



STORMWATER DRAINAGE ANALYSIS

**MOUNTAIN VIEW AUTO BODY
BLOCK 3905, LOTS 12, 13 & 14
246-264 SOUTH BROAD STREET
VILLGE OF RIDGEWOOD, BERGEN COUNTY, NEW JERSEY
BE# 22-146**

**DATE PREPARED:
DATE REVISED:**

**JUNE 13, 2022
NOVEMBER 4, 2024**

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N.J.P.E. LICENSE NO. 37073**

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I. PROJECT SUMMARY

The proposed project consists of redeveloping the fully developed lots into an automobile service center. The entire site is 1.695 acres. The existing site contains large portions of asphalt and gravel driveways and parking surfaces. Several 1-story buildings area also located throughout the site. The total amount of existing impervious and gravel surfaces at the site is 1.536 acres. The proposed development will decrease these surfaces and contain a larger portion of roof area.

For the stormwater drainage analysis, the portion of the site being disturbed will be considered the area of study. This analysis area has been divided into two drainage areas. The first drainage area is that which is directed to towards the existing South Broad Street ROW and drainage system. The existing runoff sheet flows overland towards South Broad Street and will continue to do so for the proposed condition. The proposed development will increase the size of the drainage area but reduce the amount of impervious surfaces resulting in proposed peak flow rates that do not exceed existing for the four design storms. No additional measures to reduce the runoff.

Below is a summary of the stormwater analysis results for the South Broad Street drainage area:

Drainage Area – South Broad Street (Current Precipitation)

Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.	Max. Allowable %
2	1.26	0.86	0.40	68.4%	100
10	2.02	1.48	0.54	73.4%	100
100	3.57	2.81	0.77	78.5%	100

Drainage Area – South Broad Street (Future Precipitation)

Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.	Max. Allowable %
2	1.52	1.07	0.45	70.4%	100
10	2.44	1.84	0.60	75.3%	100
100	4.66	3.75	0.92	80.4%	100

As per the above table, runoff directed towards the South Broad Street will have peak flow rates that do not exceed the existing for all design storms.

The second studied drainage area is that which is directed to the west towards the Conrail Erie Lackawanna Railroad. The existing runoff sheet flows overland towards the railroad and will continue to do so for the proposed condition. The proposed

development will increase the size of the drainage area and the amount of impervious area. Due to the increases, infiltration will be required to reduce the proposed runoff to meet the required rate reductions. The outlet of the infiltration system will discharge on-site and sheet flow towards the railroad. The infiltration system will capture and hold all collected runoff up to the 2 year storm event before any stormwater is discharged.

The development will reduce the amount of motor vehicle surfaces currently existing. Therefore, no water quality measures are required. However, since the infiltration basin will collect runoff from surfaces other than roof area, water quality treatment is required on non-roof runoff collected by the basin.

Below is a summary of the stormwater analysis results for the Railroad drainage area:

Drainage Area – Railroad (Current Precipitation)

Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.	Max. Allowable %
2	3.46	1.43	2.04	41.2%	50%
10	5.59	2.95	2.64	52.8%	75%
100	9.95	6.45	3.50	64.8%	80%

Drainage Area – Railroad (Future Precipitation)

Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.	Max. Allowable %
2	4.07	1.65	2.42	40.5%	50%
10	6.40	3.84	2.55	60.1%	75%
100	11.28	7.26	4.02	64.3%	80%

As per the above table, runoff directed towards the railroad will be reduced to levels below the existing with the required reductions for all design storms.

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FUTURE: Proposed Drainage Area - S. Broad (Combined)						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.10	12.15	1.43	12.10	1.52	12.10
10	0.22	12.15	2.24	12.10	2.44	12.10
100	0.53	12.15	4.18	12.10	4.66	12.10

3. PROPOSED RUNOFF - SOUTH BORAD STREET

I) Area of Concern:

Drainage Area	Total (acres)	Pervious (acres)	Impervious (acres)
Proposed - S. Broad	0.463	0.252	0.211

II) Peak Discharge: Proposed Drainage Area - South Broad Street (as determined by TR-55):

Proposed Drainage Area - S. Broad (Pervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	74	15.4	3.37	0.24	4.01	0.34
10			5.22	0.55	6.24	0.74
100			8.98	1.25	11.60	1.75

Proposed Drainage Area - S. Broad (Impervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	98	2.2	3.37	0.70	4.01	0.83
10			5.22	1.08	6.24	1.30
100			8.98	1.87	11.60	2.41

CURRENT: Proposed Drainage Area - S. Broad (Combined)						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.24	12.23	0.70	12.10	0.86	12.10
10	0.55	12.22	1.08	12.10	1.48	12.10
100	1.25	12.22	1.87	12.10	2.81	12.10

FUTURE: Proposed Drainage Area - S. Broad (Combined)						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.34	12.22	0.83	12.10	1.07	12.10
10	0.74	12.22	1.30	12.10	1.84	12.10
100	1.75	12.22	2.41	12.10	3.75	12.10

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III) Existing VS. Proposed Runoff: Drainage Area - South Broad Street

CURRENT: Proposed Drainage Area - S. Broad				
Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.
2	1.26	0.86	0.40	68.4%
10	2.02	1.48	0.54	73.4%
100	3.57	2.81	0.77	78.5%

FUTURE: Proposed Drainage Area - S. Broad				
Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.
2	1.52	1.07	0.45	70.4%
10	2.44	1.84	0.60	75.3%
100	4.66	3.75	0.92	80.4%

As per N.J.A.C. 7:8-5.6(b)1, no additional reduction in runoff is required.

4. EXISING RUNOFF - RAILROAD

Drainage Area	Total (acres)	Pervious (acres)	Gravel (acres)	Impervious (acres)
Existing - RR	1.266	0.096	0.667	0.503

CN Values (Hydrologic Group C),
 Pervious = 74
 Gravel = 89
 Impervious = 98

I) Peak Discharge for Drainage Area - Railroad (as determined by TR-55):

Existing Drainage Area - RR (Pervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	74	8.3	3.37	0.12	4.01	0.17
10			5.22	0.27	6.24	0.35
100			8.98	0.60	11.60	0.83

Existing Drainage Area - RR (Pervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	42	1.6	3.37	3.53	4.01	4.30
10			5.22	5.75	6.24	6.96
100			8.98	10.18	11.60	13.24

CURRENT: Existing Drainage Area - RR						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.12	12.13	3.53	12.10	3.64	12.10
10	0.27	12.13	5.75	12.10	6.00	12.10
100	0.60	12.13	10.18	12.10	10.75	12.10

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FUTURE: Existing Drainage Area - RR						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.17	12.13	4.30	12.10	4.45	12.10
10	0.35	12.13	6.96	12.10	7.29	12.10
100	0.83	12.13	13.24	12.10	14.04	12.10

As per N.J.A.C. 7:8-5.6(b)3, the proposed runoff will need to meet the required reductions for the three design storms.

5. PROPOSED RUNOFF - RAILROAD

Drainage Area	Total (acres)	Pervious (acres)	Impervious (acres)
Proposed - Basin	0.633	0.024	0.609
Proposed - Bypass	0.599	0.203	0.396

l) Peak Discharge: Proposed Drainage Area - Basin (as determined by TR-55):

Proposed Drainage Area - Basin (Pervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	74	3.1	3.37	0.04	4.01	0.05
10			5.22	0.08	6.24	0.10
100			8.98	0.17	8.42	0.24

Proposed Drainage Area - Basin (Impervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	98	2.2	3.37	2.01	4.01	2.39
10			5.22	3.12	6.24	3.74
100			8.98	5.39	8.42	6.97

CURRENT: Proposed Drainage Area - Basin						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.04	12.10	2.01	12.10	2.04	12.10
10	0.08	12.10	3.12	12.10	3.20	12.10
100	0.17	12.10	5.39	12.10	5.56	12.10

FUTURE: Proposed Drainage Area - Basin						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.05	12.10	2.39	12.10	2.44	12.10
10	0.10	12.10	3.74	12.10	3.84	12.10
100	0.24	12.10	6.97	12.10	7.20	12.10

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II) Detention Structure Summary - Infiltration Basin:

Basin: 204 Cultec 360HD (5,010 sf bed)
 Outlet Control: 31 LF of 15" HDPE @ 1.1%, Inv. 148.75
 4' Rect. Weir at Elevation 148.75

Depth vs. Storage		
Elevation (ft)	Discharge (cfs)	Storage (cf)
146.00	0.00	0
146.50	0.00	961
147.00	0.00	2,970
147.50	0.00	4,920
148.00	0.00	6,791
148.50	0.00	8,547
149.00	0.31	10,128
149.50	2.27	11,350
150.00	3.96	12,311

<-Bottom of Stone
 <-Bottom of Chamber
 <-Top of Chamber
 <-Top of Stone

See attached Cultec Recharger 360HD Volume Worksheet

CURRENT: Inflow vs. Outflow					
Storm (year)	Inflow		Outflow		
	Peak Flow (cfs)	Time (hr)	Peak Flow (cfs)	Time (hr)	Peak Elev. (ft)
2	2.04	12.10	0.00	n/a	147.95
10	3.20	12.10	0.05	20.60	148.84
100	5.56	12.10	1.31	12.32	149.30

FUTURE: Inflow vs. Outflow					
Storm (year)	Inflow		Outflow		
	Peak Flow (cfs)	Time (hr)	Peak Flow (cfs)	Time (hr)	Peak Elev. (ft)
2	2.44	12.10	0.00	n/a	148.33
10	3.84	12.10	0.15	14.55	148.92
100	7.20	12.10	4.00	12.12	150.00

III) Overflow Design

The outlet control structure for the detention basin is designed with an overflow weir. Design the overflow weir for 100 Year Storm (Q_{100}) with the weir as the only outlet.

Use $Q = 3.2 \times L \times H^{1.5}$ to solve for H (head)

100-yr Inflow: $Q_{100} = 7.20$ cfs
 $L = 10$ ft
 Solve for H, $H = 0.37$ ft above weir

The calculated value for H, 0.37 ft, should be provided as freeboard above the weir. With the weir set at elevation 148.75 (see Section 5.II), the bottom of the ramp above should be at minimum elevation 149.12 to provide the calculated value of H.

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IV) Peak Discharge: Proposed Drainage Area - Bypass (as determined by TR-55):

Proposed Drainage Area - Bypass (Pervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	74	15.0	3.37	0.22	4.01	0.31
10			5.22	0.50	6.24	0.66
100			8.98	1.12	8.42	1.57

Proposed Drainage Area - Bypass (Impervious)						
Frequency (year)	Curve Number	T _c (min)	Current		Future	
			Rainfall, P (in)	Peak Discharge (cfs)	Rainfall, P (in)	Peak Discharge (cfs)
2	98	6.9	3.37	1.13	4.01	1.34
10			5.22	1.76	6.24	2.10
100			8.98	3.03	8.42	3.92

CURRENT: Proposed Drainage Area - Bypass (Combined)						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.22	12.22	1.13	12.12	1.31	12.13
10	0.50	12.20	1.76	12.12	2.19	12.13
100	1.12	12.20	3.03	12.12	4.03	12.13

FUTURE: Proposed Drainage Area - Bypass (Combined)						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.31	12.20	1.34	12.12	1.61	12.13
10	0.66	12.20	2.10	12.12	2.68	12.13
100	1.57	12.20	3.92	12.12	5.33	12.13

V) Peak Runoff - Combined (Total)

CURRENT: Proposed Drainage Area - RR						
Storm (year)	Basin Route		Bypass		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.00	n/a	1.31	12.13	1.31	12.13
10	0.05	20.60	2.19	12.13	2.19	12.13
100	1.31	12.32	4.03	12.13	4.80	12.15

FUTURE: Proposed Drainage Area - RR						
Storm (year)	Basin Route		Bypass		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
2	0.00	n/a	1.61	12.13	1.61	12.13
10	0.15	14.55	2.68	12.13	2.68	12.13
100	4.00	12.12	5.33	12.13	9.30	12.13

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VI) Existing VS. Proposed Runoff: Drainage Area - Railroad

CURRENT: Drainage Area - RR				
Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.
2	3.64	1.31	2.33	36.0%
10	6.00	2.19	3.81	36.5%
100	10.75	4.80	5.95	44.7%

FUTURE: Drainage Area - RR				
Frequency (year)	Existing (cfs)	Proposed (cfs)	Change (cfs)	% Exist.
2	4.45	1.61	2.85	36.1%
10	7.29	2.68	4.61	36.8%
100	14.04	9.30	4.74	66.2%

6. WATER QUALITY DESIGN

Required TSS Removal Rate:

Existing On-Site Motor Vehicle Surface: 1.195 ac
 Proposed On-Site Motor Vehicle Surface: 0.728 ac
 Net Increase in Untreated Impervious Surfaces: -0.467 ac

Since the proposed amount of motor vehicle surfaces is below the existing, no water quality measures are required. However, due to use of subsurface infiltration systems, runoff from non-roof runoff must be treated to 80% TSS for the WQDS as per NJBMP Chapter 9.8.

The treatment unit will treat the pavement area directed into the drainage system for the Stormwater Quality Design Storm. As per N.J.A.C. 7:8-5.6, the BMP flow rate is determined using NRCS methodology based on the following criteria:

T_d (Storm Duration) = 2 hours

I = 0.625 inches/hr for Stormwater Quality Design Storm (See Table 5-1)

Treated drainage area is equal to DI#1 + DI#2

Drainage Area	Total (acres)	Pervious (acres)	Impervious (acres)
Prop - Treated	0.238	0.024	0.214

Proposed Drainage Area - Treated (Pervious)				
Frequency (year)	Rainfall, P (in)	Curve Number	T_c (min)	Peak Discharge (cfs)
WQ	1.25	74	3.1	0.01

Proposed Drainage Area - Treated (Impervious)				
Frequency (year)	Rainfall, P (in)	Curve Number	T_c (min)	Peak Discharge (cfs)
WQ	1.25	98	2.2	0.62

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Proposed Drainage Area - Treated						
Storm (year)	Pervious		Impervious		Combined	
	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)	Peak (cfs)	Time (hr)
WQ	0.01	1.10	0.62	1.08	0.62	1.08

The treatment unit (HC Kraken by Contech) is designed to handle the water quality flow of 0.62 cfs. According to the New Jersey MTD Laboratory Certification, each 30" cartridge within the chamber can 0.038 cfs. As specified in the manual, the design flow of 0.62 cfs requires 17 cartridges.

7. STORMWATER RECHARGE REQUIREMENT

Since the site is situated within the Metropolitan Planning Area (PA1), per the Policy Map of the New Jersey State Development and Redevelopment Plan, the site is exempt from the groundwater recharge requirements set forth in Chapter 6, Groundwater Recharge, of the NJBMP Manual.

8. STORM SEWER ANALYSIS TABLE

The following table lists the areas collected by the proposed storm sewer. See the attached Storm Sewer Design Calculations for pipe capacity calculations.

Use c = 0.99 for impervious areas
 0.51 for pervious areas

Inlet	Imperv. (Acres)	Perv. (Acres)	Total (Acres)	Weighted c
DI#1	0.116	0.024	0.140	0.91
DI#2	0.098	0.000	0.098	0.99
CC#1	0.092	0.000	0.092	0.99
CC#2	0.286	0.014	0.300	0.97

9. PREFORMED SCOUR HOLE DESIGN**I) Preformed Scour Hole - 1:**

$$Q_{25} = 0.15 \text{ cfs (See Storm Sewer Design Calculations)}$$

$$D_o = W_o = 15 \text{ in}$$

$$T_w = 0.2D_o = 0.30 \text{ ft}$$

$$\text{Length of Hole Bottom (L)} = 3 \times D_o = \mathbf{3.75 \text{ ft}}$$

$$\text{Width of Hole Bottom (W)} = 2 \times W_o = \mathbf{2.50 \text{ ft}}$$

$$\text{Median Stone Dia. (d}_{50}) = (0.0125 / 0.2D_o) \times (Q / W_o)^{4/3} = \mathbf{0.003 \text{ ft (Use 4" = 0.33 ft)}}$$

II) Preformed Scour Hole - CC#1:

$$I_{25} = 7.39 \text{ in/hr (T}_c = 5 \text{ min.)}$$

$$Q_{25} = 0.99 \times 7.39 \times 0.092 = \mathbf{0.67 \text{ cfs}}$$

$$D_o = 6 \text{ in} \quad W_o = 36 \text{ in}$$

$$T_w = 0.2D_o = 0.10 \text{ ft}$$

$$\text{Length of Hole Bottom (L)} = 3 \times D_o = \mathbf{1.50 \text{ ft}}$$

$$\text{Width of Hole Bottom (W)} = 2 \times W_o = \mathbf{6.00 \text{ ft}}$$

$$\text{Median Stone Dia. (d}_{50}) = (0.0125 / 0.2D_o) \times (Q / W_o)^{4/3} = \mathbf{0.03 \text{ ft (Use 4" = 0.33 ft)}}$$

BERTIN ENGINEERING

66 GLEN AVENUE
 GLEN ROCK, NEW JERSEY 07452
 (201) 670-6688
 FAX (201) 670-9788

JOB
 SHEET NO.
 CALCULATED BY
 CHECKED BY
 SCALE

22-146: Mountain View Auto Body - Ridgewood, NJ		
9	OF	9
MBL	DATE	11/4/2024
SPF	DATE	11/4/2024

III) Preformed Scour Hole - CC#2:

$$I_{25} = 7.39 \text{ in/hr (} T_c = 5 \text{ min.)}$$

$$Q_{25} = 0.97 \times 7.39 \times 0.300 = \mathbf{2.15 \text{ cfs}}$$

$$D_o = 6 \text{ in} \quad W_o = 36 \text{ in}$$

$$T_w = 0.2D_o = 0.10 \text{ ft}$$

$$\text{Length of Hole Bottom (L)} = 3 \times D_o = \mathbf{1.50 \text{ ft}}$$

$$\text{Width of Hole Bottom (W)} = 2 \times W_o = \mathbf{6.00 \text{ ft}}$$

$$\text{Median Stone Dia. (} d_{50} \text{)} = (0.0125 / 0.2D_o) \times (Q / W_o)^{4/3} = \mathbf{0.15 \text{ ft (Use 4" = 0.33 ft)}}$$



CULTEC Stage-Storage Calculations

Date: November 5, 2024

Project Information:

Project Number:
0

Chamber Model - Recharger 360HD
 Number of Rows - 17 units
 Total Number of Chambers - 204 units
 HVLV FC-24 Feed Connectors - 32 units
 Stone Void - 40 %
 Stone Base - 6 inches
 Stone Above Units - 6 inches
 Area - 4805.46 ft2
 Base of Stone Elevation - 0.00

Recharger 360HD Incremental Storage Volumes													
Height of System		Chamber Volume		HVLV Feed Connector Volume		Stone Volume		Cumulative Storage Volume		Total Cumulative Storage Volume		Elevation	
in	mm	ft ³	m ³	ft3	m3	ft ³	m ³	ft ³	m ³	ft ³	m ³	ft	m
48.0	1219	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	12311.49	348.62	4.000	1.22
47.0	1194	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	12151.31	344.09	3.920	1.19
46.0	1168	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	11991.13	339.55	3.830	1.17
45.0	1143	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	11830.94	335.01	3.750	1.14
44.0	1118	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	11670.76	330.48	3.670	1.12
43.0	1092	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	11510.58	325.94	3.580	1.09
42.0	1067	16.7	0.5	0.0	0.0	153.5	4.3	170.211	4.8	11350.40	321.41	3.500	1.07
41.0	1041	35.4	1.0	0.0	0.0	146.0	4.1	181.429	5.1	11180.19	316.59	3.420	1.04
40.0	1016	52.7	1.5	0.0	0.0	139.1	3.9	191.777	5.4	10998.76	311.45	3.330	1.02
39.0	991	88.8	2.5	0.0	0.0	124.6	3.5	213.482	6.0	10806.98	306.02	3.250	0.99
38.0	965	112.2	3.2	0.0	0.0	115.3	3.3	227.481	6.4	10593.50	299.97	3.170	0.97
37.0	940	129.7	3.7	0.0	0.0	108.3	3.1	238.025	6.7	10366.02	293.53	3.080	0.94
36.0	914	144.4	4.1	0.0	0.0	102.4	2.9	246.817	7.0	10127.99	286.79	3.000	0.91
35.0	889	157.1	4.4	0.0	0.0	97.3	2.8	254.445	7.2	9881.18	279.80	2.920	0.89
34.0	864	168.4	4.8	0.0	0.0	92.8	2.6	261.215	7.4	9626.73	272.60	2.830	0.86
33.0	838	178.6	5.1	0.0	0.0	88.8	2.5	267.312	7.6	9365.52	265.20	2.750	0.84
32.0	813	187.8	5.3	0.0	0.0	85.1	2.4	272.870	7.7	9098.20	257.63	2.670	0.81
31.0	787	196.3	5.6	0.0	0.0	81.7	2.3	277.950	7.9	8825.33	249.91	2.580	0.79
30.0	762	204.4	5.8	0.0	0.0	78.4	2.2	282.842	8.0	8547.38	242.03	2.500	0.76
29.0	737	211.7	6.0	0.0	0.0	75.5	2.1	287.187	8.1	8264.54	234.03	2.420	0.74
28.0	711	218.4	6.2	0.0	0.0	72.8	2.1	291.213	8.2	7977.36	225.89	2.330	0.71
27.0	686	224.7	6.4	0.0	0.0	70.3	2.0	294.982	8.4	7686.14	217.65	2.250	0.69
26.0	660	230.6	6.5	0.0	0.0	68.0	1.9	298.518	8.5	7391.16	209.29	2.170	0.66
25.0	635	236.1	6.7	0.0	0.0	65.7	1.9	301.846	8.5	7092.64	200.84	2.080	0.64
24.0	610	241.3	6.8	0.0	0.0	63.7	1.8	304.978	8.6	6790.80	192.29	2.000	0.61
23.0	584	245.9	7.0	0.0	0.0	61.8	1.8	307.747	8.7	6485.82	183.66	1.920	0.58
22.0	559	250.6	7.1	0.0	0.0	59.9	1.7	310.548	8.8	6178.07	174.94	1.830	0.56
21.0	533	255.1	7.2	0.0	0.0	58.2	1.6	313.215	8.9	5867.52	166.15	1.750	0.53
20.0	508	259.3	7.3	0.0	0.0	56.5	1.6	315.734	8.9	5554.31	157.28	1.670	0.51
19.0	483	263.2	7.5	0.0	0.0	54.9	1.6	318.119	9.0	5238.57	148.34	1.580	0.48
18.0	457	266.7	7.6	0.0	0.0	53.5	1.5	320.177	9.1	4920.45	139.33	1.500	0.46
17.0	432	270.2	7.7	0.0	0.0	52.1	1.5	322.329	9.1	4600.28	130.27	1.420	0.43
16.0	406	273.6	7.7	0.0	0.0	50.7	1.4	324.371	9.2	4277.95	121.14	1.330	0.41
15.0	381	276.5	7.8	0.0	0.0	49.6	1.4	326.111	9.2	3953.58	111.95	1.250	0.38
14.0	356	279.6	7.9	0.0	0.0	48.3	1.4	327.944	9.3	3627.47	102.72	1.170	0.36
13.0	330	282.5	8.0	0.0	0.0	47.2	1.3	329.692	9.3	3299.52	93.43	1.080	0.33
12.0	305	285.3	8.1	0.0	0.0	46.1	1.3	331.341	9.4	2969.83	84.10	1.000	0.30
11.0	279	287.6	8.1	0.0	0.0	45.2	1.3	332.713	9.4	2638.49	74.71	0.920	0.28
10.0	254	290.0	8.2	0.0	0.0	44.2	1.3	334.191	9.5	2305.78	65.29	0.830	0.25
9.0	229	292.0	8.3	0.0	0.0	43.4	1.2	335.392	9.5	1971.58	55.83	0.750	0.23
8.0	203	294.3	8.3	0.0	0.0	42.5	1.2	336.735	9.5	1636.19	46.33	0.670	0.20
7.0	178	297.0	8.4	0.0	0.0	41.4	1.2	338.364	9.6	1299.46	36.80	0.580	0.18
6.0	152	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	961.09	27.22	0.500	0.15
5.0	127	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	800.91	22.68	0.420	0.13
4.0	102	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	640.73	18.14	0.330	0.10
3.0	76	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	480.55	13.61	0.250	0.08
2.0	51	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	320.36	9.07	0.170	0.05
1.0	25	0.0	0.0	0.0	0.0	160.2	4.5	160.182	4.5	160.18	4.54	0.080	0.03
0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.00	0.00	0.000	0.00
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Top of Stone Elevation

Top of Chamber Elevation

Bottom of Chamber Elevation

Bottom of Stone Elevation



NOAA Atlas 14, Volume 2, Version 3
 Location name: Ridgewood, New Jersey, USA*
 Latitude: 40.9757°, Longitude: -74.1223°
 Elevation: 152 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

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PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.10 (3.73-4.52)	4.91 (4.45-5.41)	5.84 (5.29-6.44)	6.53 (5.90-7.19)	7.39 (6.66-8.14)	8.03 (7.20-8.83)	8.63 (7.69-9.49)	9.22 (8.16-10.2)	9.95 (8.72-11.0)	10.5 (9.14-11.7)
10-min	3.23 (2.93-3.56)	3.88 (3.52-4.28)	4.61 (4.18-5.08)	5.12 (4.64-5.64)	5.77 (5.20-6.35)	6.23 (5.59-6.86)	6.68 (5.96-7.35)	7.09 (6.28-7.82)	7.60 (6.67-8.41)	7.95 (6.92-8.83)
15-min	2.67 (2.42-2.94)	3.21 (2.91-3.54)	3.83 (3.46-4.22)	4.27 (3.86-4.70)	4.81 (4.33-5.29)	5.20 (4.66-5.72)	5.58 (4.98-6.14)	5.92 (5.24-6.53)	6.34 (5.56-7.02)	6.64 (5.77-7.37)
30-min	1.80 (1.63-1.98)	2.18 (1.98-2.41)	2.67 (2.42-2.95)	3.03 (2.74-3.33)	3.48 (3.14-3.83)	3.82 (3.42-4.20)	4.15 (3.70-4.57)	4.46 (3.95-4.92)	4.88 (4.28-5.40)	5.18 (4.51-5.75)
60-min	1.11 (1.01-1.22)	1.36 (1.23-1.49)	1.70 (1.54-1.87)	1.95 (1.76-2.15)	2.29 (2.06-2.52)	2.55 (2.29-2.81)	2.82 (2.51-3.10)	3.08 (2.73-3.40)	3.44 (3.02-3.81)	3.71 (3.23-4.12)
2-hr	0.683 (0.620-0.750)	0.830 (0.755-0.913)	1.05 (0.952-1.15)	1.22 (1.10-1.34)	1.46 (1.31-1.60)	1.65 (1.48-1.81)	1.84 (1.64-2.02)	2.05 (1.81-2.25)	2.34 (2.04-2.57)	2.56 (2.21-2.83)
3-hr	0.509 (0.464-0.558)	0.619 (0.565-0.680)	0.782 (0.713-0.859)	0.911 (0.827-0.999)	1.09 (0.984-1.19)	1.24 (1.11-1.35)	1.38 (1.24-1.52)	1.54 (1.36-1.69)	1.76 (1.54-1.93)	1.94 (1.67-2.13)
6-hr	0.331 (0.304-0.363)	0.402 (0.368-0.441)	0.507 (0.463-0.555)	0.591 (0.538-0.647)	0.711 (0.643-0.776)	0.810 (0.728-0.884)	0.915 (0.816-0.998)	1.03 (0.906-1.12)	1.19 (1.03-1.30)	1.32 (1.13-1.45)
12-hr	0.205 (0.185-0.228)	0.249 (0.225-0.276)	0.315 (0.285-0.349)	0.370 (0.333-0.409)	0.450 (0.402-0.495)	0.518 (0.459-0.570)	0.591 (0.518-0.650)	0.670 (0.582-0.738)	0.787 (0.671-0.867)	0.886 (0.744-0.978)
24-hr	0.115 (0.106-0.126)	0.140 (0.129-0.153)	0.179 (0.165-0.196)	0.213 (0.195-0.232)	0.264 (0.240-0.287)	0.308 (0.277-0.335)	0.357 (0.318-0.389)	0.411 (0.363-0.448)	0.493 (0.428-0.540)	0.564 (0.482-0.619)
2-day	0.068 (0.062-0.074)	0.082 (0.075-0.090)	0.105 (0.096-0.115)	0.124 (0.114-0.136)	0.153 (0.139-0.167)	0.177 (0.160-0.193)	0.203 (0.182-0.222)	0.232 (0.206-0.255)	0.275 (0.240-0.304)	0.312 (0.267-0.345)
3-day	0.047 (0.044-0.052)	0.057 (0.053-0.063)	0.073 (0.067-0.080)	0.086 (0.079-0.094)	0.105 (0.096-0.115)	0.122 (0.110-0.132)	0.139 (0.125-0.152)	0.158 (0.141-0.173)	0.186 (0.163-0.204)	0.210 (0.181-0.232)
4-day	0.037 (0.034-0.040)	0.045 (0.042-0.049)	0.057 (0.053-0.062)	0.067 (0.062-0.073)	0.082 (0.075-0.089)	0.094 (0.086-0.102)	0.107 (0.097-0.116)	0.121 (0.108-0.132)	0.142 (0.125-0.155)	0.159 (0.138-0.175)
7-day	0.025 (0.023-0.027)	0.030 (0.028-0.032)	0.037 (0.035-0.040)	0.044 (0.040-0.047)	0.052 (0.048-0.056)	0.060 (0.055-0.064)	0.067 (0.061-0.073)	0.076 (0.068-0.082)	0.088 (0.078-0.095)	0.097 (0.085-0.107)
10-day	0.020 (0.019-0.021)	0.024 (0.022-0.026)	0.029 (0.027-0.031)	0.034 (0.032-0.036)	0.040 (0.037-0.043)	0.045 (0.042-0.049)	0.051 (0.047-0.055)	0.057 (0.052-0.061)	0.065 (0.058-0.070)	0.072 (0.063-0.078)
20-day	0.013 (0.012-0.014)	0.016 (0.015-0.017)	0.019 (0.018-0.020)	0.022 (0.020-0.023)	0.025 (0.023-0.027)	0.028 (0.026-0.029)	0.030 (0.028-0.032)	0.033 (0.030-0.035)	0.036 (0.033-0.039)	0.039 (0.035-0.042)
30-day	0.011 (0.010-0.012)	0.013 (0.012-0.014)	0.015 (0.014-0.016)	0.017 (0.016-0.018)	0.019 (0.018-0.021)	0.021 (0.020-0.022)	0.023 (0.021-0.024)	0.024 (0.023-0.026)	0.027 (0.024-0.028)	0.028 (0.026-0.030)
45-day	0.009 (0.009-0.010)	0.011 (0.010-0.012)	0.013 (0.012-0.013)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.018-0.021)	0.021 (0.019-0.022)	0.022 (0.020-0.023)
60-day	0.008 (0.008-0.009)	0.010 (0.009-0.010)	0.011 (0.011-0.012)	0.012 (0.012-0.013)	0.014 (0.013-0.014)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.016 (0.015-0.017)	0.018 (0.016-0.019)	0.018 (0.017-0.019)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

**Table 5-2: NJDEP 1.25-Inch/2-Hour Stormwater Runoff
Water Quality Design Storm Rainfall Distribution**

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
1	0.00166	41	0.1728	81	1.0906
2	0.00332	42	0.1796	82	1.0972
3	0.00498	43	0.1864	83	1.1038
4	0.00664	44	0.1932	84	1.1104
5	0.00830	45	0.2000	85	1.1170
6	0.00996	46	0.2117	86	1.1236
7	0.01162	47	0.2233	87	1.1302
8	0.01328	48	0.2350	88	1.1368
9	0.01494	49	0.2466	89	1.1434
10	0.01660	50	0.2583	90	1.1500
11	0.01828	51	0.2783	91	1.1550
12	0.01996	52	0.2983	92	1.1600
13	0.02164	53	0.3183	93	1.1650
14	0.02332	54	0.3383	94	1.1700
15	0.02500	55	0.3583	95	1.1750
16	0.03000	56	0.4116	96	1.1800
17	0.03500	57	0.4650	97	1.1850
18	0.04000	58	0.5183	98	1.1900
19	0.04500	59	0.5717	99	1.1950
20	0.05000	60	0.6250	100	1.2000
21	0.05500	61	0.6783	101	1.2050
22	0.06000	62	0.7317	102	1.2100
23	0.06500	63	0.7850	103	1.2150
24	0.07000	64	0.8384	104	1.2200
25	0.07500	65	0.8917	105	1.2250
26	0.08000	66	0.9117	106	1.2267
27	0.08500	67	0.9317	107	1.2284
28	0.09000	68	0.9517	108	1.2300
29	0.09500	69	0.9717	109	1.2317
30	0.10000	70	0.9917	110	1.2334
31	0.10660	71	1.0034	111	1.2351
32	0.11320	72	1.0150	112	1.2367
33	0.11980	73	1.0267	113	1.2384
34	0.12640	74	1.0383	114	1.2400
35	0.13300	75	1.0500	115	1.2417
36	0.13960	76	1.0568	116	1.2434
37	0.14620	77	1.0636	117	1.2450
38	0.15280	78	1.0704	118	1.2467
39	0.15940	79	1.0772	119	1.2483
40	0.16600	80	1.0840	120	1.2500



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHILIP D. MURPHY
Governor

DIVISION OF WATERSHED PROTECTION AND RESTORATION
BUREAU OF NJPDES STORMWATER PERMITTING & WATER QUALITY MANAGEMENT

SHAWN M. LATOURETTE
Commissioner

SHEILA Y. OLIVER
Lt. Governor

P.O. Box 420 Mail Code 501-02A
Trenton, New Jersey 08625-0420
609-633-7021 / Fax: 609-777-0432

www.njstormwater.org

November 18, 2022

Zachariha J. Kent
Vice President of Product Management
Bio Clean Environmental Services, Inc., a Quikrete Company
398 Via El Centro
Oceanside, CA 92058

Re: MTD Lab Certification
Bio Clean High Capacity Kraken Filter Stormwater Treatment Device
Online Installation

TSS Removal Rate 80%

Dear Mr. Kent:

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Bio Clean Environmental Services, Inc., a Quikrete company, has requested a Laboratory Certification for the Bio Clean High Capacity Kraken Filter Stormwater Treatment Device (High Capacity Kraken Filter).

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated October 2022) for this device is published online at <http://www.njcat.org/uploads/newDocs/HCKrakenFilterNJCATFinalReport.pdf>.

The NJDEP certifies the use of the High Capacity Kraken Filter by Bio Clean Environmental Services, Inc. at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-

5.5. The MTFR is calculated based on a verified loading rate of 0.101 gpm/ft² of effective membrane filter area.

2. The High Capacity Kraken Filter shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 6 below.
3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in Chapter 11.3 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at www.njstormwater.org.
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the High Capacity Kraken Filter. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at <https://www.conteches.com/kraken> for any changes to the maintenance requirements.
6. Sizing Requirement:

The example below demonstrates the sizing procedure for the High Capacity Kraken Filter:

Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using a High Capacity Kraken Filter. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs or 354.58 gpm.

The selection of the appropriate model of a High Capacity Kraken Filter is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the High Capacity Kraken Filter in this example is 0.25 acres. Based upon the information in Table 1 below, the following number of cartridges are required in a High Capacity Kraken Filter to treat the impervious area without exceeding the maximum allowable drainage area:

- a. Twenty-eight (28) 10" cartridges;
- b. Thirteen (13) 20" cartridges; or
- c. Eight (8) 30" cartridges.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

time of concentration = 10 minutes

i = 3.2 in/hr (page 74, Fig. 5-16 of Chapter 5 of the NJ Stormwater BMP Manual)

c = 0.99 (runoff coefficient for impervious)

$Q = ciA = 0.99 \times 3.2 \times 0.25 = 0.79 \text{ cfs (354.58 gpm)}$

(Note: 1 cfs = 448.83 gpm)

Given the site runoff is 0.79 cfs and based on Table 1 below, the following minimum numbers of cartridges are required in a High Capacity Kraken Filter without exceeding the MTFR of the individual model:

- a. Seventy-two (72) 10” cartridges;
- b. Thirty-three (33) 20” cartridges; or
- c. Twenty-one (21) 30” cartridges.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the NJCAT Verification Report in the Verification Appendix under Table A-1.

Table 1. High Capacity Kraken Filter Cartridge MTFRs and Maximum Allowable Drainage Area

Cartridge Height (in)	Cartridge Maximum Treatment Flow Rate (MTFR) (cfs)	Maximum Allowable Drainage Area (acres)
30	0.038	0.032
20	0.024	0.020
10	0.011	0.009

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Changi Wu of my office at chang.i.wu@dep.nj.gov.

Sincerely,



Gabriel Mahon, Chief
Bureau of NJPDES Stormwater Permitting & Water Quality Management
Division of Watershed Protection and Restoration
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

cc: Richard Magee, NJCAT

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2 - Year

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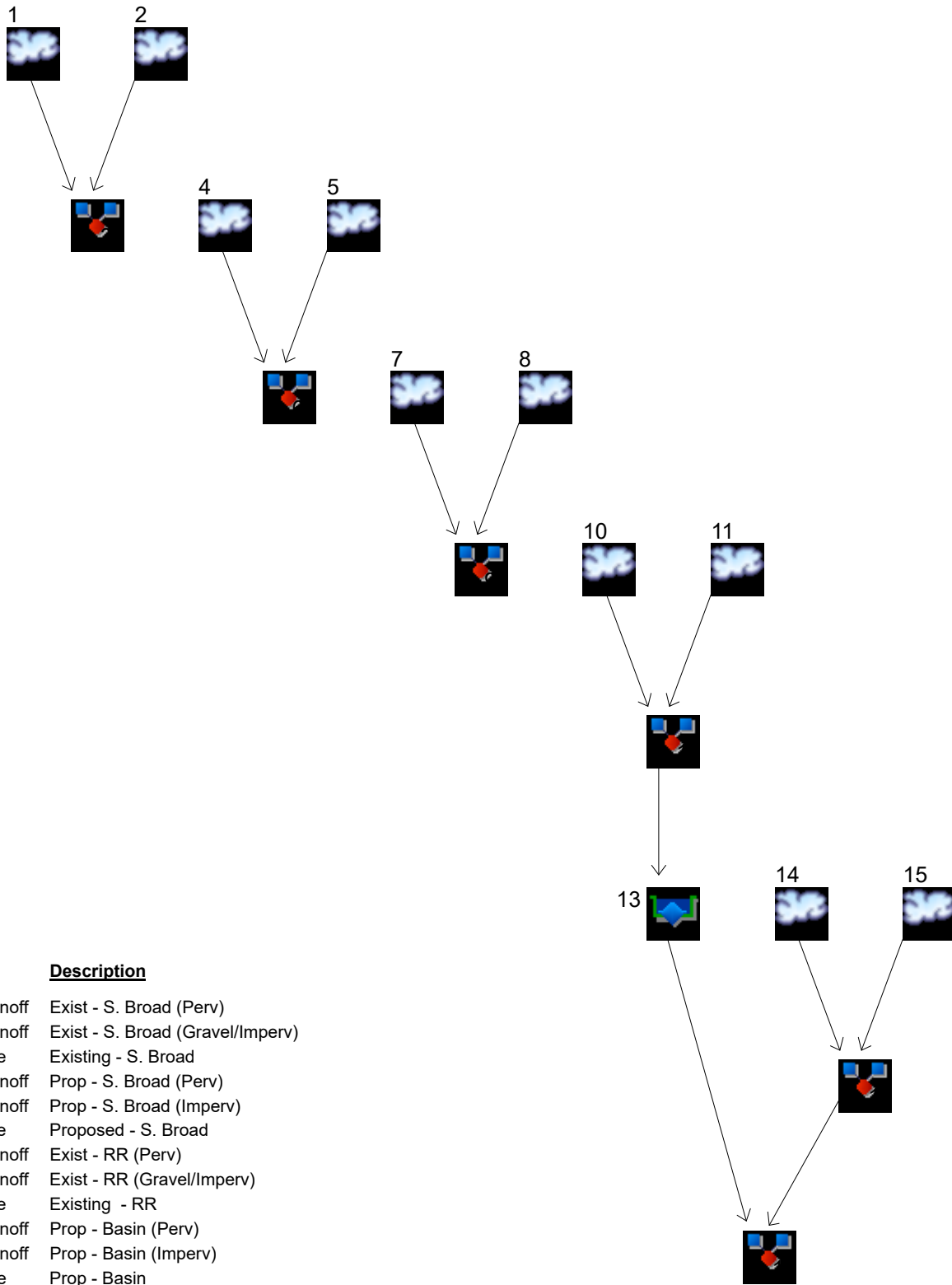
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Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Exist - S. Broad (Perv)
2	SCS Runoff	Exist - S. Broad (Gravel/Imperv)
3	Combine	Existing - S. Broad
4	SCS Runoff	Prop - S. Broad (Perv)
5	SCS Runoff	Prop - S. Broad (Imperv)
6	Combine	Proposed - S. Broad
7	SCS Runoff	Exist - RR (Perv)
8	SCS Runoff	Exist - RR (Gravel/Imperv)
9	Combine	Existing - RR
10	SCS Runoff	Prop - Basin (Perv)
11	SCS Runoff	Prop - Basin (Imperv)
12	Combine	Prop - Basin
13	Reservoir	Basin Route
14	SCS Runoff	Prop - Bypass (Perv)
15	SCS Runoff	Prop - Bypass (Imperv)
16	Combine	Prop - Bypass
17	Combine	Proposed - RR

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.074	1	729	263	-----	-----	-----	Exist - S. Broad (Perv)
2	SCS Runoff	1.191	1	726	3,768	-----	-----	-----	Exist - S. Broad (Gravel/Imperv)
3	Combine	1.255	1	726	4,031	1, 2	-----	-----	Existing - S. Broad
4	SCS Runoff	0.242	1	734	1,066	-----	-----	-----	Prop - S. Broad (Perv)
5	SCS Runoff	0.695	1	726	2,252	-----	-----	-----	Prop - S. Broad (Imperv)
6	Combine	0.858	1	726	3,319	4, 5	-----	-----	Proposed - S. Broad
7	SCS Runoff	0.117	1	728	391	-----	-----	-----	Exist - RR (Perv)
8	SCS Runoff	3.527	1	726	10,390	-----	-----	-----	Exist - RR (Gravel/Imperv)
9	Combine	3.635	1	726	10,781	7, 8	-----	-----	Existing - RR
10	SCS Runoff	0.035	1	726	94	-----	-----	-----	Prop - Basin (Perv)
11	SCS Runoff	2.005	1	726	6,501	-----	-----	-----	Prop - Basin (Imperv)
12	Combine	2.039	1	726	6,595	10, 11	-----	-----	Prop - Basin
13	Reservoir	0.000	1	n/a	0	12	147.95	6,595	Basin Route
14	SCS Runoff	0.217	1	733	911	-----	-----	-----	Prop - Bypass (Perv)
15	SCS Runoff	1.126	1	727	4,230	-----	-----	-----	Prop - Bypass (Imperv)
16	Combine	1.308	1	728	5,141	14, 15	-----	-----	Prop - Bypass
17	Combine	1.308	1	728	5,141	13, 16	-----	-----	Proposed - RR
22-146(C).gpw					Return Period: 2 Year			Monday, Nov 11, 2024	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 1

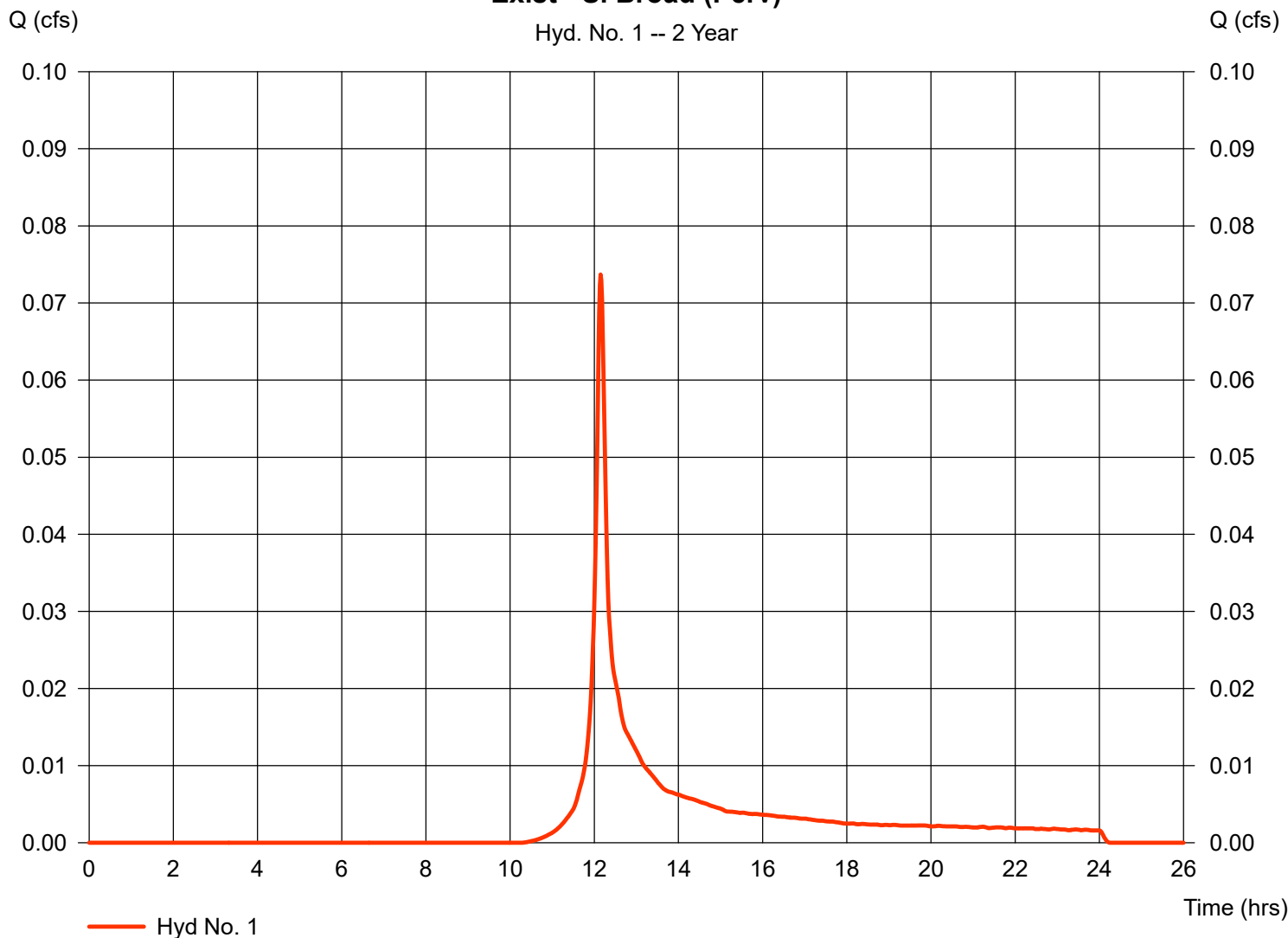
Exist - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.063 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.074 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 263 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.60 min
 Distribution = Custom
 Shape factor = 484

Exist - S. Broad (Perv)

Hyd. No. 1 -- 2 Year



TR55 Tc Worksheet

Hyd. No. 1

Exist - S. Broad (Perv)

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.240		0.011		0.011			
Flow length (ft)	= 61.0		0.0		0.0			
Two-year 24-hr precip. (in)	= 3.34		0.00		0.00			
Land slope (%)	= 2.50		0.00		0.00			
Travel Time (min)	= 8.60	+	0.00	+	0.00	=	8.60	
Shallow Concentrated Flow								
Flow length (ft)	= 0.00		0.00		0.00			
Watercourse slope (%)	= 0.00		0.00		0.00			
Surface description	= Paved		Paved		Paved			
Average velocity (ft/s)	= 0.00		0.00		0.00			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Channel Flow								
X sectional flow area (sqft)	= 0.00		0.00		0.00			
Wetted perimeter (ft)	= 0.00		0.00		0.00			
Channel slope (%)	= 0.00		0.00		0.00			
Manning's n-value	= 0.015		0.015		0.015			
Velocity (ft/s)	= 0.00		0.00		0.00			
Flow length (ft)	= 0.0		0.0		0.0			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Total Travel Time, Tc							=	8.60 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 2

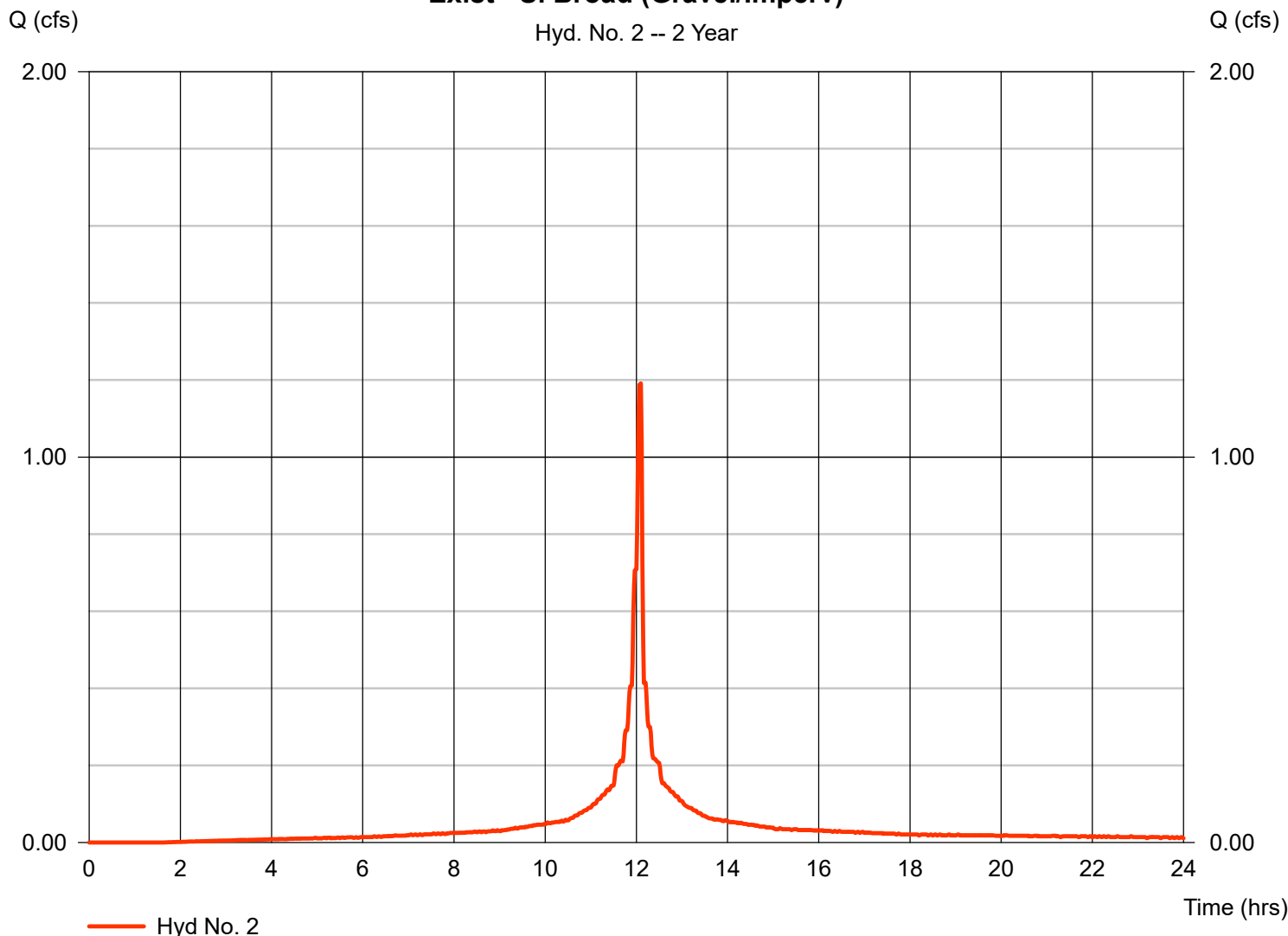
Exist - S. Broad (Gravel/Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.366 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.191 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 3,768 cuft
 Curve number = 97*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 1.60 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = [(0.028 x 89) + (0.338 x 98)] / 0.366

Exist - S. Broad (Gravel/Imperv)



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No. 2

Exist - S. Broad (Gravel/Imperv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	0.00	0.00	
Land slope (%)	= 1.50	0.00	0.00	
Travel Time (min)	= 1.33	+	0.00	+
				0.00
				= 1.33
Shallow Concentrated Flow				
Flow length (ft)	= 23.00	0.00	0.00	
Watercourse slope (%)	= 0.70	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 1.70	0.00	0.00	
Travel Time (min)	= 0.23	+	0.00	+
				0.00
				= 0.23
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+	0.00	+
				0.00
				= 0.00
Total Travel Time, Tc				1.60 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

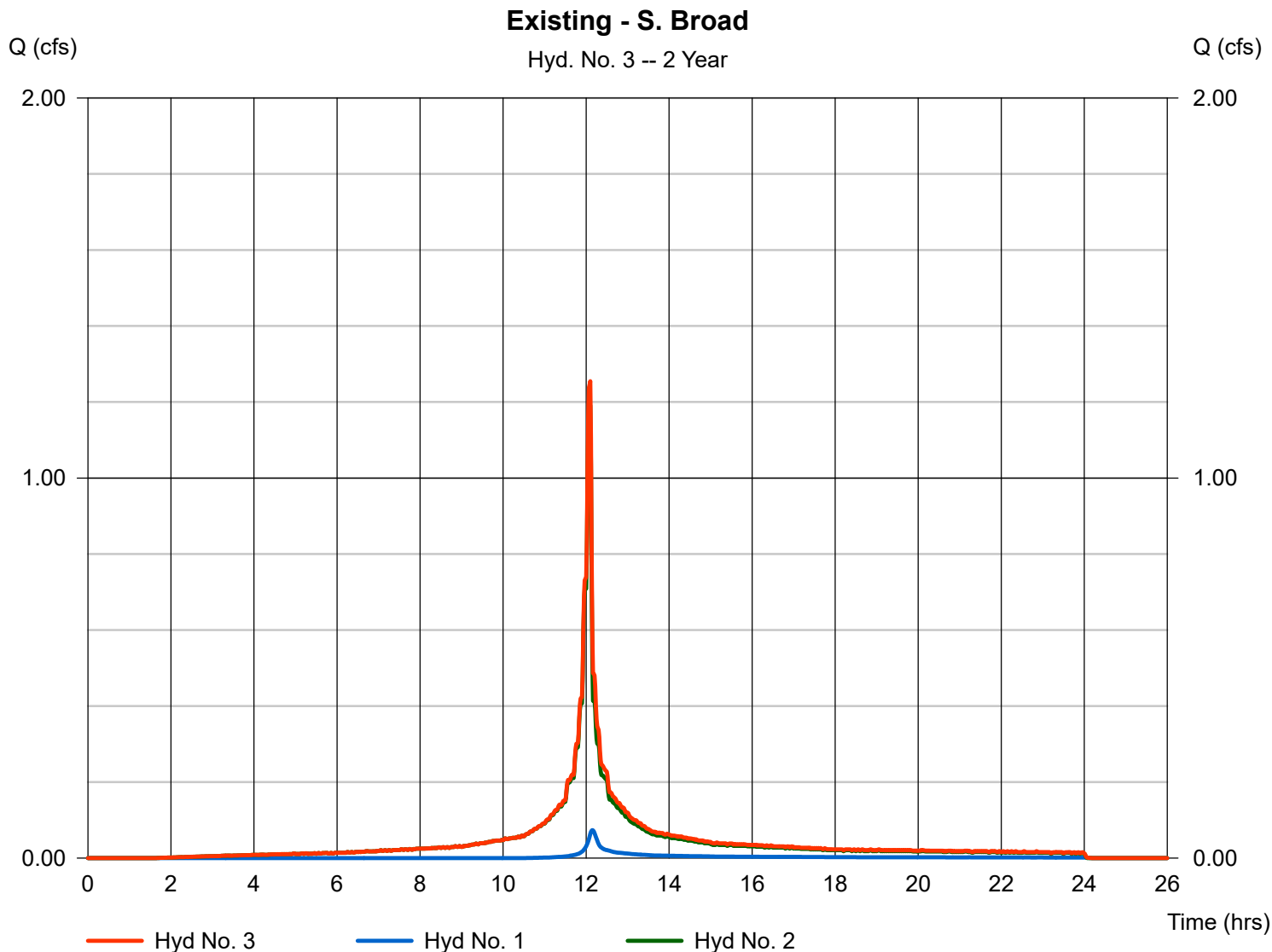
Monday, Nov 11, 2024

Hyd. No. 3

Existing - S. Broad

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

Peak discharge = 1.255 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 4,031 cuft
 Contrib. drain. area = 0.429 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 4

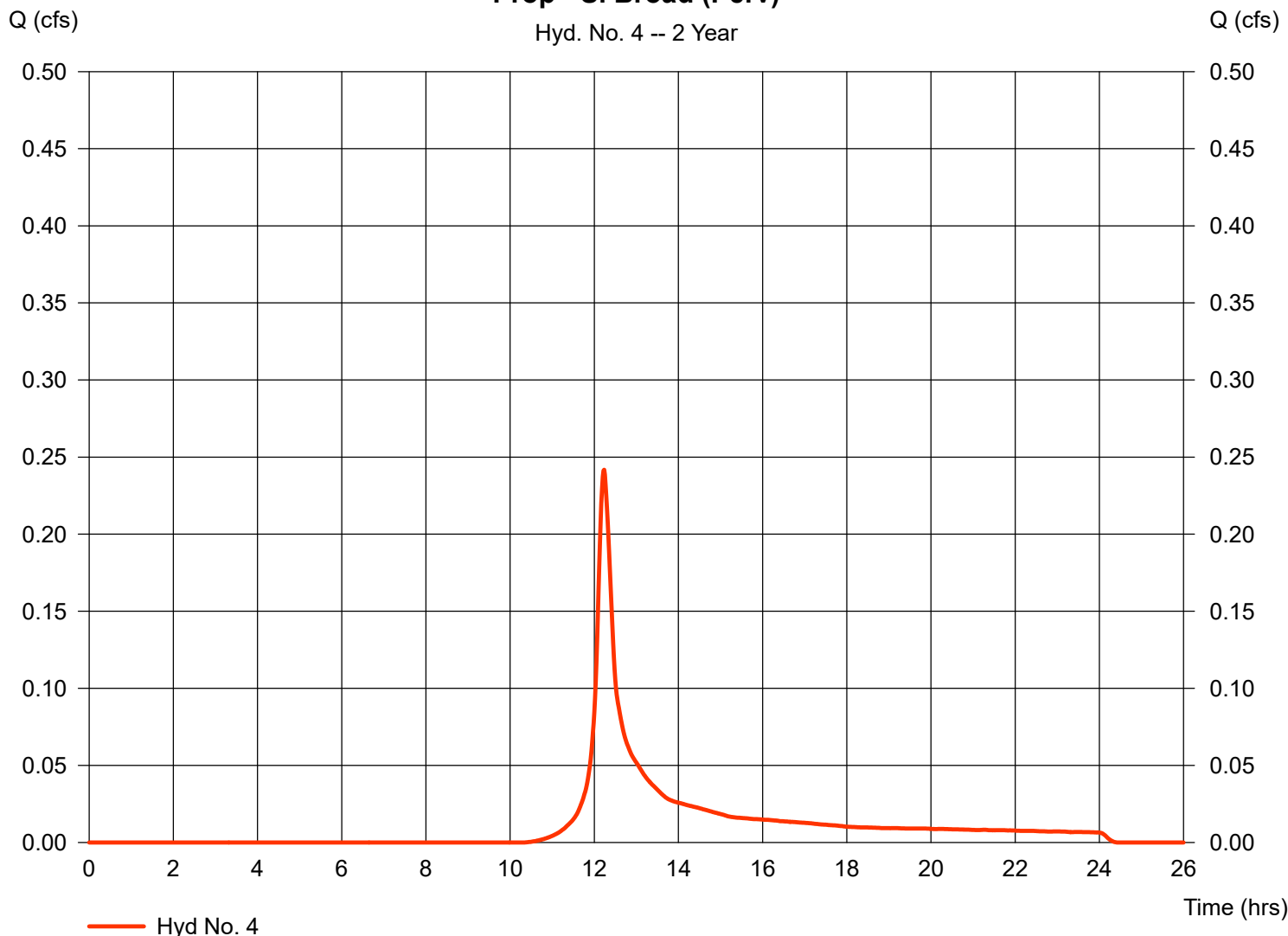
Prop - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.252 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.242 cfs
 Time to peak = 12.23 hrs
 Hyd. volume = 1,066 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.40 min
 Distribution = Custom
 Shape factor = 484

Prop - S. Broad (Perv)

Hyd. No. 4 -- 2 Year



TR55 Tc Worksheet

Hyd. No. 4

Prop - S. Broad (Perv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	0.00	0.00	
Land slope (%)	= 1.60	0.00	0.00	
Travel Time (min)	= 15.27	+ 0.00	+ 0.00	= 15.27
Shallow Concentrated Flow				
Flow length (ft)	= 15.00	0.00	0.00	
Watercourse slope (%)	= 1.60	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.04	0.00	0.00	
Travel Time (min)	= 0.12	+ 0.00	+ 0.00	= 0.12
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				15.40 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

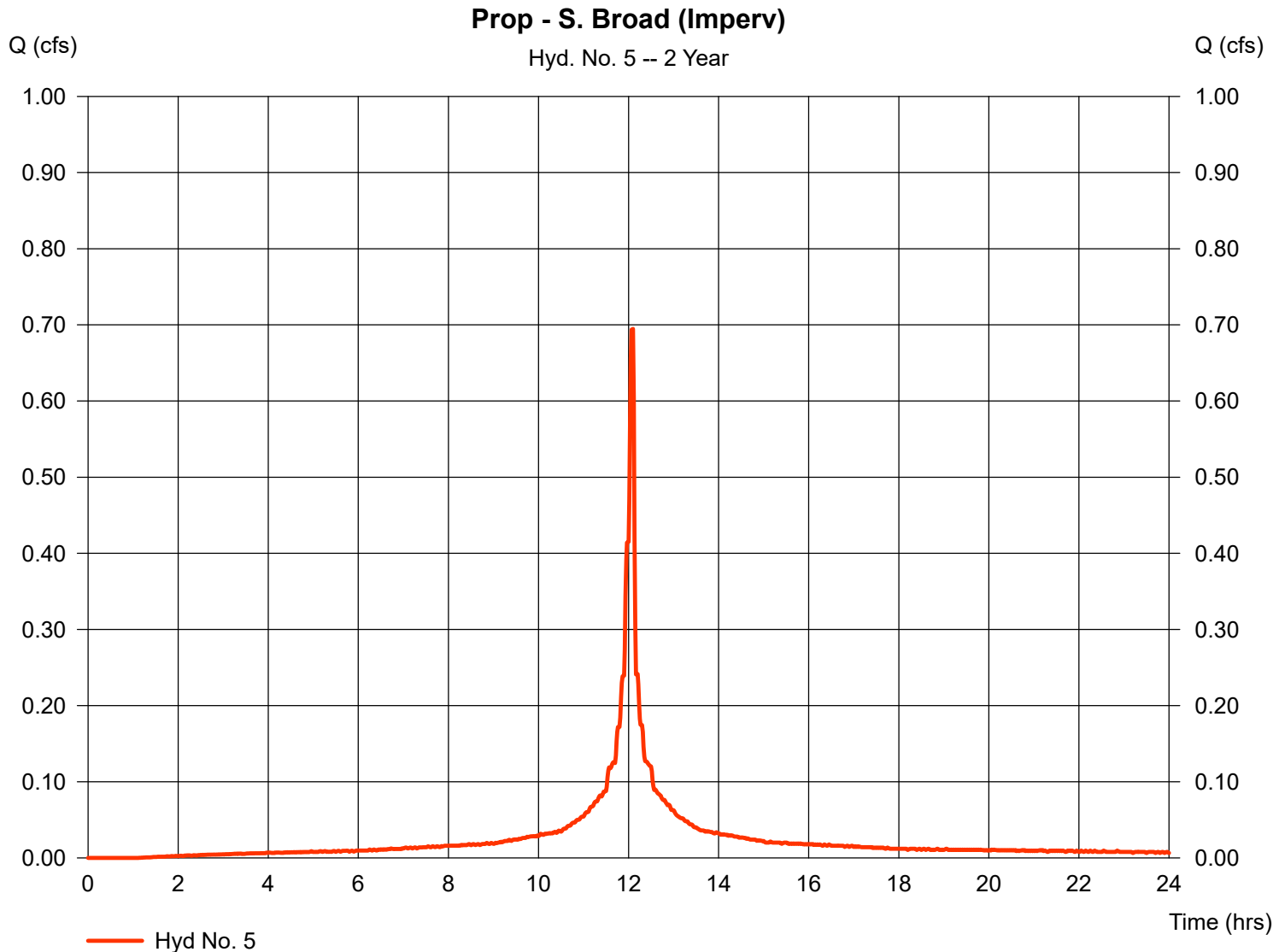
Monday, Nov 11, 2024

Hyd. No. 5

Prop - S. Broad (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.211 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.695 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 2,252 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No. 5

Prop - S. Broad (Imperv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	0.00	0.00	
Land slope (%)	= 1.00	0.00	0.00	
Travel Time (min)	= 1.56	+ 0.00	+ 0.00	= 1.56
Shallow Concentrated Flow				
Flow length (ft)	= 80.00	0.00	0.00	
Watercourse slope (%)	= 1.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 2.03	0.00	0.00	
Travel Time (min)	= 0.66	+ 0.00	+ 0.00	= 0.66
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				2.20 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

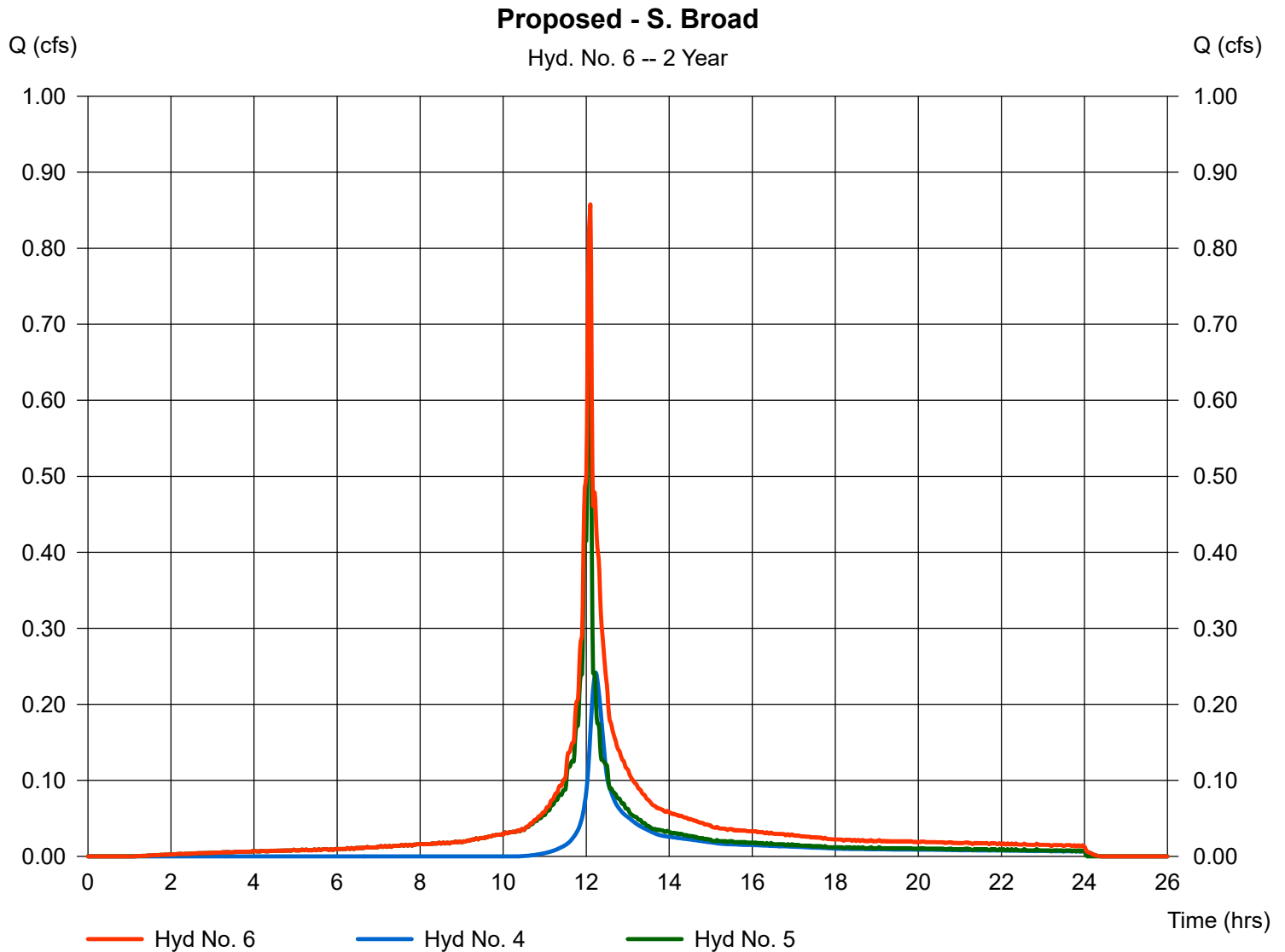
Monday, Nov 11, 2024

Hyd. No. 6

Proposed - S. Broad

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

Peak discharge = 0.858 cfs
Time to peak = 12.10 hrs
Hyd. volume = 3,319 cuft
Contrib. drain. area = 0.463 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

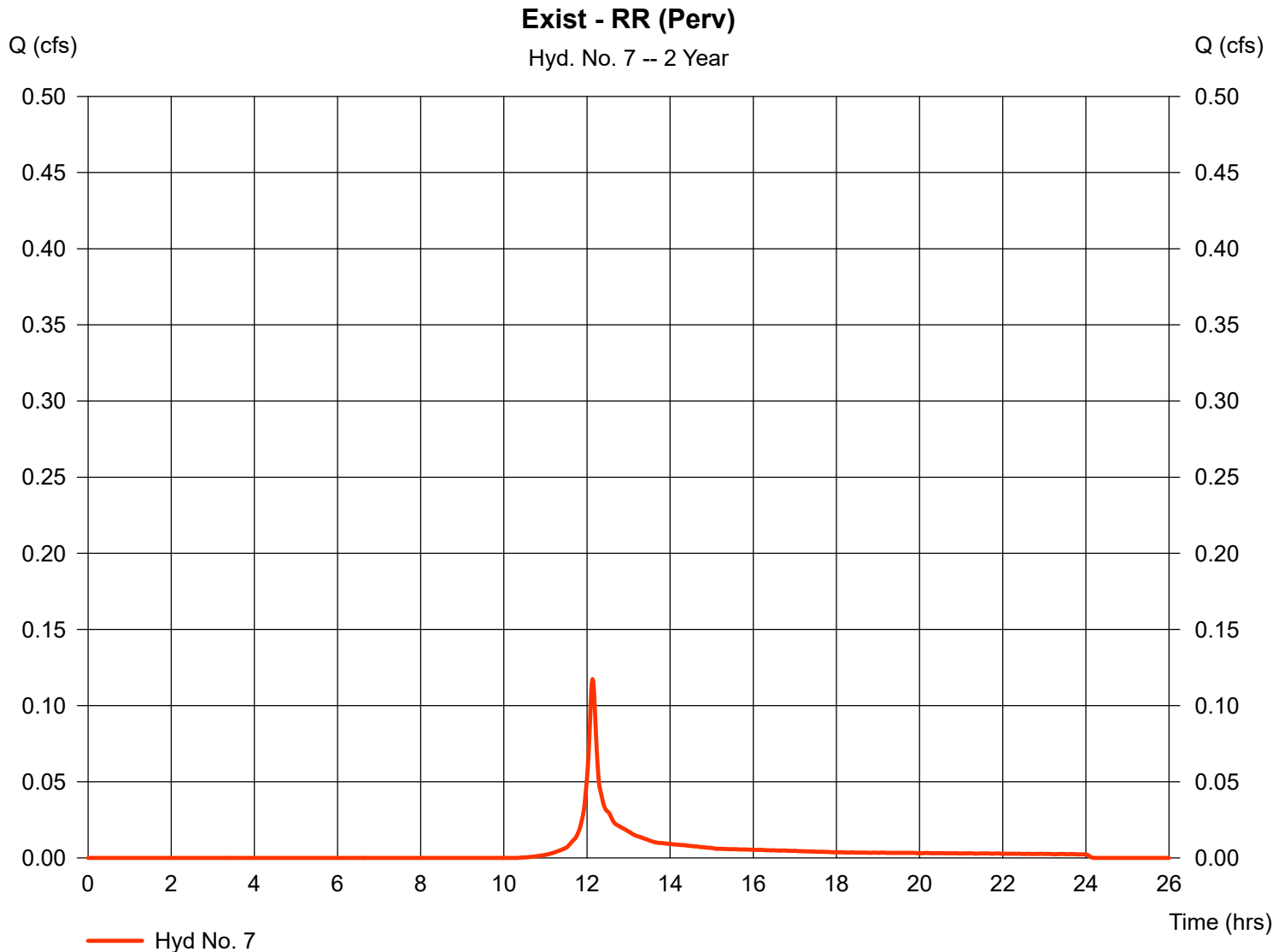
Monday, Nov 11, 2024

Hyd. No. 7

Exist - RR (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.096 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.117 cfs
 Time to peak = 12.13 hrs
 Hyd. volume = 391 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.30 min
 Distribution = Custom
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No. 7

Exist - RR (Perv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 55.0	45.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	3.34	0.00	
Land slope (%)	= 3.30	2.00	0.00	
Travel Time (min)	= 7.09	+ 0.63	+ 0.00	= 7.71
Shallow Concentrated Flow				
Flow length (ft)	= 130.00	0.00	0.00	
Watercourse slope (%)	= 3.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 3.52	0.00	0.00	
Travel Time (min)	= 0.62	+ 0.00	+ 0.00	= 0.62
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				8.30 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

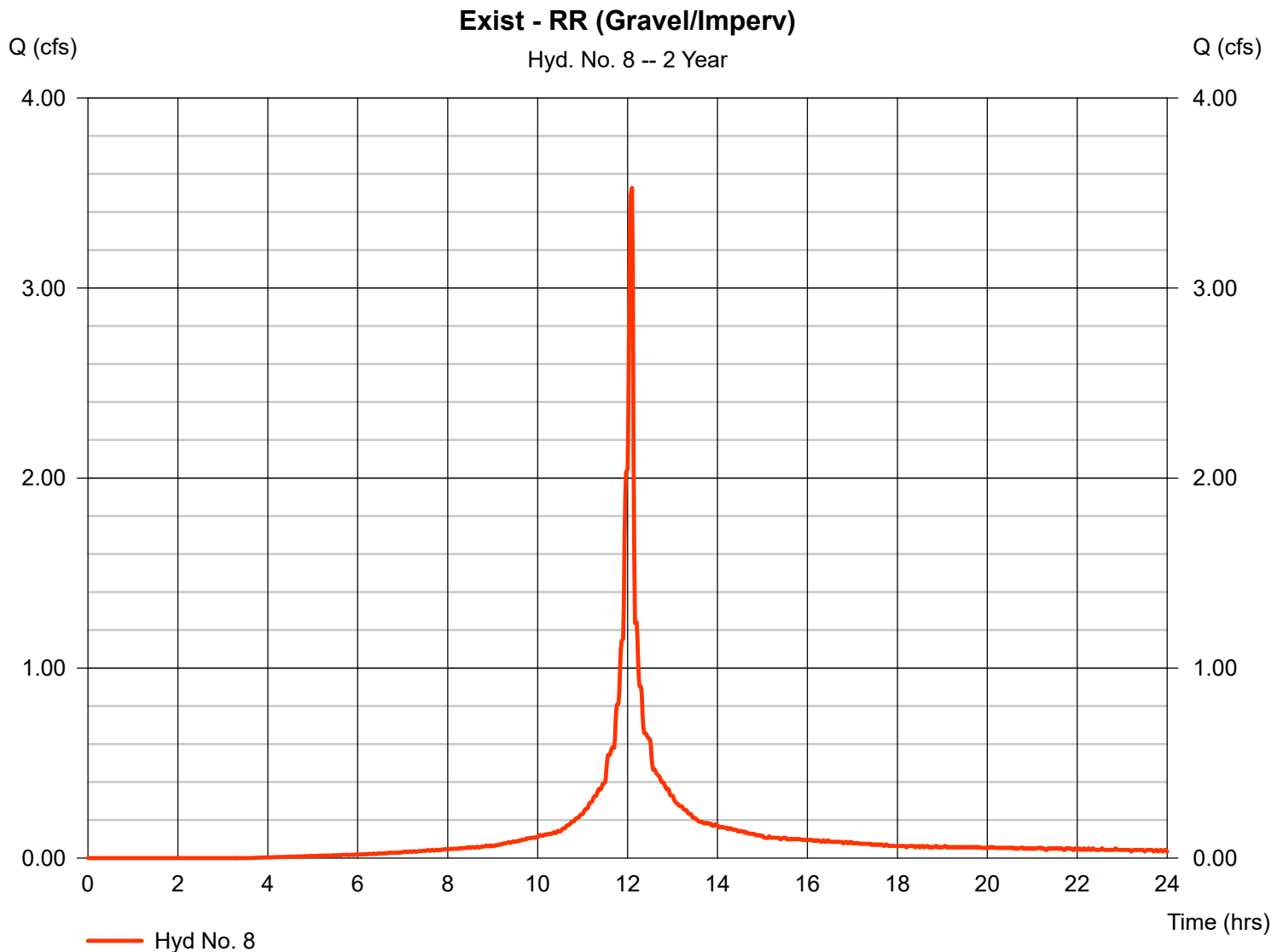
Monday, Nov 11, 2024

Hyd. No. 8

Exist - RR (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.527 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 10,390 cuft
Drainage area	= 1.170 ac	Curve number	= 93*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 3.37 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.667 x 89) + (0.503 x 98)] / 1.170



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No. 8

Exist - RR (Gravel/Imperv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	0.00	0.00	
Land slope (%)	= 2.40	0.00	0.00	
Travel Time (min)	= 1.10	+	0.00	+
				0.00
				= 1.10
Shallow Concentrated Flow				
Flow length (ft)	= 77.00	0.00	0.00	
Watercourse slope (%)	= 1.50	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 2.49	0.00	0.00	
Travel Time (min)	= 0.52	+	0.00	+
				0.00
				= 0.52
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+	0.00	+
				0.00
				= 0.00
Total Travel Time, Tc				1.60 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

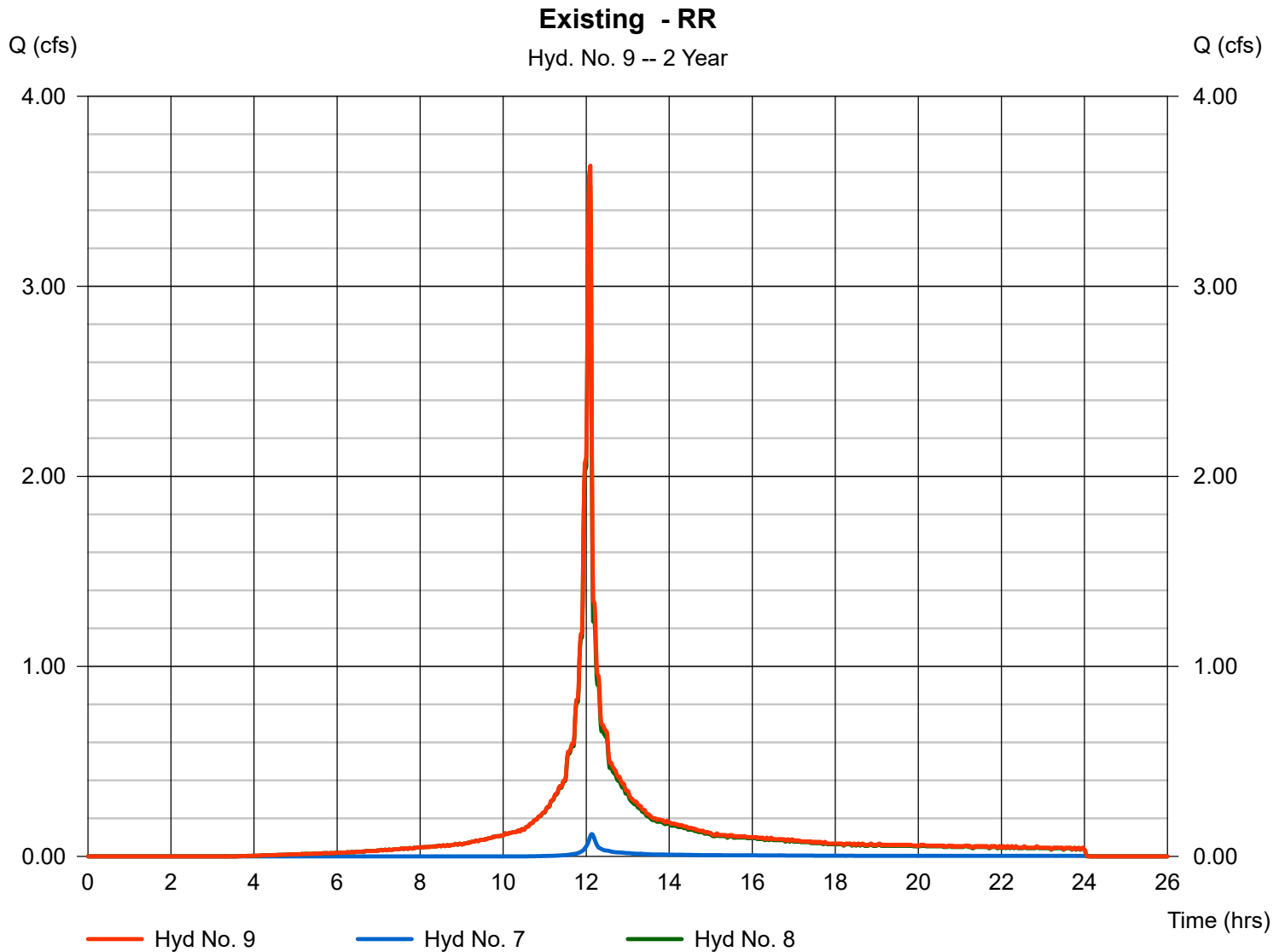
Monday, Nov 11, 2024

Hyd. No. 9

Existing - RR

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 7, 8

Peak discharge = 3.635 cfs
Time to peak = 12.10 hrs
Hyd. volume = 10,781 cuft
Contrib. drain. area = 1.266 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

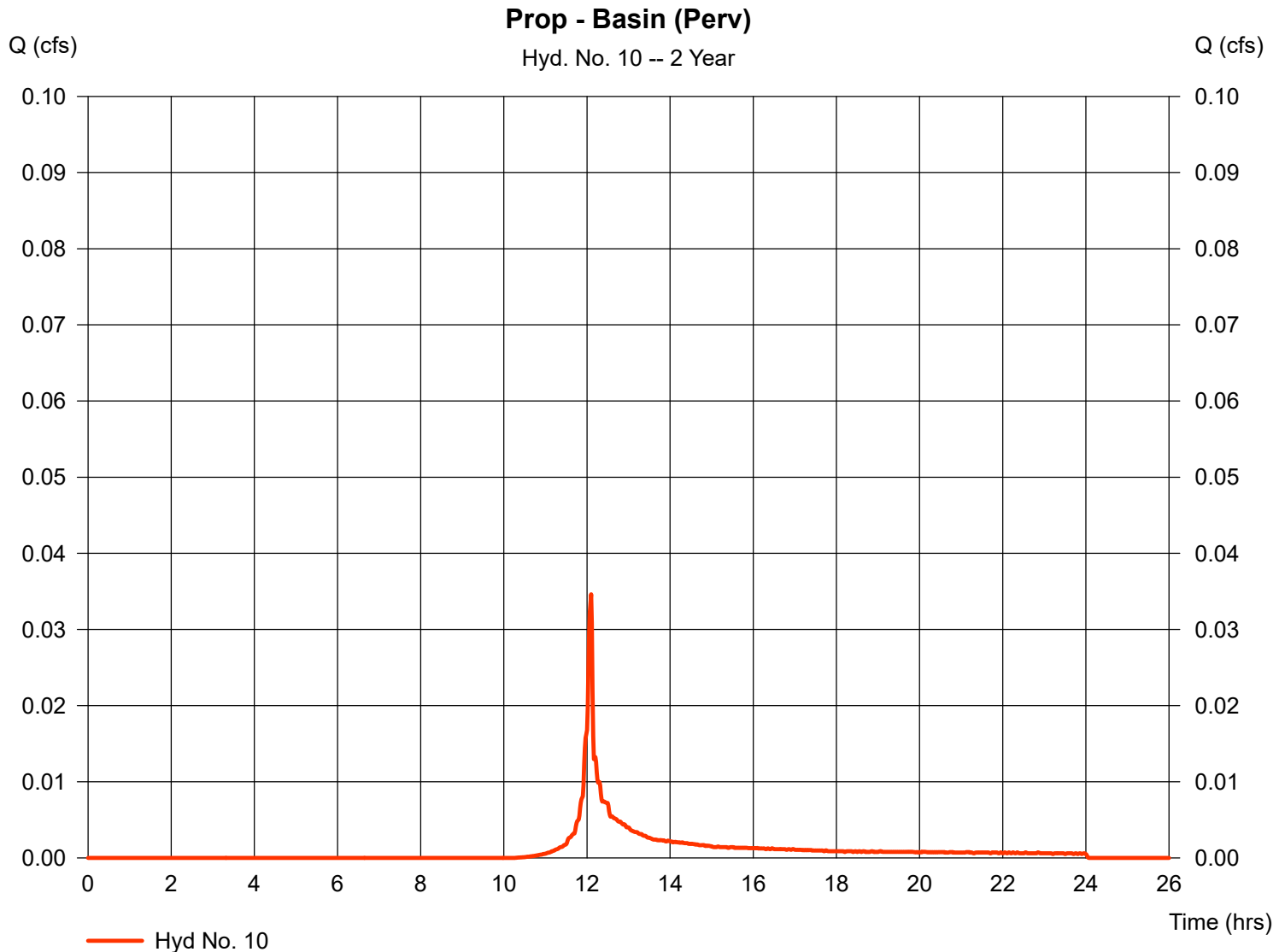
Monday, Nov 11, 2024

Hyd. No. 10

Prop - Basin (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.024 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.035 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 94 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 3.10 min
 Distribution = Custom
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No. 10

Prop - Basin (Perv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 17.0	32.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	3.34	0.00	
Land slope (%)	= 9.00	1.00	0.00	
Travel Time (min)	= 1.85	+ 0.63	+ 0.00	= 2.48
Shallow Concentrated Flow				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 0.00	0.00	0.00	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Channel Flow				
X sectional flow area (sqft)	= 1.23	0.00	0.00	
Wetted perimeter (ft)	= 3.93	0.00	0.00	
Channel slope (%)	= 1.00	0.00	0.00	
Manning's n-value	= 0.012	0.015	0.015	
Velocity (ft/s)	= 5.70	0.00	0.00	
Flow length (ft)	= 208.0	0.0	0.0	
Travel Time (min)	= 0.61	+ 0.00	+ 0.00	= 0.61
Total Travel Time, Tc				3.10 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

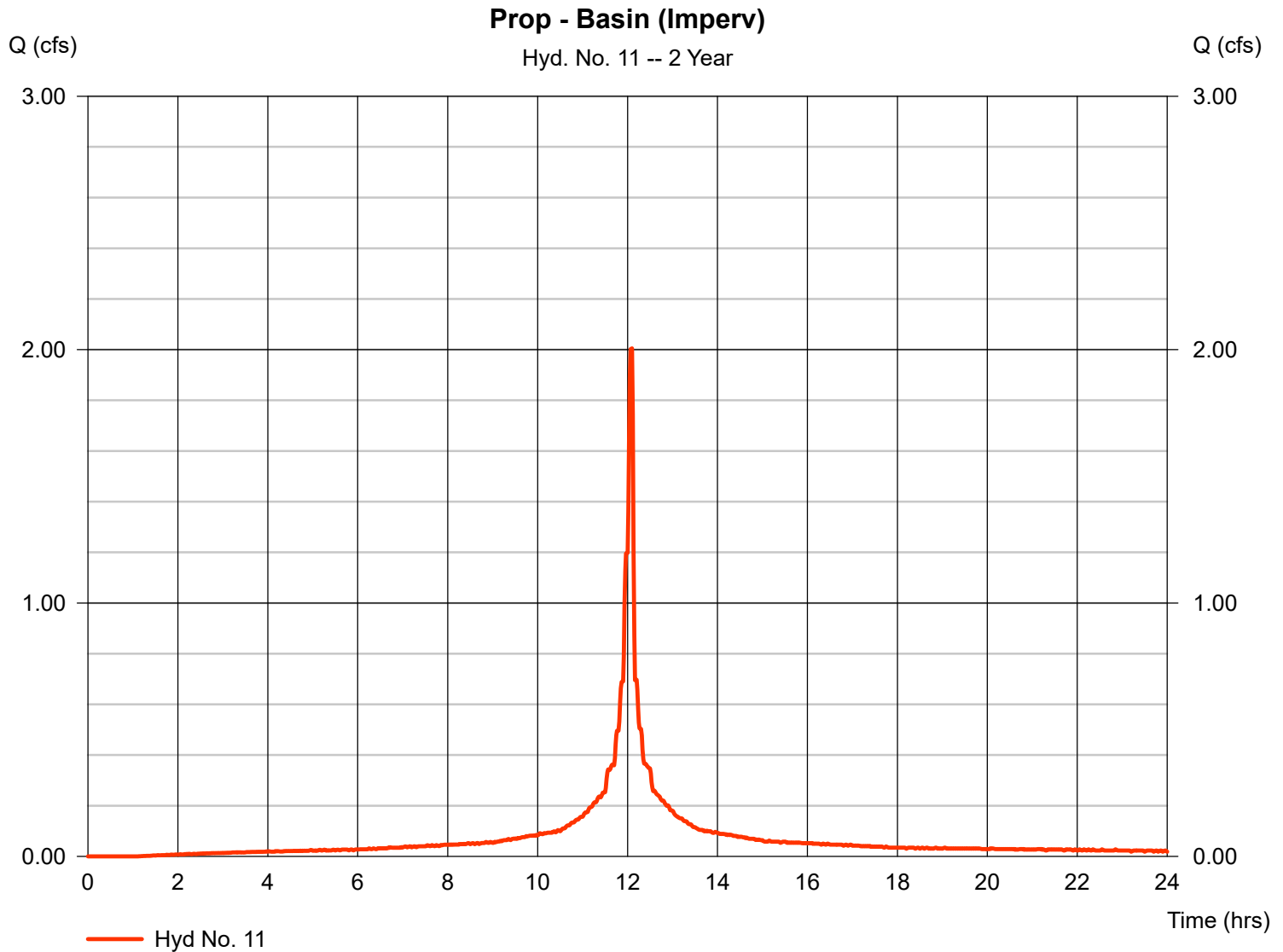
Monday, Nov 11, 2024

Hyd. No. 11

Prop - Basin (Imperv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.609 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 3.37 in
Storm duration = NOAA_D.cds

Peak discharge = 2.005 cfs
Time to peak = 12.10 hrs
Hyd. volume = 6,501 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 2.20 min
Distribution = Custom
Shape factor = 484



TR55 Tc Worksheet

Hyd. No. 11

Prop - Basin (Imperv)

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.011		0.011		0.011			
Flow length (ft)	= 100.0		0.0		0.0			
Two-year 24-hr precip. (in)	= 3.34		0.00		0.00			
Land slope (%)	= 1.20		0.00		0.00			
Travel Time (min)	= 1.45	+	0.00	+	0.00	=	1.45	
Shallow Concentrated Flow								
Flow length (ft)	= 17.00		0.00		0.00			
Watercourse slope (%)	= 1.00		0.00		0.00			
Surface description	= Paved		Paved		Paved			
Average velocity (ft/s)	= 2.03		0.00		0.00			
Travel Time (min)	= 0.14	+	0.00	+	0.00	=	0.14	
Channel Flow								
X sectional flow area (sqft)	= 1.23		0.00		0.00			
Wetted perimeter (ft)	= 3.93		0.00		0.00			
Channel slope (%)	= 1.00		0.00		0.00			
Manning's n-value	= 0.012		0.015		0.015			
Velocity (ft/s)	= 5.70		0.00		0.00			
Flow length (ft)	= 208.0		0.0		0.0			
Travel Time (min)	= 0.61	+	0.00	+	0.00	=	0.61	
Total Travel Time, Tc							=	2.20 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

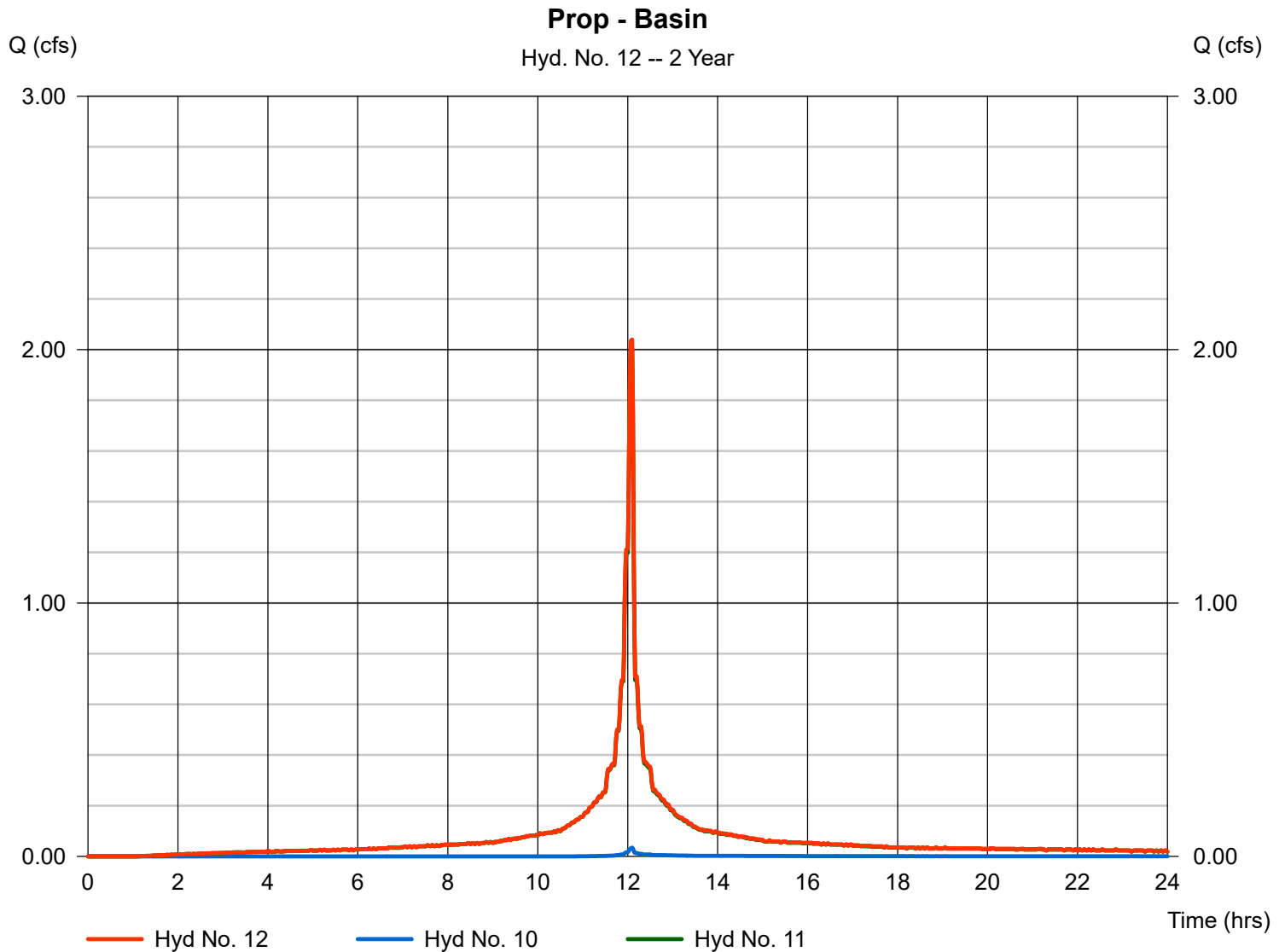
Monday, Nov 11, 2024

Hyd. No. 12

Prop - Basin

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

Peak discharge = 2.039 cfs
Time to peak = 12.10 hrs
Hyd. volume = 6,595 cuft
Contrib. drain. area = 0.633 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

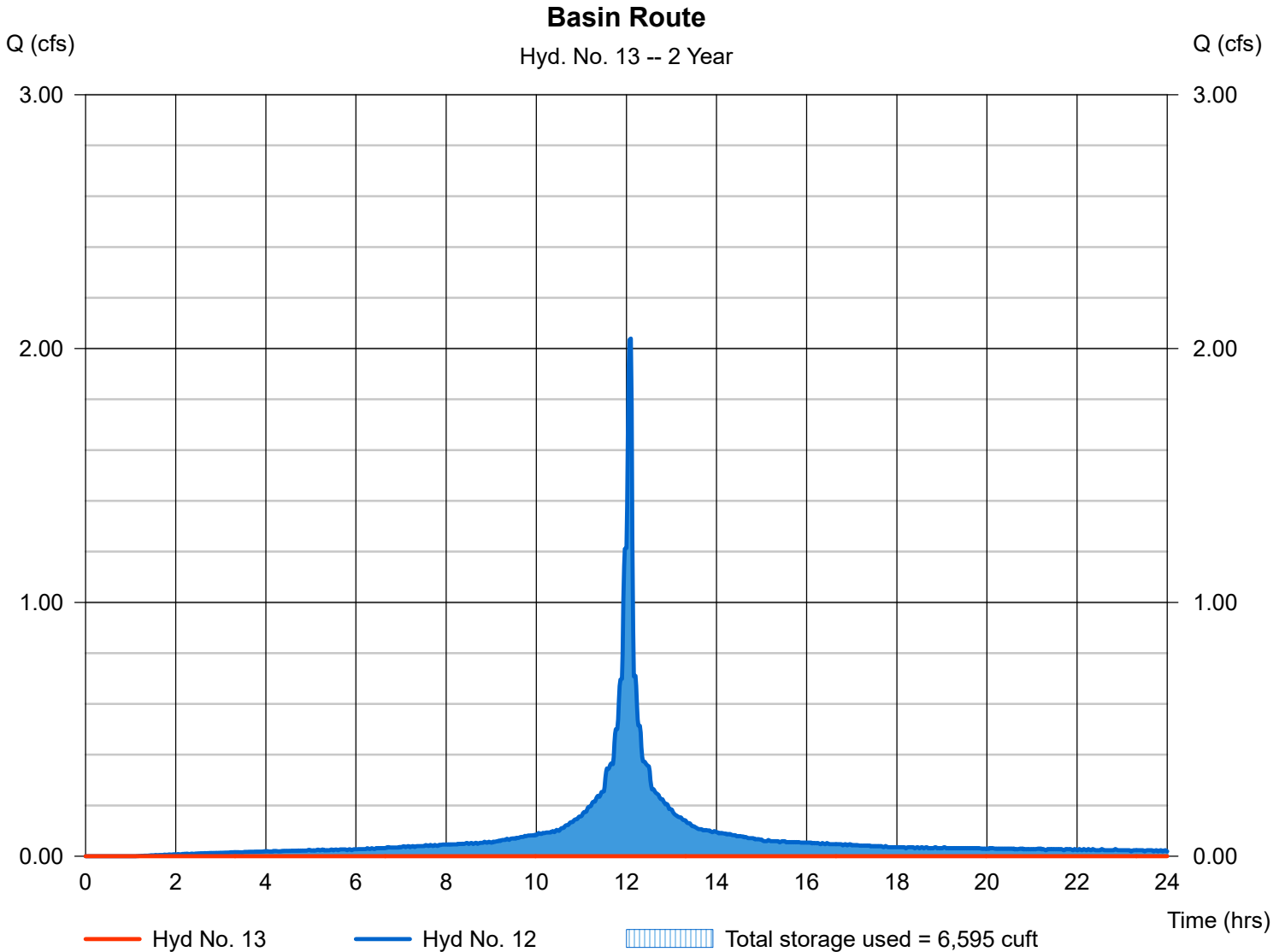
Hyd. No. 13

Basin Route

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyd. No. = 12 - Prop - Basin
Reservoir name = Basin

Peak discharge = 0.000 cfs
Time to peak = n/a
Hyd. volume = 0 cuft
Max. Elevation = 147.95 ft
Max. Storage = 6,595 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Basin

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	146.00	n/a	0	0
0.25	146.25	n/a	481	481
0.50	146.50	n/a	480	961
0.75	146.75	n/a	1,011	1,972
1.00	147.00	n/a	998	2,970
1.25	147.25	n/a	984	3,954
1.50	147.50	n/a	966	4,920
1.75	147.75	n/a	948	5,868
2.00	148.00	n/a	923	6,791
2.25	148.25	n/a	895	7,686
2.50	148.50	n/a	861	8,547
2.75	148.75	n/a	819	9,366
3.00	149.00	n/a	762	10,128
3.25	149.25	n/a	679	10,807
3.50	149.50	n/a	543	11,350
3.75	149.75	n/a	321	11,671
4.00	150.00	n/a	640	12,311

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 148.75	0.00	0.00	0.00
Length (ft)	= 31.00	0.00	0.00	0.00
Slope (%)	= 1.10	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 148.75	0.00	0.00	0.00
Weir Coeff.	= 3.20	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	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	146.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.25	481	146.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.50	961	146.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.75	1,972	146.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	2,970	147.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.25	3,954	147.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.50	4,920	147.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.75	5,868	147.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	6,791	148.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.25	7,686	148.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.50	8,547	148.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.75	9,366	148.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.00	10,128	149.00	0.31 ic	---	---	---	0.00	---	---	---	---	---	0.311
3.25	10,807	149.25	1.13 ic	---	---	---	0.00	---	---	---	---	---	1.127
3.50	11,350	149.50	2.27 ic	---	---	---	0.00	---	---	---	---	---	2.273
3.75	11,671	149.75	3.52 oc	---	---	---	0.00	---	---	---	---	---	3.516
4.00	12,311	150.00	3.96 oc	---	---	---	0.00	---	---	---	---	---	3.960

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

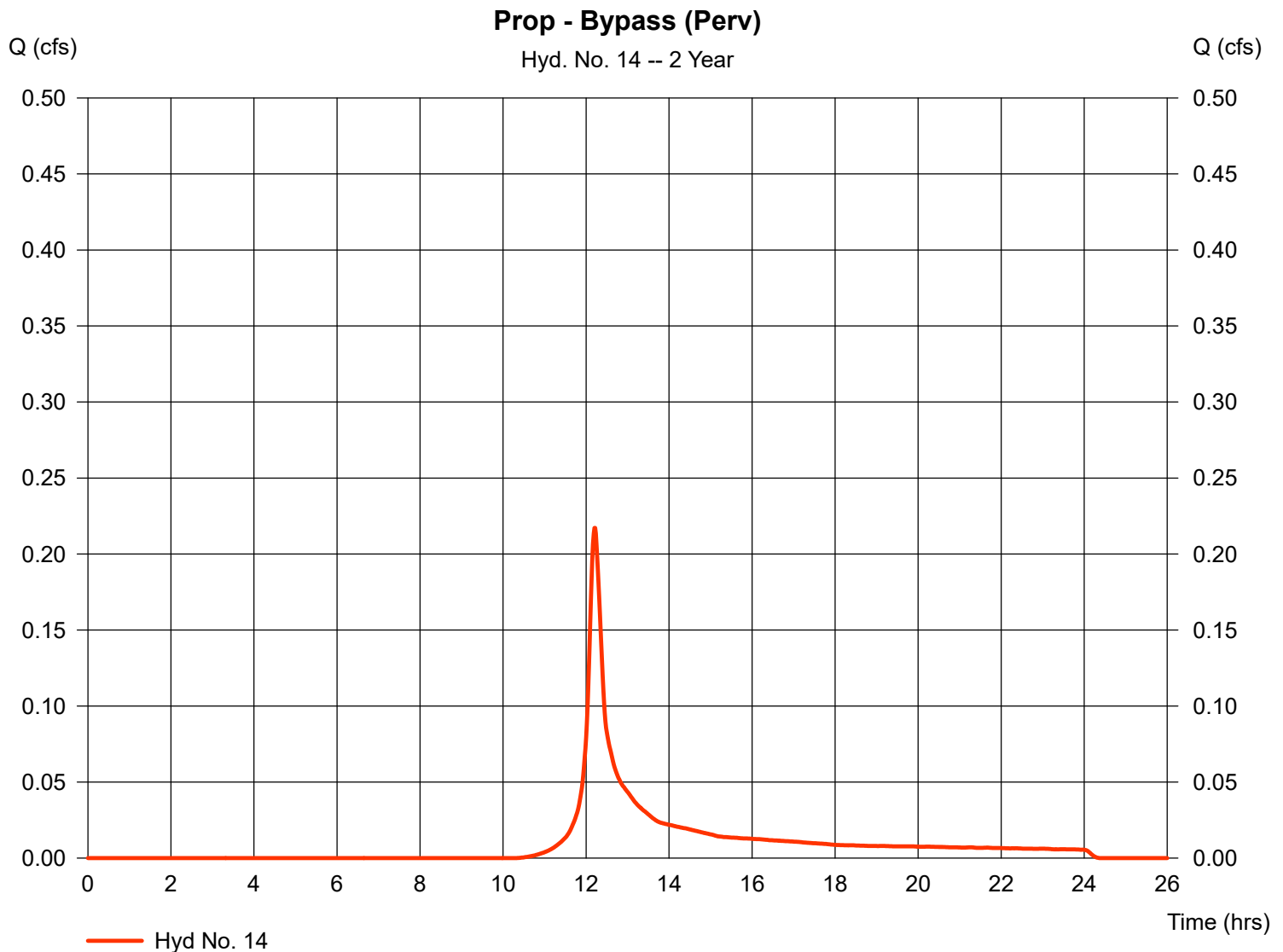
Hyd. No. 14

Prop - Bypass (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.218 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 3.37 in
Storm duration = NOAA_D.cds

Peak discharge = 0.217 cfs
Time to peak = 12.22 hrs
Hyd. volume = 911 cuft
Curve number = 74*
Hydraulic length = 0 ft
Time of conc. (Tc) = 15.00 min
Distribution = Custom
Shape factor = 484

* Composite (Area/CN) = [(0.161 x 98) + (0.426 x 98)] / 0.218



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No. 14

Prop - Bypass (Perv)

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.34	0.00	0.00	
Land slope (%)	= 1.80	0.00	0.00	
Travel Time (min)	= 14.57	+ 0.00	+ 0.00	= 14.57
Shallow Concentrated Flow				
Flow length (ft)	= 84.00	0.00	0.00	
Watercourse slope (%)	= 3.30	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.93	0.00	0.00	
Travel Time (min)	= 0.48	+ 0.00	+ 0.00	= 0.48
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				15.00 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

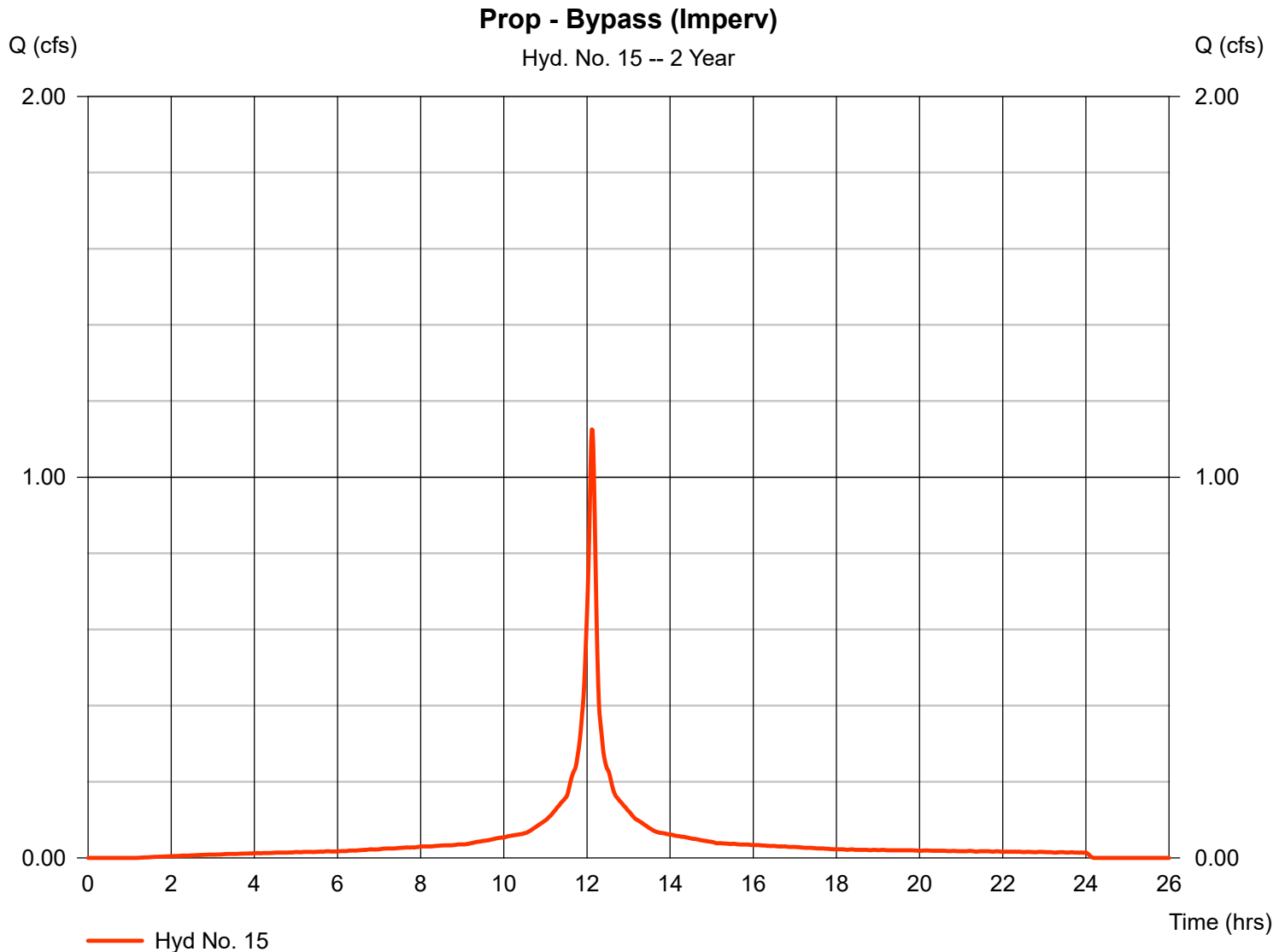
Monday, Nov 11, 2024

Hyd. No. 15

Prop - Bypass (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.381 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.37 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.126 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 4,230 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 6.90 min
 Distribution = Custom
 Shape factor = 484



TR55 Tc Worksheet

Hyd. No. 15

Prop - Bypass (Imperv)

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.011		0.240		0.011			
Flow length (ft)	= 74.0		26.0		0.0			
Two-year 24-hr precip. (in)	= 3.34		3.34		0.00			
Land slope (%)	= 1.10		1.60		0.00			
Travel Time (min)	= 1.18	+	5.20	+	0.00	=	6.38	
Shallow Concentrated Flow								
Flow length (ft)	= 94.00		0.00		0.00			
Watercourse slope (%)	= 3.30		0.00		0.00			
Surface description	= Unpaved		Paved		Paved			
Average velocity (ft/s)	= 2.93		0.00		0.00			
Travel Time (min)	= 0.53	+	0.00	+	0.00	=	0.53	
Channel Flow								
X sectional flow area (sqft)	= 0.00		0.00		0.00			
Wetted perimeter (ft)	= 0.00		0.00		0.00			
Channel slope (%)	= 0.00		0.00		0.00			
Manning's n-value	= 0.015		0.015		0.015			
Velocity (ft/s)	= 0.00		0.00		0.00			
Flow length (ft)	= 0.0		0.0		0.0			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Total Travel Time, Tc							=	6.90 min

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

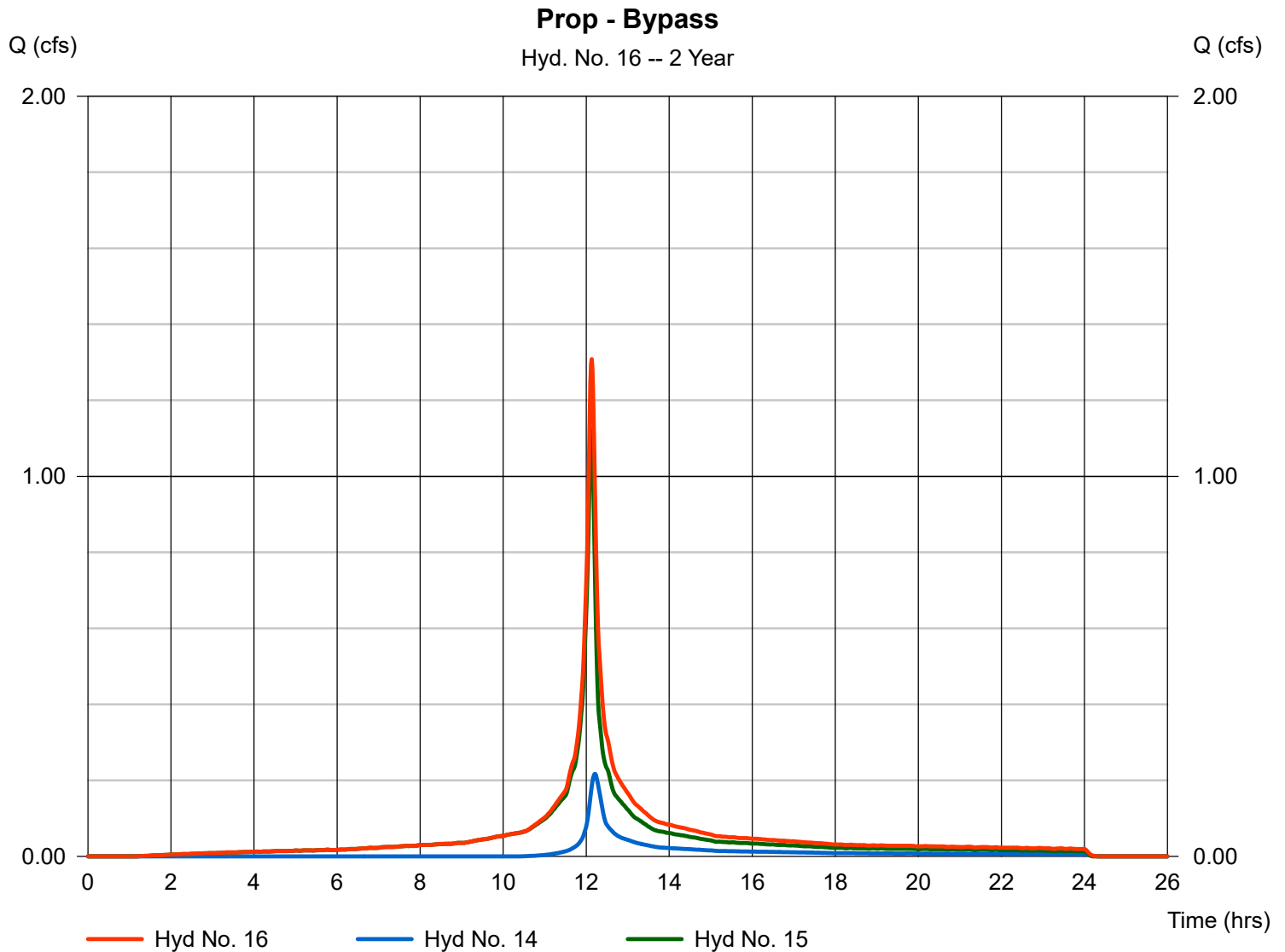
Monday, Nov 11, 2024

Hyd. No. 16

Prop - Bypass

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 14, 15

Peak discharge = 1.308 cfs
Time to peak = 12.13 hrs
Hyd. volume = 5,141 cuft
Contrib. drain. area = 0.599 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

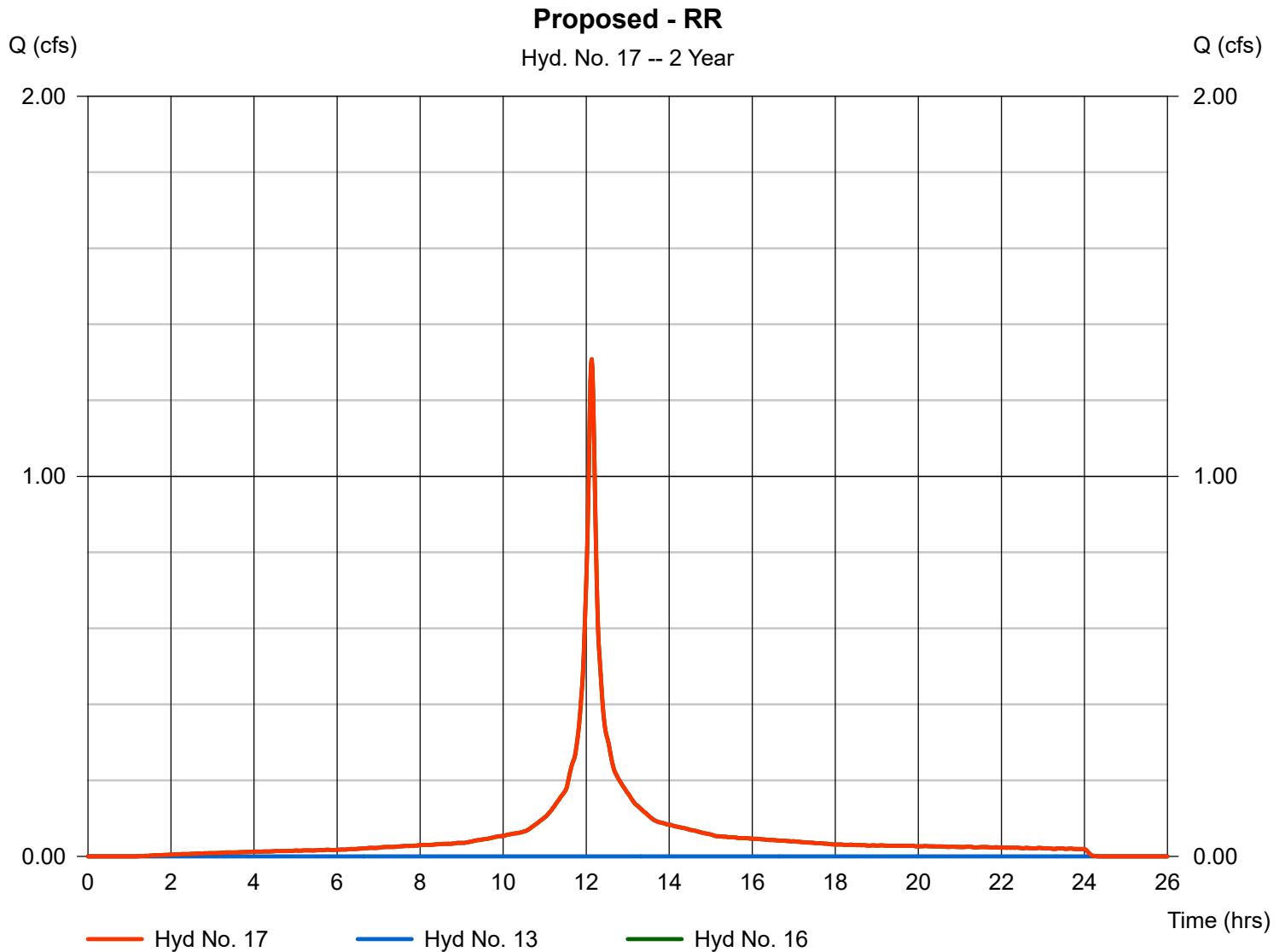
Monday, Nov 11, 2024

Hyd. No. 17

Proposed - RR

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 13, 16

Peak discharge = 1.308 cfs
Time to peak = 12.13 hrs
Hyd. volume = 5,141 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.167	1	729	581	-----	-----	-----	Exist - S. Broad (Perv)
2	SCS Runoff	1.867	1	726	6,061	-----	-----	-----	Exist - S. Broad (Gravel/Imperv)
3	Combine	2.016	1	726	6,642	1, 2	-----	-----	Existing - S. Broad
4	SCS Runoff	0.552	1	733	2,353	-----	-----	-----	Prop - S. Broad (Perv)
5	SCS Runoff	1.082	1	726	3,578	-----	-----	-----	Prop - S. Broad (Imperv)
6	Combine	1.480	1	726	5,931	4, 5	-----	-----	Proposed - S. Broad
7	SCS Runoff	0.265	1	728	863	-----	-----	-----	Exist - RR (Perv)
8	SCS Runoff	5.745	1	726	17,575	-----	-----	-----	Exist - RR (Gravel/Imperv)
9	Combine	5.995	1	726	18,439	7, 8	-----	-----	Existing - RR
10	SCS Runoff	0.076	1	726	208	-----	-----	-----	Prop - Basin (Perv)
11	SCS Runoff	3.123	1	726	10,327	-----	-----	-----	Prop - Basin (Imperv)
12	Combine	3.200	1	726	10,534	10, 11	-----	-----	Prop - Basin
13	Reservoir	0.046	1	1236	1,148	12	148.84	9,653	Basin Route
14	SCS Runoff	0.496	1	732	2,011	-----	-----	-----	Prop - Bypass (Perv)
15	SCS Runoff	1.755	1	727	6,719	-----	-----	-----	Prop - Bypass (Imperv)
16	Combine	2.187	1	728	8,730	14, 15	-----	-----	Prop - Bypass
17	Combine	2.187	1	728	9,878	13, 16	-----	-----	Proposed - RR
22-146(C).gpw					Return Period: 10 Year			Monday, Nov 11, 2024	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

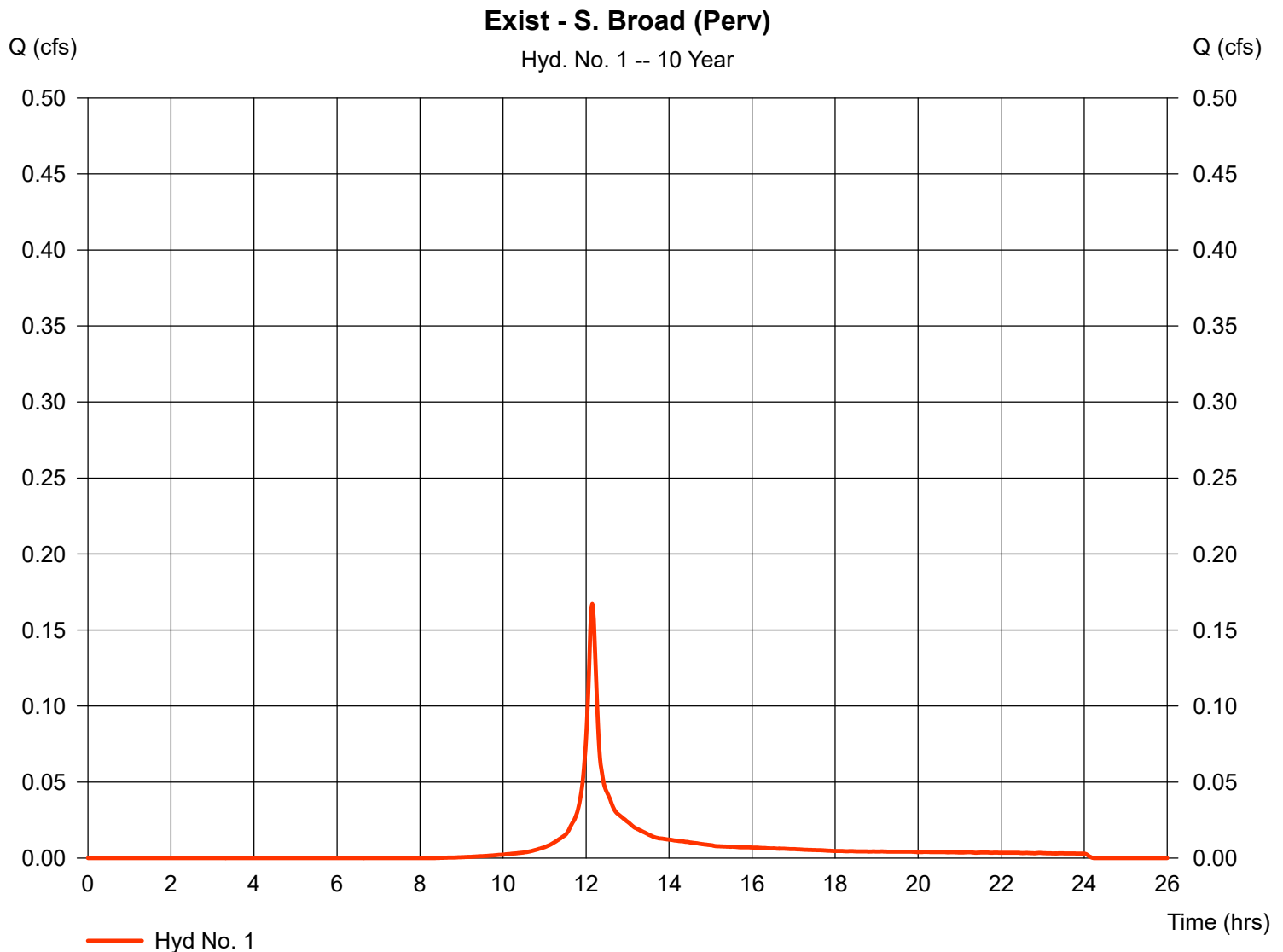
Monday, Nov 11, 2024

Hyd. No. 1

Exist - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.063 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.167 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 581 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.60 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 2

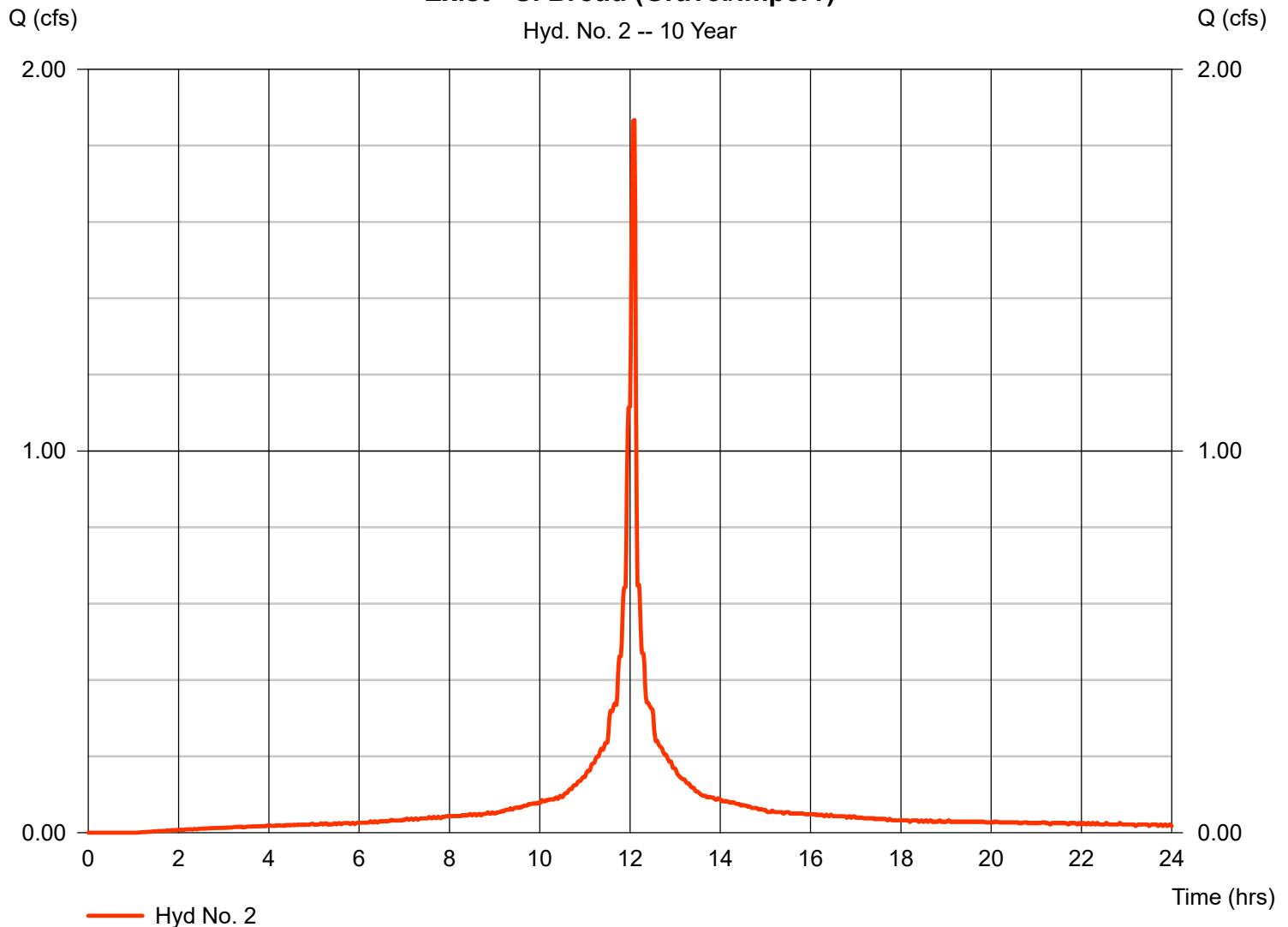
Exist - S. Broad (Gravel/Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.366 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.867 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 6,061 cuft
 Curve number = 97*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 1.60 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = [(0.028 x 89) + (0.338 x 98)] / 0.366

Exist - S. Broad (Gravel/Imperv)



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

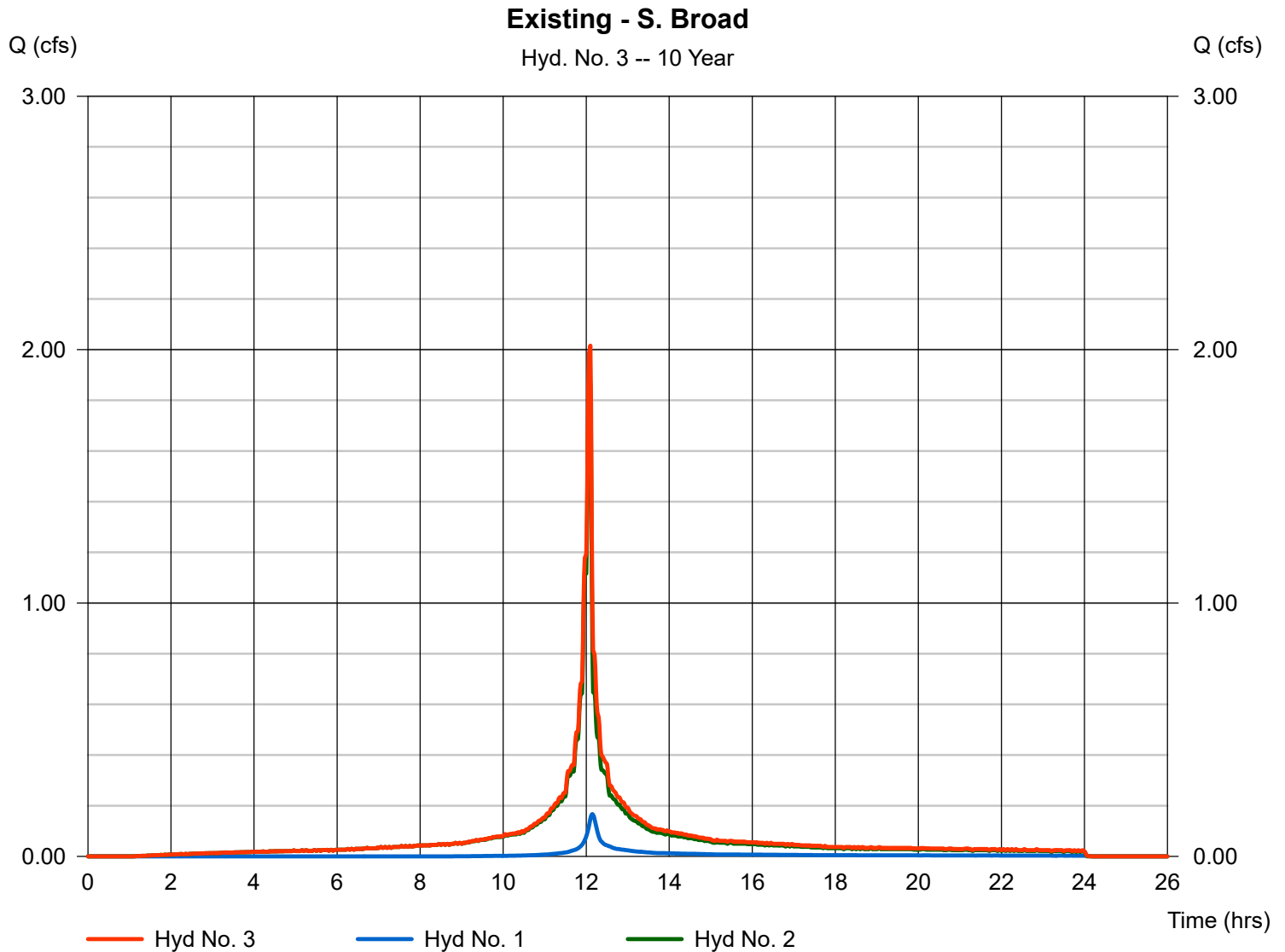
Monday, Nov 11, 2024

Hyd. No. 3

Existing - S. Broad

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

Peak discharge = 2.016 cfs
Time to peak = 12.10 hrs
Hyd. volume = 6,642 cuft
Contrib. drain. area = 0.429 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

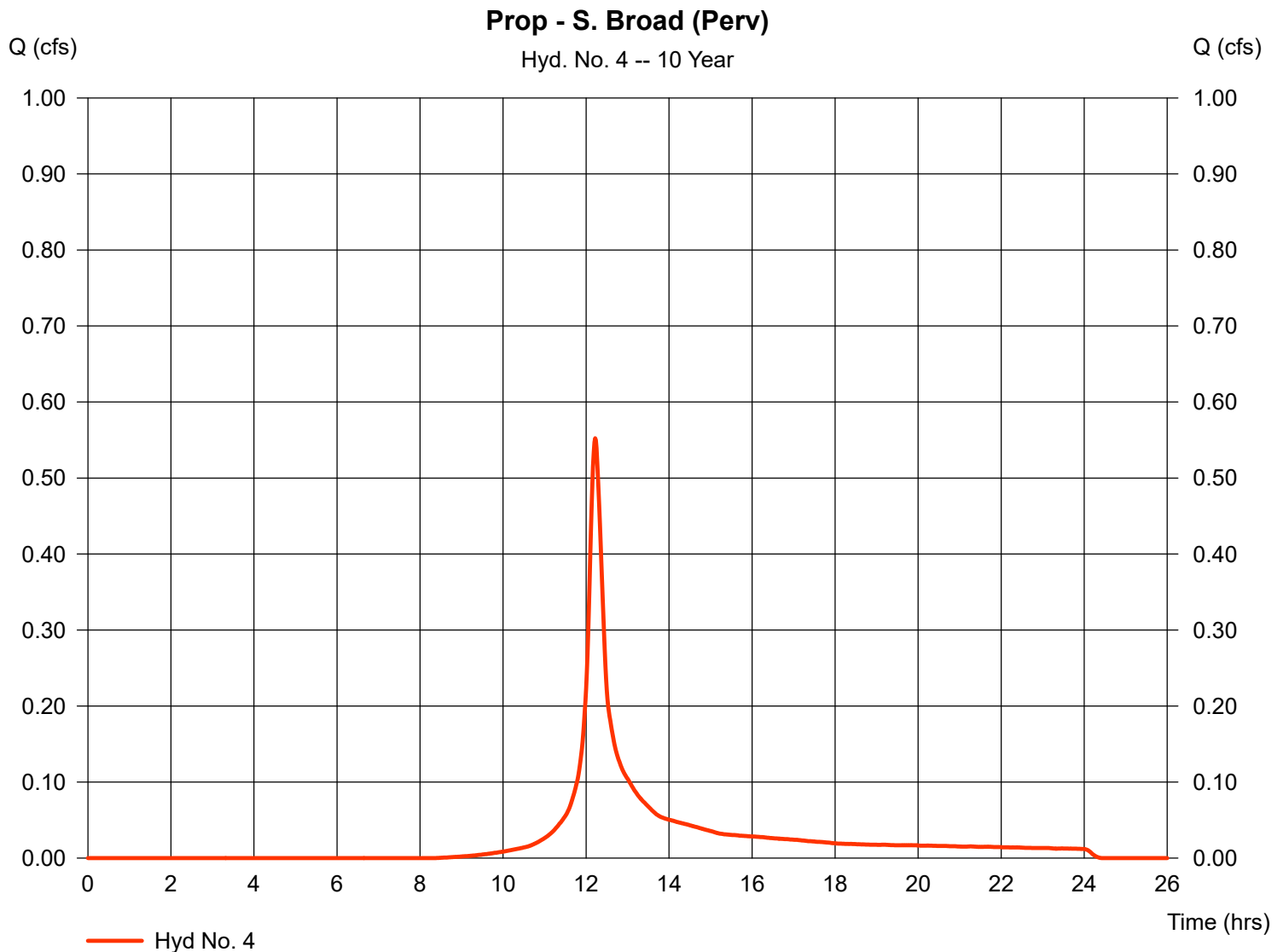
Monday, Nov 11, 2024

Hyd. No. 4

Prop - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.252 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.552 cfs
 Time to peak = 12.22 hrs
 Hyd. volume = 2,353 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.40 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

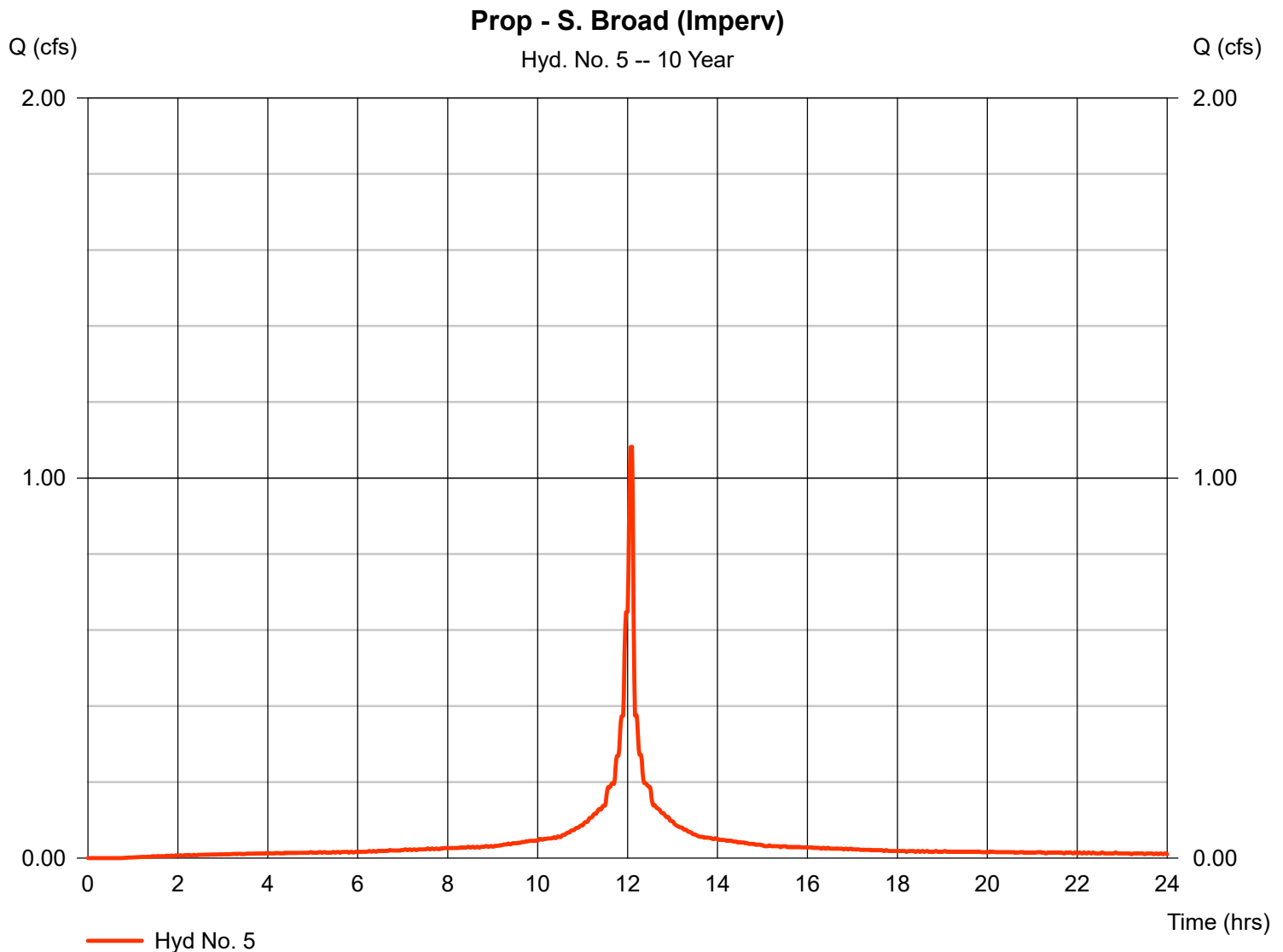
Monday, Nov 11, 2024

Hyd. No. 5

Prop - S. Broad (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.211 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.082 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 3,578 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

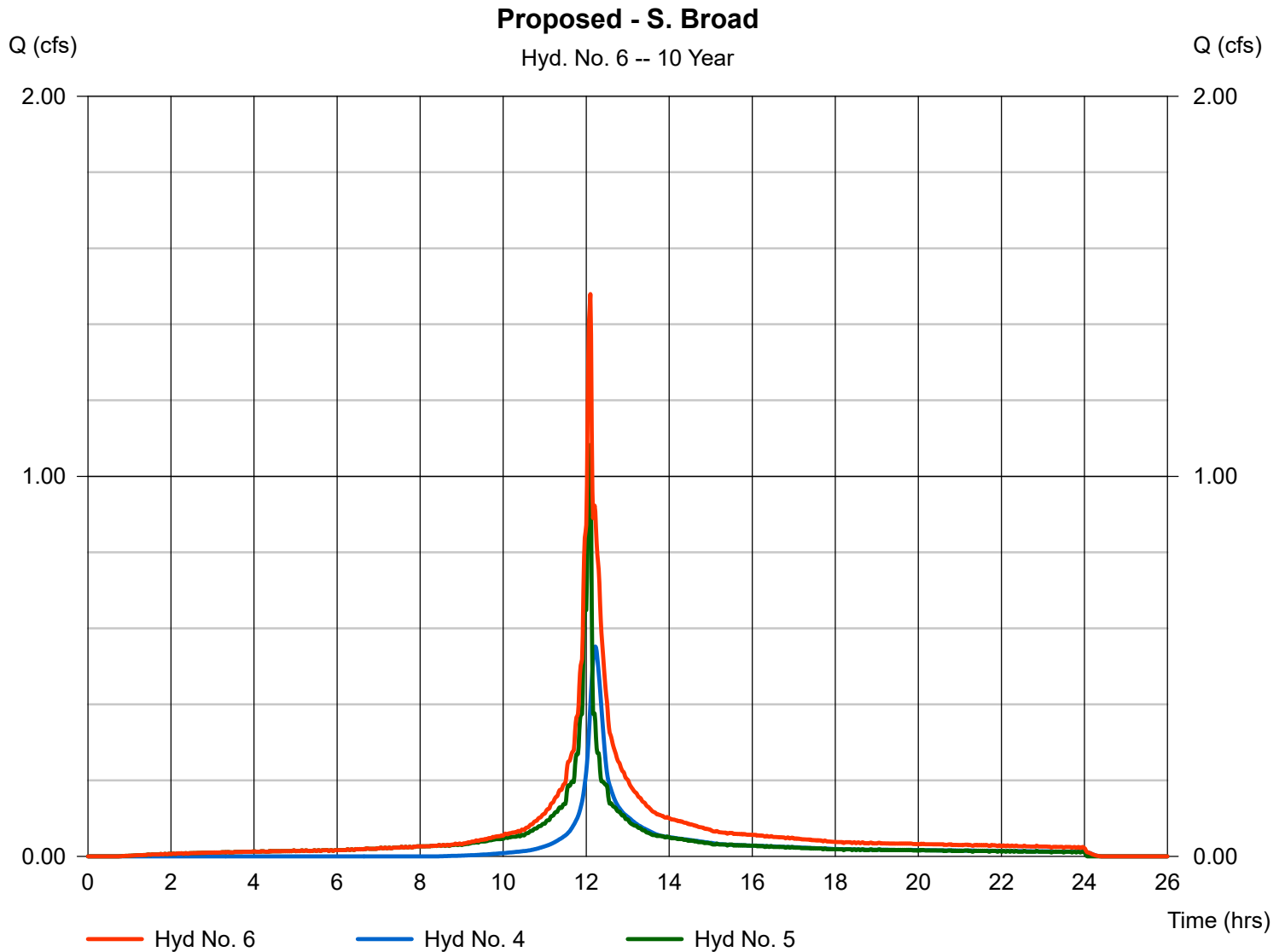
Monday, Nov 11, 2024

Hyd. No. 6

Proposed - S. Broad

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

Peak discharge = 1.480 cfs
Time to peak = 12.10 hrs
Hyd. volume = 5,931 cuft
Contrib. drain. area = 0.463 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

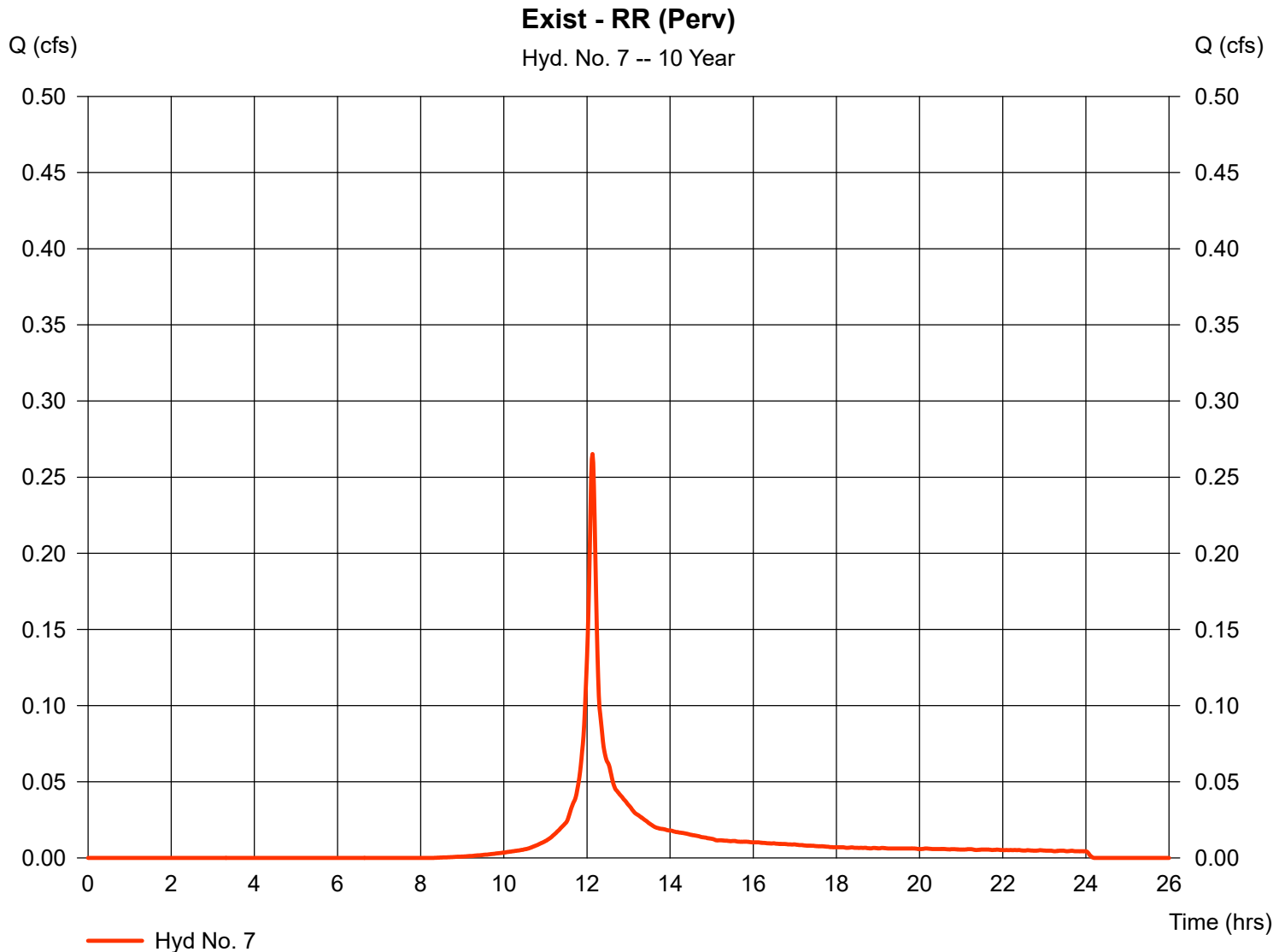
Monday, Nov 11, 2024

Hyd. No. 7

Exist - RR (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.096 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.265 cfs
 Time to peak = 12.13 hrs
 Hyd. volume = 863 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.30 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

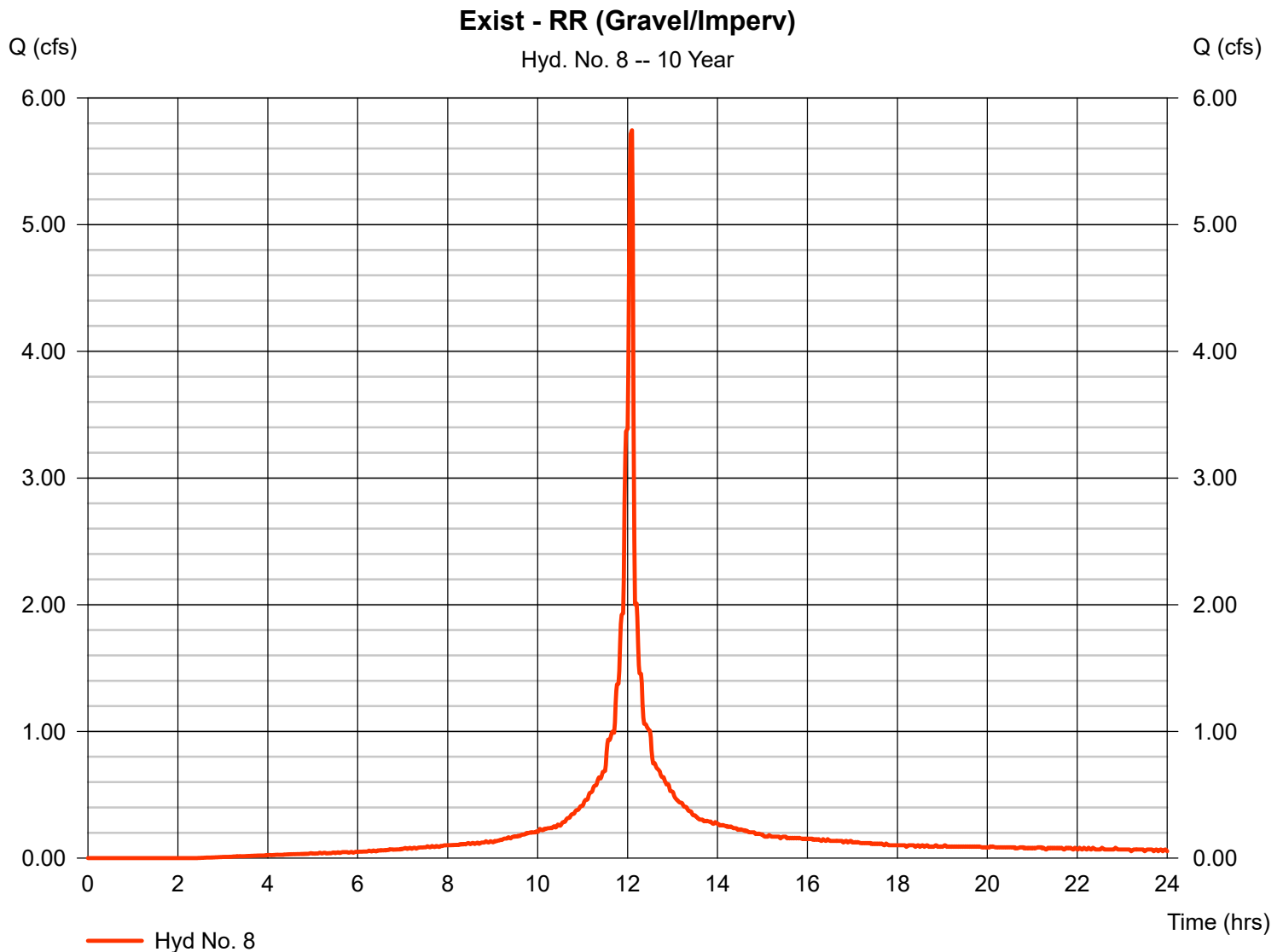
Monday, Nov 11, 2024

Hyd. No. 8

Exist - RR (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.745 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 17,575 cuft
Drainage area	= 1.170 ac	Curve number	= 93*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 5.22 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.667 x 89) + (0.503 x 98)] / 1.170



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

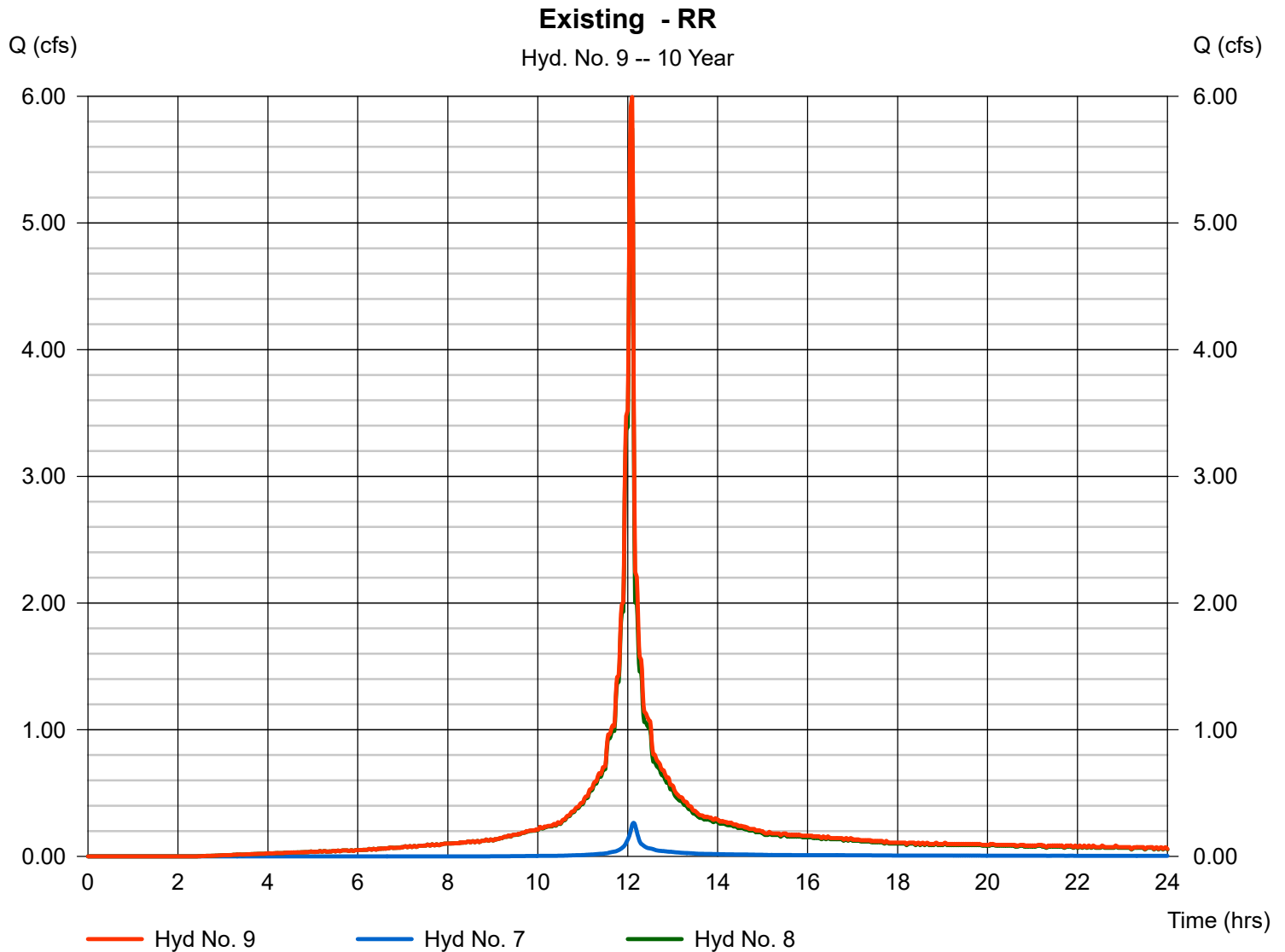
Monday, Nov 11, 2024

Hyd. No. 9

Existing - RR

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 7, 8

Peak discharge = 5.995 cfs
Time to peak = 12.10 hrs
Hyd. volume = 18,439 cuft
Contrib. drain. area = 1.266 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

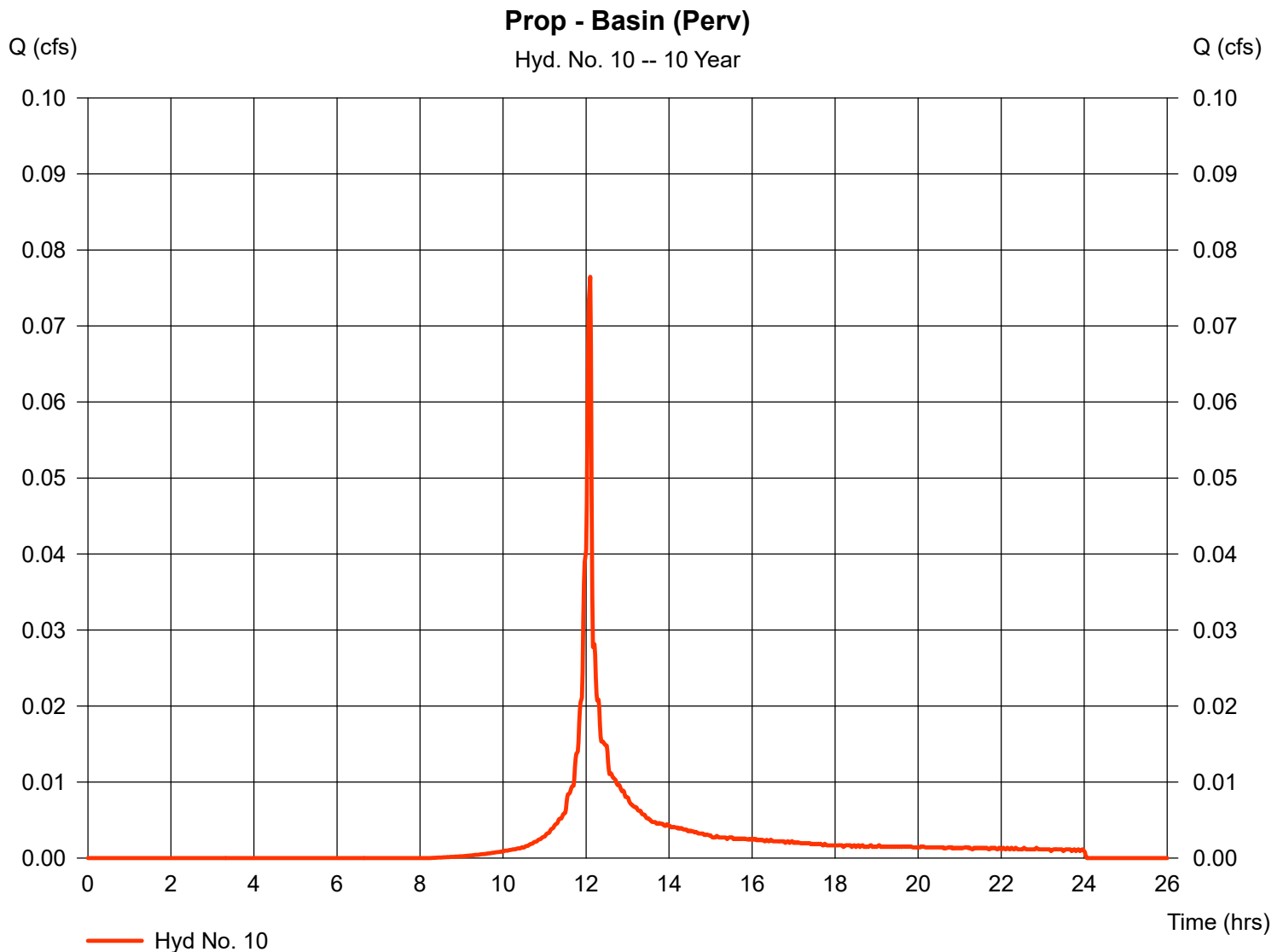
Monday, Nov 11, 2024

Hyd. No. 10

Prop - Basin (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.024 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.22 in
Storm duration = NOAA_D.cds

Peak discharge = 0.076 cfs
Time to peak = 12.10 hrs
Hyd. volume = 208 cuft
Curve number = 74
Hydraulic length = 0 ft
Time of conc. (Tc) = 3.10 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

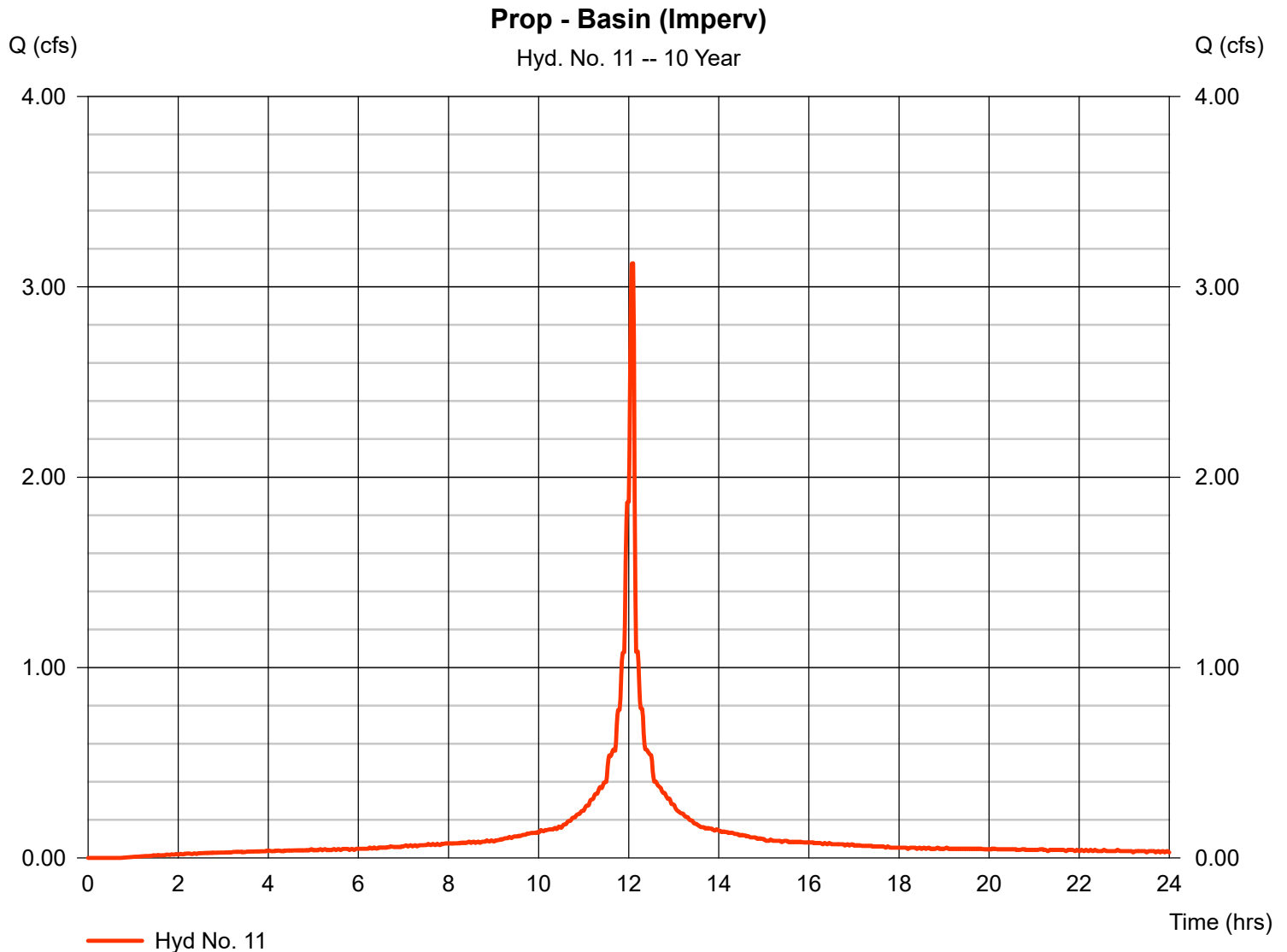
Monday, Nov 11, 2024

Hyd. No. 11

Prop - Basin (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.609 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 3.123 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 10,327 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

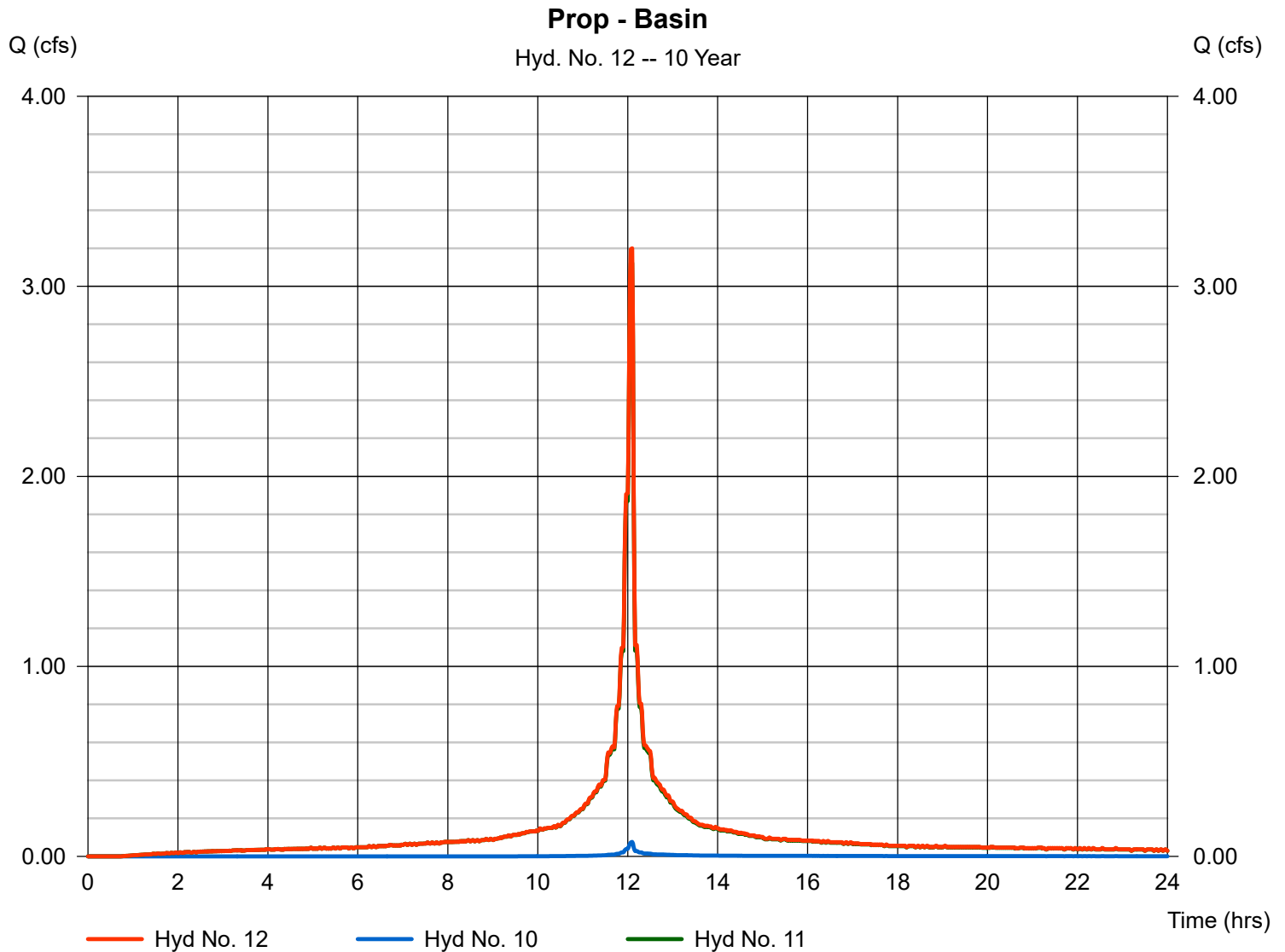
Monday, Nov 11, 2024

Hyd. No. 12

Prop - Basin

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

Peak discharge = 3.200 cfs
Time to peak = 12.10 hrs
Hyd. volume = 10,534 cuft
Contrib. drain. area = 0.633 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

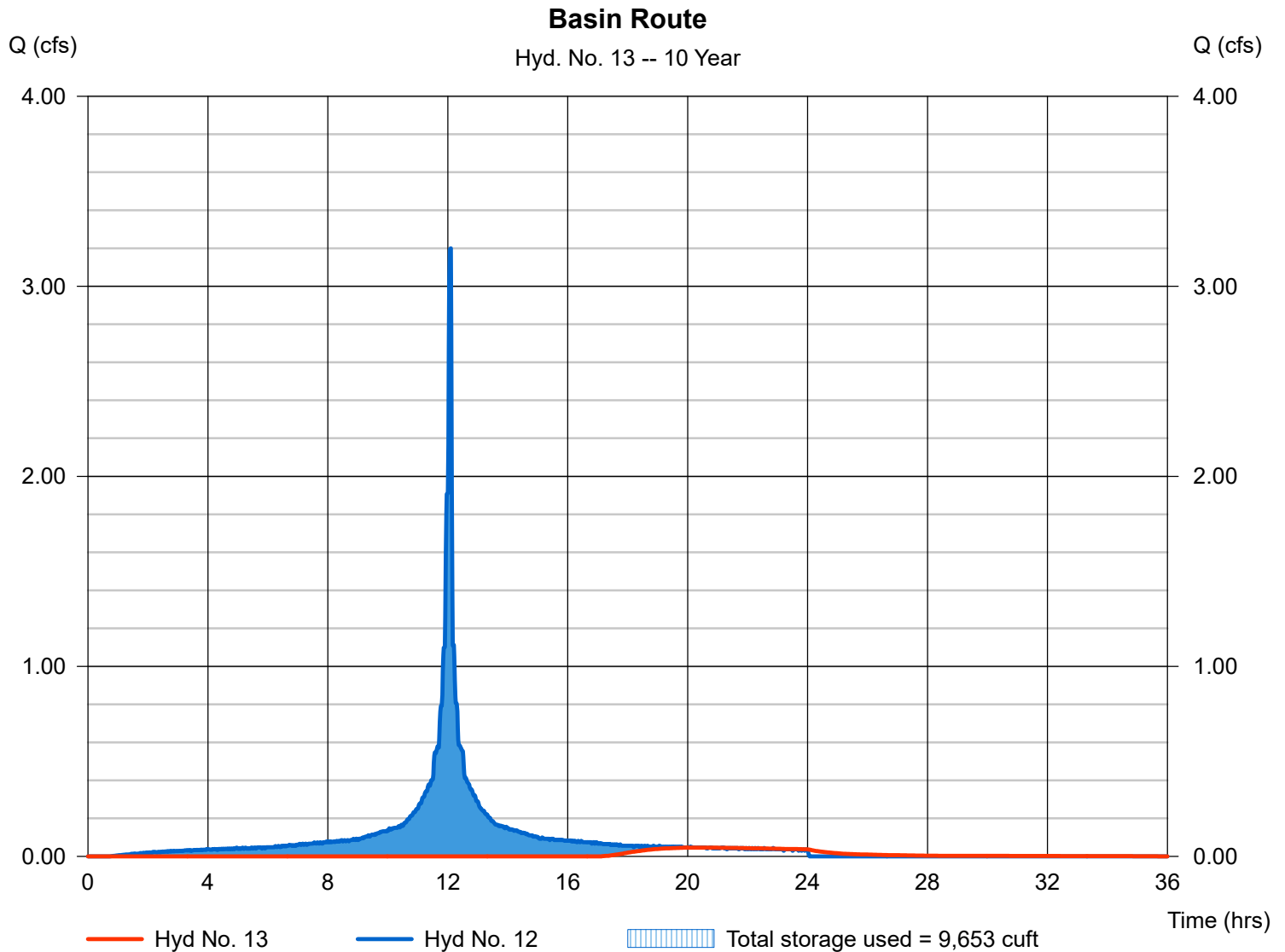
Hyd. No. 13

Basin Route

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyd. No. = 12 - Prop - Basin
Reservoir name = Basin

Peak discharge = 0.046 cfs
Time to peak = 20.60 hrs
Hyd. volume = 1,148 cuft
Max. Elevation = 148.84 ft
Max. Storage = 9,653 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

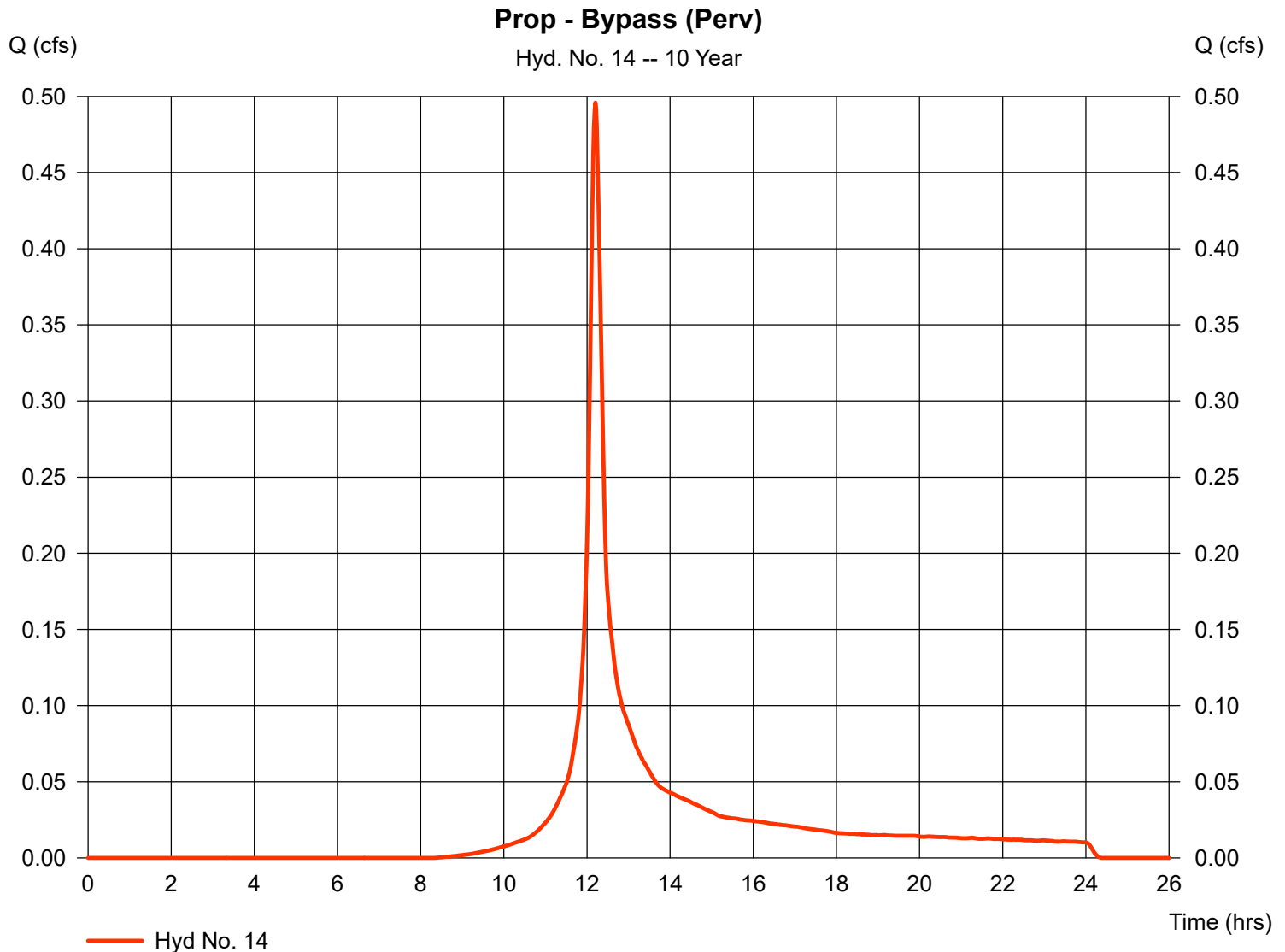
Hyd. No. 14

Prop - Bypass (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.218 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.496 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 2,011 cuft
 Curve number = 74*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.00 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = $[(0.161 \times 98) + (0.426 \times 98)] / 0.218$



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

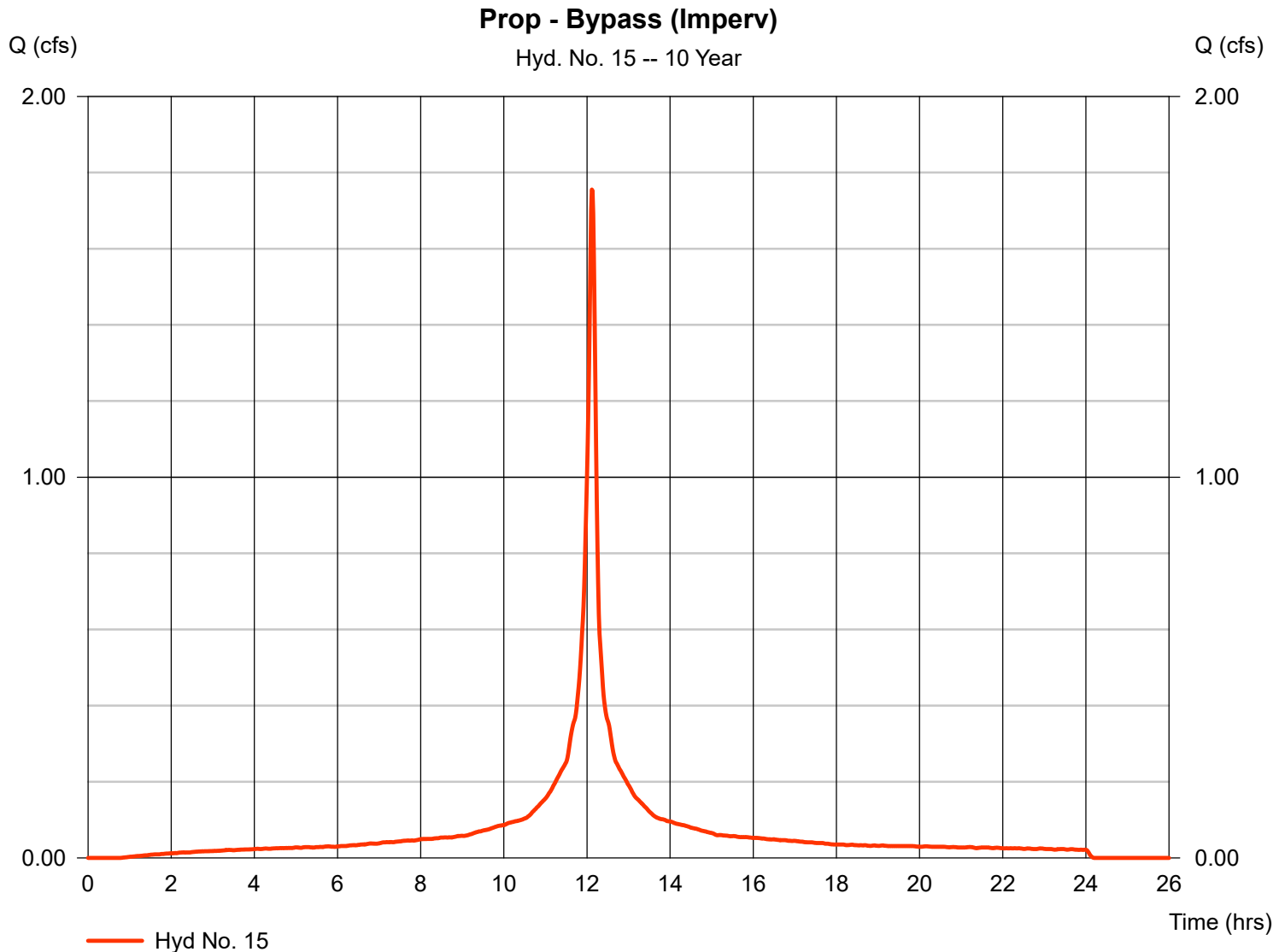
Monday, Nov 11, 2024

Hyd. No. 15

Prop - Bypass (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.381 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.22 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.755 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 6,719 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 6.90 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

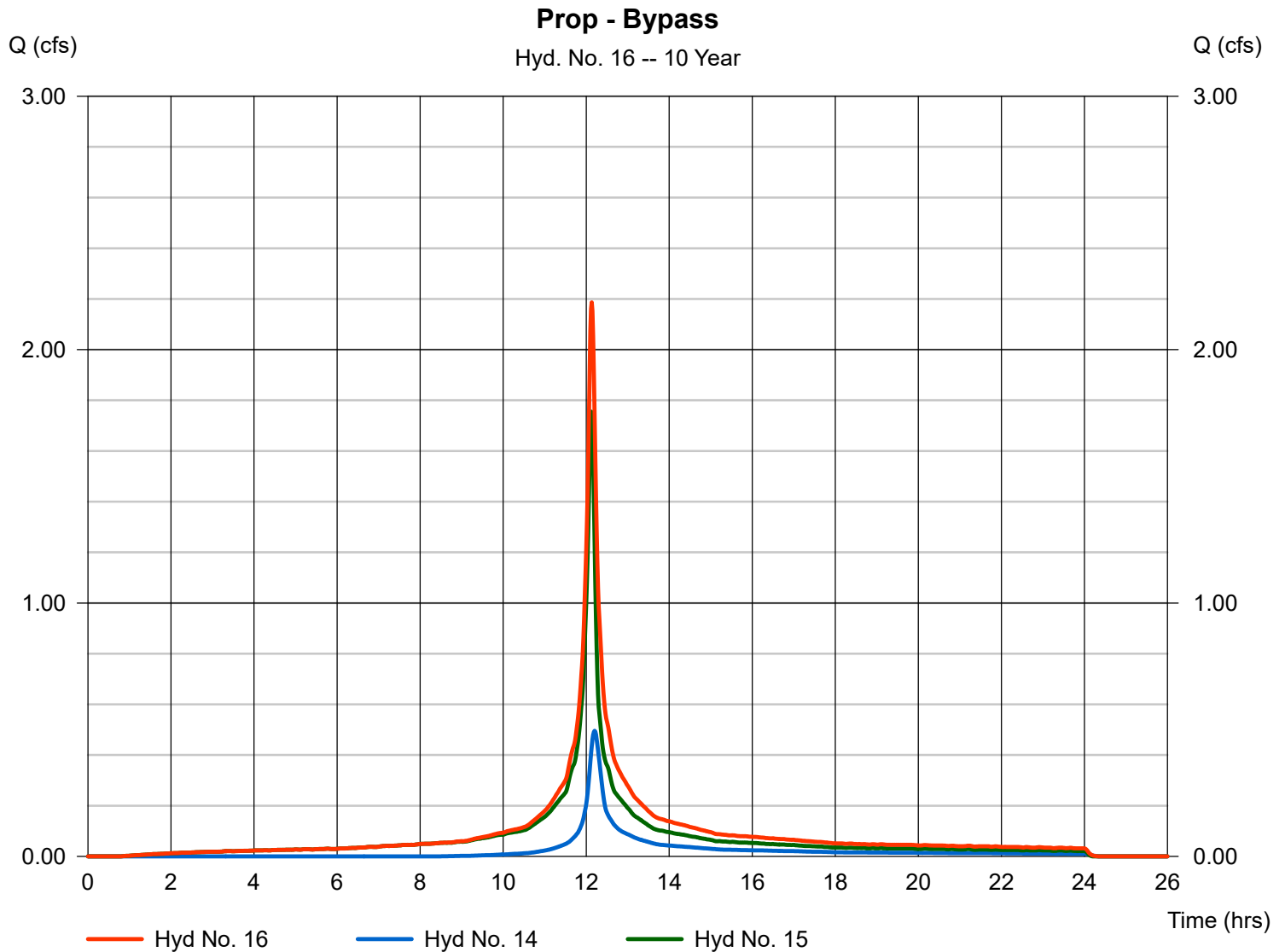
Monday, Nov 11, 2024

Hyd. No. 16

Prop - Bypass

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 14, 15

Peak discharge = 2.187 cfs
Time to peak = 12.13 hrs
Hyd. volume = 8,730 cuft
Contrib. drain. area = 0.599 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

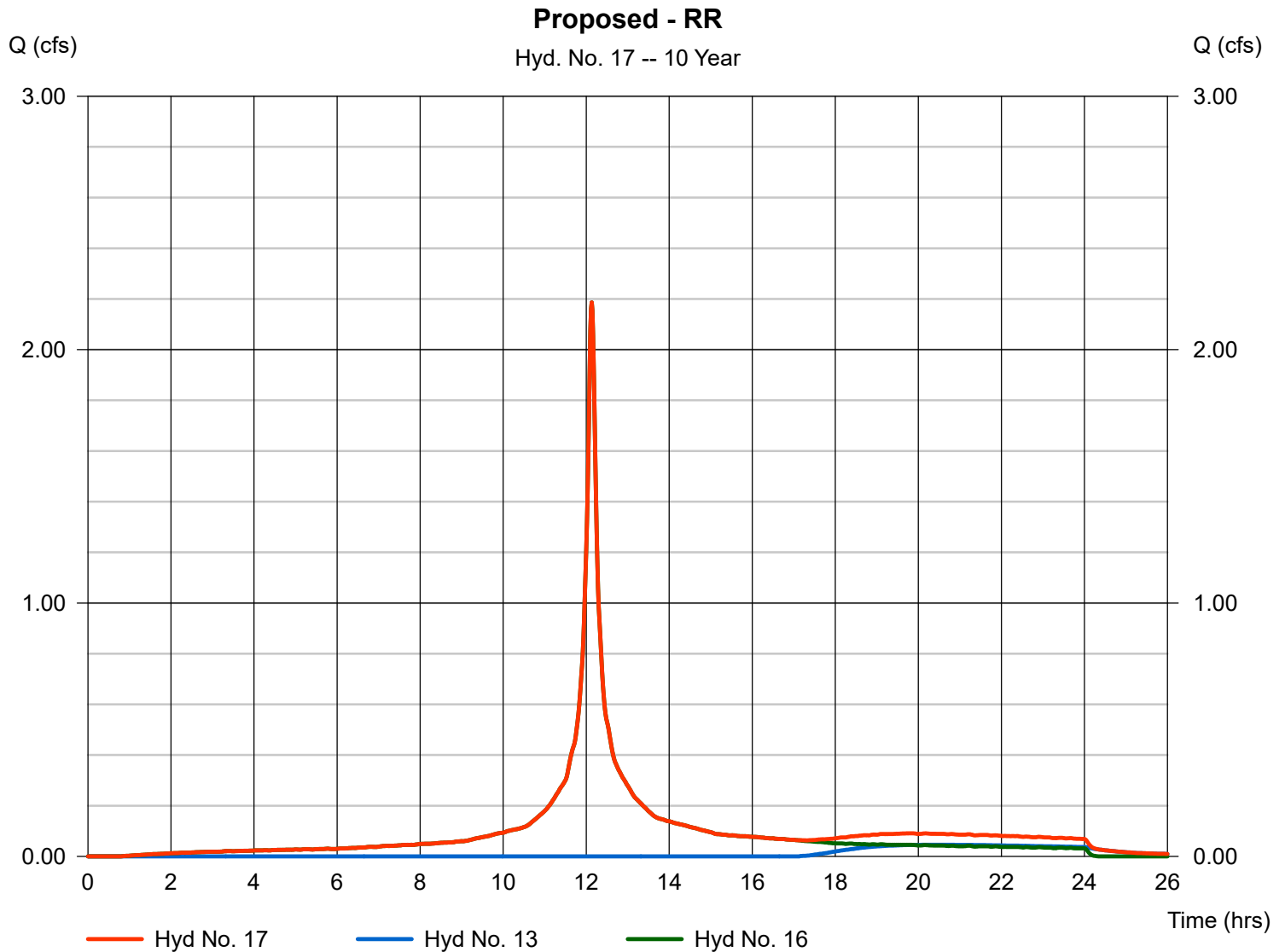
Monday, Nov 11, 2024

Hyd. No. 17

Proposed - RR

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 13, 16

Peak discharge = 2.187 cfs
Time to peak = 12.13 hrs
Hyd. volume = 9,878 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description	
1	SCS Runoff	0.377	1	729	1,329	-----	-----	-----	Exist - S. Broad (Perv)	
2	SCS Runoff	3.232	1	726	10,736	-----	-----	-----	Exist - S. Broad (Gravel/Imperv)	
3	Combine	3.574	1	726	12,065	1, 2	-----	-----	Existing - S. Broad	
4	SCS Runoff	1.253	1	733	5,382	-----	-----	-----	Prop - S. Broad (Perv)	
5	SCS Runoff	1.867	1	726	6,276	-----	-----	-----	Prop - S. Broad (Imperv)	
6	Combine	2.807	1	726	11,657	4, 5	-----	-----	Proposed - S. Broad	
7	SCS Runoff	0.596	1	728	1,974	-----	-----	-----	Exist - RR (Perv)	
8	SCS Runoff	10.18	1	726	32,394	-----	-----	-----	Exist - RR (Gravel/Imperv)	
9	Combine	10.75	1	726	34,369	7, 8	-----	-----	Existing - RR	
10	SCS Runoff	0.169	1	726	475	-----	-----	-----	Prop - Basin (Perv)	
11	SCS Runoff	5.389	1	726	18,113	-----	-----	-----	Prop - Basin (Imperv)	
12	Combine	5.558	1	726	18,588	10, 11	-----	-----	Prop - Basin	
13	Reservoir	1.311	1	739	9,201	12	149.30	10,905	Basin Route	
14	SCS Runoff	1.123	1	732	4,598	-----	-----	-----	Prop - Bypass (Perv)	
15	SCS Runoff	3.030	1	727	11,785	-----	-----	-----	Prop - Bypass (Imperv)	
16	Combine	4.030	1	728	16,383	14, 15	-----	-----	Prop - Bypass	
17	Combine	4.803	1	729	25,584	13, 16	-----	-----	Proposed - RR	
22-146(C).gpw					Return Period: 100 Year			Monday, Nov 11, 2024		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

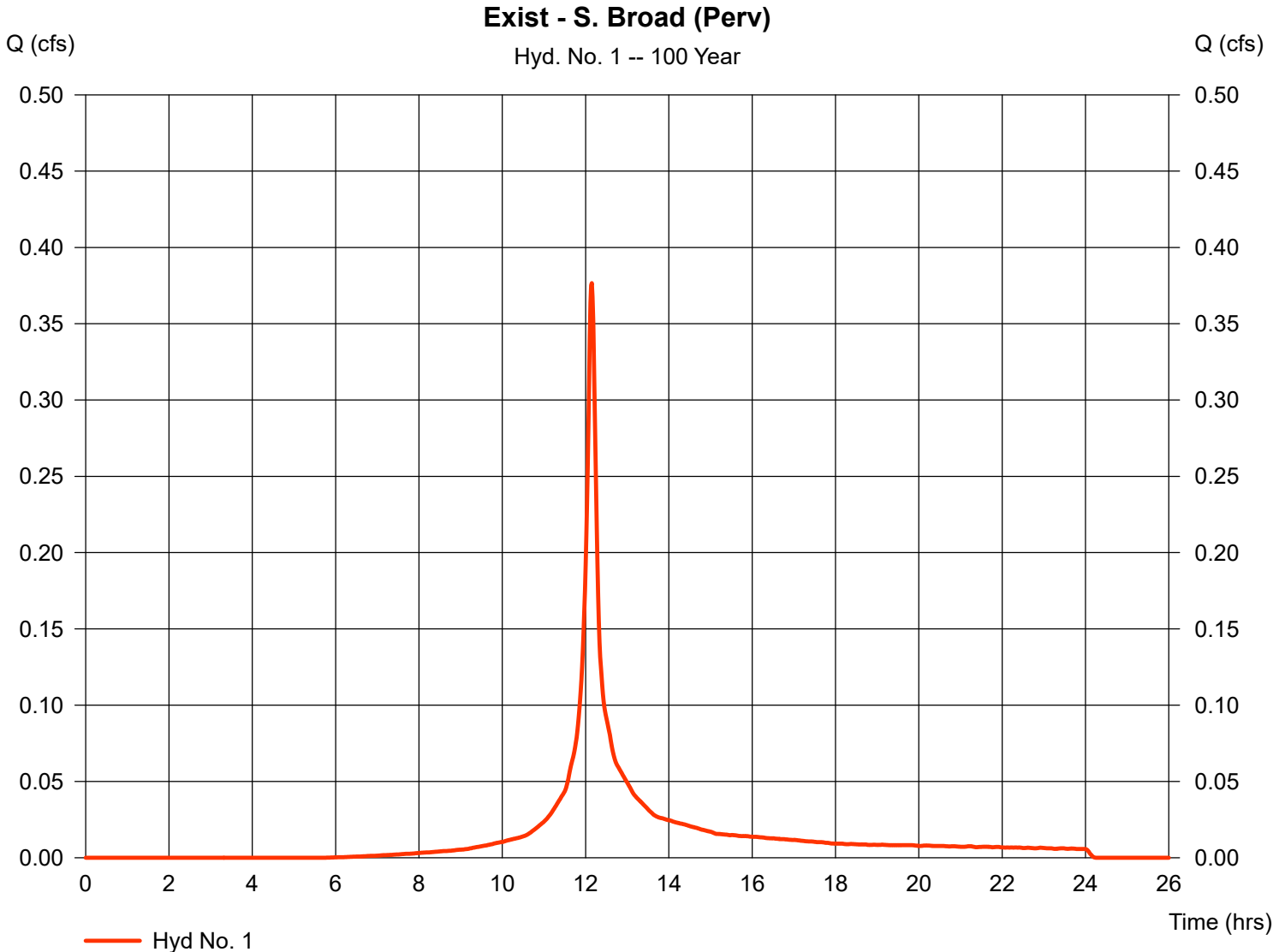
Monday, Nov 11, 2024

Hyd. No. 1

Exist - S. Broad (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.063 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 8.98 in
Storm duration = NOAA_D.cds

Peak discharge = 0.377 cfs
Time to peak = 12.15 hrs
Hyd. volume = 1,329 cuft
Curve number = 74
Hydraulic length = 0 ft
Time of conc. (Tc) = 8.60 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

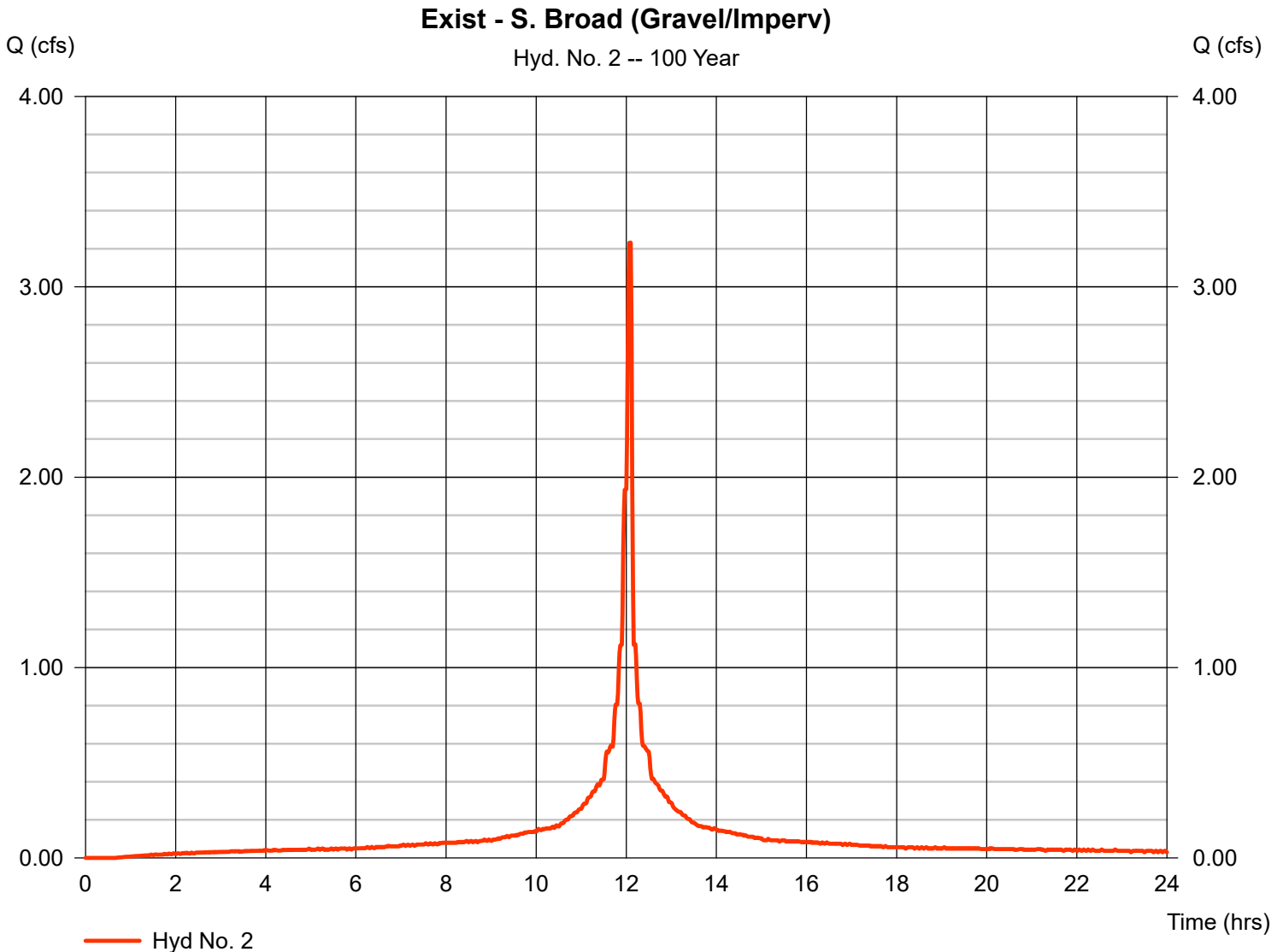
Monday, Nov 11, 2024

Hyd. No. 2

Exist - S. Broad (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.232 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 10,736 cuft
Drainage area	= 0.366 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.98 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.028 x 89) + (0.338 x 98)] / 0.366



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

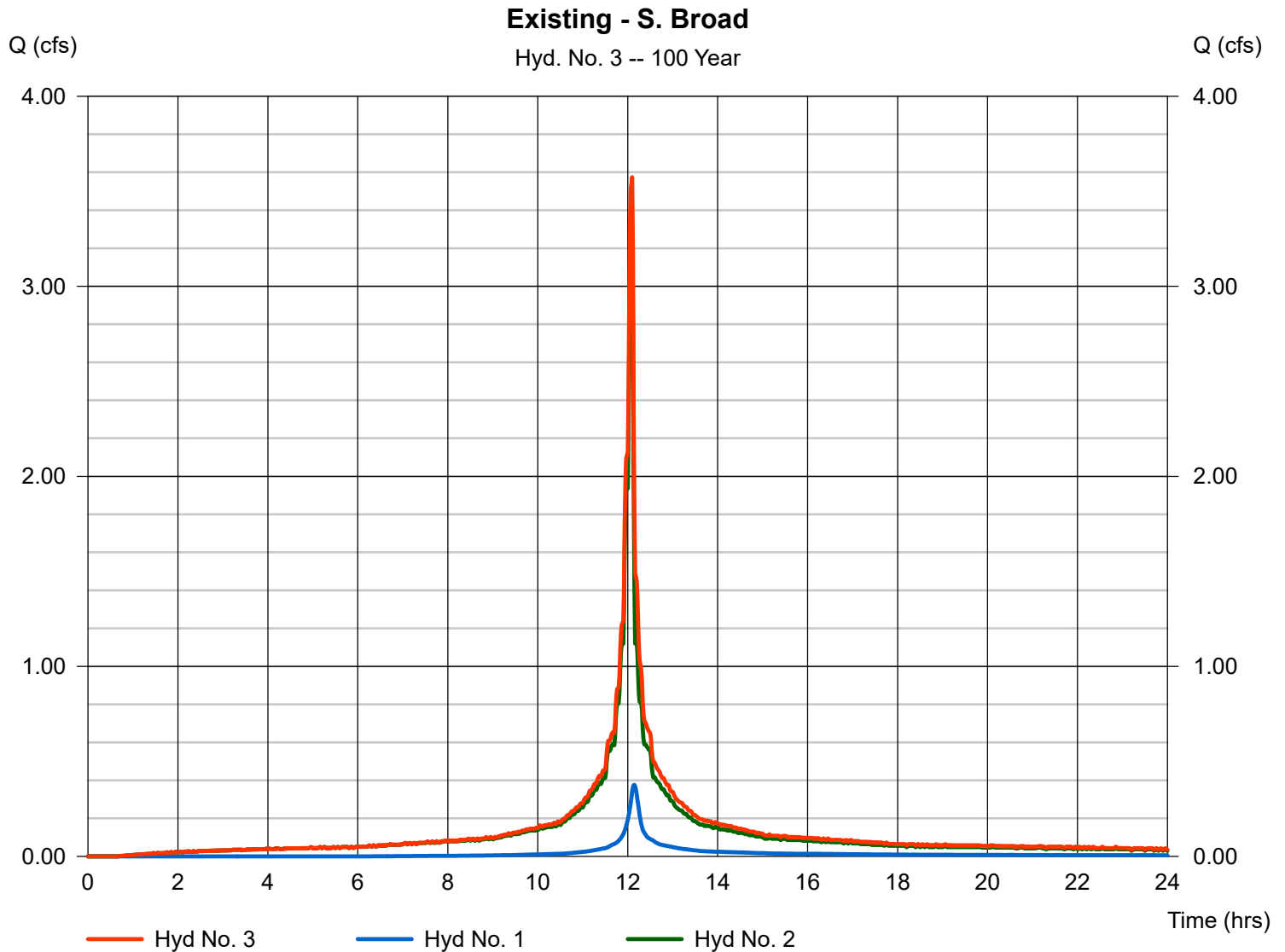
Monday, Nov 11, 2024

Hyd. No. 3

Existing - S. Broad

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 1, 2

Peak discharge = 3.574 cfs
Time to peak = 12.10 hrs
Hyd. volume = 12,065 cuft
Contrib. drain. area = 0.429 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

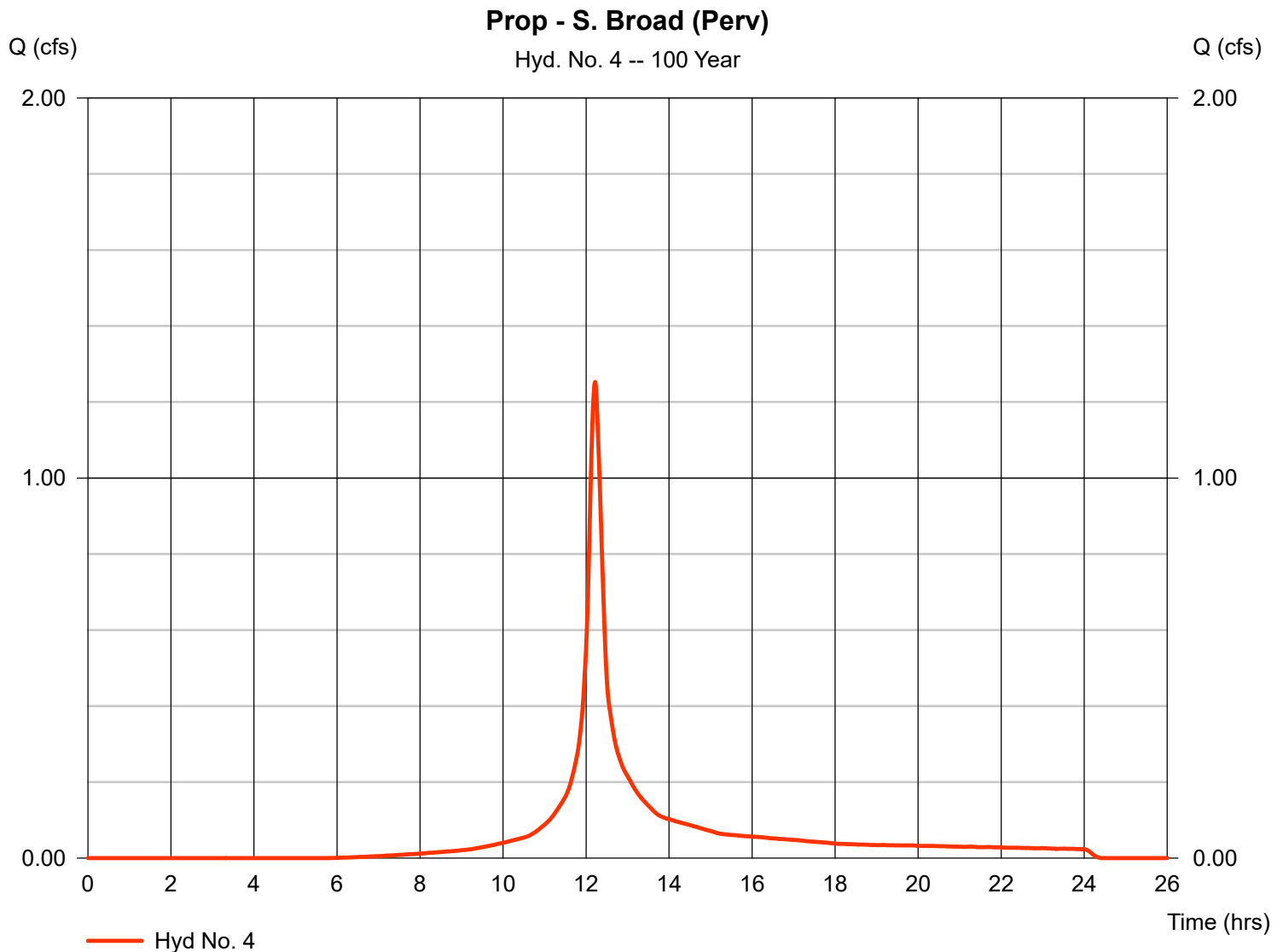
Monday, Nov 11, 2024

Hyd. No. 4

Prop - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.252 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.98 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.253 cfs
 Time to peak = 12.22 hrs
 Hyd. volume = 5,382 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.40 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

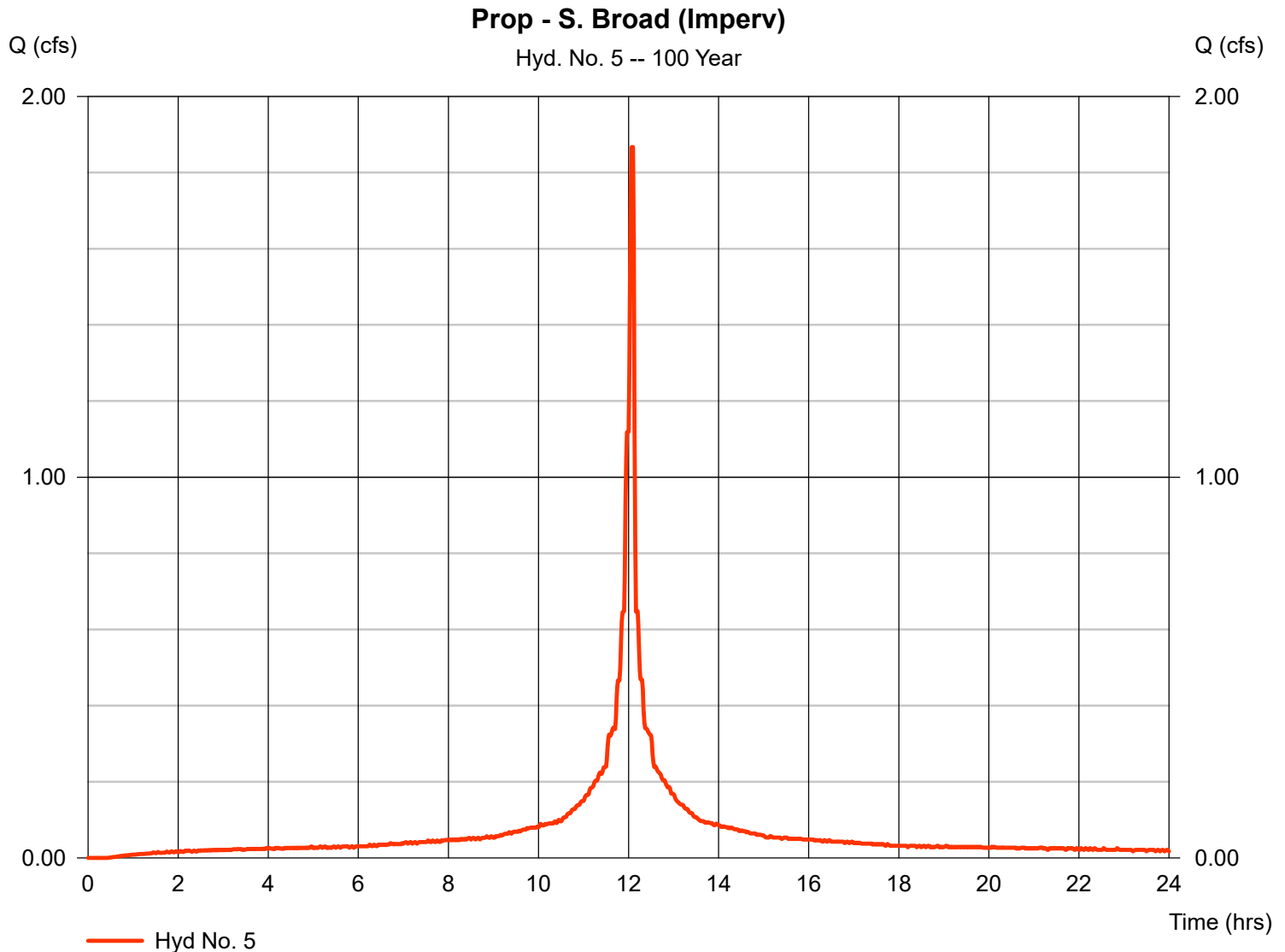
Monday, Nov 11, 2024

Hyd. No. 5

Prop - S. Broad (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.211 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.98 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.867 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 6,276 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

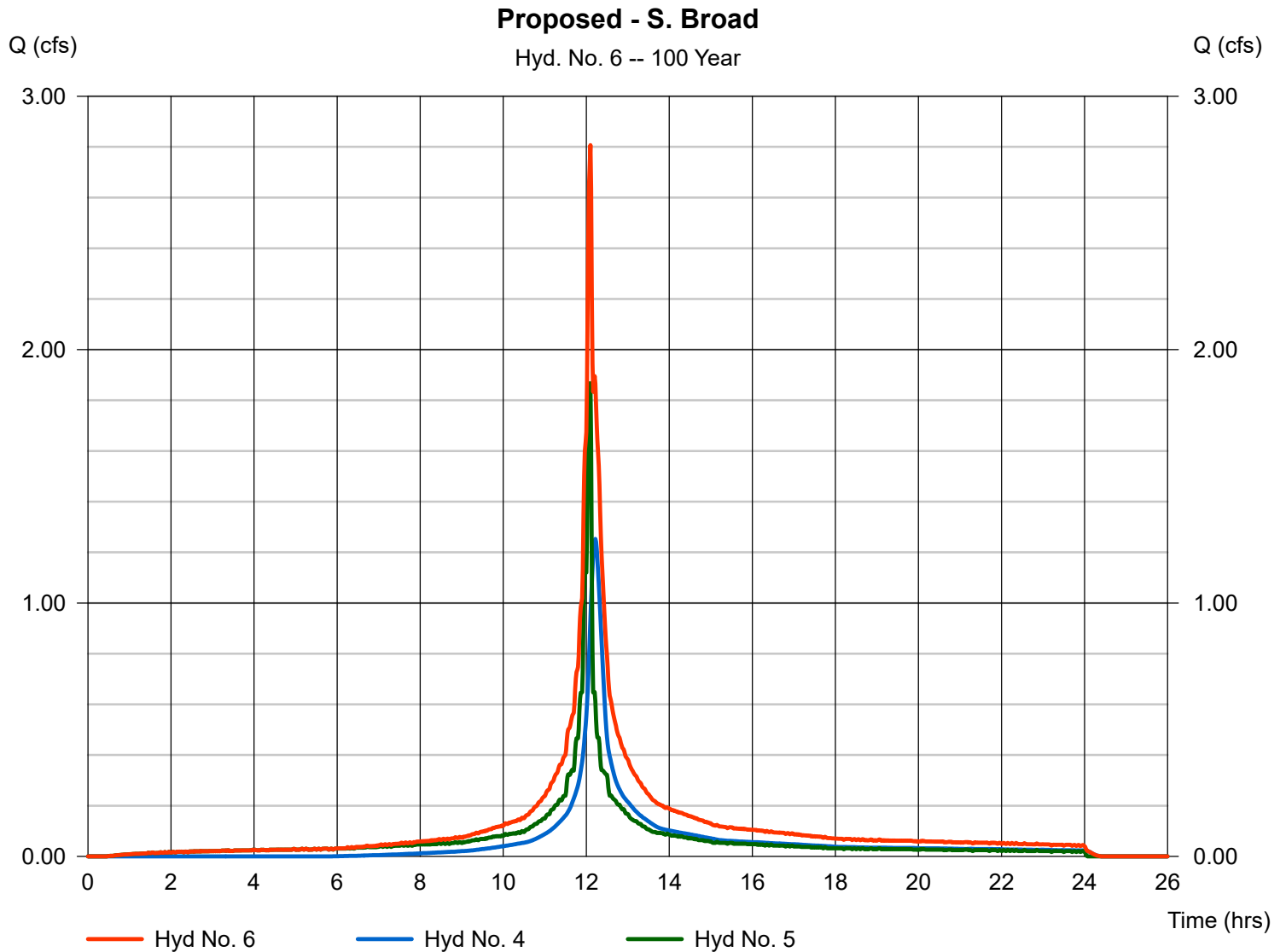
Monday, Nov 11, 2024

Hyd. No. 6

Proposed - S. Broad

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 4, 5

Peak discharge = 2.807 cfs
Time to peak = 12.10 hrs
Hyd. volume = 11,657 cuft
Contrib. drain. area = 0.463 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

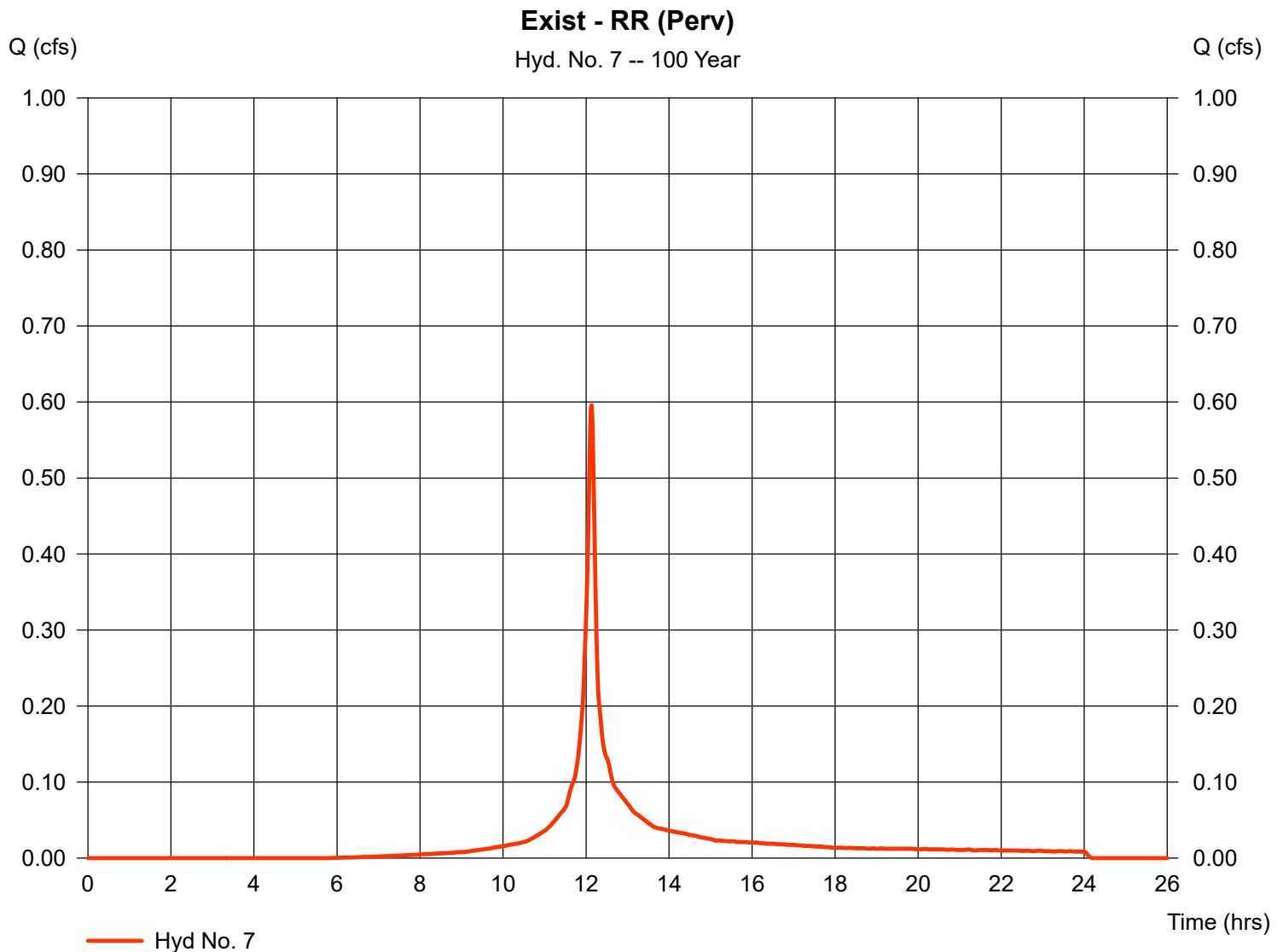
Monday, Nov 11, 2024

Hyd. No. 7

Exist - RR (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.096 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.98 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.596 cfs
 Time to peak = 12.13 hrs
 Hyd. volume = 1,974 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.30 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

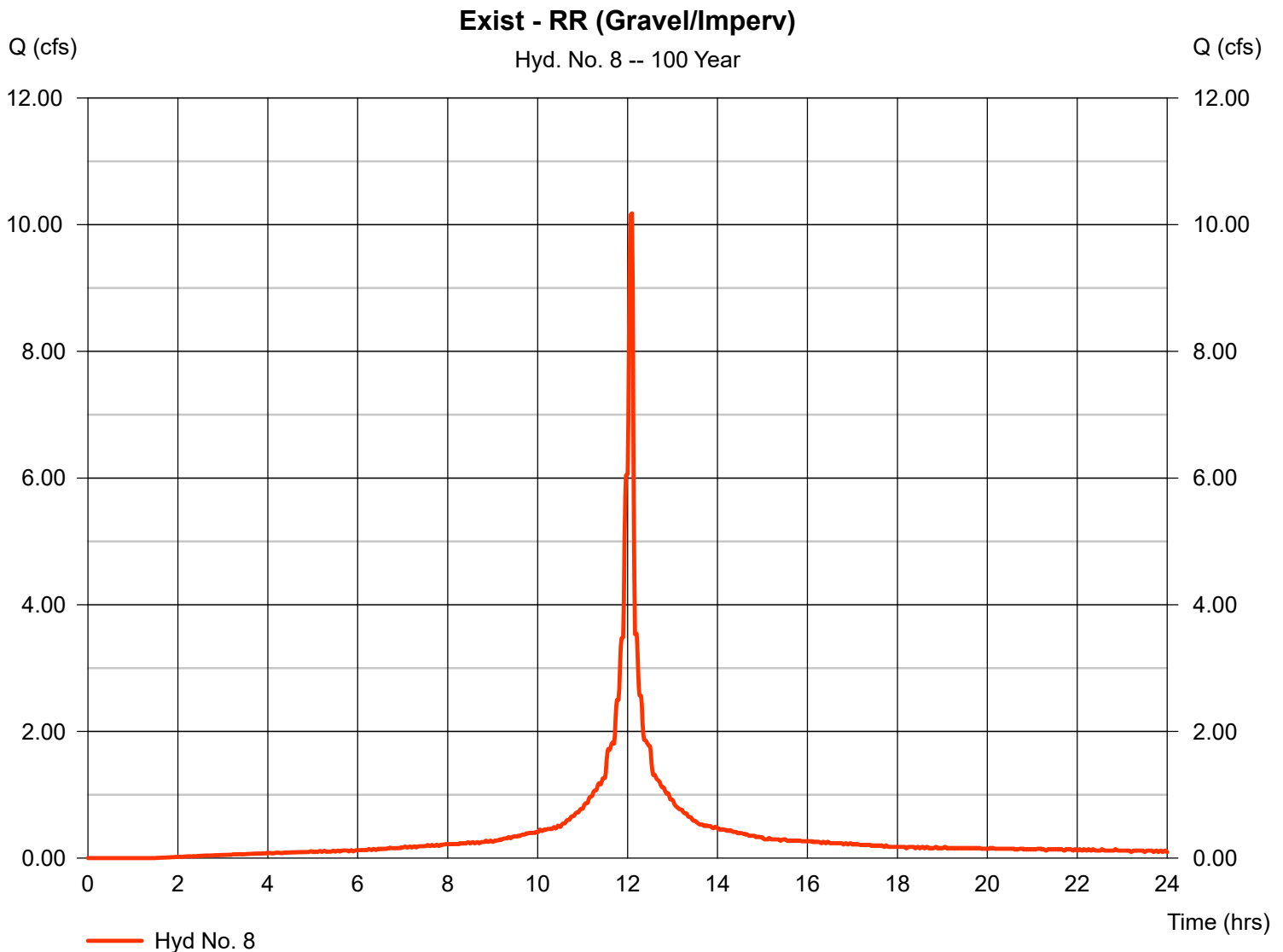
Monday, Nov 11, 2024

Hyd. No. 8

Exist - RR (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 10.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 32,394 cuft
Drainage area	= 1.170 ac	Curve number	= 93*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 8.98 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.667 x 89) + (0.503 x 98)] / 1.170



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

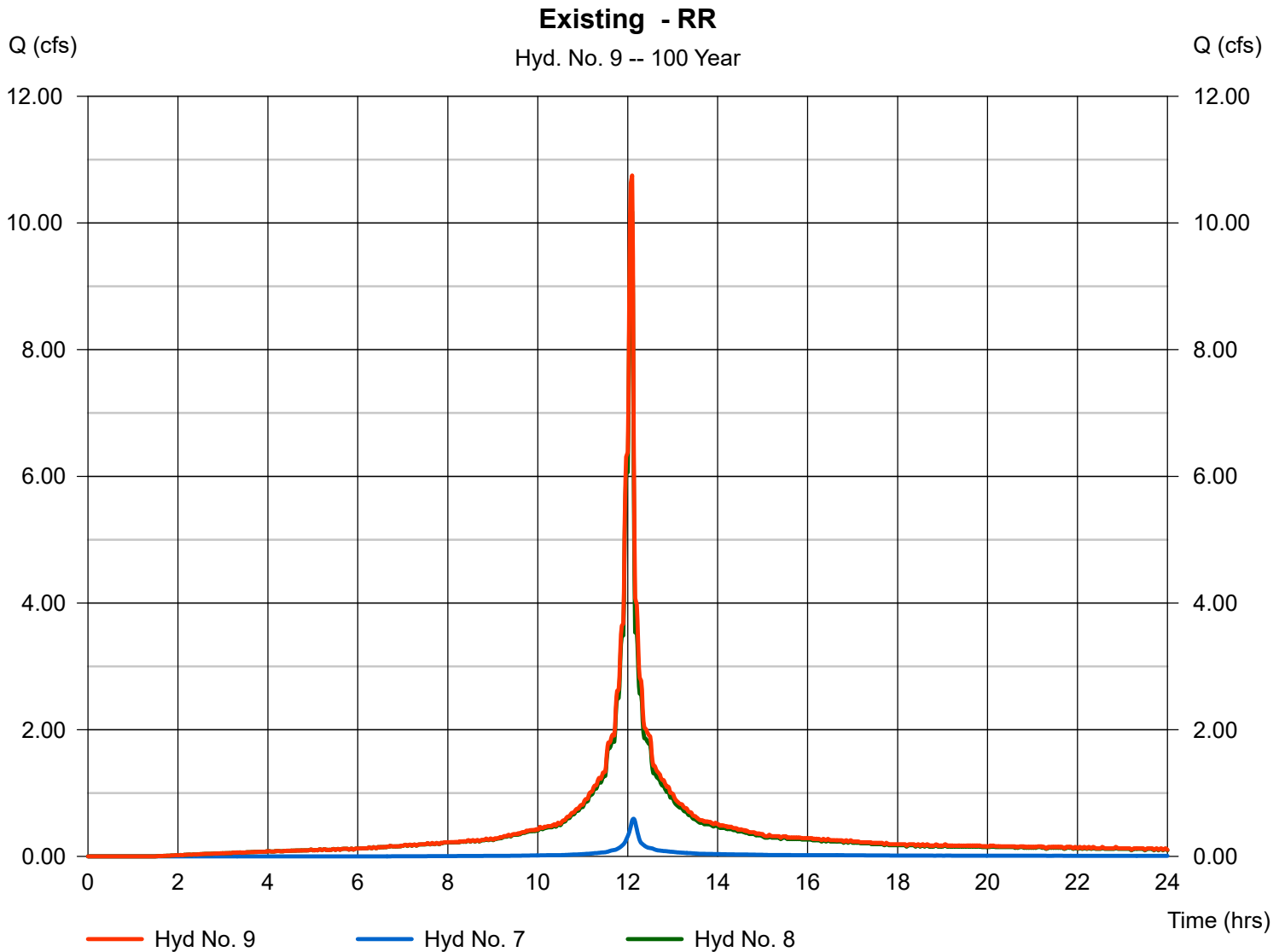
Monday, Nov 11, 2024

Hyd. No. 9

Existing - RR

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 7, 8

Peak discharge = 10.75 cfs
Time to peak = 12.10 hrs
Hyd. volume = 34,369 cuft
Contrib. drain. area = 1.266 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

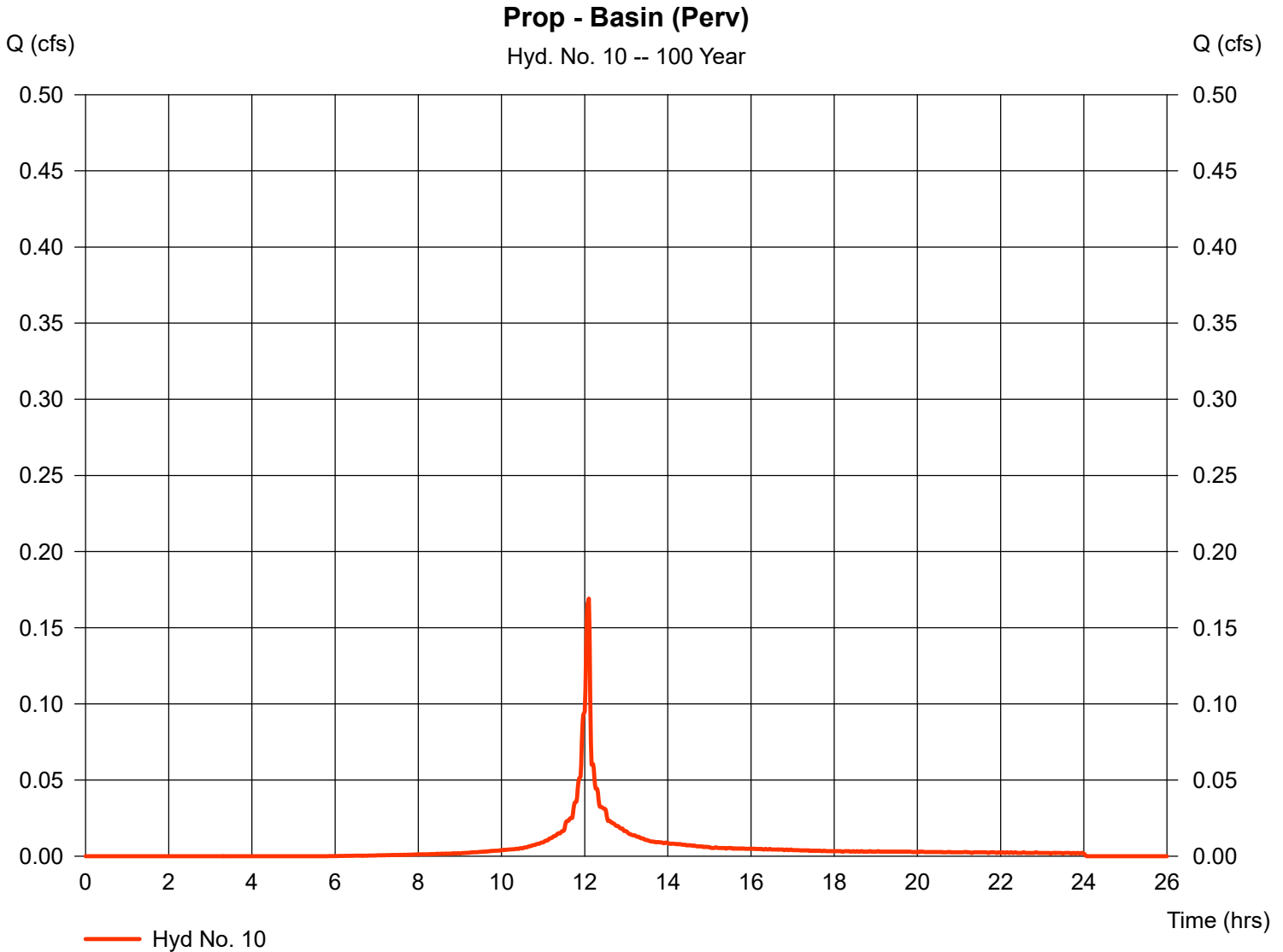
Monday, Nov 11, 2024

Hyd. No. 10

Prop - Basin (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.024 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 8.98 in
Storm duration = NOAA_D.cds

Peak discharge = 0.169 cfs
Time to peak = 12.10 hrs
Hyd. volume = 475 cuft
Curve number = 74
Hydraulic length = 0 ft
Time of conc. (Tc) = 3.10 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

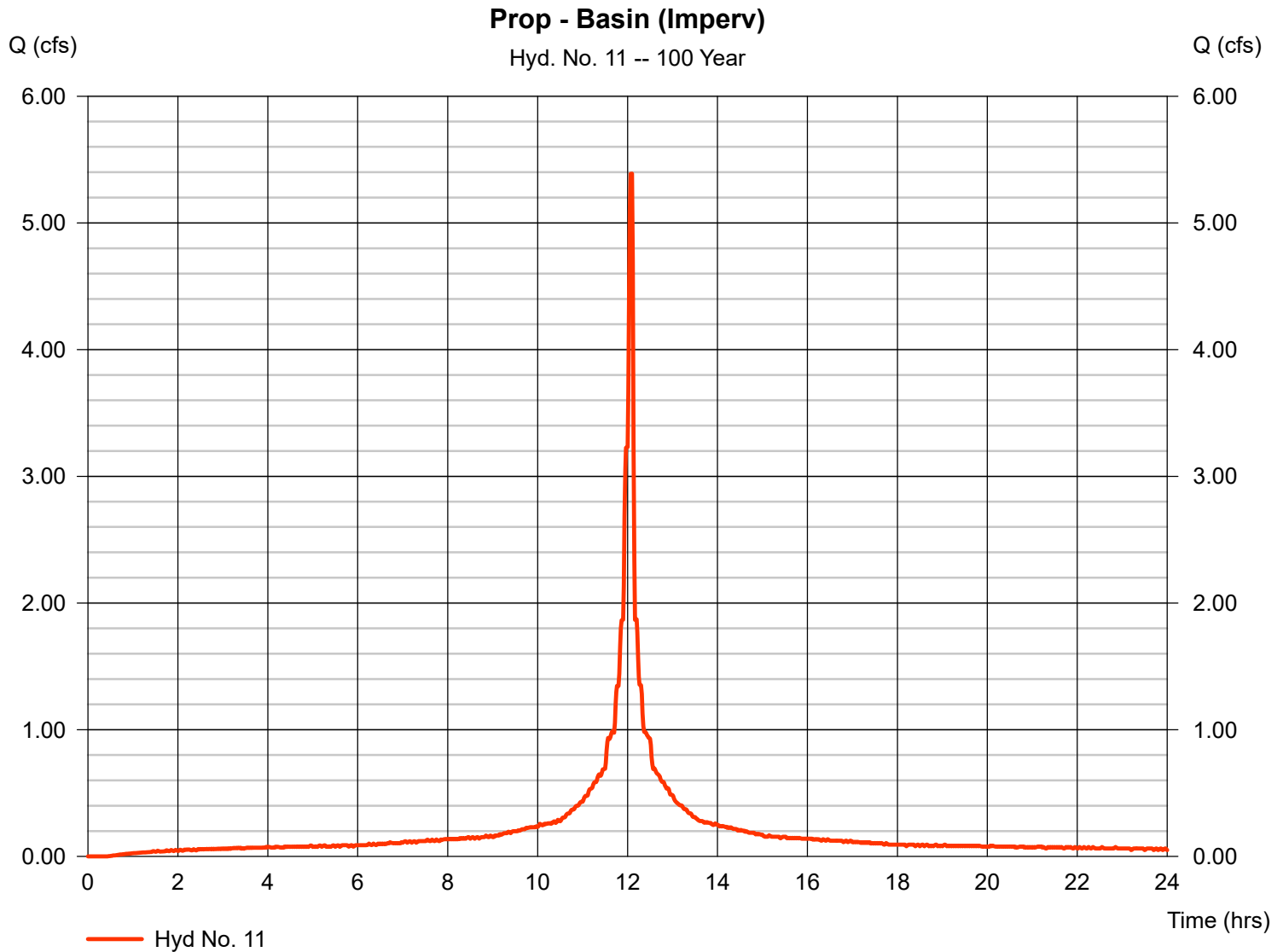
Monday, Nov 11, 2024

Hyd. No. 11

Prop - Basin (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.609 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.98 in
 Storm duration = NOAA_D.cds

Peak discharge = 5.389 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 18,113 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

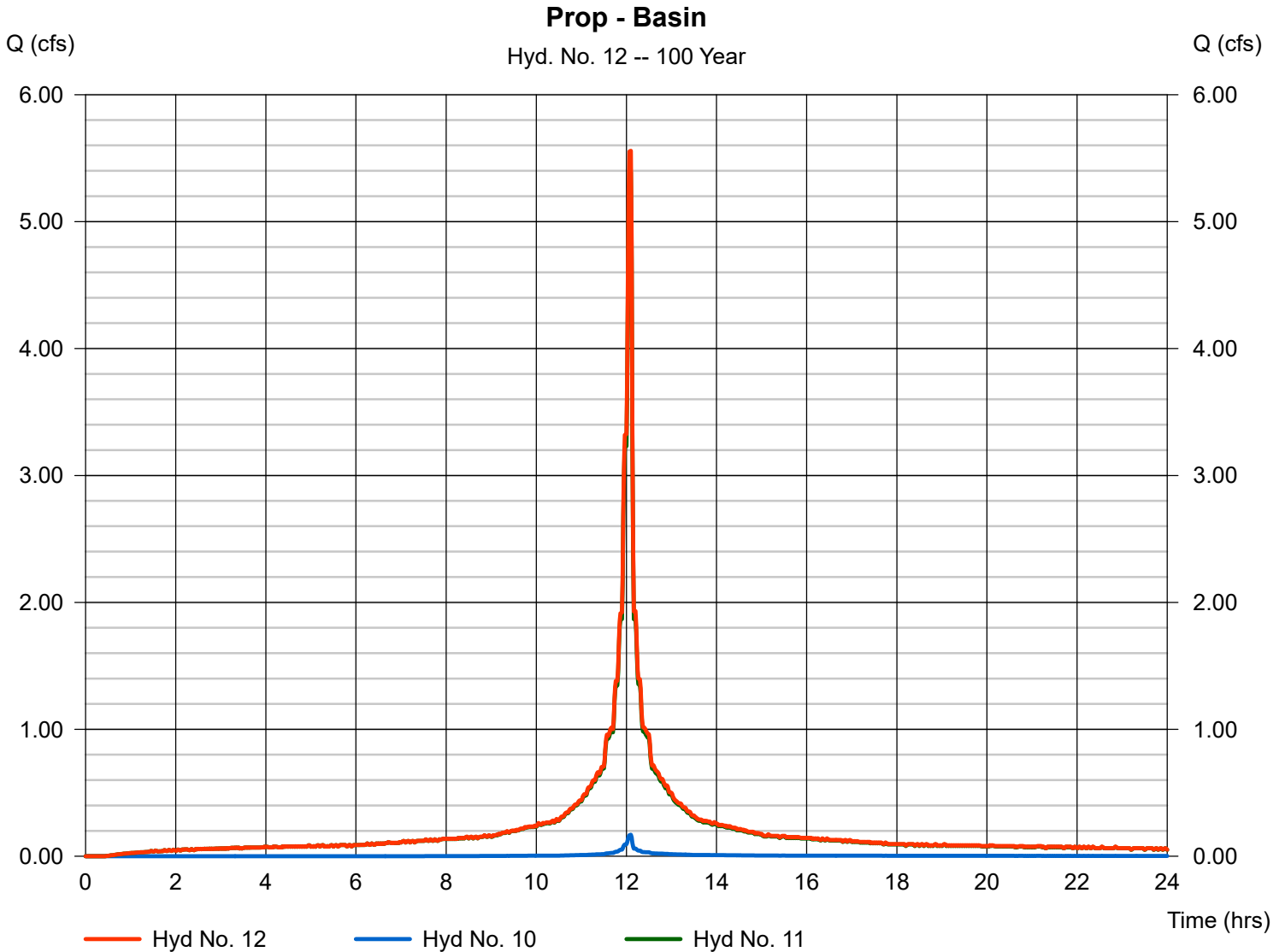
Monday, Nov 11, 2024

Hyd. No. 12

Prop - Basin

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 10, 11

Peak discharge = 5.558 cfs
Time to peak = 12.10 hrs
Hyd. volume = 18,588 cuft
Contrib. drain. area = 0.633 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

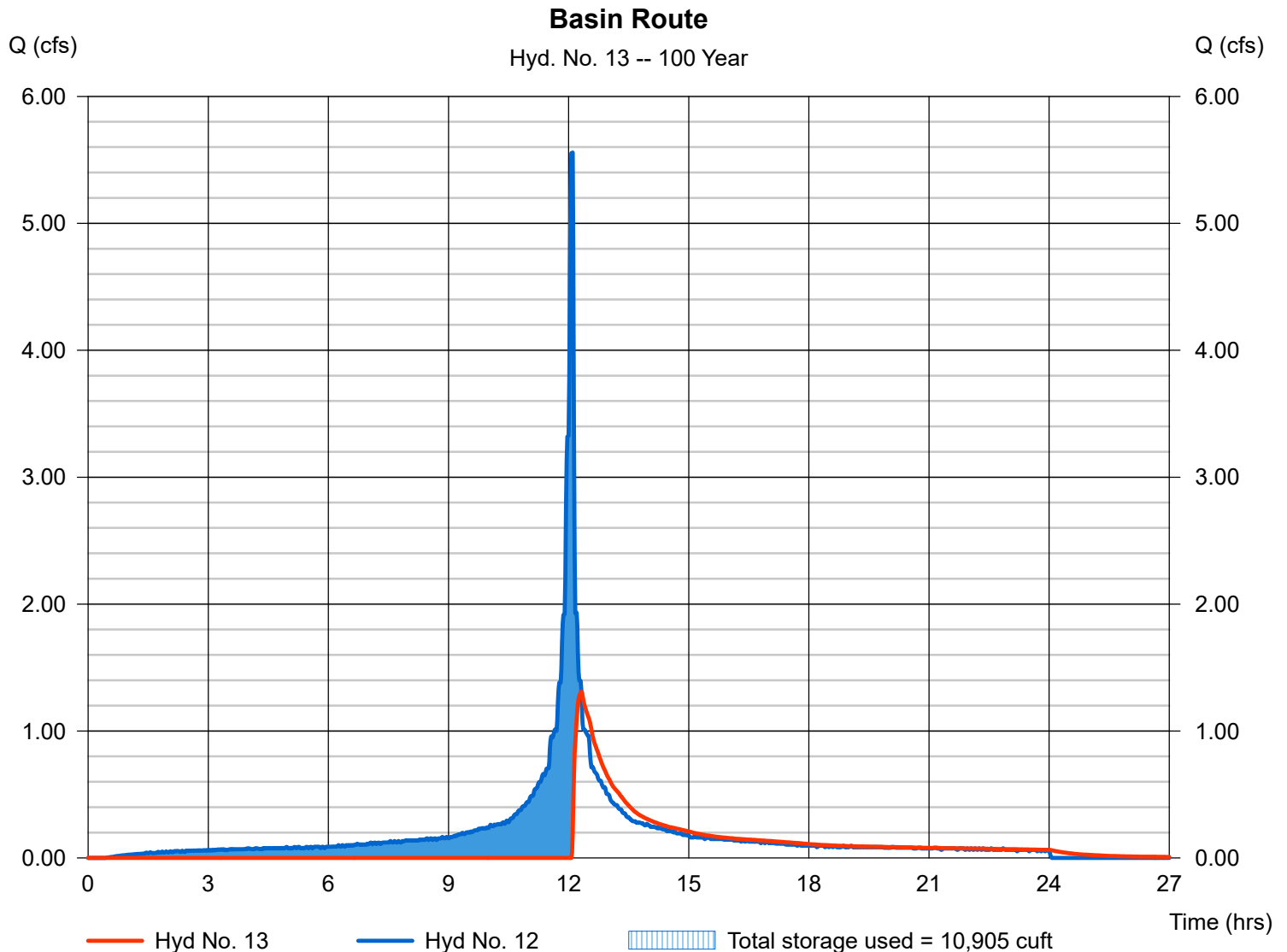
Hyd. No. 13

Basin Route

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyd. No. = 12 - Prop - Basin
Reservoir name = Basin

Peak discharge = 1,311 cfs
Time to peak = 12.32 hrs
Hyd. volume = 9,201 cuft
Max. Elevation = 149.30 ft
Max. Storage = 10,905 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

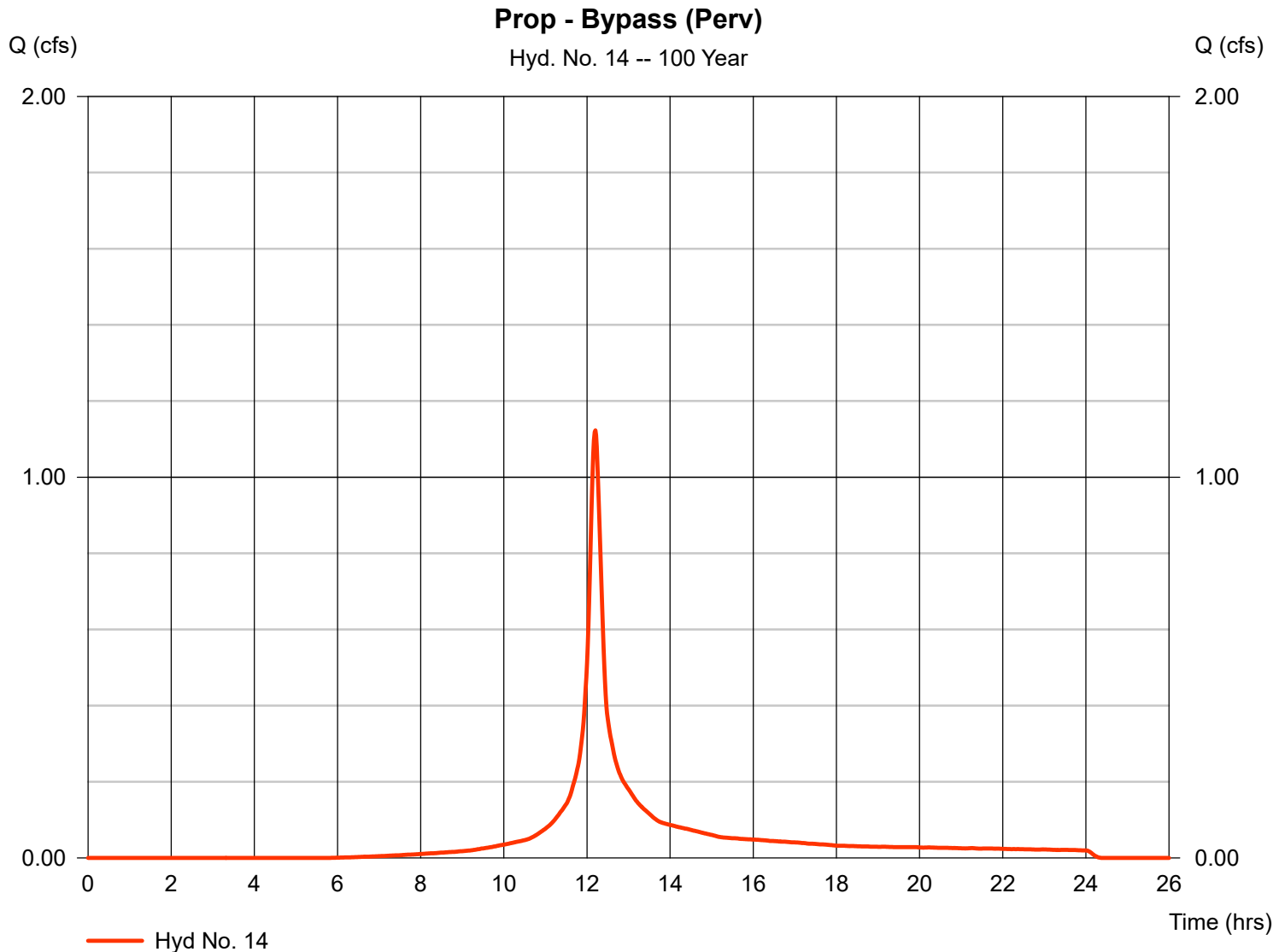
Hyd. No. 14

Prop - Bypass (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.218 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.98 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.123 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 4,598 cuft
 Curve number = 74*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.00 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = [(0.161 x 98) + (0.426 x 98)] / 0.218



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 15

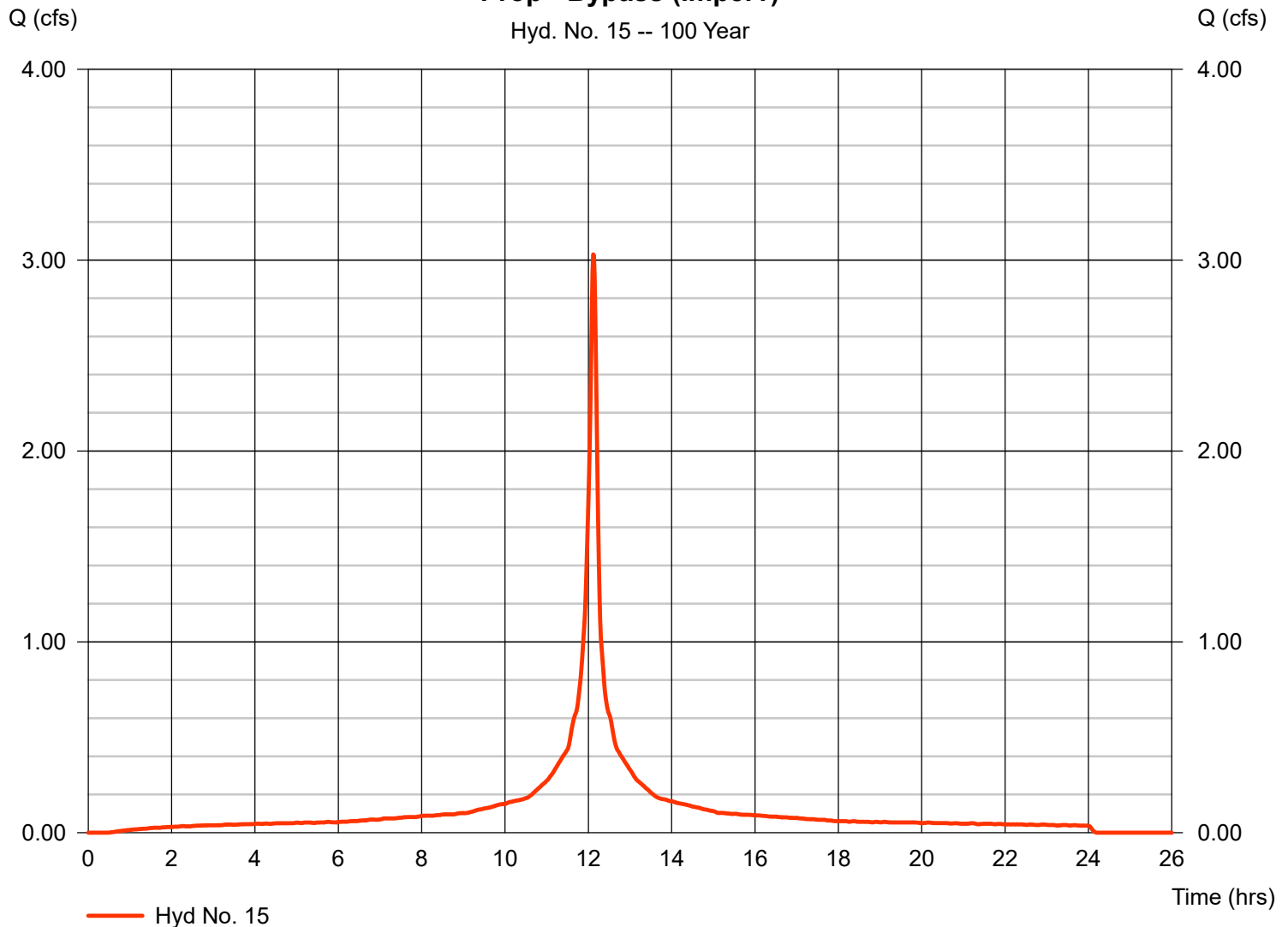
Prop - Bypass (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.381 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.98 in
 Storm duration = NOAA_D.cds

Peak discharge = 3.030 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 11,785 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 6.90 min
 Distribution = Custom
 Shape factor = 484

Prop - Bypass (Imperv)

Hyd. No. 15 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

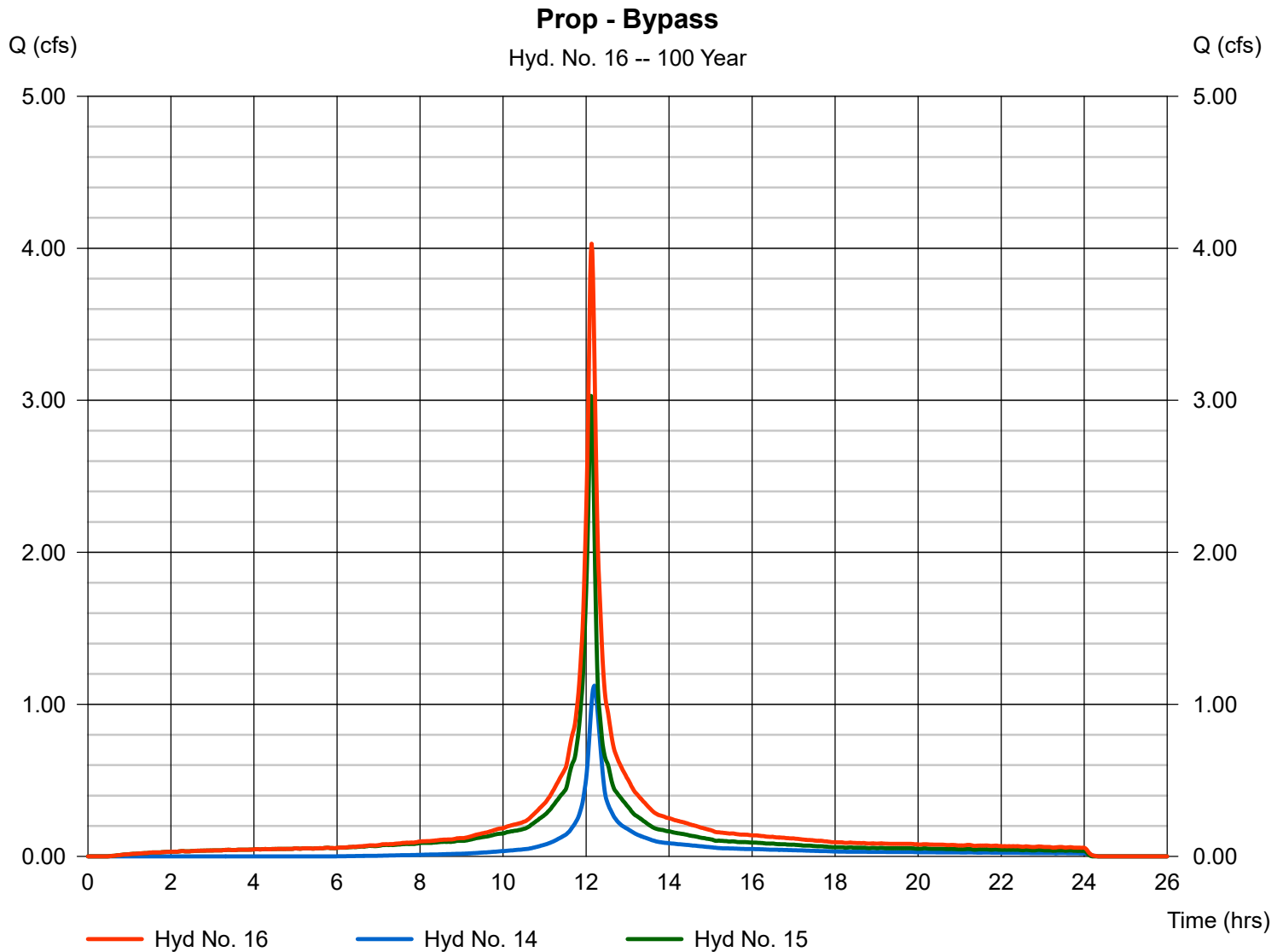
Monday, Nov 11, 2024

Hyd. No. 16

Prop - Bypass

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 14, 15

Peak discharge = 4.030 cfs
Time to peak = 12.13 hrs
Hyd. volume = 16,383 cuft
Contrib. drain. area = 0.599 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

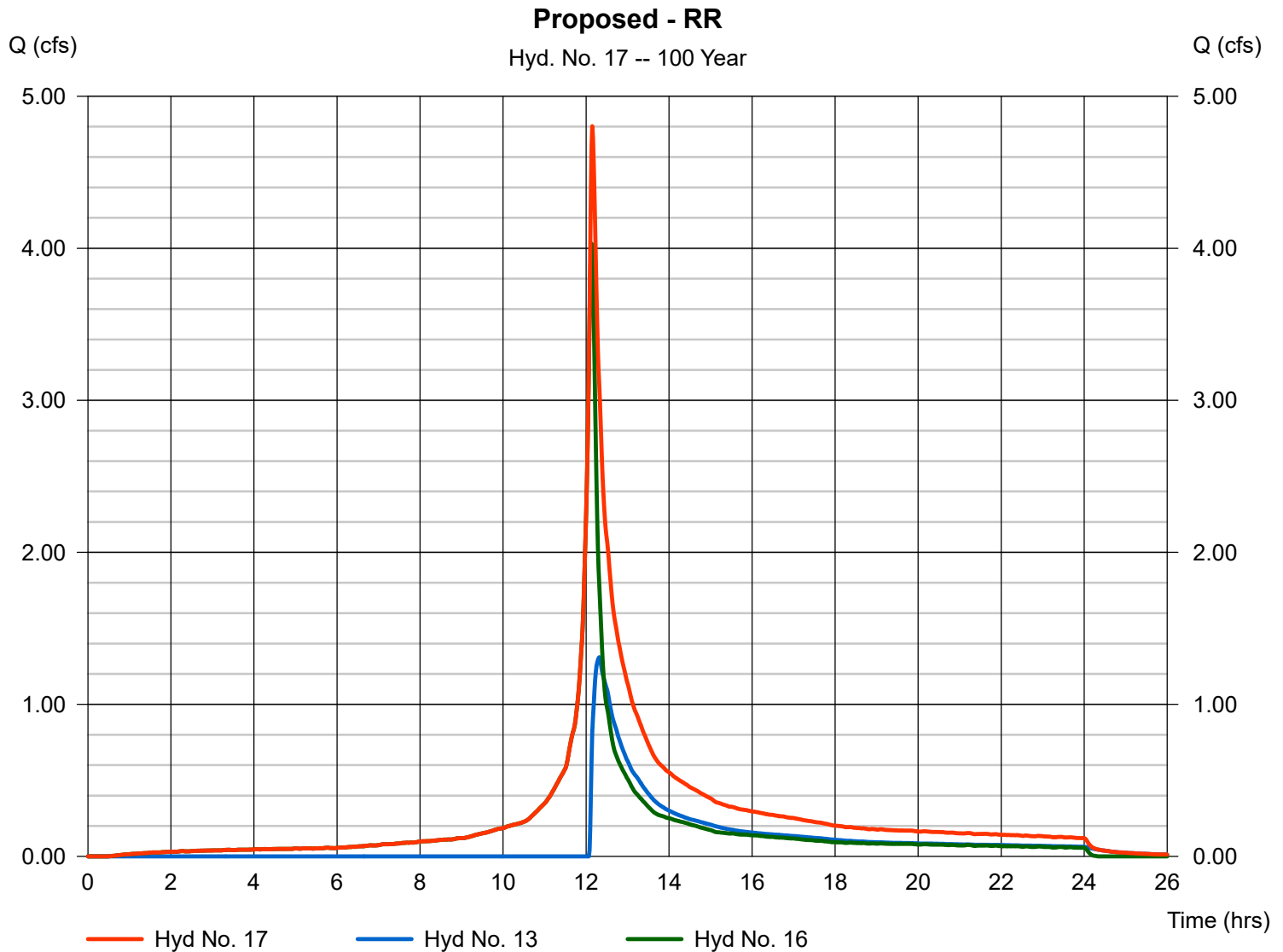
Monday, Nov 11, 2024

Hyd. No. 17

Proposed - RR

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 13, 16

Peak discharge = 4.803 cfs
Time to peak = 12.15 hrs
Hyd. volume = 25,584 cuft
Contrib. drain. area = 0.000 ac



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Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description	
1	SCS Runoff	0.104	1	729	367	-----	-----	-----	Exist - S. Broad (Perv)	
2	SCS Runoff	1.425	1	726	4,560	-----	-----	-----	Exist - S. Broad (Gravel/Imperv)	
3	Combine	1.517	1	726	4,927	1, 2	-----	-----	Existing - S. Broad	
4	SCS Runoff	0.344	1	733	1,485	-----	-----	-----	Prop - S. Broad (Perv)	
5	SCS Runoff	0.829	1	726	2,711	-----	-----	-----	Prop - S. Broad (Imperv)	
6	Combine	1.068	1	726	4,196	4, 5	-----	-----	Proposed - S. Broad	
7	SCS Runoff	0.166	1	728	545	-----	-----	-----	Exist - RR (Perv)	
8	SCS Runoff	4.298	1	726	12,859	-----	-----	-----	Exist - RR (Gravel/Imperv)	
9	Combine	4.453	1	726	13,404	7, 8	-----	-----	Existing - RR	
10	SCS Runoff	0.048	1	726	131	-----	-----	-----	Prop - Basin (Perv)	
11	SCS Runoff	2.392	1	726	7,824	-----	-----	-----	Prop - Basin (Imperv)	
12	Combine	2.441	1	726	7,955	10, 11	-----	-----	Prop - Basin	
13	Reservoir	0.000	1	n/a	0	12	148.33	7,955	Basin Route	
14	SCS Runoff	0.309	1	732	1,269	-----	-----	-----	Prop - Bypass (Perv)	
15	SCS Runoff	1.344	1	727	5,091	-----	-----	-----	Prop - Bypass (Imperv)	
16	Combine	1.608	1	728	6,360	14, 15	-----	-----	Prop - Bypass	
17	Combine	1.608	1	728	6,360	13, 16	-----	-----	Proposed - RR	
22-146(F).gpw					Return Period: 2 Year			Monday, Nov 11, 2024		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 1

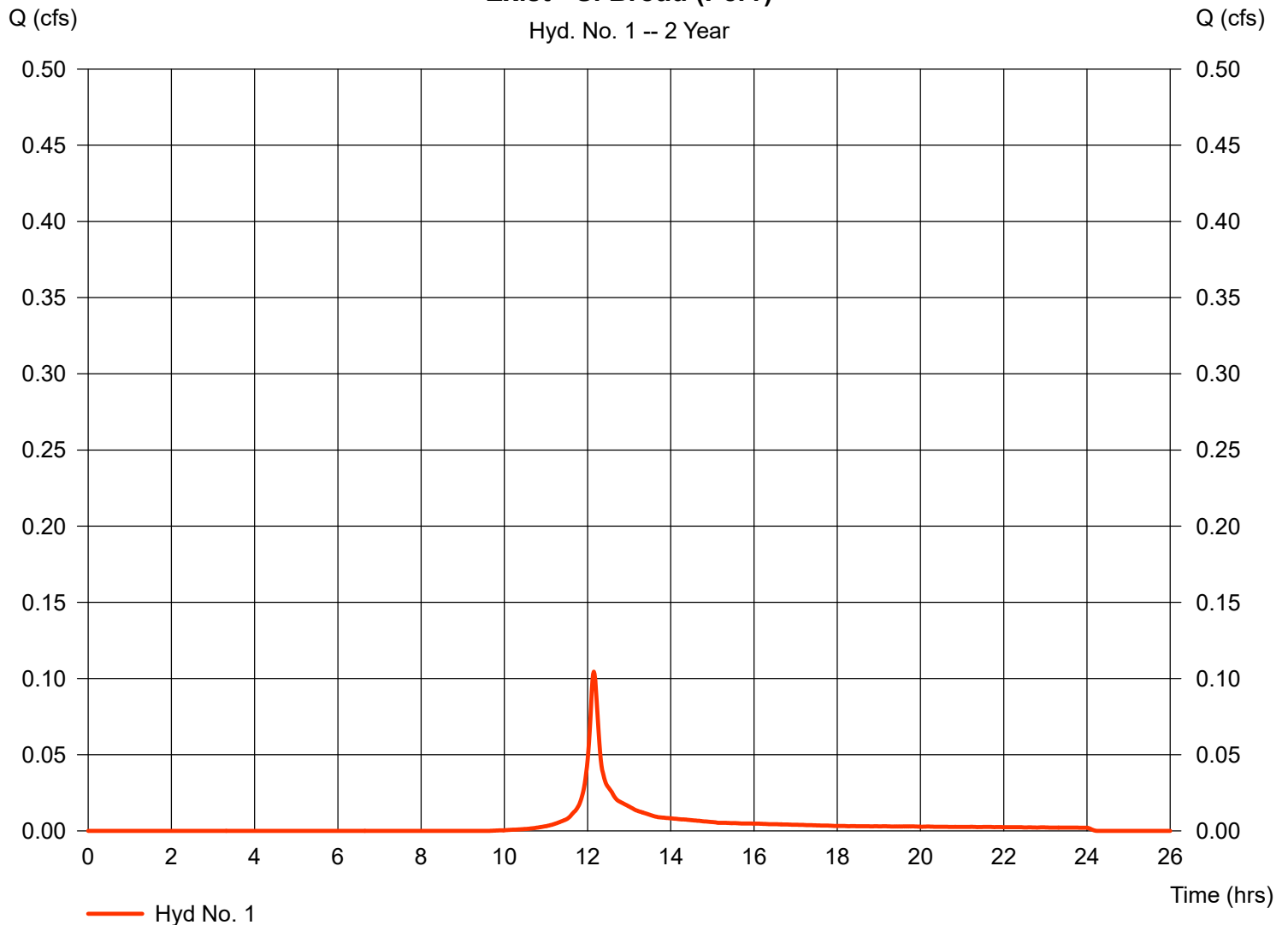
Exist - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.063 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.01 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.104 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 367 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.60 min
 Distribution = Custom
 Shape factor = 484

Exist - S. Broad (Perv)

Hyd. No. 1 -- 2 Year



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 2

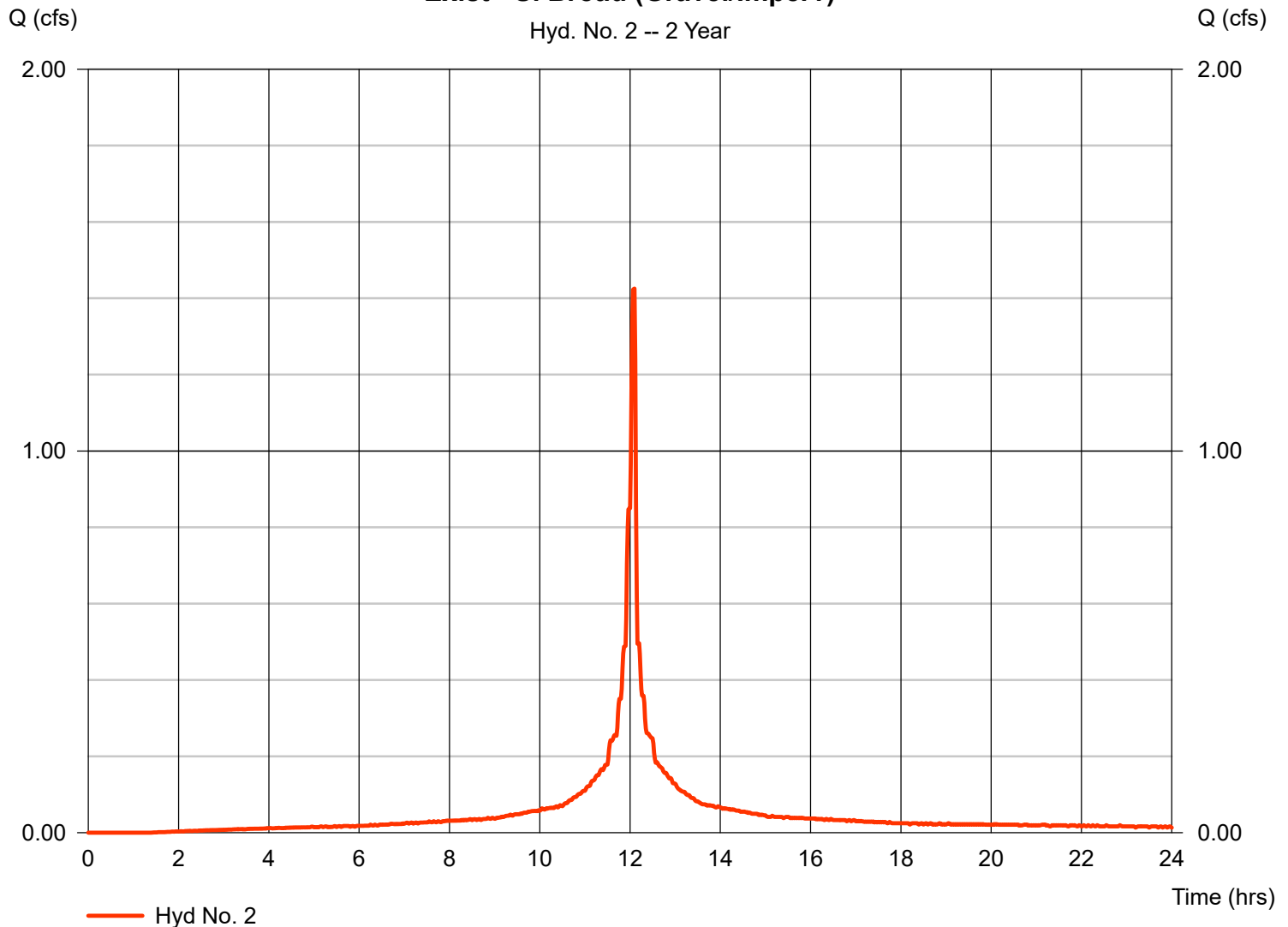
Exist - S. Broad (Gravel/Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.366 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.01 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.425 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 4,560 cuft
 Curve number = 97*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 1.60 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = [(0.028 x 89) + (0.338 x 98)] / 0.366

Exist - S. Broad (Gravel/Imperv)



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

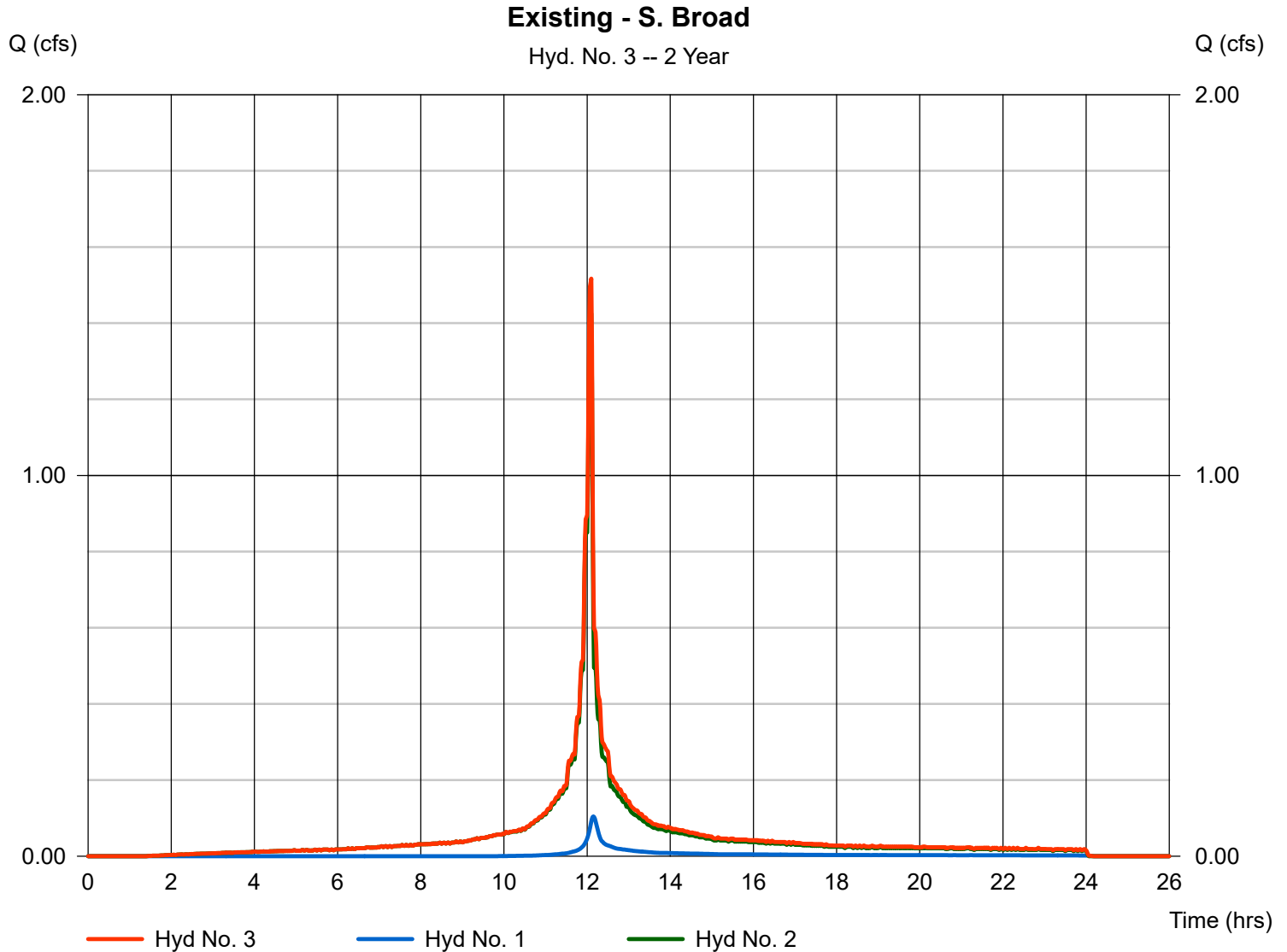
Monday, Nov 11, 2024

Hyd. No. 3

Existing - S. Broad

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

Peak discharge = 1.517 cfs
Time to peak = 12.10 hrs
Hyd. volume = 4,927 cuft
Contrib. drain. area = 0.429 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

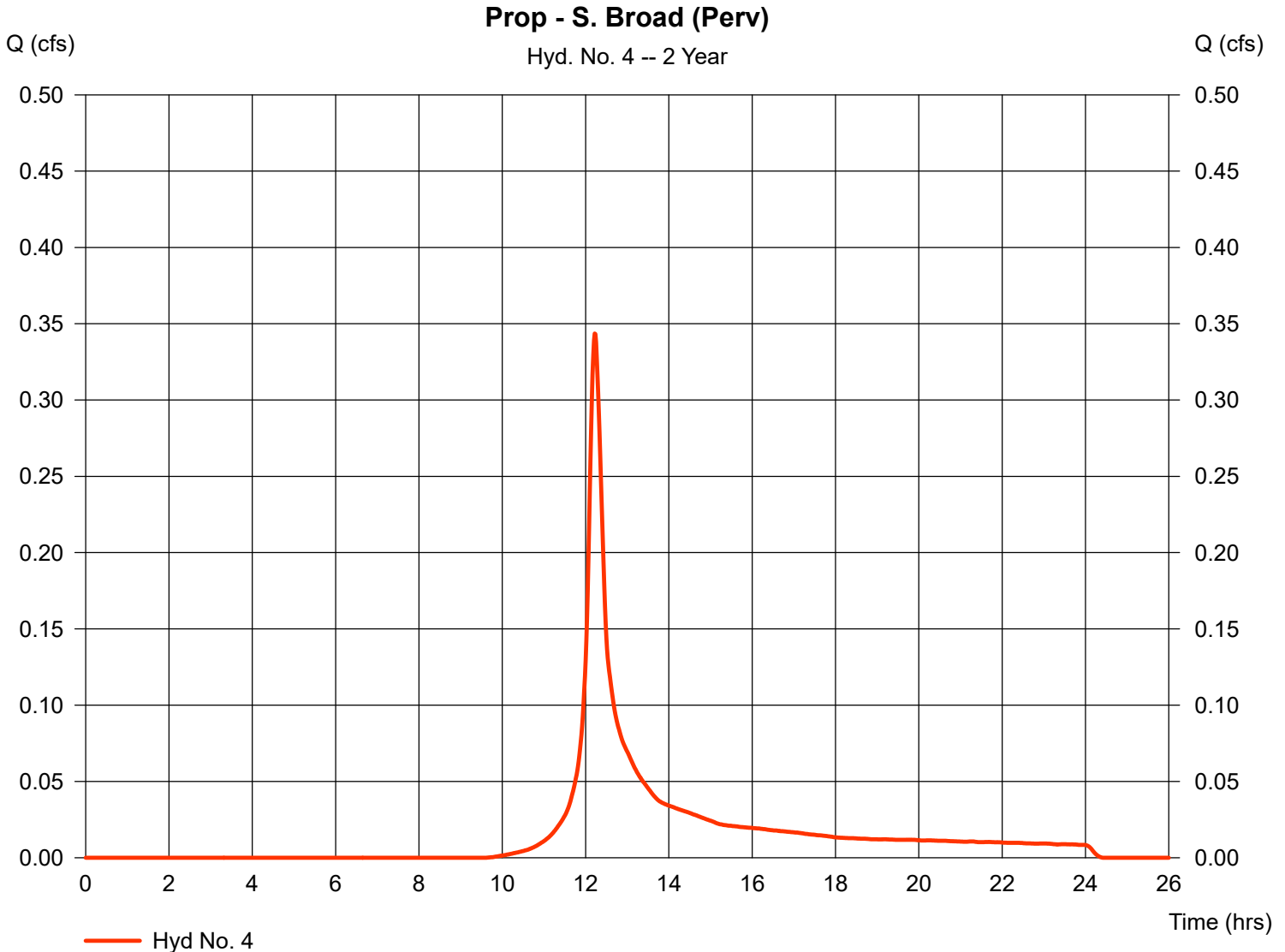
Monday, Nov 11, 2024

Hyd. No. 4

Prop - S. Broad (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.252 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 4.01 in
Storm duration = NOAA_D.cds

Peak discharge = 0.344 cfs
Time to peak = 12.22 hrs
Hyd. volume = 1,485 cuft
Curve number = 74
Hydraulic length = 0 ft
Time of conc. (Tc) = 15.40 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

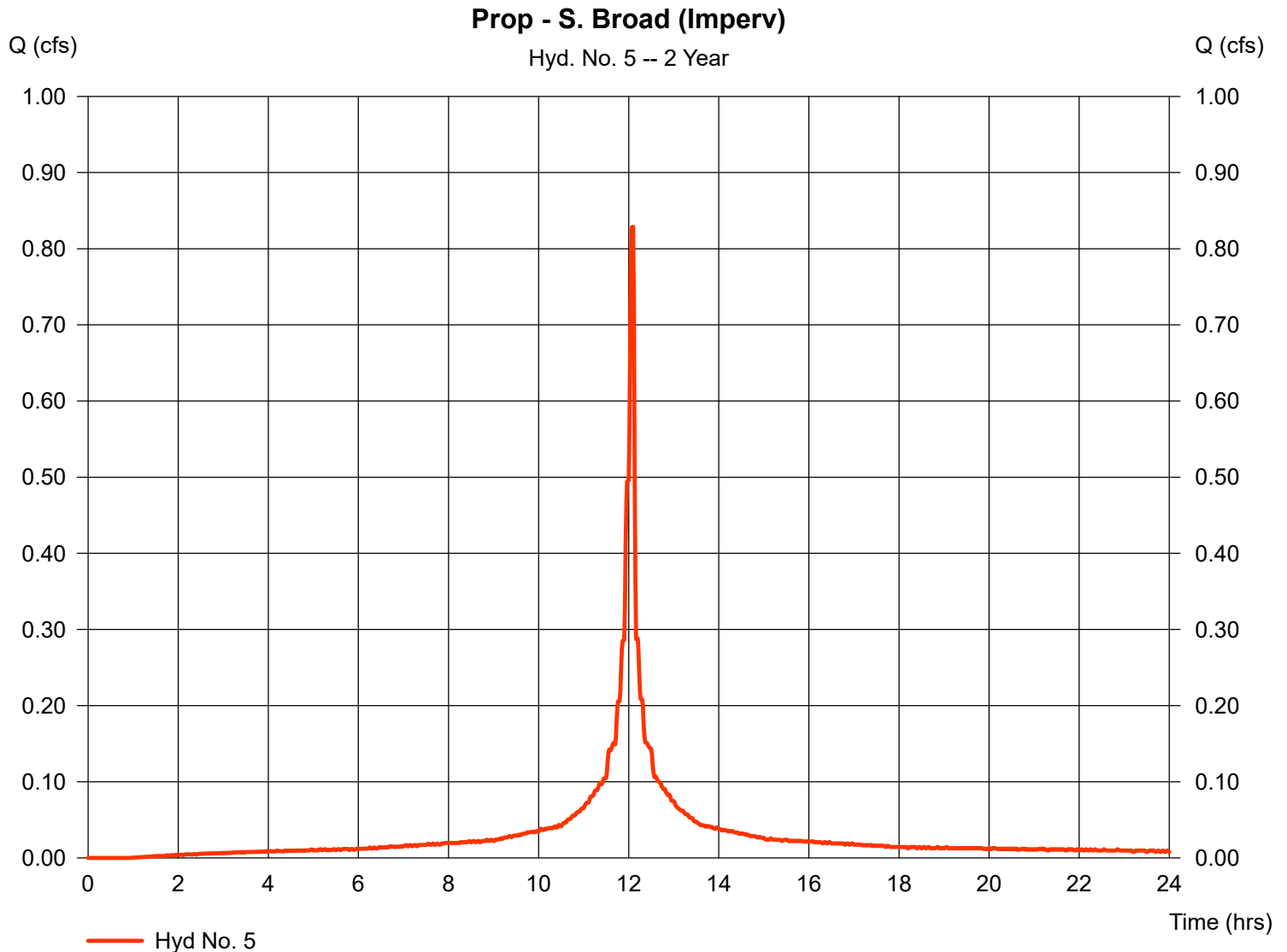
Monday, Nov 11, 2024

Hyd. No. 5

Prop - S. Broad (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.211 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.01 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.829 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 2,711 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

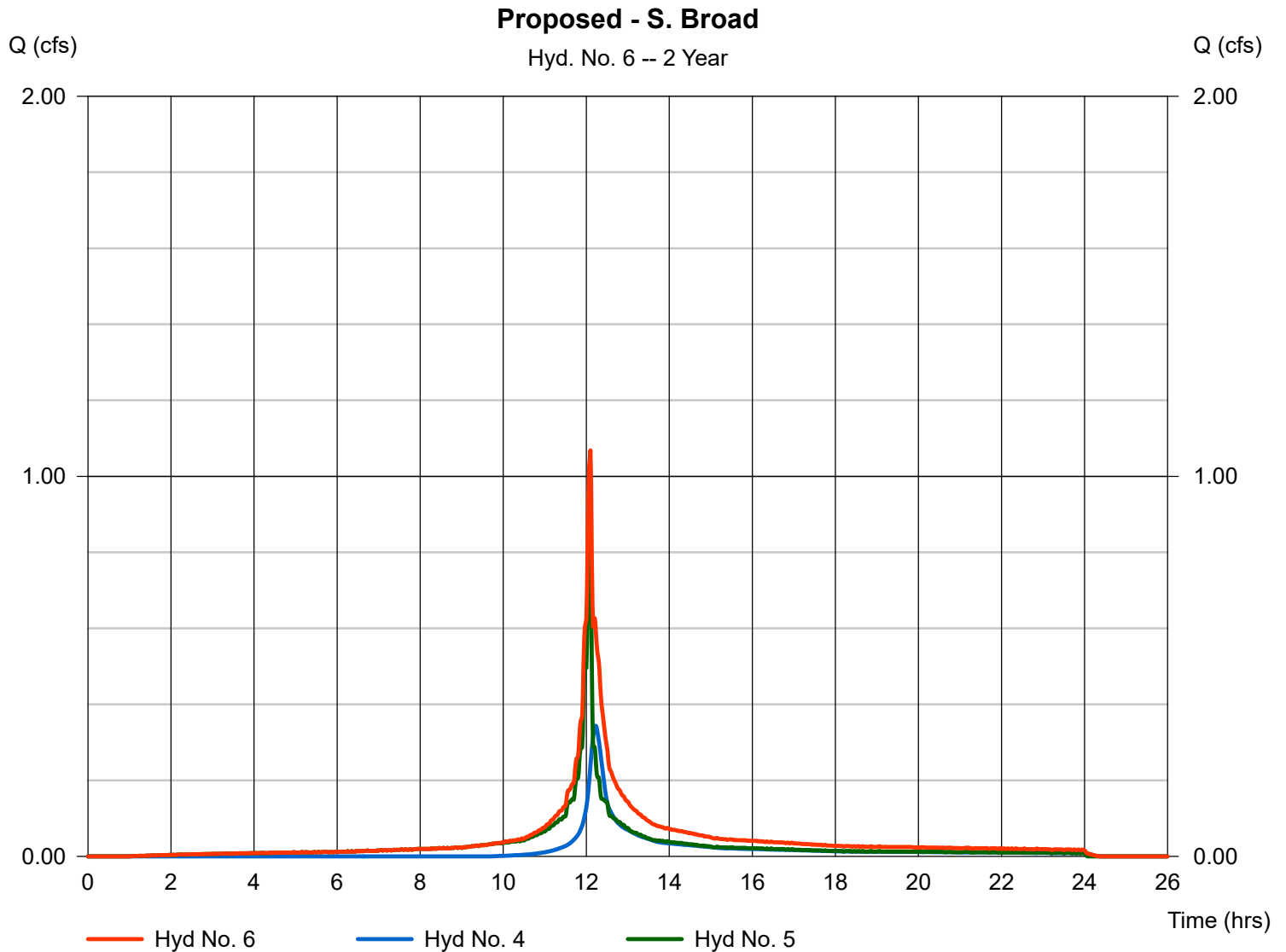
Monday, Nov 11, 2024

Hyd. No. 6

Proposed - S. Broad

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

Peak discharge = 1.068 cfs
Time to peak = 12.10 hrs
Hyd. volume = 4,196 cuft
Contrib. drain. area = 0.463 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

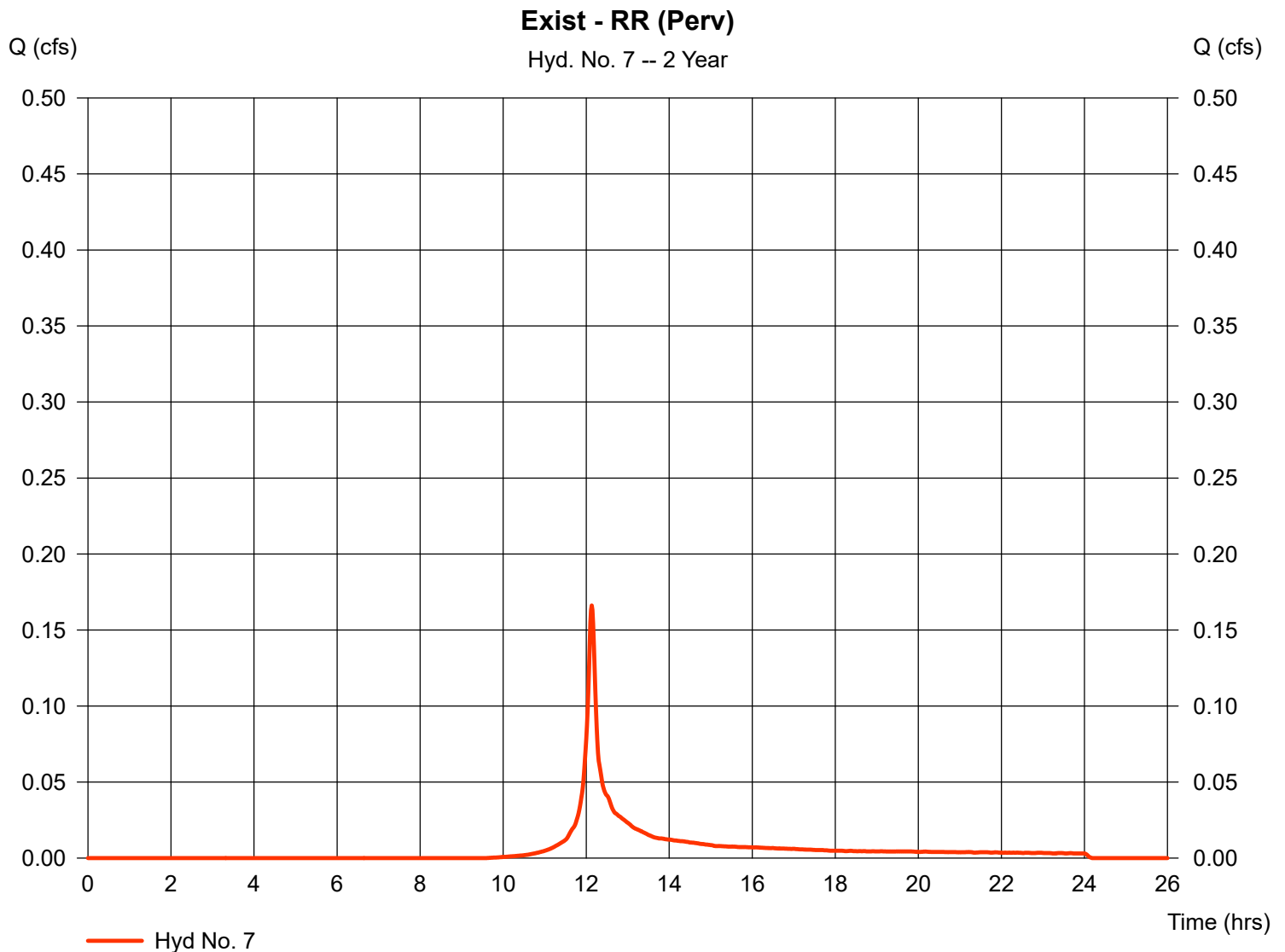
Monday, Nov 11, 2024

Hyd. No. 7

Exist - RR (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.096 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.01 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.166 cfs
 Time to peak = 12.13 hrs
 Hyd. volume = 545 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.30 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

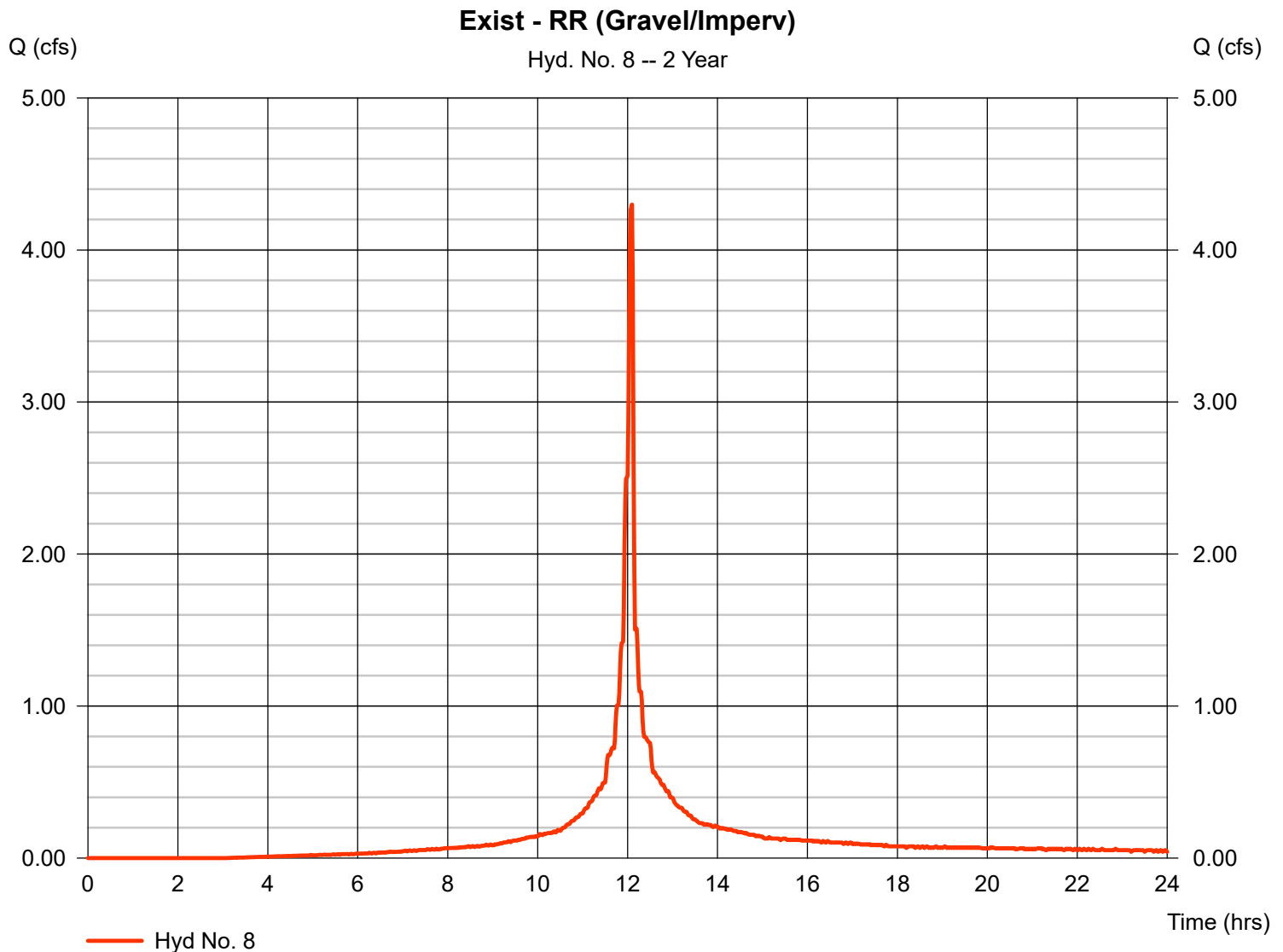
Monday, Nov 11, 2024

Hyd. No. 8

Exist - RR (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.298 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 12,859 cuft
Drainage area	= 1.170 ac	Curve number	= 93*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 4.01 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.667 x 89) + (0.503 x 98)] / 1.170



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

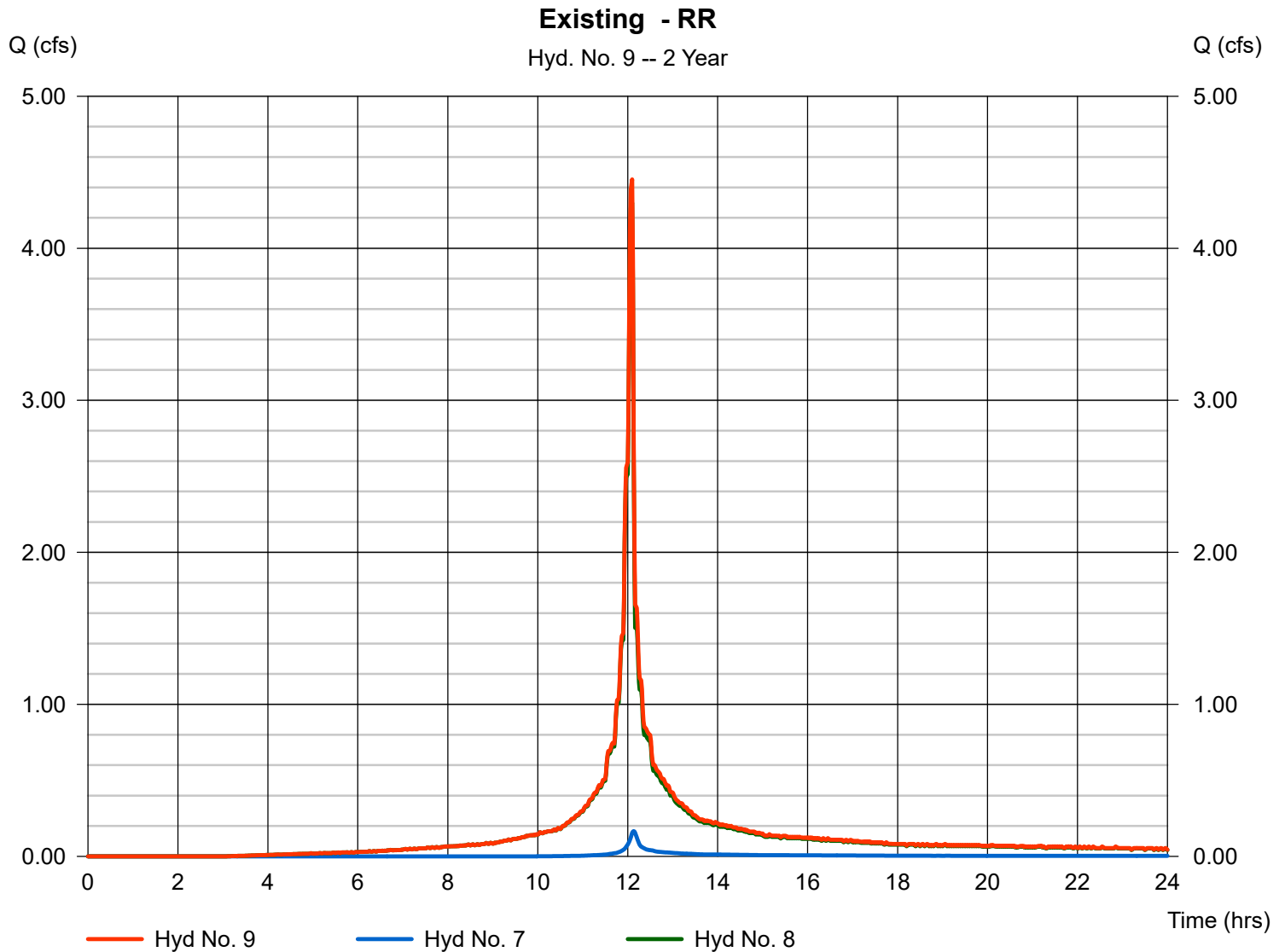
Monday, Nov 11, 2024

Hyd. No. 9

Existing - RR

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 7, 8

Peak discharge = 4.453 cfs
Time to peak = 12.10 hrs
Hyd. volume = 13,404 cuft
Contrib. drain. area = 1.266 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

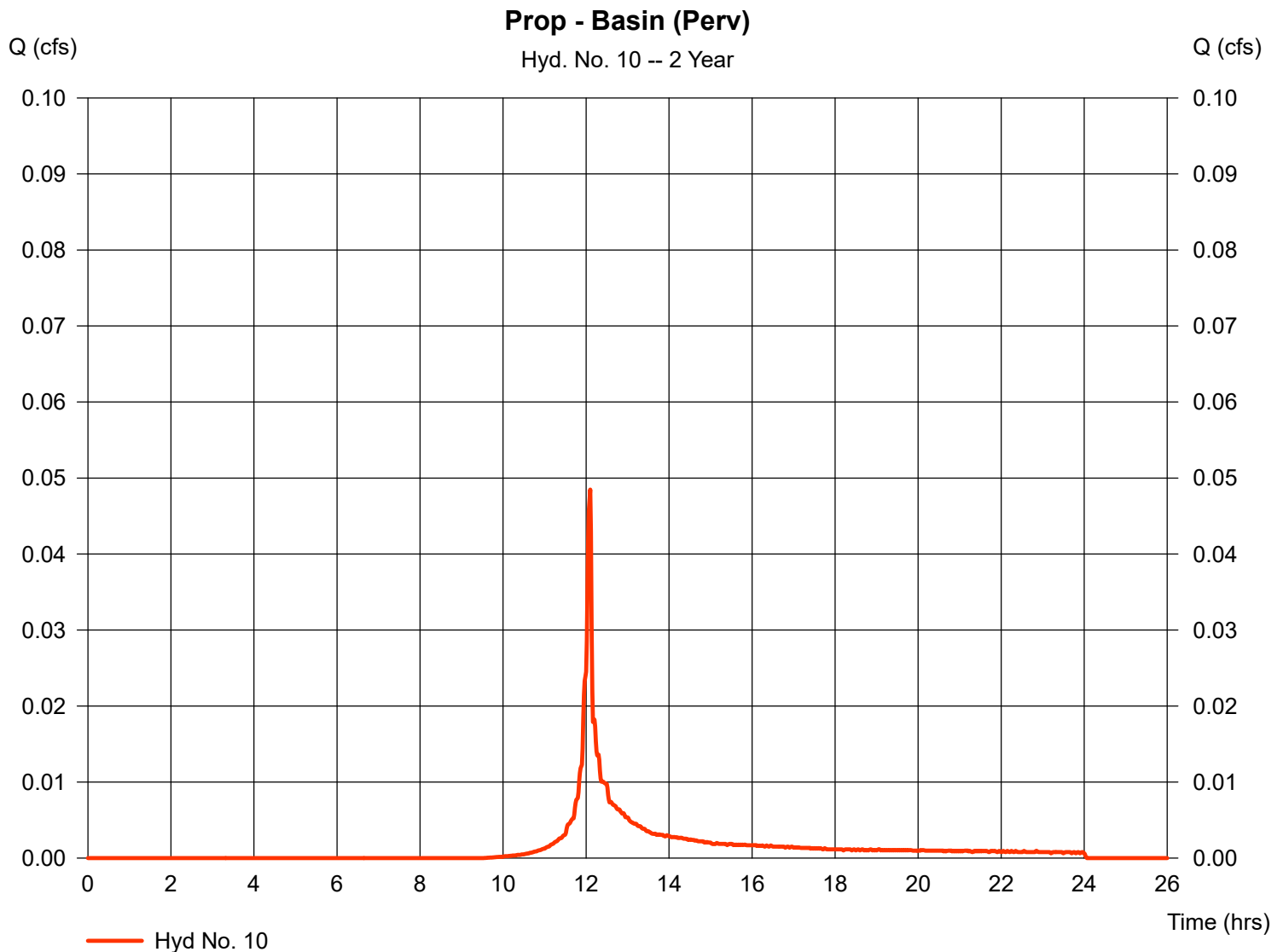
Monday, Nov 11, 2024

Hyd. No. 10

Prop - Basin (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.024 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.01 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.048 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 131 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 3.10 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

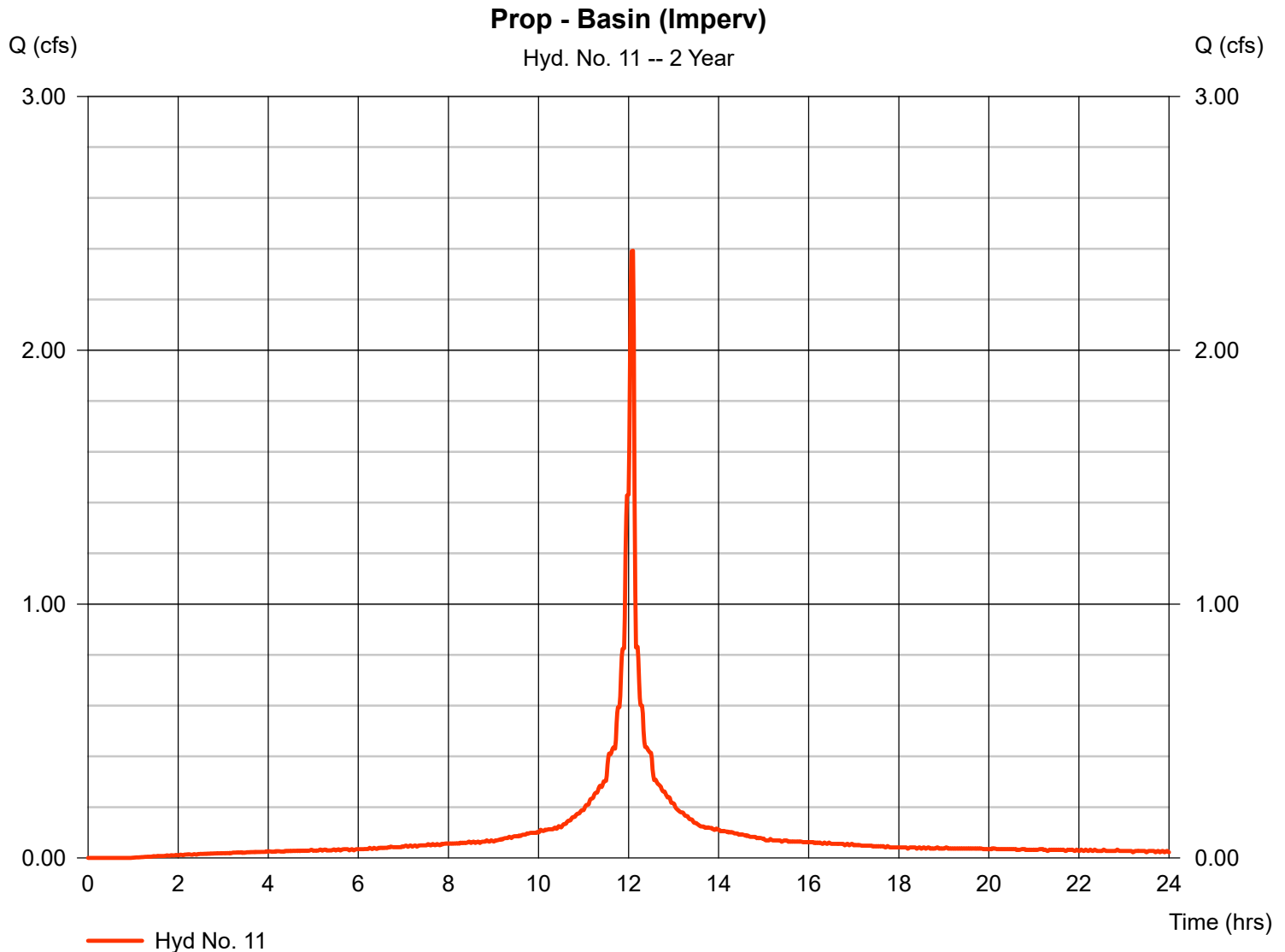
Monday, Nov 11, 2024

Hyd. No. 11

Prop - Basin (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 0.609 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.01 in
 Storm duration = NOAA_D.cds

Peak discharge = 2.392 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 7,824 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

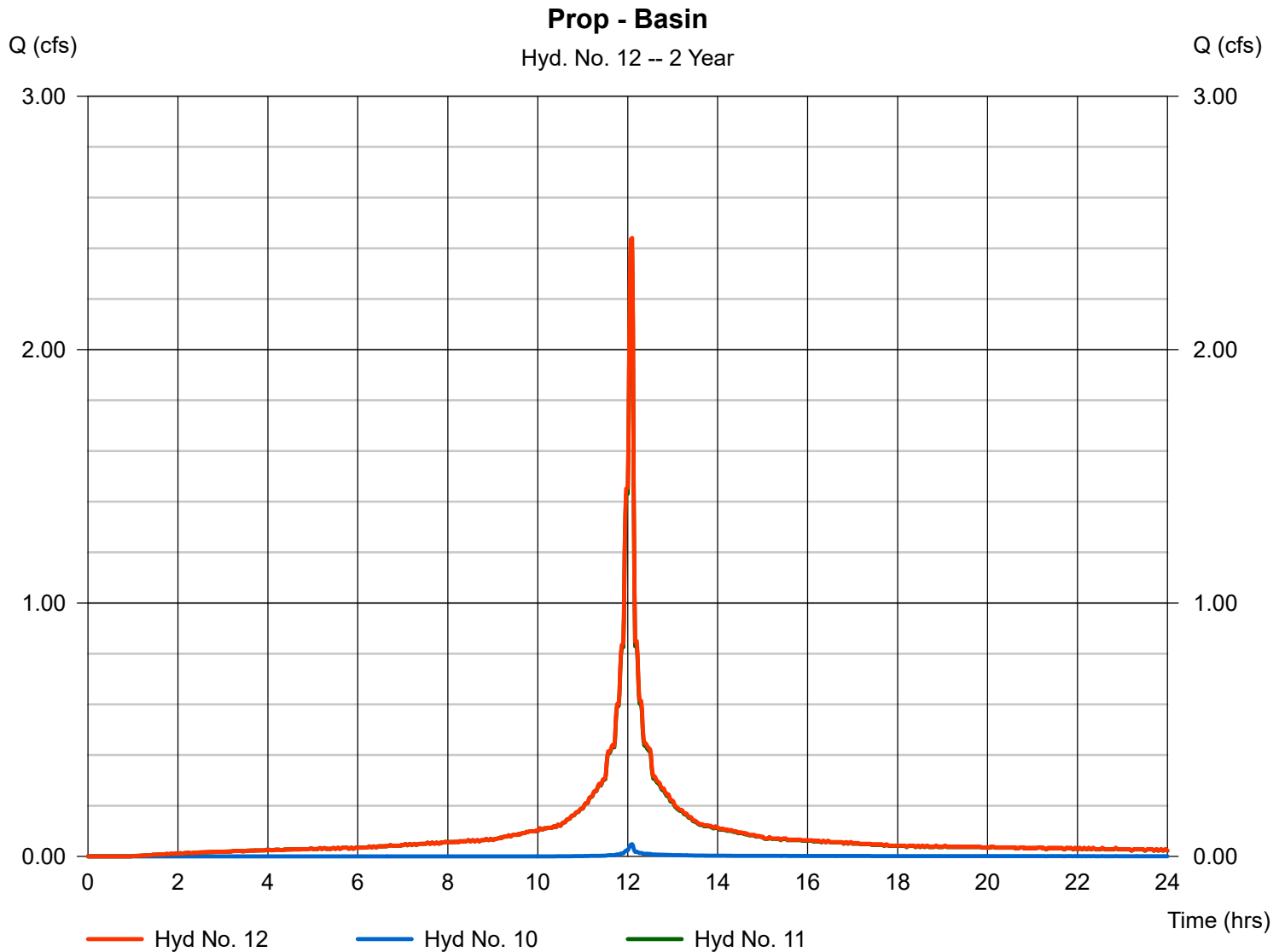
Monday, Nov 11, 2024

Hyd. No. 12

Prop - Basin

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

Peak discharge = 2.441 cfs
Time to peak = 12.10 hrs
Hyd. volume = 7,955 cuft
Contrib. drain. area = 0.633 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

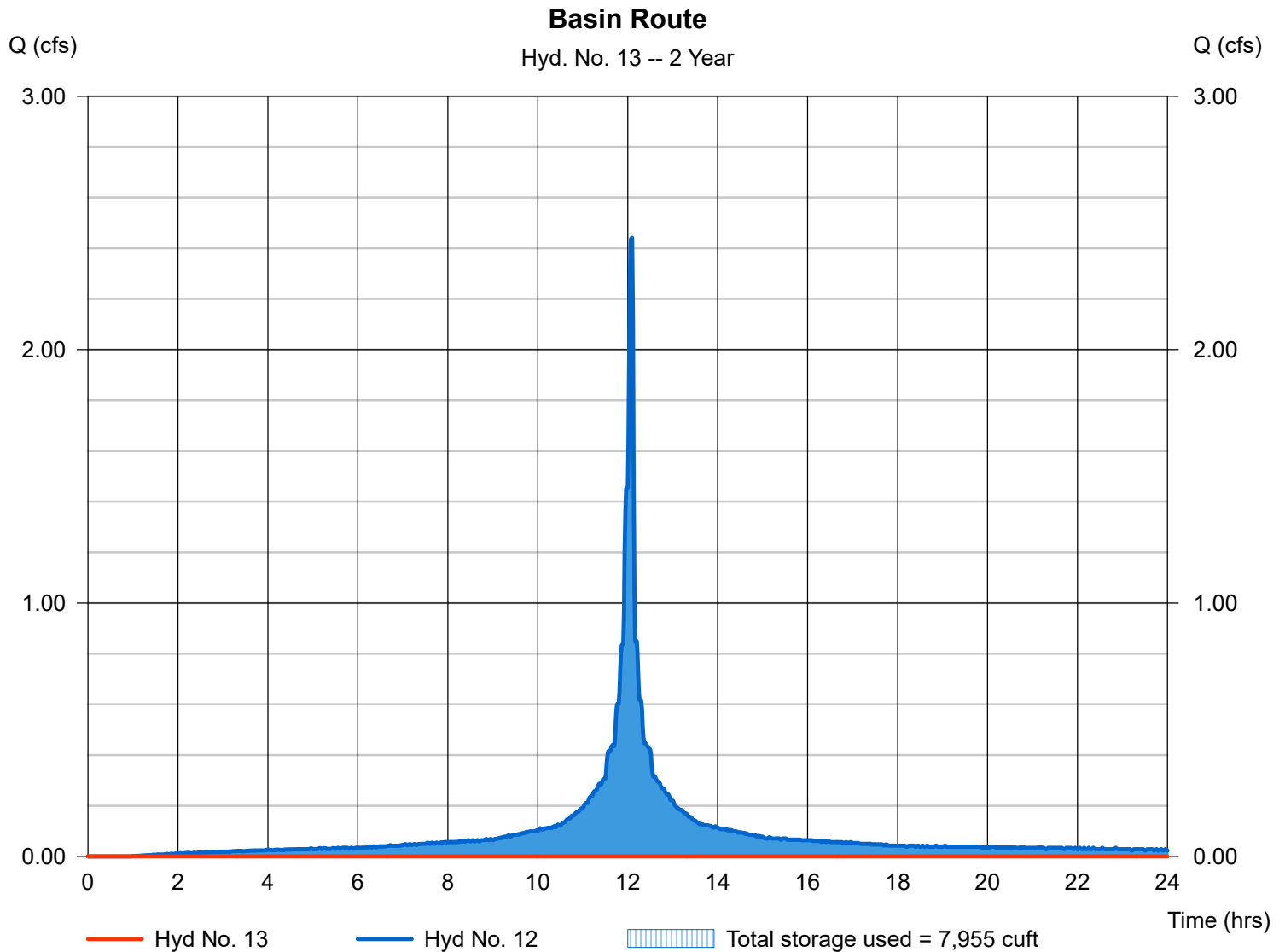
Hyd. No. 13

Basin Route

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyd. No. = 12 - Prop - Basin
Reservoir name = Basin

Peak discharge = 0.000 cfs
Time to peak = n/a
Hyd. volume = 0 cuft
Max. Elevation = 148.33 ft
Max. Storage = 7,955 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

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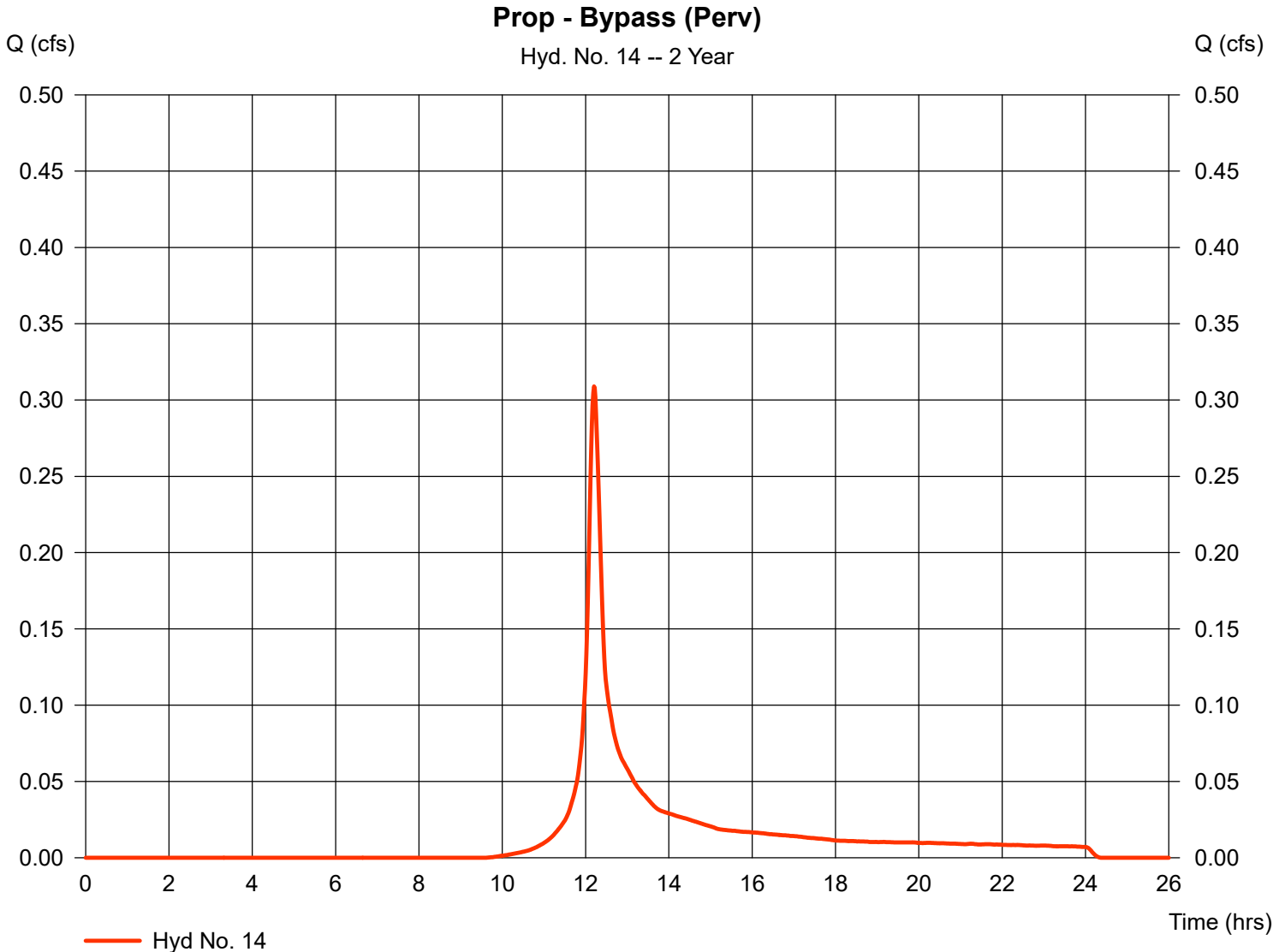
Hyd. No. 14

Prop - Bypass (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.218 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 4.01 in
Storm duration = NOAA_D.cds

Peak discharge = 0.309 cfs
Time to peak = 12.20 hrs
Hyd. volume = 1,269 cuft
Curve number = 74*
Hydraulic length = 0 ft
Time of conc. (Tc) = 15.00 min
Distribution = Custom
Shape factor = 484

* Composite (Area/CN) = [(0.161 x 98) + (0.426 x 98)] / 0.218



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

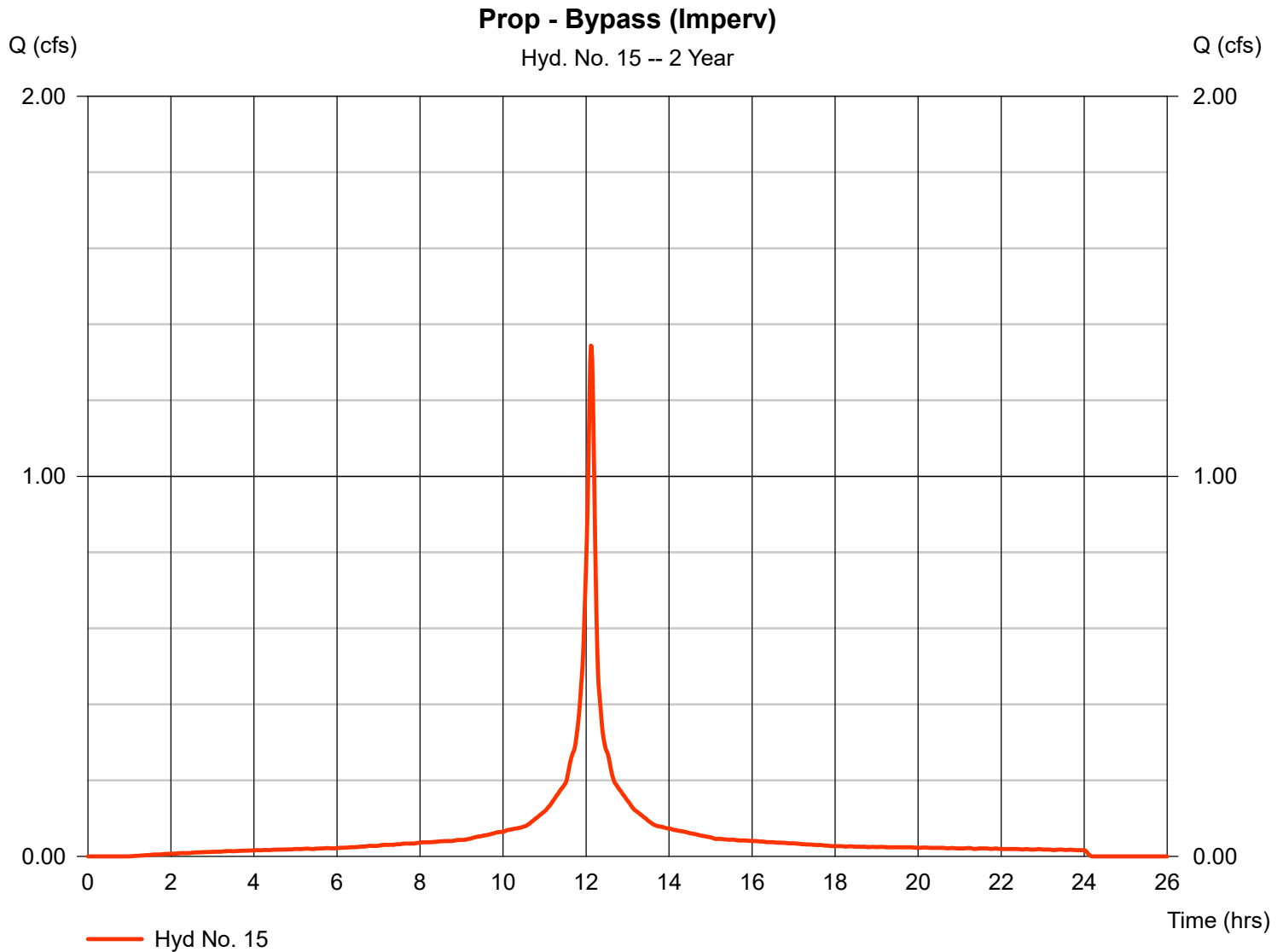
Monday, Nov 11, 2024

Hyd. No. 15

Prop - Bypass (Imperv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.381 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 4.01 in
Storm duration = NOAA_D.cds

Peak discharge = 1.344 cfs
Time to peak = 12.12 hrs
Hyd. volume = 5,091 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.90 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

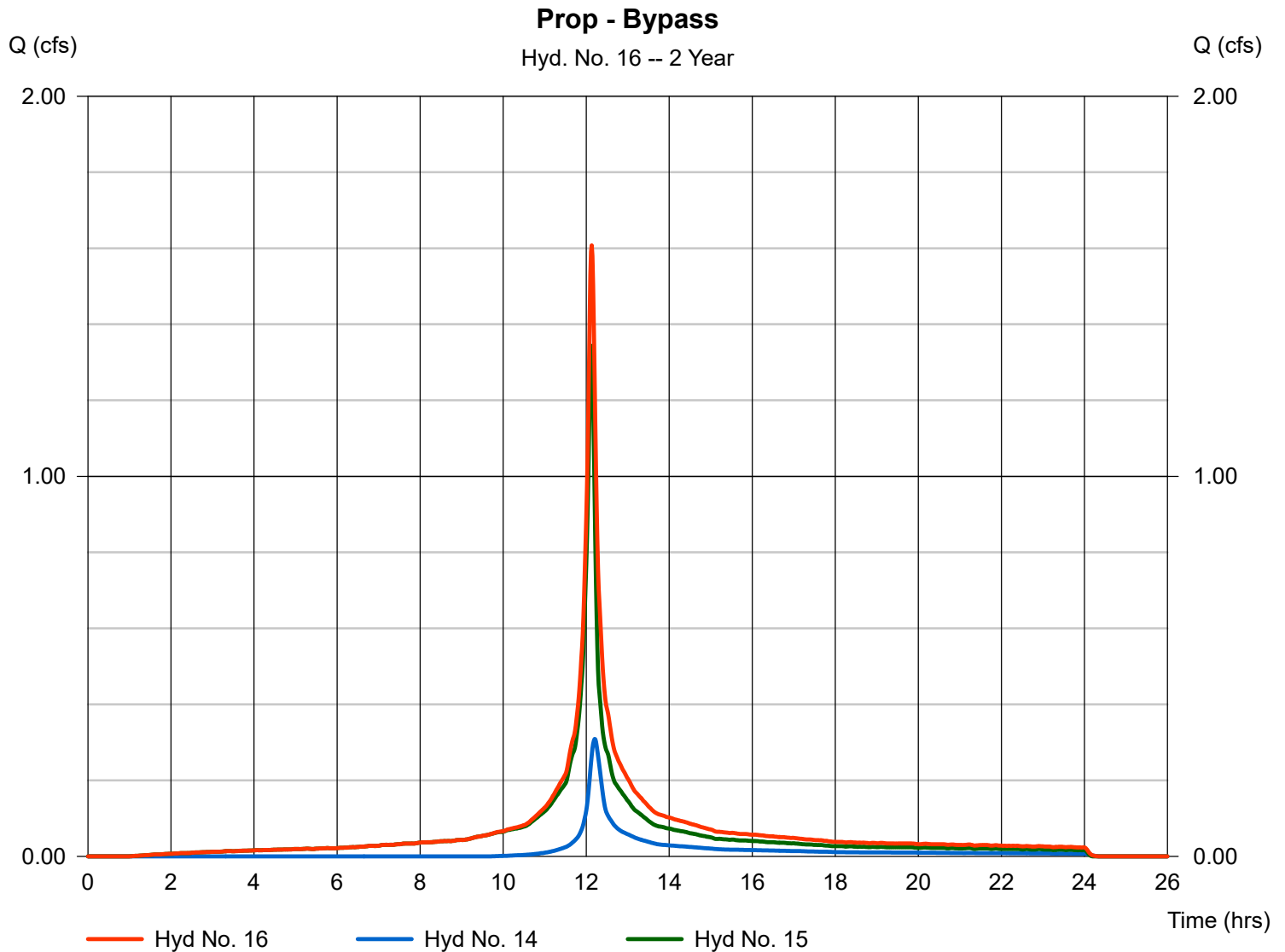
Monday, Nov 11, 2024

Hyd. No. 16

Prop - Bypass

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 1 min
 Inflow hyds. = 14, 15

Peak discharge = 1.608 cfs
 Time to peak = 12.13 hrs
 Hyd. volume = 6,360 cuft
 Contrib. drain. area = 0.599 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

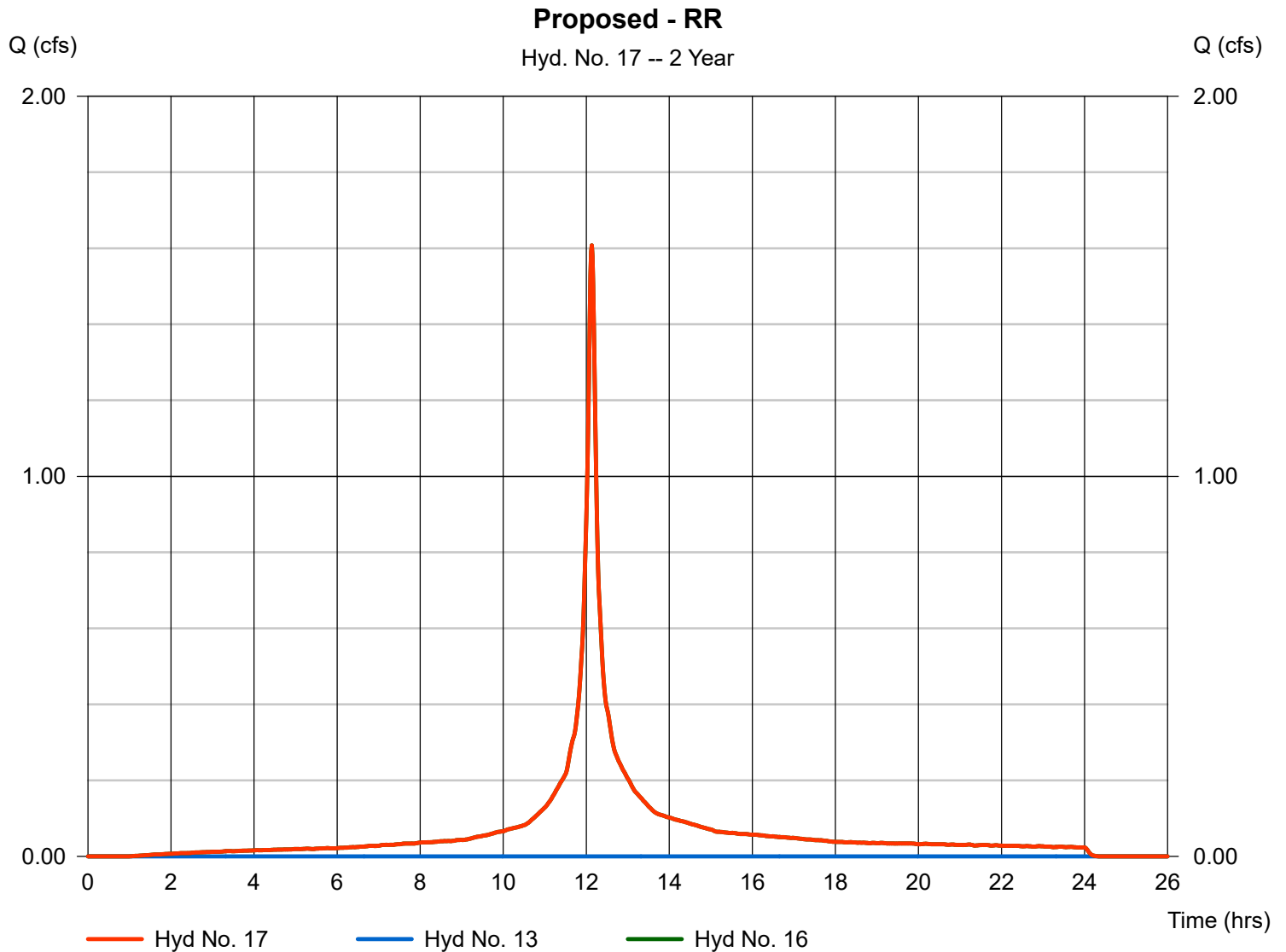
Monday, Nov 11, 2024

Hyd. No. 17

Proposed - RR

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 1 min
Inflow hyds. = 13, 16

Peak discharge = 1.608 cfs
Time to peak = 12.13 hrs
Hyd. volume = 6,360 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.223	1	729	775	-----	-----	-----	Exist - S. Broad (Perv)
2	SCS Runoff	2.238	1	726	7,328	-----	-----	-----	Exist - S. Broad (Gravel/Imperv)
3	Combine	2.438	1	726	8,103	1, 2	-----	-----	Existing - S. Broad
4	SCS Runoff	0.737	1	733	3,138	-----	-----	-----	Prop - S. Broad (Perv)
5	SCS Runoff	1.295	1	726	4,310	-----	-----	-----	Prop - S. Broad (Imperv)
6	Combine	1.835	1	726	7,447	4, 5	-----	-----	Proposed - S. Broad
7	SCS Runoff	0.353	1	728	1,151	-----	-----	-----	Exist - RR (Perv)
8	SCS Runoff	6.955	1	726	21,579	-----	-----	-----	Exist - RR (Gravel/Imperv)
9	Combine	7.289	1	726	22,730	7, 8	-----	-----	Existing - RR
10	SCS Runoff	0.101	1	726	277	-----	-----	-----	Prop - Basin (Perv)
11	SCS Runoff	3.738	1	726	12,438	-----	-----	-----	Prop - Basin (Imperv)
12	Combine	3.839	1	726	12,715	10, 11	-----	-----	Prop - Basin
13	Reservoir	0.146	1	873	3,328	12	148.92	9,891	Basin Route
14	SCS Runoff	0.662	1	732	2,681	-----	-----	-----	Prop - Bypass (Perv)
15	SCS Runoff	2.101	1	727	8,093	-----	-----	-----	Prop - Bypass (Imperv)
16	Combine	2.682	1	728	10,774	14, 15	-----	-----	Prop - Bypass
17	Combine	2.682	1	728	14,102	13, 16	-----	-----	Proposed - RR
22-146(F).gpw					Return Period: 10 Year			Monday, Nov 11, 2024	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

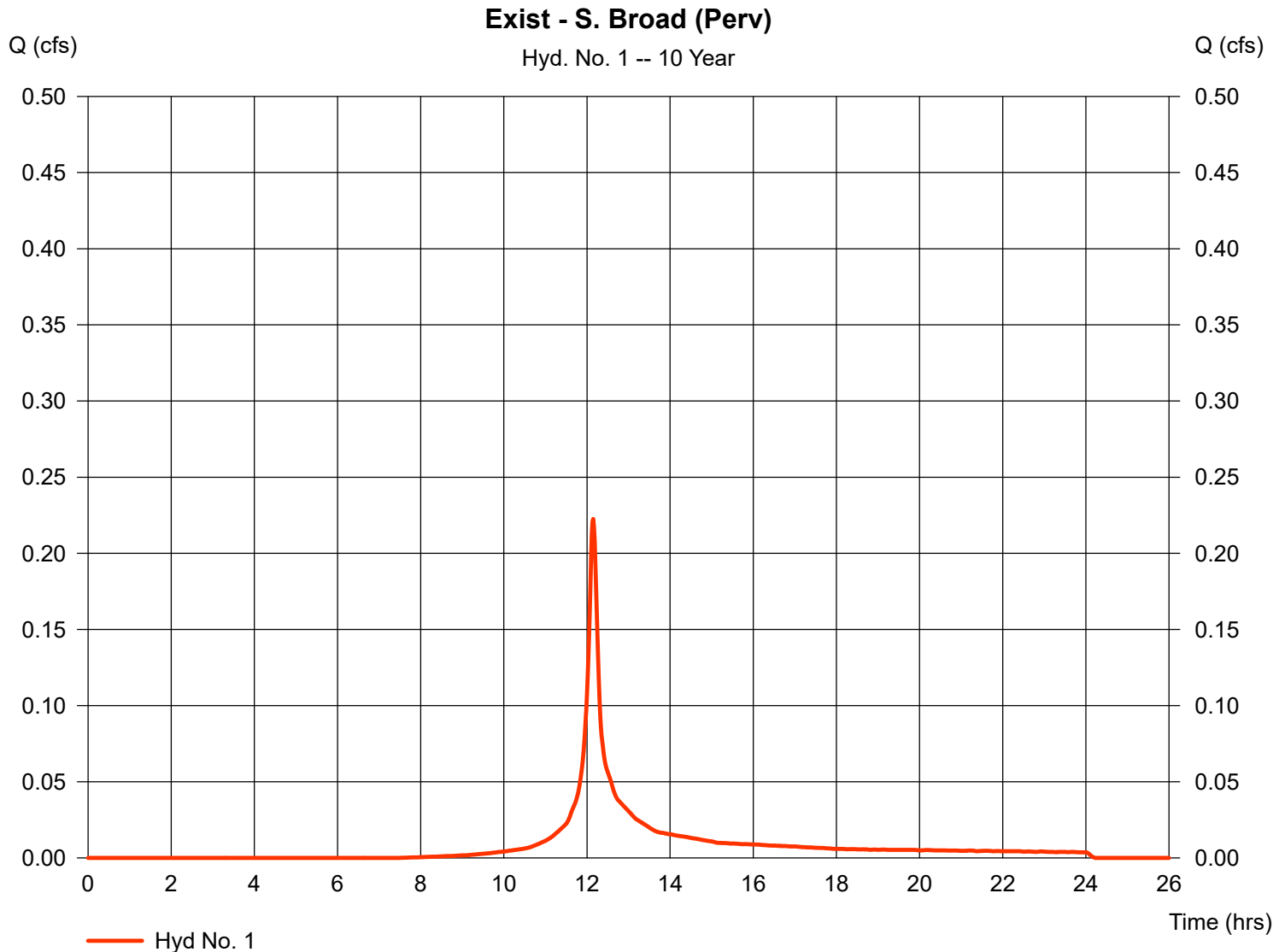
Monday, Nov 11, 2024

Hyd. No. 1

Exist - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.063 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.223 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 775 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.60 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 2

Exist - S. Broad (Gravel/Imperv)

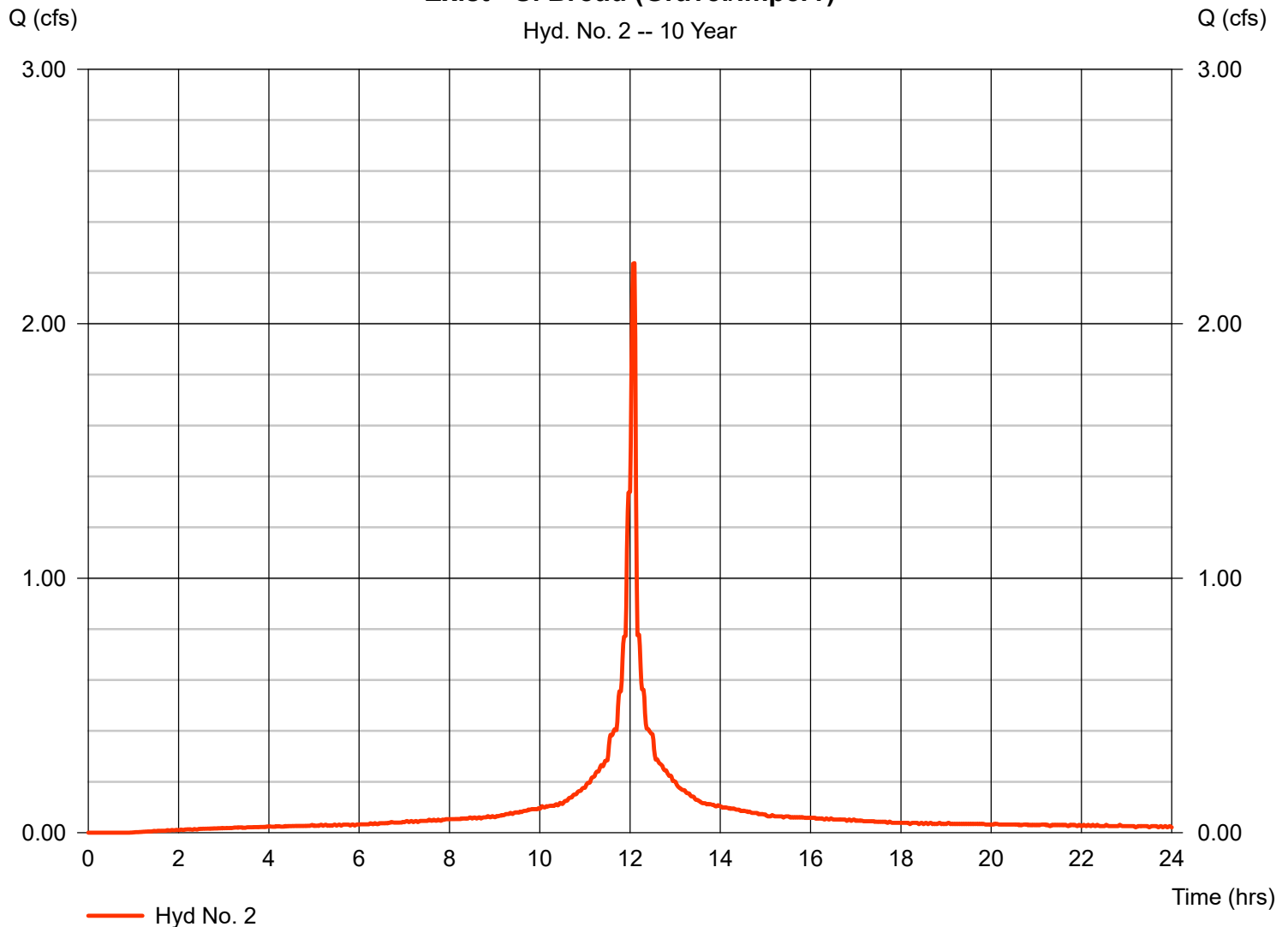
Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.366 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 2.238 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 7,328 cuft
 Curve number = 97*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 1.60 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = $[(0.028 \times 89) + (0.338 \times 98)] / 0.366$

Exist - S. Broad (Gravel/Imperv)

Hyd. No. 2 -- 10 Year



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

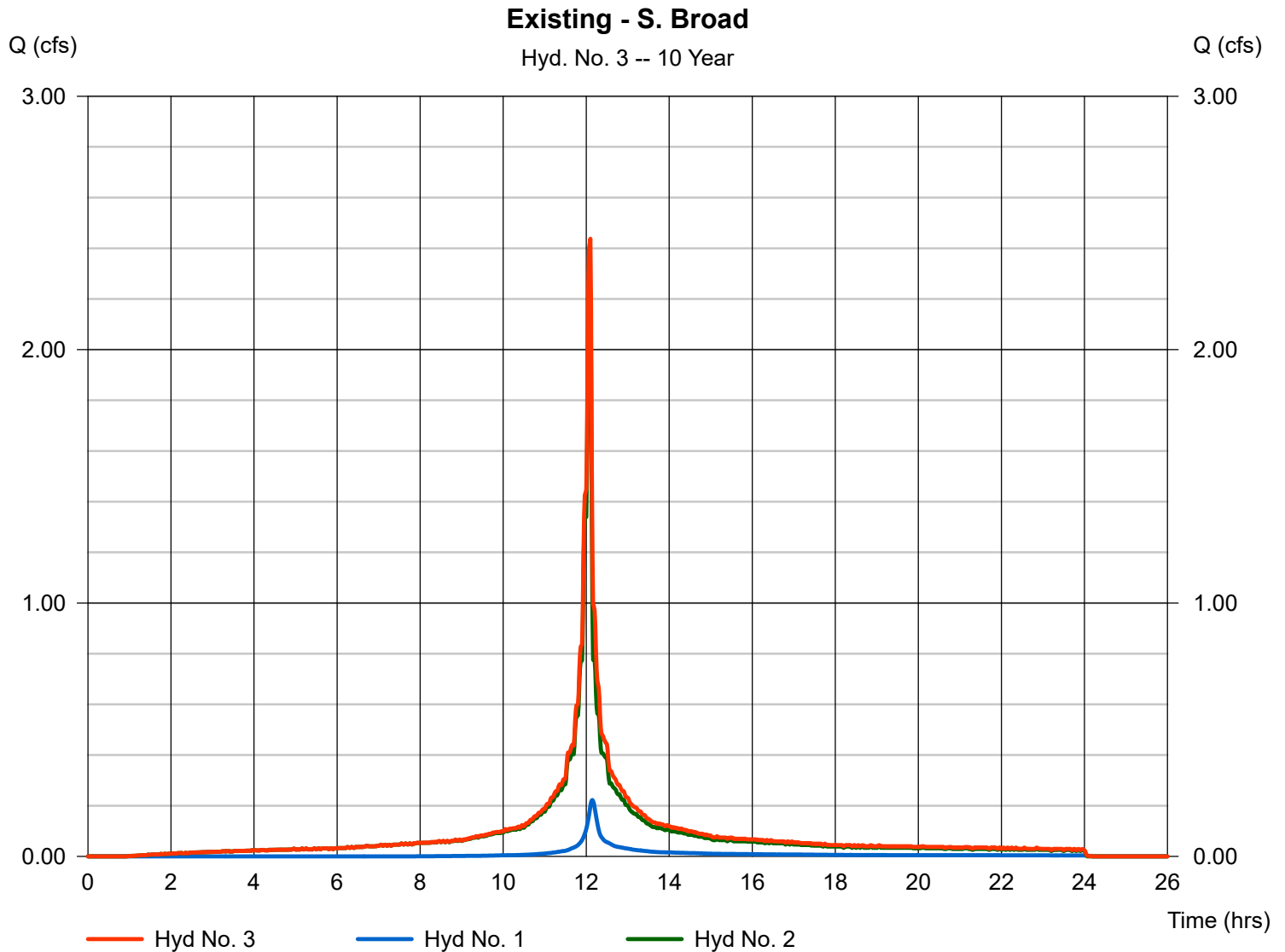
Monday, Nov 11, 2024

Hyd. No. 3

Existing - S. Broad

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

Peak discharge = 2.438 cfs
Time to peak = 12.10 hrs
Hyd. volume = 8,103 cuft
Contrib. drain. area = 0.429 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

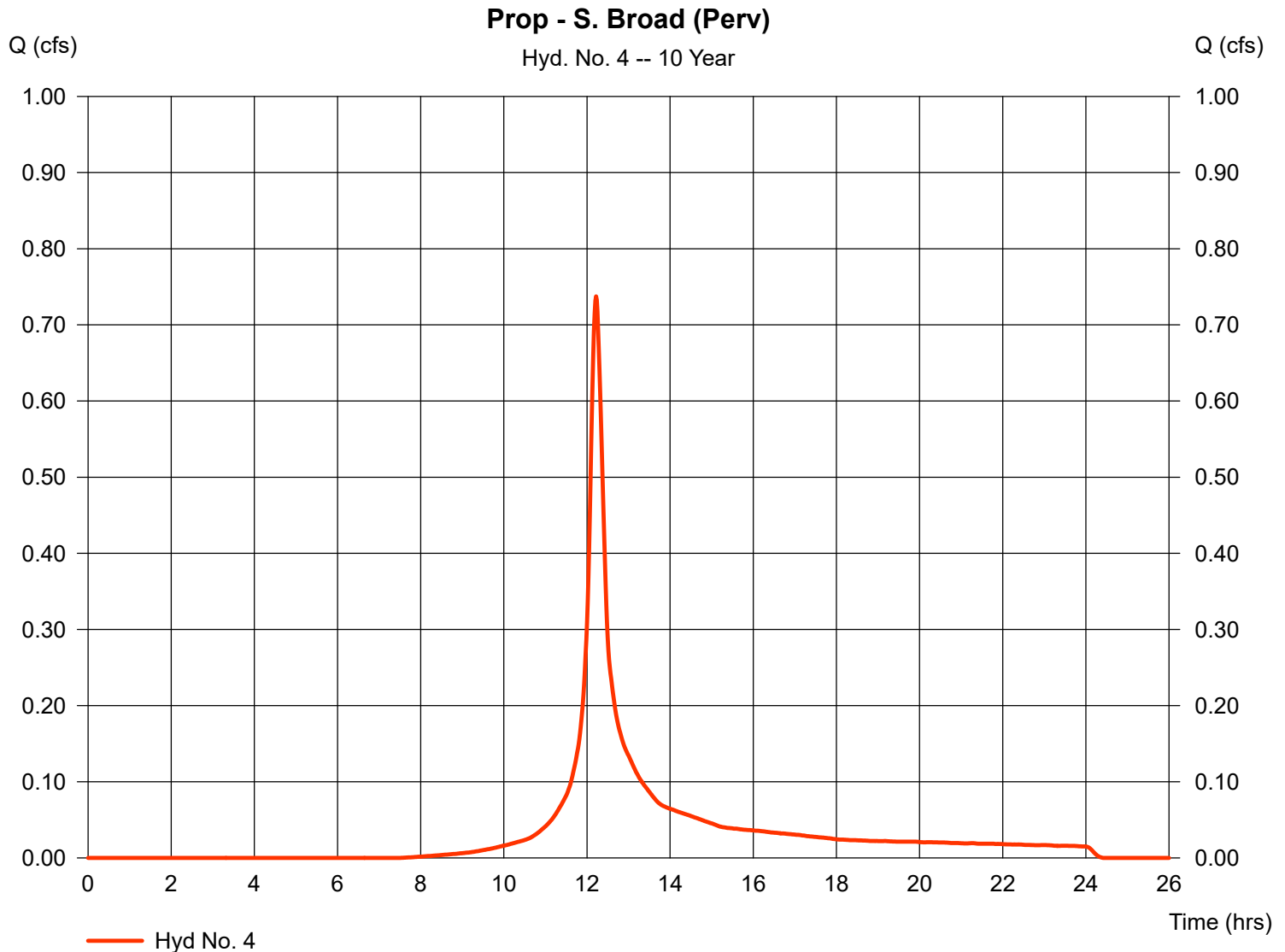
Monday, Nov 11, 2024

Hyd. No. 4

Prop - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.252 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.737 cfs
 Time to peak = 12.22 hrs
 Hyd. volume = 3,138 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.40 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

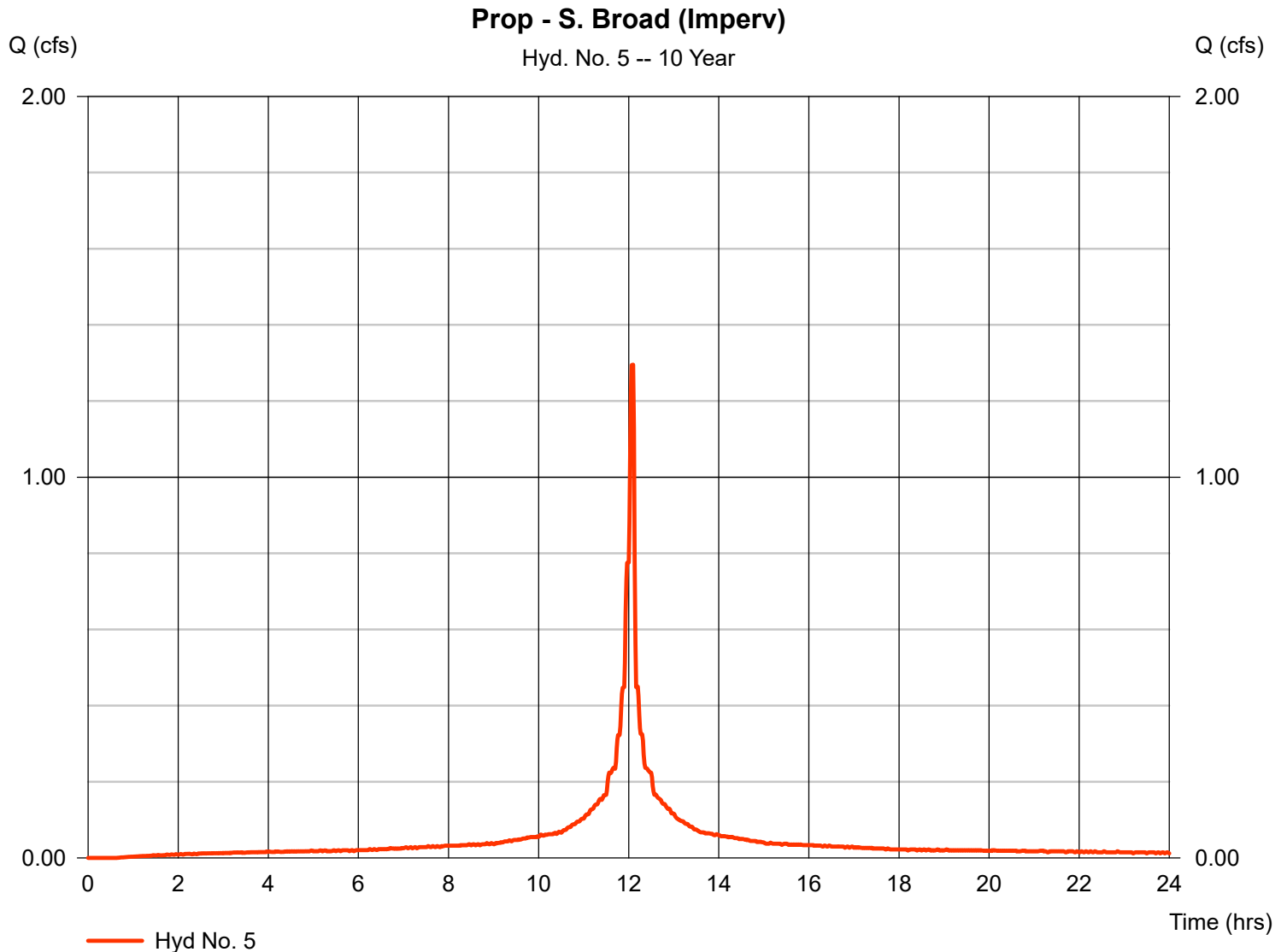
Monday, Nov 11, 2024

Hyd. No. 5

Prop - S. Broad (Imperv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.211 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 6.24 in
Storm duration = NOAA_D.cds

Peak discharge = 1.295 cfs
Time to peak = 12.10 hrs
Hyd. volume = 4,310 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 2.20 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

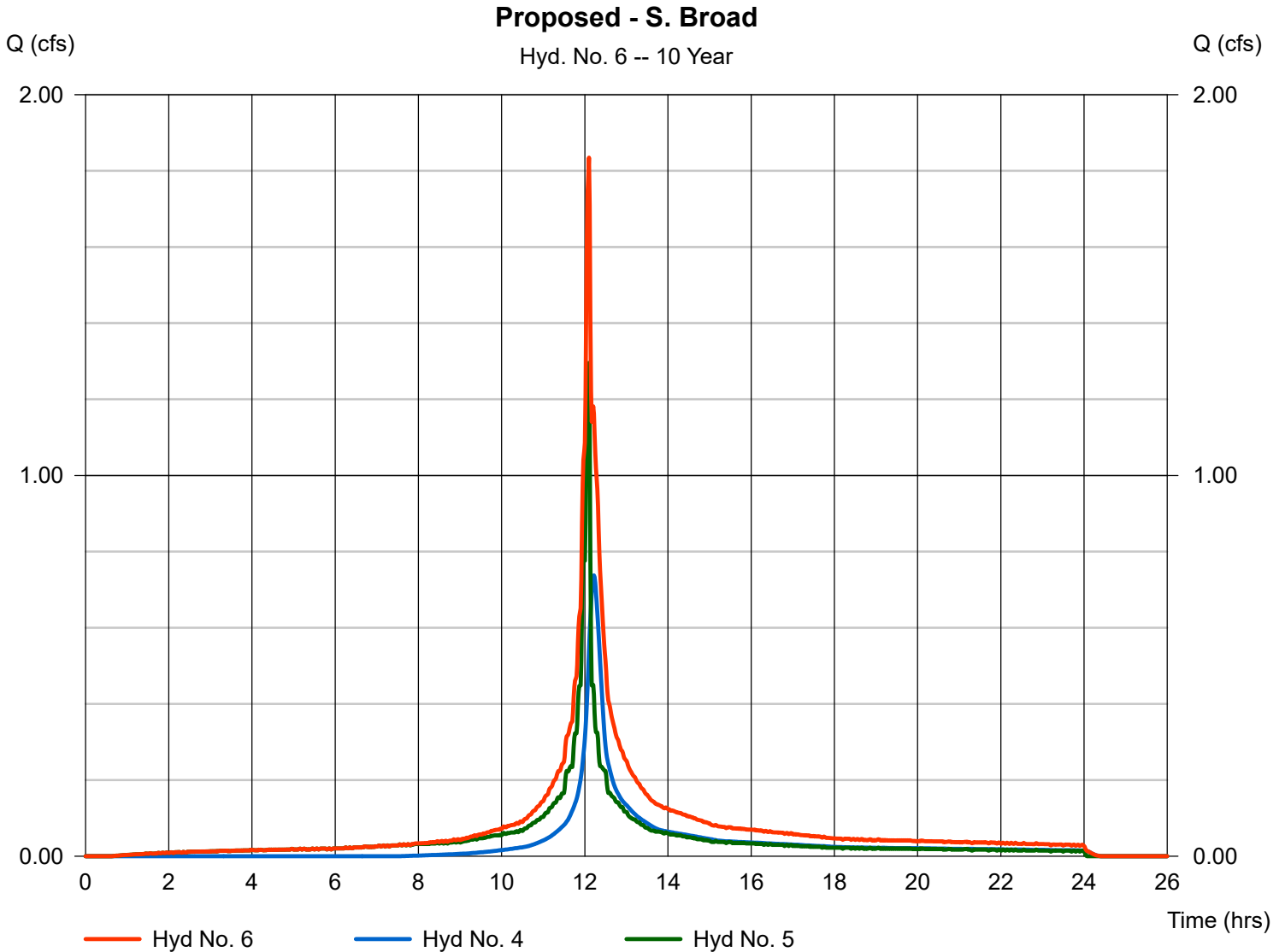
Monday, Nov 11, 2024

Hyd. No. 6

Proposed - S. Broad

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

Peak discharge = 1.835 cfs
Time to peak = 12.10 hrs
Hyd. volume = 7,447 cuft
Contrib. drain. area = 0.463 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

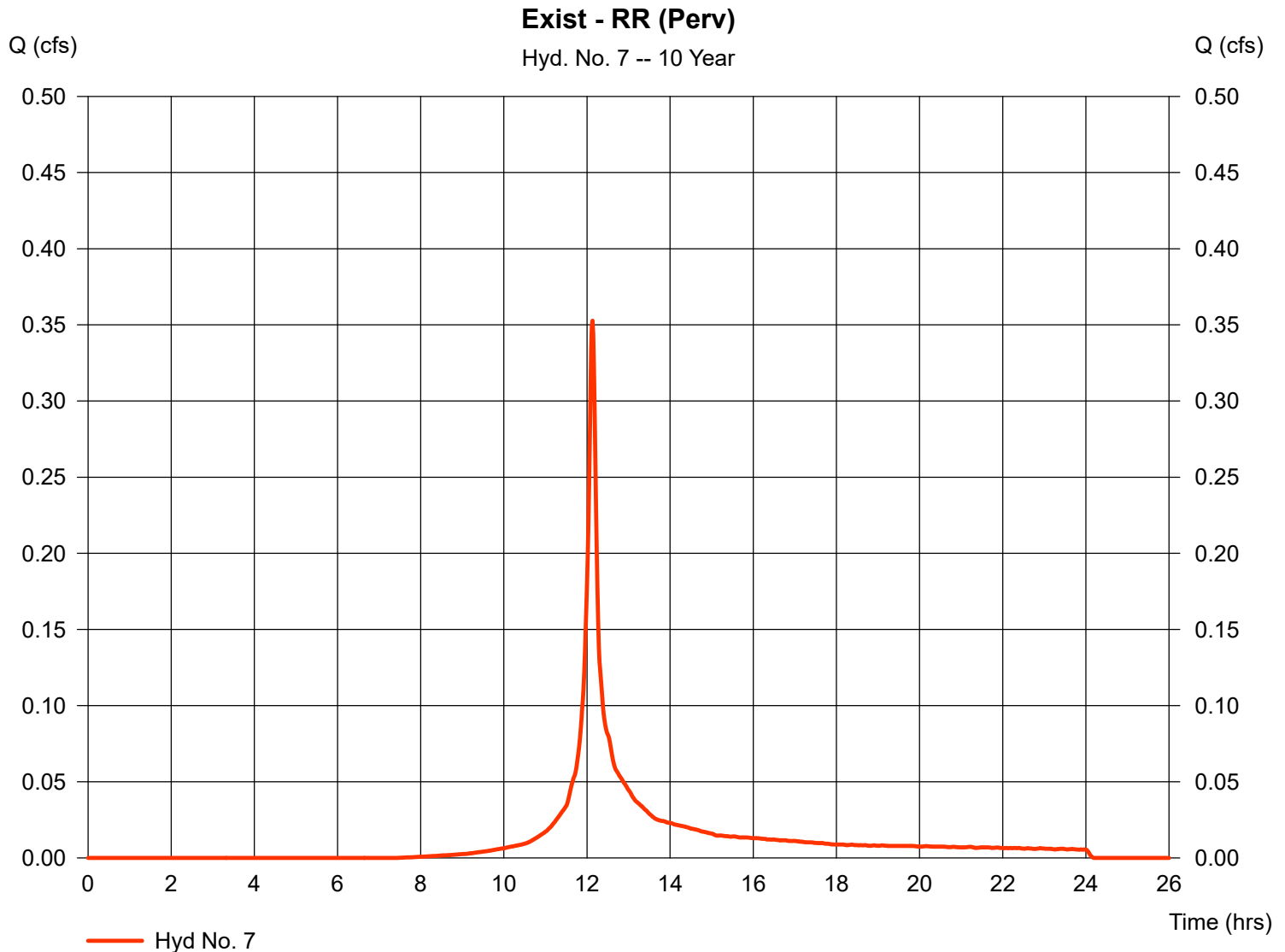
Monday, Nov 11, 2024

Hyd. No. 7

Exist - RR (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.096 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 6.24 in
Storm duration = NOAA_D.cds

Peak discharge = 0.353 cfs
Time to peak = 12.13 hrs
Hyd. volume = 1,151 cuft
Curve number = 74
Hydraulic length = 0 ft
Time of conc. (Tc) = 8.30 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

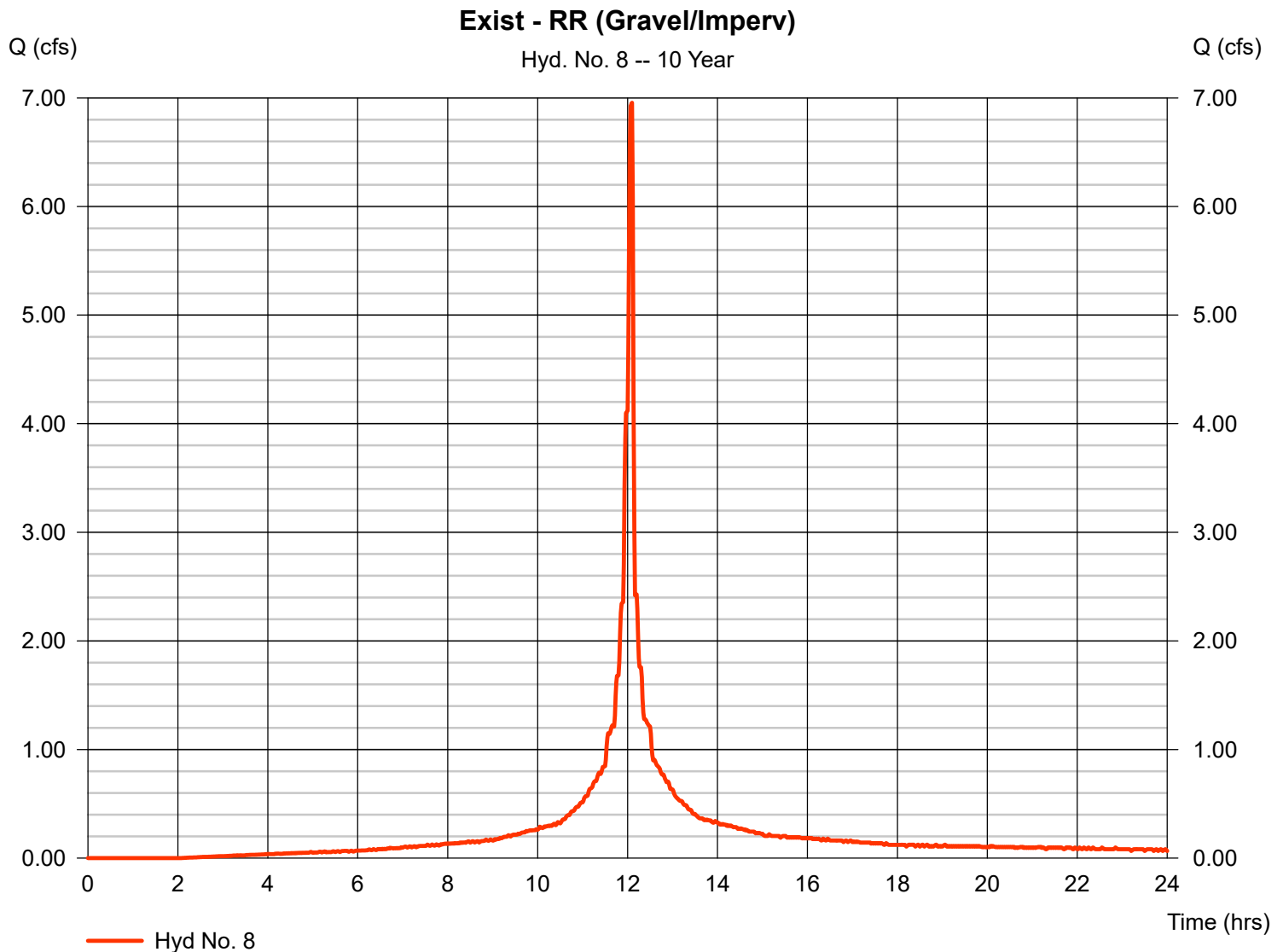
Monday, Nov 11, 2024

Hyd. No. 8

Exist - RR (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.955 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 21,579 cuft
Drainage area	= 1.170 ac	Curve number	= 93*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 6.24 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.667 x 89) + (0.503 x 98)] / 1.170



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

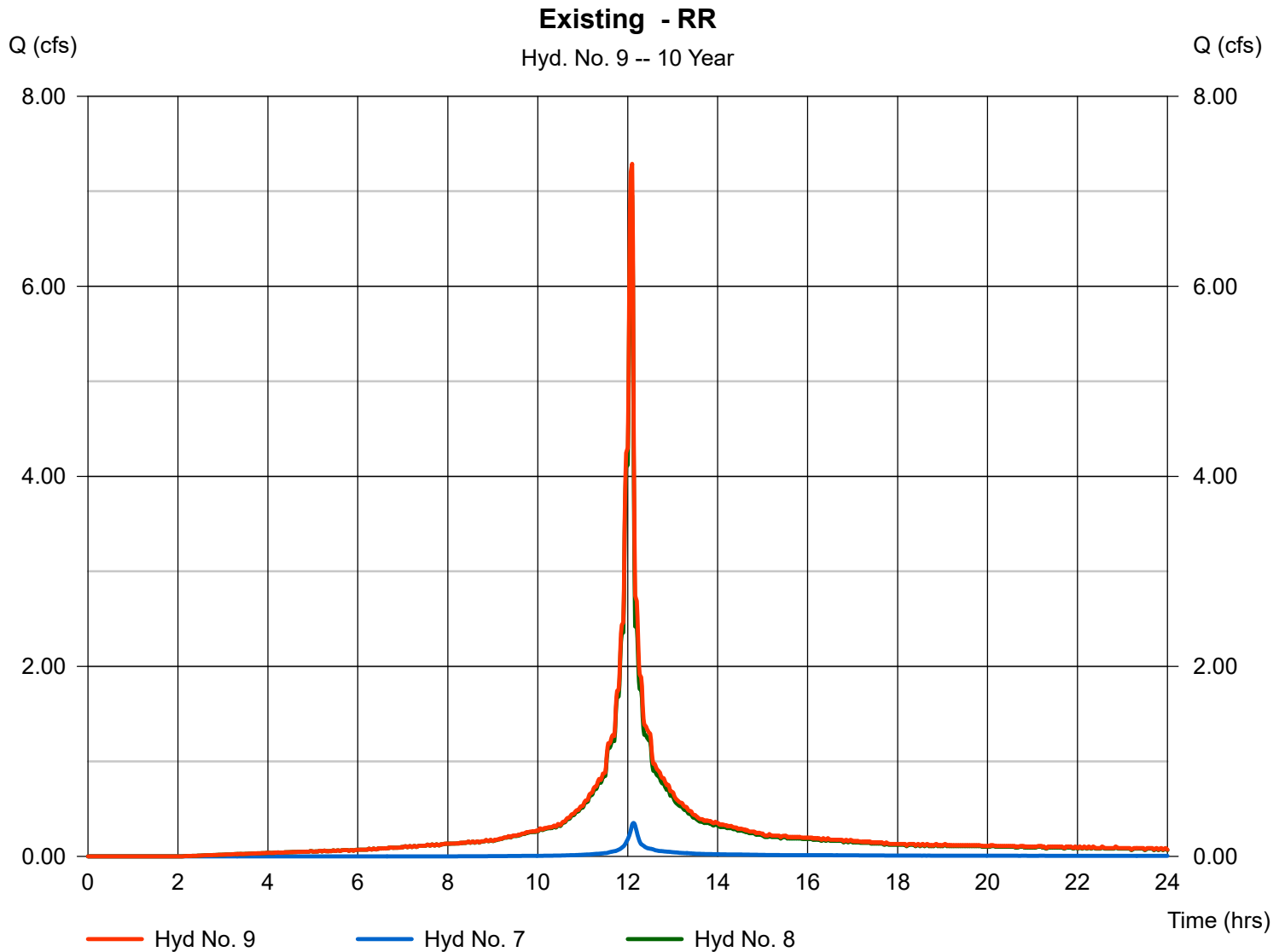
Monday, Nov 11, 2024

Hyd. No. 9

Existing - RR

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 7, 8

Peak discharge = 7.289 cfs
Time to peak = 12.10 hrs
Hyd. volume = 22,730 cuft
Contrib. drain. area = 1.266 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

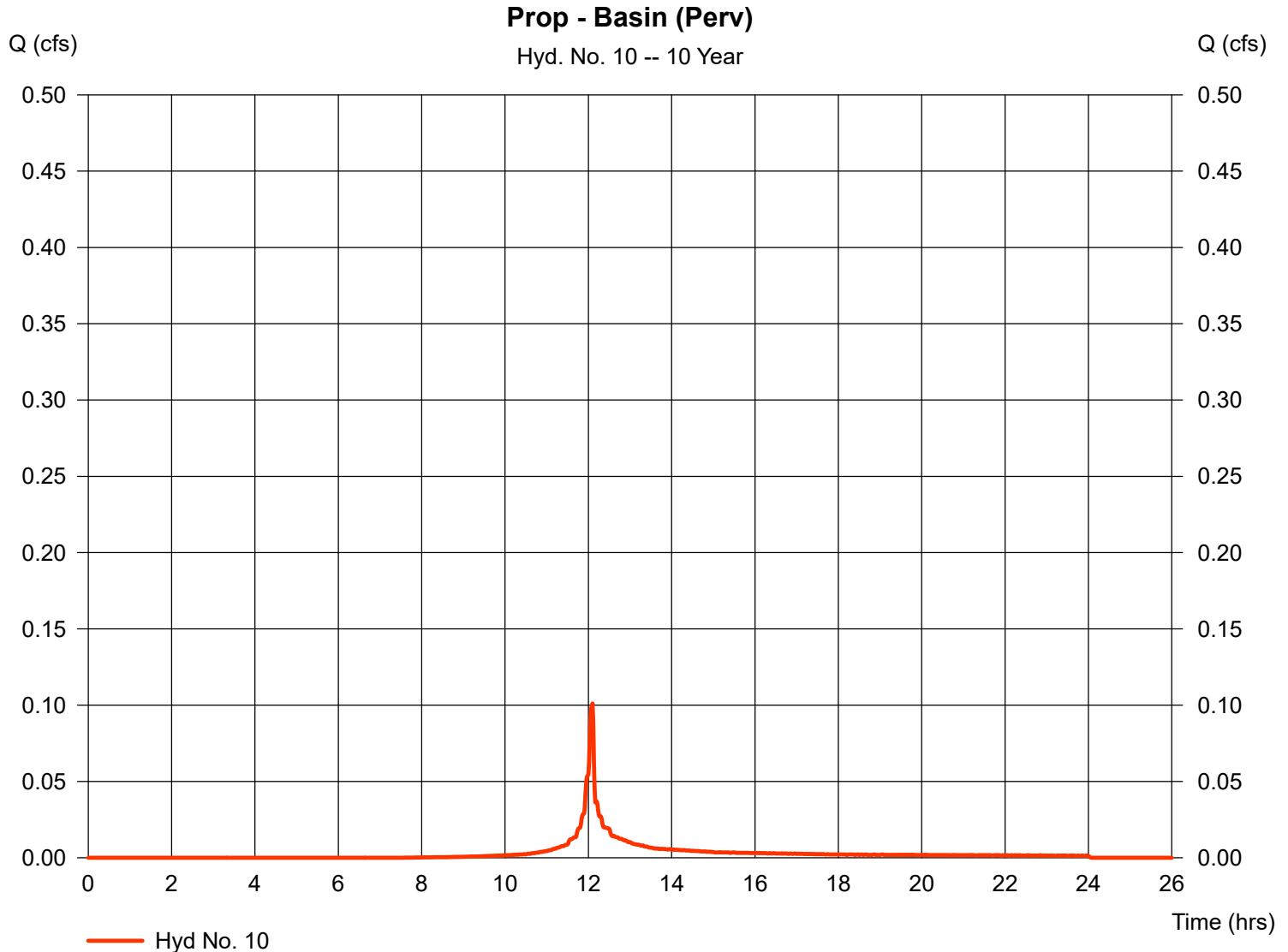
Monday, Nov 11, 2024

Hyd. No. 10

Prop - Basin (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.024 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.101 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 277 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 3.10 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

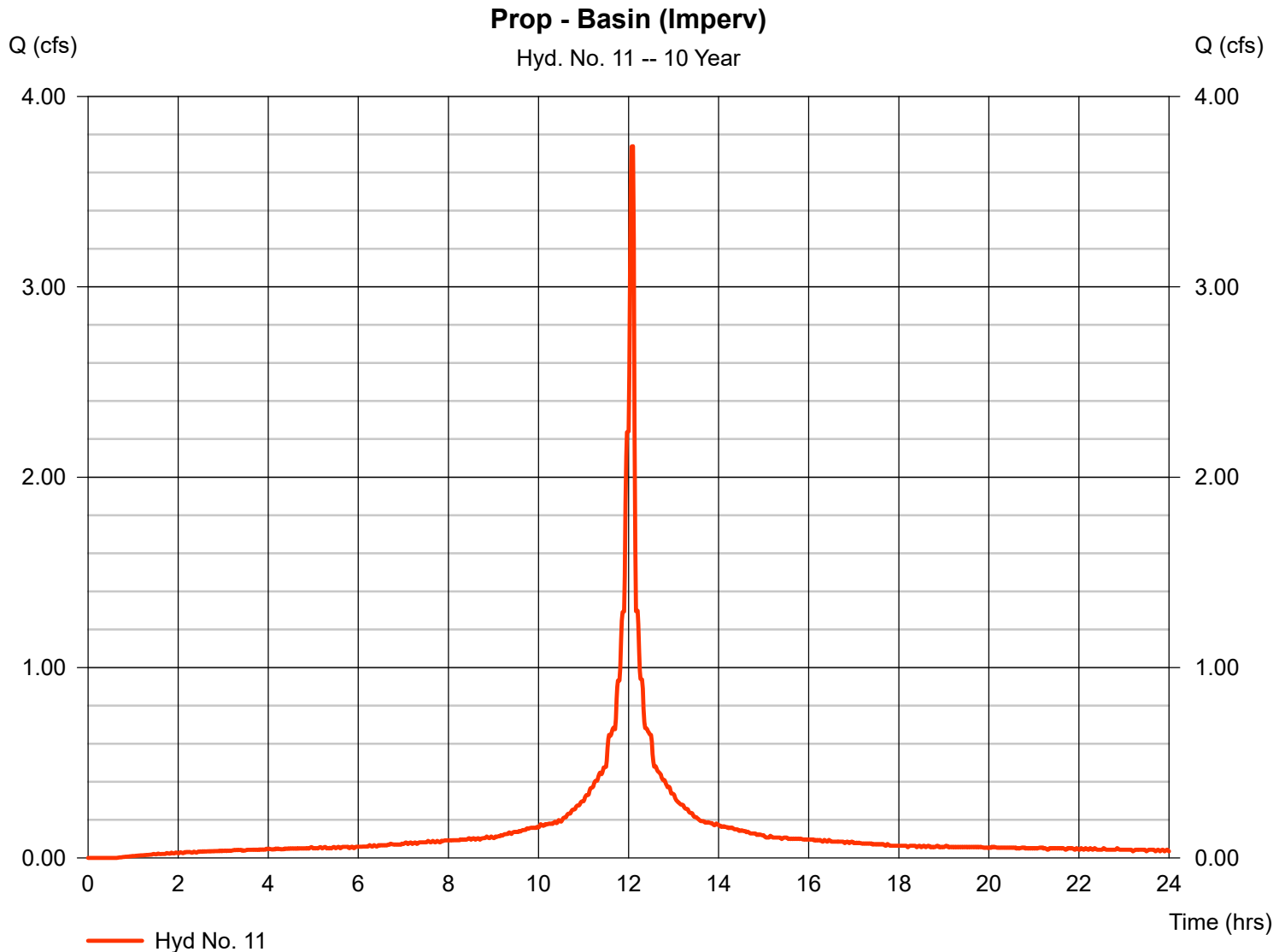
Monday, Nov 11, 2024

Hyd. No. 11

Prop - Basin (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.609 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 3.738 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 12,438 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

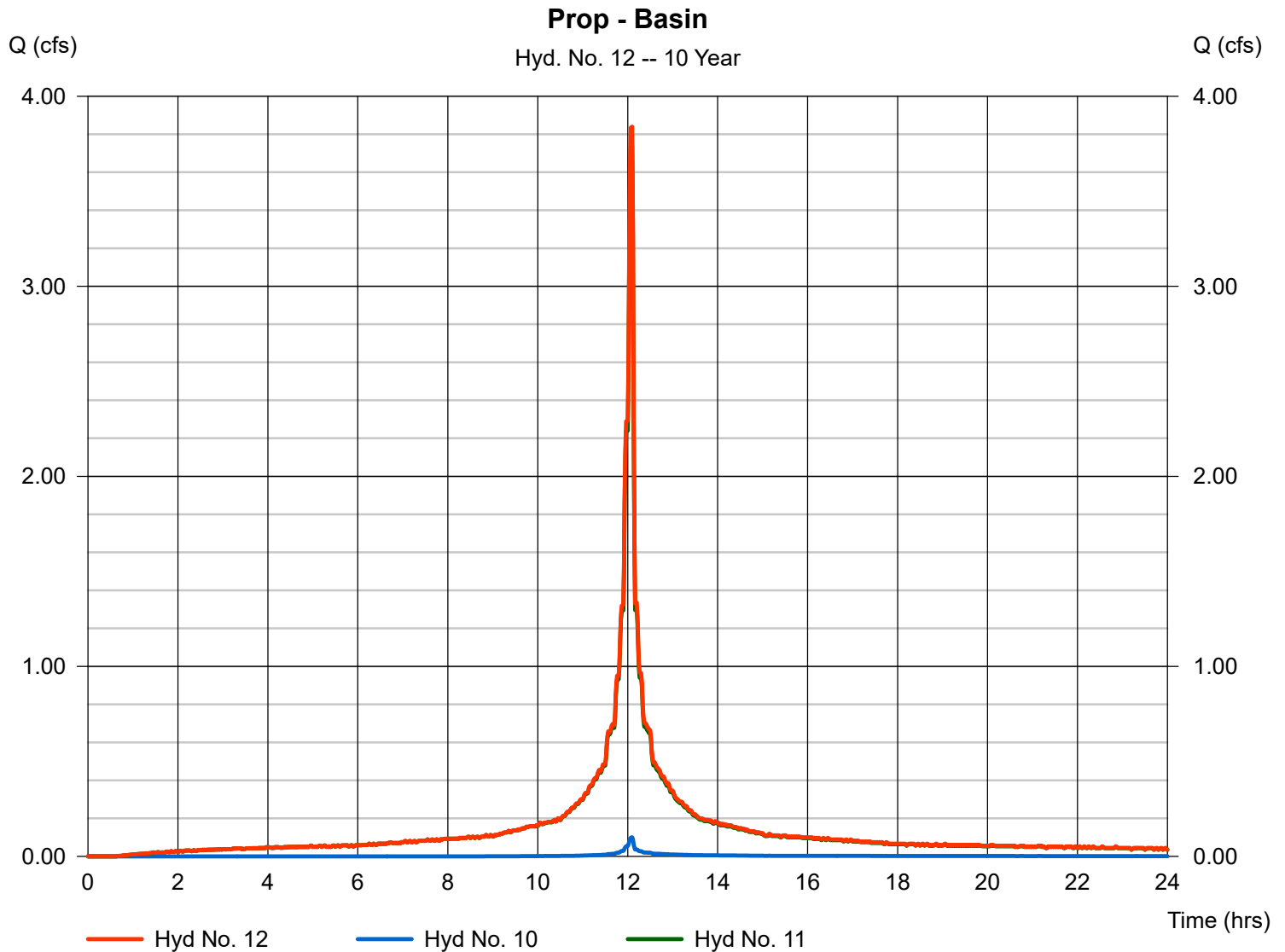
Monday, Nov 11, 2024

Hyd. No. 12

Prop - Basin

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

Peak discharge = 3.839 cfs
Time to peak = 12.10 hrs
Hyd. volume = 12,715 cuft
Contrib. drain. area = 0.633 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

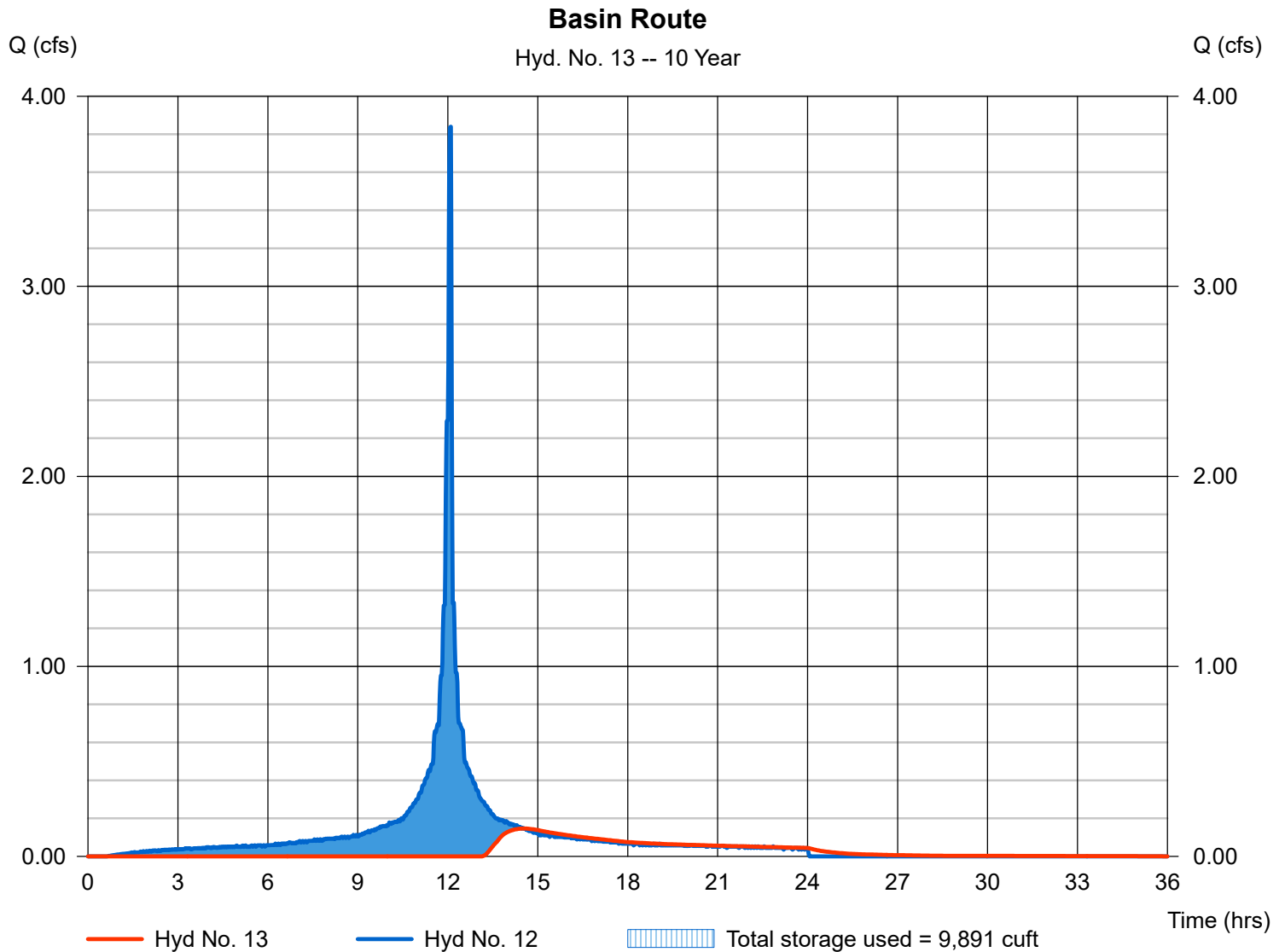
Hyd. No. 13

Basin Route

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyd. No. = 12 - Prop - Basin
Reservoir name = Basin

Peak discharge = 0.146 cfs
Time to peak = 14.55 hrs
Hyd. volume = 3,328 cuft
Max. Elevation = 148.92 ft
Max. Storage = 9,891 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

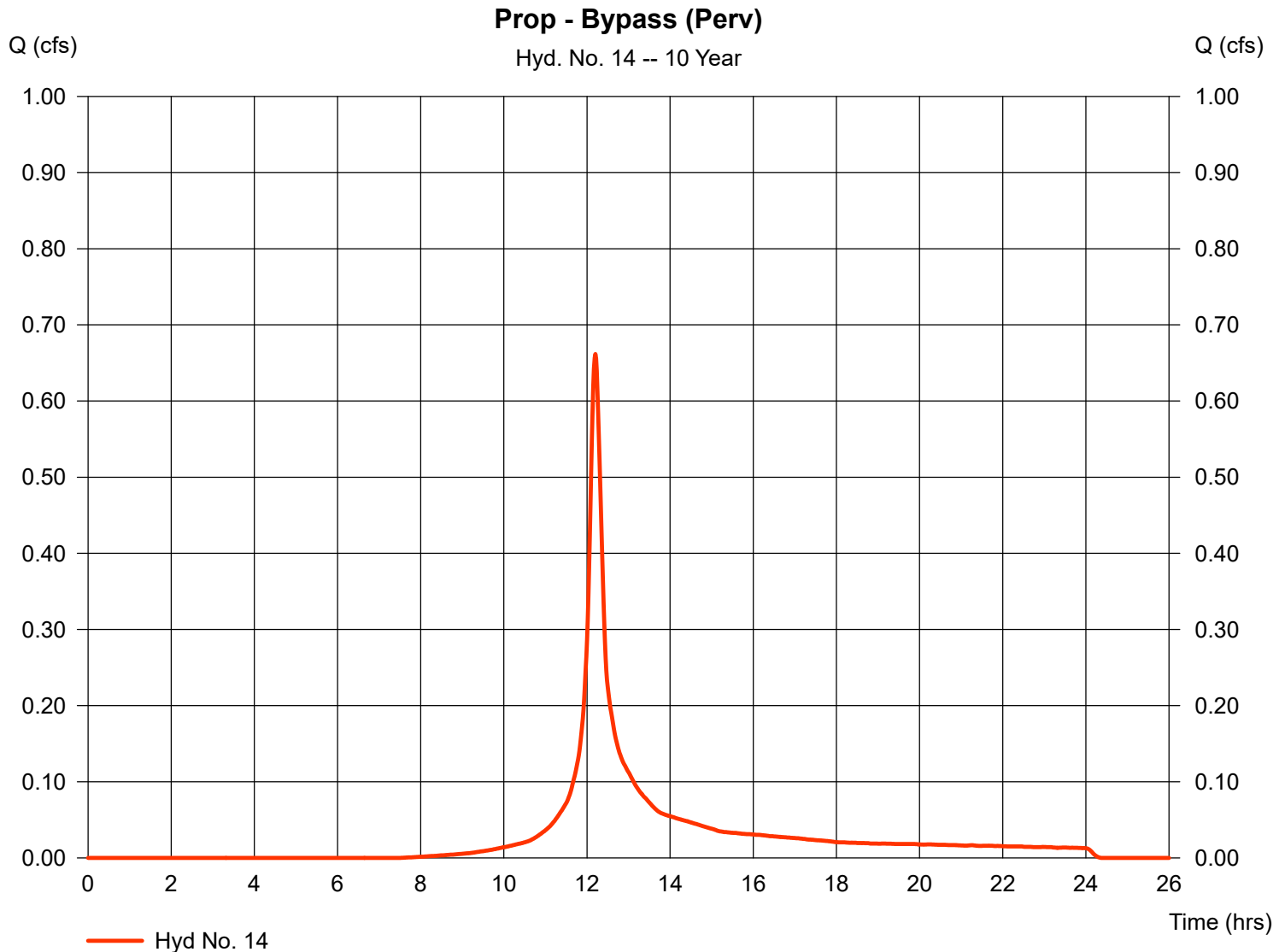
Hyd. No. 14

Prop - Bypass (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.218 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.662 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 2,681 cuft
 Curve number = 74*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.00 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = [(0.161 x 98) + (0.426 x 98)] / 0.218



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

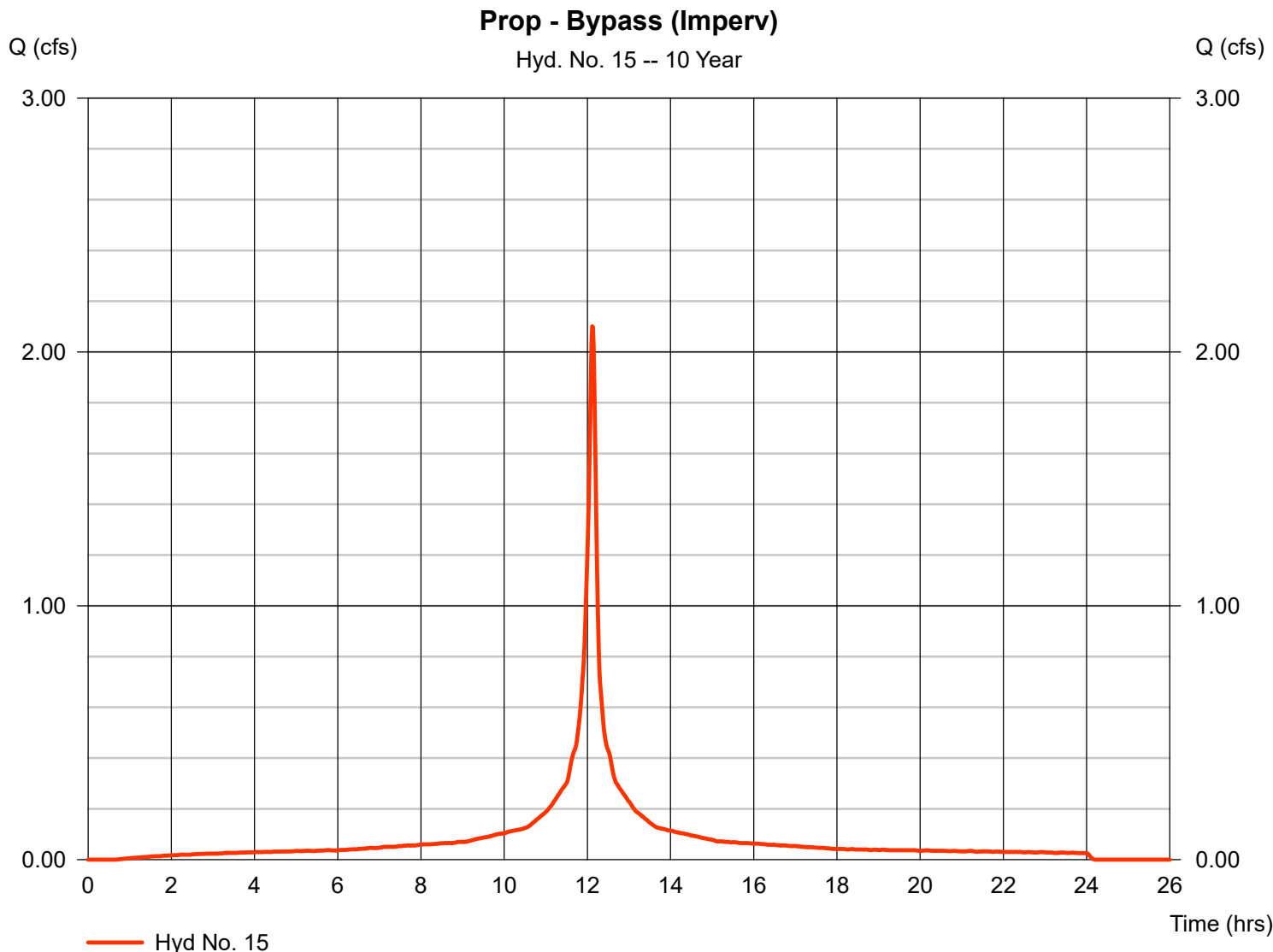
Monday, Nov 11, 2024

Hyd. No. 15

Prop - Bypass (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 0.381 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.24 in
 Storm duration = NOAA_D.cds

Peak discharge = 2.101 cfs
 Time to peak = 12.12 hrs
 Hyd. volume = 8,093 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 6.90 min
 Distribution = Custom
 Shape factor = 484



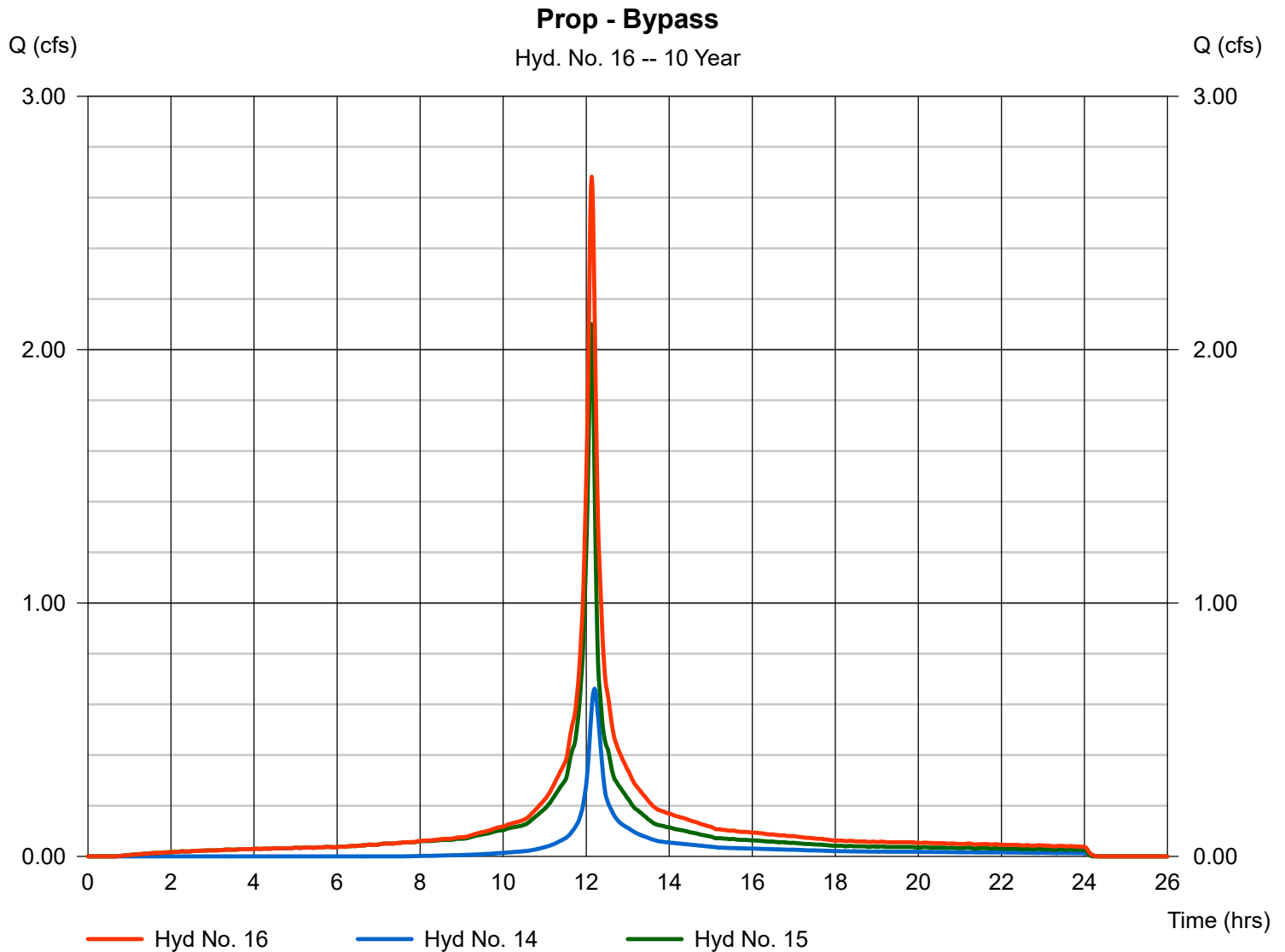
Hydrograph Report

Hyd. No. 16

Prop - Bypass

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 14, 15

Peak discharge = 2.682 cfs
Time to peak = 12.13 hrs
Hyd. volume = 10,774 cuft
Contrib. drain. area = 0.599 ac



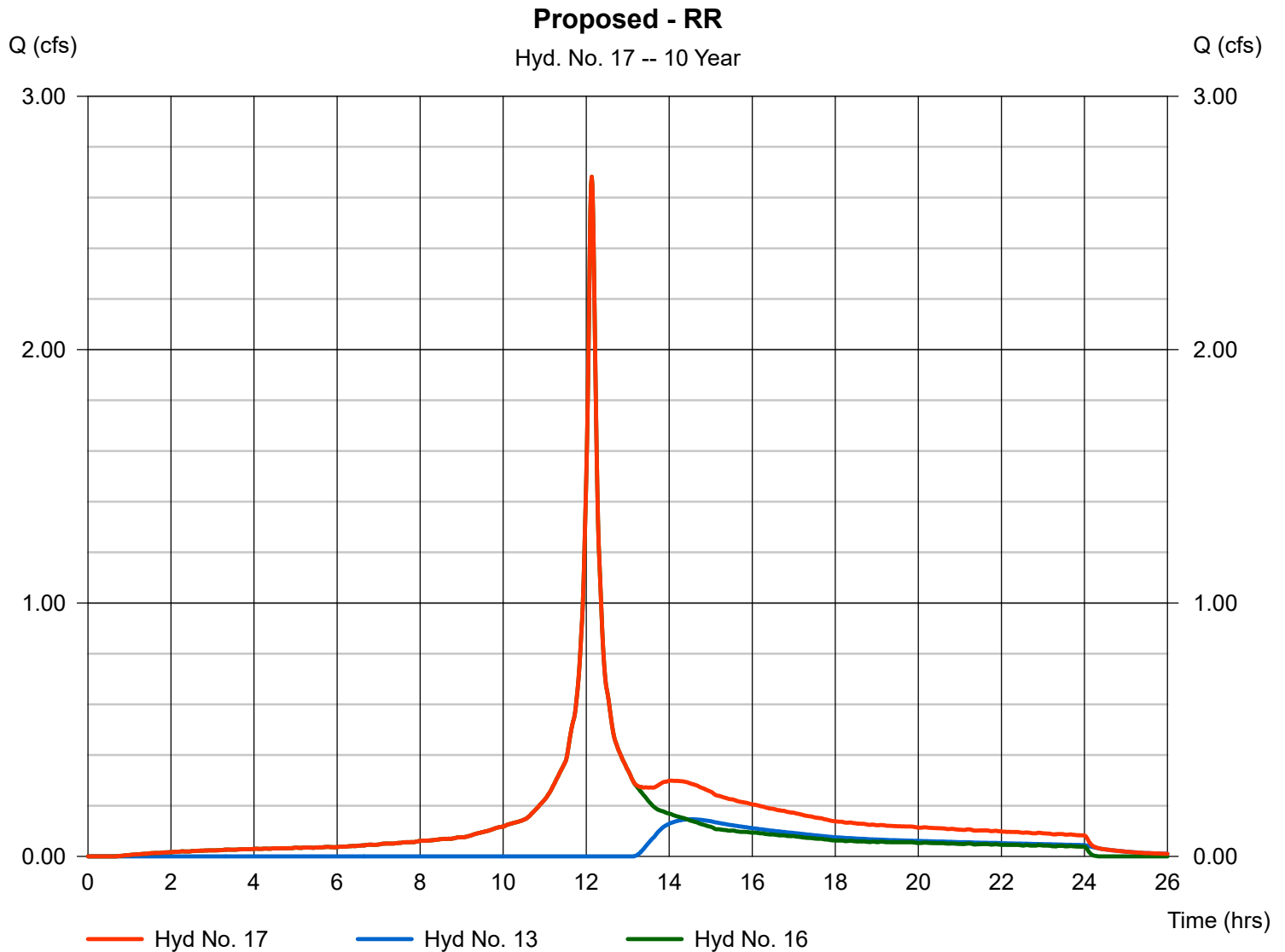
Hydrograph Report

Hyd. No. 17

Proposed - RR

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyds. = 13, 16

Peak discharge = 2.682 cfs
Time to peak = 12.13 hrs
Hyd. volume = 14,102 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description	
1	SCS Runoff	0.526	1	729	1,885	-----	-----	-----	Exist - S. Broad (Perv)	
2	SCS Runoff	4.181	1	726	13,996	-----	-----	-----	Exist - S. Broad (Gravel/Imperv)	
3	Combine	4.661	1	726	15,881	1, 2	-----	-----	Existing - S. Broad	
4	SCS Runoff	1.753	1	733	7,632	-----	-----	-----	Prop - S. Broad (Perv)	
5	SCS Runoff	2.413	1	726	8,156	-----	-----	-----	Prop - S. Broad (Imperv)	
6	Combine	3.746	1	726	15,788	4, 5	-----	-----	Proposed - S. Broad	
7	SCS Runoff	0.831	1	728	2,800	-----	-----	-----	Exist - RR (Perv)	
8	SCS Runoff	13.24	1	726	42,776	-----	-----	-----	Exist - RR (Gravel/Imperv)	
9	Combine	14.04	1	726	45,576	7, 8	-----	-----	Existing - RR	
10	SCS Runoff	0.235	1	726	673	-----	-----	-----	Prop - Basin (Perv)	
11	SCS Runoff	6.965	1	726	23,541	-----	-----	-----	Prop - Basin (Imperv)	
12	Combine	7.200	1	726	24,214	10, 11	-----	-----	Prop - Basin	
13	Reservoir	4.002	1	727	14,827	12	150.00	12,291	Basin Route	
14	SCS Runoff	1.571	1	732	6,521	-----	-----	-----	Prop - Bypass (Perv)	
15	SCS Runoff	3.916	1	727	15,317	-----	-----	-----	Prop - Bypass (Imperv)	
16	Combine	5.326	1	728	21,838	14, 15	-----	-----	Prop - Bypass	
17	Combine	9.301	1	728	36,665	13, 16	-----	-----	Proposed - RR	
22-146(F).gpw					Return Period: 100 Year			Monday, Nov 11, 2024		

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

Hyd. No. 1

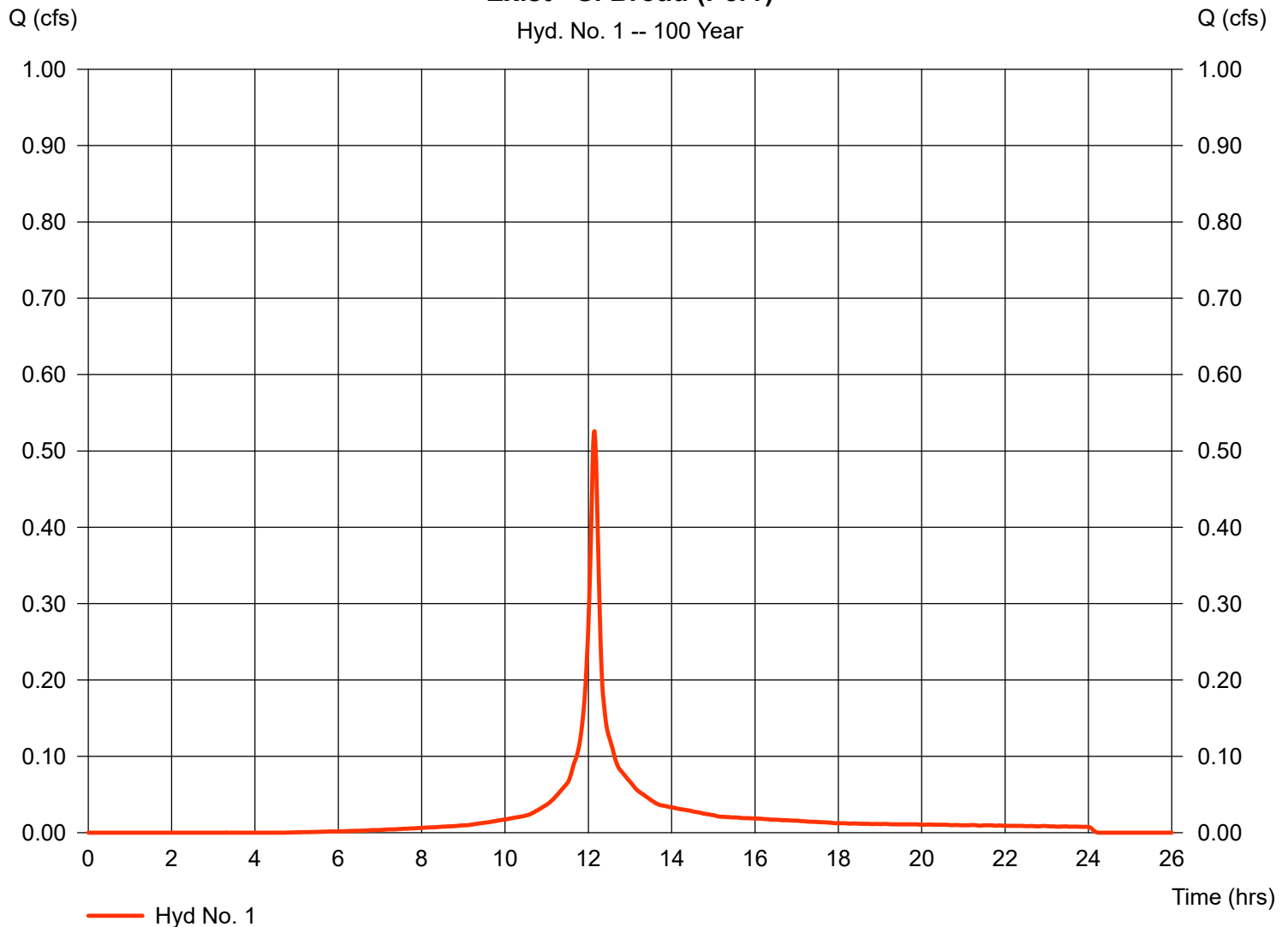
Exist - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.063 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 11.60 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.526 cfs
 Time to peak = 12.15 hrs
 Hyd. volume = 1,885 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 8.60 min
 Distribution = Custom
 Shape factor = 484

Exist - S. Broad (Perv)

Hyd. No. 1 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

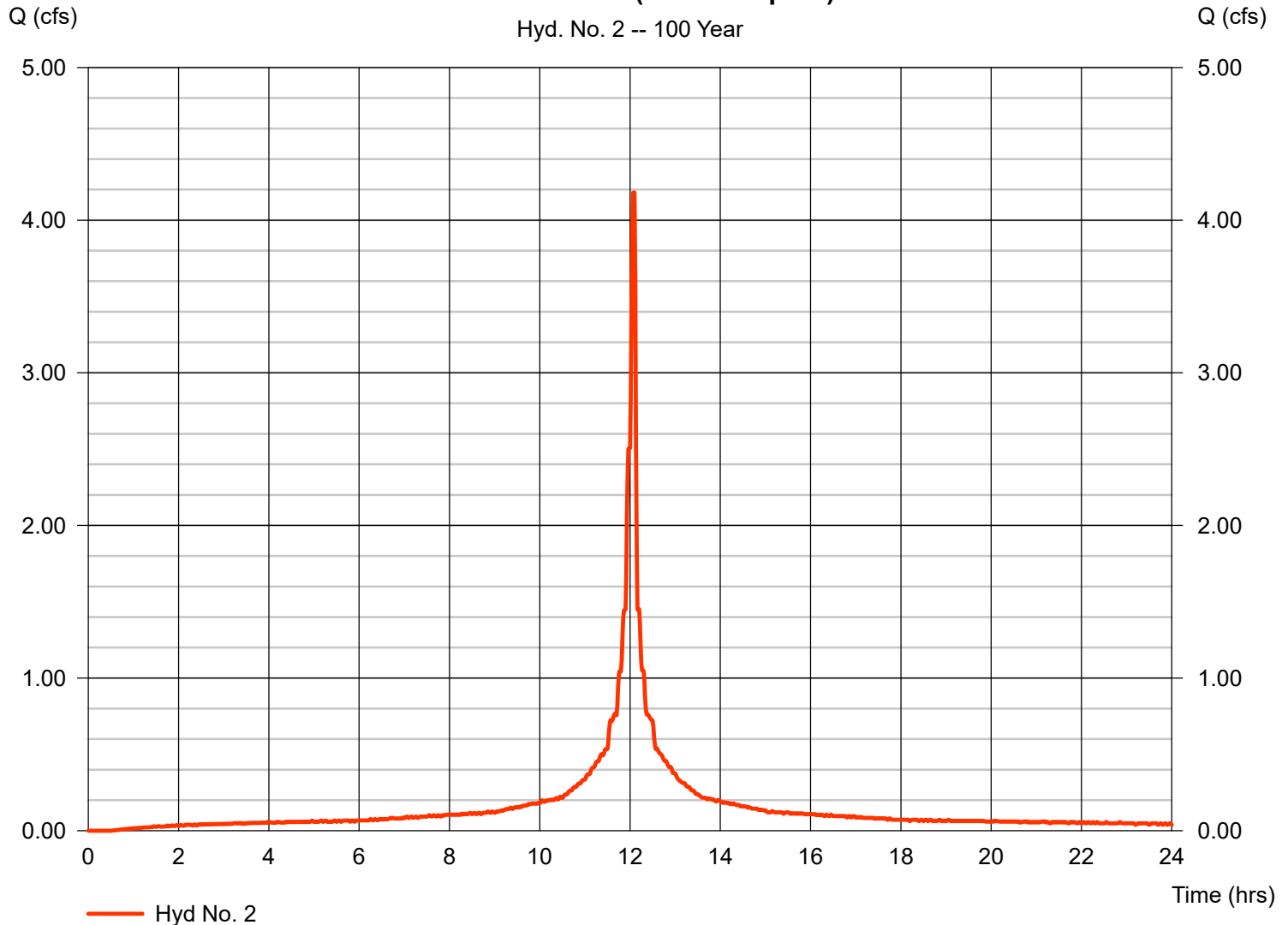
Hyd. No. 2

Exist - S. Broad (Gravel/Imperv)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.181 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 1 min	Hyd. volume	= 13,996 cuft
Drainage area	= 0.366 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 1.60 min
Total precip.	= 11.60 in	Distribution	= Custom
Storm duration	= NOAA_D.cds	Shape factor	= 484

* Composite (Area/CN) = [(0.028 x 89) + (0.338 x 98)] / 0.366

Exist - S. Broad (Gravel/Imperv)



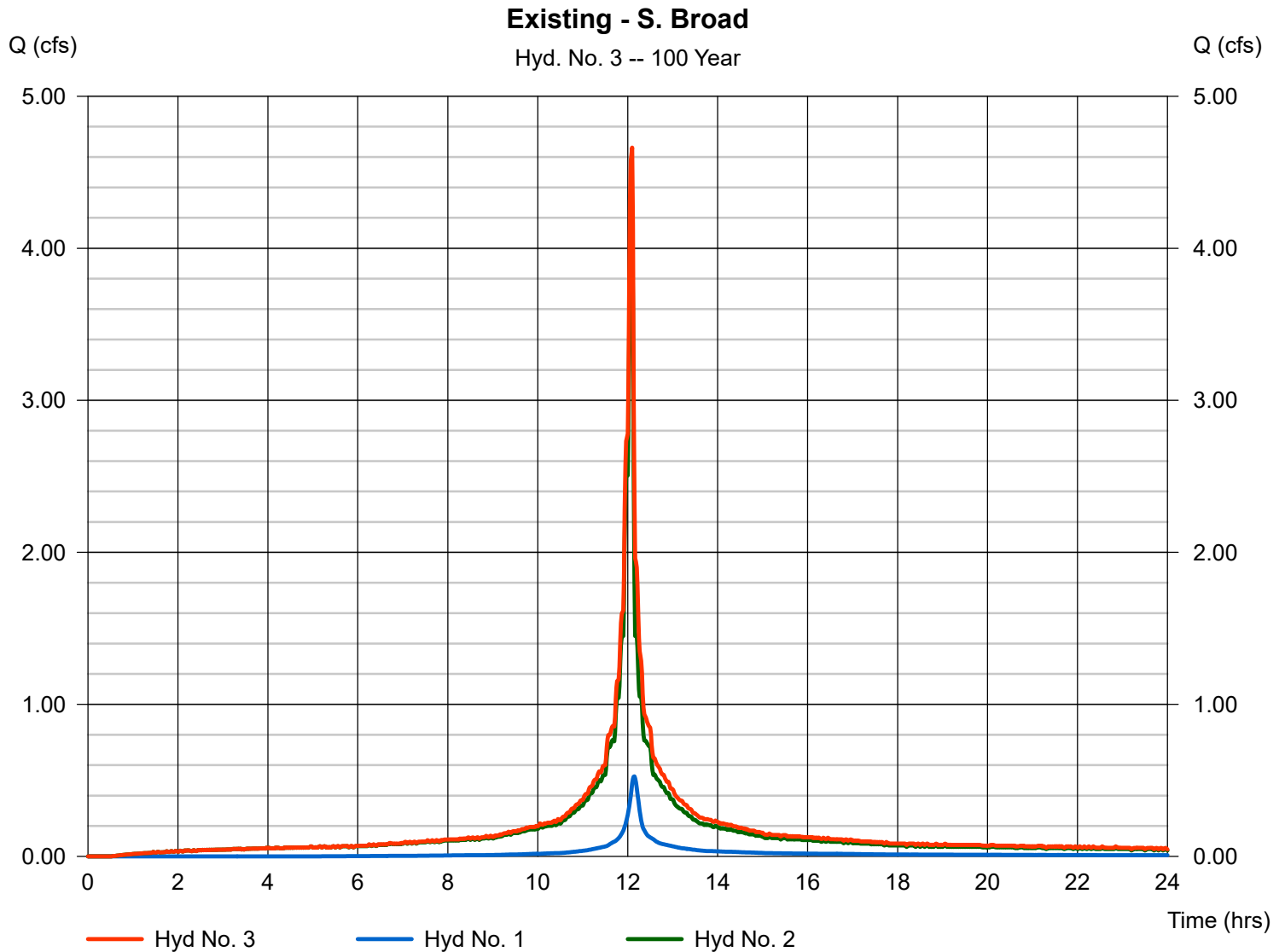
Hydrograph Report

Hyd. No. 3

Existing - S. Broad

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 1, 2

Peak discharge = 4.661 cfs
Time to peak = 12.10 hrs
Hyd. volume = 15,881 cuft
Contrib. drain. area = 0.429 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

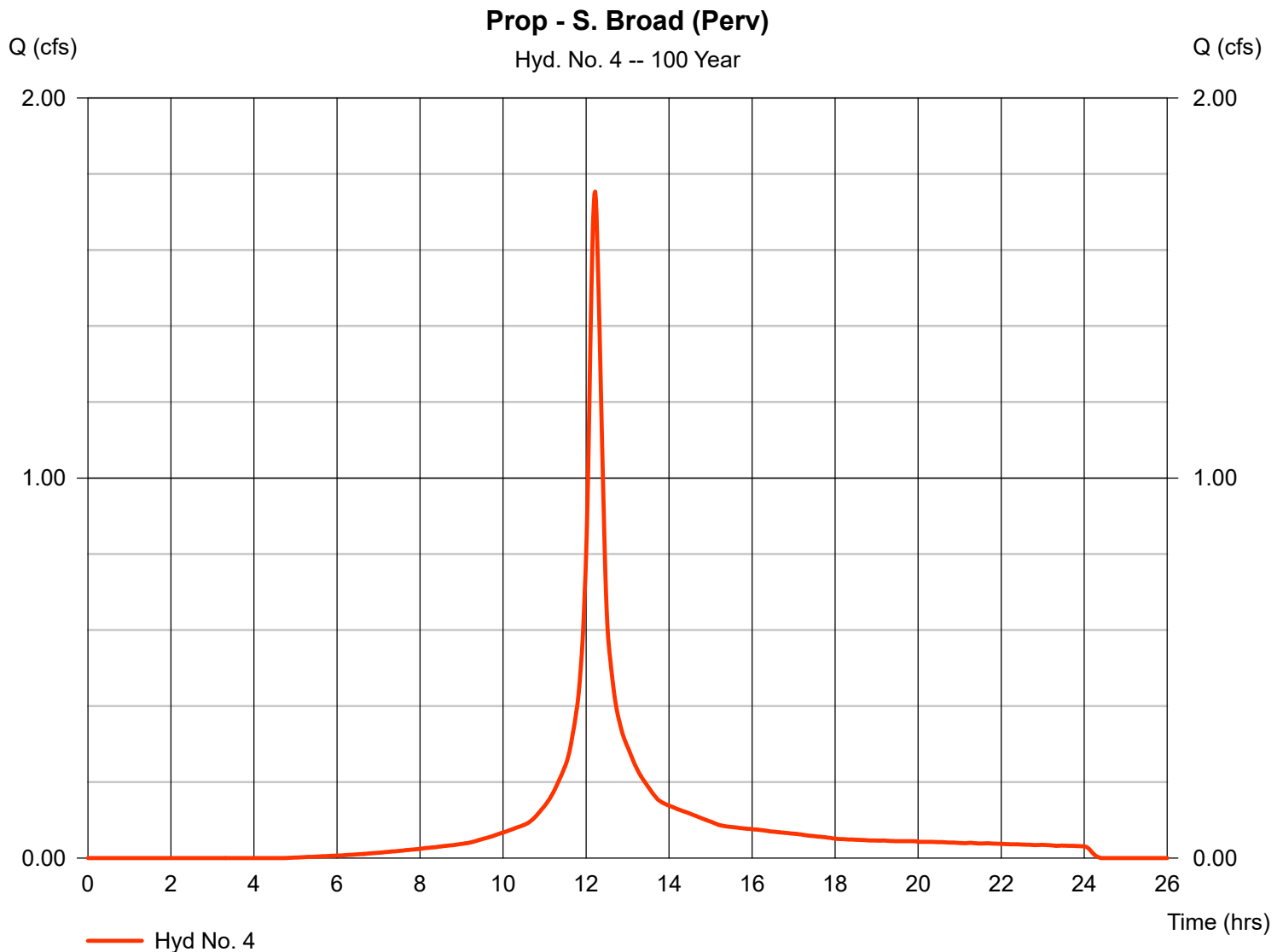
Monday, Nov 11, 2024

Hyd. No. 4

Prop - S. Broad (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.252 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 11.60 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.753 cfs
 Time to peak = 12.22 hrs
 Hyd. volume = 7,632 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.40 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

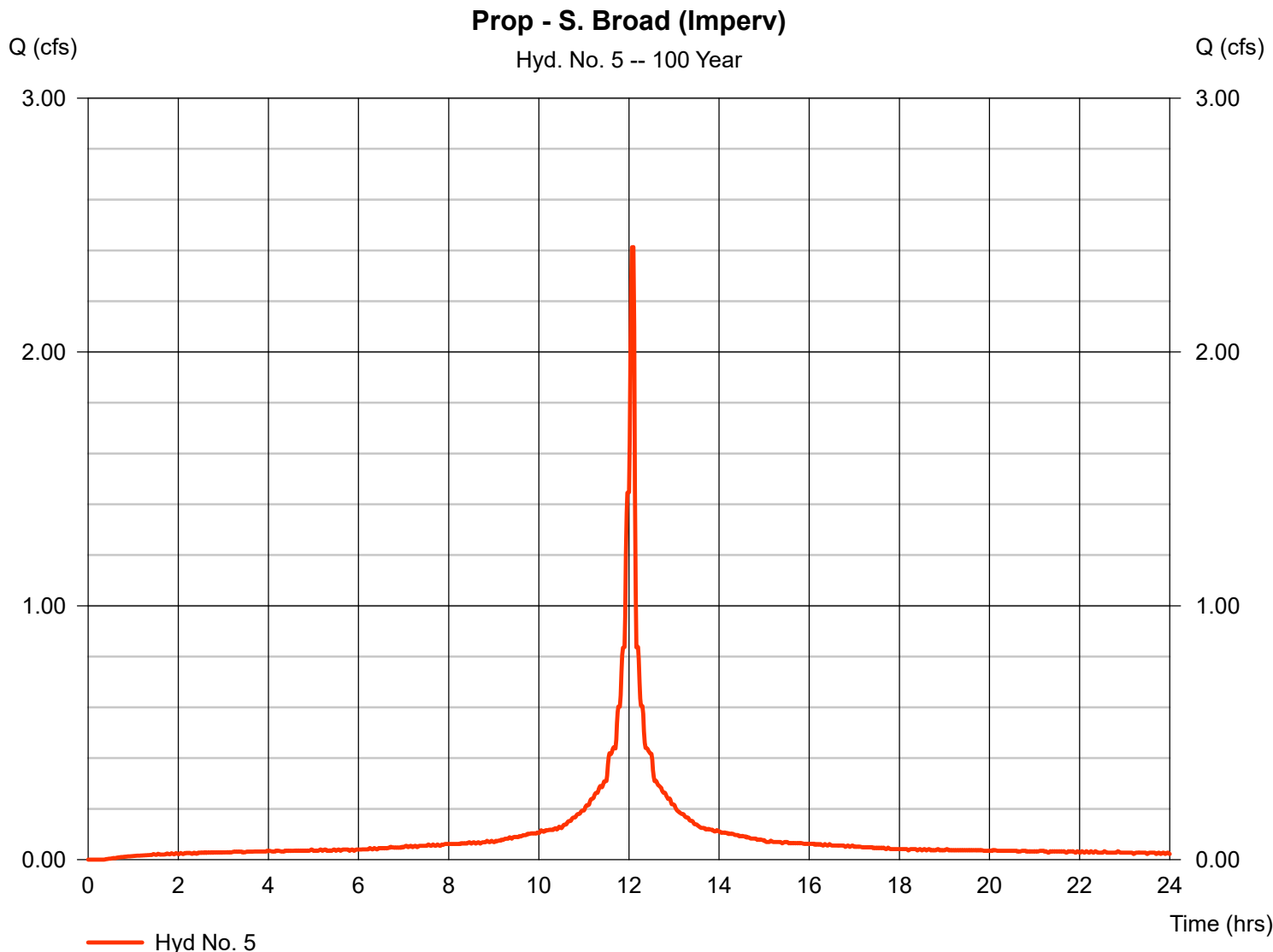
Monday, Nov 11, 2024

Hyd. No. 5

Prop - S. Broad (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.211 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 11.60 in
 Storm duration = NOAA_D.cds

Peak discharge = 2.413 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 8,156 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



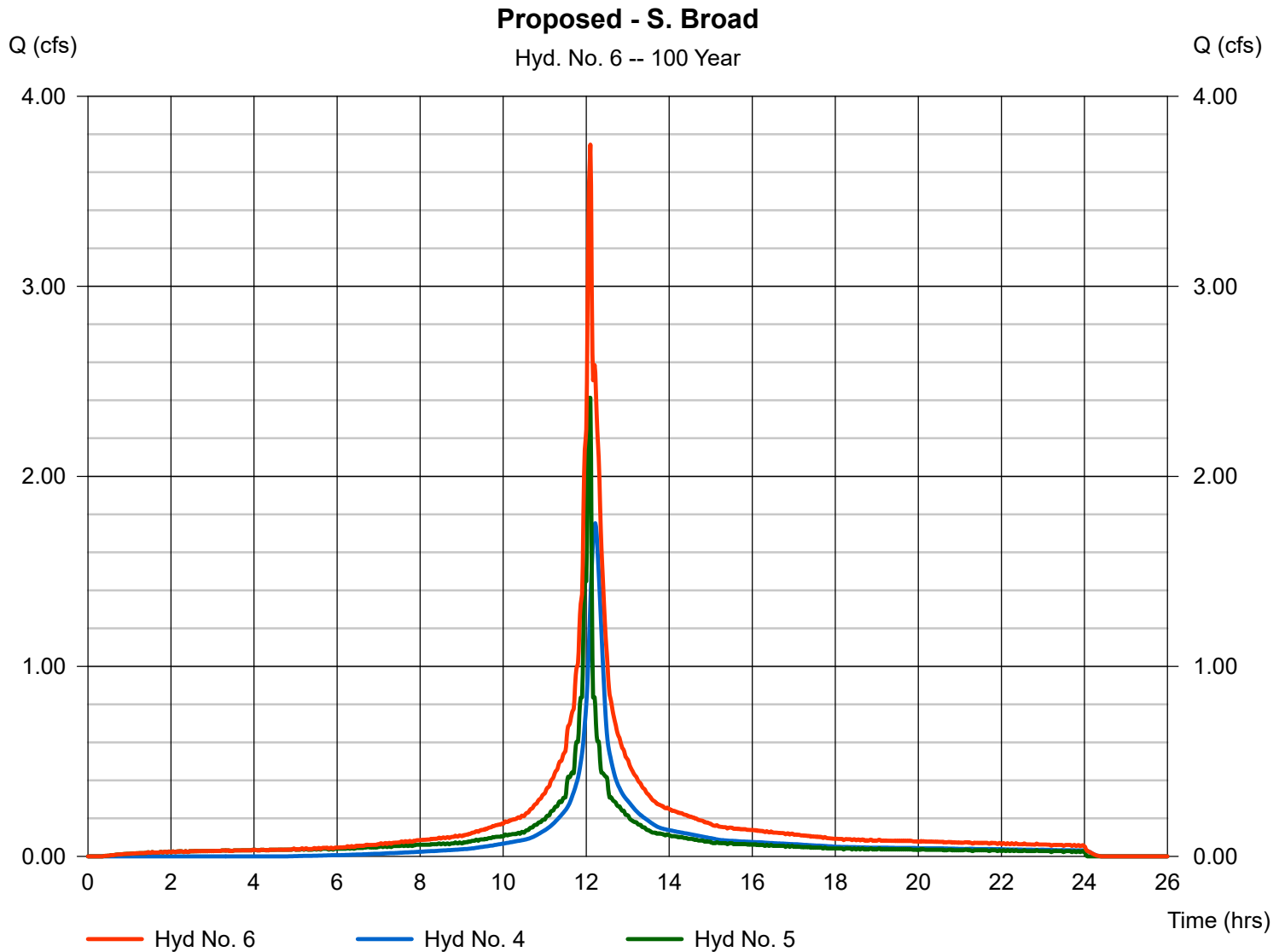
Hydrograph Report

Hyd. No. 6

Proposed - S. Broad

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 4, 5

Peak discharge = 3.746 cfs
Time to peak = 12.10 hrs
Hyd. volume = 15,788 cuft
Contrib. drain. area = 0.463 ac



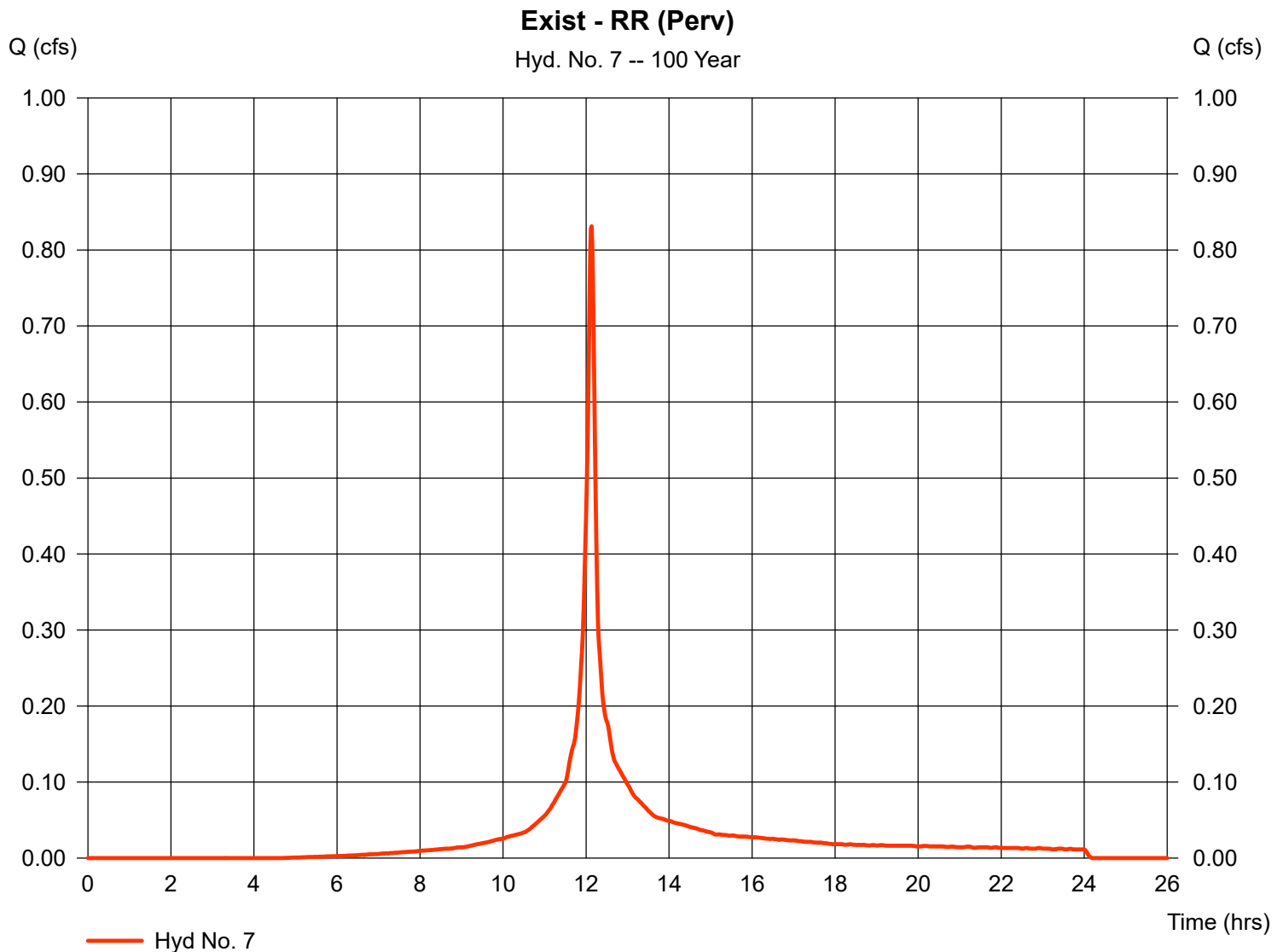
Hydrograph Report

Hyd. No. 7

Exist - RR (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.096 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 11.60 in
Storm duration = NOAA_D.cds

Peak discharge = 0.831 cfs
Time to peak = 12.13 hrs
Hyd. volume = 2,800 cuft
Curve number = 74
Hydraulic length = 0 ft
Time of conc. (Tc) = 8.30 min
Distribution = Custom
Shape factor = 484



Hydrograph Report

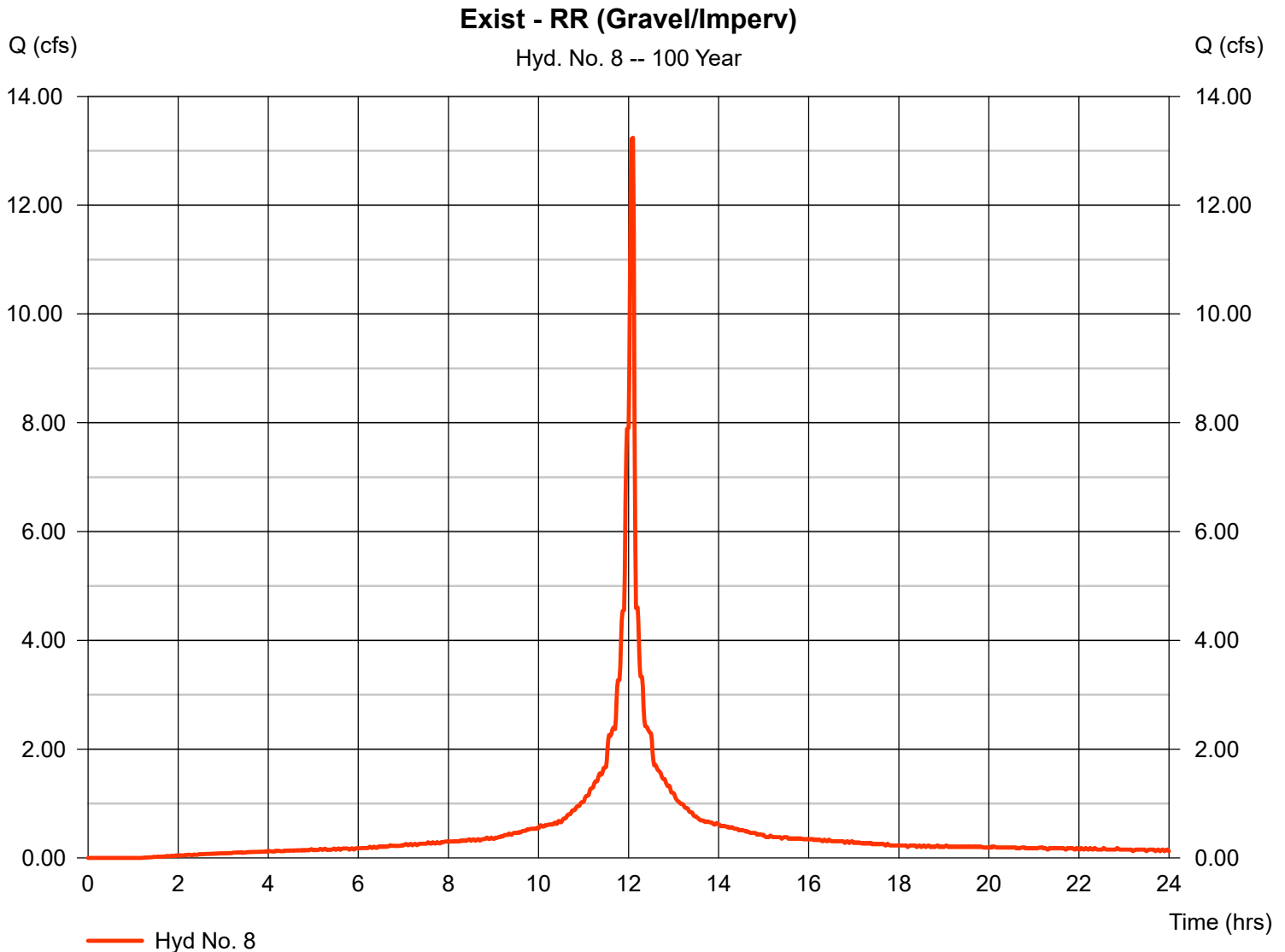
Hyd. No. 8

Exist - RR (Gravel/Imperv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.170 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 11.60 in
Storm duration = NOAA_D.cds

Peak discharge = 13.24 cfs
Time to peak = 12.10 hrs
Hyd. volume = 42,776 cuft
Curve number = 93*
Hydraulic length = 0 ft
Time of conc. (Tc) = 1.60 min
Distribution = Custom
Shape factor = 484

* Composite (Area/CN) = $[(0.667 \times 89) + (0.503 \times 98)] / 1.170$



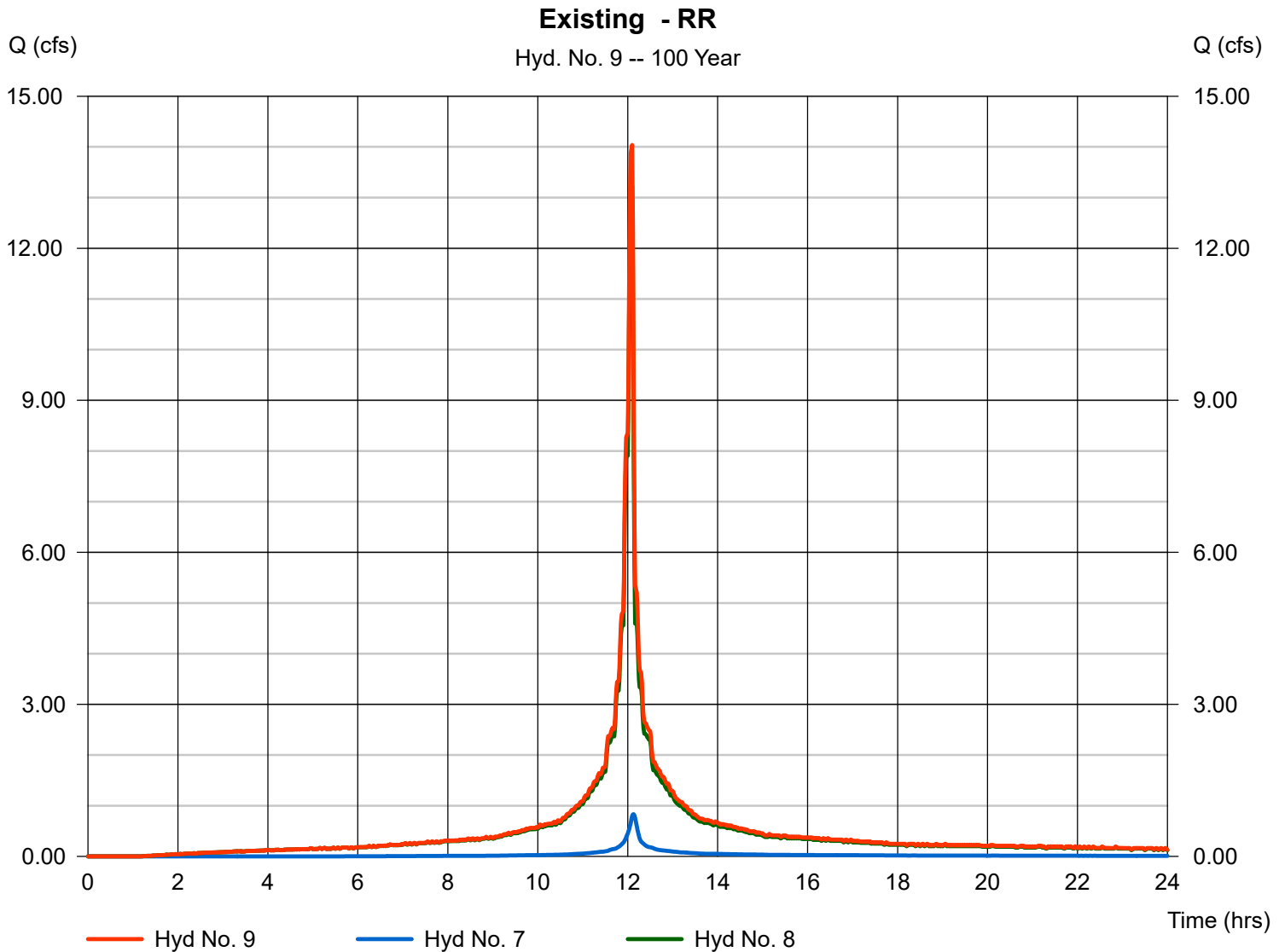
Hydrograph Report

Hyd. No. 9

Existing - RR

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 7, 8

Peak discharge = 14.04 cfs
Time to peak = 12.10 hrs
Hyd. volume = 45,576 cuft
Contrib. drain. area = 1.266 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

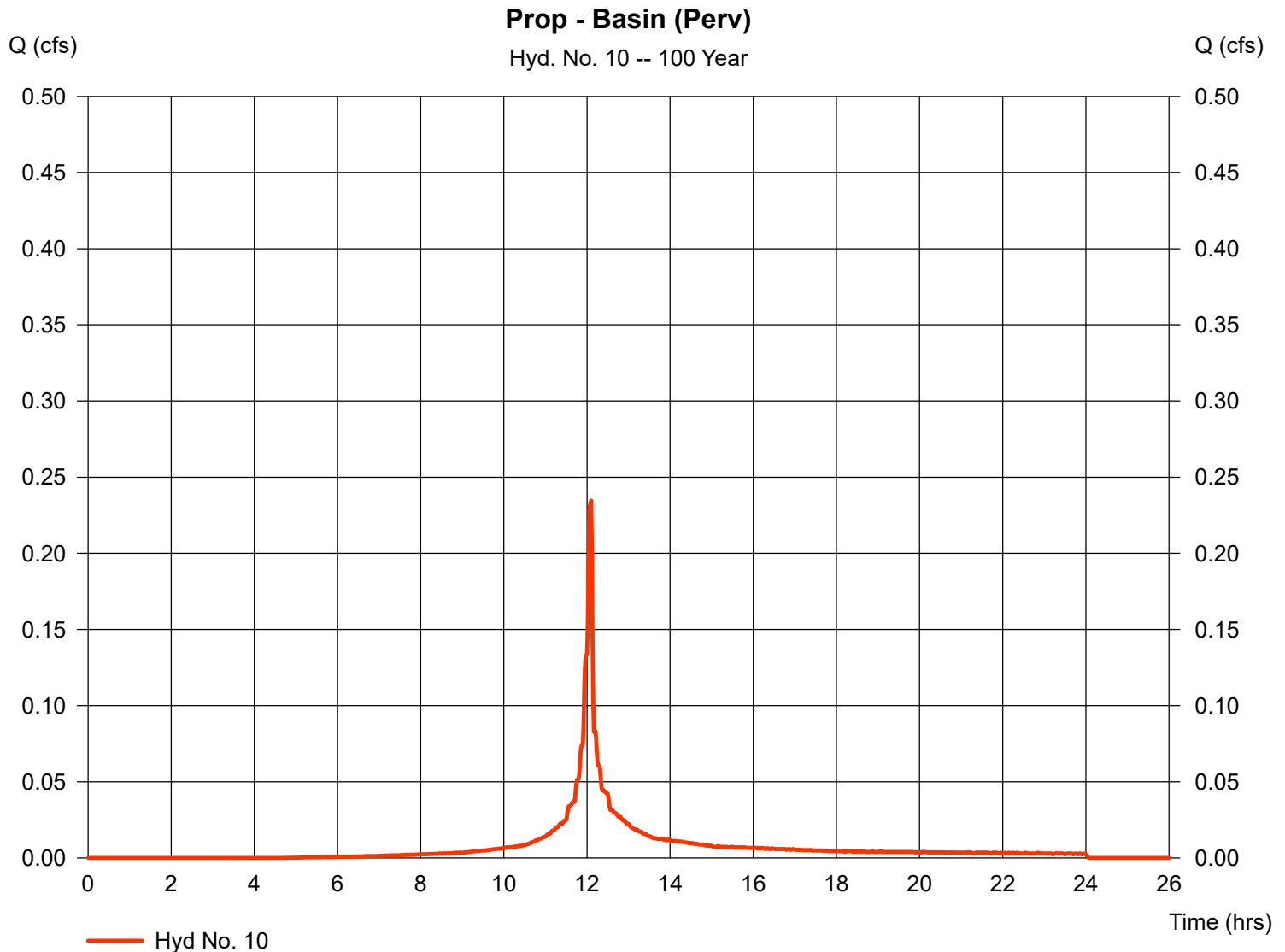
Monday, Nov 11, 2024

Hyd. No. 10

Prop - Basin (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.024 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 11.60 in
 Storm duration = NOAA_D.cds

Peak discharge = 0.235 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 673 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 3.10 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

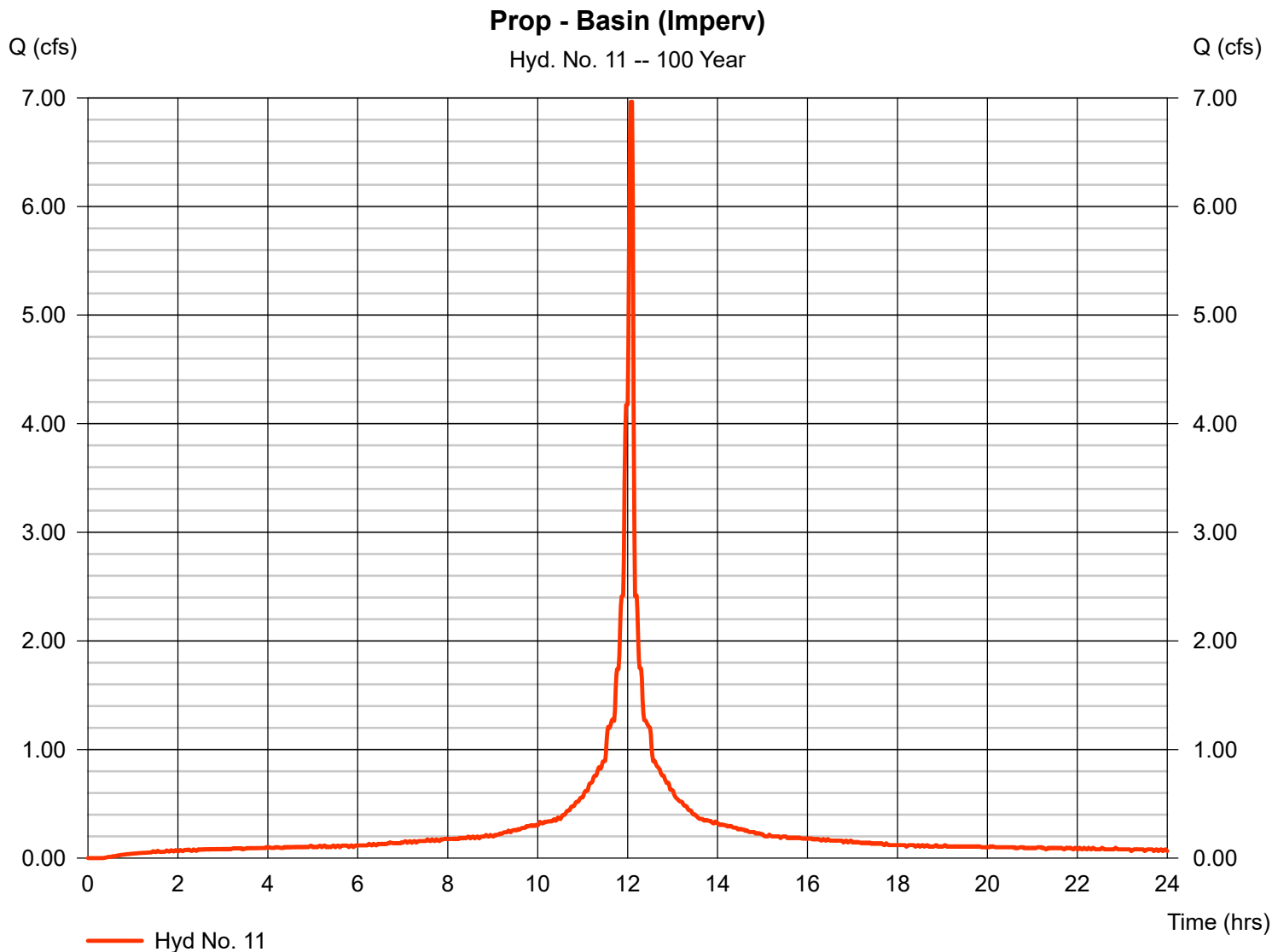
Monday, Nov 11, 2024

Hyd. No. 11

Prop - Basin (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.609 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 11.60 in
 Storm duration = NOAA_D.cds

Peak discharge = 6.965 cfs
 Time to peak = 12.10 hrs
 Hyd. volume = 23,541 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



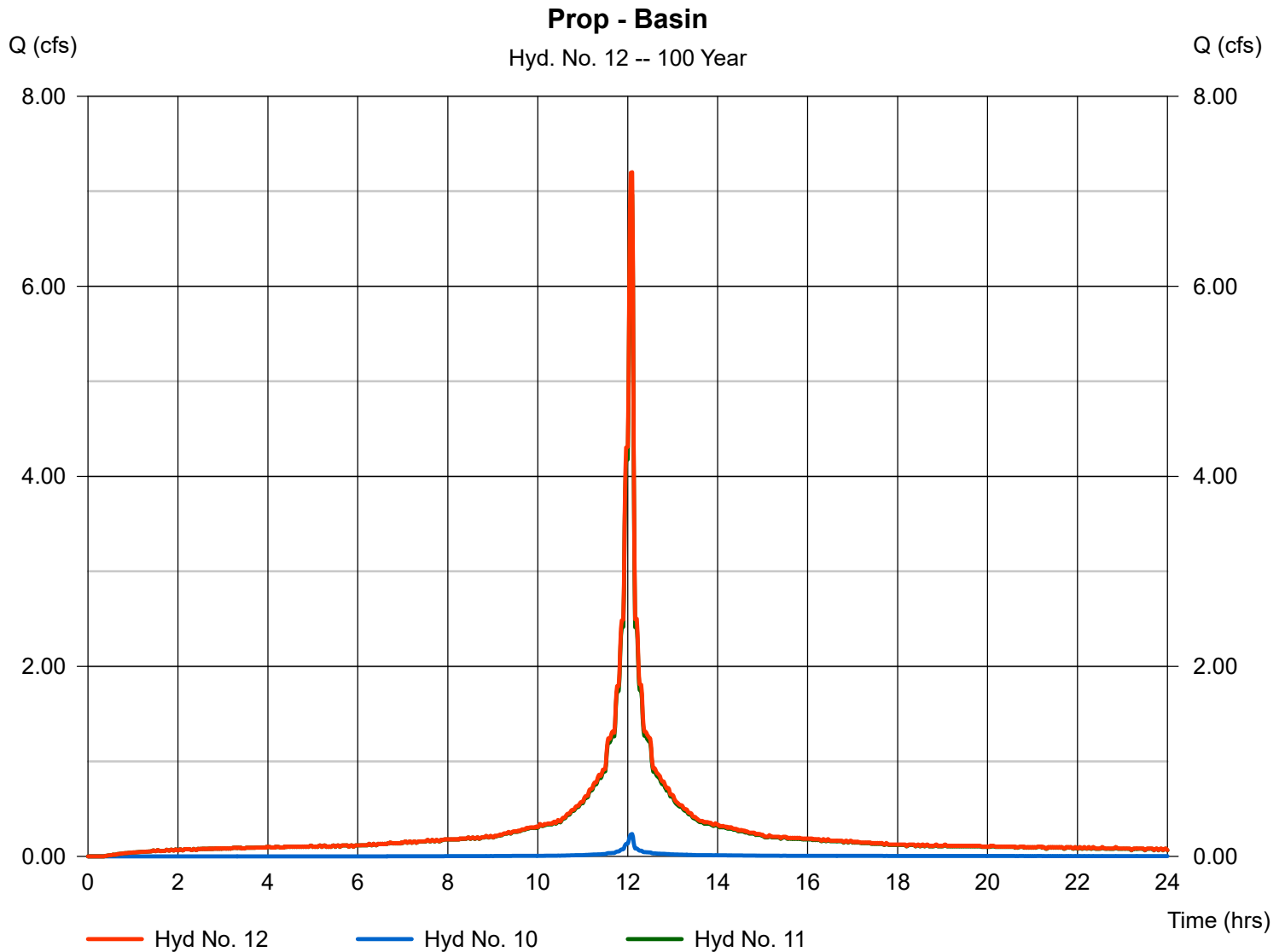
Hydrograph Report

Hyd. No. 12

Prop - Basin

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 10, 11

Peak discharge = 7.200 cfs
Time to peak = 12.10 hrs
Hyd. volume = 24,214 cuft
Contrib. drain. area = 0.633 ac



Hydrograph Report

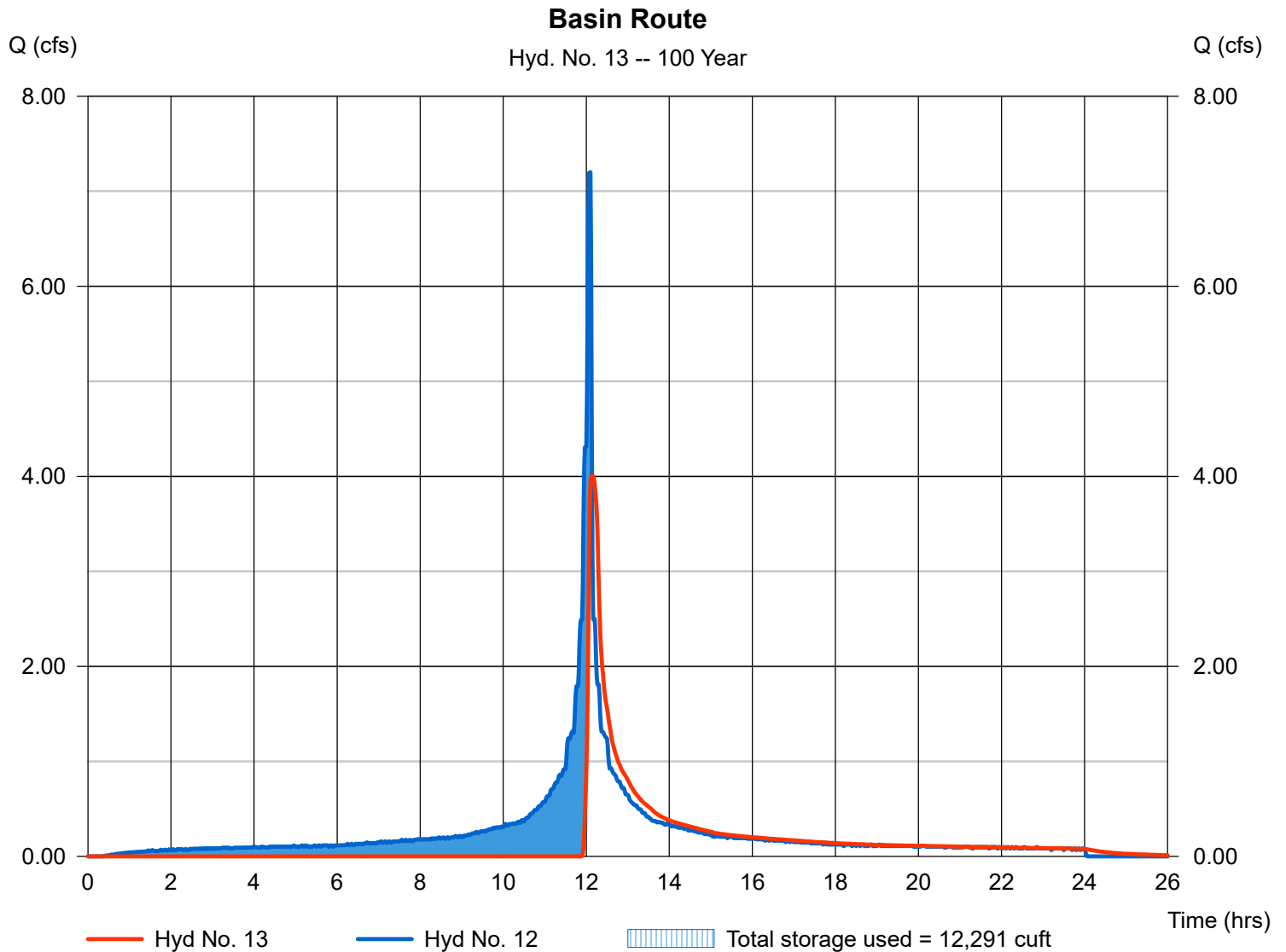
Hyd. No. 13

Basin Route

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyd. No. = 12 - Prop - Basin
Reservoir name = Basin

Peak discharge = 4.002 cfs
Time to peak = 12.12 hrs
Hyd. volume = 14,827 cuft
Max. Elevation = 150.00 ft
Max. Storage = 12,291 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

Monday, Nov 11, 2024

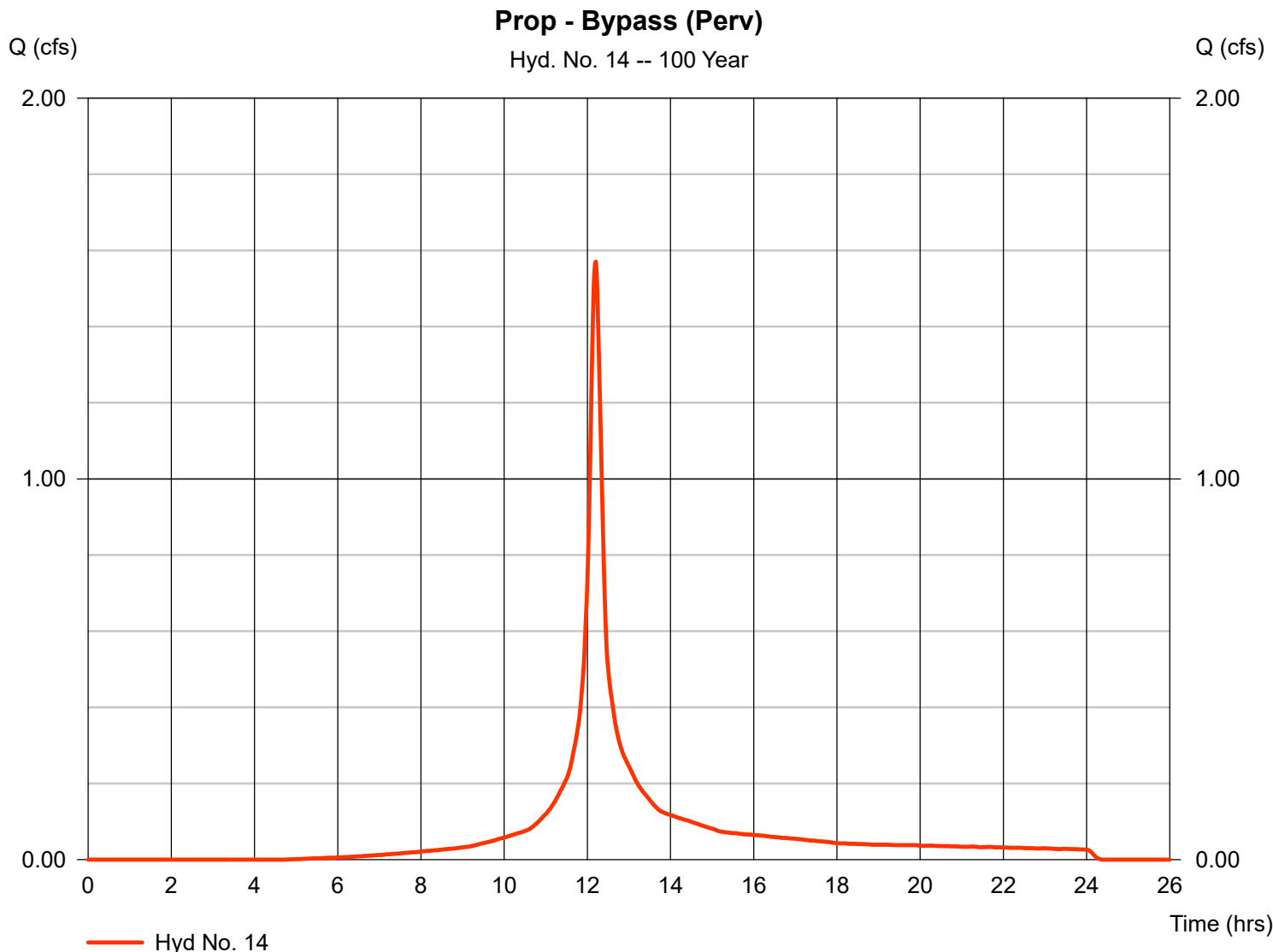
Hyd. No. 14

Prop - Bypass (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 0.218 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 11.60 in
 Storm duration = NOAA_D.cds

Peak discharge = 1.571 cfs
 Time to peak = 12.20 hrs
 Hyd. volume = 6,521 cuft
 Curve number = 74*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 15.00 min
 Distribution = Custom
 Shape factor = 484

* Composite (Area/CN) = [(0.161 x 98) + (0.426 x 98)] / 0.218



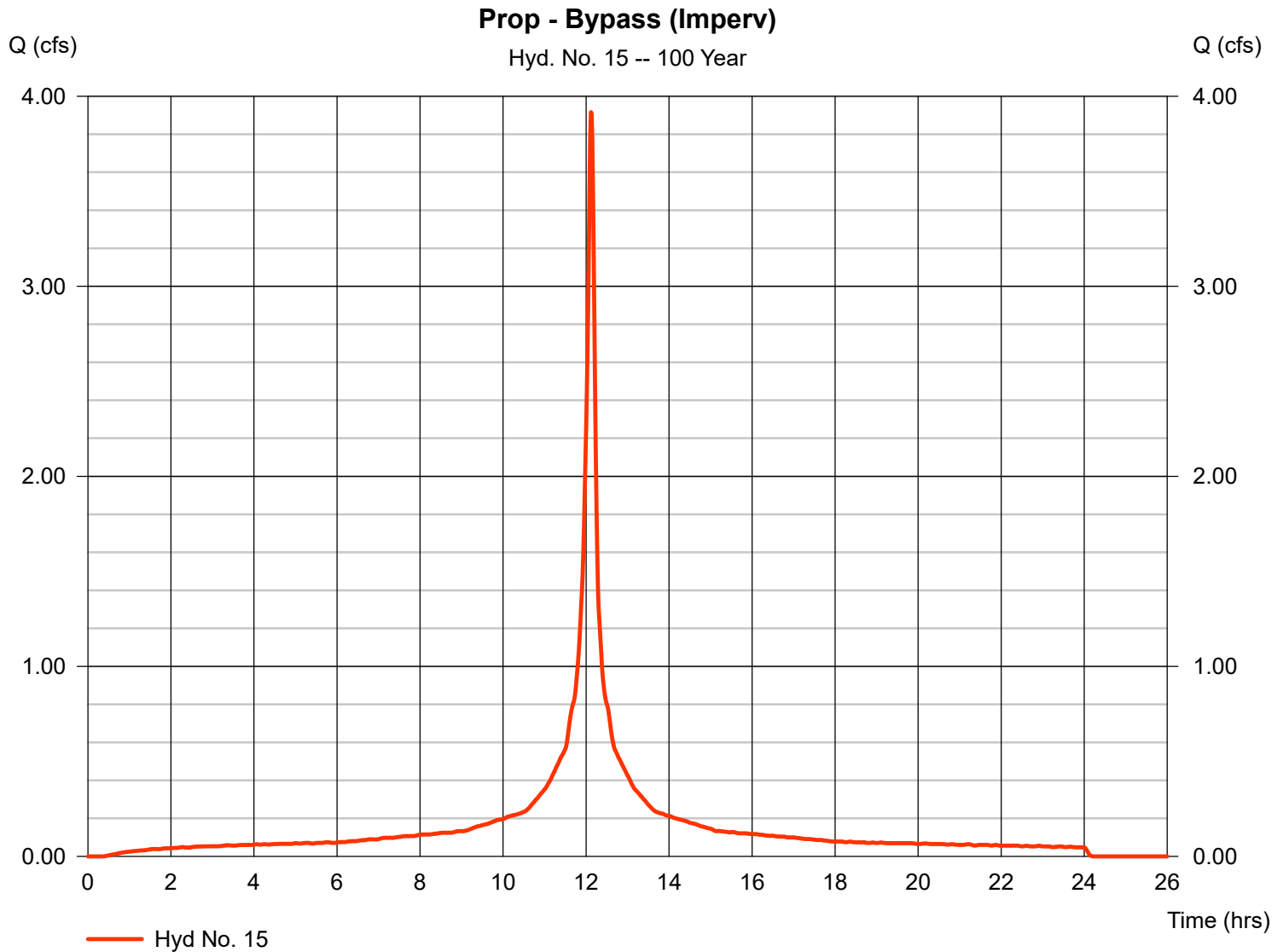
Hydrograph Report

Hyd. No. 15

Prop - Bypass (Imperv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.381 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 11.60 in
Storm duration = NOAA_D.cds

Peak discharge = 3.916 cfs
Time to peak = 12.12 hrs
Hyd. volume = 15,317 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 6.90 min
Distribution = Custom
Shape factor = 484



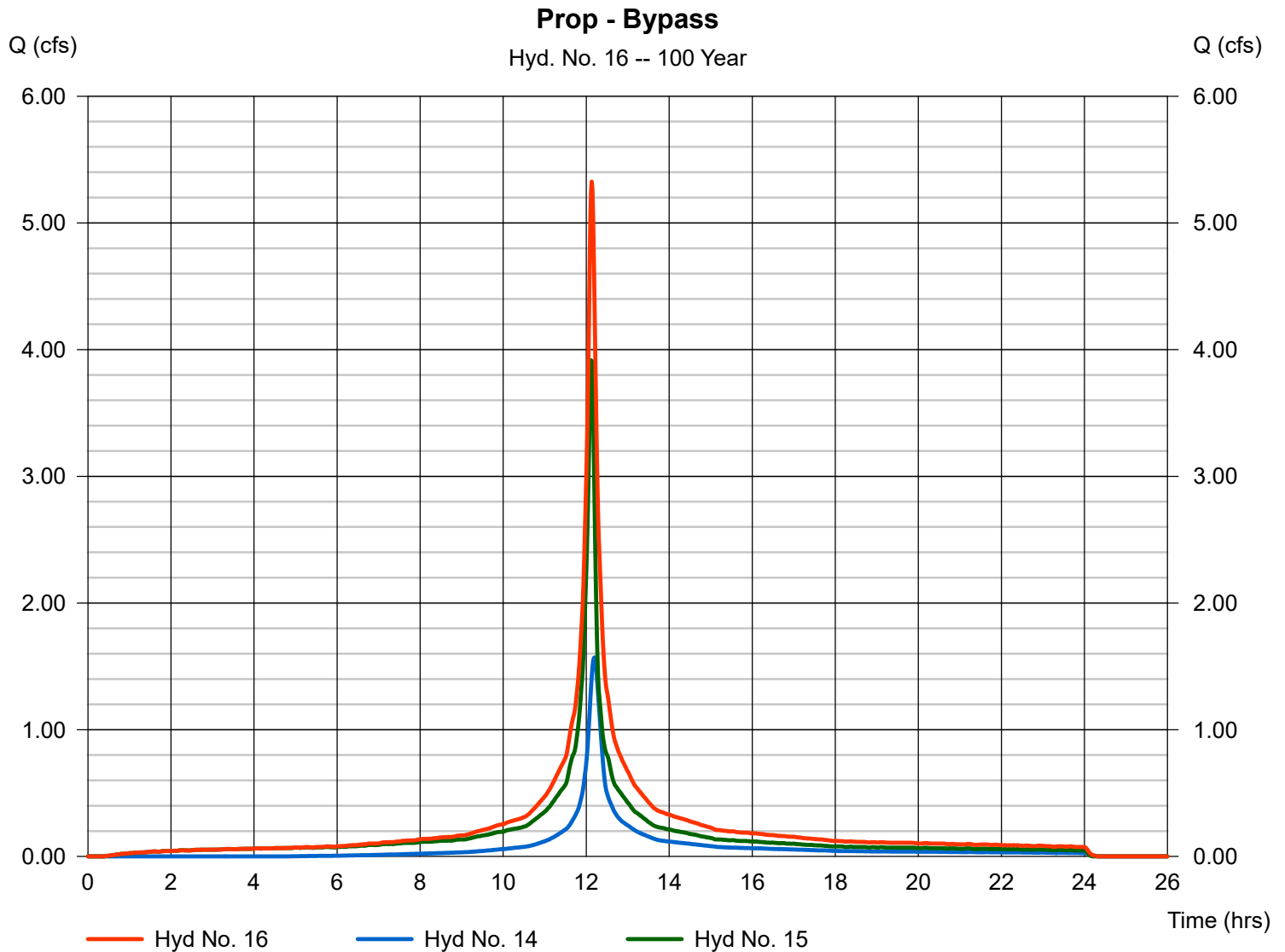
Hydrograph Report

Hyd. No. 16

Prop - Bypass

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 14, 15

Peak discharge = 5.326 cfs
Time to peak = 12.13 hrs
Hyd. volume = 21,838 cuft
Contrib. drain. area = 0.599 ac



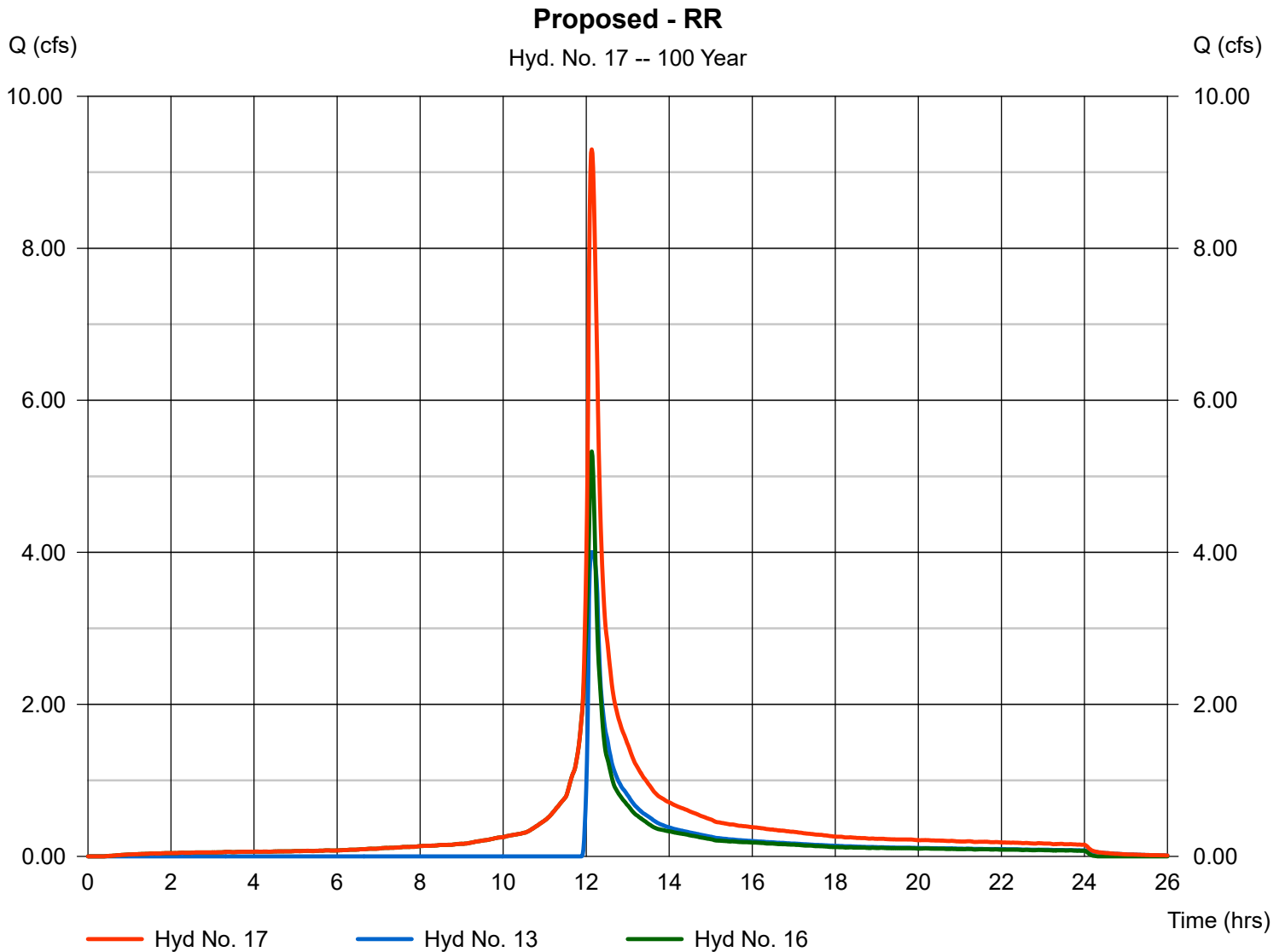
Hydrograph Report

Hyd. No. 17

Proposed - RR

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyds. = 13, 16

Peak discharge = 9.301 cfs
Time to peak = 12.13 hrs
Hyd. volume = 36,665 cuft
Contrib. drain. area = 0.000 ac



1 - Year

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Hydrograph No. 3, Combine, Treated	124

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.005	1	66	6	-----	-----	-----	Treated (Perv)
2	SCS Runoff	0.618	1	65	753	-----	-----	-----	Treated (Imperv)
3	Combine	0.622	1	65	759	1, 2	-----	-----	Treated
22-146-wq(11-04-24).gpw					Return Period: 1 Year			Tuesday, Nov 5, 2024	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

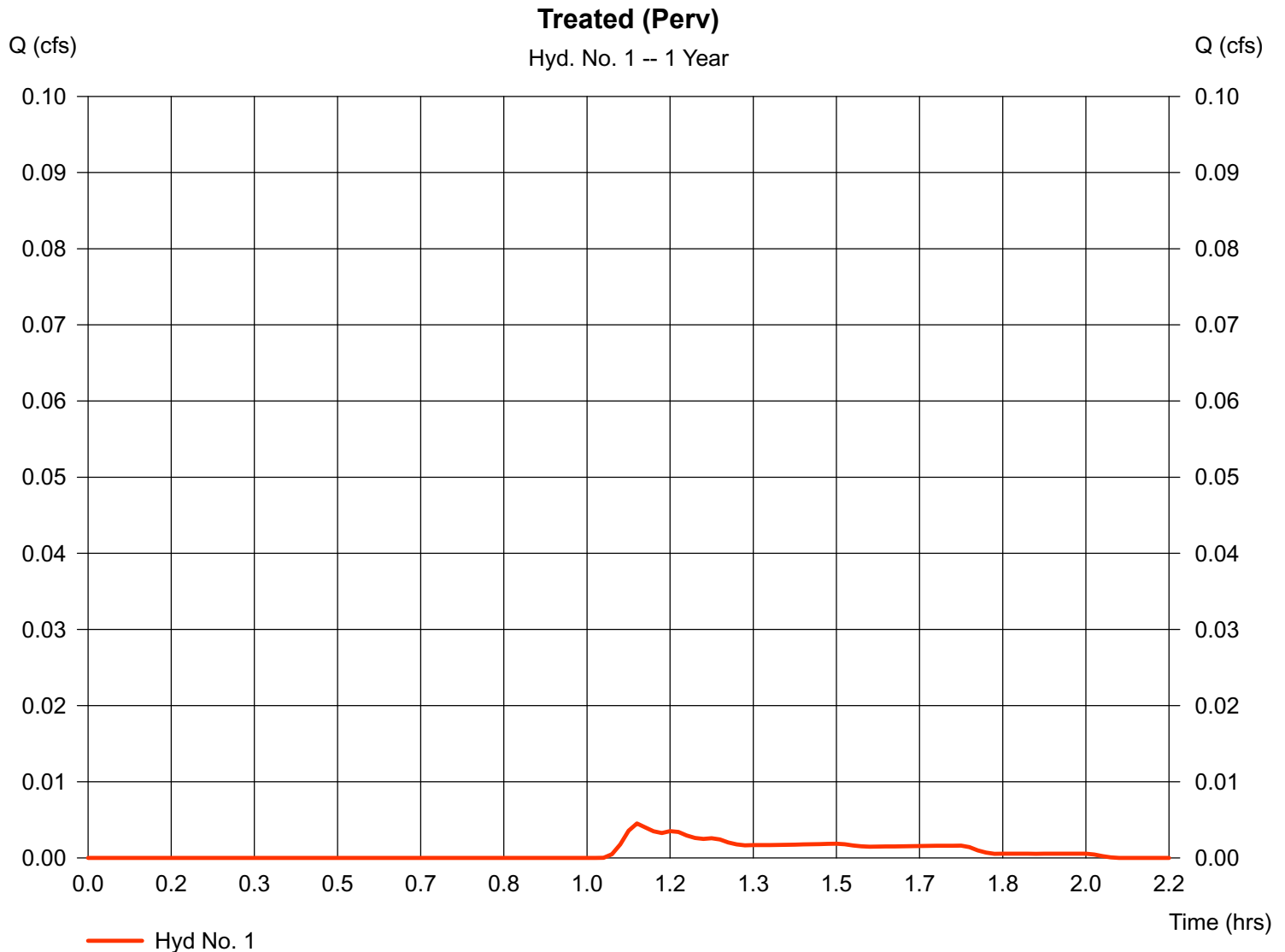
Tuesday, Nov 5, 2024

Hyd. No. 1

Treated (Perv)

Hydrograph type = SCS Runoff
 Storm frequency = 1 yrs
 Time interval = 1 min
 Drainage area = 0.024 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 1.25 in
 Storm duration = NJWaterQuality.cds

Peak discharge = 0.005 cfs
 Time to peak = 1.10 hrs
 Hyd. volume = 6 cuft
 Curve number = 74
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 3.10 min
 Distribution = Custom
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.25

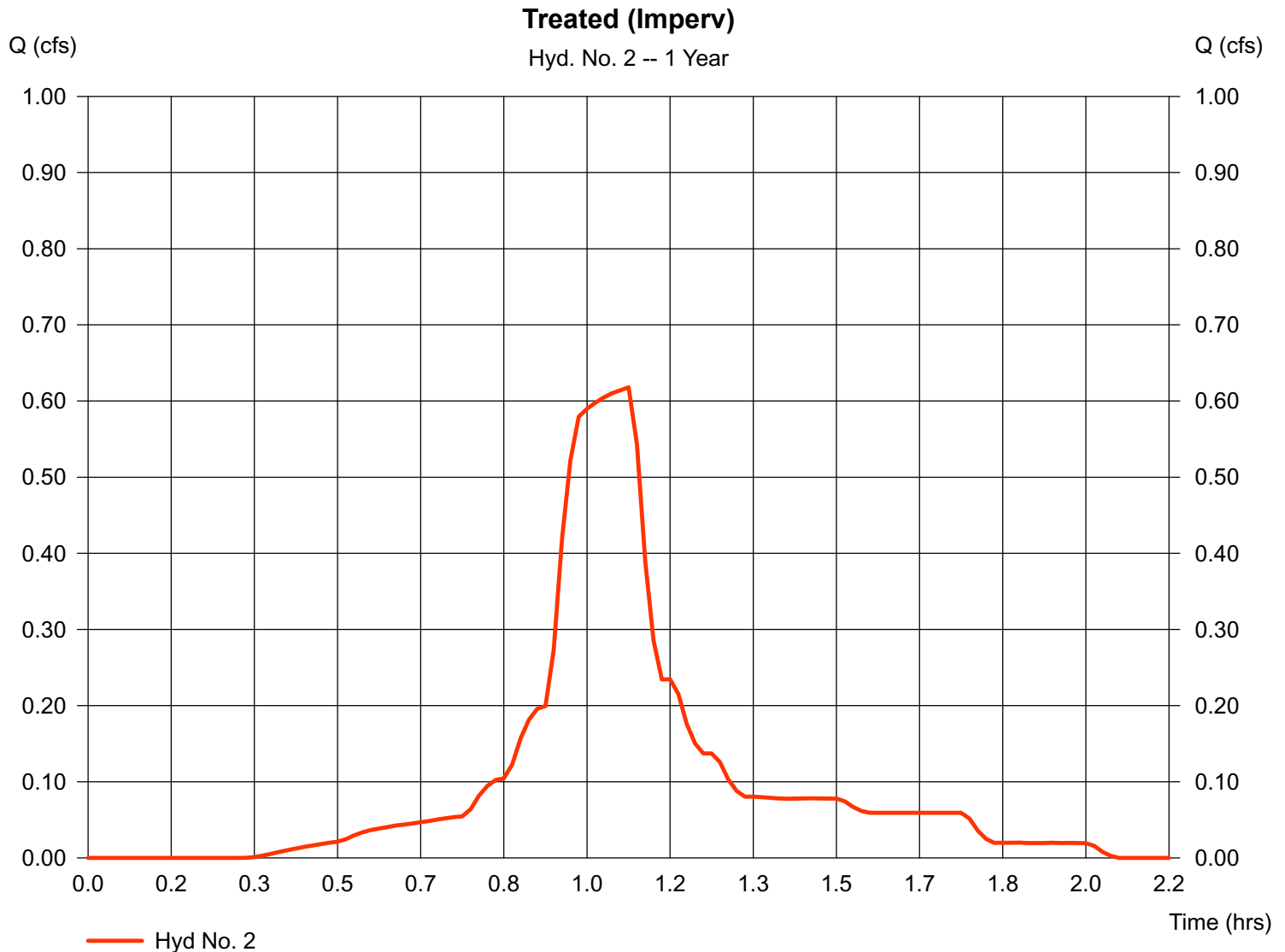
Tuesday, Nov 5, 2024

Hyd. No. 2

Treated (Imperv)

Hydrograph type = SCS Runoff
 Storm frequency = 1 yrs
 Time interval = 1 min
 Drainage area = 0.214 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 1.25 in
 Storm duration = NJWaterQuality.cds

Peak discharge = 0.618 cfs
 Time to peak = 1.08 hrs
 Hyd. volume = 753 cuft
 Curve number = 98
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 2.20 min
 Distribution = Custom
 Shape factor = 484



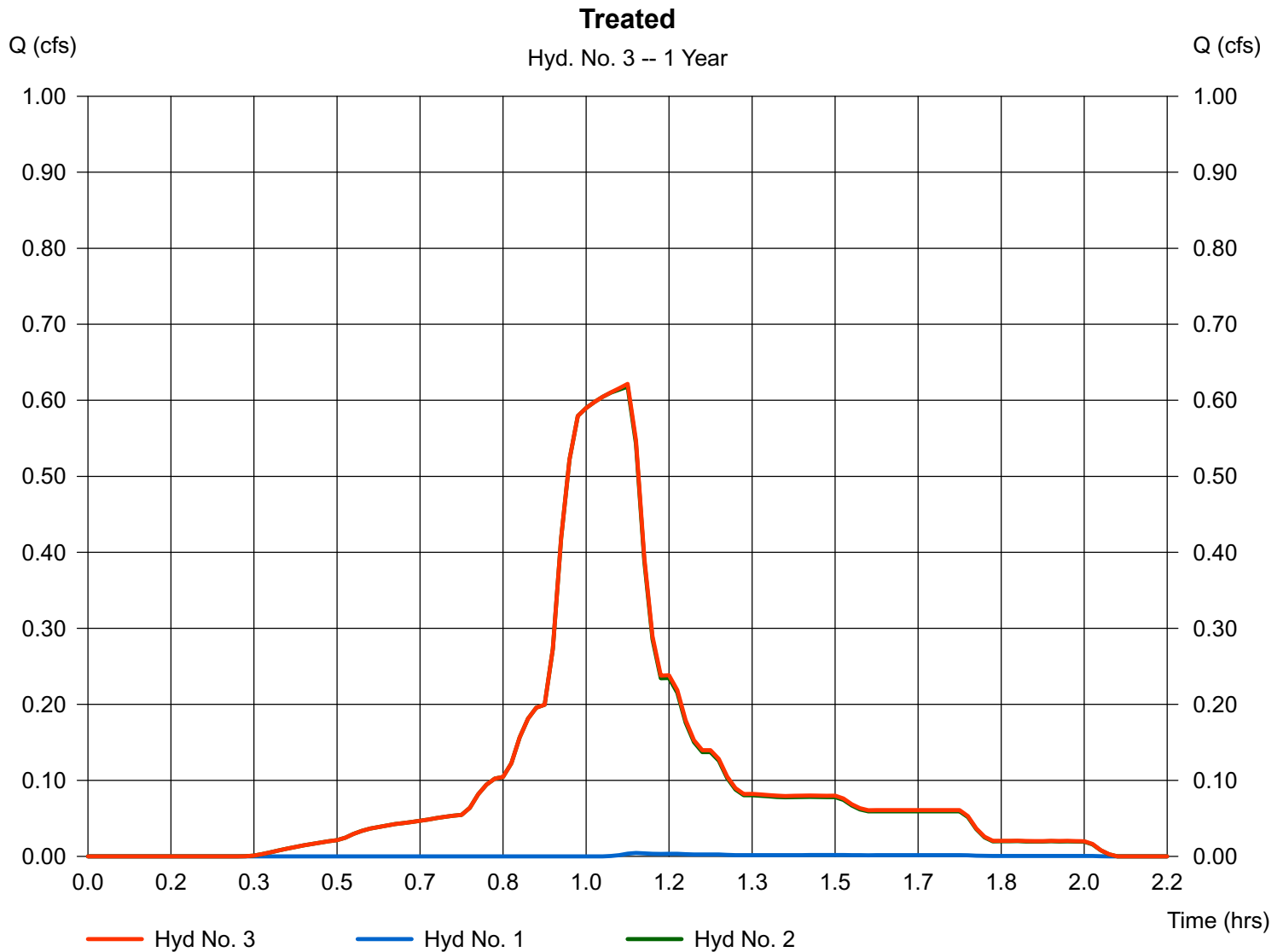
Hydrograph Report

Hyd. No. 3

Treated

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

Peak discharge = 0.622 cfs
Time to peak = 1.08 hrs
Hyd. volume = 759 cuft
Contrib. drain. area = 0.238 ac



Hydrologic Soil Group—Bergen County, New Jersey
(Soil Boundary Map)



Map Scale: 1:1,790 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines


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

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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: Bergen County, New Jersey
 Survey Area Data: Version 18, Aug 30, 2021

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

Date(s) aerial images were photographed: Dec 31, 2009—Feb 26, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DuuB	Dunellen-Urban land complex, 3 to 8 percent slopes	A	0.7	5.1%
UR	Urban land		8.9	63.4%
WeuC	Wethersfield-Urban land complex, 8 to 15 percent slopes	C	4.4	31.5%
Totals for Area of Interest			14.1	100.0%

Description

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

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

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

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

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

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

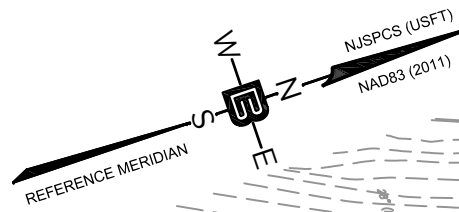
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



CONRAIL ERIE LACKAWANNA RAILROAD
 PATERSON & RAMAPO BRANCH

**EXISTING DRAINAGE AREA
 (RAILROAD)**
 1.266 ACRES

**EXISTING DRAINAGE AREA
 (S. BROAD ST.)**
 0.429 ACRES

Tc PATH
 (Imp)

Tc PATH
 (Perv)

Tc PATH /
 (Imp)

Tc PATH
 (Perv)

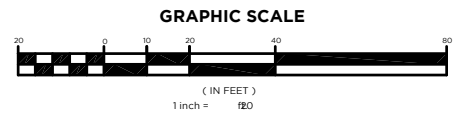
SOUTH BROAD STREET
 (FORMERLY ROCK AVENUE)

(WIDTH VARIES)

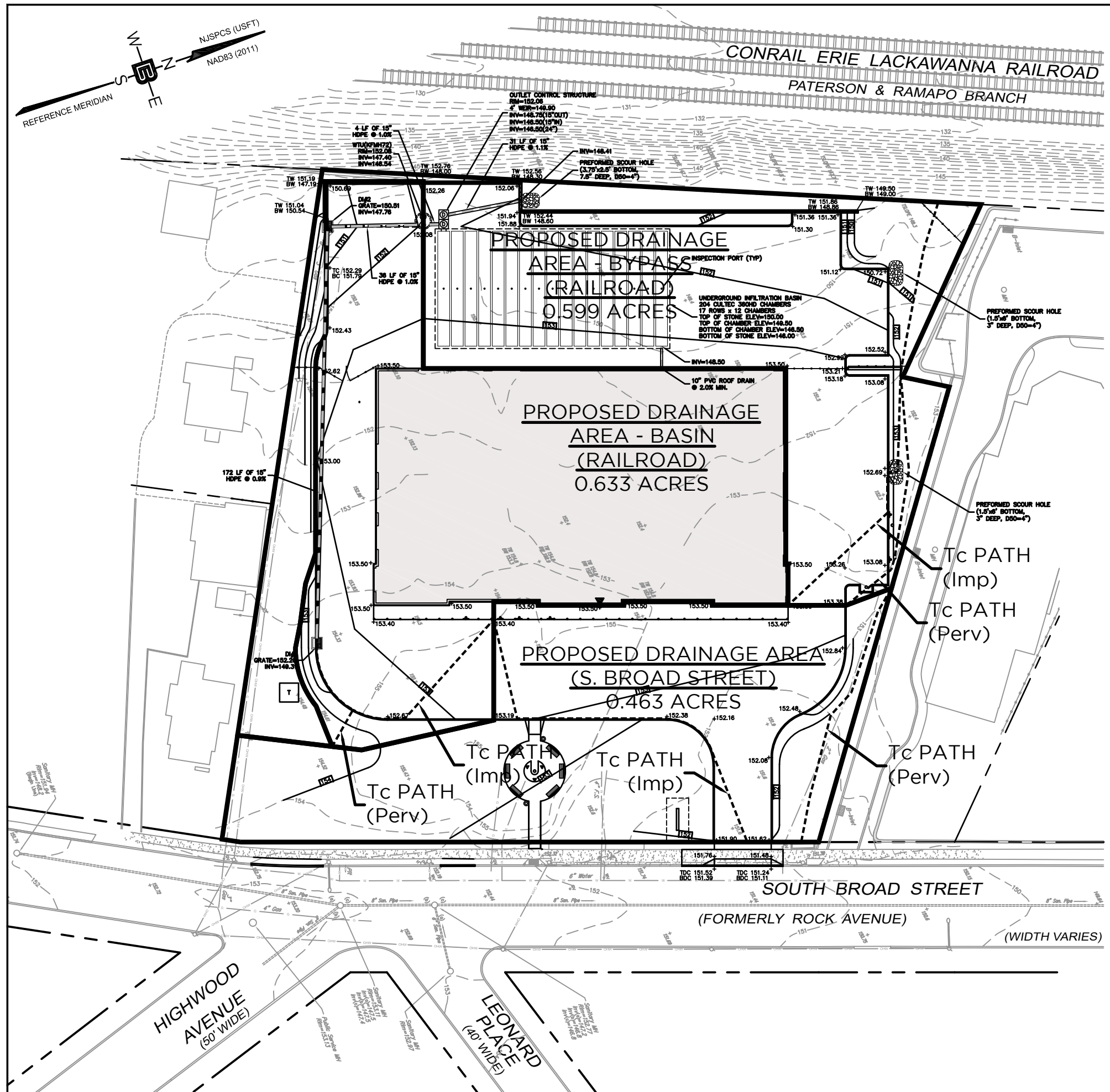
HIGHWOOD AVENUE
 (50' WIDE)

LEONARD PLACE
 (40' WIDE)

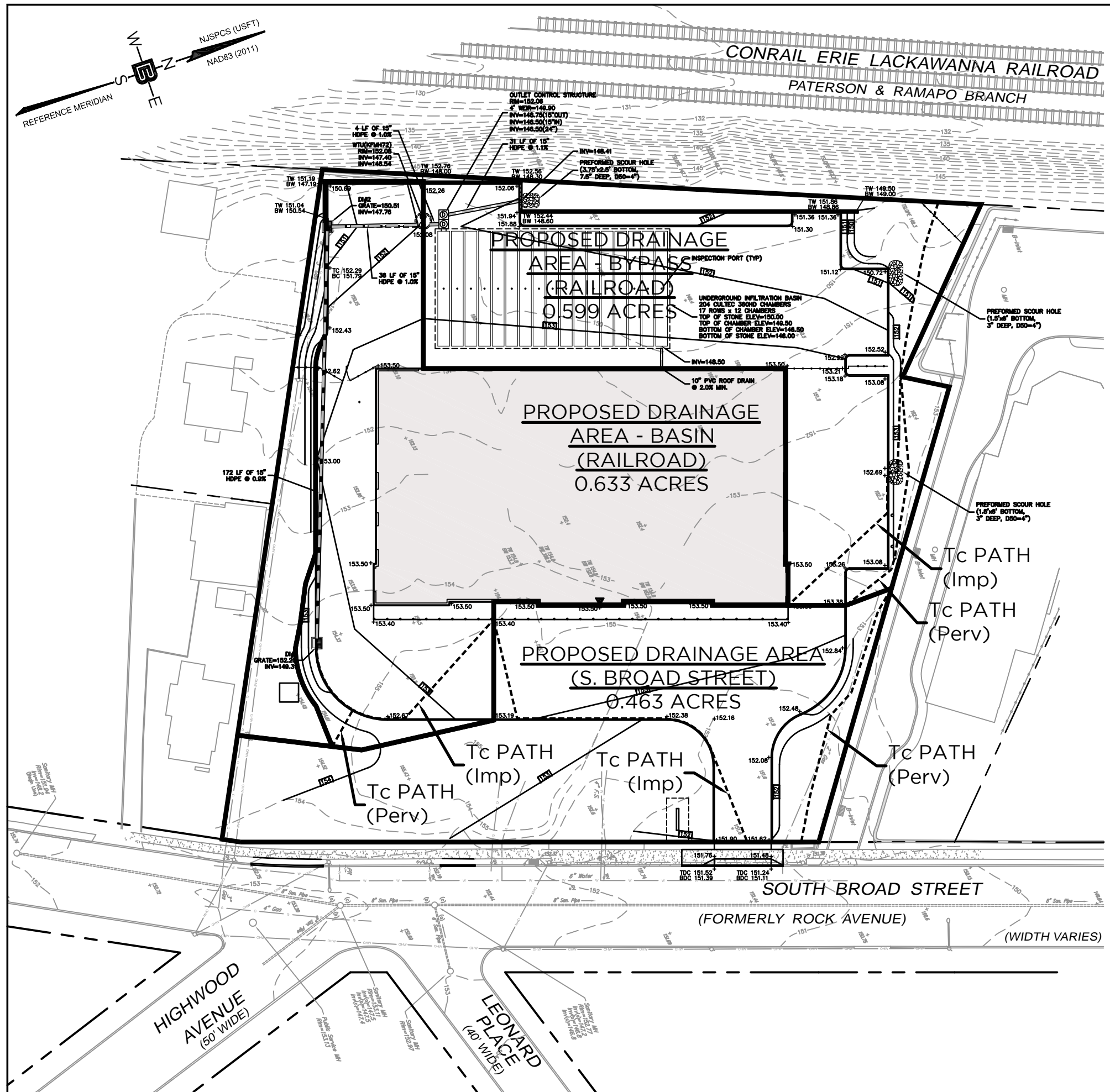
TAX BLOCK 3905
 LOT 8.01



DM1: EXISTING DRAINAGE AREA MAP



DM2: PROPOSED DRAINAGE AREA MAP



DM2: PROPOSED DRAINAGE AREA MAP

