POST CONSTRUCTION STORMWATER MANAGEMENT CALCULATIONS

112 BRYN MAWR AVENUE

LOWER MERION TOWNSHIP, MONTGOMERY COUNTY

AUGUST 23, 2019

FILE # 19-071

YOHN ENGINEERING, LLC
555 Second Avenue, Suite B-205
Collegeville, PA 19426-3674
610-489-4580
www.yohnengineering.com

STORMWATER MANAGEMENT NARRATIVE

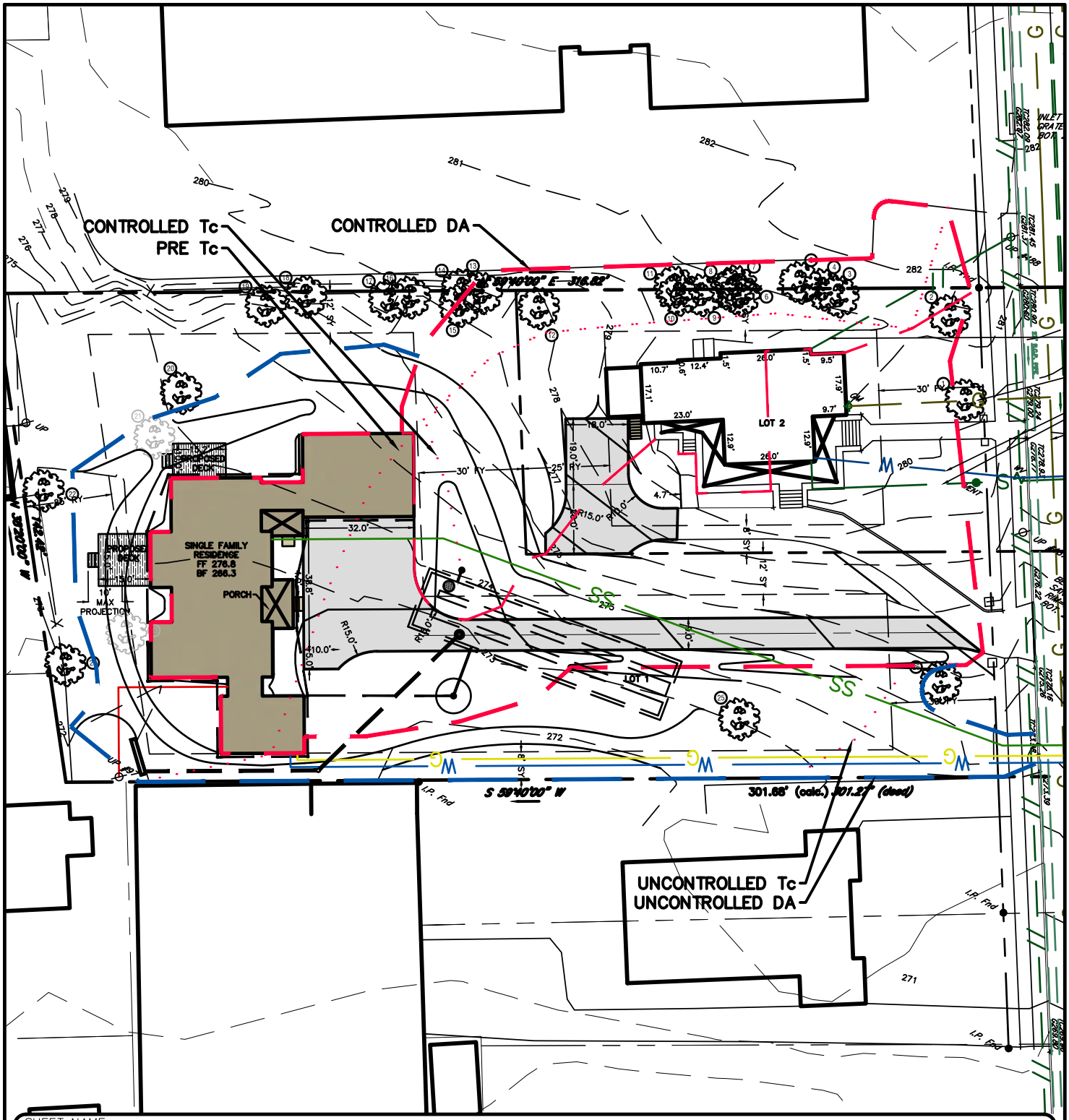
A new single family residence is proposed at 112 Bryn Mawr Avenue in Bala Cynwyd, PA 19004. The property is currently a developed 1.0 acre piece of land within Lower Merion Township, Montgomery County. In accordance with the Runoff and Erosion Control Permit requirements and Chapter 121 of the Township code, the following are stormwater management calculations for the increased impervious coverage associated with the new home, driveway, patios, walks, etc.

The site is located in a Township Non-Watershed District and as a result, several stormwater requirements need to be met:

- Where feasible, the increase in runoff generated by the proposed improvements for the 25 year storm event shall be recharged into the ground via infiltration.
- The 5 year post development runoff rate shall be reduced to the 2 year pre development rate.
- The 10 through 100 year post development runoff rates shall be reduced to their respective pre development rates.
- The infiltration volume shall be equivalent to the runoff generated from one (1”) inch of rainfall over all proposed impervious surfaces.

The required rate and volume controls are provided for the site through the use of an underground pipe system located in the front yard. The system was designed for the proposed impervious plus an additional 1,500 square feet for future development (All of which may go controlled). Double Ring Infiltrometer Testing were performed at the site in order to verify the characteristics of the existing soils and limiting zones. The complete report is included.

The following calculations demonstrate compliance with the requirements noted above.



SHEET NAME:

POST CONSTRUCTION DRAINAGE AREA MAP

PROJECT ADDRESS:

112 BRYN MAWR AVENUE, BALA CYNWYD, PA 19004

MUNICIPALITY:	COUNTY:
LOWER MERION TOWNSHIP	MONTGOMERY COUNTY

PREPARED BY:
YOHN ENGINEERING, LLC
555 SECOND AVENUE, SUITE B-205
COLLEGEVILLE, PA 19426
610-489-4580
WWW.YOHNENGINEERING.COM

PREPARED FOR:	NORTHEAST RENOVATIONS, LLC 1744 FEDERAL STREET PHILADELPHIA, PA 19146
DATE:	AUGUST 23, 2019
PROJECT NUMBER:	19-071

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RUNOFF RATE CONTROL SUMMARY

Watershed:	Non-watershed Plan District
Watershed District:	NA
Runoff Calculation Method:	SCS Type II 24 hour Storm

PRE-DEVELOPMENT RUNOFF RATES

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Entire Watershed (CFS):	**0.447**	**0.946**	**1.417**	**1.928**	**2.399**	**3.788**

PEAK ALLOWABLE RUNOFF RATES

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Event or Percent Reduction:	2-Year	2-Year	10-Year	25-Year	50-Year	100-Year
Entire Watershed (CFS):	**0.447**	**0.447**	**1.417**	**1.928**	**2.399**	**3.788**

POST-DEVELOPMENT RUNOFF RATES

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Controlled Area #1:	0.000	0.022	0.078	0.279	1.140	3.312
Uncontrolled Areas:	0.235	0.444	0.630	0.835	1.023	1.557
Entire Watershed (CFS):	**0.235**	**0.444**	**0.630**	**0.835**	**1.285**	**3.636**
NET DECREASE (CFS):	0.212	0.502	0.787	1.093	1.114	0.152
PERCENT REDUCTION:	47%	53%	56%	57%	46%	4%

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DRAINAGE AREA AND WEIGHTED CN CALCULATIONS

Development Condition: Pre — Through Subarea: Offsite/Undisturbed

Cover	Type	CN	Area (SF)	Area (AC)	
Meadow - Good Condition	B	58	0	0.000	0.0%
Lawn - Good Condition	B	61	6998	0.161	63.3%
Impervious	-	98	4056	0.093	36.7%
TOTAL:		**75**	**11054**	**0.254**	100.0%

Development Condition: Pre — Through Subarea: Onsite/Disturbed

Cover	Type	CN	Area (SF)	Area (AC)	
Meadow - Good Condition	B	58	23184	0.532	98.3%
Lawn - Good Condition	B	61	0	0.000	0.0%
Impervious	-	98	398	0.009	1.7%
TOTAL:		**59**	**23582**	**0.541**	100.0%

Development Condition: Post — Through Subarea: Entire Watershed

Cover	Type	CN	Area (SF)	Area (AC)	
Meadow - Good Condition	B	58	23184	0.532	66.9%
Lawn - Good Condition	B	61	6998	0.161	20.2%
Impervious	-	98	4454	0.102	12.9%
TOTAL:		**64**	**34636**	**0.795**	100.0%

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Development Condition: Post Through Subarea: Controlled #1

Cover	Type	CN	Area (SF)	Area (AC)	
Lawn - Good Condition	B	61	14289	0.328	57.7%
Impervious	-	98	10487	0.241	42.3%
Future Impervious	-	98	0	0.000	0.0%
TOTAL:		**77**	**24776**	**0.569**	100.0%

Development Condition: Post Through Subarea: Uncontrolled

Cover	Type	CN	Area (SF)	Area (AC)	
Lawn - Good Condition	B	61	7959	0.183	80.7%
Impervious	-	98	401	0.009	4.1%
Future Impervious	-	98	1,500	0.034	15.2%
TOTAL:		**68**	**9860**	**0.226**	100.0%

Development Condition: Post Through Subarea: Entire Watershed

Cover	Type	CN	Area (SF)	Area (AC)	
Lawn - Good Condition	B	61	22248	0.511	64.2%
Impervious*	-	98	10888	0.250	31.4%
Future Impervious	-	98	1500	0.034	4.3%
TOTAL:		**74**	**34636**	**0.795**	100.0%

* Does not include 54 sf of impervious to remain undisturbed. Includes 4,056 sf of offsite impervious.

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TIME OF CONCENTRATION / TRAVEL TIME CALCULATIONS

Development Condition:	Pre-Development
Through Subarea:	Entire Watershed

SHEET FLOW:

Surface Description:	Grass					
Manning's Roughness Coefficient:	0.24					
Flow Length (FT)(150 MAX):	150					150
2-Year 24-Hour Rainfall (IN):	3.27					
Land Slope (%):	4%					
Travel Time (HR):	0.25	0.00	0.00	0.00	0.00	**0.25**

SHALLOW CONCENTRATED FLOW:

Surface Description:	Unpaved					
Flow Length (FT):	182					182
Watercourse Slope (%):	3%					
Average Velocity (FPS):	2.79					
Travel Time (HR):	0.02	0.00	0.00	0.00	0.00	**0.02**

CHANNEL FLOW:

Pipe Diameter (IN):						
Cross Sectional Flow Area (SF):	0.00					
Wetted Perimeter (FT):	0.00					
Hydraulic Radius (FT):	0.00					
Channel Slope (%):						
Manning's Roughness Coefficient:						
Velocity (FPS):	0.00					
Flow Length (FT):						0
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

TOTAL TIME OF CONCENTRATION (HR):	**0.26**
TOTAL TIME OF CONCENTRATION (MIN):	**15.9**

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TIME OF CONCENTRATION / TRAVEL TIME CALCULATIONS

Development Condition:	Post-Development
Through Subarea:	Controlled Area #1

SHEET FLOW:

Surface Description:	Grass					
Manning's Roughness Coefficient:	0.24					
Flow Length (FT)(150 MAX):	150					150
2-Year 24-Hour Rainfall (IN):	3.27					
Land Slope (%):	4%					
Travel Time (HR):	0.25	0.00	0.00	0.00	0.00	**0.25**

SHALLOW CONCENTRATED FLOW:

Surface Description:	Unpaved					
Flow Length (FT):	84					84
Watercourse Slope (%):	5%					
Average Velocity (FPS):	3.61					
Travel Time (HR):	0.01	0.00	0.00	0.00	0.00	**0.01**

CHANNEL FLOW:

Pipe Diameter (IN):	8					
Cross Sectional Flow Area (SF):	0.35					
Wetted Perimeter (FT):	2.09					
Hydraulic Radius (FT):	0.17					
Channel Slope (%):	2.0%					
Manning's Roughness Coefficient:	0.011					
Velocity (FPS):	5.79					
Flow Length (FT):	6					6
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

TOTAL TIME OF CONCENTRATION (HR):	**0.25**
TOTAL TIME OF CONCENTRATION (MIN):	**15.2**

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TIME OF CONCENTRATION / TRAVEL TIME CALCULATIONS

Development Condition:	Post-Development
Through Subarea:	Uncontrolled Area

SHEET FLOW:

Surface Description:	Grass					
Manning's Roughness Coefficient:	0.24					
Flow Length (FT)(150 MAX):	48					48
2-Year 24-Hour Rainfall (IN):	3.27					
Land Slope (%):	7%					
Travel Time (HR):	0.08	0.00	0.00	0.00	0.00	**0.08**

SHALLOW CONCENTRATED FLOW:

Surface Description:						
Flow Length (FT):						0
Watercourse Slope (%):						
Average Velocity (FPS):						
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

CHANNEL FLOW:

Pipe Diameter (IN):						
Cross Sectional Flow Area (SF):	0.00					
Wetted Perimeter (FT):	0.00					
Hydraulic Radius (FT):	0.00					
Channel Slope (%):						
Manning's Roughness Coefficient:						
Velocity (FPS):	0.00					
Flow Length (FT):						0
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

TOTAL TIME OF CONCENTRATION (HR):	**0.08**
TOTAL TIME OF CONCENTRATION (MIN):	**4.8**

*** USE THE MINIMUM TIME OF CONCENTRATION OF 6 MINUTES**

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RUNOFF VOLUME CALCULATIONS

Rainfall: 25 Year 5.8 Inches

PRE-DEVELOPMENT DRAINAGE AREA

Cover Type	Soil Type	Area (SF)	Area (AC)	CN	S	Q Runoff (IN)	Runoff Volume (CF)
Meadow - Good Condition	B	23184	0.532	58	7.241	1.634	3156
Lawn - Good Condition	B	6998	0.161	61	6.393	1.873	1092
Impervious	-	4454	0.102	98	0.204	5.562	2064
TOTAL:		34636	0.795				**6313**

POST-DEVELOPMENT DRAINAGE AREA

Cover Type	Soil Type	Area (SF)	Area (AC)	CN	S	Q Runoff (IN)	Runoff Volume (CF)
Meadow - Good Condition	B	0	0.000	58	7.241	1.634	0
Lawn - Good Condition	B	22248	0.511	61	6.393	1.873	3472
Impervious	-	12388	0.284	98	0.204	5.562	5742
TOTAL:		34636	0.795				**9214**

NET INCREASE: **2902**

VOLUME PROVIDED:

PCSM	1						Total
Hydrograph In	7040						**7040**
Hydrograph Out	2941						**2941**
Total	4099						**4099**
Stage Storage	4098						**4098**

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REV VOLUME CALCULATIONS

Rev Formula: I * Impervious Area / 12

I is design Infiltration amount:	1	(IN)
Impervious Increase:	12388	(SF)
Rev:	**1032**	(CF)
Volume Provided:	4098	(CF)

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PCSM VOLUME REDUCTION CALCULATIONS

PCSM #	Stonebed Length (FT)	Stonebed Width (FT)	Stonebed Area (SF)	Stonebed Depth (FT)	Void Ratio %	Pipe Diameter (FT)	Pipe Length (FT)	Pipe Storage (CF)	Stone Storage (CF)	Storage Volume (CF)
1	77.5	18	1395	5	40%	4	230.5	2897	1631	**4528**

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PIPE CAPACITY CALCULATIONS

DRAINAGE AREA:	Half Roof					
Rainfall:	100	Year	Intensity:		7.5	IN/HR
Impervious Area:	1648	SF	C:		0.95	
Pervious Area:	0	SF	C:		0.35	
Total Drainage Area:	1648	SF	Weighted C:		0.95	
Overland Flow:			Q:		**0.27**	CFS
6 IN	PVC	@	0.5%	MIN =	**0.47**	CFS

DRAINAGE AREA:	Whole Roof					
Rainfall:	100	Year	Intensity:		7.5	IN/HR
Impervious Area:	3296	SF	C:		0.95	
Pervious Area:	0	SF	C:		0.35	
Total Drainage Area:	3296	SF	Weighted C:		0.95	
Overland Flow:			Q:		**0.54**	CFS
6 IN	PVC	@	0.7%	MIN =	**0.55**	CFS

DRAINAGE AREA:	Yard Drain #1					
Rainfall:	100	Year	Intensity:		7.5	IN/HR
Impervious Area:	1766	SF	C:		0.95	
Pervious Area:	7282	SF	C:		0.35	
Total Drainage Area:	9048	SF	Weighted C:		0.47	
Overland Flow:			Q:		**0.73**	CFS
8 IN	PVC	@	0.5%	MIN =	**1.01**	CFS

DRAINAGE AREA:	Yard Drain #2					
Rainfall:	100	Year	Intensity:		7.5	IN/HR
Impervious Area:	8720	SF	C:		0.95	
Pervious Area:	7008	SF	C:		0.35	
Total Drainage Area:	15728	SF	Weighted C:		0.68	
Overland Flow:			Q:		**1.85**	CFS
Total Flow: (Overland plus Yard Drain #1)			Q:		**2.58**	CFS
12 IN	PVC	@	0.5%	MIN =	**2.98**	CFS

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Montgomery County, Pennsylvania

June 18, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:696 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 30 60 120 180

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: Montgomery County, Pennsylvania
Survey Area Data: Version 13, Sep 19, 2018

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

Date(s) aerial images were photographed: Jun 15, 2014—Jun 24, 2014

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UrlB	Urban land-Gladstone complex, 0 to 8 percent slopes	1.0	100.0%
Totals for Area of Interest		**1.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Montgomery County, Pennsylvania

UrlB—Urban land-Gladstone complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2l3fs
Elevation: 200 to 1,200 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 130 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Gladstone and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 to 100 inches to lithic bedrock
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Gladstone

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Local colluvium and residuum weathered from granite and gneiss

Typical profile

A - 0 to 10 inches: gravelly loam
C - 10 to 42 inches: gravelly clay loam
2Ap - 42 to 68 inches: gravelly loam
R - 68 to 78 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 60 to 100 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Cokesbury

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Califon

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

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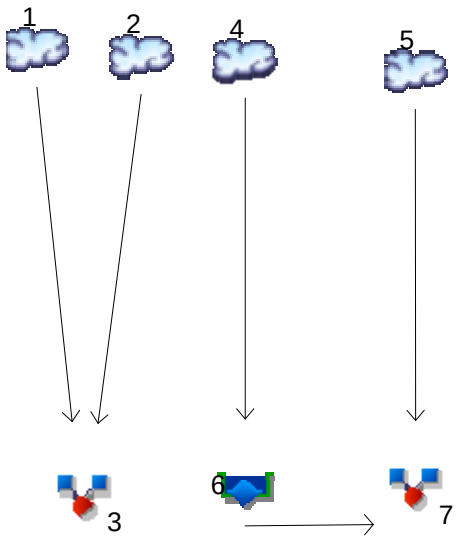
Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	PRE - ONSITE/DISTURBED
3	Combine	PRE - ENTIRE WATERSHED
4	SCS Runoff	POST - PCSM #1
5	SCS Runoff	POST - UNCONTROLLED
6	Reservoir	POST - PCSM #1 ROUTED
7	Combine	POST - ENTIRE WATERSHED

Hydrograph Return Period Recap

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	------	0.232	0.312	-------	0.532	0.725	0.926	1.106	1.606	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	------	0.063	0.136	-------	0.414	0.698	1.014	1.311	2.187	PRE - ONSITE/DISTURBED
3	Combine	1, 2	0.291	0.447	-------	0.946	1.417	1.928	2.399	3.788	PRE - ENTIRE WATERSHED
4	SCS Runoff	------	0.595	0.785	-------	1.301	1.746	2.206	2.615	3.745	POST - PCSM #1
5	SCS Runoff	------	0.161	0.235	-------	0.444	0.630	0.835	1.023	1.557	POST - UNCONTROLLED
6	Reservoir	4	0.000	0.000	-------	0.022	0.078	0.279	1.140	3.312	POST - PCSM #1 ROUTED
7	Combine	5, 6	0.161	0.235	-------	0.444	0.630	0.835	1.285	3.636	POST - ENTIRE WATERSHED

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

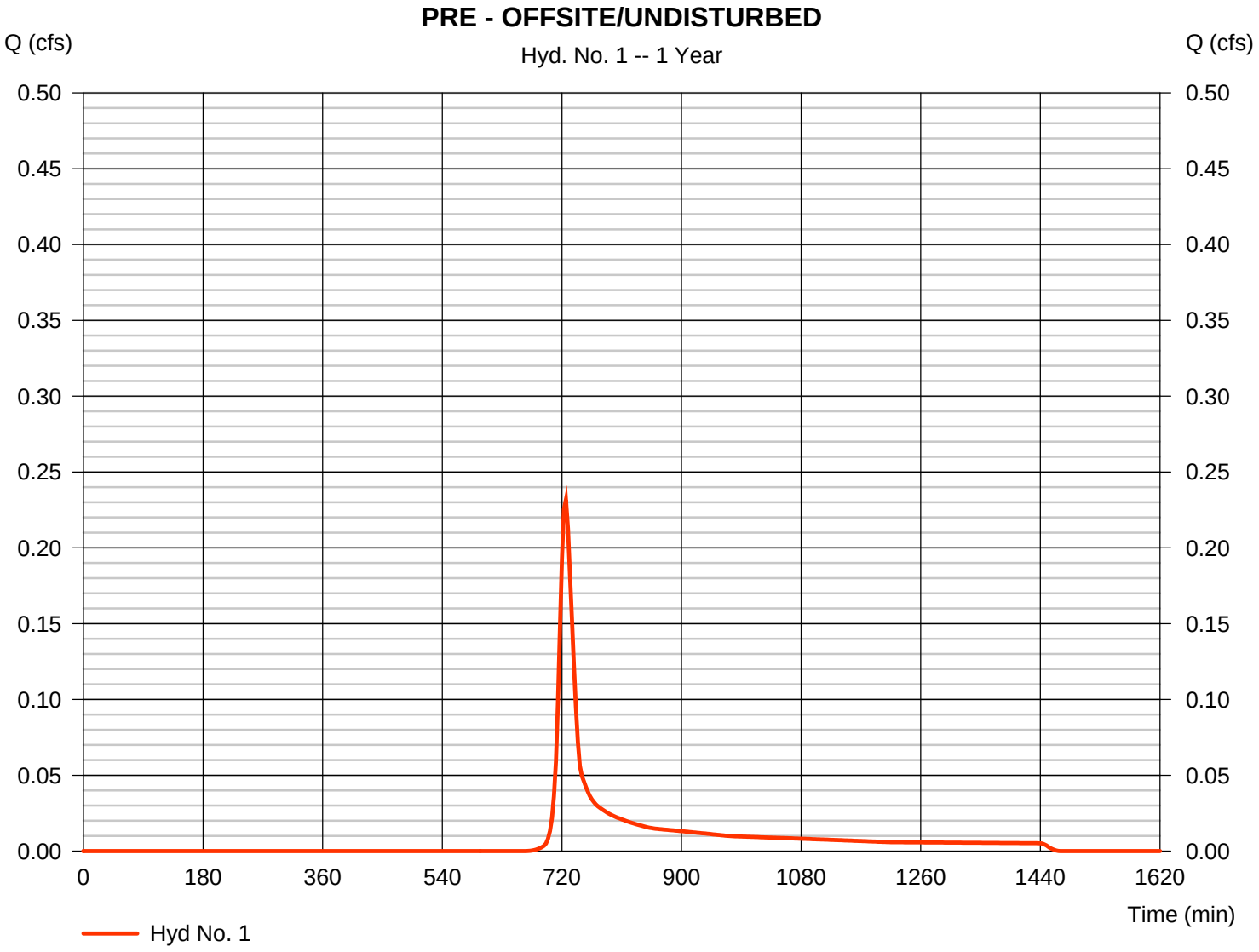
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.232	3	726	792	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.063	3	729	482	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	0.291	3	726	1,273	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	0.595	3	726	1,991	------	------	------	POST - PCSM #1
5	SCS Runoff	0.161	3	720	405	------	------	------	POST - UNCONTROLLED
6	Reservoir	0.000	3	n/a	0	4	269.95	1,991	POST - PCSM #1 ROUTED
7	Combine	0.161	3	720	405	5, 6	------	------	POST - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.232 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 792 cuft
Drainage area	= 0.254 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

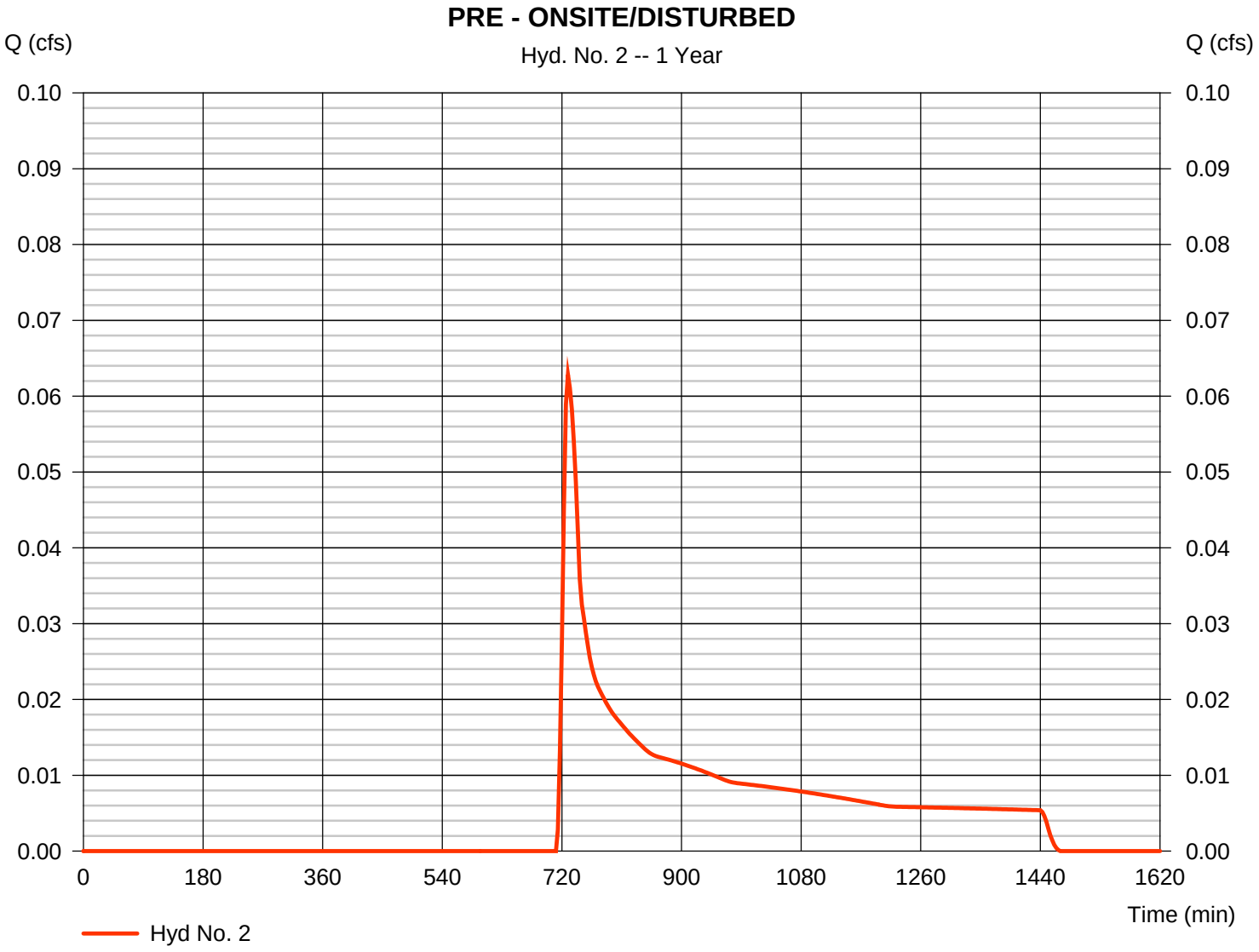


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.063 cfs
Storm frequency	= 1 yrs	Time to peak	= 729 min
Time interval	= 3 min	Hyd. volume	= 482 cuft
Drainage area	= 0.541 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

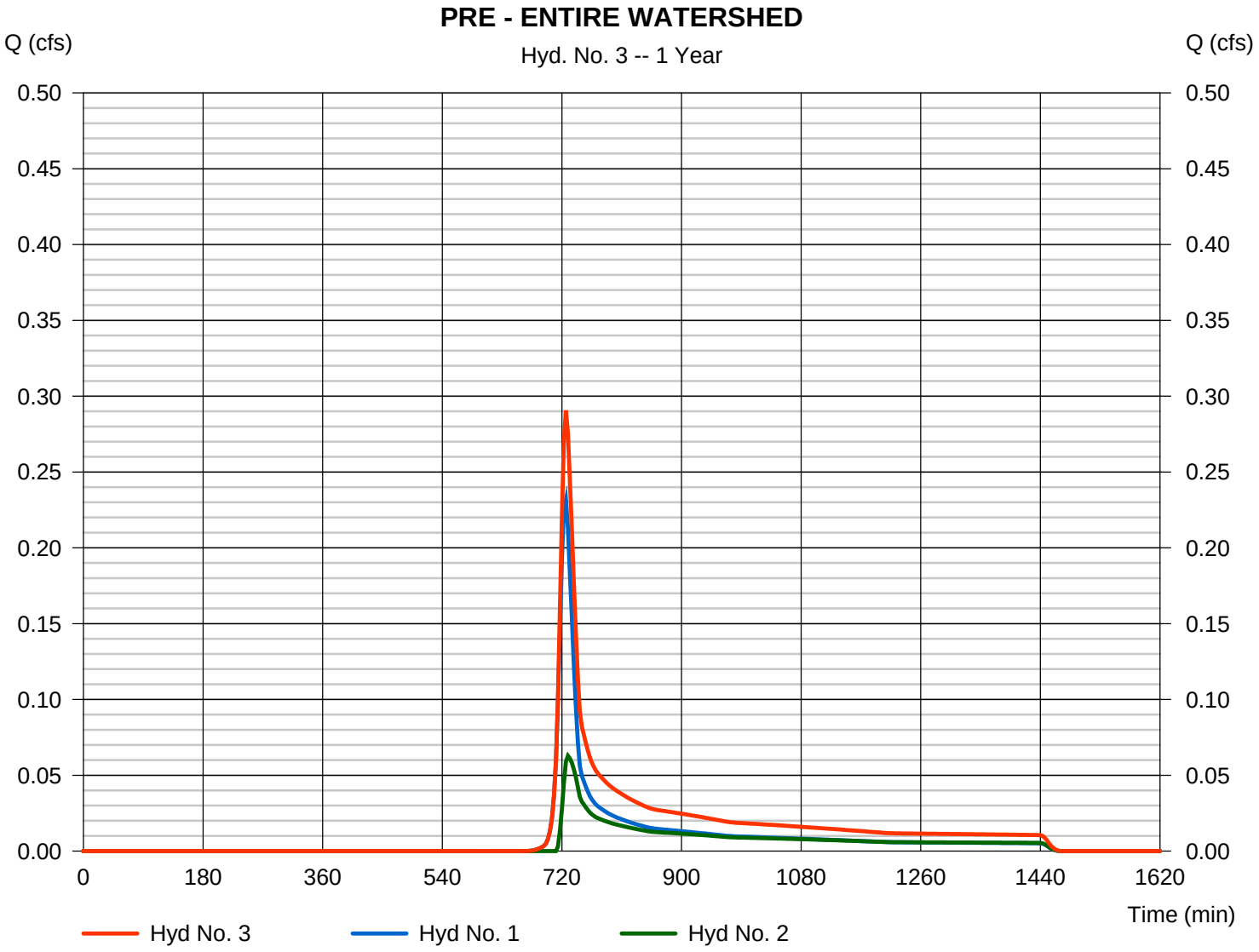


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.291 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,273 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

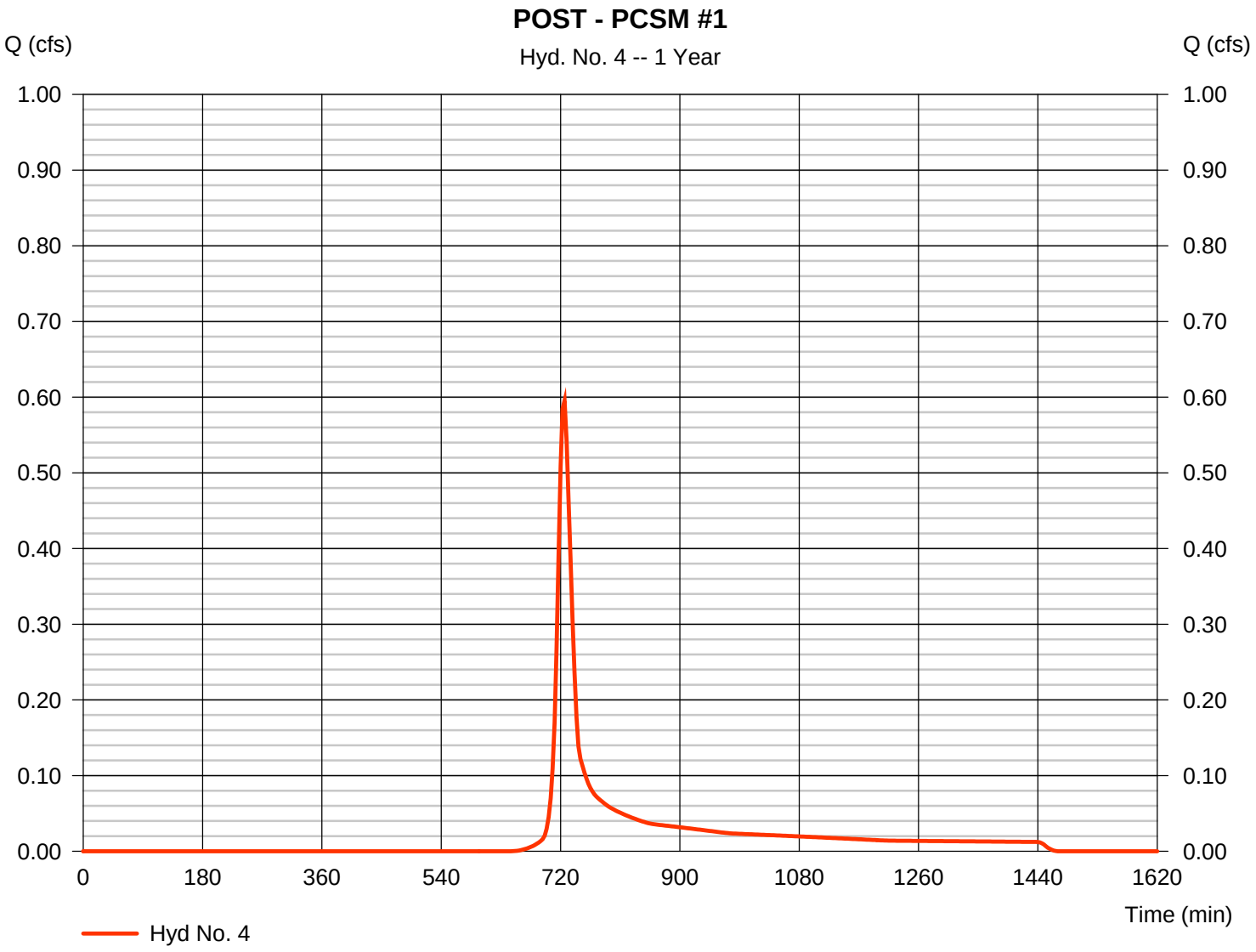


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.595 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,991 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	2.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

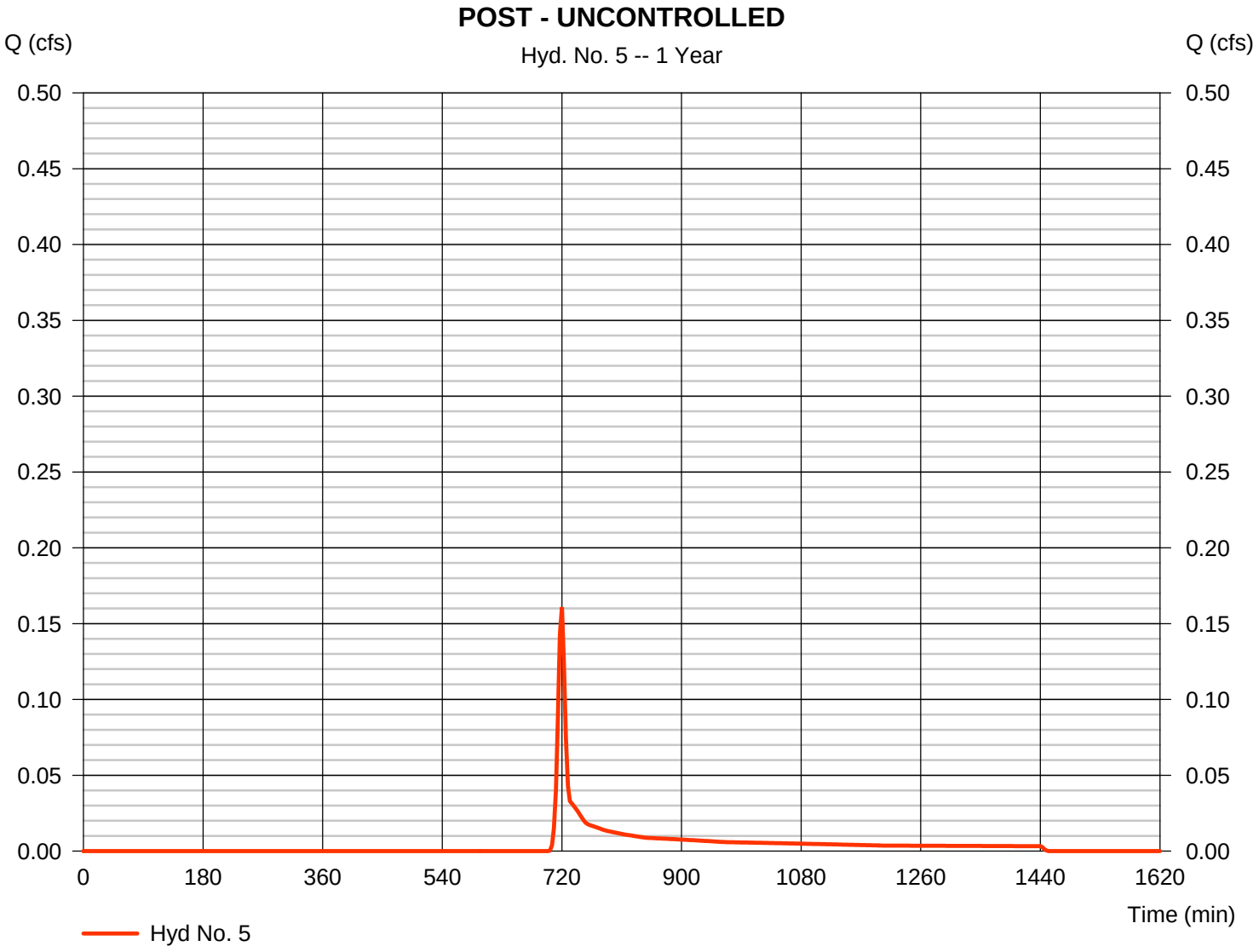


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.161 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	405 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



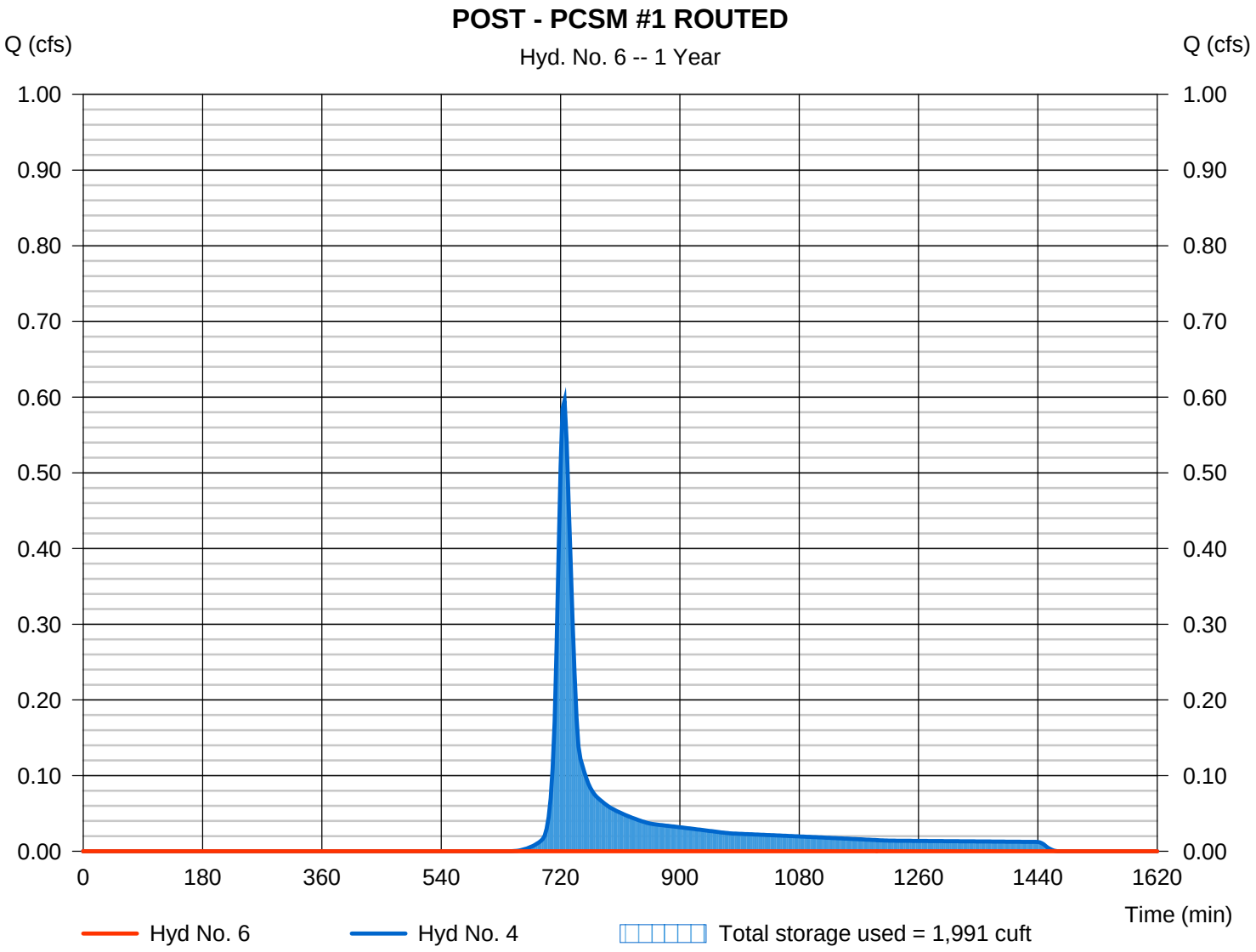
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 3 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - POST - PCSM #1	Max. Elevation	= 269.95 ft
Reservoir name	= PCSM #1	Max. Storage	= 1,991 cuft

Storage Indication method used.



Pond No. 1 - PCSM #1

Pond Data

UG Chambers -Invert elev. = 268.20 ft, Rise x Span = 4.00 x 4.00 ft, Barrel Len = 230.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Encasement -Invert elev. = 267.70 ft, Width = 6.10 ft, Height = 5.00 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	267.70	n/a	0	0
0.50	268.20	n/a	281	281
1.00	268.70	n/a	406	687
1.50	269.20	n/a	495	1,181
2.00	269.70	n/a	536	1,717
2.50	270.20	n/a	554	2,271
3.00	270.70	n/a	554	2,825
3.50	271.20	n/a	535	3,360
4.00	271.70	n/a	495	3,855
4.50	272.20	n/a	406	4,260
5.00	272.70	n/a	281	4,541

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 271.00	0.00	0.00	0.00
Length (ft)	= 55.00	0.00	0.00	0.00
Slope (%)	= 0.90	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	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.93	0.00	0.00	0.00
Crest El. (ft)	= 272.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	267.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.05	28	267.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.10	56	267.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.15	84	267.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.20	112	267.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.25	140	267.95	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.30	168	268.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.35	196	268.05	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.40	225	268.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.45	253	268.15	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.50	281	268.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.55	321	268.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.60	362	268.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.65	402	268.35	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.70	443	268.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.75	484	268.45	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.80	524	268.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.85	565	268.55	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.90	605	268.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.95	646	268.65	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	687	268.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.05	736	268.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.10	786	268.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.15	835	268.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.20	884	268.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.25	934	268.95	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.30	983	269.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.35	1,033	269.05	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.40	1,082	269.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.45	1,132	269.15	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.50	1,181	269.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.55	1,235	269.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000

Continues on next page...

PCSM #1

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
1.60	1,288	269.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.65	1,342	269.35	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.70	1,396	269.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.75	1,449	269.45	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.80	1,503	269.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.85	1,556	269.55	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.90	1,610	269.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.95	1,664	269.65	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	1,717	269.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.05	1,772	269.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.10	1,828	269.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.15	1,883	269.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.20	1,939	269.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.25	1,994	269.95	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.30	2,049	270.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.35	2,105	270.05	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.40	2,160	270.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.45	2,215	270.15	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.50	2,271	270.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.55	2,326	270.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.60	2,382	270.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.65	2,437	270.35	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.70	2,492	270.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.75	2,548	270.45	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.80	2,603	270.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.85	2,659	270.55	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.90	2,714	270.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.95	2,769	270.65	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.00	2,825	270.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.05	2,878	270.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.10	2,932	270.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.15	2,985	270.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.20	3,039	270.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.25	3,092	270.95	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.30	3,146	271.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.35	3,199	271.05	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.40	3,253	271.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.45	3,307	271.15	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.50	3,360	271.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.55	3,409	271.25	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.60	3,459	271.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.65	3,508	271.35	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.70	3,558	271.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.75	3,607	271.45	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.80	3,657	271.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.85	3,706	271.55	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.90	3,756	271.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.95	3,805	271.65	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.00	3,855	271.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.05	3,895	271.75	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.10	3,936	271.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.15	3,976	271.85	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.20	4,017	271.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.25	4,058	271.95	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.30	4,098	272.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.35	4,139	272.05	0.15 ic	---	---	---	0.15	---	---	---	---	---	0.146
4.40	4,179	272.10	0.42 ic	---	---	---	0.41	---	---	---	---	---	0.413
4.45	4,220	272.15	0.76 ic	---	---	---	0.76	---	---	---	---	---	0.760
4.50	4,260	272.20	1.18 ic	---	---	---	1.17	---	---	---	---	---	1.171
4.55	4,288	272.25	1.64 ic	---	---	---	1.64	---	---	---	---	---	1.636
4.60	4,317	272.30	2.16 ic	---	---	---	2.15	---	---	---	---	---	2.150
4.65	4,345	272.35	2.63 oc	---	---	---	2.63 s	---	---	---	---	---	2.629
4.70	4,373	272.40	2.89 oc	---	---	---	2.89 s	---	---	---	---	---	2.889
4.75	4,401	272.45	3.09 oc	---	---	---	3.09 s	---	---	---	---	---	3.086
4.80	4,429	272.50	3.25 oc	---	---	---	3.25 s	---	---	---	---	---	3.247
4.85	4,457	272.55	3.39 oc	---	---	---	3.39 s	---	---	---	---	---	3.387
4.90	4,485	272.60	3.51 oc	---	---	---	3.51 s	---	---	---	---	---	3.511
4.95	4,513	272.65	3.62 oc	---	---	---	3.62 s	---	---	---	---	---	3.623
5.00	4,541	272.70	3.73 oc	---	---	---	3.73 s	---	---	---	---	---	3.728

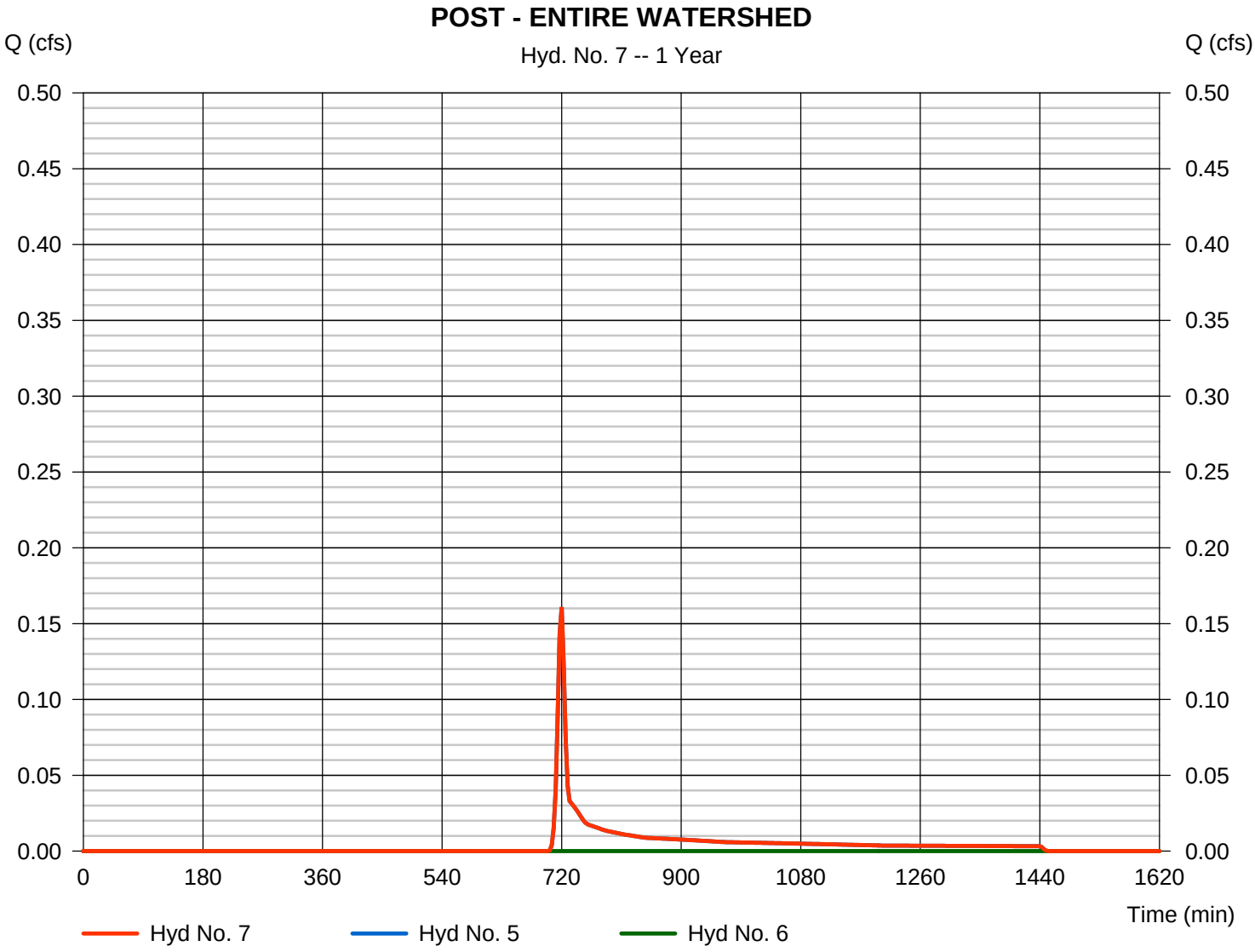
...End

Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.161 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 405 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.226 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

