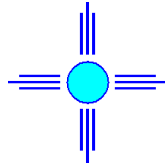


TAMER KHARRUBI
8 COUNTY ROUTE 518
MONTGOMERY TOWNSHIP
SOMERSET COUNTY, NJ



STORMWATER MANAGEMENT REPORT

FOR THE
PROPOSED SINGLE FAMILY
RESIDENCE
FOR
TAMER KHARRUBI

BLOCK 24001, LOT 37
MONTGOMERY TOWNSHIP
SOMERSET COUNTY, NJ

PREPARED BY:
BAYER-RISSE ENGINEERING, INC.
78 ROUTE 173 WEST, SUITE 6
HAMPTON, NJ 08827

A blue handwritten signature.

THEODORE H. BAYER, NJPE #33806
DECEMBER 1, 2023

Kharrubi Residence Storm Water Report

TABLE OF CONTENTS

ITEM DESCRIPTION	PAGE #
<i>Executive Summary</i>	<i>1</i>
<i>Existing Site Conditions</i>	<i>2</i>
<i>Proposed Site Conditions</i>	<i>4</i>
<i>Proposed Stormwater Management System</i>	<i>4</i>
<i>Storm Water Runoff Calculations</i>	<i>5</i>
<i>Summary and Conclusions</i>	<i>7</i>
<i>Appendix</i>	<i>A1</i>
<i>Drainage Area Maps</i>	<i>A2</i>
<i>Storm Water Supporting Data & Calculations</i>	<i>A3</i>
<i>Soil Testing Reports</i>	<i>A7</i>
<i>Hydraflow Hydrological Analysis Outputs</i>	<i>A11</i>



LIST OF FIGURES

FIGURE #	PAGE #
<i>Figure 1 (Site Aerial Photograph)</i>	<i>2</i>
<i>Figure 2 (Web Soil Survey Map)</i>	<i>3</i>



LIST OF TABLES

T A B L E #	P A G E #
<i>Table 1 (Pre-Development Onsite Area Impervious Coverages)</i>	<i>4</i>
<i>Table 2 (Post-Development Onsite Area Impervious Coverages)</i>	<i>4</i>
<i>Table 3 (Stormwater Management System Setback Distances)</i>	<i>5</i>
<i>Table 4 (Pre-Development Drainage Area Coverages)</i>	<i>5</i>
<i>Table 5 (Post-Development Drainage Area Coverages)</i>	<i>6</i>
<i>Table 6 (Runoff Rate Reduction Comparison)</i>	<i>6</i>



Kharrubi Residence Storm Water Report

Executive Summary

The applicant, Tamer Kharrubi, is proposing to construct a 2-bedroom single family residence on a site which is currently vacant and minimally developed with a 411-square-foot (sf) concrete pad. Development does not exceed the major development thresholds of one (1) acre of temporary disturbance or 0.25 acres of impervious coverage. The proposed residential development will be located on Block 24001, Lot 37 in the Township of Montgomery, Somerset County, NJ. The 0.272-acre property is located approximately 160 feet to the northeast of the intersection of Somerset County Route 518 (Georgetown and Franklin Turnpike) and Province Line Road. This section of Province Line Road is the boundary between Montgomery Township, Somerset County and Hopewell Township, Mercer County. The Township's zoning designation for this site is R-5 (Single Family Residential).

Bayer-Risse Engineering, Inc. (BRE) has prepared variance plan drawings that present the proposed improvements to the site. The variance plan drawings support this stormwater management report and are included by reference. The variance plan drawings identify the proposed stormwater improvements that will collect and control stormwater runoff from the site. Stormwater runoff generated by the improved areas onsite is directed to a proposed underground detention structure to be located below the proposed porous pavement driveway. Runoff from a drainage area to the rear of the proposed residence and a drainage area in front of the proposed improvements (within the Right-of-way of County Route 518) bypass the detention structure. The proposed detention structure is comprised of ten (10) 12-inch diameter perforated corrugated plastic pipes enclosed in a gravel envelope. Design soil permeability below the structure is 0 inches per hour (in/hr).

Surface water runoff due to the proposed project has been reduced via the proposed detention system. The New Jersey Stormwater Regulations (N.J.A.C. 7:8) specify that the maximum post-development runoff rates must be reduced to 50%, 75%, and 80% for the 2-year, 10-year, and 100-year storms, respectively. However, site constraints prevent (lot size and high groundwater table) the runoff rates for the the 2-year and 100-year storms from being reduced to the percentages required by N.J.A.C. 7:8, as such the peak runoff rates for have only been reduced to 77%, 74%, and 95% for 2-, 10-, and 100-year storms, respectively.

Pre-development runoff rates for the 2-, 10-, and 100-year storms have been calculated to be 0.451, 0.727, and 2.451 cubic feet per second (cfs), respectively. Runoff rates for the design storms following construction of the proposed improvements have been calculated to be 0.347, 0.720, and 2.316 cfs, respectively.



Kharrubi Residence Storm Water Report

Existing Site Conditions

The property is currently vacant and only minimally developed with a 411 sf concrete pad. Figure 1 is an aerial photograph reproduced from the New Jersey Department of Environmental Protection's NJ GeoWeb and identifies the project site.



Figure 1
Block 24001, Lot 37; Montgomery Township, Somerset County
NJ-GeoWeb Aerial Photograph

Figure 2 has been reproduced from the United States Department of Agriculture's Web Soil Survey and also identifies the project site. The Web Soil Survey maps the soils underlying this site to be Reaville Silt Loam (RehB), 2-6% slopes, and Penn Silt Loam (PenB), 2-6% slopes.



Kharrubi Residence Storm Water Report

These soils are classified as being somewhat poorly drained with a seasonal high water table 12-24" below the ground surface and well-drained with a seasonal high-water table in excess of 80" below the ground surface, respectively. These soils are categorized as Hydrological Soil Group C.

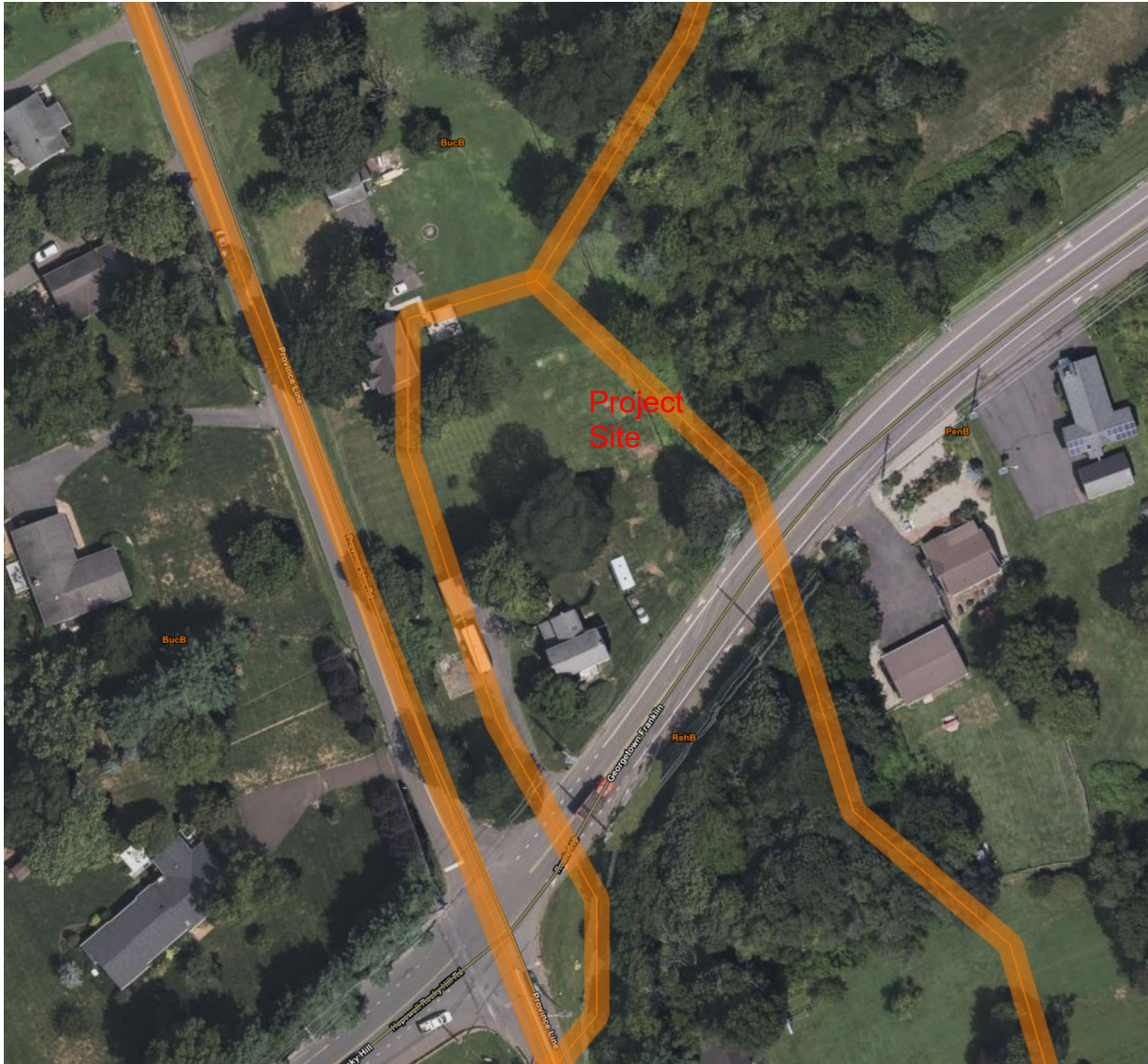


Figure 2
Web Soil Survey Map

Bayer-Risse Engineering, Inc. excavated two (2) soil logs on August 3, 2023 to confirm the suitability of the soils to support stormwater management BMPs. These soil logs are identified as SL 0803-1 and SL 0803-2. The soil log reporting forms for these are included in the Appendix to this report. Two (2) other soil logs were excavated by P&W Land Consulting, Inc. on October 18, 2021. These soil logs are identified as SL 5 and SL 6. The soil log reporting forms for these are not included in the Appendix to this report. The soil logs were recorded using the USDA Textural Classification System as described at NJAC 7:9A-5.1 through 5.8. No onsite permeability was observed, indicating the soils would not support an infiltration system. As



Kharrubi Residence Storm Water Report

such, a subsurface detention basin was determined to be the most effective stormwater management method.

Table 1 presents the pre-development onsite area and the associated impervious coverages.

Table 1
Pre-Development Onsite Area Coverage

	Land Cover	Square Feet	Acres
Preconstruction			
1.	Concrete Pad	411	0.009
2.	Open Area	11,417	0.262
Total		11,828	0.272

Proposed Site Conditions

The applicant proposes to construct a 2-bedroom single family residence on the site. Table 2 presents the post-development onsite area and the associated coverages.

Table 2
Post-Development Onsite Area Coverage

	Land Cover	Square Feet	Acres
Preconstruction			
1.	Building Footprint	1,789	0.041
2.	Driveway (Asphalt & Porous)	1,520	0.035
3.	Concrete Patio, Sidewalk, Pad	104	0.002
4.	Misc. Area (Steps/Landing)	31	0.001
5.	Open Area	8,384	0.192
Total		11,828	0.272

Proposed Stormwater Management System

The proposed stormwater system will consist of a porous pavement driveway to collect and direct surface water runoff from the residence and driveway into a subsurface detention basin. Roof downspouts will channel roof runoff into the detention system as well. Gutter guards and trash racks will prevent the entry of leaves and debris into the system.

A small-scale subsurface detention basin is proposed underneath the porous pavement driveway. The basin has a surface area of 1,245 square feet (irregularly shaped) and contains ten (10) 12-inch diameter perforated HDPE pipes of varying length surrounded by a gravel stone bed. The pipes act as underground chambers to detain stormwater. Stormwater is directed to and collected by the basin via a porous pavement driveway. No outlet control structure is proposed to manage discharge from the basin, however, there will be an outlet pipe to act as a conduit for any discharge as the basin fills. This outlet pipe is proposed to be tied into the existing storm sewer along CR-518. The subsurface detention basin is designed to conform as much as possible with the N.J.A.C 7.8-5.3 Green Infrastructure Standards.

The basin is designed to attenuate the peak rate of discharge for the 2-, 10-, and 100-year storms from the post-developed site to 77%, 74%, and 95%, respectively, of the predevelopment peak



Kharrubi Residence Storm Water Report

rates of runoff. The reduction of the peak rate of discharge for the 2- and 10-year, and 100-year cannot be reduced to 50%, 75%, and 80%, respectively, of their predevelopment peak rates of runoff. As such, variances will be required from Montgomery Township's stormwater runoff quantity standards. The proposed reductions do meet the requirements of the Somerset County Planning Board's letter, dated June 13, 2023, to reduce stormwater runoff to at least pre-construction levels.

Additional variances will be required, as the required setback distances to the foundation, neighboring well, property lines, and groundwater table for the basin cannot be achieved due to site constraints. Table 3 presents the setback distances for the proposed stormwater management system.

Table 3
Stormwater Management System Setback Distances

Object	Required Setback (Feet)	Proposed Setback (Feet)
Property Line	10	12.02
Right-of-way Line	10	0.00
Garage Slab on Grade	10	0.00
Basement Wall/Foundation	25	13.60
Neighboring Well (Lot 36)	50	20.96
Primary Septic Field	50	99.20
Reserve Septic Field	50	65.66

Storm Water Runoff Calculations

The Appendix to this report contains the runoff calculations for the site. The calculations have been prepared using Hydraflow Hydrographs, an Extension for Autodesk® Civil 3D® software. The design storms are the 2-year, 10-year, 25-year, and 100-year return period events. The total drainage area considered in the analysis is 11,763 SF (0.27 Acres).

Table 4 presents the pre-development drainage area and the associated coverages, and Table 5 presents the post-development drainage area and the associated coverages.

Table 4
Pre-Development Drainage Area Coverage

Land Cover	Square Feet	Acres
Preconstruction		
1. Concrete Pad	411	0.01
2. Open Area	11,352	0.26
Total	11,763	0.27



Kharrubi Residence Storm Water Report

Table 5
Post-Development Drainage Area Coverage

Land Cover	Square Feet	Acres
Post-construction		
1. Building Footprint	1,789	0.041
2. Driveway (Asphalt & Porous)	1,520	0.035
3. Concrete Patio, Sidewalk, Slab	104	0.002
4. Misc. Area (Steps, Landing)	31	0.001
4. Open Area	8,319	0.191
Total	11,763	0.27

The discharge rates for the pre-developed condition and the post-developed condition have been compared and are as close to compliance as possible with the quantity reductions required by the Stormwater Management Regulations. Specifically, the post-development peak rates of runoff for the 2-, 10- and 100-year storm events from the disturbed area must be reduced to less than 50%, 75% and 80%, respectively, of the pre-development peak rates of runoff for the same storm events. Given the pre-development peak rates of the 2-year, 10-year, and 100-year events, the required release criteria for the Point of Analysis are presented in Table 6.

Table 6 also presents the total peak discharges for the pre-development and post-development conditions.

Table 6
Runoff Rate Reduction: Pre-Development vs. Post-Development

Design Storm	Pre-Development	Criteria*	Post-Development
2 Year	0.451	0.226	0.347
10 Year	0.970	0.727	0.720
100 Year	2.451	1.961	2.316

*The required criteria were determined from a weighted calculation based on the percentage of disturbed area. The total disturbance is 11,761 sf (0.27 Acres) and the total drainage area is 11,763 sf (0.27 Acres). The total disturbance is 99.98 % of the total drainage area, and the required rate of reductions are 50% for the 2-year storm, 75% for the 10-year storm, and 80% for the 100-year storm from the disturbed areas in the post-development conditions. As shown in Table 6, these reductions cannot be met for the 2- and 100-year storm, as such variances from Montgomery Township are required.

2-Year: $(99.98 \% \times 0.451 \times 50 \%) + (100-99.98)\% \times 0.451 = 0.226 \text{ cfs}$

10-Year: $(99.98 \% \times 0.970 \times 75 \%) + (100-99.98)\% \times 0.970 = 0.727 \text{ cfs}$

100-Year: $(99.98 \% \times 2.451 \times 80 \%) + (100-99.98)\% \times 2.451 = 1.961 \text{ cfs}$



Kharrubi Residence Storm Water Report

Summary and Conclusions

The development of the site as proposed on the variance plan drawings will result in a decrease in the stormwater runoff from the site. However, the required runoff reductions cannot be due to site constraints, as such variances from Montgomery Township's ordinance are required. As the post-construction runoff rates have been reduced to below pre-construction levels, the proposed basin does meet the requirements set forth by the Somerset County Planning Board in their review letter dated June 13, 2023.

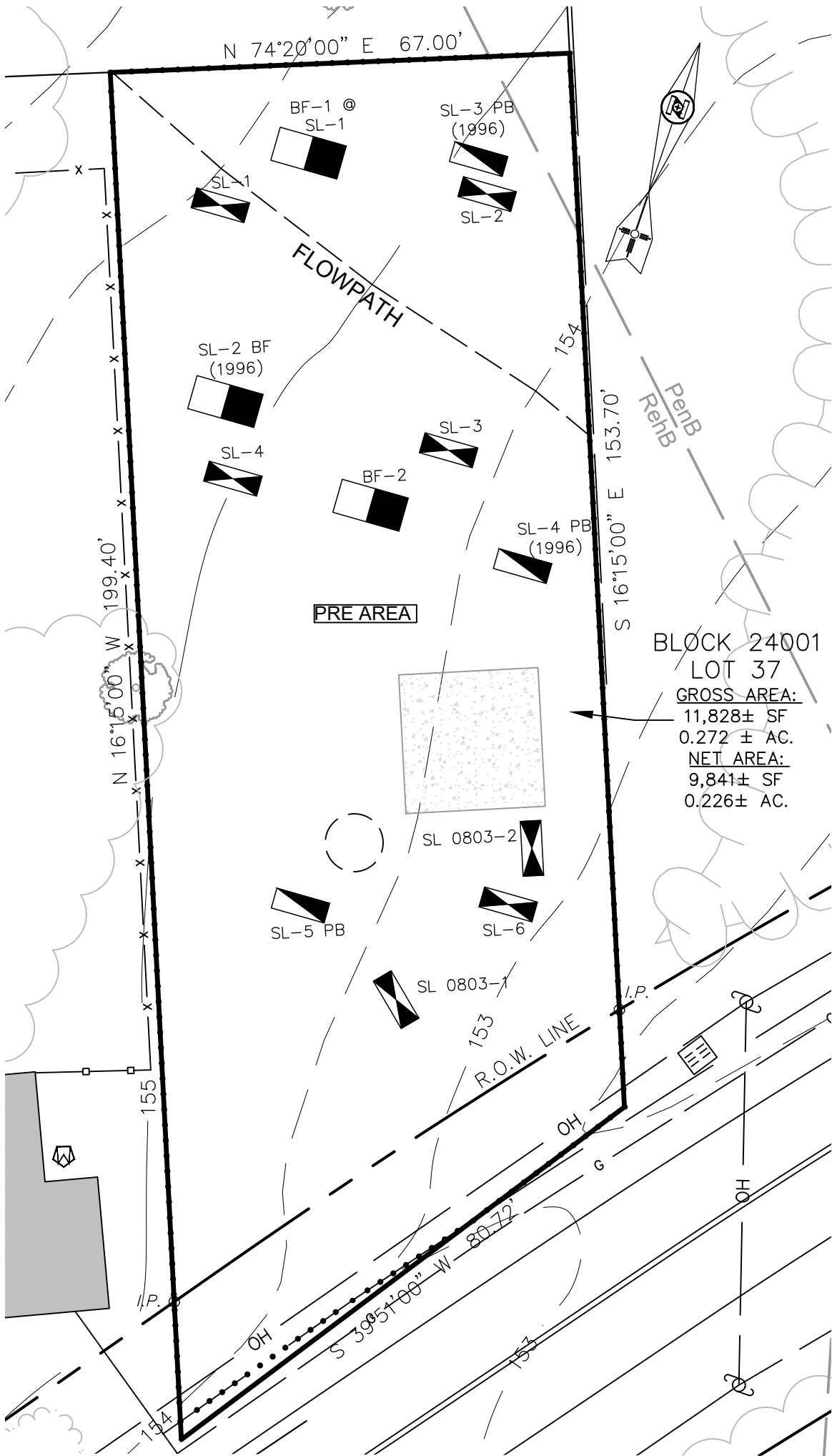


APPENDIX

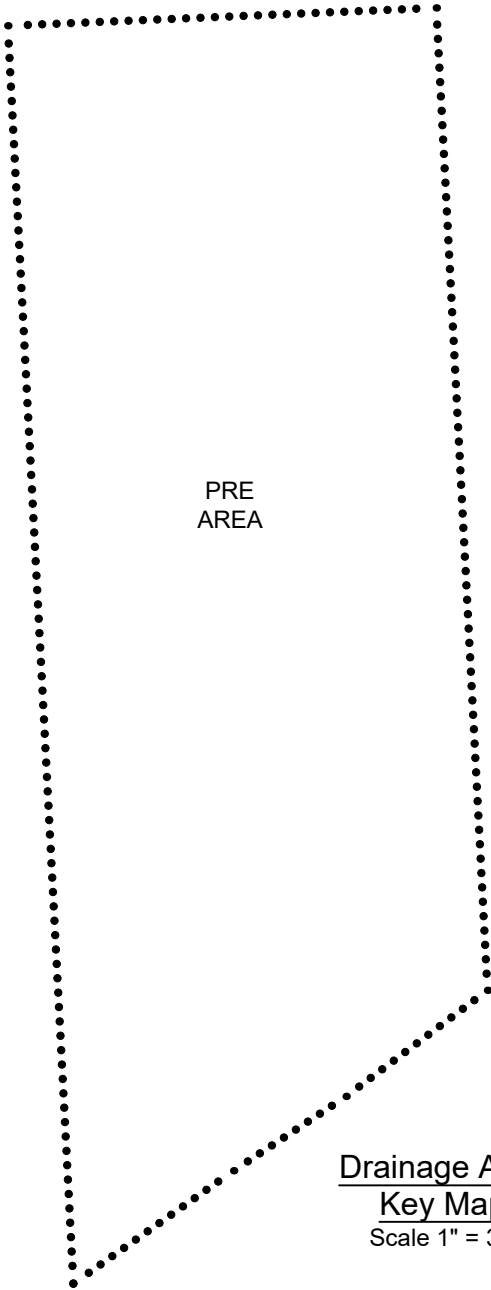


Drainage Area Maps





SITE MAP
Scale 1" = 20'




Total Drainage Area = 11,763 SF (0.27 Acres)


BASIN CHARACTERISTICS		
SUB-BASIN	AREA (SF)	T _c , (MIN)
AREA	11763	8.8

COVERAGE TABLE – EXISTING CONDITION	
LAND COVER	AREA (SF)
CONCRETE PAD	411
OPEN AREA	11352
TOTAL	11763

SOIL TYPE AND HYDROLOGICAL GROUP		
SOIL TYPE	NAME	HYDROLOGICAL GROUP
RehB	Reaville Silt Loam	C
PenB	Penn Silt Loam	C

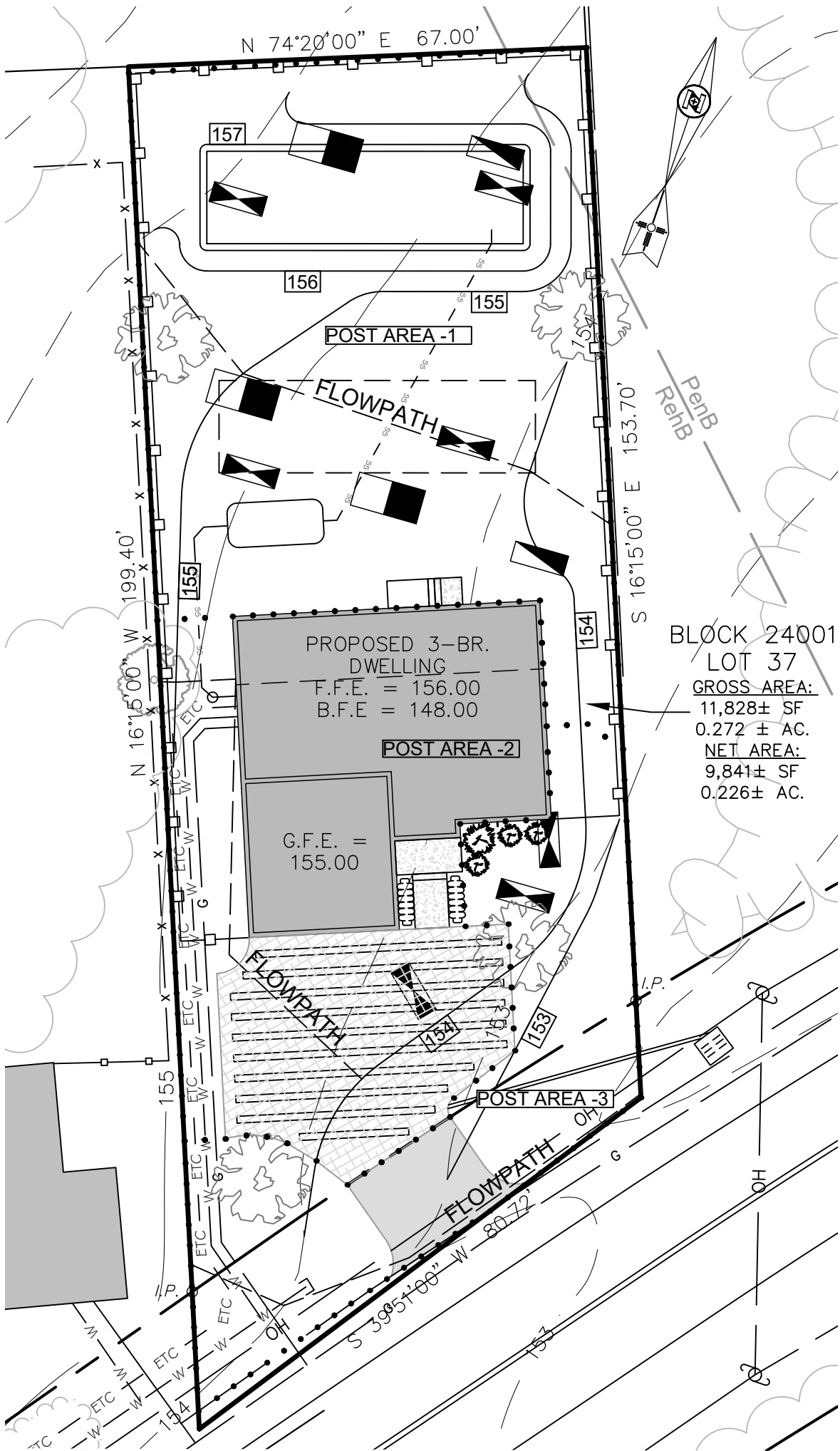


BAYER-RISSE ENGINEERING, INC.
78 ROUTE 173 WEST, SUITE 6
HAMPTON, NEW JERSEY 08827
PHONE 908-735-2255 FAX. 908-735-5838
Certificate of Authorization No. 24GA27943900



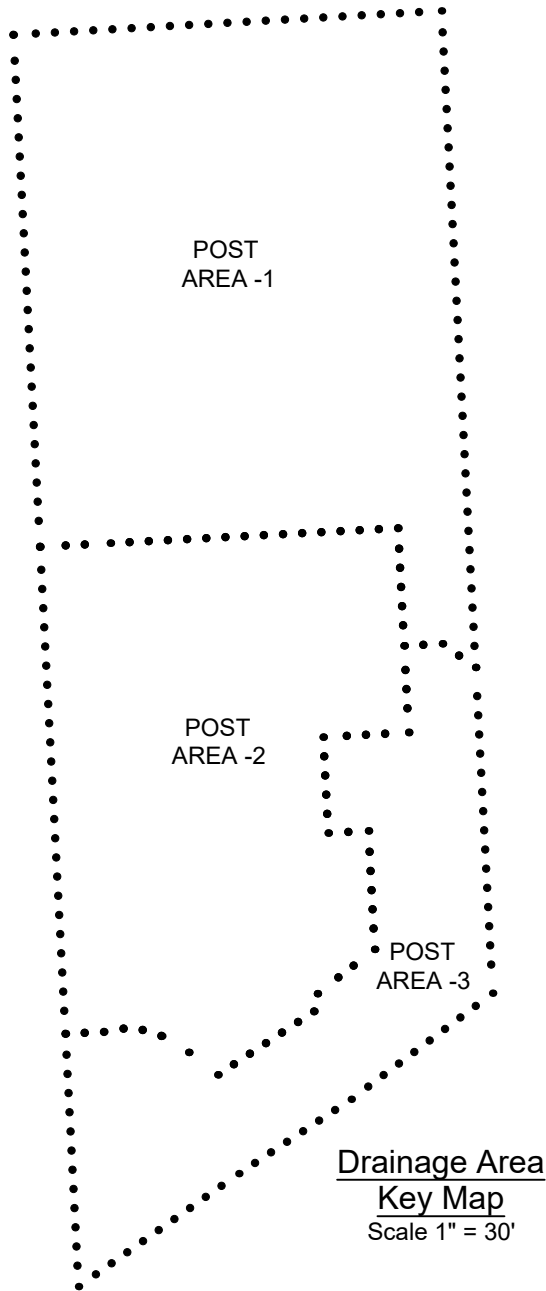
THEODORE H. BAYER, P.E.
New Jersey Professional Engineer Licence No. GE33806

REVISION DESCRIPTION		
DATE		APPROVED
DRAINAGE AREA MAP PRE-DEVELOPMENT		
Tamer Kharrubi Block 24001, Lot 37 8 County Route 518 MONTGOMERY TOWNSHIP, SOMERSET COUNTY, NEW JERSEY		
DRAWN BY:	DESIGNED BY:	CHECKED BY:
MH	MH	THB
SCALE:	As Noted	DATE: December 1, 2023
DM-PRE		BRE JOB#: 23-2586
SHEET: 1 of 1		



BLCK 24001
LOT 37
GROSS AREA:
11,828± SF
0.272 ± AC.
NET AREA:
9,841± SF
0.226± AC.

