HYDROLOGY REPORT

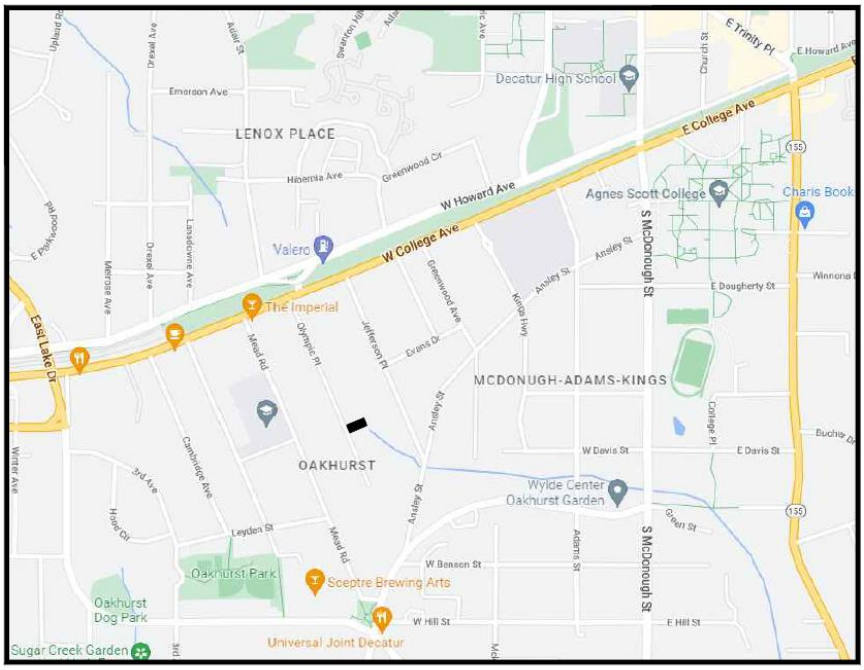
208 Olympic Place

City of Decatur, GA 30030

PREPARED BY:
JDM Consultants, LLC
P.O. Box 366411
Atlanta, GA 30336
Phone: (205) 266-1648

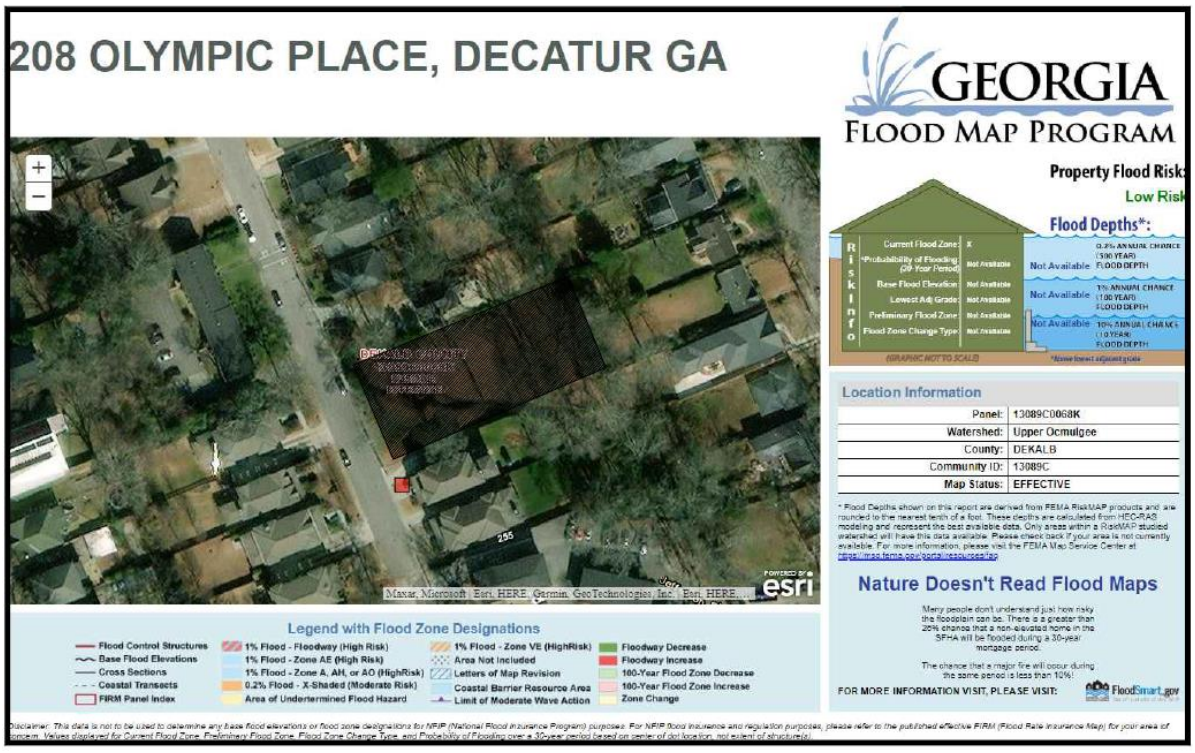
May 16th, 2023

Table of Contents



VICINITY MAP

NOT TO SCALE



FEMA MAP

NOT TO SCALE

HYDROLOGY REPORT

May 16, 2023

208 Olympic Place

County of Dekalb
City of Decatur, Georgia

Executive Summary & Narrative

The site is situated in the City of Decatur, Dekalb County, Georgia. More particularly, the site planned for development is located at 208 Olympic Place. It has frontage along Olympic Place to the west. The present zoning for the property is Single Family Residential (R-60). It is surrounded on the north, south & east by similar use zoning.

The total site is composed of two (2) properties with an area that measures 0.36 acres. The proposed improvements to the site will include the construction of a Single Family Home. Improvements will also include connecting access driveways & parking, as well as associated stormwater facilities & utilities. In the proposed condition, stormwater will be collected through sheet flow to the water quality best management practices (BMPs) & the underground piping that is conveyed to the underground stormwater facility. Afterwards, stormwater will discharge from the facility to the west of the proposed residence through underground piping at a minimal rate into an existing stream that flows through the site (at the approximate midspan) from northwest to southeast into a tributary of Shoal Creek (a creek that flows from north to south & terminates at South River).

The SCS Method, as developed by the USDA Natural Resources Conservation Service, was used to analyze the proposed conditions. Following the development of the curve numbers and times of concentrations for the drainage basins, a hydrologic model was developed for both the existing conditions and the developed conditions scenarios. Hydrograph and reservoir routing calculations were created using a computer program called Hydraflow Hydrographs Extension for Autodesk Civil 3D 2022. Input and output data sheets are included in the Appendix.

The site has been designed to meet the runoff reduction & stormwater management requirements set forth by the GSWMM. Moreover, the channel protection and flood control will be managed by an Outlet Control Structure. The design objective is to meet the twelve Design Standards of the Georgia Stormwater Management Manual including Water quality, Stream channel protection, overbank flooding protection, and extreme flooding protection. The strategy is to route as much of the developed area as possible to the underground detention facility by sheet flow & via underground storm piping (at an adequate slope to allow pipe self-cleaning). Conducive to maintaining or decreasing the existing flow rates, the design will attenuate any excess storm water flow rates generated by the post-development to pre-development rates within the detention facility.

Design Standard #1 Natural Resource Inventory

The existing site is wooded pasture that predominantly slopes towards the existing stream that crosses the site at the approximate midspan flowing from northwest to southeast into a tributary of Shoal Creek (a creek that flows from north to south & terminates at South River). Existing topography slopes range approximately 2% to 50%. The site is situated on Pacolet Urban Land Complex according to the Web Soil Survey. The site and surrounding area are served by public water and sewer systems. No wells have been identified on or near the site.

Design Standard #2 Better Site Design Practices for Stormwater Management

The goals of better site design include:

- Managing stormwater (quantity and quality) as close to the point of origin as possible and minimizing collection and conveyance
- Preventing stormwater impacts rather than mitigating them
- Utilizing simple, nonstructural methods for stormwater management that are lower cost and lower maintenance than structural controls (best management practices)
- Creating a multifunctional landscape
- Using hydrology as a framework for site design

We have incorporated the following Stormwater Better Site Design Practices into the site plan:

- ❖ Lower Impact Site Design Techniques
    - o Fit Design to the Terrain
    - o Locate Development in Less Sensitive Areas
    - o Reduce Limits of Clearing and Grading
- ❖ Utilization of Natural Features for Stormwater Management
    - o Use infiltration areas for natural groundwater recharge

The proposed improvements will be situated centrally on the property which serves as the least invasive approach to areas not already filled, flattened and developed as the historical imagery suggests. The proposed grade will basically follow the general flow pattern as the existing condition.

Design Standard #3 Runoff Reduction

Runoff reduction practices are stormwater Best Management Practices (BMPs) used to disconnect impervious and disturbed pervious surfaces from the storm drain system, thereby reducing post-construction stormwater runoff rates, volumes and pollutant loads. We have provided a green infrastructure BMP within the driveway to aid in meeting the 80% TSS removal WQ requirement. See the following runoff reduction BMPs that have been incorporated into the design:

- *Permeable Pavers* surfaces are made of either a porous material that enables stormwater to flow through it or nonporous blocks spaced so that water can flow between the gaps. Permeable paving can also include a variety of surfacing techniques for roads, parking lots, and pedestrian walkways. Permeable pavement surfaces may be composed of; pervious concrete, porous asphalt, paving stones, or interlocking pavers. The BMP will be used to accommodate a portion of the impervious area & provide runoff reduction for the development. The total area of the pavers is 0.02 acres (875 sf).

- *Infiltration Trench is a rock-filled trench with no outlet that receives stormwater runoff. Runoff is stored in the void space between the stones and infiltrates through the bottom and into the soil matrix. The primary stormwater removal mechanism of this practice is filtering through the soil. The total volume of the BMP will be as follows:*

  Prop. Infiltration Trench w/24" pipe near driveway:
  Volume: 5.48 sf x 35 lf = 192 cf (assuming 40% void space)

Design Standard #4 Water Quality

Water Quality treatment to remove 80% of Total Suspended Solids (TSS) is required for storm events of up to 1.2 inches of rainfall less runoff reduction credits calculated under Design Standards 2 and 3. See following for approach in fulfilling this requirement.

Pre-Developed Conditions

The existing site is vegetated pasture that predominantly slopes towards the existing stream that crosses the site at the approximate midspan flowing from northwest to southeast. The contributing flow of stormwater drainage entering into the stream area is an existing 30" pipe that discharges just SE of Olympic Place R/W. Thereafter, the drainage leaves the site in a southeasterly direction into a tributary of Shoals Creek. The existing topography slopes range from approximately 2% to 50%. For the purposes of this study, the pre-existing condition has been modeled as one (1) basin in a vegetated state that flows to a Point of Study. The basin is as follows:

- The Pre Basin has an onsite drainage area of 0.36 acres with a curve number (CN) of 55 and has been modeled as a predominantly pervious site with a time of concentration (Tc) of 13.0 minutes. The Pre Basin drains to the southeast towards the middle of the property & the Point of Study (POS), thereafter into a tributary of Shoals Creek.

Refer to the Pre-developed drainage map and exhibits section of this report for area breakdowns, Tc lines, and Tc calculations. See Appendix 5 for pre-developed storm calculations.

Post-Developed Conditions

The proposed improvements to the site will include the construction of a Single family residential home. Improvements will also include connecting access driveways & parking, as well as associated stormwater facilities & utilities. In the proposed condition, stormwater will be collected through sheet flow to the water quality BMPs & thereafter conveyed to the underground piping that leads to the underground stormwater facility. The overall property is 0.36 acres of which 0.20 acres of the property will be disturbed. The proposed condition has been modeled into three (3) basins that flows to the Point of Study. The basins are as follows:

- Post Basin "A1-Routed" is comprised of 0.02 acres with a CN value of 98 and a Tc of 5.0 minutes and includes the a portion of the driveway only. This basin is predominantly impervious. A breakdown of the composition of the curve number has been provided in the "Site Land Use Area Summary" below. Runoff will be routed towards the stream area & thereafter to the Point of Study (POS).

- Post Basin "A2-Routed" is comprised of 0.13 acres with a CN value of 81 and a Tc of 8.0 minutes and includes the residence & a portion of the driveway. There is approximately 0.08 acres (61.5%) of impervious area proposed in this basin and (20%) of impervious area proposed on the total property. A breakdown of the composition of the curve number has been provided in the "Site Land Use Area Summary" below. Runoff will be routed towards the UGD & thereafter the Point of Study (POS).

- Post Basin "Bypass", located predominantly within the stream area & along the southern & eastern perimeter of the property, is comprised of 0.21 acres with a CN value of 55 and a Tc of 14.2 minutes. The basin has a mixture of pervious & impervious surface. Runoff will bypass the proposed Pond and flow to Point of Study.

Please refer to the Runoff Curve number table, Time of Concentration (Tc) calculations and Post-Developed drainage maps for delineations of basins and flow paths, included in this report.

Table 1

SITE LAND USE AREA SUMMARY				
AREA DESCRIPTION		"Tc" (mins.)	"CN" VALUE	AREA (ACRES)
PRE-DEVELOPED:				
Pre Basin to POS	Vegetated Pasture	13	98	**0**
			55	**0.36**
			Weighted: 55	
			TOTAL AREA:	**0.36**
POST-DEVELOPED:				
Post Basin "A1-Routed" to POS	**Developed Areas:**	5	98	0.02
	Proposed Concrete drive at entrance		85	0
			55	0
			Weighted: 98	**0.02**
Post Basin "A2-Routed" to POS	Proposed residential building & driveway	8	**98**	**0.05**
			79	**0.03**
			55	**0.05**
			Weighted: 98	**0.13**
Post Basin "Bypass" to POS	Developed and Undeveloped Areas	14.2	98	0
			61	0
			55	0.21
			Weighted: 80	**0.21**
			TOTAL AREA:	**0.36**

The Runoff Reduction Volume required is summarized as follows:

The total Runoff Reduction requirement for the developed area was calculated to be 293.4 cf (see worksheet in Appendix). For this design, permeable pavers & infiltration below the UGD will be utilized to meet the RR requirement. Both BMPs will provide a total volume of 541.8 cf.

Design Standard #5 Stream Channel Protection

Stream channel protection requirements for the site are necessary per the Georgia Stormwater Management Manual. Based on the calculations for the site impervious area, the CPv required has been determined to be 1,012 cf. The peak flow for this 1-yr (24-hr storm) has been calculated to be 0.012 cfs. The flow falls below the threshold requirement for CPv control as per the GSWMM Sec. 2.2.4.2. However, based on the calculations, the underground detention pond has been designed to release the CPv through the WQv orifice over a 24-hr period. (See appendix for CPv calcs)

Drainage strategy/Summary

The existing site condition was analyzed as one (1) drainage basin. A Point of Study was chosen for observation. As previously mentioned, the site has varying slopes ranging from 2.0 - 50% across the property. The existing site is vegetative pasture that predominantly drains to the existing stream near the approximate midspan of the property. Thereafter, the drainage leaves the site in a southeasterly direction into a tributary of Shoals Creek. The pre-existing condition has been modeled as one (1) basin in a vegetated state with corresponding CN values of 55. Accordingly, the curve numbers for the post condition have been approximated for hydrologic soil group B as: Pervious area = 55 & 61, Impervious area = 98 & 79. The proposed post condition has been divided into three (3) drainage basins: Post A1-Routed, A2-Routed & Post Bypass. Stormwater flows within drainage basin Post "A1-Routed" will be conveyed to the proposed infiltration area near the driveway entrance. Whereas, Stormwater flows within drainage basin Post "A2-Routed" will be conveyed to the proposed underground detention facility. Conversely, stormwater flows from Basin Post "Bypass" will bypass the proposed BMPs towards the property line & the Point of Study (POS), thereafter into Shoal Creek (See Grading plan in Exhibits section). Based on the proposed design, the proposed infiltration area for Post "A1-Routed" will detain storm runoff from 0.02 acres. The infiltration area will be composed of No. 3 stone & a 24" perforated HDPE. The drainage will be controlled by a 30" OCS with a 1.5" orifice. Whereas, the proposed underground detention pond for Post "A2- Routed" will detain storm runoff from 0.13 acres. The underground detention pond facility will be composed of a series of connected thermoplastic arch chambers (MC-4500) with a 9" stone reservoir & encased with crushed stone, as well as 4ft rectangular outlet control structure (OCS), which will be used to control the rate of release from this system. A 12" RCP pipe will be affixed to the OCS allowing for discharge towards the property line. The OCS has been detailed and provided in the appendix. Stormwater drainage from basin Post "Bypass" was factored into the analysis at the POS.

Below are tables showing specific design requirements or results of the analysis. In the Appendix more details are provided through the use of maps, input / output data printouts, construction and schematic drawings.

Design Standard #6 Overbank Flood Protection

Overbank flood protection will be provided by controlling the post-development peak discharge rate to the pre-development rate (natural or existing condition, as applicable) for the 25-year, 24-hour return frequency storm event. Smaller storm events (e.g., 2-year and 10-year) are effectively controlled through a combination of extended detention for the 1-year, 24-hour event (channel protection) and control of the 25-year peak rate for overbank flood protection. These design standards, therefore, are intended to be used in unison.

Methodology

The purpose of the overbank flood protection study is to evaluate the hydrologic conditions of the post-developed site as it relates to the pre-developed conditions of the site so as to not increase the rate of runoff from the site to the Study Points in the 25-year storm after the development is complete. Smaller storm events are also evaluated.

The site's storm water runoff has been calculated for the pre-developed and post-developed basins and both have been compared to each other. This comparison will ensure that the post-developed rate of runoff shall be less than or equal to the pre-developed conditions at the existing discharge point in the 25-year storm event. The proposed flows have been routed through the existing designed storage facility and controlled with a stormwater outlet control structures. The outlet control structure will release the stormwater at a reduced rate so that the post-developed peak runoff rate does not exceed the pre-developed peak runoff rate.

The 24-hour rainfall amounts used are shown in the table below (NOAA Precipitation Frequency estimates are provided in the Appendix). The NRCS Method was used for analysis of the existing and proposed conditions. Autodesk's Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2021, a computer software program, was used to generate and route hydrographs and develop times of concentrations for this study.

Storm Event (yr)	24-hr Rainfall Amounts (in.)
1	3.27
2	3.68
5	4.39
10	5.02
25	5.93
50	6.67
100	7.45

Note: See appendix for NOAA Precipitation values

Time of Concentration

The time of concentration was determined using the procedures outlined by USDA NRCS TR-55. Exhibits in Section 5 of this report depict the path for the time of concentration for pre- and post-development calculations. **A minimum time of concentration of 5 minutes was used for post-developed basins.** Time of concentration calculations are included in Section 5 of this report.

Ground Cover Conditions (Curve Number)

The development of the runoff coefficient values followed the procedures developed by the USDA. A Curve Number value (CN) was assigned to each of these land uses to develop a composite coefficient for use in the modeling. The existing and proposed conditions were examined to develop corresponding "pre-developed" and "post-developed" runoff coefficient for use in the modeling. A "pre-developed" Curve Number value (CN) was assigned to each of the basins to determine the "pre-developed" runoff rates for use in the modeling. A "post-developed" Curve Number value (CN) was assigned to each of the basins to determine the "post-developed" runoff rates for use in the modeling. Detailed tables showing the CN and land use values used to compute the composite CN for each drainage basin are included in Table 1 of this report.

Table 2 -Pre-Developed Peak Flow Summary

PRE-DEVELOPED PEAK FLOW SUMMARY	
Storm Frequency (year)	Pre Basin to Point of Study (cfs)
1	0.06
2	0.12
5	0.27
10	0.43
25	0.70
50	0.93
100	1.19

Table 3 -Post-Developed Peak Flow Summary

POST-DEVELOPED PEAK FLOW SUMMARY						
Storm Frequency (year)	Post Basin "A1-Routed" to Infiltration Trench (cfs)	Post Basin "A1-Routed" thru Infiltration Trench (cfs)	Post Basin "A2-Routed" to Pond (cfs)	Post Basin "A2-Routed" thru Pond (cfs)	Post Basin "Bypass" to Point of Study (cfs)	Combine "Routed" + "Bypass" to POS (cfs)
1	0.10	0.05	0.33	0.01	0.03	0.08
2	0.11	0.05	0.40	0.01	0.07	0.12
5	0.13	0.06	0.53	0.03	0.15	0.21
10	0.15	0.06	0.65	0.04	0.24	0.33
25	0.18	0.07	0.81	0.05	0.38	0.50
50	0.20	0.08	0.95	0.07	0.51	0.65
100	0.22	0.08	1.10	0.08	0.66	0.81

Table 4 – Post-Developed Pond Routing Summary

PROPOSED INFILTRATION ROUTING SUMMARY				
Storm Frequency (year)	Post Basin "Routed" to Pond (cfs)	Storage Elevation (ft)	Storage Volume (cu.ft.)	Routed Flow to POS (cfs)
1	0.10	894.73	47	0.05
2	0.11	894.85	55	0.05
5	0.13	895.07	68	0.06
10	0.15	895.26	81	0.06
25	0.18	895.55	99	0.07
50	0.20	895.79	115	0.08
100	0.22	896.05	131	0.08

Table 5 – Post-Developed Pond Routing Summary

PROPOSED UNDERGROUND POND ROUTING SUMMARY				
Storm Frequency (year)	Post Basin "A-routed" to Pond (cfs)	Storage Elevation (ft)	Storage Volume (cu.ft.)	Routed Flow to POS "A" (cfs)
1	0.33	896.87	551	0.01
2	0.40	896.91	574	0.01
5	0.53	897.07	660	0.03
10	0.65	897.3	786	0.04
25	0.81	897.7	1,001	0.05
50	0.95	898.06	1,189	0.07
100	1.10	898.46	1,393	0.08

Table 6 – Post-Developed Peak Flow Summary "Percent Reduction"

PEAK FLOW SUMMARY "PERCENT REDUCTION"			
Storm Frequency (year)	Post Basin to POS (cfs)	Pre Basin to Point of Study (cfs)	Percent Reduction to POS
1	0.08	0.06	-30.00
2	0.12	0.12	5.65
5	0.21	0.27	22.43
10	0.33	0.43	24.07
25	0.50	0.70	28.35
50	0.65	0.93	30.65
100	0.81	1.19	32.27

Standard #7 Extreme Flood Protection

Extreme flood protection shall be provided by controlling and/or safely conveying the 100-year, 24-hour storm event (denoted Qf). This is accomplished either by

(1) controlling Qf through BMPs to maintain the existing 100-year floodplain, or
(2) by sizing the onsite conveyance system to safely pass Qf and allowing it to discharge into a receiving water whose protected floodplain is sufficiently sized to account for extreme flow increases without causing damage.

The 50-year and 100-year storms were modeled through the detention system using the same methodology as the 25-year storm.

Summary of 50-year and 100-year flows

As the above charts indicate, the site discharge from Basin A for the 50 & 100-yr storm event will be reduced by up to approx. 30%. From an overall site perspective the "total" post combined site runoff when compared to that of the pre-combined runoff total is maintained and reduced for each storm event.

Standard #8 Downstream Analysis

As part of our hydrology study, we are required to study an overall basin area that is representative of at least 10-times the size of our project site. For our analysis, we used the limited data provided by County GIS & topography to determine the overall drainage basin. Based on that info, the total basin draining to the POS is 7.98 acres whereas the drainage basin for the site development is 0.36 acres. The overall area is urban and composed of a high percentage of single-family residential as well as multi-family housing. As stated previously, a Curve Number value (CN) was assigned to each of these land uses to develop a composite coefficient for use in the modeling. The weighted runoff coefficient for the basin was assumed to be of 68, indicative of approx. 30% impervious coverage in the area surrounding our project site. The time of concentration was calculated to be approximately 12.7 minutes. Refer to the "Drainage Maps" section for the overall downstream drainage basin map. The total flow from the offsite and onsite areas were compared for the predevelopment condition and the post-development condition with detention provided.

Results

The post-development peak flow is less than the predevelopment peak flow as summarized in the following table.

Table 7 –Downstream Analysis to Point of Study

DOWNSTREAM PEAK FLOW SUMMARY (POINT OF STUDY)				
Storm Frequency (year)	**Dwnstrm Basin to POS (cfs)**	**Dwnstrm + Total Combined Post Peak Flow (cfs)**	**Dwnstrm + Total Combined Pre Peak Flow (cfs)**	**Percent Reduction to Point of Study (%)**
1	7.9	7.9	7.9	0.00
2	10.7	10.8	10.9	0.92
5	16.0	16.2	16.3	0.61
10	21.1	21.4	21.5	0.47
25	28.9	29.3	29.5	0.68
50	35.5	36.1	36.4	0.82
100	42.7	43.4	43.8	0.91

Standard #9 Construction Erosion and Sedimentation Control

Erosion and sedimentation control practices shall be utilized during the construction phase of development or during any land disturbing activities.

Erosion and sedimentation control plans have been prepared in accordance with the Georgia Erosion and Sedimentation Control Act and the NPDES General Permit for Construction Activities and are

included in the construction plan set. The practices are derived from guidance found in the latest version of the Manual for Erosion and Sediment Control in Georgia. Refer to the construction plans for details.

Standard #10 Stormwater Management System Operation and Maintenance

Maintenance Measures

A. Regular inspection and maintenance is critical to the effective operation of the stormwater system as designed. Maintenance responsibility for the system should be vested with a responsible authority. With that understanding the following is the inspection and maintenance requirements of the system:

Activity	Schedule
1. Remove any trash/debris and sediment buildup in the underground detention system	Annually
2. Inspect for damages. 3. Monitor for sediment accumulation. 4. Examine to ensure that inlet and outlet devices are free of debris and operational. 5. Check all control gates, valves or other mechanical devices.	Annual Inspection

B. Additional Maintenance Considerations and Requirements:

1. Sediment excavated from the stormwater system that does not receive runoff from designated hotspots is not considered toxic or hazardous material and can be safely disposed of by either land application or land filling. Sediment testing may be required prior to sediment disposal when a hotspot land use is present.

C. Review of Access and Safety Issues:

1. Access into the underground detention system shall be accessed through inlet covers located within the paved section of the site.
2. Any structural repairs or vegetated maintenance measures shall follow the standards of care and safety requirements set forth by OSHA.

Standard #11 Pollution Prevention

To the maximum extent practicable, the development or redevelopment project shall implement pollutant prevention practices and have a stormwater pollution prevention plan.

See the NPDES General Permit for Construction Activities for additional requirements for pollution prevention in addition to the erosion and sediment control provisions.

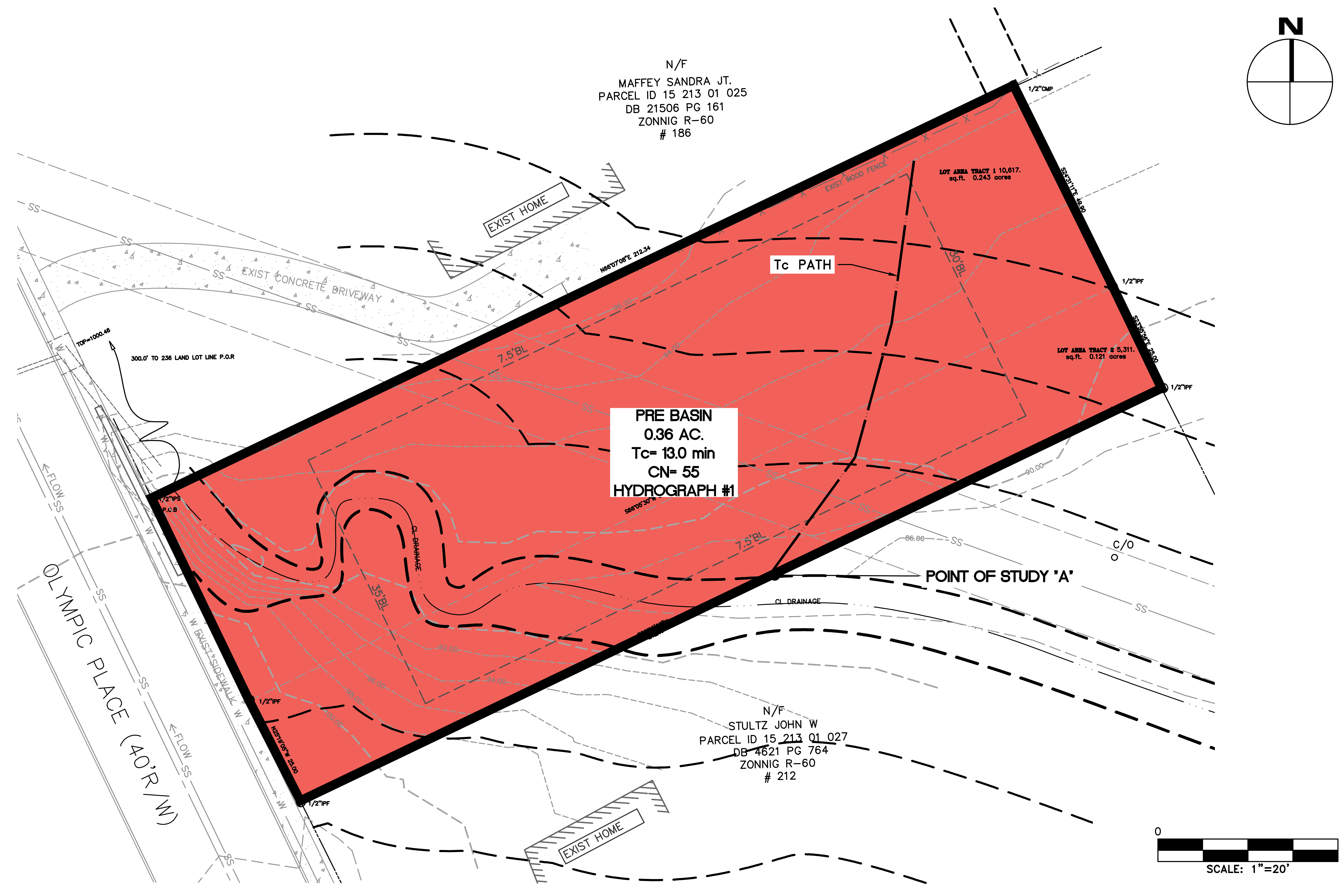
Standard #12 Stormwater Management Site Plan

The Stormwater Management Site Plan is included in the civil site plan set. The Stormwater Management Site Plan shows how Standards #1 though #11 are addressed.

Summary of Analysis

The following storm events: 1yr, 2yr, 5yr, 10yr, 25yr, 50yr, and 100-year have been analyzed to determine the impact at our points of study, both on-site and downstream at the 10% study point. With the exception of the 1-yr storm event, the proposed stormwater runoff release from the proposed site will not be greater than the rate of stormwater previously released to the points of study prior to development. The analysis indicates that the proposed stormwater management system has sufficient capacity to control stormwater runoff such that the proposed development will not cause adverse impact to life or property, public or private.

SECTION 2
DRAINAGE MAPS


N
N/F
MAFFEY SANDRA JT.
PARCEL ID 15 213 01 025
DB 21506 PG 161
ZONNIG R-60
186
EXIST HOME
EXIST CONCRETE BRIVEWAY
EXIST WOOD FENCE
LOT AREA TRACT 1 10,617. sq.ft. 0.243 acres
LOT AREA TRACT 2 5,311. sq.ft. 0.121 acres
Tc PATH
1/2"CMP
1/2"IPF
N66°07'08"E 212.34
TOP=1000.46
300.0' TO 236 LAND LOT LINE P.O.B
7.5'BL
30'BL
35'BL
PRE BASIN
0.36 AC.
Tc= 13.0 min
CN= 55
HYDROGRAPH #1
1/2"IPS
P.O.B
CL DRAINAGE
POINT OF STUDY "A"
C/O
FLOW
OLYMPIC PLACE (40'R/W)
EXIST SIDEWALK
N/F
STULTZ JOHN W
PARCEL ID 15 213 01 027
DB 4621 PG 764
ZONNIG R-60
212
EXIST HOME
0
SCALE: 1"=20'

REVISIONS

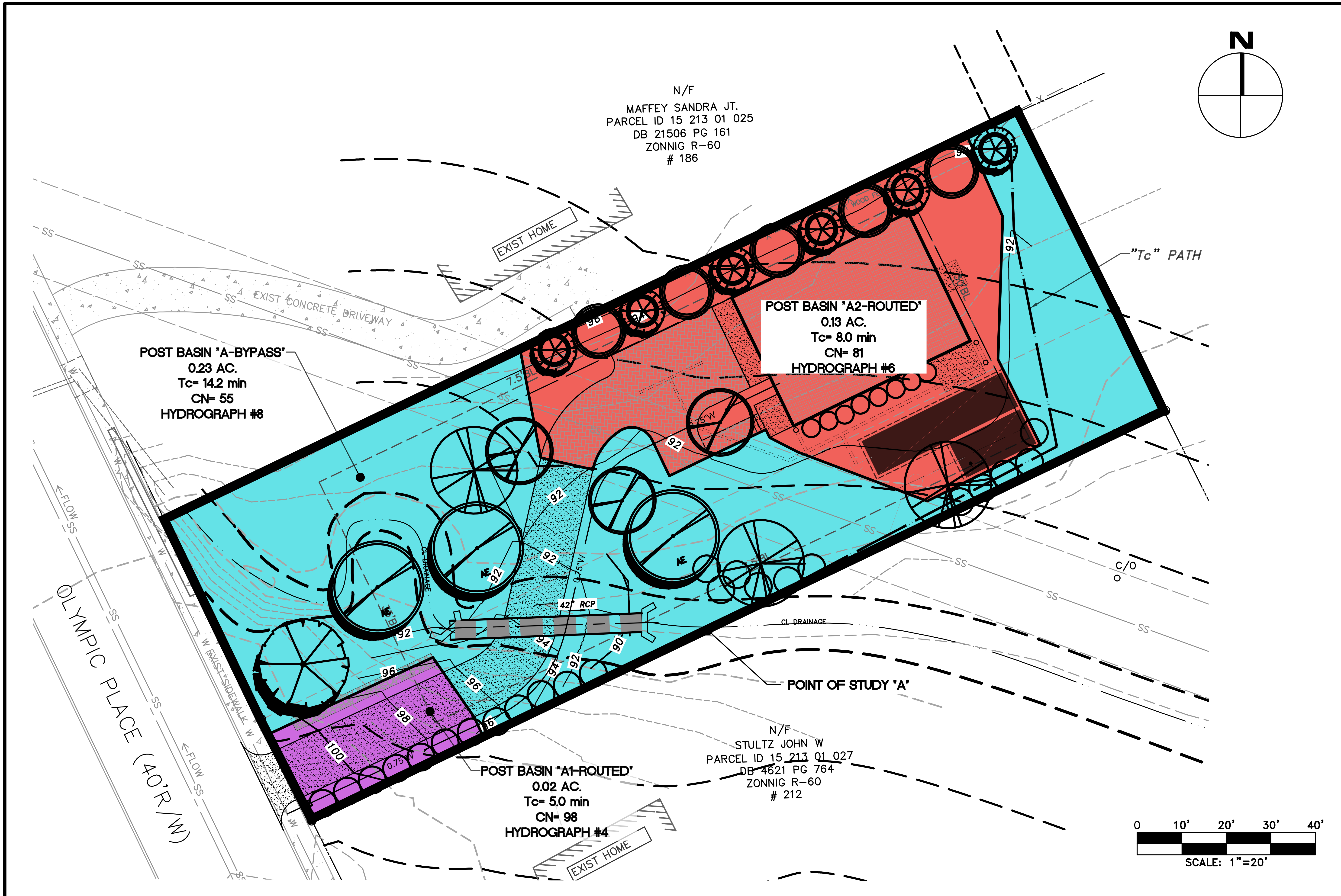
PROP. SINGLE FAMILY RESIDENTIAL
208 OLYMPIC PLACE
PREPARED FOR
ARTIS LISBON
CITY OF DECATUR, GA
DEKALB COUNTY, GA

JOB NO.:
DWG NAME: OLYMPIC PLACE HYDRO

PRE BASIN MAP

SHEET:
1 of 3

DATE: 5/15/2023


N
N/F
MAFFEY SANDRA JT.
PARCEL ID 15 213 01 025
DB 21506 PG 161
ZONNIG R-60
186
EXIST HOME
EXIST CONCRETE DRIVEWAY
"Tc" PATH
POST BASIN 'A2-ROUTED'
0.13 AC.
Tc= 8.0 min
CN= 81
HYDROGRAPH #6
POST BASIN 'A-BYPASS'
0.23 AC.
Tc= 14.2 min
CN= 55
HYDROGRAPH #8
OLYMPIC PLACE (40'R/W)
EXIST SIDEWALK
FLOW
42" RCP
CL DRAINAGE
c/o
POINT OF STUDY 'A'
POST BASIN 'A1-ROUTED'
0.02 AC.
Tc= 5.0 min
CN= 98
HYDROGRAPH #4
N/F
STULTZ JOHN W
PARCEL ID 15 213 01 027
DB 4621 PG 764
ZONNIG R-60
212
EXIST HOME
0 10' 20' 30' 40'
SCALE: 1"=20'

REVISIONS

PROP. SINGLE FAMILY RESIDENTIAL
208 OLYMPIC PLACE
PREPARED FOR
ARTIS LISBON

CITY OF DECATUR, GA
DEKALB COUNTY, GA

JOB NO:
DWG NAME:OLYMPIC PLACE HYDRO

POST DEV. BASIN MAP

SHEET:
2 of 3

DATE: 5/15/2023

DOWNSTREAM BASIN
W/O SITE
7.98 AC.
Tc= 12.7 min
CN= 68
HYDROGRAPH #12

OVERLAND FLOW DIRECTED TO INLET OF PROPOSED 42" PIPE
AREA= 20,305 SF (0.46 AC.)
INTENSITY= 8IN/HR
COVER= 0.75
C*I*A= 2.76 CFS

"Tc" PATH

POST BASIN "A2-ROUTED"
0.13 AC.
Tc= 8.0 min
CN= 81
HYDROGRAPH #6

POST BASIN "A-BYPASS"
0.23 AC.
Tc= 14.2 min
CN= 55
HYDROGRAPH #8

POST BASIN "A1-ROUTED"
0.02 AC.
Tc= 5.0 min
CN= 98
HYDROGRAPH #4

DOWNSTREAM STUDY POINT

Olympic Pl

OLYMPIC PLACE (40'R/W)

N

0 35' 70' 105' 140'
SCALE: 1"=70'

REVISIONS

PROP. SINGLE FAMILY RESIDENTIAL
208 OLYMPIC PLACE
PREPARED FOR
ARTIS LEBON

CITY OF DECATUR, GA
DEKALB COUNTY, GA

JOB NO:
DWG NAME:OLYMPIC PLACE HEC-RAS

DOWNSTREAM BASIN MAP

SHEET
3 of 3

DATE 5/15/2023

SECTION 3
PRE & POST DEVELOPED HYDROGRAPHS

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

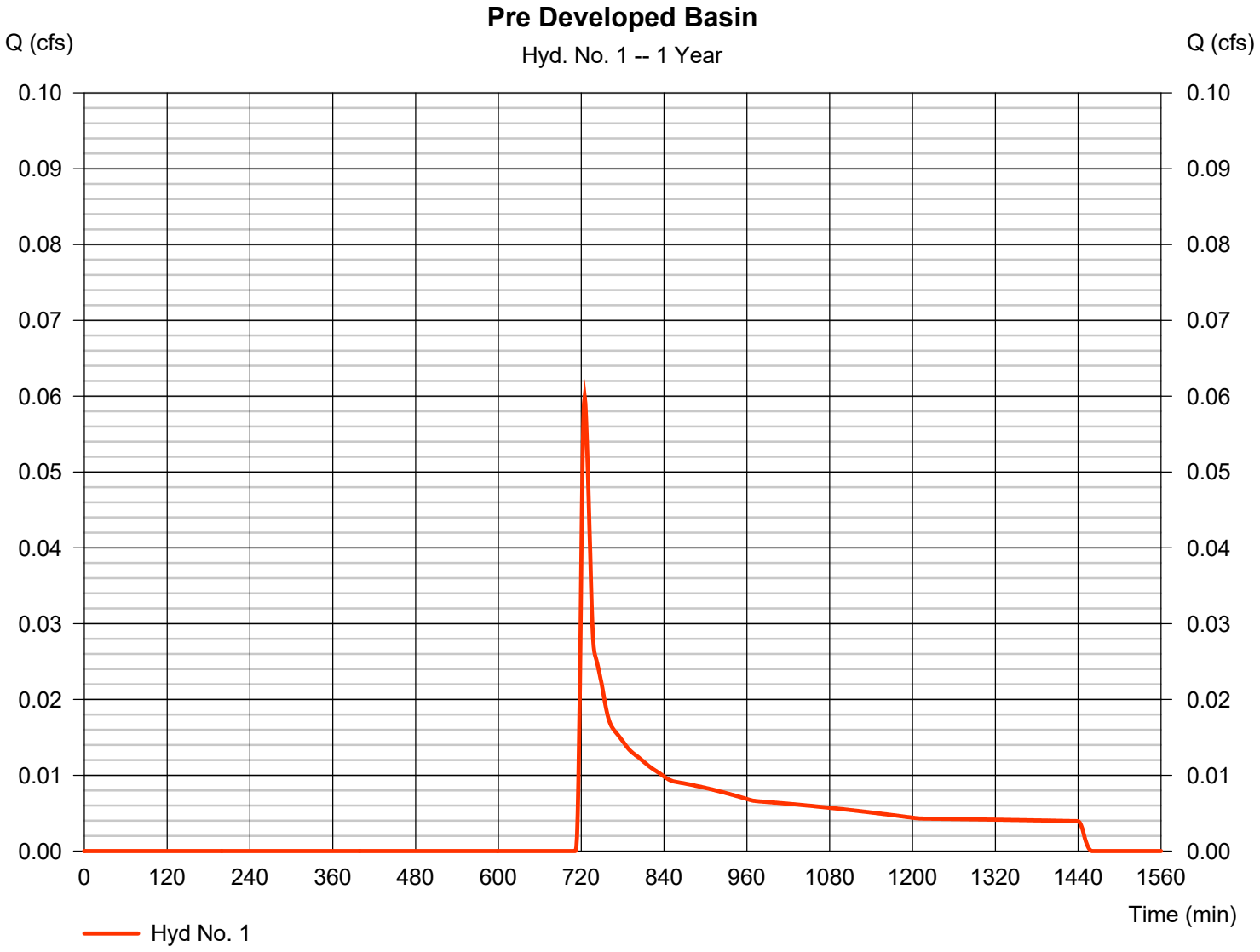
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.060	1	725	350	------	------	------	Pre Developed Basin
4	SCS Runoff	0.096	1	717	227	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.047	1	723	227	4	94.73	47.0	POST ROUTED THRU POND
6	SCS Runoff	0.332	1	719	701	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.006	1	1047	179	6	896.87	551	POST ROUTED THRU POND
8	SCS Runoff	0.032	1	726	207	------	------	------	POST DEV BYPASS
9	Combine	0.078	1	725	613	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	7.922	1	722	21,984	------	------	------	Dwnstrm w-o Site
13	Combine	7.974	1	722	22,333	1, 12	------	------	TOTAL Pre Basin
14	Combine	7.994	1	722	22,597	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.060 cfs
Storm frequency	=	1 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	350 cuft
Drainage area	=	0.360 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	3.27 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