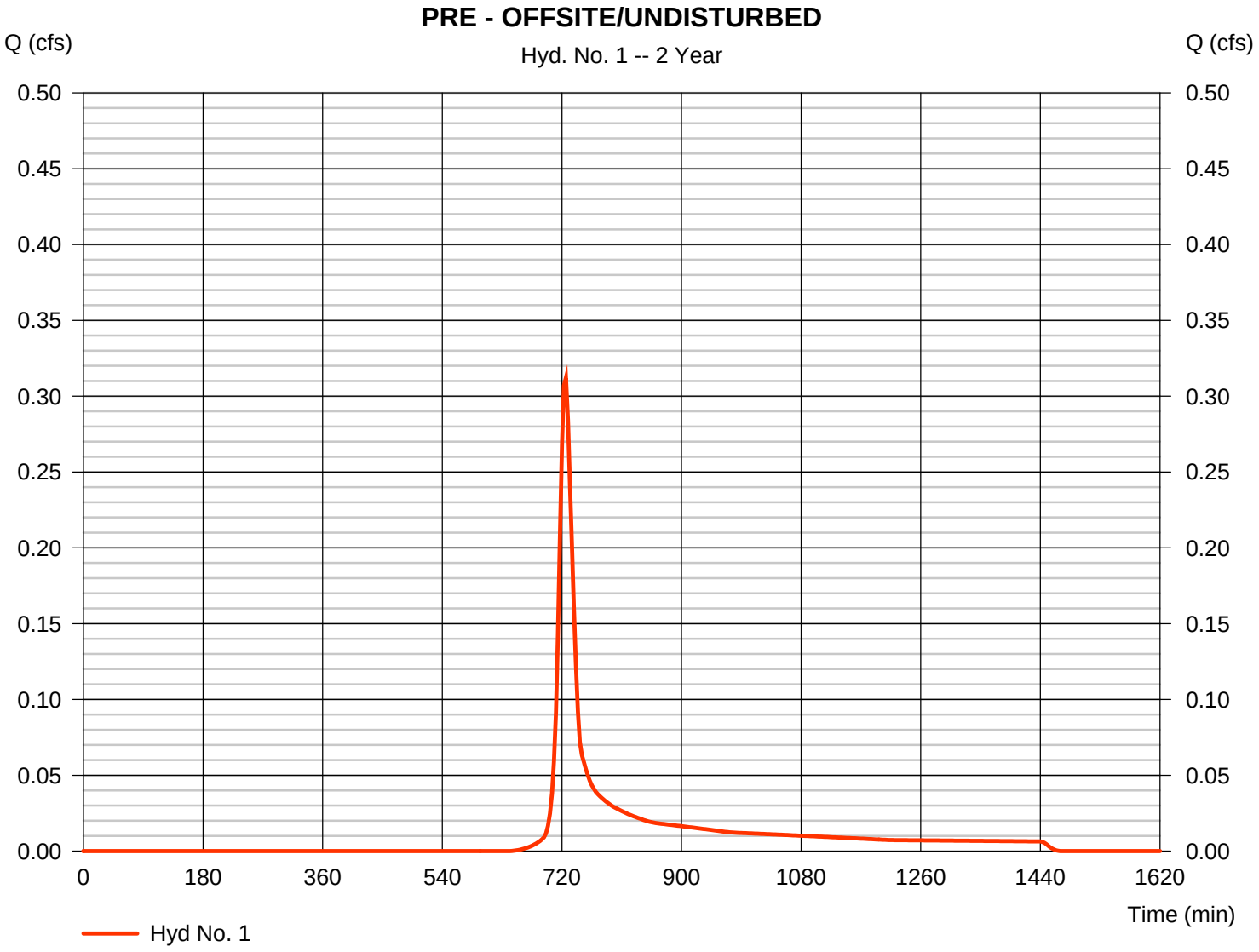
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.312	3	726	1,040	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.136	3	729	758	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	0.447	3	726	1,798	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	0.785	3	726	2,581	------	------	------	POST - PCSM #1
5	SCS Runoff	0.235	3	720	563	------	------	------	POST - UNCONTROLLED
6	Reservoir	0.000	3	n/a	0	4	270.48	2,581	POST - PCSM #1 ROUTED
7	Combine	0.235	3	720	563	5, 6	------	------	POST - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.312 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,040 cuft
Drainage area	=	0.254 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

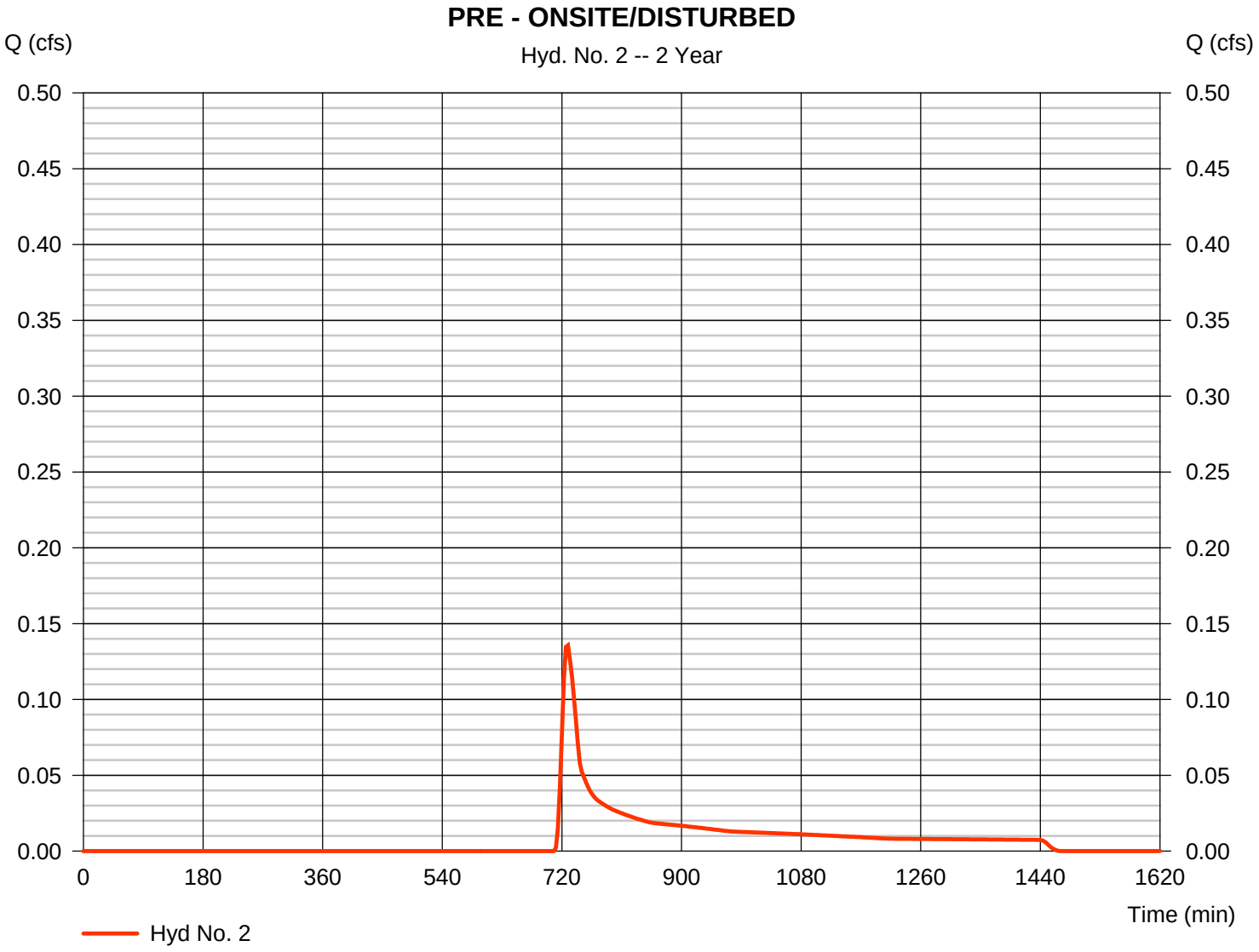


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.136 cfs
Storm frequency	=	2 yrs	Time to peak	=	729 min
Time interval	=	3 min	Hyd. volume	=	758 cuft
Drainage area	=	0.541 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

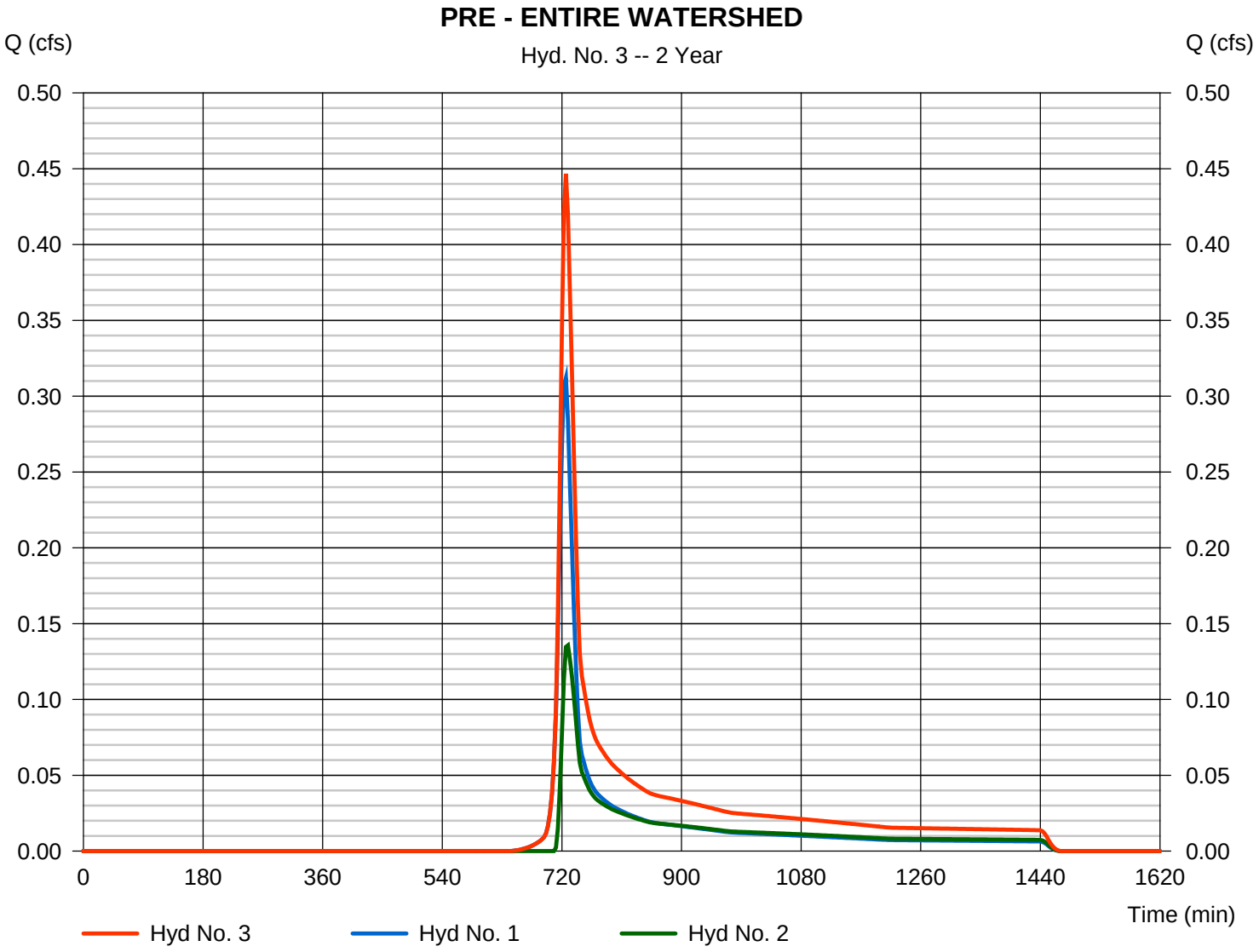


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.447 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,798 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

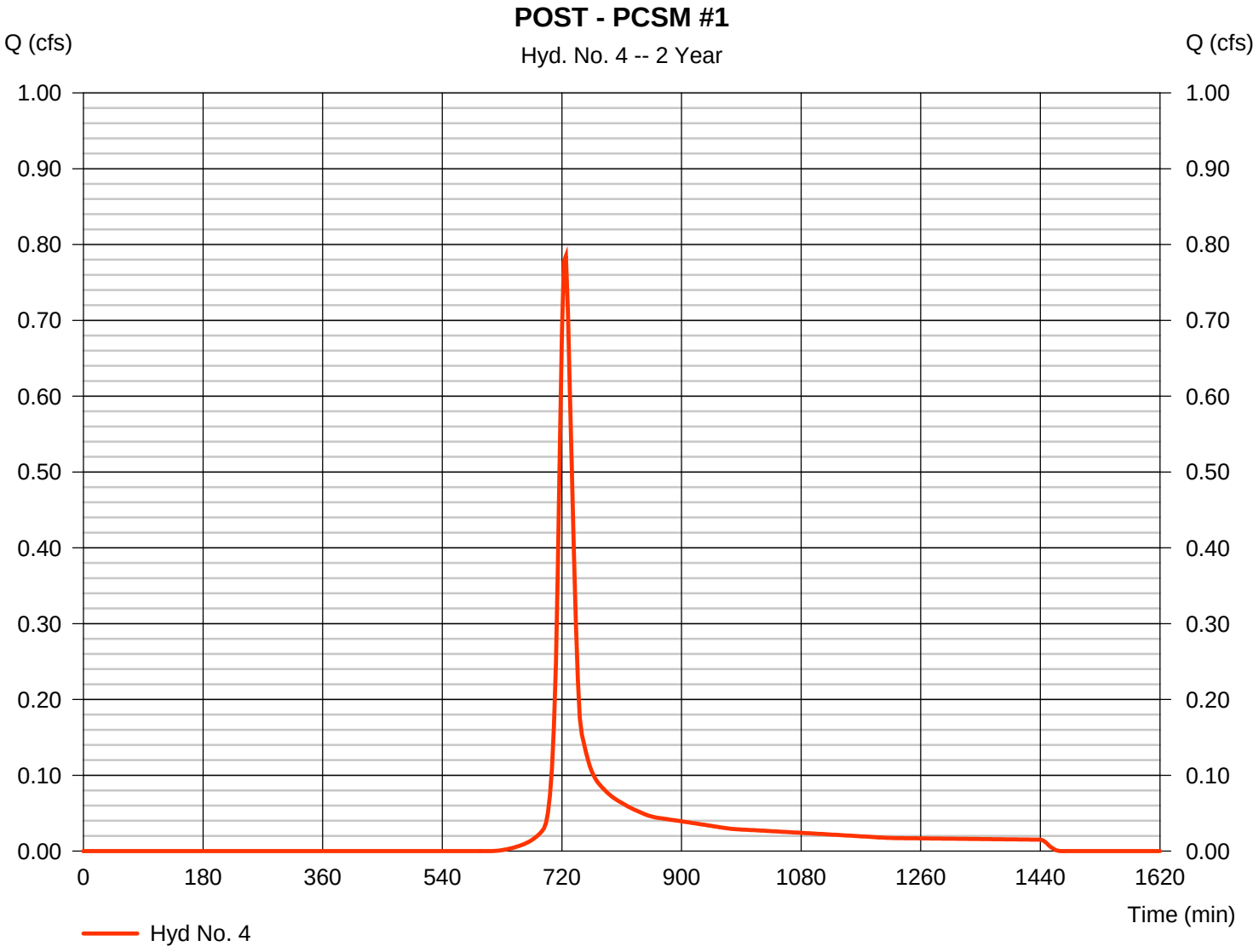


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.785 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	2,581 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

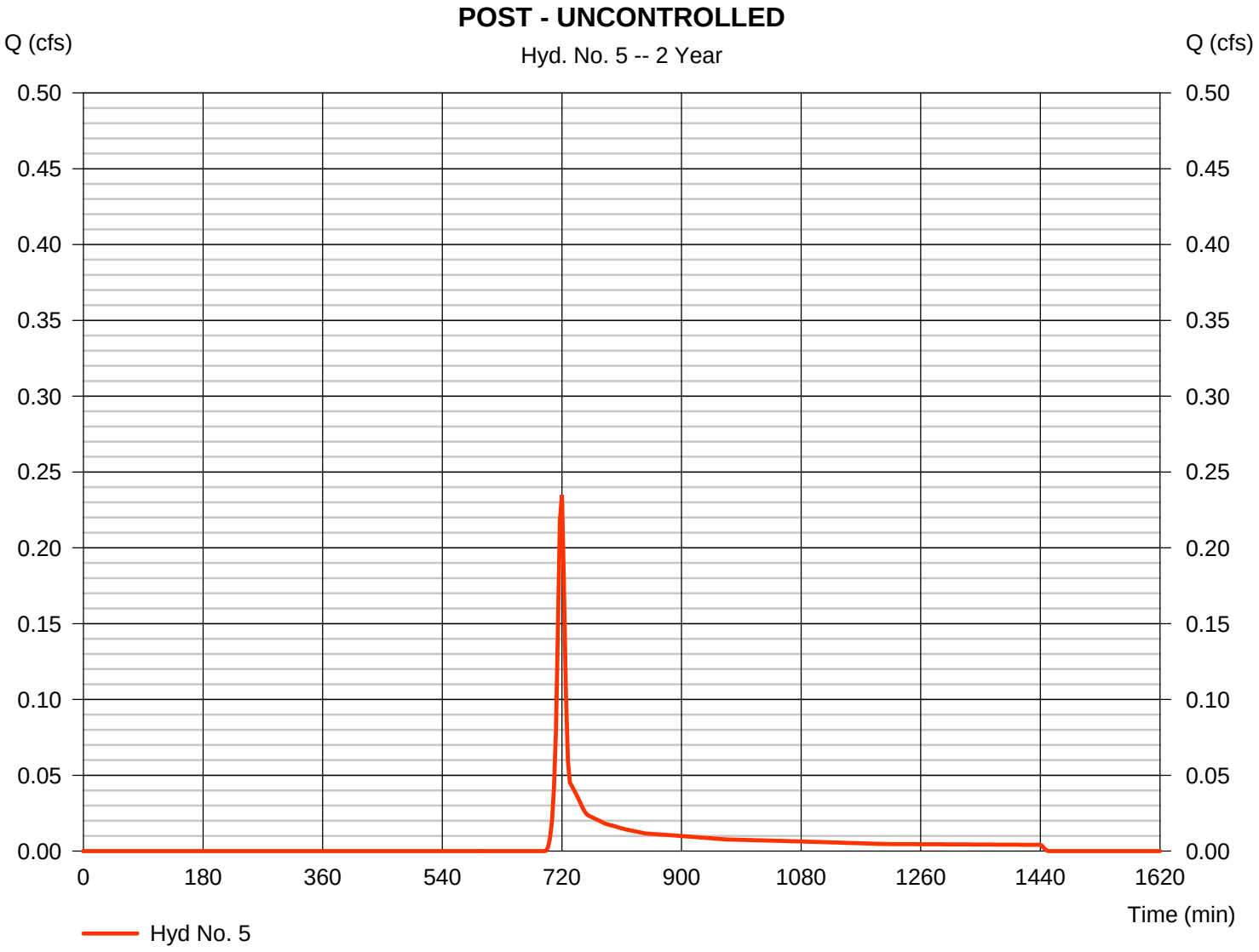


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.235 cfs
Storm frequency	=	2 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	563 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



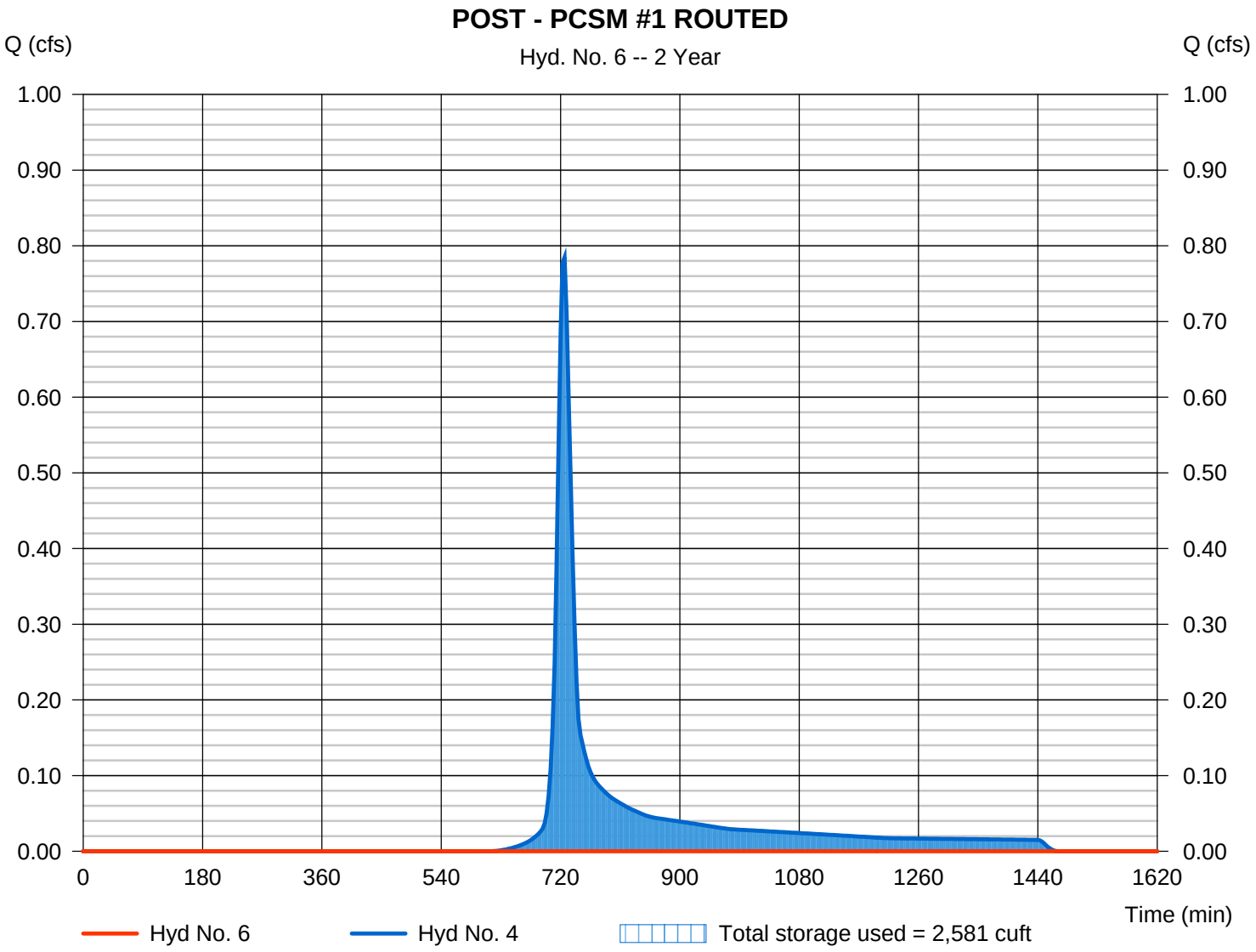
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 3 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - POST - PCSM #1	Max. Elevation	= 270.48 ft
Reservoir name	= PCSM #1	Max. Storage	= 2,581 cuft

Storage Indication method used.

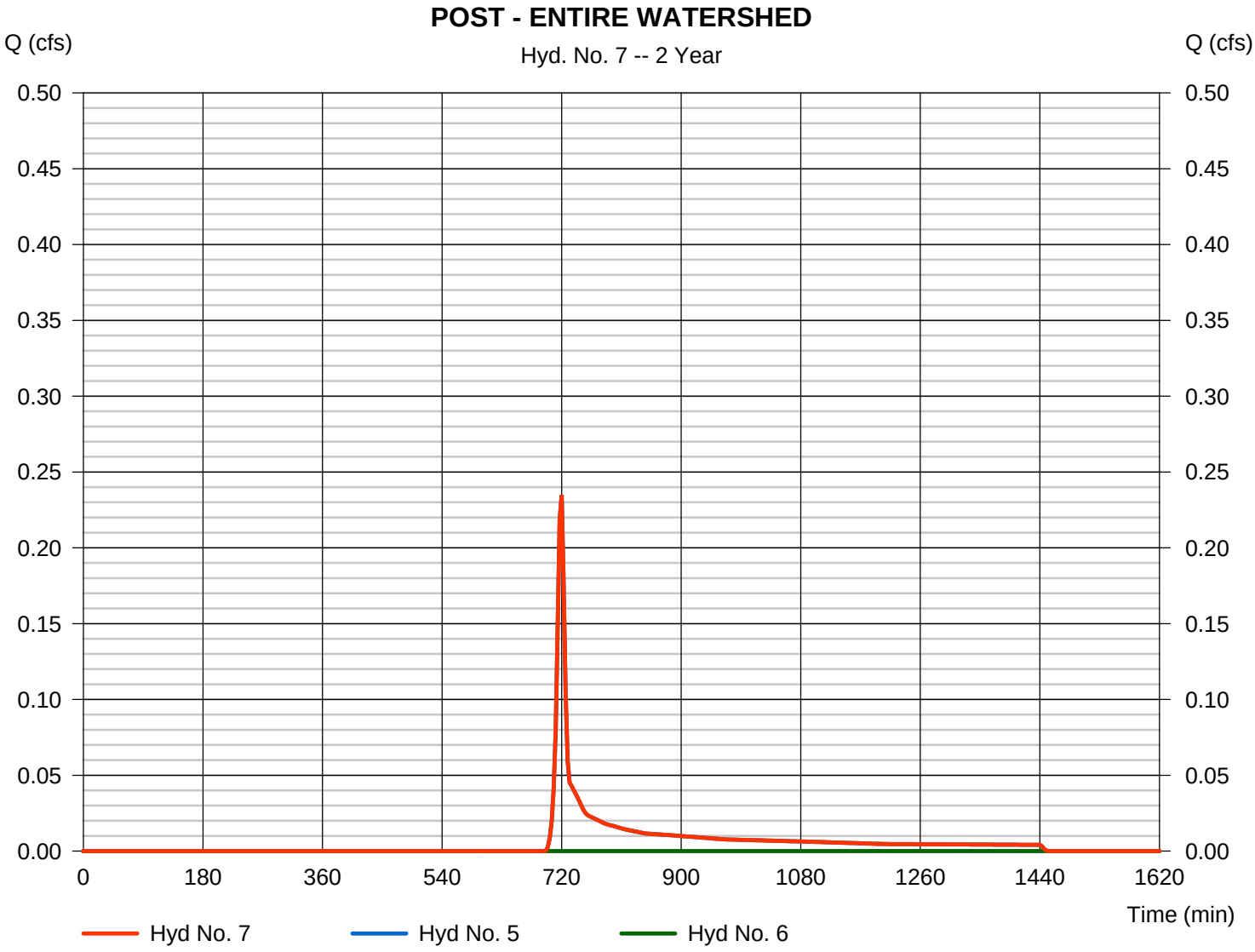


Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.235 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 563 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.226 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

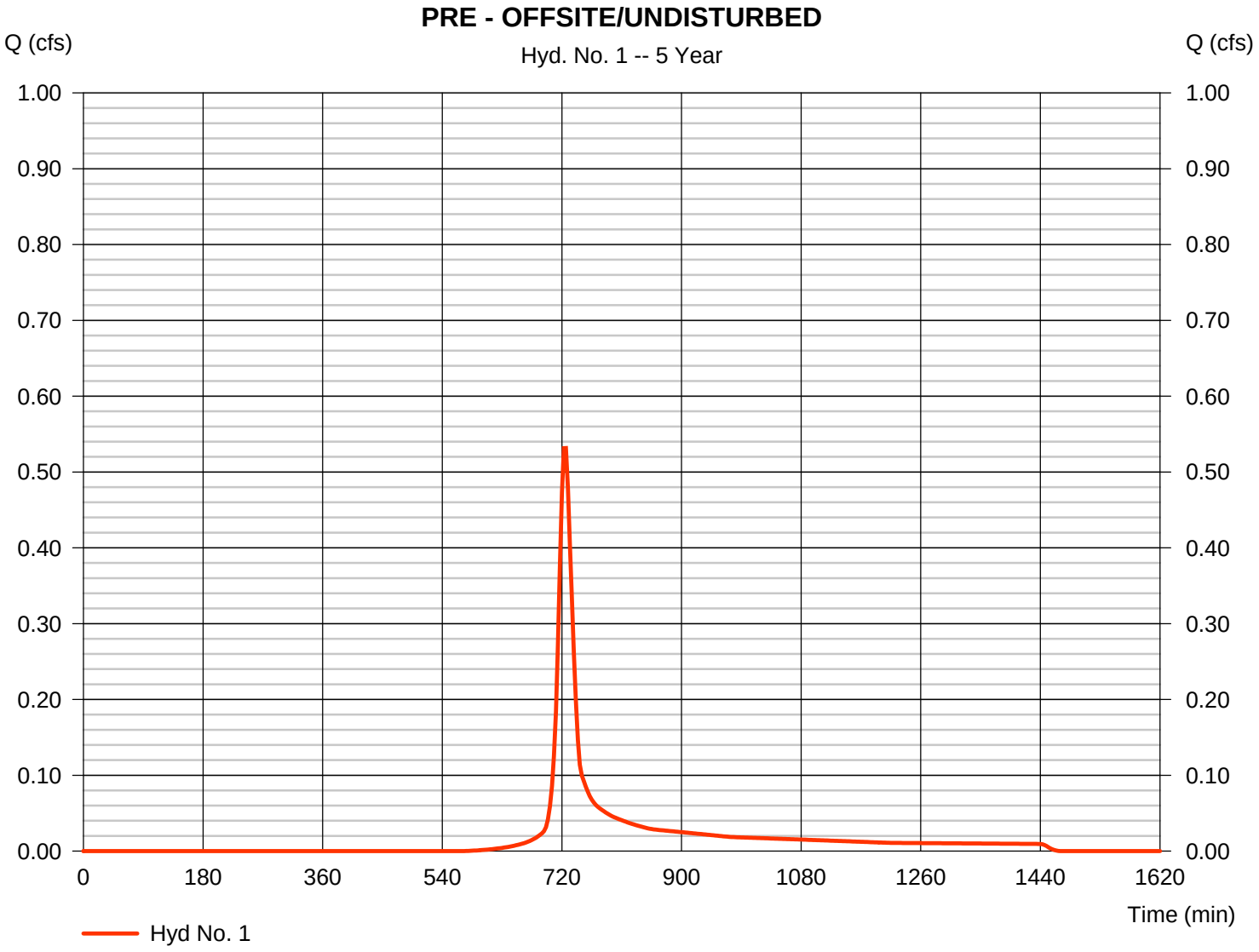
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.532	3	726	1,729	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.414	3	726	1,639	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	0.946	3	726	3,367	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	1.301	3	723	4,195	------	------	------	POST - PCSM #1
5	SCS Runoff	0.444	3	720	1,026	------	------	------	POST - UNCONTROLLED
6	Reservoir	0.022	3	1407	97	4	272.01	4,104	POST - PCSM #1 ROUTED
7	Combine	0.444	3	720	1,122	5, 6	------	------	POST - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.532 cfs
Storm frequency	= 5 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,729 cuft
Drainage area	= 0.254 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 4.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

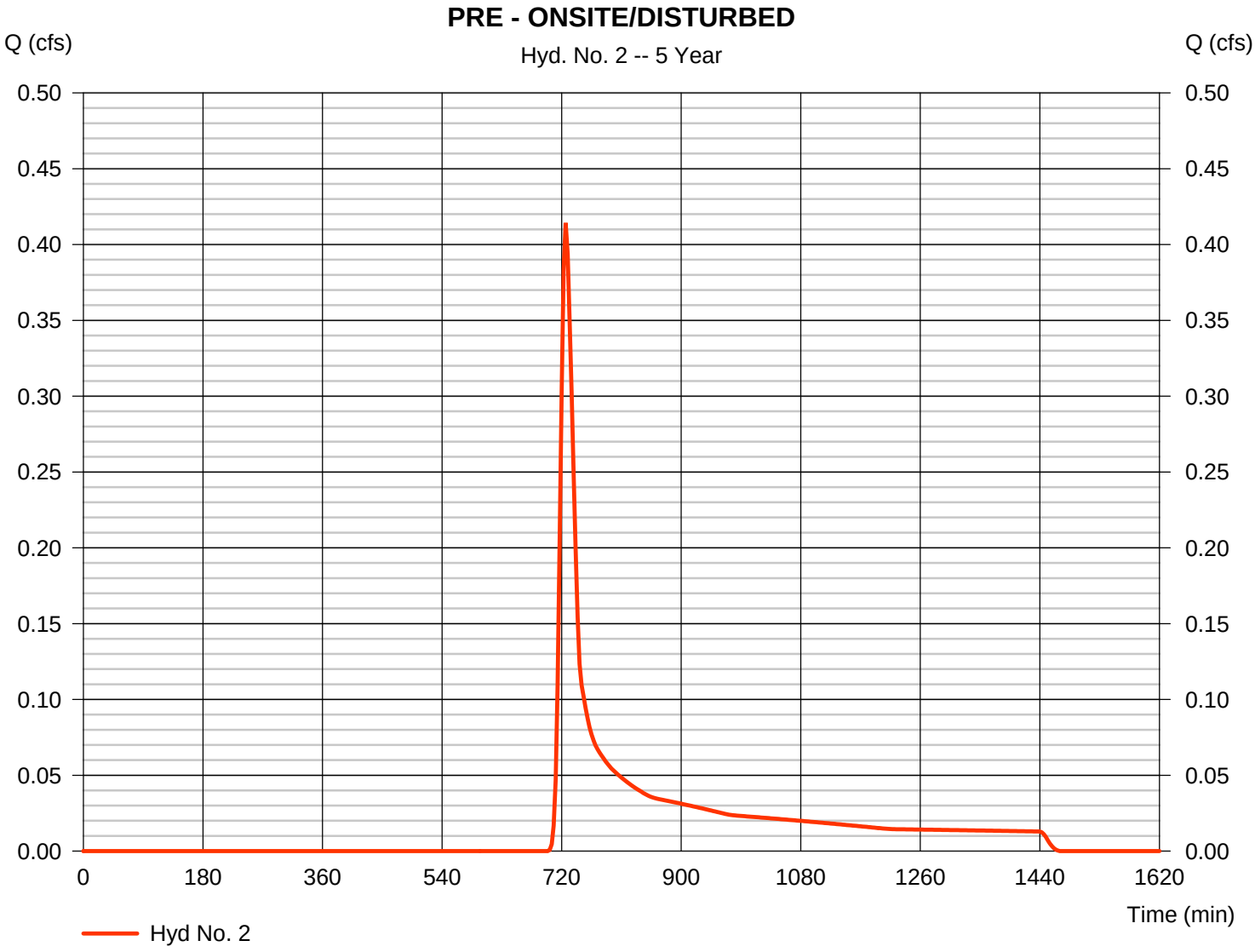


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.414 cfs
Storm frequency	= 5 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 1,639 cuft
Drainage area	= 0.541 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 4.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

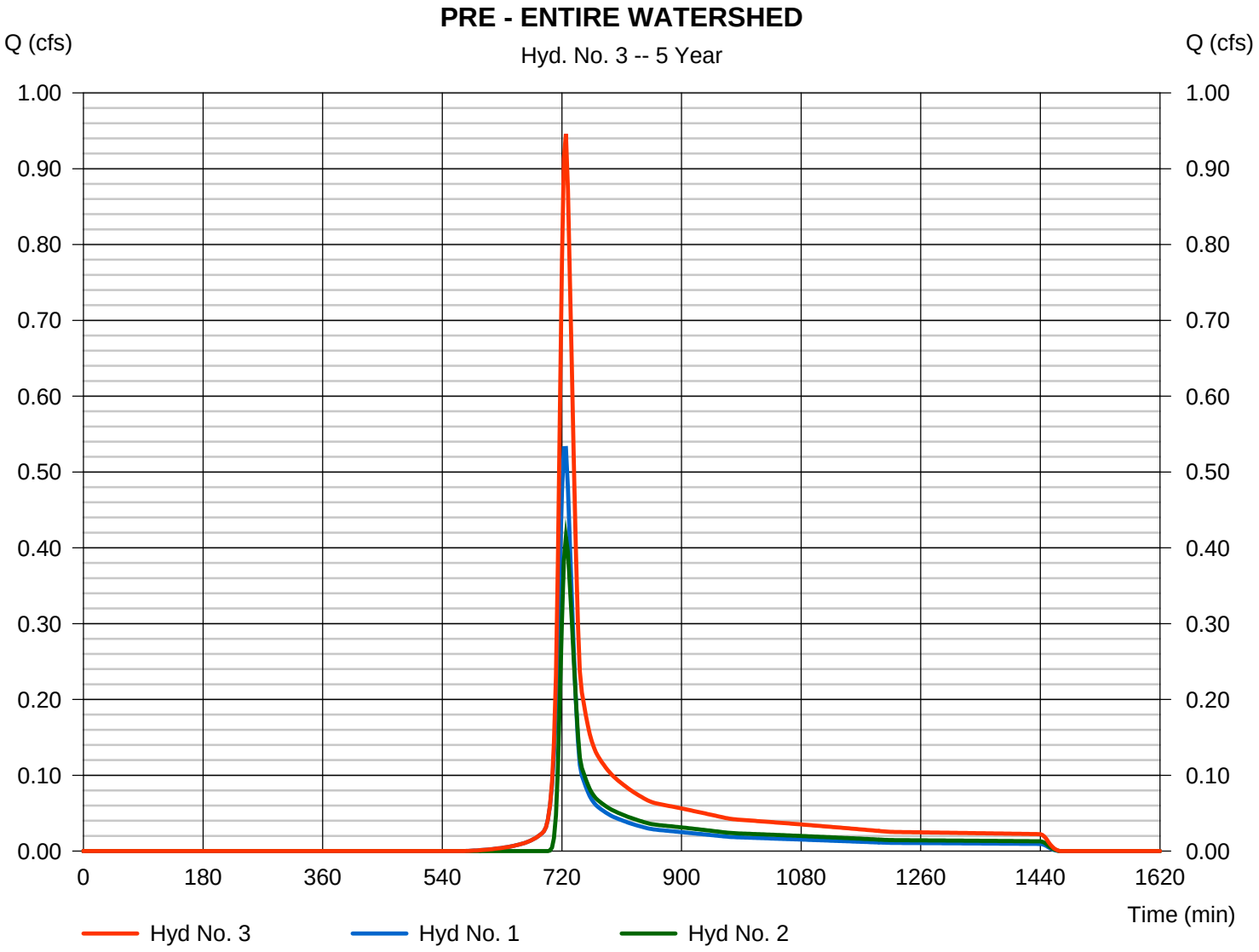


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.946 cfs
Storm frequency	=	5 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	3,367 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

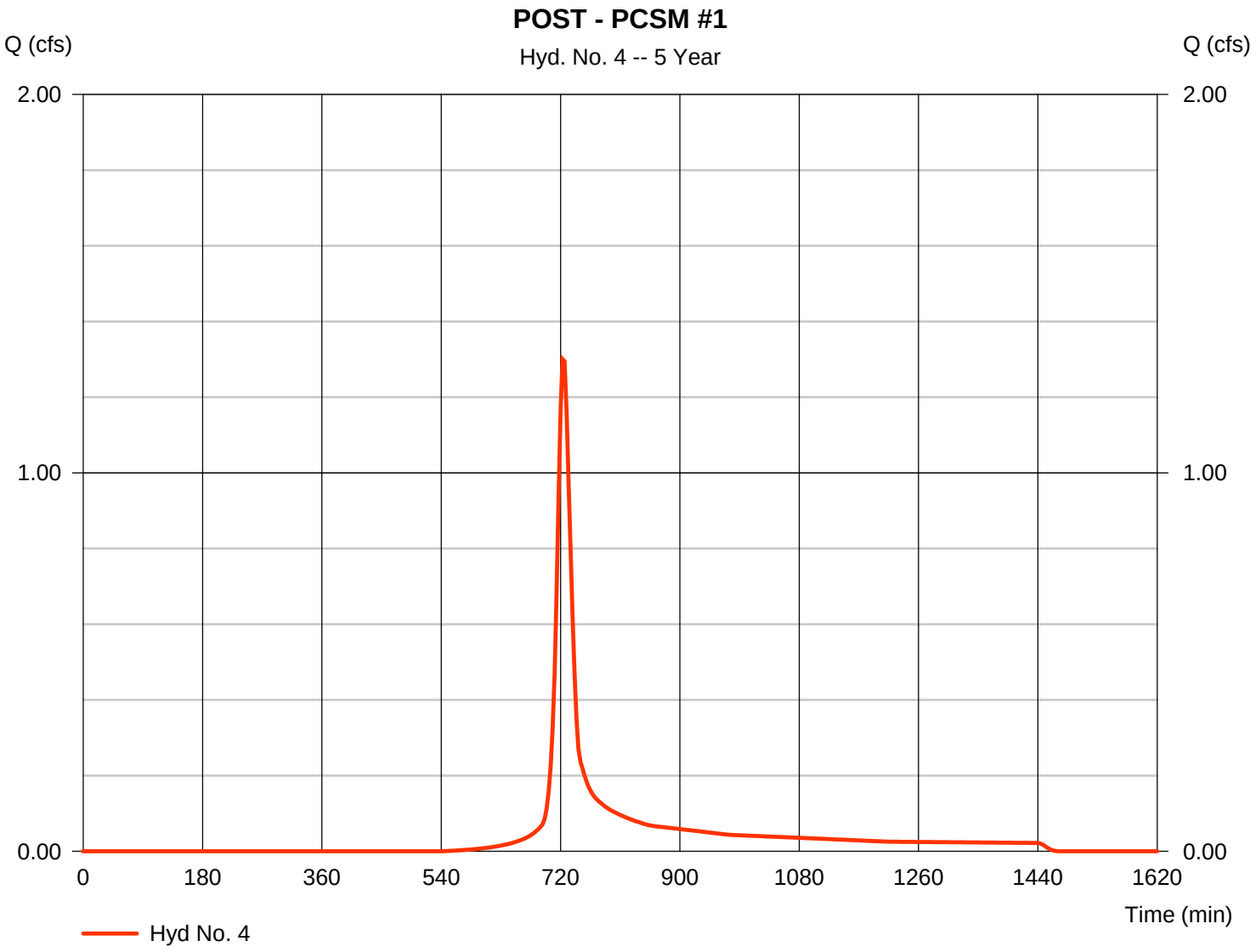


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.301 cfs
Storm frequency	=	5 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	4,195 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	4.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

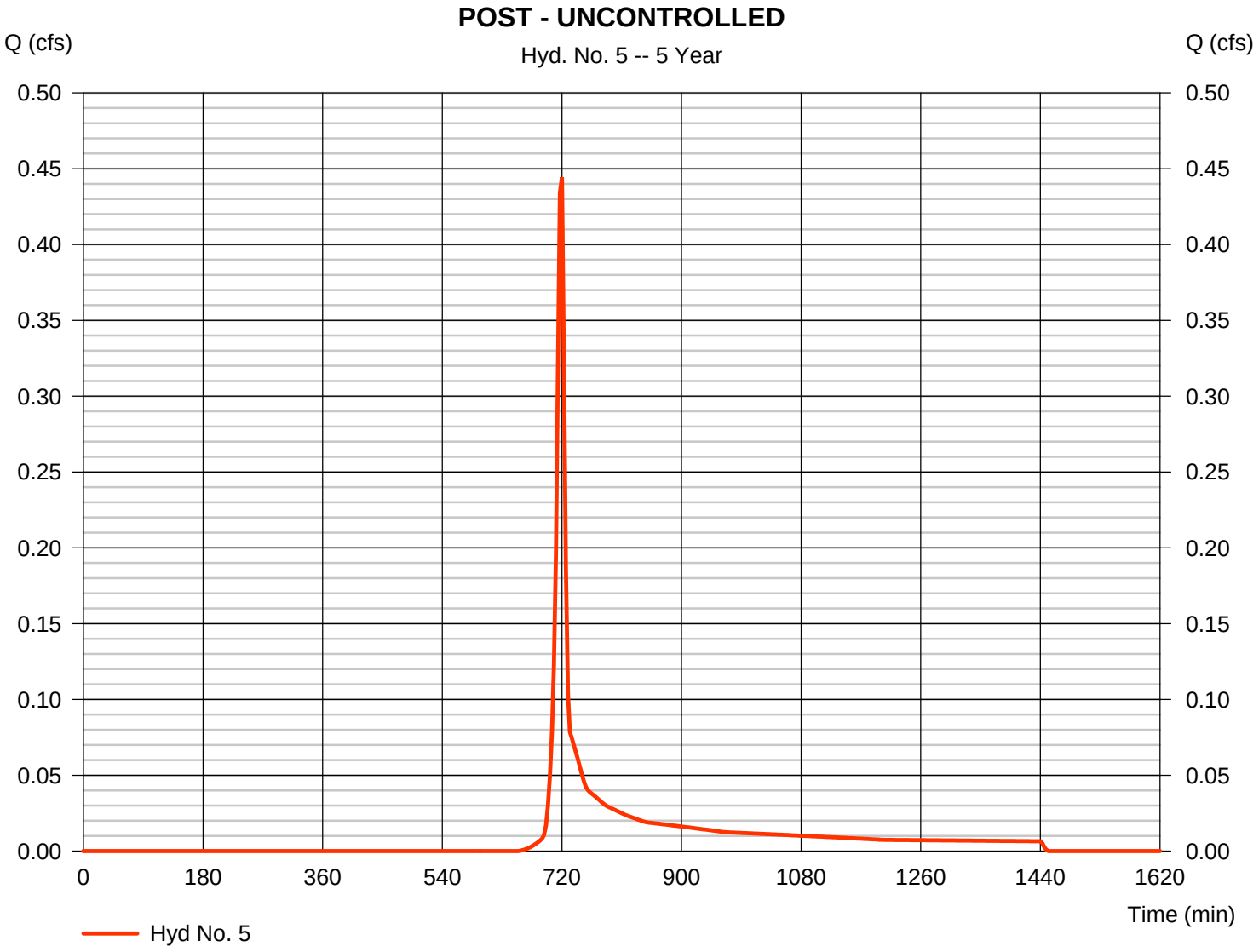


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.444 cfs
Storm frequency	=	5 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	1,026 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	4.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



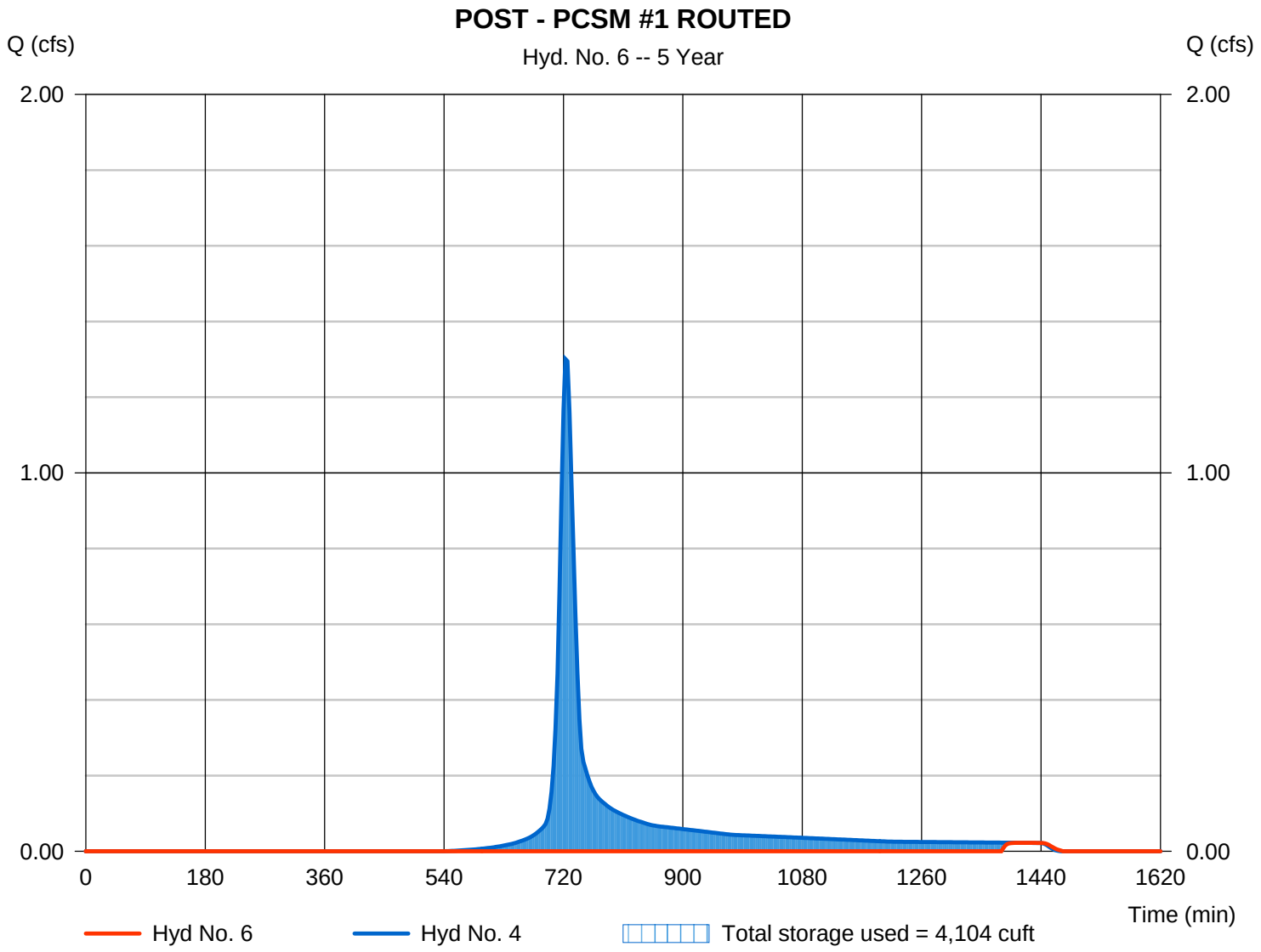
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.022 cfs
Storm frequency	=	5 yrs	Time to peak	=	1407 min
Time interval	=	3 min	Hyd. volume	=	97 cuft
Inflow hyd. No.	=	4 - POST - PCSM #1	Max. Elevation	=	272.01 ft
Reservoir name	=	PCSM #1	Max. Storage	=	4,104 cuft

Storage Indication method used.