SITE MAP
Scale 1" = 20'




Drainage Area
Key Map
Scale 1" = 30'

Total Drainage Area = 11,763 SF (0.27 Acres)


BASIN CHARACTERISTICS		
SUB-BASIN	AREA (SF)	T _c , (MIN)
AREA-1	5621	8.8
AREA-2	3872	10.3
AREA-3	2270	6.6

COVERAGE TABLE – PROPOSED CONDITION	
LAND COVER	AREA (SF)
BUILDING FOOTPRINT	1789
DRIVEWAY (ASPHALT & POROUS)	1520
CONCRETE PATIO, SIDEWALK, PAD	104
MISC. AREA (STEPS/LANDING)	35
OPEN AREA	8315
TOTAL	11763

SOIL TYPE AND HYDROLOGICAL GROUP		
SOIL TYPE	NAME	HYDROLOGICAL GROUP
RehB	Reaville Silt Loam	C
PenB	Penn Silt Loam	C



BAYER-RISSE ENGINEERING, INC.
78 ROUTE 173 WEST, SUITE 6
HAMPTON, NEW JERSEY 08827
PHONE 908-735-2255 FAX 908-735-5838
Certificate of Authorization No. 24GA27943900



THEODORE H. BAYER, P.E.
New Jersey Professional Engineer Licence No. GE33806

REVISION DESCRIPTION		
DATE		APPROVED
DRAINAGE AREA MAP POST-DEVELOPMENT		
Tamer Kharrubi Block 24001, Lot 37 8 County Route 518 MONTGOMERY TOWNSHIP, SOMERSET COUNTY, NEW JERSEY		
DRAWN BY:	DESIGNED BY:	CHECKED BY:
MH	MH	THB
DWG NO.:	DM-POST	
SCALE:	As Noted	DATE: December 1, 2023
SHEET:	1 of 1	BRE JOB#: 23-2586

Storm Water Supporting Data & Calculations



Kharrubi Residence Storm Water Report

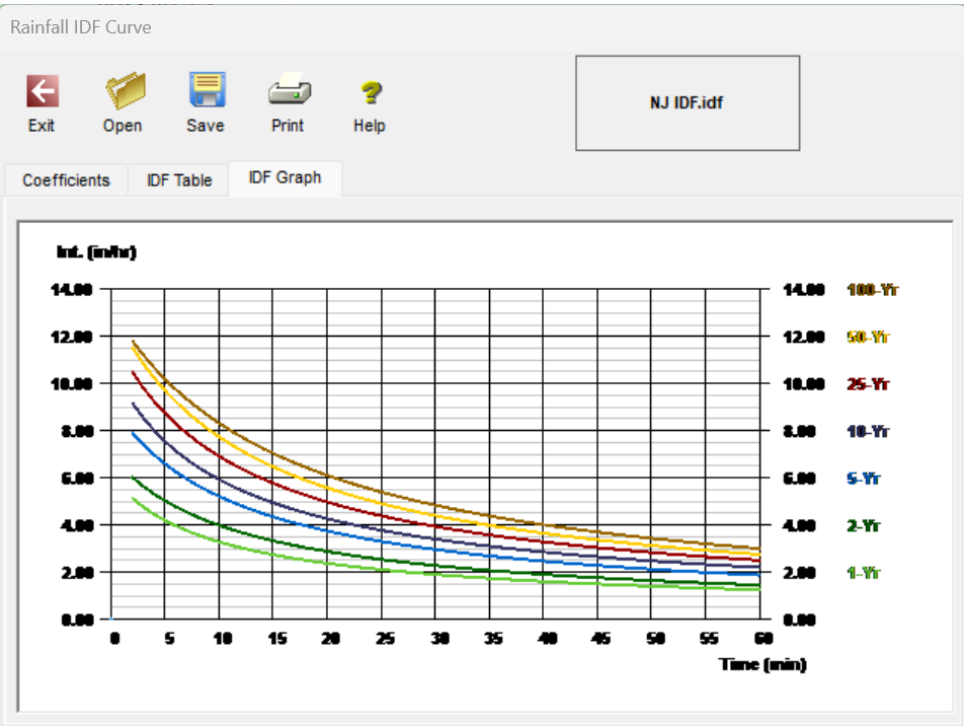
Event Manager - V:\23 Jobs 2585 -\23-2586 Kharrubi\Stormwater\Hydraflow\SomsertPrecipitation.pcp

Precipitation Data

Return Period (Yrs)	1	2	3	5	10	25	50	100
Active	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SCS 24-hr Precip (in)		3.93			6.15			12.02
SCS 6-hr Precip (in)								
Huff 1st Qt (in)								
Huff 2nd Qt (in)								
Huff 3rd Qt (in)								
Huff 4th Qt (in)								
Huff Indy (in)								
Custom Precip. (in)								

Apply Help Exit

Somerset County, NJ Precipitation Data



IDF Curve for different Return Period Storm



Kharrubi Residence Storm Water Report

Composite Curve Number Calculation

Drainage Area*

Basin	Drainage Area (Acres)		
	Total Area	Impervious Area*	Open Area
Pre-Development Subbasins			
Area #1	0.27	0.01	0.26
Post-Development Subbasins			
Area #1	0.13	0.001	0.129
Area #2	0.09	0.078	0.011
Area #3	0.05	0.006	0.046

*Impervious area includes Dwellings, Porches, Concrete Pads, Steps, and Driveways

Composite Curve Number*

Pre Area (Pervious)	74	Pre Area (Impervious)	98
Post Area #1 (Pervious)	74	Post Area #1 (Impervious)	98
Post Area #2 (Pervious)	86	Post Area #2 (Impervious)	98
Post Area #3 (Pervious)	79	Post Area #3 (Pervious)	98

*Refer to attached CN calculation sheets.

Time of Concentration

Basin	Time of Concentration (min)
Pre-Development Subbasins	
Area #1	8.8
Post-Development Subbasins	
Area #1	8.4
Area #2	10.3
Area #3	6.6



Kharrubi Residence Storm Water Report

Time of Concentration

Description	Total Flow Length (ft)	Slope, S (ft/ft)	Sheet Flow			Shallow concentrated flow			Total Tc (min)
			Flow Length (ft)	Manning's value, n	Tc (hr)	Flow Length (ft)	Avg. Velocity (ft/sec)	Tc (hr)	
Pre-Development									
Area #1	87.52	0.034	87.52	0.20	0.15	---	---	---	8.8
Post-Development									
Area #1	83.22	0.034	83.22	0.20	0.14	---	---	---	8.4
Area #2	77.89	0.018	77.89	0.20	0.17	---	---	---	10.3
Area #3	75.96	0.050	75.96	0.20	0.11	---	---	---	6.6

Stage / Storage Relationship for the Proposed Subsurface Basin

Elevation (ft)	Stage (ft)	CAD Plan Area (ft ²)	Pipe #1 Area (ft ²)	Pipe #2 Area (ft ²)	Pipe #3 Area (ft ²)	Pipe #4 Area (ft ²)	Pipe #5 Area (ft ²)	Pipe #6 Area (ft ²)	Pipe #7 Area (ft ²)	Pipe #8 Area (ft ²)	Pipe #9 Area (ft ²)	Pipe #10 Area (ft ²)
150	0	1245	0.00	0	0	0	0	0	0	0	0	0
151	1	1245	0.00	0	0	0	0	0	0	0	0	0
151.13	0.13	1245	23.76	25.08	26.4	26.4	26.4	26.4	23.1	20.46	19.14	10.56
151.25	0.12	1245	31.32	33.06	34.8	34.8	34.8	34.8	30.45	26.97	25.23	13.92
151.38	0.13	1145	34.92	36.86	38.8	38.8	38.8	38.8	33.95	30.07	28.13	15.52
151.5	0.12	1245	36.00	38	40	40	40	40	35	31	29	16
151.63	0.13	1245	34.92	36.86	38.8	38.8	38.8	38.8	33.95	30.07	28.13	15.52
151.75	0.12	1245	31.32	33.06	34.8	34.8	34.8	34.8	30.45	26.97	25.23	13.92
151.88	0.13	1245	23.76	25.08	26.4	26.4	26.4	26.4	23.1	20.46	19.14	10.56
152	0.12	1245	0.00	0	0	0	0	0	0	0	0	0
152.57	0.57	1245	0.00	0	0	0	0	0	0	0	0	0
153.07	0.5	1145	0.00	0	0	0	0	0	0	0	0	0
153.57	0.5	877	0.00	0	0	0	0	0	0	0	0	0
154.07	0.5	406	0.00	0	0	0	0	0	0	0	0	0



Kharrubi Residence Storm Water Report

Stage / Storage Relationship for the Proposed Subsurface Basin (CONT.)

Total Pipe Area (ft²)	Stone Area using 40% void (ft²)	Total Area (ft²)	Incremental Storage (cu. ft.)	Total Storage (cu. ft.)
0.00	498.00	498	0	0
0.00	498.00	498	498	498
227.70	406.92	635	83	581
300.15	377.94	678	81	662
334.65	324.14	659	86	748
345.00	360.00	705	85	832
334.65	364.14	699	91	923
300.15	377.94	678	81	1004
227.70	406.92	635	83	1087
0.00	498.00	498	60	1147
0.00	498.00	498	284	1430
0.00	458.00	458	229	1659
0.00	350.80	351	175	1835
0.00	162.40	162	81	1916



Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater

Drainage Name: Total PRE (Pervious)

Twp., County: Montgomery Township, Somerset County

Drainage Area: 0.26 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition	Average percent of impervious area/ Hydrologic condition	A		B		C		D		
		Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	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	0.26	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	
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	
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹	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. ²	Poor		48		67		77		83	
	Fair		35		56		70		77	
	Good		30		48		65		73	
Woods—grass combination (orchard or tree farm). ³	Poor		57		73		82		86	
	Fair		43		65		76		82	
	Good		32		58		72		79	
Woods. ⁴	Poor		45		66		77		83	
	Fair		36		60		73		79	
	Good		30		55		70		77	
Farmsteads—buildings, lanes, driveways, and surrounding lots	-----		59		74		82		86	

Composite Curve Number = **74.00**
= **74.00**

¹ 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.

² Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater
Twp., County: Montgomery Township, Somerset County

Drainage Name: Total PRE (Impervious)
Drainage Area: 0.01 Acres

Cover Description			Curve numbers for hydrologic soil group								
Cover type and hydrologic condition	Average percent of impervious area/ Hydrologic condition	A		B		C		D			
		Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN		
Fully developed urban areas (vegetation established)											
Open space (lawns, parks, golf courses, cemeteries, etc.)											
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	0.01	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	
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
Other Cultivated agricultural lands											
Pasture, grassland, or range—continuous forage for grazing. ¹			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. ²			Poor		48		67		77		83
			Fair		35		56		70		77
			Good		30		48		65		73
Woods—grass combination (orchard or tree farm). ³			Poor		57		73		82		86
			Fair		43		65		76		82
			Good		32		58		72		79
Woods. ⁴			Poor		45		66		77		83
			Fair		36		60		73		79
			Good		30		55		70		77
Farmsteads—buildings, lanes, driveways, and surrounding lots			-----		59		74		82		86

Composite Curve Number = **98.00**
= **98.00**

¹ 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.

² Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater

Drainage Name: Post -1 (Pervious)

Twp., County: Montgomery Township, Somerset County

Drainage Area: 0.13 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition	Average percent of impervious area/ Hydrologic condition	A		B		C		D		
		Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	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	0.13	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	
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	
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹	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. ²	Poor		48		67		77		83	
	Fair		35		56		70		77	
	Good		30		48		65		73	
Woods—grass combination (orchard or tree farm). ³	Poor		57		73		82		86	
	Fair		43		65		76		82	
	Good		32		58		72		79	
Woods. ⁴	Poor		45		66		77		83	
	Fair		36		60		73		79	
	Good		30		55		70		77	
Farmsteads—buildings, lanes, driveways, and surrounding lots	-----		59		74		82		86	

Composite Curve Number = **74.00**
= **74.00**

¹ 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.

² Poor: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater
Twp., County: Montgomery Township, Somerset County

Drainage Name: Post -1 (impervious)
Drainage Area: 0.00 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition		Average percent of impervious area/ Hydrologic condition	A		B		C		D	
			Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	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	0.00	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
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
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹	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. ²	Poor			48		67		77		83
	Fair			35		56		70		77
	Good			30		48		65		73
Woods—grass combination (orchard or tree farm). ³	Poor			57		73		82		86
	Fair			43		65		76		82
	Good			32		58		72		79
Woods. ⁴	Poor			45		66		77		83
	Fair			36		60		73		79
	Good			30		55		70		77
Farmsteads—buildings, lanes, driveways, and surrounding lots	-----			59		74		82		86

Composite Curve Number = **98.0**
= **98.0**

¹ 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.

² Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater

Drainage Name: Post -2 (Pervious)

Twp., County: Montgomery Township, Somerset County

Drainage Area: 0.01 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition	Average percent of impervious area/ Hydrologic condition	A		B		C		D		
		Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	Poor condition (grass cover < 50%)		68		79	0.01	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	
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
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹	Poor									
	Fair									
	Good									
Meadow—continuous grass, protected from grazing and generally mowed for hay.	-----									
Brush—brush-weed-grass mixture with brush the major element. ²	Poor									
	Fair									
	Good									
Woods—grass combination (orchard or tree farm). ³	Poor									
	Fair									
	Good									
Woods. ⁴	Poor									
	Fair									
	Good									
Farmsteads—buildings, lanes, driveways, and surrounding lots	-----									

Composite Curve Number = **86.00**
= **86.00**

¹ 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.

² Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater

Drainage Name: Post -2 (Impervious)

Twp., County: Montgomery Township, Somerset County

Drainage Area: 0.08 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition		Average percent of impervious area/ Hydrologic condition	A		B		C		D	
			Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	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	0.08	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
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
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹	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. ²	Poor			48		67		77		83
	Fair			35		56		70		77
	Good			30		48		65		73
Woods—grass combination (orchard or tree farm). ³	Poor			57		73		82		86
	Fair			43		65		76		82
	Good			32		58		72		79
Woods. ⁴	Poor			45		66		77		83
	Fair			36		60		73		79
	Good			30		55		70		77
Farmsteads—buildings, lanes, driveways, and surrounding lots	-----			59		74		82		86

Composite Curve Number = **98.00**
= **98.00**

¹ 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.

² Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater

Drainage Name: Post -2 (Pervious)

Twp., County: Montgomery Township, Somerset County

Drainage Area: 0.05 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition	Average percent of impervious area/ Hydrologic condition	A		B		C		D		
		Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	Poor condition (grass cover < 50%)		68		79		86		89	
	Fair condition (grass cover 50% to 75%)		49		69	0.05	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	
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
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹										
	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. ²										
	Poor		48		67		77		83	
	Fair		35		56		70		77	
	Good		30		48		65		73	
Woods—grass combination (orchard or tree farm). ³										
	Poor		57		73		82		86	
	Fair		43		65		76		82	
	Good		32		58		72		79	
Woods. ⁴										
	Poor		45		66		77		83	
	Fair		36		60		73		79	
	Good		30		55		70		77	
Farmsteads—buildings, lanes, driveways, and surrounding lots										
	-----		59		74		82		86	

Composite Curve Number = **79.00**

= **79.00**

¹ 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.

² Poor: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

³ 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.

⁴ 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.

Curve Number Calculation

Bayer-Risse Engineering, Inc

Project: Kharrubi Stormwater

Drainage Name: Post -3 (Impervious)

Twp., County: Montgomery Township, Somerset County

Drainage Area: 0.01 Acres

Cover Description			Curve numbers for hydrologic soil group							
Cover type and hydrologic condition	Average percent of impervious area/ Hydrologic condition	A		B		C		D		
		Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	Area, Acres	CN	
Fully developed urban areas (vegetation established)										
Open space (lawns, parks, golf courses, cemeteries, etc.)										
	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	0.01	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	
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
Other Cultivated agricultural lands										
Pasture, grassland, or range—continuous forage for grazing. ¹	Poor									
	Fair									
	Good									
Meadow—continuous grass, protected from grazing and generally mowed for hay.	-----									
Brush—brush-weed-grass mixture with brush the major element. ²	Poor									
	Fair									
	Good									
Woods—grass combination (orchard or tree farm). ³	Poor									
	Fair									
	Good									
Woods. ⁴	Poor									
	Fair									
	Good									
Farmsteads—buildings, lanes, driveways, and surrounding lots	-----									

Composite Curve Number = **98.00**
= **98.00**

¹ 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.

² Poor: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

³ 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.

⁴ 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.

Soil Testing Reports



Kharrubi Residence Storm Water Report

Page 1 of 3 Pages

STORMWATER PERMEABILITY TEST

MONTGOMERY TOWNSHIP/SOMERSET COUNTY

Block 24001

Lot 37

Form 2b Soil Log and Interpretation

1. Log Number SL 0803-1 Method: ☒ Profile Pit ☐ Boring
2. Soil Log: Date Recorded: August 3, 2023
Depth (Inches) | Munsell Color Name and Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragment,
Top - Bottom | If Present; Structure; Moist or Dry Consistence; Mottling Abundance, Size and Contrast, If Present

0-8" Topsoil with fine roots.
8-26" 7.5YR5/4 Brown silt loam; subangular blocky, friable; 30-40% gravel; no mottling; no seepage.
26-78" 5YR4/4 Reddish Brown non-soil; common, medium, faint mottling (5YR4/2 Dark Reddish Gray) at 30";
moderate seepage at 42".
>78" Machine Refusal.

2a. If mottling give reason for mottling: Regional Groundwater Table

3. Ground Water Observations:
☒ Seepage - Indicate Depth: 42"
☐ Pit/Boring Flooded Depth after ___ hours = ___

4. Soil Limiting Zones:
☒ Fractured Rock Substratum - Depth to Top: 26"
☐ Massive Rock Substratum - Depth to Top: ___
☐ Excessively Coarse Horizon - Depth Top to Bottom: ___
☐ Excessively Coarse Substratum - Depth to Top: ___
☐ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
☐ Hydraulically Restrictive Substratum - Depth to Top: ___
☐ Perched Zone of Saturation - Depth Top to Bottom: ___
☒ Regional Zone of Saturation - Depth to Top: 30"

5. Soil Suitability Classification: IISc, IIWr

6. I hereby certify that the information furnished on Form 2b of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Soil Evaluator Mark B. Anderson Date 08/07/2023

Signature of Professional Engineer T Date 08/07/2023

N.J. License No. 33806

Theodore H. Bayer, PE

Bayer-Risse Engineering, Inc.

Seal



Kharrubi Residence Storm Water Report

Page 2 of 3 Pages

STORMWATER PERMEABILITY TEST

MONTGOMERY TOWNSHIP/SOMERSET COUNTY

Block 24001

Lot 37

Form 2b Soil Log and Interpretation

1. Log Number SL 0803-2 Method: ☒ Profile Pit ☐ Boring
2. Soil Log: Date Recorded: August 3, 2023
Depth (Inches) | Munsell Color Name and Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragment,
Top - Bottom | If Present; Structure; Moist or Dry Consistence; Mottling Abundance, Size and Contrast, If Present

0-8" Topsoil with fine roots.
8-28" 7.5YR5/4 Brown silt loam; subangular blocky, friable; 20-30% gravel; no mottling; no seepage.
28-76" 5YR4/4 Reddish Brown non-soil; no mottling; moderate seepage at 44".
>76" Machine Refusal.

Constant Head Permeability Test K-1 performed at 40" (K = 0 in/hr)

2a. If mottling give reason for mottling: _____

3. Ground Water Observations:

☒ Seepage - Indicate Depth: 44"

☐ Pit/Boring Flooded Depth after _____ hours = _____

4. Soil Limiting Zones:

☒ Fractured Rock Substratum - Depth to Top: 28"

☐ Massive Rock Substratum - Depth to Top: _____

☐ Excessively Coarse Horizon - Depth Top to Bottom: _____

☐ Excessively Coarse Substratum - Depth to Top: _____

☐ Hydraulically Restrictive Horizon - Depth Top to Bottom: _____

☐ Hydraulically Restrictive Substratum - Depth to Top: _____

☐ Perched Zone of Saturation - Depth Top to Bottom: _____

☒ Regional Zone of Saturation - Depth to Top: 44"

5. Soil Suitability Classification: II Sc, II Wr

6. I hereby certify that the information furnished on Form 2b of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Soil Evaluator Mark B. Anderson

Date 08/07/2023

Signature of Professional Engineer T

Date 08/07/2023

Seal

N.J. License No. 33806

Theodore H. Bayer, PE

Bayer-Risse Engineering, Inc.



Kharrubi Residence Storm Water Report

Page 3 of 3 Pages

STORMWATER PERMEABILITY TEST

MONTGOMERY TOWNSHIP/SOMERSET COUNTY

Block 24001

Lot 37

Form 3a. Soil Permeability Data

Assign a number for each test and a letter for each test replicate. Show test data and calculations on Form 3b, 3c, 3d, 3e, 3f, or 3g. Use one sheet for each separate test or test replicate.

1. Summary of Data - Enter data for each test replicate on a separate line.

Type of Test	Test (Number)	Replicate (Letter)	Depth (Inches)	Result*
Constant Head Permeability Test	K-1		40"	K = 0 in/hr

*For tube permeameter, pit bailing, and piezometer tests, report results in inches per hour. For Soil permeability class rating, give soil permeability class number. For percolation test report result in minutes per inch. For basin flooding test report result as positive if basin drains completely within 24 hours of second filling, negative otherwise.

2. Design Permeability/Percolation Rate: Specify Test Number: _____
☐ Average of Test Replicates ☐ Single Replicate
☐ Slowest Replicate
3. Type of Limiting Zone Identified Test Number _____

4. Attachments (Check items included):
☐ Form 3b - Tube Permeameter Test Data - Number of Sheets: _____
☐ Form 3c - Soil Permeability Class Rating Test Data - Number of Sheets: _____
☐ Form 3d - Percolation Test Data - Number of Sheets: _____
☐ Form 3e - Piezometer Test Data - Number of Sheets: _____
☐ Form 3f - Pit Bailing Test Data - Number of Sheets: _____
☐ Form 3g - Basin Flooding Test Data - Number of Sheets: _____

5. I hereby certify that the information furnished on Form 3a of this application (and the attachments thereto) is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator  Date 08/07/2023

Signature of Professional Engineer  Date 08/07/2023

Seal

N.J. License No. 33806
Theodore H. Bayer, PE
Bayer-Risse Engineering, Inc.

