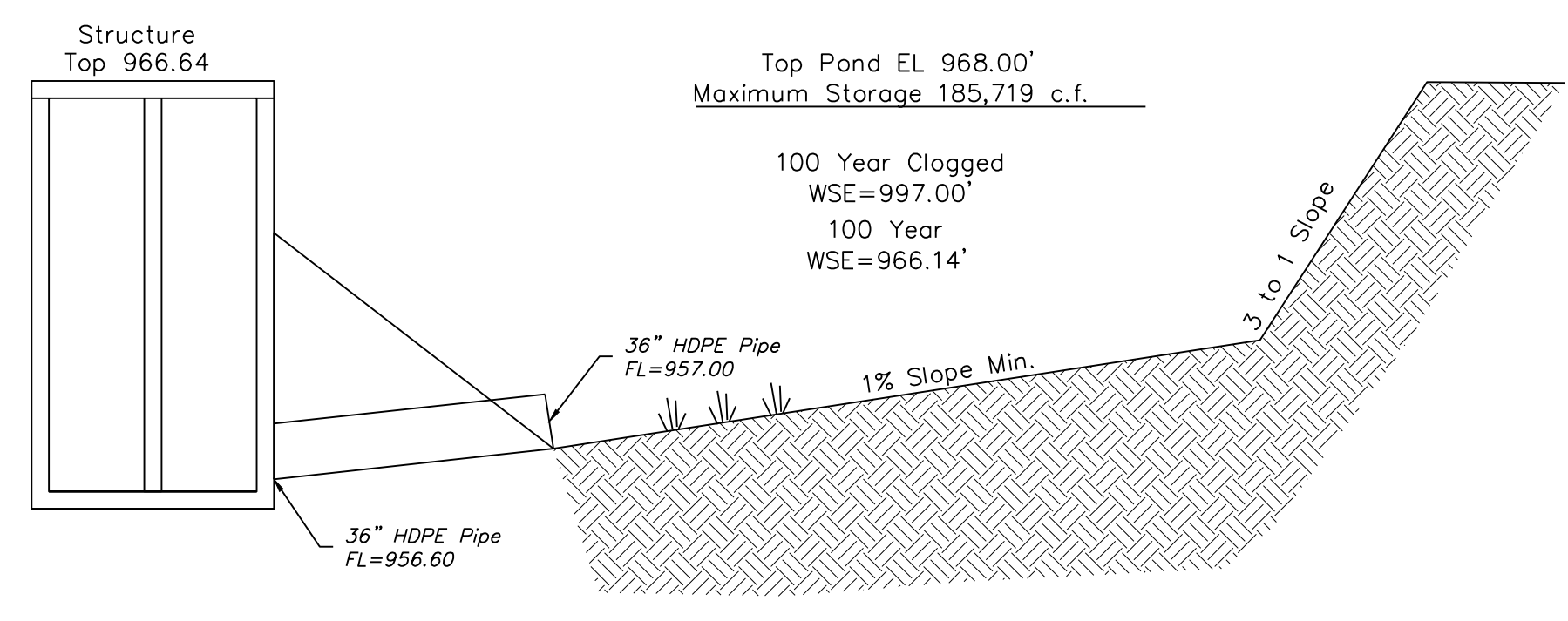
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