Schuyler Business Park

HERKIMER COUNTY, NEW YORK

Stormwater Analysis

Prepared By:

Terry Horst
LANDSCAPE
ARCHITECTURE, PC

Date: Feb. 21,2020

SCHUYLER BUSINESS PARK STORMWATER ANALYSIS

INTRODUCTION

This report is written to determine the changes in storm water runoff from pre to post developed conditions for the development of 3 industrial / manufacturing parcel in the Town of Schuyler, Herkimer County NY. This document can be used in the development of Storm Water Pollution Prevention Plans the follow the guidelines set forth in New York State Dept. of Environmental Conservation SPDES General Permit for Storm Water Discharges from Construction Activities Phase II, Permit No. GP-0-20-002, Dated: January 2020.

I. PROJECT DESCRIPTION

A. BACKGROUND INFORMATION

This project consists of the subdivision and development of a 188Acre parcel located off Drive-In Rd in the Town of Schuyler. The NYS Thruway borders the property to the south. An existing Schuyler Business development borders the site to the West. A mix farm fields, forested land and wetlands border to the North and East.

SOILS (refer to the Soils map in Appendix I)
Soil survey report is attached. Soils present on the site are a mix of Herkimer gravely silt loam, Howard gravelly silt loam and Palmyra mix soils. These are generally moderately well drained soils suitable for storm water detention. The depth to ground water is approximately 24" to 72". In areas where infiltration practices are proposed additional testing will be required to verify water table depth. Other soils present are Fredon soils which are in areas where wetlands may be present. Development in these areas will require further investigation for permitting with USACE.

II. EXISTING (PRE-DEVELOPED) CONDITIONS

Presently the property is an agricultural field with wooded areas on the North West and South East portions. According to the survey this property is generally flat with an average 2% slope across the property from East to West. Current storm water runoff is generally low because of the gentle slopes and dense coverage. See Calculations in Appendix II

III. PROPOSED CONDITIONS

The property will be divided into three parcels. One is 26Ac. with a 200,000sf building the second is 60Ac. with a 500,000 sf building and the third is 94ac with a 1,000,000 sf building. Total increase in impervious on the entire property which includes buildings and paving is approximately 66 Ac. Increase in impervious coverage over a site generates a large increase in runoff as shown in the chart below and in calculations in appendix II.

Mitigation: The increase in stormwater runoff will be mitigated using storm water detention ponds and where appropriate underground infiltration practices. Using green

infrastructure practices such as dryswales will also help meet the NYSDEC design guideline requirements.

B. CALCULATIONS

1. Curve Numbers: See Appendix II for HydroCAD Report

2. Pre and Post calculations- refer to Appendix II for detailed Calculations and printouts. Below is a summary table.

Table 1: Pre-Development Calculations (in cfs)

STORM EVENT	1 YR.	10 YR.	100 YR.
Watershed 1	0	4.02	104.72

Table 2: Post-Development Calculations (in cfs)

STORM EVENT	1 YR.	10 YR.	100 YR.
Watershed 1	26.68	71.60	293.41
Increase from Pre W1	26.68	67.58	188.69

APPENDICES

APPENDIX I

- ***Soil Report***

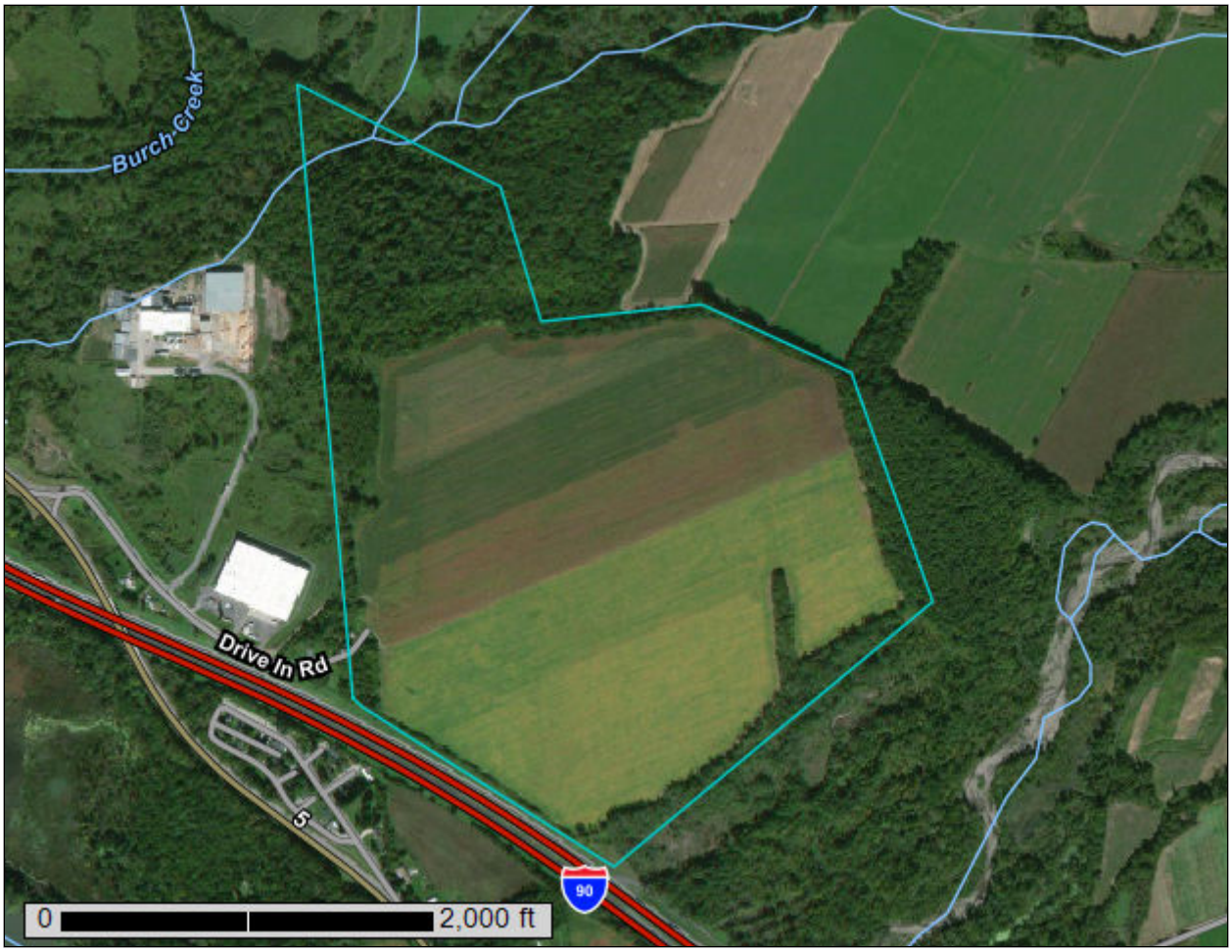
United States Department of Agriculture

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 Herkimer County, New York

Schuyler ny



July 30, 2019

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

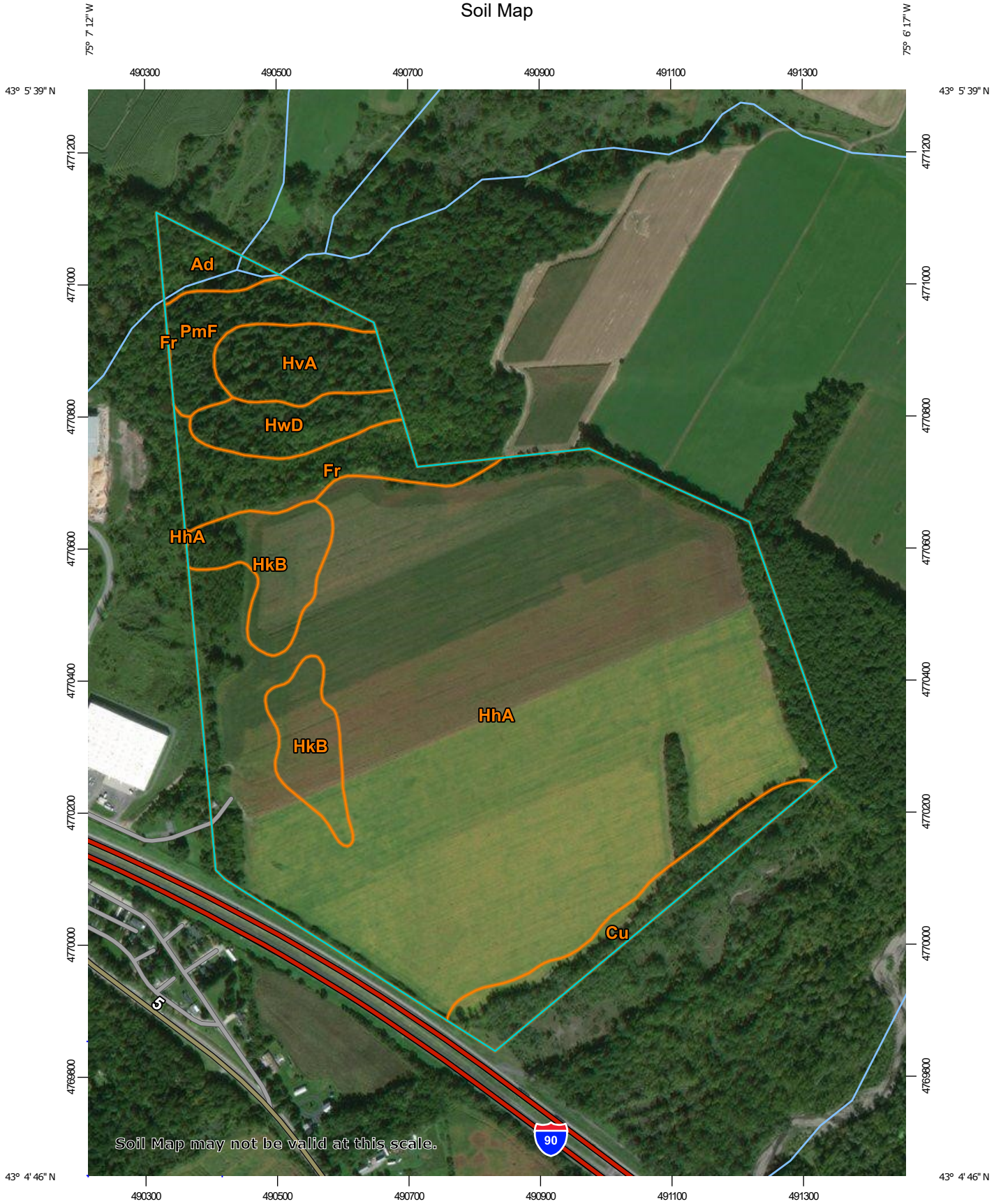
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:8,010 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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: Herkimer County, New York
Survey Area Data: Version 1, Mar 7, 2019

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

Date(s) aerial images were photographed: Apr 23, 2014—Sep 23, 2016

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
Ad	Alluvial land	3.1	1.7%
Cu	Cut and fill land	8.0	4.3%
Fr	Fredon fine sandy loam	8.6	4.6%
HhA	Herkimer gravelly silt loam, 0 to 3 percent slopes	134.8	72.9%
HkB	Herkimer gravelly silt loam, moderately well drained, 0 to 4 percent slopes	12.0	6.5%
HvA	Howard gravelly silt loam, 0 to 3 percent slopes	6.7	3.7%
HwD	Howard and Palmyra soils, 15 to 25 percent slopes	5.4	2.9%
PmF	Palmyra and Howard soils, 25 to 70 percent slopes	6.3	3.4%
Totals for Area of Interest		**184.8**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Herkimer County, New York

Ad—Alluvial land

Map Unit Setting

National map unit symbol: 9svp
Elevation: 100 to 3,000 feet
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents and similar soils: 40 percent
Udifluvents and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Typical profile

H1 - 0 to 5 inches: gravelly silt loam
H2 - 5 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 70 inches: very gravelly sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Wayland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Hamlin

Percent of map unit: 5 percent
Hydric soil rating: No

Cohoctah

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Fresh water marsh

Percent of map unit: 5 percent
Landform: Marshes
Hydric soil rating: Yes

Teel

Percent of map unit: 5 percent
Hydric soil rating: No

Cu—Cut and fill land

Map Unit Setting

National map unit symbol: 9sw9
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Typical profile

H1 - 0 to 4 inches: channery loam
H2 - 4 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: Unranked

Hornell

Percent of map unit: 5 percent
Hydric soil rating: No

Sun

Percent of map unit: 5 percent

Landform: Depressions
Hydric soil rating: Yes

Lansing
Percent of map unit: 5 percent
Hydric soil rating: No

Lamson
Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Mohawk
Percent of map unit: 5 percent
Hydric soil rating: No

Fr—Fredon fine sandy loam

Map Unit Setting
National map unit symbol: 9swg
Elevation: 250 to 1,200 feet
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Fredon, poorly drained, and similar soils: 50 percent
Fredon, somewhat poorly drained, and similar soils: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fredon, Poorly Drained

Setting
Landform: Valley trains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile
H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 15 inches: gravelly fine sandy loam
H3 - 15 to 23 inches: very gravelly fine sandy loam
H4 - 23 to 60 inches: stratified extremely gravelly loamy sand to sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Description of Fredon, Somewhat Poorly Drained

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 15 inches: gravelly fine sandy loam
H3 - 15 to 23 inches: very gravelly fine sandy loam
H4 - 23 to 60 inches: stratified extremely gravelly loamy sand to sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Phelps

Percent of map unit: 5 percent
Hydric soil rating: No

Palmyra

Percent of map unit: 5 percent
Hydric soil rating: No

Herkimer

Percent of map unit: 5 percent
Hydric soil rating: No

Howard

Percent of map unit: 5 percent
Hydric soil rating: No

Halsey

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

HhA—Herkimer gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9swr
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Herkimer and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Herkimer

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy old alluvium derived from dark, calcareous shale and varying amounts of sandstone and limestone

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 31 inches: gravelly silt loam
H3 - 31 to 46 inches: gravelly silt loam
H4 - 46 to 75 inches: channery loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Palmyra
Percent of map unit: 5 percent
Hydric soil rating: No

Howard
Percent of map unit: 5 percent
Hydric soil rating: No

Fredon
Percent of map unit: 5 percent
Hydric soil rating: No

Phelps
Percent of map unit: 5 percent
Hydric soil rating: No

HkB—Herkimer gravelly silt loam, moderately well drained, 0 to 4 percent slopes

Map Unit Setting
National map unit symbol: 9swt
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Herkimer and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Herkimer

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave

Across-slope shape: Convex
Parent material: Loamy old alluvium derived from dark, calcareous shale and varying amounts of sandstone and limestone

Typical profile
H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 31 inches: gravelly silt loam
H3 - 31 to 46 inches: gravelly silt loam
H4 - 46 to 75 inches: channery loam

Properties and qualities
Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately 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: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Phelps
Percent of map unit: 5 percent
Hydric soil rating: No

Palmyra
Percent of map unit: 5 percent
Hydric soil rating: No

Fredon
Percent of map unit: 5 percent
Hydric soil rating: No

Howard
Percent of map unit: 5 percent
Hydric soil rating: No

HvA—Howard gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 9sxf
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 125 to 165 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Howard and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

H1 - 0 to 8 inches: gravelly silt loam
H2 - 8 to 13 inches: gravelly sandy loam
H3 - 13 to 29 inches: very gravelly sandy loam
H4 - 29 to 60 inches: extremely gravelly loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

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

Minor Components

Herkimer

Percent of map unit: 5 percent
Hydric soil rating: No

Phelps

Percent of map unit: 5 percent
Hydric soil rating: No

Hartland

Percent of map unit: 5 percent
Hydric soil rating: No

Fredon

Percent of map unit: 5 percent
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Hydric soil rating: No

HwD—Howard and Palmyra soils, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 9sxj
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Howard and similar soils: 40 percent
Palmyra and similar soils: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

H1 - 0 to 8 inches: gravelly silt loam
H2 - 8 to 13 inches: gravelly sandy loam
H3 - 13 to 29 inches: very gravelly sandy loam
H4 - 29 to 60 inches: extremely gravelly loamy fine sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent

Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Palmyra

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 17 inches: gravelly very fine sandy loam
H3 - 17 to 36 inches: gravelly silt loam
H4 - 36 to 60 inches: Error

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Herkimer

Percent of map unit: 5 percent
Hydric soil rating: No

Phelps

Percent of map unit: 5 percent
Hydric soil rating: No

Fredon

Percent of map unit: 5 percent
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Hydric soil rating: No

PmF—Palmyra and Howard soils, 25 to 70 percent slopes

Map Unit Setting

National map unit symbol: 9syw
Mean annual precipitation: 41 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 125 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Palmyra and similar soils: 40 percent
Howard and similar soils: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palmyra

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy over sandy and gravelly glaciofluvial deposits, derived mainly from limestone and other sedimentary rocks

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 17 inches: gravelly very fine sandy loam
H3 - 17 to 36 inches: gravelly silt loam
H4 - 36 to 60 inches: Error

Properties and qualities

Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A

Hydric soil rating: No

Description of Howard

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, containing significant amounts of limestone

Typical profile

H1 - 0 to 8 inches: gravelly silt loam
H2 - 8 to 13 inches: gravelly sandy loam
H3 - 13 to 29 inches: very gravelly sandy loam
H4 - 29 to 60 inches: extremely gravelly loamy fine sand

Properties and qualities

Slope: 25 to 70 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Herkimer

Percent of map unit: 5 percent
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Hydric soil rating: No

Phelps

Percent of map unit: 5 percent
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

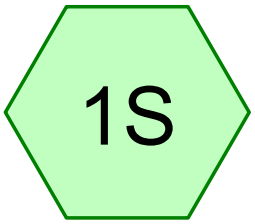
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

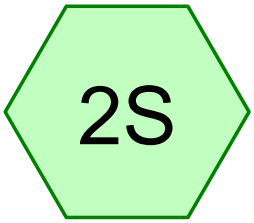
United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX II

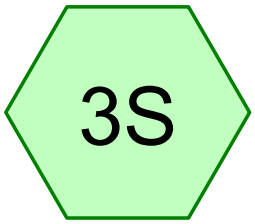
CALCULATIONS



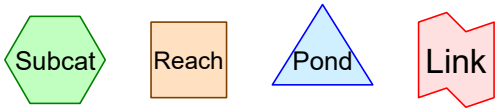
Pre Watershed 1



Pre Watershed 2



Pre Watershed 3



Routing Diagram for MVEDGE_Schuyler_HydroCAD
Prepared by Maxian + Horst, Printed 2/20/2020
HydroCAD® 10.00-24 s/n 09092 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
5,896,447	49	Pasture/grassland/range, Fair, HSG A (2S, 3S)
2,283,067	43	Woods/grass comb., Fair, HSG A (1S, 2S, 3S)
8,179,514	**47**	**TOTAL AREA**

Summary for Subcatchment 1S: Pre Watershed 1

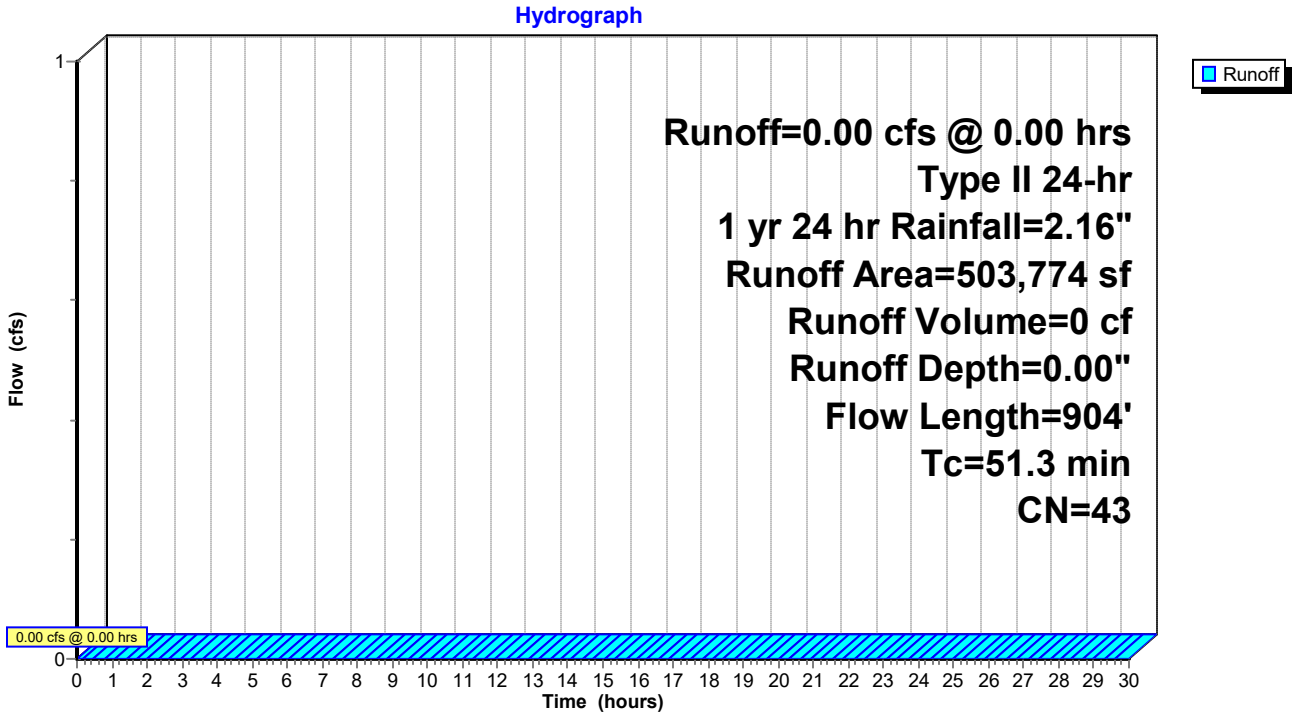
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
503,774	43	Woods/grass comb., Fair, HSG A
503,774		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	100	0.0084	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
13.6	374	0.0084	0.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	430	0.2197	2.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.3	904	Total			