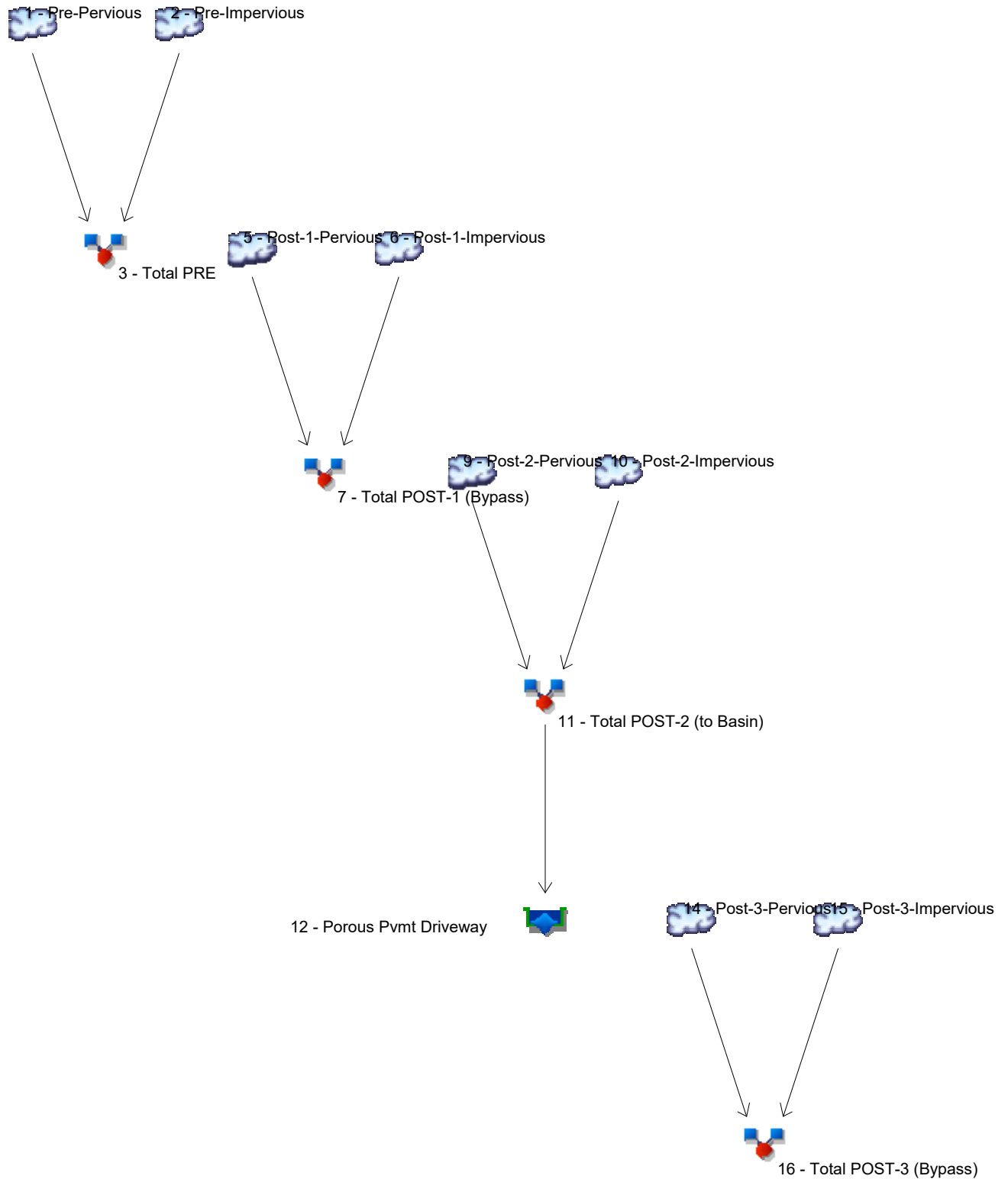


Hydraflow Hydrological Analysis Outputs



Watershed Model Schematic

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



Hydrograph Report

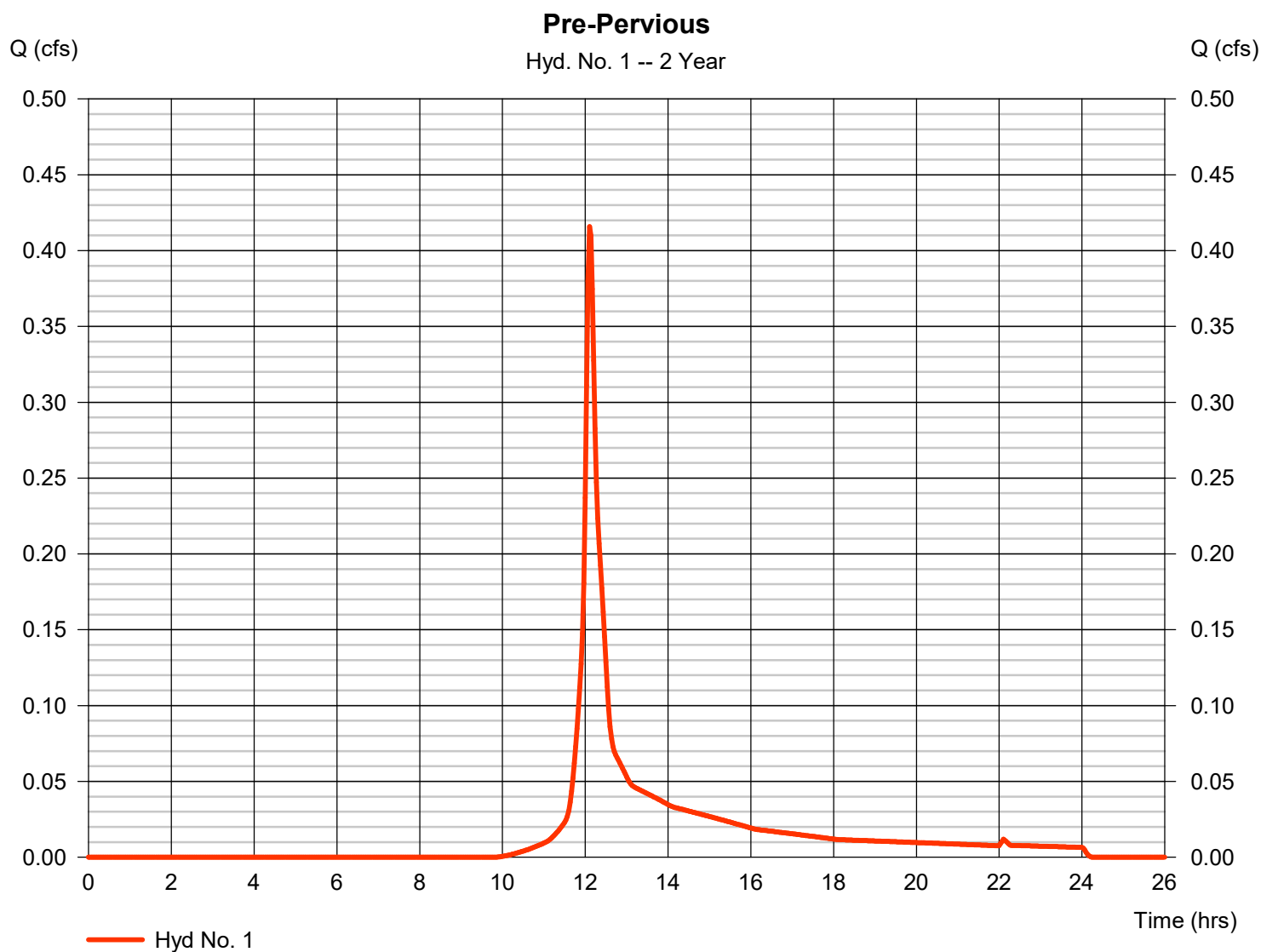
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 1

Pre-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.416 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 1,458 cuft
Drainage area	= 0.260 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.80 min
Total precip.	= 3.93 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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

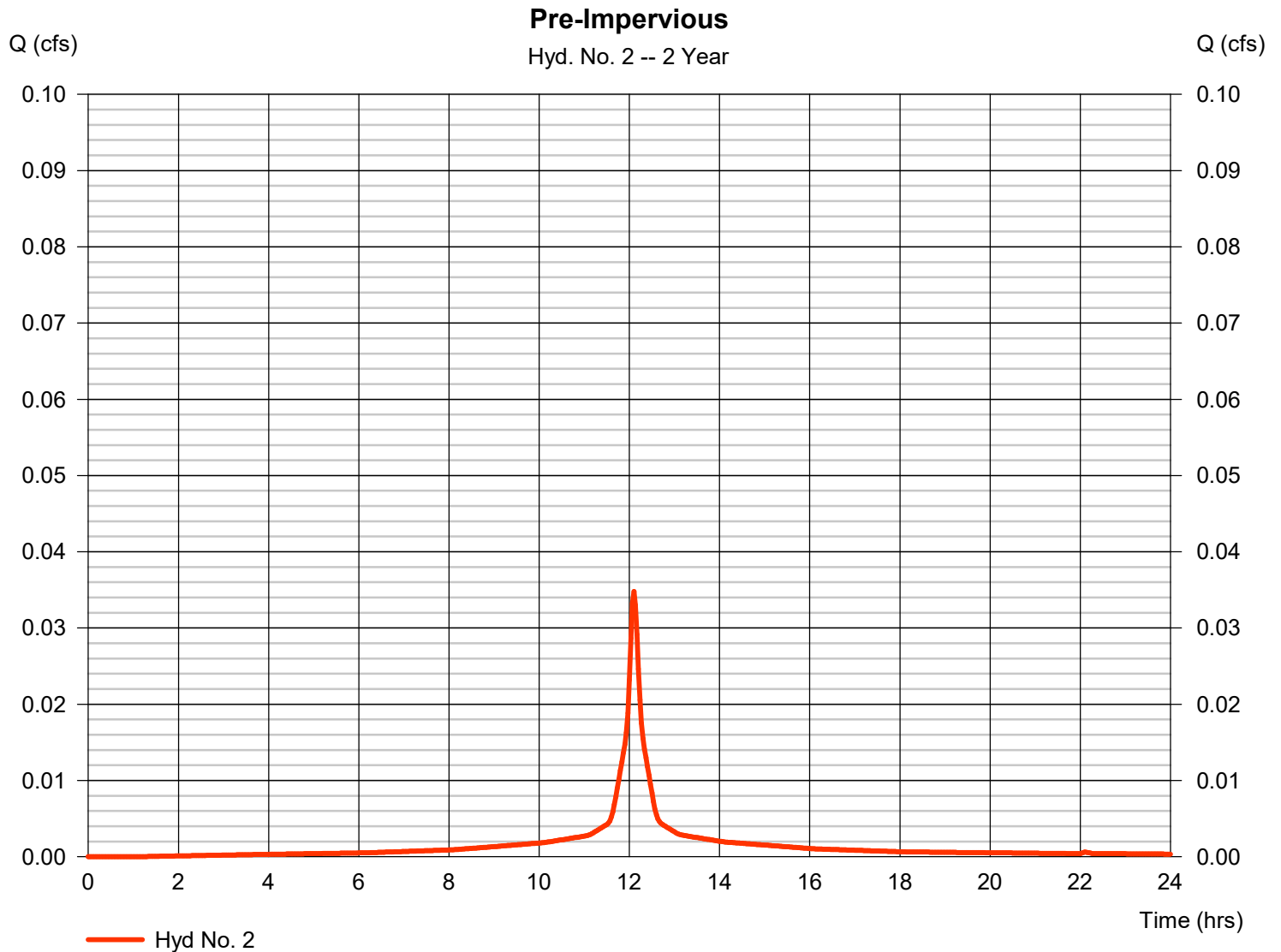
Thursday, 11 / 30 / 2023

Hyd. No. 2

Pre-Impervious

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 2 min
 Drainage area = 0.010 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.93 in
 Storm duration = 24 hrs

Peak discharge = 0.035 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 134 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.80 min
 Distribution = Type III
 Shape factor = 484

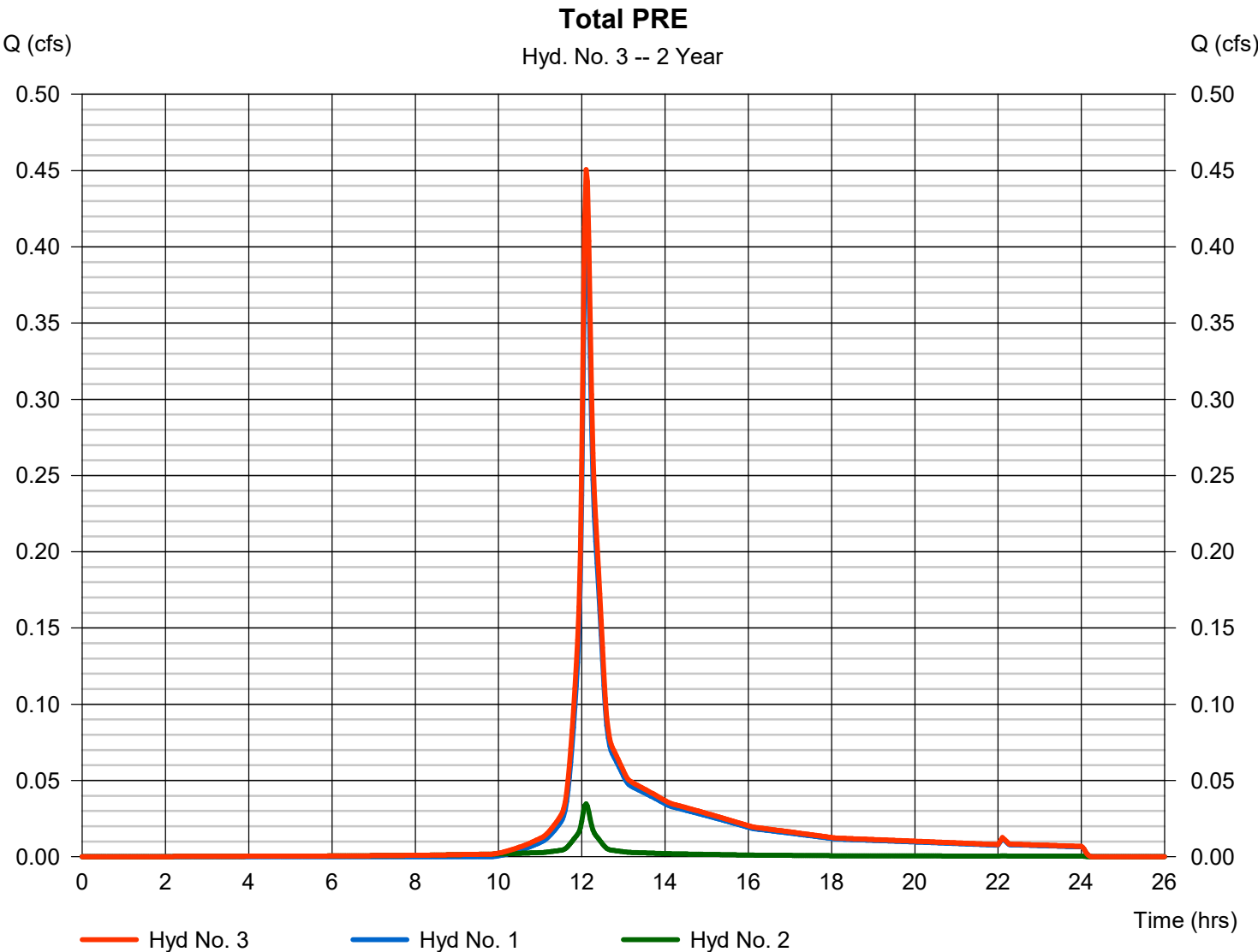


Hydrograph Report

Hyd. No. 3

Total PRE

Hydrograph type	= Combine	Peak discharge	= 0.451 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 1,592 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 0.270 ac

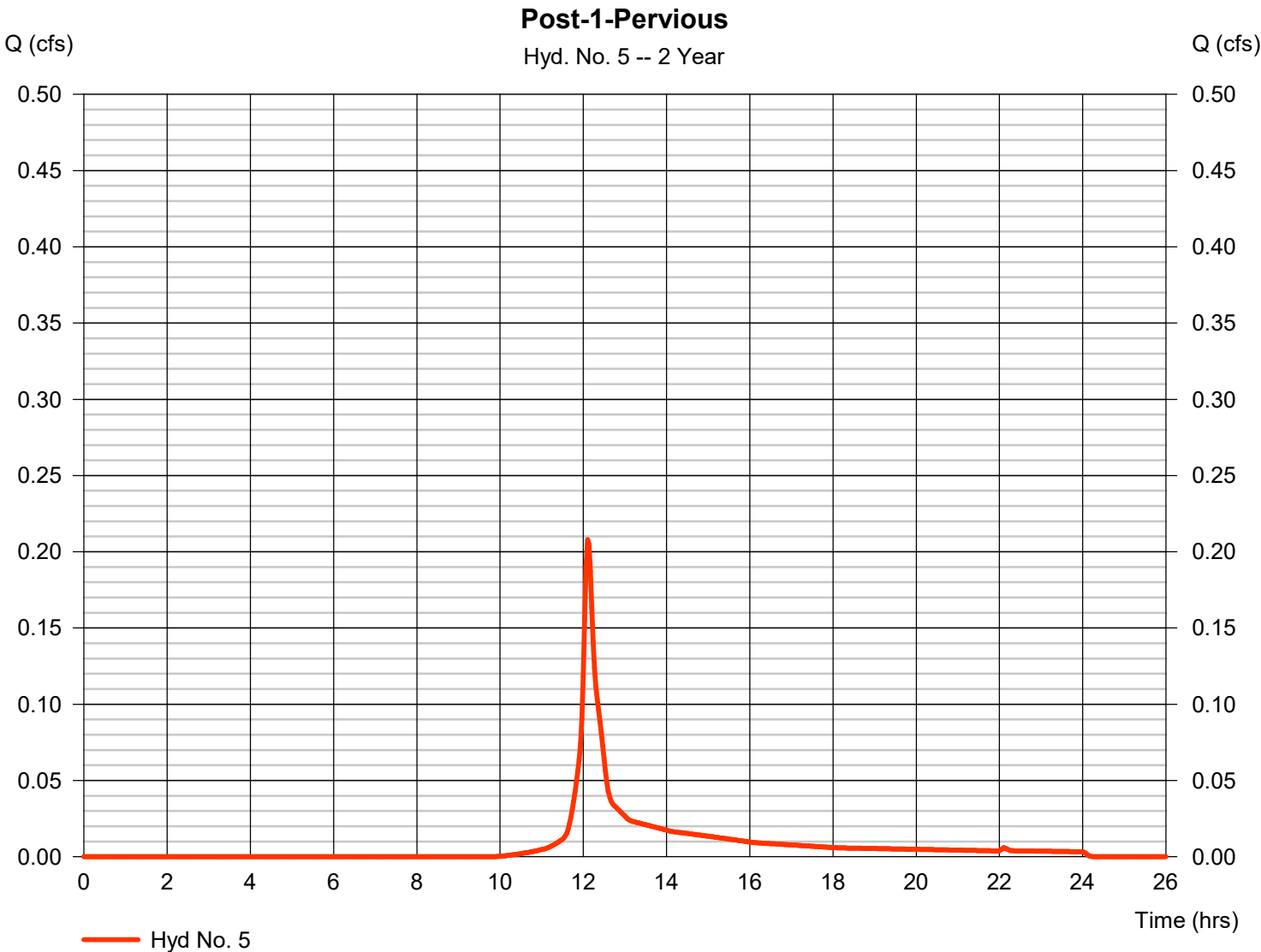


Hydrograph Report

Hyd. No. 5

Post-1-Pervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.208 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	729 cuft
Drainage area	=	0.130 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	8.40 min
Total precip.	=	3.93 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

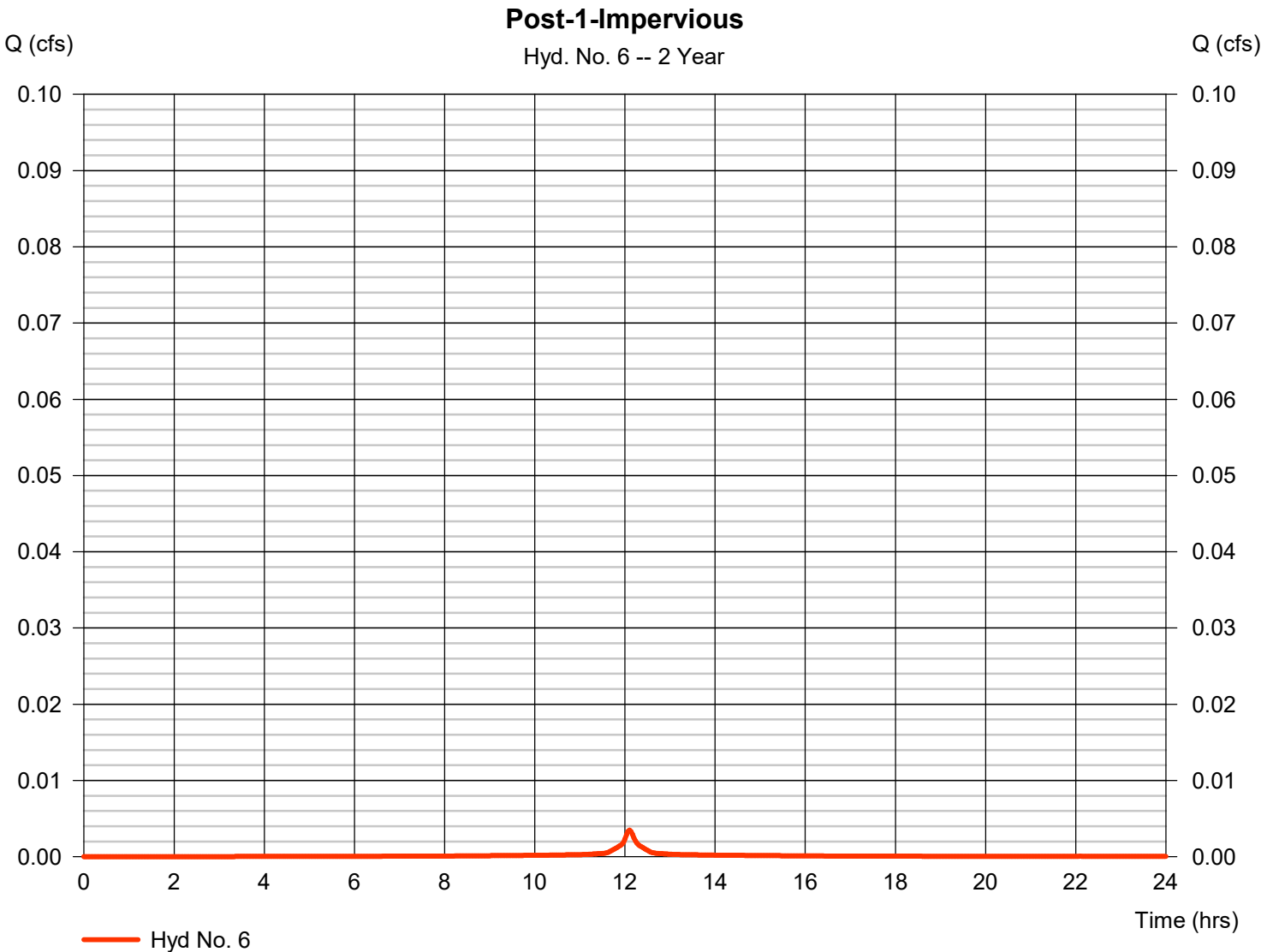


Hydrograph Report

Hyd. No. 6

Post-1-Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.003 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 13 cuft
Drainage area	= 0.001 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 3.93 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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

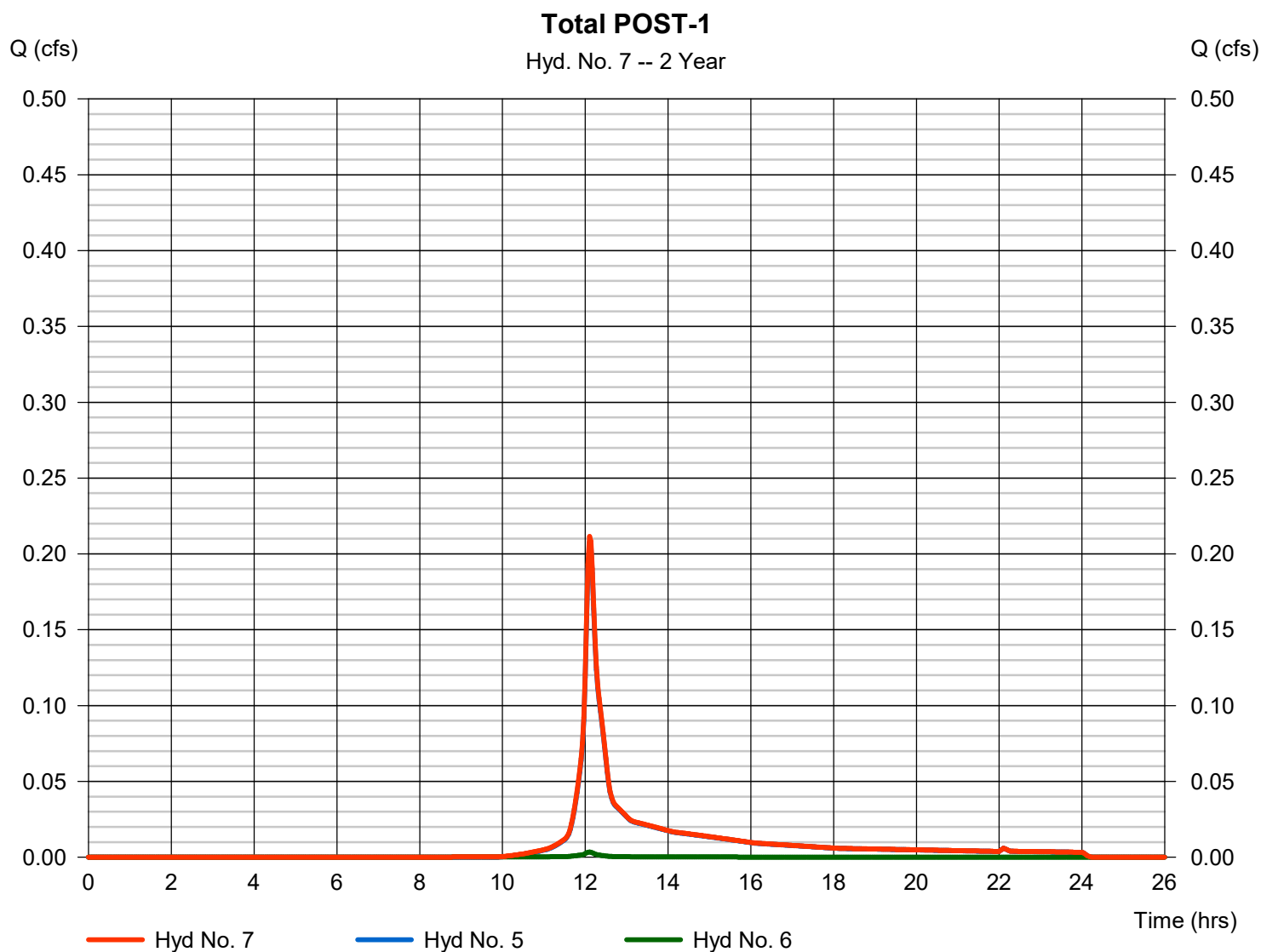
Thursday, 11 / 30 / 2023

Hyd. No. 7

Total POST-1

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 2 min
 Inflow hyds. = 5, 6

Peak discharge = 0.211 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 743 cuft
 Contrib. drain. area = 0.131 ac



