DRAINAGE CALCULATIONS, HYDRAULICS & HYDROLOGY REPORT

WOODSPRING SUITES

295 & 313 WILLETTS AVENUE
16 & 18 BOSTON POST ROAD

AUGUST 2023

Revised October 2, 2023

CLA Engineers, Inc

DRAINAGE CALCULATIONS, HYDRAULICS & HYDROLOGY REPORT

WOODSPRING SUITES

295 & 313 WILLETTS AVENUE
16 & 18 BOSTON POST ROAD

AUGUST 2023

Revised October 2, 2023

CLA Engineers, Inc

WILLETTS AVENUE & BOSTON POST ROAD
WATERFORD,CT

The site was previously developed as a sports bar with areas of previously cleared land. The site is proposed to be developed as a hotel. CLA Engineers is providing the design and calculations for the stabilization of the site.

PROPOSED HYDRAULICS

There will be three main on-site drainage areas for the proposed development, the roof drainage, which will outlet to a concrete gallery infiltration system, Drainage Area 3, which flows to the existing shopping center and then out to Willets Avenue, and Drainage Area 1 which flows directly to Willets Avenue. Please see the attached plans entitled Drainage Plan – Existing Conditions and Drainage Plan - Proposed.

Drainage Area 1 is located adjacent to Willetts Avenue and presently drains to the existing drainage system in Willetts Avenue. Proposed Drainage Area 1 will be connected to the existing drainage system in Willetts Avenue, after flowing through Stormwater Basin 1, resulting in a significant decrease in peak flows to the existing drainage system.

Drainage area 2 presently drains to the existing shopping center parking lot and drainage system, which connects to the existing drainage system in Willetts Avenue. Proposed Drainage area 2 will continue to flow to the existing shopping center parking lot drainage system, after flowing thru Sormwater Basin 2, resulting in a significant decrease in peak flows to the existing drainage system.

The roof drainage will connect to an underground infiltration system, which will contain the 100 year storm event. There also is an emergency overflow pipe which will connect to Stormwater Basin 2. A permeability test from the test hole 4, has been provided in this report. The rates are good and will allow for the galleries to empty

quickly between storm events. Infiltration was not included in the modeling program, as a conservative approach to the design.

Both the existing and the proposed conditions for the development site have been analyzed for the 2-year, 5- year, 10-year, 25-year, and 100-year design storms using the TR-55 SCS modeling program. The following is the summary table for the 2-year, 5-year, 10-year, 25-year, and 100-year design storms showing first the existing conditions and proposed conditions, after passing through the proposed roof infiltration system and the water quality basins. The calculations show that there will be a significant decrease in runoff leaving the site. The following are the results of the computer model.

Drainage Area 1

	2-year	5-year	10-year	25-year	100-year
Existing	1.680 cfs	2.462 cfs	3.125 cfs	4.055 cfs	5.503 cfs
Proposed	0.000 cfs	0.000 cfs	0.090 cfs	0.574 cfs	2.213 cfs

Drainage Area 2

	2-year	5-year	10-year	25-year	100-year
Existing	2.798 cfs	4.451 cfs	5.903 cfs	7.995 cfs	11.33 cfs
Proposed	0.000 cfs	0.000 cfs	0.000 cfs	0.000 cfs	1.054 cfs

CT GUIDELINES FOR SOIL EROSION & SEDIMENTATION CONTROL

The 2002 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 Basins have been designed to function as sedimentation traps during stabilization, and then as stormwater basins to provide permanent water quality treatment, prior to entering the existing off-site drainage systems, for the life of the facility.

Drainage Area 1, Temporary Sediment Trap 1

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 calculations for a Temporary Sediment Trap show that the sediment storage volume required is 5,066CF:

SSV = A(134CY/Acre)
A = 1.4 ACRES
SSV = 187.6 CY = 5,066 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 riprap for the level spreader outlet of the basin (elevation 92.0). The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is 5,066 CF/2 = 2,533 CF. The required dry storage volume, located above the bottom of the riprap of the level spreader outlet of the basin (elevation 92.0), is 2,533 CF.

The total storage volume required is the dry storage volume plus the wet storage volume, which is a total of 5,066 CF.

The combined volume required for the Temporary Sedimentation Basin as follows:

2,533 CF of Wet Storage Volume	4,700* CF Provided (Excavated to 90.0)
2,533 CF of Dry Storage Volume	8,323 CF Provided
5,066 CF of Total Volume Required	13,023 CF Total Provided

Drainage Area 2 Temporary Sediment Trap 2

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 calculations for a Temporary Sediment Trap show that the sediment storage volume required is 7,236 CF:

SSV = A(134CY/Acre)
A = 2.0 ACRES
SSV = 268 CY = 7,236 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 riprap for the level spreader outlet of the basin (elevation 80.5). The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is 7,236 CF/2 = 3,618 CF. The required dry storage volume, located above the bottom of the riprap of the level spreader outlet of the basin (elevation 80.5), is 3,618 CF.

The total storage volume required is the dry storage volume plus the wet storage volume, which is a total of 7,236 CF.

The combined volume required for the Temporary Sedimentation Basin as follows:

3,618 CF of Wet Storage Volume	5,488 CF Provided (Excavated to 79.0)
3,618 CF of Dry Storage Volume	8,743 CF Provided
7,236 CF of Total Volume Required	14,231 CF Total Provided

CONNECTICUT STORMWATER QUALITY MANUAL

The Stormwater Management System, consisting of two Water Quality Basins, have been designed to function as permanent water quality treatment for the life of the facility. The Connecticut 2004 Stormwater Quality Manual (Manual) applies to the post construction phase, for the operation of the facility.

Drainage Area 1, Water Quality Basin 1

The Stormwater Management System meets the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin. The calculations show that a Water Quality Volume (WQV) of 3,202 CF is required:

WQV = (1")(R)(A)/12
A = 1.4 Acres
R = 0.05 + 0.009(I)
I = 0.9 Acres / 1.4 Acres = 0.64 (64%)
R = 0.63
WQV = 0.0735 Ac-Ft = 3,202 CF required
14,400 CF Provided in the Water Quality Basin

As the calculations show that there will be no stormwater leaving the proposed stormwater management system (water quality basin), up to and including the 5 year storm event, the anticipated pollutant removal rate is 99-100%.

Drainage Area 2, Water Quality Basin 2

The Stormwater Management System meets the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin. The calculations show that a Water Quality Volume (WQV) of 3,580 CF is required:

WQV = (1")(R)(A)/12

A = 1.7 Acres

R = 0.05 + 0.009(I)

I = 1.0 Acres / 1.7 Acres = 0.59 (59%)

R = 0.58

WQV = 0.0822 Ac-Ft = 3,580 CF required

23,191 CF Provided in the Water Quality Basin

As the calculations show that there will be no stormwater leaving the proposed stormwater management system (water quality basin), up to and including the 5 year, for Stormwater Basin 1, and 25 year storm event, for Stormwater Basin 2, 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, Stormwater Basin #1 will contain up to and including the 5 year storm event and Stormwater Basin #2 will contain up to and including the 25 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.

The proposed stormwater basins are not infiltration basins, however stormwater will slowly infiltrate into the surrounding soils between storm events.

WILLETTS AVENUE & BOSTON POST ROAD
WATERFORD,CT

The site was previously developed as a sports bar with areas of previously cleared land. The site is proposed to be developed as a hotel. CLA Engineers is providing the design and calculations for the stabilization of the site.

PROPOSED HYDRAULICS

There will be three main on-site drainage areas for the proposed development, the roof drainage, which will outlet to a concrete gallery infiltration system, Drainage Area 3, which flows to the existing shopping center and then out to Willets Avenue, and Drainage Area 1 which flows directly to Willets Avenue. Please see the attached plans entitled Drainage Plan – Existing Conditions and Drainage Plan - Proposed.

Drainage Area 1 is located adjacent to Willetts Avenue and presently drains to the existing drainage system in Willetts Avenue. Proposed Drainage Area 1 will be connected to the existing drainage system in Willetts Avenue, after flowing through Stormwater Basin 1, resulting in a significant decrease in peak flows to the existing drainage system.

Drainage area 2 presently drains to the existing shopping center parking lot and drainage system, which connects to the existing drainage system in Willetts Avenue. Proposed Drainage area 2 will continue to flow to the existing shopping center parking lot drainage system, after flowing thru Sormwater Basin 2, resulting in a significant decrease in peak flows to the existing drainage system.

The roof drainage will connect to an underground infiltration system, which will contain the 100 year storm event. There also is an emergency overflow pipe which will connect to Stormwater Basin 2. A permeability test from the test hole 4, has been provided in this report. The rates are good and will allow for the galleries to empty

quickly between storm events. Infiltration was not included in the modeling program, as a conservative approach to the design.

Both the existing and the proposed conditions for the development site have been analyzed for the 2-year, 5- year, 10-year, 25-year, and 100-year design storms using the TR-55 SCS modeling program. The following is the summary table for the 2-year, 5-year, 10-year, 25-year, and 100-year design storms showing first the existing conditions and proposed conditions, after passing through the proposed roof infiltration system and the water quality basins. The calculations show that there will be a significant decrease in runoff leaving the site. The following are the results of the computer model.

Drainage Area 1

	2-year	5-year	10-year	25-year	100-year
Existing	1.680 cfs	2.462 cfs	3.125 cfs	4.055 cfs	5.503 cfs
Proposed	0.000 cfs	0.000 cfs	0.090 cfs	0.574 cfs	2.213 cfs

Drainage Area 2

	2-year	5-year	10-year	25-year	100-year
Existing	2.798 cfs	4.451 cfs	5.903 cfs	7.995 cfs	11.33 cfs
Proposed	0.000 cfs	0.000 cfs	0.000 cfs	0.000 cfs	1.054 cfs

CT GUIDELINES FOR SOIL EROSION & SEDIMENTATION CONTROL

The 2002 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 Basins have been designed to function as sedimentation traps during stabilization, and then as stormwater basins to provide permanent water quality treatment, prior to entering the existing off-site drainage systems, for the life of the facility.

Drainage Area 1, Temporary Sediment Trap 1

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 calculations for a Temporary Sediment Trap show that the sediment storage volume required is 5,066CF:

SSV = A(134CY/Acre)
A = 1.4 ACRES
SSV = 187.6 CY = 5,066 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 riprap for the level spreader outlet of the basin (elevation 92.0). The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is 5,066 CF/2 = 2,533 CF. The required dry storage volume, located above the bottom of the riprap of the level spreader outlet of the basin (elevation 92.0), is 2,533 CF.

The total storage volume required is the dry storage volume plus the wet storage volume, which is a total of 5,066 CF.

The combined volume required for the Temporary Sedimentation Basin as follows:

2,533 CF of Wet Storage Volume	4,700* CF Provided (Excavated to 90.0)
2,533 CF of Dry Storage Volume	8,323 CF Provided
5,066 CF of Total Volume Required	13,023 CF Total Provided

Drainage Area 2 Temporary Sediment Trap 2

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 calculations for a Temporary Sediment Trap show that the sediment storage volume required is 7,236 CF:

SSV = A(134CY/Acre)
A = 2.0 ACRES
SSV = 268 CY = 7,236 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 riprap for the level spreader outlet of the basin (elevation 80.5). The volume of the wet storage is required to be half of the required SSV. The required wet storage volume is 7,236 CF/2 = 3,618 CF. The required dry storage volume, located above the bottom of the riprap of the level spreader outlet of the basin (elevation 80.5), is 3,618 CF.

The total storage volume required is the dry storage volume plus the wet storage volume, which is a total of 7,236 CF.

The combined volume required for the Temporary Sedimentation Basin as follows:

3,618 CF of Wet Storage Volume	5,488 CF Provided (Excavated to 79.0)
3,618 CF of Dry Storage Volume	8,743 CF Provided
7,236 CF of Total Volume Required	14,231 CF Total Provided

CONNECTICUT STORMWATER QUALITY MANUAL

The Stormwater Management System, consisting of two Water Quality Basins, have been designed to function as permanent water quality treatment for the life of the facility. The Connecticut 2004 Stormwater Quality Manual (Manual) applies to the post construction phase, for the operation of the facility.

Drainage Area 1, Water Quality Basin 1

The Stormwater Management System meets the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin. The calculations show that a Water Quality Volume (WQV) of 4,162 CF is required:

WQV = (1.3")(R)(A)/12
A = 1.4 Acres
R = 0.05 + 0.009(I)
I = 0.9 Acres / 1.4 Acres = 0.64 (64%)
R = 0.63
WQV = 0.0955 Ac-Ft = 4,162 CF required
14,400 CF Provided in the Water Quality Basin

As the calculations show that there will be no stormwater leaving the proposed stormwater management system (water quality basin), up to and including the 5 year storm event, the anticipated pollutant removal rate is 99-100%.

Drainage Area 2, Water Quality Basin 2

The Stormwater Management System meets the criteria of the Connecticut Stormwater Quality Manual for a Water Quality Basin. The calculations show that a Water Quality Volume (WQV) of 4,653 CF is required:

WQV = (1.3")(R)(A)/12

A = 1.7 Acres

R = 0.05 + 0.009(I)

I = 1.0 Acres / 1.7 Acres = 0.59 (59%)

R = 0.58

WQV = 0.1068 Ac-Ft = 4,653 CF required

23,191 CF Provided in the Water Quality Basin

As the calculations show that there will be no stormwater leaving the proposed stormwater management system (water quality basin), up to and including the 5 year, for Stormwater Basin 1, and 25 year storm event, for Stormwater Basin 2, 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, Stormwater Basin #1 will contain up to and including the 5 year storm event and Stormwater Basin #2 will contain up to and including the 25 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.

The proposed stormwater basins are not infiltration basins, however stormwater will slowly infiltrate into the surrounding soils between storm events.

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	1.680	1	730	6,659	-----	-----	-----	Existing Conditions - Areas 1
2	SCS Runoff	2.013	1	729	7,634	-----	-----	-----	Proposed Conditions - Area 1
3	Reservoir	0.000	1	731	0	2	91.53	5,307	Stormwater Basin 1
4	SCS Runoff	2.798	2	724	8,094	-----	-----	-----	Existing Conditions - Area 2
5	SCS Runoff	2.586	2	722	6,915	-----	-----	-----	Proposed Conditions - Area 3
6	SCS Runoff	1.362	2	716	3,192	-----	-----	-----	Roof Drainage
7	Reservoir(i)	0.000	2	886	0	6	89.83	2,738	Roof Infiltration Syst
8	Combine	2.586	2	722	6,915	5, 7	-----	-----	Proposed area 2 & Roof
9	Reservoir	0.000	2	730	0	8	78.77	3,889	Stormwater Basin 2

Hydrograph Report

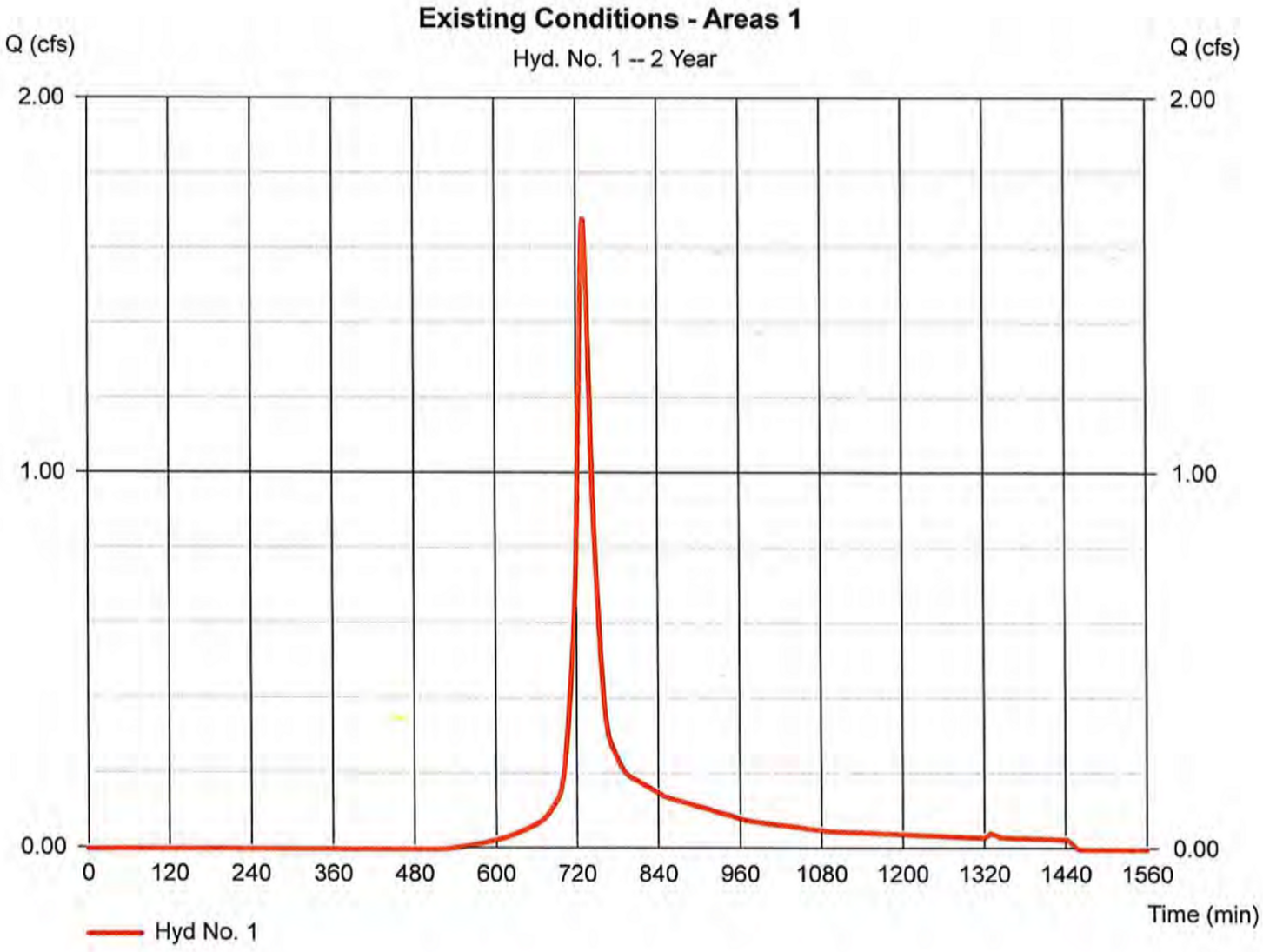
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 1

Existing Conditions - Areas 1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.680 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 6,659 cuft
Drainage area	= 1.100 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.36 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 55) + (0.700 x 98)] / 1.100



Hydrograph Report

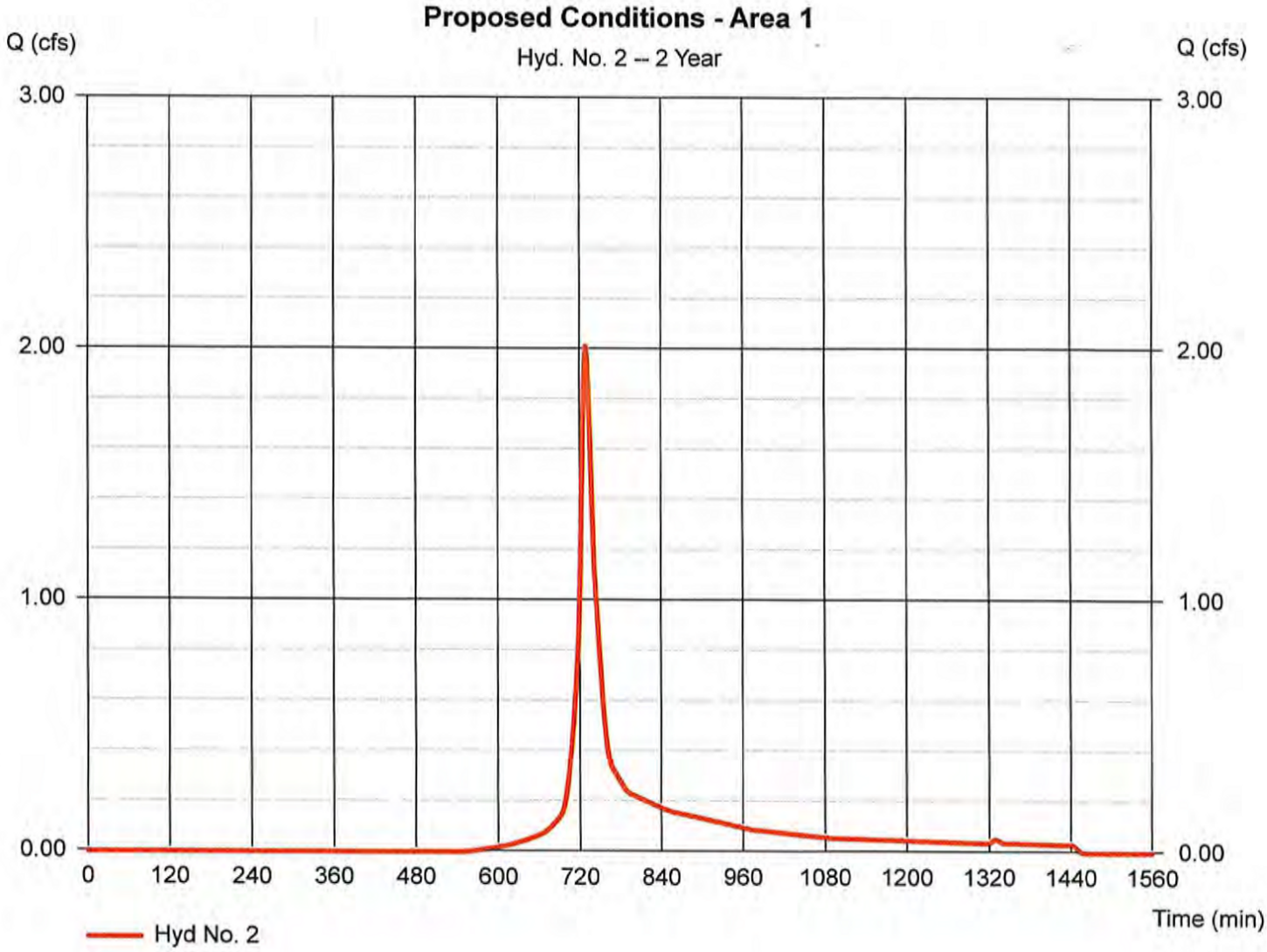
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 2

Proposed Conditions - Area 1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.013 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 7,634 cuft
Drainage area	= 1.400 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.00 min
Total precip.	= 3.36 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.800 x 98) + (0.600 x 55)] / 1.400



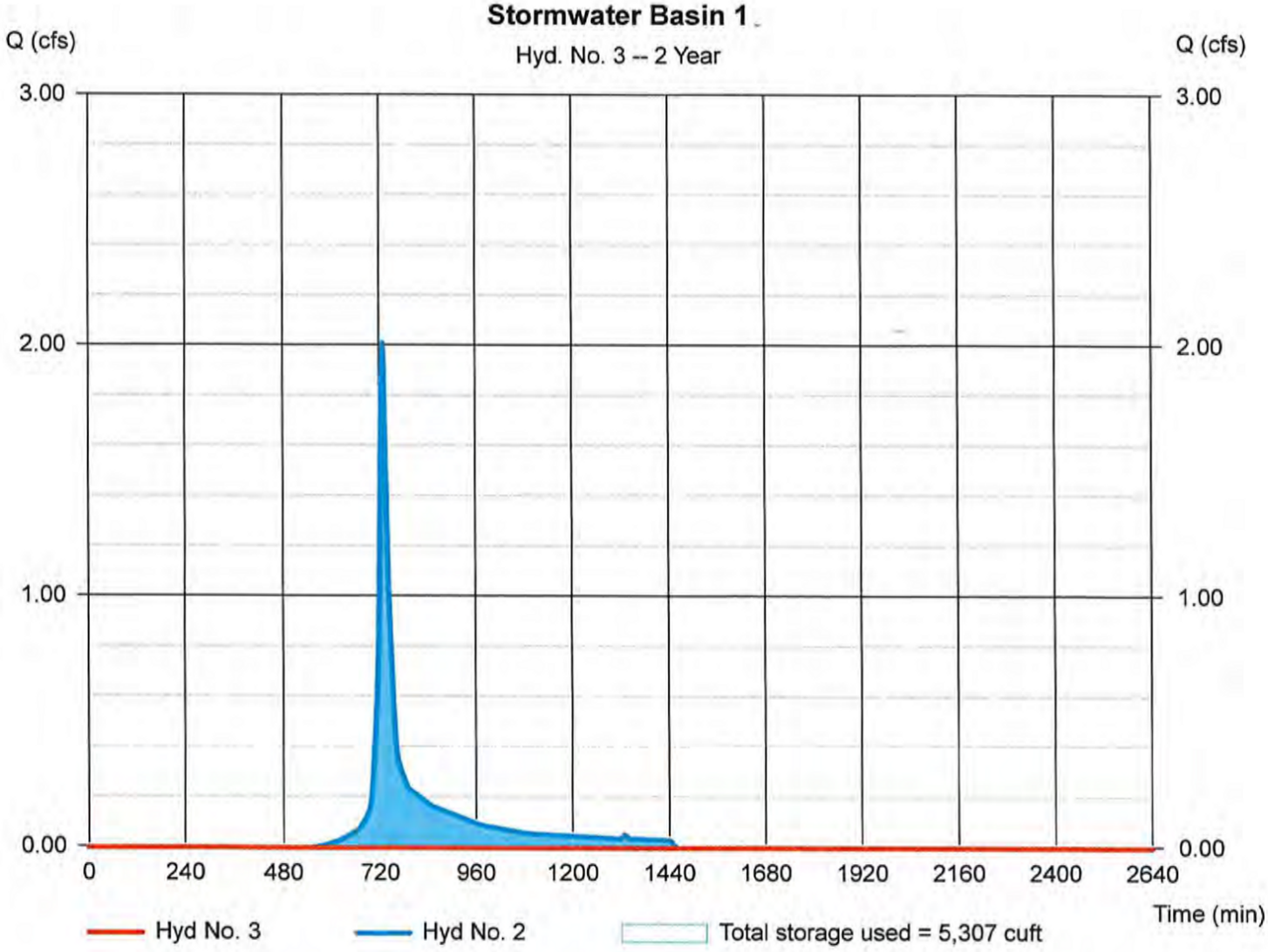
Hydrograph Report

Hyd. No. 3

Stormwater Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 2 - Proposed Conditions - Area 1	Max. Elevation	= 91.53 ft
Reservoir name	= Forebay & Stormwater Basin 1	Max. Storage	= 5,307 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



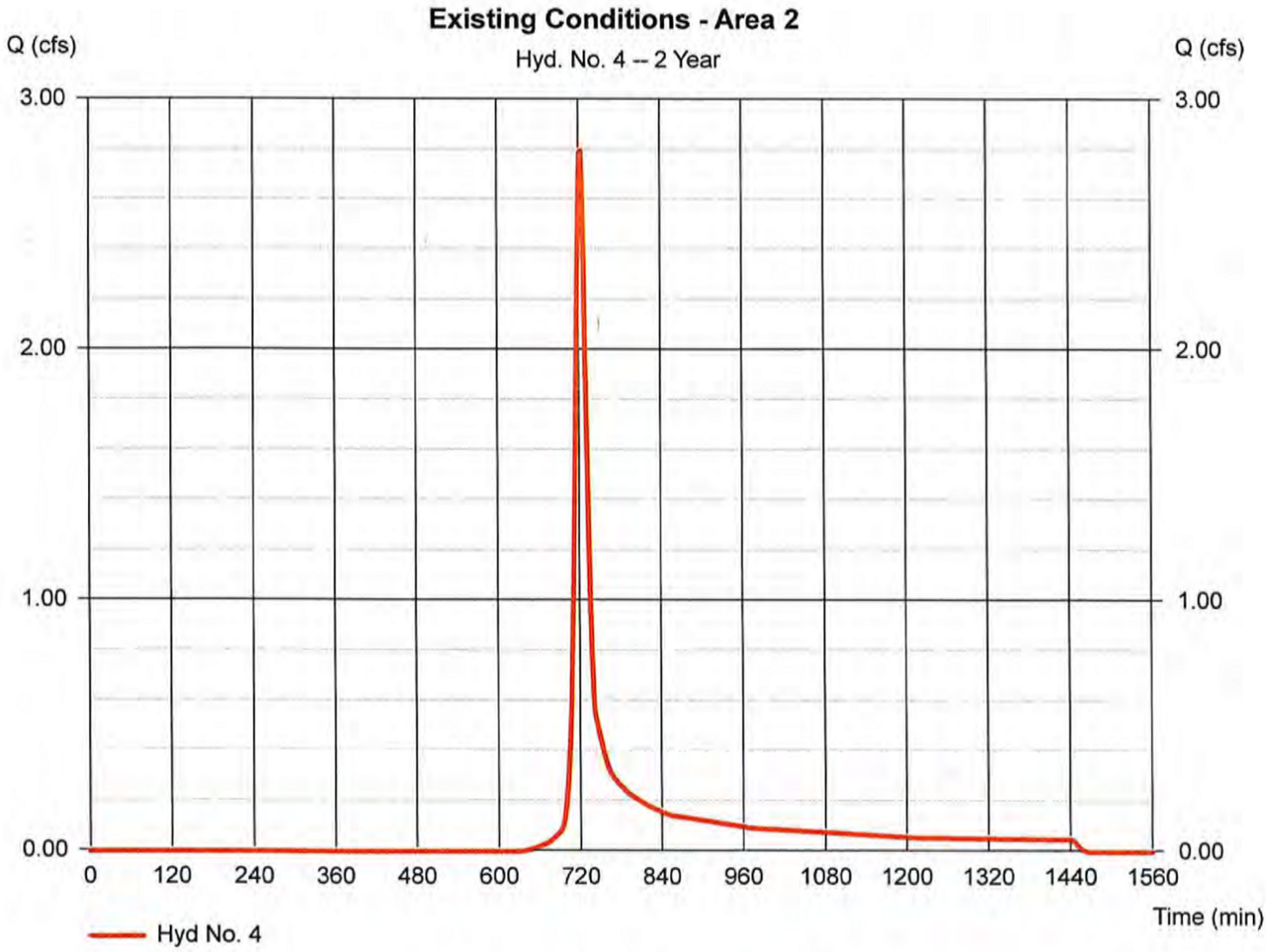
Hydrograph Report

Hyd. No. 4

Existing Conditions - Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.798 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 8,094 cuft
Drainage area	= 1.900 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 3.36 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.000 x 55) + (0.900 x 98)] / 1.900



Hydrograph Report

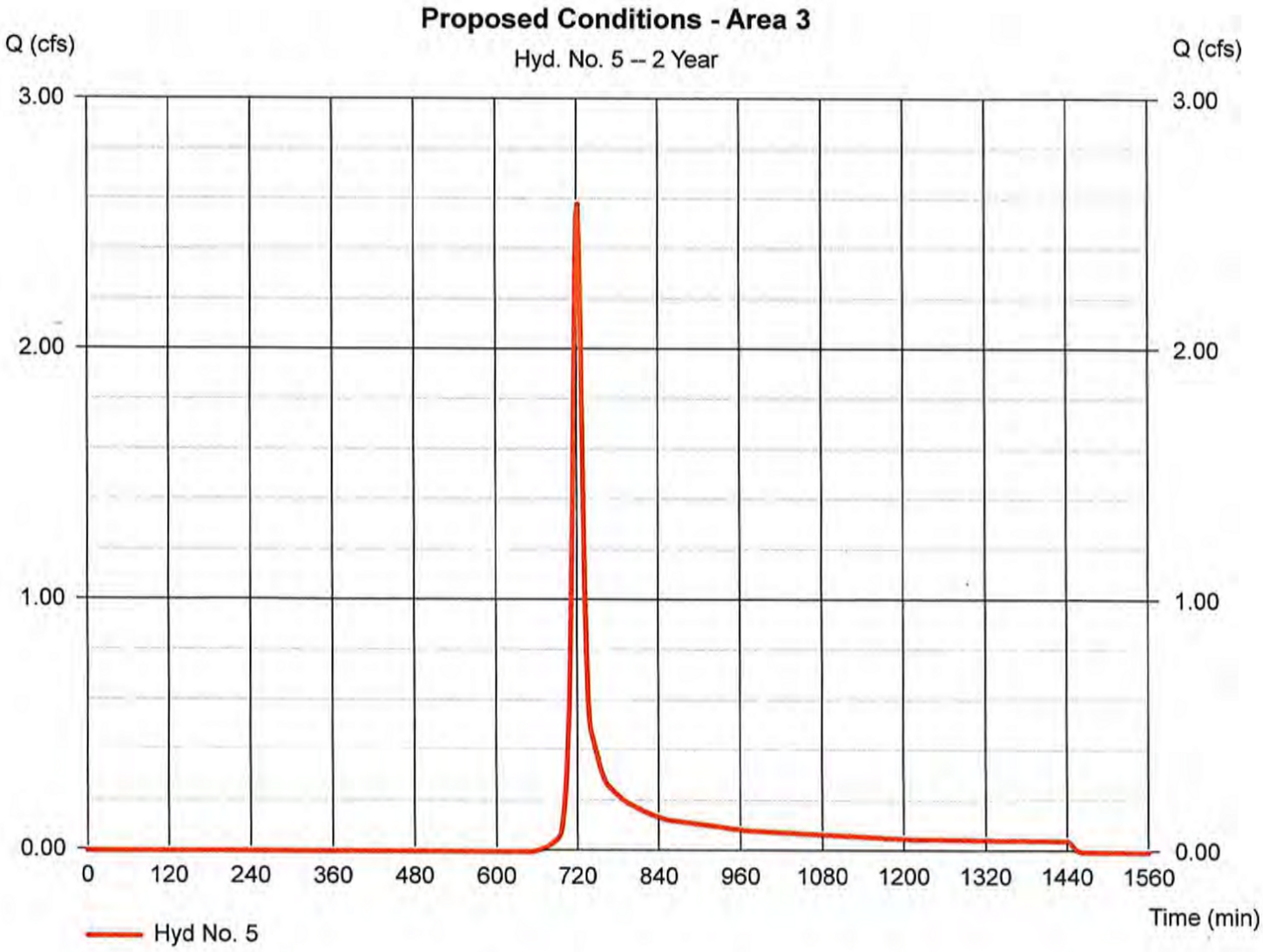
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 5

Proposed Conditions - Area 3

Hydrograph type	= SCS Runoff	Peak discharge	= 2.586 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 6,915 cuft
Drainage area	= 1.700 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.00 min
Total precip.	= 3.36 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.700 x 98) + (1.000 x 55)] / 1.700



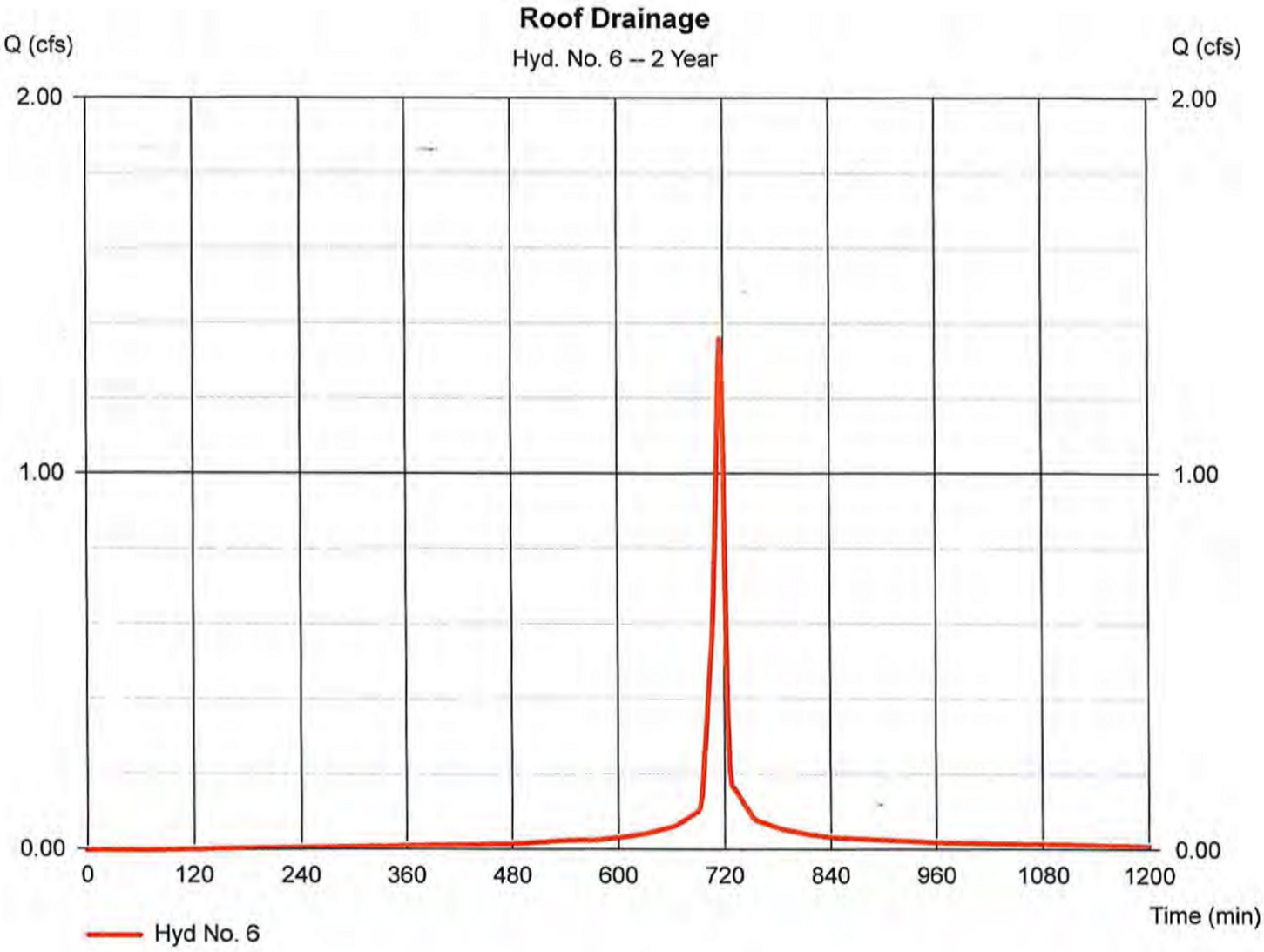
Hydrograph Report

Hyd. No. 6

Roof Drainage

Hydrograph type	= SCS Runoff	Peak discharge	= 1.362 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 3,192 cuft
Drainage area	= 0.300 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.36 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.300 x 98)] / 0.300



Hydrograph Report

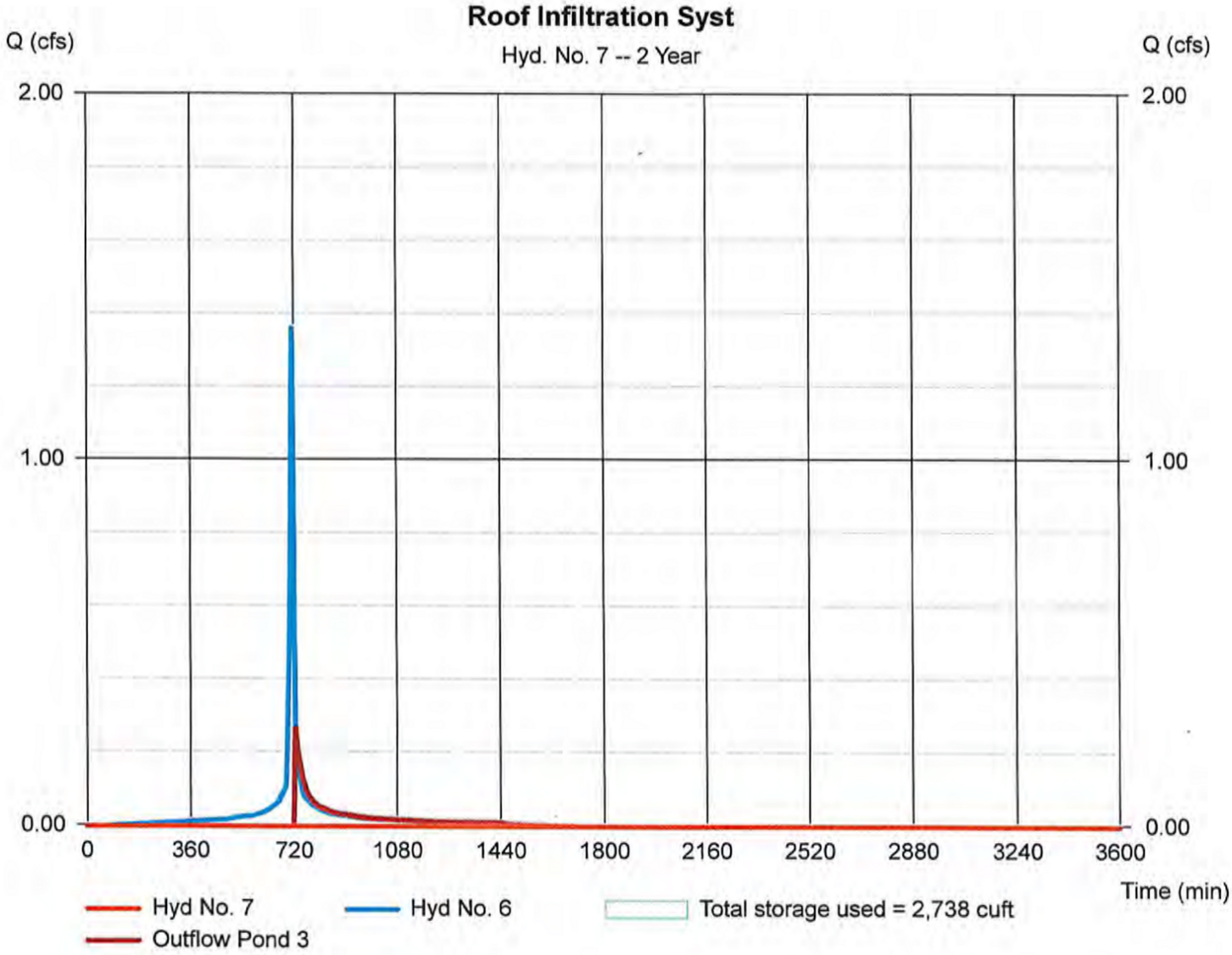
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 7

Roof Infiltration Syst

Hydrograph type	= Reservoir (Interconnected)	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 886 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Upper Pond		**Lower Pond**	
Pond name	= Roof Infiltrattion System	Pond name	= Forebay & Stormwat
Inflow hyd.	= 6 - Roof Drainage	Other Inflow hyd.	= None
Max. Elevation	= 89.83 ft	Max. Elevation	= 78.14 ft
Max. Storage	= 1,985 cuft	Max. Storage	= 752 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.

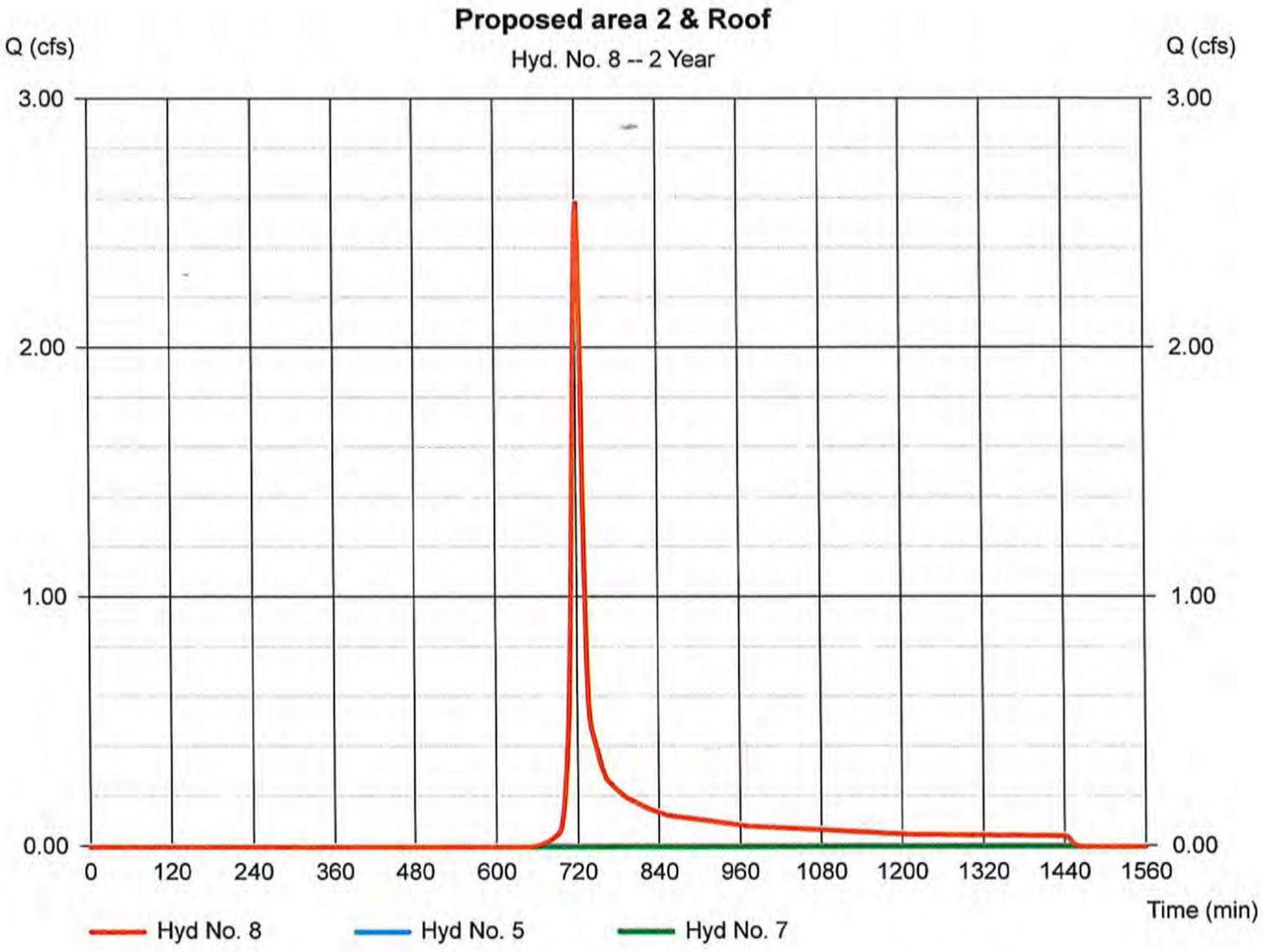


Hydrograph Report

Hyd. No. 8

Proposed area 2 & Roof

Hydrograph type	= Combine	Peak discharge	= 2.586 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 6,915 cuft
Inflow hyds.	= 5, 7	Contrib. drain. area	= 1.700 ac



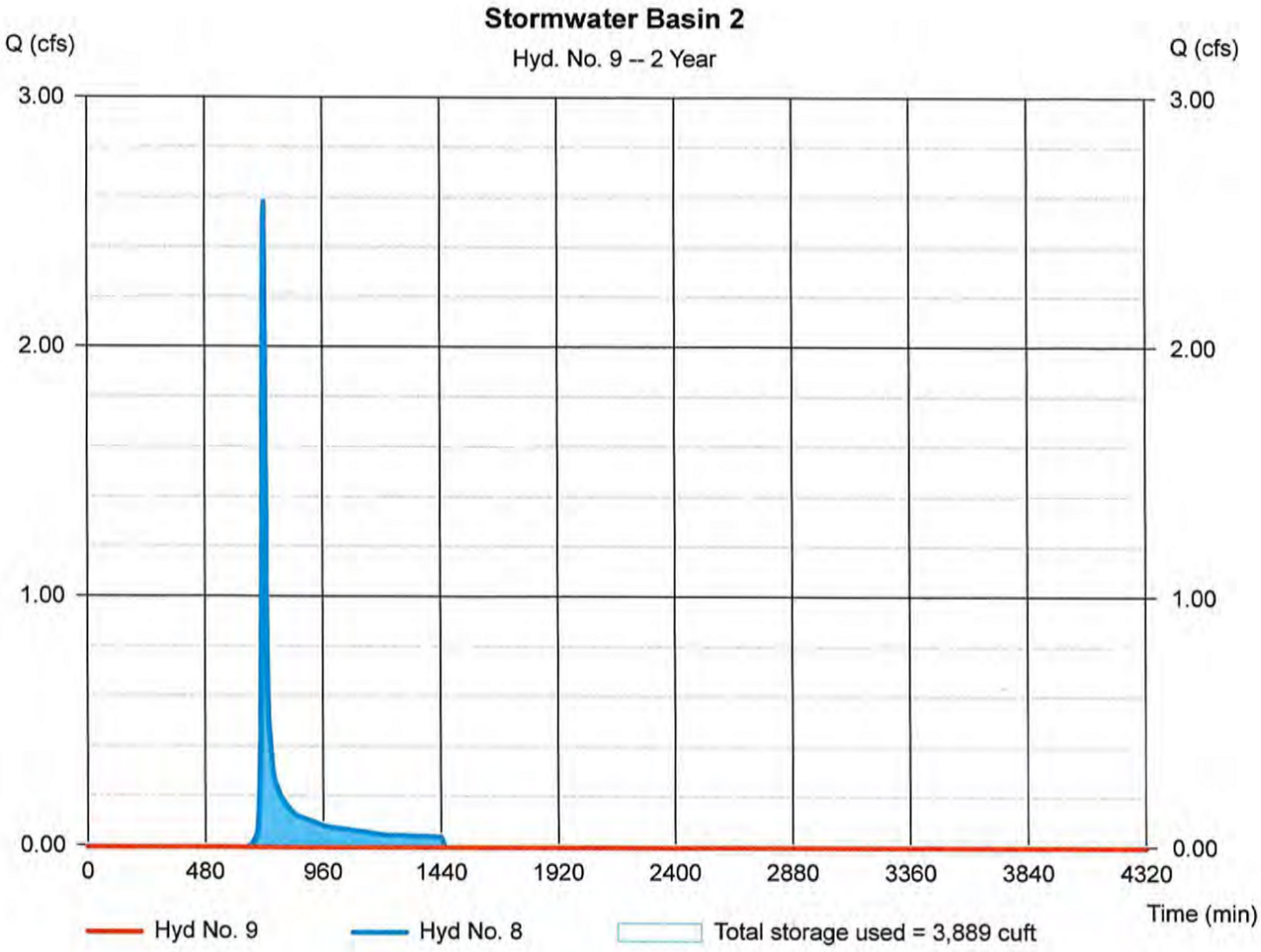
Hydrograph Report

Hyd. No. 9

Stormwater Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 8 - Proposed area 2 & Roof	Max. Elevation	= 78.77 ft
Reservoir name	= Forebay & Stormwater Basin 2	Max. Storage	= 3,889 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	2.462	1	730	9,725	-----	-----	-----	Existing Conditions - Areas 1
2	SCS Runoff	3.016	1	729	11,340	-----	-----	-----	Proposed Conditions - Area 1
3	Reservoir	0.000	1	945	0	2	92.46	8,264	Stormwater Basin 1
4	SCS Runoff	4.451	2	722	12,587	-----	-----	-----	Existing Conditions - Area 2
5	SCS Runoff	4.183	2	722	10,971	-----	-----	-----	Proposed Conditions - Area 3
6	SCS Runoff	1.737	2	716	4,119	-----	-----	-----	Roof Drainage
7	Reservoir(i)	0.000	2	932	0	6	90.32	3,647	Roof Infiltration Syst
8	Combine	4.183	2	722	10,971	5, 7	-----	-----	Proposed area 2 & Roof
9	Reservoir	0.000	2	1548	0	8	79.25	6,586	Stormwater Basin 2