Subcatchment 1S: Pre Watershed 1



Summary for Subcatchment 2S: Pre Watershed 2

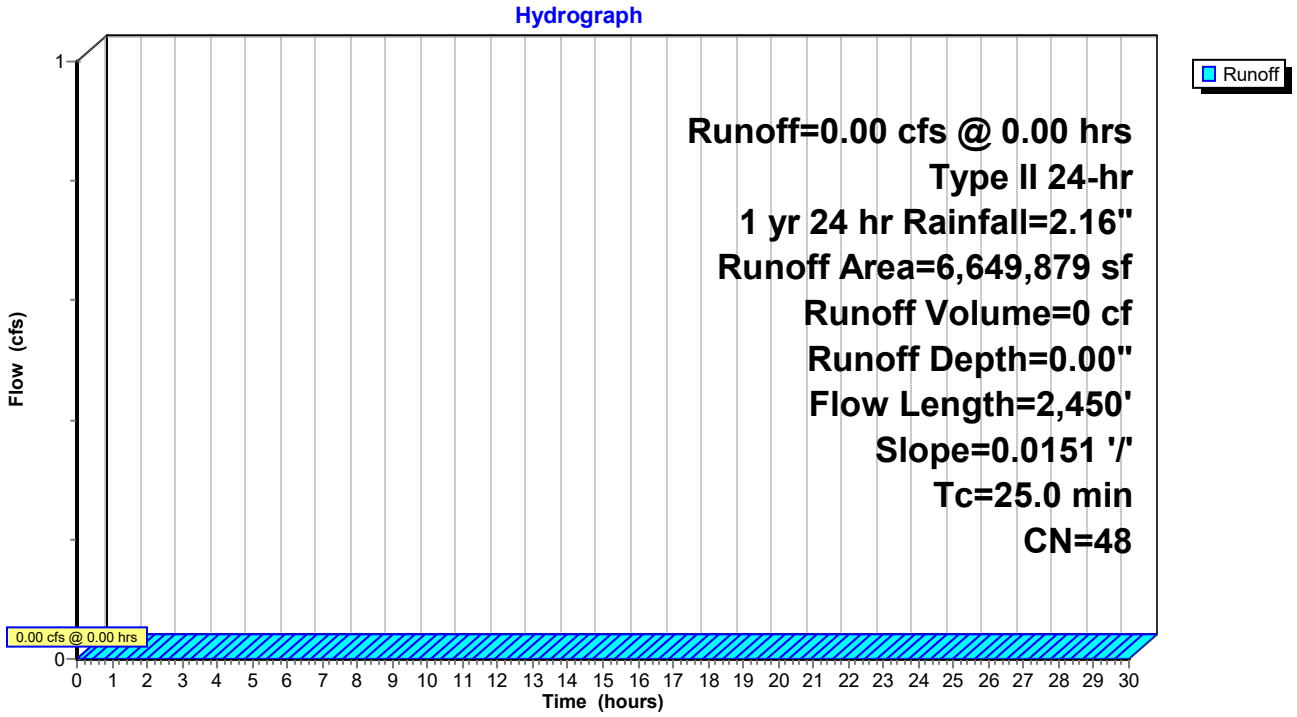
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
1,040,262	43	Woods/grass comb., Fair, HSG A
5,609,617	49	Pasture/grassland/range, Fair, HSG A
6,649,879	48	Weighted Average
6,649,879		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0151	0.32		**Sheet Flow,** Fallow n= 0.050 P2= 2.47"
19.8	2,350	0.0151	1.98		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.0	2,450	Total			

Subcatchment 2S: Pre Watershed 2



Summary for Subcatchment 3S: Pre Watershed 3

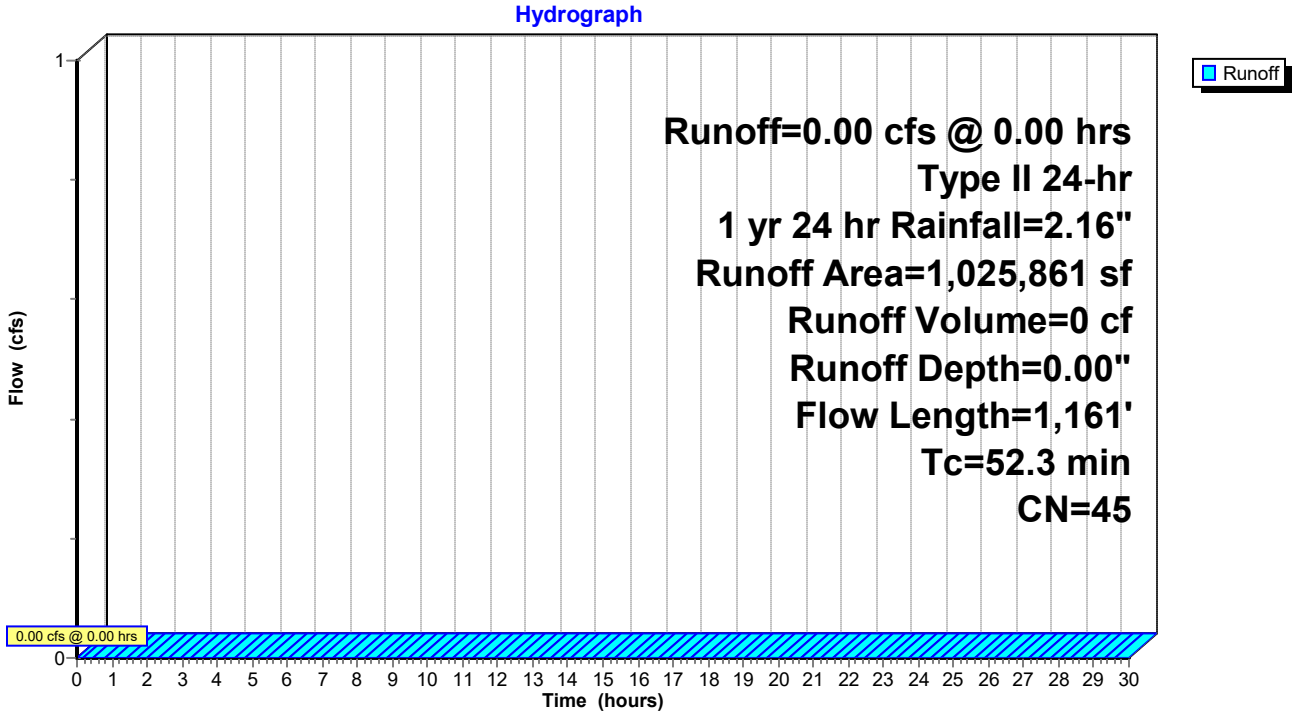
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
739,031	43	Woods/grass comb., Fair, HSG A
286,830	49	Pasture/grassland/range, Fair, HSG A
1,025,861	45	Weighted Average
1,025,861		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	100	0.0147	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
19.7	716	0.0147	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.0	345	0.0527	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
52.3	1,161	Total			

Subcatchment 3S: Pre Watershed 3



Summary for Subcatchment 1S: Pre Watershed 1

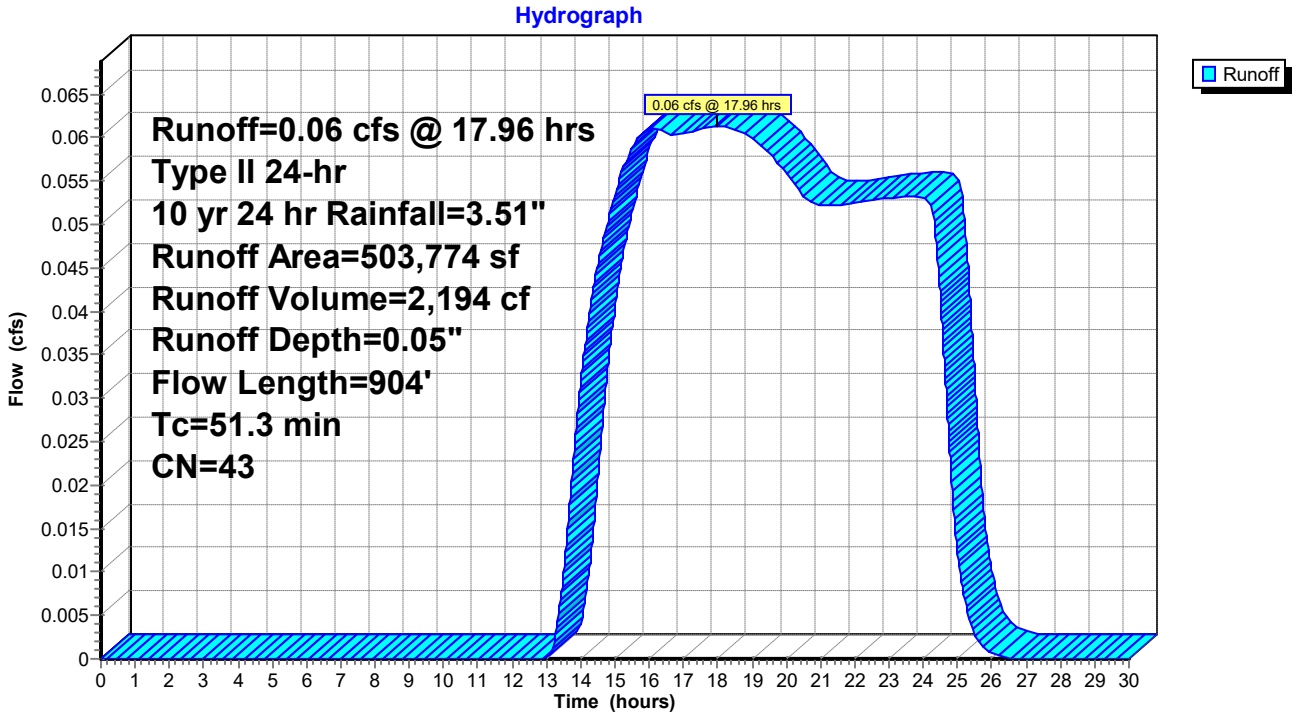
Runoff = 0.06 cfs @ 17.96 hrs, Volume= 2,194 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
503,774	43	Woods/grass comb., Fair, HSG A
503,774		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	100	0.0084	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
13.6	374	0.0084	0.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	430	0.2197	2.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.3	904	Total			

Subcatchment 1S: Pre Watershed 1



Summary for Subcatchment 2S: Pre Watershed 2

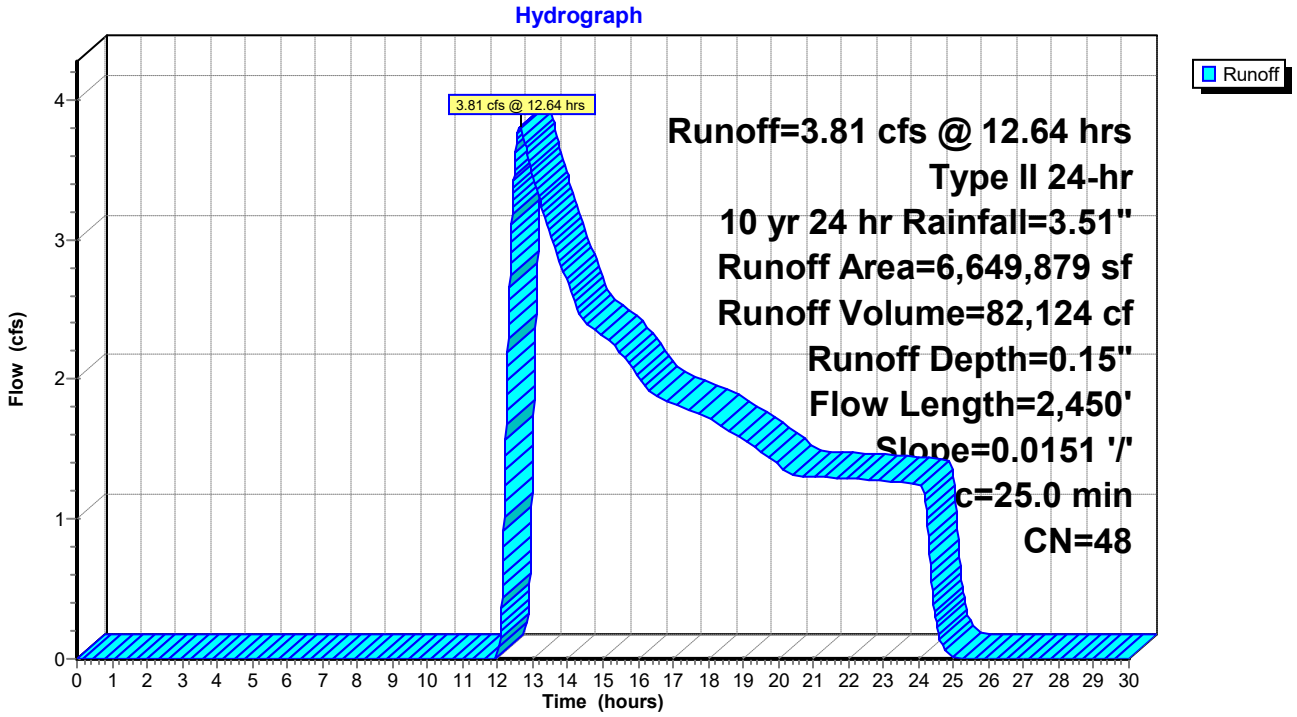
Runoff = 3.81 cfs @ 12.64 hrs, Volume= 82,124 cf, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
1,040,262	43	Woods/grass comb., Fair, HSG A
5,609,617	49	Pasture/grassland/range, Fair, HSG A
6,649,879	48	Weighted Average
6,649,879		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0151	0.32		**Sheet Flow,** Fallow n= 0.050 P2= 2.47"
19.8	2,350	0.0151	1.98		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.0	2,450	Total			

Subcatchment 2S: Pre Watershed 2



Summary for Subcatchment 3S: Pre Watershed 3

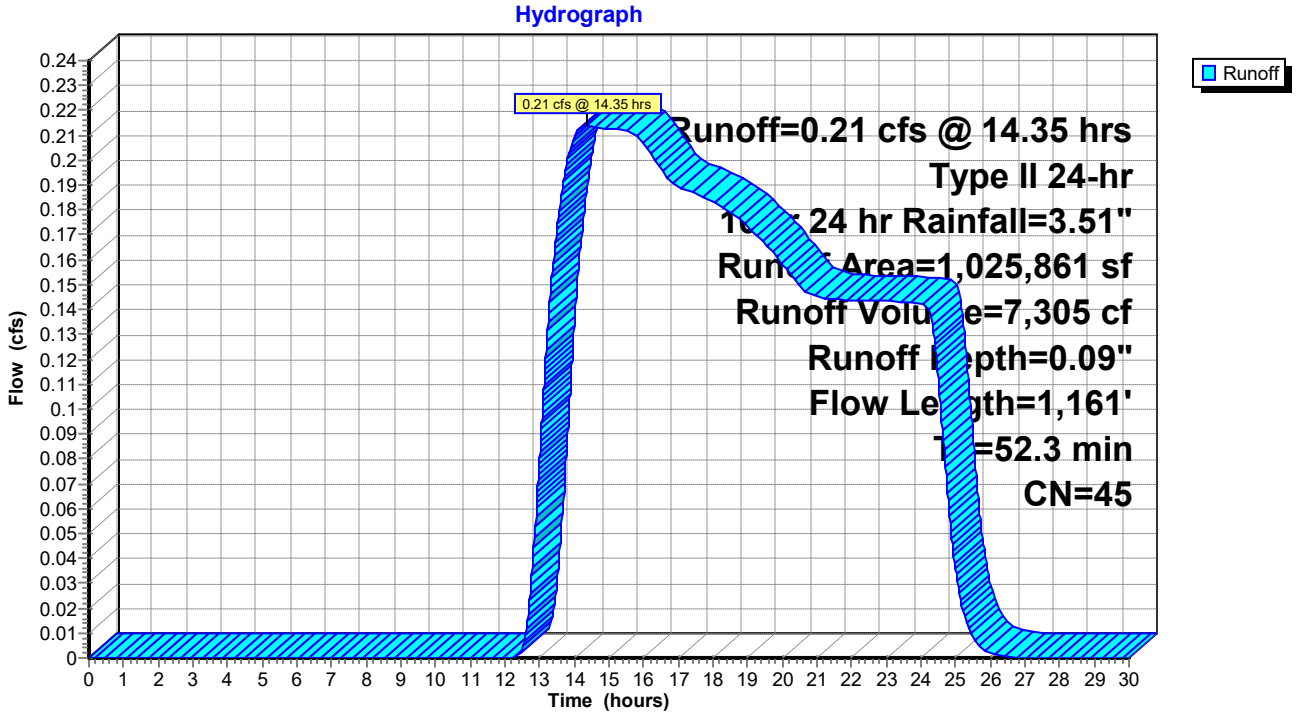
Runoff = 0.21 cfs @ 14.35 hrs, Volume= 7,305 cf, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
739,031	43	Woods/grass comb., Fair, HSG A
286,830	49	Pasture/grassland/range, Fair, HSG A
1,025,861	45	Weighted Average
1,025,861		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	100	0.0147	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
19.7	716	0.0147	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.0	345	0.0527	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
52.3	1,161	Total			

Subcatchment 3S: Pre Watershed 3



Summary for Subcatchment 1S: Pre Watershed 1

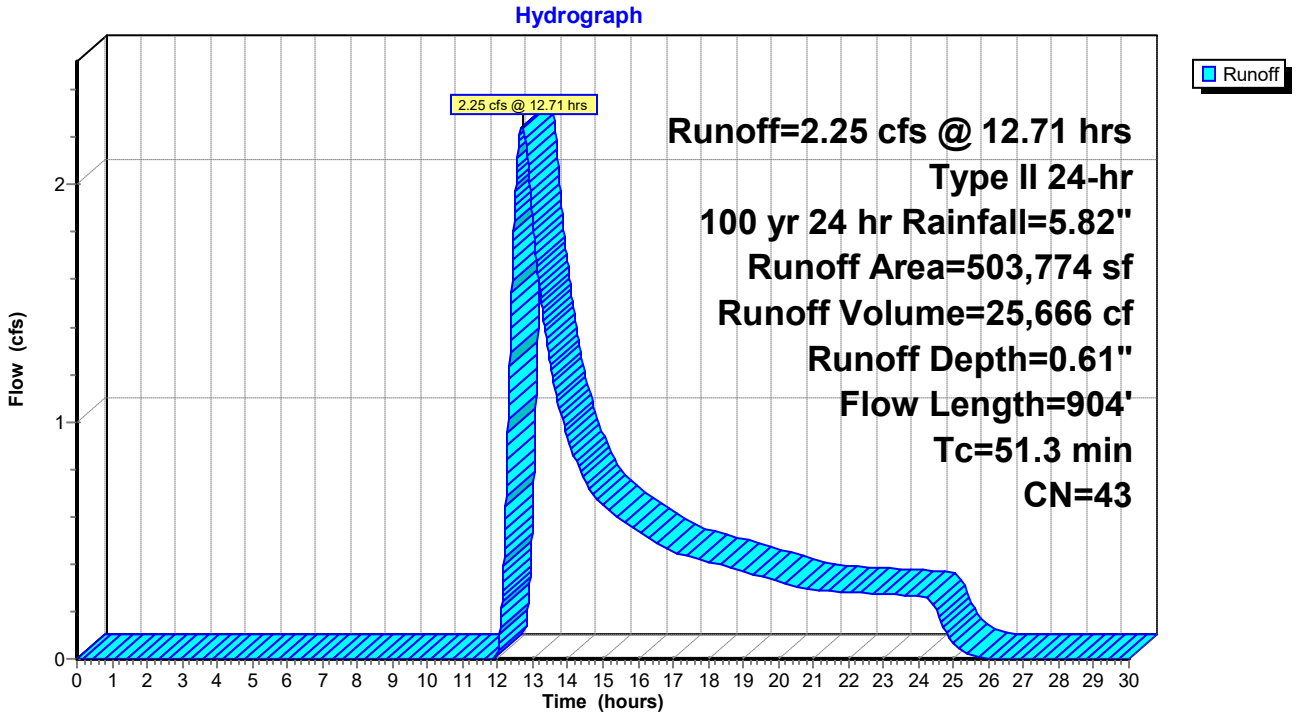
Runoff = 2.25 cfs @ 12.71 hrs, Volume= 25,666 cf, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
503,774	43	Woods/grass comb., Fair, HSG A
503,774		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	100	0.0084	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
13.6	374	0.0084	0.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	430	0.2197	2.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.3	904	Total			

Subcatchment 1S: Pre Watershed 1



Summary for Subcatchment 2S: Pre Watershed 2

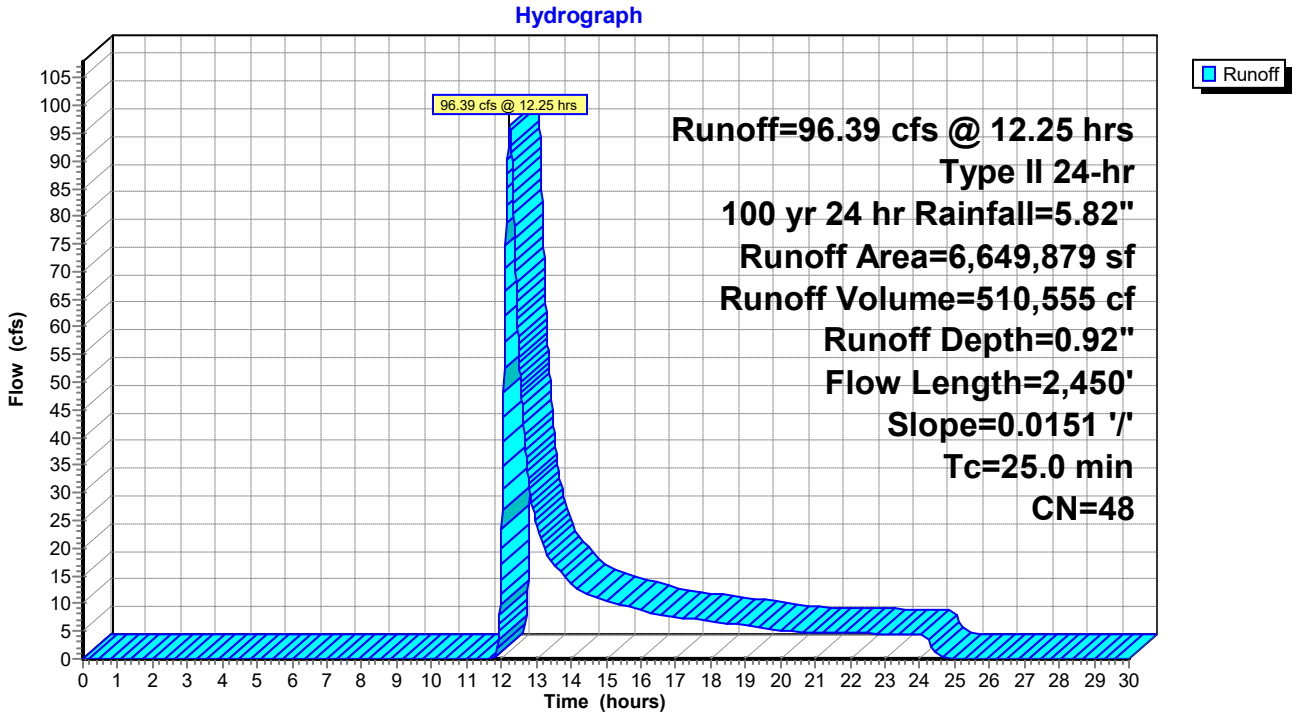
Runoff = 96.39 cfs @ 12.25 hrs, Volume= 510,555 cf, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
1,040,262	43	Woods/grass comb., Fair, HSG A
5,609,617	49	Pasture/grassland/range, Fair, HSG A
6,649,879	48	Weighted Average
6,649,879		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0151	0.32		**Sheet Flow,** Fallow n= 0.050 P2= 2.47"
19.8	2,350	0.0151	1.98		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.0	2,450	Total			

Subcatchment 2S: Pre Watershed 2



Summary for Subcatchment 3S: Pre Watershed 3

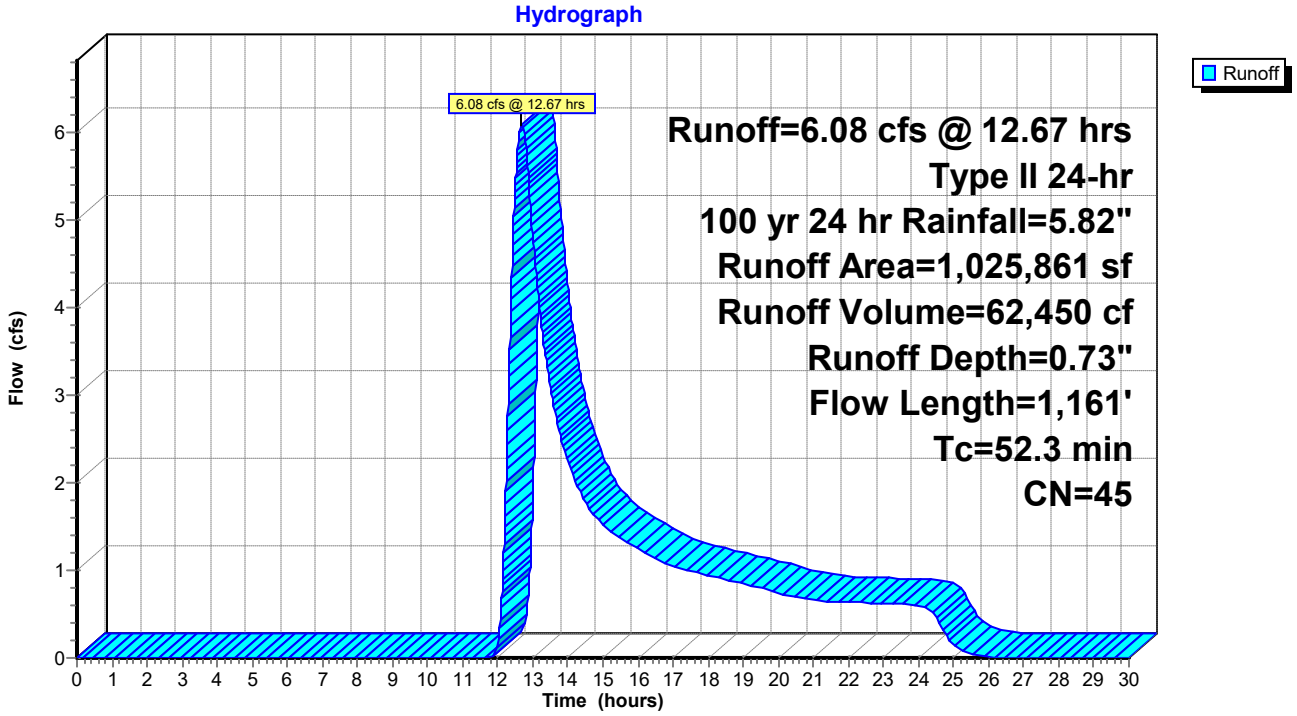
Runoff = 6.08 cfs @ 12.67 hrs, Volume= 62,450 cf, Depth= 0.73"

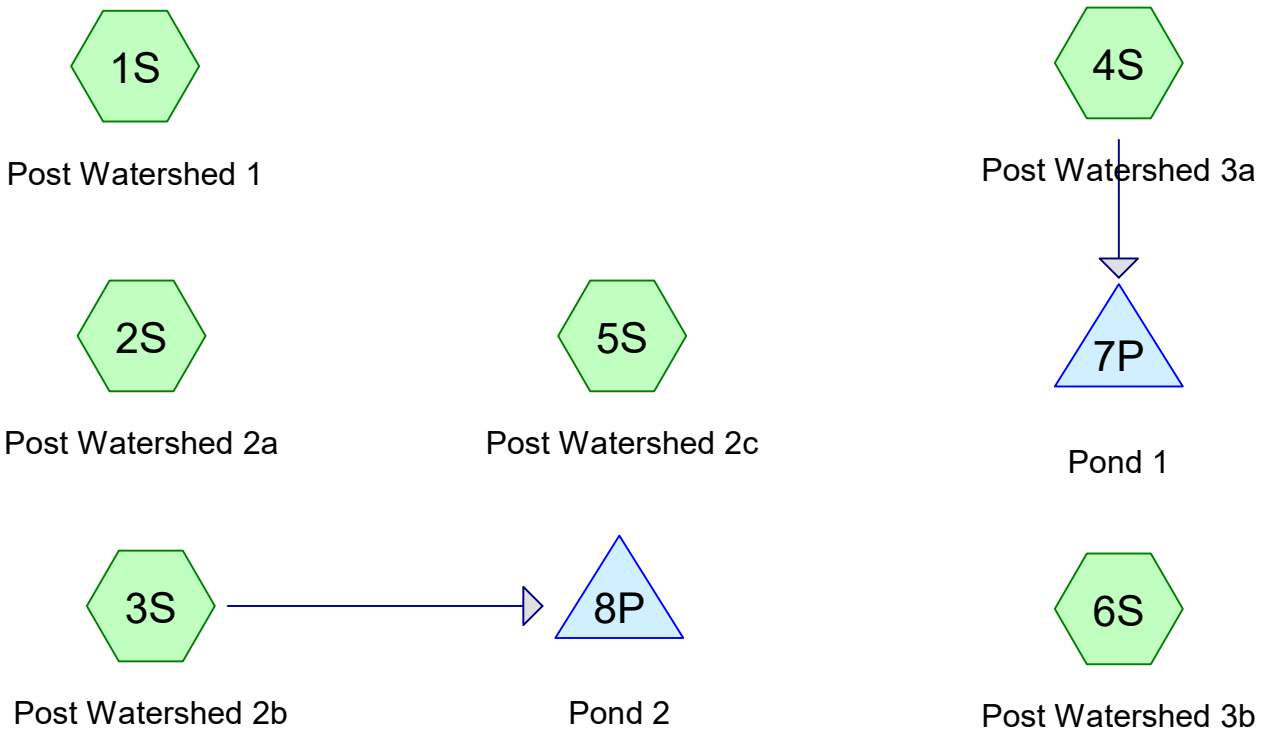
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

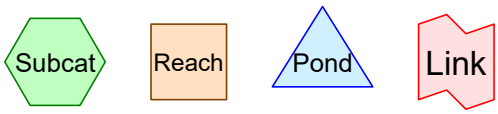
Area (sf)	CN	Description
739,031	43	Woods/grass comb., Fair, HSG A
286,830	49	Pasture/grassland/range, Fair, HSG A
1,025,861	45	Weighted Average
1,025,861		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	100	0.0147	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
19.7	716	0.0147	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.0	345	0.0527	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
52.3	1,161	Total			

Subcatchment 3S: Pre Watershed 3







Routing Diagram for MVEDGE_Schuyler_HydroCAD-Schem-Prop
Prepared by Maxian + Horst, Printed 2/20/2020
HydroCAD® 10.00-24 s/n 09092 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
2,382,439	39	>75% Grass cover, Good, HSG A (3S, 4S, 5S, 6S)
953,333	35	Brush, Fair, HSG A (2S)
2,888,603	98	Paved parking, HSG A (3S, 4S, 5S)
1,955,139	43	Woods/grass comb., Fair, HSG A (1S, 2S, 5S, 6S)
8,179,514	**60**	**TOTAL AREA**

Summary for Subcatchment 1S: Post Watershed 1

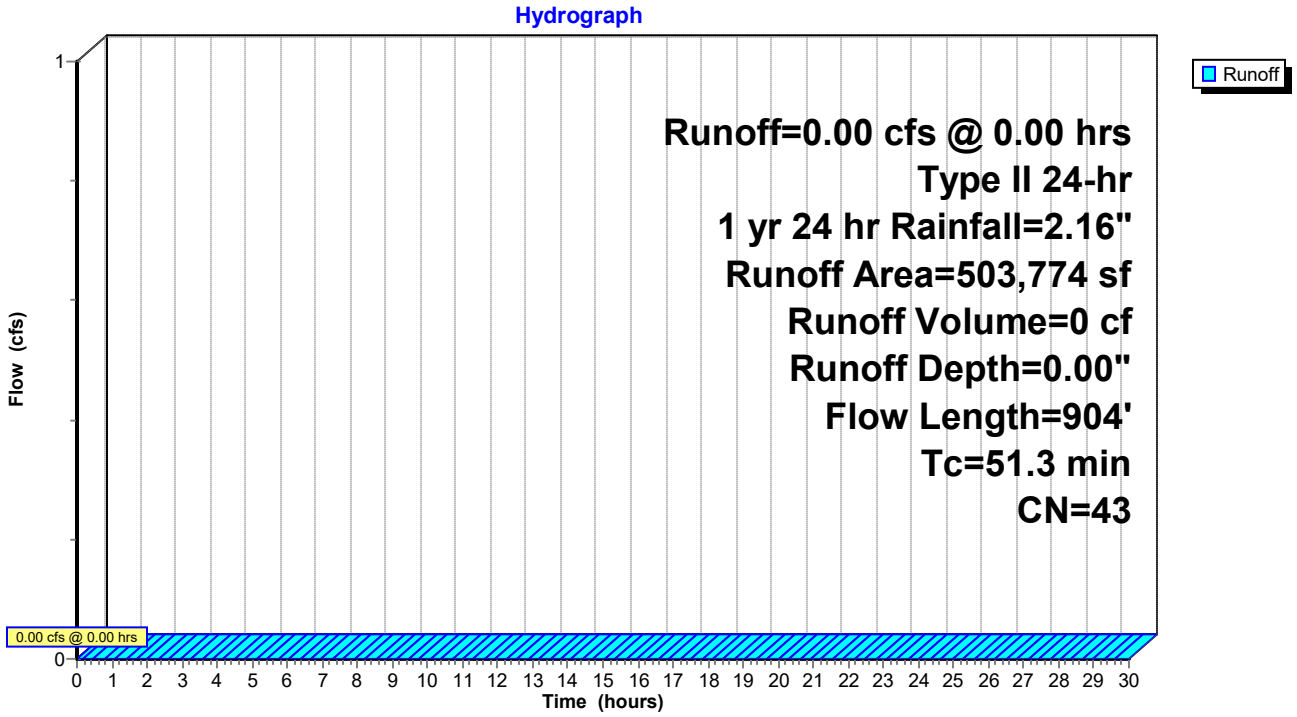
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
503,774	43	Woods/grass comb., Fair, HSG A
503,774		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	100	0.0084	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
13.6	374	0.0084	0.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	430	0.2197	2.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.3	904	Total			

Subcatchment 1S: Post Watershed 1



Summary for Subcatchment 2S: Post Watershed 2a

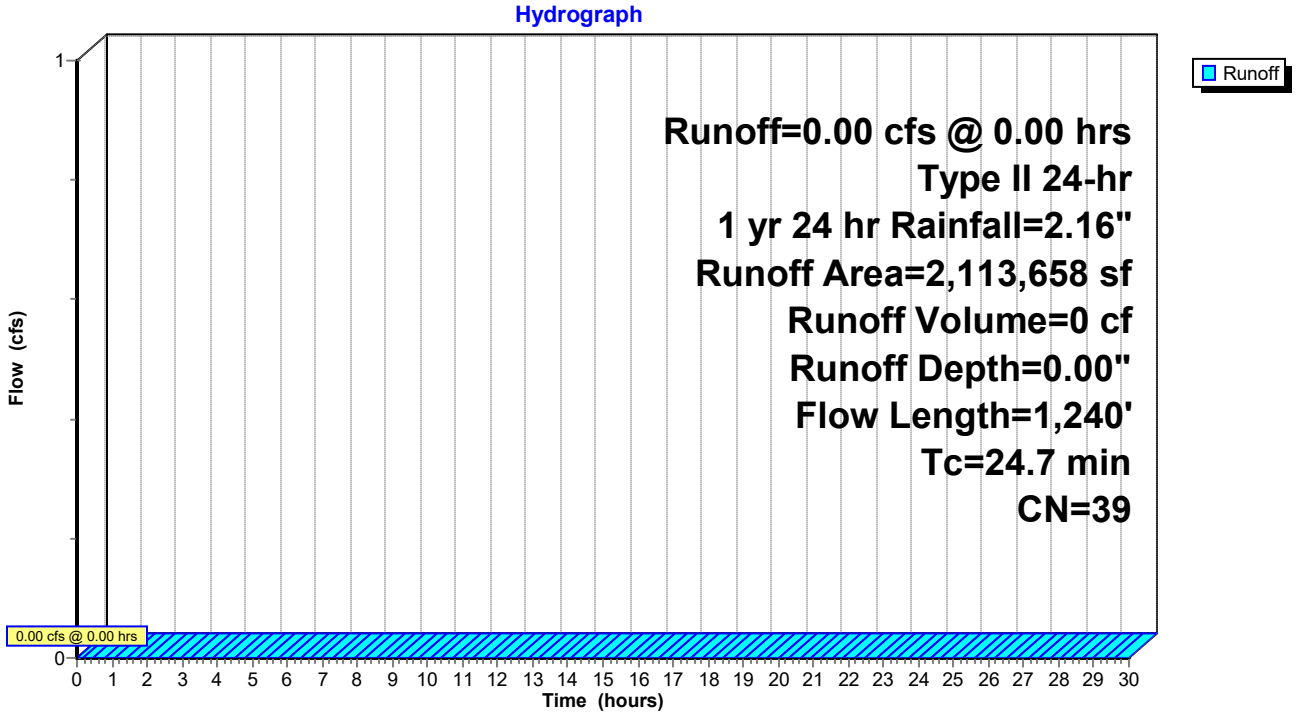
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
1,160,325	43	Woods/grass comb., Fair, HSG A
953,333	35	Brush, Fair, HSG A
2,113,658	39	Weighted Average
2,113,658		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0886	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
3.8	340	0.0886	1.49		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	800	0.0125	1.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
24.7	1,240	Total			

Subcatchment 2S: Post Watershed 2a



Summary for Subcatchment 3S: Post Watershed 2b

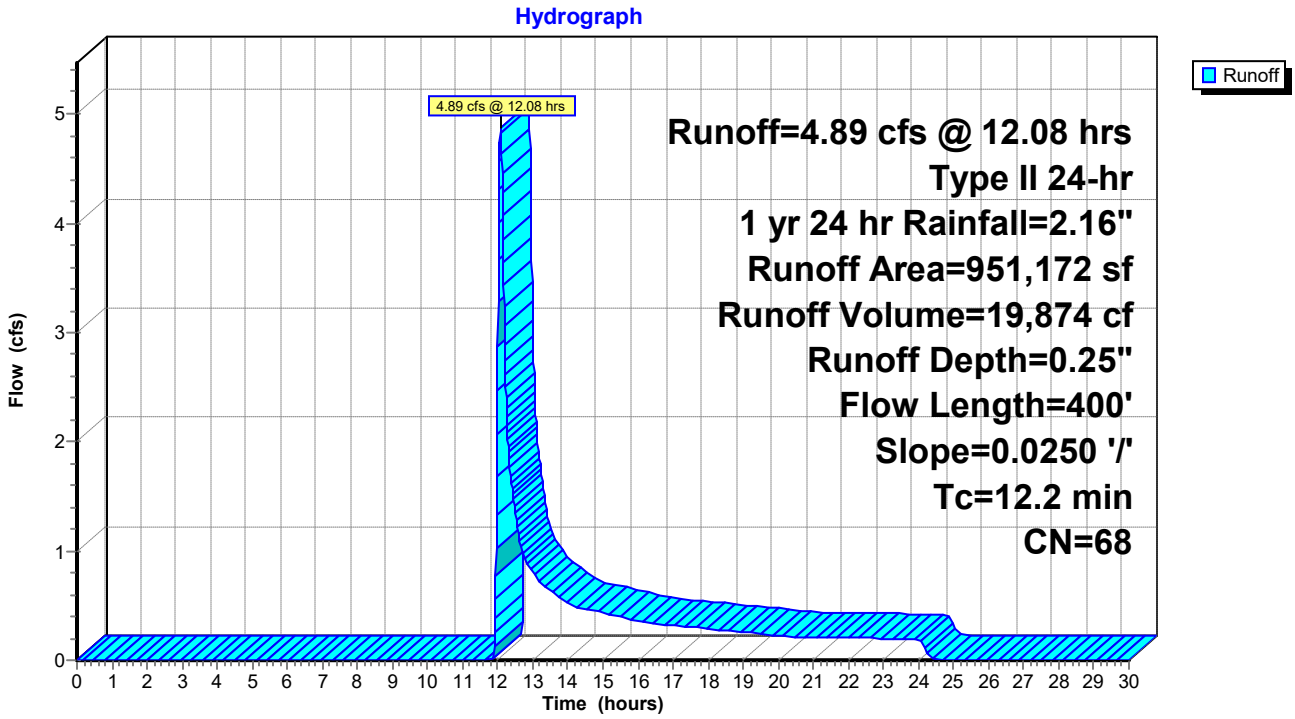
Runoff = 4.89 cfs @ 12.08 hrs, Volume= 19,874 cf, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
0	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
475,153	98	Paved parking, HSG A
476,019	39	>75% Grass cover, Good, HSG A
951,172	68	Weighted Average
476,019		50.05% Pervious Area
475,153		49.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0250	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
2.0	300	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.2	400	Total			

Subcatchment 3S: Post Watershed 2b



Summary for Subcatchment 4S: Post Watershed 3a

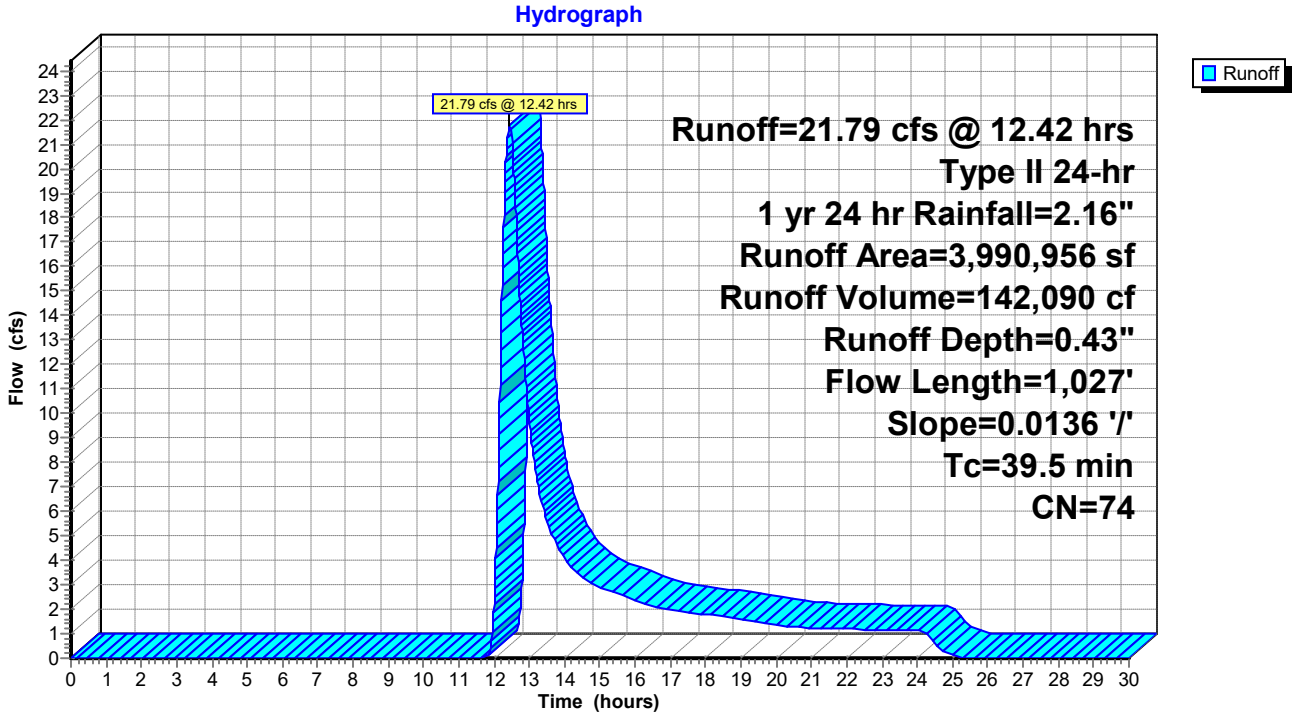
Runoff = 21.79 cfs @ 12.42 hrs, Volume= 142,090 cf, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
0	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
2,376,906	98	Paved parking, HSG A
1,614,050	39	>75% Grass cover, Good, HSG A
3,990,956	74	Weighted Average
1,614,050		40.44% Pervious Area
2,376,906		59.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0136	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
26.5	927	0.0136	0.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
39.5	1,027	Total			

Subcatchment 4S: Post Watershed 3a



Summary for Subcatchment 5S: Post Watershed 2c

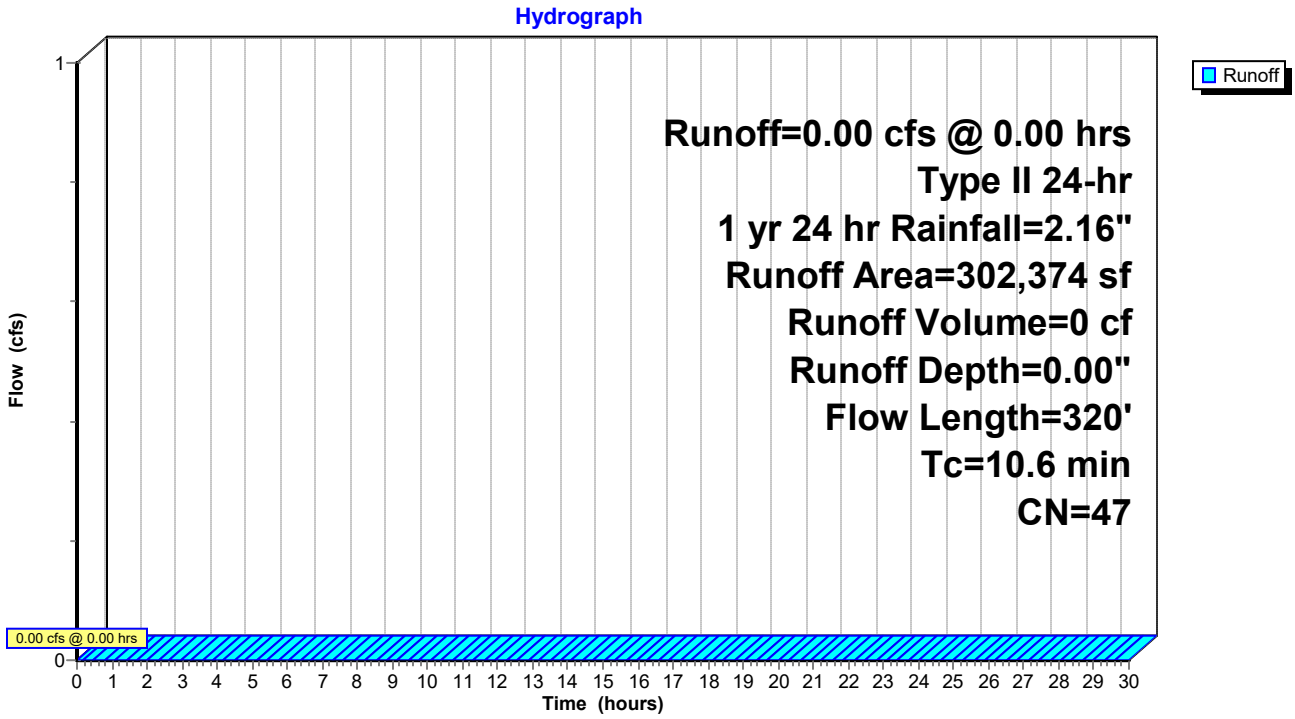
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
72,740	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
36,544	98	Paved parking, HSG A
193,090	39	>75% Grass cover, Good, HSG A
302,374	47	Weighted Average
265,830		87.91% Pervious Area
36,544		12.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0300	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
1.1	220	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.6	320	Total			

Subcatchment 5S: Post Watershed 2c



Summary for Subcatchment 6S: Post Watershed 3b

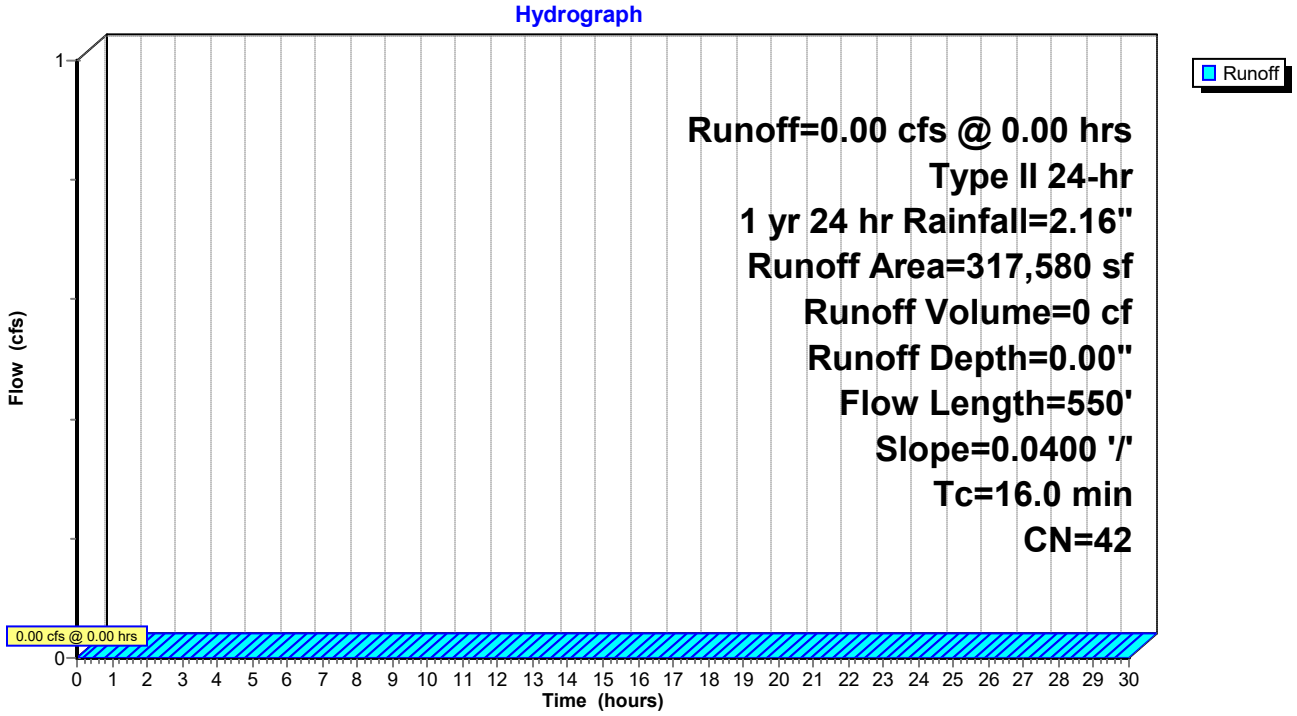
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1 yr 24 hr Rainfall=2.16"

Area (sf)	CN	Description
218,300	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
0	98	Paved parking, HSG A
99,280	39	>75% Grass cover, Good, HSG A
317,580	42	Weighted Average
317,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.0	550	Total			

Subcatchment 6S: Post Watershed 3b



Summary for Pond 7P: Pond 1

Inflow Area = 3,990,956 sf, 59.56% Impervious, Inflow Depth = 0.43" for 1 yr 24 hr event
Inflow = 21.79 cfs @ 12.42 hrs, Volume= 142,090 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 452.73' @ 26.26 hrs Surf.Area= 85,752 sf Storage= 142,090 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

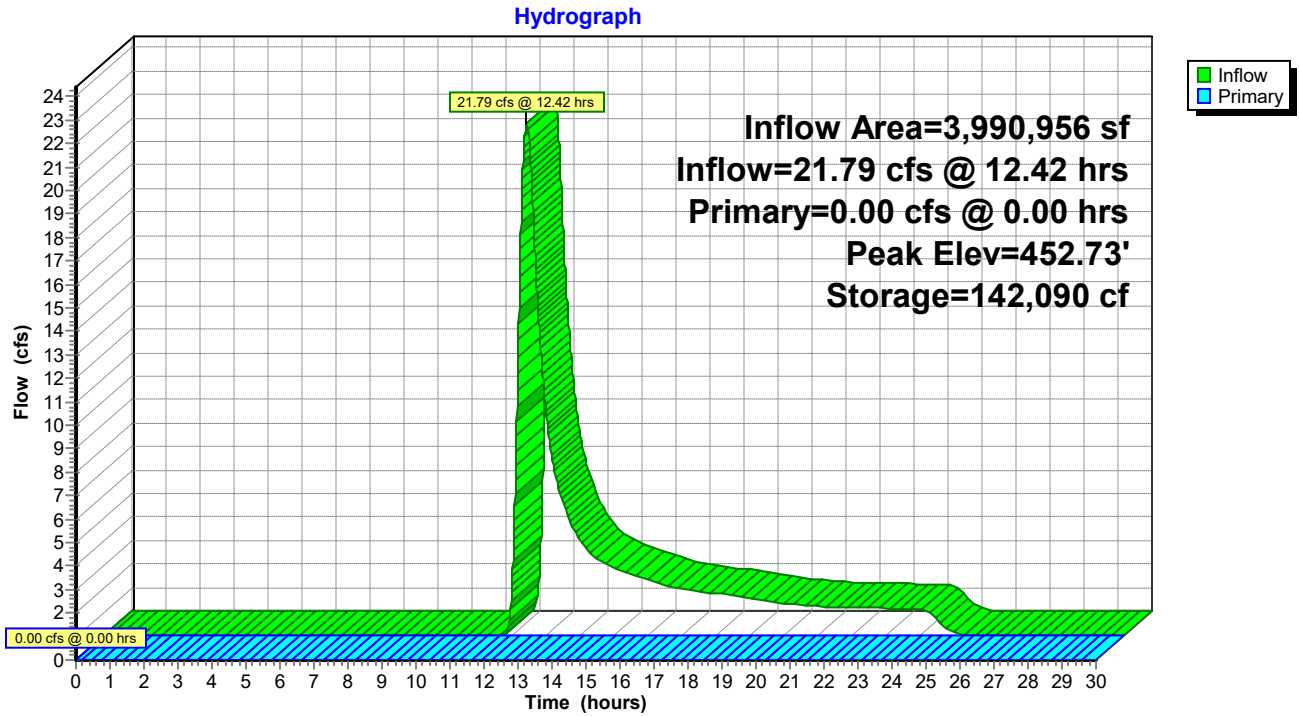
Volume	Invert	Avail.Storage	Storage Description
#1	450.99'	629,130 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
450.99	0	0	0
451.00	77,750	389	389
454.00	91,600	254,025	254,414
455.00	124,591	108,096	362,509
457.00	142,030	266,621	629,130

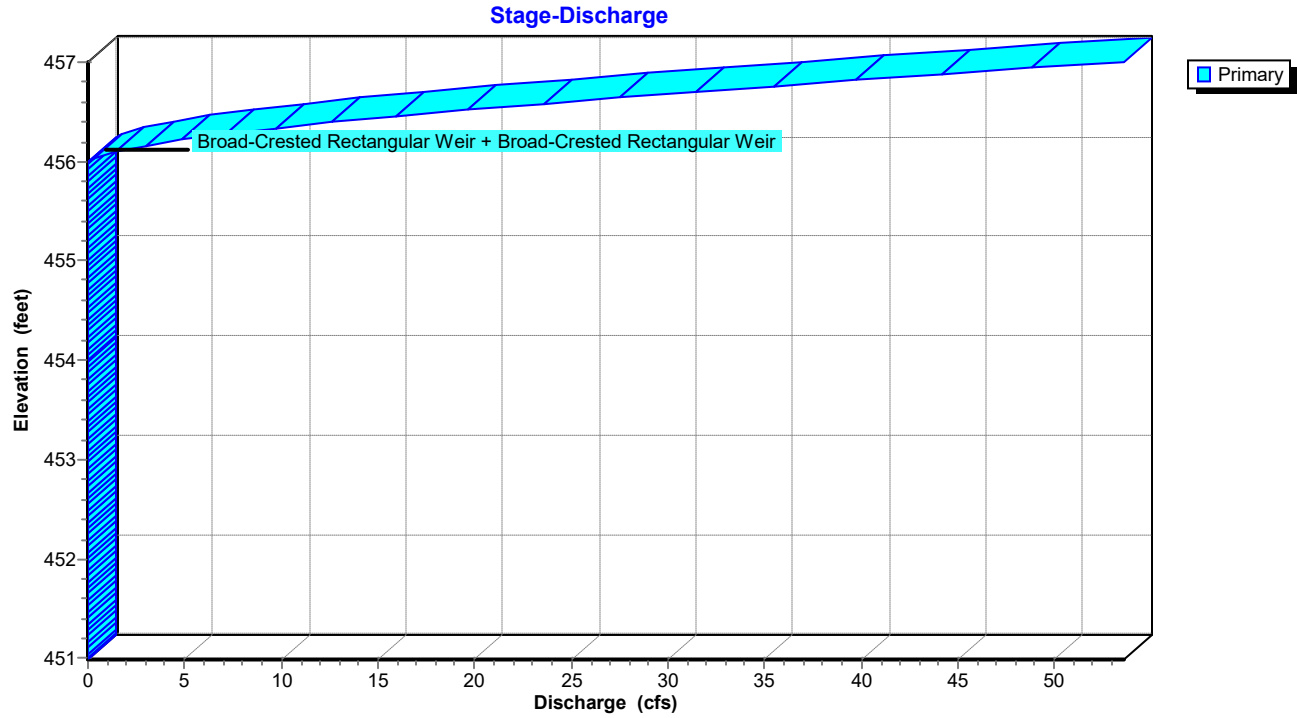
Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	456.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.99' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

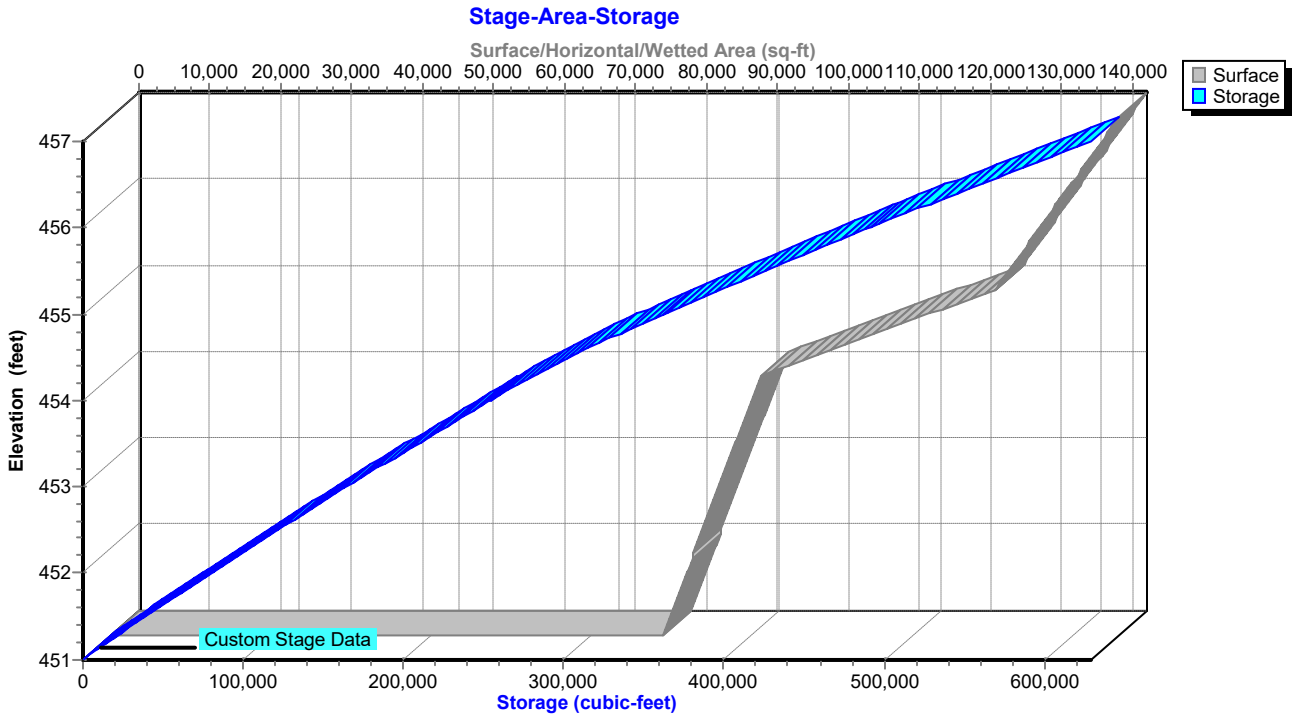
Pond 7P: Pond 1



Pond 7P: Pond 1



Pond 7P: Pond 1



Summary for Pond 8P: Pond 2

Inflow Area = 951,172 sf, 49.95% Impervious, Inflow Depth = 0.25" for 1 yr 24 hr event
Inflow = 4.89 cfs @ 12.08 hrs, Volume= 19,874 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 447.82' @ 24.71 hrs Surf.Area= 25,471 sf Storage= 19,874 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

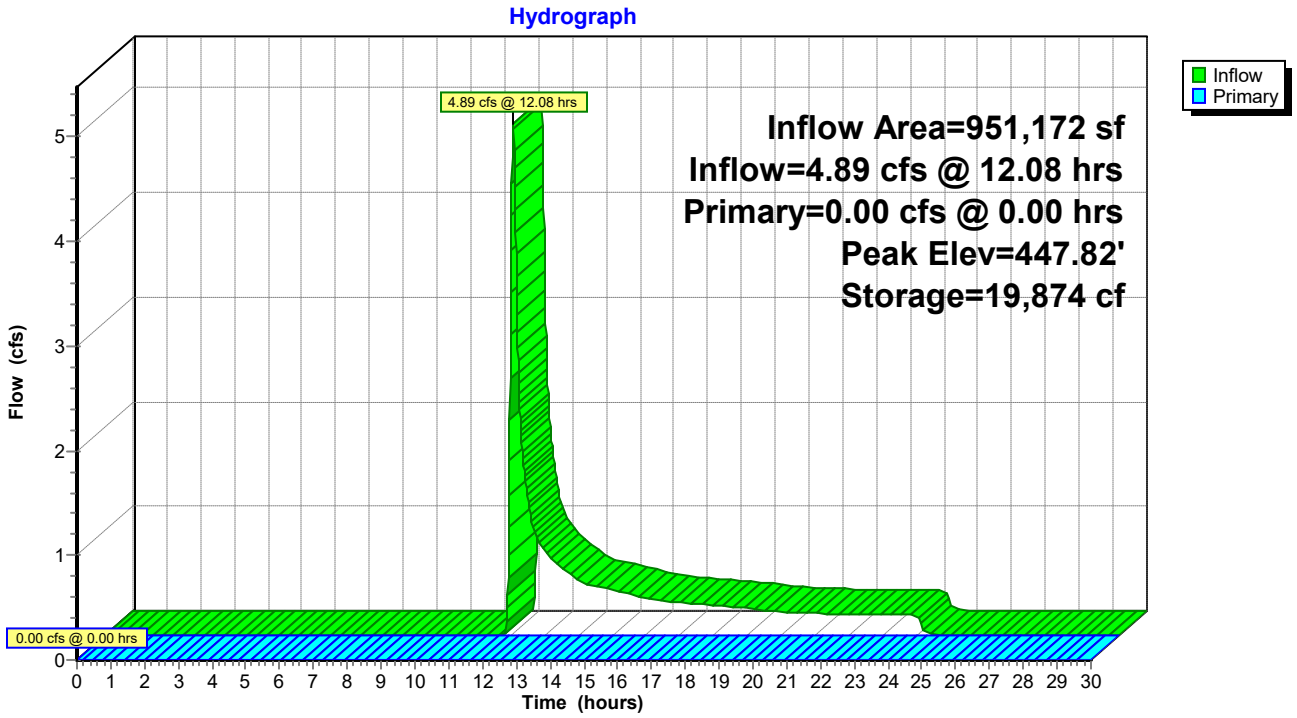
Volume	Invert	Avail.Storage	Storage Description
#1	446.99'	88,156 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
446.99	0	0	0
447.00	22,463	112	112
449.00	29,760	52,223	52,335
450.00	41,882	35,821	88,156

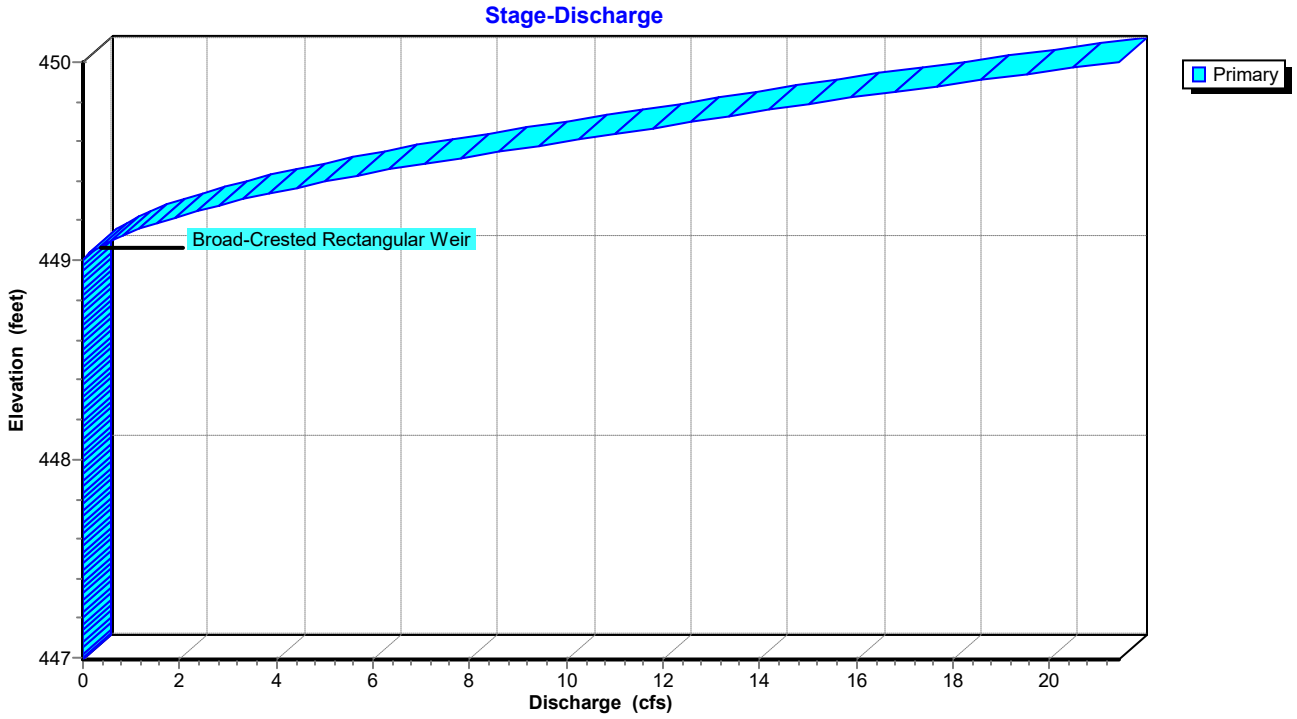
Device	Routing	Invert	Outlet Devices
#1	Primary	449.00'	**8.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=446.99' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

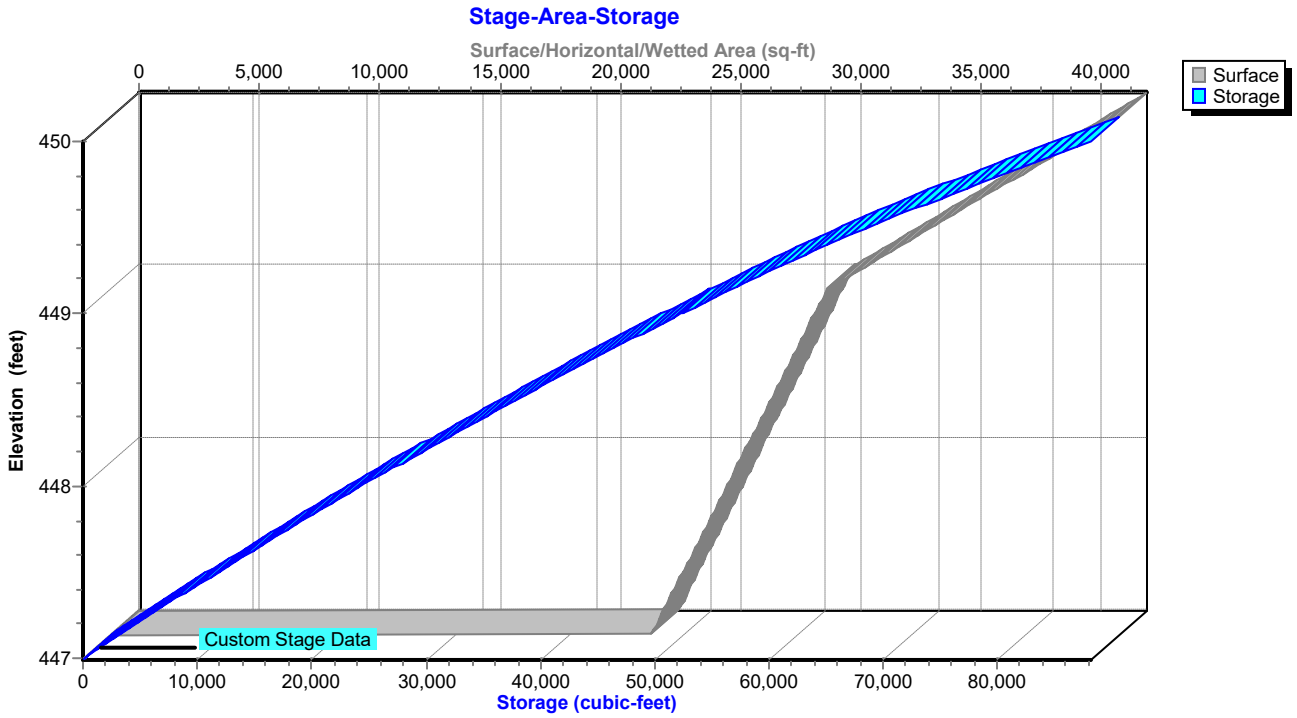
Pond 8P: Pond 2



Pond 8P: Pond 2



Pond 8P: Pond 2



Summary for Subcatchment 1S: Post Watershed 1

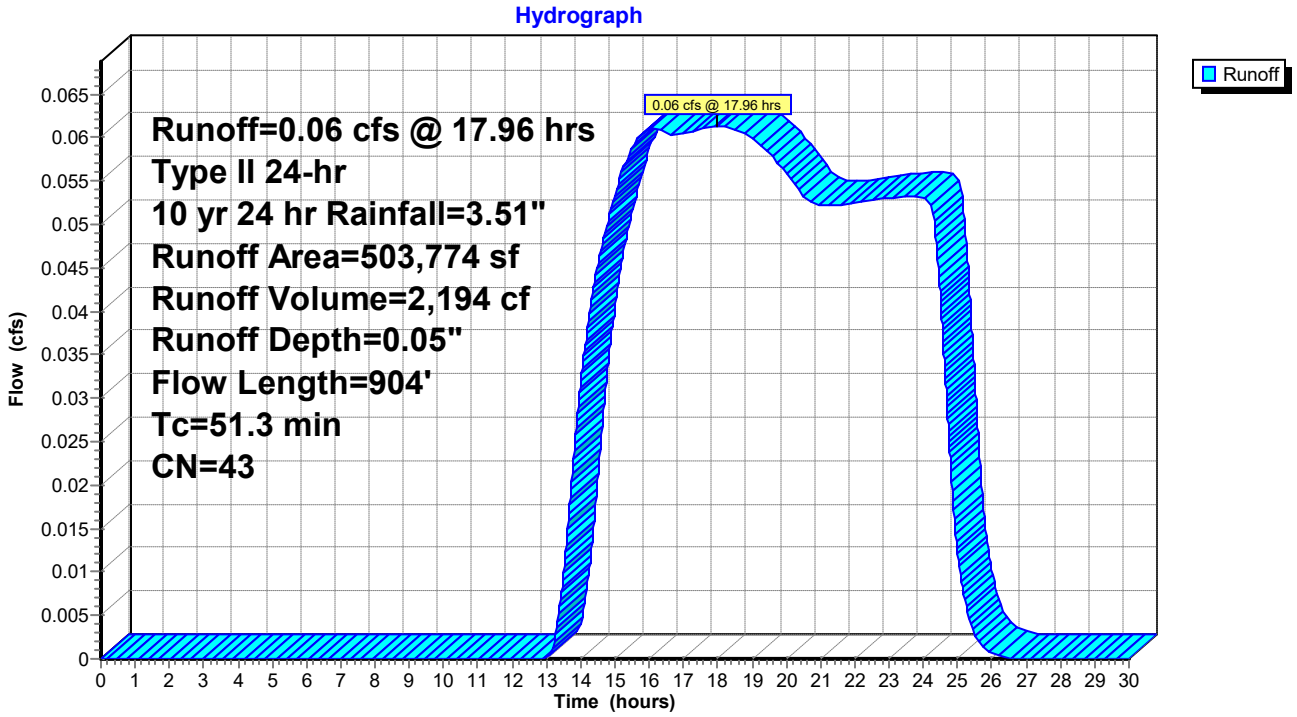
Runoff = 0.06 cfs @ 17.96 hrs, Volume= 2,194 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
503,774	43	Woods/grass comb., Fair, HSG A
503,774		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	100	0.0084	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
13.6	374	0.0084	0.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	430	0.2197	2.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.3	904	Total			

Subcatchment 1S: Post Watershed 1



Summary for Subcatchment 2S: Post Watershed 2a

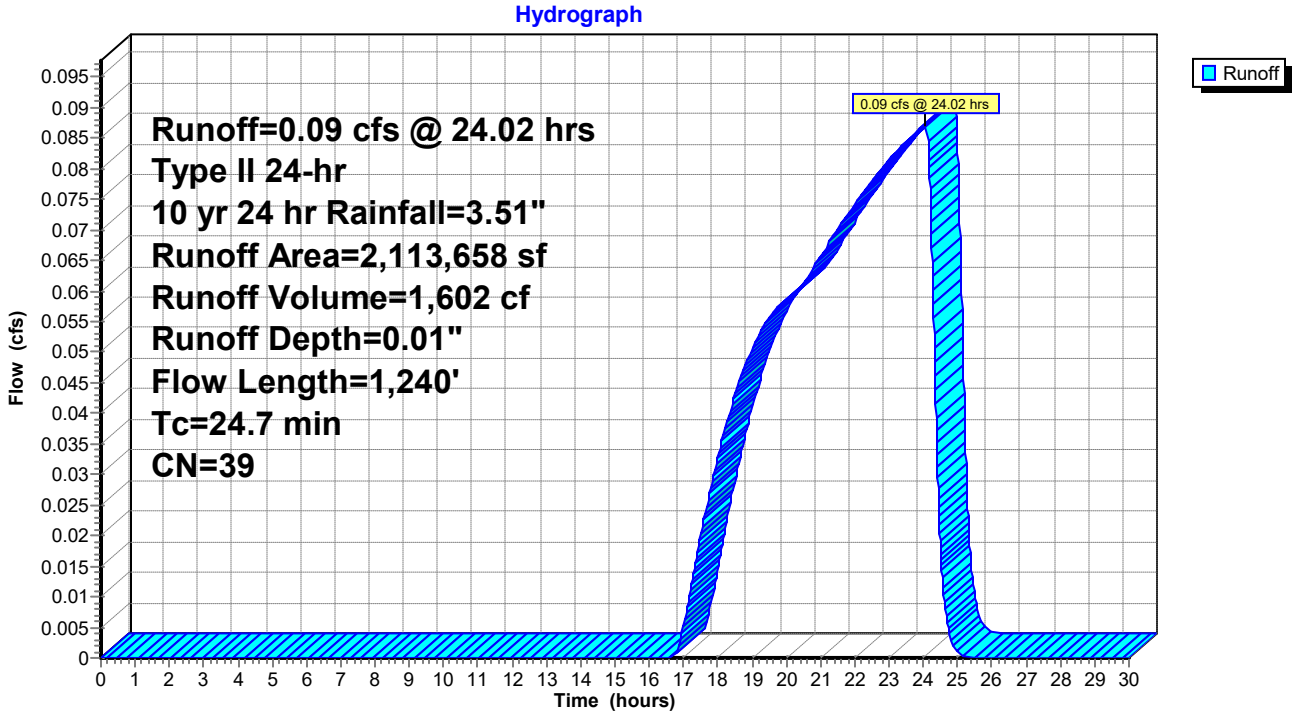
Runoff = 0.09 cfs @ 24.02 hrs, Volume= 1,602 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
1,160,325	43	Woods/grass comb., Fair, HSG A
953,333	35	Brush, Fair, HSG A
2,113,658	39	Weighted Average
2,113,658		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0886	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
3.8	340	0.0886	1.49		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	800	0.0125	1.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
24.7	1,240	Total			

Subcatchment 2S: Post Watershed 2a



Summary for Subcatchment 3S: Post Watershed 2b

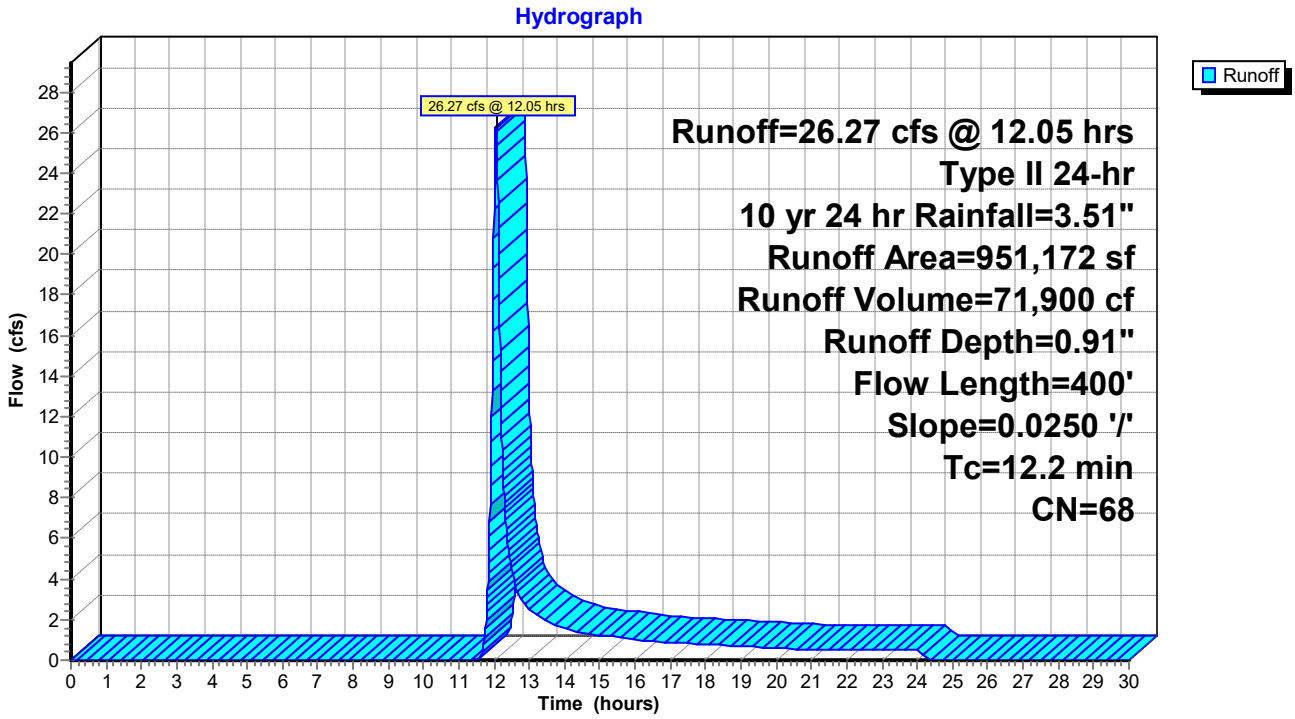
Runoff = 26.27 cfs @ 12.05 hrs, Volume= 71,900 cf, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
0	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
475,153	98	Paved parking, HSG A
476,019	39	>75% Grass cover, Good, HSG A
951,172	68	Weighted Average
476,019		50.05% Pervious Area
475,153		49.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0250	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
2.0	300	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.2	400	Total			

Subcatchment 3S: Post Watershed 2b



Summary for Subcatchment 4S: Post Watershed 3a

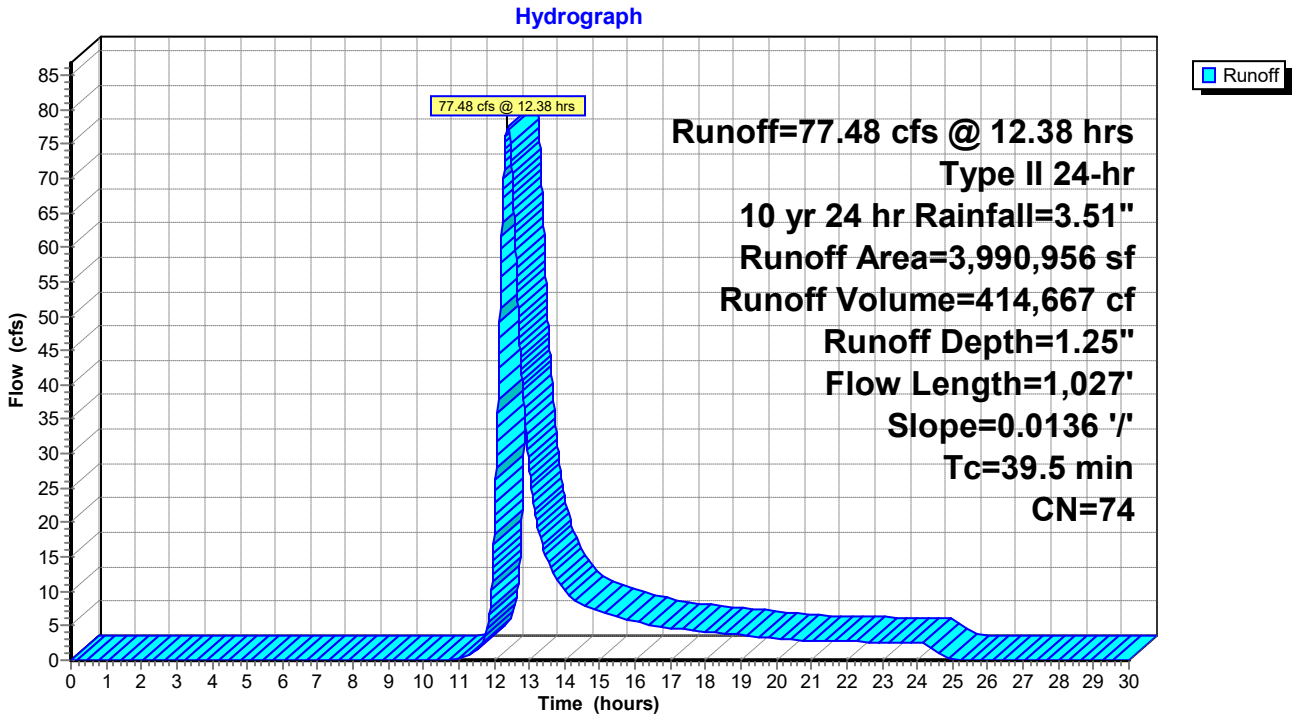
Runoff = 77.48 cfs @ 12.38 hrs, Volume= 414,667 cf, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
0	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
2,376,906	98	Paved parking, HSG A
1,614,050	39	>75% Grass cover, Good, HSG A
3,990,956	74	Weighted Average
1,614,050		40.44% Pervious Area
2,376,906		59.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0136	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
26.5	927	0.0136	0.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
39.5	1,027	Total			

Subcatchment 4S: Post Watershed 3a



Summary for Subcatchment 5S: Post Watershed 2c

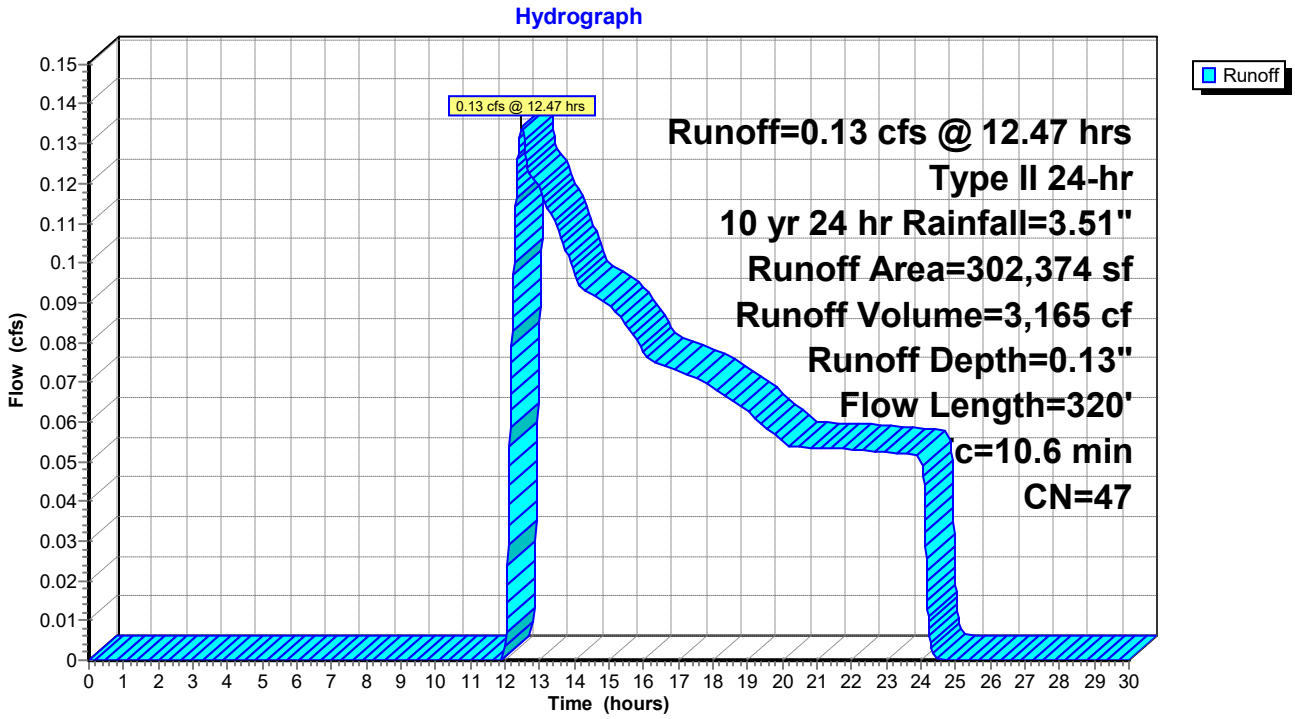
Runoff = 0.13 cfs @ 12.47 hrs, Volume= 3,165 cf, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
72,740	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
36,544	98	Paved parking, HSG A
193,090	39	>75% Grass cover, Good, HSG A
302,374	47	Weighted Average
265,830		87.91% Pervious Area
36,544		12.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0300	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
1.1	220	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.6	320	Total			

Subcatchment 5S: Post Watershed 2c



Summary for Subcatchment 6S: Post Watershed 3b

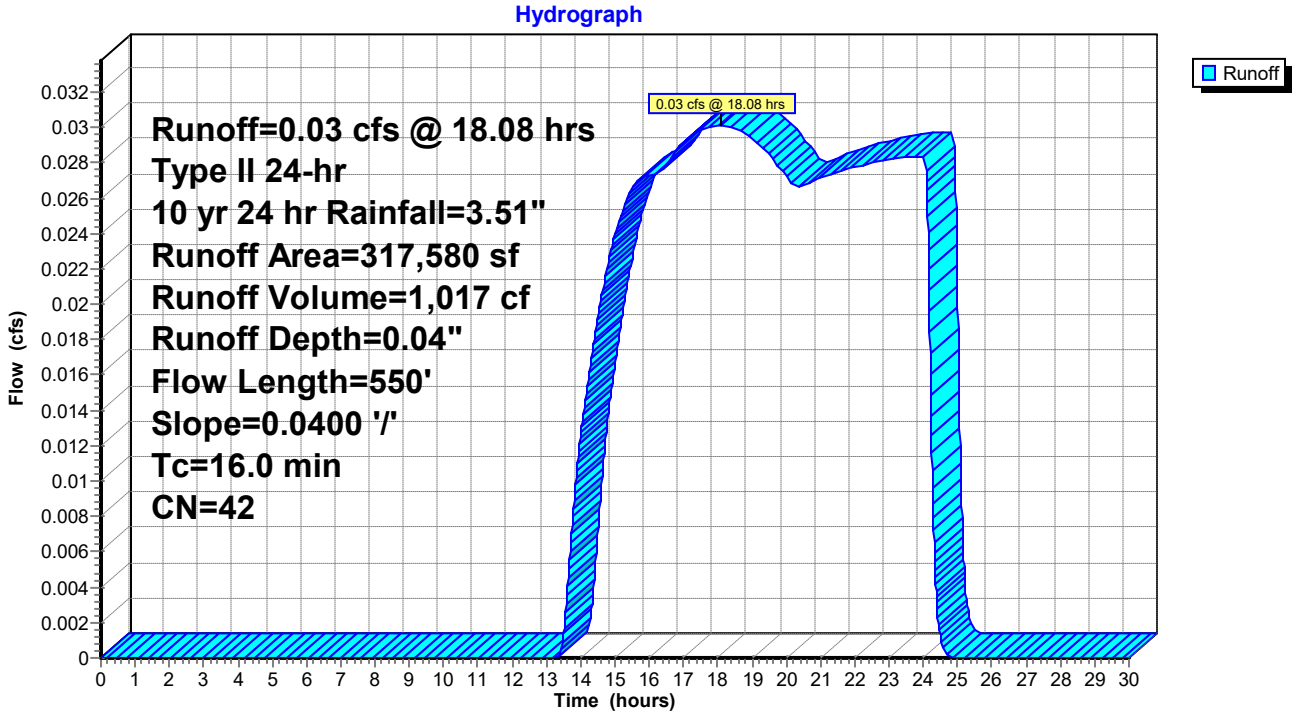
Runoff = 0.03 cfs @ 18.08 hrs, Volume= 1,017 cf, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 10 yr 24 hr Rainfall=3.51"

Area (sf)	CN	Description
218,300	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
0	98	Paved parking, HSG A
99,280	39	>75% Grass cover, Good, HSG A
317,580	42	Weighted Average
317,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.0	550	Total			

Subcatchment 6S: Post Watershed 3b



Summary for Pond 7P: Pond 1

Inflow Area = 3,990,956 sf, 59.56% Impervious, Inflow Depth = 1.25" for 10 yr 24 hr event
Inflow = 77.48 cfs @ 12.38 hrs, Volume= 414,667 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 455.41' @ 26.26 hrs Surf.Area= 128,189 sf Storage= 414,663 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

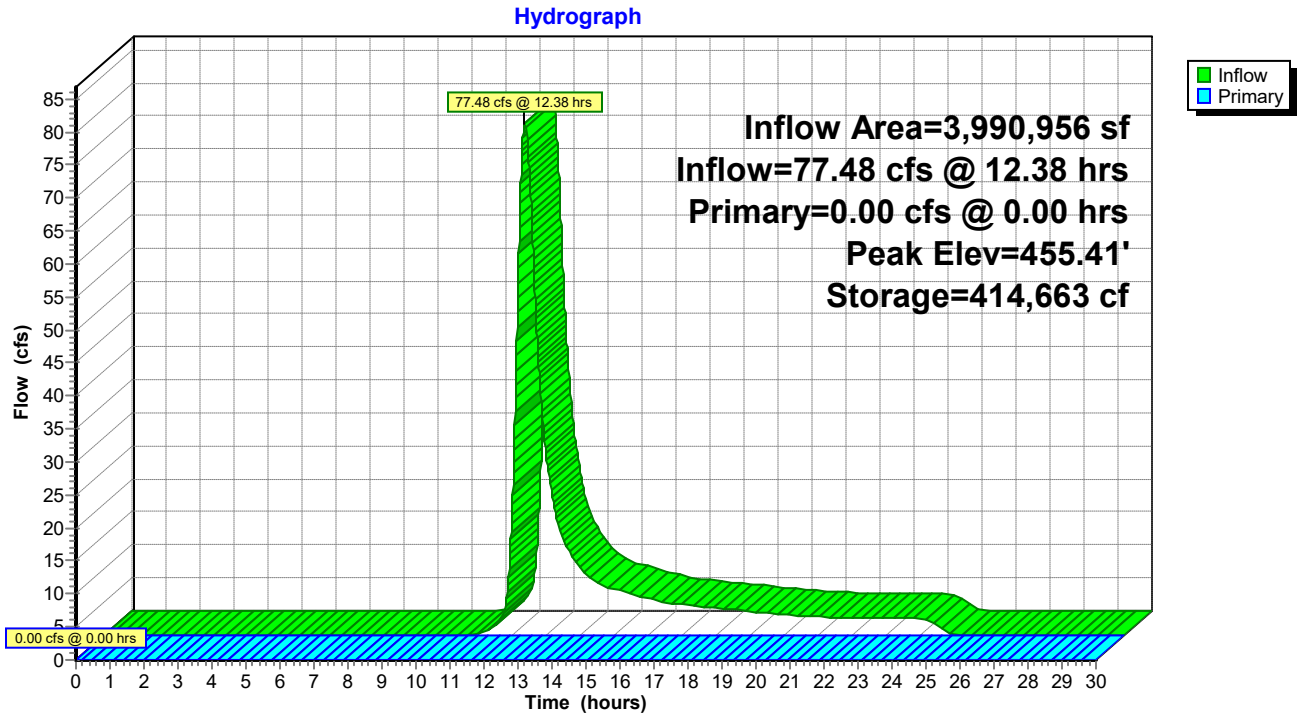
Volume	Invert	Avail.Storage	Storage Description
#1	450.99'	629,130 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
450.99	0	0	0
451.00	77,750	389	389
454.00	91,600	254,025	254,414
455.00	124,591	108,096	362,509
457.00	142,030	266,621	629,130

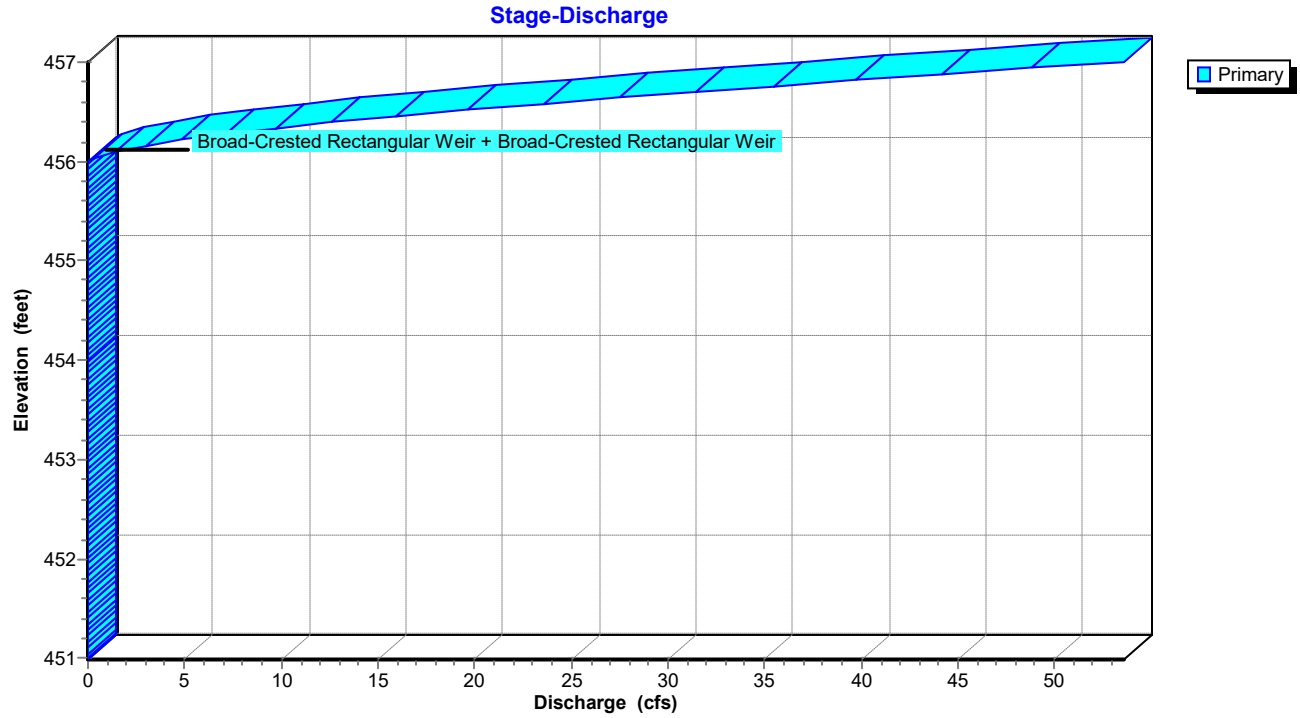
Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	456.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.99' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

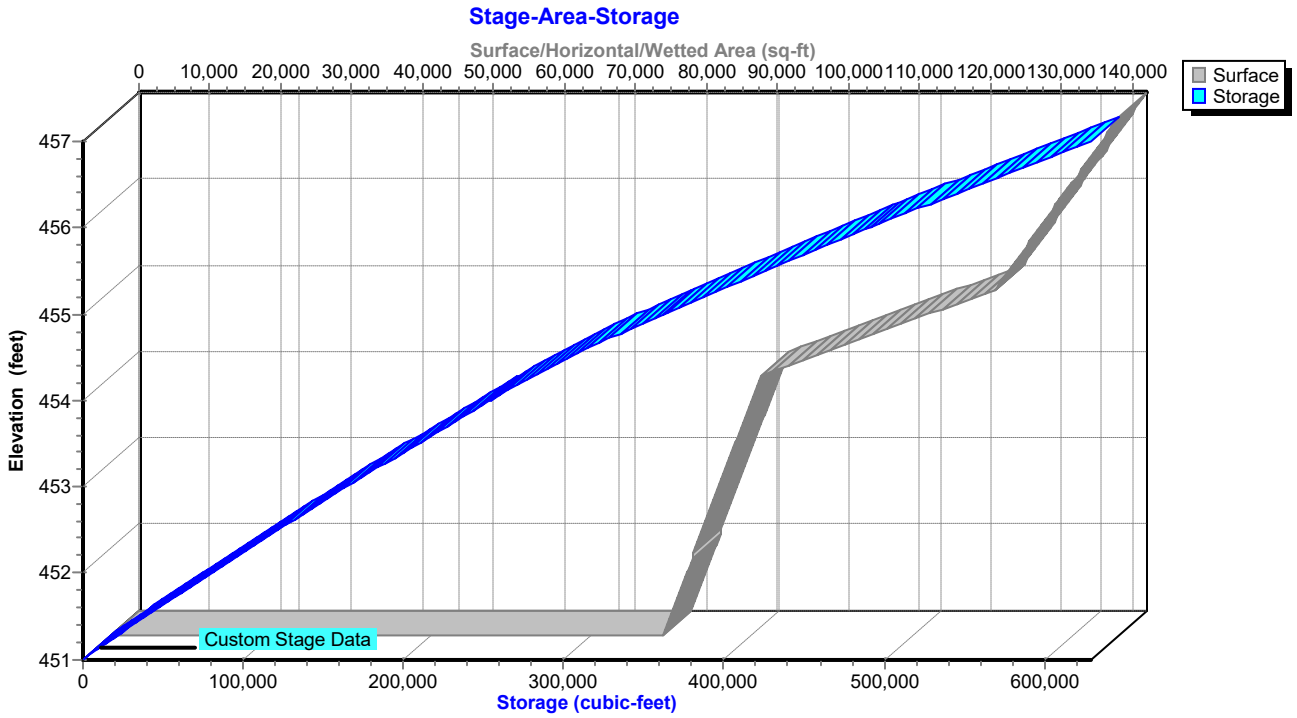
Pond 7P: Pond 1



Pond 7P: Pond 1



Pond 7P: Pond 1



Summary for Pond 8P: Pond 2

Inflow Area = 951,172 sf, 49.95% Impervious, Inflow Depth = 0.91" for 10 yr 24 hr event
Inflow = 26.27 cfs @ 12.05 hrs, Volume= 71,900 cf
Outflow = 0.73 cfs @ 18.57 hrs, Volume= 19,310 cf, Atten= 97%, Lag= 390.8 min
Primary = 0.73 cfs @ 18.57 hrs, Volume= 19,310 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 449.11' @ 18.57 hrs Surf.Area= 31,143 sf Storage= 55,809 cf

Plug-Flow detention time= 533.6 min calculated for 19,303 cf (27% of inflow)
Center-of-Mass det. time= 375.6 min (1,254.0 - 878.4)

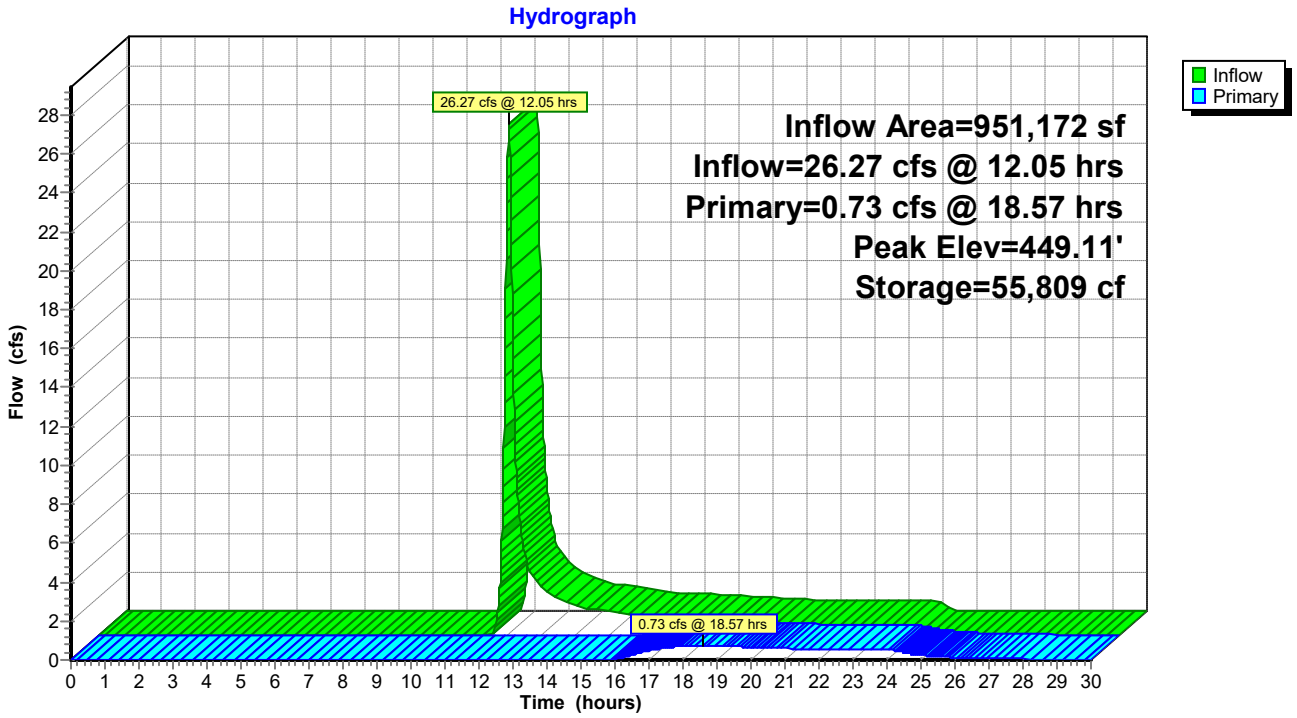
Volume	Invert	Avail.Storage	Storage Description
#1	446.99'	88,156 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
446.99	0	0	0
447.00	22,463	112	112
449.00	29,760	52,223	52,335
450.00	41,882	35,821	88,156

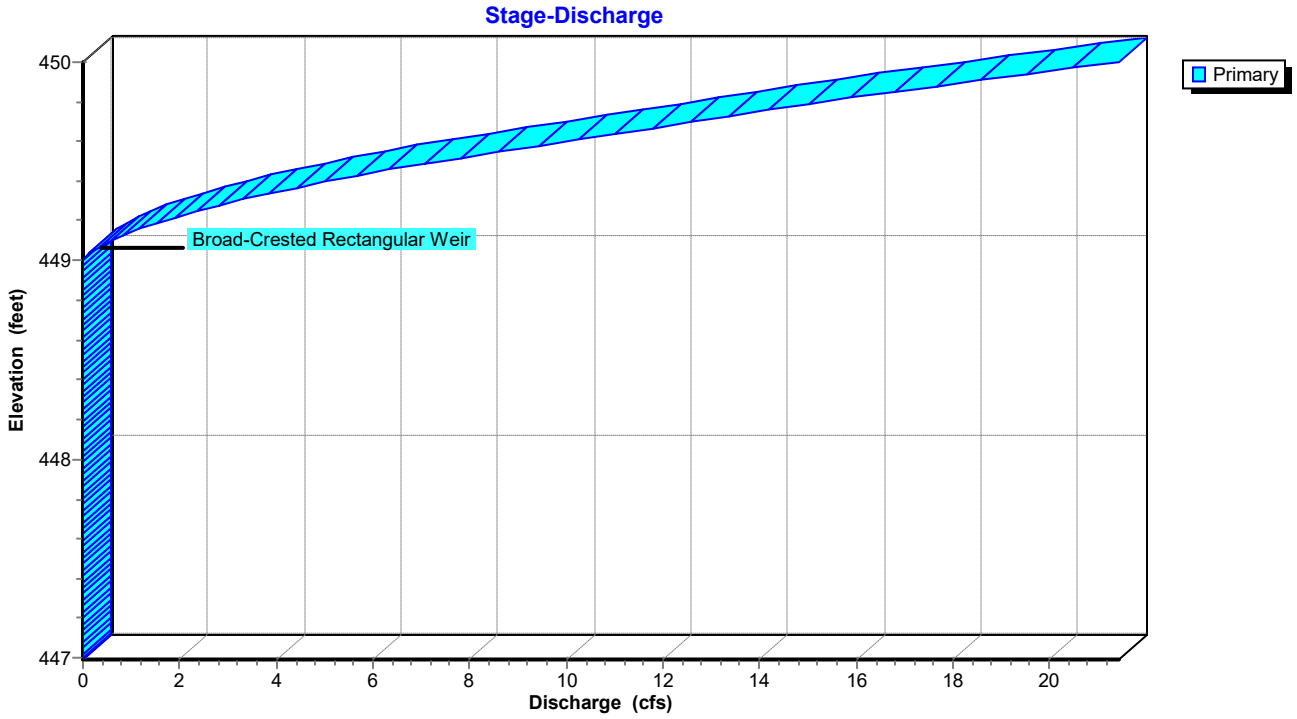
Device	Routing	Invert	Outlet Devices
#1	Primary	449.00'	**8.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.72 cfs @ 18.57 hrs HW=449.11' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.72 cfs @ 0.79 fps)

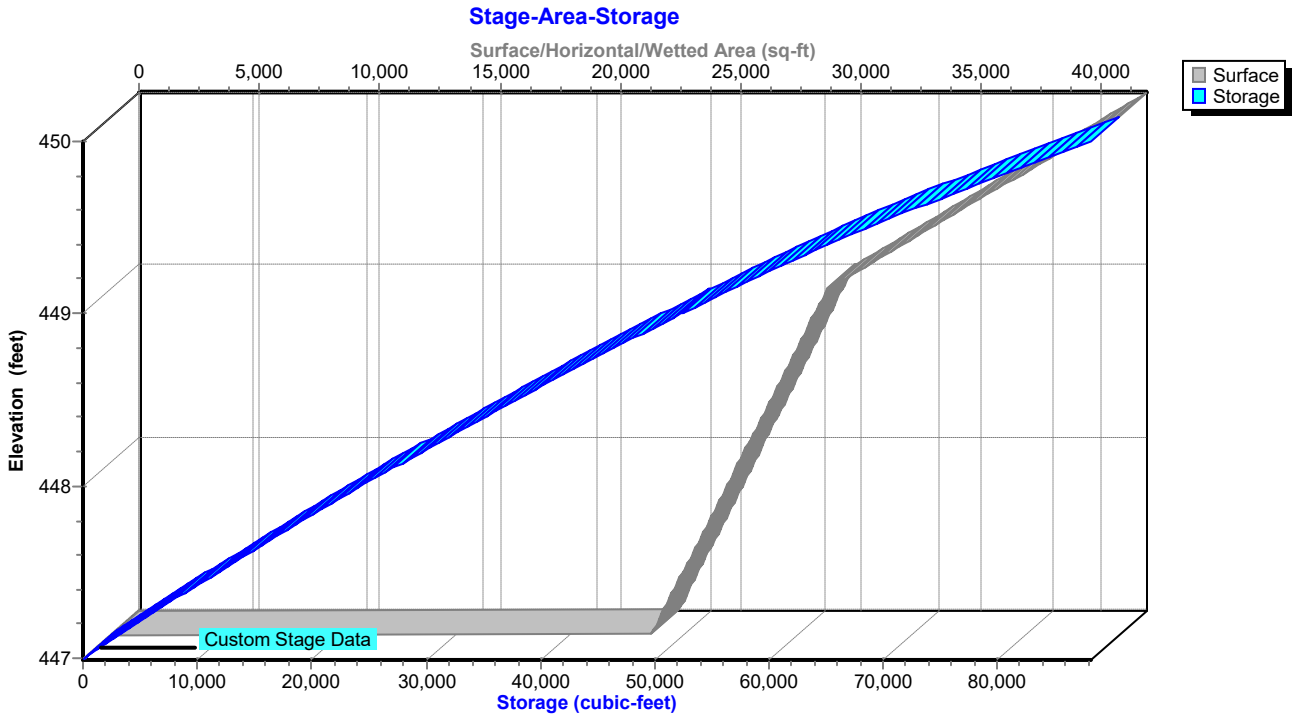
Pond 8P: Pond 2



Pond 8P: Pond 2



Pond 8P: Pond 2



Summary for Subcatchment 1S: Post Watershed 1

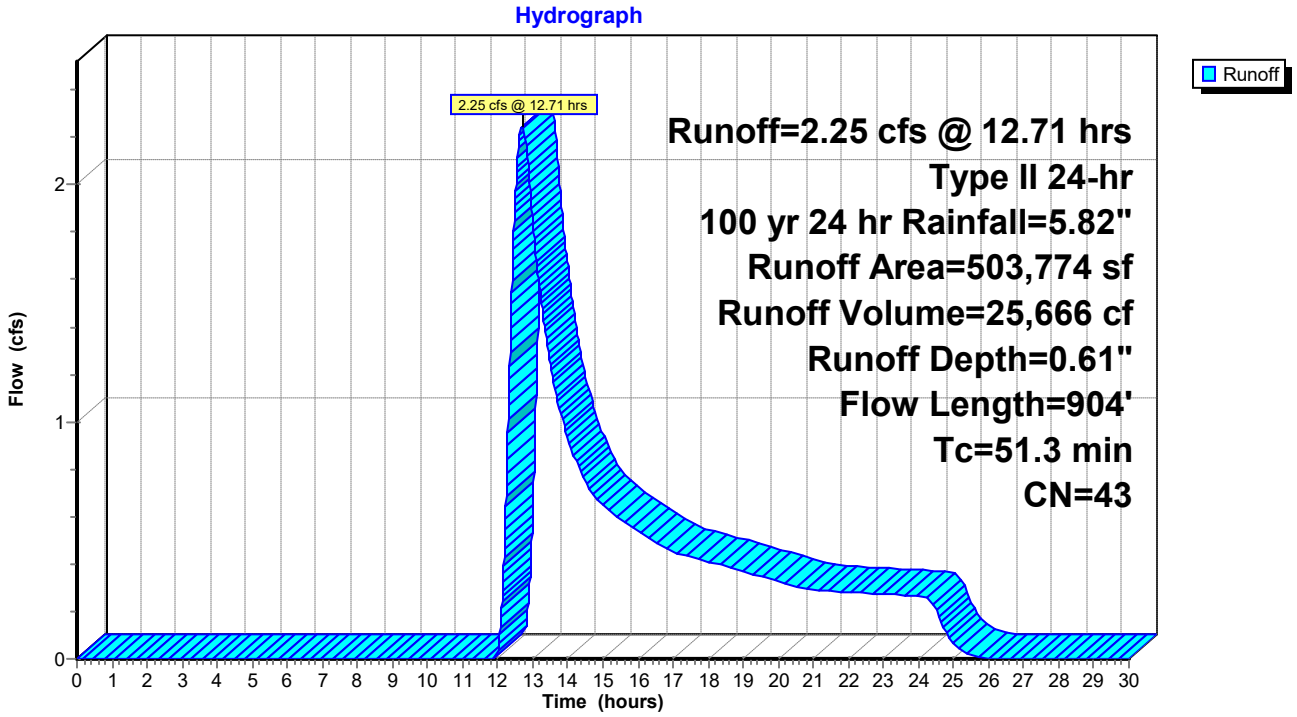
Runoff = 2.25 cfs @ 12.71 hrs, Volume= 25,666 cf, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
503,774	43	Woods/grass comb., Fair, HSG A
503,774		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.6	100	0.0084	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
13.6	374	0.0084	0.46		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	430	0.2197	2.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
51.3	904	Total			

Subcatchment 1S: Post Watershed 1



Summary for Subcatchment 2S: Post Watershed 2a

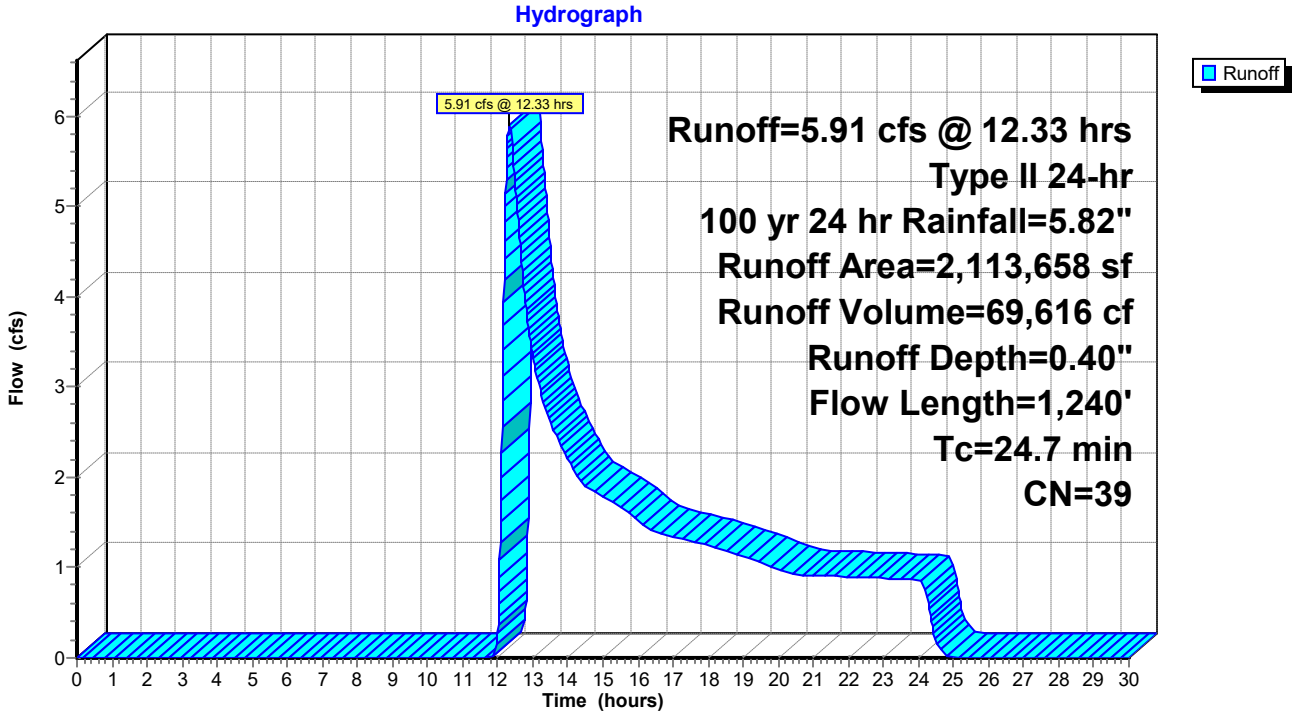
Runoff = 5.91 cfs @ 12.33 hrs, Volume= 69,616 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
1,160,325	43	Woods/grass comb., Fair, HSG A
953,333	35	Brush, Fair, HSG A
2,113,658	39	Weighted Average
2,113,658		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0886	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.47"
3.8	340	0.0886	1.49		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.4	800	0.0125	1.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
24.7	1,240	Total			

Subcatchment 2S: Post Watershed 2a



Summary for Subcatchment 3S: Post Watershed 2b

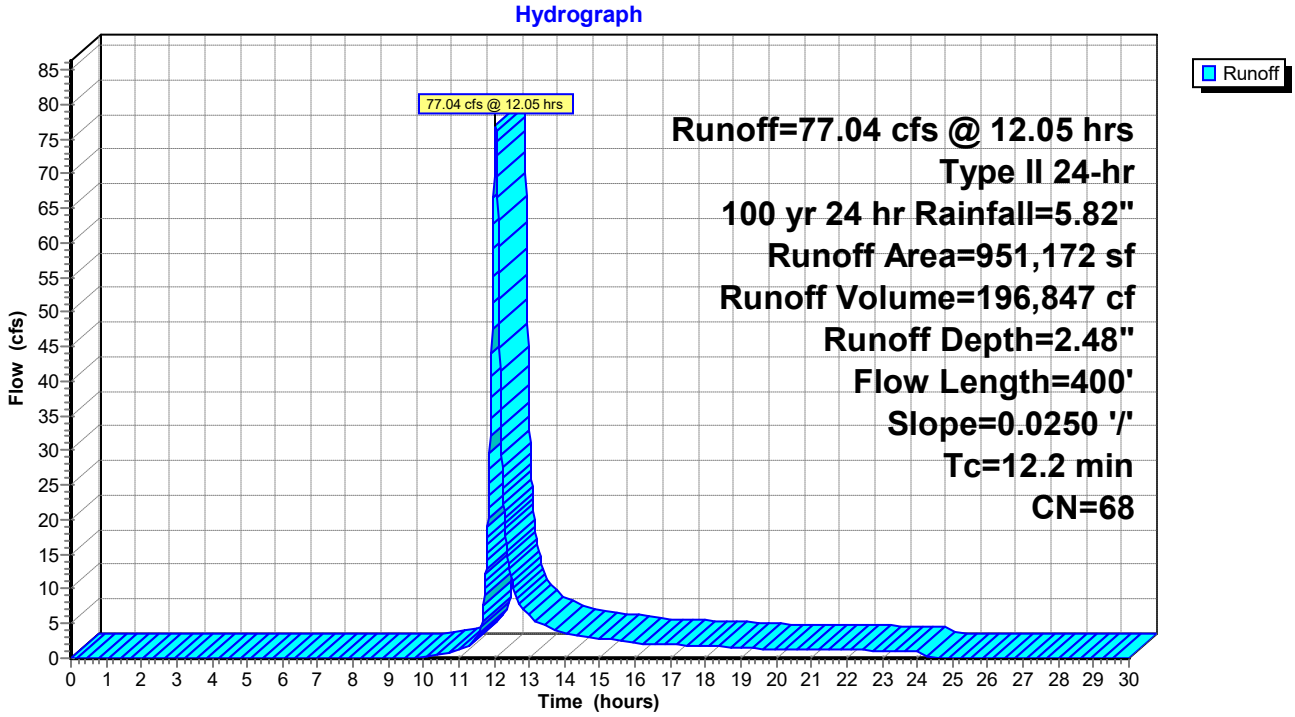
Runoff = 77.04 cfs @ 12.05 hrs, Volume= 196,847 cf, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
0	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
475,153	98	Paved parking, HSG A
476,019	39	>75% Grass cover, Good, HSG A
951,172	68	Weighted Average
476,019		50.05% Pervious Area
475,153		49.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.0250	0.16		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
2.0	300	0.0250	2.55		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.2	400	Total			

Subcatchment 3S: Post Watershed 2b



Summary for Subcatchment 4S: Post Watershed 3a

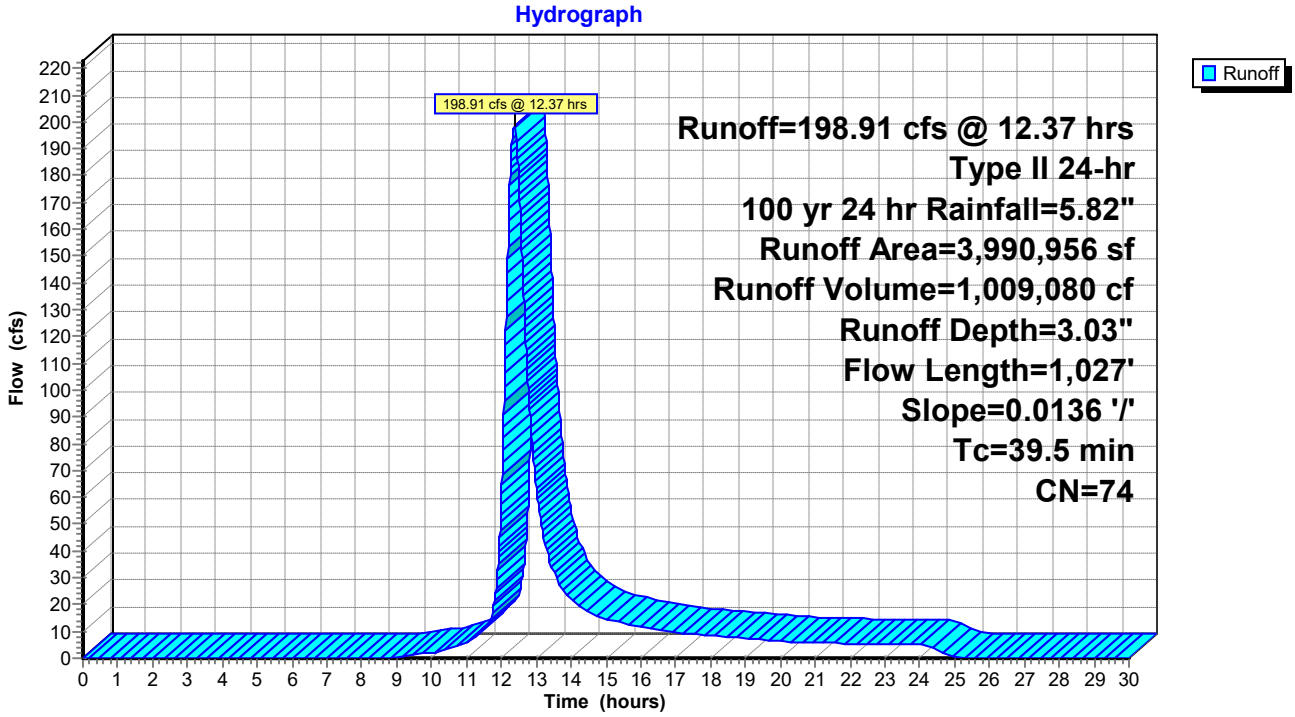
Runoff = 198.91 cfs @ 12.37 hrs, Volume= 1,009,080 cf, Depth= 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
0	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
2,376,906	98	Paved parking, HSG A
1,614,050	39	>75% Grass cover, Good, HSG A
3,990,956	74	Weighted Average
1,614,050		40.44% Pervious Area
2,376,906		59.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0136	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
26.5	927	0.0136	0.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
39.5	1,027	Total			

Subcatchment 4S: Post Watershed 3a



Summary for Subcatchment 5S: Post Watershed 2c

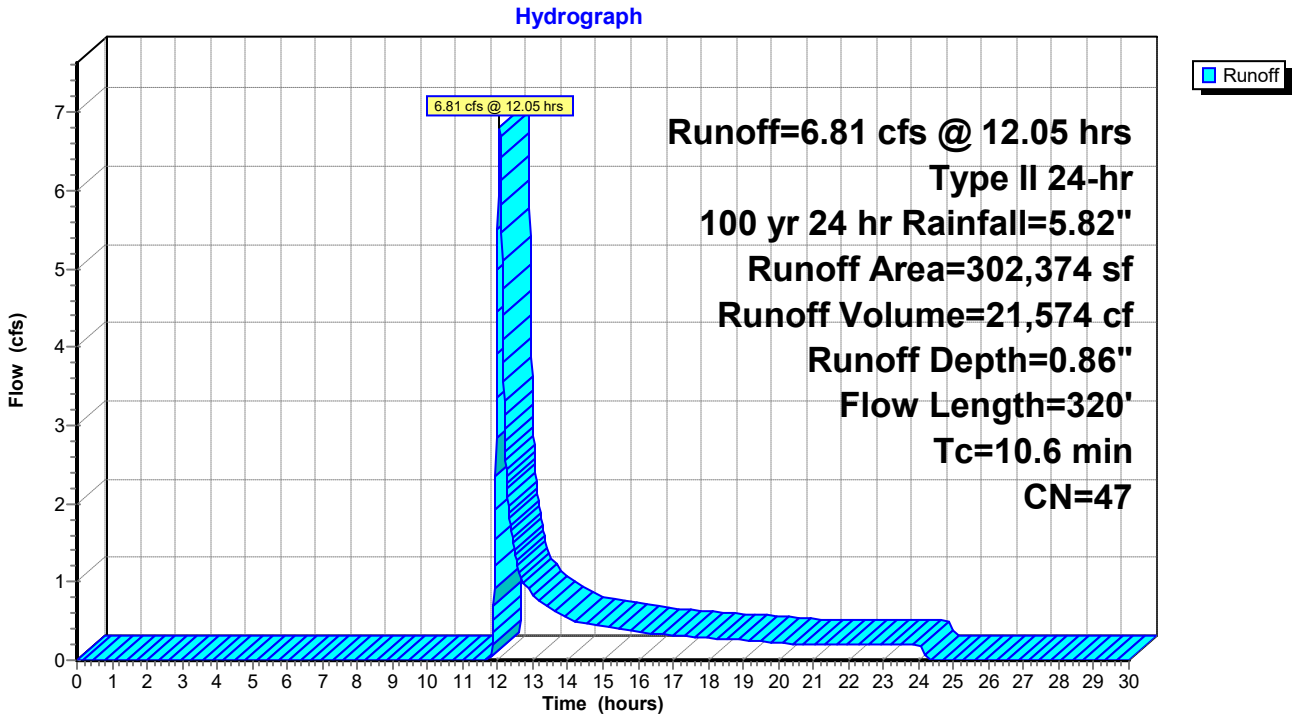
Runoff = 6.81 cfs @ 12.05 hrs, Volume= 21,574 cf, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
72,740	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
36,544	98	Paved parking, HSG A
193,090	39	>75% Grass cover, Good, HSG A
302,374	47	Weighted Average
265,830		87.91% Pervious Area
36,544		12.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0300	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
1.1	220	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
10.6	320	Total			

Subcatchment 5S: Post Watershed 2c



Summary for Subcatchment 6S: Post Watershed 3b

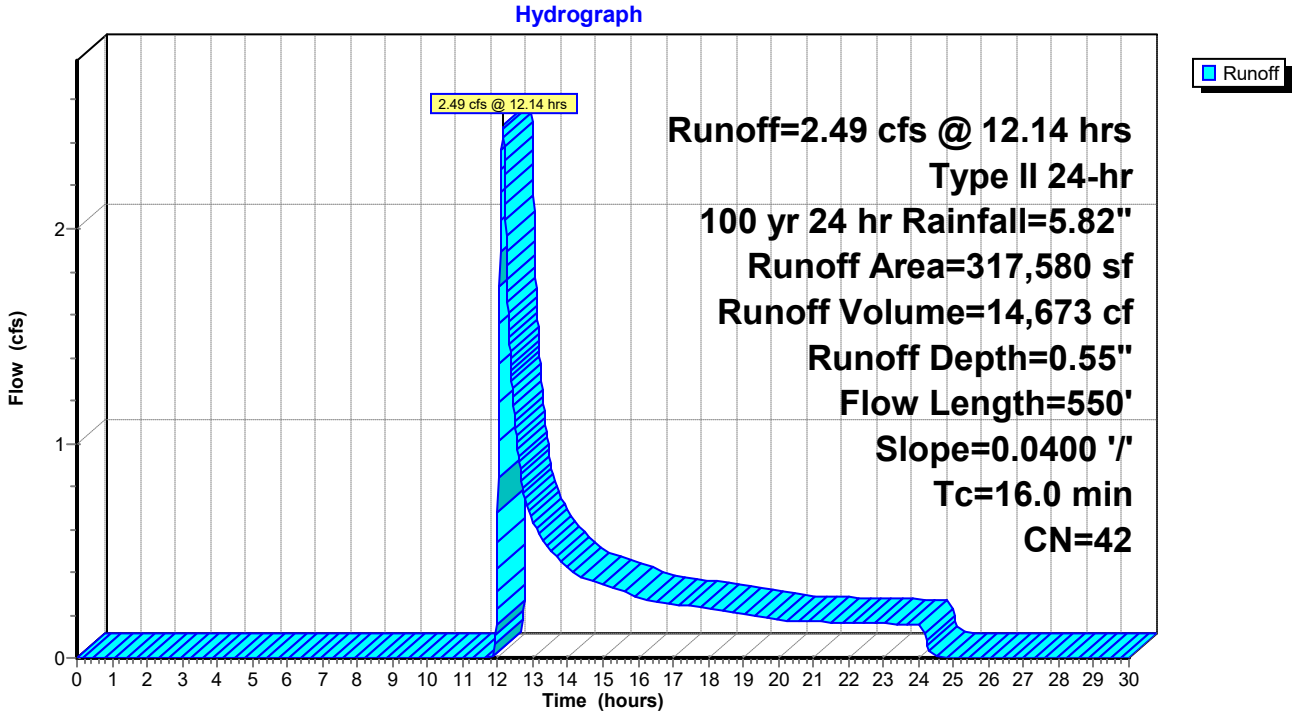
Runoff = 2.49 cfs @ 12.14 hrs, Volume= 14,673 cf, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 100 yr 24 hr Rainfall=5.82"

Area (sf)	CN	Description
218,300	43	Woods/grass comb., Fair, HSG A
0	35	Brush, Fair, HSG A
0	98	Paved parking, HSG A
99,280	39	>75% Grass cover, Good, HSG A
317,580	42	Weighted Average
317,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	100	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.47"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.0	550	Total			

Subcatchment 6S: Post Watershed 3b



Summary for Pond 7P: Pond 1

Inflow Area = 3,990,956 sf, 59.56% Impervious, Inflow Depth = 3.03" for 100 yr 24 hr event
Inflow = 198.91 cfs @ 12.37 hrs, Volume= 1,009,080 cf
Outflow = 30.70 cfs @ 13.55 hrs, Volume= 513,440 cf, Atten= 85%, Lag= 71.0 min
Primary = 30.70 cfs @ 13.55 hrs, Volume= 513,440 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 456.69' @ 13.55 hrs Surf.Area= 139,306 sf Storage= 585,189 cf

Plug-Flow detention time= 306.8 min calculated for 513,269 cf (51% of inflow)
Center-of-Mass det. time= 184.8 min (1,042.9 - 858.1)

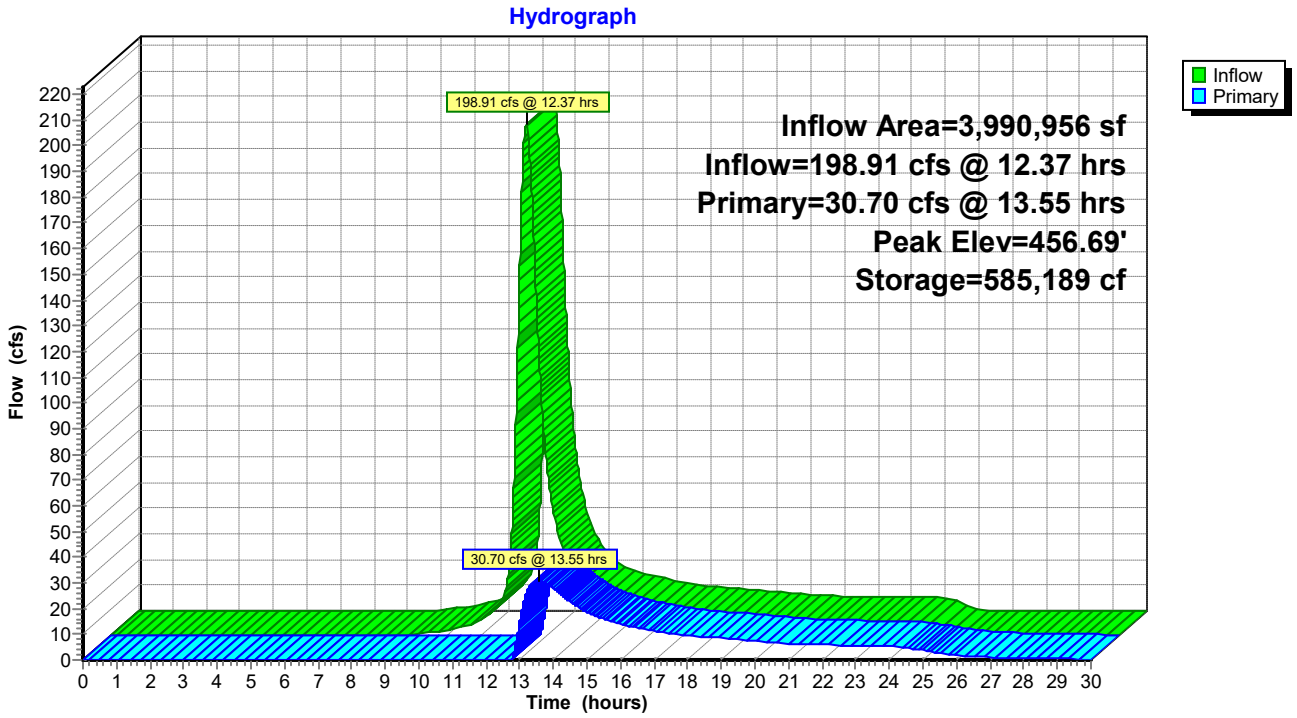
Volume	Invert	Avail.Storage	Storage Description
#1	450.99'	629,130 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
450.99	0	0	0
451.00	77,750	389	389
454.00	91,600	254,025	254,414
455.00	124,591	108,096	362,509
457.00	142,030	266,621	629,130

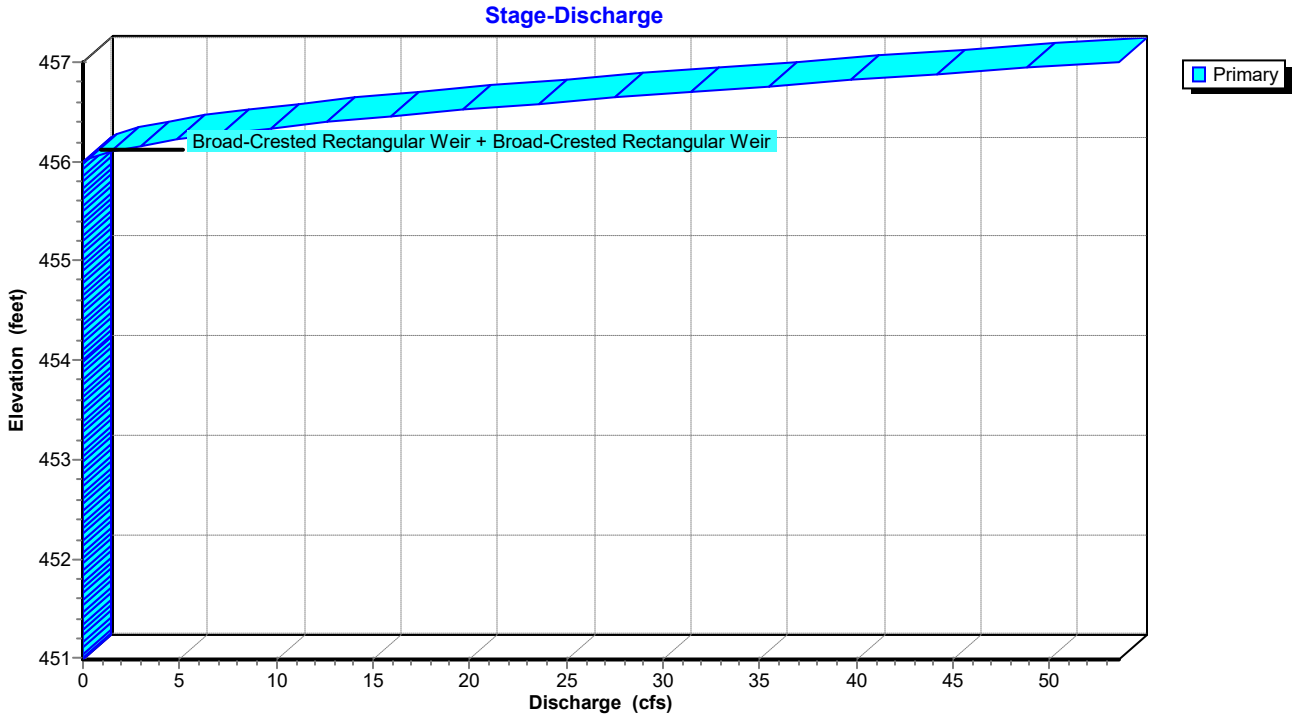
Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	456.00'	**10.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=30.69 cfs @ 13.55 hrs HW=456.69' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 15.35 cfs @ 2.23 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 15.35 cfs @ 2.23 fps)

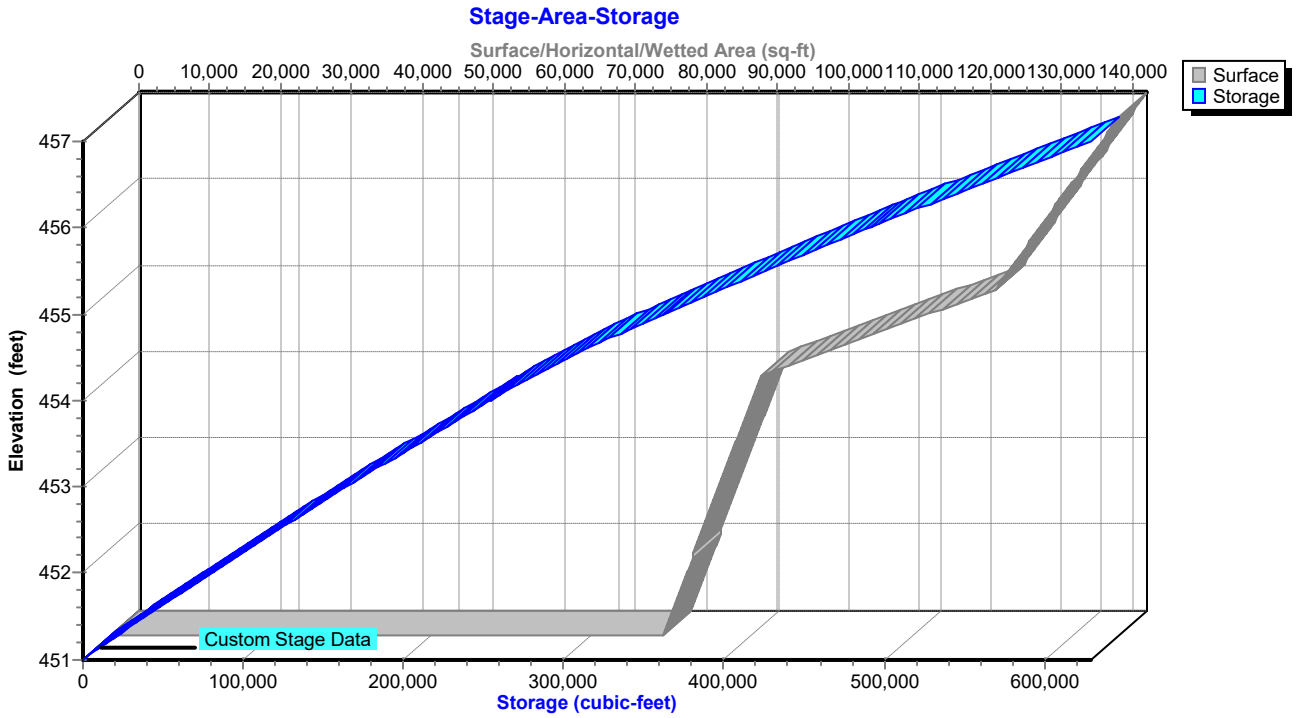
Pond 7P: Pond 1



Pond 7P: Pond 1



Pond 7P: Pond 1



Summary for Pond 8P: Pond 2

Inflow Area = 951,172 sf, 49.95% Impervious, Inflow Depth = 2.48" for 100 yr 24 hr event
Inflow = 77.04 cfs @ 12.05 hrs, Volume= 196,847 cf
Outflow = 17.28 cfs @ 12.33 hrs, Volume= 144,204 cf, Atten= 78%, Lag= 17.2 min
Primary = 17.28 cfs @ 12.33 hrs, Volume= 144,204 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 449.87' @ 12.33 hrs Surf.Area= 40,257 sf Storage= 82,652 cf

Plug-Flow detention time= 196.6 min calculated for 144,156 cf (73% of inflow)
Center-of-Mass det. time= 95.1 min (942.1 - 847.0)

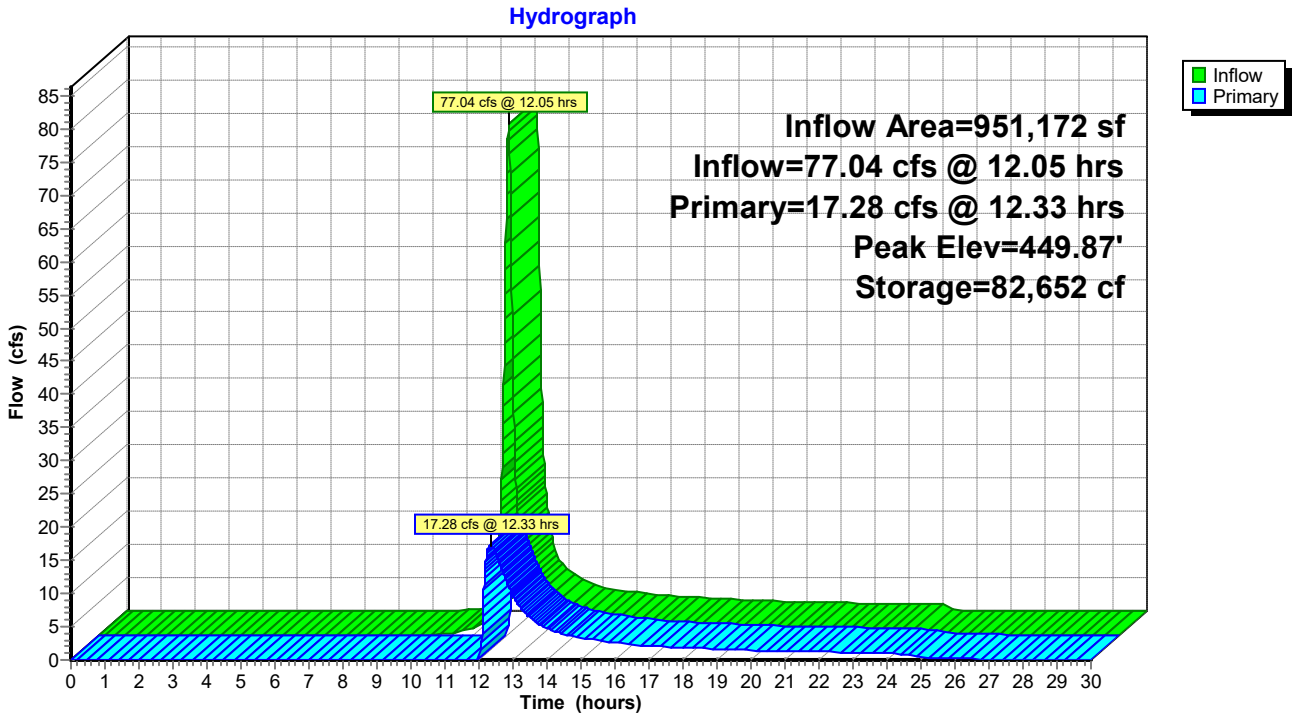
Volume	Invert	Avail.Storage	Storage Description
#1	446.99'	88,156 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
446.99	0	0	0
447.00	22,463	112	112
449.00	29,760	52,223	52,335
450.00	41,882	35,821	88,156

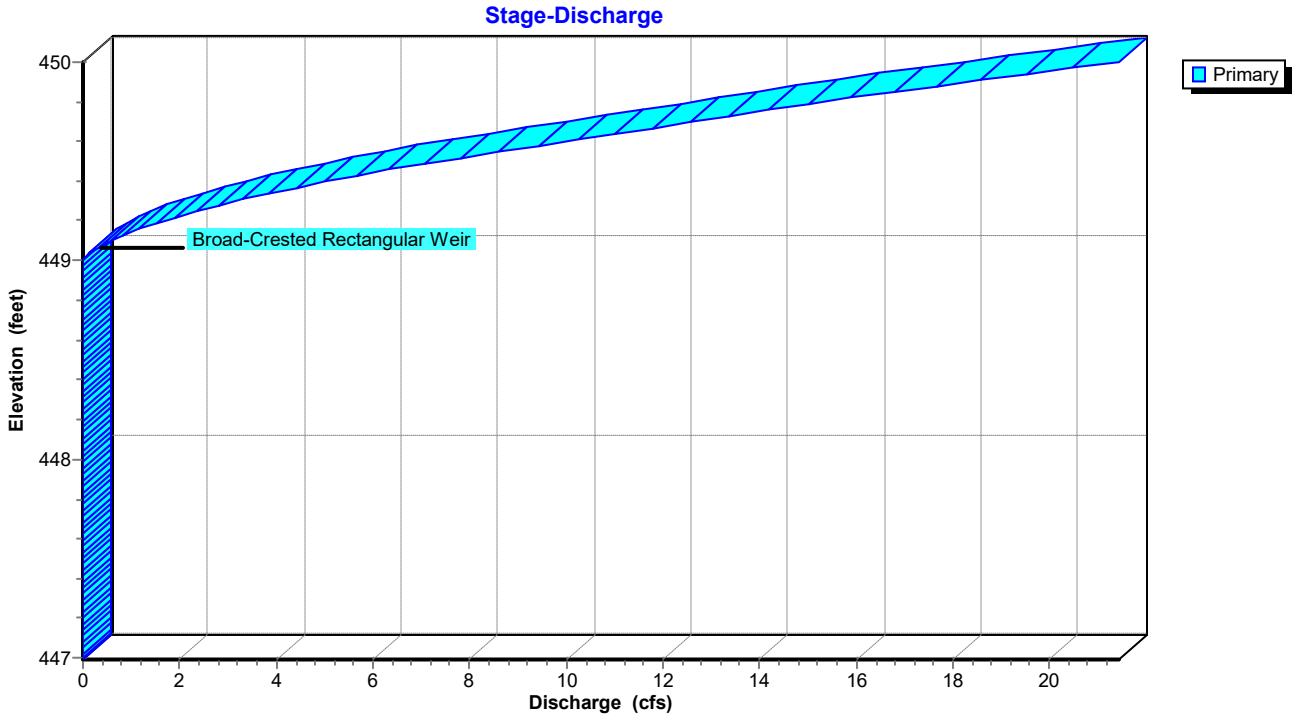
Device	Routing	Invert	Outlet Devices
#1	Primary	449.00'	**8.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=17.28 cfs @ 12.33 hrs HW=449.87' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 17.28 cfs @ 2.49 fps)

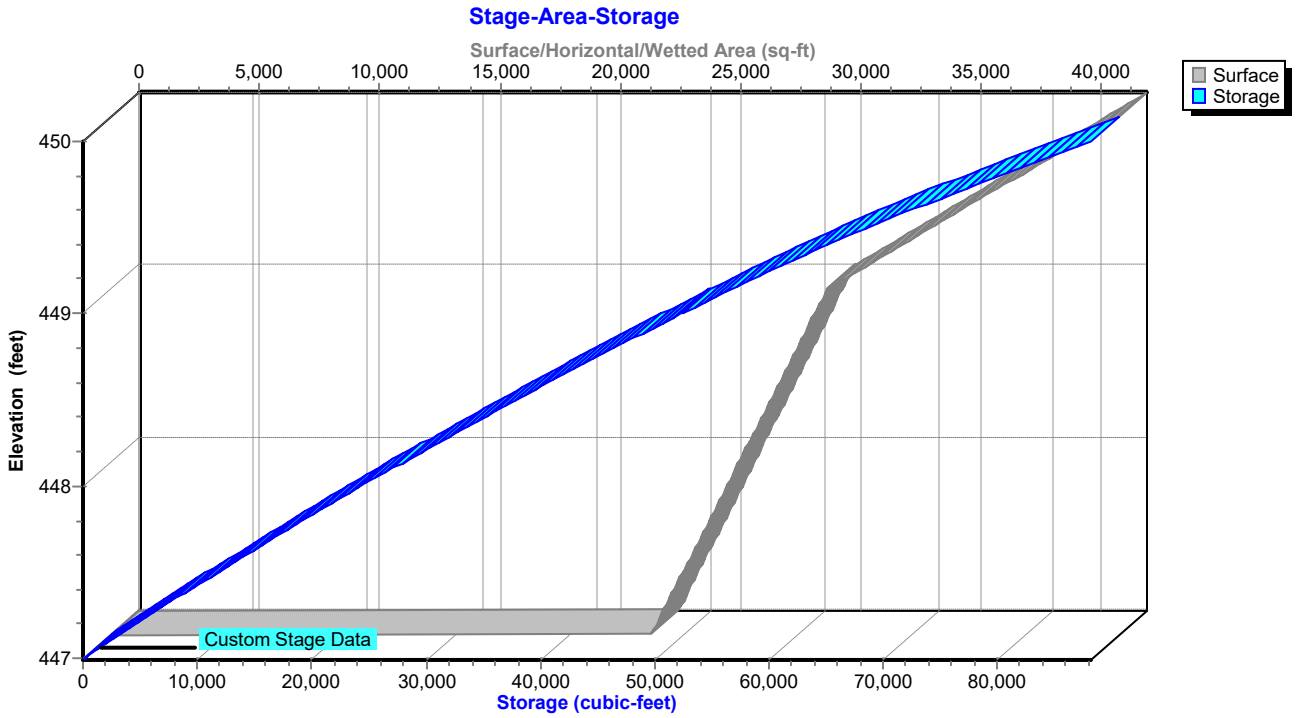
Pond 8P: Pond 2



Pond 8P: Pond 2



Pond 8P: Pond 2



Terry Horst
LANDSCAPE
ARCHITECTURE, PC

306 Hawley Avenue
Syracuse, New York 13203
thorstlandscapearch.com
(t) 315-472-2461