Stormwater Management Report

Shantok Village

1758 Route 32, Montville, Connecticut

October 28, 2024

Revised November 8, 2024

Prepared for

1758 RTE 32, LLC

24 Main Street

Centerbrook, CT 06409

Loureiro

Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory

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An Employee-Owned Company

Comm. No. 064MC4.01

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Table of Contents

		Page
1.	**INTRODUCTION**	**1-1**
1.1	Background	1-1
1.2	Physical Setting	1-1
1.3	Flood Plain and Soil Conditions	1-1
2.	**EVALUATION OF EXISTING CONDITIONS**	**2-1**
2.1	Overview	2-1
2.2	Existing Stormwater Management	2-1
2.3	Existing Subcatchment Areas	2-1
3.	**NEW DEVELOPMENT**	**3-1**
3.1	Overview	3-1
3.2	New Subcatchment Areas	3-1
3.3	Design Criteria & Proposed Stormwater Management Systems	3-1
4.	**STORMWATER MANAGEMENT EVALUATION**	**4-2**
4.1	Stormwater Runoff Calculations	4-2
4.1.1	Design Criteria & Methodology	4-2
4.1.2	Curve Numbers	4-2
4.2	Existing and New Peak-Flow Comparison	4-3
4.3	Runoff Volume	4-3
4.4	Water Quality	4-4
4.5	Stormwater System Maintenance Program	4-4
5.	**CONCLUSION**	**5-1**

DRAWINGS

Drawing DA-1 – Existing Drainage Areas
Drawing DA-2 – New Drainage Areas

APPENDICIES

Appendix A – USGS Site Location Map
Appendix B – Natural Resources Conservation Service – Web Soil Survey
Appendix C – FEMA Flood Map
Appendix D – HydroCAD Reports
Appendix E – Water Quality Volume and Water Quality Flow Calculations
Appendix F – Stormwater Management System Maintenance Program

1. INTRODUCTION

1.1 Background

This stormwater management report has been prepared by Loureiro Engineering Associates, Inc. (LEA) on behalf of 1758 RTE 32, LLC to provide a description and analysis of stormwater management for a new multifamily development. The new work will be completed at two parcels comprised of 1758 & 1790 Route 32, Montville, CT (hereinafter referred to as the "Site").

1.2 Physical Setting

The Site is 12.19 acres (ac) and is located in the R-20-M zone. Both parcels comprising the Site are wooded and vacant. The Site slopes steeply east to west from Route 32, rising from approximately 258 feet to 365 feet (NAVD88). No inland wetlands or other bodies of water are on or are in the vicinity of the Site.

The eastern boundary of the Site is bordered by Route 32 (Norwich New London Turnpike). Wooded residential lots in the R-20 zone surround the Site to the north, west, and south. The Site location is depicted on the United States Geological Survey (USGS) map included as Appendix A.

1.3 Flood Plain and Soil Conditions

The National Resource Conservation Service (NRCS) Soil Survey for the State of Connecticut identified soils as Rainbow silt loam (map unit 44B), Narragansett silt loam of varying slope (66B & 68D), and Charlton-Chatfield complex of varying slopes (73C & 73E). Rainbow silt loam correspond with the Hydrologic Soil Group (HSG) rating D, while all other soil types correspond with the HSG rating B. Ruoff potential for the different HSG soil types varies on a scale with HSG A soils generally having the lowest runoff potential, and HSG D soils having the highest runoff potential.

Falling head permeability tests were run by LEA on representative samples taken from test pits excavated on November 6 & 7, 2023. The lowest permeability rate calculated was 21.6 in/hr. Applying a factor of safety of 50%, in accordance with the 2023 Connecticut Stormwater Quality Manual, a permeability of 10.8 in/hr. was used in drainage calculations. Appendix C includes the NRCS soil map for the site.

Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) Flood Insurance Rate Map (FIRM) Number 09011C0351G, effective July 18, 2011, for Town of

Montville identifies the entire Site as within Zone X and is designated as an area of minimal flood hazard. Appendix C includes the FEMA FIRM map for the Site.

2. EVALUATION OF EXISTING CONDITIONS

2.1 Overview

The Site currently consists of wooded slopes, and there are no existing buildings, structures, or other types of impervious coverages.

2.2 Existing Stormwater Management

The Site currently has no existing drainage or stormwater management features. Stormwater runoff is conveyed 100 percent (%) through surface runoff. Water travels downslope from the mostly wooded northern portion of the Site (and from adjoining properties upslope) and either flows west off-Site, or east, where it is captured by a 24-inch culvert south of the Site along Route 32. These points of compliance are identified in the drainage analysis as POC 1 and POC 2, respectively, to evaluate peak-flows leaving the Site.

2.3 Existing Subcatchment Areas

The total analyzed drainage area for the Site is approximately 17 acres. As previously mentioned, areas north off-Site runoff towards the Site, increasing the drainage analysis area. The area is divided into two (2) subcatchment areas. Subcatchment area 1 is comprised of the eastern portion of the Site, and flows southeast towards the Route 32 culvert (POC 1). Subcatchment area 2 consists of the western portion of the Site and flows southwest off-Site (POC 2). Both subcatchments are similarly sloped and wooded.

Through available mapping and survey information, both POCs ultimately convey towards Mohegan Brook, which is a tributary of the Thames River. The Existing subcatchment area boundaries are depicted on Drawing DA 1, Existing Drainage Areas.

3. NEW DEVELOPMENT

3.1 Overview

New development includes the construction of five (5) multifamily residences and a 3,500 sf community building. As the existing Site does not have any utilities or access, the development includes a driveway, curbing, lighting, and utilities.

3.2 New Subcatchment Areas

The developed Site is divided into twenty-two (22) subcatchments. The majority of the new subcatchments will be captured or conveyed by a new catch basin and swale network. These new drainage features will convey runoff to new retain-it subsurface infiltration systems. Three (3) subcatchments convey stormwater through overland flow and discharge off-Site without being captured by the new drainage system. Runoff from these subcatchments and any stormwater discharged by new infiltration systems will flow off-Site in a manner similar to existing conditions. The new development will result in an increase in impervious area for the drainage analysis area, from 0% to 33.72 %. The new subcatchment area boundaries are depicted on Drawing DA-2, New Drainage Areas plan.

3.3 Design Criteria & Proposed Stormwater Management Systems

The post-development stormwater runoff analysis was based on the 2-, 10, 25-, 50-, and 100-year 24-hour storm events. The increase in impervious area requires on-Site attenuation to meet or reduce the existing runoff rates as closely as possible.

The new drainage system for the Site will include a manhole, catch basin, and swale network to collect runoff from paved areas and buildings. An infiltration basin has also been designed to capture the large amount of runoff from landscaped sloped areas. The interconnected infiltration systems, using the high infiltration rate of the soils on Site, have been designed to reduce peak flows and the volume of runoff to the Points of Compliance.

To improve stormwater quality discharging from the Site, the infiltration systems have been sized to retain and infiltrate the full water quality volume (WQV). WQV calculations are provided in Appendix E.

4. STORMWATER MANAGEMENT EVALUATION

4.1 Stormwater Runoff Calculations

4.1.1 Design Criteria & Methodology

Site specific point precipitation frequency estimates used to generate peak stormwater flow were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 10 Version 3: Precipitation-Frequency Atlas of the United States, Northeastern States (rev. 2015). Precipitation-frequency estimates are based upon frequency analysis of partial duration series with a 90% confidence interval of data largely from the National Centers for Environmental Information (NCEI).

The methods described in Urban Hydrology for Small Watersheds, 2nd Edition, (Technical Release Number 55 [TR-55]) from the Natural Resources Conservation Service formerly the Soil Conservation Service – [SCS], 1986) were used to calculate stormwater peak-flow generated from pre- and post-redevelopment conditions. These methods, which are incorporated into the HydroCAD computer software program, use well documented procedures to calculate stormwater runoff volume, peak-flow rate of discharge, hydrographs and storage volumes required for floodwater reservoirs in small watersheds. The method uses the SCS Runoff Curve Number method to estimate runoff volume, calculates times of concentration, produces tabular hydrographs and estimates basin storage capacity.

4.1.2 Curve Numbers

The curve numbers (CN) values utilized for the analysis of the existing and new conditions included:

Existing/Proposed:

- Woods, CN = 55 (Good woods cover, HSG B)
- Woods, CN = 77 (Good woods cover, HSG D)
- Grassed areas, CN=61 (Good grass cover, HSG B)
- Grassed areas, CN=80 (Good grass cover, HSG D)
- Impervious areas, CN = 98 (Paved parking, roofs, HSG D)

4.2 Existing and New Peak-Flow Comparison

As the result of incorporating subsurface infiltration systems into the new stormwater management system, increases in runoff are attenuated to all POC's for all storm events. The table below summarizes the pre- and post-redevelopment

Table 1 – Peak-Flow Comparison, Cubic Feet per Second (CFS)

	2-Year Event		10-Year Event		25-Year Event		50-year Event		100-year Event	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
West Off-Site (POC 1)	1.32	1.3	5.32	3.44	8.58	6.73	11.21	10.92	14.2	13.22
Rt. 32 Culvert (POC 2)	2.32	0.23	10.09	0.68	16.6	3.47	21.91	11.65	27.96	21.19
Total	2.32	0.23	10.09	0.68	16.6	3.47	21.91	11.65	27.96	21.19

The analysis indicates overall decreases in peak-flow rates of discharge to points of compliance for all design storms through the 100-year event. The new stormwater management system results in a quantitative and qualitative improvement in the peak flow rates and quality of stormwater discharge from the redeveloped Site. Appendix D includes the HydroCAD reports for both the existing and new conditions analyses.

4.3 Runoff Volume

Total runoff from the property was also analyzed volumetrically to ensure similar or lower runoff volumes under new conditions as volumes under existing conditions. The results for the 2-year and 100-year storm events for the total Site are below:

Table 2 – Total Runoff Volume Comparison, Cubic Feet

	Existing (cf)	New without SWM Measures (cf)	Volume Captured & Infiltrated by SWM Measures (cf)	New Surface Runoff Volume (cf)
2-Year	25,422	83,932	65,371	18,561
100-year	175,953	288,584	173,813	114,771

The tables show that the new infiltration systems reduce total proposed runoff volume below that of existing conditions. Therefore, receiving areas will not receive increased runoff volumes and should not be negatively impacted. Additionally, new scour holes, riprap aprons, and flared end sections will reduce velocity of flow and ensure discharges are non-erosive. Appendix D includes the HydroCAD reports showing runoff volume calculations.

4.4 Water Quality

The methods described in the 2023 Connecticut Stormwater Quality Manual were utilized to calculate the WQV of the redevelopment. The WQV for the site is equivalent to the runoff generated with the first 1.3 inches of rainfall. The developed Site is approximately 17 ac and 34% impervious, resulting in a WQV of 28,359 cf. The infiltration systems provide a storage volume of approximately 75,800 cf at full capacity. The infiltration system provides adequate amount of storage to store and infiltrate the WQV. Using permeability test results, the WQV is modelled to drain within 48 hours, meeting State requirements. The drainage system also leads to hydrodynamic separators for treatment prior to entering subsurface infiltration systems. These separators are designed to capture oil, trash, and floatables while removing total suspended solids and other pollutants. The proposed hydrodynamic separators are also designed to treat the Water Quality Flows (WQF) of their respective subcatchments. Appendix E includes the calculation worksheet for Water Quality Volume and Water Quality Flow for the relevant catchment area.

4.5 Stormwater System Maintenance Program

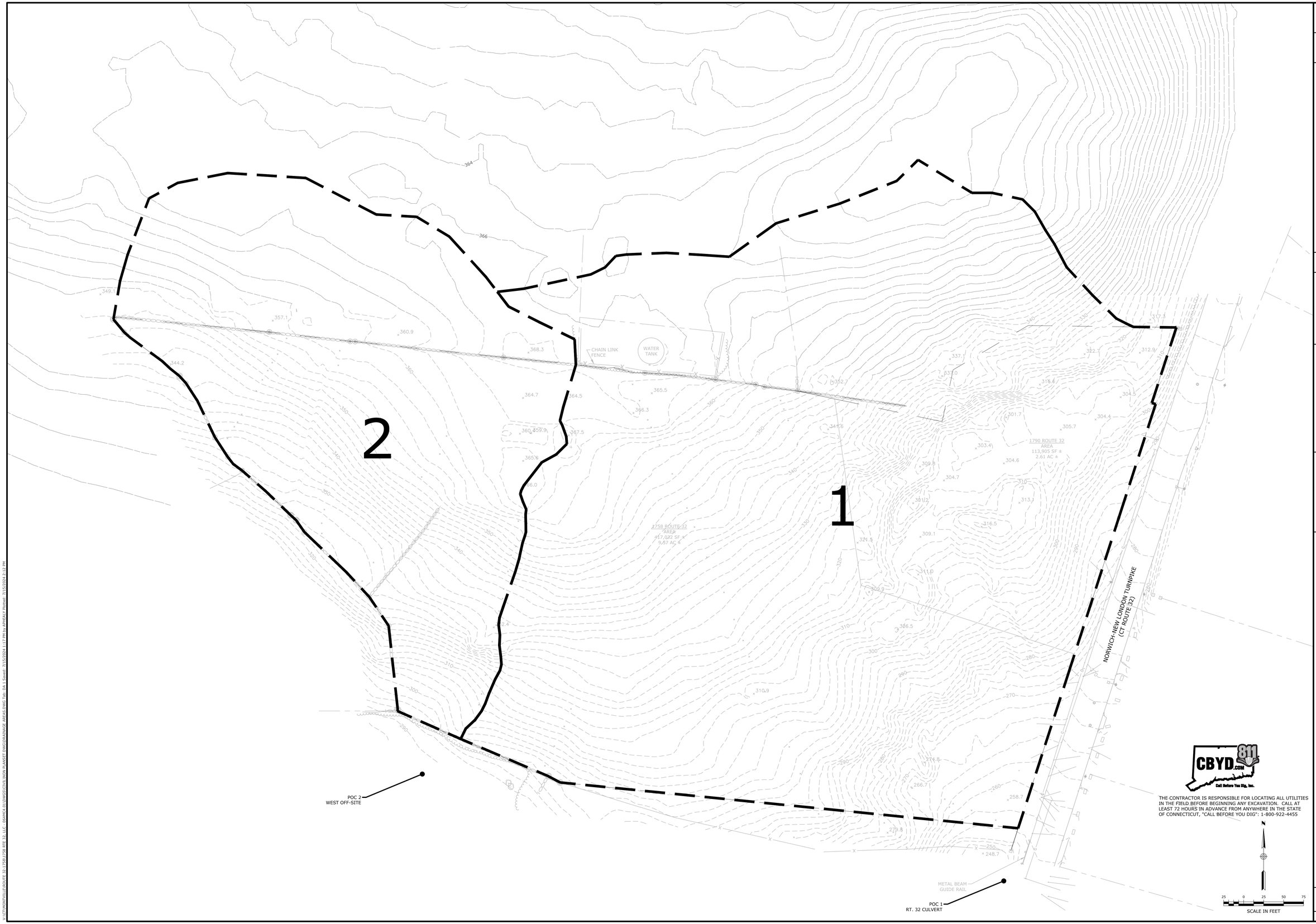
To help facilitate the function and longevity of the stormwater management system, maintenance requirements have been provided in Appendix F. The maintenance includes periodic inspections, scheduled cleanings and details on identifying signs of failures in the system. A full checklist of system features shall be completed to provide a log of inspections, cleanings, repairs, and any important information regarding the system. The program will be implemented after installation with more frequent inspections early and fewer inspections after a year or when the system function becomes more predictable. The program, checklist, and past inspection/maintenance logs will be provided to the current or future owners and necessary facility personnel.

5. CONCLUSION

The new development includes a new stormwater management system for the primary conveyance of the stormwater discharging from the Site. The proposed system provides attenuation and treatment of all stormwater events leaving the Site, managing post-development runoff rates and allowing for potential groundwater recharge. The new infiltration systems include sufficient storage capacity for the WQV to offer treatment of Site stormwater, along with treatment of WQF provided by hydrodynamic separators. Overall, the new drainage system will improve water quality discharging from the property while providing lower flow rates and volume to receiving waters.

DRAWINGS

DRAWINGS



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1	REv Comment	08/25/1894	ESF

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SCALE: 1"=50'
COMP. NO.: 064HC4-01
DRAWN BY: APH — DATE: 7/15/2024
APPROVED BY: GFA — DATE: 7/15/2024

EXISTING DRAINAGE AREAS

SHANTOK VILLAGE
1758 ROUTE 32, MONTVILLE CT 06382
PREPARED FOR:
1758 RTE 32, LLC
24 MAIN STREET, CENTERBROOK, CT 06409

DRAWING
DA 1

SHEET NO. 1 — NO. OF SHEETS 2

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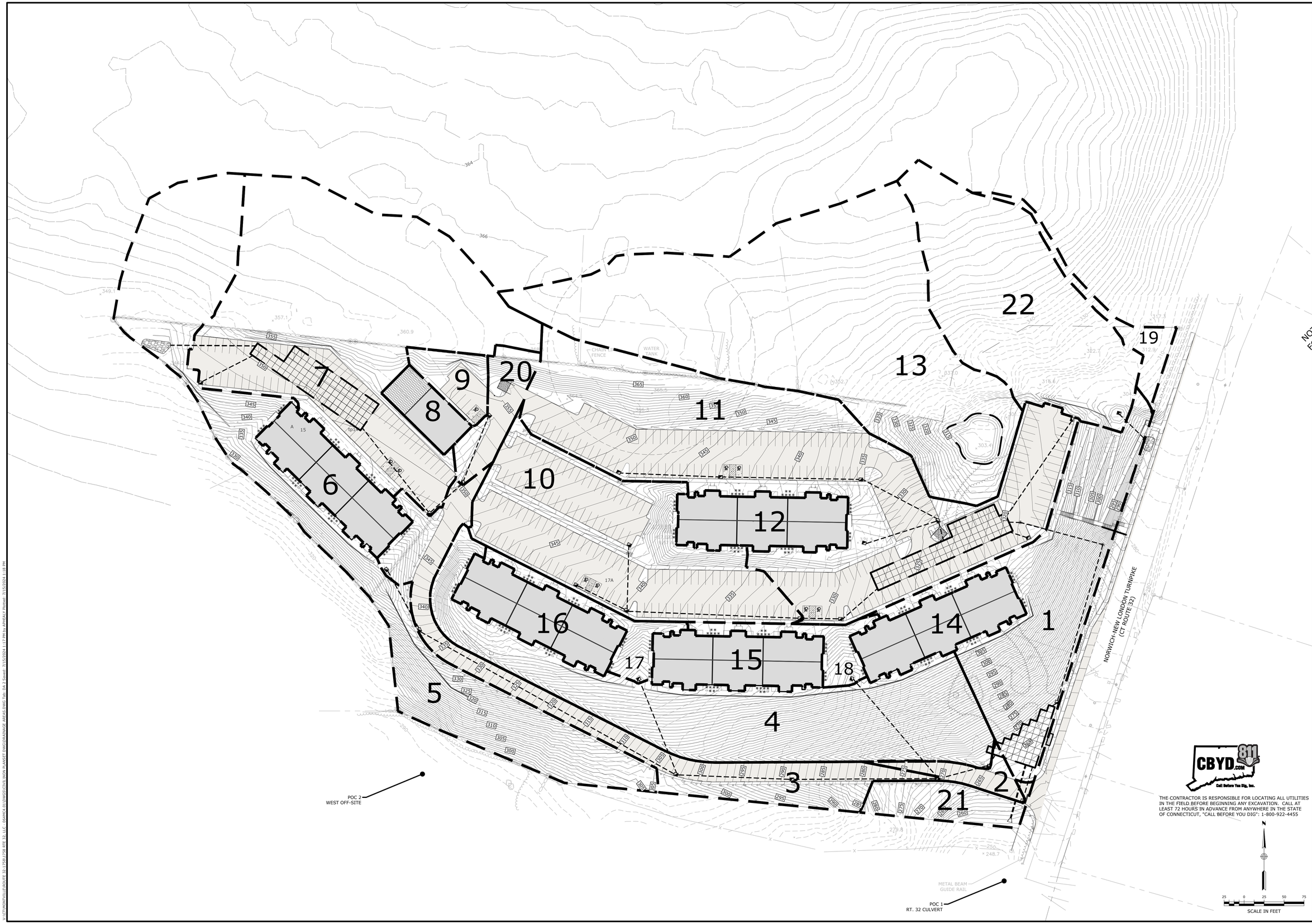

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NO.	REVISION	DATE	BY
1	Rev Comment	08/25/1894	ESF

DESCRIPTION OF REVISION

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An Employee Owned Company • www.Loureiro.com

SCALE 1"=50'
COMM. NO. 064HC4.01
DRAWN BY APH — DATE 7/15/2024
APPROVED BY GFA — DATE 7/15/2024

NEW DRAINAGE AREAS

SHANTOK VILLAGE
1758 ROUTE 32, MONTVILLE CT 06382
1758 RTE 32, LLC
24 MAIN STREET, CENTERBROOK, CT 06409

DRAWING
DA 2

SHEET NO. 2 — NO. OF SHEETS 2

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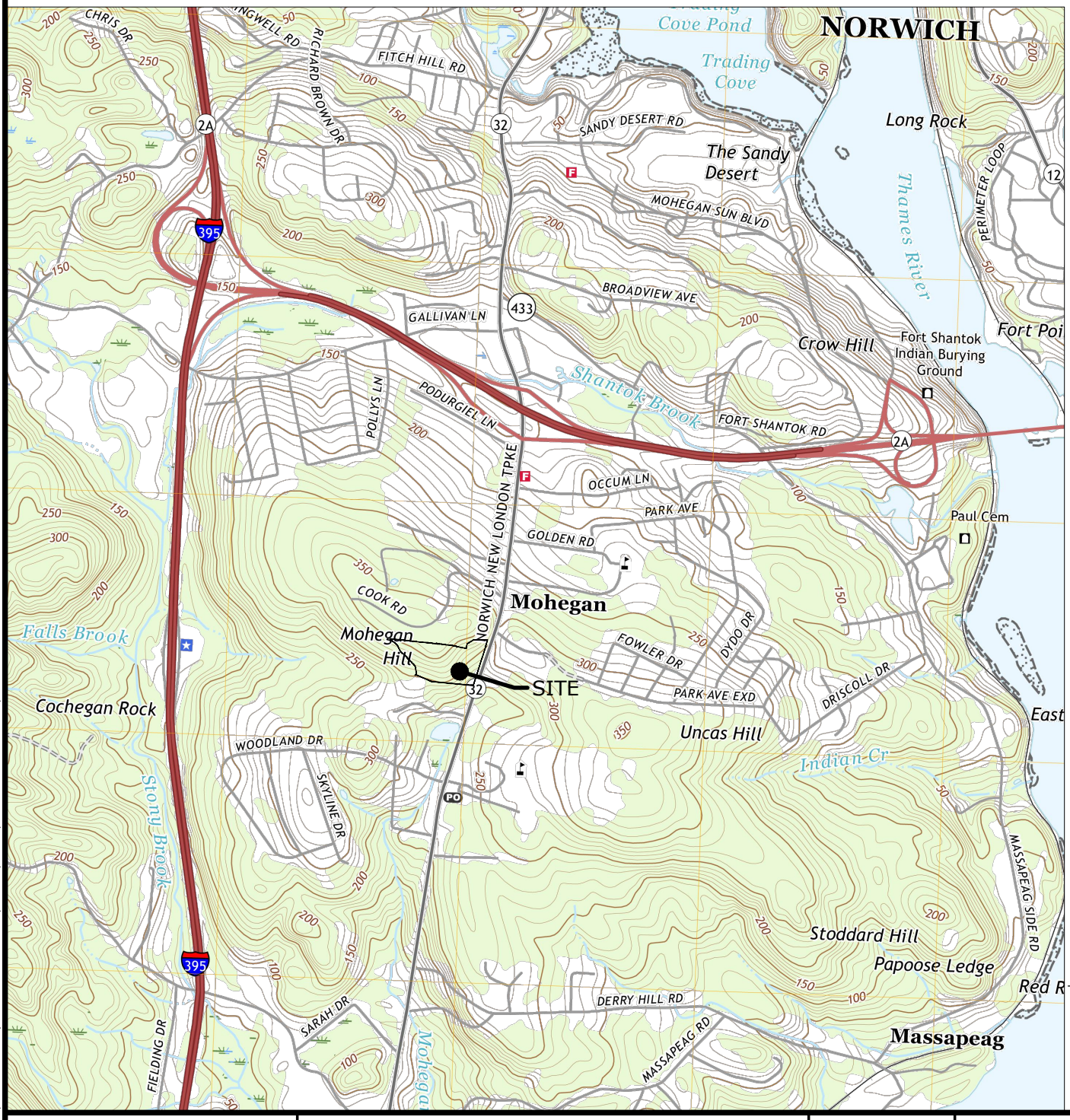
APPENDIX A

USGS Site Location Map



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SITE LOCATION MAP

SHANTOK VILLAGE
1758 ROUTE 32, MONTVILLE, CT 06382
PREPARED FOR:
1758 RTE 32, LLC
24 MAIN STREET, CENTERBROOK, CT 06409

SCALE
1"= 2000'

COMM. NO.
064MC4.01

DATE
07/12/2024

DRAWING
FIG 1

APPENDIX B

Natural Resources Conservation Service – Web Soil Survey

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 State of Connecticut, Eastern Part

June 14, 2024

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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Contents

Preface..... 2
Soil Map..... 5
Soil Map.....6
Legend.....7
Map Unit Legend..... 8
Map Unit Descriptions..... 8
State of Connecticut, Eastern Part.....11
44B—Rainbow silt loam, 2 to 8 percent slopes, very stony.....11
45C—Woodbridge fine sandy loam, 8 to 15 percent slopes..... 12
50A—Sutton fine sandy loam, 0 to 3 percent slopes..... 14
60C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes.....16
66B—Narragansett silt loam, 2 to 8 percent slopes..... 18
68D—Narragansett silt loam, 15 to 25 percent slopes, extremely stony.....20
73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky..... 22
73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky..... 24
74C—Narragansett-Hollis complex, 3 to 15 percent slopes, very rocky..... 26
Soil Information for All Uses.....30
Soil Properties and Qualities..... 30
Soil Qualities and Features.....30
Hydrologic Soil Group..... 30

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: 1:3,520 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: State of Connecticut, Eastern Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 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
44B	Rainbow silt loam, 2 to 8 percent slopes, very stony	2.7	8.6%
45C	Woodbridge fine sandy loam, 8 to 15 percent slopes	0.0	0.0%
50A	Sutton fine sandy loam, 0 to 3 percent slopes	0.6	1.9%
60C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes	1.3	4.0%
66B	Narragansett silt loam, 2 to 8 percent slopes	3.4	10.6%
68D	Narragansett silt loam, 15 to 25 percent slopes, extremely stony	4.8	14.9%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	2.8	8.8%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	15.5	48.4%
74C	Narragansett-Hollis complex, 3 to 15 percent slopes, very rocky	0.9	2.9%
Totals for Area of Interest		**32.0**	**100.0%**

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

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

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

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

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

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

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

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

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

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

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

State of Connecticut, Eastern Part

44B—Rainbow silt loam, 2 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9lnp
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Rainbow

Setting

Landform: Hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Eolian deposits over coarse-loamy lodgment till derived from gneiss and/or schist and/or sandstone and/or basalt

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 18 inches: silt loam
Bw2 - 18 to 26 inches: silt loam
2Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 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: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

Percent of map unit: 5 percent

Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Broadbrook

Percent of map unit: 5 percent
Landform: Till plains, hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Narragansett

Percent of map unit: 2 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, nonstony surface

Percent of map unit: 2 percent
Hydric soil rating: No

Wilbraham

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge

Percent of map unit: 2 percent
Landform: Hills, drumlins
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

45C—Woodbridge fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w689
Elevation: 0 to 1,370 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
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/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 4 percent

Landform: Depressions, ground moraines, hills, drainageways, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton

Percent of map unit: 1 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

50A—Sutton fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xffg
Elevation: 0 to 1,240 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sutton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton

Setting

Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 17 inches: fine sandy loam
Bw2 - 17 to 25 inches: sandy loam
C1 - 25 to 39 inches: gravelly sandy loam
C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Leicester

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

Charlton

Percent of map unit: 5 percent
Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton

Percent of map unit: 4 percent
Landform: Hills, moraines, ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Whitman

Percent of map unit: 1 percent
Landform: Ground moraines, drumlins, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

60C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w81z
Elevation: 0 to 1,620 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton and similar soils: 50 percent
Charlton and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Hills, moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, nose slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 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 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw - 7 to 22 inches: gravelly fine sandy loam
C - 22 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Leicester

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

Sutton

Percent of map unit: 5 percent
Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear

Hydric soil rating: No

Chatfield

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

66B—Narragansett silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lq3
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Narragansett

Setting

Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
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 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Broadbrook

Percent of map unit: 5 percent
Landform: Till plains, hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Leicester

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Canton

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 2 percent
Hydric soil rating: No

Wapping

Percent of map unit: 2 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

68D—Narragansett silt loam, 15 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 9lq8
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Narragansett

Setting

Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
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 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Broadbrook

Percent of map unit: 5 percent
Landform: Till plains, hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Wapping

Percent of map unit: 2 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Canton

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 2 percent
Hydric soil rating: No

Sutton, extremely stony

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield, Very Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

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

Hollis, very stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 9lql
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent
Chatfield and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
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
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 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 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop
Percent of map unit: 10 percent
Hydric soil rating: No

Leicester
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton, very stony
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hollis
Percent of map unit: 3 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, sandy subsoil
Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, red parent material
Percent of map unit: 1 percent
Hydric soil rating: No

74C—Narragansett-Hollis complex, 3 to 15 percent slopes, very rocky

Map Unit Setting
National map unit symbol: 9lqm
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Narragansett and similar soils: 55 percent
Hollis and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting

Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
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 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 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 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 6 percent
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chatfield

Percent of map unit: 5 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Wapping

Percent of map unit: 2 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Canton

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sutton, very stony

Percent of map unit: 2 percent

Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

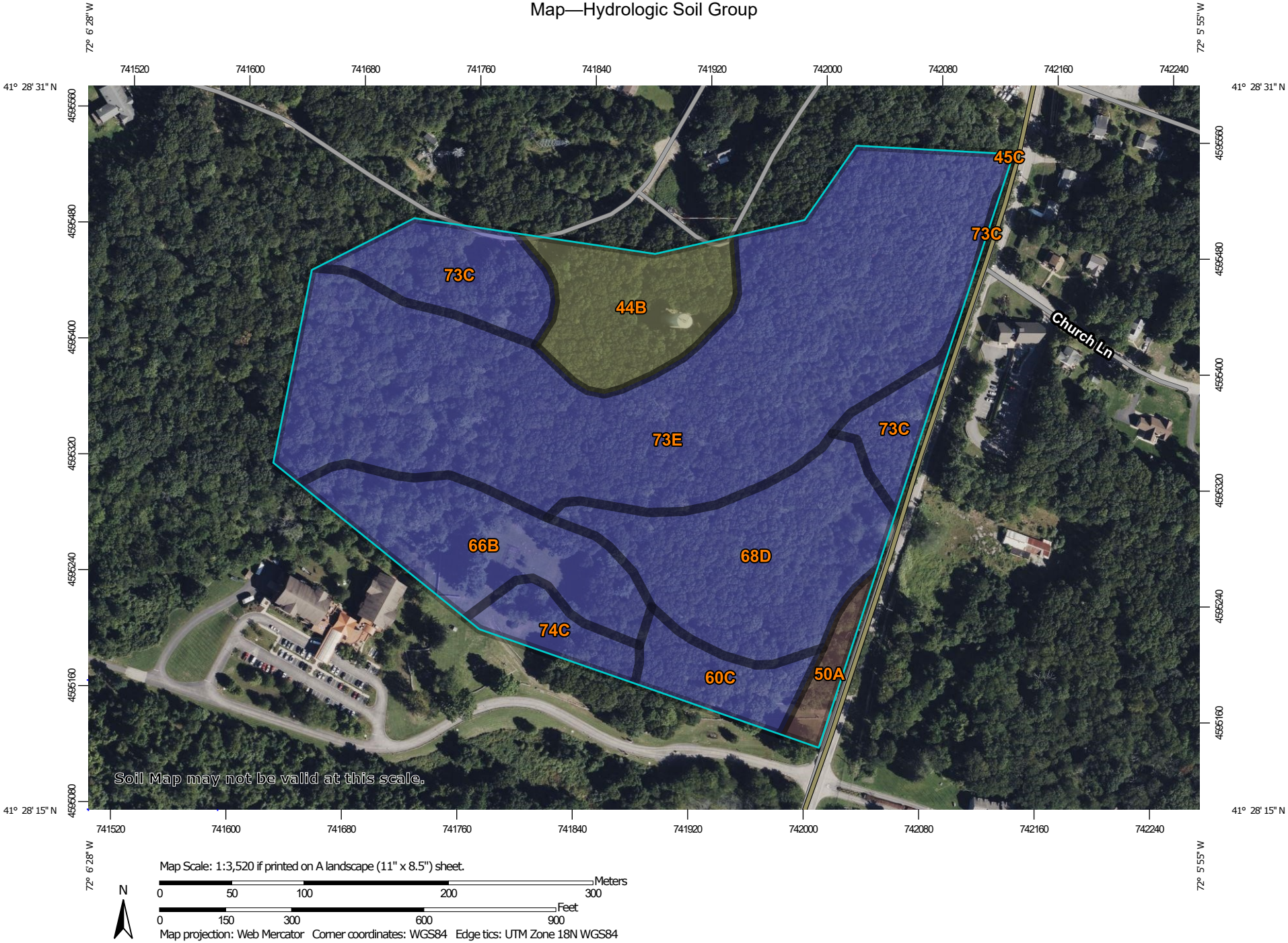
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:3,520 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

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 Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: State of Connecticut, Eastern Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
44B	Rainbow silt loam, 2 to 8 percent slopes, very stony	C/D	2.7	8.6%
45C	Woodbridge fine sandy loam, 8 to 15 percent slopes	C/D	0.0	0.0%
50A	Sutton fine sandy loam, 0 to 3 percent slopes	B/D	0.6	1.9%
60C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes	B	1.3	4.0%
66B	Narragansett silt loam, 2 to 8 percent slopes	B	3.4	10.6%
68D	Narragansett silt loam, 15 to 25 percent slopes, extremely stony	B	4.8	14.9%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	2.8	8.8%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	B	15.5	48.4%
74C	Narragansett-Hollis complex, 3 to 15 percent slopes, very rocky	B	0.9	2.9%
Totals for Area of Interest			**32.0**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

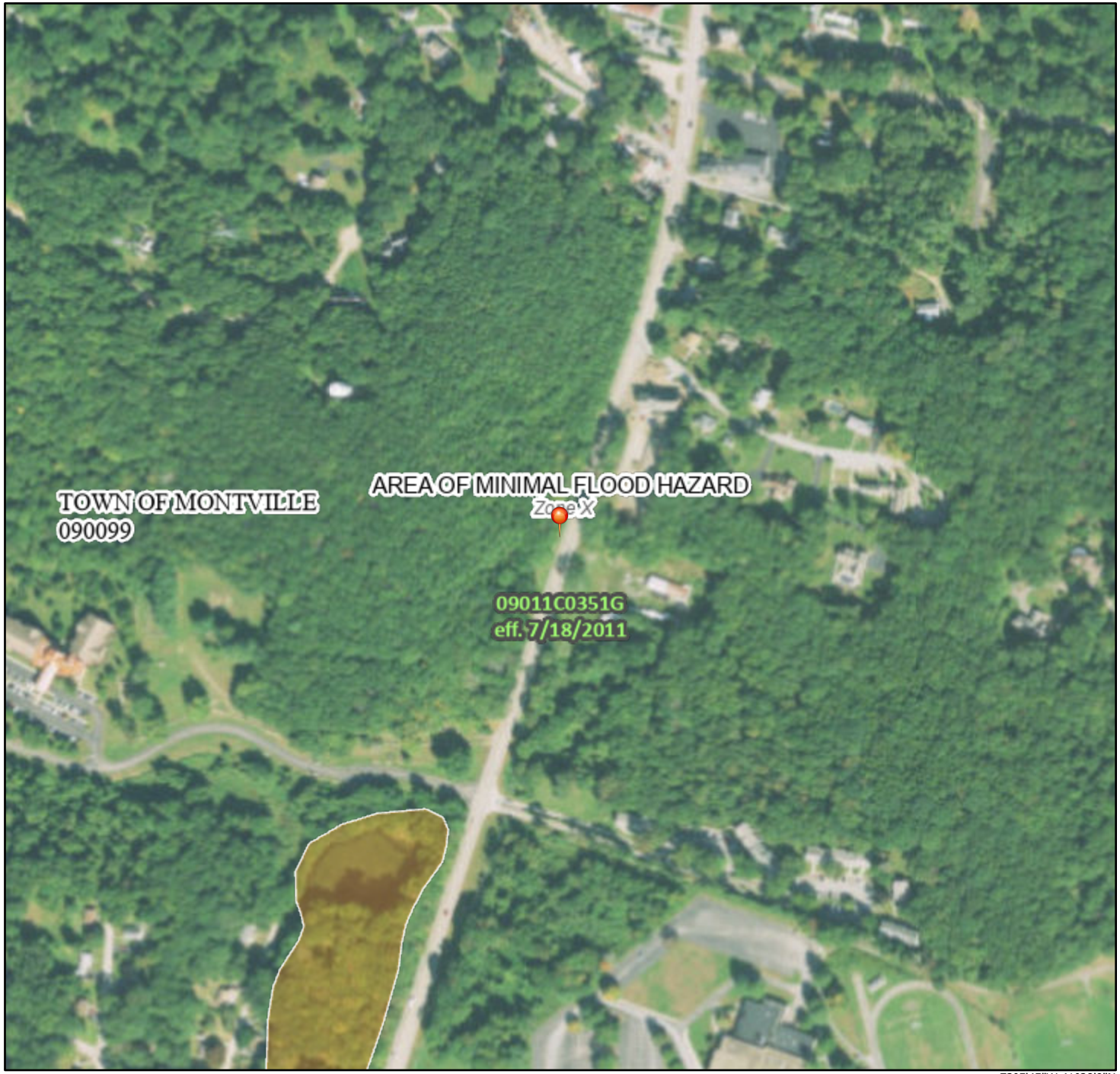
APPENDIX C

FEMA Flood Map

National Flood Hazard Layer FIRMette

FEMA

72°6'23"W 41°28'36"N



72°5'45"W 41°28'9"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

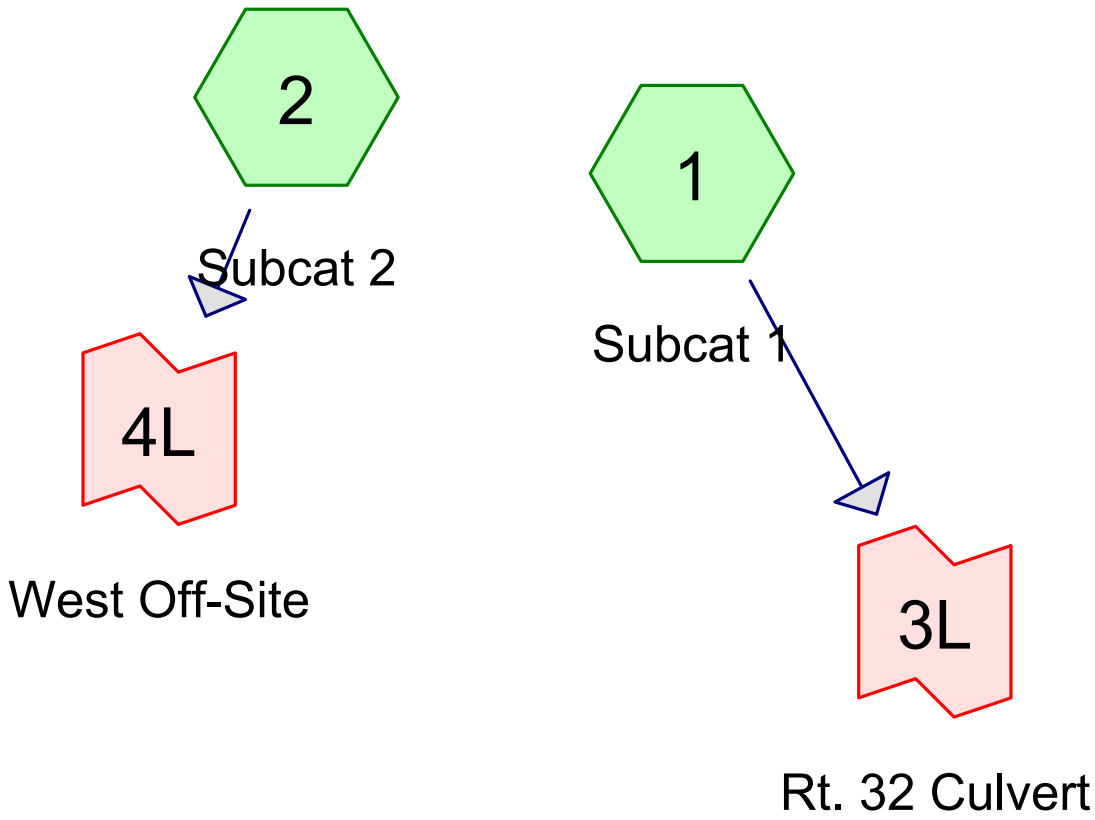
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/29/2024 at 12:59 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX D

HydroCAD Reports



Subcat Reach Pond Link

Routing Diagram for 2024-4-30 Existing Conditions
Prepared by Loureiro Engineering Assoc, Inc, Printed 7/15/2024

Project Notes

Defined 5 rainfall events from CT-Montville-1758 Route 32_DEPTHS IDF

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type II 24-hr		Default	24.00	1	3.46	2
2	10-yr	Type II 24-hr		Default	24.00	1	5.11	2
3	25-yr	Type II 24-hr		Default	24.00	1	6.15	2
4	50-yr	Type II 24-hr		Default	24.00	1	6.92	2
5	100-yr	Type II 24-hr		Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
14.884	55	Woods, Good, HSG B (1, 2)
2.120	77	Woods, Good, HSG D (1, 2)
17.005	**58**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
14.884	HSG B	1, 2
0.000	HSG C	
2.120	HSG D	1, 2
0.000	Other	
17.005		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	14.884	0.000	2.120	0.000	17.005	Woods, Good	1, 2
0.000	**14.884**	**0.000**	**2.120**	**0.000**	**17.005**	**TOTAL AREA**	

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=11.929 ac 0.00% Impervious Runoff Depth=0.40"
Flow Length=946' Tc=29.8 min CN=57 Runoff=2.32 cfs 0.399 af

Subcatchment2: Subcat 2 Runoff Area=5.076 ac 0.00% Impervious Runoff Depth=0.44"
Flow Length=473' Tc=24.4 min CN=58 Runoff=1.32 cfs 0.185 af

Link 3L: Rt. 32 Culvert Inflow=2.32 cfs 0.399 af
Primary=2.32 cfs 0.399 af

Link 4L: West Off-Site Inflow=1.32 cfs 0.185 af
Primary=1.32 cfs 0.185 af

Total Runoff Area = 17.005 ac Runoff Volume = 0.584 af Average Runoff Depth = 0.41"
100.00% Pervious = 17.005 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=11.929 ac 0.00% Impervious Runoff Depth=1.16"
Flow Length=946' Tc=29.8 min CN=57 Runoff=10.09 cfs 1.157 af

Subcatchment2: Subcat 2 Runoff Area=5.076 ac 0.00% Impervious Runoff Depth=1.23"
Flow Length=473' Tc=24.4 min CN=58 Runoff=5.32 cfs 0.520 af

Link 3L: Rt. 32 Culvert Inflow=10.09 cfs 1.157 af
Primary=10.09 cfs 1.157 af

Link 4L: West Off-Site Inflow=5.32 cfs 0.520 af
Primary=5.32 cfs 0.520 af

Total Runoff Area = 17.005 ac Runoff Volume = 1.677 af Average Runoff Depth = 1.18"
100.00% Pervious = 17.005 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=11.929 ac 0.00% Impervious Runoff Depth=1.77"
Flow Length=946' Tc=29.8 min CN=57 Runoff=16.60 cfs 1.757 af

Subcatchment2: Subcat 2 Runoff Area=5.076 ac 0.00% Impervious Runoff Depth=1.85"
Flow Length=473' Tc=24.4 min CN=58 Runoff=8.58 cfs 0.783 af

Link 3L: Rt. 32 Culvert Inflow=16.60 cfs 1.757 af
Primary=16.60 cfs 1.757 af

Link 4L: West Off-Site Inflow=8.58 cfs 0.783 af
Primary=8.58 cfs 0.783 af

Total Runoff Area = 17.005 ac Runoff Volume = 2.540 af Average Runoff Depth = 1.79"
100.00% Pervious = 17.005 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=11.929 ac 0.00% Impervious Runoff Depth=2.26"
Flow Length=946' Tc=29.8 min CN=57 Runoff=21.91 cfs 2.247 af

Subcatchment2: Subcat 2 Runoff Area=5.076 ac 0.00% Impervious Runoff Depth=2.36"
Flow Length=473' Tc=24.4 min CN=58 Runoff=11.21 cfs 0.996 af

Link 3L: Rt. 32 Culvert Inflow=21.91 cfs 2.247 af
Primary=21.91 cfs 2.247 af

Link 4L: West Off-Site Inflow=11.21 cfs 0.996 af
Primary=11.21 cfs 0.996 af

Total Runoff Area = 17.005 ac Runoff Volume = 3.243 af Average Runoff Depth = 2.29"
100.00% Pervious = 17.005 ac 0.00% Impervious = 0.000 ac

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

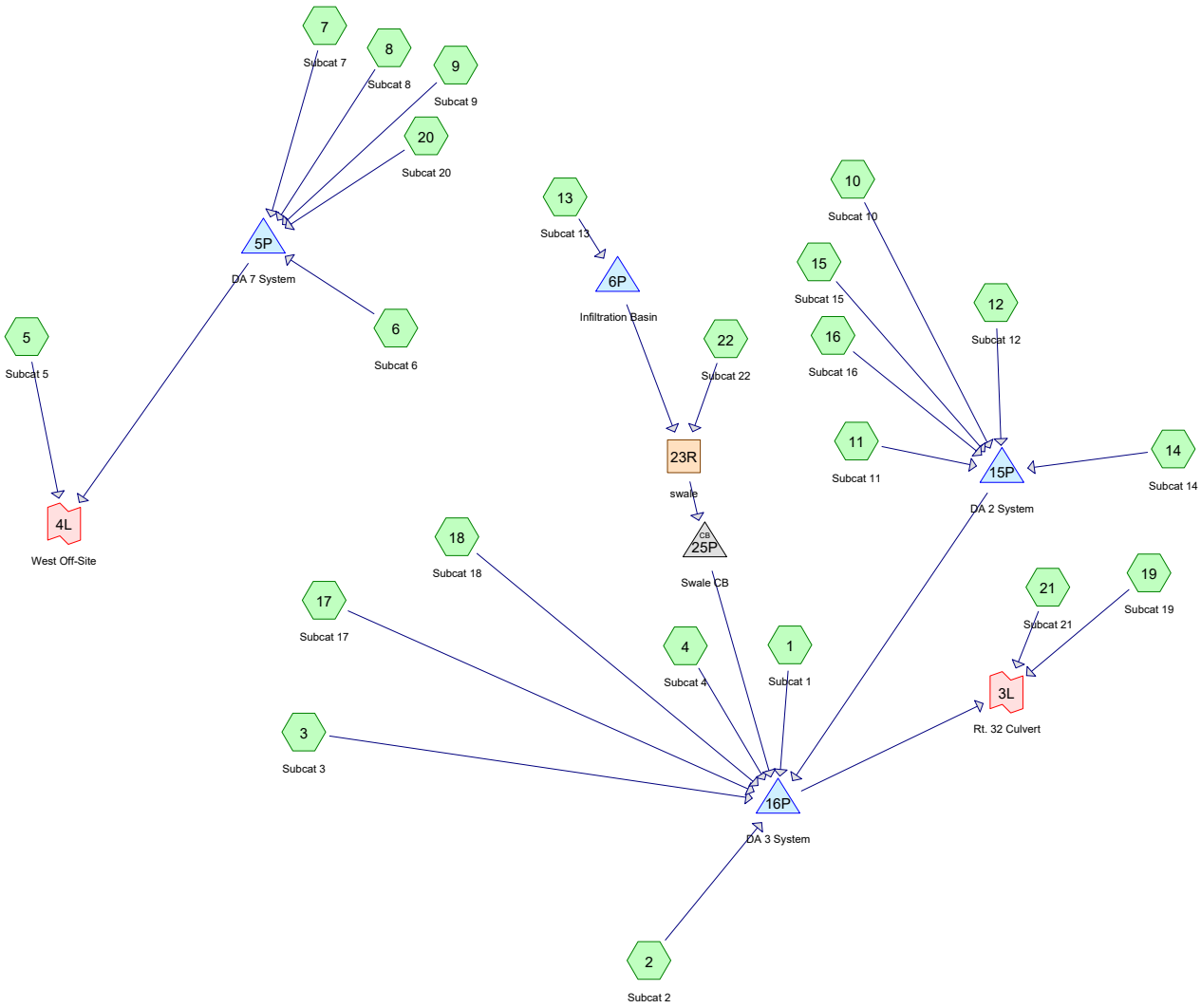
Subcatchment1: Subcat 1 Runoff Area=11.929 ac 0.00% Impervious Runoff Depth=2.82"
Flow Length=946' Tc=29.8 min CN=57 Runoff=27.96 cfs 2.802 af

Subcatchment2: Subcat 2 Runoff Area=5.076 ac 0.00% Impervious Runoff Depth=2.93"
Flow Length=473' Tc=24.4 min CN=58 Runoff=14.20 cfs 1.237 af

Link 3L: Rt. 32 Culvert Inflow=27.96 cfs 2.802 af
Primary=27.96 cfs 2.802 af

Link 4L: West Off-Site Inflow=14.20 cfs 1.237 af
Primary=14.20 cfs 1.237 af

Total Runoff Area = 17.005 ac Runoff Volume = 4.039 af Average Runoff Depth = 2.85"
100.00% Pervious = 17.005 ac 0.00% Impervious = 0.000 ac



Subcat Reach Pond Link

Routing Diagram for 2024-4-30 New Conditions
Prepared by Loureiro Engineering Assoc, Inc, Printed 7/15/2024

Project Notes

Defined 5 rainfall events from CT-Montville-1758 Route 32_DEPTHS IDF

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type II 24-hr		Default	24.00	1	3.46	2
2	10-yr	Type II 24-hr		Default	24.00	1	5.11	2
3	25-yr	Type II 24-hr		Default	24.00	1	6.15	2
4	50-yr	Type II 24-hr		Default	24.00	1	6.92	2
5	100-yr	Type II 24-hr		Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
234,194	61	>75% Grass cover, Good, HSG B (1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22)
14,435	80	>75% Grass cover, Good, HSG D (9, 10, 11, 20, 21)
136,617	98	Paved parking, HSG B (2, 3, 4, 5, 7, 8, 10, 11, 13, 20, 21, 22)
17,484	98	Paved parking, HSG D (3, 8, 9, 10, 11, 20)
75,453	98	Roofs, HSG B (1, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18)
1,294	98	Roofs, HSG D (8)
17,246	98	Unconnected pavement, HSG B (1, 3, 7, 9, 10, 11, 13, 20, 22)
1,645	98	Unconnected pavement, HSG D (9, 10, 11, 20)
184,709	55	Woods, Good, HSG B (1, 5, 7, 9, 11, 13, 19, 22)
57,502	77	Woods, Good, HSG D (7, 9, 11, 13, 20)
740,579	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
648,219	HSG B	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
0	HSG C	
92,360	HSG D	3, 7, 8, 9, 10, 11, 13, 20, 21
0	Other	
740,579		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	234,194	0	14,435	0	248,629	>75% Grass cover, Good	
0	136,617	0	17,484	0	154,101	Paved parking	
0	75,453	0	1,294	0	76,747	Roofs	
0	17,246	0	1,645	0	18,892	Unconnected pavement	
0	184,709	0	57,502	0	242,210	Woods, Good	
0	**648,219**	**0**	**92,360**	**0**	**740,579**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	5P	344.65	344.12	106.5	0.0050	0.013	0.0	15.0	0.0
2	15P	316.00	285.00	106.0	0.2925	0.013	0.0	18.0	0.0
3	16P	257.50	257.15	69.0	0.0051	0.013	0.0	24.0	0.0
4	25P	258.10	258.00	3.0	0.0333	0.013	0.0	15.0	0.0

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=46,057 sf 9.58% Impervious Runoff Depth=0.64"
Tc=10.0 min UI Adjusted CN=63 Runoff=0.89 cfs 2,457 cf

Subcatchment2: Subcat 2 Runoff Area=0.097 ac 83.65% Impervious Runoff Depth=2.60"
Tc=5.0 min CN=92 Runoff=0.44 cfs 917 cf

Subcatchment3: Subcat 3 Runoff Area=33,237 sf 65.92% Impervious Runoff Depth=1.98"
Flow Length=367' Tc=1.4 min CN=85 Runoff=3.14 cfs 5,489 cf

Subcatchment4: Subcat 4 Runoff Area=1.396 ac 2.04% Impervious Runoff Depth=0.60"
Flow Length=830' Tc=7.4 min CN=62 Runoff=1.21 cfs 3,024 cf

Subcatchment5: Subcat 5 Runoff Area=69,961 sf 0.73% Impervious Runoff Depth=0.48"
Flow Length=269' Tc=19.3 min CN=59 Runoff=0.57 cfs 2,770 cf

Subcatchment6: Subcat 6 Runoff Area=13,786 sf 100.00% Impervious Runoff Depth=3.23"
Tc=5.0 min CN=98 Runoff=1.60 cfs 3,707 cf

Subcatchment7: Subcat 7 Runoff Area=2.105 ac 27.11% Impervious Runoff Depth=0.98"
Flow Length=262' Tc=18.9 min CN=70 Runoff=2.19 cfs 7,514 cf

Subcatchment8: Subcat 8 Runoff Area=5,496 sf 100.00% Impervious Runoff Depth=3.23"
Tc=5.0 min CN=98 Runoff=0.64 cfs 1,478 cf

Subcatchment9: Subcat 9 Runoff Area=6,071 sf 49.70% Impervious Runoff Depth=1.98"
Tc=5.0 min CN=85 Runoff=0.51 cfs 1,002 cf

Subcatchment10: Subcat 10 Runoff Area=52,574 sf 82.92% Impervious Runoff Depth=2.60"
Flow Length=181' Tc=5.6 min CN=92 Runoff=5.34 cfs 11,384 cf

Subcatchment11: Subcat 11 Runoff Area=105,659 sf 63.11% Impervious Runoff Depth=2.15"
Flow Length=237' Tc=17.3 min CN=87 Runoff=6.26 cfs 18,900 cf

Subcatchment12: Subcat 12 Runoff Area=13,787 sf 100.00% Impervious Runoff Depth=3.23"
Tc=5.0 min CN=98 Runoff=1.60 cfs 3,707 cf

Subcatchment13: Subcat 13 Runoff Area=108,613 sf 0.01% Impervious Runoff Depth=0.68"
Flow Length=653' Tc=23.8 min CN=64 Runoff=1.36 cfs 6,200 cf

Subcatchment14: Subcat 14 Runoff Area=13,783 sf 99.97% Impervious Runoff Depth=3.23"
Tc=5.0 min CN=98 Runoff=1.60 cfs 3,706 cf

Subcatchment15: Subcat 15 Runoff Area=13,783 sf 99.98% Impervious Runoff Depth=3.23"
Tc=5.0 min CN=98 Runoff=1.60 cfs 3,706 cf

Subcatchment16: Subcat 16 Runoff Area=13,792 sf 99.99% Impervious Runoff Depth=3.23"
Tc=5.0 min CN=98 Runoff=1.60 cfs 3,708 cf

Subcatchment17: Subcat 17 Runoff Area=6,828 sf 8.53% Impervious Runoff Depth=0.68"
Tc=5.0 min CN=64 Runoff=0.18 cfs 390 cf

Subcatchment18: Subcat 18 Runoff Area=6,372 sf 7.75% Impervious Runoff Depth=0.68"
Tc=5.0 min CN=64 Runoff=0.17 cfs 364 cf

Subcatchment19: Subcat 19 Runoff Area=5,807 sf 0.00% Impervious Runoff Depth=0.33"
Flow Length=335' Tc=13.6 min CN=55 Runoff=0.03 cfs 161 cf

Subcatchment20: Subcat 20 Runoff Area=8,137 sf 50.55% Impervious Runoff Depth=2.15"
Tc=5.0 min CN=87 Runoff=0.73 cfs 1,456 cf

Subcatchment21: Subcat 21 Runoff Area=8,901 sf 3.88% Impervious Runoff Depth=0.64"
Tc=5.0 min CN=63 Runoff=0.22 cfs 475 cf

Subcatchment22: Subcat 22 Runoff Area=51,226 sf 0.04% Impervious Runoff Depth=0.33"
Flow Length=458' Tc=17.9 min CN=55 Runoff=0.22 cfs 1,419 cf

Reach 23R: swale Avg. Flow Depth=0.09' Max Vel=2.17 fps Inflow=0.22 cfs 1,419 cf
n=0.030 L=383.0' S=0.0640 '/' Capacity=25.18 cfs Outflow=0.22 cfs 1,419 cf

Pond 5P: DA 7 System Peak Elev=345.91' Storage=6,404 cf Inflow=4.41 cfs 15,156 cf
Outflow=0.87 cfs 15,150 cf

Pond 6P: Infiltration Basin Peak Elev=312.89' Storage=1,302 cf Inflow=1.36 cfs 6,200 cf
Discarded=0.42 cfs 6,200 cf Primary=0.00 cfs 0 cf Outflow=0.42 cfs 6,200 cf

Pond 15P: DA 2 System Peak Elev=311.20' Storage=0.426 af Inflow=15.68 cfs 45,112 cf
Discarded=1.31 cfs 45,112 cf Primary=0.00 cfs 0 cf Outflow=1.31 cfs 45,112 cf

Pond 16P: DA 3 System Peak Elev=251.29' Storage=3,908 cf Inflow=4.75 cfs 14,059 cf
Discarded=0.67 cfs 14,059 cf Primary=0.00 cfs 0 cf Outflow=0.67 cfs 14,059 cf

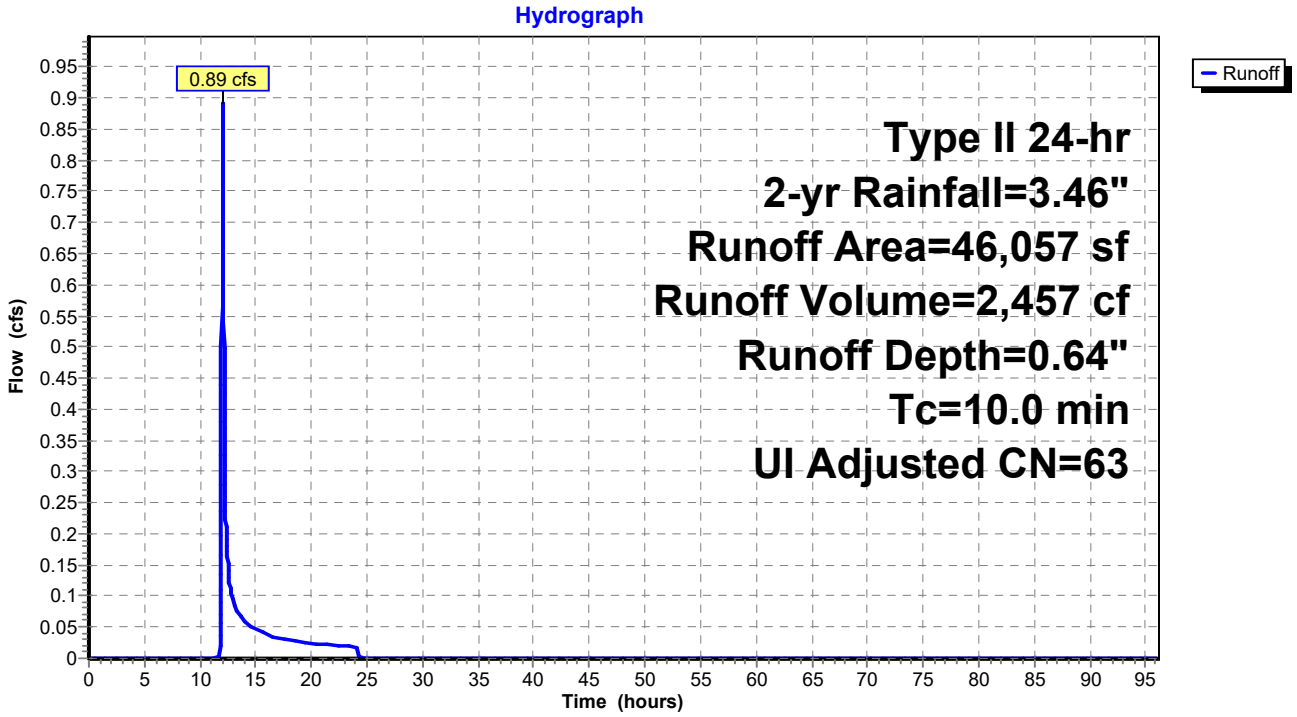
Pond 25P: Swale CB Peak Elev=258.31' Inflow=0.22 cfs 1,419 cf
15.0" Round Culvert n=0.013 L=3.0' S=0.0333 '/' Outflow=0.22 cfs 1,419 cf

Link 3L: Rt. 32 Culvert Inflow=0.23 cfs 636 cf
Primary=0.23 cfs 636 cf

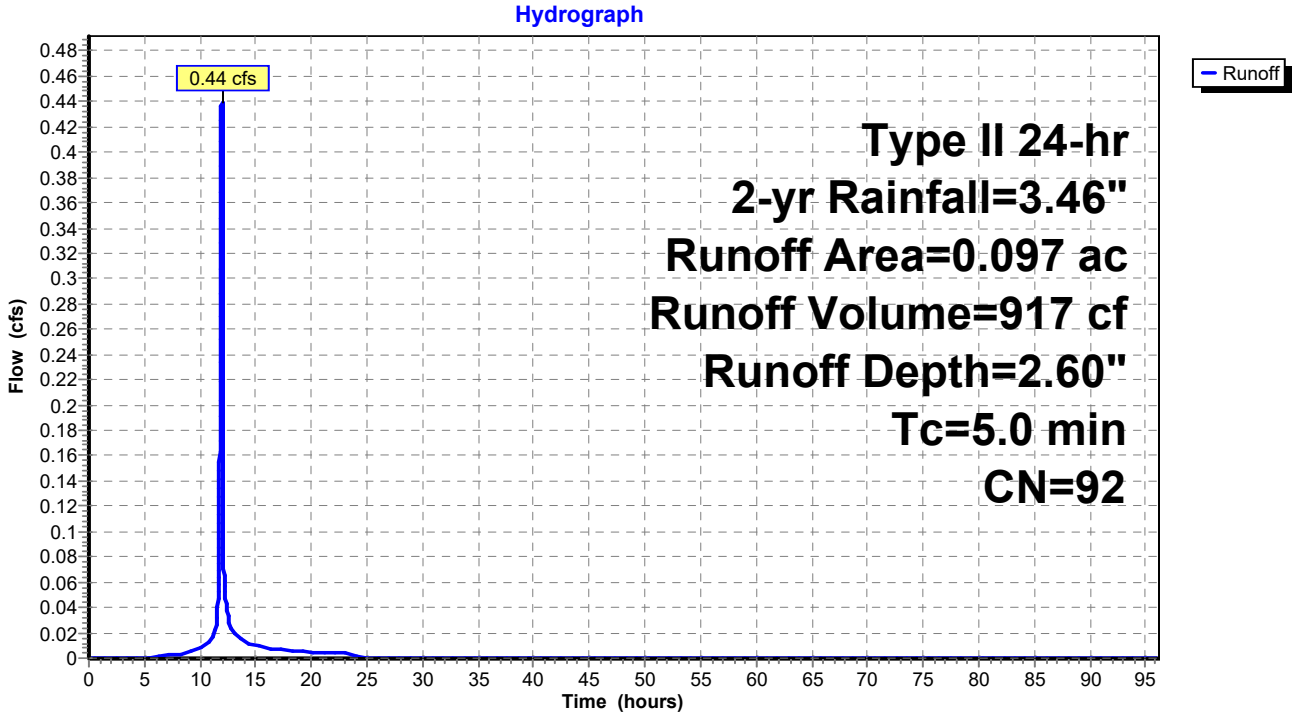
Link 4L: West Off-Site Inflow=1.30 cfs 17,921 cf
Primary=1.30 cfs 17,921 cf

Total Runoff Area = 740,579 sf Runoff Volume = 83,932 cf Average Runoff Depth = 1.36"
66.28% Pervious = 490,839 sf 33.72% Impervious = 249,740 sf

