

DRAINAGE CALCULATIONS, HYDRAULICS & HYDROLOGY REPORT

**2227 Route 32
Montville, CT**

**August 2025
Revised 9/22/25**

DRAINAGE HYDRAULICS AND HYDROLOGY REPORT

**2227 Route 32
Montville, CT**

EXISTING CONDITIONS

The site is approximately 1.1 acres in area and is shown on the Existing Conditions Survey (Sheet 1 of the site plans). There are also less than 0.1 acres of wetlands on the site.

PROPOSED DEVELOPMENT

The project proposes the redevelopment of the site for a mixed-use building. The first floor will be a package store and other commercial uses and the second floor will be apartments. This project is a modification of the previously developed site plan, with the addition of a temporary sedimentation basin, in accordance with the 2024 CT Guidelines for Soil Erosion & Sedimentation Control, which will ultimately become a permanent water quality basin and forebay, in accordance with the Connecticut the 2024 Stormwater Quality Manual (Manual). There is presently no stormwater treatment on this site.

EXISTING AND PROPOSED HYDRAULICS

The stormwater management system has been designed to provide for zero increase in peak stormwater discharge from the site. The project has been designed to actually result in a decrease in the peak stormwater rates leaving the project site. The proposed stormwater water quality basin will provide treatment of the runoff from the proposed site.

The Proposed Drainage Area contains the proposed development for the site. The stormwater runoff from the proposed development will be treated by the proposed water

quality basin and forebay. Based on the tests done on the site, the basin has been modelled to assume that the basin will be a dry basin at the onset of the storm event.

The drainage area to CTDOT Route 32, pre-construction is approximately 0.12 acres. The drainage area to CTDOT Route 32 post-construction will be approximately 0.9 acres. In addition, we will be reducing the amount of pavement within the drainage area to Route 32. Therefore, there will be a reduction of stormwater runoff to Route 32 after the project is completed.

The drainage area to northerly wetlands, pre-construction is approximately 0.3 acres. The drainage area to the northerly wetlands post-construction will be approximately 0.08 acres. Therefore, there will be a reduction of stormwater runoff to the northerly wetlands after the project is completed.

The existing soils in the area of the proposed development are extremely well drained soils, which have a hydraulic designation of A. We have used a CN of 98 for both the existing and proposed paved areas, buildings and structures. For the existing vegetated areas, we have used a CN of 45 for existing conditions, woods-poor conditions. We used poor condition, as there are a number of containers and gravel areas within the existing woodlands. For the proposed vegetated areas, we have used a CN of 39, lawns-good conditions. How the overall CN's are calculated are shown on the hydrograph sheets for Hyd. #1 and Hyd. #2.

For 2227 Route 32, use a permeability rate of 8.27 inches per hour for the basin bottoms. This is taken from Table 10-2 of the Connecticut Stormwater Manual and is for Hydrologic Group A soils classified as sand. This is the fastest rate in that table, however it is likely an underestimate of the actual field rate because the on site soil is very gravelly.

Both the existing and the proposed conditions for the development site have been analyzed for the 2-year, 10-year, 25-year, 50-year, and 100 year design storms using the

SCS model and the NOAA Type D rainfall distribution, which is included in the calculations.

Drainage Area 1

	2 Year	10 Year	25 Year	50 Year	100 Year
Existing	0.763 cfs	1.901 cfs	2.687 cfs	3.290 cfs	3.956 cfs
Proposed	0.000 cfs	0.000 cfs	0.871 cfs	2.277 cfs	3.734 cfs

The Manual calls for 6 inches of freeboard for the 10 year storm event and 3 inches of freeboard for the 100 year storm event. We have provided over 6 inches of freeboard for the 100 year storm event.

EROSION & SEDIMENTATION CONTROL

The 2024 CT Guidelines for Soil Erosion & Sedimentation Control applies to the construction phase of the project. A detailed erosion and sediment control plan has been provided in the site development plans. The proposed stormwater water quality basin has been designed to function as a sedimentation trap during stabilization. However, the bottom 3 feet of the stormwater quality basin will not be excavated until after the site is stabilized and the temporary sedimentation basin is converted to the stormwater quality basin. The basin will only be excavated down to elevation 130 for the sedimentation trap. And then the additional 3 feet will be excavated down to elevation 334 for the permanent stormwater basin. This will protect the existing infiltration rate of the native materials under the basin.

The first calculation required by the Guidelines is for the sediment storage volume (SSV). The sediment storage volume is the calculation for one year of predicted sediment load. The required SSV calculation for the temporary sediment trap is shown below.

Drainage Area

$$SSV = A(134CY/Acre)$$

A = 0.9 ACRE

SSV = 120.6 CY = 3,256 CF

The second calculation required by the Guidelines is for wet storage volume (WSV). The wet storage volume is the volume in the basin that is located below the bottom of the riprap for the level spreader outlet of the basin. The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is shown below along with the dry storage volumes (DSV).

The required and provided storage for the basins are as follows:

Drainage Area (Outlet structure inlet elevation = 131.0)

Sedimentation Trap

1,628 CF of Wet Storage Volume Required	1,697 CF Provided*
1,628 CF of Dry Storage Volume Required	6,243 CF Provided
3,256 CF of Sediment Storage Volume Required	7,940 CF Total Provided

***storage in the water quality basin between elevation 130 and 131 plus storage in the forebay between elevation 130 and elevation 131**

CONNECTICUT STORMWATER QUALITY MANUAL

The Connecticut 2024 Stormwater Quality Manual (Manual) applies to the post construction phase, for the operation of the facility. The temporary sediment trap has been designed to function as a water quality basin after the site is stabilized. The basin meets the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin.

The proposed stormwater water quality basin has been designed to function a sedimentation trap during stabilization. However, the bottom 3 feet of the stormwater quality basin will not be excavated until after the site is stabilized and the temporary

sedimentation basin is converted to the stormwater quality basin. The basin will only be excavated down to elevation 130 for the sedimentation trap. And then the additional 3 feet will be excavated down to elevation 127 for the permanent stormwater basin. This will protect the existing infiltration rate of the native materials under the basin.

Drainage Area

$$WQV = (1.3')(R)(A)/12$$

$$A = 0.9 \text{ Acre}$$

$$R = 0.05 + 0.009(I)$$

$$I = 0.5 \text{ Acres} / 0.9 \text{ Acres} = 0.56 \quad (56\%)$$

$$R = 0.55$$

$$WQV = 0.054 \text{ Ac-Ft} = 2,352\text{CF} \quad (\text{Required})$$

3,506 CF (WQV Provided in Water Quality Basin between elevation 127 and 131, plus WQV provided in the forebay)

The Forebay provides 512 CF of WQV, which is 21% of the required WQV

Once development of the site is completed, there will be a decrease in volume and runoff from the site. The temporary sedimentation basin provides ample wet and dry storage volume to meet and exceed the requirements of the 2024 CT Guidelines for Soil & Sedimentation Control, as well as the 2024 CT Guidelines for Soil & Sedimentation Control. Likewise, the Water Quality Basin meets and exceeds the post construction requirements of the Connecticut 2024 Stormwater Quality Manual.

As the calculations show that there will be no stormwater leaving the proposed stormwater management system (water quality basin), up to and including the 10 year storm event, the anticipated pollutant removal rate is 99-100%.

(https://www.unh.edu/unhsc/sites/default/files/media/ms4_permit_nomographs_sheet_final_2020.pdf) The University of New Hampshire's research reveals that efficiency removal for typical pollutants of concern such as TSS, N, P, and zinc is directly tied to the volume of stormwater that is held and infiltrated. The research reveals that if a 2 inch depth of runoff from a site's impervious surface is held and infiltrated by a given BMP, the reduction in these pollutants is 99-100%. On this site, the Stormwater basin will contain up to and including the 10 year storm event. Thus, CLA believes that pollutant removal rates for pollutants of concern will be greater than 99% and there will be no increase in releases of pollutants to the wetlands system.

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The Proposed Drainage Area contains the proposed development for the site. The stormwater runoff from the proposed development will be treated by the proposed water quality basin and forebay. Based on the tests done on the site, the basin has been modelled to assume that the basin will be a dry basin at the onset of the storm event.

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$$I = 0.5 \text{ Acres} / 0.9 \text{ Acres} = 0.56 \quad (56\%)$$

$$R = 0.55$$

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3,506 CF (WQV Provided in Water Quality Basin between elevation 127 and 131, plus WQV provided in the forebay)

The Forebay provides 512 CF of WQV, which is 21% of the required WQV

Once development of the site is completed, there will be a decrease in volume and runoff from the site. The temporary sedimentation basin provides ample wet and dry storage volume to meet and exceed the requirements of the 2024 CT Guidelines for Soil & Sedimentation Control, as well as the 2024 CT Guidelines for Soil & Sedimentation Control. Likewise, the Water Quality Basin meets and exceeds the post construction requirements of the Connecticut 2024 Stormwater Quality Manual.