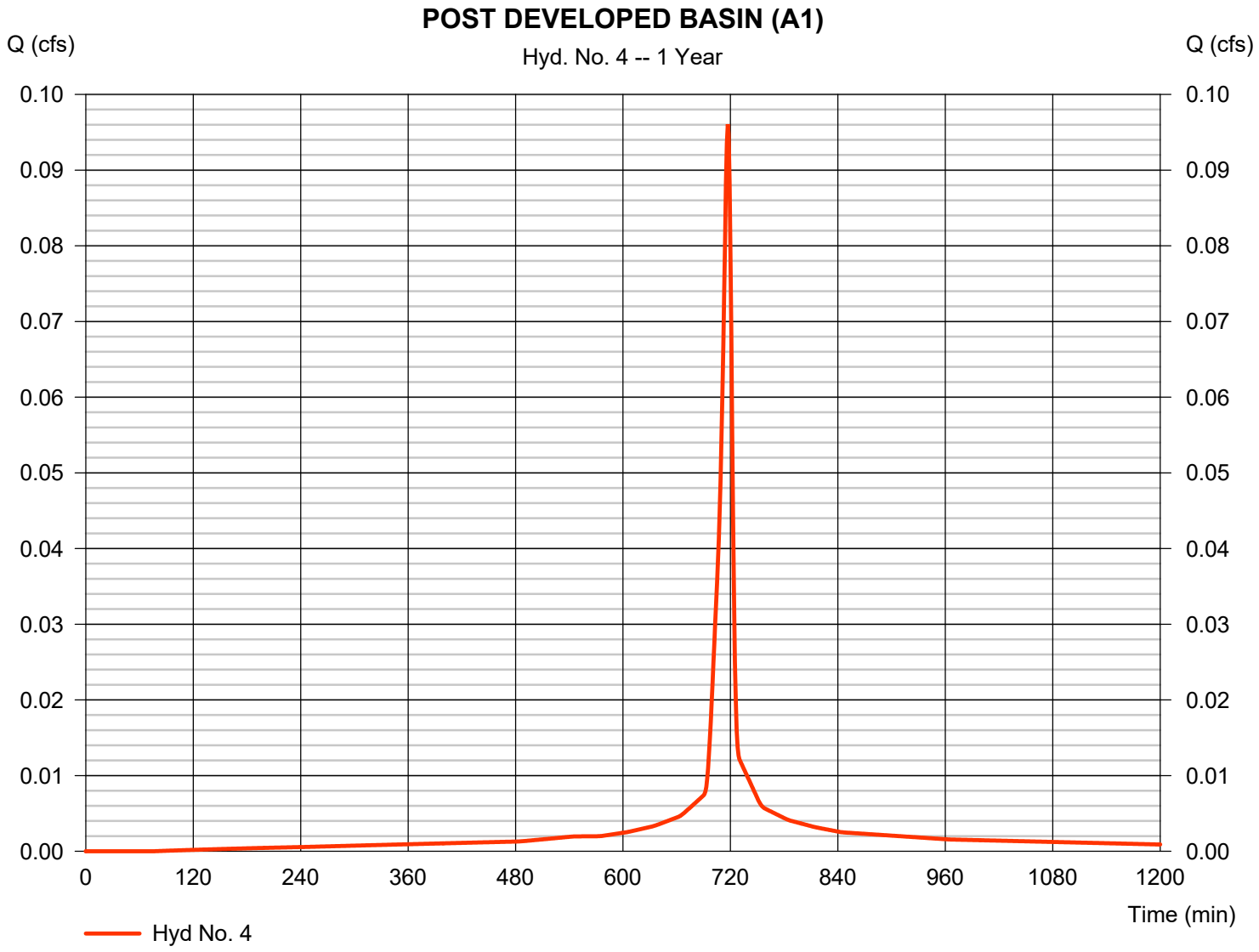
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.096 cfs
Storm frequency	= 1 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 227 cuft
Drainage area	= 0.020 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.27 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98)] / 0.020



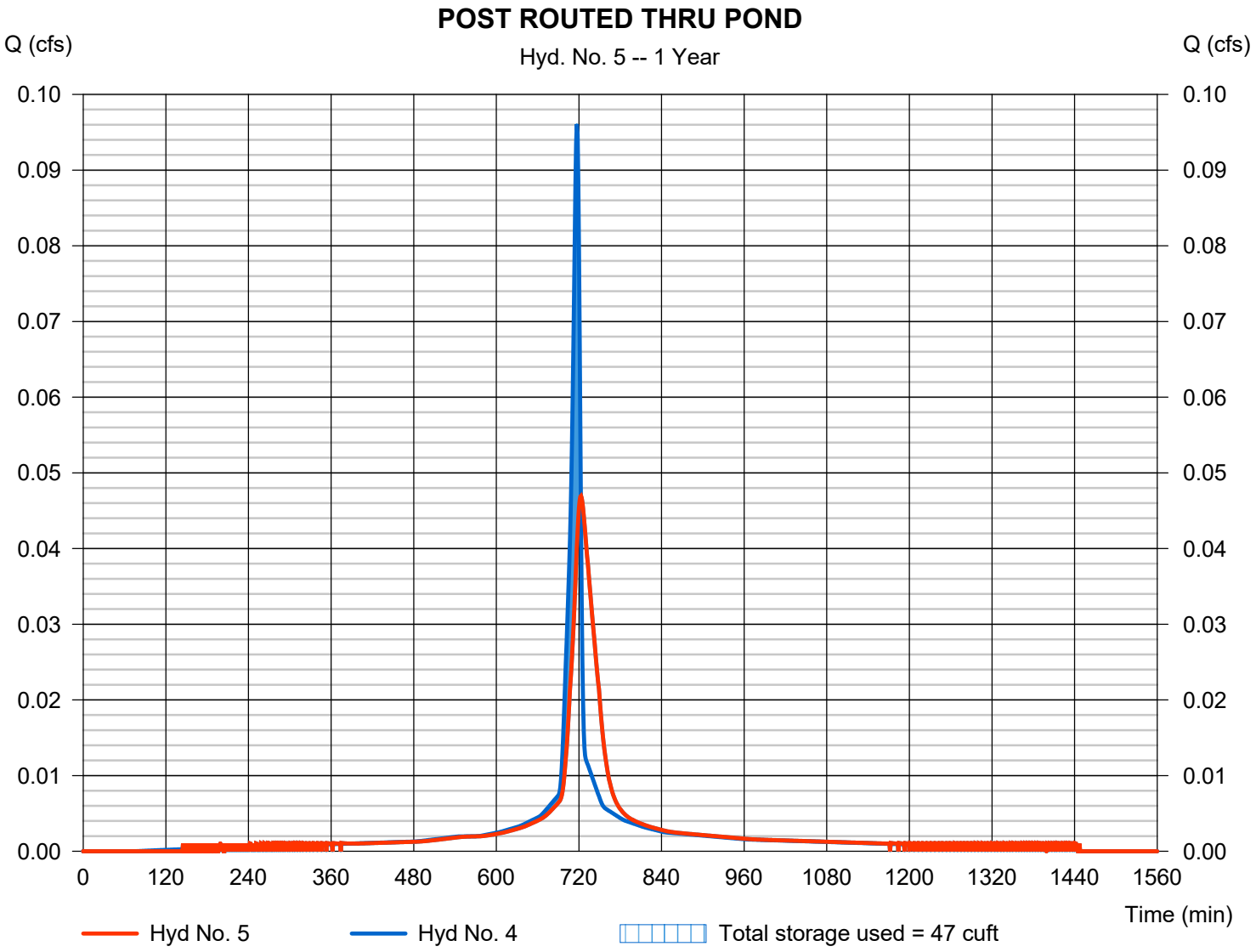
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	= Reservoir	Peak discharge	= 0.047 cfs
Storm frequency	= 1 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 227 cuft
Inflow hyd. No.	= 4 - POST DEVELOPED BASIN (A1)	Max. Elevation	= 94.73 ft
Reservoir name	= Stone Reservoir 1	Max. Storage	= 47 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



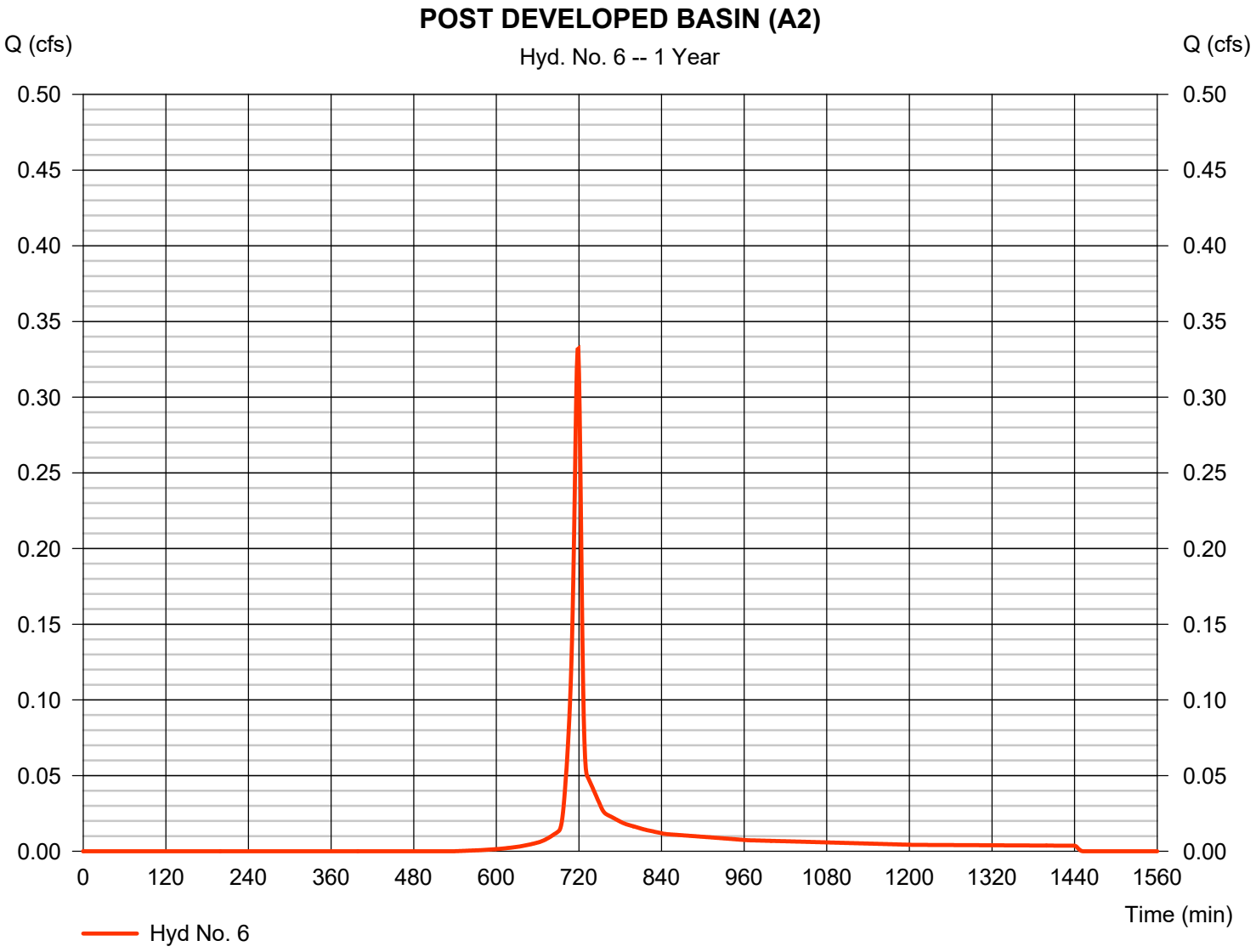
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.332 cfs
Storm frequency	= 1 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 701 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 3.27 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



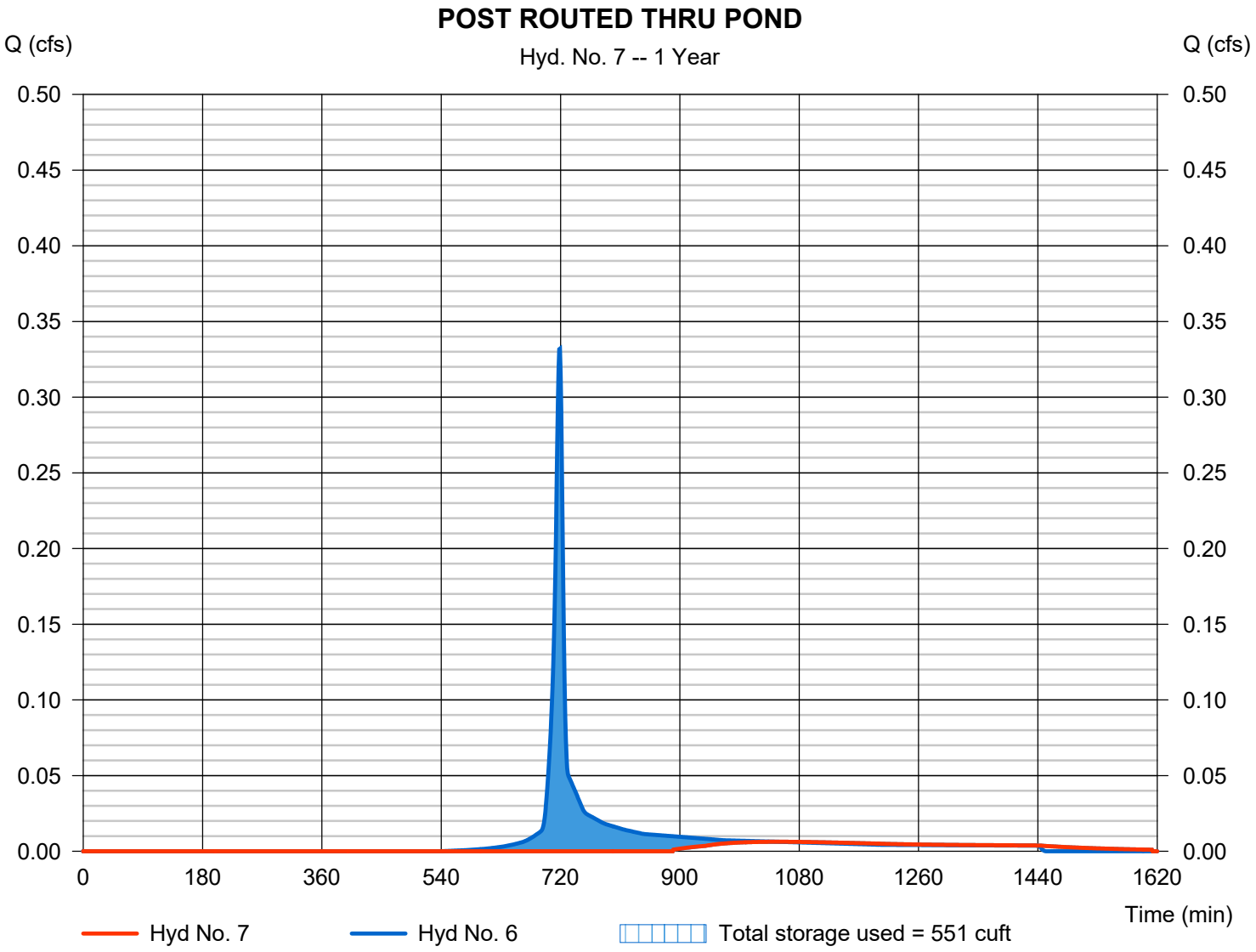
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.006 cfs
Storm frequency	=	1 yrs	Time to peak	=	1047 min
Time interval	=	1 min	Hyd. volume	=	179 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	896.87 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	551 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

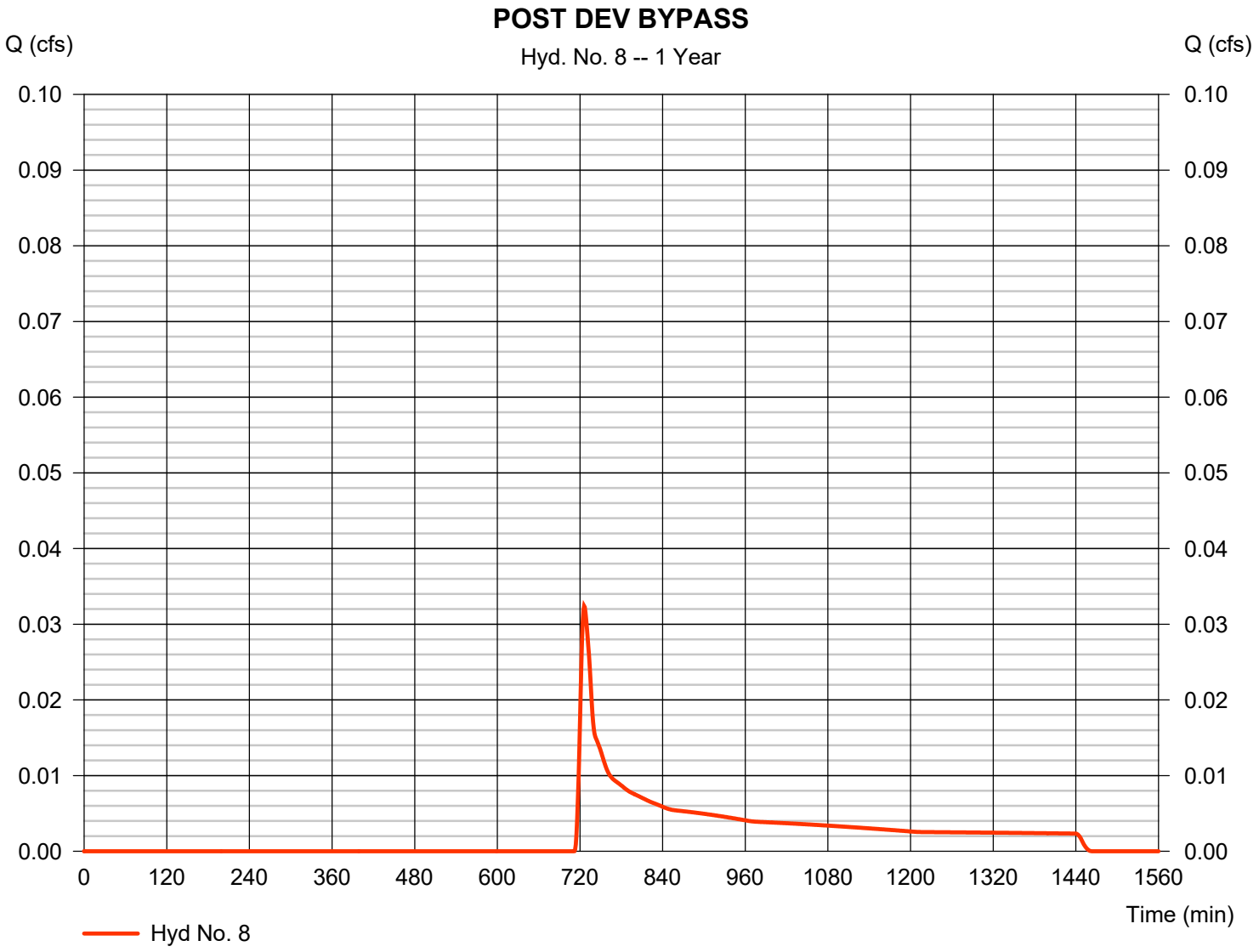


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.032 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	207 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	3.27 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

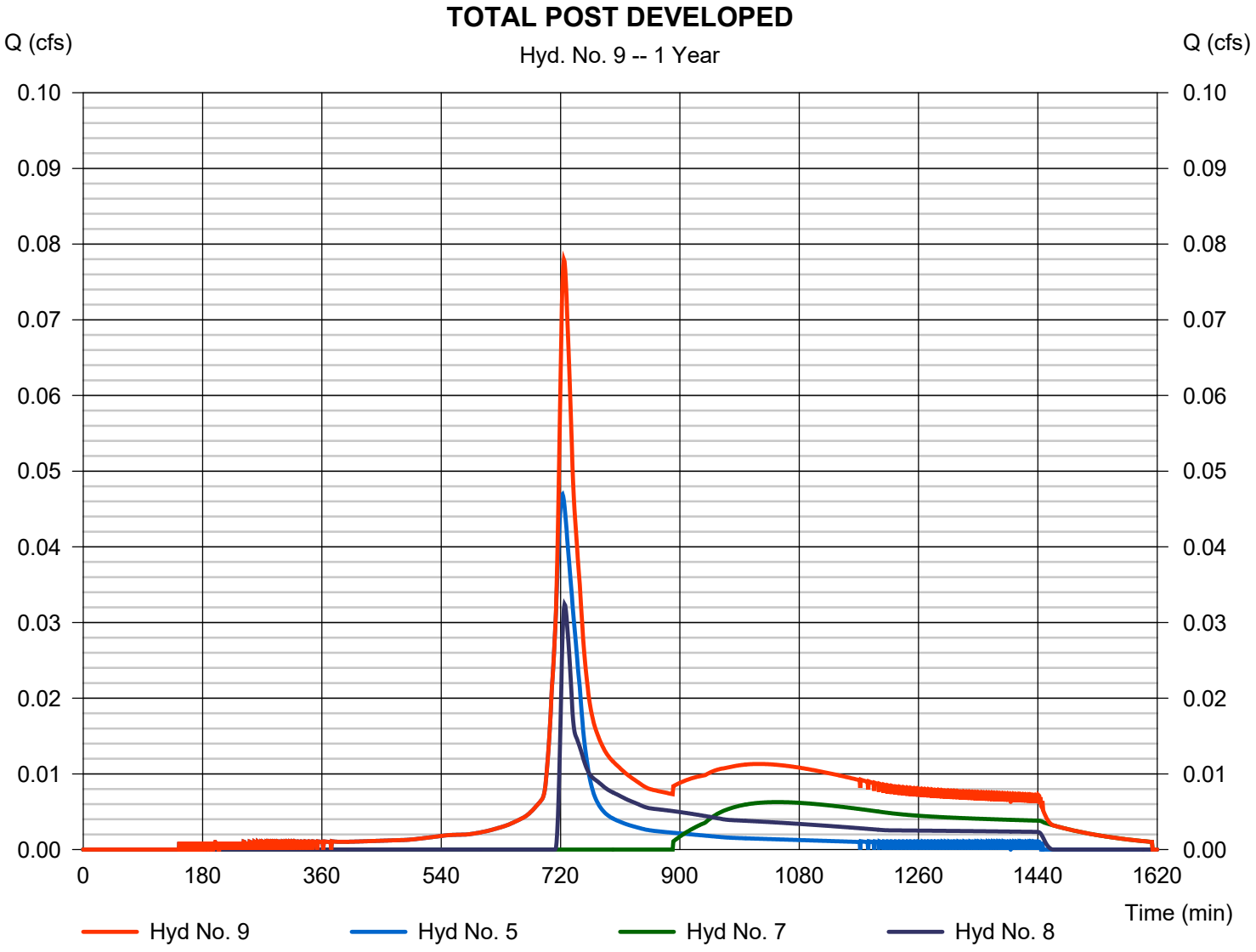


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	= Combine	Peak discharge	= 0.078 cfs
Storm frequency	= 1 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 613 cuft
Inflow hyds.	= 5, 7, 8	Contrib. drain. area	= 0.210 ac



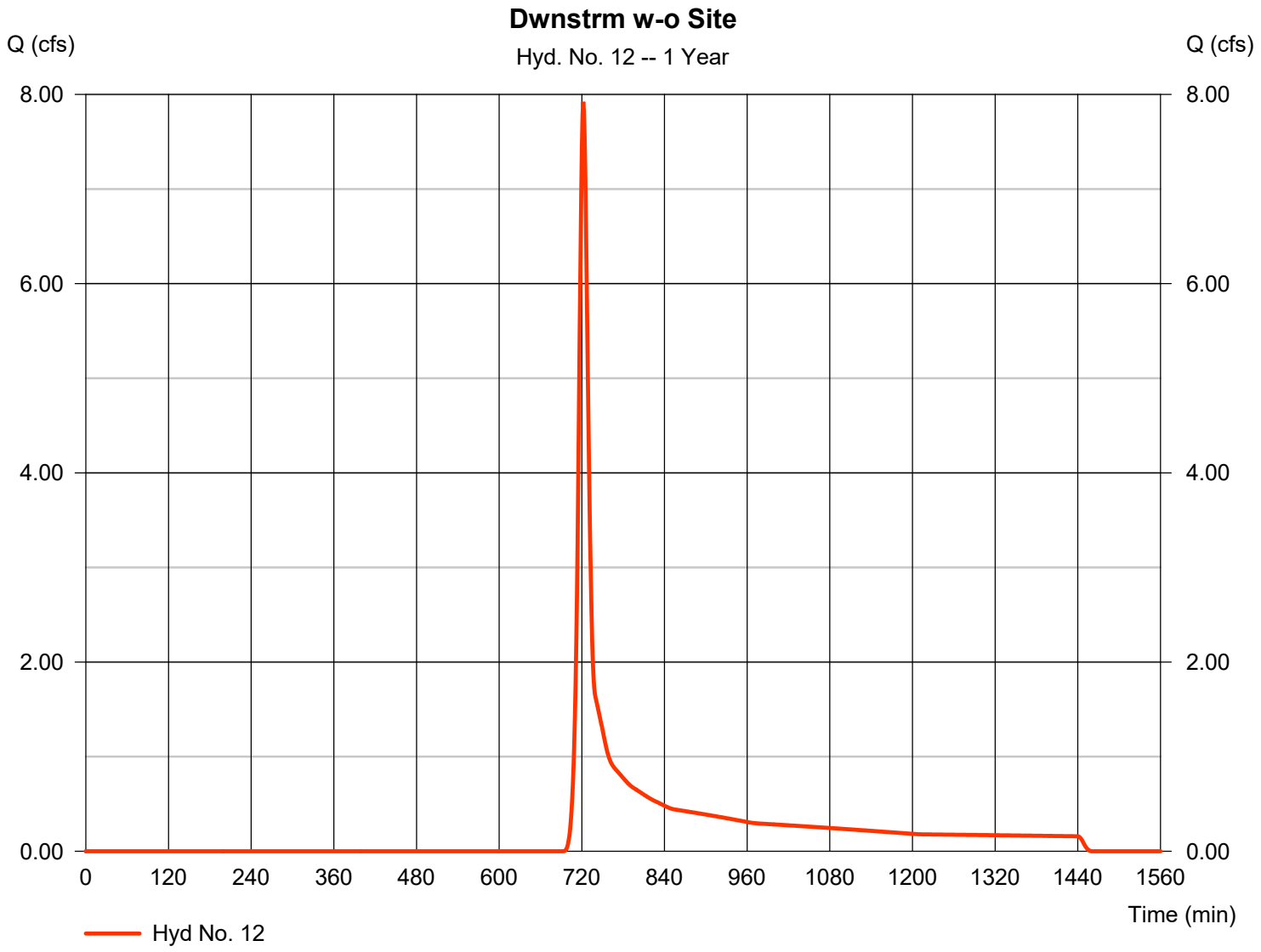
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.922 cfs
Storm frequency	=	1 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	21,984 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	3.27 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

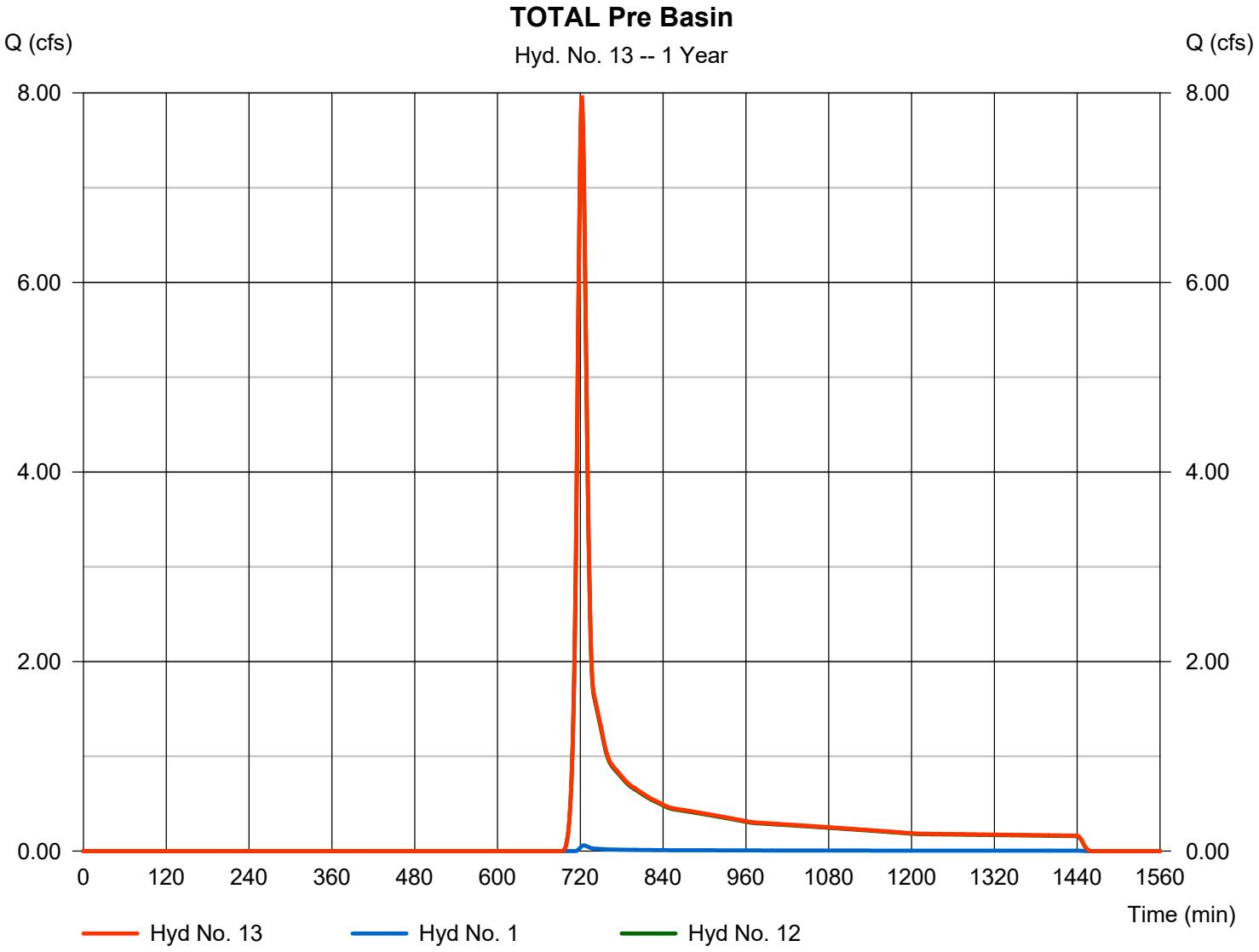


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	7.974 cfs
Storm frequency	=	1 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	22,333 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

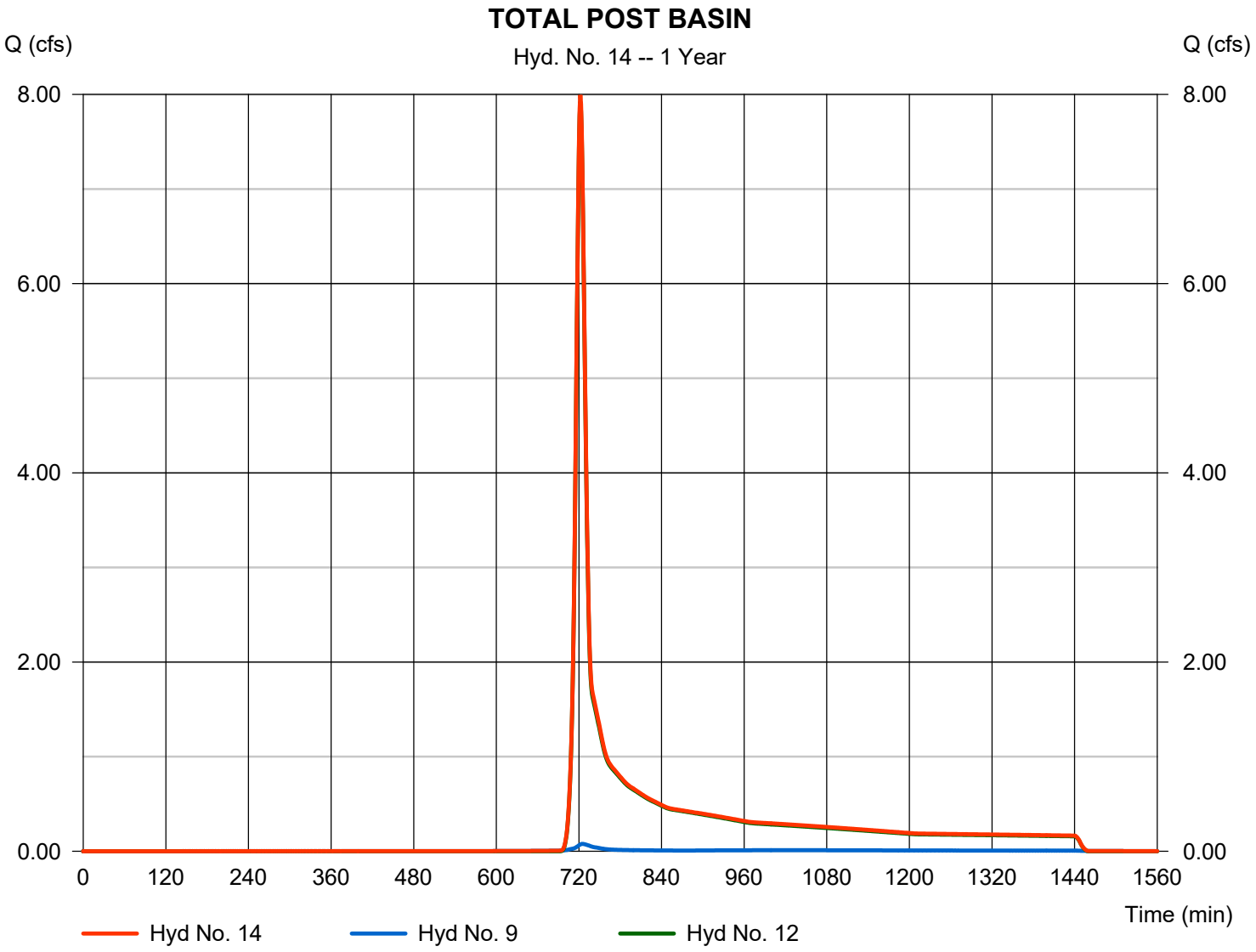


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	= Combine	Peak discharge	= 7.994 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 22,597 cuft
Inflow hyds.	= 9, 12	Contrib. drain. area	= 7.980 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

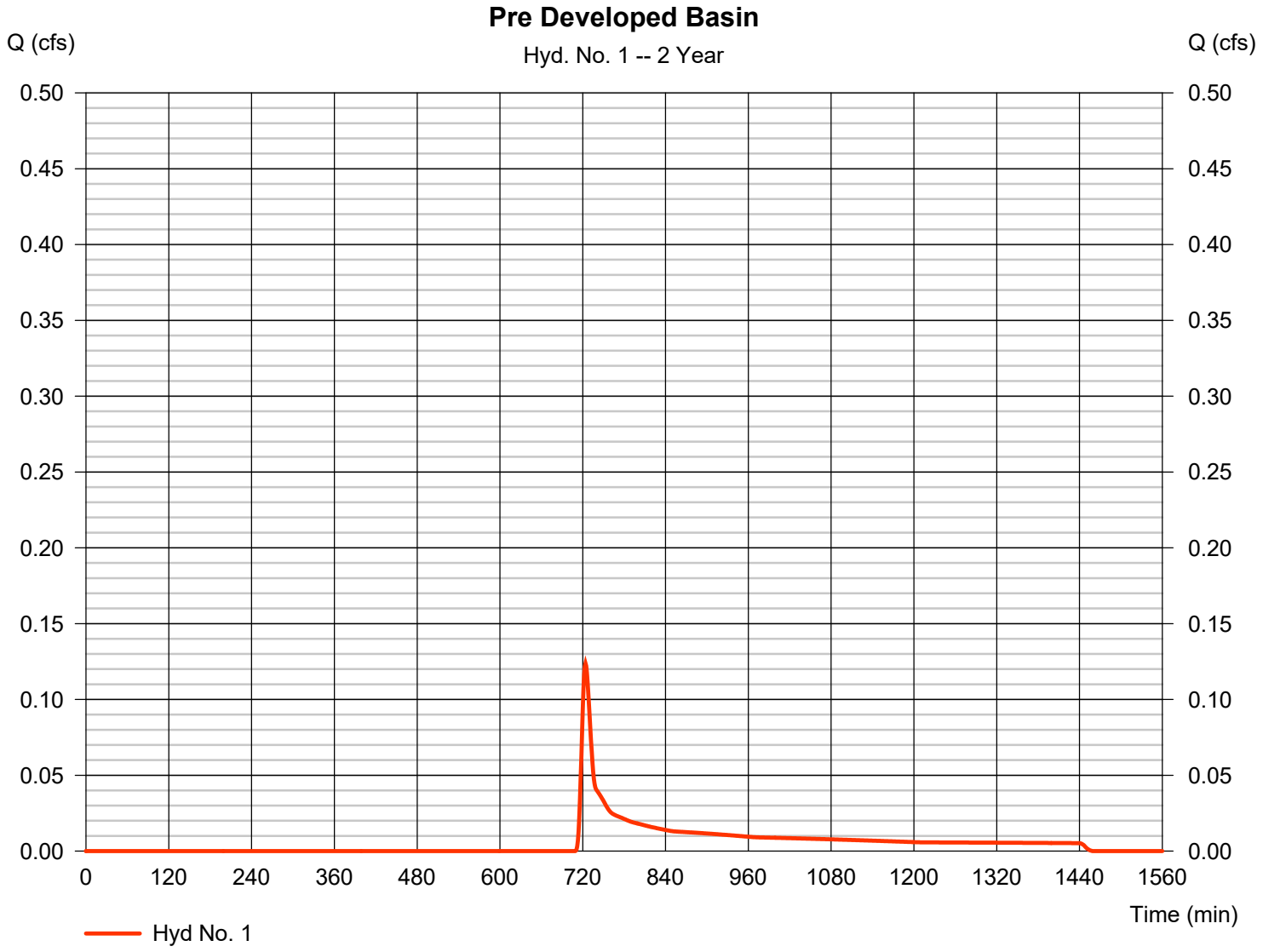
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.124	1	724	525	------	------	------	Pre Developed Basin
4	SCS Runoff	0.108	1	717	258	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.051	1	723	257	4	94.85	54.6	POST ROUTED THRU POND
6	SCS Runoff	0.403	1	718	854	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.012	1	873	332	6	896.91	574	POST ROUTED THRU POND
8	SCS Runoff	0.067	1	725	311	------	------	------	POST DEV BYPASS
9	Combine	0.117	1	725	900	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	10.73	1	722	28,731	------	------	------	Dwnstrm w-o Site
13	Combine	10.85	1	722	29,256	1, 12	------	------	TOTAL Pre Basin
14	Combine	10.84	1	722	29,631	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	= SCS Runoff	Peak discharge	= 0.124 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 525 cuft
Drainage area	= 0.360 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.00 min
Total precip.	= 3.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



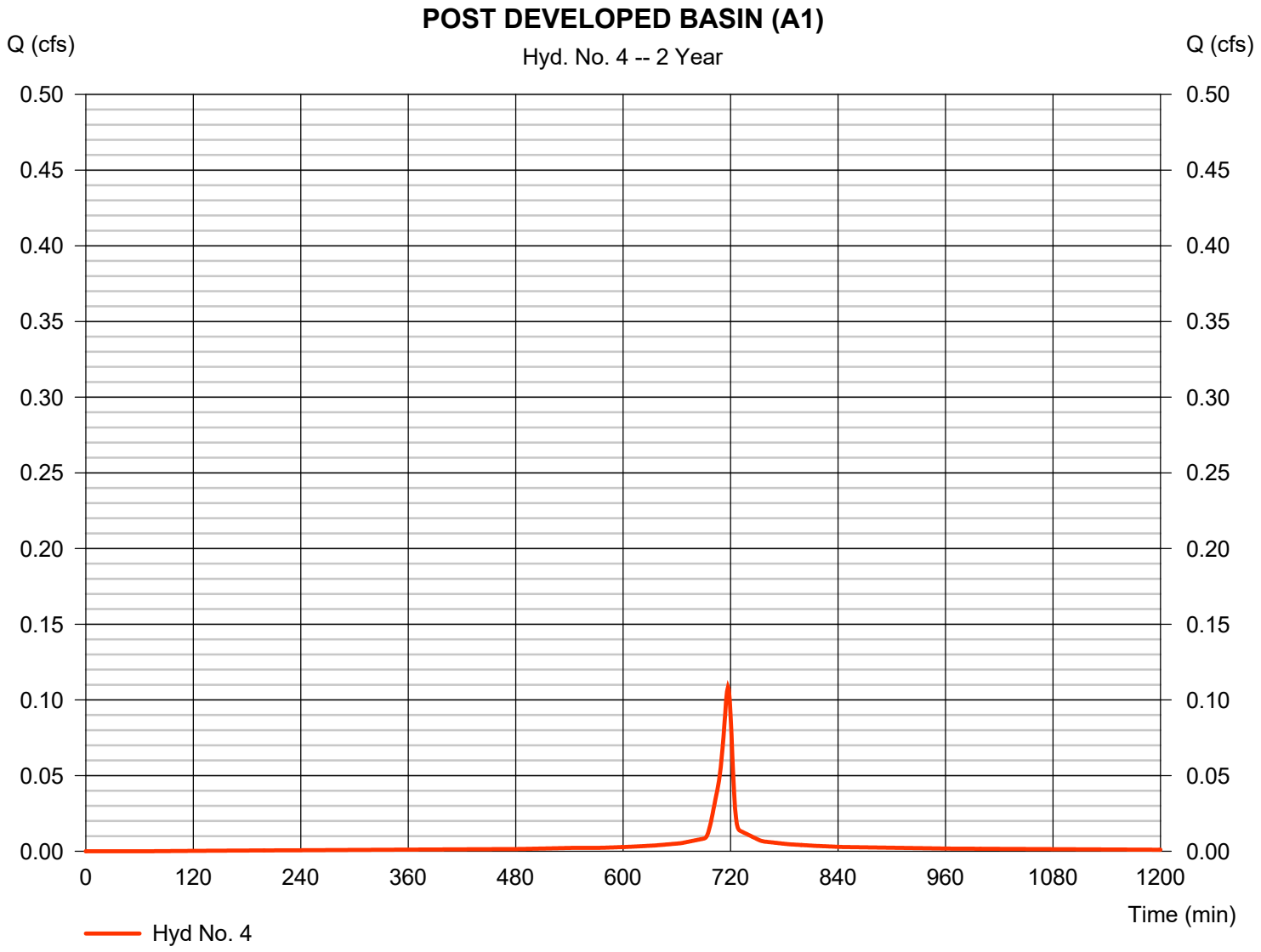
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.108 cfs
Storm frequency	= 2 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 258 cuft
Drainage area	= 0.020 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98)] / 0.020