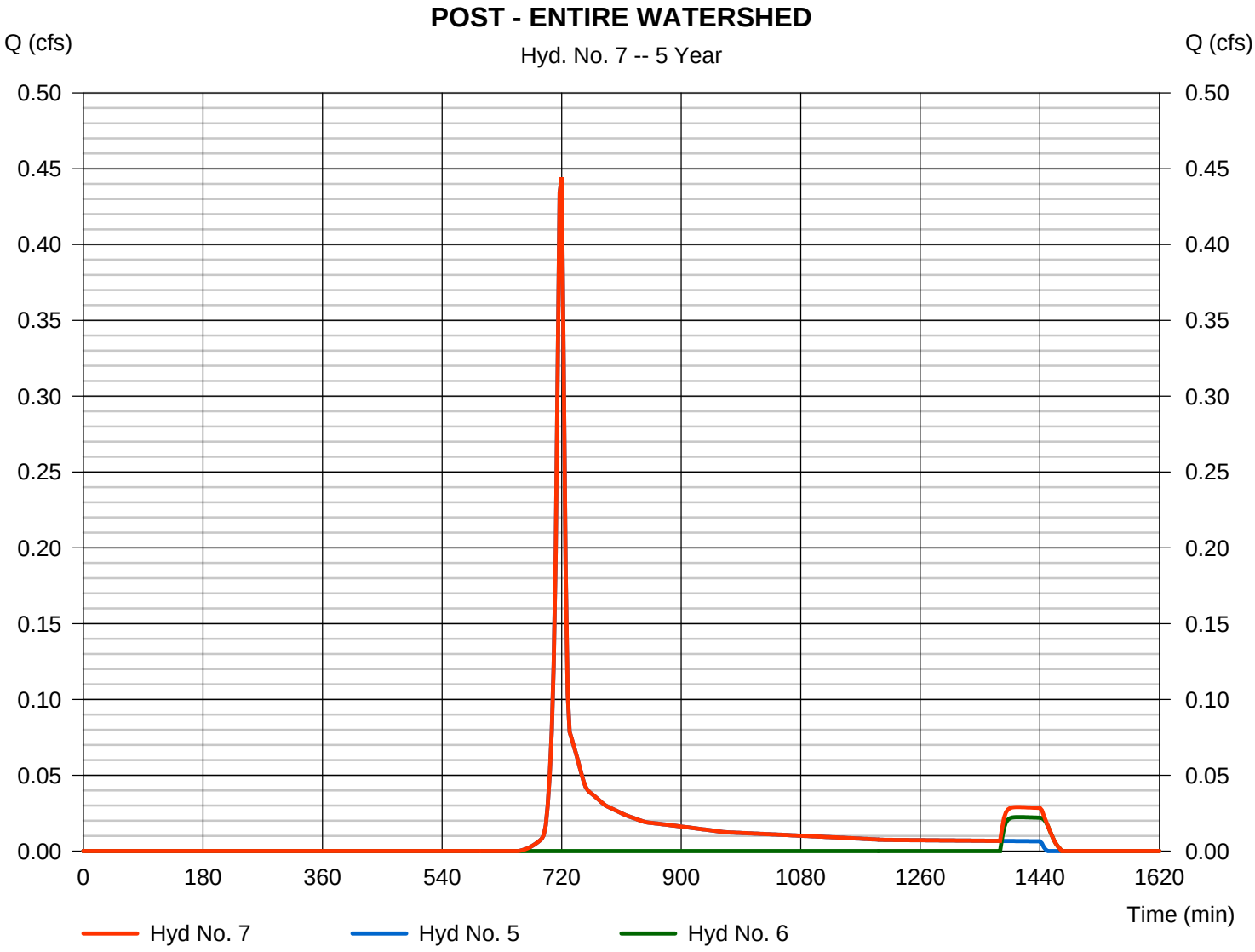


Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.444 cfs
Storm frequency	= 5 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 1,122 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.226 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

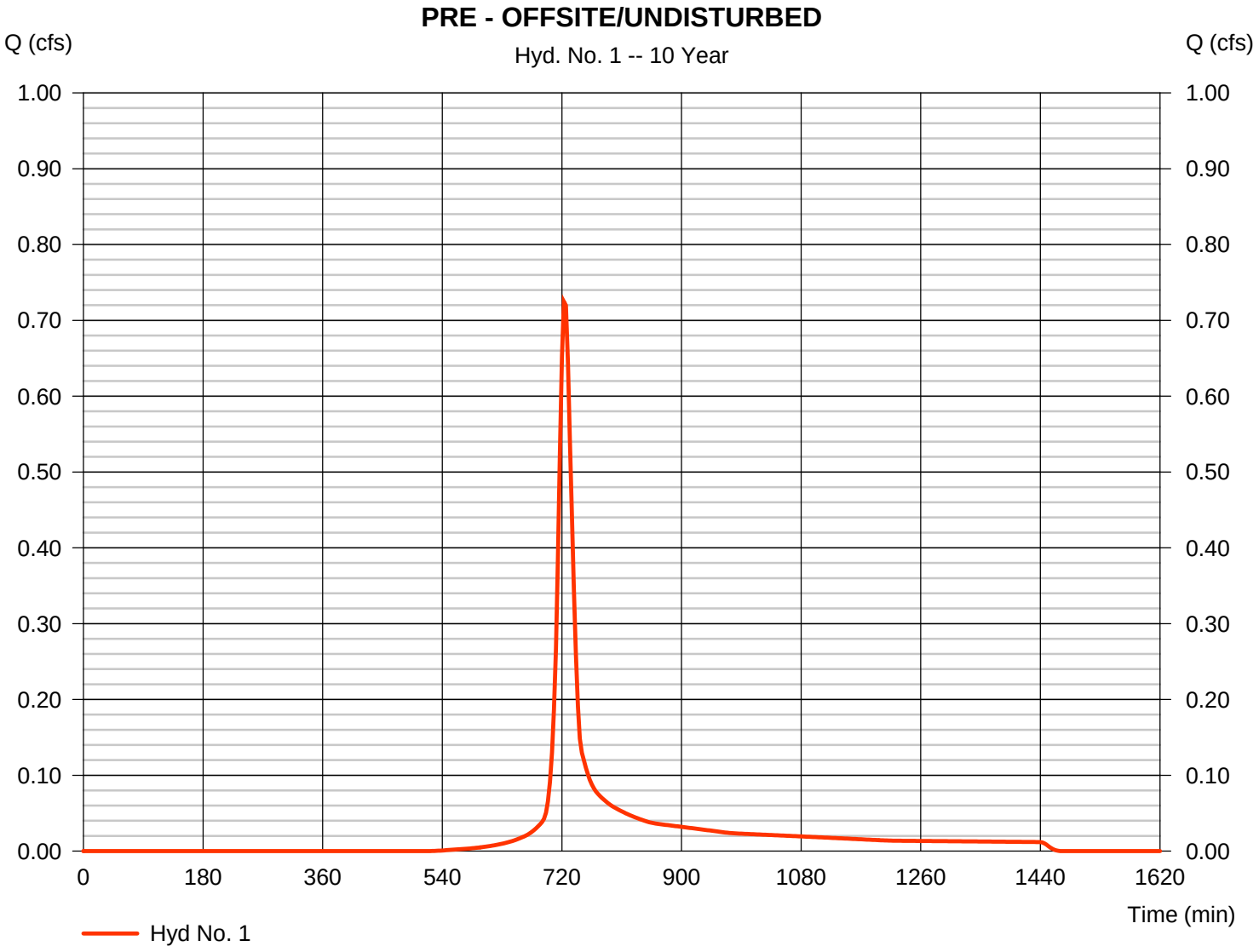
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.725	3	723	2,329	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.698	3	726	2,500	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	1.417	3	726	4,829	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	1.746	3	723	5,587	------	------	------	POST - PCSM #1
5	SCS Runoff	0.630	3	720	1,446	------	------	------	POST - UNCONTROLLED
6	Reservoir	0.078	3	888	1,489	4	272.03	4,120	POST - PCSM #1 ROUTED
7	Combine	0.630	3	720	2,934	5, 6	------	------	POST - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.725 cfs
Storm frequency	=	10 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	2,329 cuft
Drainage area	=	0.254 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	5.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

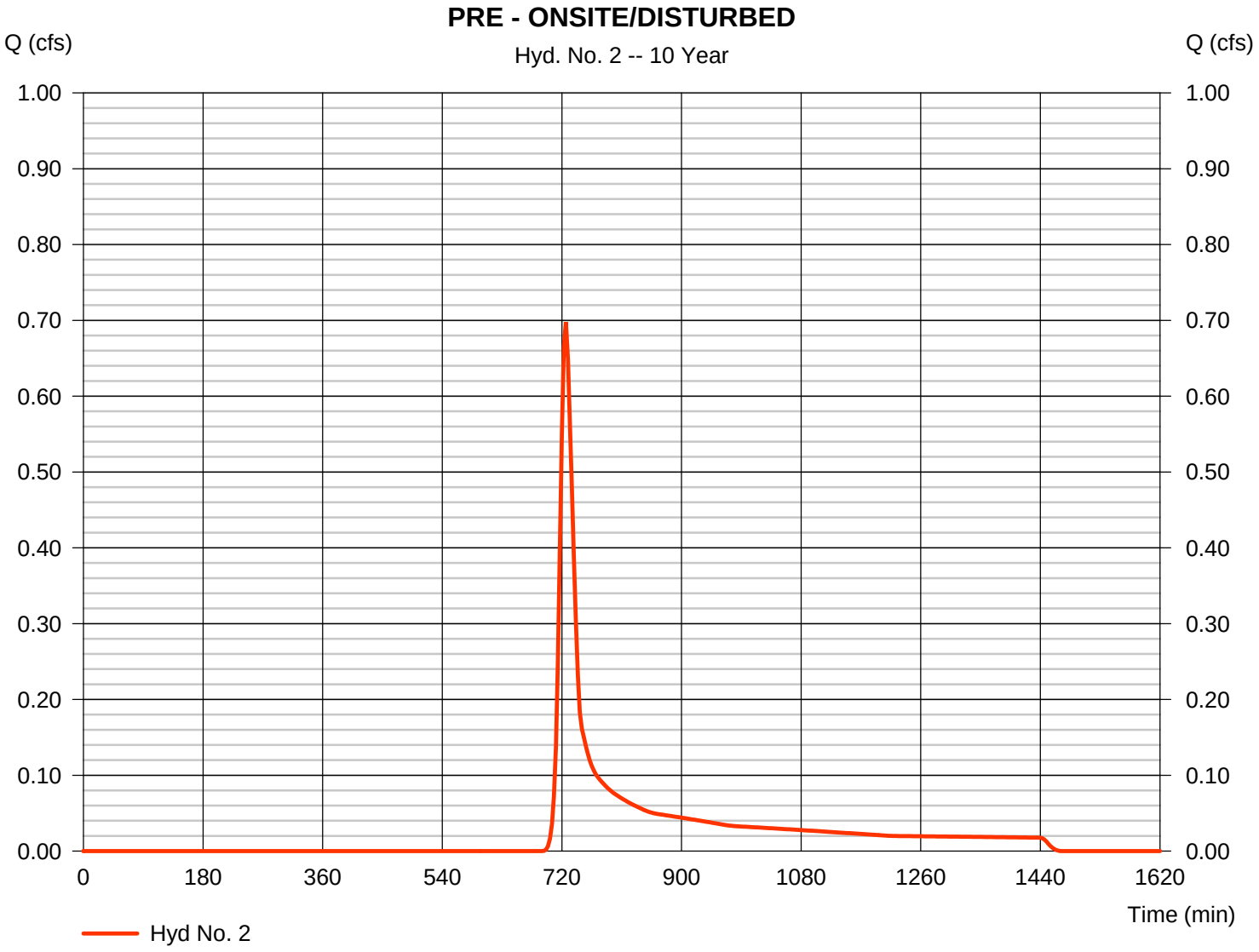


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.698 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 2,500 cuft
Drainage area	= 0.541 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 5.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

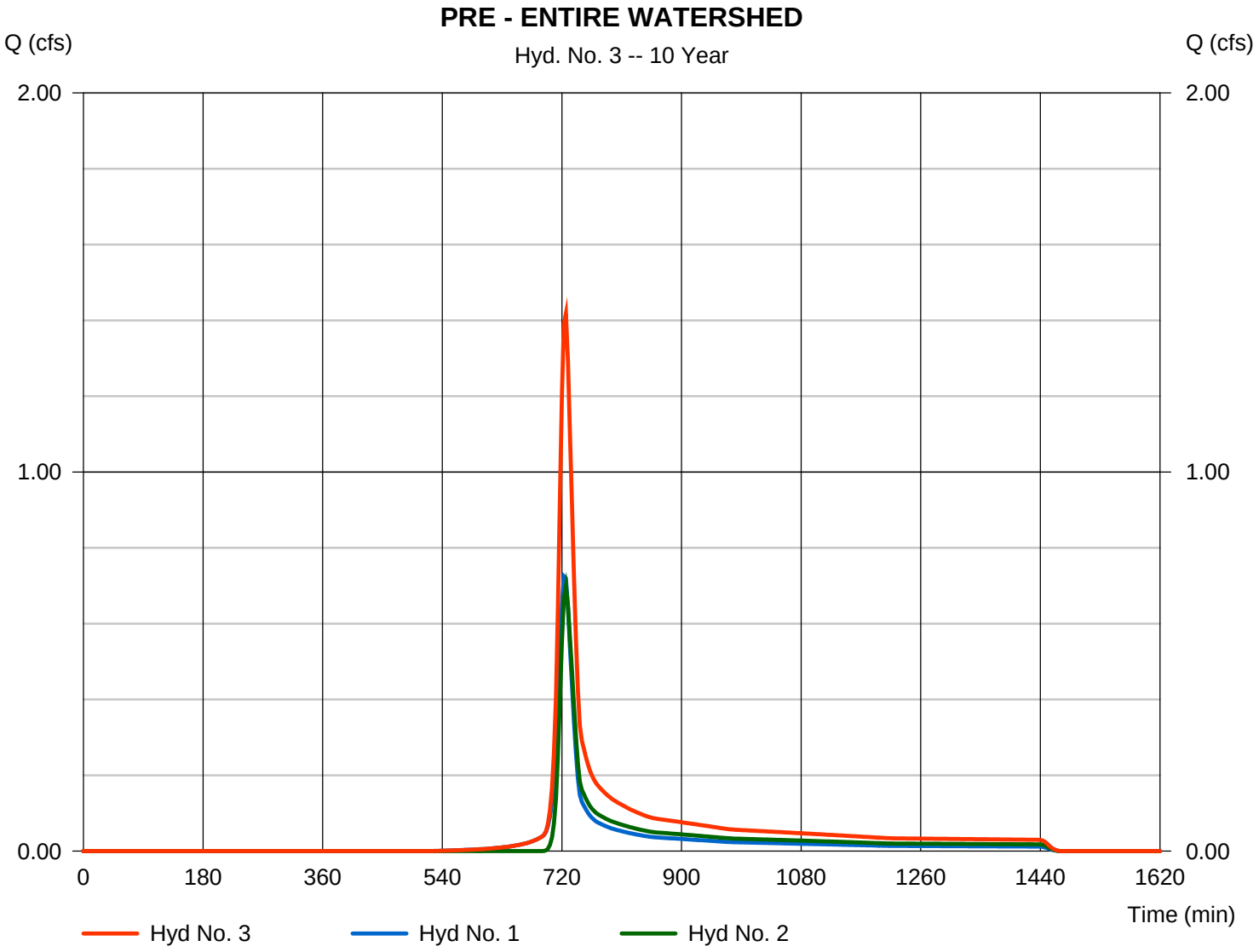


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	1.417 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	4,829 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

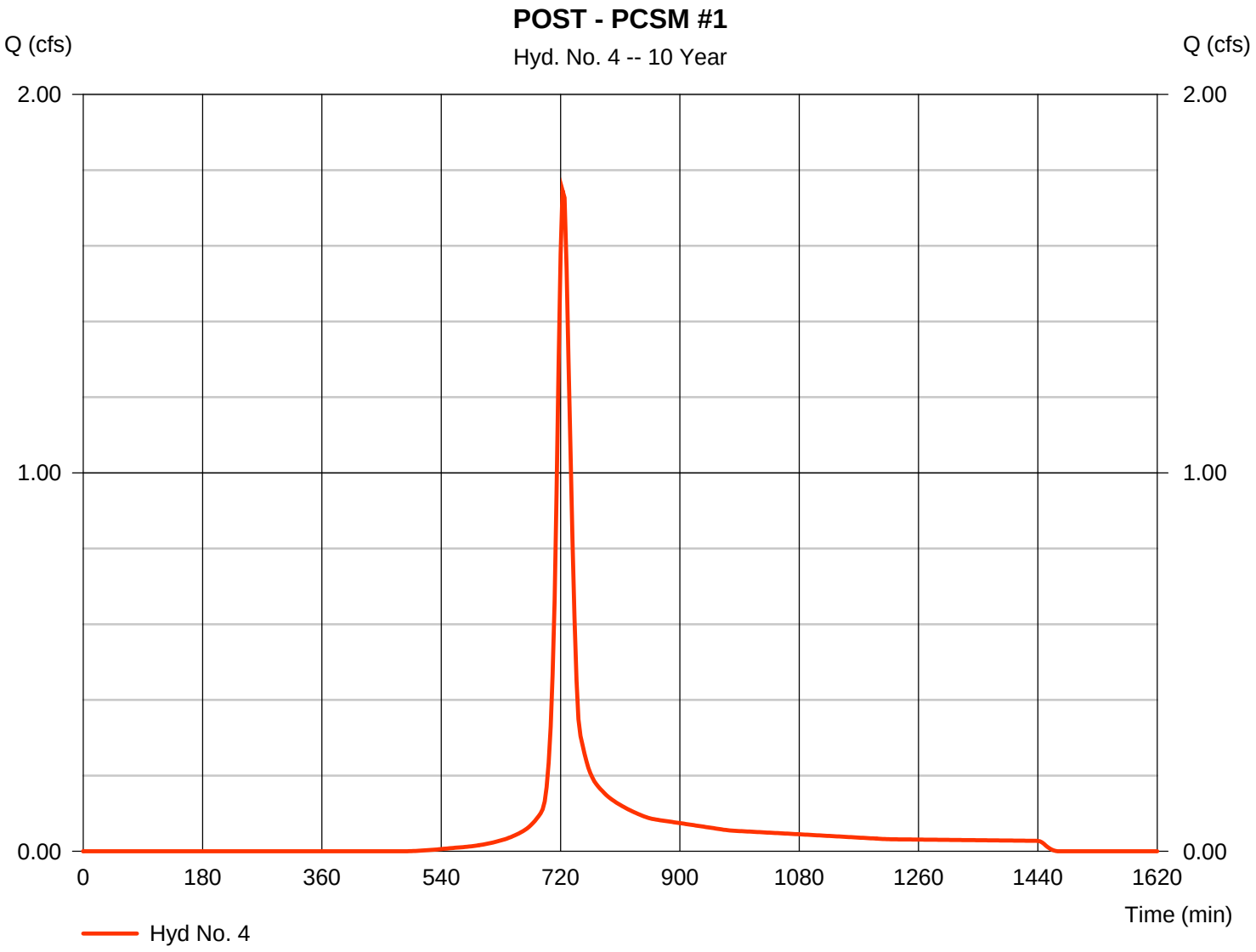


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.746 cfs
Storm frequency	=	10 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	5,587 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	5.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

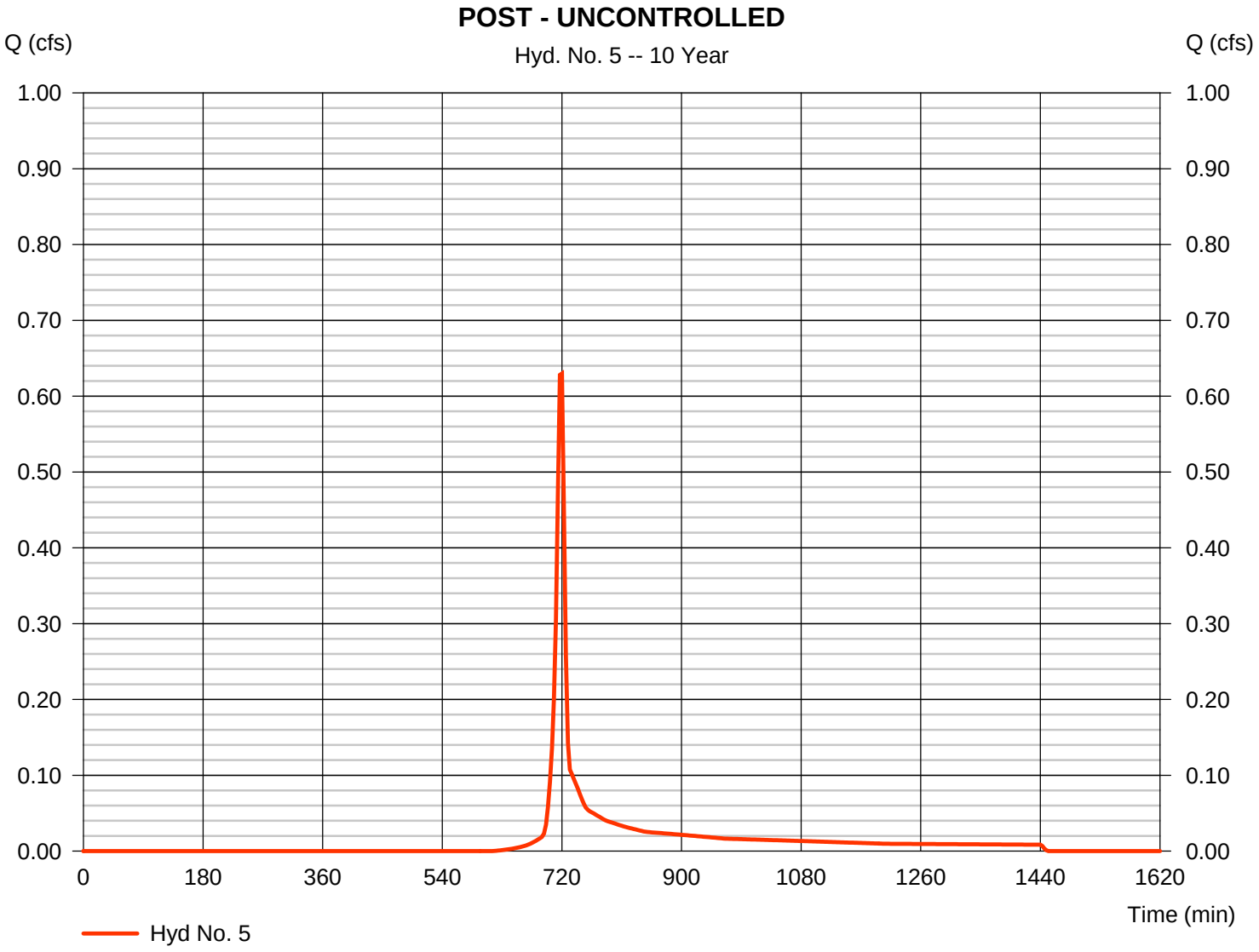


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.630 cfs
Storm frequency	=	10 yrs	Time to peak	=	720 min
Time interval	=	3 min	Hyd. volume	=	1,446 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



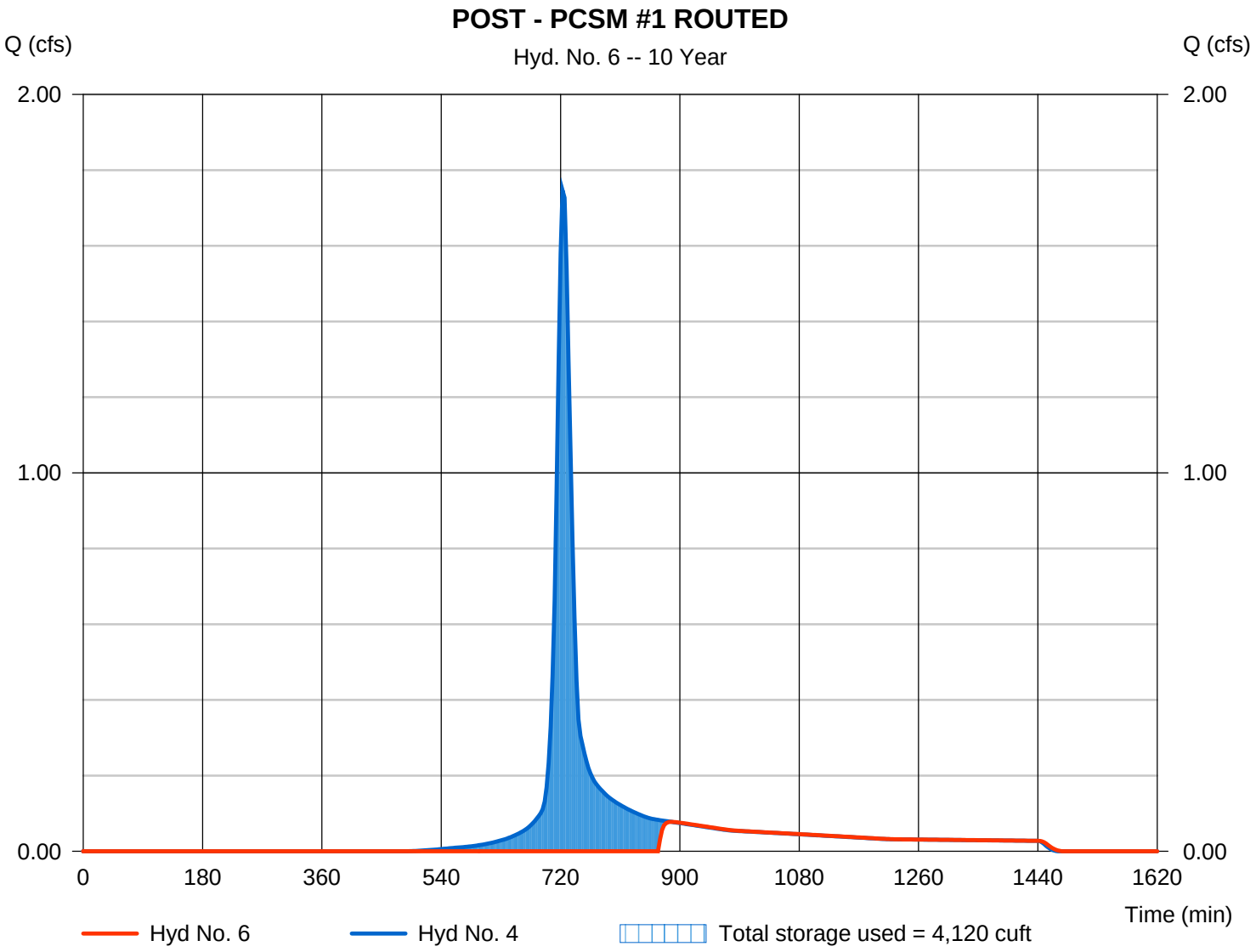
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.078 cfs
Storm frequency	=	10 yrs	Time to peak	=	888 min
Time interval	=	3 min	Hyd. volume	=	1,489 cuft
Inflow hyd. No.	=	4 - POST - PCSM #1	Max. Elevation	=	272.03 ft
Reservoir name	=	PCSM #1	Max. Storage	=	4,120 cuft

Storage Indication method used.

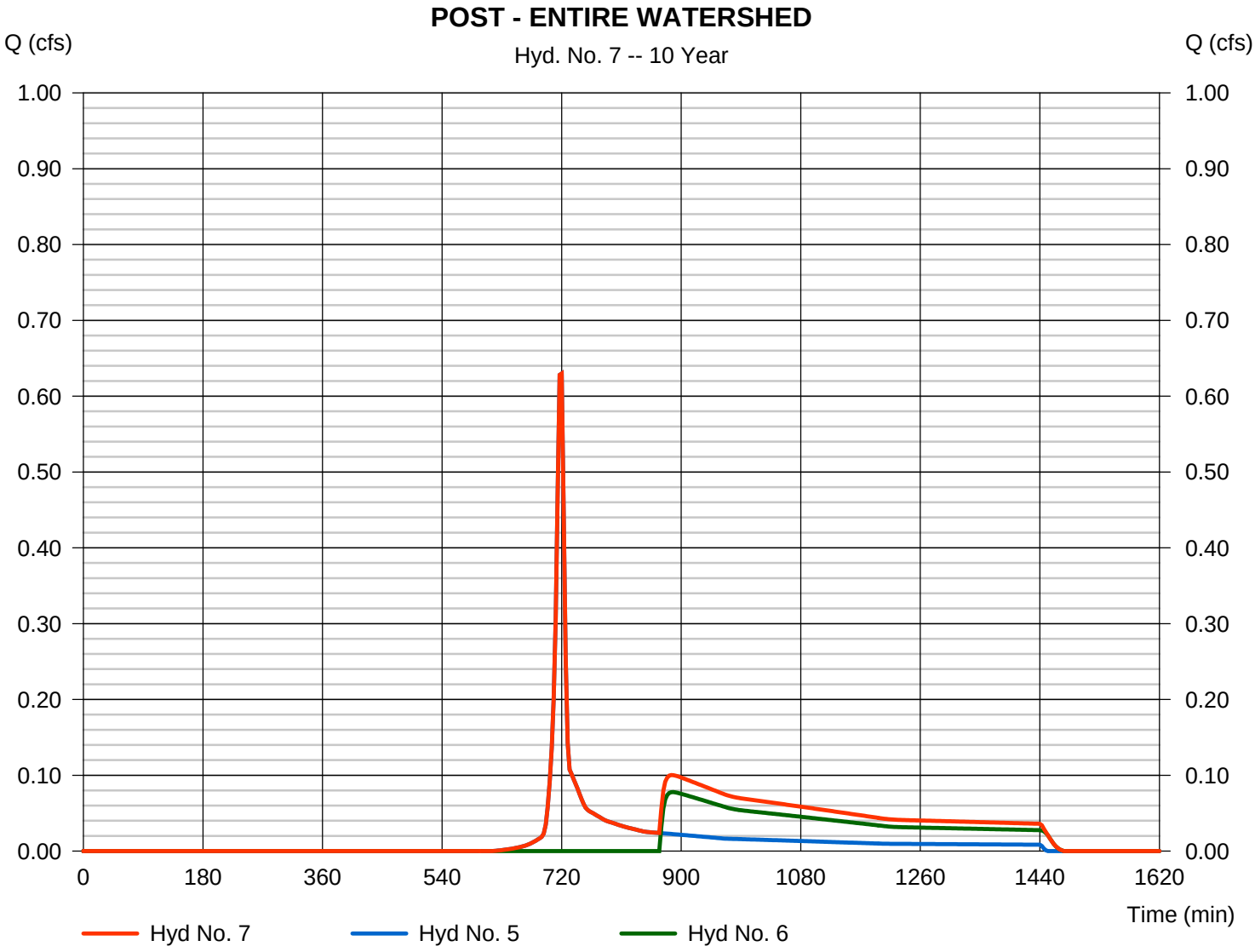


Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.630 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 3 min	Hyd. volume	= 2,934 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.226 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

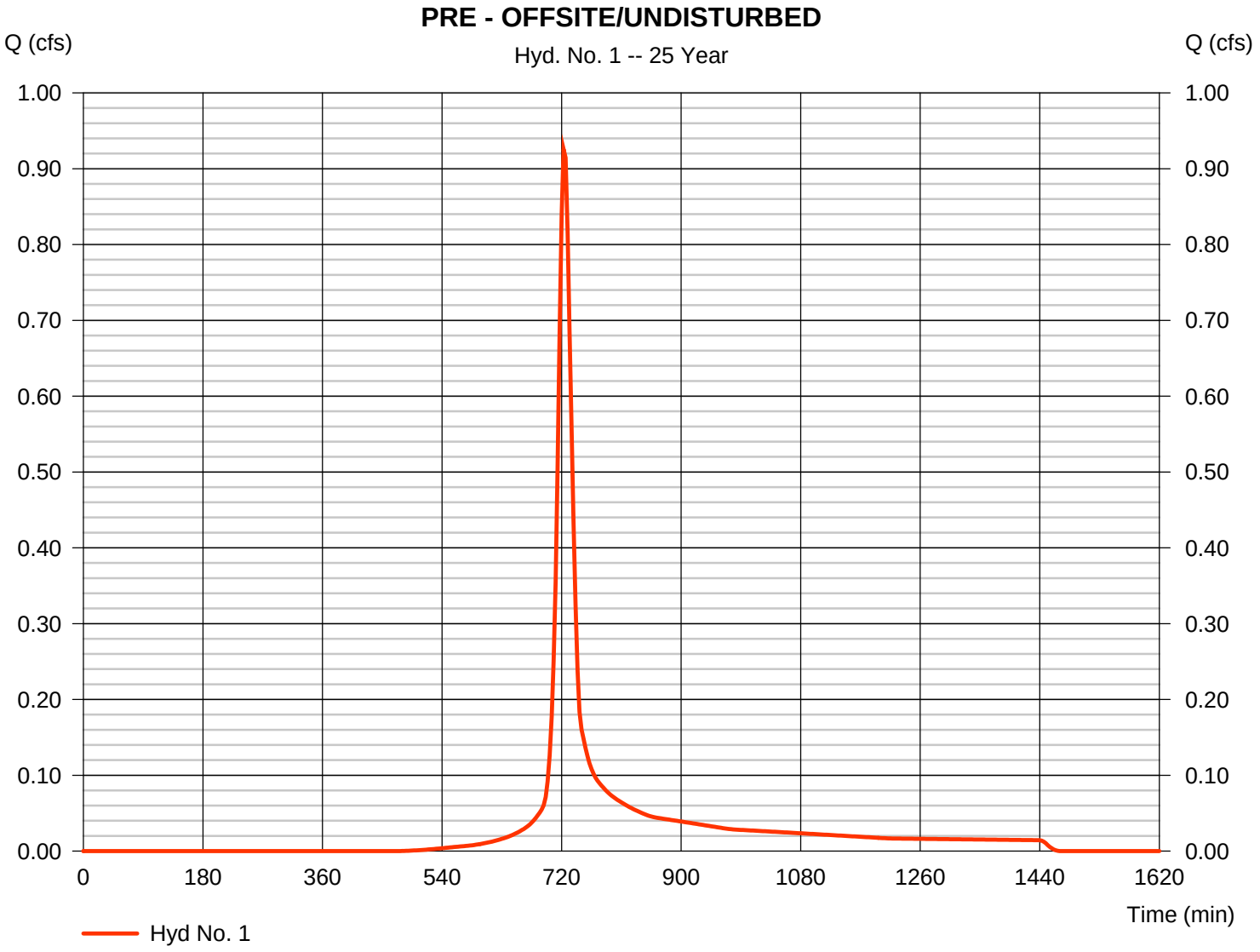
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.926	3	723	2,959	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	1.014	3	726	3,468	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	1.928	3	726	6,427	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	2.206	3	723	7,040	------	------	------	POST - PCSM #1
5	SCS Runoff	0.835	3	717	1,898	------	------	------	POST - UNCONTROLLED
6	Reservoir	0.279	3	762	2,941	4	272.08	4,159	POST - PCSM #1 ROUTED
7	Combine	0.835	3	717	4,840	5, 6	------	------	POST - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.926 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 3 min	Hyd. volume	= 2,959 cuft
Drainage area	= 0.254 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

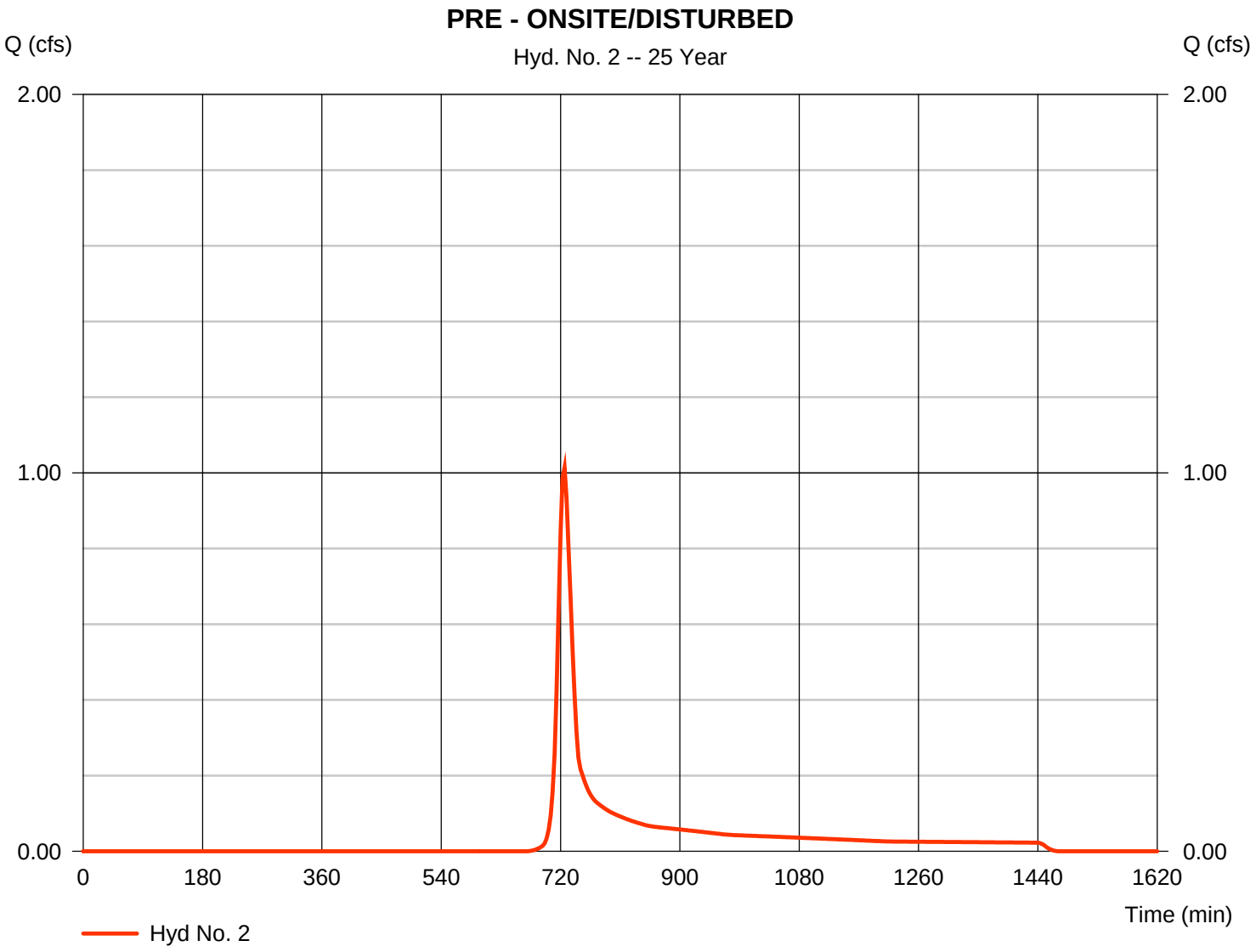


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.014 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	3,468 cuft
Drainage area	=	0.541 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	5.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

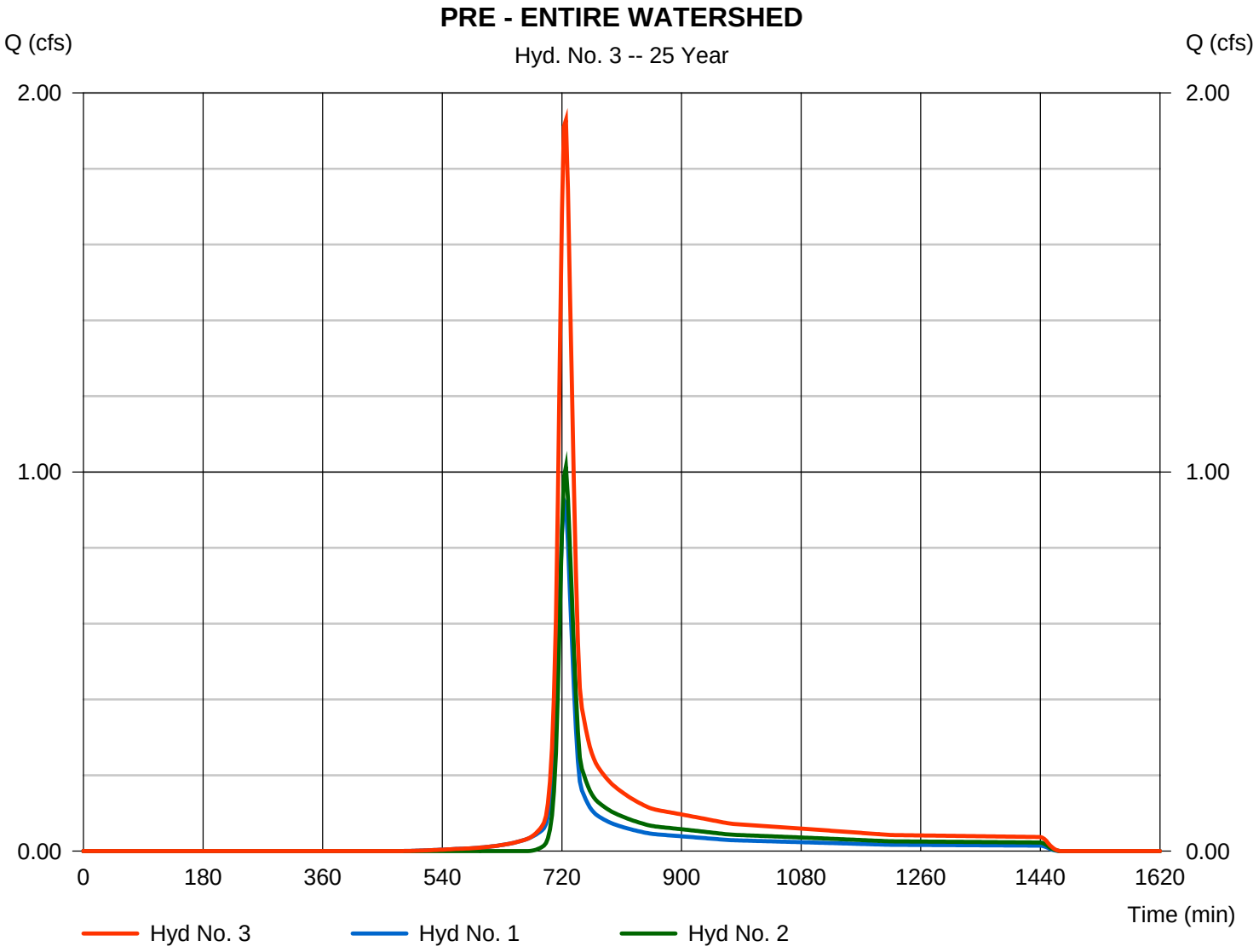


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	1.928 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	6,427 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

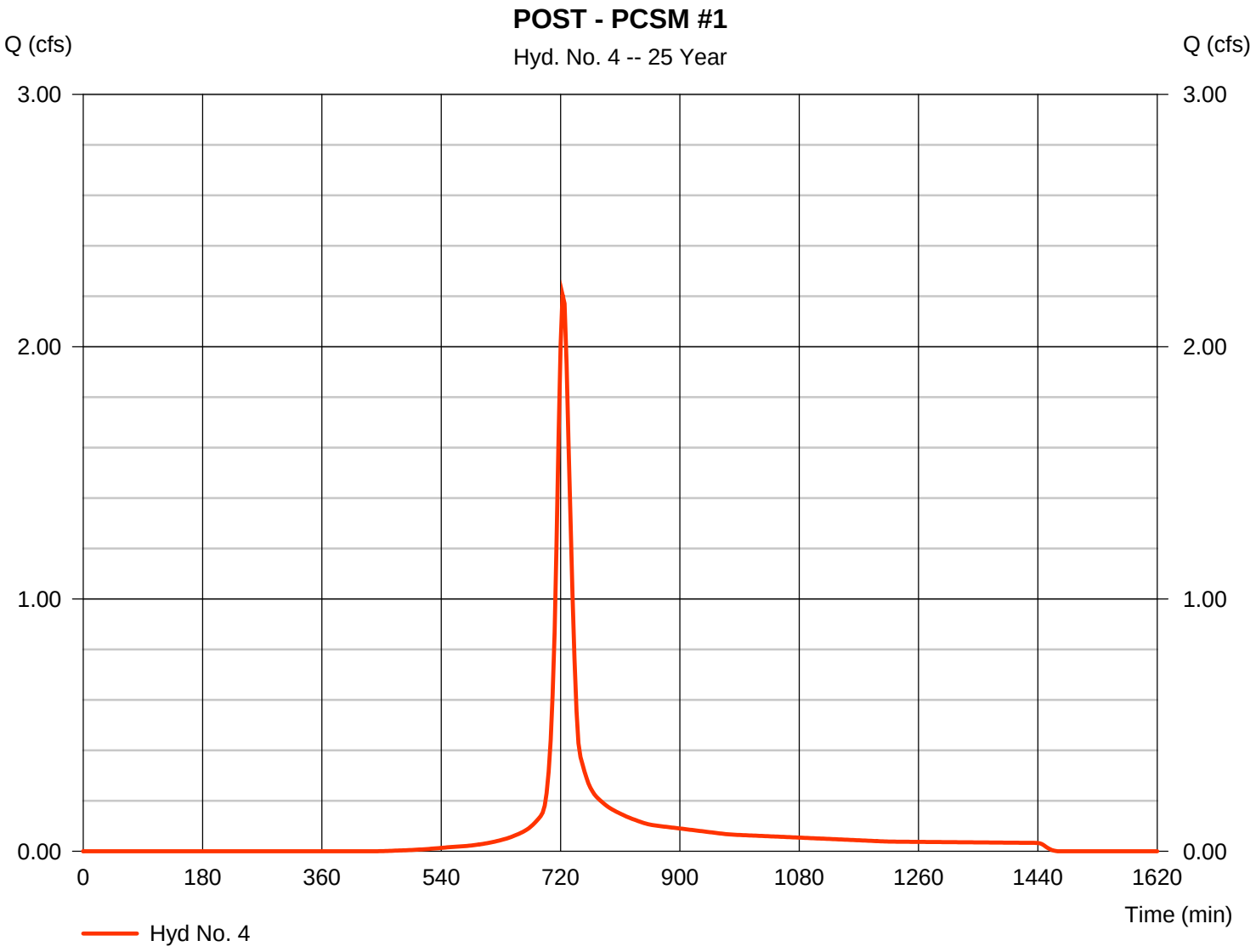


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.206 cfs
Storm frequency	=	25 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	7,040 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	5.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

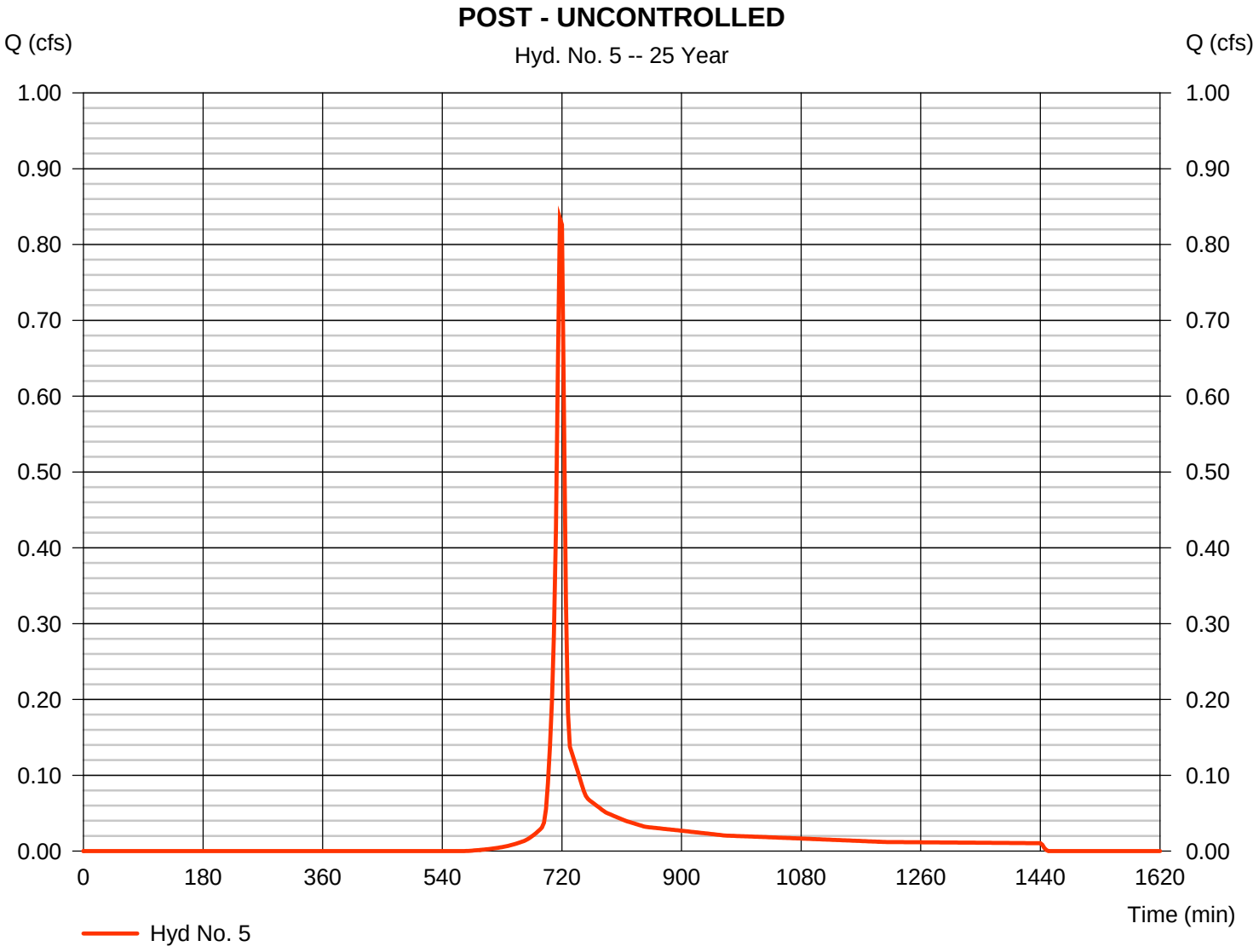


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.835 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	1,898 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



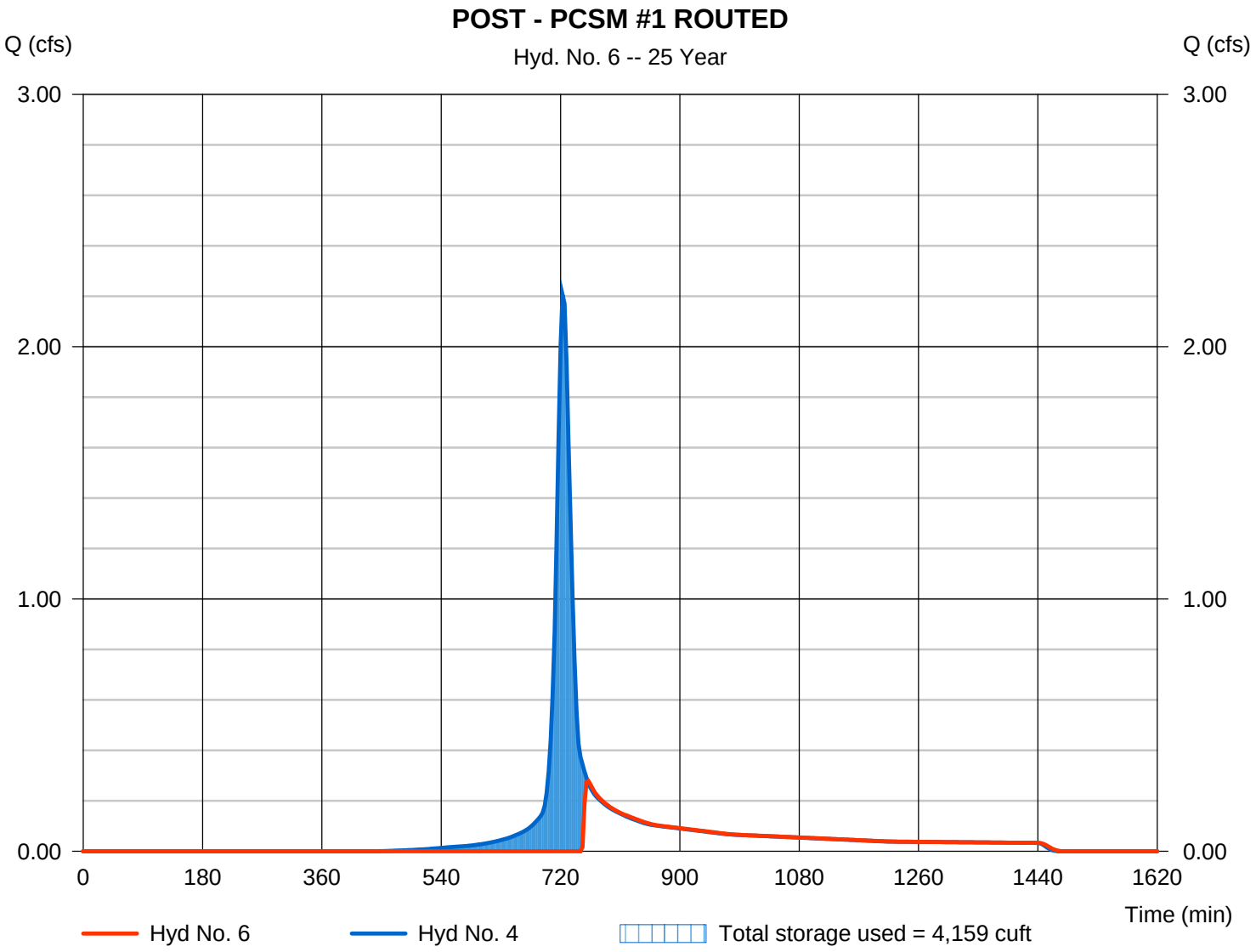
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.279 cfs
Storm frequency	=	25 yrs	Time to peak	=	762 min
Time interval	=	3 min	Hyd. volume	=	2,941 cuft
Inflow hyd. No.	=	4 - POST - PCSM #1	Max. Elevation	=	272.08 ft
Reservoir name	=	PCSM #1	Max. Storage	=	4,159 cuft

Storage Indication method used.