Hydrograph Report

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

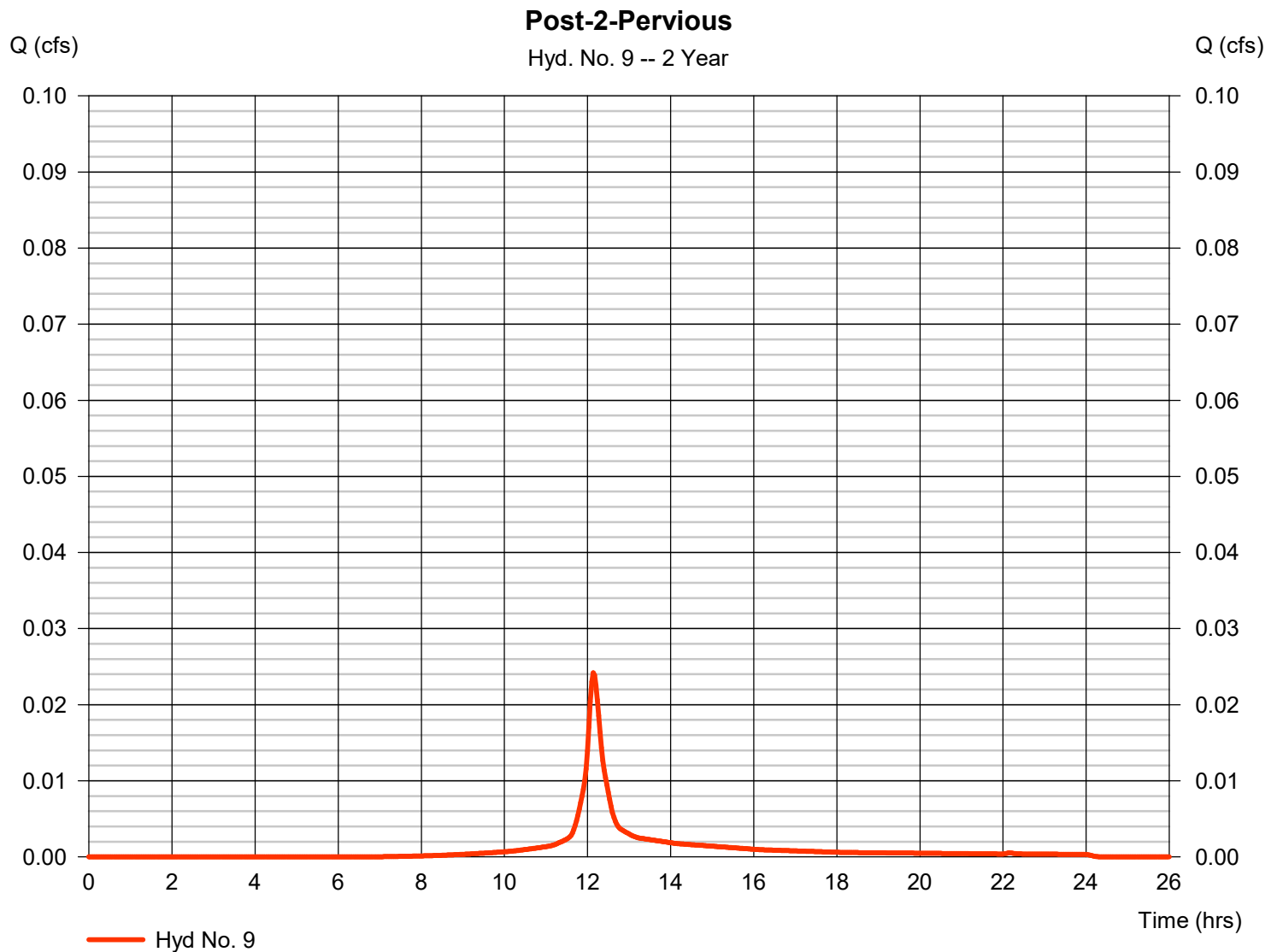
Thursday, 11 / 30 / 2023

Hyd. No. 9

Post-2-Pervious

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 2 min
 Drainage area = 0.010 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.93 in
 Storm duration = 24 hrs

Peak discharge = 0.024 cfs
 Time to peak = 12.13 hrs
 Hyd. volume = 93 cuft
 Curve number = 86
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.30 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

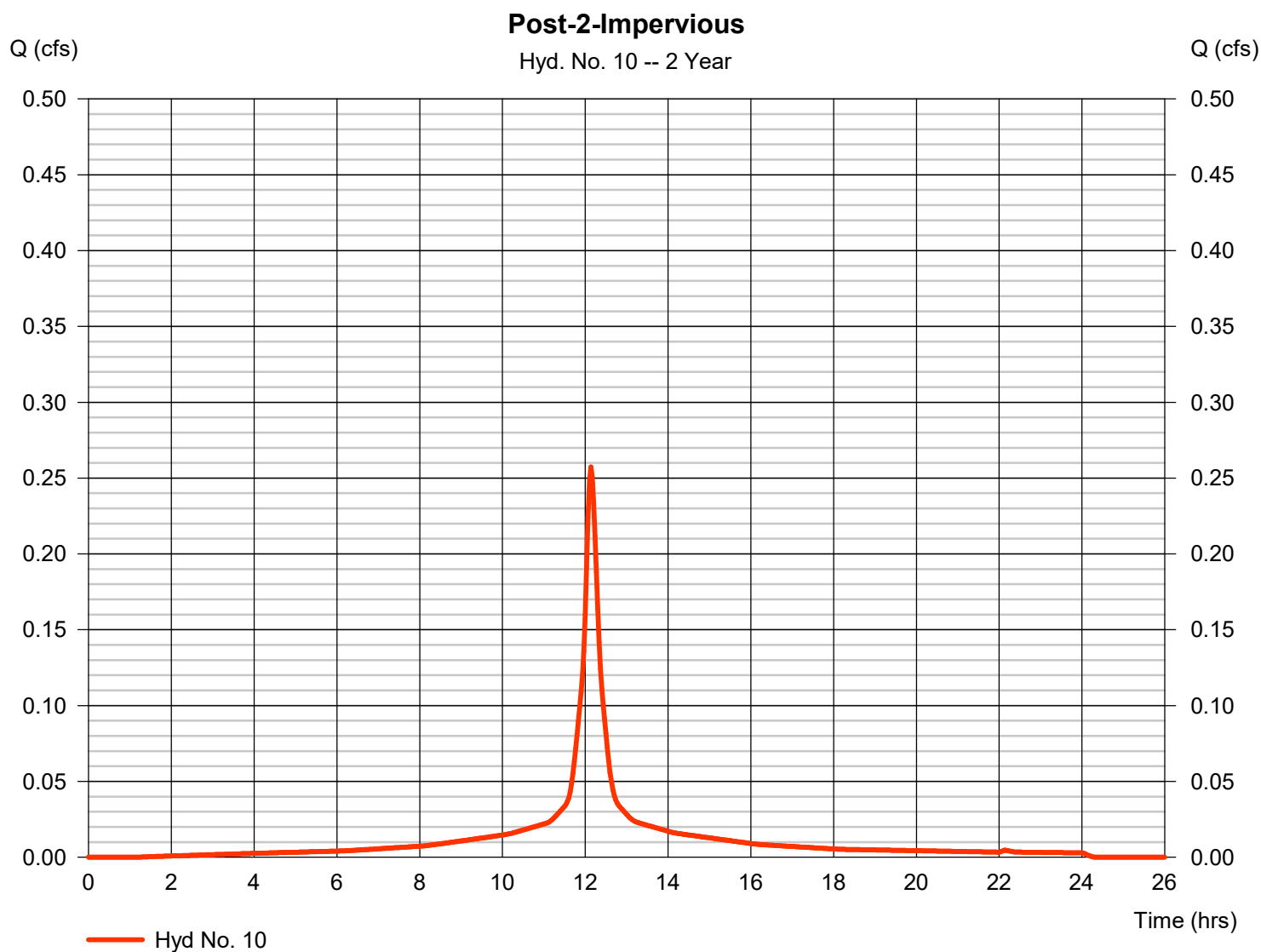
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 10

Post-2-Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.257 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,107 cuft
Drainage area	= 0.080 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 3.93 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

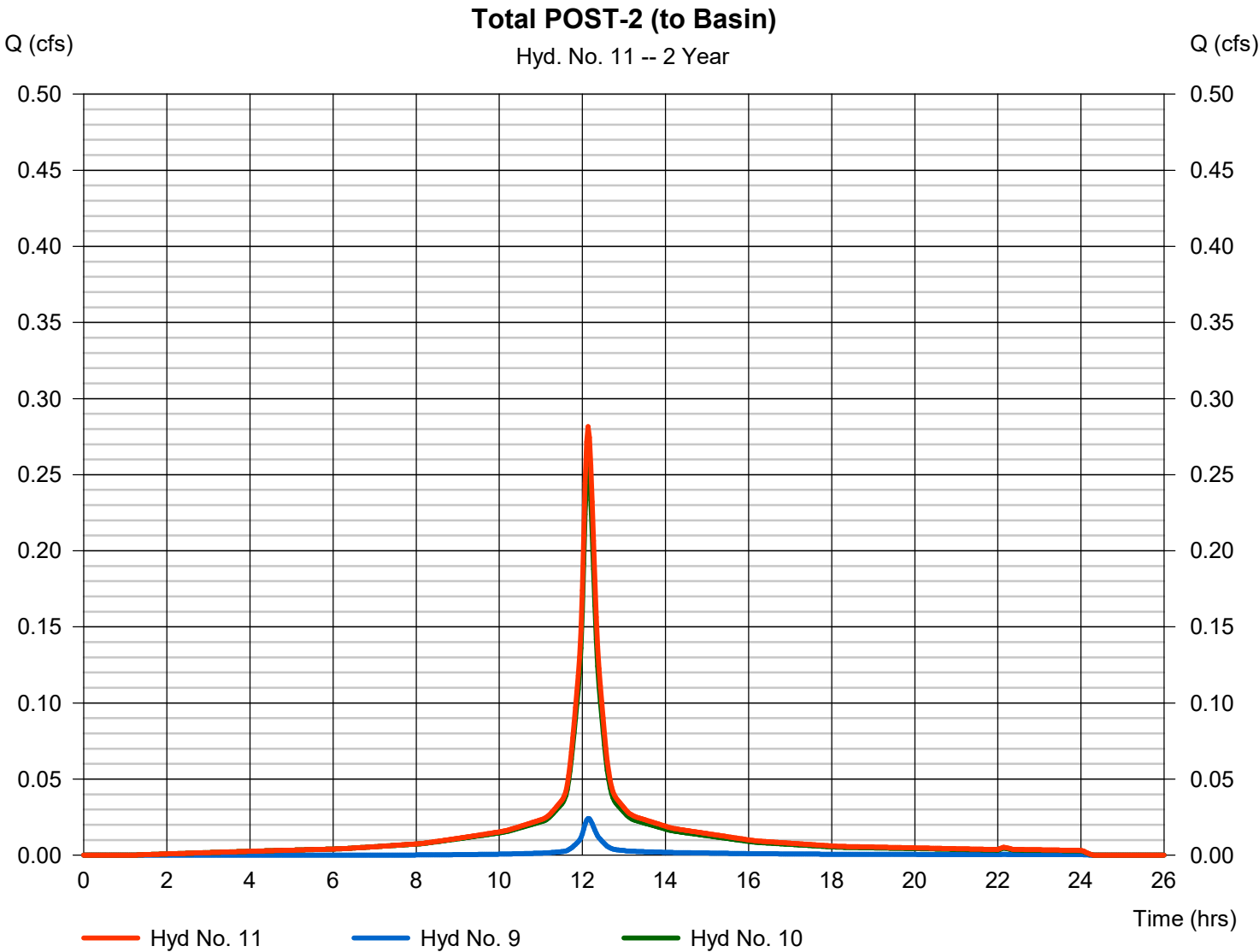


Hydrograph Report

Hyd. No. 11

Total POST-2 (to Basin)

Hydrograph type	= Combine	Peak discharge	= 0.282 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,200 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 0.090 ac



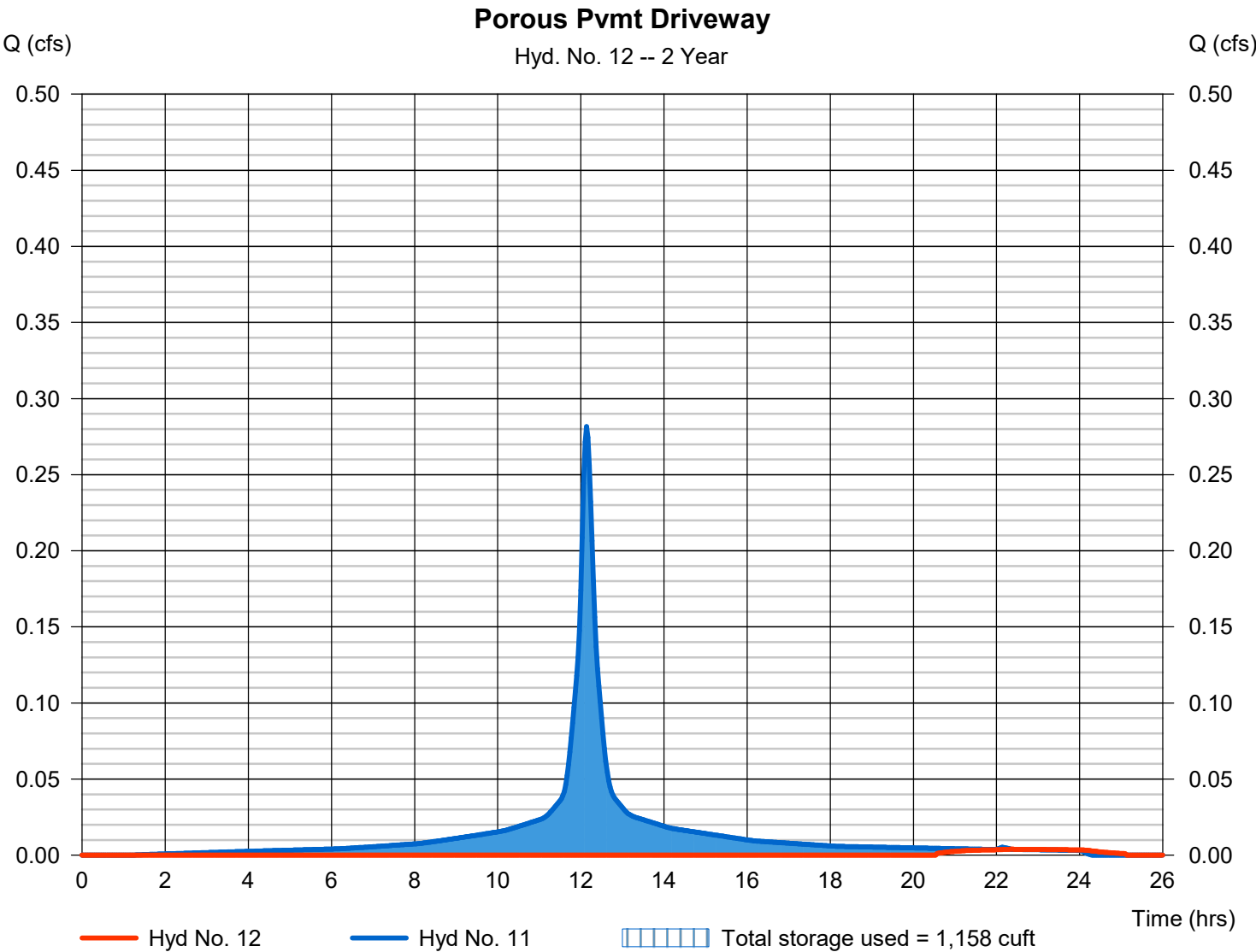
Hydrograph Report

Hyd. No. 12

Porous Pvmt Driveway

Hydrograph type	= Reservoir	Peak discharge	= 0.004 cfs
Storm frequency	= 2 yrs	Time to peak	= 22.37 hrs
Time interval	= 2 min	Hyd. volume	= 50 cuft
Inflow hyd. No.	= 11 - Total POST-2 (to Basin)	Max. Elevation	= 152.02 ft
Reservoir name	= Porous Pvmt Driveway	Max. Storage	= 1,158 cuft

Storage Indication method used.



Hydrograph Report

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

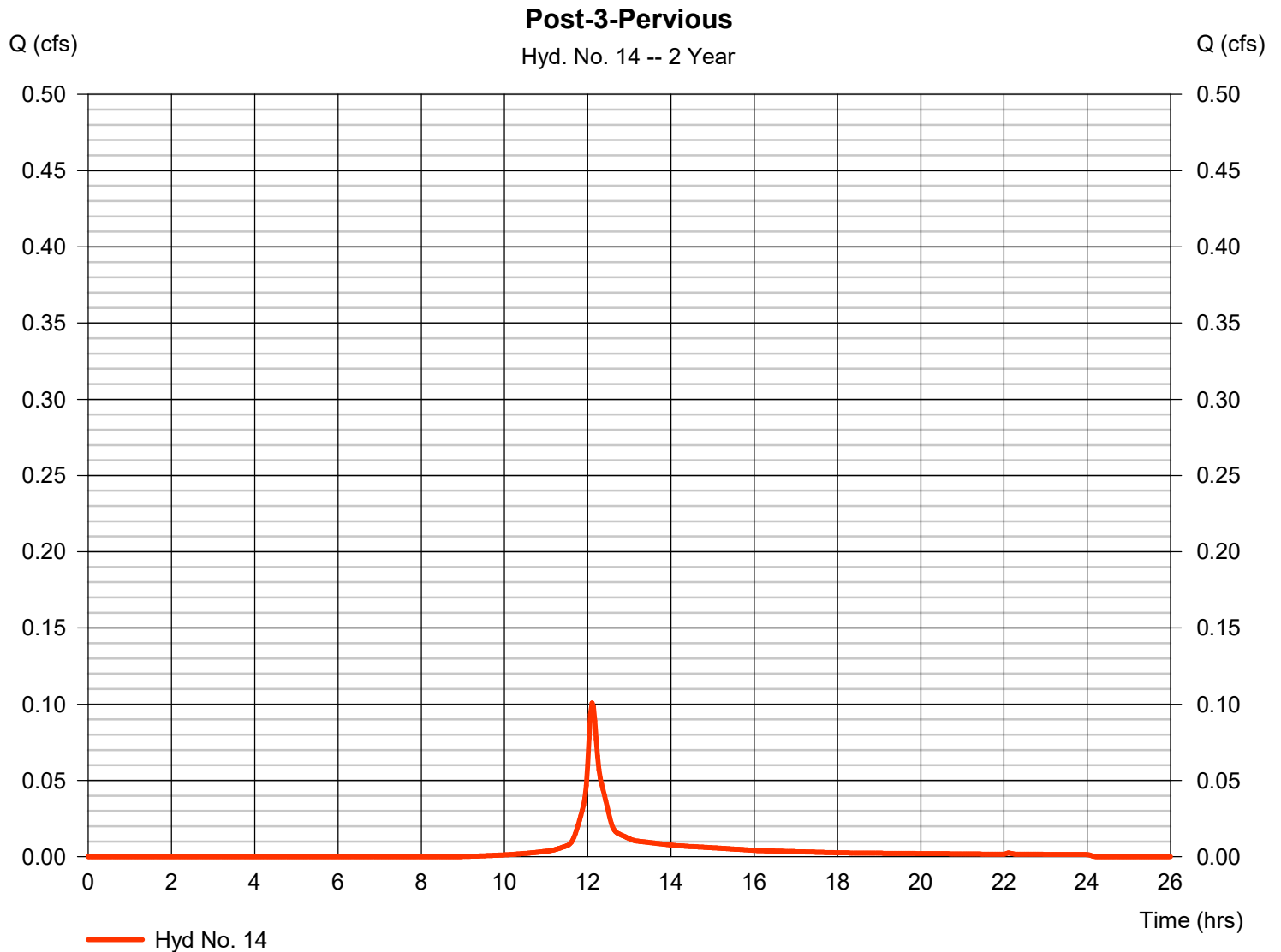
Thursday, 11 / 30 / 2023

Hyd. No. 14

Post-3-Pervious

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 2 min
 Drainage area = 0.050 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 3.93 in
 Storm duration = 24 hrs

Peak discharge = 0.101 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 346 cuft
 Curve number = 79
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 6.60 min
 Distribution = Type III
 Shape factor = 484

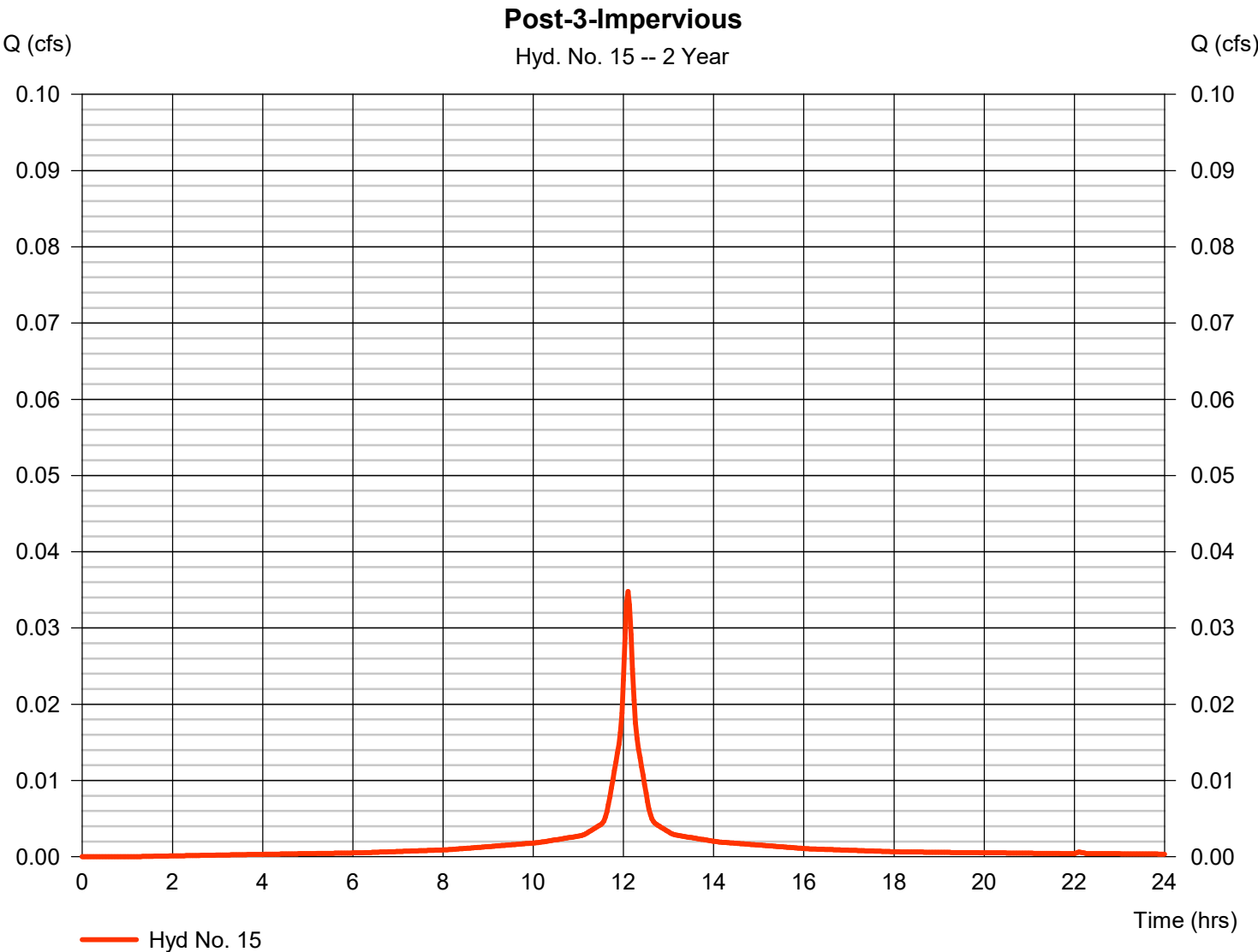


Hydrograph Report

Hyd. No. 15

Post-3-Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.035 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 134 cuft
Drainage area	= 0.010 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 3.93 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

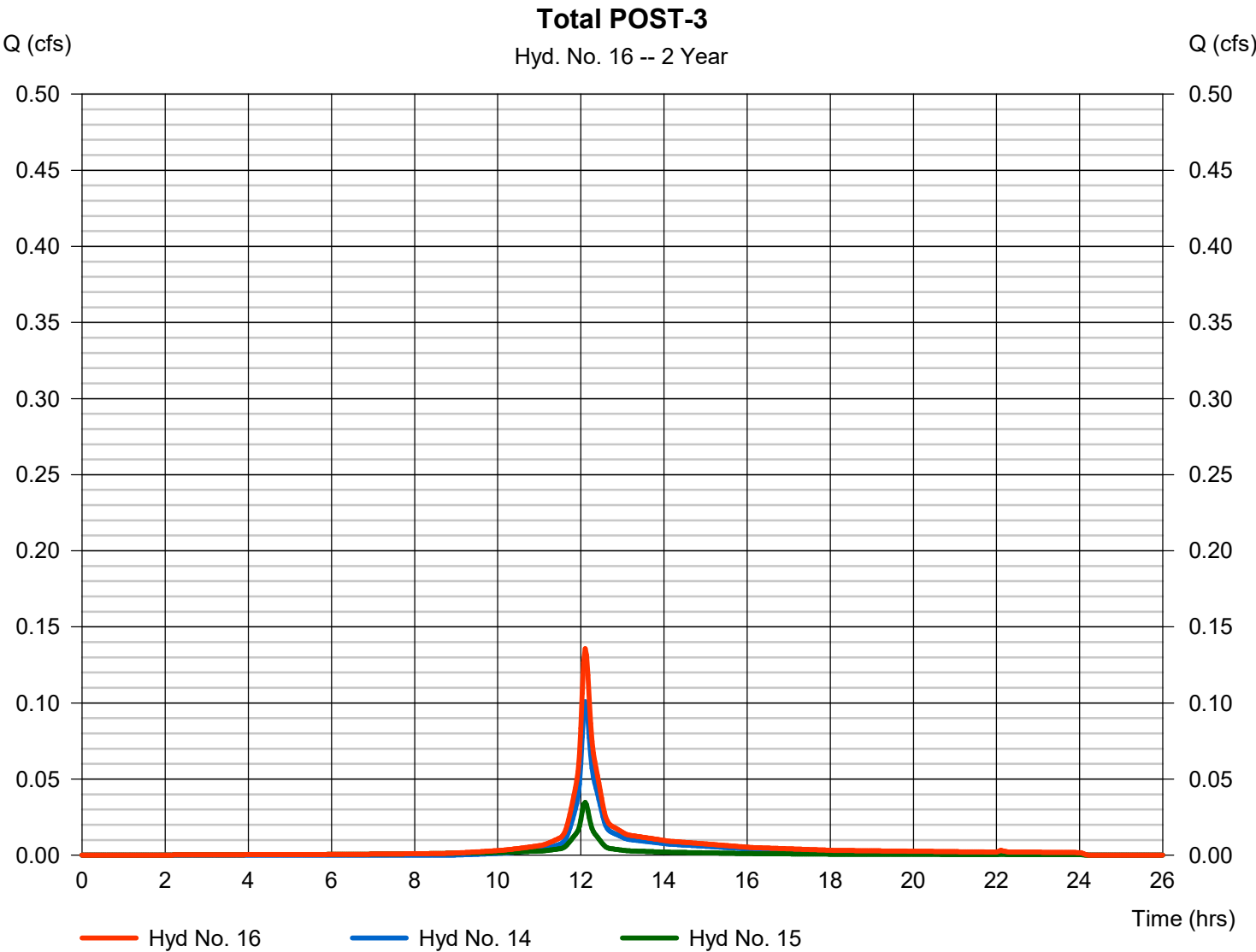


Hydrograph Report

Hyd. No. 16

Total POST-3

Hydrograph type	= Combine	Peak discharge	= 0.136 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 480 cuft
Inflow hyds.	= 14, 15	Contrib. drain. area	= 0.060 ac