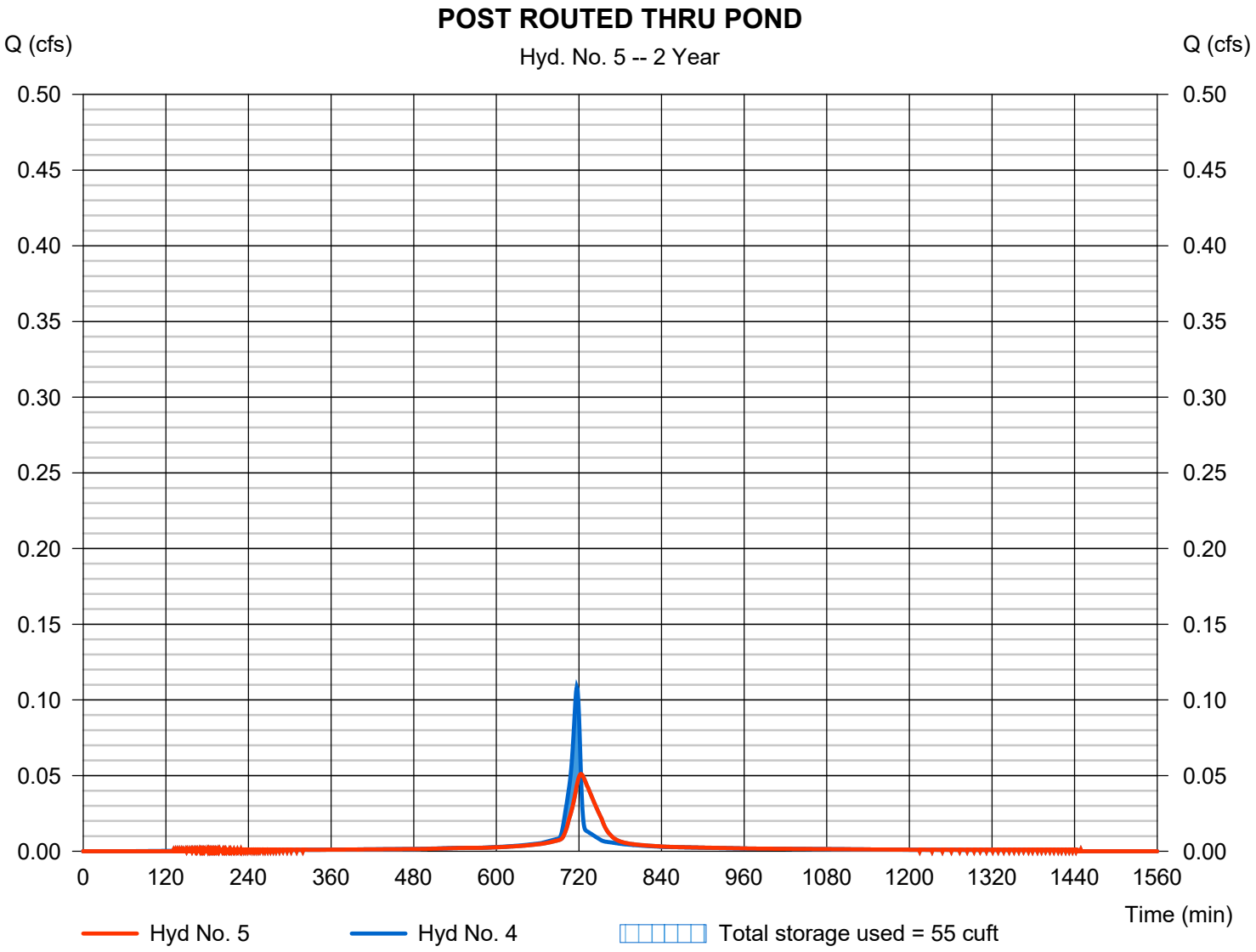
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.051 cfs
Storm frequency	=	2 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	257 cuft
Inflow hyd. No.	=	4 - POST DEVELOPED BASIN (A1)	Max. Elevation	=	94.85 ft
Reservoir name	=	Stone Reservoir 1	Max. Storage	=	55 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



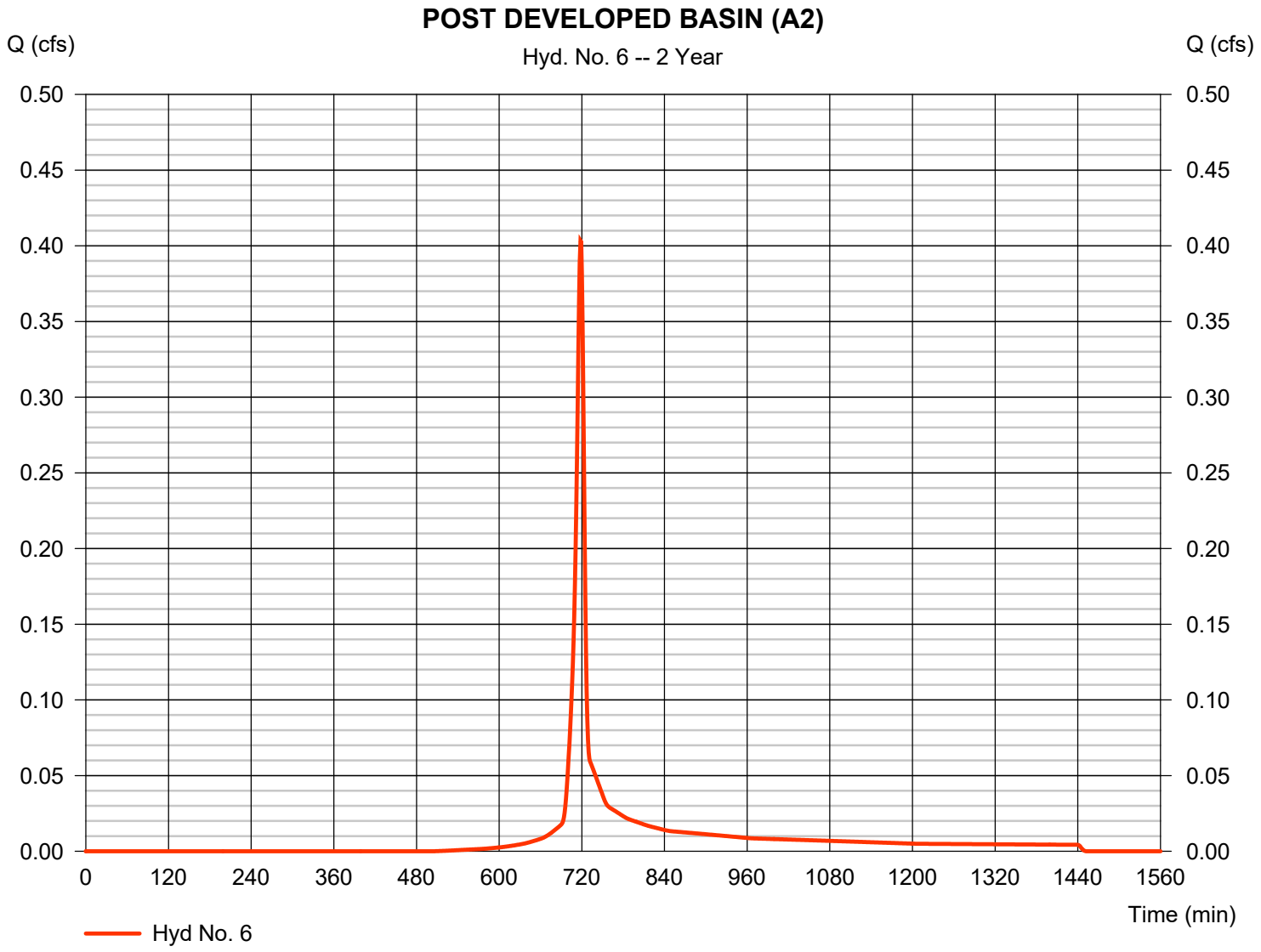
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.403 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 854 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 3.68 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



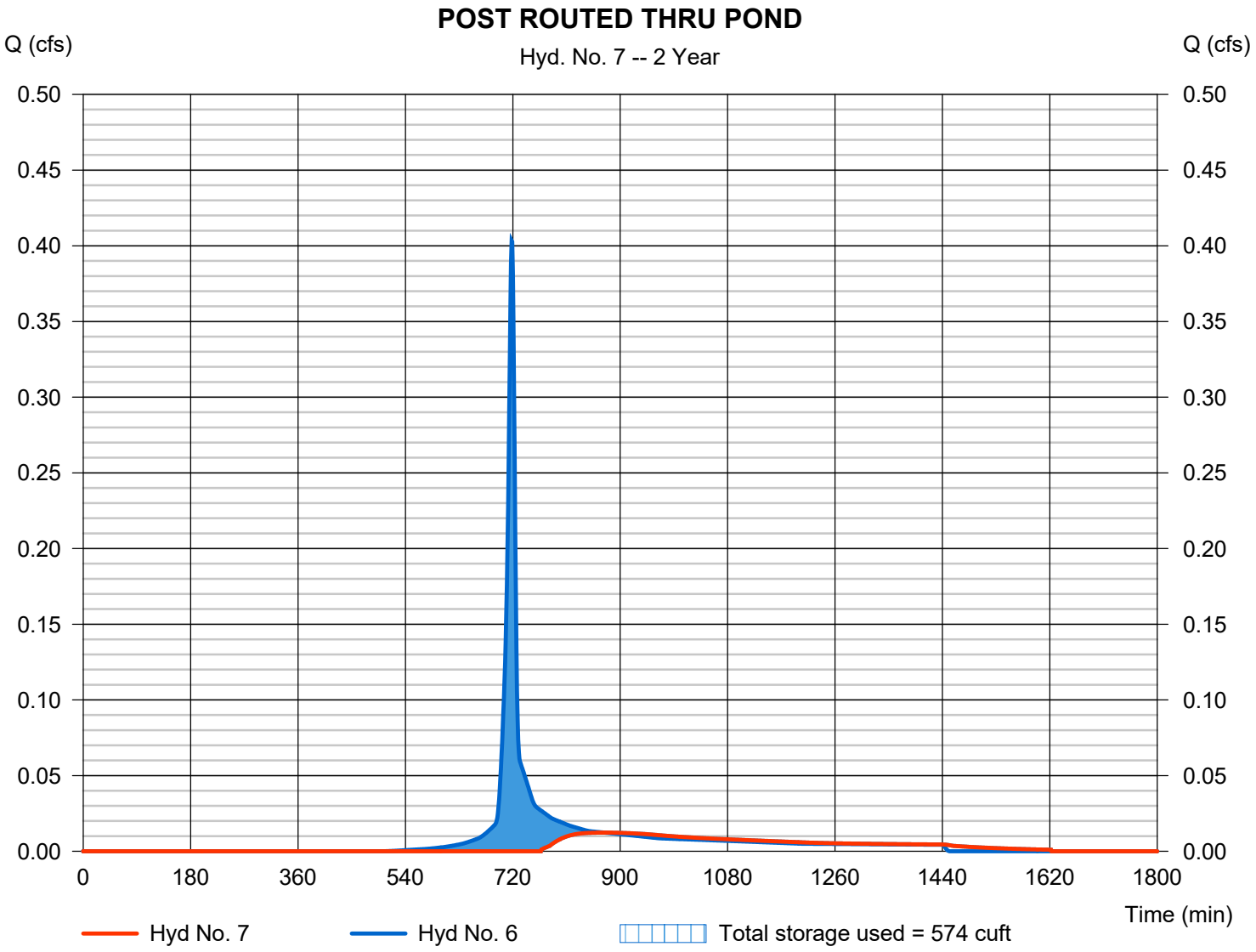
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.012 cfs
Storm frequency	=	2 yrs	Time to peak	=	873 min
Time interval	=	1 min	Hyd. volume	=	332 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	896.91 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	574 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

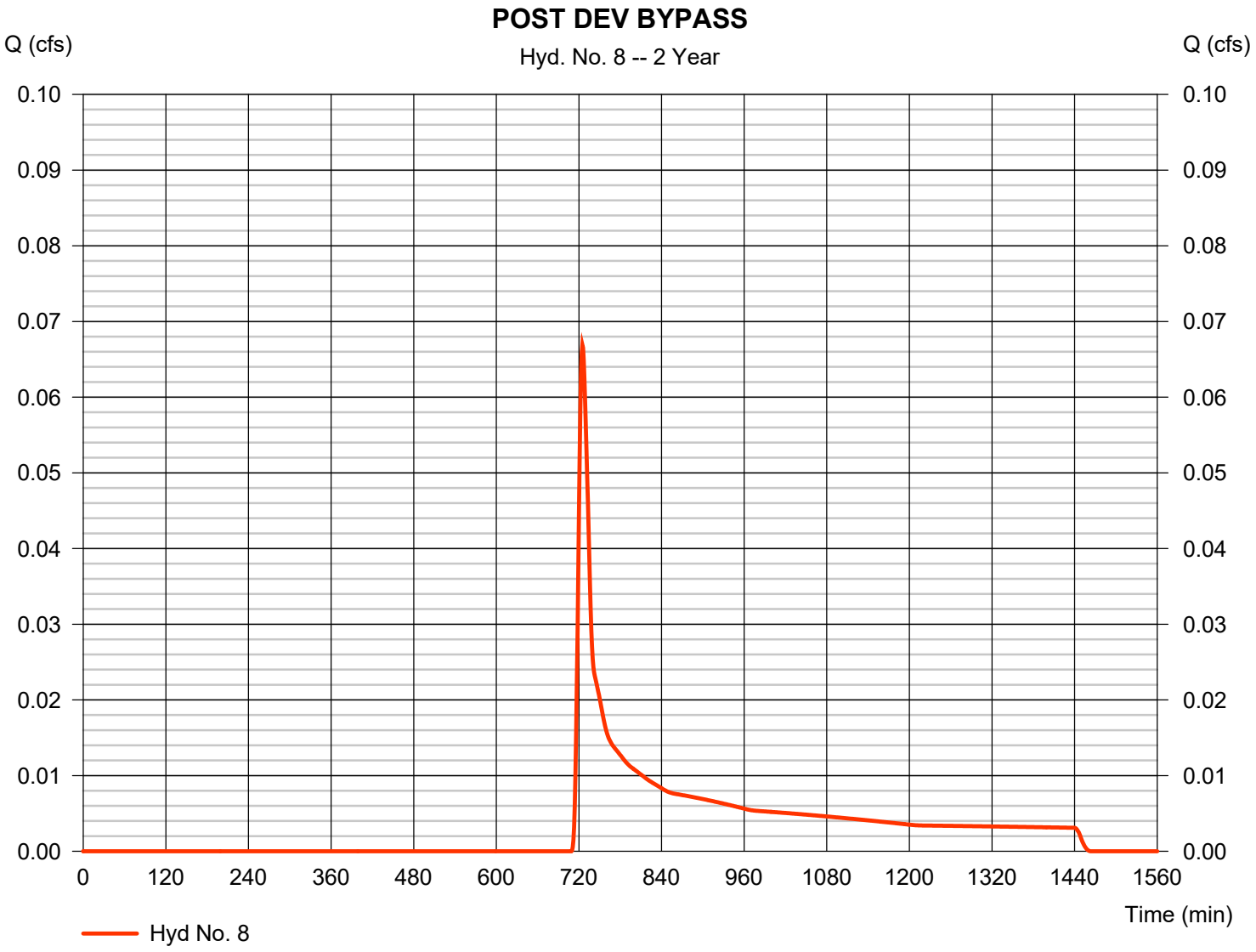


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.067 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	311 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	3.68 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

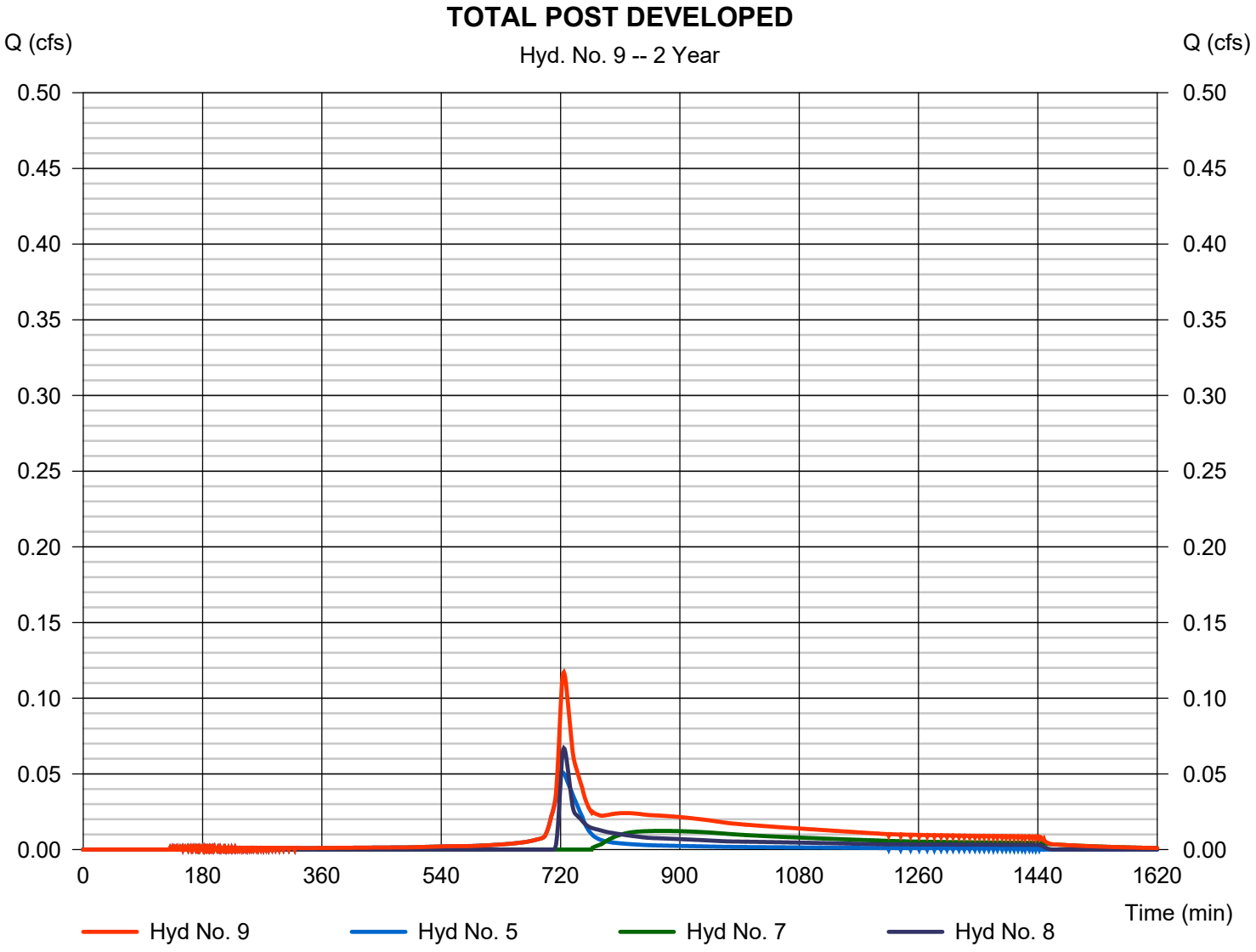


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	= Combine	Peak discharge	= 0.117 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 900 cuft
Inflow hyds.	= 5, 7, 8	Contrib. drain. area	= 0.210 ac



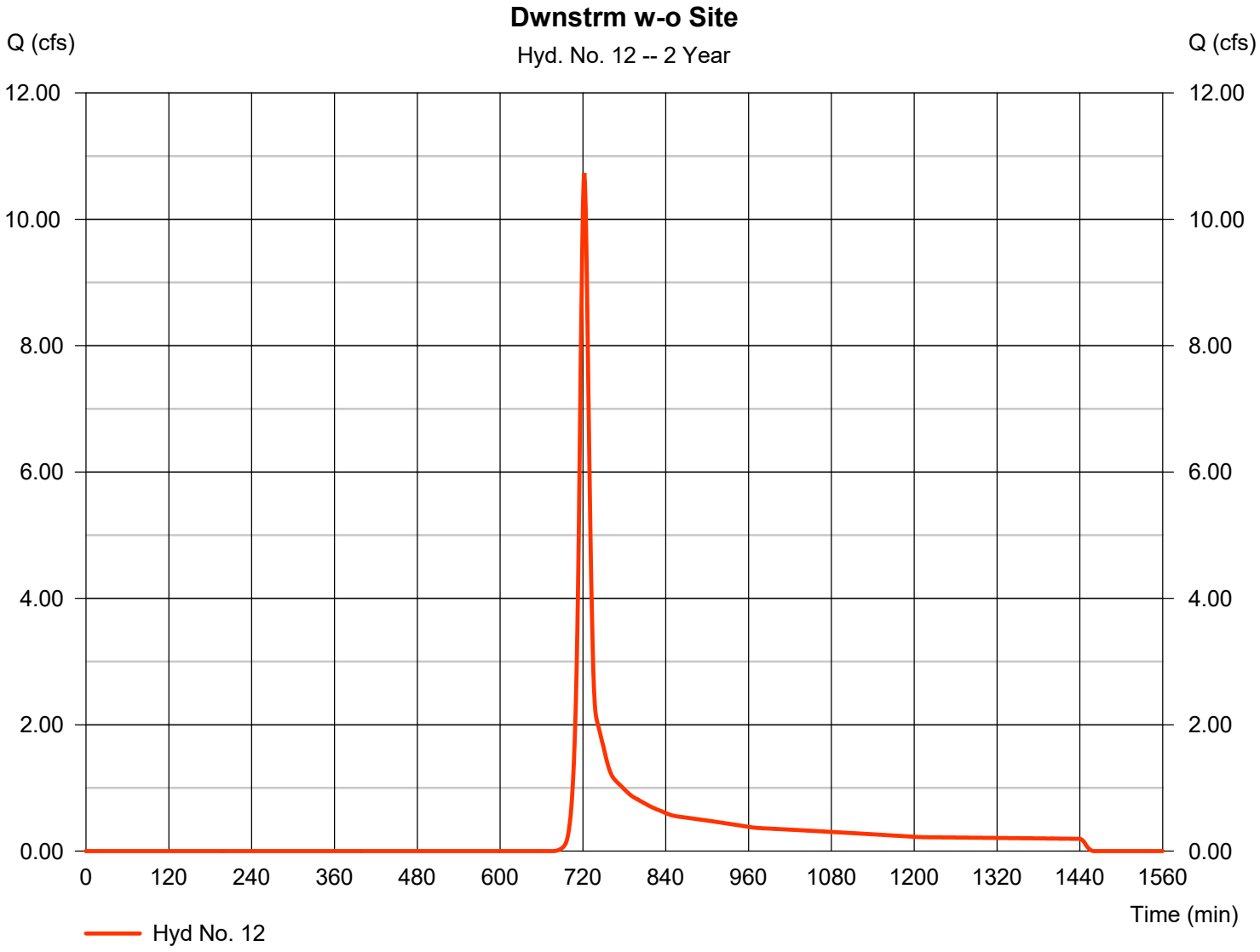
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.73 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	28,731 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	3.68 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

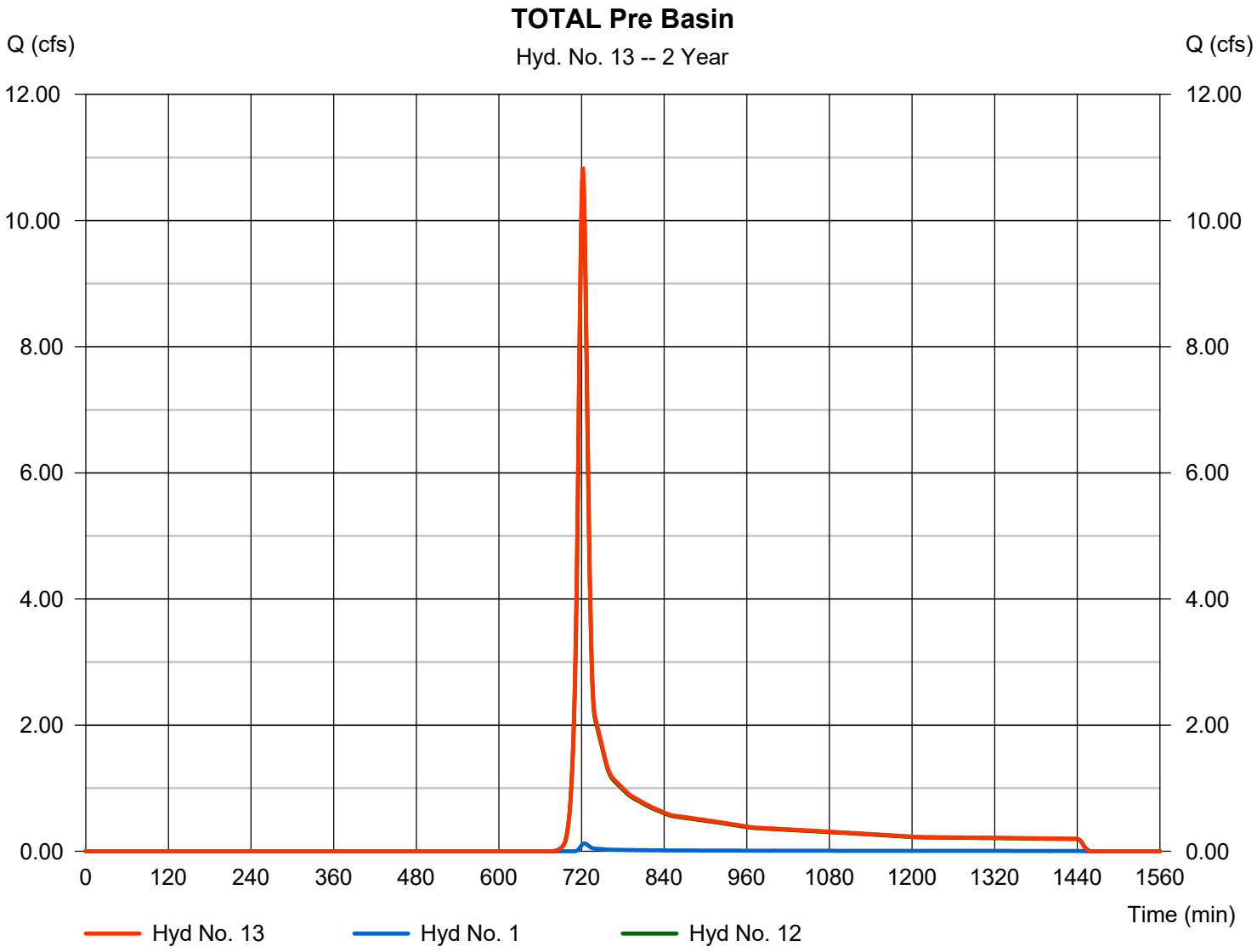


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	10.85 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	29,256 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

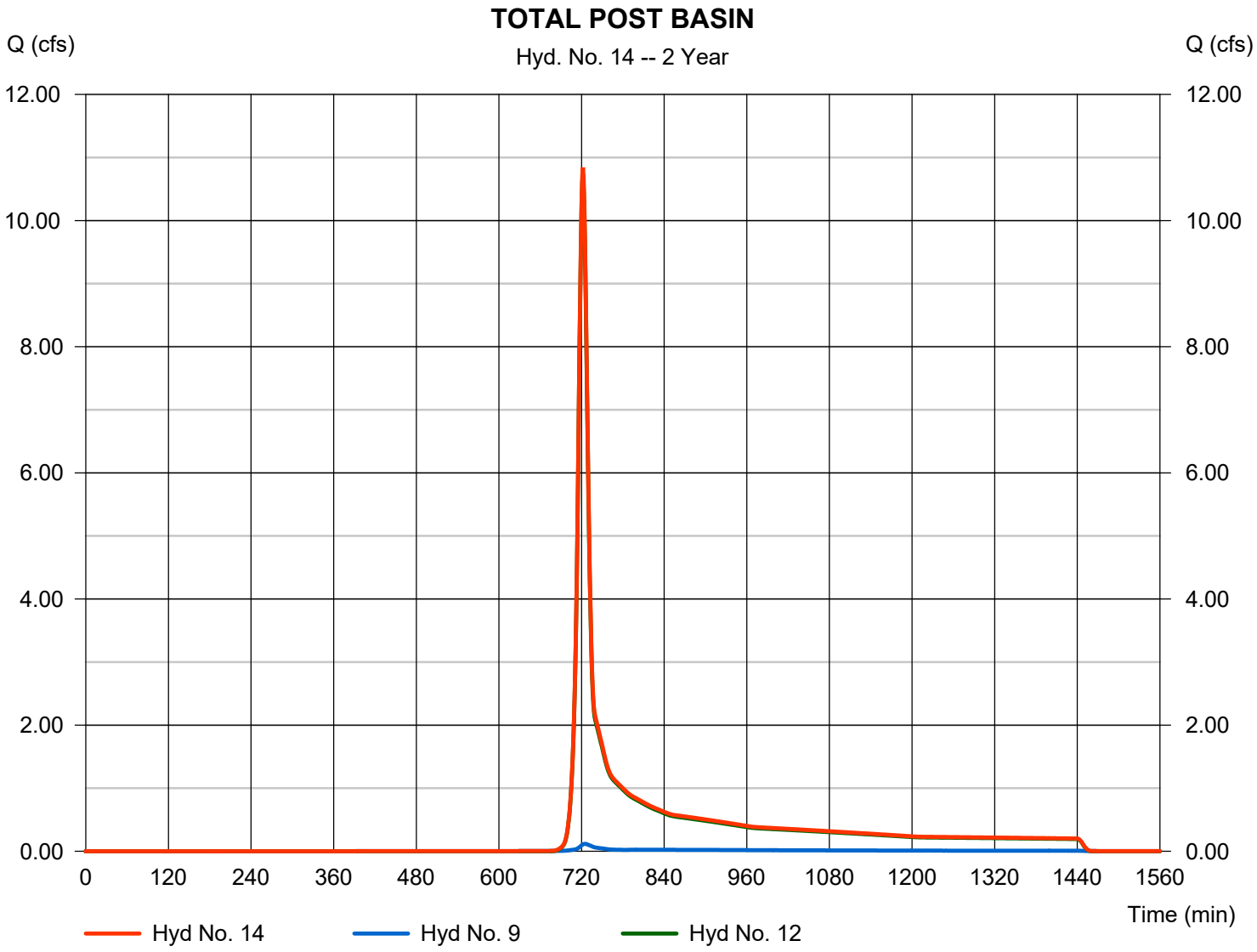


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	= Combine	Peak discharge	= 10.84 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 29,631 cuft
Inflow hyds.	= 9, 12	Contrib. drain. area	= 7.980 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

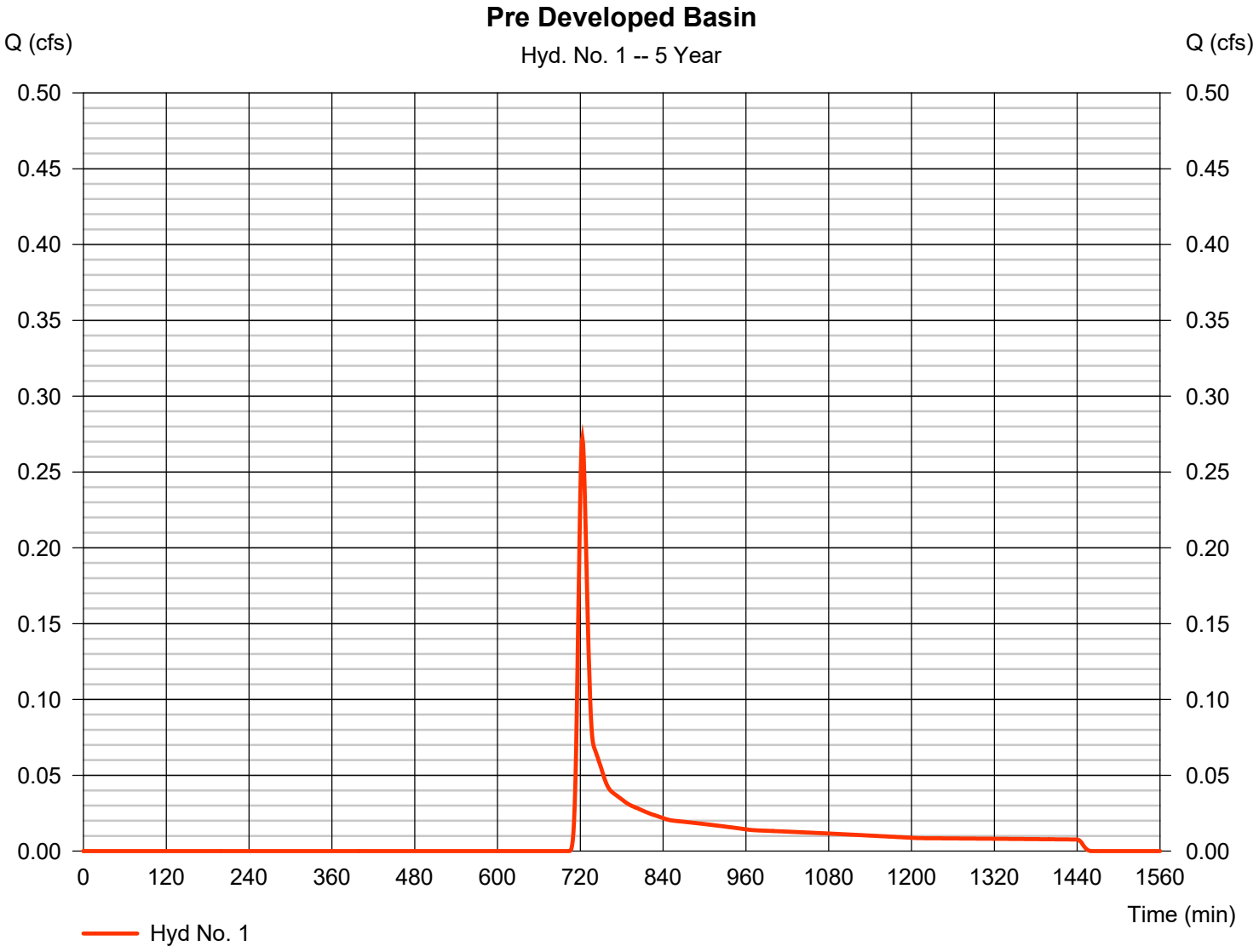
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.272	1	723	892	------	------	------	Pre Developed Basin
4	SCS Runoff	0.130	1	717	311	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.058	1	723	310	4	95.07	68.2	POST ROUTED THRU POND
6	SCS Runoff	0.531	1	718	1,129	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.027	1	789	607	6	897.07	660	POST ROUTED THRU POND
8	SCS Runoff	0.148	1	724	529	------	------	------	POST DEV BYPASS
9	Combine	0.211	1	725	1,446	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	16.02	1	722	41,591	------	------	------	Dwnstrm w-o Site
13	Combine	16.29	1	722	42,483	1, 12	------	------	TOTAL Pre Basin
14	Combine	16.22	1	722	43,037	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.272 cfs
Storm frequency	=	5 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	892 cuft
Drainage area	=	0.360 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	4.39 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



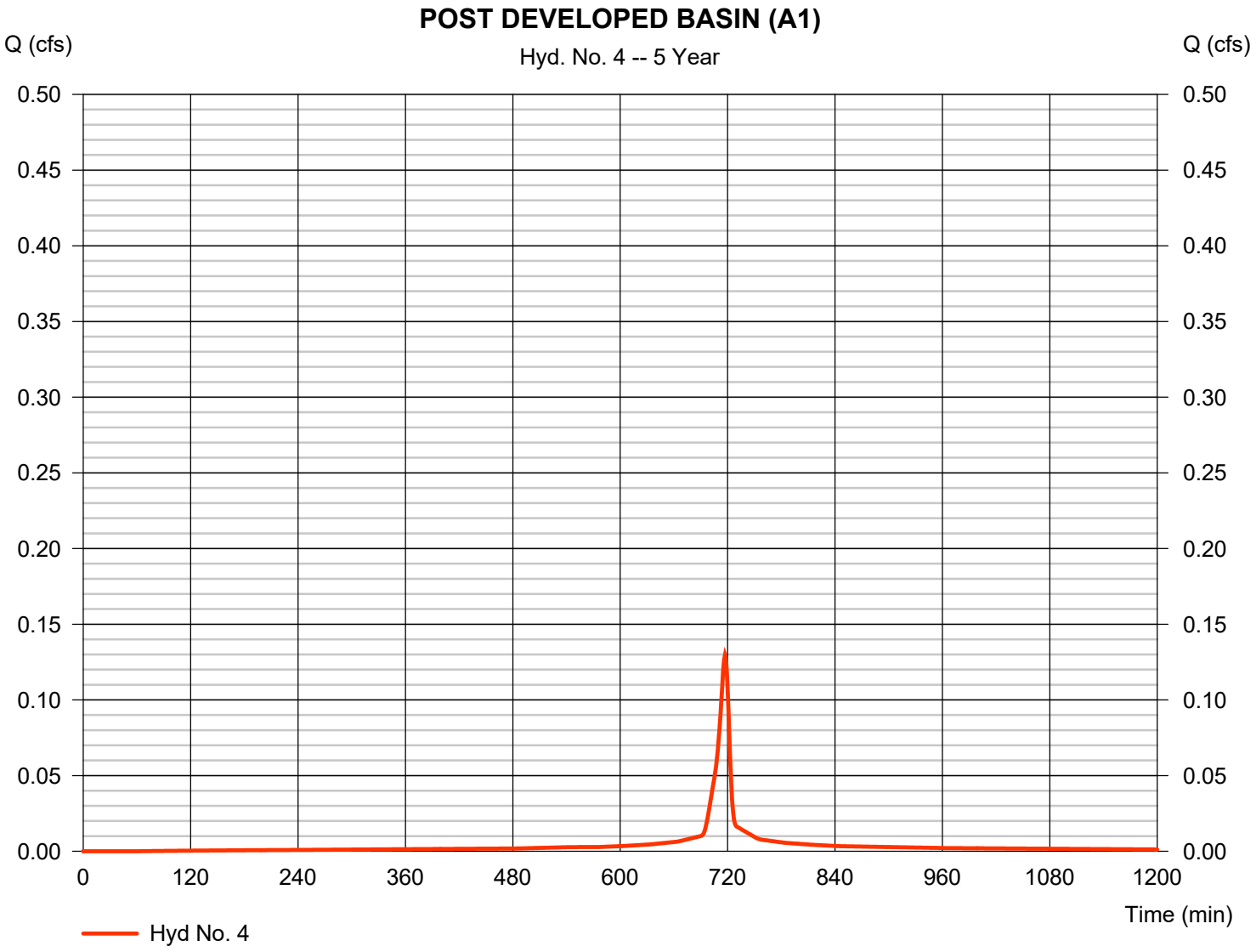
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.130 cfs
Storm frequency	= 5 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 311 cuft
Drainage area	= 0.020 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.39 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98)] / 0.020



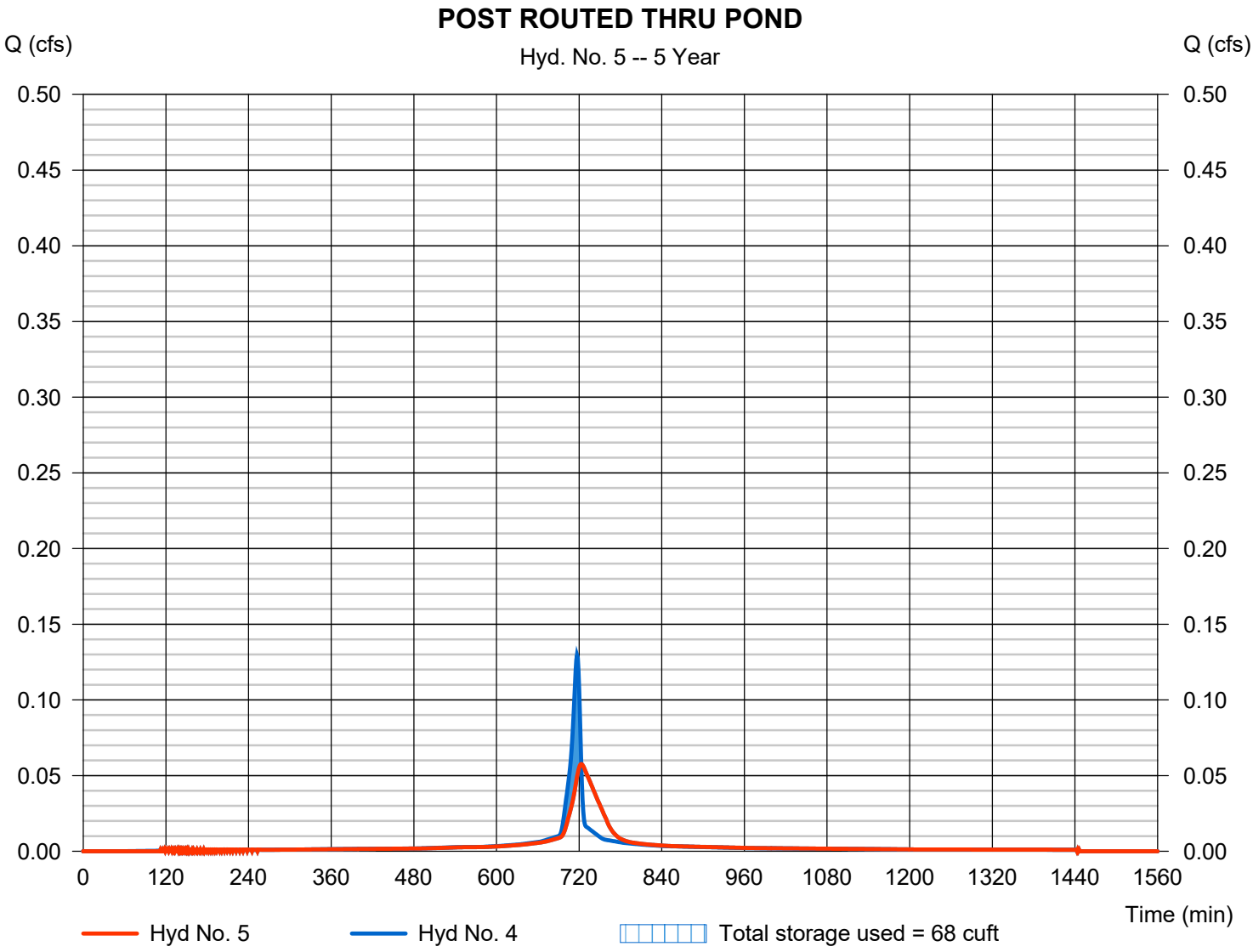
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	= Reservoir	Peak discharge	= 0.058 cfs
Storm frequency	= 5 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 310 cuft
Inflow hyd. No.	= 4 - POST DEVELOPED BASIN (A1)	Max. Elevation	= 95.07 ft
Reservoir name	= Stone Reservoir 1	Max. Storage	= 68 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