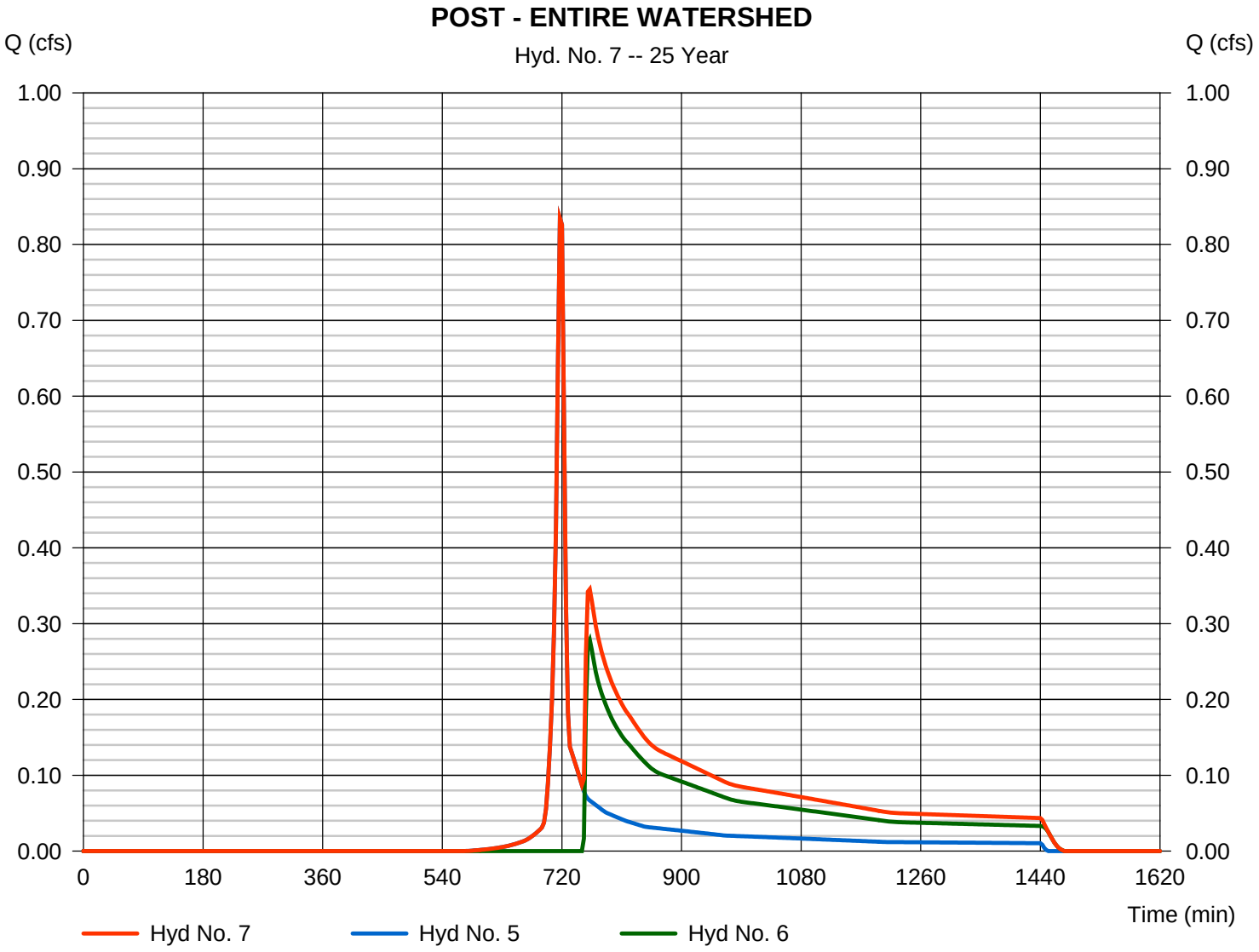


Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.835 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	4,840 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.226 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	1.106	3	723	3,530	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	1.311	3	726	4,385	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	2.399	3	726	7,915	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	2.615	3	723	8,348	------	------	------	POST - PCSM #1
5	SCS Runoff	1.023	3	717	2,315	------	------	------	POST - UNCONTROLLED
6	Reservoir	1.140	3	738	4,250	4	272.20	4,257	POST - PCSM #1 ROUTED
7	Combine	1.285	3	738	6,565	5, 6	------	------	POST - ENTIRE WATERSHED

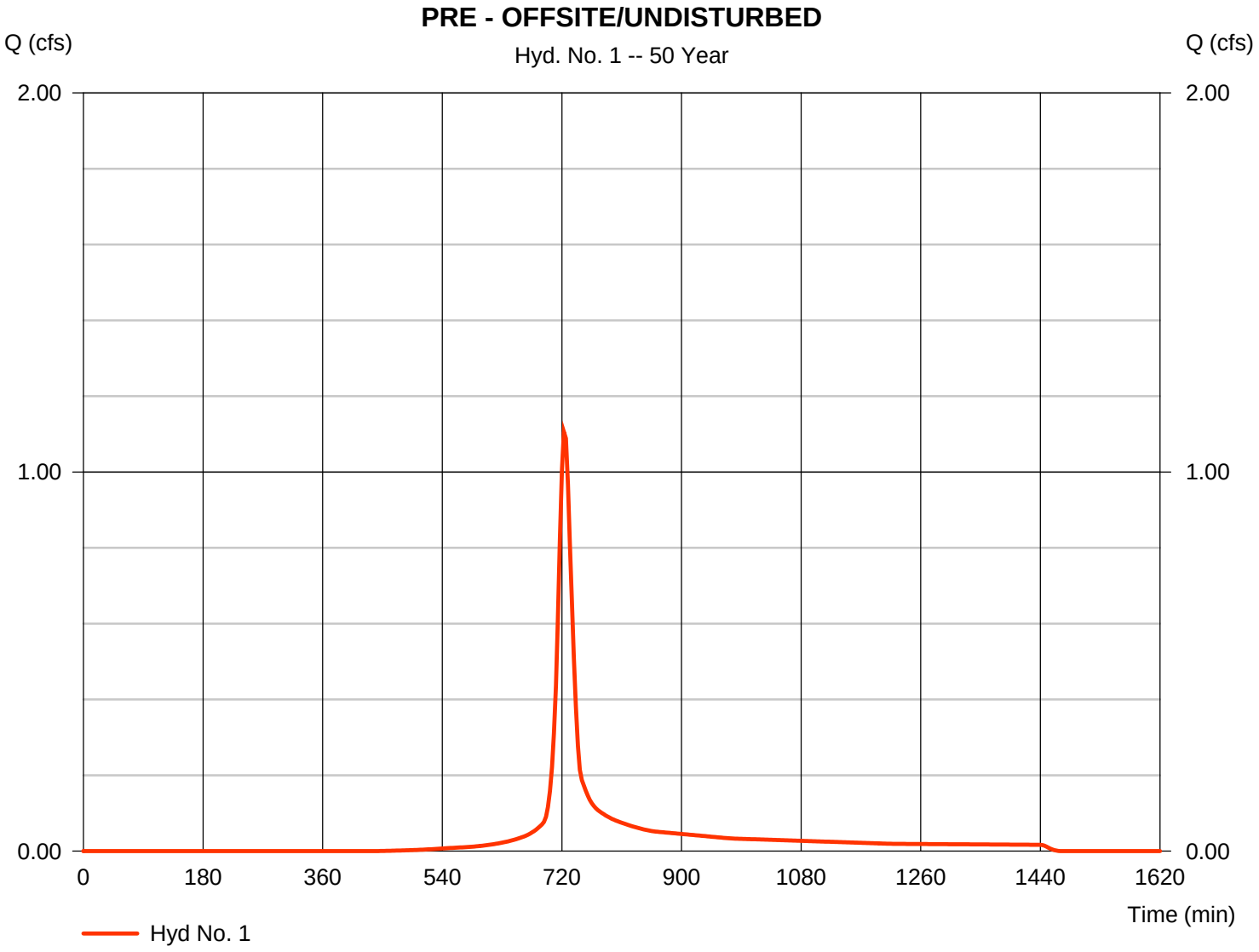
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Thursday, 08 / 22 / 2019

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.106 cfs
Storm frequency	=	50 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	3,530 cuft
Drainage area	=	0.254 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

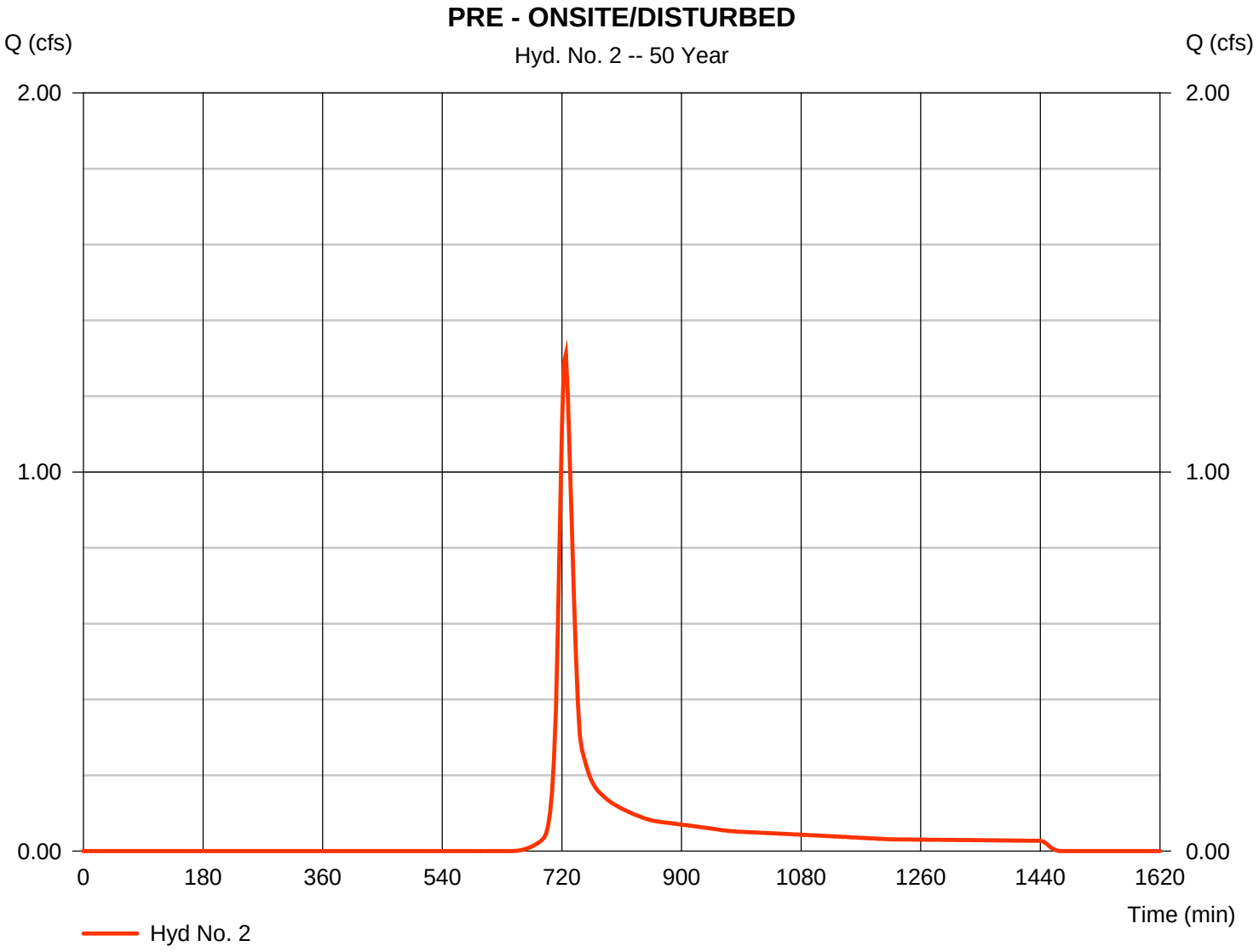


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.311 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	4,385 cuft
Drainage area	=	0.541 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

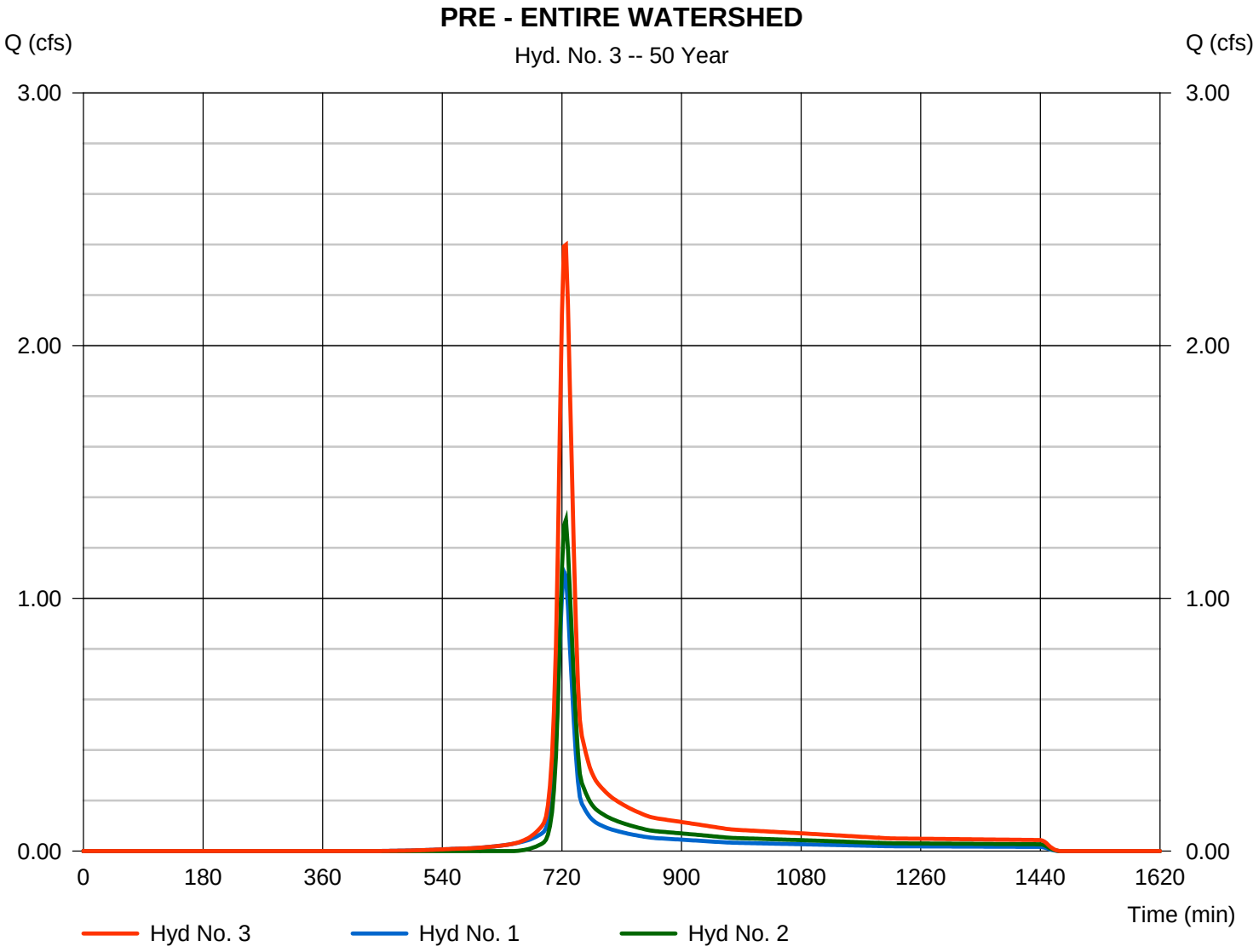


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	2.399 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	7,915 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

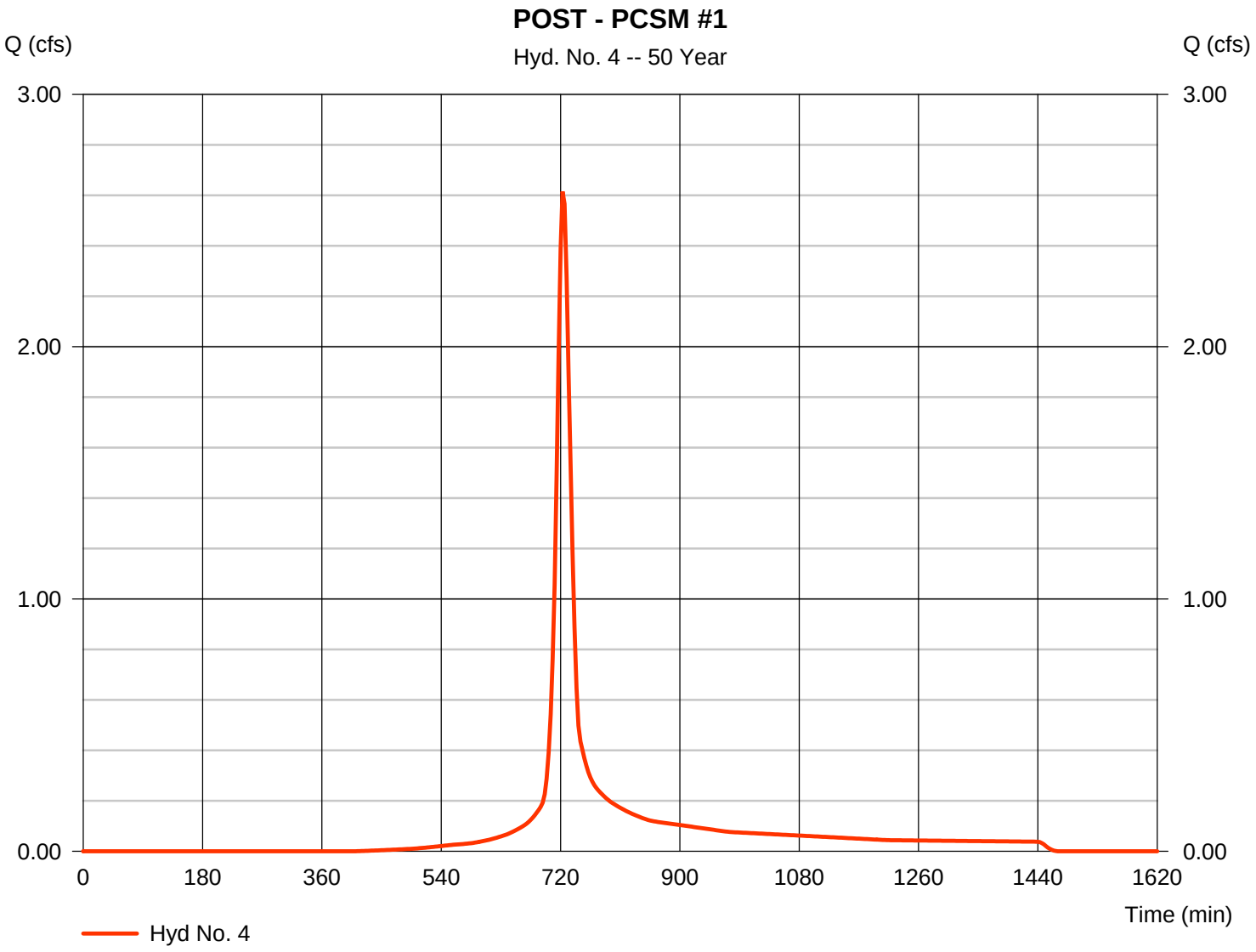


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.615 cfs
Storm frequency	=	50 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	8,348 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

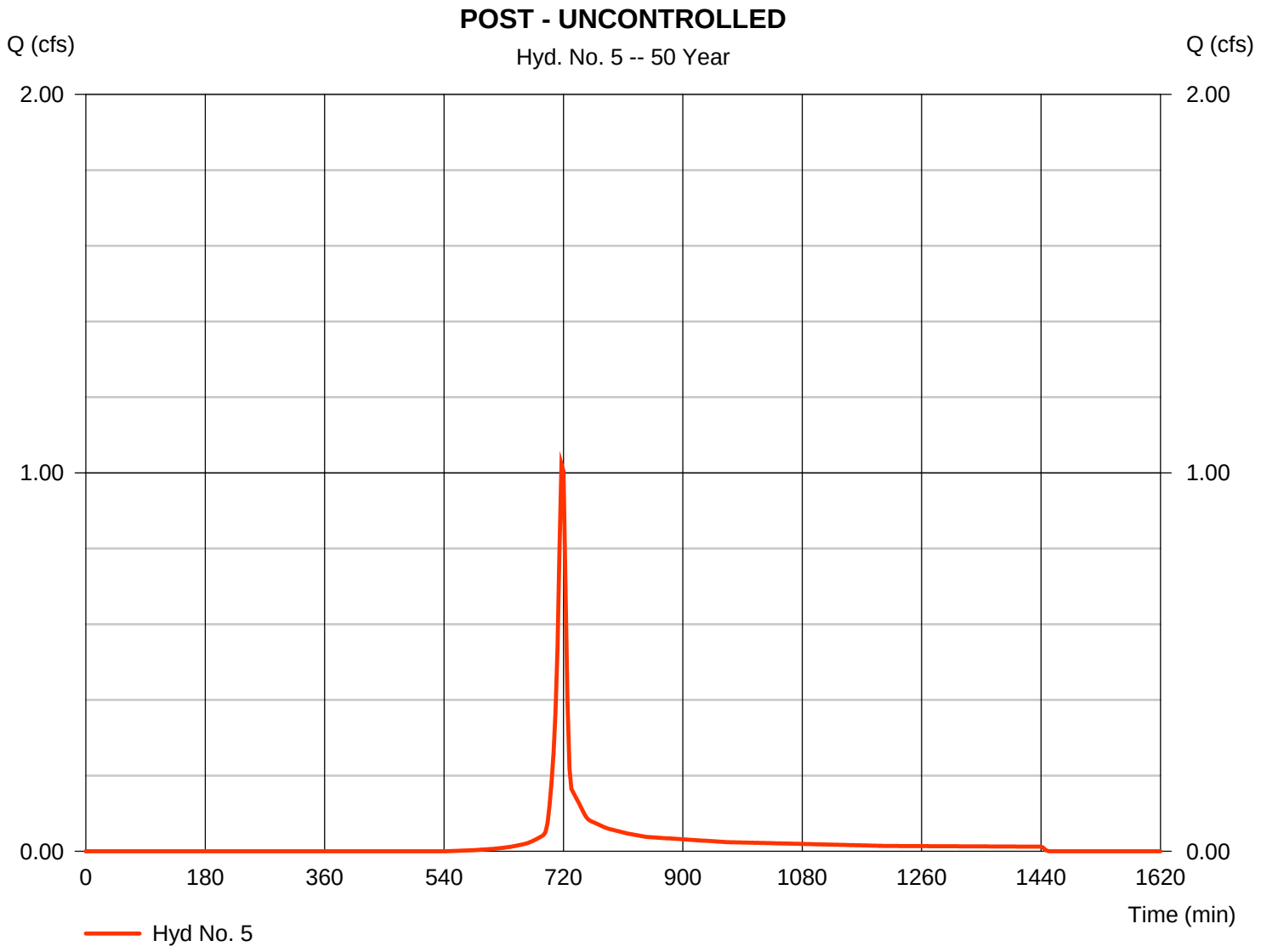


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.023 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	2,315 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



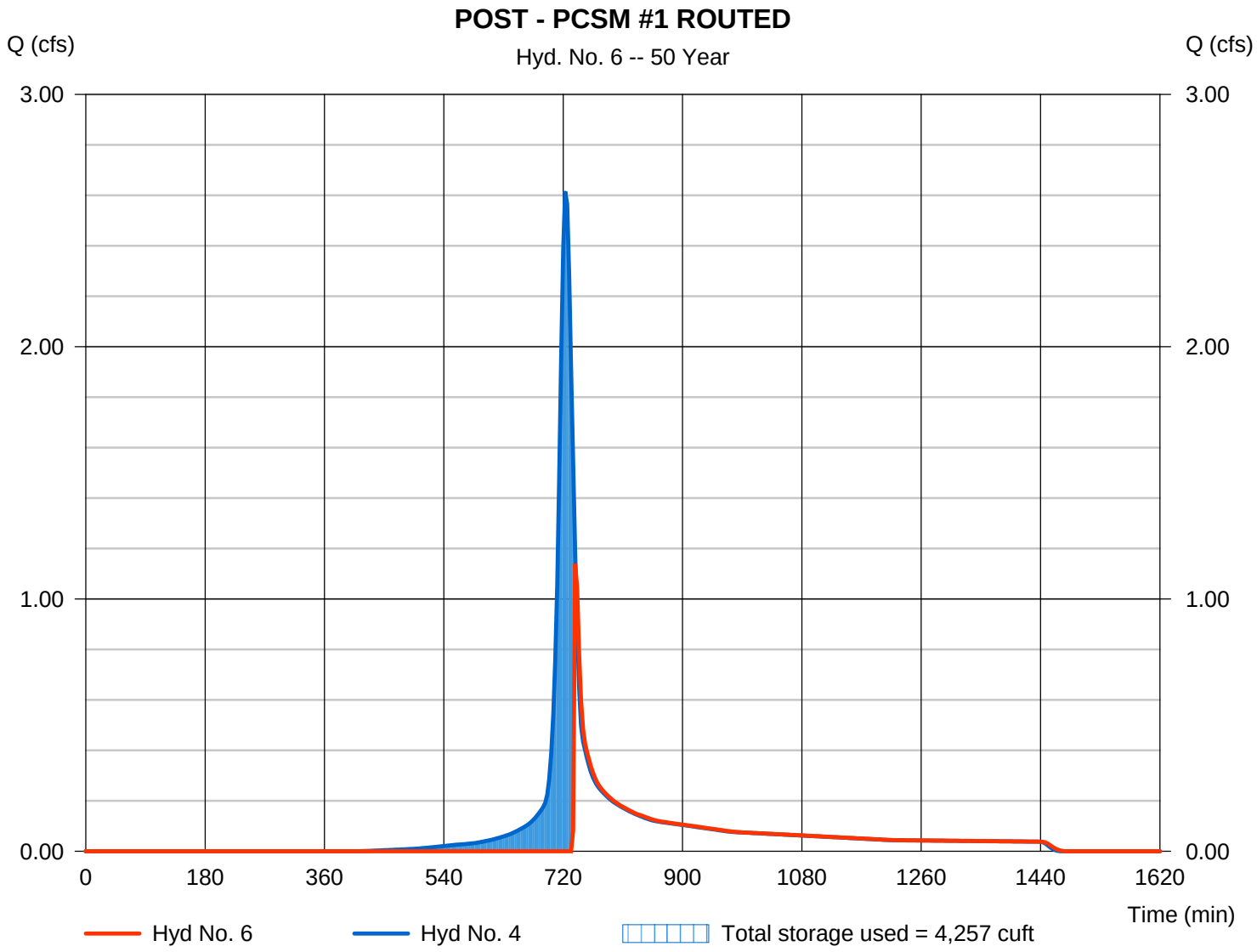
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	1.140 cfs
Storm frequency	=	50 yrs	Time to peak	=	738 min
Time interval	=	3 min	Hyd. volume	=	4,250 cuft
Inflow hyd. No.	=	4 - POST - PCSM #1	Max. Elevation	=	272.20 ft
Reservoir name	=	PCSM #1	Max. Storage	=	4,257 cuft

Storage Indication method used.

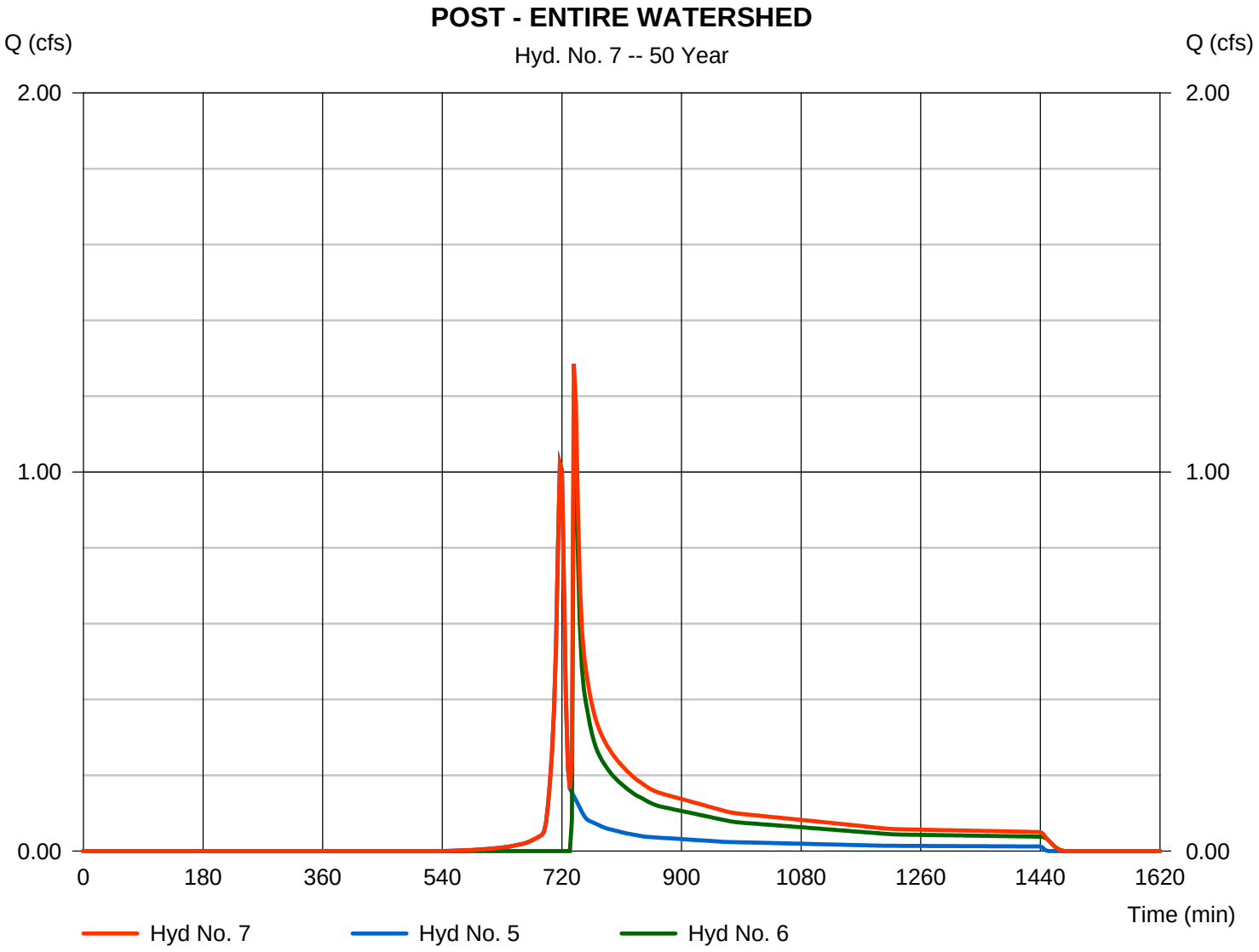


Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	1.285 cfs
Storm frequency	=	50 yrs	Time to peak	=	738 min
Time interval	=	3 min	Hyd. volume	=	6,565 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.226 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

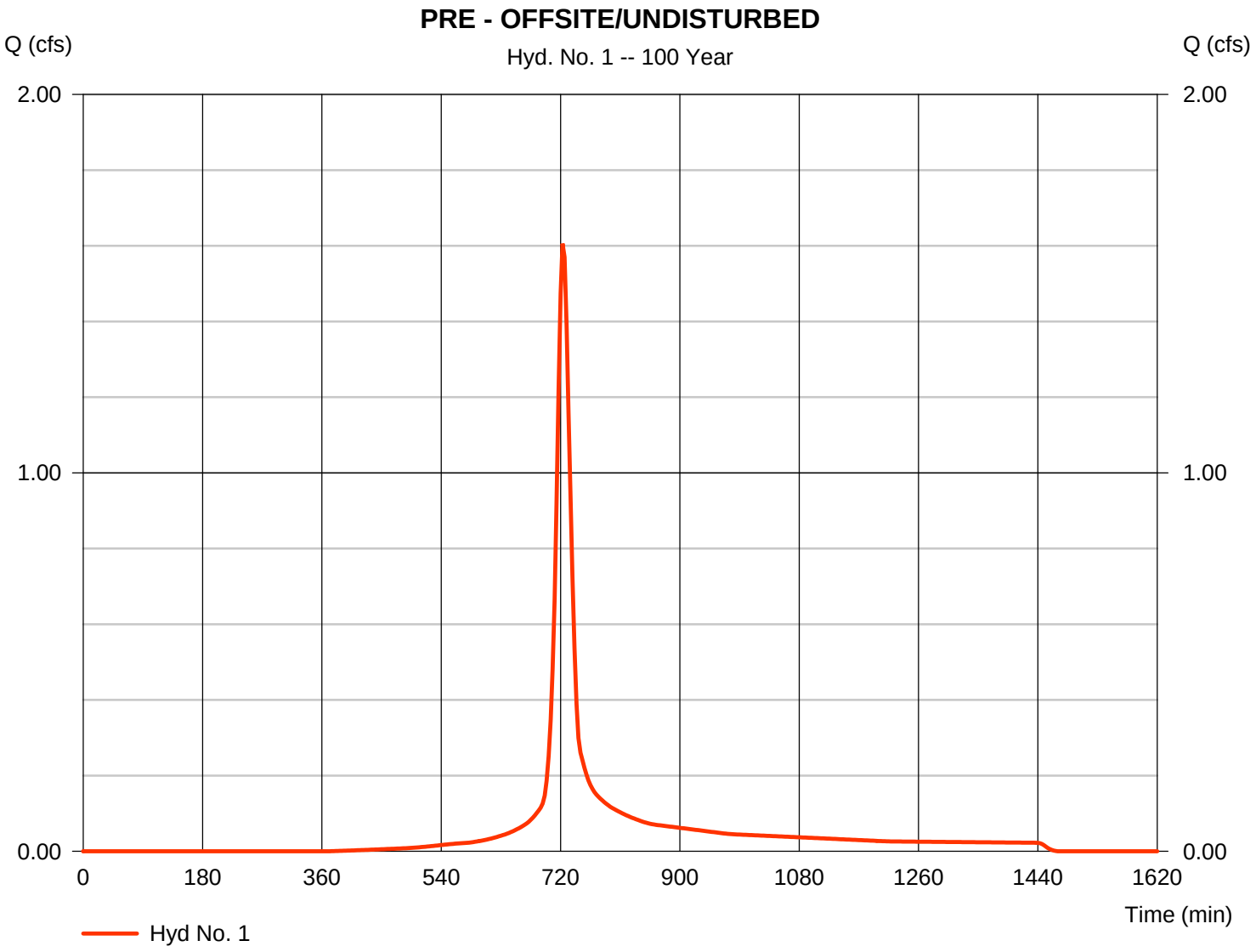
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.606	3	723	5,138	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	2.187	3	726	7,130	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	3.788	3	723	12,268	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	3.745	3	723	12,019	------	------	------	POST - PCSM #1
5	SCS Runoff	1.557	3	717	3,517	------	------	------	POST - UNCONTROLLED
6	Reservoir	3.312	3	729	7,920	4	272.54	4,442	POST - PCSM #1 ROUTED
7	Combine	3.636	3	726	11,438	5, 6	------	------	POST - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.606 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	5,138 cuft
Drainage area	=	0.254 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

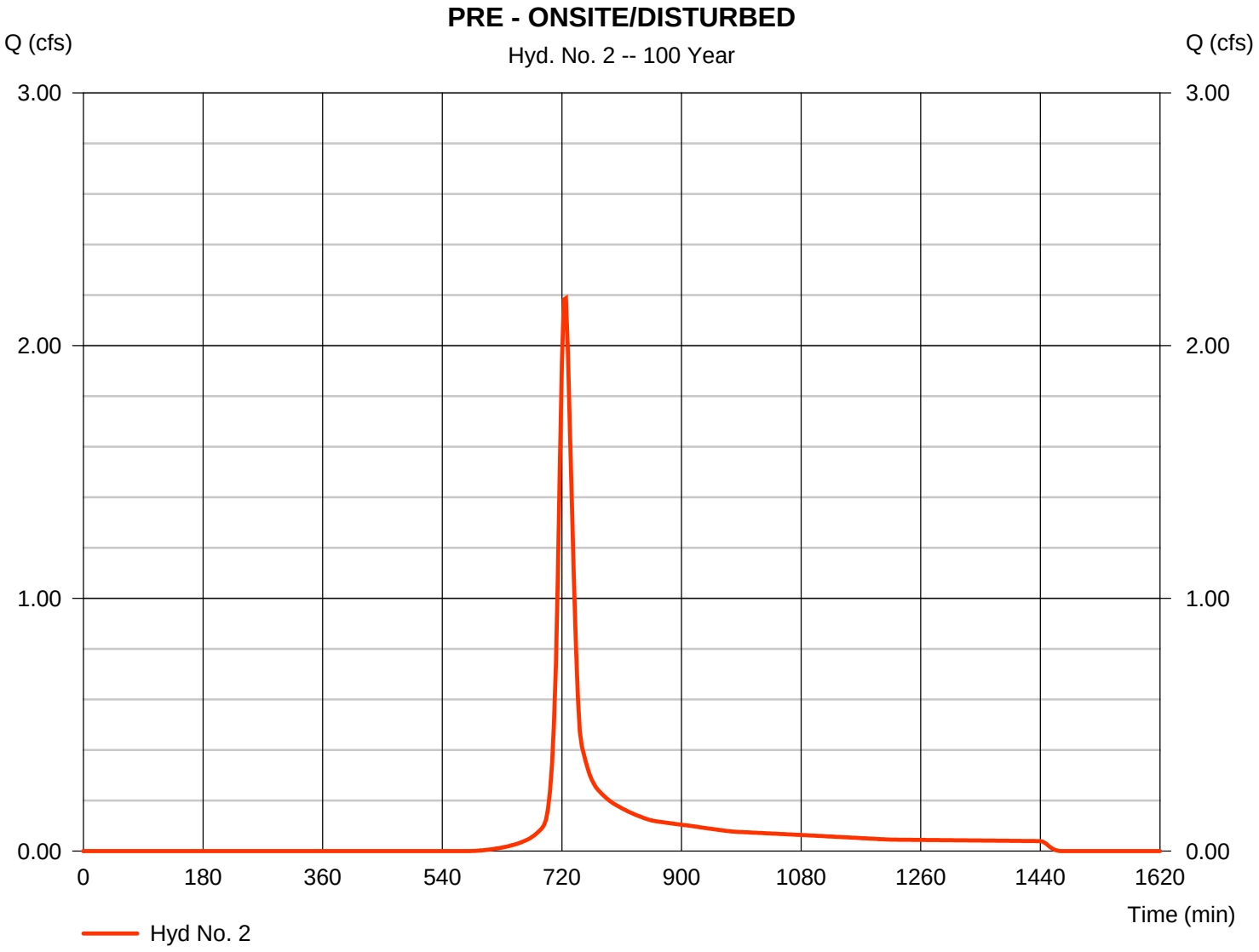


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.187 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	7,130 cuft
Drainage area	=	0.541 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

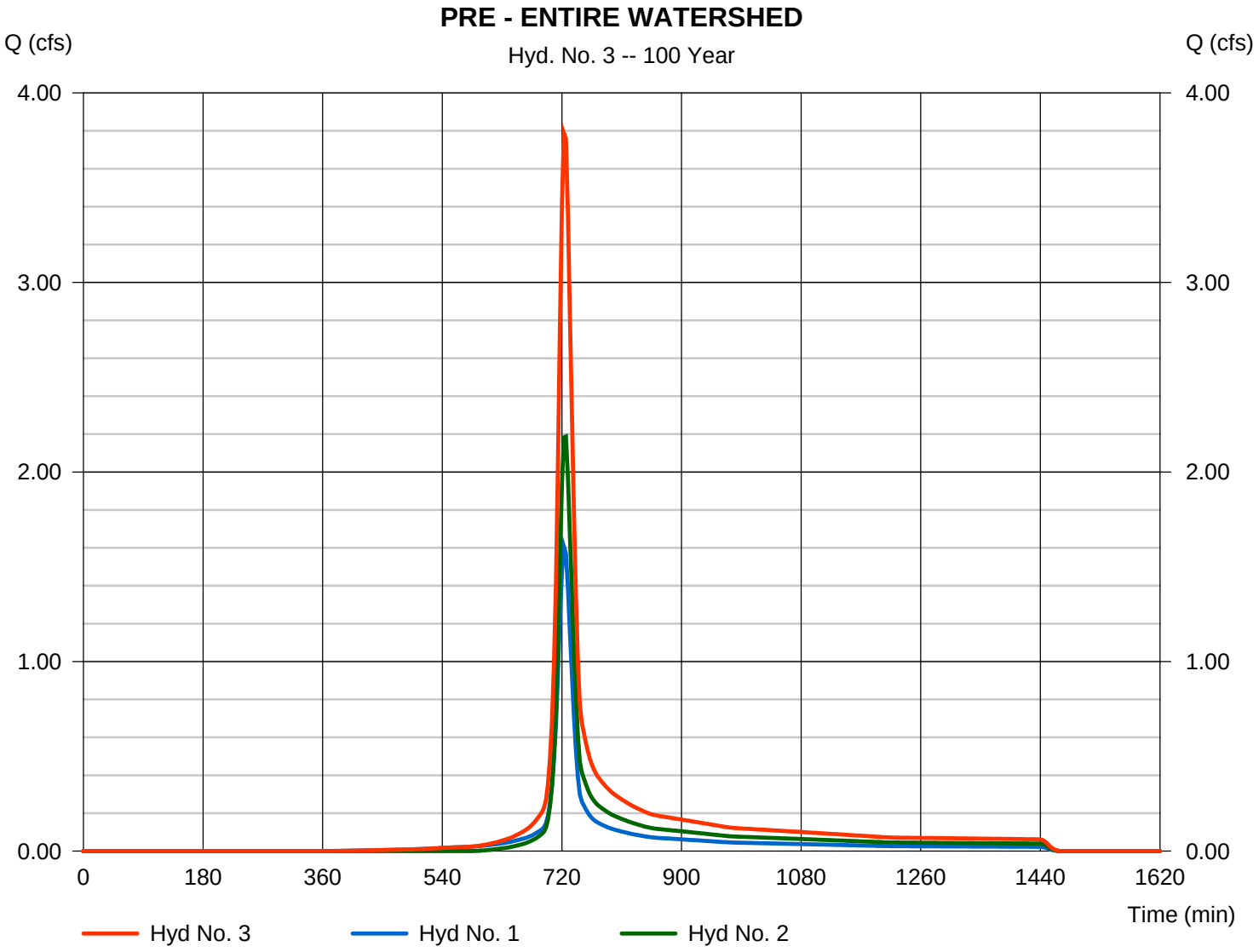


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	3.788 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	12,268 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.795 ac

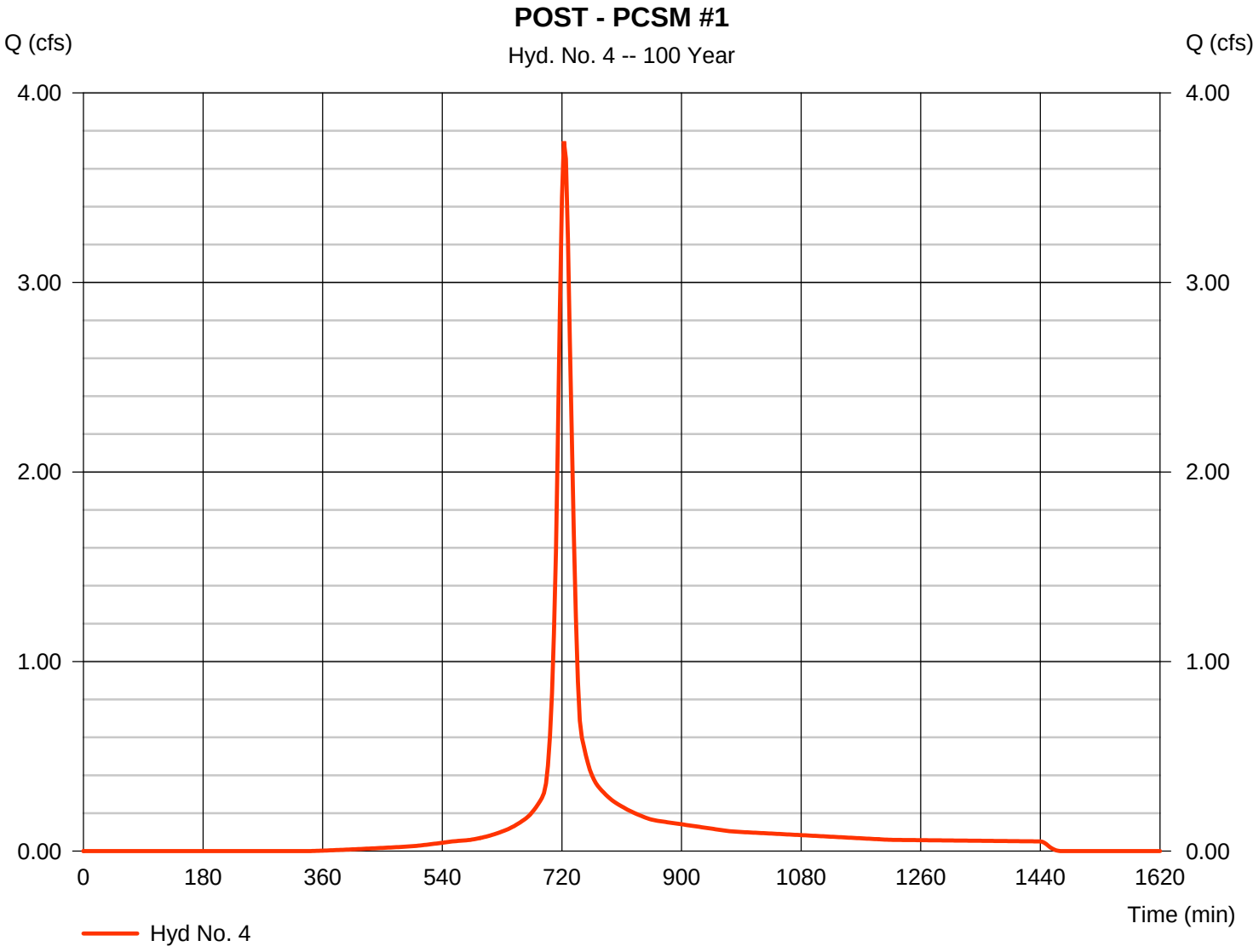


Hydrograph Report

Hyd. No. 4

POST - PCSM #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.745 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	12,019 cuft
Drainage area	=	0.569 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.20 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

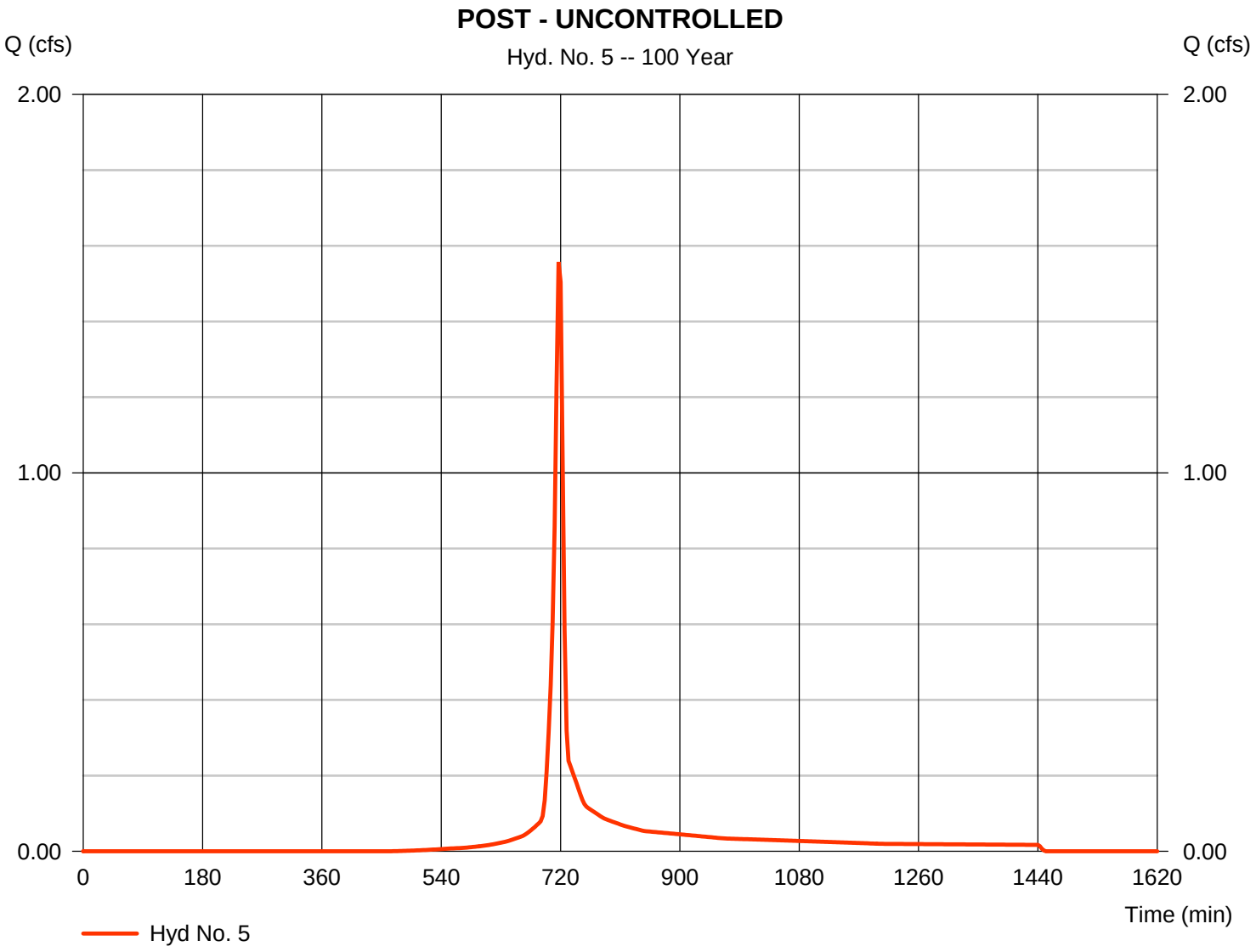


Hydrograph Report

Hyd. No. 5

POST - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.557 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	3,517 cuft
Drainage area	=	0.226 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



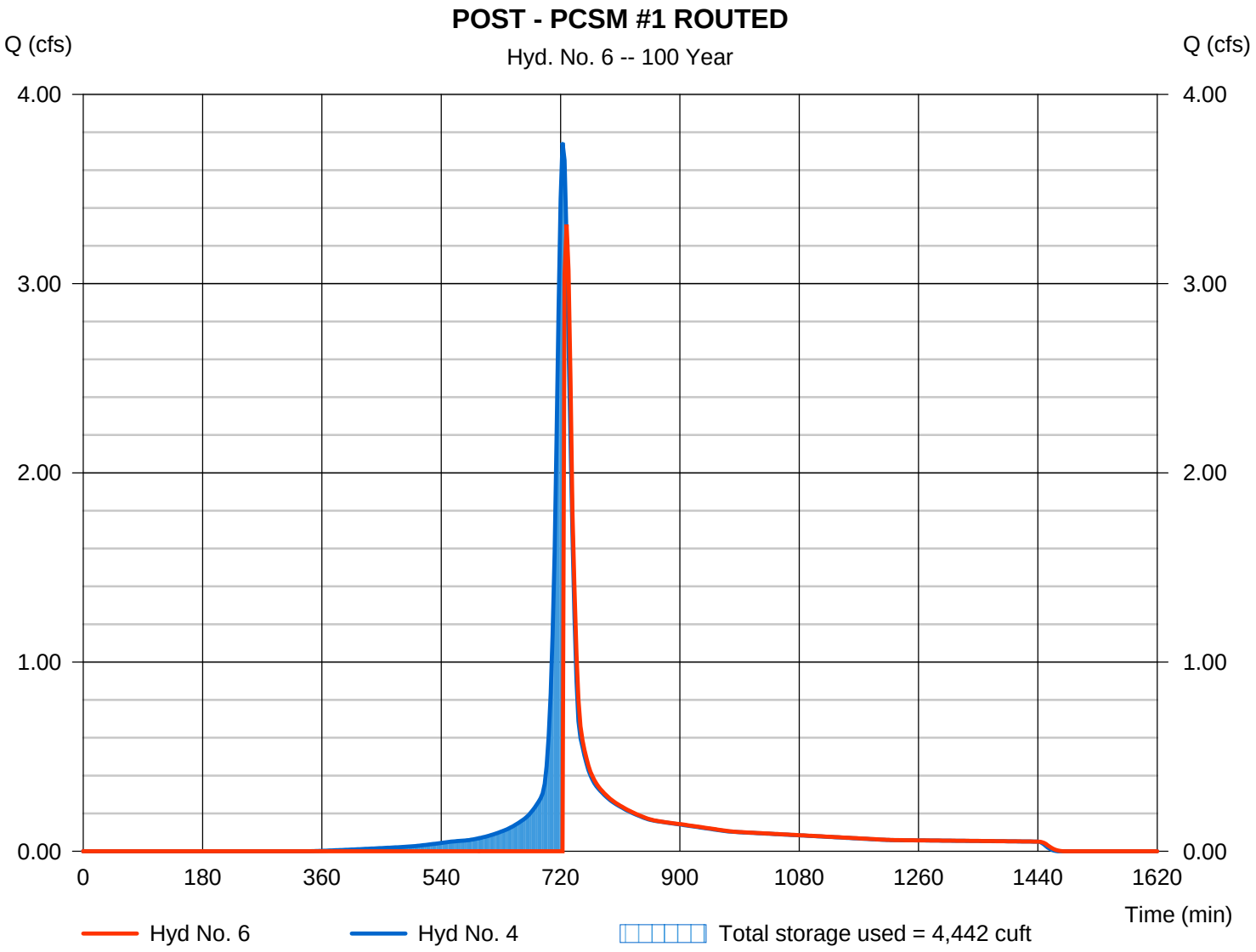
Hydrograph Report

Hyd. No. 6

POST - PCSM #1 ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	3.312 cfs
Storm frequency	=	100 yrs	Time to peak	=	729 min
Time interval	=	3 min	Hyd. volume	=	7,920 cuft
Inflow hyd. No.	=	4 - POST - PCSM #1	Max. Elevation	=	272.54 ft
Reservoir name	=	PCSM #1	Max. Storage	=	4,442 cuft

Storage Indication method used.