As the calculations show that there will be no stormwater leaving the proposed stormwater management system (water quality basin), up to and including the 10 year storm event, the anticipated pollutant removal rate is 99-100%.

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	0.783	1	728	2,613	----	----	----	Existing Area
2	SCS Runoff	1.148	1	727	3,667	----	----	----	Proposed Area
3	Reservoir	1.105	1	729	3,155	2	131.17	612	Forbay
4	Reservoir	0.000	1	760	0	3	129.17	911	Stormwater Basin

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

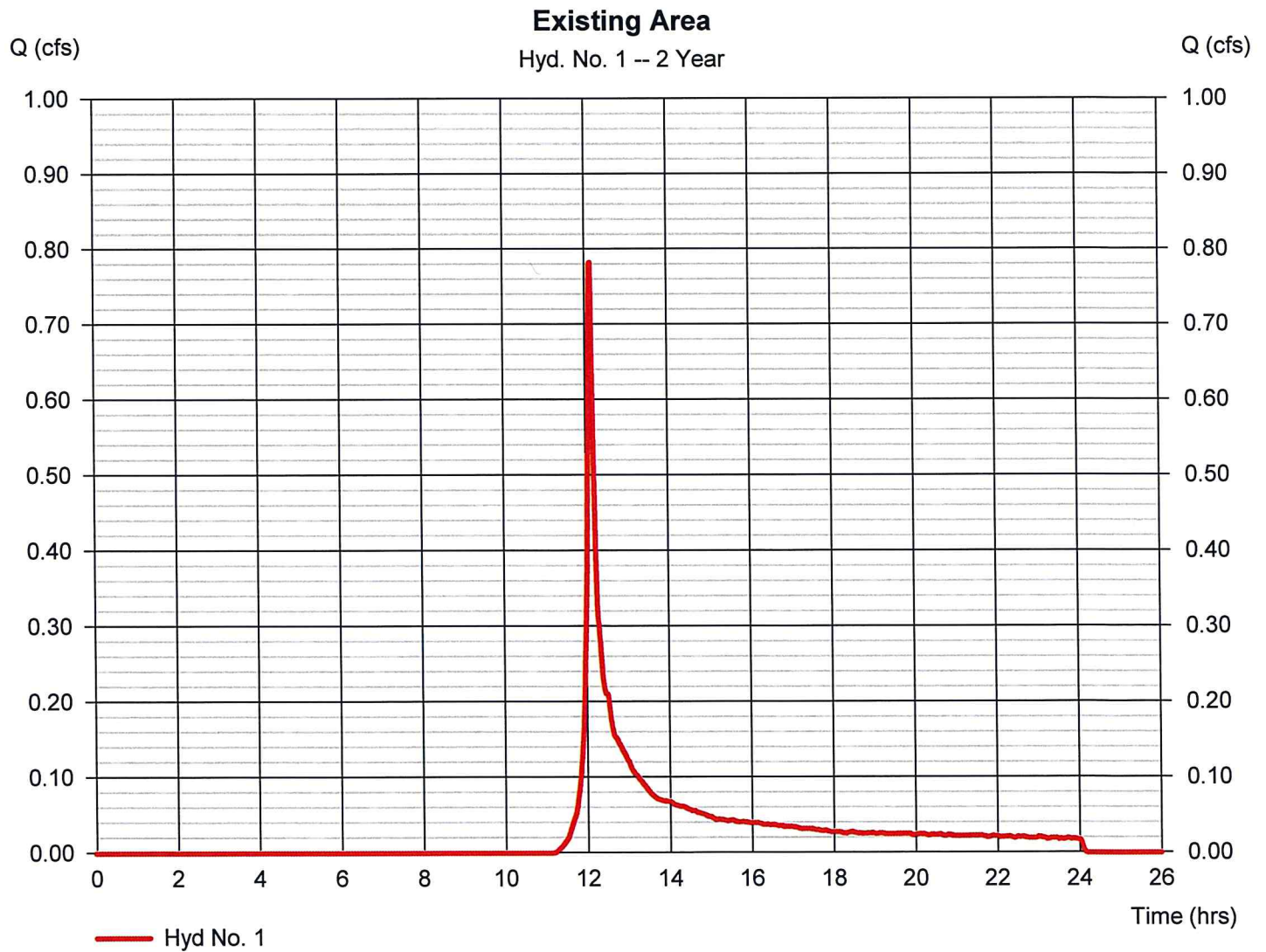
Tuesday, 09 / 23 / 2025

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 0.783 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 2,613 cuft
Drainage area	= 0.800 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1	Shape factor	= 484

* Composite (Area/CN) = [(0.350 x 98) + (0.450 x 45)] / 0.800



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

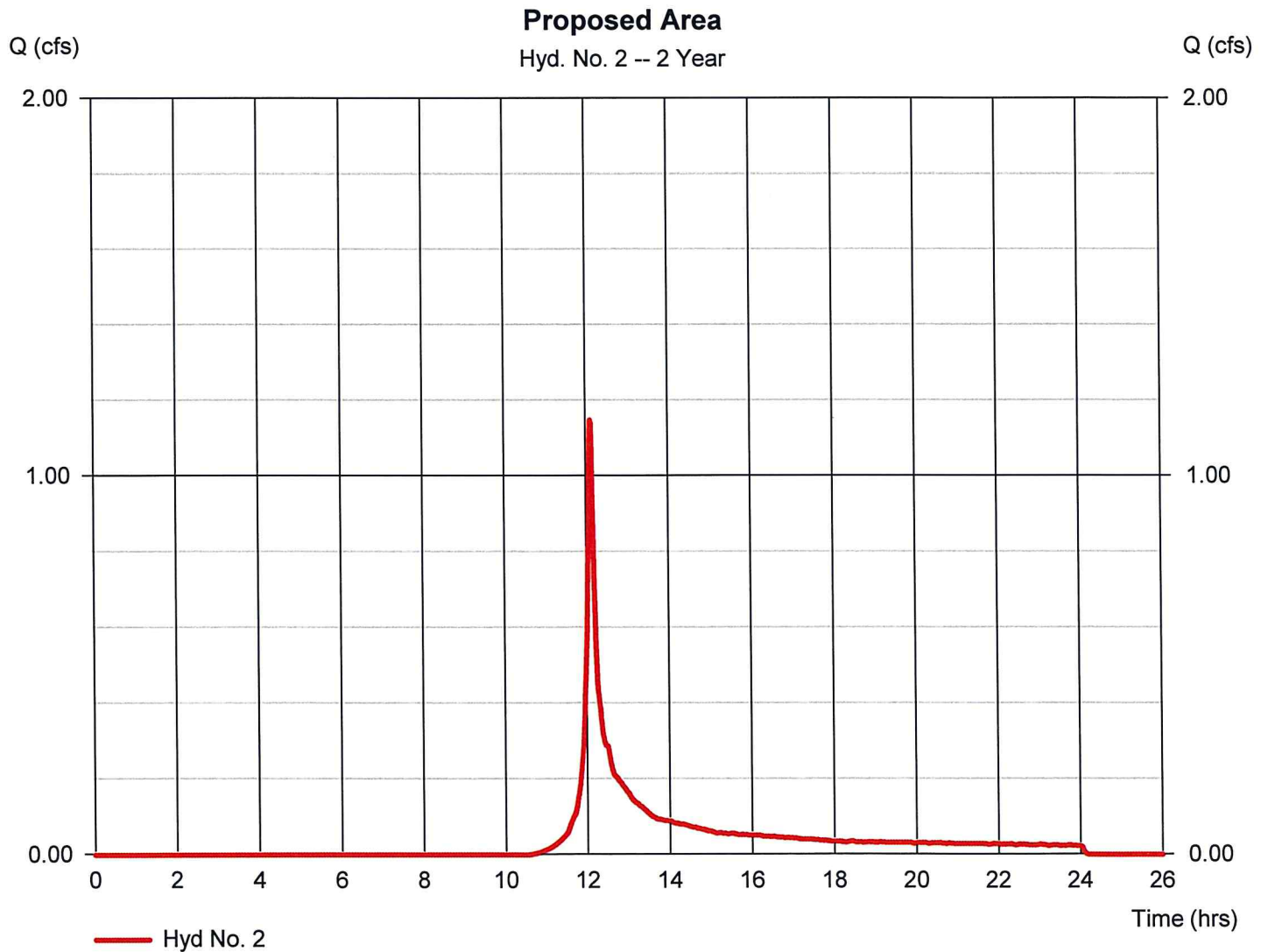
Tuesday, 09 / 23 / 2025

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 1.148 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 3,667 cuft
Drainage area	= 0.900 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 shape	Shape factor	= 484