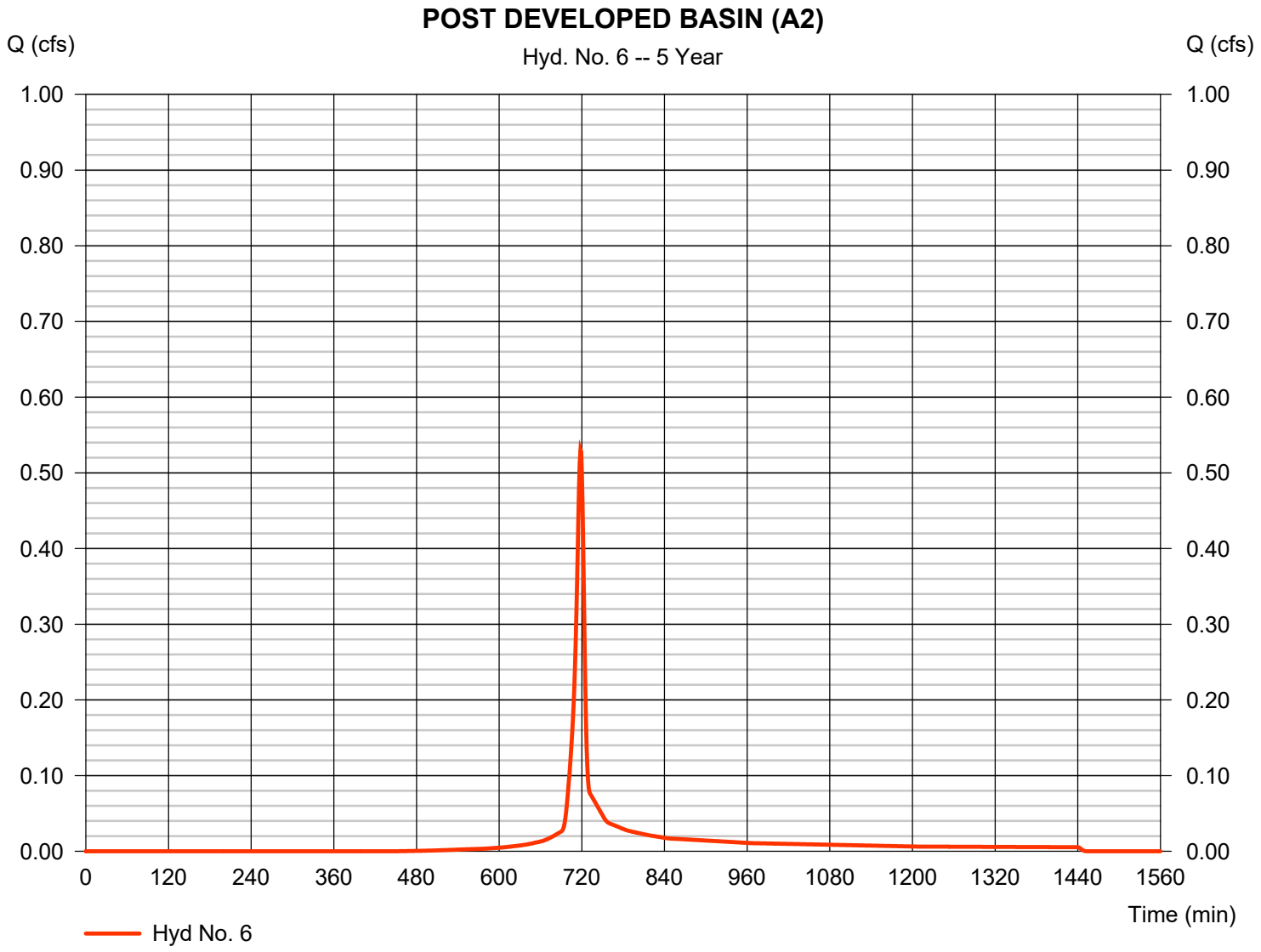
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.531 cfs
Storm frequency	= 5 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,129 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 4.39 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



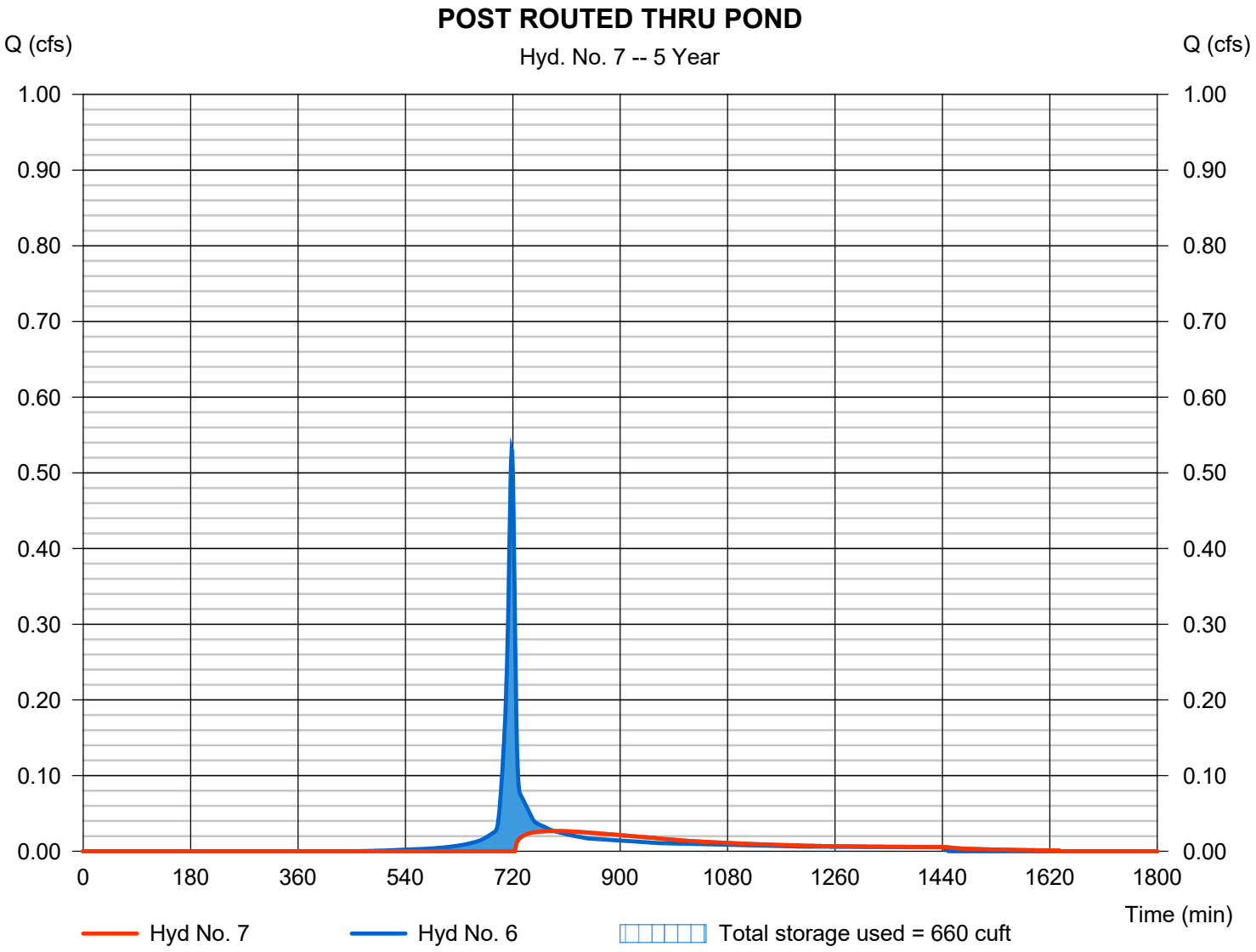
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.027 cfs
Storm frequency	=	5 yrs	Time to peak	=	789 min
Time interval	=	1 min	Hyd. volume	=	607 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	897.07 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	660 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

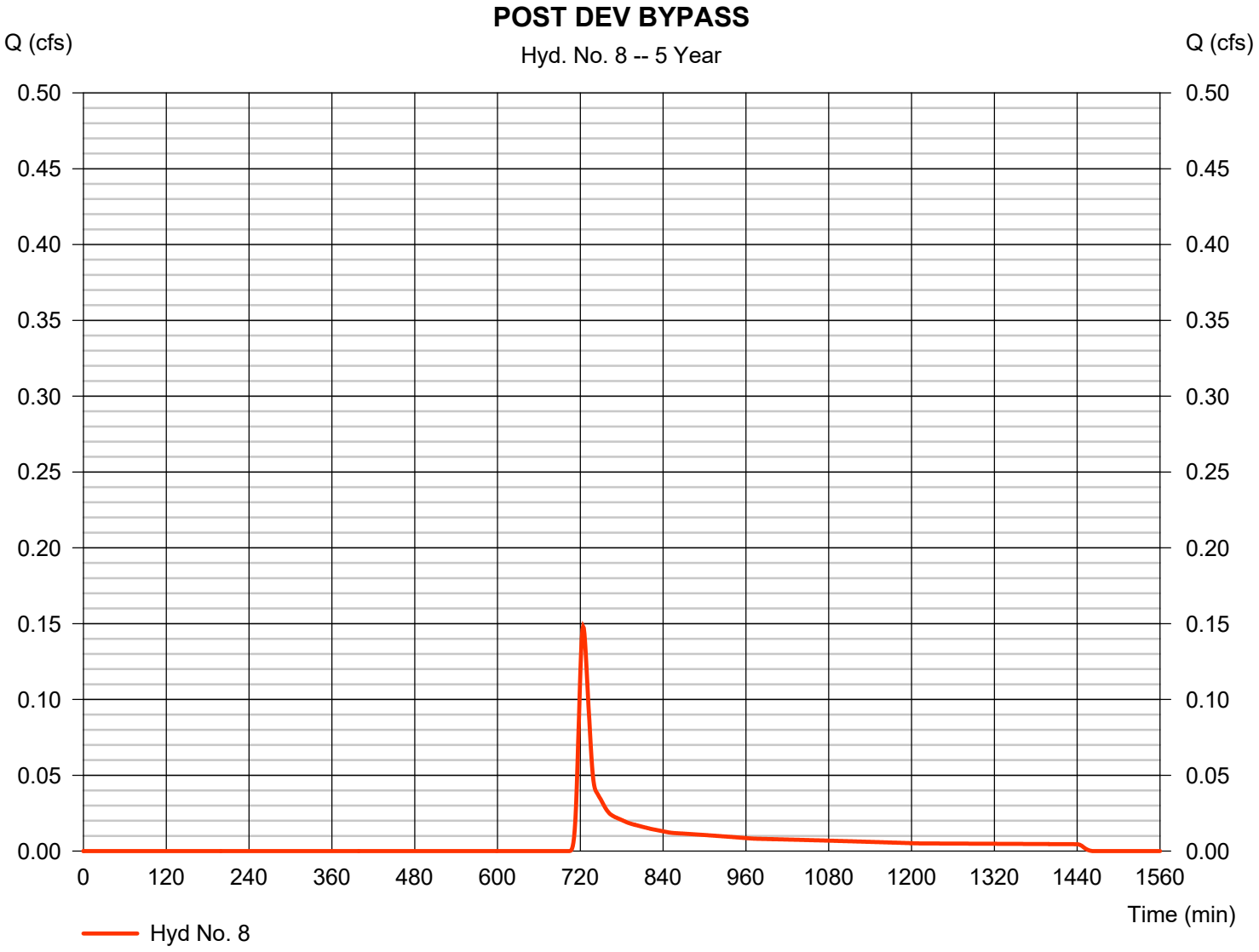


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.148 cfs
Storm frequency	=	5 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	529 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	4.39 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

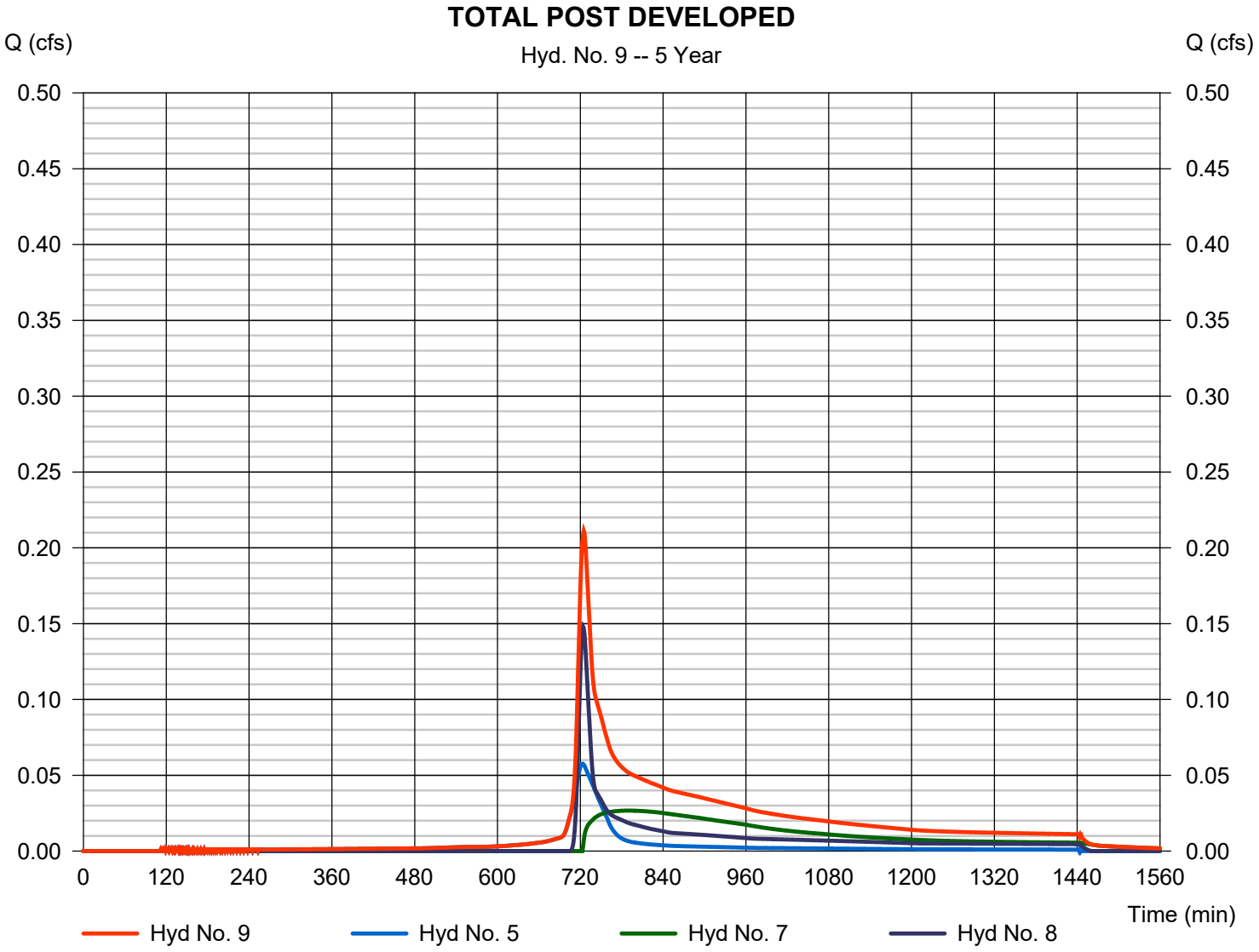


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	= Combine	Peak discharge	= 0.211 cfs
Storm frequency	= 5 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,446 cuft
Inflow hyds.	= 5, 7, 8	Contrib. drain. area	= 0.210 ac



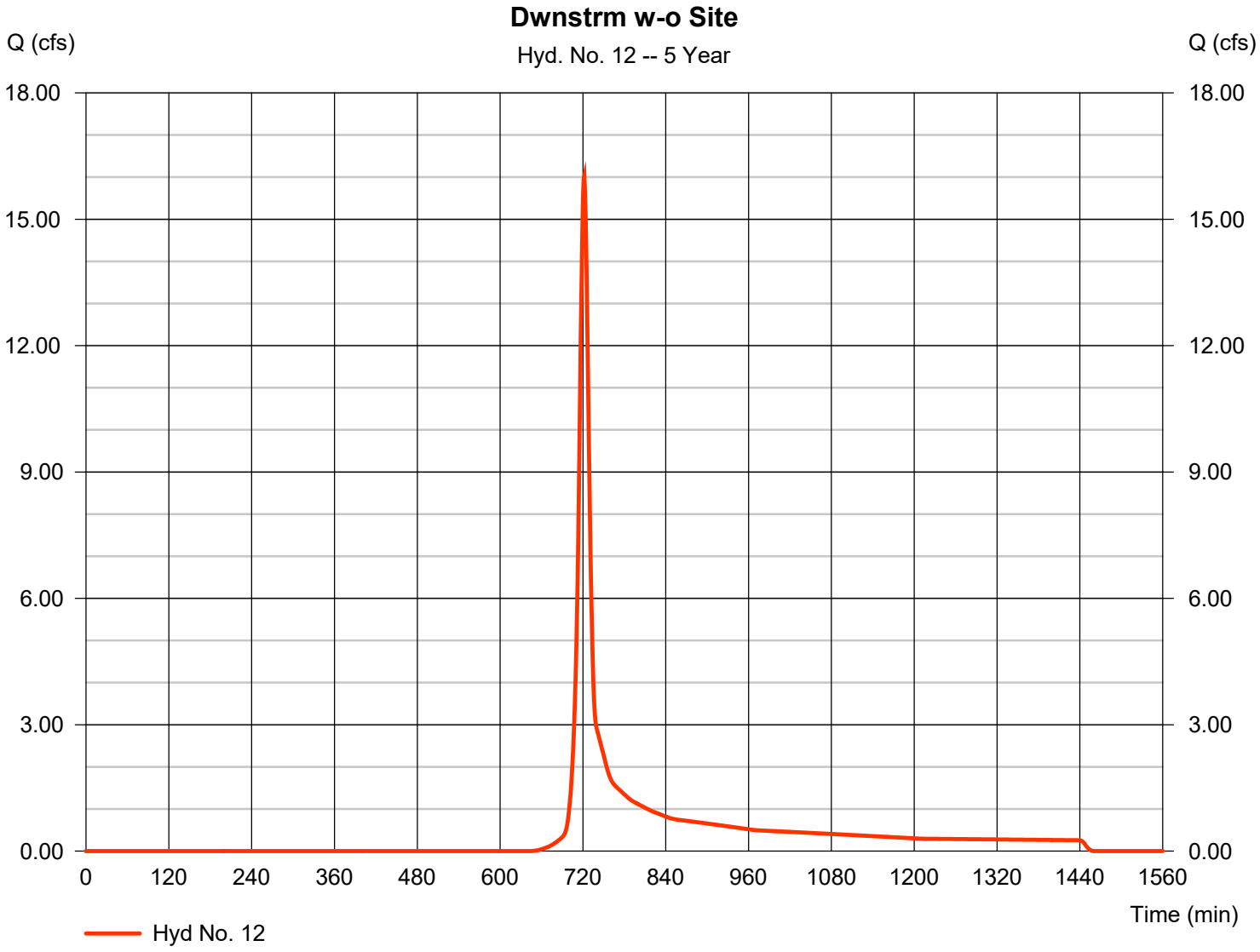
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.02 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	41,591 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	4.39 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

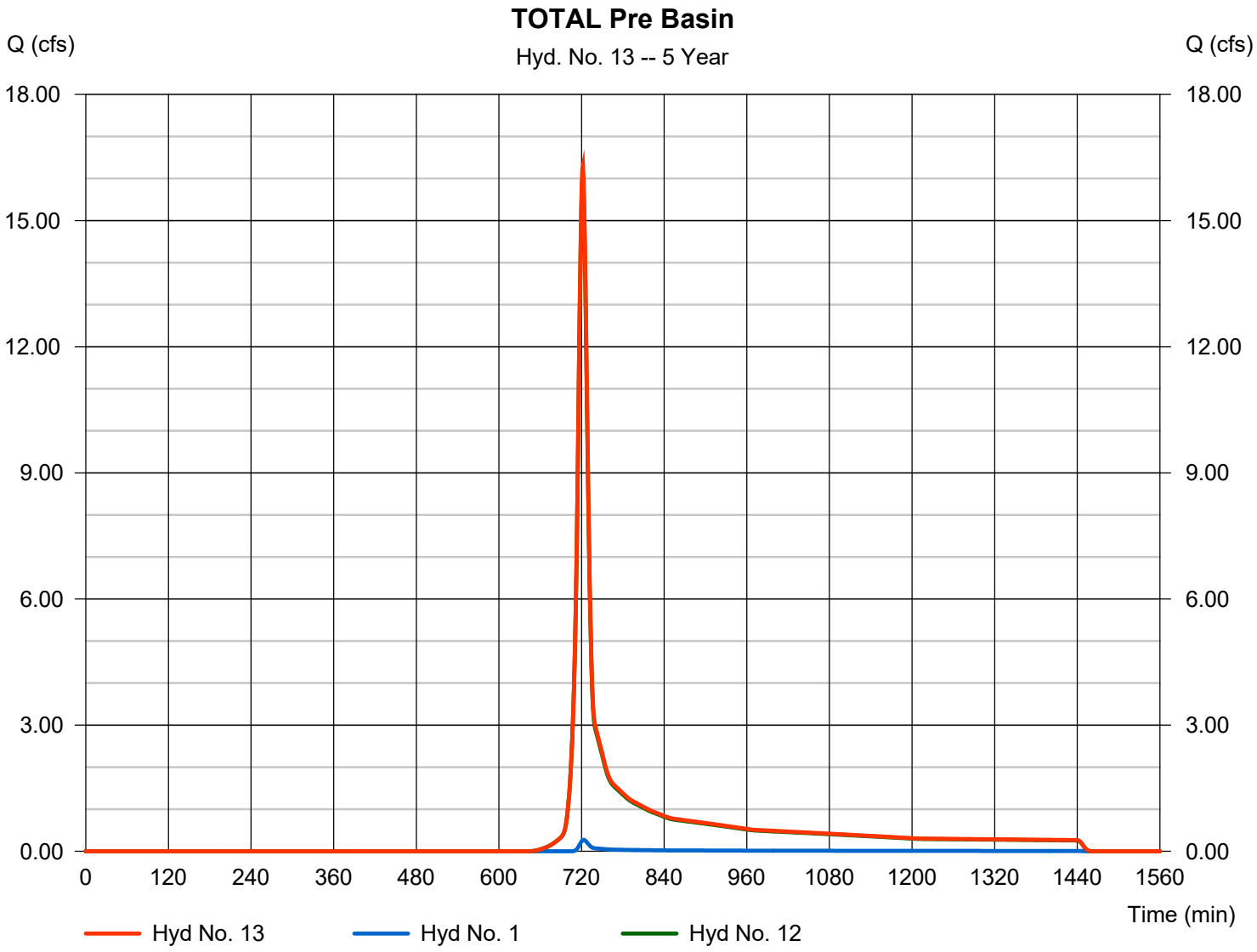


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	16.29 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	42,483 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

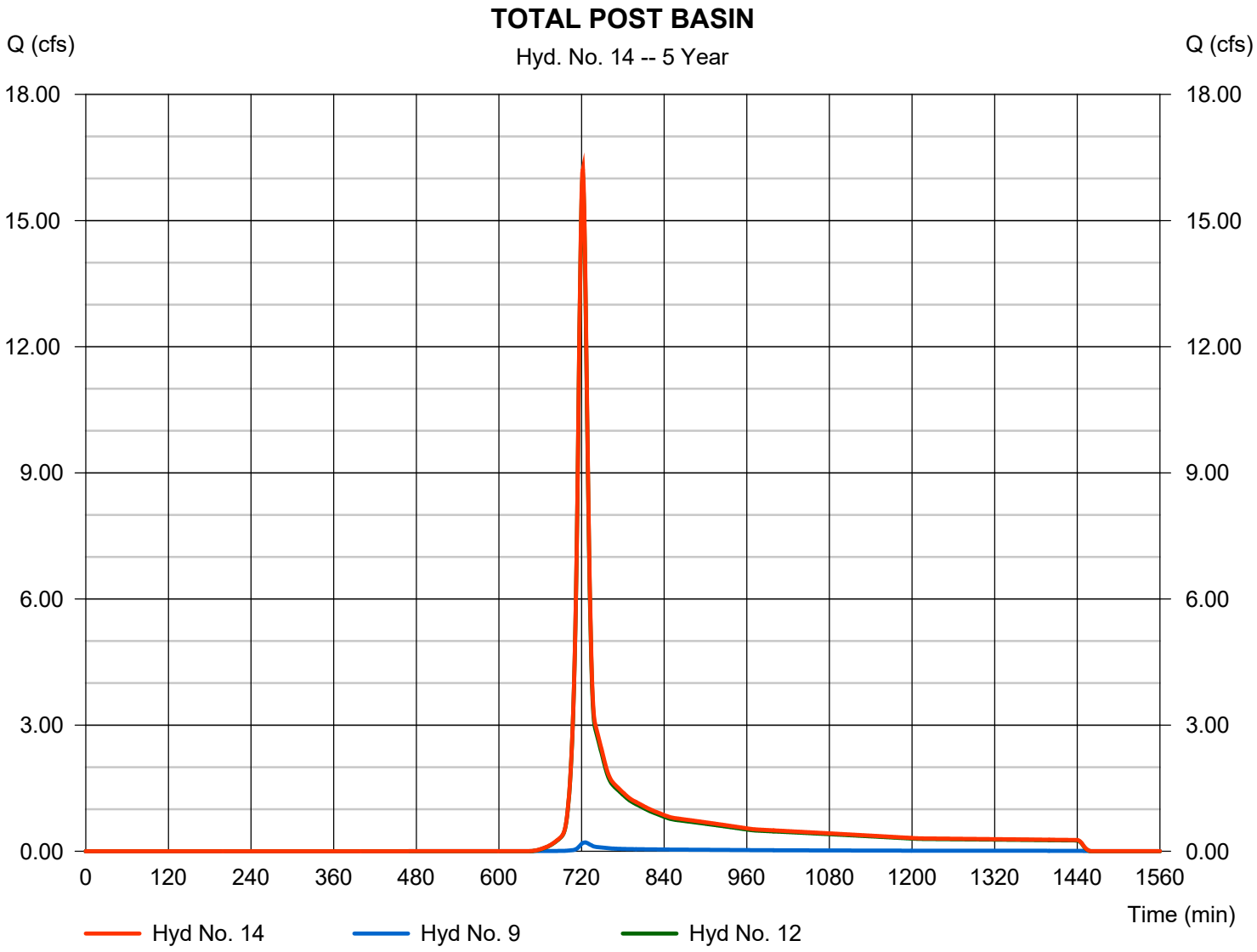


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	= Combine	Peak discharge	= 16.22 cfs
Storm frequency	= 5 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 43,037 cuft
Inflow hyds.	= 9, 12	Contrib. drain. area	= 7.980 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

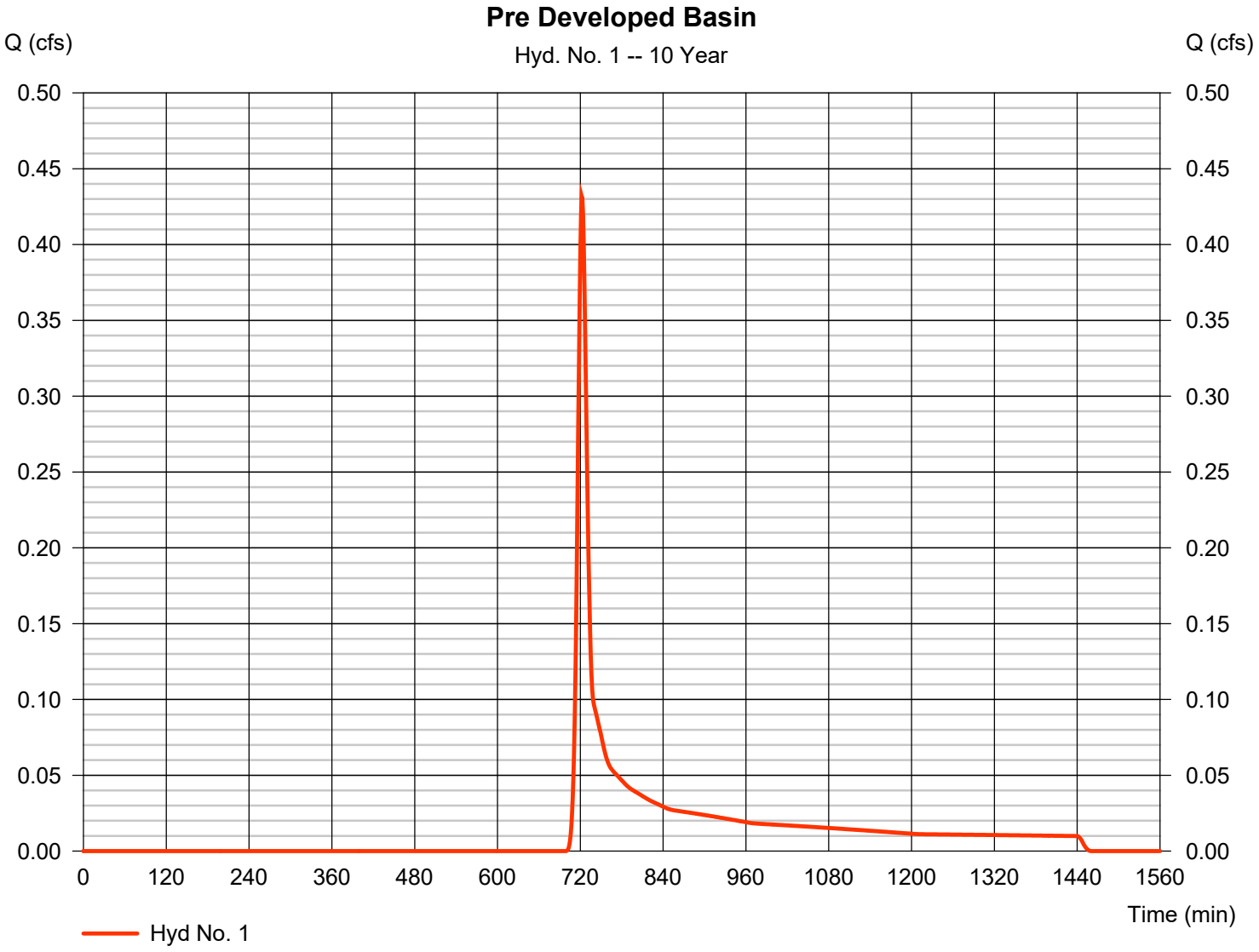
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.432	1	722	1,273	------	------	------	Pre Developed Basin
4	SCS Runoff	0.148	1	717	358	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.063	1	723	357	4	95.26	80.6	POST ROUTED THRU POND
6	SCS Runoff	0.646	1	718	1,382	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.039	1	771	860	6	897.30	786	POST ROUTED THRU POND
8	SCS Runoff	0.236	1	724	755	------	------	------	POST DEV BYPASS
9	Combine	0.328	1	724	1,972	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	21.06	1	722	54,002	------	------	------	Dwnstrm w-o Site
13	Combine	21.50	1	722	55,276	1, 12	------	------	TOTAL Pre Basin
14	Combine	21.38	1	722	55,974	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.432 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	1,273 cuft
Drainage area	=	0.360 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



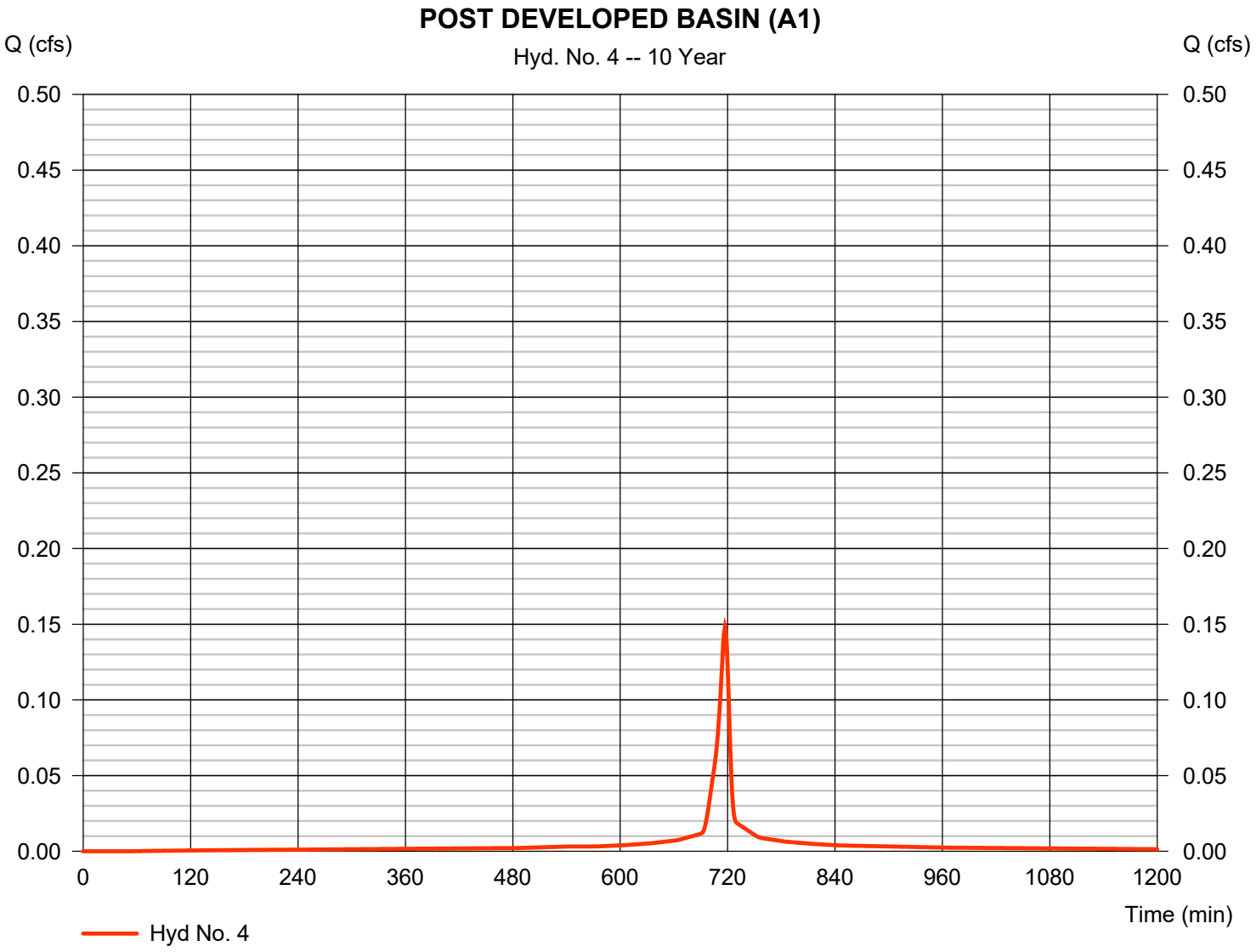
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.148 cfs
Storm frequency	= 10 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 358 cuft
Drainage area	= 0.020 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) = [(0.020 x 98)] / 0.020



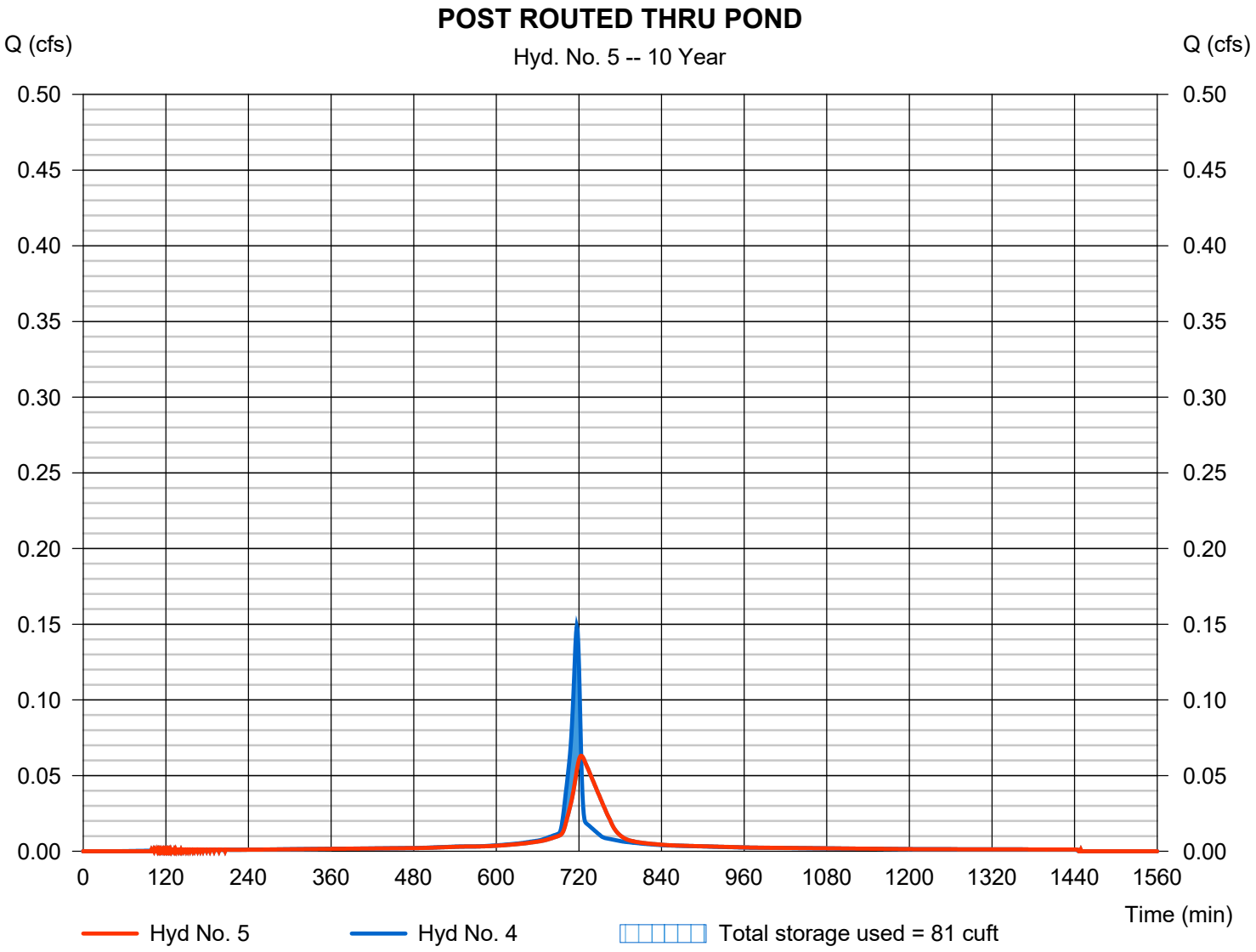
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.063 cfs
Storm frequency	=	10 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	357 cuft
Inflow hyd. No.	=	4 - POST DEVELOPED BASIN (A1)	Max. Elevation	=	95.26 ft
Reservoir name	=	Stone Reservoir 1	Max. Storage	=	81 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



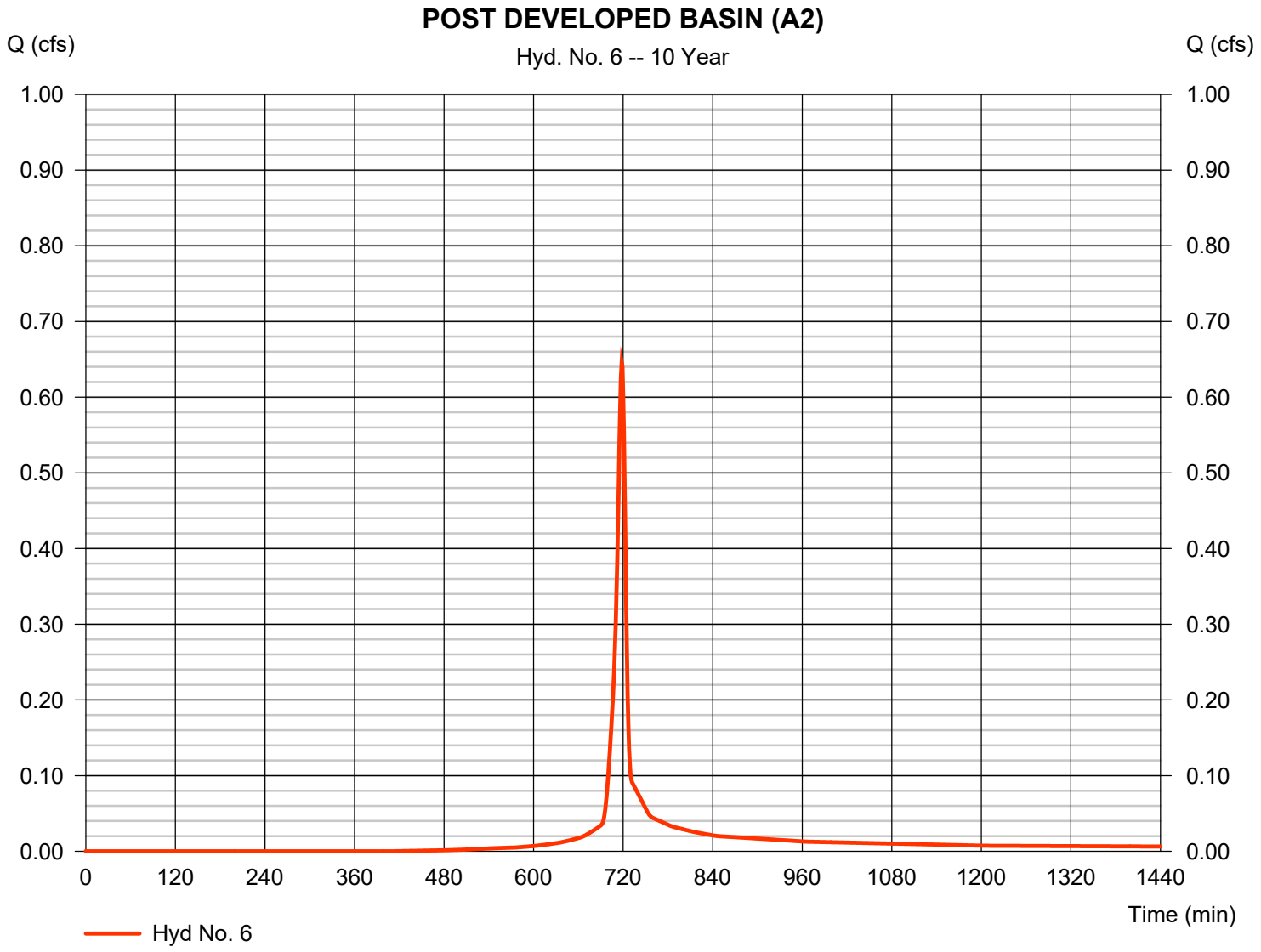
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.646 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,382 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 5.02 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