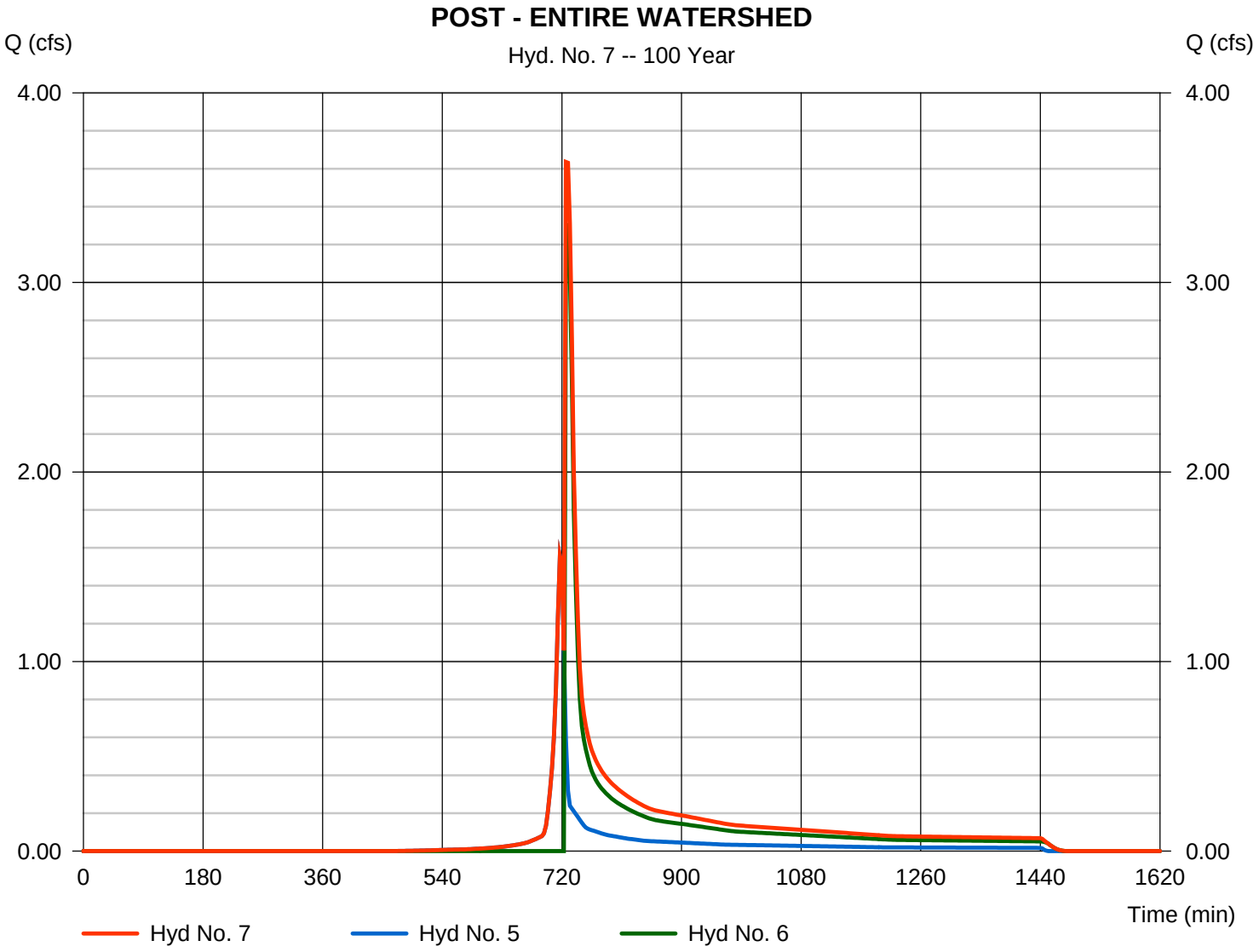


Hydrograph Report

Hyd. No. 7

POST - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	3.636 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	11,438 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.226 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: P:\Storm\Lower Merion Township.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.20	0.00	4.20	5.00	5.80	6.50	8.40
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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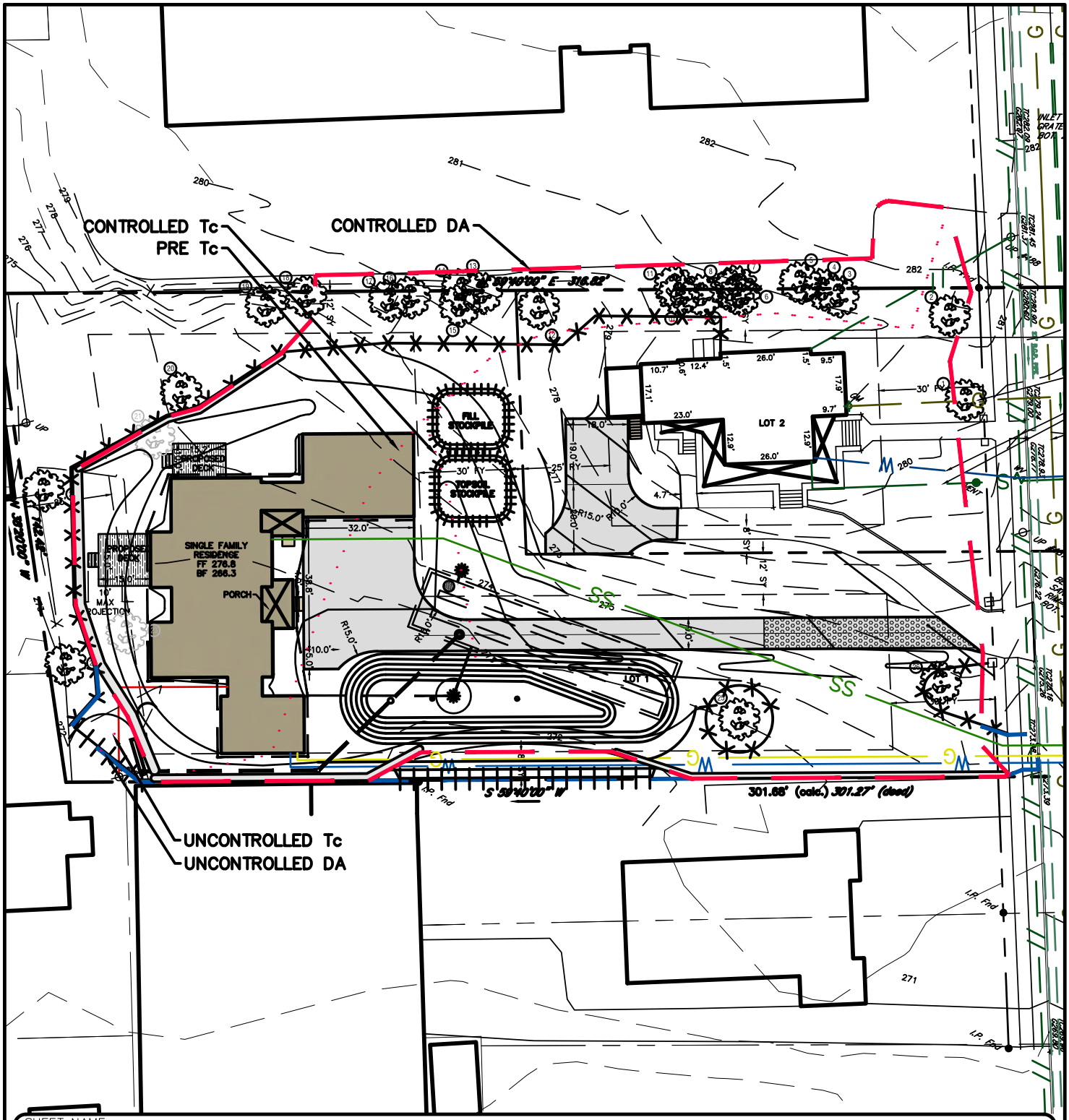
DURING CONSTRUCTION STORMWATER MANAGEMENT CALCULATIONS



SHEET NAME:	DURING CONSTRUCTION DRAINAGE AREA MAP
PROJECT ADDRESS:	112 BRYN MAWR AVENUE, BALA CYNWYD, PA 19004
MUNICIPALITY:	LOWER MERION TOWNSHIP
COUNTY:	MONTGOMERY COUNTY

PREPARED BY:
YOHN ENGINEERING, LLC
555 SECOND AVENUE, SUITE B-205
COLLEGEVILLE, PA 19426
610-489-4580
WWW.YOHNENGINEERING.COM

PREPARED FOR:	NORTHEAST RENOVATIONS, LLC 1744 FEDERAL STREET PHILADELPHIA, PA 19146
DATE:	AUGUST 23, 2019
PROJECT NUMBER:	19-071

YOHN ENGINEERING, LLC
555 Second Avenue, Suite B-205
Collegeville, PA 19426-3674
610-489-4580
www.yohnengineering.com

Date:	August 23, 2019		
Project:	112 Bryn Mawr Ave	File No.:	19-071
Municipality:	Lower Merion Township	County:	Montgomery

RUNOFF RATE CONTROL SUMMARY

Watershed:	Non-watershed Plan District
Watershed District:	NA
Runoff Calculation Method:	SCS Type II 24 hour Storm

PRE-DEVELOPMENT RUNOFF RATES

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Entire Watershed (CFS):	**0.439**	**0.949**	**1.433**	**1.957**	**2.442**	**3.870**

PEAK ALLOWABLE RUNOFF RATES

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Event or Percent Reduction:	2-Year	2-Year	10-Year	25-Year	50-Year	100-Year
Entire Watershed (CFS):	**0.439**	**0.439**	**1.433**	**1.957**	**2.442**	**3.870**

DURING-DEVELOPMENT RUNOFF RATES

	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
During Controlled	0.026	0.174	0.804	1.755	2.354	3.669
Uncontrolled Areas:	0.072	0.106	0.133	0.160	0.184	0.249
Entire Watershed (CFS):	**0.072**	**0.179**	**0.818**	**1.775**	**2.378**	**3.701**
NET DECREASE (CFS):	0.367	0.770	0.615	0.182	0.064	0.169
PERCENT REDUCTION:	84%	81%	43%	9%	3%	4%

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Municipality:	Lower Merion Township	County:	Montgomery

DRAINAGE AREA AND WEIGHTED CN CALCULATIONS

Development Condition: Pre — Through Subarea: Offsite/Undisturbed

Cover	Type	CN	Area (SF)	Area (AC)	
Meadow - Good Condition	B	58	0	0.000	0.0%
Lawn - Good Condition	B	61	7235	0.166	64.1%
Impervious	-	98	4056	0.093	35.9%
TOTAL:		**74**	**11291**	**0.259**	100.0%

Development Condition: Pre — Through Subarea: Onsite/Disturbed

Cover	Type	CN	Area (SF)	Area (AC)	
Meadow - Good Condition	B	58	24103	0.553	98.4%
Lawn - Good Condition	B	61	0	0.000	0.0%
Impervious	-	98	398	0.009	1.6%
TOTAL:		**59**	**24501**	**0.562**	100.0%

Development Condition: Post — Through Subarea: Entire Watershed

Cover	Type	CN	Area (SF)	Area (AC)	
Meadow - Good Condition	B	58	24103	0.553	67.3%
Lawn - Good Condition	B	61	7235	0.166	20.2%
Impervious	-	98	4454	0.102	12.4%
TOTAL:		**64**	**35792**	**0.822**	100.0%

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DRAINAGE AREA AND WEIGHTED CN CALCULATIONS

Development Condition: During Through Subarea: Controlled #1

Cover	Type	CN	Area (SF)	Area (AC)	
Lawn - Good Condition	B	61	7235	0.166	20.9%
Denuded	-	86	16524	0.379	47.7%
Impervious	-	98	10888	0.250	31.4%
TOTAL:		**85**	**34647**	**0.795**	100.0%

Development Condition: During Through Subarea: Uncontrolled

Cover	Type	CN	Area (SF)	Area (AC)	
Lawn - Good Condition	B	61	0	0.000	0.0%
Denuded	-	86	1145	0.026	100.0%
Impervious	-	98	0	0.000	0.0%
TOTAL:		**86**	**1145**	**0.026**	100.0%

Development Condition: During Through Subarea: Entire Watershed

Cover	Type	CN	Area (SF)	Area (AC)	
Lawn - Good Condition	B	61	7235	0.166	20.2%
Denuded	-	86	17669	0.406	49.4%
Impervious*	-	98	10888	0.250	30.4%
TOTAL:		**85**	**35792**	**0.822**	100.0%

* Does not include 54 sf of impervious to remain undisturbed. Includes 4,056 sf of offsite impervious.

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Date:	August 23, 2019		
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Municipality:	Lower Merion Township	County:	Montgomery

TIME OF CONCENTRATION / TRAVEL TIME CALCULATIONS

Development Condition:	Pre-Development
Through Subarea:	Entire Watershed

SHEET FLOW:

Surface Description:	Grass					
Manning's Roughness Coefficient:	0.24					
Flow Length (FT)(150 MAX):	150					150
2-Year 24-Hour Rainfall (IN):	3.27					
Land Slope (%):	4%					
Travel Time (HR):	0.25	0.00	0.00	0.00	0.00	**0.25**

SHALLOW CONCENTRATED FLOW:

Surface Description:	Unpaved					
Flow Length (FT):	182					182
Watercourse Slope (%):	3%					
Average Velocity (FPS):	2.79					
Travel Time (HR):	0.02	0.00	0.00	0.00	0.00	**0.02**

CHANNEL FLOW:

Pipe Diameter (IN):						
Cross Sectional Flow Area (SF):	0.00					
Wetted Perimeter (FT):	0.00					
Hydraulic Radius (FT):	0.00					
Channel Slope (%):						
Manning's Roughness Coefficient:						
Velocity (FPS):	0.00					
Flow Length (FT):						0
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

TOTAL TIME OF CONCENTRATION (HR):	**0.26**
TOTAL TIME OF CONCENTRATION (MIN):	**15.9**

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Municipality:	Lower Merion Township	County:	Montgomery

TIME OF CONCENTRATION / TRAVEL TIME CALCULATIONS

Development Condition:	During
Through Subarea:	Controlled Area #1

SHEET FLOW:

Surface Description:	Grass					
Manning's Roughness Coefficient:	0.24					
Flow Length (FT)(150 MAX):	150					150
2-Year 24-Hour Rainfall (IN):	3.27					
Land Slope (%):	4%					
Travel Time (HR):	0.25	0.00	0.00	0.00	0.00	**0.25**

SHALLOW CONCENTRATED FLOW:

Surface Description:	Paved					
Flow Length (FT):	84					84
Watercourse Slope (%):	5%					
Average Velocity (FPS):	4.55					
Travel Time (HR):	0.01	0.00	0.00	0.00	0.00	**0.01**

CHANNEL FLOW:

Pipe Diameter (IN):						
Cross Sectional Flow Area (SF):	0.00					
Wetted Perimeter (FT):	0.00					
Hydraulic Radius (FT):	0.00					
Channel Slope (%):						
Manning's Roughness Coefficient:						
Velocity (FPS):	0.00					
Flow Length (FT):						0
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

TOTAL TIME OF CONCENTRATION (HR):	**0.25**
TOTAL TIME OF CONCENTRATION (MIN):	**15.1**

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Project:	112 Bryn Mawr Ave	File No.:	19-071
Municipality:	Lower Merion Township	County:	Montgomery

TIME OF CONCENTRATION / TRAVEL TIME CALCULATIONS

Development Condition:	During
Through Subarea:	Uncontrolled Area

SHEET FLOW:

Surface Description:	Bare					
Manning's Roughness Coefficient:	0.01					
Flow Length (FT)(150 MAX):	13					13
2-Year 24-Hour Rainfall (IN):	3.27					
Land Slope (%):	2%					
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

SHALLOW CONCENTRATED FLOW:

Surface Description:						
Flow Length (FT):						0
Watercourse Slope (%):						
Average Velocity (FPS):						
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

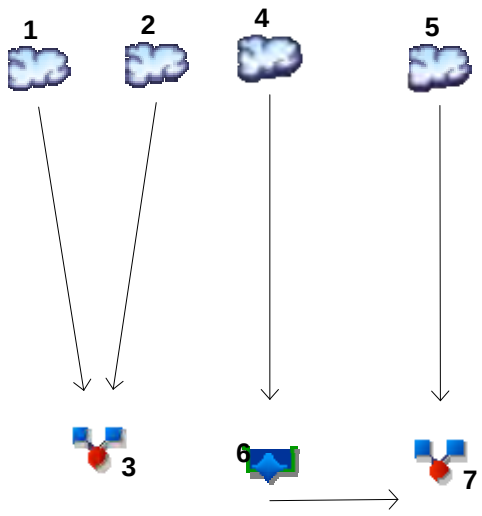
CHANNEL FLOW:

Pipe Diameter (IN):						
Cross Sectional Flow Area (SF):	0.00					
Wetted Perimeter (FT):	0.00					
Hydraulic Radius (FT):	0.00					
Channel Slope (%):						
Manning's Roughness Coefficient:						
Velocity (FPS):	0.00					
Flow Length (FT):						0
Travel Time (HR):	0.00	0.00	0.00	0.00	0.00	**0.00**

TOTAL TIME OF CONCENTRATION (HR):	**0.00**
TOTAL TIME OF CONCENTRATION (MIN):	**0.2**

*** USE THE MINIMUM TIME OF CONCENTRATION OF 6 MINUTES**

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	PRE - ONSITE/DISTURBED
3	Combine	PRE - ENTIRE WATERSHED
4	SCS Runoff	DURING - CONTROLLED
5	SCS Runoff	DURING - UNCONTROLLED
6	Reservoir	DURING - ROUTED
7	Combine	DURING - ENTIRE WATERSHED

Hydrograph Return Period Recap

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	------	0.220	0.299	-------	0.519	0.711	0.914	1.096	1.603	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	------	0.065	0.141	-------	0.430	0.725	1.053	1.362	2.272	PRE - ONSITE/DISTURBED
3	Combine	1, 2	0.281	0.439	-------	0.949	1.433	1.957	2.442	3.870	PRE - ENTIRE WATERSHED
4	SCS Runoff	------	1.320	1.638	-------	2.456	3.122	3.792	4.379	5.968	DURING - CONTROLLED
5	SCS Runoff	------	0.058	0.072	-------	0.106	0.133	0.160	0.184	0.249	DURING - UNCONTROLLED
6	Reservoir	4	0.000	0.026	-------	0.174	0.804	1.755	2.354	3.669	DURING - ROUTED
7	Combine	5, 6	0.058	0.072	-------	0.179	0.818	1.775	2.378	3.701	DURING - ENTIRE WATERSHED

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

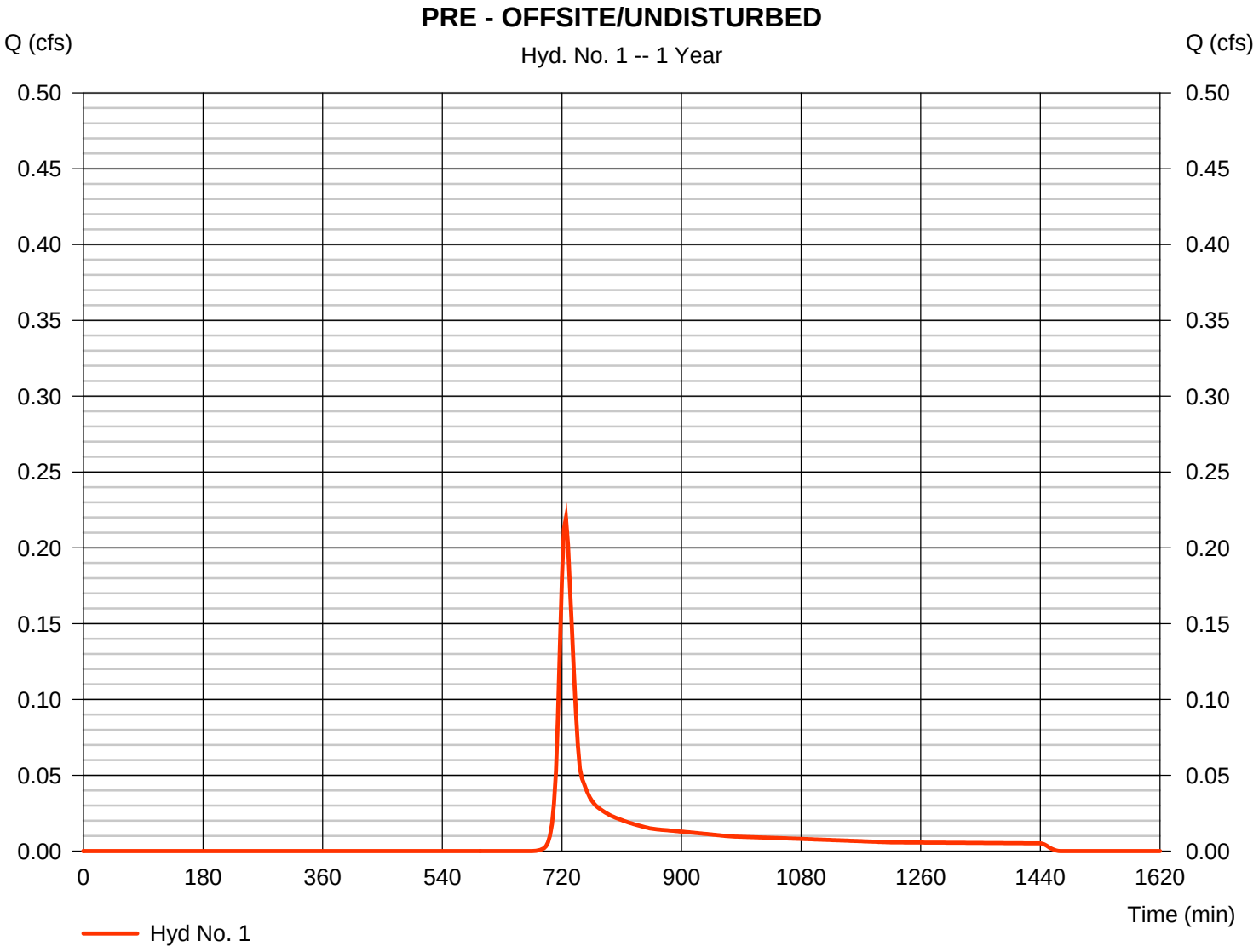
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.220	3	726	760	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.065	3	729	500	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	0.281	3	726	1,260	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	1.320	3	723	4,231	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.058	3	717	132	------	------	------	DURING - UNCONTROLLED
6	Reservoir	0.000	3	n/a	0	4	271.66	4,231	DURING - ROUTED
7	Combine	0.058	3	717	132	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.220 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 3 min	Hyd. volume	= 760 cuft
Drainage area	= 0.259 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

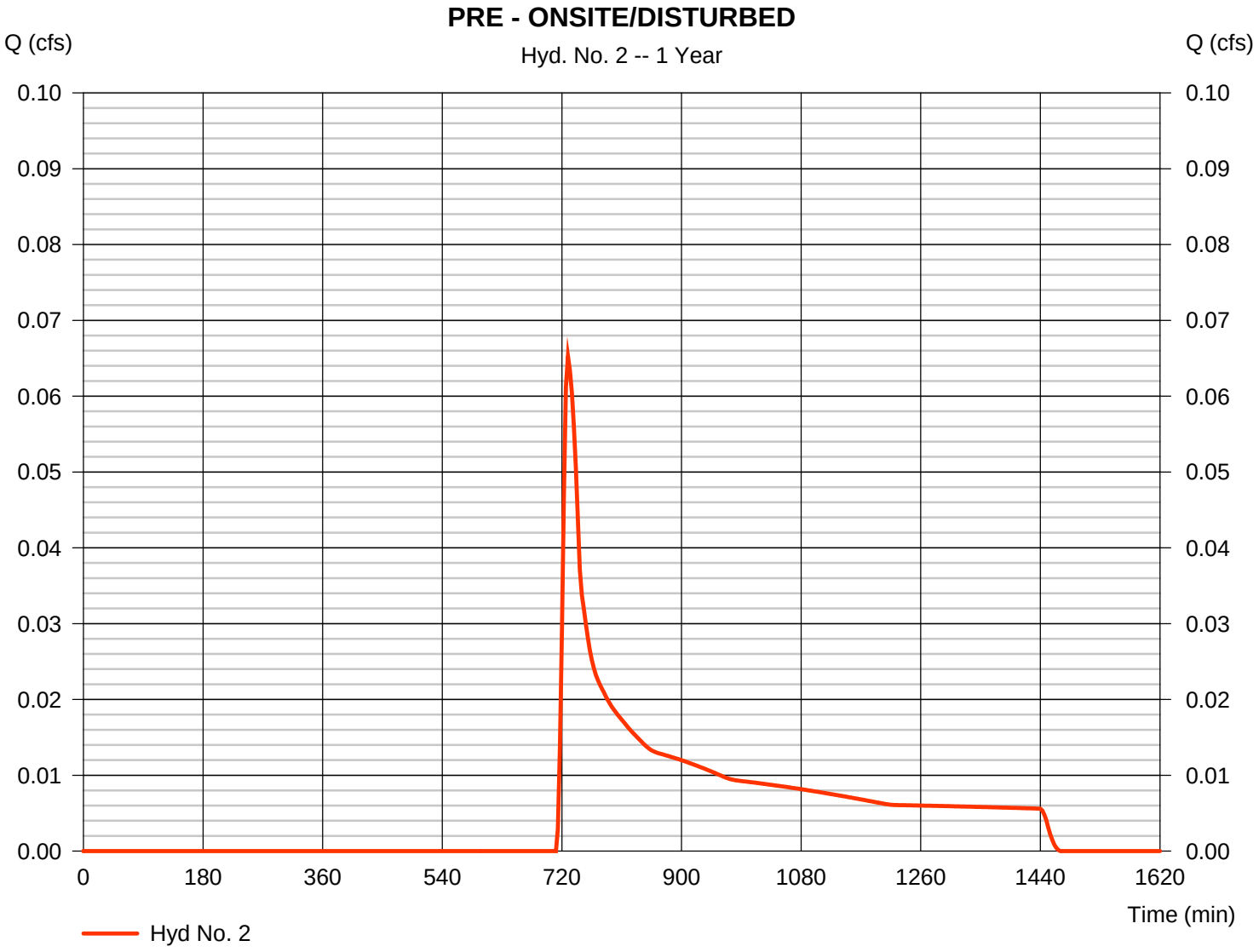


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.065 cfs
Storm frequency	= 1 yrs	Time to peak	= 729 min
Time interval	= 3 min	Hyd. volume	= 500 cuft
Drainage area	= 0.562 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

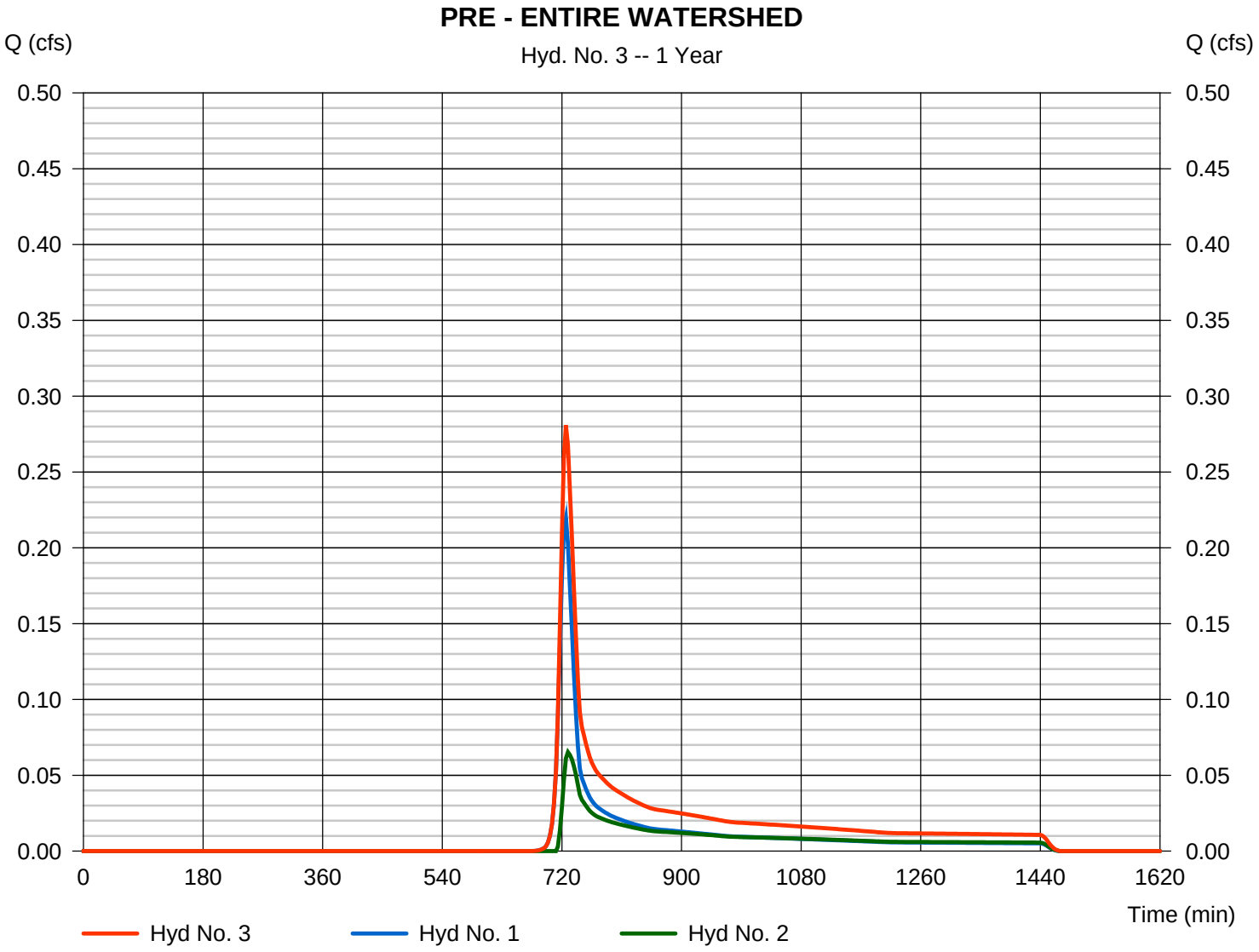


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.281 cfs
Storm frequency	=	1 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,260 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

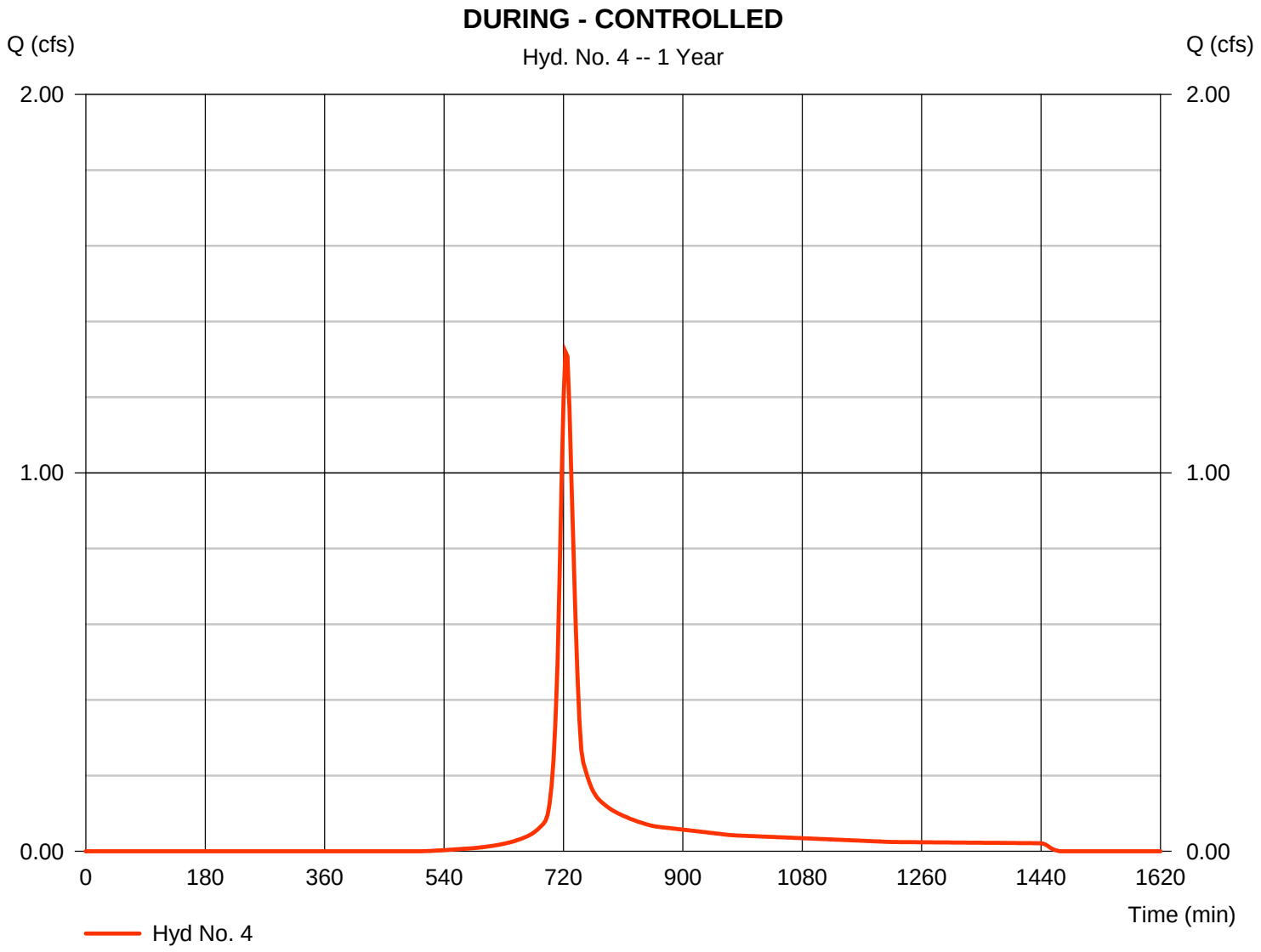


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.320 cfs
Storm frequency	=	1 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	4,231 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	2.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

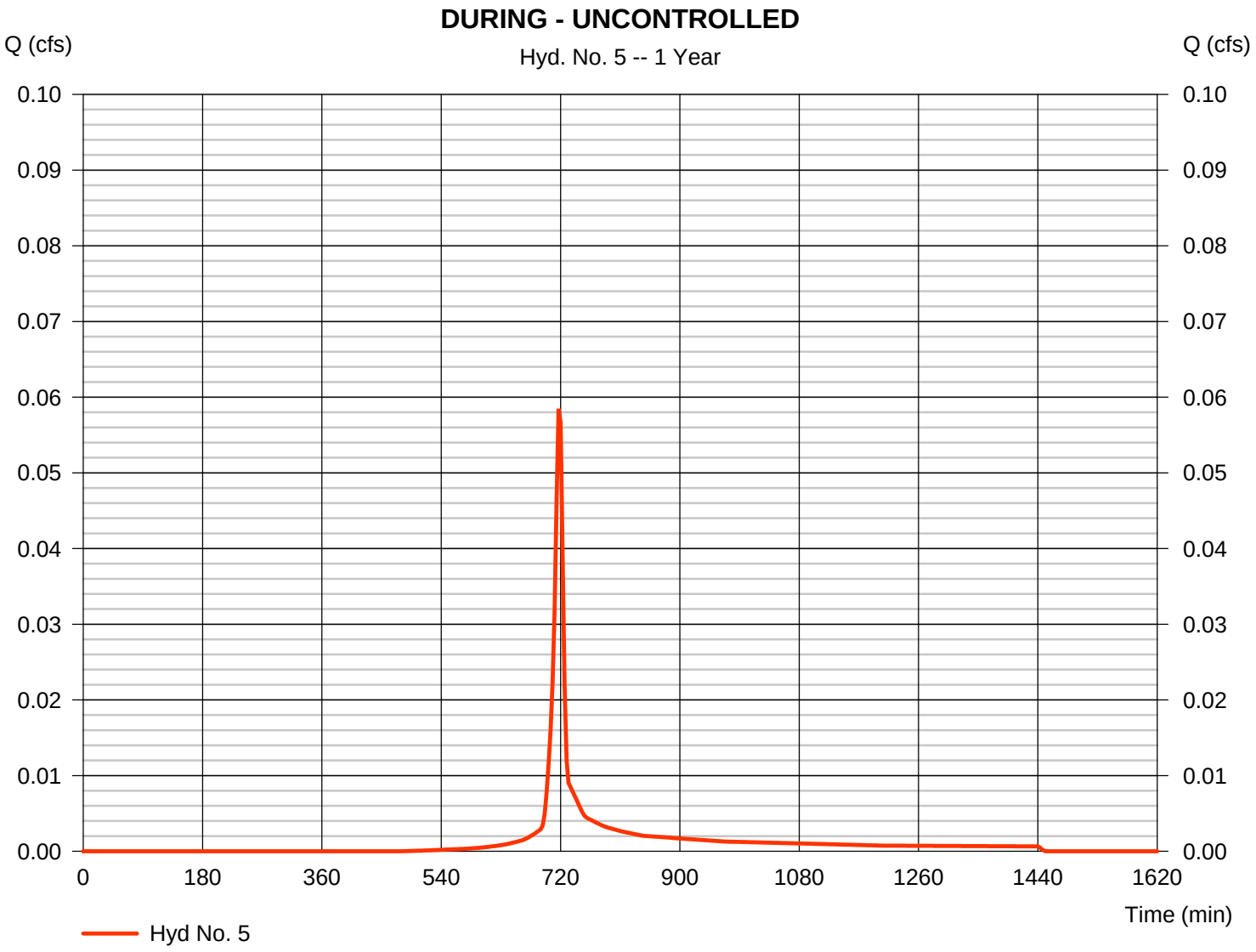


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.058 cfs
Storm frequency	=	1 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	132 cuft
Drainage area	=	0.026 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	2.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



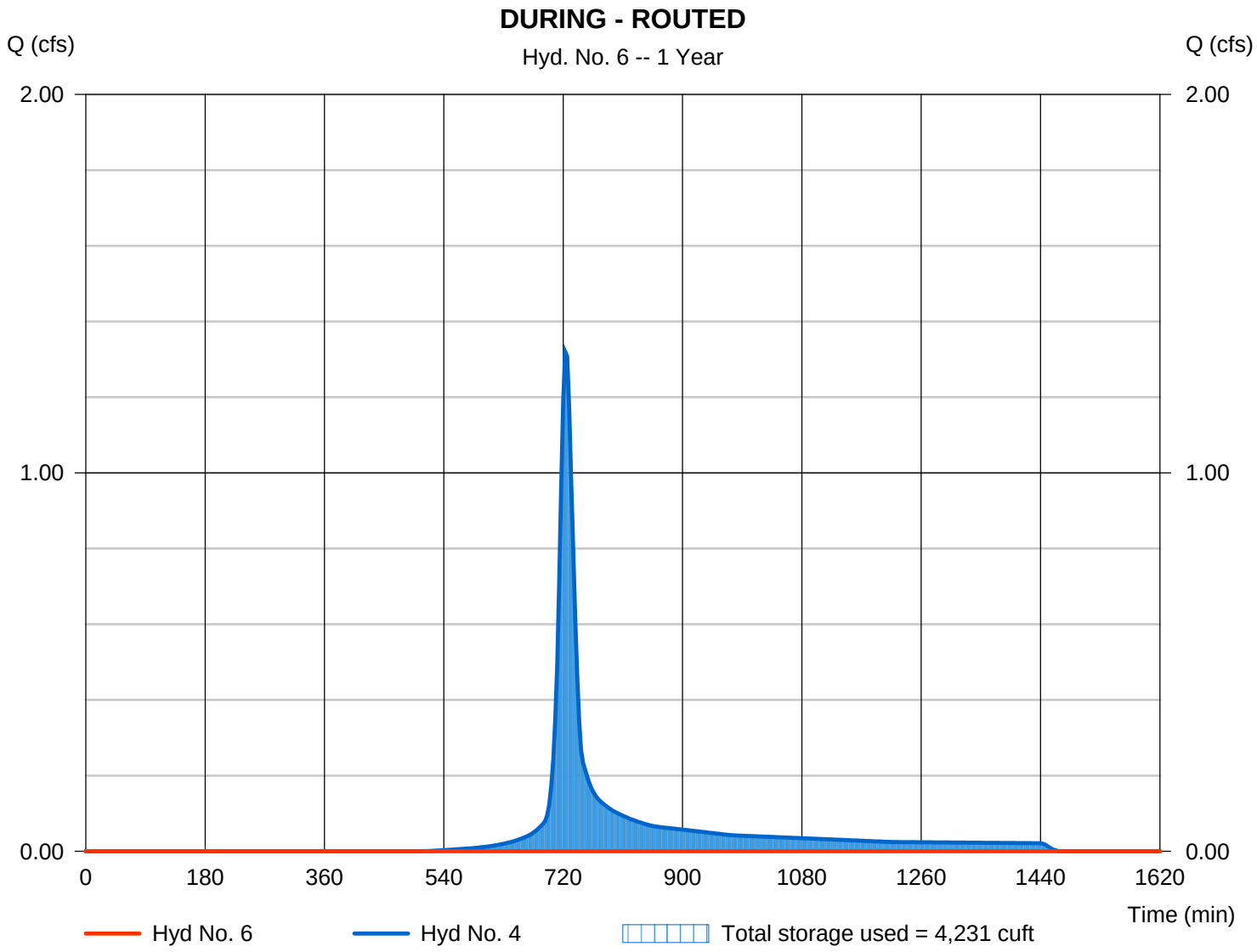
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	1 yrs	Time to peak	=	n/a
Time interval	=	3 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	271.66 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	4,231 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - TEMP TRAP

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 268.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	268.00	610	0	0
1.00	269.00	836	720	720
2.00	270.00	1,076	953	1,673
3.00	271.00	1,665	1,360	3,033
4.00	272.00	1,978	1,819	4,852
5.00	273.00	2,306	2,140	6,992
6.00	274.00	2,764	2,531	9,523
6.50	274.50	3,003	1,441	10,964

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.50	0.00	0.00
Span (in)	= 12.00	6.50	0.00	0.00
No. Barrels	= 1	3	0	0
Invert El. (ft)	= 270.80	272.00	0.00	0.00
Length (ft)	= 28.00	0.00	0.00	0.00
Slope (%)	= 0.90	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)	= 3.93	55.00	0.00	0.00
Crest El. (ft)	= 273.30	273.40	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	268.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.10	72	268.10	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.20	144	268.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.30	216	268.30	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.40	288	268.40	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.50	360	268.50	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.60	432	268.60	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.70	504	268.70	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.80	576	268.80	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.90	648	268.90	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.00	720	269.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.10	815	269.10	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.20	911	269.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.30	1,006	269.30	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.40	1,101	269.40	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.50	1,197	269.50	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.60	1,292	269.60	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.70	1,387	269.70	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.80	1,483	269.80	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
1.90	1,578	269.90	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.00	1,673	270.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.10	1,809	270.10	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.20	1,945	270.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.30	2,081	270.30	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.40	2,217	270.40	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.50	2,353	270.50	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.60	2,489	270.60	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.70	2,625	270.70	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.80	2,761	270.80	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
2.90	2,897	270.90	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.00	3,033	271.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.10	3,215	271.10	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.20	3,397	271.20	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.30	3,579	271.30	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.40	3,761	271.40	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000

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TEMP TRAP

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
3.50	3,943	271.50	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.60	4,124	271.60	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.70	4,306	271.70	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.80	4,488	271.80	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
3.90	4,670	271.90	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
4.00	4,852	272.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
4.10	5,066	272.10	0.10 ic	0.10 ic	---	---	0.00	0.00	---	---	---	---	0.097
4.20	5,280	272.20	0.37 ic	0.36 ic	---	---	0.00	0.00	---	---	---	---	0.361
4.30	5,494	272.30	0.74 ic	0.73 ic	---	---	0.00	0.00	---	---	---	---	0.734
4.40	5,708	272.40	1.18 ic	1.18 ic	---	---	0.00	0.00	---	---	---	---	1.183
4.50	5,922	272.50	1.61 oc	1.61 ic	---	---	0.00	0.00	---	---	---	---	1.609
4.60	6,136	272.60	1.92 oc	1.91 ic	---	---	0.00	0.00	---	---	---	---	1.910
4.70	6,350	272.70	2.18 oc	2.18 ic	---	---	0.00	0.00	---	---	---	---	2.180
4.80	6,564	272.80	2.42 oc	2.42 ic	---	---	0.00	0.00	---	---	---	---	2.421
4.90	6,778	272.90	2.64 oc	2.64 ic	---	---	0.00	0.00	---	---	---	---	2.640
5.00	6,992	273.00	2.84 oc	2.84 ic	---	---	0.00	0.00	---	---	---	---	2.842
5.10	7,245	273.10	3.03 oc	3.03 ic	---	---	0.00	0.00	---	---	---	---	3.031
5.20	7,498	273.20	3.21 oc	3.21 ic	---	---	0.00	0.00	---	---	---	---	3.208
5.30	7,751	273.30	3.38 oc	3.38 ic	---	---	0.00	0.00	---	---	---	---	3.376
5.40	8,004	273.40	3.76 oc	3.34 ic	---	---	0.41	0.00	---	---	---	---	3.758
5.50	8,257	273.50	5.57 ic	0.61 ic	---	---	0.68 s	4.28 s	---	---	---	---	5.563
5.60	8,511	273.60	5.73 ic	0.25 ic	---	---	0.55 s	4.91 s	---	---	---	---	5.714
5.70	8,764	273.70	5.86 ic	0.15 ic	---	---	0.51 s	5.17 s	---	---	---	---	5.836
5.80	9,017	273.80	5.98 ic	0.10 ic	---	---	0.48 s	5.25 s	---	---	---	---	5.829
5.90	9,270	273.90	6.10 ic	0.08 ic	---	---	0.47 s	5.36 s	---	---	---	---	5.906
6.00	9,523	274.00	6.21 ic	0.06 ic	---	---	0.47 s	5.49 s	---	---	---	---	6.018
6.05	9,667	274.05	6.27 ic	0.05 ic	---	---	0.44 s	5.21 s	---	---	---	---	5.696
6.10	9,811	274.10	6.33 ic	0.04 ic	---	---	0.41 s	4.90 s	---	---	---	---	5.353
6.15	9,955	274.15	6.38 ic	0.04 ic	---	---	0.44 s	5.30 s	---	---	---	---	5.773
6.20	10,100	274.20	6.44 ic	0.03 ic	---	---	0.37 s	4.52 s	---	---	---	---	4.921
6.25	10,244	274.25	6.49 ic	0.03 ic	---	---	0.41 s	5.02 s	---	---	---	---	5.456
6.30	10,388	274.30	6.55 ic	0.03 ic	---	---	0.43 s	5.35 s	---	---	---	---	5.810
6.35	10,532	274.35	6.60 ic	0.02 ic	---	---	0.27 s	3.36 s	---	---	---	---	3.648
6.40	10,676	274.40	6.66 ic	0.02 ic	---	---	0.28 s	3.56 s	---	---	---	---	3.861
6.45	10,820	274.45	6.71 ic	0.02 ic	---	---	0.30 s	3.76 s	---	---	---	---	4.075
6.50	10,964	274.50	6.76 ic	0.02 ic	---	---	0.40 s	5.09 s	---	---	---	---	5.517

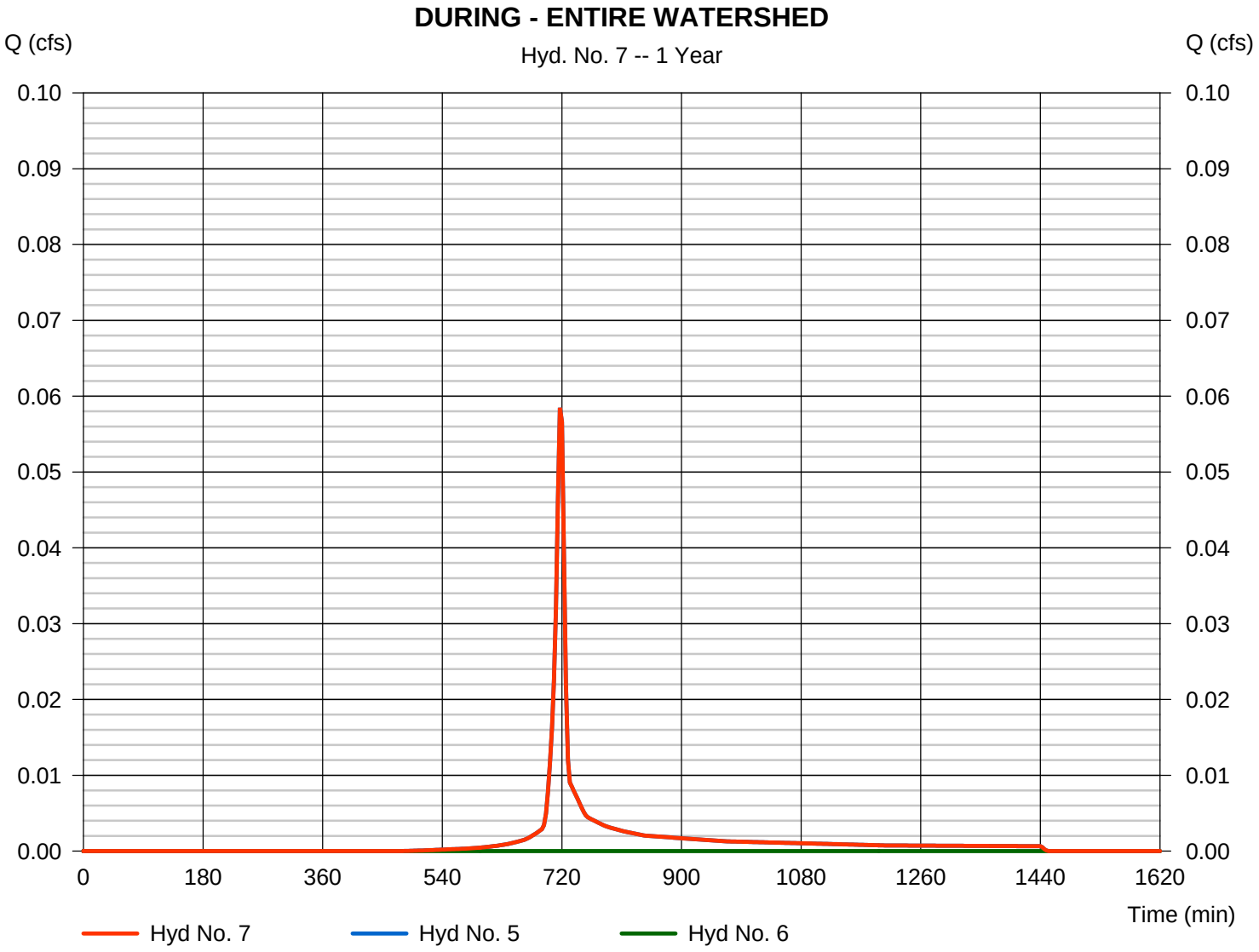
...End

Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.058 cfs
Storm frequency	= 1 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 132 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.026 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

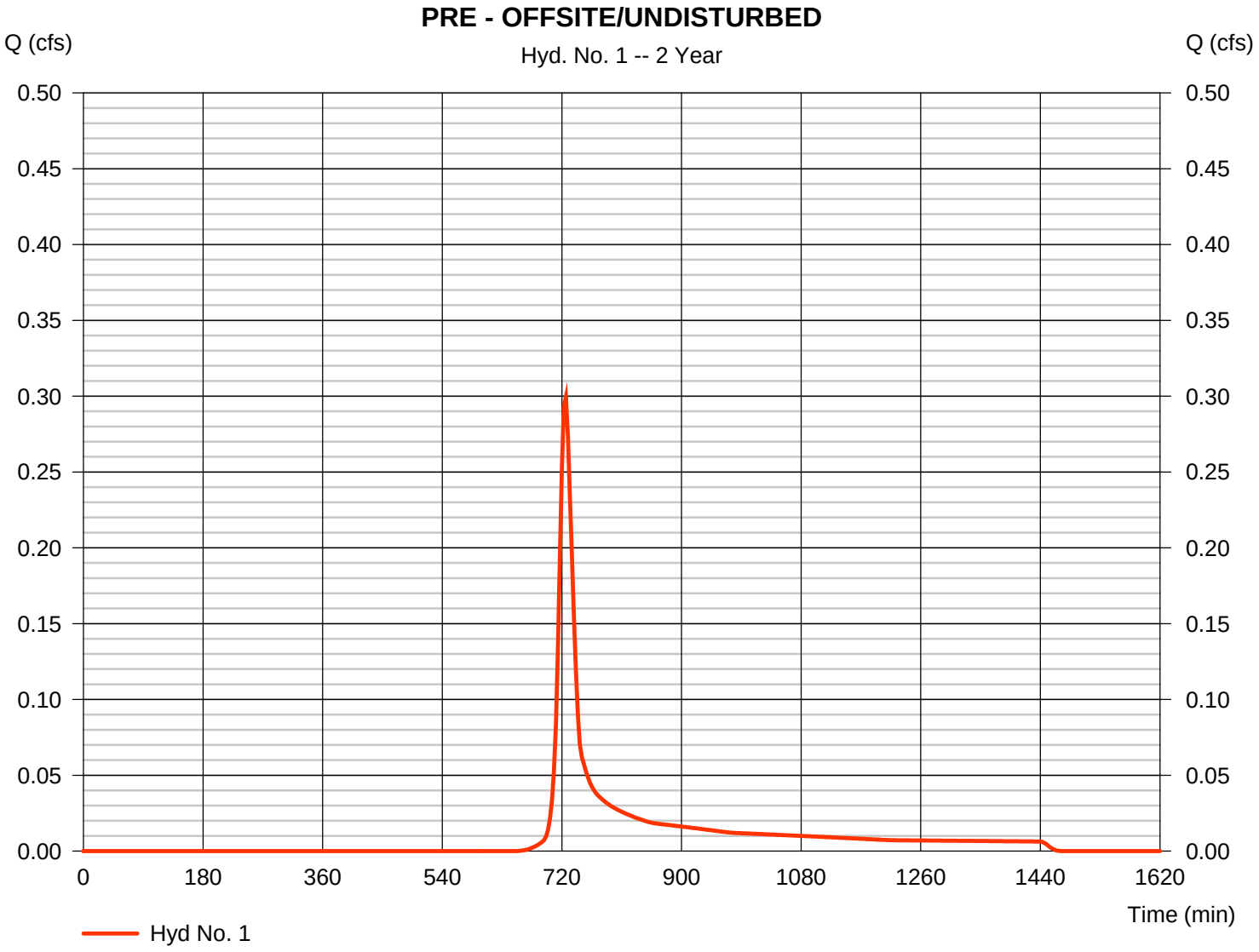
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.299	3	726	1,006	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.141	3	729	787	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	0.439	3	726	1,793	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	1.638	3	723	5,231	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.072	3	717	162	------	------	------	DURING - UNCONTROLLED
6	Reservoir	0.026	3	1359	376	4	272.03	4,911	DURING - ROUTED
7	Combine	0.072	3	717	539	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.299 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,006 cuft
Drainage area	=	0.259 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

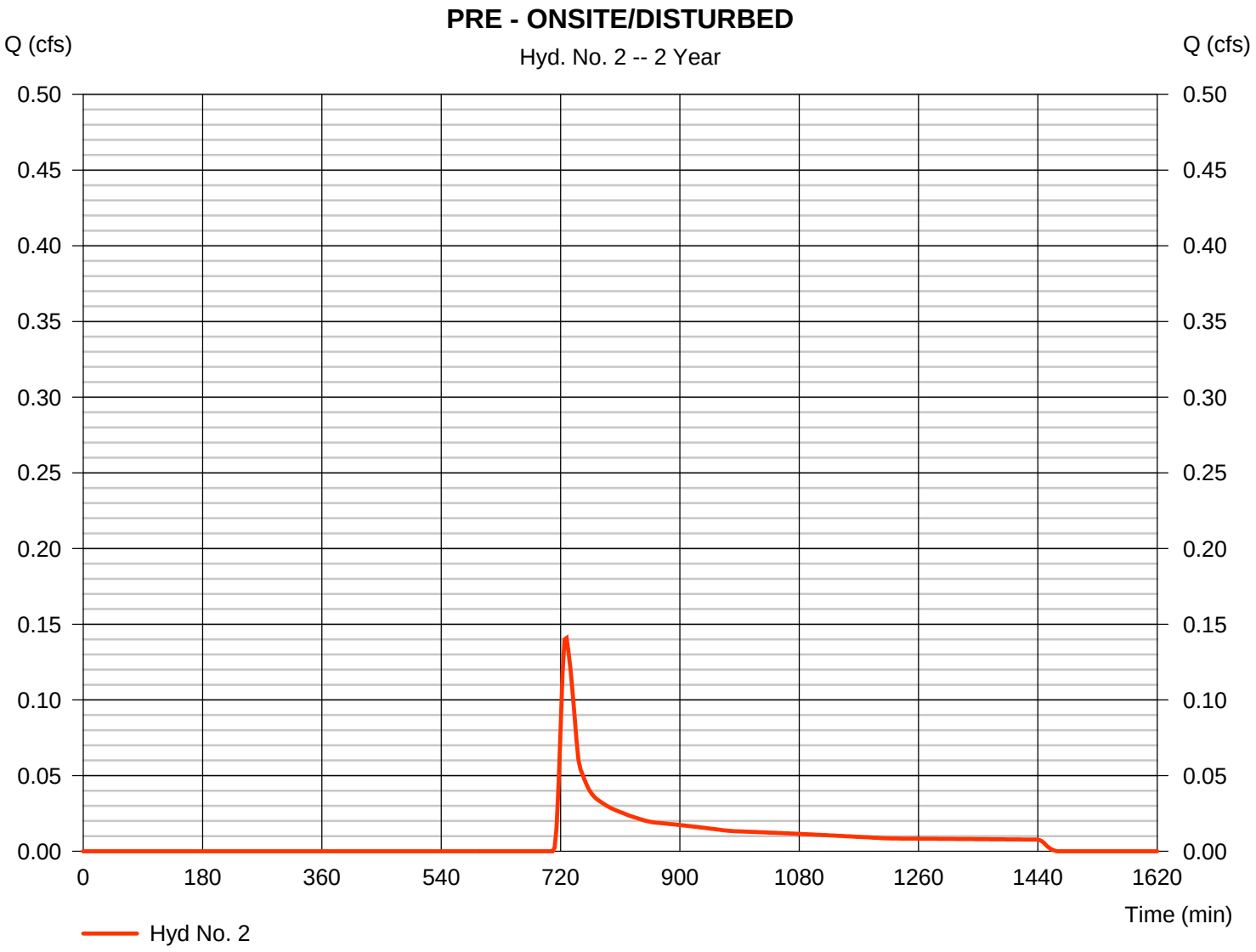


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.141 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 3 min	Hyd. volume	= 787 cuft
Drainage area	= 0.562 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 3.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

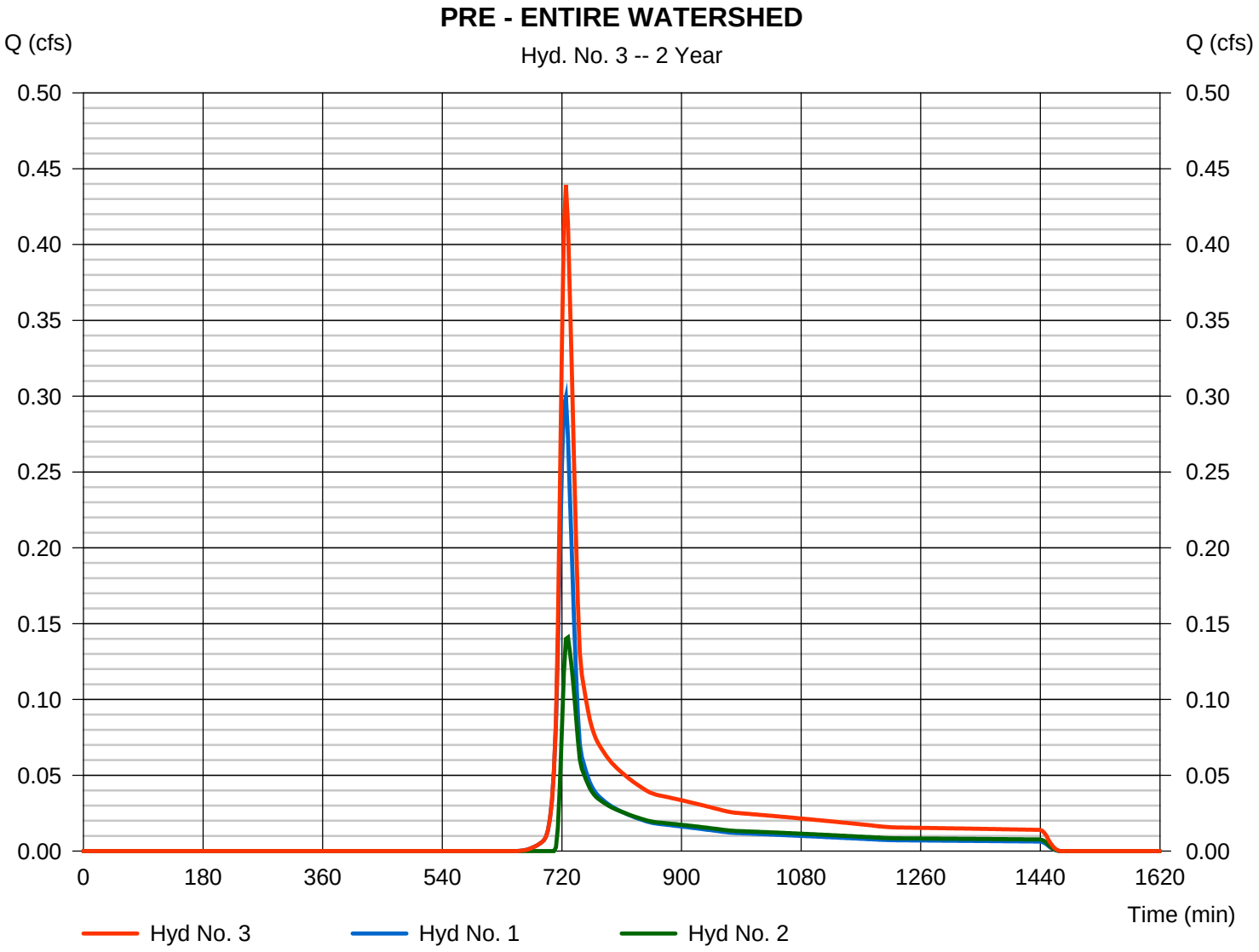


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.439 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,793 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

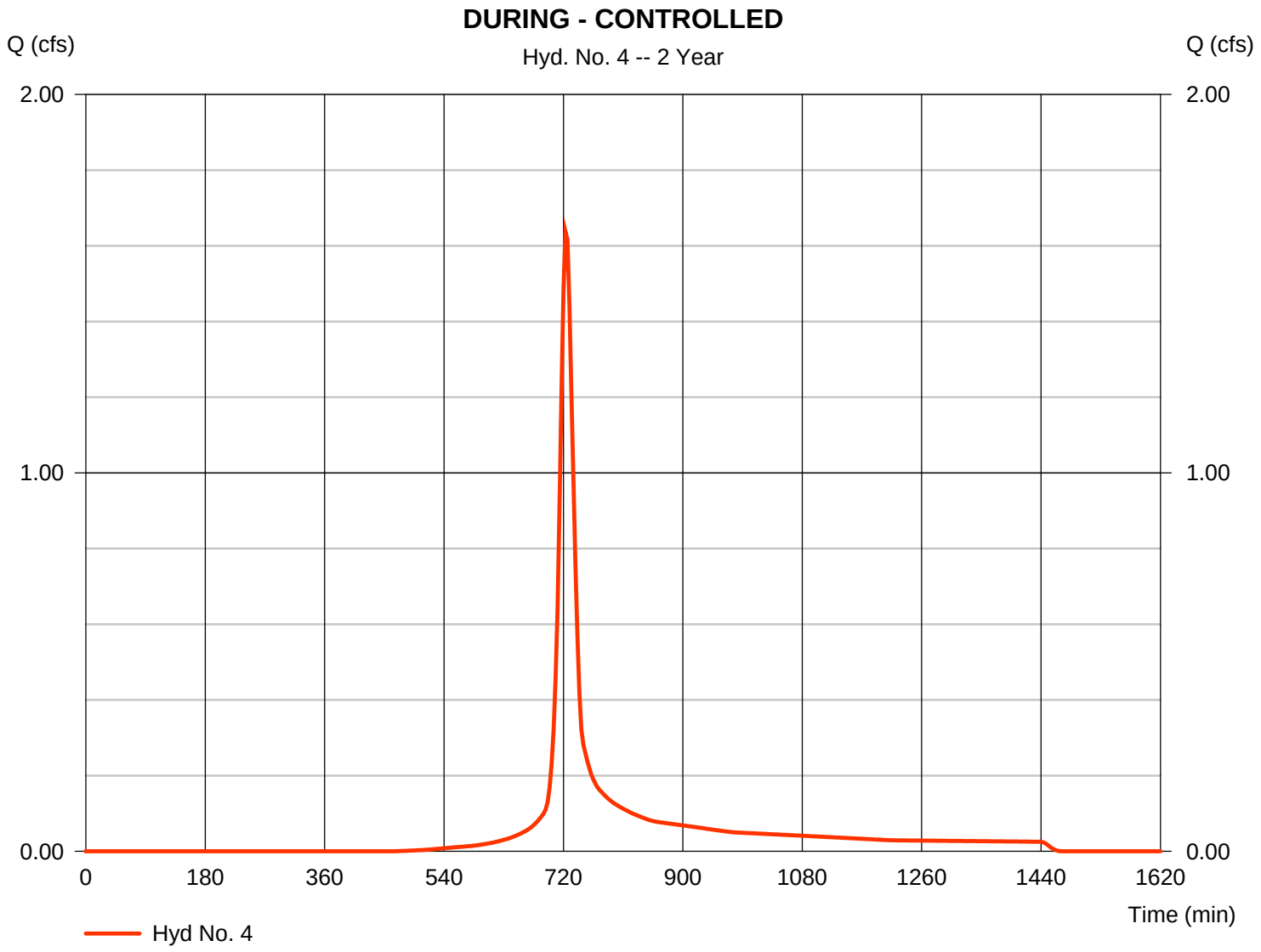


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.638 cfs
Storm frequency	=	2 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	5,231 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

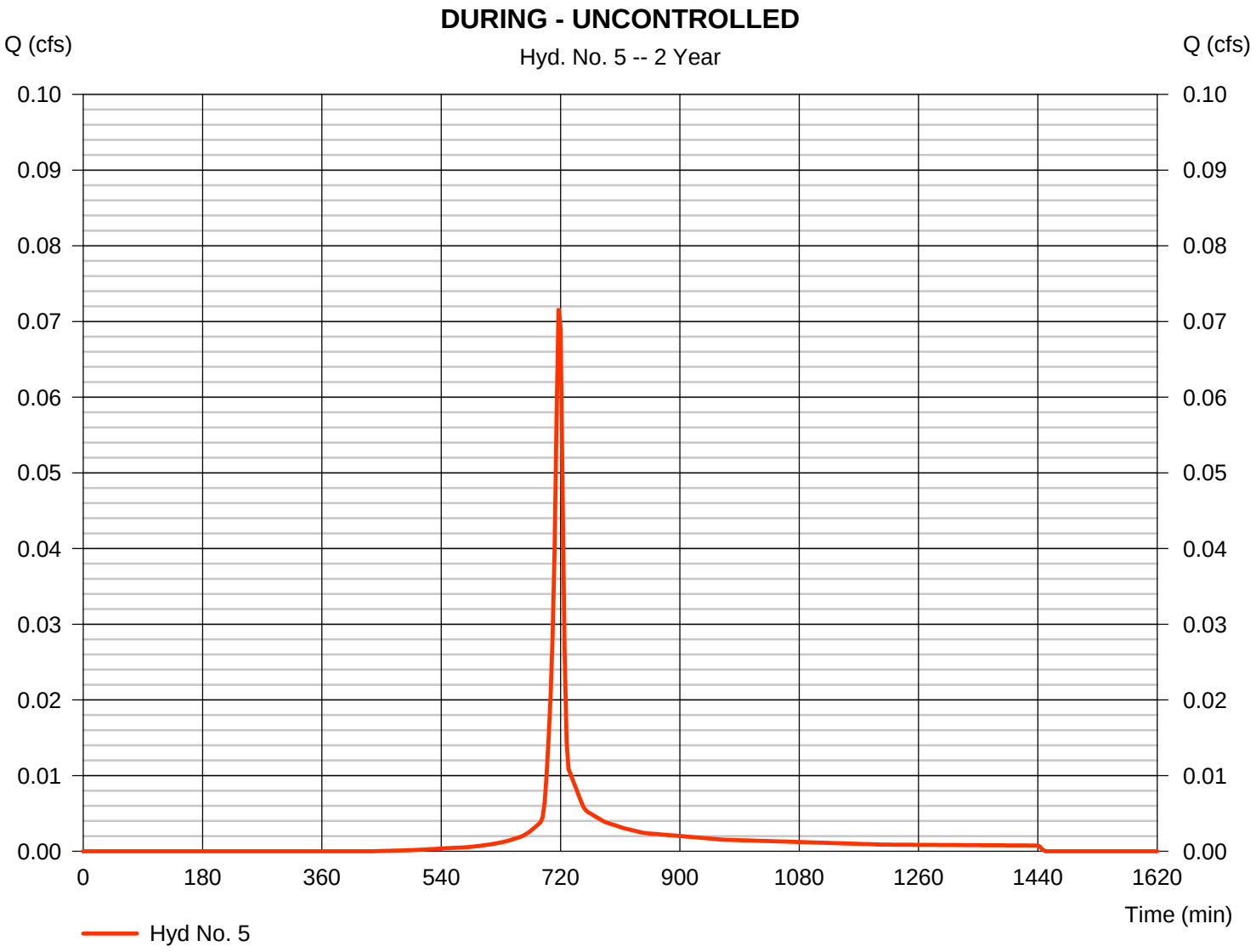


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.072 cfs
Storm frequency	=	2 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	162 cuft
Drainage area	=	0.026 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



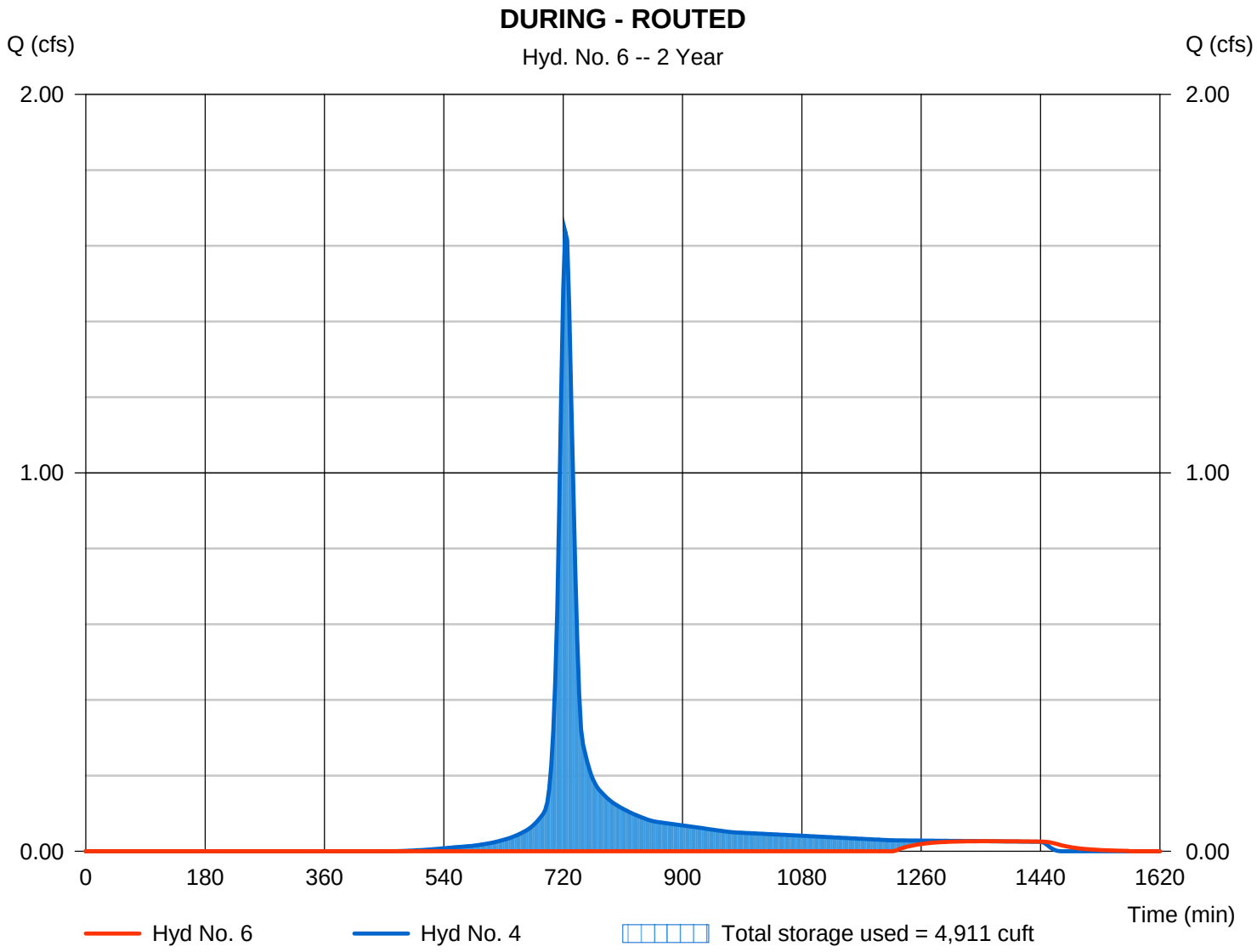
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.026 cfs
Storm frequency	=	2 yrs	Time to peak	=	1359 min
Time interval	=	3 min	Hyd. volume	=	376 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	272.03 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	4,911 cuft

Storage Indication method used.

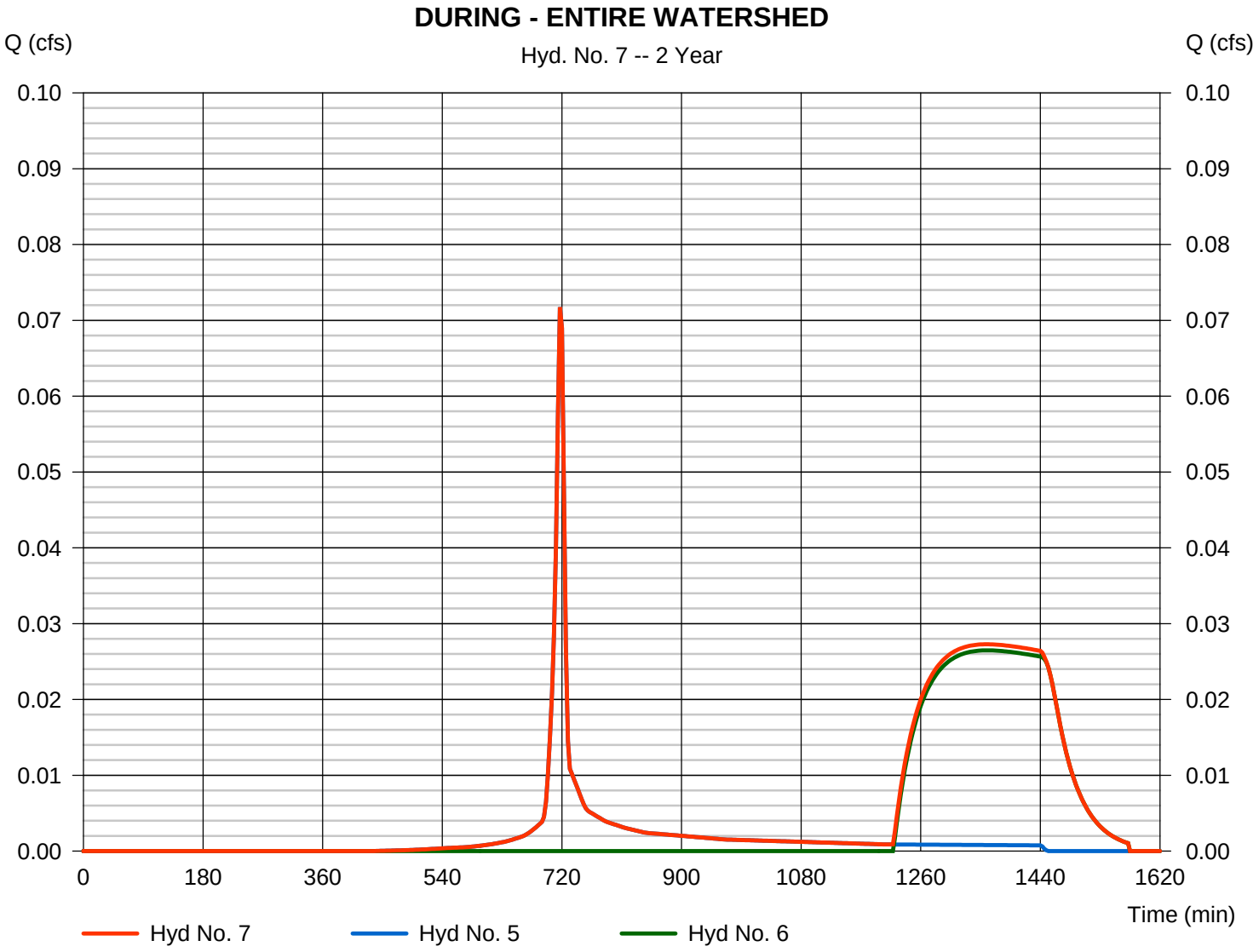


Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.072 cfs
Storm frequency	= 2 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 539 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.026 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

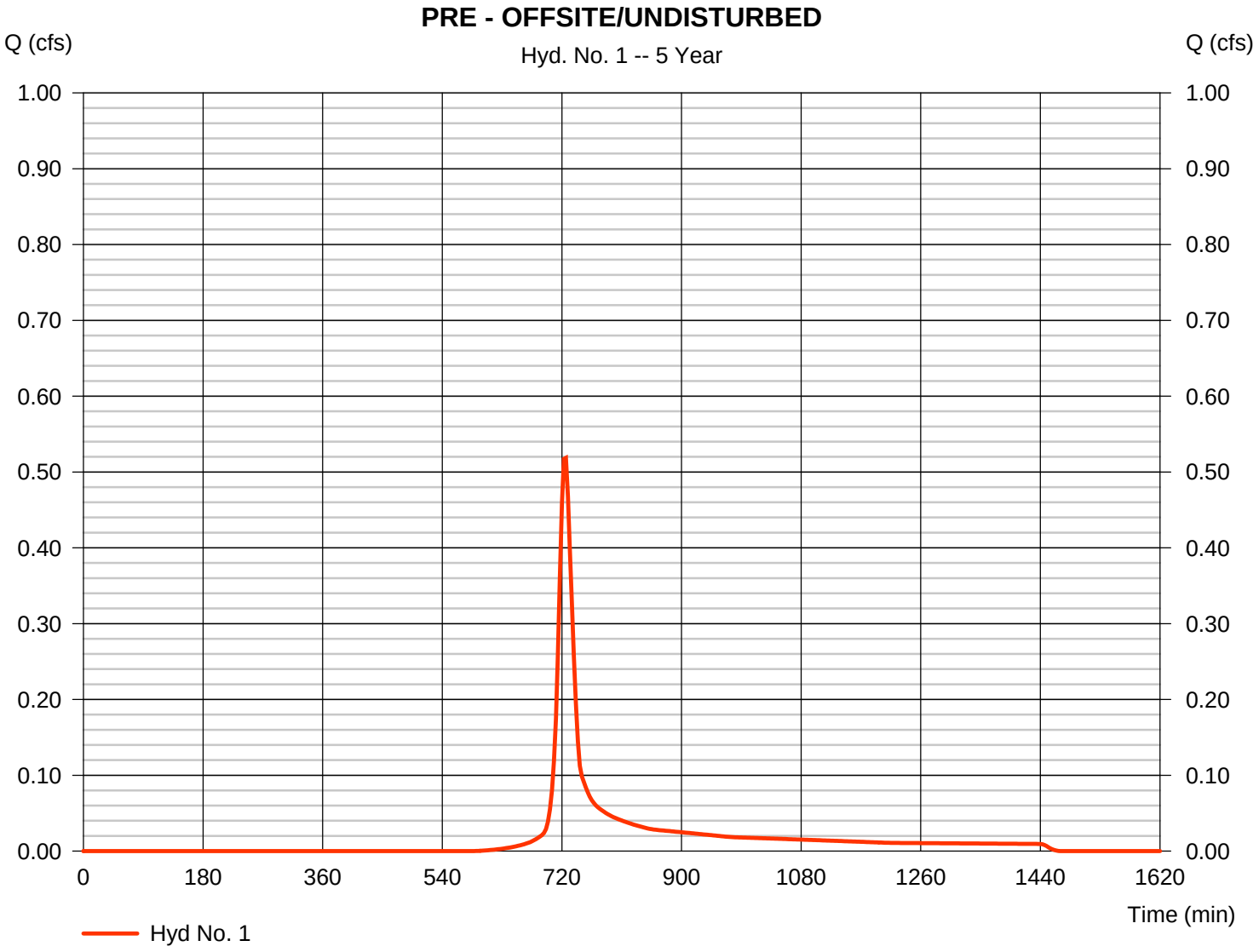
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.519	3	726	1,691	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.430	3	726	1,702	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	0.949	3	726	3,394	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	2.456	3	723	7,849	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.106	3	717	241	------	------	------	DURING - UNCONTROLLED
6	Reservoir	0.174	3	801	2,994	4	272.13	5,129	DURING - ROUTED
7	Combine	0.179	3	798	3,236	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.519 cfs
Storm frequency	=	5 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,691 cuft
Drainage area	=	0.259 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	4.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

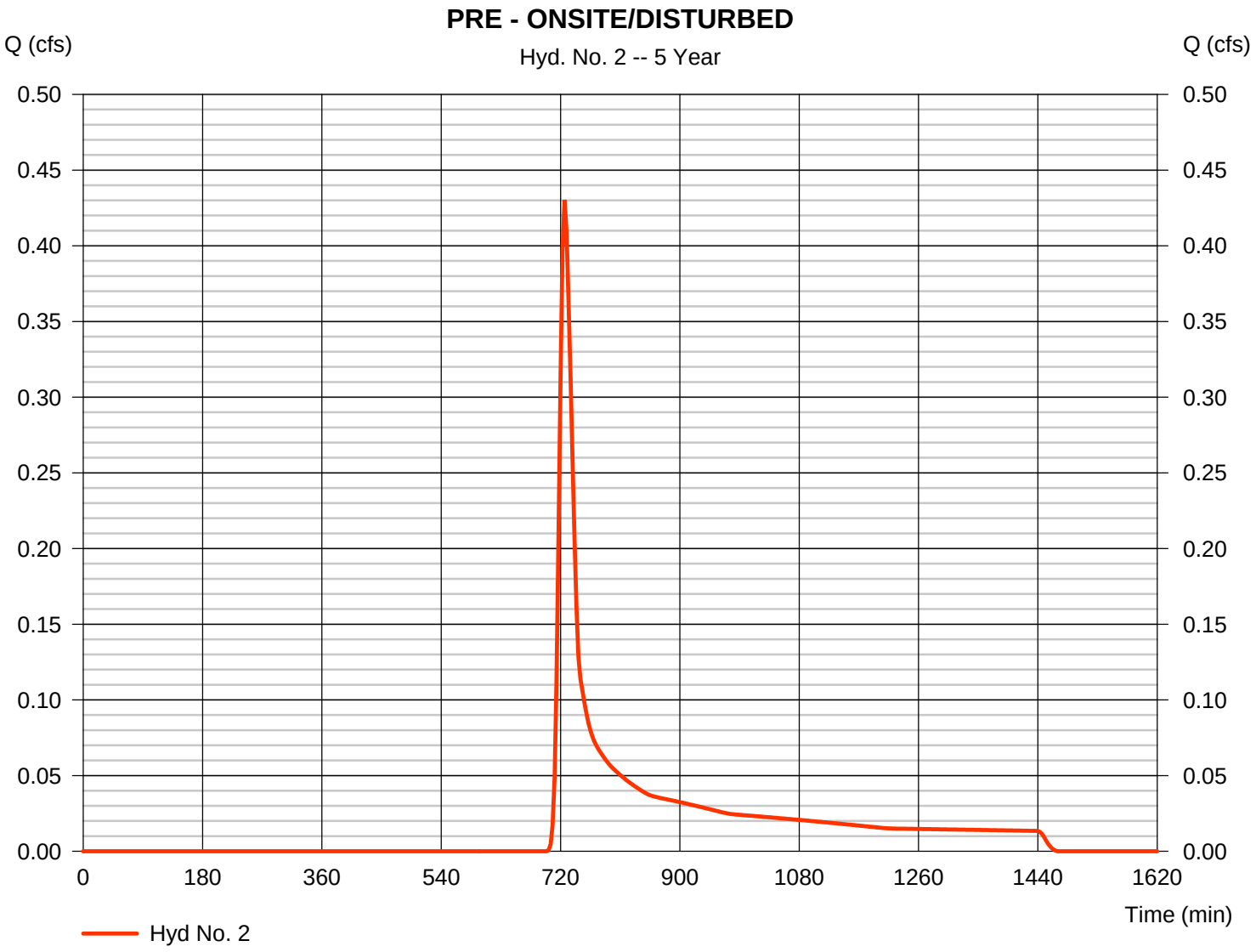


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.430 cfs
Storm frequency	=	5 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	1,702 cuft
Drainage area	=	0.562 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	4.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

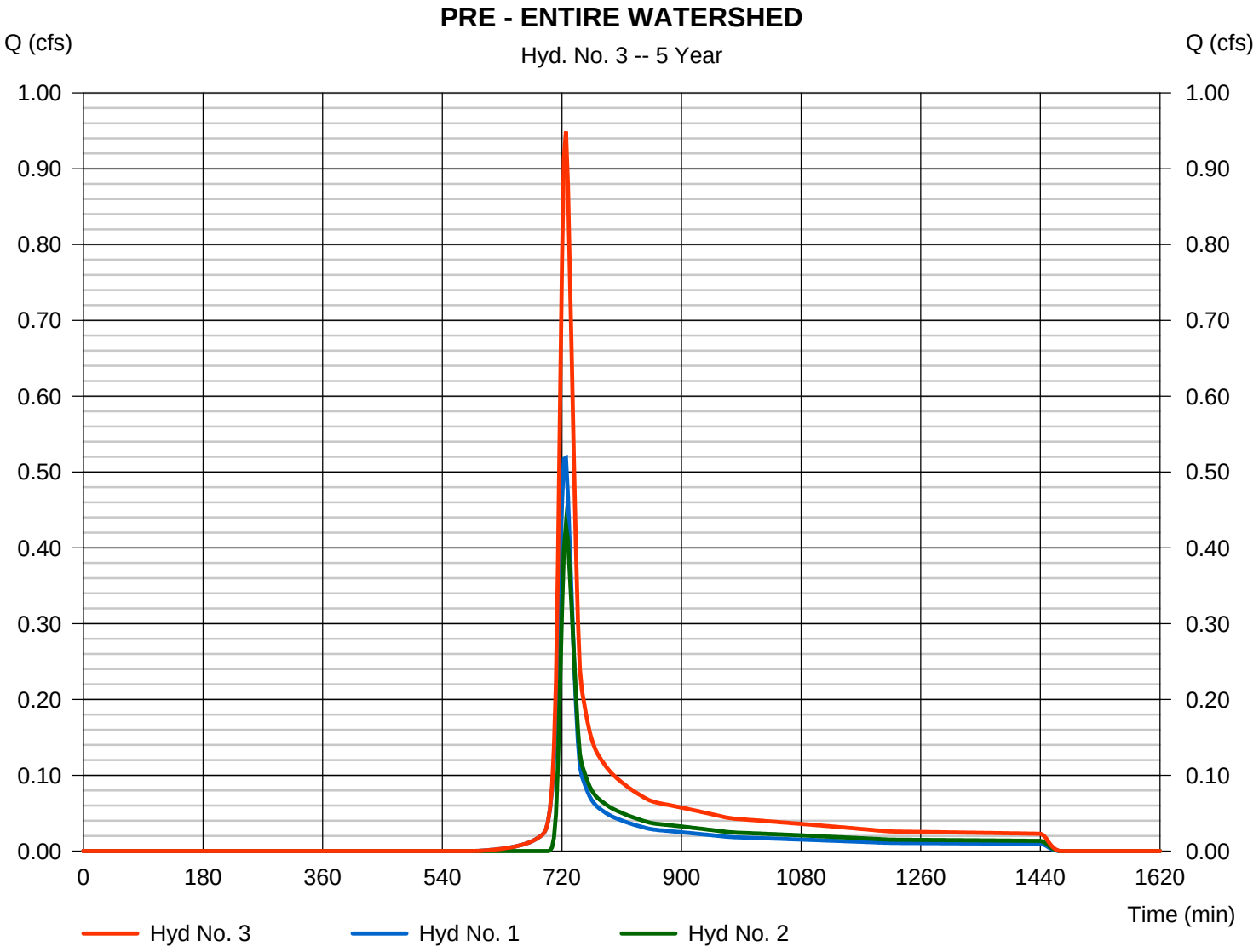


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.949 cfs
Storm frequency	=	5 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	3,394 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

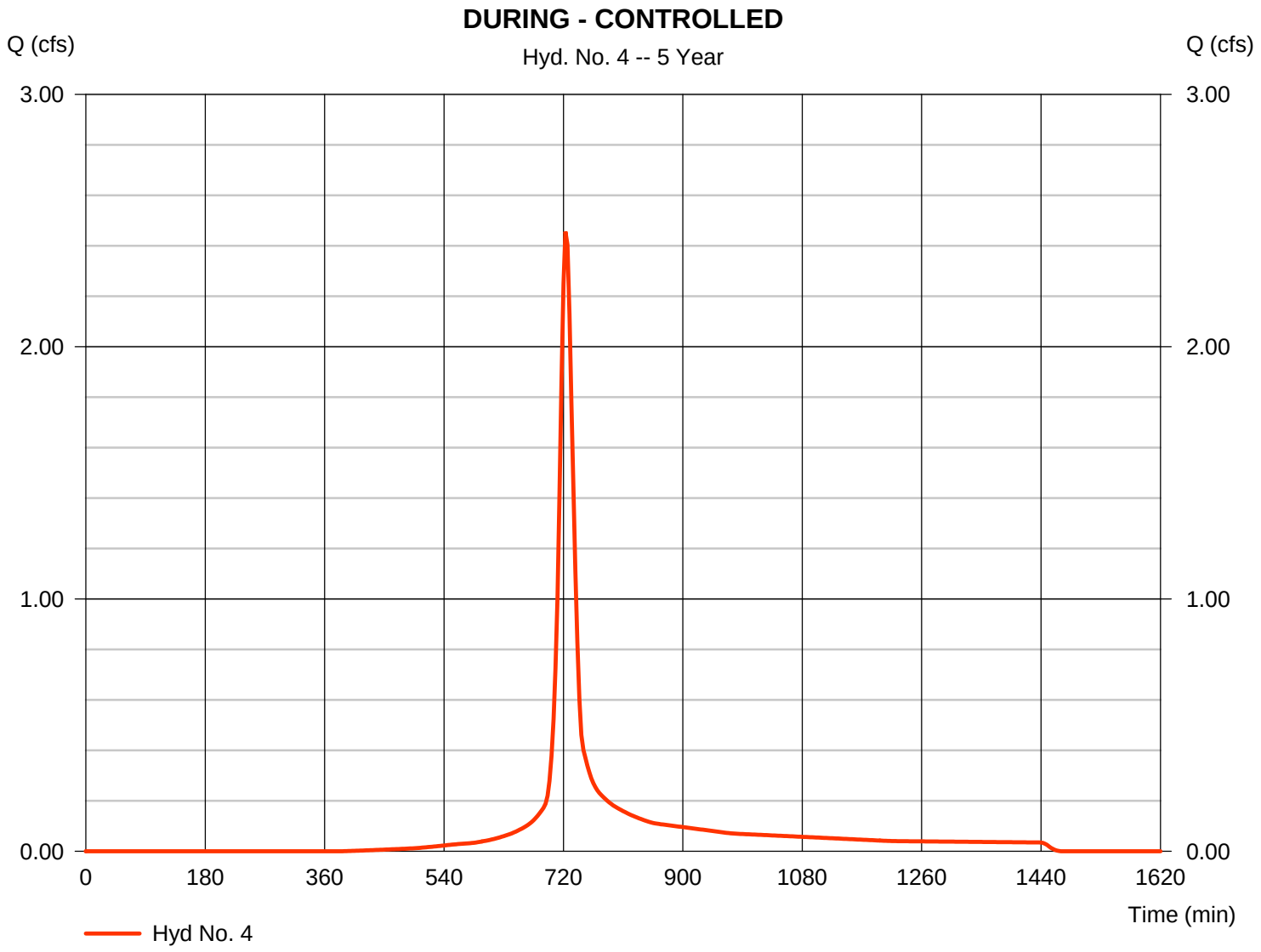


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.456 cfs
Storm frequency	=	5 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	7,849 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	4.20 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

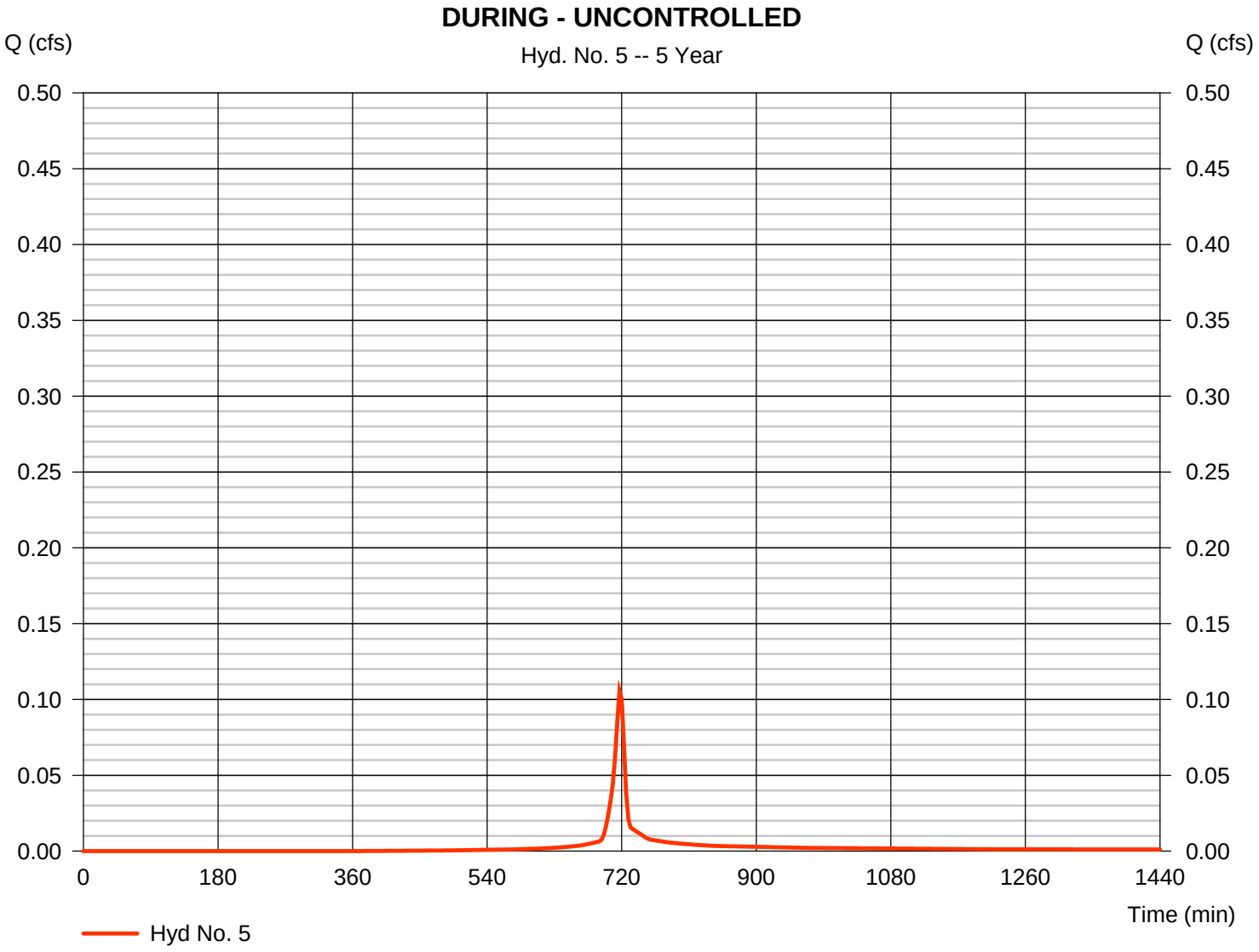


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.106 cfs
Storm frequency	= 5 yrs	Time to peak	= 717 min
Time interval	= 3 min	Hyd. volume	= 241 cuft
Drainage area	= 0.026 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



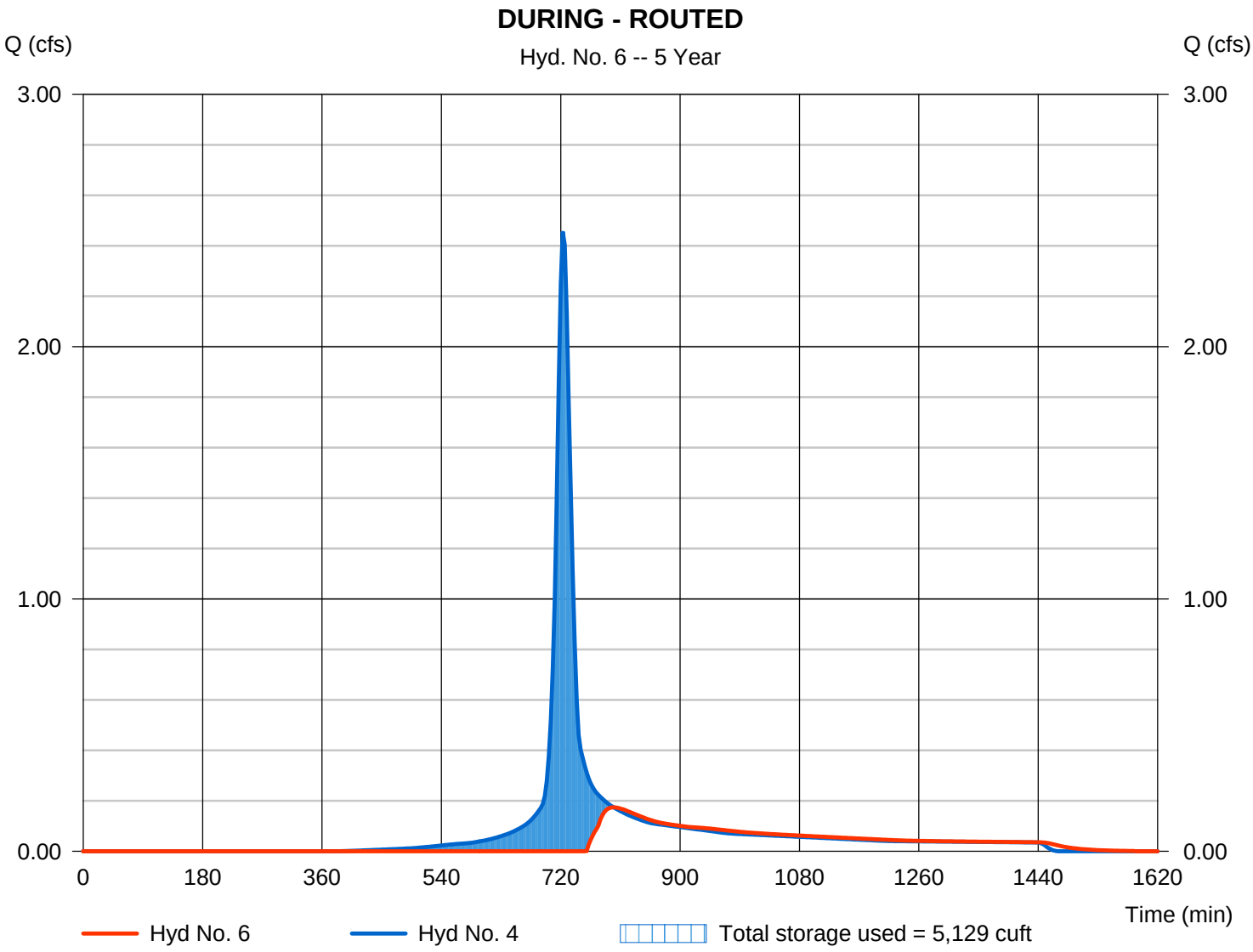
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.174 cfs
Storm frequency	=	5 yrs	Time to peak	=	801 min
Time interval	=	3 min	Hyd. volume	=	2,994 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	272.13 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	5,129 cuft

Storage Indication method used.

