

PARKERS RIDGE

82 SCHOOL STREET
ROLESVILLE, NC 27571

STORMWATER MANAGEMENT CALCULATIONS

PREPARED FOR:

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FOR PERMIT ONLY

1st Submittal: 6/3/2023
2nd Submittal: 8/1/2023
3RD Submittal: 10/2/2023



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INTRODUCTION

On behalf of our client, Lennar Corporation, BGE, Inc. (BGE) submits this Engineer's Report in support of Parker Ridge project. This report contains the approach and results of the stormwater design for the subject property. The subject property is located at 82 School Street in the Town of Rolesville (Town), North Carolina. The site is comprised of four (4) parcels identified by the following parcel identification numbers (PINs): 1758-98-8411, 1758-98-3710, 1758-88-4270 E, and 1758-88-4270 W. The project area is approximately 86.74-acre (see project aerial map).

EXISTING CONDITIONS

The existing site condition is primarily undeveloped and tree-covered with several existing ponds. The predominant soil types within the proposed limit of construction are Rawlings-Rion complex (RgD), Urban land (Ur), and Wake-Rolesville complex (WaD) as taken from the Web Soil Survey 2.1 – National Cooperative Soil Survey by NRCS).

For the western parcel most of the site drains to the stream that runs through the site and into the southwest corner shown as POA #1 on the Pre-Development Exhibit. For the east parcel most of the site drains into the existing pond located in the center of the east parcel and flows into Harris Creek exiting south of our site with a small portion draining to a more southern stream connection. These areas are shown on the Pre-Development Exhibit as POA#3 and POA#2. There is a large drainage area upstream of both the east and west that drains through the site. Most of these areas drain directly to the streams. The rest of the site runs off in smaller areas shown through POA #4, POA #5 and POA #6.

FLOODPLAIN, FLOODWAY AND WATERSHED

The proposed site does not lie within a 100-year floodplain boundary as determined by FEMA FIRM Panel(s): #3720176800K and #3720175800K dated July 18, 2022.

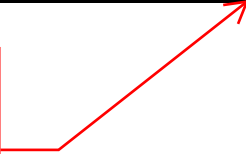
PROPOSED DEVELOPMENT

The overall proposed project will include the development of 114 attached townhouse lots and 161 single-family lots with associated infrastructure. The proposed impervious buildout for the development is as follows:

Table 1 Impervious Area

| POST-DEVELOPMENT IMPERVIOUS AREAS | | |
|--------------------------------------|--------------|-----------|
| PAVEMENT | 7.4 | AC |
| SIDEWALK | 3.35 | AC |
| LOTS - TOWNHOMES | 5.7 | AC |
| LOTS - SINGLE-FAMILY (MAX.) | 9.66 | AC |
| TOTAL ONSITE IMPERVIOUS AREA: | 26.11 | AC |

#160-Repeat
Comment- Doesn't
match impervious
indicated on cover
sheet



STORM DRAINAGE DESIGN

The existing topographic information was used to grade the property and identify the contributing drainage areas to the stormwater devices.

This project includes four (4) separate drainage systems that will drain to four (4) different proposed wet ponds located throughout the site. All four (4) of the proposed ponds will discharge to the existing Harris Creek located at the southern portion of both parcels. With Bypass also flowing into Harris Creek. The on-site storm sewer collection system was designed to capture and convey the 1-, 10-, and 25- year storm event for the proposed development. Per local design standards, the Rational Method and Manning's Equation will be used for the storm sewer system design utilizing AutoDesk's Hydraflow Storm Sewers software. A Manning's n value of 0.013 will be used for the reinforced concrete pipe and 0.024 for HDPE. Runoff coefficients (C) used for open space and impervious cover were 0.35 and 0.95, respectively. The starting HGL used for the 10 yr calculations is the 10 yr WSE for the detention pond, and the starting HGL for the 25 yr WSE for the 25 yr calculations.

WATER QUALITY

The proposed wet detention ponds (SCM's) have been designed based on the town's water quantity requirements to attenuate the post-development peak runoff rates for the 1-, 10-, and 25-year storm events to pre-developed rates. The ponds are designed with weirs to safely pass the 25-year storm event and provides a minimum of one foot of freeboard above the peak stage to the top of the embankment.

The pre-development drainage area that was established for the project area includes stormwater runoff that will be conveyed to 6 points of analysis (POA's). The post-development drainage area was established based on proposed grading conditions, where all stormwater is either conveyed into a pond, and into a post-POA. The curve numbers (CN) and time of concentration (T_c) for each drainage basin were calculated based on existing and proposed conditions using the TR-55 method. The 4 proposed ponds (SCM's) were analyzed with Hydraflow modeling software for verification that the proposed design meets the Town of Rolesville's and NCDEQ's minimum requirements. The Wake County Stormwater Design Tool was used for this project. DA #s 1 - 6 match the pre and post development maps. SCM 1 and SCM2 correlate to POA 1 and POA 2 respectively. However, SCM#s 3 and 4 both drain to POA 3. In addition, the offsite drainage for POA 1&2 includes existing drainage from Redford Place Drive while POA 3 includes offsite drainage from the future Young Street connector.

WATER QUANTITY

The proposed wet detention ponds (SCM's) have been designed based on both the NCDEQ's MDC and the town's water quantity requirements to attenuate the post-development peak runoff rates for the 1-, 10, and 25- year, 24-hour storm events. The post development flows are required to be less than the pre-developed rates by means of stormwater detention. The wet pond is designed to reduce the flows of each storm event mentioned above with a weir, the riser and an emergency spillway to safely pass the 25-year storm event.

The post-development drainage area was established based on existing and proposed site conditions. The curve numbers (CN) and time of concentration (T_c) for each drainage basin were calculated based on existing and proposed conditions using the TR-55 method. The 4 proposed ponds (SCM's) were

analyzed with Hydraflow modeling software for verification that the proposed design meets the Town of Rolesville and NCDEQ's minimum requirements. For the pre-development condition and the tree save areas, the curve # of roughly 77 was used while 80 was used for the open space (grass) and 98 was used for the impervious areas. Information on Peak Flow Analysis is available below in Table 2.

Table 2 Peak Flow Analysis

| | Pre-Development (cfs) | Post-Development (cfs) | % Change |
|---------------|--------------------------|---------------------------|-------------|
| POA # | 1-yr | 1-yr | 1-yr |
| POA #1 | 32.39 | 16.85 | -48% |
| POA #2 | 25.18 | 3.395 | -87% |
| POA #3 | 49.44 | 34.43 | -30% |
| POA #4 | 9.007 | 1.259 | -86% |
| POA #5 | 4.695 | 1.831 | -61% |
| POA #6 | 3.117 | 1.145 | -63% |

SUMMARY

Based on the results of the stormwater models, all points of analysis are reduced in the post development condition. As a result, the proposed design meets the requirements for the Town of Rolesville and NCDEQ for stormwater conveyance, and stormwater treatment and detention. The stormwater detention information is as follows:

SCM #1

Drainage Area: 9.22 ac
 Impervious Area: 5.13 ac
 Average Pond Depth: 3.5 feet
 Surface Area Required: 7261 sf
 Surface Area Proposed: 8489 sf
 1" Detention Volume: 18433 cf
 Top of Dam El: 390 at 10' wide

SCM #2

Drainage Area: 20.21 ac
 Impervious Area: 10.42 ac
 Average Pond Depth: 3.5 feet
 Surface Area Required: 18693 sf
 Surface Area Proposed: 20384 sf
 1" Detention Volume: 37710 cf
 Top of Dam El: 357 at 10' wide

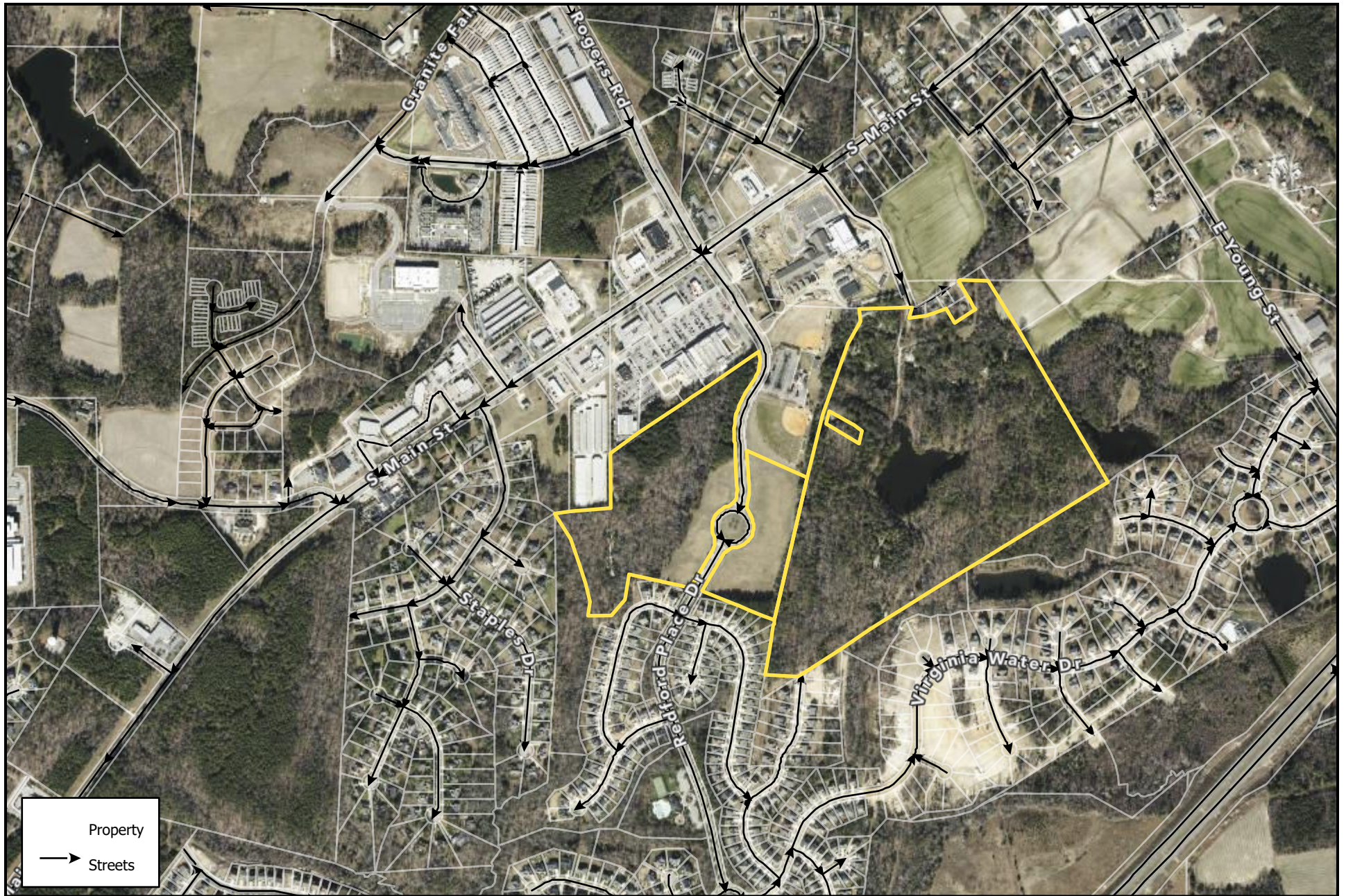
SCM #3

Drainage Area: 11.64 ac
 Impervious Area: 6.23 ac
 Average Pond Depth: 3.5 feet
 Surface Area Required: 8866 sf
 Surface Area Proposed: 11217 sf
 1" Detention Volume: 22466 cf
 Top of Dam El: 390 at 10' wide

SCM #4

Drainage Area: 9.70 ac
 Impervious Area: 4.31 ac
 Average Pond Depth: 3.5 feet
 Surface Area Required: 8544 sf
 Surface Area Proposed: 14636 sf
 1" Detention Volume: 15841 cf
 Top of Dam El: 386 at 10' wide

ATTACHMENT 1: PROJECT AERIAL MAP



0 400 800 1600 ft
1 inch equals 800 feet

Disclaimer
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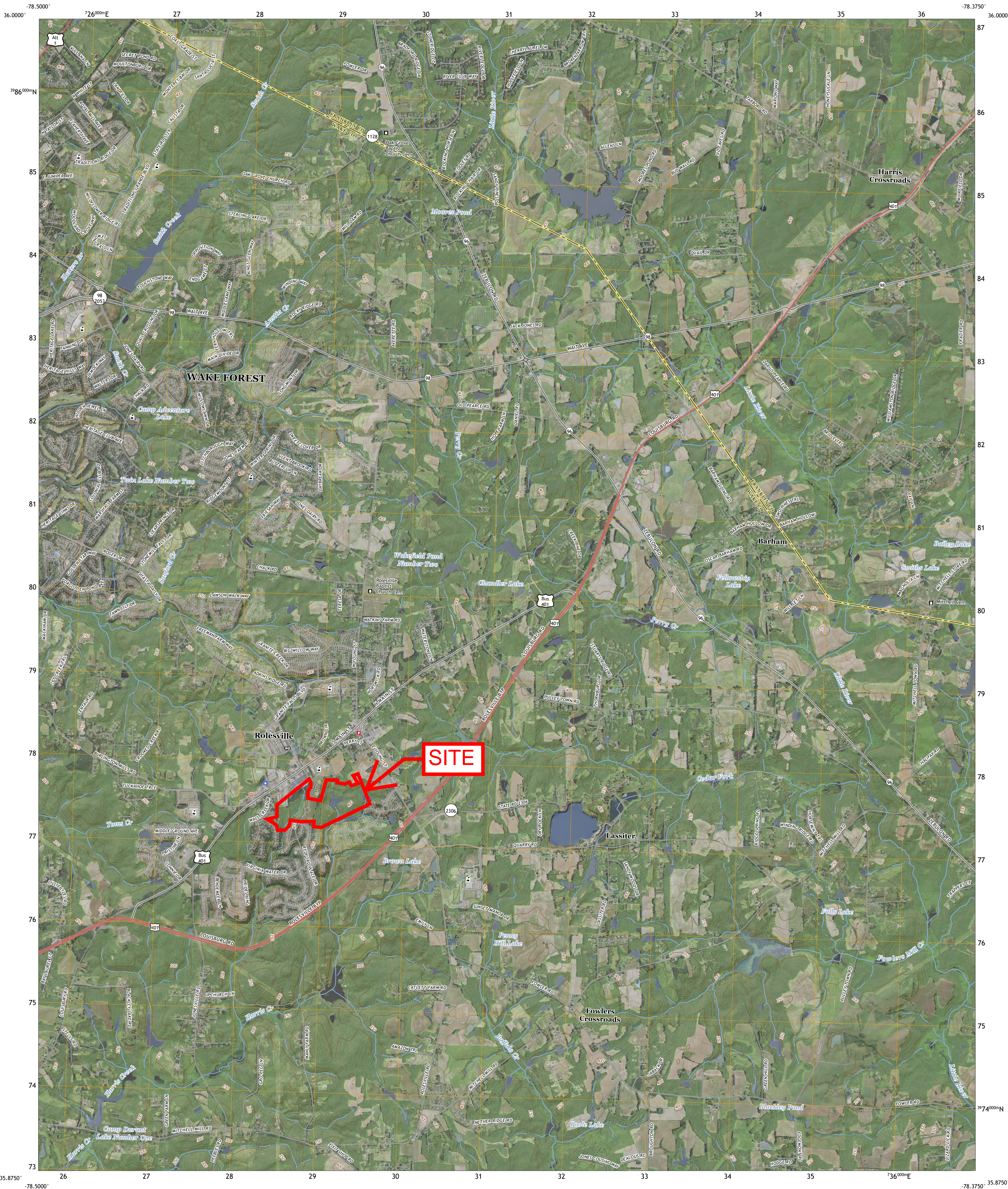
ATTACHMENT 2: USGS TOPO MAP



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

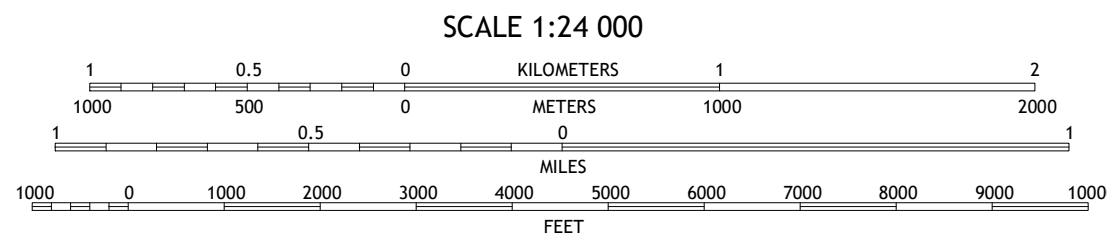
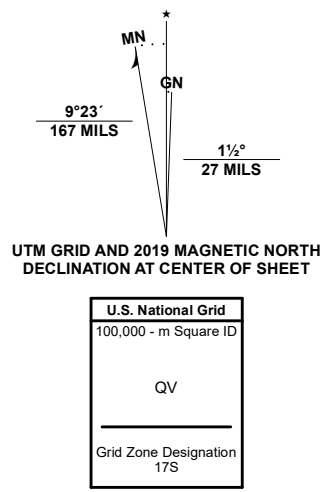


ROLESVILLE QUADRANGLE
NORTH CAROLINA
7.5-MINUTE SERIES



Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid/Universal Transverse Mercator, Zone 17S
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.
Imagery.....NAIP, July 2020 - July 2020
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1980-2022
Hydrography.....National Hydrography Dataset, 2001-2021
Contours.....National Elevation Dataset, 2008
Boundaries.....Multiple sources: see metadata file 2019 - 2021
Wetlands.....FWS National Wetlands Inventory Not Available



QUADRANGLE LOCATION

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |

- 1 Grissom
- 2 Franklin
- 3 Louisville
- 4 Wake Forest
- 5 Burn West
- 6 Raleigh East
- 7 Knightdale
- 8 Zebulon

| ROAD CLASSIFICATION | |
|---------------------|-----------------|
| Expressway | Local Connector |
| Secondary Hwy | Local Road |
| Ramp | 4WD |
| Interstate Route | US Route |
| | State Route |

ROLESVILLE, NC
2022



ATTACHMENT 3: SOIL SURVEY REPORT



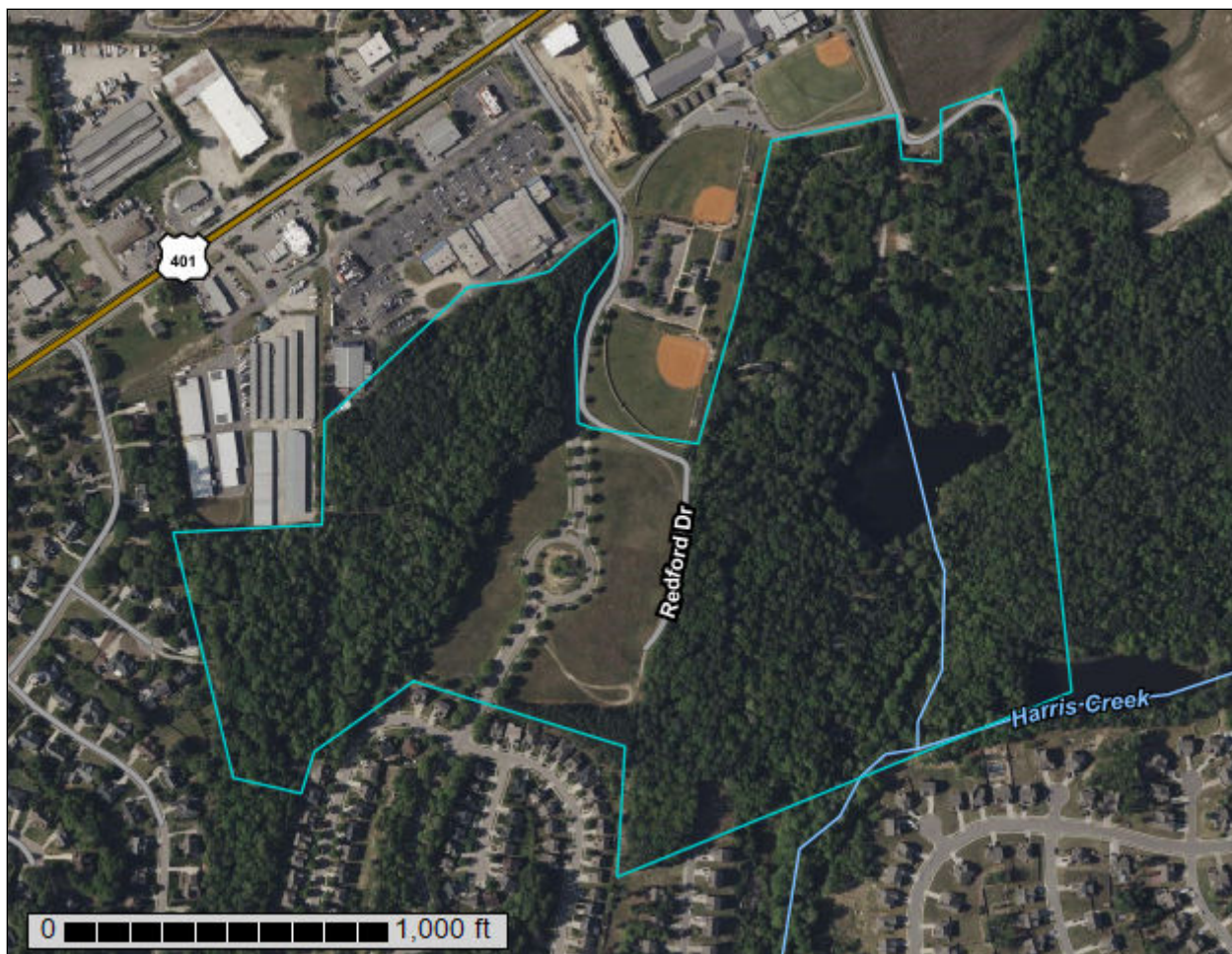
United States
Department of
Agriculture

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 **Wake County, North Carolina**



March 29, 2023

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

Custom Soil Resource Report

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



Custom Soil Resource Report

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 1:24,000.

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: Wake County, North Carolina
Survey Area Data: Version 23, Sep 12, 2022

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

Date(s) aerial images were photographed: Apr 24, 2022—May 9, 2022

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 |
|------------------------------------|--|--------------|----------------|
| HeB | Helena sandy loam, 2 to 6 percent slopes | 11.1 | 13.2% |
| RgB | Rawlings-Rion complex, 2 to 6 percent slopes | 6.1 | 7.2% |
| RgC | Rawlings-Rion complex, 6 to 10 percent slopes | 0.6 | 0.7% |
| RgD | Rawlings-Rion complex, 10 to 15 percent slopes | 17.4 | 20.5% |
| Ur | Urban land | 16.4 | 19.4% |
| W | Water | 3.9 | 4.6% |
| WaD | Wake-Rolesville complex, 10 to 15 percent slopes, very rocky | 13.4 | 15.8% |
| WaE | Wake-Rolesville complex, 15 to 25 percent slopes, very rocky | 11.6 | 13.7% |
| WfB | Wedowee-Saw complex, 2 to 6 percent slopes | 1.2 | 1.4% |
| WgB | Wedowee-Urban land complex, 2 to 6 percent slopes | 2.8 | 3.4% |
| WgC | Wedowee-Urban land complex, 6 to 15 percent slopes | 0.1 | 0.2% |
| Totals for Area of Interest | | 84.7 | 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.

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

Wake County, North Carolina

HeB—Helena sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2qqgq

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Helena and similar soils: 92 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helena

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 12 inches: sandy loam

BE - 12 to 19 inches: sandy clay loam

Bt1 - 19 to 39 inches: clay

Bt2 - 39 to 43 inches: clay loam

BCg - 43 to 46 inches: clay loam

C - 46 to 80 inches: sandy loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: D

Ecological site: F136XY810SC - Acidic upland forest, seasonally wet

Hydric soil rating: No

RgB—Rawlings-Rion complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2xhb9

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Rawlings and similar soils: 55 percent

Rion and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rawlings

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt - 8 to 20 inches: sandy clay loam

C - 20 to 40 inches: gravelly sandy loam

R - 40 to 80 inches: bedrock

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: F136XY830NC - Acidic upland forest, dry-moist

Hydric soil rating: No

Description of Rion

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite derived from granite and gneiss

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt1 - 8 to 17 inches: sandy clay loam

Bt2 - 17 to 38 inches: sandy loam

C - 38 to 80 inches: sandy loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

RgC—Rawlings-Rion complex, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: 2xhbb

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Rawlings and similar soils: 55 percent

Rion and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rawlings

Setting

Landform: Interfluves

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt - 8 to 20 inches: sandy clay loam

C - 20 to 40 inches: gravelly sandy loam

R - 40 to 80 inches: bedrock

Properties and qualities

Slope: 6 to 10 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: F136XY830NC - Acidic upland forest, dry-moist

Hydric soil rating: No

Description of Rion

Setting

Landform: Interfluves

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite derived from granite and gneiss

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt1 - 8 to 17 inches: sandy clay loam

Bt2 - 17 to 38 inches: sandy loam

C - 38 to 80 inches: sandy loam

Properties and qualities

Slope: 6 to 10 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Custom Soil Resource Report

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

RgD—Rawlings-Rion complex, 10 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2xhb8

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Rawlings and similar soils: 55 percent

Rion and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rawlings

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt - 8 to 20 inches: sandy clay loam

C - 20 to 40 inches: gravelly sandy loam

R - 40 to 80 inches: bedrock

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: F136XY830NC - Acidic upland forest, dry-moist

Hydric soil rating: No

Description of Rion

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite derived from granite and gneiss

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt1 - 8 to 17 inches: sandy clay loam

Bt2 - 17 to 38 inches: sandy loam

C - 38 to 80 inches: sandy loam

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

Ur—Urban land

Map Unit Setting

National map unit symbol: 2qwpc

Elevation: 70 to 1,400 feet

Mean annual precipitation: 39 to 51 inches

Mean annual air temperature: 54 to 63 degrees F

Frost-free period: 190 to 250 days

Custom Soil Resource Report

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Impervious layers over human-transported material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 2qqjv

Elevation: 70 to 450 feet

Mean annual precipitation: 39 to 51 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

WaD—Wake-Rolesville complex, 10 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2xhbf

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Wake, very rocky, and similar soils: 50 percent

Rolesville, very rocky, and similar soils: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wake, Very Rocky

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 7 inches: gravelly loamy coarse sand

C - 7 to 11 inches: gravelly loamy sand

R - 11 to 80 inches: bedrock

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: D

Ecological site: F136XY870GA - Outer piedmont acidic upland woodlands and glades, dry

Hydric soil rating: No

Description of Rolesville, Very Rocky

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 12 inches: loamy sand

Bw - 12 to 26 inches: loamy sand

C - 26 to 32 inches: loamy coarse sand

Cr - 32 to 38 inches: bedrock

R - 38 to 80 inches: bedrock

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock; 20 to 80 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: F136XY870GA - Outer piedmont acidic upland woodlands and glades, dry

Hydric soil rating: No

WaE—Wake-Rolesville complex, 15 to 25 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2xhbg

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Wake, very rocky, and similar soils: 50 percent

Rolesville, very rocky, and similar soils: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wake, Very Rocky

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 7 inches: gravelly loamy coarse sand

C - 7 to 11 inches: gravelly loamy sand

R - 11 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: F136XY870GA - Outer piedmont acidic upland woodlands and glades, dry
Hydric soil rating: No

Description of Rolesville, Very Rocky

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 12 inches: loamy sand
Bw - 12 to 26 inches: loamy sand
C - 26 to 32 inches: loamy coarse sand
Cr - 32 to 38 inches: bedrock
R - 38 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock; 20 to 80 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F136XY870GA - Outer piedmont acidic upland woodlands and glades, dry
Hydric soil rating: No

WfB—Wedowee-Saw complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2xn42

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Wedowee and similar soils: 60 percent

Saw and similar soils: 35 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wedowee

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite residuum weathered from granite and gneiss and/or
saprolite residuum weathered from schist

Typical profile

Ap - 0 to 4 inches: sandy loam

E - 4 to 7 inches: sandy loam

BC - 23 to 35 inches: clay loam

C - 35 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

Description of Saw

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 8 inches: sandy loam

Bt - 8 to 20 inches: clay

BC - 20 to 26 inches: sandy clay loam

C - 26 to 29 inches: sandy loam

R - 29 to 80 inches: bedrock

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: F136XY830NC - Acidic upland forest, dry-moist

Hydric soil rating: No

WgB—Wedowee-Urban land complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2xn43

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Wedowee and similar soils: 55 percent

Urban land: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wedowee

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite residuum weathered from granite and gneiss and/or
saprolite residuum weathered from schist

Typical profile

Ap - 0 to 4 inches: sandy loam

E - 4 to 7 inches: sandy loam

BC - 23 to 35 inches: clay loam

C - 35 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

Description of Urban Land

Setting

Parent material: Impervious layers over human transported material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

WgC—Wedowee-Urban land complex, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2xn44

Elevation: 70 to 560 feet

Mean annual precipitation: 39 to 47 inches

Custom Soil Resource Report

Mean annual air temperature: 55 to 63 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Wedowee and similar soils: 55 percent

Urban land: 40 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wedowee

Setting

Landform: Interfluves

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Saprolite residuum weathered from granite and gneiss and/or
saprolite residuum weathered from schist

Typical profile

Ap - 0 to 4 inches: sandy loam

E - 4 to 7 inches: sandy loam

BC - 23 to 35 inches: clay loam

C - 35 to 80 inches: sandy clay loam

Properties and qualities

Slope: 6 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: F136XY820GA - Acidic upland forest, moist

Hydric soil rating: No

Description of Urban Land

Setting

Parent material: Impervious layers over human transported material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

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Custom Soil Resource Report

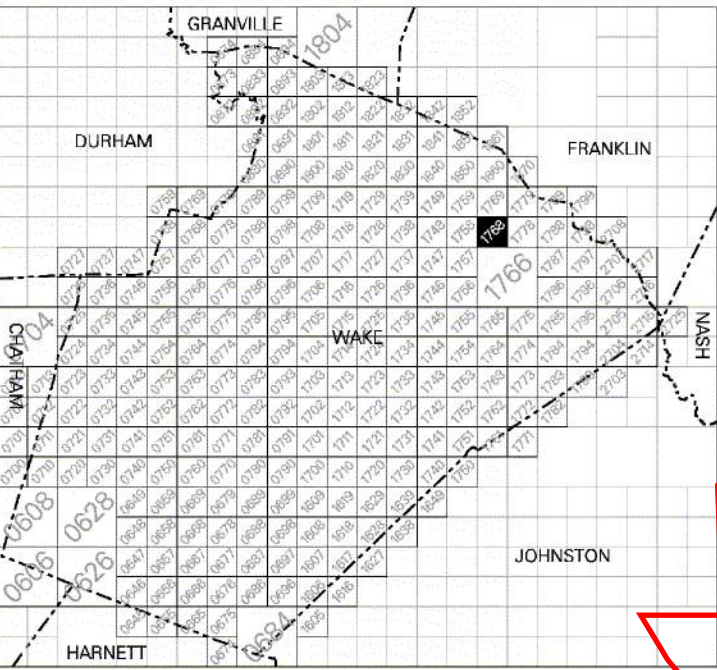
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ATTACHMENT 4: FEMA FLOOD MAP

STATE OF NORTH CAROLINA FIRM PANEL LOCATOR DIAGRAM



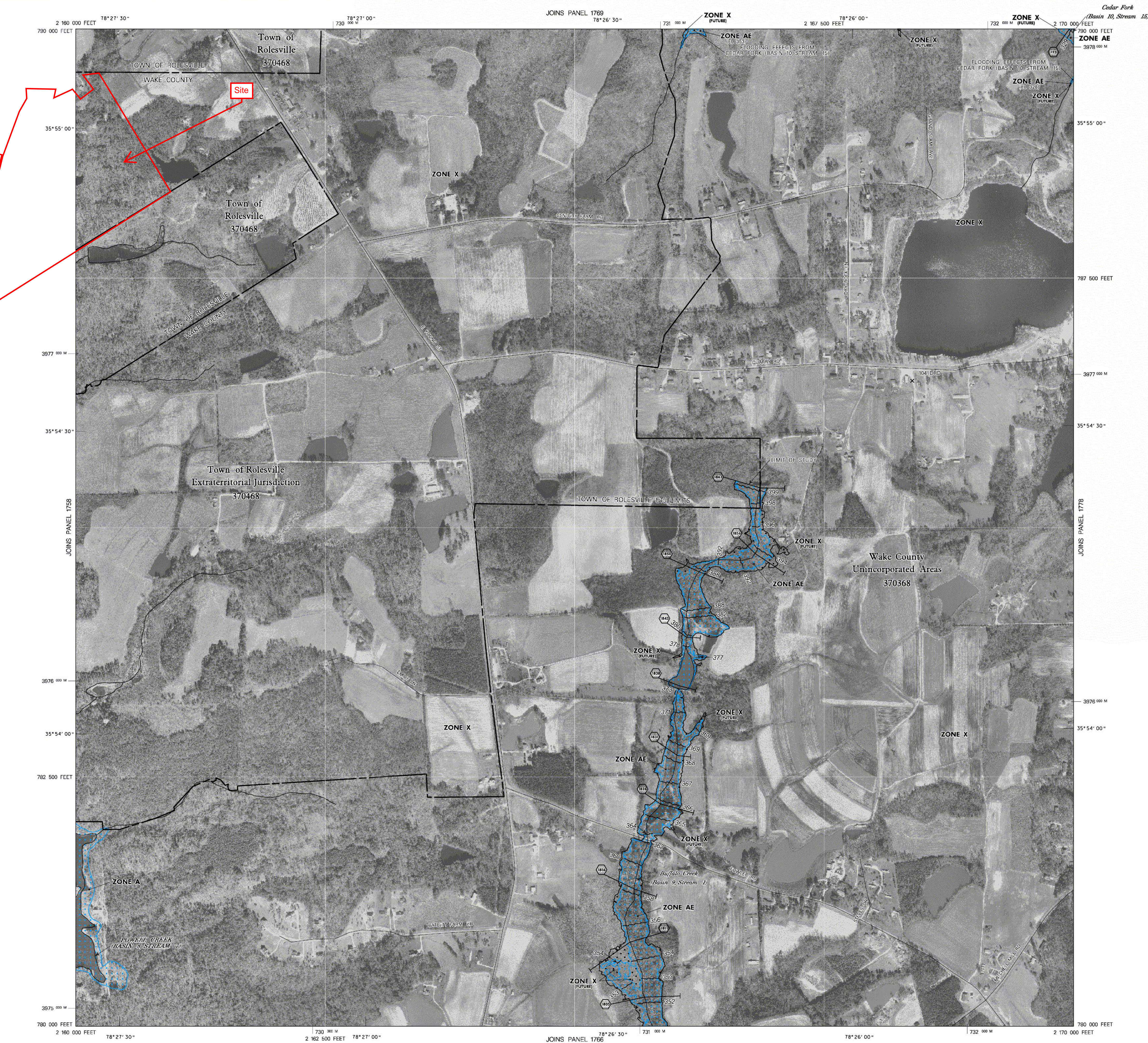
DATUM INFORMATION

The **projection** used in the preparation of this map was the North Carolina State Plane (FIPSZONE 3200). The **horizontal datum** was the North American Datum of 1983. GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at www.ngs.noaa.gov.

| | |
|--|--|
| North Carolina Geodetic Survey 121 West Jones Street Raleigh, NC 27601 (919) 733-3636 www.ncgs.state.nc.us | County Average Vertical Datum Offset Table County Vertical Datum Offset (ft) Wake - 0.88 Example: NAVD 88 = NGVD 29 + (-0.88) |
|--|--|

All streams listed in the **Flood Hazard Data Table** below were studied by detailed methods using field survey. Other flood hazard data shown on this map may have been derived using either a coastal analysis or limited detailed riverine analysis. More information on the flooding sources studied by these analyses is contained in the Flood Insurance Study report.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of future conditions 1% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance and future conditions 1% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

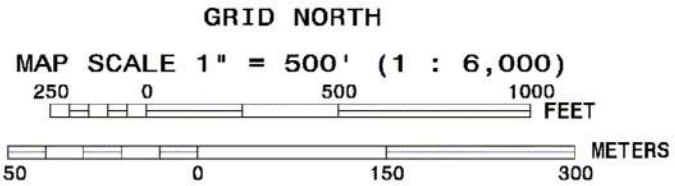
OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary and future conditions 1% annual chance floodplain boundary
- Floodway boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 2500-foot grid values; North Carolina State Plane coordinate system (FIPSZONE 3200; State Plane NAD 83 feet)
- North Carolina Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
- National Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
- River Mile



NOTES TO USERS

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To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data, Limited Detailed Flood Hazard Data, and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of **regulatory floodways** shown on the FIRM for flooding sources studied by detailed methods were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data for flooding sources studied by detailed methods as well as **non-encroachment widths** for flooding sources studied by limited detailed methods are provided in the FIS report for this jurisdiction. The FIS report also provides instructions for determining a floodway using non-encroachment widths for flooding sources studied by limited detailed methods.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 4.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

Base map information and geospatial data used to develop this FIRM were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by Wake County. The time period of collection for the imagery is 1999. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map. See geospatial metadata for the associated digital FIRM for additional information about base map preparation.

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This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov.

An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the **North Carolina Floodplain Mapping Program** website at www.ncfloodmaps.com, or contact the **FEMA Map Service Center** at 1-800-358-9616 for information on all related products associated with this FIRM. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at www.msc.fema.gov.

MAP REPOSITORY

Refer to listing of Map Repositories on Map Index or visit www.ncfloodmaps.com.

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL
MAY 2, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent, the North Carolina Division of Emergency Management or the National Flood Insurance Program at the following phone numbers or websites:

NC Division of Emergency Management
(919) 715-8000
www.ncemergencycontrol.org/nfip

National Flood Insurance Program
1-800-638-6620
www.fema.gov/nfip



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

www.ncfloodmaps.com

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1768J

FIRM

FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 1768

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | CID No. | PANEL | SUFFIX |
|---------------------|---------|-------|--------|
| ROLESVILLE, TOWN OF | 370468 | 1768 | J |
| WAKE COUNTY | 370368 | 1768 | J |

Effective Date

MAY 2, 2006

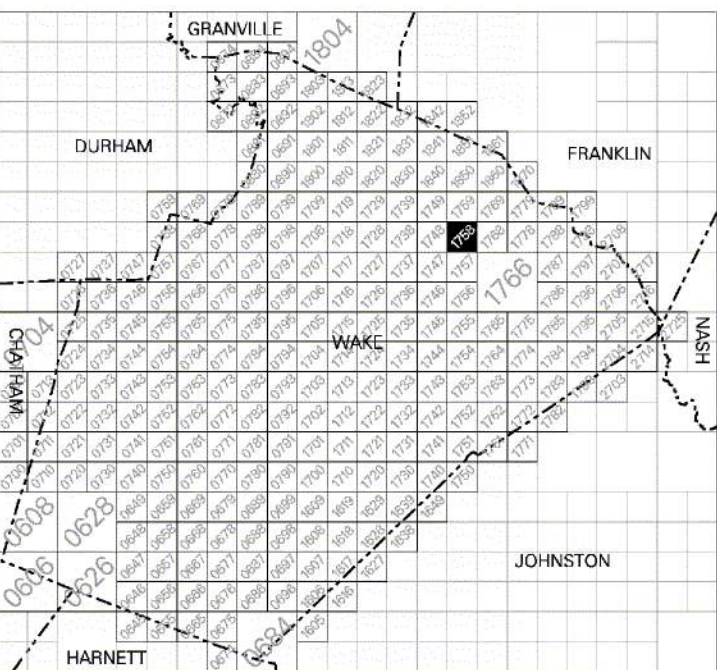
Map Number

3720176800J

State of North Carolina

Federal Emergency Management Agency

STATE OF NORTH CAROLINA FIRM PANEL LOCATOR DIAGRAM



DATUM INFORMATION

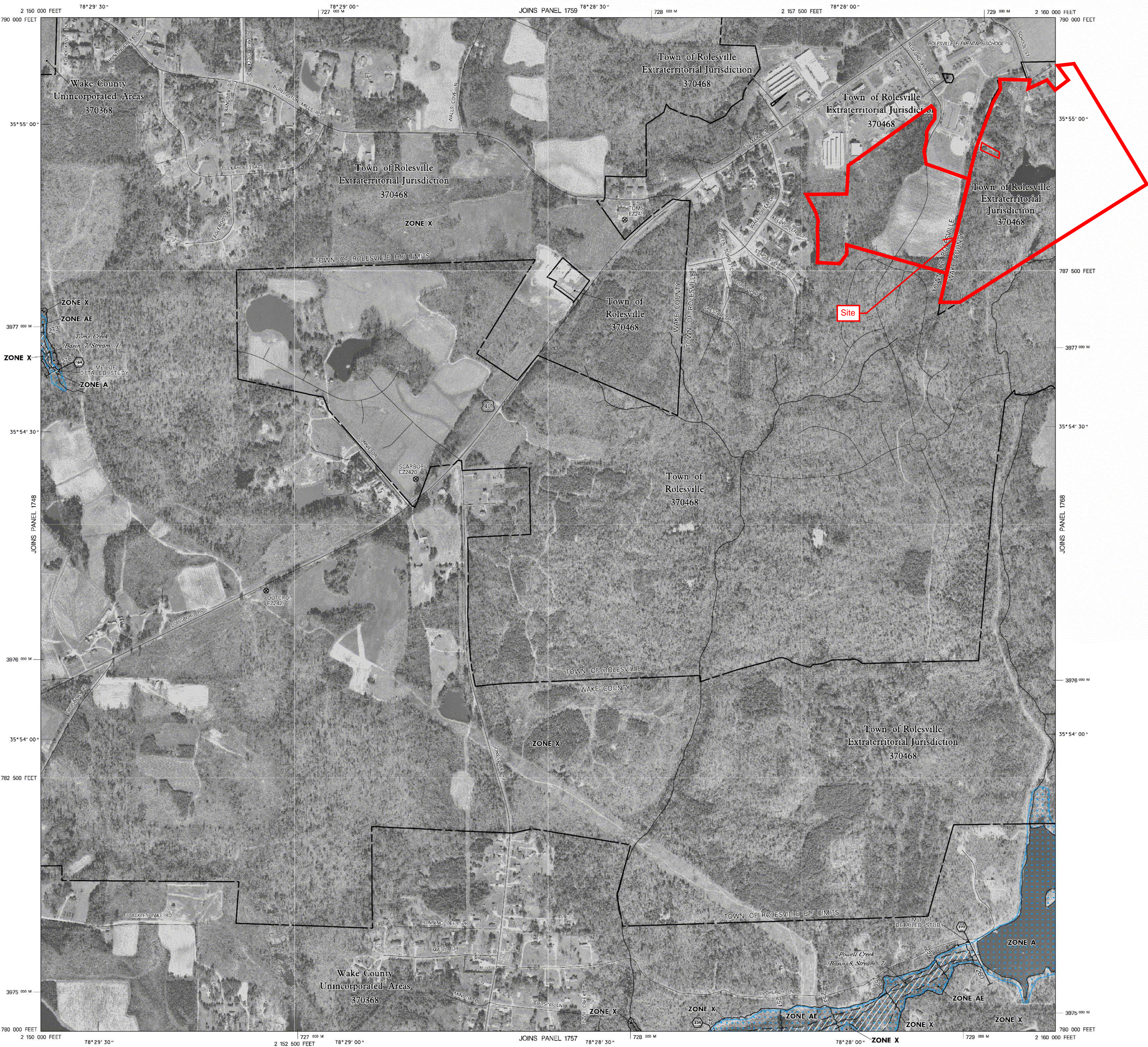
The **projection** used in the preparation of this map was the North Carolina State Plane (NAD83 3200). The **horizontal datum** was the North American Datum of 1983, GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

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| County | Average Vertical Datum Offset Table |
|--------------------------------------|-------------------------------------|
| County | Vertical Datum Offset (ft) |
| Wake | -0.88 |
| Example: NAVD 88 = NGVD 29 + (-0.88) | |

All streams listed in the **Flood Hazard Data Table** below were studied by detailed methods using field survey. Other flood hazard data shown on this map may have been derived using either a coastal analysis or limited detailed riverine analysis. More information on the flooding sources studied by these analyses is contained in the Flood Insurance Study report.

| FLOOD HAZARD DATA TABLE | | | | | Floodway Width (feet) |
|---|----------------|-----------------------|--|--|---|
| Cross Section | Stream Station | Flood Discharge (cfs) | 1% Annual Chance (100-year) Water-Surface Elevation (feet NAVD 88) | | Left/Right Distance From the Center of Stream to Encroachment Boundary (Looking Downstream) or Total Floodway Width |
| TOMS CREEK (BASIN 7, STREAM 1) | | | | | |
| 164 | 16,350' | NA | 275.5 | | 50 |
| POWELL CREEK (BASIN 8, STREAM 7) | | | | | |
| 239 | 23,890' | NA | 248.7 | | 120 |
| 272 | 27,200' | NA | 259.9 | | 110 |
| * Feet above confluence with Neuse River (Basin 15, Stream 1) | | | | | |
| † Feet above confluence with Hodges Creek (Basin 8, Stream 1) | | | | | |



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MAP REPOSITORY
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EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL
MAY 2, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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www.ncdcmcontrol.org/nfip
National Flood Insurance Program
1-800-638-6620
www.fema.gov/nfip

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of future conditions 1% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance and future conditions 1% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
 0.2% annual chance floodplain boundary and future conditions 1% annual chance floodplain boundary
 Floodway boundary
 Zone D Boundary
 CBRS and OPA boundary
 Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
 Base Flood Elevation line and value; elevation in feet*
 Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

91°07'30", 32°22'30"
4276000 M
1477 600 FEET
BM5510 x
BM5510 x
M1.5
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
1000-meter Universal Transverse Mercator grid ticks, zone 17
2500-foot grid values; North Carolina State Plane coordinate system (NAD 83)
North Carolina Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
National Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
River Mile



GRID NORTH
MAP SCALE 1" = 500' (1 : 6,000)

250 500 1000
150 0 150 300
FEET
METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1758J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 1758

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | CID No. | PANEL | SUFFIX |
|---------------------|---------|-------|--------|
| ROLESVILLE, TOWN OF | 370468 | 1758 | J |
| WAKE COUNTY | 370368 | 1758 | J |

EFFECTIVE DATE
MAY 2, 2006

MAP NUMBER
3720175800J



State of North Carolina
Federal Emergency Management Agency



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www.ncfloodmaps.com

ATTACHMENT 5: RAINFALL DATA



NOAA Atlas 14, Volume 2, Version 3
Location name: Rolesville, North Carolina, USA*
Latitude: 35.9195°, Longitude: -78.4618°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

| PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹ | | | | | | | | | | |
|--|-------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Duration | Average recurrence interval (years) | | | | | | | | | |
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.403 (0.369-0.441) | 0.468 (0.429-0.512) | 0.534 (0.489-0.582) | 0.599 (0.548-0.654) | 0.665 (0.606-0.725) | 0.718 (0.651-0.782) | 0.764 (0.689-0.832) | 0.805 (0.722-0.879) | 0.851 (0.756-0.929) | 0.892 (0.786-0.976) |
| 10-min | 0.644 (0.590-0.704) | 0.749 (0.687-0.818) | 0.855 (0.783-0.933) | 0.959 (0.877-1.05) | 1.06 (0.965-1.16) | 1.14 (1.04-1.25) | 1.21 (1.09-1.32) | 1.28 (1.14-1.39) | 1.35 (1.20-1.47) | 1.41 (1.24-1.54) |
| 15-min | 0.805 (0.738-0.880) | 0.942 (0.863-1.03) | 1.08 (0.991-1.18) | 1.21 (1.11-1.32) | 1.34 (1.22-1.46) | 1.45 (1.31-1.58) | 1.53 (1.38-1.67) | 1.61 (1.44-1.76) | 1.69 (1.51-1.85) | 1.76 (1.55-1.93) |
| 30-min | 1.10 (1.01-1.21) | 1.30 (1.19-1.42) | 1.54 (1.41-1.68) | 1.76 (1.61-1.92) | 1.99 (1.81-2.17) | 2.18 (1.98-2.38) | 2.35 (2.12-2.56) | 2.51 (2.25-2.74) | 2.70 (2.40-2.94) | 2.86 (2.52-3.12) |
| 60-min | 1.38 (1.26-1.51) | 1.63 (1.50-1.78) | 1.97 (1.81-2.15) | 2.29 (2.09-2.50) | 2.65 (2.41-2.89) | 2.95 (2.68-3.22) | 3.24 (2.92-3.53) | 3.52 (3.15-3.84) | 3.87 (3.44-4.22) | 4.17 (3.67-4.56) |
| 2-hr | 1.61 (1.46-1.78) | 1.91 (1.75-2.10) | 2.34 (2.13-2.56) | 2.74 (2.49-3.01) | 3.23 (2.91-3.53) | 3.65 (3.28-3.99) | 4.06 (3.62-4.43) | 4.47 (3.96-4.89) | 5.01 (4.40-5.48) | 5.49 (4.78-6.02) |
| 3-hr | 1.71 (1.55-1.89) | 2.03 (1.85-2.24) | 2.49 (2.26-2.74) | 2.94 (2.67-3.24) | 3.49 (3.15-3.84) | 3.99 (3.57-4.38) | 4.47 (3.97-4.91) | 4.99 (4.40-5.46) | 5.67 (4.94-6.21) | 6.29 (5.42-6.91) |
| 6-hr | 2.05 (1.87-2.26) | 2.44 (2.23-2.68) | 2.99 (2.72-3.28) | 3.54 (3.22-3.88) | 4.22 (3.81-4.62) | 4.83 (4.34-5.28) | 5.45 (4.85-5.95) | 6.10 (5.37-6.65) | 6.98 (6.07-7.61) | 7.79 (6.68-8.50) |
| 12-hr | 2.41 (2.21-2.66) | 2.87 (2.64-3.15) | 3.54 (3.24-3.88) | 4.21 (3.84-4.61) | 5.06 (4.59-5.53) | 5.84 (5.25-6.35) | 6.62 (5.90-7.20) | 7.47 (6.57-8.11) | 8.64 (7.48-9.37) | 9.72 (8.29-10.6) |
| 24-hr | 2.86 (2.66-3.08) | 3.45 (3.22-3.72) | 4.34 (4.04-4.68) | 5.04 (4.68-5.43) | 6.00 (5.56-6.46) | 6.77 (6.25-7.28) | 7.56 (6.95-8.14) | 8.37 (7.67-9.02) | 9.50 (8.66-10.2) | 10.4 (9.42-11.2) |
| 2-day | 3.32 (3.09-3.57) | 3.99 (3.72-4.30) | 4.98 (4.63-5.36) | 5.76 (5.35-6.20) | 6.81 (6.31-7.34) | 7.65 (7.06-8.24) | 8.51 (7.84-9.17) | 9.40 (8.62-10.1) | 10.6 (9.68-11.5) | 11.6 (10.5-12.6) |
| 3-day | 3.52 (3.28-3.77) | 4.23 (3.95-4.53) | 5.24 (4.89-5.62) | 6.05 (5.63-6.48) | 7.15 (6.63-7.67) | 8.02 (7.42-8.60) | 8.91 (8.22-9.57) | 9.84 (9.03-10.6) | 11.1 (10.1-12.0) | 12.1 (11.0-13.1) |
| 4-day | 3.72 (3.48-3.98) | 4.46 (4.17-4.77) | 5.51 (5.15-5.89) | 6.34 (5.91-6.77) | 7.48 (6.95-7.99) | 8.39 (7.77-8.97) | 9.32 (8.60-9.97) | 10.3 (9.45-11.0) | 11.6 (10.6-12.4) | 12.6 (11.5-13.6) |
| 7-day | 4.31 (4.04-4.60) | 5.15 (4.82-5.50) | 6.28 (5.88-6.70) | 7.18 (6.71-7.66) | 8.41 (7.83-8.98) | 9.39 (8.72-10.0) | 10.4 (9.63-11.1) | 11.4 (10.5-12.3) | 12.9 (11.8-13.8) | 14.0 (12.8-15.0) |
| 10-day | 4.91 (4.61-5.23) | 5.84 (5.48-6.23) | 7.04 (6.59-7.49) | 7.97 (7.46-8.49) | 9.24 (8.62-9.84) | 10.2 (9.53-10.9) | 11.2 (10.4-12.0) | 12.3 (11.4-13.1) | 13.7 (12.6-14.6) | 14.7 (13.5-15.8) |
| 20-day | 6.59 (6.20-7.01) | 7.78 (7.32-8.28) | 9.21 (8.66-9.80) | 10.3 (9.71-11.0) | 11.9 (11.1-12.6) | 13.1 (12.2-13.9) | 14.3 (13.3-15.2) | 15.5 (14.4-16.6) | 17.2 (15.9-18.4) | 18.5 (17.0-19.8) |
| 30-day | 8.18 (7.72-8.68) | 9.62 (9.07-10.2) | 11.2 (10.6-11.9) | 12.4 (11.7-13.2) | 14.1 (13.2-14.9) | 15.3 (14.3-16.3) | 16.6 (15.5-17.6) | 17.8 (16.6-19.0) | 19.5 (18.1-20.8) | 20.7 (19.2-22.2) |
| 45-day | 10.4 (9.89-11.0) | 12.2 (11.6-12.9) | 14.0 (13.3-14.8) | 15.4 (14.6-16.2) | 17.2 (16.2-18.1) | 18.5 (17.5-19.5) | 19.9 (18.7-21.0) | 21.2 (19.9-22.4) | 22.9 (21.4-24.3) | 24.2 (22.6-25.7) |
| 60-day | 12.5 (11.9-13.1) | 14.6 (13.9-15.3) | 16.5 (15.7-17.4) | 18.0 (17.1-19.0) | 20.0 (18.9-21.0) | 21.4 (20.2-22.5) | 22.8 (21.5-24.0) | 24.2 (22.8-25.5) | 25.9 (24.4-27.4) | 27.3 (25.6-28.8) |

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

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

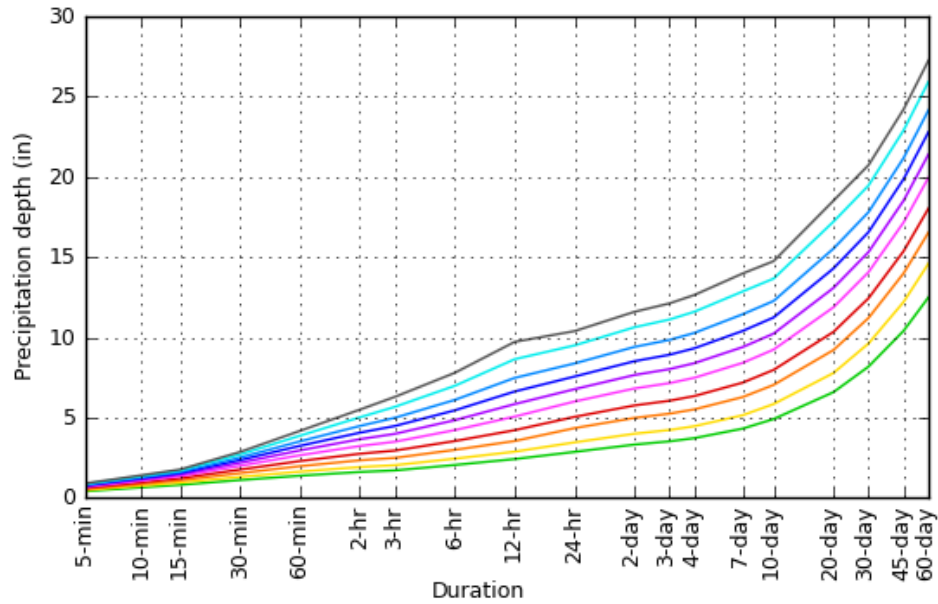
Please refer to NOAA Atlas 14 document for more information.

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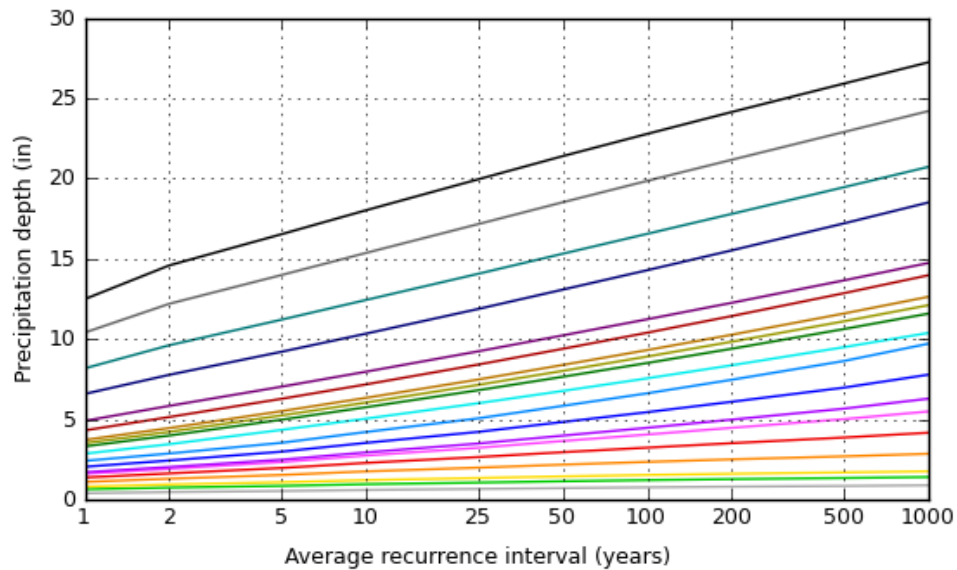
PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 35.9195°, Longitude: -78.4618°



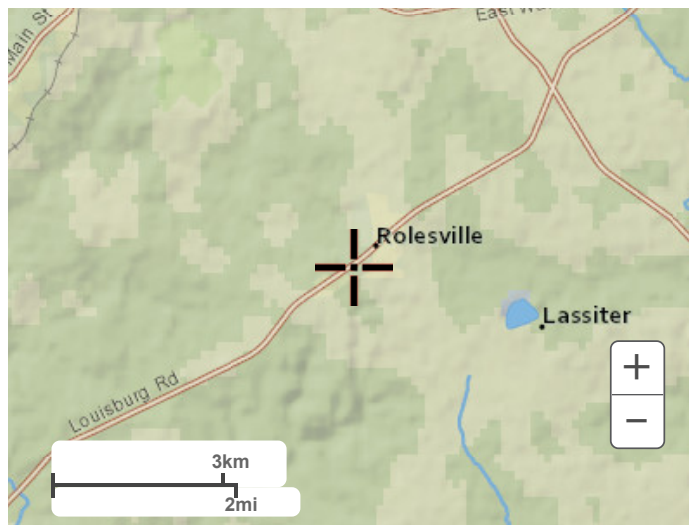
| Average recurrence interval (years) | |
|-------------------------------------|------|
| 1 | 2 |
| 5 | 10 |
| 25 | 50 |
| 100 | 200 |
| 500 | 1000 |



| Duration | |
|----------|--------|
| 5-min | 2-day |
| 10-min | 3-day |
| 15-min | 4-day |
| 30-min | 7-day |
| 60-min | 10-day |
| 2-hr | 20-day |
| 3-hr | 30-day |
| 6-hr | 45-day |
| 12-hr | 60-day |
| 24-hr | |

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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NOAA Atlas 14, Volume 2, Version 3
Location name: Rolesville, North Carolina, USA*
Latitude: 35.9195°, Longitude: -78.4618°
Elevation: 426 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

| PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹ | | | | | | | | | | |
|---|-------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Duration | Average recurrence interval (years) | | | | | | | | | |
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 4.84 (4.43-5.29) | 5.62 (5.15-6.14) | 6.41 (5.87-6.98) | 7.19 (6.58-7.85) | 7.98 (7.27-8.70) | 8.62 (7.81-9.38) | 9.17 (8.27-9.98) | 9.66 (8.66-10.5) | 10.2 (9.07-11.1) | 10.7 (9.43-11.7) |
| 10-min | 3.86 (3.54-4.22) | 4.49 (4.12-4.91) | 5.13 (4.70-5.60) | 5.75 (5.26-6.27) | 6.36 (5.79-6.93) | 6.86 (6.22-7.47) | 7.28 (6.56-7.94) | 7.66 (6.86-8.36) | 8.08 (7.18-8.82) | 8.43 (7.43-9.22) |
| 15-min | 3.22 (2.95-3.52) | 3.77 (3.45-4.12) | 4.32 (3.96-4.72) | 4.85 (4.44-5.29) | 5.38 (4.89-5.86) | 5.79 (5.25-6.31) | 6.14 (5.53-6.69) | 6.44 (5.77-7.03) | 6.78 (6.02-7.40) | 7.05 (6.22-7.72) |
| 30-min | 2.21 (2.02-2.41) | 2.60 (2.38-2.84) | 3.07 (2.82-3.35) | 3.51 (3.21-3.83) | 3.98 (3.62-4.34) | 4.36 (3.95-4.75) | 4.70 (4.24-5.12) | 5.02 (4.49-5.47) | 5.39 (4.79-5.89) | 5.71 (5.03-6.25) |
| 60-min | 1.38 (1.26-1.50) | 1.63 (1.50-1.78) | 1.97 (1.80-2.15) | 2.29 (2.09-2.50) | 2.65 (2.41-2.89) | 2.95 (2.68-3.22) | 3.24 (2.92-3.53) | 3.52 (3.15-3.84) | 3.87 (3.44-4.22) | 4.17 (3.67-4.56) |
| 2-hr | 0.804 (0.731-0.887) | 0.957 (0.874-1.05) | 1.17 (1.06-1.28) | 1.37 (1.24-1.50) | 1.61 (1.45-1.76) | 1.82 (1.64-2.00) | 2.03 (1.81-2.22) | 2.24 (1.98-2.44) | 2.51 (2.20-2.74) | 2.75 (2.39-3.01) |
| 3-hr | 0.567 (0.516-0.629) | 0.676 (0.617-0.746) | 0.827 (0.753-0.913) | 0.979 (0.888-1.08) | 1.16 (1.05-1.28) | 1.33 (1.19-1.46) | 1.49 (1.32-1.63) | 1.66 (1.46-1.82) | 1.89 (1.65-2.07) | 2.09 (1.80-2.30) |
| 6-hr | 0.341 (0.311-0.377) | 0.406 (0.372-0.448) | 0.498 (0.454-0.548) | 0.590 (0.537-0.648) | 0.704 (0.636-0.771) | 0.807 (0.724-0.882) | 0.909 (0.809-0.993) | 1.02 (0.897-1.11) | 1.16 (1.01-1.27) | 1.30 (1.12-1.42) |
| 12-hr | 0.200 (0.183-0.220) | 0.238 (0.219-0.261) | 0.293 (0.269-0.321) | 0.349 (0.318-0.382) | 0.420 (0.380-0.458) | 0.484 (0.435-0.527) | 0.549 (0.489-0.597) | 0.620 (0.545-0.673) | 0.716 (0.620-0.778) | 0.806 (0.687-0.876) |
| 24-hr | 0.119 (0.110-0.128) | 0.143 (0.134-0.155) | 0.180 (0.168-0.194) | 0.210 (0.195-0.226) | 0.250 (0.231-0.269) | 0.282 (0.260-0.303) | 0.314 (0.289-0.338) | 0.348 (0.319-0.375) | 0.395 (0.360-0.426) | 0.432 (0.392-0.467) |
| 2-day | 0.069 (0.064-0.074) | 0.083 (0.077-0.089) | 0.103 (0.096-0.111) | 0.119 (0.111-0.129) | 0.141 (0.131-0.152) | 0.159 (0.147-0.171) | 0.177 (0.163-0.190) | 0.195 (0.179-0.211) | 0.221 (0.201-0.239) | 0.241 (0.219-0.261) |
| 3-day | 0.048 (0.045-0.052) | 0.058 (0.054-0.062) | 0.072 (0.067-0.078) | 0.084 (0.078-0.090) | 0.099 (0.092-0.106) | 0.111 (0.103-0.119) | 0.123 (0.114-0.132) | 0.136 (0.125-0.146) | 0.154 (0.140-0.166) | 0.168 (0.152-0.181) |
| 4-day | 0.038 (0.036-0.041) | 0.046 (0.043-0.049) | 0.057 (0.053-0.061) | 0.066 (0.061-0.070) | 0.077 (0.072-0.083) | 0.087 (0.080-0.093) | 0.097 (0.089-0.103) | 0.107 (0.098-0.114) | 0.120 (0.110-0.129) | 0.131 (0.119-0.141) |
| 7-day | 0.025 (0.024-0.027) | 0.030 (0.028-0.032) | 0.037 (0.034-0.039) | 0.042 (0.039-0.045) | 0.050 (0.046-0.053) | 0.055 (0.051-0.059) | 0.061 (0.057-0.066) | 0.068 (0.062-0.072) | 0.076 (0.070-0.082) | 0.083 (0.075-0.089) |
| 10-day | 0.020 (0.019-0.021) | 0.024 (0.022-0.025) | 0.029 (0.027-0.031) | 0.033 (0.031-0.035) | 0.038 (0.035-0.041) | 0.042 (0.039-0.045) | 0.046 (0.043-0.049) | 0.051 (0.047-0.054) | 0.056 (0.052-0.060) | 0.061 (0.056-0.065) |
| 20-day | 0.013 (0.012-0.014) | 0.016 (0.015-0.017) | 0.019 (0.018-0.020) | 0.021 (0.020-0.022) | 0.024 (0.023-0.026) | 0.027 (0.025-0.029) | 0.029 (0.027-0.031) | 0.032 (0.030-0.034) | 0.035 (0.033-0.038) | 0.038 (0.035-0.041) |
| 30-day | 0.011 (0.010-0.012) | 0.013 (0.012-0.014) | 0.015 (0.014-0.016) | 0.017 (0.016-0.018) | 0.019 (0.018-0.020) | 0.021 (0.019-0.022) | 0.022 (0.021-0.024) | 0.024 (0.023-0.026) | 0.027 (0.025-0.028) | 0.028 (0.026-0.030) |
| 45-day | 0.009 (0.009-0.010) | 0.011 (0.010-0.011) | 0.012 (0.012-0.013) | 0.014 (0.013-0.015) | 0.015 (0.015-0.016) | 0.017 (0.016-0.018) | 0.018 (0.017-0.019) | 0.019 (0.018-0.020) | 0.021 (0.019-0.022) | 0.022 (0.020-0.023) |
| 60-day | 0.008 (0.008-0.009) | 0.010 (0.009-0.010) | 0.011 (0.010-0.012) | 0.012 (0.011-0.013) | 0.013 (0.013-0.014) | 0.014 (0.014-0.015) | 0.015 (0.014-0.016) | 0.016 (0.015-0.017) | 0.018 (0.016-0.019) | 0.018 (0.017-0.020) |

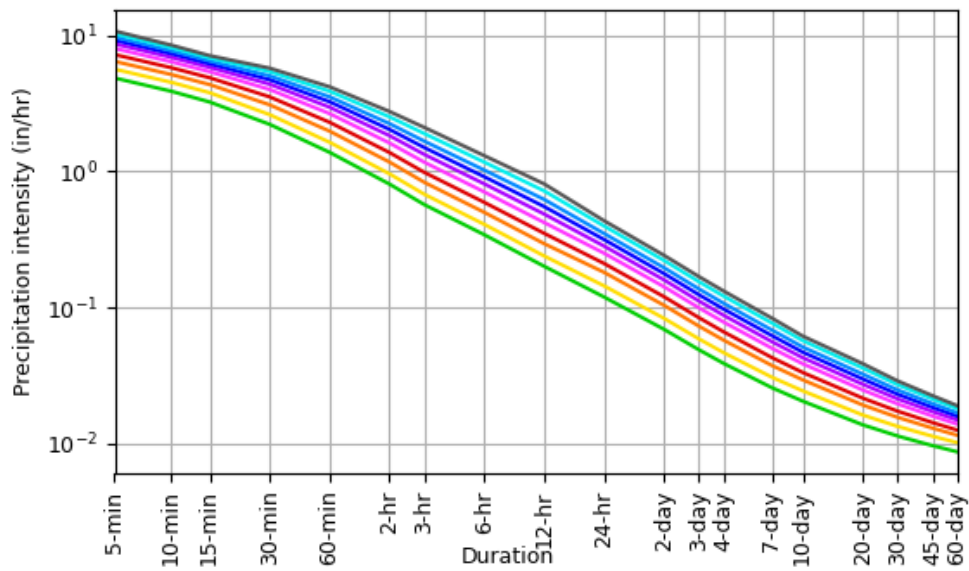
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

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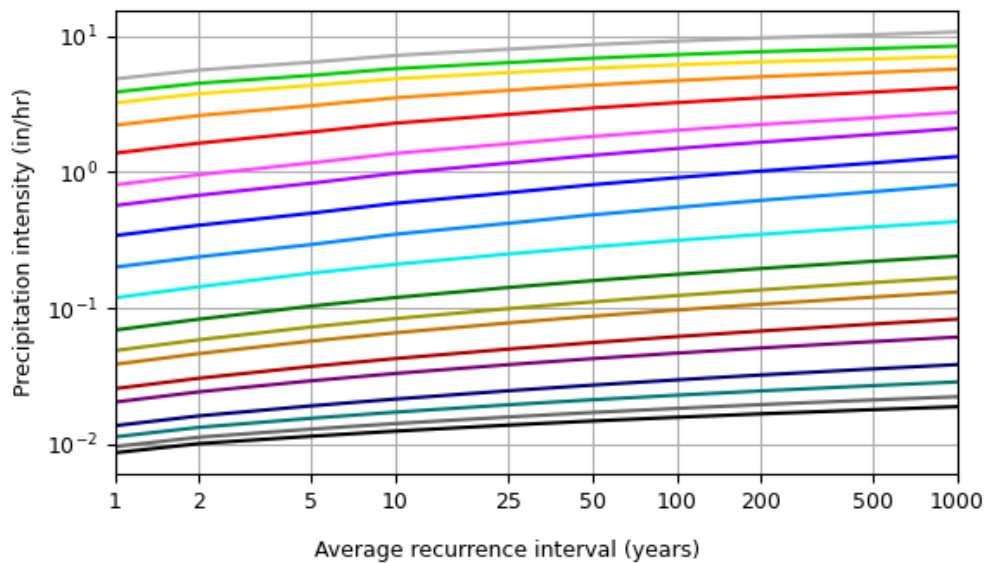
PF graphical

PDS-based intensity-duration-frequency (IDF) curves

Latitude: 35.9195°, Longitude: -78.4618°



| Average recurrence interval (years) |
|-------------------------------------|
| 1 |
| 2 |
| 5 |
| 10 |
| 25 |
| 50 |
| 100 |
| 200 |
| 500 |
| 1000 |

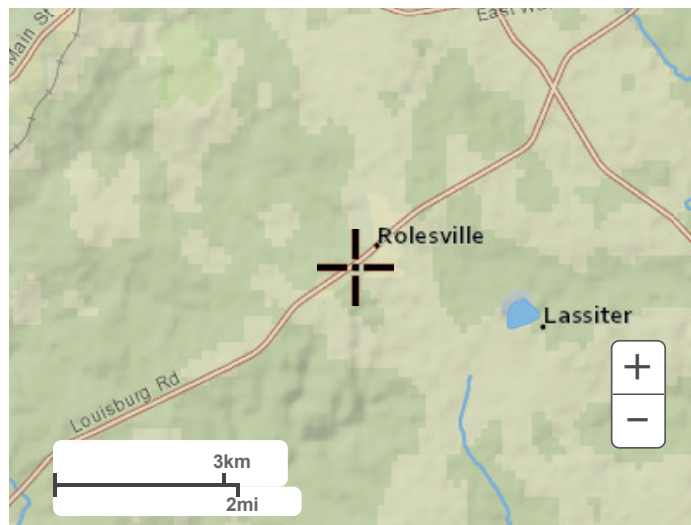


| Duration |
|----------|
| 5-min |
| 10-min |
| 15-min |
| 30-min |
| 60-min |
| 2-hr |
| 3-hr |
| 6-hr |
| 12-hr |
| 24-hr |
| 2-day |
| 3-day |
| 4-day |
| 7-day |
| 10-day |
| 20-day |
| 30-day |
| 45-day |
| 60-day |

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Maps & arials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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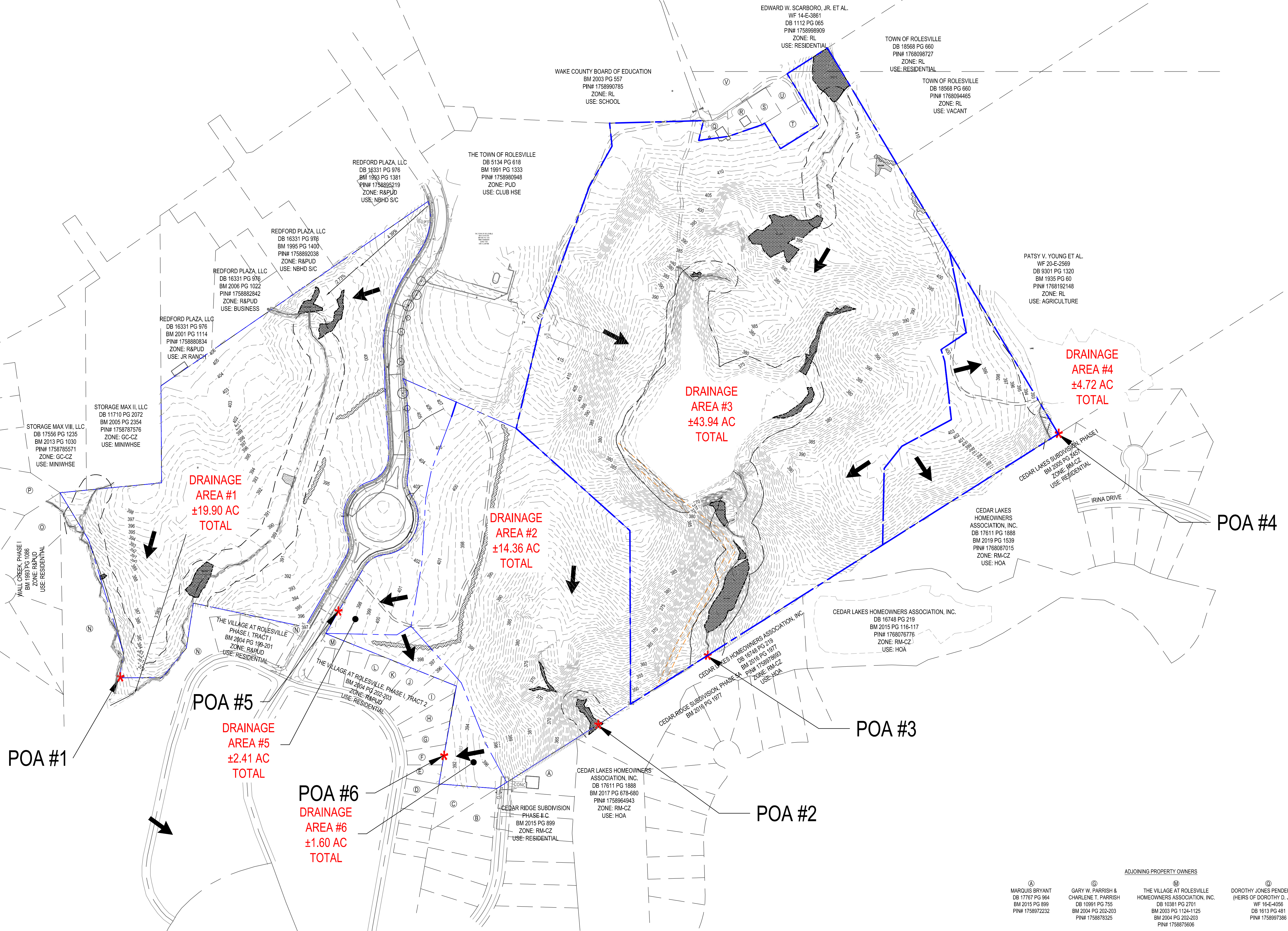
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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ATTACHMENT 6: PRE- AND POST- DEVELOPMENT DRAINAGE AREA MAPS



G:\NCA\Projects\Lemmar\8430-03 - Lemmar - School Street - Rolesville\04 - Calculations\StormCAD FILES - WORKING\PRE DRAINAGE AREA MAP.dwg



5440 WADE PARK BLVD, SUITE 102
RALEIGH NC 27607
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PRE DEVELOPMENT DRAINAGE AREA

ADJOINING PROPERTY OWNERS

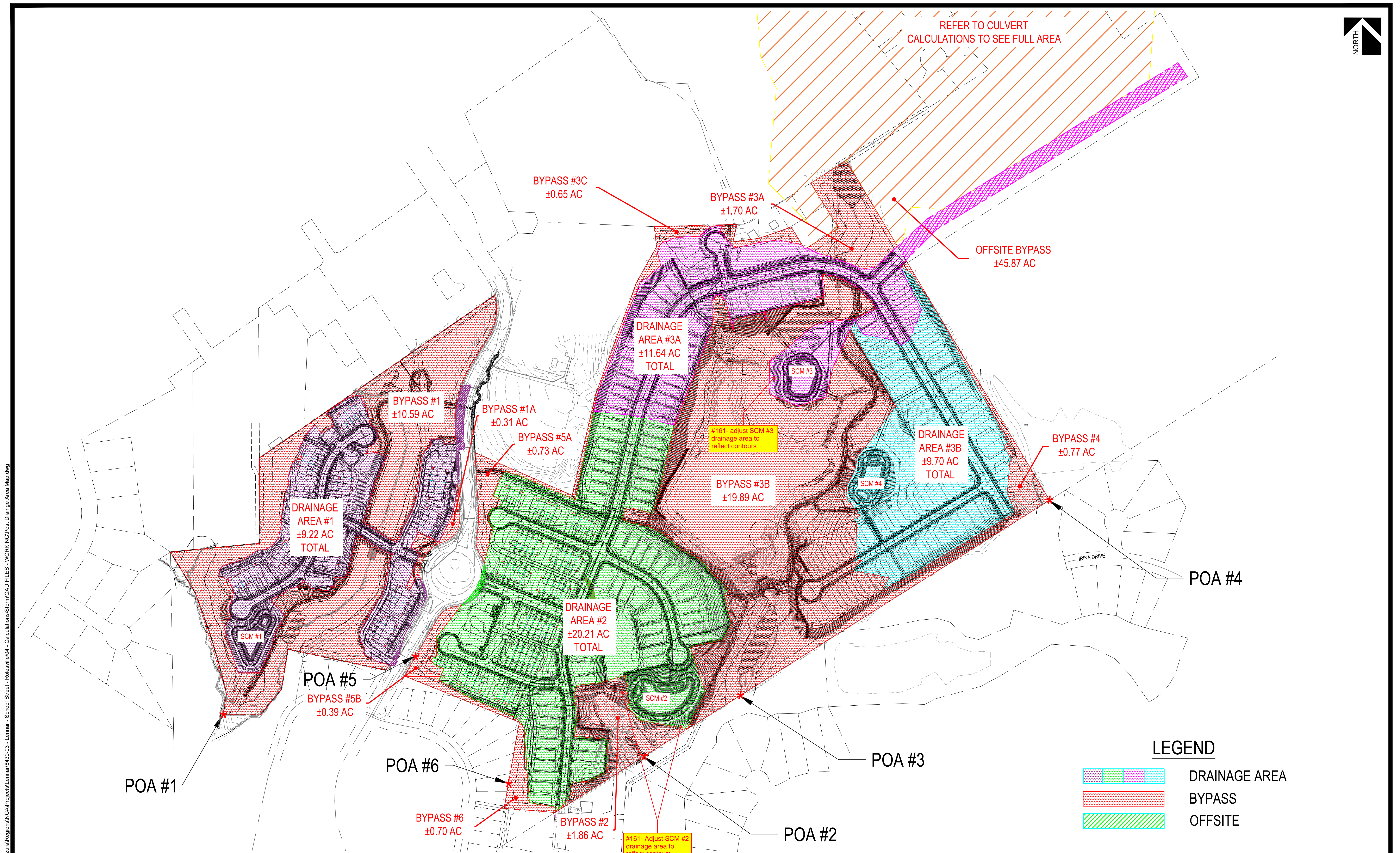
| | | | |
|--|---|---|--|
| ① MARQUIS BRYANT DB 17787 PG 964 BM 2015 PG 899 PIN# 175897232 | ② GARY W. PARRISH & CHARLENE T. PARRISH DB 10991 PG 755 BM 2004 PG 202-203 PIN# 1758878325 | ③ THE VILLAGE AT ROLESVILLE HOMEOWNERS ASSOCIATION, INC. DB 10381 PG 2701 BM 2003 PG 1124-1125 BM 2004 PG 202-203 PIN# 1758875506 | ④ DOROTHY JONES PENDER ET AL. (HEIRS OF DOROTHY D. JONES) WF 16-E-4056 DB 1613 PG 481 PIN# 1758997386 |
|--|---|---|--|

DATE: 2/6/2023

0 150' 300' 450'
SCALE: 1" = 150'



\\brownjay.net\panzura\Regions\NCA\Projects\Lemmar\8430-03 - Lemmar - School Street - Rolesville\04 - Calculations\StormCAD Files - WORKING\Post Drainage Area Map.dwg



LEGEND

- DRAINAGE AREA
- BYPASS
- OFFSITE

BGE
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RALEIGH NC 27607
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POST DEVELOPMENT DRAINAGE AREA

DATE: 3/29/2023
0 150' 300' 450'
SCALE: 1" = 150'

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ATTACHMENT 7: SCM CALCULATIONS

Project Name: Parker Ridge
City/State: Rolesville, NC

Project #: 8430-03
Date: 10/5/23

SCM 1

Table 1 Surface Area to Drainage Area Ratio for Permanent Pool Sizing

Piedmont and Mountain SA/DA Table (Adapted from Driscoll, 1986)

| % Impervious | Permanent Pool Depth (feet) | | | | | |
|--------------|-----------------------------|------|------|------|------|------|
| | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 |
| 10 | 0.51 | 0.43 | 0.37 | 0.30 | 0.27 | 0.25 |
| 20 | 0.84 | 0.69 | 0.61 | 0.51 | 0.44 | 0.40 |
| 30 | 1.17 | 0.94 | 0.84 | 0.72 | 0.61 | 0.56 |
| 40 | 1.51 | 1.24 | 1.09 | 0.91 | 0.78 | 0.71 |
| 50 | 1.79 | 1.51 | 1.31 | 1.13 | 0.95 | 0.87 |
| 60 | 2.09 | 1.77 | 1.49 | 1.31 | 1.12 | 1.03 |
| 70 | 2.51 | 2.09 | 1.80 | 1.56 | 1.34 | 1.17 |
| 80 | 2.92 | 2.41 | 2.07 | 1.82 | 1.62 | 1.40 |
| 90 | 3.25 | 2.64 | 2.31 | 2.04 | 1.84 | 1.59 |
| 100 | 3.55 | 2.79 | 2.52 | 2.34 | 2.04 | 1.75 |

Source: NCDEQ Stormwater Design Manual Minimum Design Criteria C-3 Wet Pond (4.18.2017)

Drainage Area Information

Total Drainage Area = 9.22 acres
Total Impervious Area = 5.13 acres
% Impervious Surface Area = 55.64 %

Normal Pool Information

| Minimum Required Permanent Pool Surface Area | Provided Permanent Pool Surface Area |
|---|--------------------------------------|
| Avg Depth = 3.50 ft | Normal Pool Elevation = 384.5 |
| SA/DA ratio = 1.81 From Table 1 | Main Pool SA Provided = 8489 sq. ft. |
| Minimum pond surface area (SA) = $\frac{DA \times SA \div DA \text{ ratio}}{100}$ | 0.195 acres |
| SA = 7261 sq. ft. | |
| 0.167 acres | |

Water Quality Information

| 1-Inch Runoff Volume Calculation (Water Quality Volume) | Provided Water Quality Volume |
|---|---|
| Using "Simple Method" Runoff Volume Calculations As described by Schueler (1987) | Water Quality Pool Elev = 386.00 ft |
| Where: Rv = Runoff coefficient (in./in.) I = Percent impervious | Overflow Elev = 387.90 ft |
| $Rv = 0.05 + 0.9 \times I$ | Storage Volume Provided = 66349 cu. ft. |
| Rv = 0.55 in/in | 1.523 acre-ft |
| Total runoff volume from 1-inch precipitation: | |
| Runoff Volume (S) = Design Rainfall \times Rv \times Drainage Area | |
| S = 18433 cu. ft. | |
| 0.423 acre-ft | |

Project Name: **Parker Ridge**

Project #: 8430-03

City/State: **Rolesville, NC**

Date: 10/5/23

SCM 1

Total Drainage Area = 9.22

AVERAGE DEPTH

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The average depth of a wet pond is to be calculated by one of these two options:

| | Below Normal Pool Contours (feet) | Contour Area (SF) | Incremental Contour Volume (CF) | Accumulated Contour Volume (CF) | |
|------------------------------|---|-------------------------|--|--|--------------------------------------|
| $A_{bot_pond} \rightarrow$ | 379.00 | 4017 | | | |
| | 380.00 | 4627 | 4318 | 4318 | \leftarrow Sediment Storage Volume |
| | 381.00 | 5266 | 4943 | 9261 | |
| $A_{bot_shelf} \rightarrow$ | 384.00 | 7367 | 18862 | 28123 | |
| $A_{perm_pool} \rightarrow$ | 384.50 | 8489 | 3961 | 32084 | \leftarrow Total Pond Volume |

$$V_{perm_pool} = \text{Total Volume} - \text{Sediment Storage Volume} = 27,765 \text{ cf}$$

OPTION 1: Use the following equation:

$$D_{avg} = \frac{V_{perm_pool}}{A_{perm_pool}}$$

Where: D_{avg} = Average Depth (ft) V_{perm_pool} = Volume of Permanent Pool (ft³) A_{perm_pool} = Area of Permanent Pool (ft²)

$$D_{avg} = 3.27 \text{ ft}$$

OPTION 2: Use the following equation:

$$D_{avg} = 0.25 \times \left(1 + \frac{A_{bot_shelf}}{A_{perm_pool}} \right) + \frac{A_{bot_shelf} + A_{bot_pond}}{2} \times \frac{\text{Depth}}{A_{bot_shelf}}$$

Where: D_{avg} = Average Depth (ft) A_{bot_shelf} = Area of Wet Pond at the Bottom of the Shelf (ft²) A_{bot_pond} = Area of Wet Pond Bottom above Sediment Storage (ft²) A_{perm_pool} = Area of Permanent Pool (ft²)

Depth = Depth of Wet Pond from Bottom of Shelf to Sediment Storage (ft)

$$D_{avg} = 3.72 \text{ ft}$$

Use Average Depth = 3.50 ft



Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**
SCM 1

Project #: **8430-03**
 Date: **10/5/23**

Total Drainage Area =

FOREBAY DESIGN

Per NCDEQ "Stormwater Design Manual " Minimum Design Criteria:

The forebay volume shall be 15-20% of the main pool.

Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**

Project #: **8430-03**
 Date: **10/5/23**

70 Runoff Storage Volume Information

| Pond Area | Countour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume | Accumulated Contour Volume | |
|----------------|-------------------------|-------------------|----------------------------|----------------------------|---------------|
| Storage Volume | 390.00 | 20,196 | 19,318 | 85,667 | ← Top of Dam |
| | 389.00 | 18,453 | 17,603 | 66,349 | |
| | 388.00 | 16,767 | 15,946 | 48,746 | |
| | 387.00 | 15,138 | 14,344 | 32,800 | |
| | 386.00 | 13,565 | 12,800 | 18,456 | |
| | 385.00 | 12,050 | 5,656 | 5,656 | |
| Normal Pool | 384.50 | 10,590 | 0 | 0 | ← Normal Pool |

70 Pond Volume Information

| Pond Area | Countour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume (cf) | Accumulated Contour Volume (cf) | |
|-----------|-------------------------|-------------------|---------------------------------|---------------------------------|---------------------------|
| Main Pool | 384.50 | 8,489 | 3,961 | 32,109 | ← Normal Pool |
| | 384.00 | 7,367 | 7,001 | 28,148 | ← Bottom of Litoral Shelf |
| | 383.00 | 6,641 | 6,287 | 21,147 | |
| | 382.00 | 5,939 | 5,599 | 14,861 | |
| | 381.00 | 5,266 | 4,943 | 9,261 | |
| | 380.00 | 4,627 | 4,318 | 4,318 | ← Sediment Storage Volume |
| | 379.00 | 4,017 | 0 | 0 | ← Pond Bottom |
| Forebay | 384.50 | 2,101 | 927 | 5,775 | ← Normal Pool |
| | 384.00 | 1,617 | 1,470 | 4,848 | ← Bottom of Litoral Shelf |
| | 383.00 | 1,328 | 1,194 | 3,378 | |
| | 382.00 | 1,064 | 942 | 2,184 | |
| | 381.00 | 826 | 718 | 1,242 | |
| | 380.00 | 616 | 523 | 523 | ← Sediment Storage Volume |
| | 379.00 | 436 | 0 | 0 | ← Forebay Bottom |
| Total | 384.50 | 10,590 | 4,888 | 37,887 | |
| | 384.00 | 8,984 | 8,471 | 32,999 | |
| | 383.00 | 7,969 | 7,481 | 24,528 | |
| | 382.00 | 7,003 | 6,542 | 17,047 | |
| | 381.00 | 6,092 | 5,662 | 10,505 | |
| | 380.00 | 5,243 | 4,843 | 4,843 | |
| | 379.00 | 4,453 | 0 | 0 | |

Project Name: Parker RidgeProject #: 8430-03City/State: Rolesville, NCDate: 10/5/23**SCM 1**

Total Drainage Area = 9.22 acres

OS-A Anti-Floatation Sizing Calculations**Outlet Structure Dimension**

| | | | |
|---------------------|----------|----------------------|------|
| Inside Riser Width: | 4 ft | Outside Riser Width: | 5 ft |
| Wall Thickness: | 6 in | | |
| Top Elevation: | 387.9 ft | | |
| Invert Elevation: | 384.5 ft | | |
| Bottom Elevation: | 379 ft | | |
| Extended Base: | 12 in | Extended Base Width: | 7 ft |

Displaced Volume: 222 cu ft

Displaced Weight: 13884 lbs

Volume of Actual Structure: 31 cu ft

Weight of Concrete Structure: 4590 lbs

Weight of Earth with Extended Base: 4488 lbs

Weight of Extra Depth: 20625 lbs

Total Weight of Structure: 29703 lbs

Factor of Safety: 2.1 OK

Project Name: Parker RidgeCity/State: Rolesville, NCProject #: 8430-03Date: 10/6/23**SCM 1**

Total Drainage Area =

ORIFICE CALCULATOR

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The design volume shall draw down to the permanent pool level in 2-5 days.

$$Q = C_d A \sqrt{2gh}$$

1" WATER QUALITY STORM VOLUME

| Variables | | | Constants | |
|----------------------|---------------|--------------|-----------|------------------------|
| WQ Volume: | 0.423 Acre-ft | 18433 cf | g = | 32.2 ft/s ² |
| Head / Driving Head: | 1.50 ft | 0.50 ft | Cd= | 0.6 |
| Draw down time: | 48 hrs | 172800 s | | |
| Orifice Area = | 0.031 sq. ft | 4.514 sq. in | | |
| Orifice Diameter = | 2.397 in | | | |

USE 2 INCH DIAMETER ORIFICE

Project Name: Parker Ridge
City/State: Rolesville, NC

Project #: 8430-03
Date: 10/6/23

SCM 2

Table 1 Surface Area to Drainage Area Ratio for Permanent Pool Sizing
Piedmont and Mountain SA/DA Table (Adapted from Driscoll, 1986)

| % Impervious | Permanent Pool Depth (feet) | | | | | |
|--------------|-----------------------------|------|------|------|------|------|
| | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 |
| 10 | 0.51 | 0.43 | 0.37 | 0.30 | 0.27 | 0.25 |
| 20 | 0.84 | 0.69 | 0.61 | 0.51 | 0.44 | 0.40 |
| 30 | 1.17 | 0.94 | 0.84 | 0.72 | 0.61 | 0.56 |
| 40 | 1.51 | 1.24 | 1.09 | 0.91 | 0.78 | 0.71 |
| 50 | 1.79 | 1.51 | 1.31 | 1.13 | 0.95 | 0.87 |
| 60 | 2.09 | 1.77 | 1.49 | 1.31 | 1.12 | 1.03 |
| 70 | 2.51 | 2.09 | 1.80 | 1.56 | 1.34 | 1.17 |
| 80 | 2.92 | 2.41 | 2.07 | 1.82 | 1.62 | 1.40 |
| 90 | 3.25 | 2.64 | 2.31 | 2.04 | 1.84 | 1.59 |
| 100 | 3.55 | 2.79 | 2.52 | 2.34 | 2.04 | 1.75 |

Source: NCDEQ Stormwater Design Manual Minimum Design Criteria C-3 Wet Pond (4.18.2017)

Drainage Area Information

Total Drainage Area = 20.21 acres

Total Impervious Area = 10.42 acres

% Impervious Surface Area = 51.56 %

Normal Pool Information

| Minimum Required Permanent Pool Surface Area | Provided Permanent Pool Surface Area |
|---|---------------------------------------|
| Avg Depth = 3.50 ft | Normal Pool Elevation = 351.5 |
| SA/DA ratio = 2.12 From Table 1 | Main Pool SA Provided = 20384 sq. ft. |
| Minimum pond surface area (SA) = $\frac{DA \times SA \div DA \text{ ratio}}{100}$ | 0.468 acres |
| SA = 18693 sq. ft. | |
| 0.429 acres | |

Water Quality Information

| 1-Inch Runoff Volume Calculation (Water Quality Volume) | Provided Water Quality Volume |
|---|--|
| Using "Simple Method" Runoff Volume Calculations As described by Schueler (1987) | Water Quality Pool Elev = 352.87 ft |
| Where: Rv = Runoff coefficient (in./in.) I = Percent impervious | Overflow Elev = 355.50 ft |
| $Rv = 0.05 + 0.9 \times I$ | Storage Volume Provided = 138278 cu. ft. |
| RV = 0.51 in/in | 3.174 acre-ft |
| Total runoff volume from 1-inch precipitation: | |
| Runoff Volume (S) = Design Rainfall \times Rv \times Drainage Area | |
| S = 37710 cu. ft. | |
| 0.866 acre-ft | |

Interpolation from table 10.1:

| % impervious | Permanent Pool Depth | | | |
|--------------|----------------------|------|------|------|
| | | 3.0 | 3.5 | 4.0 |
| 50.0 | | 1.79 | | 1.51 |
| 51.6 | | 1.84 | 2.12 | 2.41 |
| 60.0 | | 2.09 | | 1.77 |

Project Name: **Parker Ridge**

Project #: 8430-03

City/State: **Rolesville, NC**

Date: 10/6/23

SCM 2**Total Drainage Area =****AVERAGE DEPTH**

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The average depth of a wet pond is to be calculated by one of these two options:

| | Below Normal Pool Contours (feet) | Contour Area (SF) | Incremental Contour Volume (CF) | Accumulated Contour Volume (CF) | |
|------------------------------|---|-------------------------|--|--|--------------------------------------|
| $A_{bot_pond} \rightarrow$ | 346.00 | 12020 | | | |
| | 347.00 | 13231 | 12621 | 12621 | \leftarrow Sediment Storage Volume |
| | 348.00 | 14468 | 13845 | 26466 | |
| $A_{bot_shelf} \rightarrow$ | 351.00 | 18329 | 49081 | 75547 | |
| $A_{perm_pool} \rightarrow$ | 351.50 | 20384 | 9674 | 85221 | \leftarrow Total Pond Volume |

$$V_{perm_pool} = \text{Total Volume} - \text{Sediment Storage Volume} = 72,600 \text{ cf}$$

OPTION 1: Use the following equation:

$$D_{avg} = \frac{V_{perm_pool}}{A_{perm_pool}}$$

Where: D_{avg} = Average Depth (ft) V_{perm_pool} = Volume of Permanent Pool (ft³) A_{perm_pool} = Area of Permanent Pool (ft²)

$$D_{avg} = 3.56 \text{ ft}$$

OPTION 2: Use the following equation:

$$D_{avg} = 0.25 \times \left(1 + \frac{A_{bot_shelf}}{A_{perm_pool}} \right) + \frac{A_{bot_shelf} + A_{bot_pond}}{2} \times \frac{\text{Depth}}{A_{bot_shelf}}$$

Where: D_{avg} = Average Depth (ft) A_{bot_shelf} = Area of Wet Pond at the Bottom of the Shelf (ft²) A_{bot_pond} = Area of Wet Pond Bottom above Sediment Storage (ft²) A_{perm_pool} = Area of Permanent Pool (ft²)

Depth = Depth of Wet Pond from Bottom of Shelf to Sediment Storage (ft)

$$D_{avg} = 3.92 \text{ ft}$$

$$\text{Use Average Depth} = 3.50 \text{ ft}$$



Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**
SCM 2

Project #: **8430-03**
 Date: **10/6/23**

Total Drainage Area =

FOREBAY DESIGN

Per NCDEQ "Stormwater Design Manual " Minimum Design Criteria:

The forebay volume shall be 15-20% of the main pool.

Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**

Project #: **8430-03**
 Date: **10/6/23**

50 Runoff Storage Volume Information

| Pond Area | Contour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume | Accumulated Contour Volume | |
|----------------|------------------------|-------------------|----------------------------|----------------------------|---------------|
| Storage Volume | 357.00 | 37,716 | 36,604 | 174,882 | ← Top of Dam |
| | 356.00 | 35,504 | 34,421 | 138,278 | |
| | 355.00 | 33,350 | 32,295 | 103,857 | |
| | 354.00 | 31,251 | 30,224 | 71,562 | |
| | 353.00 | 29,209 | 28,211 | 41,337 | |
| | 352.00 | 27,224 | 13,127 | 13,127 | |
| Normal Pool | 351.50 | 25,295 | 0 | 0 | ← Normal Pool |

50 Pond Volume Information

| Pond Area | Contour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume (cf) | Accumulated Contour Volume (cf) | |
|-----------|------------------------|-------------------|---------------------------------|---------------------------------|---------------------------|
| Main Pool | 351.50 | 20,384 | 9,674 | 85,272 | ← Normal Pool |
| | 351.00 | 18,329 | 17,669 | 75,598 | ← Bottom of Litoral Shelf |
| | 350.00 | 17,017 | 16,369 | 57,929 | |
| | 349.00 | 15,730 | 15,095 | 41,560 | |
| | 348.00 | 14,468 | 13,845 | 26,466 | |
| | 347.00 | 13,231 | 12,621 | 12,621 | ← Sediment Storage Volume |
| | 346.00 | 12,020 | 0 | 0 | ← Pond Bottom |
| Forebay | 351.50 | 4,911 | 2,185 | 12,993 | ← Normal Pool |
| | 351.00 | 3,849 | 3,477 | 10,809 | ← Bottom of Litoral Shelf |
| | 350.00 | 3,117 | 2,768 | 7,332 | |
| | 349.00 | 2,434 | 2,111 | 4,564 | |
| | 348.00 | 1,803 | 1,504 | 2,453 | |
| | 347.00 | 1,224 | 949 | 949 | ← Sediment Storage Volume |
| | 346.00 | 698 | 0 | 0 | ← Forebay Bottom |
| Total | 351.50 | 25,295 | 11,860 | 98,288 | |
| | 351.00 | 22,178 | 21,148 | 86,428 | |
| | 350.00 | 20,134 | 19,141 | 65,281 | |
| | 349.00 | 18,164 | 17,209 | 46,140 | |
| | 348.00 | 16,271 | 15,354 | 28,931 | |
| | 347.00 | 14,455 | 13,577 | 13,577 | |
| | 346.00 | 12,718 | 0 | 0 | |

15.2%



Project Name: Parker Ridge
City/State: Rolesville, NC

Project #: 8430-03
Date: 10/6/23

SCM 2

Total Drainage Area =

OS-A Anti-Floatation Sizing Calculations**Outlet Structure Dimension**

| | | | |
|---------------------|----------|----------------------|------|
| Inside Riser Width: | 4 ft | Outside Riser Width: | 5 ft |
| Wall Thickness: | 6 in | | |
| Top Elevation: | 356 ft | | |
| Invert Elevation: | 351.5 ft | | |
| Bottom Elevation: | 347 ft | | |
| Extended Base: | 12 in | Extended Base Width: | 7 ft |

Displaced Volume: 225 cu ft

Displaced Weight: 14040 lbs

Volume of Actual Structure: 41 cu ft

Weight of Concrete Structure: 6075 lbs

Weight of Earth with Extended Base: 5940 lbs

Weight of Extra Depth: 16875 lbs

Total Weight of Structure: 28890 lbs

Factor of Safety: 2.1 OK

Project Name: Parker RidgeCity/State: Rolesville, NCProject #: 8430-03Date: 10/6/23**SCM 2**

Total Drainage Area =

ORIFICE CALCULATOR

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The design volume shall draw down to the permanent pool level in 2-5 days.

$$Q = C_d A \sqrt{2gh}$$

1" WATER QUALITY STORM VOLUME

| Variables | | | Constants | |
|----------------------|---------------|--------------|-----------|------------------------|
| WQ Volume: | 0.866 Acre-ft | 37710 cf | g = | 32.2 ft/s ² |
| Head / Driving Head: | 1.37 ft | 0.46 ft | Cd= | 0.6 |
| Draw down time: | 48 hrs | 172800 s | | |
| Orifice Area = | 0.067 sq. ft | 9.653 sq. in | | |
| Orifice Diameter = | 3.506 in | | | |

USE 4 INCH DIAMETER ORIFICE

Project Name: Parker Ridge
City/State: Rolesville, NC

Project #: 8430-03
Date: 10/5/23

SCM 3

Table 1 Surface Area to Drainage Area Ratio for Permanent Pool Sizing
Piedmont and Mountain SA/DA Table (Adapted from Driscoll, 1986)

| % Impervious | Permanent Pool Depth (feet) | | | | | |
|--------------|-----------------------------|------|------|------|------|------|
| | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 |
| 10 | 0.51 | 0.43 | 0.37 | 0.30 | 0.27 | 0.25 |
| 20 | 0.84 | 0.69 | 0.61 | 0.51 | 0.44 | 0.40 |
| 30 | 1.17 | 0.94 | 0.84 | 0.72 | 0.61 | 0.56 |
| 40 | 1.51 | 1.24 | 1.09 | 0.91 | 0.78 | 0.71 |
| 50 | 1.79 | 1.51 | 1.31 | 1.13 | 0.95 | 0.87 |
| 60 | 2.09 | 1.77 | 1.49 | 1.31 | 1.12 | 1.03 |
| 70 | 2.51 | 2.09 | 1.80 | 1.56 | 1.34 | 1.17 |
| 80 | 2.92 | 2.41 | 2.07 | 1.82 | 1.62 | 1.40 |
| 90 | 3.25 | 2.64 | 2.31 | 2.04 | 1.84 | 1.59 |
| 100 | 3.55 | 2.79 | 2.52 | 2.34 | 2.04 | 1.75 |

Source: NCDEQ Stormwater Design Manual Minimum Design Criteria C-3 Wet Pond (4.18.2017)

Drainage Area Information

Total Drainage Area = 11.64 acres
Total Impervious Area = 6.23 acres
% Impervious Surface Area = 53.52 %

Input

Output

Normal Pool Information

| Minimum Required Permanent Pool Surface Area | Provided Permanent Pool Surface Area |
|---|---------------------------------------|
| Avg Depth = 3.50 ft | Normal Pool Elevation = 384.5 |
| SA/DA ratio = 1.75 From Table 1 | Main Pool SA Provided = 11217 sq. ft. |
| Minimum pond surface area (SA) = $\frac{DA \times SA \div DA \text{ ratio}}{100}$ | 0.258 acres |
| SA = 8866 sq. ft. | |
| 0.204 acres | |

Water Quality Information

| 1-Inch Runoff Volume Calculation (Water Quality Volume) | Provided Water Quality Volume |
|---|---|
| Using "Simple Method" Runoff Volume Calculations As described by Schueler (1987) | Water Quality Pool Elev = 385.93 ft |
| $Rv = 0.05 + 0.9 \times I$ Where: Rv = Runoff coefficient (in./in.) I = Percent impervious | Overflow Elev = 387.80 ft |
| Rv = 0.53 in/in | Storage Volume Provided = 60436 cu. ft. |
| Total runoff volume from 1-inch precipitation: | 1.387 acre-ft |
| Runoff Volume (S) = Design Rainfall \times Rv \times Drainage Area | |
| S = 22466 cu. ft. | |
| 0.516 acre-ft | |

Project Name: **Parker Ridge**

Project #: 8430-03

City/State: **Rolesville, NC**

Date: 10/5/23

SCM 3**Total Drainage Area =****AVERAGE DEPTH**

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The average depth of a wet pond is to be calculated by one of these two options:

| | Below Normal Pool Contours (feet) | Contour Area (SF) | Incremental Contour Volume (CF) | Accumulated Contour Volume (CF) | |
|------------------------------|---|-------------------------|--|--|--------------------------------------|
| $A_{bot_pond} \rightarrow$ | 379.00 | 6368 | | | |
| | 380.00 | 7038 | 6700 | 6700 | \leftarrow Sediment Storage Volume |
| | 381.00 | 7730 | 7381 | 14082 | |
| $A_{bot_shelf} \rightarrow$ | 384.00 | 9960 | 26464 | 40546 | |
| $A_{perm_pool} \rightarrow$ | 384.50 | 11217 | 5291 | 45837 | \leftarrow Total Pond Volume |

$$V_{perm_pool} = \text{Total Volume} - \text{Sediment Storage Volume} = 39,137 \text{ cf}$$

OPTION 1: Use the following equation:

$$D_{avg} = \frac{V_{perm_pool}}{A_{perm_pool}}$$

Where: D_{avg} = Average Depth (ft) V_{perm_pool} = Volume of Permanent Pool (ft³) A_{perm_pool} = Area of Permanent Pool (ft²)

$$D_{avg} = 3.49 \text{ ft}$$

OPTION 2: Use the following equation:

$$D_{avg} = 0.25 \times \left(1 + \frac{A_{bot_shelf}}{A_{perm_pool}} \right) + \frac{A_{bot_shelf} + A_{bot_pond}}{2} \times \frac{\text{Depth}}{A_{bot_shelf}}$$

Where: D_{avg} = Average Depth (ft) A_{bot_shelf} = Area of Wet Pond at the Bottom of the Shelf (ft²) A_{bot_pond} = Area of Wet Pond Bottom above Sediment Storage (ft²) A_{perm_pool} = Area of Permanent Pool (ft²)

Depth = Depth of Wet Pond from Bottom of Shelf to Sediment Storage (ft)

$$D_{avg} = 3.89 \text{ ft}$$

$$\text{Use Average Depth} = 3.50 \text{ ft}$$



Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**
SCM 3

Project #: **8430-03**
 Date: **10/5/23**

Total Drainage Area = 11.64

FOREBAY DESIGN

Per NCDEQ "Stormwater Design Manual " Minimum Design Criteria:

The forebay volume shall be 15-20% of the main pool.

Project Name: **Parker Ridge Subdivision**
 City/State: **Rolesville, NC**

Project #: **8430-03**
 Date: **10/5/23**

70 Runoff Storage Volume Information

| Pond Area | Countour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume | Accumulated Contour Volume | |
|----------------|-------------------------|-------------------|----------------------------|----------------------------|--------------|
| Storage Volume | 390.00 | 23,096 | 22,278 | 103,393 | ←Top of Dam |
| | 389.00 | 21,469 | 20,679 | 81,115 | |
| | 388.00 | 19,899 | 19,137 | 60,436 | |
| | 387.00 | 18,385 | 17,651 | 41,299 | |
| | 386.00 | 16,928 | 16,222 | 23,647 | |
| | 385.00 | 15,527 | 7,425 | 7,425 | |
| Normal Pool | 384.50 | 14,183 | 0 | 0 | ←Normal Pool |

70 Pond Volume Information

| Pond Area | Countour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume (cf) | Accumulated Contour Volume (cf) | |
|-----------|-------------------------|-------------------|---------------------------------|---------------------------------|--------------------------|
| Main Pool | 384.50 | 11,217 | 5,291 | 45,850 | ←Normal Pool |
| | 384.00 | 9,960 | 9,573 | 40,559 | ←Bottom of Litoral Shelf |
| | 383.00 | 9,192 | 8,817 | 30,986 | |
| | 382.00 | 8,448 | 8,087 | 22,168 | |
| | 381.00 | 7,730 | 7,381 | 14,082 | |
| | 380.00 | 7,038 | 6,700 | 6,700 | ←Sediment Storage Volume |
| | 379.00 | 6,368 | 0 | 0 | ←Pond Bottom |
| Forebay | 384.50 | 2,965 | 1,274 | 8,035 | ←Normal Pool |
| | 384.00 | 2,153 | 1,976 | 6,760 | ←Bottom of Litoral Shelf |
| | 383.00 | 1,804 | 1,639 | 4,785 | |
| | 382.00 | 1,480 | 1,328 | 3,145 | |
| | 381.00 | 1,181 | 1,041 | 1,818 | |
| | 380.00 | 907 | 777 | 777 | ←Sediment Storage Volume |
| | 379.00 | 653 | 0 | 0 | ←Forebay Bottom |
| Total | 384.50 | 14,182 | 6,567 | 53,891 | |
| | 384.00 | 12,113 | 11,550 | 47,324 | |
| | 383.00 | 10,996 | 10,458 | 35,774 | |
| | 382.00 | 9,928 | 9,415 | 25,317 | |
| | 381.00 | 8,911 | 8,423 | 15,902 | |
| | 380.00 | 7,945 | 7,478 | 7,478 | |
| | 379.00 | 7,021 | 0 | 0 | |

Project Name: Parker RidgeProject #: 8430-03City/State: Rolesville, NCDate: 10/5/23

SCM 3

Total Drainage Area =

OS-A Anti-Floatation Sizing Calculations**Outlet Structure Dimension**

| | | | |
|---------------------|-----------|----------------------|------|
| Inside Riser Width: | 4 ft | Outside Riser Width: | 5 ft |
| Wall Thickness: | 6 in | | |
| Top Elevation: | 388.35 ft | | |
| Invert Elevation: | 384.5 ft | | |
| Bottom Elevation: | 380 ft | | |
| Extended Base: | 12 in | Extended Base Width: | 7 ft |

Displaced Volume: 209 cu ft

Displaced Weight: 13026 lbs

Volume of Actual Structure: 35 cu ft

Weight of Concrete Structure: 5198 lbs

Weight of Earth with Extended Base: 5082 lbs

Weight of Extra Depth: 16875 lbs

Total Weight of Structure: 27155 lbs

Factor of Safety: 2.1 OK

Project Name: Parker RidgeCity/State: Rolesville, NCProject #: 8430-03Date: 10/6/23

SCM 3A

Total Drainage Area =

ORIFICE CALCULATOR

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The design volume shall draw down to the permanent pool level in 2-5 days.

$$Q = C_d A \sqrt{2gh}$$

1" WATER QUALITY STORM VOLUME

| Variables | | | Constants | |
|----------------------|---------------|--------------|-----------|------------------------|
| WQ Volume: | 0.516 Acre-ft | 22466 cf | g = | 32.2 ft/s ² |
| Head / Driving Head: | 1.43 ft | 0.48 ft | Cd= | 0.6 |
| Draw down time: | 48 hrs | 172800 s | | |
| Orifice Area = | 0.039 sq. ft | 5.637 sq. in | | |
| Orifice Diameter = | 2.679 in | | | |

USE 3 INCH DIAMETER ORIFICE**LEVEL SPREADER FILTER STRIP CALCULATIONS**

| | | |
|----------------|----------|-------|
| Drawdown Rate: | 0.13 cfs | |
| LS Length: | 10 feet | (min) |



Project Name: Parker Ridge
City/State: Rolesville, NC

Project #: 8430-03
Date: 10/6/23

SCM 3B

Table 1 Surface Area to Drainage Area Ratio for Permanent Pool Sizing
Piedmont and Mountain SA/DA Table (Adapted from Driscoll, 1986)

| % Impervious | Permanent Pool Depth (feet) | | | | | |
|--------------|-----------------------------|------|------|------|------|------|
| | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 |
| 10 | 0.51 | 0.43 | 0.37 | 0.30 | 0.27 | 0.25 |
| 20 | 0.84 | 0.69 | 0.61 | 0.51 | 0.44 | 0.40 |
| 30 | 1.17 | 0.94 | 0.84 | 0.72 | 0.61 | 0.56 |
| 40 | 1.51 | 1.24 | 1.09 | 0.91 | 0.78 | 0.71 |
| 50 | 1.79 | 1.51 | 1.31 | 1.13 | 0.95 | 0.87 |
| 60 | 2.09 | 1.77 | 1.49 | 1.31 | 1.12 | 1.03 |
| 70 | 2.51 | 2.09 | 1.80 | 1.56 | 1.34 | 1.17 |
| 80 | 2.92 | 2.41 | 2.07 | 1.82 | 1.62 | 1.40 |
| 90 | 3.25 | 2.64 | 2.31 | 2.04 | 1.84 | 1.59 |
| 100 | 3.55 | 2.79 | 2.52 | 2.34 | 2.04 | 1.75 |

Source: NCDEQ Stormwater Design Manual Minimum Design Criteria C-3 Wet Pond (4.18.2017)

Drainage Area Information

Total Drainage Area = 9.70 acres

Total Impervious Area = 4.31 acres

% Impervious Surface Area = 44.43 %

Input

Output

Normal Pool Information

| Minimum Required Permanent Pool Surface Area | Provided Permanent Pool Surface Area |
|--|---------------------------------------|
| Avg Depth = 3.50 ft | Normal Pool Elevation = 380.5 |
| SA/DA ratio = 2.02 From Table 1 | Main Pool SA Provided = 14636 sq. ft. |
| $\text{Minimum pond surface area (SA)} = \frac{DA \times SA \div DA \text{ ratio}}{100}$ | 0.336 acres |
| SA = 8544 sq. ft. | |
| 0.196 acres | |

Water Quality Information

| 1-Inch Runoff Volume Calculation (Water Quality Volume) | Provided Water Quality Volume |
|---|---|
| Using "Simple Method" Runoff Volume Calculations As described by Schueler (1987) | Water Quality Pool Elev = 381.48 ft |
| $Rv = 0.05 + 0.9 \times I$ Where: Rv = Runoff coefficient (in./in.) I = Percent impervious | Overflow Elev = 384.00 ft |
| Rv = 0.45 in/in | Storage Volume Provided = 84687 cu. ft. |
| Total runoff volume from 1-inch precipitation: | 1.944 acre-ft |
| $\text{Runoff Volume (S)} = \text{Design Rainfall} \times Rv \times \text{Drainage Area}$ | |
| S = 15841 cu. ft. | |
| 0.364 acre-ft | |

Project Name: **Parker Ridge**

Project #: 8430-03

City/State: Rolesville, NCDate: 10/6/23**SCM 3B****Total Drainage Area =****AVERAGE DEPTH**

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The average depth of a wet pond is to be calculated by one of these two options:

| | Below Normal Pool Contours (feet) | Contour Area (SF) | Incremental Contour Volume (CF) | Accumulated Contour Volume (CF) | |
|------------------------------|---|-------------------------|--|--|---------------------------|
| $A_{bot_pond} \rightarrow$ | 375.00 | 5047 | | | |
| | 376.00 | 5697 | 5369 | 5369 | ← Sediment Storage Volume |
| | 377.00 | 6373 | 6032 | 11401 | |
| $A_{bot_shelf} \rightarrow$ | 380.00 | 8550 | 22305 | 33705 | |
| $A_{perm_pool} \rightarrow$ | 380.50 | 10901 | 4851 | 38556 | ← Total Pond Volume |

$$V_{perm_pool} = \text{Total Volume} - \text{Sediment Storage Volume} = 33,187 \text{ cf}$$

OPTION 1: Use the following equation:

$$D_{avg} = \frac{V_{perm_pool}}{A_{perm_pool}}$$

Where: D_{avg} = Average Depth (ft) V_{perm_pool} = Volume of Permanent Pool (ft³) A_{perm_pool} = Area of Permanent Pool (ft²)

$$D_{avg} = 3.04 \text{ ft}$$

OPTION 2: Use the following equation:

$$D_{avg} = 0.25 \times \left(1 + \frac{A_{bot_shelf}}{A_{perm_pool}} \right) + \frac{A_{bot_shelf} + A_{bot_pond}}{2} \times \frac{\text{Depth}}{A_{bot_shelf}}$$

Where: D_{avg} = Average Depth (ft) A_{bot_shelf} = Area of Wet Pond at the Bottom of the Shelf (ft²) A_{bot_pond} = Area of Wet Pond Bottom above Sediment Storage (ft²) A_{perm_pool} = Area of Permanent Pool (ft²)

Depth = Depth of Wet Pond from Bottom of Shelf to Sediment Storage (ft)

$$D_{avg} = 3.78 \text{ ft}$$

$$\text{Use Average Depth} = 3.50 \text{ ft}$$



Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**
SCM 3B

Project #: **8430-03**
 Date: **10/6/23**

Total Drainage Area = 9.7

FOREBAY DESIGN

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The forebay volume shall be 15-20% of the main pool.

Project Name: **Parker Ridge**
 City/State: **Rolesville, NC**

Project #: **8430-03**
 Date: **10/6/23**

70 Runoff Storage Volume Information

| Pond Area | Contour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume | Accumulated Contour Volume | |
|-------------------|------------------------------|-------------------------|----------------------------------|----------------------------------|--------------|
| Storage Volume | 386.00 | 24,300 | 23,419 | 108,106 | ←Top of Dam |
| | 385.00 | 22,548 | 21,695 | 84,687 | |
| | 384.00 | 20,853 | 20,028 | 62,992 | |
| | 383.00 | 19,214 | 18,418 | 42,964 | |
| | 382.00 | 17,634 | 16,864 | 24,546 | |
| | 381.00 | 16,105 | 7,682 | 7,682 | |
| Normal Pool | 380.50 | 14,636 | 0 | 0 | ←Normal Pool |

70 Pond Volume Information

| Pond Area | Contour Elevation (ft) | Contour Area (sf) | Incremental Contour Volume (cf) | Accumulated Contour Volume (cf) | |
|-----------|------------------------------|-------------------------|--|--|--------------------------|
| Main Pool | 380.50 | 10,901 | 4,851 | 38,576 | ←Normal Pool |
| | 380.00 | 8,550 | 8,172 | 33,725 | ←Bottom of Litoral Shelf |
| | 379.00 | 7,799 | 7,433 | 25,554 | |
| | 378.00 | 7,073 | 6,720 | 18,121 | |
| | 377.00 | 6,373 | 6,032 | 11,401 | |
| | 376.00 | 5,697 | 5,369 | 5,369 | ←Sediment Storage Volume |
| | 375.00 | 5,047 | 0 | 0 | ←Pond Bottom |
| Forebay | 380.50 | 3,735 | 1,638 | 9,851 | ←Normal Pool |
| | 380.00 | 2,839 | 2,566 | 8,212 | ←Bottom of Litoral Shelf |
| | 379.00 | 2,302 | 2,054 | 5,647 | |
| | 378.00 | 1,816 | 1,592 | 3,592 | |
| | 377.00 | 1,379 | 1,181 | 2,000 | |
| | 376.00 | 993 | 819 | 819 | ←Sediment Storage Volume |
| | 375.00 | 657 | 0 | 0 | ←Forebay Bottom |
| Total | 380.50 | 14,636 | 6,489 | 48,435 | |
| | 380.00 | 11,389 | 10,739 | 41,946 | |
| | 379.00 | 10,101 | 9,489 | 31,208 | |
| | 378.00 | 8,889 | 8,314 | 21,719 | |
| | 377.00 | 7,752 | 7,214 | 13,405 | |
| | 376.00 | 6,690 | 6,190 | 6,190 | |
| | 375.00 | 5,704 | 0 | 0 | |



Project Name: Parker Ridge
City/State: Rolesville, NC
SCM 3B

Project #: 8430-03
Date: 10/6/23

Total Drainage Area =

OS-A Anti-Floatation Sizing Calculations

Outlet Structure Dimension

| | | | |
|---------------------|----------|----------------------|------|
| Inside Riser Width: | 4 ft | Outside Riser Width: | 5 ft |
| Wall Thickness: | 6 in | | |
| Top Elevation: | 386 ft | | |
| Invert Elevation: | 380.5 ft | | |
| Bottom Elevation: | 375 ft | | |
| Extended Base: | 12 in | Extended Base Width: | 7 ft |

Displaced Volume: 275 cu ft
Displaced Weight: 17160 lbs

Volume of Actual Structure: 50 cu ft
Weight of Concrete Structure: 7425 lbs
Weight of Earth with Extended Base: 7260 lbs
Weight of Extra Depth: 20625 lbs
Total Weight of Structure: 35310 lbs

Factor of Safety: 2.1 OK

Project Name: Parker RidgeCity/State: Rolesville, NCProject #: 8430-03Date: 10/6/23

SCM 3B

Total Drainage Area =

ORIFICE CALCULATOR

Per NCDEQ "Stormwater Design Manual" Minimum Design Criteria:

The design volume shall draw down to the permanent pool level in 2-5 days.

$$Q = C_d A \sqrt{2gh}$$

1" WATER QUALITY STORM VOLUME

| Variables | | | Constants | |
|----------------------|---------------|--------------|-----------|------------------------|
| WQ Volume: | 0.364 Acre-ft | 15841 cf | g = | 32.2 ft/s ² |
| Head / Driving Head: | 0.98 ft | 0.33 ft | Cd= | 0.6 |
| Draw down time: | 48 hrs | 172800 s | | |
| Orifice Area = | 0.033 sq. ft | 4.788 sq. in | | |
| Orifice Diameter = | 2.469 in | | | |

USE 2 INCH DIAMETER ORIFICE**LEVEL SPREADER FILTER STRIP CALCULATIONS**

| | | |
|----------------|----------|-------|
| Drawdown Rate: | 0.09 cfs | |
| LS Length: | 10 feet | (min) |

Hydraflow Table of Contents

SCMs.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

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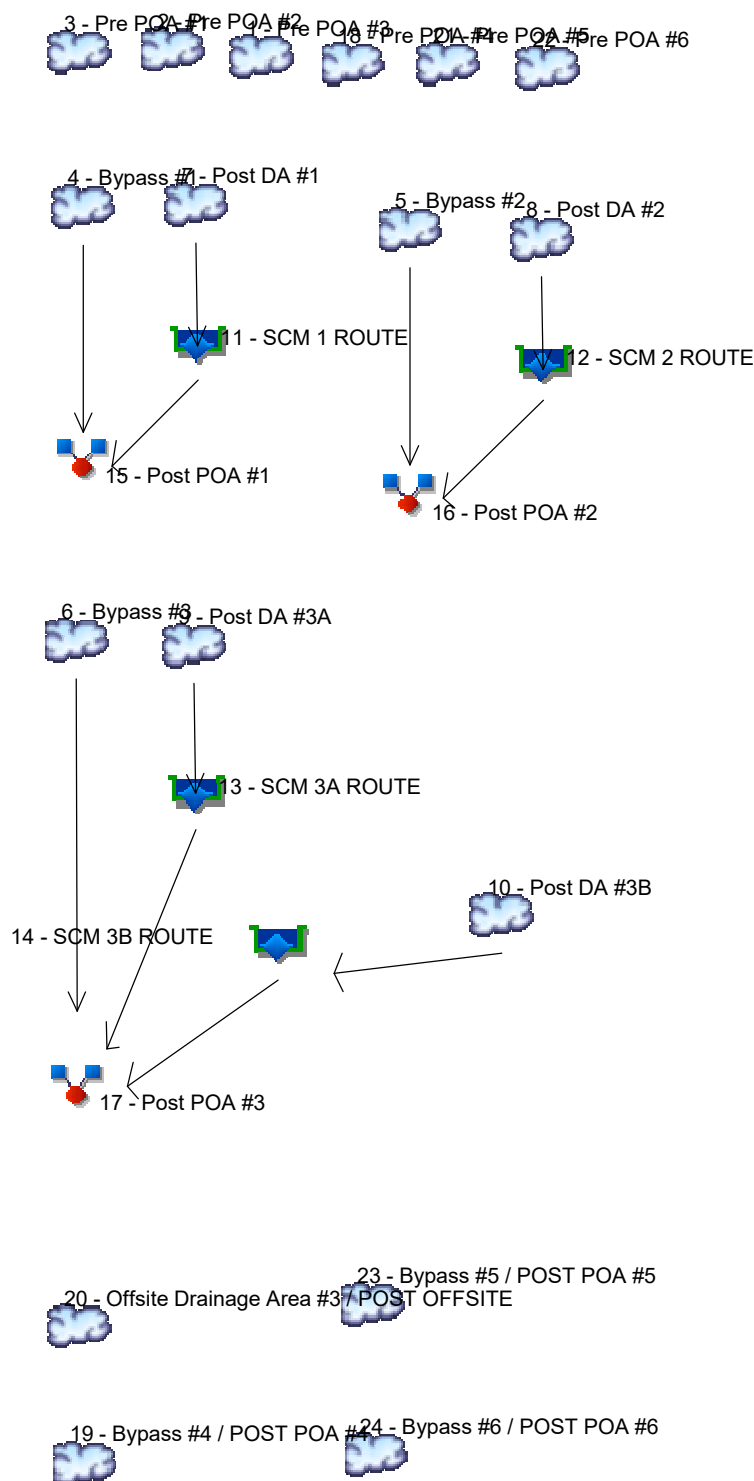
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023



Legend

Hyd. Origin Description

| | | |
|----|------------|---|
| 1 | SCS Runoff | Pre POA #3 |
| 2 | SCS Runoff | Pre POA #2 |
| 3 | SCS Runoff | Pre POA #1 |
| 4 | SCS Runoff | Bypass #1 |
| 5 | SCS Runoff | Bypass #2 |
| 6 | SCS Runoff | Bypass #3 |
| 7 | SCS Runoff | Post DA #1 |
| 8 | SCS Runoff | Post DA #2 |
| 9 | SCS Runoff | Post DA #3A |
| 10 | SCS Runoff | Post DA #3B |
| 11 | Reservoir | SCM 1 ROUTE |
| 12 | Reservoir | SCM 2 ROUTE |
| 13 | Reservoir | SCM 3A ROUTE |
| 14 | Reservoir | SCM 3B ROUTE |
| 15 | Combine | Post POA #1 |
| 16 | Combine | Post POA #2 |
| 17 | Combine | Post POA #3 |
| 18 | SCS Runoff | Pre POA #4 |
| 19 | SCS Runoff | Bypass #4 / POST POA #4 |
| 20 | SCS Runoff | Offsite Drainage Area #3 / POST OFFSITE |
| 21 | SCS Runoff | Pre POA #5 |
| 22 | SCS Runoff | Pre POA #6 |
| 23 | SCS Runoff | Bypass #5 / POST POA #5 |
| 24 | SCS Runoff | Bypass #6 / POST POA #6 |

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

| 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 | ----- | 49.44 | 76.69 | ----- | ----- | 160.03 | 214.69 | ----- | 309.61 | Pre POA #3 |
| 2 | SCS Runoff | ----- | 25.18 | 35.57 | ----- | ----- | 66.23 | 85.75 | ----- | 117.93 | Pre POA #2 |
| 3 | SCS Runoff | ----- | 32.39 | 46.07 | ----- | ----- | 86.61 | 112.37 | ----- | 154.90 | Pre POA #1 |
| 4 | SCS Runoff | ----- | 16.85 | 23.87 | ----- | ----- | 44.61 | 57.66 | ----- | 79.15 | Bypass #1 |
| 5 | SCS Runoff | ----- | 2.876 | 4.074 | ----- | ----- | 7.613 | 9.838 | ----- | 13.51 | Bypass #2 |
| 6 | SCS Runoff | ----- | 34.39 | 48.71 | ----- | ----- | 91.03 | 117.64 | ----- | 161.50 | Bypass #3 |
| 7 | SCS Runoff | ----- | 21.52 | 28.31 | ----- | ----- | 46.90 | 58.14 | ----- | 76.32 | Post DA #1 |
| 8 | SCS Runoff | ----- | 47.17 | 62.05 | ----- | ----- | 102.80 | 127.44 | ----- | 167.28 | Post DA #2 |
| 9 | SCS Runoff | ----- | 28.41 | 37.04 | ----- | ----- | 60.55 | 74.71 | ----- | 97.60 | Post DA #3A |
| 10 | SCS Runoff | ----- | 21.62 | 28.69 | ----- | ----- | 48.19 | 60.03 | ----- | 79.20 | Post DA #3B |
| 11 | Reservoir | 7 | 2.097 | 4.580 | ----- | ----- | 27.13 | 44.96 | ----- | 66.14 | SCM 1 ROUTE |
| 12 | Reservoir | 8 | 3.161 | 6.359 | ----- | ----- | 34.37 | 77.06 | ----- | 126.27 | SCM 2 ROUTE |
| 13 | Reservoir | 9 | 1.829 | 4.264 | ----- | ----- | 41.67 | 63.26 | ----- | 87.44 | SCM 3A ROUTE |
| 14 | Reservoir | 10 | 1.828 | 3.880 | ----- | ----- | 11.74 | 28.75 | ----- | 57.55 | SCM 3B ROUTE |
| 15 | Combine | 4, 11, | 16.85 | 25.20 | ----- | ----- | 59.09 | 94.86 | ----- | 141.27 | Post POA #1 |
| 16 | Combine | 5, 12, | 3.395 | 6.979 | ----- | ----- | 37.08 | 82.97 | ----- | 136.26 | Post POA #2 |
| 17 | Combine | 6, 13, 14, | 34.43 | 50.45 | ----- | ----- | 125.52 | 187.24 | ----- | 288.98 | Post POA #3 |
| 18 | SCS Runoff | ----- | 9.007 | 12.85 | ----- | ----- | 24.01 | 31.12 | ----- | 42.89 | Pre POA #4 |
| 19 | SCS Runoff | ----- | 1.259 | 1.768 | ----- | ----- | 3.250 | 4.177 | ----- | 5.699 | Bypass #4 / POST POA #4 |
| 20 | SCS Runoff | ----- | 42.77 | 62.67 | ----- | ----- | 122.39 | 160.69 | ----- | 224.46 | Offsite Drainage Area #3 / POST OFF |
| 21 | SCS Runoff | ----- | 4.695 | 6.498 | ----- | ----- | 11.80 | 15.11 | ----- | 20.53 | Pre POA #5 |
| 22 | SCS Runoff | ----- | 3.117 | 4.314 | ----- | ----- | 7.835 | 10.03 | ----- | 13.63 | Pre POA #6 |
| 23 | SCS Runoff | ----- | 1.831 | 2.572 | ----- | ----- | 4.727 | 6.075 | ----- | 8.289 | Bypass #5 / POST POA #5 |
| 24 | SCS Runoff | ----- | 1.145 | 1.608 | ----- | ----- | 2.955 | 3.797 | ----- | 5.181 | Bypass #6 / POST POA #6 |
| Proj. file: SCMs.gpw | | | | | | | | | | Friday, 10 / 6 / 2023 | |

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

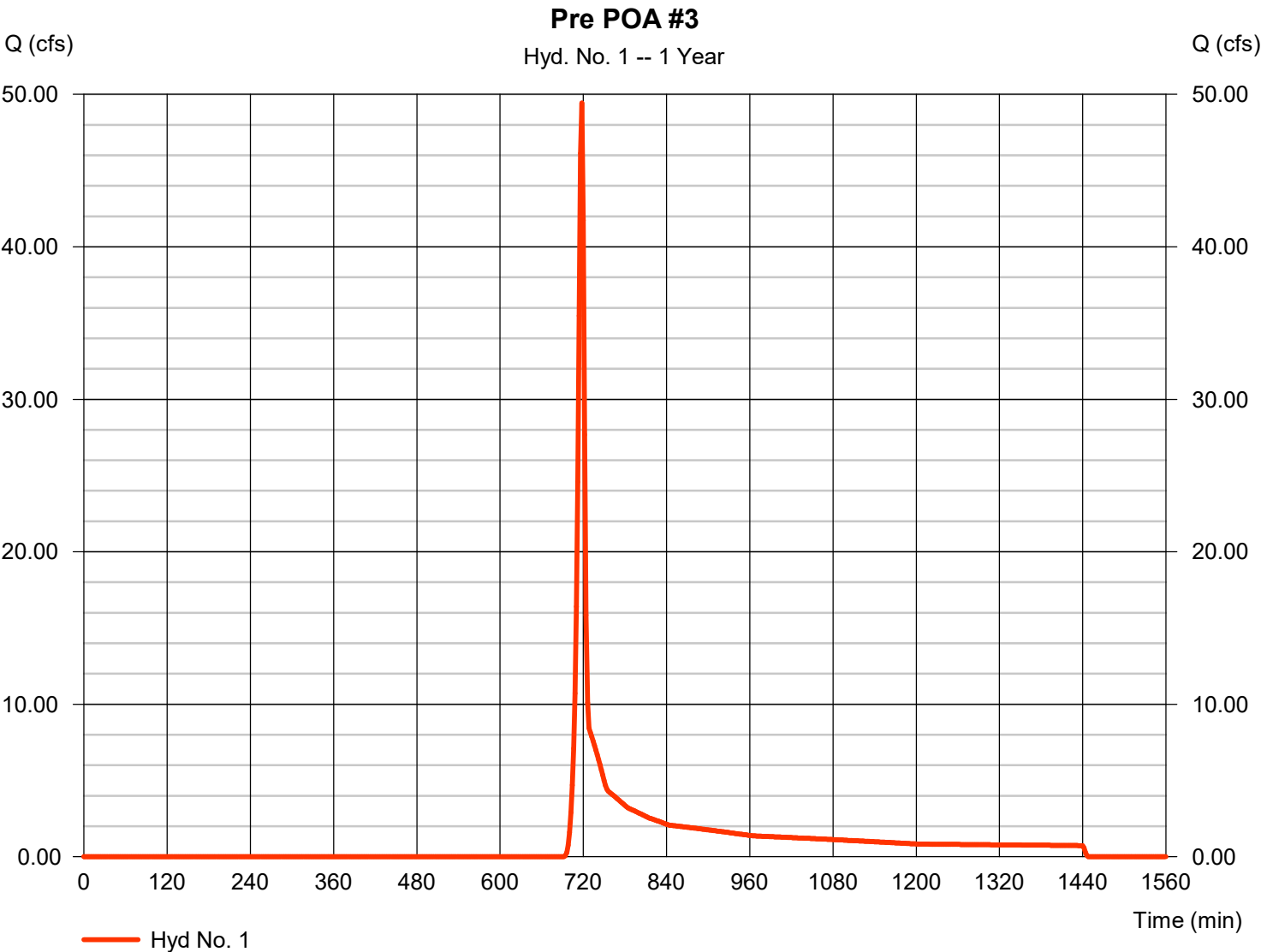
| Hyd. No. | Hydrograph type (origin) | Peak flow (cfs) | Time interval (min) | Time to Peak (min) | Hyd. volume (cuft) | Inflow hyd(s) | Maximum elevation (ft) | Total strge used (cuft) | Hydrograph Description |
|----------|--------------------------|-----------------|---------------------|--------------------|-----------------------|---------------|------------------------|-------------------------|-------------------------------------|
| 1 | SCS Runoff | 49.44 | 2 | 718 | 101,863 | ----- | ----- | ----- | Pre POA #3 |
| 2 | SCS Runoff | 25.18 | 2 | 718 | 50,347 | ----- | ----- | ----- | Pre POA #2 |
| 3 | SCS Runoff | 32.39 | 2 | 720 | 74,422 | ----- | ----- | ----- | Pre POA #1 |
| 4 | SCS Runoff | 16.85 | 2 | 722 | 44,360 | ----- | ----- | ----- | Bypass #1 |
| 5 | SCS Runoff | 2.876 | 2 | 722 | 7,570 | ----- | ----- | ----- | Bypass #2 |
| 6 | SCS Runoff | 34.39 | 2 | 722 | 90,511 | ----- | ----- | ----- | Bypass #3 |
| 7 | SCS Runoff | 21.52 | 2 | 720 | 55,826 | ----- | ----- | ----- | Post DA #1 |
| 8 | SCS Runoff | 47.17 | 2 | 720 | 122,369 | ----- | ----- | ----- | Post DA #2 |
| 9 | SCS Runoff | 28.41 | 2 | 720 | 73,826 | ----- | ----- | ----- | Post DA #3A |
| 10 | SCS Runoff | 21.62 | 2 | 720 | 56,035 | ----- | ----- | ----- | Post DA #3B |
| 11 | Reservoir | 2.097 | 2 | 758 | 35,924 | 7 | 386.83 | 30,415 | SCM 1 ROUTE |
| 12 | Reservoir | 3.161 | 2 | 784 | 81,007 | 8 | 353.97 | 70,506 | SCM 2 ROUTE |
| 13 | Reservoir | 1.829 | 2 | 786 | 41,869 | 9 | 387.17 | 43,836 | SCM 3A ROUTE |
| 14 | Reservoir | 1.828 | 2 | 766 | 37,960 | 10 | 382.30 | 30,584 | SCM 3B ROUTE |
| 15 | Combine | 16.85 | 2 | 722 | 80,284 | 4, 11, | ----- | ----- | Post POA #1 |
| 16 | Combine | 3.395 | 2 | 778 | 88,577 | 5, 12, | ----- | ----- | Post POA #2 |
| 17 | Combine | 34.43 | 2 | 722 | 170,339 | 6, 13, 14, | ----- | ----- | Post POA #3 |
| 18 | SCS Runoff | 9.007 | 1 | 716 | 15,664 | ----- | ----- | ----- | Pre POA #4 |
| 19 | SCS Runoff | 1.259 | 2 | 722 | 3,303 | ----- | ----- | ----- | Bypass #4 / POST POA #4 |
| 20 | SCS Runoff | 42.77 | 2 | 730 | 165,240 | ----- | ----- | ----- | Offsite Drainage Area #3 / POST OFF |
| 21 | SCS Runoff | 4.695 | 2 | 718 | 9,399 | ----- | ----- | ----- | Pre POA #5 |
| 22 | SCS Runoff | 3.117 | 2 | 718 | 6,240 | ----- | ----- | ----- | Pre POA #6 |
| 23 | SCS Runoff | 1.831 | 2 | 722 | 4,805 | ----- | ----- | ----- | Bypass #5 / POST POA #5 |
| 24 | SCS Runoff | 1.145 | 2 | 722 | 3,003 | ----- | ----- | ----- | Bypass #6 / POST POA #6 |
| SCMs.gpw | | | | | Return Period: 1 Year | | | Friday, 10 / 6 / 2023 | |

Hydrograph Report

Hyd. No. 1

Pre POA #3

| | | | | | |
|-----------------|---|------------|--------------------|---|--------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 49.44 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 101,863 cuft |
| Drainage area | = | 43.940 ac | Curve number | = | 71 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 3.10 min |
| Total precip. | = | 2.86 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 1

Pre POA #3

| <u>Description</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Totals</u> |
|------------------------------------|---------------|----------|-------------|-----------------|
| Sheet Flow | | | | |
| Manning's n-value | = 0.011 | 0.011 | 0.011 | |
| Flow length (ft) | = 300.0 | 0.0 | 0.0 | |
| Two-year 24-hr precip. (in) | = 2.20 | 0.00 | 0.00 | |
| Land slope (%) | = 7.06 | 0.00 | 0.00 | |
| Travel Time (min) | = 2.12 | + | 0.00 | + |
| | | | 0.00 | = 2.12 |
| Shallow Concentrated Flow | | | | |
| Flow length (ft) | = 193.00 | 0.00 | 0.00 | |
| Watercourse slope (%) | = 4.30 | 0.00 | 0.00 | |
| Surface description | = Paved | Paved | Paved | |
| Average velocity (ft/s) | =4.22 | 0.00 | 0.00 | |
| Travel Time (min) | = 0.76 | + | 0.00 | + |
| | | | 0.00 | = 0.76 |
| Channel Flow | | | | |
| X sectional flow area (sqft) | = 30.00 | 0.00 | 0.00 | |
| Wetted perimeter (ft) | = 16.00 | 0.00 | 0.00 | |
| Channel slope (%) | = 5.00 | 0.00 | 0.00 | |
| Manning's n-value | = 0.015 | 0.015 | 0.015 | |
| Velocity (ft/s) | =33.84 | 0.00 | 0.00 | |
| Flow length (ft) | (0)500.0 | 0.0 | 0.0 | |
| Travel Time (min) | = 0.25 | + | 0.00 | + |
| | | | 0.00 | = 0.25 |
| Total Travel Time, Tc | | | | 3.10 min |

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

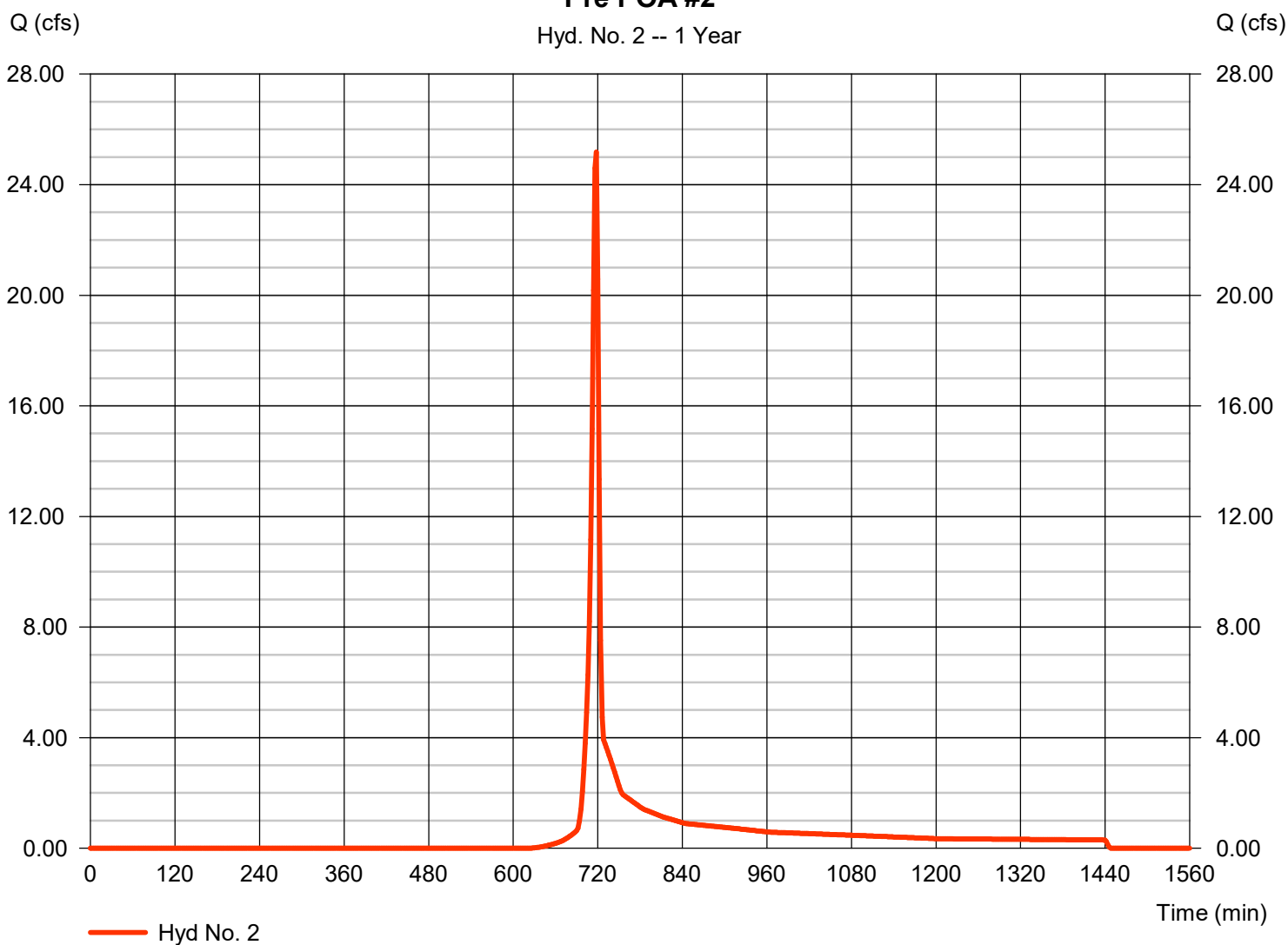
Hyd. No. 2

Pre POA #2

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 25.18 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 50,347 cuft |
| Drainage area | = 14.360 ac | Curve number | = 78 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 5.60 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

Pre POA #2

Hyd. No. 2 -- 1 Year



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 2

Pre POA #2

| <u>Description</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Totals</u> | | | |
|------------------------------------|---------------|----------|-------------|-----------------|-------------|----------|-------------|
| Sheet Flow | | | | | | | |
| Manning's n-value | = 0.011 | 0.011 | 0.011 | | | | |
| Flow length (ft) | = 300.0 | 0.0 | 0.0 | | | | |
| Two-year 24-hr precip. (in) | = 2.20 | 0.00 | 0.00 | | | | |
| Land slope (%) | = 3.80 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 2.72 | + | 0.00 | + | 0.00 | = | 2.72 |
| Shallow Concentrated Flow | | | | | | | |
| Flow length (ft) | = 850.00 | 0.00 | 0.00 | | | | |
| Watercourse slope (%) | = 6.00 | 0.00 | 0.00 | | | | |
| Surface description | = Paved | Paved | Paved | | | | |
| Average velocity (ft/s) | =4.98 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 2.85 | + | 0.00 | + | 0.00 | = | 2.85 |
| Channel Flow | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | 0.00 | 0.00 | | | | |
| Wetted perimeter (ft) | = 0.00 | 0.00 | 0.00 | | | | |
| Channel slope (%) | = 0.00 | 0.00 | 0.00 | | | | |
| Manning's n-value | = 0.015 | 0.015 | 0.015 | | | | |
| Velocity (ft/s) | =0.00 | 0.00 | 0.00 | | | | |
| Flow length (ft) | (0)0.0 | 0.0 | 0.0 | | | | |
| Travel Time (min) | = 0.00 | + | 0.00 | + | 0.00 | = | 0.00 |
| Total Travel Time, Tc | | | | 5.60 min | | | |

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

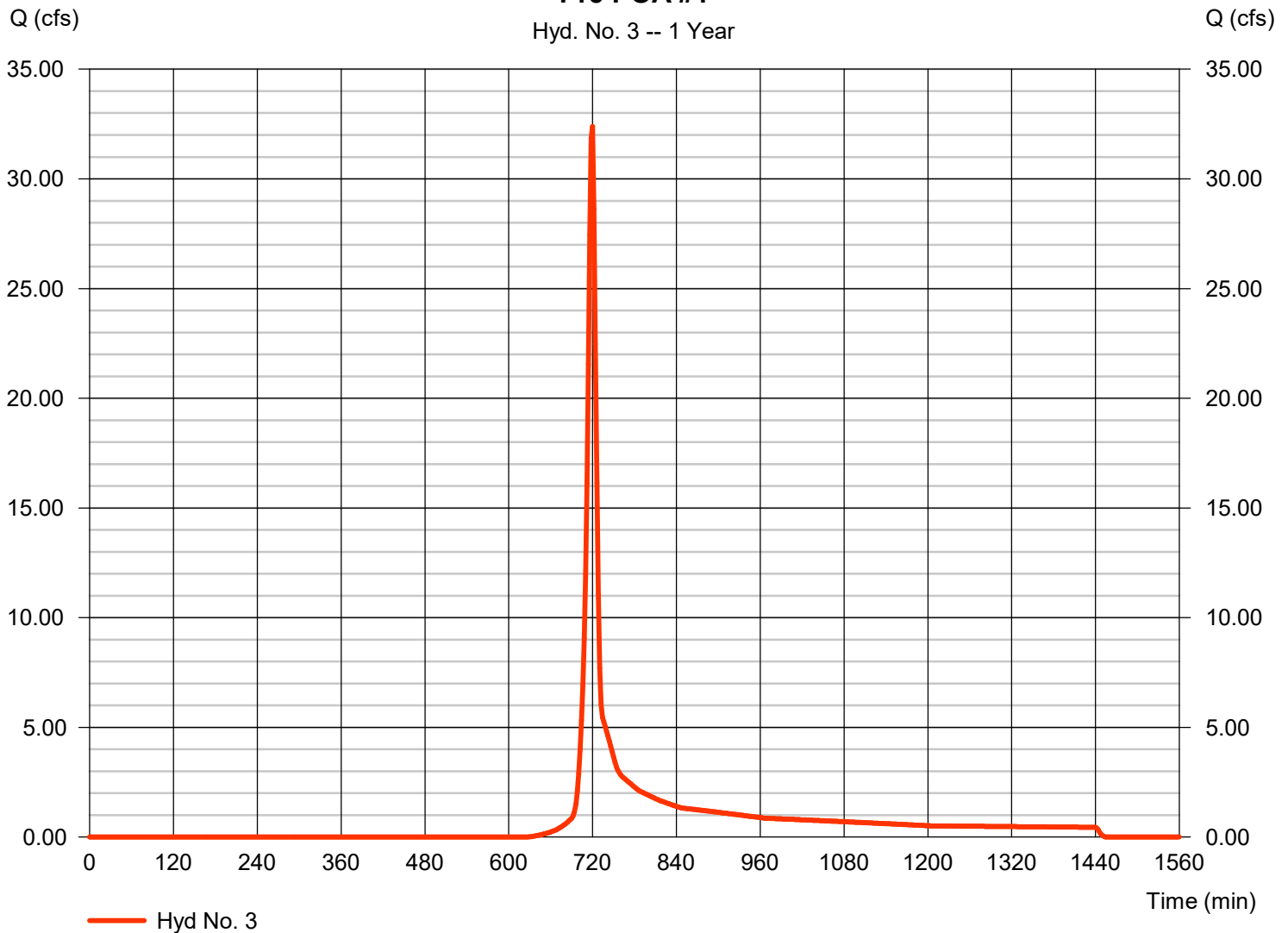
Hyd. No. 3

Pre POA #1

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 32.39 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 74,422 cuft |
| Drainage area | = 19.900 ac | Curve number | = 78 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 9.70 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

Pre POA #1

Hyd. No. 3 -- 1 Year



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 3

Pre POA #1

| <u>Description</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Totals</u> | | | |
|------------------------------------|---------------|----------|-------------|-----------------|-------------|----------|-------------|
| Sheet Flow | | | | | | | |
| Manning's n-value | = 0.011 | 0.011 | 0.011 | | | | |
| Flow length (ft) | = 300.0 | 0.0 | 0.0 | | | | |
| Two-year 24-hr precip. (in) | = 2.20 | 0.00 | 0.00 | | | | |
| Land slope (%) | = 4.60 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 2.52 | + | 0.00 | + | 0.00 | = | 2.52 |
| Shallow Concentrated Flow | | | | | | | |
| Flow length (ft) | = 150.00 | 0.00 | 0.00 | | | | |
| Watercourse slope (%) | = 3.50 | 0.00 | 0.00 | | | | |
| Surface description | = Unpaved | Paved | Paved | | | | |
| Average velocity (ft/s) | =3.02 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 0.83 | + | 0.00 | + | 0.00 | = | 0.83 |
| Channel Flow | | | | | | | |
| X sectional flow area (sqft) | = 16.00 | 0.00 | 0.00 | | | | |
| Wetted perimeter (ft) | = 20.00 | 0.00 | 0.00 | | | | |
| Channel slope (%) | = 1.00 | 0.00 | 0.00 | | | | |
| Manning's n-value | = 0.015 | 0.015 | 0.015 | | | | |
| Velocity (ft/s) | =8.55 | 0.00 | 0.00 | | | | |
| Flow length (ft) | (0)3240.0 | 0.0 | 0.0 | | | | |
| Travel Time (min) | = 6.31 | + | 0.00 | + | 0.00 | = | 6.31 |
| Total Travel Time, Tc | | | | 9.70 min | | | |

Hydrograph Report

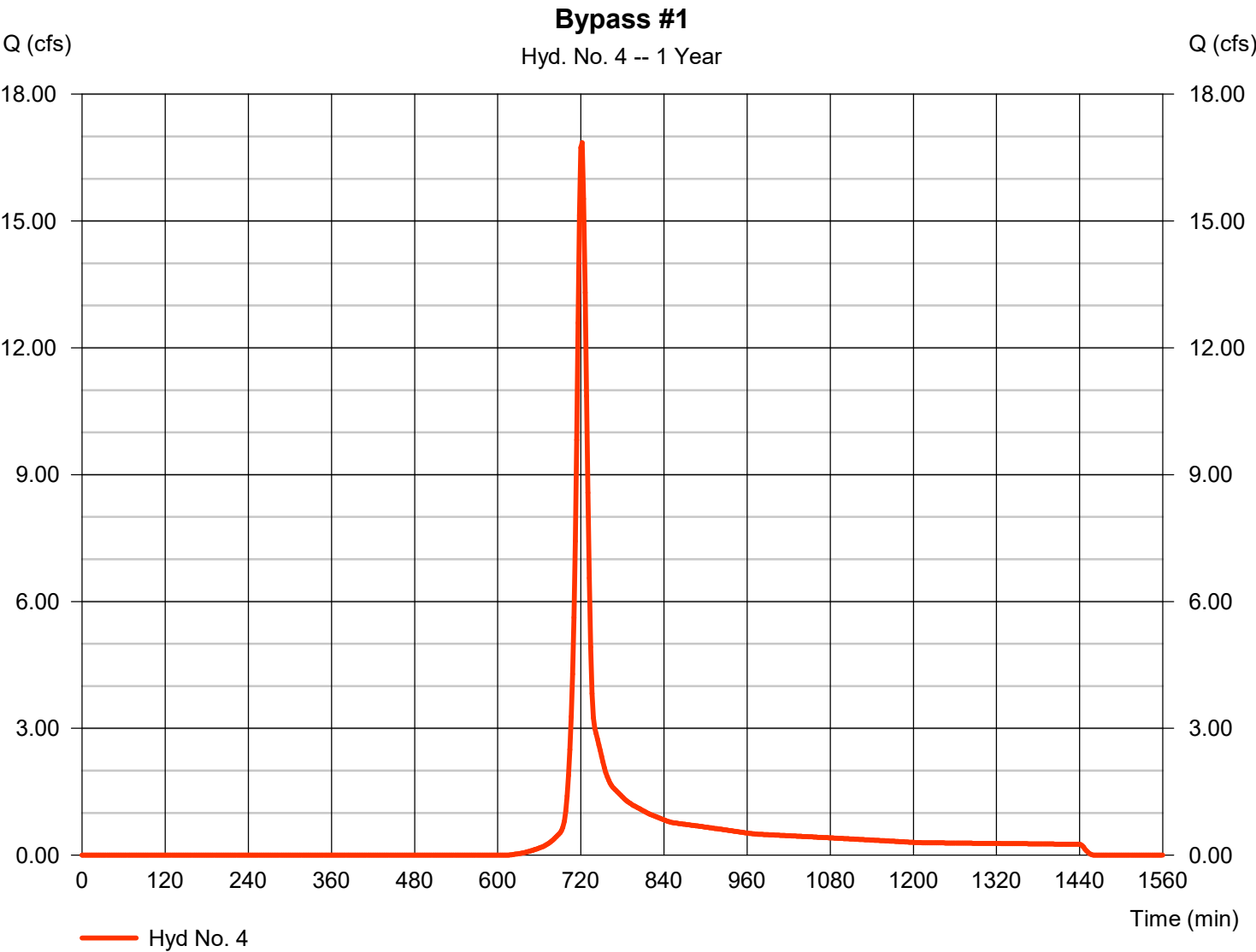
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 4

Bypass #1

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 16.85 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 44,360 cuft |
| Drainage area | = 10.900 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

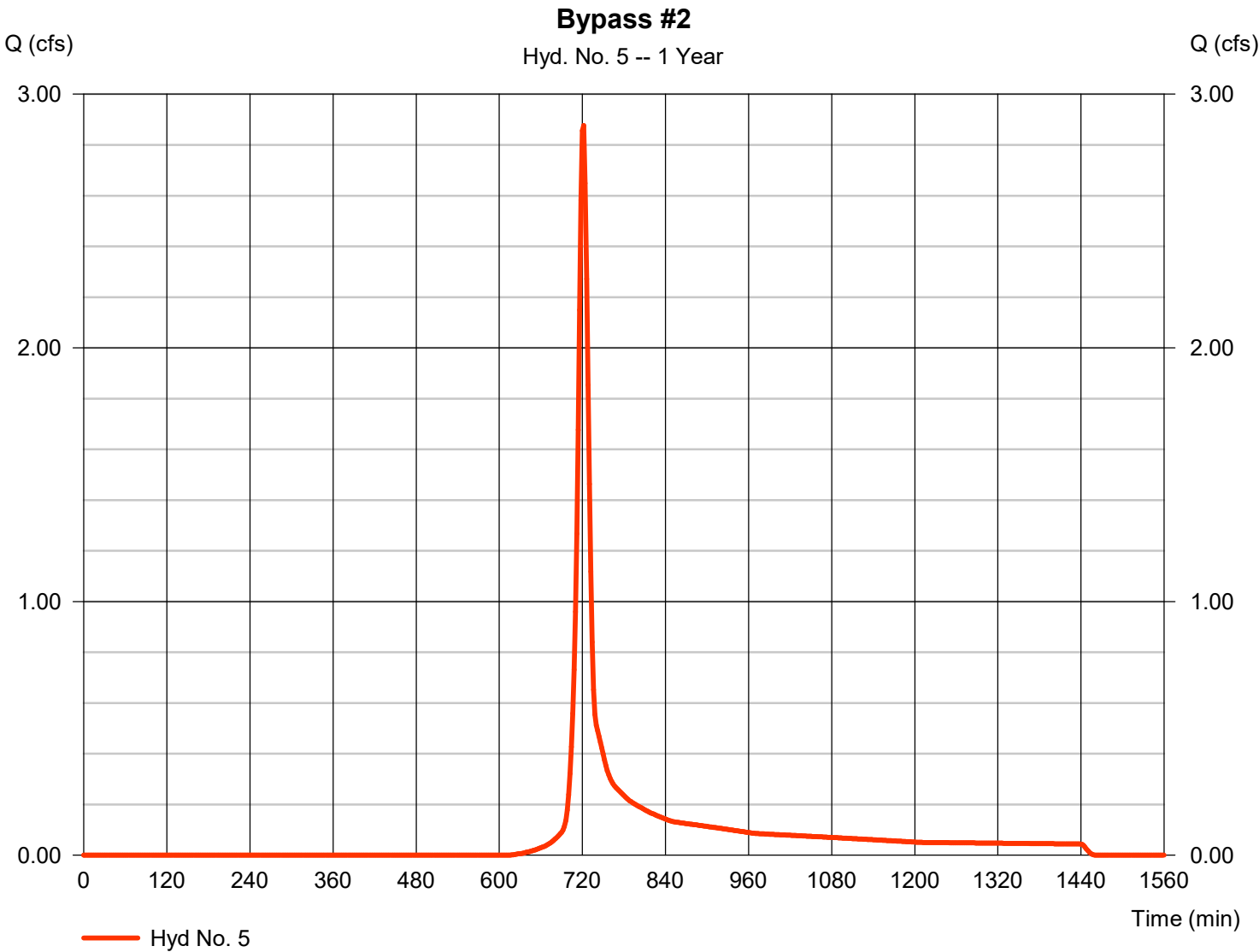
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 5

Bypass #2

| | | | |
|-----------------|--------------|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.876 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 7,570 cuft |
| Drainage area | = 1.860 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

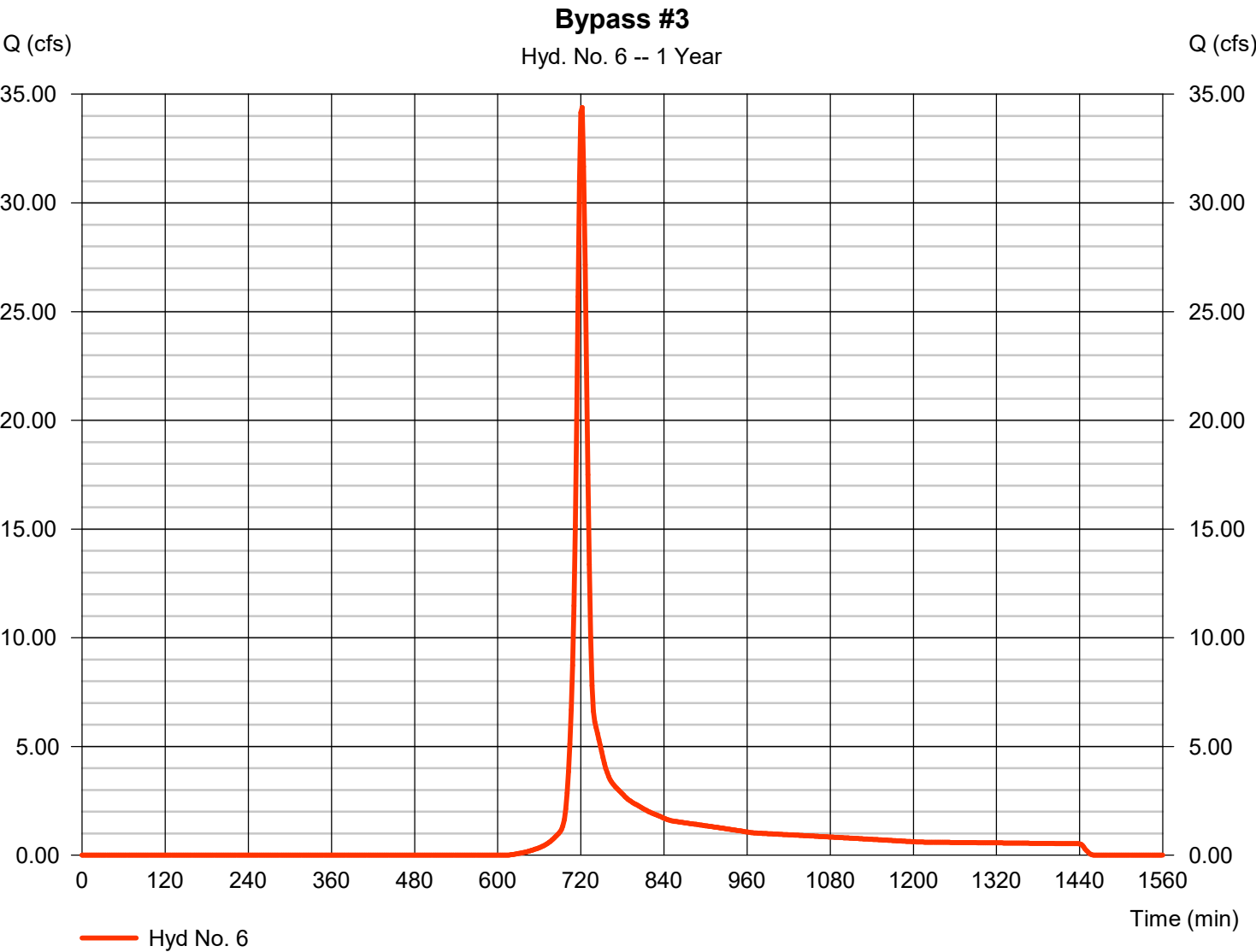
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Friday, 10 / 6 / 2023

Hyd. No. 6

Bypass #3

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 34.39 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 90,511 cuft |
| Drainage area | = 22.240 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

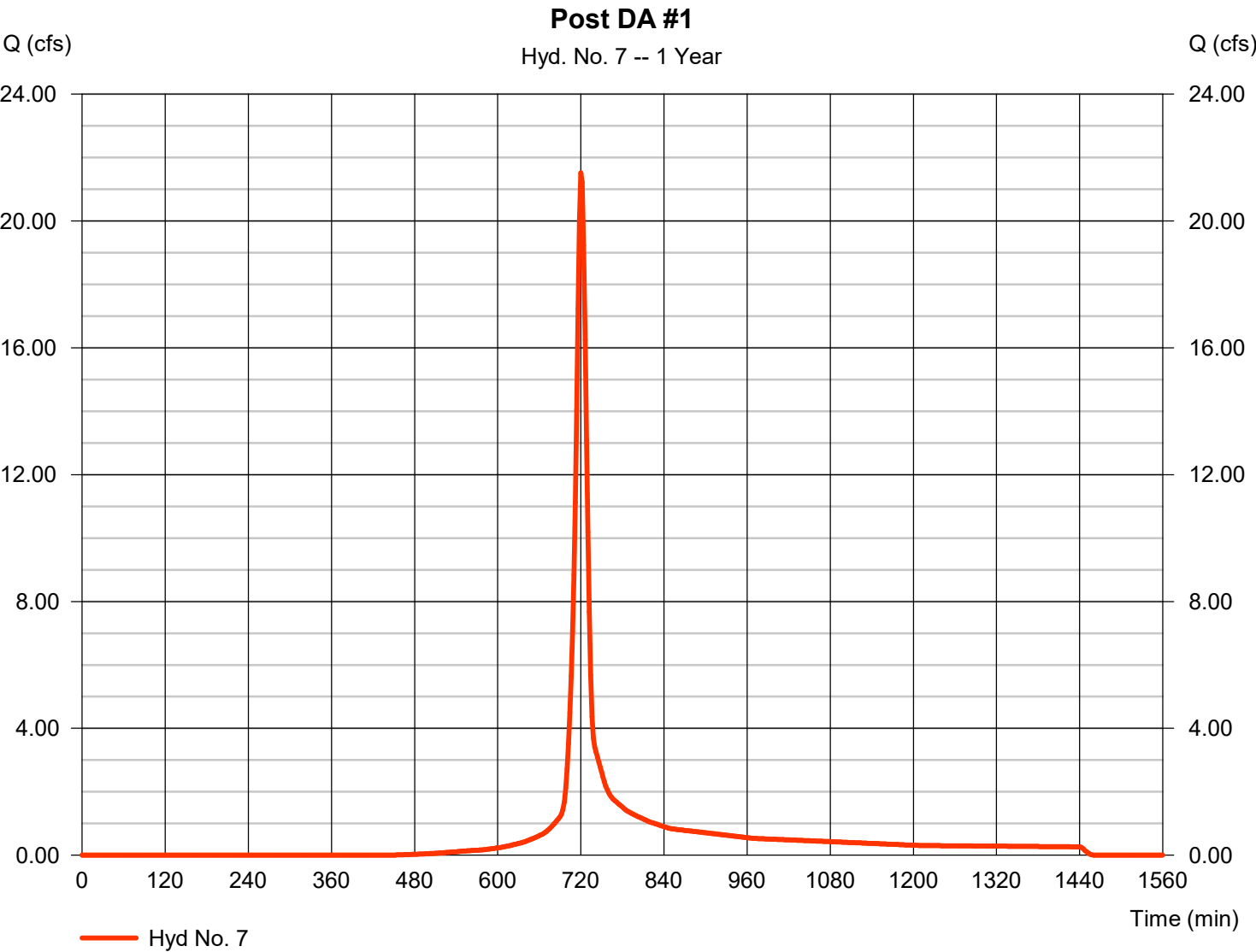
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Friday, 10 / 6 / 2023

Hyd. No. 7

Post DA #1

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 21.52 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 55,826 cuft |
| Drainage area | = 9.220 ac | Curve number | = 87 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

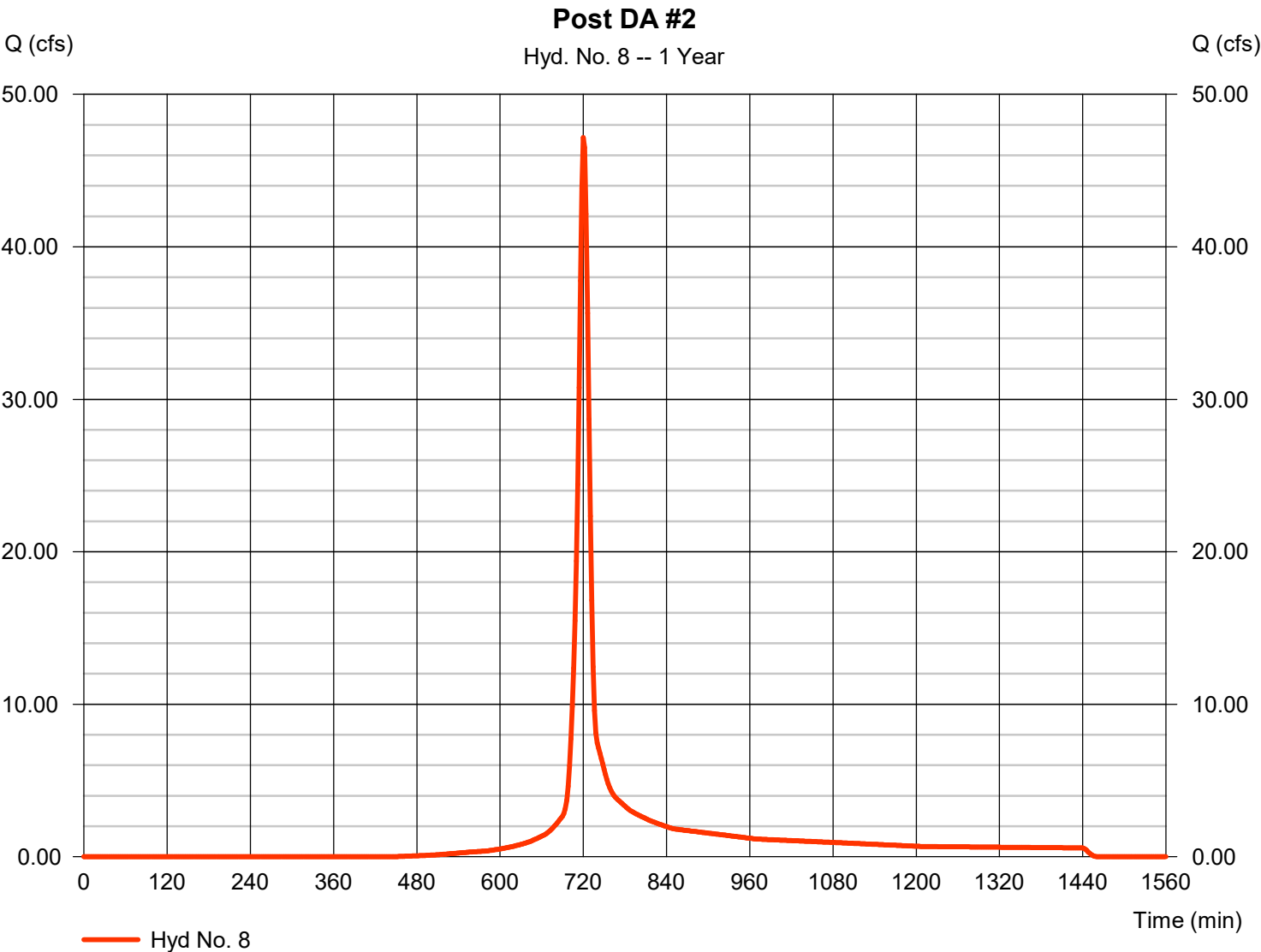
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Friday, 10 / 6 / 2023

Hyd. No. 8

Post DA #2

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 47.17 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 122,369 cuft |
| Drainage area | = 20.210 ac | Curve number | = 87 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

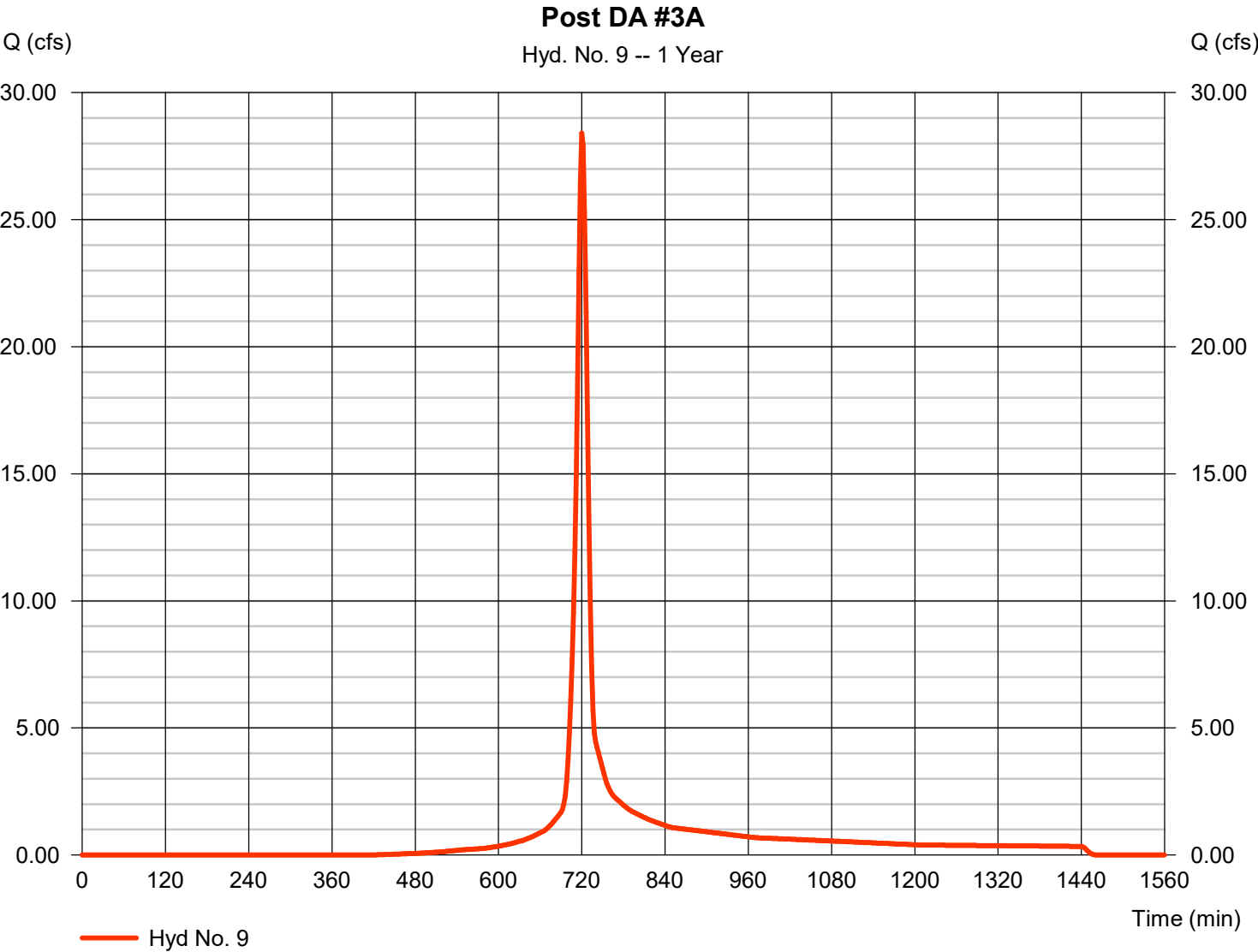
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Friday, 10 / 6 / 2023

Hyd. No. 9

Post DA #3A

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 28.41 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 73,826 cuft |
| Drainage area | = 11.640 ac | Curve number | = 88 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

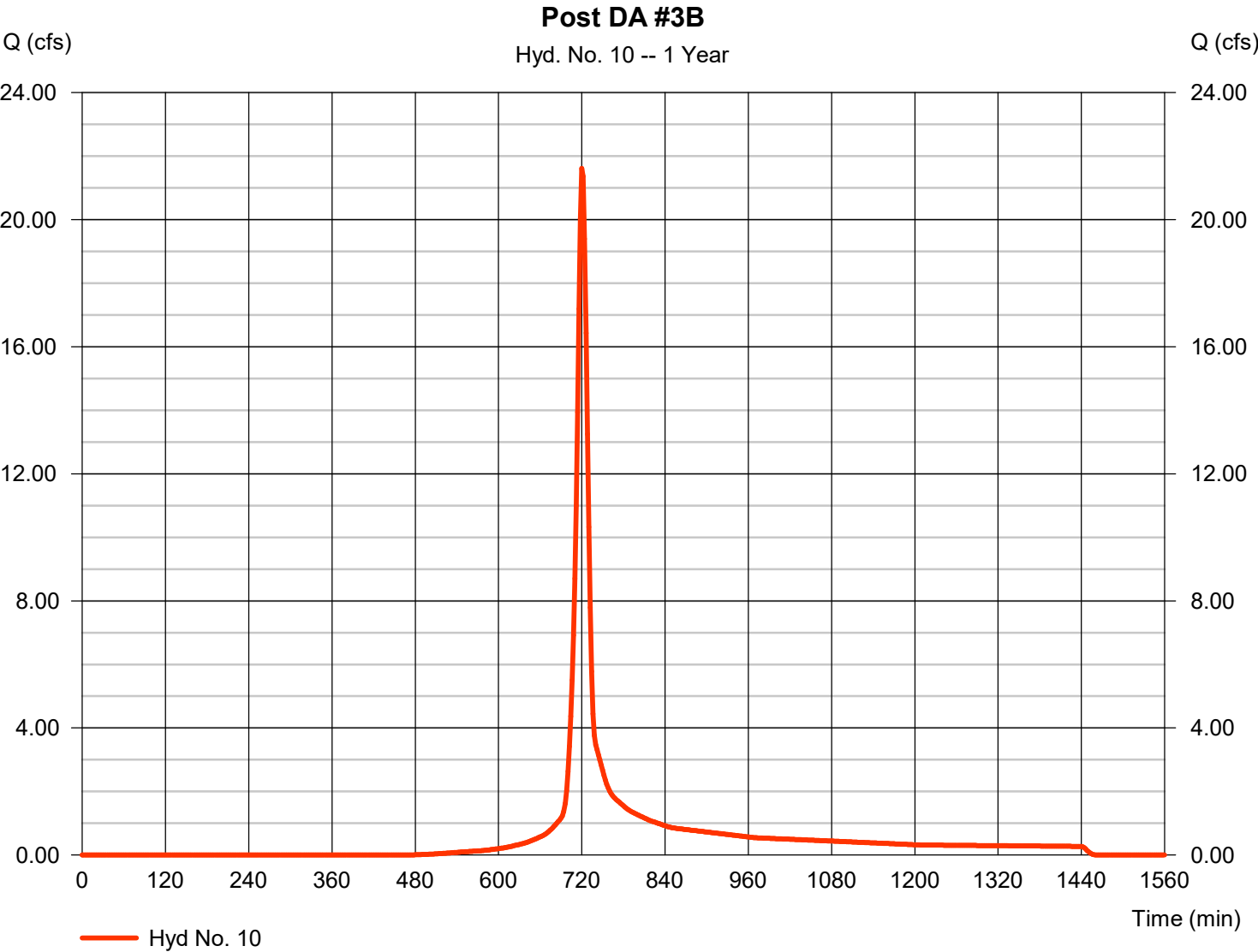


Hydrograph Report

Hyd. No. 10

Post DA #3B

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 21.62 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 56,035 cuft |
| Drainage area | = 9.700 ac | Curve number | = 86 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



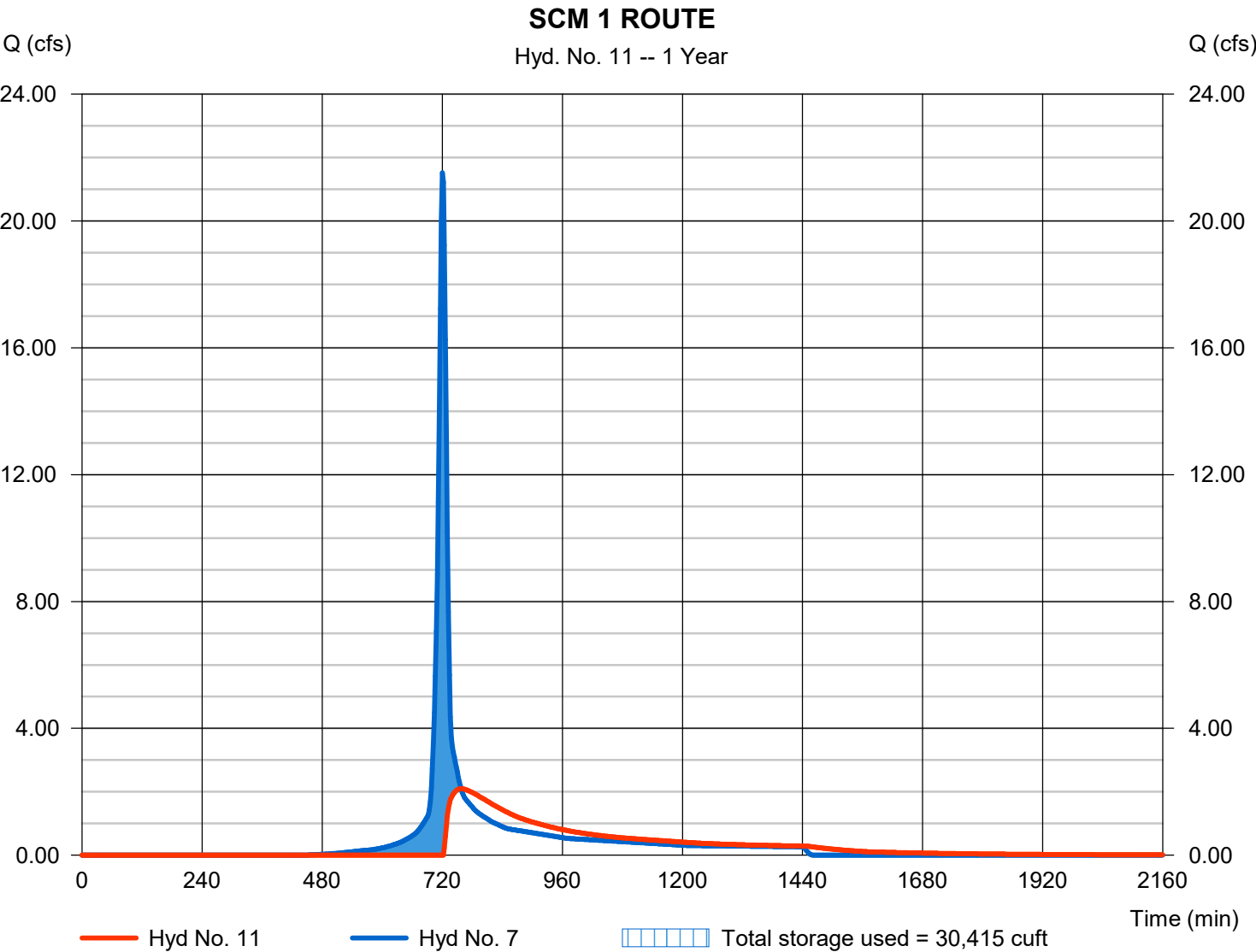
Hydrograph Report

Hyd. No. 11

SCM 1 ROUTE

| | | | |
|-----------------|------------------|----------------|---------------|
| Hydrograph type | = Reservoir | Peak discharge | = 2.097 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 758 min |
| Time interval | = 2 min | Hyd. volume | = 35,924 cuft |
| Inflow hyd. No. | = 7 - Post DA #1 | Max. Elevation | = 386.83 ft |
| Reservoir name | = SCM 1 | Max. Storage | = 30,415 cuft |

Storage Indication method used.



Pond No. 1 - SCM 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 384.50 ft

Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00 | 384.50 | 10,590 | 0 | 0 |
| 0.50 | 385.00 | 12,050 | 5,656 | 5,656 |
| 1.50 | 386.00 | 13,565 | 12,799 | 18,454 |
| 2.50 | 387.00 | 15,138 | 14,343 | 32,797 |
| 3.50 | 388.00 | 16,767 | 15,944 | 48,741 |
| 4.50 | 389.00 | 18,453 | 17,602 | 66,343 |
| 5.50 | 390.00 | 20,196 | 19,316 | 85,659 |

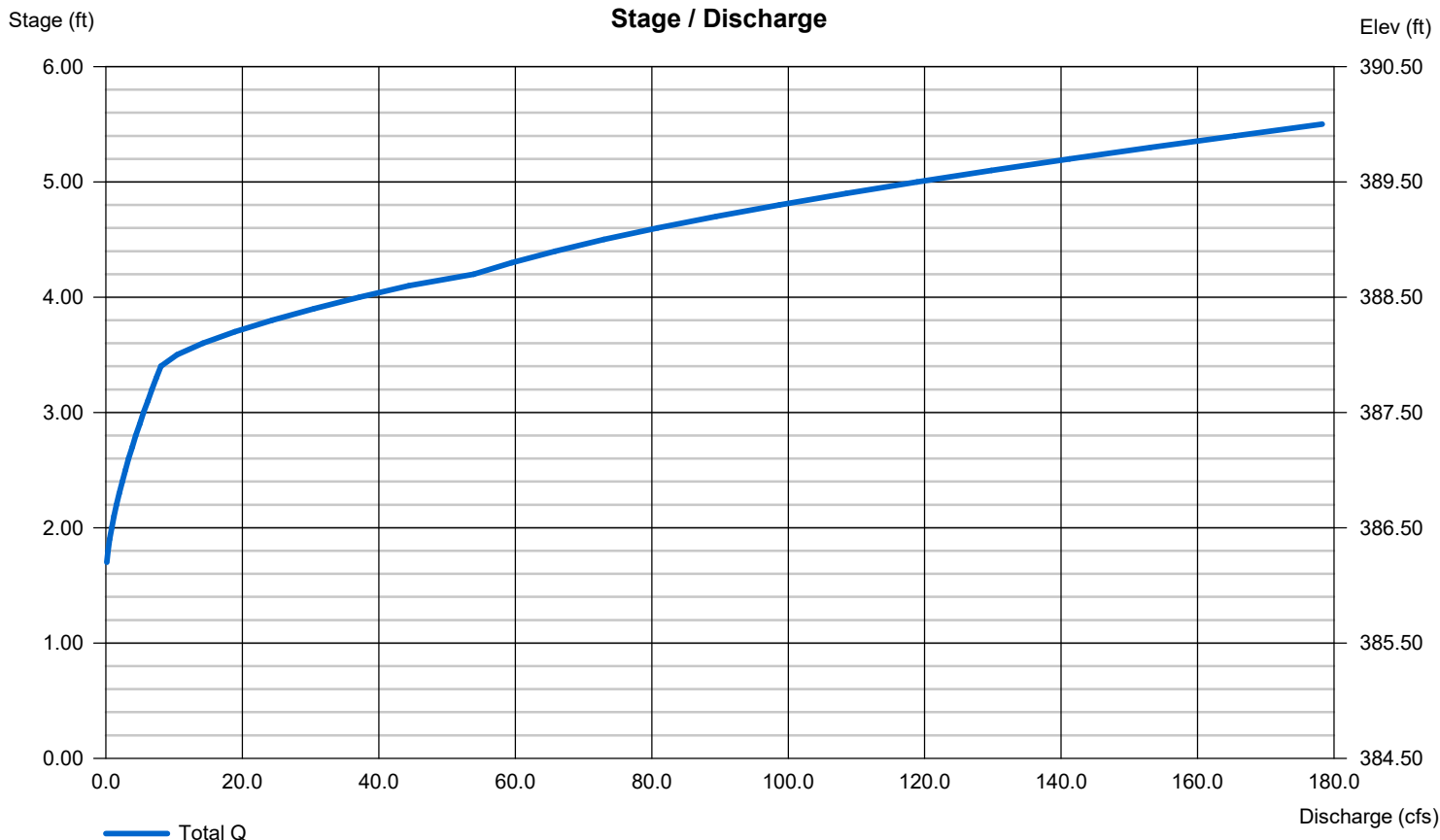
Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|-----------------|----------|--------|------|----------|
| Rise (in) | = 24.00 | 2.00 | 0.00 | 0.00 |
| Span (in) | = 24.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 |
| Invert El. (ft) | = 379.00 | 384.50 | 0.00 | 0.00 |
| Length (ft) | = 165.00 | 1.00 | 0.00 | 0.00 |
| Slope (%) | = 0.61 | 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) | = 16.00 | 1.00 | 20.00 | Inactive |
| Crest El. (ft) | = 387.90 | 386.10 | 388.60 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = 1 | Rect | Rect | --- |
| Multi-Stage | = Yes | No | No | No |
| Exfil.(in/hr) | = 0.000 (by Contour) | | | |
| TW Elev. (ft) | = 0.00 | | | |

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



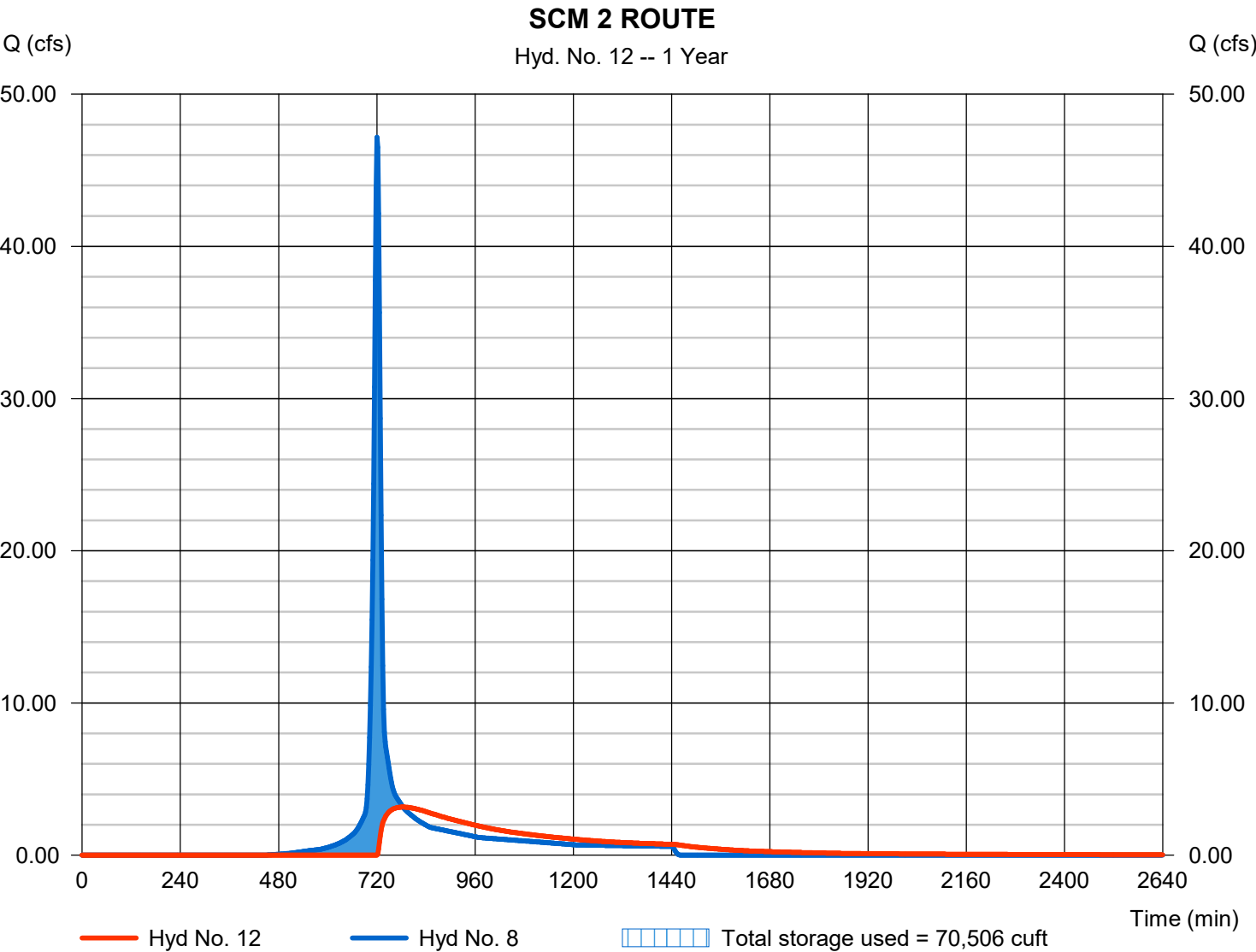
Hydrograph Report

Hyd. No. 12

SCM 2 ROUTE

| | | | |
|-----------------|------------------|----------------|---------------|
| Hydrograph type | = Reservoir | Peak discharge | = 3.161 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 784 min |
| Time interval | = 2 min | Hyd. volume | = 81,007 cuft |
| Inflow hyd. No. | = 8 - Post DA #2 | Max. Elevation | = 353.97 ft |
| Reservoir name | = SCM 2 | Max. Storage | = 70,506 cuft |

Storage Indication method used.



Pond No. 2 - SCM 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 351.50 ft

Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00 | 351.50 | 25,295 | 0 | 0 |
| 0.50 | 352.00 | 27,224 | 13,125 | 13,125 |
| 1.50 | 353.00 | 29,209 | 28,208 | 41,333 |
| 2.50 | 354.00 | 31,251 | 30,221 | 71,555 |
| 3.50 | 355.00 | 33,350 | 32,292 | 103,846 |
| 4.50 | 356.00 | 35,504 | 34,418 | 138,264 |
| 5.50 | 357.00 | 37,716 | 36,601 | 174,865 |

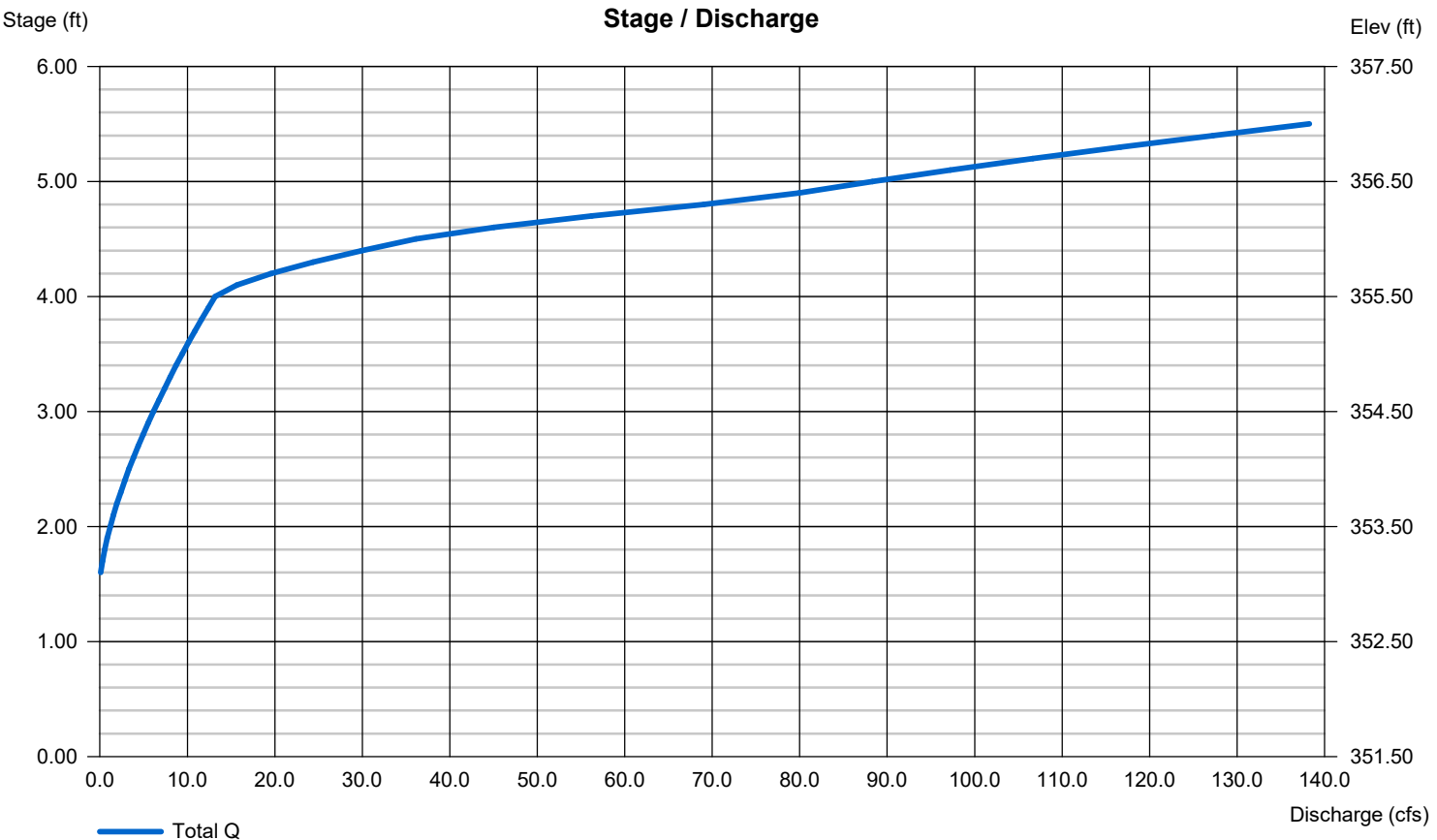
Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|-----------------|----------|--------|------|----------|
| Rise (in) | = 24.00 | 4.00 | 0.00 | 0.00 |
| Span (in) | = 24.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 |
| Invert El. (ft) | = 347.00 | 351.50 | 0.00 | 0.00 |
| Length (ft) | = 87.00 | 1.00 | 0.00 | 0.00 |
| Slope (%) | = 1.15 | 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) | = 16.00 | 1.00 | 20.00 | Inactive |
| Crest El. (ft) | = 355.50 | 353.00 | 356.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = 1 | Rect | Rect | --- |
| Multi-Stage | = Yes | No | No | No |
| Exfil.(in/hr) | = 0.000 (by Contour) | | | |
| TW Elev. (ft) | = 0.00 | | | |

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

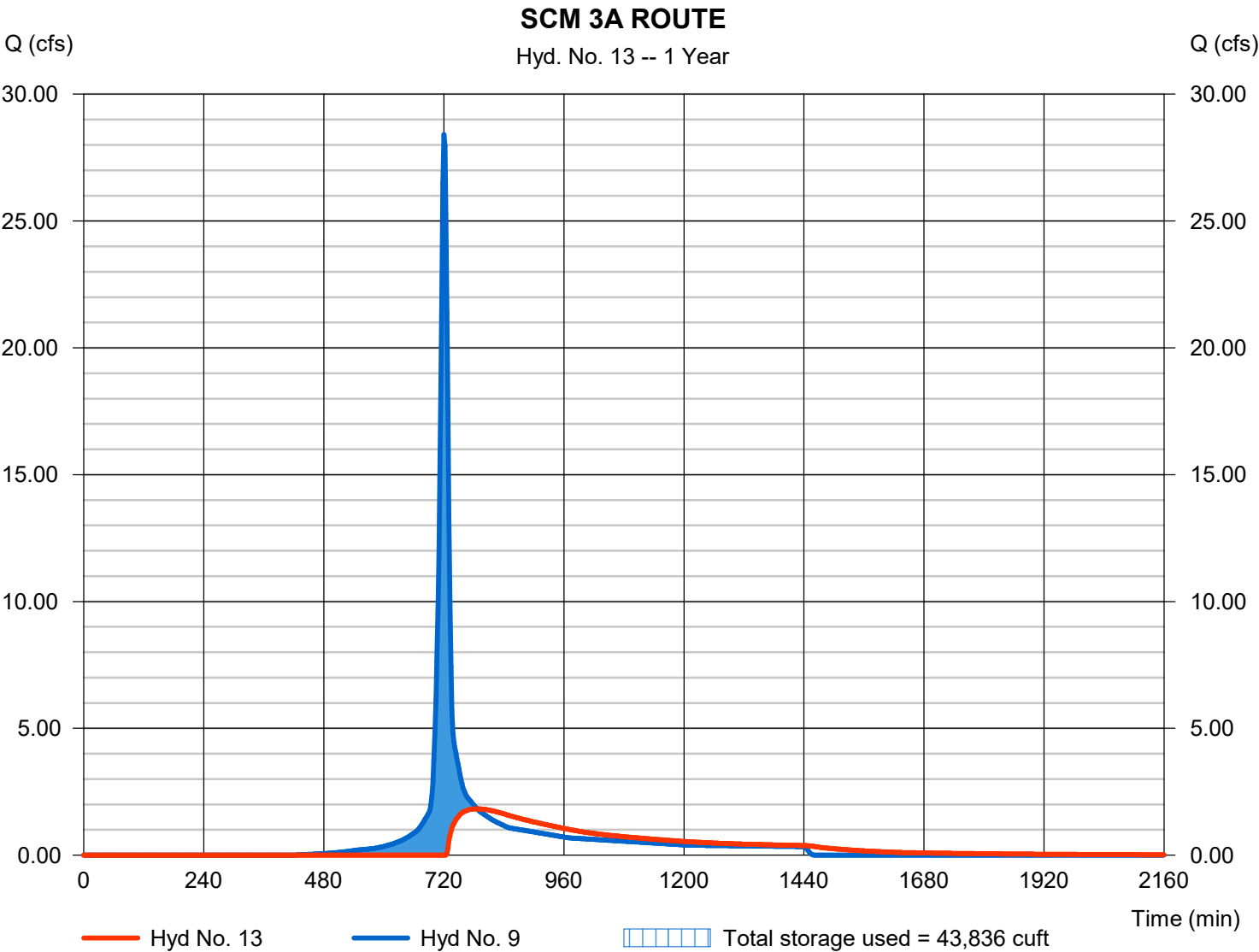
Friday, 10 / 6 / 2023

Hyd. No. 13

SCM 3A ROUTE

| | | | |
|-----------------|-------------------|----------------|---------------|
| Hydrograph type | = Reservoir | Peak discharge | = 1.829 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 786 min |
| Time interval | = 2 min | Hyd. volume | = 41,869 cuft |
| Inflow hyd. No. | = 9 - Post DA #3A | Max. Elevation | = 387.17 ft |
| Reservoir name | = SCM 3A | Max. Storage | = 43,836 cuft |

Storage Indication method used.



Pond No. 3 - SCM 3A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 384.50 ft

Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00 | 384.50 | 14,183 | 0 | 0 |
| 0.50 | 385.00 | 15,527 | 7,424 | 7,424 |
| 1.50 | 386.00 | 16,222 | 15,872 | 23,296 |
| 2.50 | 387.00 | 18,385 | 17,290 | 40,586 |
| 3.50 | 388.00 | 19,899 | 19,135 | 59,721 |
| 4.50 | 389.00 | 20,679 | 20,286 | 80,007 |
| 5.50 | 390.00 | 22,278 | 21,471 | 101,479 |

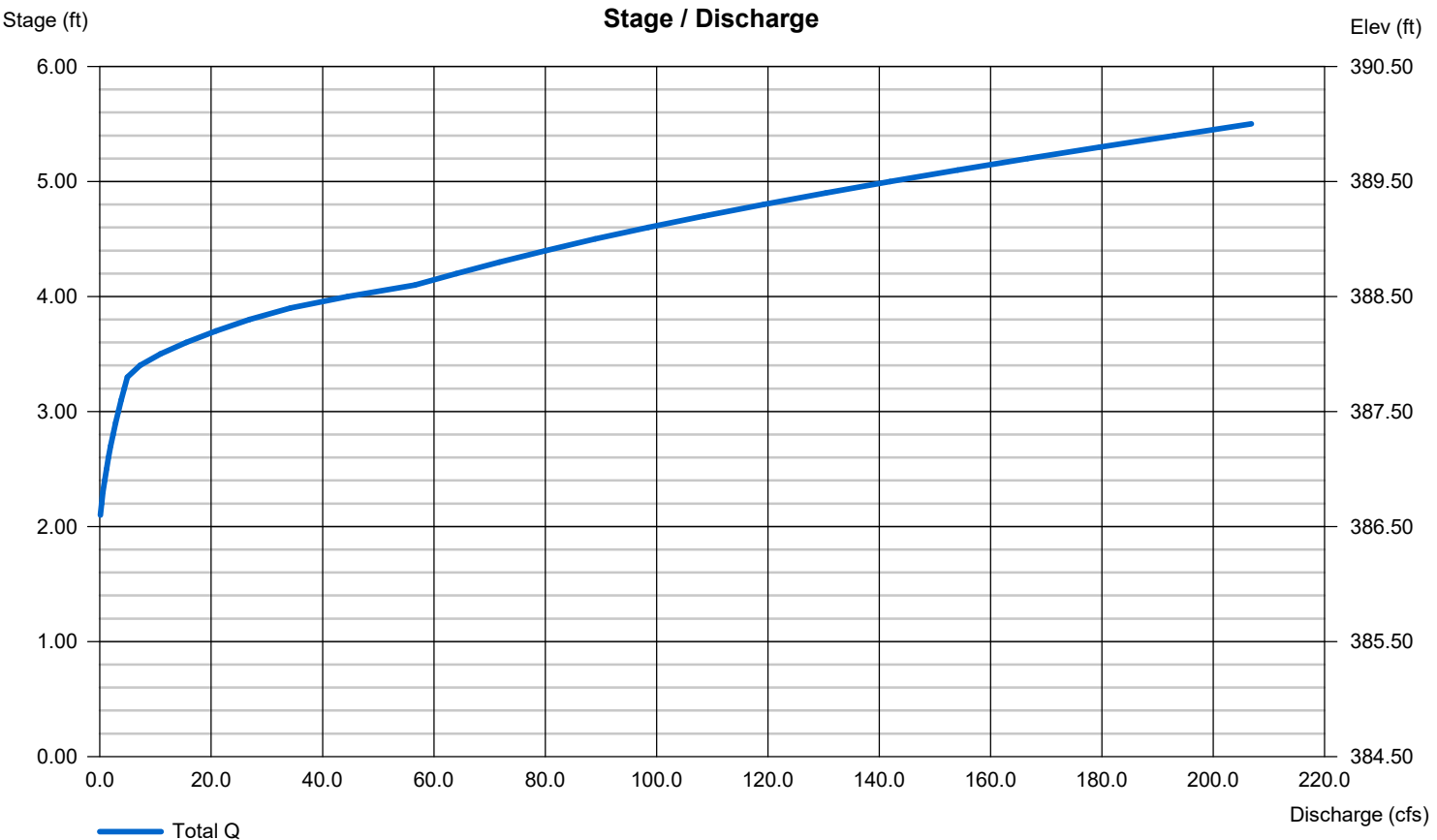
Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|-----------------|----------|--------|------|----------|
| Rise (in) | = 24.00 | 3.00 | 0.00 | 0.00 |
| Span (in) | = 24.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 |
| Invert El. (ft) | = 380.00 | 384.50 | 0.00 | 0.00 |
| Length (ft) | = 118.00 | 1.00 | 0.00 | 0.00 |
| Slope (%) | = 0.85 | 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) | = 16.00 | 1.00 | 20.00 | Inactive |
| Crest El. (ft) | = 387.80 | 386.50 | 388.35 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = 1 | Rect | Rect | --- |
| Multi-Stage | = Yes | No | No | No |
| Exfil.(in/hr) | = 0.000 (by Contour) | | | |
| TW Elev. (ft) | = 0.00 | | | |

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

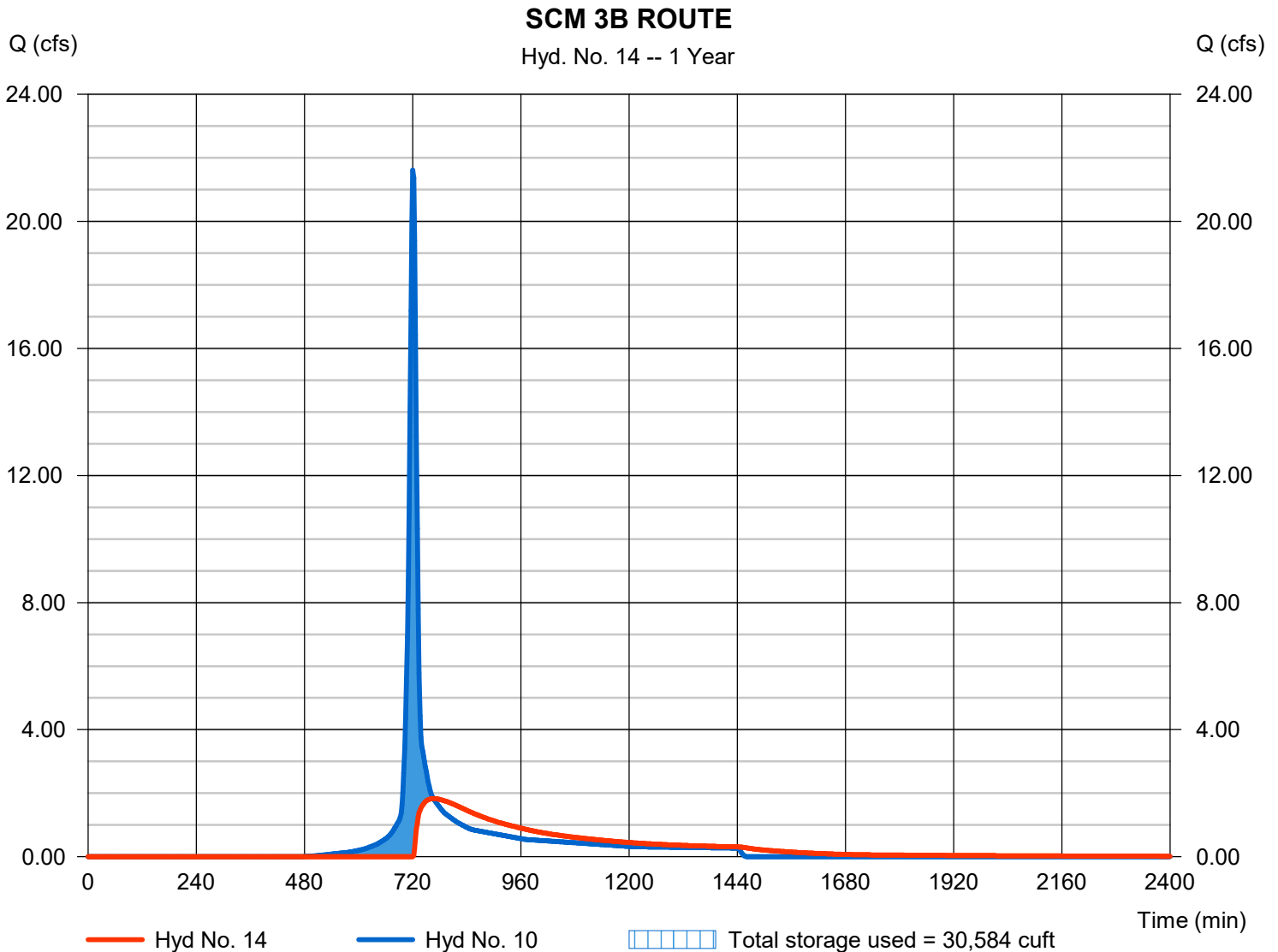
Friday, 10 / 6 / 2023

Hyd. No. 14

SCM 3B ROUTE

| | | | |
|-----------------|--------------------|----------------|---------------|
| Hydrograph type | = Reservoir | Peak discharge | = 1.828 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 766 min |
| Time interval | = 2 min | Hyd. volume | = 37,960 cuft |
| Inflow hyd. No. | = 10 - Post DA #3B | Max. Elevation | = 382.30 ft |
| Reservoir name | = SCM 3B | Max. Storage | = 30,584 cuft |

Storage Indication method used.



Pond No. 4 - SCM 3B

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 380.50 ft

Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|------------|----------------|---------------------|----------------------|----------------------|
| 0.00 | 380.50 | 14,636 | 0 | 0 |
| 0.50 | 381.00 | 16,358 | 7,744 | 7,744 |
| 1.50 | 382.00 | 18,005 | 17,173 | 24,917 |
| 2.50 | 383.00 | 19,735 | 18,862 | 43,778 |
| 3.50 | 384.00 | 21,522 | 20,620 | 64,398 |
| 4.50 | 385.00 | 22,548 | 22,031 | 86,429 |
| 5.50 | 386.00 | 24,300 | 23,416 | 109,845 |

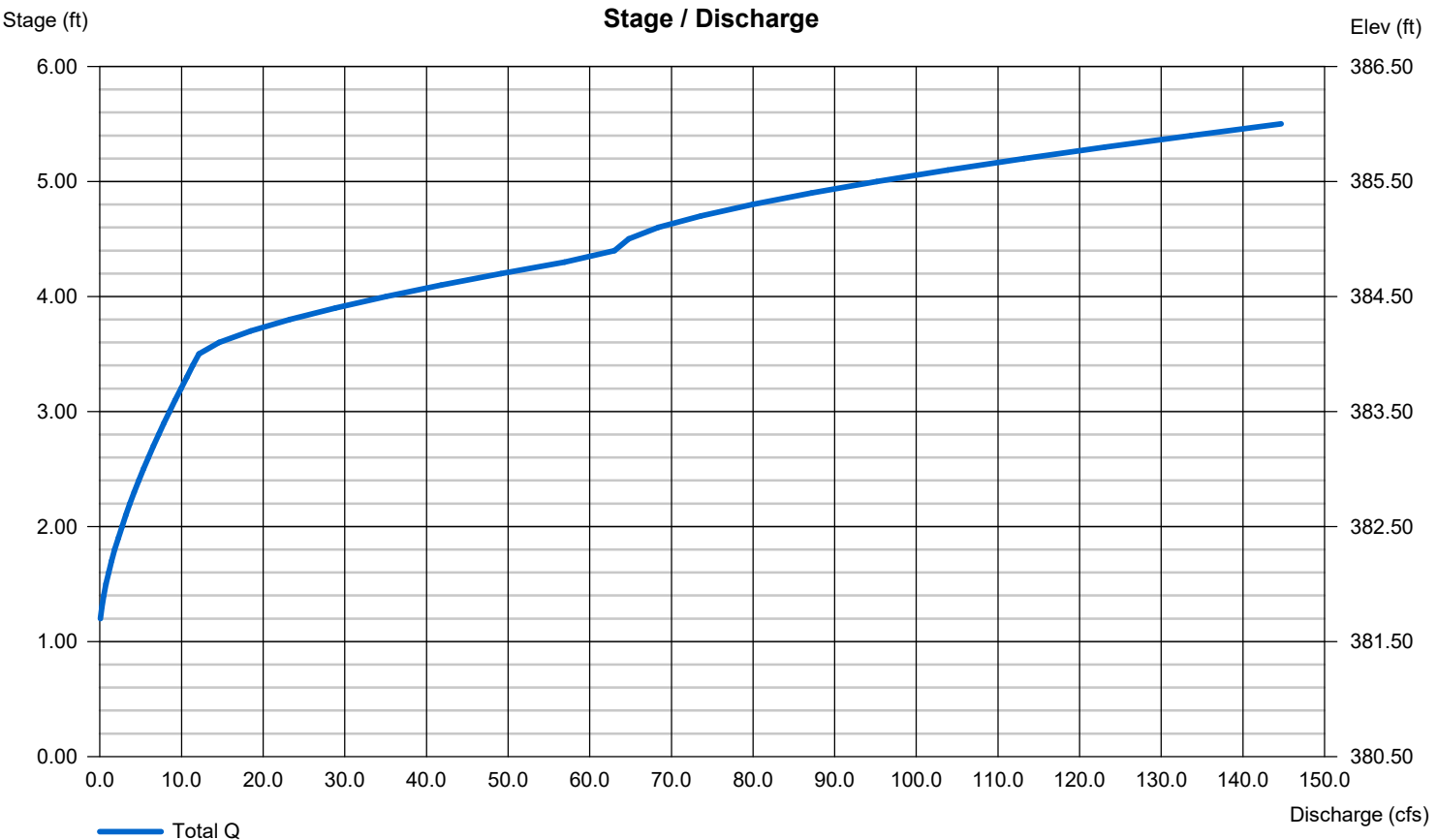
Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|-----------------|----------|--------|------|----------|
| Rise (in) | = 24.00 | 2.00 | 0.00 | 0.00 |
| Span (in) | = 24.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 |
| Invert El. (ft) | = 375.00 | 380.50 | 0.00 | 0.00 |
| Length (ft) | = 63.00 | 1.00 | 0.00 | 0.00 |
| Slope (%) | = 1.60 | 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) | = 16.00 | 1.00 | 20.00 | Inactive |
| Crest El. (ft) | = 384.00 | 381.63 | 385.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = 1 | Rect | Rect | --- |
| Multi-Stage | = Yes | No | No | No |
| Exfil.(in/hr) | = 0.000 (by Contour) | | | |
| TW Elev. (ft) | = 0.00 | | | |

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

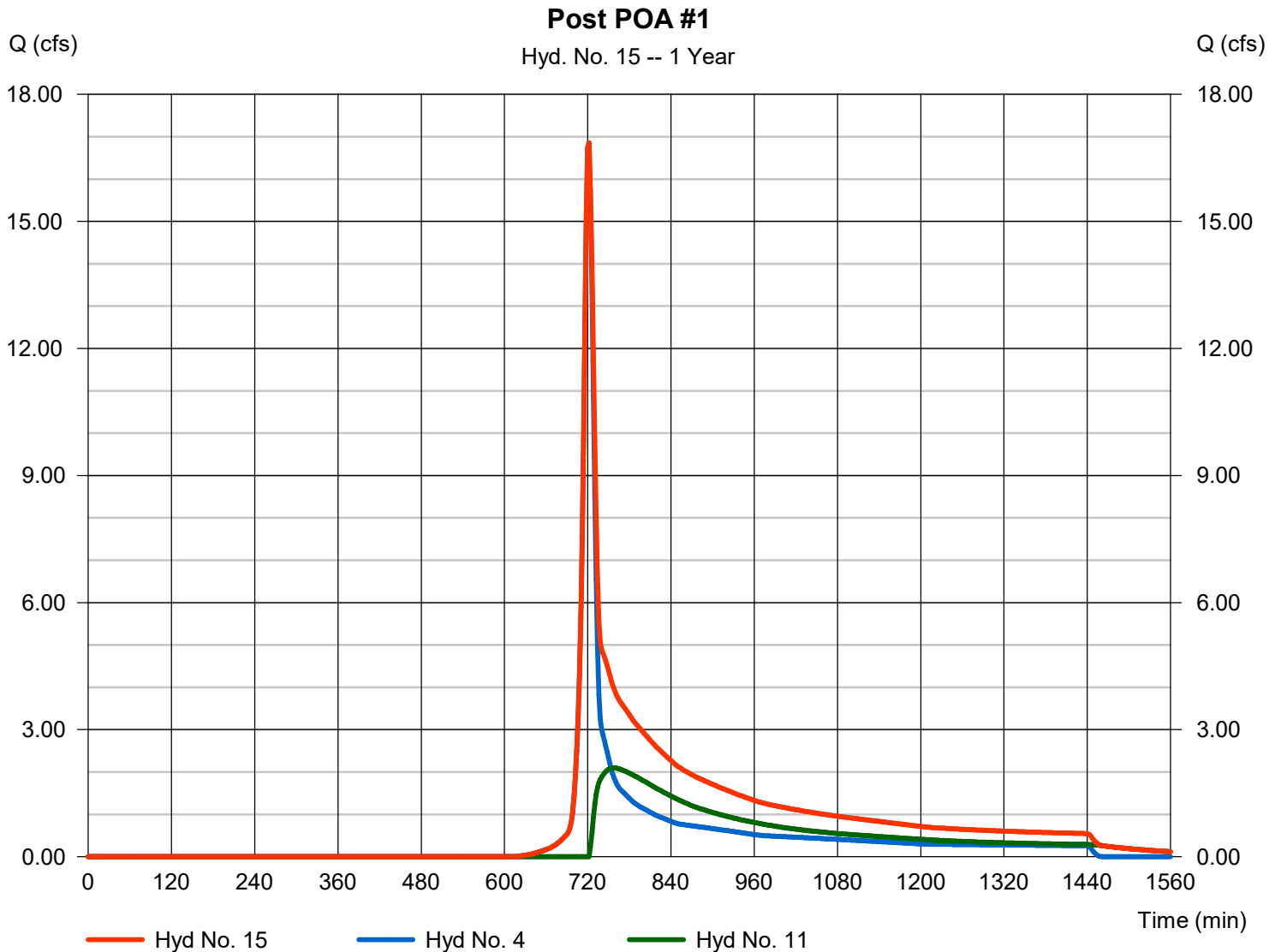
Friday, 10 / 6 / 2023

Hyd. No. 15

Post POA #1

Hydrograph type = Combine
Storm frequency = 1 yrs
Time interval = 2 min
Inflow hyds. = 4, 11

Peak discharge = 16.85 cfs
Time to peak = 722 min
Hyd. volume = 80,284 cuft
Contrib. drain. area = 10.900 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

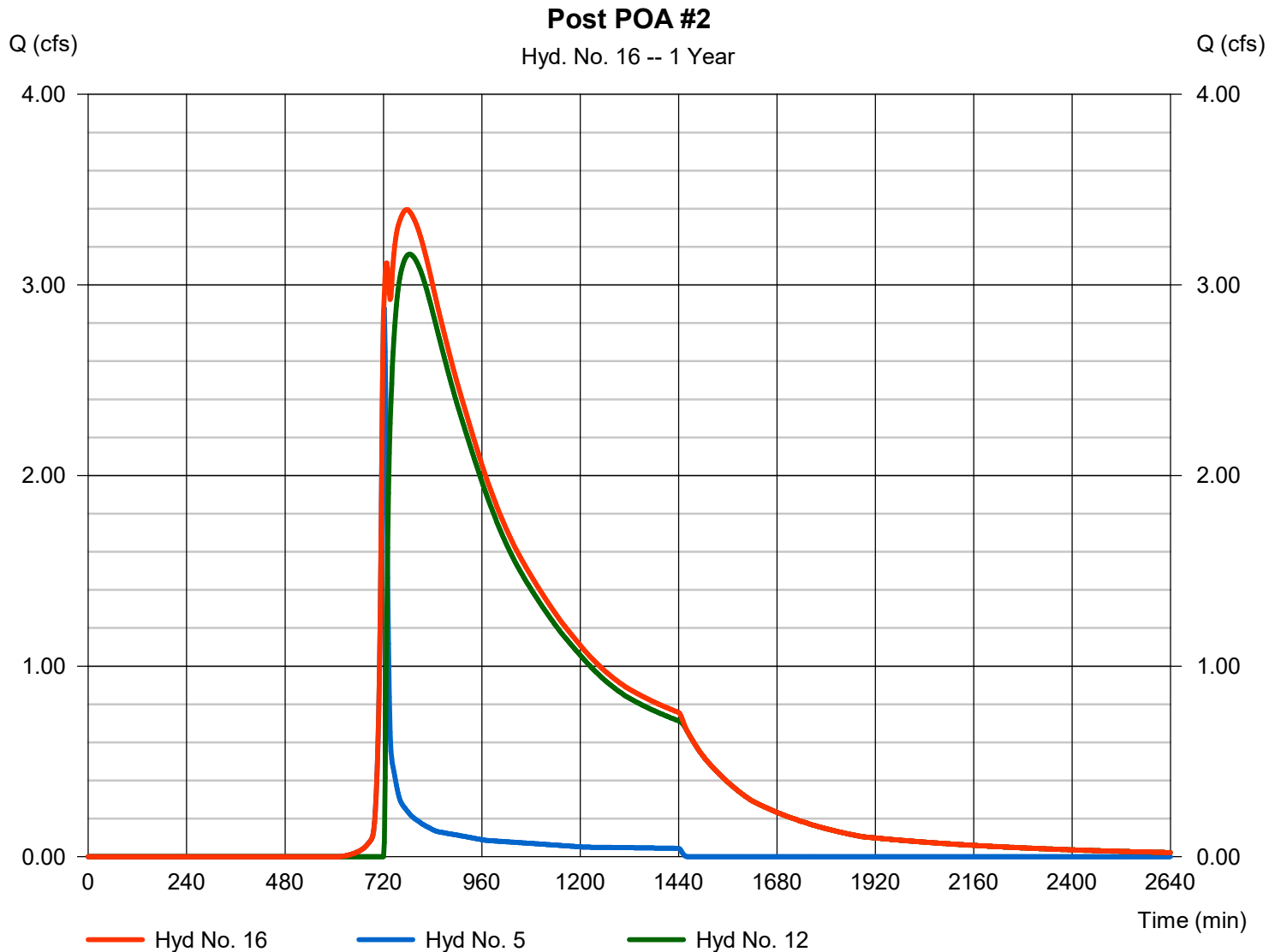
Friday, 10 / 6 / 2023

Hyd. No. 16

Post POA #2

Hydrograph type = Combine
Storm frequency = 1 yrs
Time interval = 2 min
Inflow hyds. = 5, 12

Peak discharge = 3.395 cfs
Time to peak = 778 min
Hyd. volume = 88,577 cuft
Contrib. drain. area = 1.860 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

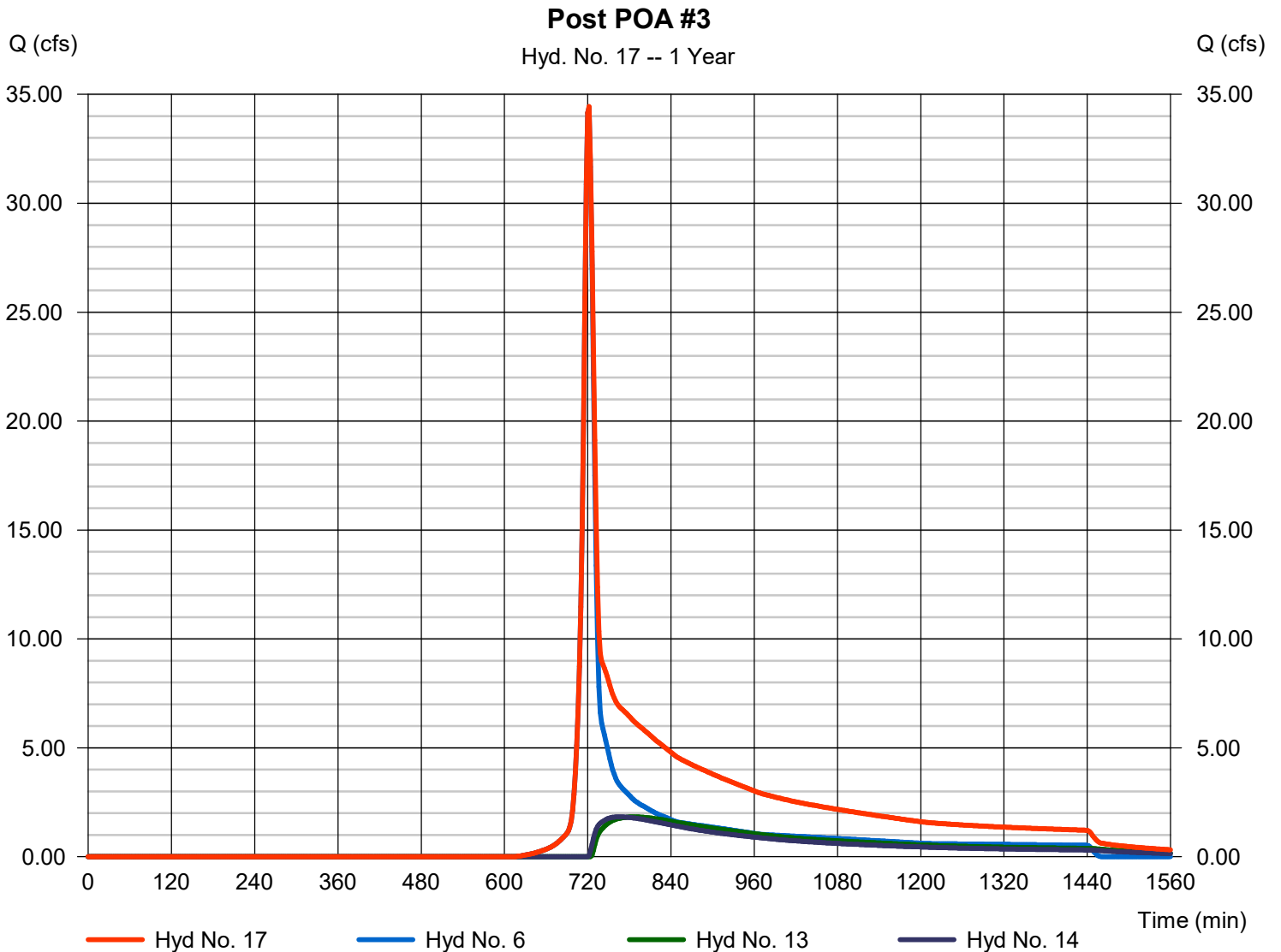
Friday, 10 / 6 / 2023

Hyd. No. 17

Post POA #3

Hydrograph type = Combine
 Storm frequency = 1 yrs
 Time interval = 2 min
 Inflow hyds. = 6, 13, 14

Peak discharge = 34.43 cfs
 Time to peak = 722 min
 Hyd. volume = 170,339 cuft
 Contrib. drain. area = 22.240 ac



Hydrograph Report

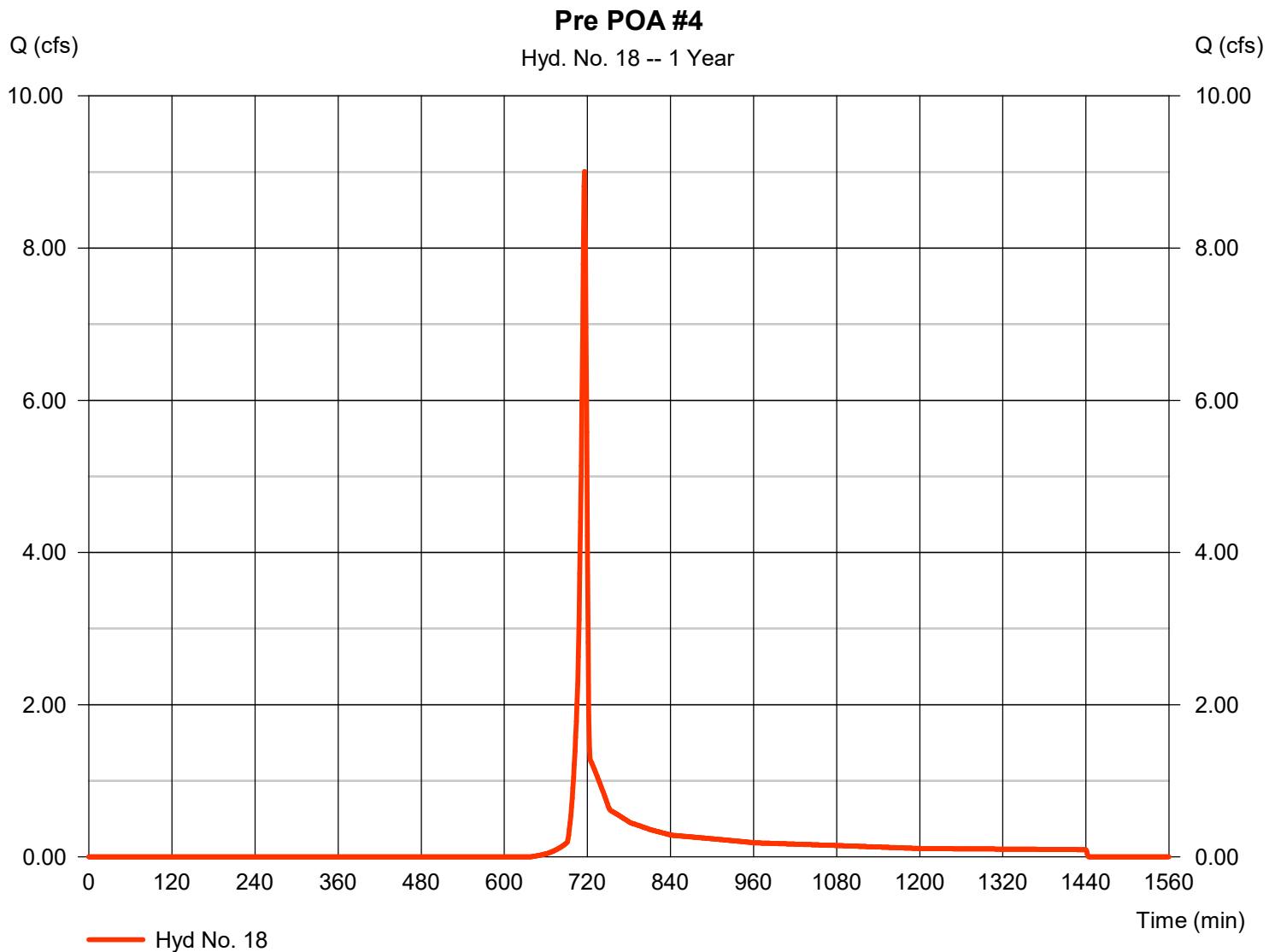
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Friday, 10 / 6 / 2023

Hyd. No. 18

Pre POA #4

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 9.007 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 716 min |
| Time interval | = 1 min | Hyd. volume | = 15,664 cuft |
| Drainage area | = 4.720 ac | Curve number | = 77 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 2.10 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 18

Pre POA #4

| <u>Description</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Totals</u> | | | |
|------------------------------------|---------------|----------|-------------|-----------------|-------------|----------|-------------|
| Sheet Flow | | | | | | | |
| Manning's n-value | = 0.011 | 0.011 | 0.011 | | | | |
| Flow length (ft) | = 300.0 | 0.0 | 0.0 | | | | |
| Two-year 24-hr precip. (in) | = 2.20 | 0.00 | 0.00 | | | | |
| Land slope (%) | = 8.00 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 2.02 | + | 0.00 | + | 0.00 | = | 2.02 |
| Shallow Concentrated Flow | | | | | | | |
| Flow length (ft) | = 30.00 | 0.00 | 0.00 | | | | |
| Watercourse slope (%) | = 8.00 | 0.00 | 0.00 | | | | |
| Surface description | = Unpaved | Paved | Paved | | | | |
| Average velocity (ft/s) | =4.56 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 0.11 | + | 0.00 | + | 0.00 | = | 0.11 |
| Channel Flow | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | 0.00 | 0.00 | | | | |
| Wetted perimeter (ft) | = 0.00 | 0.00 | 0.00 | | | | |
| Channel slope (%) | = 0.00 | 0.00 | 0.00 | | | | |
| Manning's n-value | = 0.015 | 0.015 | 0.015 | | | | |
| Velocity (ft/s) | =0.00 | 0.00 | 0.00 | | | | |
| Flow length (ft) | (0)0.0 | 0.0 | 0.0 | | | | |
| Travel Time (min) | = 0.00 | + | 0.00 | + | 0.00 | = | 0.00 |
| Total Travel Time, Tc | | | | 2.10 min | | | |

Hydrograph Report

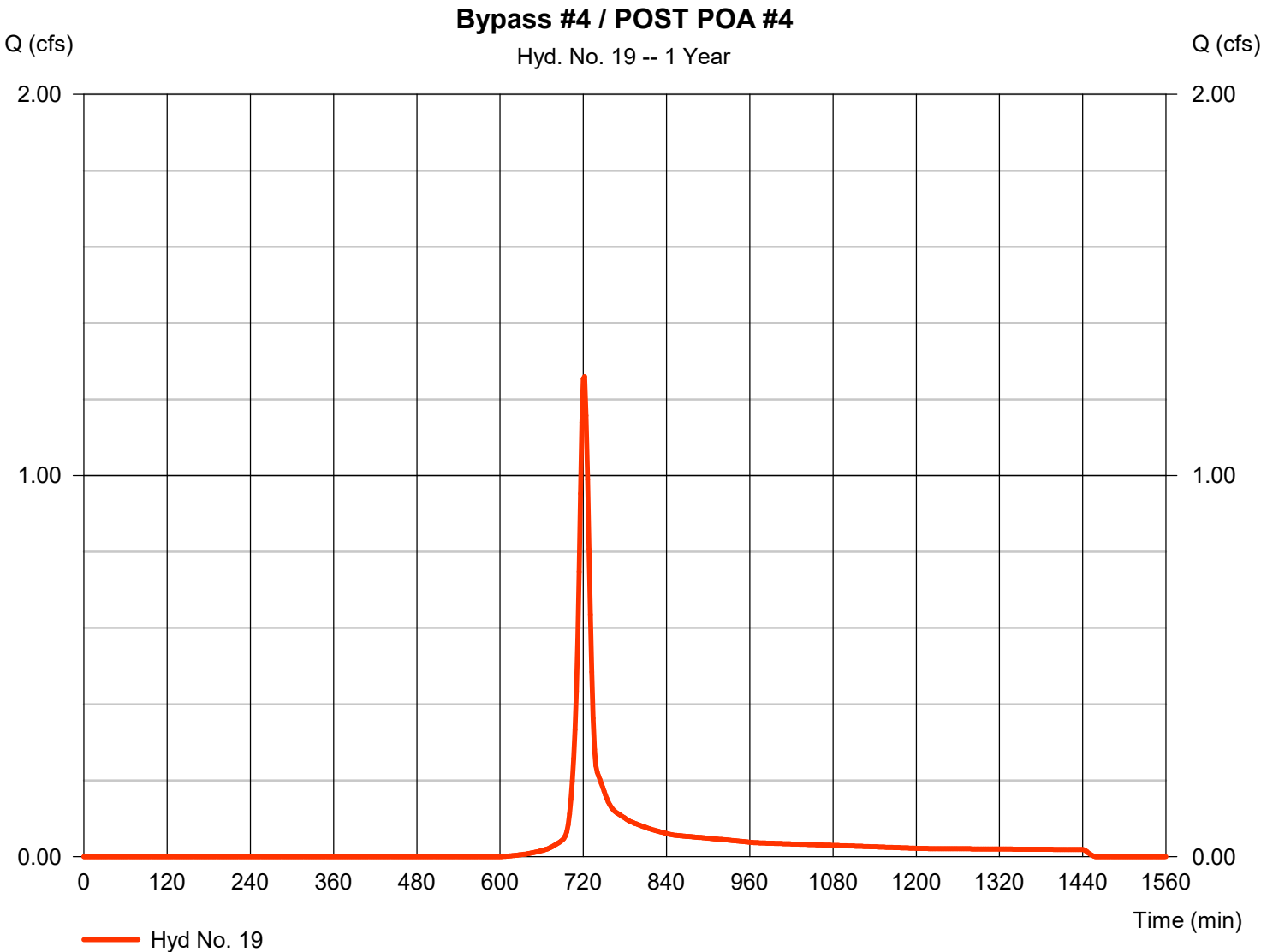
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Friday, 10 / 6 / 2023

Hyd. No. 19

Bypass #4 / POST POA #4

| | | | | | |
|-----------------|---|------------|--------------------|---|------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 1.259 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 722 min |
| Time interval | = | 2 min | Hyd. volume | = | 3,303 cuft |
| Drainage area | = | 0.770 ac | Curve number | = | 80 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 10.00 min |
| Total precip. | = | 2.86 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



Hydrograph Report

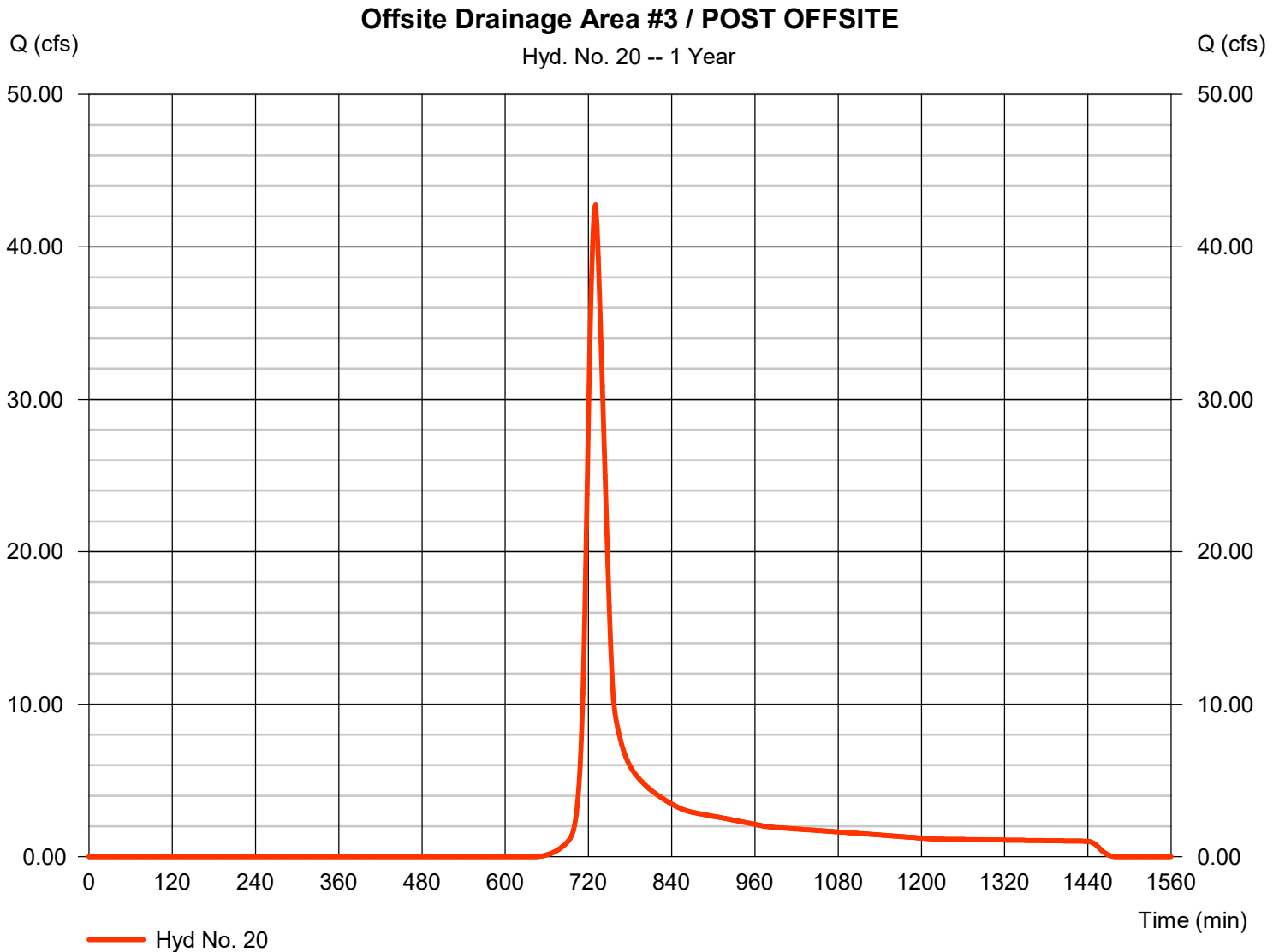
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Friday, 10 / 6 / 2023

Hyd. No. 20

Offsite Drainage Area #3 / POST OFFSITE

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 42.77 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 730 min |
| Time interval | = 2 min | Hyd. volume | = 165,240 cuft |
| Drainage area | = 47.420 ac | Curve number | = 77 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 25.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

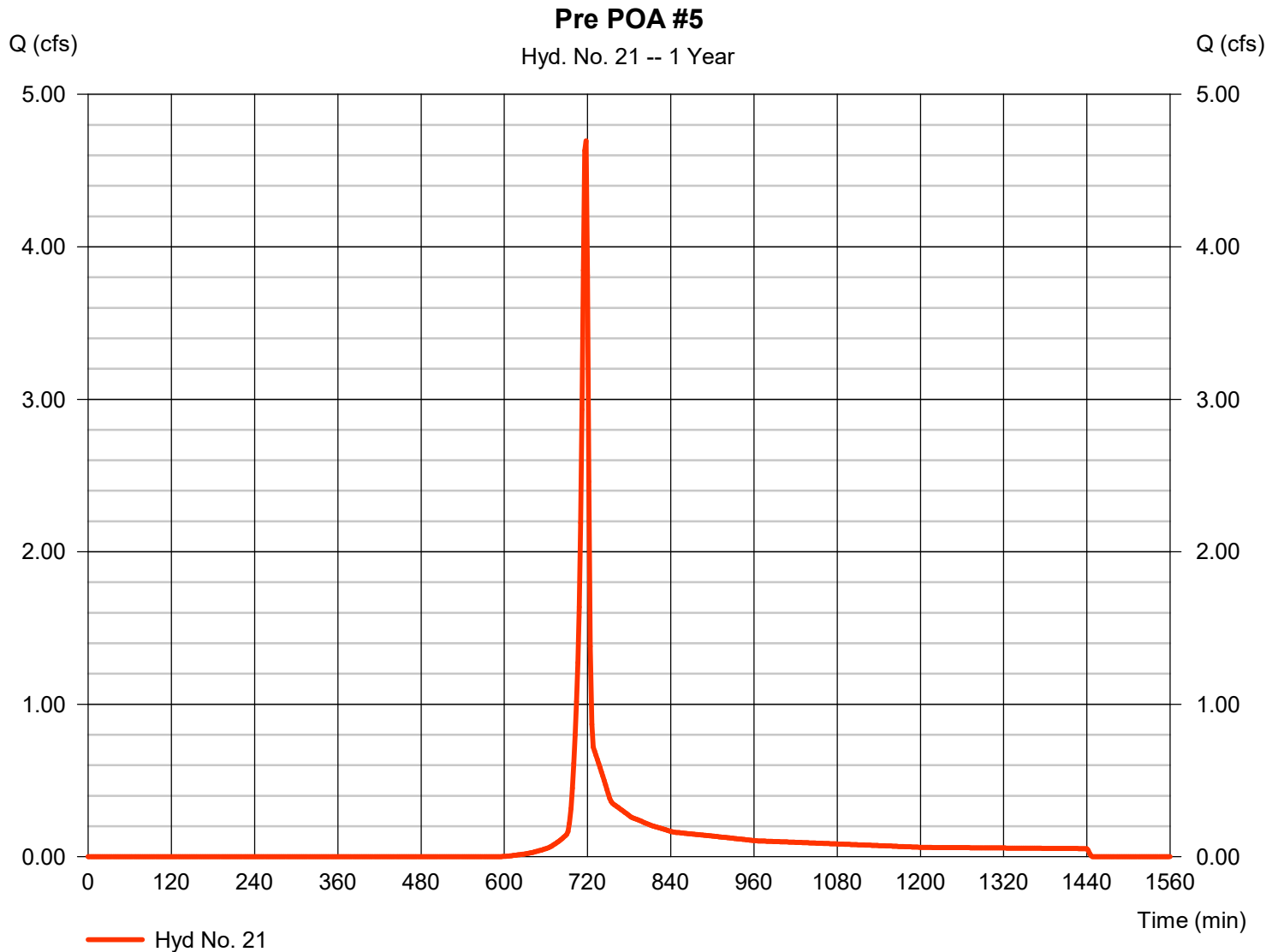
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Friday, 10 / 6 / 2023

Hyd. No. 21

Pre POA #5

| | | | |
|-----------------|--------------|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.695 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 9,399 cuft |
| Drainage area | = 2.410 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 4.50 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 21

Pre POA #5

| <u>Description</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Totals</u> | | | |
|------------------------------------|---------------|----------|-------------|-----------------|-------------|----------|-------------|
| Sheet Flow | | | | | | | |
| Manning's n-value | = 0.011 | 0.011 | 0.011 | | | | |
| Flow length (ft) | = 300.0 | 0.0 | 0.0 | | | | |
| Two-year 24-hr precip. (in) | = 3.45 | 0.00 | 0.00 | | | | |
| Land slope (%) | = 2.09 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 2.76 | + | 0.00 | + | 0.00 | = | 2.76 |
| Shallow Concentrated Flow | | | | | | | |
| Flow length (ft) | = 253.00 | 0.00 | 0.00 | | | | |
| Watercourse slope (%) | = 2.32 | 0.00 | 0.00 | | | | |
| Surface description | = Unpaved | Paved | Paved | | | | |
| Average velocity (ft/s) | =2.46 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 1.72 | + | 0.00 | + | 0.00 | = | 1.72 |
| Channel Flow | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | 0.00 | 0.00 | | | | |
| Wetted perimeter (ft) | = 0.00 | 0.00 | 0.00 | | | | |
| Channel slope (%) | = 0.00 | 0.00 | 0.00 | | | | |
| Manning's n-value | = 0.015 | 0.015 | 0.015 | | | | |
| Velocity (ft/s) | =0.00 | 0.00 | 0.00 | | | | |
| Flow length (ft) | ((0})0.0 | 0.0 | 0.0 | | | | |
| Travel Time (min) | = 0.00 | + | 0.00 | + | 0.00 | = | 0.00 |
| Total Travel Time, Tc | | | | 4.50 min | | | |

Hydrograph Report

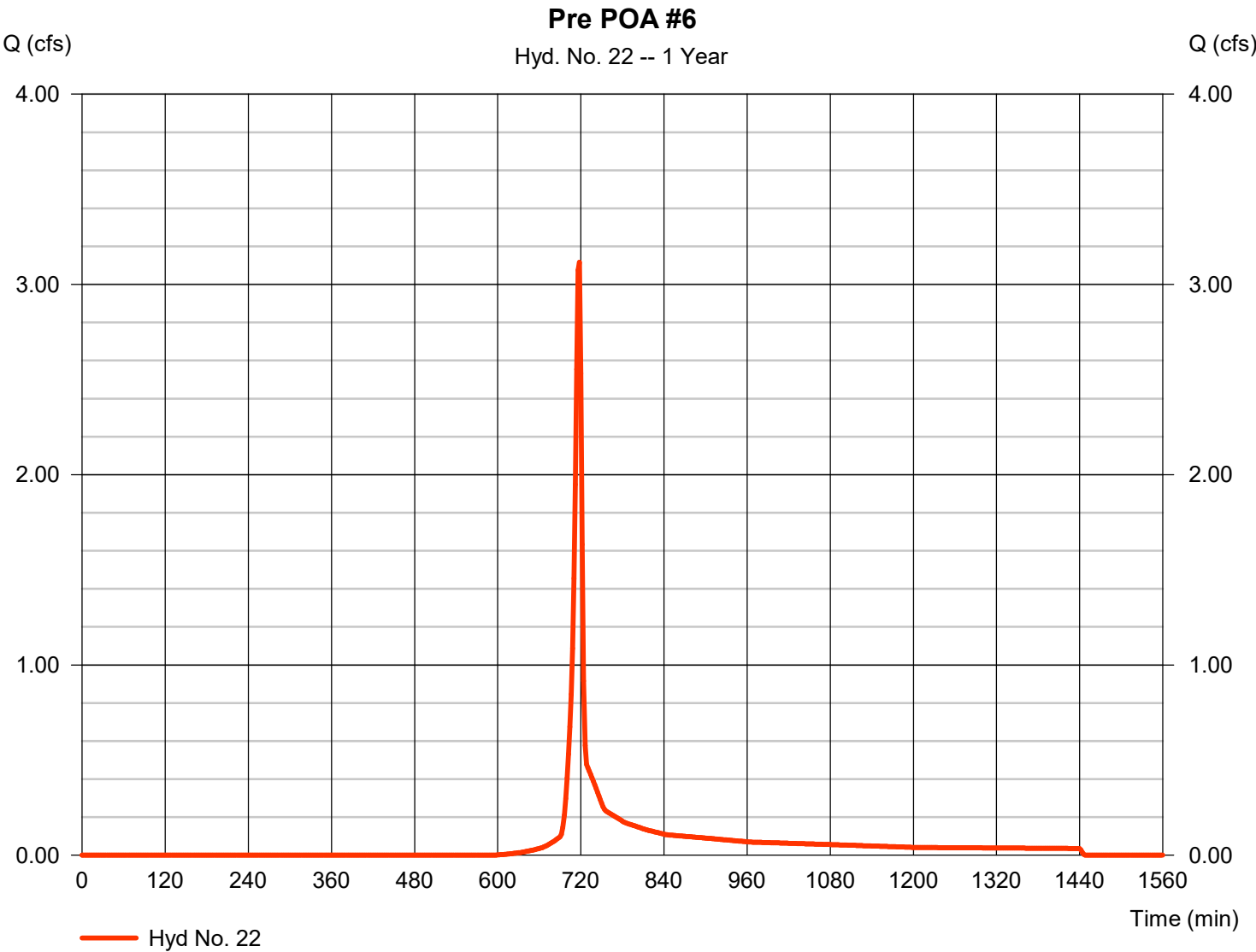
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Friday, 10 / 6 / 2023

Hyd. No. 22

Pre POA #6

| | | | | | |
|-----------------|---|------------|--------------------|---|------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 3.117 cfs |
| Storm frequency | = | 1 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 6,240 cuft |
| Drainage area | = | 1.600 ac | Curve number | = | 80 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 4.20 min |
| Total precip. | = | 2.86 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No. 22

Pre POA #6

| <u>Description</u> | <u>A</u> | <u>B</u> | <u>C</u> | <u>Totals</u> | | | |
|------------------------------------|---------------|----------|-------------|-----------------|-------------|----------|-------------|
| Sheet Flow | | | | | | | |
| Manning's n-value | = 0.011 | 0.011 | 0.011 | | | | |
| Flow length (ft) | = 146.0 | 0.0 | 0.0 | | | | |
| Two-year 24-hr precip. (in) | = 3.45 | 0.00 | 0.00 | | | | |
| Land slope (%) | = 3.87 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 1.21 | + | 0.00 | + | 0.00 | = | 1.21 |
| Shallow Concentrated Flow | | | | | | | |
| Flow length (ft) | = 437.00 | 0.00 | 0.00 | | | | |
| Watercourse slope (%) | = 2.35 | 0.00 | 0.00 | | | | |
| Surface description | = Unpaved | Paved | Paved | | | | |
| Average velocity (ft/s) | =2.47 | 0.00 | 0.00 | | | | |
| Travel Time (min) | = 2.94 | + | 0.00 | + | 0.00 | = | 2.94 |
| Channel Flow | | | | | | | |
| X sectional flow area (sqft) | = 0.00 | 0.00 | 0.00 | | | | |
| Wetted perimeter (ft) | = 0.00 | 0.00 | 0.00 | | | | |
| Channel slope (%) | = 0.00 | 0.00 | 0.00 | | | | |
| Manning's n-value | = 0.015 | 0.015 | 0.015 | | | | |
| Velocity (ft/s) | =0.00 | 0.00 | 0.00 | | | | |
| Flow length (ft) | (0)0.0 | 0.0 | 0.0 | | | | |
| Travel Time (min) | = 0.00 | + | 0.00 | + | 0.00 | = | 0.00 |
| Total Travel Time, Tc | | | | 4.20 min | | | |

Hydrograph Report

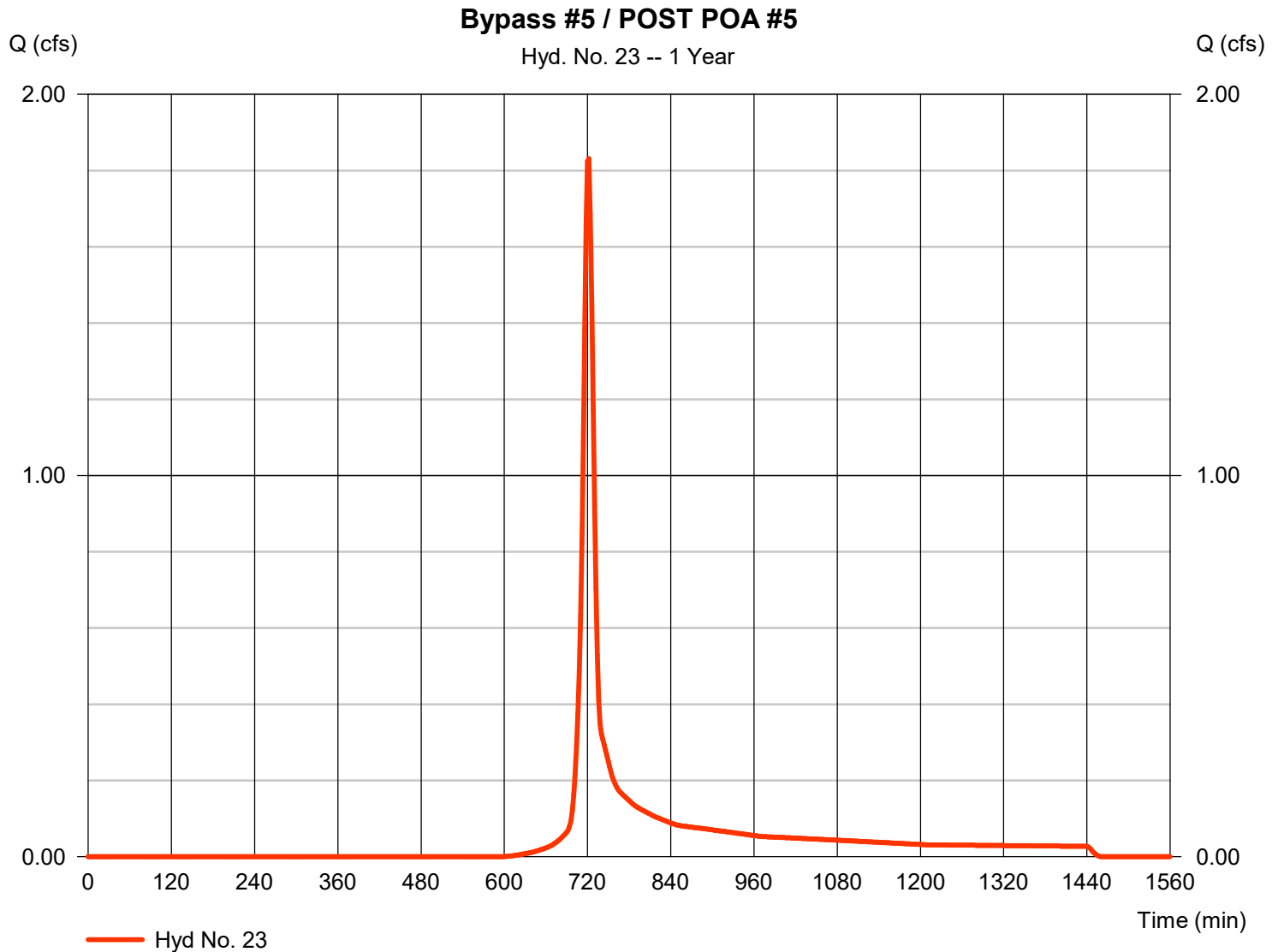
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Friday, 10 / 6 / 2023

Hyd. No. 23

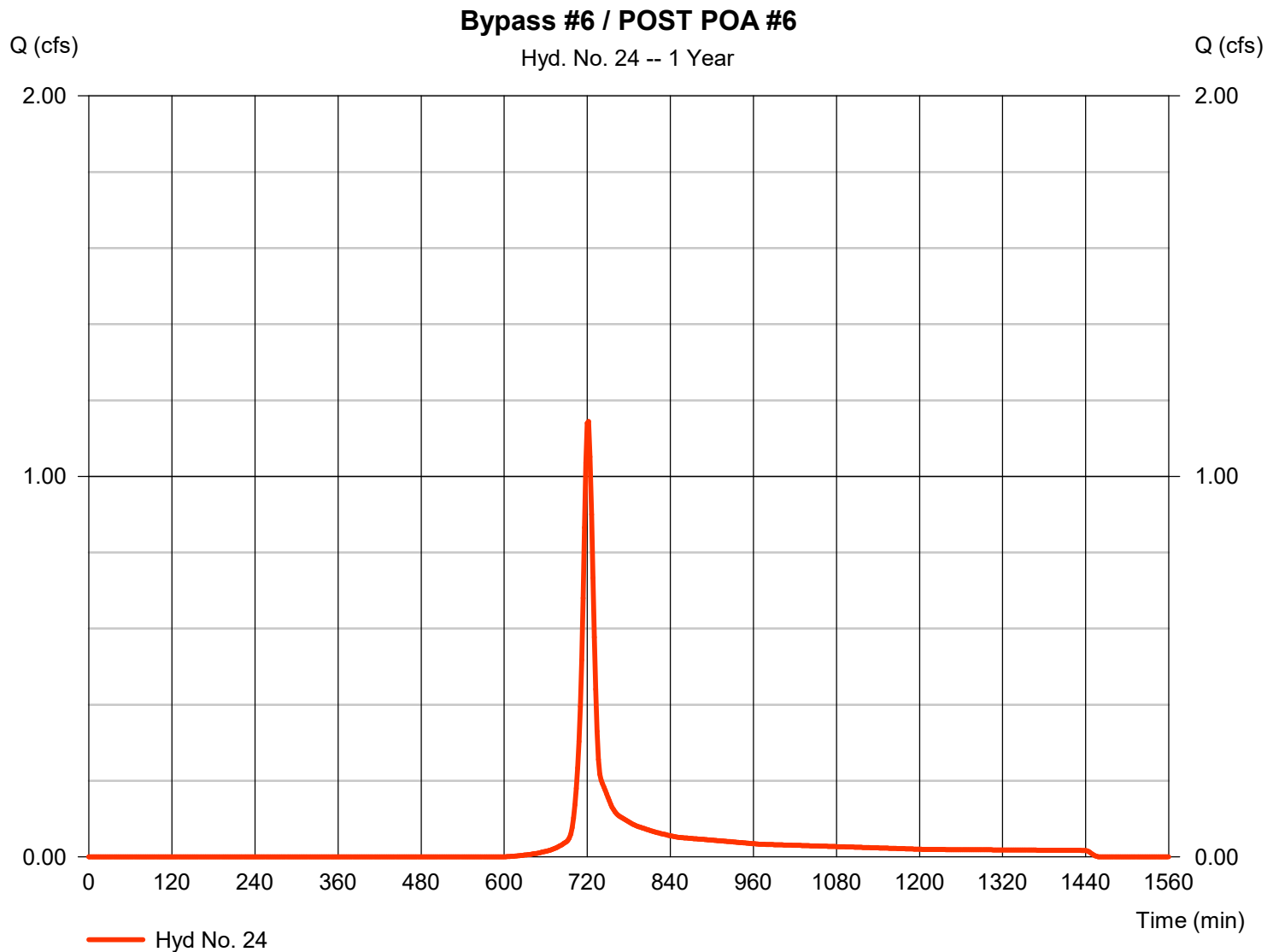
Bypass #5 / POST POA #5

| | | | |
|-----------------|--------------|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 1.831 cfs |
| Storm frequency | = 1 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 4,805 cuft |
| Drainage area | = 1.120 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 2.86 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Bypass #6 / POST POA #6

| | |
|--------------------|--------------|
| Peak discharge | = 1.145 cfs |
| Time to peak | = 722 min |
| Hyd. volume | = 3,003 cuft |
| Curve number | = 80 |
| Hydraulic length | = 0 ft |
| Time of conc. (Tc) | = 10.00 min |
| Distribution | = Type II |
| Shape factor | = 484 |



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

| 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 | 160.03 | 2 | 718 | 321,014 | ----- | ----- | ----- | Pre POA #3 |
| 2 | SCS Runoff | 66.23 | 2 | 716 | 134,179 | ----- | ----- | ----- | Pre POA #2 |
| 3 | SCS Runoff | 86.61 | 2 | 718 | 198,340 | ----- | ----- | ----- | Pre POA #1 |
| 4 | SCS Runoff | 44.61 | 2 | 720 | 115,723 | ----- | ----- | ----- | Bypass #1 |
| 5 | SCS Runoff | 7.613 | 2 | 720 | 19,747 | ----- | ----- | ----- | Bypass #2 |
| 6 | SCS Runoff | 91.03 | 2 | 720 | 236,118 | ----- | ----- | ----- | Bypass #3 |
| 7 | SCS Runoff | 46.90 | 2 | 720 | 124,424 | ----- | ----- | ----- | Post DA #1 |
| 8 | SCS Runoff | 102.80 | 2 | 720 | 272,734 | ----- | ----- | ----- | Post DA #2 |
| 9 | SCS Runoff | 60.55 | 2 | 720 | 161,525 | ----- | ----- | ----- | Post DA #3A |
| 10 | SCS Runoff | 48.19 | 2 | 720 | 127,248 | ----- | ----- | ----- | Post DA #3B |
| 11 | Reservoir | 27.13 | 2 | 728 | 104,522 | 7 | 388.35 | 54,826 | SCM 1 ROUTE |
| 12 | Reservoir | 34.37 | 2 | 732 | 231,372 | 8 | 355.97 | 137,280 | SCM 2 ROUTE |
| 13 | Reservoir | 41.67 | 2 | 726 | 129,567 | 9 | 388.47 | 69,306 | SCM 3A ROUTE |
| 14 | Reservoir | 11.74 | 2 | 734 | 109,172 | 10 | 383.95 | 63,300 | SCM 3B ROUTE |
| 15 | Combine | 59.09 | 2 | 724 | 220,245 | 4, 11, | ----- | ----- | Post POA #1 |
| 16 | Combine | 37.08 | 2 | 732 | 251,120 | 5, 12, | ----- | ----- | Post POA #2 |
| 17 | Combine | 125.52 | 2 | 724 | 474,858 | 6, 13, 14, | ----- | ----- | Post POA #3 |
| 18 | SCS Runoff | 24.01 | 1 | 716 | 42,671 | ----- | ----- | ----- | Pre POA #4 |
| 19 | SCS Runoff | 3.250 | 2 | 720 | 8,439 | ----- | ----- | ----- | Bypass #4 / POST POA #4 |
| 20 | SCS Runoff | 122.39 | 2 | 728 | 450,129 | ----- | ----- | ----- | Offsite Drainage Area #3 / POST OFF |
| 21 | SCS Runoff | 11.80 | 2 | 716 | 24,012 | ----- | ----- | ----- | Pre POA #5 |
| 22 | SCS Runoff | 7.835 | 2 | 716 | 15,942 | ----- | ----- | ----- | Pre POA #6 |
| 23 | SCS Runoff | 4.727 | 2 | 720 | 12,275 | ----- | ----- | ----- | Bypass #5 / POST POA #5 |
| 24 | SCS Runoff | 2.955 | 2 | 720 | 7,672 | ----- | ----- | ----- | Bypass #6 / POST POA #6 |
| SCMs.gpw | | | | | Return Period: 10 Year | | | Friday, 10 / 6 / 2023 | |

Hydrograph Report

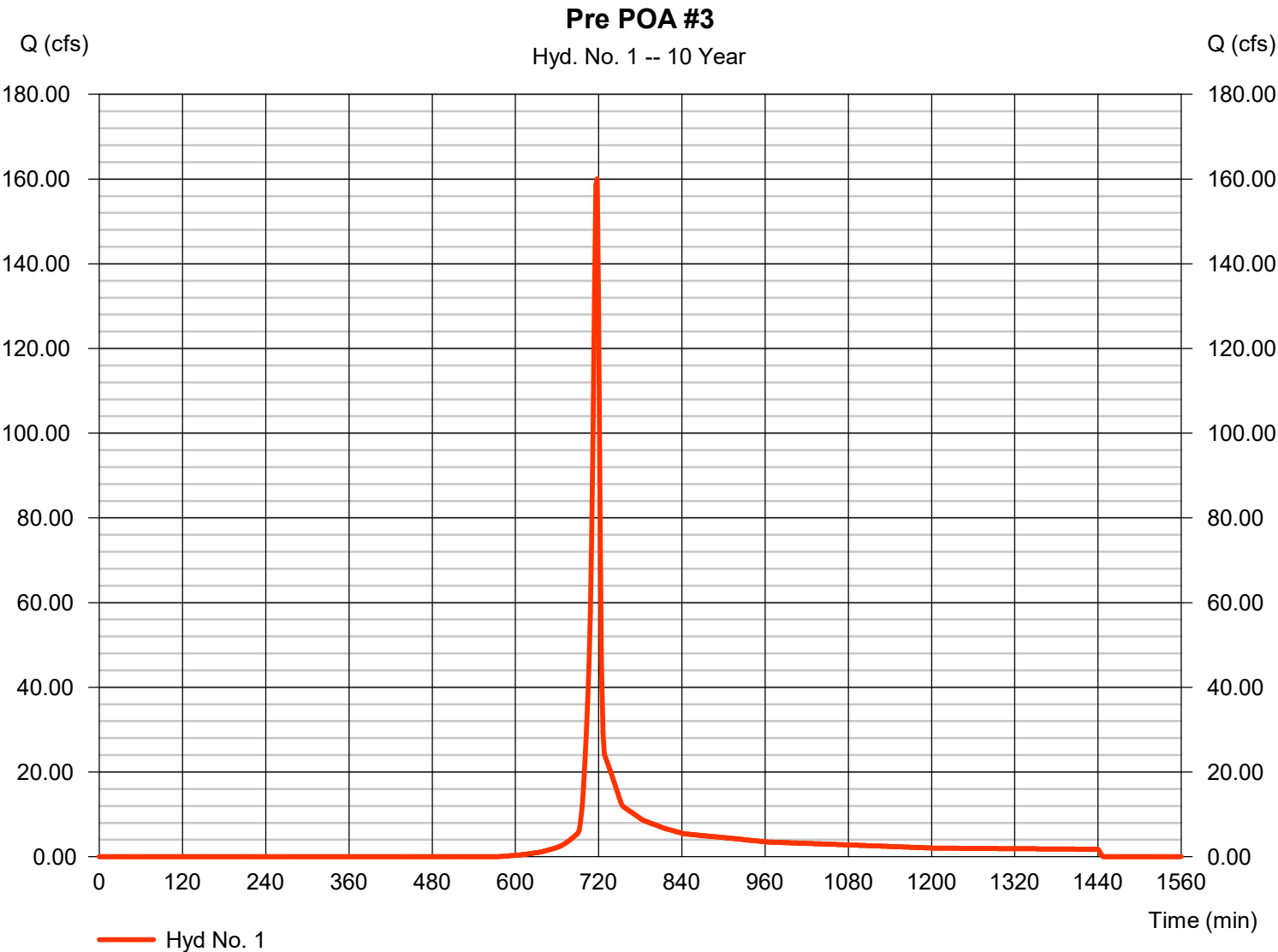
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Friday, 10 / 6 / 2023

Hyd. No. 1

Pre POA #3

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 160.03 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 718 min |
| Time interval | = 2 min | Hyd. volume | = 321,014 cuft |
| Drainage area | = 43.940 ac | Curve number | = 71 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 3.10 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

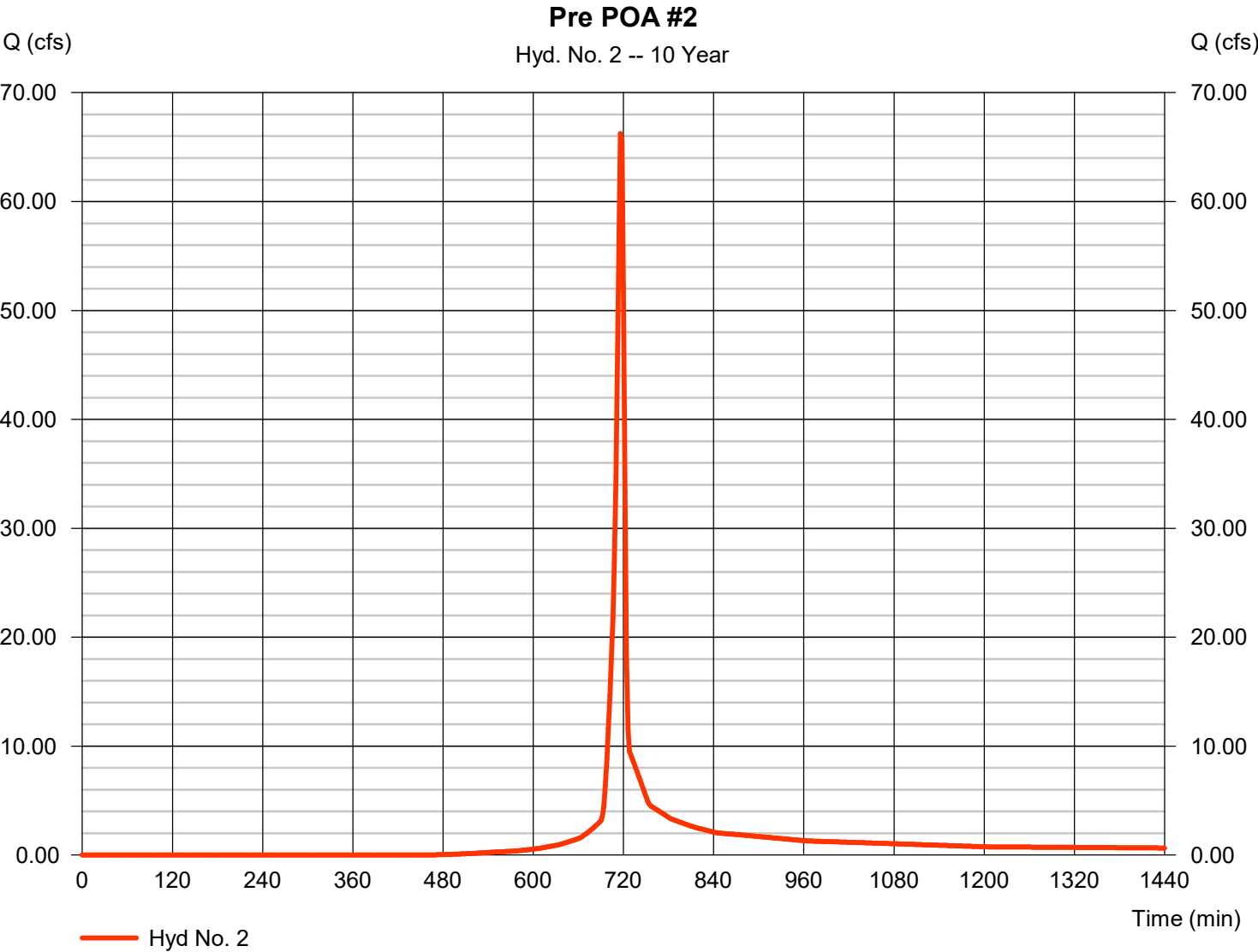
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Friday, 10 / 6 / 2023

Hyd. No. 2

Pre POA #2

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 66.23 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 134,179 cuft |
| Drainage area | = 14.360 ac | Curve number | = 78 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 5.60 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 3

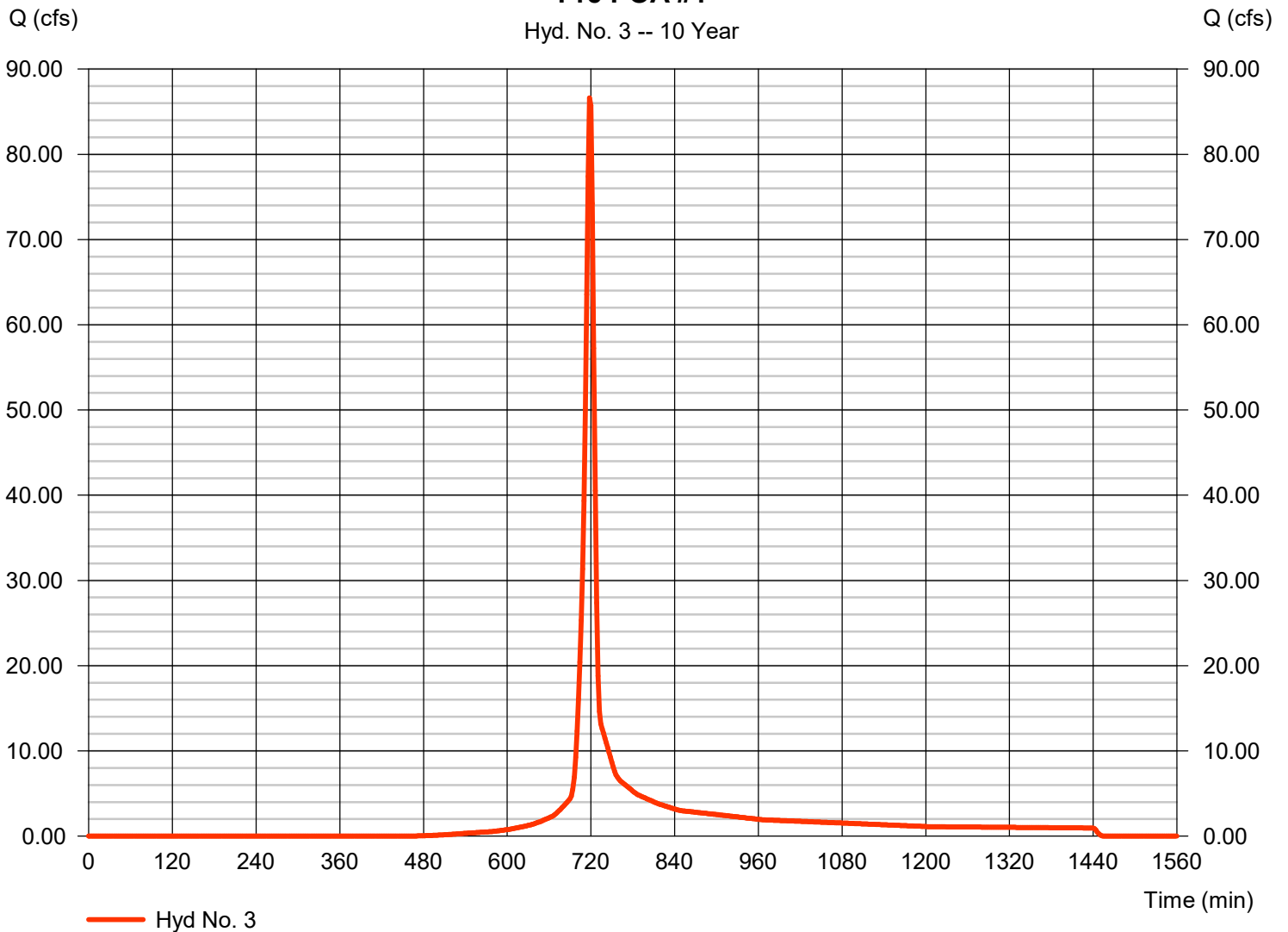
Pre POA #1

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 2 min
 Drainage area = 19.900 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.04 in
 Storm duration = 24 hrs

Peak discharge = 86.61 cfs
 Time to peak = 718 min
 Hyd. volume = 198,340 cuft
 Curve number = 78
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 9.70 min
 Distribution = Type II
 Shape factor = 484

Pre POA #1

Hyd. No. 3 -- 10 Year



Hydrograph Report

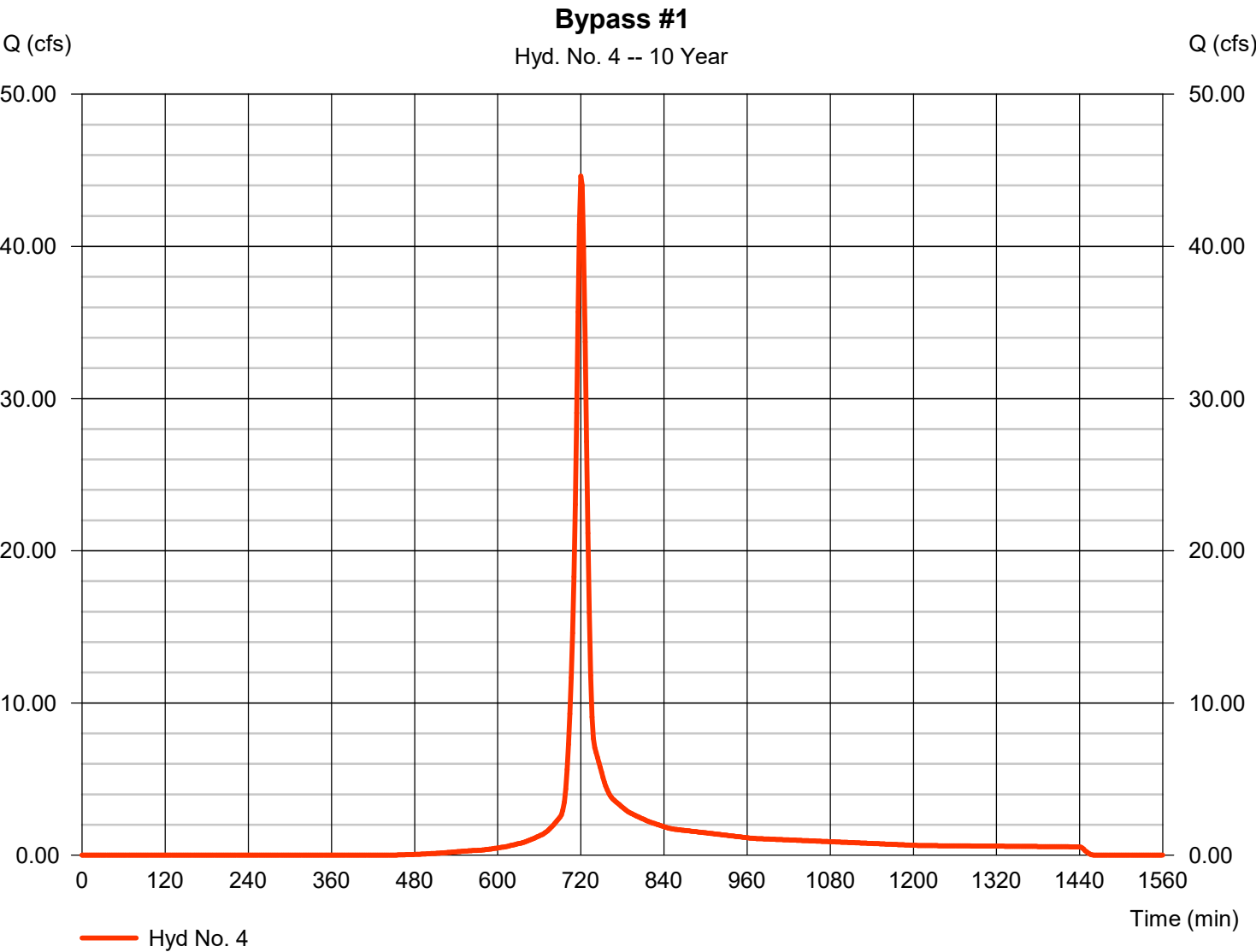
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Friday, 10 / 6 / 2023

Hyd. No. 4

Bypass #1

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 44.61 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 115,723 cuft |
| Drainage area | = 10.900 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

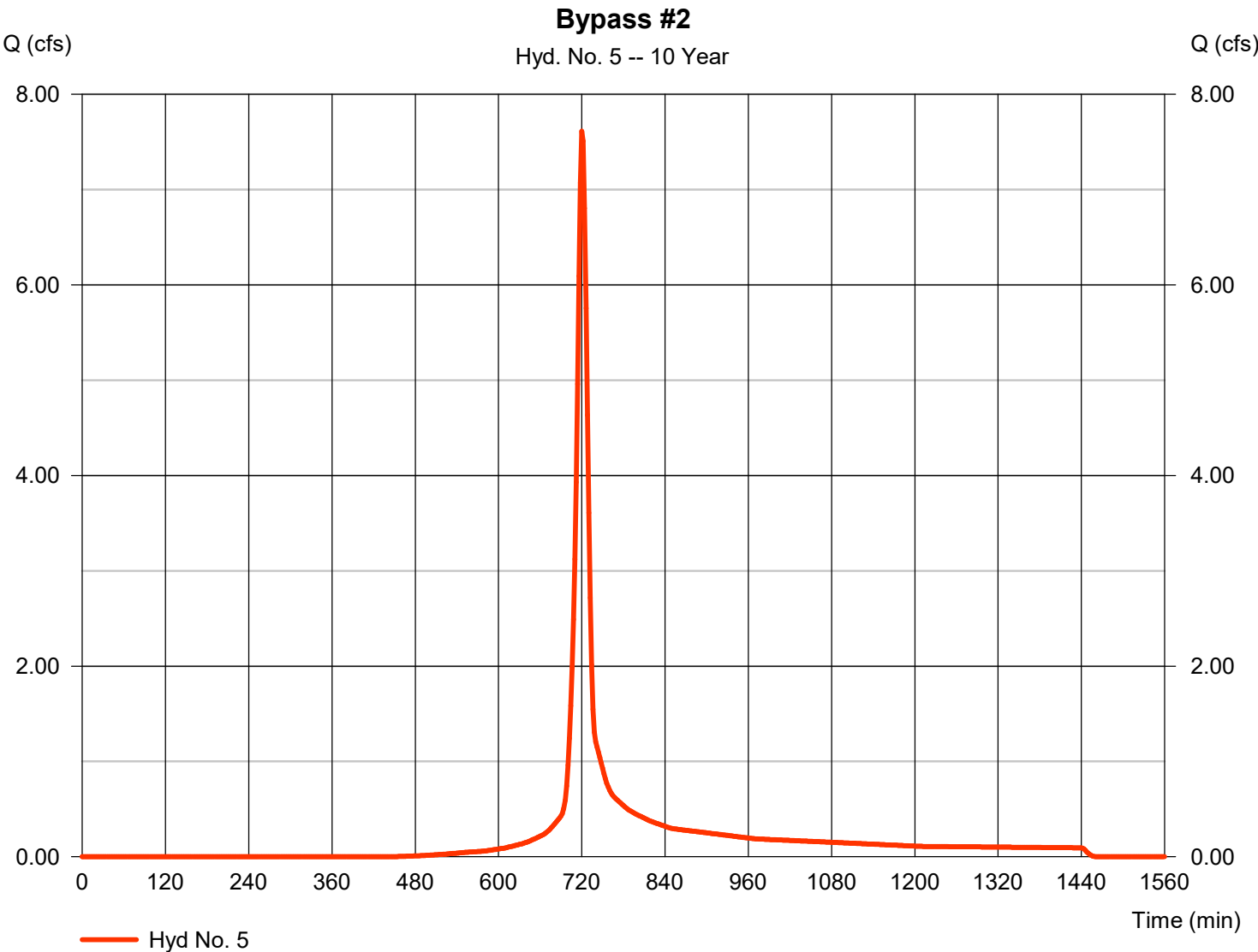
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Friday, 10 / 6 / 2023

Hyd. No. 5

Bypass #2

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.613 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 19,747 cuft |
| Drainage area | = 1.860 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

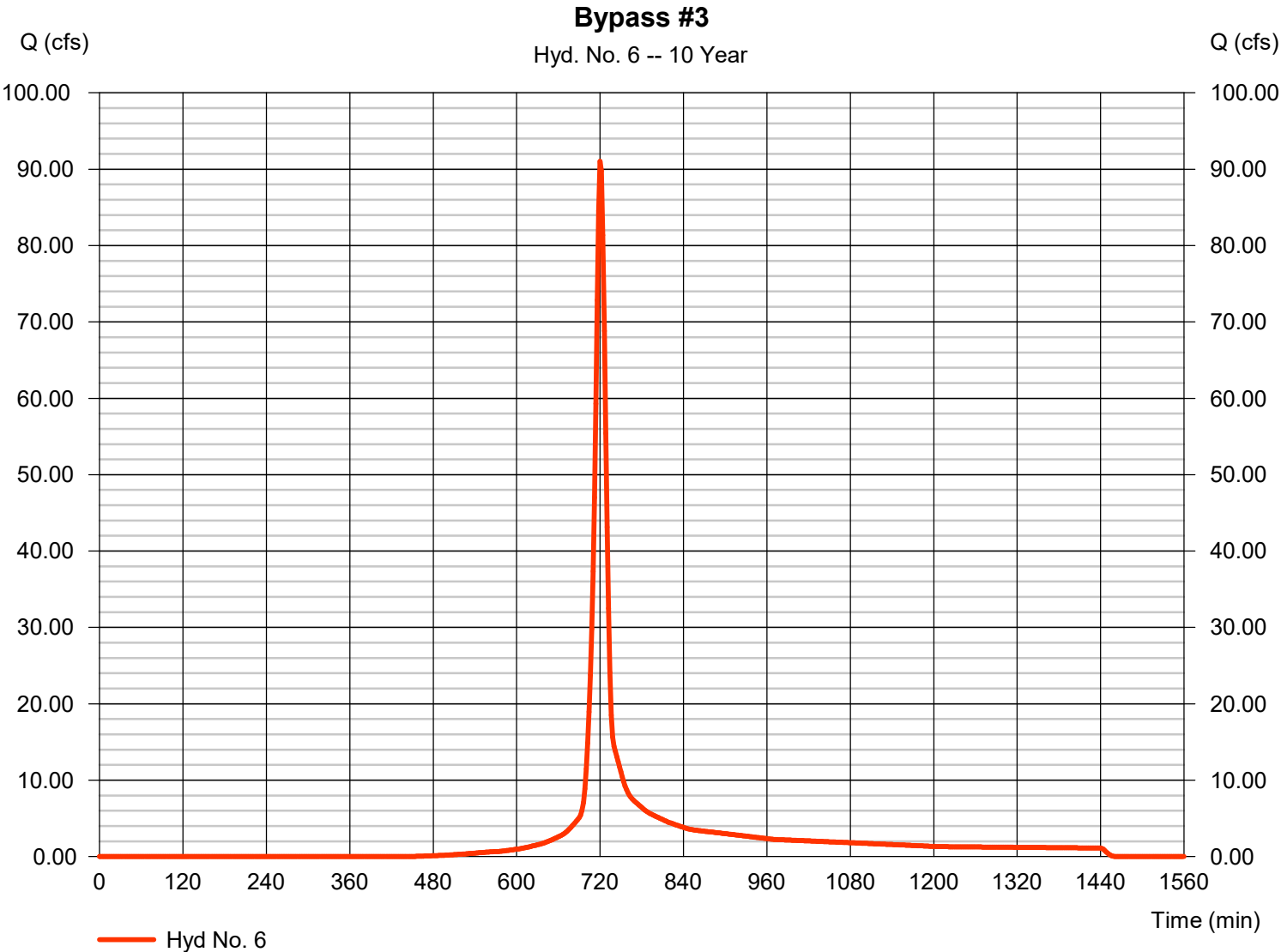
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Friday, 10 / 6 / 2023

Hyd. No. 6

Bypass #3

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 91.03 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 236,118 cuft |
| Drainage area | = 22.240 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

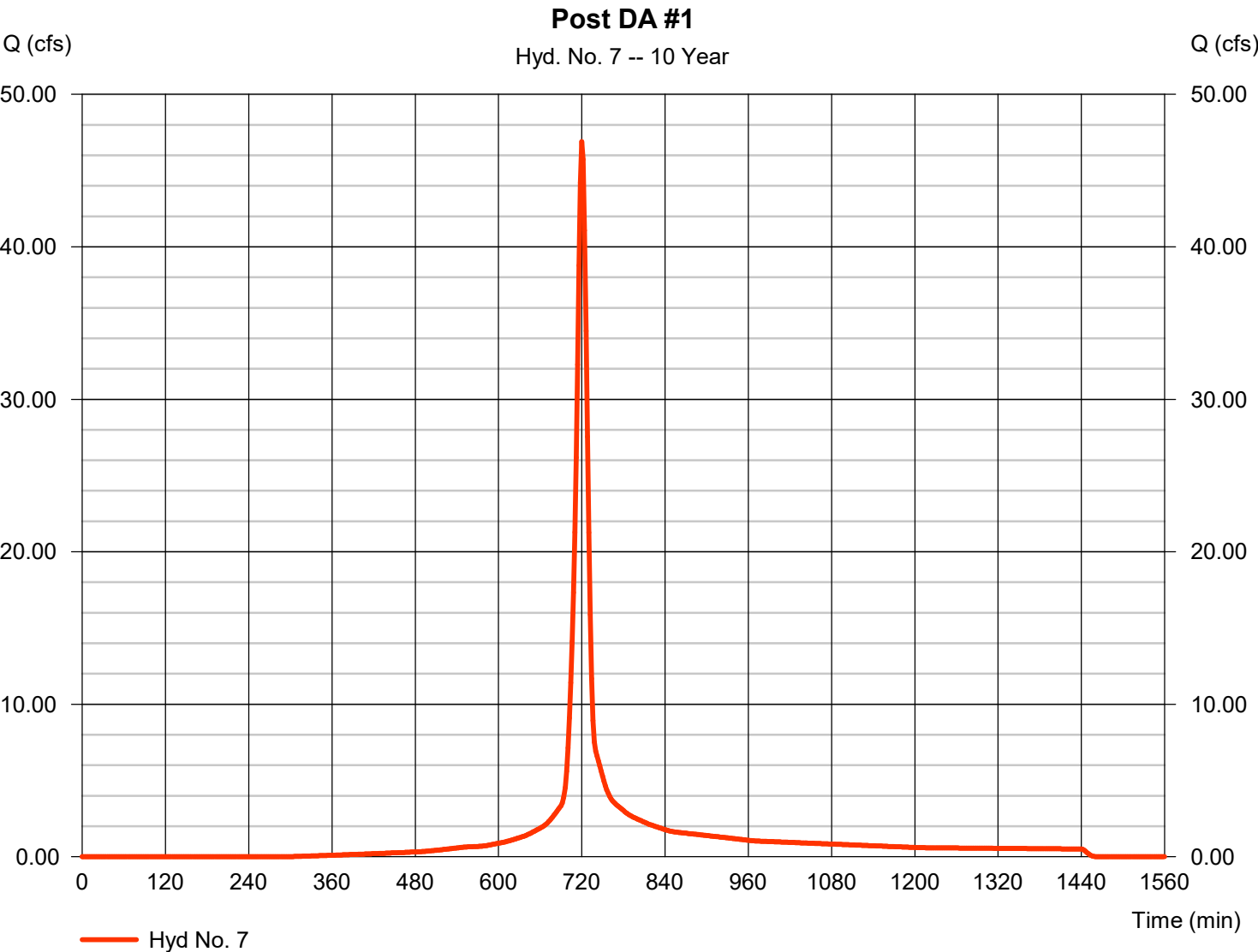
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Friday, 10 / 6 / 2023

Hyd. No. 7

Post DA #1

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 46.90 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 124,424 cuft |
| Drainage area | = 9.220 ac | Curve number | = 87 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

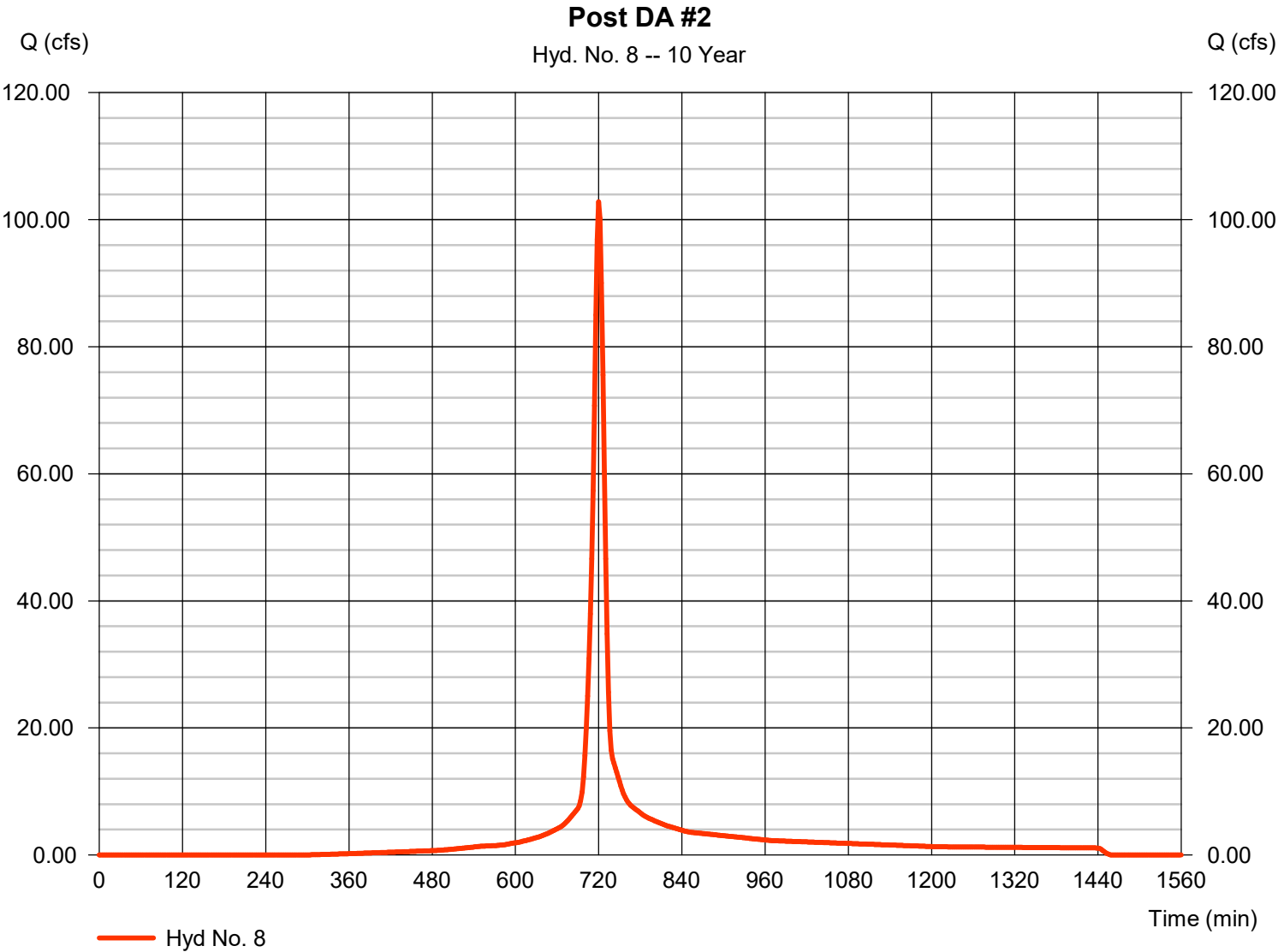


Hydrograph Report

Hyd. No. 8

Post DA #2

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 102.80 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 272,734 cuft |
| Drainage area | = 20.210 ac | Curve number | = 87 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

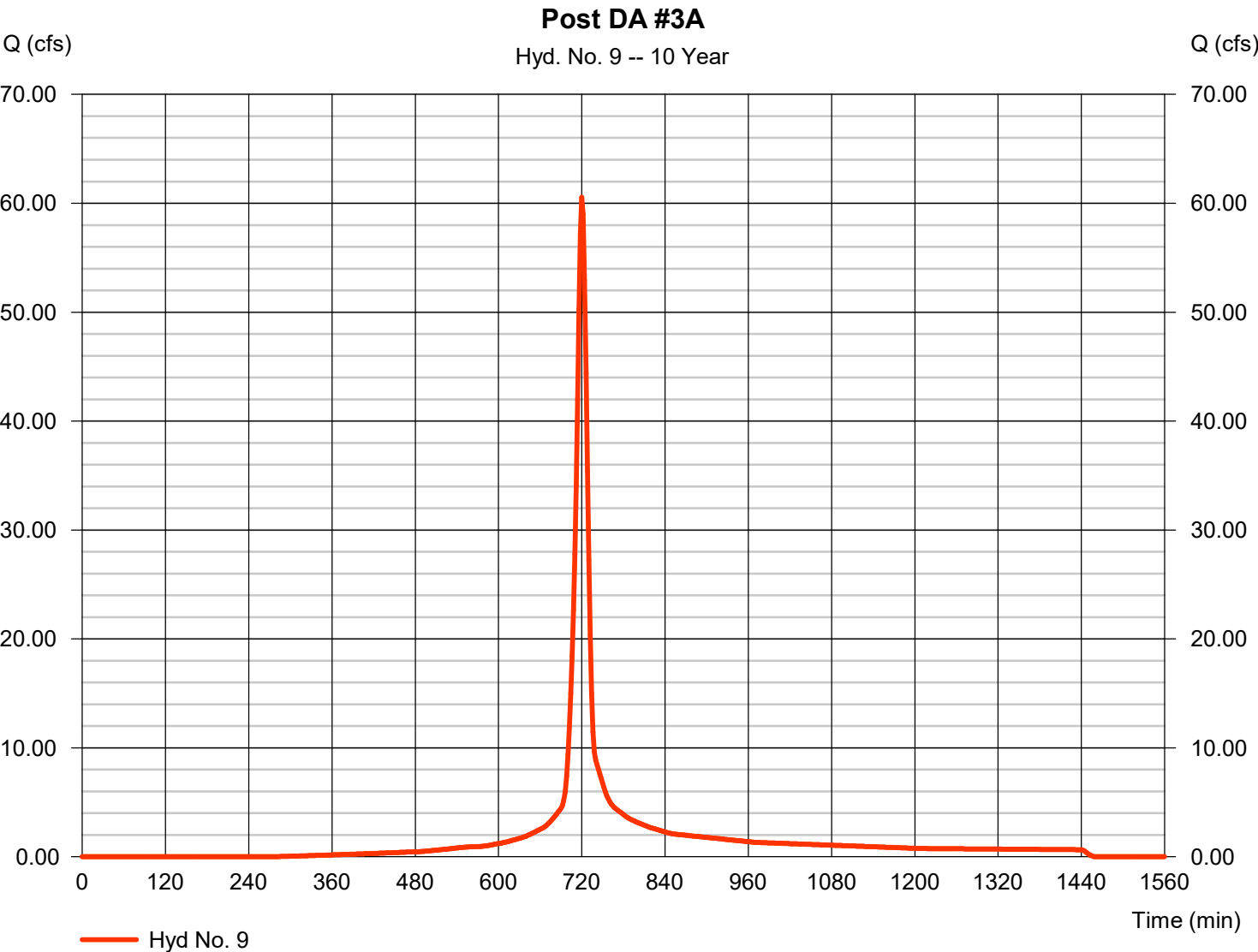
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Friday, 10 / 6 / 2023

Hyd. No. 9

Post DA #3A

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 60.55 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 161,525 cuft |
| Drainage area | = 11.640 ac | Curve number | = 88 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

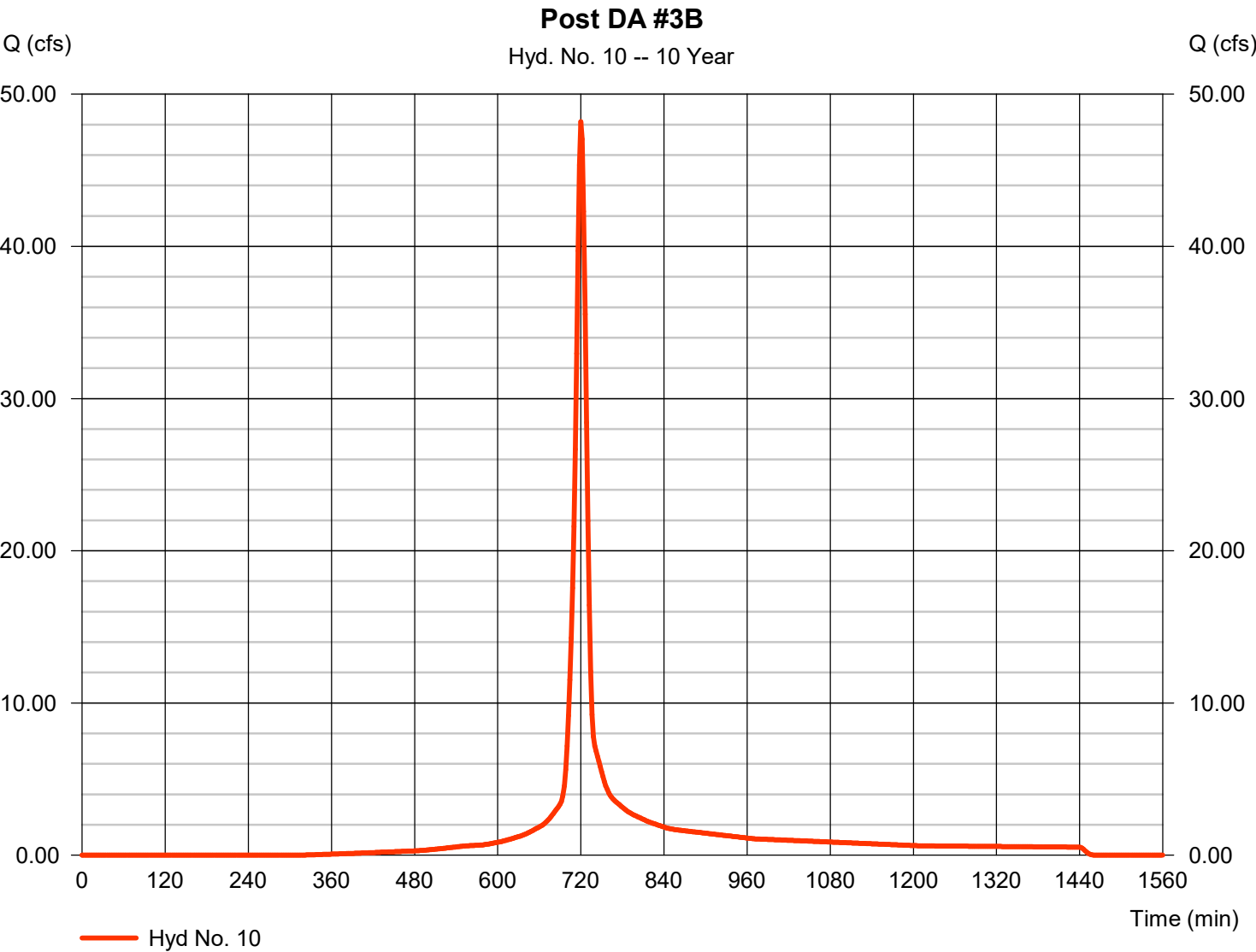
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Friday, 10 / 6 / 2023

Hyd. No. 10

Post DA #3B

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 48.19 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 127,248 cuft |
| Drainage area | = 9.700 ac | Curve number | = 86 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

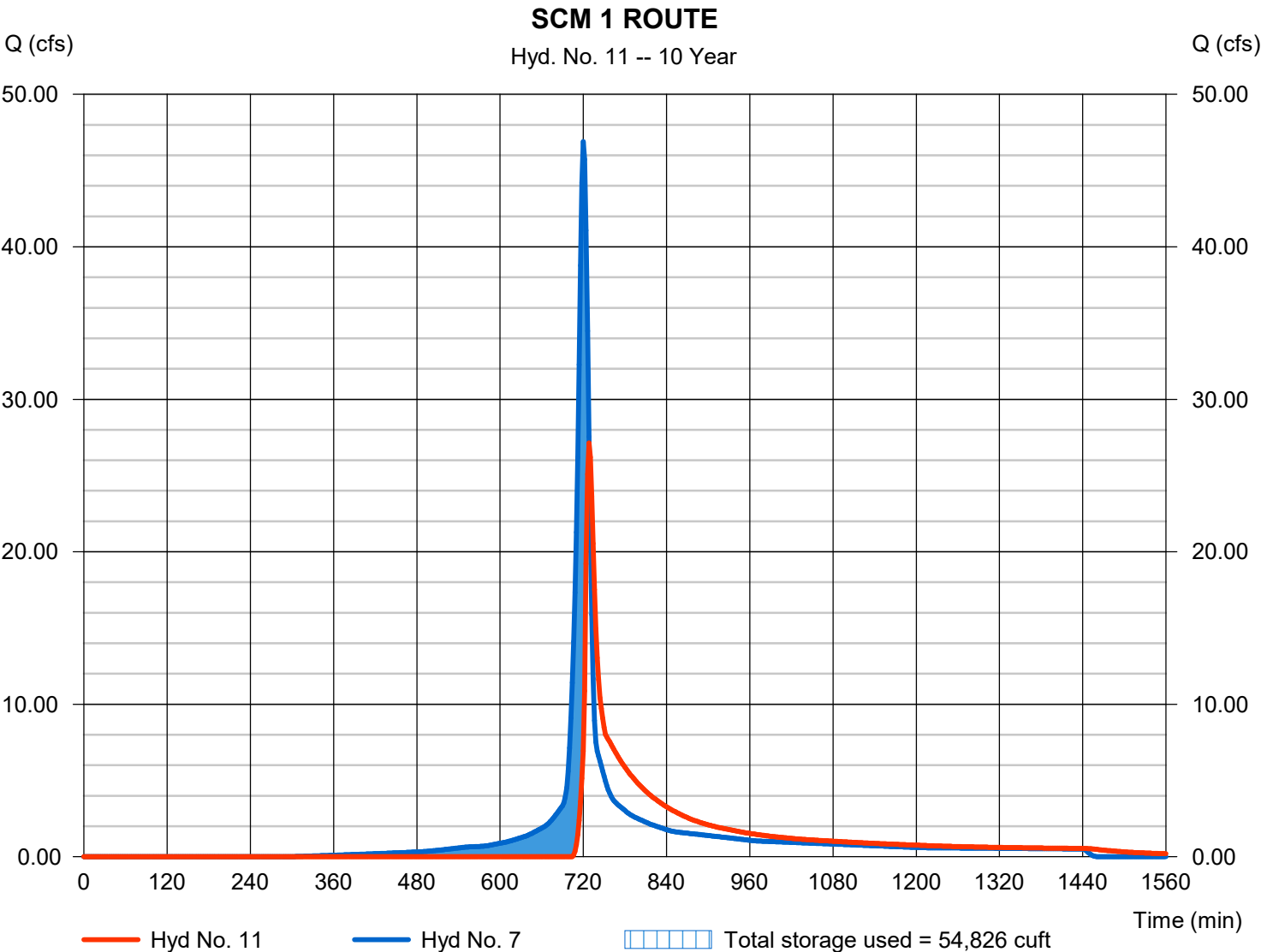
Friday, 10 / 6 / 2023

Hyd. No. 11

SCM 1 ROUTE

| | | | |
|-----------------|------------------|----------------|----------------|
| Hydrograph type | = Reservoir | Peak discharge | = 27.13 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 728 min |
| Time interval | = 2 min | Hyd. volume | = 104,522 cuft |
| Inflow hyd. No. | = 7 - Post DA #1 | Max. Elevation | = 388.35 ft |
| Reservoir name | = SCM 1 | Max. Storage | = 54,826 cuft |

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

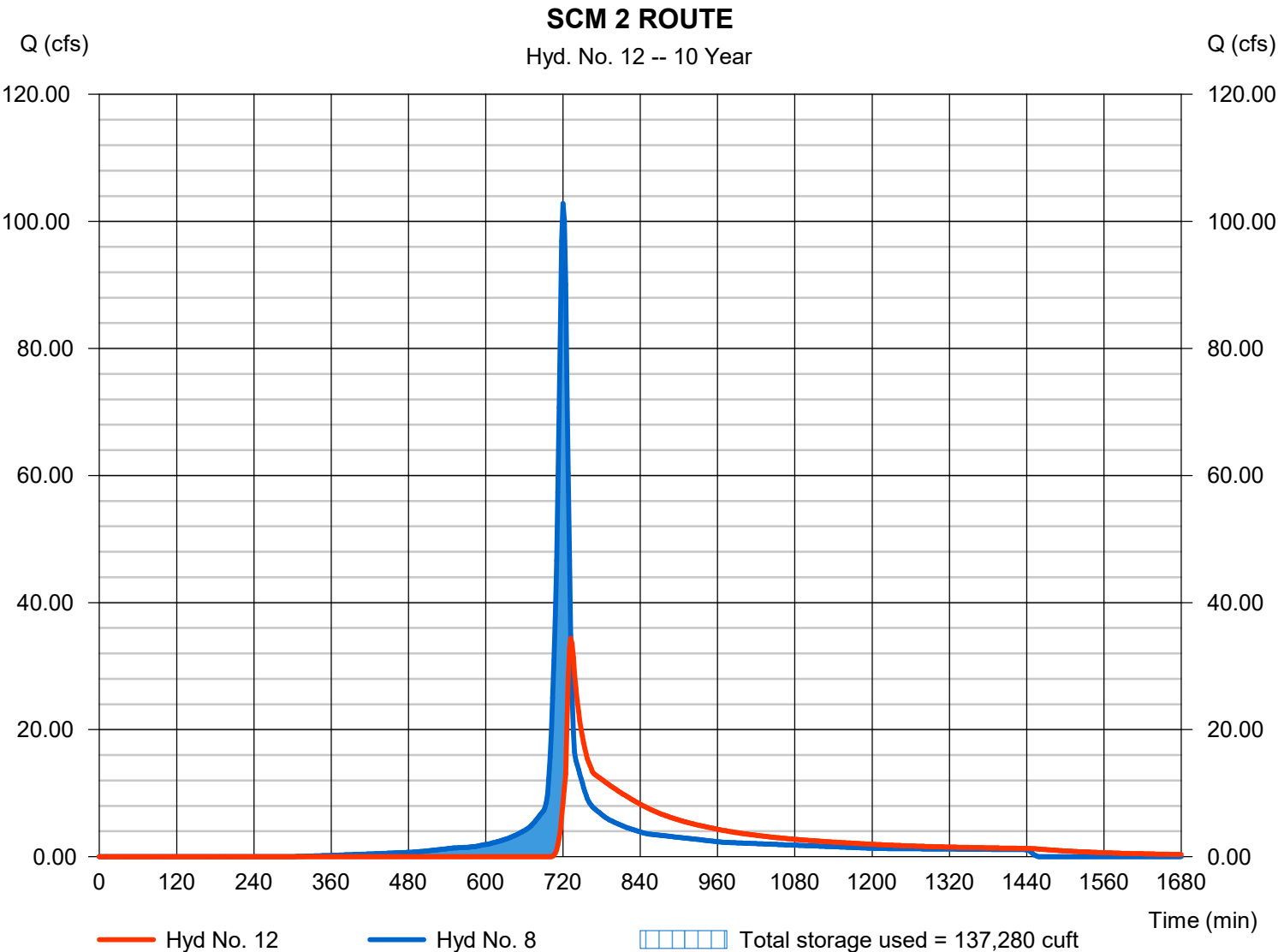
Friday, 10 / 6 / 2023

Hyd. No. 12

SCM 2 ROUTE

| | | | |
|-----------------|------------------|----------------|----------------|
| Hydrograph type | = Reservoir | Peak discharge | = 34.37 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 231,372 cuft |
| Inflow hyd. No. | = 8 - Post DA #2 | Max. Elevation | = 355.97 ft |
| Reservoir name | = SCM 2 | Max. Storage | = 137,280 cuft |

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

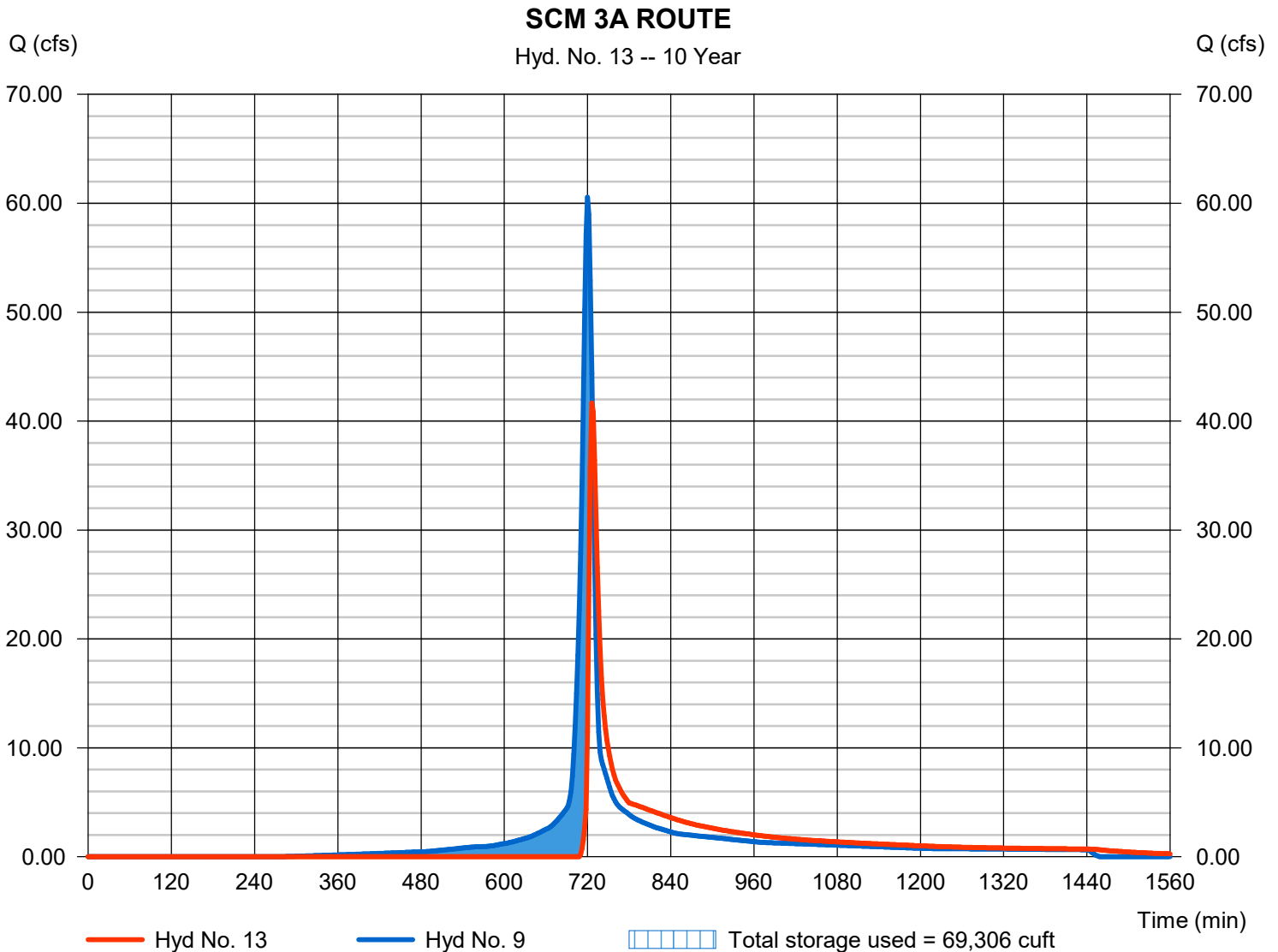
Hyd. No. 13

SCM 3A ROUTE

Hydrograph type = Reservoir
 Storm frequency = 10 yrs
 Time interval = 2 min
 Inflow hyd. No. = 9 - Post DA #3A
 Reservoir name = SCM 3A

Peak discharge = 41.67 cfs
 Time to peak = 726 min
 Hyd. volume = 129,567 cuft
 Max. Elevation = 388.47 ft
 Max. Storage = 69,306 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

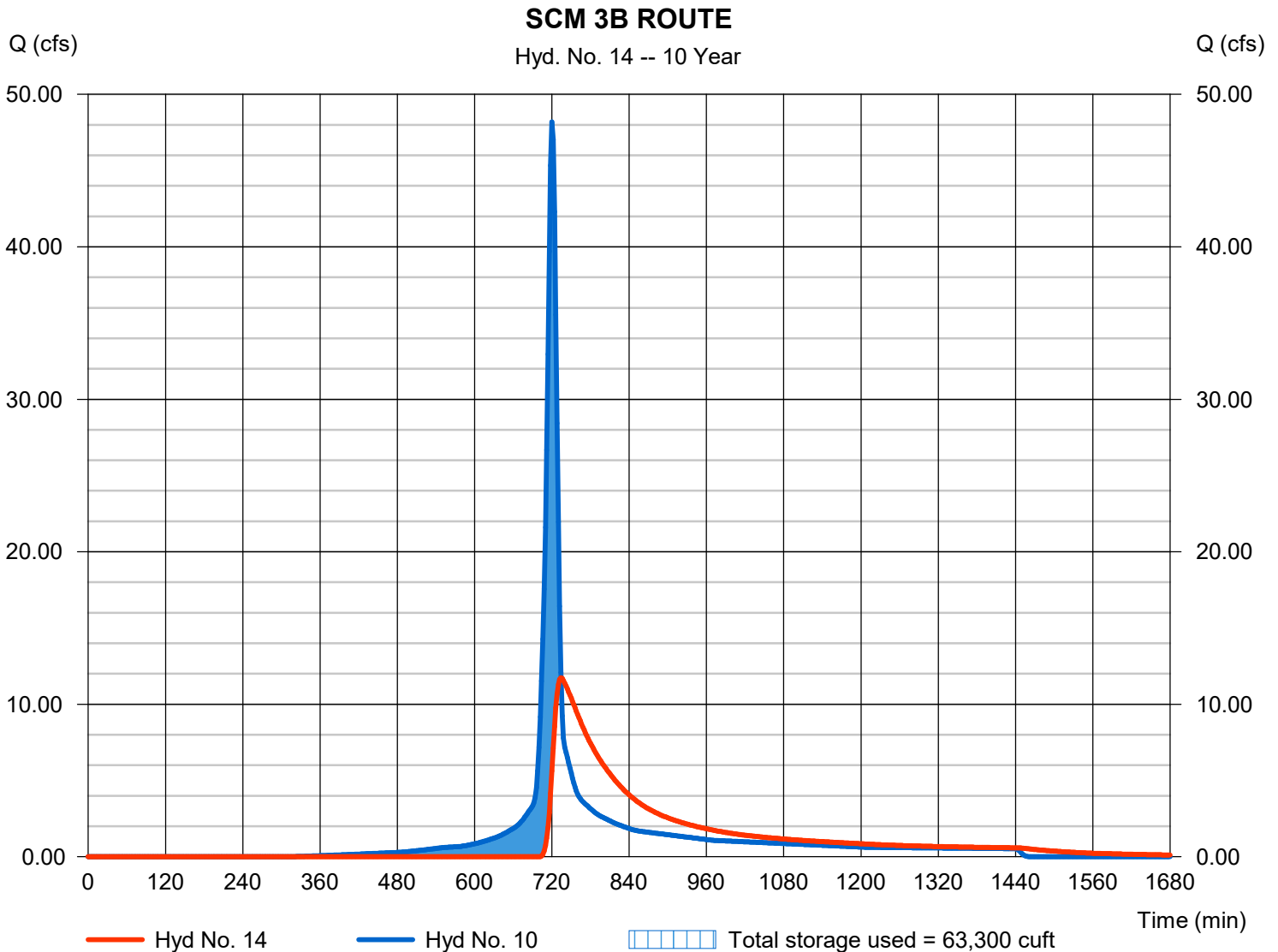
Friday, 10 / 6 / 2023

Hyd. No. 14

SCM 3B ROUTE

| | | | |
|-----------------|--------------------|----------------|----------------|
| Hydrograph type | = Reservoir | Peak discharge | = 11.74 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 734 min |
| Time interval | = 2 min | Hyd. volume | = 109,172 cuft |
| Inflow hyd. No. | = 10 - Post DA #3B | Max. Elevation | = 383.95 ft |
| Reservoir name | = SCM 3B | Max. Storage | = 63,300 cuft |

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

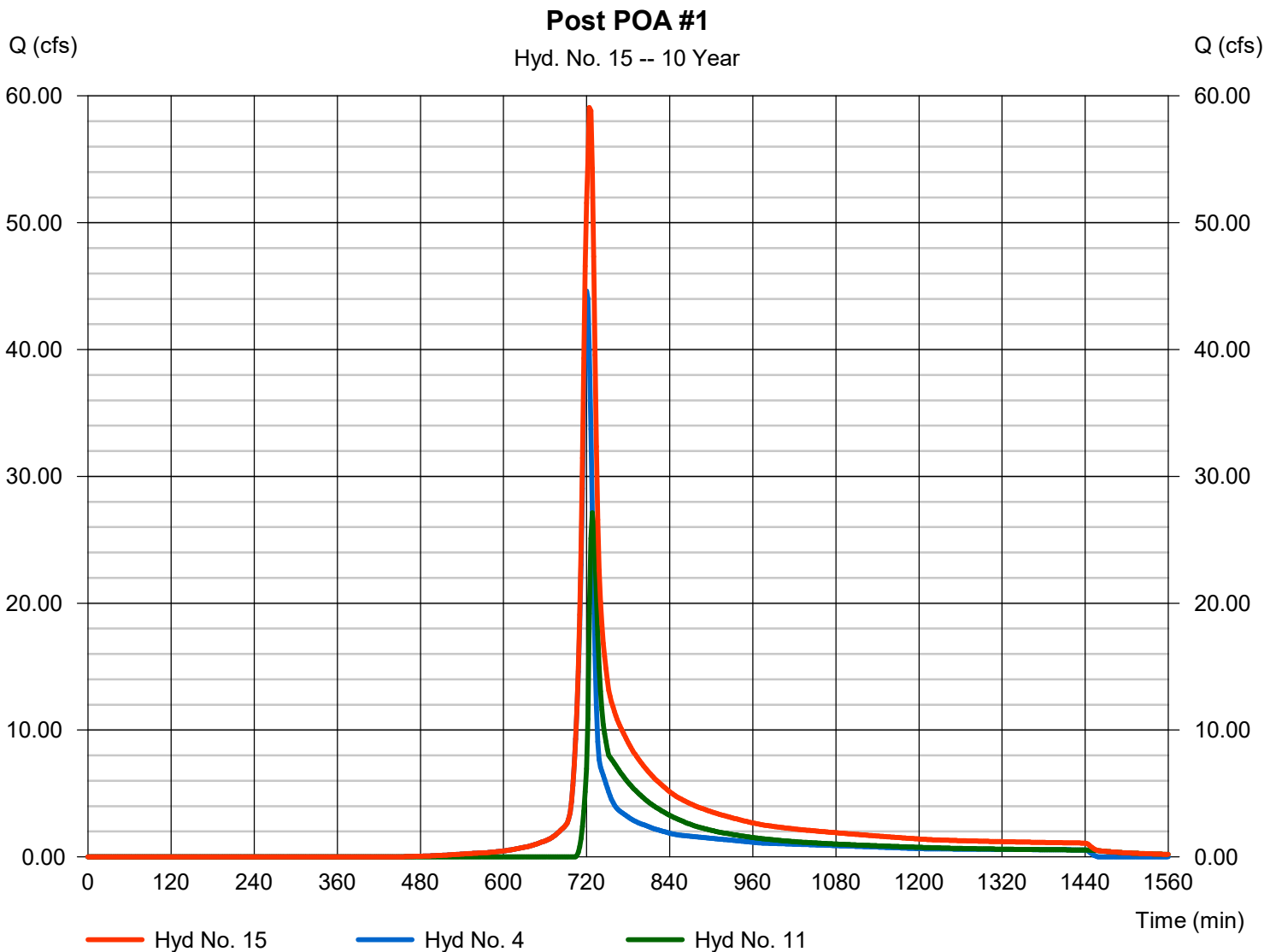
Friday, 10 / 6 / 2023

Hyd. No. 15

Post POA #1

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 2 min
 Inflow hyds. = 4, 11

Peak discharge = 59.09 cfs
 Time to peak = 724 min
 Hyd. volume = 220,245 cuft
 Contrib. drain. area = 10.900 ac

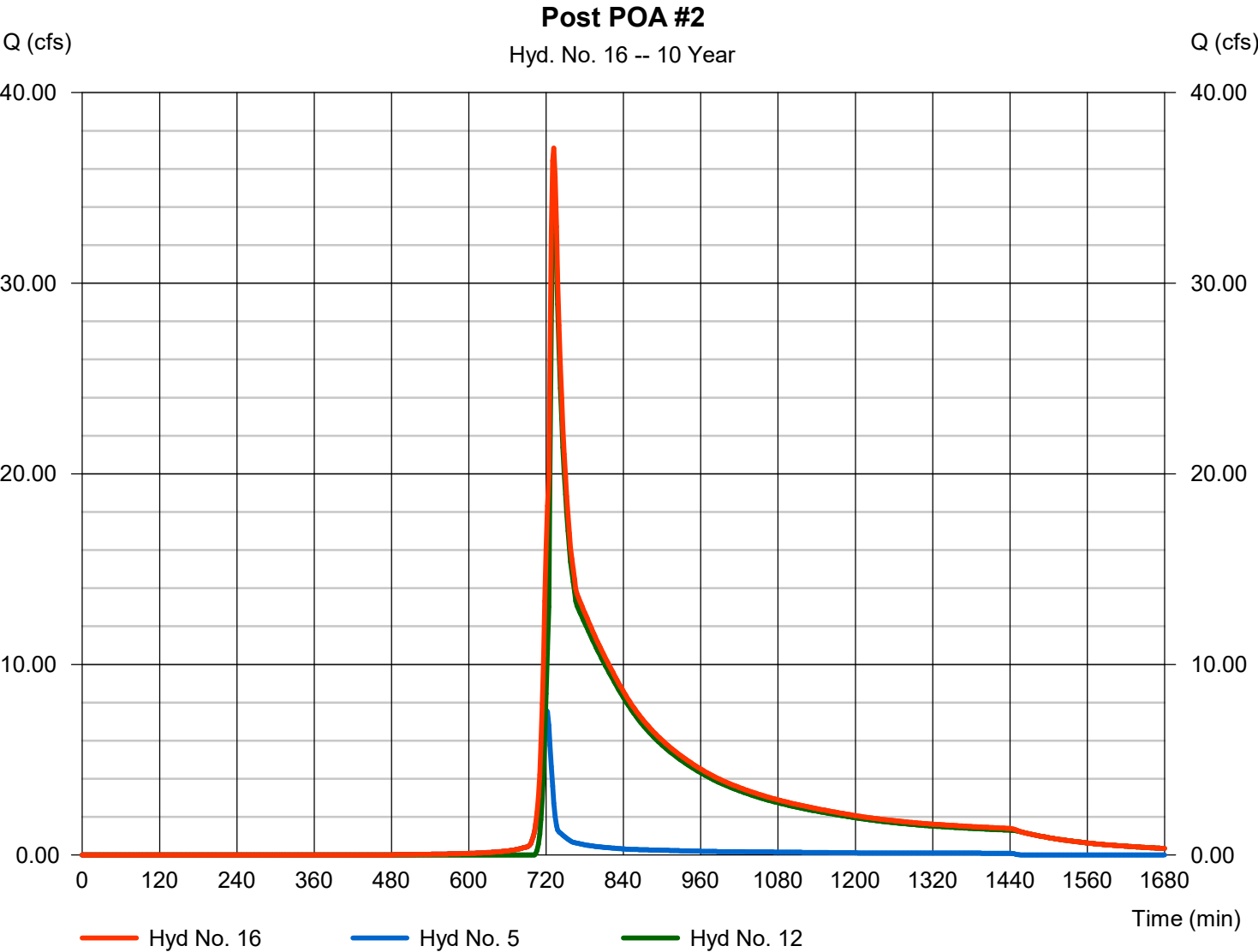


Hydrograph Report

Hyd. No. 16

Post POA #2

| | | | |
|-----------------|-----------|----------------------|----------------|
| Hydrograph type | = Combine | Peak discharge | = 37.08 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 732 min |
| Time interval | = 2 min | Hyd. volume | = 251,120 cuft |
| Inflow hyds. | = 5, 12 | Contrib. drain. area | = 1.860 ac |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

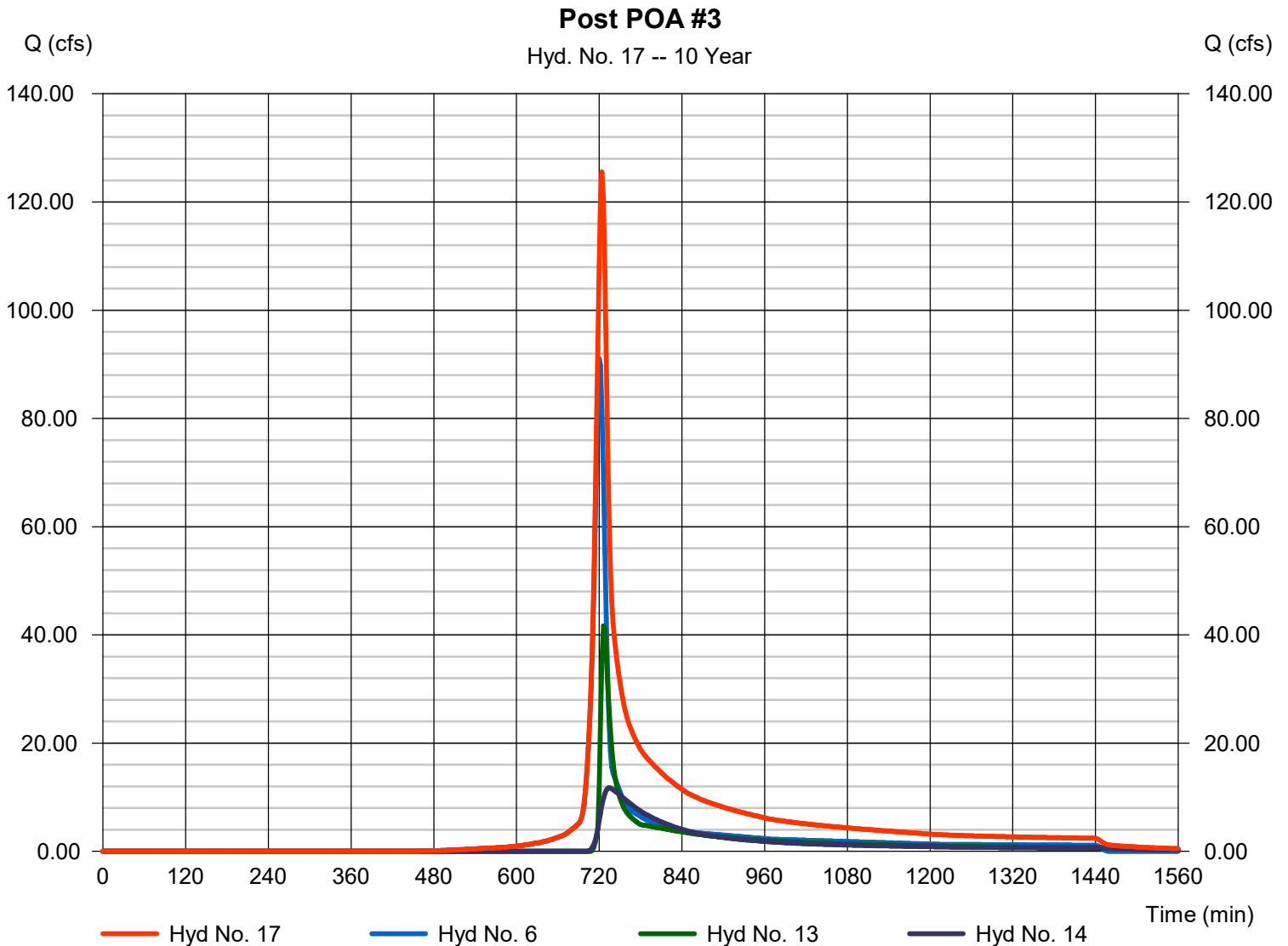
Friday, 10 / 6 / 2023

Hyd. No. 17

Post POA #3

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 2 min
 Inflow hyds. = 6, 13, 14

Peak discharge = 125.52 cfs
 Time to peak = 724 min
 Hyd. volume = 474,858 cuft
 Contrib. drain. area = 22.240 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

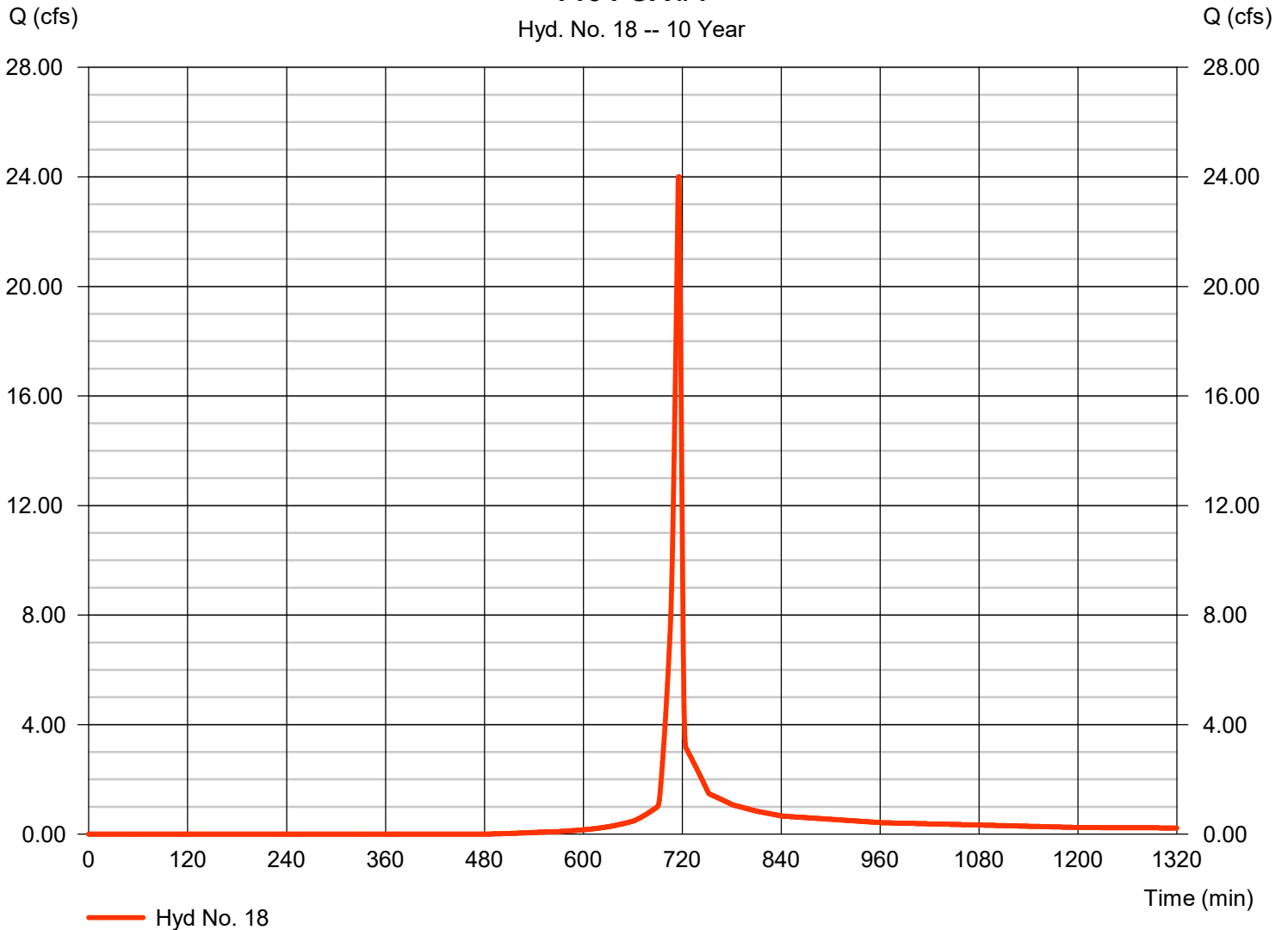
Hyd. No. 18

Pre POA #4

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 24.01 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 1 min | Hyd. volume | = 42,671 cuft |
| Drainage area | = 4.720 ac | Curve number | = 77 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 2.10 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

Pre POA #4

Hyd. No. 18 -- 10 Year



Hydrograph Report

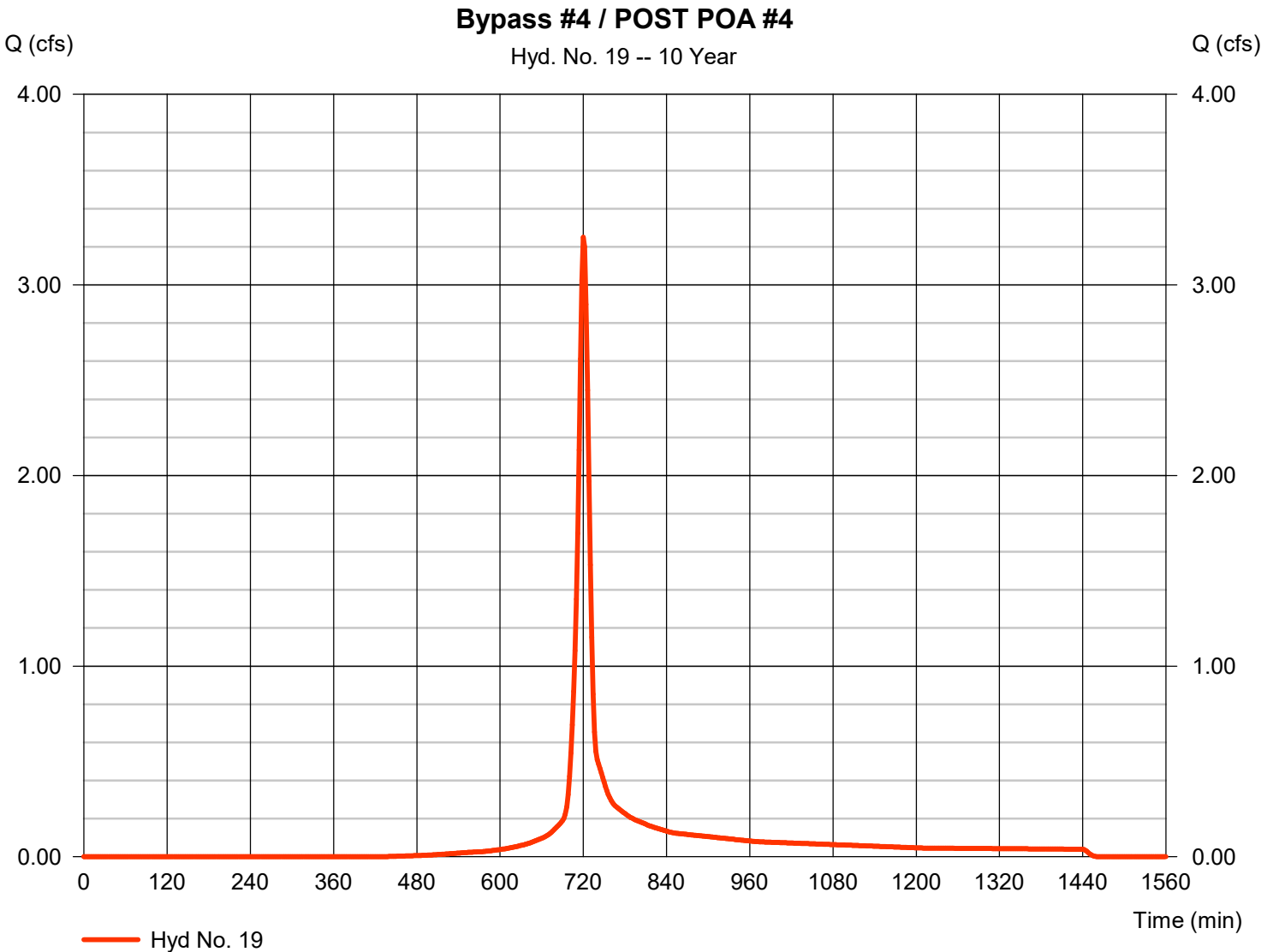
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Friday, 10 / 6 / 2023

Hyd. No. 19

Bypass #4 / POST POA #4

| | | | | | |
|-----------------|---|------------|--------------------|---|------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 3.250 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 8,439 cuft |
| Drainage area | = | 0.770 ac | Curve number | = | 80 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 10.00 min |
| Total precip. | = | 5.04 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



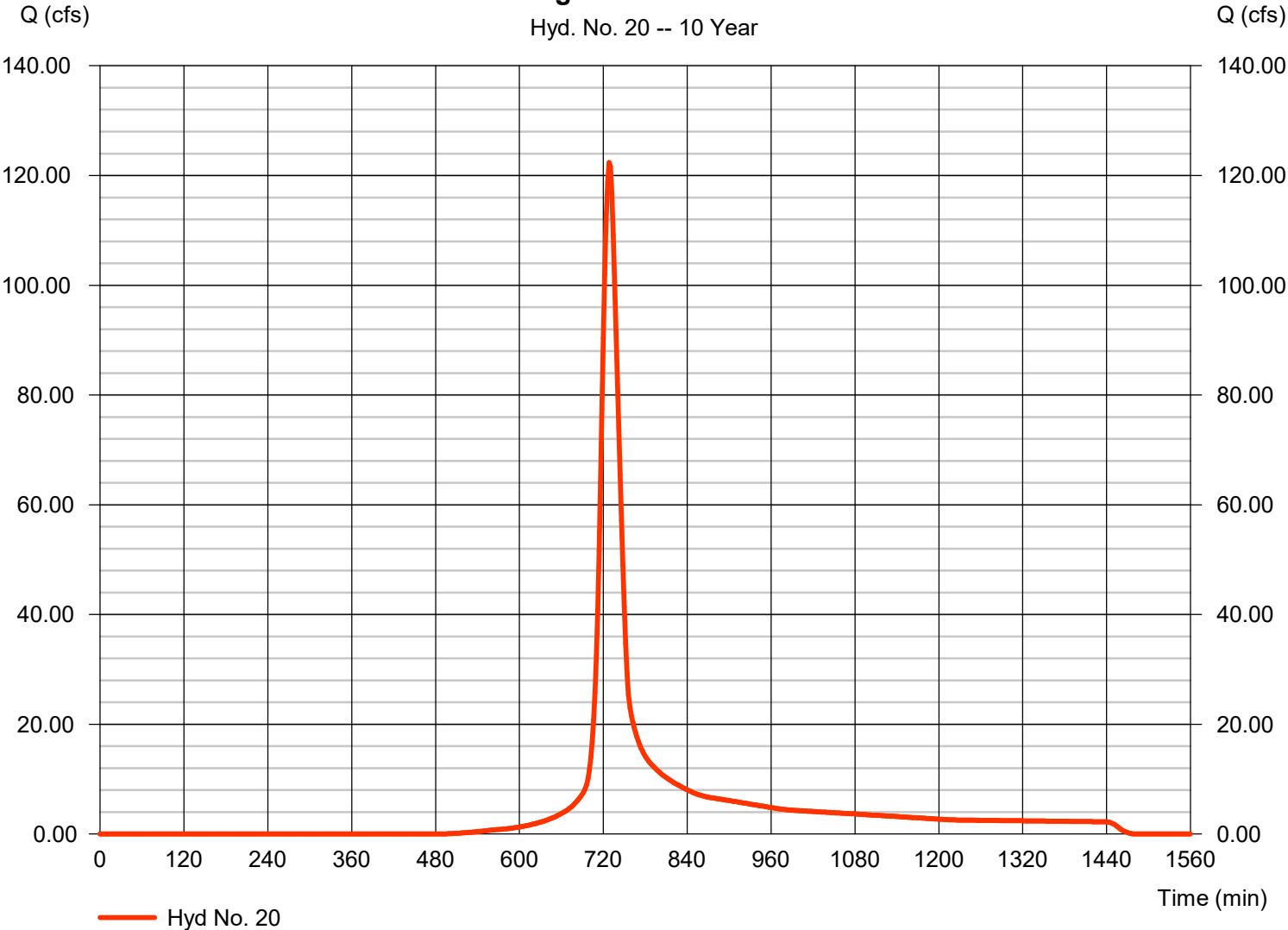
Hydrograph Report

Hyd. No. 20

Offsite Drainage Area #3 / POST OFFSITE

| | | | | | |
|-----------------|---|------------|--------------------|---|--------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 122.39 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 728 min |
| Time interval | = | 2 min | Hyd. volume | = | 450,129 cuft |
| Drainage area | = | 47.420 ac | Curve number | = | 77 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 25.00 min |
| Total precip. | = | 5.04 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

Offsite Drainage Area #3 / POST OFFSITE



Hydrograph Report

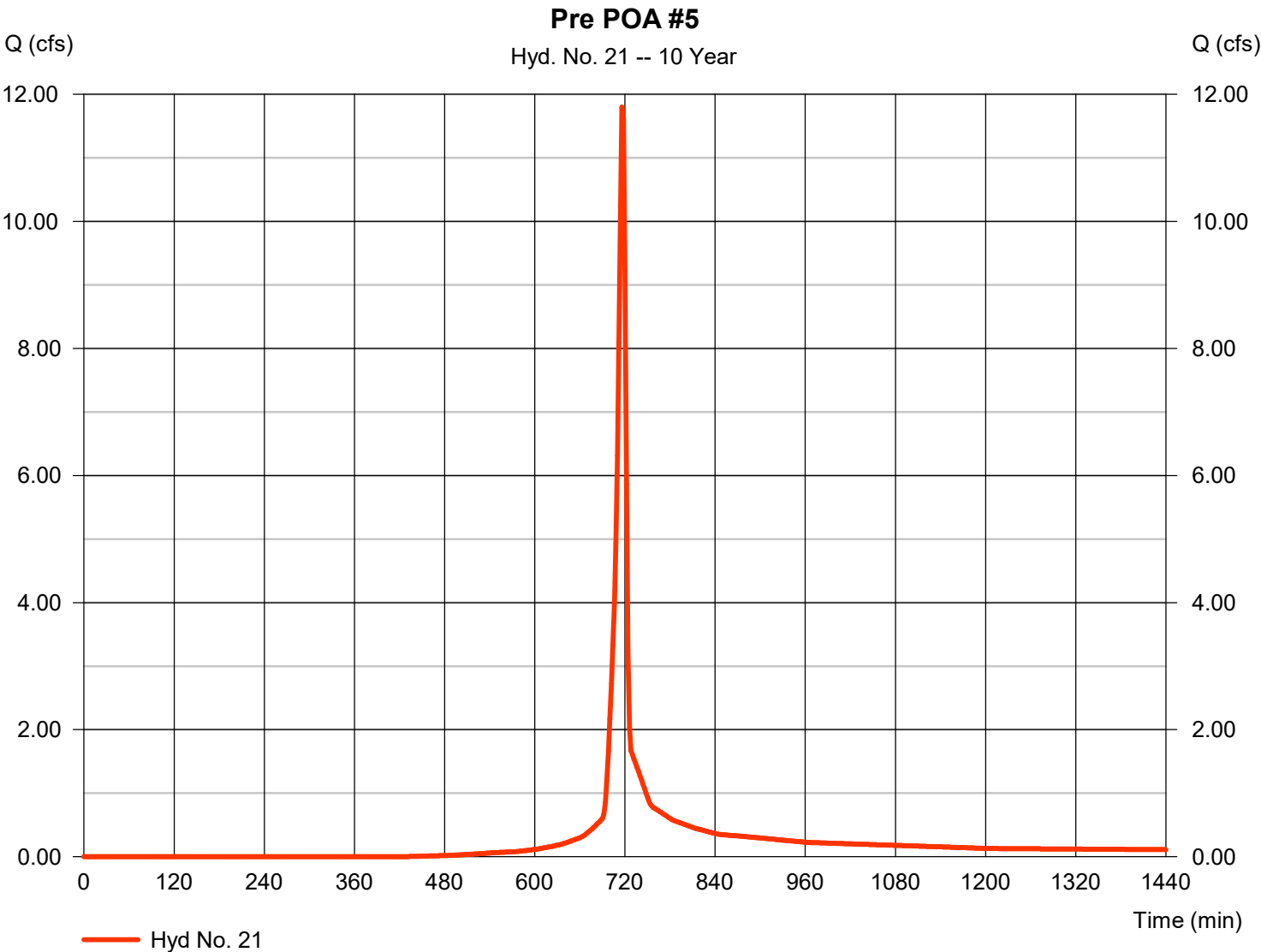
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Friday, 10 / 6 / 2023

Hyd. No. 21

Pre POA #5

| | | | | | |
|-----------------|---|------------|--------------------|---|-------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 11.80 cfs |
| Storm frequency | = | 10 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 24,012 cuft |
| Drainage area | = | 2.410 ac | Curve number | = | 80 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 4.50 min |
| Total precip. | = | 5.04 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



Hydrograph Report

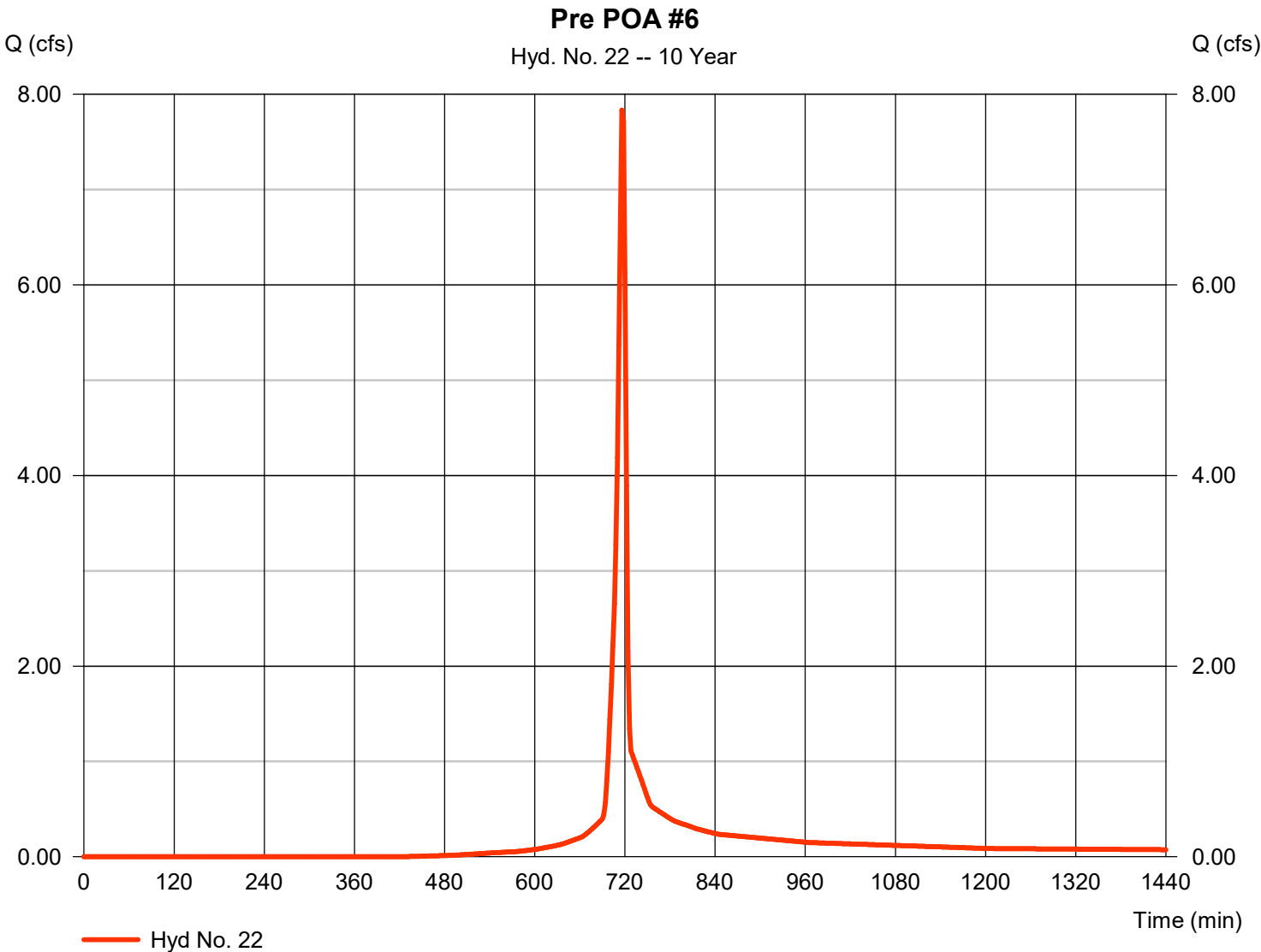
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Friday, 10 / 6 / 2023

Hyd. No. 22

Pre POA #6

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 7.835 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 15,942 cuft |
| Drainage area | = 1.600 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 4.20 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

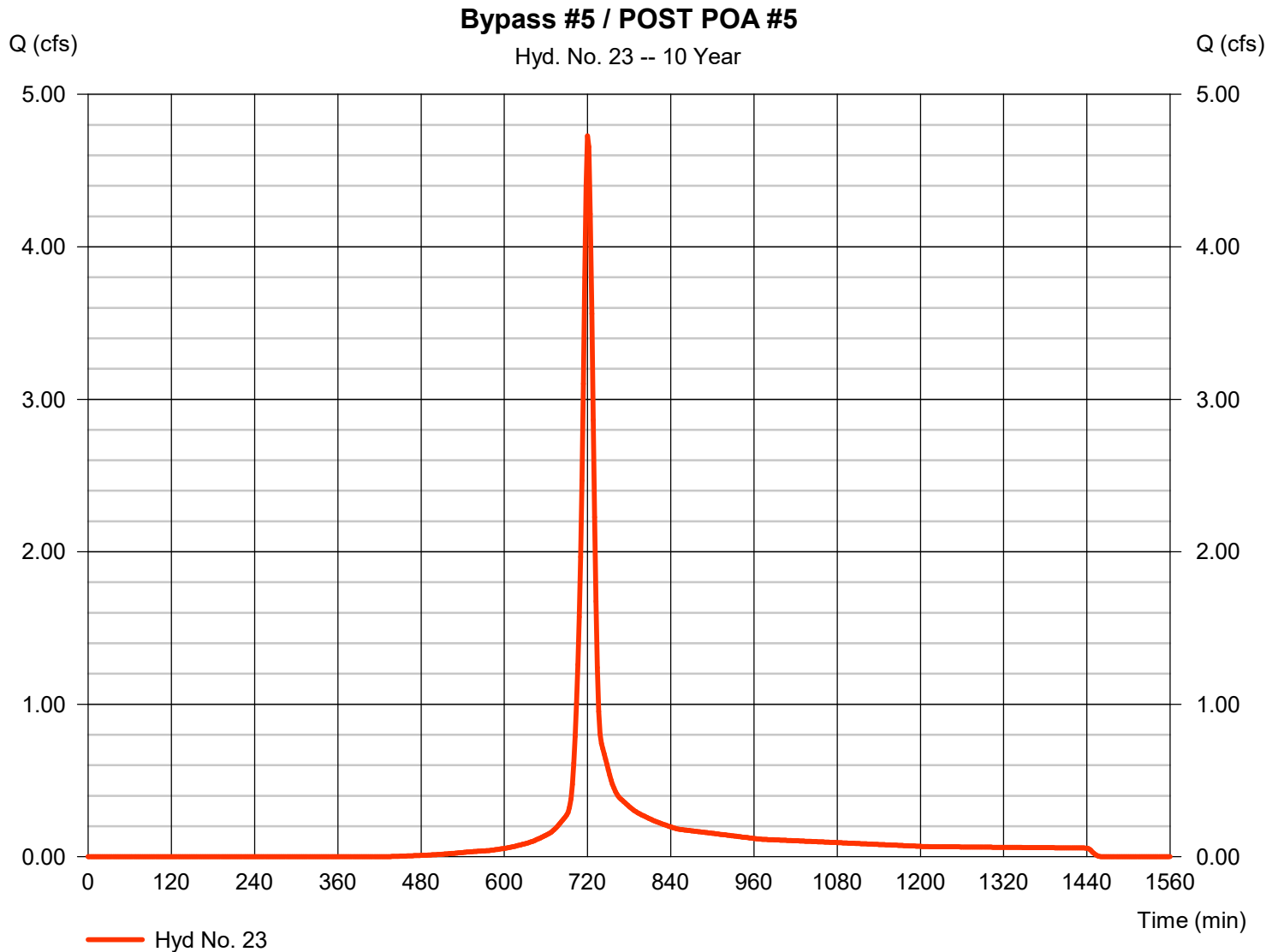
Friday, 10 / 6 / 2023

Hyd. No. 23

Bypass #5 / POST POA #5

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 2 min
 Drainage area = 1.120 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 5.04 in
 Storm duration = 24 hrs

Peak discharge = 4.727 cfs
 Time to peak = 720 min
 Hyd. volume = 12,275 cuft
 Curve number = 80
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

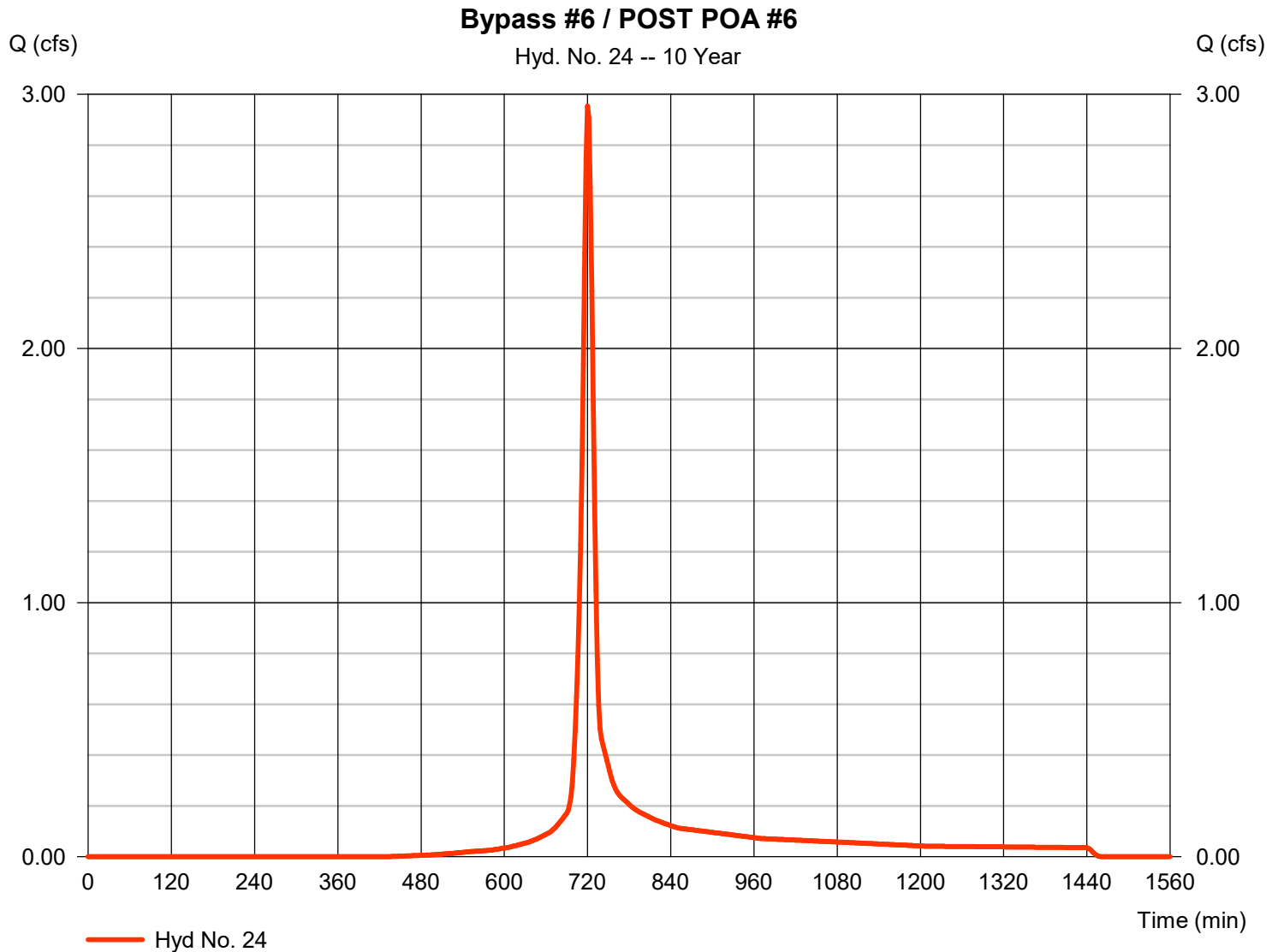
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Friday, 10 / 6 / 2023

Hyd. No. 24

Bypass #6 / POST POA #6

| | | | |
|-----------------|--------------|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 2.955 cfs |
| Storm frequency | = 10 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 7,672 cuft |
| Drainage area | = 0.700 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 5.04 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

| 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 | 214.69 | 2 | 716 | 433,460 | ----- | ----- | ----- | Pre POA #3 |
| 2 | SCS Runoff | 85.75 | 2 | 716 | 174,897 | ----- | ----- | ----- | Pre POA #2 |
| 3 | SCS Runoff | 112.37 | 2 | 718 | 258,530 | ----- | ----- | ----- | Pre POA #1 |
| 4 | SCS Runoff | 57.66 | 2 | 720 | 150,142 | ----- | ----- | ----- | Bypass #1 |
| 5 | SCS Runoff | 9.838 | 2 | 720 | 25,621 | ----- | ----- | ----- | Bypass #2 |
| 6 | SCS Runoff | 117.64 | 2 | 720 | 306,345 | ----- | ----- | ----- | Bypass #3 |
| 7 | SCS Runoff | 58.14 | 2 | 720 | 155,909 | ----- | ----- | ----- | Post DA #1 |
| 8 | SCS Runoff | 127.44 | 2 | 720 | 341,748 | ----- | ----- | ----- | Post DA #2 |
| 9 | SCS Runoff | 74.71 | 2 | 720 | 201,566 | ----- | ----- | ----- | Post DA #3A |
| 10 | SCS Runoff | 60.03 | 2 | 720 | 160,112 | ----- | ----- | ----- | Post DA #3B |
| 11 | Reservoir | 44.96 | 2 | 726 | 136,007 | 7 | 388.61 | 59,411 | SCM 1 ROUTE |
| 12 | Reservoir | 77.06 | 2 | 728 | 300,387 | 8 | 356.37 | 151,943 | SCM 2 ROUTE |
| 13 | Reservoir | 63.26 | 2 | 724 | 169,608 | 9 | 388.69 | 73,705 | SCM 3A ROUTE |
| 14 | Reservoir | 28.75 | 2 | 730 | 142,037 | 10 | 384.40 | 73,176 | SCM 3B ROUTE |
| 15 | Combine | 94.86 | 2 | 724 | 286,149 | 4, 11, | ----- | ----- | Post POA #1 |
| 16 | Combine | 82.97 | 2 | 728 | 326,007 | 5, 12, | ----- | ----- | Post POA #2 |
| 17 | Combine | 187.24 | 2 | 722 | 617,990 | 6, 13, 14, | ----- | ----- | Post POA #3 |
| 18 | SCS Runoff | 31.12 | 1 | 715 | 55,883 | ----- | ----- | ----- | Pre POA #4 |
| 19 | SCS Runoff | 4.177 | 2 | 720 | 10,899 | ----- | ----- | ----- | Bypass #4 / POST POA #4 |
| 20 | SCS Runoff | 160.69 | 2 | 728 | 589,512 | ----- | ----- | ----- | Offsite Drainage Area #3 / POST OFF |
| 21 | SCS Runoff | 15.11 | 2 | 716 | 31,012 | ----- | ----- | ----- | Pre POA #5 |
| 22 | SCS Runoff | 10.03 | 2 | 716 | 20,589 | ----- | ----- | ----- | Pre POA #6 |
| 23 | SCS Runoff | 6.075 | 2 | 720 | 15,853 | ----- | ----- | ----- | Bypass #5 / POST POA #5 |
| 24 | SCS Runoff | 3.797 | 2 | 720 | 9,908 | ----- | ----- | ----- | Bypass #6 / POST POA #6 |
| SCMs.gpw | | | | | Return Period: 25 Year | | | Friday, 10 / 6 / 2023 | |

Hydrograph Report

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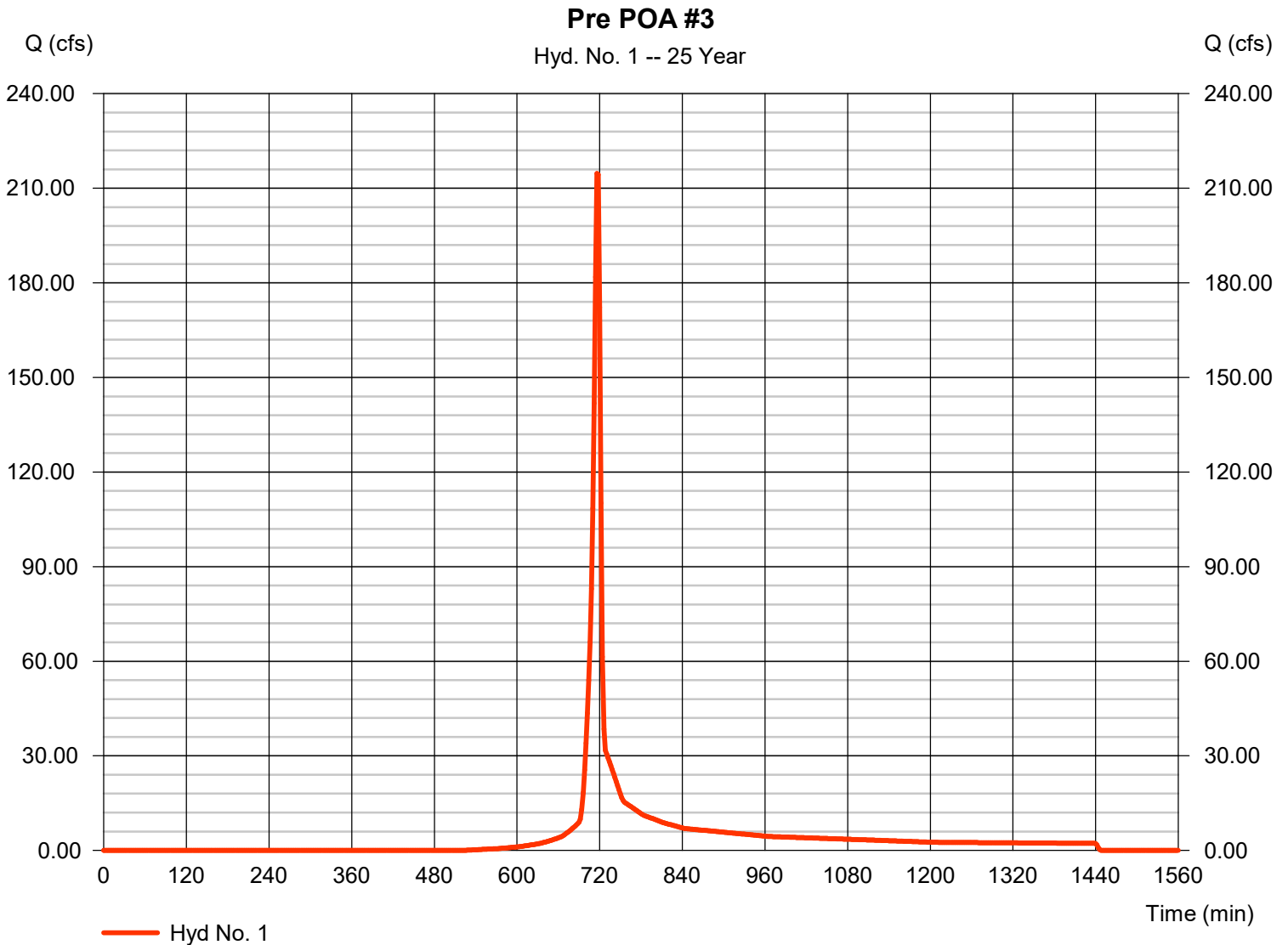
Friday, 10 / 6 / 2023

Hyd. No. 1

Pre POA #3

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 43.940 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.00 in
 Storm duration = 24 hrs

Peak discharge = 214.69 cfs
 Time to peak = 716 min
 Hyd. volume = 433,460 cuft
 Curve number = 71
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 3.10 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

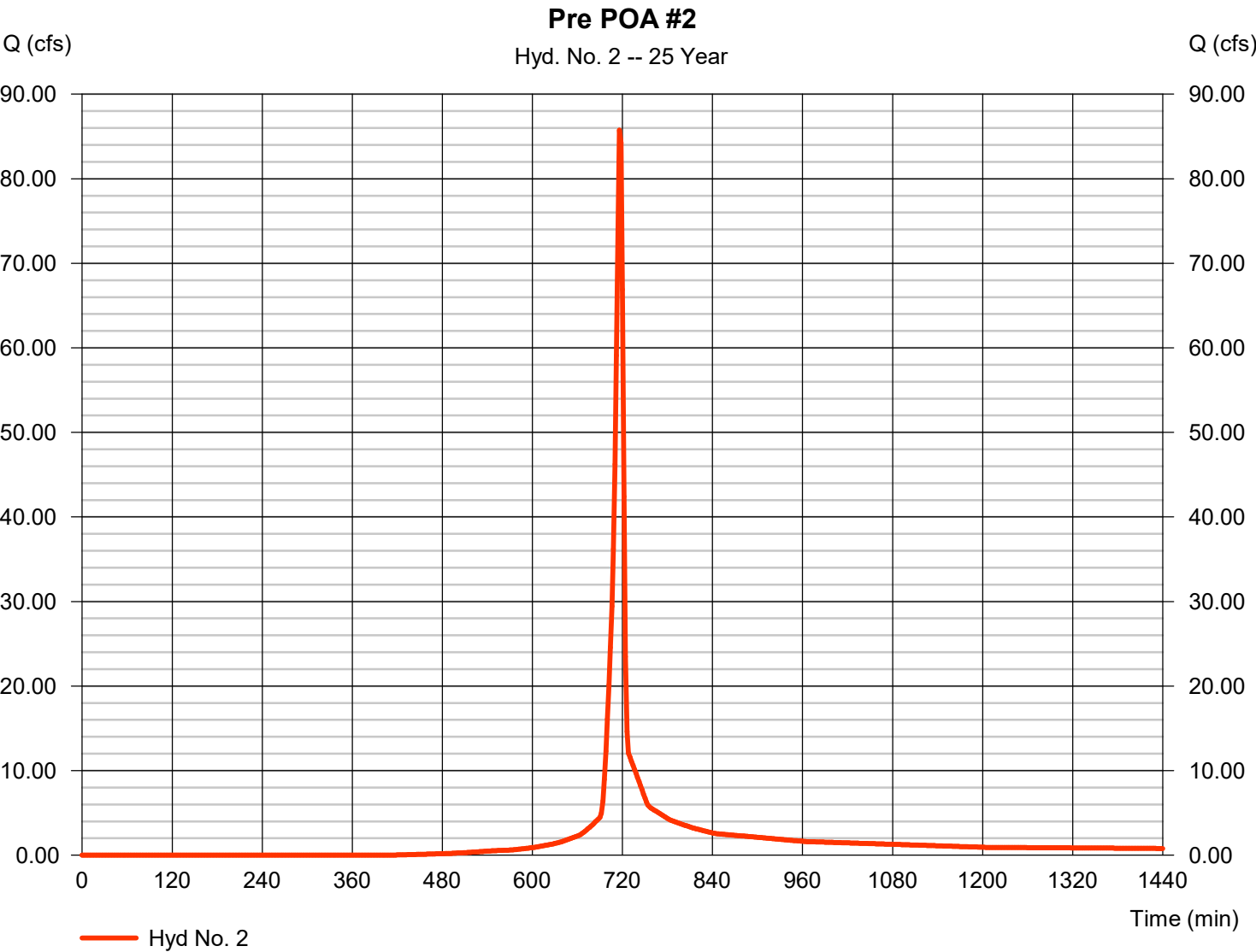
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Friday, 10 / 6 / 2023

Hyd. No. 2

Pre POA #2

| | | | | | |
|-----------------|---|------------|--------------------|---|--------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 85.75 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 716 min |
| Time interval | = | 2 min | Hyd. volume | = | 174,897 cuft |
| Drainage area | = | 14.360 ac | Curve number | = | 78 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 5.60 min |
| Total precip. | = | 6.00 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |

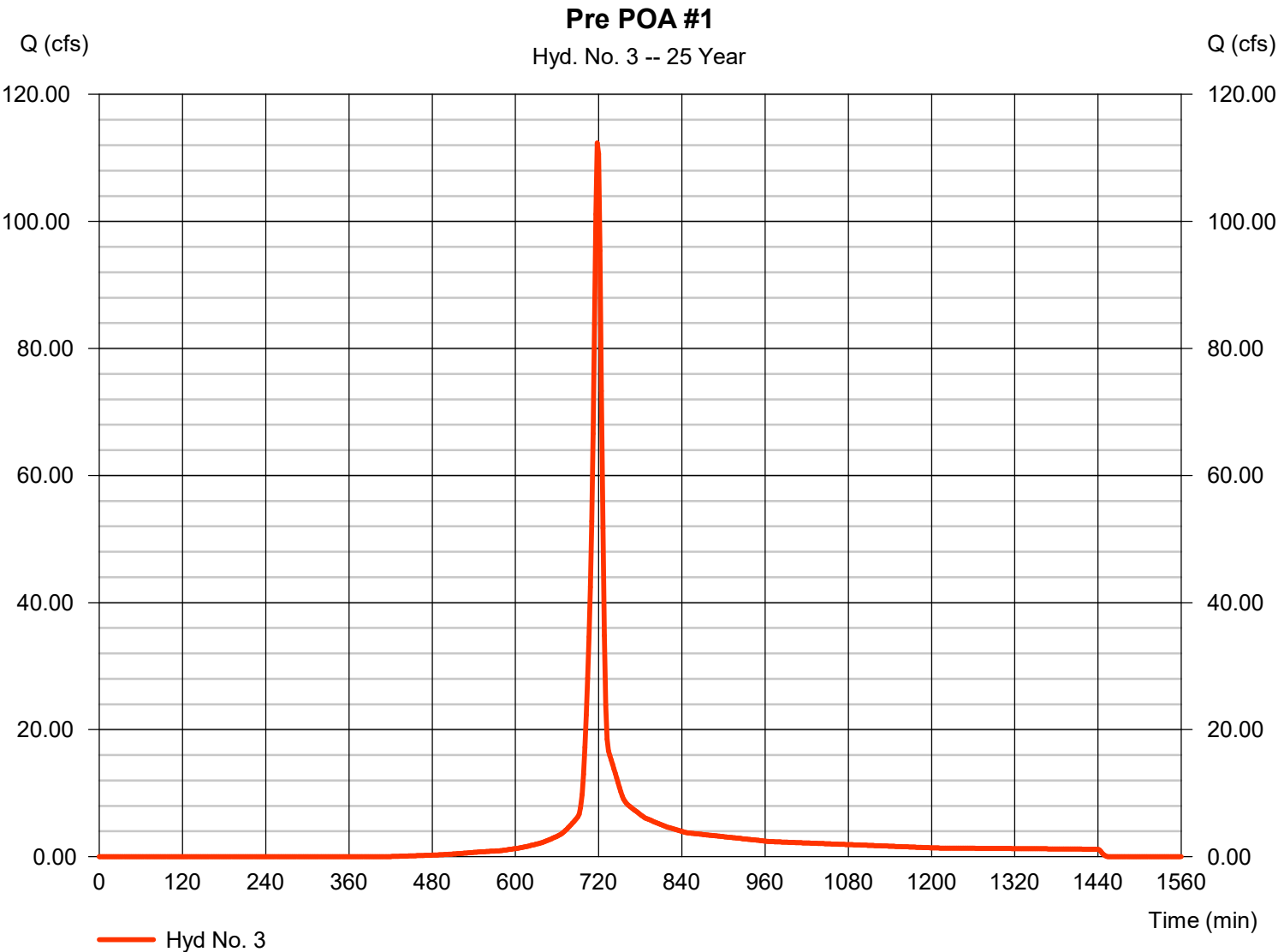


Hydrograph Report

Hyd. No. 3

Pre POA #1

| | | | | | |
|-----------------|---|------------|--------------------|---|--------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 112.37 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 718 min |
| Time interval | = | 2 min | Hyd. volume | = | 258,530 cuft |
| Drainage area | = | 19.900 ac | Curve number | = | 78 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | TR55 | Time of conc. (Tc) | = | 9.70 min |
| Total precip. | = | 6.00 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



Hydrograph Report

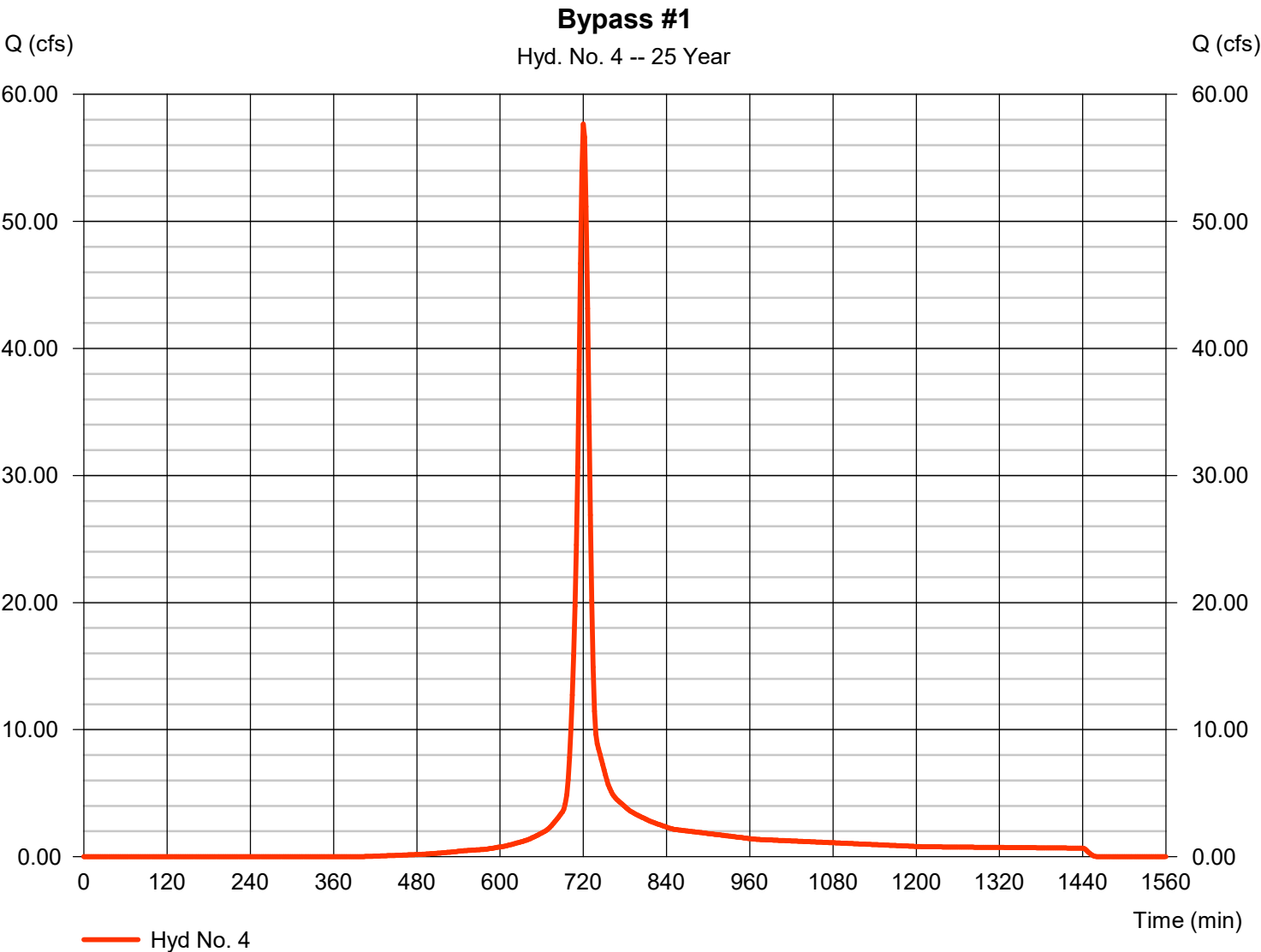
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Friday, 10 / 6 / 2023

Hyd. No. 4

Bypass #1

| | | | | | |
|-----------------|---|------------|--------------------|---|--------------|
| Hydrograph type | = | SCS Runoff | Peak discharge | = | 57.66 cfs |
| Storm frequency | = | 25 yrs | Time to peak | = | 720 min |
| Time interval | = | 2 min | Hyd. volume | = | 150,142 cuft |
| Drainage area | = | 10.900 ac | Curve number | = | 79 |
| Basin Slope | = | 0.0 % | Hydraulic length | = | 0 ft |
| Tc method | = | User | Time of conc. (Tc) | = | 10.00 min |
| Total precip. | = | 6.00 in | Distribution | = | Type II |
| Storm duration | = | 24 hrs | Shape factor | = | 484 |



Hydrograph Report

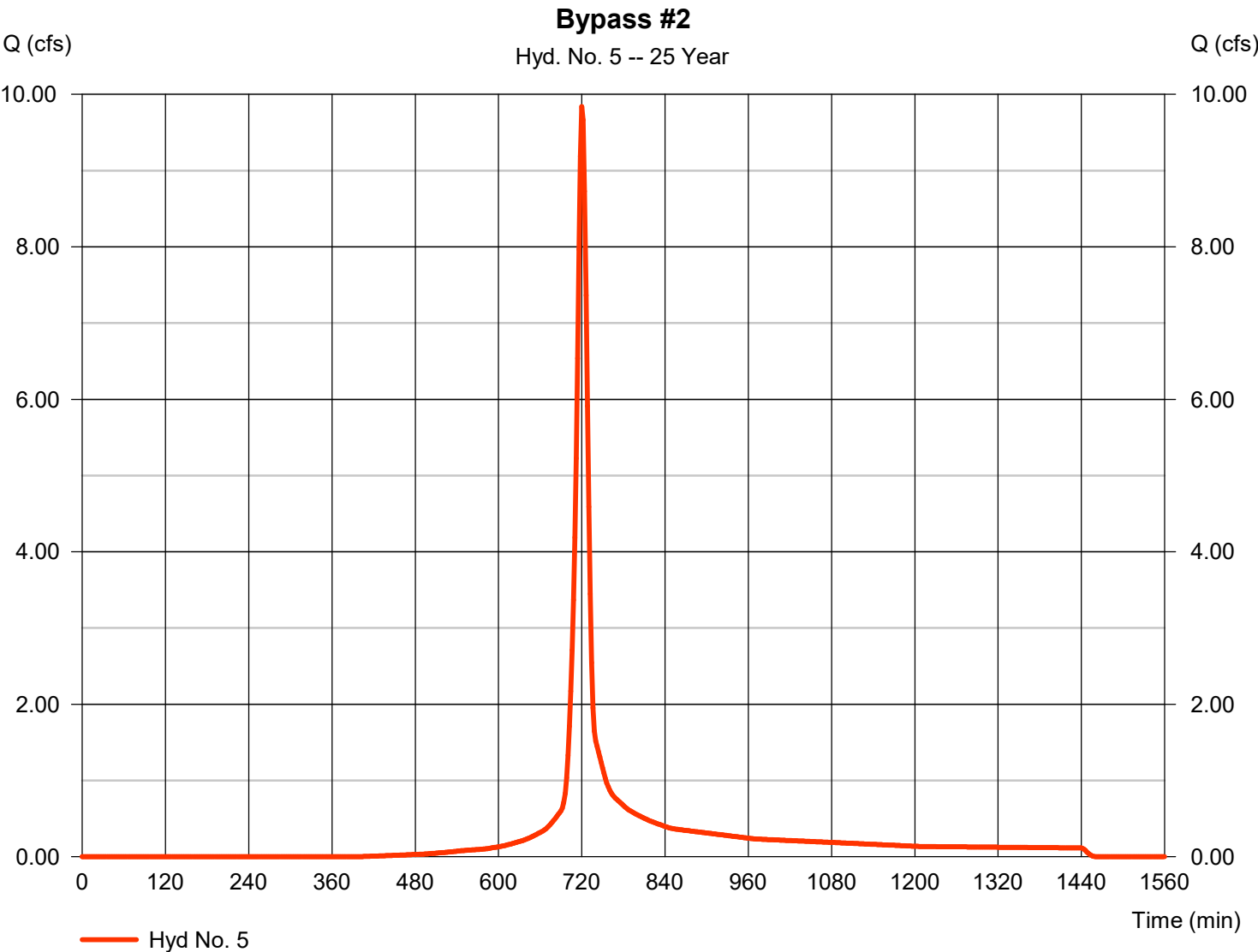
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 5

Bypass #2

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 9.838 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 25,621 cuft |
| Drainage area | = 1.860 ac | Curve number | = 79 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

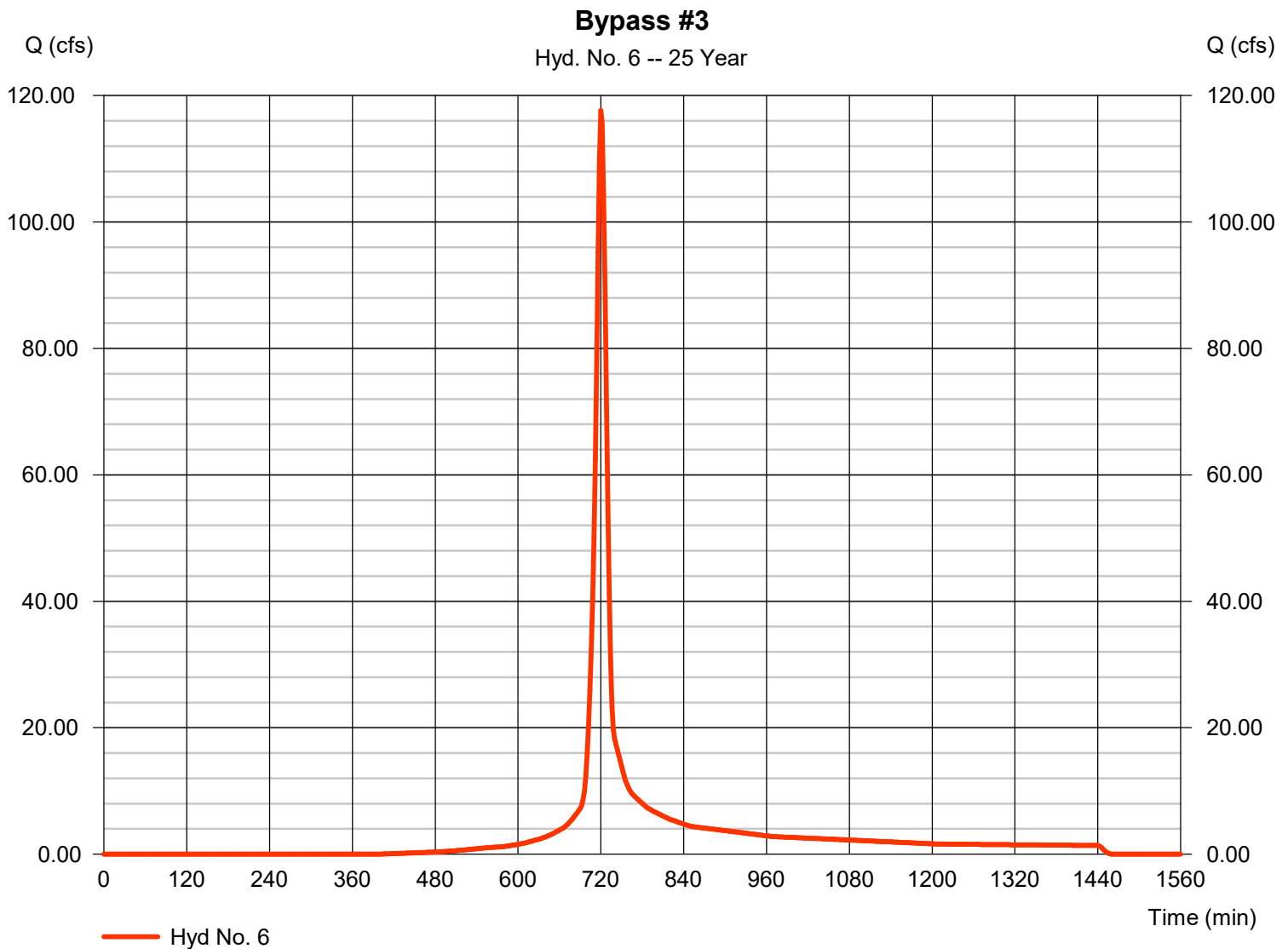
Friday, 10 / 6 / 2023

Hyd. No. 6

Bypass #3

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 22.240 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 6.00 in
 Storm duration = 24 hrs

Peak discharge = 117.64 cfs
 Time to peak = 720 min
 Hyd. volume = 306,345 cuft
 Curve number = 79
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

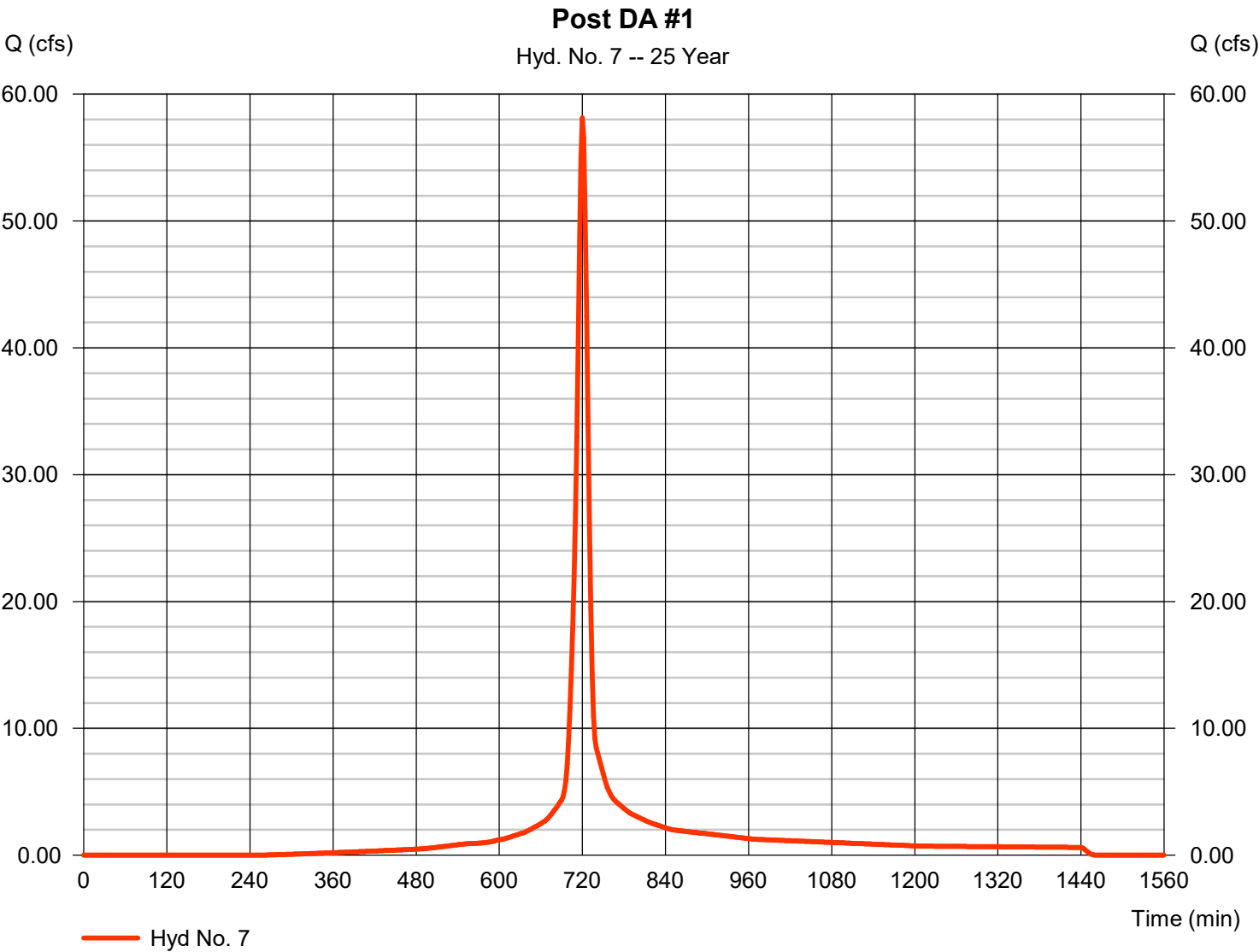
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 7

Post DA #1

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 58.14 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 155,909 cuft |
| Drainage area | = 9.220 ac | Curve number | = 87 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

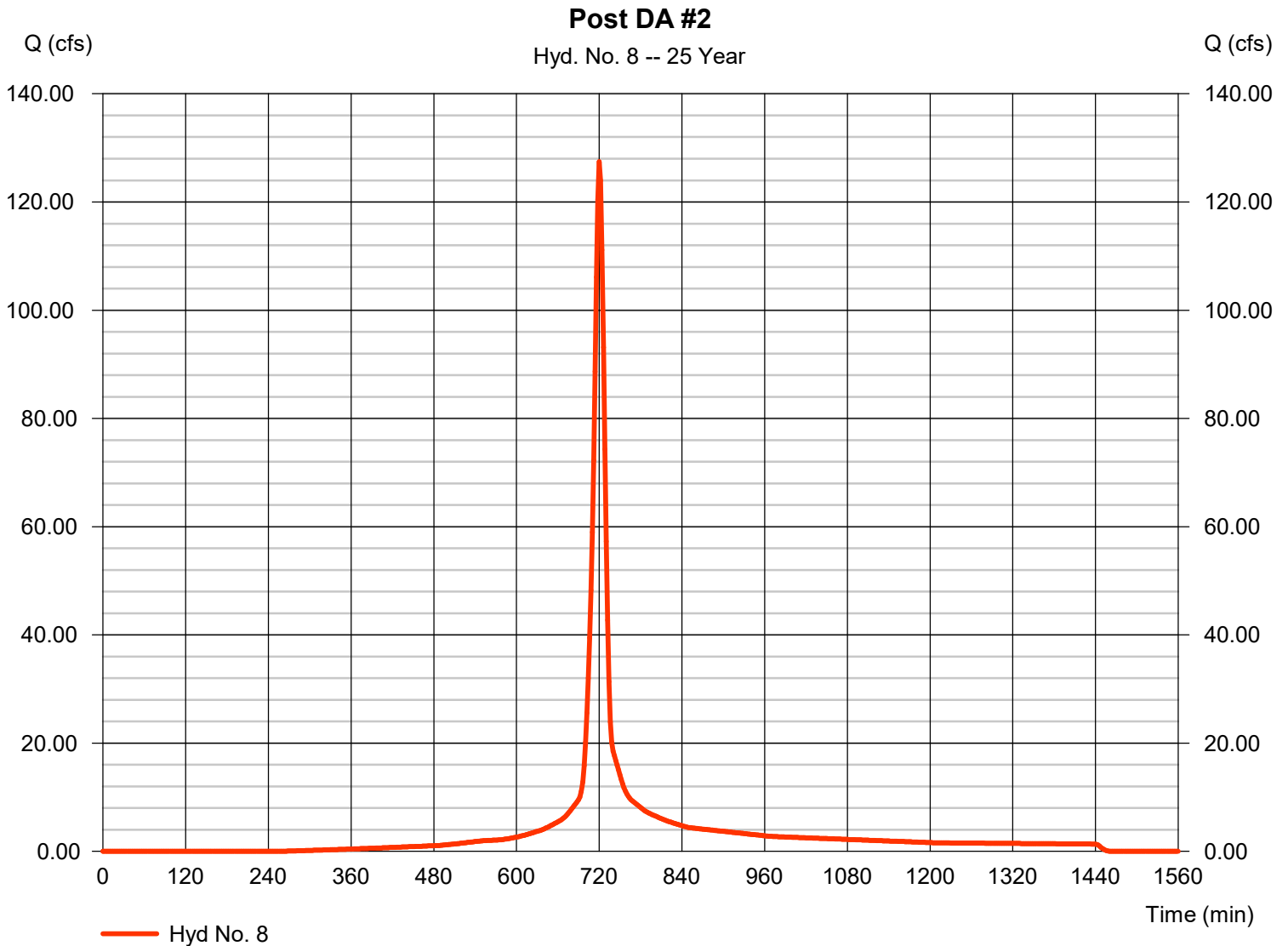
Friday, 10 / 6 / 2023

Hyd. No. 8

Post DA #2

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 20.210 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 6.00 in
 Storm duration = 24 hrs

Peak discharge = 127.44 cfs
 Time to peak = 720 min
 Hyd. volume = 341,748 cuft
 Curve number = 87
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

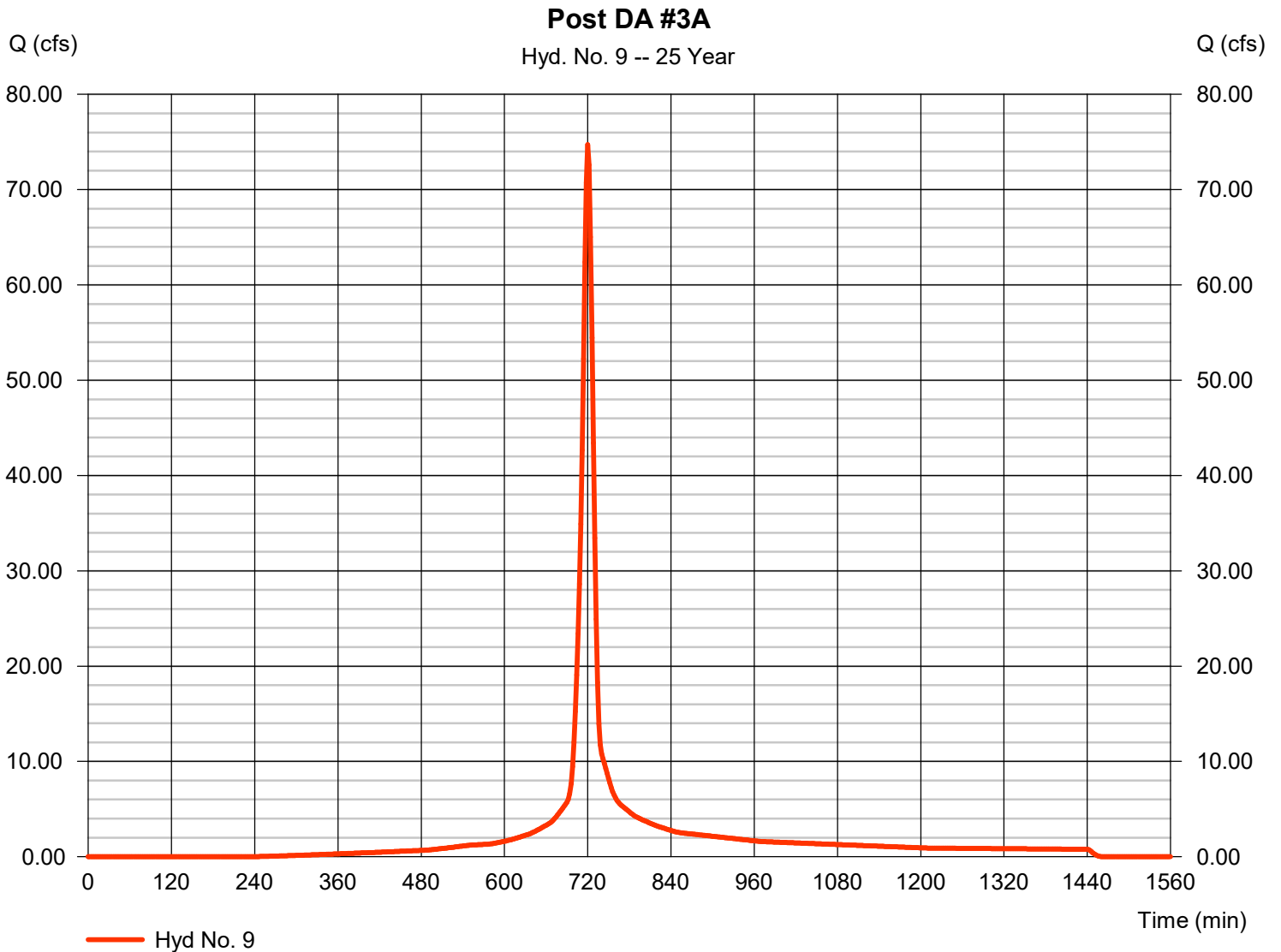
Friday, 10 / 6 / 2023

Hyd. No. 9

Post DA #3A

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 11.640 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 6.00 in
 Storm duration = 24 hrs

Peak discharge = 74.71 cfs
 Time to peak = 720 min
 Hyd. volume = 201,566 cuft
 Curve number = 88
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 10.00 min
 Distribution = Type II
 Shape factor = 484



Hydrograph Report

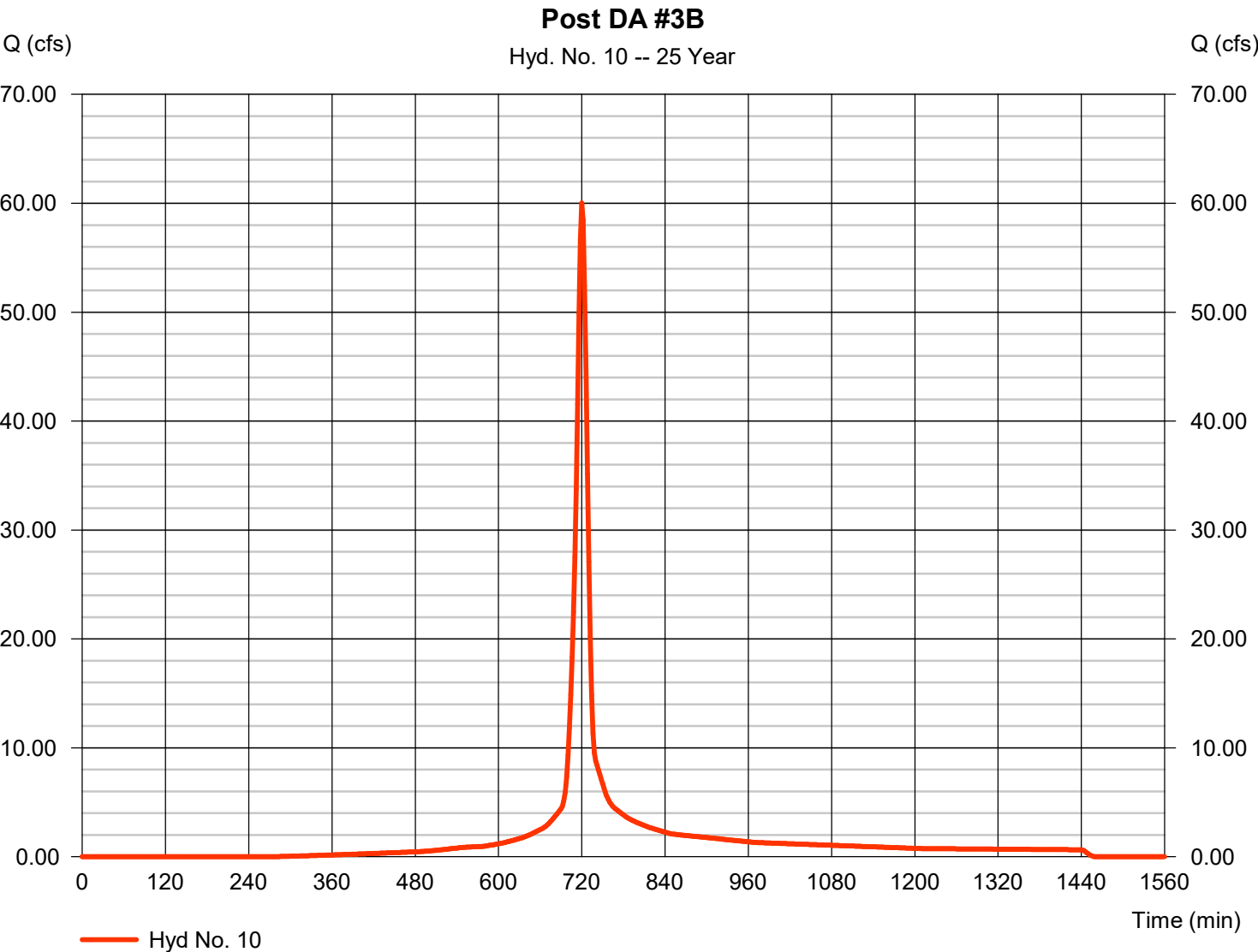
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Friday, 10 / 6 / 2023

Hyd. No. 10

Post DA #3B

| | | | |
|-----------------|--------------|--------------------|----------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 60.03 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 160,112 cuft |
| Drainage area | = 9.700 ac | Curve number | = 86 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

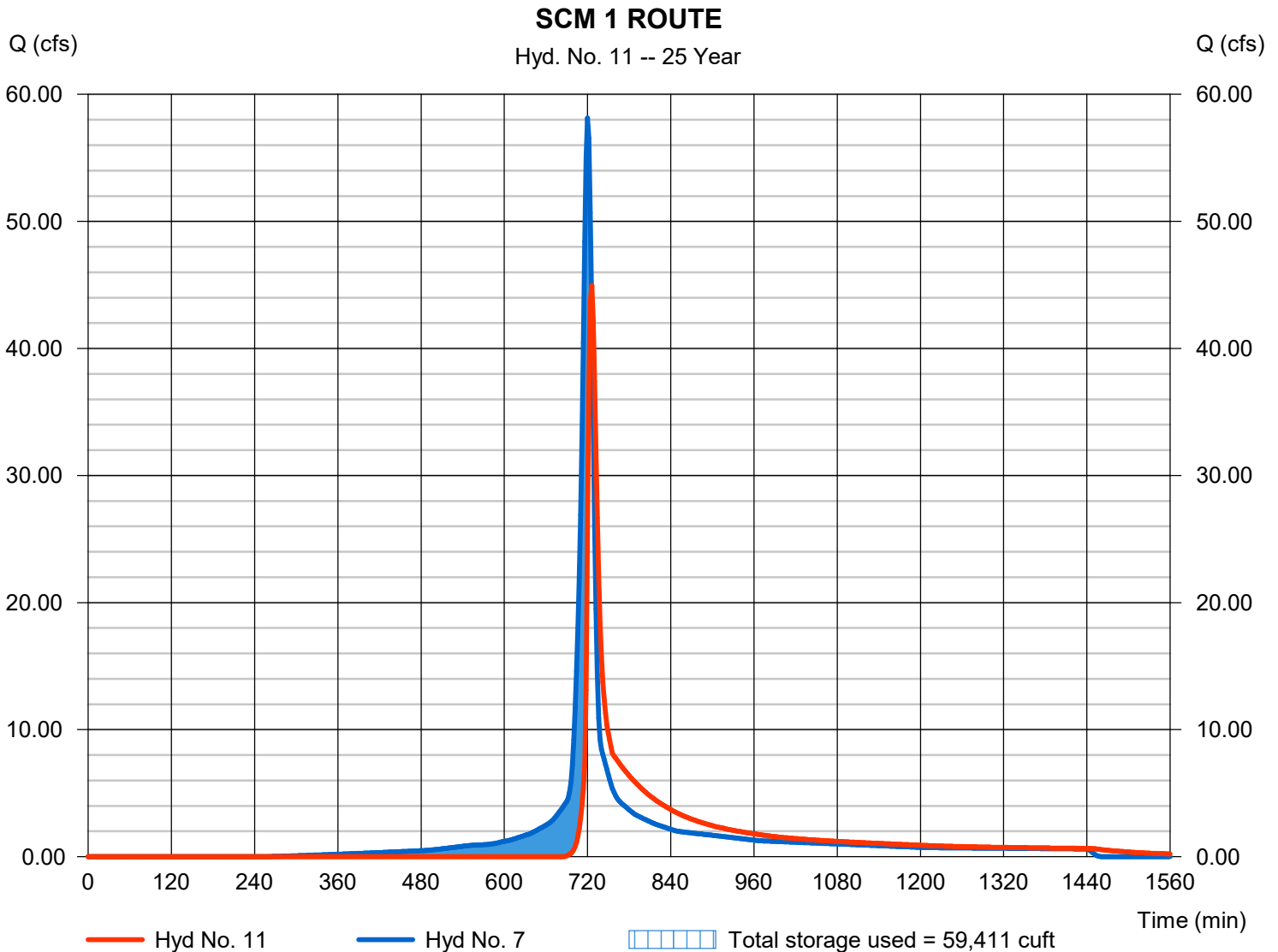
Hyd. No. 11

SCM 1 ROUTE

Hydrograph type = Reservoir
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyd. No. = 7 - Post DA #1
 Reservoir name = SCM 1

Peak discharge = 44.96 cfs
 Time to peak = 726 min
 Hyd. volume = 136,007 cuft
 Max. Elevation = 388.61 ft
 Max. Storage = 59,411 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

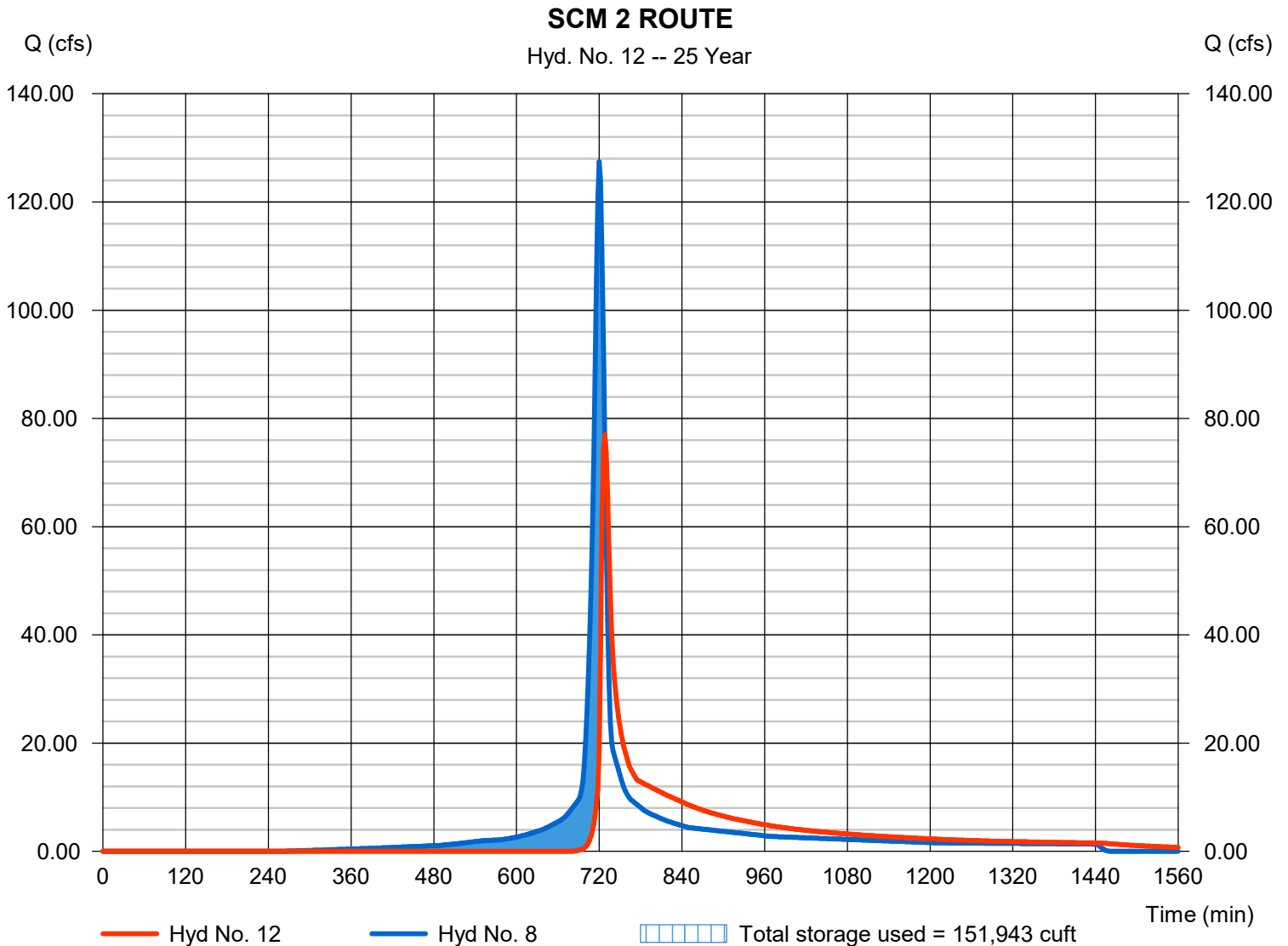
Hyd. No. 12

SCM 2 ROUTE

Hydrograph type = Reservoir
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyd. No. = 8 - Post DA #2
 Reservoir name = SCM 2

Peak discharge = 77.06 cfs
 Time to peak = 728 min
 Hyd. volume = 300,387 cuft
 Max. Elevation = 356.37 ft
 Max. Storage = 151,943 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

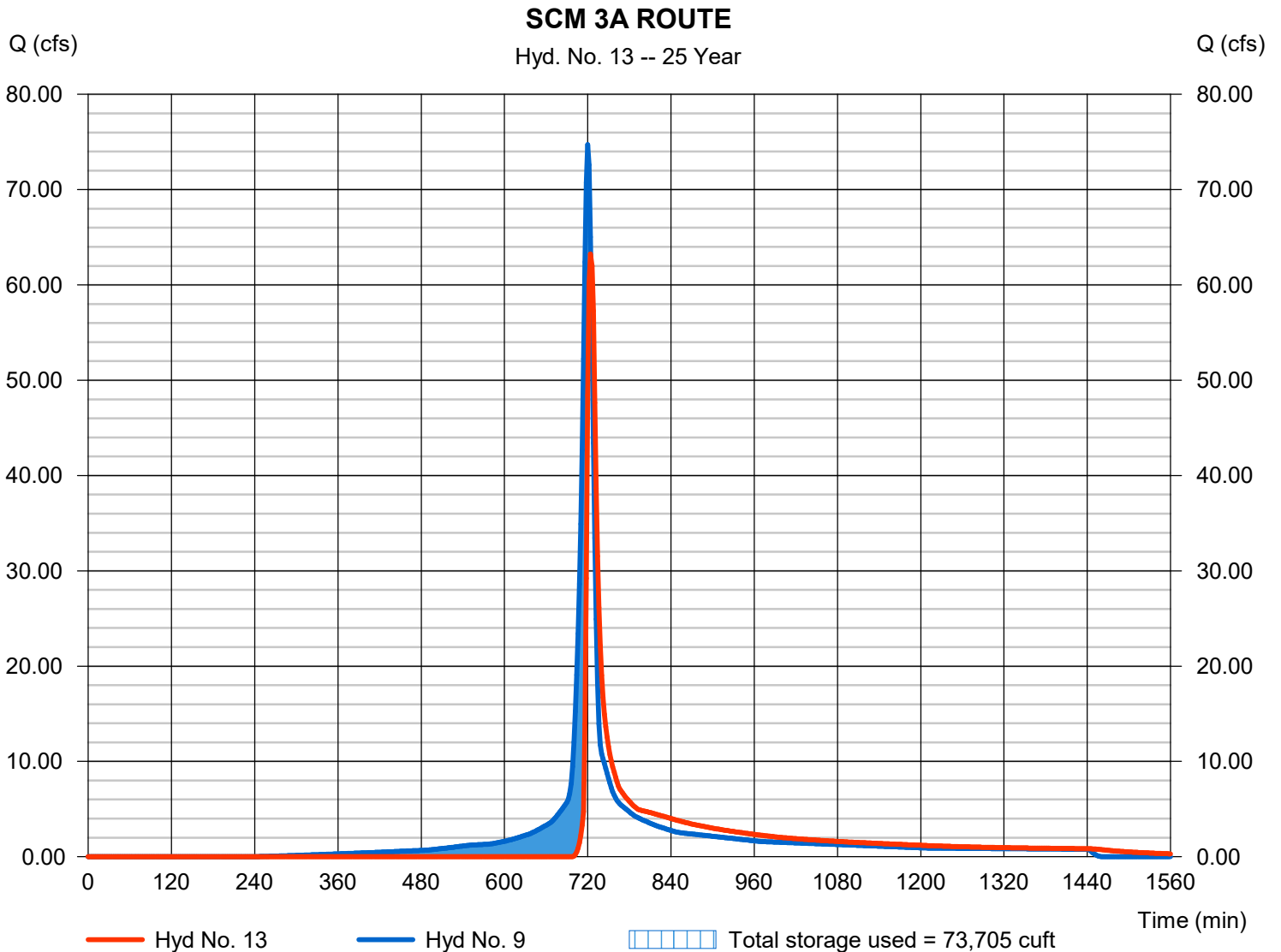
Hyd. No. 13

SCM 3A ROUTE

Hydrograph type = Reservoir
 Storm frequency = 25 yrs
 Time interval = 2 min
 Inflow hyd. No. = 9 - Post DA #3A
 Reservoir name = SCM 3A

Peak discharge = 63.26 cfs
 Time to peak = 724 min
 Hyd. volume = 169,608 cuft
 Max. Elevation = 388.69 ft
 Max. Storage = 73,705 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

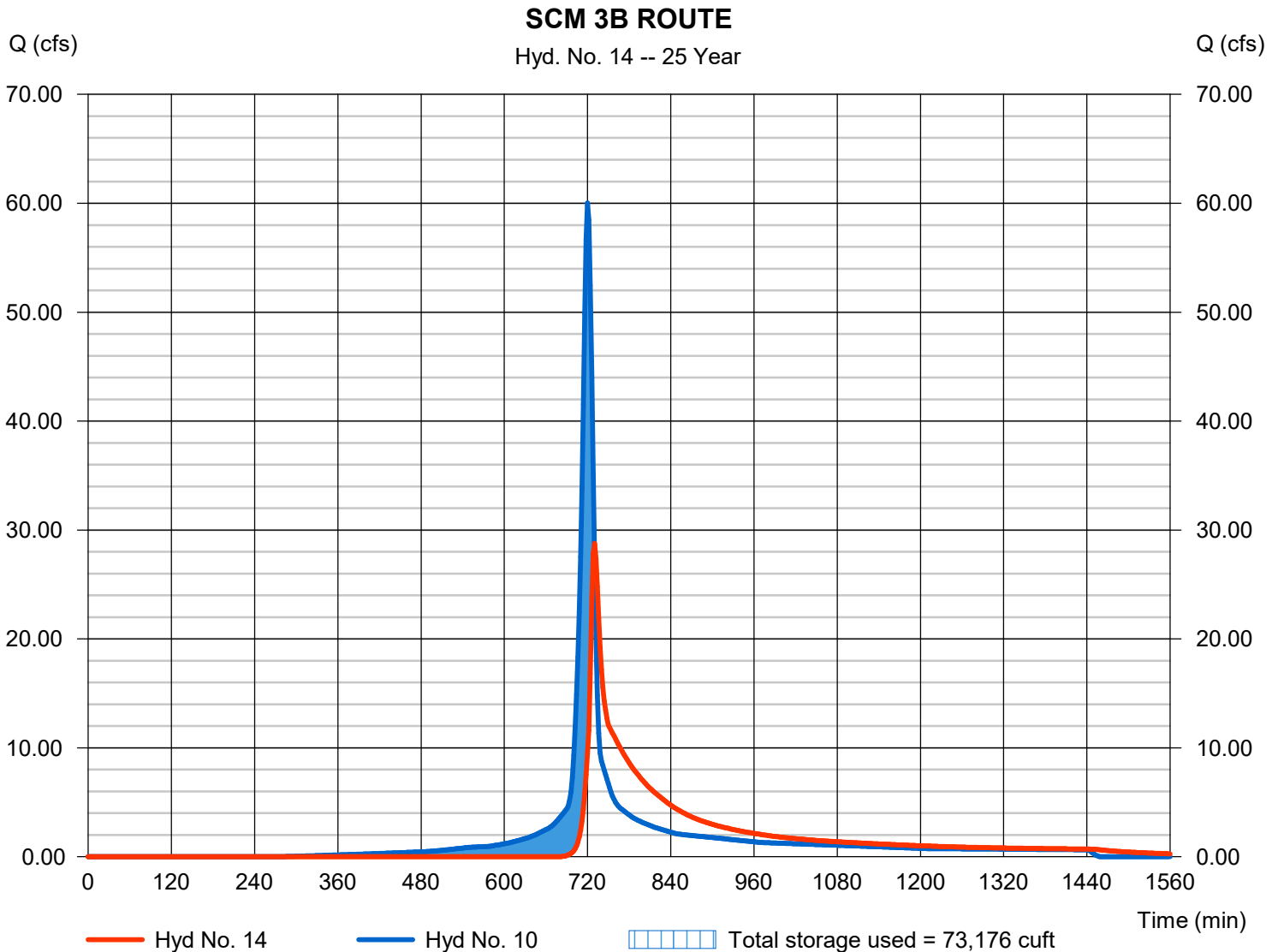
Friday, 10 / 6 / 2023

Hyd. No. 14

SCM 3B ROUTE

| | | | |
|-----------------|--------------------|----------------|----------------|
| Hydrograph type | = Reservoir | Peak discharge | = 28.75 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 730 min |
| Time interval | = 2 min | Hyd. volume | = 142,037 cuft |
| Inflow hyd. No. | = 10 - Post DA #3B | Max. Elevation | = 384.40 ft |
| Reservoir name | = SCM 3B | Max. Storage | = 73,176 cuft |

Storage Indication method used.

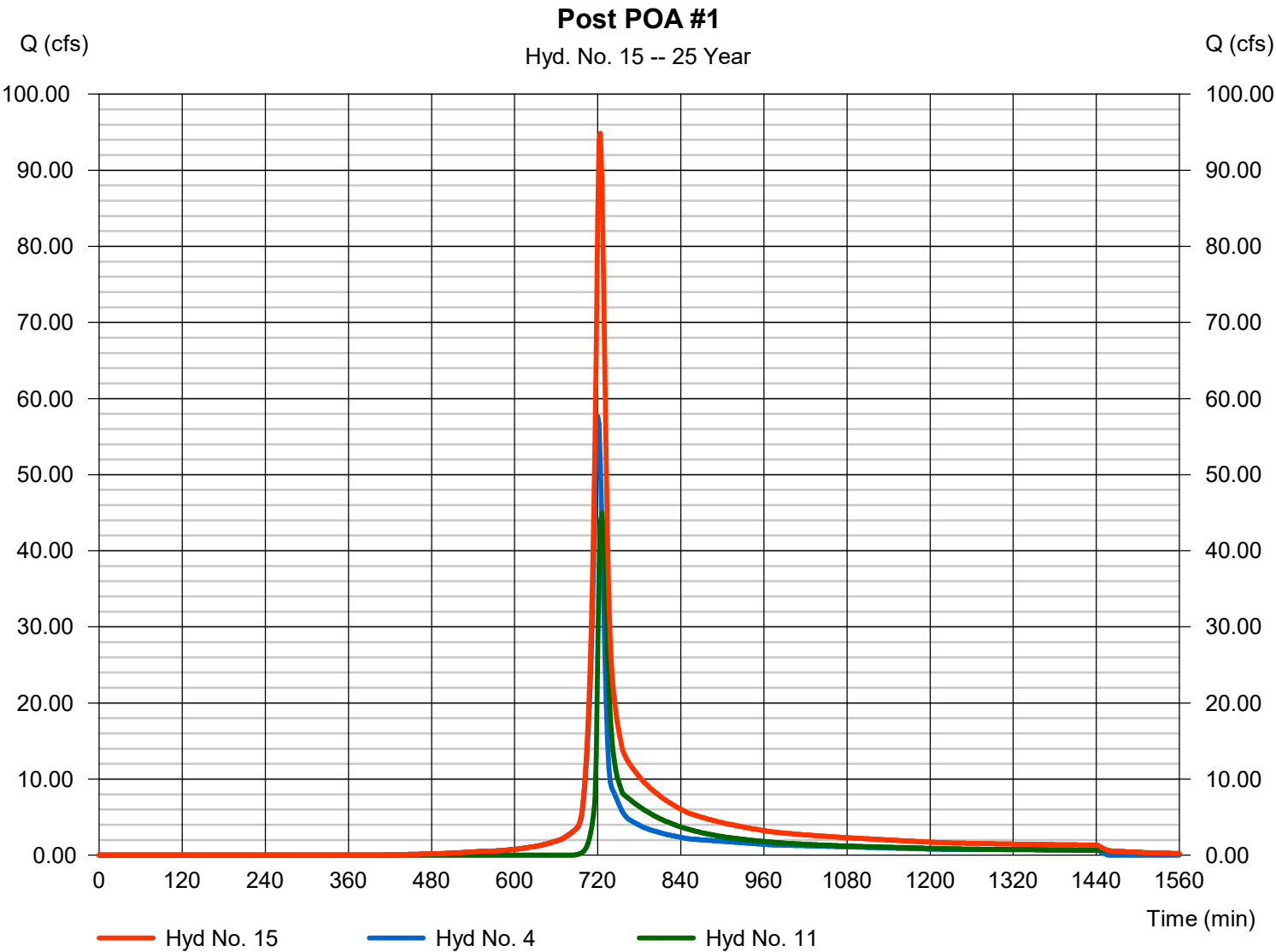


Hydrograph Report

Hyd. No. 15

Post POA #1

| | | | |
|-----------------|-----------|----------------------|----------------|
| Hydrograph type | = Combine | Peak discharge | = 94.86 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 724 min |
| Time interval | = 2 min | Hyd. volume | = 286,149 cuft |
| Inflow hyds. | = 4, 11 | Contrib. drain. area | = 10.900 ac |



Hydrograph Report

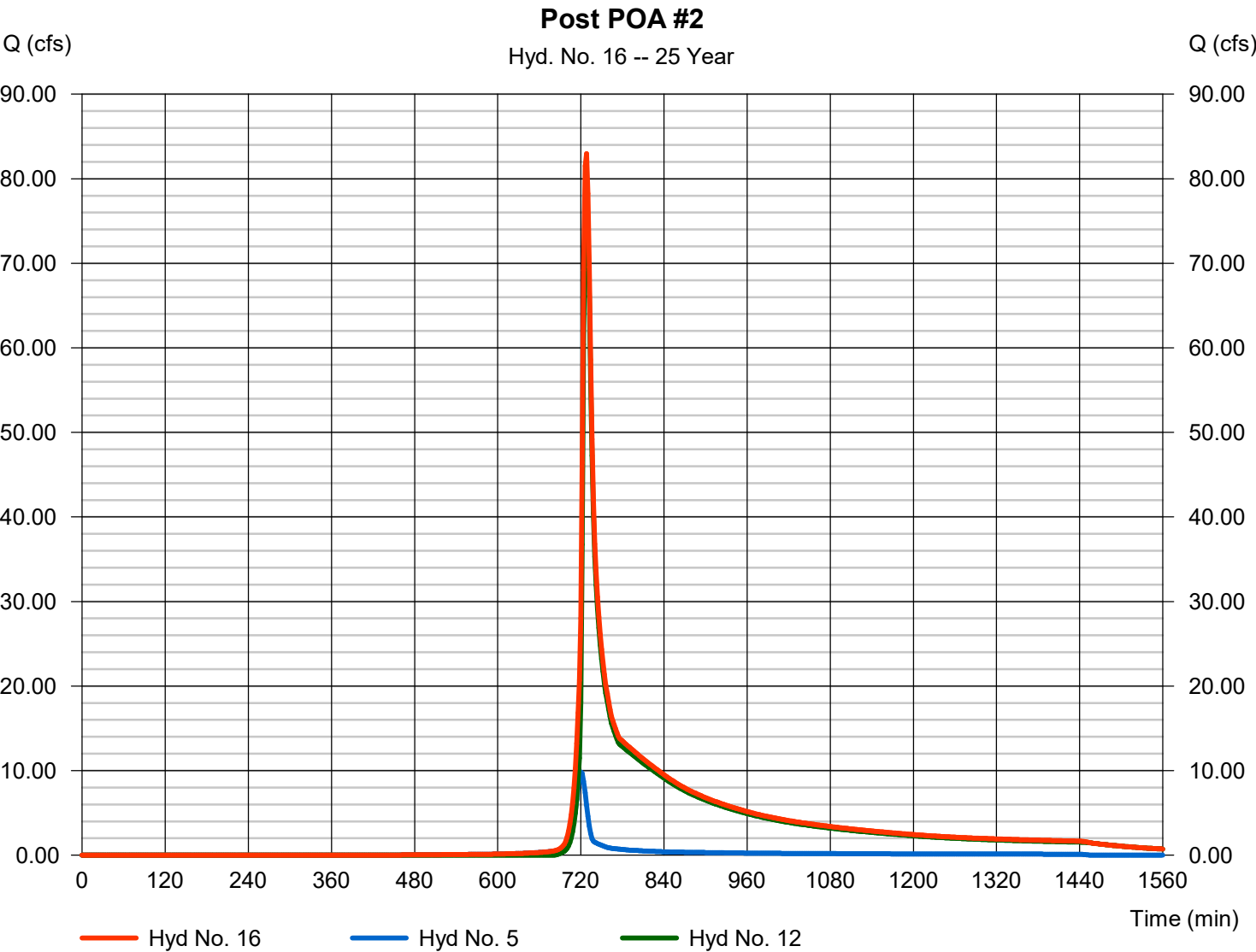
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 16

Post POA #2

| | | | |
|-----------------|-----------|----------------------|----------------|
| Hydrograph type | = Combine | Peak discharge | = 82.97 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 728 min |
| Time interval | = 2 min | Hyd. volume | = 326,007 cuft |
| Inflow hyds. | = 5, 12 | Contrib. drain. area | = 1.860 ac |



Hydrograph Report

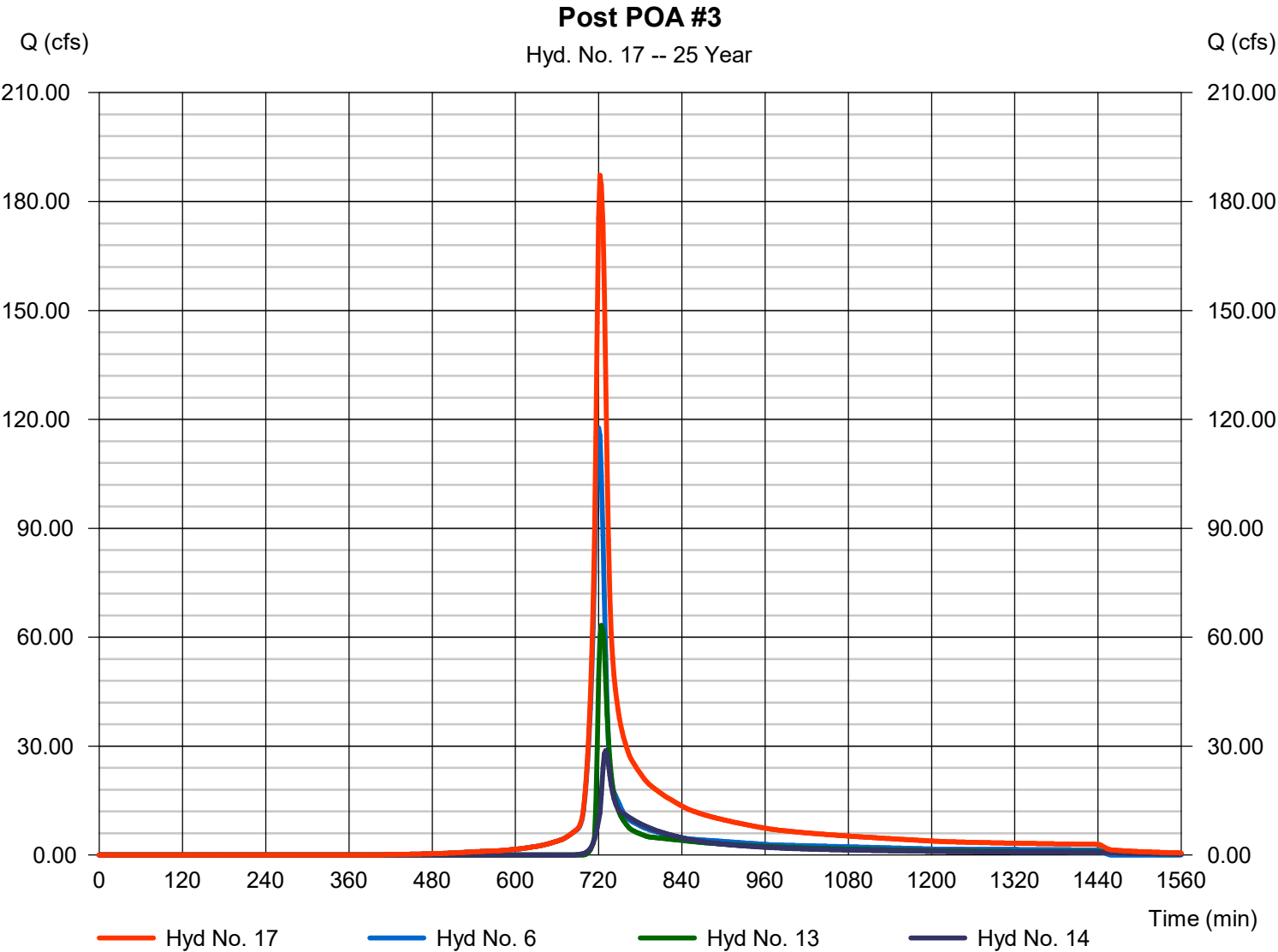
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Friday, 10 / 6 / 2023

Hyd. No. 17

Post POA #3

| | | | |
|-----------------|-------------|----------------------|----------------|
| Hydrograph type | = Combine | Peak discharge | = 187.24 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 722 min |
| Time interval | = 2 min | Hyd. volume | = 617,990 cuft |
| Inflow hyds. | = 6, 13, 14 | Contrib. drain. area | = 22.240 ac |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

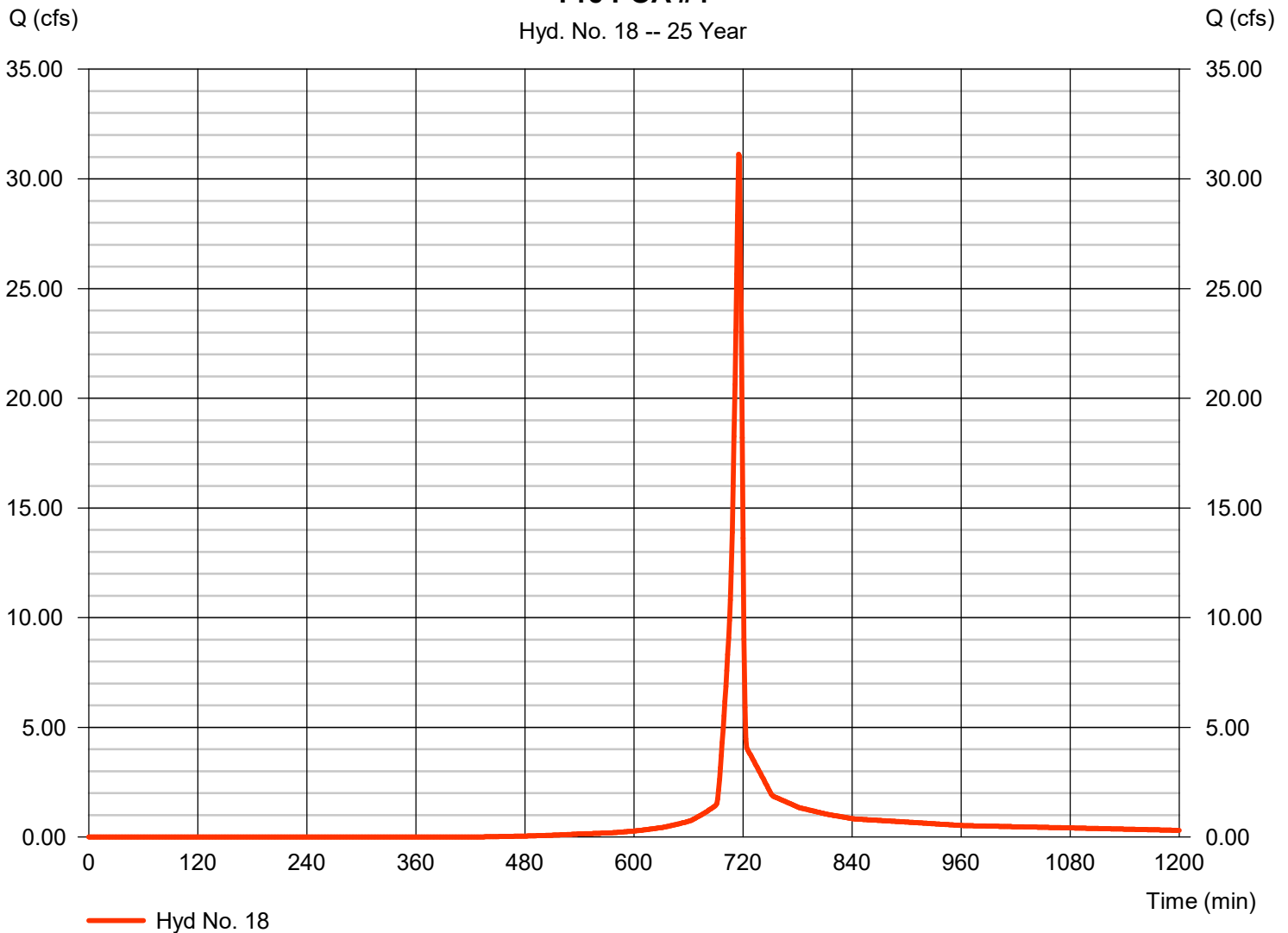
Hyd. No. 18

Pre POA #4

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 31.12 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 715 min |
| Time interval | = 1 min | Hyd. volume | = 55,883 cuft |
| Drainage area | = 4.720 ac | Curve number | = 77 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 2.10 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |

Pre POA #4

Hyd. No. 18 -- 25 Year



Hydrograph Report

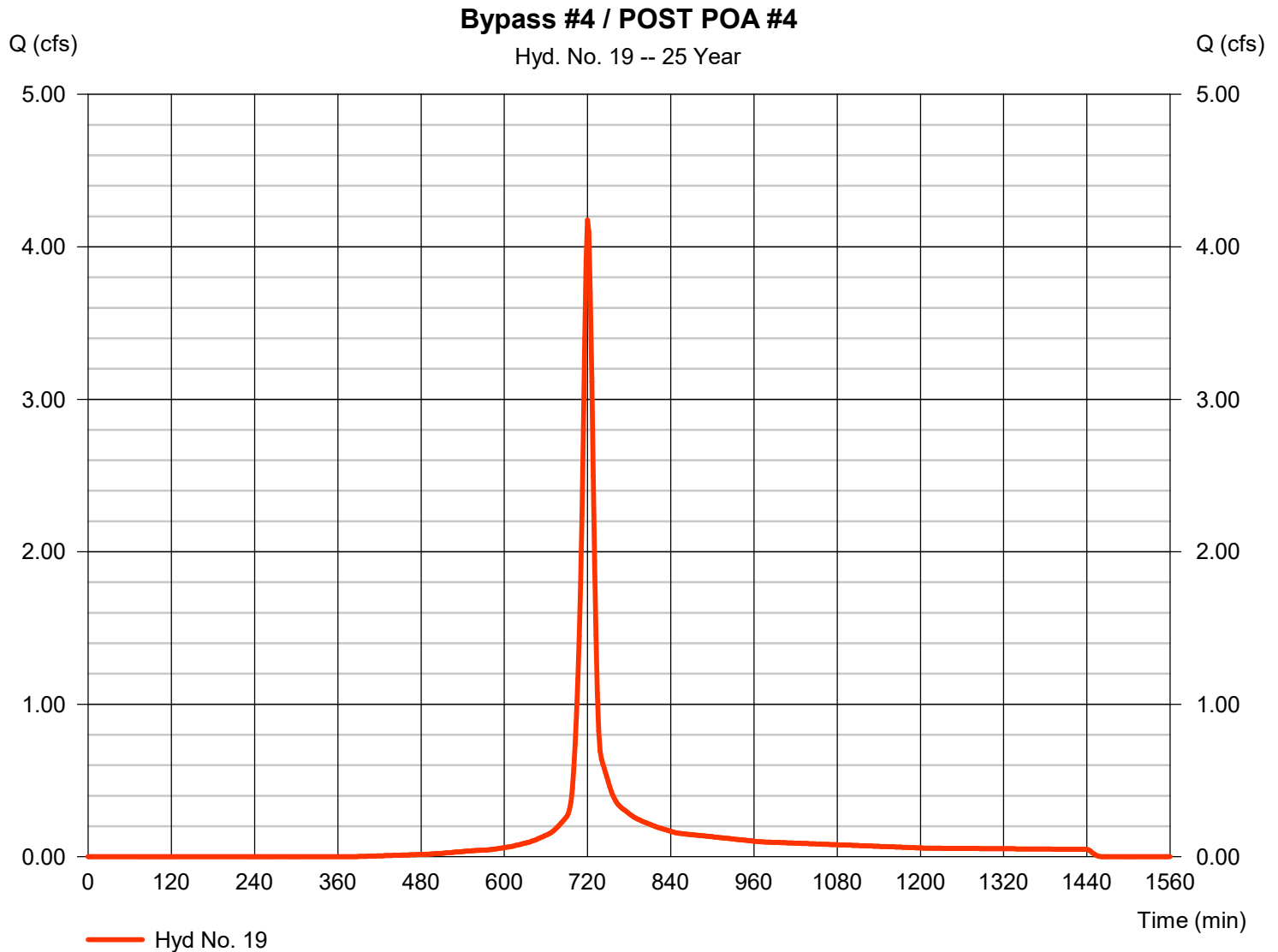
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Friday, 10 / 6 / 2023

Hyd. No. 19

Bypass #4 / POST POA #4

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 4.177 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 10,899 cuft |
| Drainage area | = 0.770 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

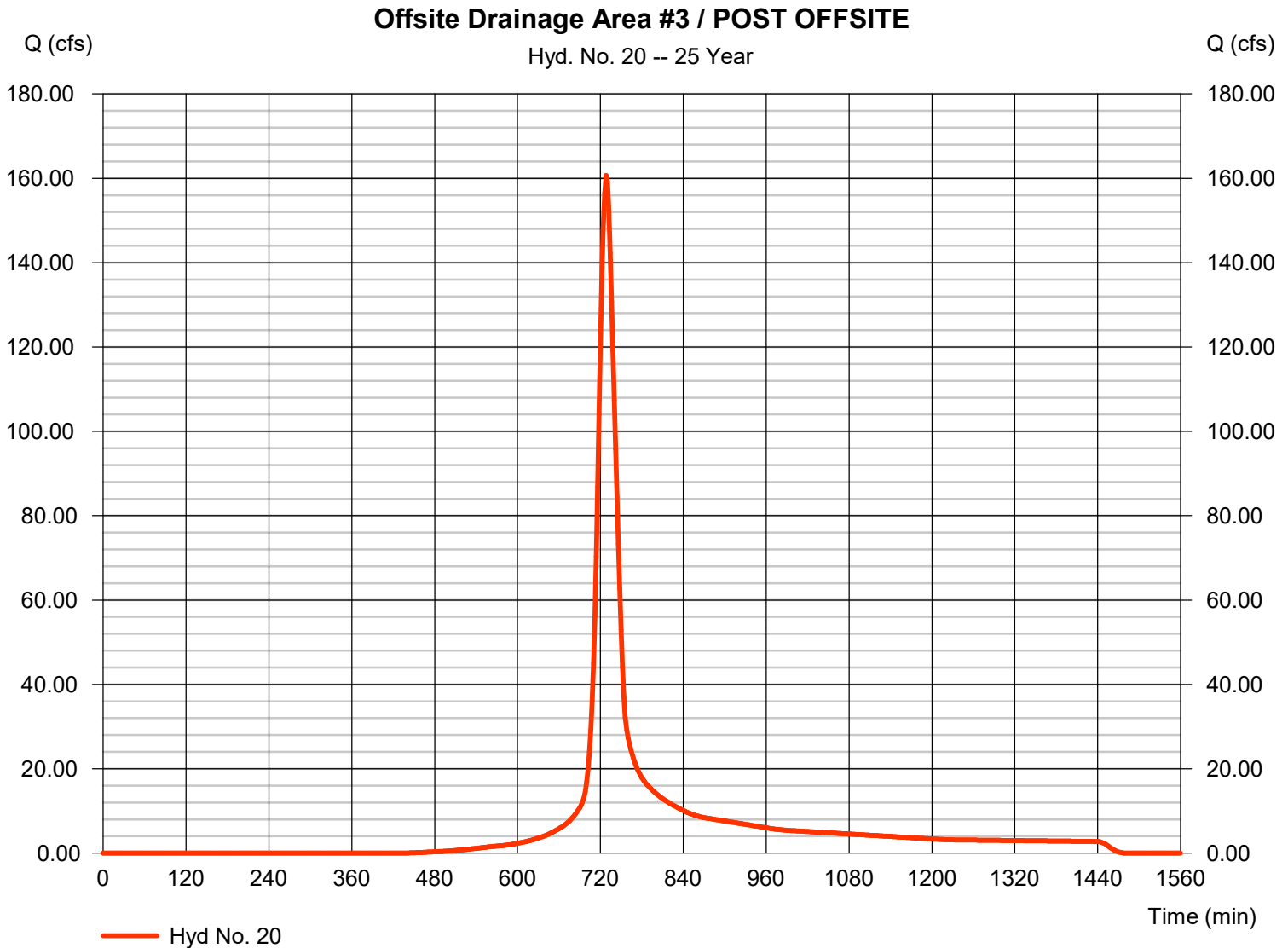
Friday, 10 / 6 / 2023

Hyd. No. 20

Offsite Drainage Area #3 / POST OFFSITE

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 2 min
 Drainage area = 47.420 ac
 Basin Slope = 0.0 %
 Tc method = User
 Total precip. = 6.00 in
 Storm duration = 24 hrs

Peak discharge = 160.69 cfs
 Time to peak = 728 min
 Hyd. volume = 589,512 cuft
 Curve number = 77
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 25.00 min
 Distribution = Type II
 Shape factor = 484

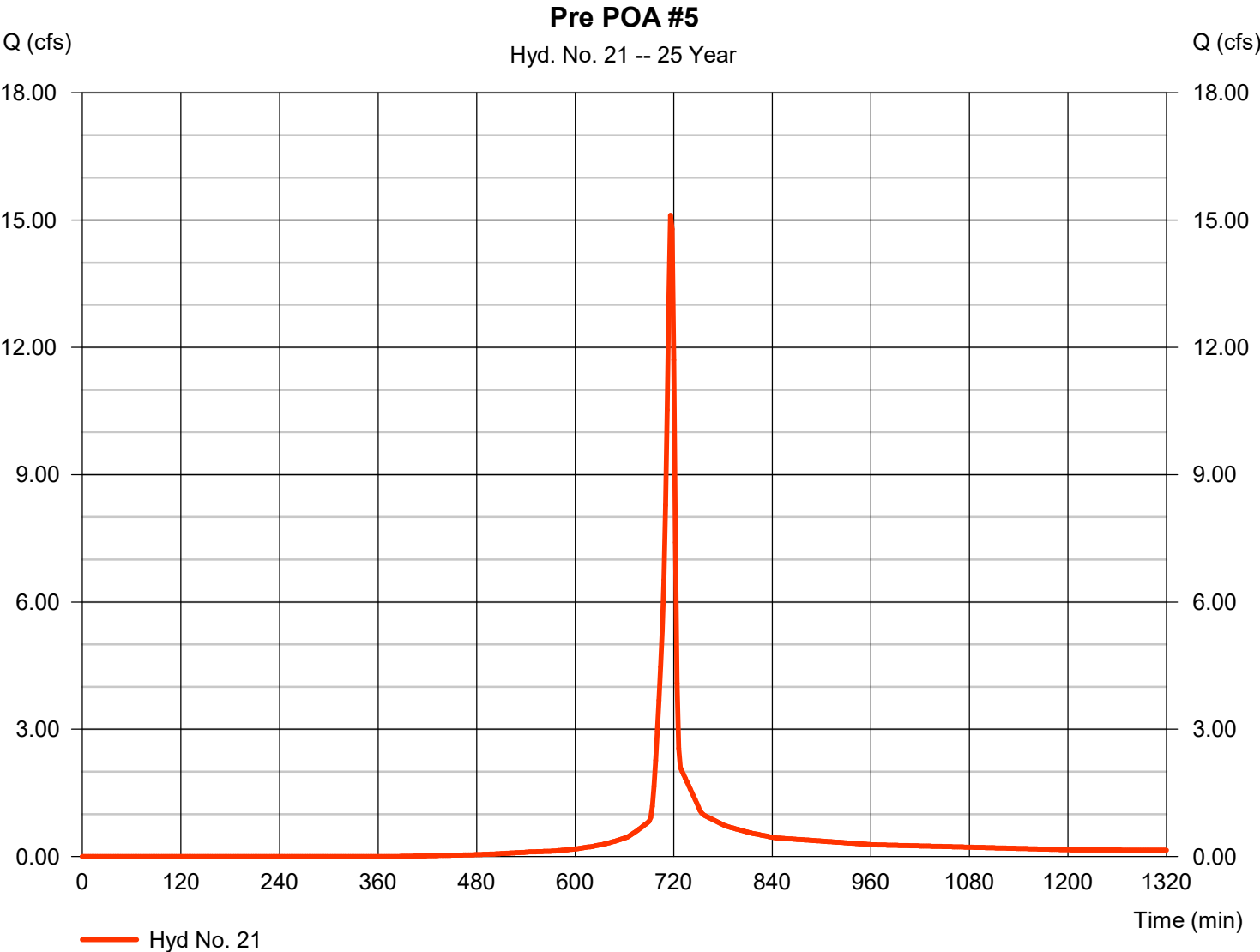


Hydrograph Report

Hyd. No. 21

Pre POA #5

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 15.11 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 31,012 cuft |
| Drainage area | = 2.410 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 4.50 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

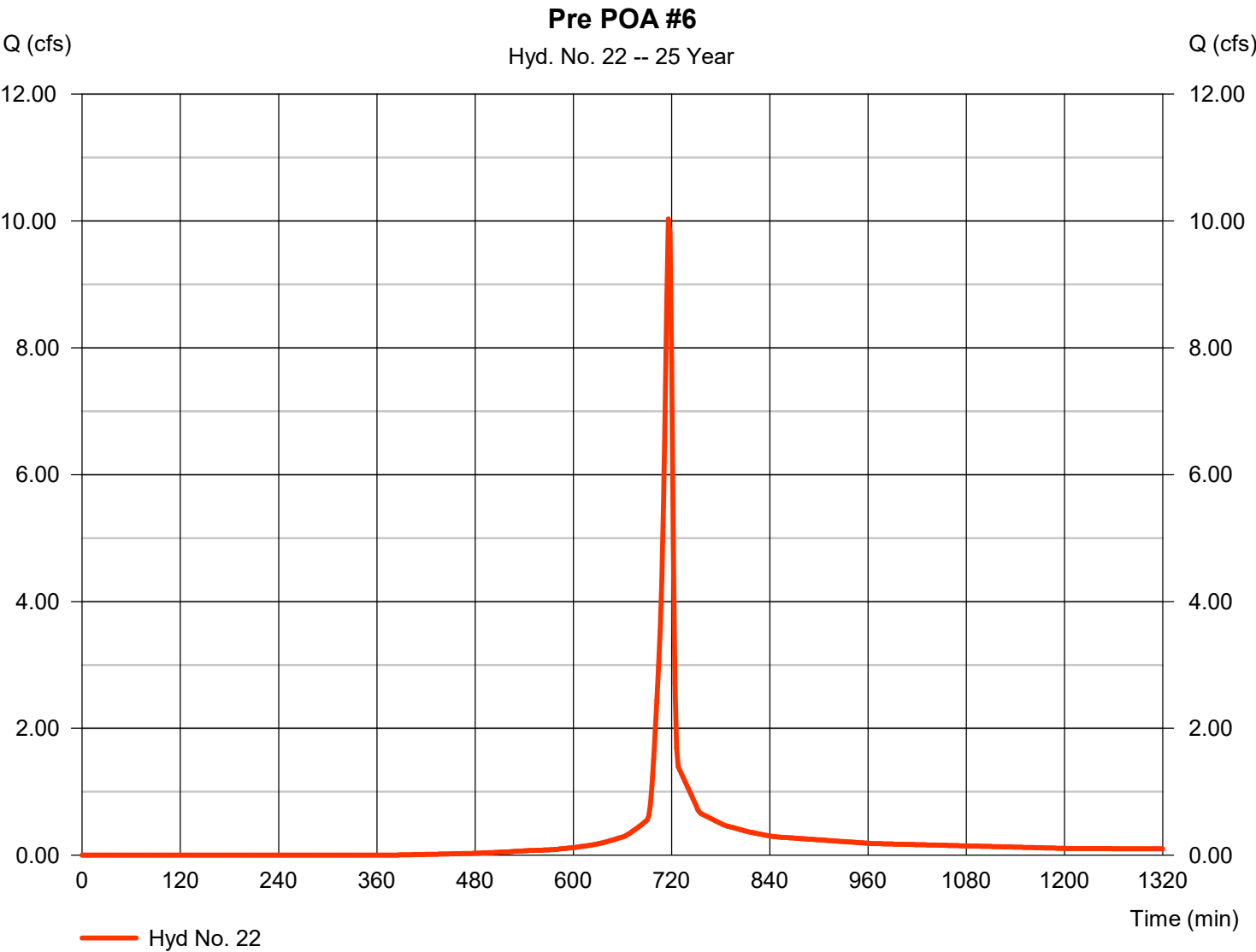
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 22

Pre POA #6

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 10.03 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 716 min |
| Time interval | = 2 min | Hyd. volume | = 20,589 cuft |
| Drainage area | = 1.600 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = TR55 | Time of conc. (Tc) | = 4.20 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

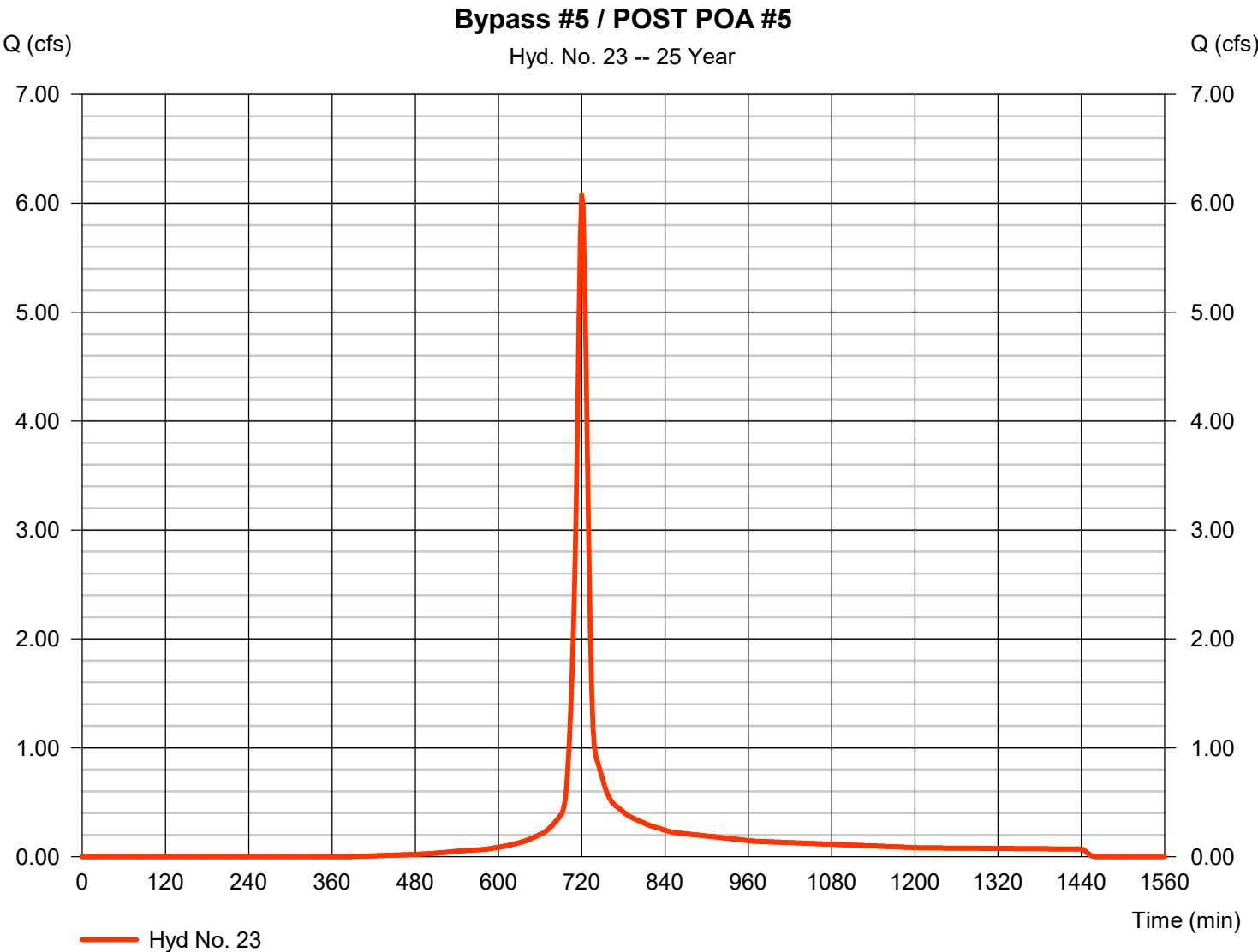
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 23

Bypass #5 / POST POA #5

| | | | |
|-----------------|--------------|--------------------|---------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 6.075 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 15,853 cuft |
| Drainage area | = 1.120 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydrograph Report

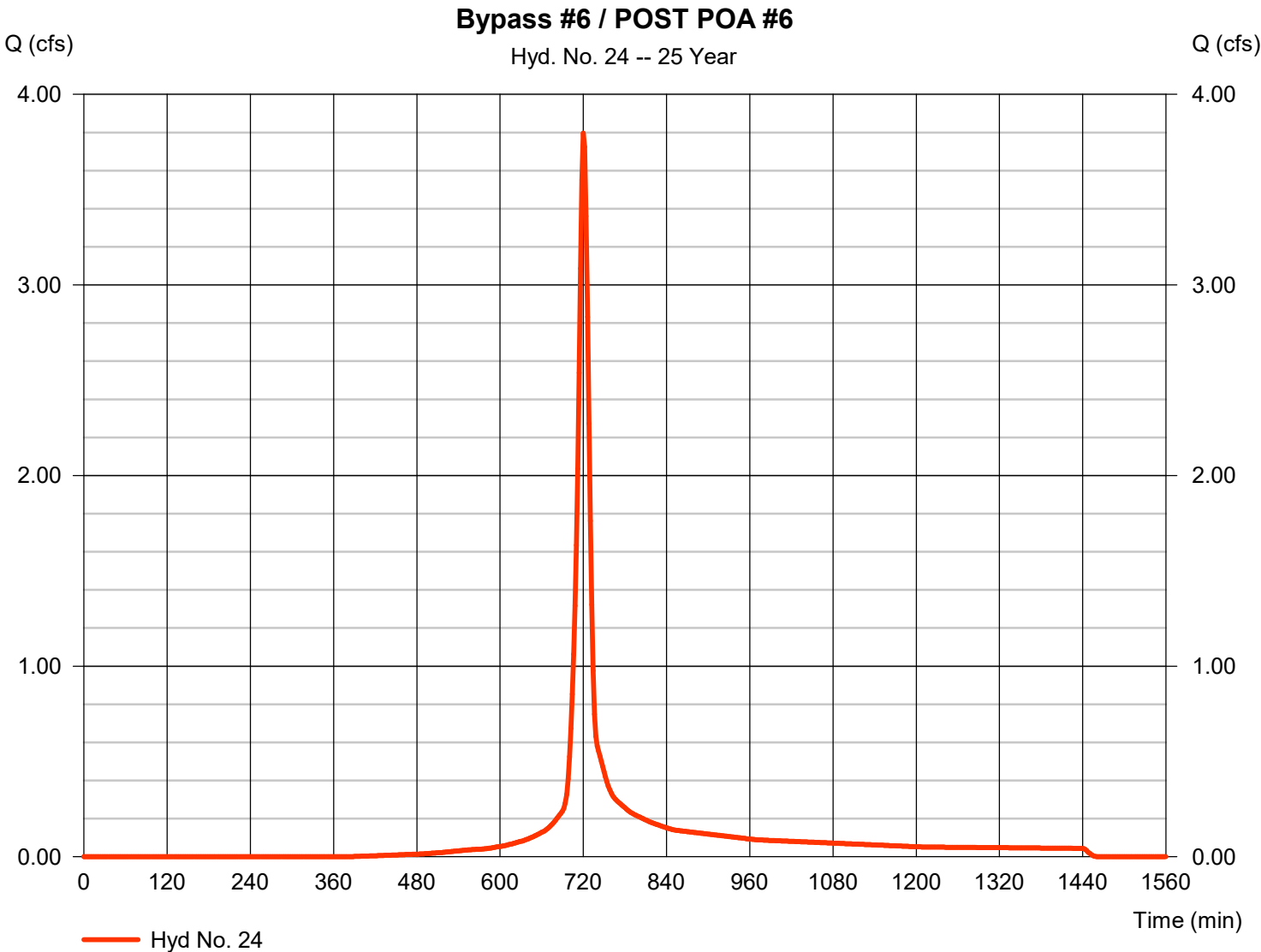
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

Hyd. No. 24

Bypass #6 / POST POA #6

| | | | |
|-----------------|--------------|--------------------|--------------|
| Hydrograph type | = SCS Runoff | Peak discharge | = 3.797 cfs |
| Storm frequency | = 25 yrs | Time to peak | = 720 min |
| Time interval | = 2 min | Hyd. volume | = 9,908 cuft |
| Drainage area | = 0.700 ac | Curve number | = 80 |
| Basin Slope | = 0.0 % | Hydraulic length | = 0 ft |
| Tc method | = User | Time of conc. (Tc) | = 10.00 min |
| Total precip. | = 6.00 in | Distribution | = Type II |
| Storm duration | = 24 hrs | Shape factor | = 484 |



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Friday, 10 / 6 / 2023

| Return Period (Yrs) | Intensity-Duration-Frequency Equation Coefficients (FHA) | | | |
|------------------------|--|---------|--------|-------|
| | B | D | E | (N/A) |
| 1 | 0.0000 | 0.0000 | 0.0000 | ----- |
| 2 | 51.0918 | 10.3000 | 0.8101 | ----- |
| 3 | 0.0000 | 0.0000 | 0.0000 | ----- |
| 5 | 49.6368 | 10.3000 | 0.7553 | ----- |
| 10 | 51.1095 | 10.4000 | 0.7327 | ----- |
| 25 | 54.6954 | 10.5000 | 0.7118 | ----- |
| 50 | 58.0360 | 10.6000 | 0.7004 | ----- |
| 100 | 61.9189 | 10.8000 | 0.6926 | ----- |

File name: rolesville.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

| 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 | 5.61 | 4.46 | 3.73 | 3.22 | 2.85 | 2.56 | 2.33 | 2.14 | 1.98 | 1.85 | 1.73 | 1.63 |
| 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 | 6.33 | 5.11 | 4.33 | 3.78 | 3.36 | 3.04 | 2.79 | 2.57 | 2.40 | 2.24 | 2.11 | 2.00 |
| 10 | 6.89 | 5.61 | 4.78 | 4.19 | 3.75 | 3.40 | 3.12 | 2.89 | 2.70 | 2.53 | 2.39 | 2.26 |
| 25 | 7.77 | 6.37 | 5.46 | 4.80 | 4.31 | 3.92 | 3.61 | 3.35 | 3.14 | 2.95 | 2.79 | 2.65 |
| 50 | 8.47 | 6.97 | 5.99 | 5.29 | 4.75 | 4.34 | 4.00 | 3.72 | 3.48 | 3.28 | 3.10 | 2.94 |
| 100 | 9.16 | 7.57 | 6.52 | 5.77 | 5.20 | 4.75 | 4.38 | 4.08 | 3.82 | 3.60 | 3.41 | 3.24 |

Tc = time in minutes. Values may exceed 60.

name: G:\NCA\Projects\Lennar\8430-03 - Lennar - School Street - Rolesville\04 - Calculations\Storm\rolesville prec.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 | 2.86 | 3.45 | 0.00 | 3.30 | 5.04 | 6.00 | 6.80 | 7.56 |
| SCS 6-Hr | 2.04 | 2.44 | 0.00 | 0.00 | 3.54 | 4.22 | 0.00 | 5.45 |
| Huff-1st | 0.00 | 0.00 | 0.00 | 2.75 | 0.00 | 0.00 | 6.50 | 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 | 2.80 | 0.00 | 0.00 | 6.00 | 0.00 |

ATTACHMENT 8: NUTRIENT CALCULATIONS – STORMWATER DESIGN TOOL



SITE DATA

| Project Information | |
|--|--|
| Project Name: | Parker Ridge |
| Permit No (if known): | |
| Applicant: | Lennar Corporation |
| Applicant Contact Name: | Michael Taylor |
| Applicant Contact Number: | (919) 863-6461 |
| Contact Email: | michael.taylor@lennar.com |
| Last Modified Date: | Wednesday, October 4, 2023 |
| Site Data: | |
| River Basin: | Neuse |
| Regulatory Watershed: | N/A |
| Physiographic/Geologic Region: | Piedmont |
| Type of Development (Select from Dropdown menu): | Residential |
| Zoning: | R-5 |
| Total Site Area (Ac): | 86.34 |
| Existing Lake/Pond Area (Ac): | 3.58 |
| Proposed Disturbed Area (Ac): | 62.30 |
| Proposed Impervious Surface Area from DA Sheets (acre): | 26.11 |
| Percent Built Upon Area (BUA): | 30% |
| Is the proposed project a site expansion? | No |
| Number of Drainage Areas on Site (Points of Analysis): | 6 |
| Annual Rainfall (in): | 45.41 |
| One-year, 24-hour rainfall (in): | 3.00 |
| Two-year, 24-hour rainfall (in): | 3.60 |
| Proposed Residential Stormwater Details (if applicable): | |
| Site Square Footage: | 3,760,970 |
| Total Acreage in Lots: | 28.52 |
| Lot Square Footage: | 1,242,331 |
| Number of Lots: | 275 |
| Average Lot Size (SF): | 4,518 |
| Proposed Impervious Surface Area from DA sheets (SF): | 1,137,352 |
| Proposed Impervious Surface Area Devoted to Lots (SF): | 815,008 |
| Total Impervious Surface Area Devoted to Roads (SF): | 176,418 |
| Other Impervious Surface Area (SF): | 145,926 |



Project Name:

Parker Ridge

DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

| LAND USE & SITE DATA | | PRE-DEVELOPMENT | | | | | | | | POST-DEVELOPMENT | | | | | | | |
|--------------------------------------|--|-----------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|---------|---------|---------|---------|---------|---------|
| Drainage Area (Acres)= | | 19.90 | | | | | | | | 20.12 | | | | | | | |
| Site Acreage within Drainage= | | 19.90 | | | | | | | | 19.87 | | | | | | | |
| One-year, 24-hour rainfall (in)= | | 3.00 | | | | | | | | | | | | | | | |
| Land Use (acres) by Soil Group: | | A Soils | | B Soils | | C Soils | | D Soils | | A Soils | | B Soils | | C Soils | | D Soils | |
| Commercial | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | | |
| Industrial | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | | |
| Transportation | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| High Density (interstate, main) | | | | | | | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | | |
| Rural | | | | | | | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | | | | | | | |
| Misc. Pervious | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Managed pervious (Open Space) | | | | | | | | 3.89 | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | 11.56 | | | | | | | | | |
| Residential | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Roadway | | | | | | | | | | | | | | | | 1.71 | 0.24 |
| Grassed Right-of-ways | | | | | | | | | | | | | | | | | |
| Driveway | | | | | | | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | 2.75 | |
| Sidewalk (Includes Patios) | | | | | | | | | | | | | | | | 0.90 | |
| Lawn | | | | | | | | | | | | | | | | 1.10 | |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | | 8.79 | 0.01 |
| Woods (on lots) | | | | | | | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | | | | | | 0.46 | |
| JURISDICTIONAL LANDS | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Natural wetland | | | | | | | | 0.12 | | | | | | | | 0.12 | |
| Riparian buffer (Zone 1 only) | | | | | | | | 4.33 | | | | | | | | 4.04 | |
| Open water | | | | | | | | | | | | | | | | | |
| Totals (Ac)= | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19.87 | 0.25 |

| SITE FLOW | PRE-DEVELOPMENT T_c | POST-DEVELOPMENT T_c |
|--|-----------------------------|-----------------------------|
| Sheet Flow | | |
| Length (ft)= | 300.00 | 300.00 |
| Slope (ft/ft)= | 0.05 | 0.01 |
| Surface Cover: | Paved, Gravel, or Bare Soil | Paved, Gravel, or Bare Soil |
| n-value= | 0.01 | 0.011 |
| T_t (hrs)= | 0.03 | 0.07 |
| Shallow Flow | | |
| Length (ft)= | 150.00 | 150.00 |
| Slope (ft/ft)= | 0.04 | 0.00 |
| Surface Cover: | Unpaved | Paved |
| Average Velocity (ft/sec)= | 3.02 | 0.91 |
| T_t (hrs)= | 0.01 | 0.05 |
| Channel Flow 1 | | |
| Length (ft)= | 3240.00 | |
| Slope (ft/ft)= | 0.01 | |
| Cross Sectional Flow Area (ft ²)= | 16.00 | |
| Wetted Perimeter (ft)= | 20.00 | |
| Channel Lining: | Asphalt | |
| n-value= | 0.02 | |
| Hydraulic Radius (ft)= | 0.80 | 0.00 |
| Average Velocity (ft/sec)= | 8.03 | 0.00 |
| T_t (hrs)= | 0.11 | 0.00 |
| T_c (hrs)= | 0.16 | 0.08 |
| RESULTS | PRE-DEVELOPMENT | POST-DEVELOPMENT |
| Site Impervious Surface Area (Ac) = | 0.00 | 5.36 |
| Lot Impervious Surface Area (Ac) = | 0.00 | 3.65 |
| 1-year, 24-hour storm (Peak Flow) | | |
| Volume of runoff (ft ³) = | 82,562 | 122,076 |
| Volume change (ft ³) = | 39,515 | |
| Runoff (inches) = Q^* = | 1.1429 | 1.6715 |
| Peak Discharge (cfs)= Q = | 29.6047 | 55.8496 |
| Composite Curve Number (DA)= | 78 | 85 |
| Composite Curve Number (Site only)= | 78 | 85 |
| DISCONNECTED IMPERVIOUS - Credit given only to residential development with drainage area with less than 30% impervious | | |
| Percent Disconnected Impervious Credit (Residential Only) = | | |
| Disconnected impervious area (Ac) = | 0.00 | |
| Drainage Area $CN_{adjusted}$ = | 85 | |
| Site Only $CN_{adjusted}$ = | 85 | |

Post-development peak flow exceeds pre-development peak flow for this DA!



Project Name:

Parker Ridge

DRAINAGE AREA 2
STORMWATER PRE-POST CALCULATIONS

| LAND USE & SITE DATA | PRE-DEVELOPMENT | | | | | | | | POST-DEVELOPMENT | | | | | | | |
|--------------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|---------|---------|---------|---------|---------|---------|
| Drainage Area (Acres)= | 14.36 | | | | | | | | 22.07 | | | | | | | |
| Site Acreage within Drainage= | 14.36 | | | | | | | | 22.00 | | | | | | | |
| One-year, 24-hour rainfall (in)= | 3.00 | | | | | | | | | | | | | | | |
| Land Use (acres) by Soil Group: | A Soils | | B Soils | | C Soils | | D Soils | | A Soils | | B Soils | | C Soils | | D Soils | |
| Commercial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Industrial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Transportation | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| High Density (interstate, main) | | | | | | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Rural | | | | | | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | | | | | | |
| Misc. Pervious | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Managed pervious (Open Space) | | | | | | | 3.34 | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | 10.66 | | | | | | | | | |
| Residential | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Roadway | | | | | | | | | | | | | | | 3.02 | 0.07 |
| Grassed Right-of-ways | | | | | | | | | | | | | | | | |
| Driveway | | | | | | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | 6.37 | |
| Sidewalk (Includes Patios) | | | | | | | | | | | | | | | 0.96 | |
| Lawn | | | | | | | | | | | | | | | 2.89 | |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | 7.53 | |
| Woods (on lots) | | | | | | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | | | | | 0.87 | |
| JURISDICTIONAL LANDS | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Natural wetland | | | | | | | 0.03 | | | | | | | | 0.03 | |
| Riparian buffer (Zone 1 only) | | | | | | | 0.33 | | | | | | | | 0.33 | |
| Open water | | | | | | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 22.00 | 0.07 |

| SITE FLOW | PRE-DEVELOPMENT T_c | POST-DEVELOPMENT T_c |
|--|-----------------------------|-------------------------|
| Sheet Flow | | |
| Length (ft)= | 300.00 | |
| Slope (ft/ft)= | 0.02 | |
| Surface Cover: | Paved, Gravel, or Bare Soil | |
| n-value= | 0.01 | |
| T_t (hrs)= | 0.04 | 0.00 |
| Shallow Flow | | |
| Length (ft)= | 850.00 | |
| Slope (ft/ft)= | 0.06 | |
| Surface Cover: | Paved | |
| Average Velocity (ft/sec)= | 4.98 | 0.00 |
| T_t (hrs)= | 0.05 | 0.00 |
| Channel Flow 1 | | |
| Length (ft)= | | |
| Slope (ft/ft)= | | |
| Cross Sectional Flow Area (ft ²)= | | |
| Wetted Perimeter (ft)= | | |
| Channel Lining: | | |
| n-value= | | |
| Hydraulic Radius (ft)= | 0.00 | 0.00 |
| Average Velocity (ft/sec)= | 0.00 | 0.00 |
| T_t (hrs)= | 0.00 | 0.00 |
| T_c (hrs)= | 0.09 | 0.08 |
| RESULTS | PRE-DEVELOPMENT | POST-DEVELOPMENT |
| Site Impervious Surface Area (Ac) = | 0.00 | 10.35 |
| Lot Impervious Surface Area (Ac) = | 0.00 | 7.33 |
| 1-year, 24-hour storm (Peak Flow) | | |
| Volume of runoff (ft ³) = | 58,131 | 157,550 |
| Volume change (ft ³) = | 99,419 | |
| Runoff (inches) = Q^* = | 1.1152 | 1.9666 |
| Peak Discharge (cfs)= Q = | 25.2653 | 72.7664 |
| Composite Curve Number (DA)= | 78 | 88 |
| Composite Curve Number (Site only)= | 78 | 88 |
| DISCONNECTED IMPERVIOUS - Credit given only to residential development with drainage area with less than 30% impervious | | |
| Percent Disconnected Impervious Credit (Residential Only) = | | |
| Disconnected impervious area (Ac) = | 0.00 | |
| Drainage Area $CN_{adjusted}$ = | 88 | |
| Site Only $CN_{adjusted}$ = | 88 | |

Post-development peak flow exceeds pre-development peak flow for this DA!



Project Name:

Parker Ridge

DRAINAGE AREA 3
STORMWATER PRE-POST CALCULATIONS

| LAND USE & SITE DATA | | PRE-DEVELOPMENT | | | | | | | | POST-DEVELOPMENT | | | | | | | |
|--------------------------------------|--|-----------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|---------|---------|---------|---------|---------|---------|
| Drainage Area (Acres)= | | 43.94 | | | | | | | | 43.58 | | | | | | | |
| Site Acreage within Drainage= | | 43.94 | | | | | | | | 41.88 | | | | | | | |
| One-year, 24-hour rainfall (in)= | | 3.00 | | | | | | | | | | | | | | | |
| Land Use (acres) by Soil Group: | | A Soils | | B Soils | | C Soils | | D Soils | | A Soils | | B Soils | | C Soils | | D Soils | |
| Commercial | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | | |
| Industrial | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | | |
| Transportation | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| High Density (interstate, main) | | | | | | | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | | |
| Rural | | | | | | | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | | | | | | | |
| Misc. Pervious | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | 33.72 | | | | | | | | | |
| Residential | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Roadway | | | | | | | | | | | | | | | | 2.67 | 1.70 |
| Grassed Right-of-ways | | | | | | | | | | | | | | | | | |
| Driveway | | | | | | | | 0.13 | | | | | | | | | |
| Parking lot | | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | 6.24 | |
| Sidewalk (Includes Patios) | | | | | | | | | | | | | | | | 1.49 | |
| Lawn | | | | | | | | | | | | | | | | 3.12 | |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | | 17.42 | |
| Woods (on lots) | | | | | | | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | | | | | | | |
| JURISDICTIONAL LANDS | | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Natural wetland | | | | | | | | 0.78 | | | | | | | | 0.74 | |
| Riparian buffer (Zone 1 only) | | | | | | | | 5.73 | | | | | | | | 5.57 | |
| Open water | | | | | | | | 3.58 | | | | | | | | 3.58 | |
| Totals (Ac)= | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 43.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 41.88 | 1.70 |

| SITE FLOW | PRE-DEVELOPMENT T_c | POST-DEVELOPMENT T_c |
|--|-----------------------------|-------------------------|
| Sheet Flow | | |
| Length (ft)= | 300.00 | |
| Slope (ft/ft)= | 0.07 | |
| Surface Cover: | Paved, Gravel, or Bare Soil | |
| n-value= | 0.01 | |
| T_i (hrs)= | 0.03 | 0.00 |
| Shallow Flow | | |
| Length (ft)= | 193.00 | |
| Slope (ft/ft)= | 0.04 | |
| Surface Cover: | Paved | |
| Average Velocity (ft/sec)= | 4.22 | 0.00 |
| T_i (hrs)= | 0.01 | 0.00 |
| Channel Flow 1 | | |
| Length (ft)= | 500.00 | |
| Slope (ft/ft)= | 0.05 | |
| Cross Sectional Flow Area (ft ²)= | 30.00 | |
| Wetted Perimeter (ft)= | 16.00 | |
| Channel Lining: | Gravel Bottom/riprap sides | |
| n-value= | 0.03 | |
| Hydraulic Radius (ft)= | 1.88 | 0.00 |
| Average Velocity (ft/sec)= | 15.35 | 0.00 |
| T_i (hrs)= | 0.01 | 0.00 |
| T_c (hrs)= | 0.05 | 0.08 |
| RESULTS | PRE-DEVELOPMENT | POST-DEVELOPMENT |
| Site Impervious Surface Area (Ac) = | 0.13 | 10.40 |
| Lot Impervious Surface Area (Ac) = | 0.13 | 7.73 |
| 1-year, 24-hour storm (Peak Flow) | | |
| Volume of runoff (ft ³) = | 122,982 | 207,584 |
| Volume change (ft ³) = | 84,602 | |
| Runoff (inches) = Q^* = | 0.7710 | 1.3122 |
| Peak Discharge (cfs)= Q = | 63.4382 | 94.0197 |
| Composite Curve Number (DA)= | 71 | 78 |
| Composite Curve Number (Site only)= | 71 | 78 |
| DISCONNECTED IMPERVIOUS - Credit given only to residential development with drainage area with less than 30% impervious | | |
| Percent Disconnected Impervious Credit (Residential Only) = | | |
| Disconnected impervious area (Ac) = | 0.00 | |
| Drainage Area $CN_{adjusted}$ = | 78 | |
| Site Only $CN_{adjusted}$ = | 78 | |

Post-development peak flow exceeds pre-development peak flow for this DA!



Project Name:

Parker Ridge

DRAINAGE AREA 4
STORMWATER PRE-POST CALCULATIONS

| LAND USE & SITE DATA | PRE-DEVELOPMENT | | | | | | | | POST-DEVELOPMENT | | | | | | | |
|--------------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|---------|---------|---------|---------|---------|---------|
| Drainage Area (Acres)= | 4.72 | | | | | | | | 0.77 | | | | | | | |
| Site Acreage within Drainage= | 4.72 | | | | | | | | 0.77 | | | | | | | |
| One-year, 24-hour rainfall (in)= | 3.00 | | | | | | | | | | | | | | | |
| Land Use (acres) by Soil Group: | A Soils | | B Soils | | C Soils | | D Soils | | A Soils | | B Soils | | C Soils | | D Soils | |
| Commercial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Industrial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Transportation | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| High Density (interstate, main) | | | | | | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Rural | | | | | | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | | | | | | |
| Misc. Pervious | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | 4.52 | | | | | | | | | |
| Residential | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Roadway | | | | | | | | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | | | | | | |
| Driveway | | | | | | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Sidewalk (Includes Patios) | | | | | | | | | | | | | | | | |
| Lawn | | | | | | | | | | | | | | | | |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | 0.57 | |
| Woods (on lots) | | | | | | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Natural wetland | | | | | | | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | | | 0.20 | | | | | | | | 0.20 | |
| Open water | | | | | | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.77 | 0.00 |

| SITE FLOW | PRE-DEVELOPMENT T_c | POST-DEVELOPMENT T_c |
|--|-----------------------------|-------------------------|
| Sheet Flow | | |
| Length (ft)= | 300.00 | |
| Slope (ft/ft)= | 0.02 | |
| Surface Cover: | Paved, Gravel, or Bare Soil | |
| n-value= | 0.01 | |
| T_t (hrs)= | 0.05 | 0.00 |
| Shallow Flow | | |
| Length (ft)= | 30.00 | |
| Slope (ft/ft)= | 0.08 | |
| Surface Cover: | Paved | |
| Average Velocity (ft/sec)= | 5.75 | 0.00 |
| T_t (hrs)= | 0.00 | 0.00 |
| Channel Flow 1 | | |
| Length (ft)= | | |
| Slope (ft/ft)= | | |
| Cross Sectional Flow Area (ft ²)= | | |
| Wetted Perimeter (ft)= | | |
| Channel Lining: | | |
| n-value= | | |
| Hydraulic Radius (ft)= | 0.00 | 0.00 |
| Average Velocity (ft/sec)= | 0.00 | 0.00 |
| T_t (hrs)= | 0.00 | 0.00 |
| T_c (hrs)= | 0.05 | 0.08 |
| RESULTS | PRE-DEVELOPMENT | POST-DEVELOPMENT |
| Site Impervious Surface Area (Ac) = | 0.00 | 0.00 |
| Lot Impervious Surface Area (Ac) = | 0.00 | 0.00 |
| 1-year, 24-hour storm (Peak Flow) | | |
| Volume of runoff (ft ³) = | 18,475 | 3,494 |
| Volume change (ft ³) = | -14,981 | |
| Runoff (inches) = Q^* = | 1.0783 | 1.2500 |
| Peak Discharge (cfs)= Q = | 9.6116 | 1.5761 |
| Composite Curve Number (DA)= | 77 | 80 |
| Composite Curve Number (Site only)= | 77 | 80 |
| DISCONNECTED IMPERVIOUS - Credit given only to residential development with drainage area with less than 30% impervious | | |
| Percent Disconnected Impervious Credit (Residential Only) = | | |
| Disconnected impervious area (Ac) = | 0.00 | |
| Drainage Area $CN_{adjusted}$ = | 80 | |
| Site Only $CN_{adjusted}$ = | 80 | |



Project Name:

Parker Ridge

DRAINAGE AREA 5
STORMWATER PRE-POST CALCULATIONS

| LAND USE & SITE DATA | PRE-DEVELOPMENT | | | | | | | | POST-DEVELOPMENT | | | | | | | |
|--------------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|---------|---------|---------|---------|---------|---------|
| Drainage Area (Acres)= | 2.41 | | | | | | | | 1.12 | | | | | | | |
| Site Acreage within Drainage= | 2.41 | | | | | | | | 1.12 | | | | | | | |
| One-year, 24-hour rainfall (in)= | 3.00 | | | | | | | | | | | | | | | |
| Land Use (acres) by Soil Group: | A Soils | | B Soils | | C Soils | | D Soils | | A Soils | | B Soils | | C Soils | | D Soils | |
| Commercial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Industrial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Transportation | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| High Density (interstate, main) | | | | | | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Rural | | | | | | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | | | | | | |
| Misc. Pervious | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Managed pervious (Open Space) | | | | | | | 2.41 | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | | | | | | |
| Residential | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Roadway | | | | | | | | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | | | | | | |
| Driveway | | | | | | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Sidewalk (Includes Patios) | | | | | | | | | | | | | | | | |
| Lawn | | | | | | | | | | | | | | | | |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | 1.12 | |
| Woods (on lots) | | | | | | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Natural wetland | | | | | | | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | | | | | | | | | | | | |
| Open water | | | | | | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.41 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.12 | 0.00 |

| SITE FLOW | PRE-DEVELOPMENT T_c | POST-DEVELOPMENT T_c |
|--|-----------------------------|-------------------------|
| Sheet Flow | | |
| Length (ft)= | 300.00 | |
| Slope (ft/ft)= | 0.03 | |
| Surface Cover: | Paved, Gravel, or Bare Soil | |
| n-value= | 0.01 | |
| T_t (hrs)= | 0.04 | 0.00 |
| Shallow Flow | | |
| Length (ft)= | 253.00 | |
| Slope (ft/ft)= | 0.02 | |
| Surface Cover: | Unpaved | |
| Average Velocity (ft/sec)= | 2.46 | 0.00 |
| T_t (hrs)= | 0.03 | 0.00 |
| Channel Flow 1 | | |
| Length (ft)= | | |
| Slope (ft/ft)= | | |
| Cross Sectional Flow Area (ft ²)= | | |
| Wetted Perimeter (ft)= | | |
| Channel Lining: | | |
| n-value= | | |
| Hydraulic Radius (ft)= | 0.00 | 0.00 |
| Average Velocity (ft/sec)= | 0.00 | 0.00 |
| T_t (hrs)= | 0.00 | 0.00 |
| T_c (hrs)= | 0.07 | 0.08 |
| RESULTS | PRE-DEVELOPMENT | POST-DEVELOPMENT |
| Site Impervious Surface Area (Ac) = | 0.00 | 0.00 |
| Lot Impervious Surface Area (Ac) = | 0.00 | 0.00 |
| 1-year, 24-hour storm (Peak Flow) | | |
| Volume of runoff (ft ³) = | 10,935 | 5,082 |
| Volume change (ft ³) = | -5,853 | |
| Runoff (inches) = Q^* = | 1.2500 | 1.2500 |
| Peak Discharge (cfs)= Q = | 5.2625 | 2.2926 |
| Composite Curve Number (DA)= | 80 | 80 |
| Composite Curve Number (Site only)= | 80 | 80 |
| DISCONNECTED IMPERVIOUS - Credit given only to residential development with drainage area with less than 30% impervious | | |
| Percent Disconnected Impervious Credit (Residential Only) = | | |
| Disconnected impervious area (Ac) = | 0.00 | |
| Drainage Area $CN_{adjusted}$ = | 80 | |
| Site Only $CN_{adjusted}$ = | 80 | |



Project Name:

Parker Ridge

DRAINAGE AREA 6
STORMWATER PRE-POST CALCULATIONS

| LAND USE & SITE DATA | PRE-DEVELOPMENT | | | | | | | | POST-DEVELOPMENT | | | | | | | |
|--------------------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|---------|---------|---------|---------|---------|---------|
| Drainage Area (Acres)= | 1.60 | | | | | | | | 0.70 | | | | | | | |
| Site Acreage within Drainage= | 1.60 | | | | | | | | 0.70 | | | | | | | |
| One-year, 24-hour rainfall (in)= | 3.00 | | | | | | | | | | | | | | | |
| Land Use (acres) by Soil Group: | A Soils | | B Soils | | C Soils | | D Soils | | A Soils | | B Soils | | C Soils | | D Soils | |
| Commercial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Industrial | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | | | | | | |
| Transportation | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| High Density (interstate, main) | | | | | | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Rural | | | | | | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | | | | | | |
| Misc. Pervious | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Managed pervious (Open Space) | | | | | | | 1.60 | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | | | | | | |
| Residential | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Roadway | | | | | | | | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | | | | | | |
| Driveway | | | | | | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | | | | | | |
| Roof | | | | | | | | | | | | | | | | |
| Sidewalk (Includes Patios) | | | | | | | | | | | | | | | | |
| Lawn | | | | | | | | | | | | | | | | |
| Managed pervious (Open Space) | | | | | | | | | | | | | | | 0.70 | |
| Woods (on lots) | | | | | | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite |
| Natural wetland | | | | | | | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | | | | | | | | | | | | |
| Open water | | | | | | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.00 |

| SITE FLOW | PRE-DEVELOPMENT T_c | POST-DEVELOPMENT T_c |
|--|-----------------------------|-------------------------|
| Sheet Flow | | |
| Length (ft)= | 146.00 | |
| Slope (ft/ft)= | 0.03 | |
| Surface Cover: | Paved, Gravel, or Bare Soil | |
| n-value= | 0.01 | |
| T_t (hrs)= | 0.02 | 0.00 |
| Shallow Flow | | |
| Length (ft)= | 437.00 | |
| Slope (ft/ft)= | 0.02 | |
| Surface Cover: | Unpaved | |
| Average Velocity (ft/sec)= | 2.47 | 0.00 |
| T_t (hrs)= | 0.05 | 0.00 |
| Channel Flow 1 | | |
| Length (ft)= | | |
| Slope (ft/ft)= | | |
| Cross Sectional Flow Area (ft ²)= | | |
| Wetted Perimeter (ft)= | | |
| Channel Lining: | | |
| n-value= | | |
| Hydraulic Radius (ft)= | 0.00 | 0.00 |
| Average Velocity (ft/sec)= | 0.00 | 0.00 |
| T_t (hrs)= | 0.00 | 0.00 |
| T_c (hrs)= | 0.07 | 0.08 |
| RESULTS | PRE-DEVELOPMENT | POST-DEVELOPMENT |
| Site Impervious Surface Area (Ac) = | 0.00 | 0.00 |
| Lot Impervious Surface Area (Ac) = | 0.00 | 0.00 |
| 1-year, 24-hour storm (Peak Flow) | | |
| Volume of runoff (ft ³) = | 7,260 | 3,176 |
| Volume change (ft ³) = | -4,084 | |
| Runoff (inches) = Q^* = | 1.2500 | 1.2500 |
| Peak Discharge (cfs)= Q = | 3.4358 | 1.4329 |
| Composite Curve Number (DA)= | 80 | 80 |
| Composite Curve Number (Site only)= | 80 | 80 |
| DISCONNECTED IMPERVIOUS - Credit given only to residential development with drainage area with less than 30% impervious | | |
| Percent Disconnected Impervious Credit (Residential Only) = | | |
| Disconnected impervious area (Ac) = | 0.00 | |
| Drainage Area $CN_{adjusted}$ = | 80 | |
| Site Only $CN_{adjusted}$ = | 80 | |

Project Name: **Parker Ridge**

DA SITE SUMMARY
STORMWATER PRE-POST CALCULATIONS

| SITE SUMMARY | | | | | | |
|---|-----------|--------|-----------|-------|-------|-------|
| DRAINAGE AREA SUMMARIES | | | | | | |
| DRAINAGE AREA: | DA1 | DA2 | DA3 | DA4 | DA5 | DA6 |
| Pre-Development (1-year, 24-hour storm) | | | | | | |
| Runoff (in)=Q* = | 1.143 | 1.115 | 0.771 | 1.078 | 1.250 | 1.250 |
| Peak Flow (cfs)=Q _{post} = | 29.605 | 25.265 | 63.438 | 9.612 | 5.263 | 3.436 |
| Post-Development (1-year, 24-hour storm) | | | | | | |
| Proposed Impervious Surface (acre) = | 5.36 | 10.35 | 10.40 | | | |
| Runoff (in)=Q* = | 1.671 | 1.967 | 1.312 | 1.250 | 1.250 | 1.250 |
| Peak Flow (cfs)=Q _{post} = | 55.850 | 72.766 | 94.020 | 1.576 | 2.293 | 1.433 |
| TARGET CURVE NUMBER (TCN) - Residential Only | | | | | | |
| SITE SOIL COMPOSITION | | | | | | |
| HYDROLOGIC SOIL GROUP | Site Area | % | Target CN | | | |
| A | 0.00 | 0% | 43 | | | |
| B | 0.00 | 0% | 63 | | | |
| C | 0.00 | 0% | 76 | | | |
| D | 86.34 | 100% | 81 | | | |
| Total Site Area (acres) = | | 86.34 | | | | |
| Zoning = | | R-5 | | | | |
| Target Curve Number (TCN) = | | 81 | | | | |
| % Impervious = | | 30% | | | | |
| Post Development CN _{adjusted} = | | 82 | | | | |
| Required Volume to be Managed (TCN)= ft ³ = | | 22,519 | | | | |
| SITE NITROGEN AND PHOSPHORUS LOADING | | | | | | |
| Nitrogen and Phosphorus Targets (Based on Regulatory Watershed) | | | | | | |
| Target Nitrogen Load (lb/ac/yr)= | | 3.6 | | | | |
| Target Phosphorus Load (Falls and Jordan Lakes Only) (lb/ac/yr)= | | N/A | | | | |
| % N Loading Reduction Option for Expansions (Falls and Jordan Lakes Only) = | | N/A | | | | |
| % Loading Reduction Nitrogen Target (Falls and Jordan Lakes Only) (lb/ac/yr)= | | N/A | | | | |
| % P Loading Reduction Option for Expansions (Falls and Jordan Lakes Only) = | | N/A | | | | |
| % Loading Reduction Phosphorus Target (Falls and Jordan Lakes Only) (lb/ac/yr)= | | N/A | | | | |
| Pre Development Nitrogen and Phosphorus Load | | | | | | |
| Total Nitrogen (lb/ac/yr)= | | 0.89 | | | | |
| Total Phosphorus (lb/ac/yr)= | | N/A | | | | |
| Post Development Nitrogen and Phosphorus Load | | | | | | |
| Total Nitrogen (lb/ac/yr)= | | 4.93 | | | | |
| Total Phosphorus (lb/ac/yr)= | | N/A | | | | |

Project Name: **Parker Ridge**
**DRAINAGE AREA 1
BMP CALCULATIONS**

| DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS | | | | | | | | | | | |
|---|--------------------|---|---------------------|---------------------------|--------------------------------------|--|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| DA1 Site Acreage= | 19.87 | | | | | | | | | | |
| DA1 Off-Site Acreage= | 0.25 | | | | | | | | | | |
| Total Required Storage Volume for Site TCN Requirement (ft ³)= | 22,519 | | | | | | | | | | |
| Will site use underground water harvesting? | No | Enter % volume reduction in decimal form= | | | | Note: Supporting information/details should be submitted to demonstrate water usage. | | | | | |
| ENTER AREA TREATED BY BMP | | | | | | | | | | | |
| Land Use (acres) | Sub-DA1(a) (Ac) | | Sub-DA1(b) (Ac) | | Sub-DA1(c) (Ac) | | Sub-DA1(d) (Ac) | | Sub-DA1(e) (Ac) | | |
| Commercial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Industrial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Transportation | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| High Density (interstate, main) | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Rural | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Misc. Pervious | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Managed pervious | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | |
| Residential | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Roadway | 1.64 | 0.24 | 0.07 | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | |
| Driveway | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | 2.75 | | | | | | | | | | |
| Sidewalk | 0.50 | | 0.40 | | | | | | | | |
| Lawn | 1.10 | | | | | | | | | | |
| Managed pervious | 2.52 | 0.01 | 6.27 | | | | | | | | |
| Woods (on lots) | | | | | | | | | | | |
| Land Taken up by BMP | 0.46 | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Off-site | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | |
| Natural wetland | | | 0.12 | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | 4.04 | | | | | | | | |
| Totals (Ac)= | 8.97 | 0.25 | 10.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Sub-DA1(a) BMP(s) | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| SCM 1 | Wet Detention Pond | 18,433 | 1.26 | 7.66 | 0.36 | 2.20 | 1.04 | 5.65 | 0.14 | 0.77 | 85,659 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | 5.65 | | Outflow Total Phosphorus (lb/ac/yr)= | | | 0.77 | | | |
| Sub-DA1(b) BMP(s) | | | | | | | | | | | |

| If Sub-DA1(b) is connected to upstream sub-basin(s), select all contributing sub-basin(s) from dropdown menus: | | | | | | | | | | | |
|--|-------------|-----------------------------|---------------------|--------------------------------------|---------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| Bypass #1 | | 2,759 | | 1.78 | | 0.67 | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA1 (c) BMP(s) | | | | | | | | | | | |
| If Sub-DA1(c) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA1 (d) BMP(s) | | | | | | | | | | | |
| If Sub-DA1(d) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA1 (e) BMP(s) | | | | | | | | | | | |
| If Sub-DA1(e) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| DA1 BMP SUMMARY | | | | | | | | | | | |
| Total Volume Treated (c.f.)= | | 85659 | | | | | | | | | |
| DA1 Outflow Total Nitrogen (lb/ac/yr)= | | 5.65 | | | | | | | | | |
| DA1 Outflow Total Phosphorus (lb/ac/yr)= | | 0.77 | | | | | | | | | |
| 1-year, 24-hour storm | | | | | | | | | | | |
| Pre Development Peak Discharge (cfs)= $Q_{1\text{-year}}$ = | | 29.60 | | | | | | | | | |
| Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$ = | | 16.85 | | | | | | | | | |

Project Name: **Parker Ridge**
**DRAINAGE AREA 2
BMP CALCULATIONS**

| DRAINAGE AREA 2 - BMP DEVICES AND ADJUSTMENTS | | | | | | | | | | | |
|---|--------------------|---|---------------------|---------------------------|--------------------------------------|--|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| DA2 Site Acreage= | 22.00 | | | | | | | | | | |
| DA2 Off-Site Acreage= | 0.07 | | | | | | | | | | |
| Total Required Storage Volume for Site TCN Requirement (ft ³)= | 22,519 | | | | | | | | | | |
| Will site use underground water harvesting? | No | Enter % volume reduction in decimal form= | | | | Note: Supporting information/details should be submitted to demonstrate water usage. | | | | | |
| ENTER AREA TREATED BY BMP | | | | | | | | | | | |
| Land Use (acres) | Sub-DA2(a) (Ac) | | Sub-DA2(b) (Ac) | | Sub-DA2(c) (Ac) | | Sub-DA2(d) (Ac) | | Sub-DA2(e) (Ac) | | |
| Commercial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Industrial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Transportation | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| High Density (interstate, main) | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Rural | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Misc. Pervious | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Managed pervious | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | |
| Residential | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Roadway | 3.02 | 0.07 | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | |
| Driveway | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | 6.37 | | | | | | | | | | |
| Sidewalk | 0.96 | | | | | | | | | | |
| Lawn | 2.89 | | | | | | | | | | |
| Managed pervious | 6.00 | | 1.53 | | | | | | | | |
| Woods (on lots) | | | | | | | | | | | |
| Land Taken up by BMP | 0.87 | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Off-site | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | |
| Natural wetland | 0.03 | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | 0.33 | | | | | | | | |
| Totals (Ac)= | 20.14 | 0.07 | 1.86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Sub-DA2(a) BMP(s) | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| SCM 2 | Wet Detention Pond | 37,705 | 1.26 | 7.16 | 0.34 | 1.96 | 1.04 | 5.31 | 0.14 | 0.71 | 174,865 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | 5.31 | | Outflow Total Phosphorus (lb/ac/yr)= | | | 0.71 | | | |
| Sub-DA2(b) BMP(s) | | | | | | | | | | | |

| If Sub-DA2(b) is connected to upstream sub-basin(s), select all contributing sub-basin(s) from dropdown menus: | | | | | | | | | | | |
|--|-------------|-----------------------------|---------------------|--------------------------------------|---------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| Bypass #2 | | 278 | | 1.43 | | 0.27 | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA2 (c) BMP(s) | | | | | | | | | | | |
| If Sub-DA2(c) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA2 (d) BMP(s) | | | | | | | | | | | |
| If Sub-DA2(d) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA2 (e) BMP(s) | | | | | | | | | | | |
| If Sub-DA2(e) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| DA2 BMP SUMMARY | | | | | | | | | | | |
| Total Volume Treated (c.f.)= | | 174865 | | | | | | | | | |
| DA2 Outflow Total Nitrogen (lb/ac/yr)= | | 5.31 | | | | | | | | | |
| DA2 Outflow Total Phosphorus (lb/ac/yr)= | | 0.71 | | | | | | | | | |
| 1-year, 24-hour storm | | | | | | | | | | | |
| Pre Development Peak Discharge (cfs)= Q_{1-year} = | | 25.27 | | | | | | | | | |
| Post BMP Peak Discharge (cfs)= Q_{1-year} = | | 3.46 | | | | | | | | | |

Project Name: **Parker Ridge**
**DRAINAGE AREA 3
BMP CALCULATIONS**

| DRAINAGE AREA 3 - BMP DEVICES AND ADJUSTMENTS | | | | | | | | | | | |
|--|--------------------|---|---------------------|---------------------------|--------------------------------------|--|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| DA3 Site Acreage= | 41.88 | | | | | | | | | | |
| DA3 Off-Site Acreage= | 1.70 | | | | | | | | | | |
| Total Required Storage Volume for Site TCN Requirement (ft ³)= | 22,519 | | | | | | | | | | |
| Will site use underground water harvesting? | No | Enter % volume reduction in decimal form= | | | | Note: Supporting information/details should be submitted to demonstrate water usage. | | | | | |
| ENTER AREA TREATED BY BMP | | | | | | | | | | | |
| Land Use (acres) | Sub-DA3(a) (Ac) | | Sub-DA3(b) (Ac) | | Sub-DA3(c) (Ac) | | Sub-DA3(d) (Ac) | | Sub-DA3(e) (Ac) | | |
| Commercial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Industrial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Transportation | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| High Density (interstate, main) | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Rural | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Misc. Pervious | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Managed pervious | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | |
| Residential | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Roadway | 1.49 | 1.70 | 0.97 | | 0.21 | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | |
| Driveway | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | 2.52 | | 3.00 | | 0.72 | | | | | | |
| Sidewalk | 0.52 | | 0.34 | | 0.63 | | | | | | |
| Lawn | 1.26 | | 1.50 | | 0.36 | | | | | | |
| Managed pervious | 3.66 | | 3.33 | | 10.43 | | | | | | |
| Woods (on lots) | | | | | | | | | | | |
| Land Taken up by BMP | 0.49 | | 0.56 | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Off-site | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | |
| Natural wetland | | | | | 0.74 | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | 5.57 | | | | | | |
| Totals (Ac)= | 9.94 | 1.70 | 9.70 | 0.00 | 18.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Sub-DA3(a) BMP(s) | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| SCM 3 | Wet Detention Pond | 22,466 | 1.29 | 6.72 | 0.37 | 1.94 | 1.04 | 4.88 | 0.14 | 0.66 | 101,479 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | 4.88 | | Outflow Total Phosphorus (lb/ac/yr)= | | | 0.66 | | | |
| Sub-DA3(b) BMP(s) | | | | | | | | | | | |

| If Sub-DA3(b) is connected to upstream sub-basin(s), select all contributing sub-basin(s) from dropdown menus: | | | | | | | | | | | |
|--|--------------------|-----------------------------|---------------------|---------------------------|--------------------------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| SCM 4 | Wet Detention Pond | 15,841 | 1.25 | 6.48 | 0.31 | 1.59 | 1.04 | 4.83 | 0.13 | 0.63 | 109,845 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | 4.83 | | Outflow Total Phosphorus (lb/ac/yr)= | | | 0.63 | | | |
| Sub-DA3 (c) BMP(s) | | | | | | | | | | | |
| If Sub-DA3(c) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| Bypass #3 | | 7,338 | | 2.18 | | 0.71 | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | |
| Sub-DA3 (d) BMP(s) | | | | | | | | | | | |
| If Sub-DA3(d) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | |
| Sub-DA3 (e) BMP(s) | | | | | | | | | | | |
| If Sub-DA3(e) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | |
| DA3 BMP SUMMARY | | | | | | | | | | | |
| Total Volume Treated (c.f.)= | | | 211324 | | | | | | | | |
| DA3 Outflow Total Nitrogen (lb/ac/yr)= | | | 4.83 | | | | | | | | |
| DA3 Outflow Total Phosphorus (lb/ac/yr)= | | | 0.63 | | | | | | | | |
| 1-year, 24-hour storm | | | | | | | | | | | |
| Pre Development Peak Discharge (cfs)= Q_{1-year} = | | | 63.44 | | | | | | | | |
| Post BMP Peak Discharge (cfs)= Q_{1-year} = | | | 34.43 | | | | | | | | |

Project Name: Parker Ridge

DRAINAGE AREA 4 BMP CALCULATIONS

| DRAINAGE AREA 4 - BMP DEVICES AND ADJUSTMENTS | | | | | | | | | | | |
|---|--------------------|---|---------------------|---------------------------|---------------------|---------------------------|----------------------|--|----------------------|----------------------------|--------------------------------|
| DA4 Site Acreage= | 0.77 | | | | | | | | | | |
| DA4 Off-Site Acreage= | 0.00 | | | | | | | | | | |
| Total Required Storage Volume for Site TCN Requirement (ft ³)= | 22,519 | | | | | | | | | | |
| Will site use underground water harvesting? | | Enter % volume reduction in decimal form= | | | | | | Note: Supporting information/details should be submitted to demonstrate water usage. | | | |
| ENTER AREA TREATED BY BMP | | | | | | | | | | | |
| Land Use (acres) | Sub-DA4(a) (Ac) | | Sub-DA4(b) (Ac) | | Sub-DA4(c) (Ac) | | Sub-DA4(d) (Ac) | | Sub-DA4(e) (Ac) | | |
| | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Commercial | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Industrial | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Transportation | | | | | | | | | | | |
| High Density (interstate, main) | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Rural | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Misc. Pervious | | | | | | | | | | | |
| Managed pervious | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | |
| Residential | | | | | | | | | | | |
| Roadway | | | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | |
| Driveway | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Lawn | | | | | | | | | | | |
| Managed pervious | | | | | | | | | | | |
| Woods (on lots) | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | |
| JURISDICTIONAL LANDS | | | | | | | | | | | |
| Natural wetland | | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Sub-DA4(a) BMP(s) | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | | | | | | | | |
| Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | | | | | |
| Sub-DA4(b) BMP(s) | | | | | | | | | | | |

| If Sub-DA4(b) is connected to upstream sub-basin(s), select all contributing sub-basin(s) from dropdown menus: | | | | | | | | | | | |
|--|-------------|-----------------------------|---------------------|--------------------------------------|---------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA4 (c) BMP(s) | | | | | | | | | | | |
| If Sub-DA4(c) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA4 (d) BMP(s) | | | | | | | | | | | |
| If Sub-DA4(d) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA4 (e) BMP(s) | | | | | | | | | | | |
| If Sub-DA4(e) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| DA4 BMP SUMMARY | | | | | | | | | | | |
| Total Volume Treated (c.f.)= | | | 0 | | | | | | | | |
| DA4 Outflow Total Nitrogen (lb/ac/yr)= | | | | | | | | | | | |
| DA4 Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | | | | | |
| 1-year, 24-hour storm | | | | | | | | | | | |
| Pre Development Peak Discharge (cfs)= Q_{1-year} = | | | 9.61 | | | | | | | | |
| Post BMP Peak Discharge (cfs)= Q_{1-year} = | | | 1.58 | | | | | | | | |

Project Name: Parker Ridge

DRAINAGE AREA 5 BMP CALCULATIONS

| DRAINAGE AREA 5 - BMP DEVICES AND ADJUSTMENTS | | | | | | | | | | | |
|---|--------------------|---|--------------------------------------|---------------------------|---------------------|---------------------------|----------------------|--|----------------------|----------------------------|--------------------------------|
| DA5 Site Acreage= | 1.12 | | | | | | | | | | |
| DA5 Off-Site Acreage= | 0.00 | | | | | | | | | | |
| Total Required Storage Volume for Site TCN Requirement (ft ³)= | 22,519 | | | | | | | | | | |
| Will site use underground water harvesting? | | Enter % volume reduction in decimal form= | | | | | | Note: Supporting information/details should be submitted to demonstrate water usage. | | | |
| ENTER AREA TREATED BY BMP | | | | | | | | | | | |
| Land Use (acres) | Sub-DA5(a) (Ac) | | Sub-DA5(b) (Ac) | | Sub-DA5(c) (Ac) | | Sub-DA5(d) (Ac) | | Sub-DA5(e) (Ac) | | |
| Commercial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Industrial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Transportation | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| High Density (interstate, main) | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Rural | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Misc. Pervious | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Managed pervious | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | |
| Residential | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Roadway | | | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | |
| Driveway | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Lawn | | | | | | | | | | | |
| Managed pervious | | | | | | | | | | | |
| Woods (on lots) | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Off-site | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | |
| Natural wetland | | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Sub-DA5(a) BMP(s) | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | | |
| Sub-DA5(b) BMP(s) | | | | | | | | | | | |

| If Sub-DA5(b) is connected to upstream sub-basin(s), select all contributing sub-basin(s) from dropdown menus: | | | | | | | | | | | |
|--|-------------|-----------------------------|---------------------|--------------------------------------|---------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA5 (c) BMP(s) | | | | | | | | | | | |
| If Sub-DA5(c) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA5 (d) BMP(s) | | | | | | | | | | | |
| If Sub-DA5(d) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA5 (e) BMP(s) | | | | | | | | | | | |
| If Sub-DA5(e) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| DA5 BMP SUMMARY | | | | | | | | | | | |
| Total Volume Treated (c.f.)= | | 0 | | | | | | | | | |
| DA5 Outflow Total Nitrogen (lb/ac/yr)= | | | | | | | | | | | |
| DA5 Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | | | | | |
| 1-year, 24-hour storm | | | | | | | | | | | |
| Pre Development Peak Discharge (cfs)= Q _{1-year} = | | 5.26 | | | | | | | | | |
| Post BMP Peak Discharge (cfs)= Q _{1-year} = | | 2.29 | | | | | | | | | |

Project Name: Parker Ridge
**DRAINAGE AREA 6
BMP CALCULATIONS**

| DRAINAGE AREA 6 - BMP DEVICES AND ADJUSTMENTS | | | | | | | | | | | |
|---|--------------------|---|--------------------------------------|---------------------------|---------------------|---------------------------|----------------------|--|----------------------|----------------------------|--------------------------------|
| DA6 Site Acreage= | 0.70 | | | | | | | | | | |
| DA6 Off-Site Acreage= | 0.00 | | | | | | | | | | |
| Total Required Storage Volume for Site TCN Requirement (ft ³)= | 22,519 | | | | | | | | | | |
| Will site use underground water harvesting? | | Enter % volume reduction in decimal form= | | | | | | Note: Supporting information/details should be submitted to demonstrate water usage. | | | |
| ENTER AREA TREATED BY BMP | | | | | | | | | | | |
| Land Use (acres) | Sub-DA6(a) (Ac) | | Sub-DA6(b) (Ac) | | Sub-DA6(c) (Ac) | | Sub-DA6(d) (Ac) | | Sub-DA6(e) (Ac) | | |
| Commercial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Industrial | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Open/Landscaped | | | | | | | | | | | |
| Transportation | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| High Density (interstate, main) | | | | | | | | | | | |
| High Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Low Density (secondary, feeder) | | | | | | | | | | | |
| Low Density (Grassed Right-of-ways) | | | | | | | | | | | |
| Rural | | | | | | | | | | | |
| Rural (Grassed Right-of-ways) | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Misc. Pervious | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Managed pervious | | | | | | | | | | | |
| Unmanaged (pasture) | | | | | | | | | | | |
| Woods (not on lots) | | | | | | | | | | | |
| Residential | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | Site | Off-site | |
| Roadway | | | | | | | | | | | |
| Grassed Right-of-ways | | | | | | | | | | | |
| Driveway | | | | | | | | | | | |
| Parking lot | | | | | | | | | | | |
| Roof | | | | | | | | | | | |
| Sidewalk | | | | | | | | | | | |
| Lawn | | | | | | | | | | | |
| Managed pervious | | | | | | | | | | | |
| Woods (on lots) | | | | | | | | | | | |
| Land Taken up by BMP | | | | | | | | | | | |
| JURISDICTIONAL LANDS | Site | Off-site | Site | Offsite | Site | Offsite | Site | Offsite | Site | Offsite | |
| Natural wetland | | | | | | | | | | | |
| Riparian buffer (Zone 1 only) | | | | | | | | | | | |
| Totals (Ac)= | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Sub-DA6(a) BMP(s) | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | | |
| Sub-DA6(b) BMP(s) | | | | | | | | | | | |

| If Sub-DA6(b) is connected to upstream sub-basin(s), select all contributing sub-basin(s) from dropdown menus: | | | | | | | | | | | |
|--|-------------|-----------------------------|---------------------|--------------------------------------|---------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------|--------------------------------|
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA6 (c) BMP(s) | | | | | | | | | | | |
| If Sub-DA6(c) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA6 (d) BMP(s) | | | | | | | | | | | |
| If Sub-DA6(d) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| Sub-DA6 (e) BMP(s) | | | | | | | | | | | |
| If Sub-DA6(e) is connected to upstream sub-basin(s), select all contributing sub-basin(s): | | | | | | | | | | | |
| Device Name (As Shown on Plan) | Device Type | Water Quality Volume (c.f.) | Inflow N EMC (mg/L) | Total Inflow N (lb/ac/yr) | Inflow P EMC (mg/L) | Total Inflow P (lb/ac/yr) | Outflow N EMC (mg/L) | Total Outflow N (lb/ac/yr) | Outflow P EMC (mg/L) | Total Outflow P (lb/ac/yr) | Provided Volume Managed (c.f.) |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | | | | Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | |
| DA6 BMP SUMMARY | | | | | | | | | | | |
| Total Volume Treated (c.f.)= | | 0 | | | | | | | | | |
| DA6 Outflow Total Nitrogen (lb/ac/yr)= | | | | | | | | | | | |
| DA6 Outflow Total Phosphorus (lb/ac/yr)= | | | | | | | | | | | |
| 1-year, 24-hour storm | | | | | | | | | | | |
| Pre Development Peak Discharge (cfs)= $Q_{1\text{-year}}$ = | | 3.44 | | | | | | | | | |
| Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$ = | | 1.43 | | | | | | | | | |

Project Name: **Parker Ridge**

DA SITE SUMMARY
BMP CALCULATIONS

| BMP SUMMARY | | | | | | | |
|--|---------|-------|-------|------|------|------|--|
| DRAINAGE AREA SUMMARIES | | | | | | | |
| DRAINAGE AREA: | DA1 | DA2 | DA3 | DA4 | DA5 | DA6 | |
| Post-Development (1-year, 24-hour storm) | | | | | | | |
| Peak Flow (cfs)=Q _{1-year} = | 55.85 | 72.77 | 94.02 | 1.58 | 2.29 | 1.43 | |
| Post-Development with BMPs (1-year, 24-hour storm) | | | | | | | |
| % Impervious = | 30% | | | | | | |
| Volume Managed (CF)= | 471,848 | | | | | | |
| Post BMP Peak Discharge (cfs)= Q _{1-year} = | 16.85 | 3.46 | 34.43 | 1.58 | 2.29 | 1.43 | |
| Have Target Curve Number Requirements been met? | YES | | | | | | |
| Pre Development Nitrogen and Phosphorus Load | | | | | | | |
| Total Nitrogen (lb/ac/yr)= | 0.89 | | | | | | |
| Total Phosphorus (lb/ac/yr)= | N/A | | | | | | |
| Post Development Nitrogen and Phosphorus Load | | | | | | | |
| Total Nitrogen (lb/ac/yr)= | 4.93 | | | | | | |
| Total Phosphorus (lb/ac/yr)= | N/A | | | | | | |
| Post-BMP Nitrogen Loading | | | | | | | |
| Outflow Total Nitrogen (lb/ac/yr)= | 3.10 | | | | | | |
| Outflow Total Phosphorus (lb/ac/yr)= | 0.42 | | | | | | |
| Has site met the Target? | YES | | | | | | |
| Has site met requirements for offsetting? | YES | | | | | | |