* Composite (Area/CN) = [(0.500 x 98) + (0.400 x 39)] / 0.900



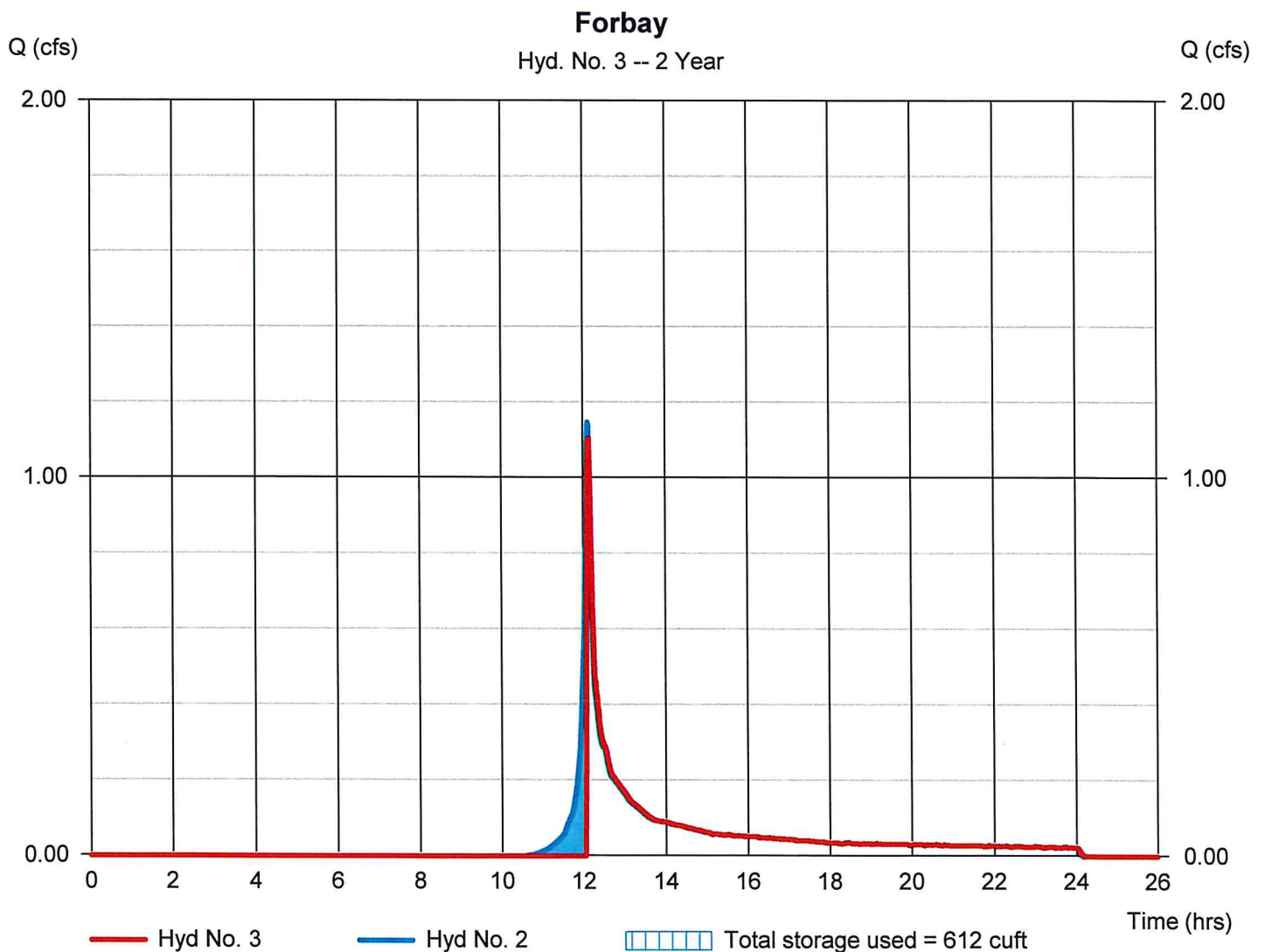
Hydrograph Report

Hyd. No. 3

Forbay

Hydrograph type	= Reservoir	Peak discharge	= 1.105 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 1 min	Hyd. volume	= 3,155 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 131.17 ft
Reservoir name	= Forebay	Max. Storage	= 612 cuft

Storage Indication method used.



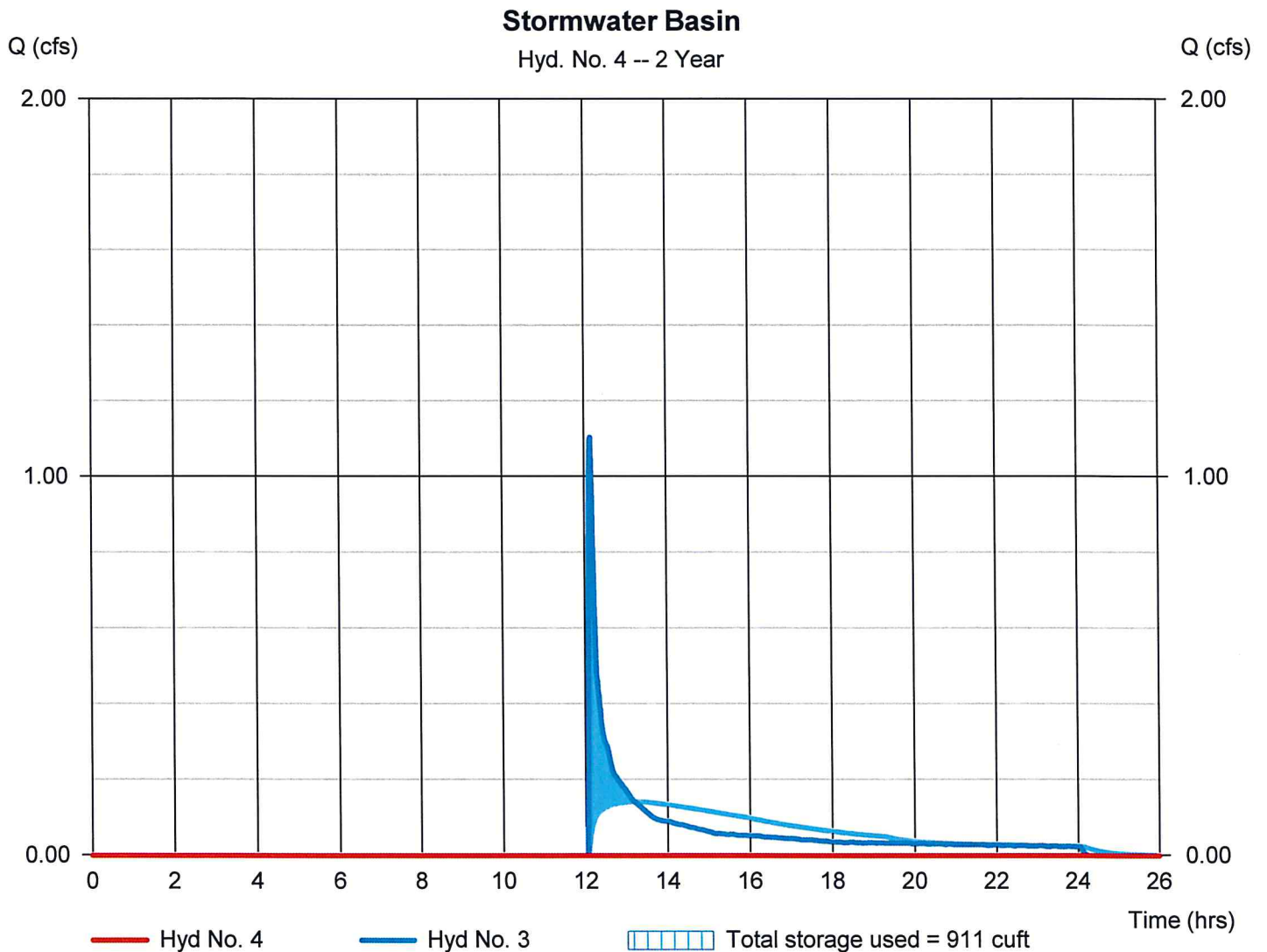
Hydrograph Report

Hyd. No. 4

Stormwater Basin

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.67 hrs
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - Forbay	Max. Elevation	= 129.17 ft
Reservoir name	= Pond 1	Max. Storage	= 911 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	1.901	1	727	5,929	-----	-----	-----	Existing Area
2	SCS Runoff	2.512	1	727	7,770	-----	-----	-----	Proposed Area
3	Reservoir	2.474	1	728	7,258	2	131.29	687	Forbay
4	Reservoir	0.000	1	725	0	3	130.87	2,804	Stormwater Basin

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

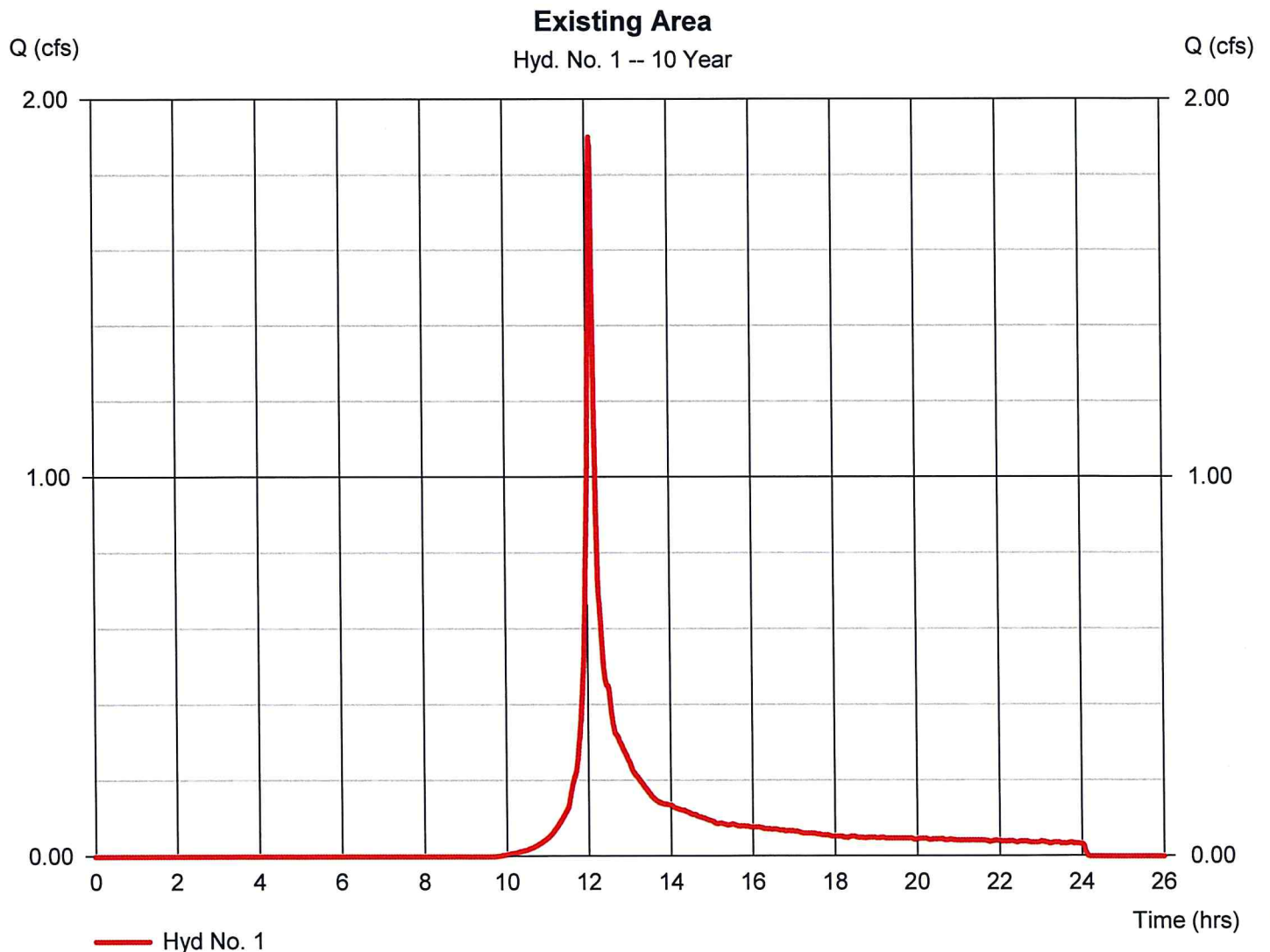
Tuesday, 09 / 23 / 2025

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 1.901 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 5,929 cuft
Drainage area	= 0.800 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.14 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1	Shape factor	= 484

* Composite (Area/CN) = [(0.350 x 98) + (0.450 x 45)] / 0.800



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

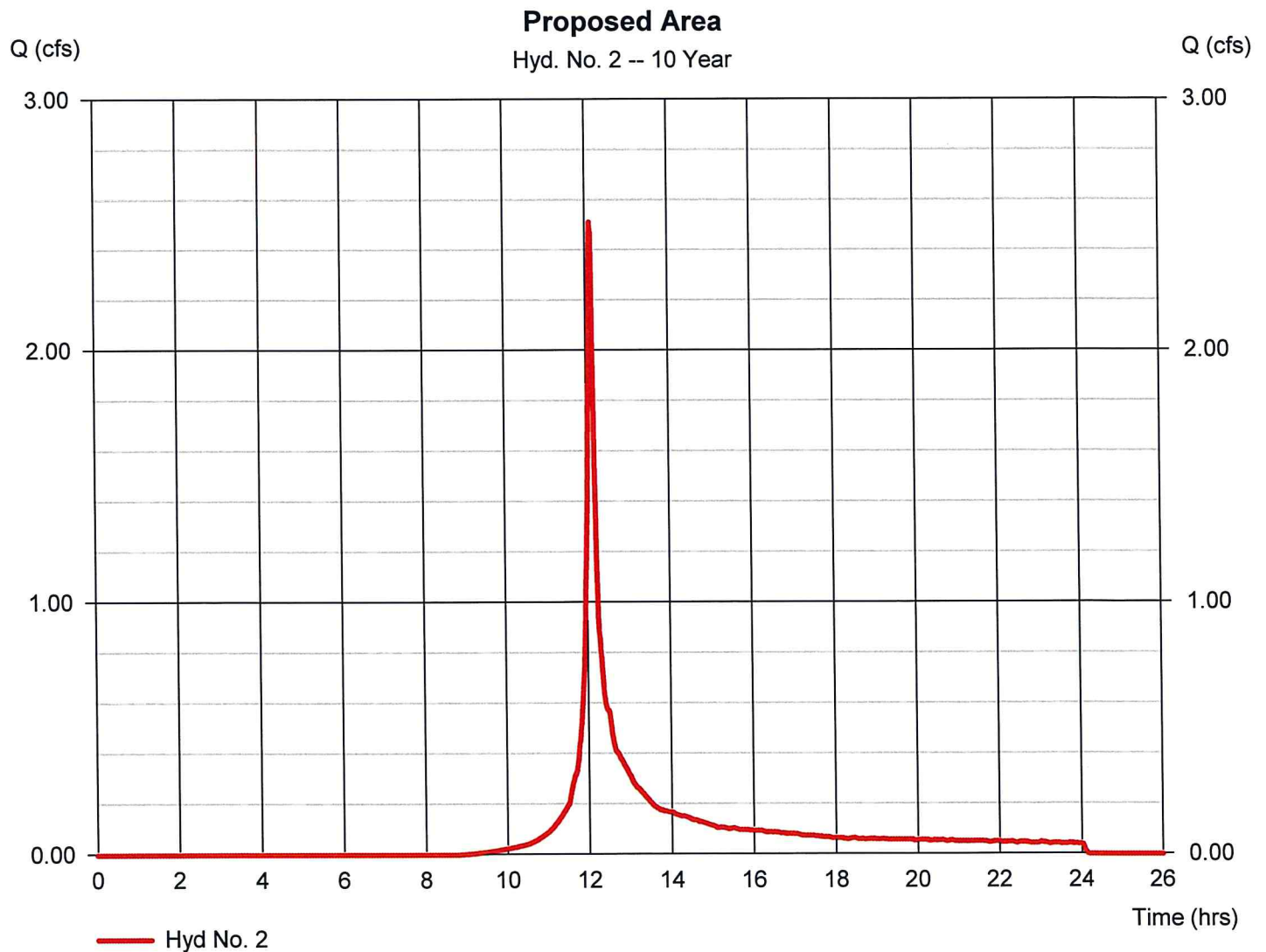
Tuesday, 09 / 23 / 2025

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 2.512 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 7,770 cuft
Drainage area	= 0.900 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.14 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1	Shape factor	= 484

* Composite (Area/CN) = [(0.500 x 98) + (0.400 x 39)] / 0.900



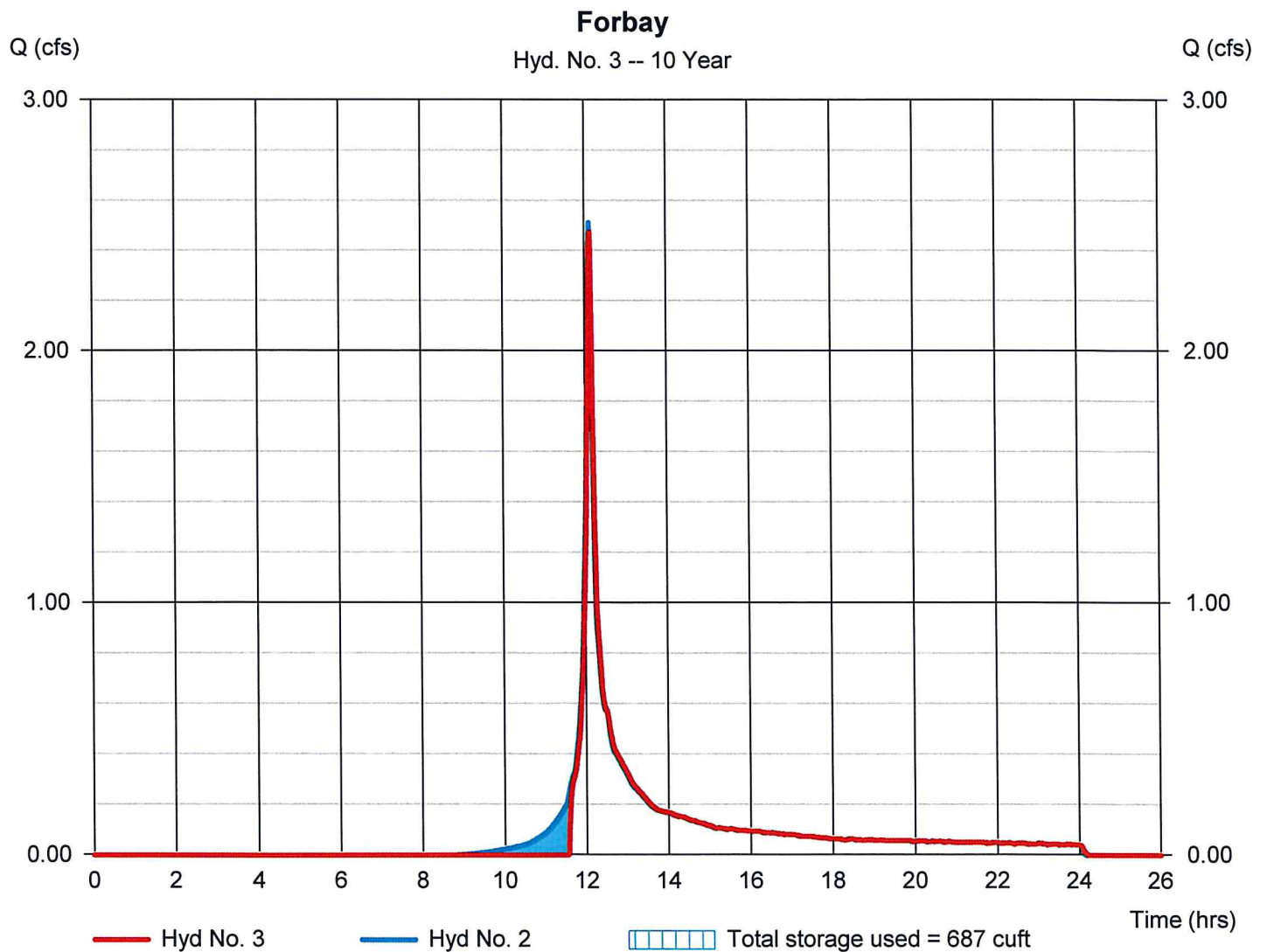
Hydrograph Report

Hyd. No. 3

Forbay

Hydrograph type	= Reservoir	Peak discharge	= 2.474 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 7,258 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 131.29 ft
Reservoir name	= Forebay	Max. Storage	= 687 cuft

Storage Indication method used.



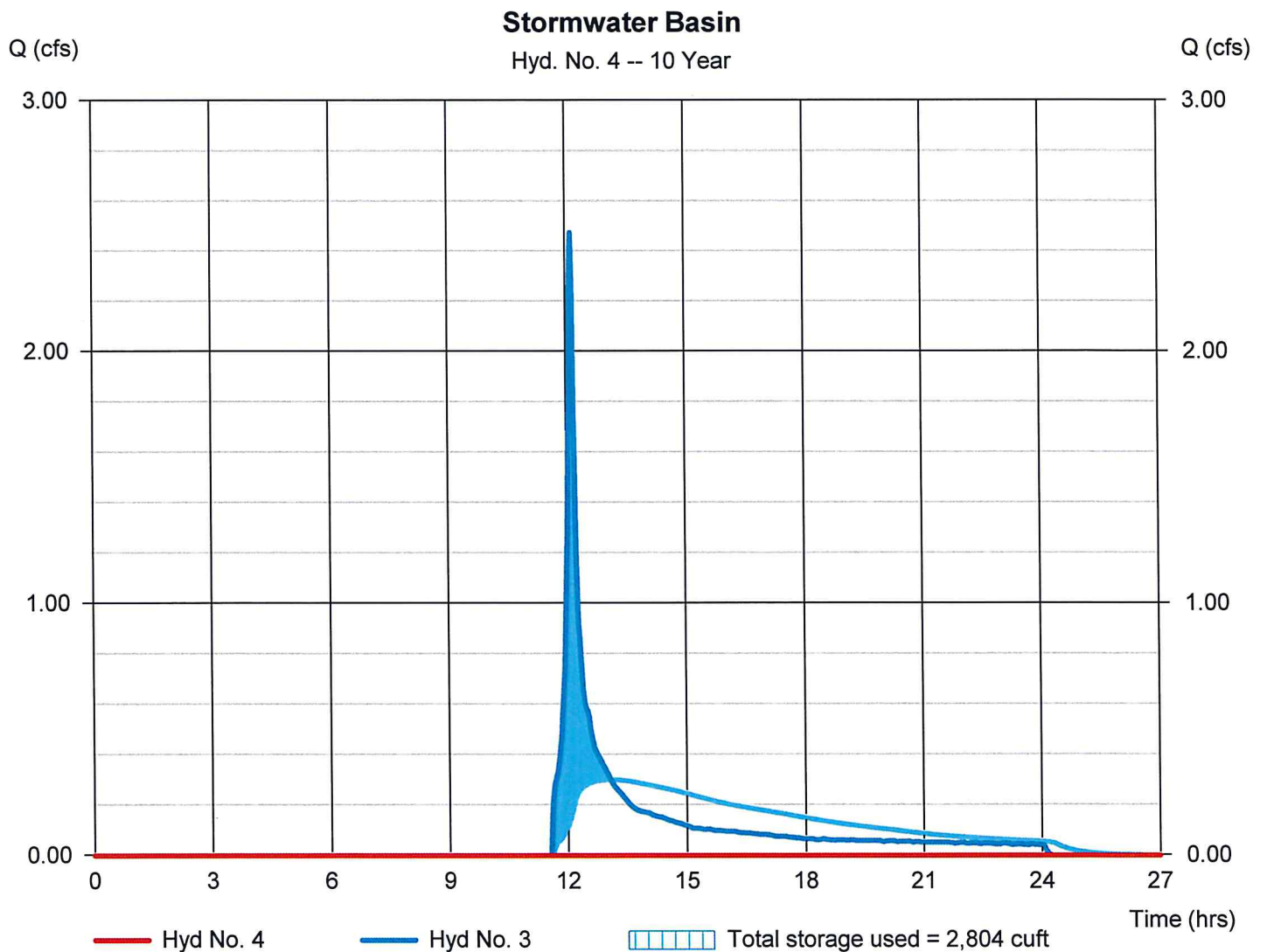
Hydrograph Report

Hyd. No. 4

Stormwater Basin

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.08 hrs
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - Forbay	Max. Elevation	= 130.87 ft
Reservoir name	= Pond 1	Max. Storage	= 2,804 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

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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	2.687	1	727	8,311	-----	-----	-----	Existing Area
2	SCS Runoff	3.442	1	727	10,638	-----	-----	-----	Proposed Area
3	Reservoir	3.400	1	728	10,126	2	131.36	728	Forbay
4	Reservoir	0.871	1	738	1,367	3	131.15	3,257	Stormwater Basin
Route 32 - Drainage Calculations - SCSgpw. Return Period: 25 Year								Tuesday, 09 / 23 / 2025	

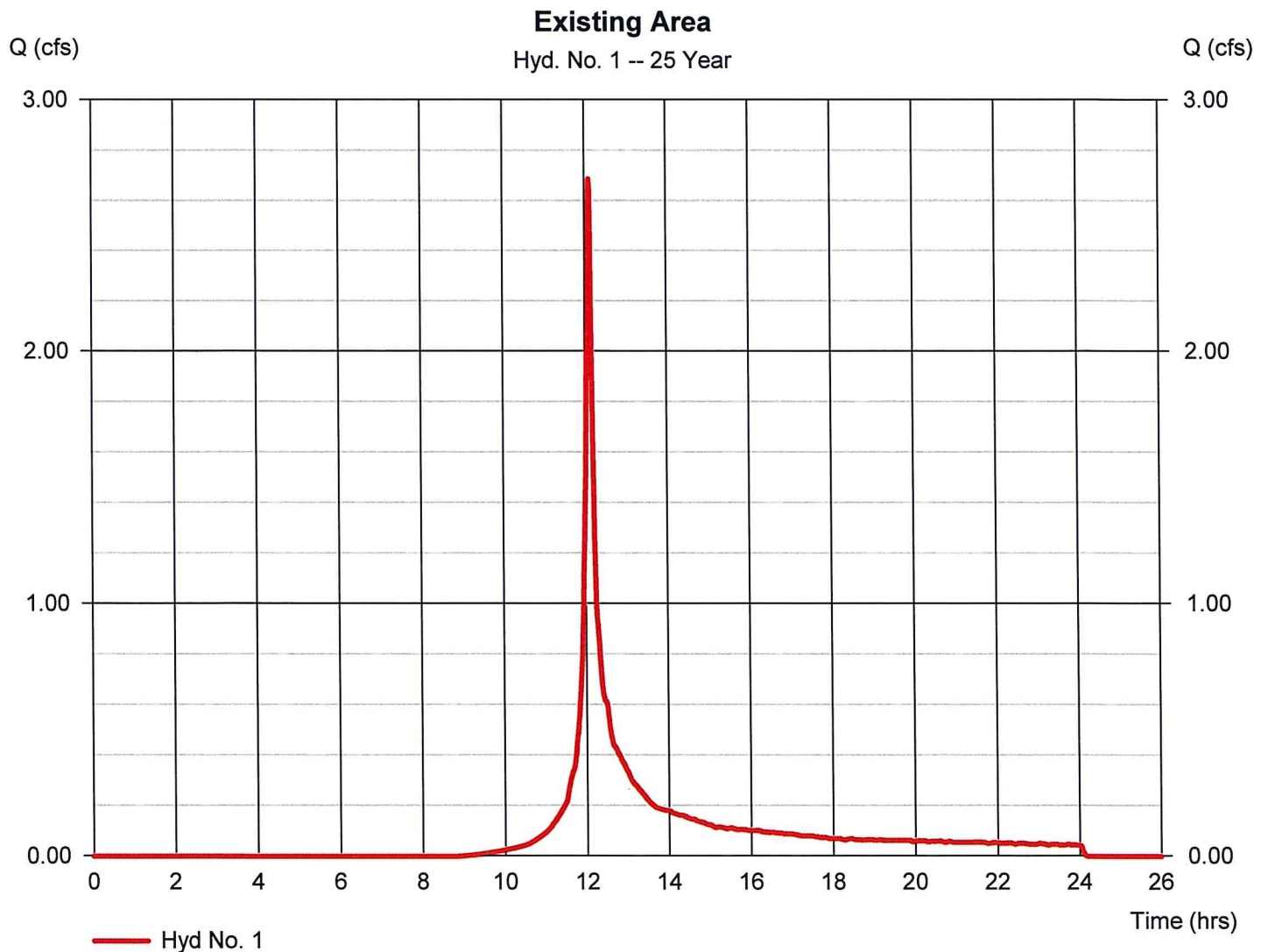
Hydrograph Report

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 2.687 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 8,311 cuft
Drainage area	= 0.800 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.20 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1	Shape factor	= 484

* Composite (Area/CN) = $[(0.350 \times 98) + (0.450 \times 45)] / 0.800$



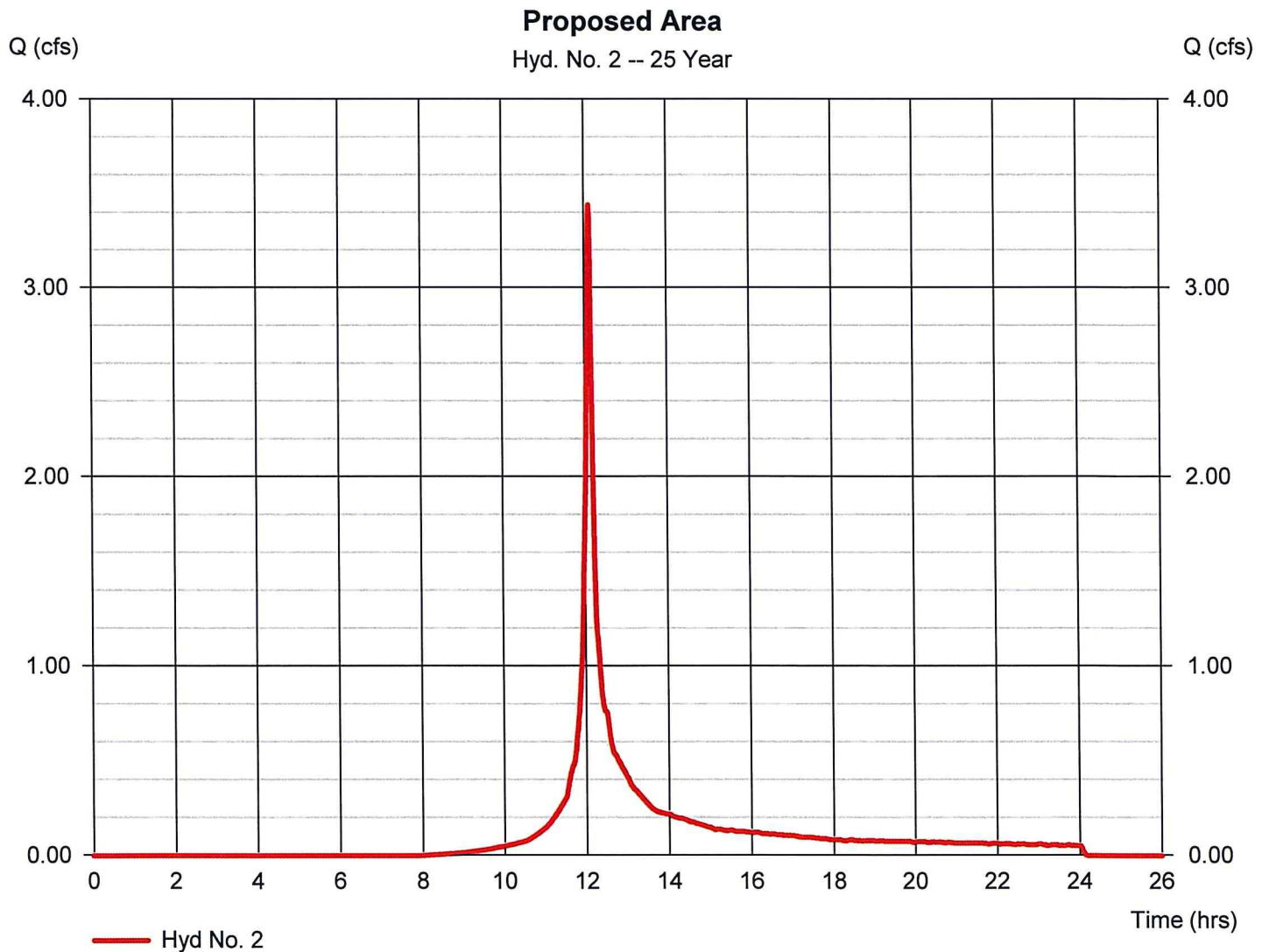
Hydrograph Report

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 3.442 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 10,638 cuft
Drainage area	= 0.900 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.20 in	Distribution	= Custom
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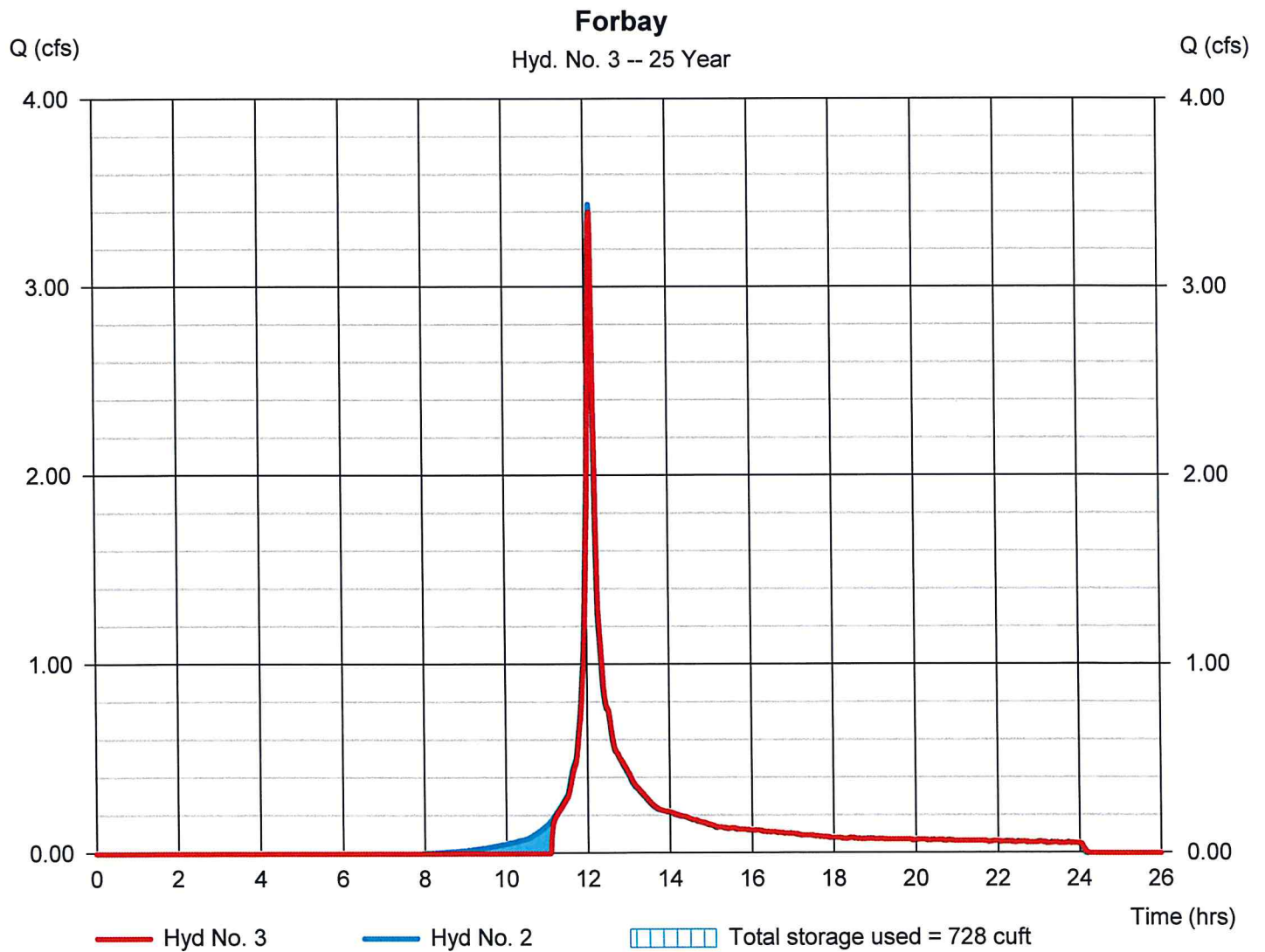
Tuesday, 09 / 23 / 2025

Hyd. No. 3

Forbay

Hydrograph type	= Reservoir	Peak discharge	= 3.400 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 10,126 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 131.36 ft
Reservoir name	= Forebay	Max. Storage	= 728 cuft

Storage Indication method used.



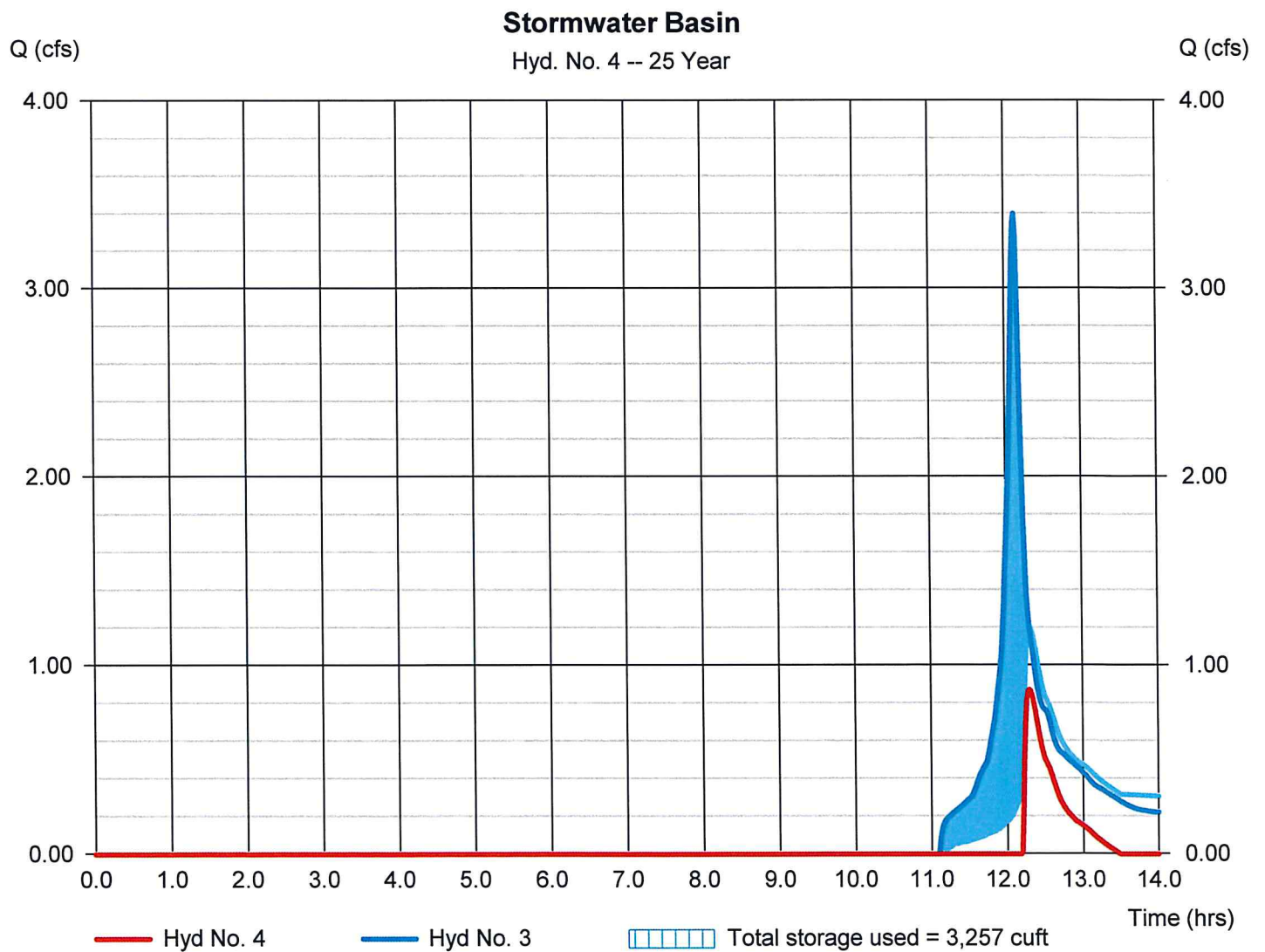
Hydrograph Report

Hyd. No. 4

Stormwater Basin

Hydrograph type	= Reservoir	Peak discharge	= 0.871 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.30 hrs
Time interval	= 1 min	Hyd. volume	= 1,367 cuft
Inflow hyd. No.	= 3 - Forbay	Max. Elevation	= 131.15 ft
Reservoir name	= Pond 1	Max. Storage	= 3,257 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	3.290	1	727	10,164	-----	-----	-----	Existing Area
2	SCS Runoff	4.146	1	727	12,843	-----	-----	-----	Proposed Area
3	Reservoir	4.098	1	728	12,331	2	131.41	757	Forbay
4	Reservoir	2.277	1	732	2,713	3	131.28	3,494	Stormwater Basin
Route 32 - Drainage Calculations - SCSgpw						Return Period: 50 Year			Tuesday, 09 / 23 / 2025

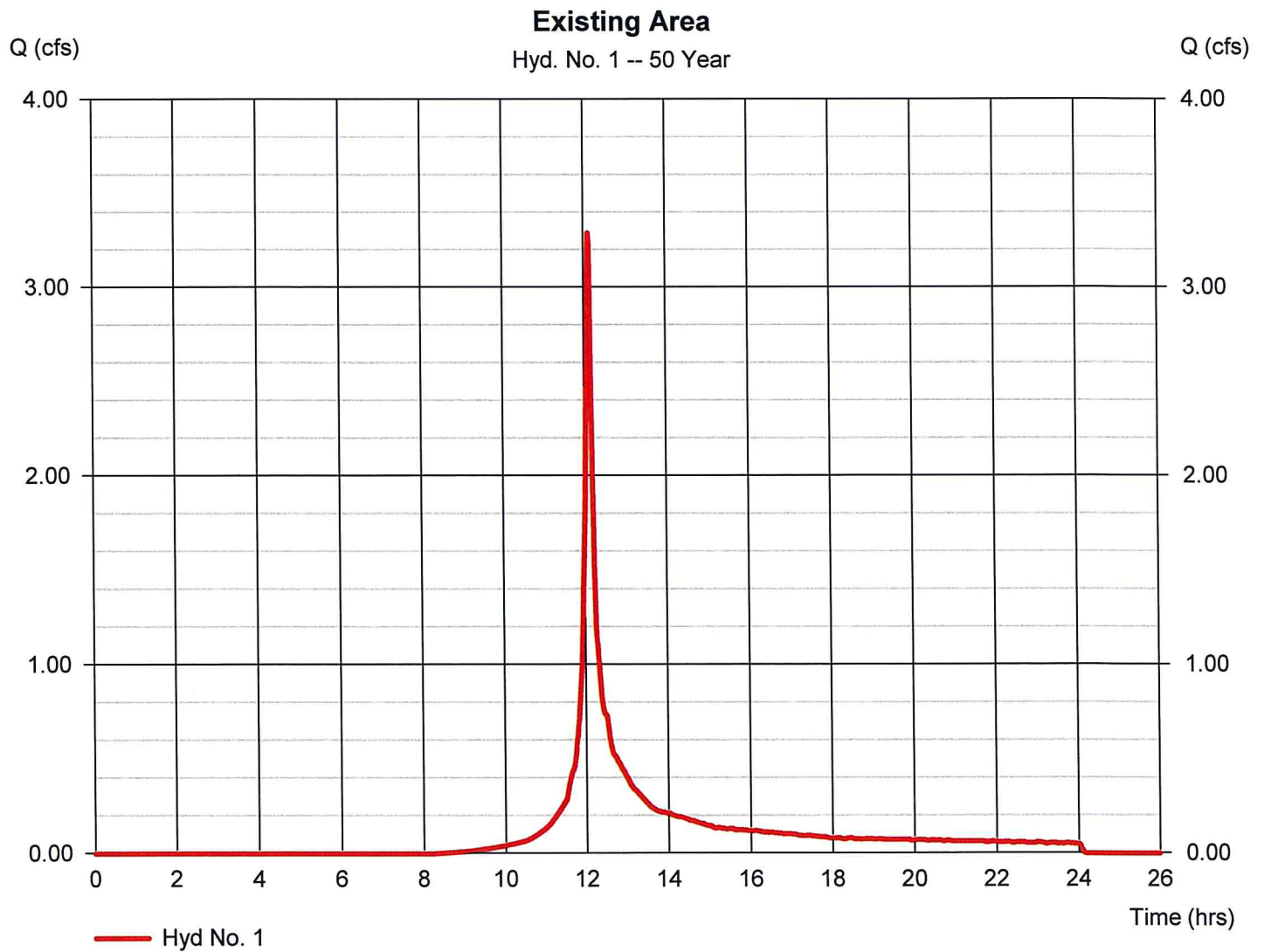
Hydrograph Report

Hyd. No. 1

Existing Area

Hydrograph type	= SCS Runoff	Peak discharge	= 3.290 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 10,164 cuft
Drainage area	= 0.800 ac	Curve number	= 68*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.98 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1	Shape factor	= 484

* Composite (Area/CN) = [(0.350 x 98) + (0.450 x 45)] / 0.800



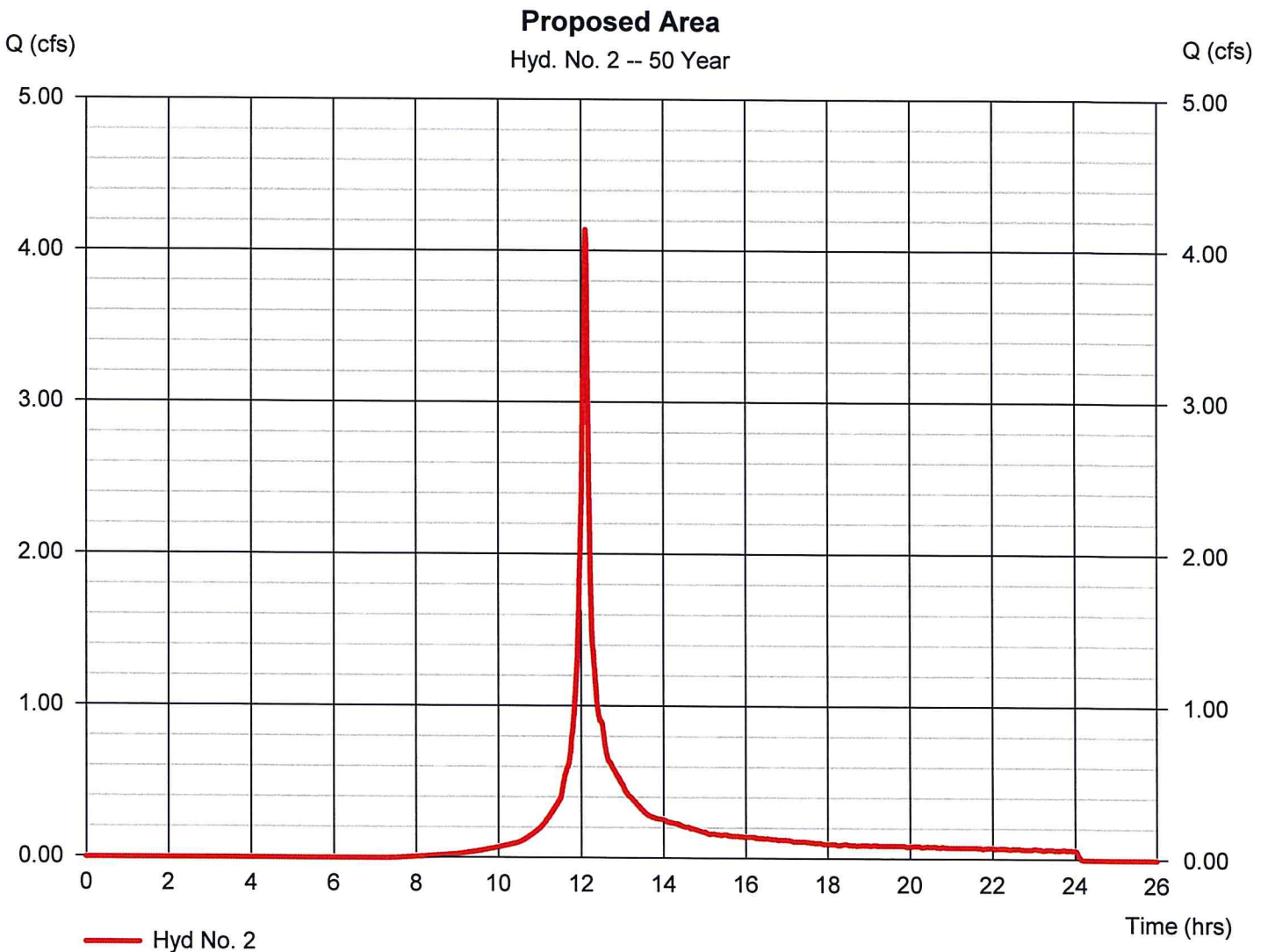
Hydrograph Report

Hyd. No. 2

Proposed Area

Hydrograph type	= SCS Runoff	Peak discharge	= 4.146 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.12 hrs
Time interval	= 1 min	Hyd. volume	= 12,843 cuft
Drainage area	= 0.900 ac	Curve number	= 72*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.98 in	Distribution	= Custom
Storm duration	= NOAA Type D Distribution 1 shape	Shape factor	= 484

* Composite (Area/CN) = [(0.500 x 98) + (0.400 x 39)] / 0.900



Hydrograph Report

Hyd. No. 3

Forbay

Hydrograph type	= Reservoir	Peak discharge	= 4.098 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.13 hrs
Time interval	= 1 min	Hyd. volume	= 12,331 cuft
Inflow hyd. No.	= 2 - Proposed Area	Max. Elevation	= 131.41 ft
Reservoir name	= Forebay	Max. Storage	= 757 cuft

Storage Indication method used.