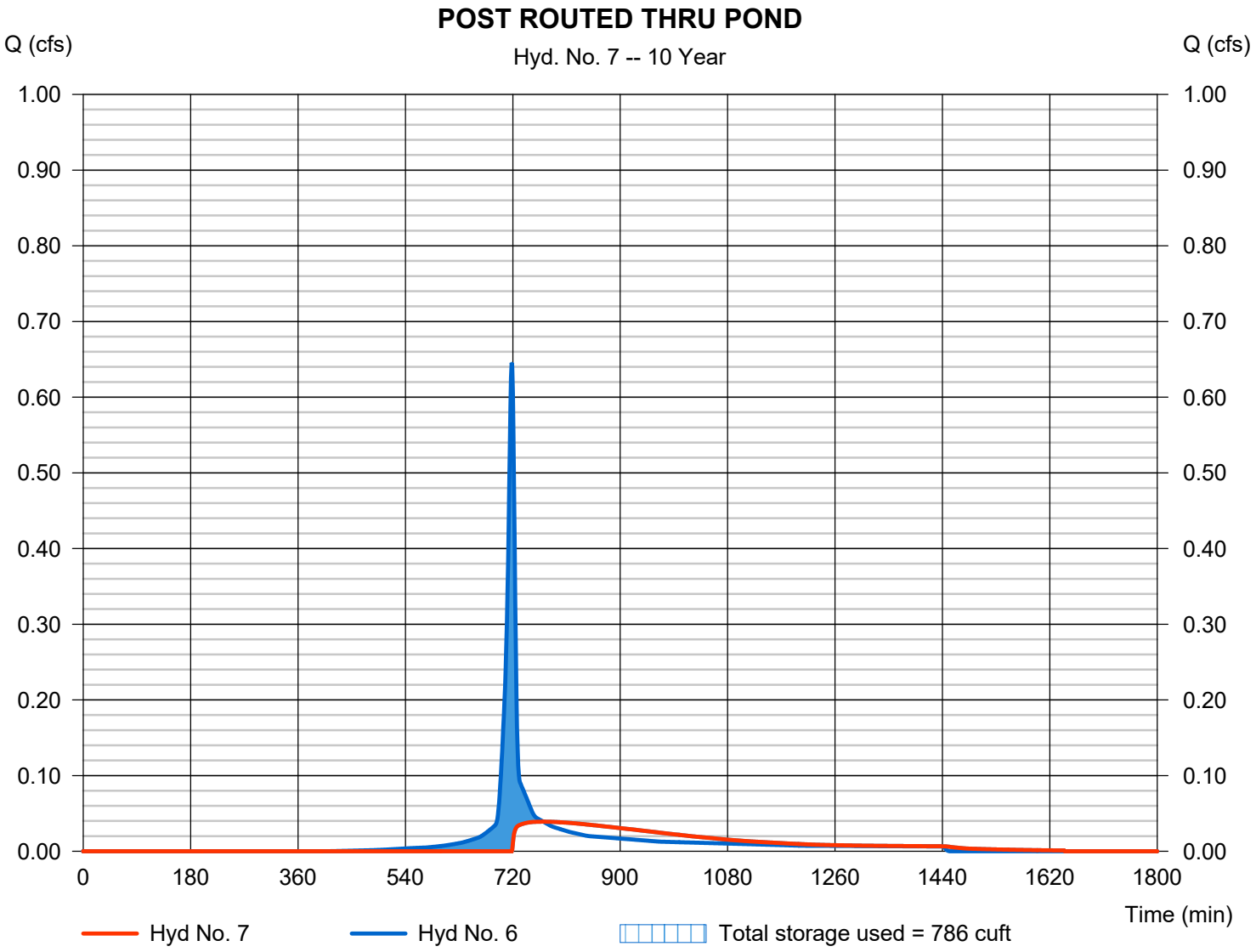
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.039 cfs
Storm frequency	=	10 yrs	Time to peak	=	771 min
Time interval	=	1 min	Hyd. volume	=	860 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	897.30 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	786 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

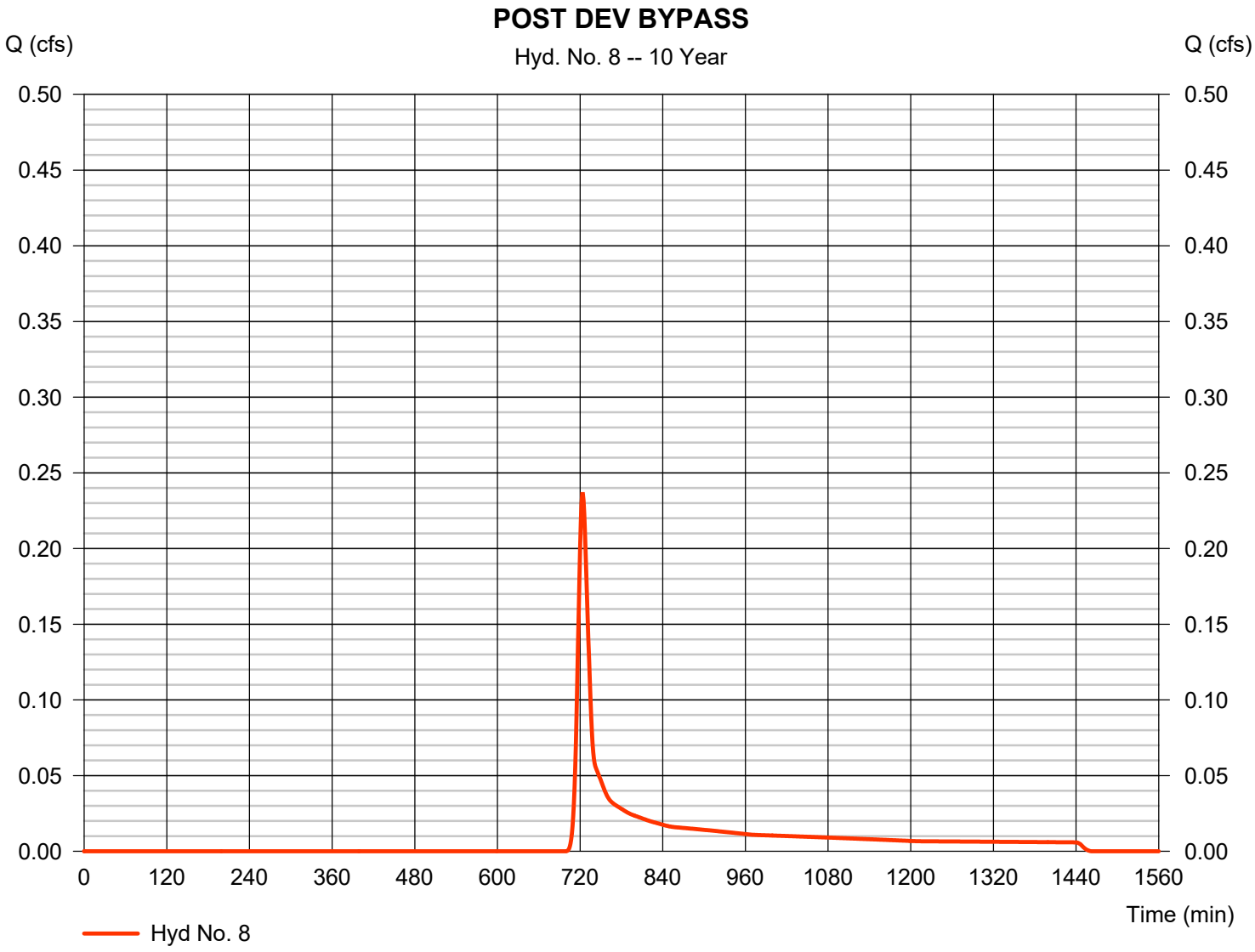


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.236 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	755 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

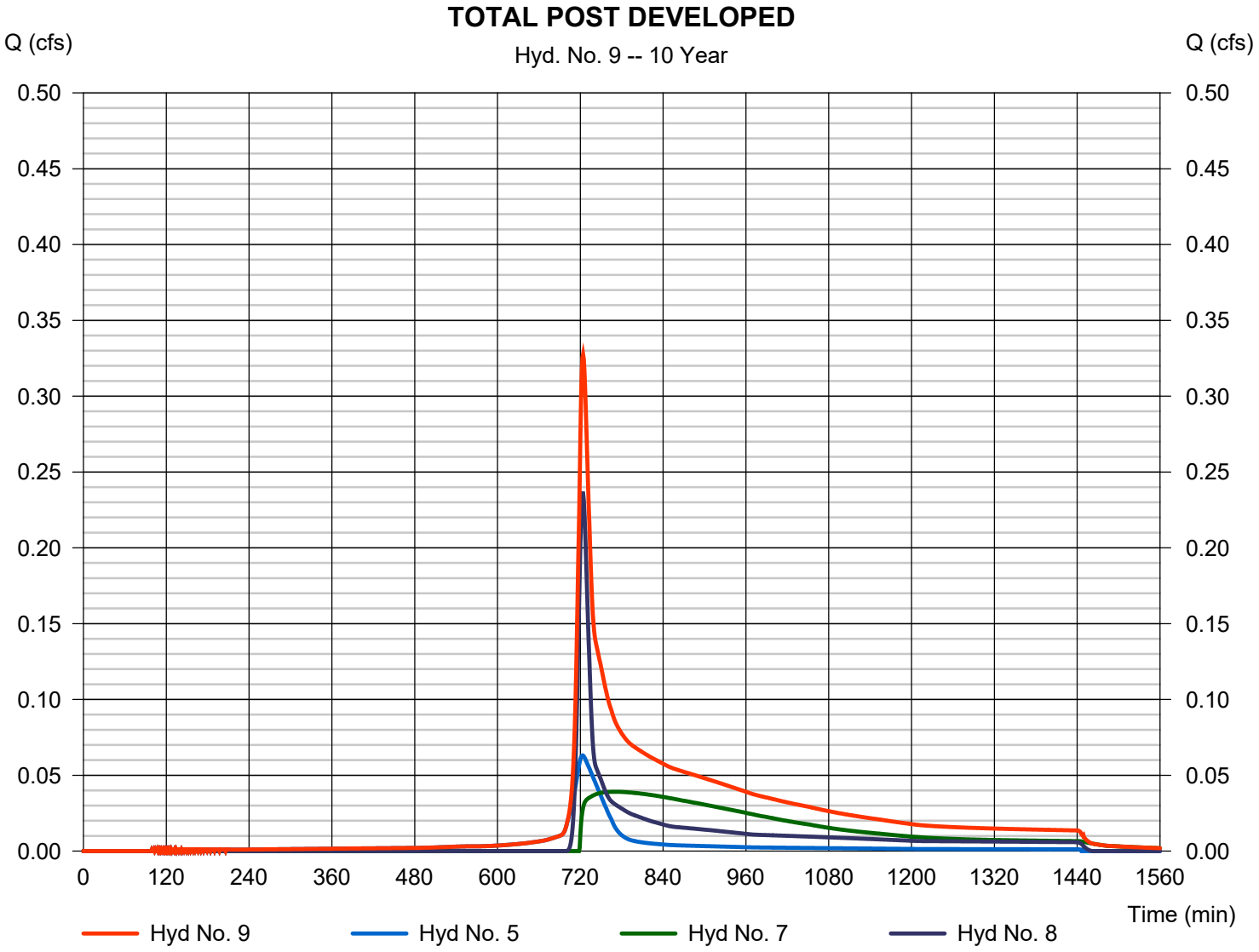


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	=	Combine	Peak discharge	=	0.328 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	1,972 cuft
Inflow hyds.	=	5, 7, 8	Contrib. drain. area	=	0.210 ac



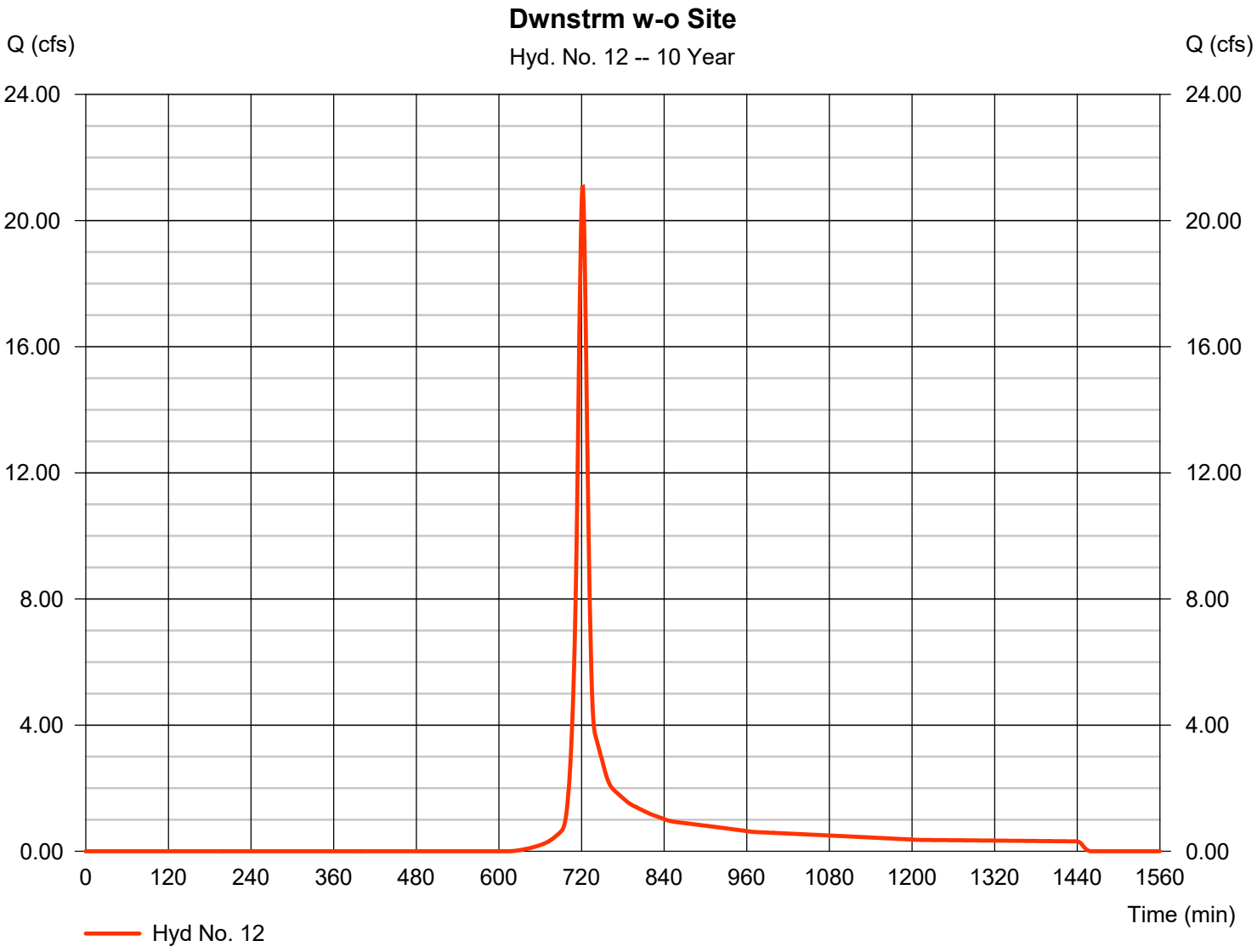
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.06 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	54,002 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	5.02 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

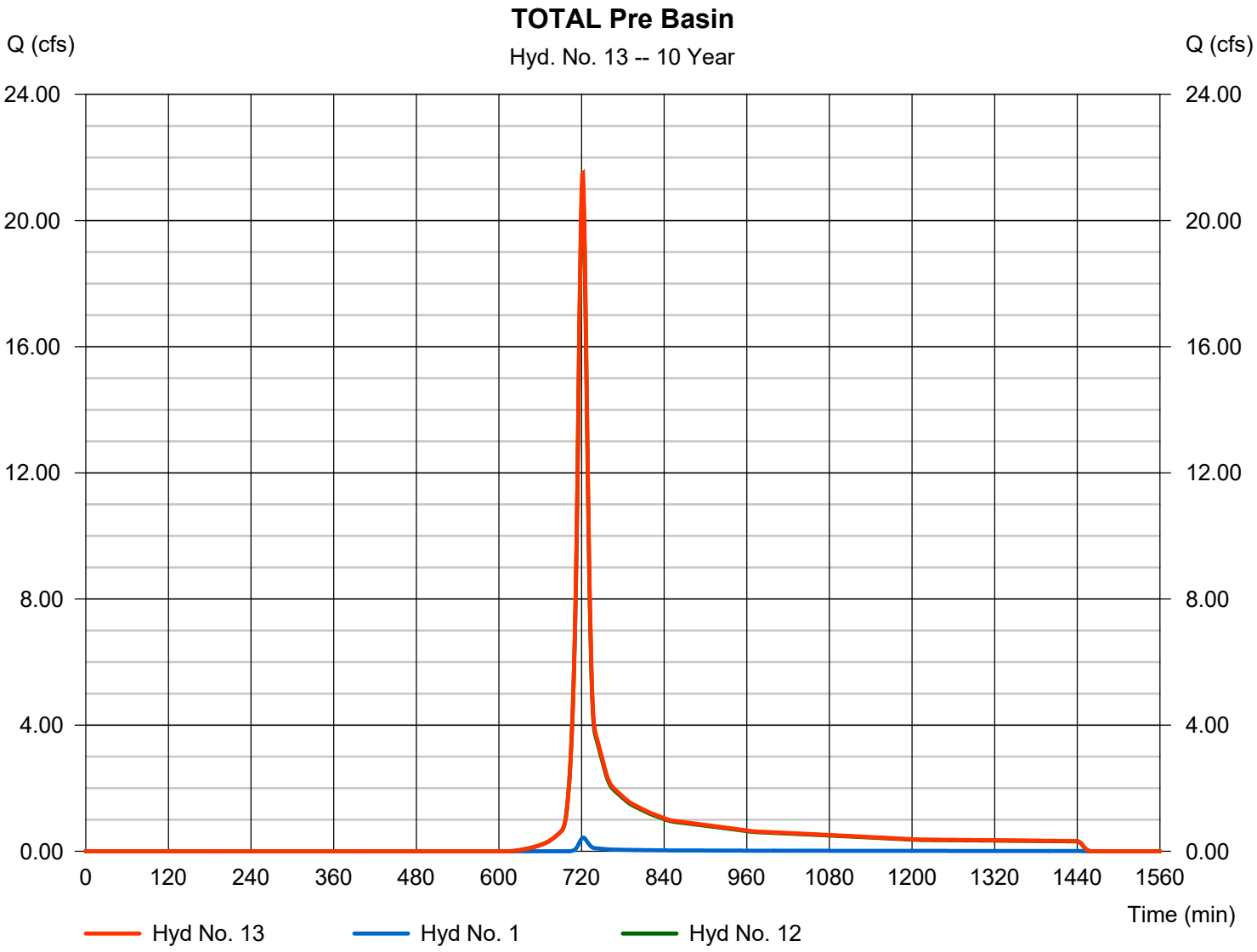


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	21.50 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	55,276 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

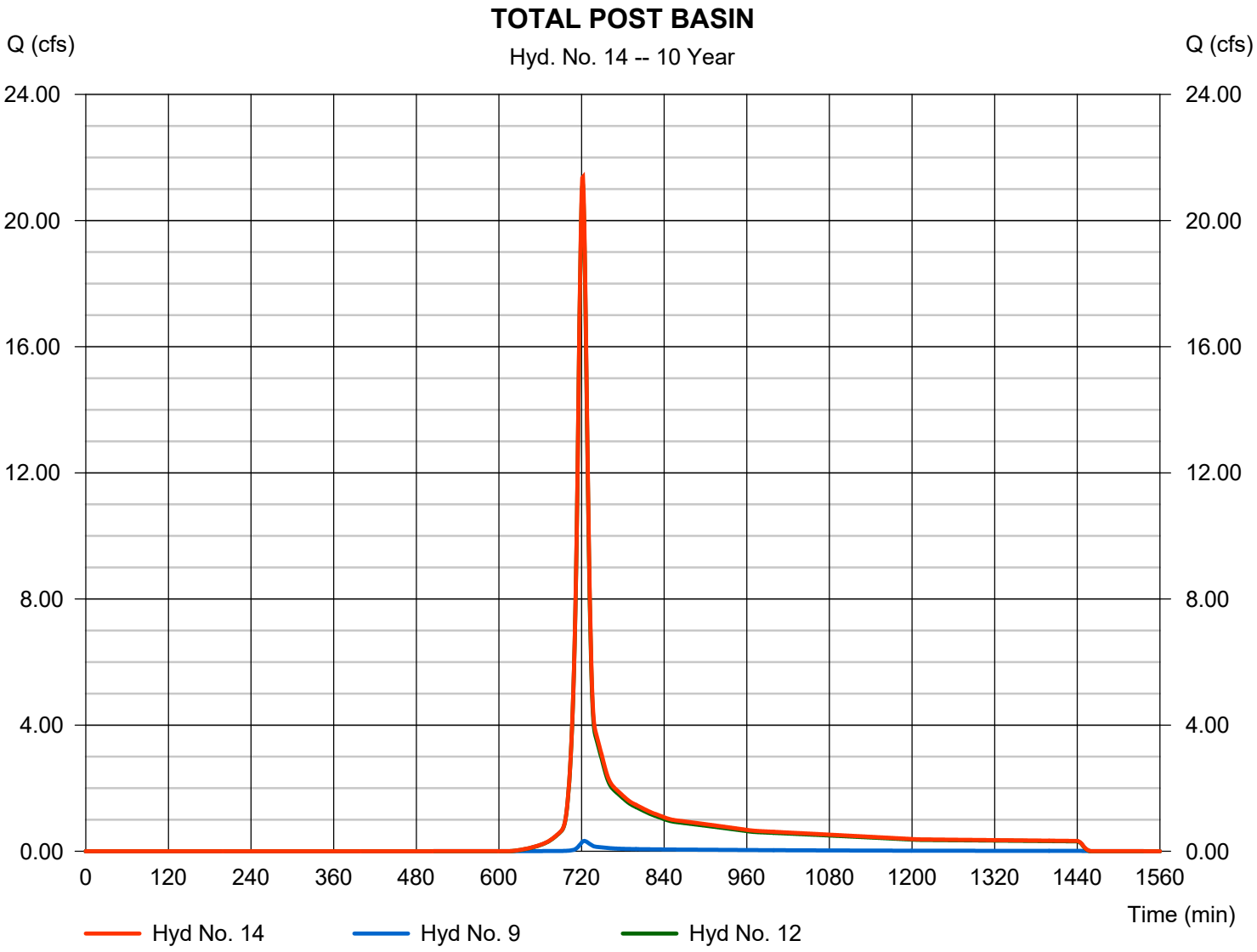


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	= Combine	Peak discharge	= 21.38 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 55,974 cuft
Inflow hyds.	= 9, 12	Contrib. drain. area	= 7.980 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

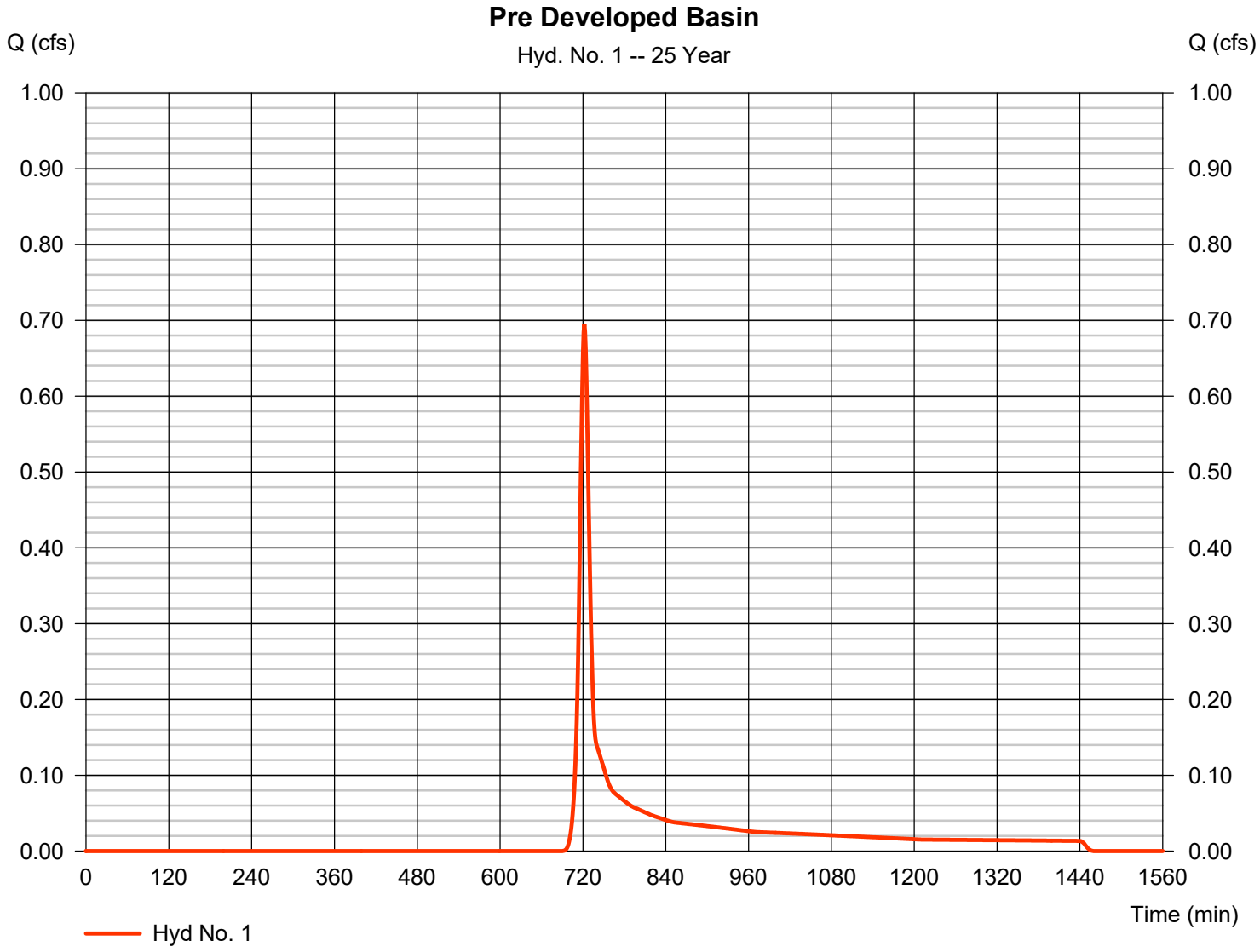
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.695	1	722	1,901	------	------	------	Pre Developed Basin
4	SCS Runoff	0.176	1	717	426	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.070	1	723	425	4	95.55	99.0	POST ROUTED THRU POND
6	SCS Runoff	0.813	1	718	1,758	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.054	1	760	1,236	6	897.70	1,001	POST ROUTED THRU POND
8	SCS Runoff	0.383	1	723	1,126	------	------	------	POST DEV BYPASS
9	Combine	0.498	1	723	2,787	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	28.86	1	721	73,204	------	------	------	Dwnstrm w-o Site
13	Combine	29.54	1	721	75,104	1, 12	------	------	TOTAL Pre Basin
14	Combine	29.33	1	721	75,991	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	= SCS Runoff	Peak discharge	= 0.695 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 1,901 cuft
Drainage area	= 0.360 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.00 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



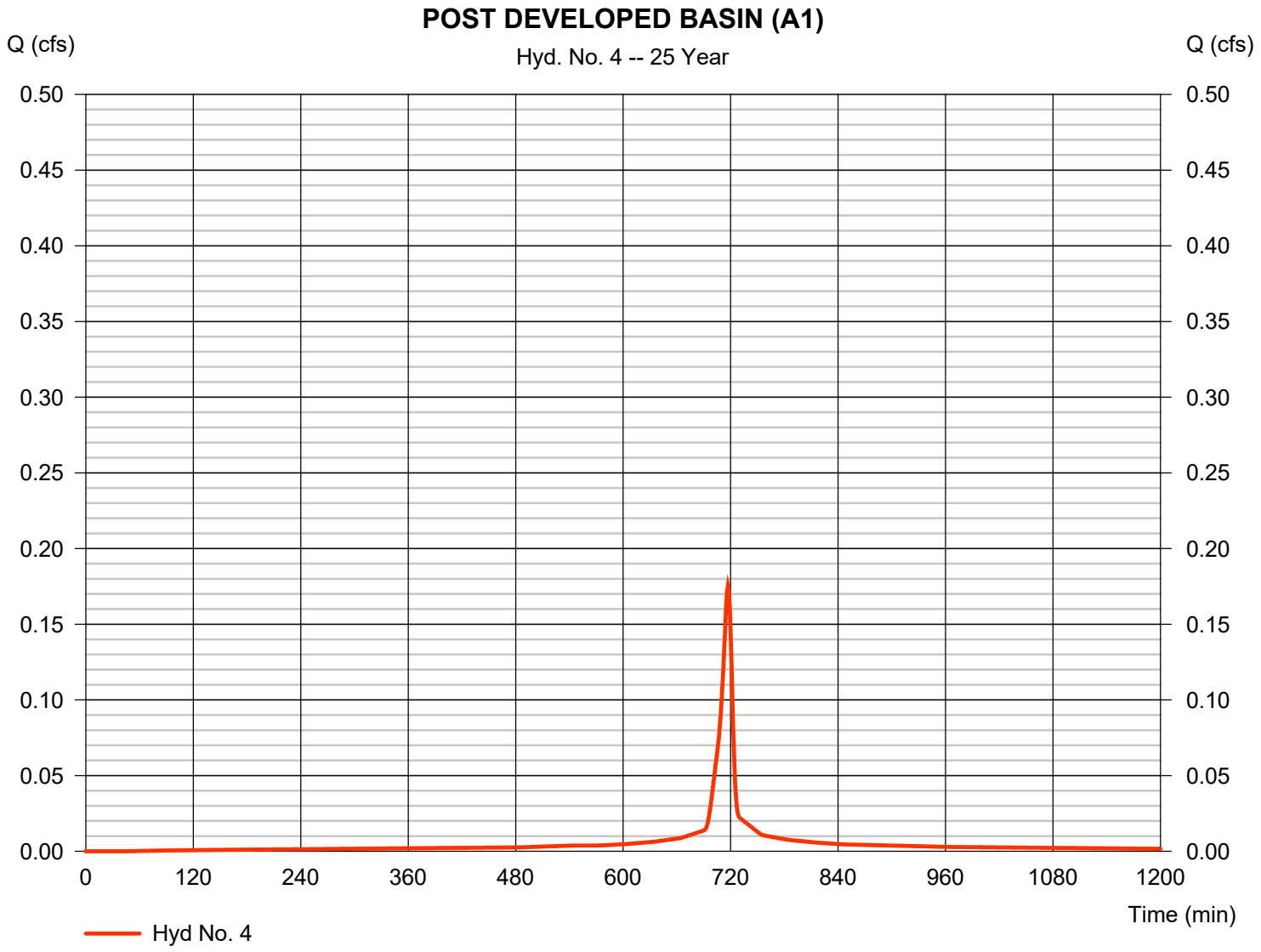
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.176 cfs
Storm frequency	= 25 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 426 cuft
Drainage area	= 0.020 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98)] / 0.020



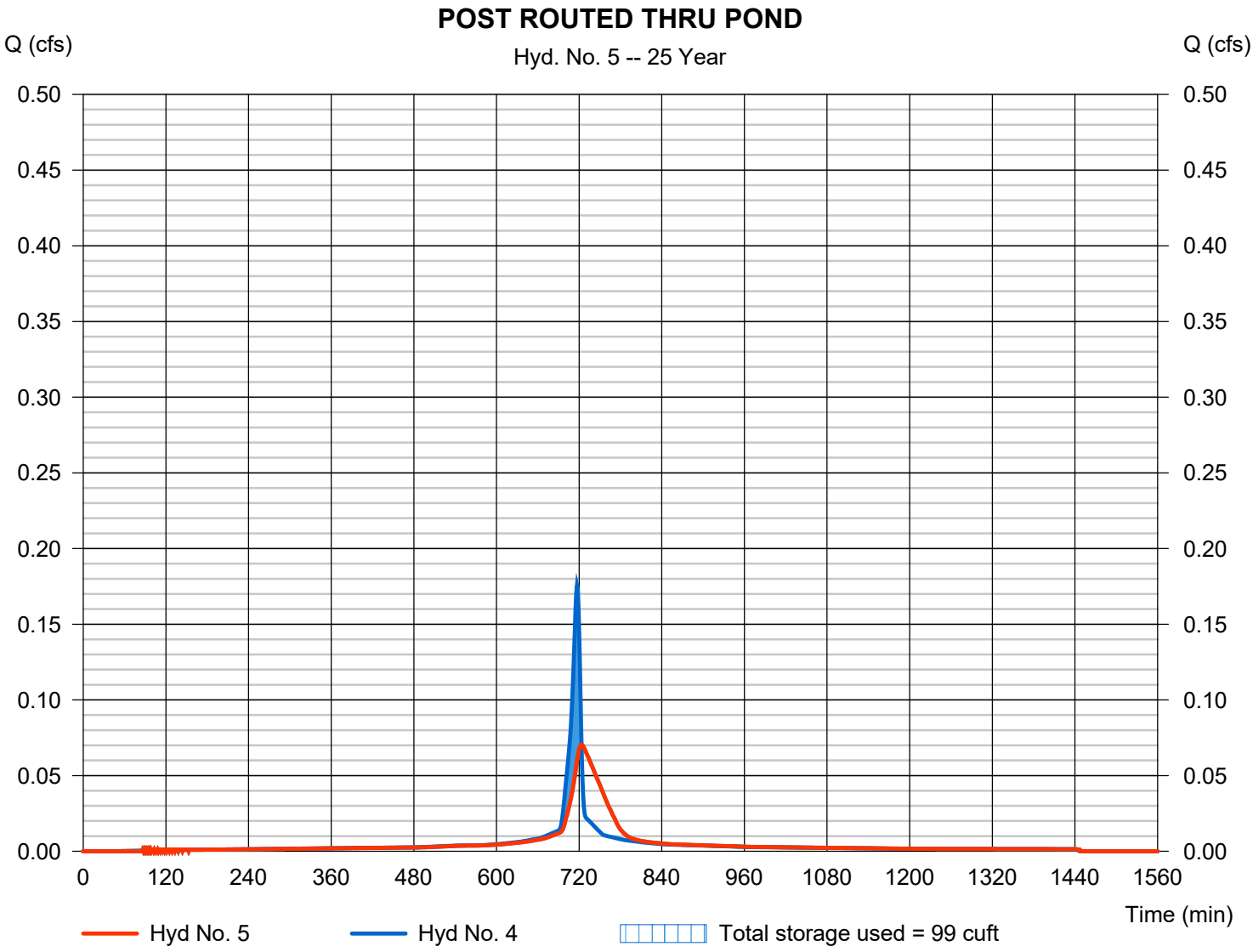
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	= Reservoir	Peak discharge	= 0.070 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 425 cuft
Inflow hyd. No.	= 4 - POST DEVELOPED BASIN (A1)	Max. Elevation	= 95.55 ft
Reservoir name	= Stone Reservoir 1	Max. Storage	= 99 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



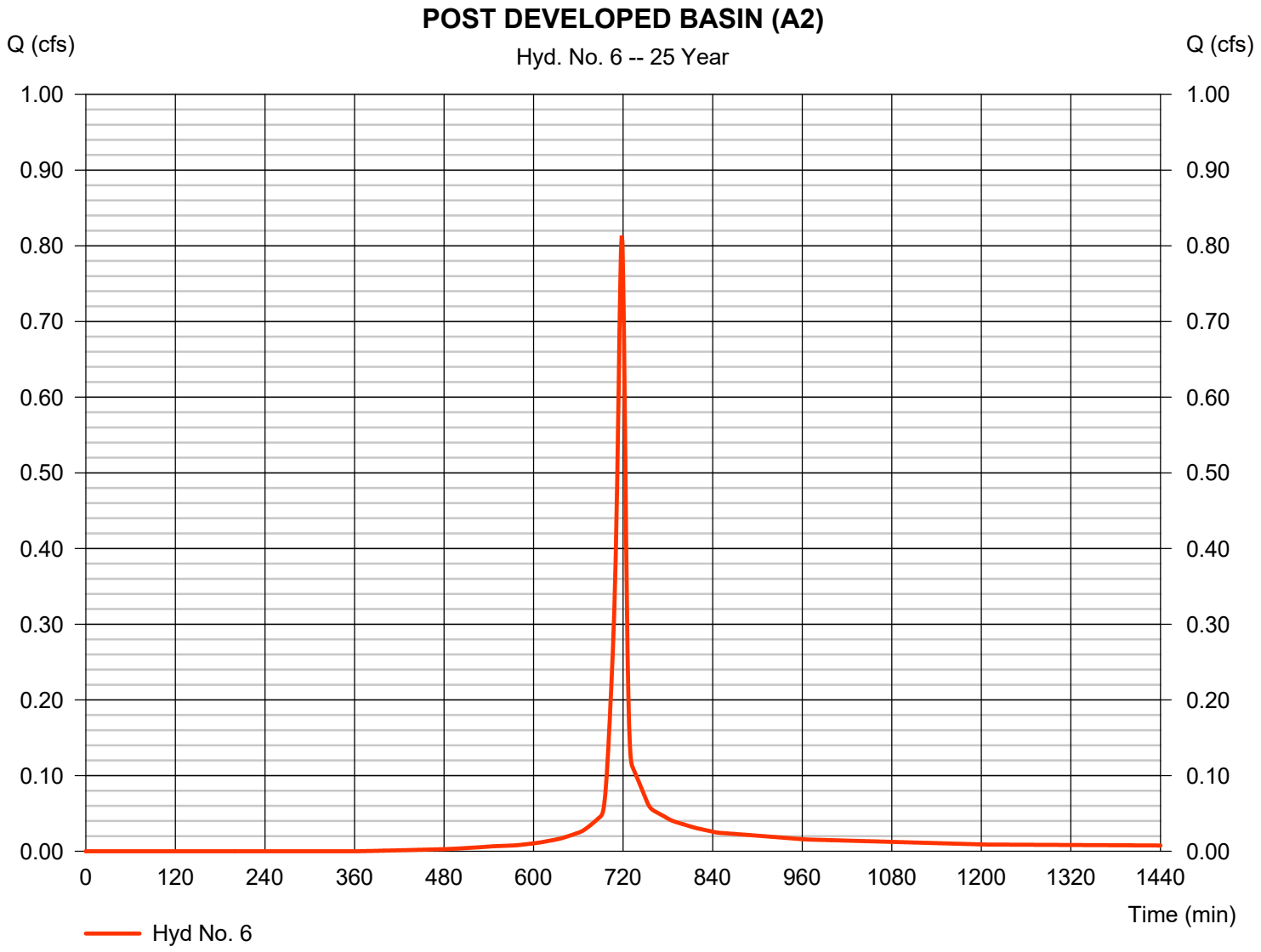
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.813 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,758 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 5.93 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



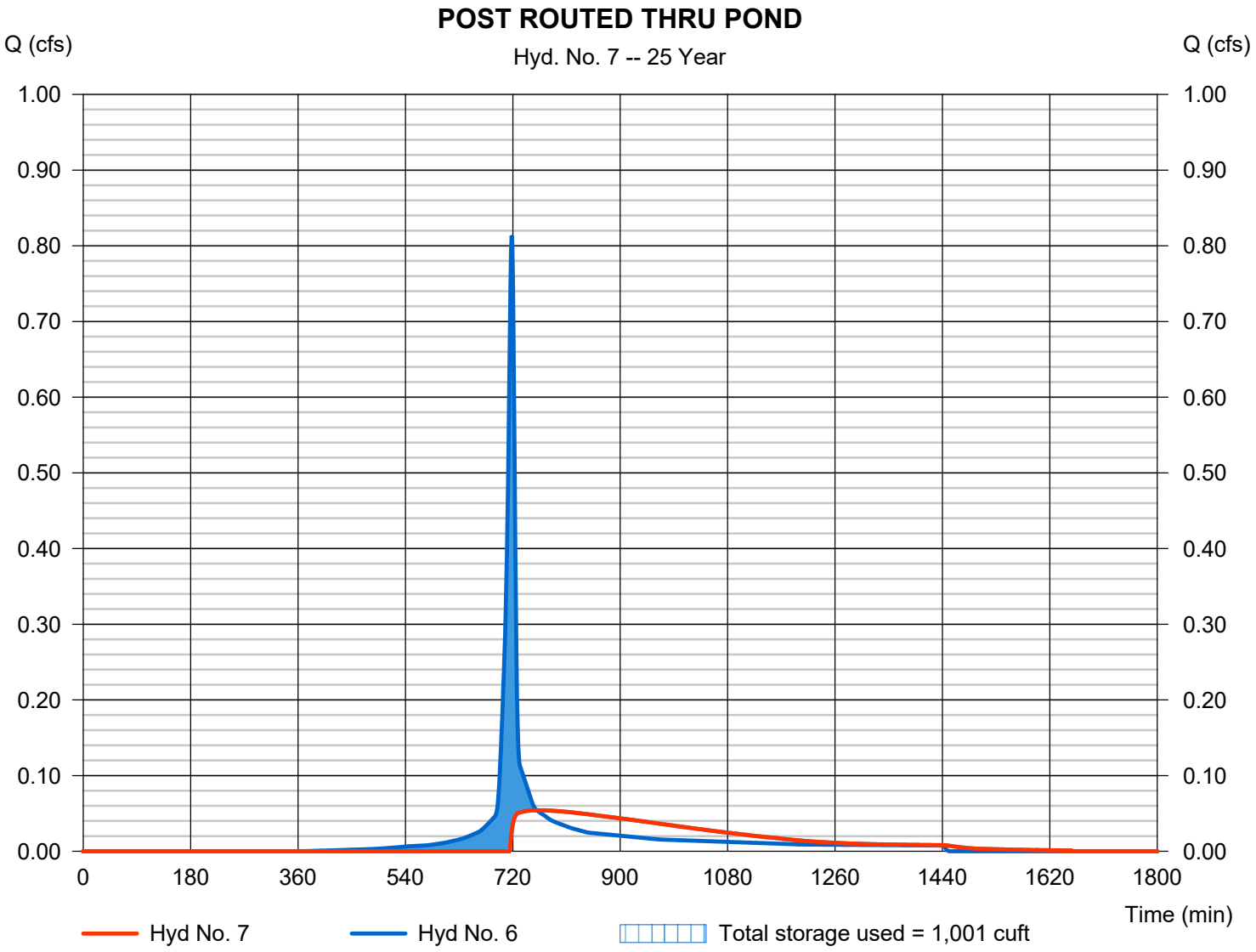
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.054 cfs
Storm frequency	=	25 yrs	Time to peak	=	760 min
Time interval	=	1 min	Hyd. volume	=	1,236 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	897.70 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	1,001 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