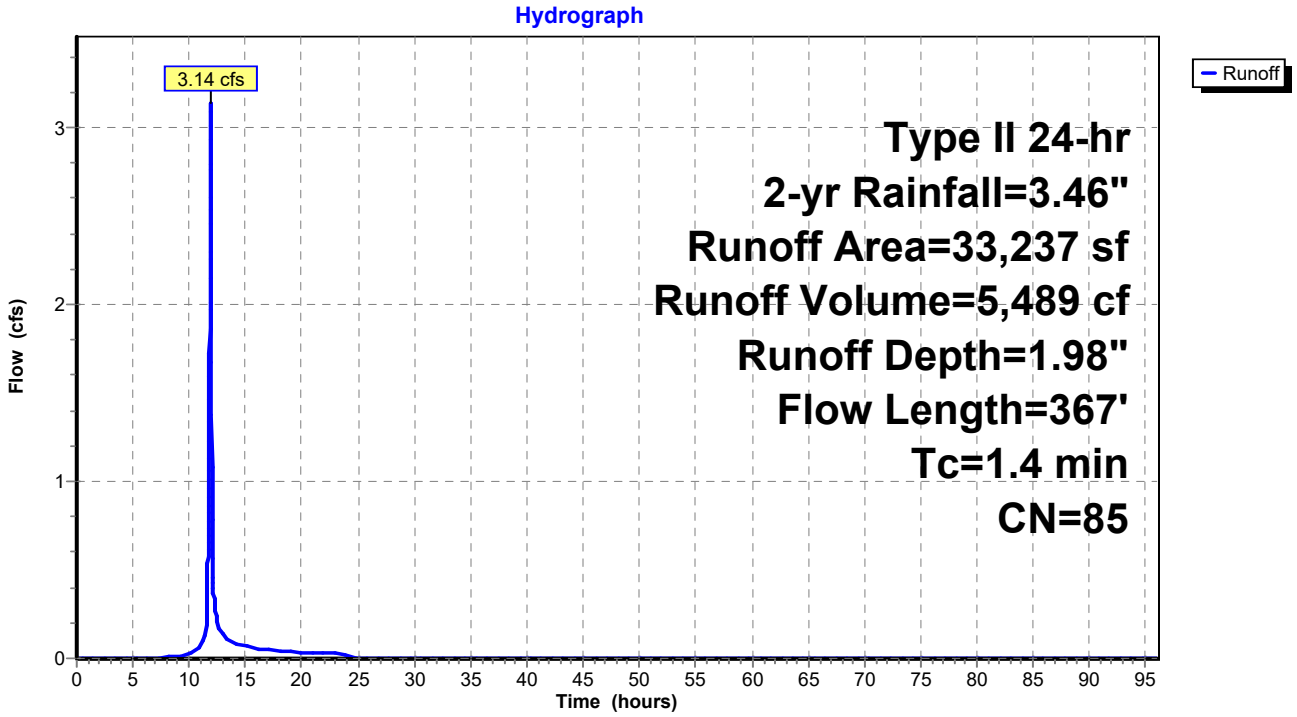
Subcatchment 1: Subcat 1



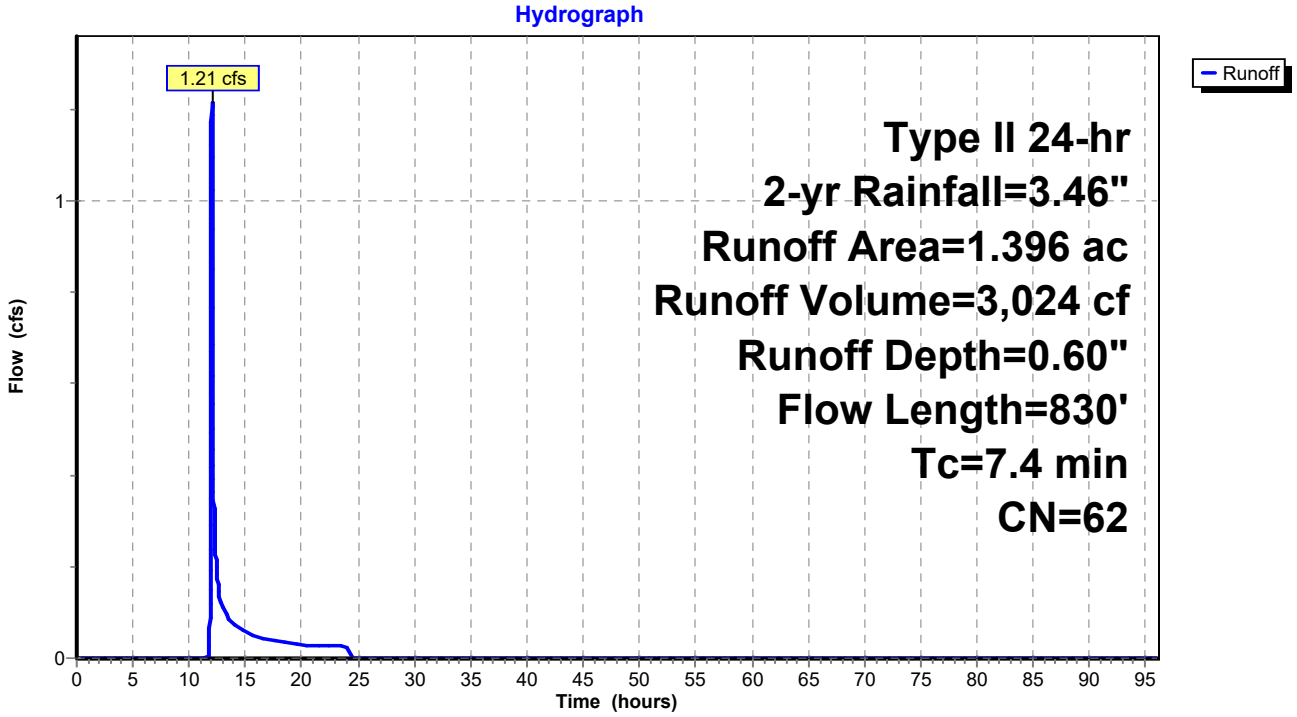
Subcatchment 2: Subcat 2



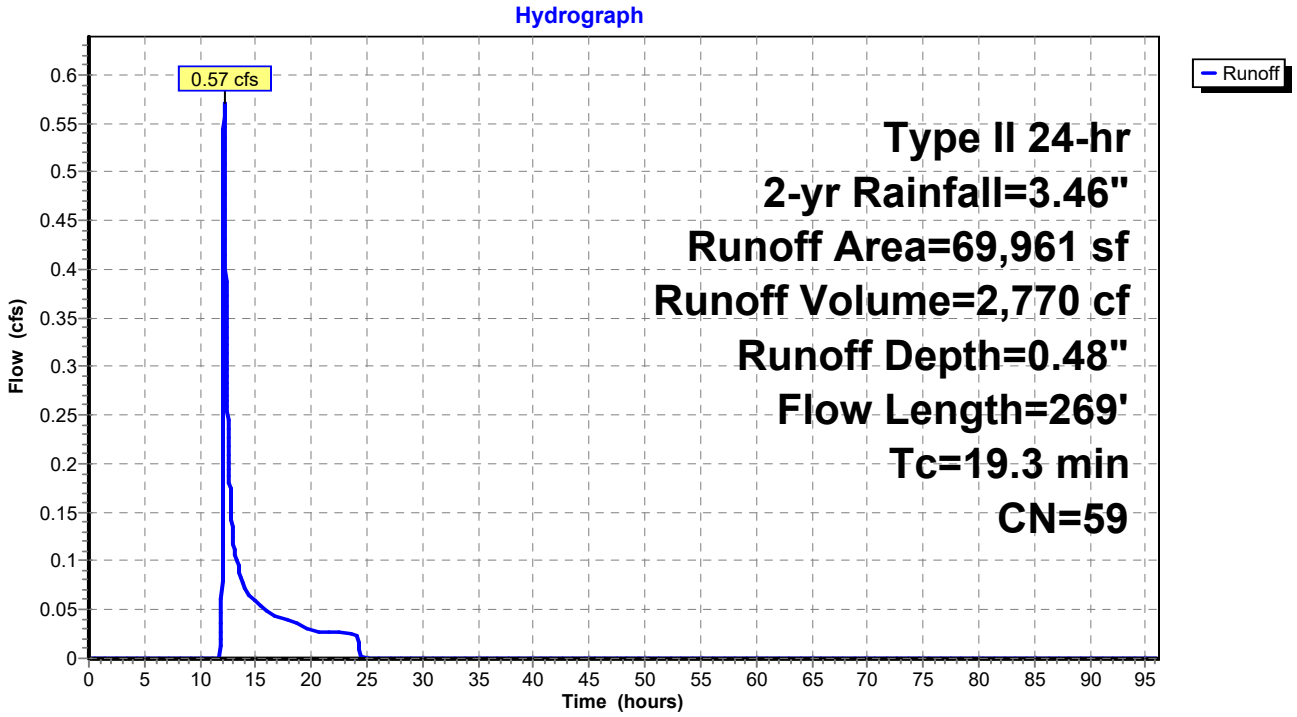
Subcatchment 3: Subcat 3



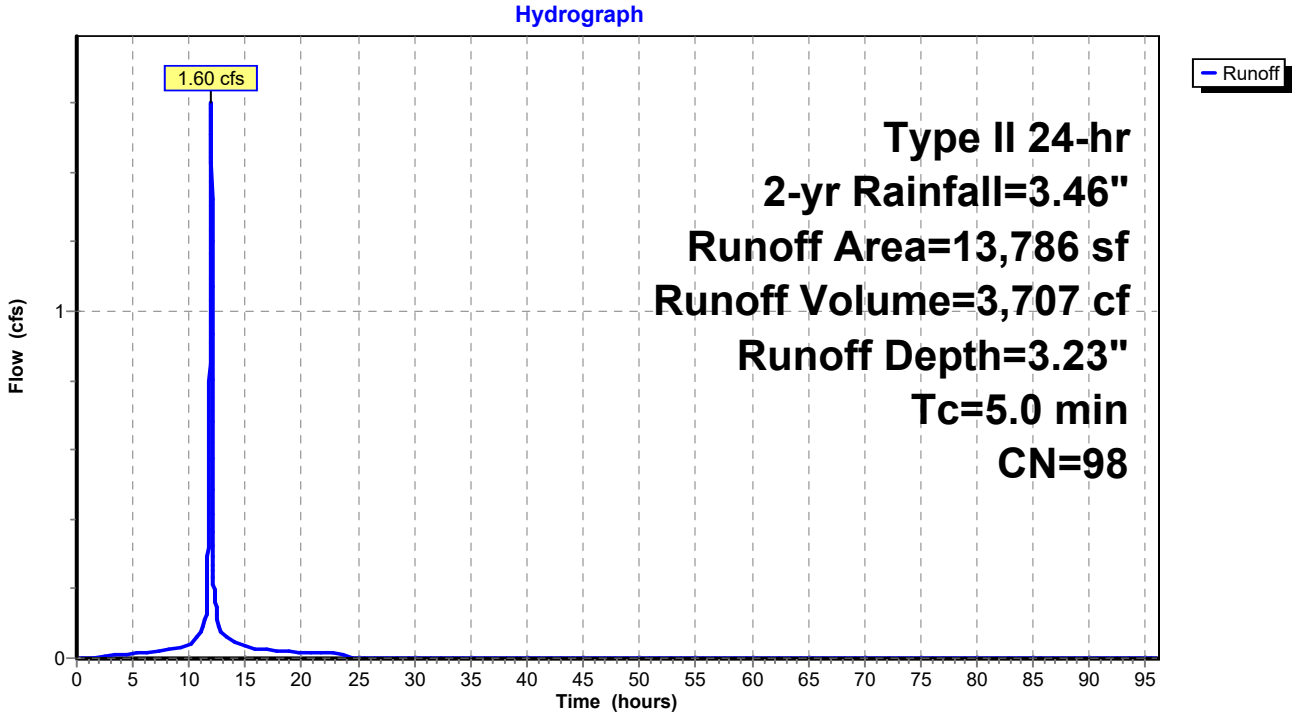
Subcatchment 4: Subcat 4



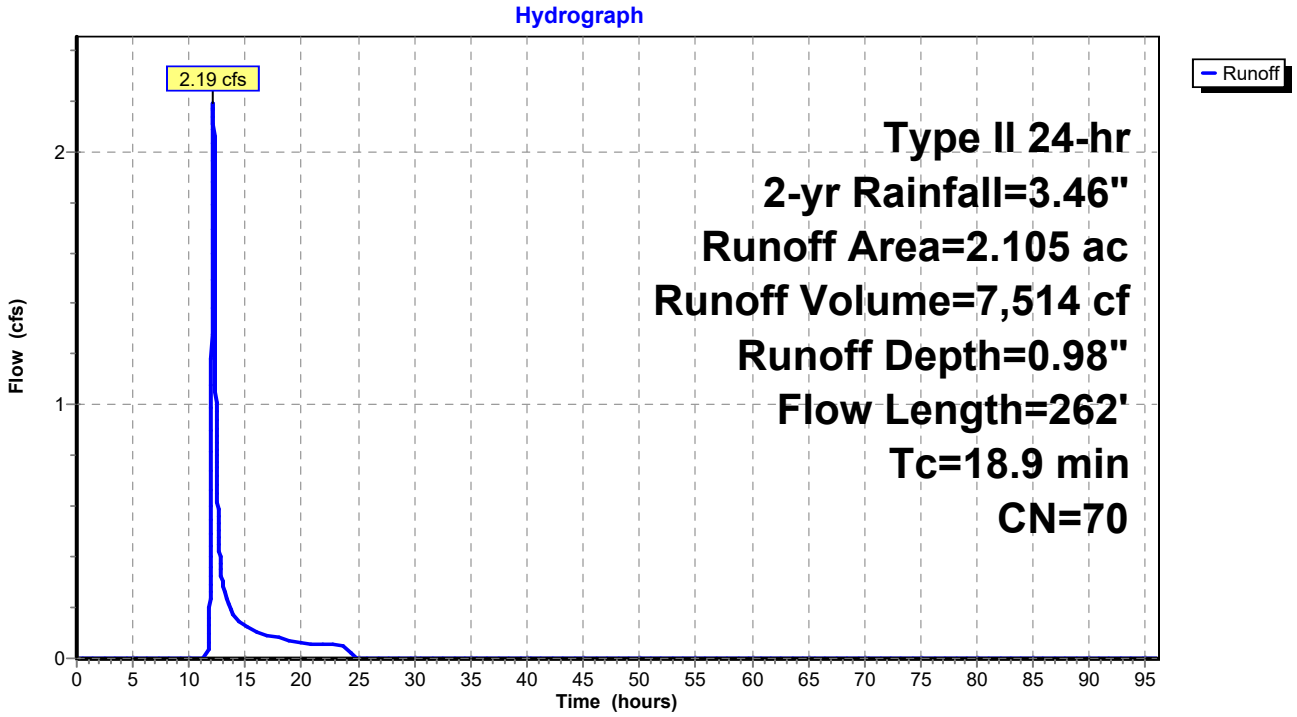
Subcatchment 5: Subcat 5



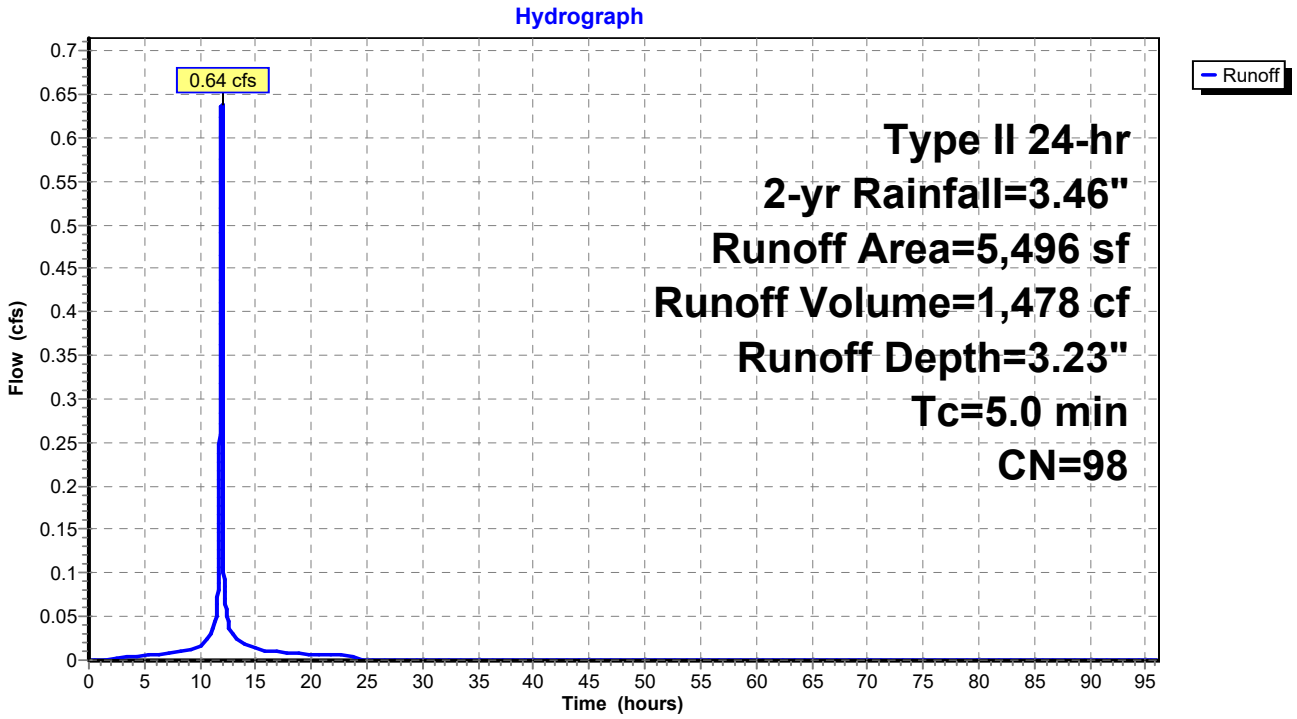
Subcatchment 6: Subcat 6



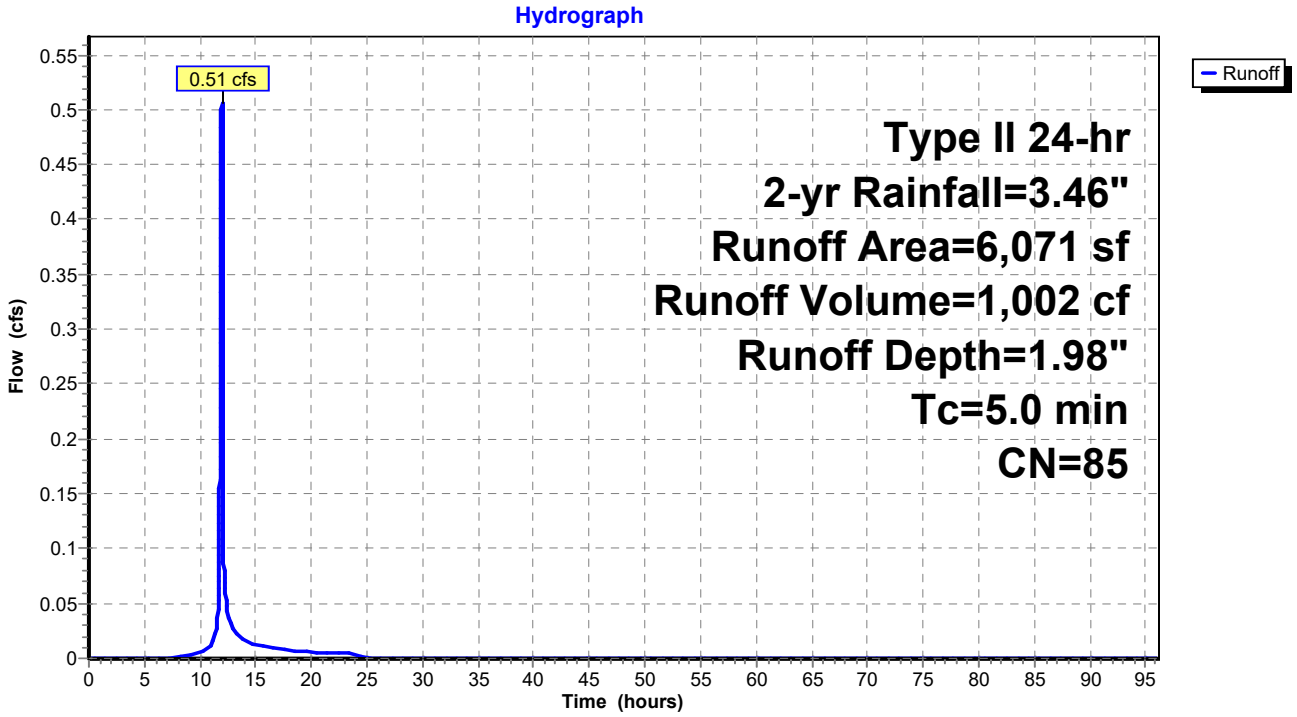
Subcatchment 7: Subcat 7



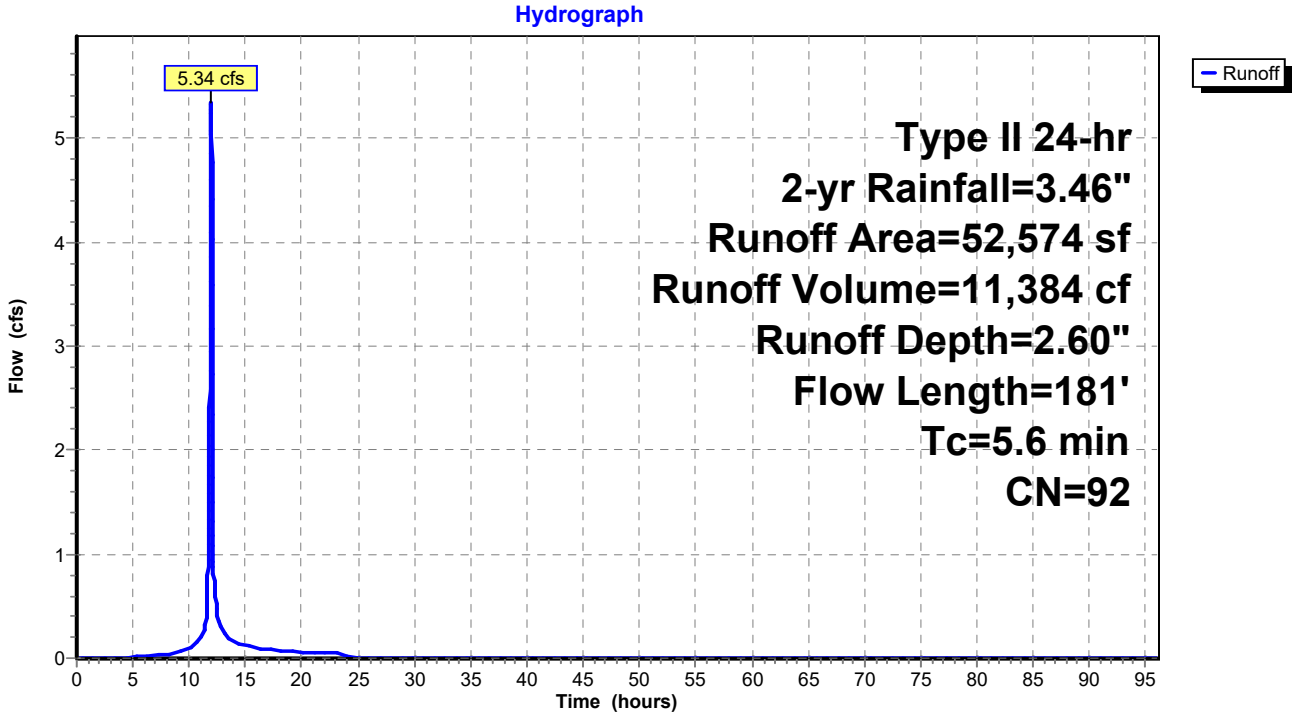
Subcatchment 8: Subcat 8



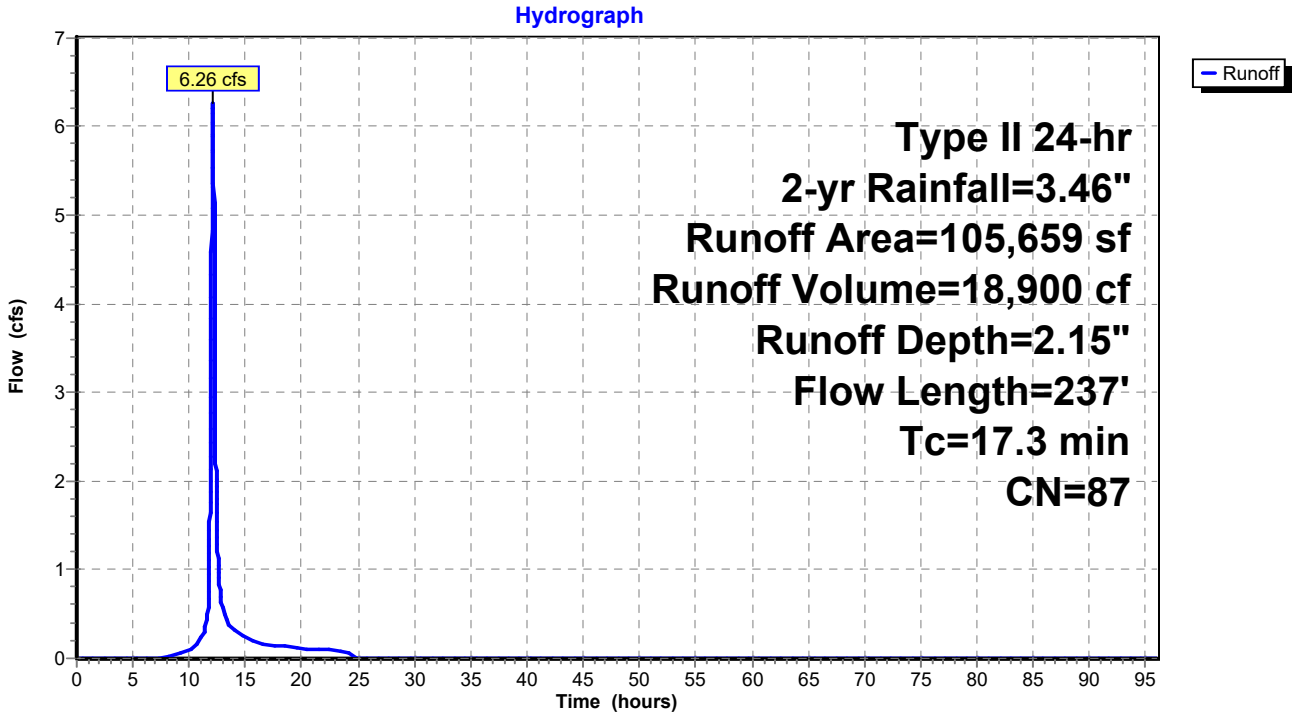
Subcatchment 9: Subcat 9



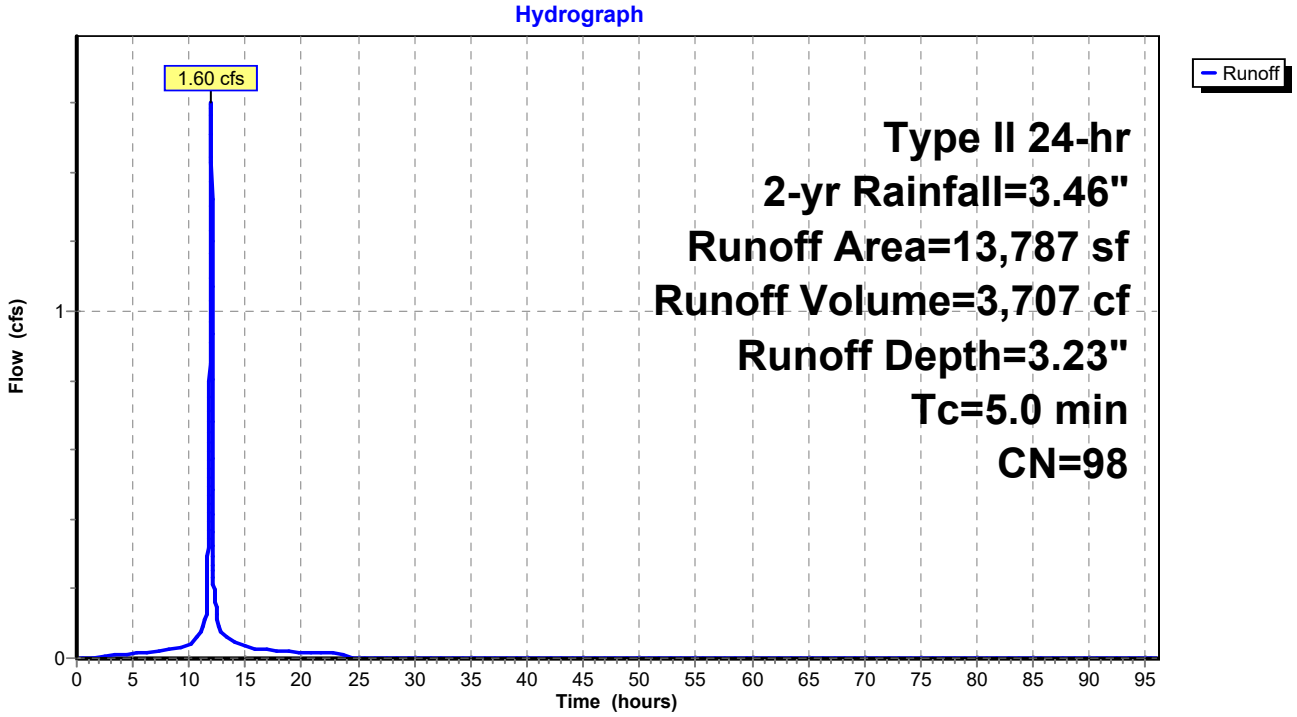
Subcatchment 10: Subcat 10



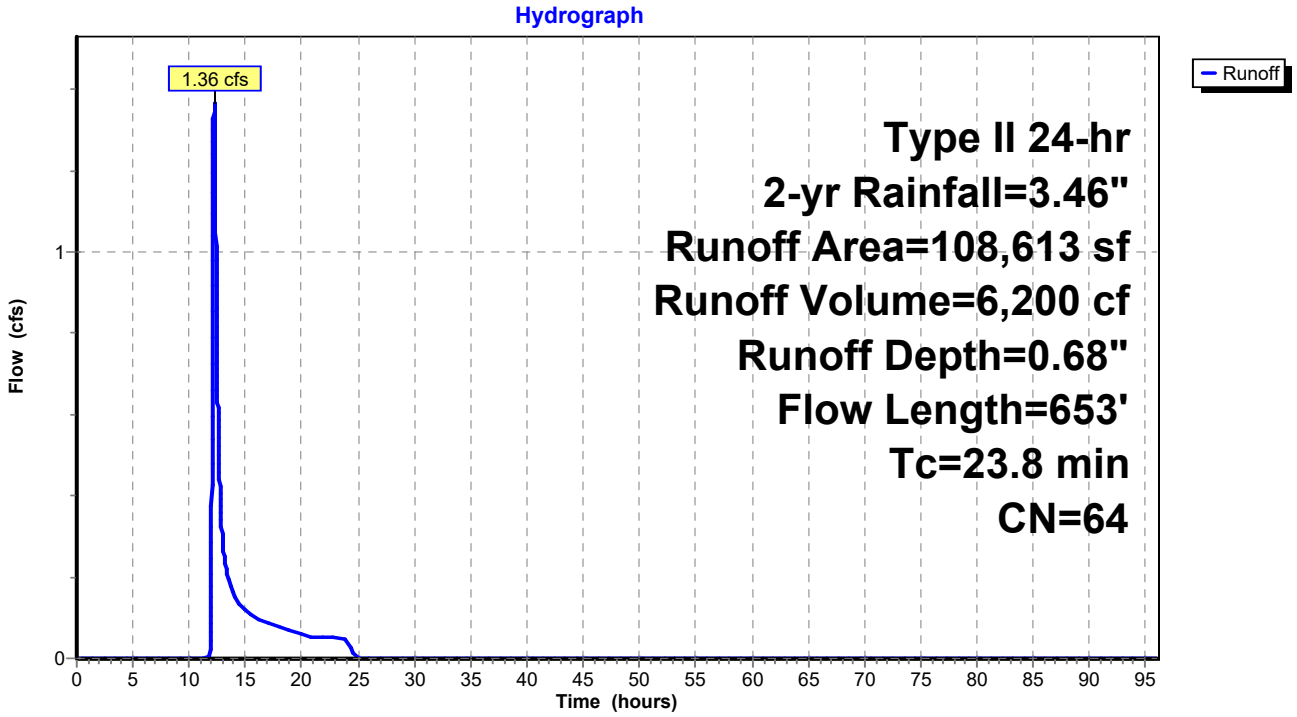
Subcatchment 11: Subcat 11



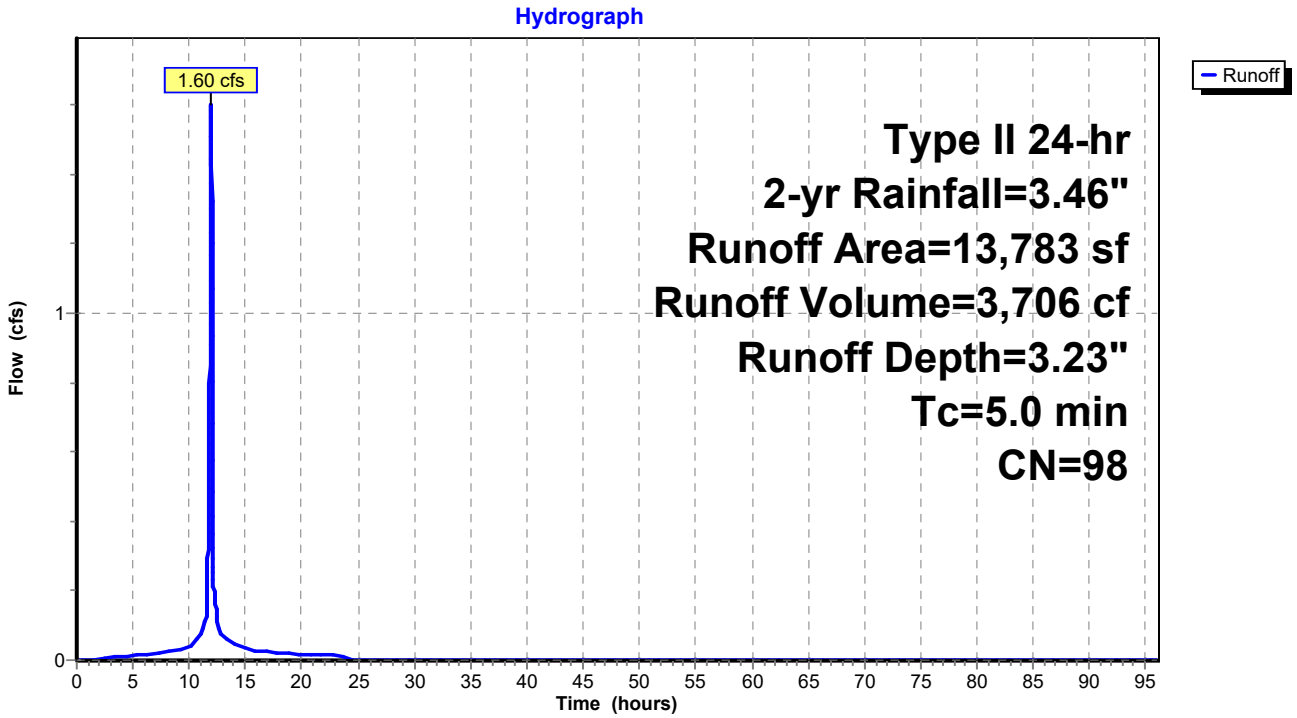
Subcatchment 12: Subcat 12



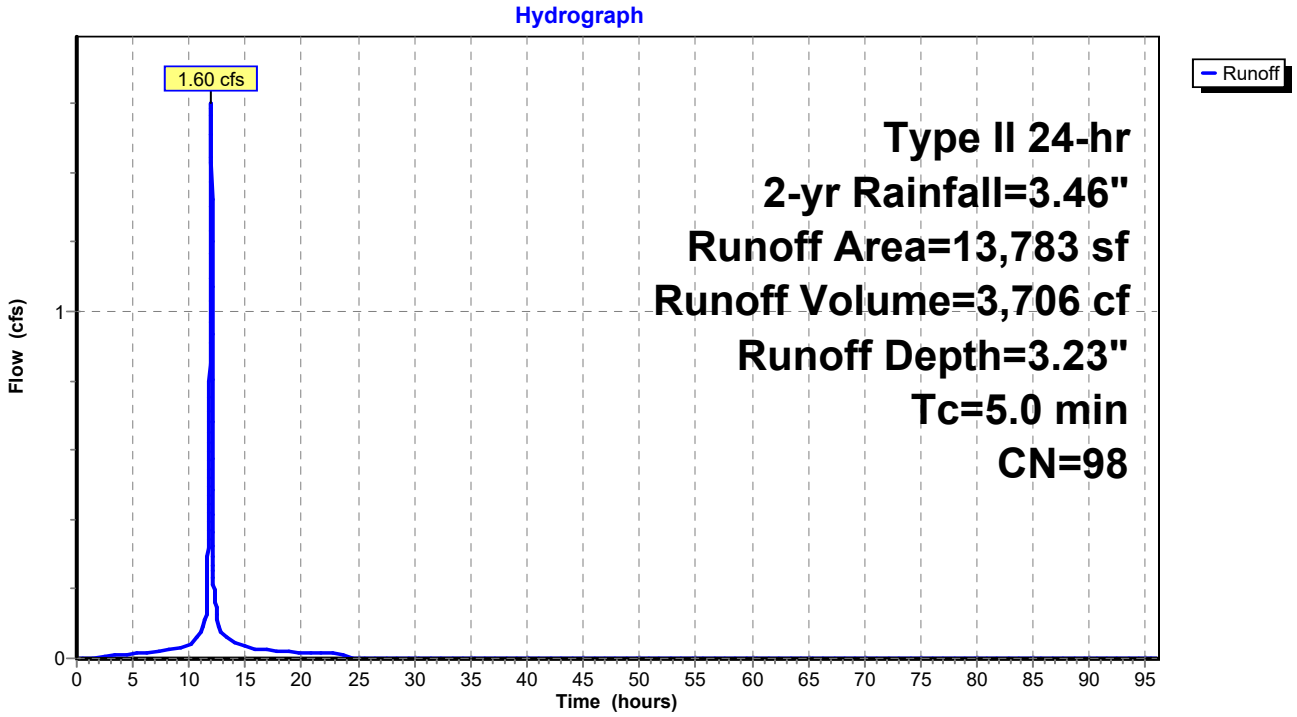
Subcatchment 13: Subcat 13



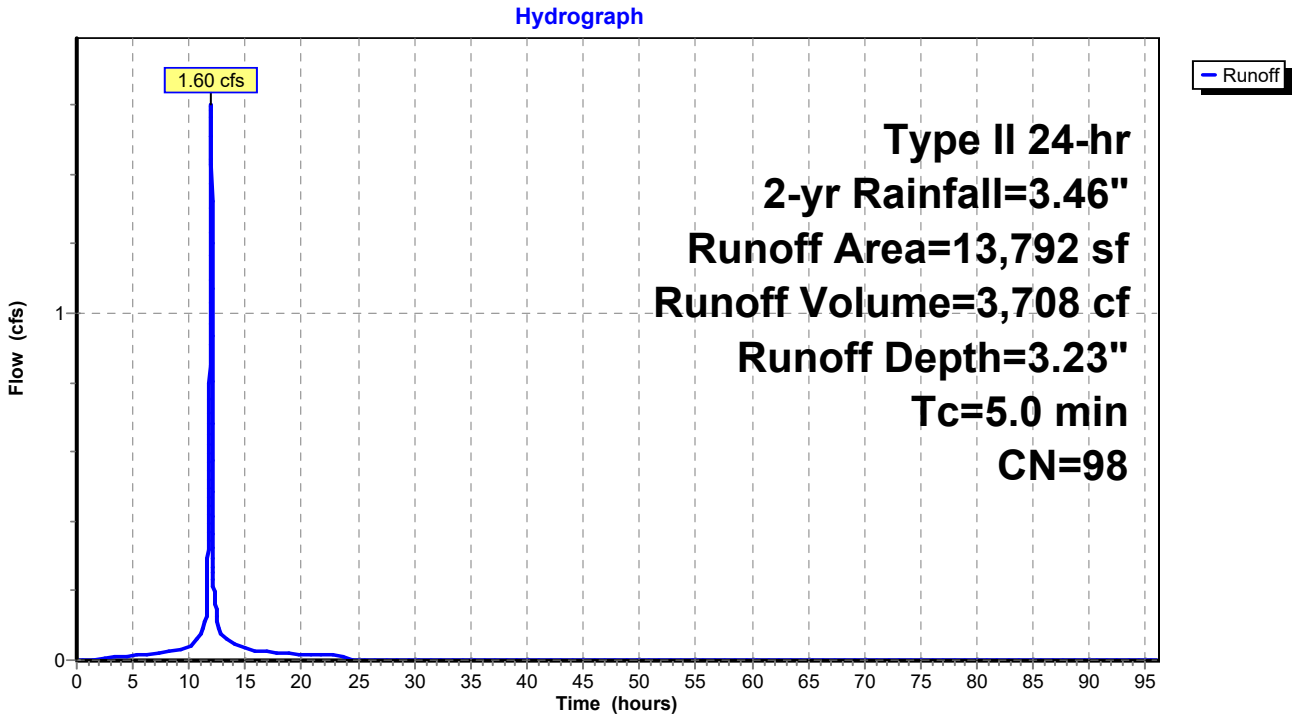
Subcatchment 14: Subcat 14



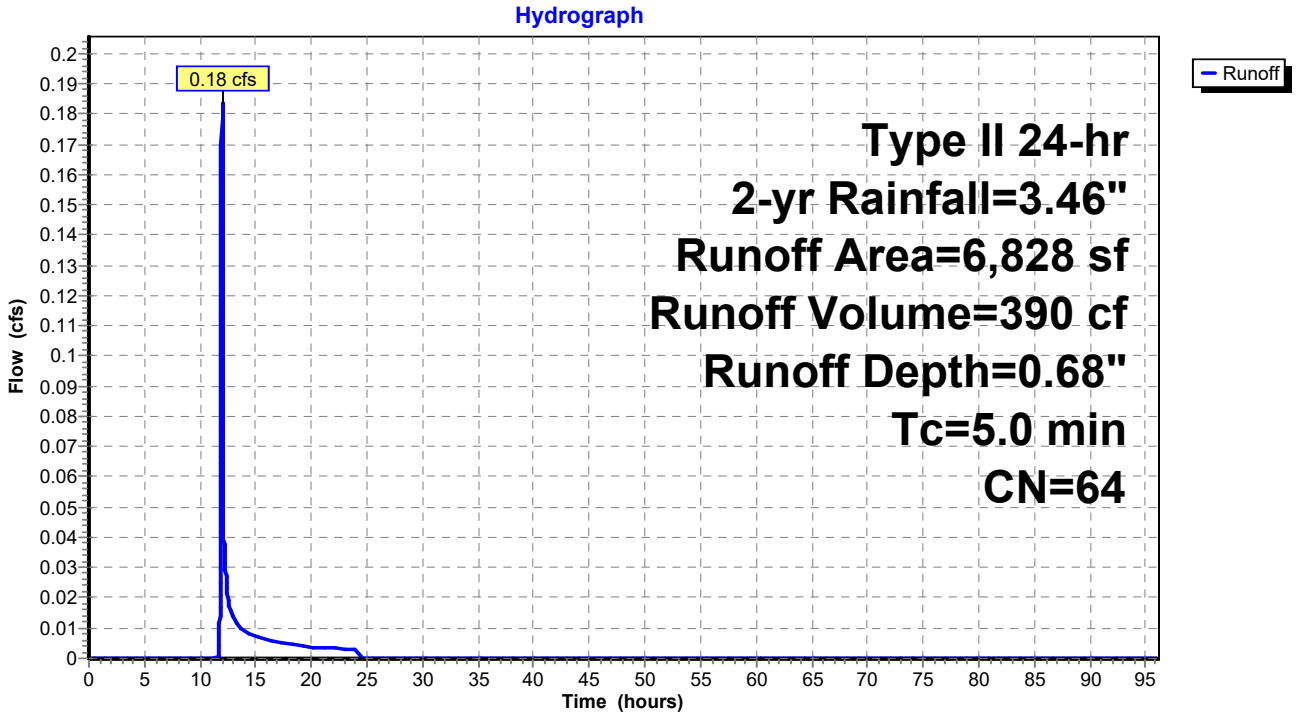
Subcatchment 15: Subcat 15



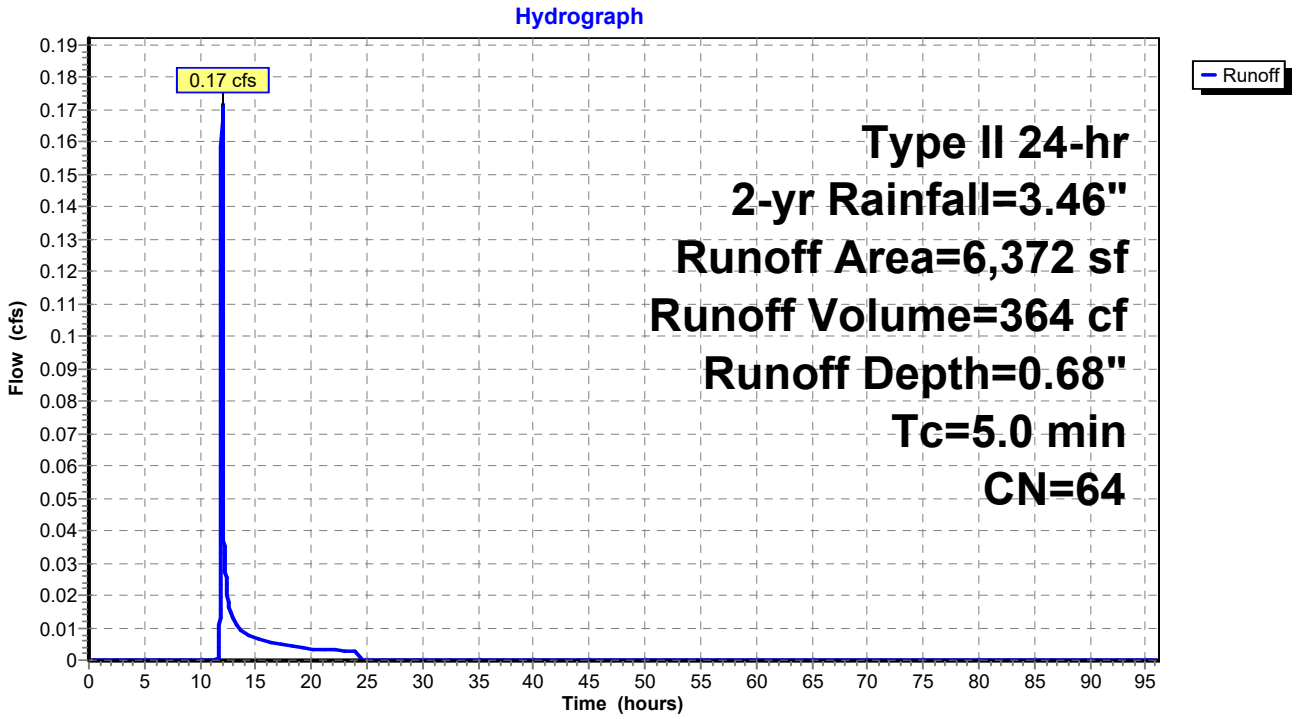
Subcatchment 16: Subcat 16



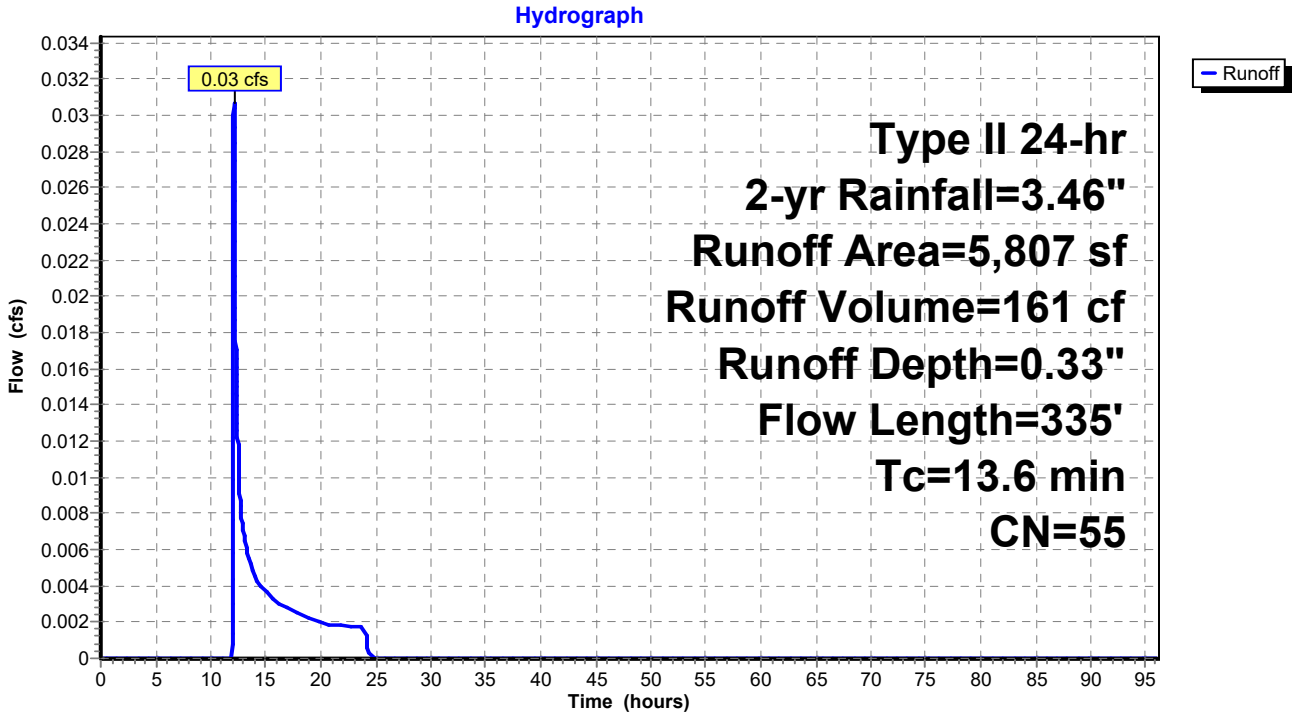
Subcatchment 17: Subcat 17



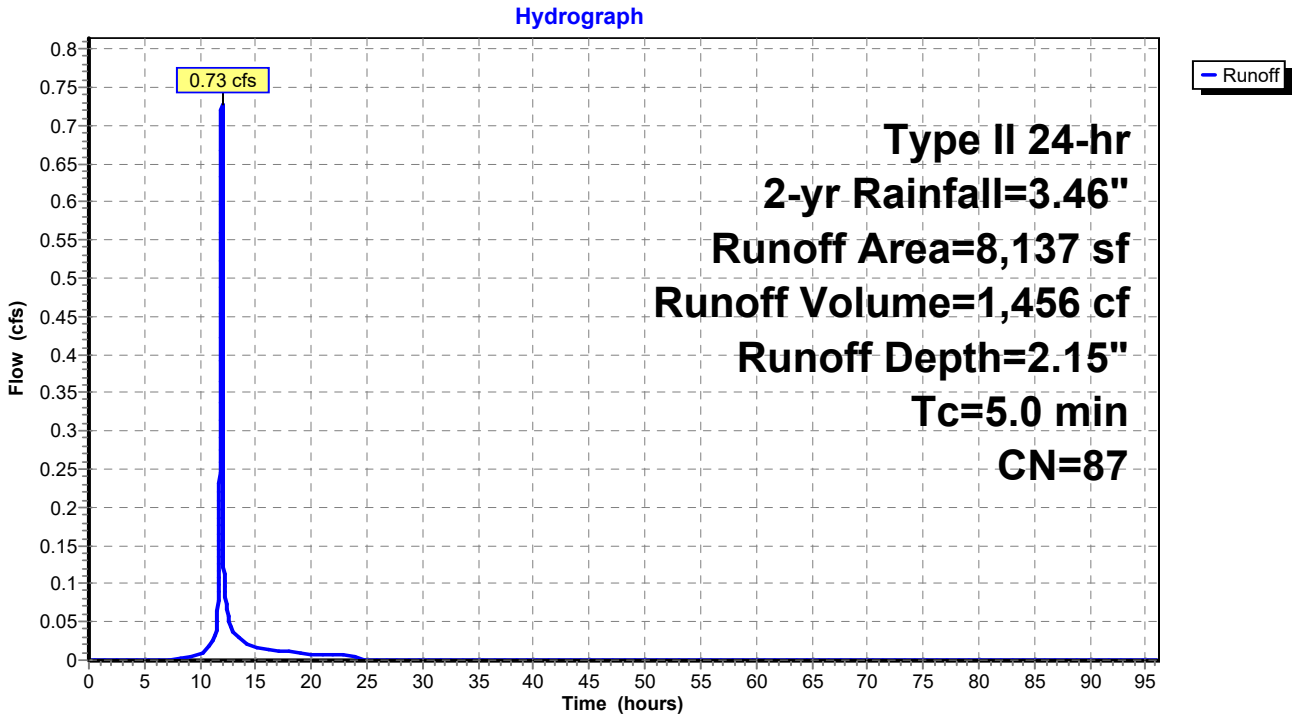
Subcatchment 18: Subcat 18



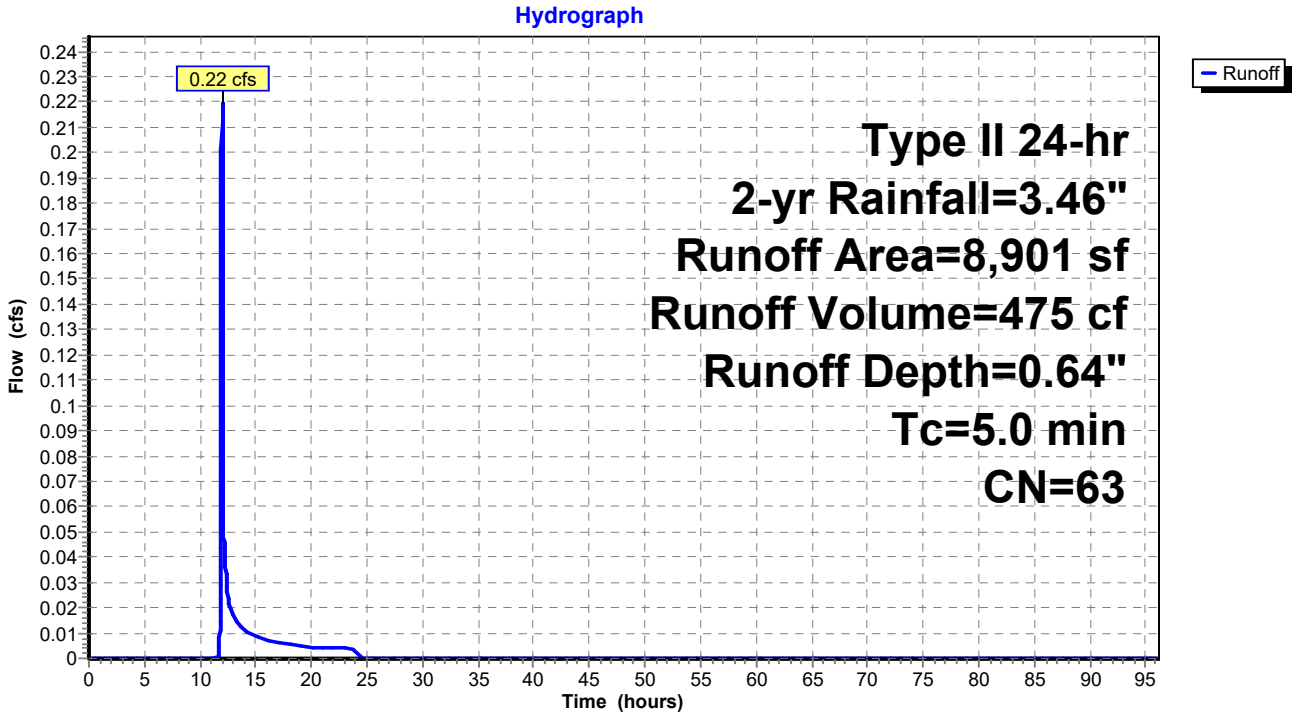
Subcatchment 19: Subcat 19



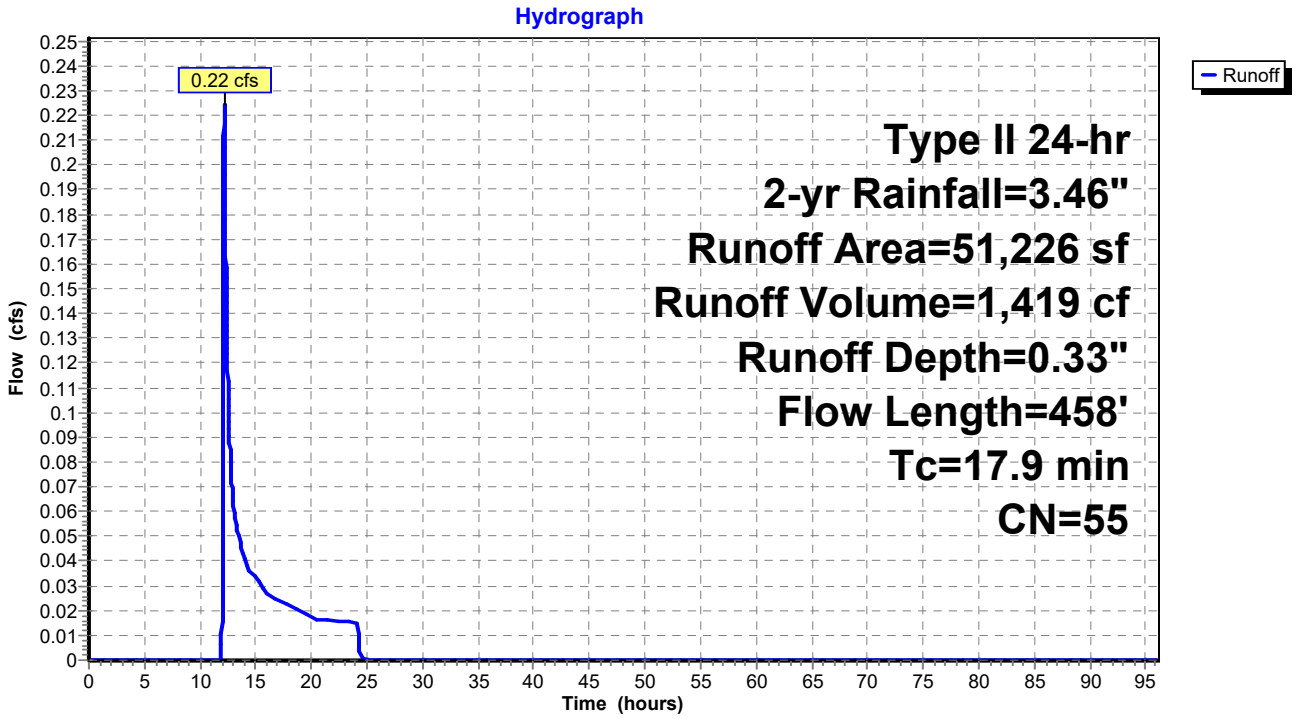
Subcatchment 20: Subcat 20



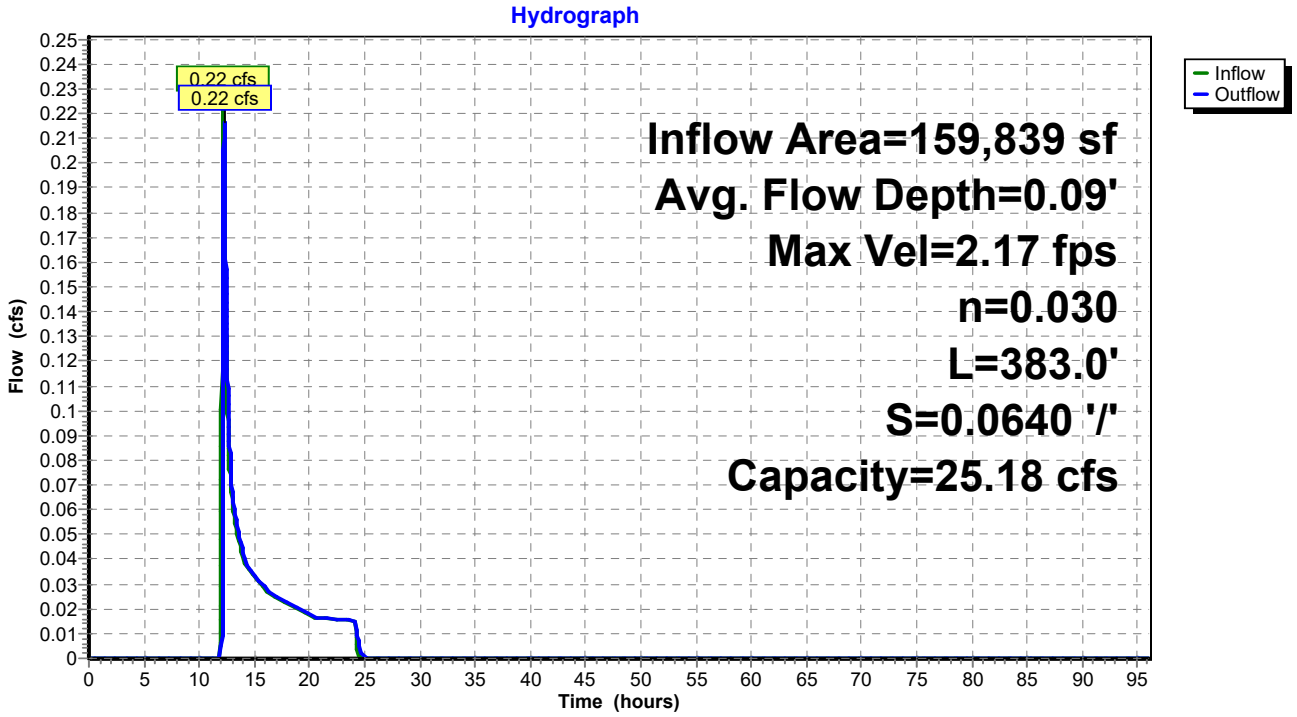
Subcatchment 21: Subcat 21



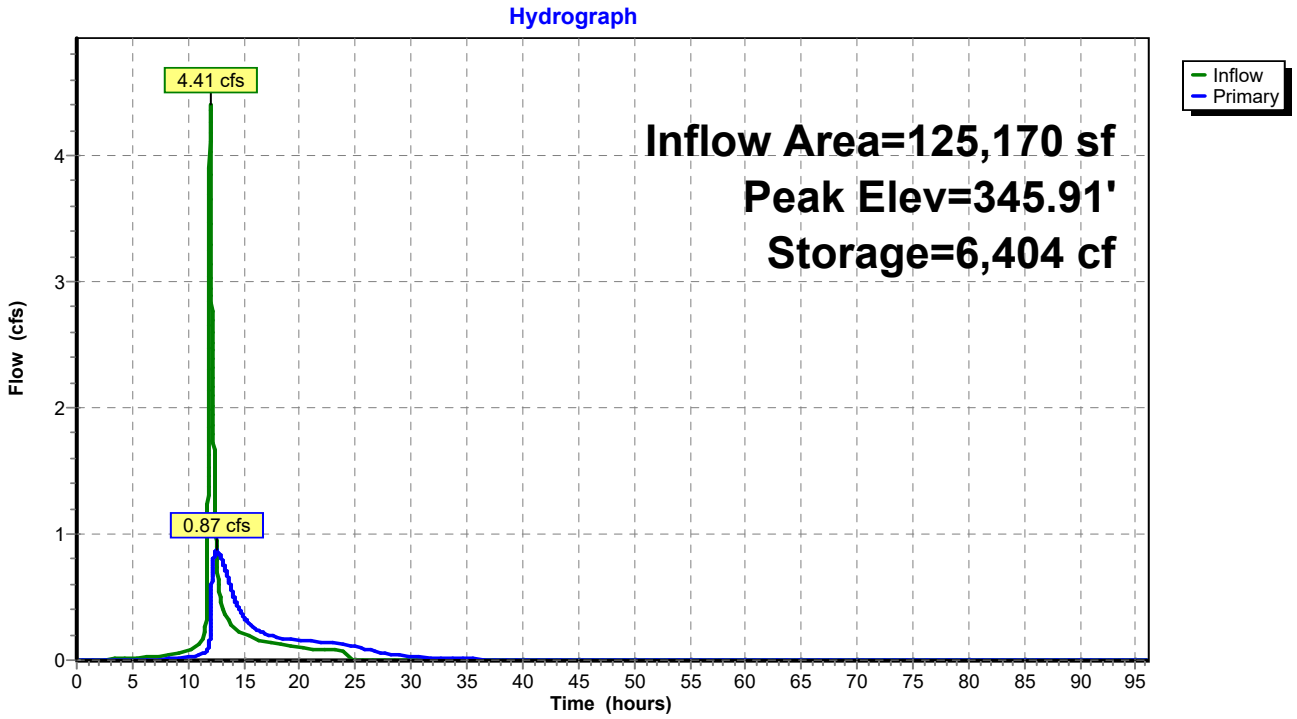
Subcatchment 22: Subcat 22



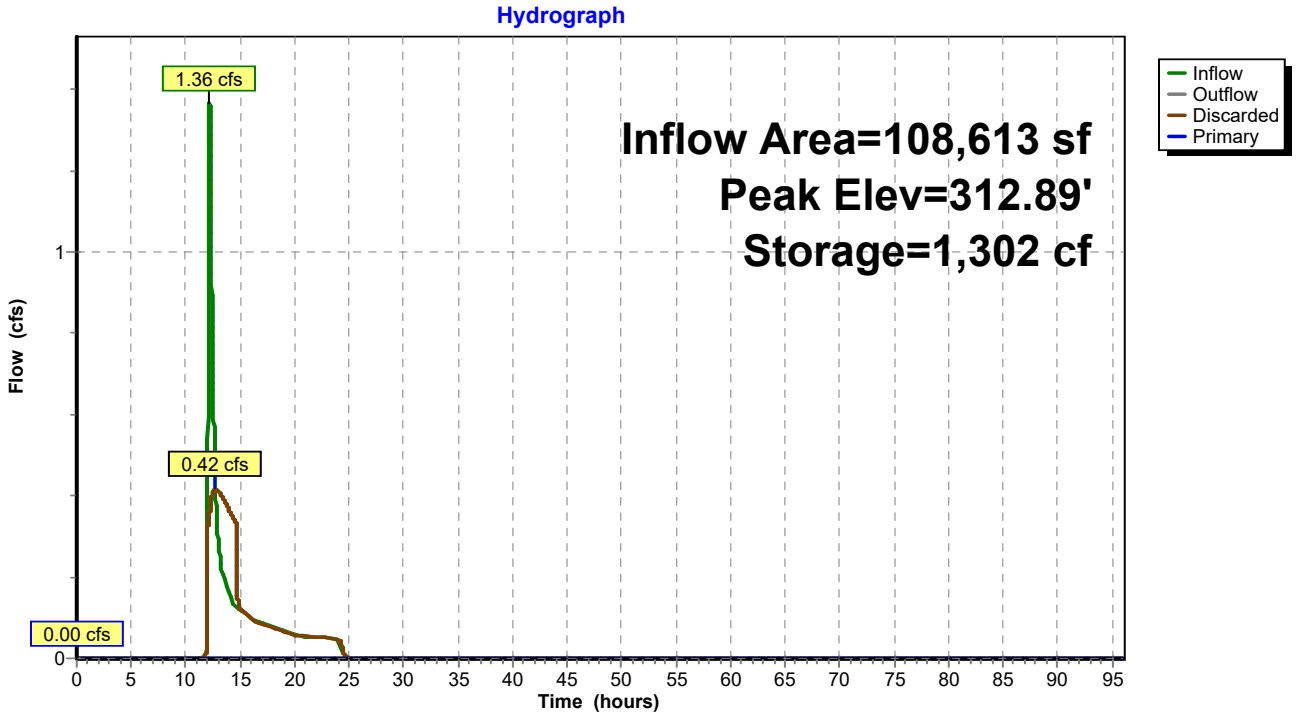
Reach 23R: swale



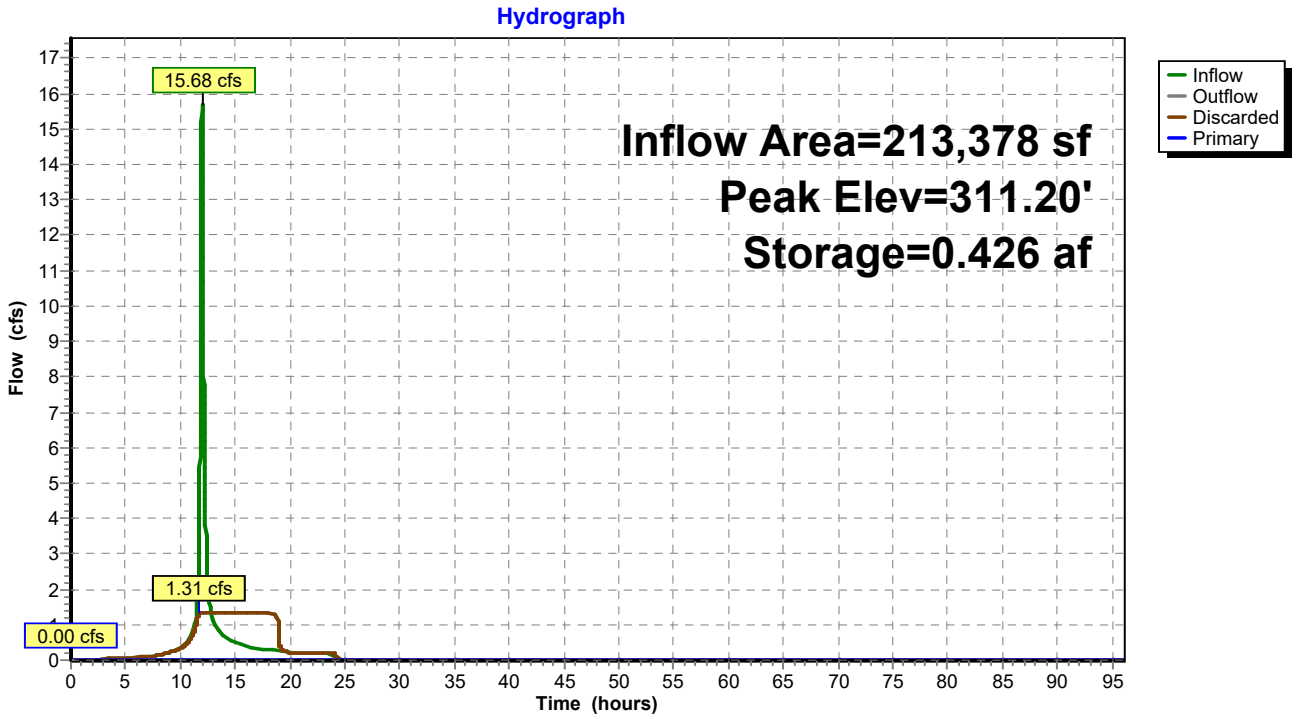
Pond 5P: DA 7 System



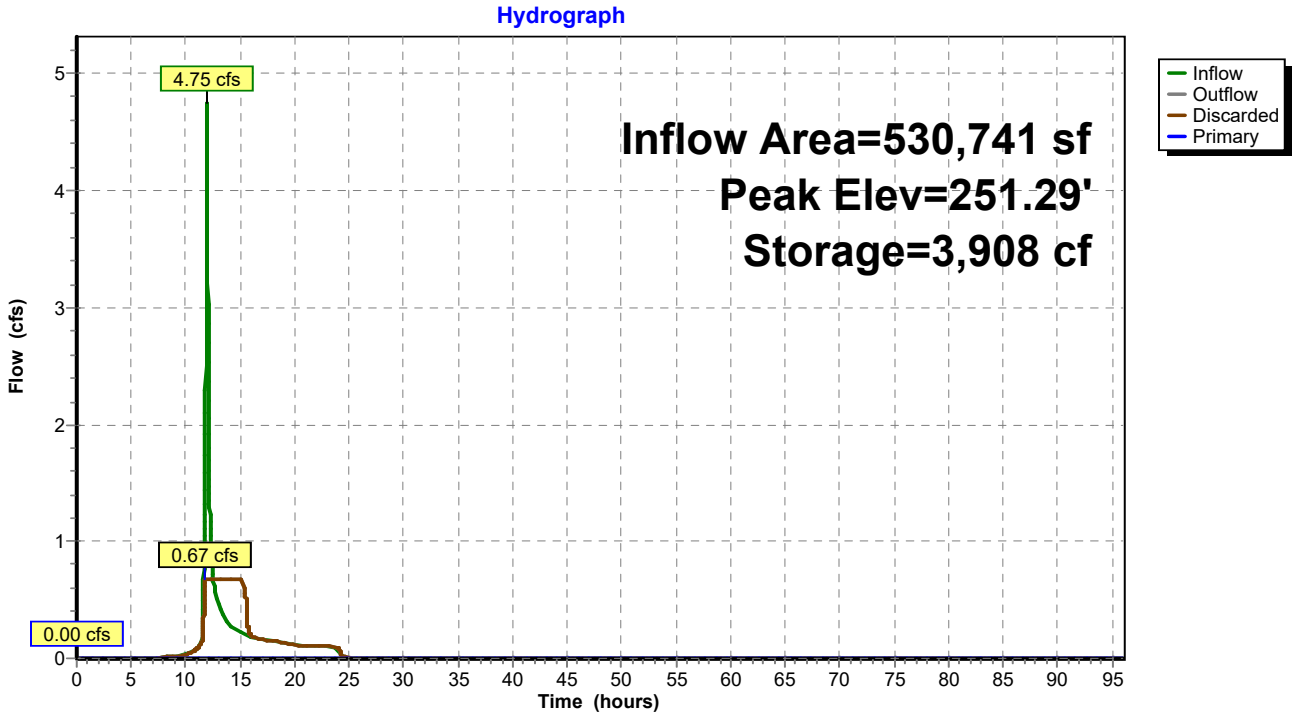
Pond 6P: Infiltration Basin



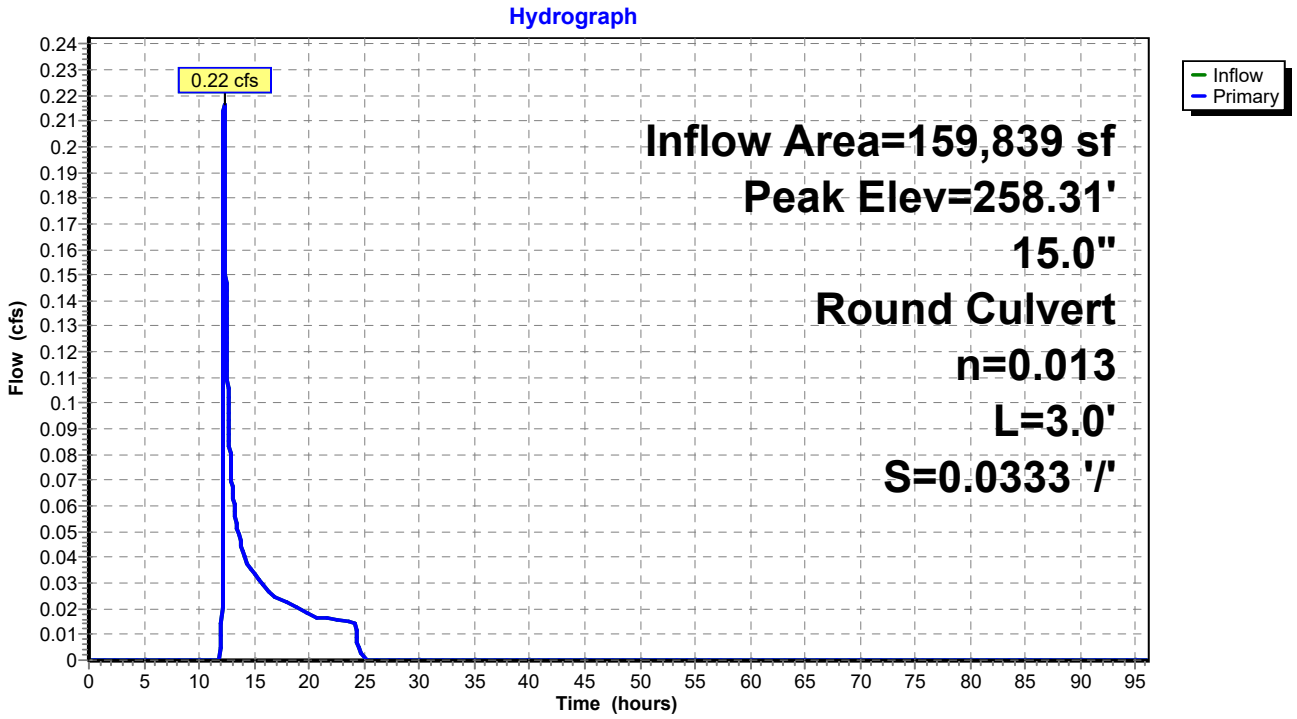
Pond 15P: DA 2 System



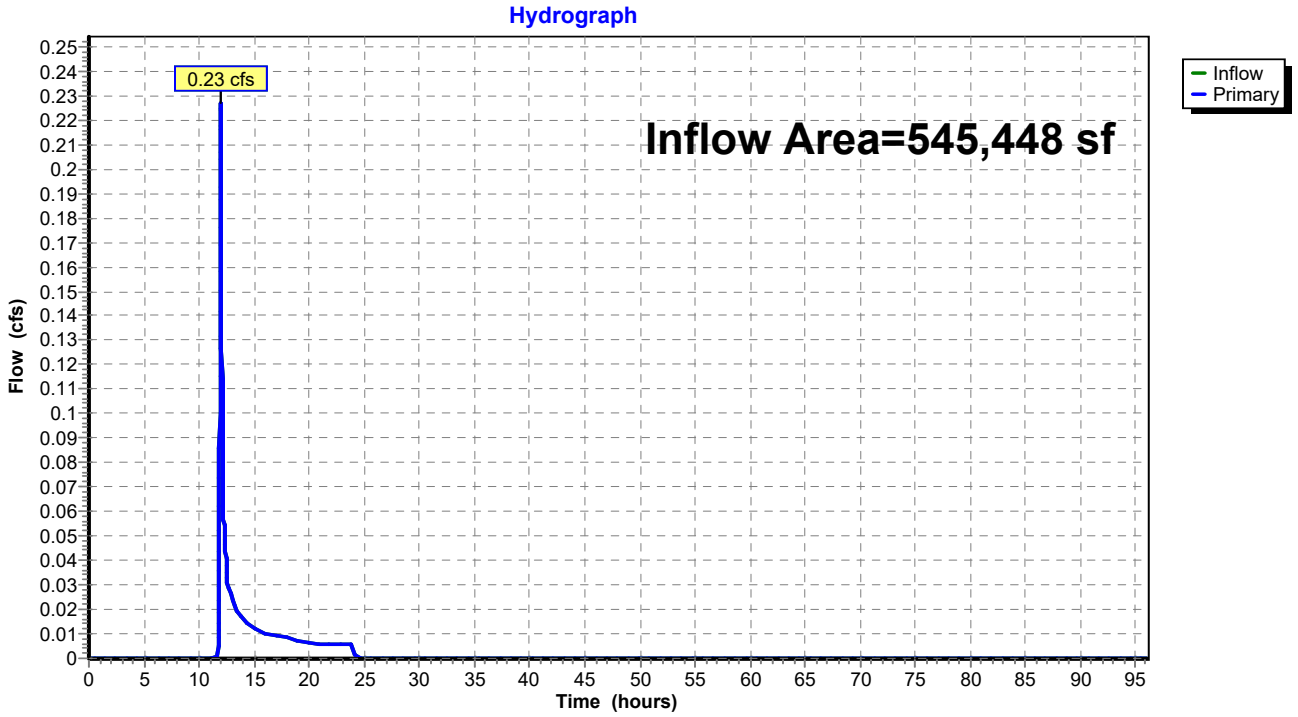
Pond 16P: DA 3 System



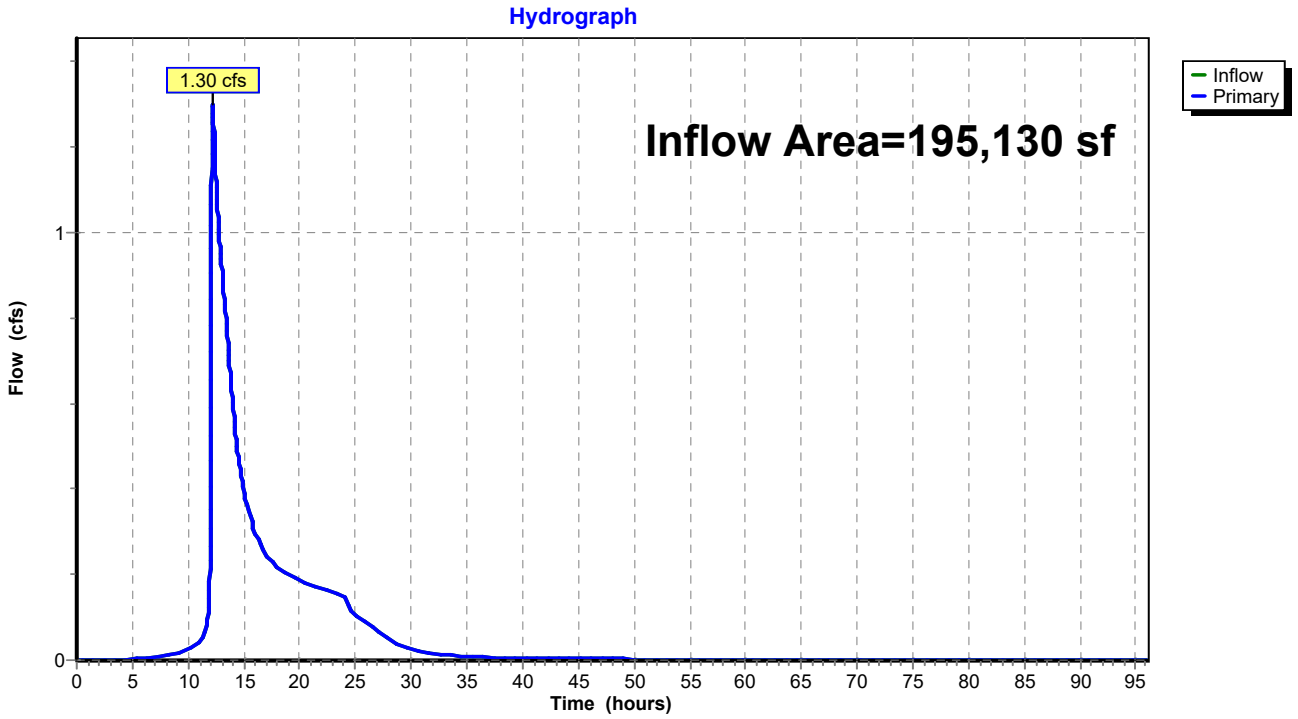
Pond 25P: Swale CB



Link 3L: Rt. 32 Culvert



Link 4L: West Off-Site



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=46,057 sf 9.58% Impervious Runoff Depth=1.58"
Tc=10.0 min UI Adjusted CN=63 Runoff=2.50 cfs 6,060 cf

Subcatchment2: Subcat 2 Runoff Area=0.097 ac 83.65% Impervious Runoff Depth=4.20"
Tc=5.0 min CN=92 Runoff=0.69 cfs 1,481 cf

Subcatchment3: Subcat 3 Runoff Area=33,237 sf 65.92% Impervious Runoff Depth=3.47"
Flow Length=367' Tc=1.4 min CN=85 Runoff=5.32 cfs 9,611 cf

Subcatchment4: Subcat 4 Runoff Area=1.396 ac 2.04% Impervious Runoff Depth=1.51"
Flow Length=830' Tc=7.4 min CN=62 Runoff=3.49 cfs 7,633 cf

Subcatchment5: Subcat 5 Runoff Area=69,961 sf 0.73% Impervious Runoff Depth=1.30"
Flow Length=269' Tc=19.3 min CN=59 Runoff=2.11 cfs 7,562 cf

Subcatchment6: Subcat 6 Runoff Area=13,786 sf 100.00% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=98 Runoff=2.38 cfs 5,598 cf

Subcatchment7: Subcat 7 Runoff Area=2.105 ac 27.11% Impervious Runoff Depth=2.12"
Flow Length=262' Tc=18.9 min CN=70 Runoff=5.05 cfs 16,183 cf

Subcatchment8: Subcat 8 Runoff Area=5,496 sf 100.00% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=98 Runoff=0.95 cfs 2,232 cf

Subcatchment9: Subcat 9 Runoff Area=6,071 sf 49.70% Impervious Runoff Depth=3.47"
Tc=5.0 min CN=85 Runoff=0.86 cfs 1,755 cf

Subcatchment10: Subcat 10 Runoff Area=52,574 sf 82.92% Impervious Runoff Depth=4.20"
Flow Length=181' Tc=5.6 min CN=92 Runoff=8.36 cfs 18,387 cf

Subcatchment11: Subcat 11 Runoff Area=105,659 sf 63.11% Impervious Runoff Depth=3.67"
Flow Length=237' Tc=17.3 min CN=87 Runoff=10.54 cfs 32,323 cf

Subcatchment12: Subcat 12 Runoff Area=13,787 sf 100.00% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=98 Runoff=2.38 cfs 5,599 cf

Subcatchment13: Subcat 13 Runoff Area=108,613 sf 0.01% Impervious Runoff Depth=1.65"
Flow Length=653' Tc=23.8 min CN=64 Runoff=3.90 cfs 14,957 cf

Subcatchment14: Subcat 14 Runoff Area=13,783 sf 99.97% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=98 Runoff=2.38 cfs 5,597 cf

Subcatchment15: Subcat 15 Runoff Area=13,783 sf 99.98% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=98 Runoff=2.38 cfs 5,597 cf

Subcatchment16: Subcat 16 Runoff Area=13,792 sf 99.99% Impervious Runoff Depth=4.87"
Tc=5.0 min CN=98 Runoff=2.38 cfs 5,601 cf

Subcatchment17: Subcat 17 Runoff Area=6,828 sf 8.53% Impervious Runoff Depth=1.65"
Tc=5.0 min CN=64 Runoff=0.48 cfs 940 cf

Subcatchment18: Subcat 18 Runoff Area=6,372 sf 7.75% Impervious Runoff Depth=1.65"
Tc=5.0 min CN=64 Runoff=0.45 cfs 877 cf

Subcatchment19: Subcat 19 Runoff Area=5,807 sf 0.00% Impervious Runoff Depth=1.04"
Flow Length=335' Tc=13.6 min CN=55 Runoff=0.16 cfs 501 cf

Subcatchment20: Subcat 20 Runoff Area=8,137 sf 50.55% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=87 Runoff=1.21 cfs 2,489 cf

Subcatchment21: Subcat 21 Runoff Area=8,901 sf 3.88% Impervious Runoff Depth=1.58"
Tc=5.0 min CN=63 Runoff=0.59 cfs 1,171 cf

Subcatchment22: Subcat 22 Runoff Area=51,226 sf 0.04% Impervious Runoff Depth=1.04"
Flow Length=458' Tc=17.9 min CN=55 Runoff=1.19 cfs 4,419 cf

Reach 23R: swale Avg. Flow Depth=0.22' Max Vel=3.70 fps Inflow=1.19 cfs 5,182 cf
n=0.030 L=383.0' S=0.0640 '/' Capacity=25.18 cfs Outflow=1.18 cfs 5,182 cf

Pond 5P: DA 7 System Peak Elev=347.07' Storage=12,332 cf Inflow=8.03 cfs 28,258 cf
Outflow=1.55 cfs 28,251 cf

Pond 6P: Infiltration Basin Peak Elev=314.59' Storage=4,832 cf Inflow=3.90 cfs 14,957 cf
Discarded=0.63 cfs 14,194 cf Primary=0.68 cfs 763 cf Outflow=1.31 cfs 14,957 cf

Pond 15P: DA 2 System Peak Elev=314.47' Storage=0.701 af Inflow=24.75 cfs 73,103 cf
Discarded=2.62 cfs 73,103 cf Primary=0.00 cfs 0 cf Outflow=2.62 cfs 73,103 cf

Pond 16P: DA 3 System Peak Elev=255.61' Storage=12,635 cf Inflow=10.60 cfs 31,785 cf
Discarded=1.34 cfs 31,785 cf Primary=0.00 cfs 0 cf Outflow=1.34 cfs 31,785 cf

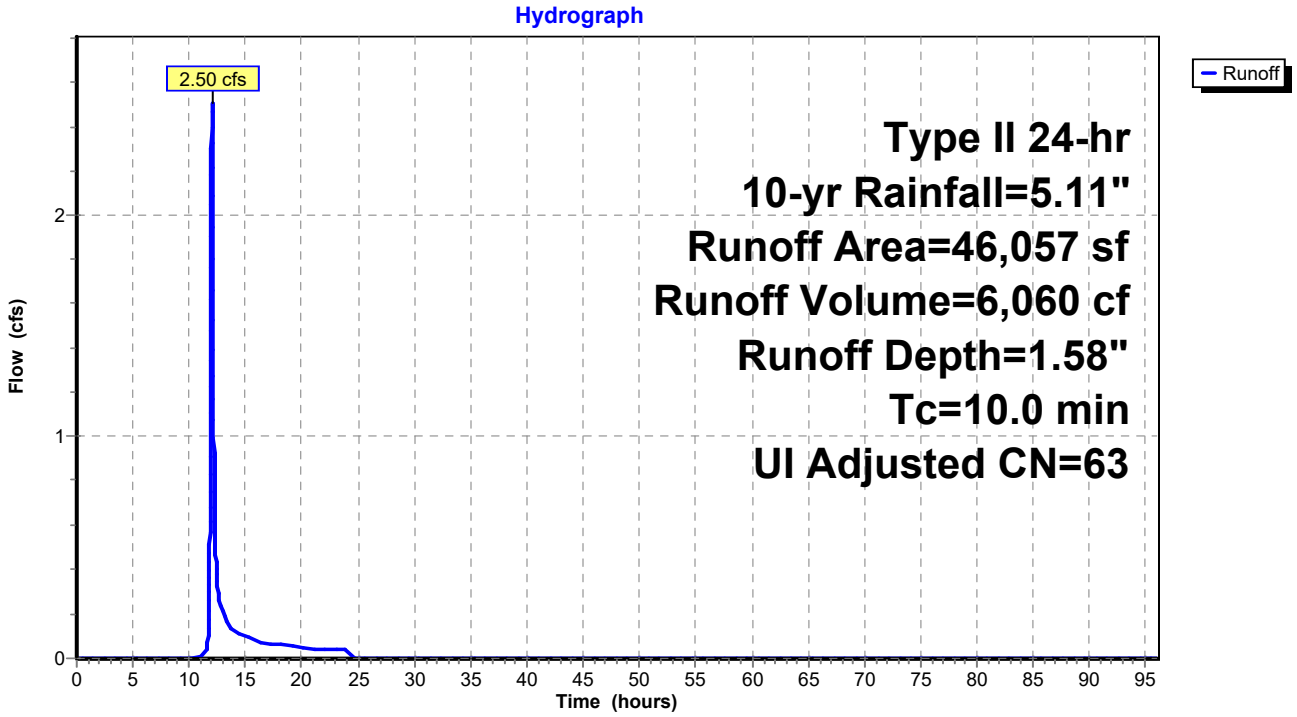
Pond 25P: Swale CB Peak Elev=258.67' Inflow=1.18 cfs 5,182 cf
15.0" Round Culvert n=0.013 L=3.0' S=0.0333 '/' Outflow=1.18 cfs 5,182 cf

Link 3L: Rt. 32 Culvert Inflow=0.68 cfs 1,672 cf
Primary=0.68 cfs 1,672 cf

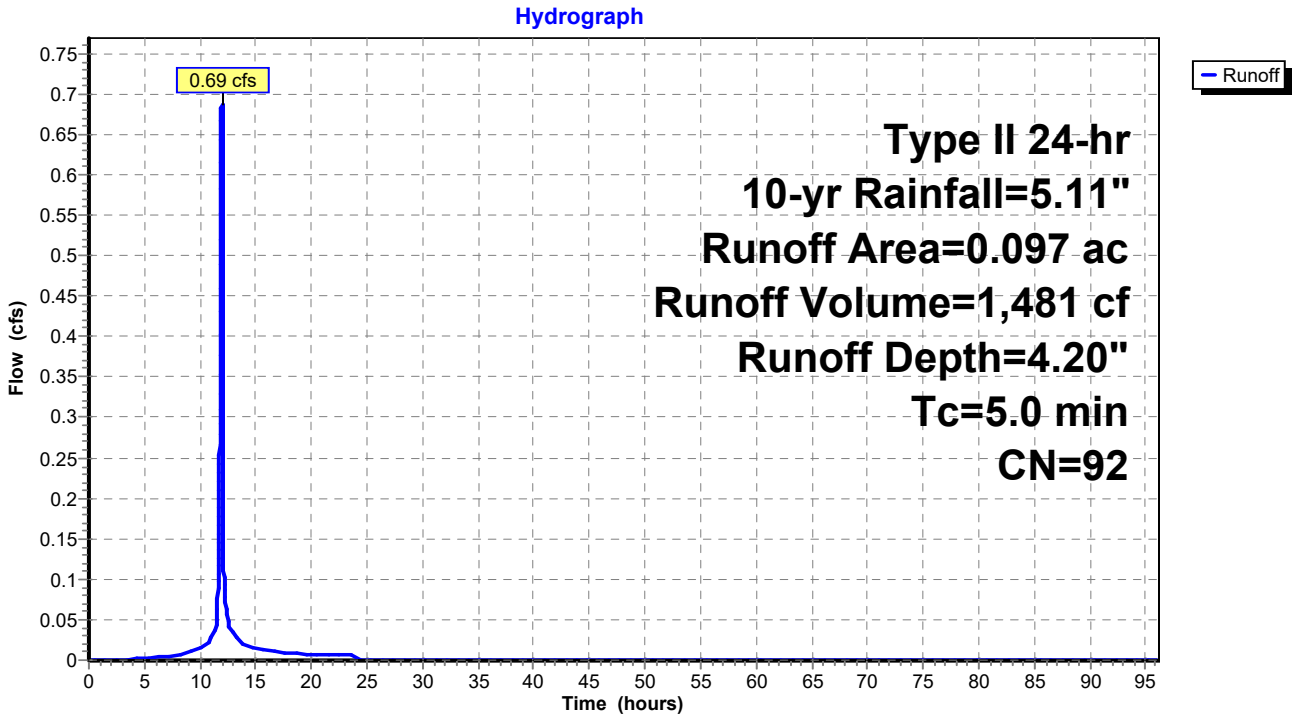
Link 4L: West Off-Site Inflow=3.44 cfs 35,814 cf
Primary=3.44 cfs 35,814 cf

Total Runoff Area = 740,579 sf Runoff Volume = 156,574 cf Average Runoff Depth = 2.54"
66.28% Pervious = 490,839 sf 33.72% Impervious = 249,740 sf

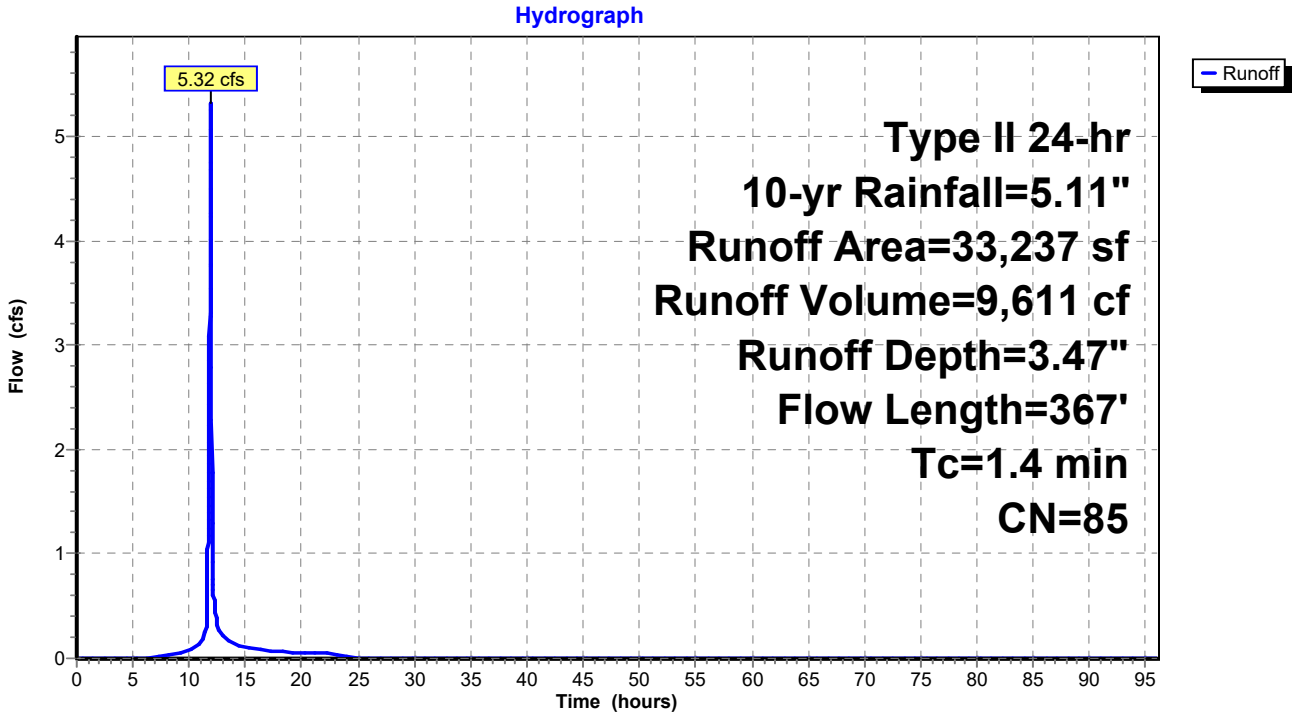
Subcatchment 1: Subcat 1



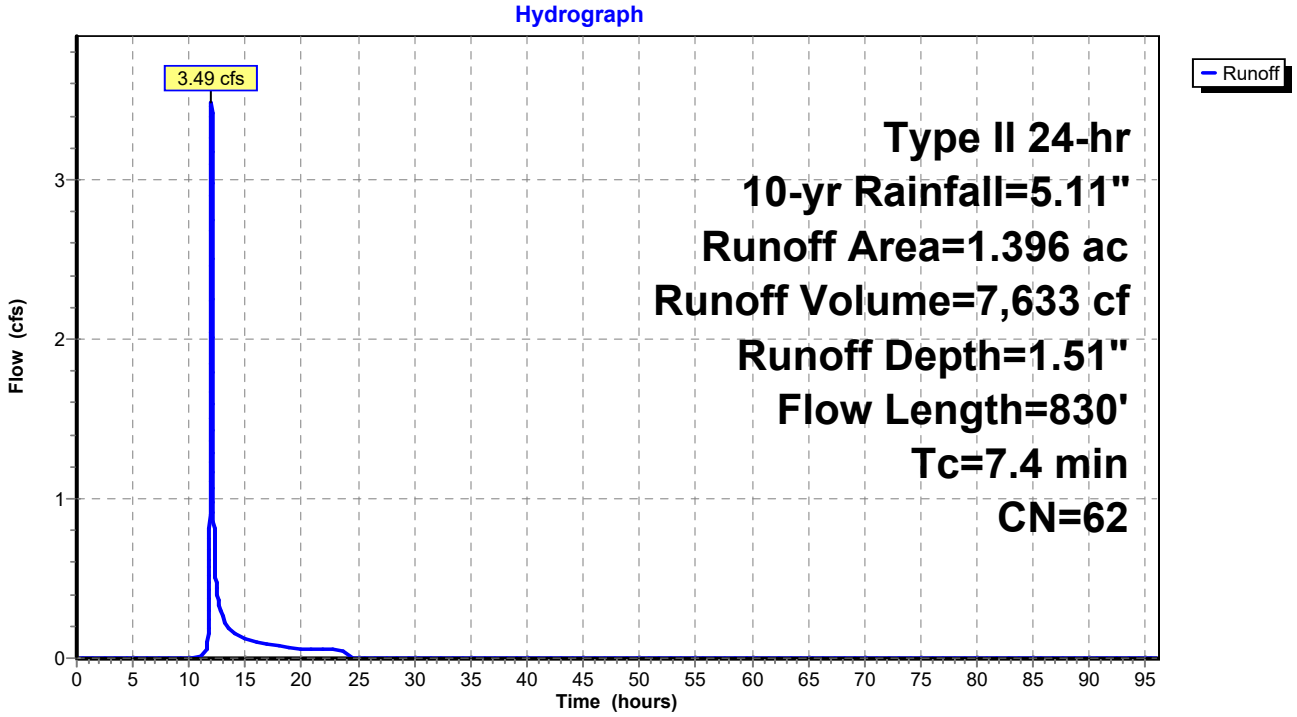
Subcatchment 2: Subcat 2



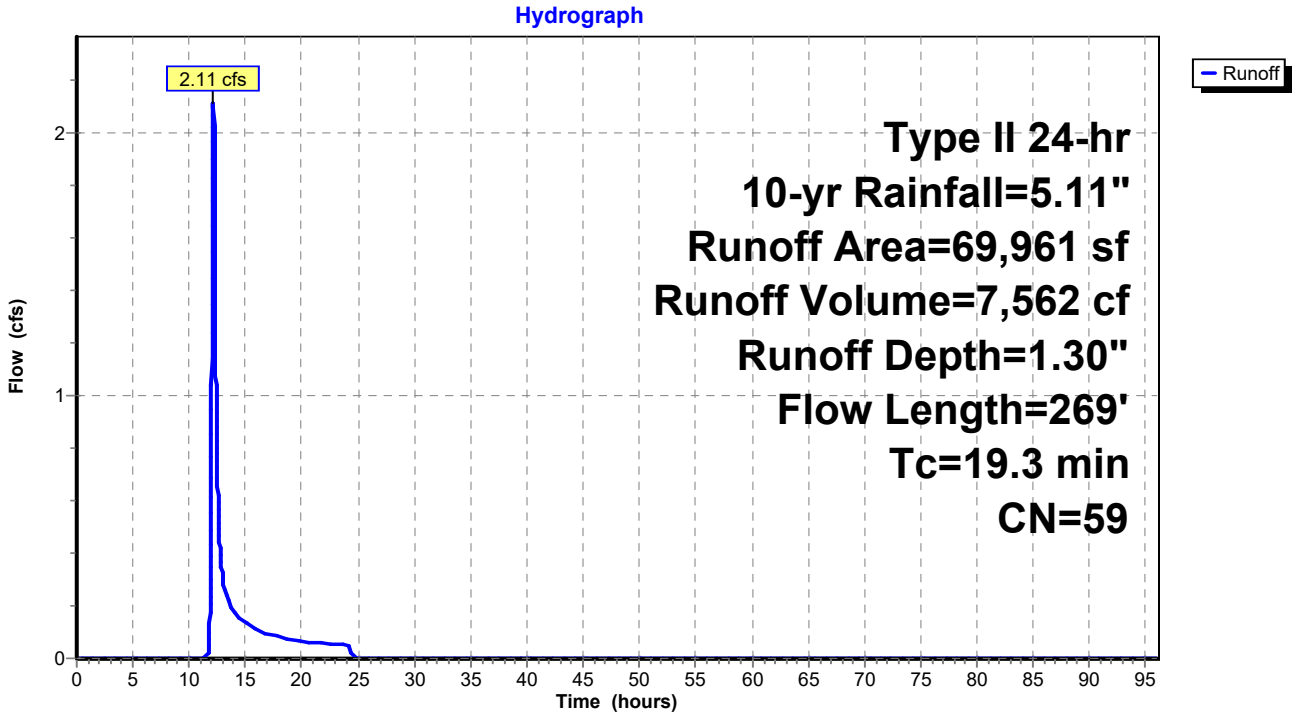
Subcatchment 3: Subcat 3



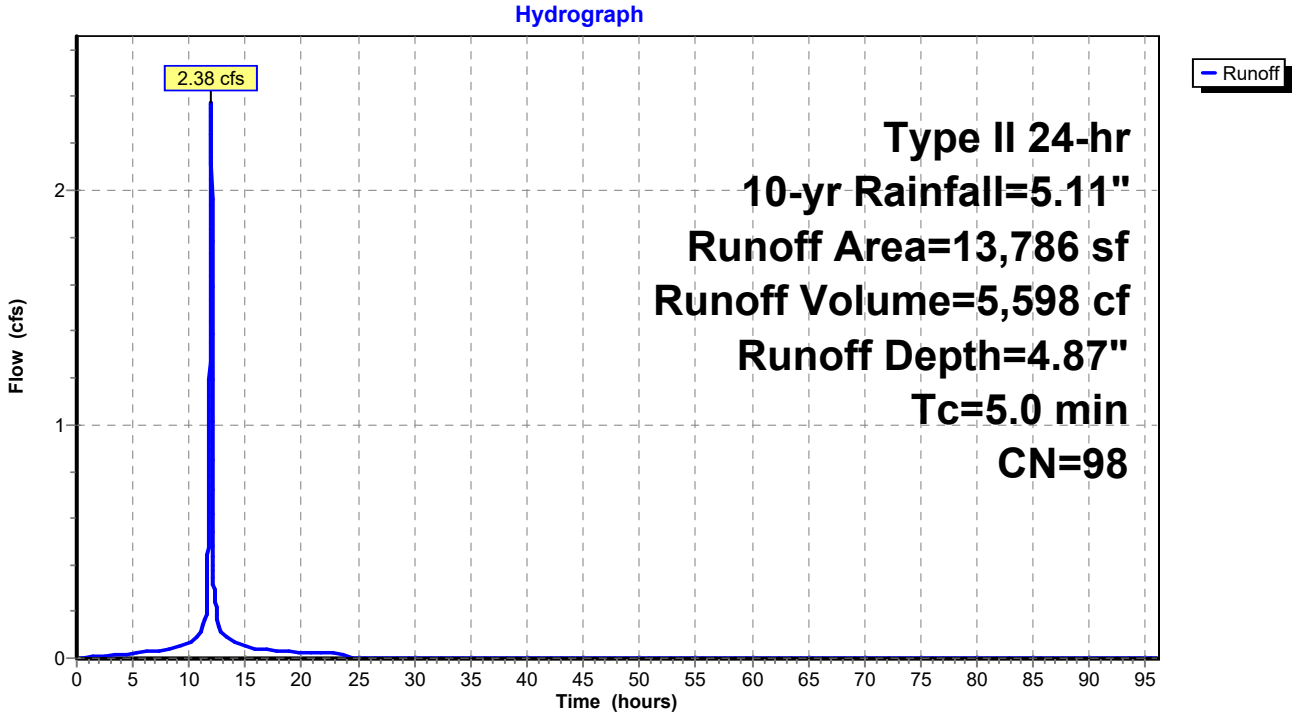
Subcatchment 4: Subcat 4



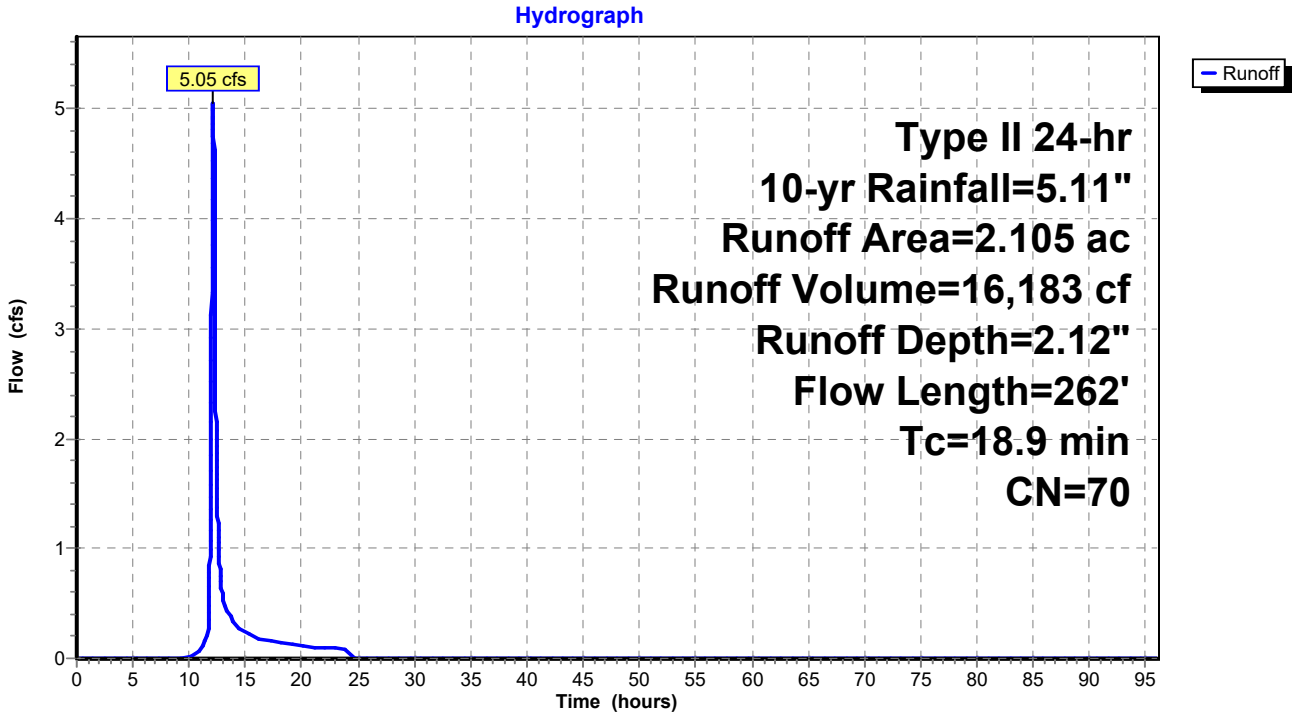
Subcatchment 5: Subcat 5



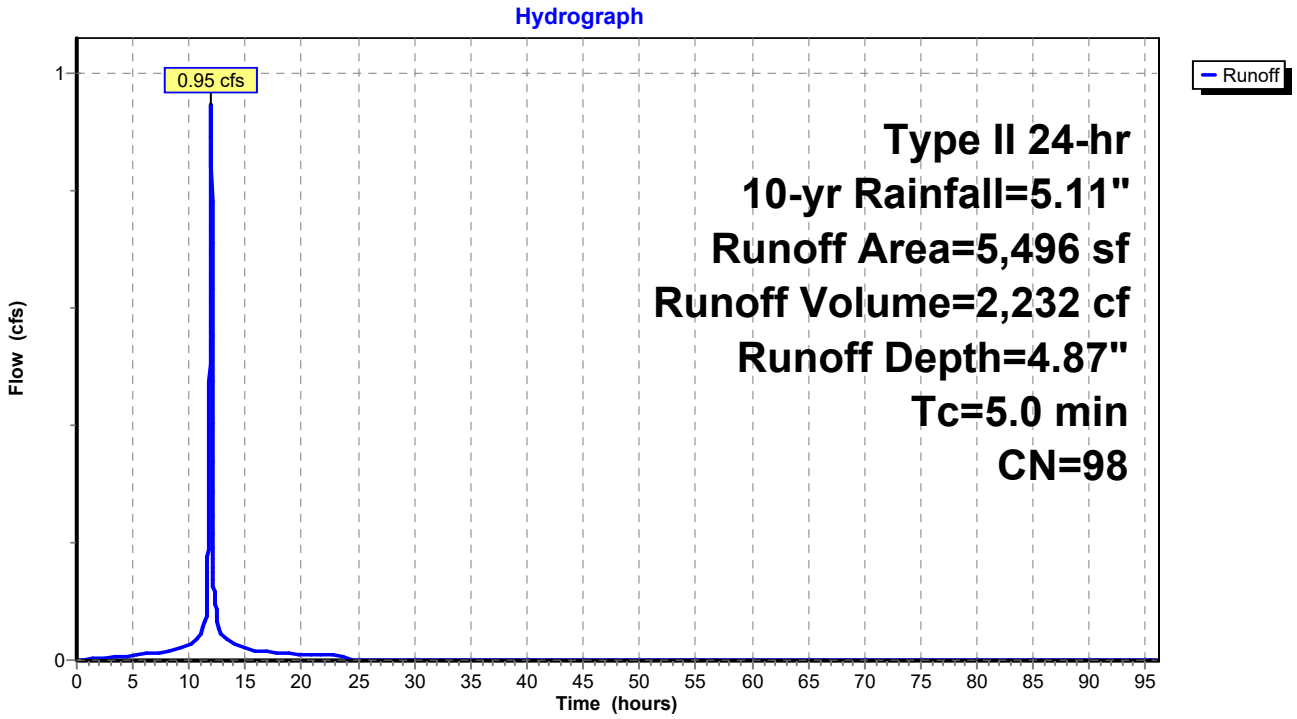
Subcatchment 6: Subcat 6



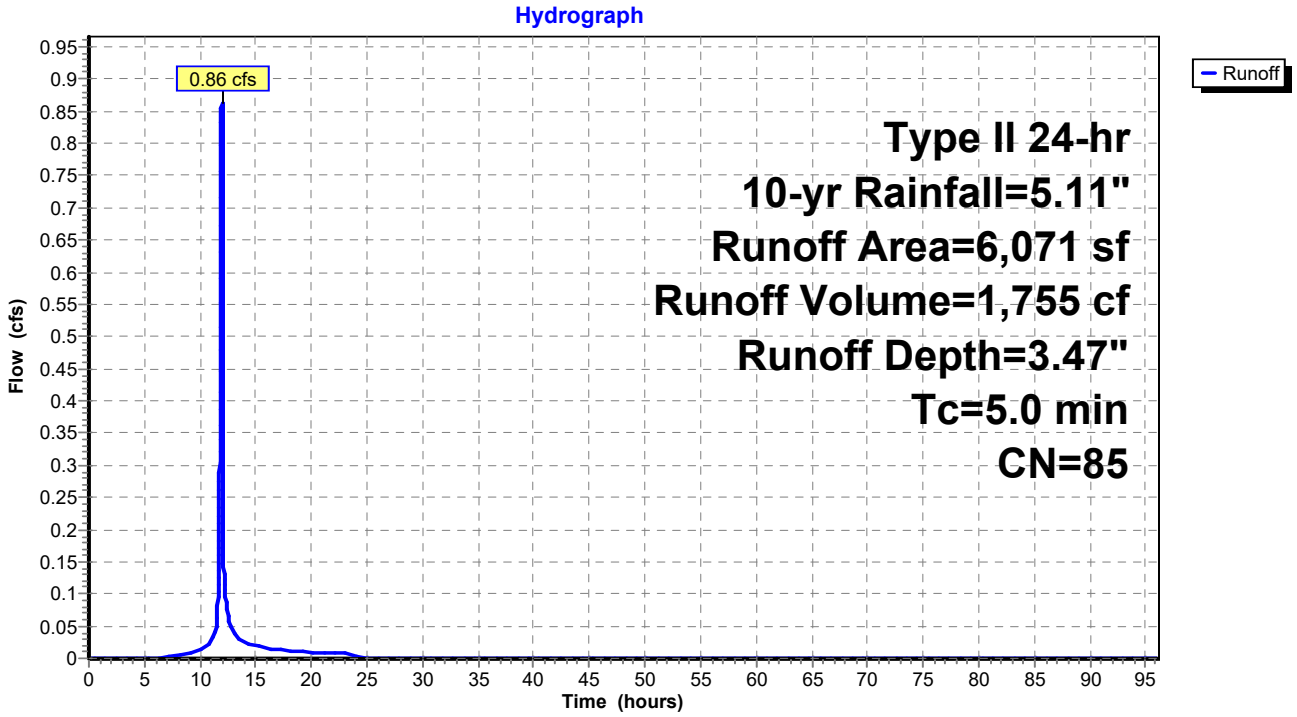
Subcatchment 7: Subcat 7



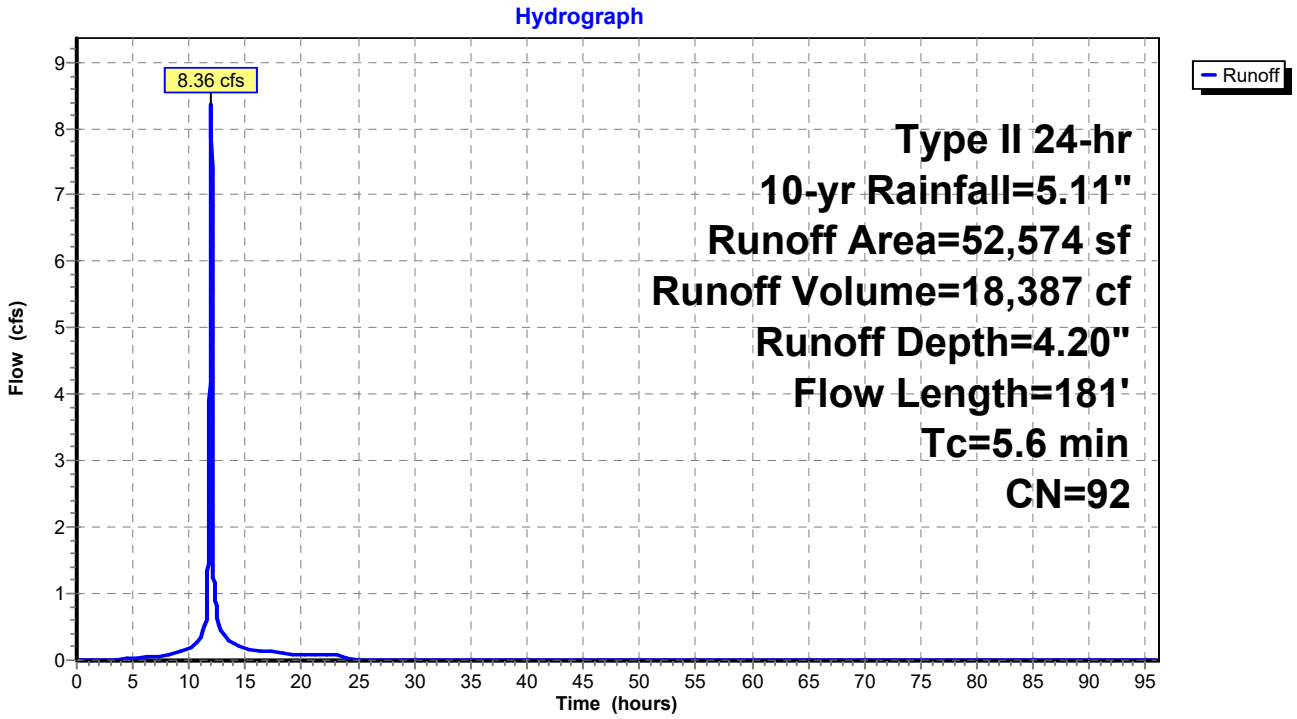
Subcatchment 8: Subcat 8



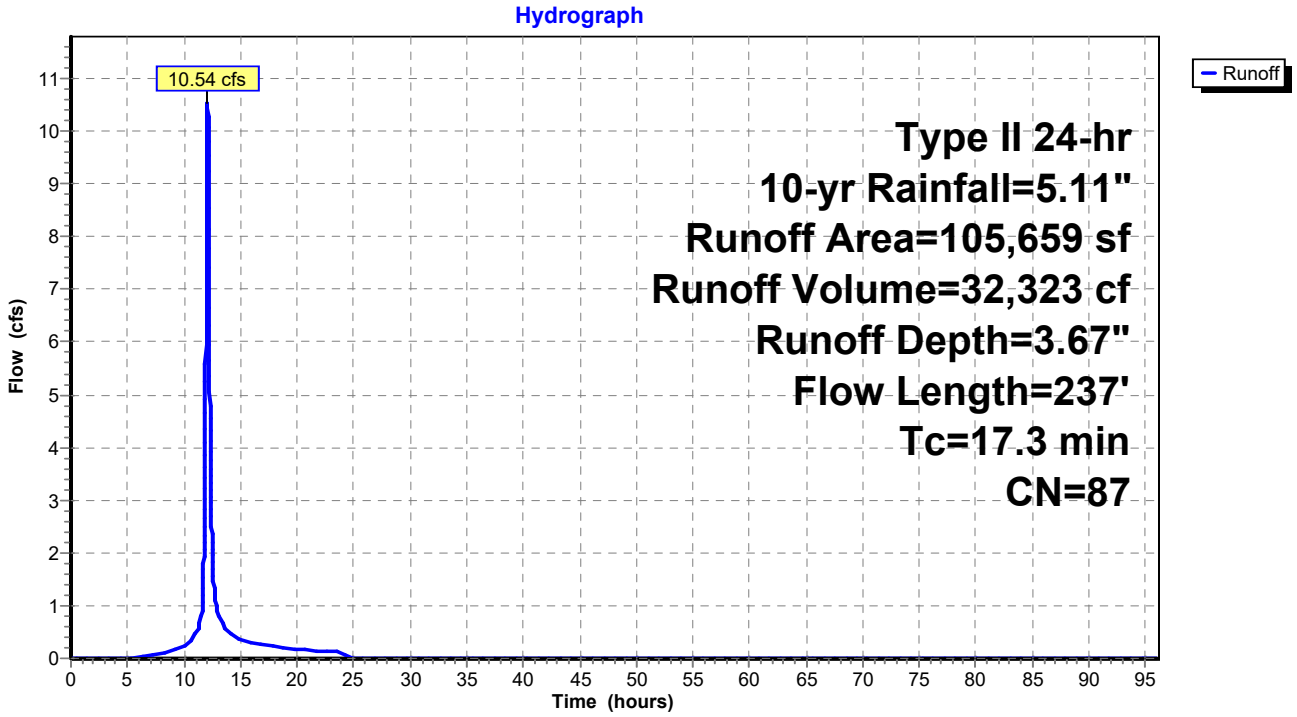
Subcatchment 9: Subcat 9



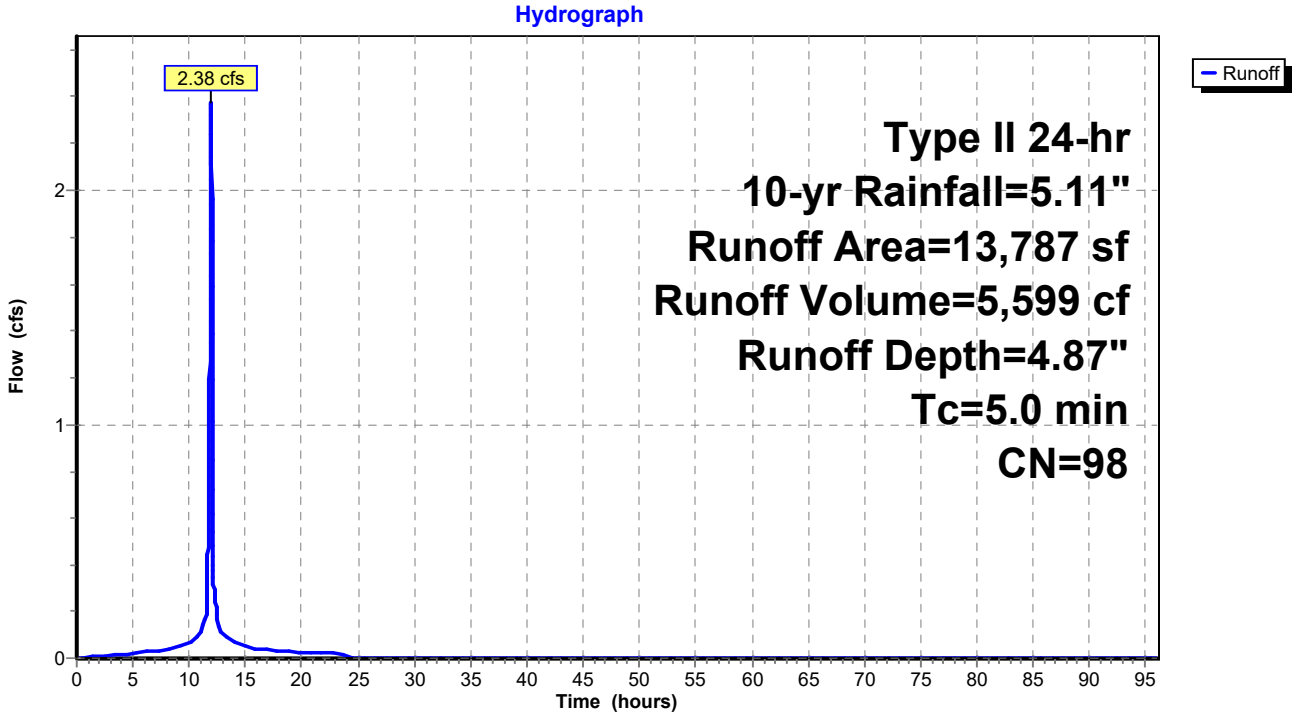
Subcatchment 10: Subcat 10



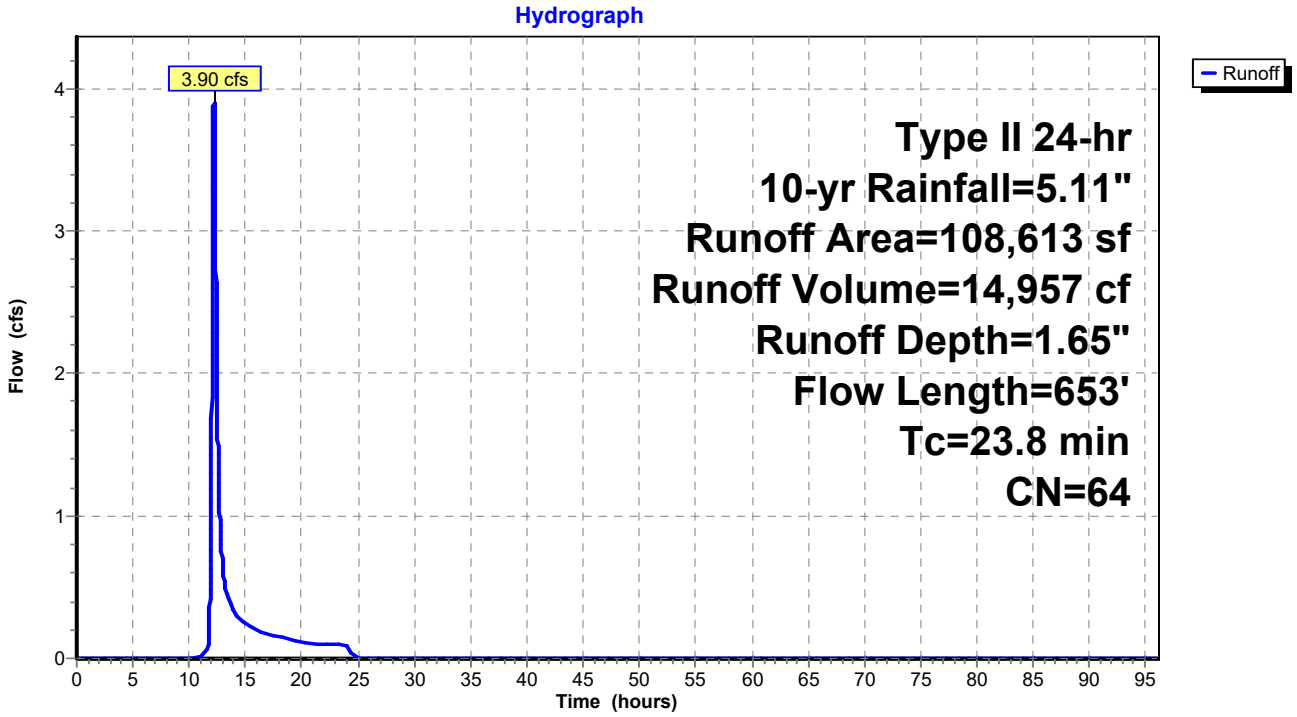
Subcatchment 11: Subcat 11



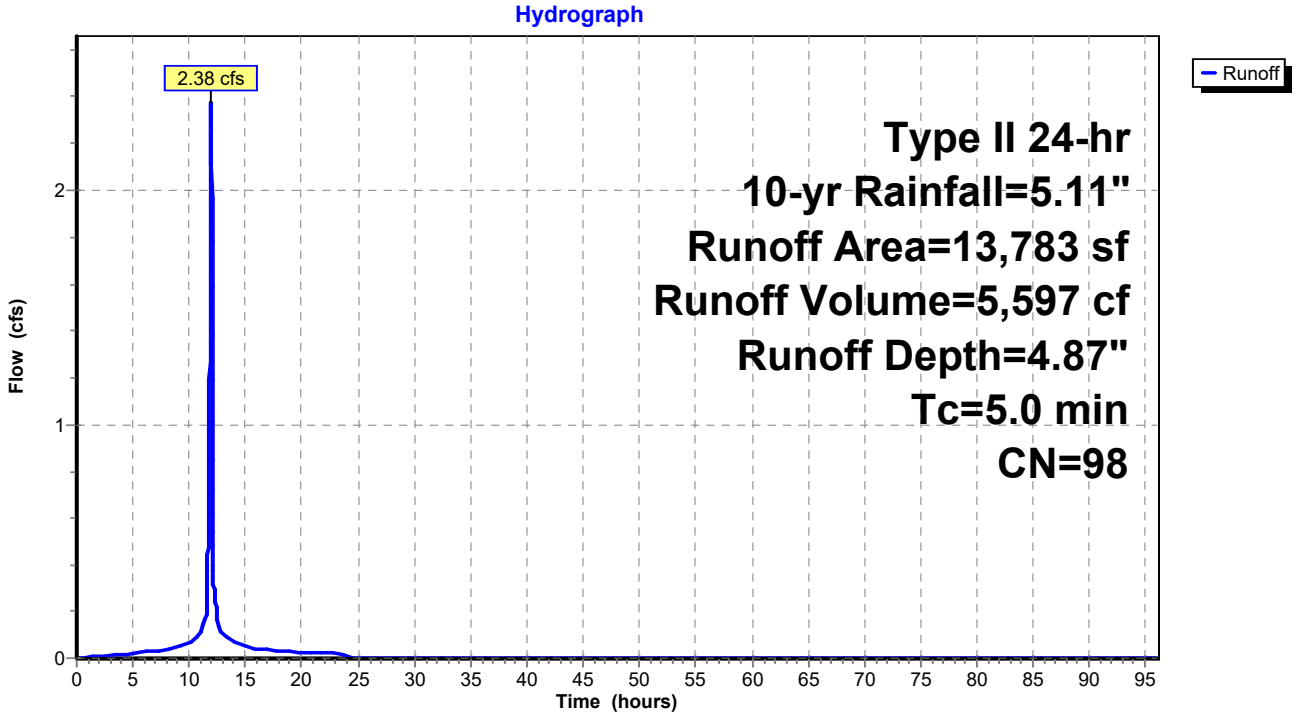
Subcatchment 12: Subcat 12



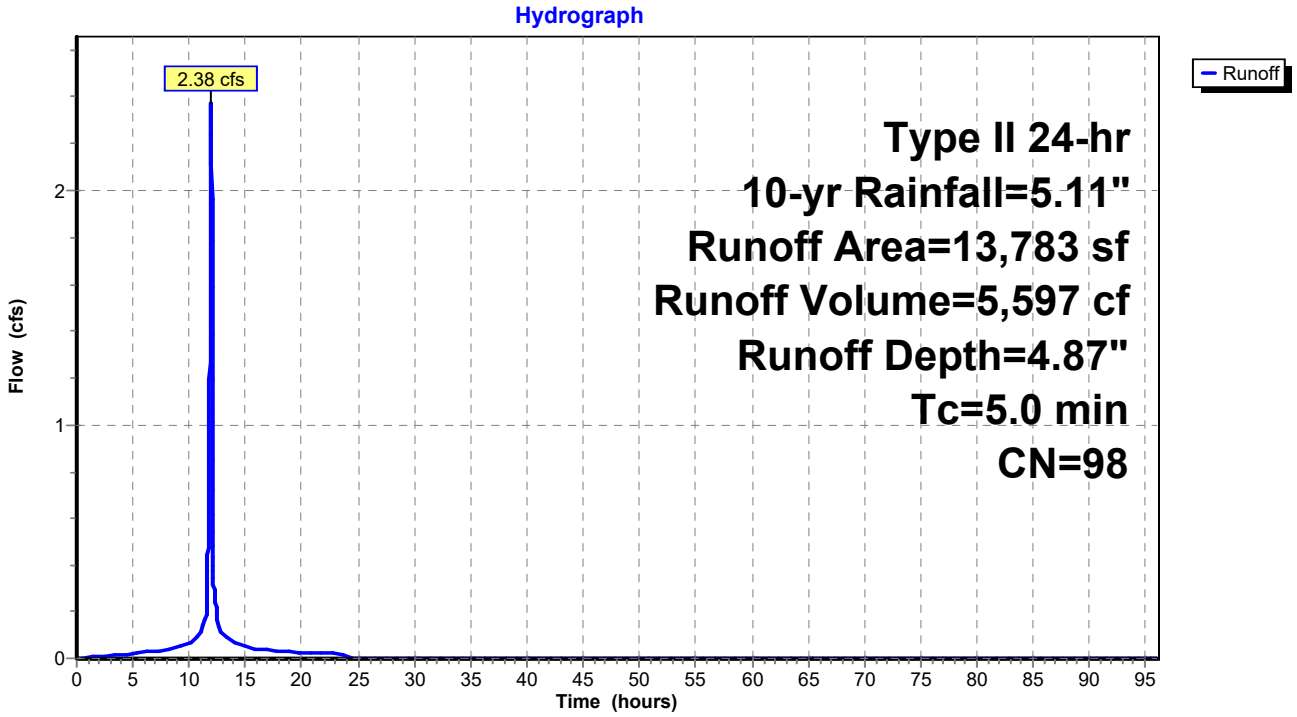
Subcatchment 13: Subcat 13



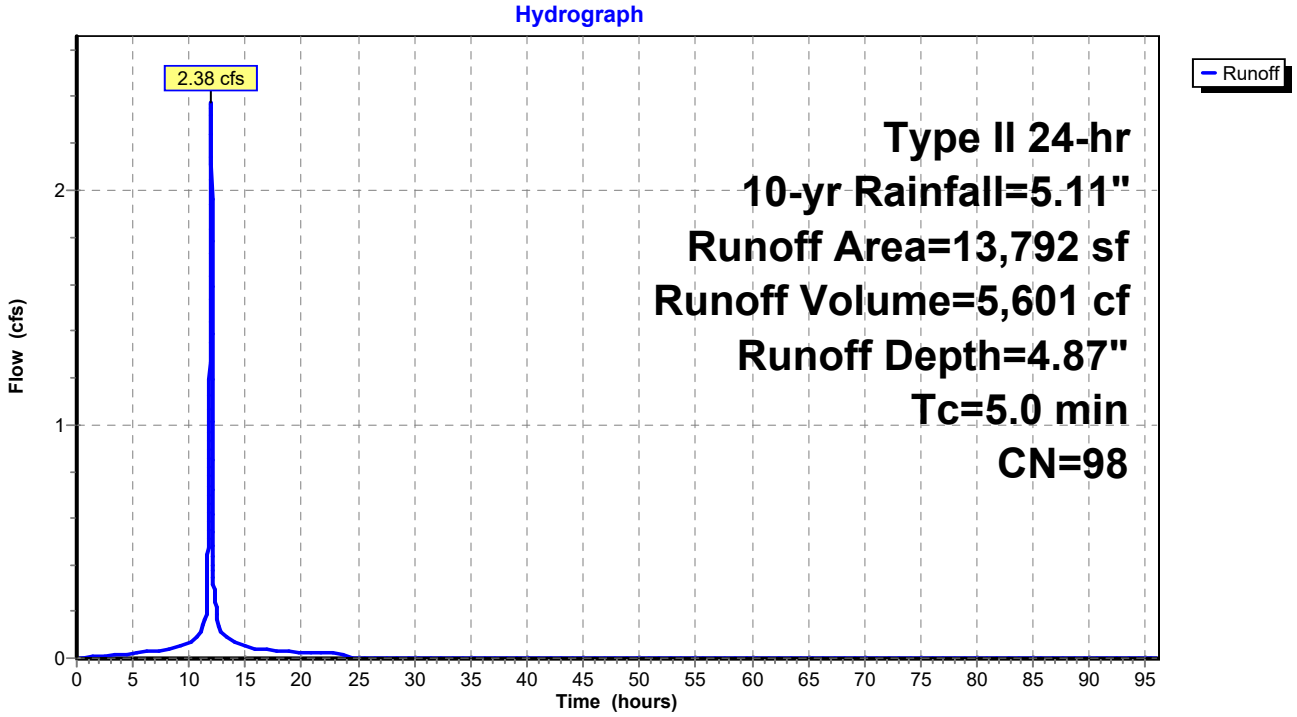
Subcatchment 14: Subcat 14



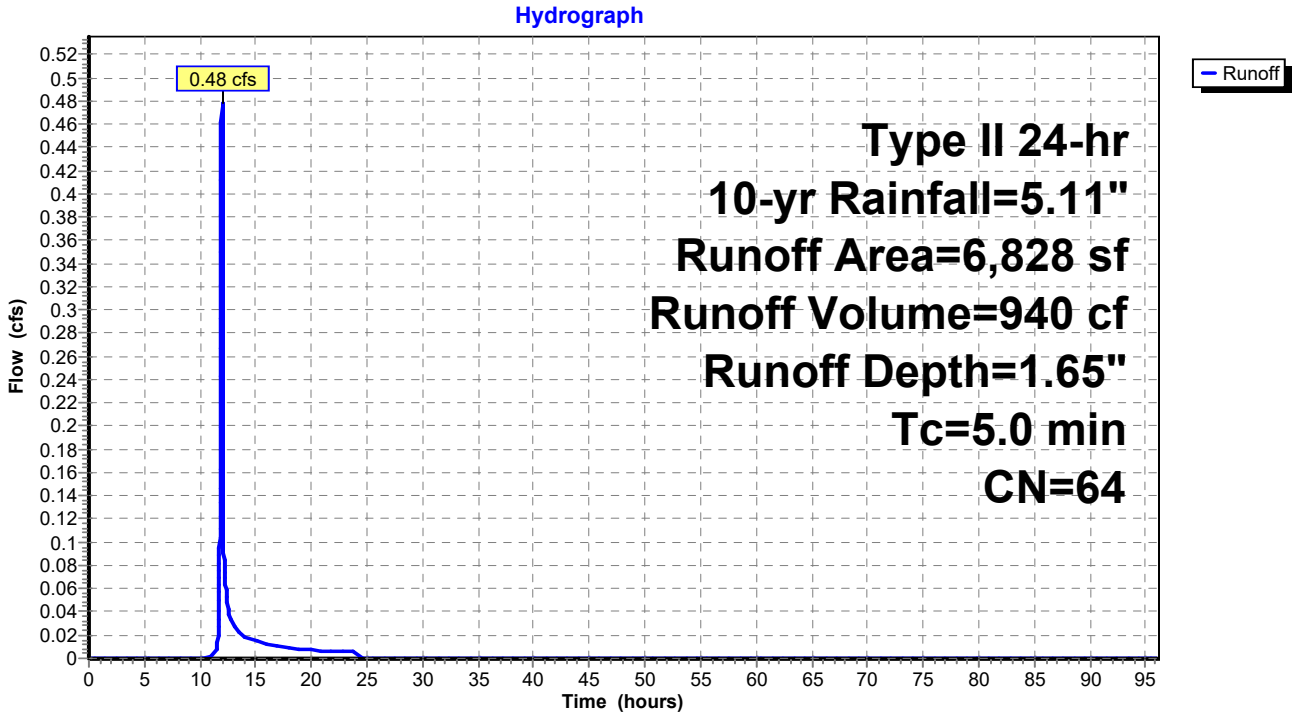
Subcatchment 15: Subcat 15



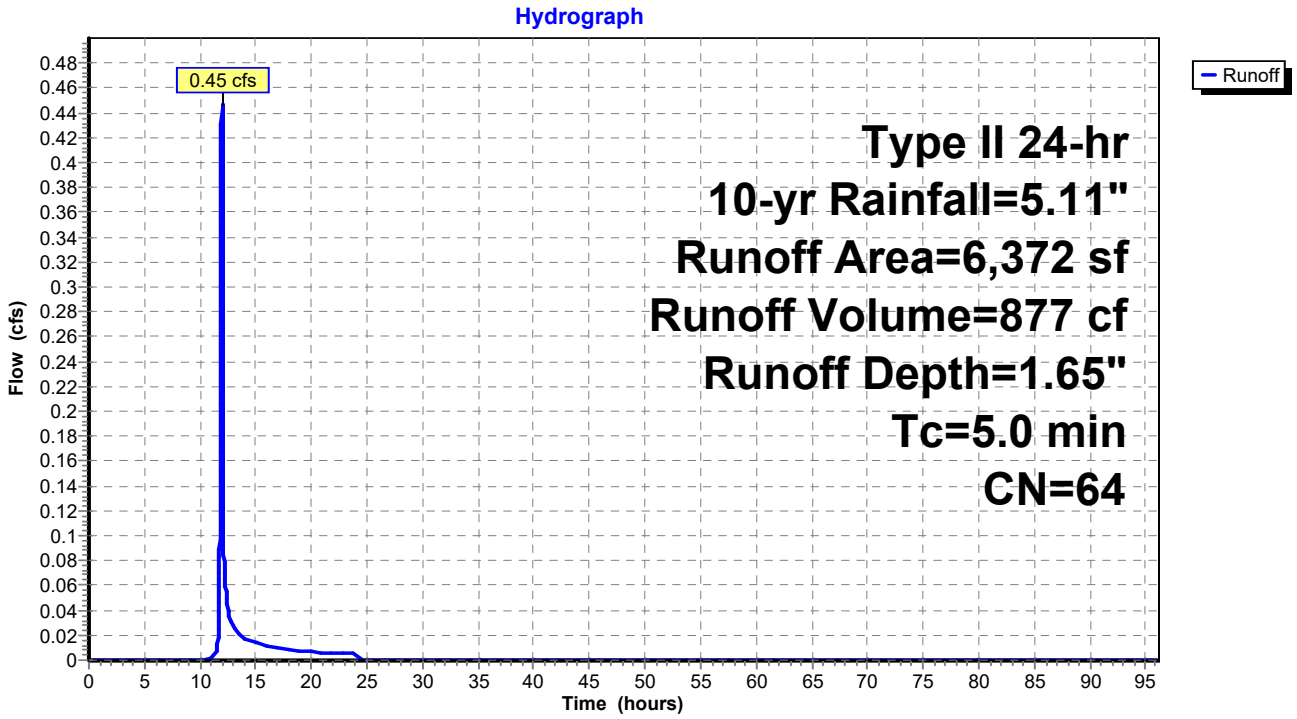
Subcatchment 16: Subcat 16



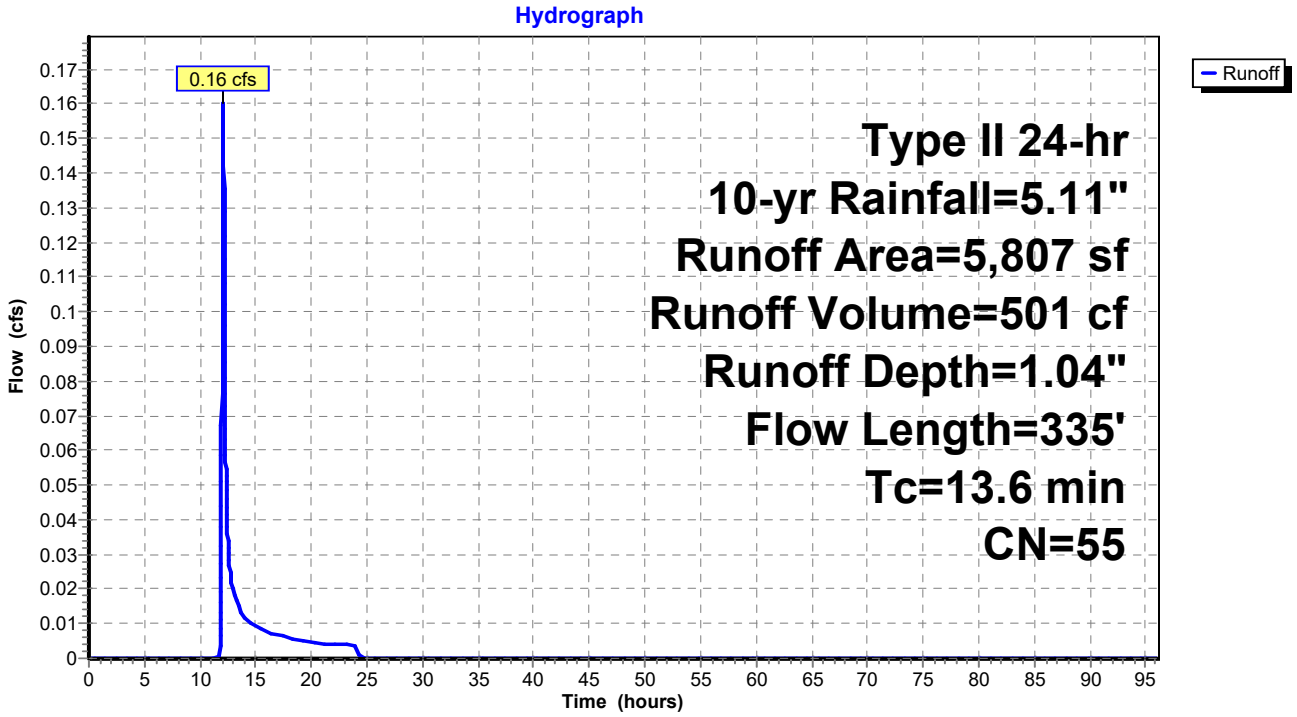
Subcatchment 17: Subcat 17



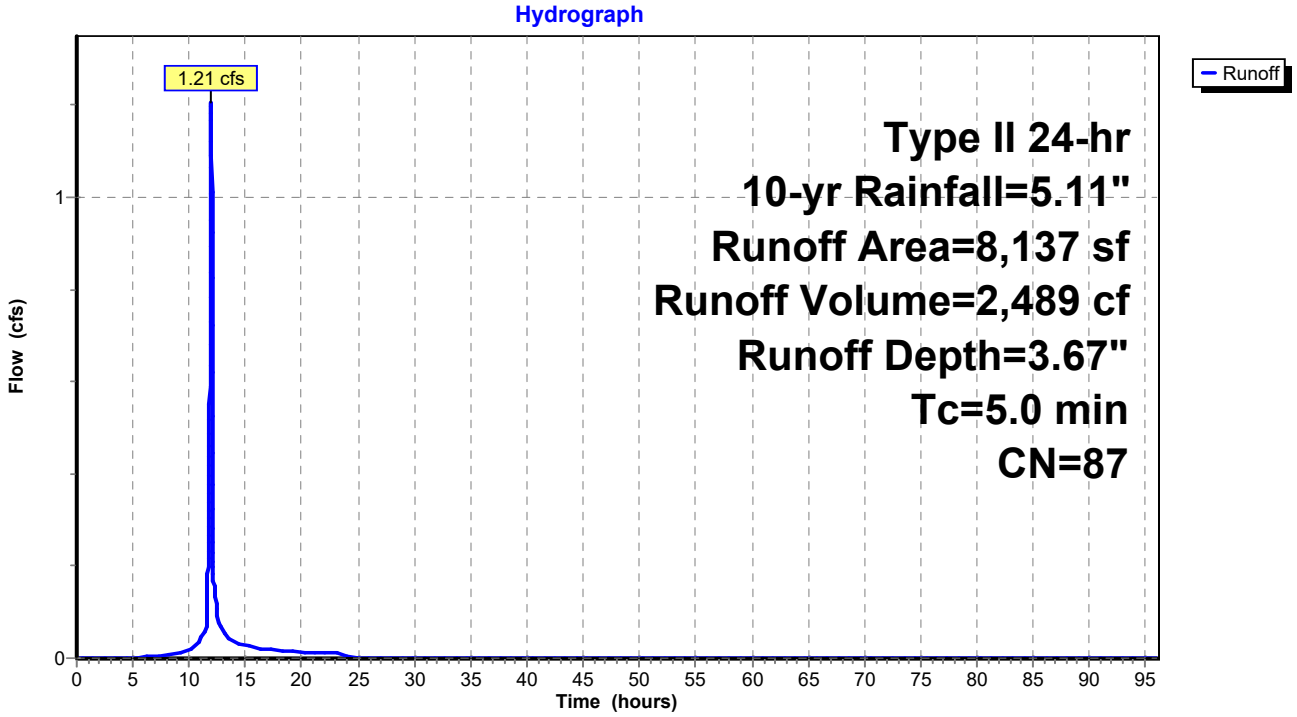
Subcatchment 18: Subcat 18



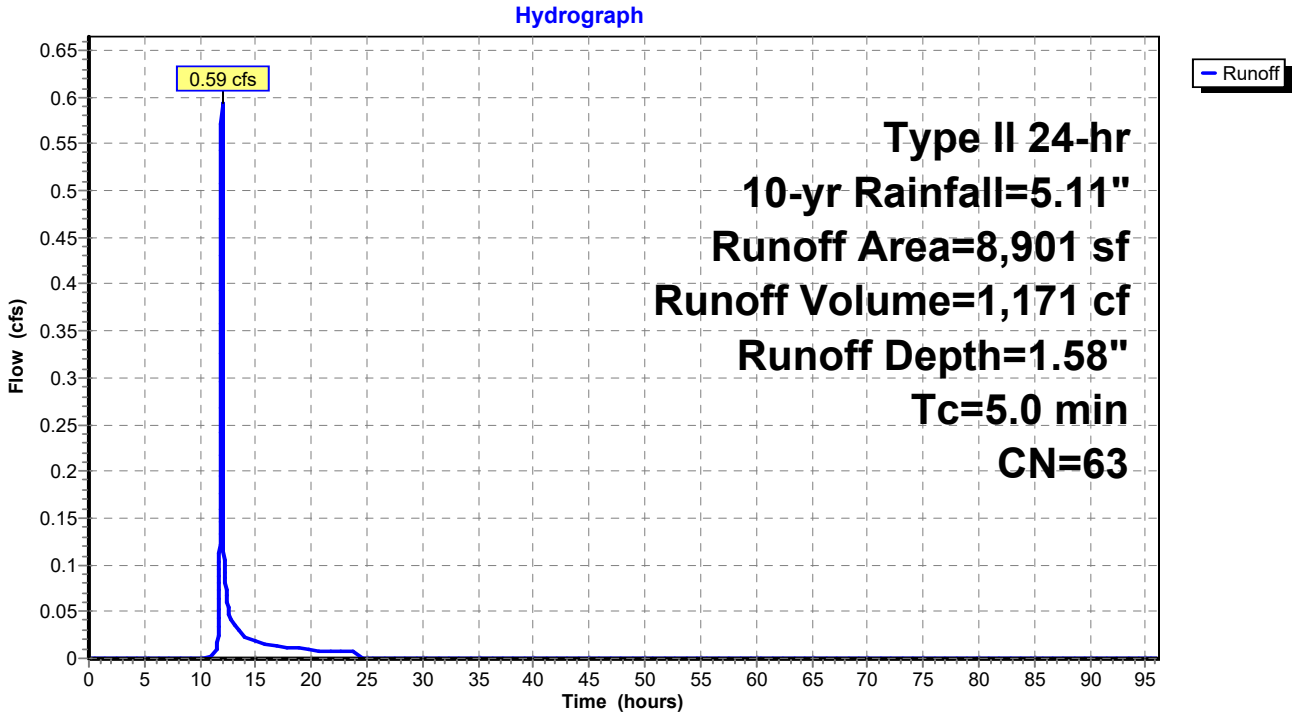
Subcatchment 19: Subcat 19



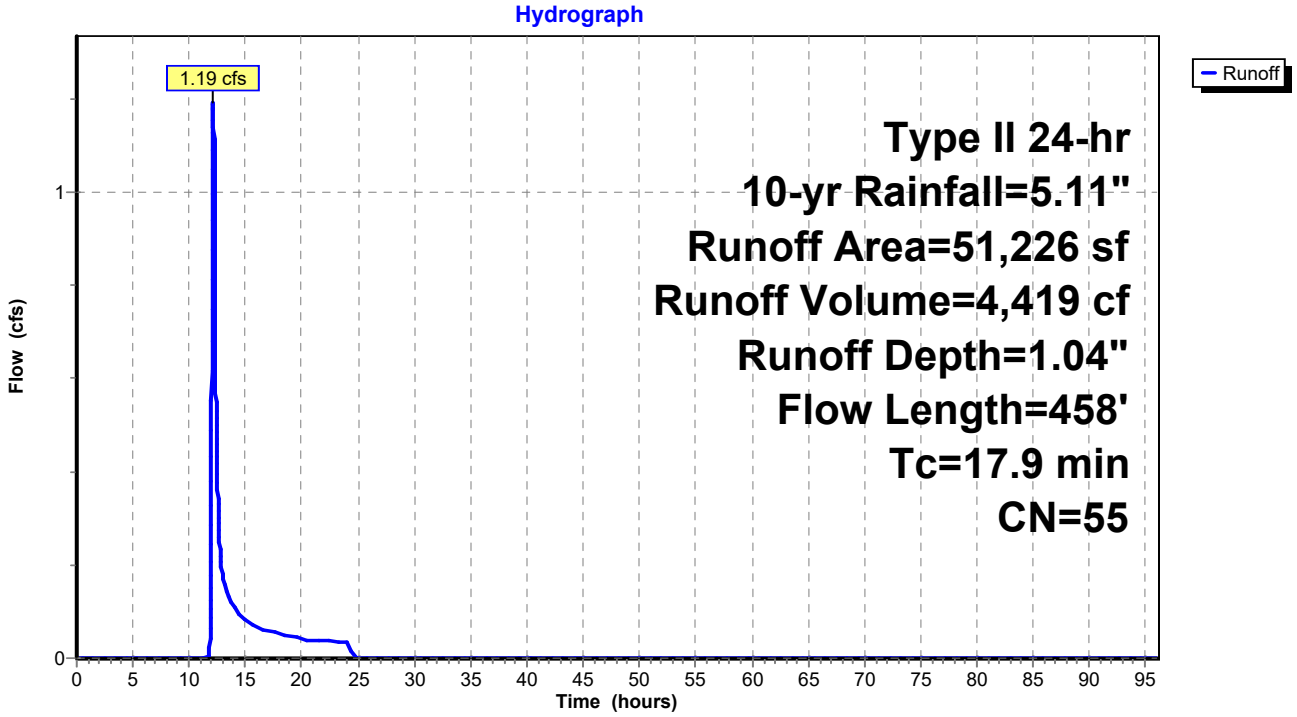
Subcatchment 20: Subcat 20



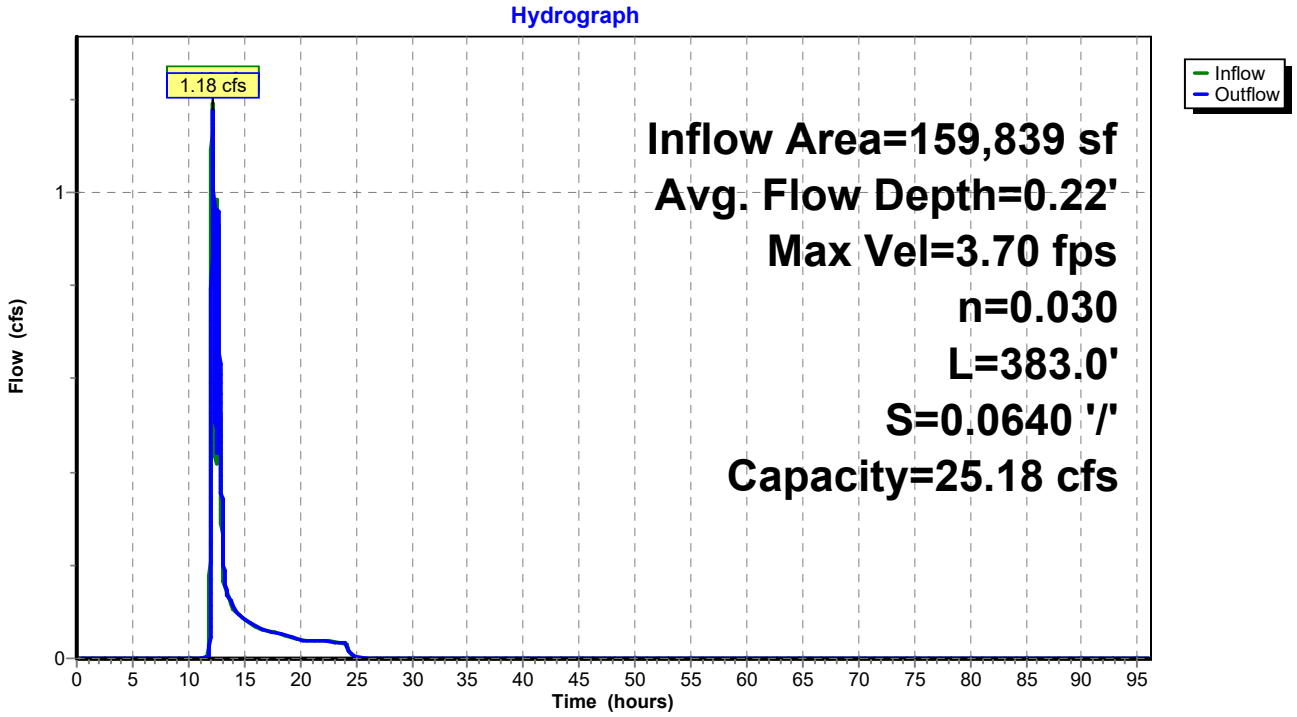
Subcatchment 21: Subcat 21



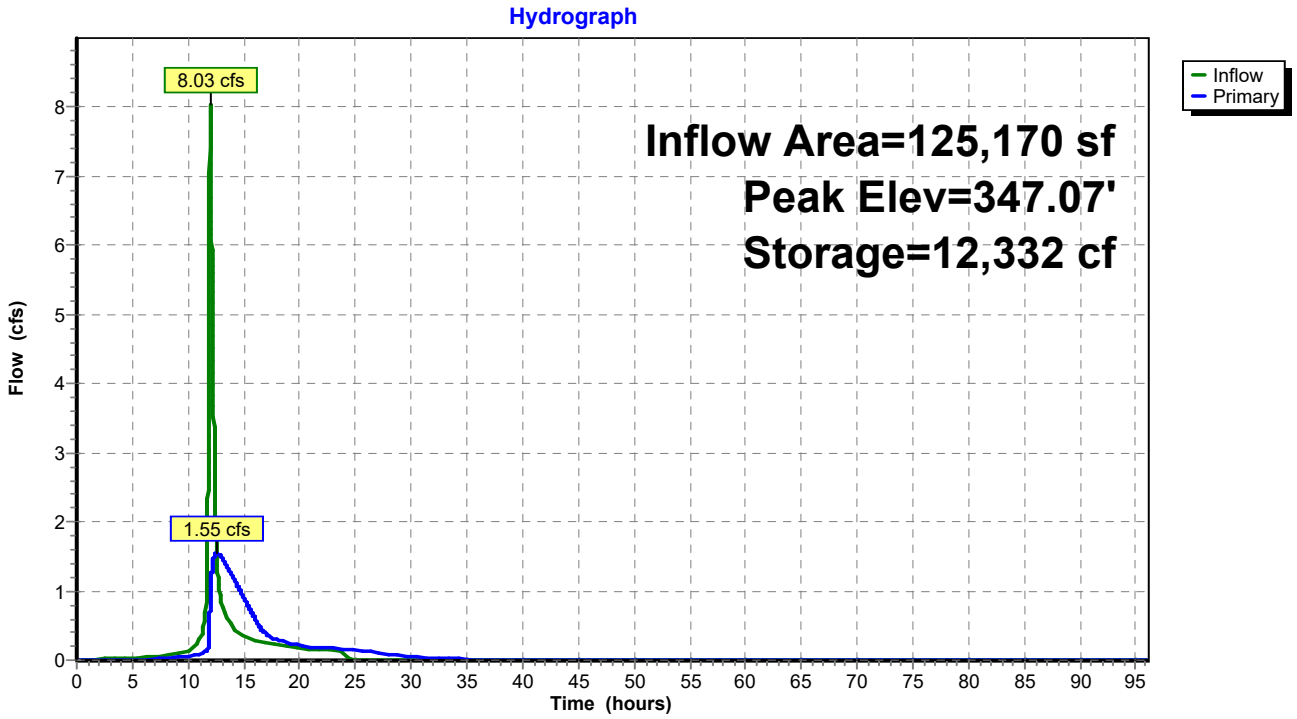
Subcatchment 22: Subcat 22



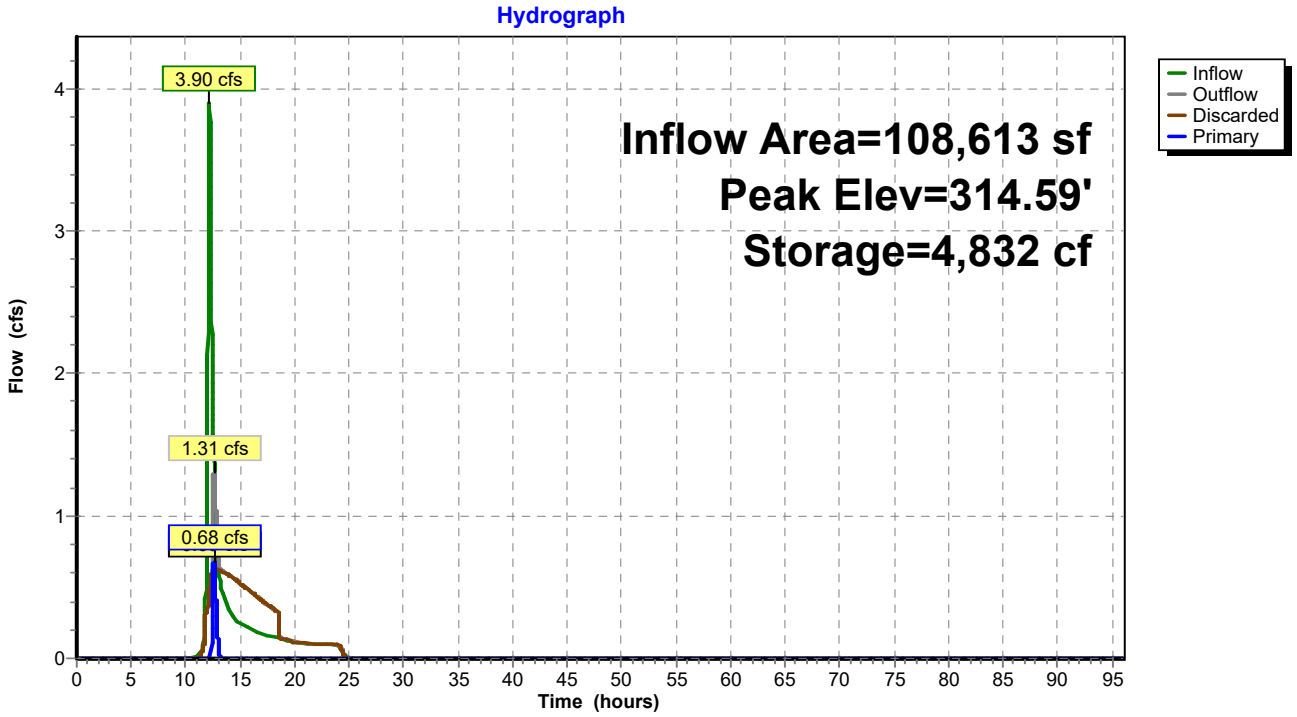
Reach 23R: swale



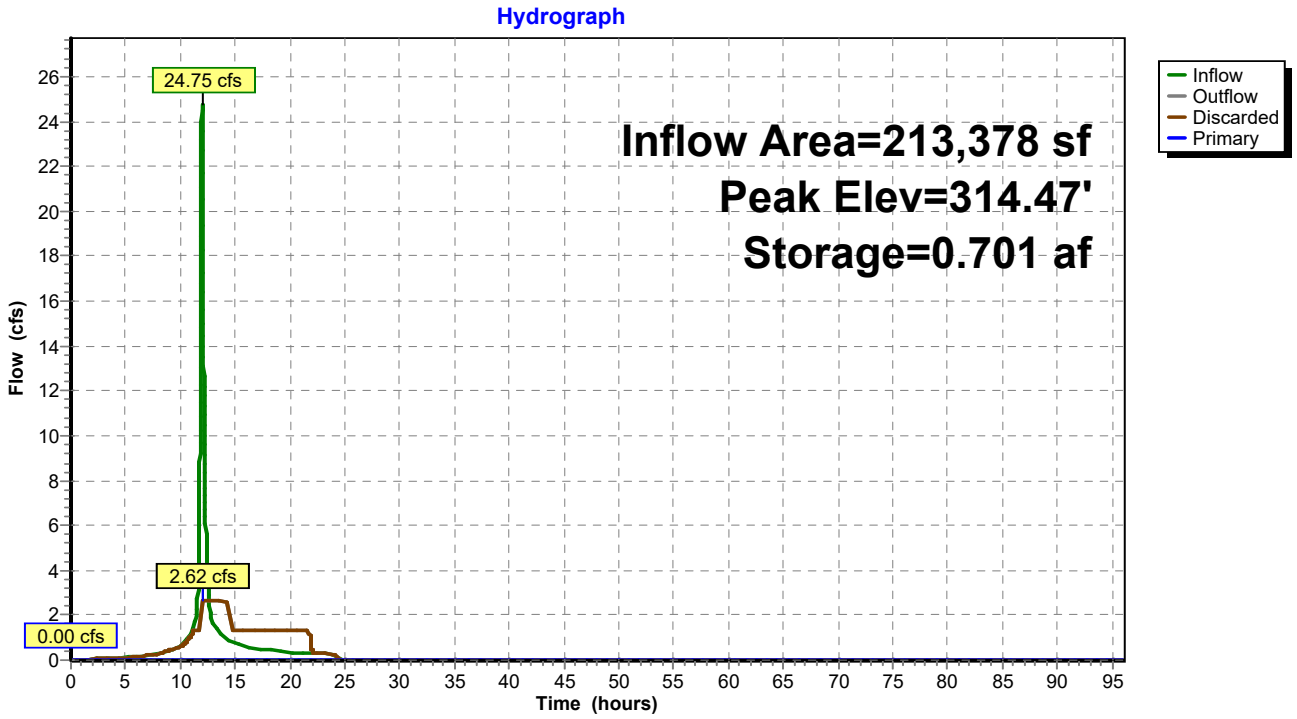
Pond 5P: DA 7 System



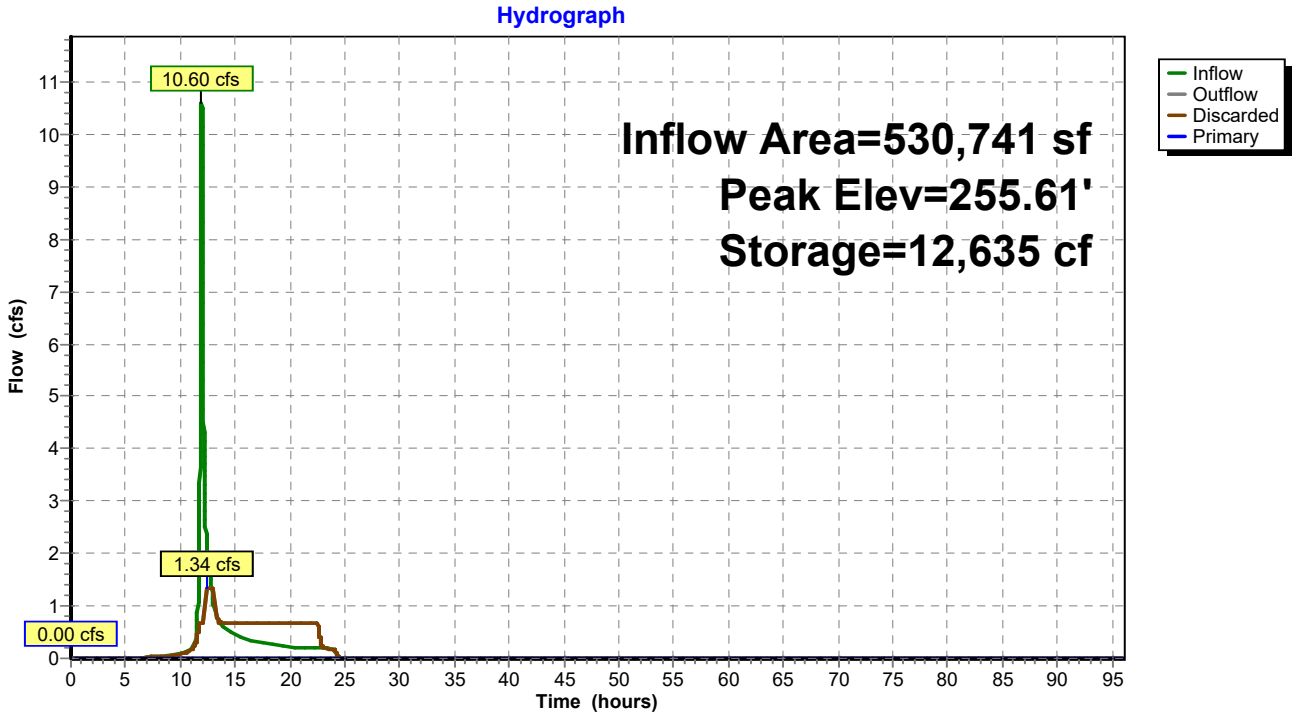
Pond 6P: Infiltration Basin



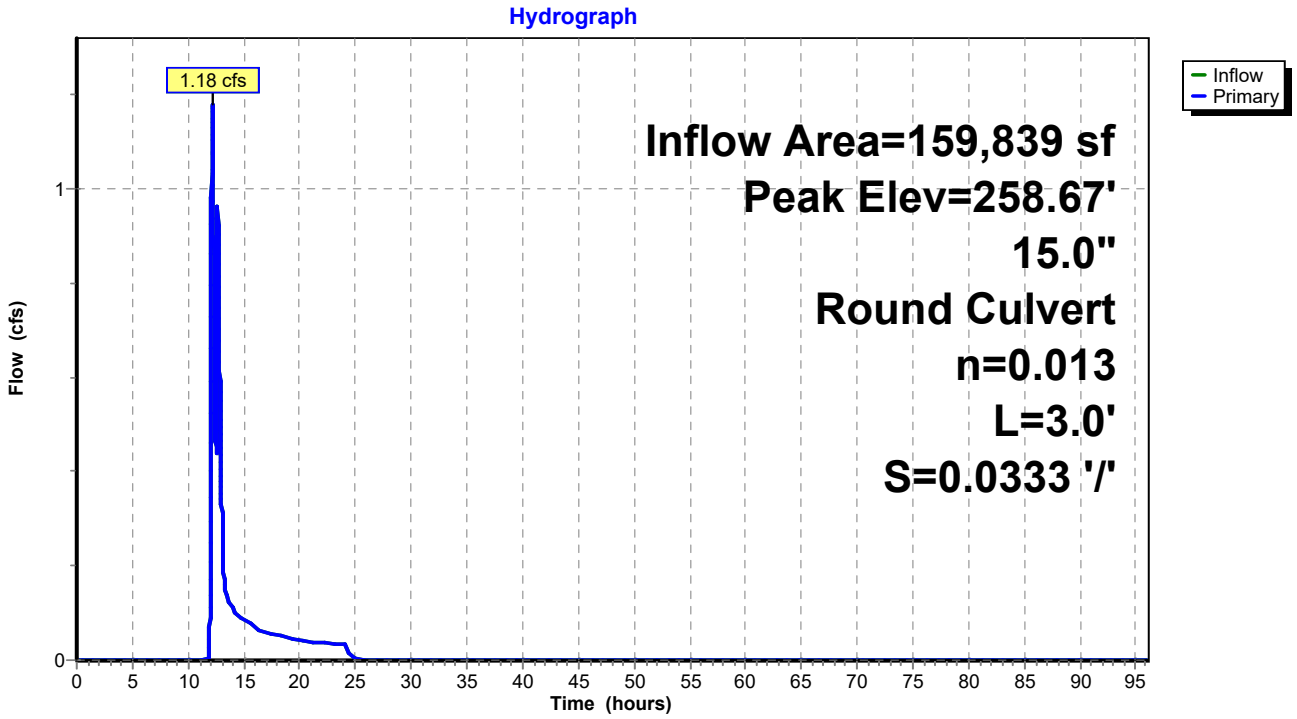
Pond 15P: DA 2 System



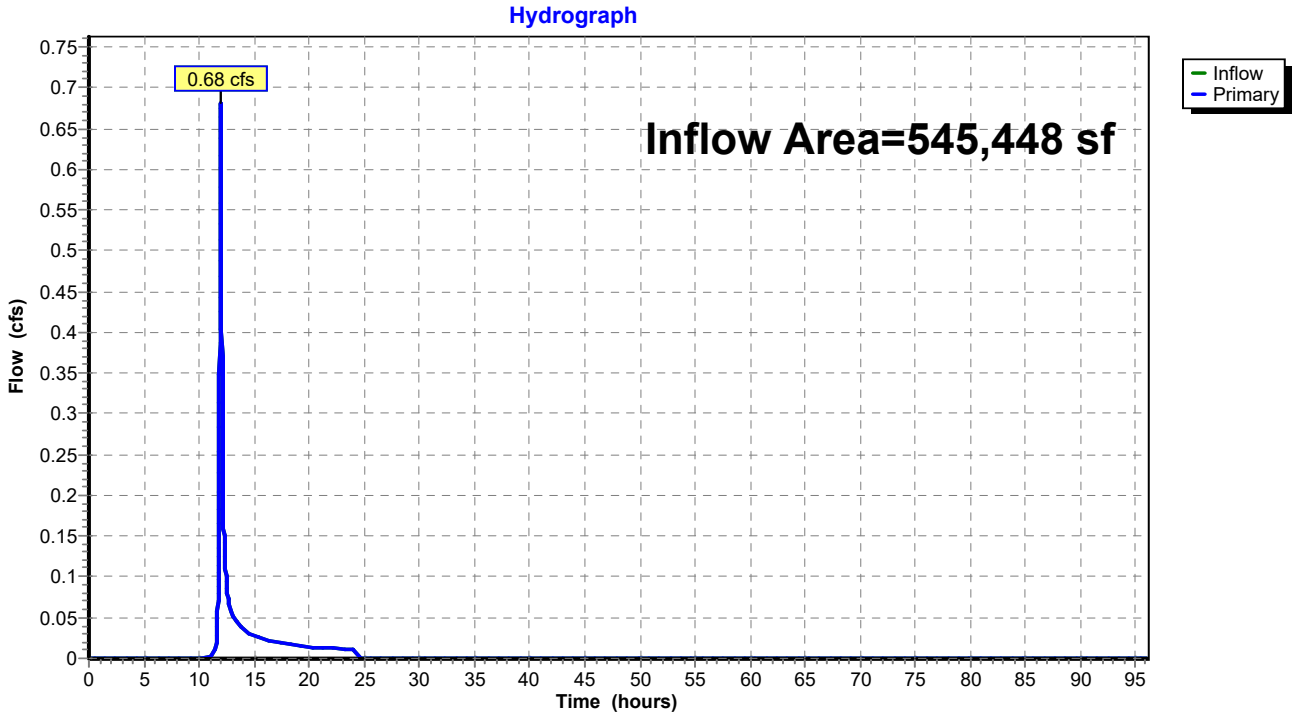
Pond 16P: DA 3 System



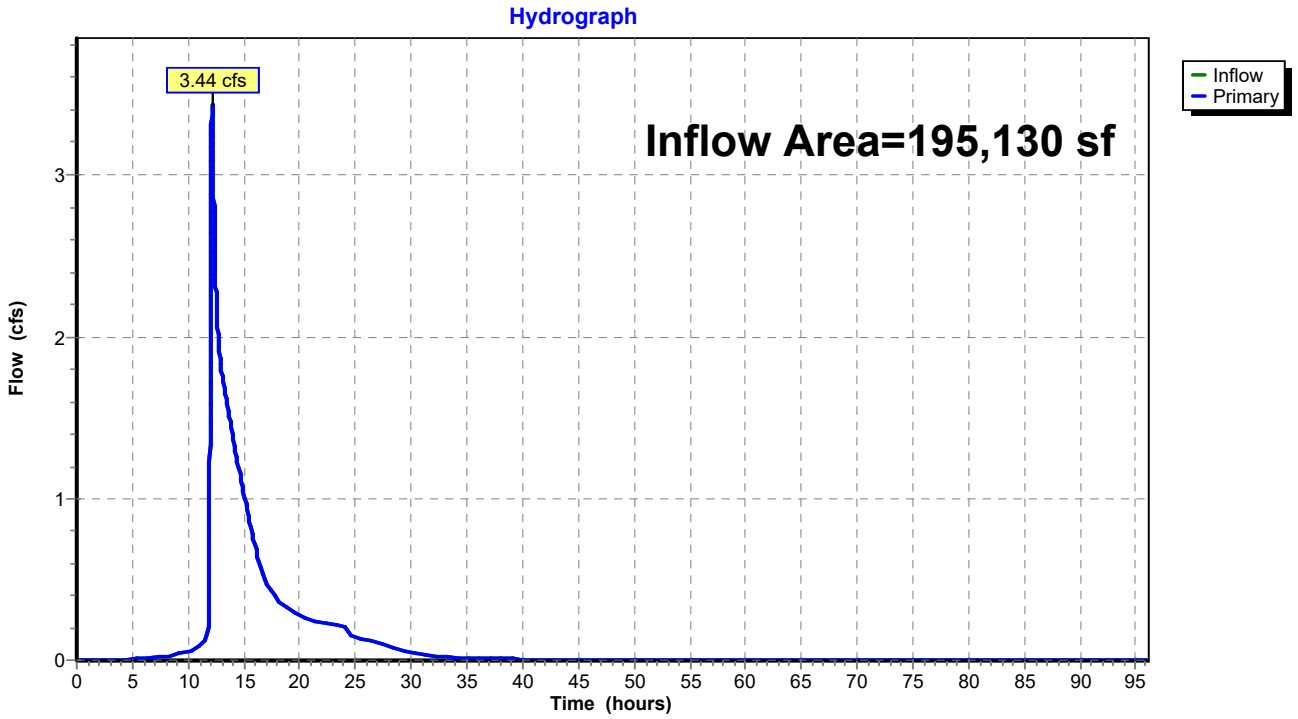
Pond 25P: Swale CB



Link 3L: Rt. 32 Culvert



Link 4L: West Off-Site



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=46,057 sf 9.58% Impervious Runoff Depth=2.28"
Tc=10.0 min UI Adjusted CN=63 Runoff=3.69 cfs 8,758 cf

Subcatchment2: Subcat 2 Runoff Area=0.097 ac 83.65% Impervious Runoff Depth=5.22"
Tc=5.0 min CN=92 Runoff=0.84 cfs 1,841 cf

Subcatchment3: Subcat 3 Runoff Area=33,237 sf 65.92% Impervious Runoff Depth=4.44"
Flow Length=367' Tc=1.4 min CN=85 Runoff=6.70 cfs 12,309 cf

Subcatchment4: Subcat 4 Runoff Area=1.396 ac 2.04% Impervious Runoff Depth=2.19"
Flow Length=830' Tc=7.4 min CN=62 Runoff=5.17 cfs 11,114 cf

Subcatchment5: Subcat 5 Runoff Area=69,961 sf 0.73% Impervious Runoff Depth=1.94"
Flow Length=269' Tc=19.3 min CN=59 Runoff=3.33 cfs 11,282 cf

Subcatchment6: Subcat 6 Runoff Area=13,786 sf 100.00% Impervious Runoff Depth=5.91"
Tc=5.0 min CN=98 Runoff=2.86 cfs 6,791 cf

Subcatchment7: Subcat 7 Runoff Area=2.105 ac 27.11% Impervious Runoff Depth=2.92"
Flow Length=262' Tc=18.9 min CN=70 Runoff=7.05 cfs 22,345 cf

Subcatchment8: Subcat 8 Runoff Area=5,496 sf 100.00% Impervious Runoff Depth=5.91"
Tc=5.0 min CN=98 Runoff=1.14 cfs 2,707 cf

Subcatchment9: Subcat 9 Runoff Area=6,071 sf 49.70% Impervious Runoff Depth=4.44"
Tc=5.0 min CN=85 Runoff=1.09 cfs 2,248 cf

Subcatchment10: Subcat 10 Runoff Area=52,574 sf 82.92% Impervious Runoff Depth=5.22"
Flow Length=181' Tc=5.6 min CN=92 Runoff=10.24 cfs 22,857 cf

Subcatchment11: Subcat 11 Runoff Area=105,659 sf 63.11% Impervious Runoff Depth=4.66"
Flow Length=237' Tc=17.3 min CN=87 Runoff=13.24 cfs 41,039 cf

Subcatchment12: Subcat 12 Runoff Area=13,787 sf 100.00% Impervious Runoff Depth=5.91"
Tc=5.0 min CN=98 Runoff=2.86 cfs 6,792 cf

Subcatchment13: Subcat 13 Runoff Area=108,613 sf 0.01% Impervious Runoff Depth=2.37"
Flow Length=653' Tc=23.8 min CN=64 Runoff=5.76 cfs 21,460 cf

Subcatchment14: Subcat 14 Runoff Area=13,783 sf 99.97% Impervious Runoff Depth=5.91"
Tc=5.0 min CN=98 Runoff=2.86 cfs 6,790 cf

Subcatchment15: Subcat 15 Runoff Area=13,783 sf 99.98% Impervious Runoff Depth=5.91"
Tc=5.0 min CN=98 Runoff=2.86 cfs 6,790 cf

Subcatchment16: Subcat 16 Runoff Area=13,792 sf 99.99% Impervious Runoff Depth=5.91"
Tc=5.0 min CN=98 Runoff=2.87 cfs 6,794 cf

Subcatchment17: Subcat 17 Runoff Area=6,828 sf 8.53% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=64 Runoff=0.69 cfs 1,349 cf

Subcatchment18: Subcat 18 Runoff Area=6,372 sf 7.75% Impervious Runoff Depth=2.37"
Tc=5.0 min CN=64 Runoff=0.65 cfs 1,259 cf

Subcatchment19: Subcat 19 Runoff Area=5,807 sf 0.00% Impervious Runoff Depth=1.60"
Flow Length=335' Tc=13.6 min CN=55 Runoff=0.27 cfs 777 cf

Subcatchment20: Subcat 20 Runoff Area=8,137 sf 50.55% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=87 Runoff=1.51 cfs 3,161 cf

Subcatchment21: Subcat 21 Runoff Area=8,901 sf 3.88% Impervious Runoff Depth=2.28"
Tc=5.0 min CN=63 Runoff=0.87 cfs 1,692 cf

Subcatchment22: Subcat 22 Runoff Area=51,226 sf 0.04% Impervious Runoff Depth=1.60"
Flow Length=458' Tc=17.9 min CN=55 Runoff=2.02 cfs 6,850 cf

Reach 23R: swale Avg. Flow Depth=0.44' Max Vel=5.36 fps Inflow=4.53 cfs 11,317 cf
n=0.030 L=383.0' S=0.0640 '/' Capacity=25.18 cfs Outflow=4.46 cfs 11,317 cf

Pond 5P: DA 7 System Peak Elev=347.55' Storage=14,736 cf Inflow=10.50 cfs 37,252 cf
Outflow=4.51 cfs 37,245 cf

Pond 6P: Infiltration Basin Peak Elev=314.77' Storage=5,285 cf Inflow=5.76 cfs 21,460 cf
Discarded=0.65 cfs 16,994 cf Primary=3.55 cfs 4,466 cf Outflow=4.20 cfs 21,460 cf

Pond 15P: DA 2 System Peak Elev=316.39' Storage=0.904 af Inflow=30.46 cfs 91,062 cf
Discarded=2.62 cfs 89,736 cf Primary=0.79 cfs 1,326 cf Outflow=3.41 cfs 91,062 cf

Pond 16P: DA 3 System Peak Elev=258.39' Storage=19,288 cf Inflow=15.05 cfs 49,273 cf
Discarded=1.34 cfs 43,075 cf Primary=3.36 cfs 6,198 cf Outflow=4.70 cfs 49,273 cf

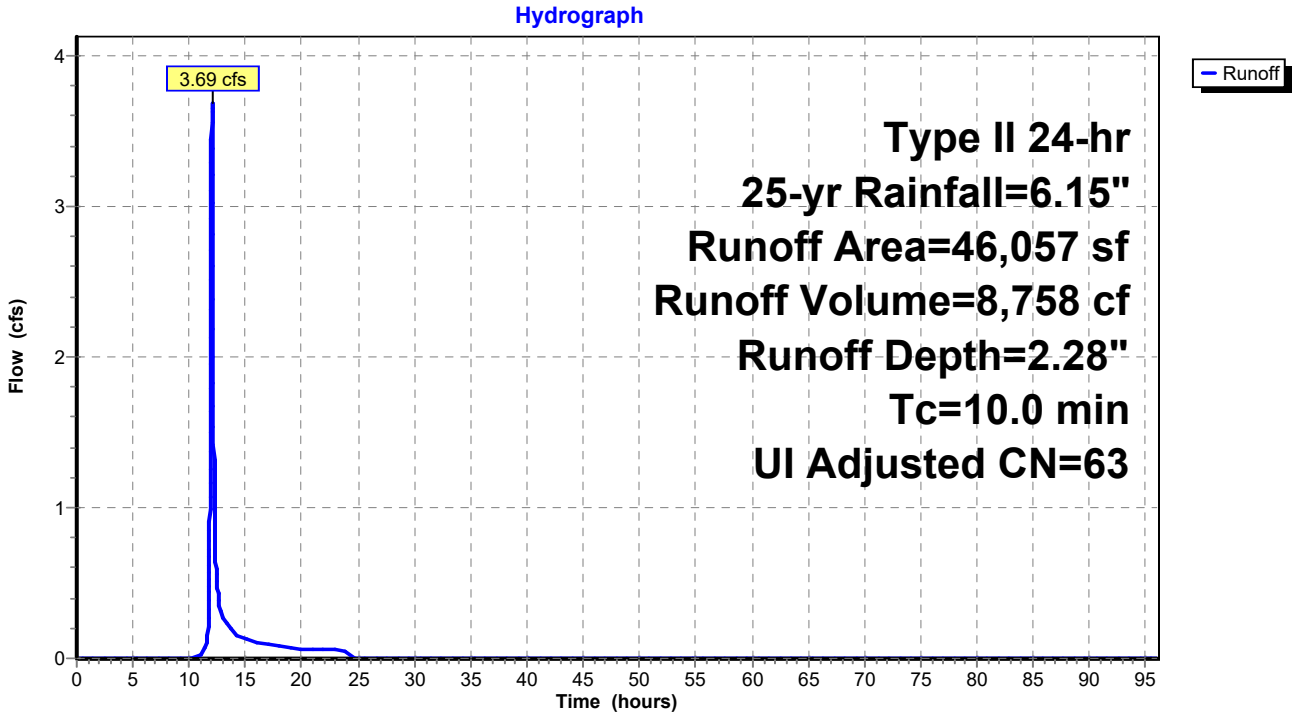
Pond 25P: Swale CB Peak Elev=259.43' Inflow=4.46 cfs 11,317 cf
15.0" Round Culvert n=0.013 L=3.0' S=0.0333 '/' Outflow=4.46 cfs 11,317 cf

Link 3L: Rt. 32 Culvert Inflow=3.47 cfs 8,667 cf
Primary=3.47 cfs 8,667 cf

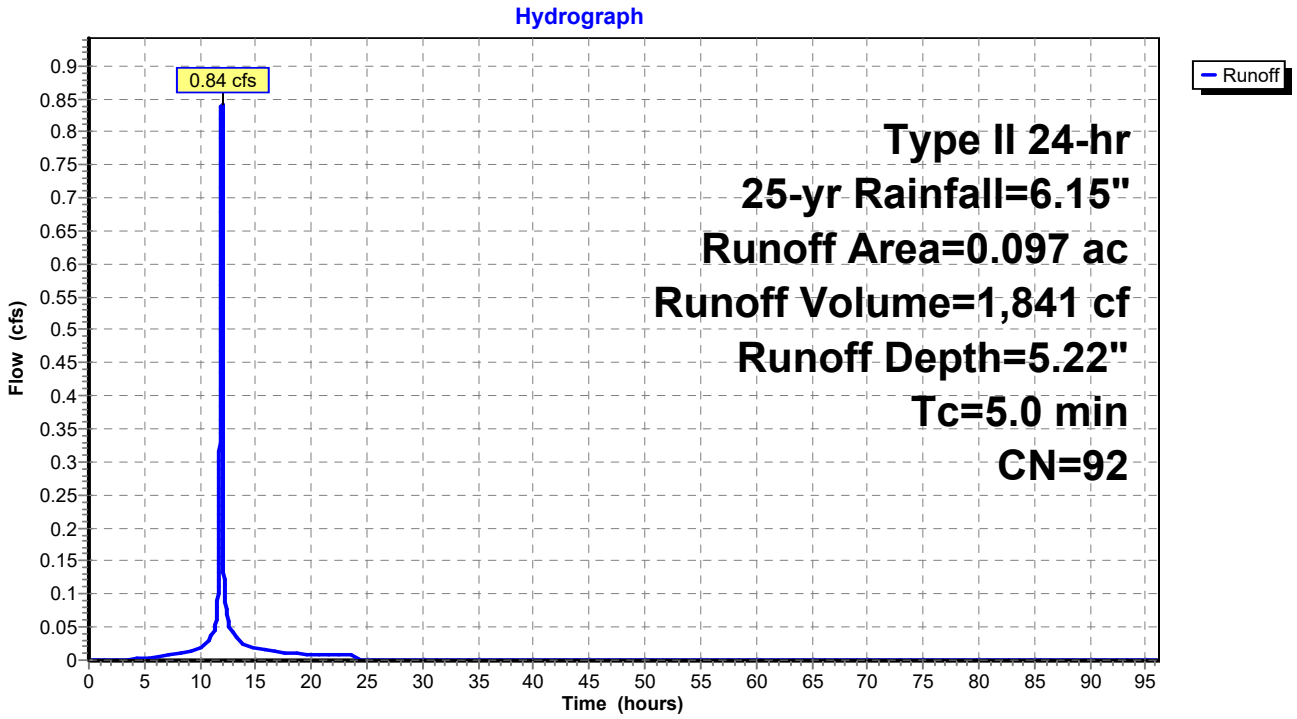
Link 4L: West Off-Site Inflow=6.73 cfs 48,527 cf
Primary=6.73 cfs 48,527 cf

Total Runoff Area = 740,579 sf Runoff Volume = 207,005 cf Average Runoff Depth = 3.35"
66.28% Pervious = 490,839 sf 33.72% Impervious = 249,740 sf

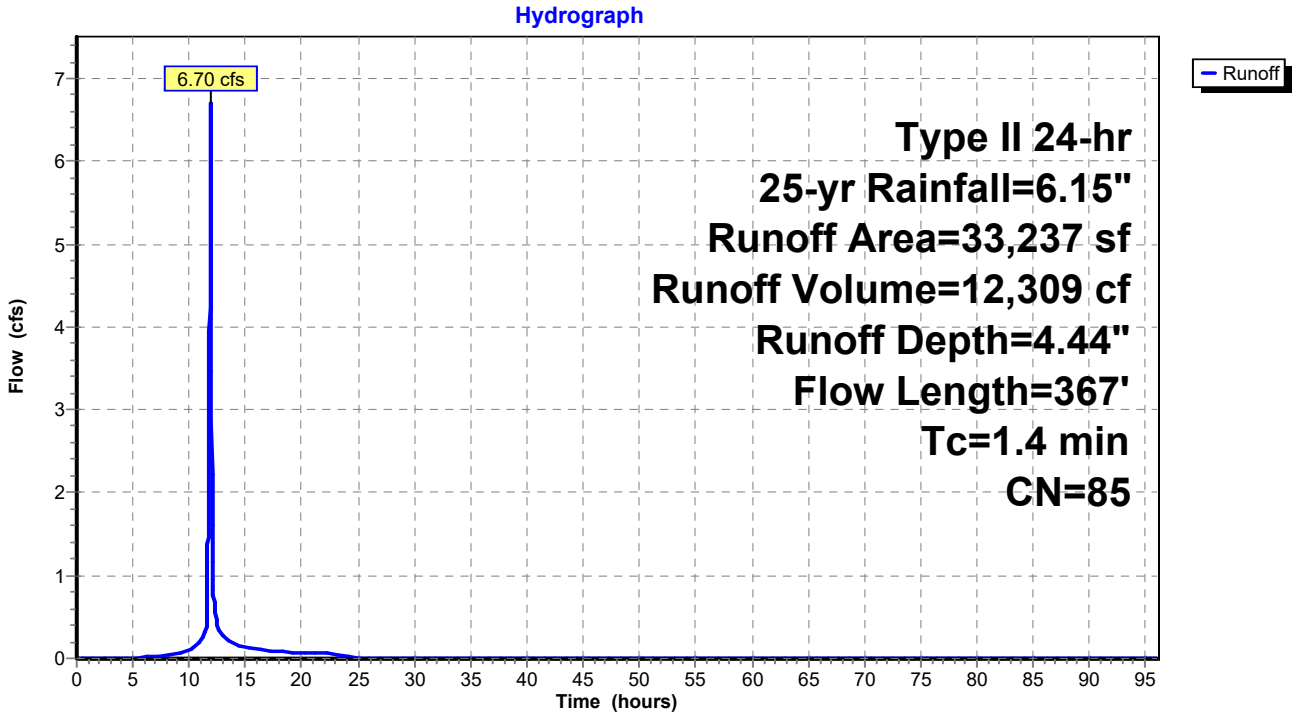
Subcatchment 1: Subcat 1



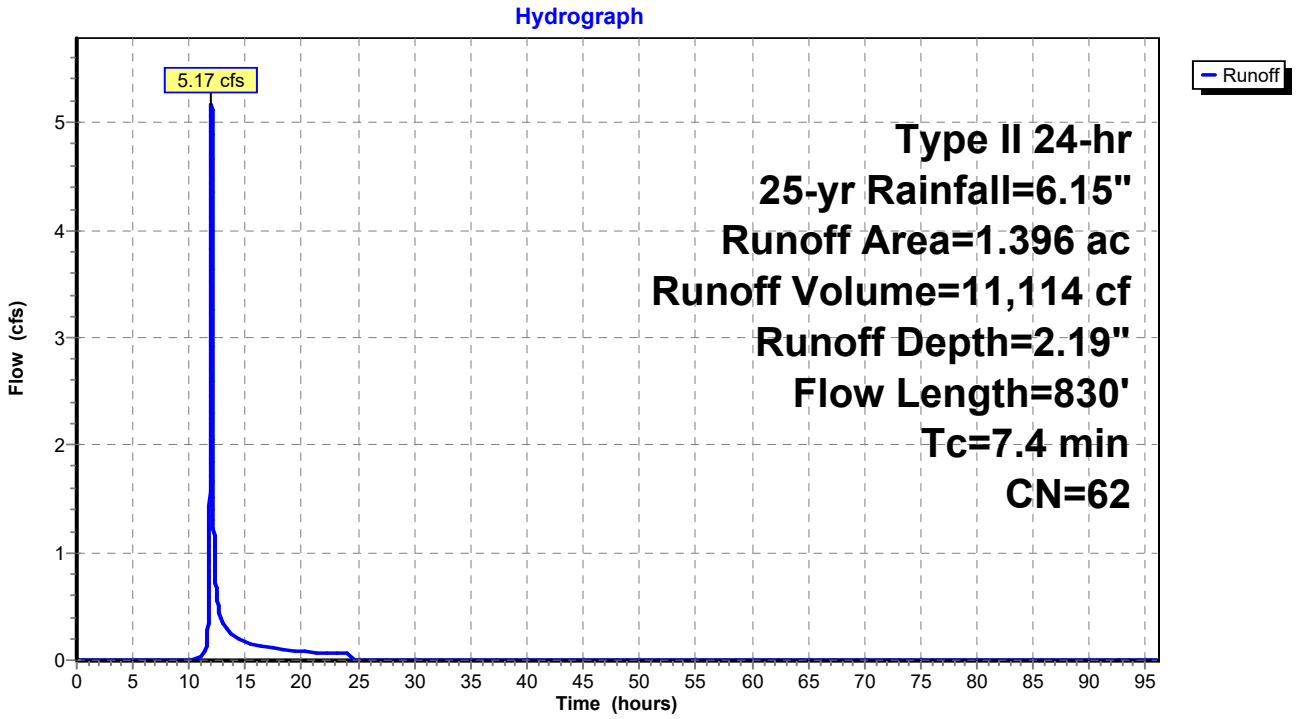
Subcatchment 2: Subcat 2



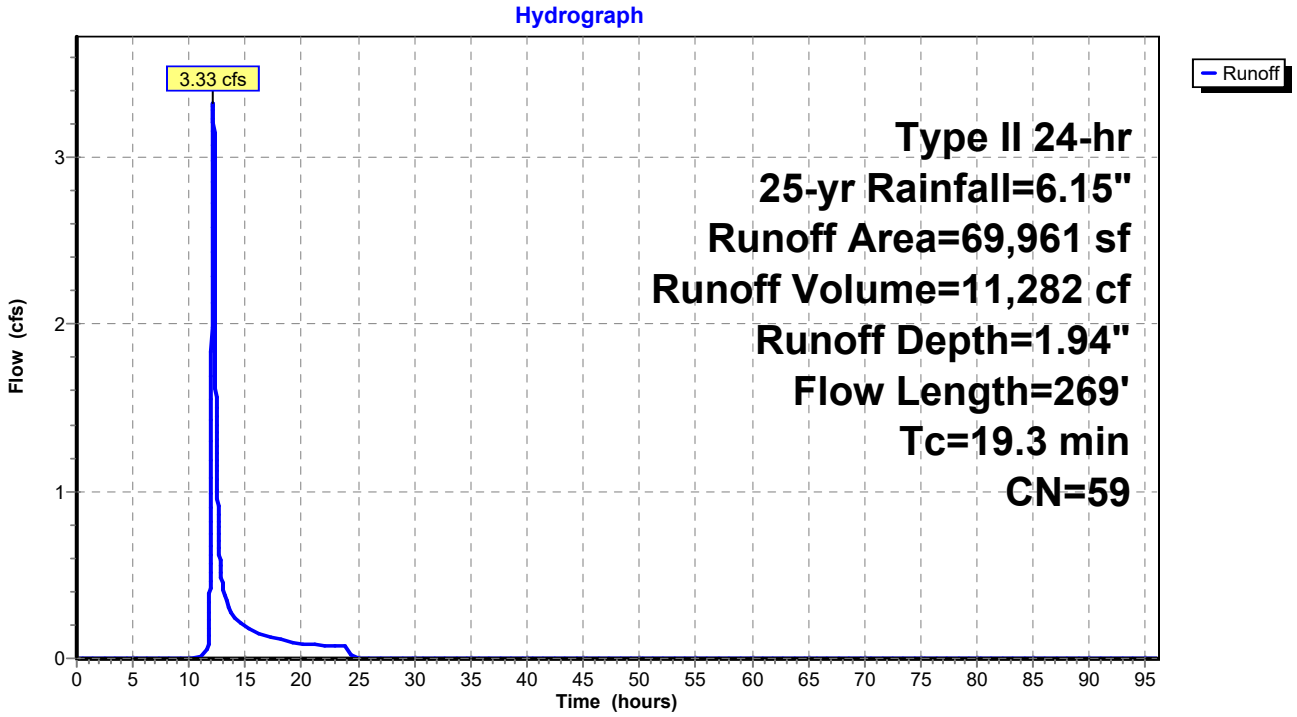
Subcatchment 3: Subcat 3



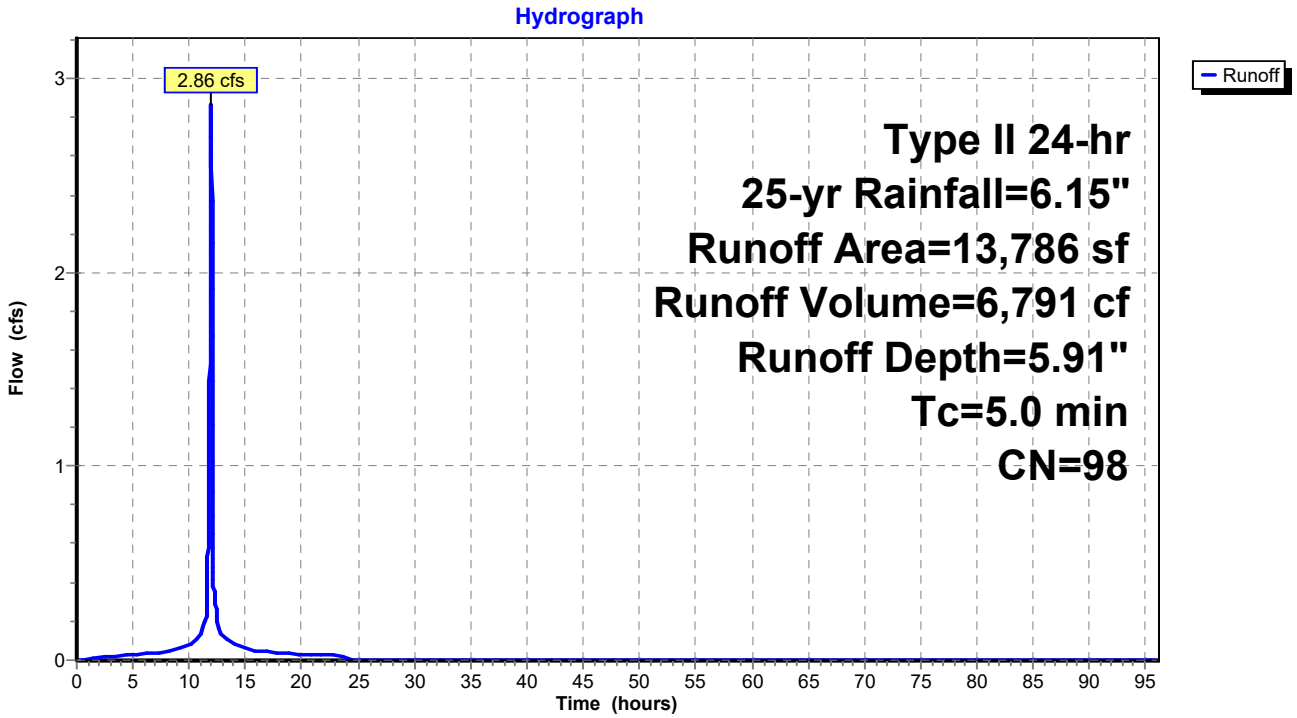
Subcatchment 4: Subcat 4



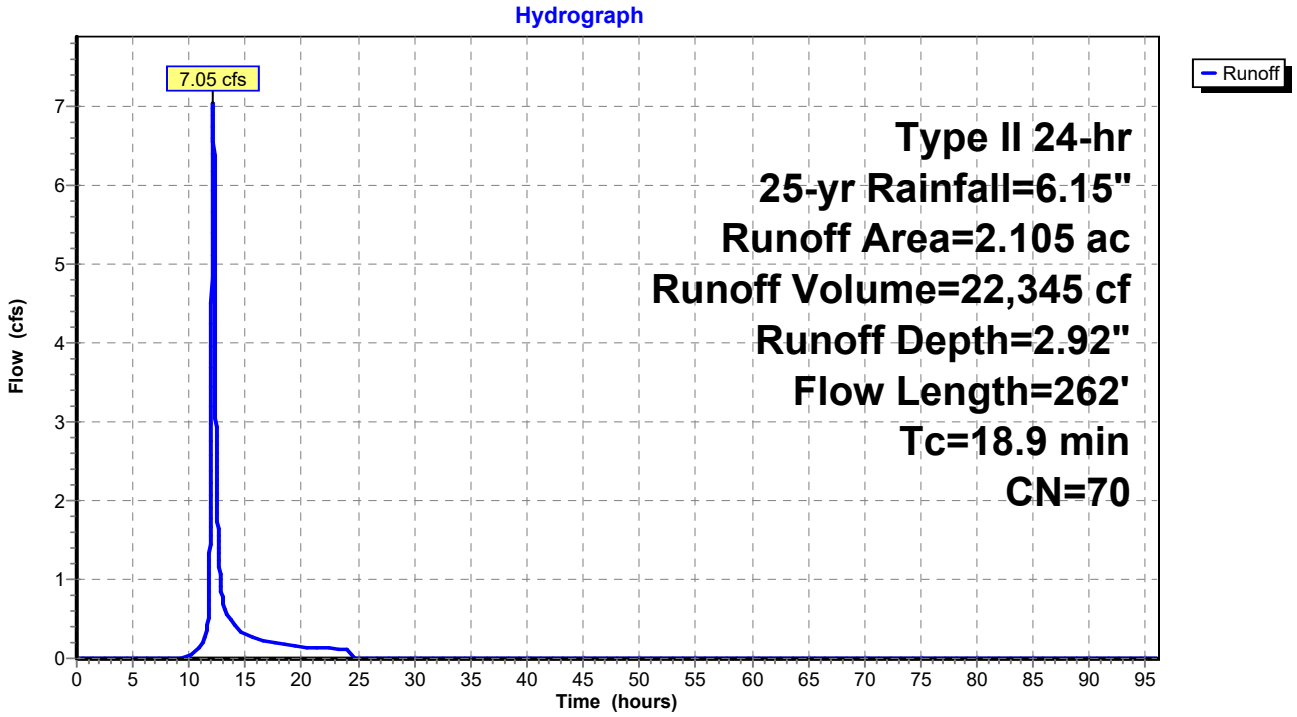
Subcatchment 5: Subcat 5



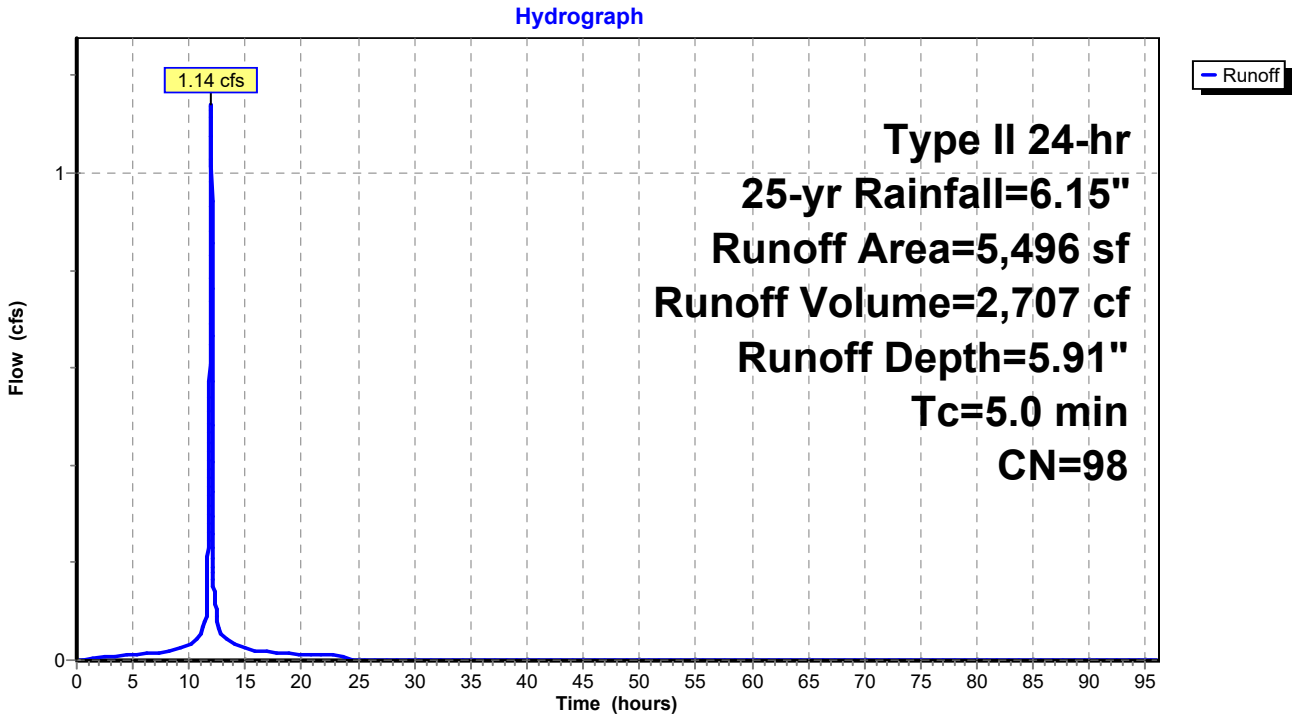
Subcatchment 6: Subcat 6



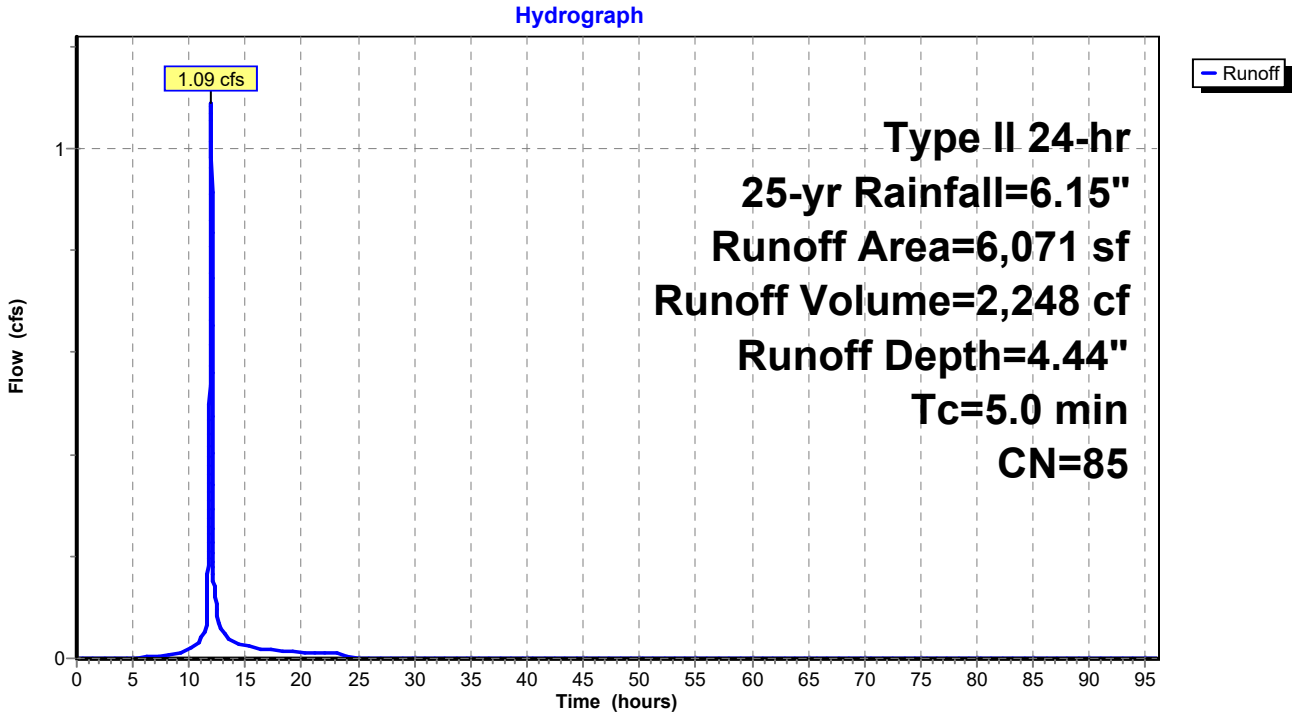
Subcatchment 7: Subcat 7



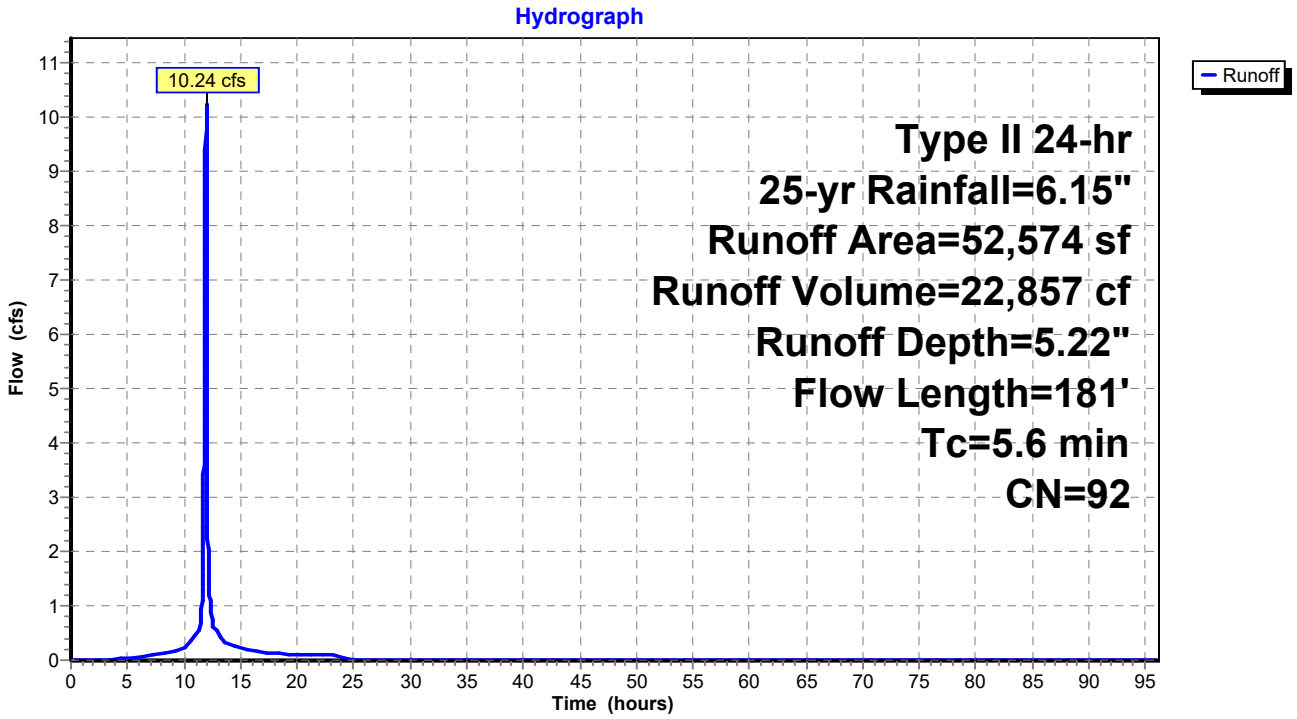
Subcatchment 8: Subcat 8



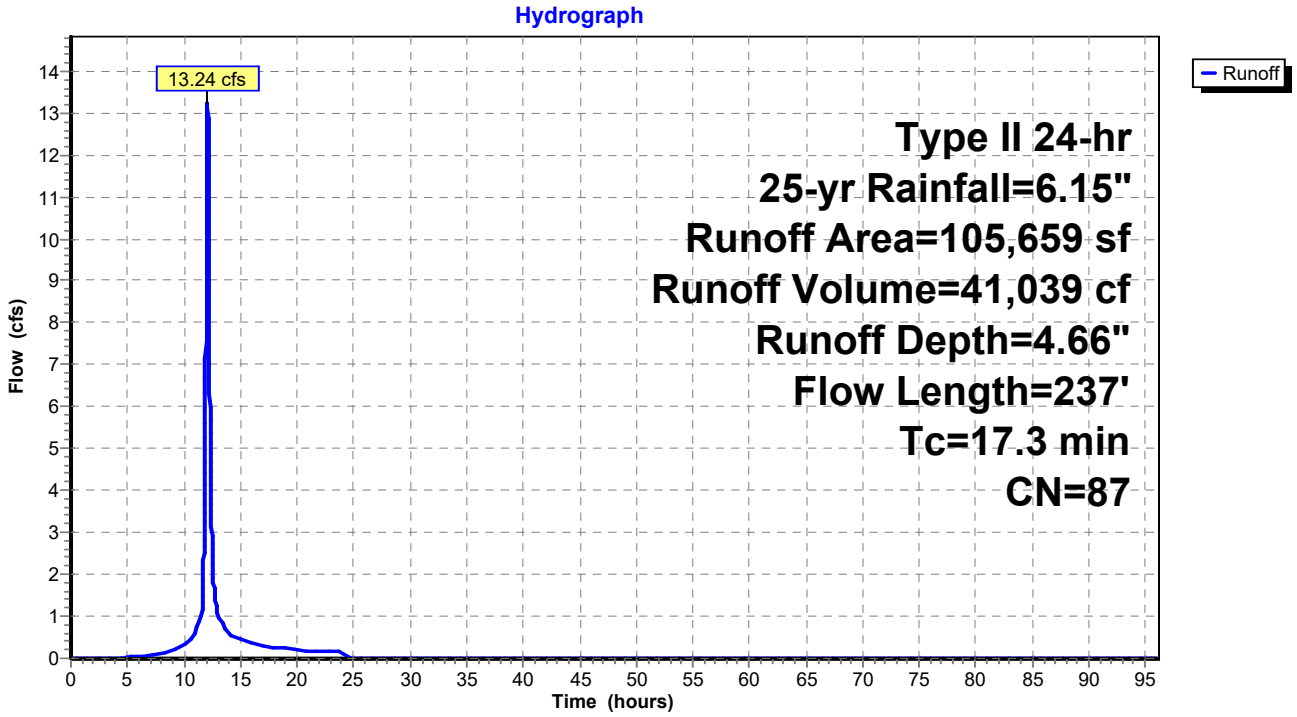
Subcatchment 9: Subcat 9



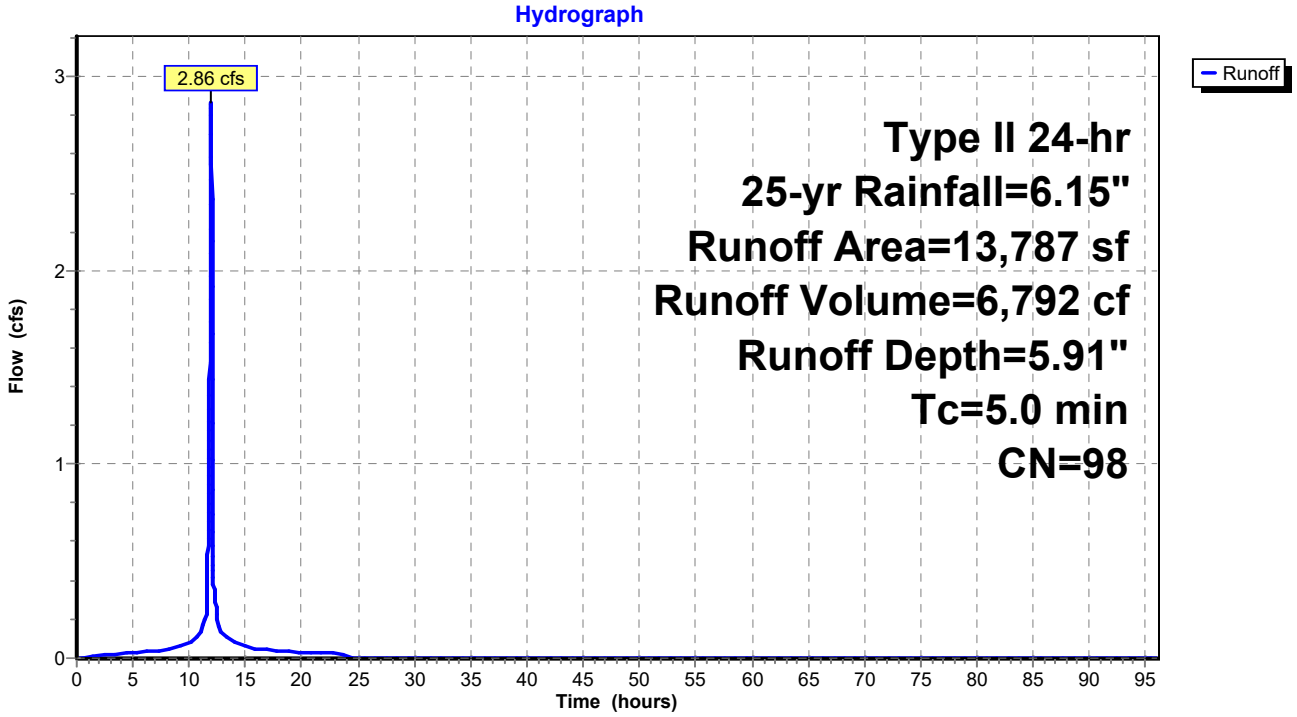
Subcatchment 10: Subcat 10



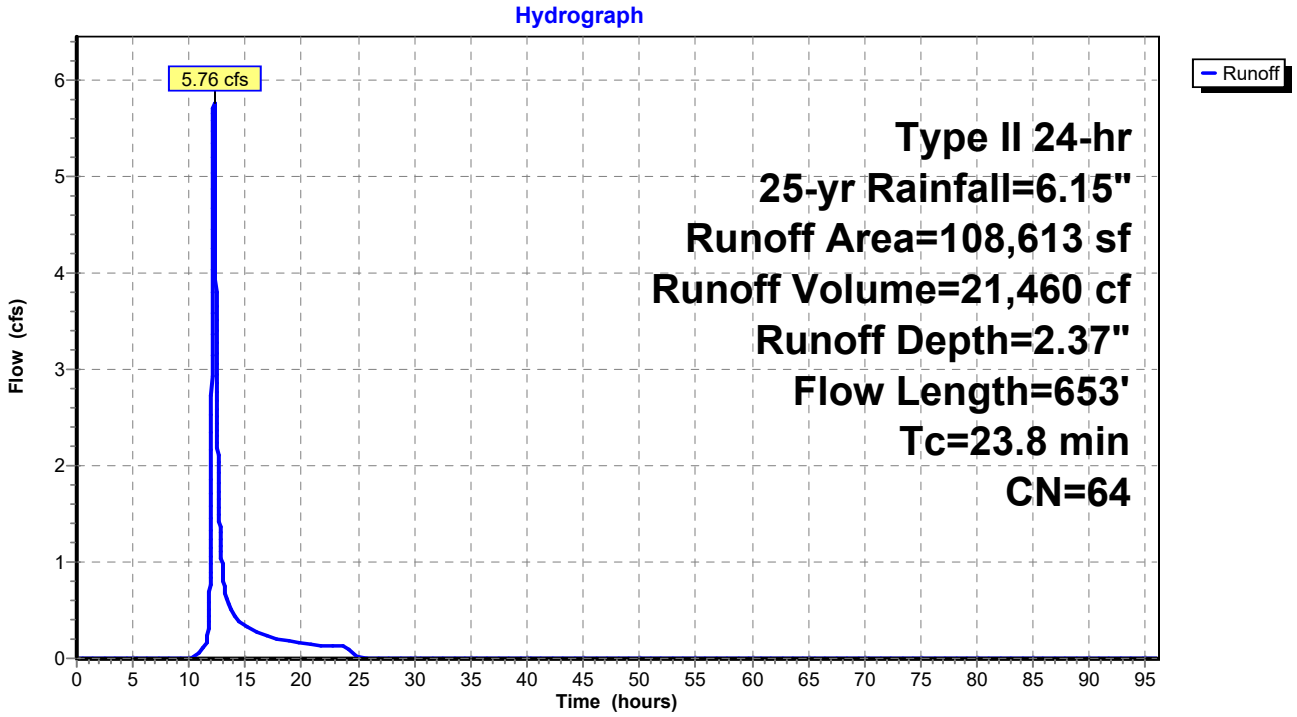
Subcatchment 11: Subcat 11



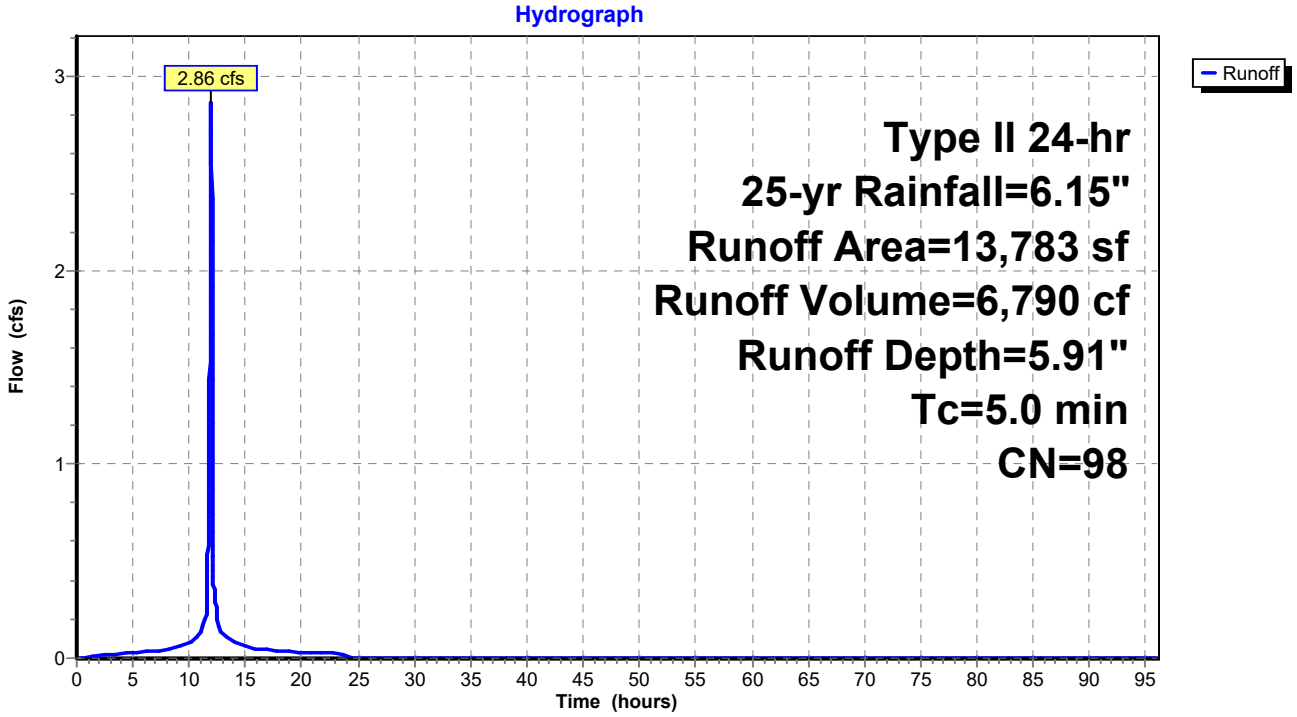
Subcatchment 12: Subcat 12



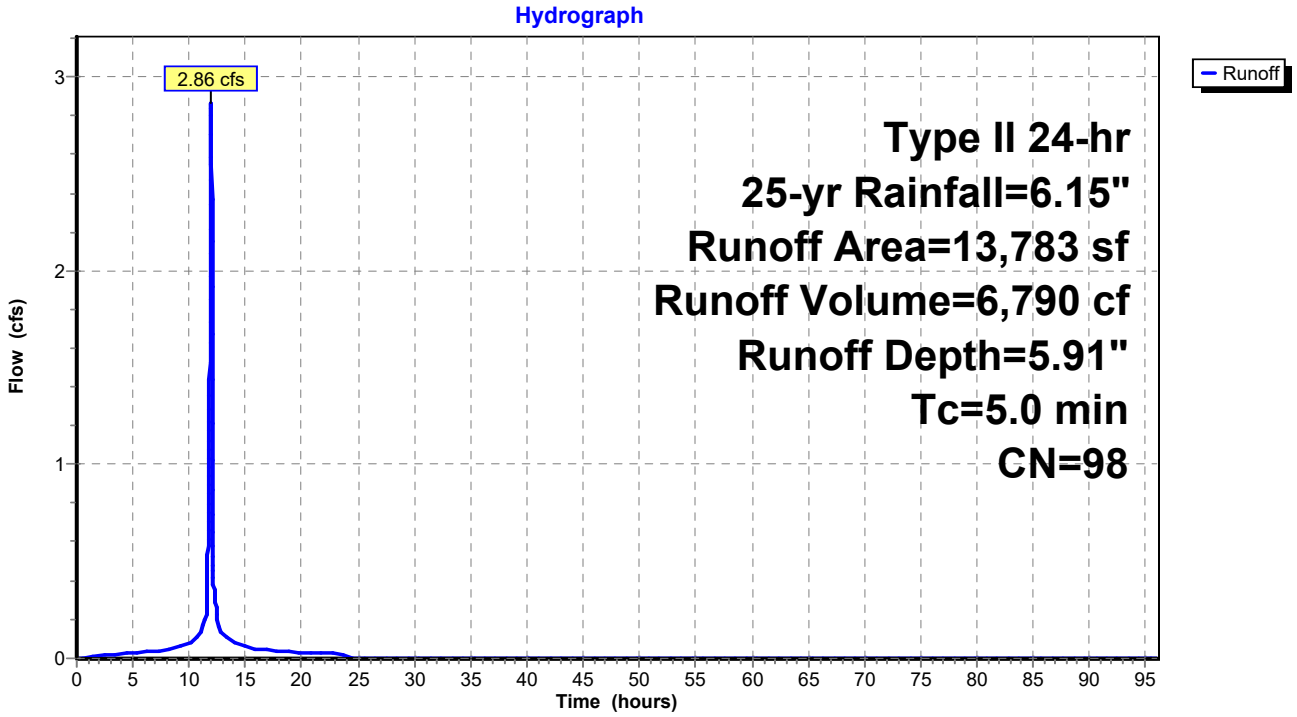
Subcatchment 13: Subcat 13



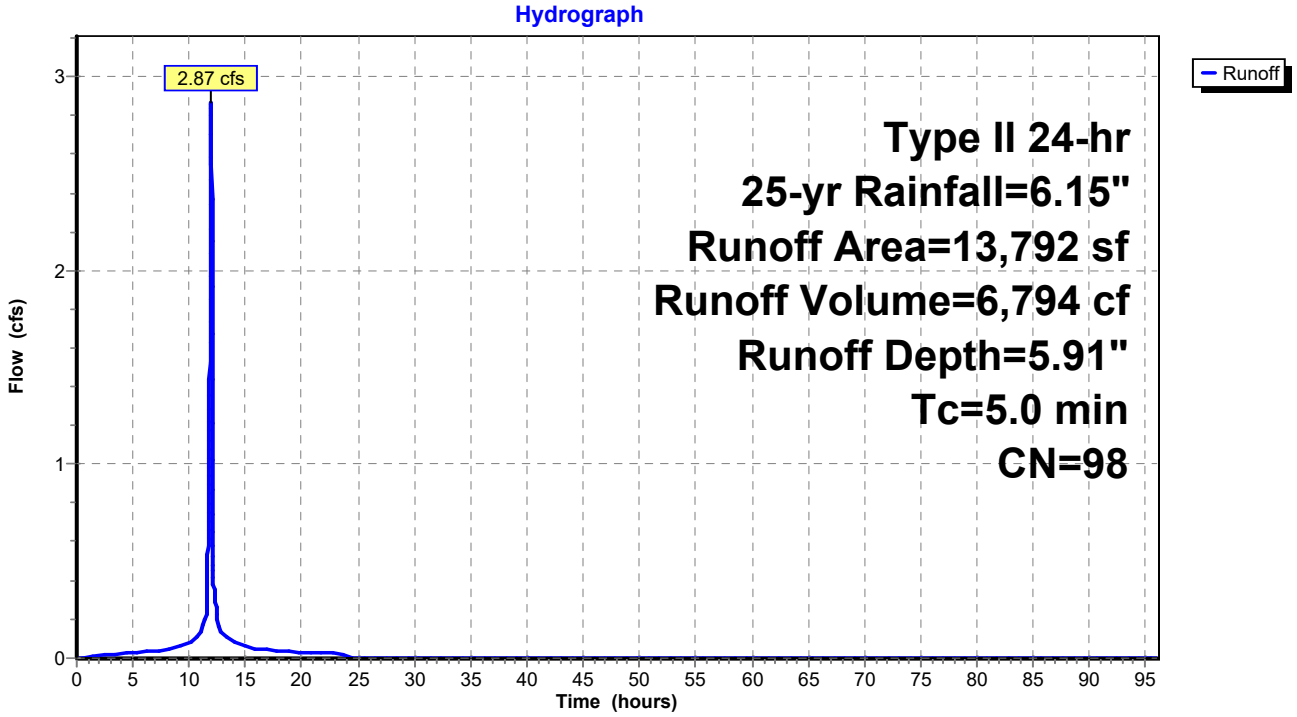
Subcatchment 14: Subcat 14



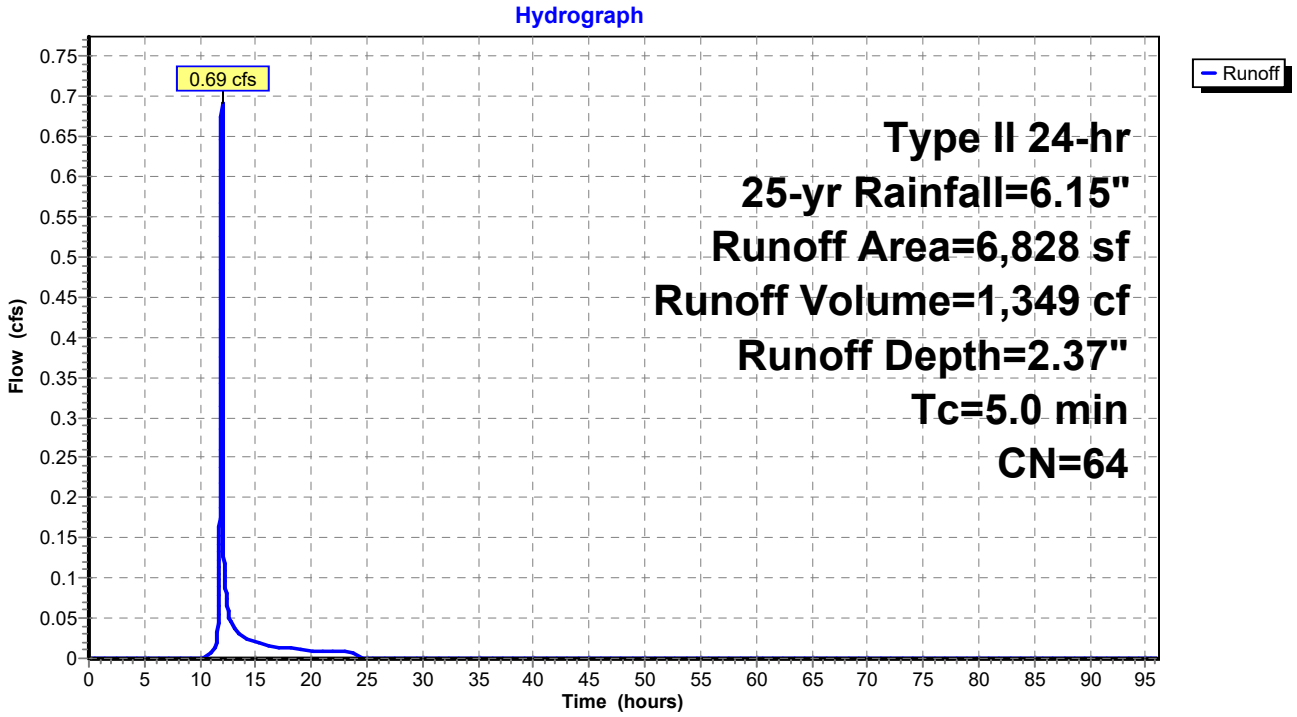
Subcatchment 15: Subcat 15



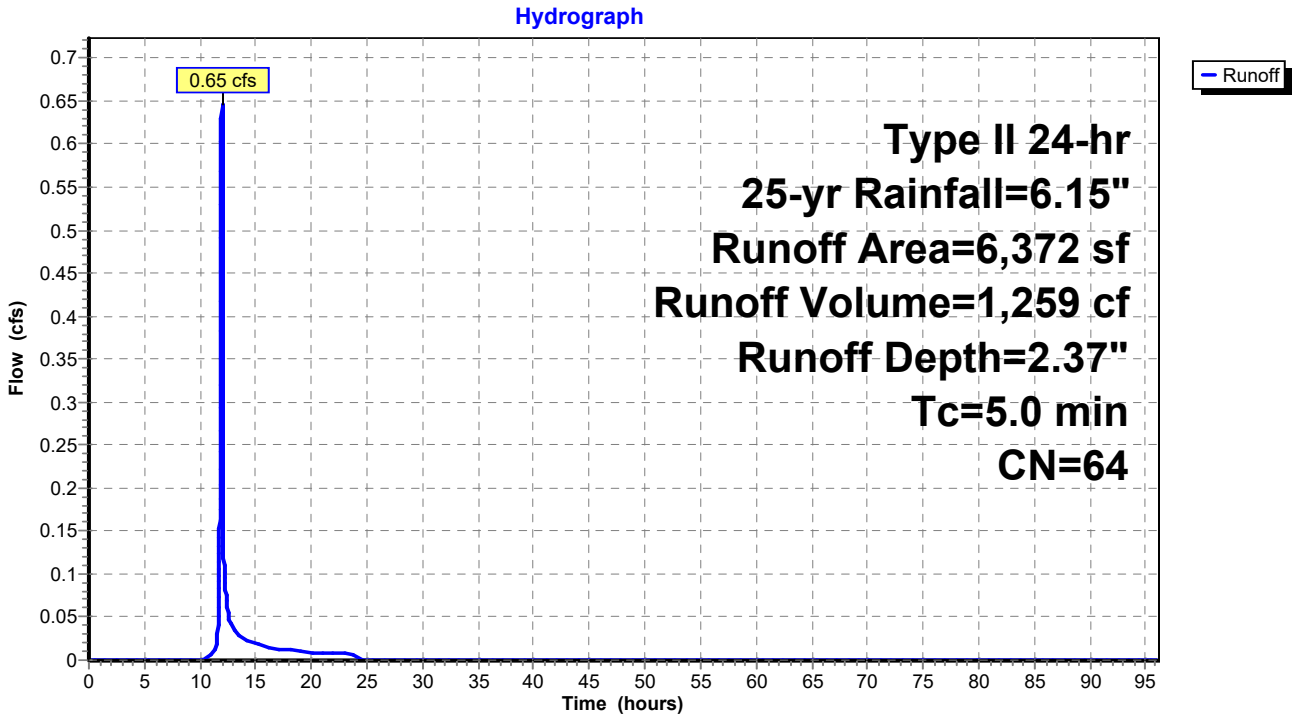
Subcatchment 16: Subcat 16



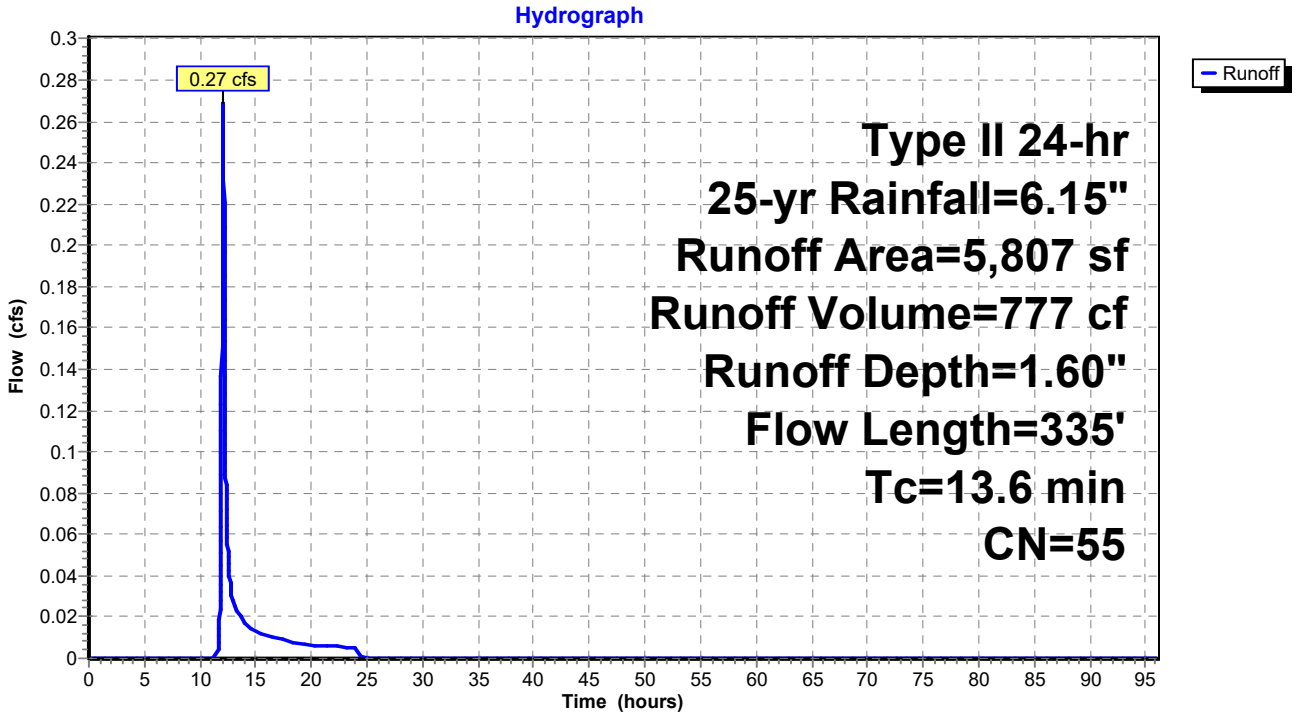
Subcatchment 17: Subcat 17



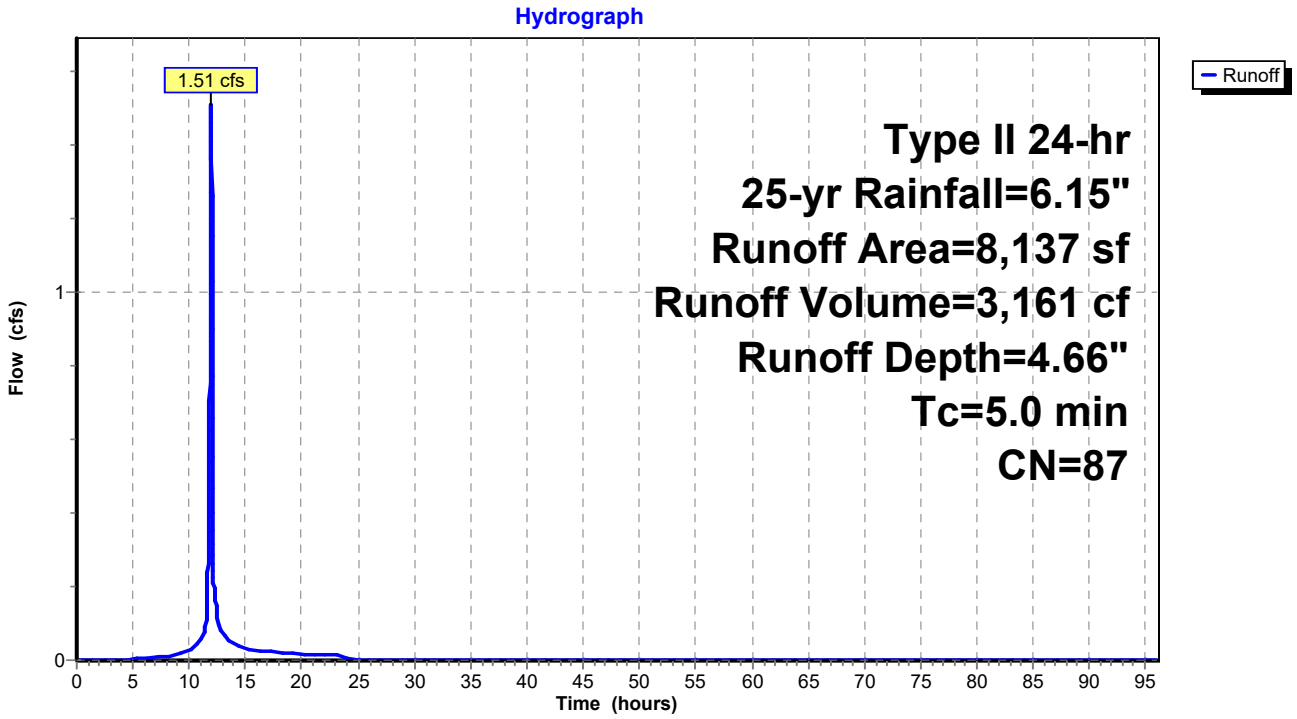
Subcatchment 18: Subcat 18



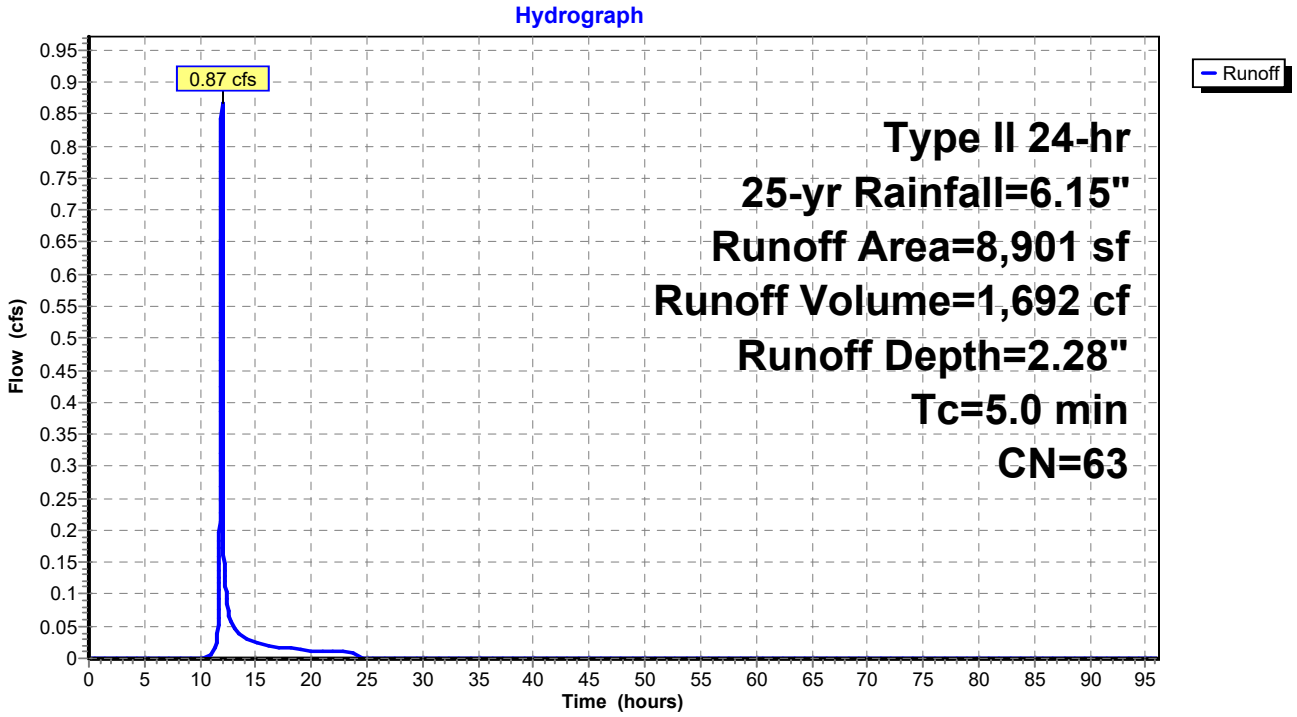
Subcatchment 19: Subcat 19



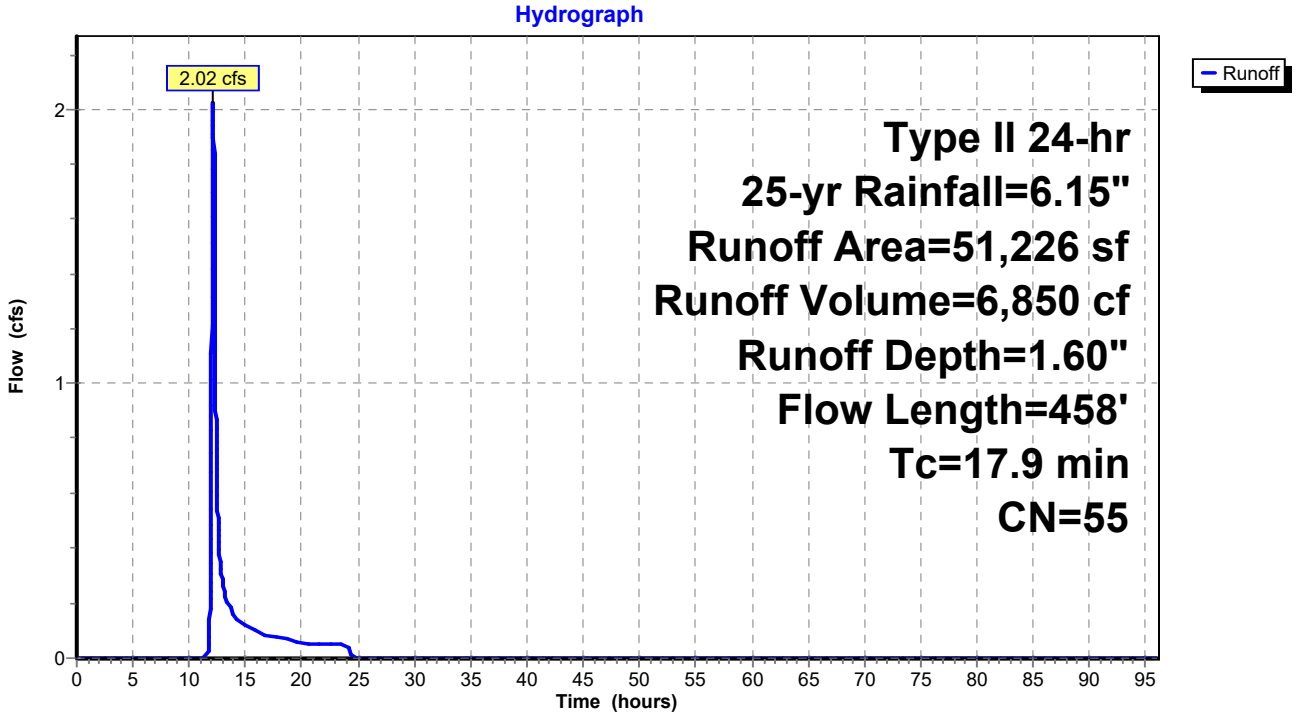
Subcatchment 20: Subcat 20



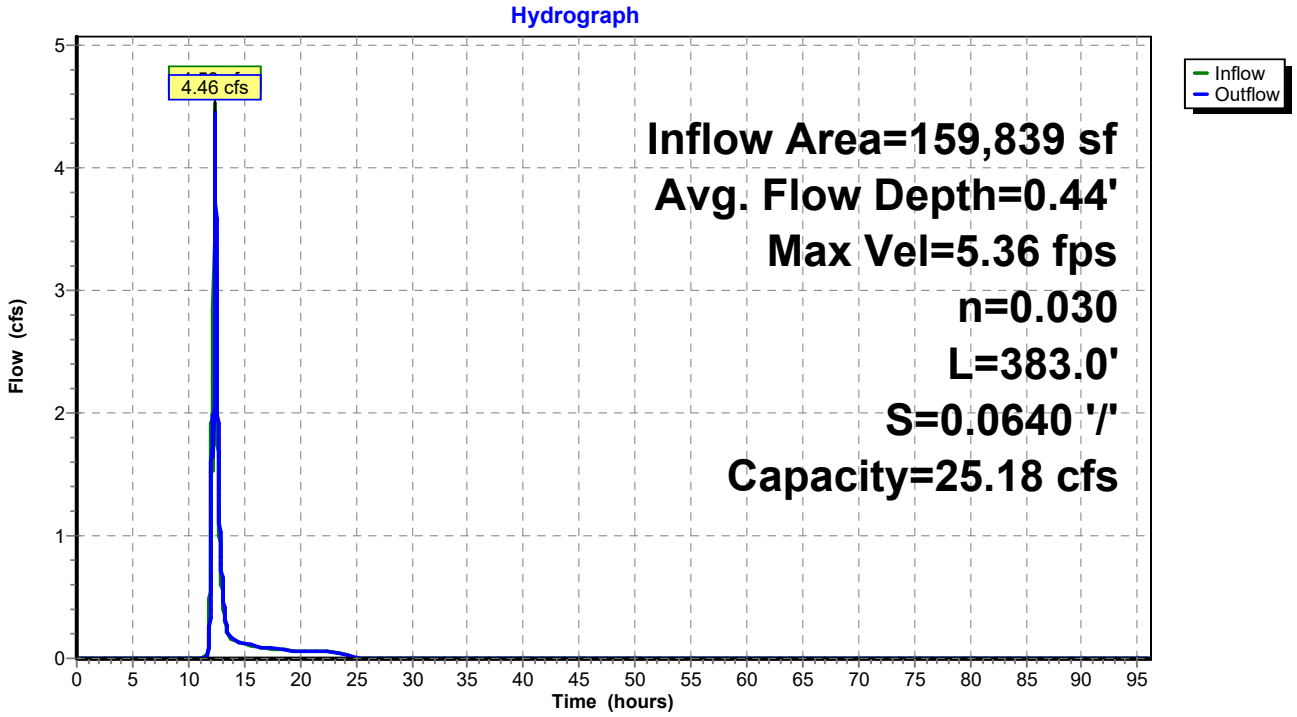
Subcatchment 21: Subcat 21



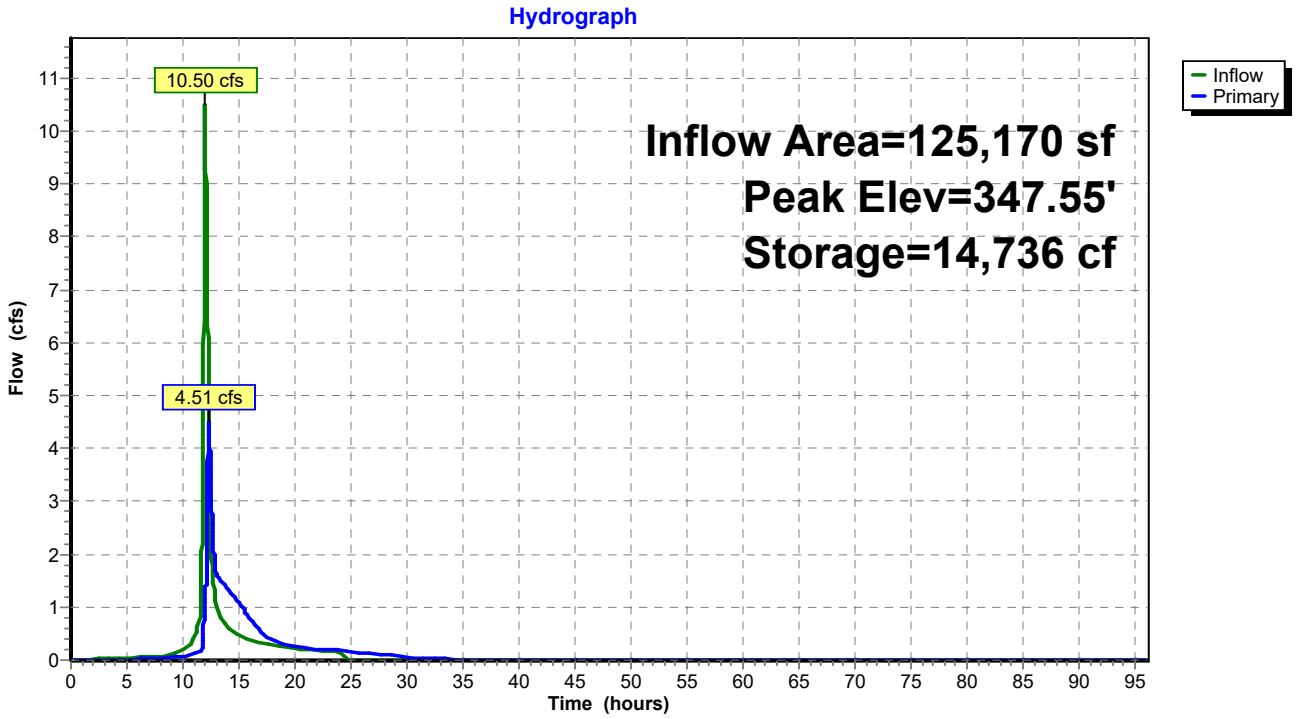
Subcatchment 22: Subcat 22



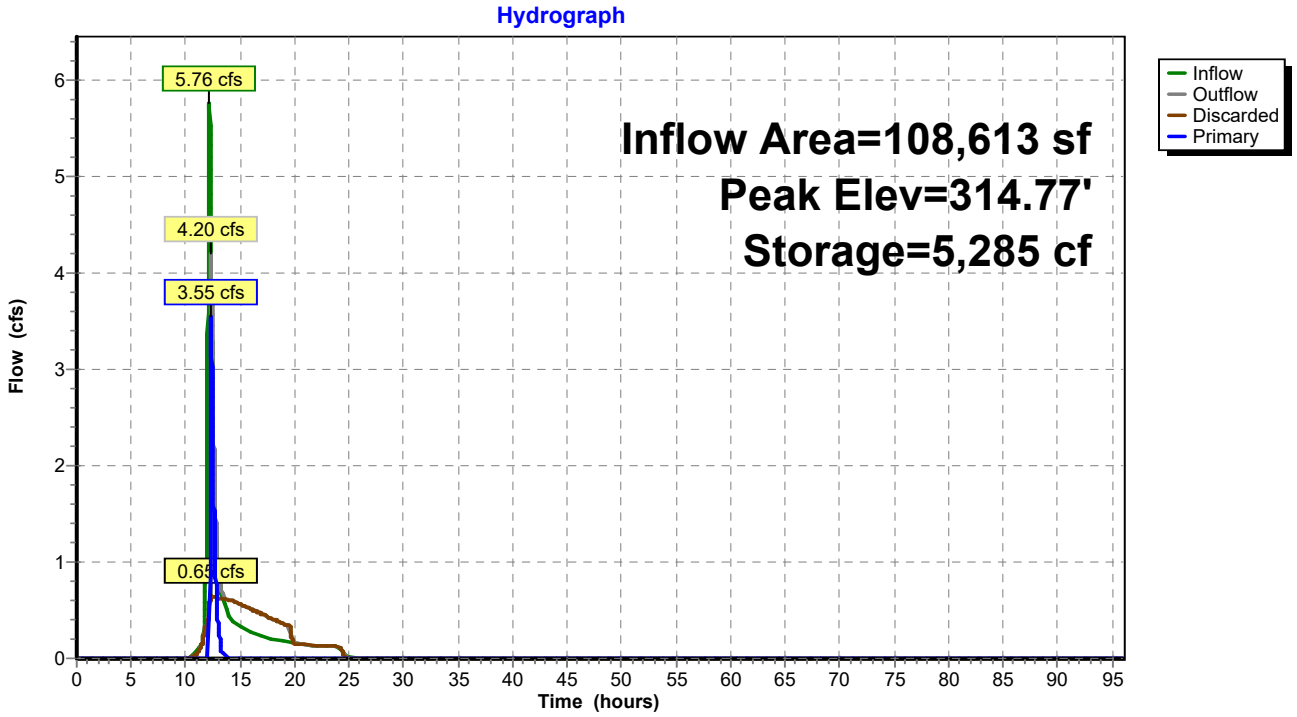
Reach 23R: swale



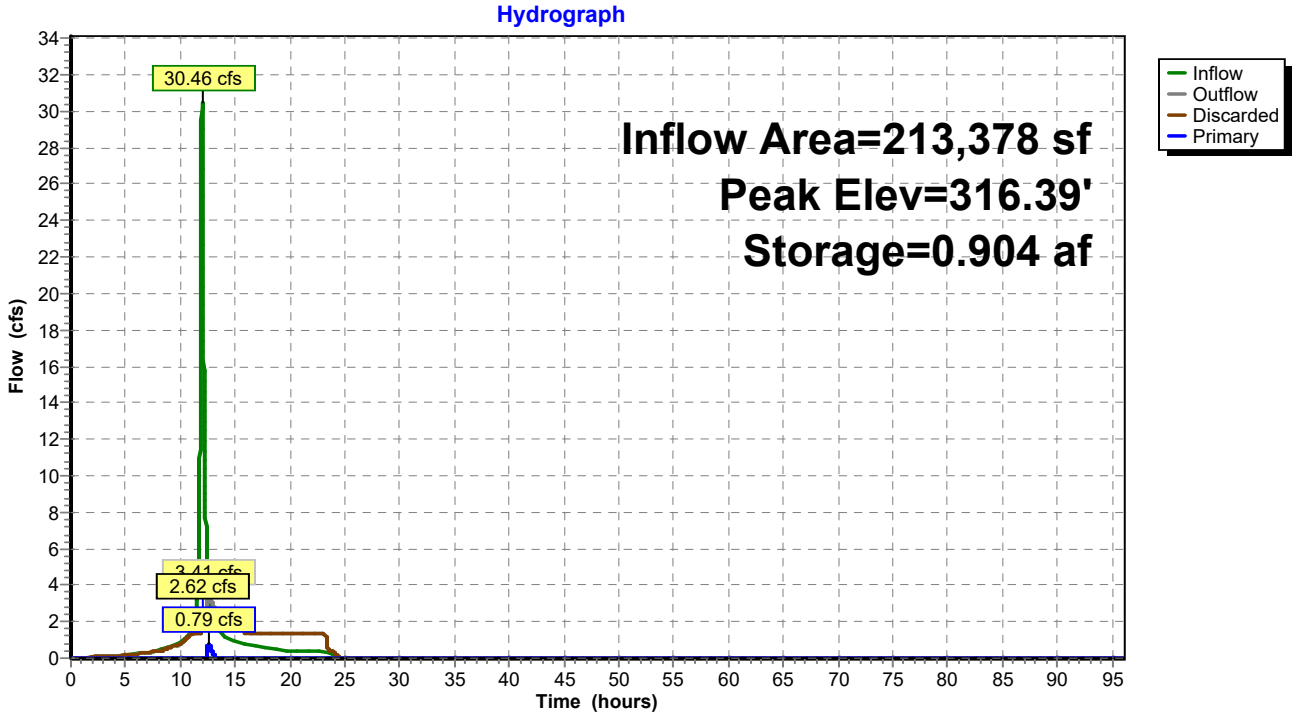
Pond 5P: DA 7 System



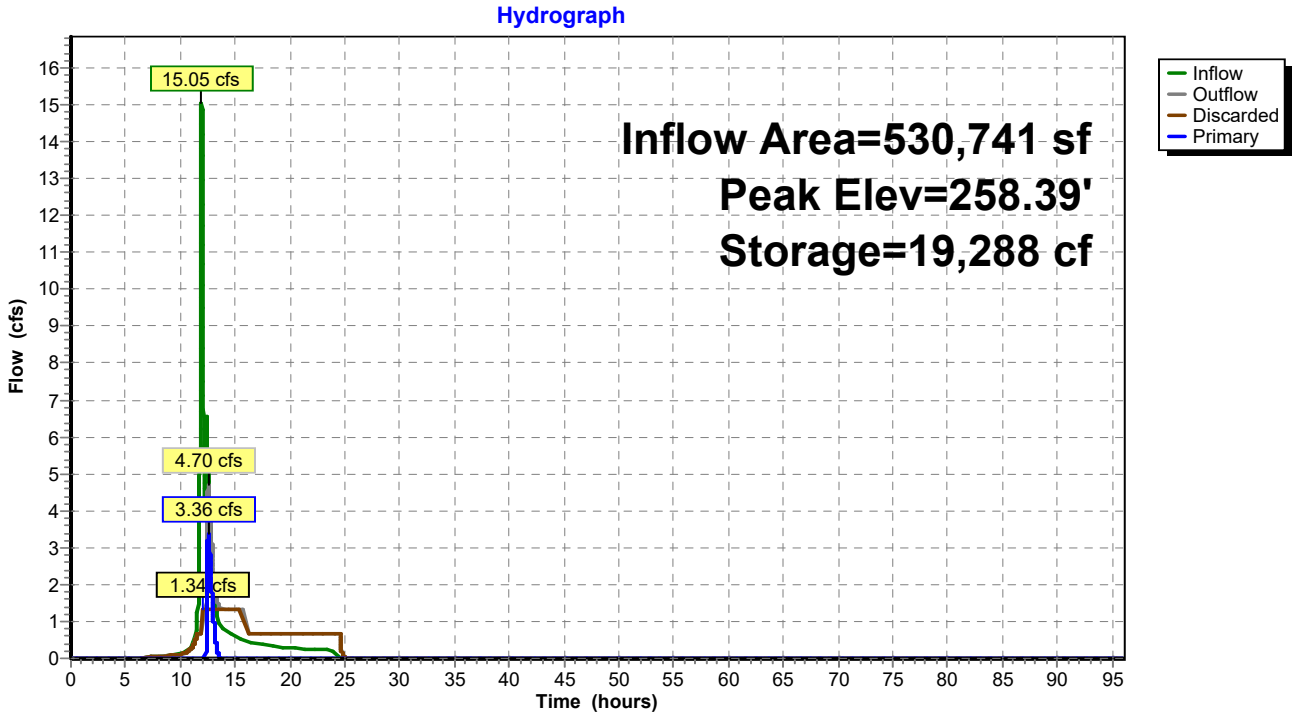
Pond 6P: Infiltration Basin



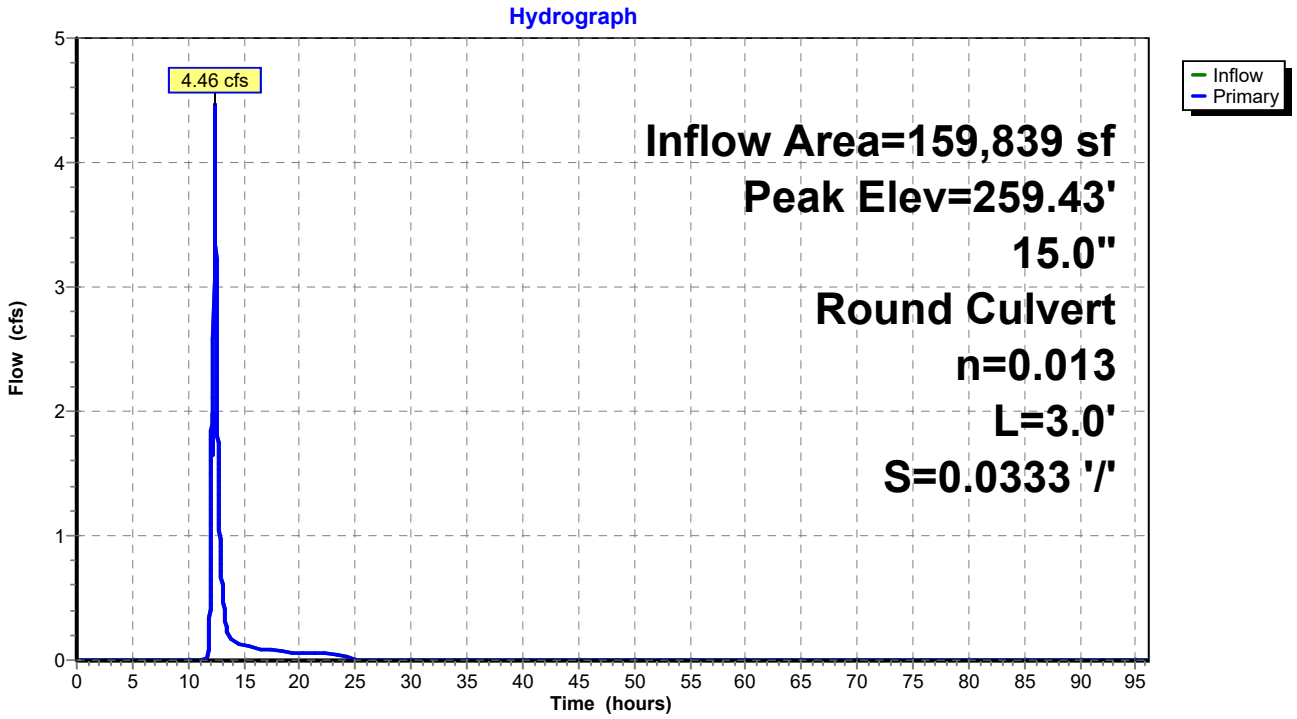
Pond 15P: DA 2 System



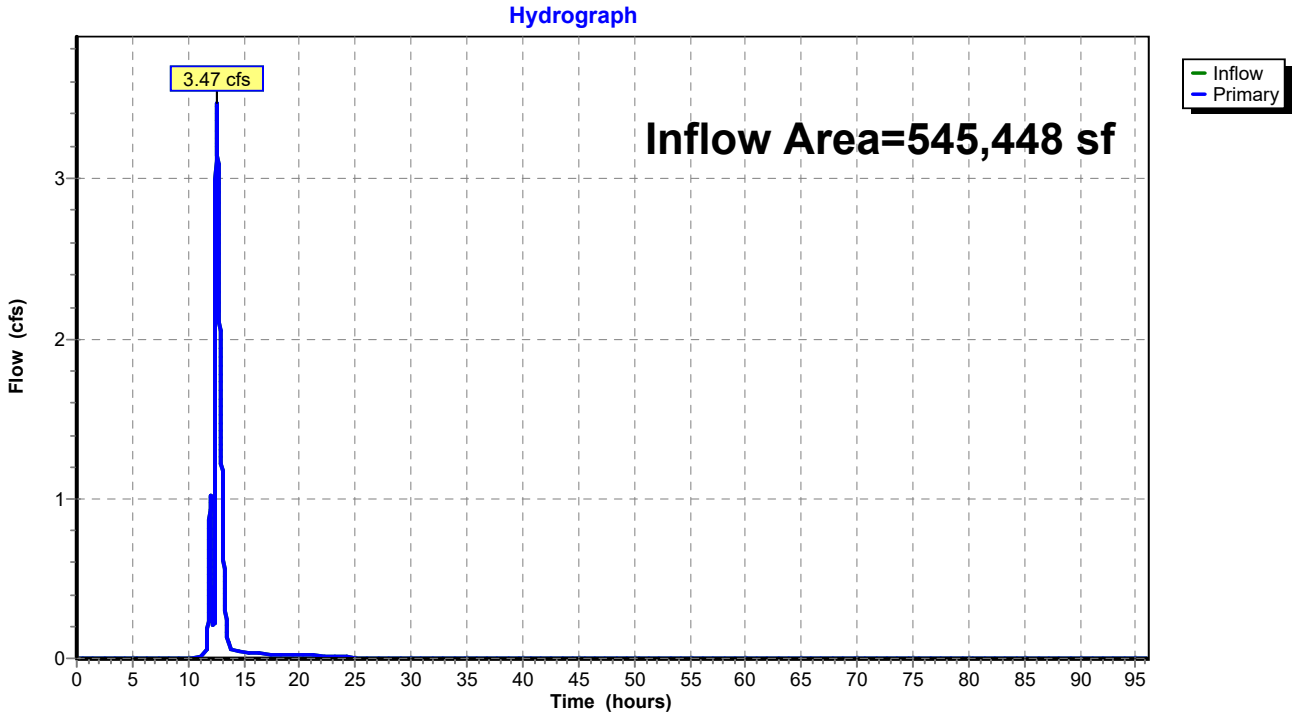
Pond 16P: DA 3 System



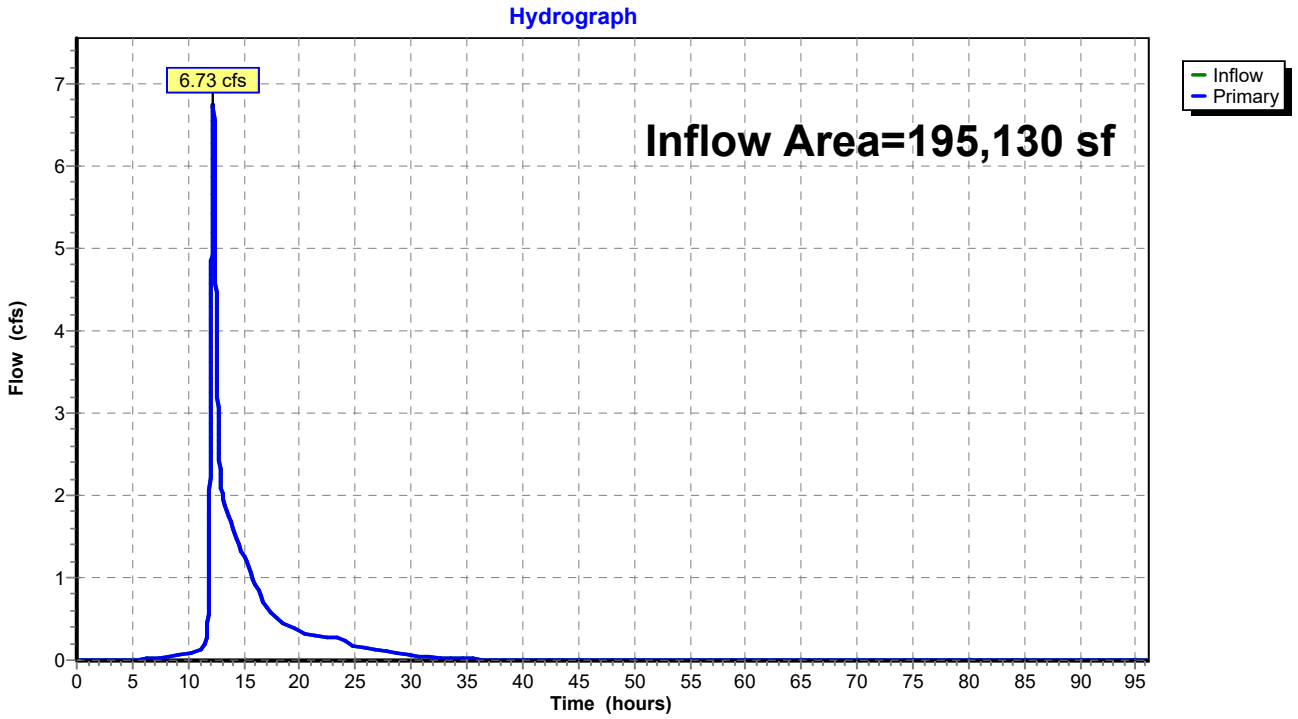
Pond 25P: Swale CB



Link 3L: Rt. 32 Culvert



Link 4L: West Off-Site



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=46,057 sf 9.58% Impervious Runoff Depth=2.84"
Tc=10.0 min UI Adjusted CN=63 Runoff=4.62 cfs 10,905 cf

Subcatchment2: Subcat 2 Runoff Area=0.097 ac 83.65% Impervious Runoff Depth=5.98"
Tc=5.0 min CN=92 Runoff=0.95 cfs 2,108 cf

Subcatchment3: Subcat 3 Runoff Area=33,237 sf 65.92% Impervious Runoff Depth=5.18"
Flow Length=367' Tc=1.4 min CN=85 Runoff=7.72 cfs 14,337 cf

Subcatchment4: Subcat 4 Runoff Area=1.396 ac 2.04% Impervious Runoff Depth=2.74"
Flow Length=830' Tc=7.4 min CN=62 Runoff=6.49 cfs 13,894 cf

Subcatchment5: Subcat 5 Runoff Area=69,961 sf 0.73% Impervious Runoff Depth=2.45"
Flow Length=269' Tc=19.3 min CN=59 Runoff=4.31 cfs 14,288 cf

Subcatchment6: Subcat 6 Runoff Area=13,786 sf 100.00% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=98 Runoff=3.23 cfs 7,675 cf

Subcatchment7: Subcat 7 Runoff Area=2.105 ac 27.11% Impervious Runoff Depth=3.55"
Flow Length=262' Tc=18.9 min CN=70 Runoff=8.59 cfs 27,137 cf

Subcatchment8: Subcat 8 Runoff Area=5,496 sf 100.00% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=98 Runoff=1.29 cfs 3,060 cf

Subcatchment9: Subcat 9 Runoff Area=6,071 sf 49.70% Impervious Runoff Depth=5.18"
Tc=5.0 min CN=85 Runoff=1.26 cfs 2,619 cf

Subcatchment10: Subcat 10 Runoff Area=52,574 sf 82.92% Impervious Runoff Depth=5.98"
Flow Length=181' Tc=5.6 min CN=92 Runoff=11.62 cfs 26,181 cf

Subcatchment11: Subcat 11 Runoff Area=105,659 sf 63.11% Impervious Runoff Depth=5.40"
Flow Length=237' Tc=17.3 min CN=87 Runoff=15.23 cfs 47,565 cf

Subcatchment12: Subcat 12 Runoff Area=13,787 sf 100.00% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=98 Runoff=3.23 cfs 7,676 cf

Subcatchment13: Subcat 13 Runoff Area=108,613 sf 0.01% Impervious Runoff Depth=2.94"
Flow Length=653' Tc=23.8 min CN=64 Runoff=7.24 cfs 26,616 cf

Subcatchment14: Subcat 14 Runoff Area=13,783 sf 99.97% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=98 Runoff=3.22 cfs 7,673 cf

Subcatchment15: Subcat 15 Runoff Area=13,783 sf 99.98% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=98 Runoff=3.22 cfs 7,674 cf

Subcatchment16: Subcat 16 Runoff Area=13,792 sf 99.99% Impervious Runoff Depth=6.68"
Tc=5.0 min CN=98 Runoff=3.23 cfs 7,679 cf

Subcatchment17: Subcat 17 Runoff Area=6,828 sf 8.53% Impervious Runoff Depth=2.94"
Tc=5.0 min CN=64 Runoff=0.86 cfs 1,673 cf

Subcatchment18: Subcat 18 Runoff Area=6,372 sf 7.75% Impervious Runoff Depth=2.94"
Tc=5.0 min CN=64 Runoff=0.80 cfs 1,561 cf

Subcatchment19: Subcat 19 Runoff Area=5,807 sf 0.00% Impervious Runoff Depth=2.07"
Flow Length=335' Tc=13.6 min CN=55 Runoff=0.36 cfs 1,003 cf

Subcatchment20: Subcat 20 Runoff Area=8,137 sf 50.55% Impervious Runoff Depth=5.40"
Tc=5.0 min CN=87 Runoff=1.73 cfs 3,663 cf

Subcatchment21: Subcat 21 Runoff Area=8,901 sf 3.88% Impervious Runoff Depth=2.84"
Tc=5.0 min CN=63 Runoff=1.08 cfs 2,107 cf

Subcatchment22: Subcat 22 Runoff Area=51,226 sf 0.04% Impervious Runoff Depth=2.07"
Flow Length=458' Tc=17.9 min CN=55 Runoff=2.71 cfs 8,850 cf

Reach 23R: swale Avg. Flow Depth=0.56' Max Vel=6.10 fps Inflow=7.36 cfs 16,486 cf
n=0.030 L=383.0' S=0.0640 '/' Capacity=25.18 cfs Outflow=7.27 cfs 16,486 cf

Pond 5P: DA 7 System Peak Elev=347.74' Storage=15,728 cf Inflow=12.38 cfs 44,154 cf
Outflow=7.24 cfs 44,147 cf

Pond 6P: Infiltration Basin Peak Elev=314.86' Storage=5,530 cf Inflow=7.24 cfs 26,616 cf
Discarded=0.66 cfs 18,981 cf Primary=5.66 cfs 7,635 cf Outflow=6.32 cfs 26,616 cf

Pond 15P: DA 2 System Peak Elev=317.07' Storage=0.975 af Inflow=34.68 cfs 104,447 cf
Discarded=2.62 cfs 95,854 cf Primary=4.72 cfs 8,594 cf Outflow=7.34 cfs 104,447 cf

Pond 16P: DA 3 System Peak Elev=259.36' Storage=21,602 cf Inflow=18.56 cfs 69,557 cf
Discarded=1.34 cfs 47,058 cf Primary=11.44 cfs 22,499 cf Outflow=12.79 cfs 69,557 cf

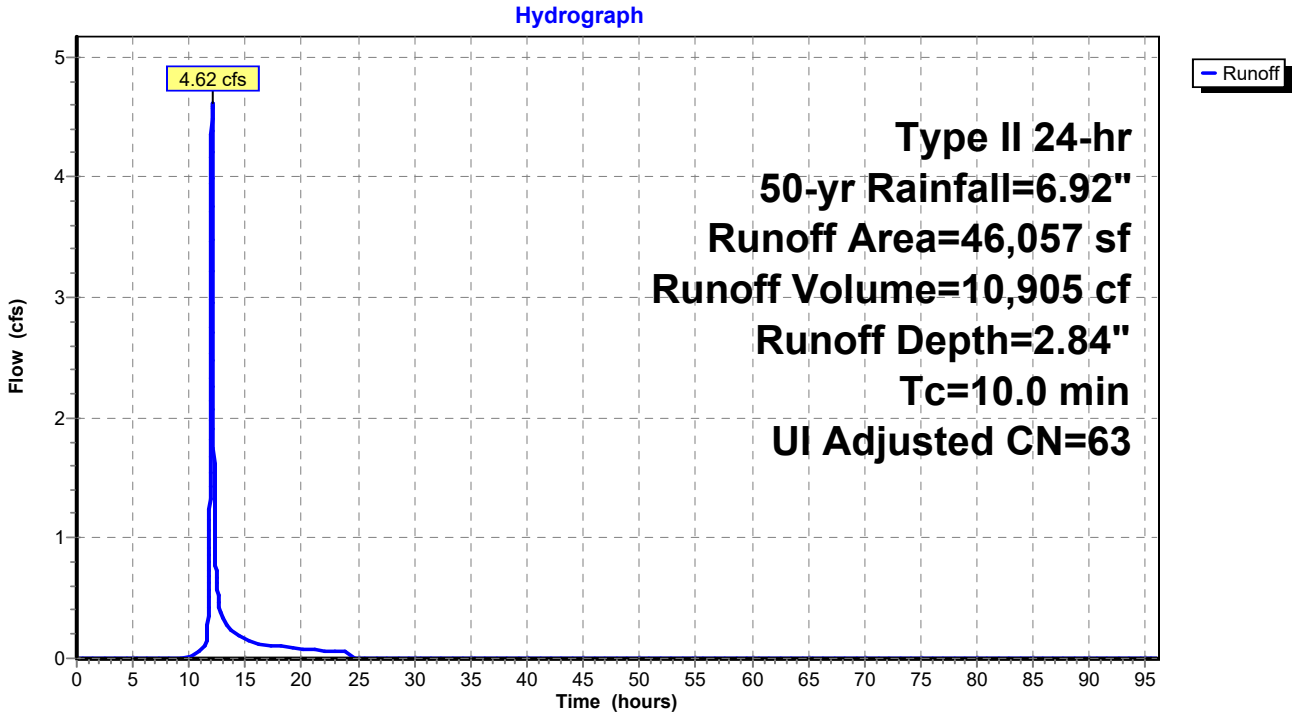
Pond 25P: Swale CB Peak Elev=260.24' Inflow=7.27 cfs 16,486 cf
15.0" Round Culvert n=0.013 L=3.0' S=0.0333 '/' Outflow=7.27 cfs 16,486 cf

Link 3L: Rt. 32 Culvert Inflow=11.65 cfs 25,610 cf
Primary=11.65 cfs 25,610 cf

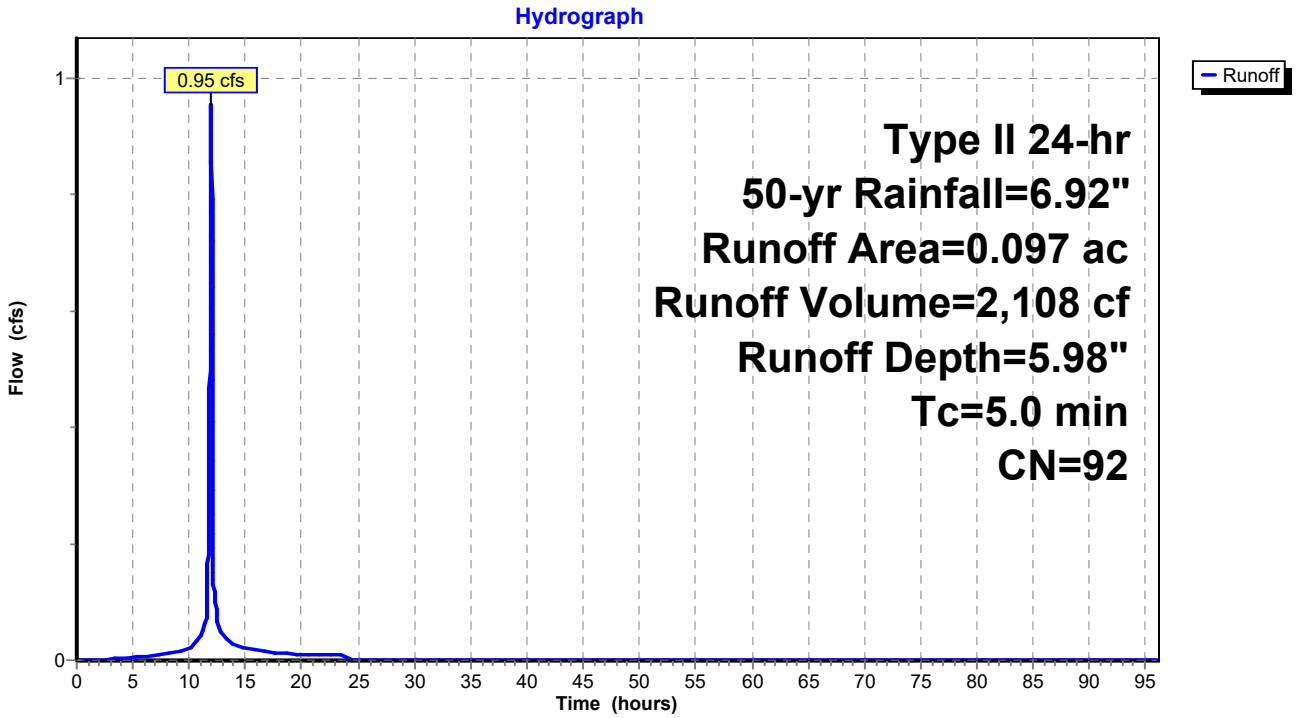
Link 4L: West Off-Site Inflow=10.92 cfs 58,435 cf
Primary=10.92 cfs 58,435 cf

Total Runoff Area = 740,579 sf Runoff Volume = 245,944 cf Average Runoff Depth = 3.99"
66.28% Pervious = 490,839 sf 33.72% Impervious = 249,740 sf

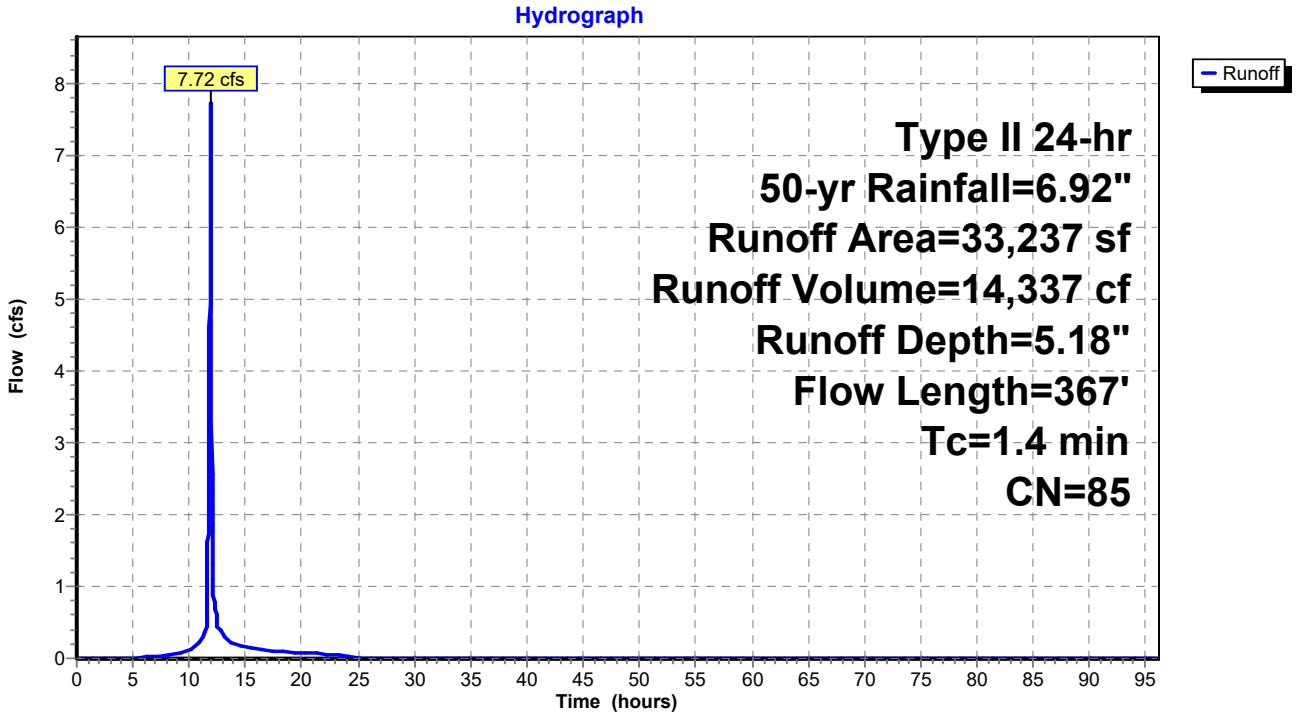
Subcatchment 1: Subcat 1



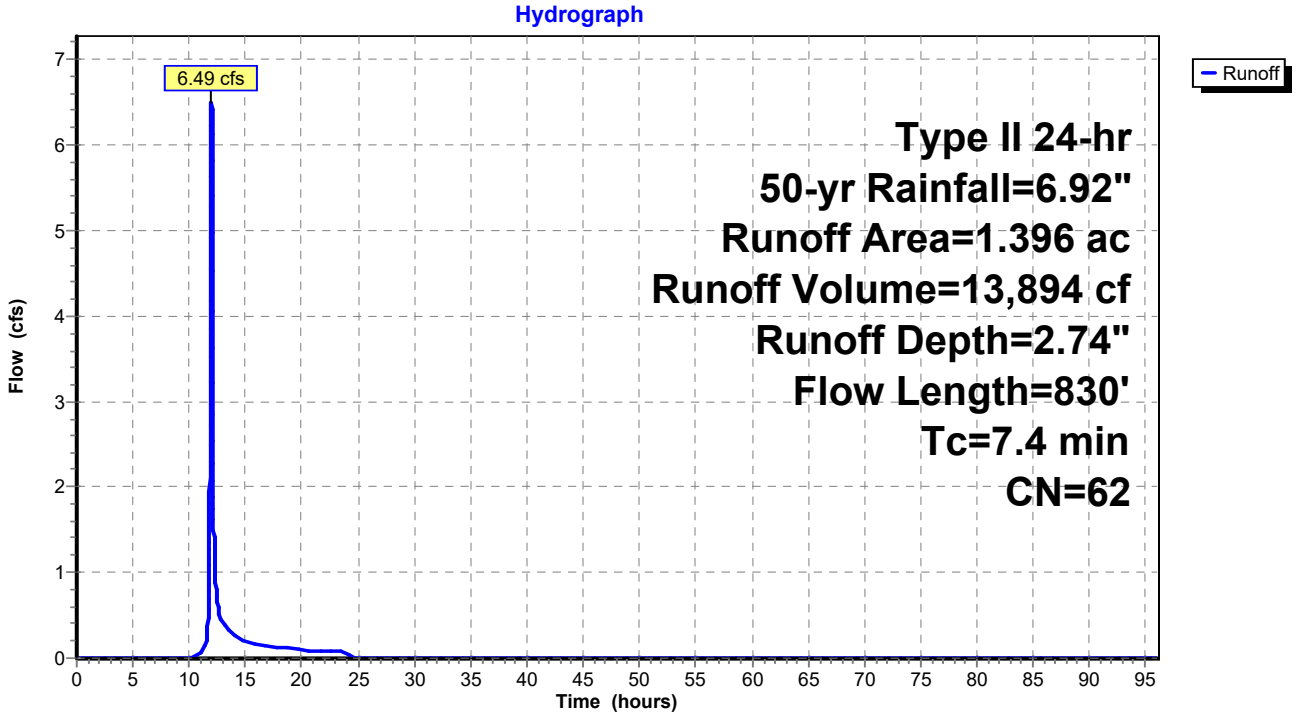
Subcatchment 2: Subcat 2



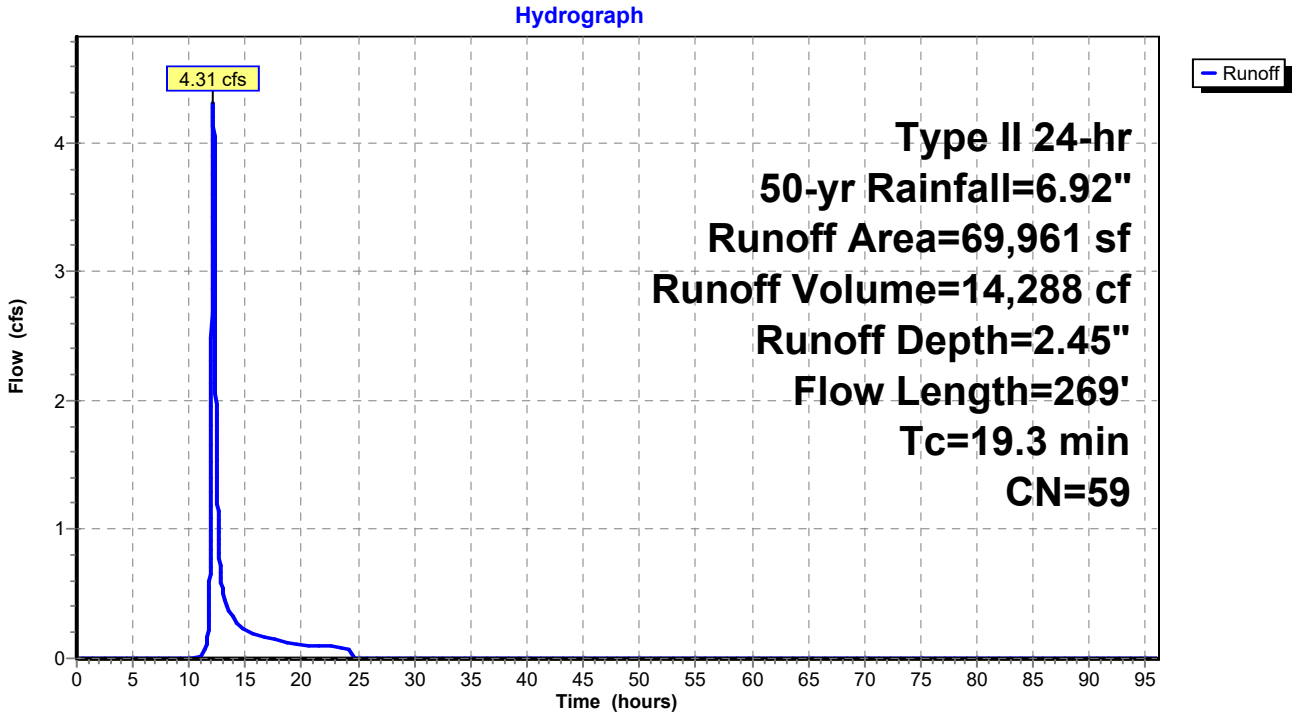
Subcatchment 3: Subcat 3



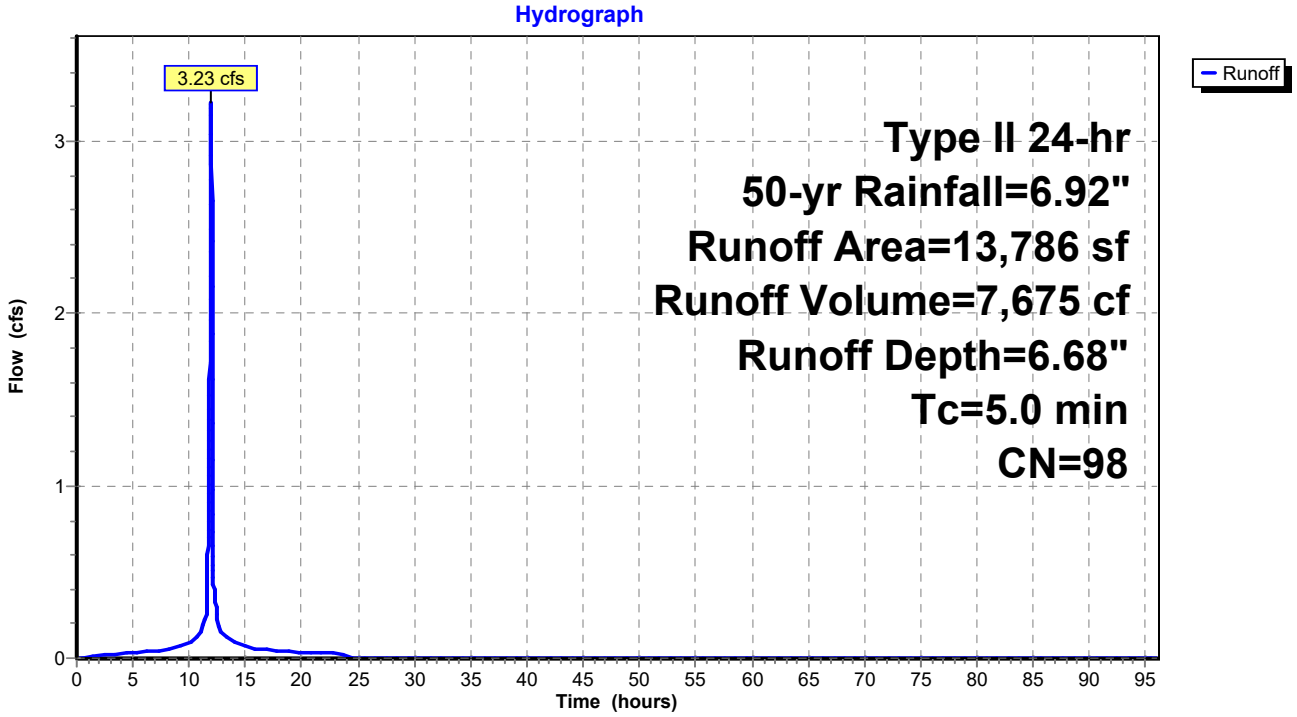
Subcatchment 4: Subcat 4



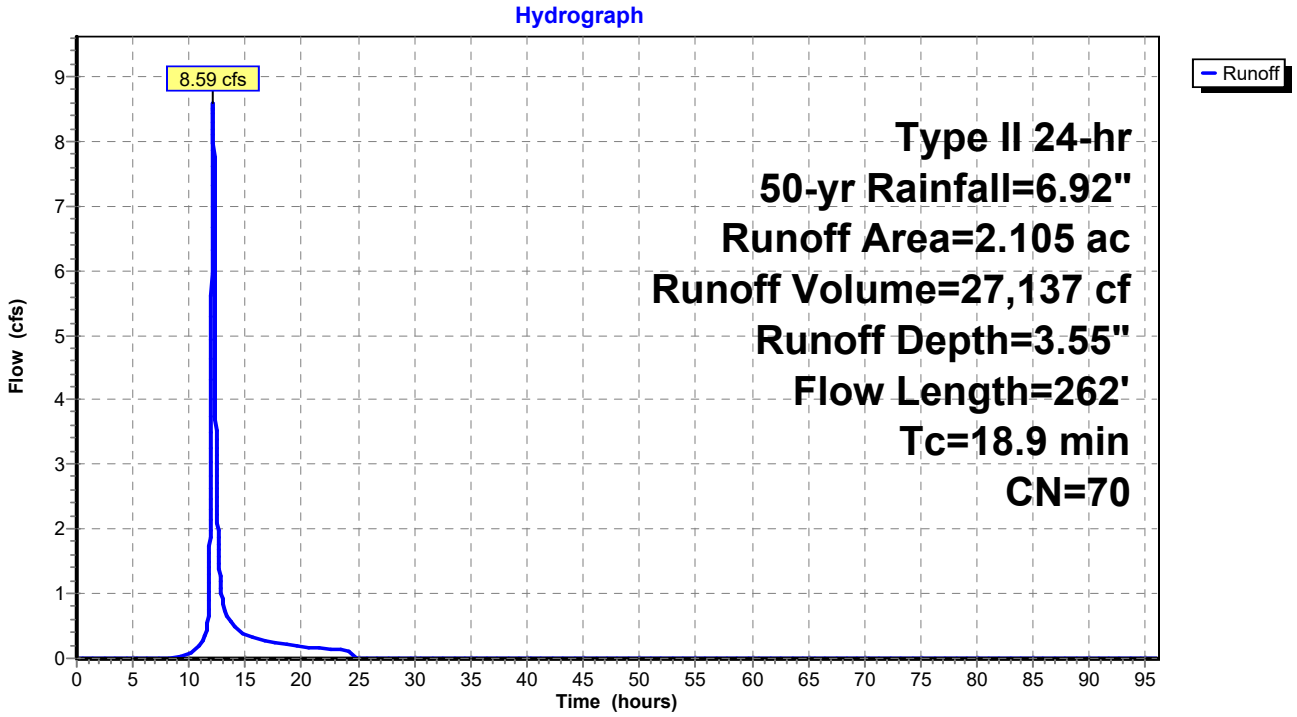
Subcatchment 5: Subcat 5



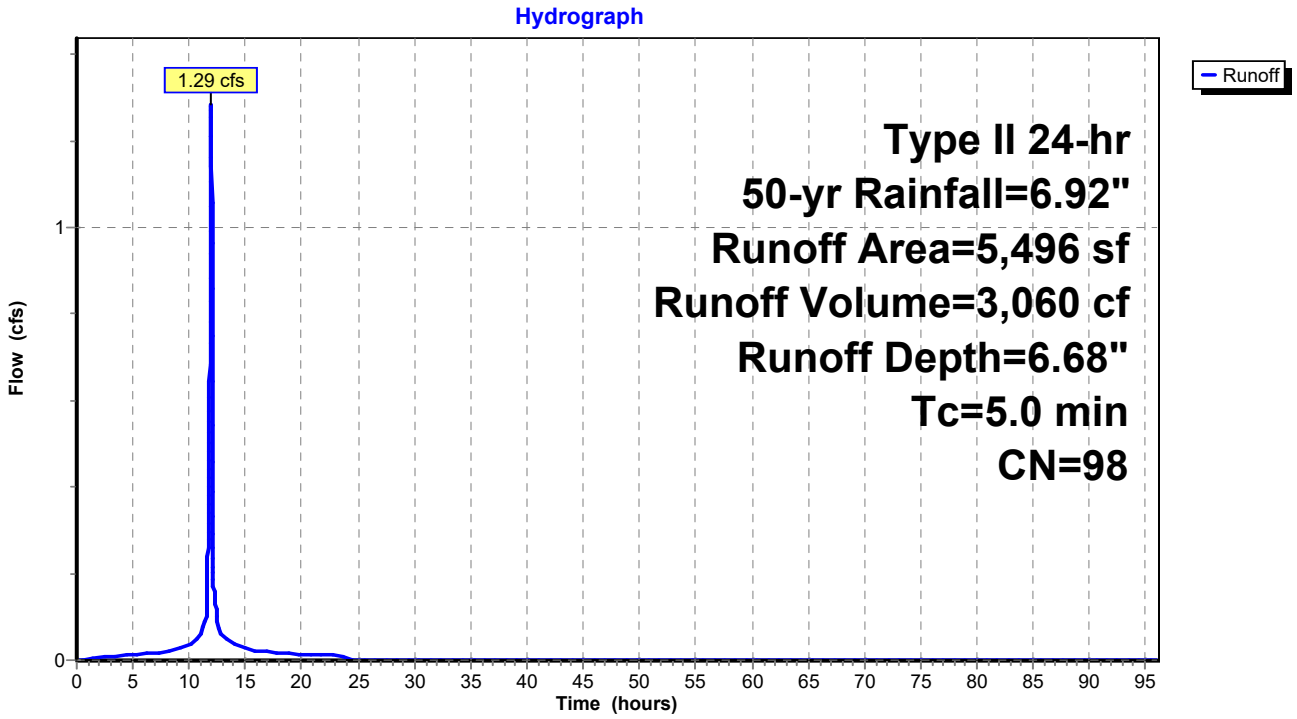
Subcatchment 6: Subcat 6



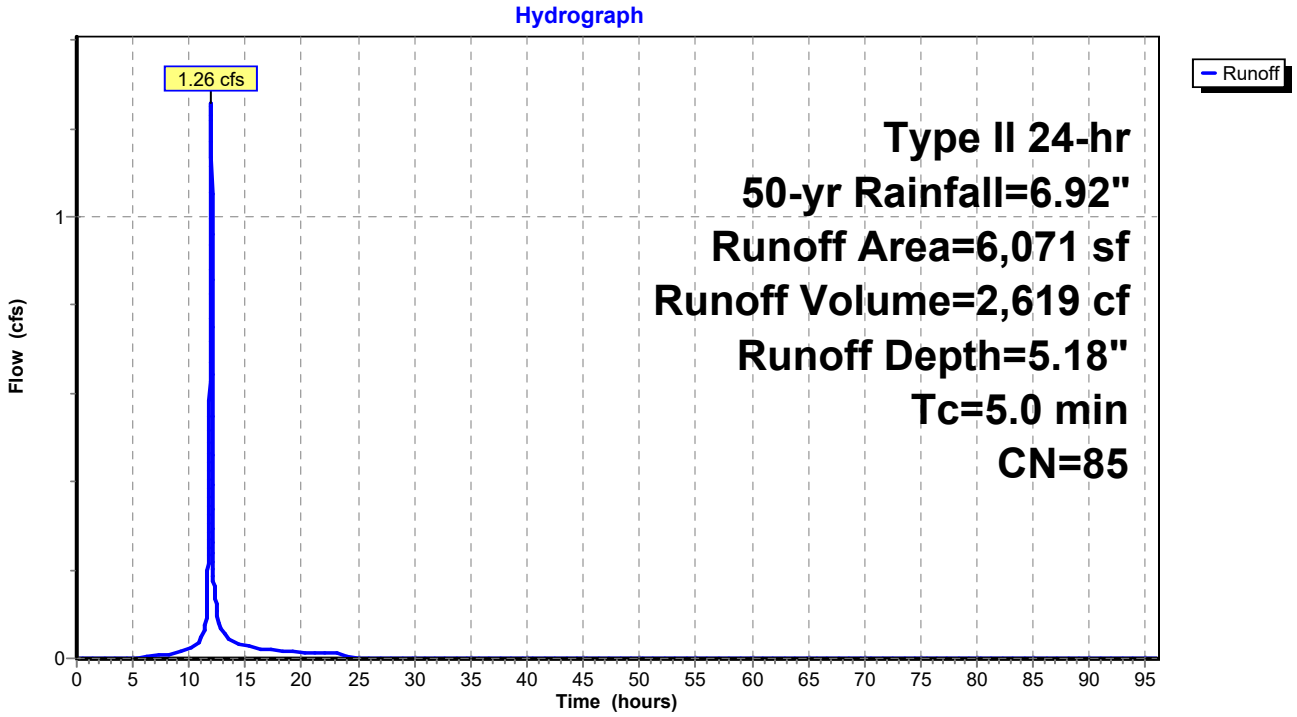
Subcatchment 7: Subcat 7



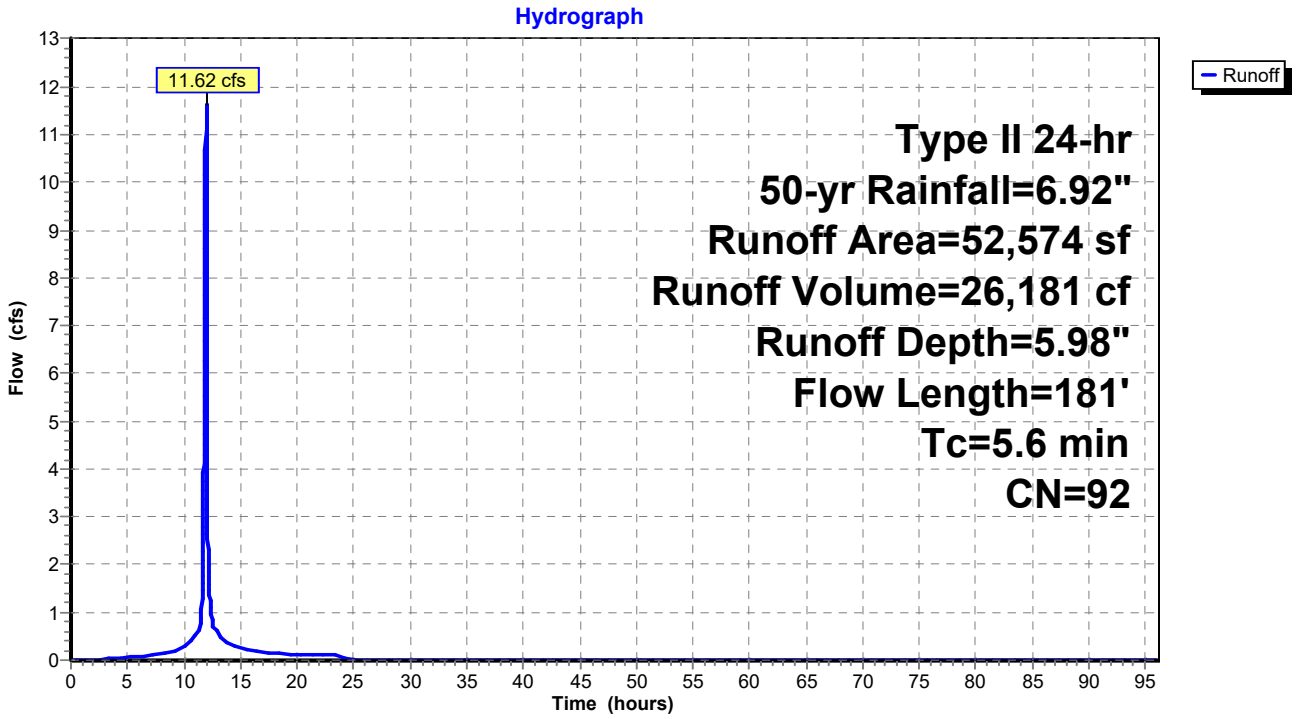
Subcatchment 8: Subcat 8



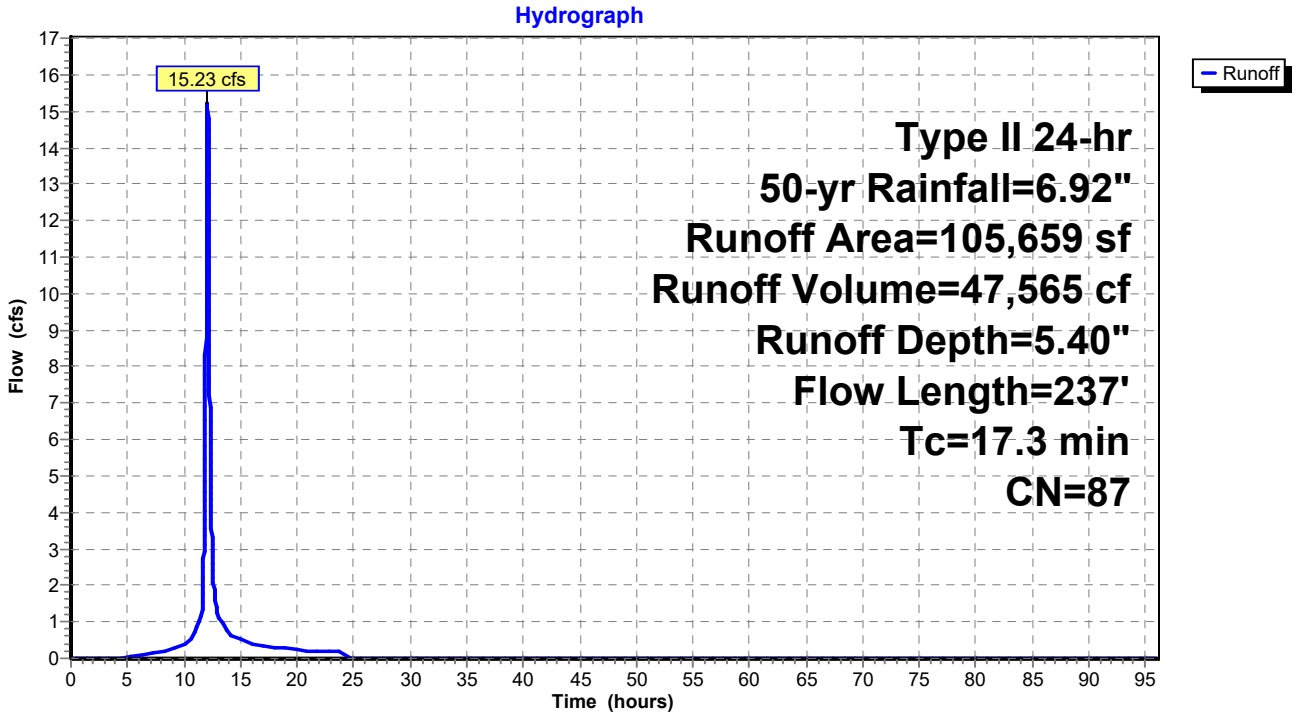
Subcatchment 9: Subcat 9



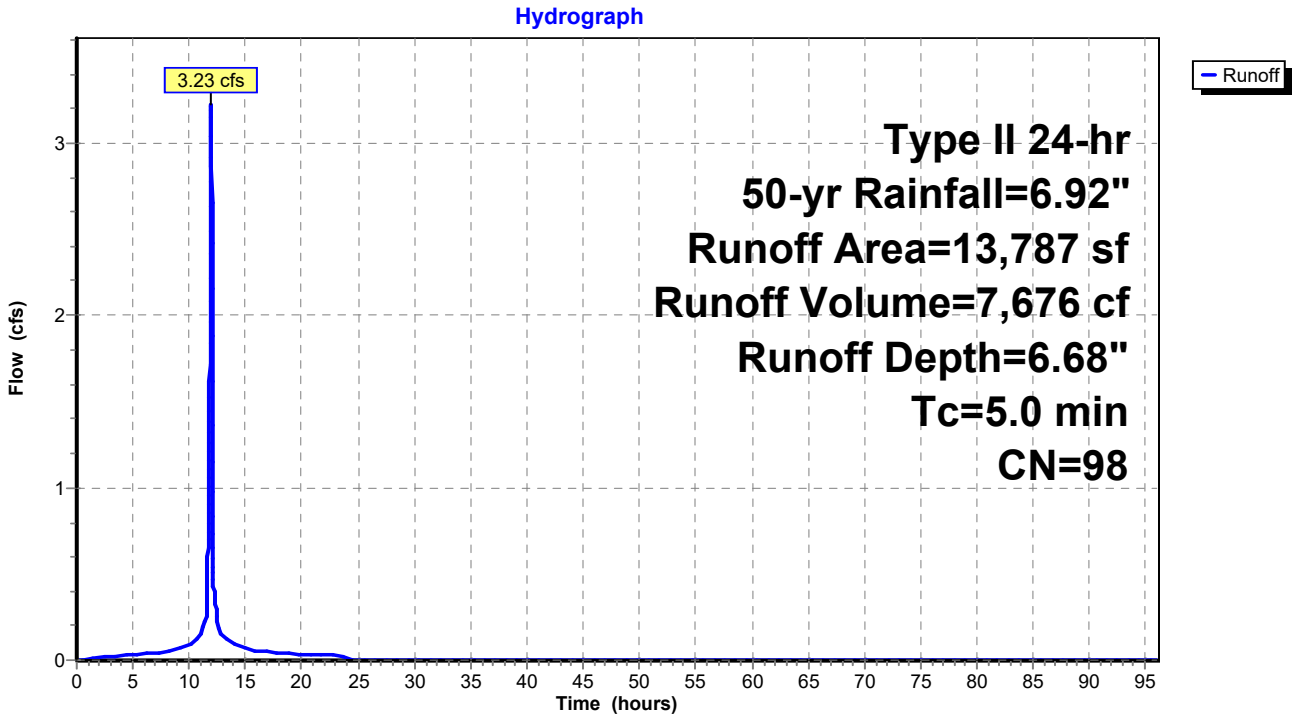
Subcatchment 10: Subcat 10



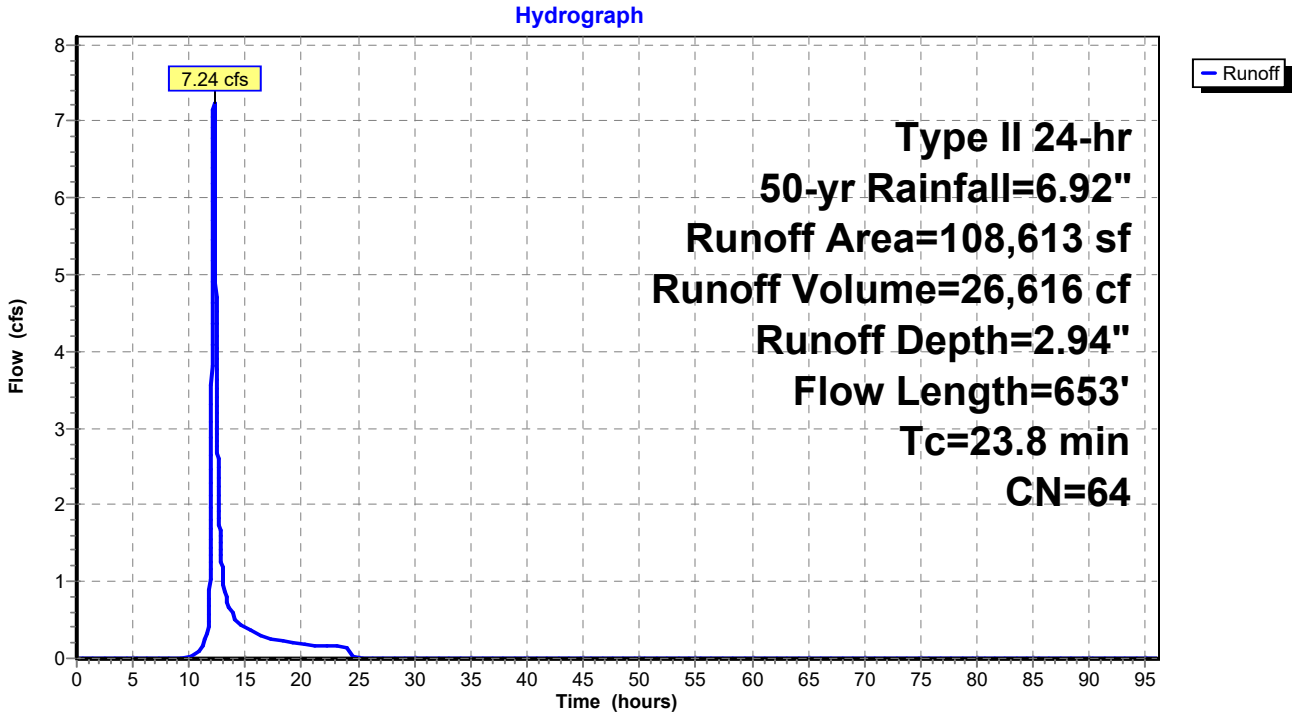
Subcatchment 11: Subcat 11



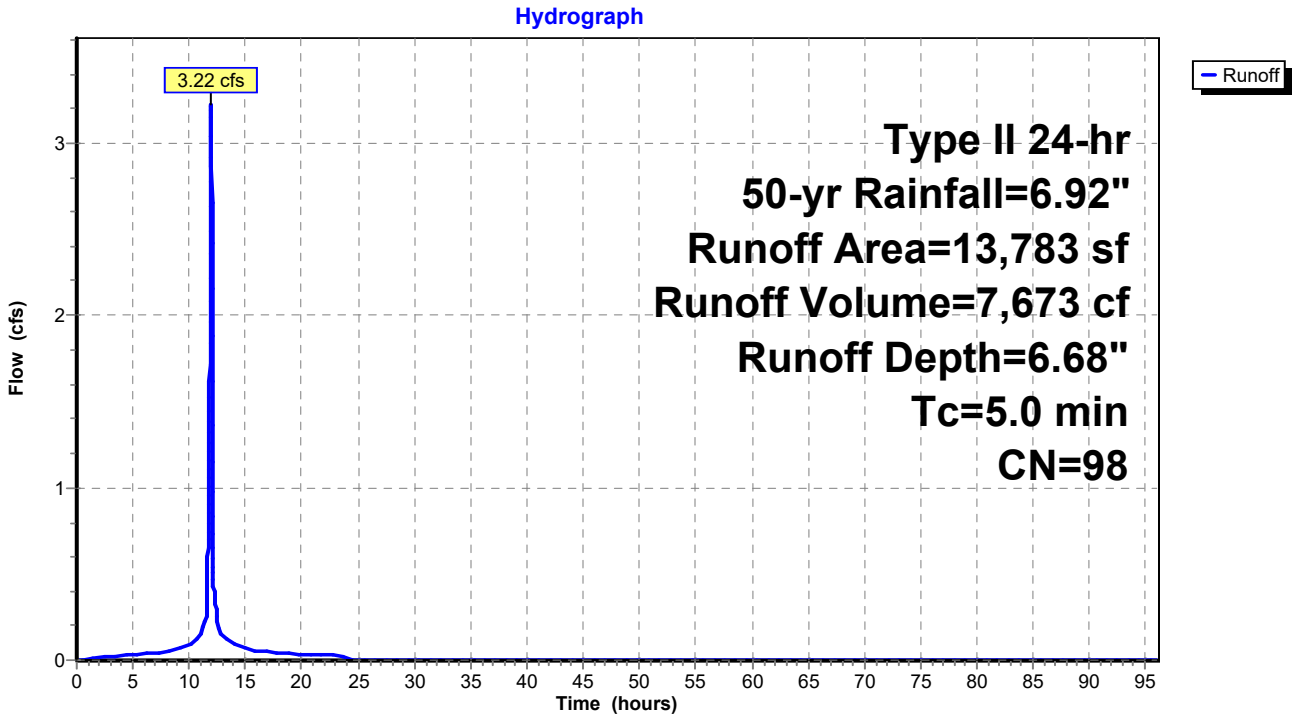
Subcatchment 12: Subcat 12



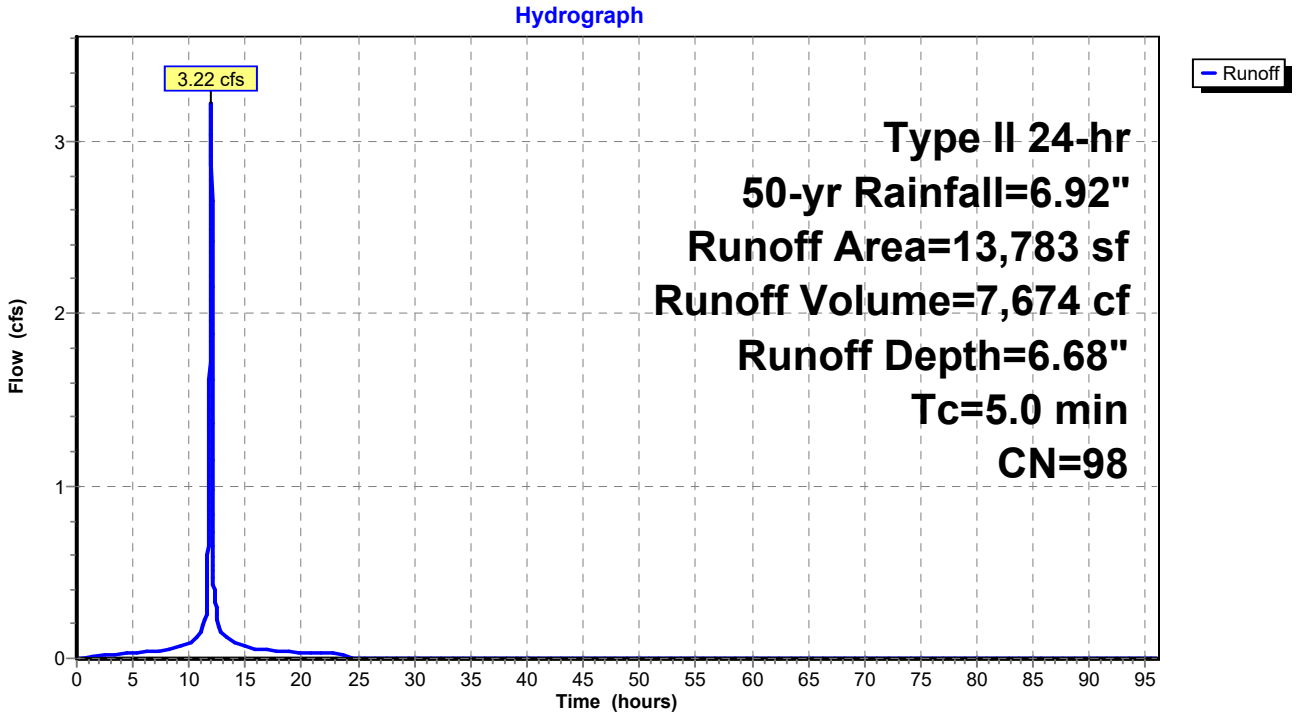
Subcatchment 13: Subcat 13



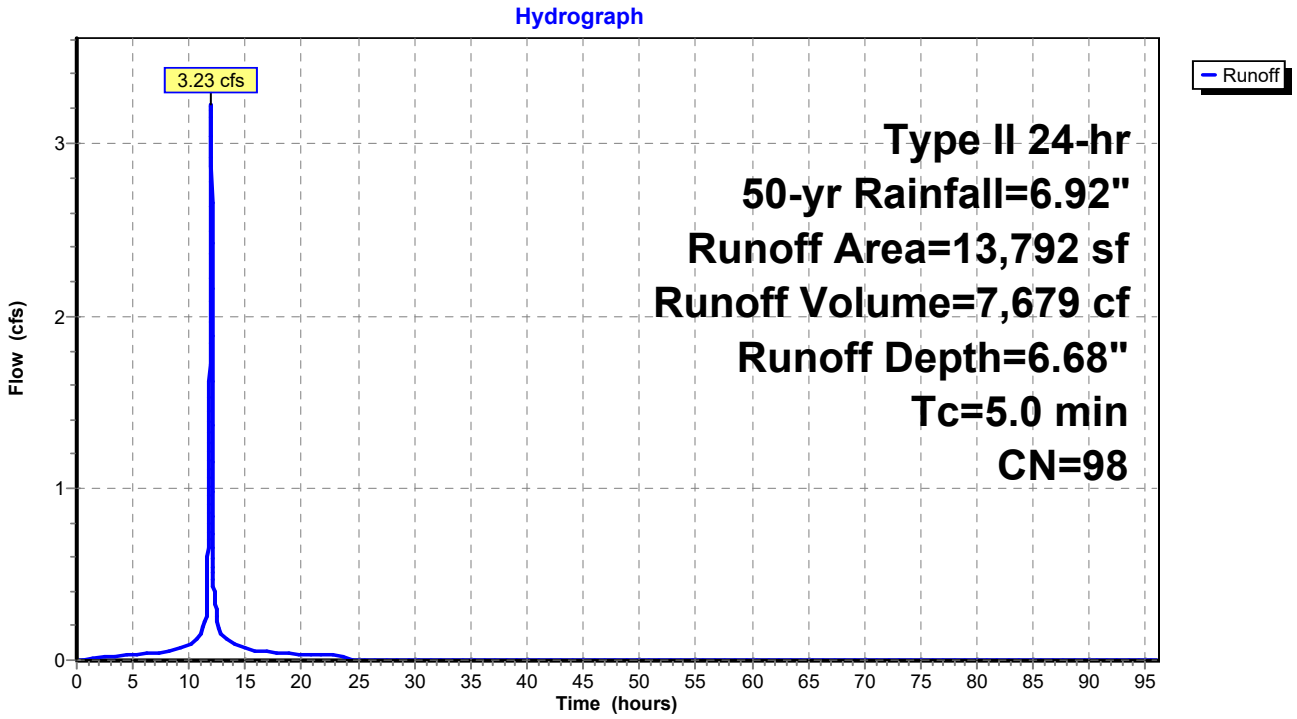
Subcatchment 14: Subcat 14



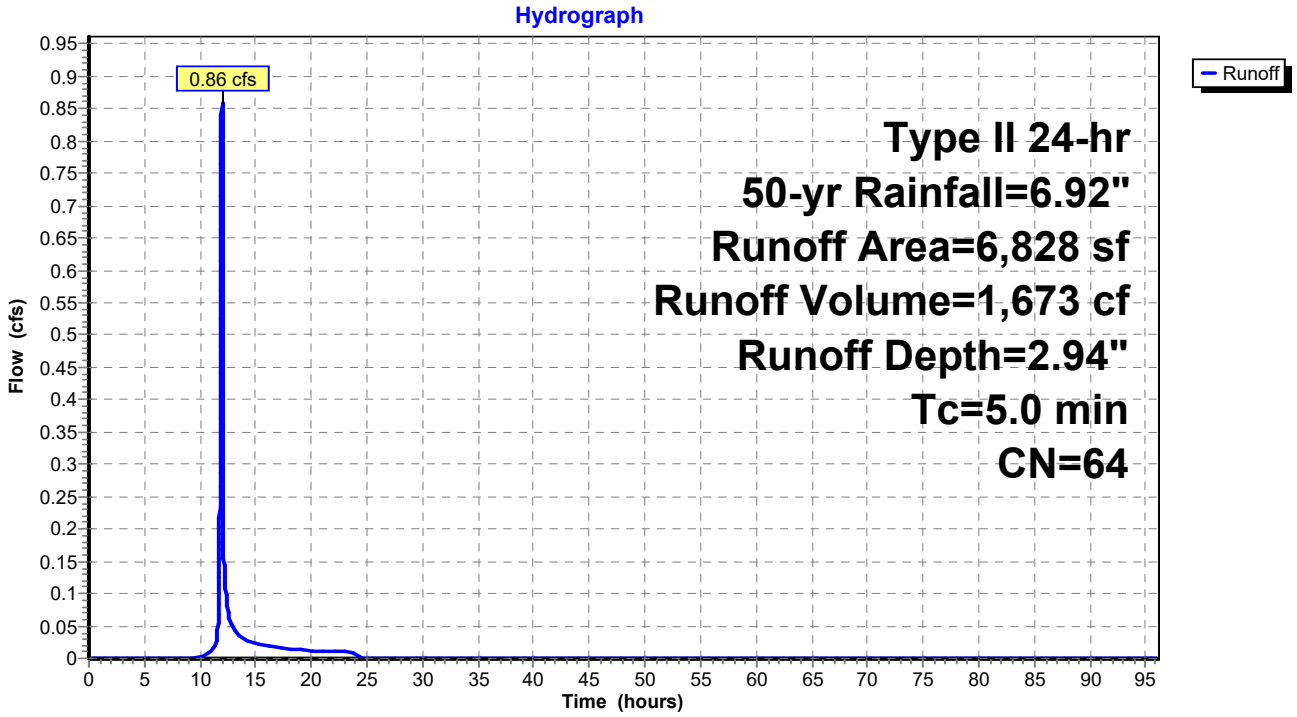
Subcatchment 15: Subcat 15



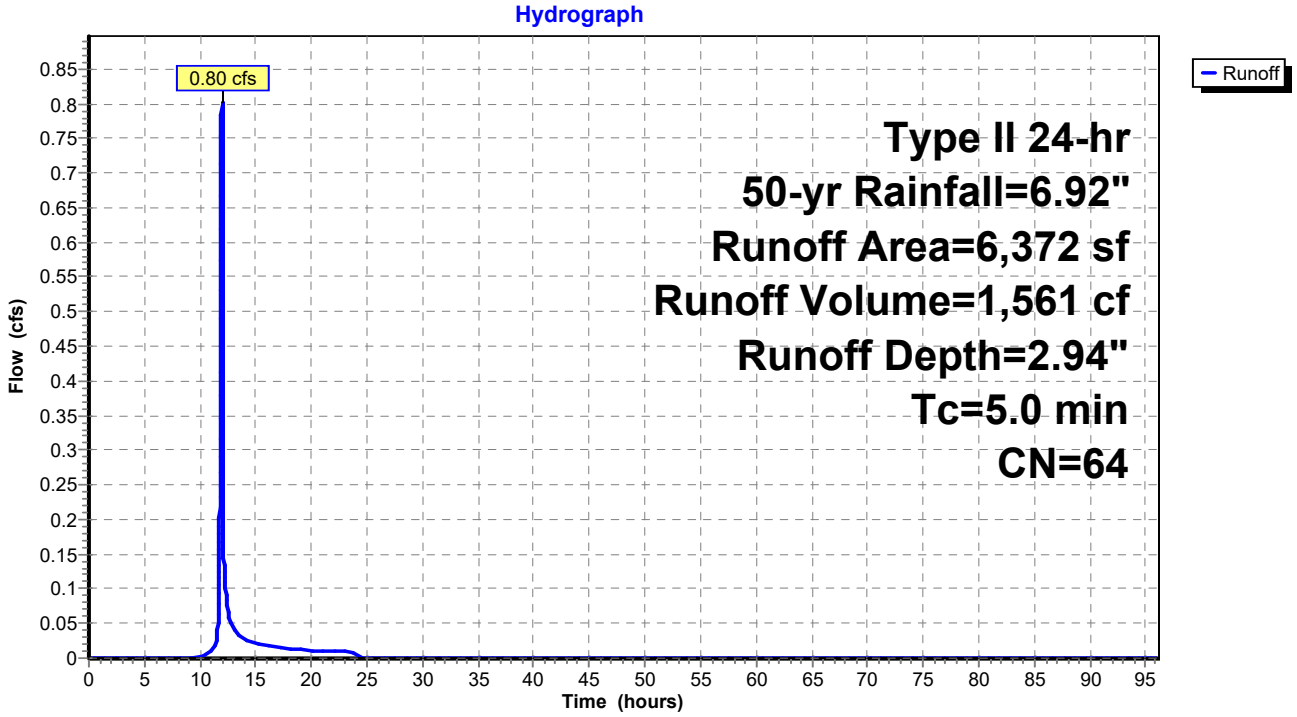
Subcatchment 16: Subcat 16



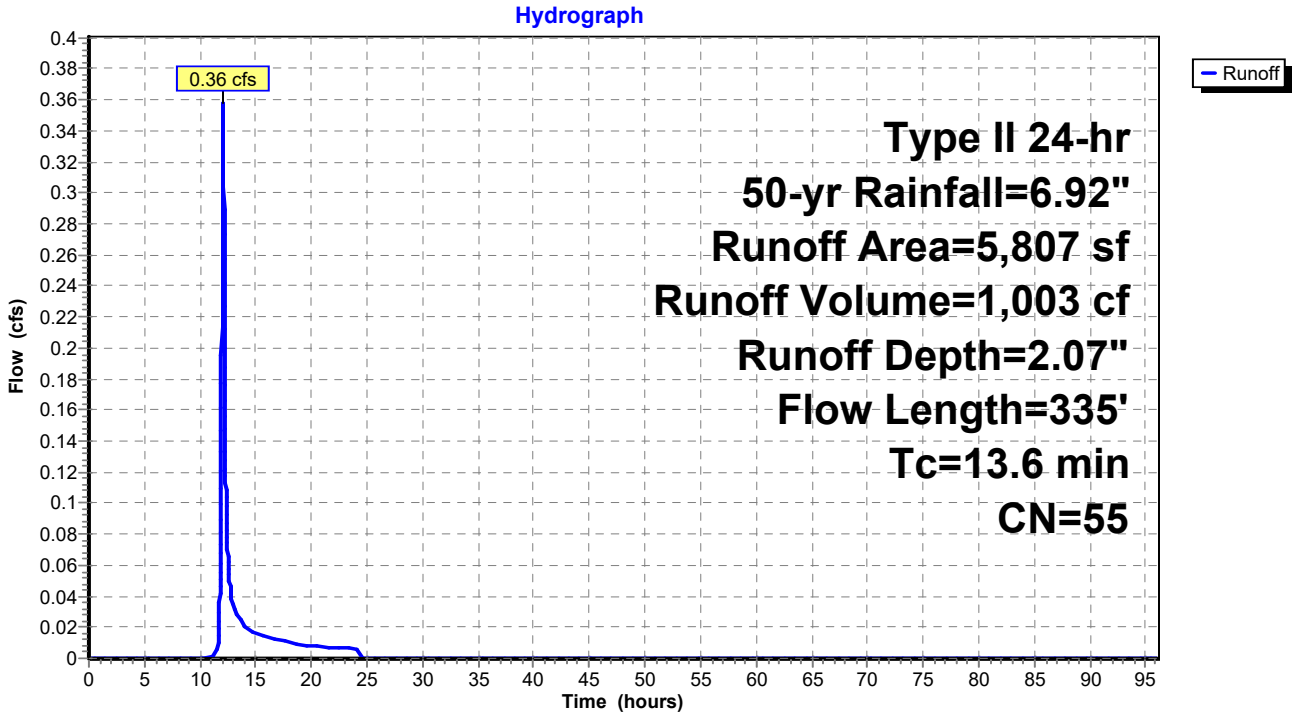
Subcatchment 17: Subcat 17



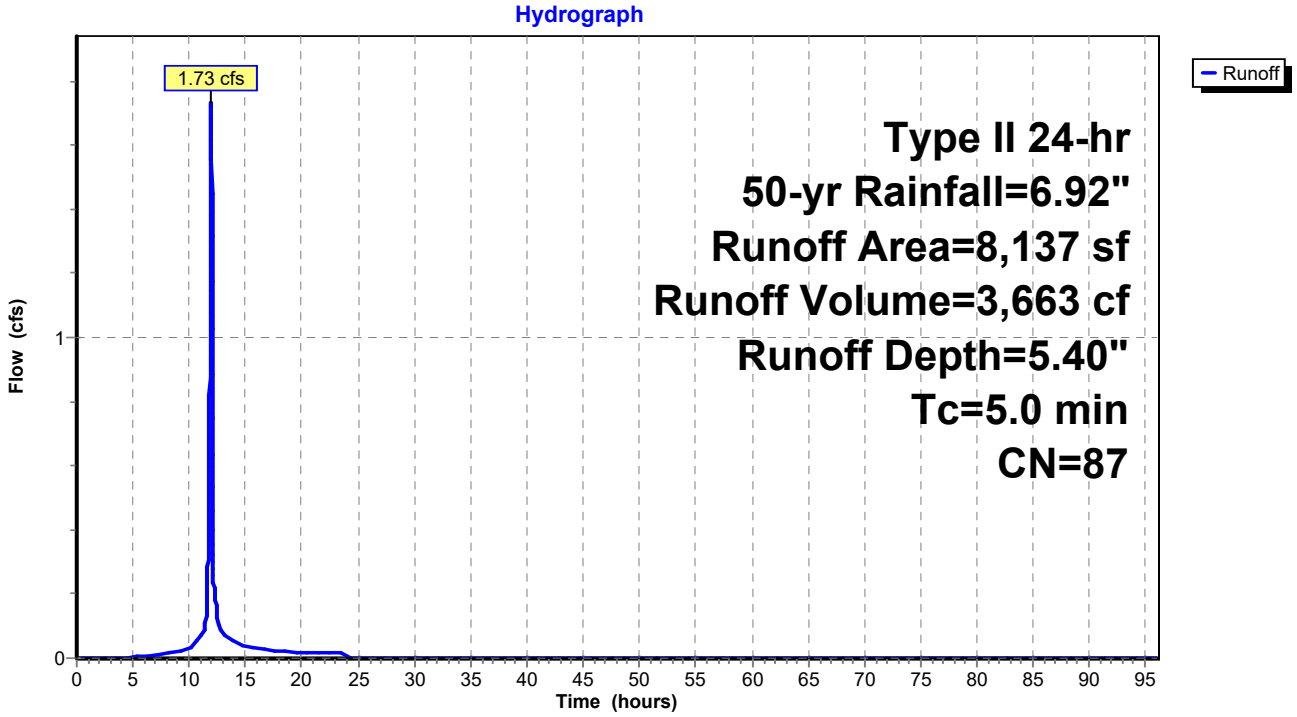
Subcatchment 18: Subcat 18



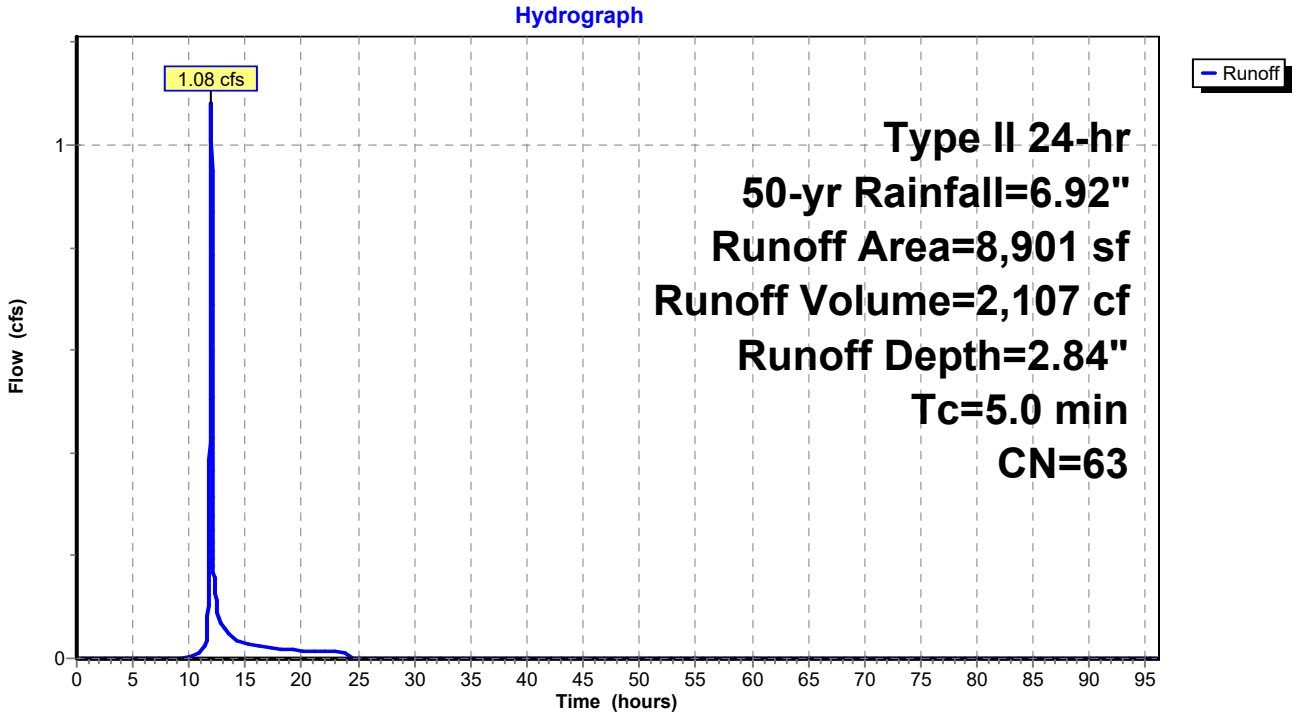
Subcatchment 19: Subcat 19



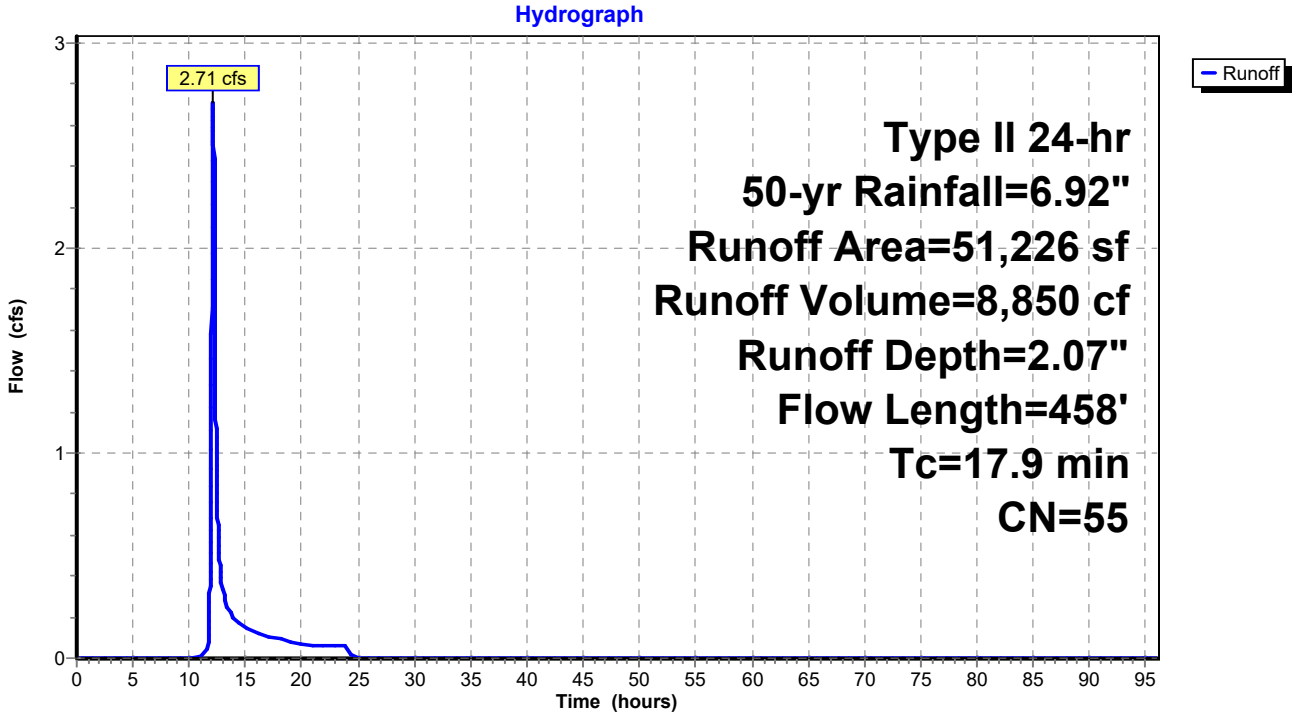
Subcatchment 20: Subcat 20



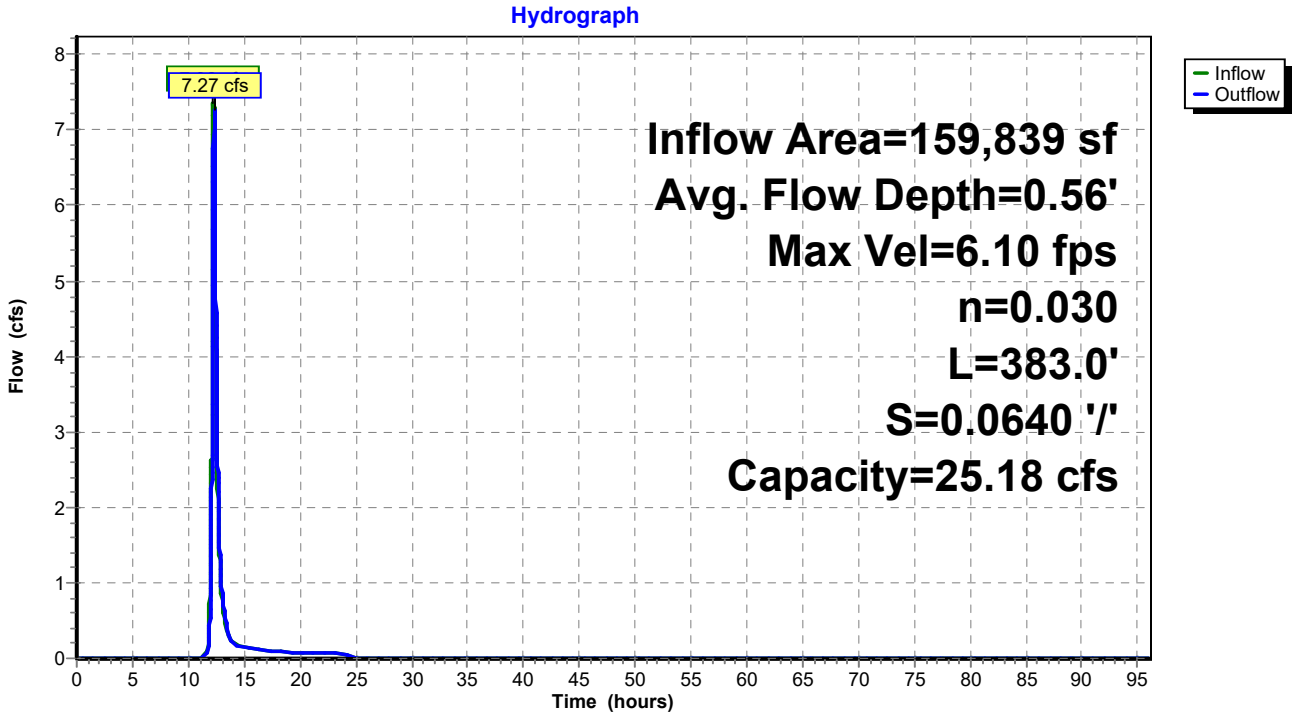
Subcatchment 21: Subcat 21



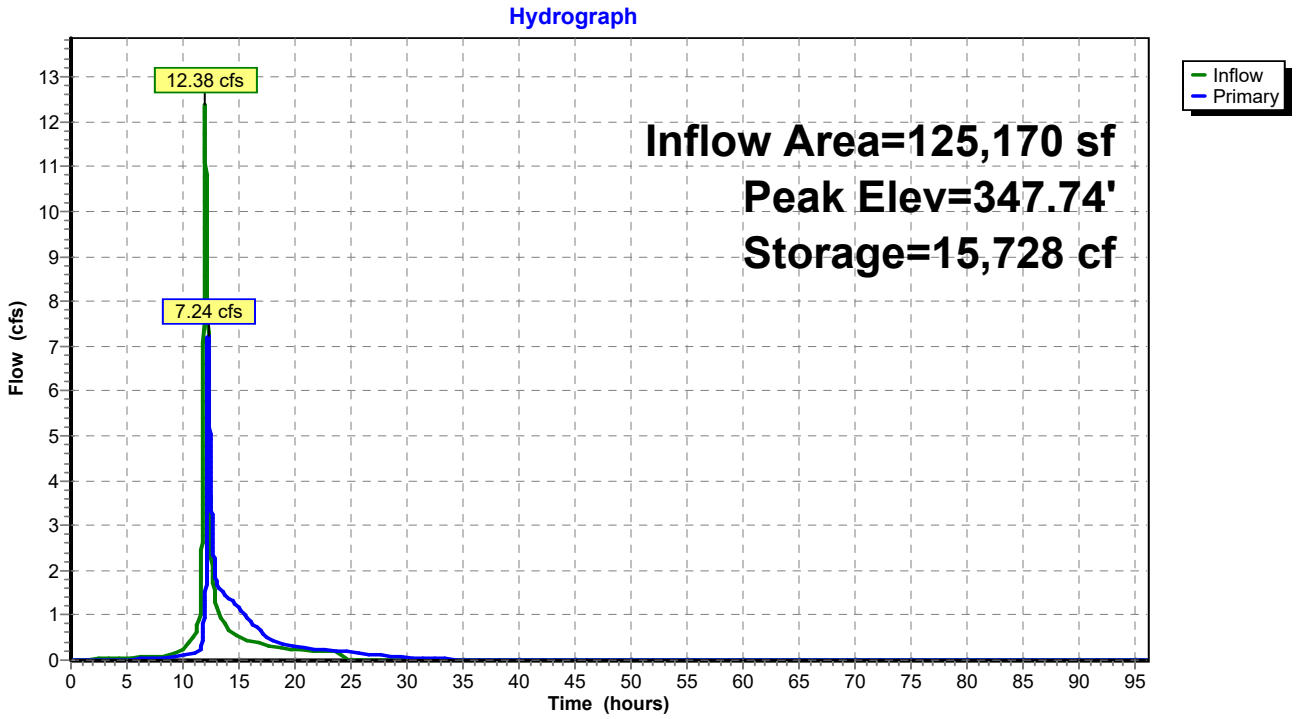
Subcatchment 22: Subcat 22



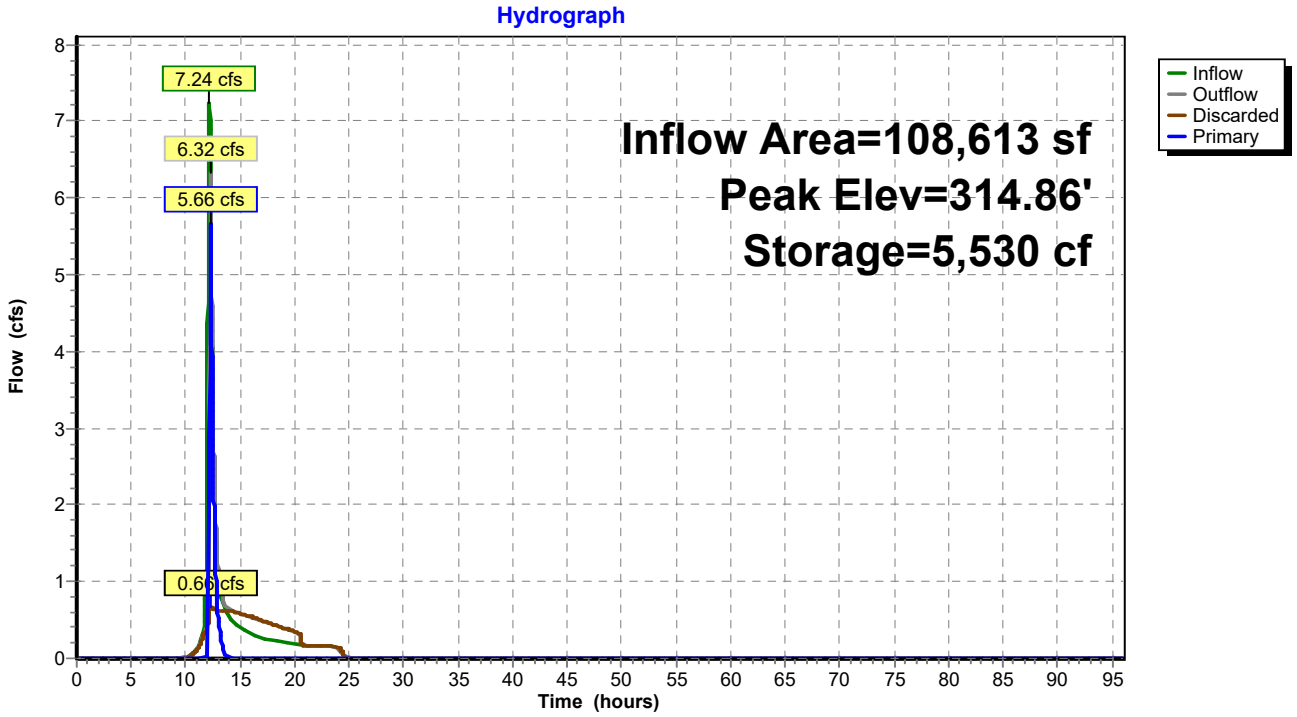
Reach 23R: swale



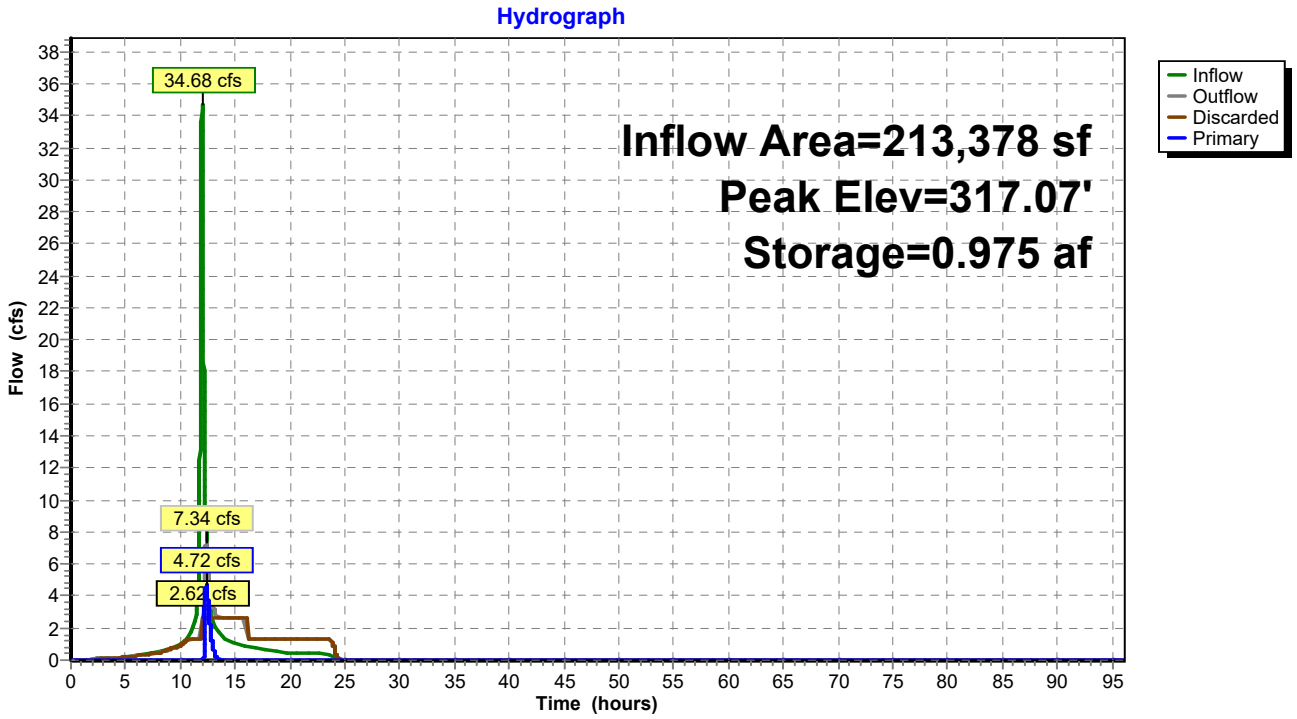
Pond 5P: DA 7 System



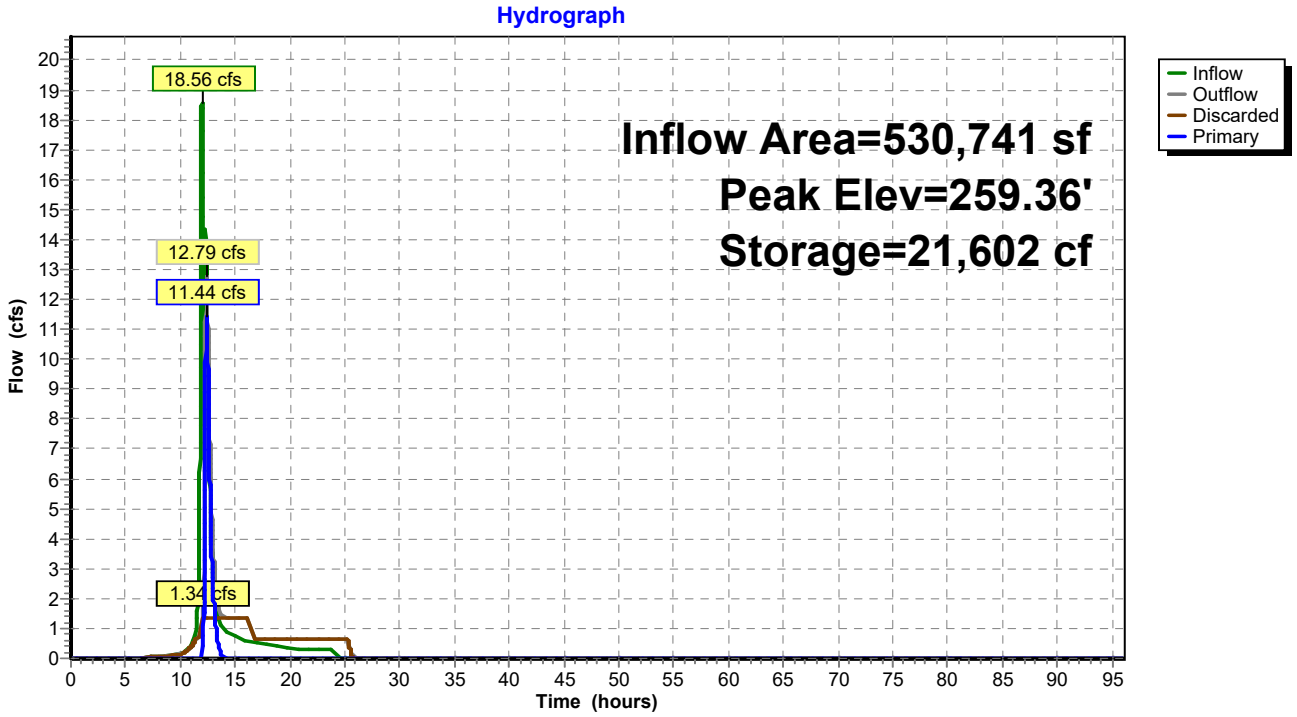
Pond 6P: Infiltration Basin



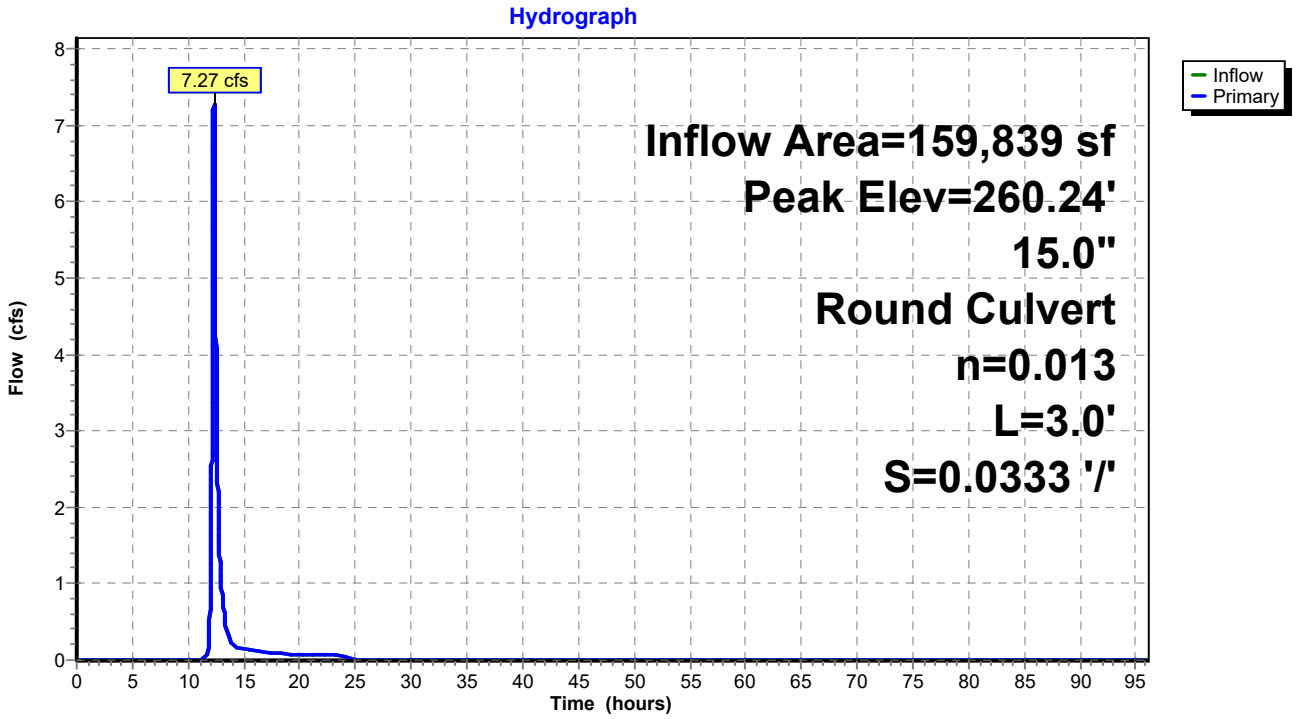
Pond 15P: DA 2 System



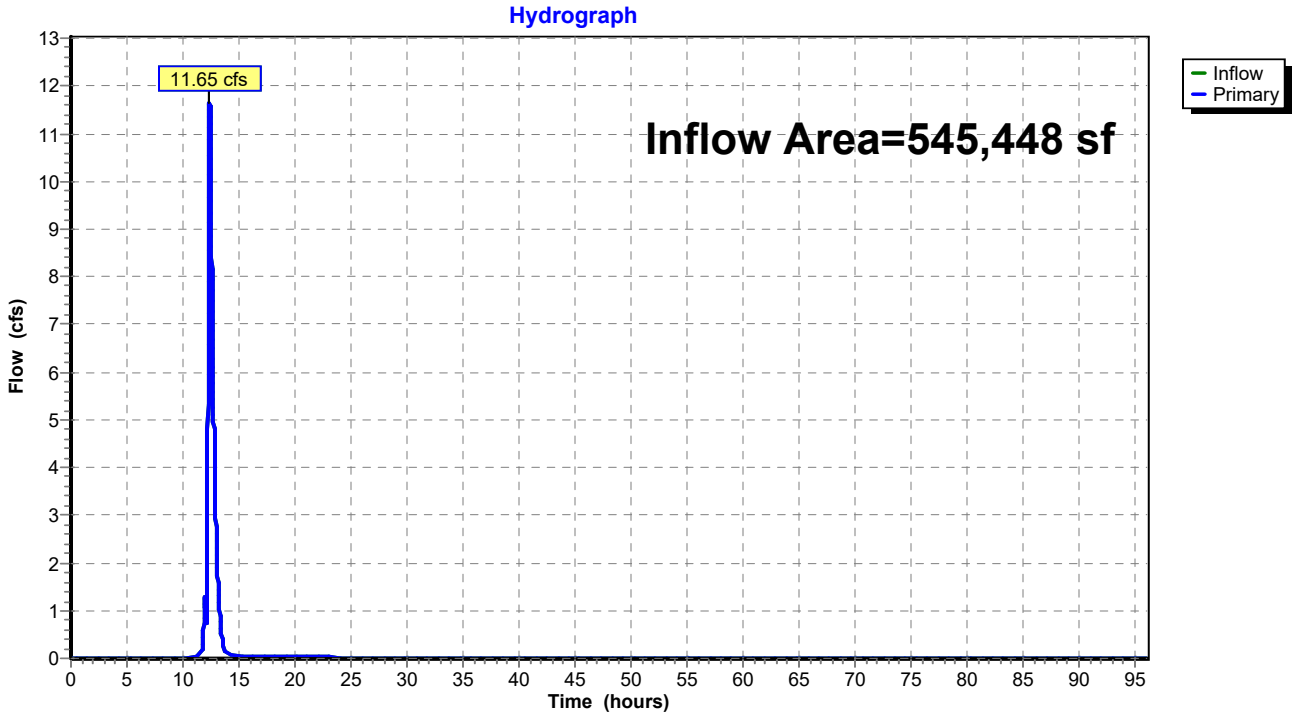
Pond 16P: DA 3 System



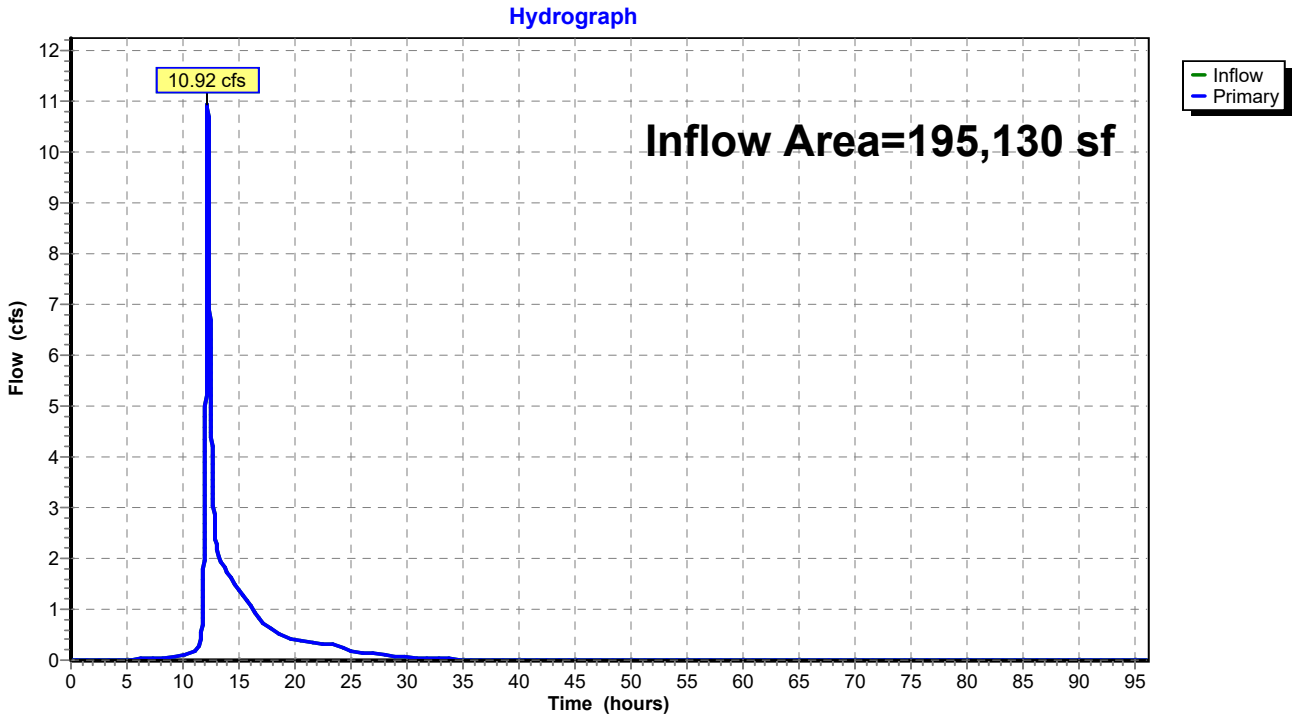
Pond 25P: Swale CB



Link 3L: Rt. Culvert



Link 4L: West Off-Site



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=46,057 sf 9.58% Impervious Runoff Depth=3.47"
Tc=10.0 min UI Adjusted CN=63 Runoff=5.65 cfs 13,301 cf

Subcatchment2: Subcat 2 Runoff Area=0.097 ac 83.65% Impervious Runoff Depth=6.79"
Tc=5.0 min CN=92 Runoff=1.07 cfs 2,394 cf

Subcatchment3: Subcat 3 Runoff Area=33,237 sf 65.92% Impervious Runoff Depth=5.96"
Flow Length=367' Tc=1.4 min CN=85 Runoff=8.80 cfs 16,515 cf

Subcatchment4: Subcat 4 Runoff Area=1.396 ac 2.04% Impervious Runoff Depth=3.36"
Flow Length=830' Tc=7.4 min CN=62 Runoff=7.96 cfs 17,004 cf

Subcatchment5: Subcat 5 Runoff Area=69,961 sf 0.73% Impervious Runoff Depth=3.03"
Flow Length=269' Tc=19.3 min CN=59 Runoff=5.41 cfs 17,677 cf

Subcatchment6: Subcat 6 Runoff Area=13,786 sf 100.00% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=98 Runoff=3.61 cfs 8,617 cf

Subcatchment7: Subcat 7 Runoff Area=2.105 ac 27.11% Impervious Runoff Depth=4.24"
Flow Length=262' Tc=18.9 min CN=70 Runoff=10.27 cfs 32,407 cf

Subcatchment8: Subcat 8 Runoff Area=5,496 sf 100.00% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=98 Runoff=1.44 cfs 3,435 cf

Subcatchment9: Subcat 9 Runoff Area=6,071 sf 49.70% Impervious Runoff Depth=5.96"
Tc=5.0 min CN=85 Runoff=1.43 cfs 3,016 cf

Subcatchment10: Subcat 10 Runoff Area=52,574 sf 82.92% Impervious Runoff Depth=6.79"
Flow Length=181' Tc=5.6 min CN=92 Runoff=13.09 cfs 29,732 cf

Subcatchment11: Subcat 11 Runoff Area=105,659 sf 63.11% Impervious Runoff Depth=6.20"
Flow Length=237' Tc=17.3 min CN=87 Runoff=17.34 cfs 54,562 cf

Subcatchment12: Subcat 12 Runoff Area=13,787 sf 100.00% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=98 Runoff=3.61 cfs 8,617 cf

Subcatchment13: Subcat 13 Runoff Area=108,613 sf 0.01% Impervious Runoff Depth=3.58"
Flow Length=653' Tc=23.8 min CN=64 Runoff=8.86 cfs 32,358 cf

Subcatchment14: Subcat 14 Runoff Area=13,783 sf 99.97% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=98 Runoff=3.61 cfs 8,615 cf

Subcatchment15: Subcat 15 Runoff Area=13,783 sf 99.98% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=98 Runoff=3.61 cfs 8,615 cf

Subcatchment16: Subcat 16 Runoff Area=13,792 sf 99.99% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=98 Runoff=3.61 cfs 8,620 cf

Subcatchment17: Subcat 17 Runoff Area=6,828 sf 8.53% Impervious Runoff Depth=3.58"
Tc=5.0 min CN=64 Runoff=1.04 cfs 2,034 cf

Subcatchment18: Subcat 18 Runoff Area=6,372 sf 7.75% Impervious Runoff Depth=3.58"
Tc=5.0 min CN=64 Runoff=0.97 cfs 1,898 cf

Subcatchment19: Subcat 19 Runoff Area=5,807 sf 0.00% Impervious Runoff Depth=2.61"
Flow Length=335' Tc=13.6 min CN=55 Runoff=0.46 cfs 1,262 cf

Subcatchment20: Subcat 20 Runoff Area=8,137 sf 50.55% Impervious Runoff Depth=6.20"
Tc=5.0 min CN=87 Runoff=1.97 cfs 4,202 cf

Subcatchment21: Subcat 21 Runoff Area=8,901 sf 3.88% Impervious Runoff Depth=3.47"
Tc=5.0 min CN=63 Runoff=1.32 cfs 2,570 cf

Subcatchment22: Subcat 22 Runoff Area=51,226 sf 0.04% Impervious Runoff Depth=2.61"
Flow Length=458' Tc=17.9 min CN=55 Runoff=3.49 cfs 11,133 cf

Reach 23R: swale Avg. Flow Depth=0.66' Max Vel=6.66 fps Inflow=10.30 cfs 22,491 cf
n=0.030 L=383.0' S=0.0640 '/' Capacity=25.18 cfs Outflow=10.22 cfs 22,491 cf

Pond 5P: DA 7 System Peak Elev=348.04' Storage=17,237 cf Inflow=14.42 cfs 51,677 cf
Outflow=8.06 cfs 51,669 cf

Pond 6P: Infiltration Basin Peak Elev=314.94' Storage=5,743 cf Inflow=8.86 cfs 32,358 cf
Discarded=0.68 cfs 21,000 cf Primary=7.70 cfs 11,358 cf Outflow=8.38 cfs 32,358 cf

Pond 15P: DA 2 System Peak Elev=317.75' Storage=1.047 af Inflow=39.17 cfs 118,761 cf
Discarded=2.62 cfs 101,767 cf Primary=8.49 cfs 16,994 cf Outflow=11.12 cfs 118,761 cf

Pond 16P: DA 3 System Peak Elev=260.77' Storage=23,927 cf Inflow=22.45 cfs 92,631 cf
Discarded=1.34 cfs 51,046 cf Primary=20.89 cfs 41,586 cf Outflow=22.24 cfs 92,631 cf

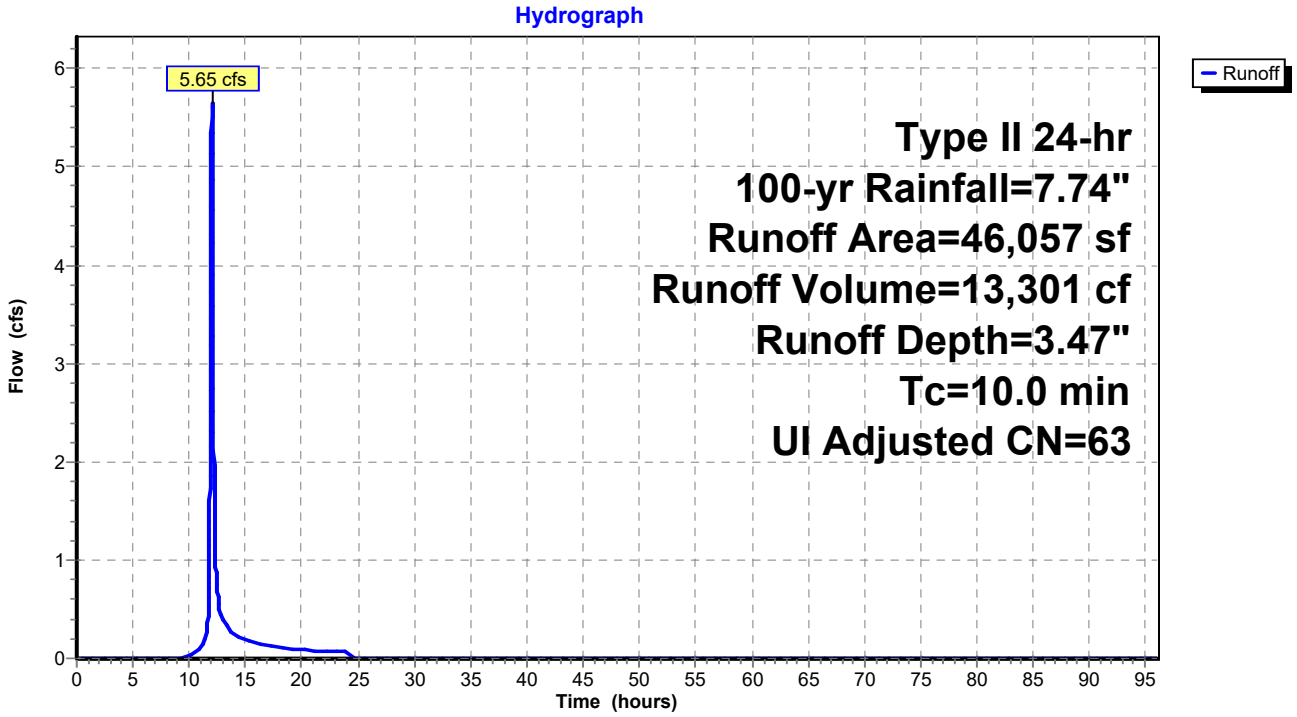
Pond 25P: Swale CB Peak Elev=261.72' Inflow=10.22 cfs 22,491 cf
15.0" Round Culvert n=0.013 L=3.0' S=0.0333 '/' Outflow=10.22 cfs 22,491 cf

Link 3L: Rt. 32 Culvert Inflow=21.19 cfs 45,418 cf
Primary=21.19 cfs 45,418 cf

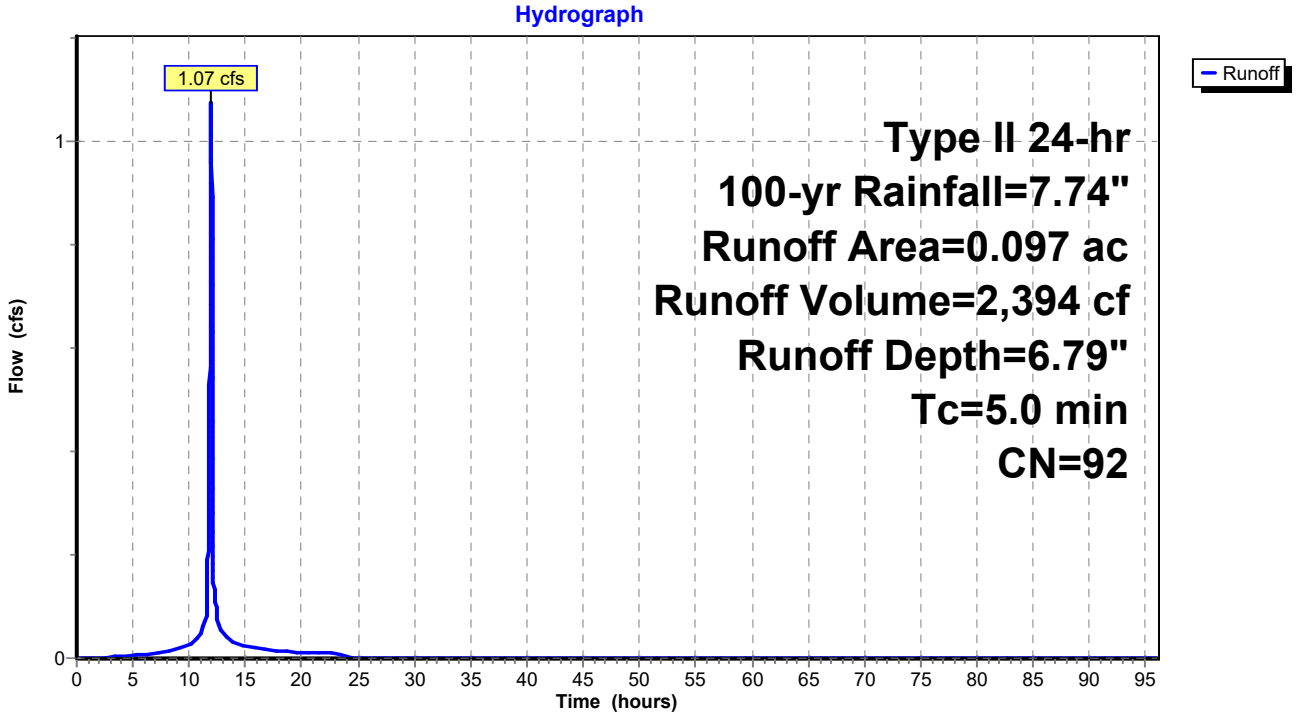
Link 4L: West Off-Site Inflow=13.22 cfs 69,347 cf
Primary=13.22 cfs 69,347 cf

Total Runoff Area = 740,579 sf Runoff Volume = 288,584 cf Average Runoff Depth = 4.68"
66.28% Pervious = 490,839 sf 33.72% Impervious = 249,740 sf

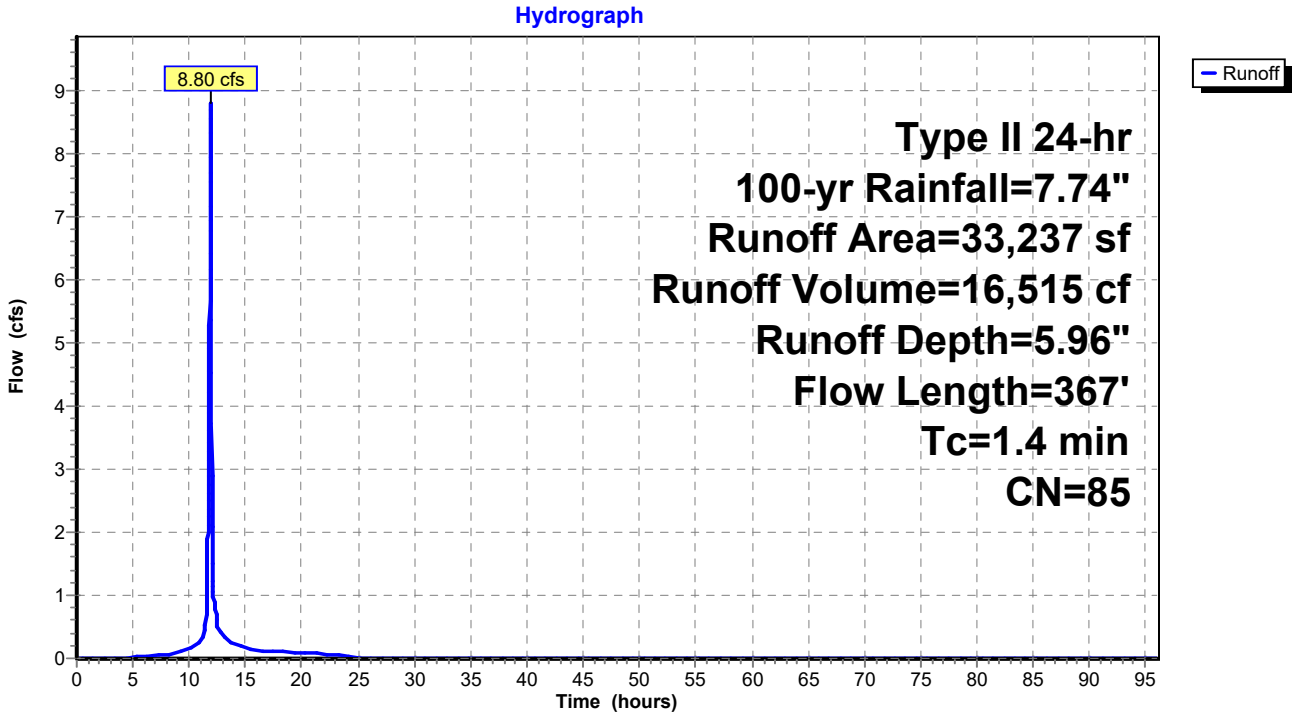
Subcatchment 1: Subcat 1



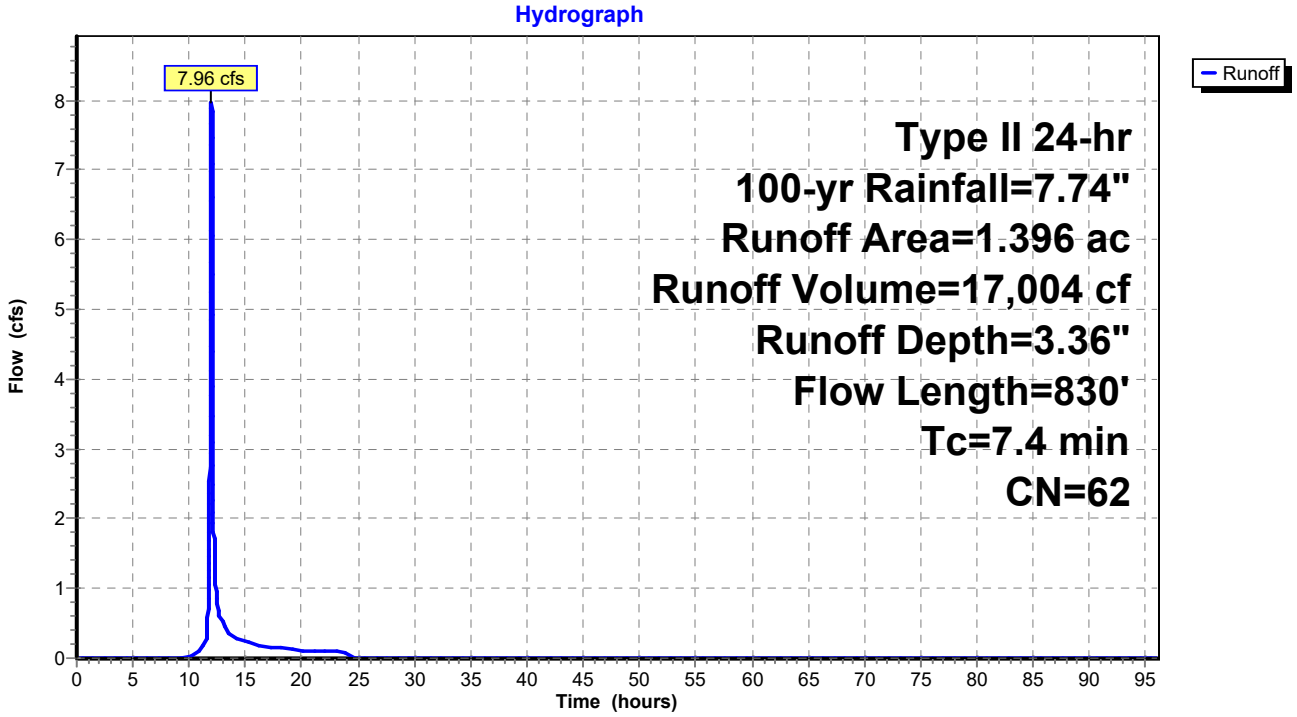
Subcatchment 2: Subcat 2



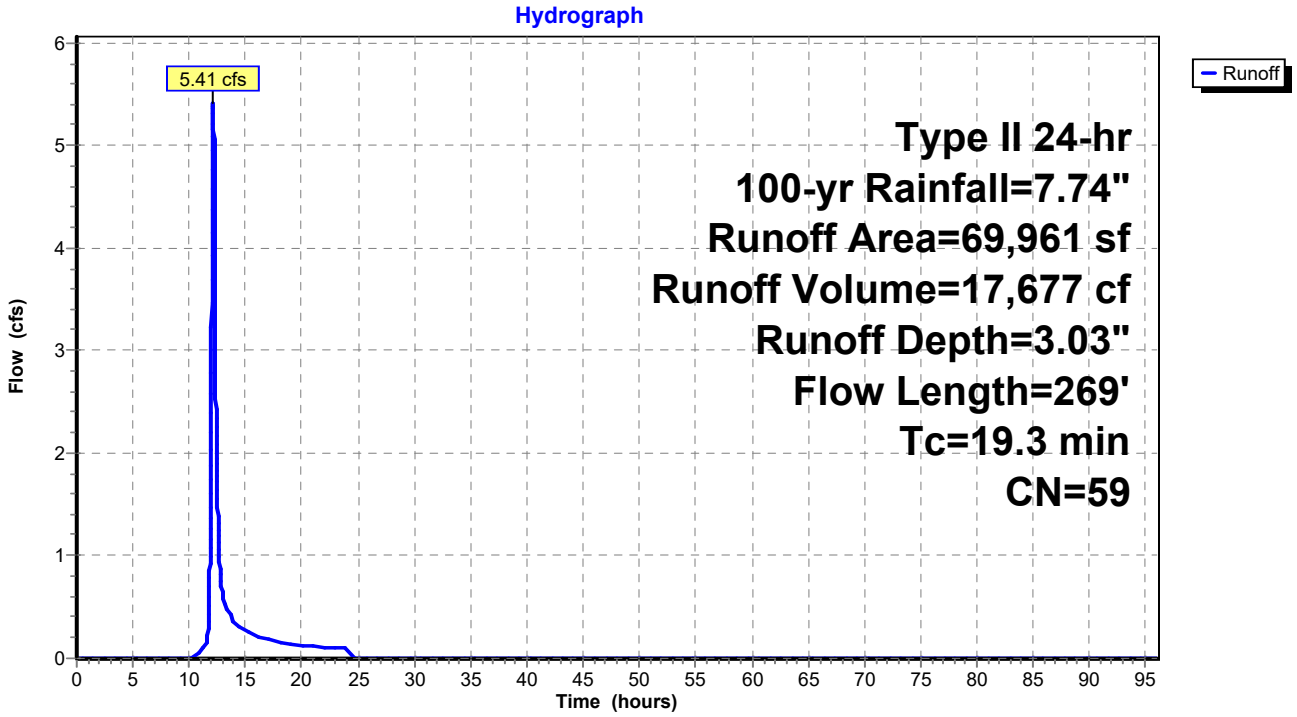
Subcatchment 3: Subcat 3



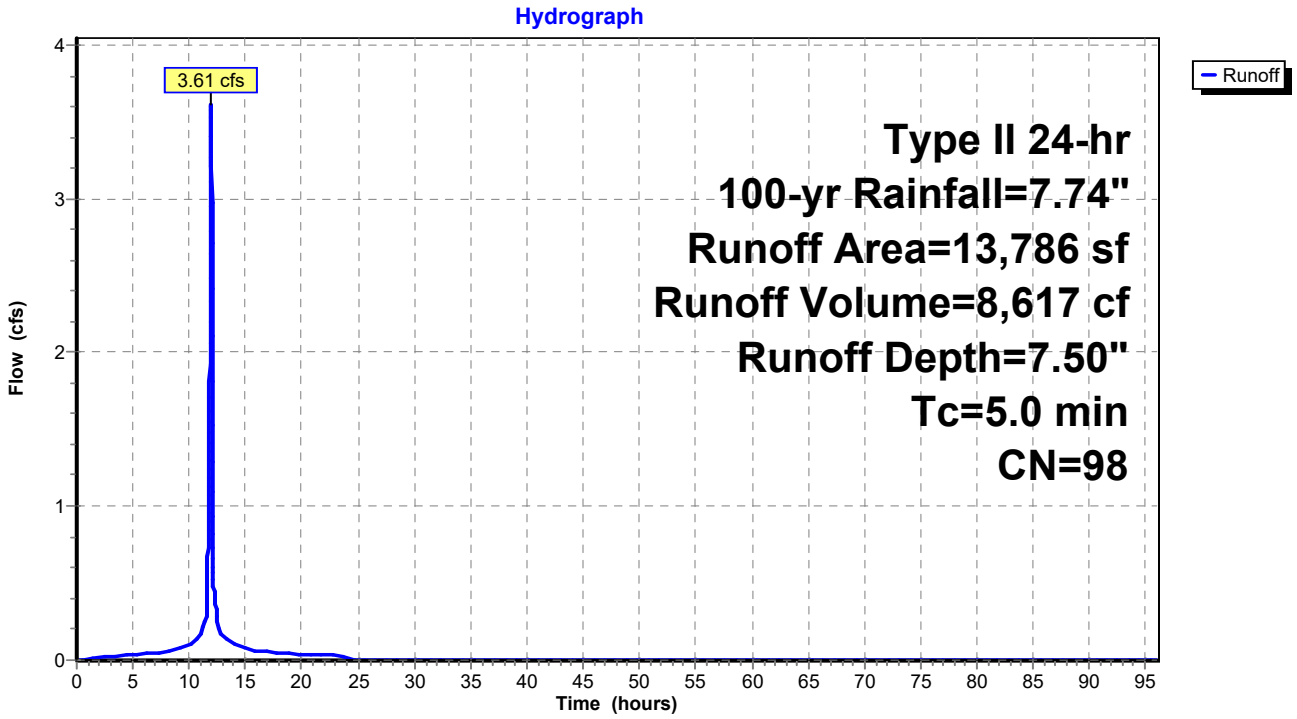
Subcatchment 4: Subcat 4



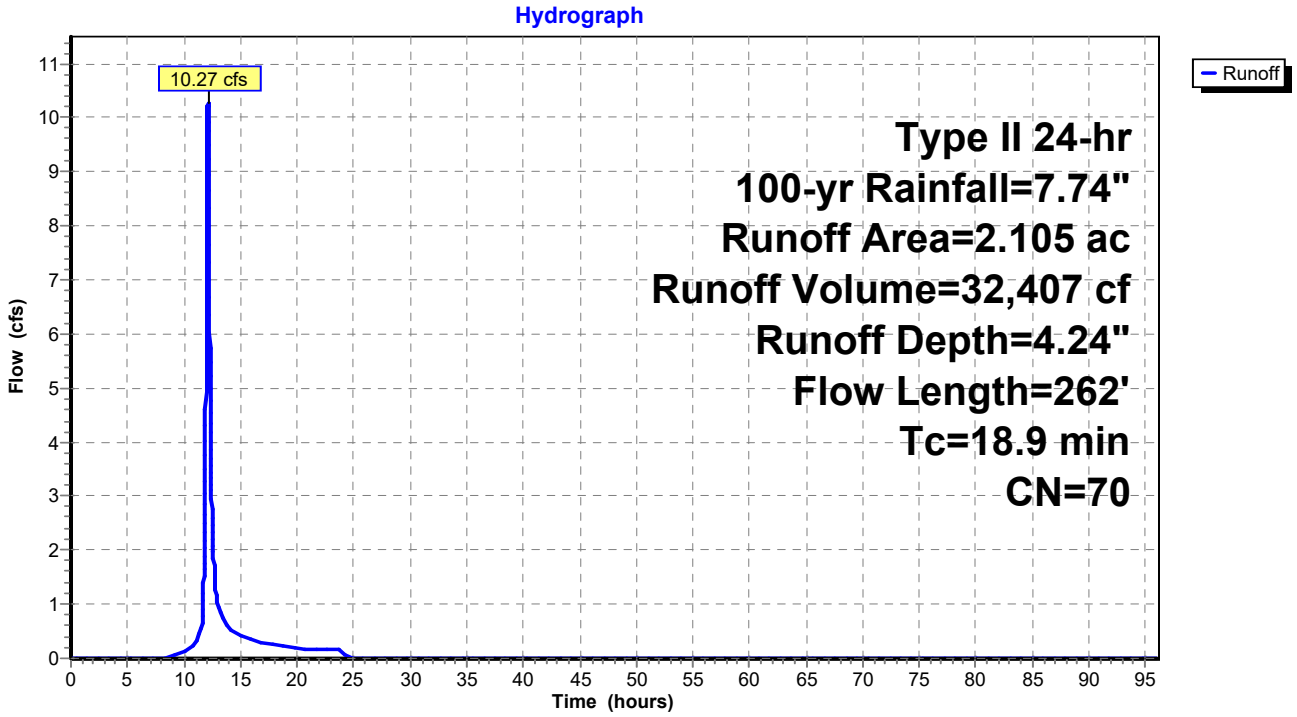
Subcatchment 5: Subcat 5



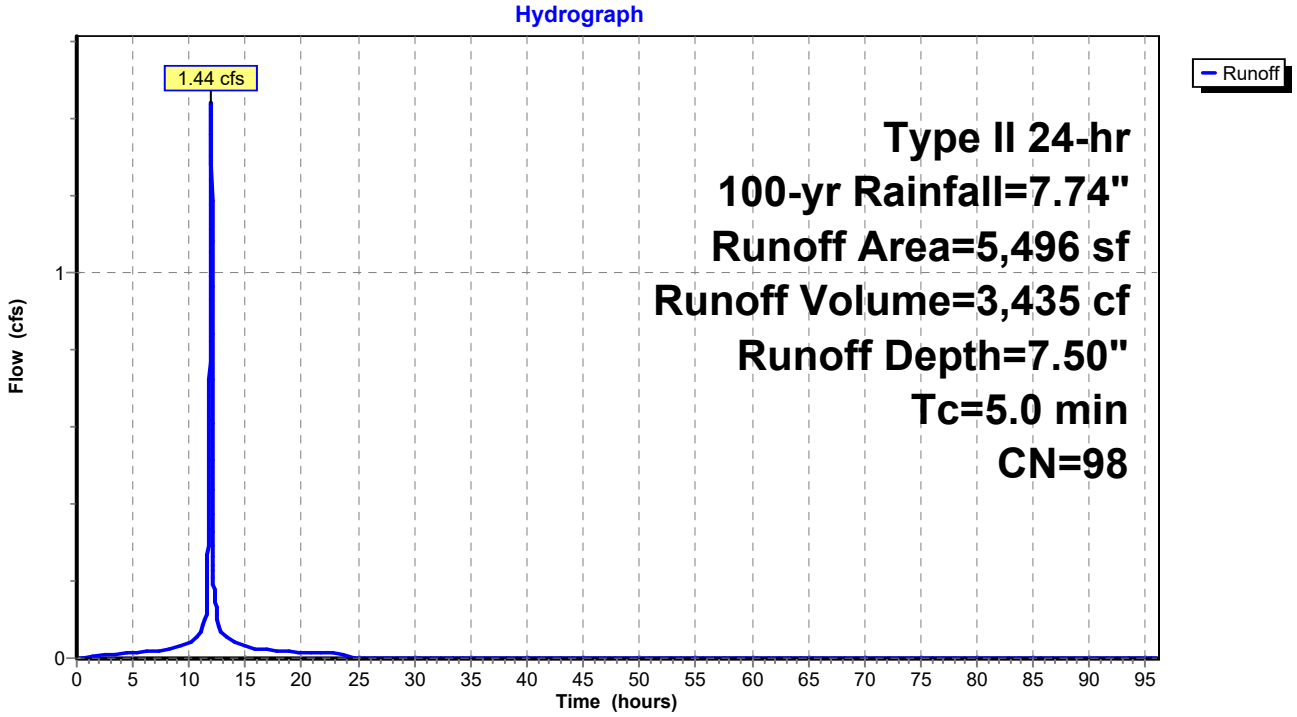
Subcatchment 6: Subcat 6



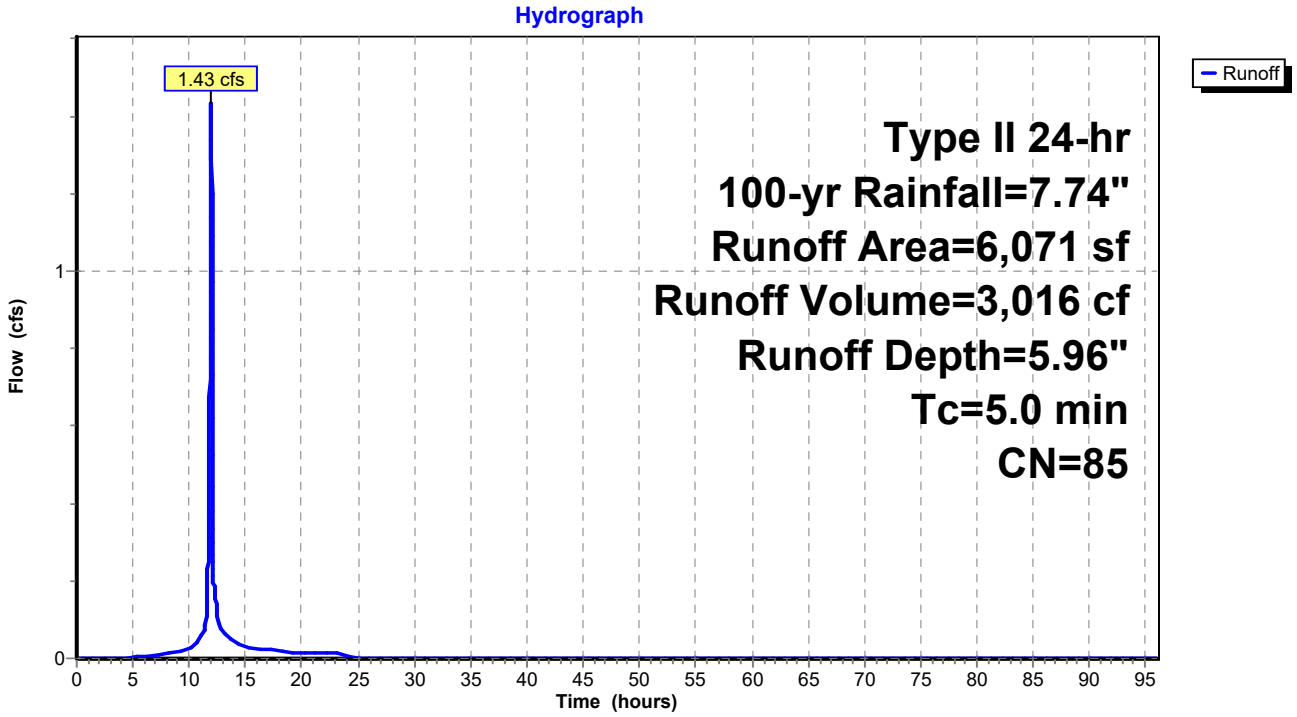
Subcatchment 7: Subcat 7



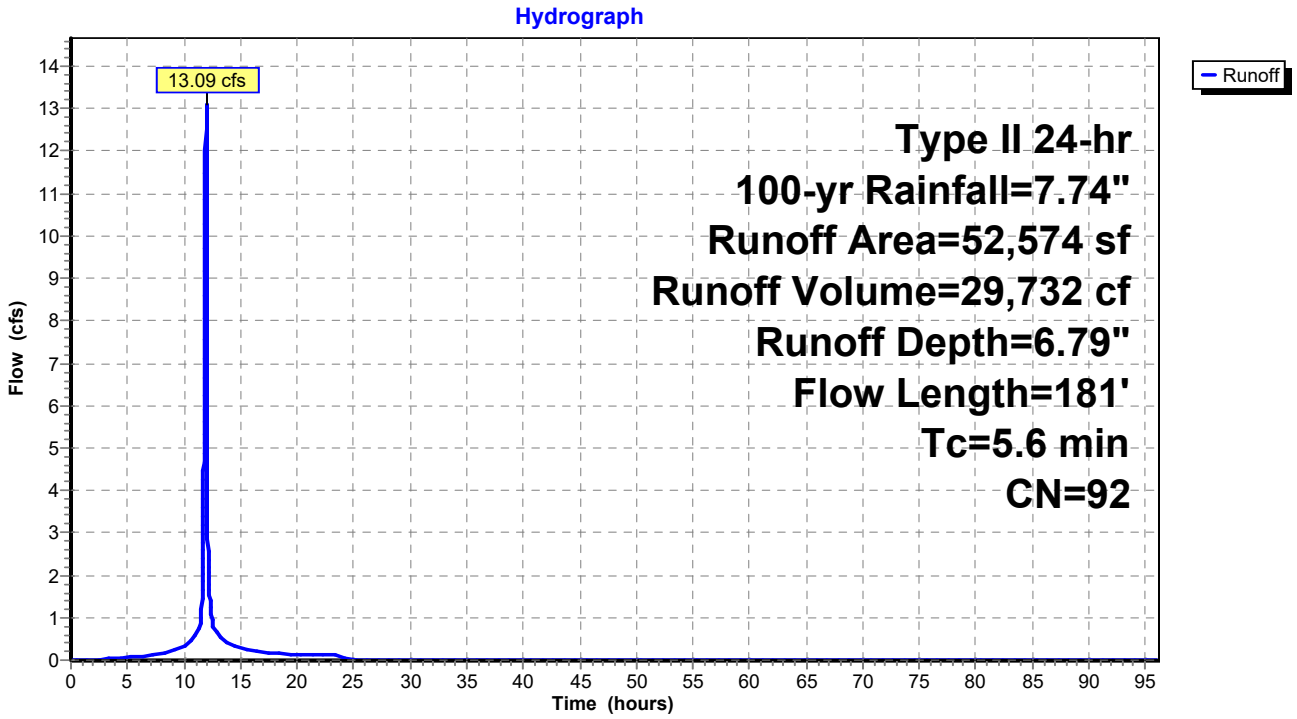
Subcatchment 8: Subcat 8



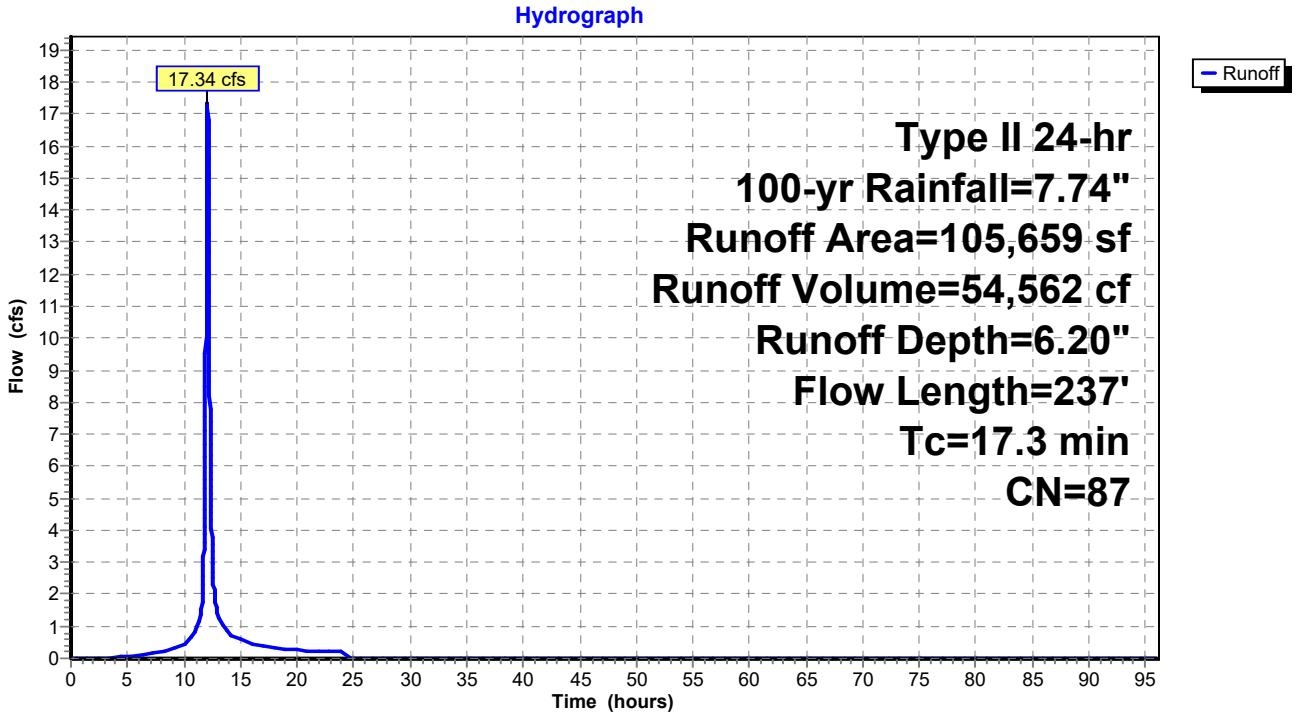
Subcatchment 9: Subcat 9



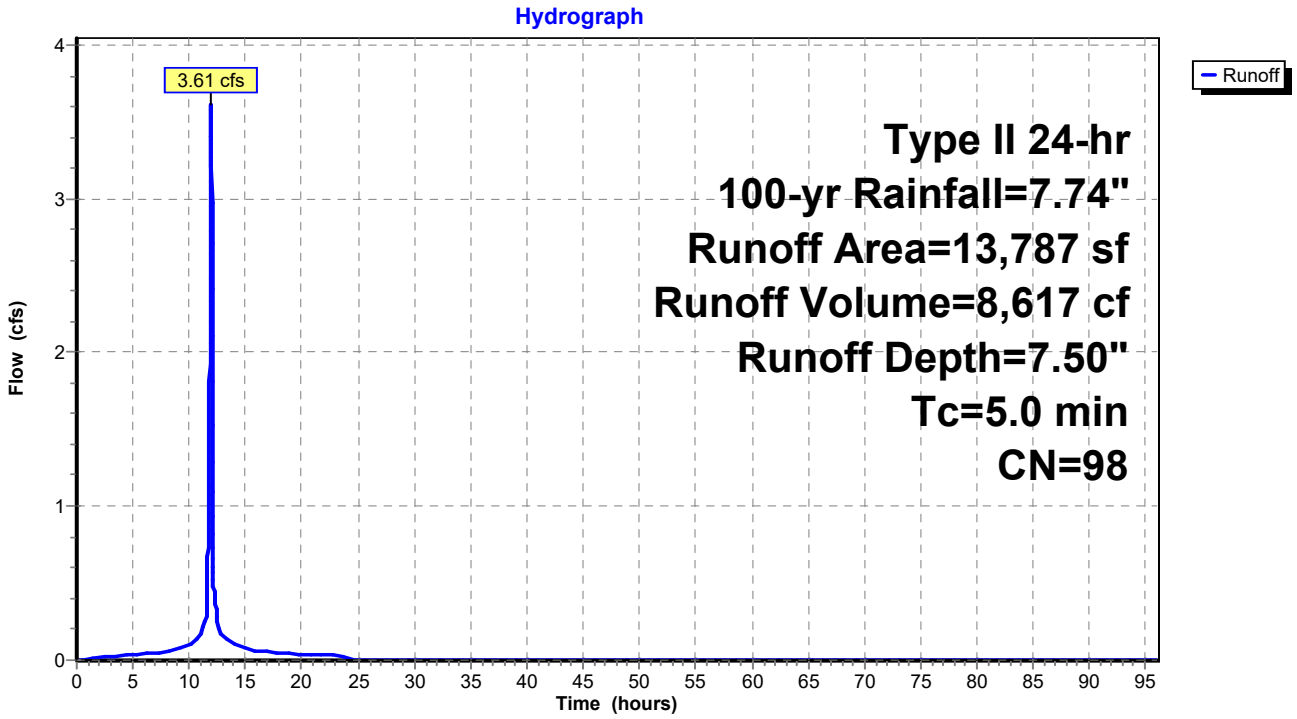
Subcatchment 10: Subcat 10



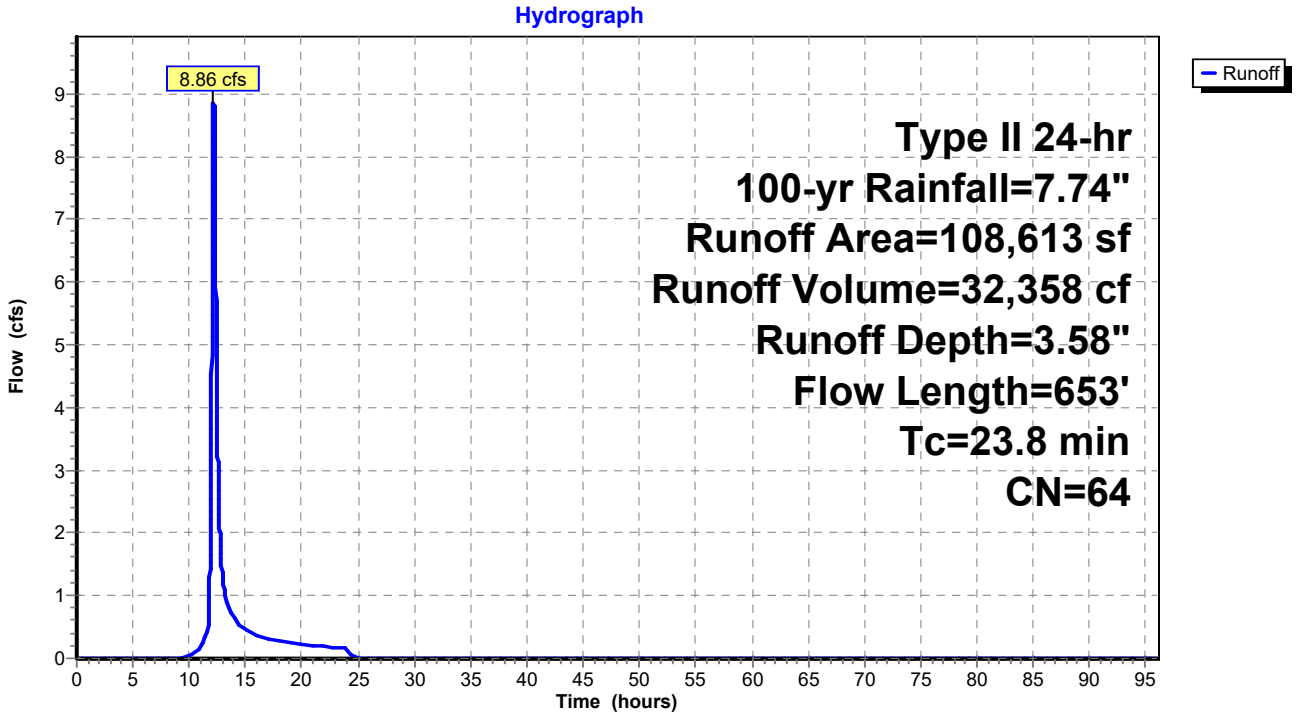
Subcatchment 11: Subcat 11



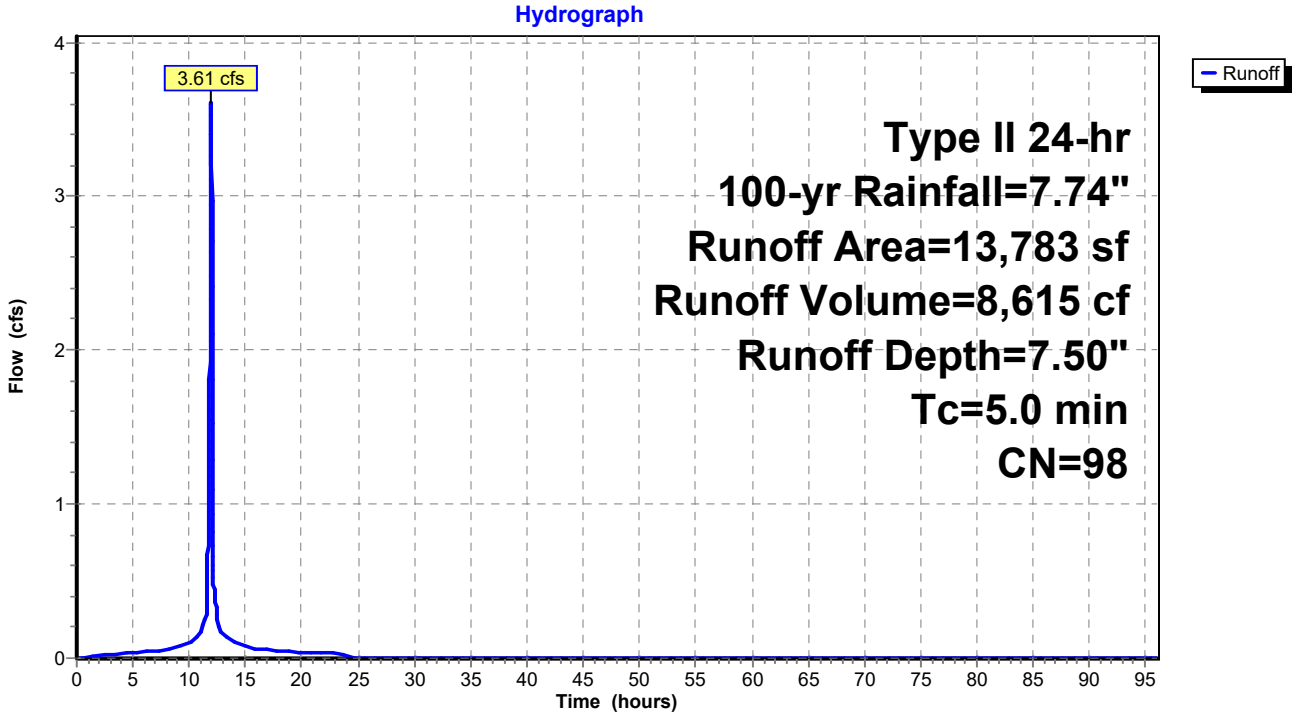
Subcatchment 12: Subcat 12



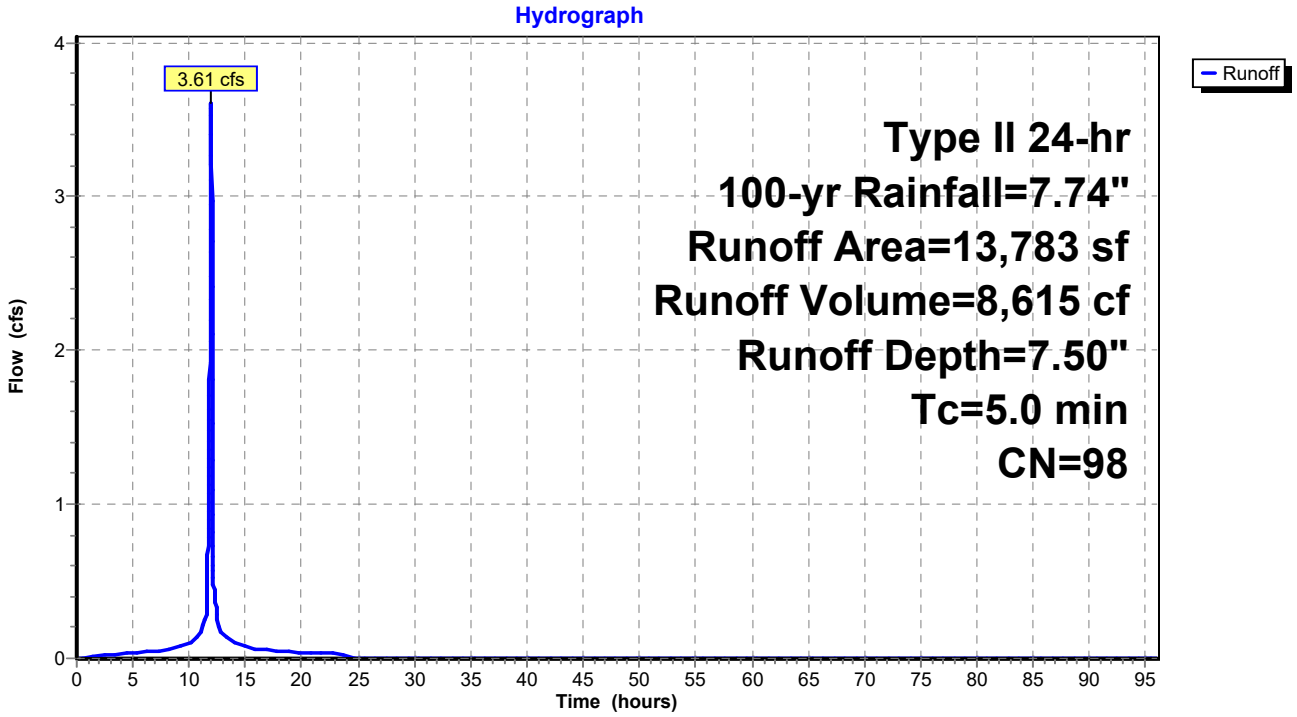
Subcatchment 13: Subcat 13



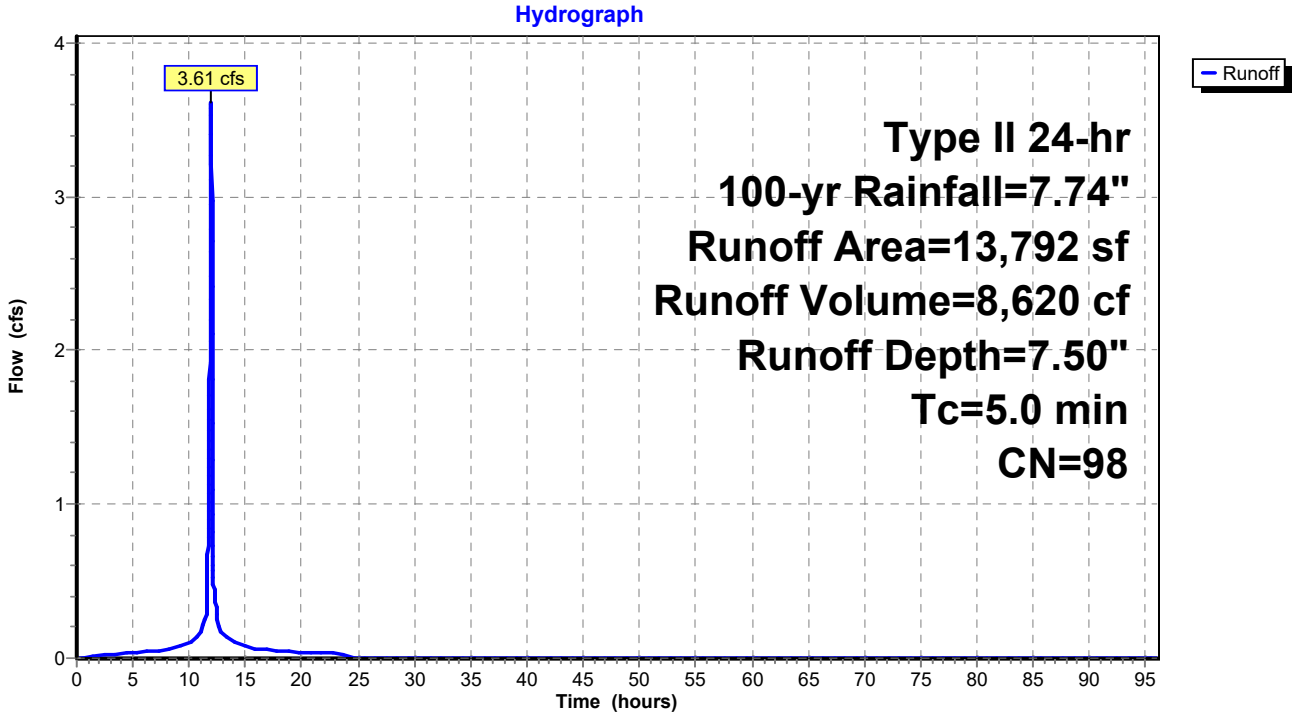
Subcatchment 14: Subcat 14



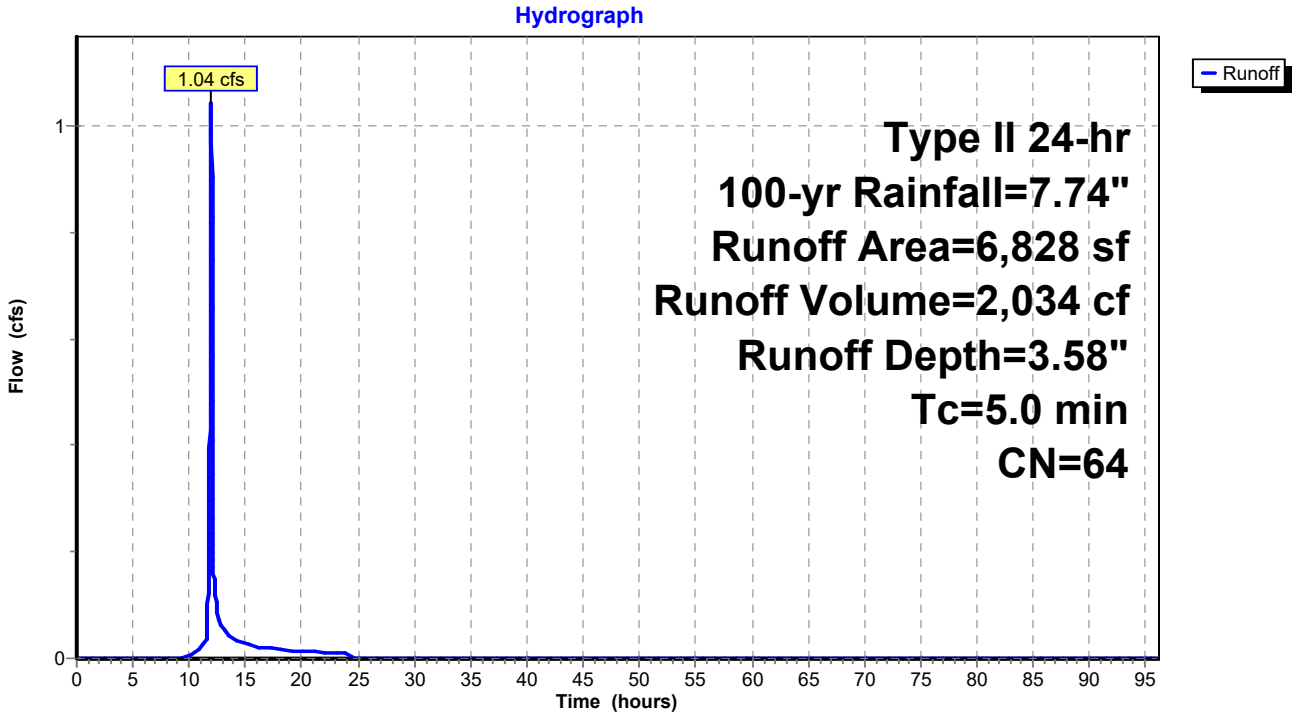
Subcatchment 15: Subcat 15



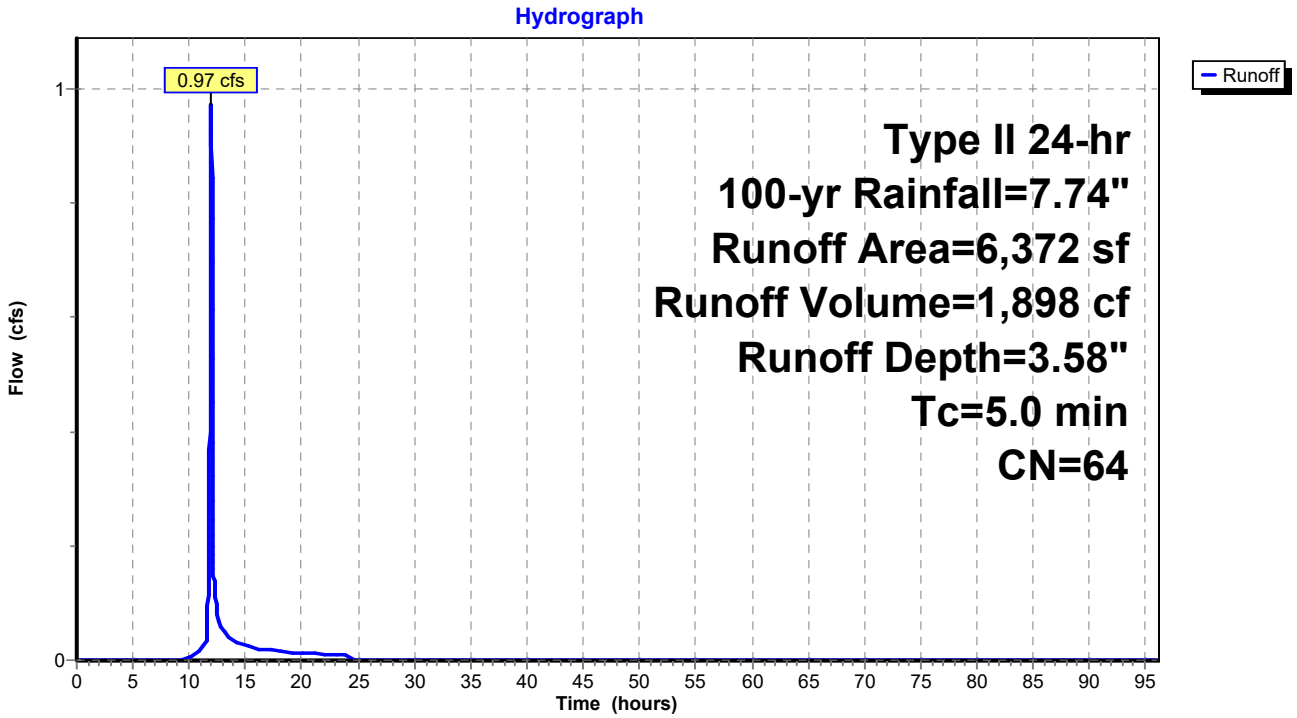
Subcatchment 16: Subcat 16



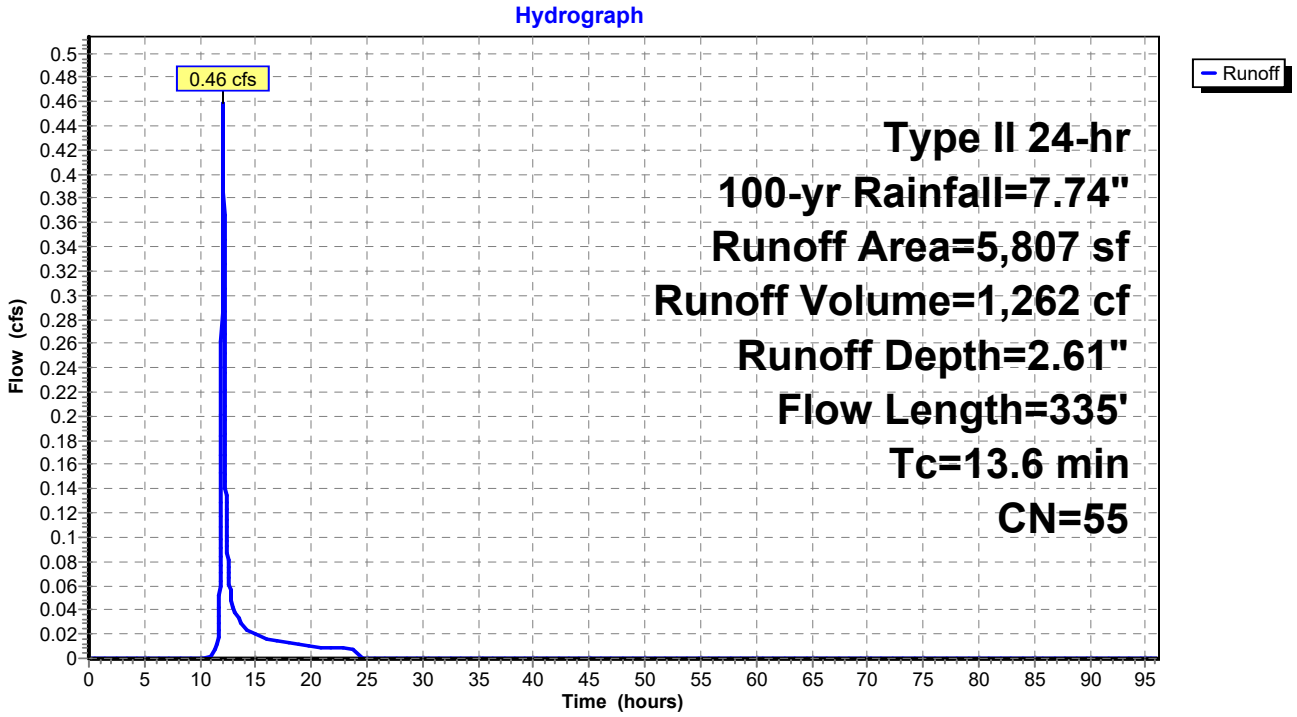
Subcatchment 17: Subcat 17



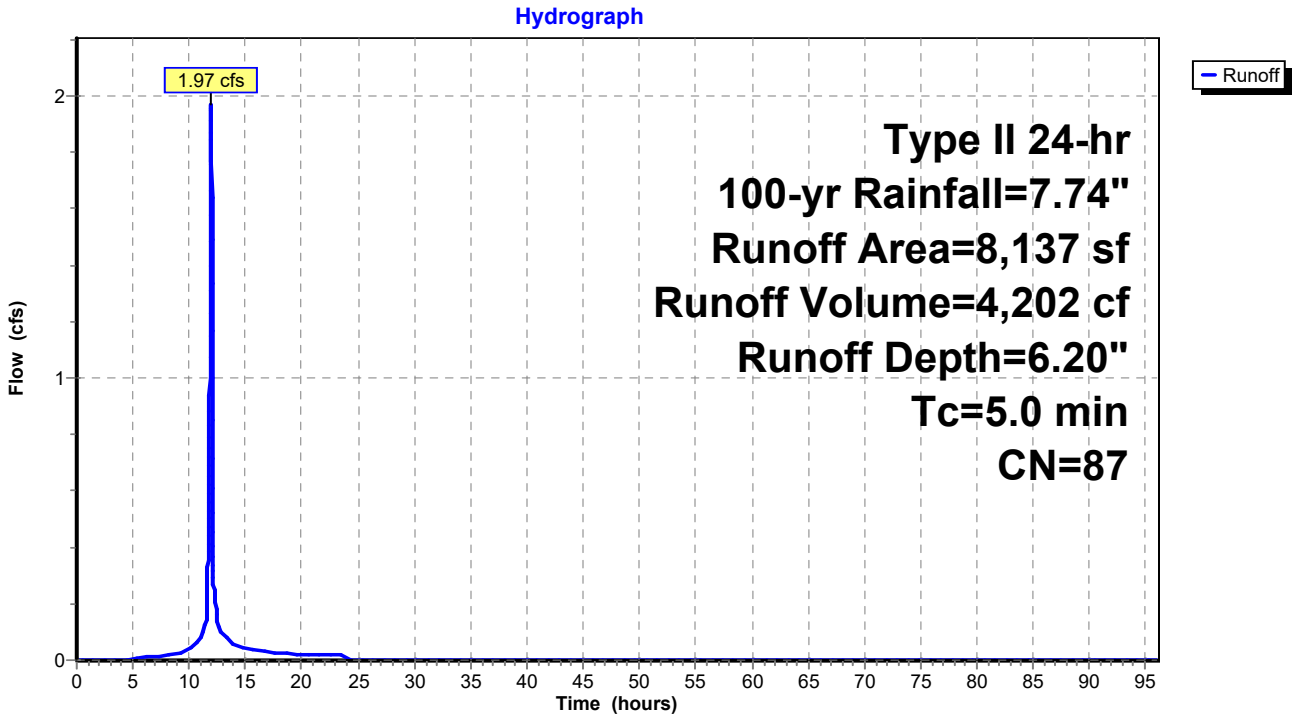
Subcatchment 18: Subcat 18



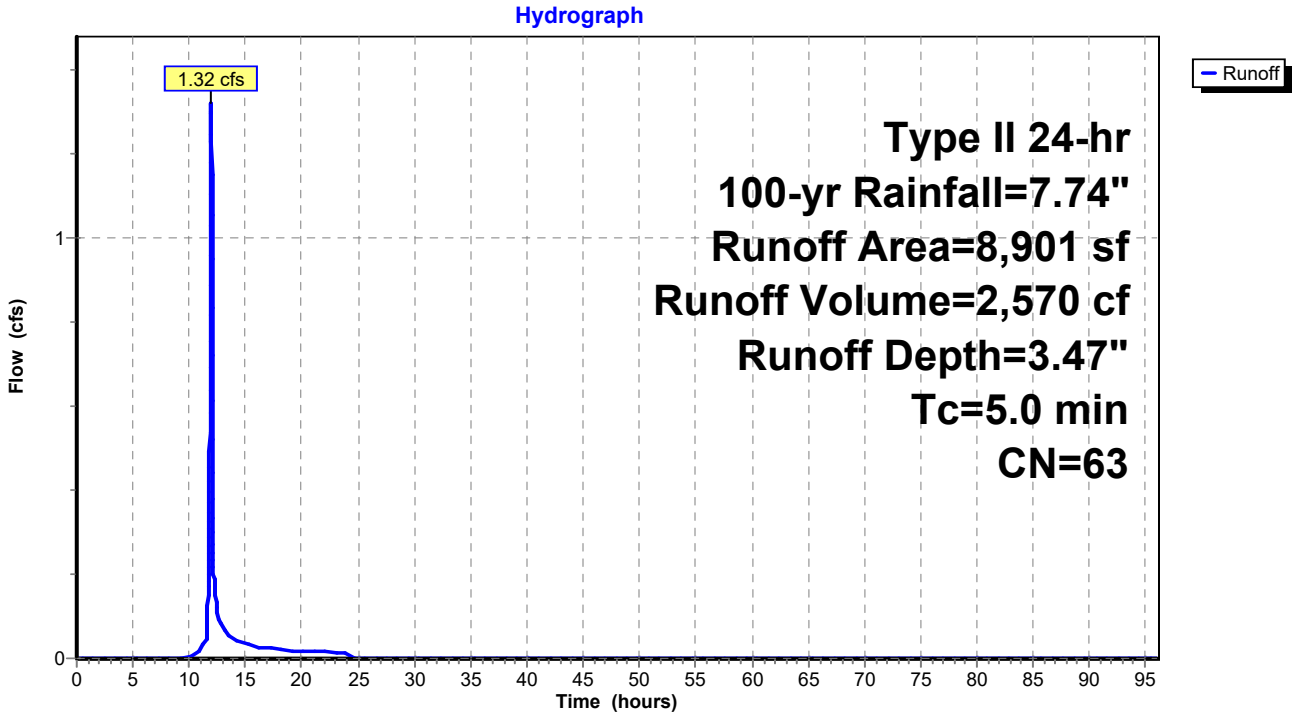
Subcatchment 19: Subcat 19



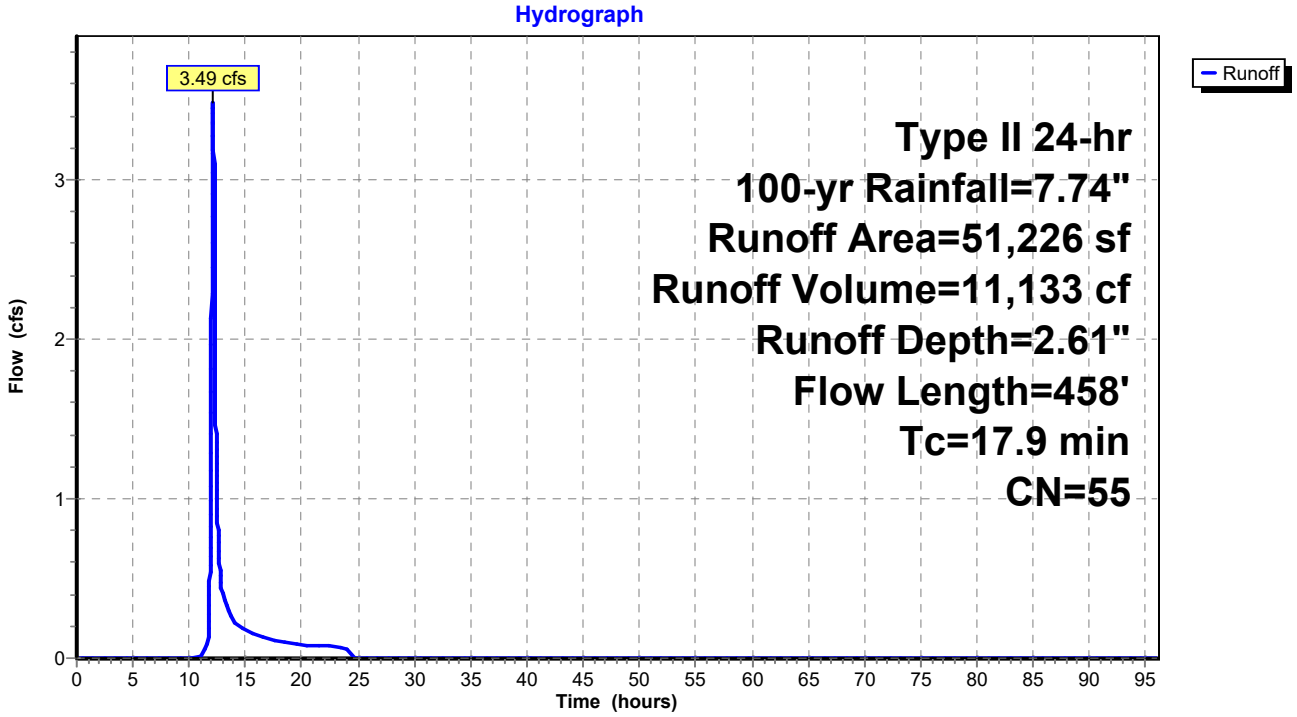
Subcatchment 20: Subcat 20



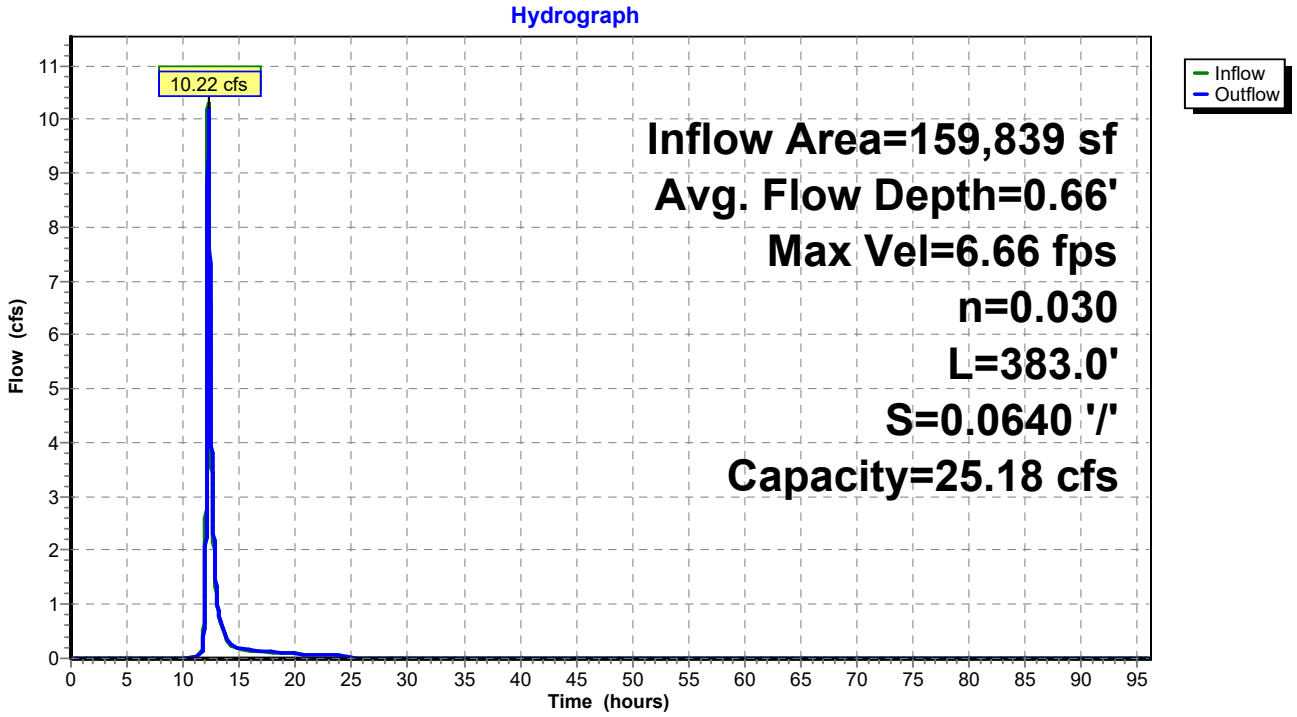
Subcatchment 21: Subcat 21



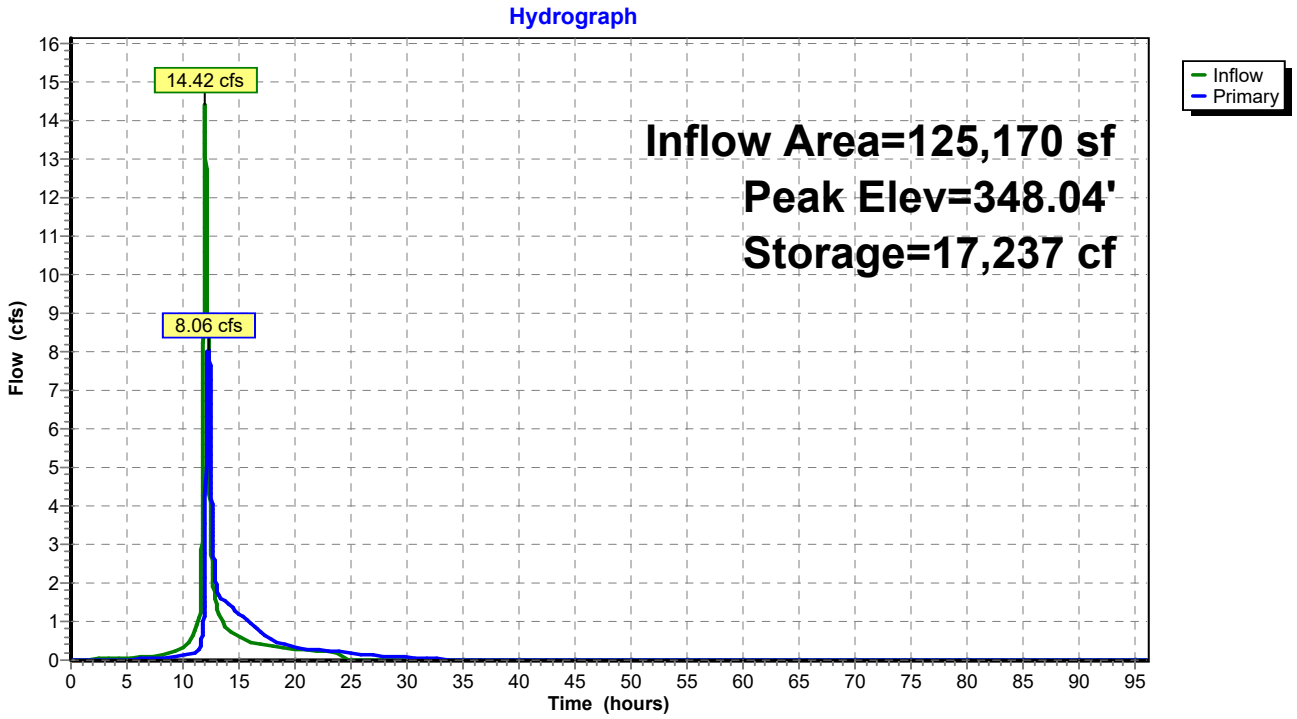
Subcatchment 22: Subcat 22



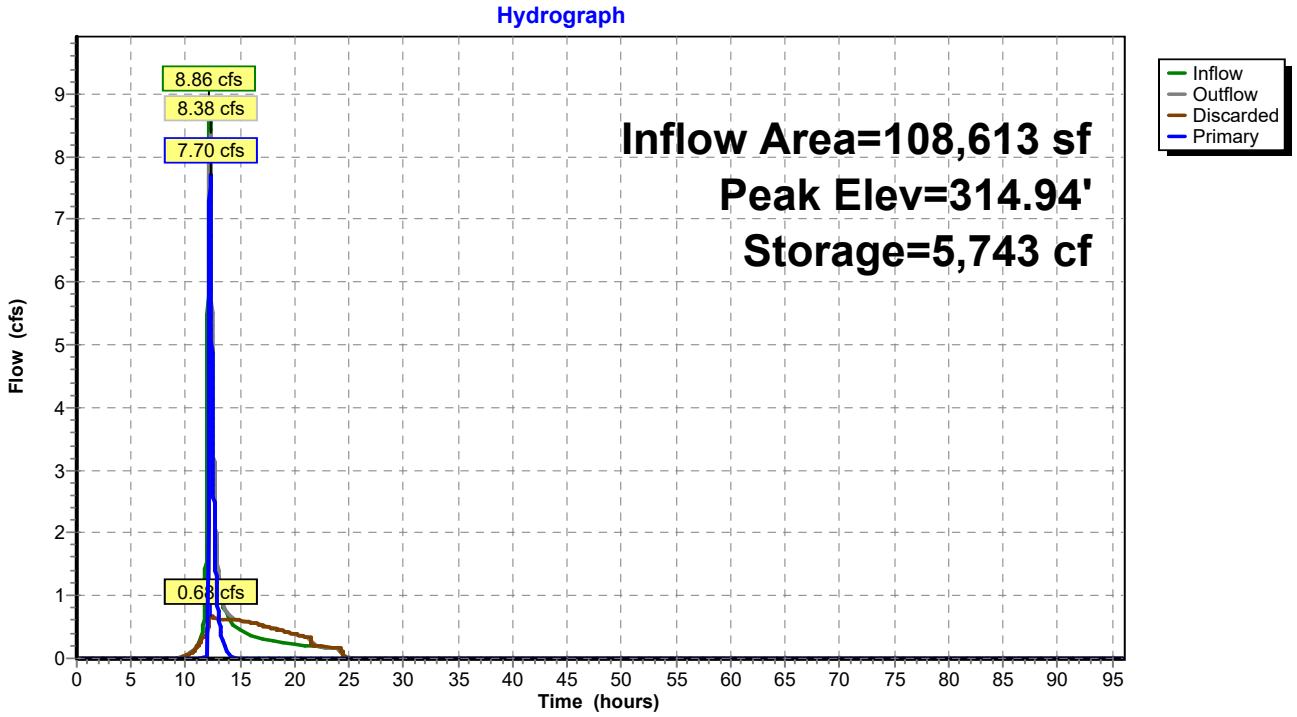
Reach 23R: swale



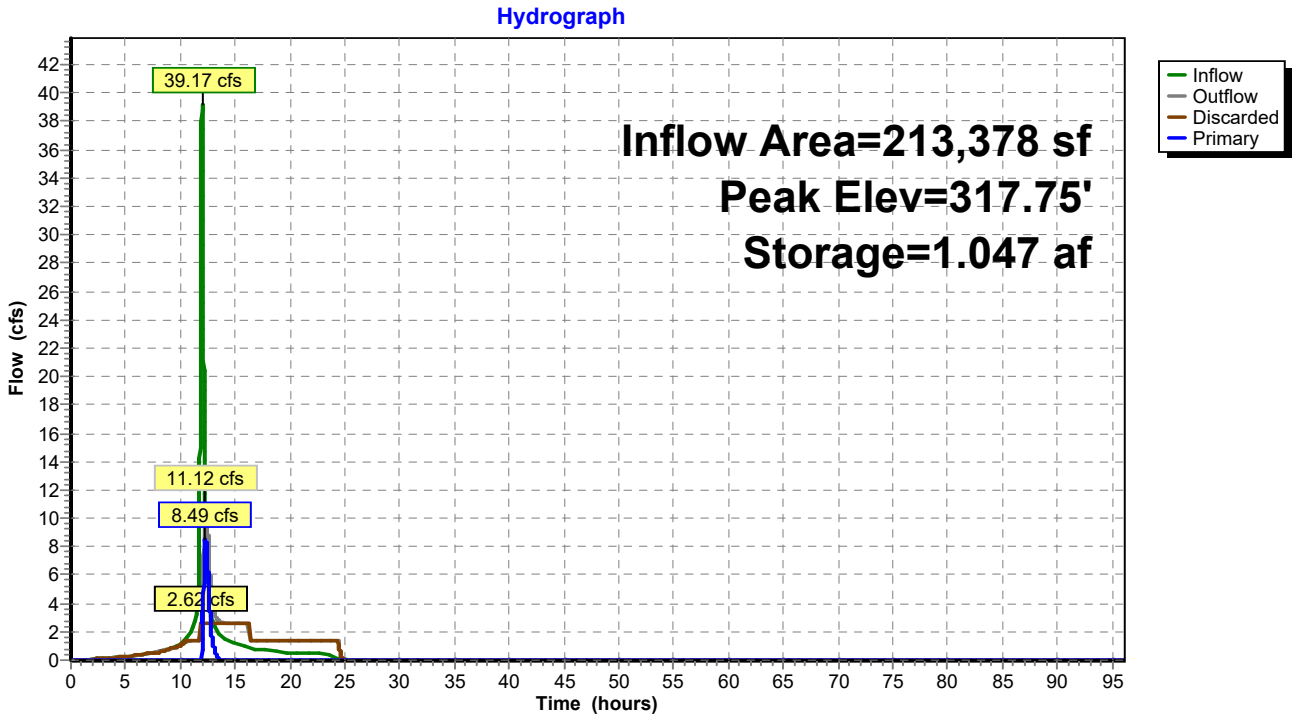
Pond 5P: DA 7 System



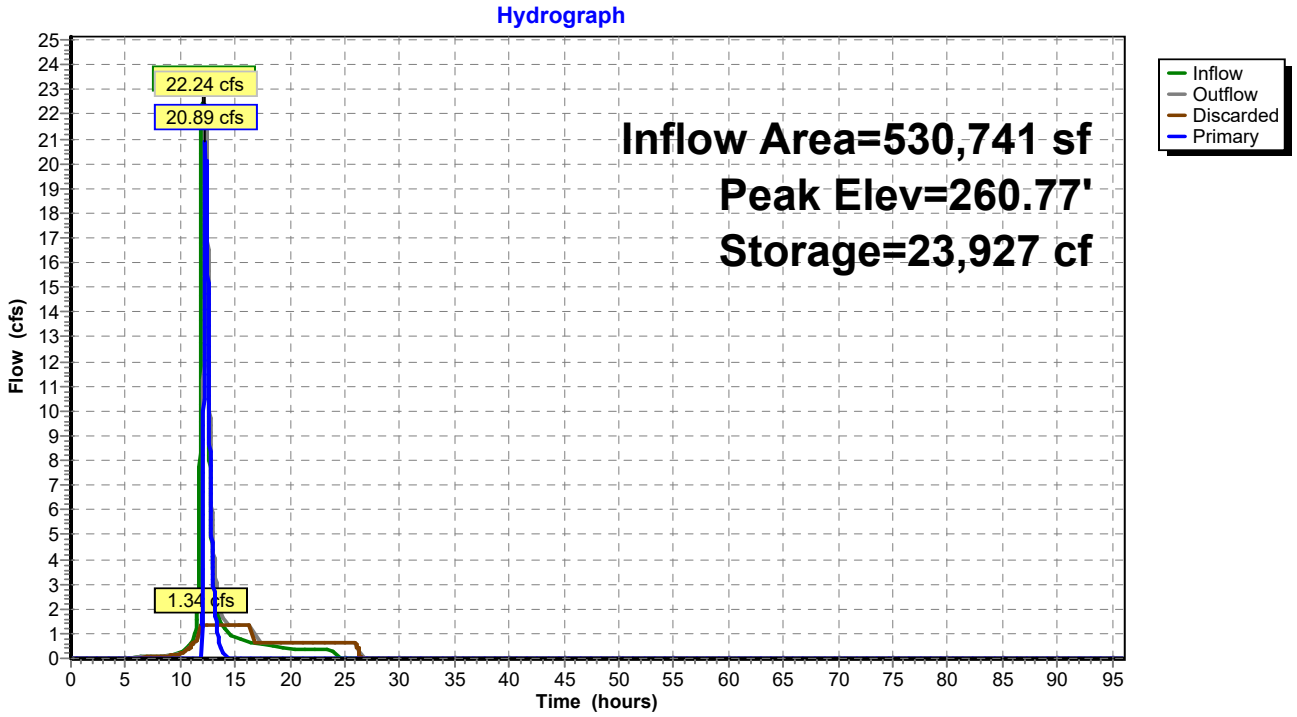
Pond 6P: Infiltration Basin



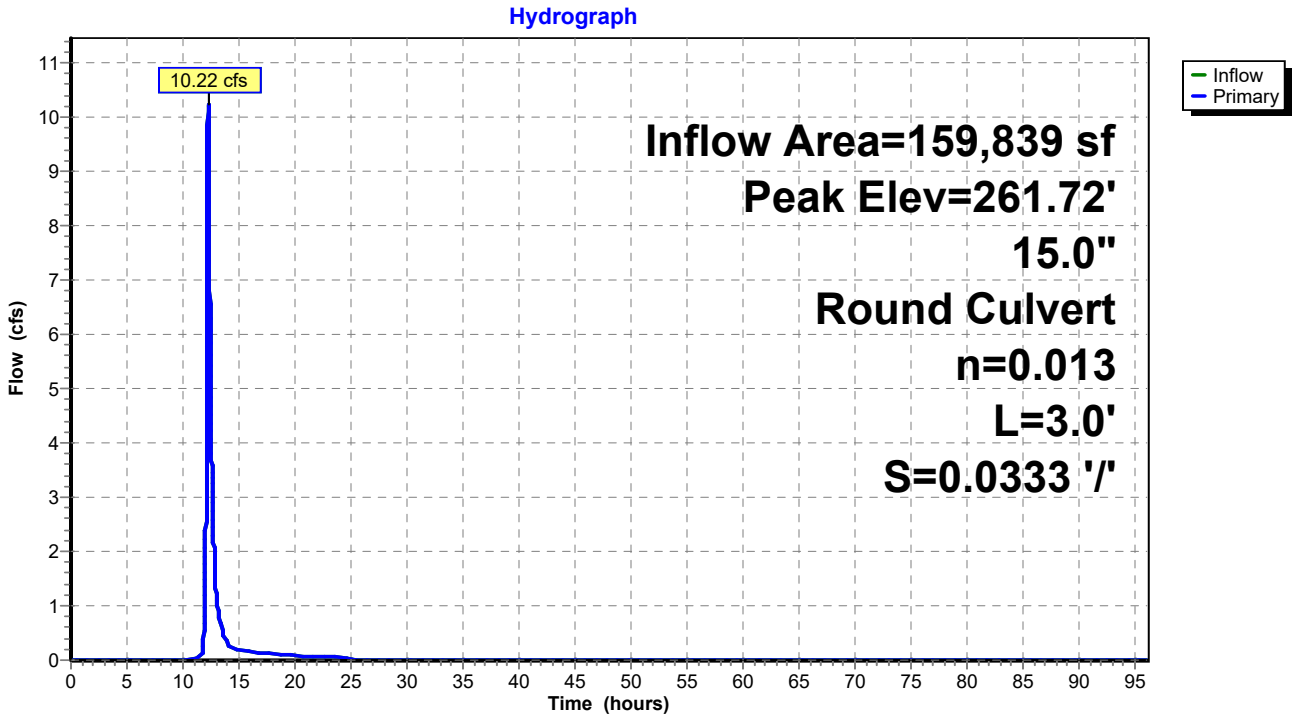
Pond 15P: DA 2 System



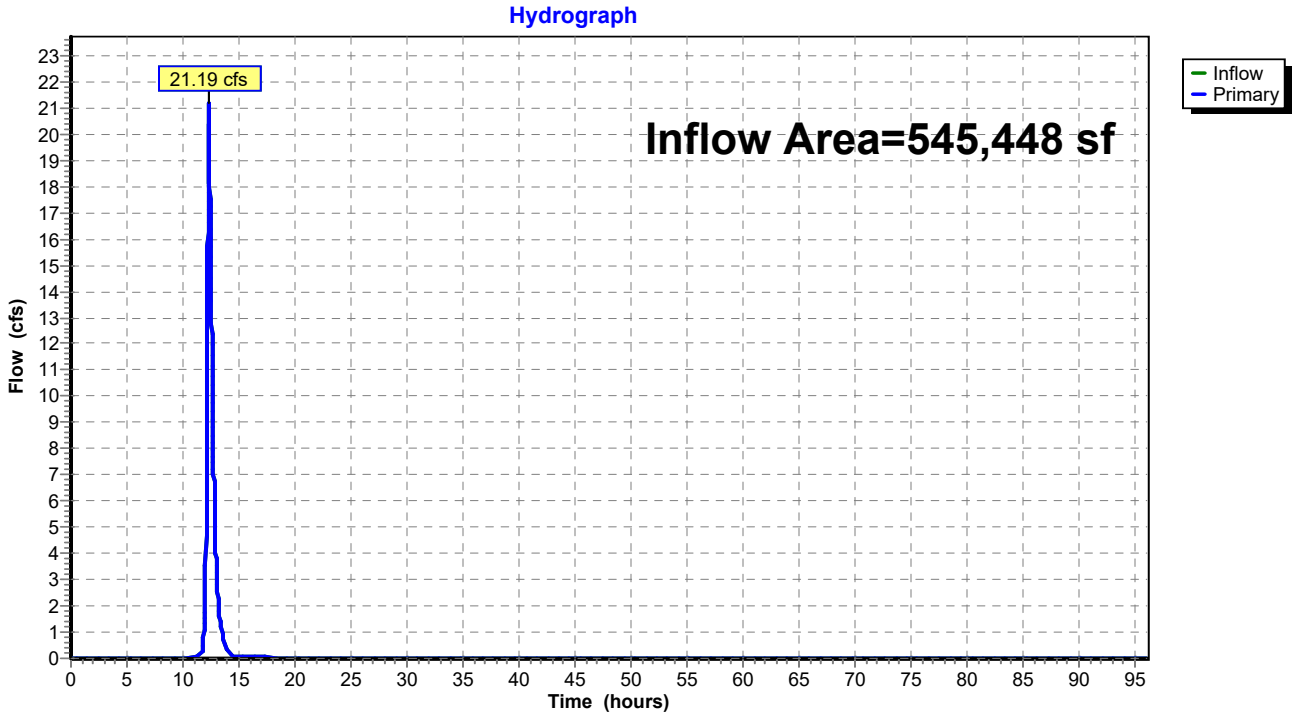
Pond 16P: DA 3 System



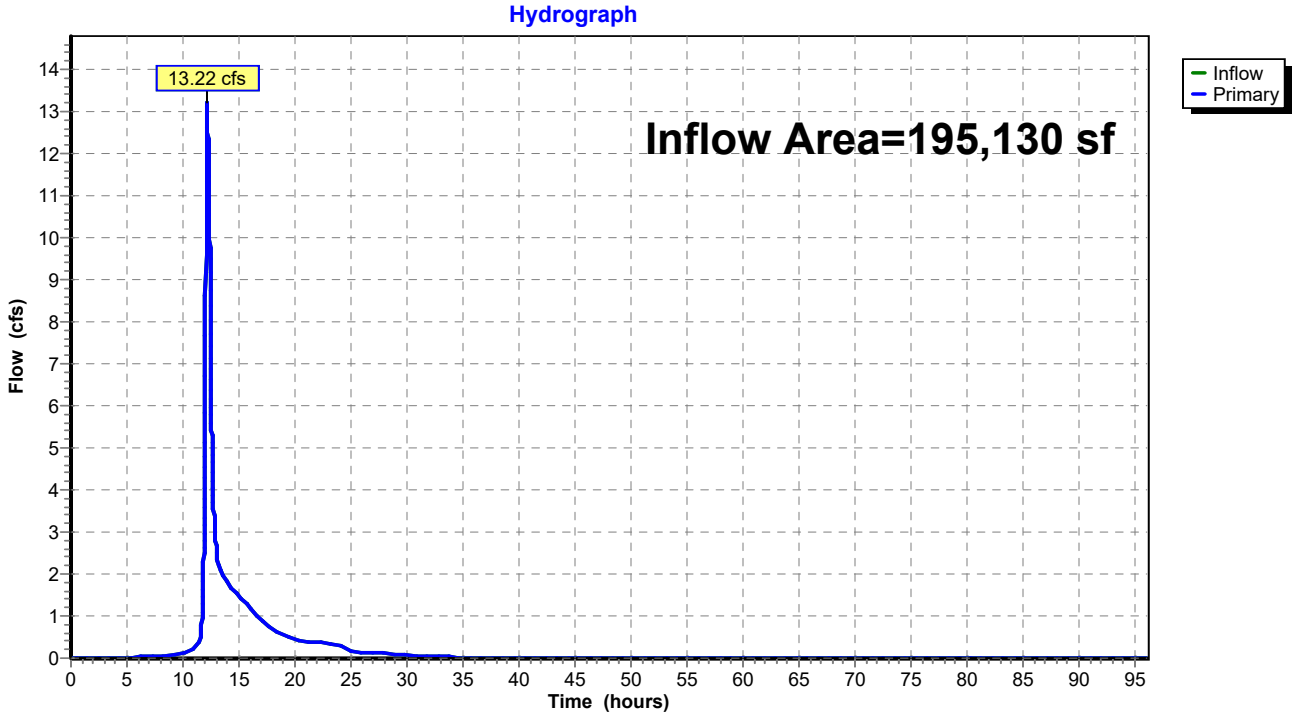
Pond 25P: Swale CB



Link 3L: Rt. 32 Culvert



Link 4L: West Off-Site



APPENDIX E

Water Quality Volume and Water Quality Flow Calculations

Loureiro
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory

Project:	Shantok Village		
Calculated By:	APH	**Date:**	**07/15/24**
Checked By:	GFA	**Date:**	**07/15/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	Developed Site
Condition:	Post-Construction

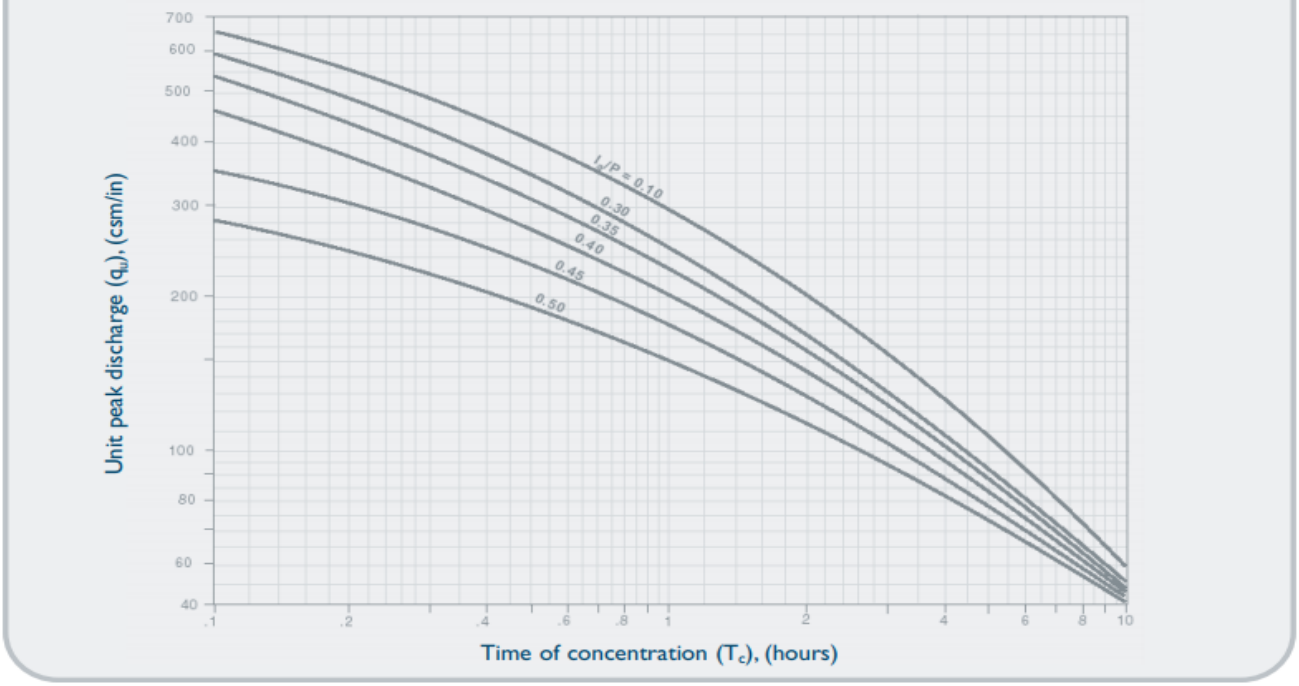
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	34%	
Volumetric Runoff Coefficient, R:	*0.353*	
Area, A:	740,579	S.F.
Water Quality Volume, WQV:	***28,359***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.460*	*in*	
Runoff Curve Number, CN:	*88*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.273*	*in*	
I_a/P:	*0.21*		
Unit Peak Discharge, q_u:	590	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.02656*	mi^2	
Water Quality Flow, WQF:	***7.20***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



APPENDIX F

Stormwater Maintenance Program and Checklist

1758 Rt. 32, Montville CT

Stormwater Management System Maintenance Program

There shall be periodic maintenance of the stormwater systems on the property after installation. In order to ensure effective performance of the system, the following stormwater maintenance program has been established. The property owner will be responsible for implementation of this program. A log and schedule of all inspections, cleanings, and repairs shall be maintained by the property owner. All maintenance documents shall be transferred to any future owners upon sale or transfer of the property.

A. Catch basins/Manholes

Catch basins are designed with sumps for the purpose of collecting coarse sediment. All catch basins should be inspected two times per year, specifically during times for high levels of maintenance around the site. Sediment should be removed when it extends to within 6 inches of the outlet pipe invert or not less than once per year. Cleanout should be facilitated via vacuum truck or other means that accomplish sediment removal. The sediment shall be disposed of in an approved off-site location in accordance with town and state requirements.

B. Asphalt

Asphalt areas should be swept annually. Ideal sweeping timeframe is in the spring after winter sanding or salting for deicing. Deicing chemicals should be kept to a minimum during the winter months.

C. Subsurface detention/infiltration systems

Underground detention/infiltration systems shall be inspected through the surface openings quarterly and sediment/debris shall be removed as needed to ensure proper functioning of structures and inlets/outlets. Areas of disturbance that may be as a result of cleaning shall be seeded and planted in accordance with the original planting plan. Associated structures shall be maintained yearly, or more frequently, as required, by the condition of the site and system. Waste material will be properly disposed of off-site.

D. Lawn and vegetated areas

Vegetated cover shall be maintained on all earth surfaces to minimize soil erosion. Fertilizer use should be minimized and applied using careful application processes.

E. Hydrodynamic Separator

The hydrodynamic separator shall be inspected and maintained during catch basin inspections and cleaning. An inspection is made by checking the depth of sediment in each manhole with a grade stick or similar device. Maintenance is required when the sediment depth in exceeds 20 inches. Minimum inspection is recommended twice a year to maintain operation and function of the unit.

Maintenance Instructions:

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 10” diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment.
3. Use a high-pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.

Stormwater Management System Maintenance Checklist

5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
    - Check with the local sewer authority for authority to discharge the liquid.

F. Outlet control structures

The outlet control structures shall be inspected and maintained during catch basin inspections and cleaning. Maintenance is required when any sediment accumulation is observed at the bottom of the structure. Minimum inspection is recommended twice a year to maintain operation and function of the unit. See stormwater management system maintenance checklist for outlet control structure instructions.

1758 Rt. 32, Montville CT

Stormwater Management System Maintenance Checklist

Inspection Date: _____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
Drainage Structures			
Sedimentation Accumulation			
Large Floating Debris			
Inlet/Outlet			
Structure walls			
Riser			
Frame and Cover			
Detention/Infiltration System			
Settling Over System			
Sedimentation Accumulation			
Large Floating Debris			
Inspection Structure Integrity			
Inspection Inlets/Outlets			
Surrounding Lawn and Vegetated Areas			
Signs of Erosion			
Ponding/Settling			
Overgrowth			

Additional Comments: _____