ChoiceOne Engineering

Bethel Township, Miami County, Ohio
Eetsabarn Site Plan
Retention Report

August 25, 2026

W. Central Ohio/E. Indiana
2633 Campbell Rd.
Sidney, OH 45365
937.497.0200 **Phone**

S. Ohio/N. Kentucky
6279 Tri-Ridge Blvd., Suite 100
Loveland, OH 45140
513.239.8554 **Phone**

WWW.CHOICEONEENGINEERING.COM

Bethel Township, Miami County

Eetsabarn Site Plan
Storm Water Detention Calculations

August 25, 2026

Site Description and Existing Hydrologic Conditions:

The project site is northeast of the intersection of Wildcat Road and US 40 in Bethel Township, and currently consists of an undeveloped row crop agricultural field. Existing drainage patterns are characterized by sheet flow moving from the eastern portion of the site toward the west. Surface runoff leaves the site as overland flow and ultimately discharges to a 45-inch by 75-inch elliptical culvert located beneath Wildcat Road west of the property. This culvert serves as the primary outlet for stormwater originating from the site and conveys runoff downstream. No existing detention, retention, or other stormwater management facilities are currently located within the site.

Developed Hydrologic Conditions and Stormwater Management Plan:

The proposed site includes two new buildings and a parking lot and will introduce new impervious areas, resulting in increased runoff that requires on-site retention basin to meet water quality and water quantity requirements. Runoff from the proposed pavement and buildings will be conveyed through new catch basins and storm sewer, with grading directing flow toward the proposed storm structures. Once captured, stormwater will be routed through the new storm sewer network to the proposed retention basin, where the required water quality volume will be retained. After the water quality volume is stored, the outlet structure will allow controlled increases in discharge in accordance with the critical storm method, ensuring that post-developed release rates do not exceed the allowable rates for up to the 100-year storm.

Hydrologic Methodologies:

The hydrologic methodology used for this design was the Soil Conservation Service (SCS) TR-55 Method, which was computed via the Bentley PondPack program.

Applicable Permits:

The Ohio Environmental Protection Agency, Notice of Intent.

Site Characteristics:

Below is a summary of the storm water detention calculations. Please see the attached computer printouts for additional details.

Hydrologic Soil Group C was used for calculations based upon soil in the surrounding area. A soil map from the USDA's Web Soil Survey website was utilized to determine this Soil Group.

Detained Pre-Developed Site:

- Time of Concentration (Tc)
  - Pre-developed Tc = 33 minutes (0.454 hrs) - See page 6 of Hydro Studio calculations
- Curve Number
  - Pre-developed = 85 – see page 5 of Hydro Studio calculations
- Total Acreage = 8.19 acres

Undetained Pre-Developed Site:

- Time of Concentration (Tc)
  - Pre-developed Tc = 10 minutes – minimum was assumed
- Curve Number
  - Pre-developed = 89 – see page 4 of Hydro Studio calculations
- Total Acreage = 0.25 acres

Detained Post-Developed Site:

- Time of Concentration (Tc)
  - Post-developed Tc = 10 minutes – minimum was assumed
- Curve Number
  - Post-developed CN = 95 – see page 9 of Hydro Studio calculations
- Total Acreage = 8.19 acres

Undetained Post-Developed Site:

- Time of Concentration (Tc)
  - Post-developed Tc = 10 minutes – minimum was assumed
- Curve Number
  - Post-developed CN = 89 – see page 8 of Hydro Studio calculations
- Total Acreage = 0.25 acres

Pre-developed Hydrograph Volume		Post-developed Hydrograph Volume	
Storm	Peak Volume	Storm	Peak Volume
1 year	30,982 cf	1 year	53,915 cf

- Critical Storm = ((1-yr. post – 1 yr. pre) / 1 yr. pre)*100 = ((53,915-30,982)/30,982)*100 = 74%
  - 74% increase in runoff volume = 10-year critical storm

Proposed Retention Basin Summary

The proposed retention basin utilizes a 2-3 catch basin as the outlet control structure. The catch basin contains orifices that have been designed to control the release rate. The outlet control structure consists of the following release features:

- 4" diameter water quality orifice at invert 923.00
- 36" wide by 6" tall window opening at invert 924.25
- Top of 2-3 grate at 925.65
- 40' wide emergency overflow weir invert 926.50

See outlet structure detail in the plans for more information.

- Retention volume provided to an elevation of 927.00 = 88,541 cf – see page 11 of Hydro Studio calculations

STORM	PEAK BASIN INFLOW	BASIN OUTFLOW	UNDETAINED OUTFLOW	COMBINED OUTFLOW	ALLOWABLE FLOW	STORAGE	PEAK BASIN ELEVATION
1 YEAR	20.06 cfs	2.44 cfs	0.46 cfs	2.50 cfs	6.90 cfs	31,104 cf	924.60
2 YEAR	24.69 cfs	4.56 cfs	0.60 cfs	4.70 cfs	6.90 cfs	37,029 cf	924.88
5 YEAR	30.83 cfs	5.35 cfs	0.79 cfs	5.64 cfs	6.90 cfs	46,366 cf	925.30
10 YEAR	35.71 cfs	6.06 cfs	0.94 cfs	6.24 cfs	6.90 cfs	54,153 cf	925.63
25 YEAR	42.29 cfs	12.00 cfs	1.15 cfs	12.39 cfs	20.25 cfs	62,164 cf	925.98
50 YEAR	47.43 cfs	17.05 cfs	1.31 cfs	17.51 cfs	23.51 cfs	67,340 cf	926.18
100 YEAR	52.75 cfs	21.38 cfs	1.48 cfs	22.04 cfs	26.90 cfs	72,364 cf	926.38

NOTE: The post-developed release rate from the 1- 10-year storms are less than the 1-year pre-developed release rate (per the required critical storm method) and the post-developed release rates from the 25, 50, and 100-year storms are less than their respective pre-developed release rates.

Project and Watershed Information; WQv Calculation

version 3.2 2020-07-07

Project Details

Project Name:	Eetsabarn Site Plan
Project Location:	US-40
Project Latitude:	
Project Longitude:	
NPDES Permit Applicant:	
Submitted by:	Tyler Thobe - Choice One Engineering
Date:	8/25/2026

Subwatershed Details

Subwatershed ID/Label:

Subwatershed Drainage Area, A_{total} =	**8.19**	**acres**	**=**	**356,756**	**ft^2**
Subwatershed Impervious Area, A_{imp} =	**7.32**	**acres**	**=**	**318,859**	**ft^2**
Imperviousness fraction, i =	**0.89**		**=**	**89**	**%**
Volumetric Runoff Coefficient, Rv =	**0.85**				
Water Quality Volume, WQv =	**22,861**	**ft^3**	**=**	**0.525**	**ac-ft**

Wet Extended Detention Basin WQv Compliance Tool

version 3.2 2020-07-07

Project Summary

Project Name: Eetsabarn Site Plan
Subwatershed ID/Label:
Submitted by: Tyler Thobe - Choice One Engineering
Date: 8/25/2026

Subwatershed Drainage Area, A_{total} =	8.19	acres	=	356,756	ft2
Subwatershed Impervious Area, A_{imp} =	7.32	acres	=	318,859	ft2
Imperviousness fraction, i =	0.89			89	%
Water Quality Volume, WQv =	22,861	ft^3	=	0.52	ac-ft

Step 1 - Soil Suitability

Soil Series: Miamian Silt Loam HSG: C

Step 2 - Wet ED Basin Volume Requirements

Extended Detention Volume, EDv =	22861	ft^3
Minimum Sediment Storage Volume, $V_{sediment}$ =	4572	ft^3
Minimum Permanent Pool Volume, PPv =	27433	ft^3

Step 3 - Basin Stage-Storage Relationship

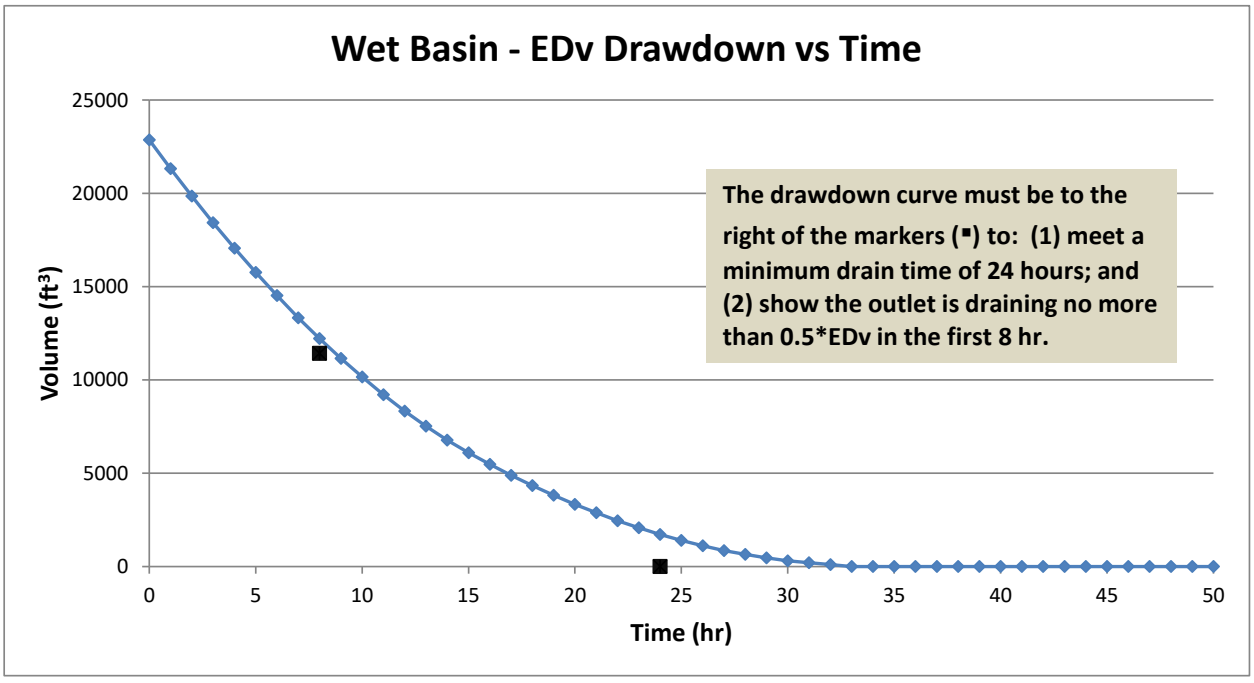
	Elevation ft	Area ft^2		Incremental Volume ft^3	Cumulative Volume ft^3
Bottom of Permanent Micropool =	915.00	6576			
	916.00	7306		6,938	6,938
	918.00	8867		16,148	23,086
	919.00	9698		9,279	32,365
	921.00	11462		21,135	53,500
	921.01	13360		124	53,624
	922.00	15382		14,216	67,840
	923.00	17507		16,433	84,273
	924.00	19733		18,609	102,882
	925.00	22060		20,886	123,768
	926.00	24487		23,263	147,031
	927.00	27015		25,741	172,771

Step 4 - Outlet Elevations and Storage Volumes

WQ Orifice Invert Elevation =	923.00				
Elevation of Top of EDv =	924.22				
Secondary Outlet Invert Elevation =	924.25				OKAY
WQ Treatment Volume Provided, $V_{treatment}$ =	23,613	ft^3			
Treatment Vol Provided Relative to EDv, $V_{treatment}/EDv$ =	1.03		=	103%	OKAY
Permanent Pool Volume Provided, PPv =	84,273	ft^3			
Ratio PPv Provided to PPv Required =	3.07		=	307%	OKAY

Step 5 - Outlet (Orifice) Sizing

Maximum Hydraulic Head, Hmax =	1.22	ft			
Orifice Coefficient, C =	0.6				
Target (Minimum) Draw-down Time, T_d =	24	hr			
Target Average Discharge, Q_{avg} =	0.26	cfs			
Average Hydraulic Head, H_{avg} =	0.61	ft			
Estimated Orifice Area, $A_{orifice}$ =	10.13	in^2	=	0.070	ft^2
Estimated Orifice Diameter, $D_{orifice}$ =	3.59	in	=	0.30	ft
Design Orifice Diameter, $D_{orifice}$ =	4.00	in	=	0.33	ft
Design Orifice Area, $A_{orifice}$ =	12.49	in^2	=	0.087	ft^2
Time to Completely Drain EDv, T_d =	33	hr	must be ≥ 24 hr		OKAY
Volume Drained in First 8 hr =	10,646	ft^3			
% of EDv =	46.6	%	must be ≤ 50%		OKAY



PROP. BUILDING 56x134 FFE-937.44

PROP. BUILDING 56x134 FFE-938.94

PROP. BUILDING 56x134 FFE-940.44

PROP. BUILDING 56x90 FFE-936.56

PROP. BUILDING 56x90 FFE-937.82

PROP. BUILDING 56x90 FFE-939.07

PROP. BUILDING 56x90 FFE-937.30

PROP. BUILDING 56x90 FFE-938.56

PROP. BUILDING 56x90 FFE-939.81

PROP. BUILDING 56x134 FFE-940.99

PROP. BUILDING 56x134 FFE-937.76

PROP. BUILDING 56x134 FFE-939.81

PROP. BUILDING 50x80 FFE-937.66 SALT STORAGE

PROP. BUILDING 56x134 FFE-940.10

PROP. BUILDING 72x160 FFE-938.06

DETAINED PRE/POST DRAINAGE AREA = 8.19 ACRES

UNDETAINED PRE/POST DRAINAGE AREA = 0.25 ACRES

15' REAR SETBACK

20' SIDE SETBACK

25' FRONT SETBACK

BOARD OF COUNTY COMMISSIONERS D.B. 331, PAGE 645

BAILEY EWALD, LTD D.B. 644, PAGE 821

IRON WORKERS LOCAL 290 INTERNATIONAL ASSOCIATION OF BRIDGE, STRUCTURAL ORNAMENTAL REINFORCING IRON WORKERS 20160R-01833

ASPHALT PVMT.

GRAVEL PVMT.

CHAIN LINK GATE

WILDCAT RD

US-40/W NATIONAL RD

US-40

Ex R/W

SAN MH #6
TOP 929.89
8" N INV 920.39
8" S INV 920.39

SAN MH #2
TOP 933.95
8" N INV 923.05
8" E INV 923.05
8" W INV 923.05
8" S INV 924.45

SAN MH WITH DROP #5

SAN MH #1
TOP 943.07
8" E INV 935.62
8" W INV 935.62

SCALE 1"=40'
0' 20' 40' 80'

Z:\project\Miami\BethelTwp\MIA-BET-2601EetsabarnSitePlan\MIABET2601_BD001.dwg 08-Sep-26 11:31 AM

ChoiceOne Engineering

SIDNEY, OHIO 937.497.0200
LOVELAND, OHIO 513.239.8554
www.CHOICEONEENGINEERING.com

EETSABARN SITE PLAN
BETHEL TOWNSHIP
RETENTION DRAINAGE MAP

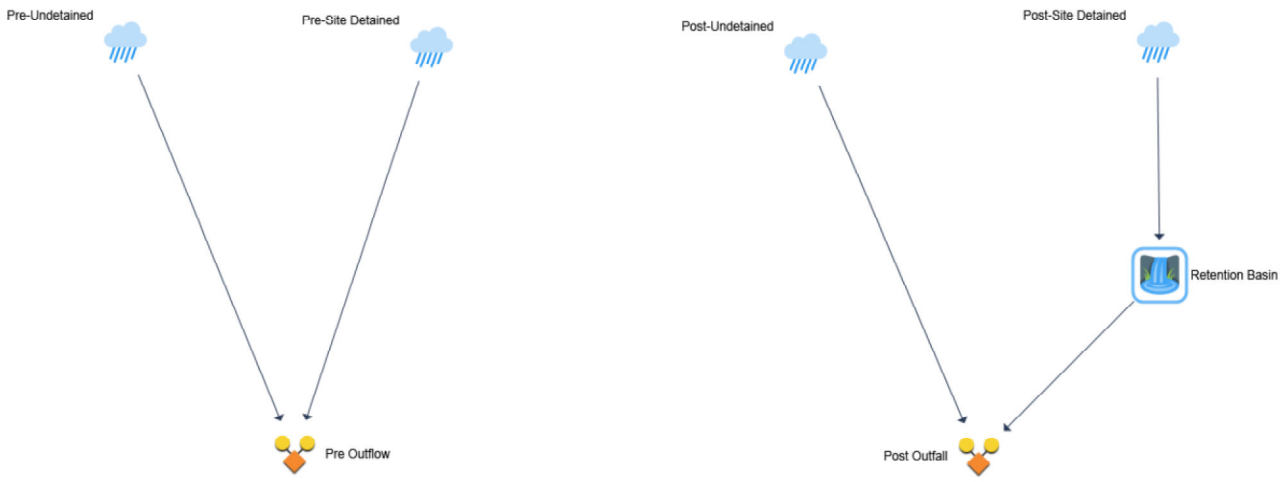
REVISIONS:

FILE NAME	RETENTION
DRAWN BY	DMR
CHECKED BY	JSP
PROJECT No.	MIA-BET-2601
DATE	09-08-2026
SHEET NUMBER	1 OF 1

Basin Model

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026



Hydrograph by Return Period

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	NRCS Runoff	Pre-Undetained	0.450	0.590		0.779	0.931	1.138	1.300	1.467
2	NRCS Runoff	Pre-Site Detained	6.775	9.321		12.88	15.82	19.87	23.07	26.41
3	Junction	Pre Outflow	6.904	9.515		13.15	16.14	20.25	23.51	26.90
4	NRCS Runoff	Post-Undetained	0.459	0.599		0.789	0.941	1.148	1.309	1.477
5	NRCS Runoff	Post-Site Detained	20.06	24.69		30.83	35.71	42.29	47.43	52.75
6	Pond Route	Retention Basin	2.439	4.561		5.346	6.060	12.00	17.05	21.38
7	Junction	Post Outfall	2.502	4.699		5.640	6.242	12.39	17.51	22.04

Hydrograph 1-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	0.450	12.00	1,167	----		
2	NRCS Runoff	Pre-Site Detained	6.775	12.23	29,815	----		
3	Junction	Pre Outflow	6.904	12.20	30,982	1, 2		
4	NRCS Runoff	Post-Undetained	0.459	12.00	1,191	----		
5	NRCS Runoff	Post-Site Detained	20.06	12.00	54,389	----		
6	Pond Route	Retention Basin	2.439	12.43	53,915	5	924.60	31,104
7	Junction	Post Outfall	2.502	12.43	55,106	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

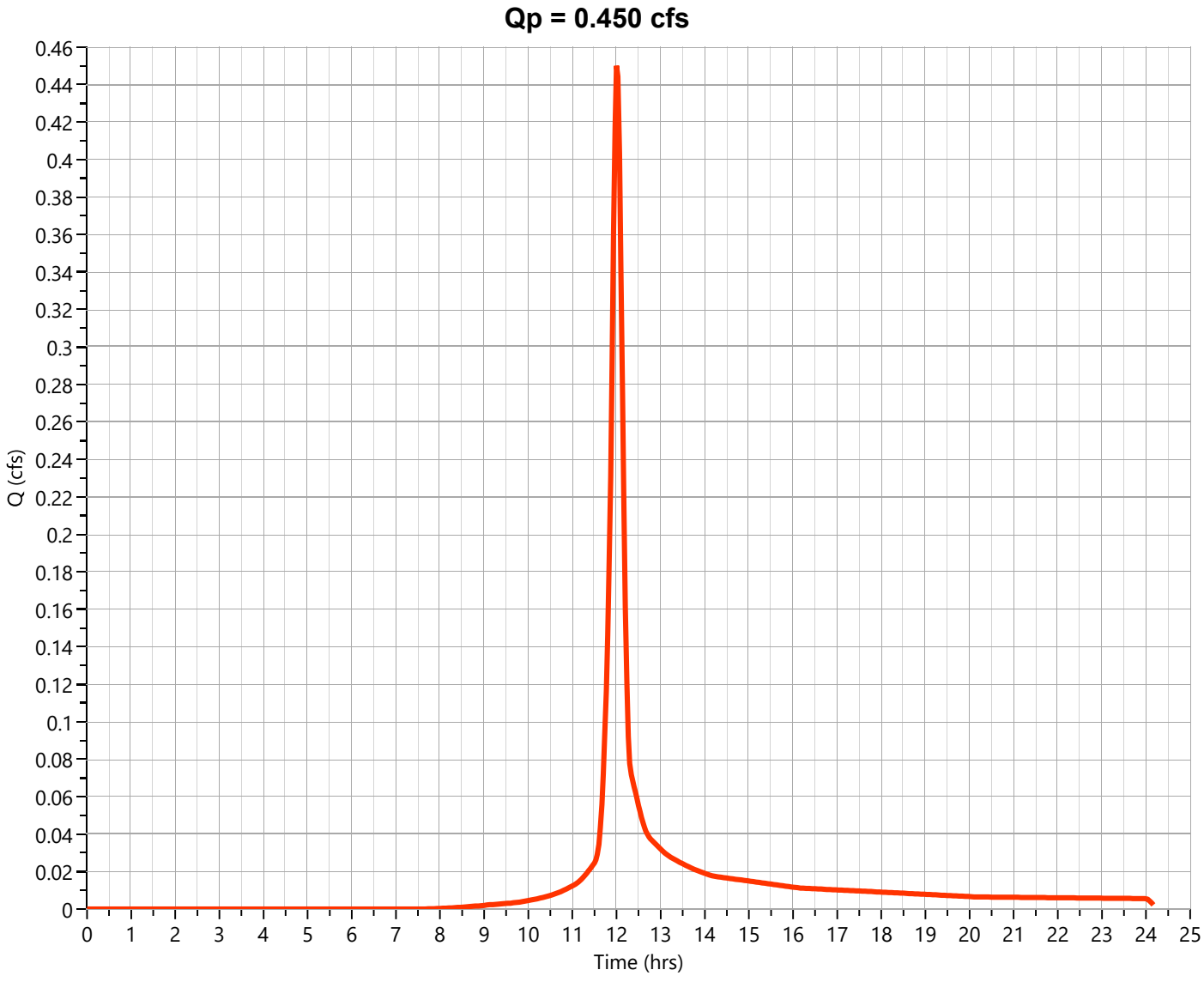
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.450 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 1,167 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.26 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

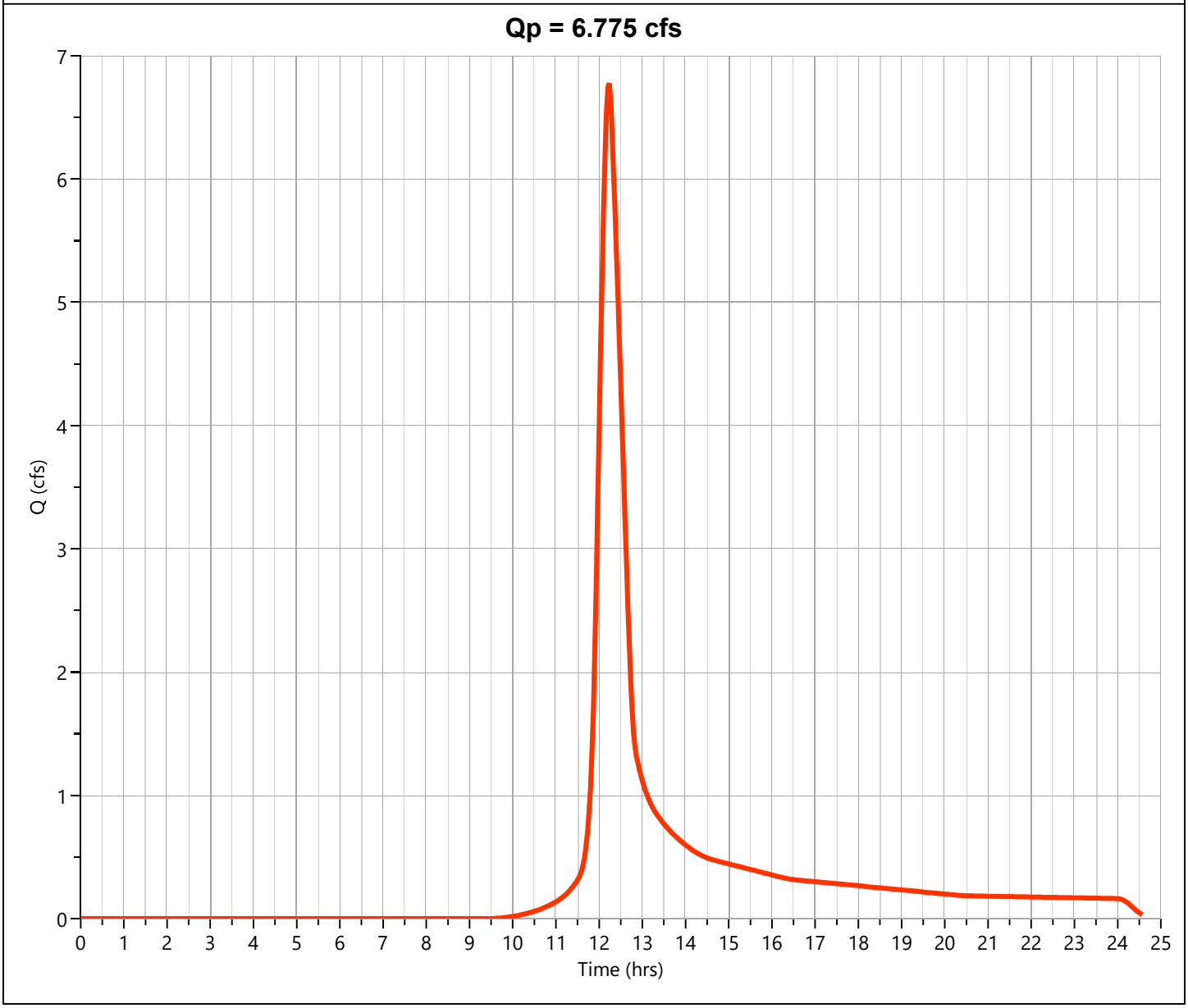
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.775 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.23 hrs
Time Interval	= 2 min	Runoff Volume	= 29,815 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 2.26 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Tc by TR55 Worksheet

File: 2026-08-25-WetRetentionCalculations.hys

Hydrology Studio v 3.0.0.44

08-25-2026

Pre-Site Detained
NRCS Runoff

Hyd. No. 2

Description	Segments			
	A	B	C	Tc (min)
Sheet Flow				
Description				
Manning's n	0.170	0.170	0.170	
Flow Length (ft)	100	100	100	
2-yr, 24-hr Precip. (in)	2.71	2.71	2.71	
Land Slope (%)	2.7	2.7	2.7	
Travel Time (min)	**10.44**	**10.44**	**10.44**	**31.31**
Shallow Concentrated Flow				
Flow Length (ft)	240			
Watercourse Slope (%)	1.80	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	2.16			
Travel Time (min)	**1.85**	**0.00**	**0.00**	**1.85**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**33.16 min**

Hydrograph Report

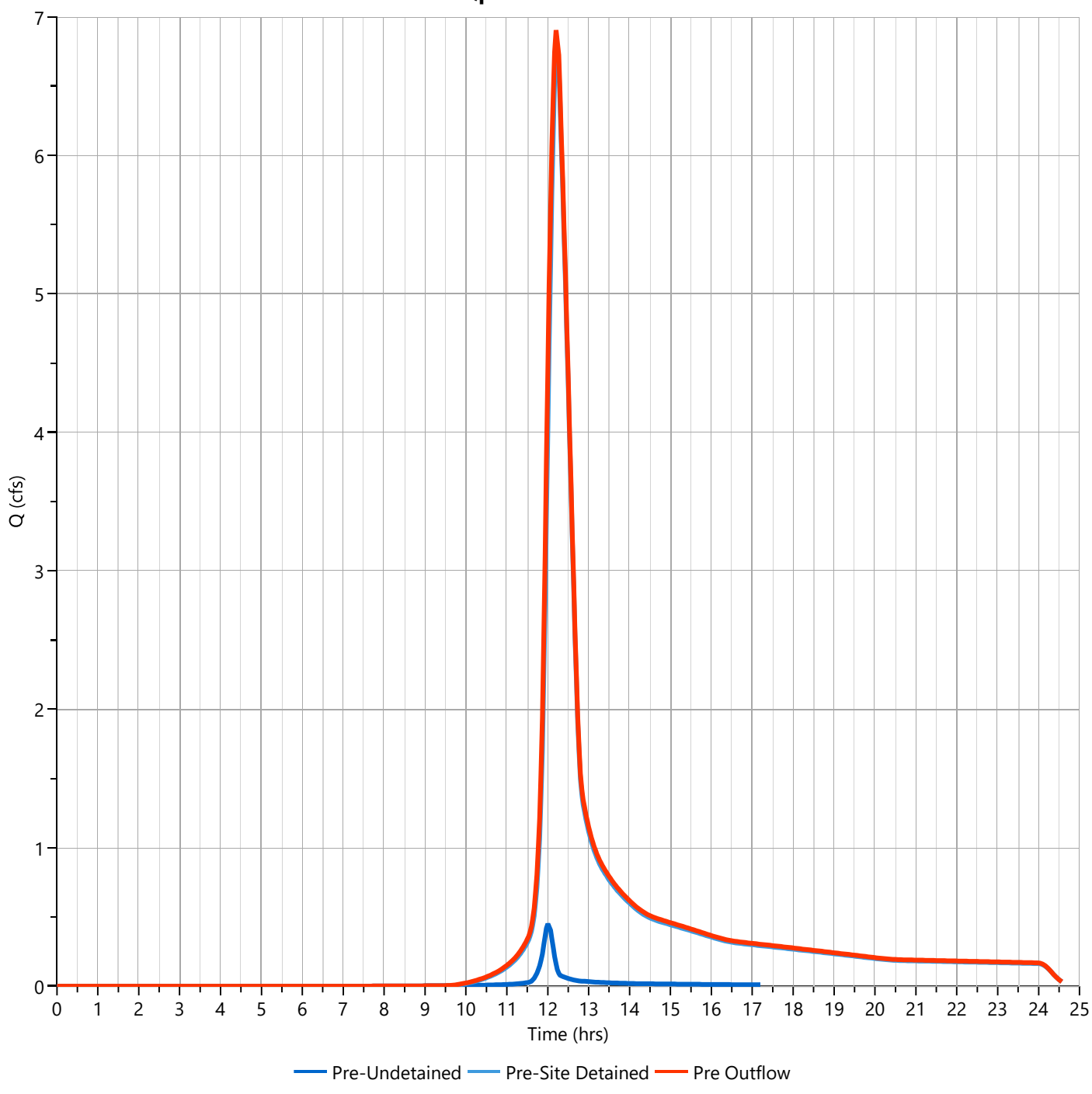
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 6.904 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 30,982 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

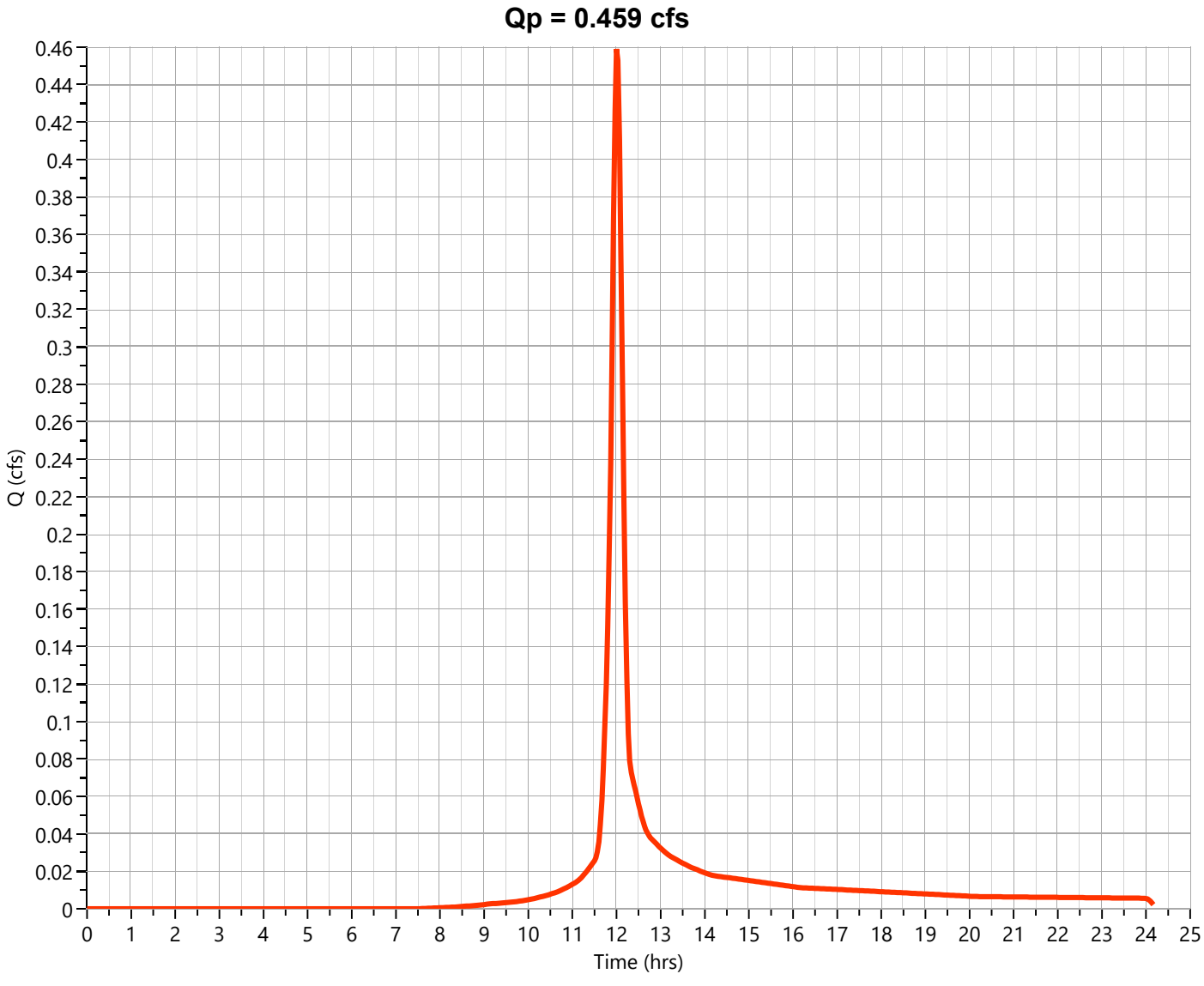
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.459 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 1,191 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.26 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

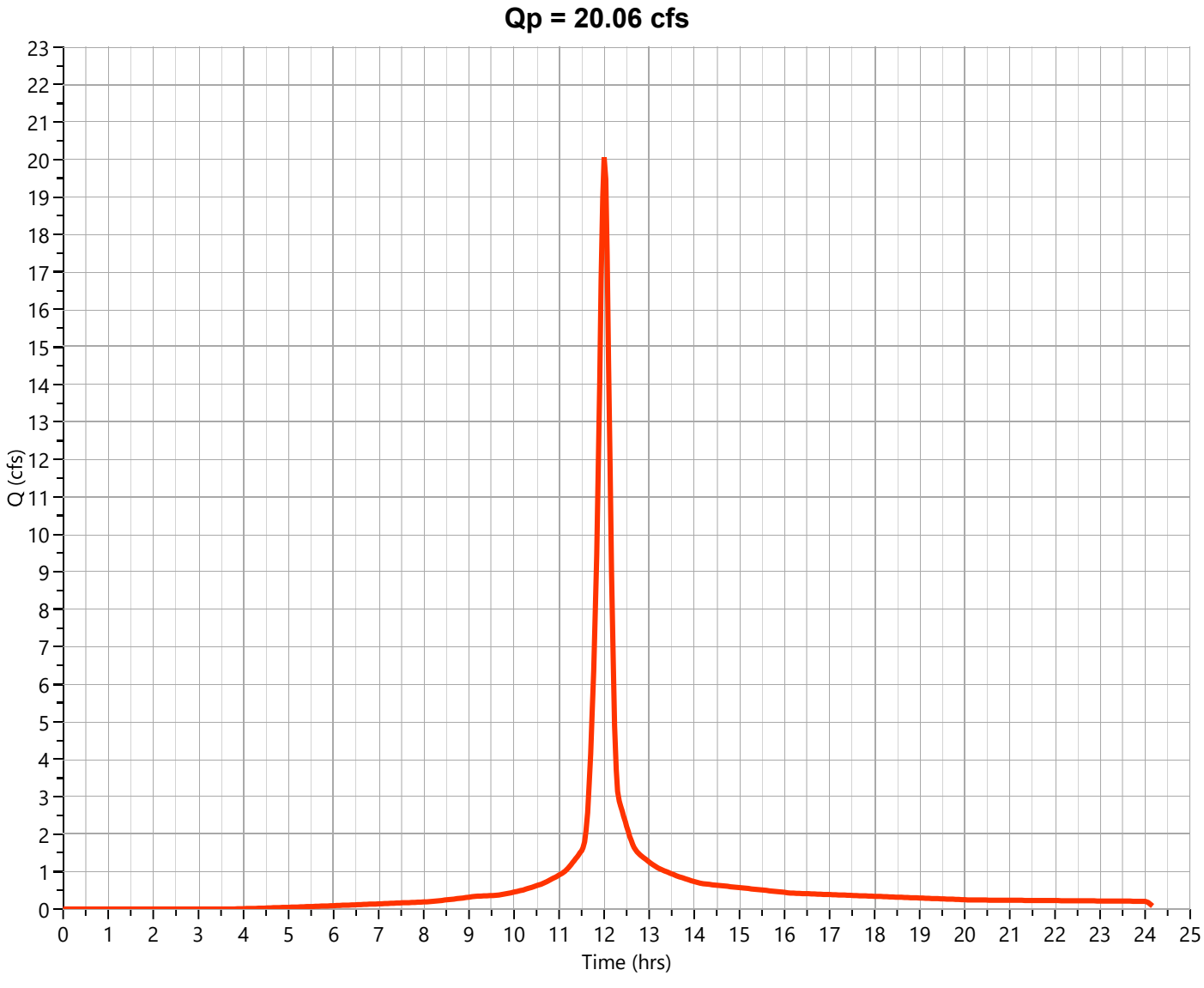
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 20.06 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 54,389 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.26 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

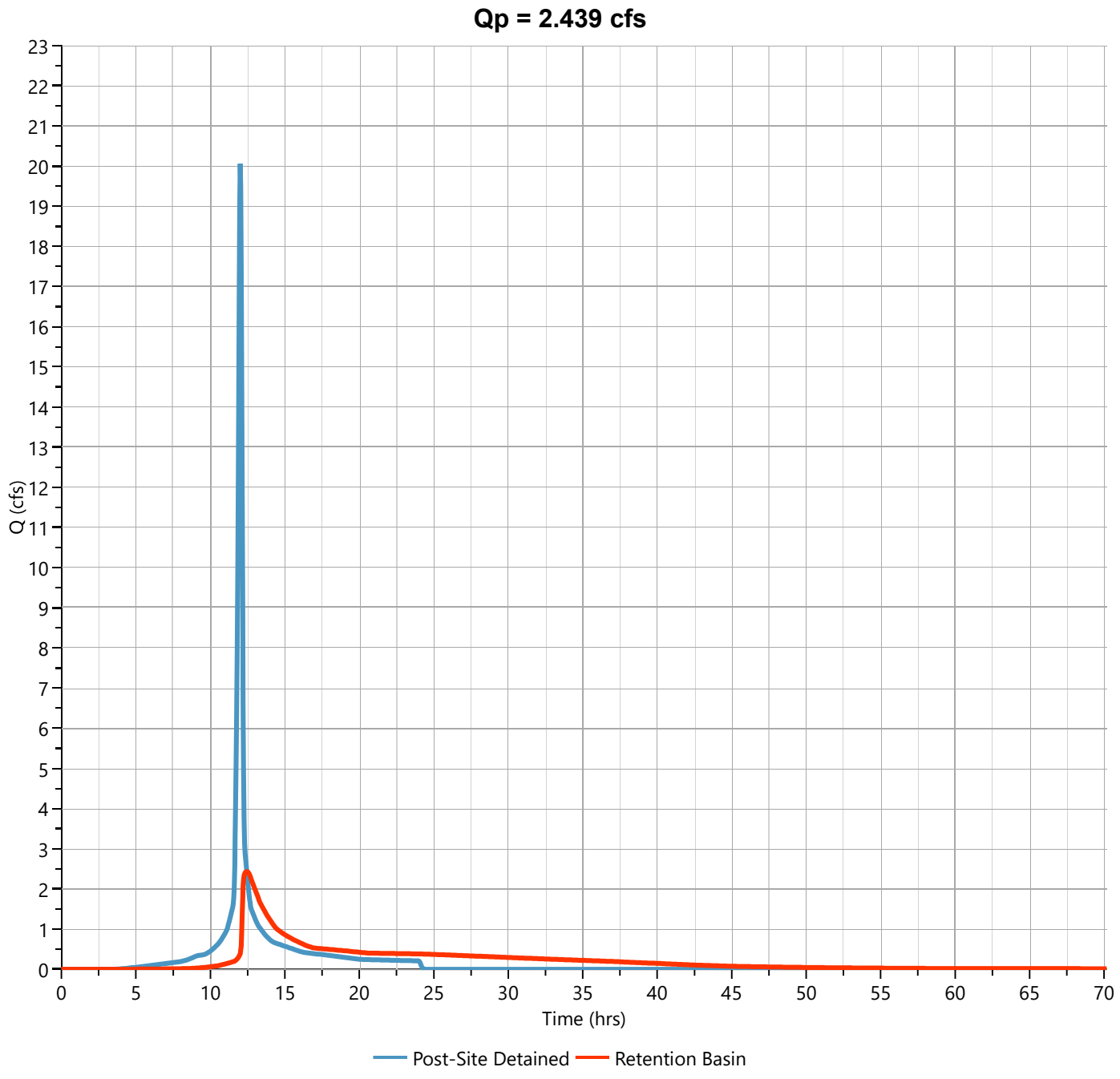
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 2.439 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.43 hrs
Time Interval	= 2 min	Hydrograph Volume	= 53,915 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 924.60 ft
Pond Name	= Retention Basin	Max. Storage	= 31,104 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 9.08 hrs



Pond Report

File: 2026-08-25-WetRetentionCalculations.hys

Hydrology Studio v 3.0.0.44

08-25-2026

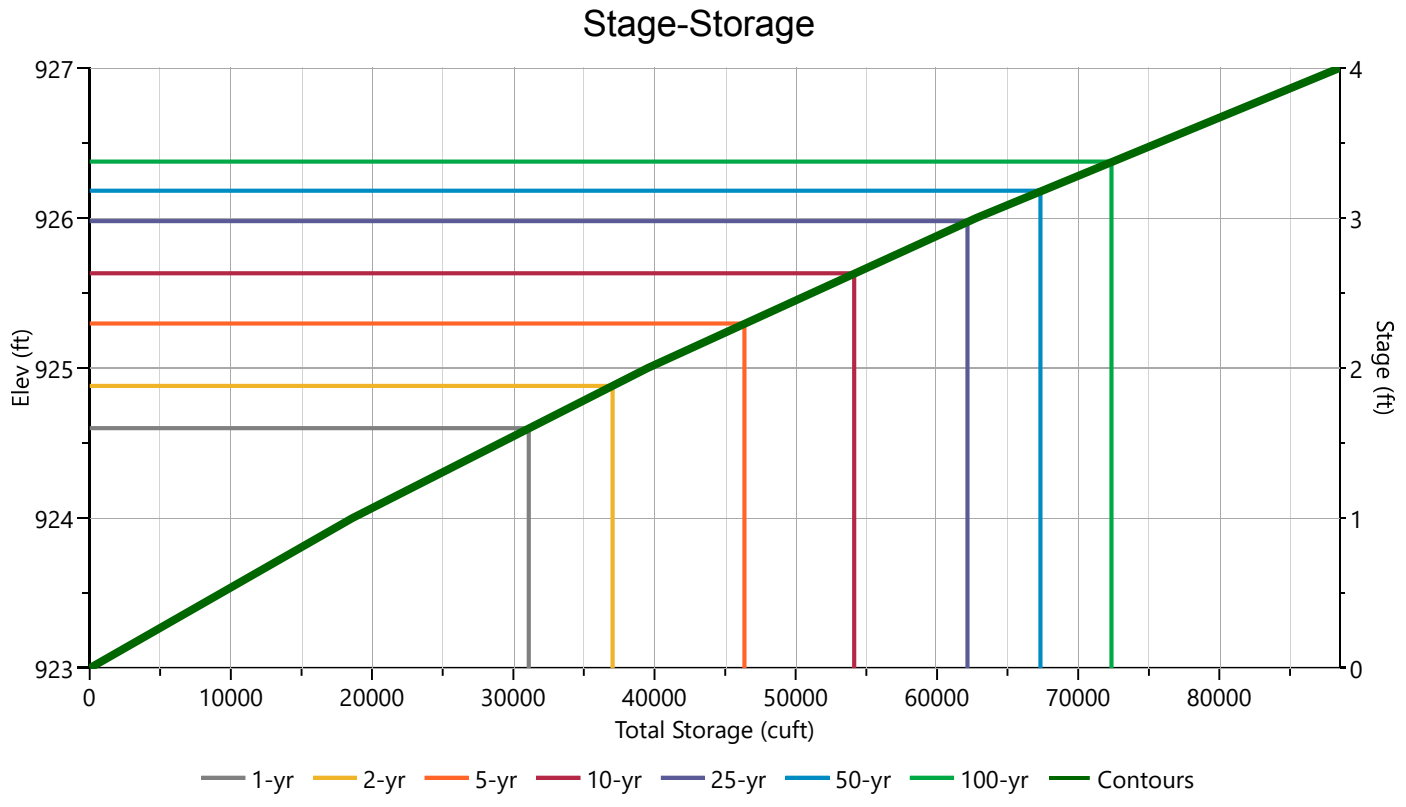
Retention Basin

Stage-Storage

User Defined Contours	
Description	**Input**
Bottom Elevation, ft	923.00
Voids (%)	100.00
Volume Calc	None

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	923.00	17,507	0.000	0.000
1.00	924.00	19,733	18,620	18,620
2.00	925.00	22,060	20,897	39,517
3.00	926.00	24,487	23,274	62,790
4.00	927.00	27,015	25,751	88,541



Pond Report

File: 2026-08-25-WetRetentionCalculations.hys

Hydrology Studio v 3.0.0.44

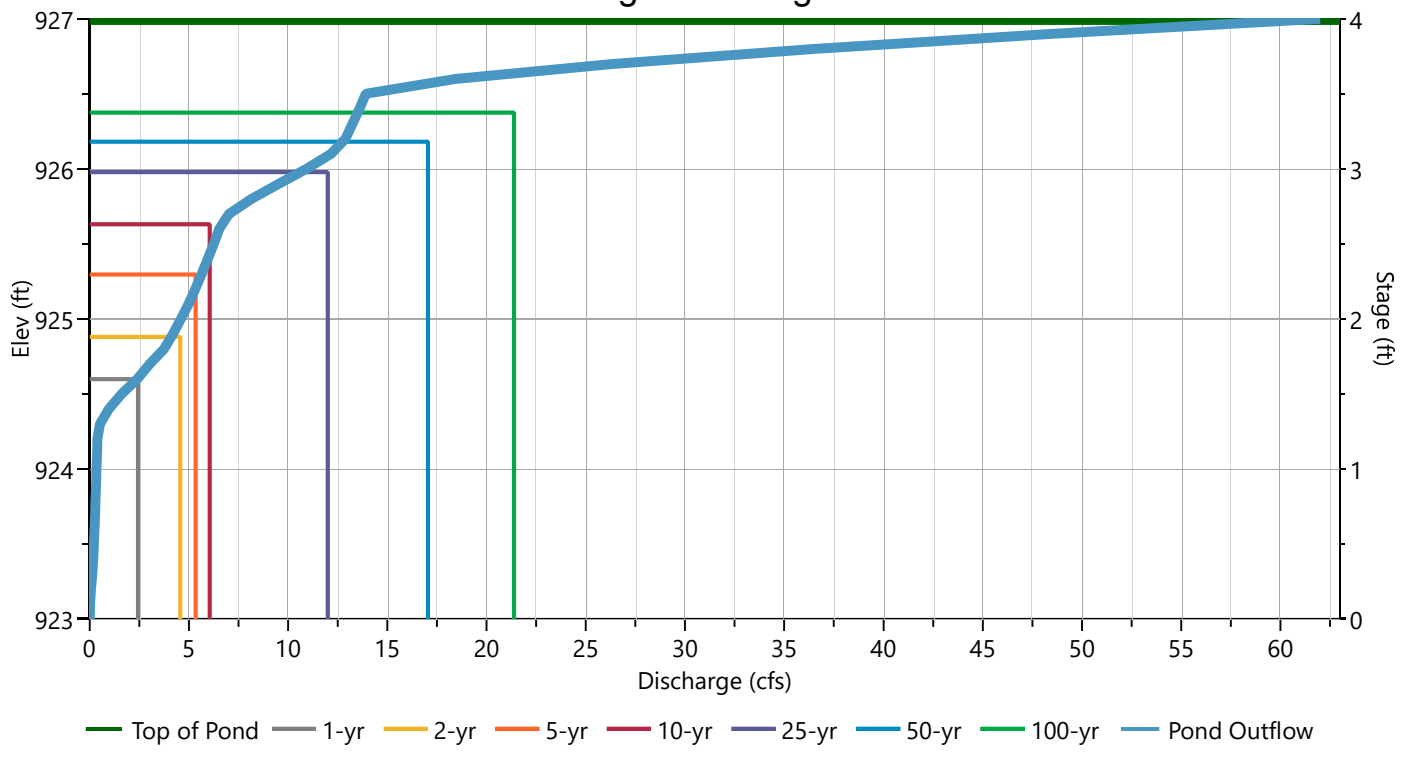
08-25-2026

Retention Basin

Stage-Discharge

Culvert / Orifices	Cir Culvert	Orifice			Orifice Plate	
		1 (m)	2 (m)	3		
Rise, in	18	4	6		Orifice Dia, in	
Span, in	18	4	36		No. Orifices	
No. Barrels	1	1	1		Invert Elevation, ft	
Invert Elevation, ft	923.00	923.01	924.25		Height, ft	
Orifice Coefficient, Co	0.60	0.60	0.60		Orifice Coefficient, Co	
Length, ft	37					
Barrel Slope, %	.25					
N-Value, n	0.013					
Weirs	**Riser**	**Weir**			**Ancillary**	
		1 (i)	2	3		
Shape / Type	Box	Rectangular			Exfiltration, in/hr	
Crest Elevation, ft	925.65	926.5				
Crest Length, ft	12	40				
Angle, deg						
Weir Coefficient, Cw	2.7	3.3				

m = Flows through Culvert, i = Independent



Pond Report

File: 2026-08-25-WetRetentionCalculations.hys

Hydrology Studio v 3.0.0.44

08-25-2026

Retention Basin

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	923.00	0.000	0.000	0.000	0.000		0.000	0.000						0.000
1.00	924.00	18,620	0.352 oc	0.352	0.000		0.000	0.000						0.352
2.00	925.00	39,517	4.607 oc	0.253	4.354		0.000	0.000						4.607
3.00	926.00	62,790	10.93 oc	0.232	3.987		6.708	0.000						10.93
4.00	927.00	88,541	15.34 ic	0.000	0.000		0.000	46.67						62.01

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

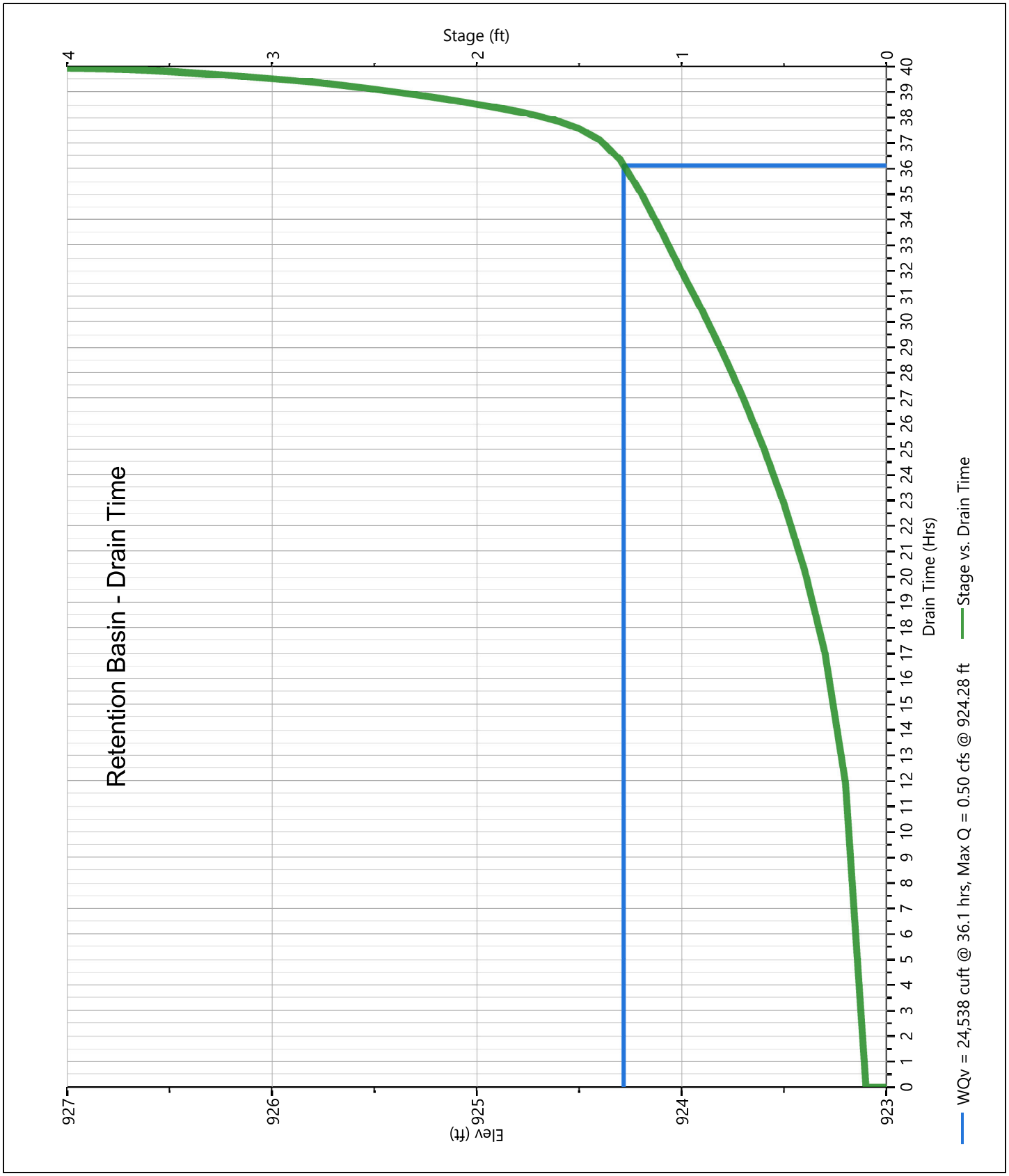
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Hydrology Studio v 3.0.0.44

08-25-2026

Retention Basin

Extended Detention



Hydrograph Report

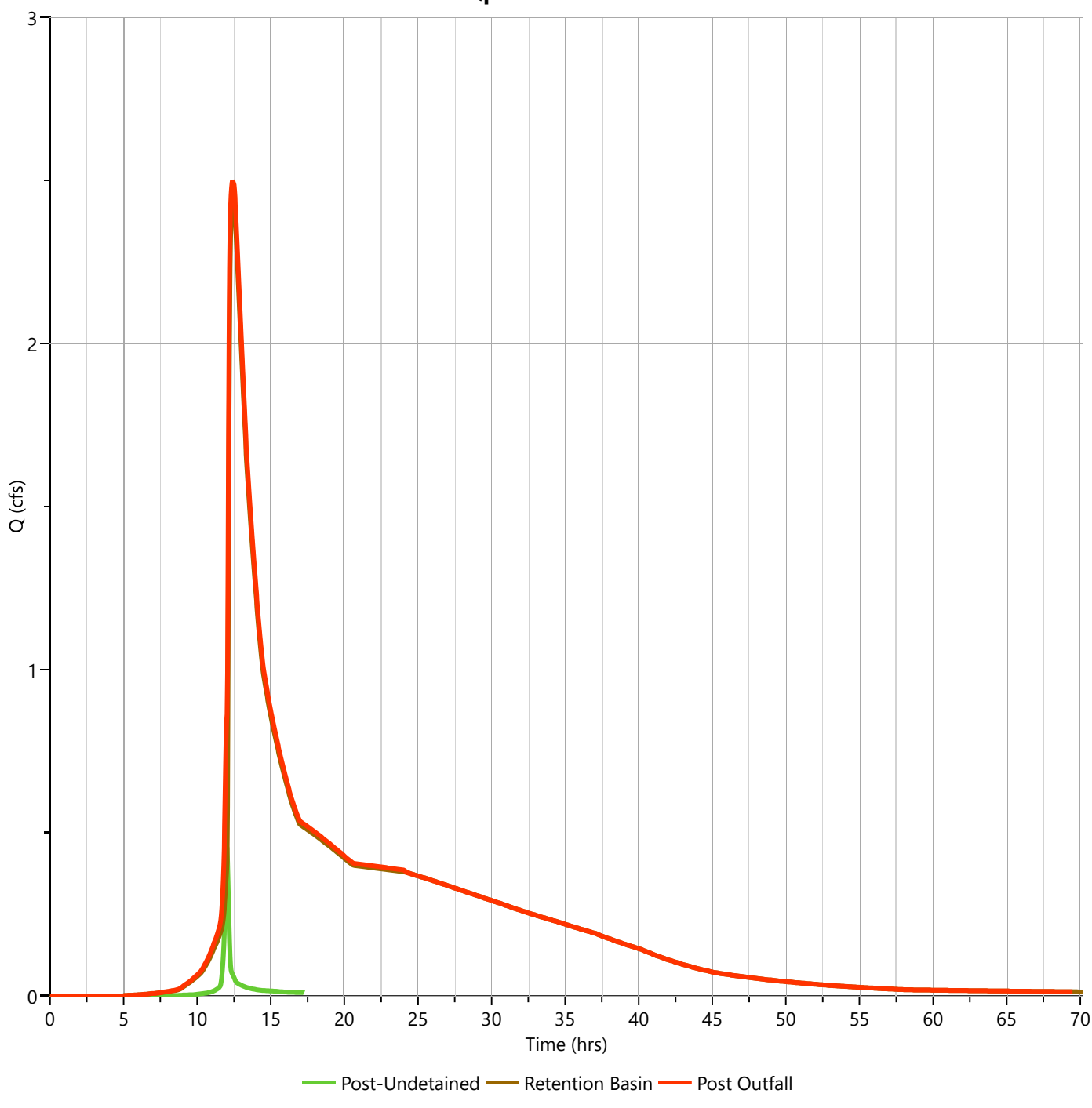
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 2.502 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.43 hrs
Time Interval	= 2 min	Hydrograph Volume	= 55,106 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac



Hydrograph 2-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	0.590	12.00	1,535	----		
2	NRCS Runoff	Pre-Site Detained	9.321	12.23	40,574	----		
3	Junction	Pre Outflow	9.515	12.20	42,108	1, 2		
4	NRCS Runoff	Post-Undetained	0.599	12.00	1,561	----		
5	NRCS Runoff	Post-Site Detained	24.69	12.00	67,801	----		
6	Pond Route	Retention Basin	4.561	12.27	67,314	5	924.88	37,029
7	Junction	Post Outfall	4.699	12.23	68,875	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

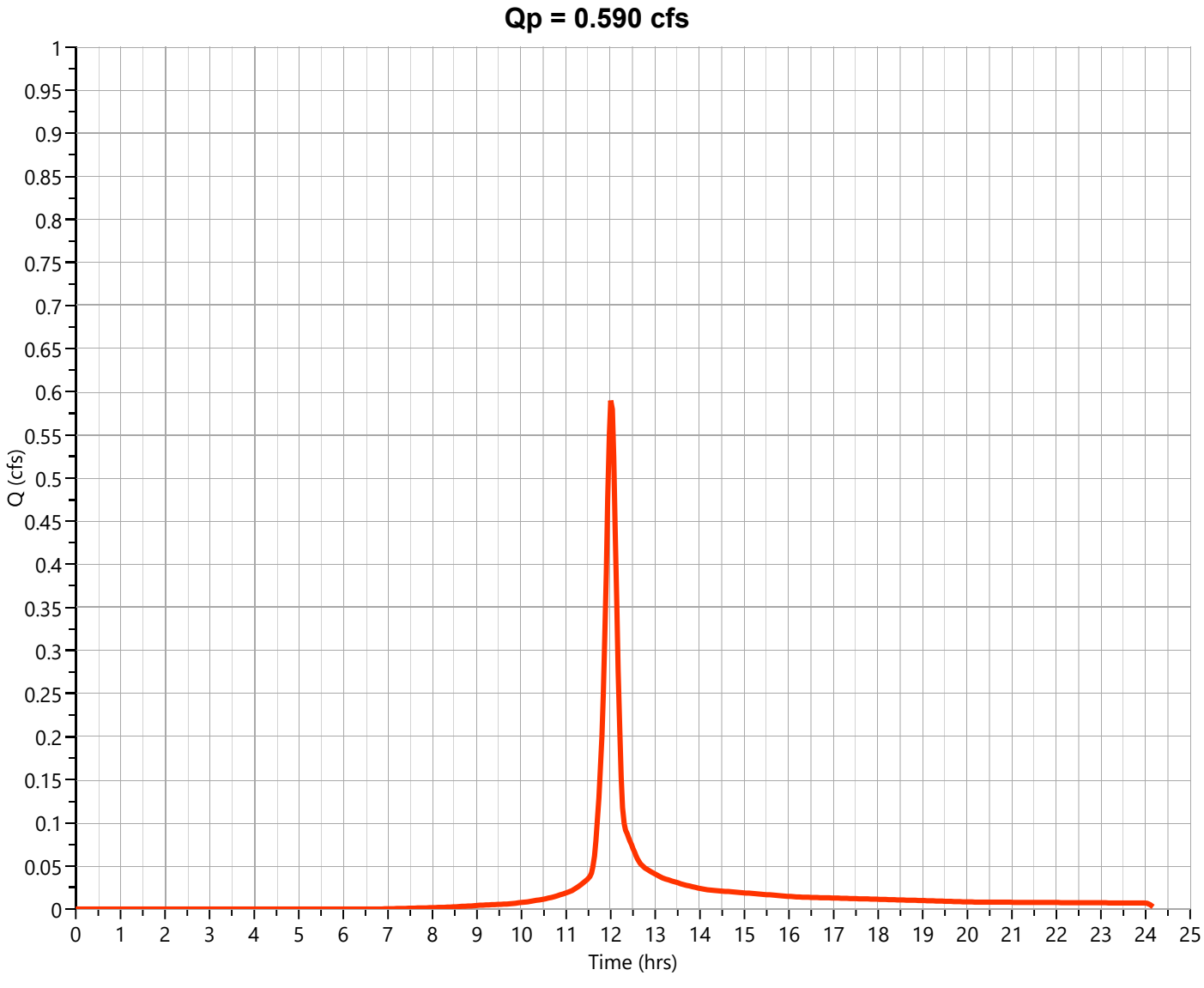
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.590 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 1,535 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.71 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

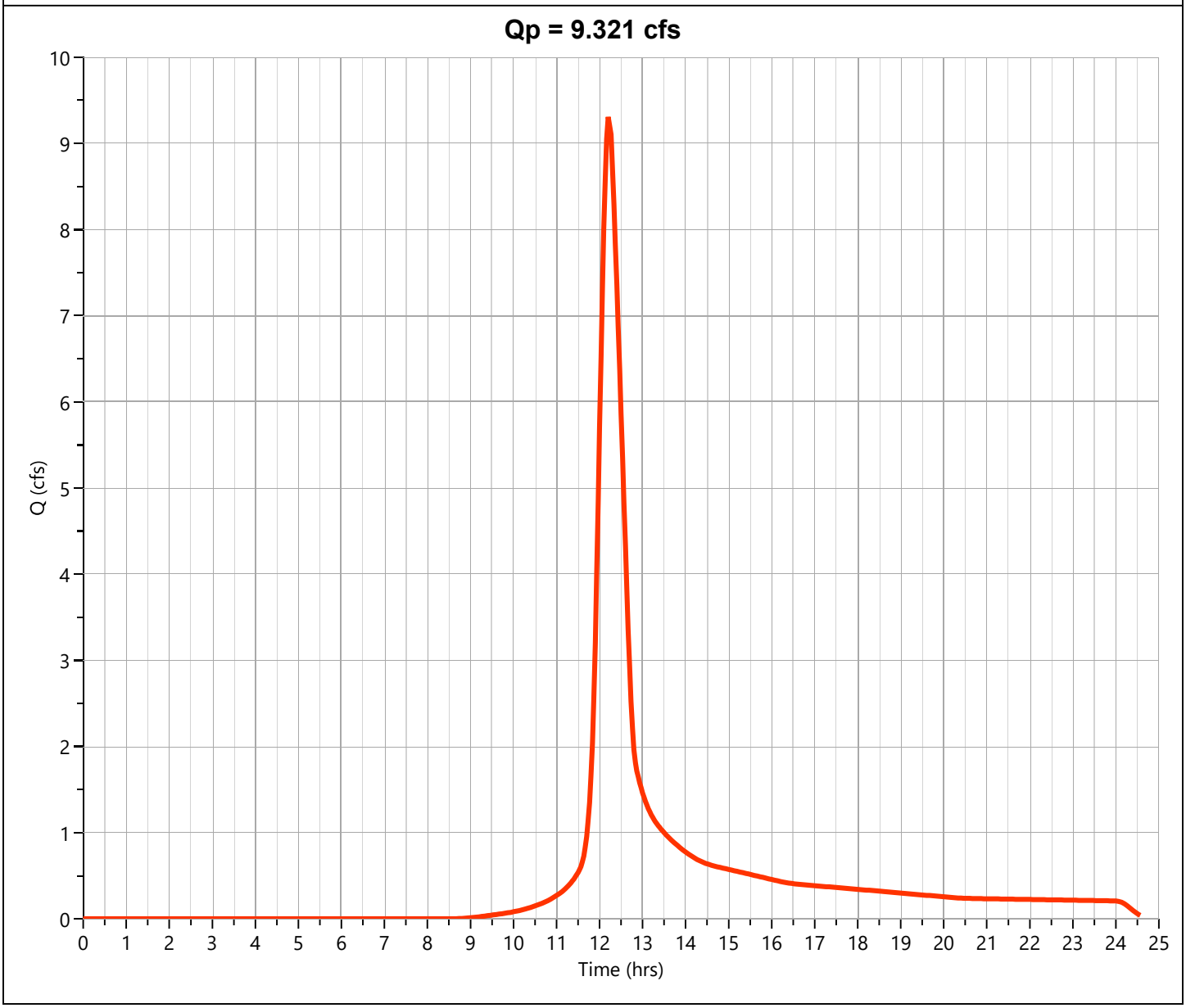
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9.321 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.23 hrs
Time Interval	= 2 min	Runoff Volume	= 40,574 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 2.71 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Hydrograph Report

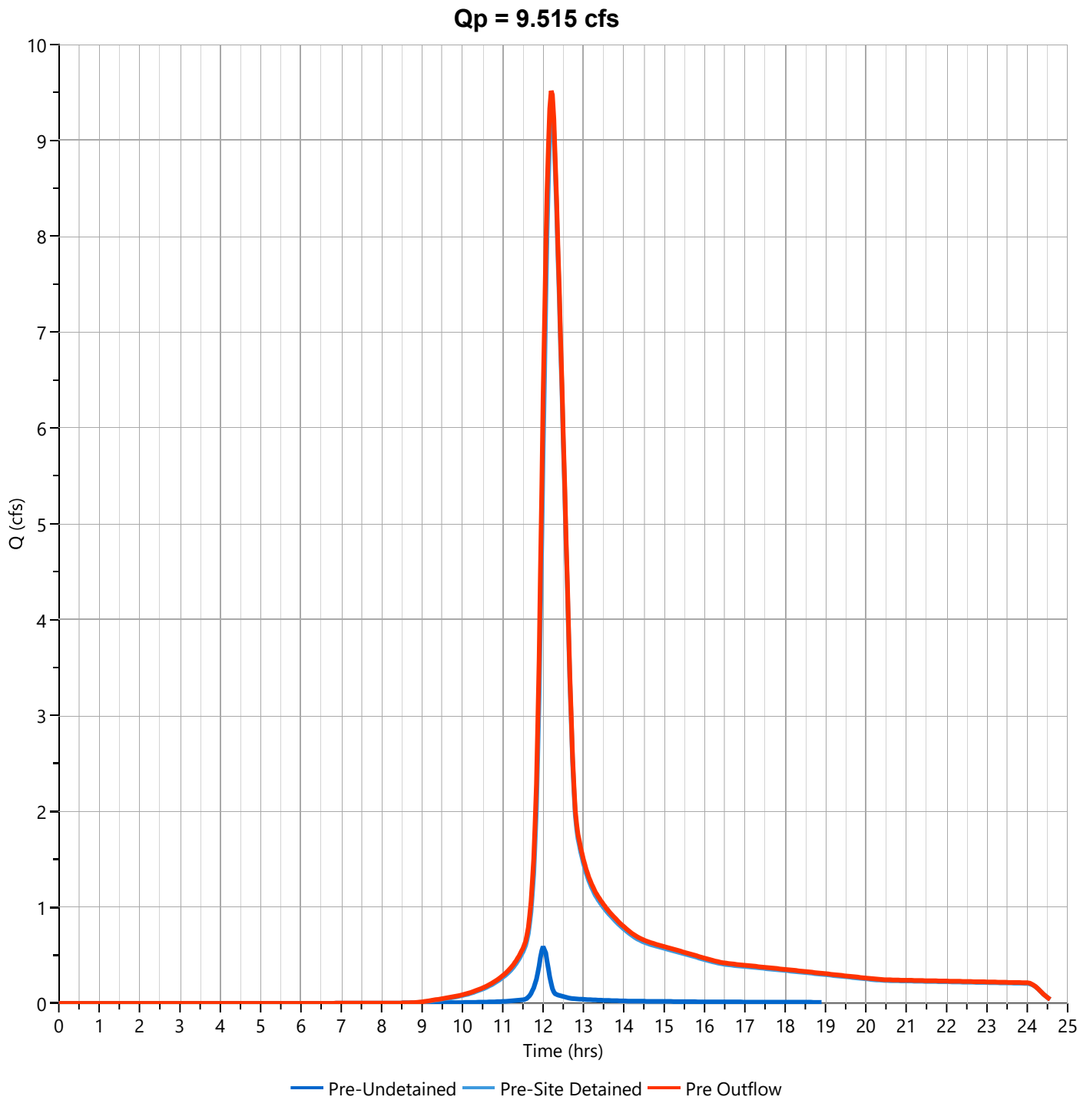
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 9.515 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 42,108 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

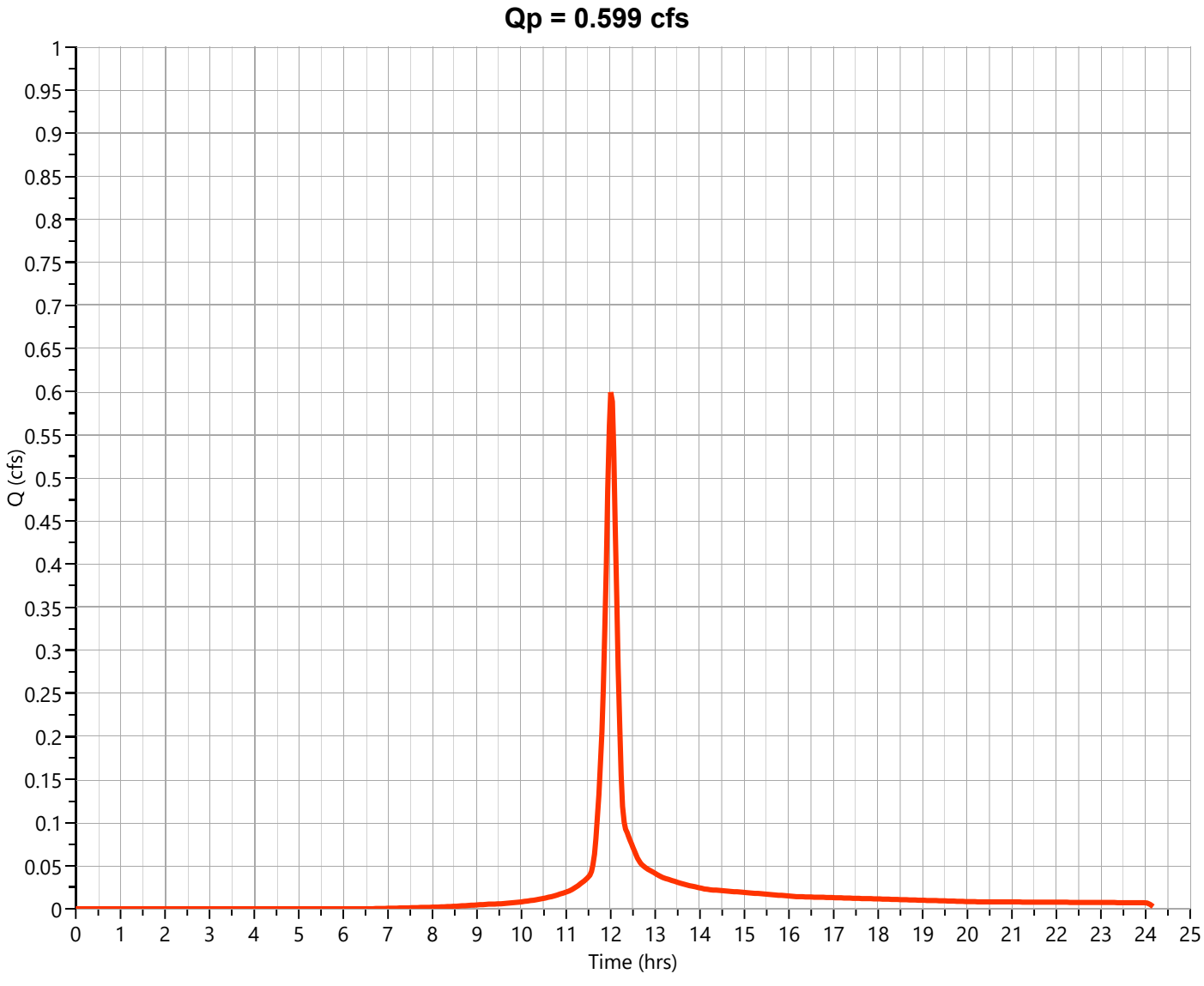
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.599 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 1,561 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.71 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

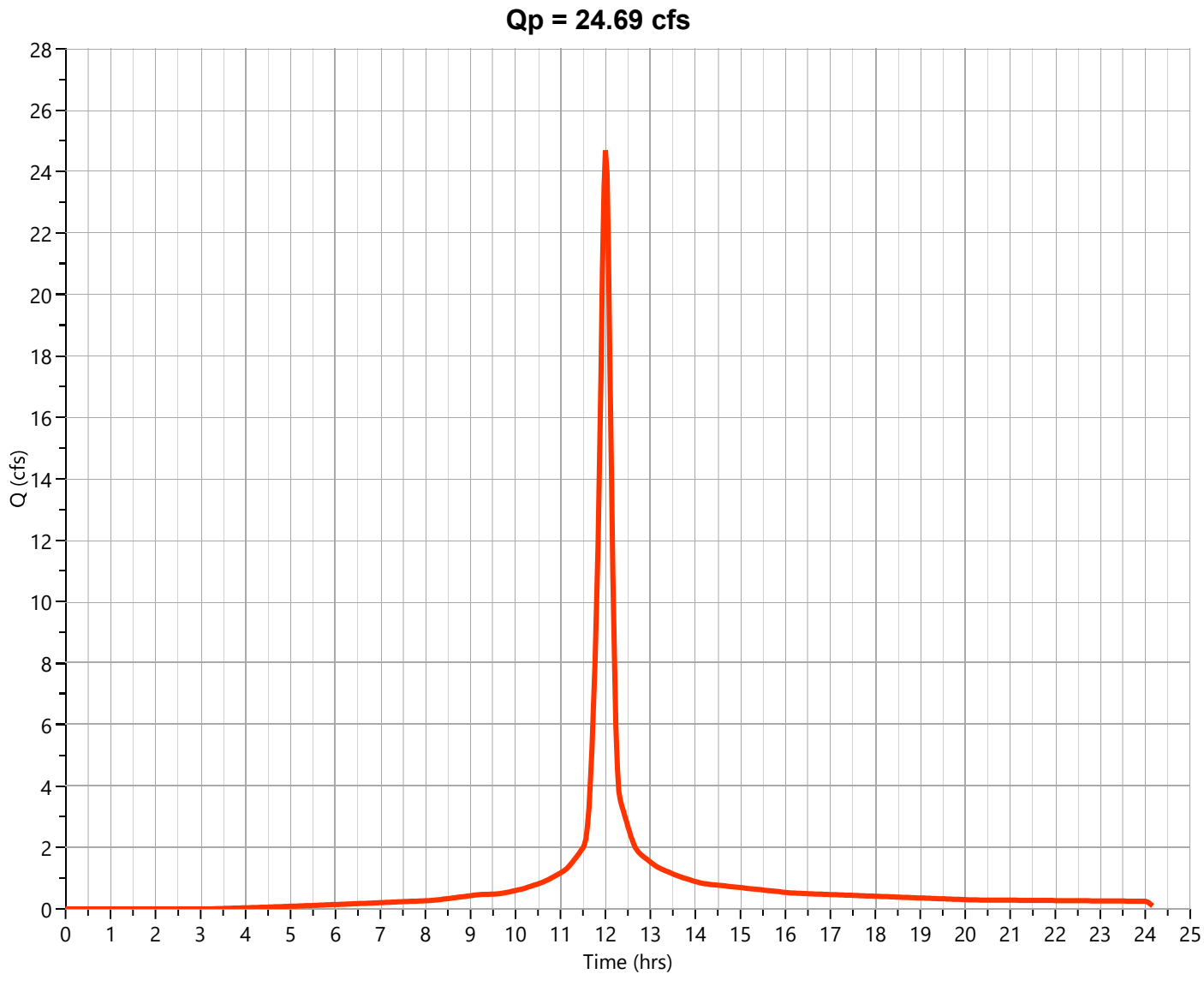
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 24.69 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 67,801 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 2.71 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

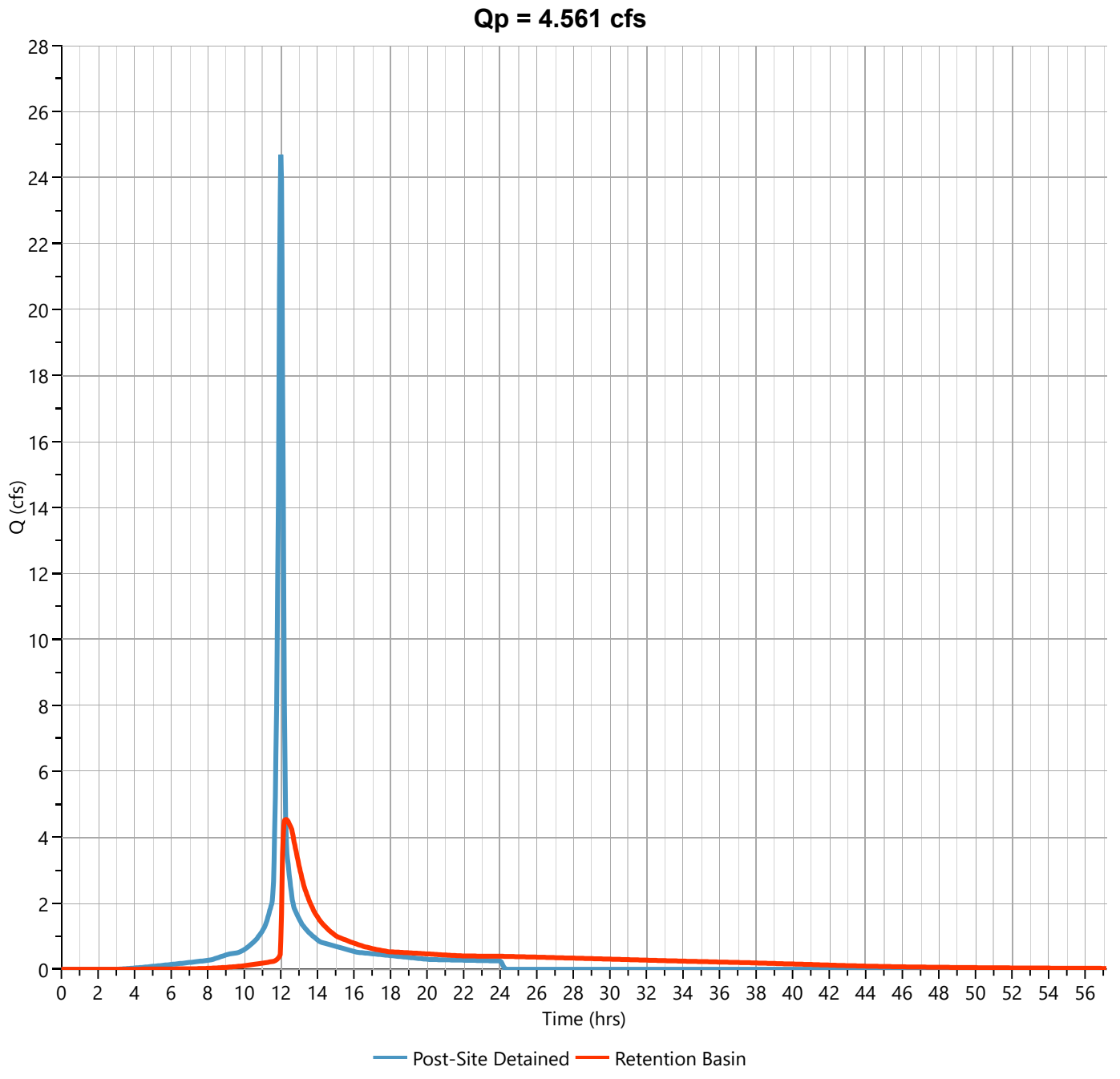
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 4.561 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.27 hrs
Time Interval	= 2 min	Hydrograph Volume	= 67,314 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 924.88 ft
Pond Name	= Retention Basin	Max. Storage	= 37,029 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 7.42 hrs



Hydrograph Report

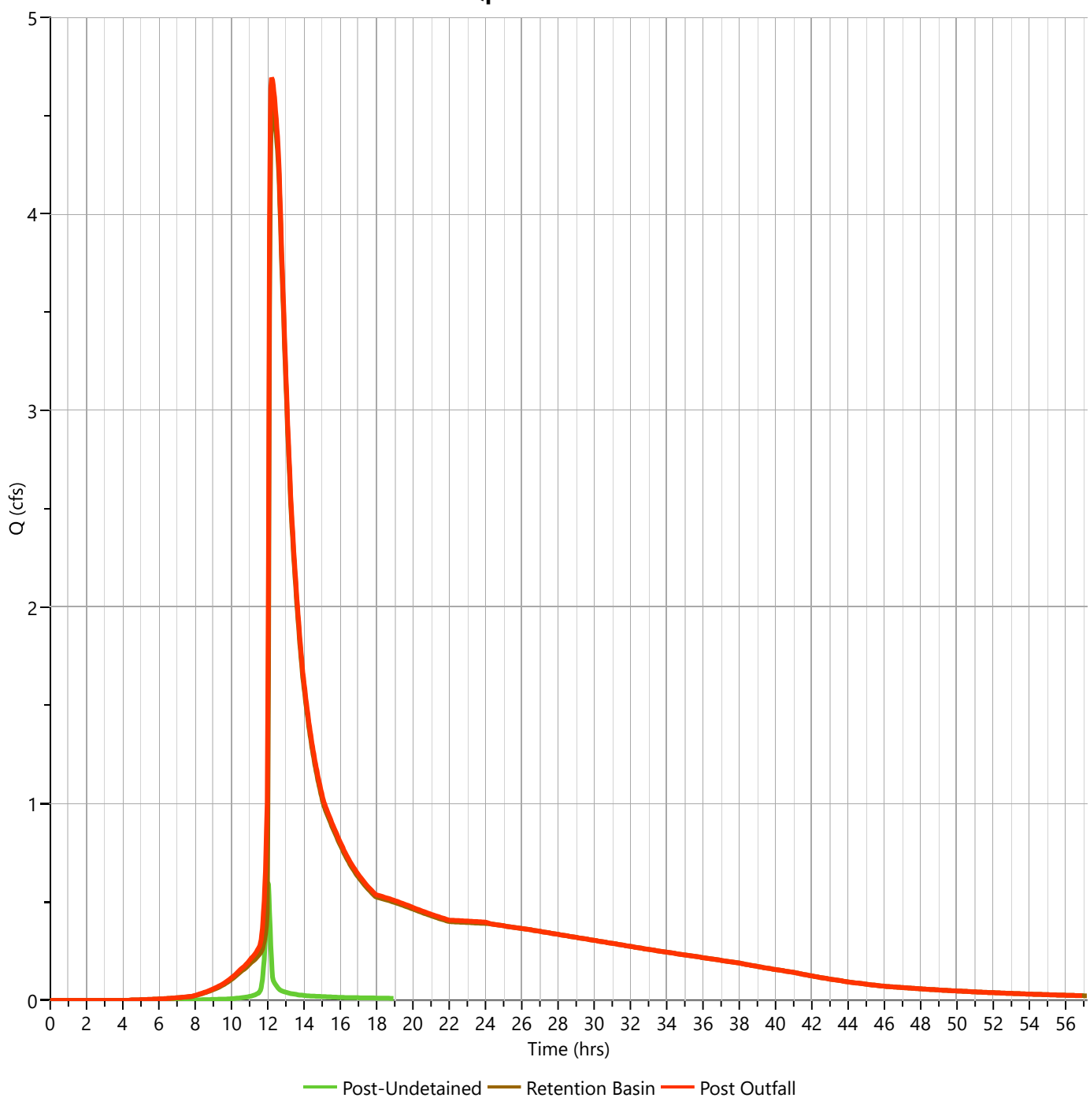
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 4.699 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.23 hrs
Time Interval	= 2 min	Hydrograph Volume	= 68,875 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac



Hydrograph 5-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	0.779	12.00	2,042	----		
2	NRCS Runoff	Pre-Site Detained	12.88	12.20	55,744	----		
3	Junction	Pre Outflow	13.15	12.20	57,787	1, 2		
4	NRCS Runoff	Post-Undetained	0.789	12.00	2,072	----		
5	NRCS Runoff	Post-Site Detained	30.83	12.00	85,830	----		
6	Pond Route	Retention Basin	5.346	12.27	85,330	5	925.30	46,366
7	Junction	Post Outfall	5.640	12.13	87,401	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

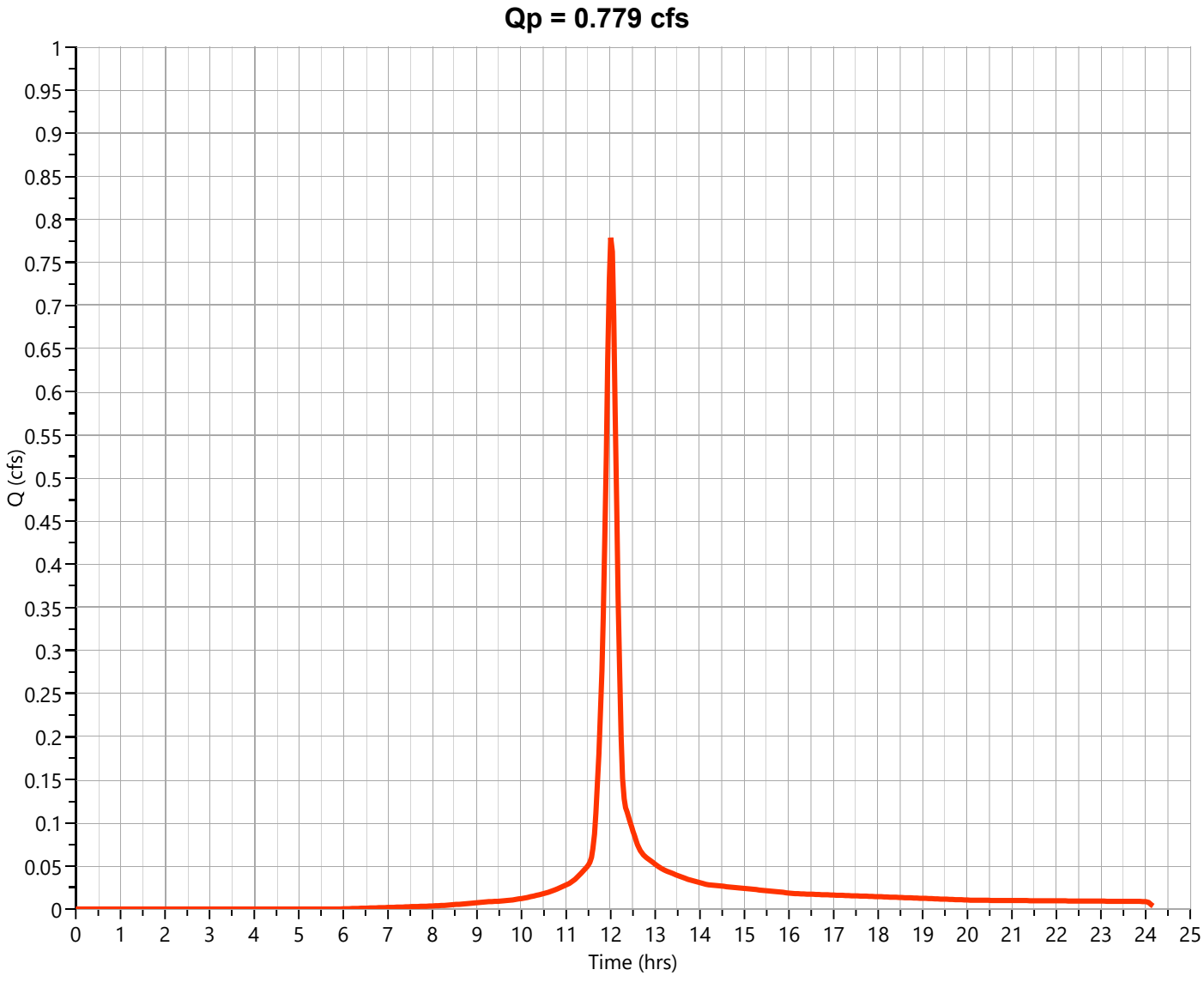
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.779 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 2,042 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.31 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

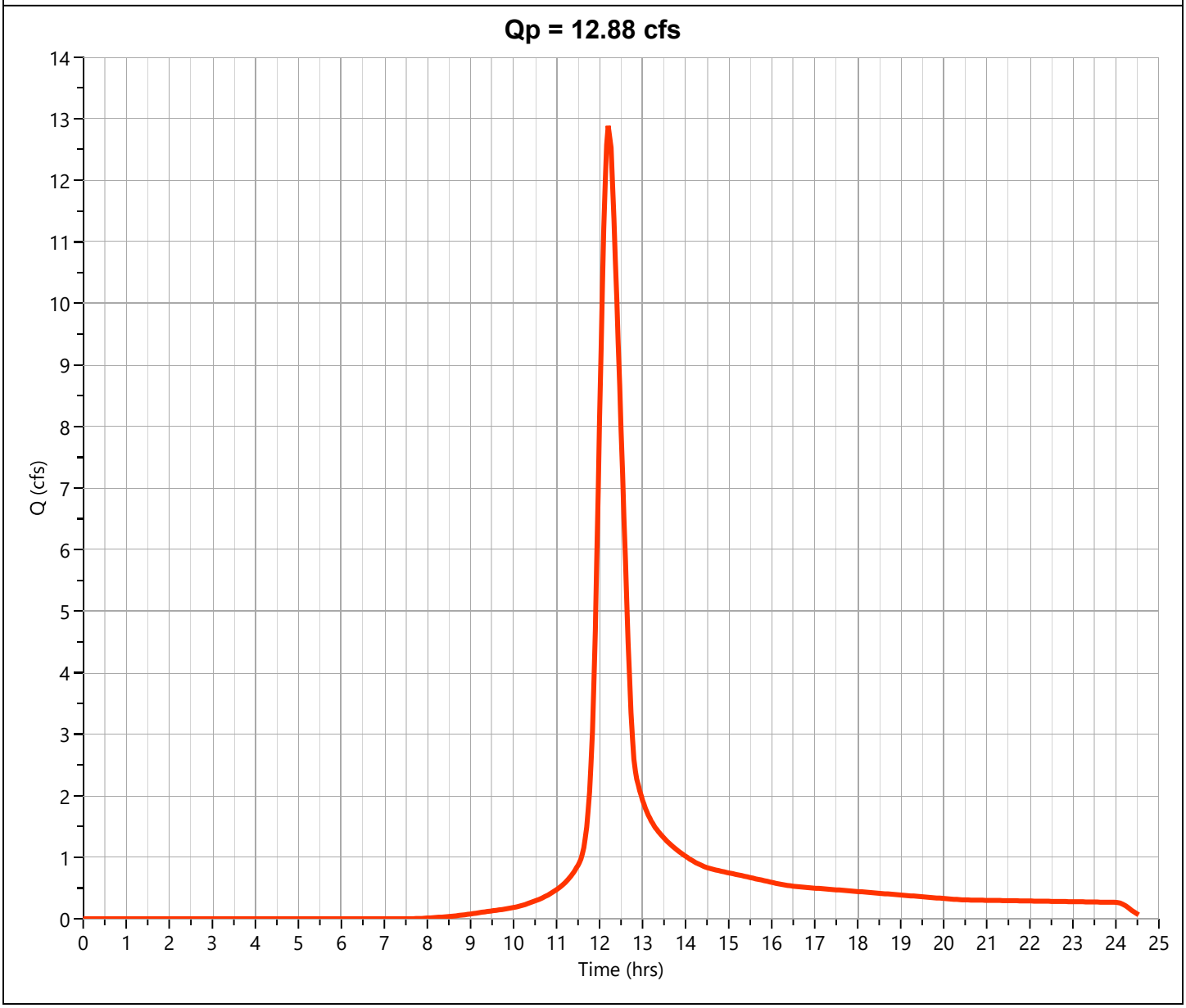
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 12.88 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 55,744 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 3.31 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Hydrograph Report

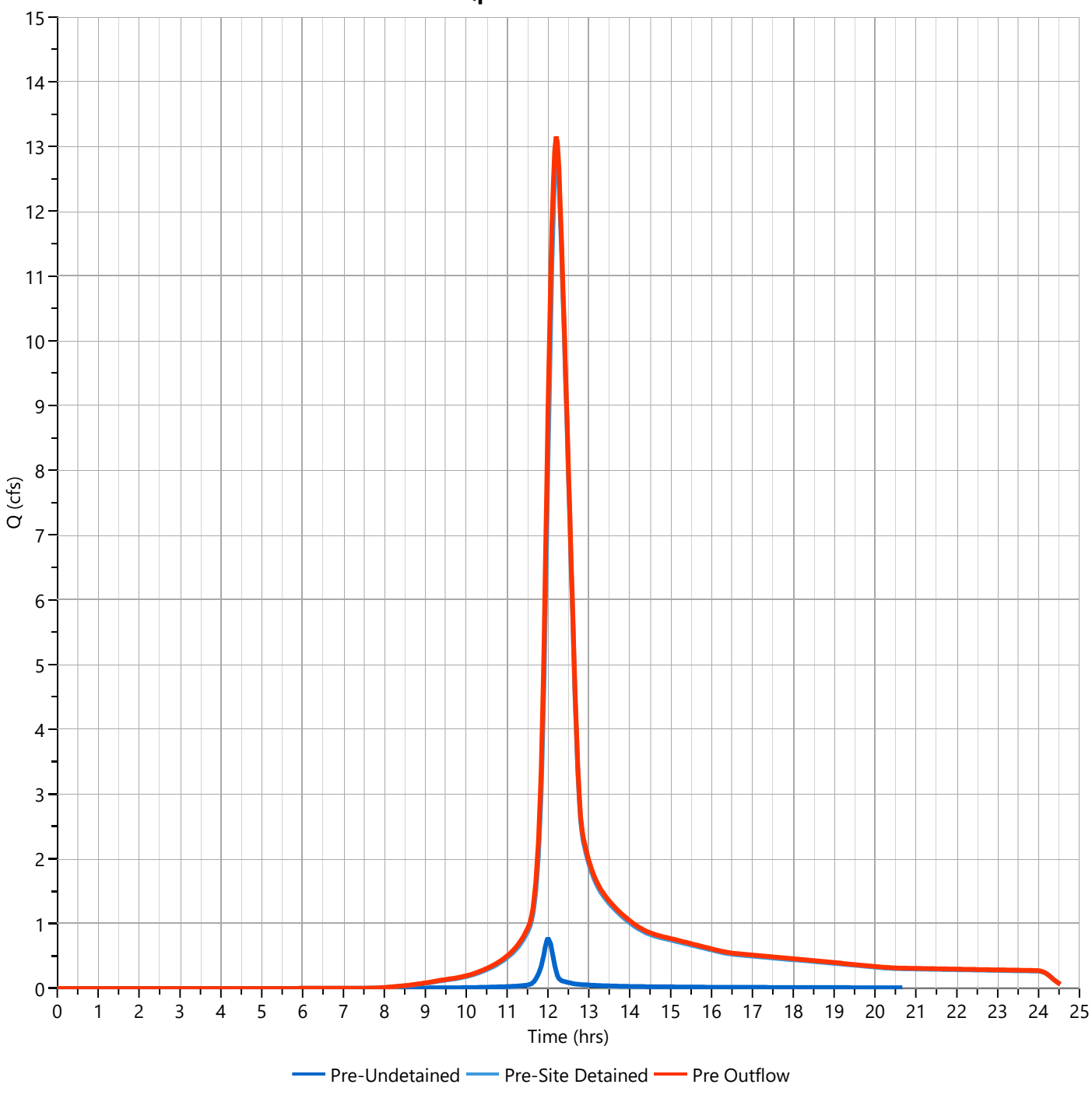
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 13.15 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 57,787 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

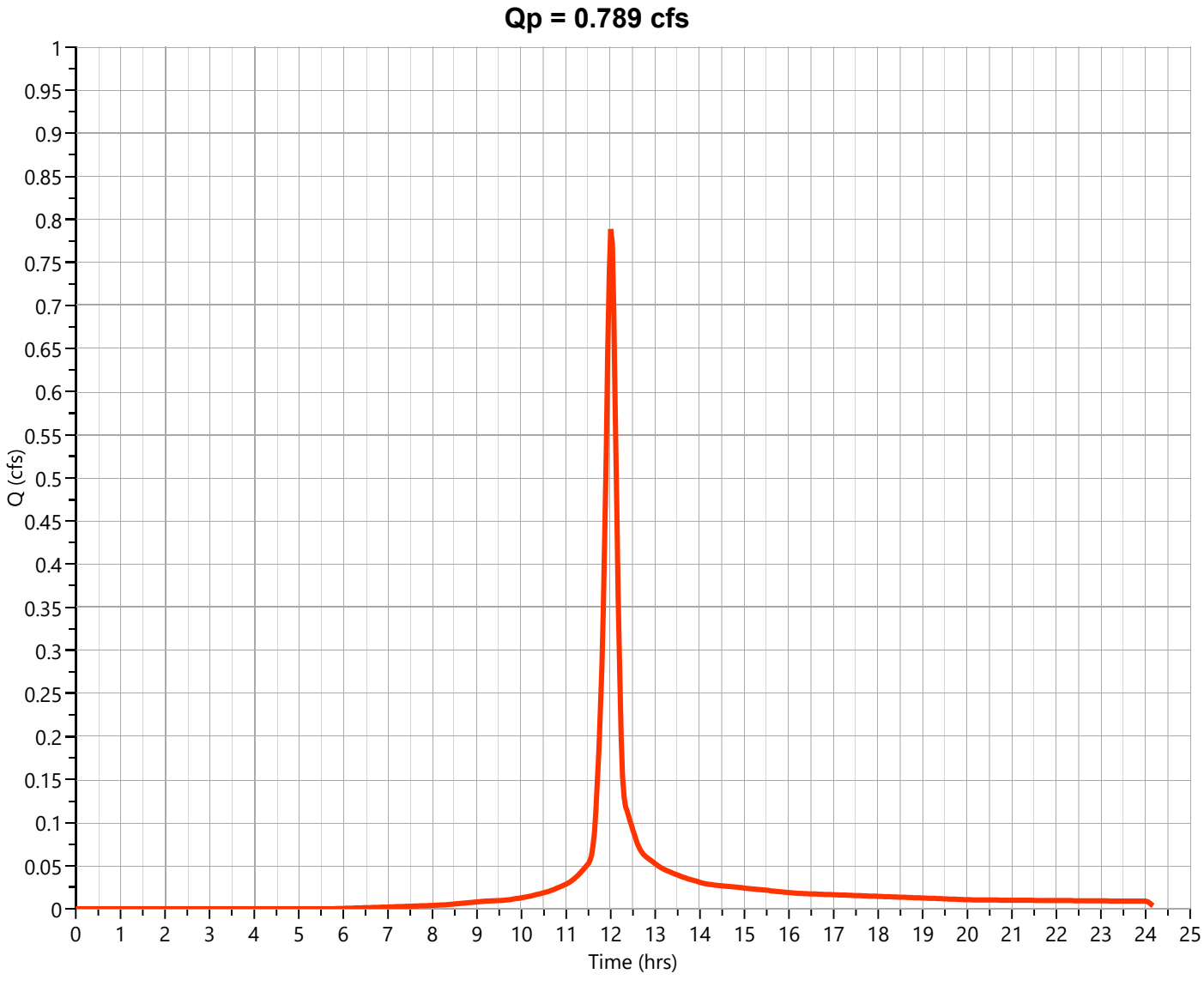
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.789 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 2,072 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.31 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

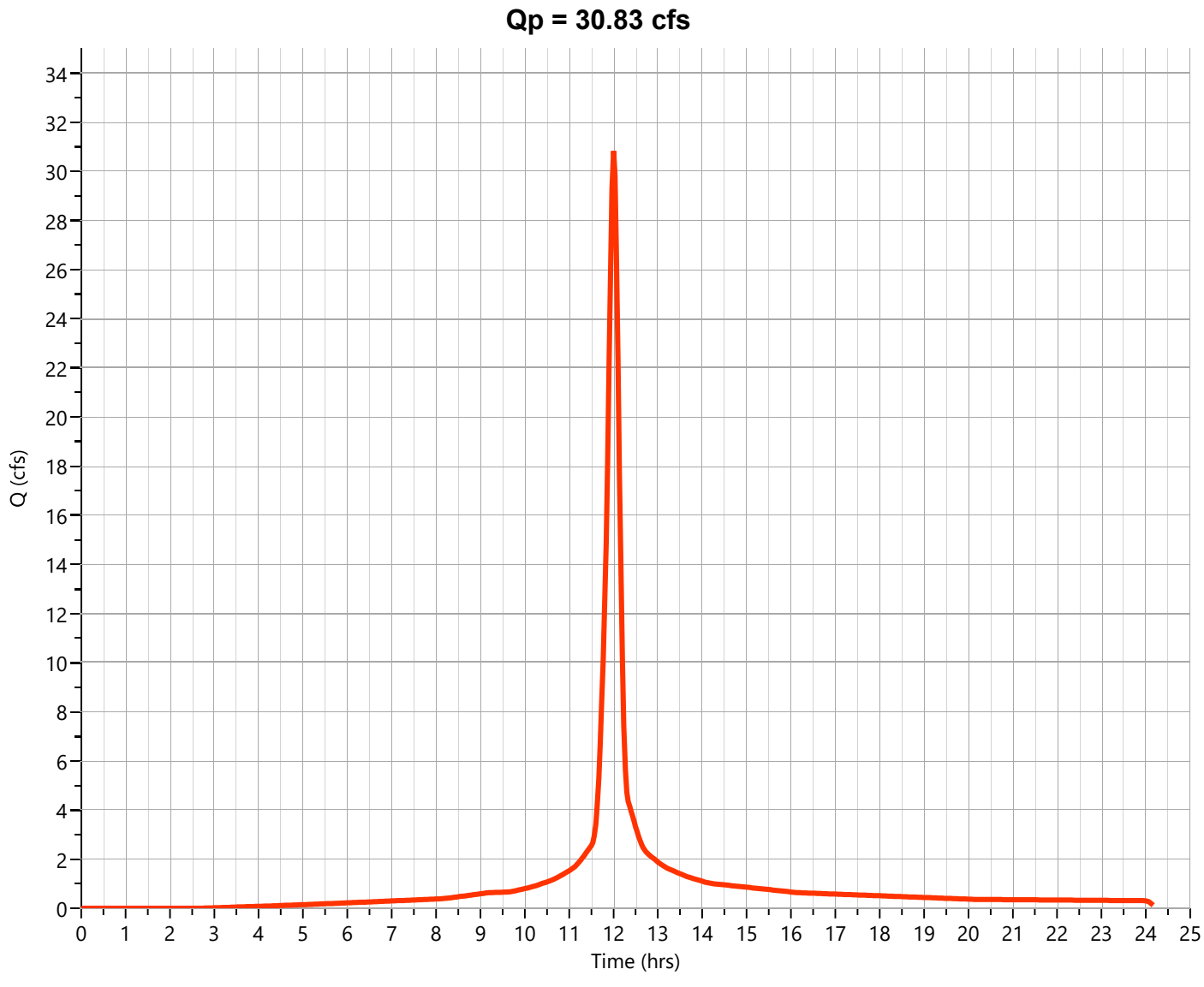
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 30.83 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 85,830 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.31 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

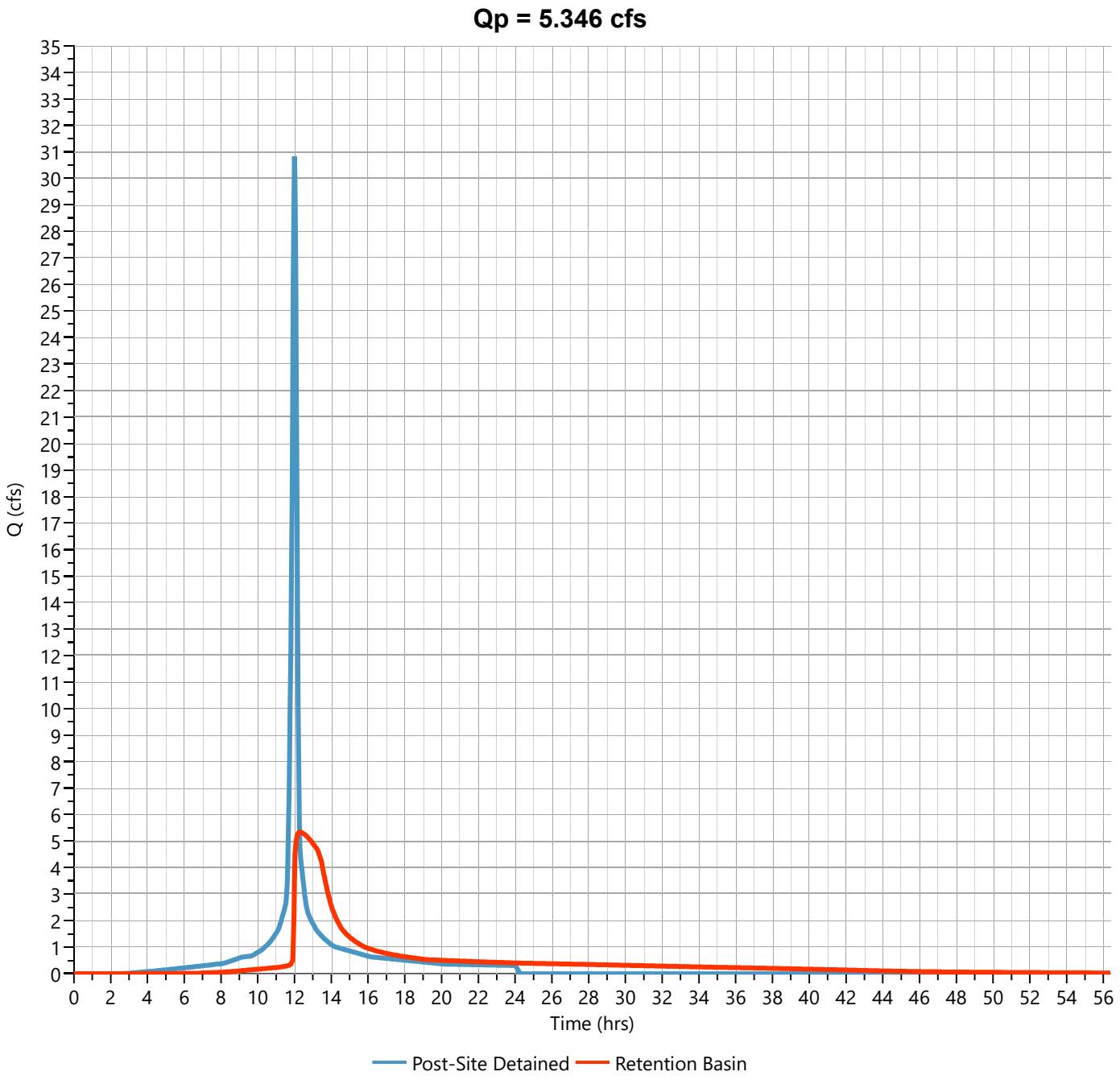
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 5.346 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.27 hrs
Time Interval	= 2 min	Hydrograph Volume	= 85,330 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 925.30 ft
Pond Name	= Retention Basin	Max. Storage	= 46,366 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 6.30 hrs



Hydrograph Report

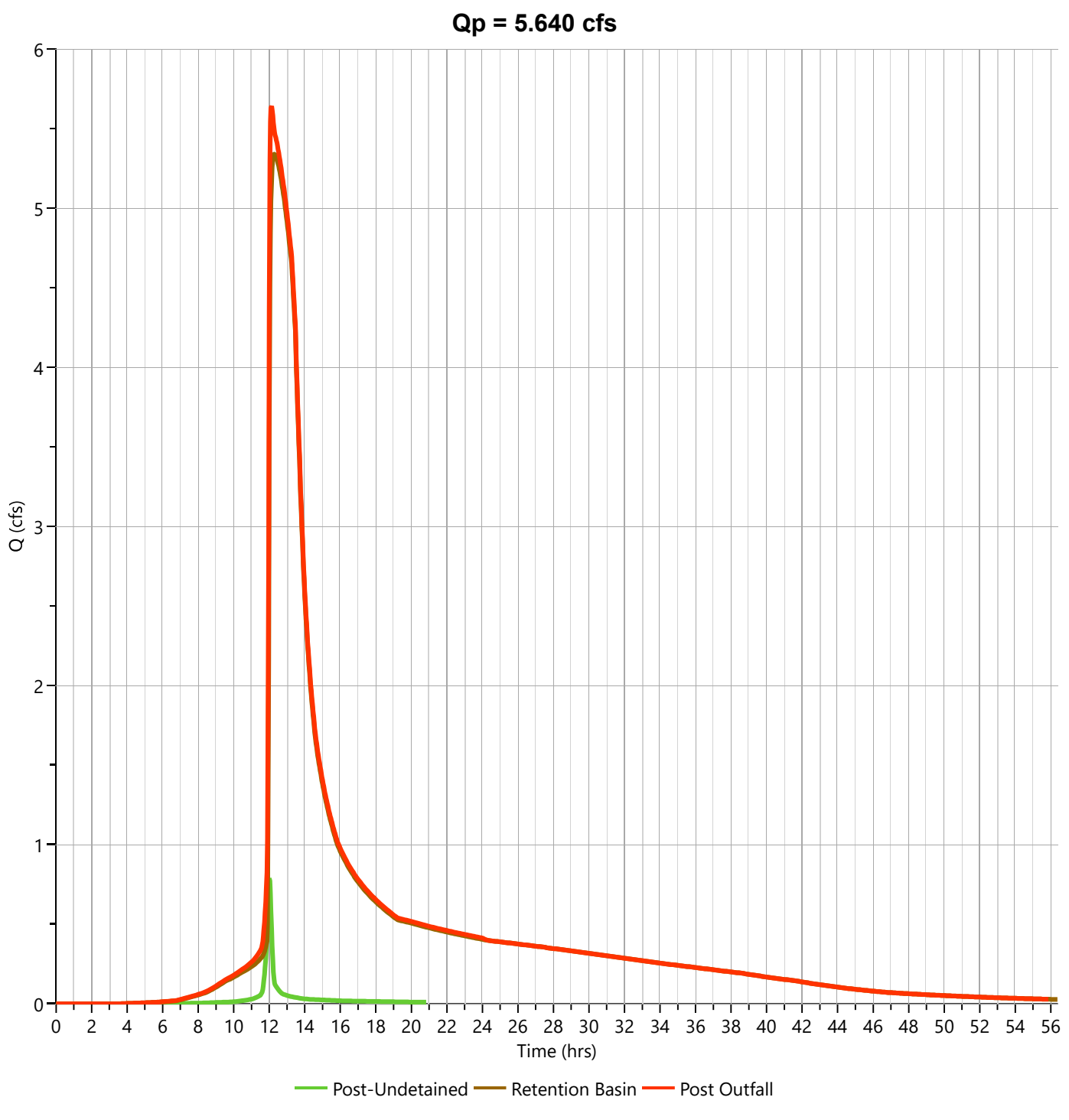
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 5.640 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.13 hrs
Time Interval	= 2 min	Hydrograph Volume	= 87,401 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac



Hydrograph 10-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	0.931	12.00	2,458	----		
2	NRCS Runoff	Pre-Site Detained	15.82	12.20	68,361	----		
3	Junction	Pre Outflow	16.14	12.20	70,819	1, 2		
4	NRCS Runoff	Post-Undetained	0.941	12.00	2,489	----		
5	NRCS Runoff	Post-Site Detained	35.71	12.00	100,329	----		
6	Pond Route	Retention Basin	6.060	12.27	99,821	5	925.63	54,153
7	Junction	Post Outfall	6.242	12.23	102,310	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