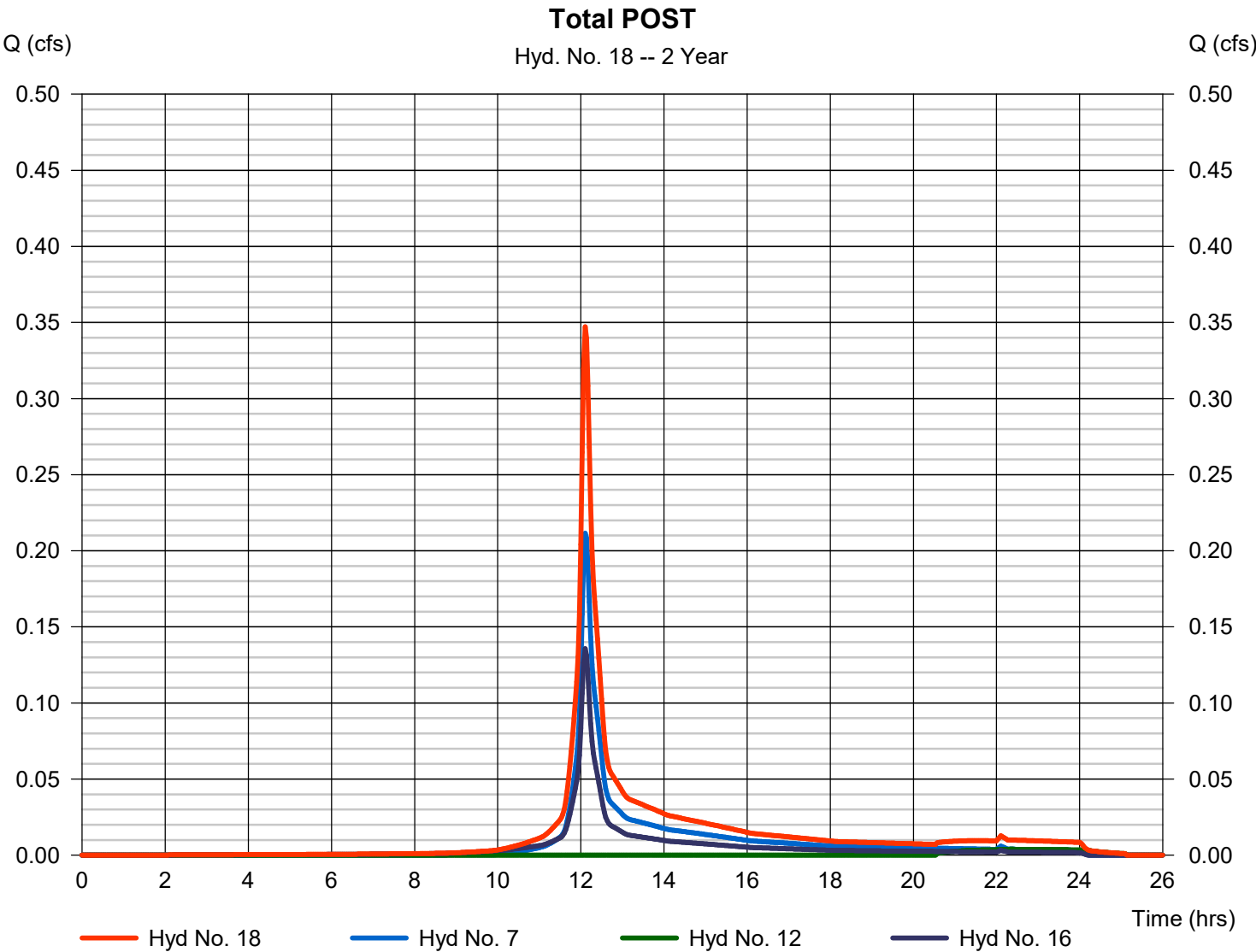


Hydrograph Report

Hyd. No. 18

Total POST

Hydrograph type	= Combine	Peak discharge	= 0.347 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 1,273 cuft
Inflow hyds.	= 7, 12, 16	Contrib. drain. area	= 0.000 ac

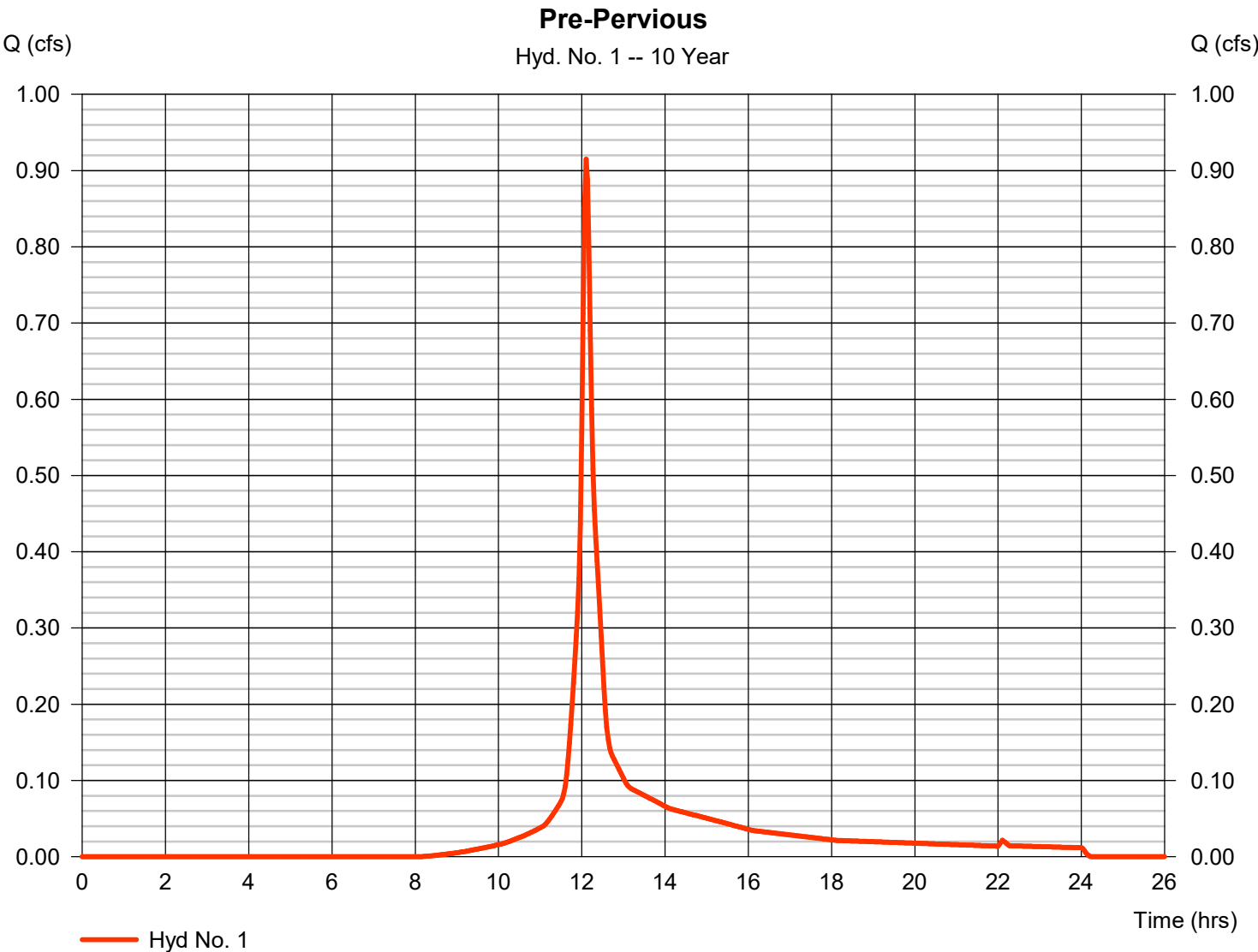


Hydrograph Report

Hyd. No. 1

Pre-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.915 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 3,125 cuft
Drainage area	= 0.260 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.80 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

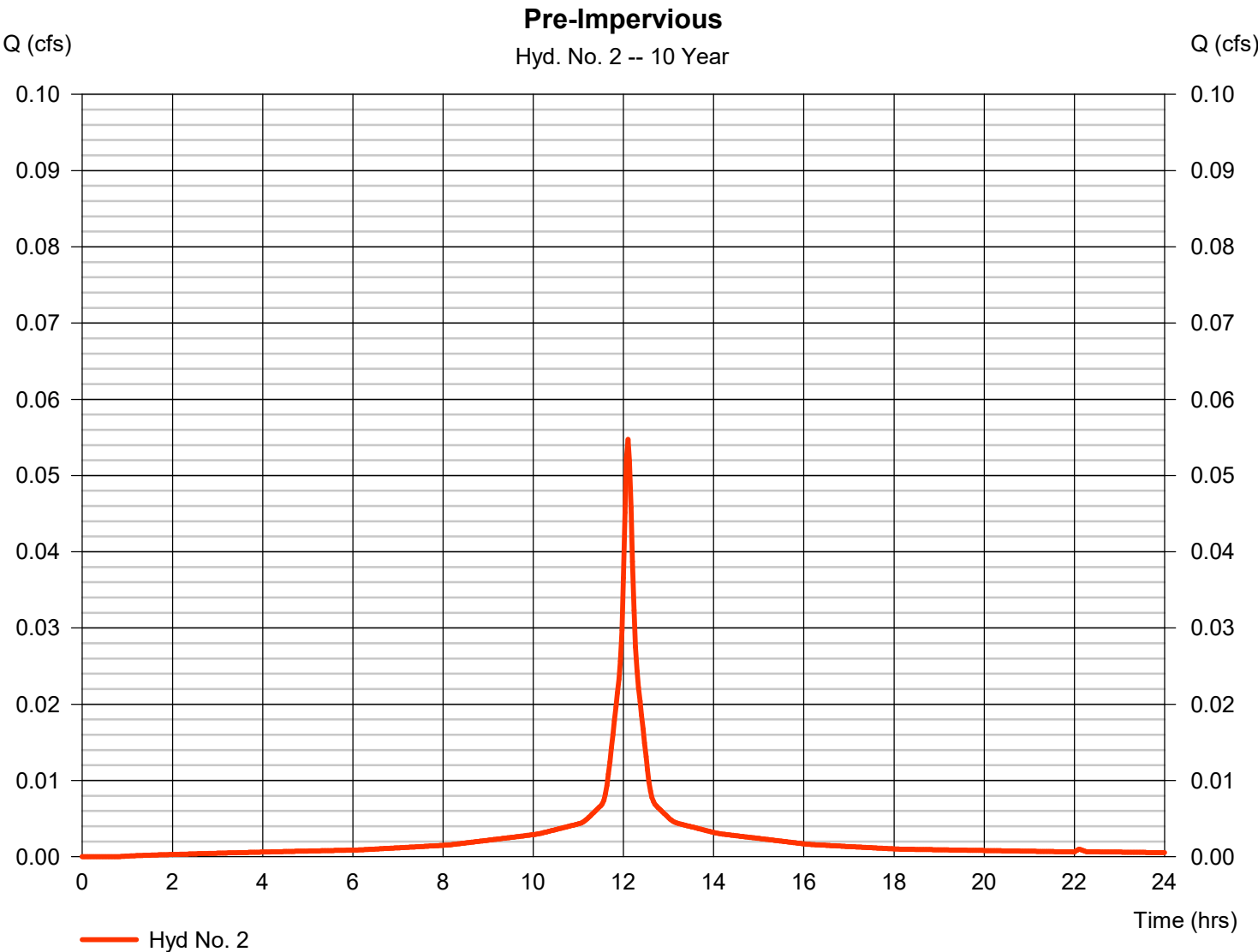
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 2

Pre-Impervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.055 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	215 cuft
Drainage area	=	0.010 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	8.80 min
Total precip.	=	6.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

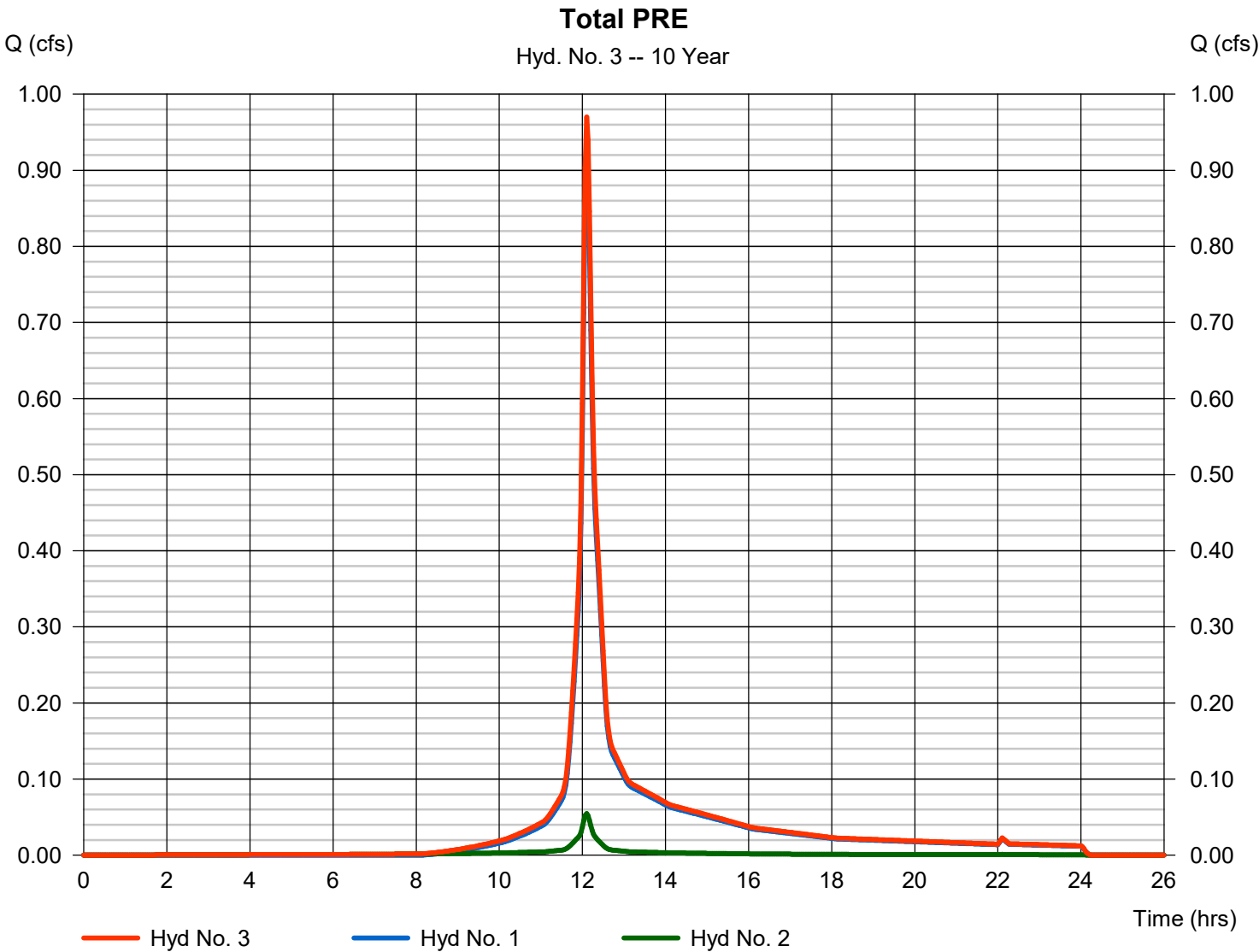


Hydrograph Report

Hyd. No. 3

Total PRE

Hydrograph type	= Combine	Peak discharge	= 0.970 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 3,340 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 0.270 ac

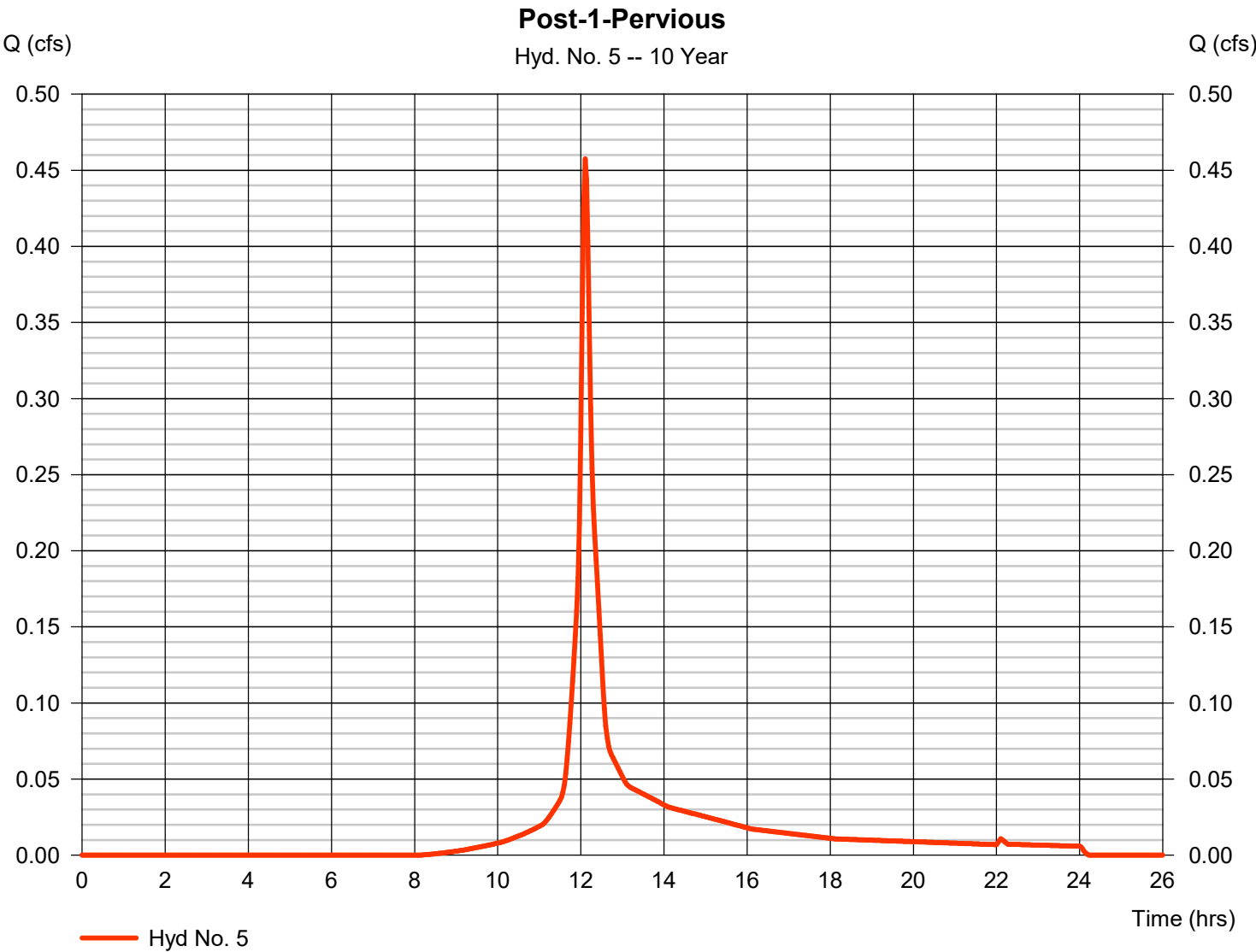


Hydrograph Report

Hyd. No. 5

Post-1-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.458 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 1,563 cuft
Drainage area	= 0.130 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

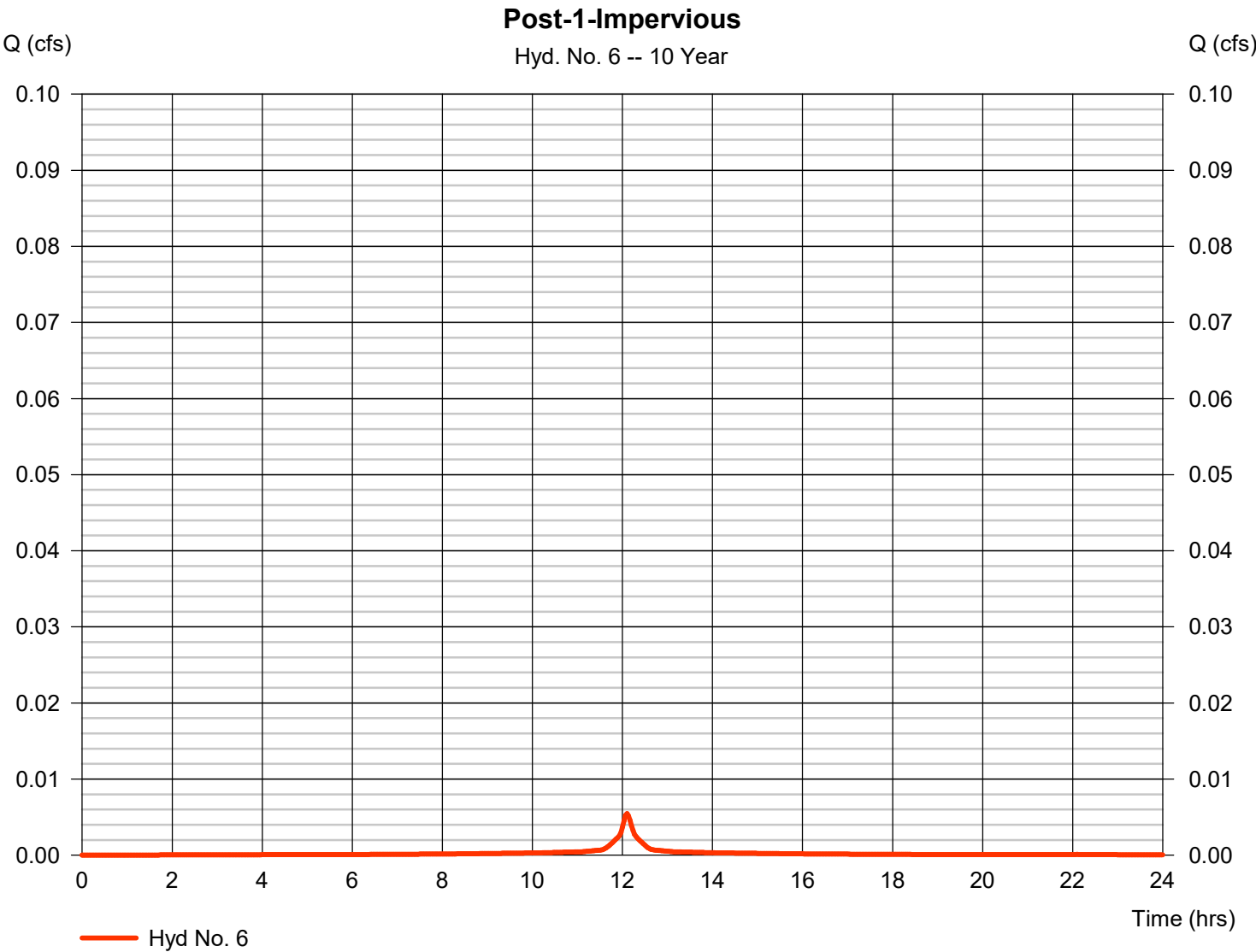


Hydrograph Report

Hyd. No. 6

Post-1-Impervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.005 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	21 cuft
Drainage area	=	0.001 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	8.40 min
Total precip.	=	6.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

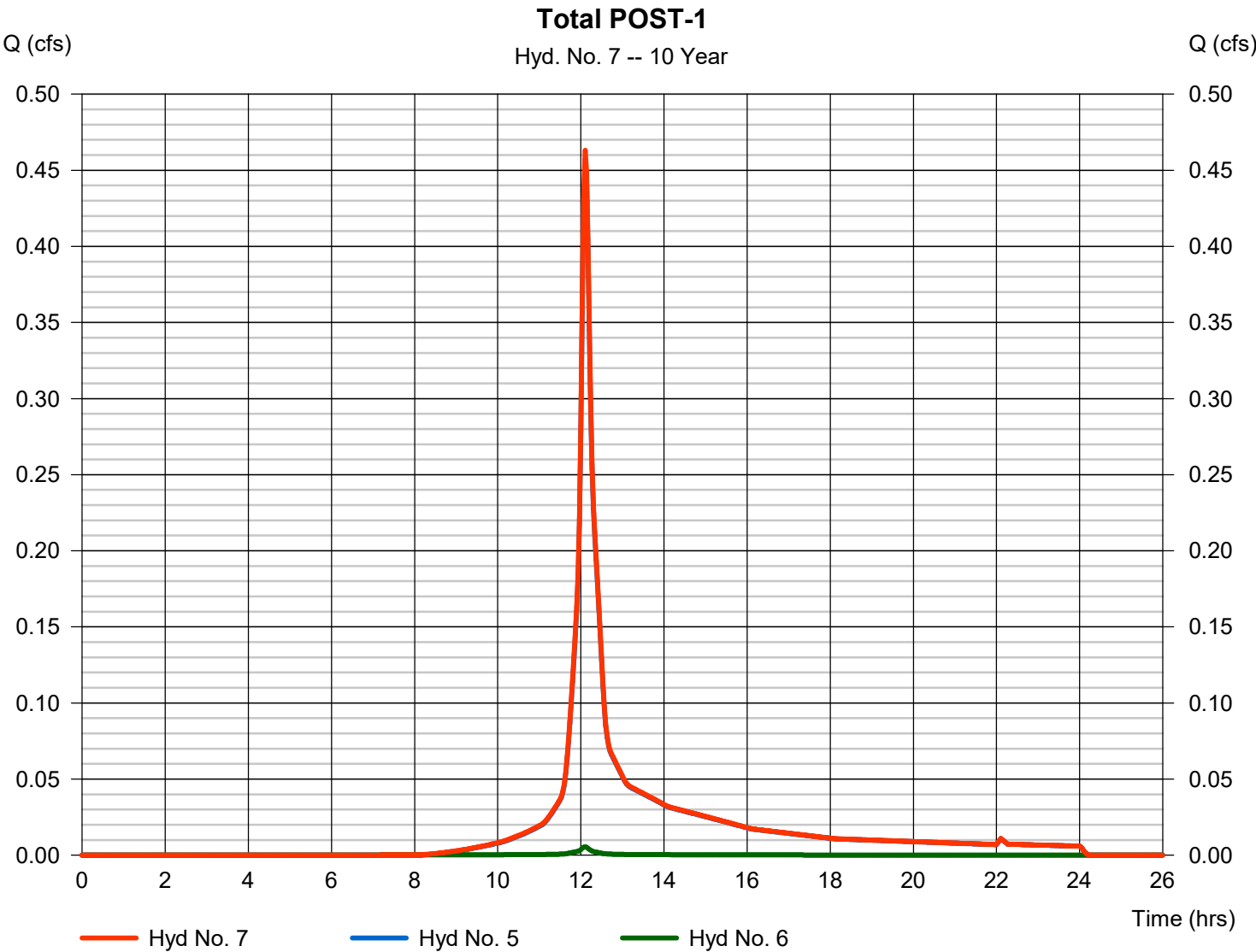


Hydrograph Report

Hyd. No. 7

Total POST-1

Hydrograph type	= Combine	Peak discharge	= 0.463 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 1,584 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.131 ac