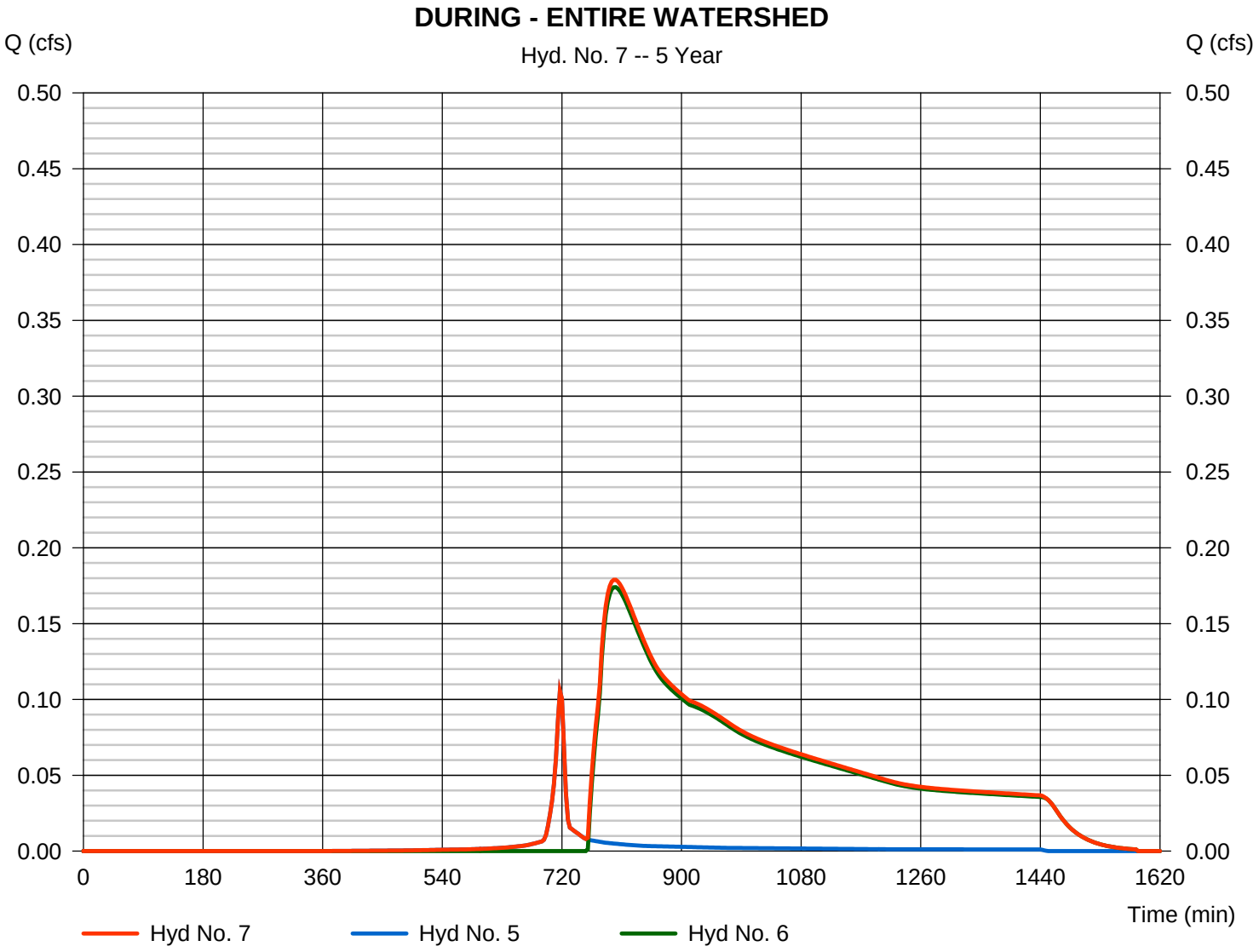


Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 0.179 cfs
Storm frequency	= 5 yrs	Time to peak	= 798 min
Time interval	= 3 min	Hyd. volume	= 3,236 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.026 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

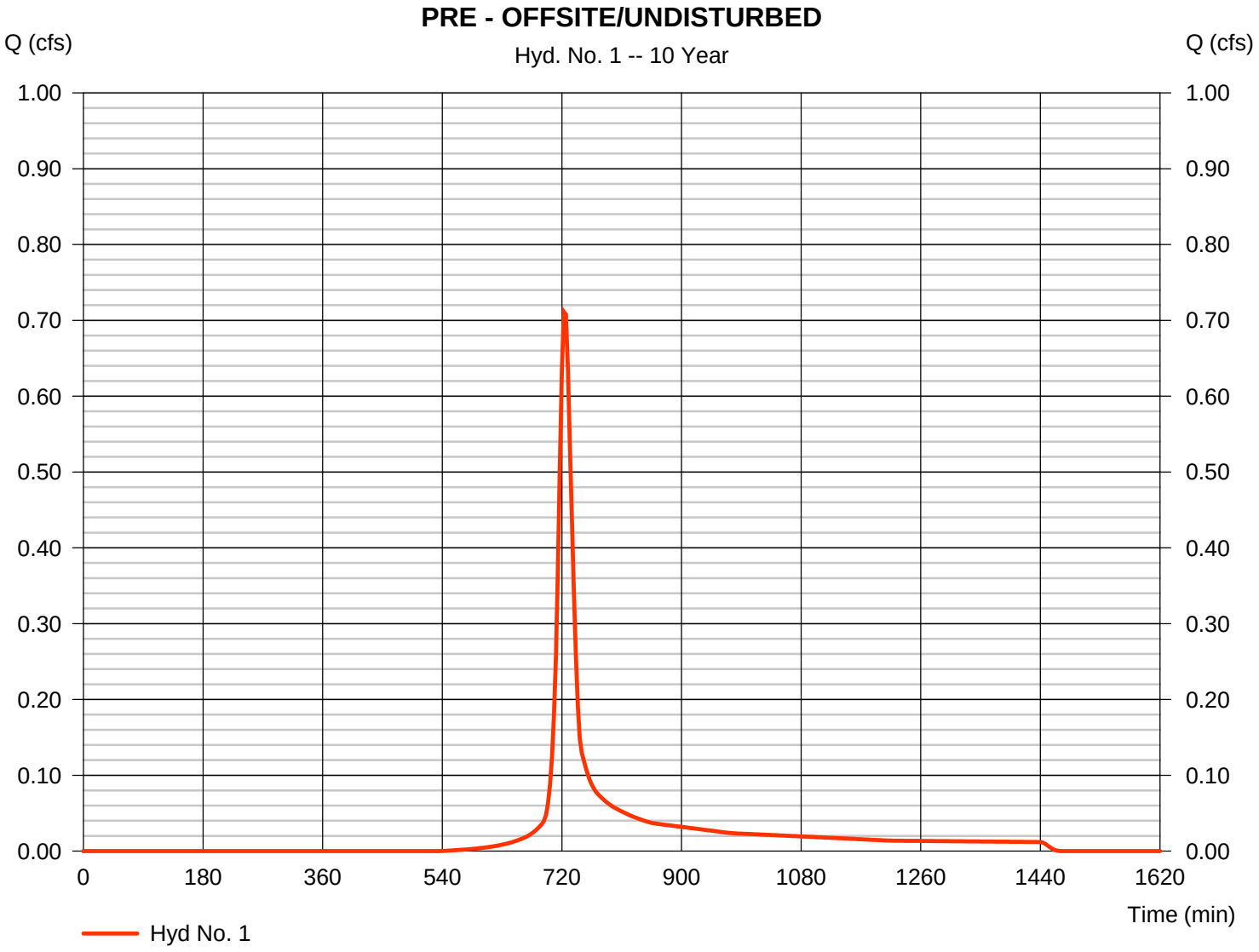
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.711	3	723	2,292	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	0.725	3	726	2,597	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	1.433	3	726	4,889	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	3.122	3	723	10,023	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.133	3	717	307	------	------	------	DURING - UNCONTROLLED
6	Reservoir	0.804	3	744	5,169	4	272.32	5,527	DURING - ROUTED
7	Combine	0.818	3	744	5,476	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.711 cfs
Storm frequency	= 10 yrs	Time to peak	= 723 min
Time interval	= 3 min	Hyd. volume	= 2,292 cuft
Drainage area	= 0.259 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 5.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

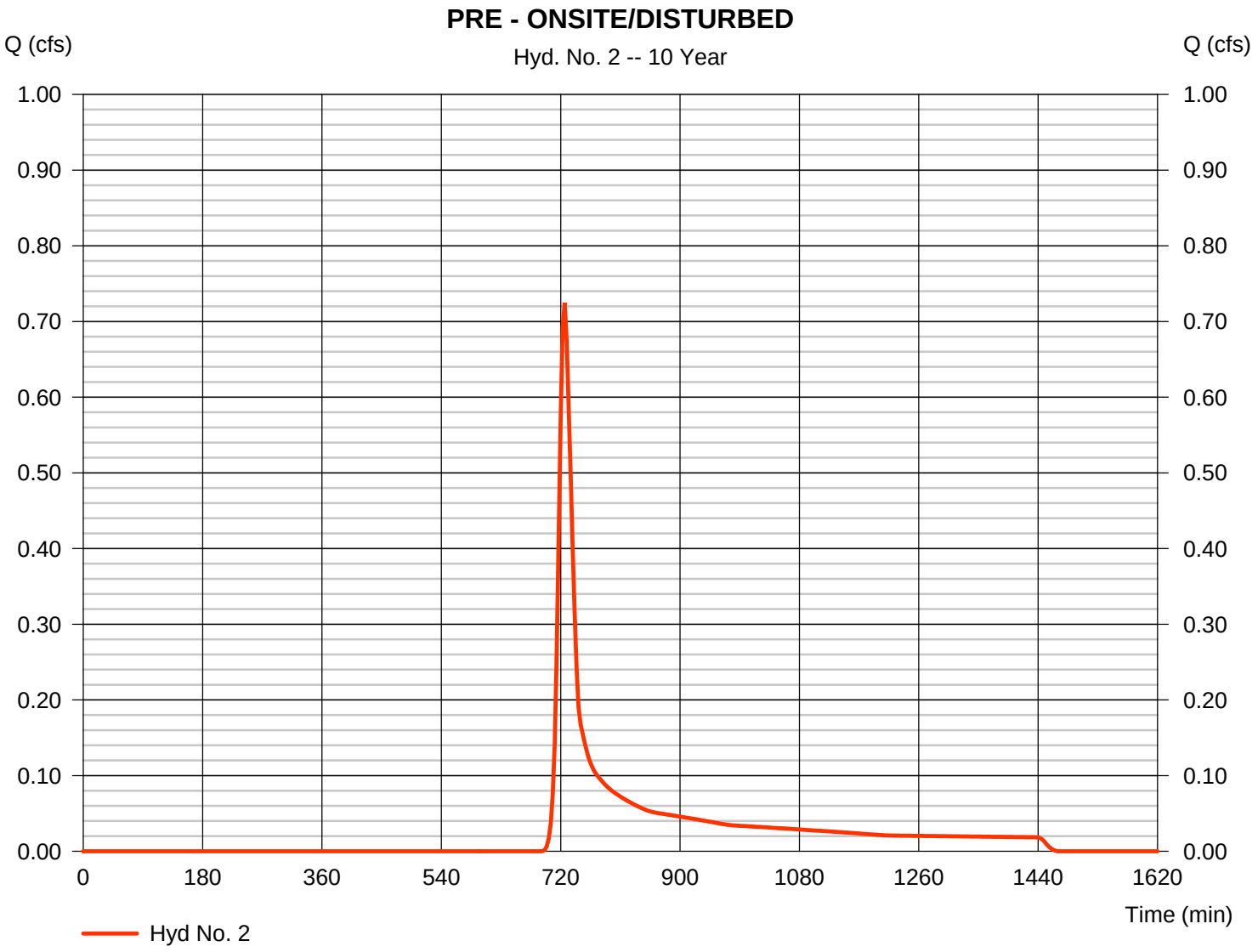


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.725 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	2,597 cuft
Drainage area	=	0.562 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	5.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

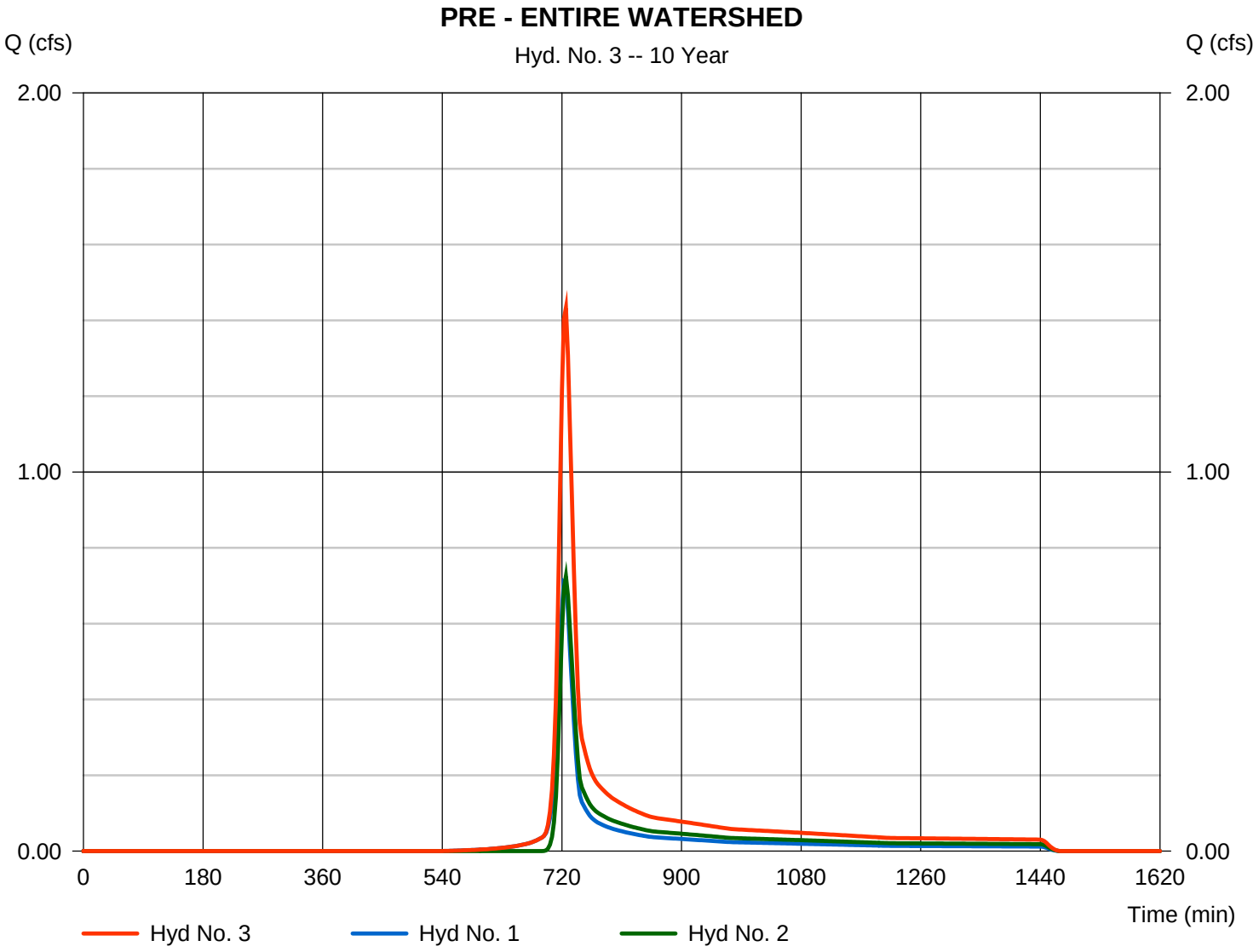


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	1.433 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	4,889 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

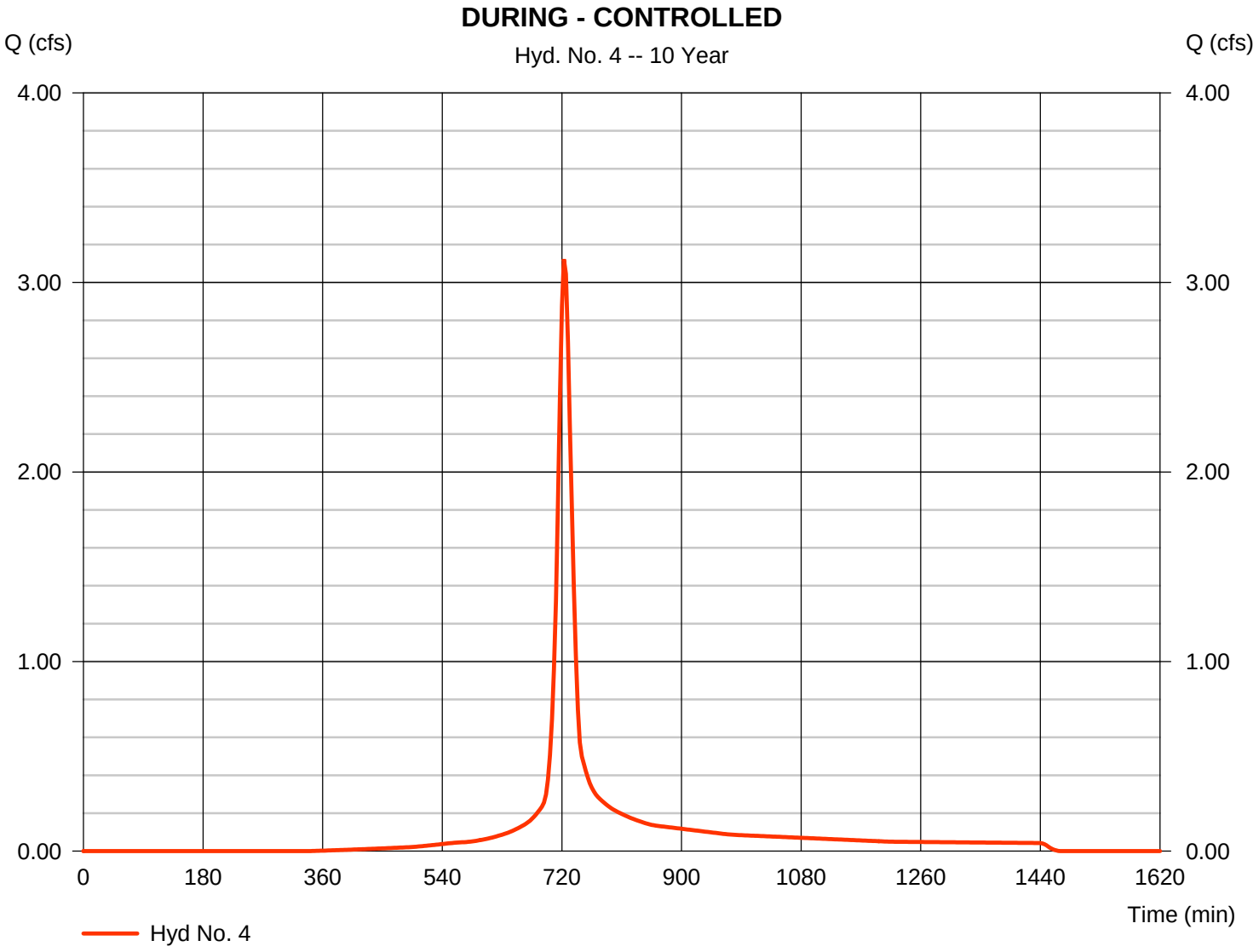


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.122 cfs
Storm frequency	=	10 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	10,023 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	5.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

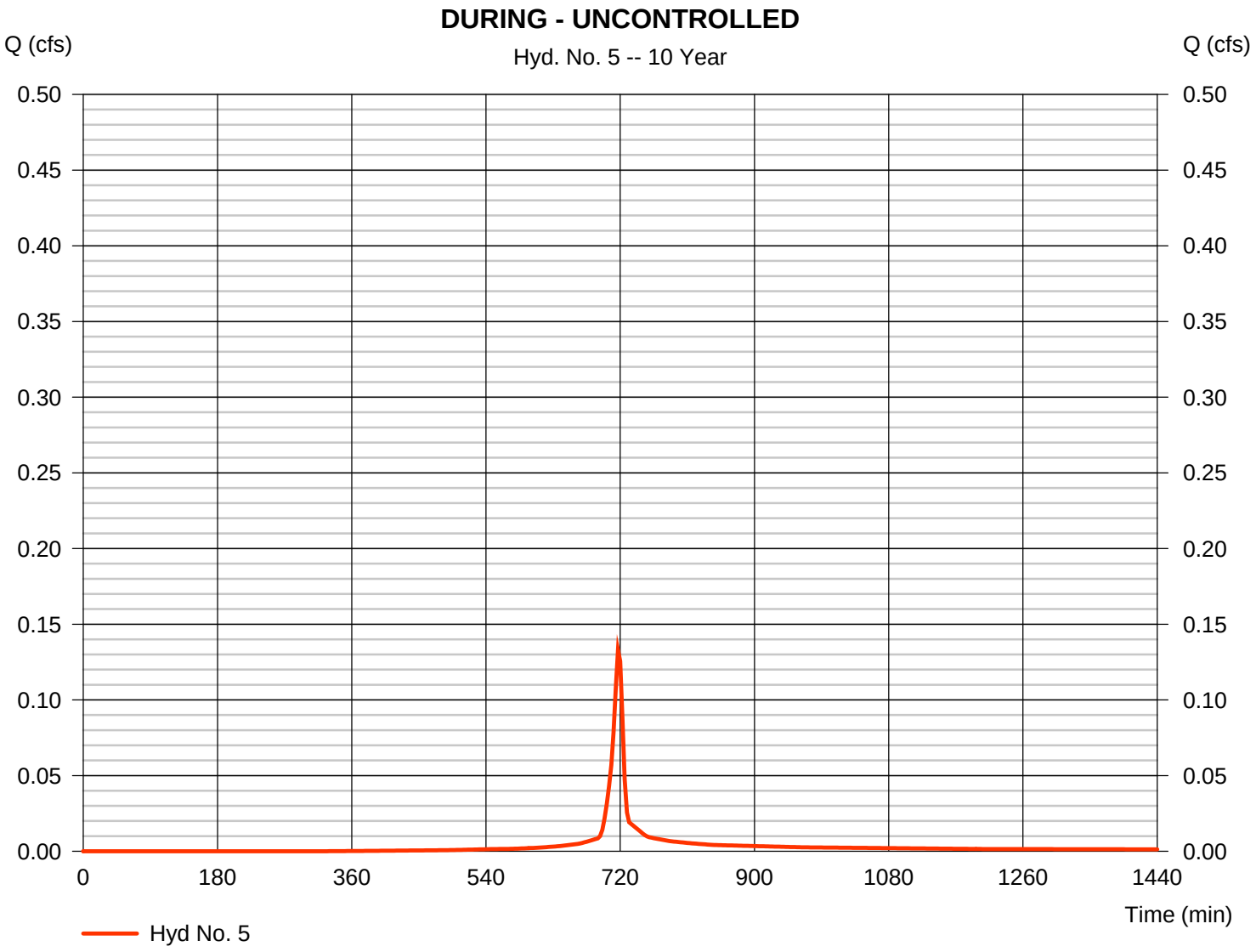


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.133 cfs
Storm frequency	=	10 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	307 cuft
Drainage area	=	0.026 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



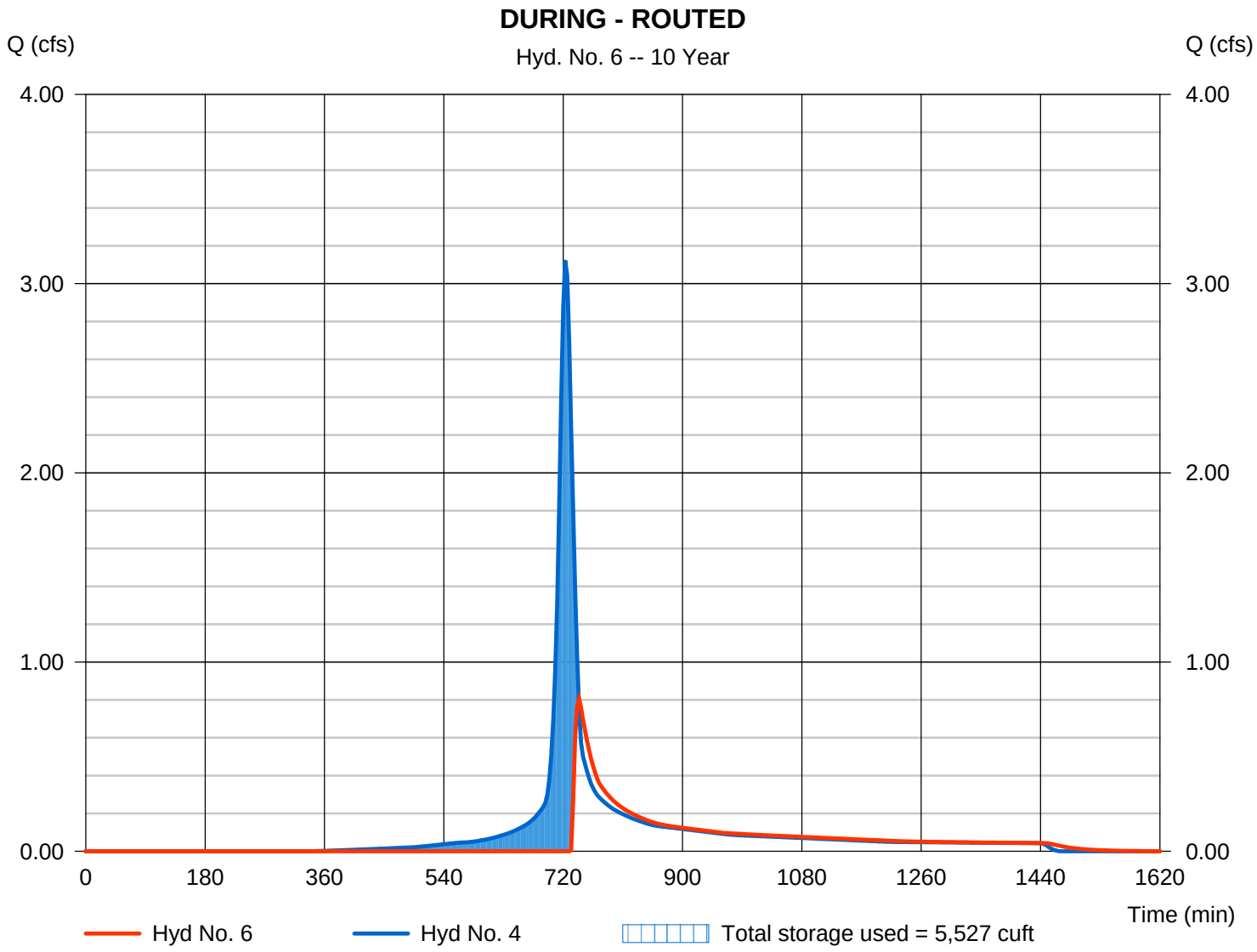
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	0.804 cfs
Storm frequency	=	10 yrs	Time to peak	=	744 min
Time interval	=	3 min	Hyd. volume	=	5,169 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	272.32 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	5,527 cuft

Storage Indication method used.

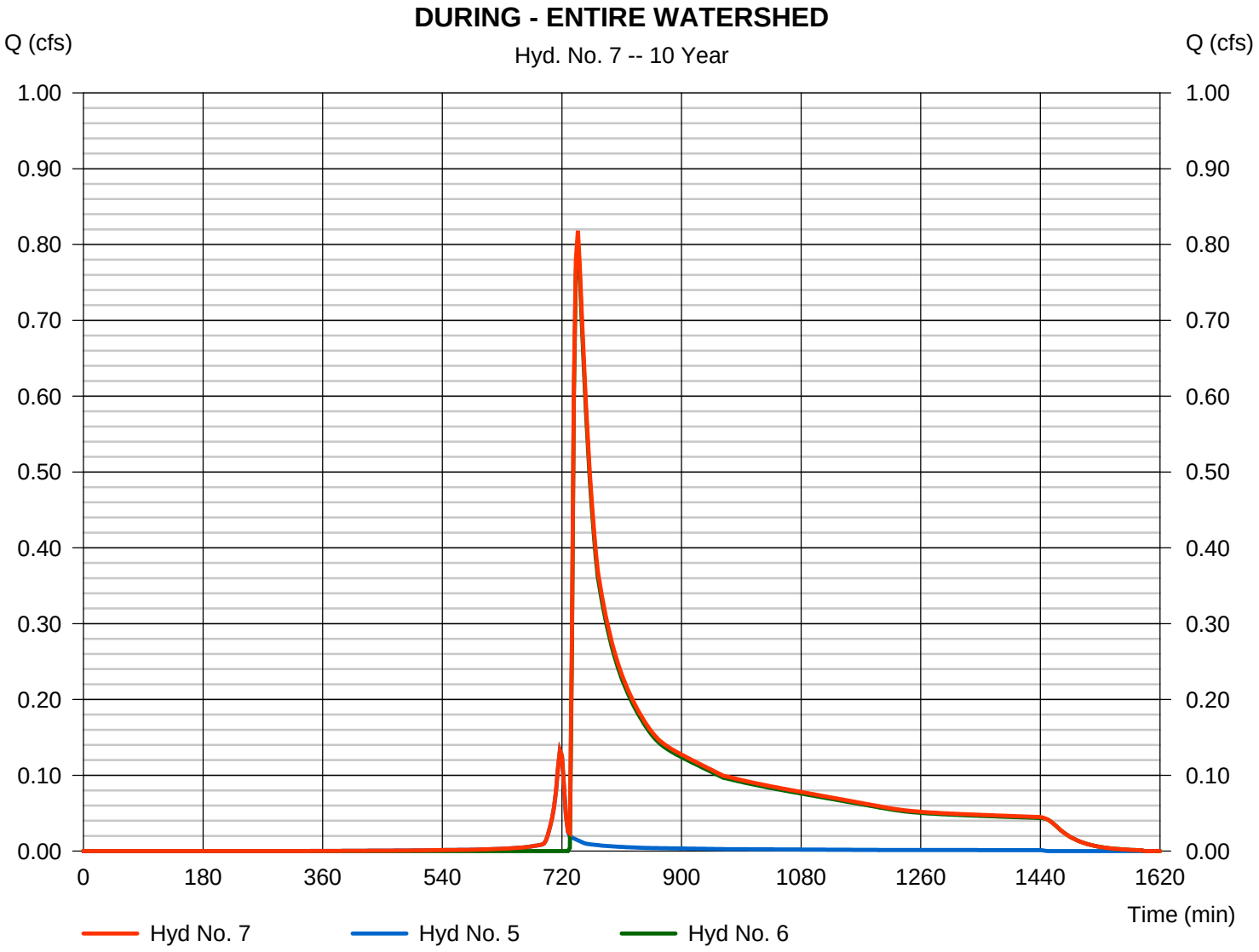


Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	0.818 cfs
Storm frequency	=	10 yrs	Time to peak	=	744 min
Time interval	=	3 min	Hyd. volume	=	5,476 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.026 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

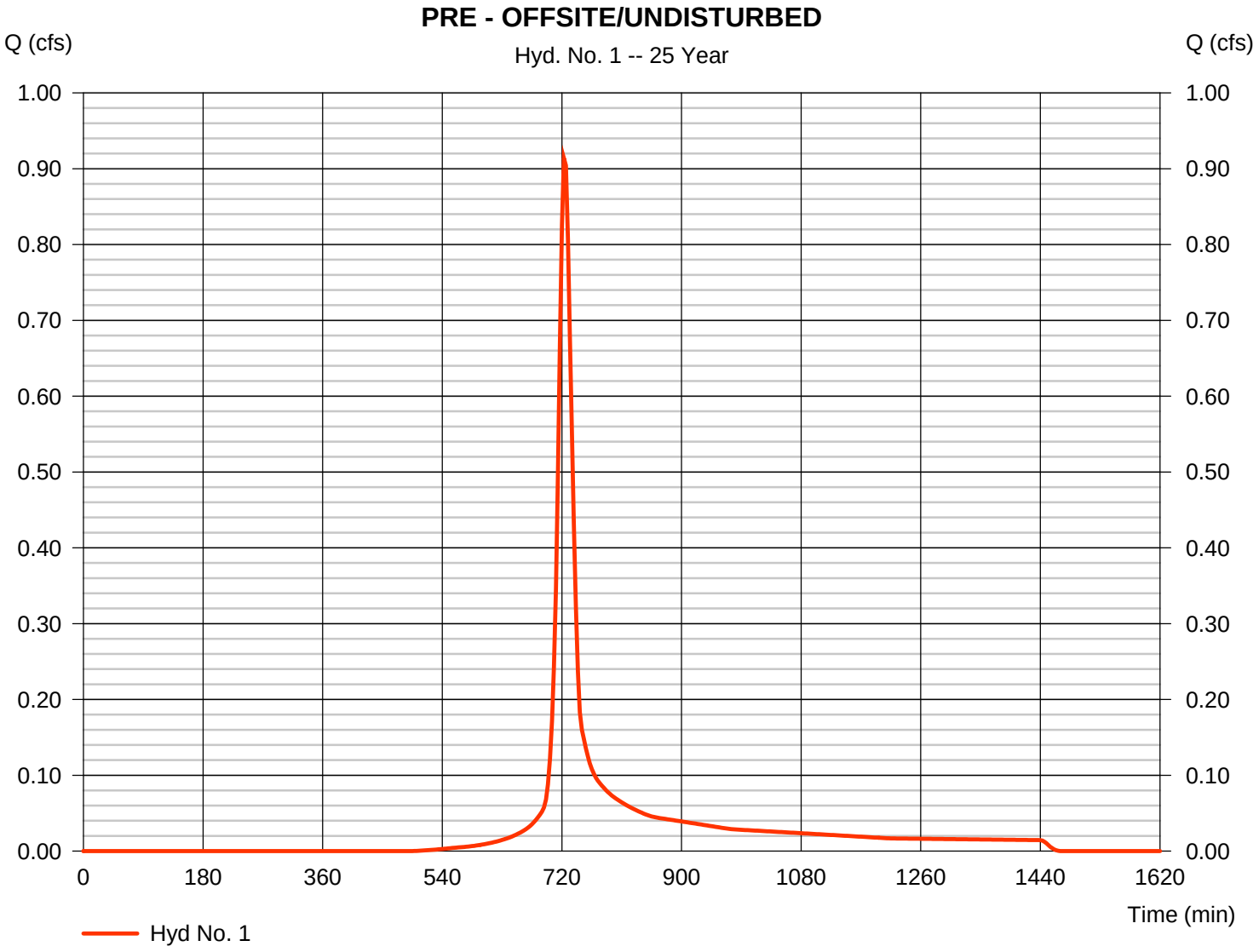
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.914	3	723	2,926	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	1.053	3	726	3,602	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	1.957	3	726	6,528	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	3.792	3	723	12,244	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.160	3	717	373	------	------	------	DURING - UNCONTROLLED
6	Reservoir	1.755	3	738	7,390	4	272.55	6,026	DURING - ROUTED
7	Combine	1.775	3	738	7,763	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.914 cfs
Storm frequency	= 25 yrs	Time to peak	= 723 min
Time interval	= 3 min	Hyd. volume	= 2,926 cuft
Drainage area	= 0.259 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.90 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

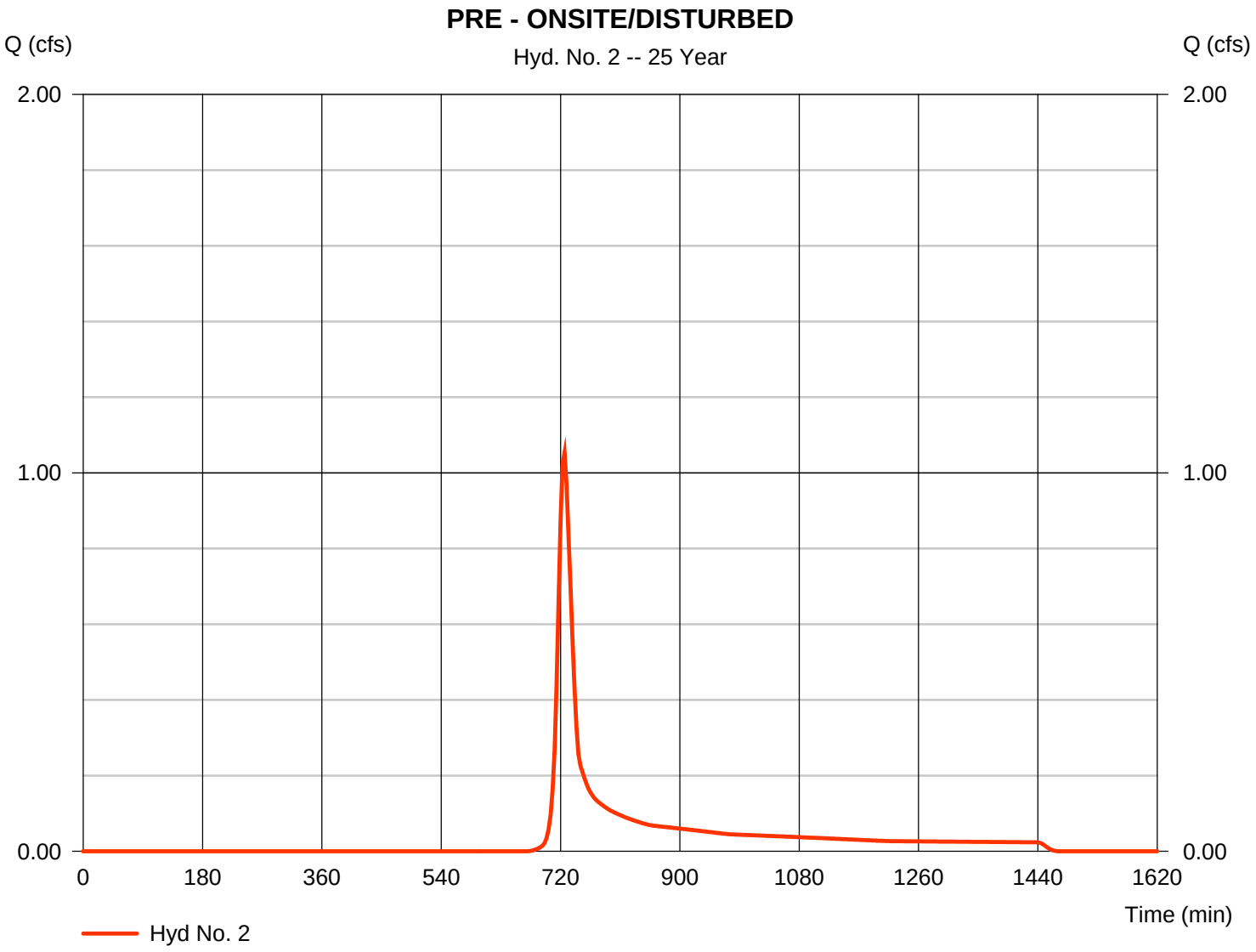


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.053 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	3,602 cuft
Drainage area	=	0.562 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	5.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

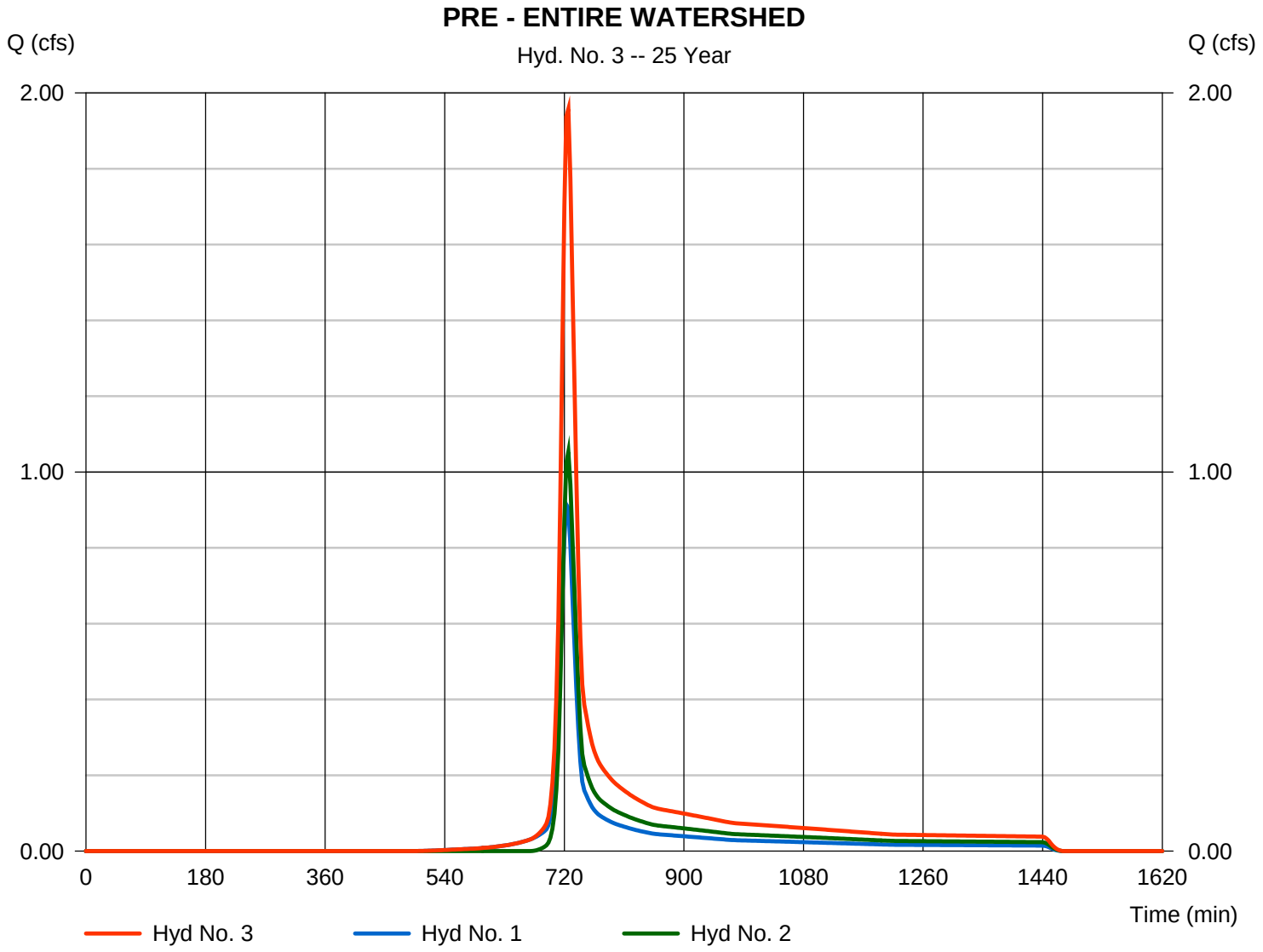


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	1.957 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	6,528 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

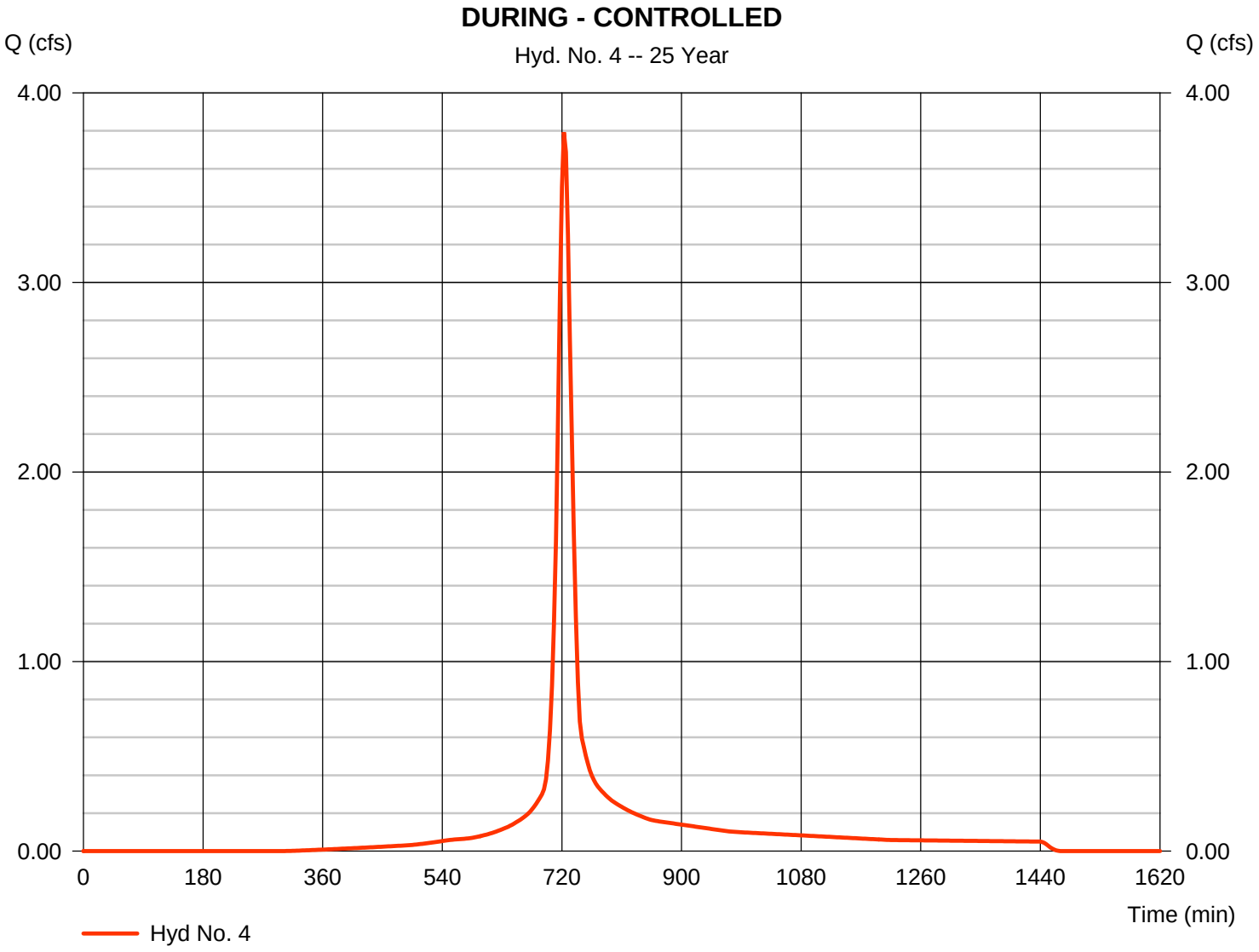


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.792 cfs
Storm frequency	=	25 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	12,244 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	5.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

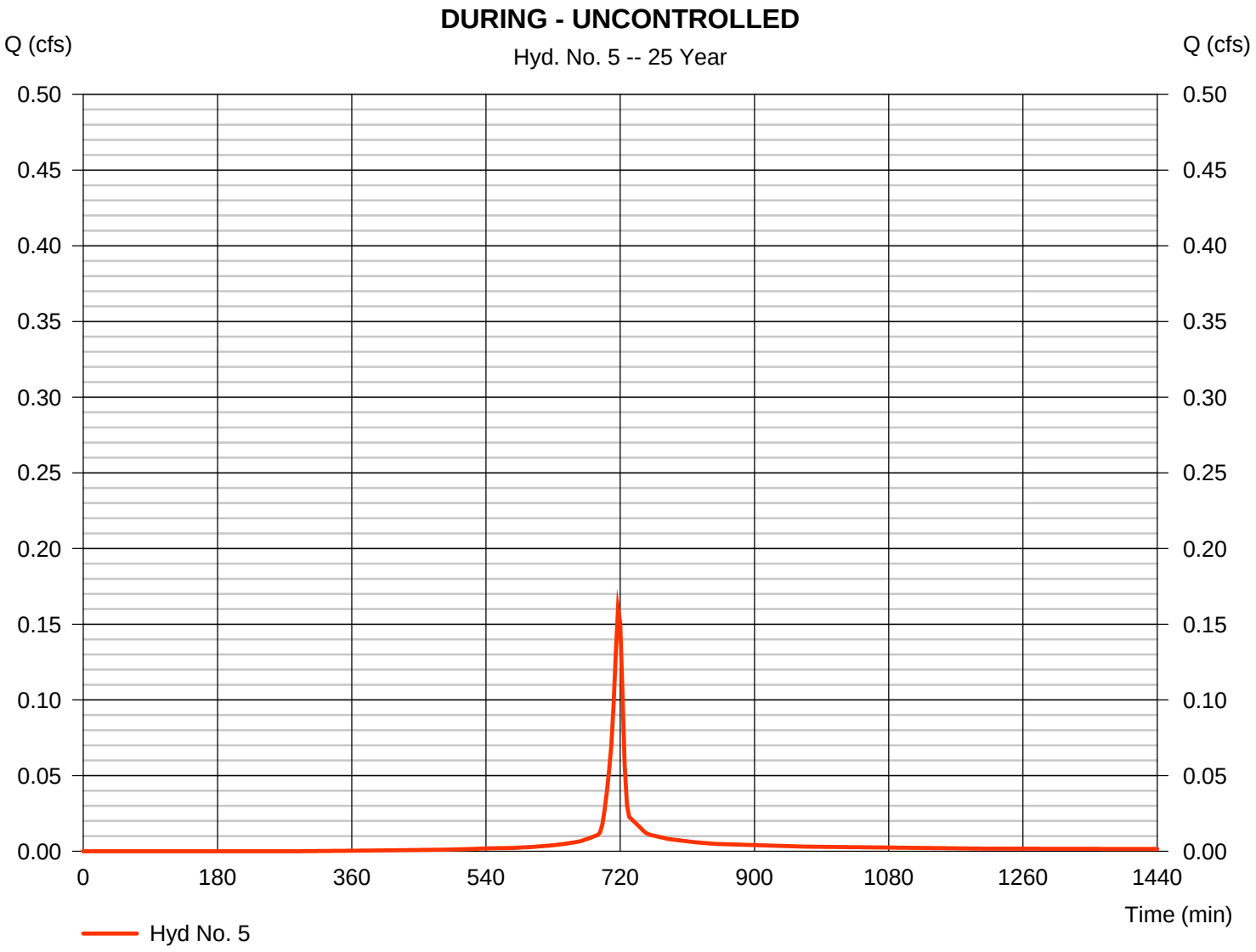


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.160 cfs
Storm frequency	=	25 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	373 cuft
Drainage area	=	0.026 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



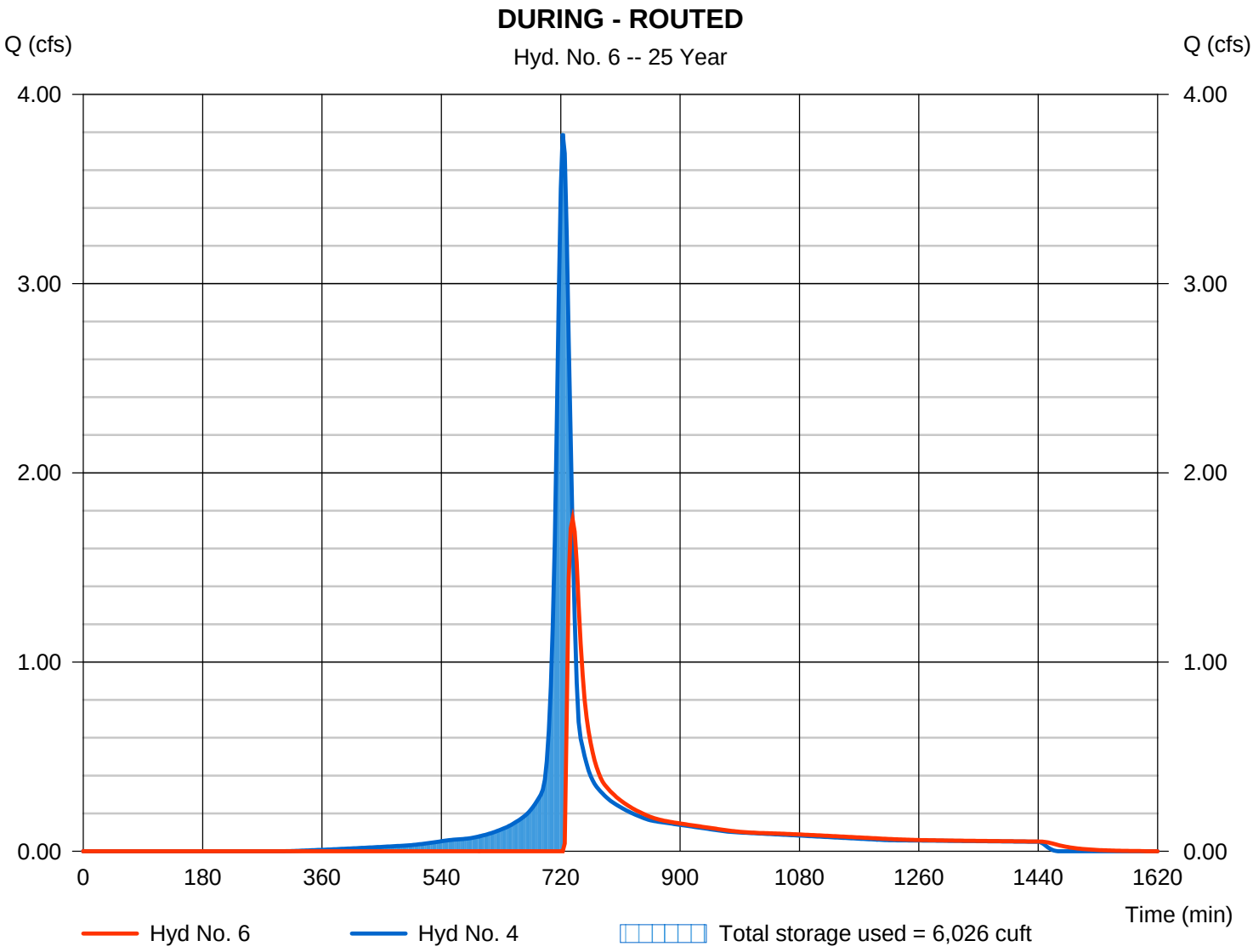
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	1.755 cfs
Storm frequency	=	25 yrs	Time to peak	=	738 min
Time interval	=	3 min	Hyd. volume	=	7,390 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	272.55 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	6,026 cuft

Storage Indication method used.

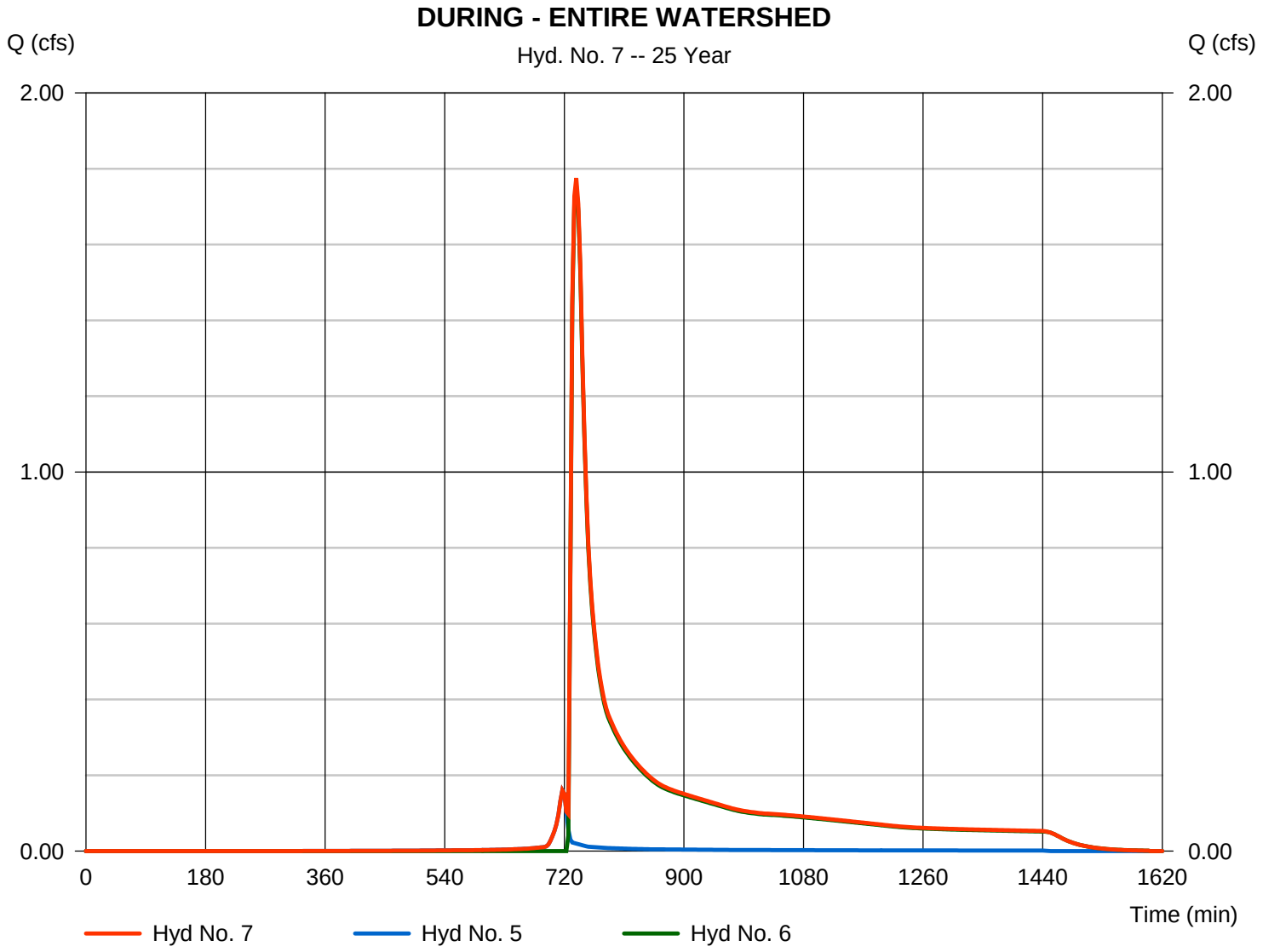


Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	1.775 cfs
Storm frequency	=	25 yrs	Time to peak	=	738 min
Time interval	=	3 min	Hyd. volume	=	7,763 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.026 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

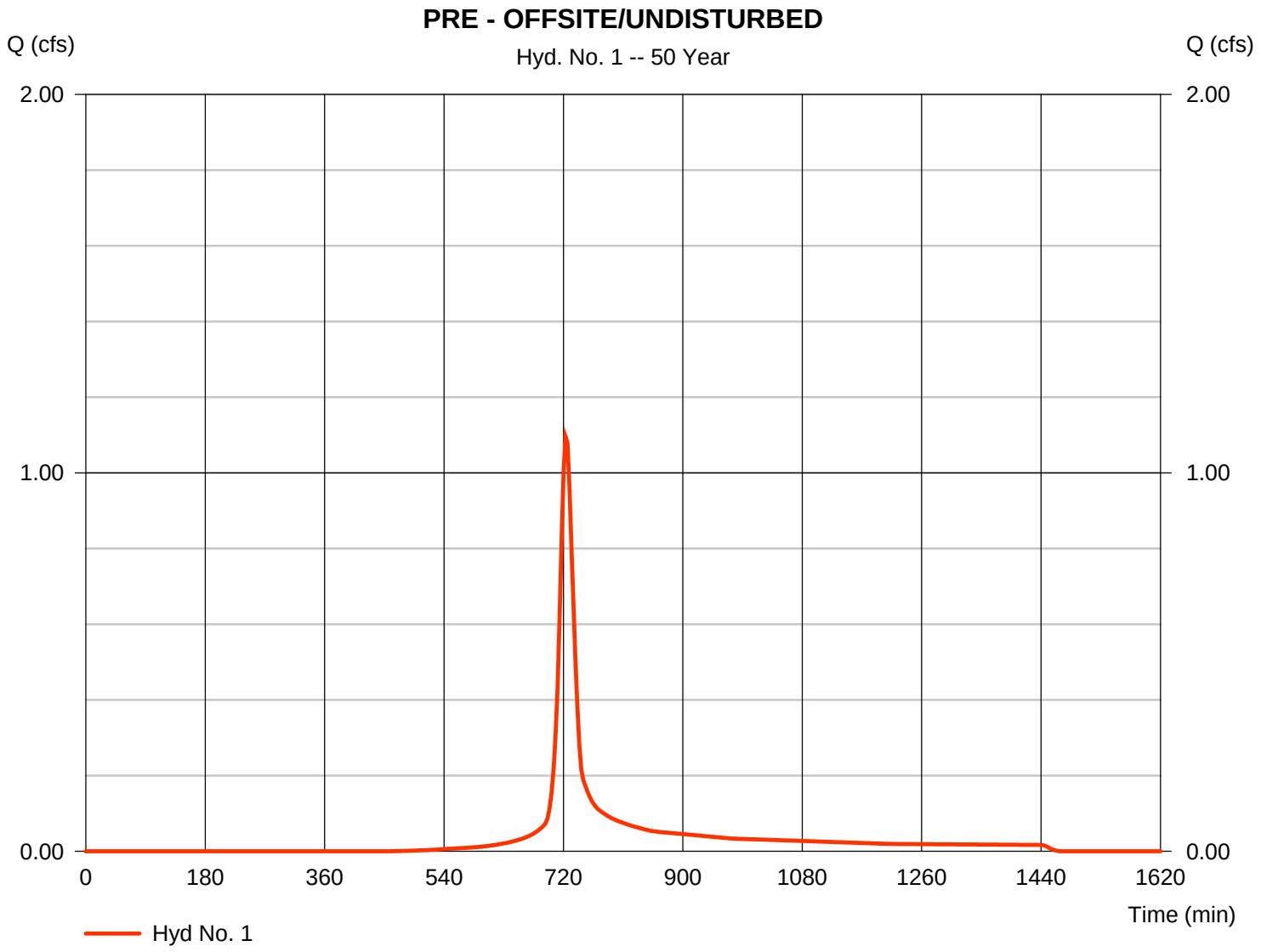
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.096	3	723	3,500	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	1.362	3	726	4,556	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	2.442	3	726	8,055	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	4.379	3	723	14,213	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.184	3	717	432	------	------	------	DURING - UNCONTROLLED
6	Reservoir	2.354	3	735	9,359	4	272.78	6,504	DURING - ROUTED
7	Combine	2.378	3	735	9,791	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.096 cfs
Storm frequency	=	50 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	3,500 cuft
Drainage area	=	0.259 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

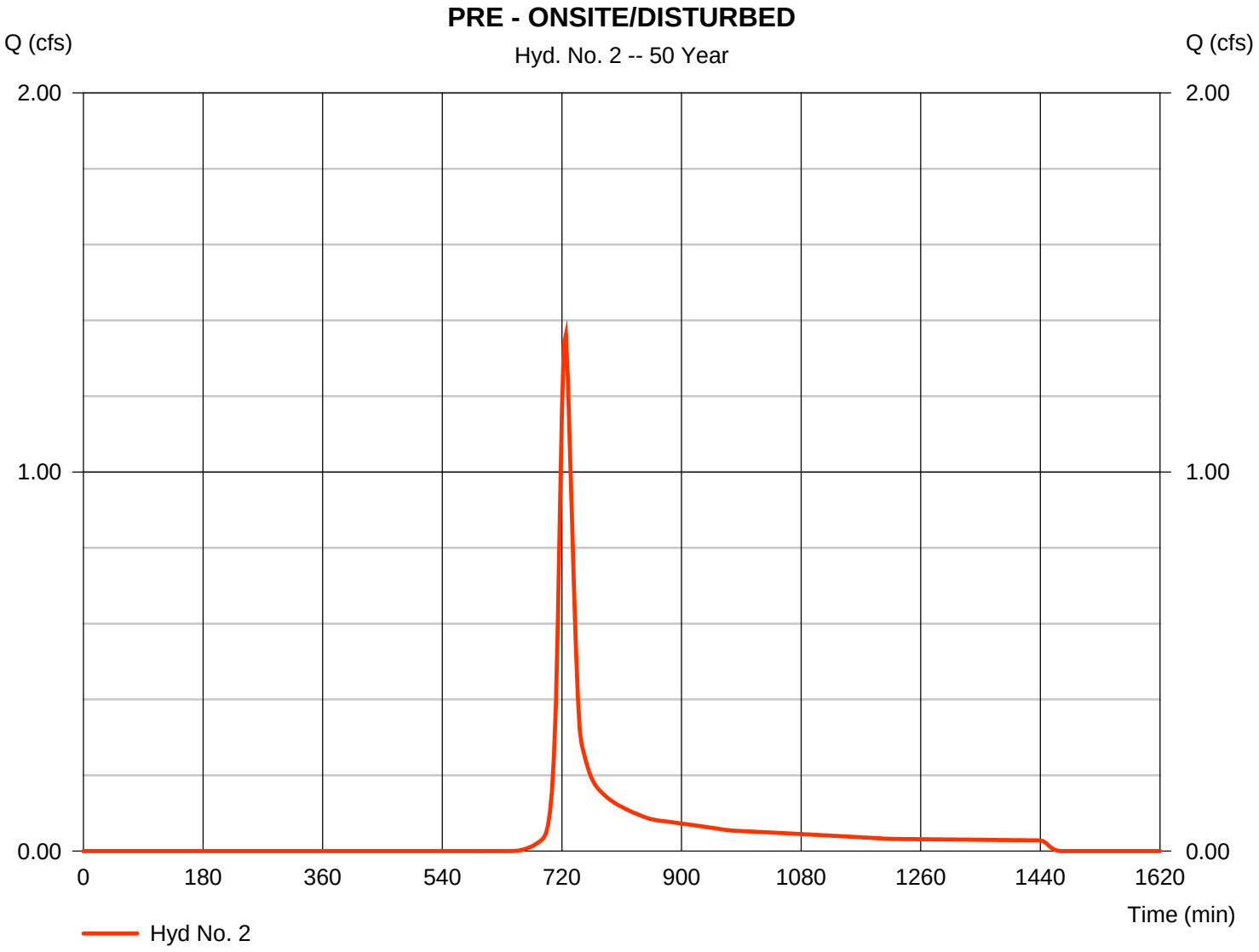


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.362 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	4,556 cuft
Drainage area	=	0.562 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

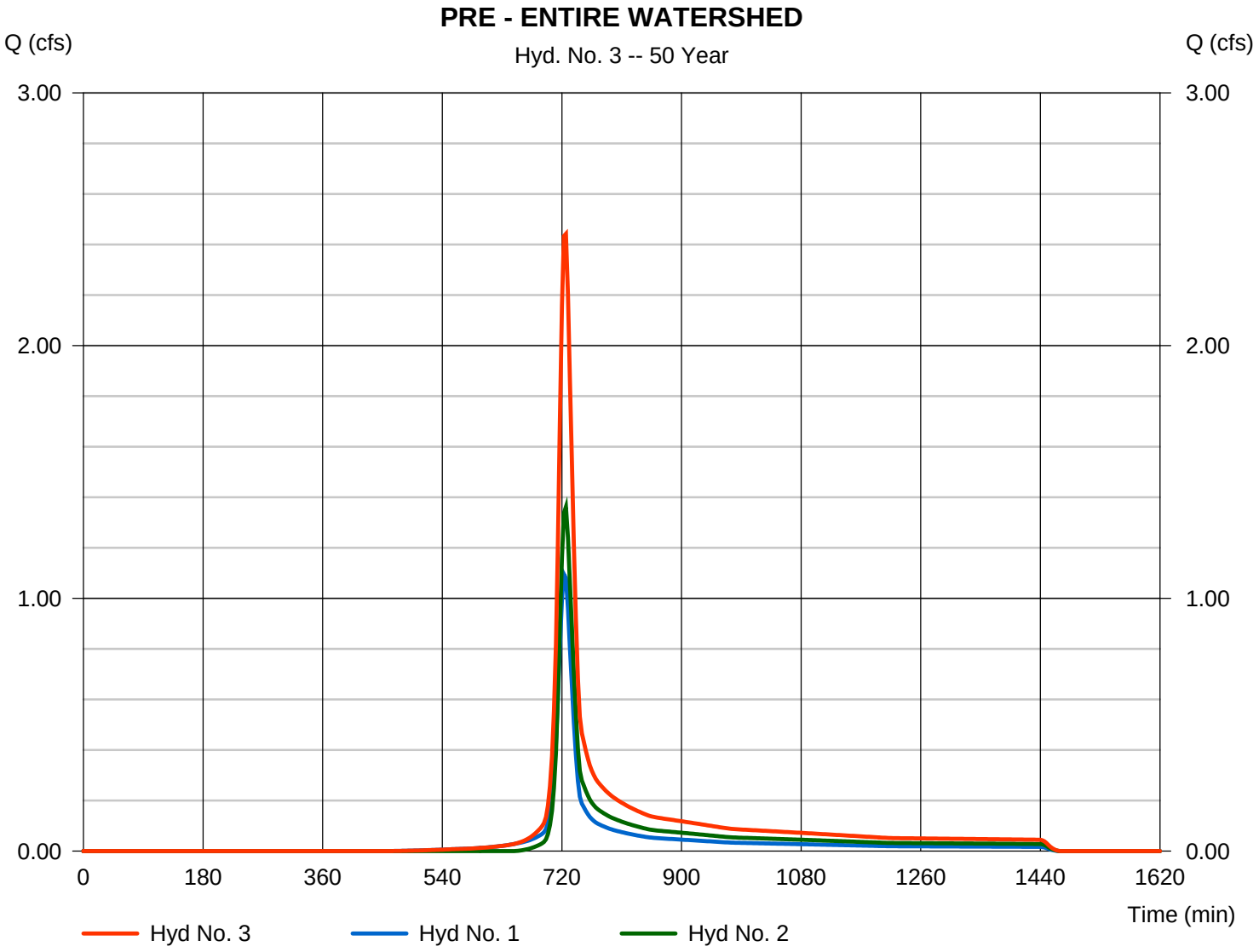


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	2.442 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	8,055 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

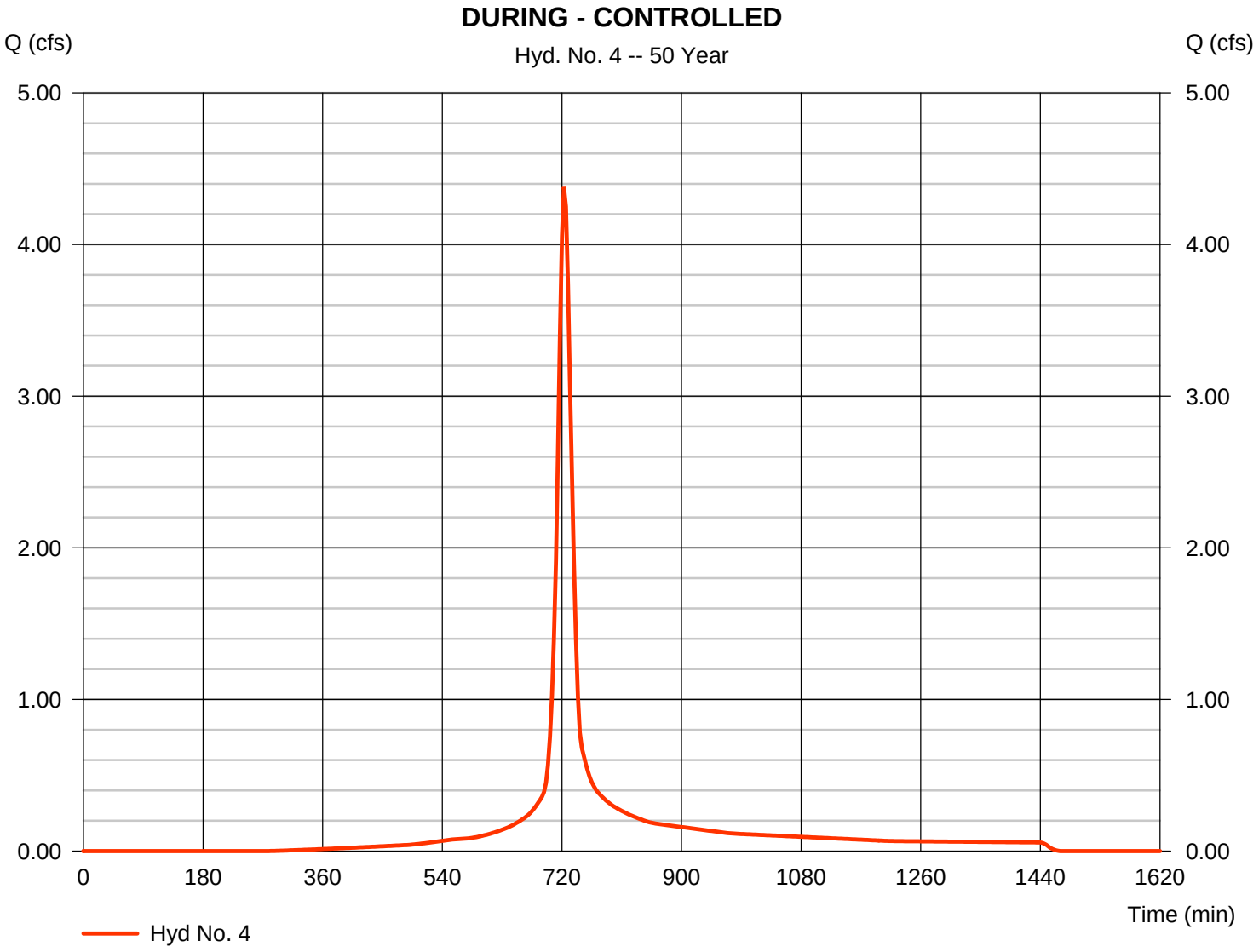


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.379 cfs
Storm frequency	=	50 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	14,213 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

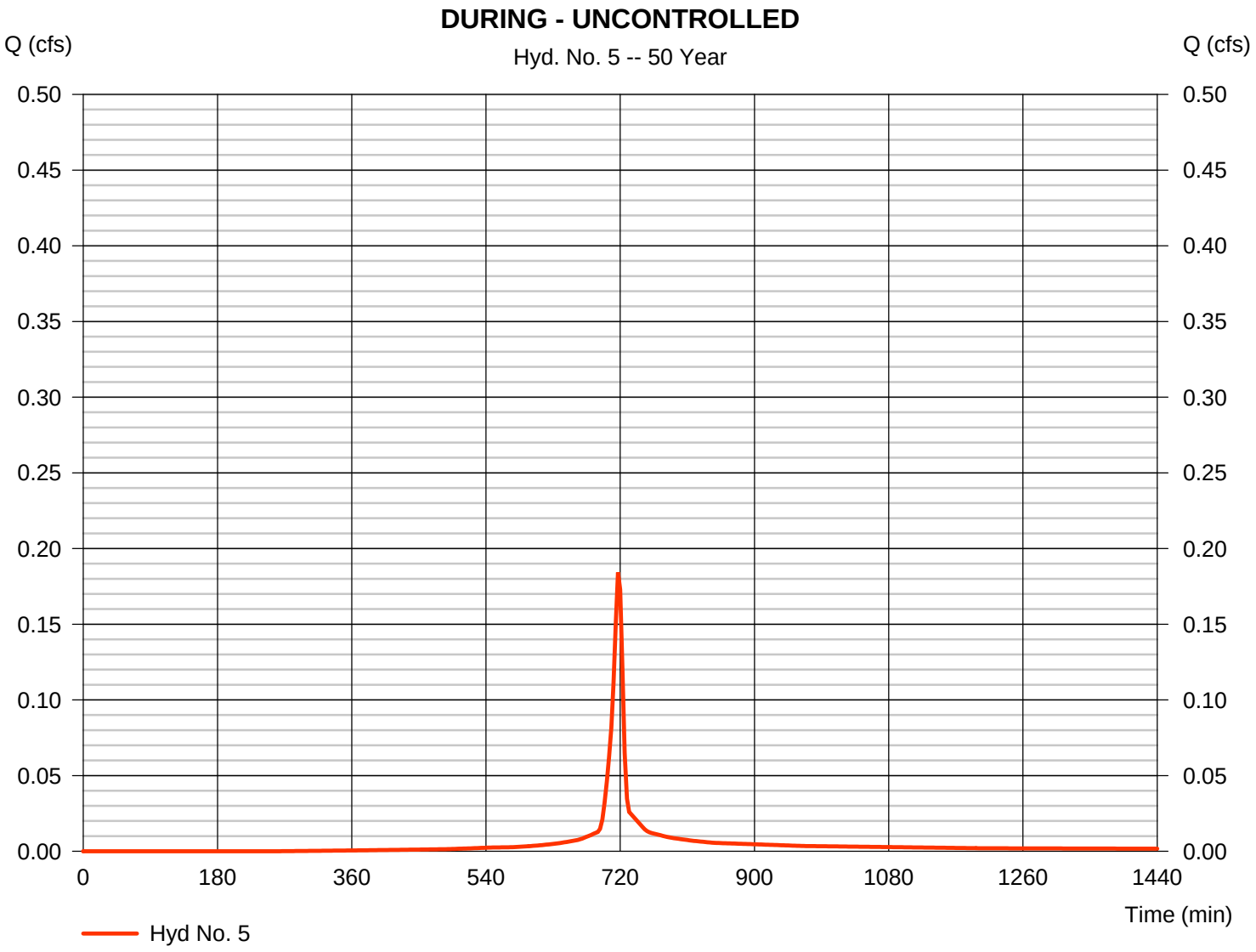


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.184 cfs
Storm frequency	=	50 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	432 cuft
Drainage area	=	0.026 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	6.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



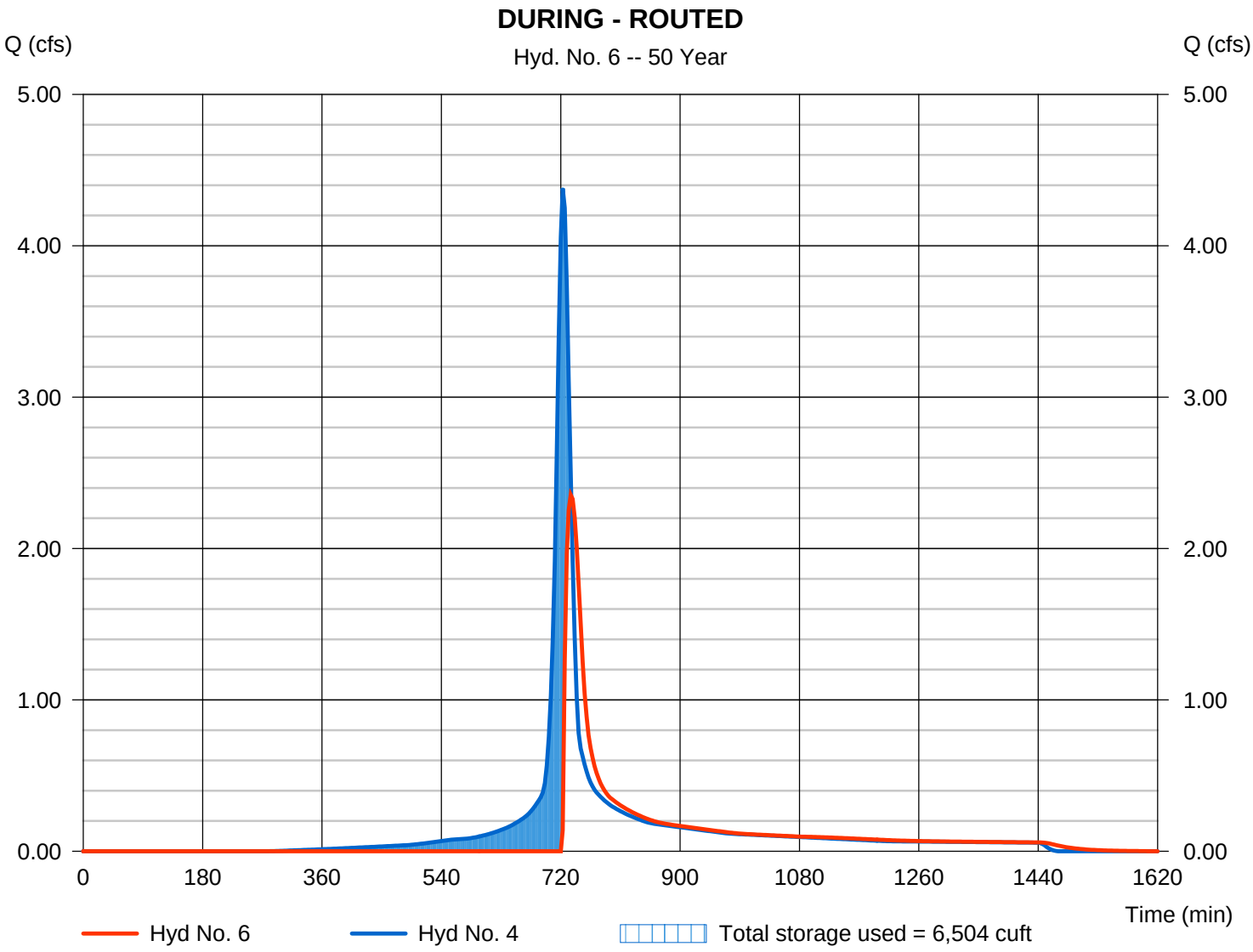
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	2.354 cfs
Storm frequency	=	50 yrs	Time to peak	=	735 min
Time interval	=	3 min	Hyd. volume	=	9,359 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	272.78 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	6,504 cuft

Storage Indication method used.

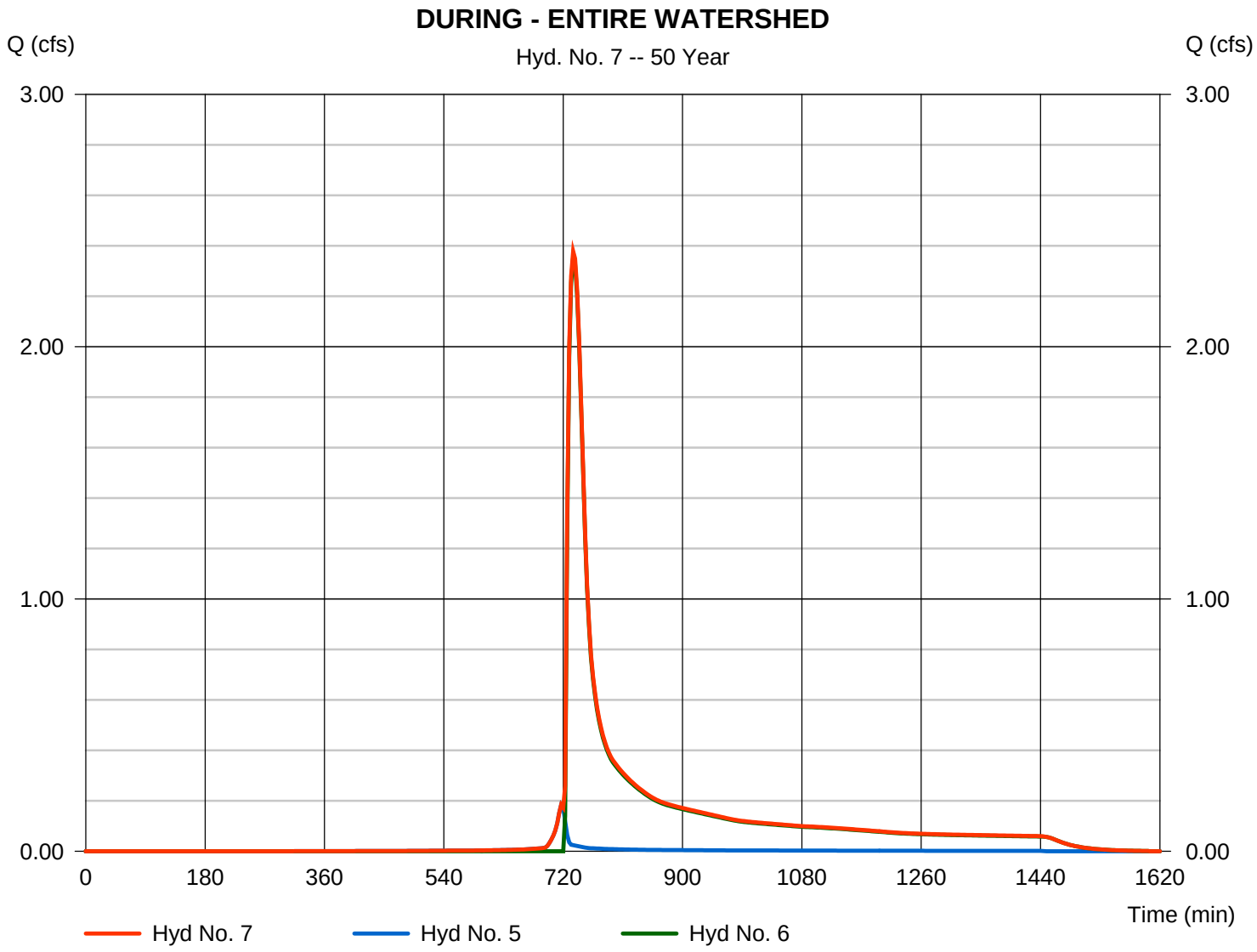


Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	= Combine	Peak discharge	= 2.378 cfs
Storm frequency	= 50 yrs	Time to peak	= 735 min
Time interval	= 3 min	Hyd. volume	= 9,791 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.026 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

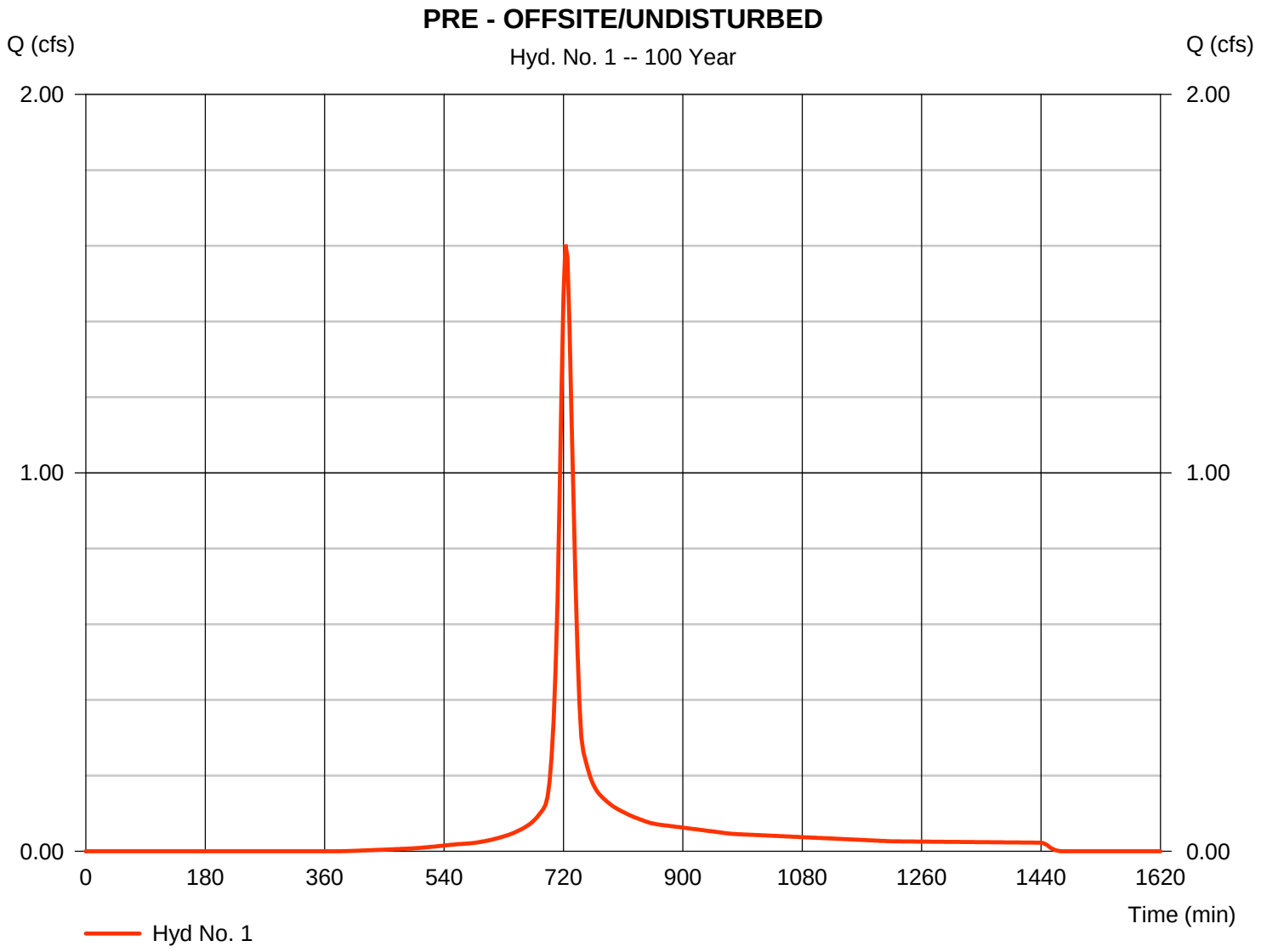
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.603	3	723	5,124	------	------	------	PRE - OFFSITE/UNDISTURBED
2	SCS Runoff	2.272	3	726	7,406	------	------	------	PRE - ONSITE/DISTURBED
3	Combine	3.870	3	723	12,530	1, 2	------	------	PRE - ENTIRE WATERSHED
4	SCS Runoff	5.968	3	723	19,641	------	------	------	DURING - CONTROLLED
5	SCS Runoff	0.249	3	717	595	------	------	------	DURING - UNCONTROLLED
6	Reservoir	3.669	3	735	14,787	4	273.39	7,945	DURING - ROUTED
7	Combine	3.701	3	735	15,381	5, 6	------	------	DURING - ENTIRE WATERSHED

Hydrograph Report

Hyd. No. 1

PRE - OFFSITE/UNDISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.603 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	5,124 cuft
Drainage area	=	0.259 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

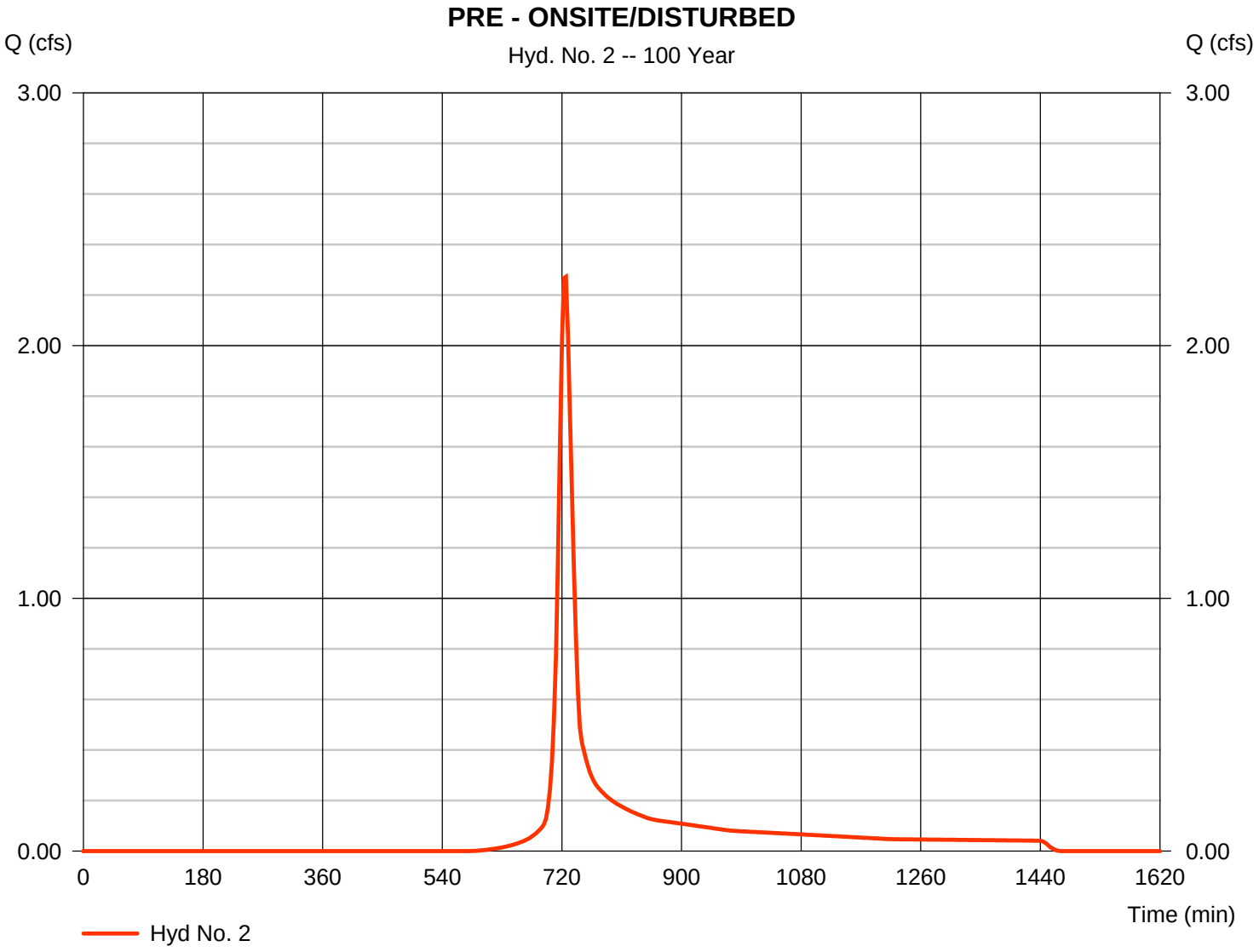


Hydrograph Report

Hyd. No. 2

PRE - ONSITE/DISTURBED

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.272 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	3 min	Hyd. volume	=	7,406 cuft
Drainage area	=	0.562 ac	Curve number	=	59
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.90 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

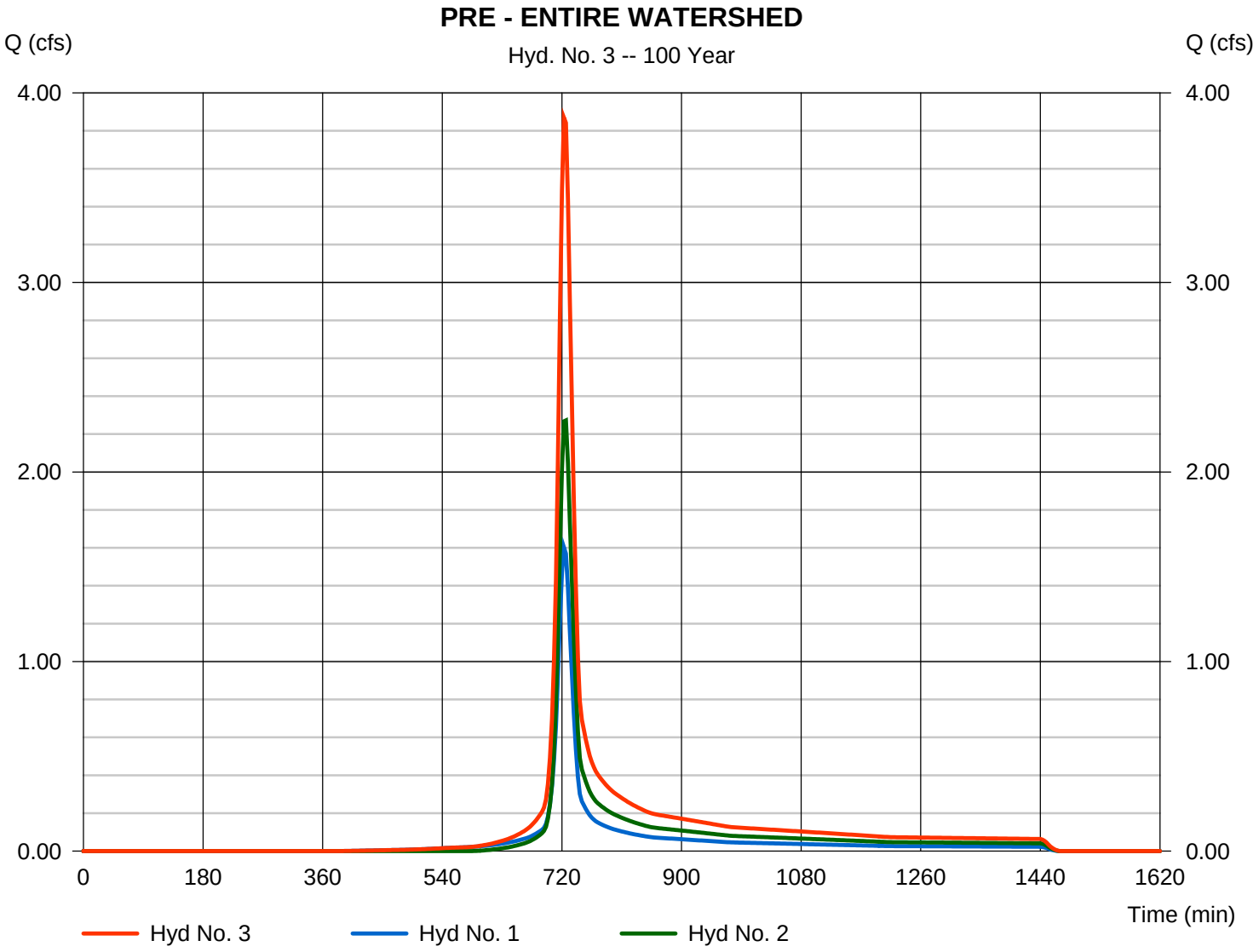


Hydrograph Report

Hyd. No. 3

PRE - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	3.870 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	12,530 cuft
Inflow hyds.	=	1, 2	Contrib. drain. area	=	0.821 ac

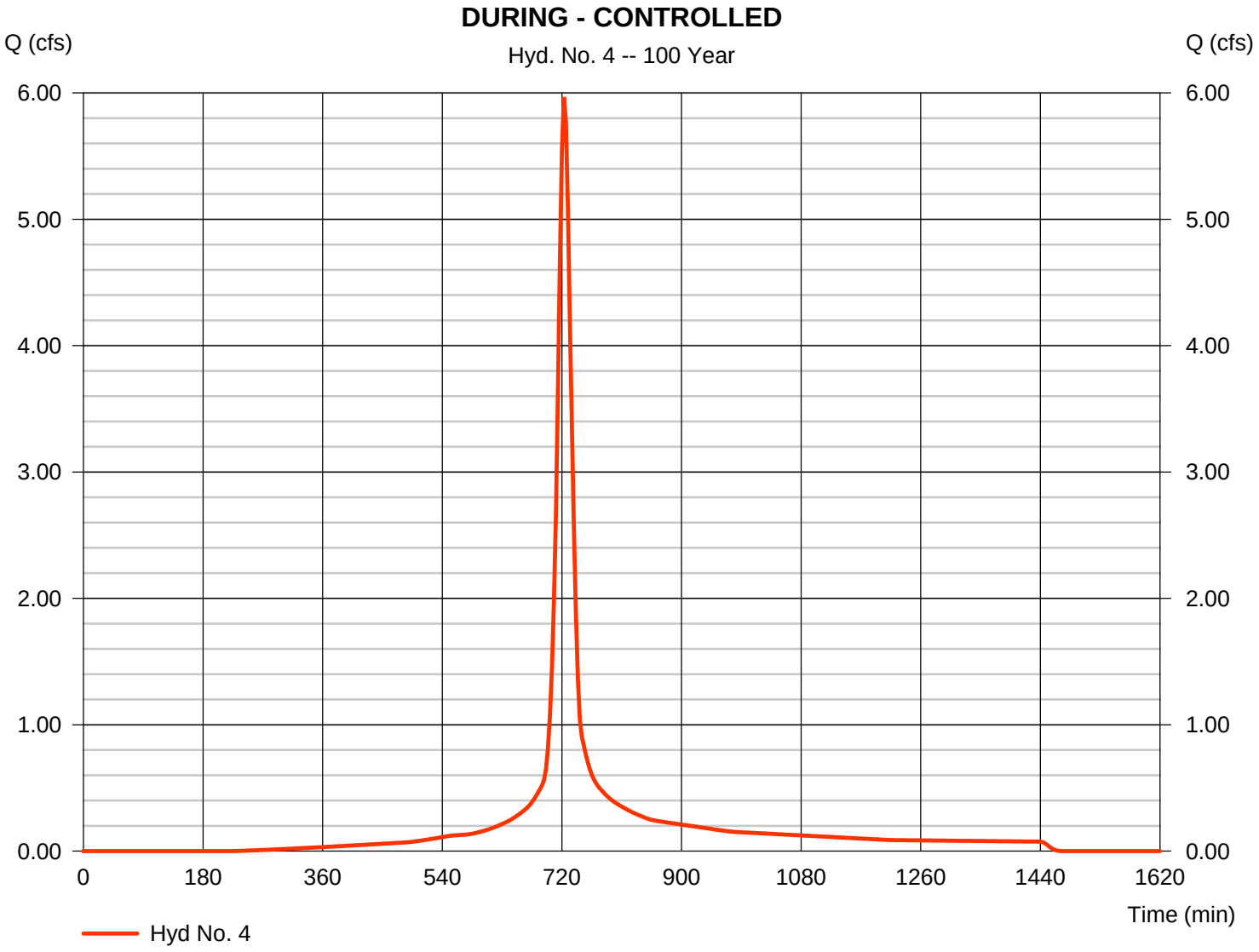


Hydrograph Report

Hyd. No. 4

DURING - CONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.968 cfs
Storm frequency	=	100 yrs	Time to peak	=	723 min
Time interval	=	3 min	Hyd. volume	=	19,641 cuft
Drainage area	=	0.795 ac	Curve number	=	85
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	15.10 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

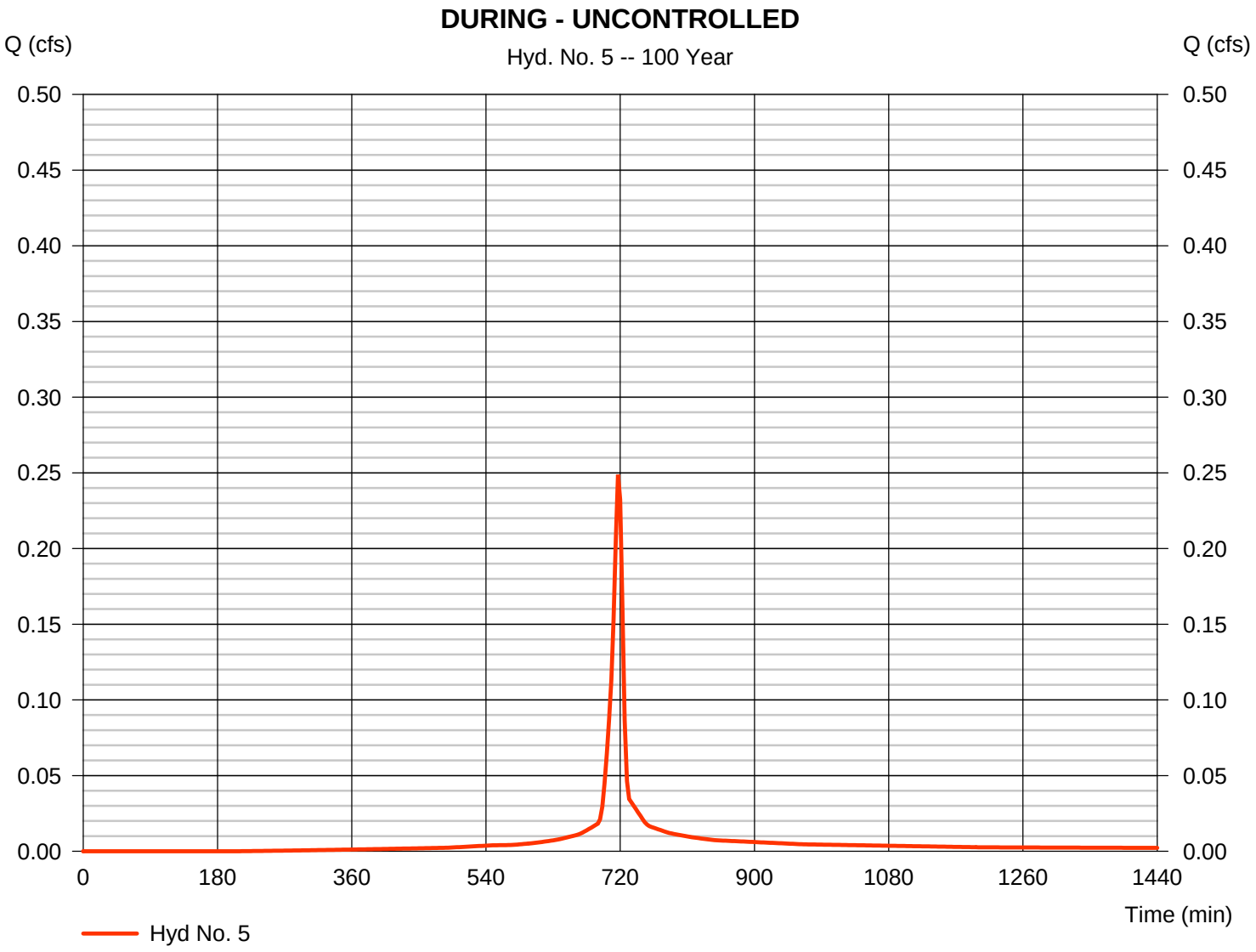


Hydrograph Report

Hyd. No. 5

DURING - UNCONTROLLED

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.249 cfs
Storm frequency	=	100 yrs	Time to peak	=	717 min
Time interval	=	3 min	Hyd. volume	=	595 cuft
Drainage area	=	0.026 ac	Curve number	=	86
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.40 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



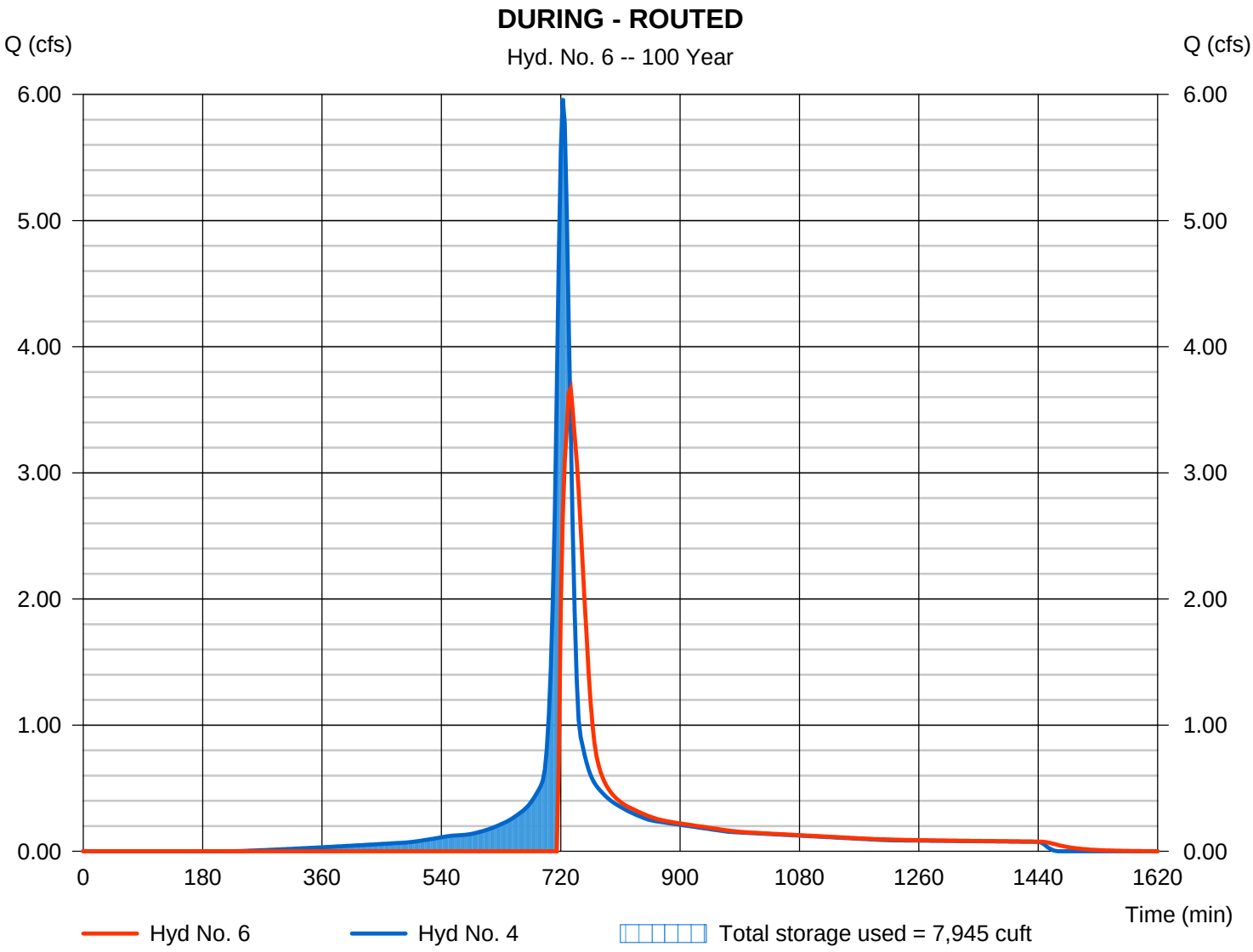
Hydrograph Report

Hyd. No. 6

DURING - ROUTED

Hydrograph type	=	Reservoir	Peak discharge	=	3.669 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	3 min	Hyd. volume	=	14,787 cuft
Inflow hyd. No.	=	4 - DURING - CONTROLLED	Max. Elevation	=	273.39 ft
Reservoir name	=	TEMP TRAP	Max. Storage	=	7,945 cuft

Storage Indication method used.

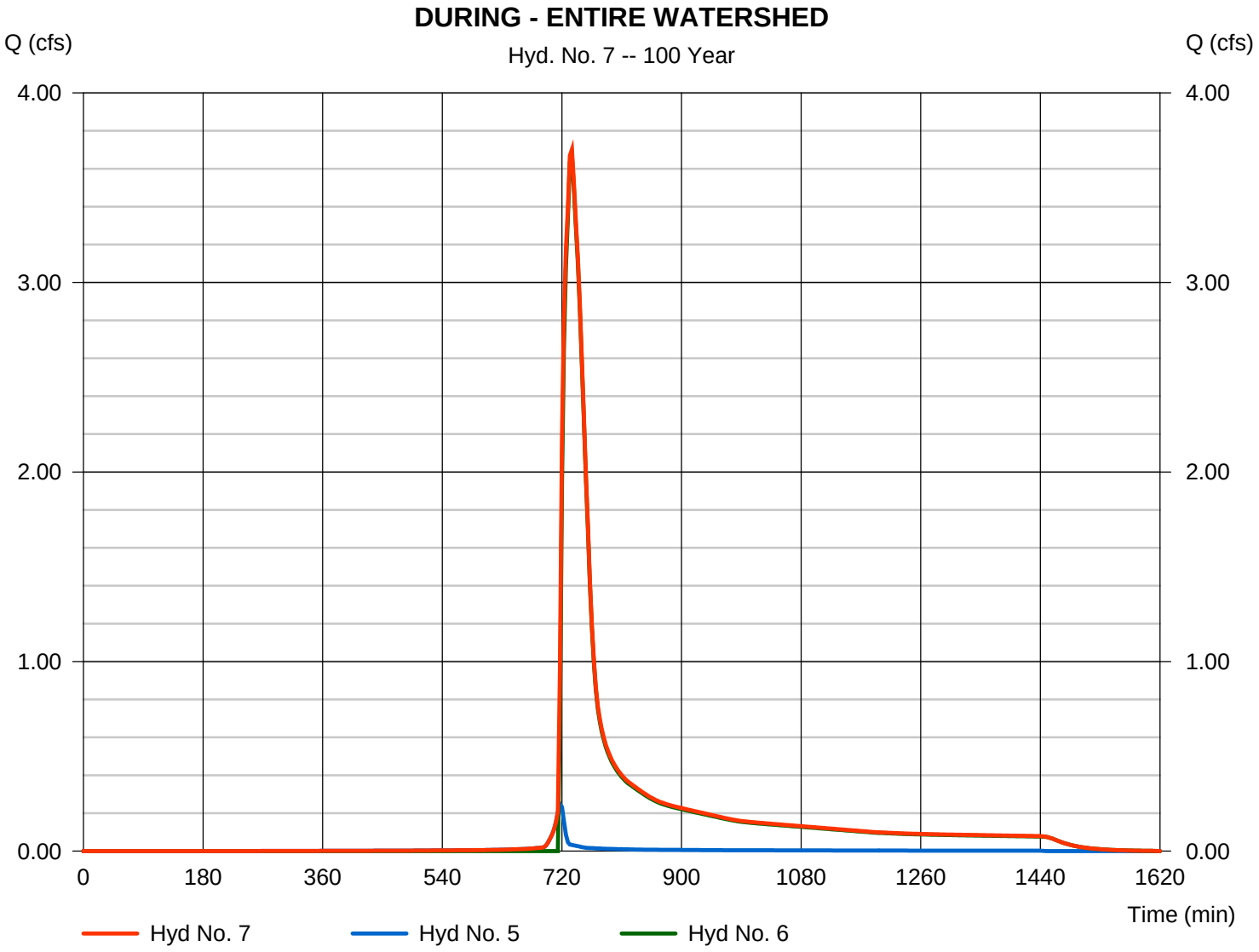


Hydrograph Report

Hyd. No. 7

DURING - ENTIRE WATERSHED

Hydrograph type	=	Combine	Peak discharge	=	3.701 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	3 min	Hyd. volume	=	15,381 cuft
Inflow hyds.	=	5, 6	Contrib. drain. area	=	0.026 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: P:\Storm\Lower Merion Township.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.20	0.00	4.20	5.00	5.80	6.50	8.40
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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19071SCSD.gpw

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