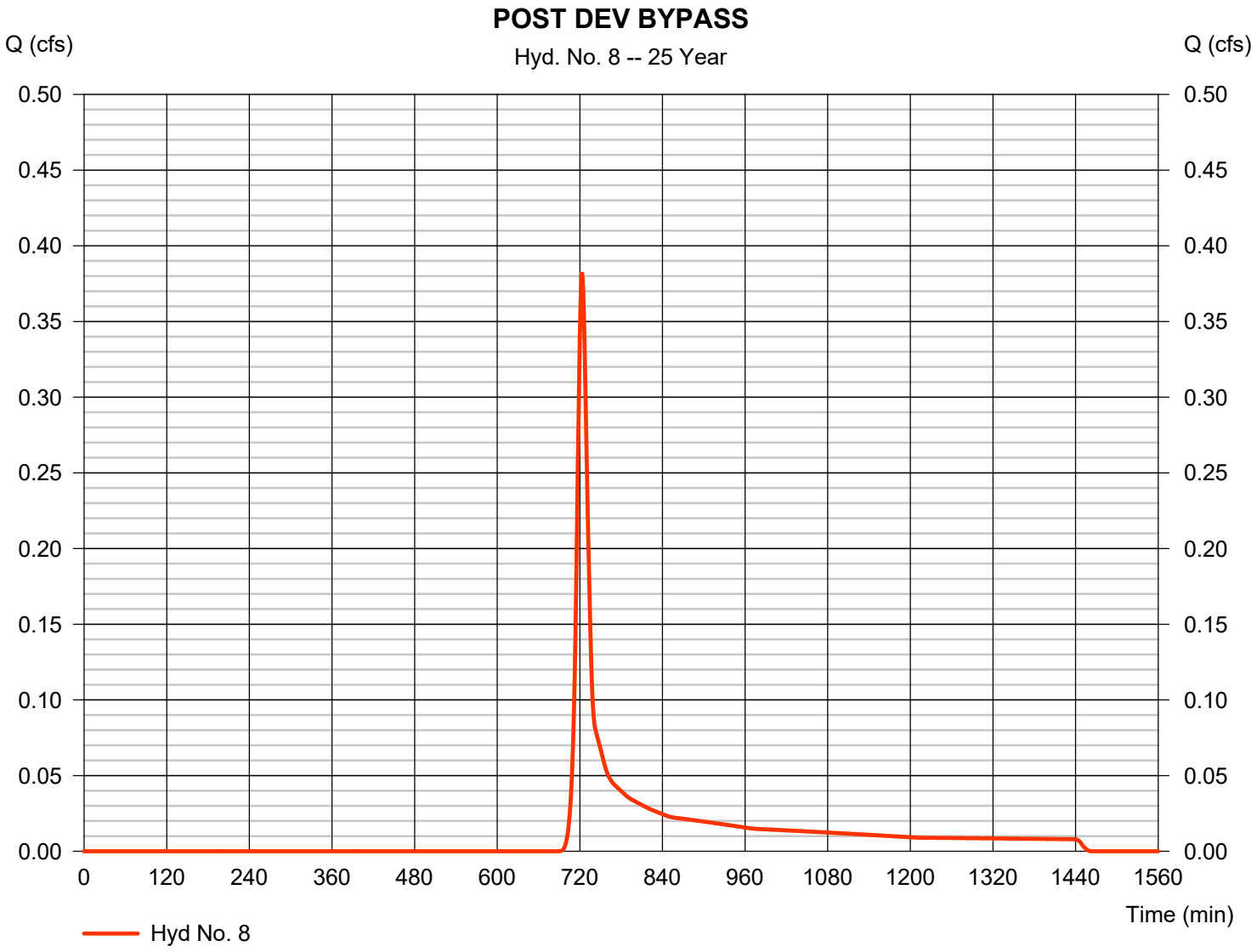


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.383 cfs
Storm frequency	=	25 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	1,126 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

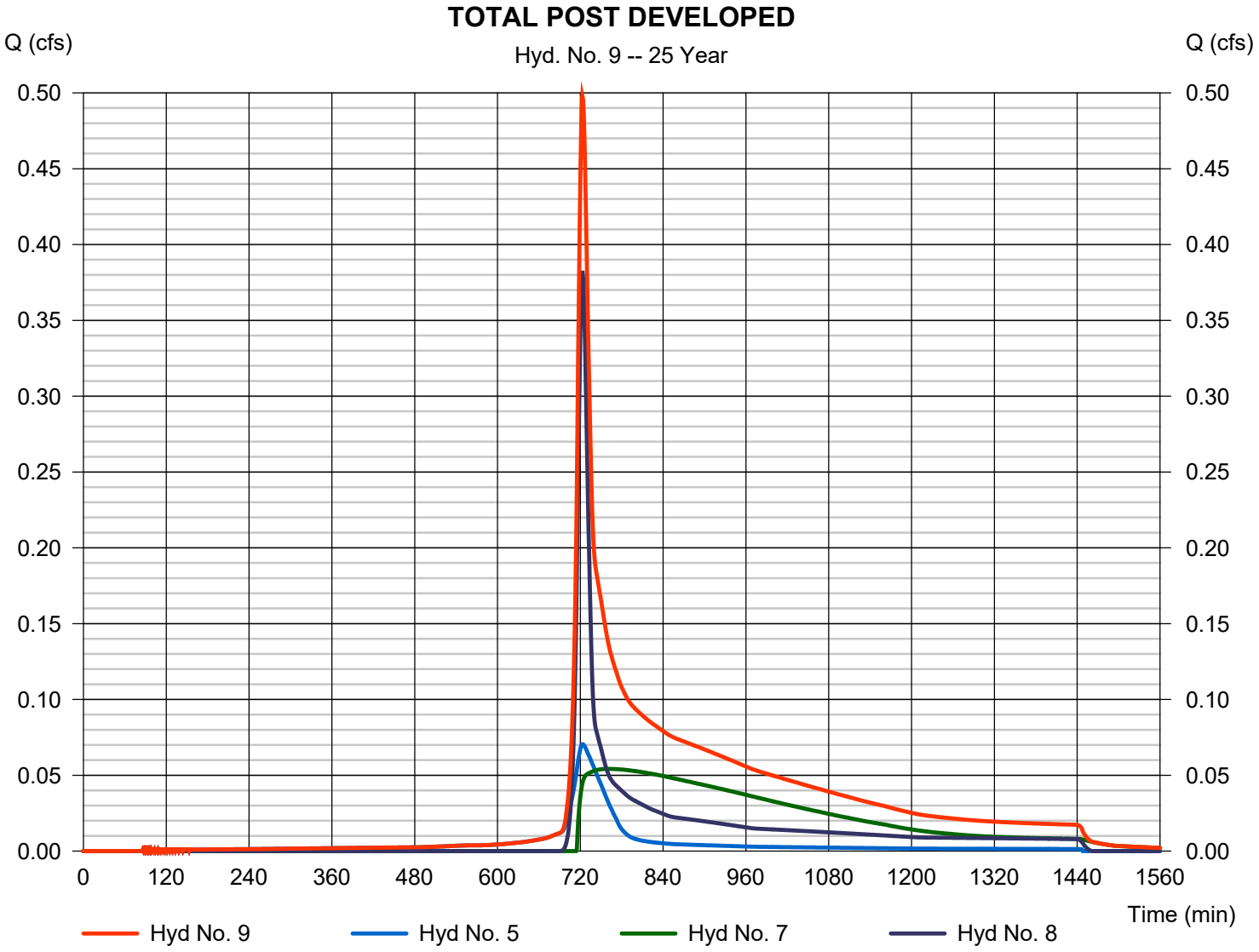


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	=	Combine	Peak discharge	=	0.498 cfs
Storm frequency	=	25 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	2,787 cuft
Inflow hyds.	=	5, 7, 8	Contrib. drain. area	=	0.210 ac



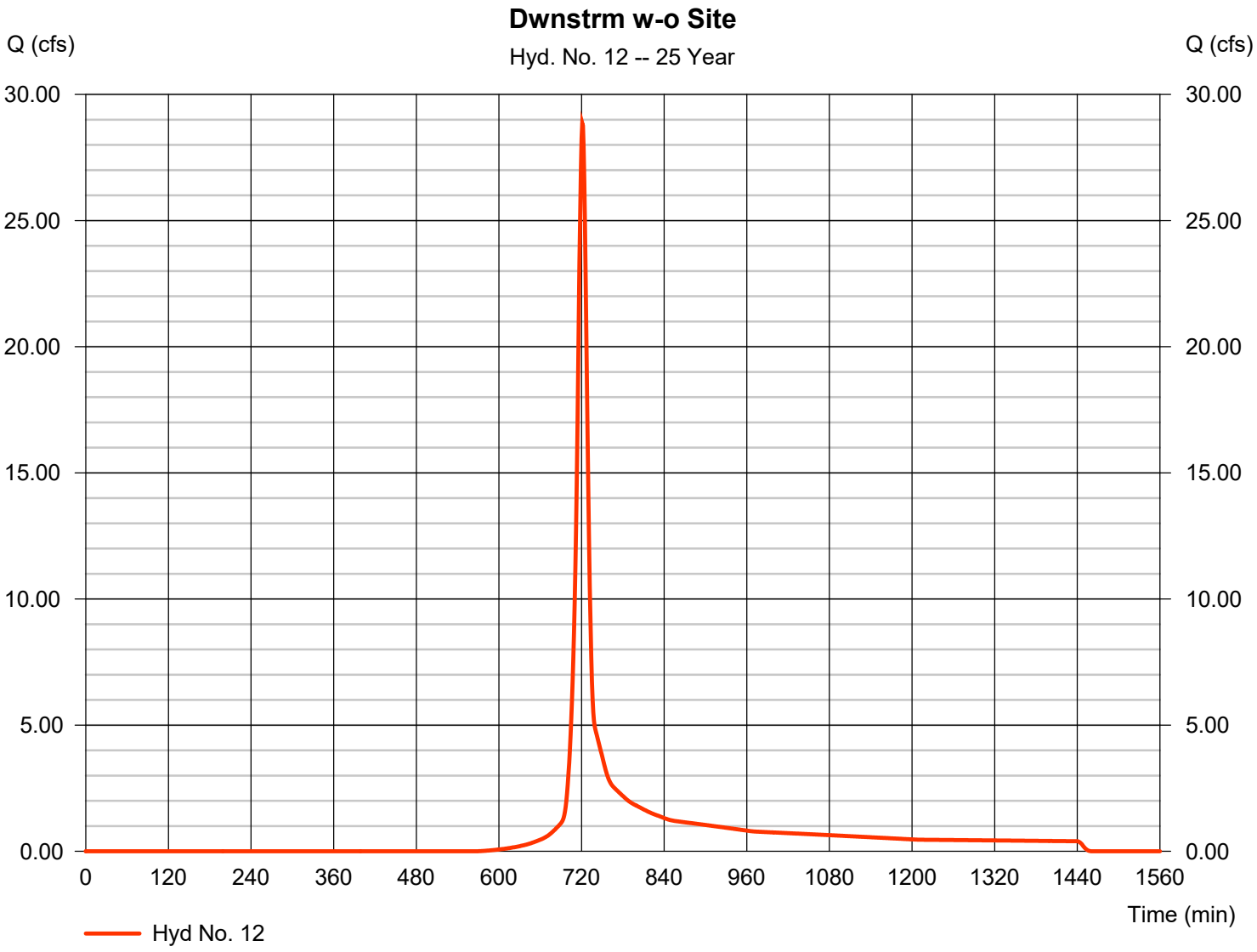
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.86 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	73,204 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	5.93 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

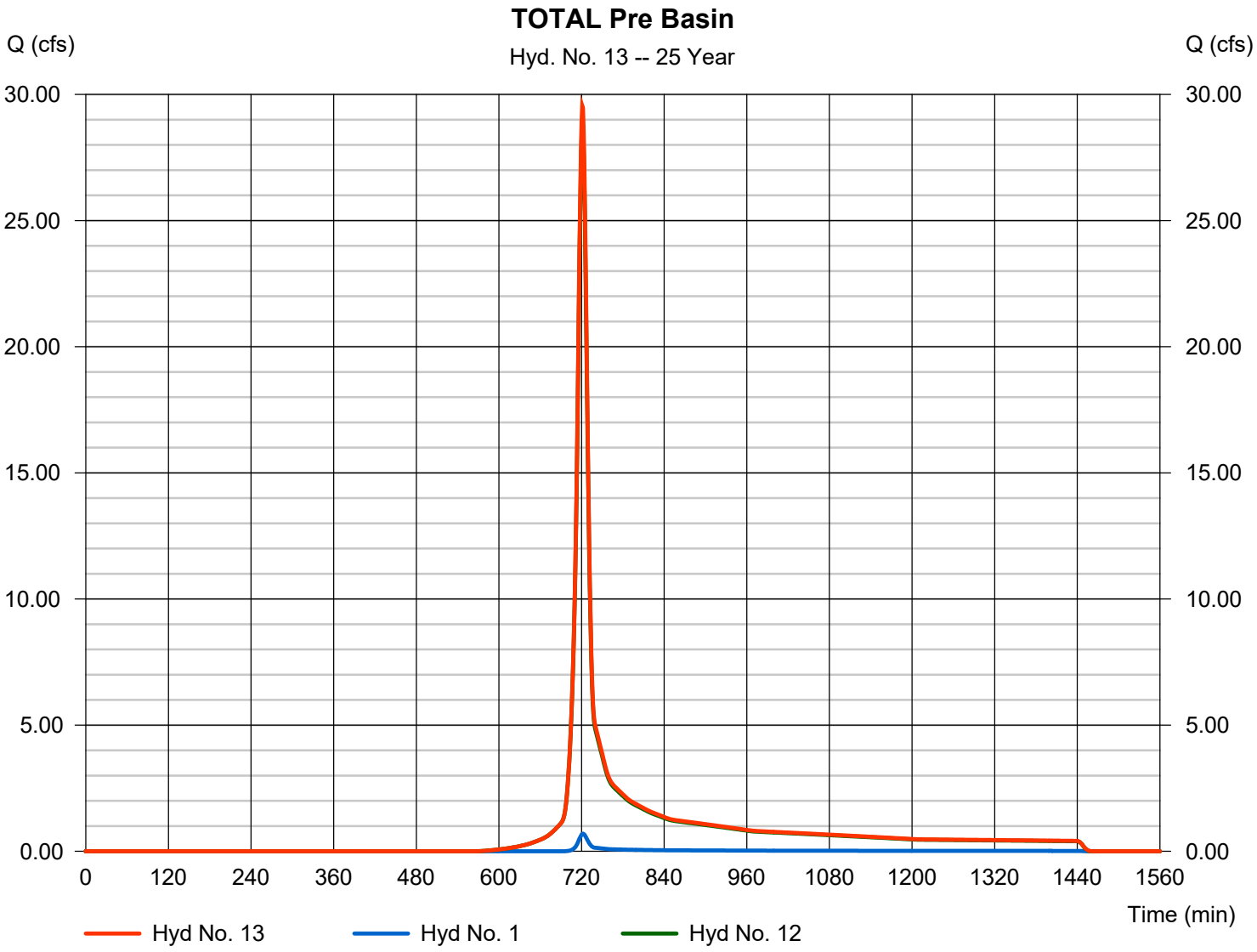


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	29.54 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	75,104 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

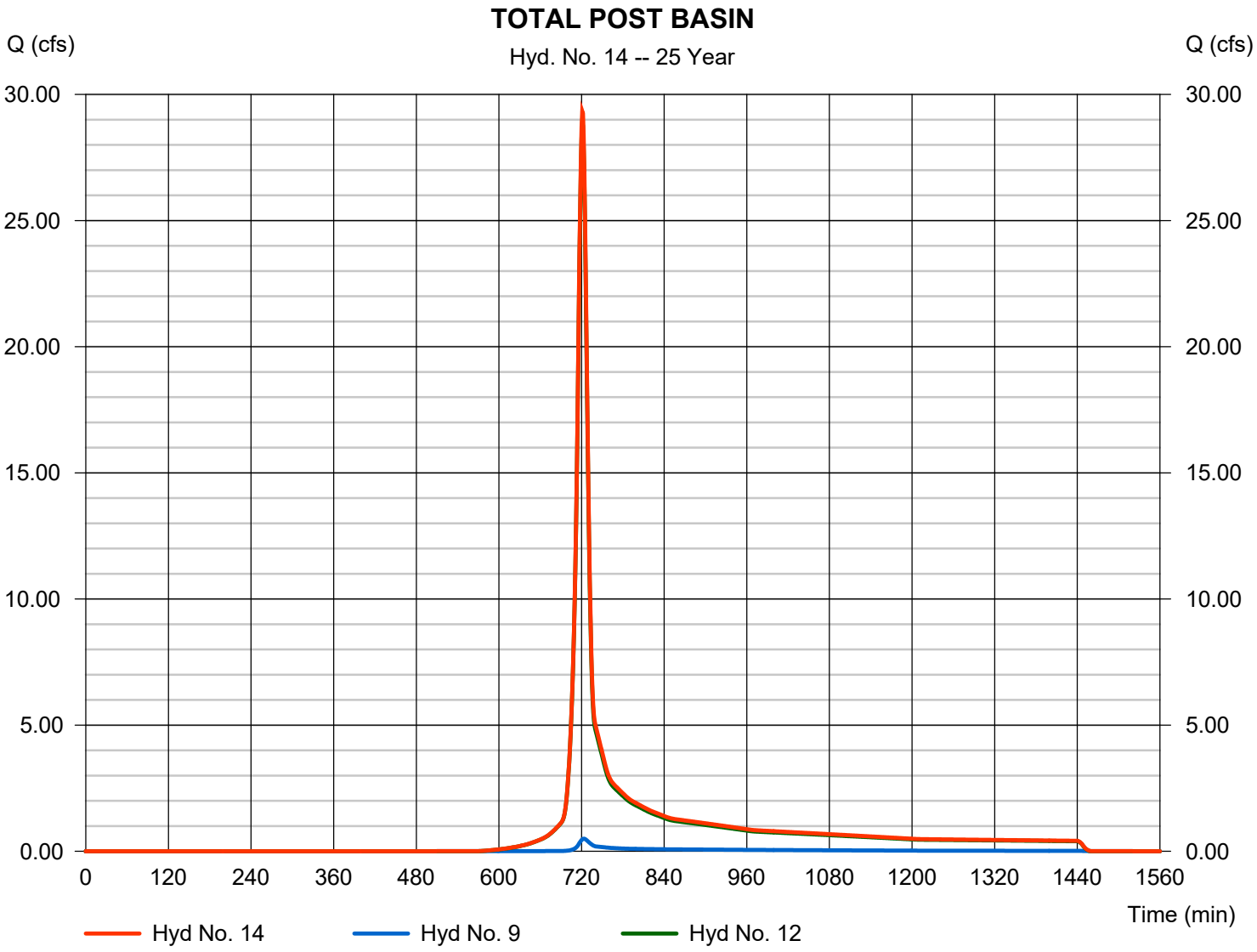


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	=	Combine	Peak discharge	=	29.33 cfs
Storm frequency	=	25 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	75,991 cuft
Inflow hyds.	=	9, 12	Contrib. drain. area	=	7.980 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

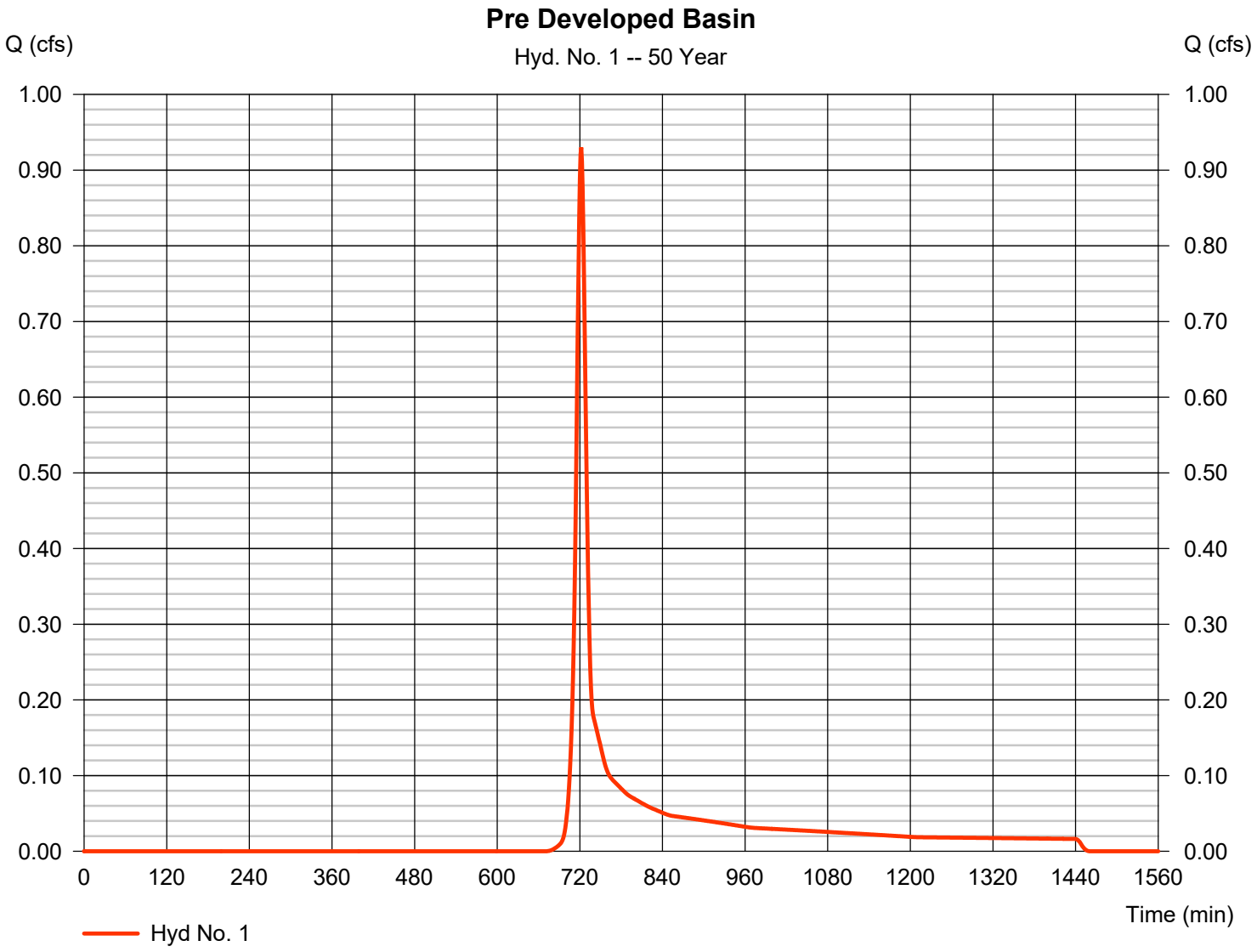
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.930	1	722	2,466	------	------	------	Pre Developed Basin
4	SCS Runoff	0.198	1	717	481	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.076	1	724	481	4	95.79	115	POST ROUTED THRU POND
6	SCS Runoff	0.951	1	718	2,070	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.065	1	758	1,548	6	898.06	1,189	POST ROUTED THRU POND
8	SCS Runoff	0.513	1	723	1,462	------	------	------	POST DEV BYPASS
9	Combine	0.645	1	723	3,490	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	35.48	1	721	89,685	------	------	------	Dwnstrm w-o Site
13	Combine	36.40	1	721	92,151	1, 12	------	------	TOTAL Pre Basin
14	Combine	36.10	1	721	93,175	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.930 cfs
Storm frequency	=	50 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	2,466 cuft
Drainage area	=	0.360 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	6.67 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



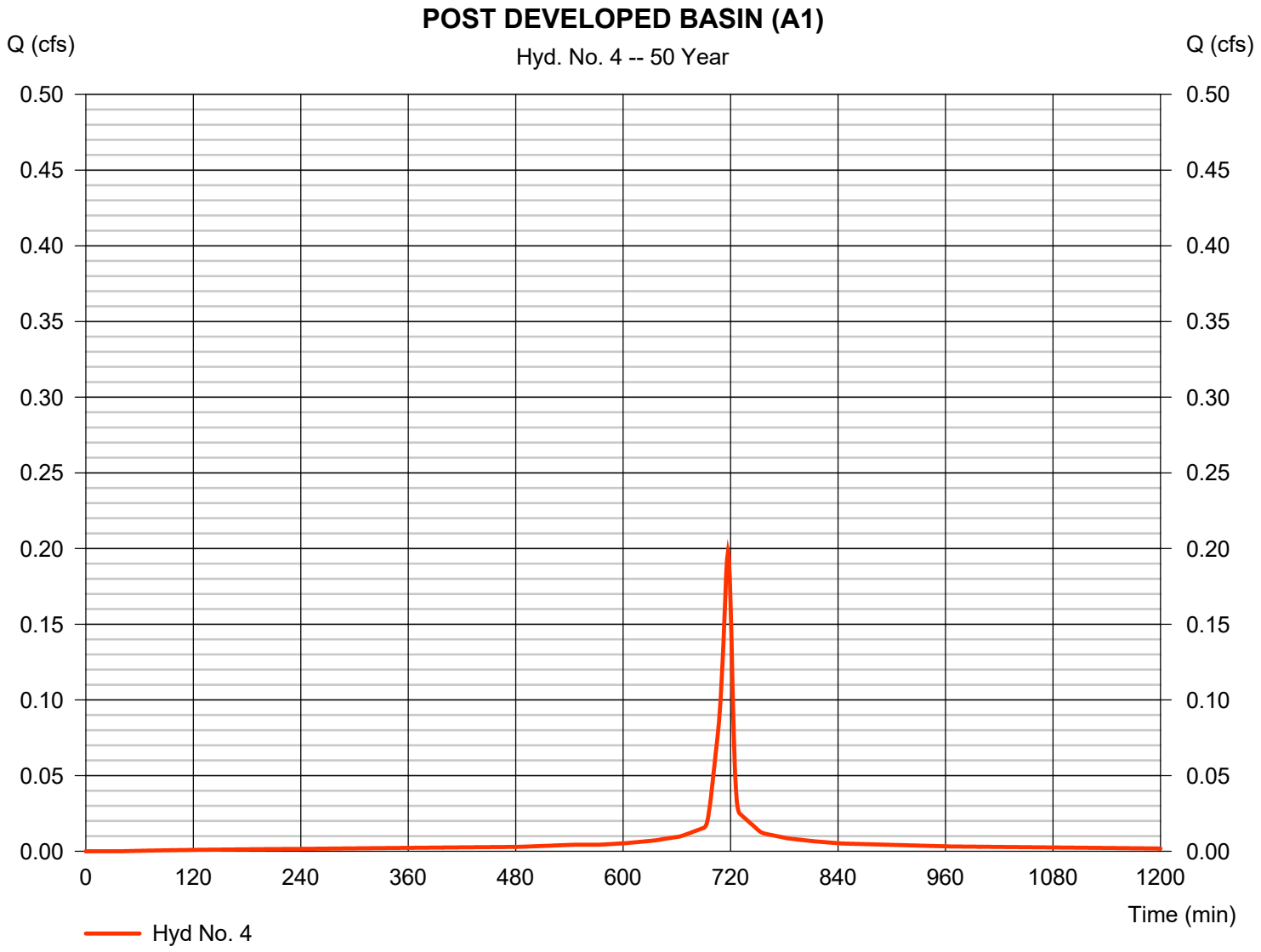
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.198 cfs
Storm frequency	= 50 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 481 cuft
Drainage area	= 0.020 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98)] / 0.020



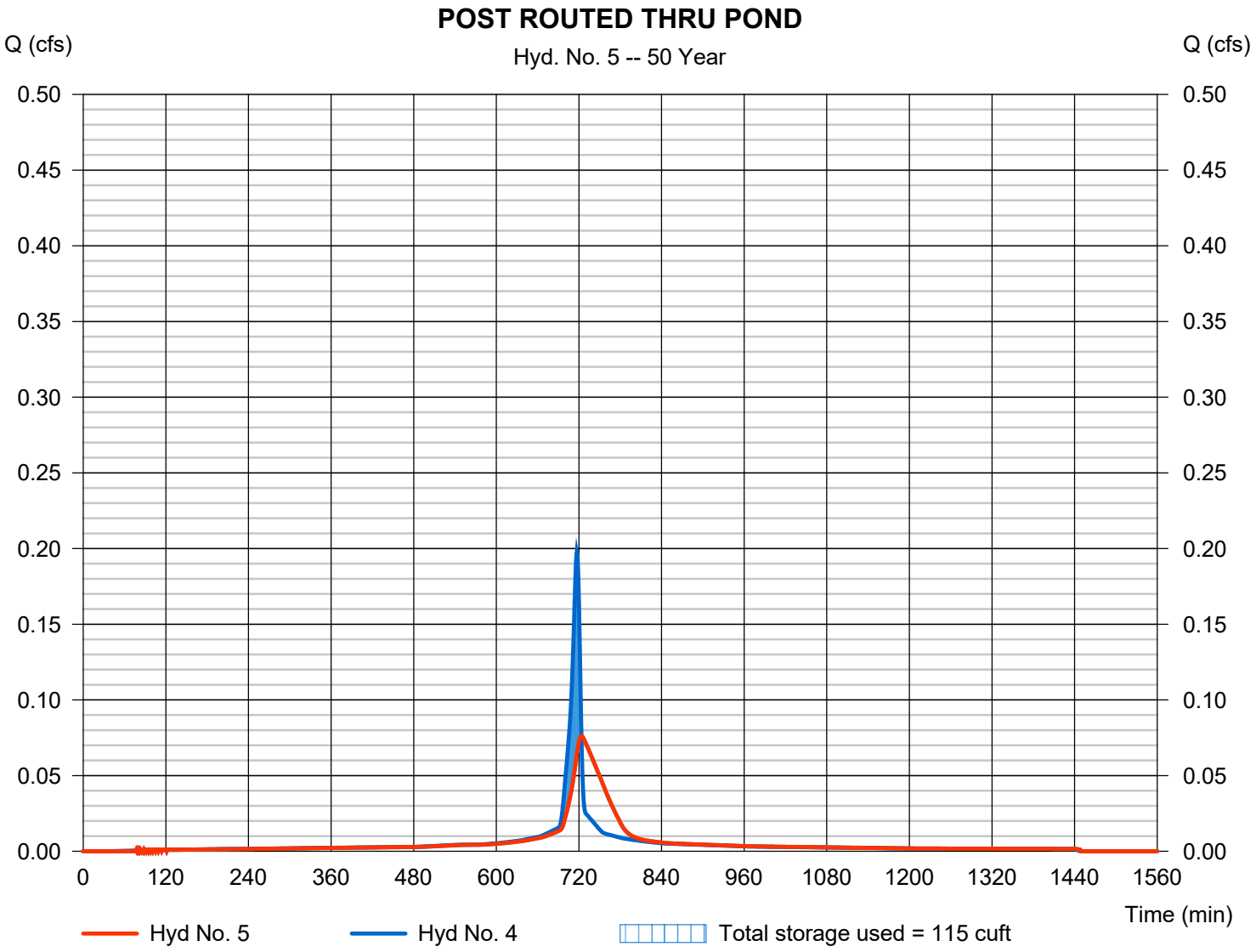
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.076 cfs
Storm frequency	=	50 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	481 cuft
Inflow hyd. No.	=	4 - POST DEVELOPED BASIN (A1)	Max. Elevation	=	95.79 ft
Reservoir name	=	Stone Reservoir 1	Max. Storage	=	115 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



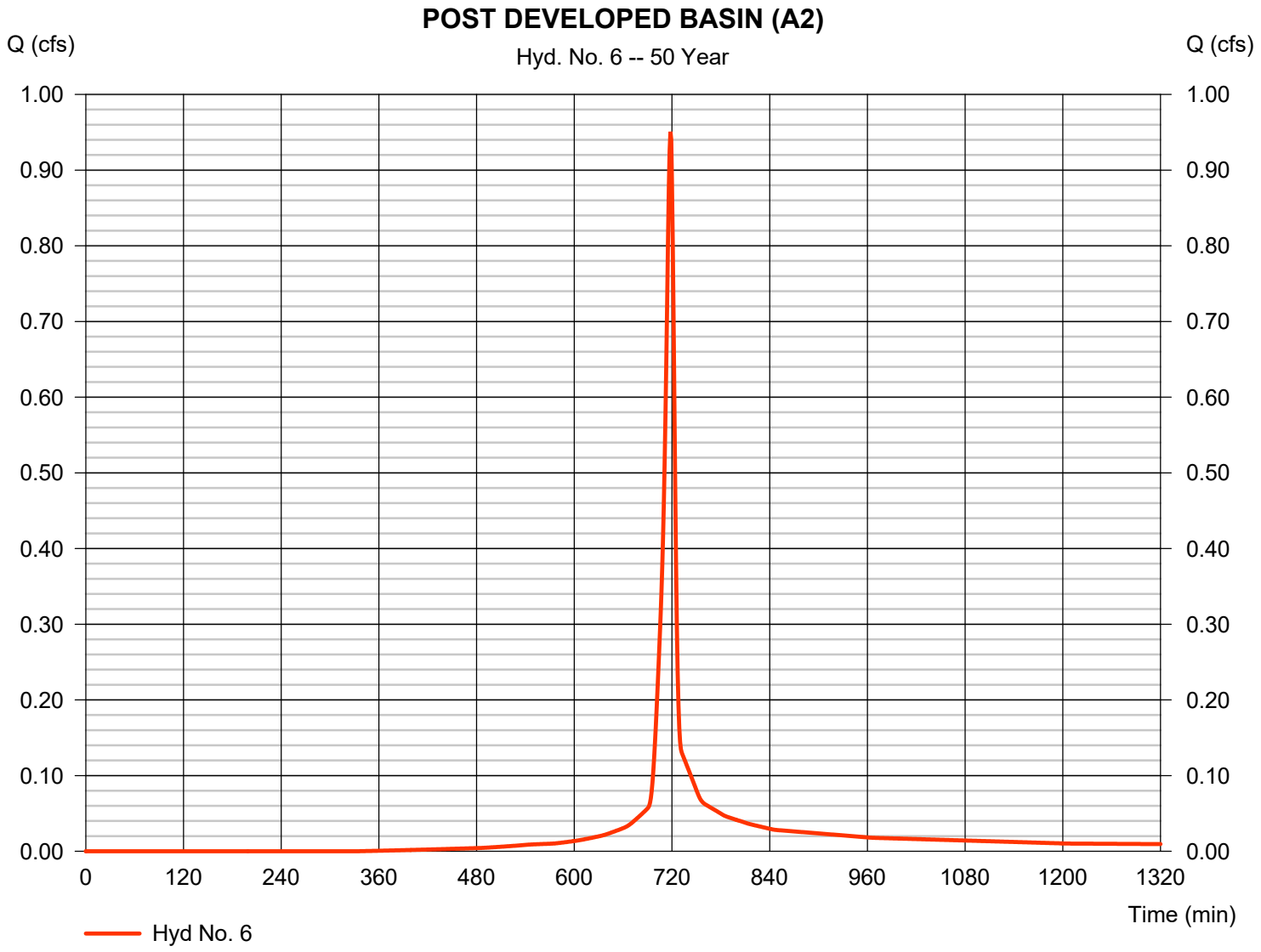
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.951 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 2,070 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 6.67 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



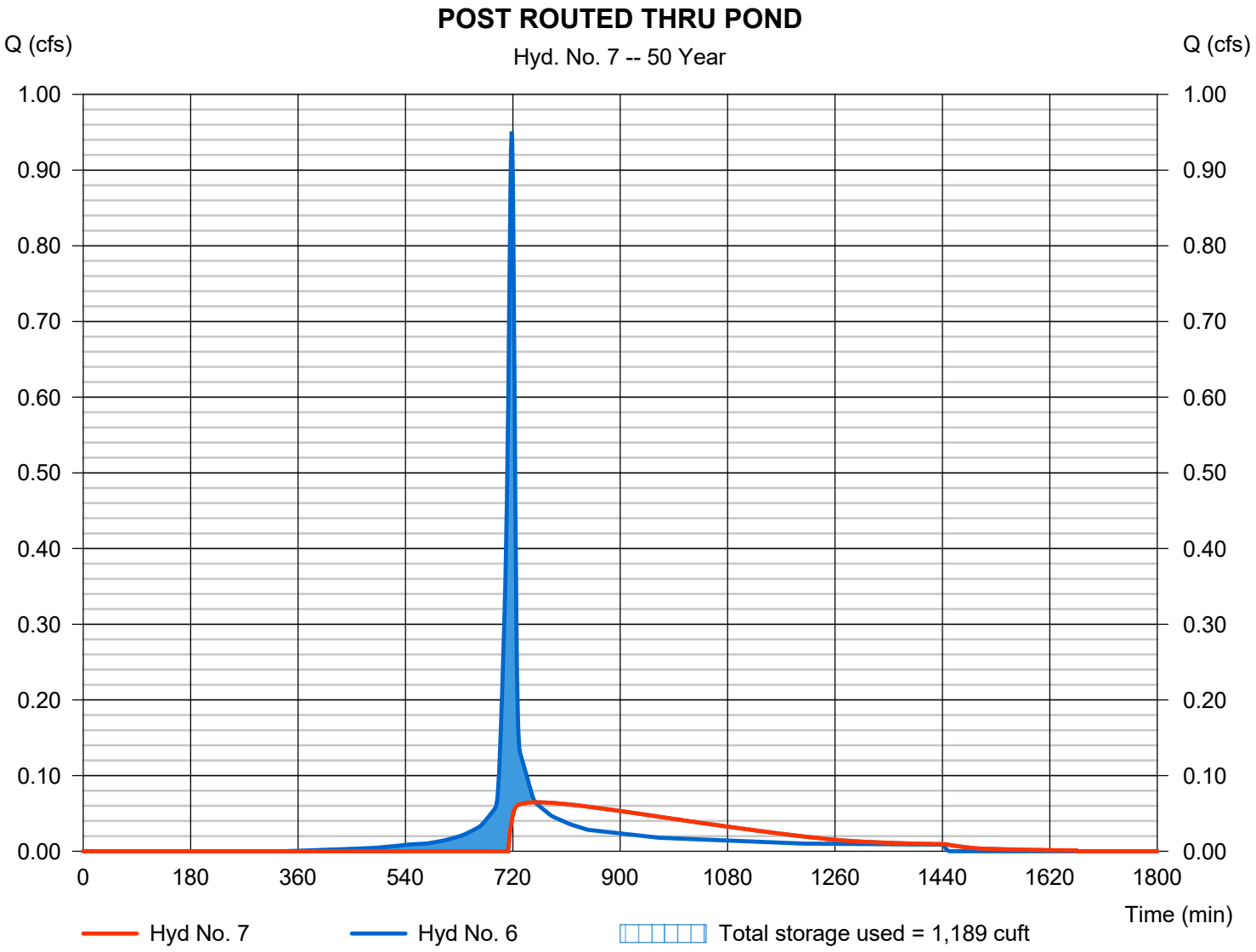
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.065 cfs
Storm frequency	=	50 yrs	Time to peak	=	758 min
Time interval	=	1 min	Hyd. volume	=	1,548 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	898.06 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	1,189 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

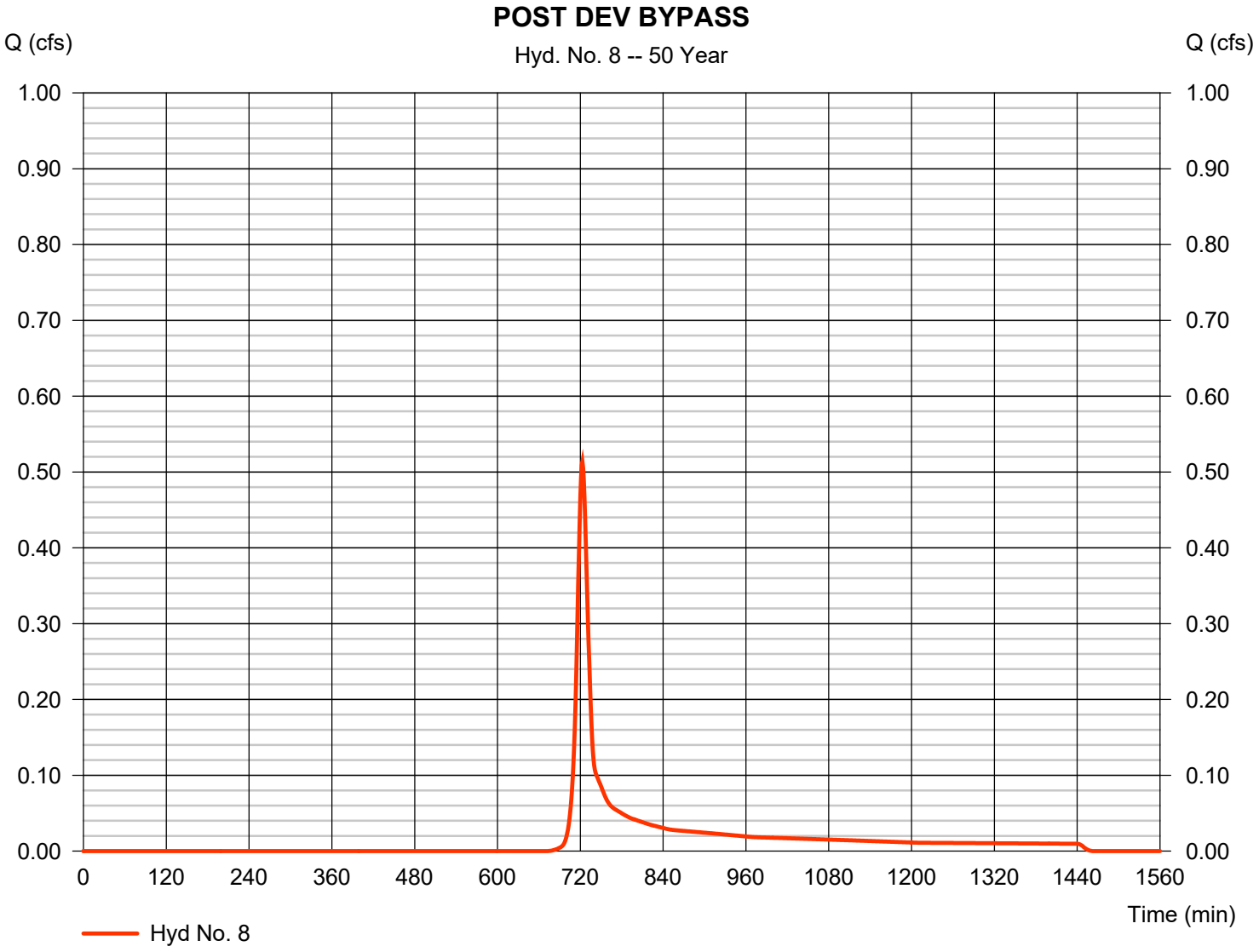


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.513 cfs
Storm frequency	=	50 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	1,462 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	6.67 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