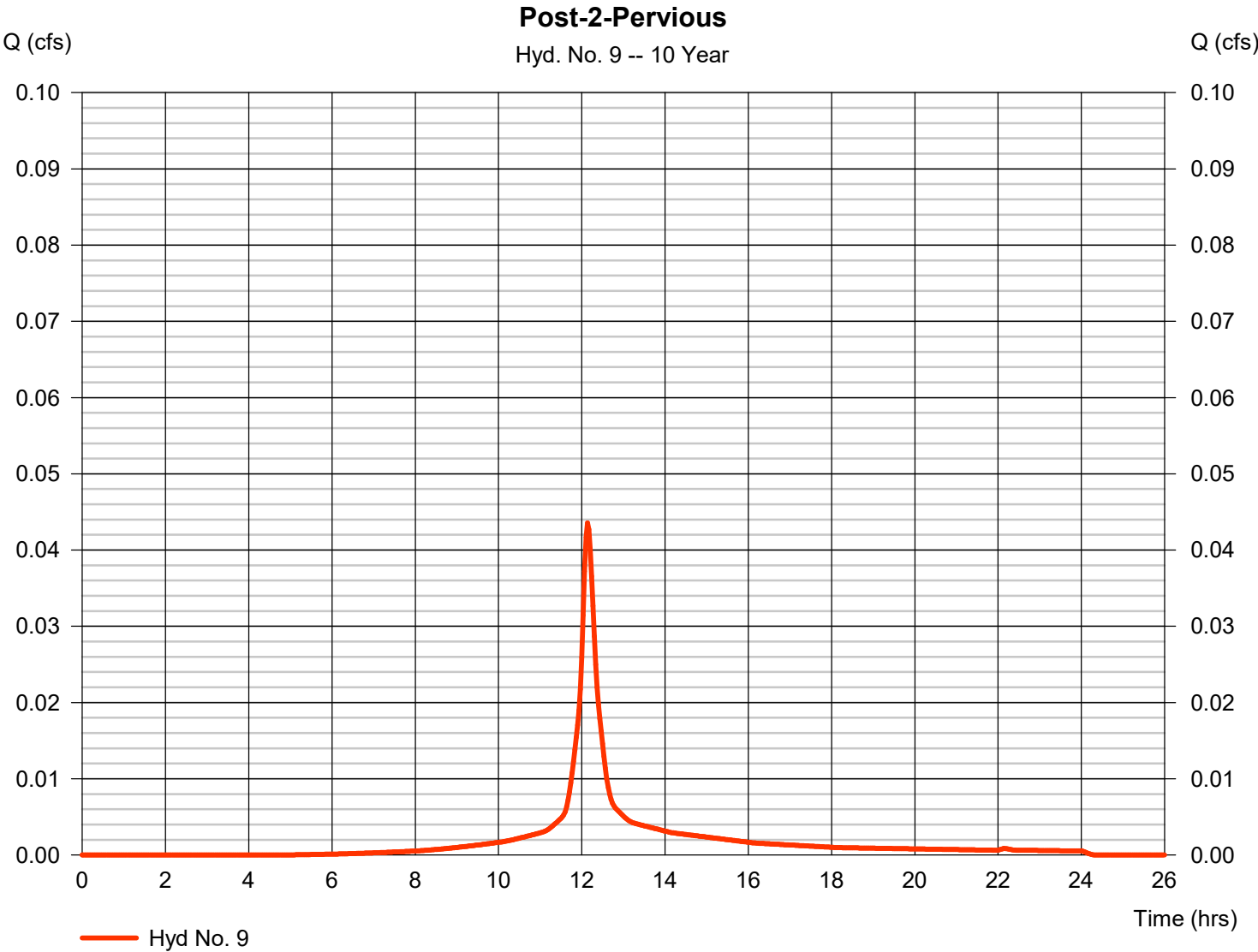


Hydrograph Report

Hyd. No. 9

Post-2-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.044 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 170 cuft
Drainage area	= 0.010 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

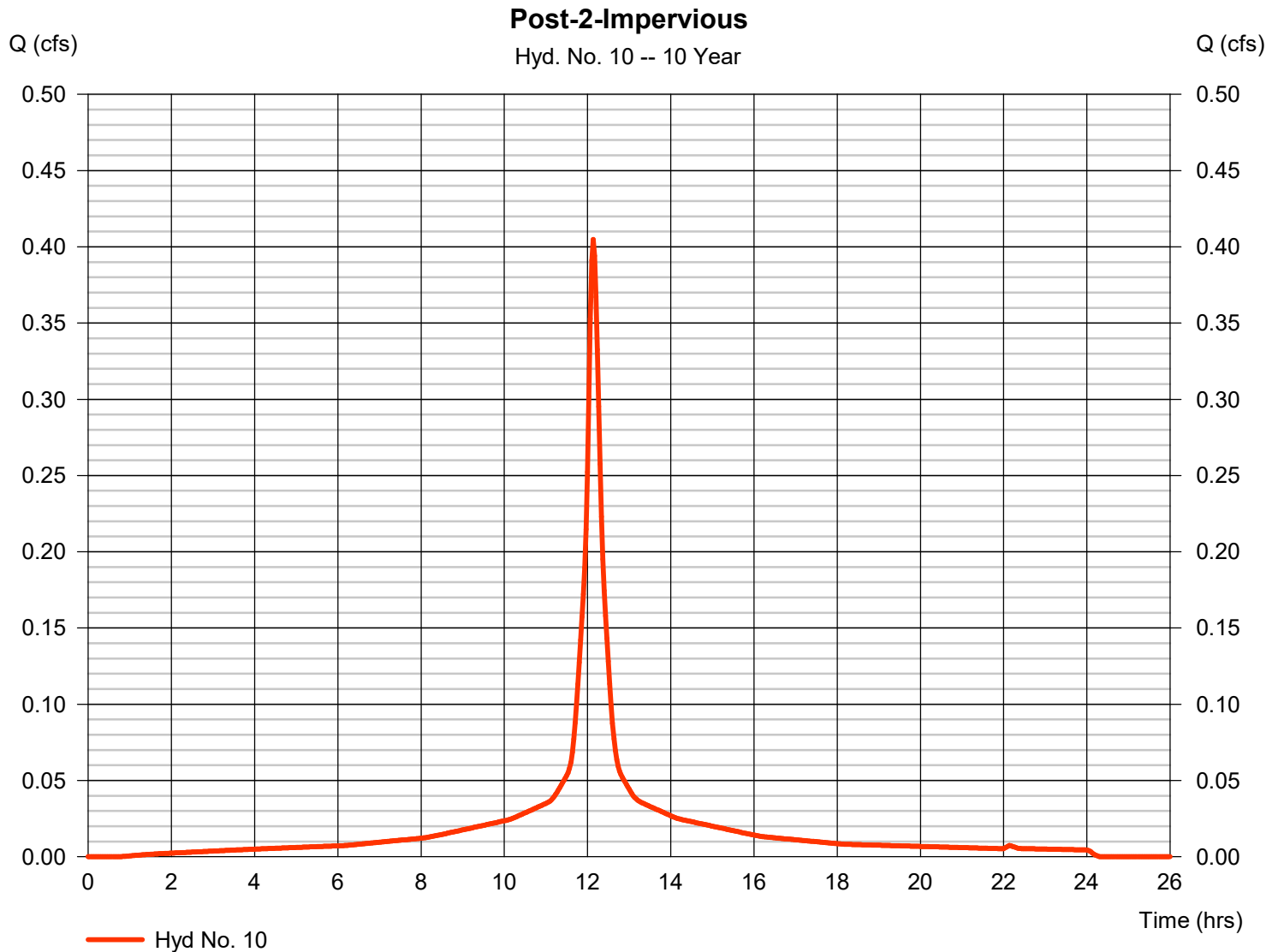
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 10

Post-2-Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.405 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,770 cuft
Drainage area	= 0.080 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

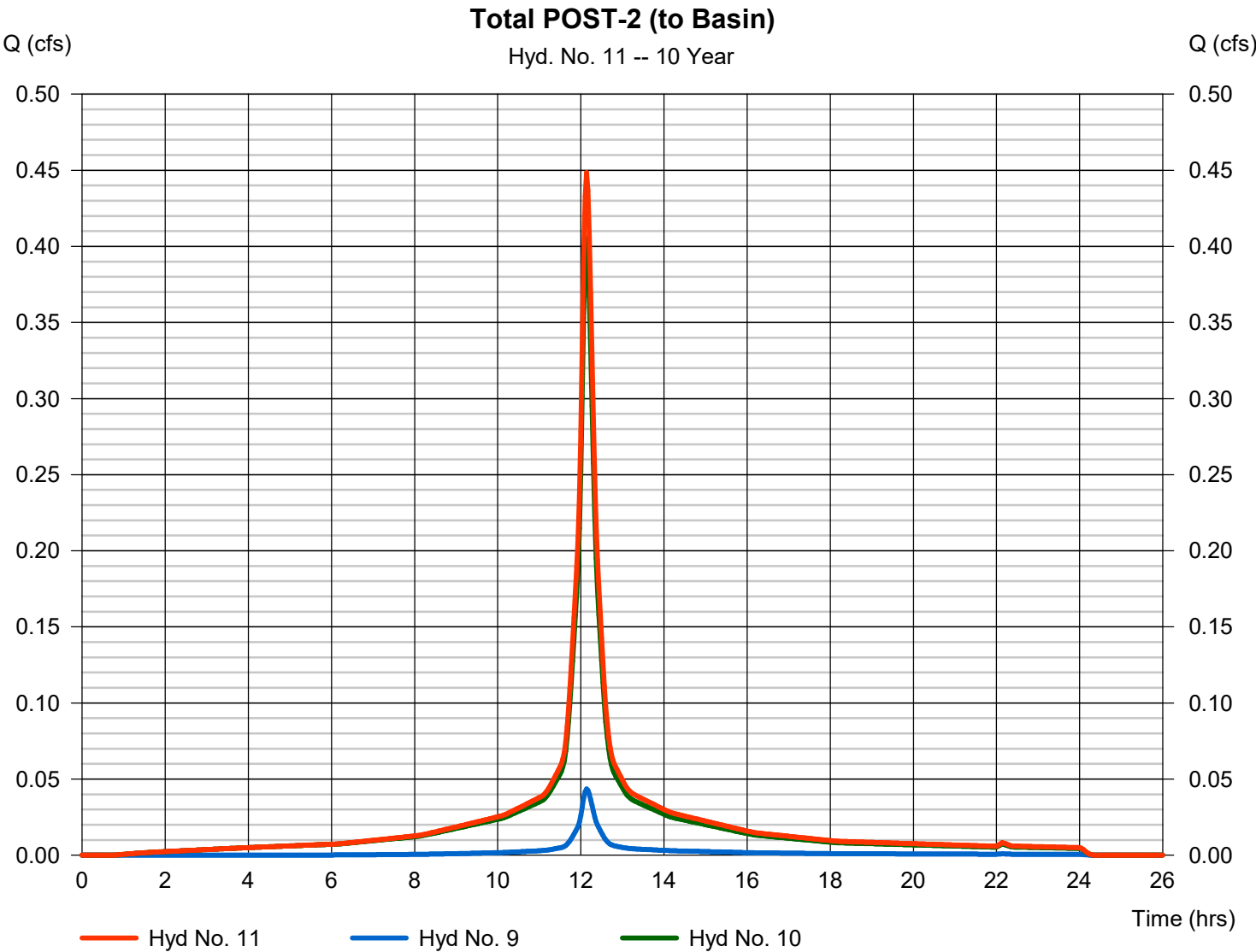


Hydrograph Report

Hyd. No. 11

Total POST-2 (to Basin)

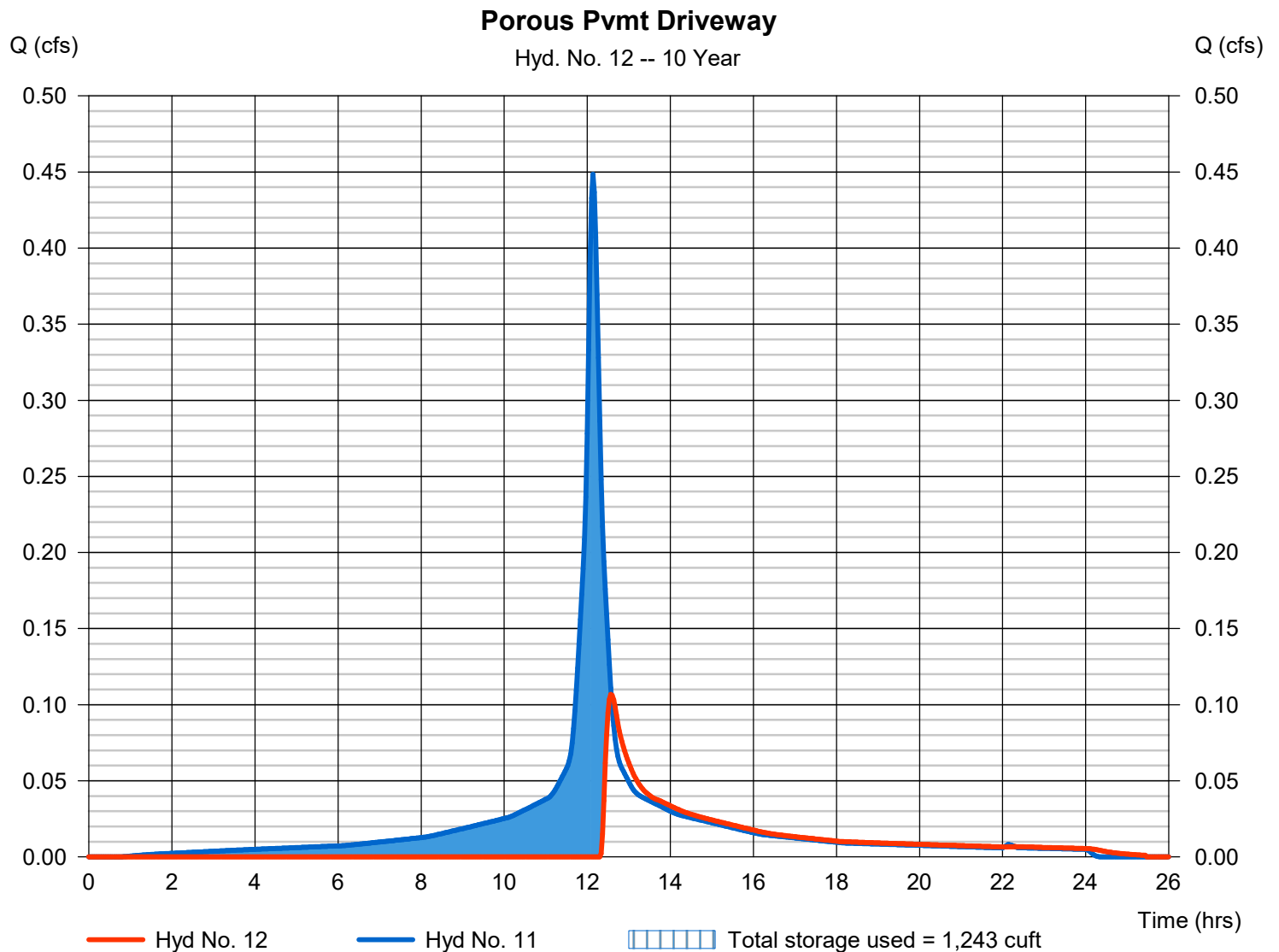
Hydrograph type	= Combine	Peak discharge	= 0.448 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,941 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 0.090 ac



Porous Pvmt Driveway

Hydrograph type	= Reservoir	Peak discharge	= 0.107 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.57 hrs
Time interval	= 2 min	Hyd. volume	= 791 cuft
Inflow hyd. No.	= 11 - Total POST-2 (to Basin)	Max. Elevation	= 152.19 ft
Reservoir name	= Porous Pvmt Driveway	Max. Storage	= 1,243 cuft

Storage Indication method used.

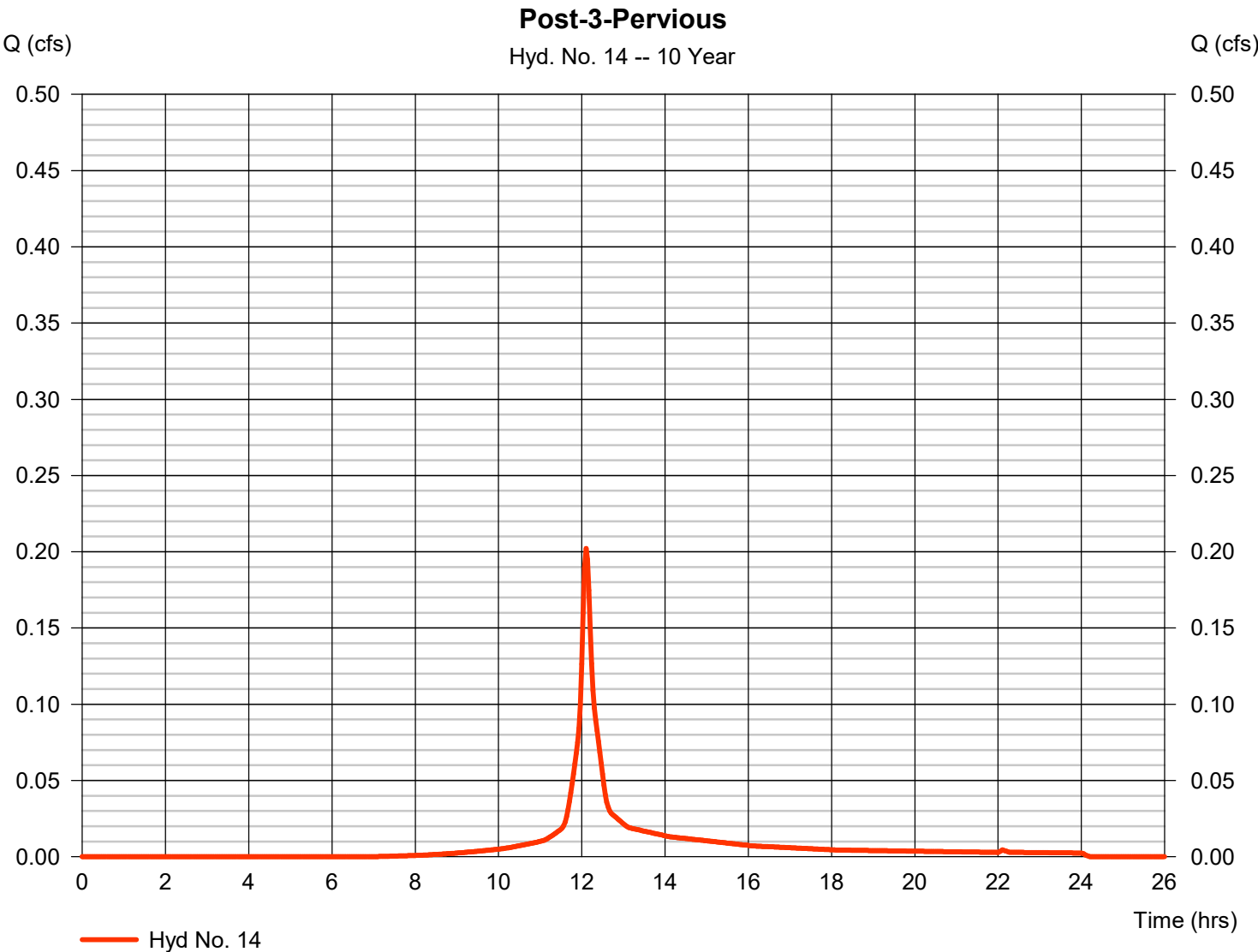


Hydrograph Report

Hyd. No. 14

Post-3-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.202 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 692 cuft
Drainage area	= 0.050 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

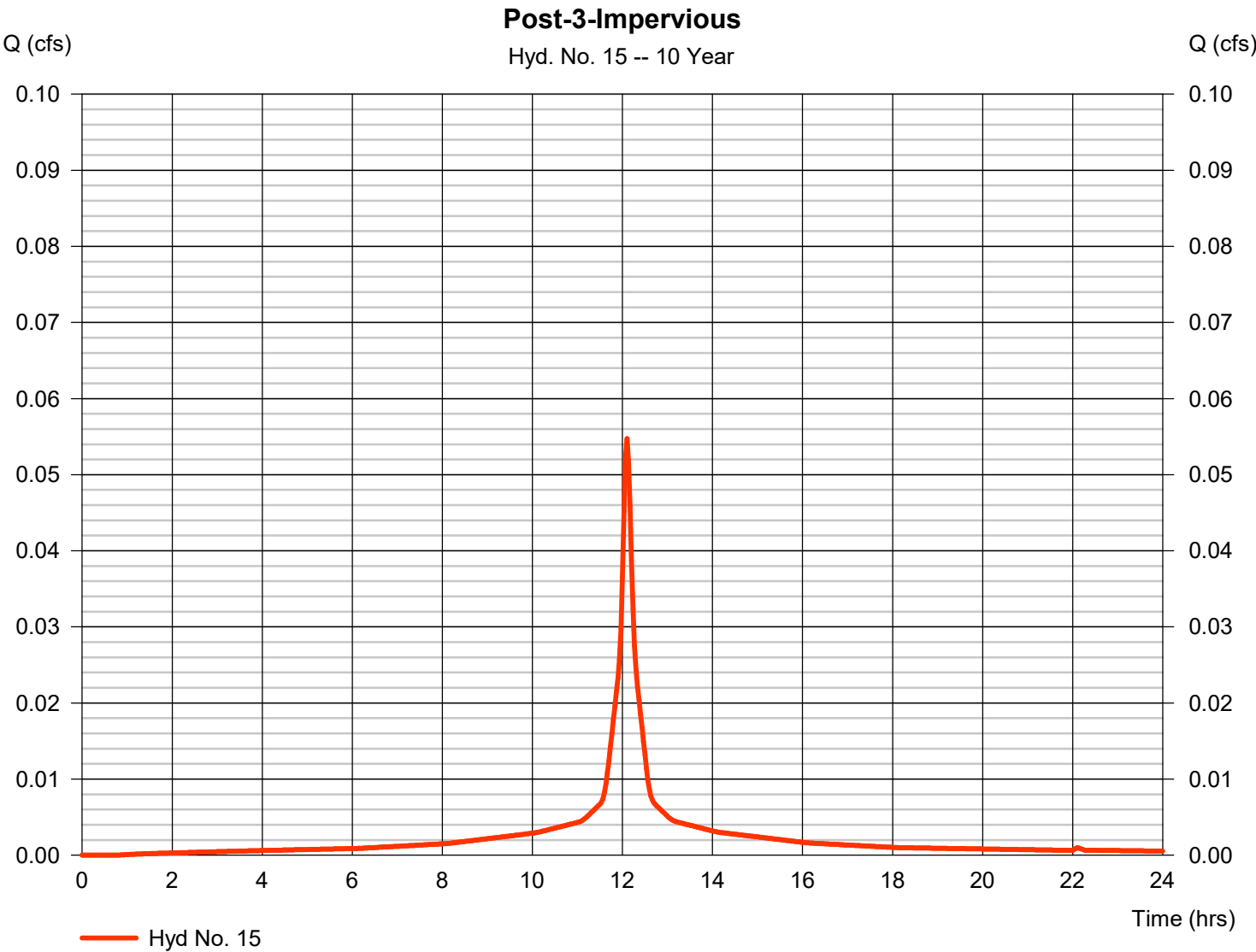


Hydrograph Report

Hyd. No. 15

Post-3-Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.055 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 215 cuft
Drainage area	= 0.010 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 6.15 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

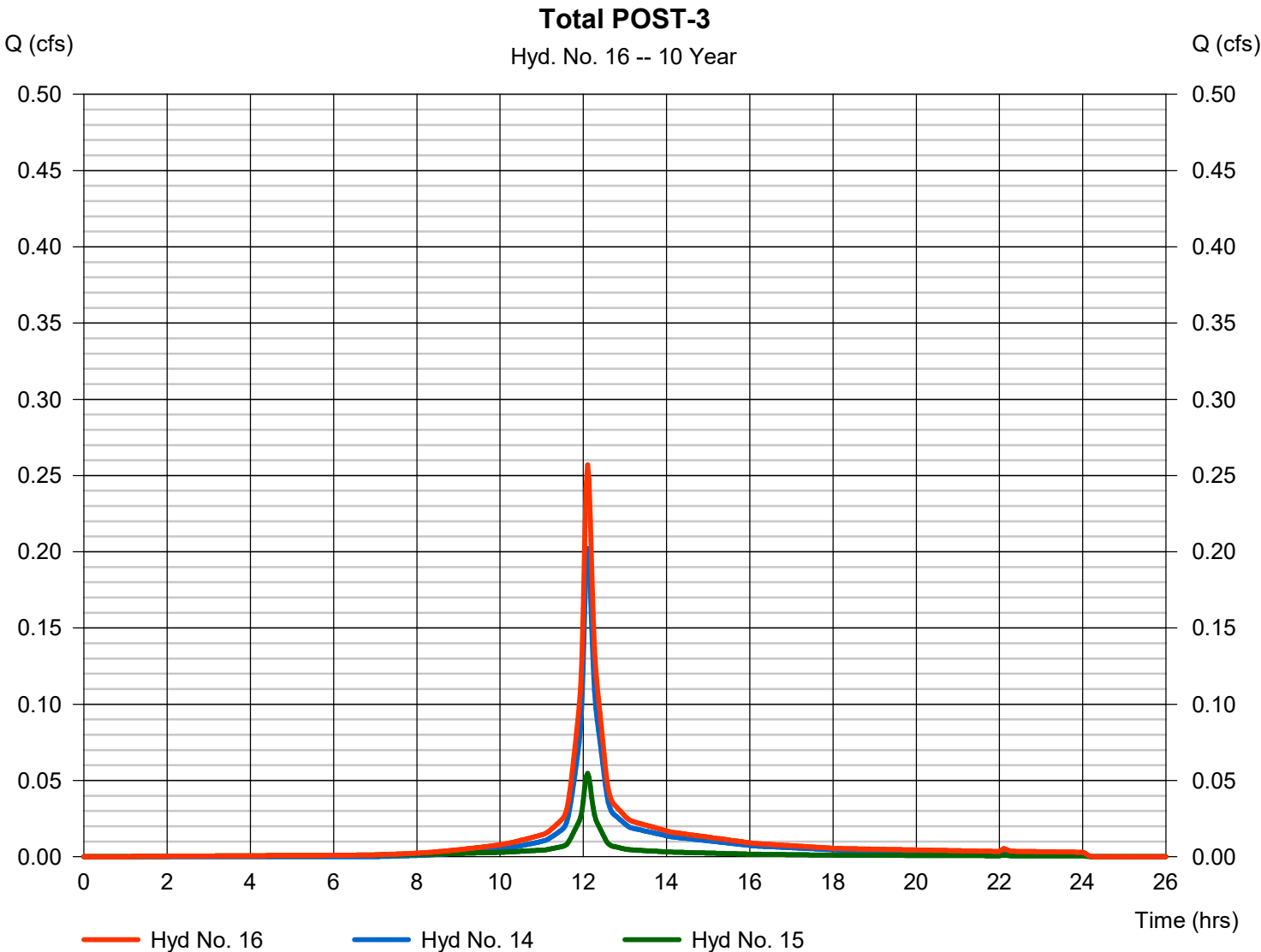


Hydrograph Report

Hyd. No. 16

Total POST-3

Hydrograph type	= Combine	Peak discharge	= 0.257 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 907 cuft
Inflow hyds.	= 14, 15	Contrib. drain. area	= 0.060 ac

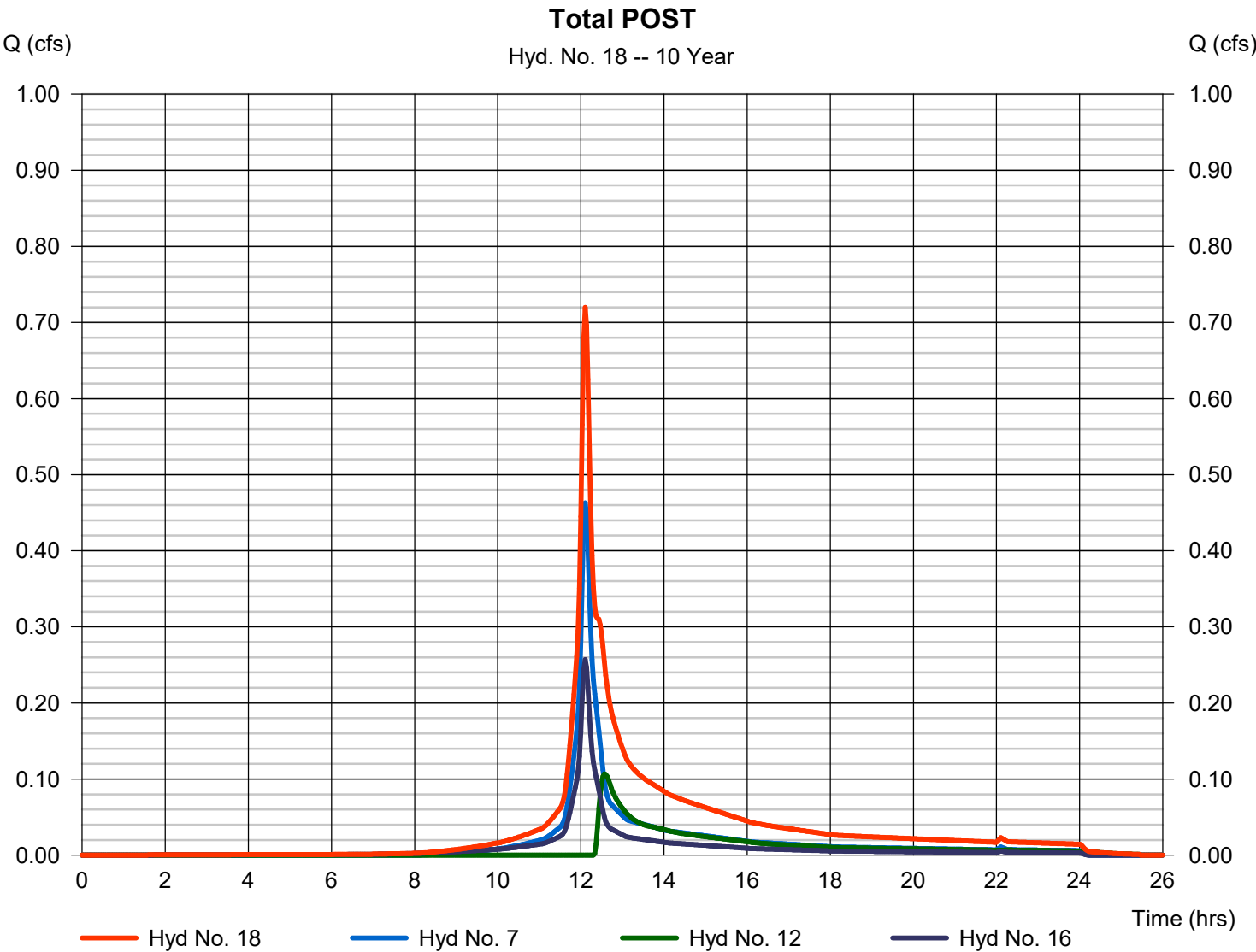


Hydrograph Report

Hyd. No. 18

Total POST

Hydrograph type	= Combine	Peak discharge	= 0.720 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 3,282 cuft
Inflow hyds.	= 7, 12, 16	Contrib. drain. area	= 0.000 ac



Hydrograph Report

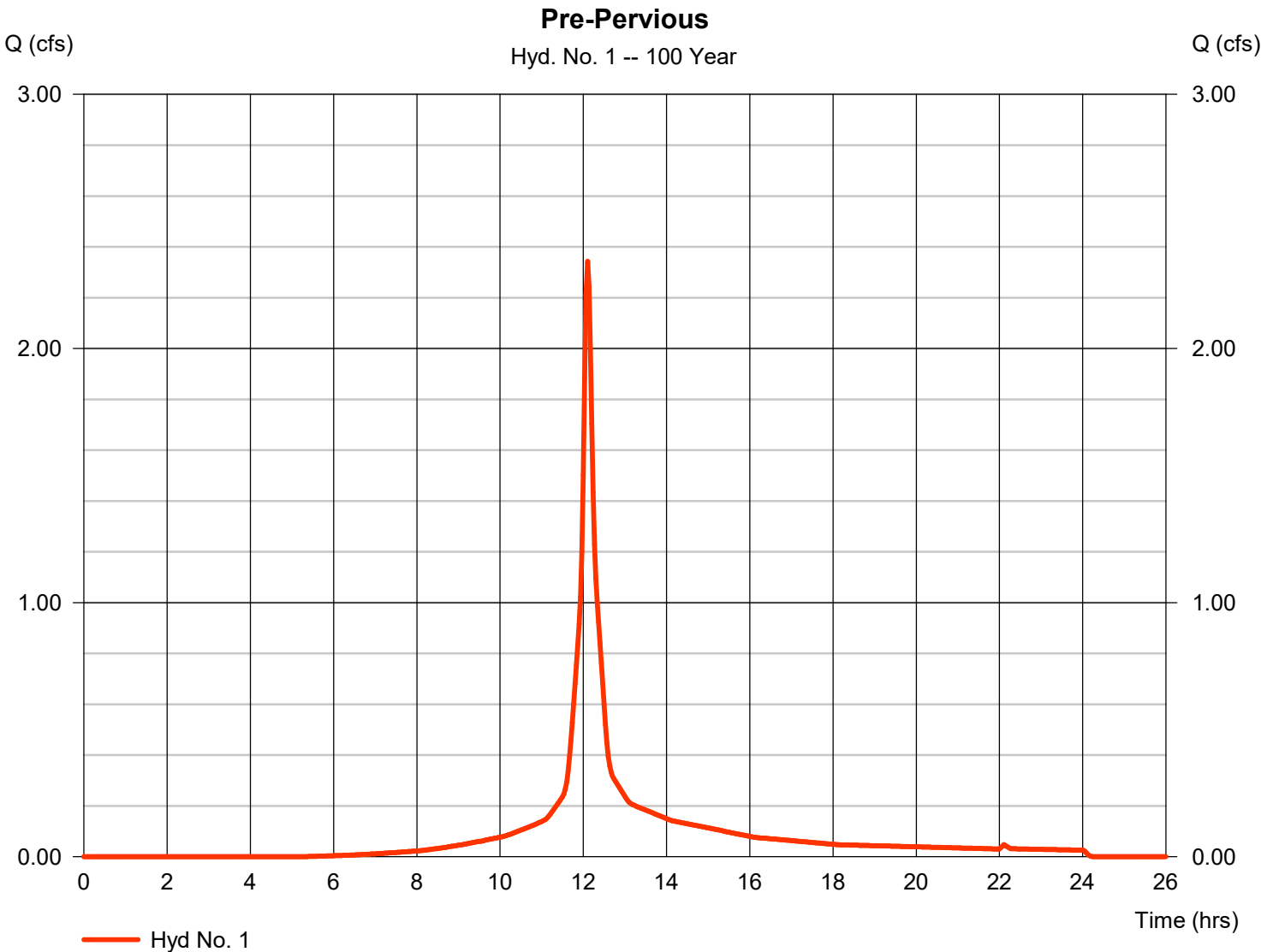
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 1

Pre-Pervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.343 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	8,151 cuft
Drainage area	=	0.260 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	8.80 min
Total precip.	=	12.02 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

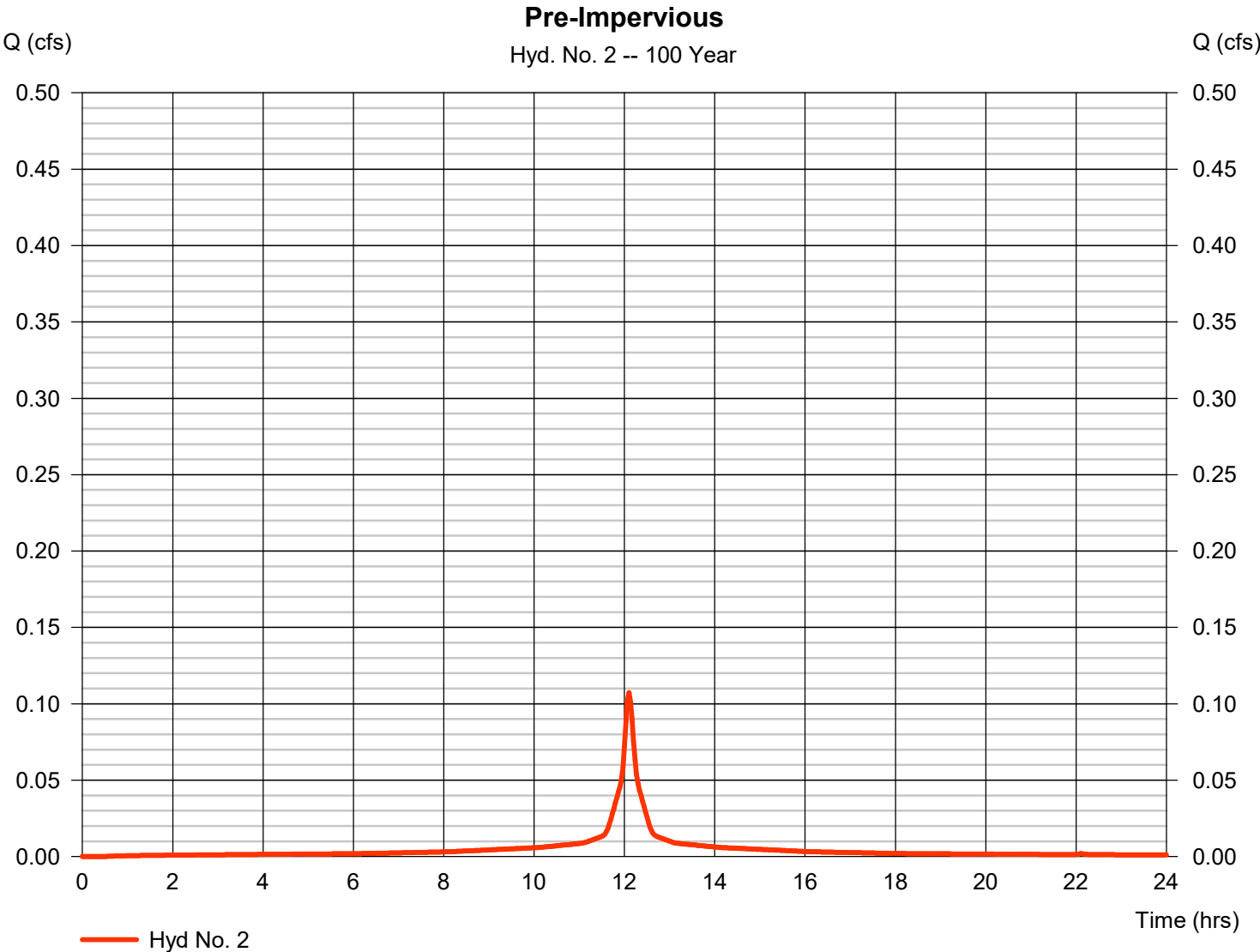
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 2

Pre-Impervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.107 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 428 cuft
Drainage area	= 0.010 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.80 min
Total precip.	= 12.02 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

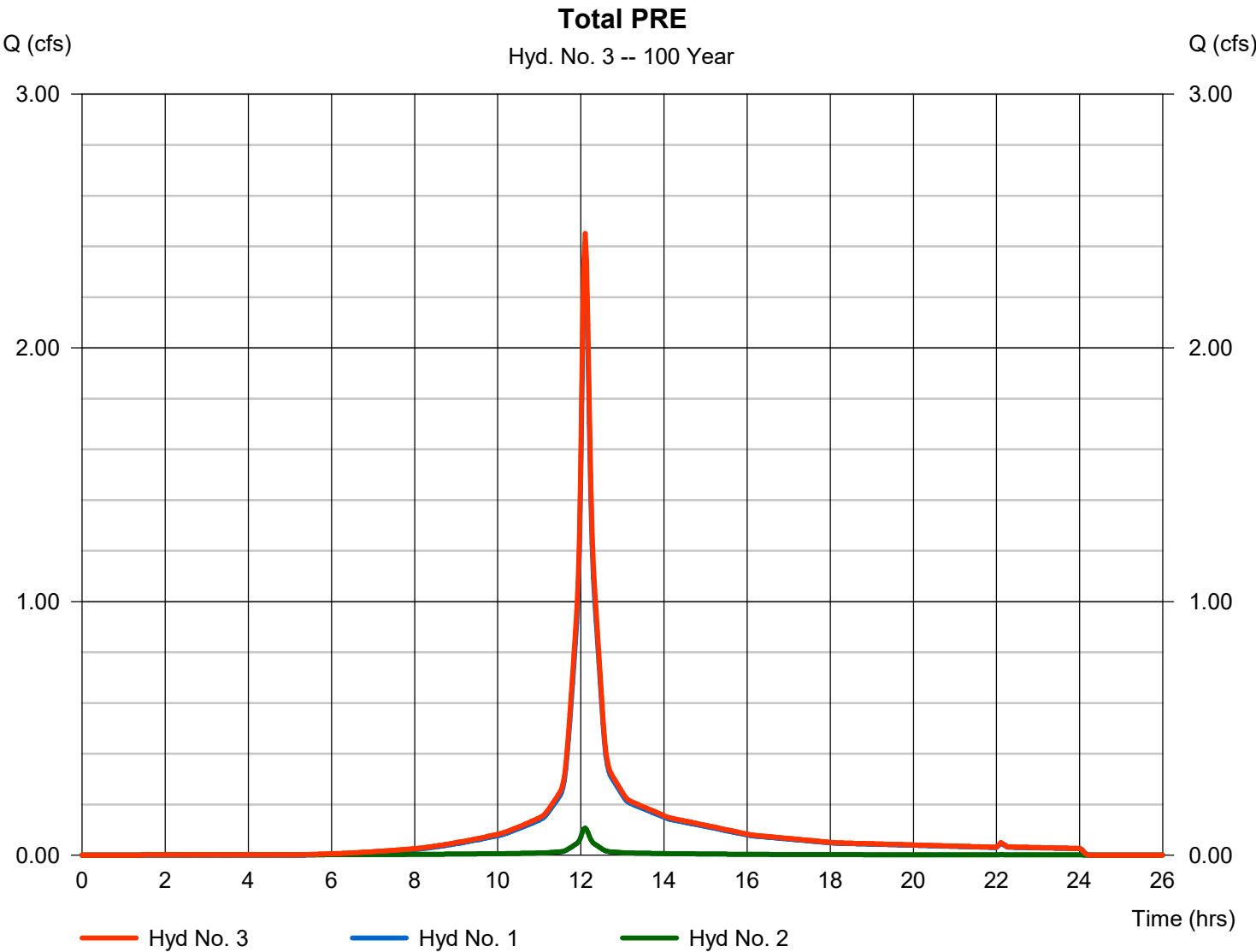
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 3

Total PRE

Hydrograph type	= Combine	Peak discharge	= 2.451 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 8,578 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 0.270 ac

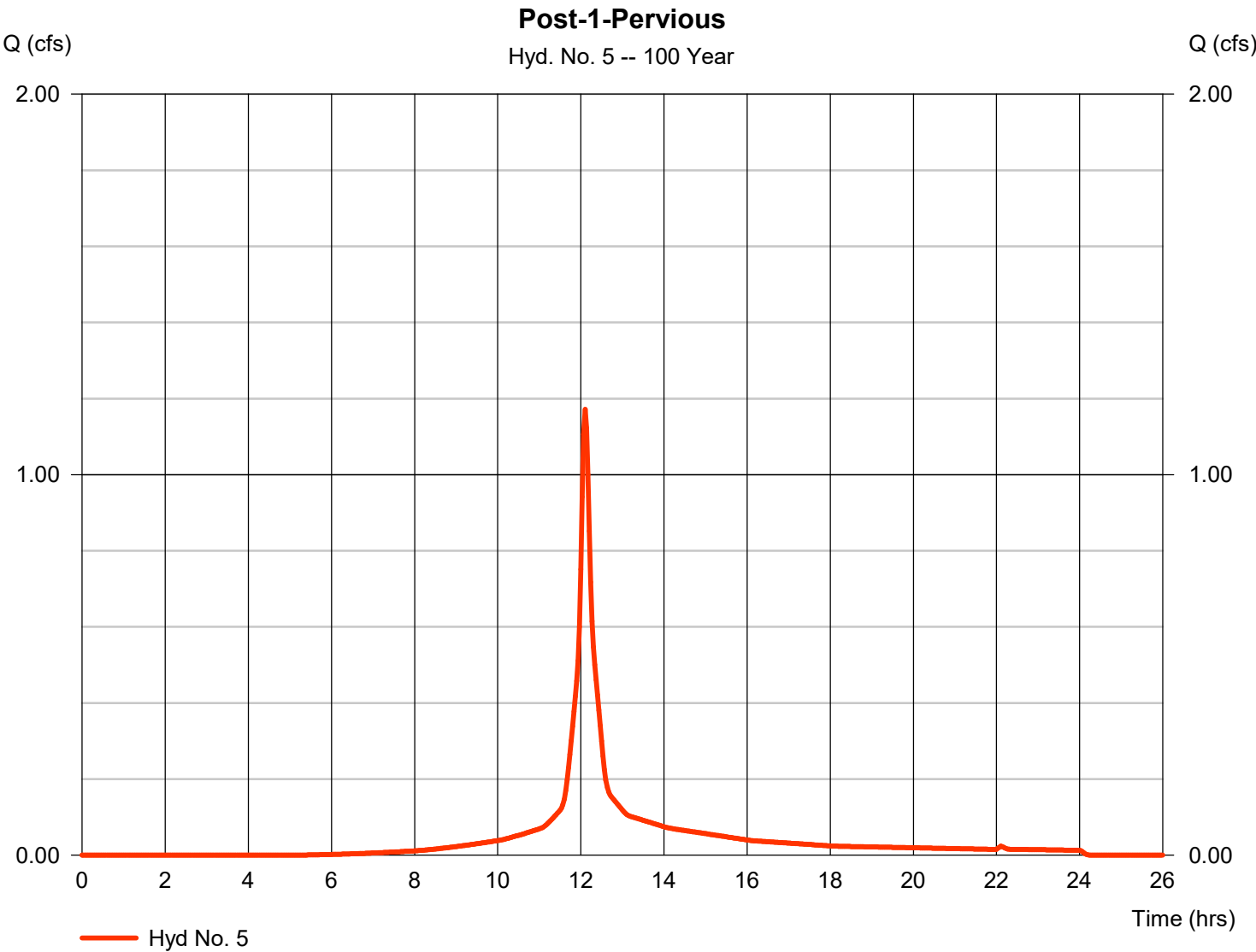


Hydrograph Report

Hyd. No. 5

Post-1-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 1.172 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 4,075 cuft
Drainage area	= 0.130 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 12.02 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

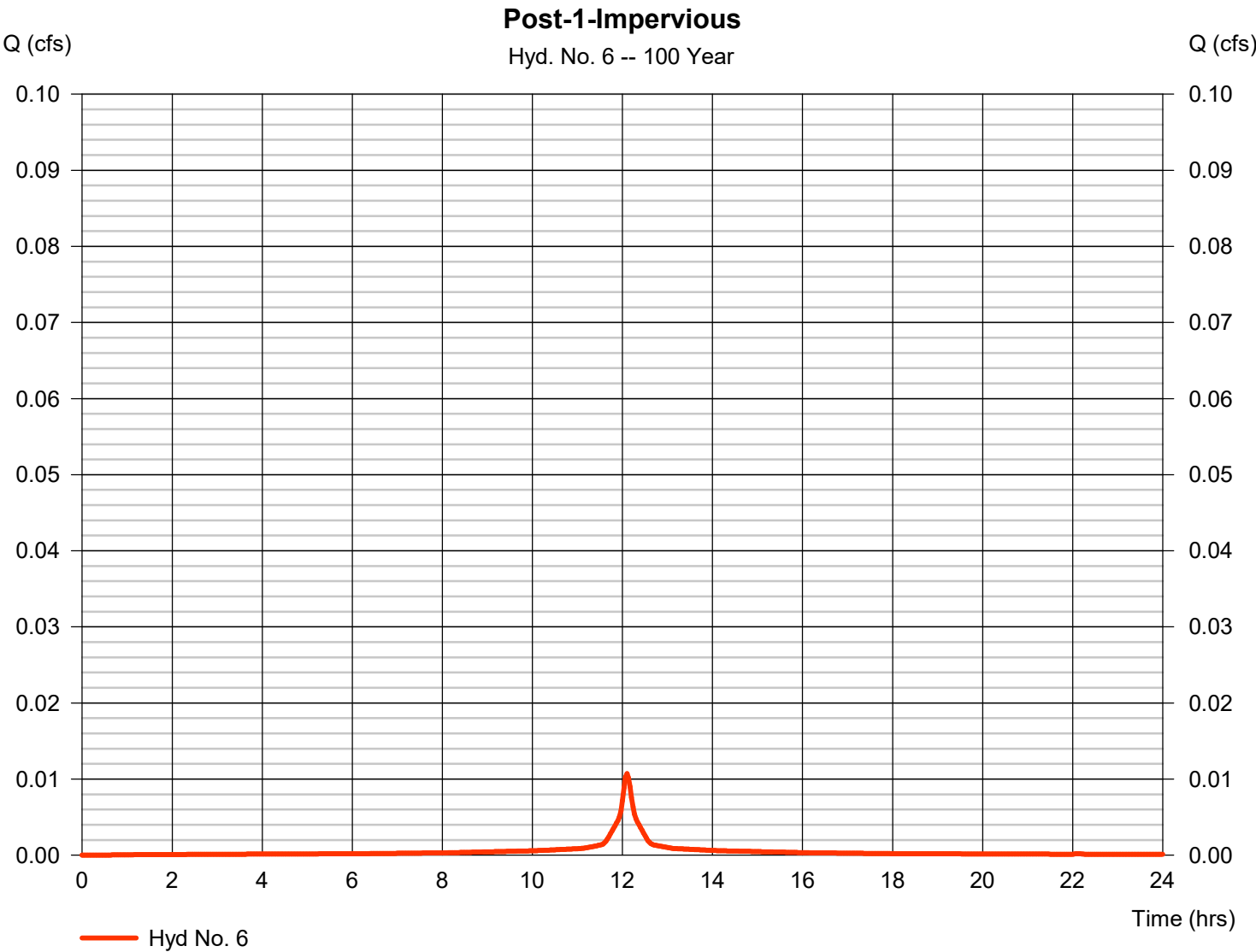


Hydrograph Report

Hyd. No. 6

Post-1-Impervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.011 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	43 cuft
Drainage area	=	0.001 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	8.40 min
Total precip.	=	12.02 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

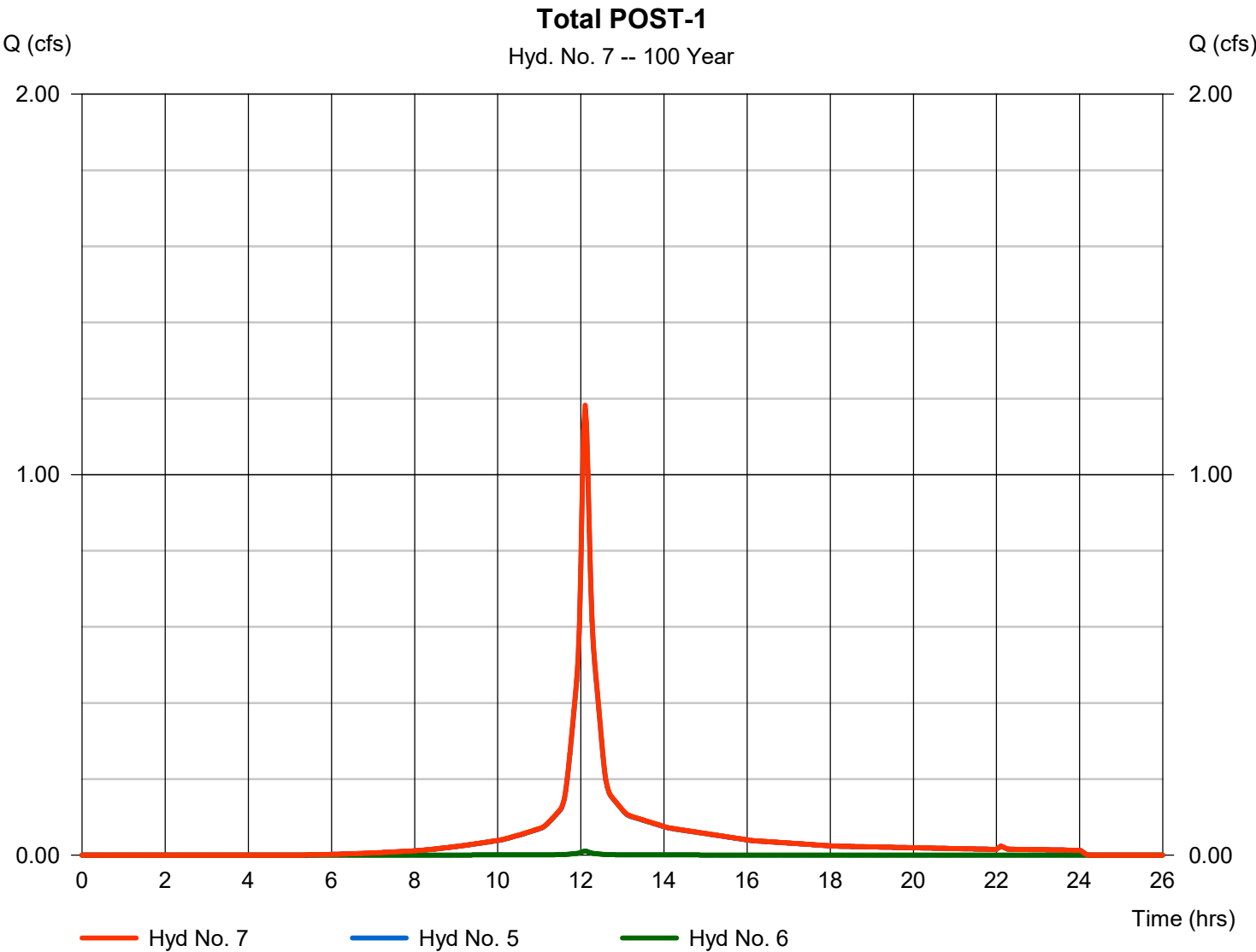


Hydrograph Report

Hyd. No. 7

Total POST-1

Hydrograph type	= Combine	Peak discharge	= 1.182 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 4,118 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.131 ac

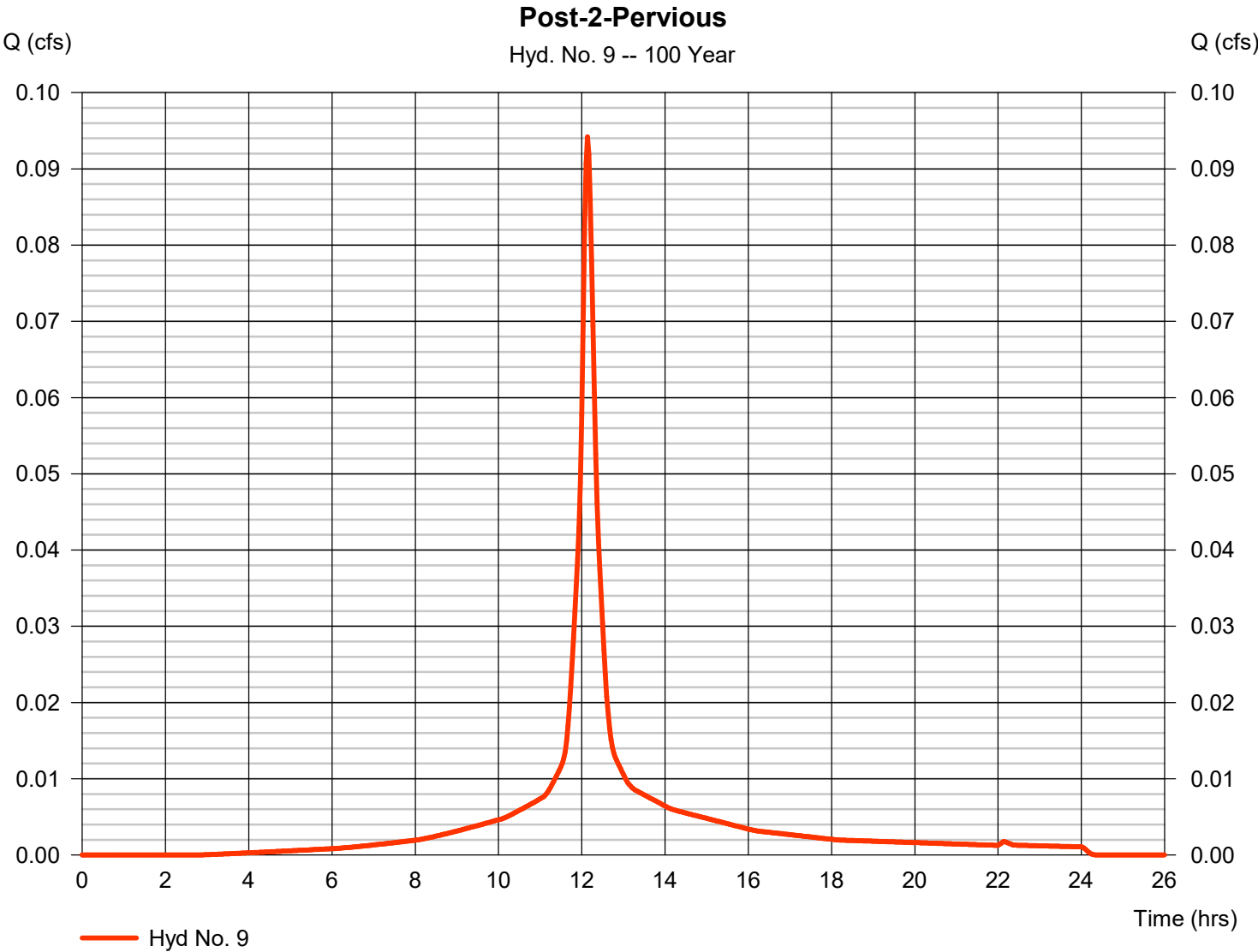


Hydrograph Report

Hyd. No. 9

Post-2-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.094 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 384 cuft
Drainage area	= 0.010 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.30 min
Total precip.	= 12.02 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

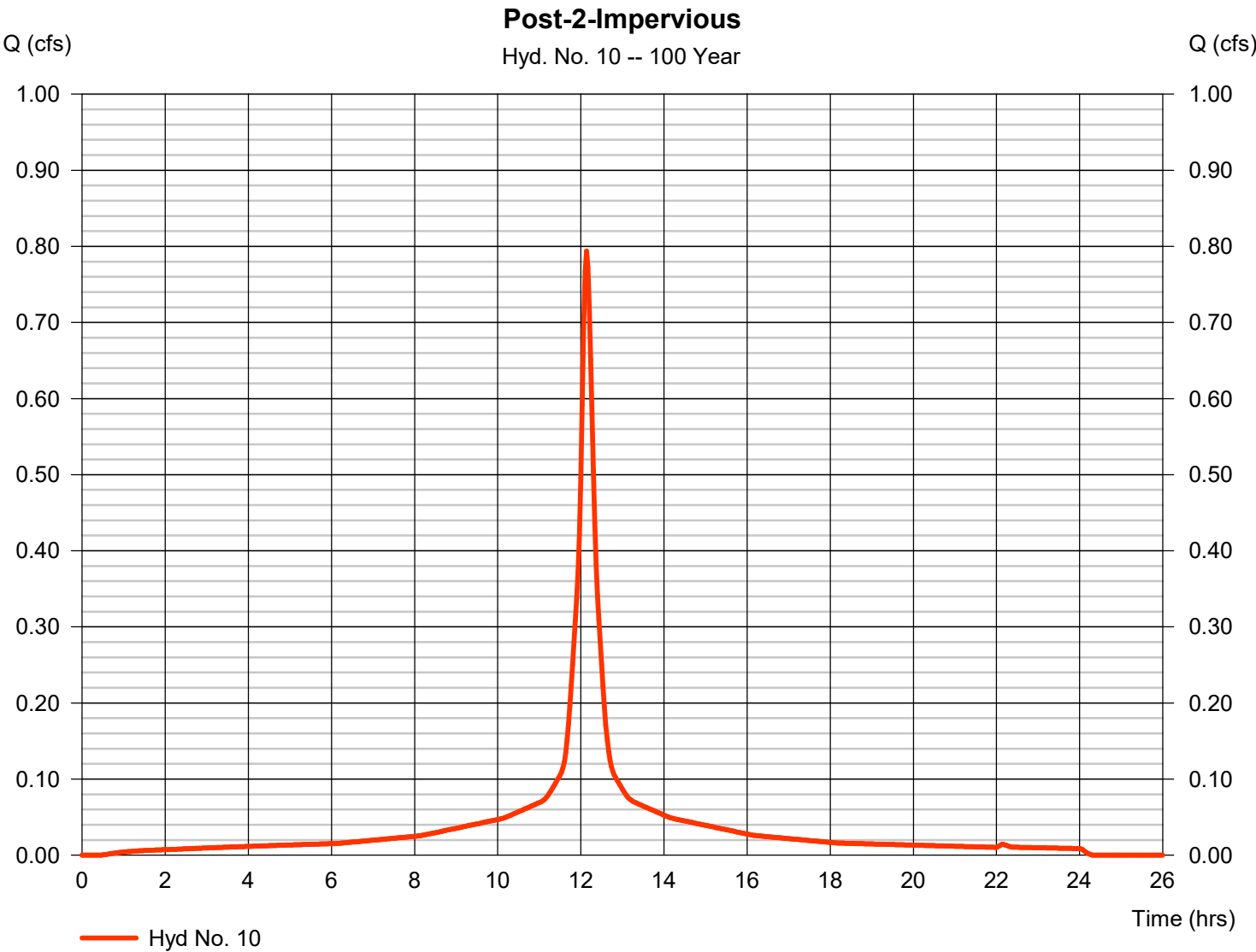
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 10

Post-2-Impervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.794 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	3,527 cuft
Drainage area	=	0.080 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.30 min
Total precip.	=	12.02 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

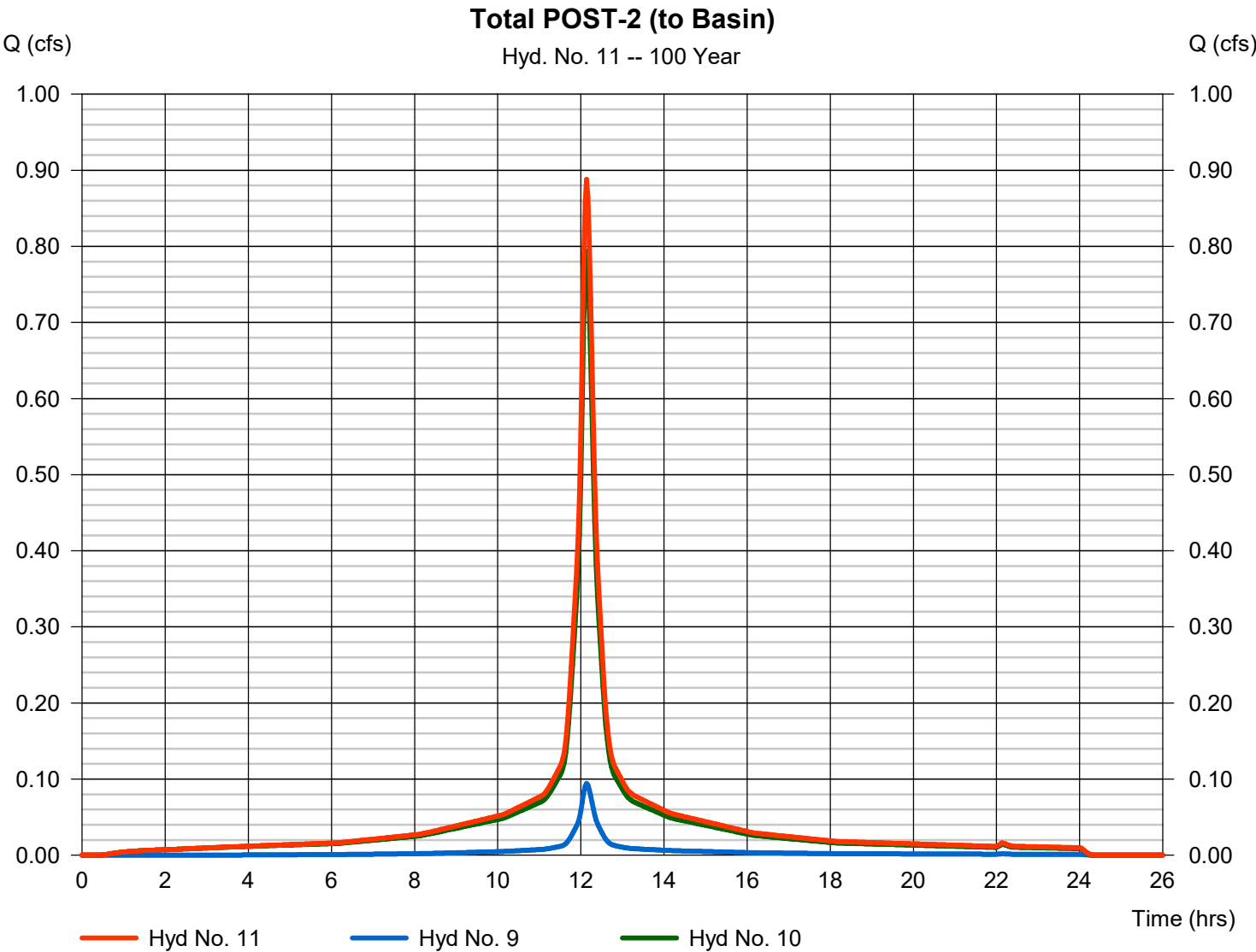


Hydrograph Report

Hyd. No. 11

Total POST-2 (to Basin)

Hydrograph type	= Combine	Peak discharge	= 0.888 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 3,912 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 0.090 ac



Hydrograph Report

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

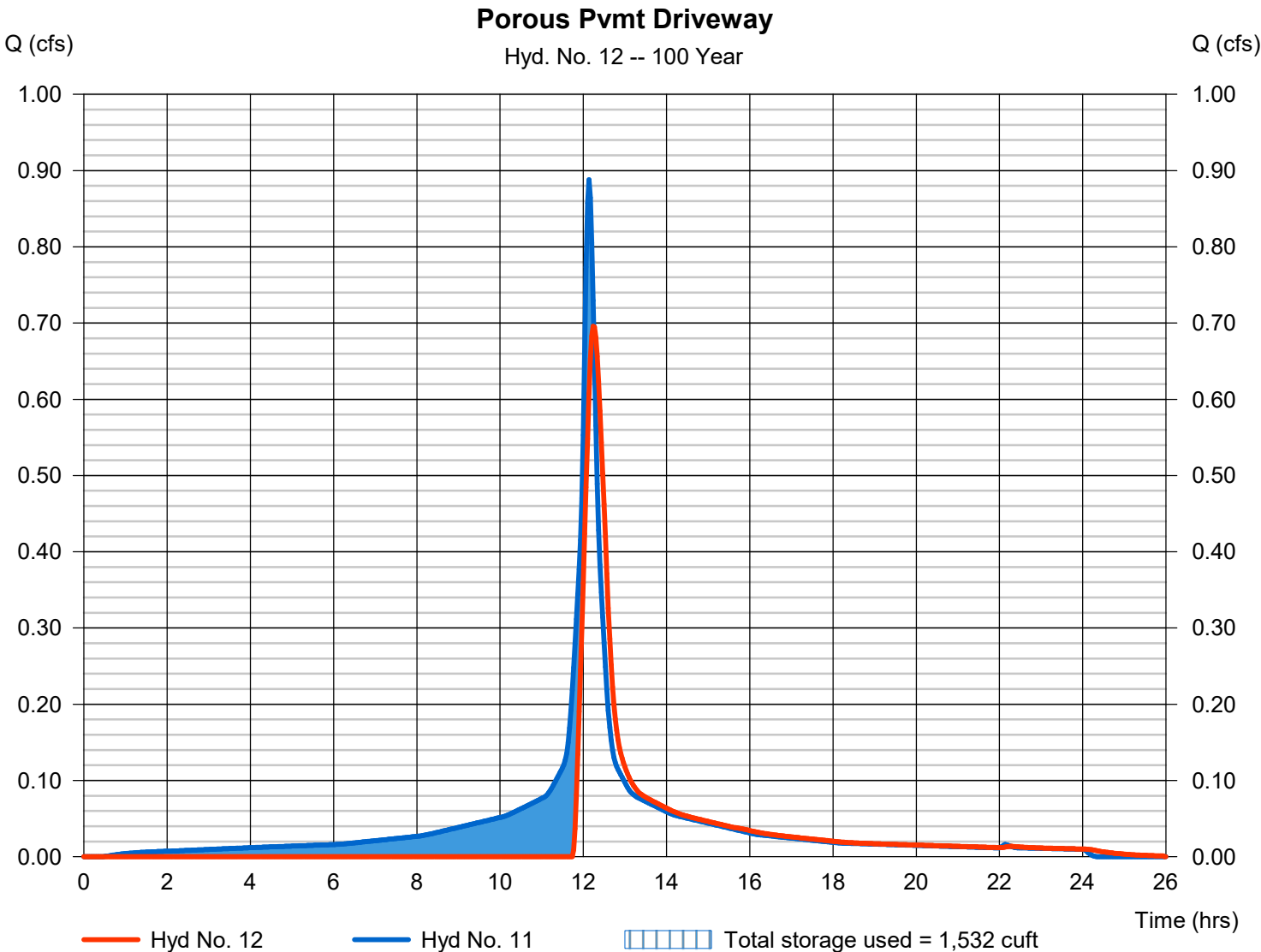
Thursday, 11 / 30 / 2023

Hyd. No. 12

Porous Pvmt Driveway

Hydrograph type	= Reservoir	Peak discharge	= 0.696 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 2 min	Hyd. volume	= 2,762 cuft
Inflow hyd. No.	= 11 - Total POST-2 (to Basin)	Max. Elevation	= 152.79 ft
Reservoir name	= Porous Pvmt Driveway	Max. Storage	= 1,532 cuft

Storage Indication method used.



Hydrograph Report

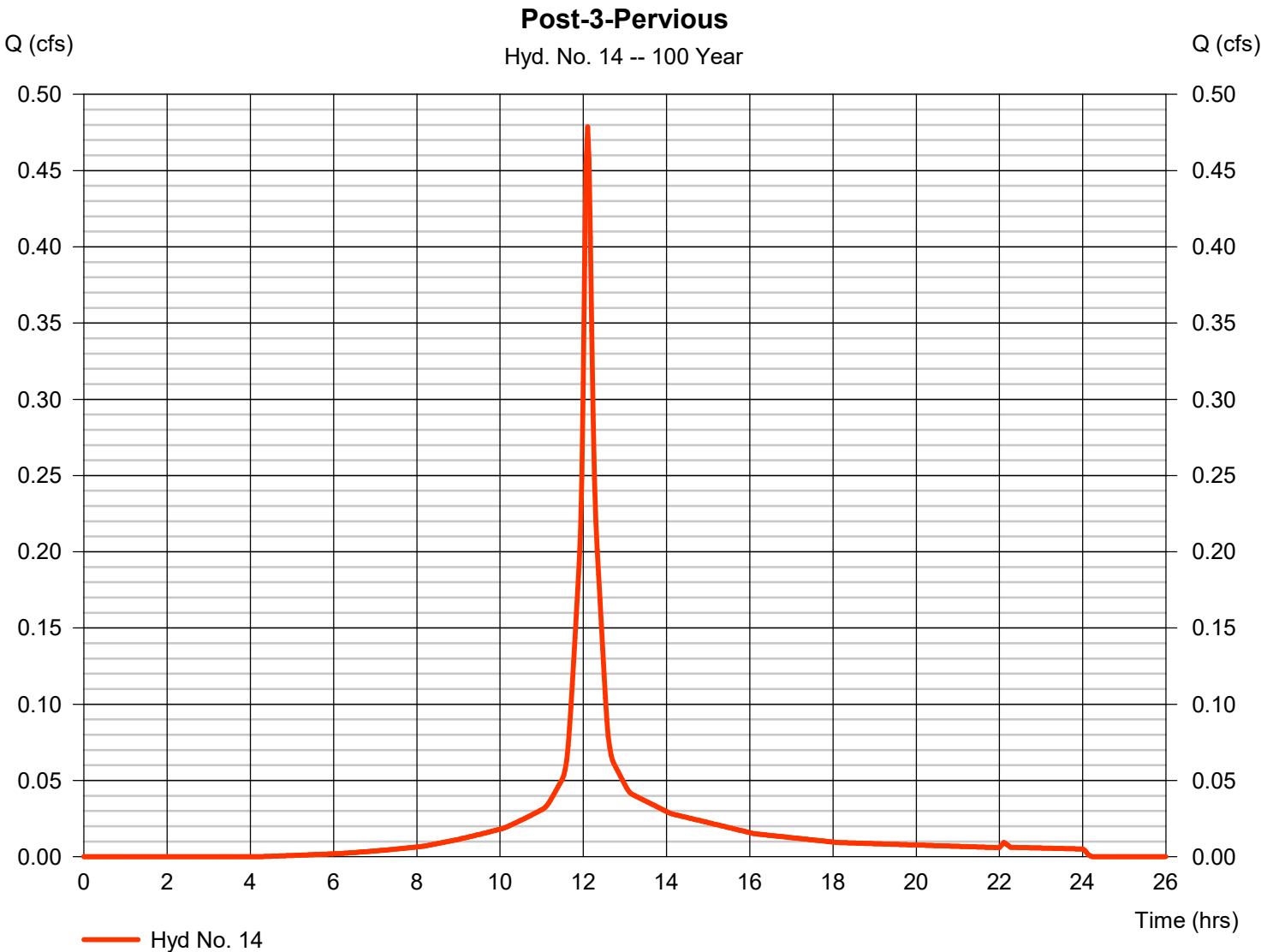
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 14

Post-3-Pervious

Hydrograph type	= SCS Runoff	Peak discharge	= 0.479 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 1,693 cuft
Drainage area	= 0.050 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.60 min
Total precip.	= 12.02 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

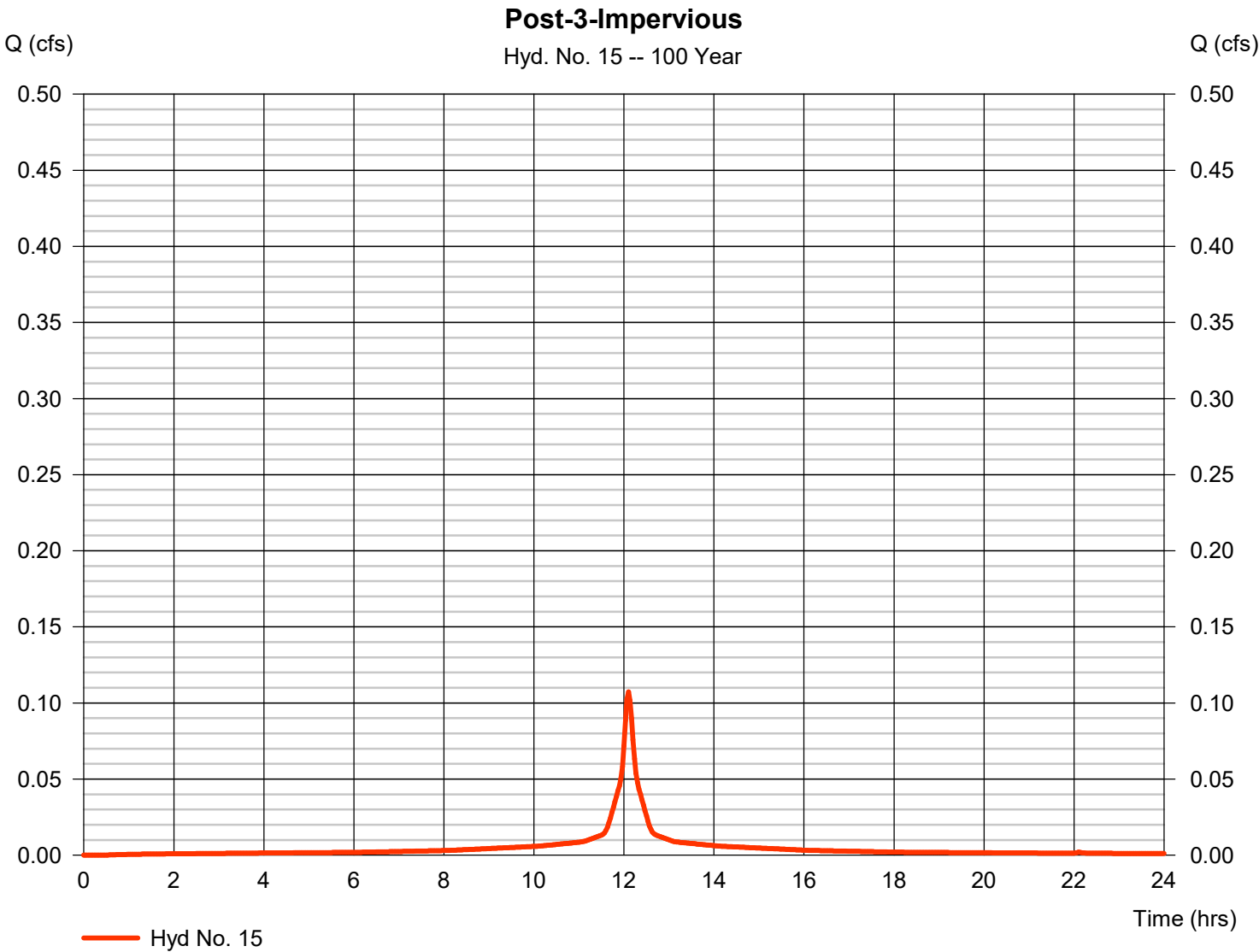
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Thursday, 11 / 30 / 2023

Hyd. No. 15

Post-3-Impervious

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.107 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	428 cuft
Drainage area	=	0.010 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.60 min
Total precip.	=	12.02 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

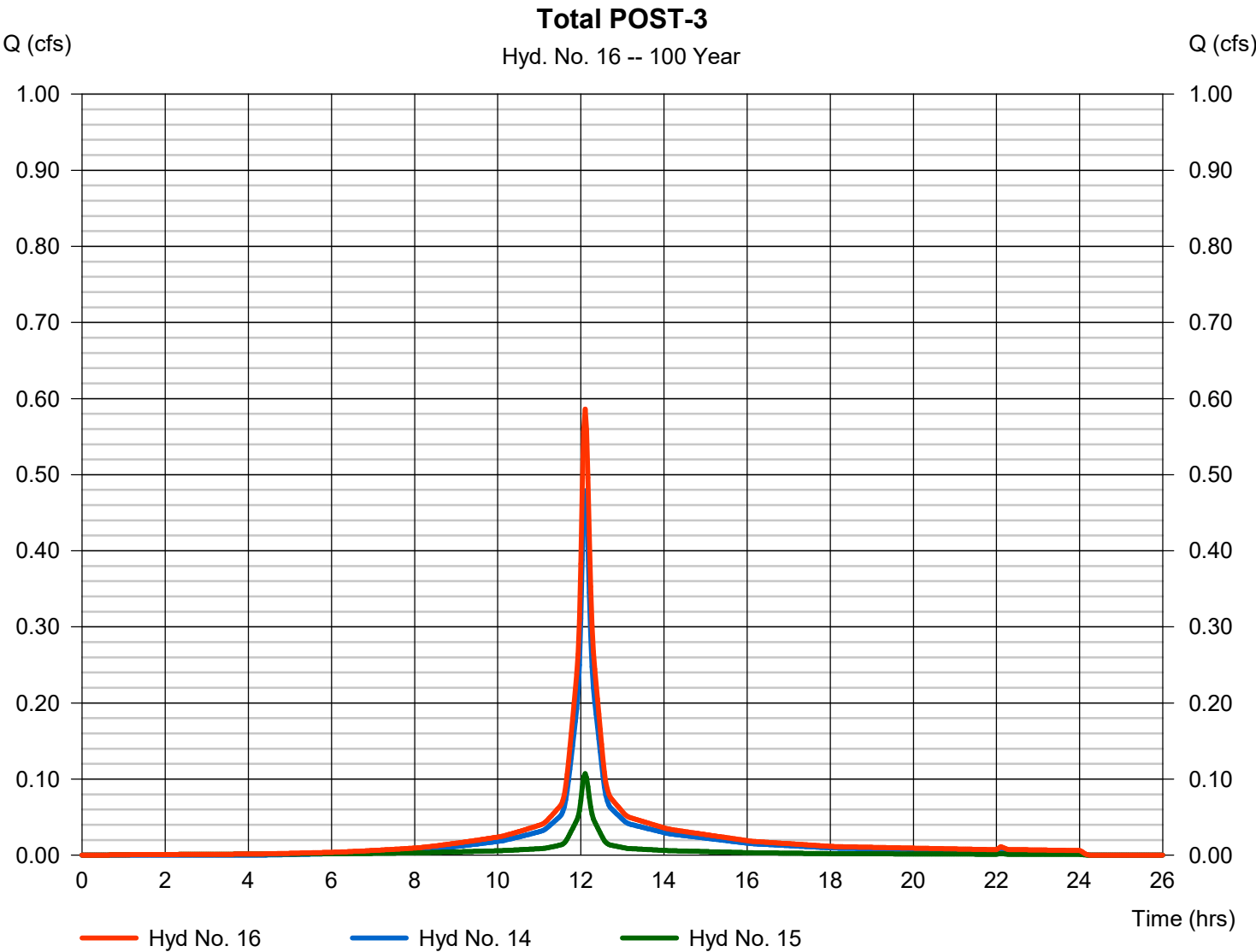


Hydrograph Report

Hyd. No. 16

Total POST-3

Hydrograph type	= Combine	Peak discharge	= 0.586 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 2,121 cuft
Inflow hyds.	= 14, 15	Contrib. drain. area	= 0.060 ac



Hydrograph Report

Hyd. No. 18

Total POST

Hydrograph type	= Combine	Peak discharge	= 2.316 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 2 min	Hyd. volume	= 9,001 cuft
Inflow hyds.	= 7, 12, 16	Contrib. drain. area	= 0.000 ac