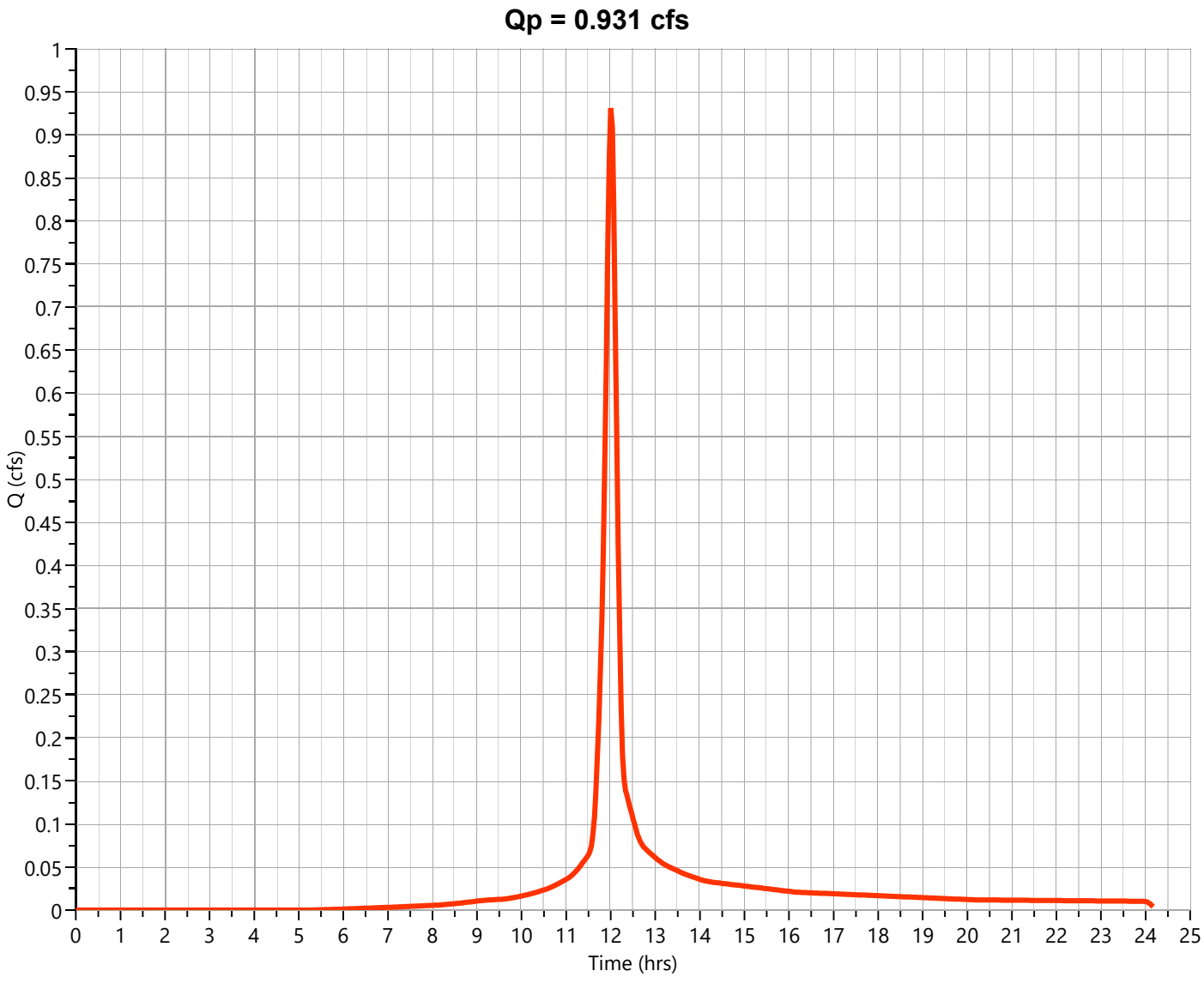
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.931 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 2,458 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.79 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

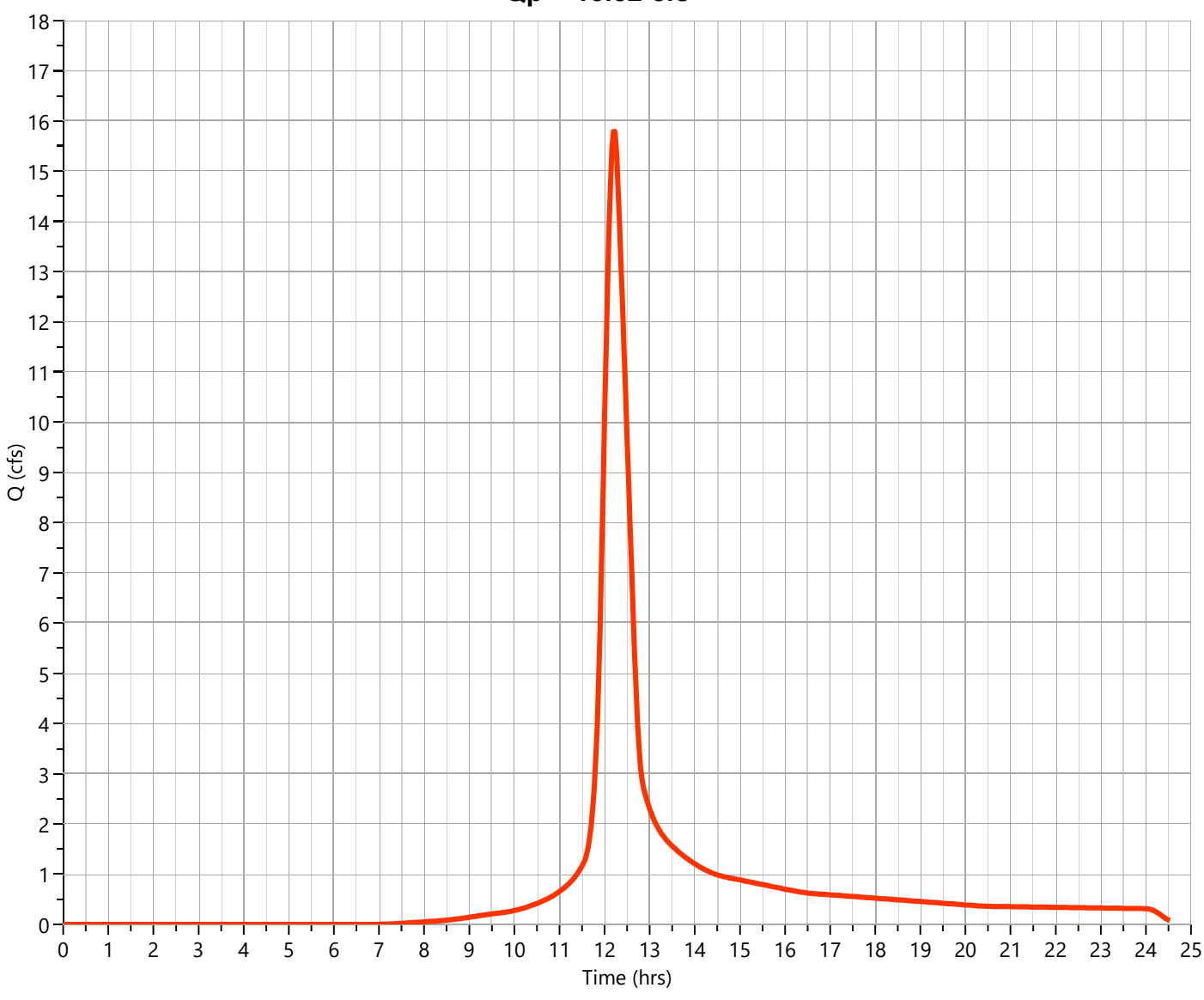
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 15.82 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 68,361 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 3.79 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Hydrograph Report

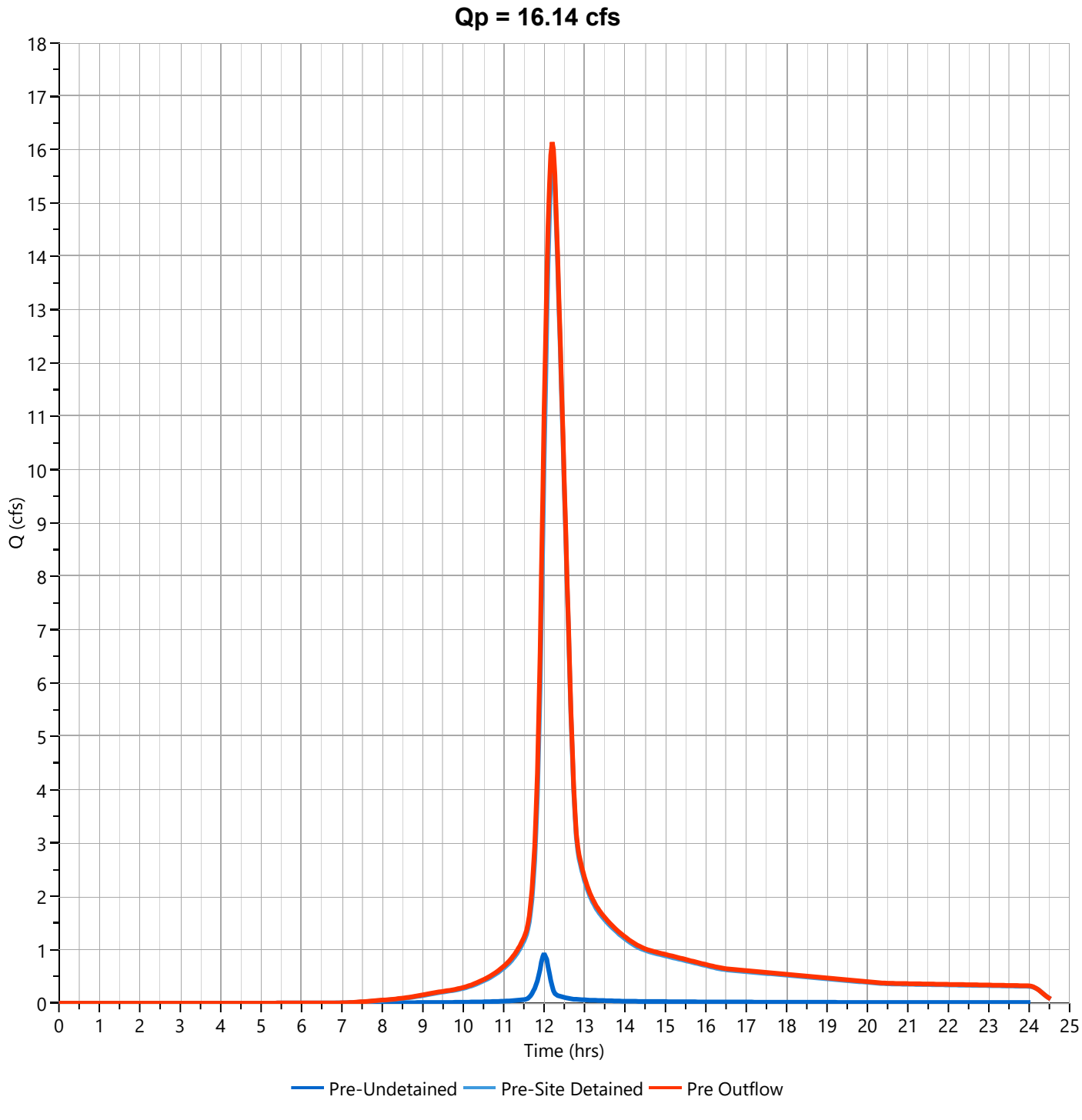
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 16.14 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 70,819 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

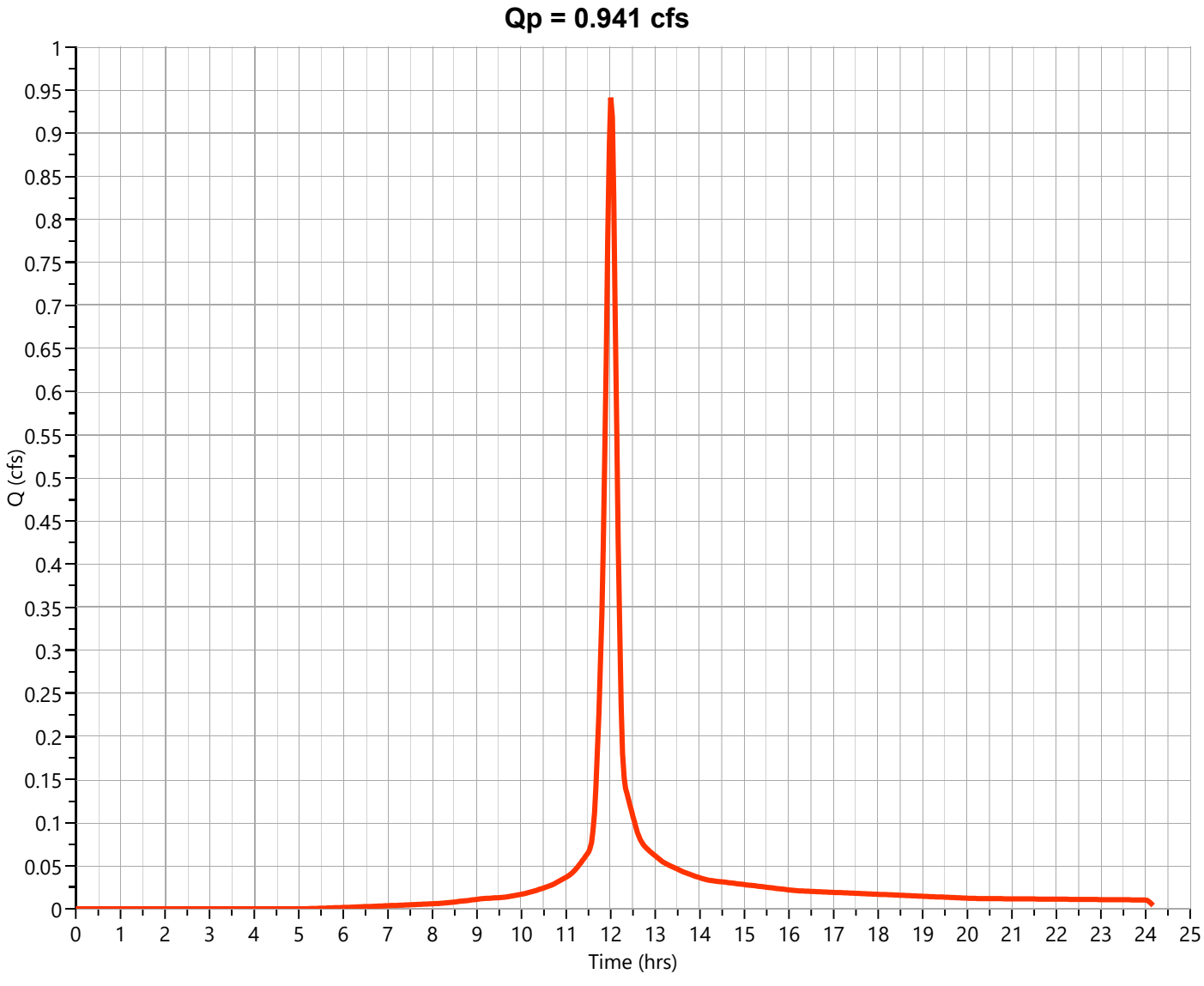
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.941 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 2,489 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.79 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

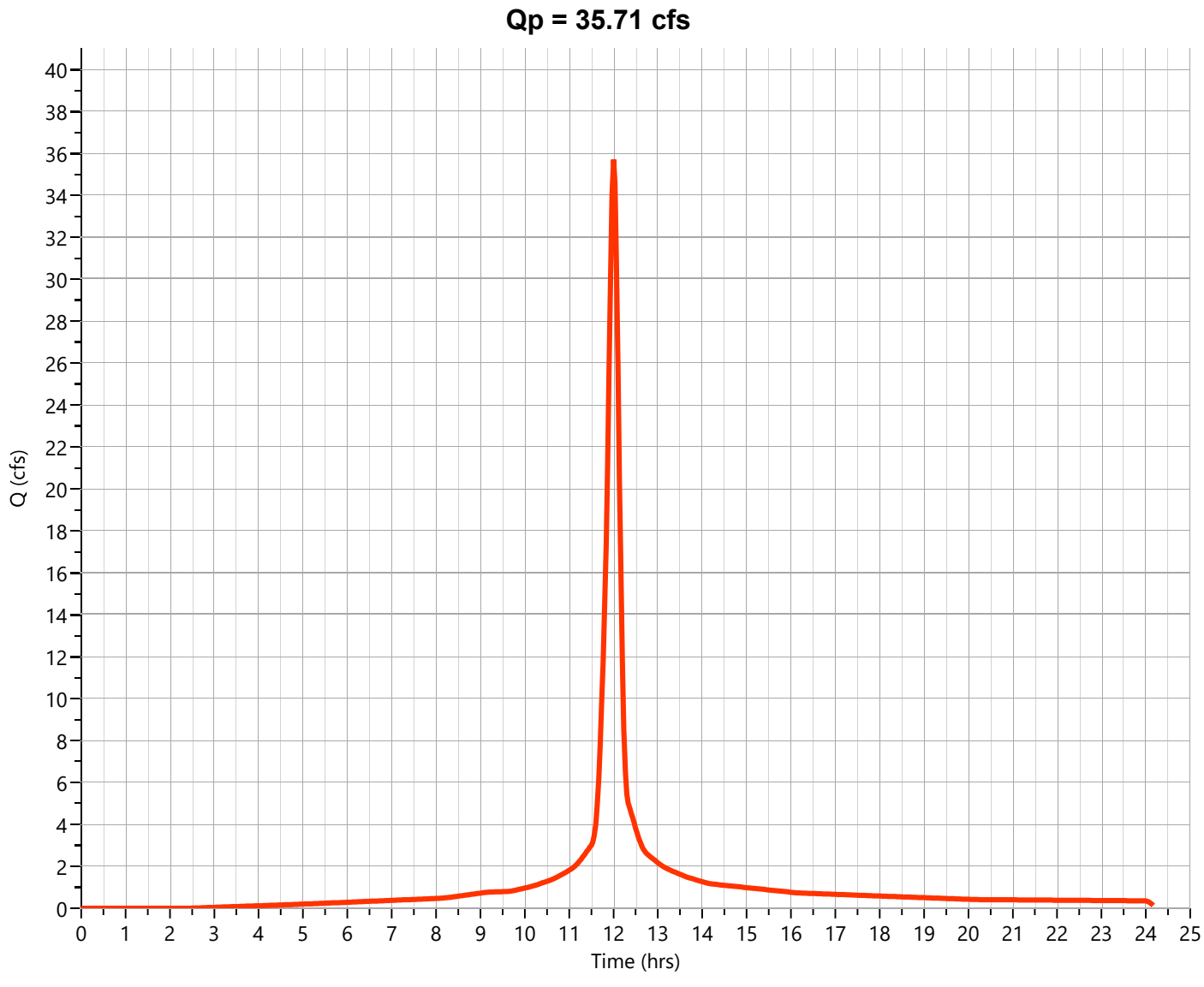
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 35.71 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 100,329 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.79 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

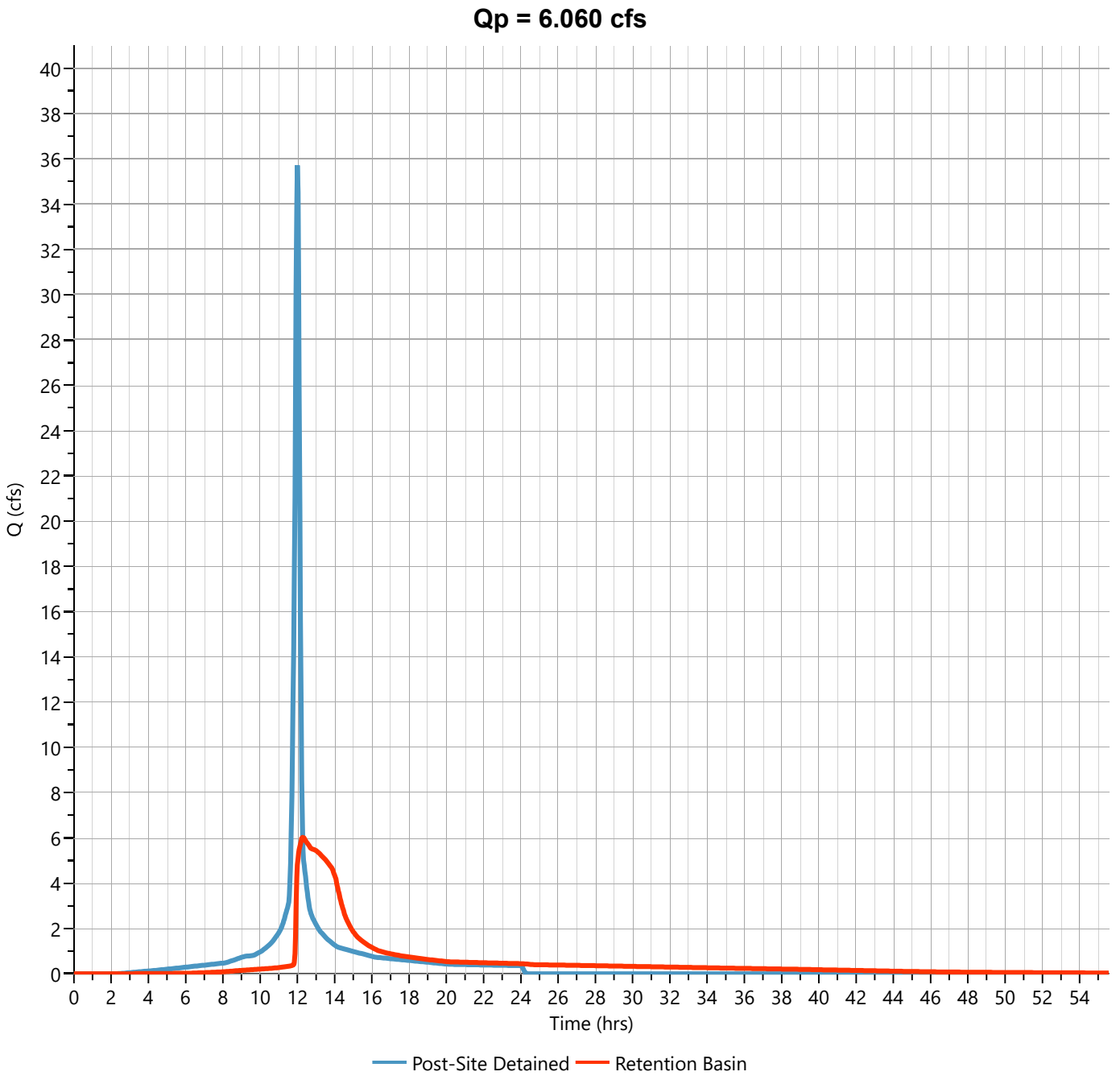
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 6.060 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.27 hrs
Time Interval	= 2 min	Hydrograph Volume	= 99,821 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 925.63 ft
Pond Name	= Retention Basin	Max. Storage	= 54,153 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 5.72 hrs



Hydrograph Report

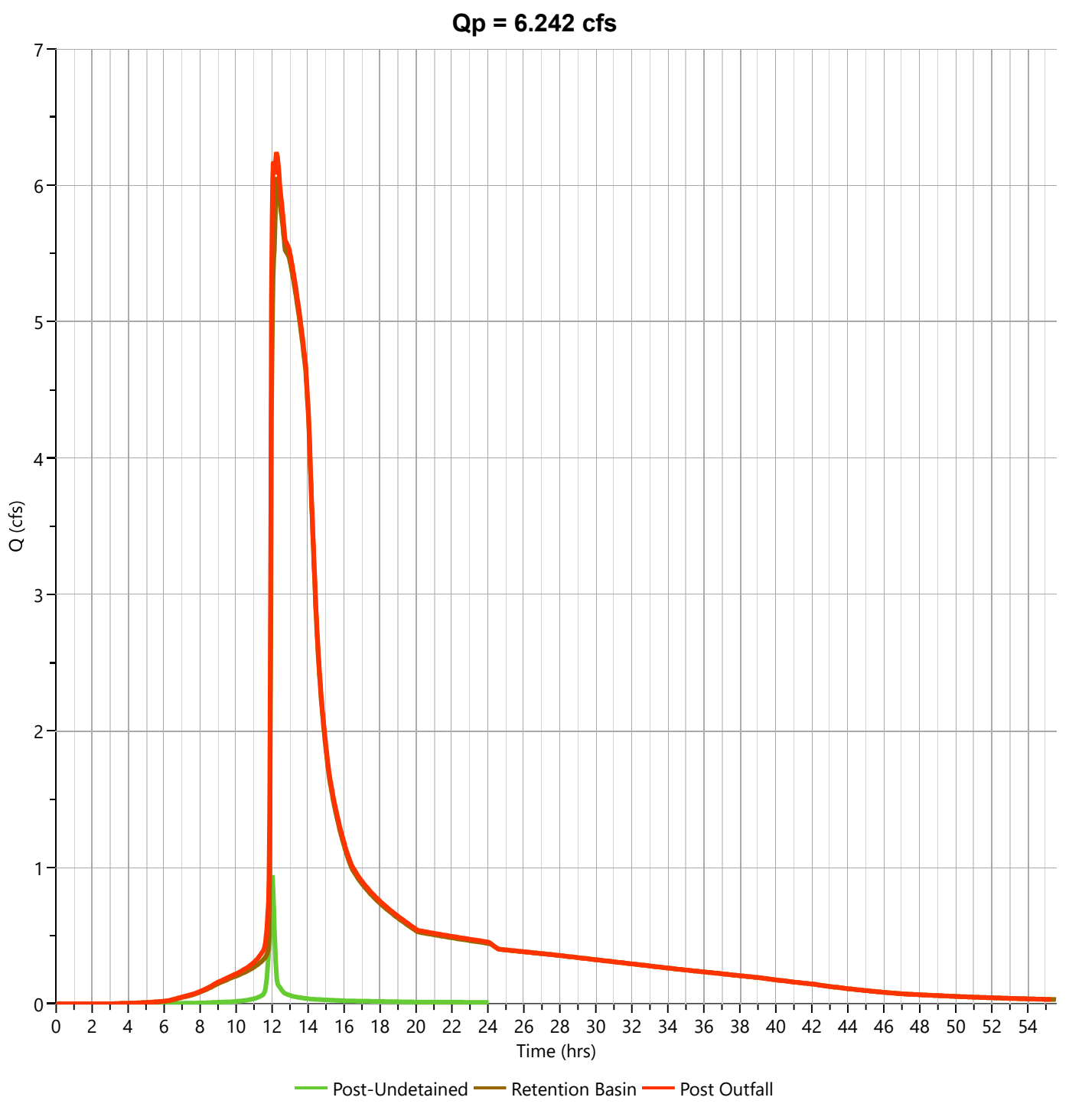
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 6.242 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.23 hrs
Time Interval	= 2 min	Hydrograph Volume	= 102,310 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac



Hydrograph 25-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	1.138	12.00	3,031	----		
2	NRCS Runoff	Pre-Site Detained	19.87	12.20	85,925	----		
3	Junction	Pre Outflow	20.25	12.20	88,956	1, 2		
4	NRCS Runoff	Post-Undetained	1.148	12.00	3,064	----		
5	NRCS Runoff	Post-Site Detained	42.29	12.00	120,032	----		
6	Pond Route	Retention Basin	12.00	12.20	119,515	5	925.98	62,164
7	Junction	Post Outfall	12.39	12.20	122,579	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

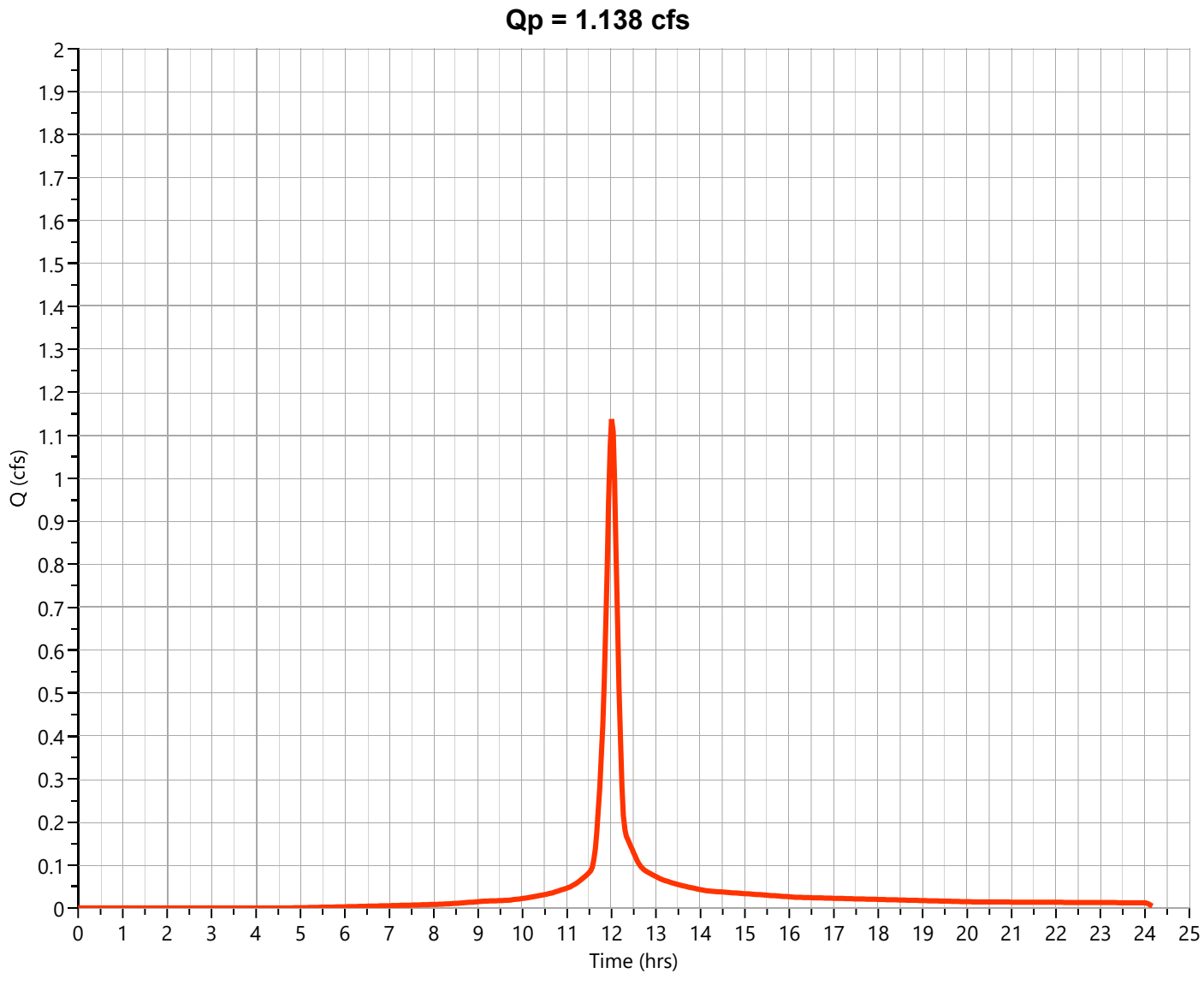
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.138 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 3,031 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.44 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

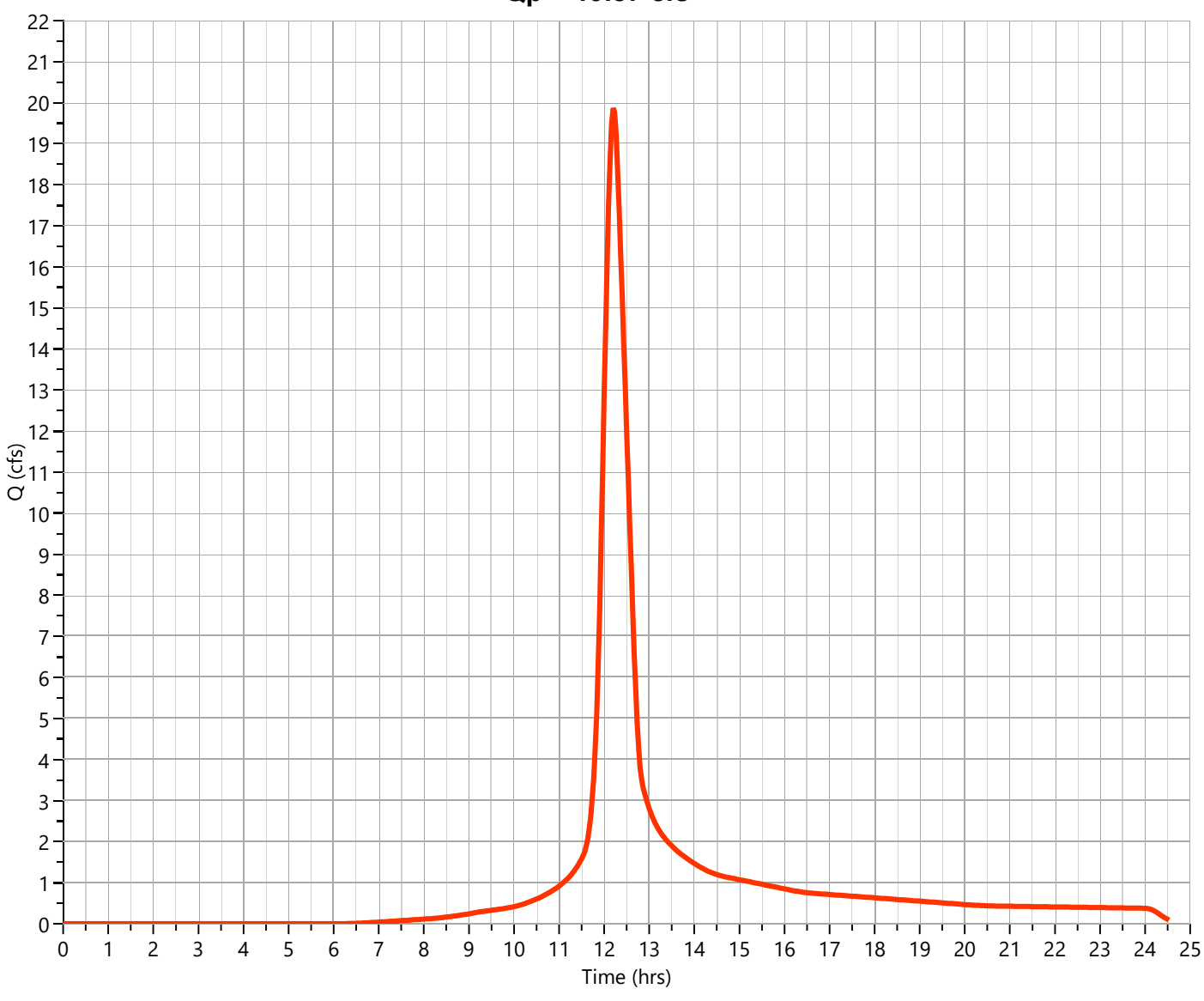
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 19.87 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 85,925 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 4.44 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Hydrograph Report

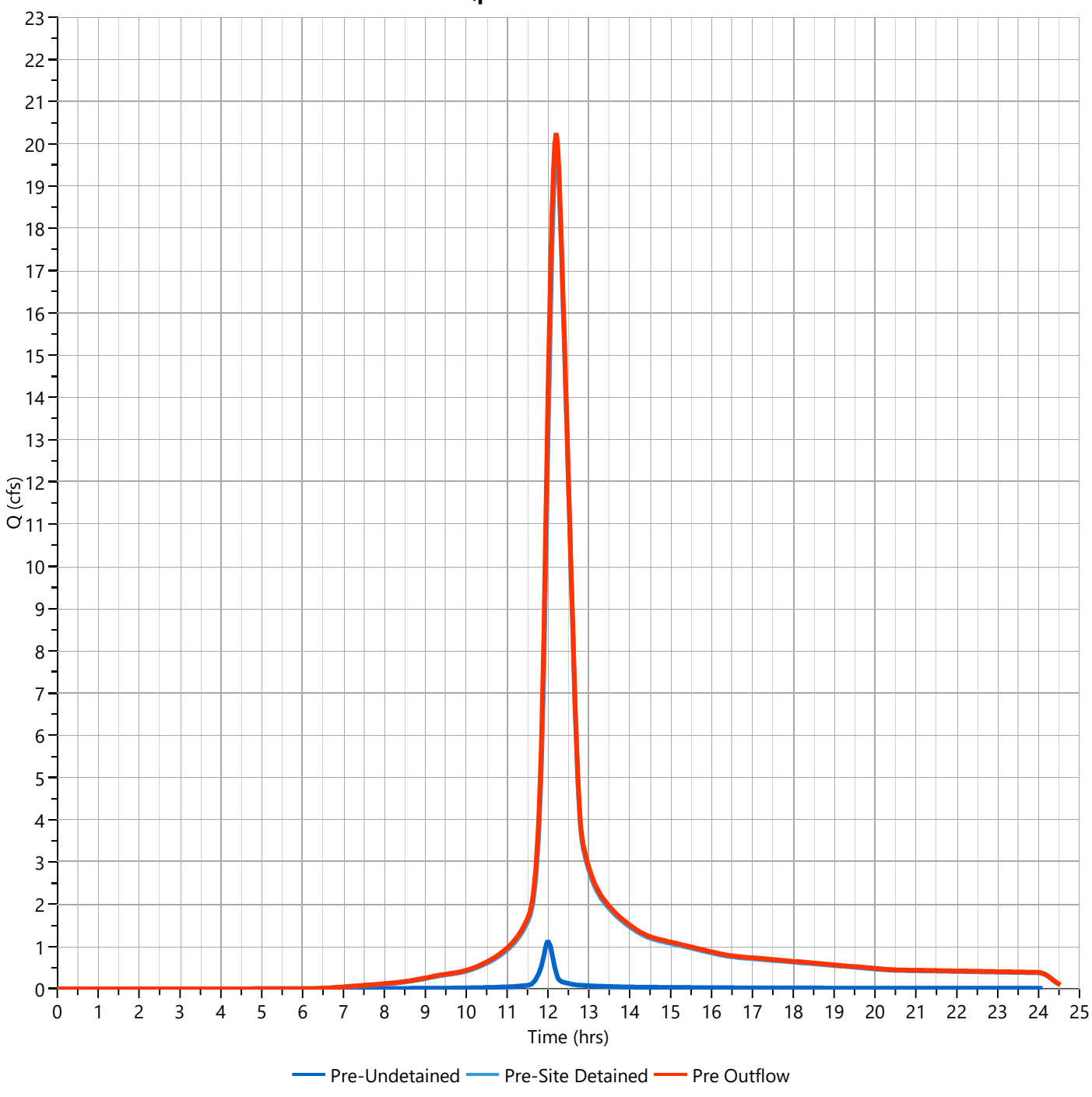
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 20.25 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 88,956 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

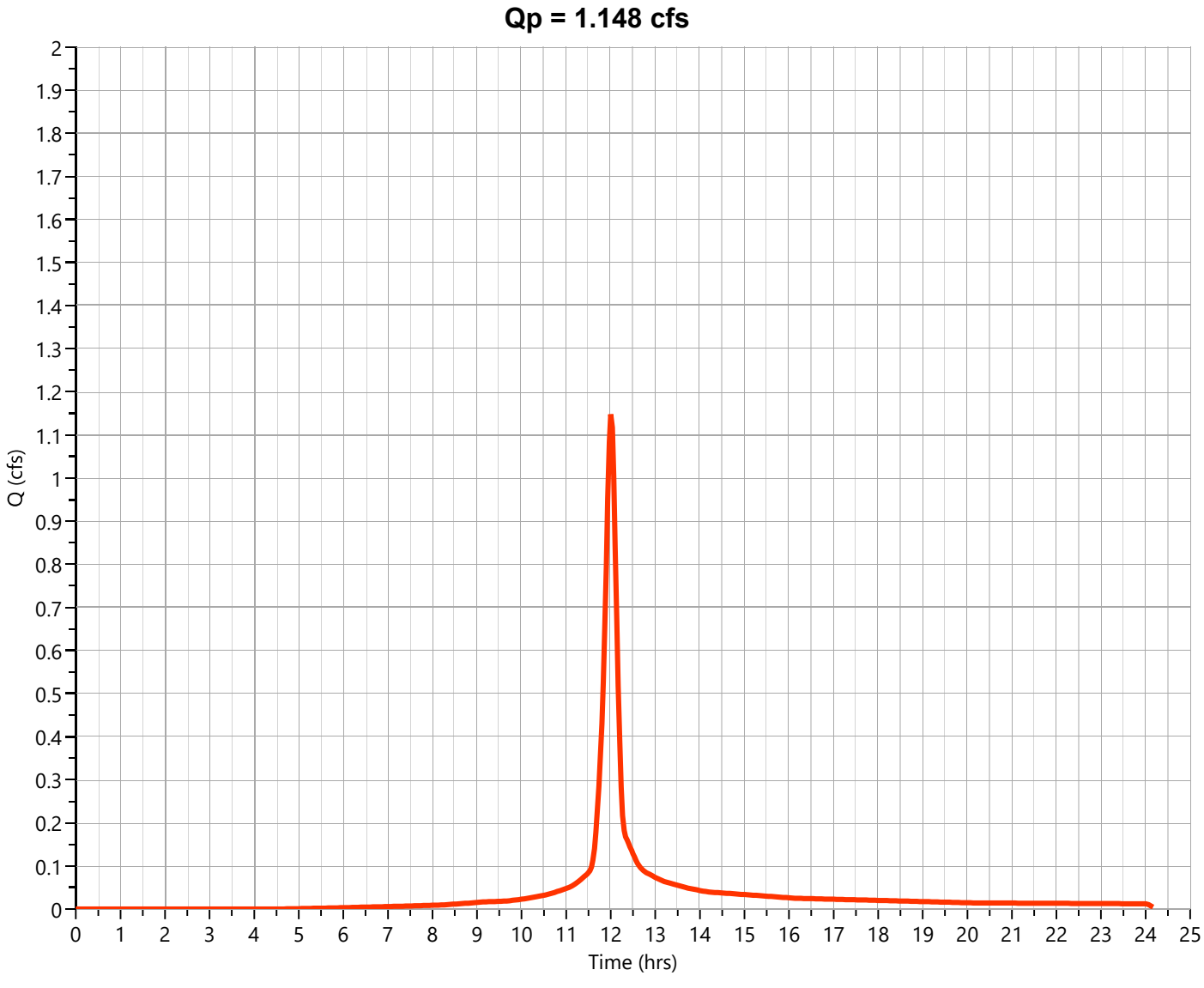
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.148 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 3,064 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.44 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

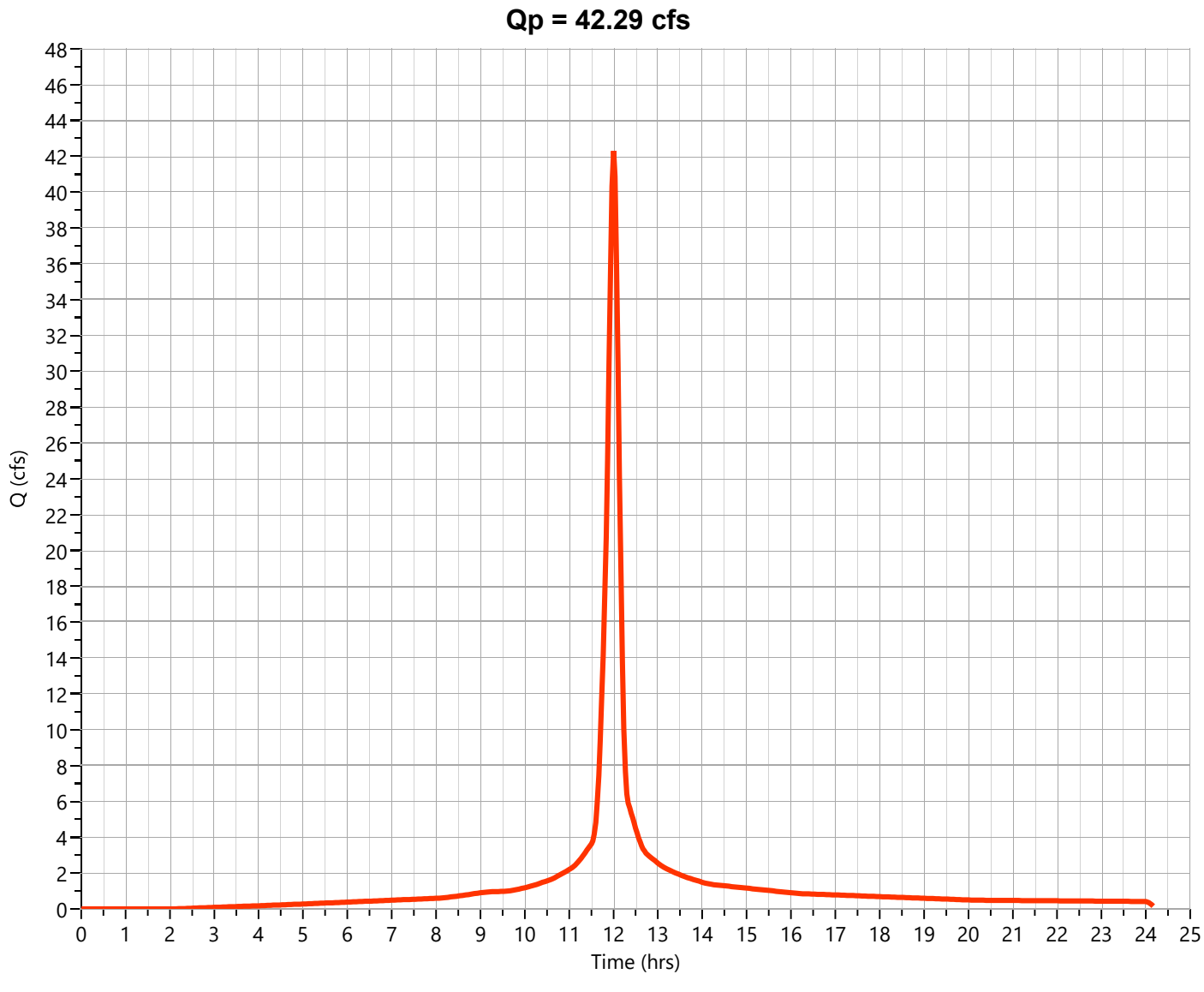
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 42.29 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 120,032 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.44 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

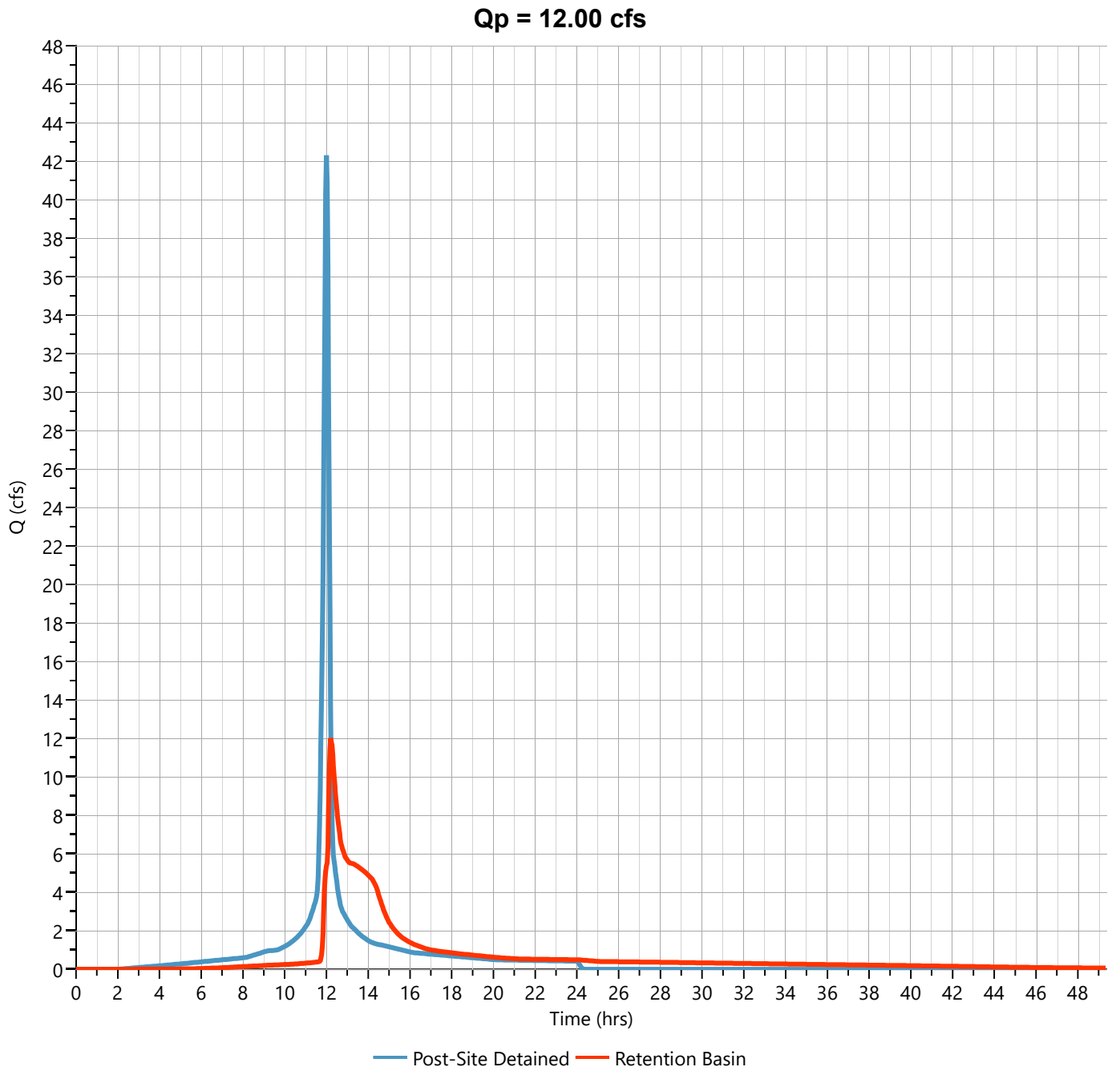
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 12.00 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 119,515 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 925.98 ft
Pond Name	= Retention Basin	Max. Storage	= 62,164 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 4.73 hrs



Hydrograph Report

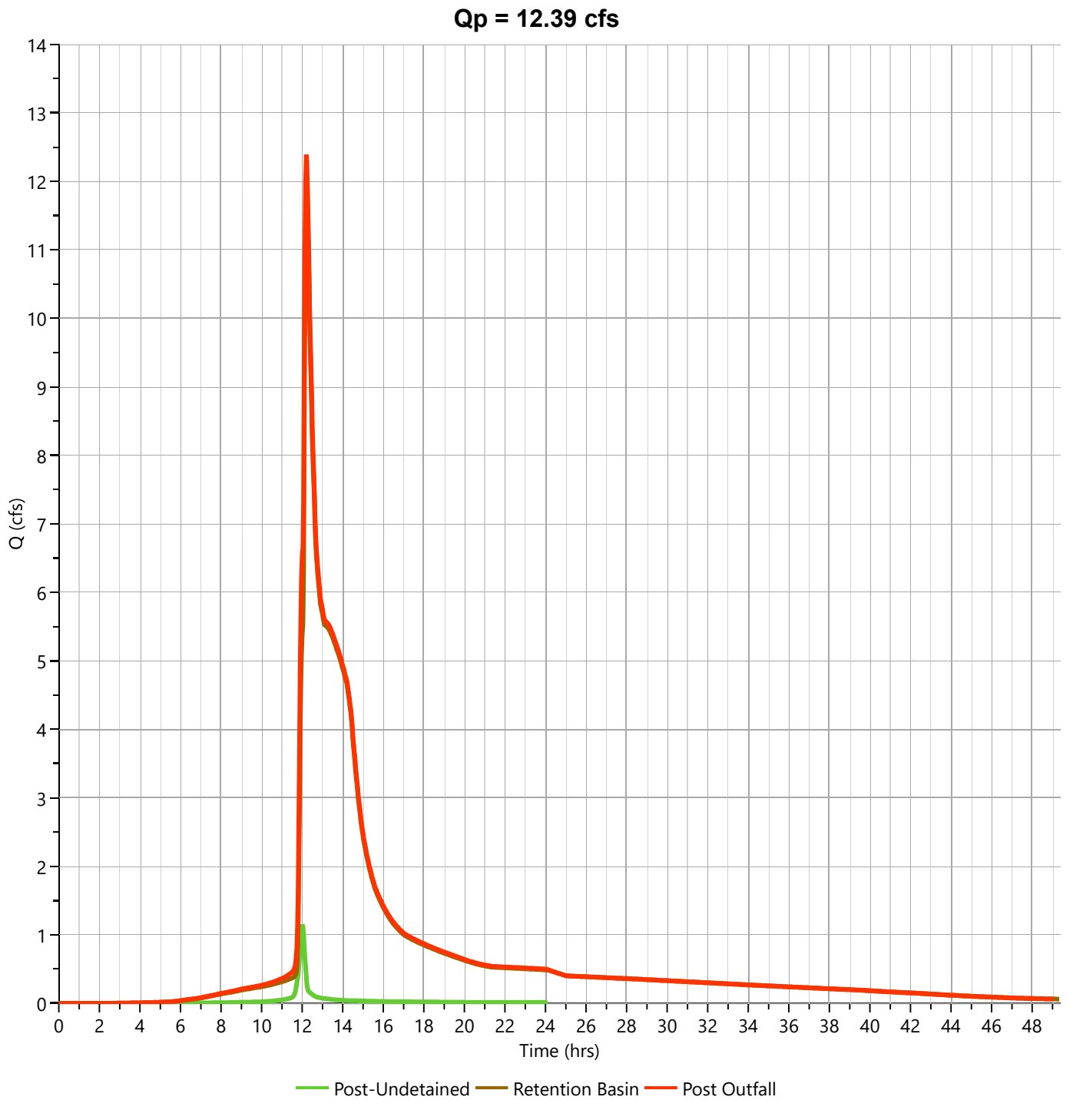
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 12.39 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 122,579 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac



Hydrograph 50-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	1.300	12.00	3,485	----		
2	NRCS Runoff	Pre-Site Detained	23.07	12.20	99,993	----		
3	Junction	Pre Outflow	23.51	12.20	103,478	1, 2		
4	NRCS Runoff	Post-Undetained	1.309	12.00	3,520	----		
5	NRCS Runoff	Post-Site Detained	47.43	12.00	135,530	----		
6	Pond Route	Retention Basin	17.05	12.20	135,008	5	926.18	67,340
7	Junction	Post Outfall	17.51	12.17	138,528	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

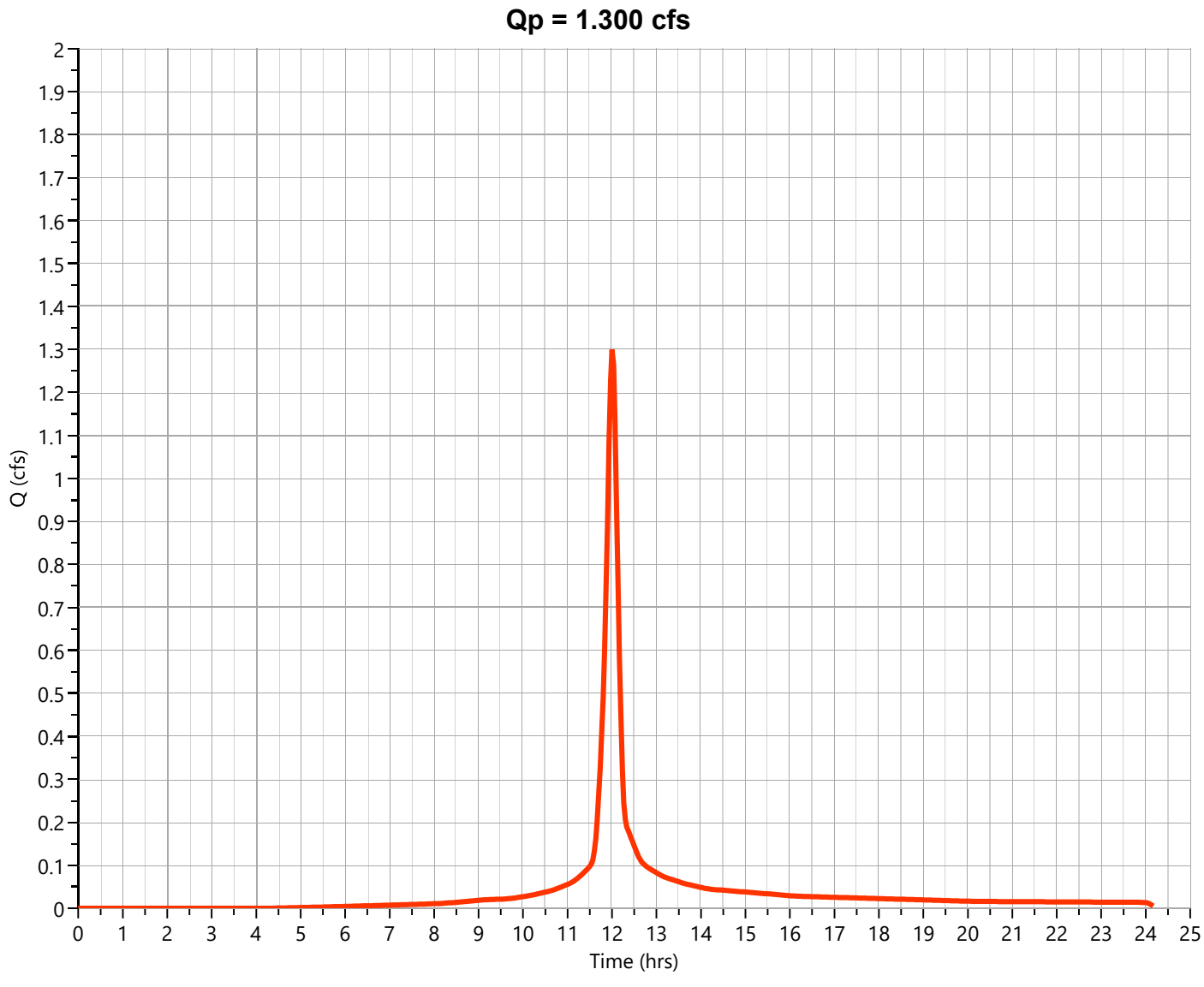
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.300 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 3,485 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.95 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

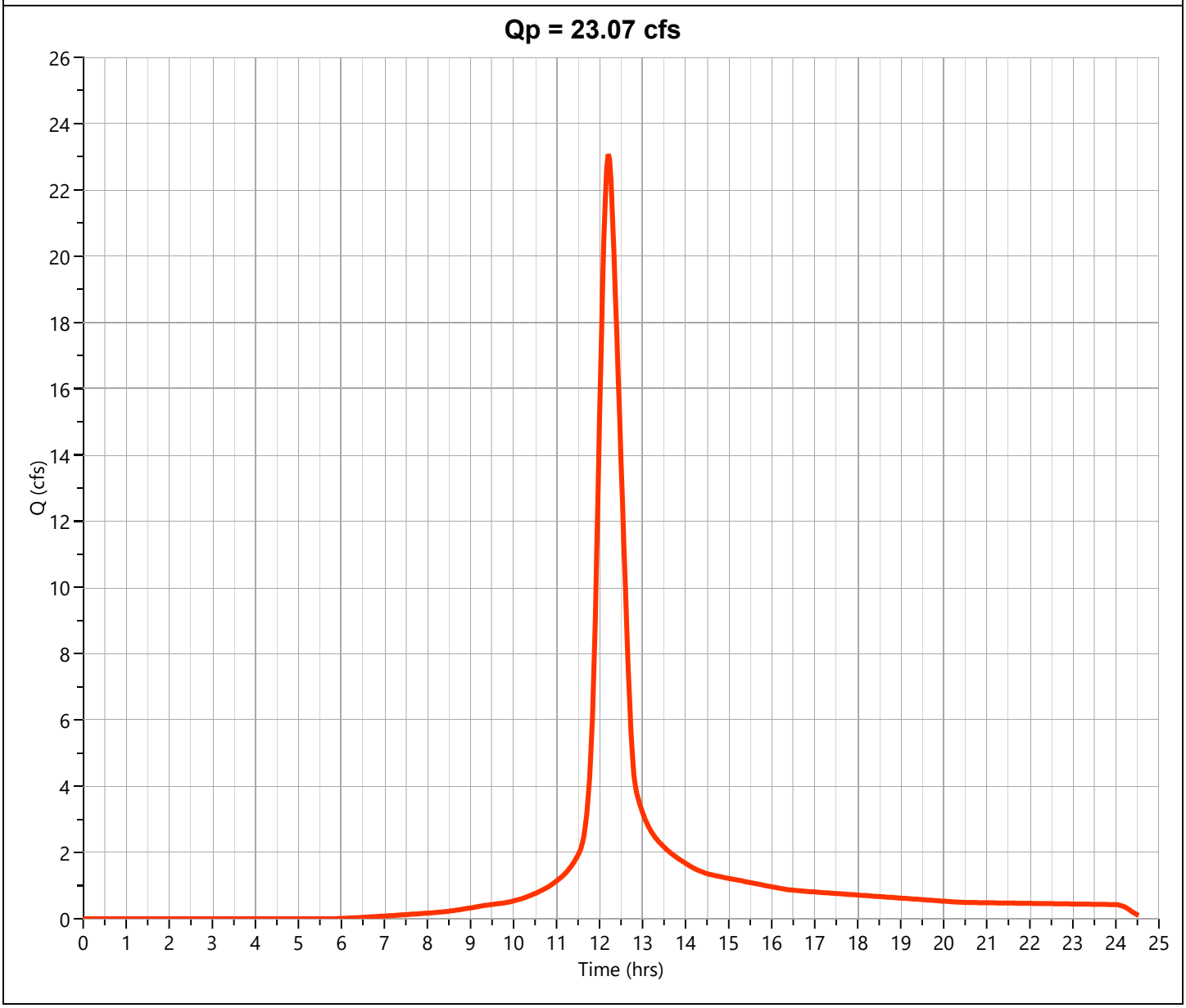
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 23.07 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 99,993 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 4.95 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Hydrograph Report

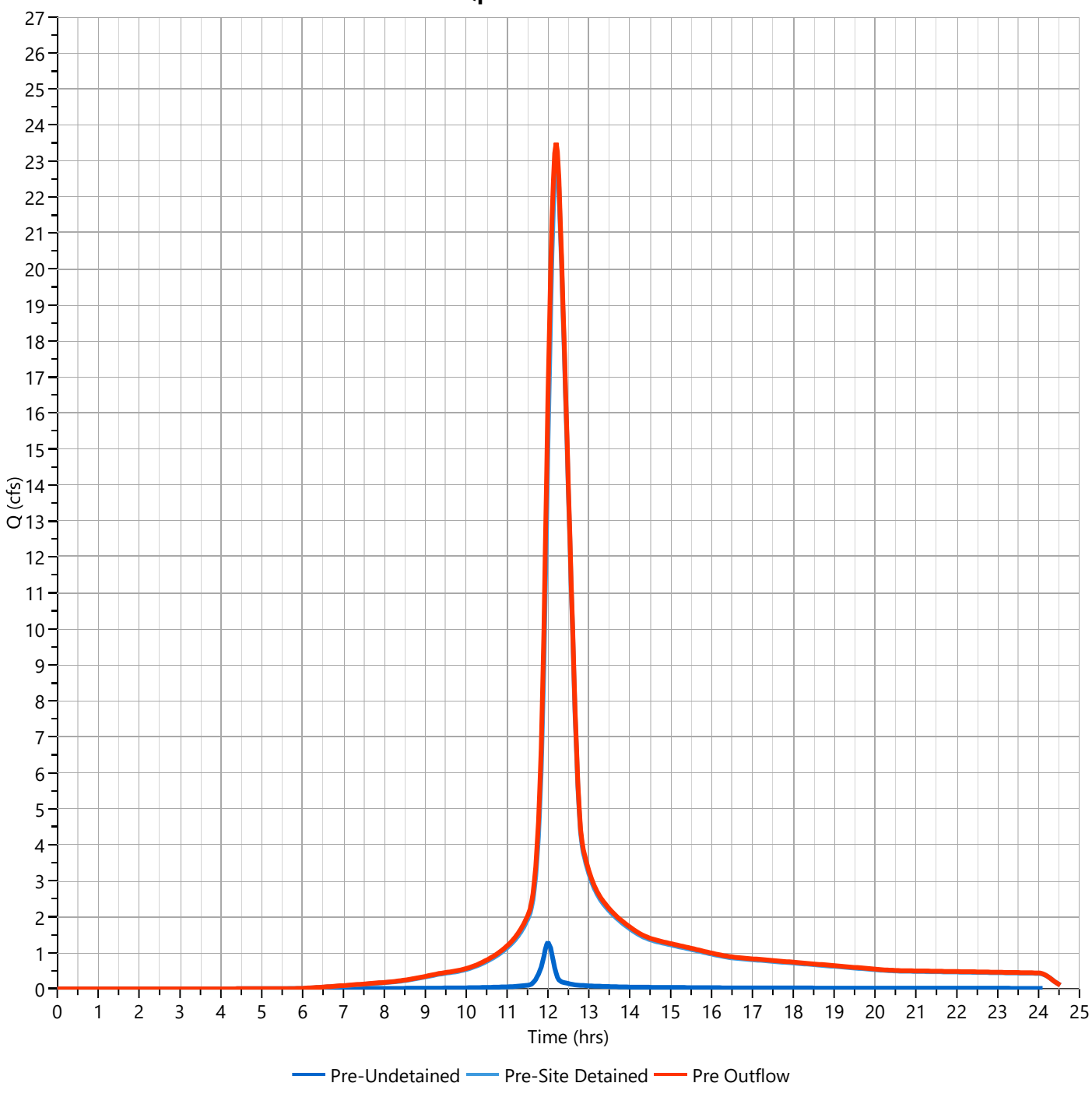
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 23.51 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 103,478 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

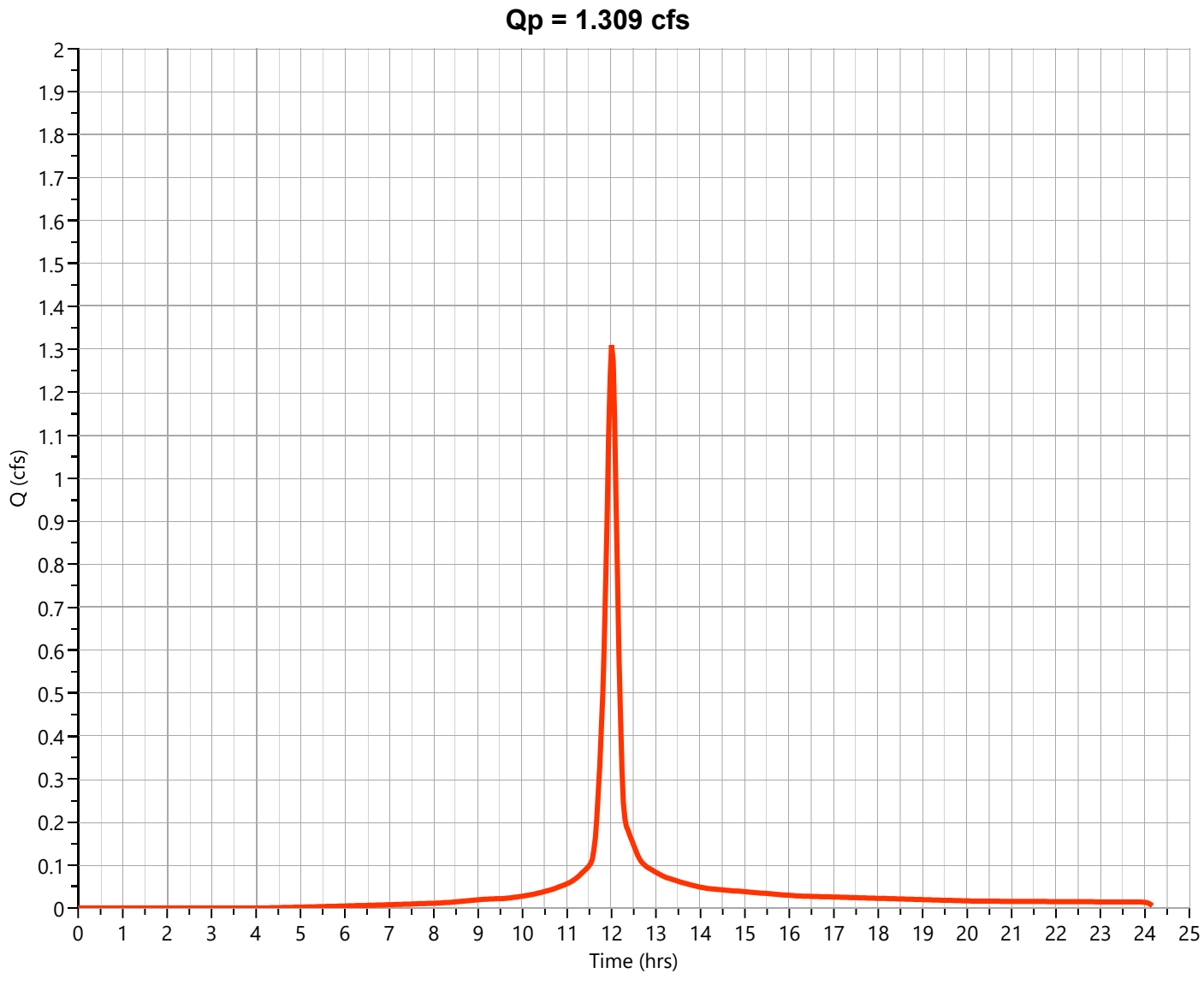
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.309 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 3,520 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.95 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

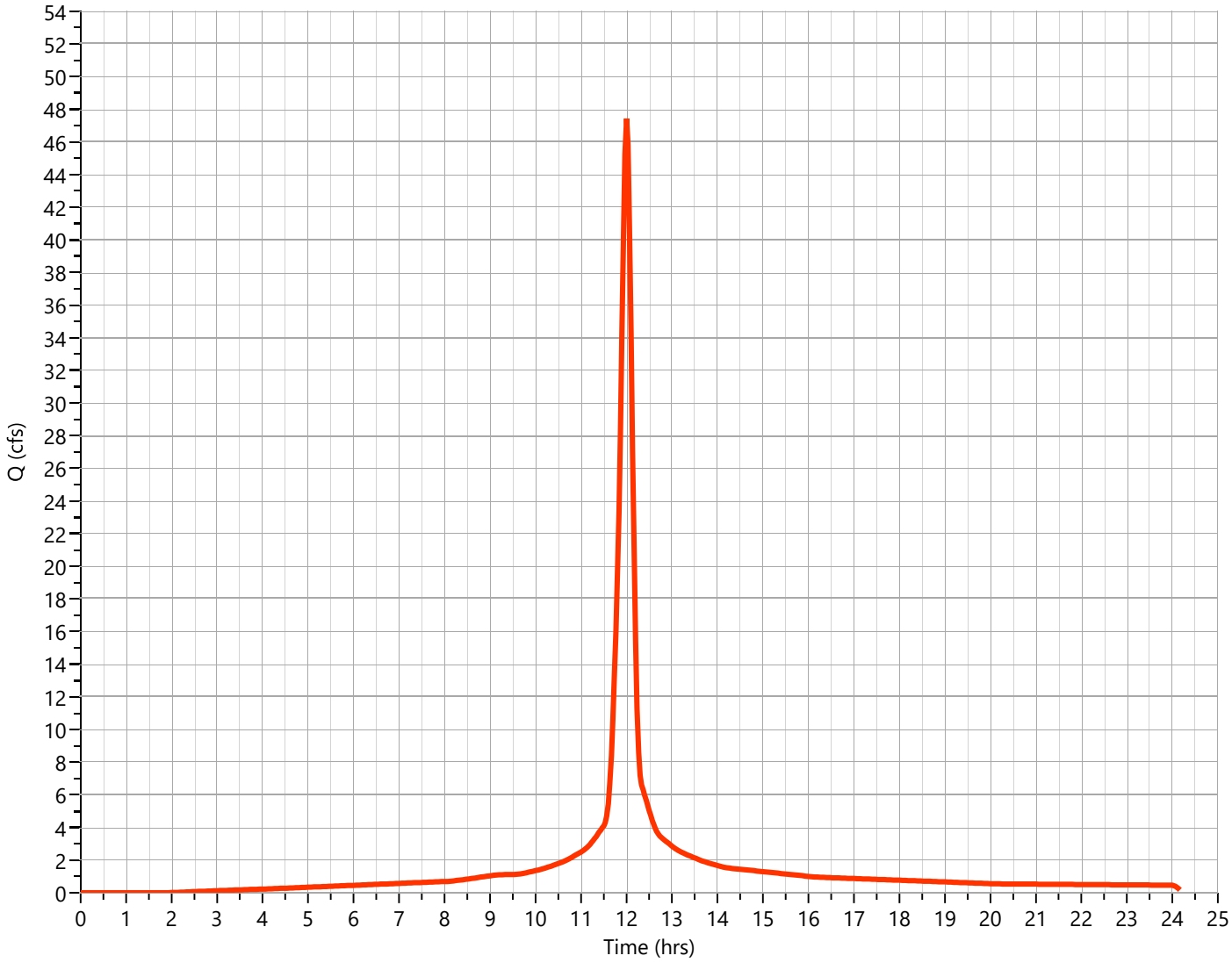
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 47.43 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 135,530 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.95 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

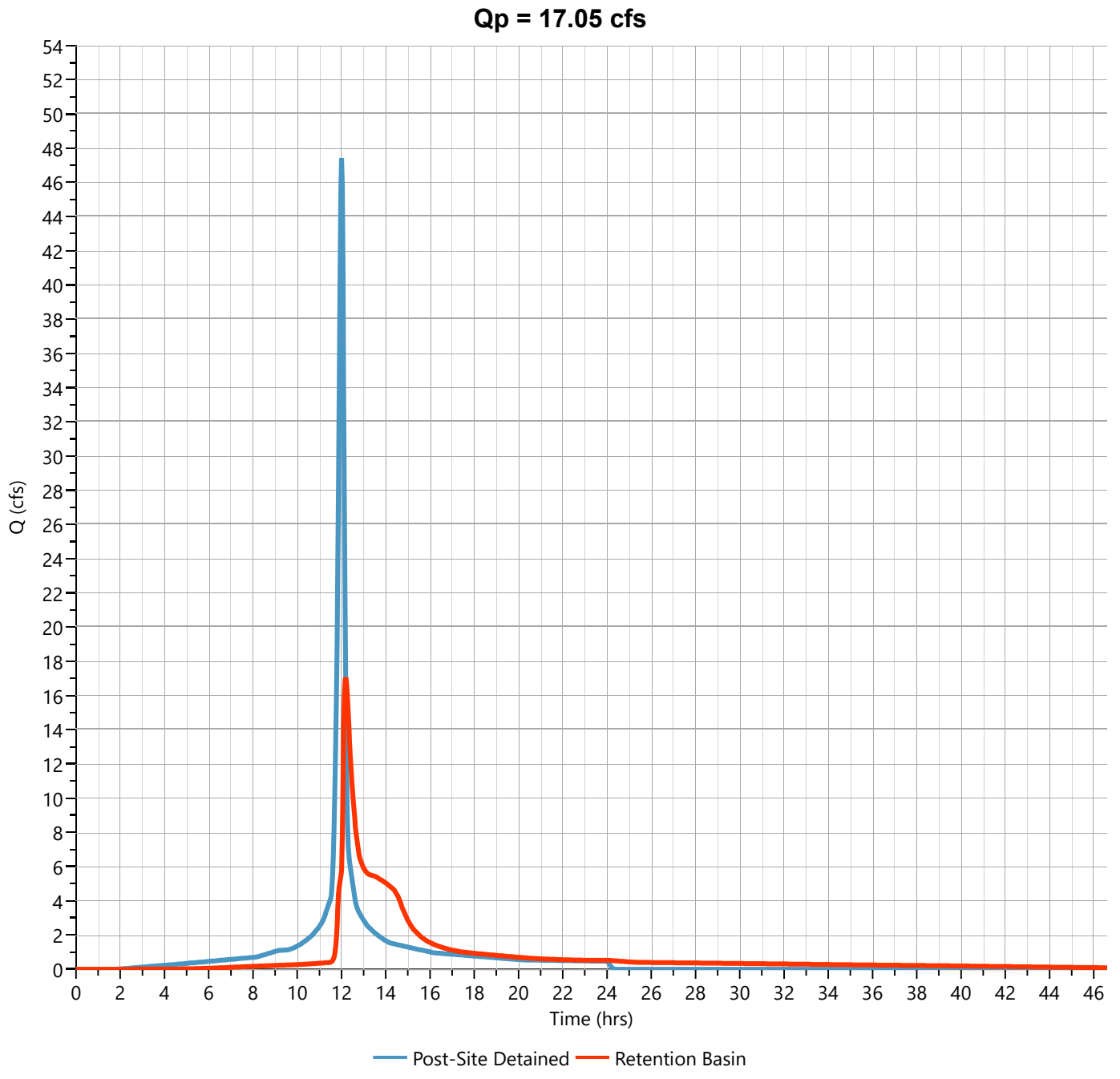
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 17.05 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 135,008 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 926.18 ft
Pond Name	= Retention Basin	Max. Storage	= 67,340 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 4.07 hrs



Hydrograph Report

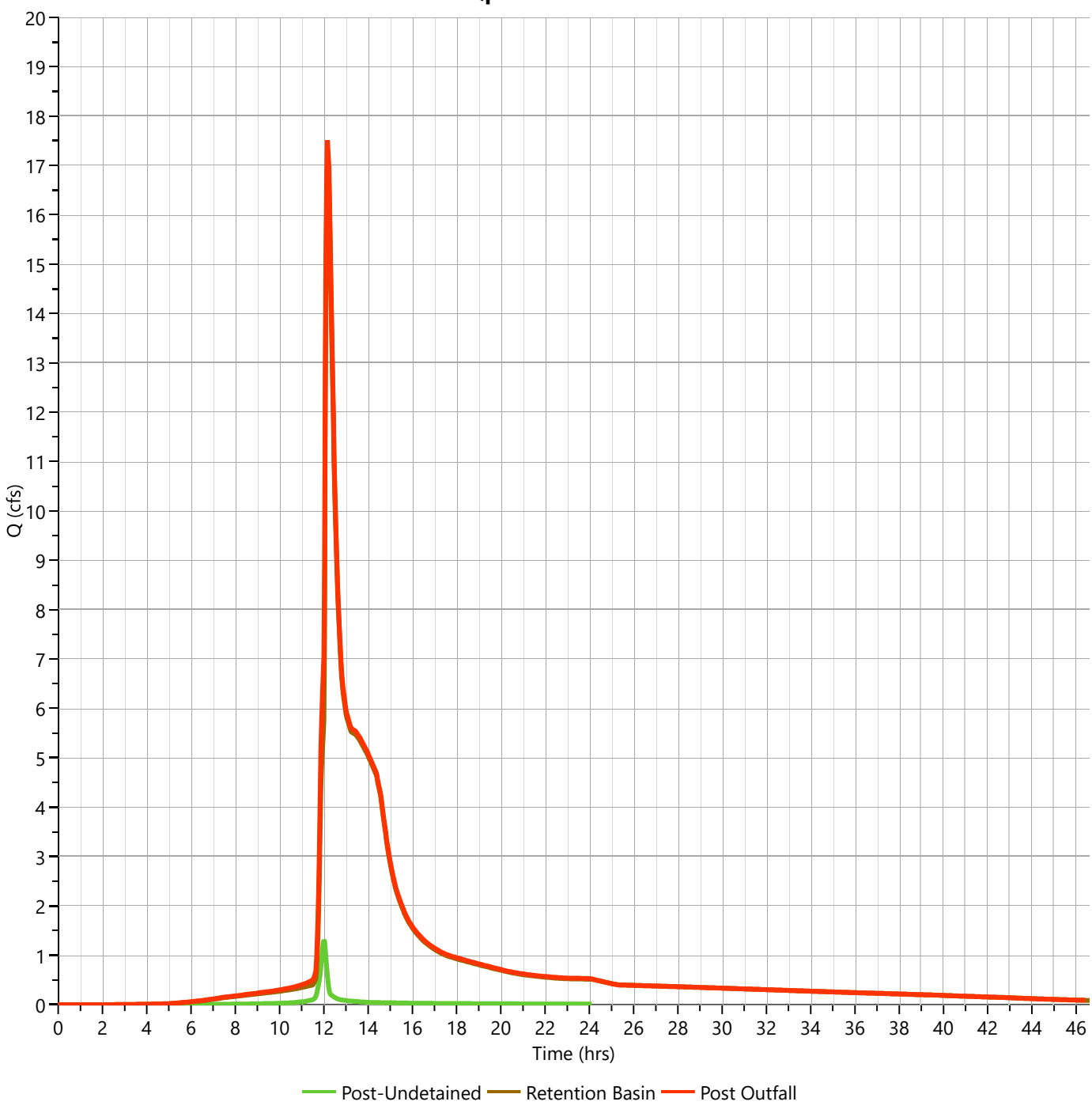
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 17.51 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 138,528 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac



Hydrograph 100-yr Summary

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys

08-25-2026

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre-Undetained	1.467	12.00	3,961	----		
2	NRCS Runoff	Pre-Site Detained	26.41	12.20	114,813	----		
3	Junction	Pre Outflow	26.90	12.20	118,775	1, 2		
4	NRCS Runoff	Post-Undetained	1.477	12.00	3,998	----		
5	NRCS Runoff	Post-Site Detained	52.75	12.00	151,661	----		
6	Pond Route	Retention Basin	21.38	12.17	151,136	5	926.38	72,364
7	Junction	Post Outfall	22.04	12.17	155,134	4, 6		

Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

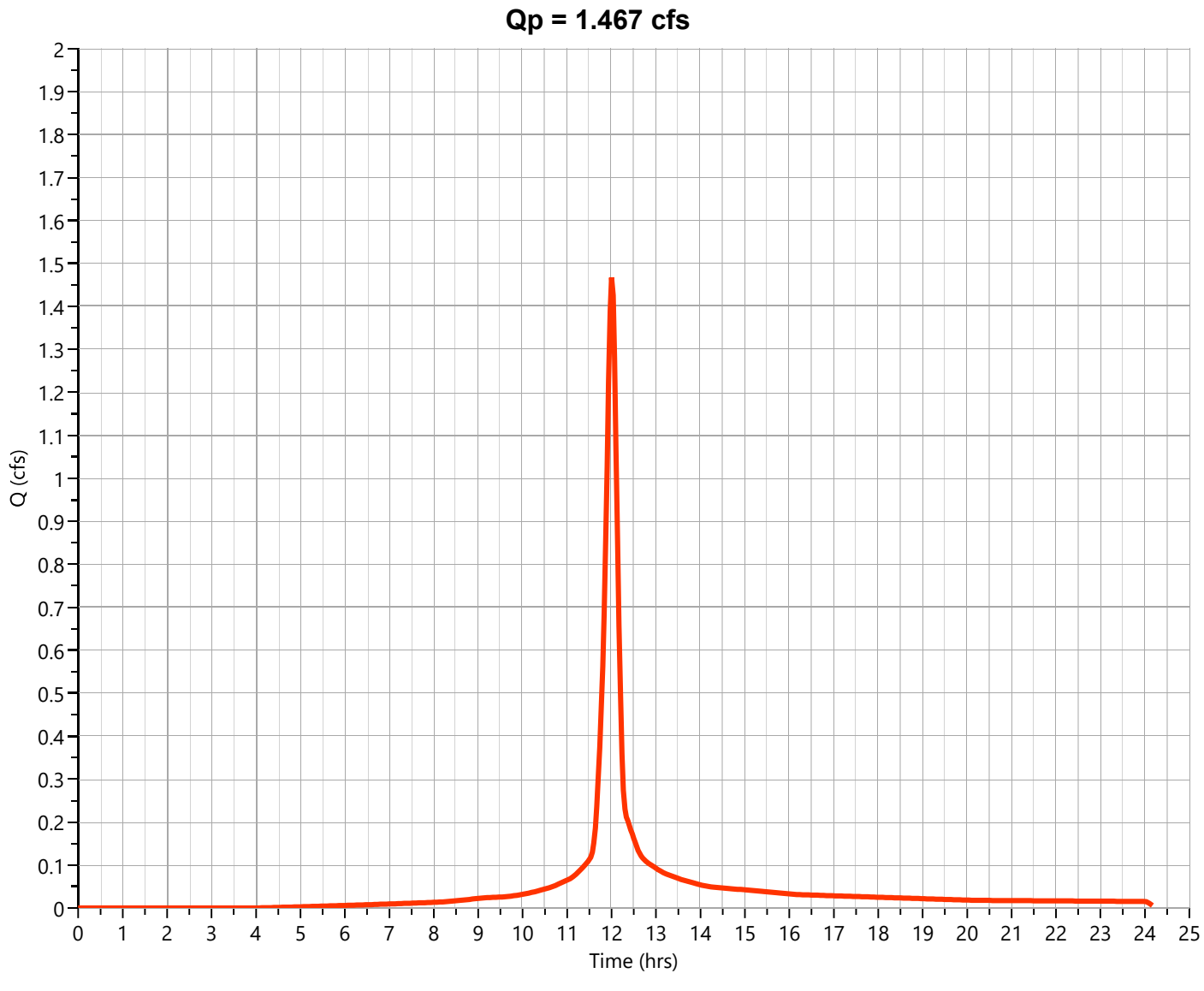
Pre-Undetained

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.467 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 3,961 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.00*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.48 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.07	98.00	Impervious
0.18	85.00	Row Crop C Soil
0.25	**89.00**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

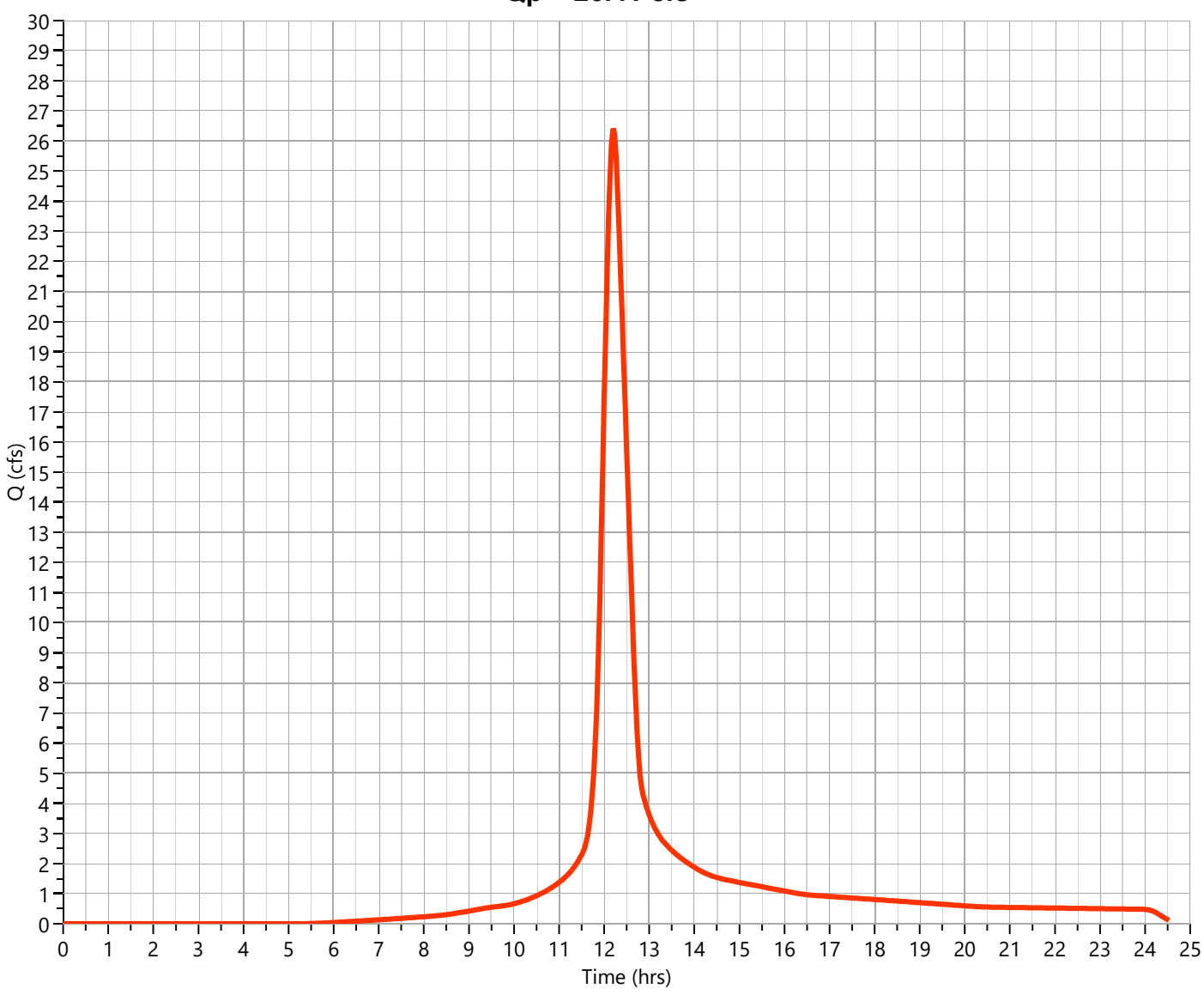
Pre-Site Detained

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 26.41 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 114,813 cuft
Drainage Area	= 8.19 ac	Curve Number	= 85.00*
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 33.16 min
Total Rainfall	= 5.48 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
8.19	85.00	Row Crop C Soil
8.19	**85.00**	Weighted CN Method Employed



Hydrograph Report

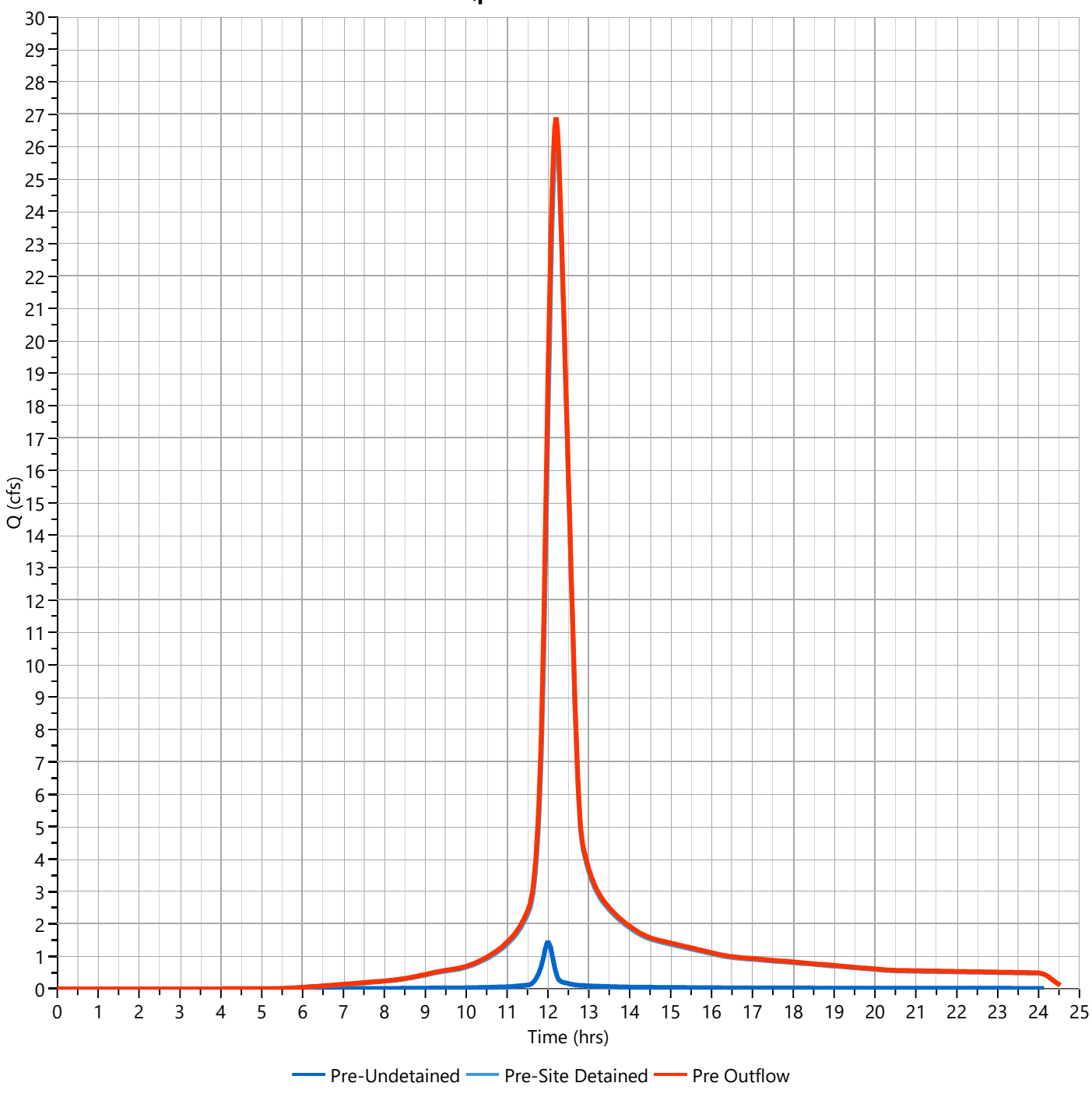
Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Pre Outflow

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 26.90 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 118,775 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.44 ac



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

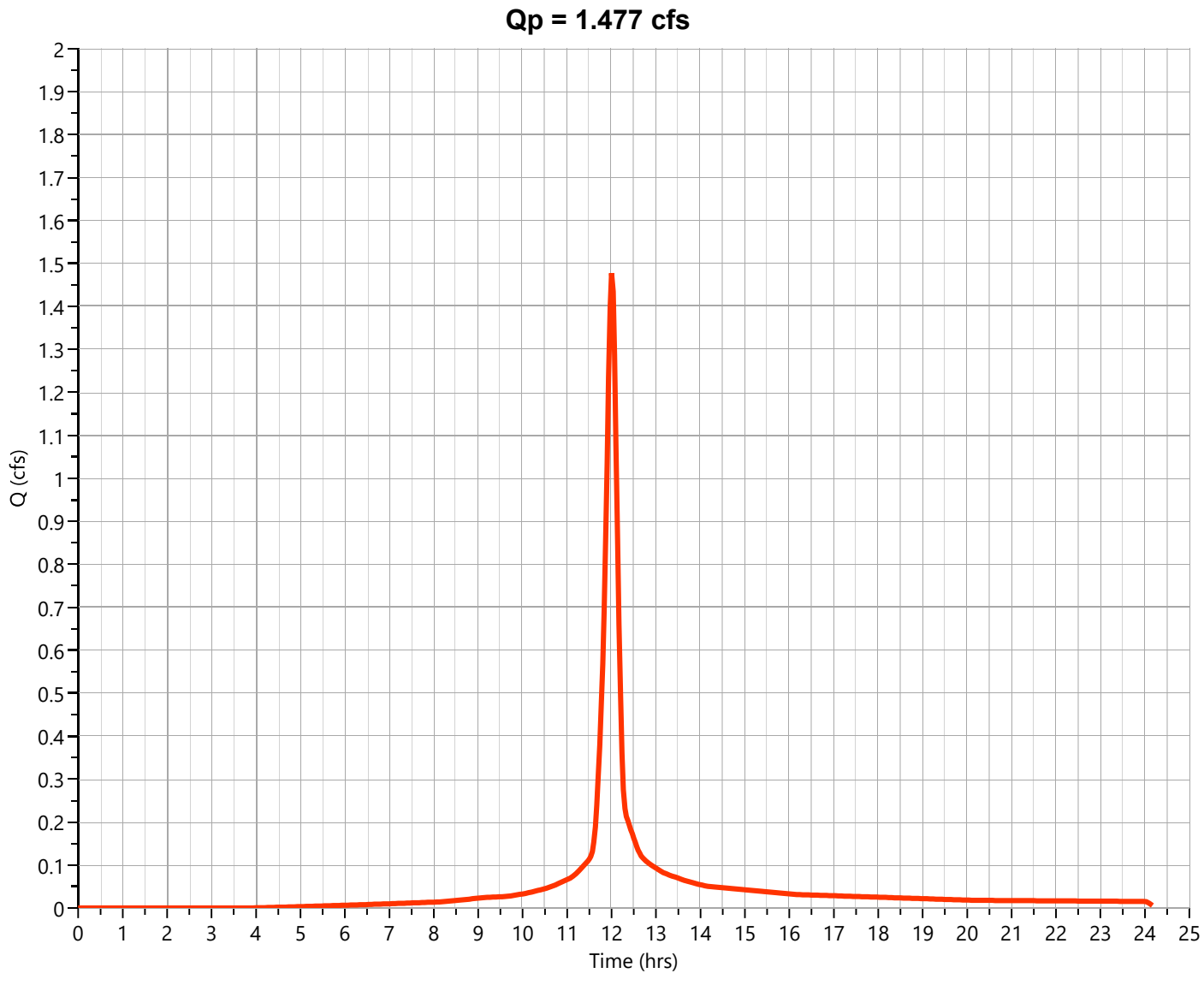
Post-Undetained

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.477 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 3,998 cuft
Drainage Area	= 0.25 ac	Curve Number	= 89.36*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.48 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.16	98.00	Impervious
0.09	74.00	Open Space C Soil
0.25	**89.36**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

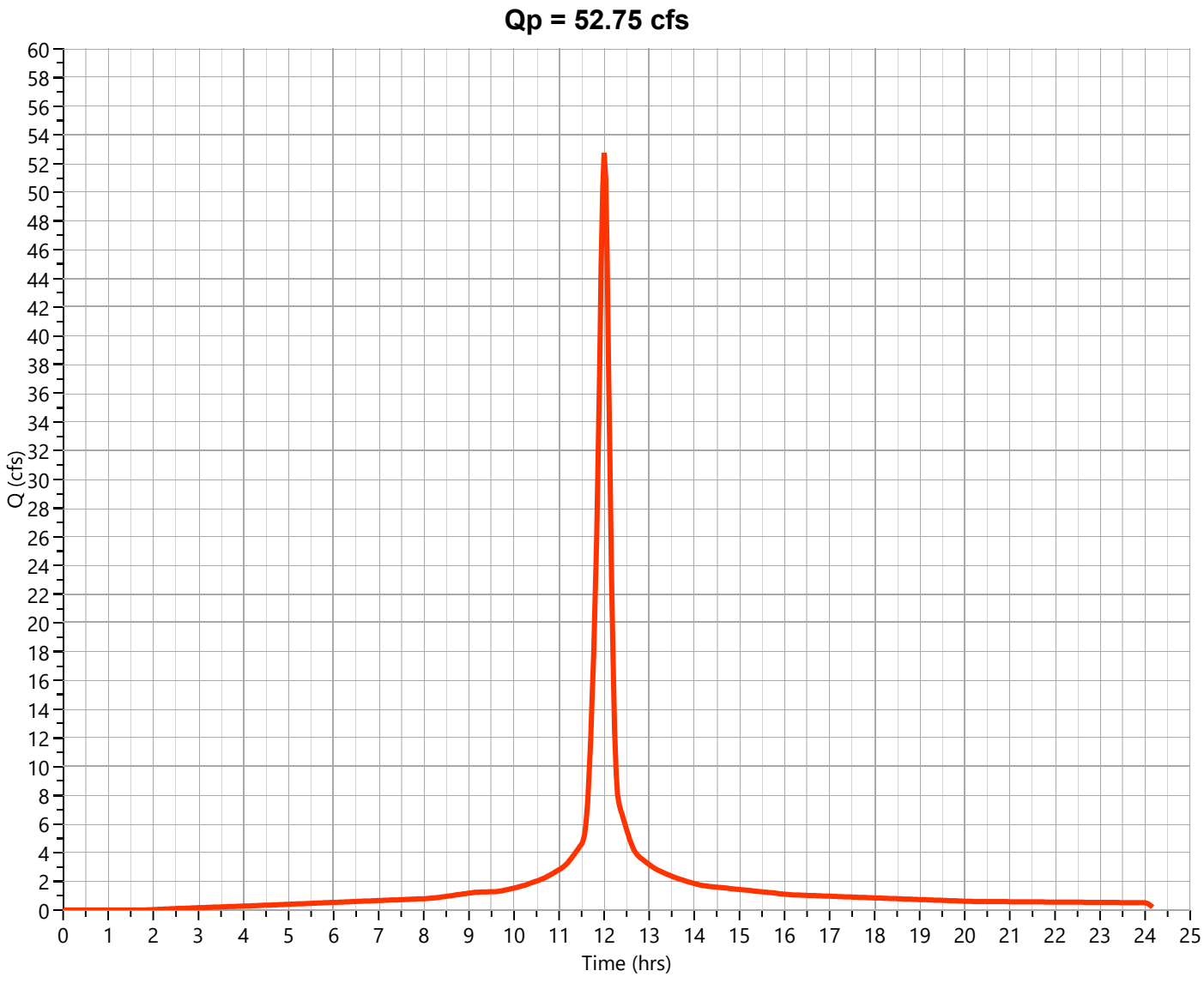
Post-Site Detained

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 52.75 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.00 hrs
Time Interval	= 2 min	Runoff Volume	= 151,661 cuft
Drainage Area	= 8.19 ac	Curve Number	= 95.45*
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.48 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
7.32	98.00	Impervious
0.87	74.00	Open Space C Soil
8.19	**95.45**	Weighted CN Method Employed



Hydrograph Report

Hydrology Studio v 3.0.0.44

File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

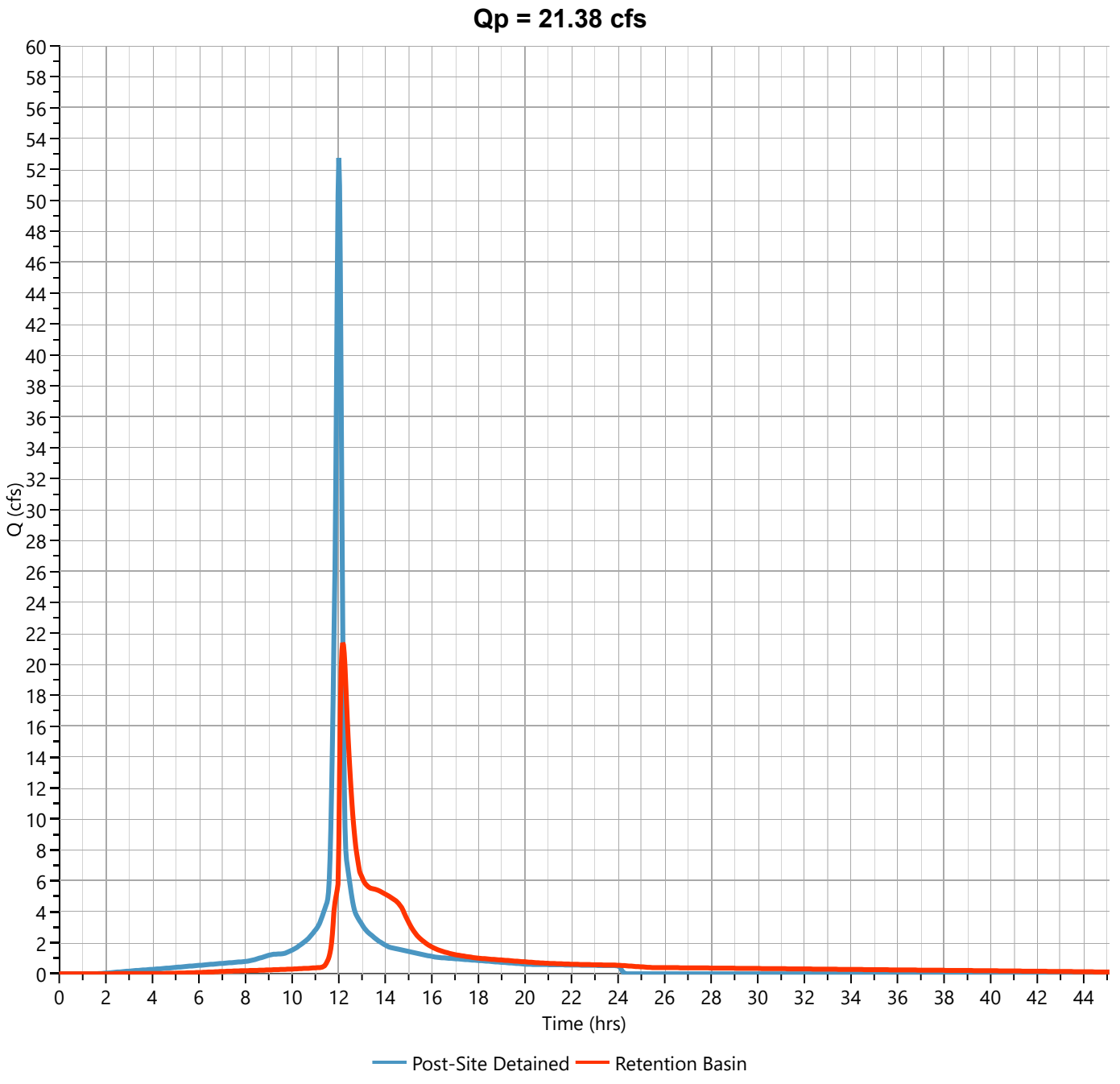
Retention Basin

Hyd. No. 6

Hydrograph Type	= Pond Route	Peak Flow	= 21.38 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 151,136 cuft
Inflow Hydrograph	= 5 - Post-Site Detained	Max. Elevation	= 926.38 ft
Pond Name	= Retention Basin	Max. Storage	= 72,364 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 3.47 hrs



Hydrograph Report

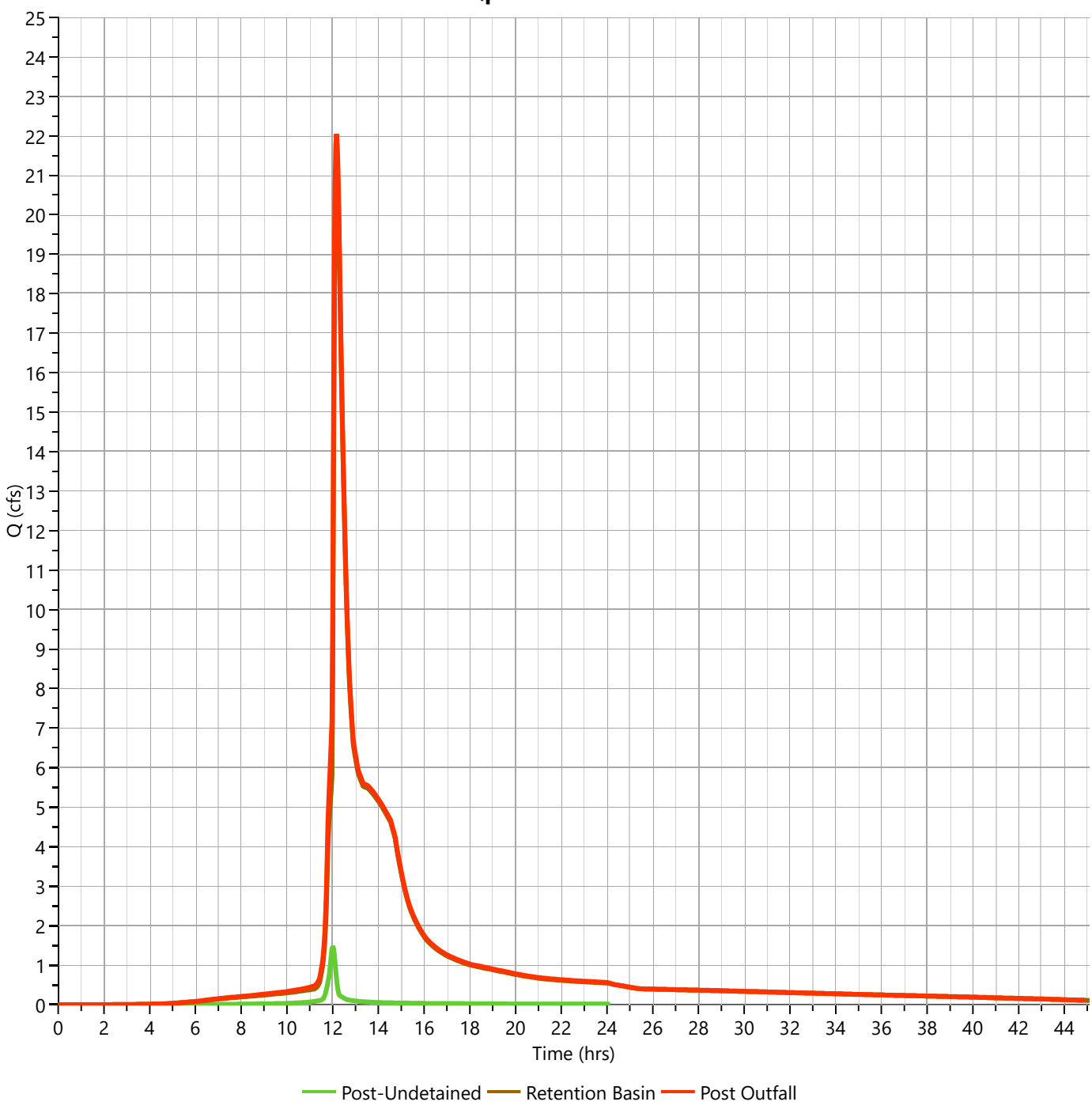
Hydrology Studio v 3.0.0.44

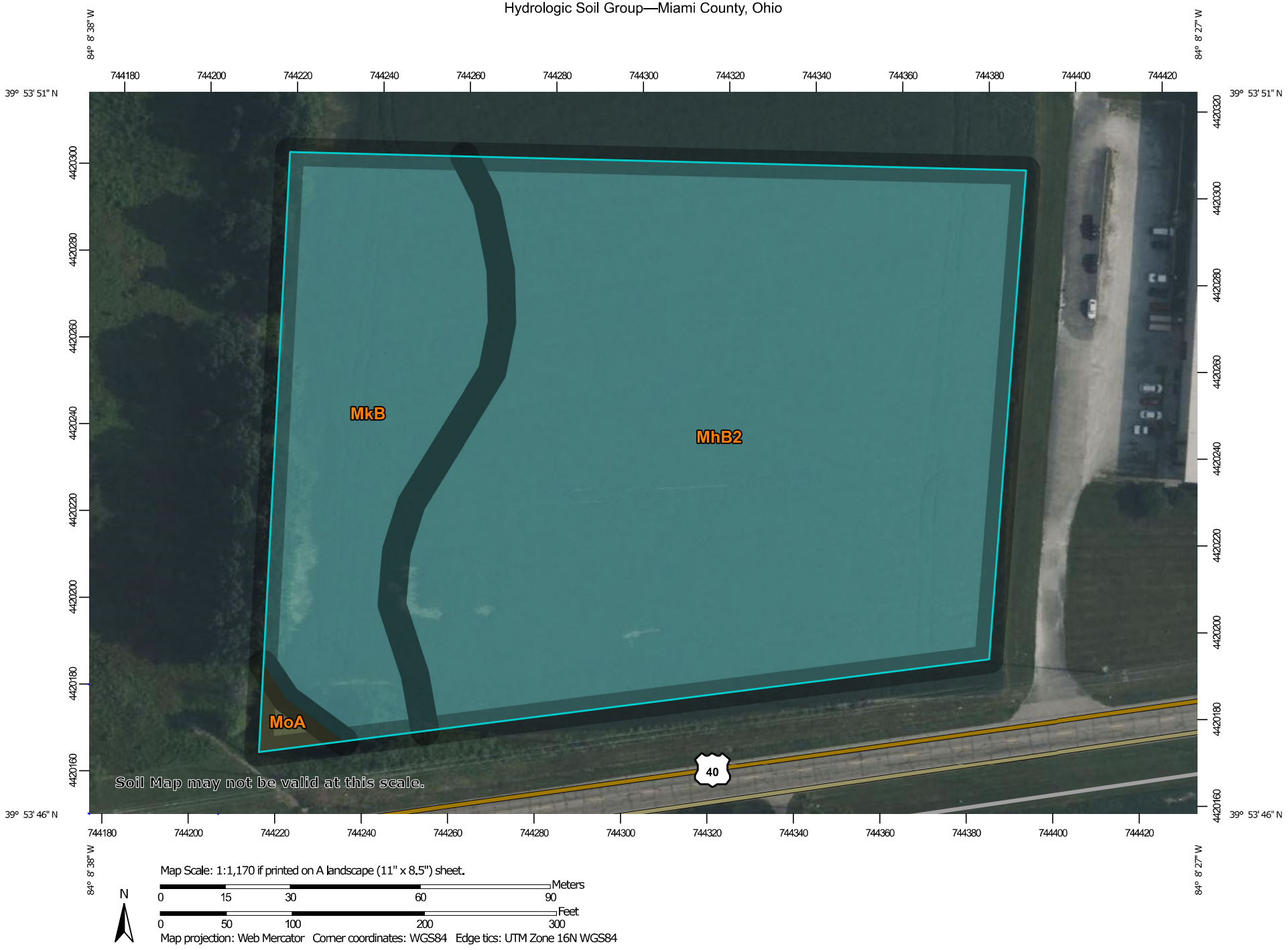
File: 2026-08-25-WetRetentionCalculations.hys
08-25-2026

Post Outfall

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 22.04 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 155,134 cuft
Inflow Hydrographs	= 4	Total Contrib. Area	= 0.25 ac





Map Scale: 1:1,170 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Miami County, Ohio
Survey Area Data: Version 24, Sep 2, 2025

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

Date(s) aerial images were photographed: May 18, 2023—Aug 4, 2023

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
MhB2	Miamian silt loam, 2 to 6 percent slopes, eroded	C	3.9	74.4%
MkB	Miamian silt loam, limestone substratum, 2 to 6 percent slopes	C	1.3	24.8%
MoA	Millsdale silty clay loam, 0 to 2 percent slopes	C/D	0.0	0.8%
Totals for Area of Interest			**5.3**	**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

STORM WATER DETENTION SUMMARY SHEET

Project: Eetsabarn Site Plan Calculation Methc Critical Storm Date 8/25/2026

	1 Year	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Pre-developed Site							
Max. Discharge (cfs)	6.904	9.515	13.150	16.140	20.250	23.510	26.900
Post-developed Site							
Uncontrolled Max. Discharge (cfs)	0.459	0.599	0.789	0.941	1.148	1.309	1.477
Controlled Max. Discharge (cfs)	2.439	4.561	5.346	6.060	12.000	17.050	21.380
Max. Routed Pond Inflow (cfs)	20.060	24.690	30.830	35.710	42.290	47.430	52.750
Max. Routed Pond Discharge (cfs)	2.439	4.561	5.346	6.060	12.000	17.050	21.380
Max. NonRouted Discharge (cfs)	0.459	0.599	0.789	0.941	1.148	1.309	1.477
Total Site Max Discharge (cfs)	2.502	4.699	5.640	6.242	12.390	17.510	22.040
Max. Pond Storage (Acre -ft)	0.714	0.850	1.064	1.243	1.427	1.546	1.661
Max. Pond Elevation (ft)	924.60	924.88	925.30	925.63	925.98	926.18	926.38
Total Runoff Volume (Cubic feet)	55,106	65,875 67,314	87,401	102,310	122,579	138,528	155,134
Total Routed Volume (Cubic feet)	53,915	67,314	85,330	99,821	119,515	135,008	151,136

	Detain	Undet.		Detain	Undet.		Det.	Undet
Pre-developed Area (Acres)	8.19	0.25	Pre-developed Composite CN or C	85	89	Pre-developed Tc (min)	33	10
Post-developed Area (Acres)	8.19	0.25	Post-developed Composite CN or C	95	89	Post-developed Tc (min)	10	10

Total Pond Volume (Acre-ft) 2.033 Top of Pond Elevation (ft) 927.00 Pond Overflow Elevation 926.50

Primary Outlet Device 2-3 CB, 18" Pipe Primary Outlet Device Invert Elevation 923.00