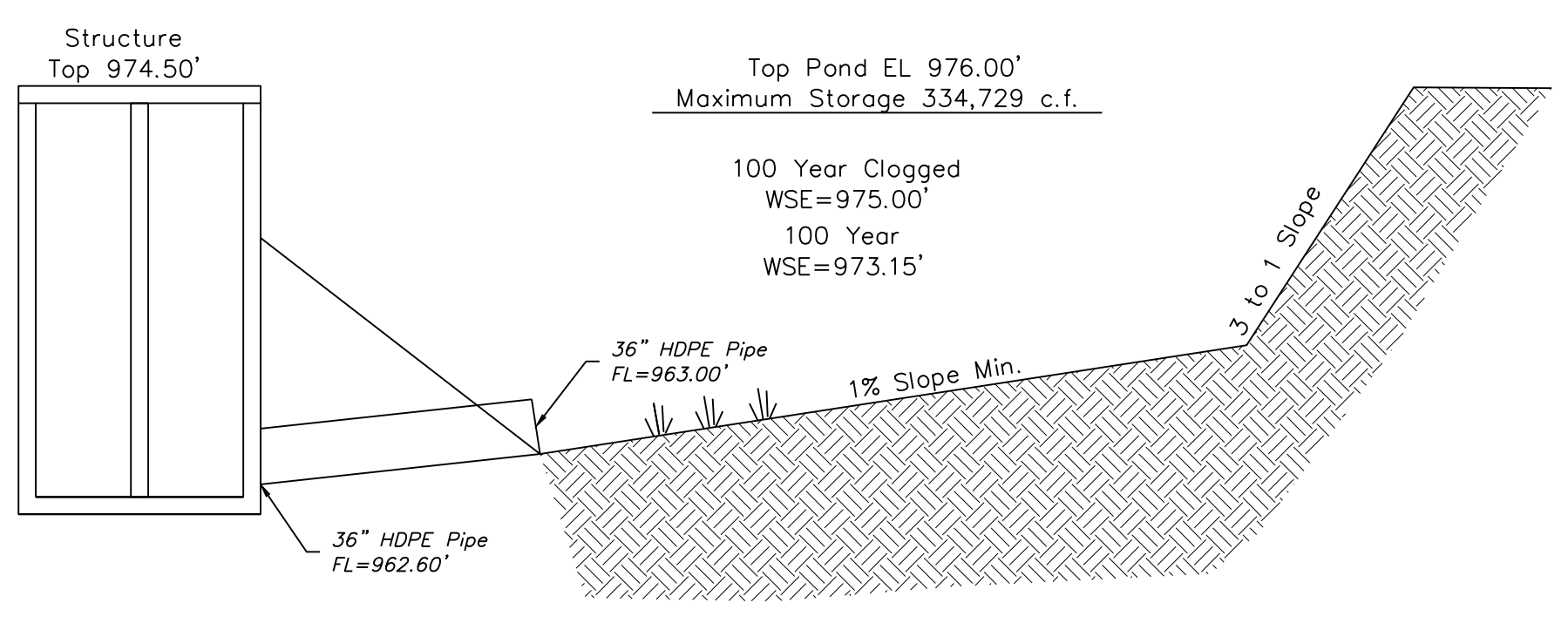
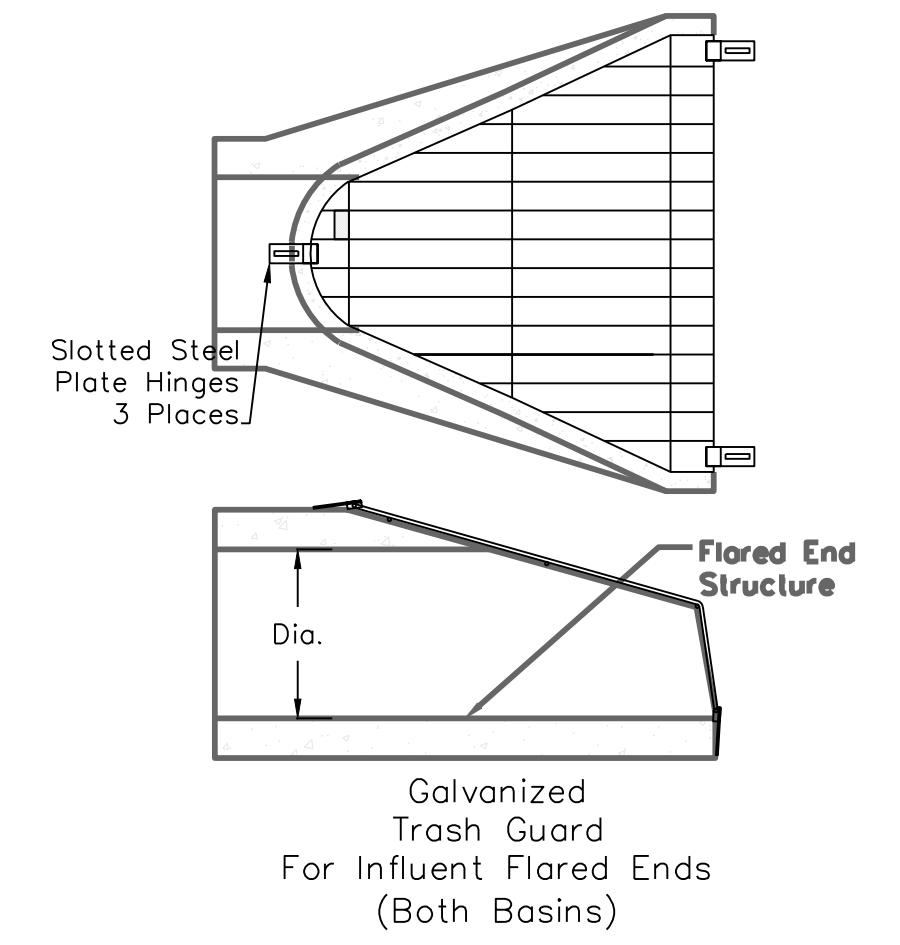
DETONATION BASIN PLAN

SCALE: 1" = 50'

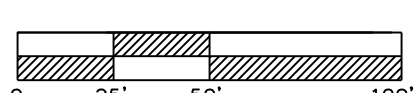
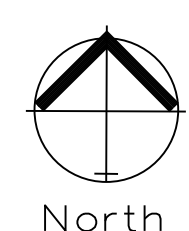
- NOTES:
 1. BOTH BASINS SHALL BE CONSTRUCTED WITH THE EROSION AND SEDIMENT CONTROL MEASURES.
 2. AN AS-BUILT DETENTION BASIN PLAN SHALL BE SUBMITTED AND ACCEPTED PRIOR TO ISSUANCE OF A CERTIFICATE OF SUBSTANTIAL COMPLETION, WITH AS-BUILT VERSUS PROPOSED STORAGE.



SECTION VIEW - BASIN B1
N.T.S.

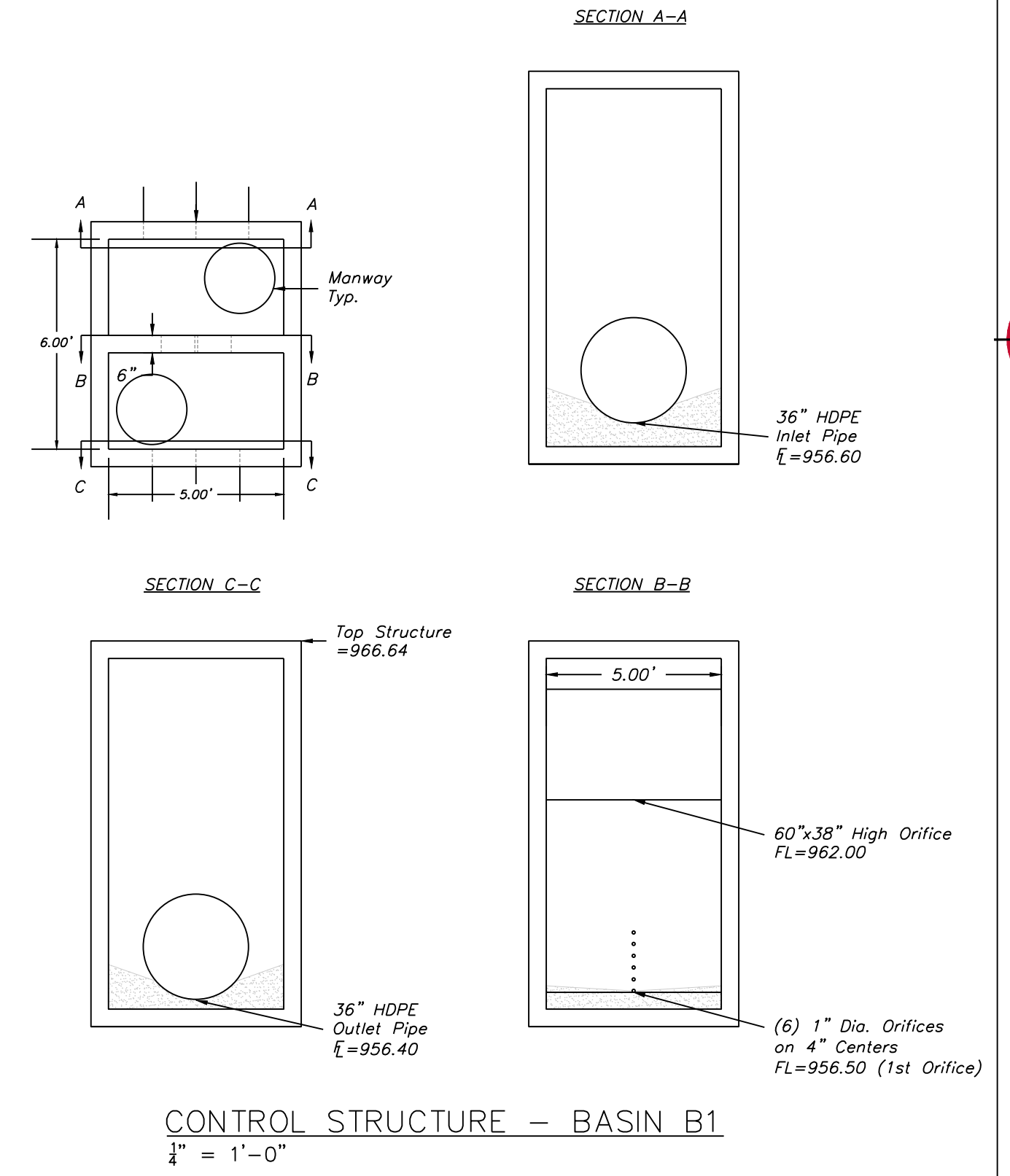


SECTION VIEW - BASIN C1
N.T.S.

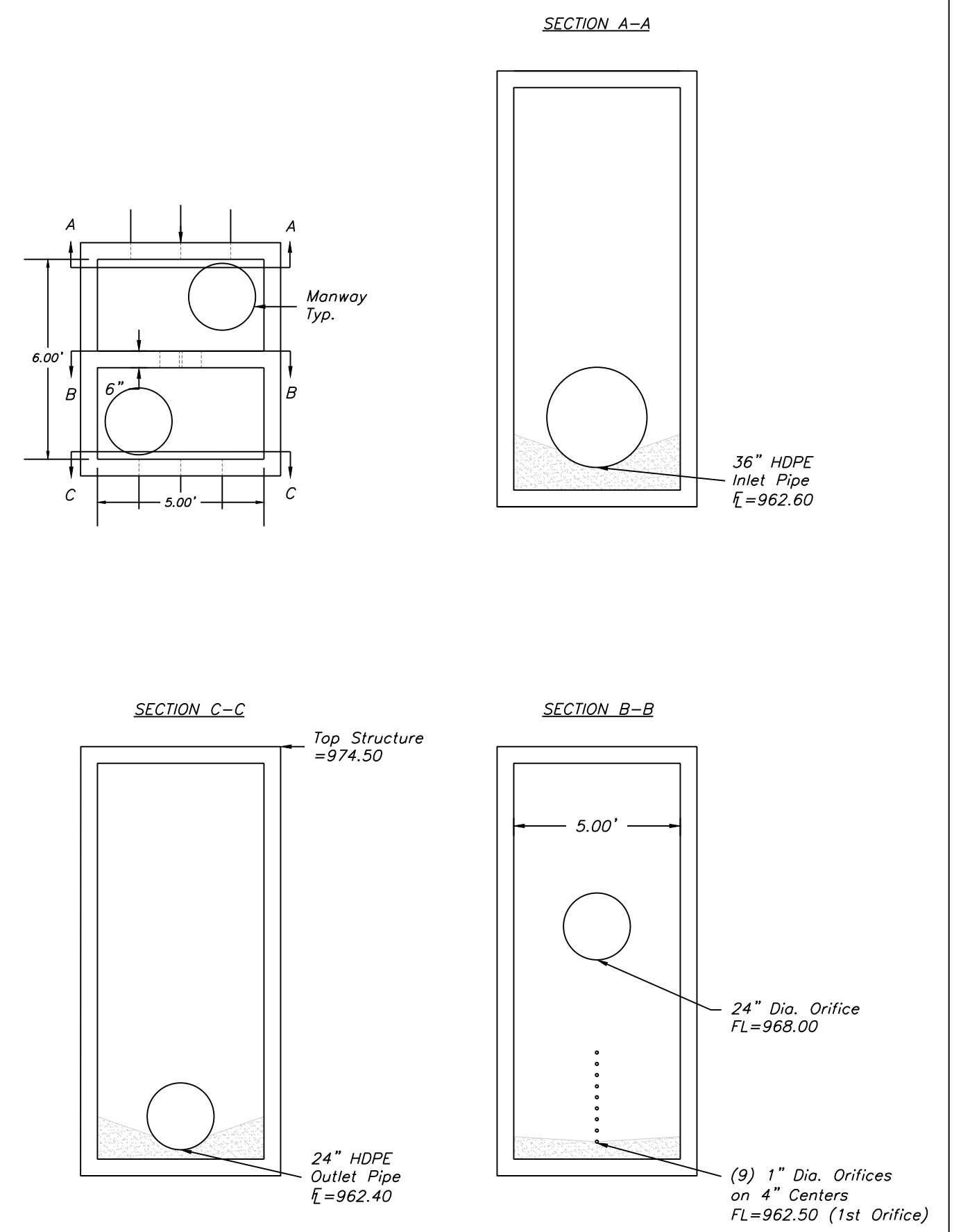


DETONATION BASIN PLAN

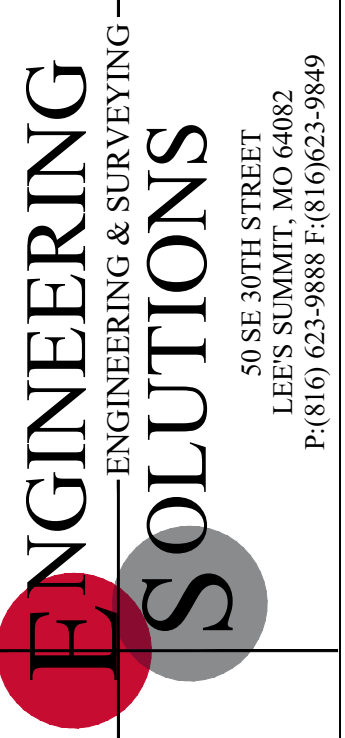
SCALE: 1" = 50'



CONTROL STRUCTURE - BASIN B1
1/4" = 1'-0"



CONTROL STRUCTURE - BASIN B2
1/4" = 1'-0"



Professional Registration
 Missouri Engineering 2005602186-D
 Surveying 20050619-D
 Kansas Engineering E-1896
 Surveying L2-218
 Oklahoma Engineering 6254
 Nebraska Engineering CA2821

Project:
 WEAVER DEVELOPMENT
 Issue Date:
 February 25, 2022

TRISTRAR AT LEE'S SUMMIT
 Part of the North 1/2 of
 Section 29, Township 47 North, Range 31 West
 LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

Detention Basin Plan - B1 & B2
 Preliminary Plans for:
 TRISTRAR AT LEE'S SUMMIT
 LEE'S SUMMIT, JACKSON COUNTY, MISSOURI



Matthew J. Schlicht
 MO PE 2006019708
 KS PE 19071
 OK PE 25226

REVISIONS

REV.	3/28/2022