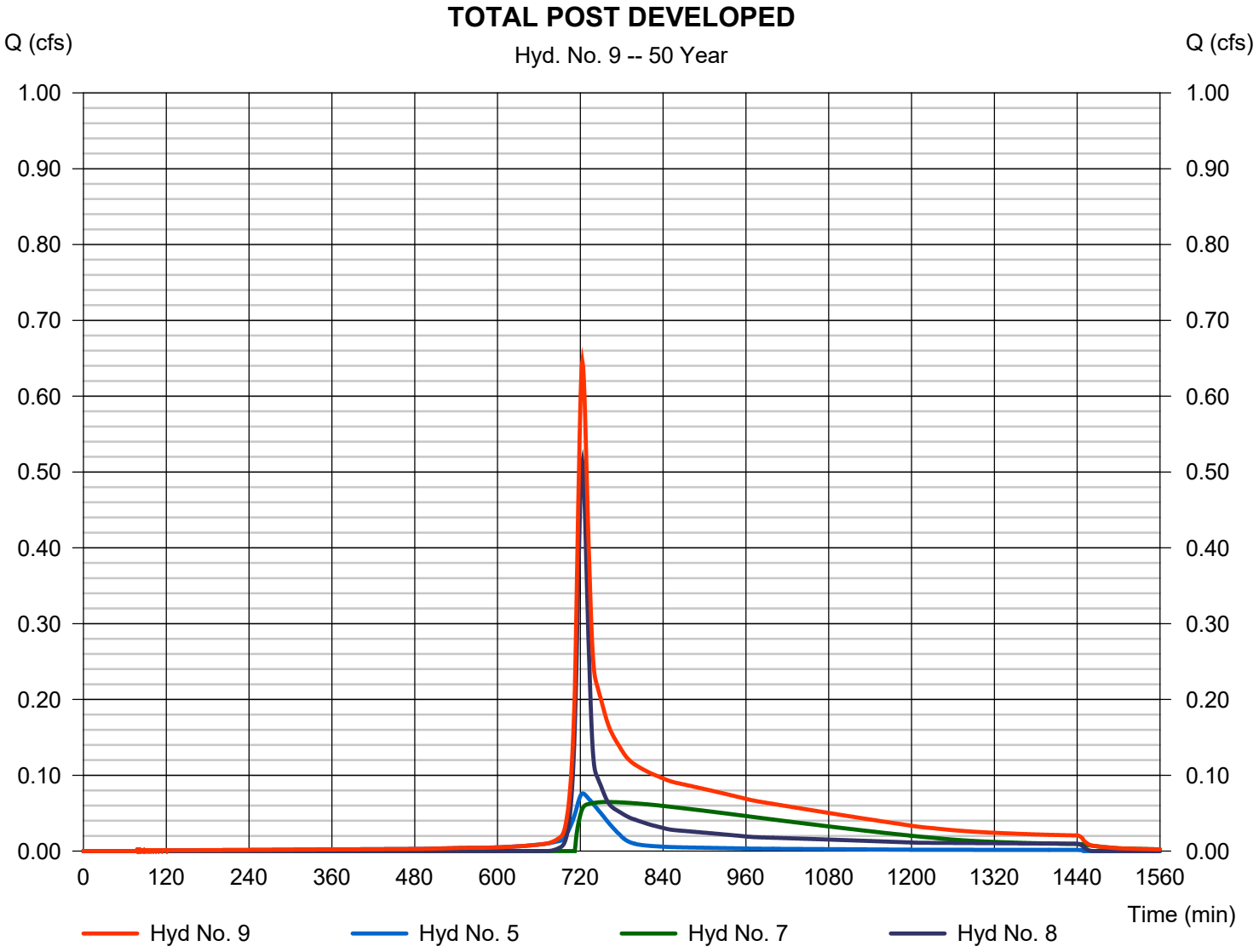


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	=	Combine	Peak discharge	=	0.645 cfs
Storm frequency	=	50 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	3,490 cuft
Inflow hyds.	=	5, 7, 8	Contrib. drain. area	=	0.210 ac



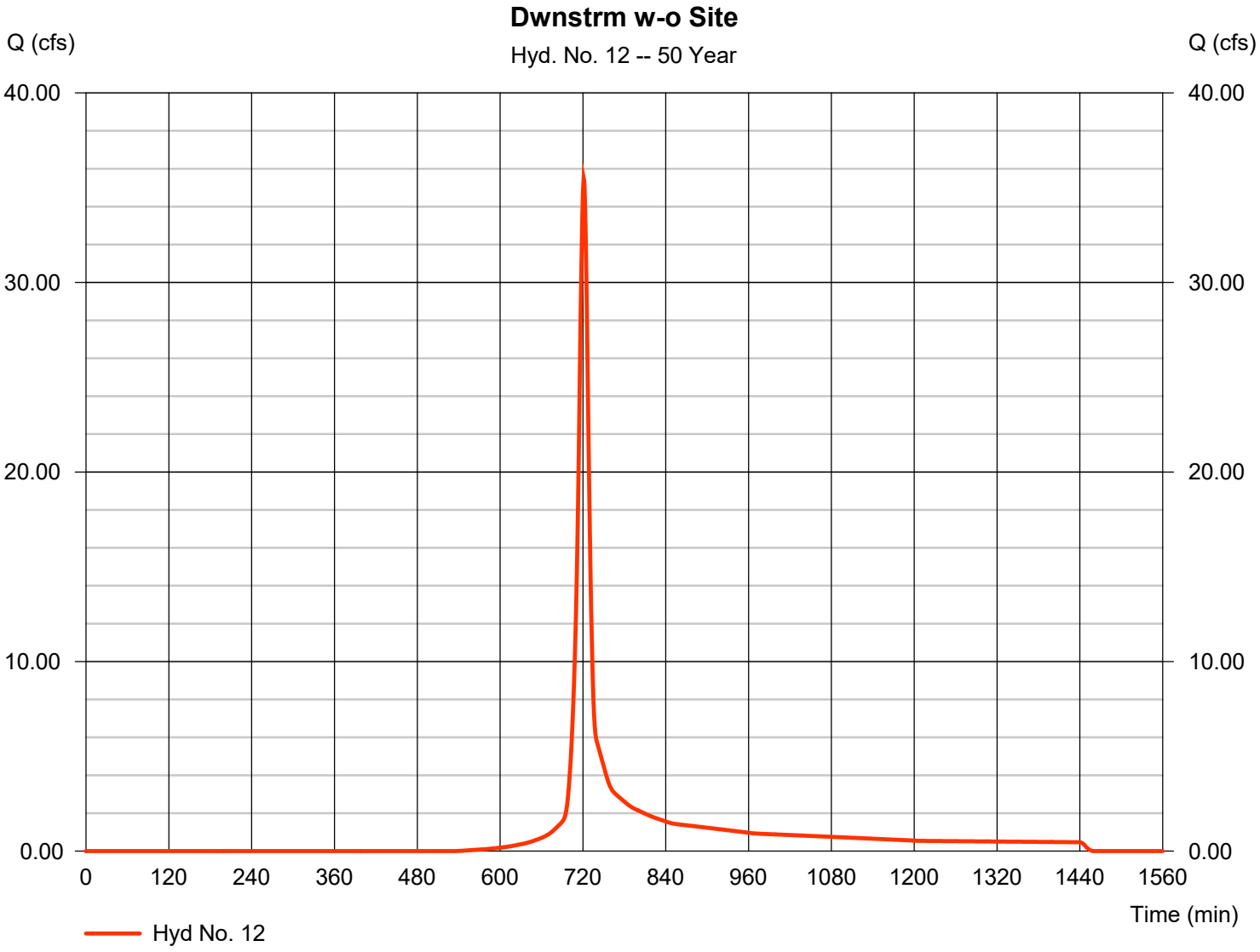
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.48 cfs
Storm frequency	=	50 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	89,685 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	6.67 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

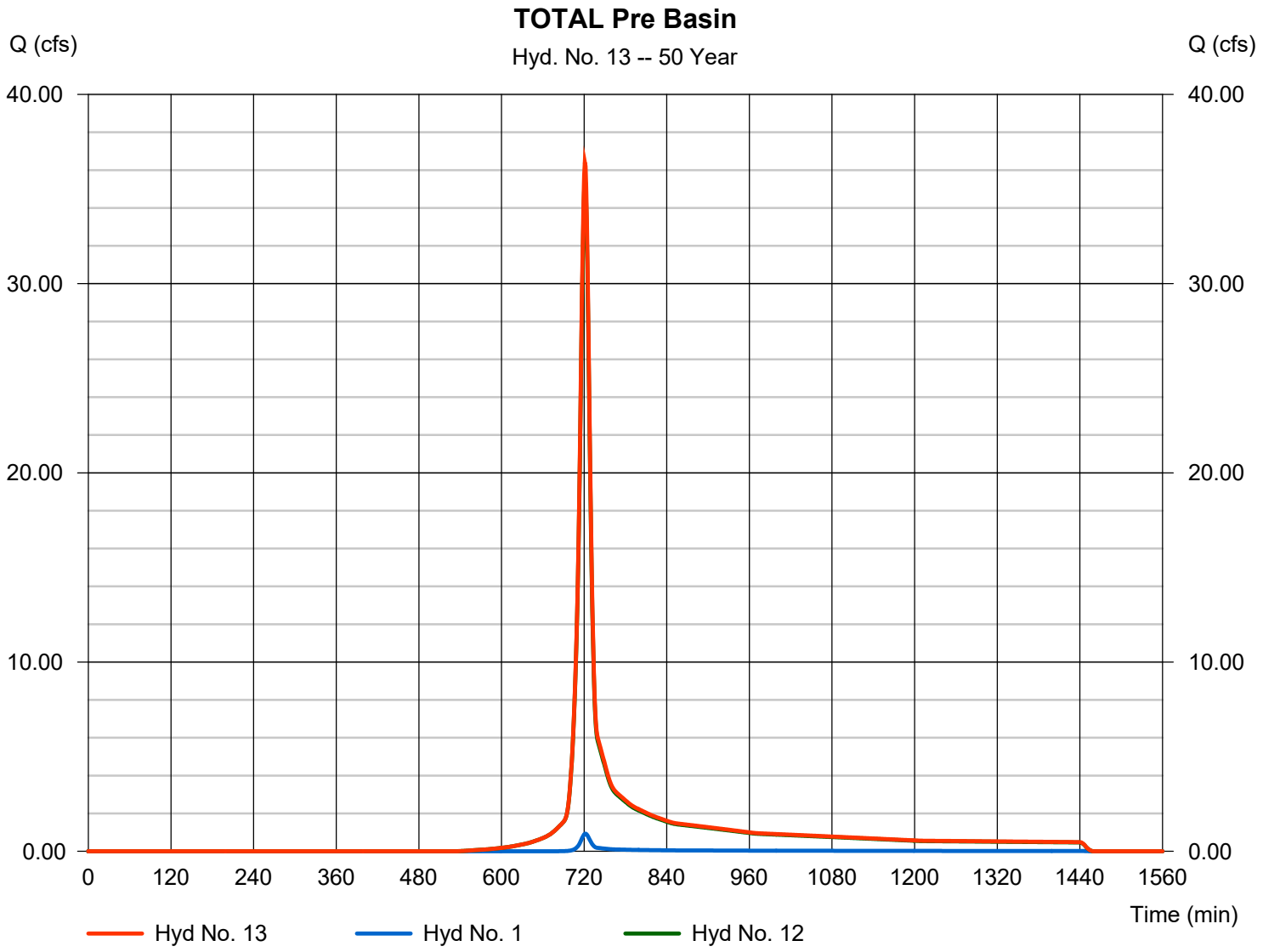


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	36.40 cfs
Storm frequency	=	50 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	92,151 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

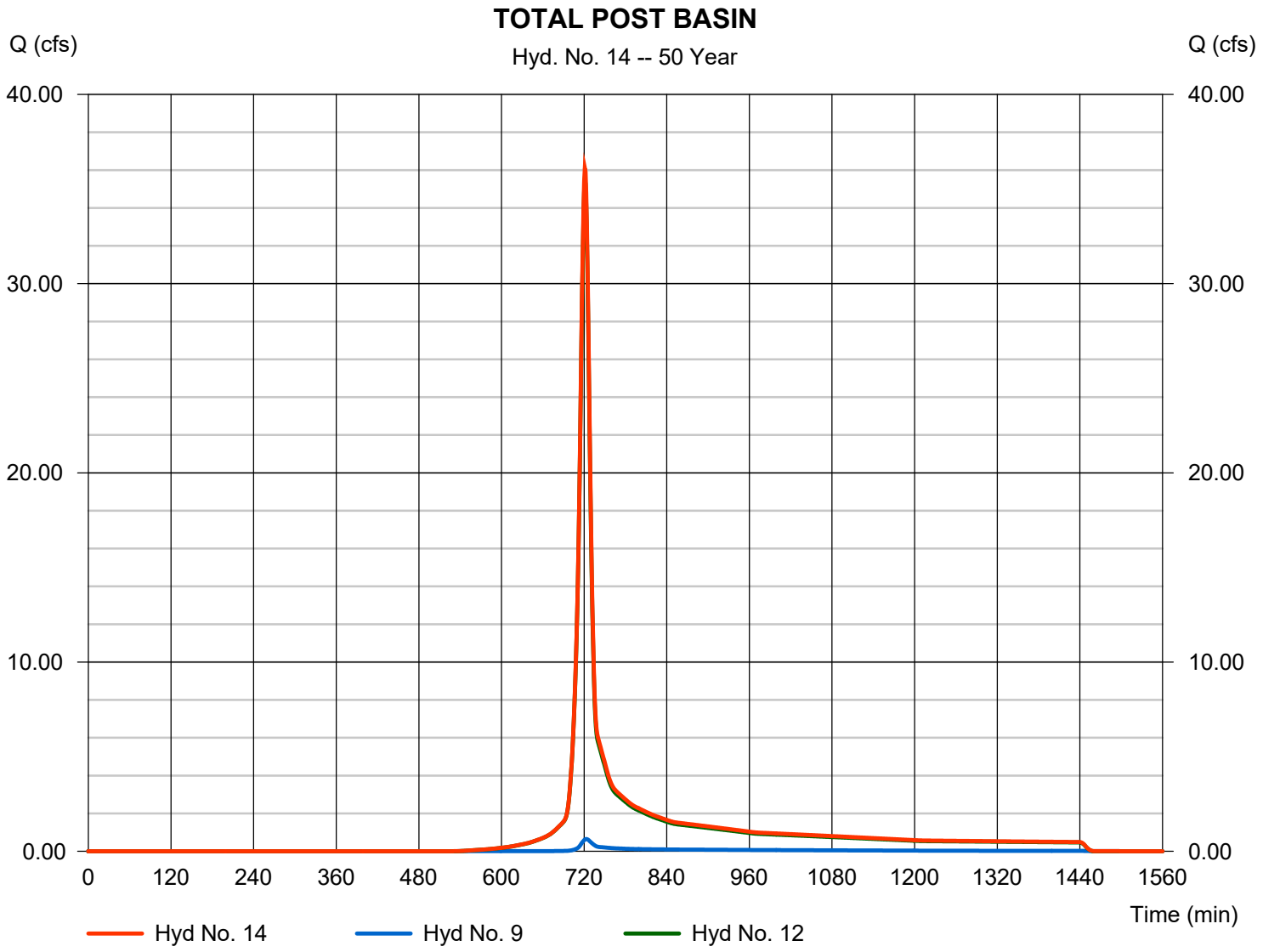


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	= Combine	Peak discharge	= 36.10 cfs
Storm frequency	= 50 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 93,175 cuft
Inflow hyds.	= 9, 12	Contrib. drain. area	= 7.980 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

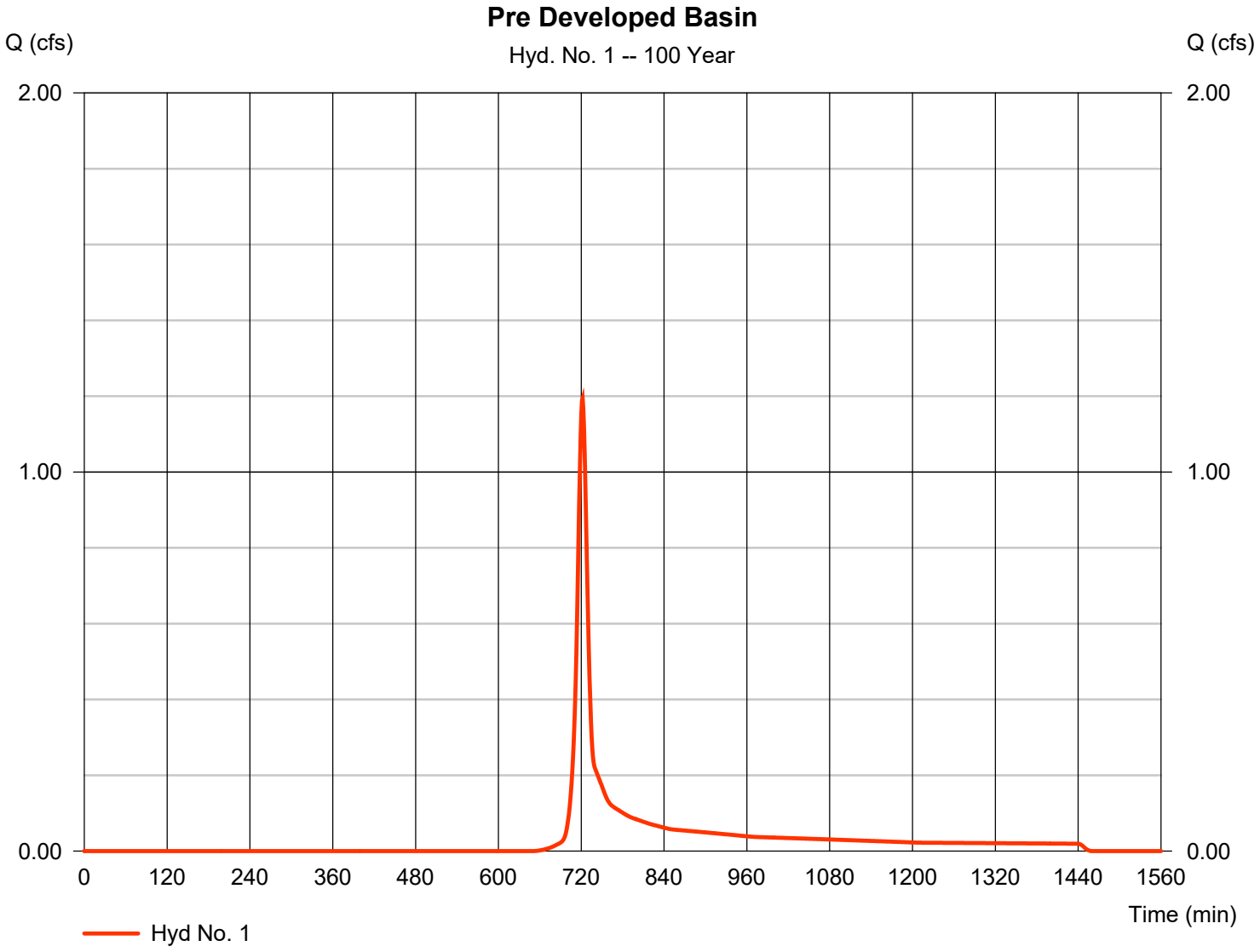
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.193	1	722	3,107	------	------	------	Pre Developed Basin
4	SCS Runoff	0.221	1	717	540	------	------	------	POST DEVELOPED BASIN (A1)
5	Reservoir	0.082	1	724	539	4	96.05	131	POST ROUTED THRU POND
6	SCS Runoff	1.096	1	718	2,404	------	------	------	POST DEVELOPED BASIN (A2)
7	Reservoir	0.075	1	757	1,882	6	898.46	1,393	POST ROUTED THRU POND
8	SCS Runoff	0.660	1	723	1,841	------	------	------	POST DEV BYPASS
9	Combine	0.808	1	723	4,262	5, 7, 8	------	------	TOTAL POST DEVELOPED
12	SCS Runoff	42.65	1	721	107,718	------	------	------	Dwnstrm w-o Site
13	Combine	43.84	1	721	110,824	1, 12	------	------	TOTAL Pre Basin
14	Combine	43.43	1	721	111,980	9, 12,	------	------	TOTAL POST BASIN

Hydrograph Report

Hyd. No. 1

Pre Developed Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.193 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	1 min	Hyd. volume	=	3,107 cuft
Drainage area	=	0.360 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.00 min
Total precip.	=	7.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



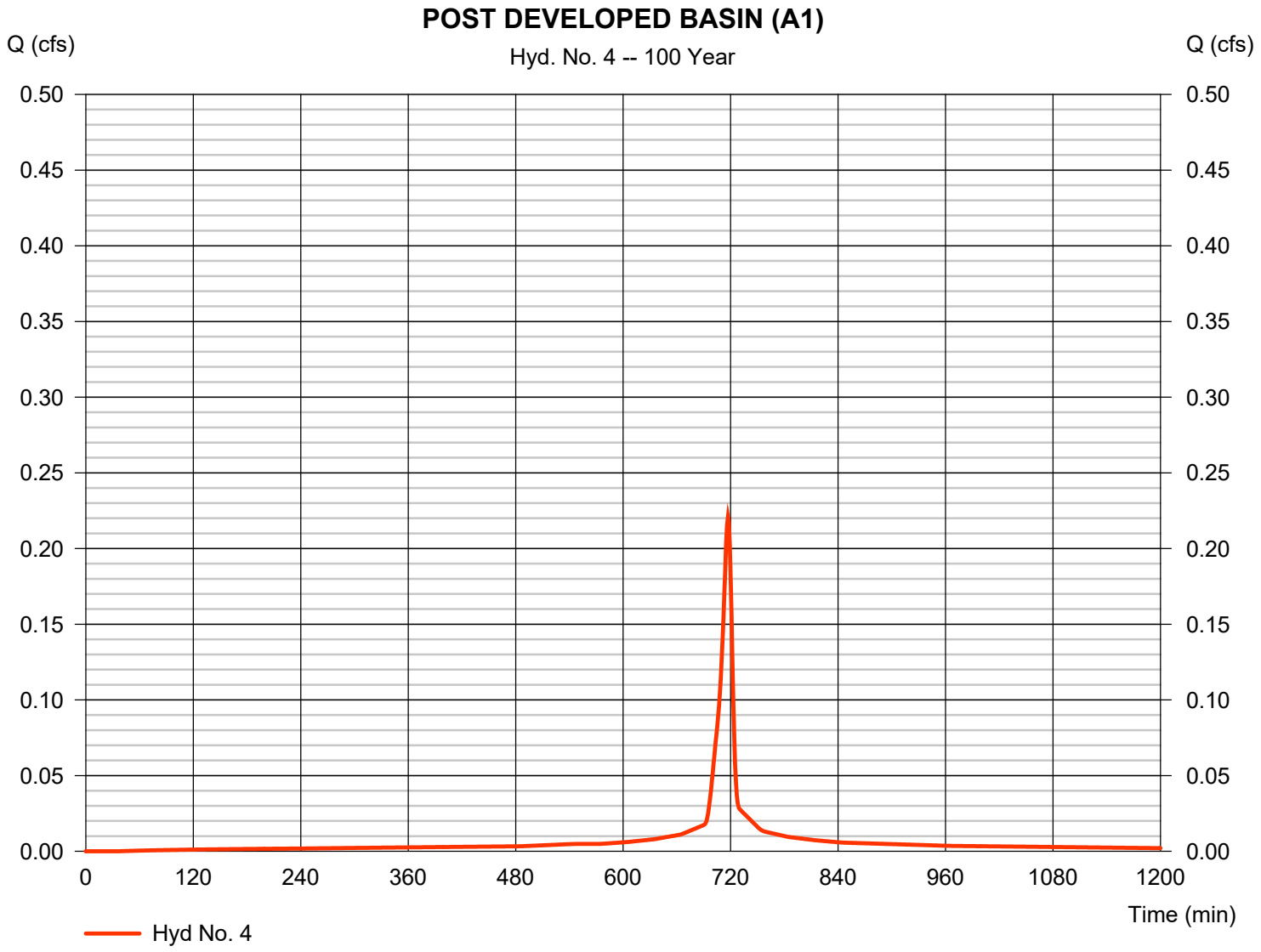
Hydrograph Report

Hyd. No. 4

POST DEVELOPED BASIN (A1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.221 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 540 cuft
Drainage area	= 0.020 ac	Curve number	= 98*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.020 x 98)] / 0.020



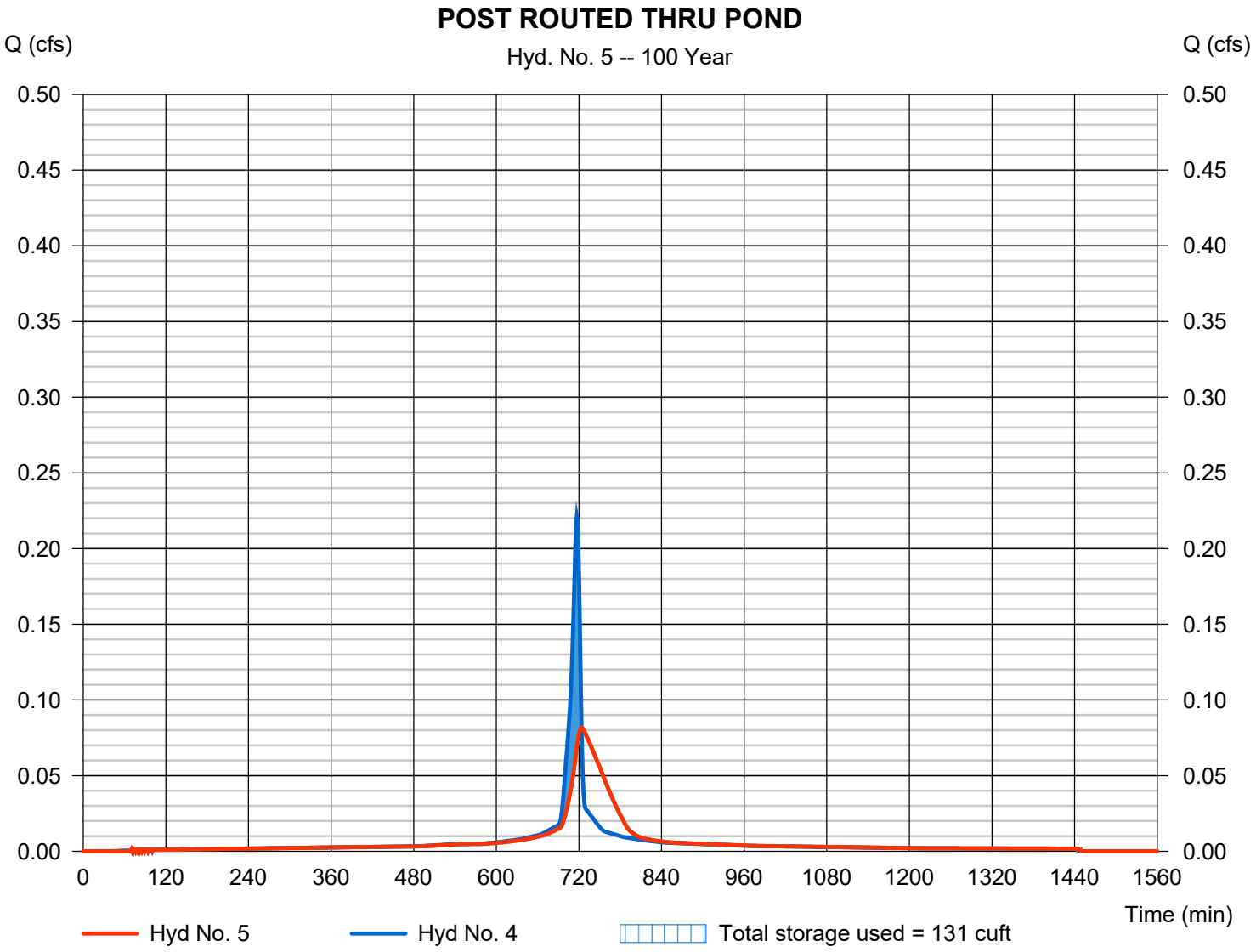
Hydrograph Report

Hyd. No. 5

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.082 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	539 cuft
Inflow hyd. No.	=	4 - POST DEVELOPED BASIN (A1)	Max. Elevation	=	96.05 ft
Reservoir name	=	Stone Reservoir 1	Max. Storage	=	131 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



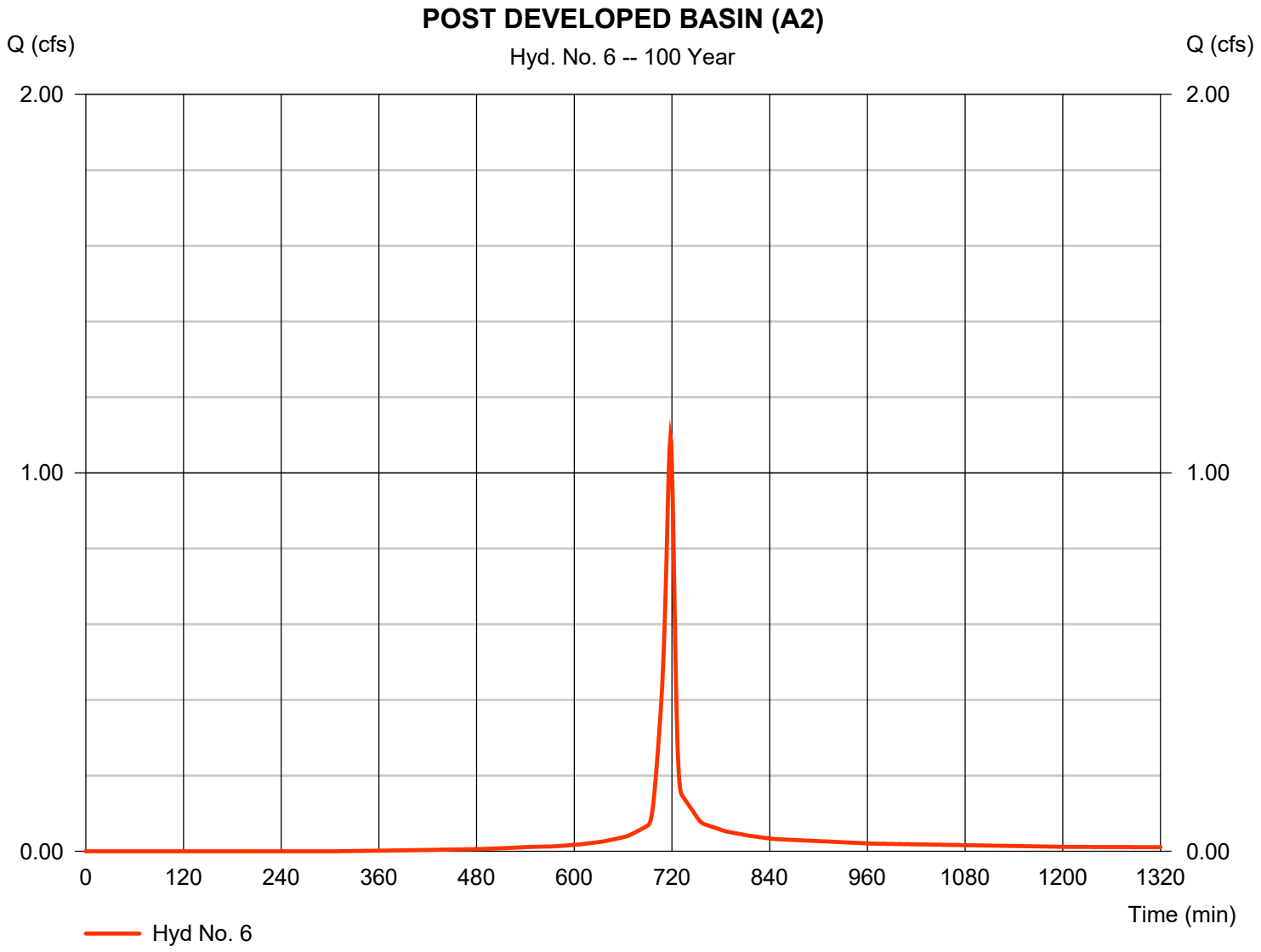
Hydrograph Report

Hyd. No. 6

POST DEVELOPED BASIN (A2)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.096 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 2,404 cuft
Drainage area	= 0.130 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.00 min
Total precip.	= 7.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.050 x 98) + (0.030 x 79) + (0.050 x 55)] / 0.130



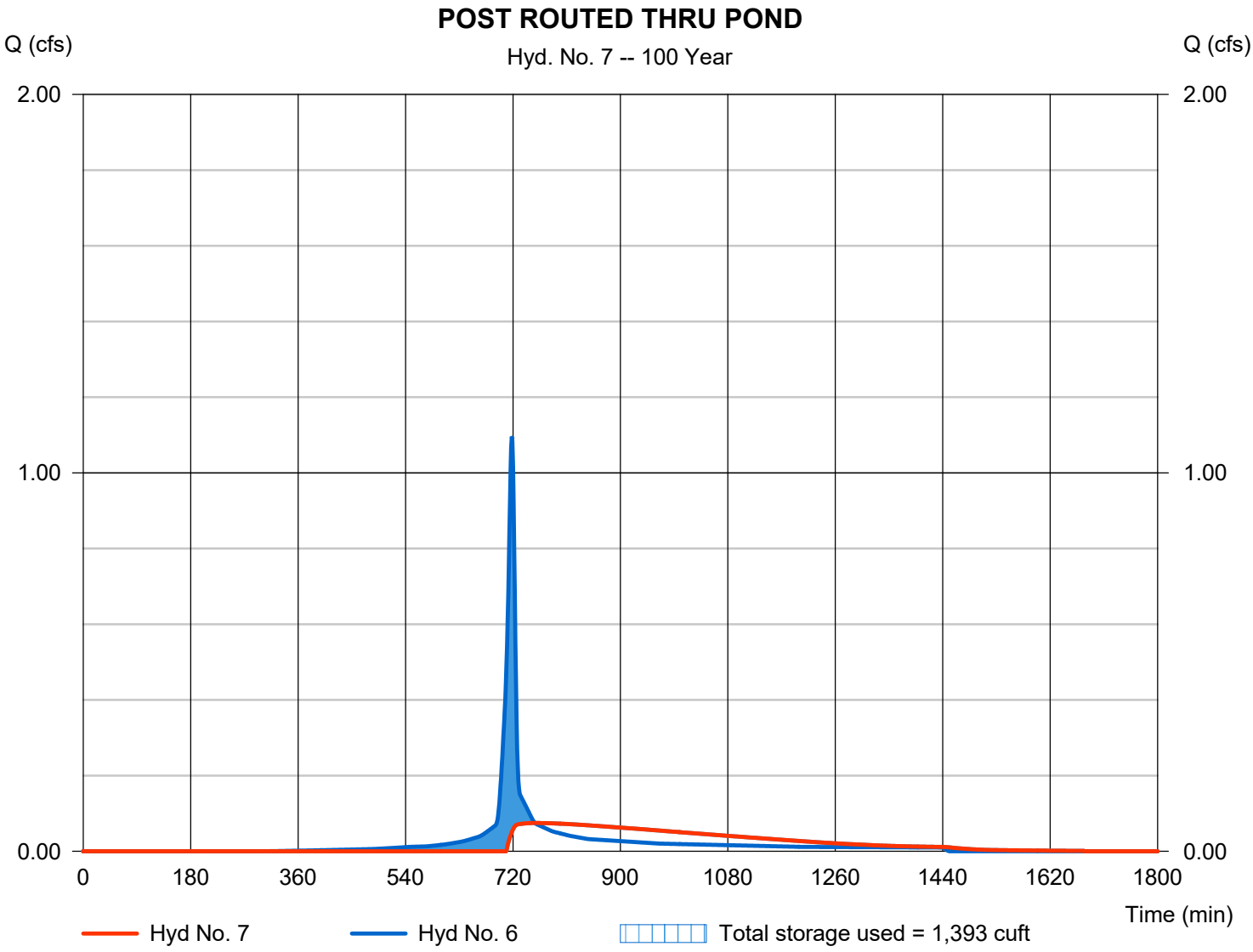
Hydrograph Report

Hyd. No. 7

POST ROUTED THRU POND

Hydrograph type	=	Reservoir	Peak discharge	=	0.075 cfs
Storm frequency	=	100 yrs	Time to peak	=	757 min
Time interval	=	1 min	Hyd. volume	=	1,882 cuft
Inflow hyd. No.	=	6 - POST DEVELOPED BASIN (A2)	Max. Elevation	=	898.46 ft
Reservoir name	=	Underground Detention Pond	Max. Storage	=	1,393 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

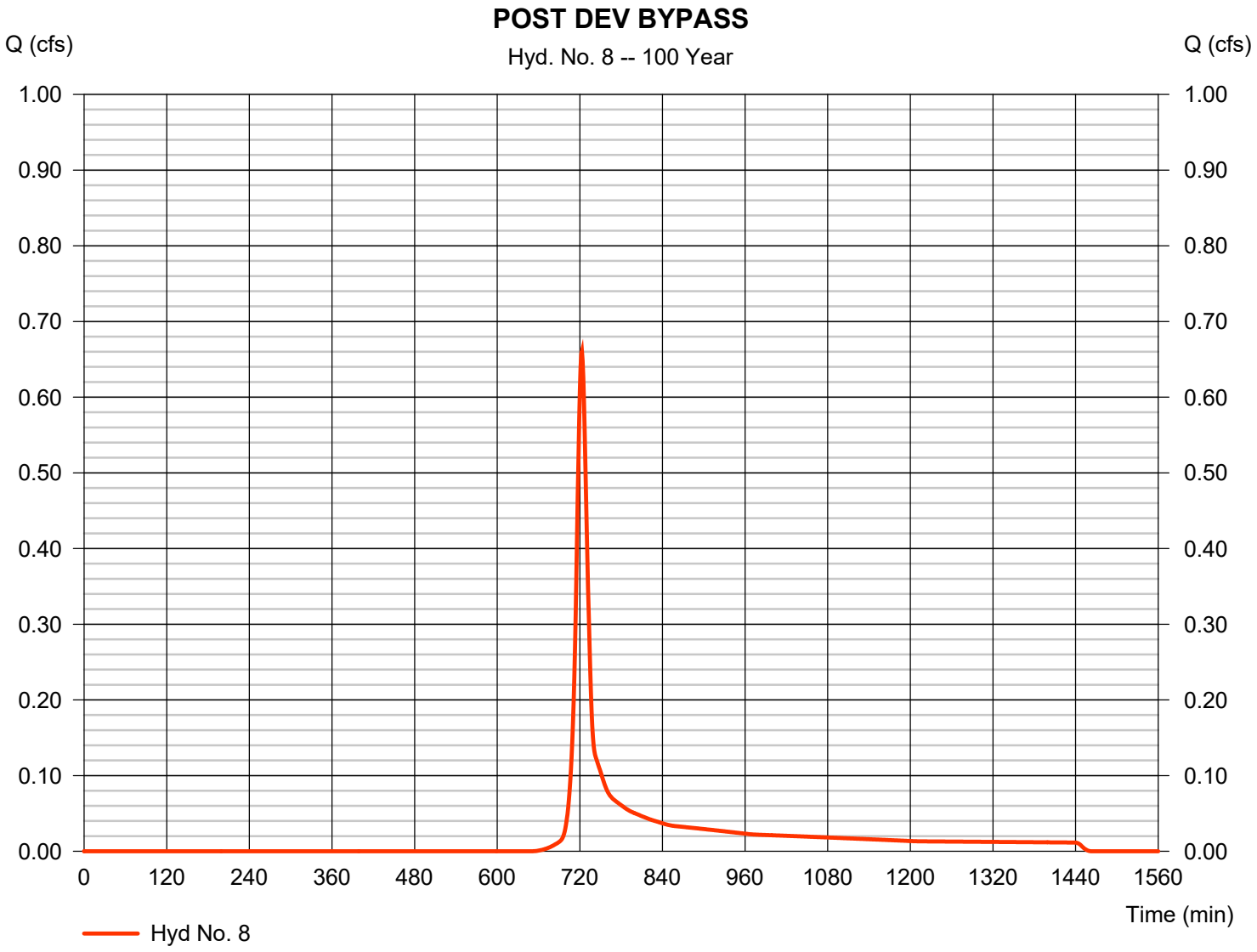


Hydrograph Report

Hyd. No. 8

POST DEV BYPASS

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.660 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	1,841 cuft
Drainage area	=	0.210 ac	Curve number	=	55
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	14.20 min
Total precip.	=	7.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

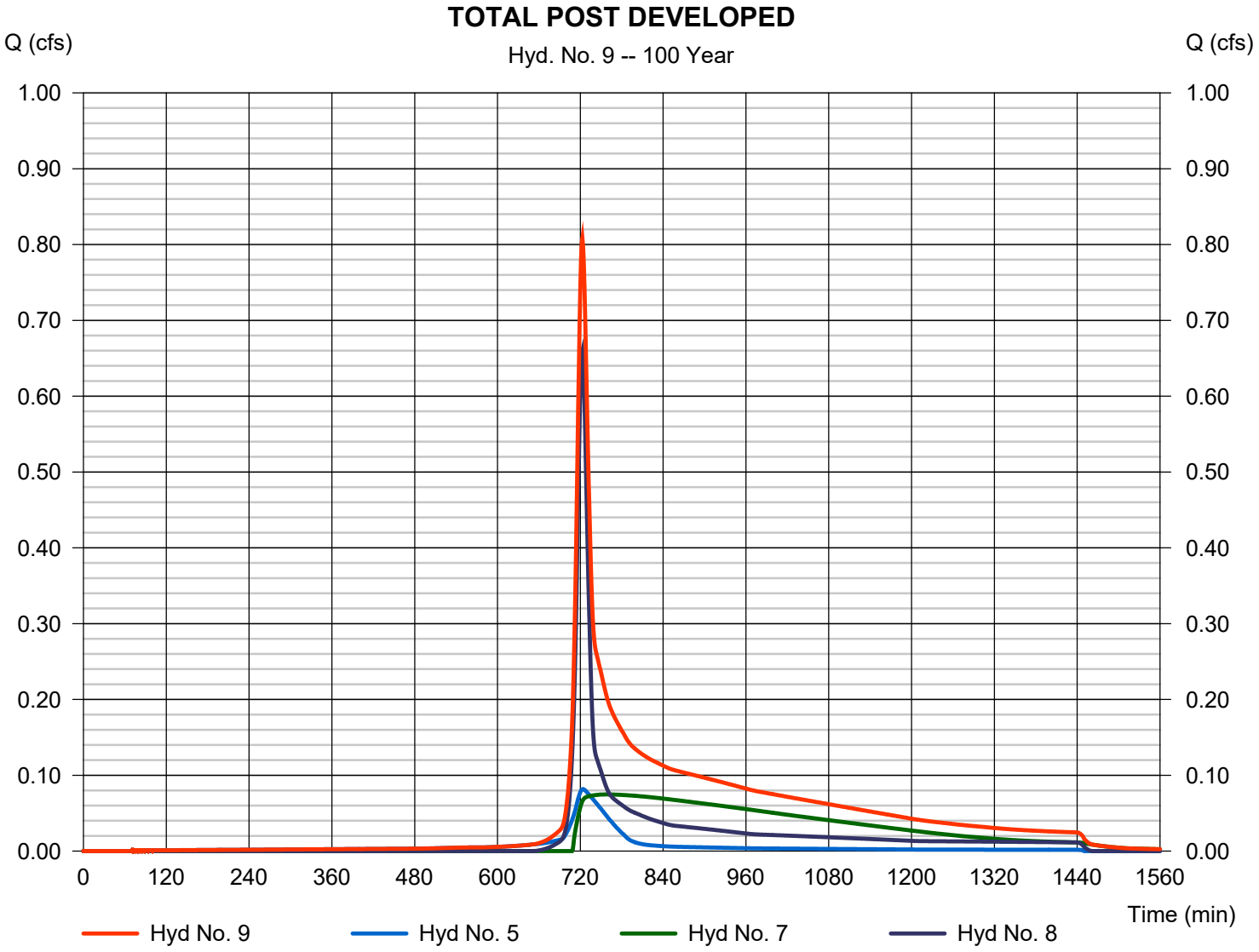


Hydrograph Report

Hyd. No. 9

TOTAL POST DEVELOPED

Hydrograph type	=	Combine	Peak discharge	=	0.808 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	1 min	Hyd. volume	=	4,262 cuft
Inflow hyds.	=	5, 7, 8	Contrib. drain. area	=	0.210 ac