Hydrograph Report

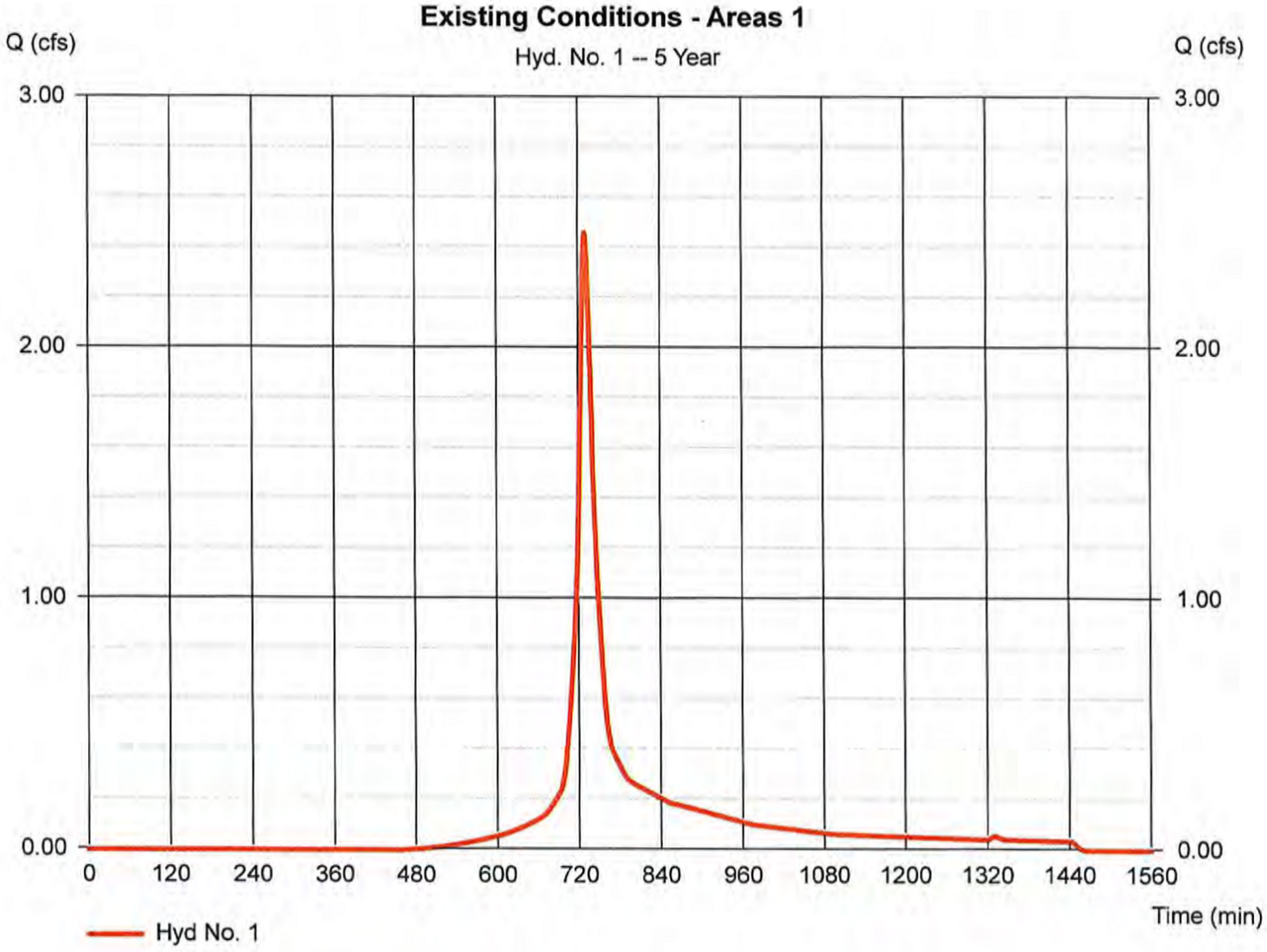
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 1

Existing Conditions - Areas 1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.462 cfs
Storm frequency	= 5 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 9,725 cuft
Drainage area	= 1.100 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 55) + (0.700 x 98)] / 1.100



Hydrograph Report

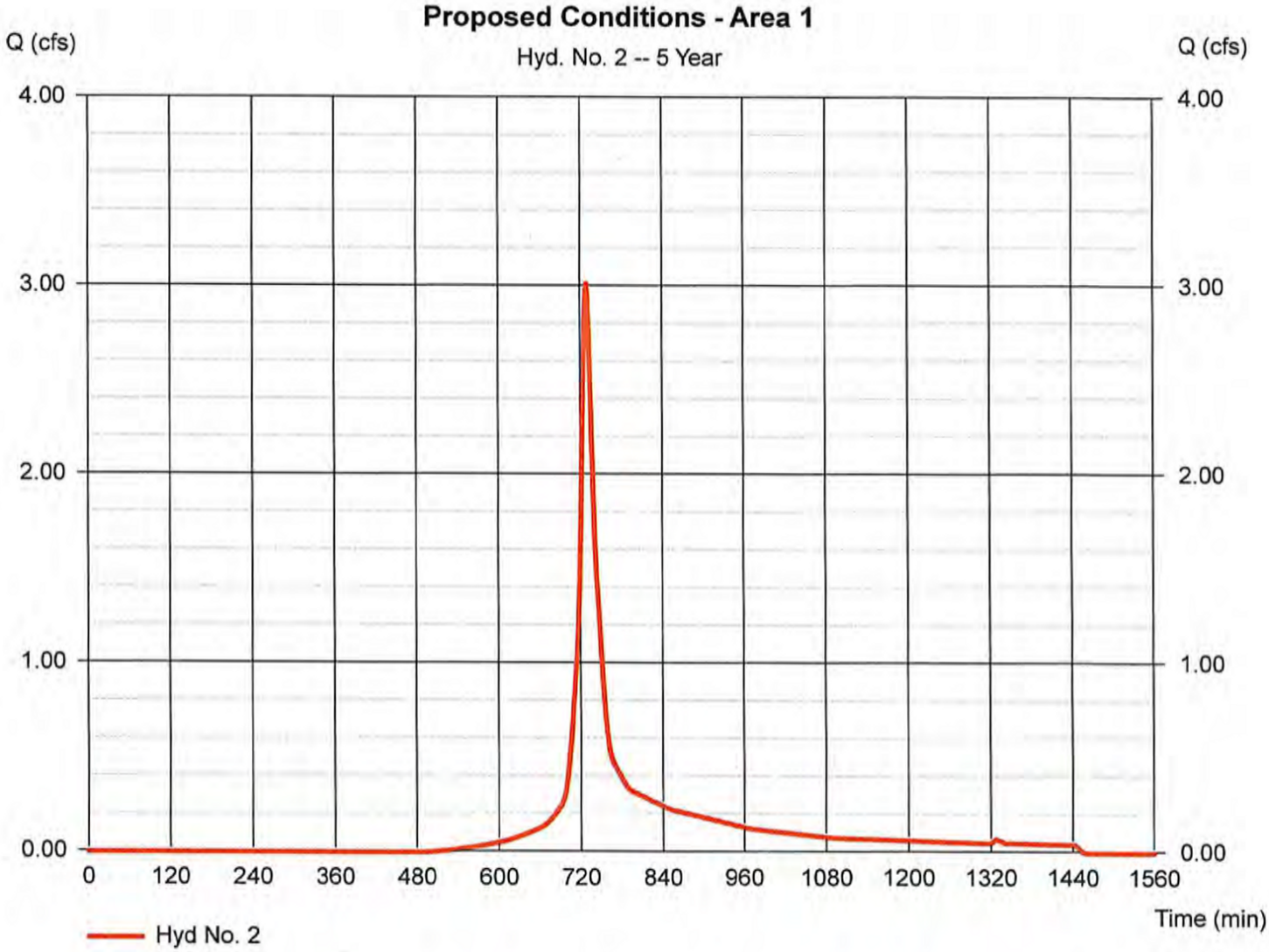
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 2

Proposed Conditions - Area 1

Hydrograph type	= SCS Runoff	Peak discharge	= 3.016 cfs
Storm frequency	= 5 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 11,340 cuft
Drainage area	= 1.400 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.00 min
Total precip.	= 4.27 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.800 x 98) + (0.600 x 55)] / 1.400



Hydrograph Report

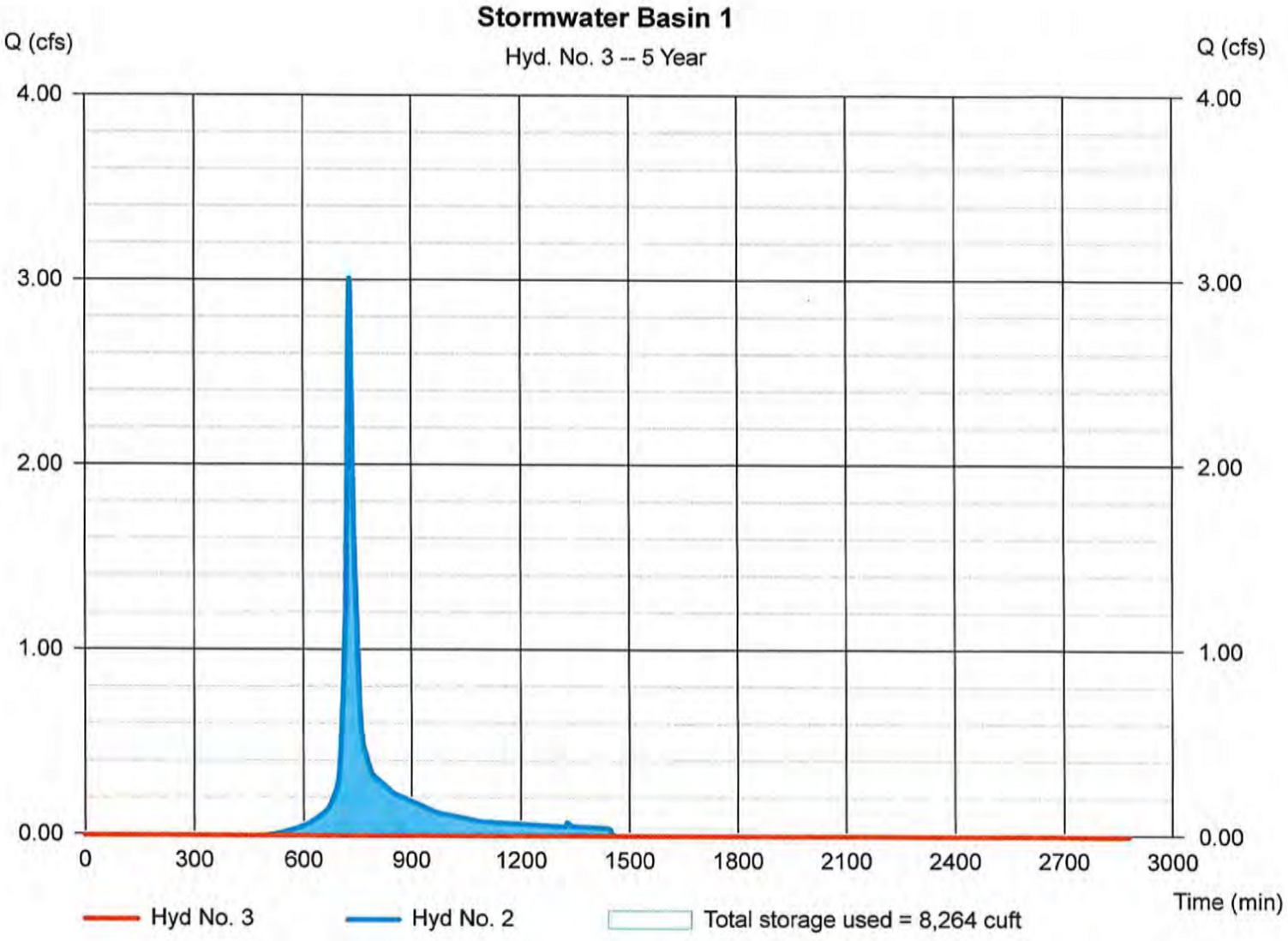
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 3

Stormwater Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 5 yrs	Time to peak	= 945 min
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 2 - Proposed Conditions - Area 1	Max. Elevation	= 92.46 ft
Reservoir name	= Forebay & Stormwater Basin 1	Max. Storage	= 8,264 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

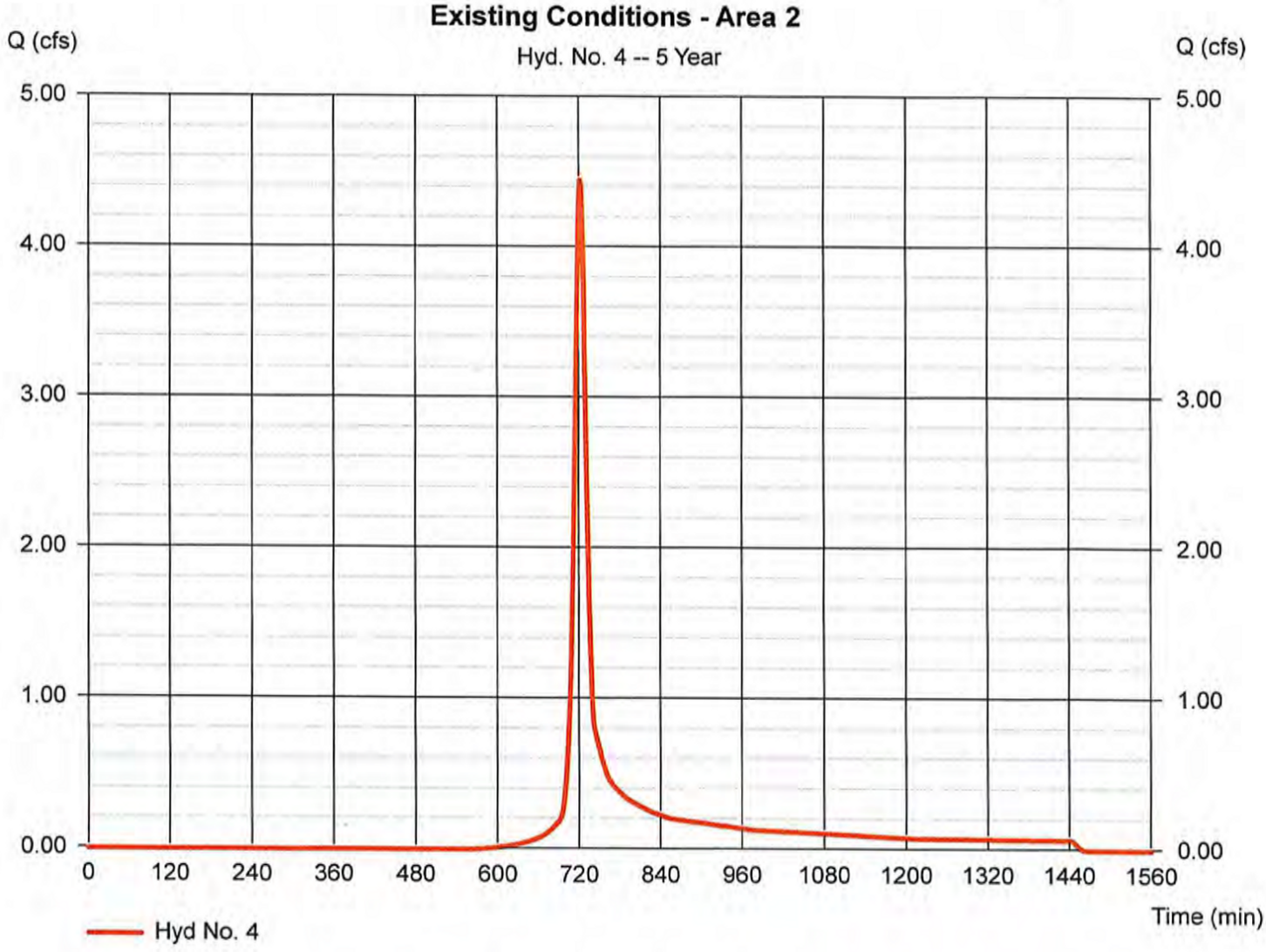
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 4

Existing Conditions - Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.451 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 12,587 cuft
Drainage area	= 1.900 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.27 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.000 x 55) + (0.900 x 98)] / 1.900



Hydrograph Report

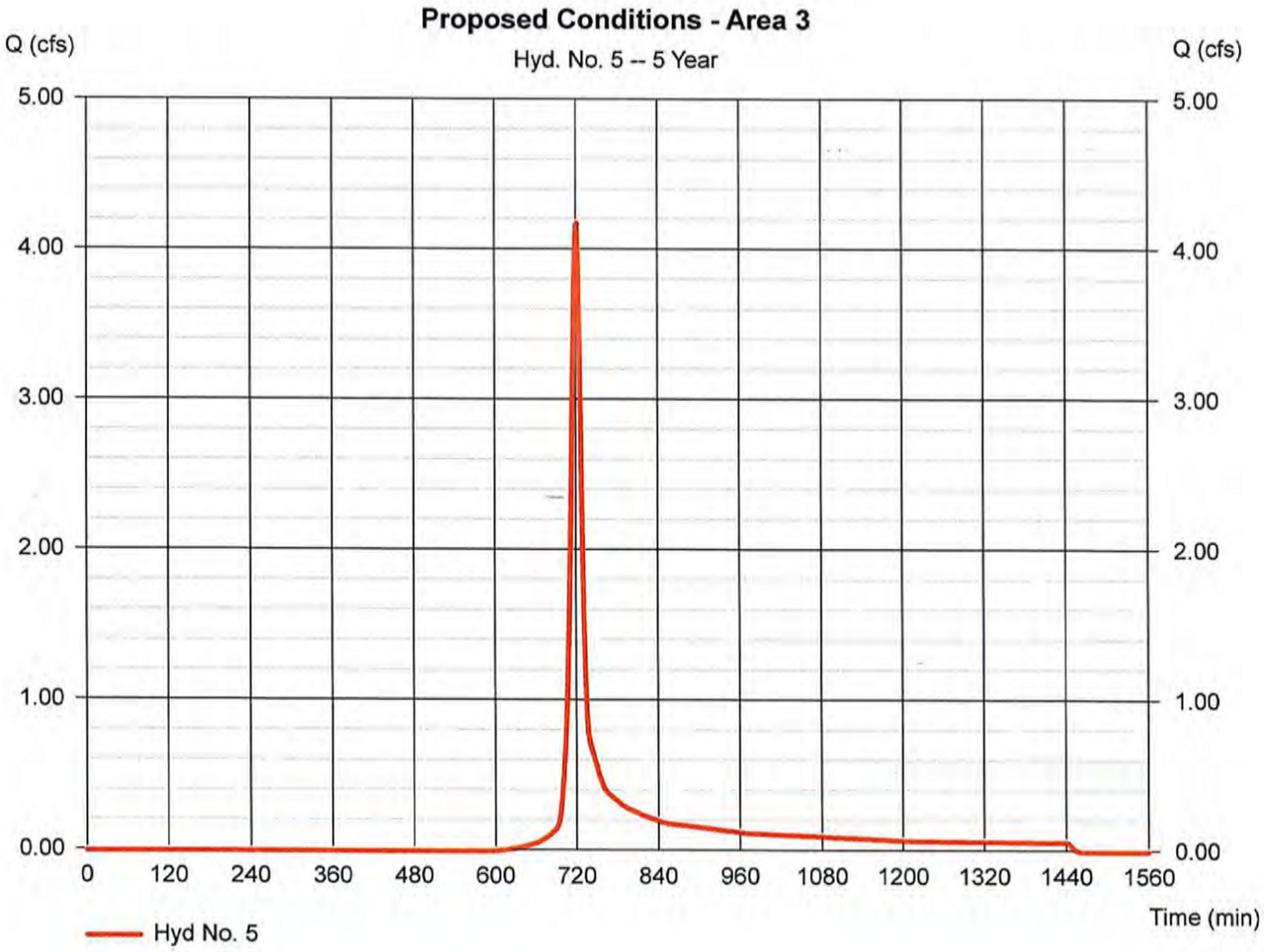
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 5

Proposed Conditions - Area 3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.183 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 10,971 cuft
Drainage area	= 1.700 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.00 min
Total precip.	= 4.27 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.700 x 98) + (1.000 x 55)] / 1.700



Hydrograph Report

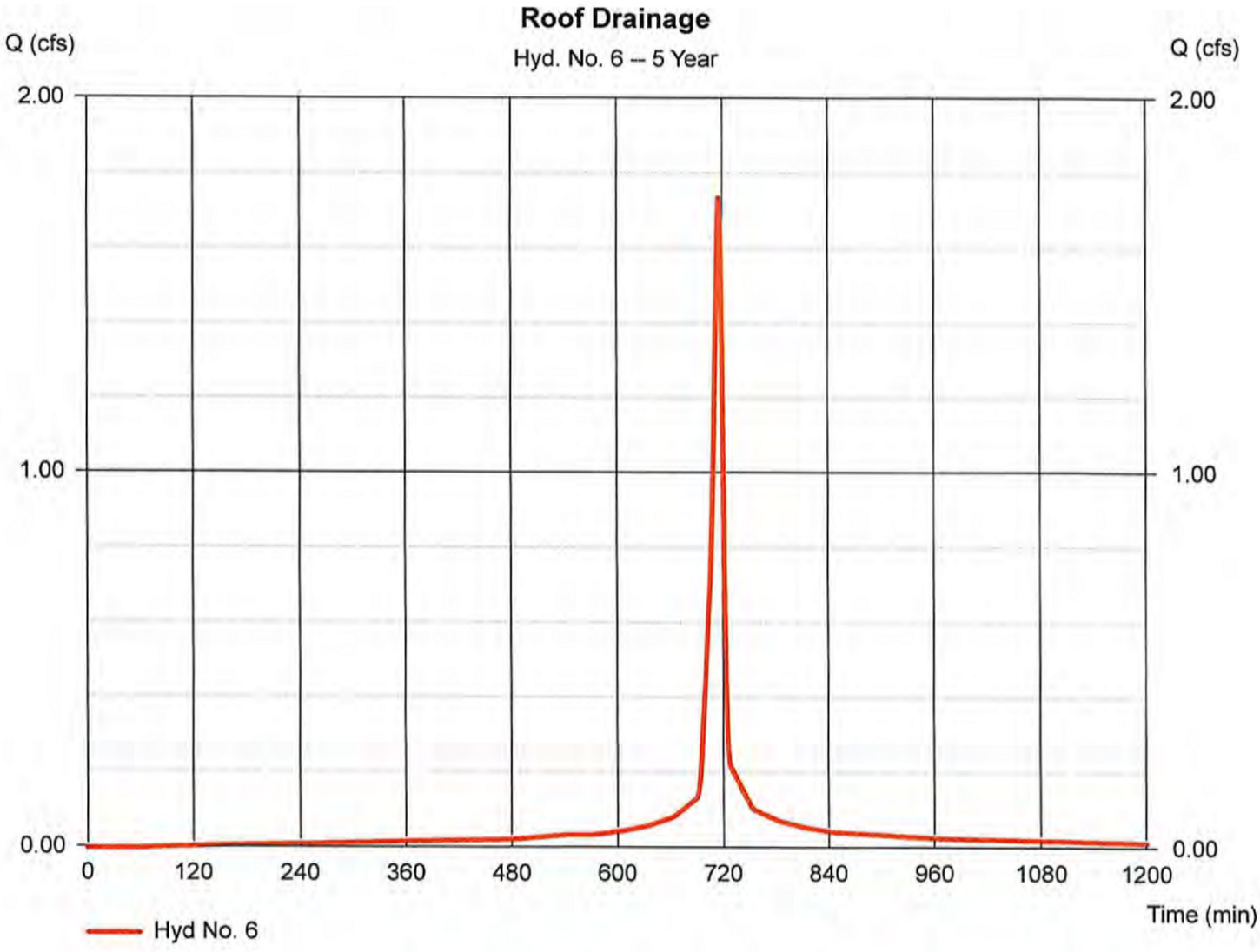
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 6

Roof Drainage

Hydrograph type	= SCS Runoff	Peak discharge	= 1.737 cfs
Storm frequency	= 5 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 4,119 cuft
Drainage area	= 0.300 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.27 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.300 x 98)] / 0.300



Hydrograph Report

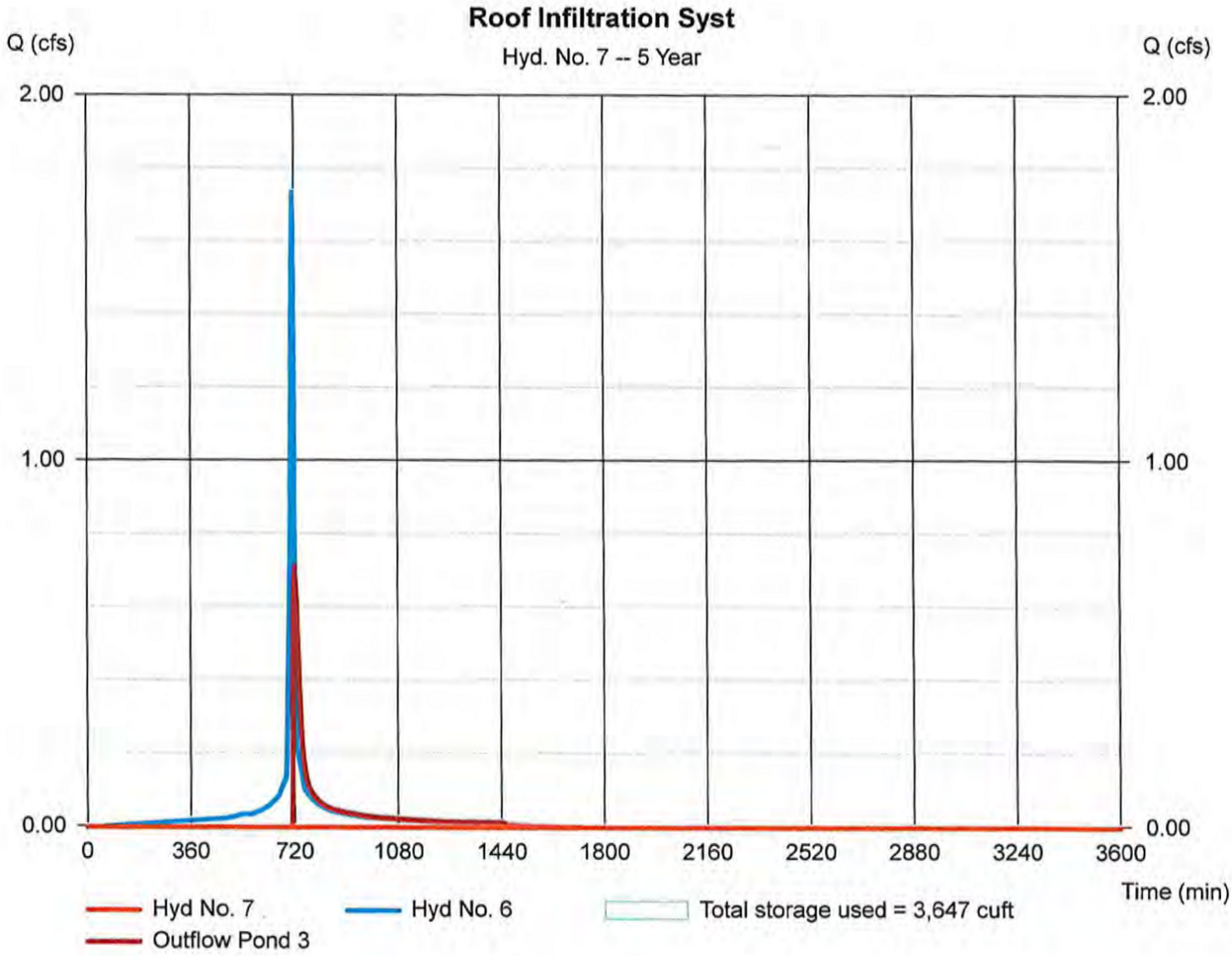
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 7

Roof Infiltration Syst

Hydrograph type	= Reservoir (Interconnected)	Peak discharge	= 0.000 cfs
Storm frequency	= 5 yrs	Time to peak	= 932 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Upper Pond		**Lower Pond**	
Pond name	= Roof Infiltrattion System	Pond name	= Forebay & Stormwat
Inflow hyd.	= 6 - Roof Drainage	Other Inflow hyd.	= None
Max. Elevation	= 90.32 ft	Max. Elevation	= 78.25 ft
Max. Storage	= 2,324 cuft	Max. Storage	= 1,323 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.



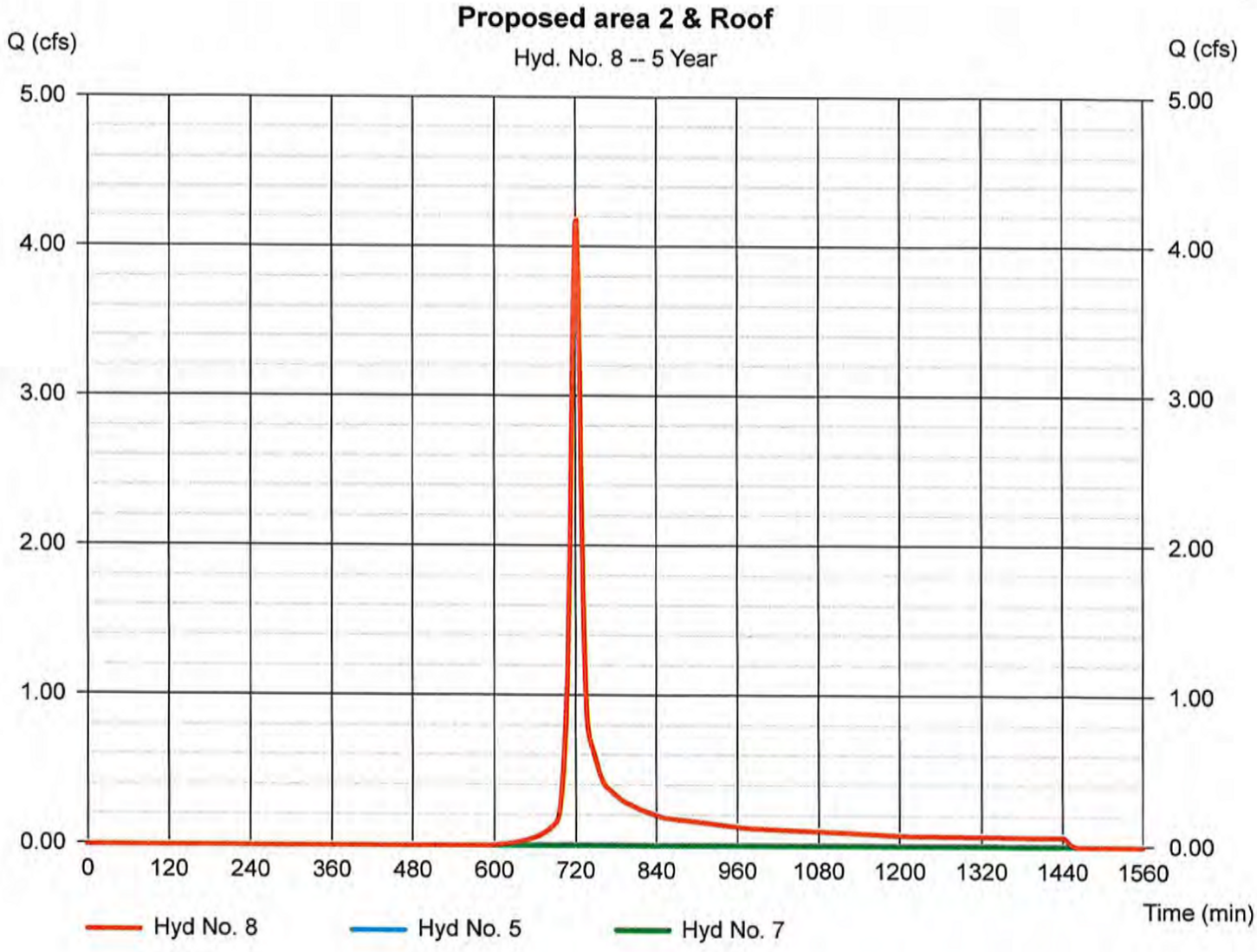
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 8

Proposed area 2 & Roof

Hydrograph type	= Combine	Peak discharge	= 4.183 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 10,971 cuft
Inflow hyds.	= 5, 7	Contrib. drain. area	= 1.700 ac



Hydrograph Report

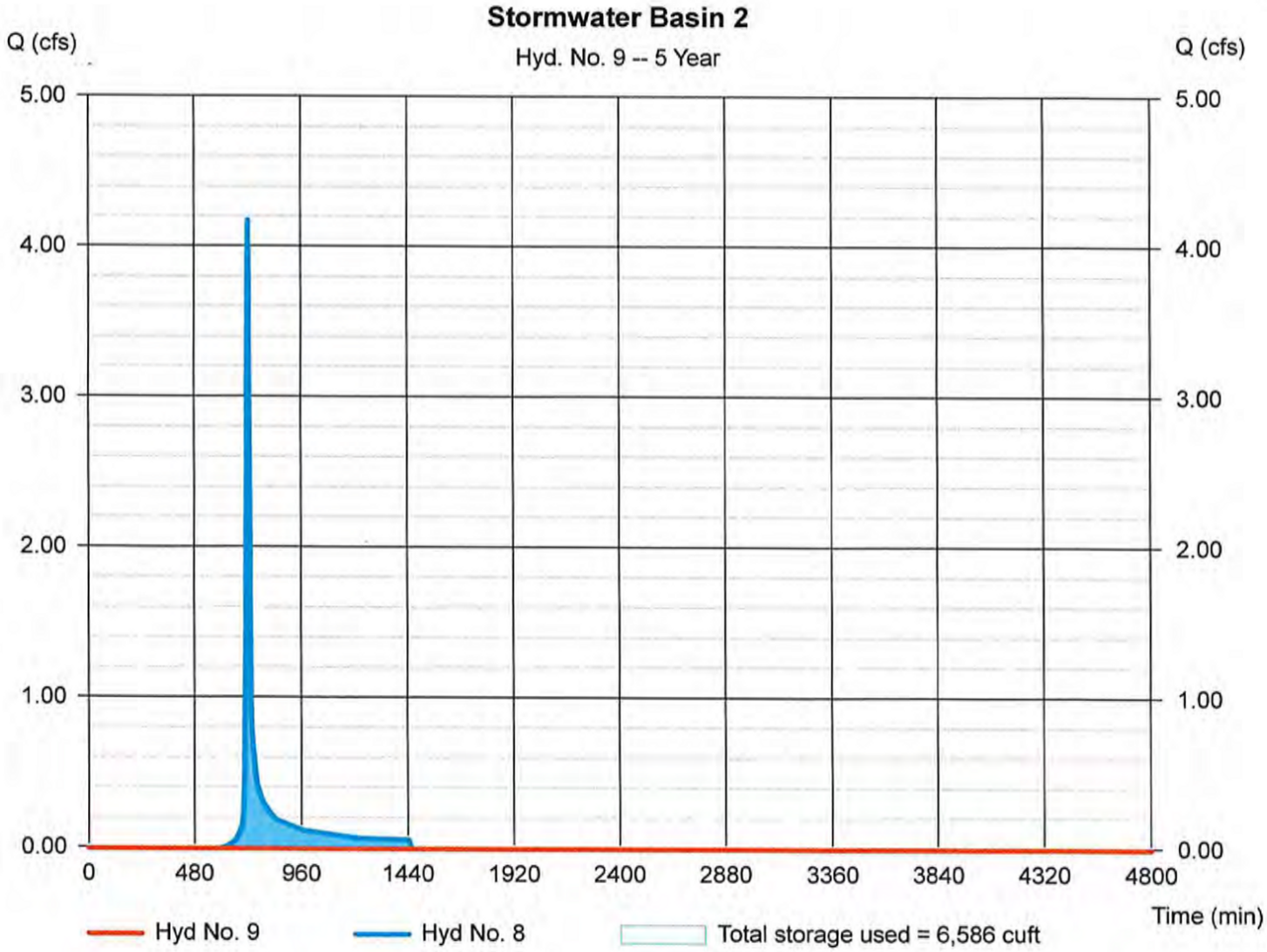
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 9

Stormwater Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 5 yrs	Time to peak	= 1548 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 8 - Proposed area 2 & Roof	Max. Elevation	= 79.25 ft
Reservoir name	= Forebay & Stormwater Basin 2	Max. Storage	= 6,586 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	3.125	1	730	12,366	-----	-----	-----	Existing Conditions - Areas 1
2	SCS Runoff	3.873	1	729	14,559	-----	-----	-----	Proposed Conditions - Area 1
3	Reservoir	0.090	1	942	639	2	93.03	10,324	Stormwater Basin 1
4	SCS Runoff	5.903	2	722	16,579	-----	-----	-----	Existing Conditions - Area 2
5	SCS Runoff	5.609	2	720	14,612	-----	-----	-----	Proposed Conditions - Area 3
6	SCS Runoff	2.047	2	716	4,883	-----	-----	-----	Roof Drainage
7	Reservoir(i)	0.000	2	752	0	6	90.69	4,426	Roof Infiltration Syst
8	Combine	5.609	2	720	14,612	5, 7	-----	-----	Proposed area 2 & Roof
9	Reservoir	0.000	2	1886	0	8	79.70	9,383	Stormwater Basin 2

Hydrograph Report

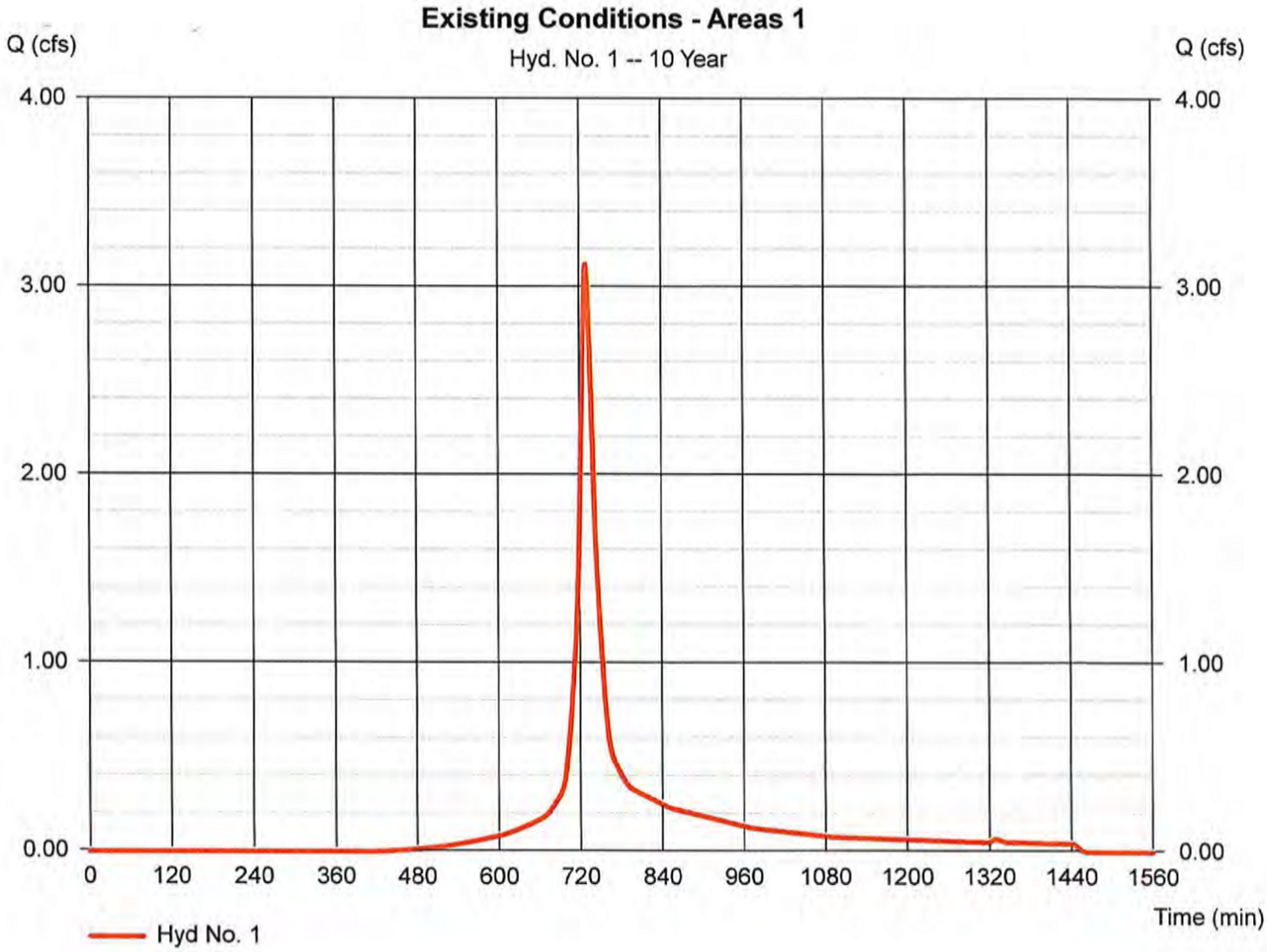
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 1

Existing Conditions - Areas 1

Hydrograph type	= SCS Runoff	Peak discharge	= 3.125 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 12,366 cuft
Drainage area	= 1.100 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.02 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 55) + (0.700 x 98)] / 1.100



Hydrograph Report

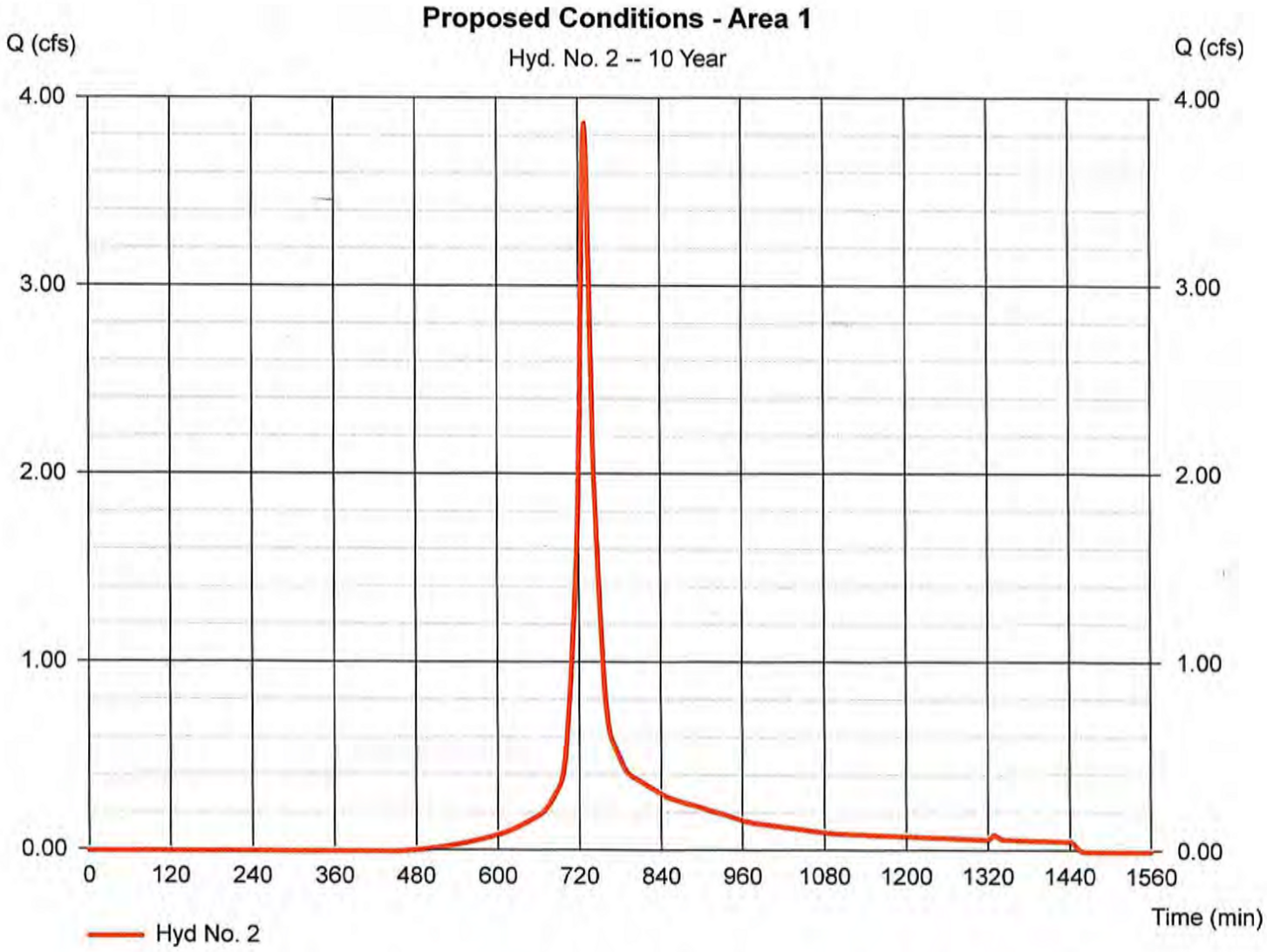
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 2

Proposed Conditions - Area 1

Hydrograph type	= SCS Runoff	Peak discharge	= 3.873 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 14,559 cuft
Drainage area	= 1.400 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.00 min
Total precip.	= 5.02 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.800 x 98) + (0.600 x 55)] / 1.400



Hydrograph Report

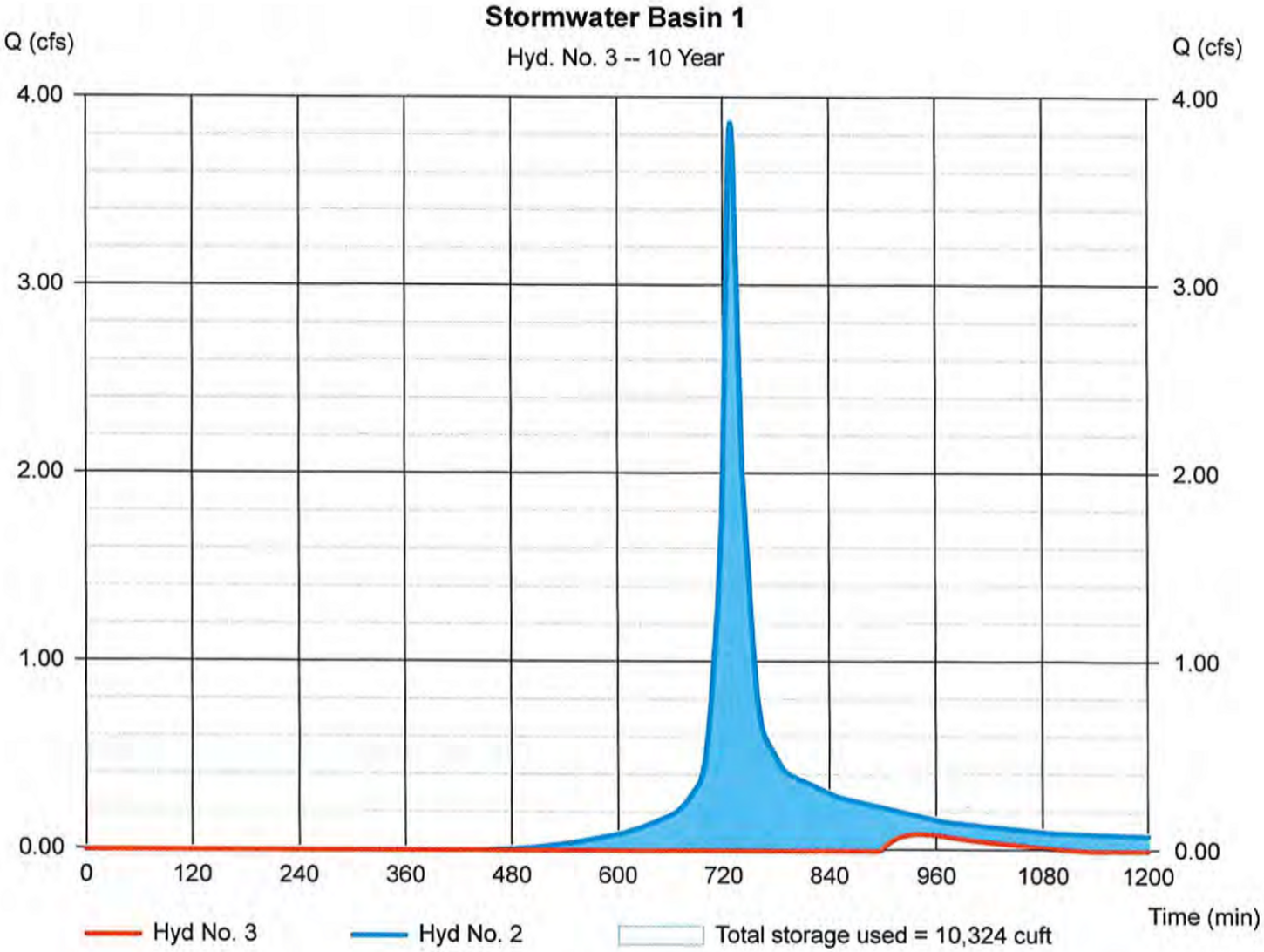
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 3

Stormwater Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.090 cfs
Storm frequency	= 10 yrs	Time to peak	= 942 min
Time interval	= 1 min	Hyd. volume	= 639 cuft
Inflow hyd. No.	= 2 - Proposed Conditions - Area 1	Max. Elevation	= 93.03 ft
Reservoir name	= Forebay & Stormwater Basin 1	Max. Storage	= 10,324 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



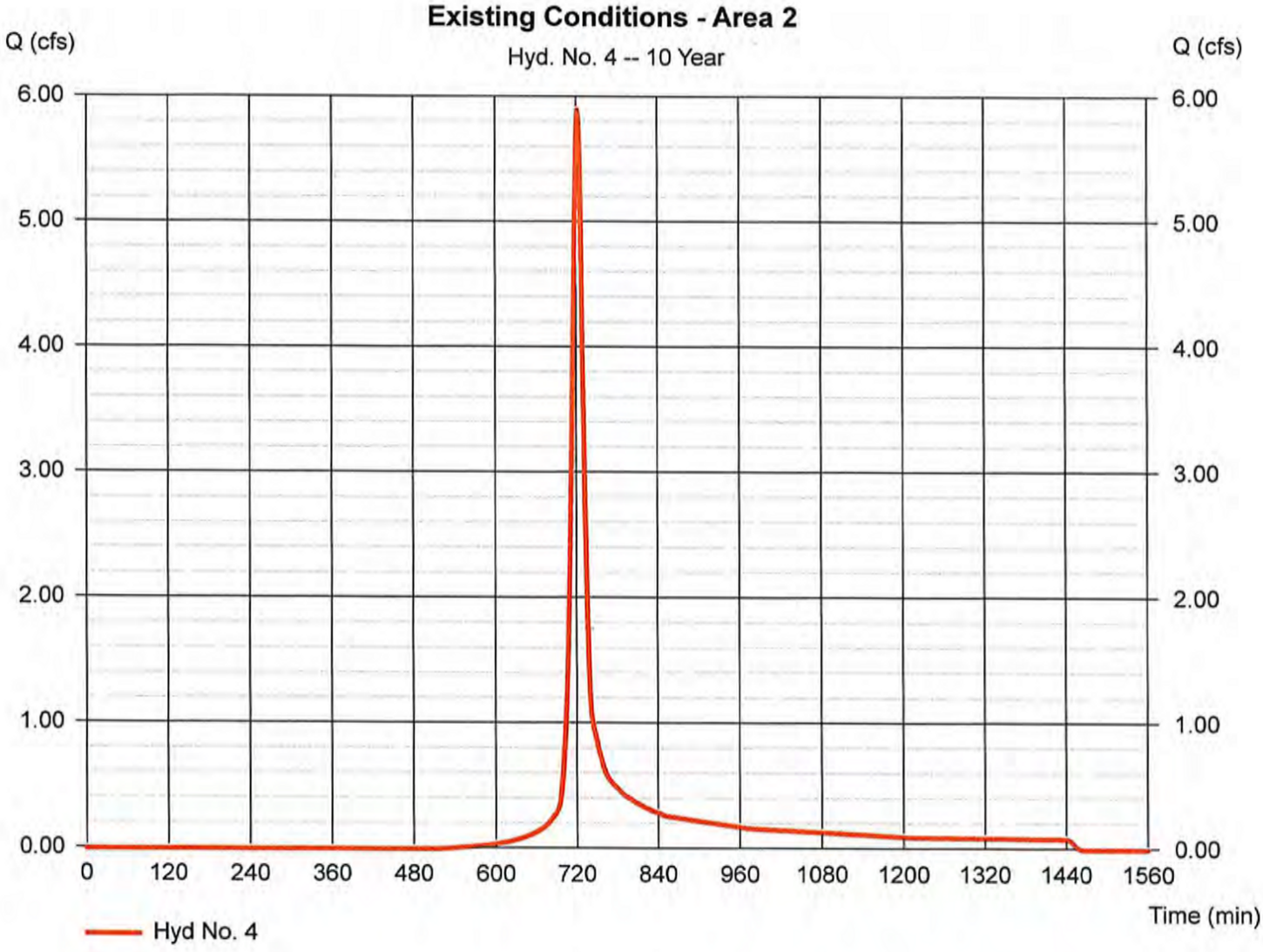
Hydrograph Report

Hyd. No. 4

Existing Conditions - Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 5.903 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 16,579 cuft
Drainage area	= 1.900 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.000 x 55) + (0.900 x 98)] / 1.900



Hydrograph Report

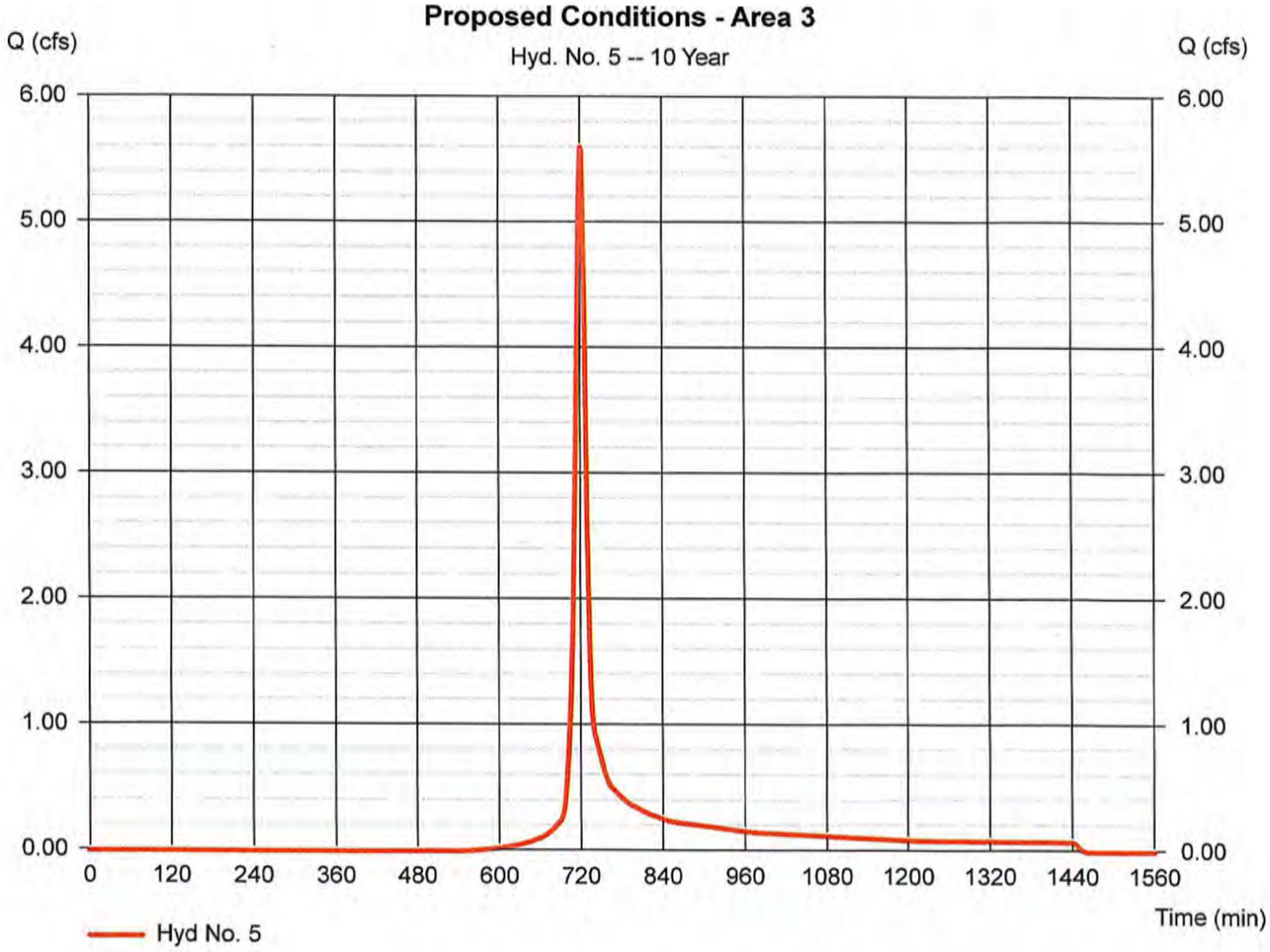
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 5

Proposed Conditions - Area 3

Hydrograph type	= SCS Runoff	Peak discharge	= 5.609 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,612 cuft
Drainage area	= 1.700 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.00 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.700 x 98) + (1.000 x 55)] / 1.700



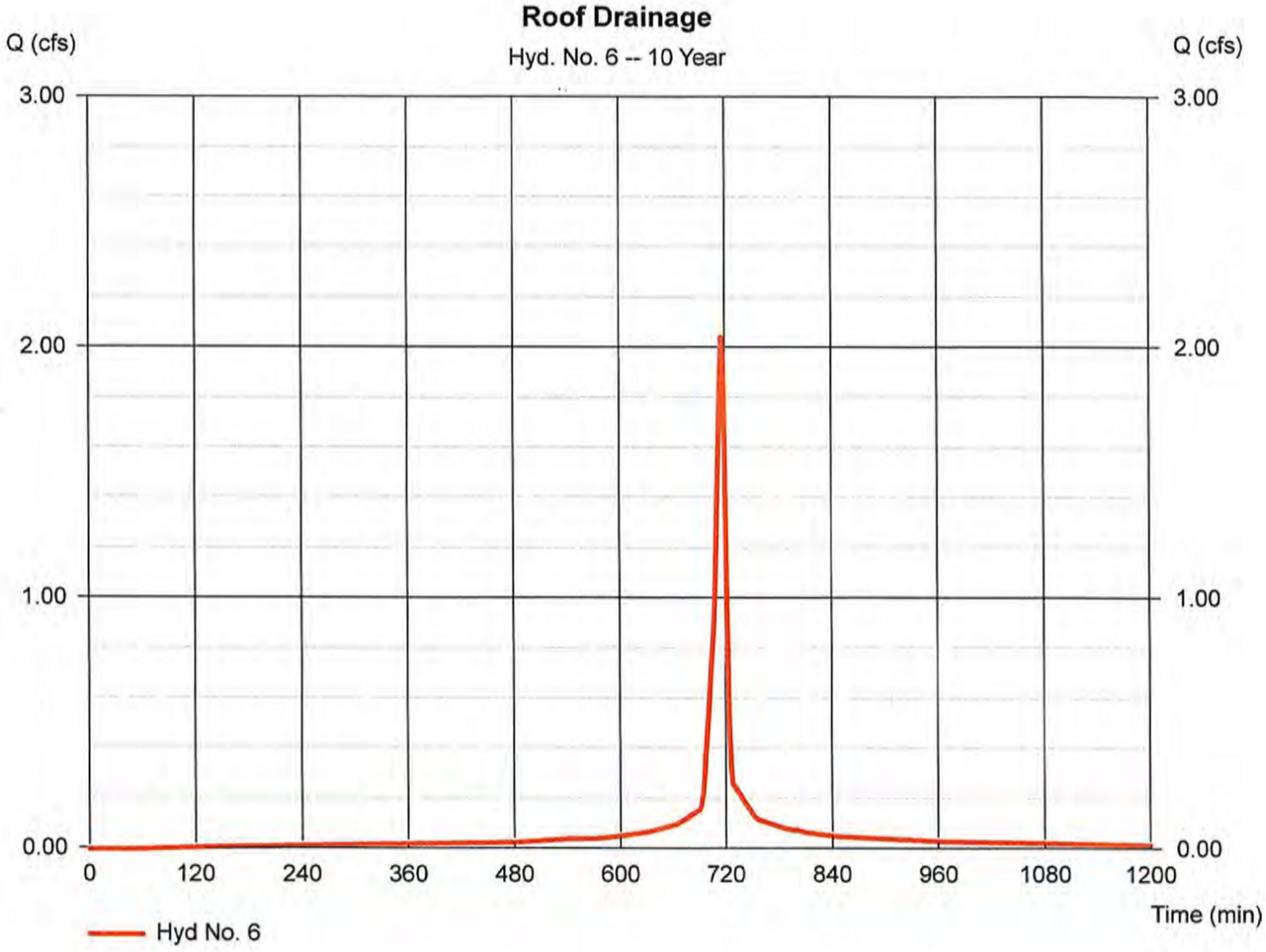
Hydrograph Report

Hyd. No. 6

Roof Drainage

Hydrograph type	= SCS Runoff	Peak discharge	= 2.047 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 4,883 cuft
Drainage area	= 0.300 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.300 x 98)] / 0.300



Hydrograph Report

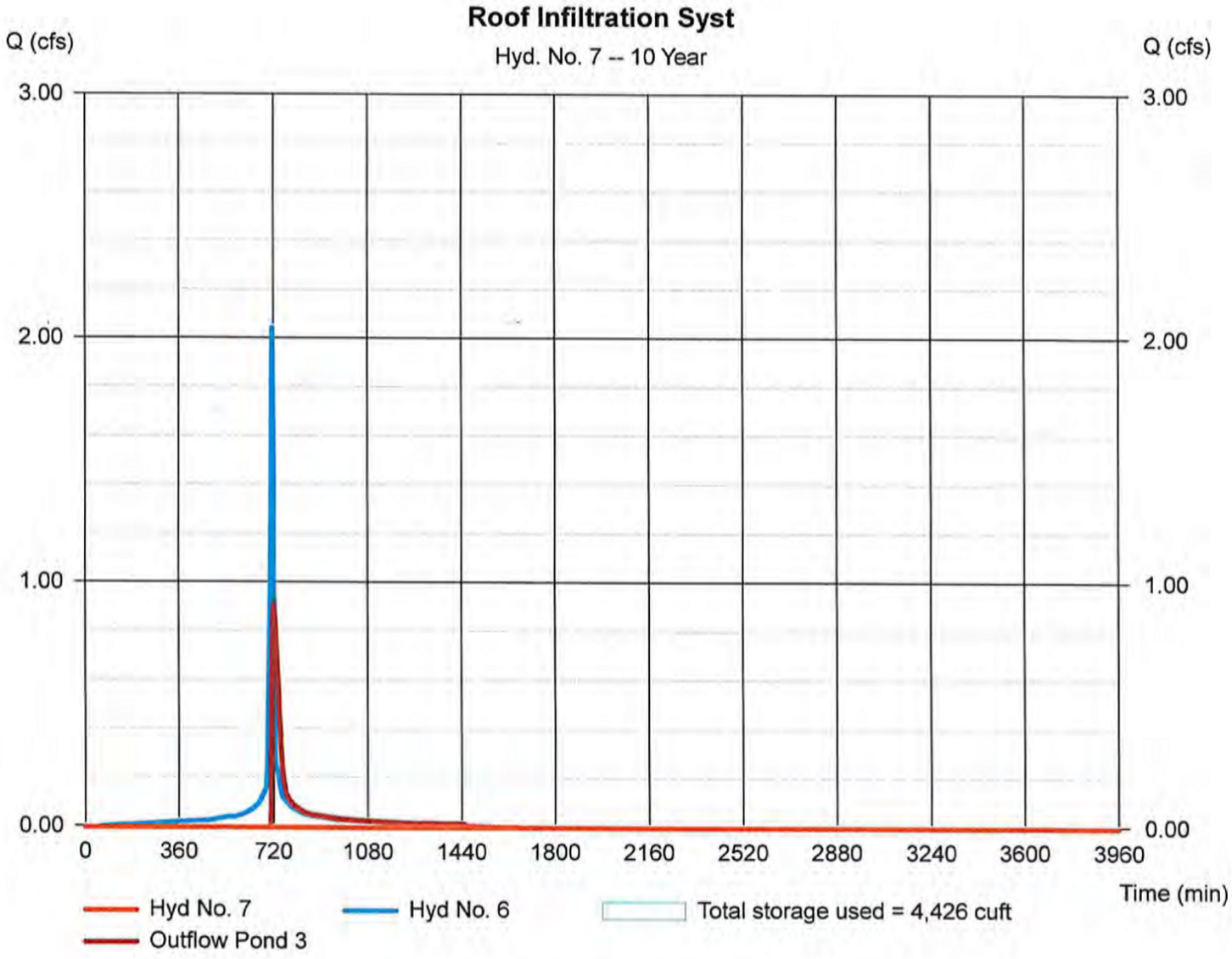
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 7

Roof Infiltration Syst

Hydrograph type	= Reservoir (Interconnected)	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Upper Pond		**Lower Pond**	
Pond name	= Roof Infiltrattion System	Pond name	= Forebay & Stormwat
Inflow hyd.	= 6 - Roof Drainage	Other Inflow hyd.	= None
Max. Elevation	= 90.69 ft	Max. Elevation	= 78.35 ft
Max. Storage	= 2,606 cuft	Max. Storage	= 1,820 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.

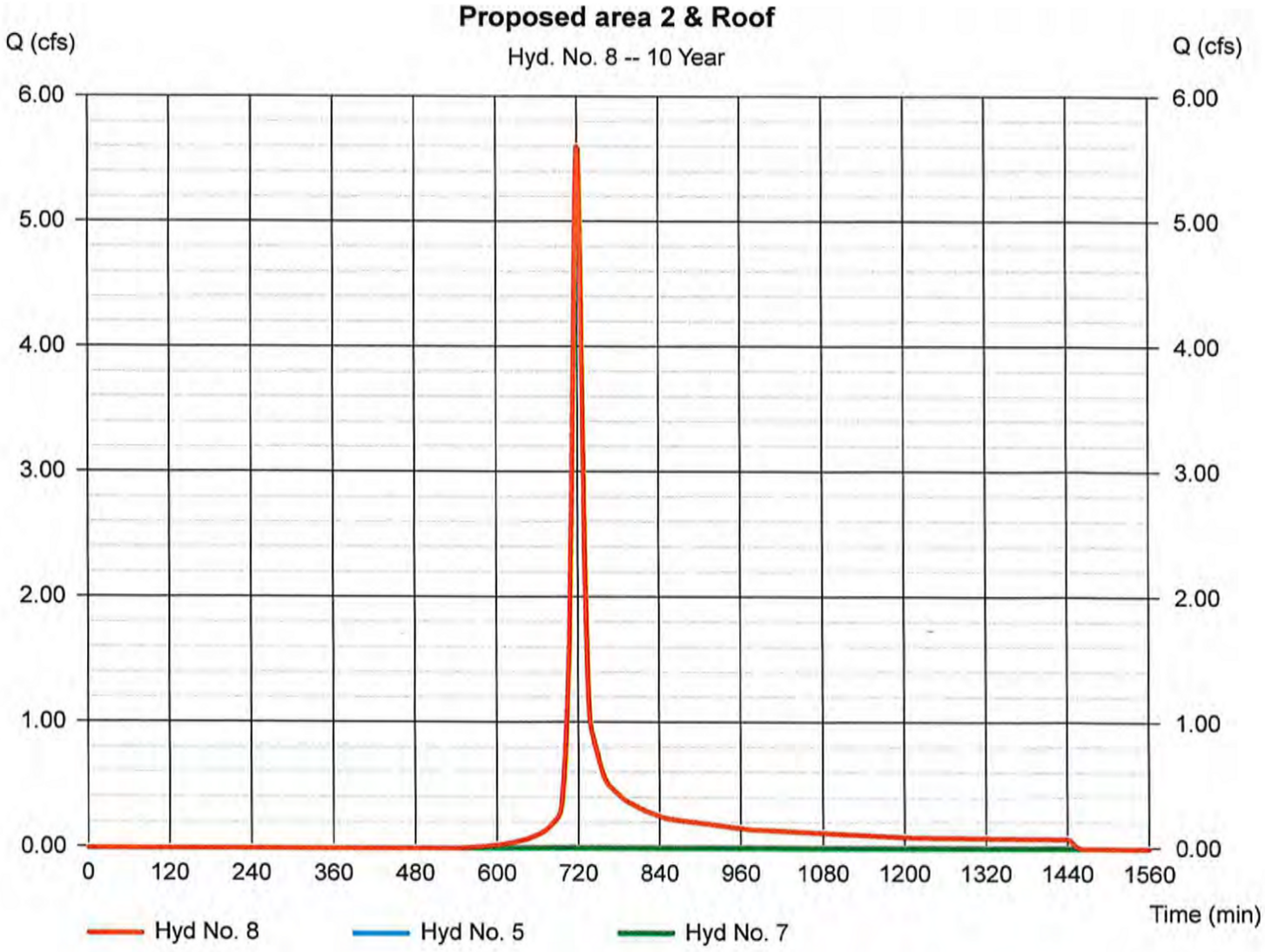


Hydrograph Report

Hyd. No. 8

Proposed area 2 & Roof

Hydrograph type	= Combine	Peak discharge	= 5.609 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,612 cuft
Inflow hyds.	= 5, 7	Contrib. drain. area	= 1.700 ac



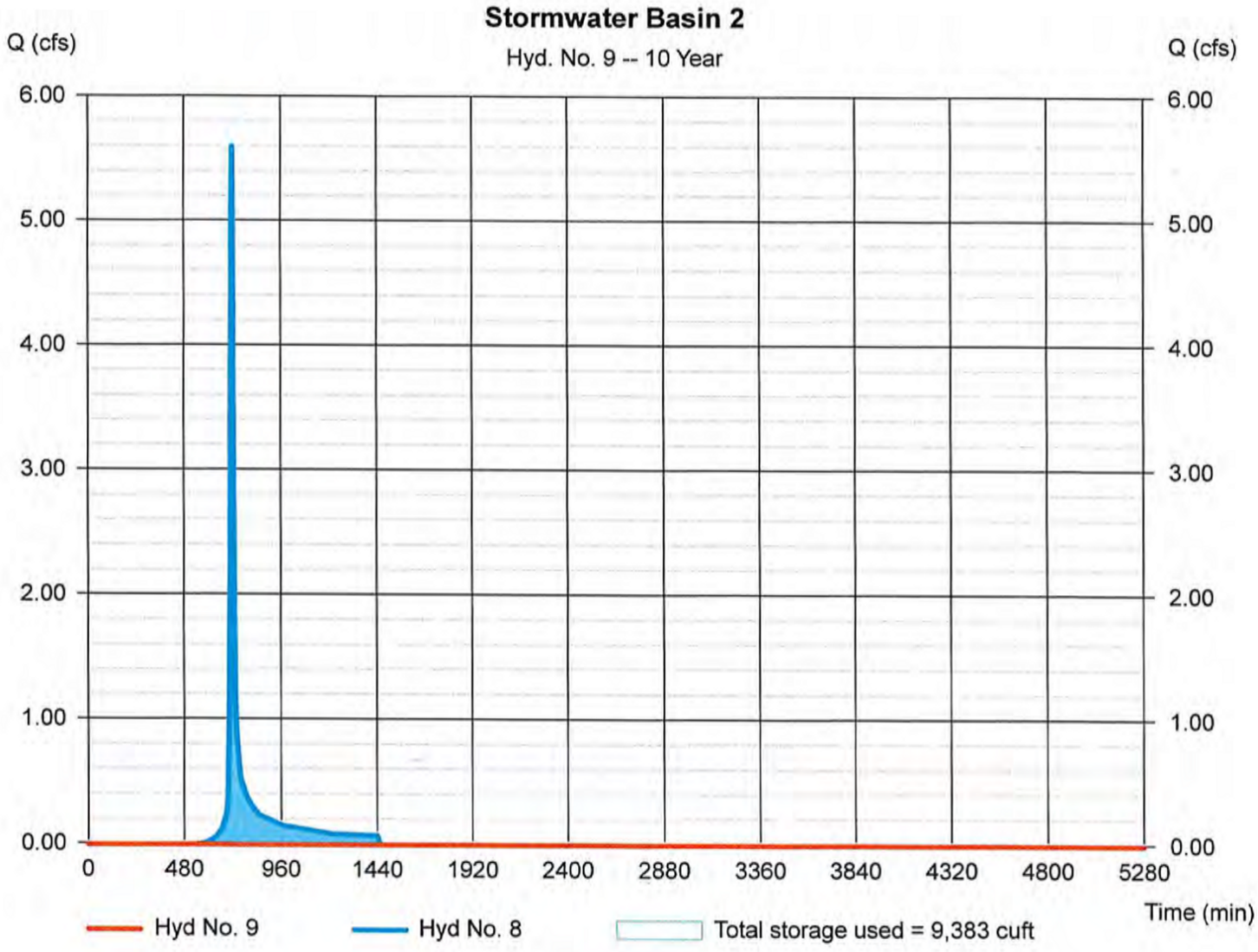
Hydrograph Report

Hyd. No. 9

Stormwater Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= 1886 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 8 - Proposed area 2 & Roof	Max. Elevation	= 79.70 ft
Reservoir name	= Forebay & Stormwater Basin 2	Max. Storage	= 9,383 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	4.055	1	730	16,141	-----	-----	-----	Existing Conditions - Areas 1
2	SCS Runoff	5.084	1	729	19,187	-----	-----	-----	Proposed Conditions - Area 1
3	Reservoir	0.574	1	775	4,786	2	93.14	10,856	Stormwater Basin 1
4	SCS Runoff	7.995	2	722	22,415	-----	-----	-----	Existing Conditions - Area 2
5	SCS Runoff	7.702	2	720	19,973	-----	-----	-----	Proposed Conditions - Area 3
6	SCS Runoff	2.475	2	716	5,944	-----	-----	-----	Roof Drainage
7	Reservoir(i)	0.000	2	1006	0	6	91.16	5,505	Roof Infiltration Syst
8	Combine	7.702	2	720	19,973	5, 7	-----	-----	Proposed area 2 & Roof
9	Reservoir	0.000	2	2426	0	8	80.31	13,649	Stormwater Basin 2

Hydrograph Report

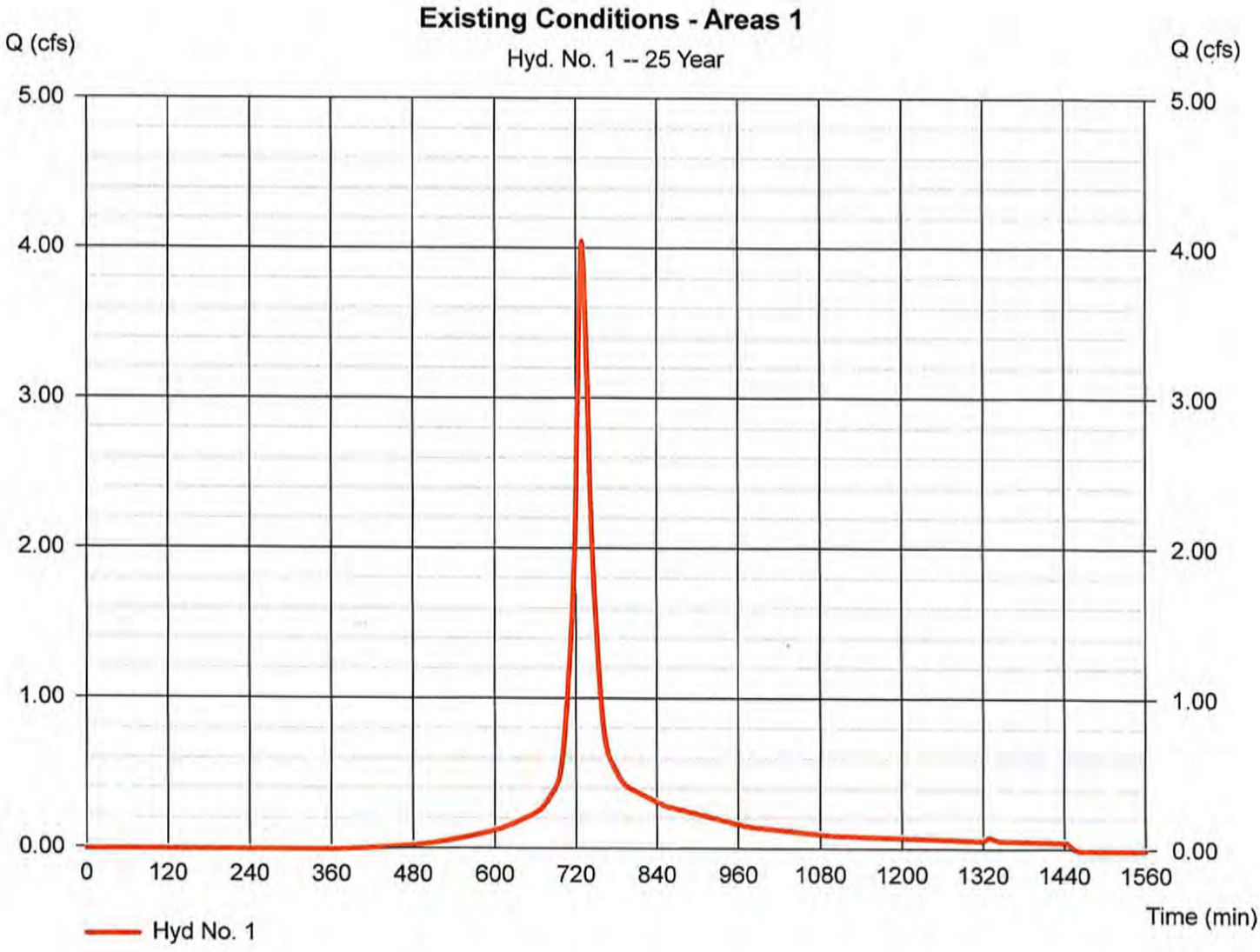
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 1

Existing Conditions - Areas 1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.055 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 16,141 cuft
Drainage area	= 1.100 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.06 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 55) + (0.700 x 98)] / 1.100



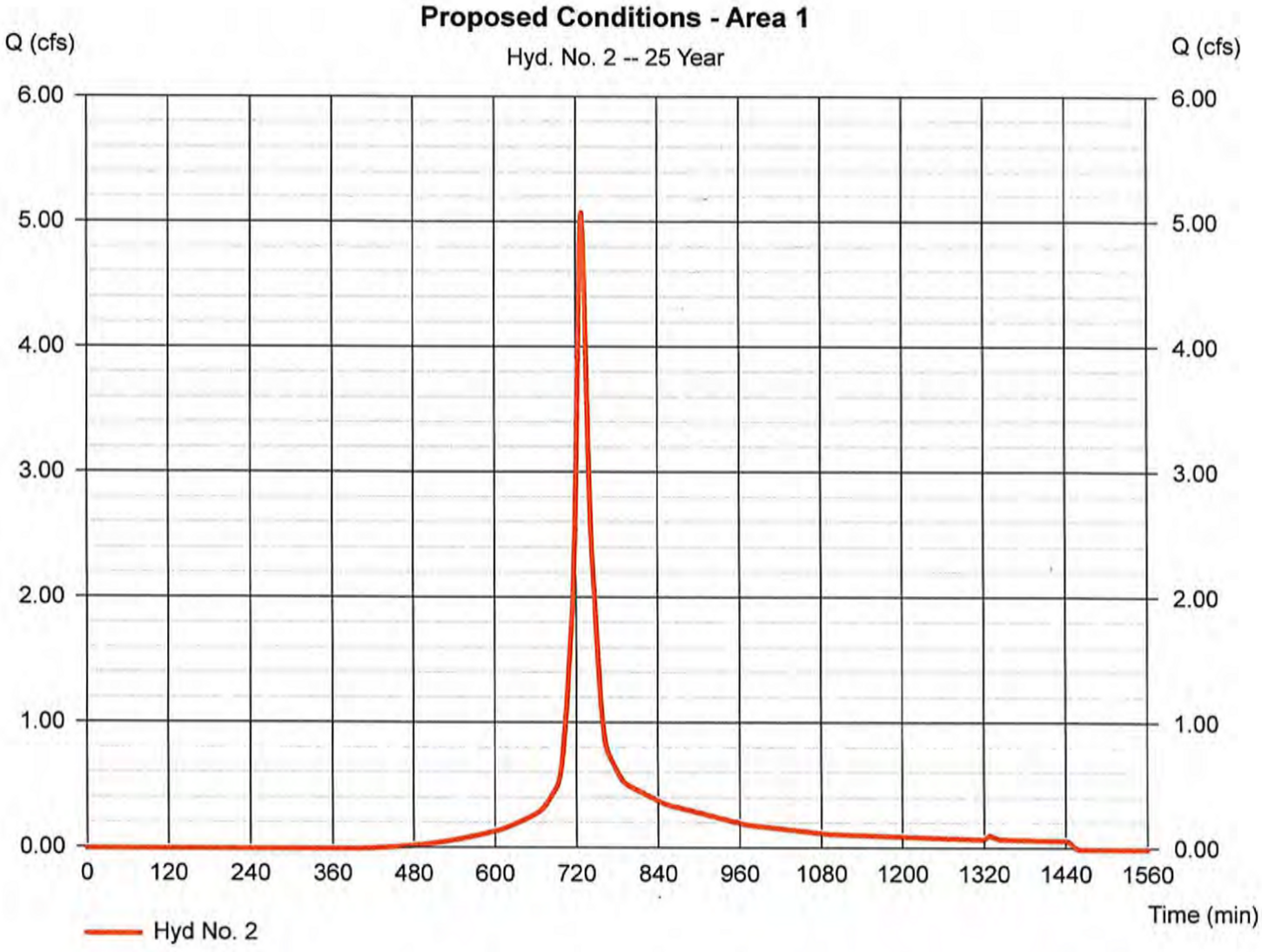
Hydrograph Report

Hyd. No. 2

Proposed Conditions - Area 1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.084 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 19,187 cuft
Drainage area	= 1.400 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.00 min
Total precip.	= 6.06 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.800 x 98) + (0.600 x 55)] / 1.400



Hydrograph Report

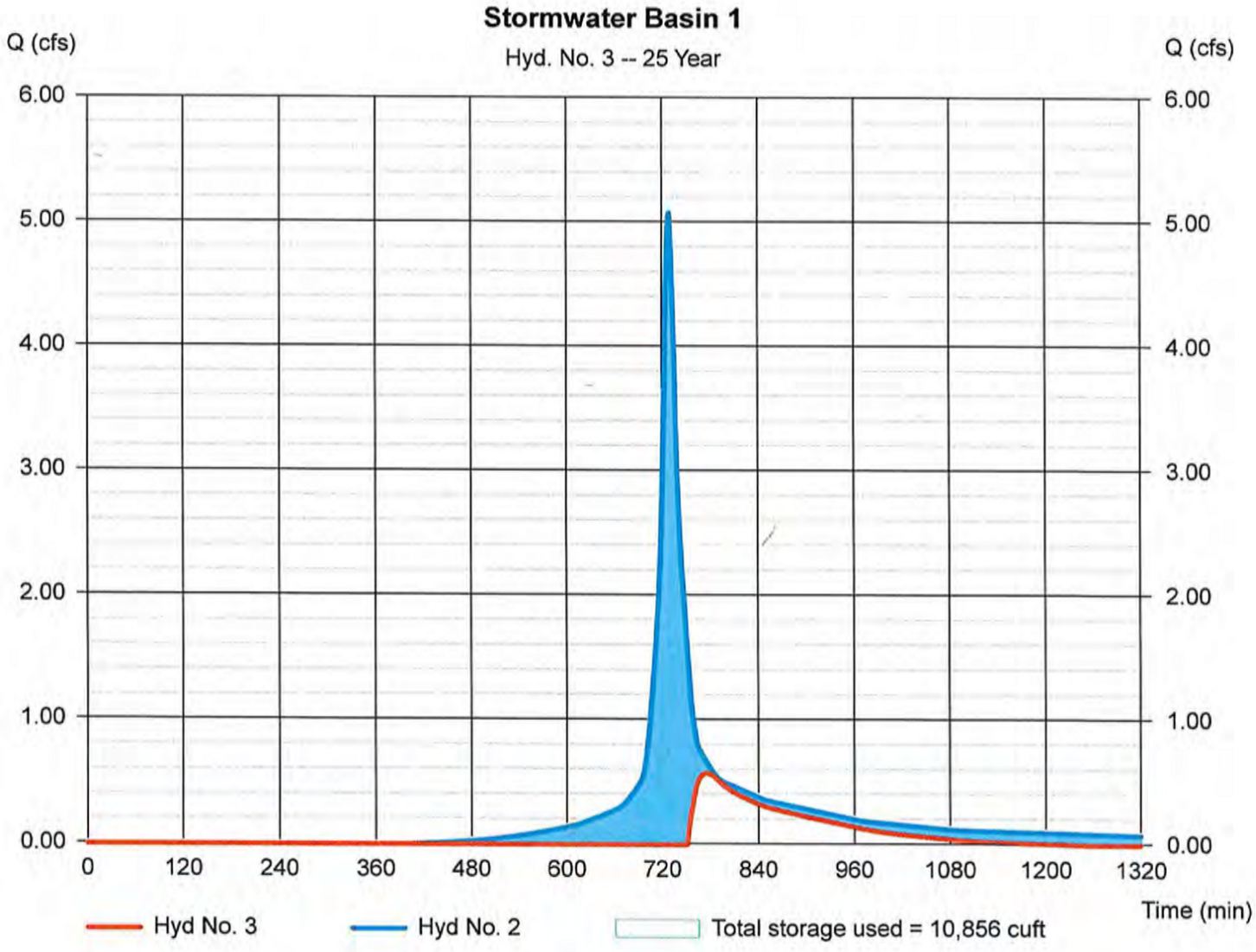
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 3

Stormwater Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.574 cfs
Storm frequency	= 25 yrs	Time to peak	= 775 min
Time interval	= 1 min	Hyd. volume	= 4,786 cuft
Inflow hyd. No.	= 2 - Proposed Conditions - Area 1	Max. Elevation	= 93.14 ft
Reservoir name	= Forebay & Stormwater Basin 1	Max. Storage	= 10,856 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

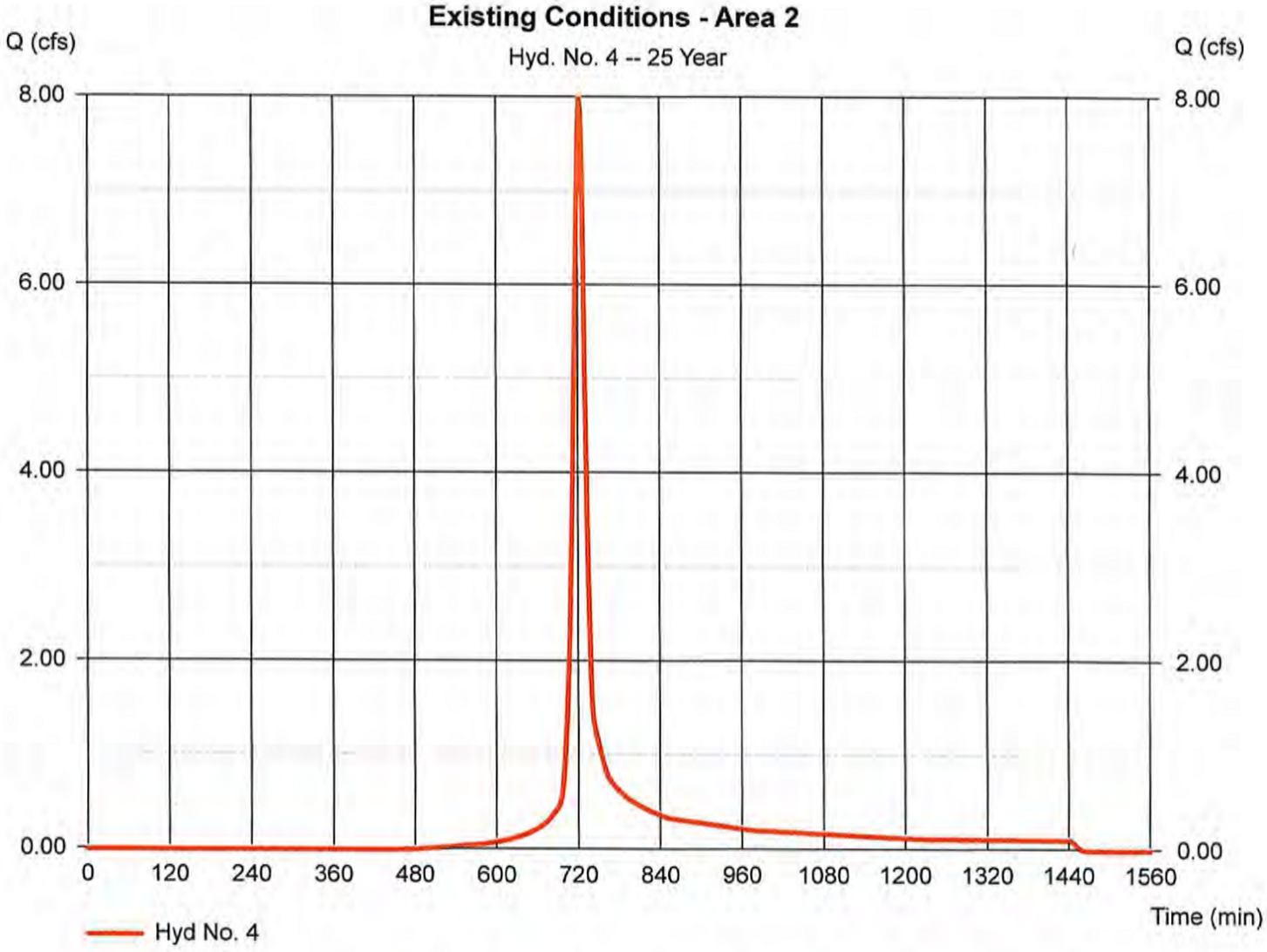
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 4

Existing Conditions - Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 7.995 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 22,415 cuft
Drainage area	= 1.900 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 6.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.000 x 55) + (0.900 x 98)] / 1.900



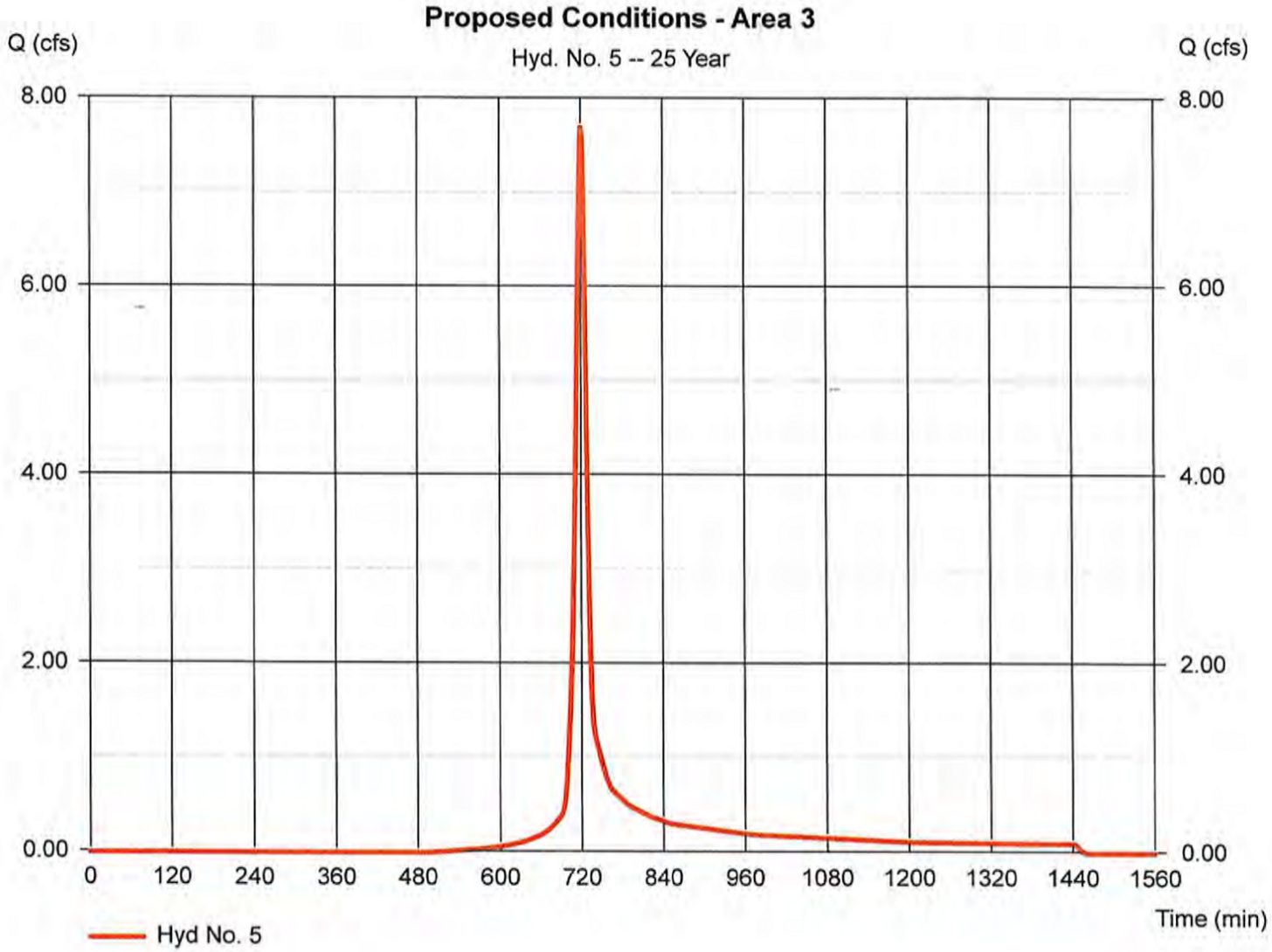
Hydrograph Report

Hyd. No. 5

Proposed Conditions - Area 3

Hydrograph type	= SCS Runoff	Peak discharge	= 7.702 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 19,973 cuft
Drainage area	= 1.700 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.00 min
Total precip.	= 6.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.700 x 98) + (1.000 x 55)] / 1.700



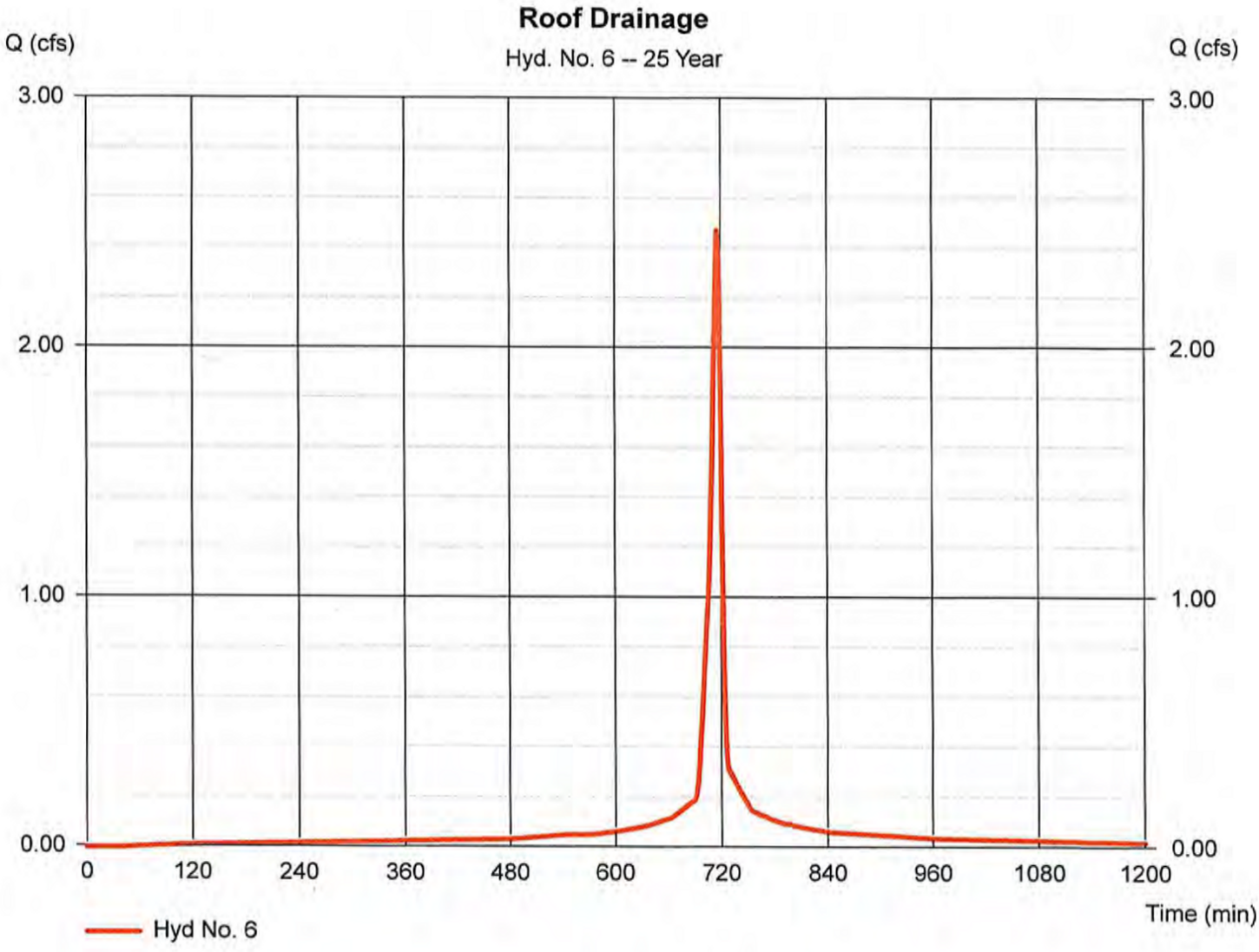
Hydrograph Report

Hyd. No. 6

Roof Drainage

Hydrograph type	= SCS Runoff	Peak discharge	= 2.475 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 5,944 cuft
Drainage area	= 0.300 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.06 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.300 x 98)] / 0.300



Hydrograph Report

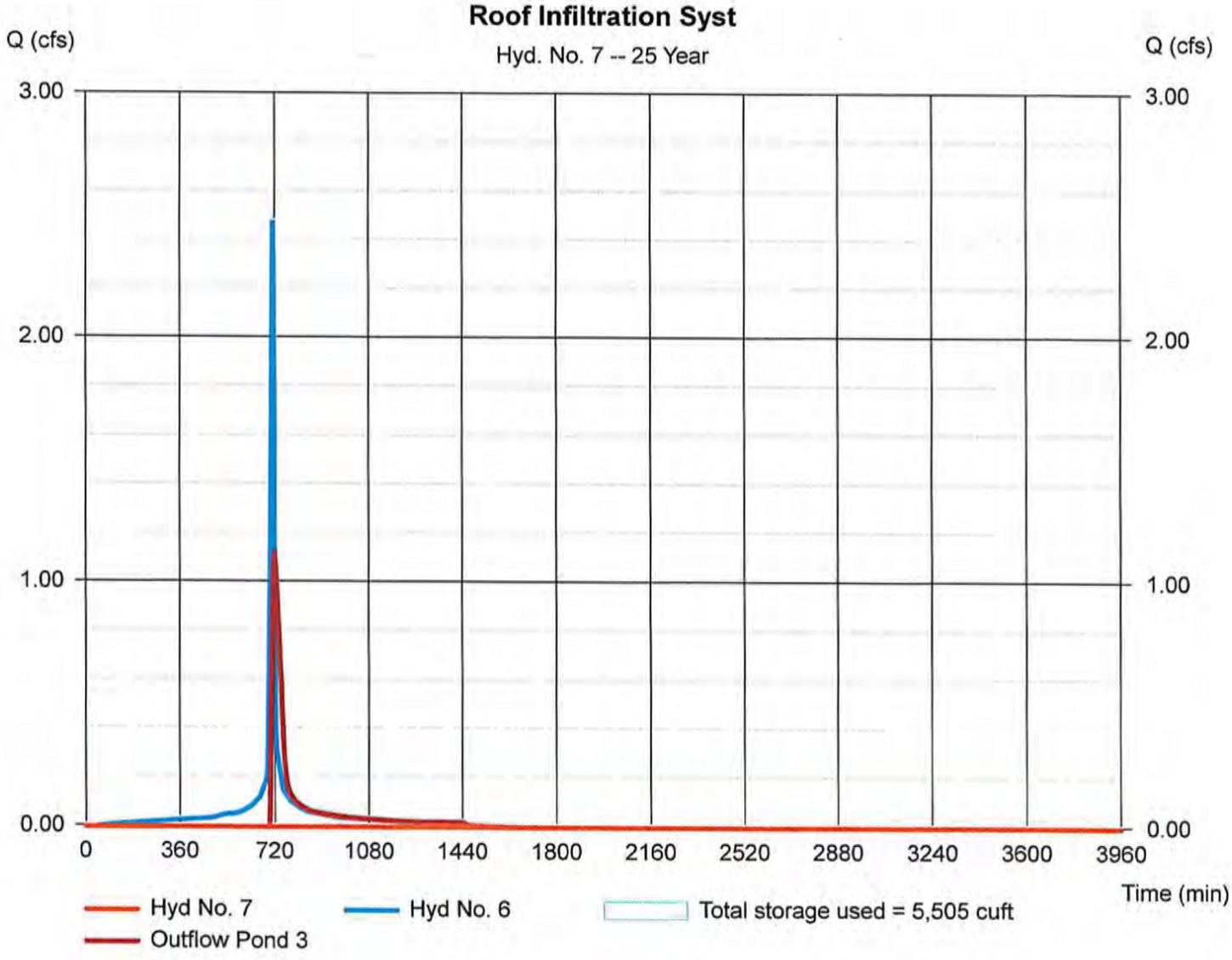
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 7

Roof Infiltration Syst

Hydrograph type	= Reservoir (Interconnected)	Peak discharge	= 0.000 cfs
Storm frequency	= 25 yrs	Time to peak	= 1006 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Upper Pond		**Lower Pond**	
Pond name	= Roof Infiltrattion System	Pond name	= Forebay & Stormwat
Inflow hyd.	= 6 - Roof Drainage	Other Inflow hyd.	= None
Max. Elevation	= 91.16 ft	Max. Elevation	= 78.49 ft
Max. Storage	= 2,970 cuft	Max. Storage	= 2,536 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.

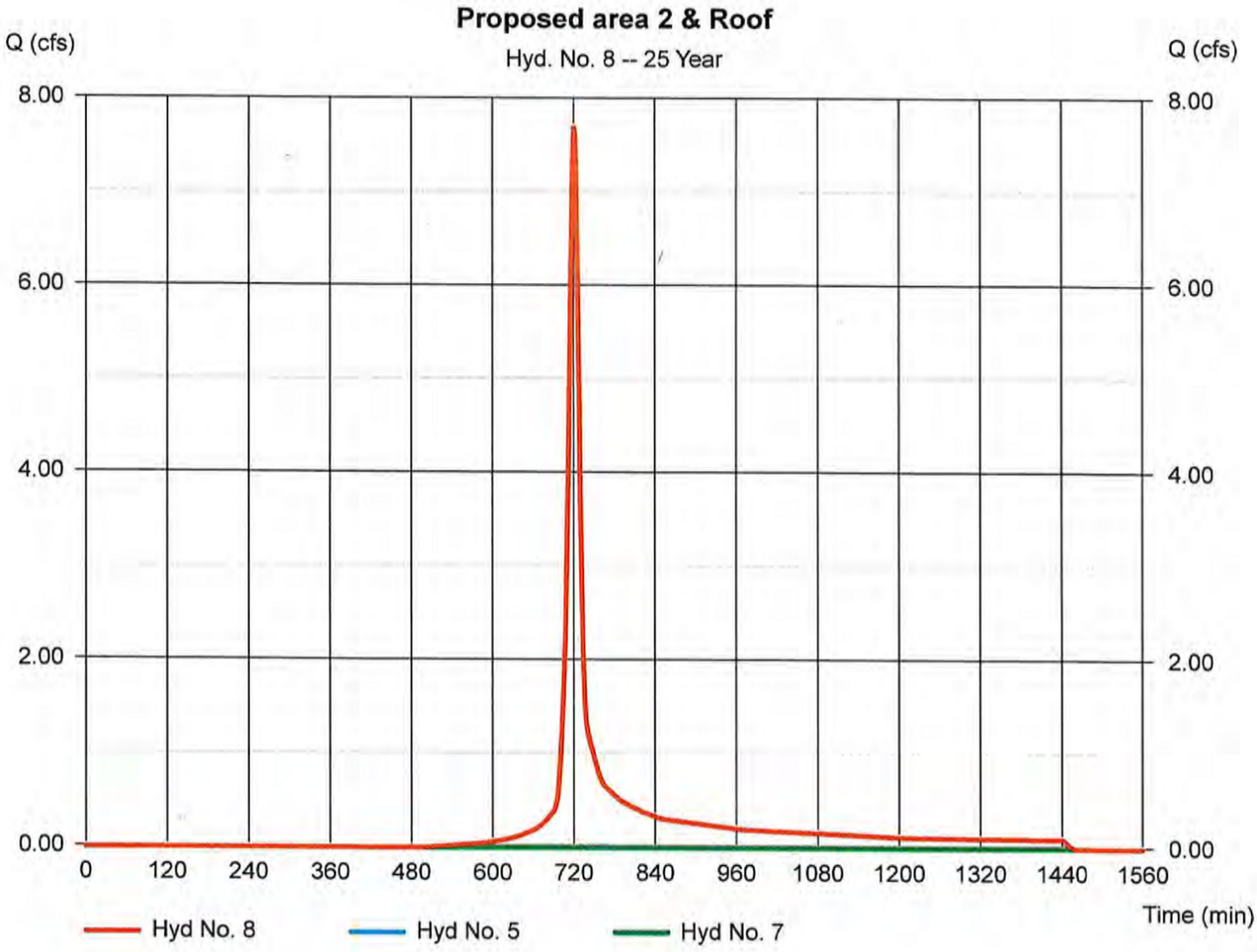


Hydrograph Report

Hyd. No. 8

Proposed area 2 & Roof

Hydrograph type	= Combine	Peak discharge	= 7.702 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 19,973 cuft
Inflow hyds.	= 5, 7	Contrib. drain. area	= 1.700 ac



Hydrograph Report

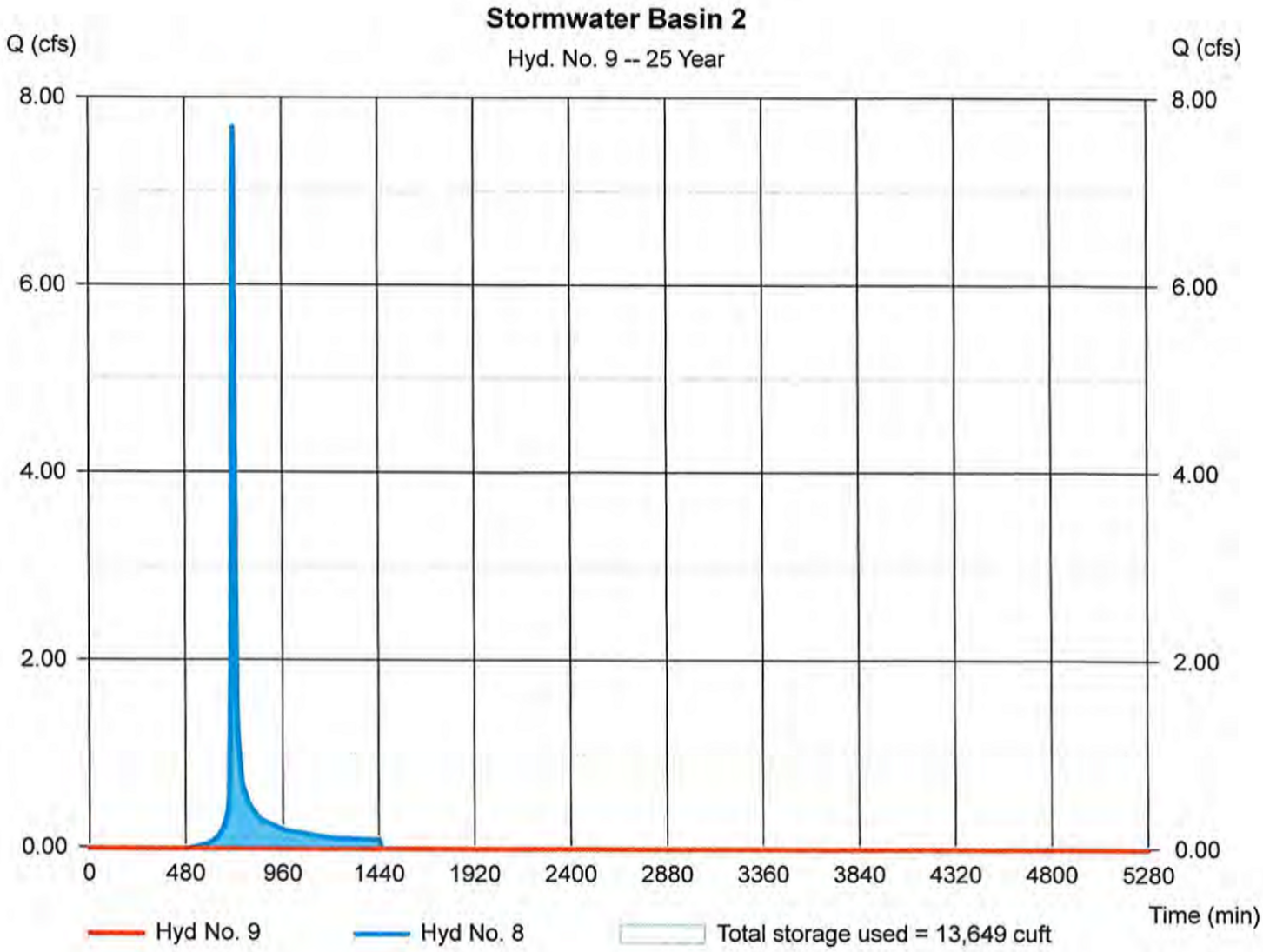
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 9

Stormwater Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 25 yrs	Time to peak	= 2426 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 8 - Proposed area 2 & Roof	Max. Elevation	= 80.31 ft
Reservoir name	= Forebay & Stormwater Basin 2	Max. Storage	= 13,649 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

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	5.503	1	730	22,149	------	------	------	Existing Conditions - Areas 1
2	SCS Runoff	6.980	1	729	26,595	------	------	------	Proposed Conditions - Area 1
3	Reservoir	2.213	1	750	11,812	2	93.54	12,647	Stormwater Basin 1
4	SCS Runoff	11.33	2	722	31,908	------	------	------	Existing Conditions - Area 2
5	SCS Runoff	11.07	2	720	28,756	------	------	------	Proposed Conditions - Area 3
6	SCS Runoff	3.136	2	716	7,586	------	------	------	Roof Drainage
7	Reservoir(i)	0.000	2	860	0	6	91.82	7,131	Roof Infiltration Syst
8	Combine	11.07	2	720	28,756	5, 7	------	------	Proposed area 2 & Roof
9	Reservoir	1.054	2	752	6,228	8	80.60	15,793	Stormwater Basin 2

Hydrograph Report

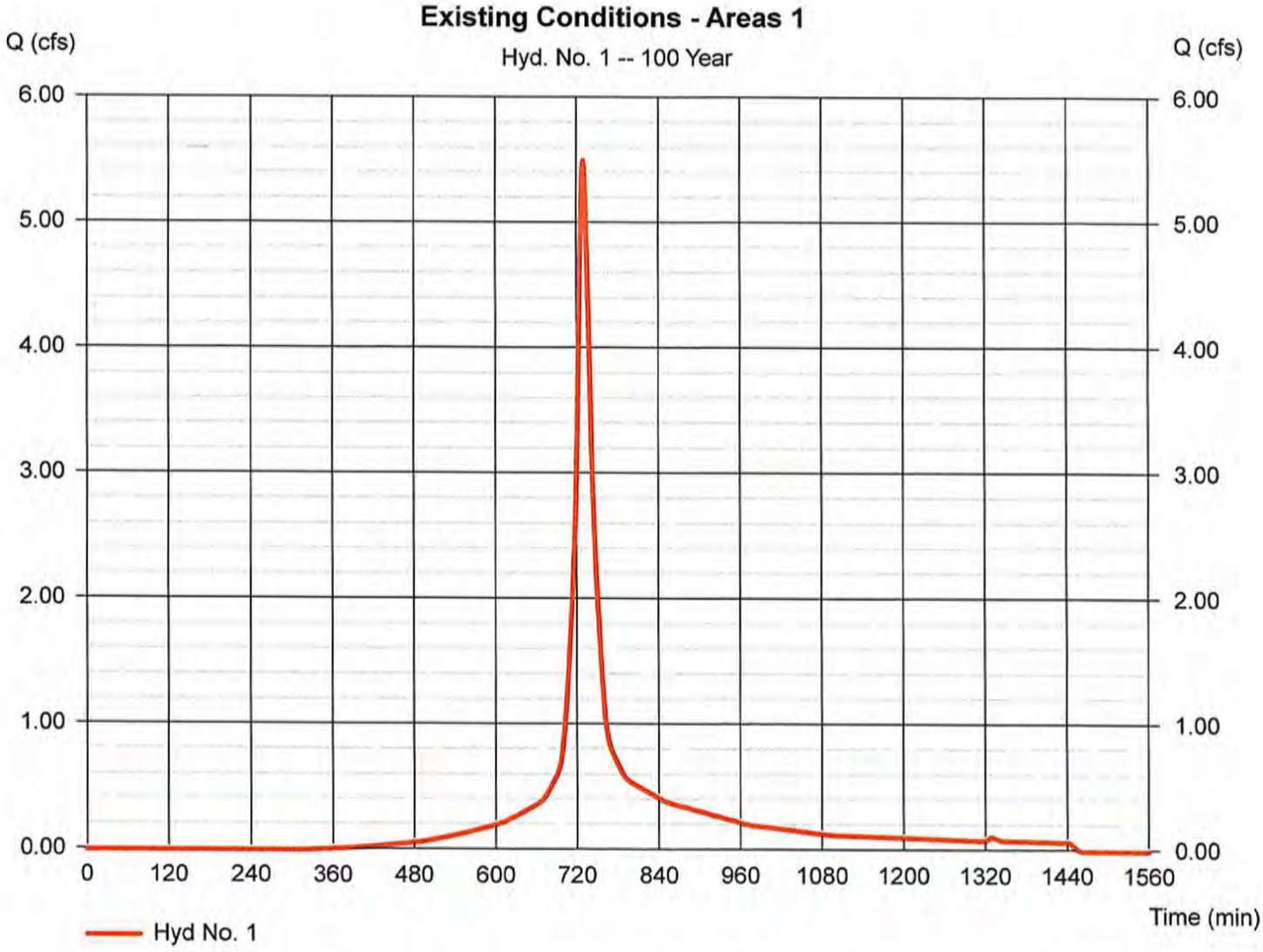
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 1

Existing Conditions - Areas 1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.503 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 1 min	Hyd. volume	= 22,149 cuft
Drainage area	= 1.100 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.67 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.400 x 55) + (0.700 x 98)] / 1.100



Hydrograph Report

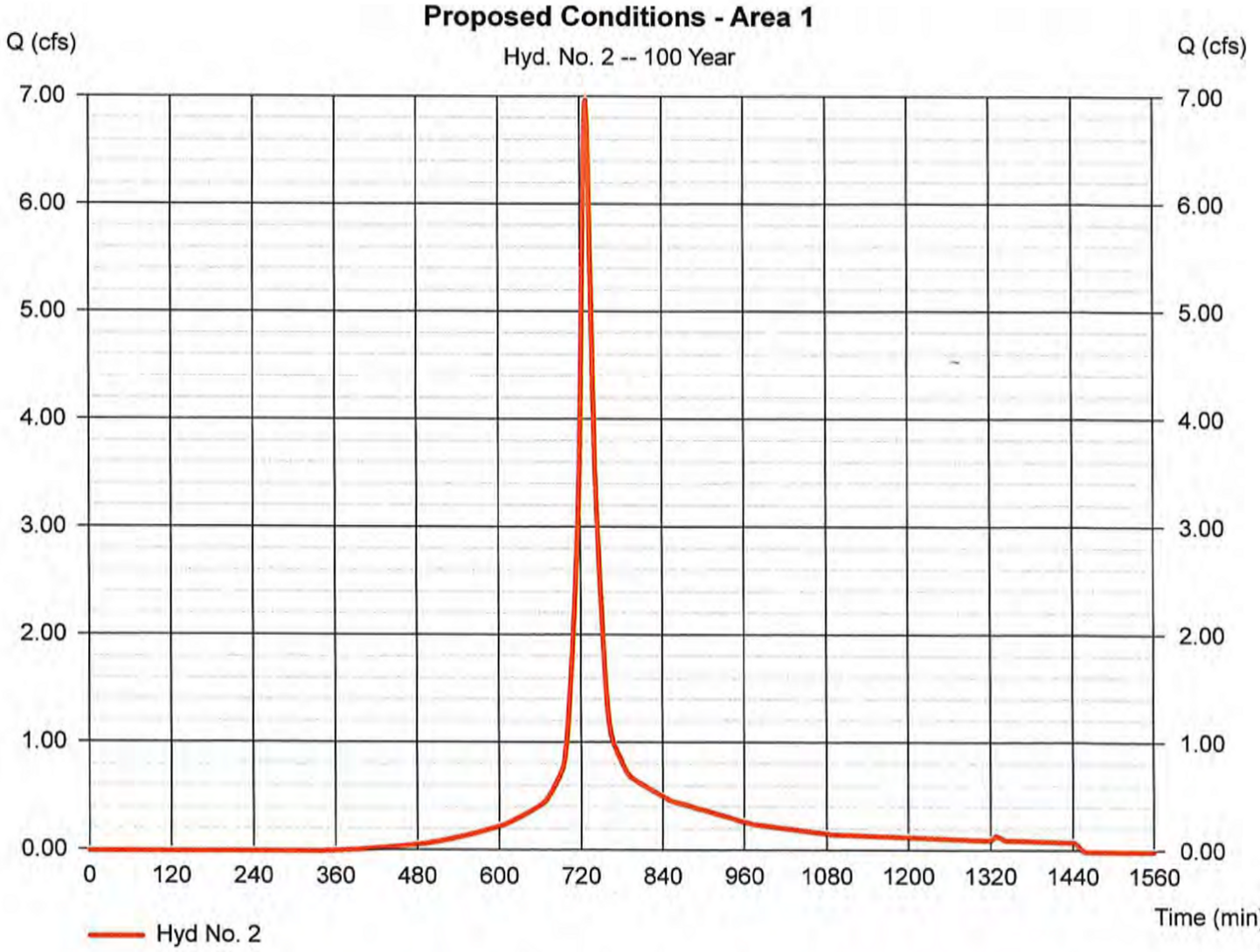
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 2

Proposed Conditions - Area 1

Hydrograph type	= SCS Runoff	Peak discharge	= 6.980 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 26,595 cuft
Drainage area	= 1.400 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.00 min
Total precip.	= 7.67 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.800 x 98) + (0.600 x 55)] / 1.400



Hydrograph Report

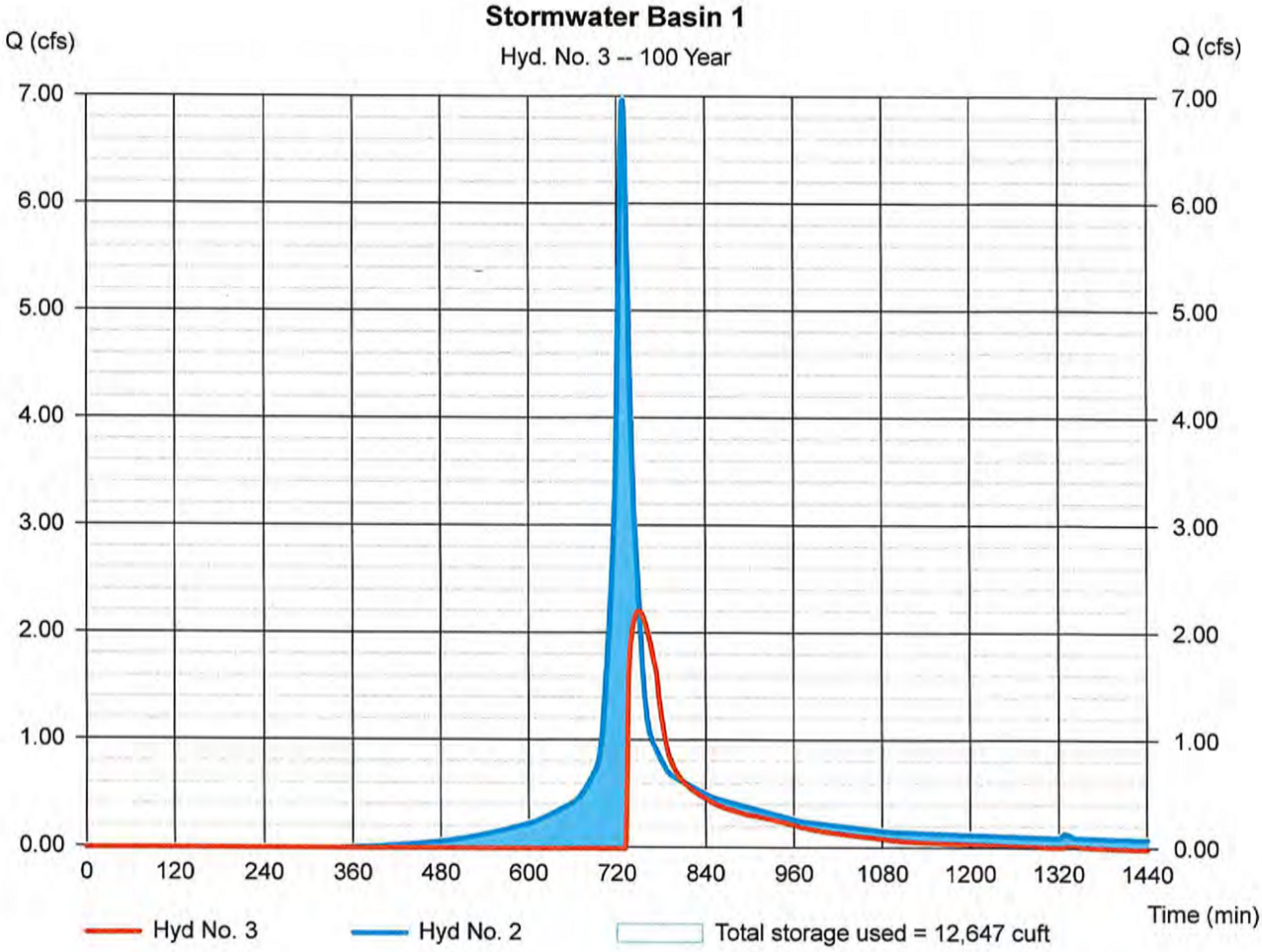
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 3

Stormwater Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 2.213 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 1 min	Hyd. volume	= 11,812 cuft
Inflow hyd. No.	= 2 - Proposed Conditions - Area 1	Max. Elevation	= 93.54 ft
Reservoir name	= Forebay & Stormwater Basin 1	Max. Storage	= 12,647 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

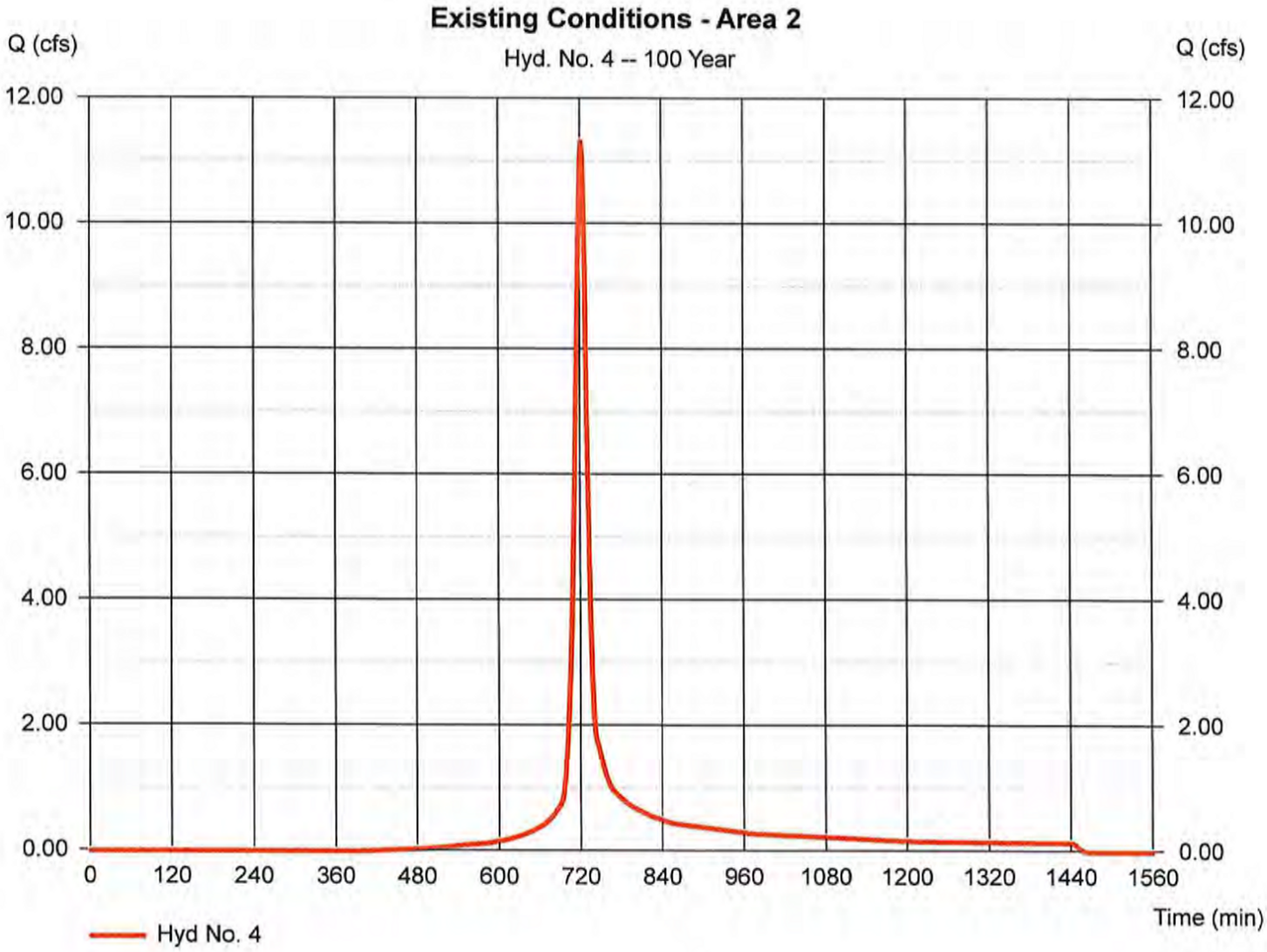
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 4

Existing Conditions - Area 2

Hydrograph type	= SCS Runoff	Peak discharge	= 11.33 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 31,908 cuft
Drainage area	= 1.900 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 15.00 min
Total precip.	= 7.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(1.000 x 55) + (0.900 x 98)] / 1.900



Hydrograph Report

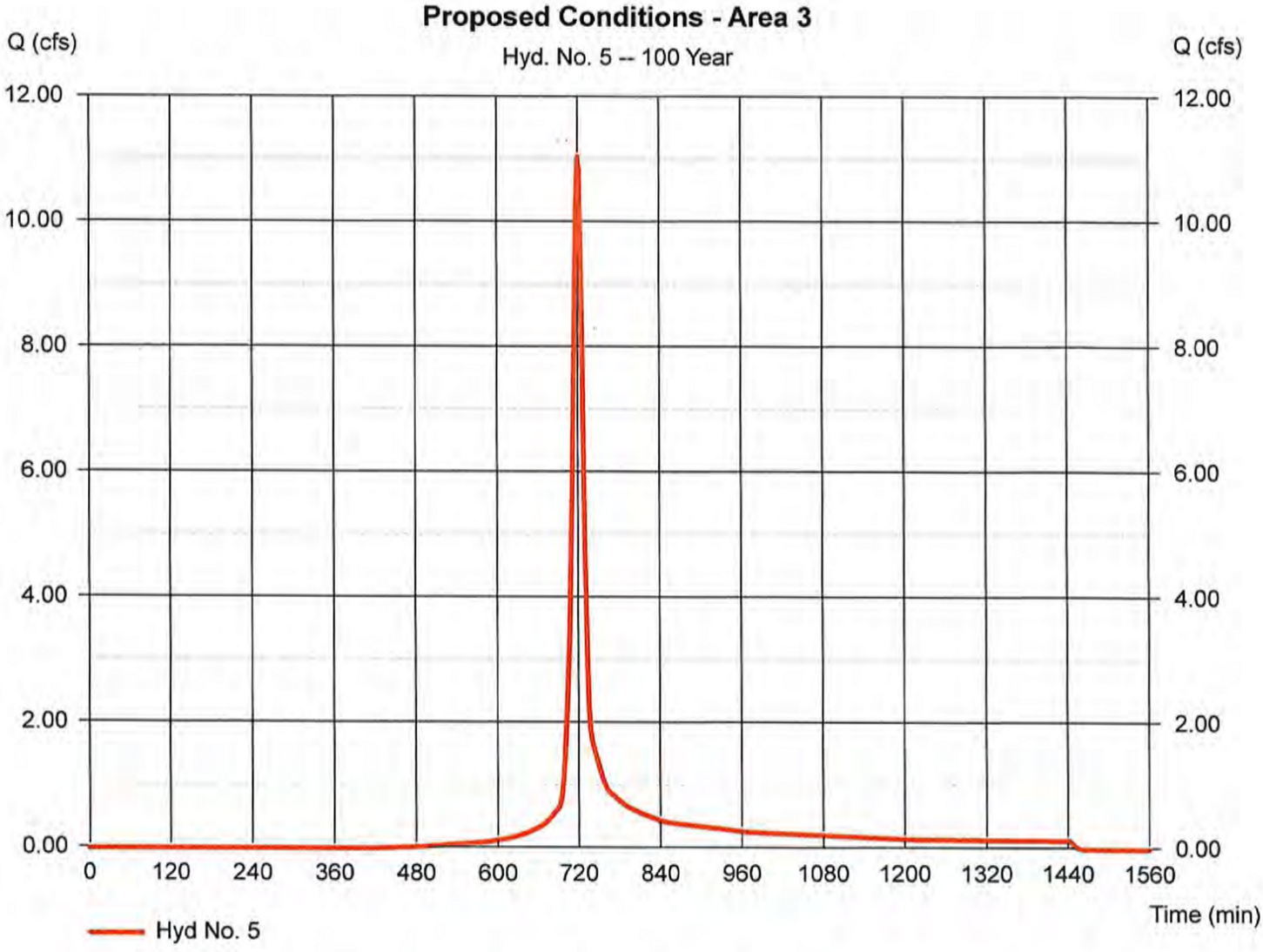
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 5

Proposed Conditions - Area 3

Hydrograph type	= SCS Runoff	Peak discharge	= 11.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 28,756 cuft
Drainage area	= 1.700 ac	Curve number	= 73*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.00 min
Total precip.	= 7.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.700 x 98) + (1.000 x 55)] / 1.700



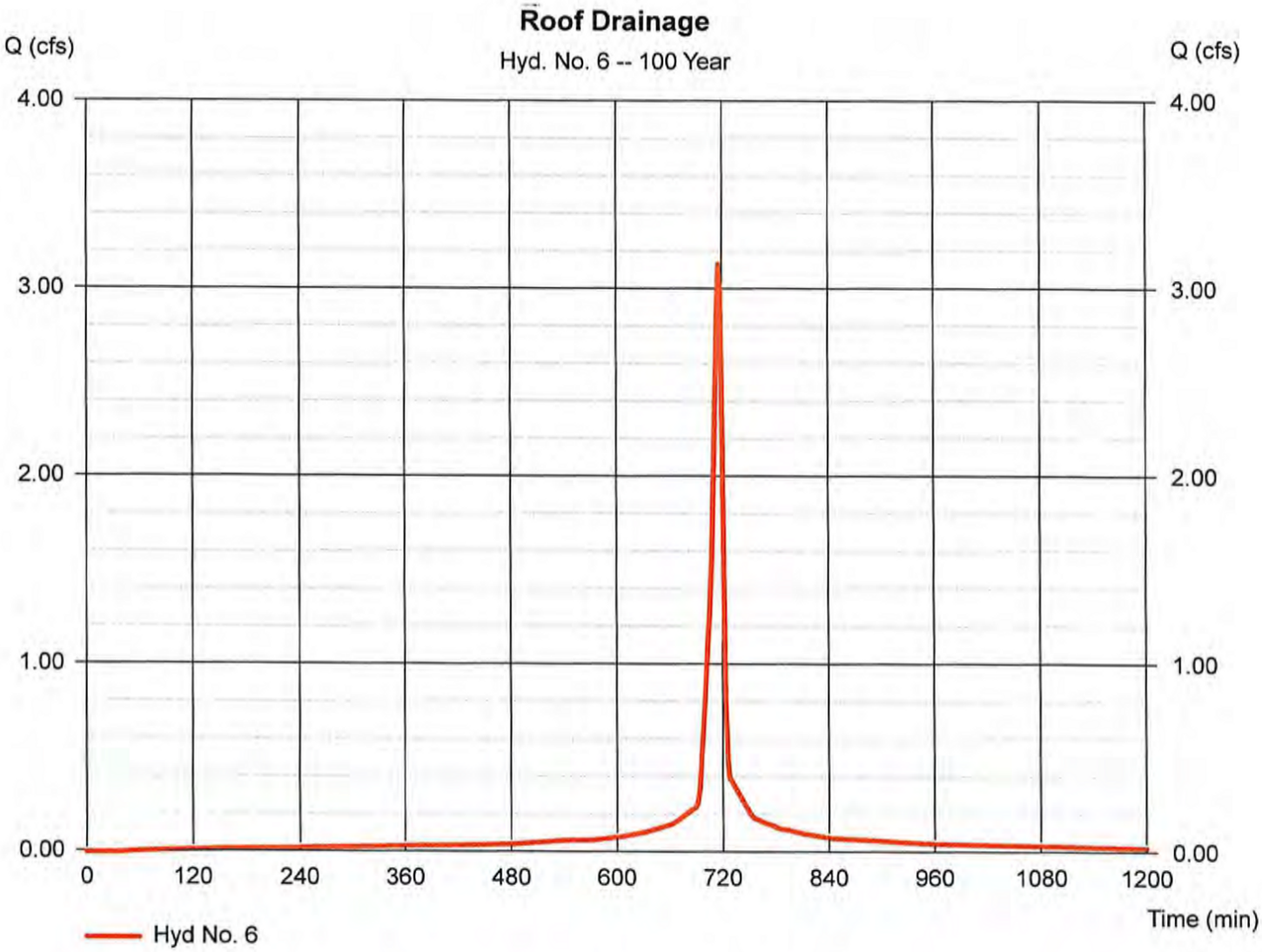
Hydrograph Report

Hyd. No. 6

Roof Drainage

Hydrograph type	= SCS Runoff	Peak discharge	= 3.136 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 7,586 cuft
Drainage area	= 0.300 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.300 x 98)] / 0.300



Hydrograph Report

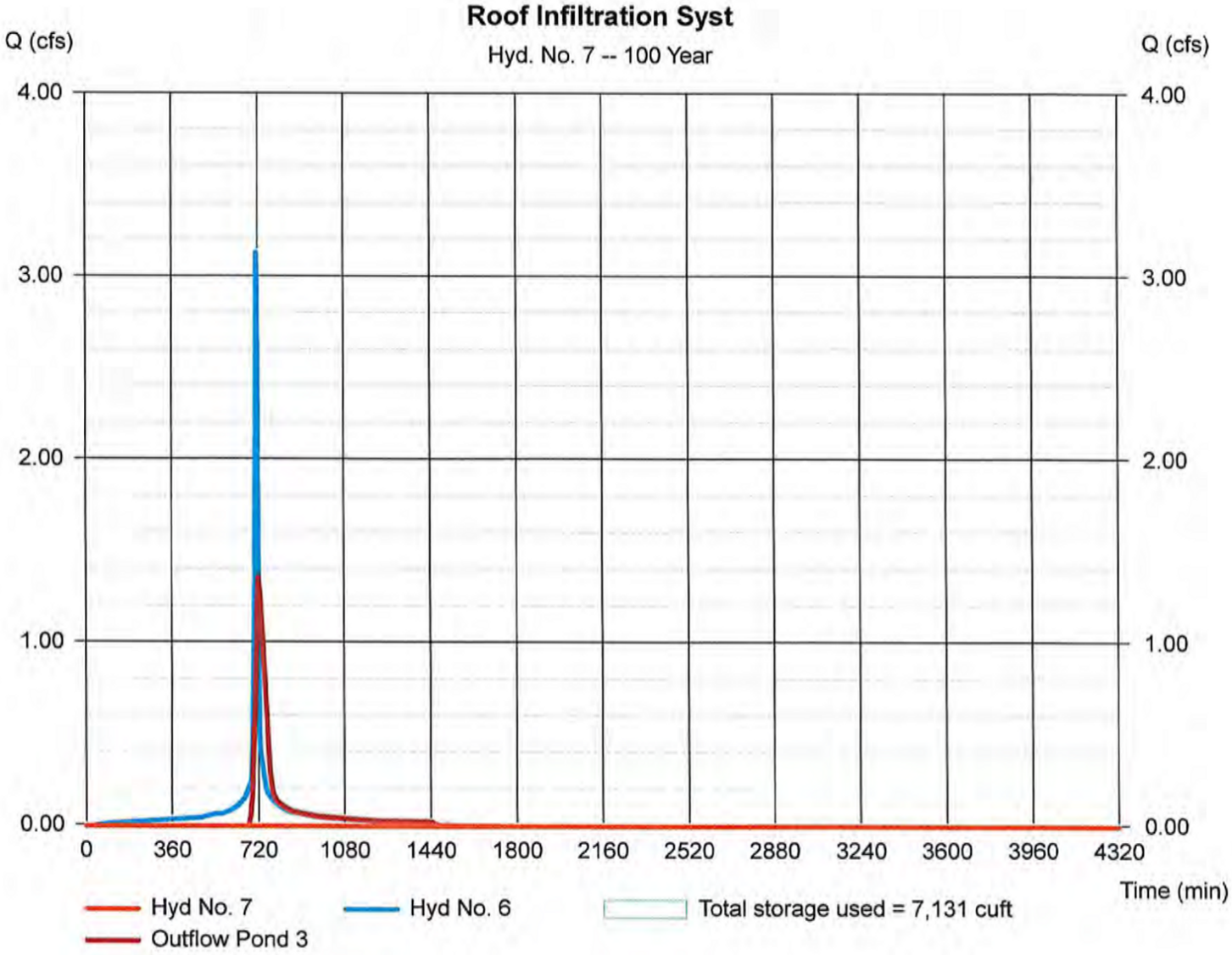
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 7

Roof Infiltration Syst

Hydrograph type	= Reservoir (Interconnected)	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 860 min
Time interval	= 2 min	Hyd. volume	= 0 cuft
Upper Pond		**Lower Pond**	
Pond name	= Roof Infiltrattion System	Pond name	= Forebay & Stormwat
Inflow hyd.	= 6 - Roof Drainage	Other Inflow hyd.	= None
Max. Elevation	= 91.82 ft	Max. Elevation	= 78.70 ft
Max. Storage	= 3,471 cuft	Max. Storage	= 3,660 cuft

Interconnected Pond Routing. Storage Indication method used. Exfiltration extracted from Outflow.



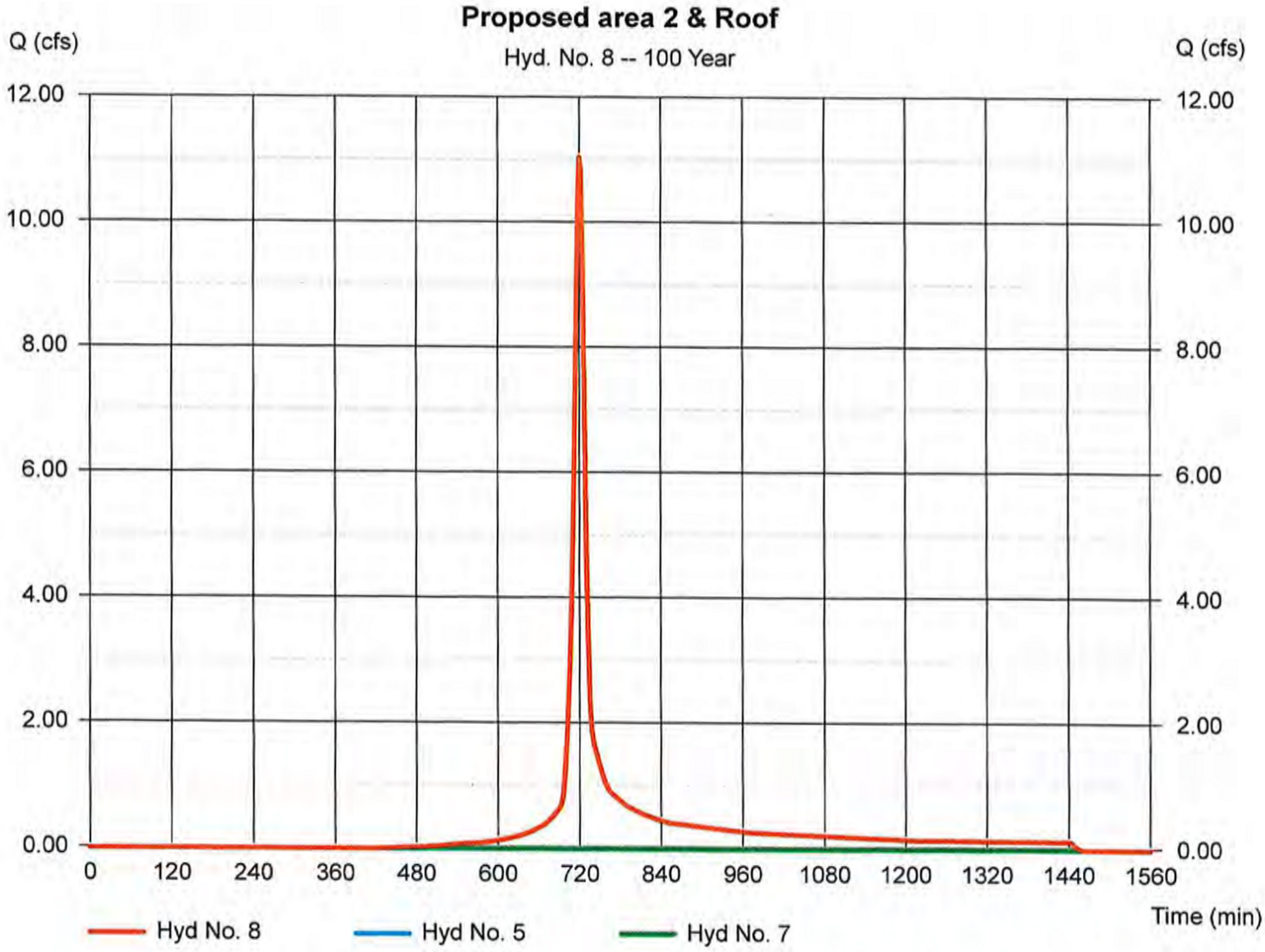
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 8

Proposed area 2 & Roof

Hydrograph type	= Combine	Peak discharge	= 11.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 28,756 cuft
Inflow hyds.	= 5, 7	Contrib. drain. area	= 1.700 ac



Hydrograph Report

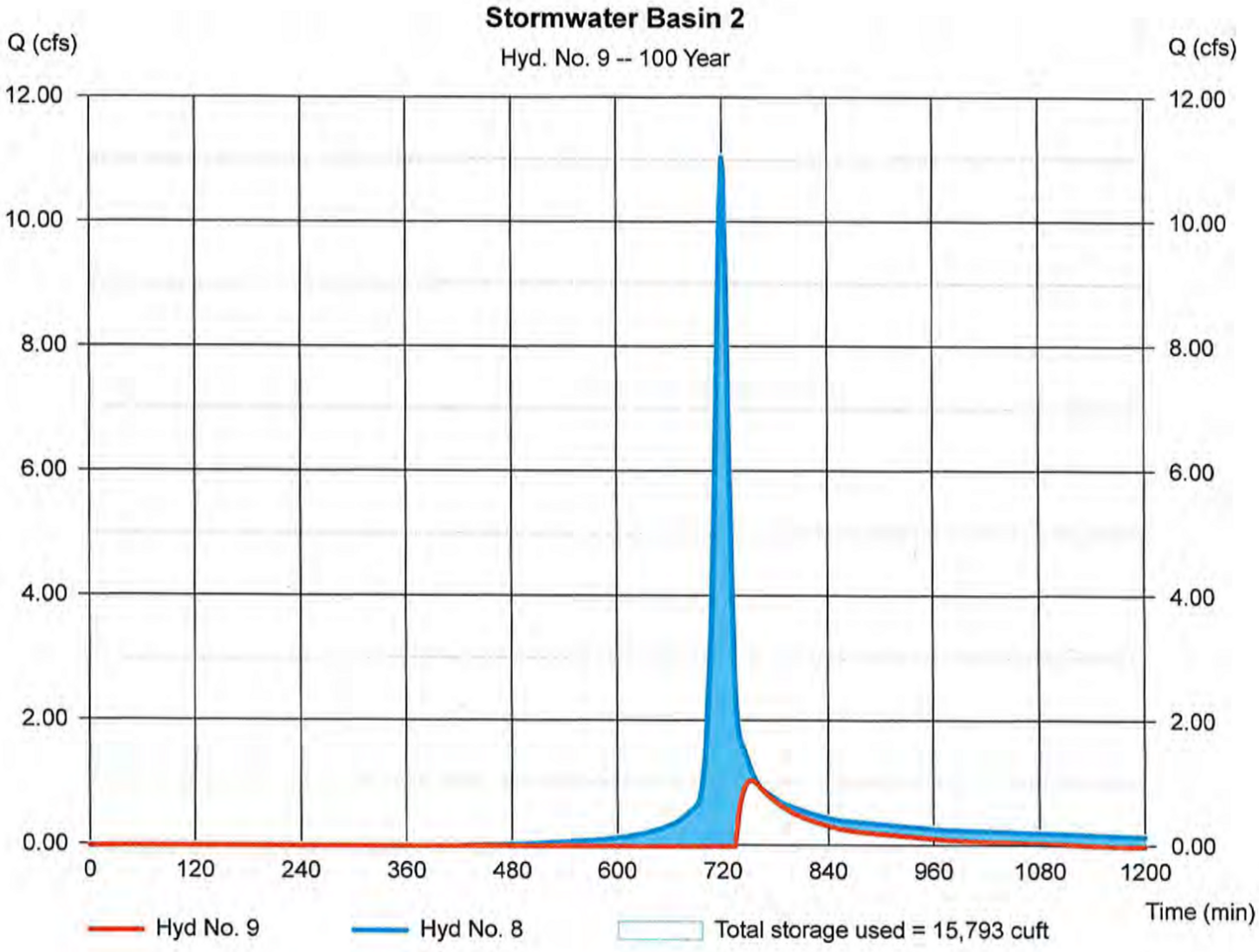
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Monday, Oct 9, 2023

Hyd. No. 9

Stormwater Basin 2

Hydrograph type	= Reservoir	Peak discharge	= 1.054 cfs
Storm frequency	= 100 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 6,228 cuft
Inflow hyd. No.	= 8 - Proposed area 2 & Roof	Max. Elevation	= 80.60 ft
Reservoir name	= Forebay & Stormwater Basin 2	Max. Storage	= 15,793 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



CLA Engineers, Inc.
Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

Permeability of Soils using Compaction Permeameter

Date: 10/8/2023
Project: 296 & 313 Willetts Avenue, Waterford, Ct.
CLA Project #: 7401
Material: On-site material manually extracted
Specification: Compacted to 110.0 lbs/cu ft per Soil Profiles

---

Sample #1: Test Hole #1 30 to 40 inches

Permeability: 1.67 x 10-3 cm/sec or 4.7 ft/day

Thomas Cummings 9 Oct 23
PE No. 9606



CLA Engineers, Inc.
Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

SIEVE ANALYSIS

Date: 10/5/2023
Project: 286 & 313 Willetts Avenue, Waterford, Ct.
CLA Project #: 7401
Material: Manually Extracted Test Hole
Specification: N/A
Sample Designation: TH 30 to 40 inches

Sieve Size	% Passing
3/4 in	74.0
¼ in	70.9
#4	69.5
#10	64.6
#20	57.1
#40	45.3
#60	30.5
#100	16.6
#200	4.9

Thomas Cummings 10-5-23
PE No. 9606



SIEVE ANALYSIS

CLIENT:	296 & 313 Willetts Ave	DATE:	10/5/2023
PROJECT:	296 & 313 Willetts Ave	BY:	JB
SOURCE:	Test Hole	SAMPLE:	TP 30 to 40 inches
SAMPLING METHOD	Sampled On-site	SPEC:	N/A

Sieve	Gross Weight	Sieve Weight	Net Weight	% Retained	% Pass	Spec
3/4 in	327.2			26.0	**74.0**	
1/4 in	365.2			29.1	**70.9**	
#4	383.6			30.5	**69.5**	
#10	445			35.4	**64.6**	
#20	539.8			42.9	**57.1**	
#40	687.2			54.7	**45.3**	
#60	873.2			69.5	**30.5**	
#100	1047.8			83.4	**16.6**	
#200	1195.6			95.1	**4.9**	
	1256.9					