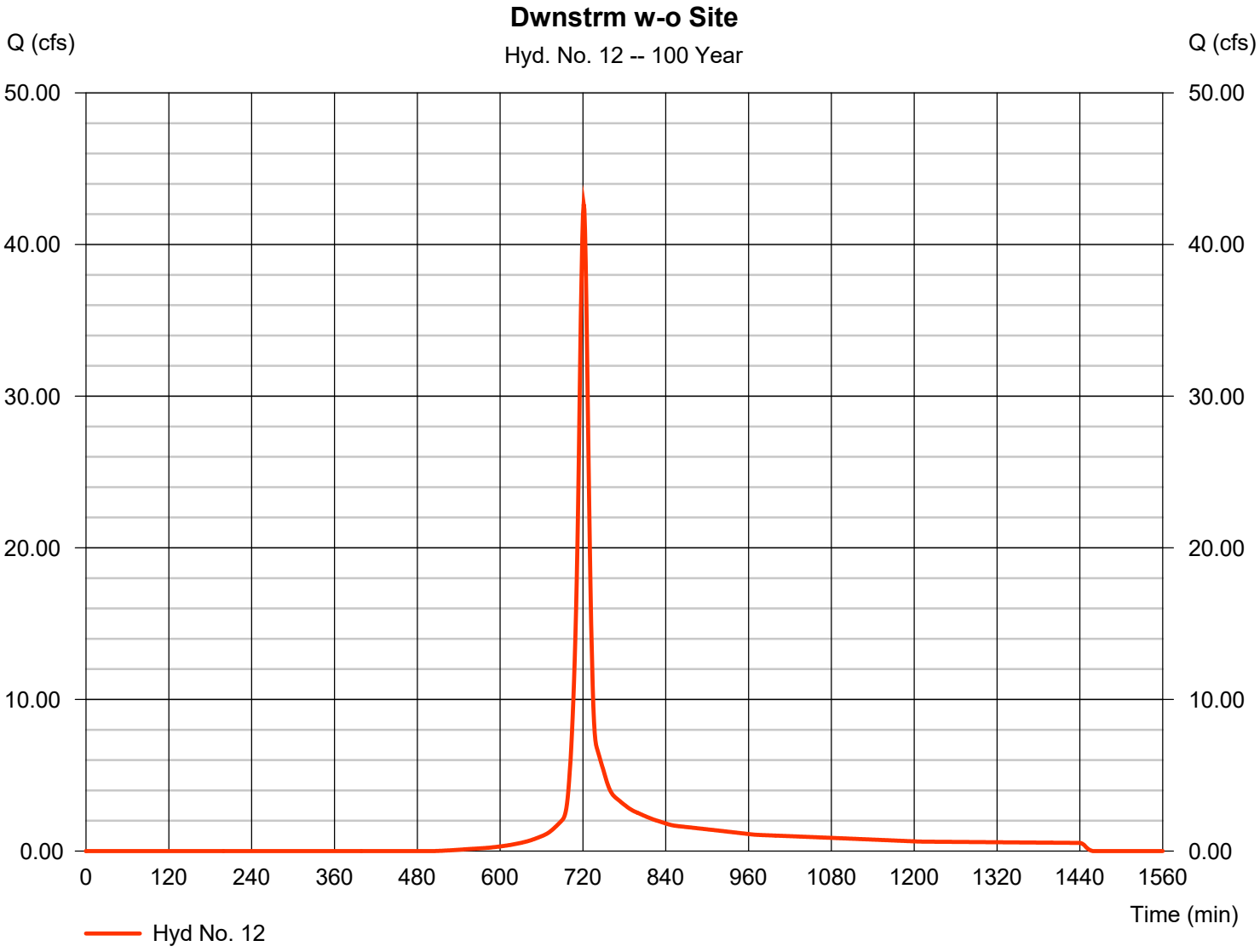
Hydrograph Report

Hyd. No. 12

Dwnstrm w-o Site

Hydrograph type	=	SCS Runoff	Peak discharge	=	42.65 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	107,718 cuft
Drainage area	=	7.980 ac	Curve number	=	68*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.70 min
Total precip.	=	7.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(2.400 x 98) + (5.580 x 55)] / 7.980

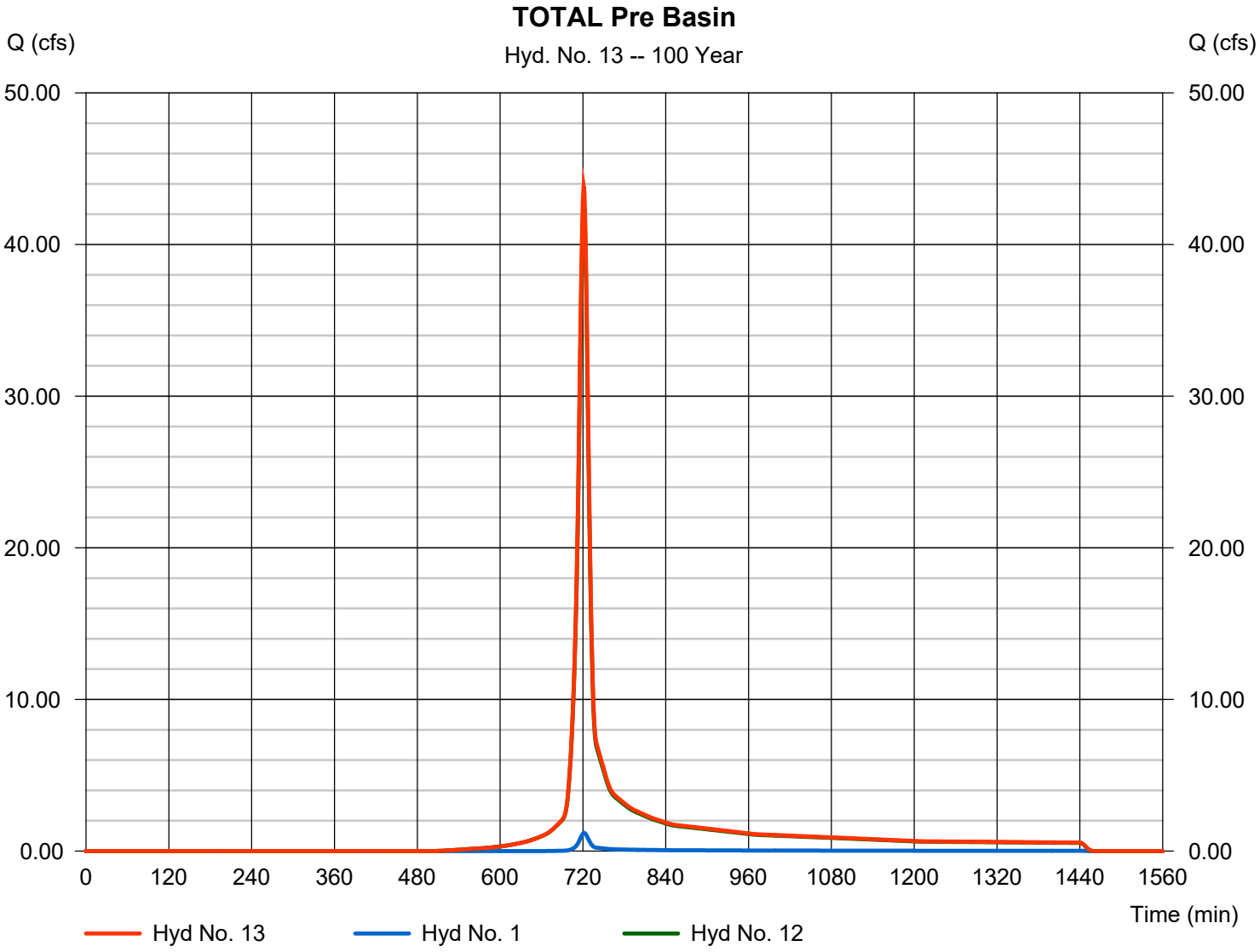


Hydrograph Report

Hyd. No. 13

TOTAL Pre Basin

Hydrograph type	=	Combine	Peak discharge	=	43.84 cfs
Storm frequency	=	100 yrs	Time to peak	=	721 min
Time interval	=	1 min	Hyd. volume	=	110,824 cuft
Inflow hyds.	=	1, 12	Contrib. drain. area	=	8.340 ac

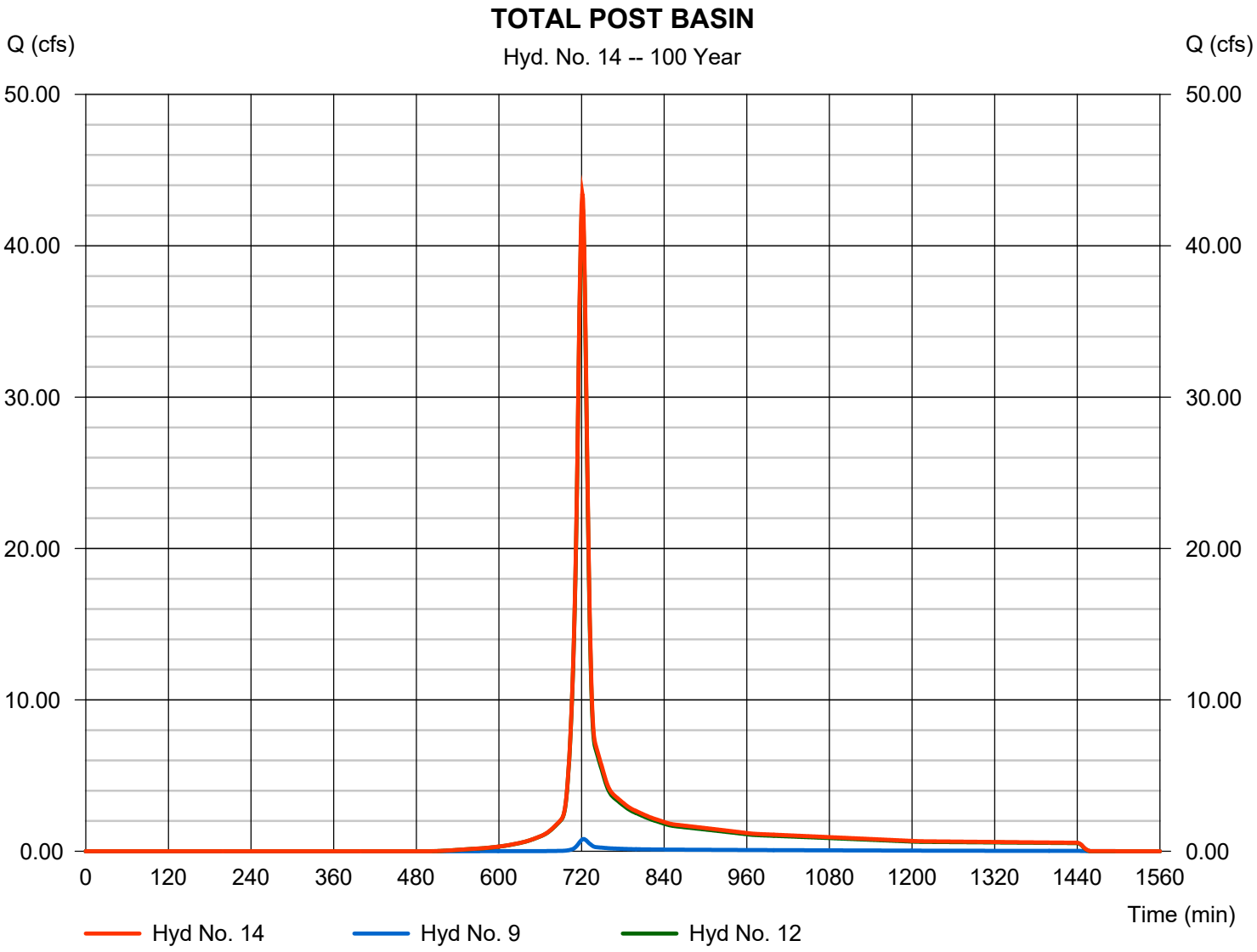


Hydrograph Report

Hyd. No. 14

TOTAL POST BASIN

Hydrograph type	= Combine	Peak discharge	= 43.43 cfs
Storm frequency	= 100 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 111,980 cuft
Inflow hyds.	= 9, 12	Contrib. drain. area	= 7.980 ac



SECTION 4
PROP. DETENTION POND

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Monday, 05 / 15 / 2023

Pond No. 1 - Underground Detention Pond

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	895.50	n/a	0	0
0.50	896.00	n/a	140	140
1.00	896.50	n/a	209	349
1.50	897.00	n/a	275	624
2.00	897.50	n/a	270	894
2.50	898.00	n/a	263	1,157
3.00	898.50	n/a	256	1,413
3.50	899.00	n/a	245	1,658
4.00	899.50	n/a	234	1,892
4.50	900.00	n/a	218	2,110
5.00	900.50	n/a	199	2,309
5.50	901.00	n/a	167	2,476
6.00	901.50	n/a	143	2,618
6.50	902.00	n/a	140	2,758
6.75	902.25	n/a	70	2,828

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	1.50	0.00	0.00
Span (in)	= 12.00	1.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 896.00	896.80	0.00	0.00
Length (ft)	= 10.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.25	0.00	0.00
Crest El. (ft)	= 901.00	899.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.810 (by Wet area)

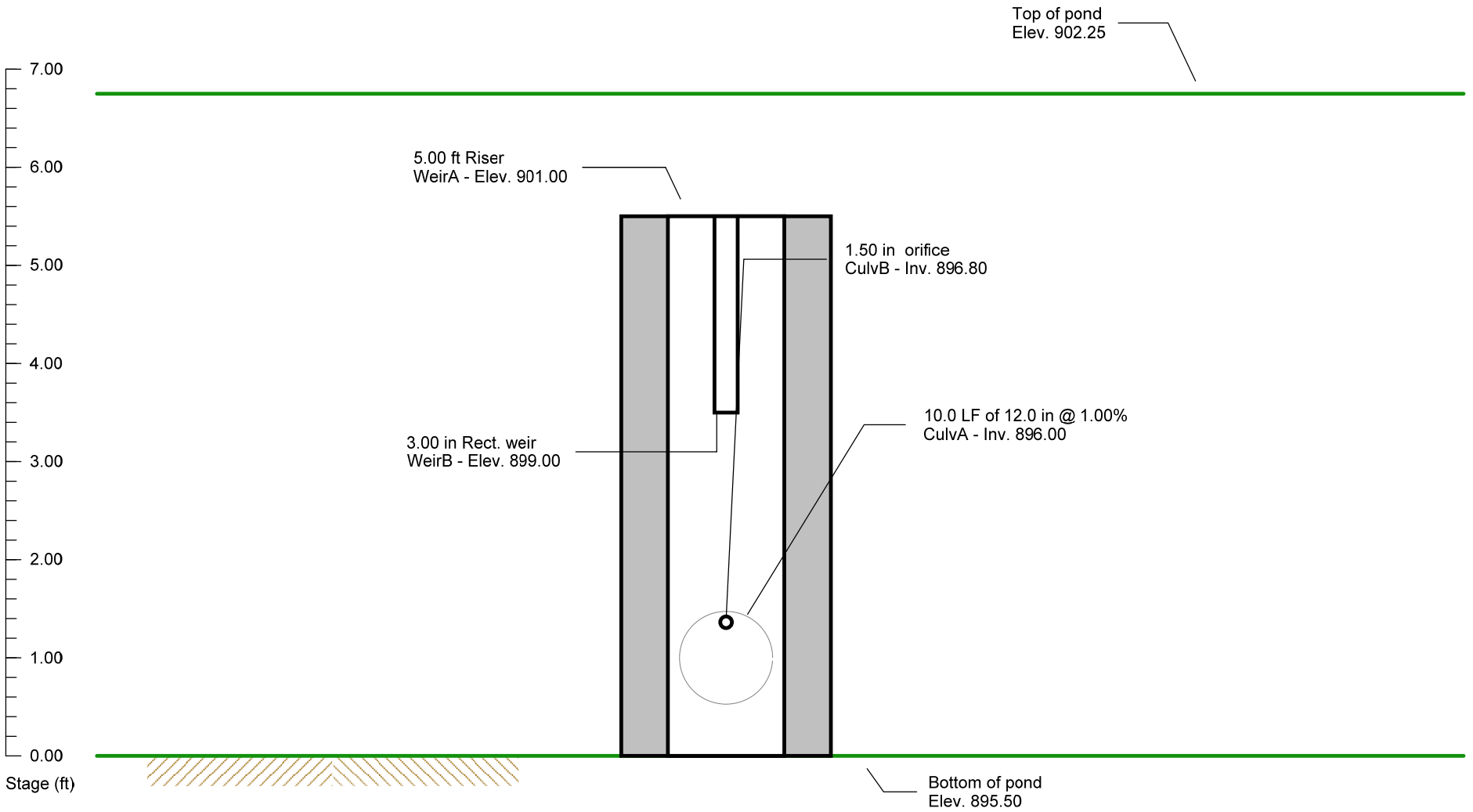
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	895.50	0.00	0.00	---	---	0.00	0.00	---	---	0.000	---	0.000
0.50	140	896.00	0.00	0.00	---	---	0.00	0.00	---	---	0.000	---	0.000
1.00	349	896.50	0.00	0.00	---	---	0.00	0.00	---	---	0.000	---	0.000
1.50	624	897.00	0.02 ic	0.02 ic	---	---	0.00	0.00	---	---	0.000	---	0.022
2.00	894	897.50	0.05 ic	0.05 ic	---	---	0.00	0.00	---	---	0.000	---	0.047
2.50	1,157	898.00	0.07 ic	0.06 ic	---	---	0.00	0.00	---	---	0.000	---	0.063
3.00	1,413	898.50	0.08 ic	0.08 ic	---	---	0.00	0.00	---	---	0.000	---	0.076
3.50	1,658	899.00	0.09 ic	0.09 ic	---	---	0.00	0.00	---	---	0.000	---	0.086
4.00	1,892	899.50	0.40 oc	0.10 ic	---	---	0.00	0.29	---	---	0.000	---	0.390
4.50	2,110	900.00	0.94 oc	0.10 ic	---	---	0.00	0.83	---	---	0.000	---	0.937
5.00	2,309	900.50	1.64 oc	0.11 ic	---	---	0.00	1.53	---	---	0.000	---	1.640
5.50	2,476	901.00	2.47 oc	0.12 ic	---	---	0.00	2.35	---	---	0.000	---	2.470
6.00	2,618	901.50	8.00 ic	0.04 ic	---	---	5.89	2.07 s	---	---	0.000	---	7.997
6.50	2,758	902.00	8.80 ic	0.02 ic	---	---	7.50 s	1.28 s	---	---	0.000	---	8.795
6.75	2,828	902.25	9.03 ic	0.01 ic	---	---	7.87 s	1.14 s	---	---	0.000	---	9.026

Pond No. 1 - Underground Detention Pond



Front View
NTS - Looking Downstream

Inflow hydrograph = 6. SCS Runoff - POST DEVELOPED BASIN (A2)

Pond Report

Pond No. 3 - Stone Reservoir 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 94.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	94.00	64	0	0
1.00	95.00	64	64	64
2.00	96.00	64	64	128
3.00	97.00	64	64	192

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	1.50	0.00	0.00
Span (in)	= 12.00	1.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 94.00	94.00	0.00	0.00
Length (ft)	= 10.00	0.00	0.00	0.00
Slope (%)	= 15.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.050 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	94.00	0.00	0.00	---	---	---	---	---	---	0.000	---	0.000
1.00	64	95.00	0.06 ic	0.06 ic	---	---	---	---	---	---	0.000	---	0.056
2.00	128	96.00	0.08 ic	0.08 ic	---	---	---	---	---	---	0.000	---	0.081
3.00	192	97.00	0.10 ic	0.10 ic	---	---	---	---	---	---	0.000	---	0.100

Water Quality Design Worksheet

Version 2012.1

Project Name 208 Olympic Place **Project** **Date** 5/15/2023

Engineer DDJ **Note** Prop. Underground Detention Pond

General Design

Water quality for the site will be achieved by detaining the runoff for a period of 24 hours and allowing the solids to settle which will reduce 80% of total suspended solids in the runoff thus cleansing the water that flows into reservoirs. The outlet structure is sized to detain the water quality volume for 24 hours.

Water Quality Sizing (Note: This calc is for the Runoff Reduction Volume)

Onsite Drainage Area	0.36 ac	=	15,682 ft^2	
Impervious Area	0.10 ac	=	27.8 % Impervious	

Runoff Reduction Volume (ft^3)

R_v	Volumetric runoff	0.05 + 0.009 x I%	**0.30**	
RR_v	Runoff Reduction Volume	1 in * Area (ft^2) * R_v / 12 $^{in}/_{ft}$	**392**	**ft^3**
RR_d	RRv Peak Discharge	RRv / (24 hr x 3600 $^{sec}/_{hr}$)	**0.005**	**ft^3 /sec**

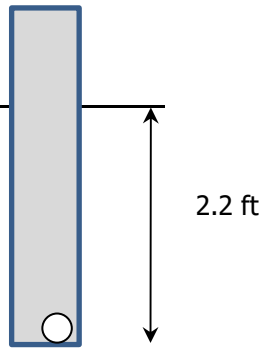
Water Quality Elevations (ft)

Elev. (ft)	Area (ft^2)	Volume (ft^3)	Storage (ft^3)
895.5		0	0
896.5		140	140
897.5		209	349
898.5		275	624
899.5		270	894
0.0		0	894
0.0		0	894
0.0		0	894

WQv Elevation. = 897.70

WQv Volume. = 392

WQv Orifice Elev. = **895.50**



Water Quality Orifice (in)

H	Orifice Head	WQv Elev - WQv Orifice	**2.2**	ft
A	Area of Orifice *	√ WQ_v / (0.6 (2gH/2)$^{0.5}$	**0.0009**	ft^2
D	Diameter of Orifice	√ Area* (4/π)	**0.41**	in

Diameter of orifice used: **1.50** inch

Notes

The Average Hydraulic Head and Average Discharge Method is used determine the orifice size.

Channel Protection Design Worksheet

5/15/2023 22:08

Version 6.2011

Project Name 208 Olympic Place **Project #** **Date** 5/15/2023

Engineer DDJ **Note** Prop. Underground Detention Pond

General Design

Channel erosion downstream of a development site can be significantly reduced by storing and releasing stormwater runoff from the channel-forming runoff events (which corresponds approximately to the 1-year storm event) in a gradual manner using a low flow orifice to ensure that critical erosive velocities and flow volumes are not exceeded.

Channel Protection Sizing

Drainage Area	0.36 ac	=	15,682 ft^2	
CN Value	76			
1-yr Storm Event	3.24 in			
Tc (mins)	6.0 min	=	0.10 hr	

Channel Protection Volume

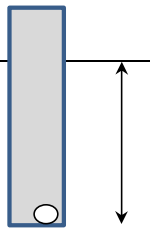
- S	Soil retention	(1000/CN)-10	**3.16**	
- I_A	Initial abstraction	0.2 x S	**0.632**	
- I_A/ P		I_A / P (rainfall)	**0.19**	
- Q_U	Unit peak discharge	From GaSWMM Table 2.1-5-6	**1000**	**cfs/mi^2/in**
- Q_d	Runoff (in)	$\frac{(P-Ia)^2}{(P-Ia)+S}$	**1.18**	**in**
- Q_o	Peak outflow discharge			**cfs**
- Q_i	Peak inflow discharge			**cfs**
- Q_o/Q_i	Ratio Qout / Qin	$Qo/Qi = 12.03Q_U^{-0.9406}$	**0.02**	
- V_s	Required Storage Volume			**acre-ft**
- V_r	Runoff Volume			**acre-ft**
- Vs/Vr	$VS/Vr = 0.682 - 1.43\,(q_O/q_I) + 1.64\,(q_O/q_I)^2 - 0.804\,(q_O/q_I)^3$		**0.66**	
- CPv	Channel Protection Vol. (Vs/Vr) x Area (ft2) x Qd x (1ft/12in)		**0.02**	**acre-ft**
			1,012	**ft^3**
- CP_d	Avg. CPv Discharge over 24 hr	CPv / (24 hr x 3600s $^{sec}/_{hr}$)	**0.012**	**cfs**

Channel Protection Elevations (ft)

Elev. (ft)	Area (ft^2)	Volume (ft^3)	Storage (ft^3)
895.5		0	0
896.5		140	140
897.5		209	349
898.5		275	624
899.5		270	894
900.5		263	1,157
0.0		0	1,157
0.0		0	1,157
0.0		0	1,157
0.0		0	1,157
0.0		0	1,157

CPv Elevation. = 900.00

CPv Volume. = 1,012



CPv Orifice Elev. = 897.70

WQv Orifice Elev. = 895.50

Channel Protection Orifice Sizing

WQ_{vh}	Average head of WQ_v Orifice			**4.90**	ft
WQ_{vd}	Average Discharge from WQ_v			**0.13**	cfs
Cp_{davg}	Average Release Rate for CP_v Orifice	CP_d - WQ_{vd}		**-0.12**	cfs
CP_{inv}	Channel Protection Orifice Invert			**897.70**	ft-elev
CP_{elev}	Channel Protection Elevation @ Volume:		**1,012 ft^3 =**	**900.00**	ft-elev
- H	Orifice Head	CP_{elev} - Cp_{inv}		**2.30**	ft
- A	Area of Orifice	$\sqrt{}$ CP_d / (0.6 (2g H /2)$^{0.5}$		**-0.0230**	ft^2
- D	Diameter of Orifice	$\sqrt{}$ Area* (4/π)		**#NUM!**	in

Water Quality Orifice will also release the CPv

- The average hydraulic head and average discharge method is used determine the orifice size.

SECTION 5
EXHIBITS

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.060	0.124	-------	0.272	0.432	0.695	0.930	1.193	Pre Developed Basin
4	SCS Runoff	------	0.096	0.108	-------	0.130	0.148	0.176	0.198	0.221	POST DEVELOPED BASIN (A1)
5	Reservoir	4	0.047	0.051	-------	0.058	0.063	0.070	0.076	0.082	POST ROUTED THRU POND
6	SCS Runoff	------	0.332	0.403	-------	0.531	0.646	0.813	0.951	1.096	POST DEVELOPED BASIN (A2)
7	Reservoir	6	0.006	0.012	-------	0.027	0.039	0.054	0.065	0.075	POST ROUTED THRU POND
8	SCS Runoff	------	0.032	0.067	-------	0.148	0.236	0.383	0.513	0.660	POST DEV BYPASS
9	Combine	5, 7, 8	0.078	0.117	-------	0.211	0.328	0.498	0.645	0.808	TOTAL POST DEVELOPED
12	SCS Runoff	------	7.922	10.73	-------	16.02	21.06	28.86	35.48	42.65	Dwnstrm w-o Site
13	Combine	1, 12	7.974	10.85	-------	16.29	21.50	29.54	36.40	43.84	TOTAL Pre Basin
14	Combine	9, 12,	7.994	10.84	-------	16.22	21.38	29.33	36.10	43.43	TOTAL POST BASIN

TR55 Tc Worksheet

Hyd. No. 1

Pre Developed Basin

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.400		0.011		
Flow length (ft)	= 0.0		90.0		0.0		
Two-year 24-hr precip. (in)	= 0.00		3.84		0.00		
Land slope (%)	= 0.00		4.50		0.00		
Travel Time (min)	**= 0.00**	**+**	**13.03**	**+**	**0.00**	**=**	**13.03**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 13.00 min

TR55 Tc Worksheet

Hyd. No. 8

POST DEV BYPASS

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.400		0.011		
Flow length (ft)	= 0.0		65.0		0.0		
Two-year 24-hr precip. (in)	= 0.00		3.84		0.00		
Land slope (%)	= 0.00		2.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**13.89**	**+**	**0.00**	**=**	**13.89**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		48.00		0.00		
Watercourse slope (%)	= 0.00		2.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		2.28		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.35**	**+**	**0.00**	**=**	**0.35**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 14.20 min

TR55 Tc Worksheet

Hyd. No. 12

Dwnstrm w-o Site

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.400		0.011		
Flow length (ft)	= 0.0		100.0		0.0		
Two-year 24-hr precip. (in)	= 0.00		3.84		0.00		
Land slope (%)	= 0.00		8.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**11.26**	**+**	**0.00**	**=**	**11.26**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		422.00		0.00		
Watercourse slope (%)	= 0.00		9.00		0.00		
Surface description	= Paved		Unpaved		Paved		
Average velocity (ft/s)	=0.00		4.84		0.00		
Travel Time (min)	**= 0.00**	**+**	**1.45**	**+**	**0.00**	**=**	**1.45**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 12.70 min

NOAA Atlas 14, Volume 9, Version 2
Location name: Decatur, Georgia, USA*
Latitude: 33.7634°, Longitude: -84.3038°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.400** (0.314-0.504)	**0.461** (0.362-0.581)	**0.563** (0.441-0.711)	**0.650** (0.507-0.823)	**0.773** (0.589-0.997)	**0.871** (0.652-1.13)	**0.970** (0.708-1.27)	**1.07** (0.760-1.43)	**1.22** (0.835-1.64)	**1.32** (0.891-1.80)
10-min	**0.586** (0.460-0.739)	**0.675** (0.530-0.851)	**0.825** (0.645-1.04)	**0.952** (0.742-1.21)	**1.13** (0.863-1.46)	**1.27** (0.954-1.65)	**1.42** (1.04-1.87)	**1.57** (1.11-2.09)	**1.78** (1.22-2.40)	**1.94** (1.31-2.63)
15-min	**0.714** (0.561-0.901)	**0.823** (0.646-1.04)	**1.01** (0.787-1.27)	**1.16** (0.905-1.47)	**1.38** (1.05-1.78)	**1.56** (1.16-2.02)	**1.73** (1.26-2.28)	**1.92** (1.36-2.55)	**2.17** (1.49-2.93)	**2.36** (1.59-3.21)
30-min	**1.02** (0.805-1.29)	**1.18** (0.927-1.49)	**1.44** (1.13-1.82)	**1.67** (1.30-2.11)	**1.98** (1.51-2.56)	**2.23** (1.67-2.89)	**2.49** (1.81-3.26)	**2.75** (1.94-3.66)	**3.11** (2.13-4.19)	**3.38** (2.28-4.60)
60-min	**1.32** (1.04-1.66)	**1.51** (1.19-1.91)	**1.85** (1.45-2.33)	**2.13** (1.66-2.70)	**2.55** (1.95-3.30)	**2.89** (2.16-3.75)	**3.23** (2.36-4.26)	**3.60** (2.55-4.80)	**4.10** (2.82-5.55)	**4.50** (3.03-6.12)
2-hr	**1.61** (1.28-2.01)	**1.85** (1.47-2.30)	**2.25** (1.78-2.81)	**2.60** (2.06-3.25)	**3.12** (2.42-4.00)	**3.54** (2.69-4.56)	**3.98** (2.95-5.19)	**4.45** (3.20-5.88)	**5.10** (3.56-6.83)	**5.62** (3.84-7.55)
3-hr	**1.80** (1.44-2.23)	**2.05** (1.64-2.53)	**2.48** (1.98-3.07)	**2.87** (2.29-3.56)	**3.45** (2.70-4.40)	**3.93** (3.02-5.03)	**4.44** (3.32-5.75)	**4.98** (3.62-6.54)	**5.75** (4.05-7.65)	**6.36** (4.38-8.49)
6-hr	**2.20** (1.79-2.69)	**2.48** (2.01-3.02)	**2.97** (2.40-3.62)	**3.41** (2.75-4.18)	**4.09** (3.25-5.15)	**4.65** (3.63-5.89)	**5.26** (4.00-6.74)	**5.92** (4.36-7.69)	**6.85** (4.91-9.03)	**7.61** (5.32-10.0)
12-hr	**2.73** (2.25-3.29)	**3.04** (2.50-3.66)	**3.60** (2.95-4.34)	**4.11** (3.36-4.97)	**4.87** (3.93-6.06)	**5.52** (4.36-6.89)	**6.20** (4.78-7.85)	**6.94** (5.19-8.91)	**8.00** (5.81-10.4)	**8.85** (6.28-11.5)
24-hr	**3.27** (2.73-3.89)	**3.68** (3.07-4.38)	**4.39** (3.65-5.23)	**5.02** (4.16-5.98)	**5.93** (4.83-7.25)	**6.67** (5.33-8.20)	**7.45** (5.82-9.28)	**8.28** (6.27-10.5)	**9.44** (6.95-12.1)	**10.4** (7.46-13.3)
2-day	**3.78** (3.20-4.43)	**4.33** (3.66-5.07)	**5.25** (4.43-6.17)	**6.04** (5.08-7.11)	**7.17** (5.90-8.62)	**8.07** (6.53-9.77)	**8.99** (7.11-11.0)	**9.96** (7.64-12.4)	**11.3** (8.42-14.3)	**12.3** (9.00-15.7)
3-day	**4.16** (3.55-4.84)	**4.72** (4.02-5.49)	**5.68** (4.83-6.62)	**6.52** (5.52-7.61)	**7.74** (6.44-9.26)	**8.73** (7.13-10.5)	**9.76** (7.79-11.9)	**10.9** (8.42-13.4)	**12.4** (9.33-15.6)	**13.6** (10.0-17.2)
4-day	**4.50** (3.86-5.20)	**5.06** (4.33-5.85)	**6.03** (5.16-6.99)	**6.90** (5.88-8.01)	**8.19** (6.87-9.77)	**9.26** (7.63-11.1)	**10.4** (8.36-12.6)	**11.6** (9.07-14.3)	**13.3** (10.1-16.7)	**14.7** (10.9-18.4)
7-day	**5.35** (4.64-6.11)	**5.96** (5.17-6.82)	**7.06** (6.11-8.09)	**8.06** (6.94-9.26)	**9.57** (8.14-11.3)	**10.8** (9.04-12.9)	**12.2** (9.94-14.7)	**13.7** (10.8-16.7)	**15.7** (12.1-19.5)	**17.4** (13.1-21.7)
10-day	**6.07** (5.30-6.89)	**6.75** (5.89-7.67)	**7.97** (6.94-9.06)	**9.07** (7.87-10.3)	**10.7** (9.19-12.6)	**12.1** (10.2-14.3)	**13.6** (11.2-16.3)	**15.2** (12.1-18.5)	**17.5** (13.6-21.6)	**19.3** (14.7-23.9)
20-day	**8.13** (7.21-9.10)	**8.98** (7.95-10.1)	**10.5** (9.24-11.7)	**11.8** (10.3-13.2)	**13.7** (11.8-15.7)	**15.2** (13.0-17.7)	**16.9** (14.0-19.8)	**18.6** (15.1-22.3)	**21.0** (16.6-25.6)	**23.0** (17.7-28.1)
30-day	**9.97** (8.91-11.1)	**11.0** (9.81-12.2)	**12.7** (11.3-14.1)	**14.1** (12.5-15.8)	**16.2** (14.1-18.4)	**17.8** (15.3-20.4)	**19.5** (16.3-22.7)	**21.2** (17.3-25.1)	**23.6** (18.8-28.4)	**25.4** (19.8-30.9)
45-day	**12.5** (11.2-13.7)	**13.7** (12.4-15.1)	**15.8** (14.2-17.4)	**17.4** (15.6-19.3)	**19.7** (17.2-22.1)	**21.4** (18.4-24.2)	**23.1** (19.5-26.5)	**24.7** (20.3-28.9)	**26.9** (21.5-32.0)	**28.5** (22.5-34.4)
60-day	**14.7** (13.3-16.1)	**16.2** (14.7-17.7)	**18.6** (16.8-20.4)	**20.5** (18.4-22.5)	**22.9** (20.1-25.4)	**24.7** (21.4-27.7)	**26.3** (22.3-30.0)	**27.9** (23.0-32.4)	**29.9** (24.0-35.3)	**31.3** (24.8-37.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

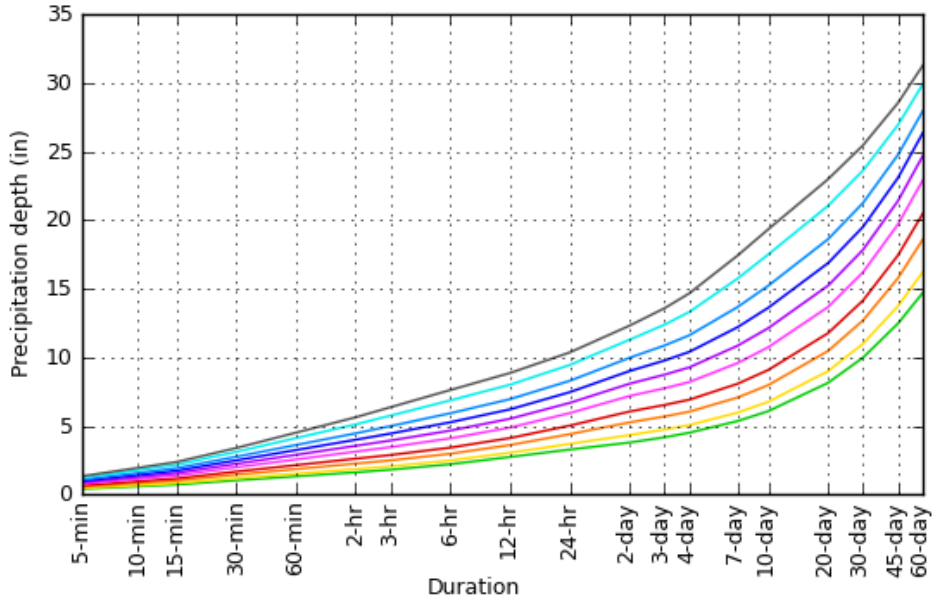
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

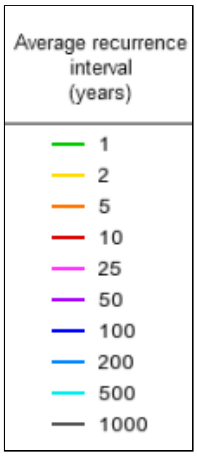
Please refer to NOAA Atlas 14 document for more information.

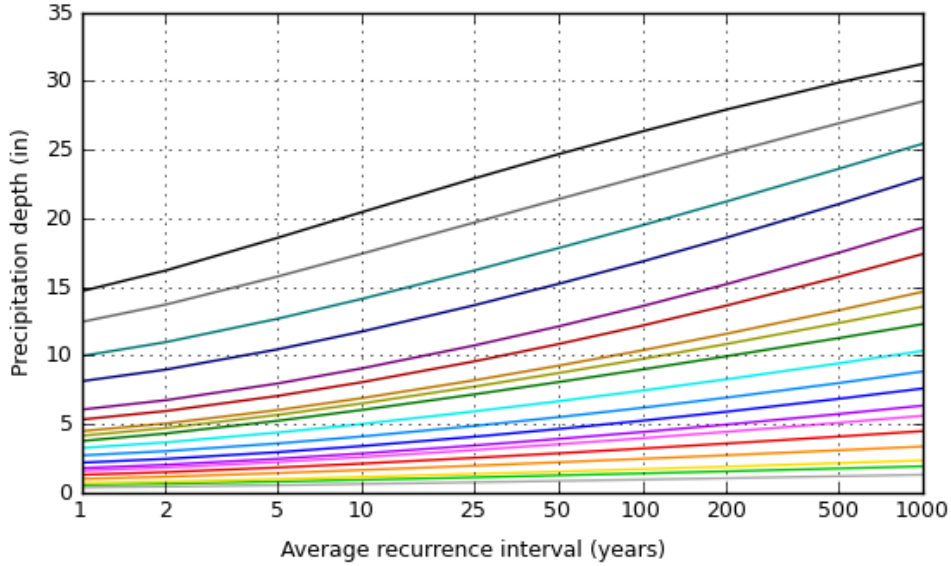
Back to Top

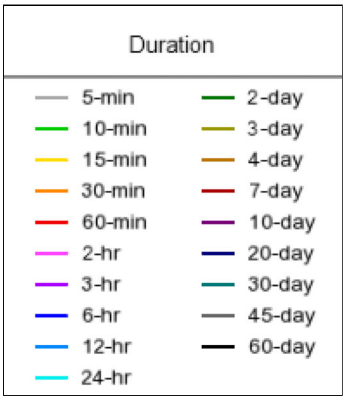
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.7634°, Longitude: -84.3038°









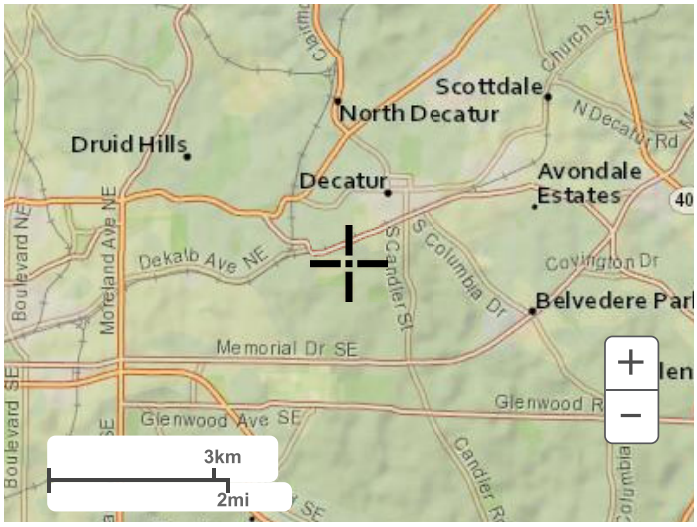
NOAA Atlas 14, Volume 9, Version 2

Created (GMT): Mon May 15 01:31:31 2023

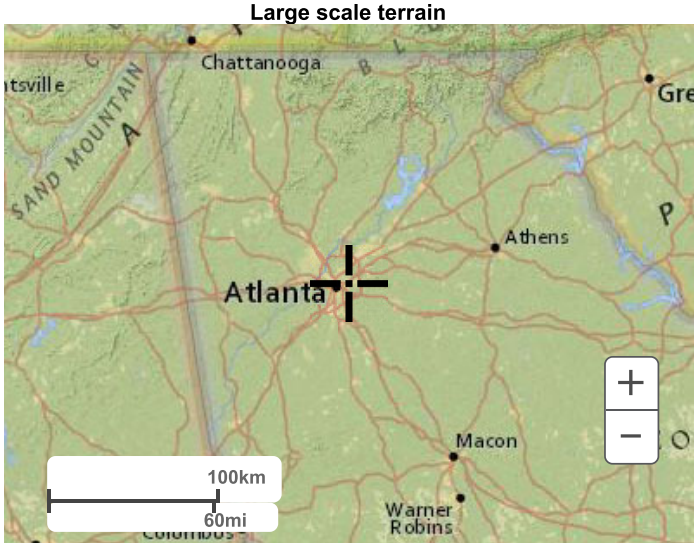
Back to Top

Maps & aerials

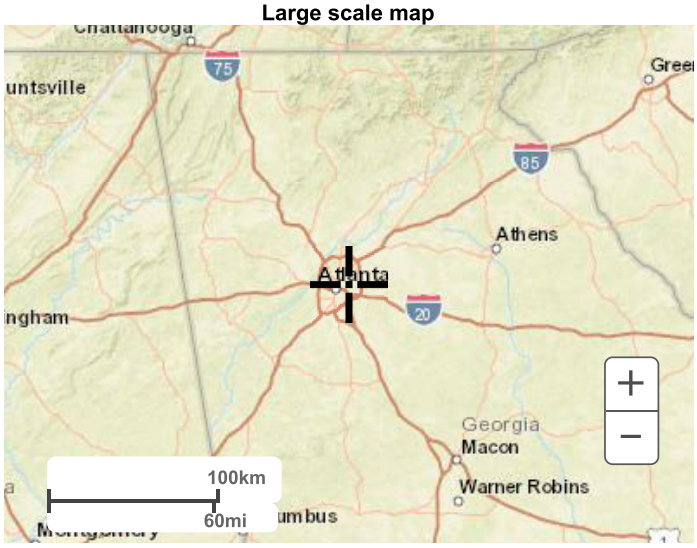
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer