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

The National Map US Topo

COVENTRY QUADRANGLE
CONNECTICUT - TOLLAND COUNTY
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 18T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2016 - September 2016
Roads..... U.S. Census Bureau, 2016
Names.....GNIS, 1979 - 2017
Hydrography.....National Hydrography Dataset, 2003
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 2016 - 2017

Wetlands.....FWS National Wetlands Inventory 2010

MN GN
14°0′ 249 MILS
1°48′ 32 MILS
UTM GRID AND 2017 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
YM
Grid Zone Designation 18T

SCALE 1:24 000
KILOMETERS 1 0.5 0 1 2
METERS 1000 500 0 1000 2000
MILES 1 0.5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

CONNECTICUT
QUADRANGLE LOCATION

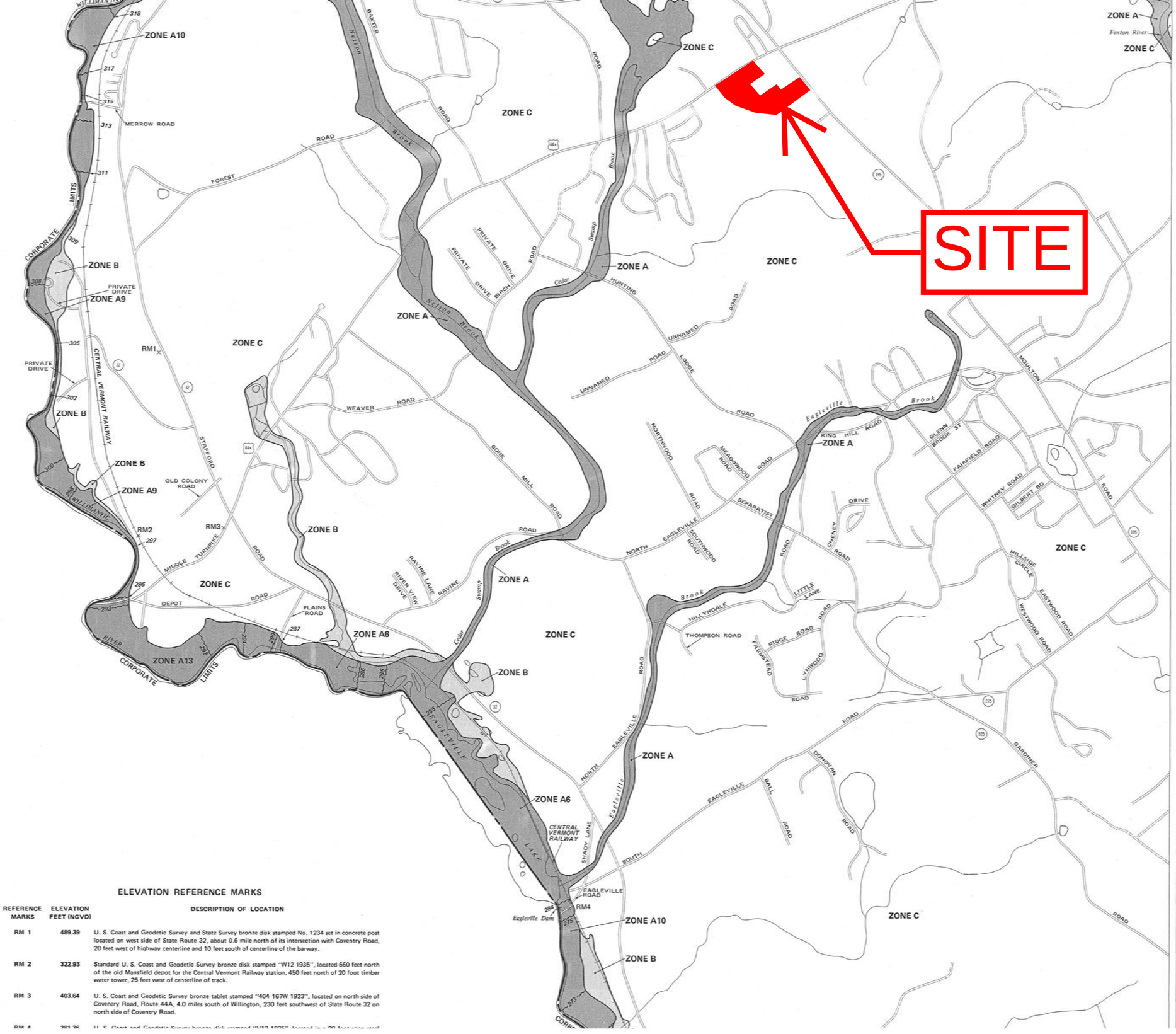
1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Ellington
2 Stafford Springs
3 Westford
4 Rockville
5 Spring Hill
6 Marlborough
7 Columbia
8 Willimantic

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

COVENTRY, CT
2018

ISSN. 7643016360105
SKA REF NO. USGSX24K10393
7643016360105



ELEVATION REFERENCE MARKS

REFERENCE MARKS	ELEVATION FEET (NGVD)	DESCRIPTION OF LOCATION
RM 1	489.39	U. S. Coast and Geodetic Survey and State Survey bronze disk stamped No. 1234 set in concrete post located on west side of State Route 32, about 0.6 mile north of its intersection with Coventry Road, 20 feet west of highway centerline and 10 feet south of centerline of the barway.
RM 2	322.93	Standard U. S. Coast and Geodetic Survey bronze disk stamped "W12 1935", located 660 feet north of the old Mansfield depot for the Central Vermont Railway station, 450 feet north of 20 foot timber water tower, 25 feet west of centerline of track.
RM 3	403.64	U. S. Coast and Geodetic Survey bronze tablet stamped "404 167W 1923", located on north side of Coventry Road, Route 44A, 4.0 miles south of Willington, 230 feet southwest of State Route 32 on north side of Coventry Road.
RM 4	281.36	U. S. Coast and Geodetic Survey bronze disk stamped "W12 1935", located in a 20 foot steep steel

River Mile •M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
JANUARY 9, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
OCTOBER 29, 1976
JUNE 21, 1977

FLOOD INSURANCE RATE MAP EFFECTIVE:
JANUARY 2, 1981

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620, or (800) 424-8872.

N

APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
MANSFIELD,
CONNECTICUT
TOLLAND COUNTY

PANEL 5 OF 20

APPENDIX B: SOIL AND WETLAND INFORMATION

- *NCRS CUSTOM SOIL RESOURCE REPORT*
- *REPORT OF GEOTECHNICAL INVESTIGATION*
- *WETLAND/WATERCOURSES REPORT (under separate cover)*
- *PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION*
- *SUPPLEMENTAL STORMWATER MANAGEMENT AREA EVALUATION*

United States Department of Agriculture

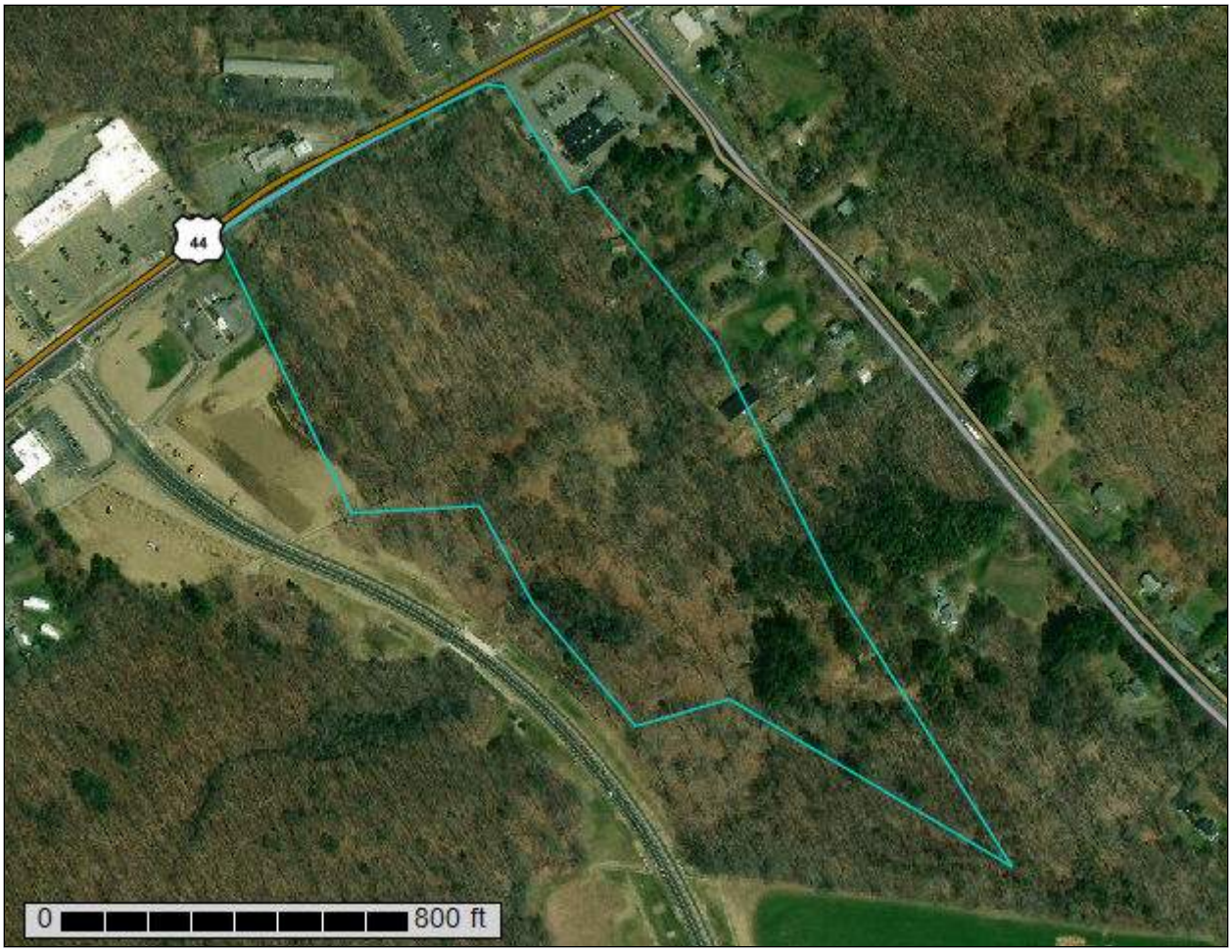
Natural Resources Conservation Service

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

Custom Soil Resource Report for

State of Connecticut

Mansfield Soil Survey



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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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.

Map Scale: 1:1,360 if printed on D landscape (34" x 22") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

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
Survey Area Data: Version 19, Sep 13, 2019

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

Date(s) aerial images were photographed: Apr 30, 2013—Sep 23, 2017

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
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	0.5	1.8%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	6.7	24.1%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	1.5	5.2%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	5.6	20.2%
60B	Canton and Charlton fine sandy loams, 3 to 8 percent slopes	11.3	40.6%
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	2.2	8.0%
306	Udorthents-Urban land complex	0.0	0.1%
Totals for Area of Interest		**27.9**	**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

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt
Elevation: 0 to 1,480 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

Ridgebury, extremely stony, and similar soils: 40 percent
Leicester, extremely stony, and similar soils: 35 percent
Whitman, extremely stony, and similar soils: 17 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Ground moraines, drumlins, drainageways, depressions, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Natural drainage class: Poorly 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 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Hills, ground moraines, drainageways, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly 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 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

Landform: Hills, ground moraines, drumlins, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam

Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Natural drainage class: Very poorly drained
Runoff class: Negligible
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 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

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

45B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2ql
Elevation: 0 to 1,470 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

Woodbridge, fine sandy loam, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
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: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
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
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 8 percent
Landform: Ground moraines, depressions, drainageways, hills

Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

46B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 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

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
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 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Paxton, very stony
Percent of map unit: 10 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Ridgebury, very stony
Percent of map unit: 8 percent
Landform: Depressions, drainageways, ground moraines, drumlins, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

51B—Sutton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2xfff
Elevation: 0 to 1,410 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
Sutton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sutton, Very Stony

Setting
Landform: Hills, ground moraines
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

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: fine sandy loam
Bw1 - 7 to 19 inches: fine sandy loam
Bw2 - 19 to 27 inches: sandy loam
C1 - 27 to 41 inches: gravelly sandy loam
C2 - 41 to 62 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Charlton, very stony

Percent of map unit: 7 percent
Landform: Ridges, hills, ground moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Canton, very stony

Percent of map unit: 4 percent
Landform: Moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Leicester, very stony

Percent of map unit: 3 percent
Landform: Depressions, drainageways, hills, ground moraines
Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

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

60B—Canton and Charlton fine sandy loams, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2w81s
Elevation: 0 to 1,460 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
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: Ridges, hills, moraines
Landform position (two-dimensional): Summit, shoulder, backslope
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: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Natural 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 storage in profile: Very low (about 2.7 inches)

Interpretive groups

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

Description of Charlton

Setting

Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
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: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

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

Minor Components

Sutton

Percent of map unit: 5 percent
Landform: Ridges, 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

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

Leicester

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

61B—Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81v
Elevation: 0 to 1,480 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

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

Description of Canton, Very Stony

Setting

Landform: Ridges, hills, moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, nose slope, side slope
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

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural 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
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
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: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural 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

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Moderate (about 8.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Sutton, very stony
Percent of map unit: 5 percent
Landform: 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

Leicester, very stony
Percent of map unit: 5 percent
Landform: Hills, depressions, drainageways, ground moraines
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

Chatfield, very stony
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

306—Udorthents-Urban land complex

Map Unit Setting
National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents and similar soils: 50 percent

Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

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

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent
Hydric soil rating: No

Udorthents, wet substratum

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

Rock outcrop

Percent of map unit: 2 percent

Hydric soil rating: No

References

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

December 6, 2018

via email

CAPSTONE COLLEGIATE COMMUNITIES, LLC
431 Office Park Drive
Birmingham, Alabama 35223

Attention: Ms. Amanda Wallis
Executive Vice President – Development

Regarding: PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MAP 9, BLOCK 23, LOTS 1, 7, & 8
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
WHITESTONE PROJECT NO.: GM1816022.000

Dear Ms. Wallis:

Whitestone Associates, Inc. (Whitestone) has completed a preliminary geotechnical investigation at the above-referenced site. The results of the investigation and recommendations presented below are based on the soil conditions disclosed from a limited number of soil explorations performed during Whitestone's field investigation. The purpose of the investigation was to assess subsurface conditions within proposed building areas accessible to all terrain vehicle (ATV) mounted drilling equipment. Preliminary recommendations for support of the proposed buildings, slabs, and pavement, and anticipated earthwork requirements are included herein.

1.0 PROJECT DESCRIPTION

1.1 Site Location & Existing Conditions

The 24.1-acre site is located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut. According to the Town of Mansfield Assessor's Office, the site is identified as Map 9, Block 23, Lots 1, 7, and 8. The site currently is developed with several residential buildings along Storrs Road. The remaining portions of the site are wooded. Wetlands within the subject site reportedly limit the development area to approximately 15.9 acres. Based on a review of available topographic maps, the site slopes down to the northeast from the approximate elevation of 660 feet above North American Vertical Datum of 1988 (NAVD) to approximately 620 feet above NAVD.

1.2 Site Geology

On the *Surficial Materials Map of Connecticut (1992)*, the site is shown underlain by glacial till. The *Bedrock Geologic Map of Connecticut (1985)* indicates that the subject property is underlain by Silurian-aged schist with minor granofels of the upper member of the Bigelow Brook Formation, part of the Eastern Uplands.

1.3 Proposed Construction

The final design has not yet been determined, however, the client anticipates the proposed redevelopment will include approximately 150 residential units, separated into two-story and three-story buildings with associated parking, utilities, and recreational areas. No stormwater management facilities have been identified at this time.

Detailed structural information was not available at the time of this report, however, based on experience with similar facilities, Whitestone anticipates that maximum column, wall, and floor loads will be less than about 50 kips, two kips per lineal foot, and 150 pounds per square foot, respectively.

2.0 FIELD INVESTIGATION

2.1 Fieldwork

Field exploration at the project site consisted of performing five soil borings, completed as groundwater monitoring wells. The locations of the soil borings are shown on the accompanying *Boring Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The subsurface tests were conducted in the presence of a Whitestone engineer who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, where encountered, were recorded during and immediately after the completion of field operations, and in the installed groundwater monitoring wells. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.2 Laboratory Testing Program

In addition to the field investigation, a laboratory testing program was conducted to assess additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory testing program was performed in general accordance with applicable ASTM standard test methods and included physical/textural testing.

The results of the laboratory testing program are presented in this section in a general manner and qualitatively interpreted. The results are incorporated into the findings and recommendations discussed throughout this report. Quantitative test results are provided in Appendix B.

Physical and Textural Analysis: Representative samples of the selected stratum encountered were subjected to a laboratory testing program that included moisture content determinations (ASTM D2216) and washed gradation analyses (ASTM D422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table.

PHYSICAL/TEXTURAL ANALYSES SUMMARY					
Boring	**Sample**	**Depth (fbgs)**	**Moisture Content (%)**	**% Passing No. 200 Sieve**	**USCS Classification**
B-1	S-3	5.0 - 7.0	11.2	43.3	SM
B-5	S-2	2.0 - 4.0	15.0	17.9	SM

3.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the subsurface tests conducted by Whitestone consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Surface Cover Materials: The borings encountered topsoil, three inch to eight inches in thickness, at the ground surface.

Glacial Till: Beneath the surface cover materials, the borings encountered glacial till, consisting of brown, medium dense to very dense (surficially very loose to loose), silty sand with gravel (USCS: SM). SPT N-values within the glacial till were variable, ranging from two blows per foot (bpf) to greater than 100 bpf.

Apparent Bedrock: The explorations encountered refusal on apparent bedrock at depths ranging from 2.5 fbgs to 12.5 fbgs. Refusal materials were not sampled through rock coring efforts. Rock coring techniques would be required to further characterize the nature and extent of the refusal materials. Bedrock outcrops were noted at various locations throughout the site.

Groundwater: Static groundwater was encountered within the explorations at depths ranging from two fbgs to three fbgs. Groundwater levels should be expected to fluctuate seasonally and following periods of precipitation. Groundwater levels were measured in the monitoring wells at depths ranging from 0.8 fbgs to 4.1 fbgs on December 3, 2018.

4.0 PRELIMINARY CONCLUSIONS & RECOMMENDATIONS

Whitestone's findings indicate that the proposed structures may be supported on conventional shallow foundations bearing on approved natural glacial till and/or properly placed structural fill. Whitestone's findings also indicate that the site is suitable for ground-supported floor slabs deriving support from properly inspected and approved compacted glacial till, and/or compacted structural fill. Additionally, the site conditions support the use of typical pavement sections using standard CTDOT specified materials.

The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered within the limited exploration performed. If there are any significant changes to the project characteristics or if significantly different subsurface conditions are encountered during construction, Whitestone should be consulted, so that the recommendations of this report can be reviewed.

4.1 Site Preparation & Earthwork

Surface Preparation: Prior to placing fill to raise or restore grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm and unyielding surface with several passes in two perpendicular directions of a minimum 10-ton vibratory compactor. Fill and backfill should be placed and compacted in accordance with Section 4.2.

Weather Performance Criteria: Because the natural site soils will soften when exposed to water, every effort should be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of saturated soils and replacement with controlled structural fill per Section 4.2 of this report may be required prior to resuming work on disturbed subgrade soils.

Subgrade Protection and Inspection: Every effort should be made to reduce disturbance of the on-site soils by construction traffic and surface runoff. The on-site soils may deteriorate when subjected to repeated construction traffic and/or inclement weather, which would require removal and replacement. These materials also may require discing, drying, and aeration during wet periods. The contractor should be responsible for protection of subgrades and minimization of exposure of the site soils to precipitation by covering stockpiles and subgrades with plastic and preventing ponding of water by sealing subgrades before precipitation events and grading the site to allow proper drainage of surface water. All rutting from construction equipment should be removed prior to any forecasted or actual precipitation. The services of the geotechnical engineer should be retained to observe soils conditions during construction and review the suitability of prepared foundation subgrades for support of design loads.

Groundwater Control: Static groundwater was encountered within the explorations at depths that will impact excavation for foundations or utilities. As such, construction phase dewatering will likely consist of temporarily lowering the static groundwater and removing surface water runoff, infiltrating water, or trapped water at this site. Temporary construction phase dewatering of static and trapped/perched water should be feasible through the use of gravity fed sump pits and pumps.

Since excessive amounts of perched groundwater may accumulate during periods of wet weather, Whitestone recommends that foundation construction occur during periods of relatively dry weather. Every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of foundation areas to precipitation.

4.2 Structural Fill & Backfill

Imported Fill Material: Any imported material placed as structural fill or backfill to restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 12 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. Any imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

Soil Reusability: Portions of the site soils are acceptable for selective reuse as fill/backfill material, provided that soil moisture contents are controlled within two percent of optimum moisture level, particles larger than three inches in diameter are either removed or crushed, and objectionable portions, such as organics or debris, are segregated. Reuse of the site soils will be contingent on careful review in the field by the owner's geotechnical engineer by visual observation during construction as recommended herein. However, portions of the natural silty soils at the site are marginally acceptable for reuse as structural fill and/or backfill because of difficult workability. Reuse of these silty soils will likely require extensive moisture conditioning and/or drying to facilitate reuse, workability, and compaction in fill areas. Immediate re-use of on-site soils for structural fill or backfill should not be anticipated as the majority of the site natural soils are moisture sensitive. On-site natural materials that are or become wet will require extensive handling, such as discing and aerating, which may not be practical during wet seasons or where site area is limited. In order to attempt the re-use of on-site natural soil, the contractor should cover stockpiled soils, seal subgrades each day with a smooth drum roller, and provide proper surface drainage during forecasted wet weather. Alternatively, imported fill materials may be required to expedite earthwork operations. The stripped surface cover materials should not be used as structural fill or backfill.

Compaction and Placement Requirements: Fill and backfill should be placed in maximum eight-inch thick loose lifts and compacted using a vibratory drum roller during mass grading activities or a small hand-held vibratory compactor within excavations. Structural fill and backfill placed within the building pads, including 10 feet outside the exterior walls, should be compacted to at least 95 percent of the maximum dry density within two percent of the optimum moisture content, as determined by ASTM D1557 (Modified Proctor). Structural fill and backfill placed within non-building areas should be compacted to at least 92 percent of the maximum dry density within two percent of the optimum moisture content, as determined by ASTM D1557.

4.3 Preliminary Foundation Design Criteria

Foundations: Whitestone preliminarily recommends supporting the proposed structures on conventional spread foundations designed to bear within the approved natural glacial till and/or on controlled structural fill materials that are properly evaluated, placed and compacted as described herein. Foundations bearing within these materials may preliminarily be designed using a maximum net allowable bearing pressure of 4,000 pounds per square foot subject to review of final design loading, grading, and settlement tolerances.

Foundation subgrades should be compacted in the presence of the geotechnical engineer to densify loose upper soils and disturbed soils. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for spread footings.

Footings subject to lateral loads and/or overturning should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings, so that lateral resistance should be provided by friction resistance at the base of the footings. An allowable coefficient of friction against sliding of 0.4 is recommended for use in the design of the foundations bearing within the existing site soils or imported structural fill soils.

Seismic Site Class: Based on a review of the subsurface conditions relevant to the *Connecticut State Building Code*, the subject site has been assigned a Site Class C. The site soils are not susceptible to earthquake induced liquefaction.

Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils at the footing bottoms be reviewed by a geotechnical engineer immediately prior to placing concrete for the footings. In the event that areas of unsuitable materials are encountered, additional overexcavation and replacement of the materials may be necessary to provide a suitable footing subgrade. Any overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation may be eliminated if grades are restored with lean concrete. Compaction of the bottom of overexcavations should be reviewed by the on-site geotechnical engineer.

Frost Coverage: Footings subject to frost action should be placed at least 42 inches below adjacent exterior grades, in accordance with the *Connecticut State Building Code*, to provide protection from frost penetration. Interior footings not subject to frost action may be placed at a minimum depth of 18 inches below the floor slabs.

Settlement: Whitestone estimates post-construction settlements of proposed foundations of less than one inch, if the recommendations outlined in this report are properly implemented. Differential settlement of foundations should be less than one half inch.

4.4 Floor Slabs

Whitestone anticipates that the natural glacial till or controlled structural fill materials will be suitable for support of the proposed floor slabs provided these materials are properly evaluated, placed, and compacted.

4.5 Pavements

Whitestone anticipates that the properly inspected and approved natural glacial till or compacted structural fill and/or backfill placed to raise or restore design elevations will be suitable for support of the proposed pavements, provided these materials are properly evaluated, compacted, and proofrolled during favorable weather conditions.

A California Bearing Ratio value of 8.0 has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible pavement designs per the AASHTO *Guide for the Design of Pavement Structures*. Design traffic loads were assumed based on typical volumes for similar facilities and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. Estimated maximum pavement loads of 11,000 ESALs and 30,000 ESALs were used for the standard-duty and heavy-duty pavement areas, respectively.

Pavement components should meet material specifications from CTDOT *Standard Specifications* specified below. The recommended flexible pavement sections are tabulated below:

FLEXIBLE PAVEMENT SECTIONS			
Layer	**Material**	**Standard-Duty Thickness (inches)**	**Heavy-Duty Thickness (inches)**
Asphalt Wearing Course	CTDOT HMA S0.375 (Superpave); PG 64S-22	1.5	1.5
Asphalt Binder Course	CTDOT HMA S0.5 (Superpave); PG 64S-22	1.5	2.0
Granular Base	CTDOT M.05.01 Processed Aggregate Base	6.0	6.0
Granular Subbase	CTDOT M.02.02 Subbase; M.02.06 Gradation A	6.0	6.0

The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thickness may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. Proper drainage should be provided for the pavement structure, including appropriate grading and surface water control, and interceptor (edge) drains on the higher side(s) of the site. Consideration should also be given to radial drains at catch basins.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that CTDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials.

4.6 Excavations

The site soils encountered during the investigation generally are most consistent with, at least, Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA) that require a maximum unbraced excavation

angle of 1.5:1 (horizontal:vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA), so that safe excavation methods and/or shoring and bracing requirements are implemented. Competent bedrock may be excavated at an angle of 1:6 (horizontal:vertical). A steeper excavation angle in the bedrock may be feasible, if the exposed bedrock is reviewed by a professional engineer or geologist.

5.0 SUPPLEMENTAL POST INVESTIGATION SERVICES

Construction Inspection and Monitoring: The owner's geotechnical engineer with specific knowledge of the subsurface conditions and design intent should perform inspection, testing, and consultation during construction, as described in previous sections of this report. Monitoring and testing should also be performed to check that the existing surface cover materials are properly stripped and suitable materials, used for controlled fill, are properly placed and compacted over suitable subgrade soils. The proofrolling of all subgrades prior to pavement support should be witnessed and documented by the owner's geotechnical engineer.

6.0 CLOSING

Whitestone geotechnical division appreciates the opportunity to be of service to Capstone Collegiate Communities, LLC. Whitestone has the capability to perform the additional geotechnical engineering services recommended herein. Please contact us at (860) 726-7889 with any questions regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Richard W.M. McLaren, P.E.
Senior Consultant

Ryan R. Roy, P.E.
Principal, New England Region

RWM/br N:\Job Folders\2018\1816022GM\Reports and Submittals\GM1816022 Lim GI Mansfield CT.docx
Copy: Laurence W. Keller, P.E., Whitestone Associates, Inc.

FIGURE 1
Boring Location Plan

LEGEND

B-1 BORING LOCATION (APPROX.)

REFERENCE

THIS PLAN IS BASED UPON AN OCTOBER 11, 2018 *CONCEPTUAL DEVELOPMENT PLAN* PREPARED BY NILES BOLTON ASSOCIATES

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

DRAWING TITLE: **BORING LOCATION PLAN**

CLIENT: **CAPSTONE COLLEGIATE COMMUNITIES, LLC**

PROJECT: PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT

PROJECT #: GM1816022.000	
DESIGNED BY: JL	PROJ. MGR.: RRR
DATE: 12/05/18	FIGURE: 1
SCALE: 1" = 100'	

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APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	9.5 feet bgs	**Date Completed:**	11/19/2018				
Proposed Location:	Building	**Logged By:**	JM	**During:**	3.0	--	
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	--	--	**At Completion:** -- / --
		Equipment:	Diedrich D-50	**12/3/2018**	0.8	--	**24 Hours:** -- / --

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
							TS	8" Topsoil	
0 - 2	S-1		W O - 1 - 1 - 2 H	19	2		GLACIAL TILL	Brown, Very Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2		4 - 13 - 18 - 22	20	31			As Above, Dense (SM)	
						5.0			
5 - 7	S-3		17 - 8 - 15 - 22	24	23			As Above, Medium Dense (SM)	
7 - 9	S-4		14 - 21 - 27 - 29	20	48			As Above, Dense (SM)	
						10.0		Boring Log B-1Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 9.5 Feet Below Ground Surface.	Monitoring Well Installed
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018	**Water Depth | Elevation** (feet bgs) | (feet NAVD88)		**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)	
Termination Depth:	2.5 feet bgs	**Date Completed:**	11/19/2018				
Proposed Location:	Building	**Logged By:**	JM	**During:**	-- | --		
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	-- | --	**At Completion:**	-- | --
		Equipment:	Diedrich D-50	**12/3/2018**	1.3 | --	**24 Hours:**	-- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - .8	S-1	X	28 - 50/3"	8	-		TS		3" Topsoil	
							GLACIAL TILL		Brown, Dense, Silty Sand with Gravel (SM)	Offset Boring, Same Refusal
						5.0			Boring Log B-2 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 2.5 Feet Below Ground Surface.	Monitoring Well Installed
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018	**Water Depth | Elevation** (feet bgs) | (feet NAVD88)	**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)
Termination Depth:	5.0 feet bgs	**Date Completed:**	11/19/2018		
Proposed Location:	Building	**Logged By:**	JM	**During:** -- | --	
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:** -- | --	**At Completion:** -- | --
		Equipment:	Diedrich D-50	**12/3/2018** 4.1 | --	**24 Hours:** -- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		4" Topsoil	
0 - 2	S-1	X	2 - 2 - 1 - 2	5	3		GLACIAL TILL		Brown, Very Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2	X	2 - 2 - 4 - 4	12	6				As Above, Loose (SM)	
						5.0				
									Boring Log B-3 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 5.0 Feet Below Ground Surface.	Monitoring Well Installed
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018	**Water Depth | Elevation** (feet bgs) | (feet NAVD88)		**Cave-In Depth | Elevation** (feet bgs) | (feet NAVD88)	
Termination Depth:	7.5 feet bgs	**Date Completed:**	11/19/2018				
Proposed Location:	Building	**Logged By:**	JM	**During:**	2.0 | --		
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	-- | --	**At Completion:**	-- | --
		Equipment:	Diedrich D-50	**12/3/2018**	0.3 | --	**24 Hours:**	-- | --

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		4" Topsoil	
0 - 2	S-1	X	6 - 3 - 3 - 9	13	6		GLACIAL TILL		Brown, Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2	X	5 - 19 - 21 - 22	13	40				As Above, Dense (SM)	
						5.0				
5 - 7	S-3	X	17 - 17 - 36 - 75	12	53				As Above, Very Dense (SM)	
									Boring Log B-4 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 7.5 Feet Below Ground Surface.	Monitoring Well Installed
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-5

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1816022.000
Location:	Middle Turnpike & Storrs Road, Mansfield, Tolland County, Connecticut	**Client:**	Capstone Collegiate Communities, LLC

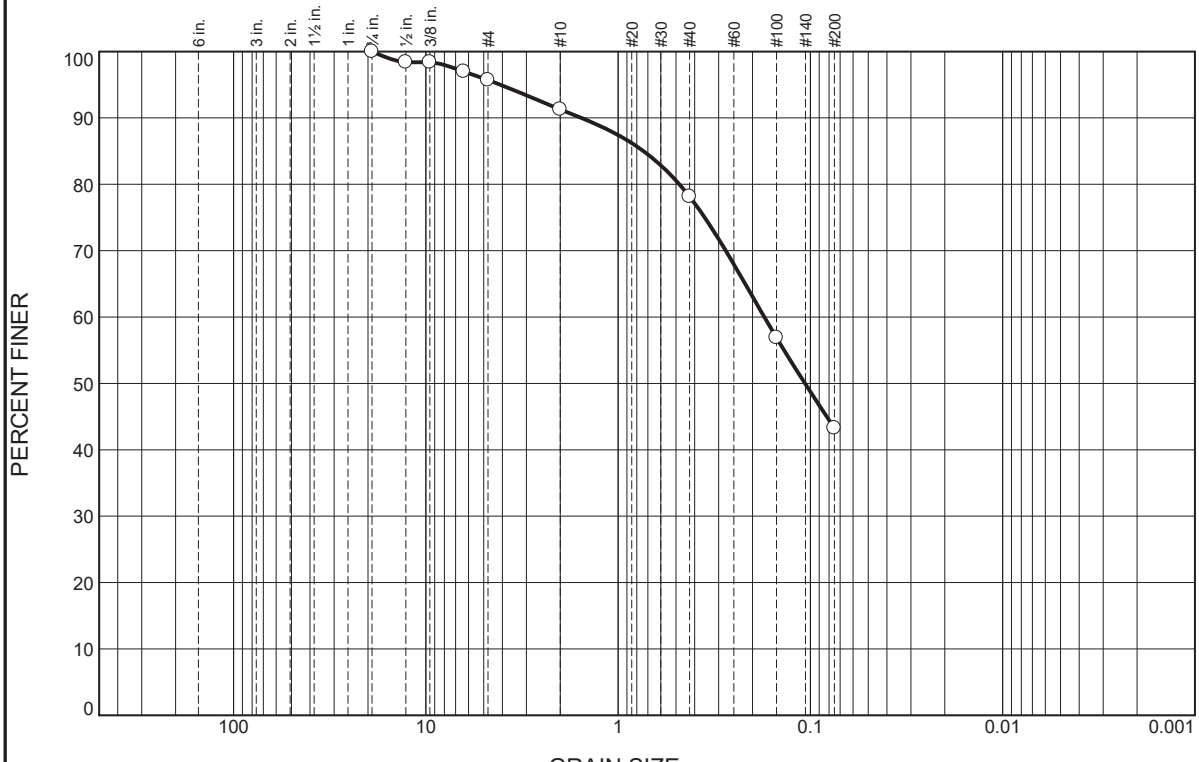
Surface Elevation:	± NS feet above NAVD88	**Date Started:**	11/19/2018		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	12.5 feet bgs	**Date Completed:**	11/19/2018				
Proposed Location:	Building	**Logged By:**	JM	**During:**	2.0	--	
Drill / Test Method:	HSA / SPT	**Contractor:**	OR	**At Completion:**	--	--	**At Completion:** -- / --
		Equipment:	Diedrich D-50	**12/3/2018**	1.2	--	**24 Hours:** -- / --

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
							TS	8" Topsoil	
0 - 2	S-1		W O - 2 - 4 - 8 H	10	6			Brown, Loose, Silty Sand with Gravel (SM)	
2 - 4	S-2		15 - 13 - 13 - 14	10	26			As Above, Medium Dense (SM)	
						5.0			
5 - 7	S-3		8 - 50 - 31 - 24	24	81		GLACIAL TILL	As Above, Very Dense (SM)	
7 - 9	S-4		26 - 41 - 37 - 35	24	78			As Above (SM)	
						10.0			
10 - 11.3	S-5		27 - 71 - 50/3"	11	>100			As Above (SM)	
								Boring Log B-5 Terminated Upon Auger Refusal on Probable Bedrock at a Depth of 12.5 Feet Below Ground Surface.	Monitoring Well Installed
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

APPENDIX B
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.3	4.4	13.2	34.8	43.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.4		
3/8"	98.4		
1/4"	97.0		
#4	95.7		
#10	91.3		
#40	78.1		
#100	56.9		
#200	43.3		

* (no specification provided)

Soil Description

Silty Sand

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 1.5546 D_{85}= 0.7382 D_{60}= 0.1736
D_{50}= 0.1066 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content: 11.2%

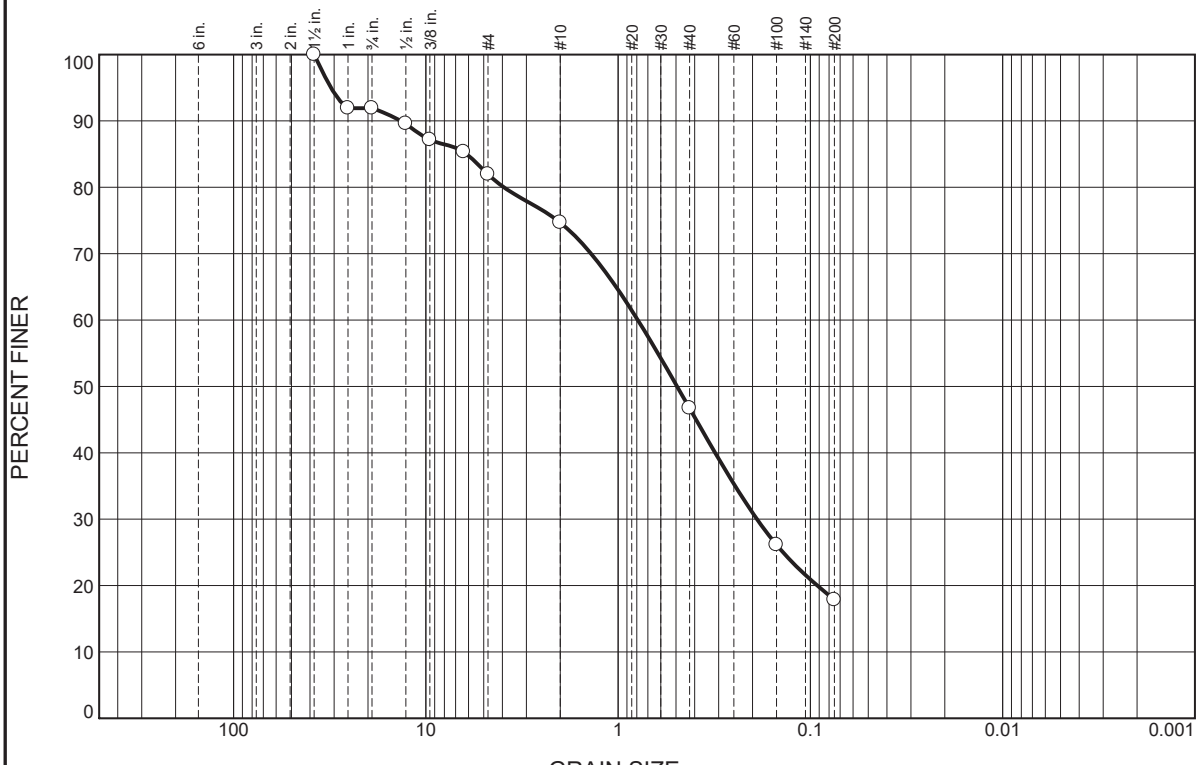
Location: B-1
Sample Number: S-3 **Depth:** 5'-7' **Date:** 11/26/2018

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

Client: Capstone Collegiate Communities, LLC
Project: Proposed Student Housing Development
Middle Turnpike (Route 44) & Storrs Road (Route 195),
Project No: GM1816022.000 **Figure** S-1

Tested By: CN **Checked By:** RWM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.1	10.0	7.2	28.0	28.8	17.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1"	91.9		
3/4"	91.9		
1/2"	89.6		
3/8"	87.2		
1/4"	85.3		
#4	81.9		
#10	74.7		
#40	46.7		
#100	26.1		
#200	17.9		

* (no specification provided)

Soil Description

Silty Sand with Gravel

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 13.4852 D_{85}= 6.1332 D_{60}= 0.7899
D_{50}= 0.4933 D_{30}= 0.1895 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture Content: 15.0%

Location: B-5
Sample Number: S-2 **Depth:** 2'-4' **Date:** 11/26/18

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

Client: Capstone Collegiate Communities, LLC
Project: Proposed Student Housing Development
Middle Turnpike (Route 44) & Storrs Road (Route 195),
Project No: GM1816022.000 **Figure** S-2

Tested By: CN **Checked By:** RWM

APPENDIX C
Supplemental Information
(USCS, Terms and Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT	
TRACE	1% TO 10%
LITTLE	10% TO 20%
SOME	20% TO 35%
AND	35% TO 50%

COMPACTNESS*
Sand and/or Gravel

	RELATIVE DENSITY
LOOSE	0% TO 40%
MEDIUM DENSE	40% TO 70%
DENSE	70% TO 90%
VERY DENSE	90% TO 100%

CONSISTENCY*
Clay and/or Silt

	RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT
VERY SOFT	LESS THAN 250
SOFT	250 TO 500
MEDIUM	500 TO 1000
STIFF	1000 TO 2000
VERY STIFF	2000 TO 4000
HARD	GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

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Other Office Locations:

WARREN, NJ 908.668.7777 | CHALFONT, PA 215.712.2700 | SOUTHBOROUGH, MA 508.485.0755 | WALL, NJ 732.592.2101 | STERLING, VA 703.464.5858 | EVERGREEN, CO 303.670.6905

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

January 8, 2019

via email

CAPSTONE COLLEGIATE COMMUNITIES, LLC
431 Office Park Drive
Birmingham, Alabama 35223

Attention: Ms. Amanda Wallis
Executive Vice President – Development

Regarding: SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
ROCK PROBE SUMMARY
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
PARCEL NOs: 9.23.1, 9.23.7 & 9.23.8
WHITESTONE PROJECT NO.: GM1816022.001

Dear Ms. Wallis:

Whitestone Associates, Inc. (Whitestone) is pleased to submit this rock probe summary letter in support of the proposed student housing development referenced above. Whitestone previously provided a December 6, 2018 *Preliminary Geotechnical Investigation* for the site. Whitestone's supplemental geotechnical services were performed in accordance with our December 12, 2018 proposal.

PROJECT DETAILS

The project site is an approximately 19.2-acre, irregularly-shaped parcel located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut currently developed with several residential buildings along Storrs Road. The remaining portions of the site are forested. Wetlands within the subject site reportedly limit the developable area to approximately 15.9 acres. Based on a review of available topographic maps and site reconnaissance, the site slopes down to the northeast from the approximate elevation of 660 feet above mean sea level (msl) to approximately 610 feet above msl.

The final design has not yet been determined, however, the client anticipates the proposed redevelopment will include approximately 200 residential units, separated into three-story to four-story buildings with associated parking, utilities, and recreational areas. It is expected that cuts and fills on the order of five feet to 10 feet and retaining walls or slopes may be required to develop the site. No stormwater management facilities have been identified at this time.

Whitestone's previously completed preliminary geotechnical investigation disclosed probable shallow bedrock at depths ranging from 2.5 feet below ground surface (fbgs) to 12.5 fbgs. Shallow bedrock can have a significant impact on site development costs. Based on the discovery of the shallow bedrock rock probing was requested to document bedrock topography beneath the site. The bedrock topography is intended to assist the design team in producing a cost-effective development plan for the site.

FIELD INVESTIGATION

Field exploration of the project site was conducted by means of 84 bedrock probes, identified as P-2 through P-85 (P-1 was inaccessible). Prior to mobilizing a rock probe drill Whitestone completed a field survey on December 19, 2018 to lay out probe locations and document apparent bedrock outcrops.

On December 26 through 28, 2018 Whitestone mobilized to the site to perform bedrock probes. The bedrock probes were advanced with a Furuwake HCR900 series rock drill to termination depths that ranged from approximately seven feet below ground surface (fbgs) to 23 fbgs. Probes were advanced approximately five feet beyond the apparent bedrock surface to help delineate between boulders and bedrock. Bedrock probe locations and estimated bedrock surface elevations contours are shown on the *Bedrock Surface Contour Plan*, included as Figure 1. Depth to bedrock is shown on the color-coded *Bedrock Depth Plan*, included as Figure 2. A table of probes and estimated bedrock depths is attached as Table 1.

PRELIMINARY FINDINGS

The shallow bedrock generally forms an irregular ridge across the mid-point of the site from west to east. However, there is a relatively large area of shallow bedrock at the south end of the site and a smaller area within the northeast quadrant.

Based on the results of the bedrock probes and the type of bedrock (metamorphosed schist) exposed in outcrops around the site, Whitestone considers that, apart from the upper foot or so, the rock will not be rippable. A portion of the bedrock could be removed with *Ho-Rams* (pneumatic hammers). This procedure would be aided by the soil seams encountered within the upper few feet of bedrock by the probes, which will allow easier removal of portions of the bedrock. However, blasting would likely be required for more extensive excavation.

Special measures should be employed for blasting, including pre- and post-blast surveys of neighboring properties and vibration monitoring during blasting. Blasting should be conducted by an experienced specialty contractor in accordance with applicable Town of Mansfield, State, and federal regulations. Care should be taken to minimize the amount of explosive charge used to reduce the likelihood of over-blast and to provide proper engineering controls during and following blasting operations. Engineering controls will include properly cleaning of loose shot rock from blasted surfaces and allowing the geotechnical engineer to inspect exposed rock conditions.

Rock pieces produced by blasting can be crushed and used on the site for roadway aggregate base and subbase and for crushed stone. Bedrock samples could be tested for L.A. Abrasion (AASHTO T96) and Soundness by Magnesium Sulfate (AASHTO T104) to determine if the bedrock meets the requirements for sale to the Connecticut Department of Transportation as fine and coarse aggregates, but given the bedrock type, its suitability is unlikely. However, regardless of the results of this testing, the crushed excavated rock will be suitable for reuse at the site for the proposed construction.

Whitestone appreciates being of continued service to Capstone Collegiate Communities, LLC. Please do not hesitate to contact us at with any questions regarding this summary letter.

Sincerely,

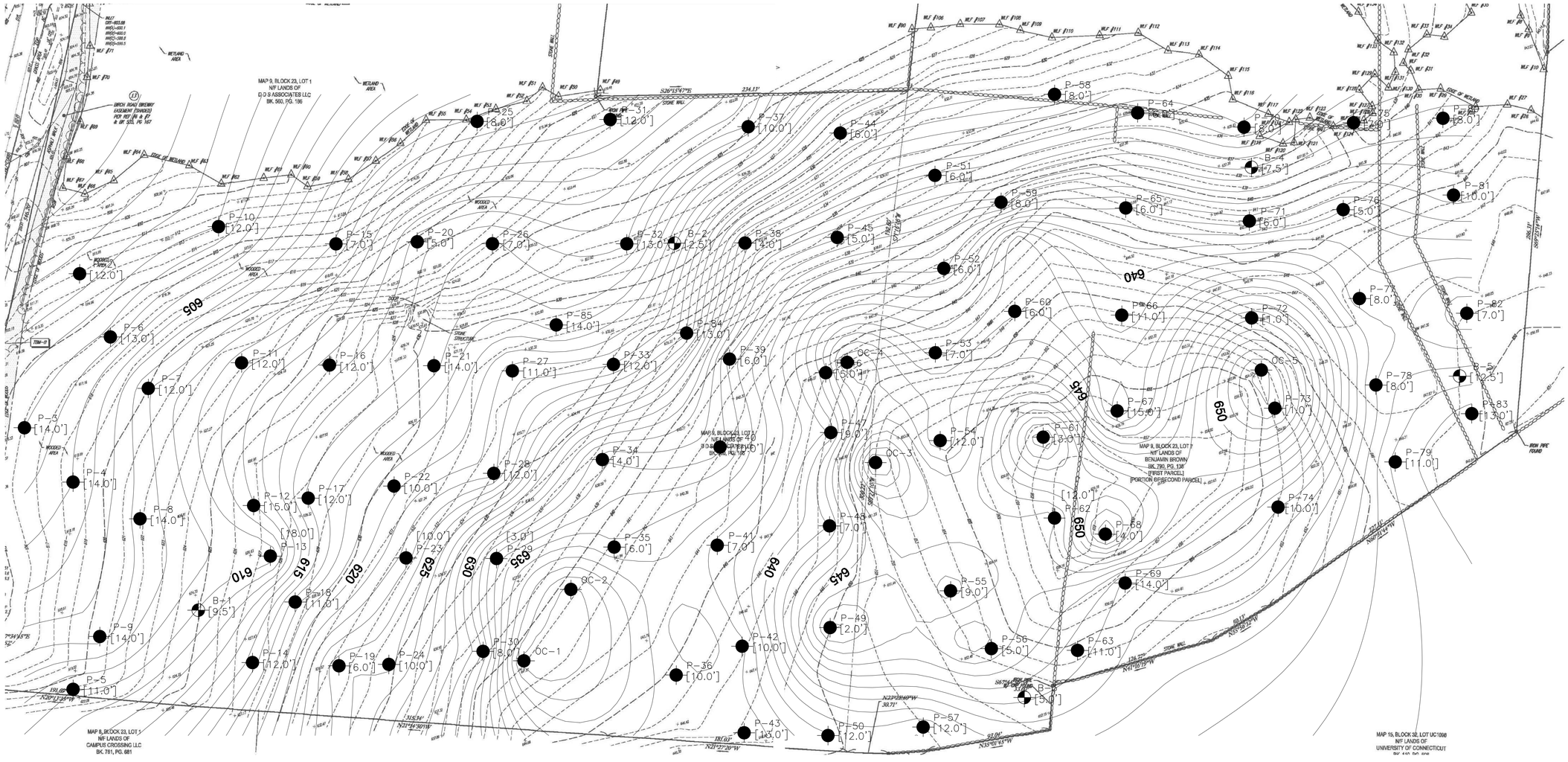
WHITESTONE ASSOCIATES, INC.

Jason R. Landry
Project Manager

Ryan R. Roy, P.E.
Principal, New England Region

JRL/hz N:\Job Folders\2018\1816022GM\Reports and Submittals\GM1816022 SuppGI Rock Probes.docx
Enclosures

FIGURE 1
Bedrock Surface Contour Plan



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)

1 inch = 30 ft.

LEGEND

P-1	ROCK PROBE LOCATION (APPROX.)
[12.0']	APPROXIMATE DEPTH TO BEDROCK
650	APPROXIMATE BEDROCK SURFACE ELEVATION CONTOUR

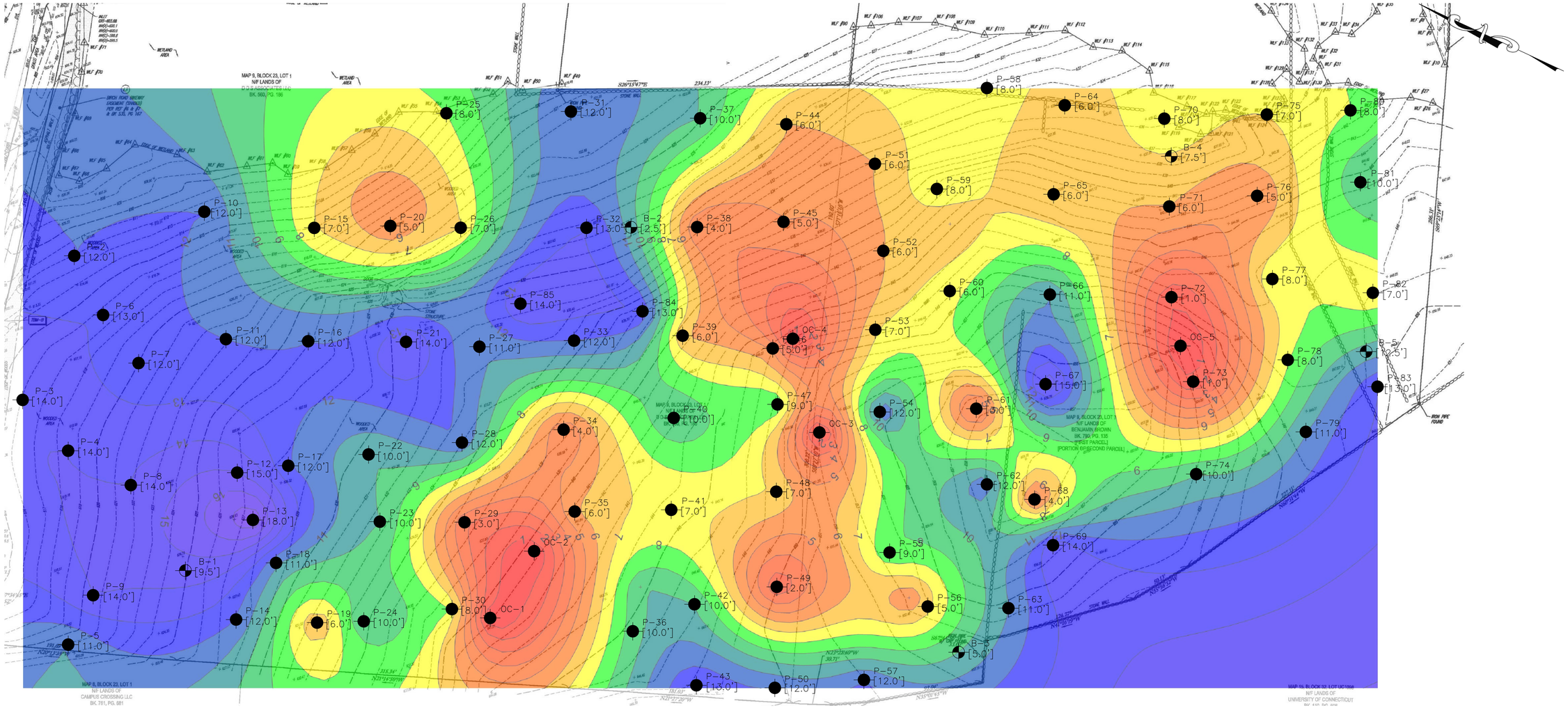
REFERENCE

THIS PLAN IS BASED UPON AN AUGUST 24, 2018 ALTA LAND SURVEY PREPARED BY CONTROL POINT ASSOCIATES, INC.

PROJECT #: GM1816022.001	DRAWING TITLE: BEDROCK SURFACE CONTOUR PLAN
DESIGNED BY: JL / PROJ. MGR.: RR	CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC
DATE: 01/07/19 / FIGURE: 1	PROJECT: PROPOSED STUDENT HOUSING DEVELOPMENT MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195) MANSFIELD, TOLLAND COUNTY, CONNECTICUT
SCALE: 1" = 40'	

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

FIGURE 2
Bedrock Depth Plan



LEGEND

P-1 — ROCK PROBE LOCATION (APPROX.)

[12.0'] — APPROXIMATE DEPTH TO BEDROCK

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 — APPROXIMATE DEPTH TO BEDROCK (FEET)

REFERENCE

THIS PLAN IS BASED UPON AN AUGUST 24, 2018 ALTA LAND SURVEY PREPARED BY CONTROL POINT ASSOCIATES, INC.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

PROJECT #: GM1816022.001	DRAWING TITLE: BEDROCK DEPTH PLAN
DESIGNED BY: JL / PROJ. MGR.: RR	CLIENT: CAPSTONE COLLEGIATE COMMUNITIES, LLC
DATE: 01/07/19 / FIGURE: 2	PROJECT: PROPOSED STUDENT HOUSING DEVELOPMENT MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195) MANSFIELD, TOLLAND COUNTY, CONNECTICUT
SCALE: 1" = 40'	

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
16 OLD FORGE ROAD, SUITE A, ROCKY HILL, CT 06067
860.726.7889 WHITESTONEASSOC.COM

Table 1
Estimated Bedrock Depths

ESTIMATED BEDROCK DEPTHS															
Probe No.	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**	**Probe No.**	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**	**Probe No.**	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**	**Probe No.**	**Depth to Bedrock (fbgs)**	**Ground Elev. (ft)**	**Bedrock Elev. (ft)**
P-1	-	-	-	**P-26**	7	623.5	616.5	**P-51**	6	636	630	**P-76**	5	643	638
P-2	12	611.5	599.5	**P-27**	11	632.5	621.5	**P-52**	6	643	637	**P-77**	8	647	639
P-3	14	616	602	**P-28**	12	633.5	621.5	**P-53**	7	648.5	641.5	**P-78**	8	648	640
P-4	14	618	604	**P-29**	3	637	634	**P-54**	12	654.5	642.5	**P-79**	11	648.5	637.5
P-5	11	621	610	**P-30**	8	639	631	**P-55**	9	653	644	**P-80**	8	641.5	633.5
P-6	13	615.5	602.5	**P-31**	12	622	610	**P-56**	5	653	648	**P-81**	10	645.5	635.5
P-7	12	620	608	**P-32**	13	628	615	**P-57**	12	651	639	**P-82**	7	649	642
P-8	14	621.5	607.5	**P-33**	12	634	622	**P-58**	8	633	625	**P-83**	13	649.5	636.5
P-9	14	620.5	606.5	**P-34**	4	637	633	**P-59**	8	641	633	**P-84**	13	637	624
P-10	12	613	601	**P-35**	6	641	635	**P-60**	6	649	643	**P-85**	14	631.5	617.5
P-11	12	622.5	610.5	**P-36**	10	645.5	635.5	**P-61**	3	657.5	654.5	**OC1**	0	6401	641
P-12	15	627	612	**P-37**	10	625	615	**P-62**	12	658.5	646.5	**OC2**	0	640.5	640.5
P-13	18	627	609	**P-38**	4	634	630	**P-63**	11	654.5	643.5	**OC3**	0	652	652
P-14	12	627.5	615.5	**P-39**	6	640.5	634.5	**P-64**	6	635	629	**OC4**	0	646.5	646.5
P-15	7	615	608	**P-40**	10	642.5	632.5	**P-65**	6	643	637	**OC5**	0	653.5	653.5
P-16	12	625.5	613.5	**P-41**	7	644.5	637.5	**P-66**	11	651	640				
P-17	12	628.5	616.5	**P-42**	10	646.5	636.5	**P-67**	15	656	641				
P-18	11	629	618	**P-43**	13	649	636	**P-68**	4	658.5	654.5				
P-19	6	631	625	**P-44**	6	630.5	624.5	**P-69**	14	656.5	642.5				
P-20	5	620	615	**P-45**	5	638	633	**P-70**	8	636	628				
P-21	14	630.5	616.5	**P-46**	5	646.5	641.5	**P-71**	6	642.5	636.5				
P-22	10	630	620	**P-47**	9	648	639	**P-72**	1	649	648				
P-23	10	632.5	622.5	**P-48**	7	648	641	**P-73**	1	654	653				
P-24	10	634.5	624.5	**P-49**	2	650.5	648.5	**P-74**	10	654	644				
P-25	8	616	608	**P-50**	12	651	639	**P-75**	7	639.5	632.5				

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

November 21, 2019

via email

BOHLER ENGINEERING MA, LLC
16 Old Forge Road
Suite A
Rocky Hill, Connecticut 06067

Attention: Geoffrey Fitzgerald, P.E.
Branch Manager

Regarding: PRELIMINARY STORMWATER MANAGEMENT AREA EVALUATION
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
PARCEL NOs: 9.23.1, 9.23.7 & 9.23.8
WHITESTONE PROJECT NO.: PRO20194G.M19

Dear Mr. Fitzgerald:

Whitestone Associates, Inc. (Whitestone) is pleased to submit this summary letter regarding a preliminary stormwater management (SWM) area evaluation in support of the proposed student housing development referenced above. This letter is based on information provided in a November 12, 2019 *Grading Plan* provided by Bohler Engineering MA, LLC (Bohler).

SITE DESCRIPTION

The project site is an approximately 19.2-acre, irregularly-shaped parcel located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut. The site is developed with several residential buildings along Storrs Road. The remaining portions of the site are forested or covered by wetlands. Approximately 15.9 acres of the site can be developed. The remaining portion of the site is not suitable for development due to wetland impacts. Based on a review of available topographic maps, the site slopes to the northeast from the approximate elevation of 660 feet to approximately 620 feet as compared to the National American Vertical Datum of 1988 (NAVD). Four SWM areas are proposed along the eastern site property line.

FIELD INVESTIGATION & TESTING

On November 14, 2019 Whitestone monitored the excavation of twelve test pits. Test pit locations were determined in the field by a Bohler representative and are shown on the attached plan, a November 22, 2019, *Test Pit Exhibit* prepared by Bohler. Site subsurface conditions at the exploration locations generally consisted of forest mat or topsoil underlain by glacial till. The glacial till consisted of a mixture of silty sand, gravel, cobbles and boulders. *Records of Subsurface Exploration* are attached.

In order to evaluate in-situ infiltration rates a total of nine samples were collected and subjected to falling head infiltration testing in general conformance with Connecticut Department of Energy & Environmental Protection procedures. The results of the laboratory testing are summarized in the following table:

Falling Head Saturated Hydraulic Conductivity Test, K_{SAT} (in/hr)								
TP-1	**TP-2**	**TP-3**	**TP-7**	**TP-8**	**TP-9**	**TP-10**	**TP-11**	**TP-12**
0.02	8.76	1.47	0.06	0.08	9.46	0.10	2.74	0.25

A sample was not collected from test pit TP-4, however, soil conditions within TP-4 were consistent with those observed within TP-2. Infiltration conditions within TP-4 are expected to be similar to TP-2.

Whitestone appreciates the opportunity to be of continued service to Bohler Engineering MA, LLC. Please contact us with any questions regarding this proposal.

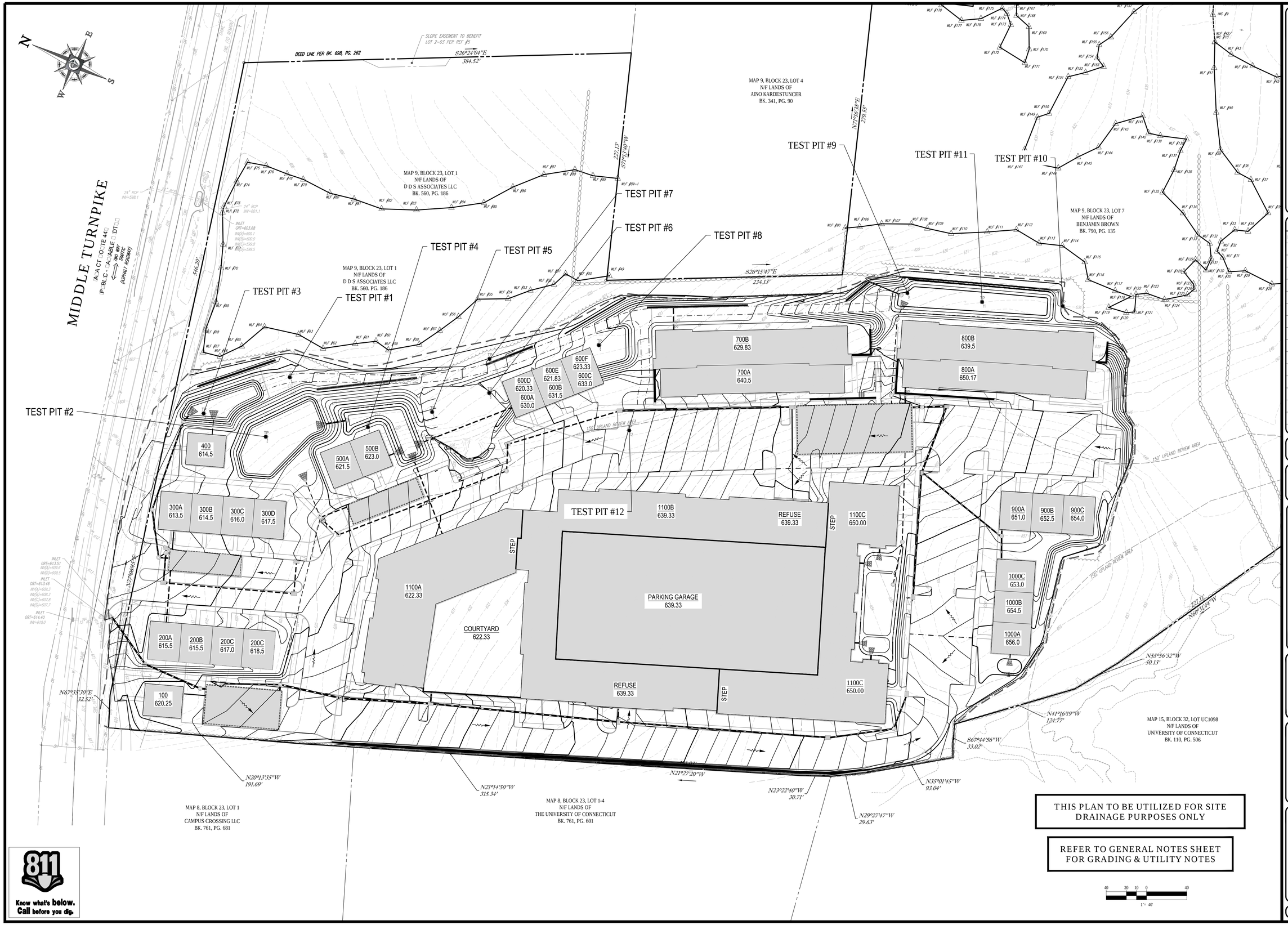
Sincerely,

WHITESTONE ASSOCIATES, INC.

Jason R. Landry
Project Manager

Ryan R. Roy, P.E.
Principal, New England Region

JRL/hz N:\Proposal Folders\2019\PRO20194G.M19\Reports and Submittals\Mansfield CT-SWMA(PRO20194G.M19).docx
Enclosures



BOHLER ENGINEERING

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN PERMITTING SERVICES TRANSPORTATION SERVICES

REGIONAL OFFICES
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REVISIONS

E	DATE	COMMENT	B
1	09:23:19	D A NA E FLO S	MAA
2	10:18:19	3rd PA T E E COMMENTS	MAA
3	11:12:19	3rd PA T E E COMMENTS	MAA
4	11:22:19	3rd PA T E E COMMENTS	MAA
5			
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PE M T
SET

P O ECT N	CT181007
D A N B	MAA
C EC ED B	PF
DATE	08:22:19
SCALE	AS NOTED
CAD D	TB-CT181007

P O ECT

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STO S D M DDLE TP E
LOTS 1, 7, 8, BLOC 23, MAP 9
TO N OF MANSF ELD
STATE OF CONNECT C T

BOHLER ENGINEERING
16 OLD FO E OAD, S TE A
OC LL, CT 06067
P n :860 333-8900
F :508 480-9080
www.BohlerEngineering.com

S EET T TLE

TEST PIT EXHIBIT

S EET N MBE

7
OF 24

E 3 - 11.12.2019

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-1

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	7.3 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:** 6.8	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Forest Mat	
2.3	TS-1	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 3.5 fbgs Seasonal High GWT @ 3.5 fbgs
			10.0 15.0		Test Pit Log TP-1 Terminated at a Depth of 7.3 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-2

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)**	**Elevation (feet msl)**	**Cave-In Depth (feet bgs)** / **Elevation (feet msl)**
Termination Depth:	6.3 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**			
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	6.3		**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Forest Mat	
2.5	TS-2	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @ 2.8 fbgs
			5.0			
			10.0		Test Pit Log TP-2 Terminated at a Depth of 6.3 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-3

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	7.5 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:** 7.0	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	11" Forest Mat	
3.0	TS-3	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 3 fbgs Seasonal High GWT @3.3 fbgs
			5.0		Gray to Light Brown, Silty Sand (SM)	
			10.0		Test Pit Log TP-3 Terminated at a Depth of 7.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-4

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)**	**Elevation (feet msl)**	**Cave-In Depth (feet bgs)** / **Elevation (feet msl)**
Termination Depth:	7.5 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**			
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	7.3		**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
					Orange/Rust Mottling	Seasonal High GWT @ 3 fbgs
						Roots to 3.5 fbgs
					Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0			
					Test Pit Log TP-4 Terminated at a Depth of 7.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-5

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	5.0 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:** 4.3	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	14" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 3.0 fbgs Seasonal High GWT @ 3.0 fbgs
			5.0			
					Test Pit Log TP-5 Terminated at a Depth of 5.0 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-6

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	3.5 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Forest Mat	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	No Seasonal High GWT Evidence
			5.0		Test Pit Log TP-6 Terminated at a Depth of 3.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-7

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)**	**Elevation (feet msl)**	**Cave-In Depth (feet bgs)** / **Elevation (feet msl)**
Termination Depth:	6.5 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**			
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	4.3		**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	11" Forest Mat	
2.5	TS-4	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @2.5 fbgs Roots to 2.5 fbgs
			10.0 15.0		Test Pit Log TP-7 Terminated at a Depth of 6.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-8

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)**	**Elevation (feet msl)**	**Cave-In Depth (feet bgs)** / **Elevation (feet msl)**
Termination Depth:	6.5 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**			
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	3.8		**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Forest Mat	
2.3	TS-5	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 2.8 fbgs Seasonal High GWT @3.0 fbgs
			10.0 15.0		Test Pit Log TP-8 Terminated at a Depth of 6.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-9

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)**	**Elevation (feet msl)**	**Cave-In Depth (feet bgs)** / **Elevation (feet msl)**
Termination Depth:	6.5 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**	6.3		
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**			**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**			

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Forest Mat	
3.0	TS-6	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM) Orange/Rust Mottling	Roots to 4.0 fbgs Seasonal High GWT @ 4.25 fbgs
			10.0 15.0		Test Pit Log TP-9 Terminated at a Depth of 6.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-10

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	5.5 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:** 6.3 |	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:** |	**At Completion:** |
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:** |	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	15" Topsoil	
2.5	S-1	Grab		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Roots to 3.0 fbgs
					Gray Silty Sand with Gravel (4.3 fbgs to 4.5 fbgs)	Seasonal High GWT @ 3.3 fbgs
					Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0			Wet at Bottom of TP
					Test Pit Log TP-10 Terminated at a Depth of 5.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-11

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019		**Water Depth (feet bgs)** | **Elevation (feet msl)**		**Cave-In Depth (feet bgs)** | **Elevation (feet msl)**
Termination Depth:	5.5 feet bgs	**Date Completed:**	11/14/2019				
Proposed Location:		**Logged By:**	DC	**During:**	6.3 |		
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	|	**At Completion:**	|
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	|		

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0				
				TS		15" Topsoil	
				GLACIAL TILL		Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
4.0	S-2	Grab	5.0			Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @ 5.0 fbgs Wet at Bottom of TP
			10.0 15.0			Test Pit Log TP-11 Terminated at a Depth of 5.5 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-12

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	PRO20194G.M19
Location:	Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet above msl	**Date Started:**	11/14/2019	**Water Depth (feet bgs) | Elevation (feet msl)**	**Cave-In Depth (feet bgs) | Elevation (feet msl)**
Termination Depth:	6.8 feet bgs	**Date Completed:**	11/14/2019		
Proposed Location:		**Logged By:**	DC	**During:**	
Excavating Method:	Test Pit Excavation	**Contractor:**	JS	**At Completion:**	**At Completion:**
Test Method:	Visual Observation	**Rig Type:**	Kobelco SK55	**24 Hours:**	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	10" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
4.5	S-3	Grab	5.0		Gray to Light Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Seasonal High GWT @ 5.0 fbgs
			10.0		Test Pit Log TP-12 Terminated at a Depth of 6.8 Feet Below Ground Surface Upon Refusal on Probable Bedrock.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE
ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

December 24, 2019

via email

BOHLER ENGINEERING MA, LLC
16 Old Forge Road
Suite A
Rocky Hill, Connecticut 06067

Attention: Geoffrey Fitzgerald, P.E.
Branch Manager

Regarding: SUPPLEMENTAL STORMWATER MANAGEMENT AREA EVALUATION
PROPOSED STUDENT HOUSING DEVELOPMENT
MIDDLE TURNPIKE (U.S. ROUTE 44) & STORRS ROAD (CT ROUTE 195)
MANSFIELD, TOLLAND COUNTY, CONNECTICUT
PARCEL NOs: 9.23.1, 9.23.7 & 9.23.8
WHITESTONE PROJECT NO.: GM1916845.000

Dear Mr. Fitzgerald:

Whitestone Associates, Inc. (Whitestone) is pleased to submit this summary letter regarding the supplemental stormwater management (SWM) area evaluation in support of the proposed student housing development referenced above. This letter is based on information provided in the November 22, 2019, *Test Pit Exhibit* provided by Bohler Engineering MA, LLC (Bohler). Whitestone previously performed a preliminary SWM evaluation at this site on November 14, 2019.

SITE DESCRIPTION

The project site is an approximately 19.2-acre, irregularly shaped parcel located at the intersection of Middle Turnpike and Storrs Road in the Town of Mansfield, Tolland County, Connecticut. The site is developed with several residential buildings along Storrs Road. The remaining portions of the site are forested or covered by wetlands. Approximately 15.9 acres of the site can be developed. The remaining portion of the site is not suitable for development due to wetland impacts. Based on a review of available topographic maps, the site slopes to the northeast from the approximate elevation of 660 feet to approximately 620 feet as compared to the National American Vertical Datum of 1988 (NAVD).

FIELD INVESTIGATION & TESTING

On December 5, 2019 and December 10, 2019, Whitestone monitored the excavation of 10 test pits. Test pit locations were determined in the field by a Bohler representative and are shown on the attached *Test Pit Exhibit* provided by Bohler. Site subsurface conditions at the exploration locations generally consisted of

forest mat or topsoil underlain by glacial till. The glacial till consisted of a mixture of silty sand, gravel, cobbles and boulders. *Records of Subsurface Exploration* are attached.

In order to evaluate *in-situ* infiltration rates, a total of 10 samples were collected and subjected to falling head infiltration testing in general conformance with Connecticut Department of Energy & Environmental Protection procedures. The results of the laboratory testing are summarized in the following table:

Falling Head Saturated Hydraulic Conductivity Test, K_{SAT} (inches/hour)									
TP-13	**TP-14**	**TP-15**	**TP-16**	**TP-17**	**TP-18**	**TP-19**	**TP-20**	**TP-21**	**TP-22**
8.63	16.81	0.93	4.02	*	0.76	5.75	18.41	7.08	1.16

* infiltration undetectable - considered impermeable

Whitestone appreciates the opportunity to be of continued service to Bohler Engineering MA, LLC. Please contact us with any questions regarding this report.

Sincerely,

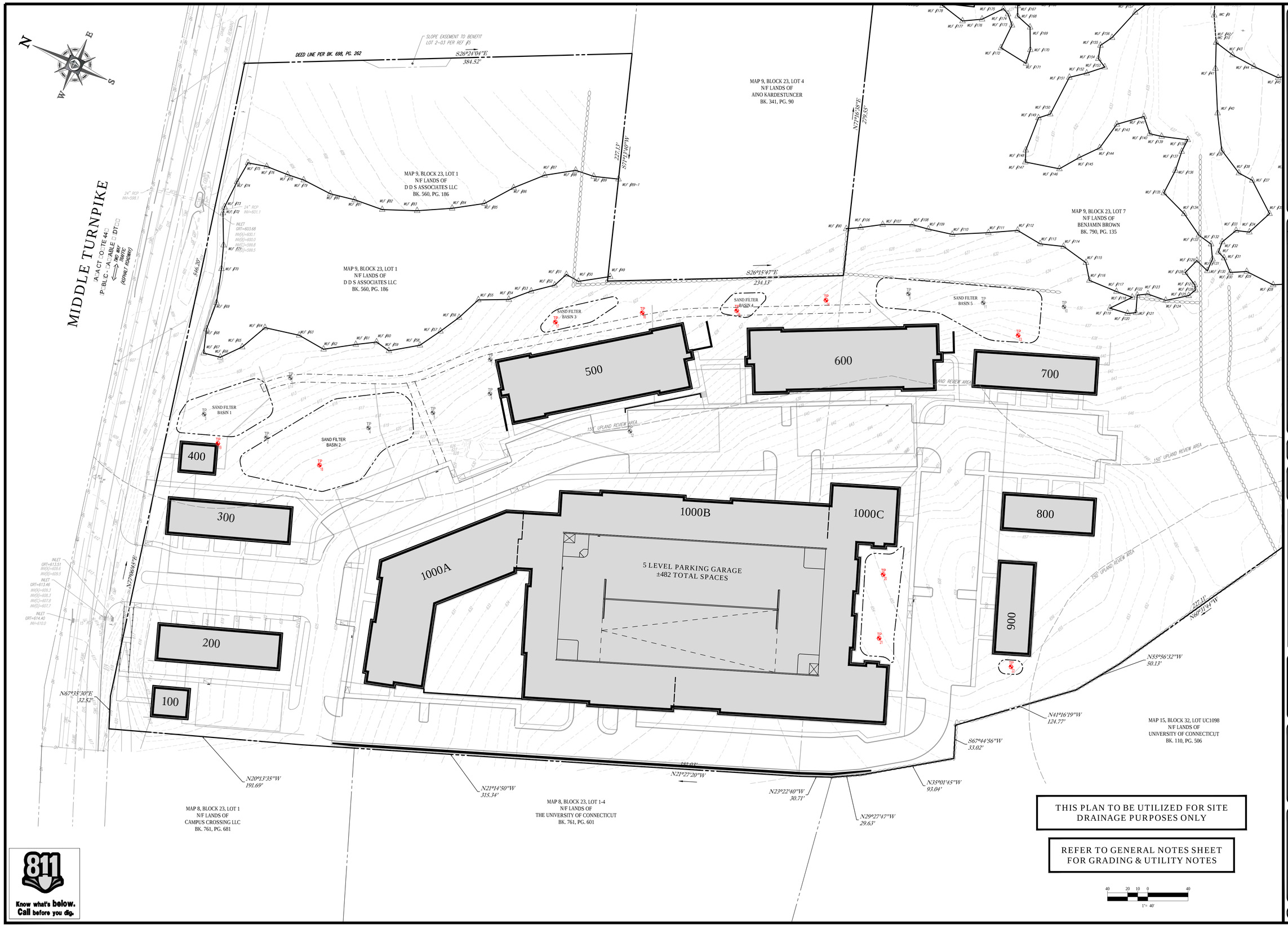
WHITESTONE ASSOCIATES, INC.

Jason R. Landry
Project Manager

Ryan R. Roy, P.E.
Principal, New England Region

JRL/hz N:\Job Folders\2019\1916845GM\Reports and Submittals\Mansfield CT-SWMA(GM1916845.000).docx
Enclosures

FIGURE 1
Test Location Plan



BOHLER ENGINEERING

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING PROGRAM MANAGEMENT LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN PROJECT MANAGEMENT TRANSPORTATION SERVICES

◆ PITTSBURGH, PA ◆ BALTIMORE, MD ◆ CHARLOTTE, NC
◆ NORTHEAST, NJ ◆ SOUTHEAST, NY ◆ ATLANTA, GA
◆ BOSTON, MA ◆ NORTHEAST, PA ◆ TAMPA, FL
◆ NEW YORK, NY ◆ SOUTHEAST, PA ◆ DALLAS, TX

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REVISIONS

	DATE	COMMENT	
1	09.23.19	3rd PA	MAA
2	10.18.19	3rd PA COMMENTS	MAA
3	11.12.19	3rd PA COMMENTS	MAA
4	11.22.19	3rd PA COMMENTS	MAA
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

PERMIT SET

PROJECT NO.	CT181007
DRAWN BY	MAA
CHECKED BY	PF
DATE	08.22.19
SCALE	AS NOTED
CAD FILE	TB-CT181007-TP

PROJECT

RESIDENTIAL DEVELOPMENT

FOR

CAPSTONE COLLEGIATE COMMUNITIES, LLC

LOCATION OF SITE

1621 STORRS ROAD
LOTS 1, 7, & 8, BLOCK 23, MAP 9
TOWN OF MANSFIELD
STATE OF CONNECTICUT

BOHLER ENGINEERING
16 OLD FORGE ROAD, SUITE A
COLCHESTER, CT 06067
PHONE: 860.333.8900
FAX: 508.480.9080
www.BohlerEngineering.com

G.P. FITZGERALD

PROFESSIONAL ENGINEER

SHEET TITLE

TEST PIT EXHIBIT

SHEET NUMBER

TP

APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-13

Project: Proposed Student Housing Development
WAI Project No.: GM1916845.000
Location: Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT
Client: Bohler Engineering MA, LLC

Surface Elevation: ± NS feet NAVD88
Termination Depth: 4.0 feet bgs
Proposed Location: Sand Filter
Excavating Method: Test Pit Excavation
Test Method: Visual Observation

Date Started: 12/5/2019
Date Completed: 12/5/2019
Logged By: JM
Contractor: DF
Rig Type: Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet msl)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
					Brown, Silty Sand, Cobbles, Boulders (SM)	
3.5	TS-2	1.25" Tube			Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0		Test Pit Log TP-13 Terminated at a Depth of 4.0 Feet Below Ground Surface.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-14

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	6.5 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	--	**Logged By:**	JM	**During:**	6.0	--	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	--	--	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
					Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
4.5	TS-3	1.25" Tube	5.0		Brown, Silty Sand with Gravel (SM)	
					Test Pit Log TP-14 Terminated at a Depth of 6.5 Feet Below Ground Surface.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-15

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/10/2019		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	4.0 feet bgs	**Date Completed:**	12/10/2019				
Proposed Location:	Sand Filter	**Logged By:**	JM	**During:**	4.0	--	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	--	--	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.0	TS-4	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Increase in Silt Content
			5.0		Test Pit Log TP-15 Terminated at a Depth of 4.0 Feet Below Ground Surface	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-16

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	6.5 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	--	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	3.0	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
2.5	TS-5	1.25" Tube		GLACIAL TILL	Brown, Silty Sand with Gravel (SM) Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0			
			10.0		Test Pit Log TP-16 Terminated at a Depth of 6.5 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-17

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	7.5 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	Sand Filter	**Logged By:**	JM	**During:**	7.0	--	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	--	--	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.5	TS-6	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	Increase in Silt Content
			10.0		Test Pit Log TP-17 Terminated at a Depth of 7.5 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-18

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	7.5 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	Sand Filter	**Logged By:**	JM	**During:**	--	--	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	--	--	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	8" Topsoil	
2.5	TS-7	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand (SM) Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Increase in Silt Content
			10.0 15.0		Test Pit Log TP-18 Terminated at a Depth of 7.5 Feet Below Ground Surface.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-19

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	7.0 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	Building	**Logged By:**	JM	**During:**	5.0	--	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	--	--	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	8" Topsoil	
				GLACIAL TILL	Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	
3.0	TS-8	1.25" Tube			Grey, Silty Sand with Gravel, Cobbles, Boulders (SM)	
			5.0		Brown, Silty Sand with Gravel, Cobbles, Boulders (SM)	Increase in Silt Content
					Test Pit Log TP-19 Terminated at a Depth of 7.0 Feet Below Ground Surface.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-20

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019		**Water Depth (feet bgs)**	**Elevation (feet NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (feet NAVD88)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	Sand Filter	**Logged By:**	JM	**During:**	--	--	
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	--	--	**At Completion:** -- / --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	--	--	

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.25	TS-9	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
			10.0		Test Pit Log TP-20 Terminated at a Depth of 6.0 Feet Below Ground Surface.	
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-21

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019
Termination Depth:	6.5 feet bgs	**Date Completed:**	12/5/2019
Proposed Location:	Sand Filter	**Logged By:**	JM
Excavating Method:	Test Pit Excavation	**Contractor:**	DF
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135

	Water Depth (feet bgs)	Elevation (feet NAVD88)
During:	--	--
At Completion:	--	--
24 Hours:	--	--

	Cave-In Depth (feet bgs)	Elevation (feet NAVD88)
At Completion:	--	--

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
3.5	TS-10	1.25" Tube	5.0	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
			10.0 15.0		Test Pit Log TP-21 Terminated at a Depth of 6.5 Feet Below Ground Surface.	

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-22

Page 1 of 1

Project:	Proposed Student Housing Development	**WAI Project No.:**	GM1916845.000
Location:	Middle Turnpike Route 44 & Route 195 Mansfield, Tolland County, CT	**Client:**	Bohler Engineering MA, LLC

Surface Elevation:	± NS feet NAVD88	**Date Started:**	12/5/2019		**Water Depth (feet bgs)** | **Elevation (feet NAVD88)**		**Cave-In Depth (feet bgs)** | **Elevation (feet NAVD88)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	12/5/2019				
Proposed Location:	Sand Filter	**Logged By:**	JM	**During:**	-- | --		
Excavating Method:	Test Pit Excavation	**Contractor:**	DF	**At Completion:**	-- | --	**At Completion:**	-- | --
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB-135	**24 Hours:**	-- | --		

SAMPLE INFORMATION Depth (ft.)	Number	Type	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
			0.0			
				TS	12" Topsoil	
2.25	TS-11	1.25" Tube	2.5	GLACIAL TILL	Brown, Silty Sand with Gravel (SM)	
			5.0			
					Test Pit Log TP-22 Terminated at a Depth of 6.0 Feet Below Ground Surface.	
			10.0			
			15.0			

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

APPENDIX B
Supplemental Information (USCS, Terms and Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
Celebrating 25 Years 1994 – 2019

16 OLD FORGE ROAD
SUITE A
ROCKY HILL, CT 06067
860.726.7889
whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

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Other Office Locations:

WARREN, NJ 908.668.7777
CHALFONT, PA 215.712.2700
SOUTHBOROUGH, MA 508.485.0755
WALL, NJ 732.592.2101
STERLING, VA 703.464.5858
EVERGREEN, CO 303.670.6905

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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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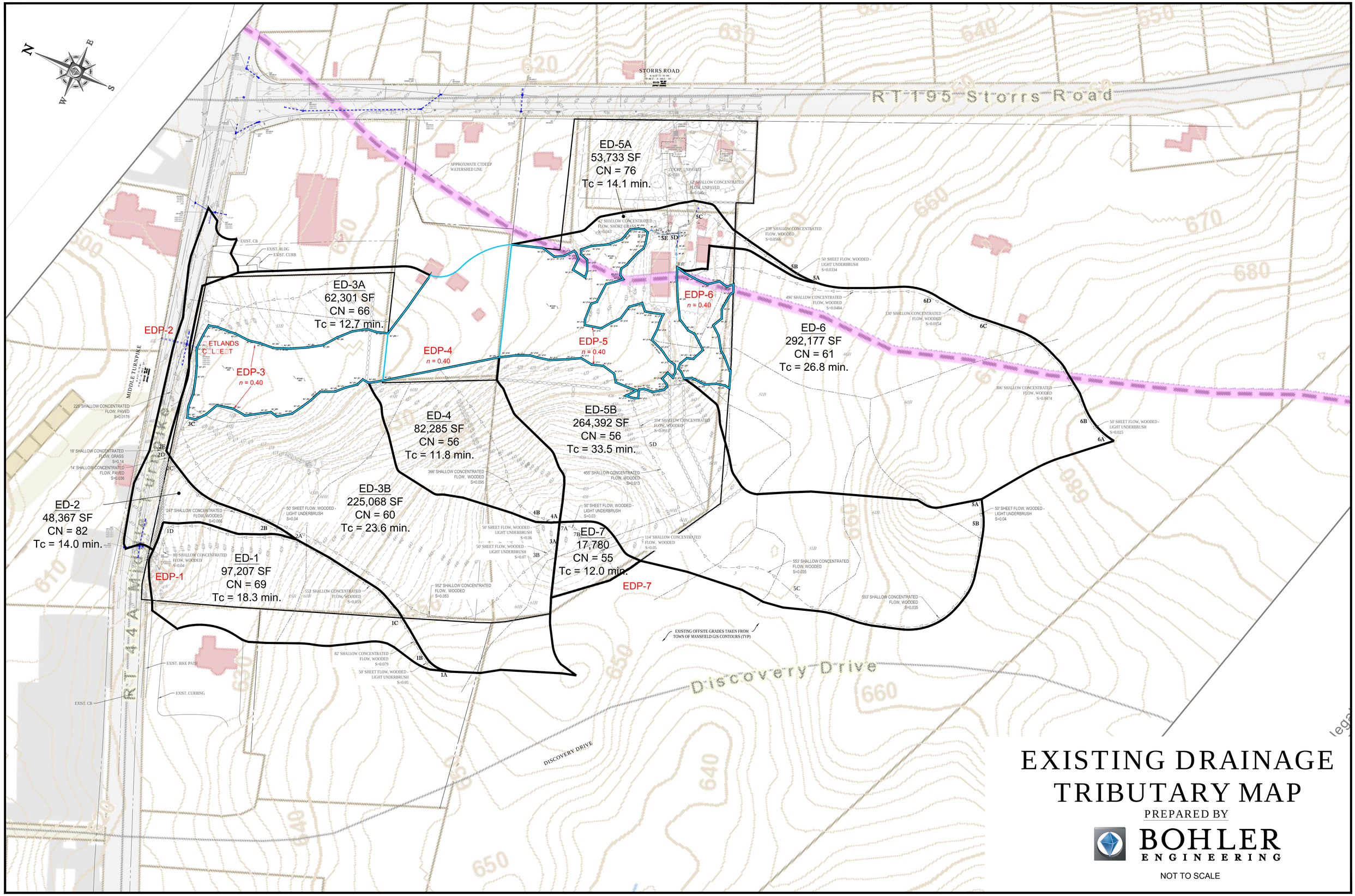
APPENDIX C: EXISTING CONDITIONS HYDROLOGIC ANALYSIS

- *EXISTING CONDITIONS DRAINAGE MAP*
- *EXISTING CONDITIONS HYDROCAD COMPUTATIONS*

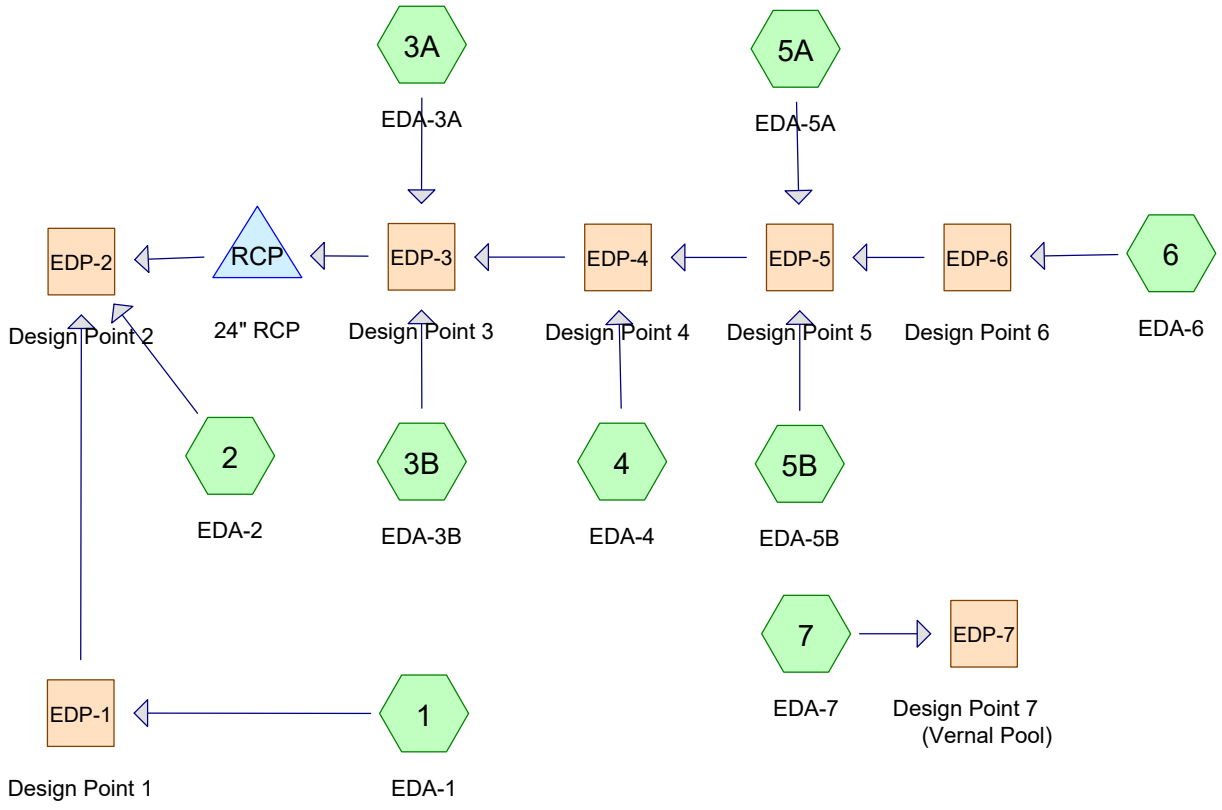


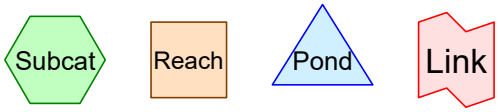
EXISTING DRAINAGE TRIBUTARY MAP

PREPARED BY

BOHLER ENGINEERING

NOT TO SCALE





Routing Diagram for Existing Conditions
Prepared by Bohler Engineering, Printed 12/29/2019
HydroCAD® 10.00-21 s/n 08311 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.439	79	50-75% Grass cover, Fair, HSG C (5A)
0.055	98	Paved parking, HSG B (3A)
0.463	98	Paved parking, HSG C (2)
0.111	98	Unconnected roofs, HSG C (5A)
16.762	55	Woods, Good, HSG B (1, 2, 3A, 3B, 4, 5B, 6, 7)
8.099	70	Woods, Good, HSG C (1, 2, 3A, 3B, 4, 5A, 6)
0.318	77	Woods, Good, HSG D (5B)
26.247	**61**	**TOTAL AREA**

Summary for Subcatchment 1: EDA-1

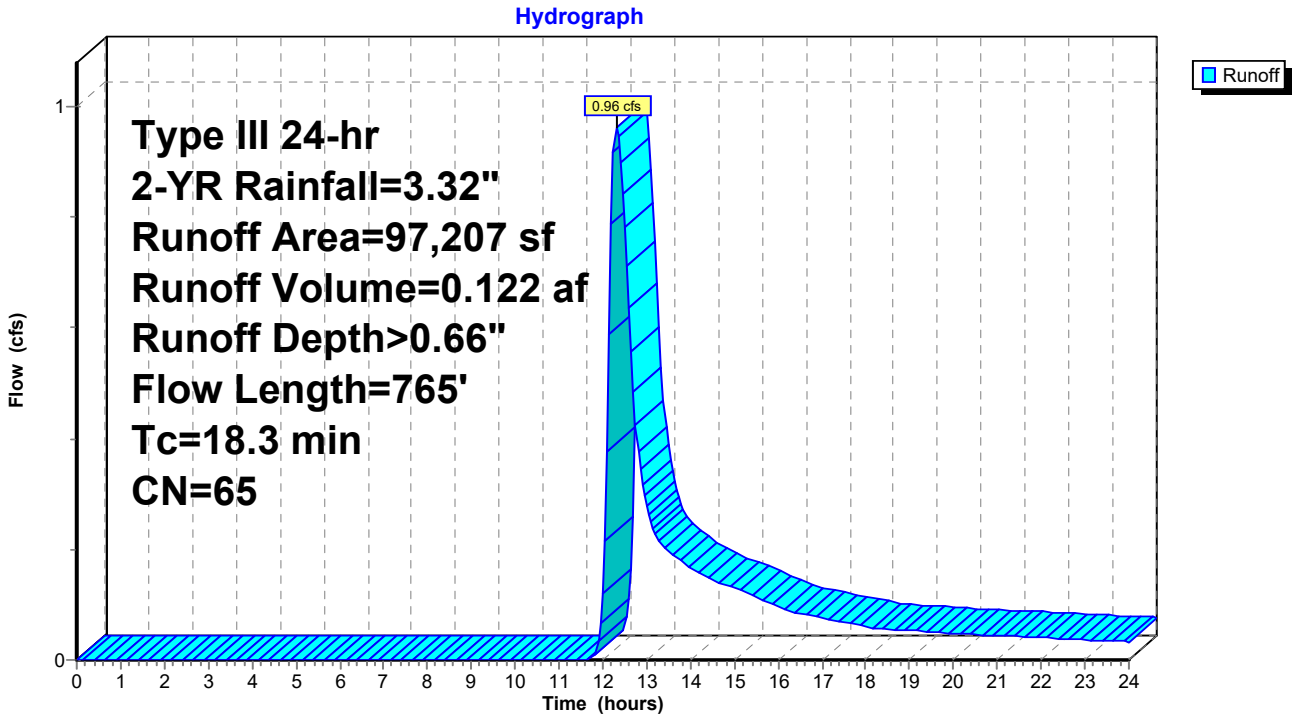
Runoff = 0.96 cfs @ 12.31 hrs, Volume= 0.122 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

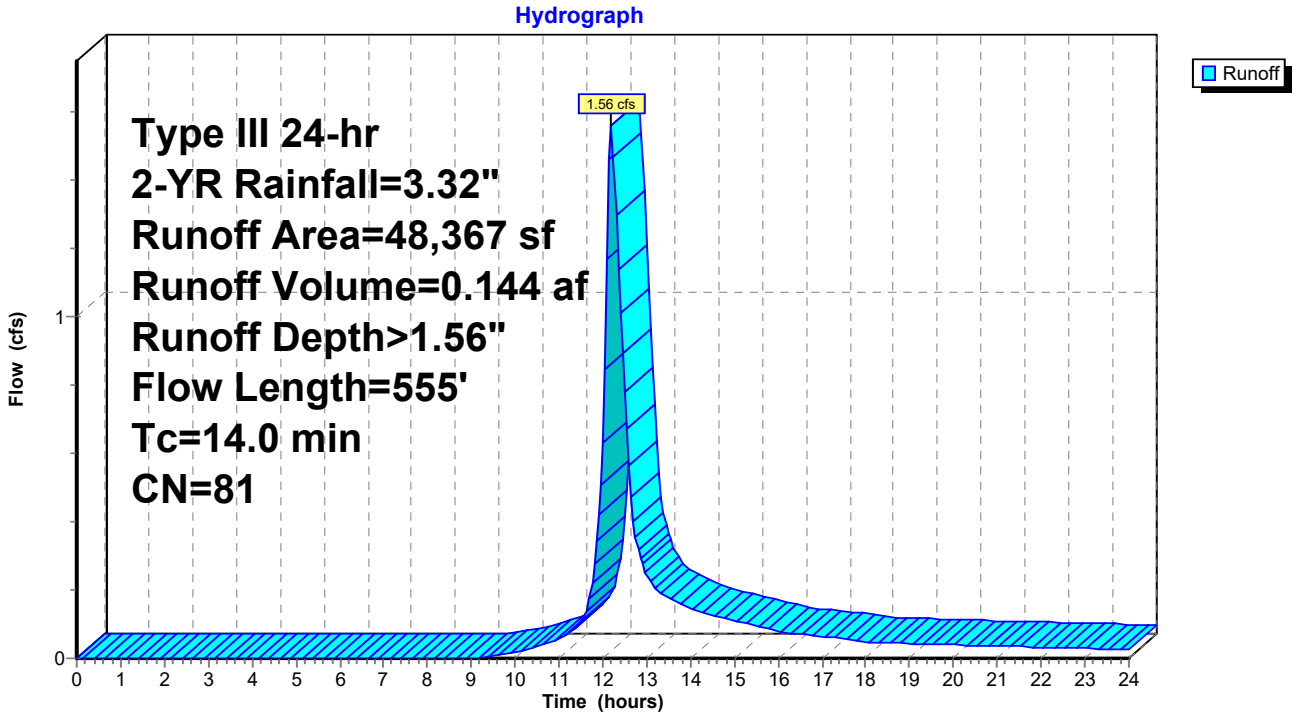
Runoff = 1.56 cfs @ 12.20 hrs, Volume= 0.144 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

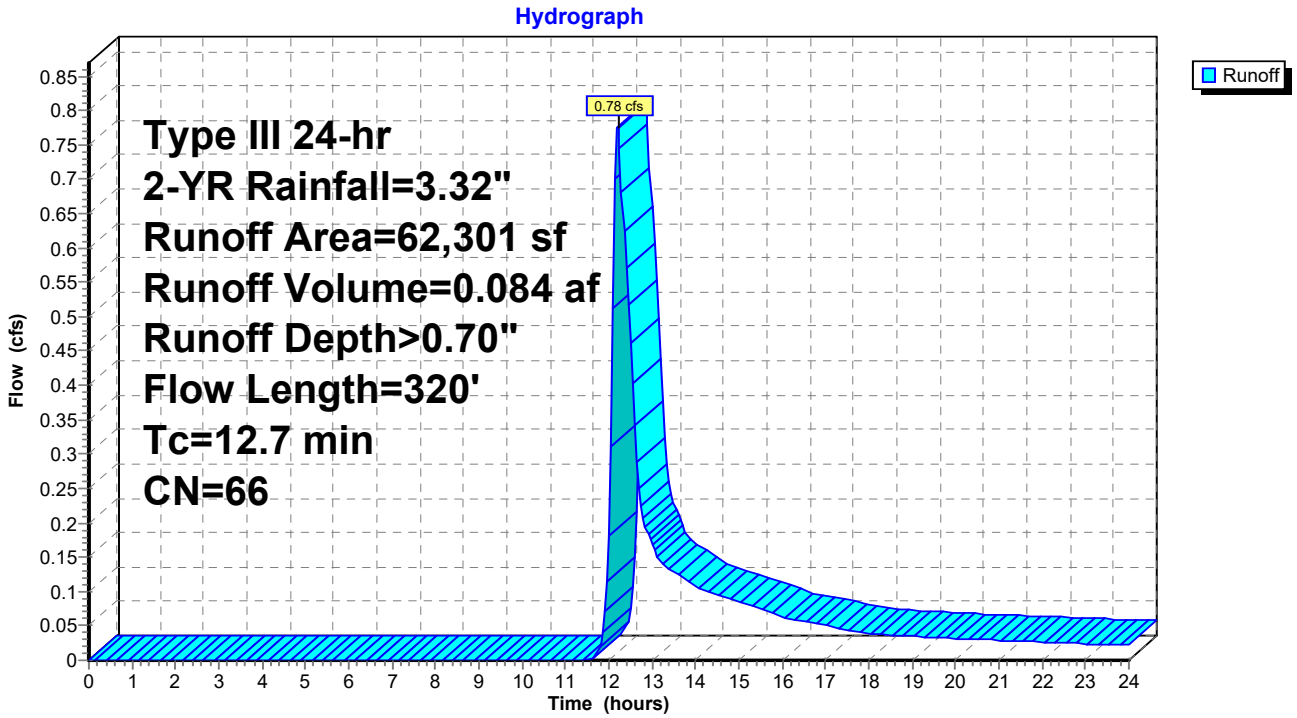
Runoff = 0.78 cfs @ 12.21 hrs, Volume= 0.084 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

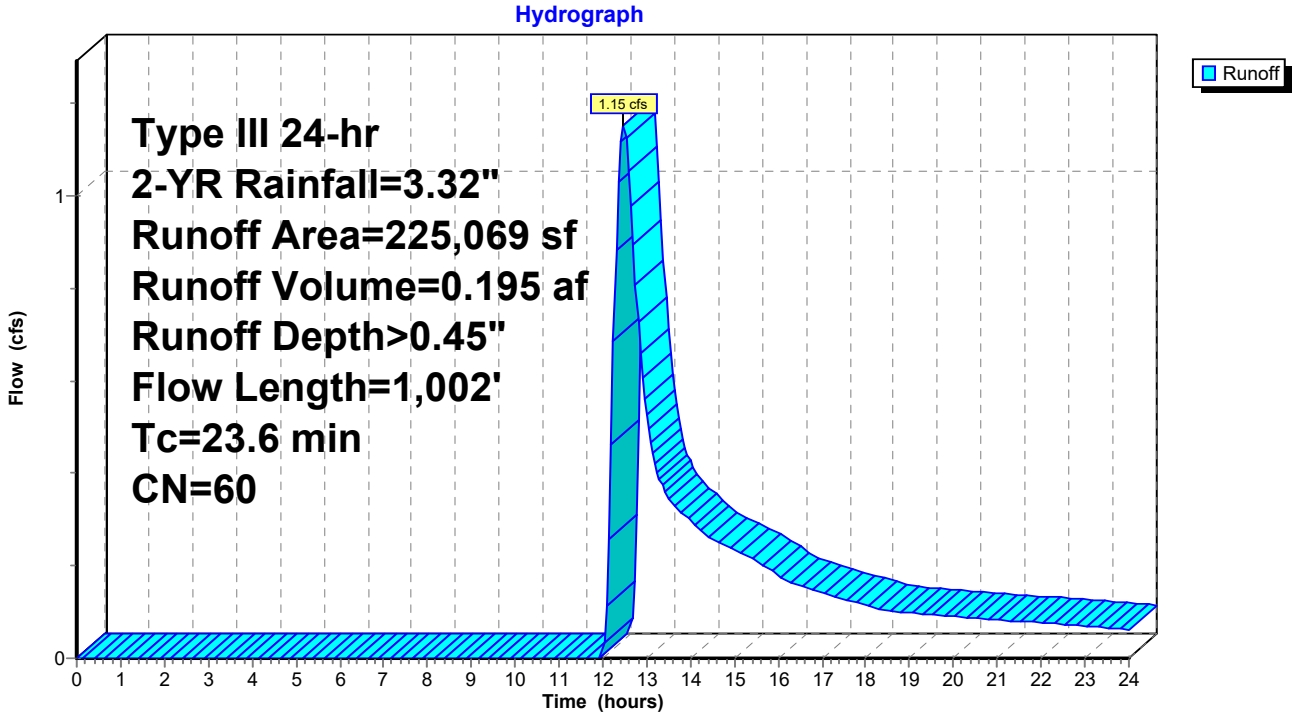
Runoff = 1.15 cfs @ 12.47 hrs, Volume= 0.195 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

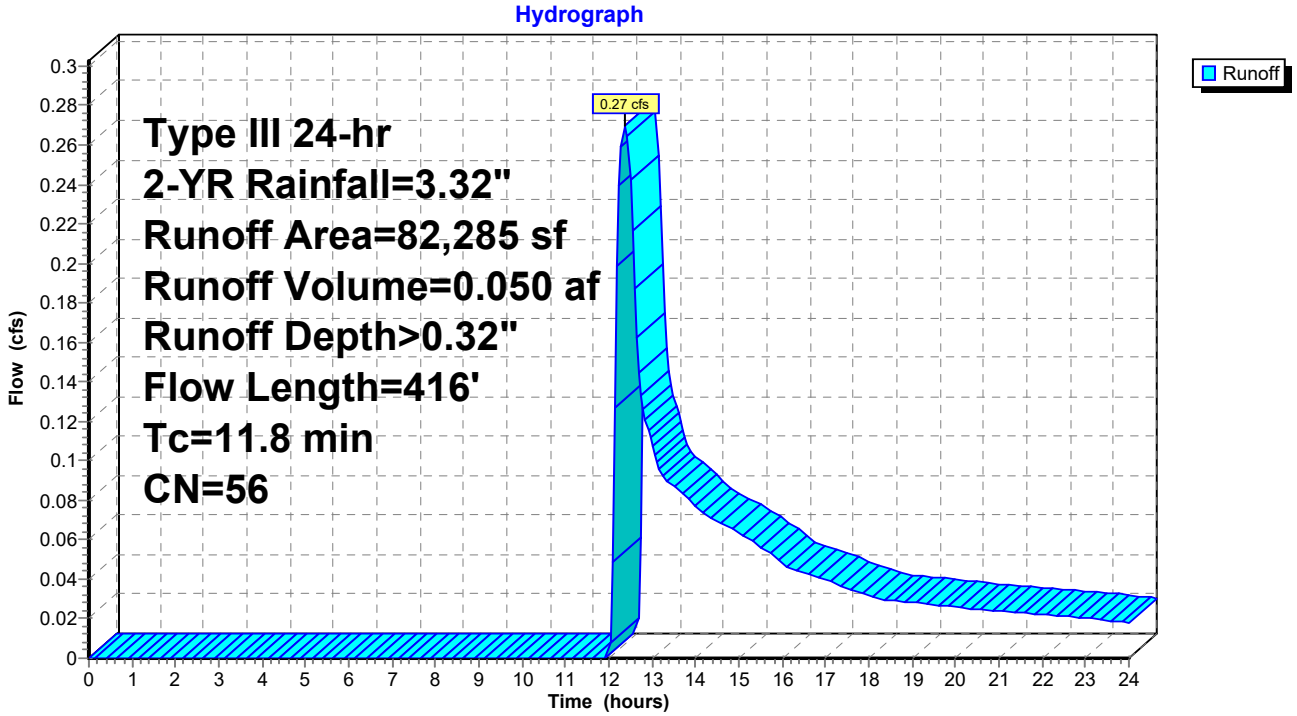
Runoff = 0.27 cfs @ 12.38 hrs, Volume= 0.050 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

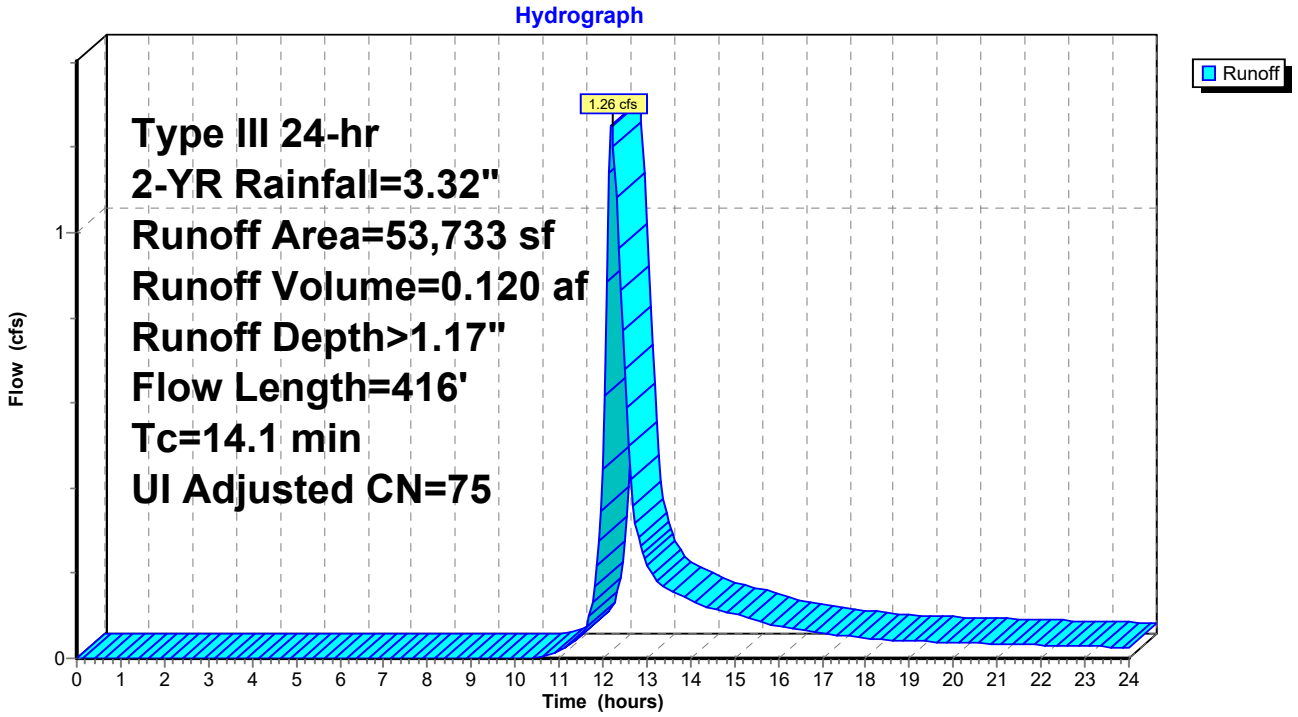
Runoff = 1.26 cfs @ 12.21 hrs, Volume= 0.120 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

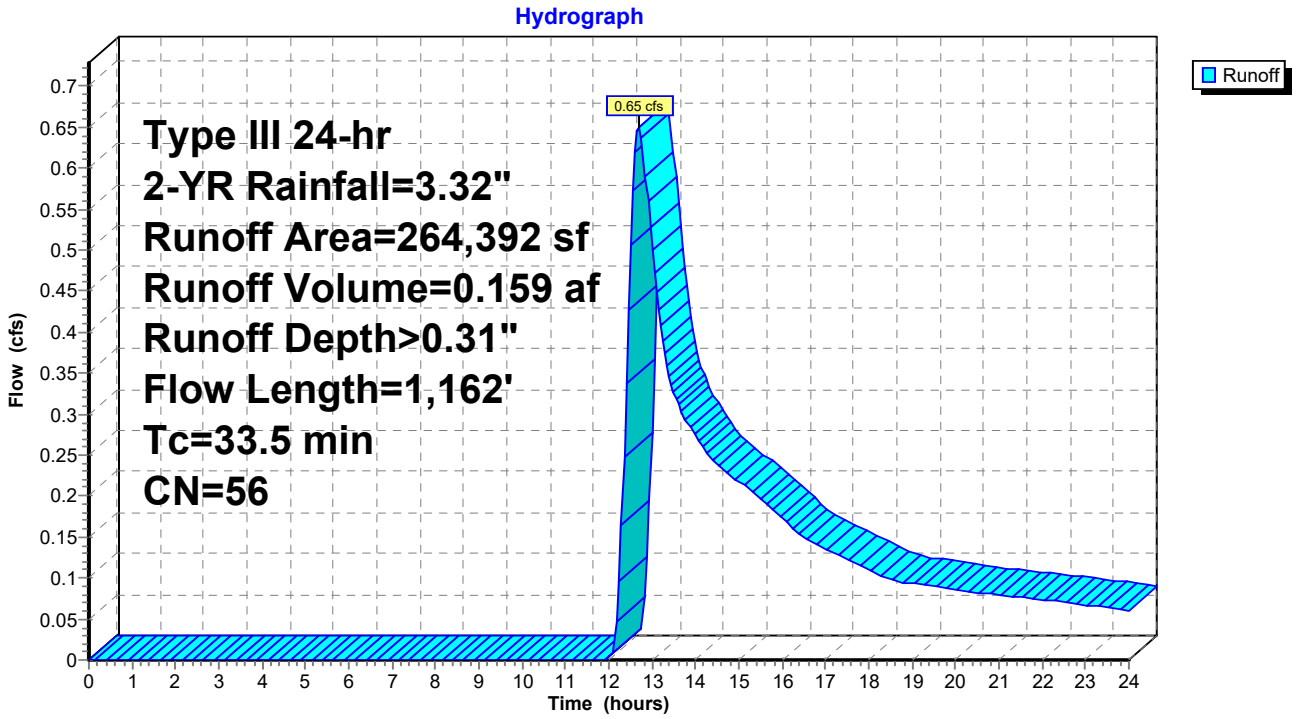
Runoff = 0.65 cfs @ 12.69 hrs, Volume= 0.159 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

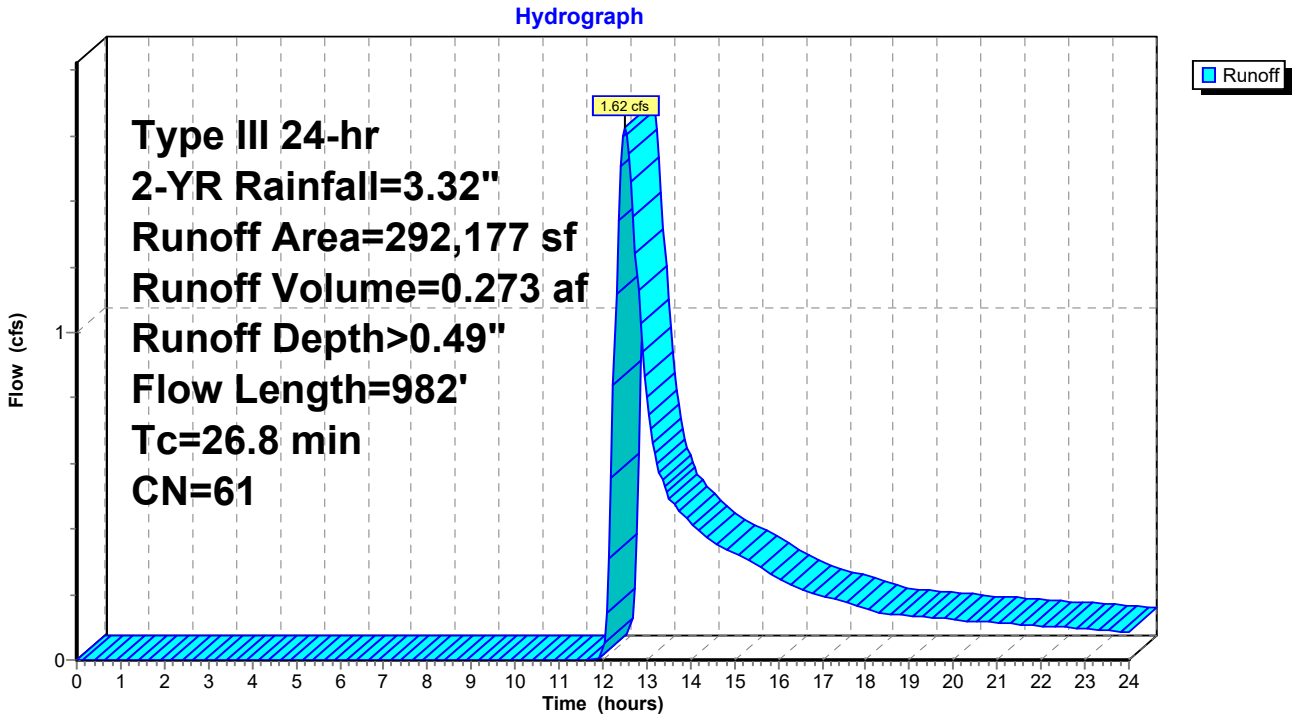
Runoff = 1.62 cfs @ 12.50 hrs, Volume= 0.273 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

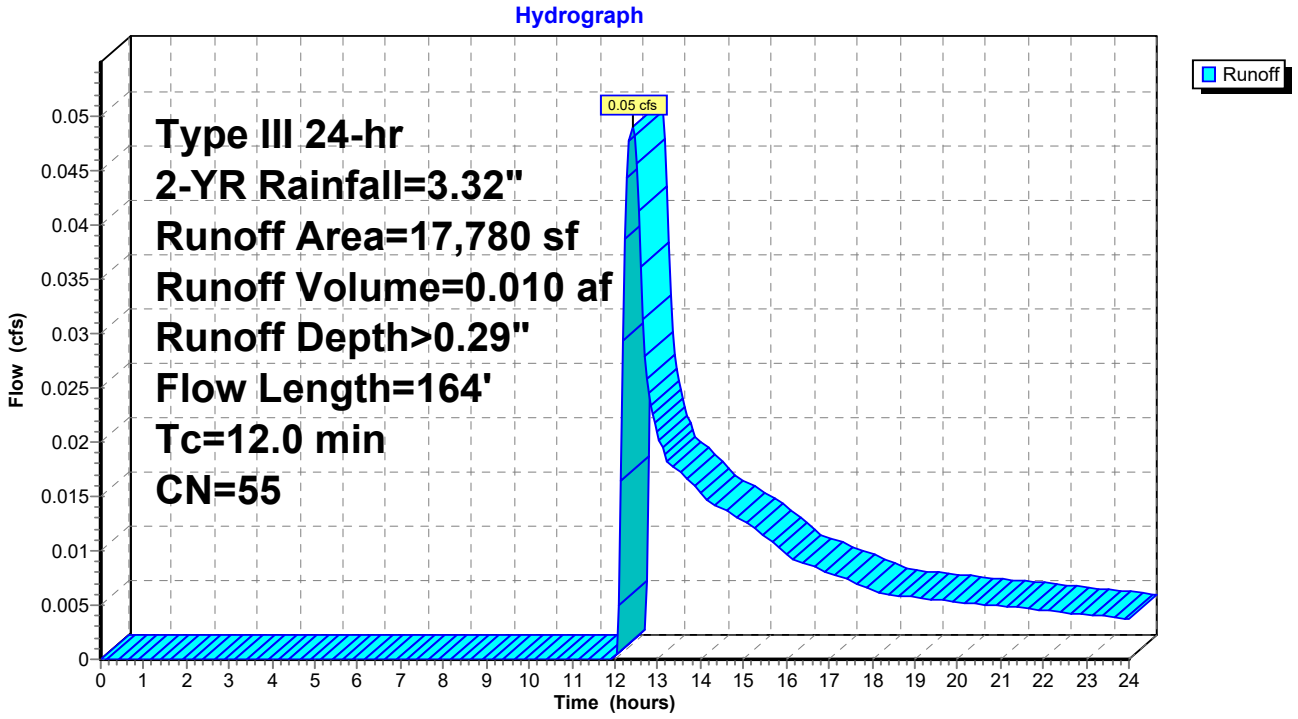
Runoff = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

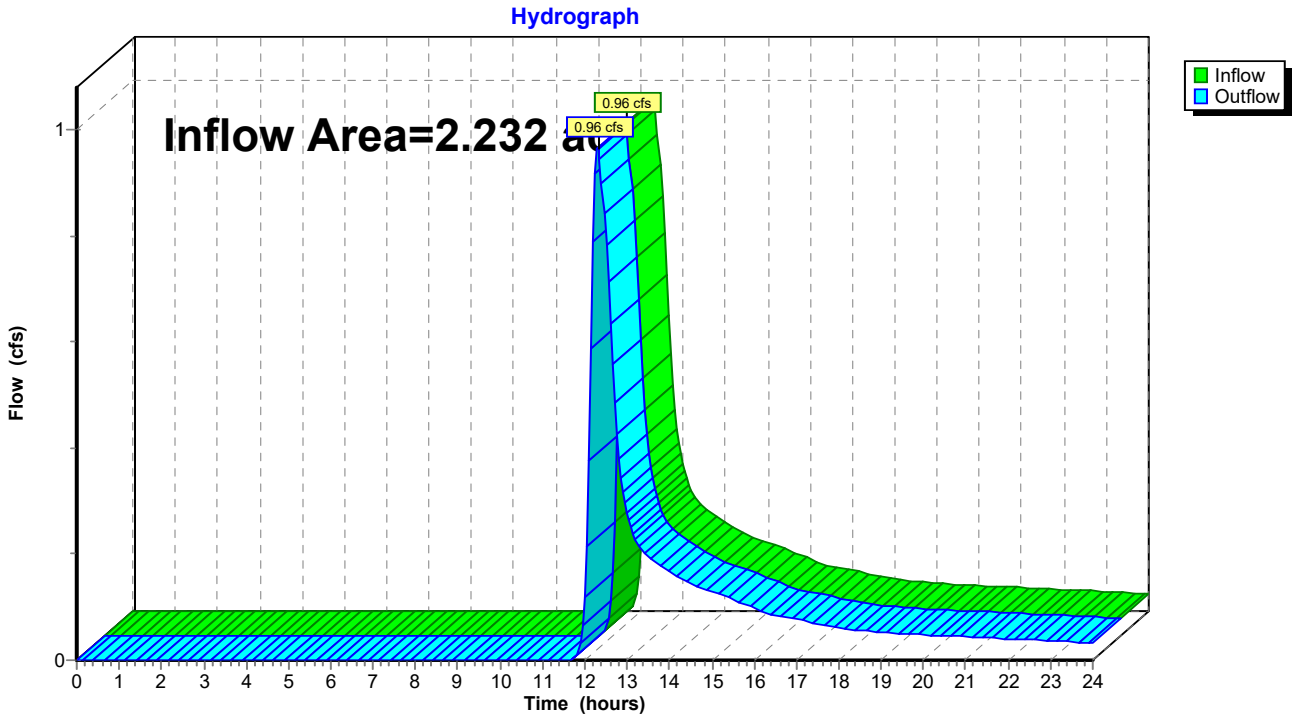


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 0.66" for 2-YR event
Inflow = 0.96 cfs @ 12.31 hrs, Volume= 0.122 af
Outflow = 0.96 cfs @ 12.31 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

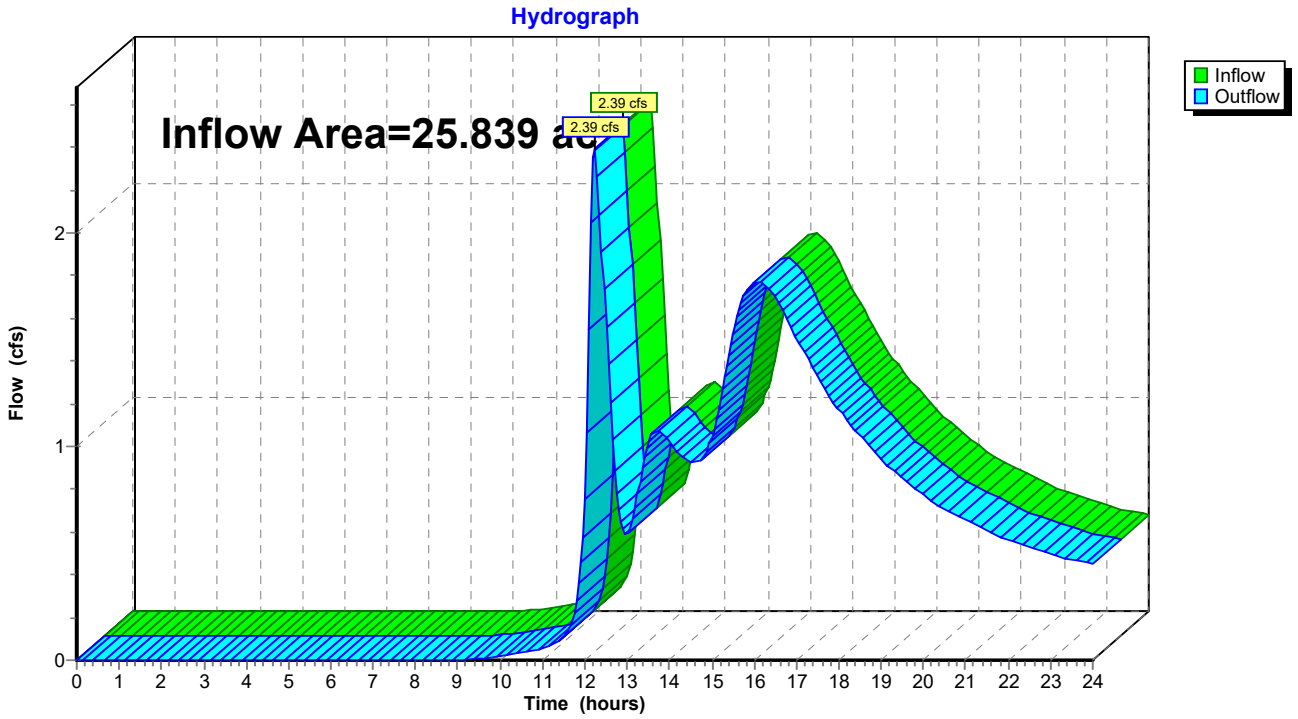


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 2.39 cfs @ 12.24 hrs, Volume= 1.007 af
Outflow = 2.39 cfs @ 12.24 hrs, Volume= 1.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

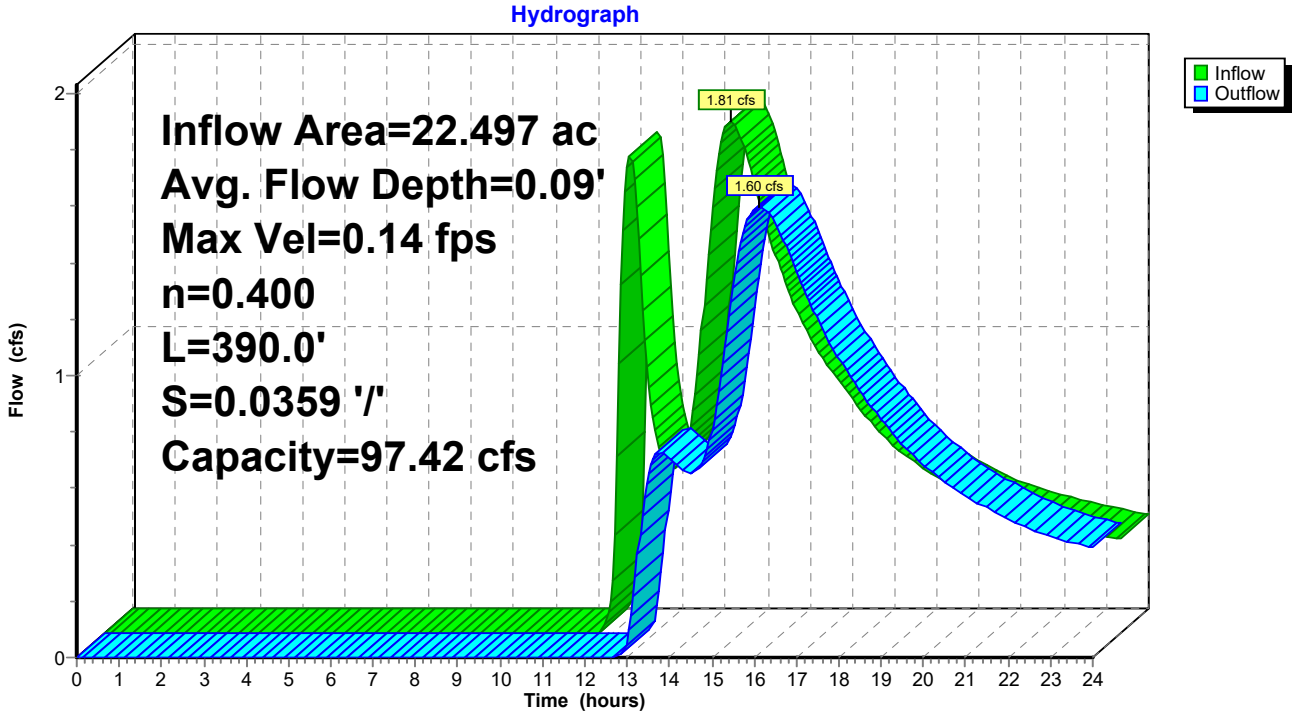
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 0.43" for 2-YR event
Inflow = 1.81 cfs @ 14.77 hrs, Volume= 0.807 af
Outflow = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af, Atten= 12%, Lag= 80.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.14 fps, Min. Travel Time= 47.1 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 66.0 min

Peak Storage= 4,521 cf @ 15.33 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

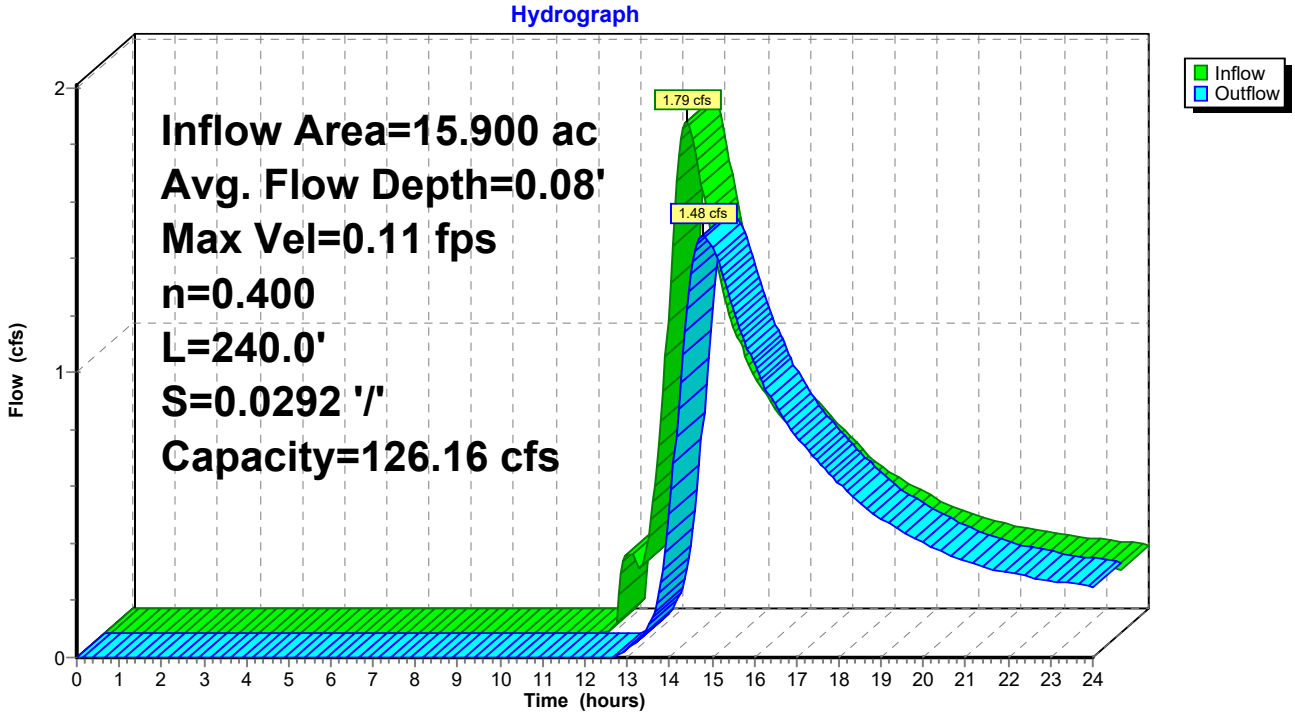
Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 0.43" for 2-YR event
Inflow = 1.79 cfs @ 13.74 hrs, Volume= 0.564 af
Outflow = 1.48 cfs @ 14.80 hrs, Volume= 0.529 af, Atten= 18%, Lag= 63.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.11 fps, Min. Travel Time= 35.5 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 57.8 min

Peak Storage= 3,154 cf @ 14.21 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 2.34 cfs @ 12.79 hrs, Volume= 0.547 af
Outflow = 1.71 cfs @ 13.74 hrs, Volume= 0.514 af, Atten= 27%, Lag= 57.1 min

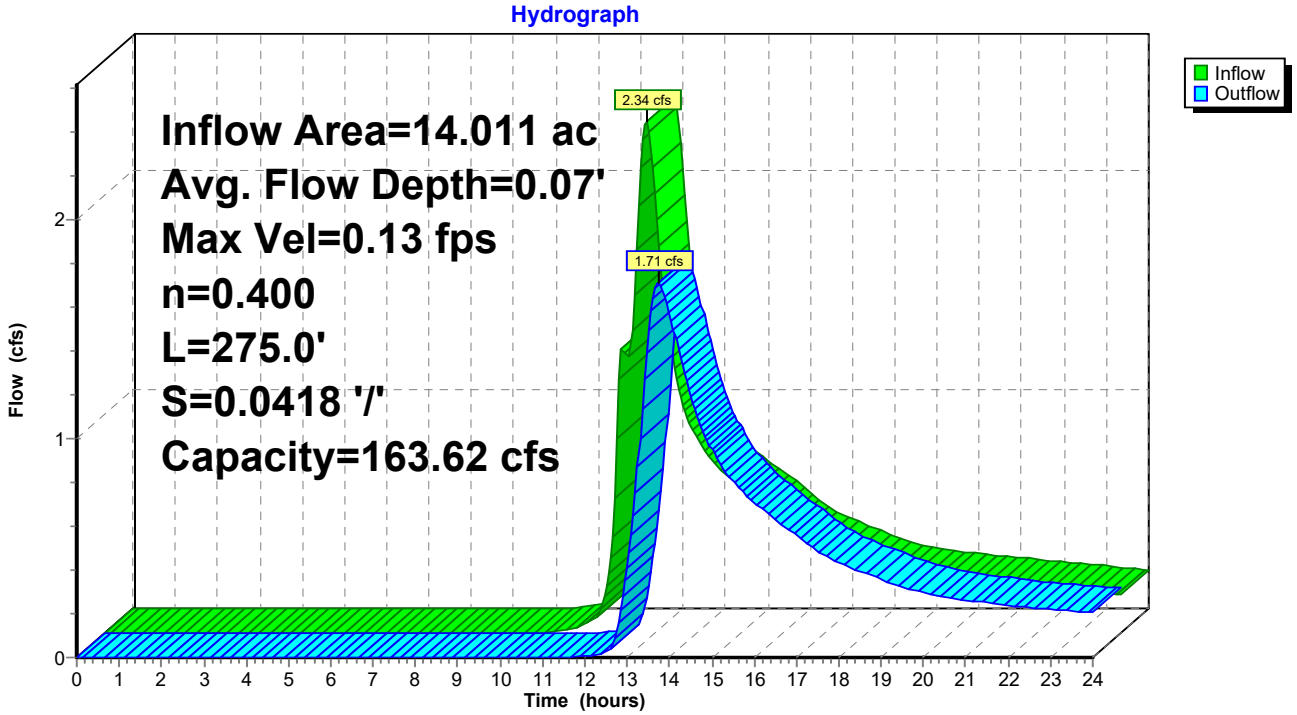
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.13 fps, Min. Travel Time= 36.6 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 65.7 min

Peak Storage= 3,761 cf @ 13.13 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

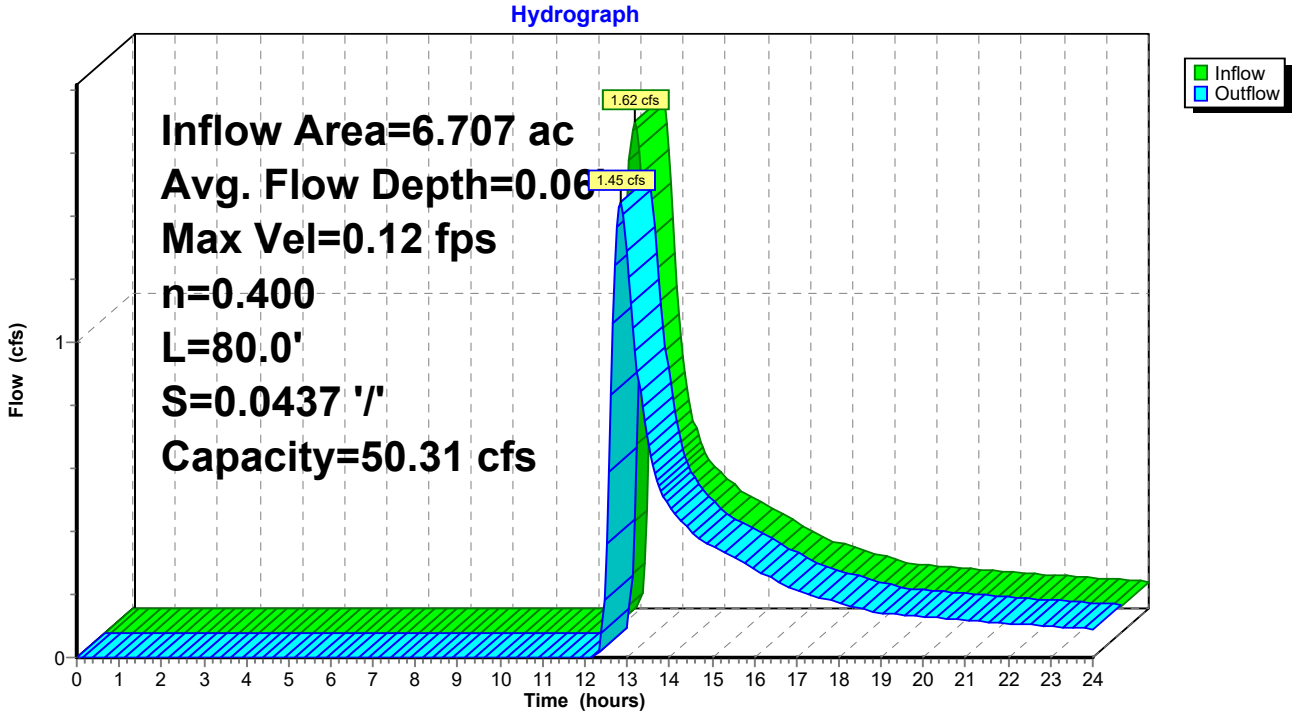
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 0.49" for 2-YR event
Inflow = 1.62 cfs @ 12.50 hrs, Volume= 0.273 af
Outflow = 1.45 cfs @ 12.84 hrs, Volume= 0.268 af, Atten= 11%, Lag= 20.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.12 fps, Min. Travel Time= 11.2 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 23.7 min

Peak Storage= 976 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

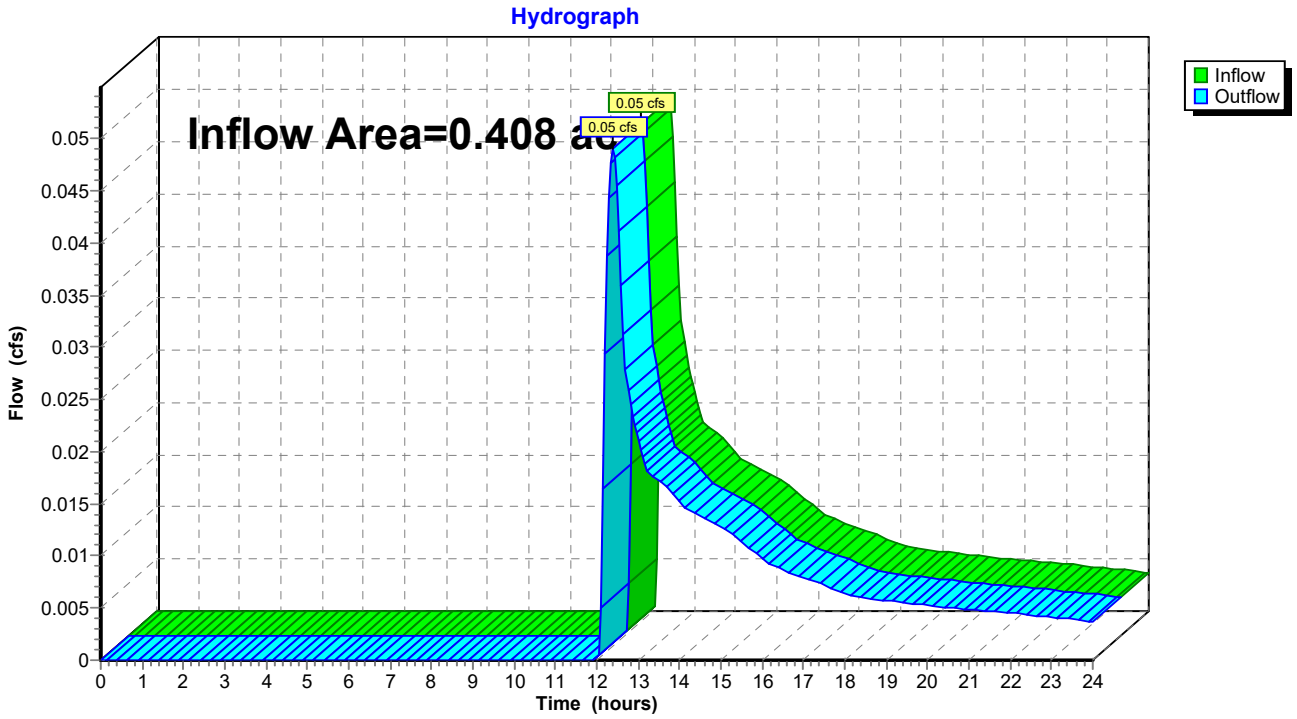


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 0.29" for 2-YR event
Inflow = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af
Outflow = 0.05 cfs @ 12.41 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 0.40" for 2-YR event
Inflow = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af
Outflow = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min
Primary = 1.60 cfs @ 16.12 hrs, Volume= 0.741 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 601.56' @ 16.12 hrs Surf.Area= 15 sf Storage= 6 cf

Plug-Flow detention time= 0.1 min calculated for 0.739 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (1,070.3 - 1,070.2)

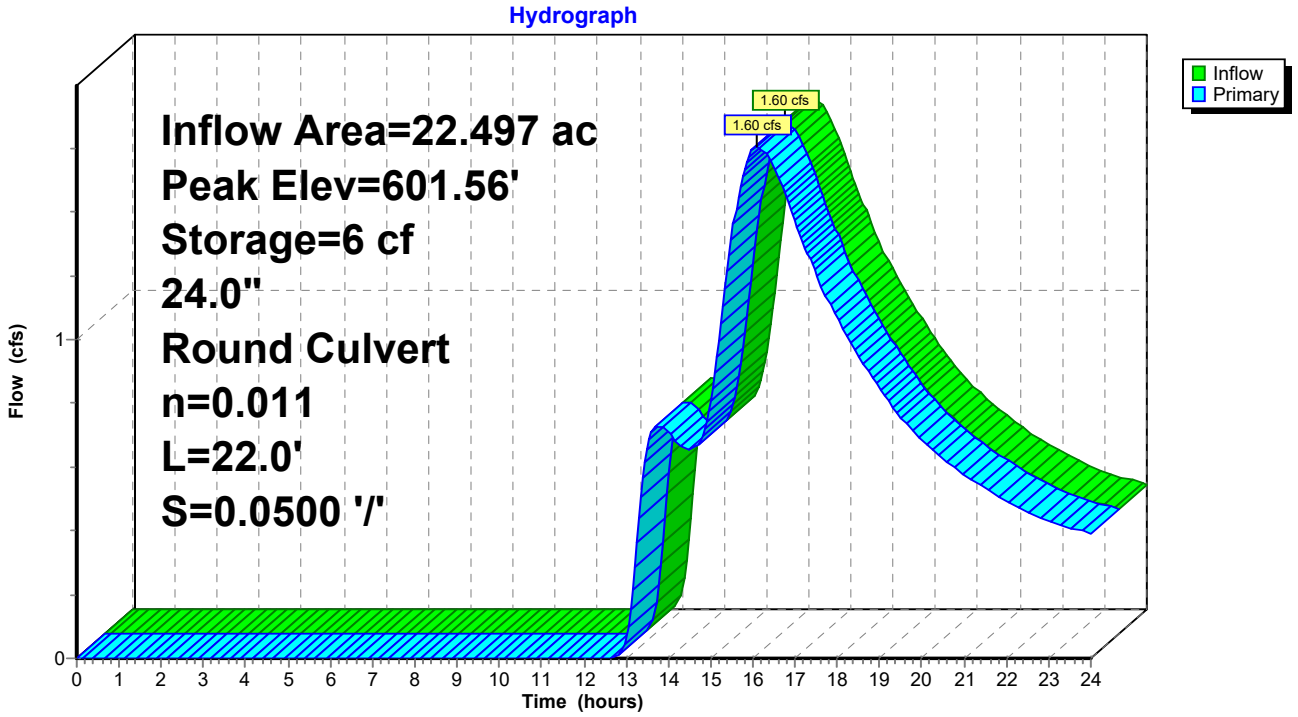
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.60 cfs @ 16.12 hrs HW=601.56' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 1.60 cfs @ 2.90 fps)

Pond RCP: 24" RCP



Summary for Subcatchment 1: EDA-1

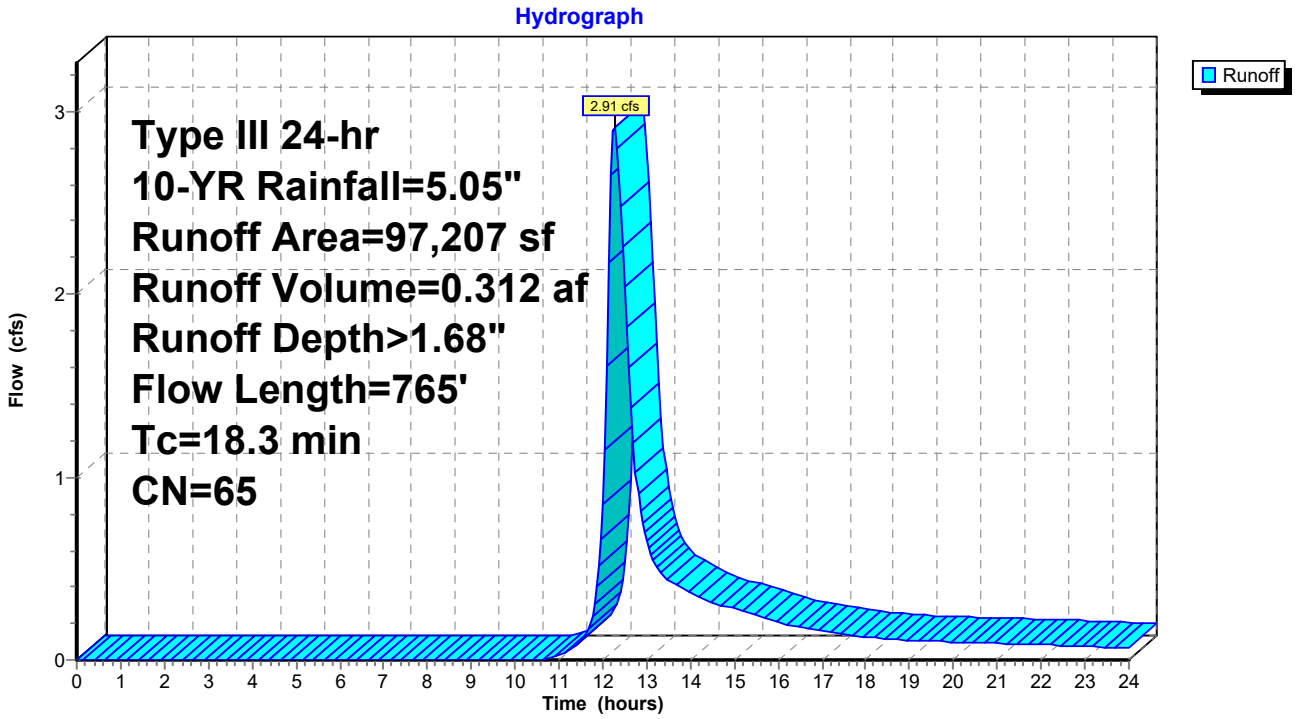
Runoff = 2.91 cfs @ 12.27 hrs, Volume= 0.312 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

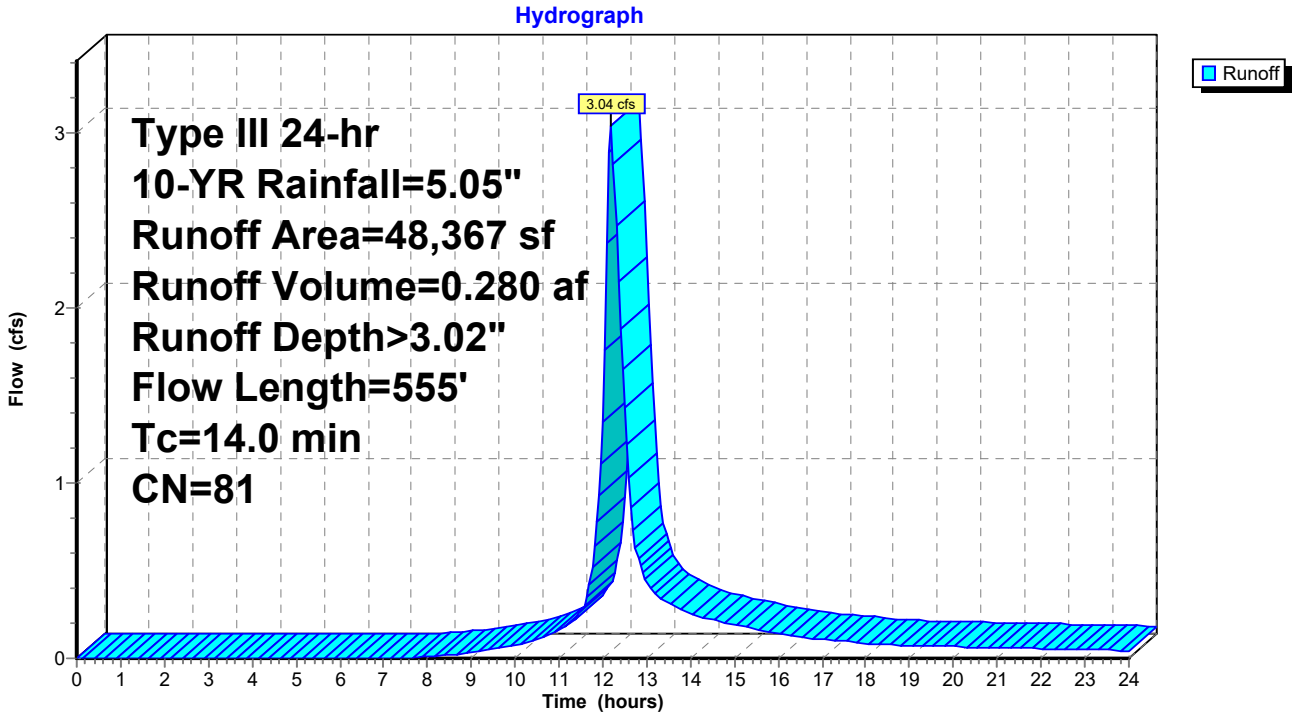
Runoff = 3.04 cfs @ 12.20 hrs, Volume= 0.280 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

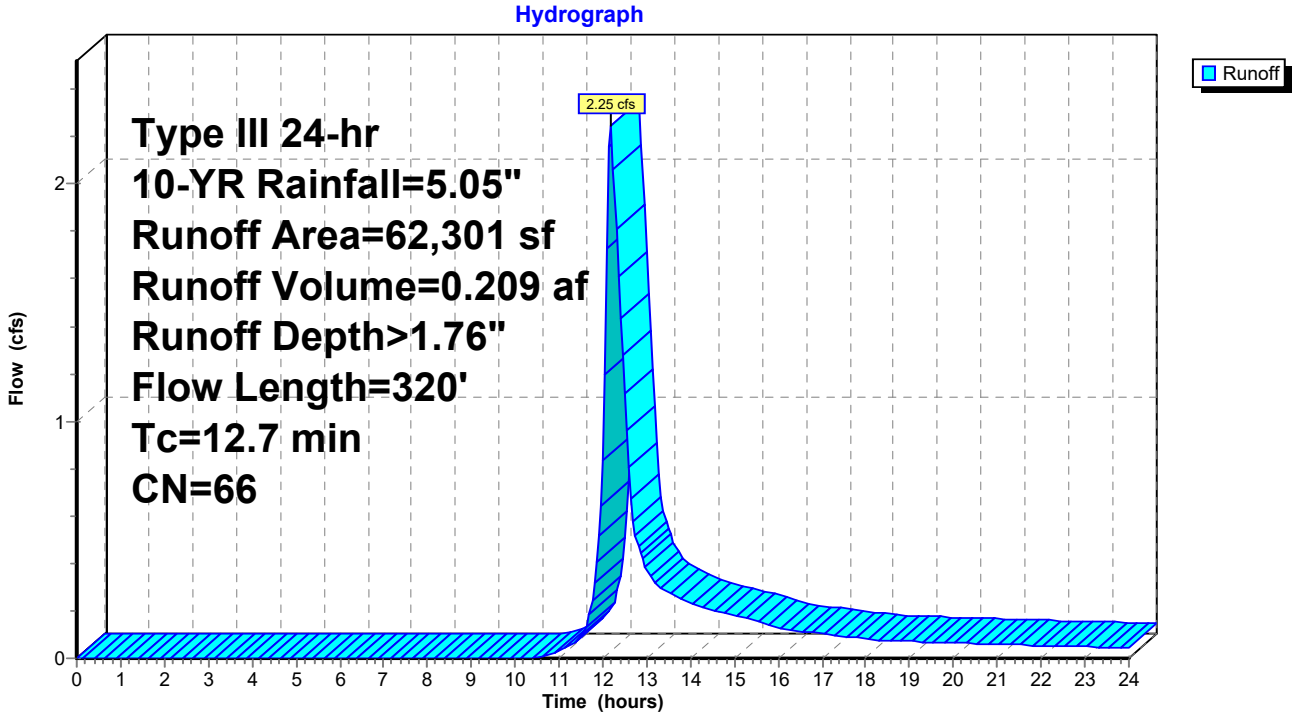
Runoff = 2.25 cfs @ 12.19 hrs, Volume= 0.209 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

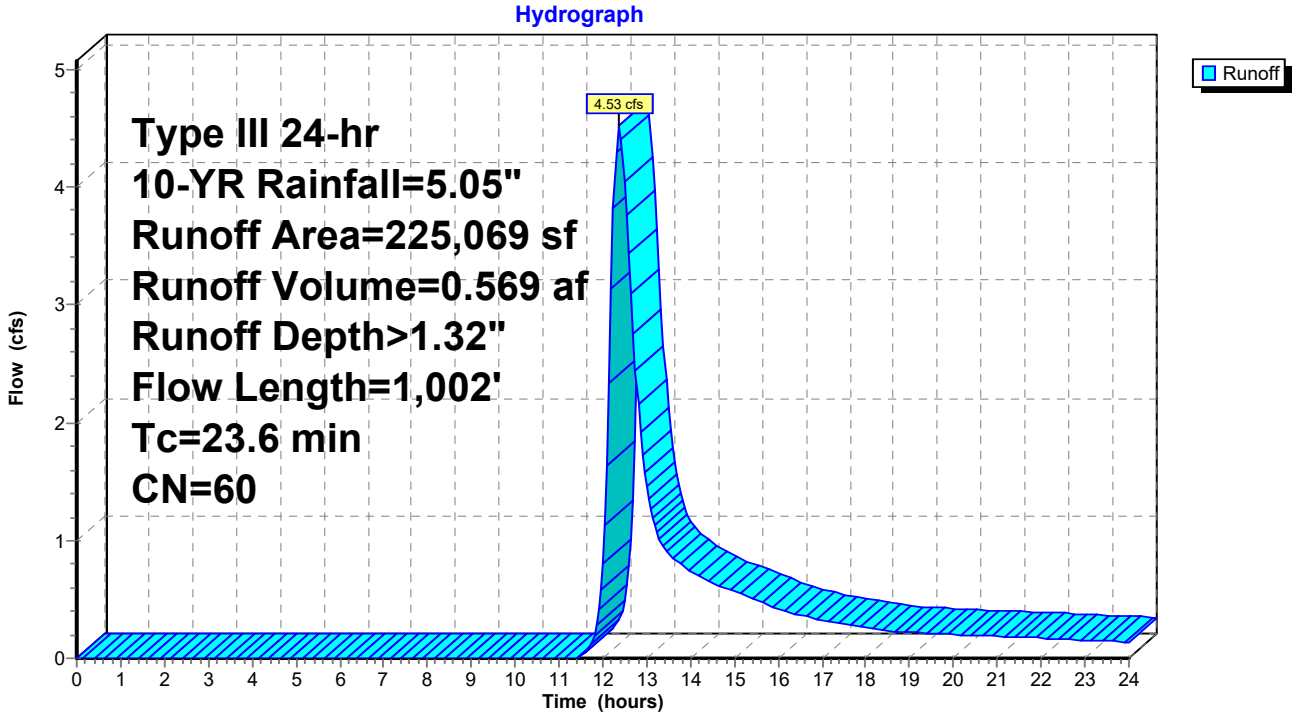
Runoff = 4.53 cfs @ 12.37 hrs, Volume= 0.569 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

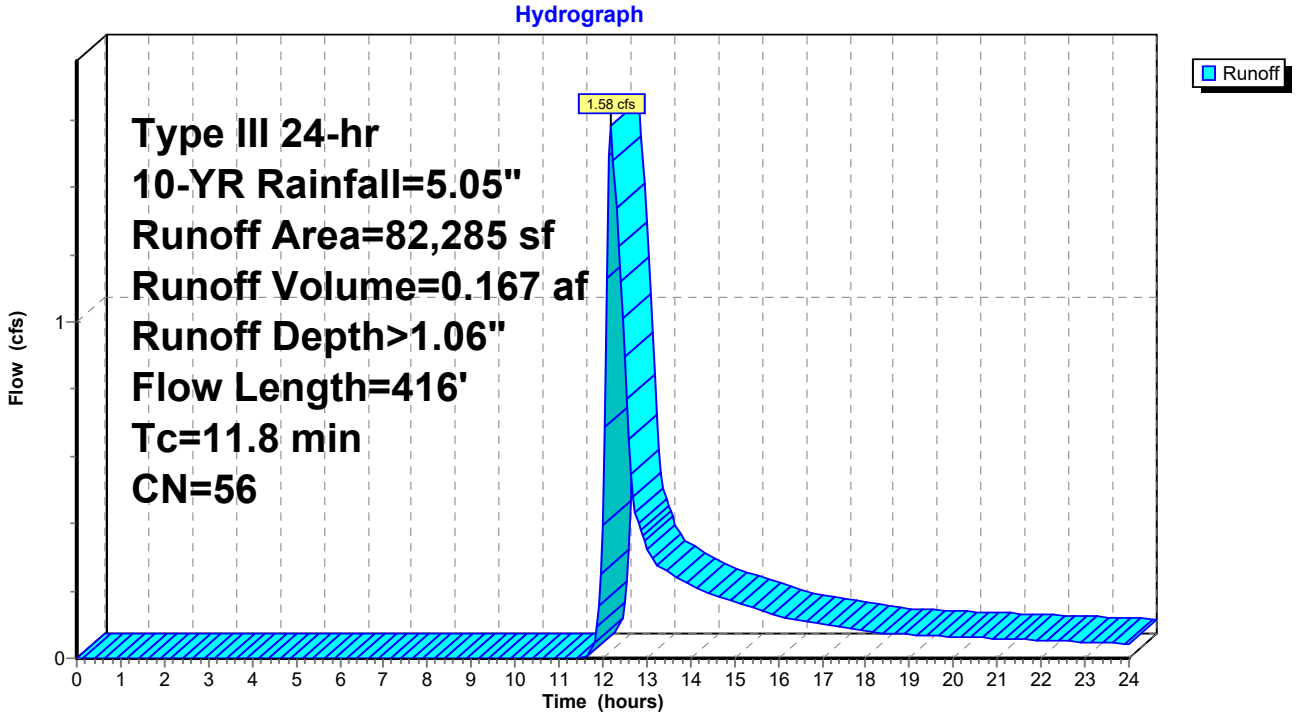
Runoff = 1.58 cfs @ 12.20 hrs, Volume= 0.167 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

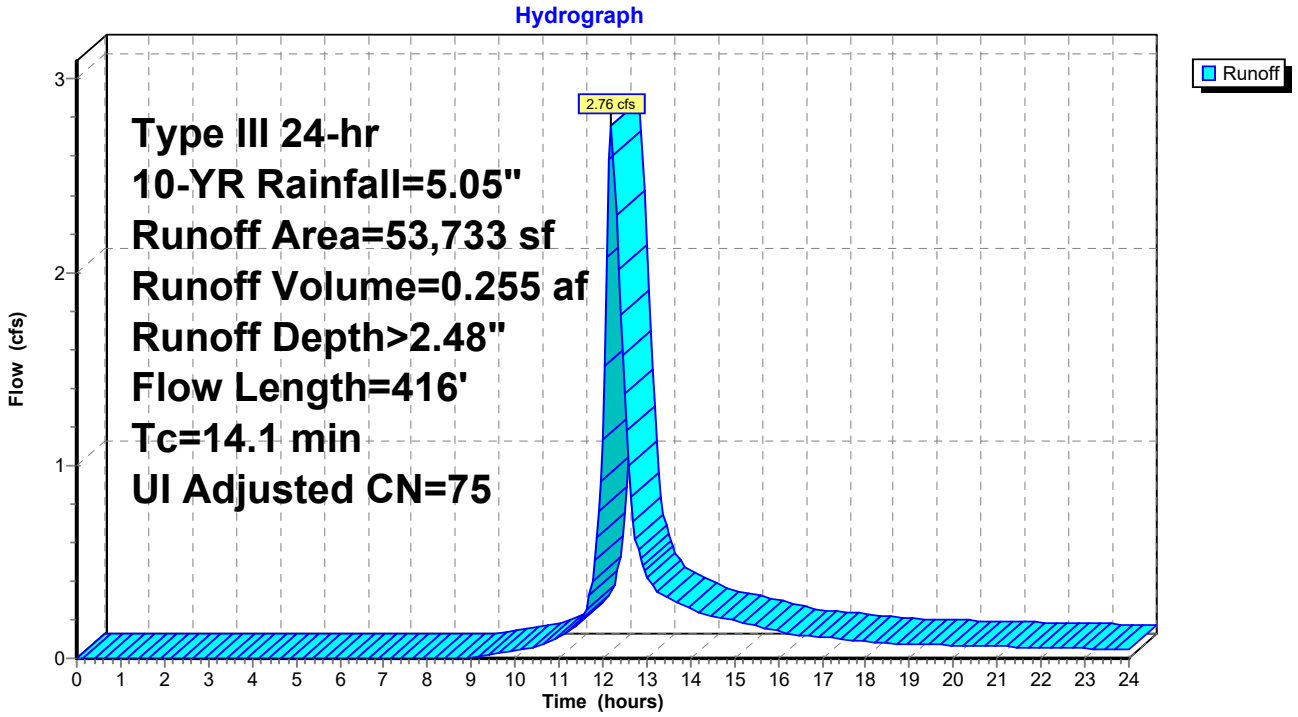
Runoff = 2.76 cfs @ 12.20 hrs, Volume= 0.255 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

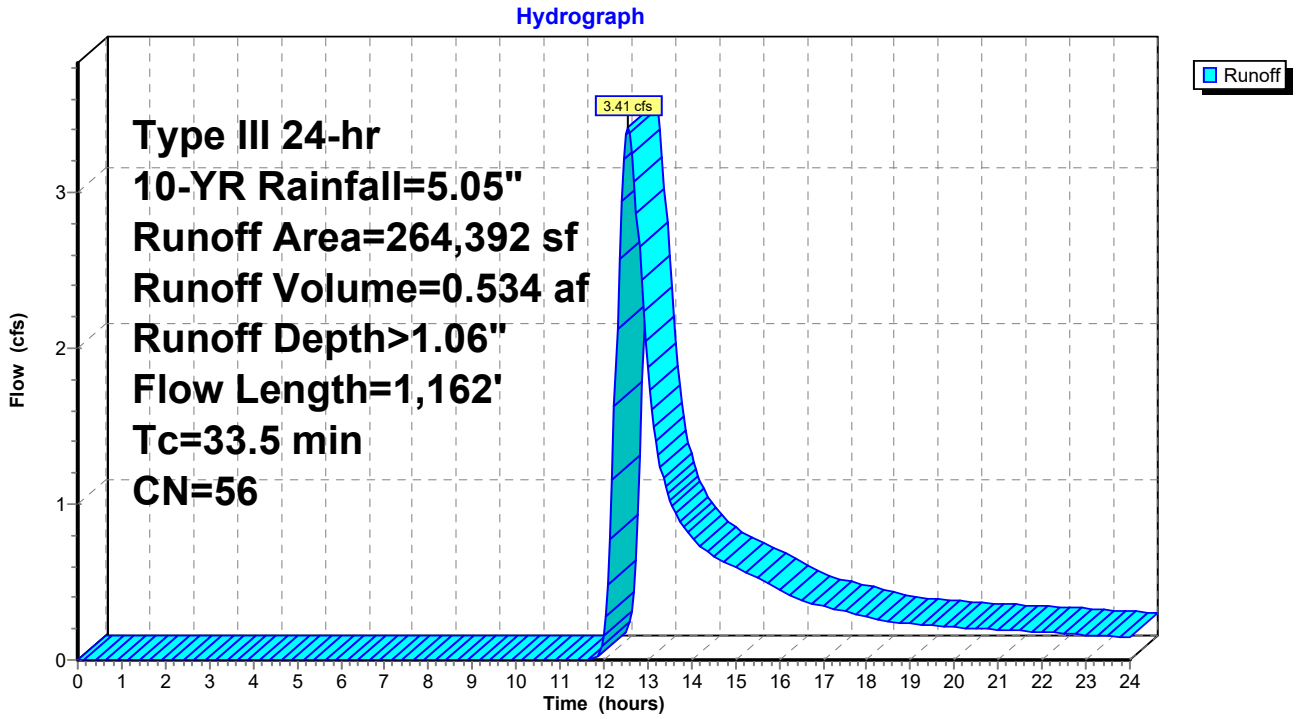
Runoff = 3.41 cfs @ 12.55 hrs, Volume= 0.534 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

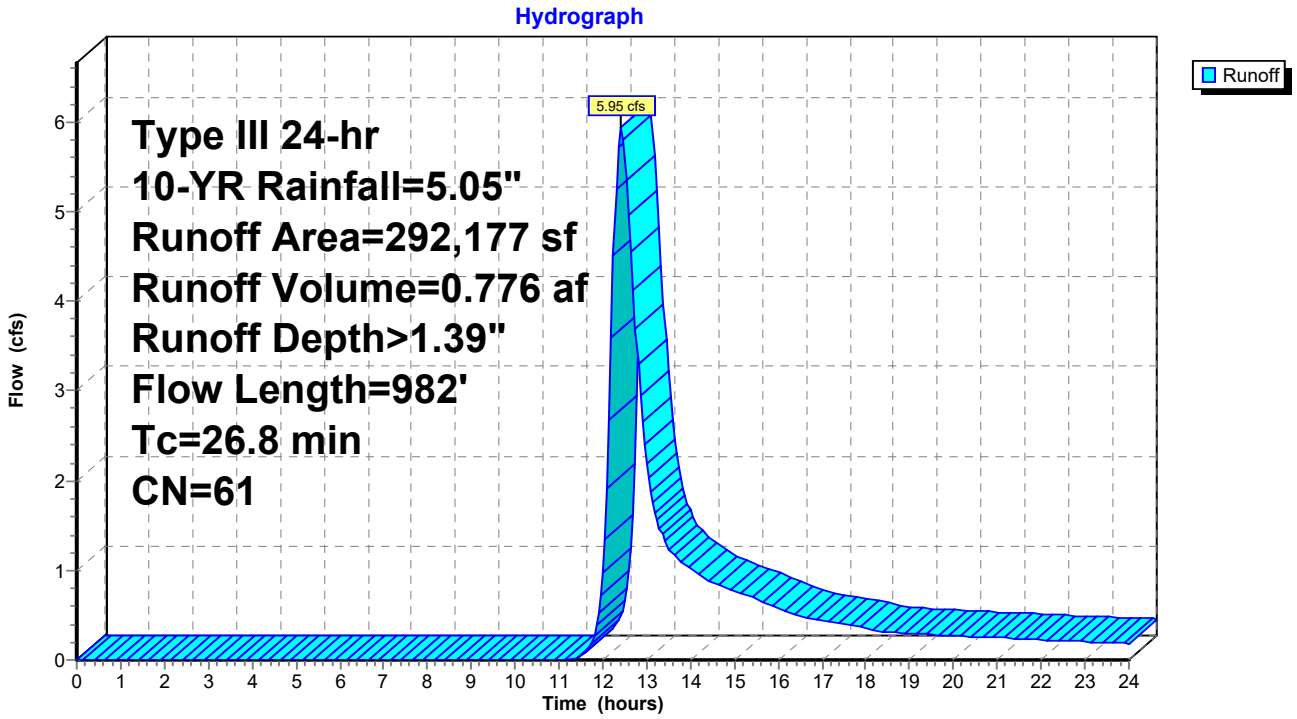
Runoff = 5.95 cfs @ 12.42 hrs, Volume= 0.776 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

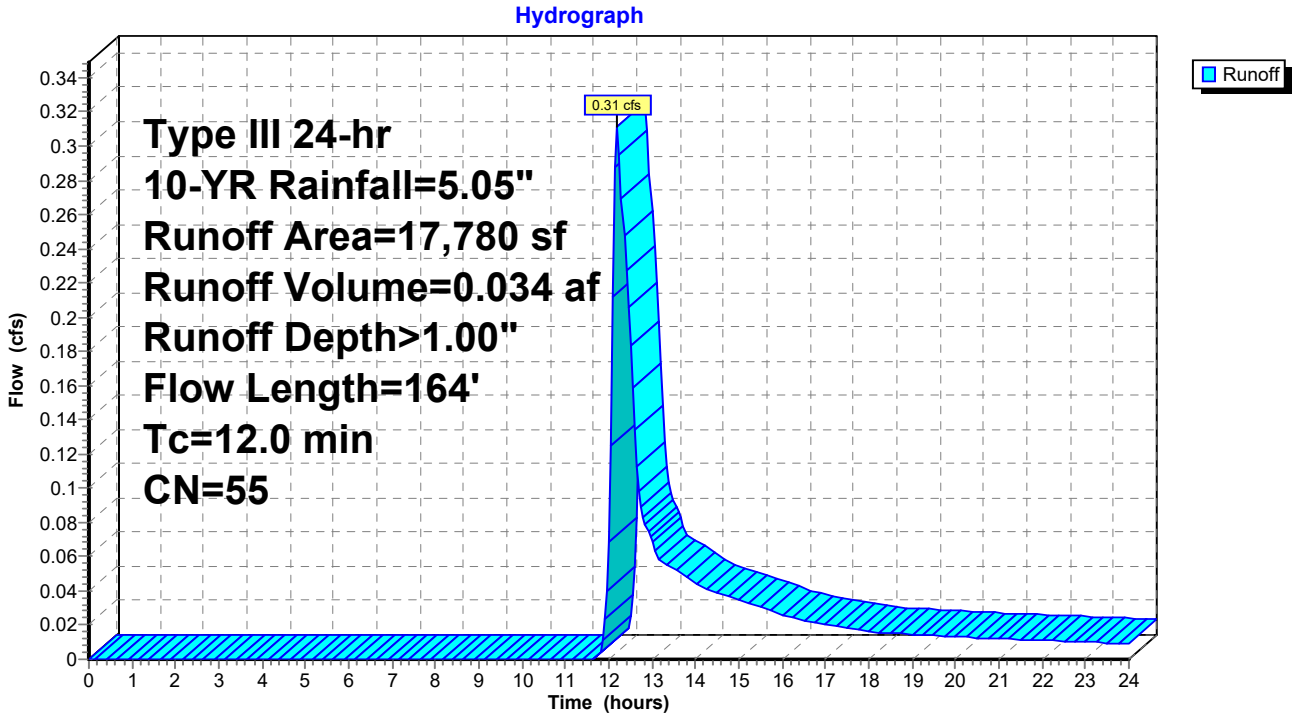
Runoff = 0.31 cfs @ 12.20 hrs, Volume= 0.034 af, Depth> 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

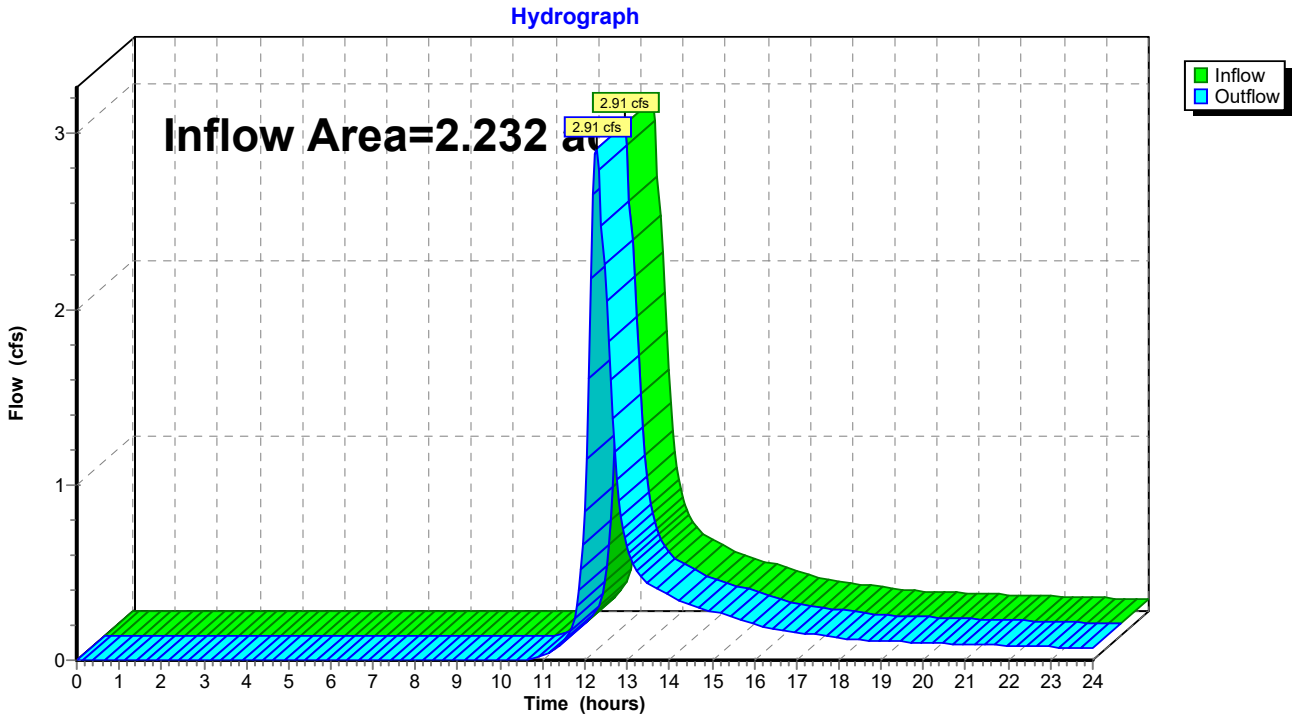


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 1.68" for 10-YR event
Inflow = 2.91 cfs @ 12.27 hrs, Volume= 0.312 af
Outflow = 2.91 cfs @ 12.27 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

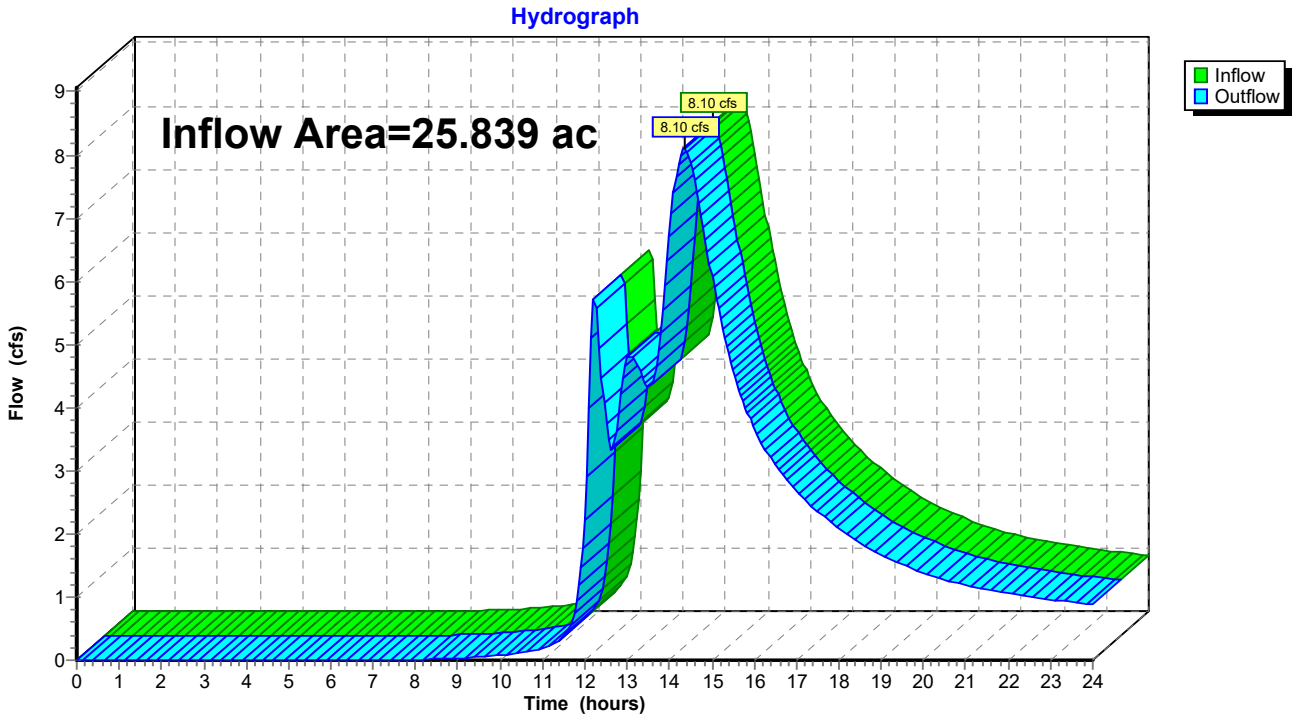


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 1.35" for 10-YR event
Inflow = 8.10 cfs @ 14.35 hrs, Volume= 2.906 af
Outflow = 8.10 cfs @ 14.35 hrs, Volume= 2.906 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.28" for 10-YR event
Inflow = 8.48 cfs @ 13.65 hrs, Volume= 2.405 af
Outflow = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af, Atten= 11%, Lag= 42.0 min

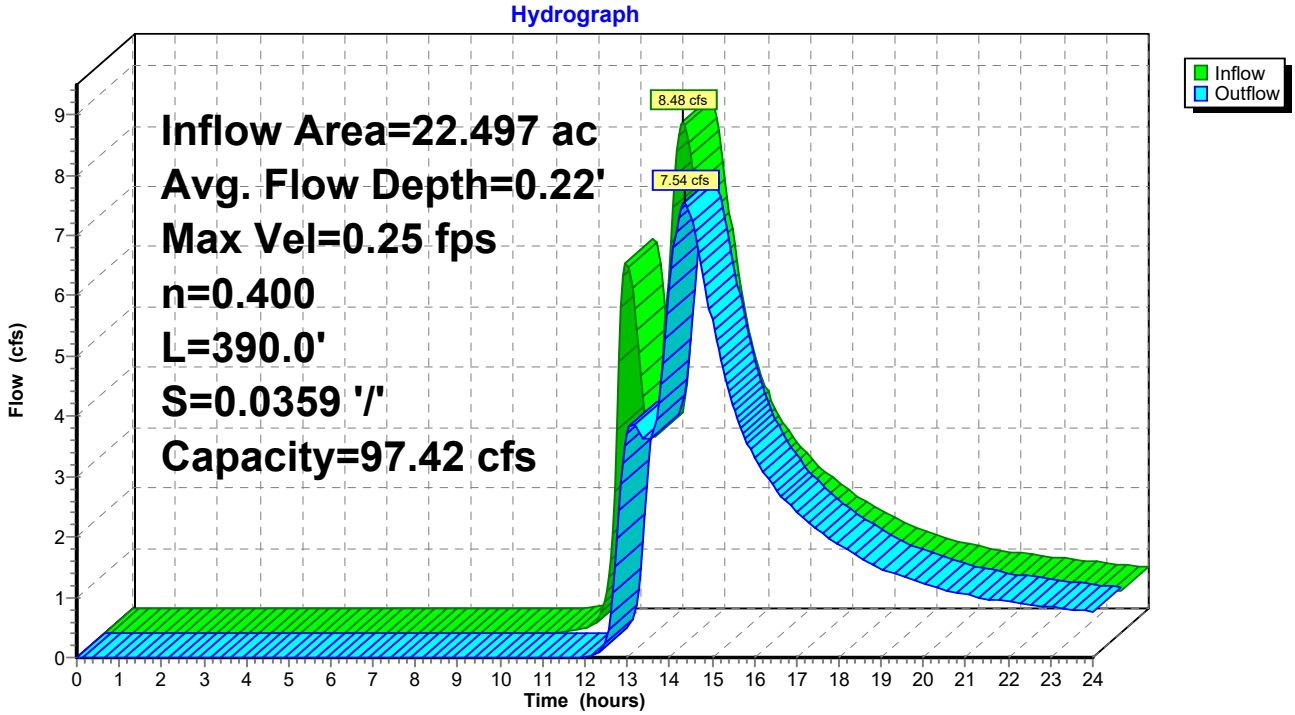
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 25.8 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 48.7 min

Peak Storage= 11,665 cf @ 13.92 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

‡

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 1.27" for 10-YR event
Inflow = 8.54 cfs @ 13.10 hrs, Volume= 1.677 af
Outflow = 7.38 cfs @ 13.66 hrs, Volume= 1.627 af, Atten= 14%, Lag= 33.5 min

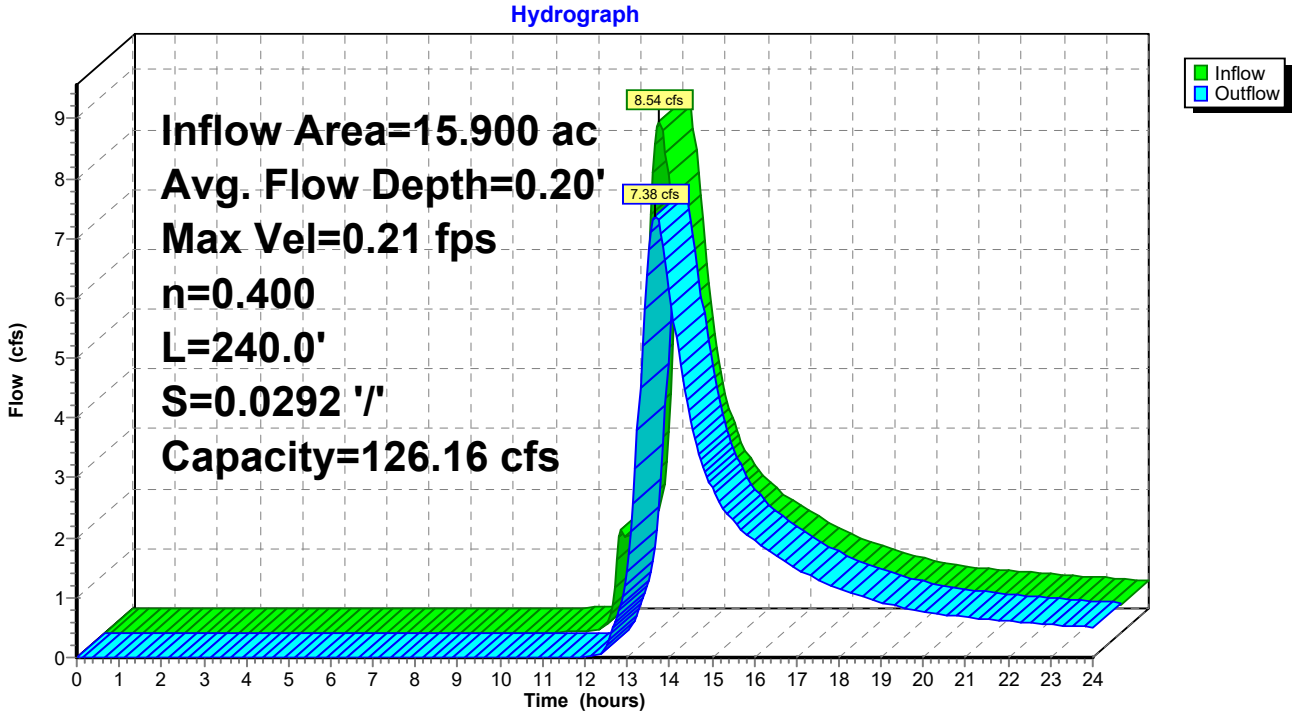
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.21 fps, Min. Travel Time= 19.4 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 43.1 min

Peak Storage= 8,610 cf @ 13.34 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 1.33" for 10-YR event
Inflow = 10.15 cfs @ 12.56 hrs, Volume= 1.557 af
Outflow = 8.24 cfs @ 13.11 hrs, Volume= 1.510 af, Atten= 19%, Lag= 32.8 min

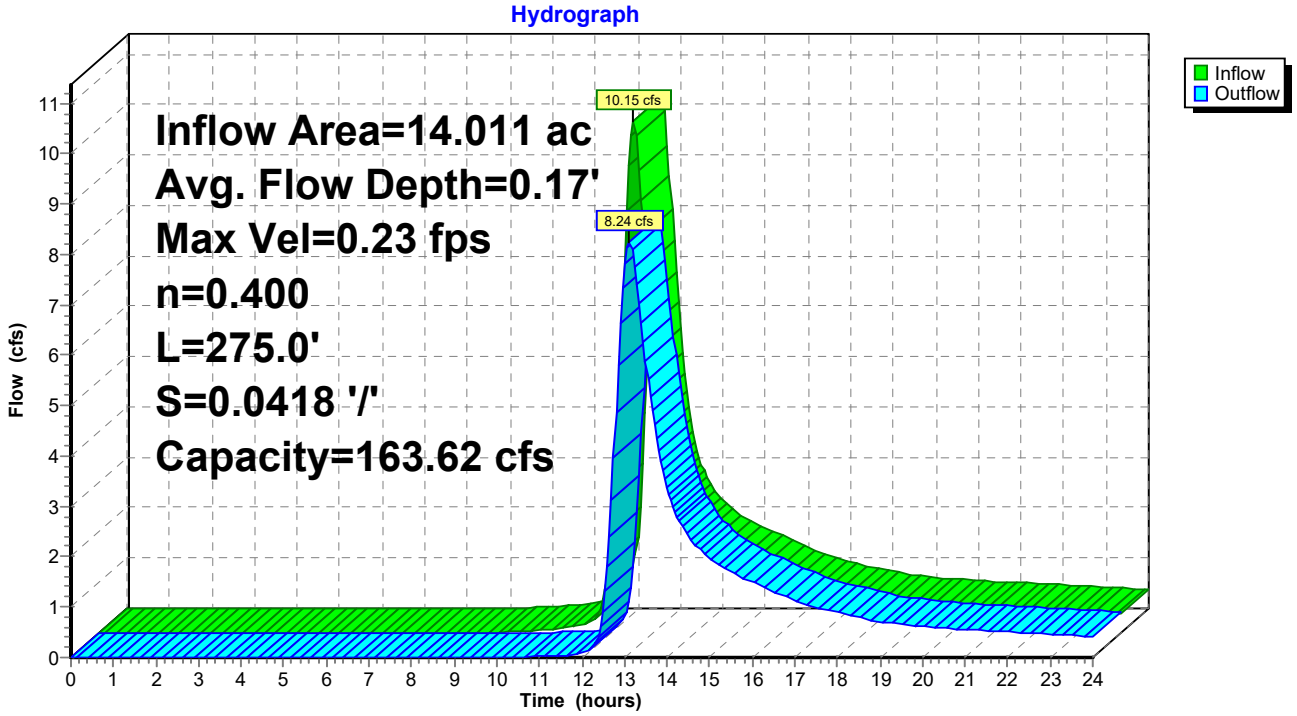
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.23 fps, Min. Travel Time= 19.8 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 49.3 min

Peak Storage= 9,825 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

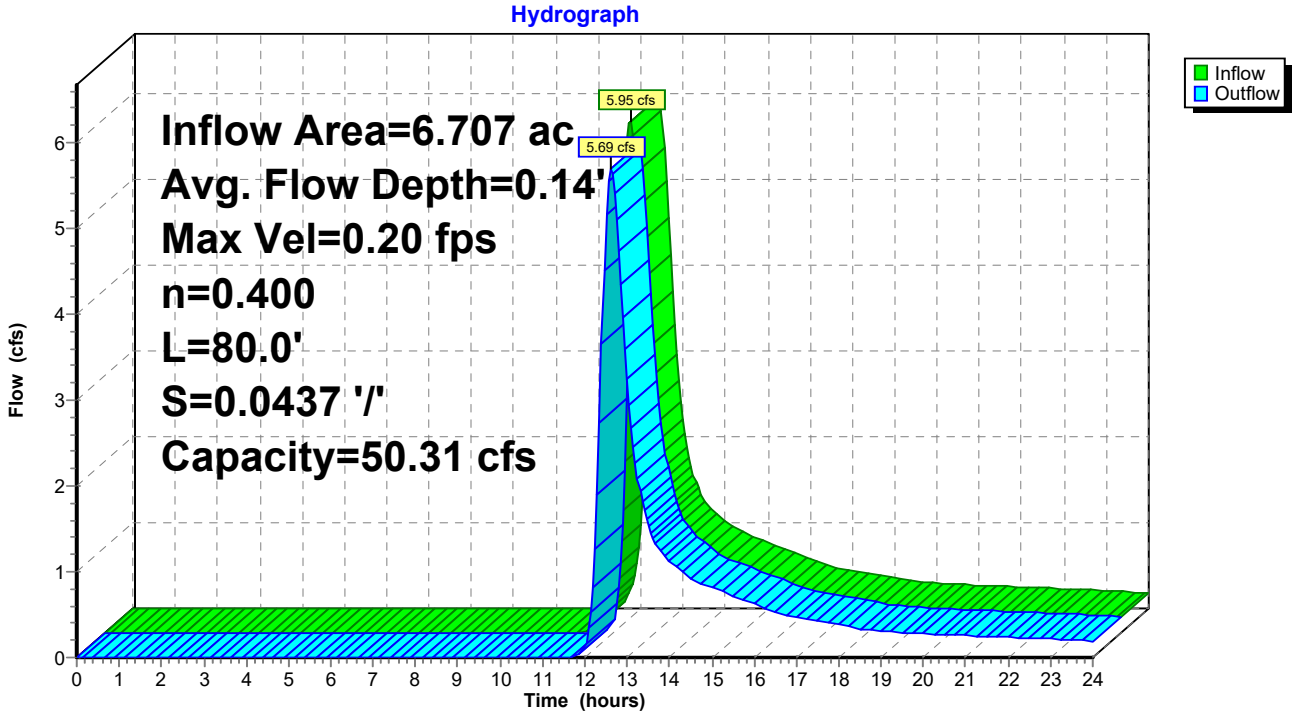
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 1.39" for 10-YR event
Inflow = 5.95 cfs @ 12.42 hrs, Volume= 0.776 af
Outflow = 5.69 cfs @ 12.61 hrs, Volume= 0.768 af, Atten= 4%, Lag= 11.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.20 fps, Min. Travel Time= 6.5 min
Avg. Velocity = 0.08 fps, Avg. Travel Time= 17.0 min

Peak Storage= 2,238 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

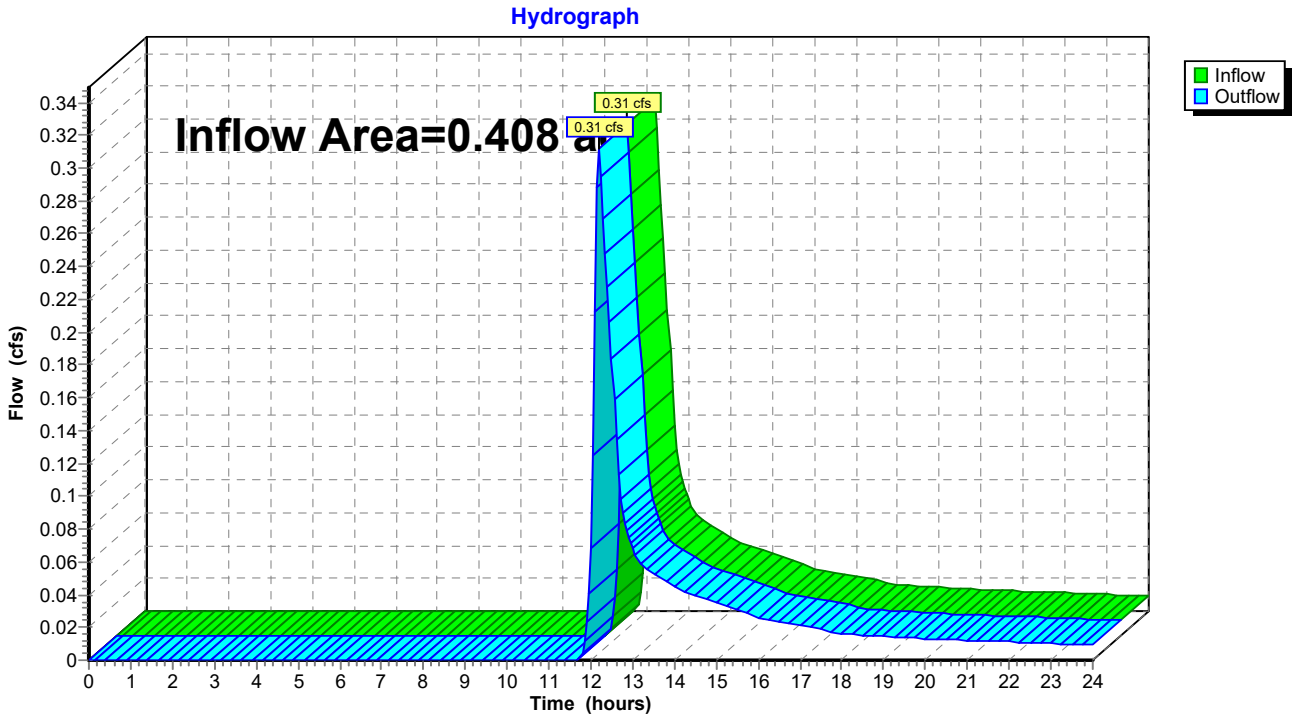


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 1.00" for 10-YR event
Inflow = 0.31 cfs @ 12.20 hrs, Volume= 0.034 af
Outflow = 0.31 cfs @ 12.20 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.23" for 10-YR event
Inflow = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af
Outflow = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af, Atten= 0%, Lag= 0.0 min
Primary = 7.54 cfs @ 14.35 hrs, Volume= 2.314 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 602.17' @ 14.35 hrs Surf.Area= 22 sf Storage= 17 cf

Plug-Flow detention time= 0.1 min calculated for 2.310 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (980.3 - 980.2)

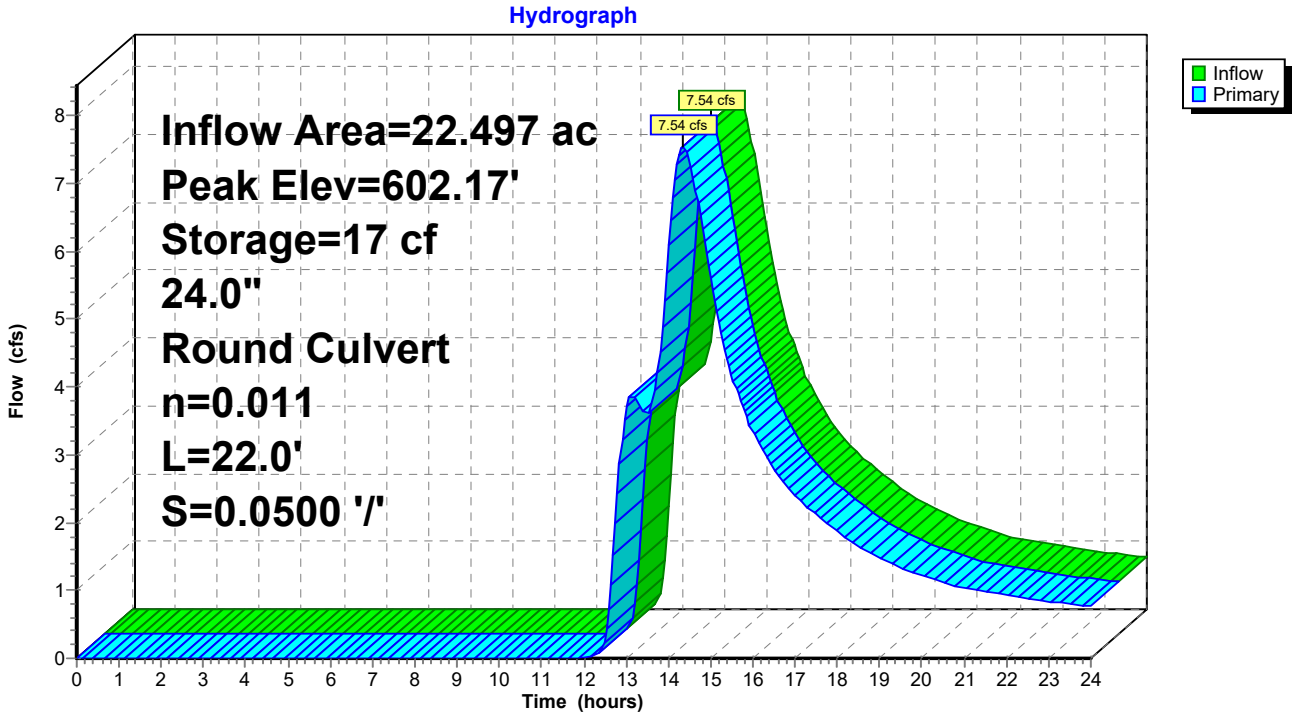
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=7.54 cfs @ 14.35 hrs HW=602.17' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 7.54 cfs @ 4.40 fps)

Pond RCP: 24" RCP



Summary for Subcatchment 1: EDA-1

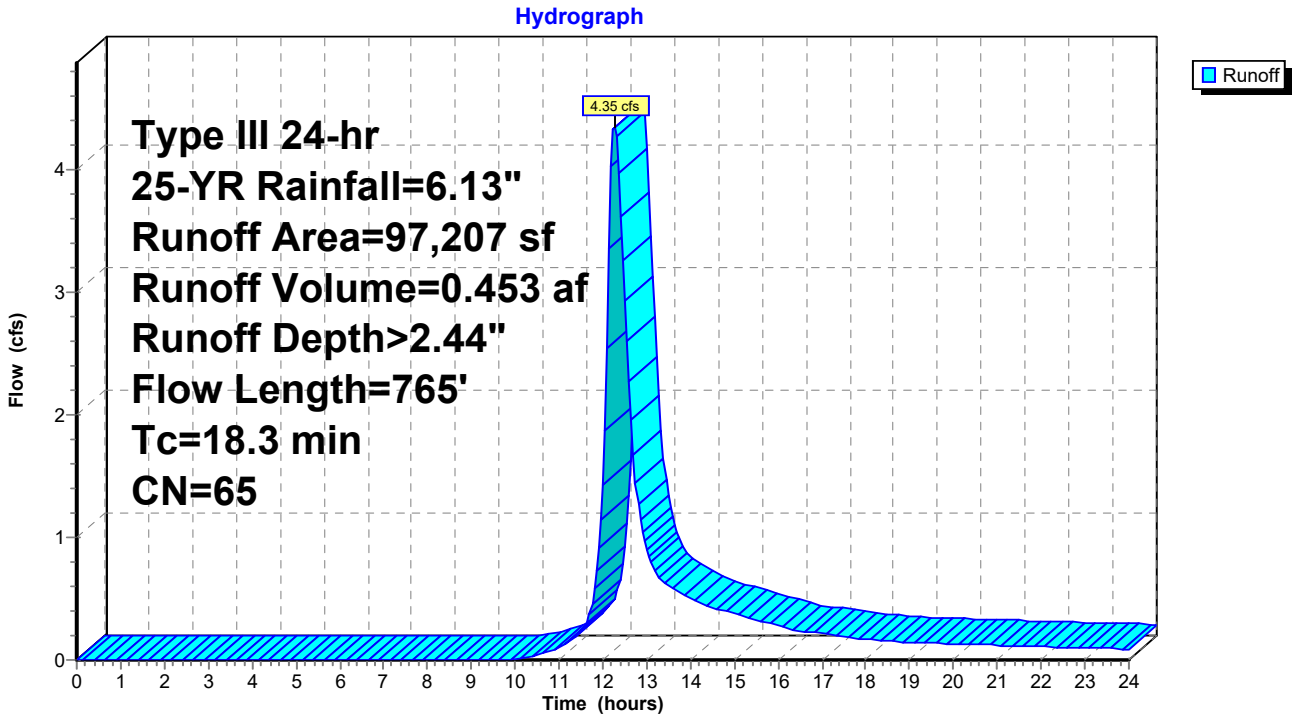
Runoff = 4.35 cfs @ 12.27 hrs, Volume= 0.453 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

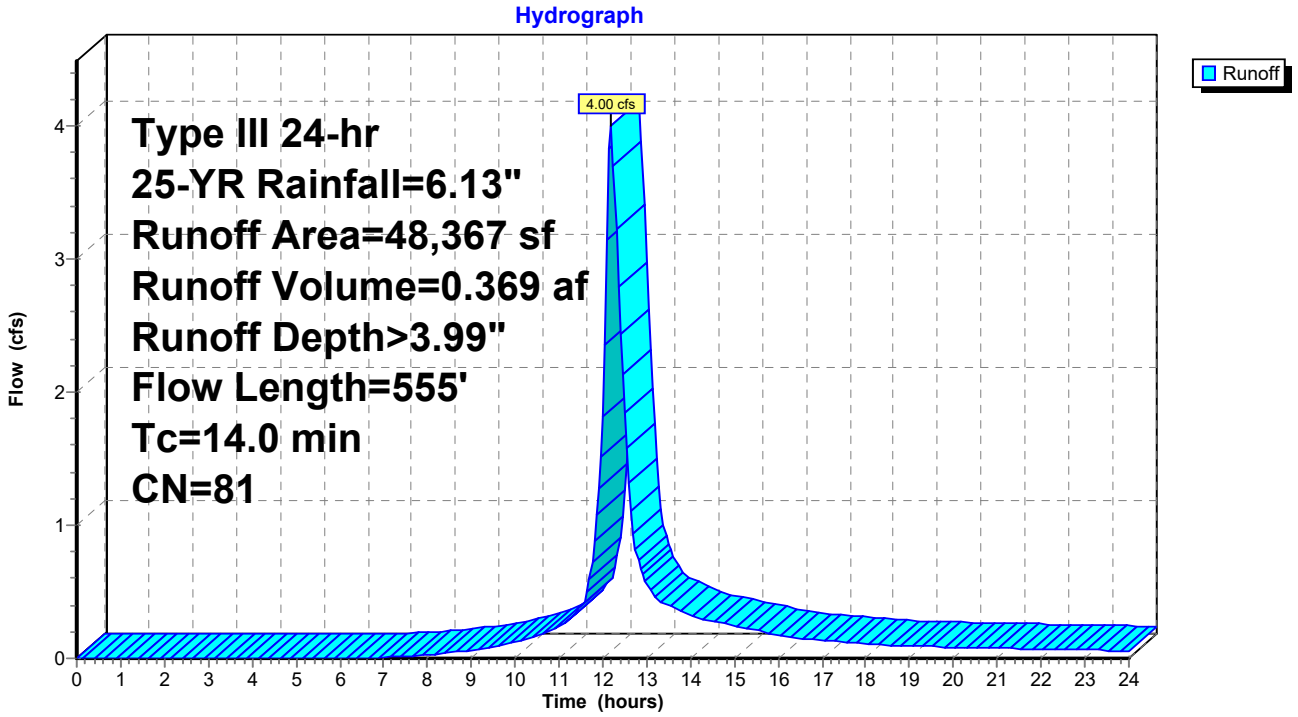
Runoff = 4.00 cfs @ 12.19 hrs, Volume= 0.369 af, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

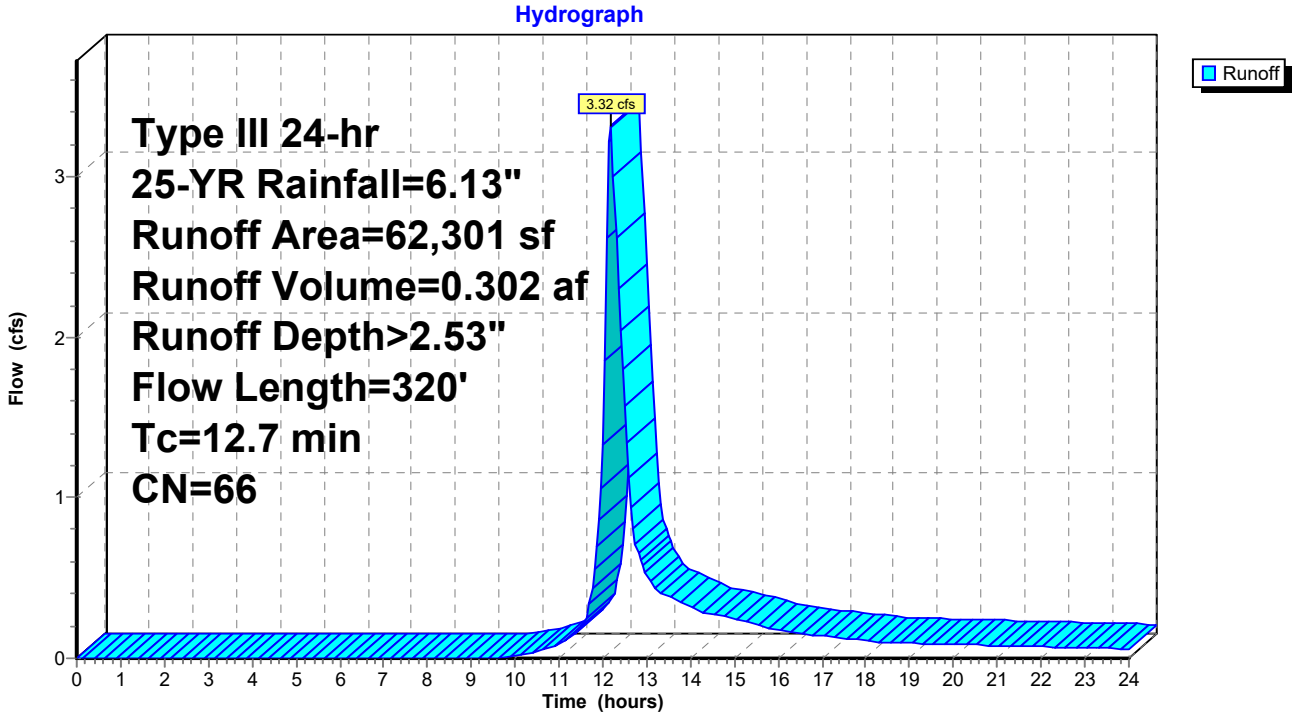
Runoff = 3.32 cfs @ 12.19 hrs, Volume= 0.302 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

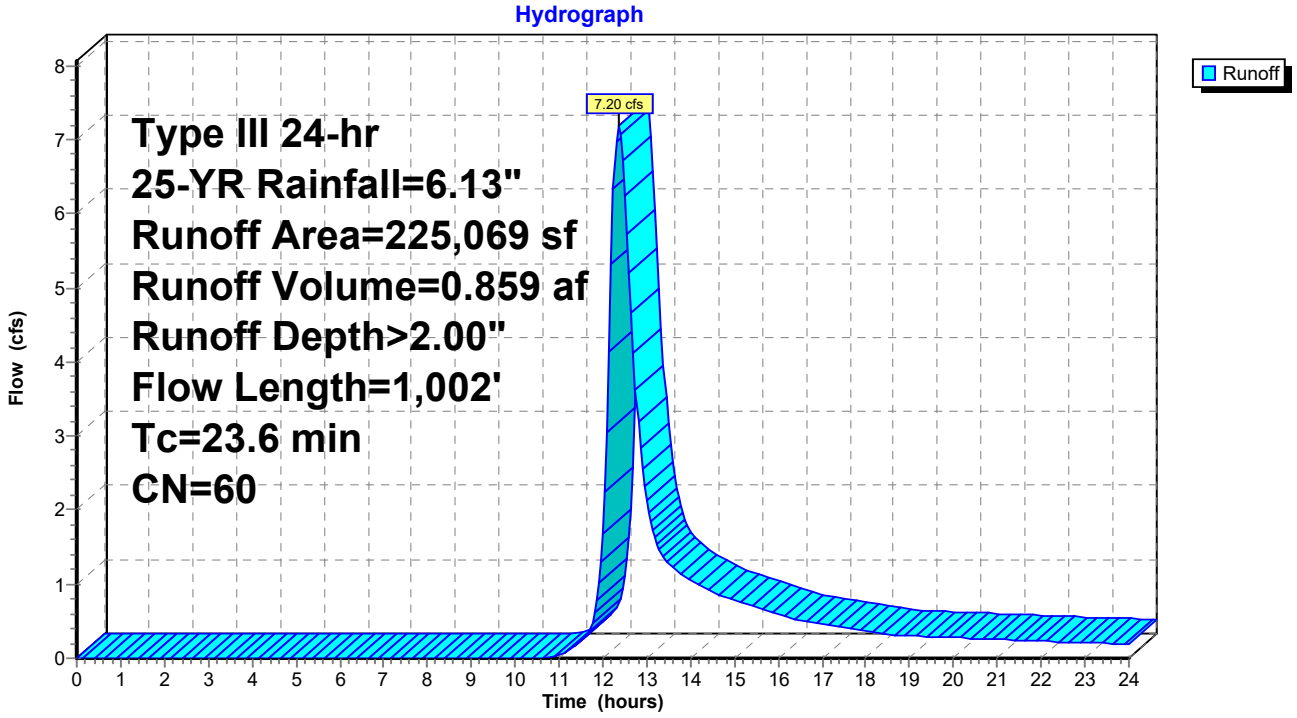
Runoff = 7.20 cfs @ 12.36 hrs, Volume= 0.859 af, Depth> 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

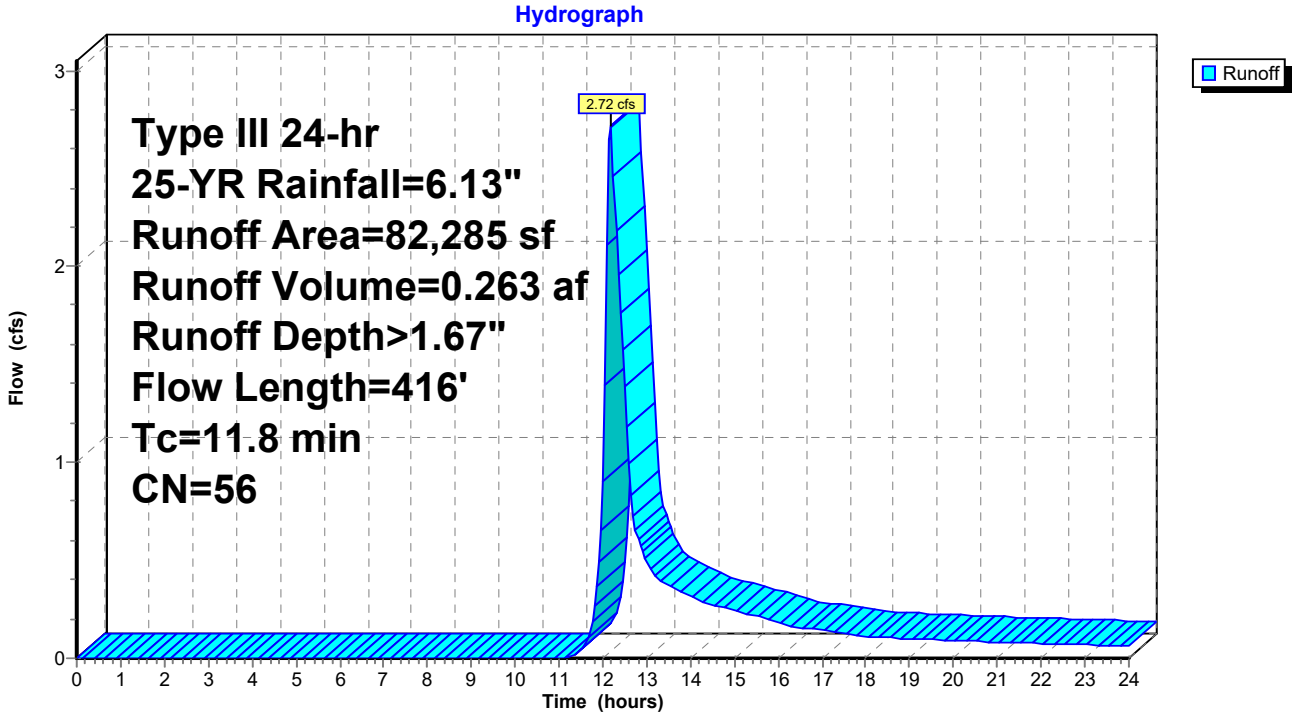
Runoff = 2.72 cfs @ 12.18 hrs, Volume= 0.263 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

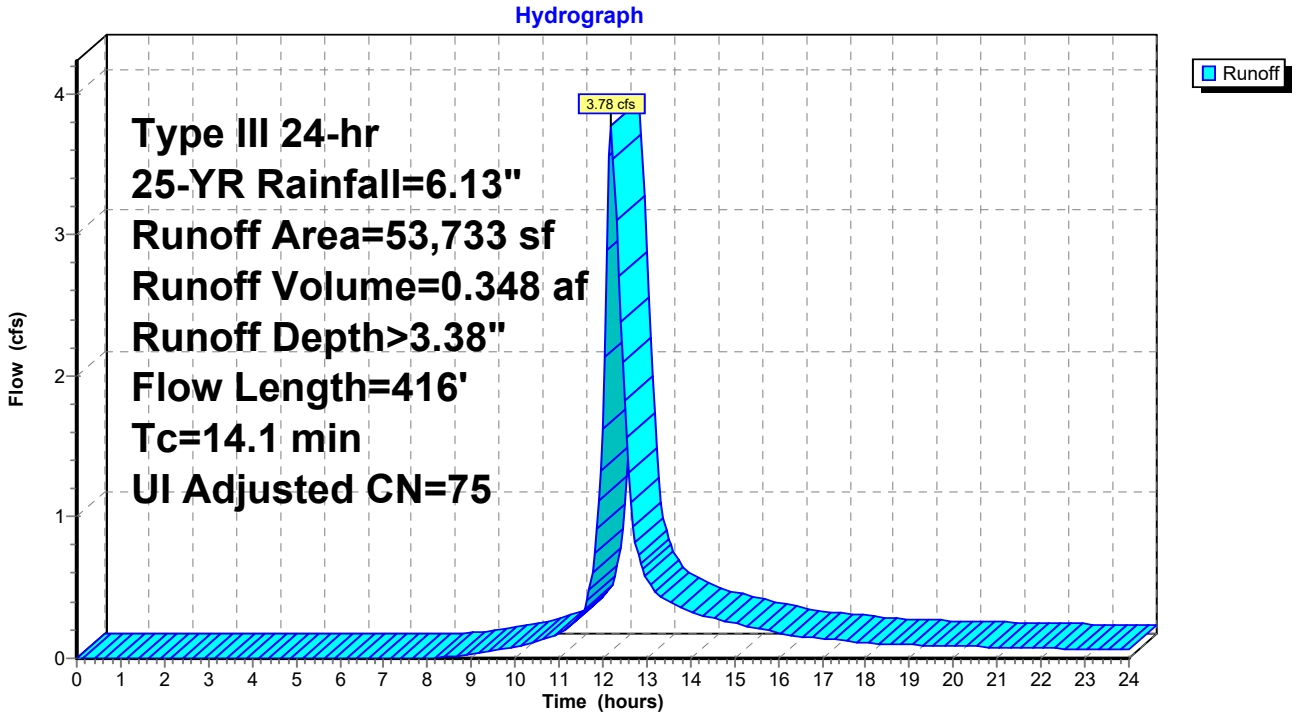
Runoff = 3.78 cfs @ 12.20 hrs, Volume= 0.348 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

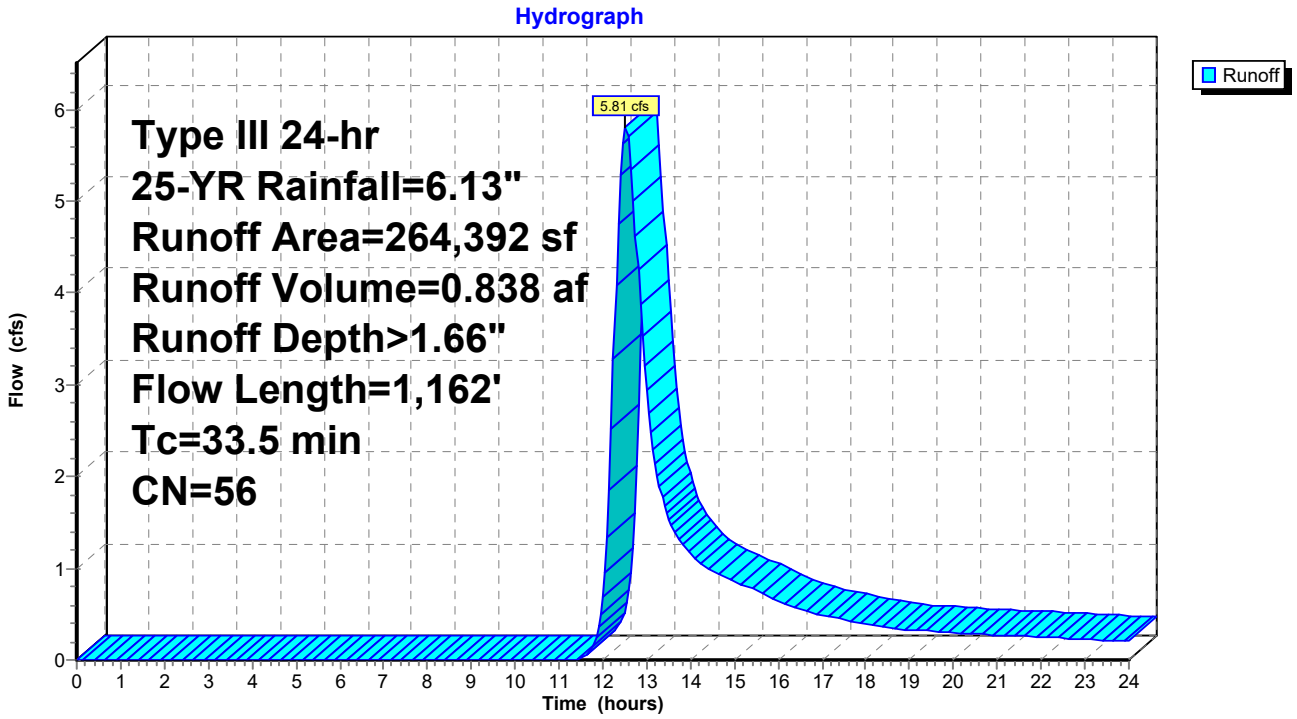
Runoff = 5.81 cfs @ 12.52 hrs, Volume= 0.838 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

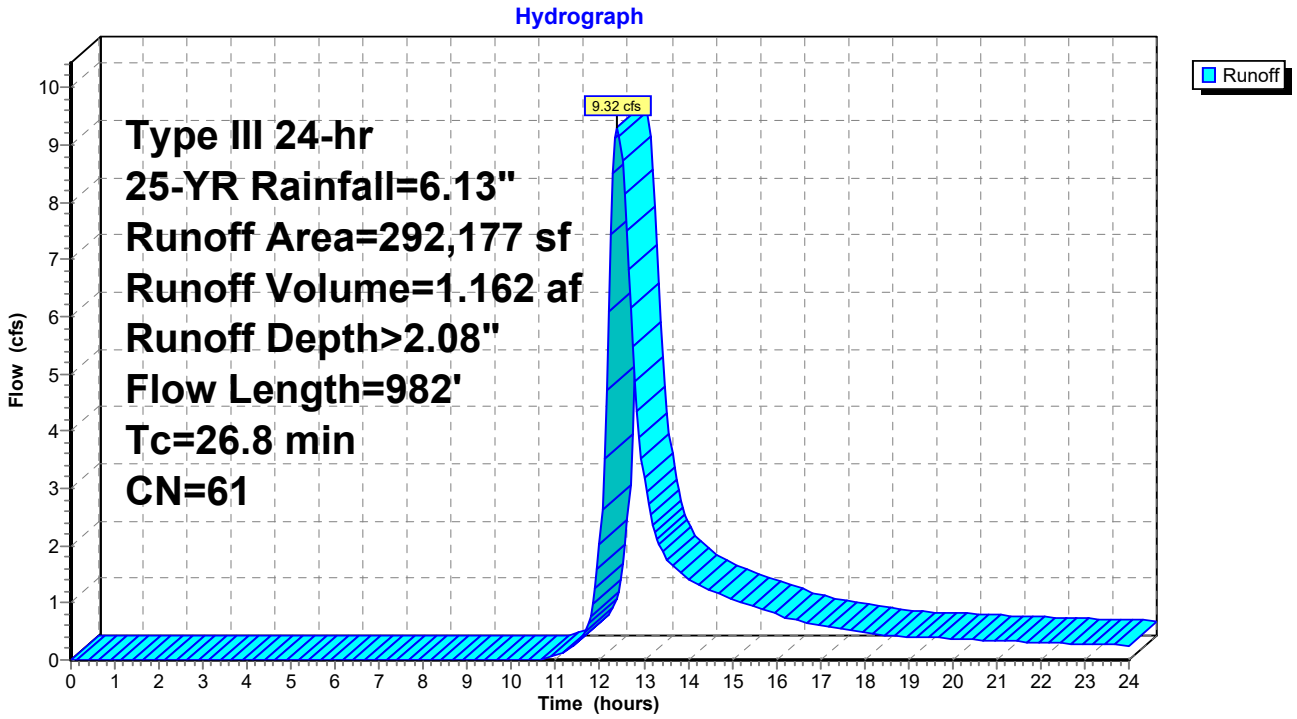
Runoff = 9.32 cfs @ 12.40 hrs, Volume= 1.162 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

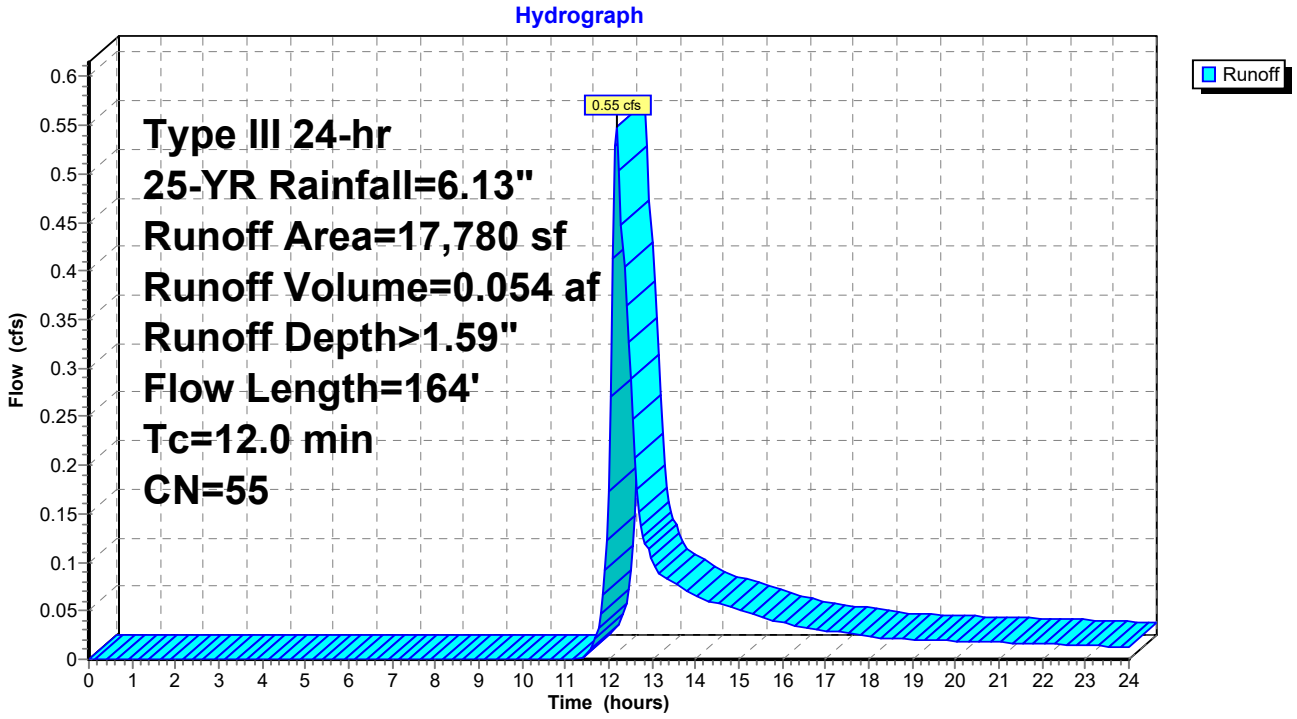
Runoff = 0.55 cfs @ 12.19 hrs, Volume= 0.054 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

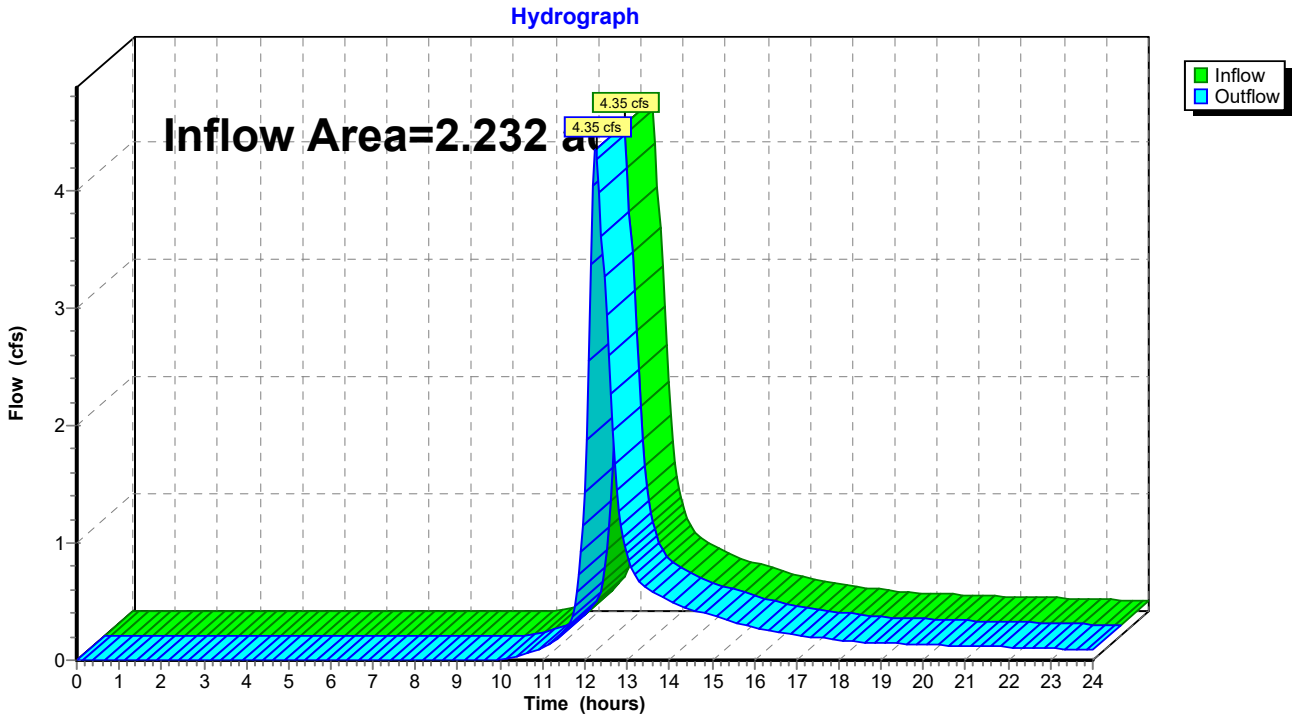


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 2.44" for 25-YR event
Inflow = 4.35 cfs @ 12.27 hrs, Volume= 0.453 af
Outflow = 4.35 cfs @ 12.27 hrs, Volume= 0.453 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

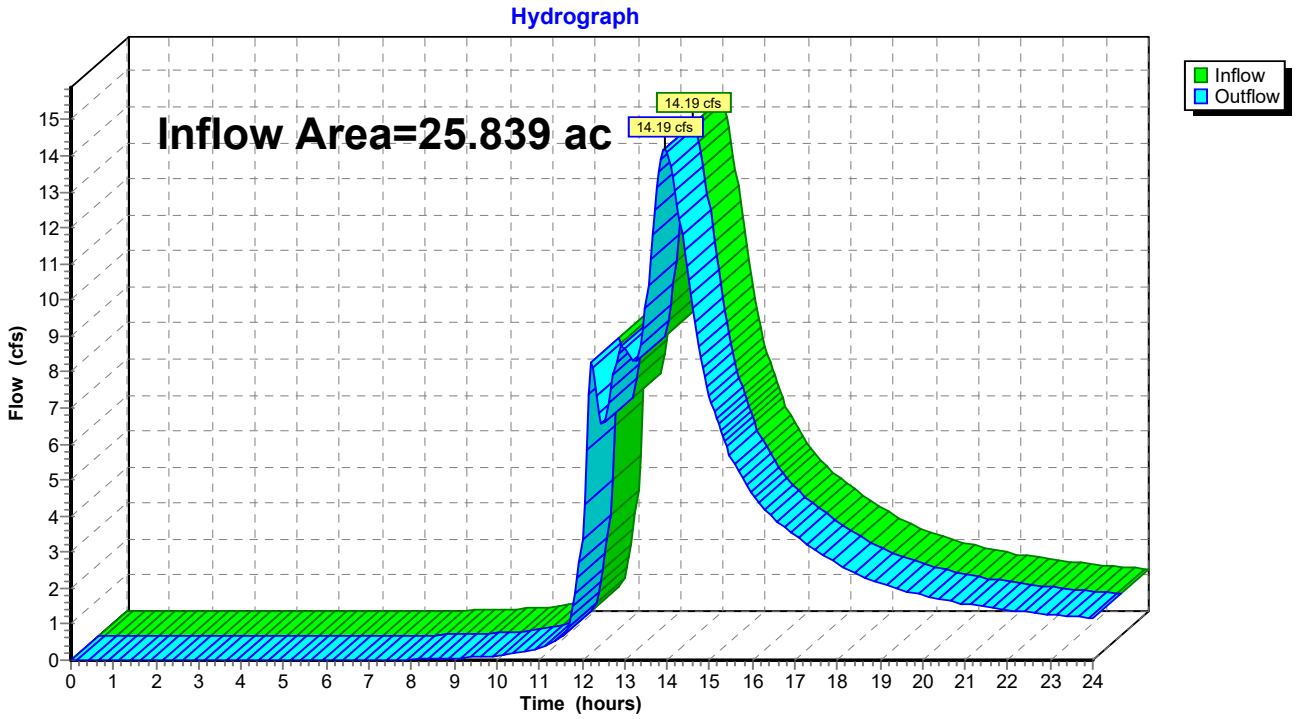


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 2.03" for 25-YR event
Inflow = 14.19 cfs @ 13.95 hrs, Volume= 4.364 af
Outflow = 14.19 cfs @ 13.95 hrs, Volume= 4.364 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

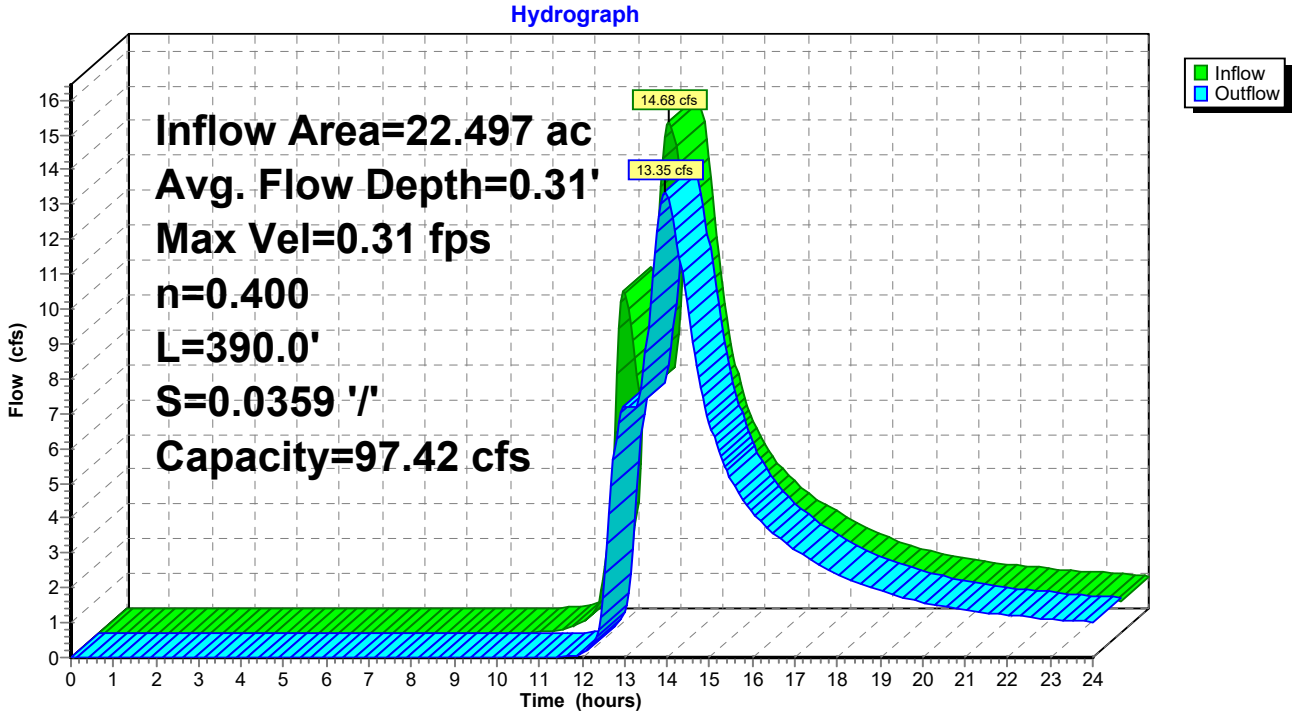
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.95" for 25-YR event
Inflow = 14.68 cfs @ 13.40 hrs, Volume= 3.647 af
Outflow = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af, Atten= 9%, Lag= 33.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 20.7 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 44.2 min

Peak Storage= 16,600 cf @ 13.61 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 1.92" for 25-YR event
Inflow = 14.56 cfs @ 12.96 hrs, Volume= 2.545 af
Outflow = 12.94 cfs @ 13.42 hrs, Volume= 2.486 af, Atten= 11%, Lag= 27.2 min

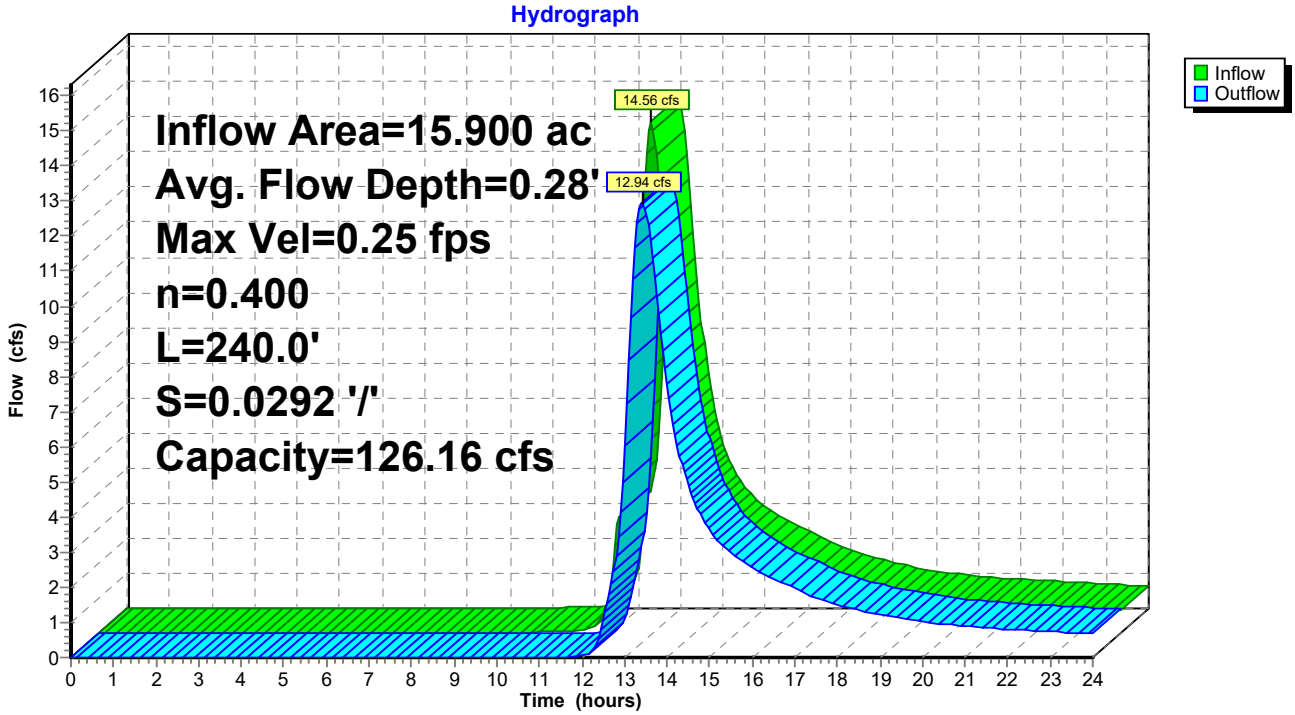
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 15.9 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 39.1 min

Peak Storage= 12,337 cf @ 13.15 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 2.00" for 25-YR event
Inflow = 16.45 cfs @ 12.52 hrs, Volume= 2.339 af
Outflow = 14.05 cfs @ 12.97 hrs, Volume= 2.283 af, Atten= 15%, Lag= 26.6 min

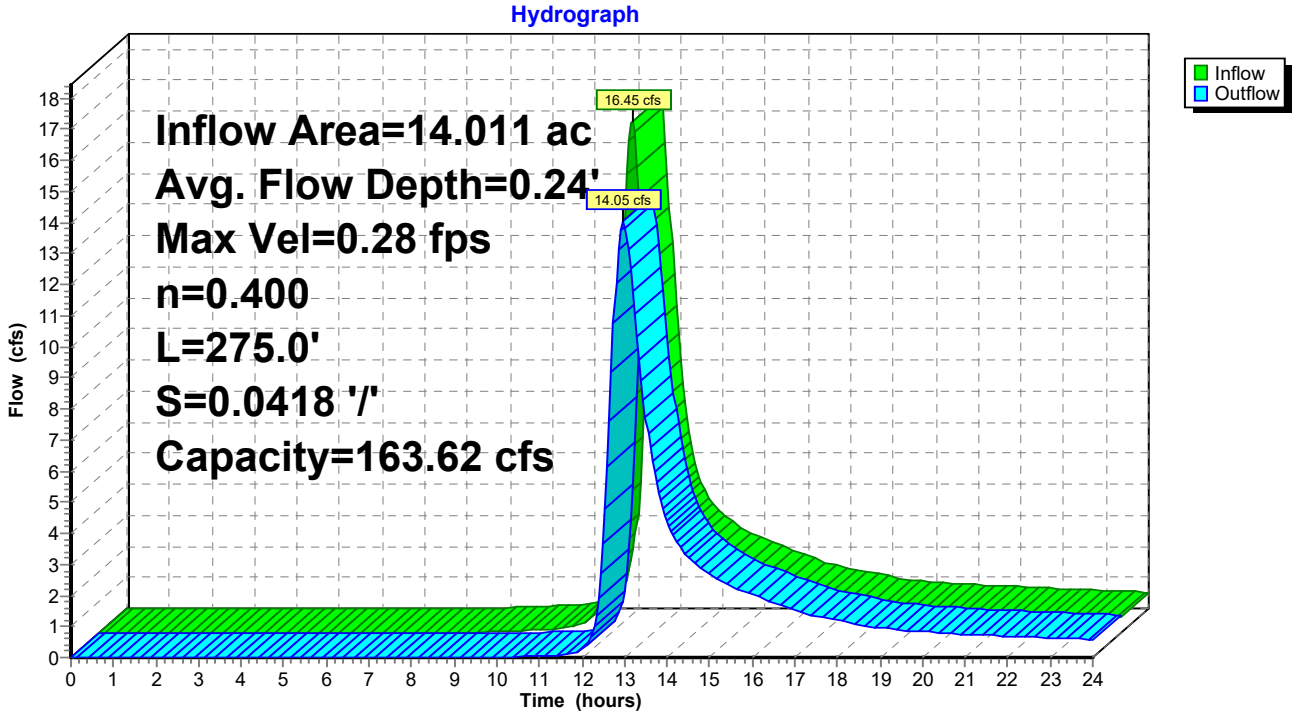
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.28 fps, Min. Travel Time= 16.2 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 44.5 min

Peak Storage= 13,659 cf @ 12.70 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

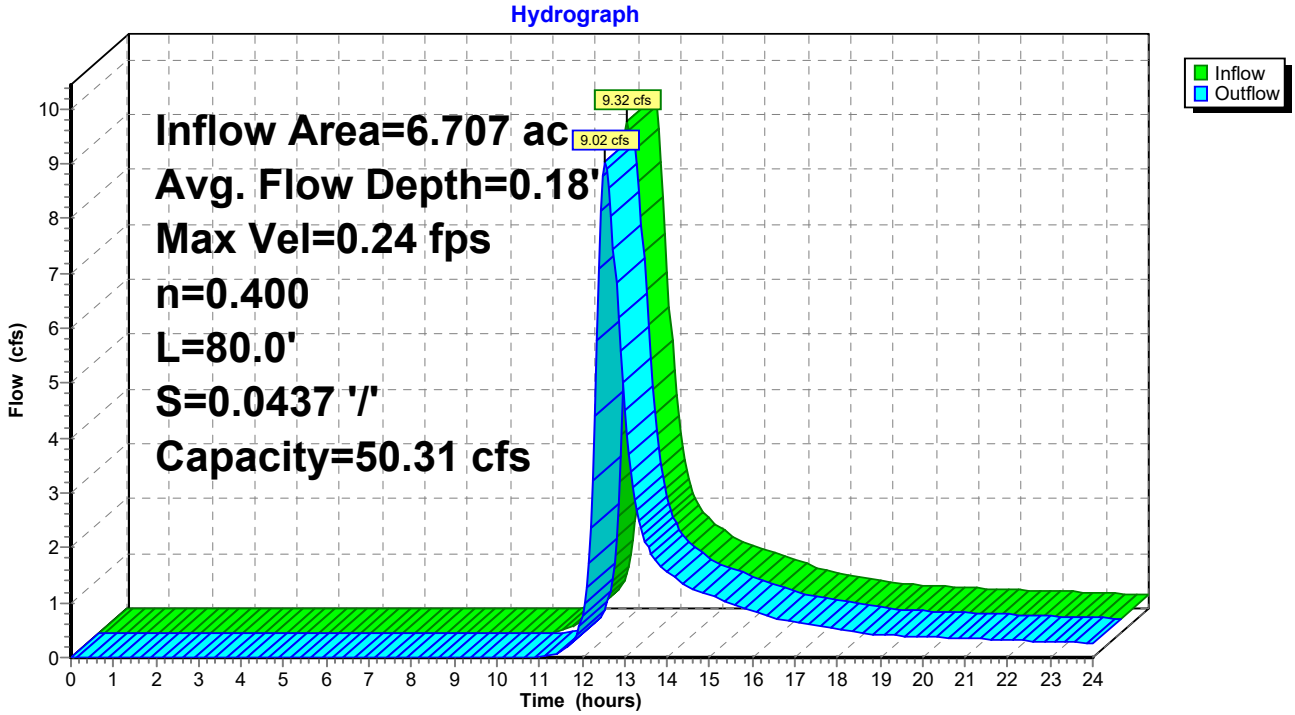
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 2.08" for 25-YR event
Inflow = 9.32 cfs @ 12.40 hrs, Volume= 1.162 af
Outflow = 9.02 cfs @ 12.56 hrs, Volume= 1.152 af, Atten= 3%, Lag= 9.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.24 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 15.1 min

Peak Storage= 2,966 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

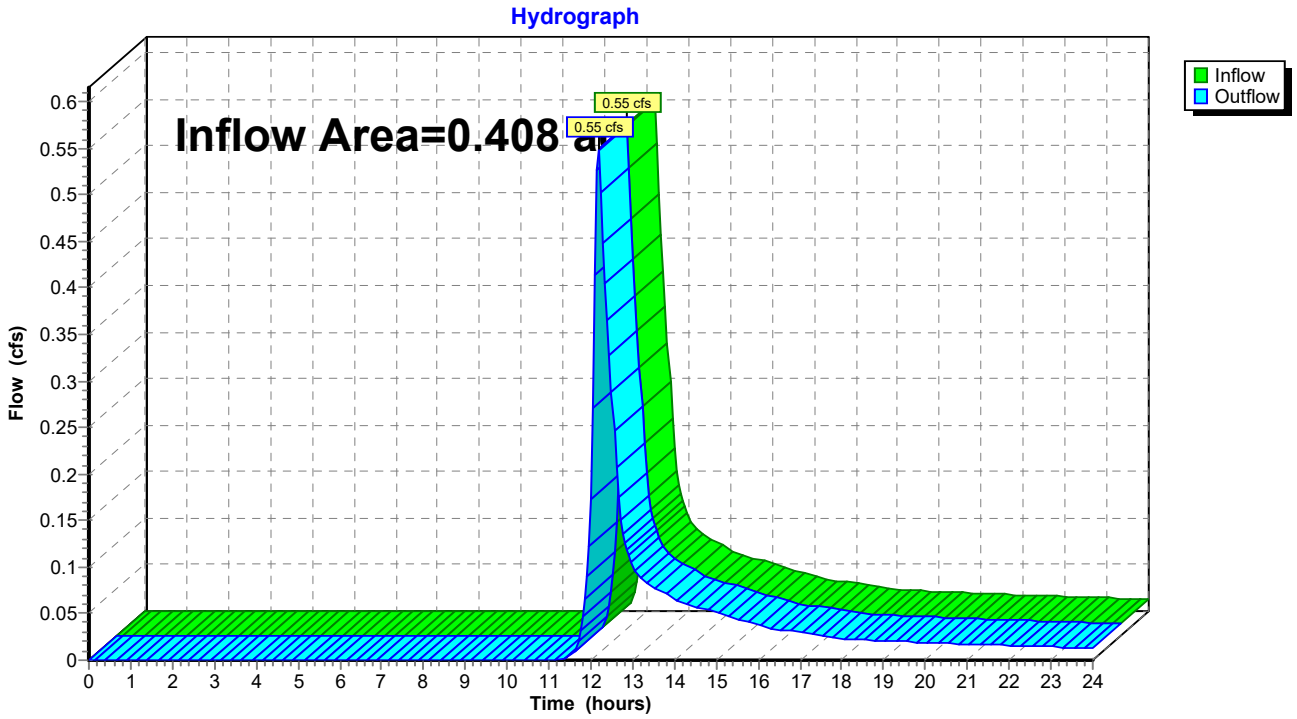


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 1.59" for 25-YR event
Inflow = 0.55 cfs @ 12.19 hrs, Volume= 0.054 af
Outflow = 0.55 cfs @ 12.19 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 1.89" for 25-YR event
Inflow = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af
Outflow = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af, Atten= 0%, Lag= 0.0 min
Primary = 13.35 cfs @ 13.96 hrs, Volume= 3.541 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 602.61' @ 13.96 hrs Surf.Area= 26 sf Storage= 28 cf

Plug-Flow detention time= 0.0 min calculated for 3.534 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (953.6 - 953.6)

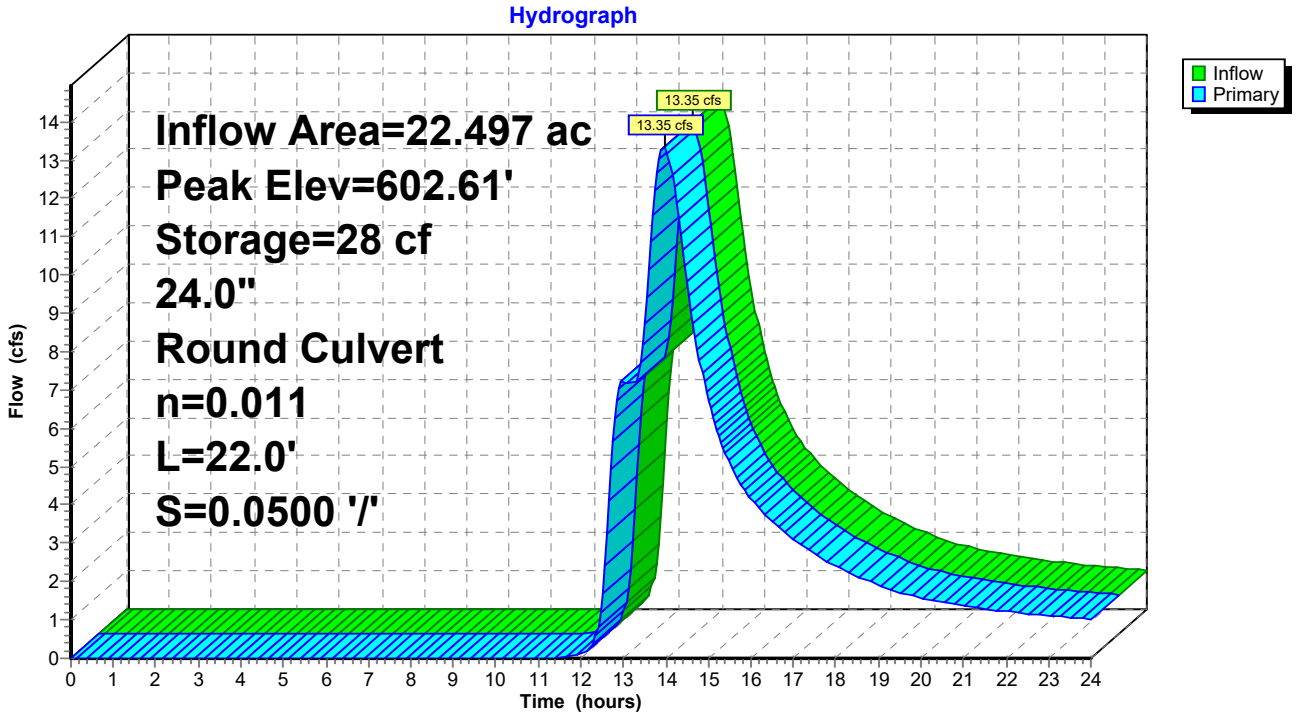
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=13.34 cfs @ 13.96 hrs HW=602.61' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 13.34 cfs @ 5.23 fps)

Pond RCP: 24" RCP



Summary for Subcatchment 1: EDA-1

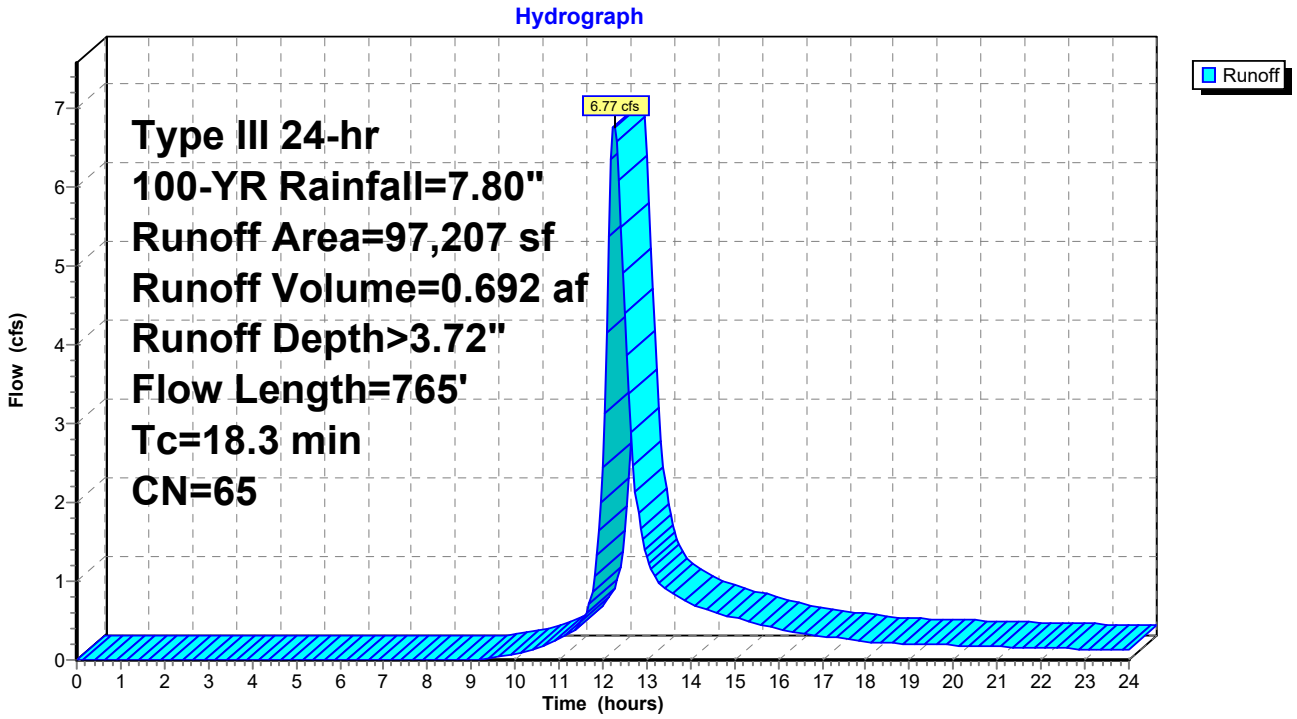
Runoff = 6.77 cfs @ 12.26 hrs, Volume= 0.692 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
62,786	70	Woods, Good, HSG C
34,421	55	Woods, Good, HSG B
97,207	65	Weighted Average
97,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.0	82	0.0790	1.41		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
7.6	553	0.0590	1.21		**Shallow Concentrated Flow, 1C-1D** Woodland Kv= 5.0 fps
1.3	80	0.0400	1.00		**Shallow Concentrated Flow, 1D-EDP-1** Woodland Kv= 5.0 fps
18.3	765	Total			

Subcatchment 1: EDA-1



Summary for Subcatchment 2: EDA-2

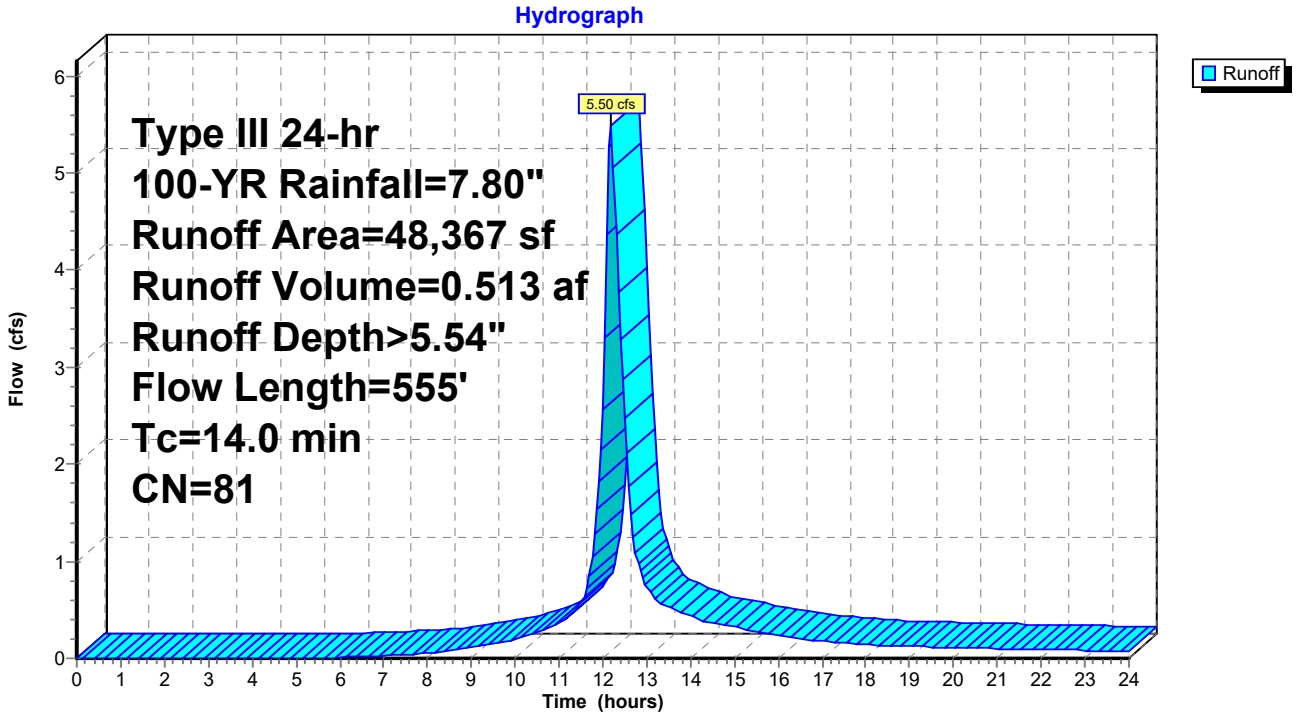
Runoff = 5.50 cfs @ 12.19 hrs, Volume= 0.513 af, Depth> 5.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
24,861	70	Woods, Good, HSG C
3,336	55	Woods, Good, HSG B
20,170	98	Paved parking, HSG C
48,367	81	Weighted Average
28,197		58.30% Pervious Area
20,170		41.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.2	247	0.0664	1.29		**Shallow Concentrated Flow, 2B-2C** Woodland Kv= 5.0 fps
0.1	14	0.0360	3.85		**Shallow Concentrated Flow, 2C-2D** Paved Kv= 20.3 fps
0.1	19	0.1400	2.62		**Shallow Concentrated Flow, 2D-2E** Short Grass Pasture Kv= 7.0 fps
1.4	225	0.0178	2.71		**Shallow Concentrated Flow, 2E-EDP-2** Paved Kv= 20.3 fps
14.0	555	Total			

Subcatchment 2: EDA-2



Summary for Subcatchment 3A: EDA-3A

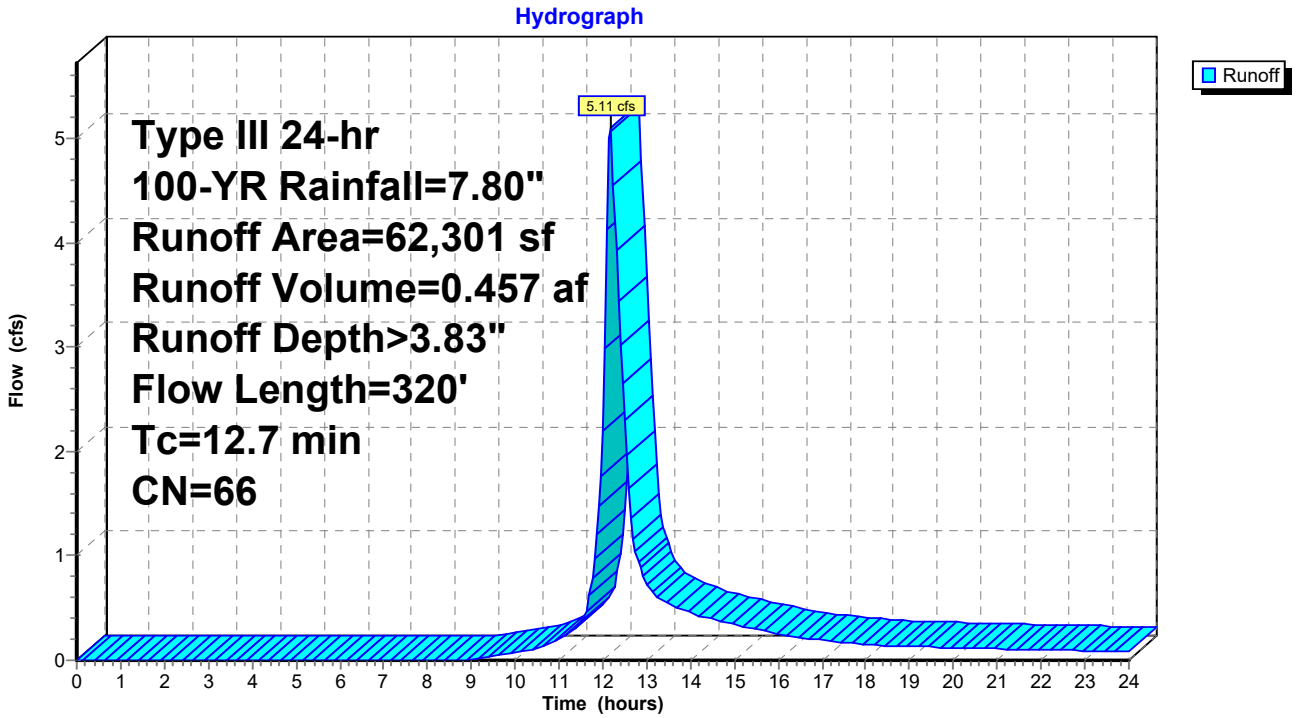
Runoff = 5.11 cfs @ 12.18 hrs, Volume= 0.457 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: EDA-3A



Summary for Subcatchment 3B: EDA-3B

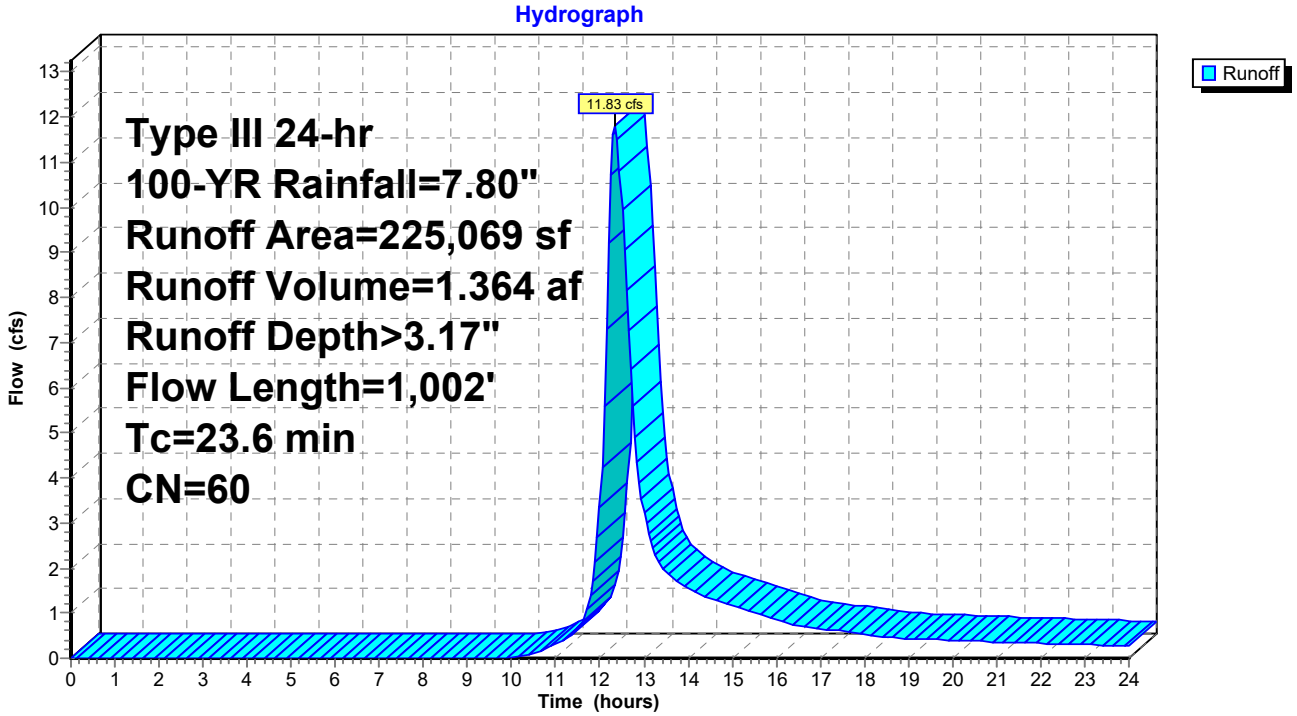
Runoff = 11.83 cfs @ 12.34 hrs, Volume= 1.364 af, Depth> 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
145,447	55	Woods, Good, HSG B
79,622	70	Woods, Good, HSG C
225,069	60	Weighted Average
225,069		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0343	0.09		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
13.8	952	0.0530	1.15		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
23.6	1,002	Total			

Subcatchment 3B: EDA-3B



Summary for Subcatchment 4: EDA-4

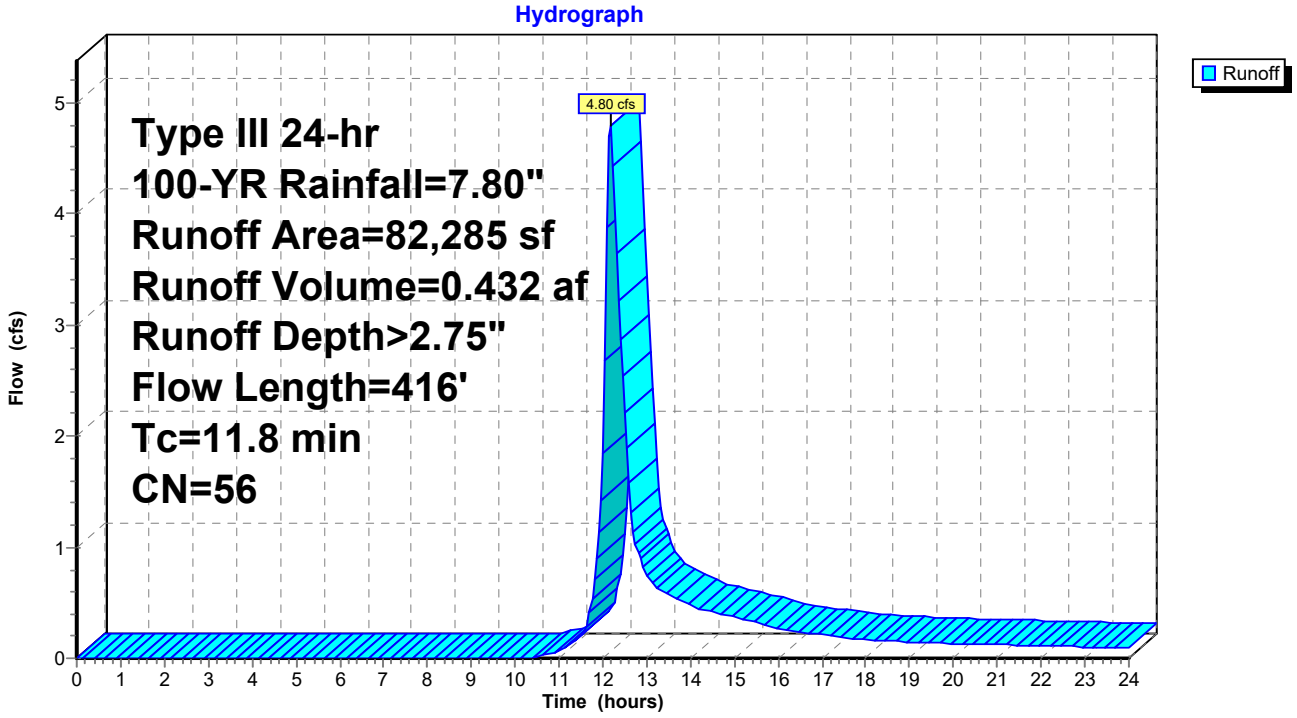
Runoff = 4.80 cfs @ 12.17 hrs, Volume= 0.432 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
77,691	55	Woods, Good, HSG B
4,594	70	Woods, Good, HSG C
82,285	56	Weighted Average
82,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0600	0.11		**Sheet Flow, 4A-4B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.0	366	0.0950	1.54		**Shallow Concentrated Flow, 4B-EDP-4** Woodland Kv= 5.0 fps
11.8	416	Total			

Subcatchment 4: EDA-4



Summary for Subcatchment 5A: EDA-5A

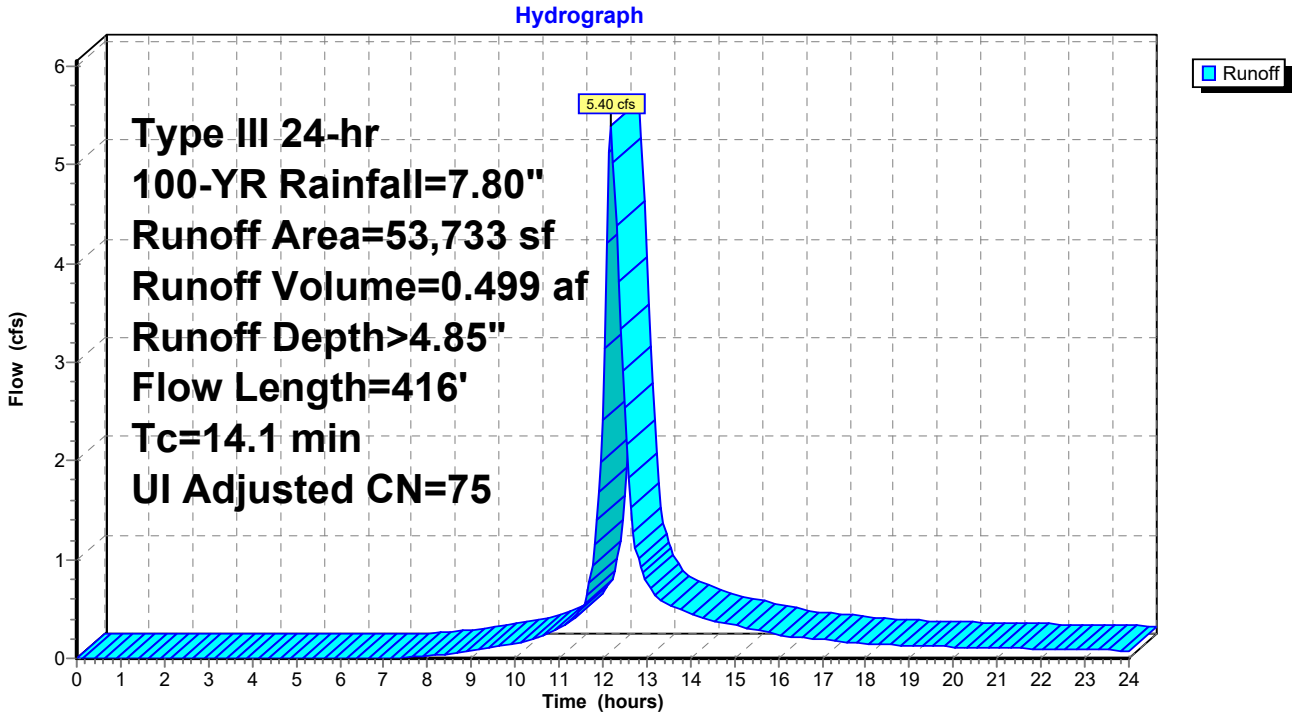
Runoff = 5.40 cfs @ 12.20 hrs, Volume= 0.499 af, Depth> 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Adj	Description
29,770	70		Woods, Good, HSG C
4,837	98		Unconnected roofs, HSG C
19,126	79		50-75% Grass cover, Fair, HSG C
53,733	76	75	Weighted Average, UI Adjusted
48,896			91.00% Pervious Area
4,837			9.00% Impervious Area
4,837			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.5	42	0.0430	1.45		**Shallow Concentrated Flow, 5E-EDP-5** Short Grass Pasture Kv= 7.0 fps
14.1	416	Total			

Subcatchment 5A: EDA-5A



Summary for Subcatchment 5B: EDA-5B

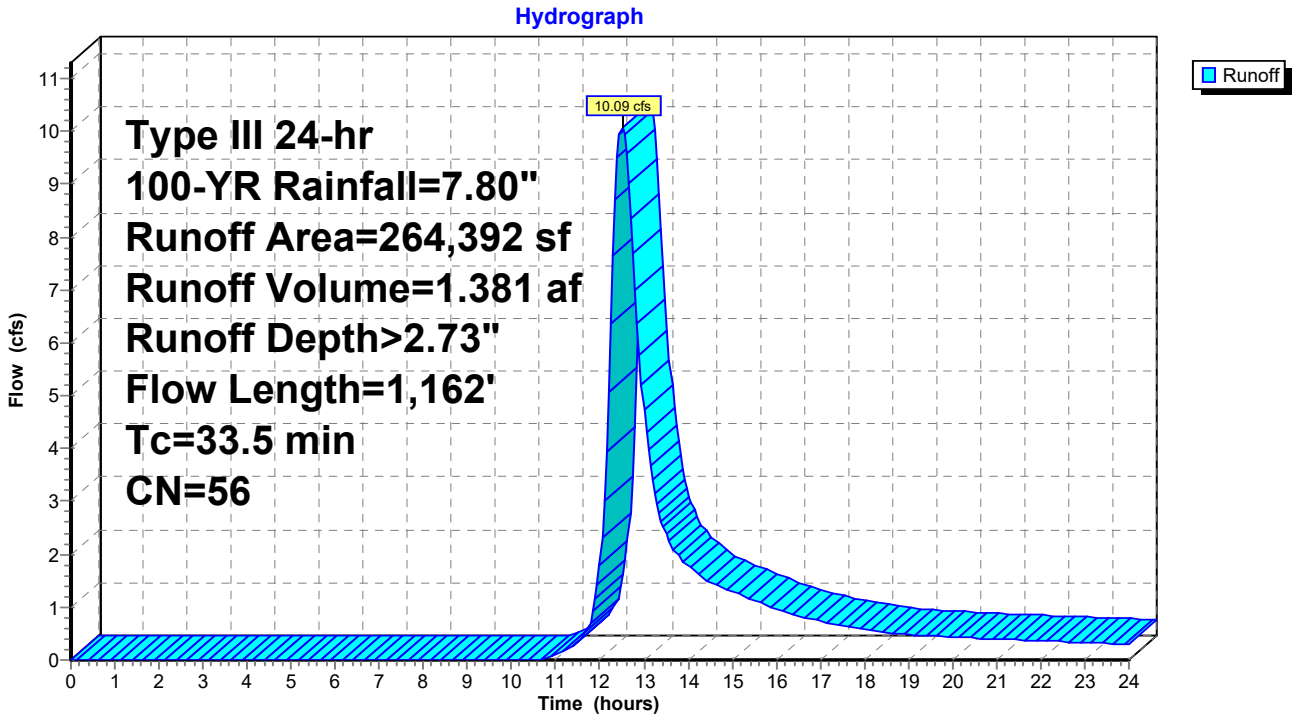
Runoff = 10.09 cfs @ 12.50 hrs, Volume= 1.381 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
250,540	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
264,392	56	Weighted Average
264,392		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: EDA-5B



Summary for Subcatchment 6: EDA-6

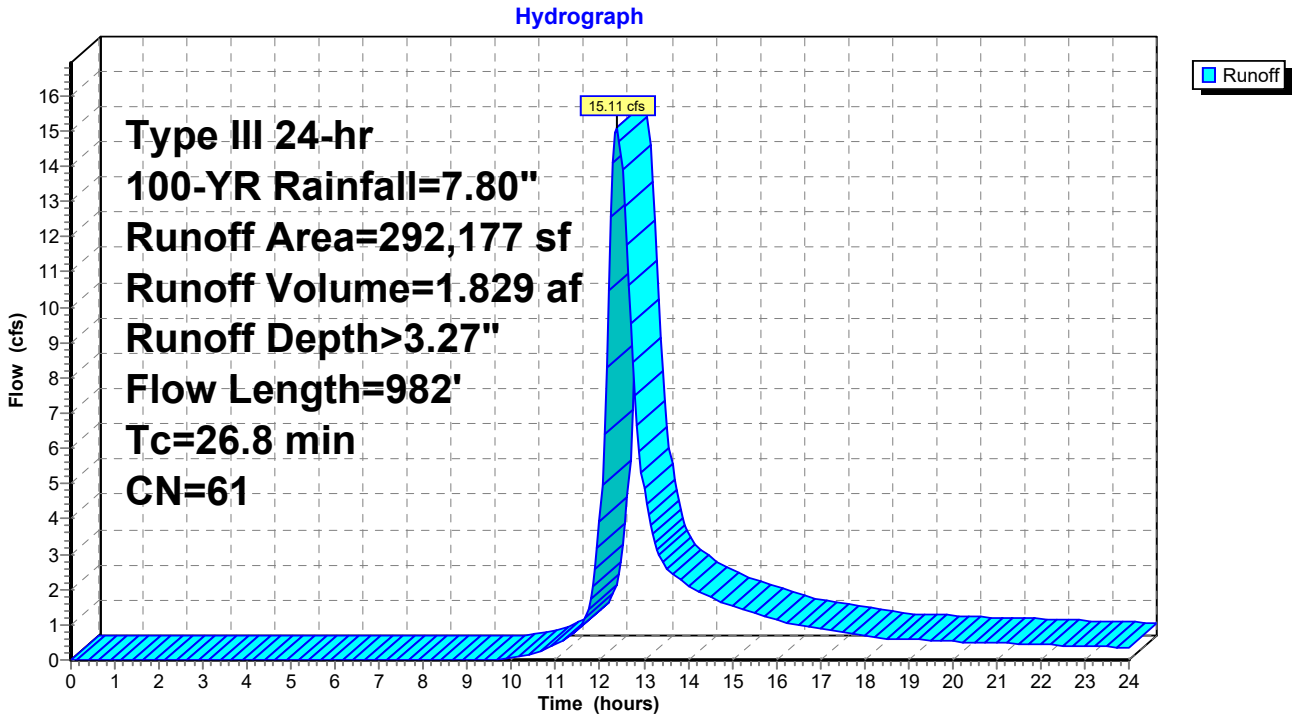
Runoff = 15.11 cfs @ 12.39 hrs, Volume= 1.829 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: EDA-6



Summary for Subcatchment 7: EDA-7

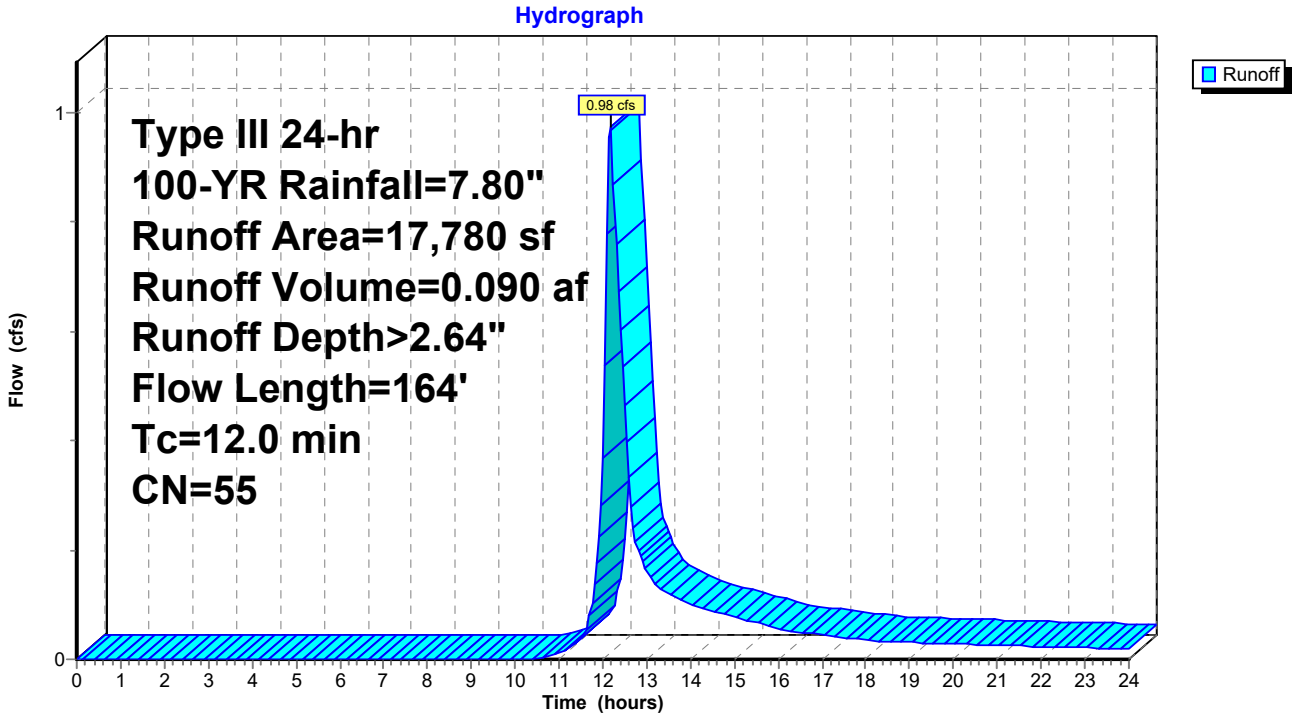
Runoff = 0.98 cfs @ 12.18 hrs, Volume= 0.090 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
17,780	55	Woods, Good, HSG B
17,780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.32"
1.7	114	0.0500	1.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
12.0	164	Total			

Subcatchment 7: EDA-7

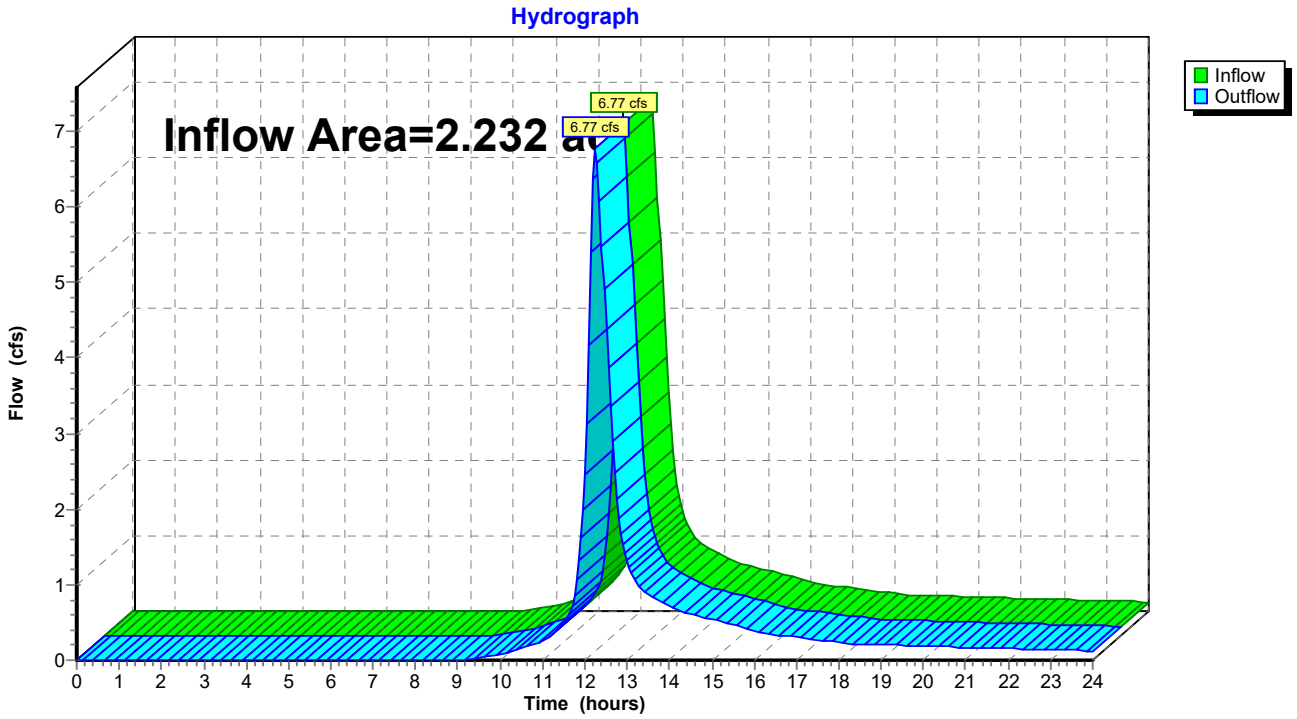


Summary for Reach EDP-1: Design Point 1

Inflow Area = 2.232 ac, 0.00% Impervious, Inflow Depth > 3.72" for 100-YR event
Inflow = 6.77 cfs @ 12.26 hrs, Volume= 0.692 af
Outflow = 6.77 cfs @ 12.26 hrs, Volume= 0.692 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-1: Design Point 1

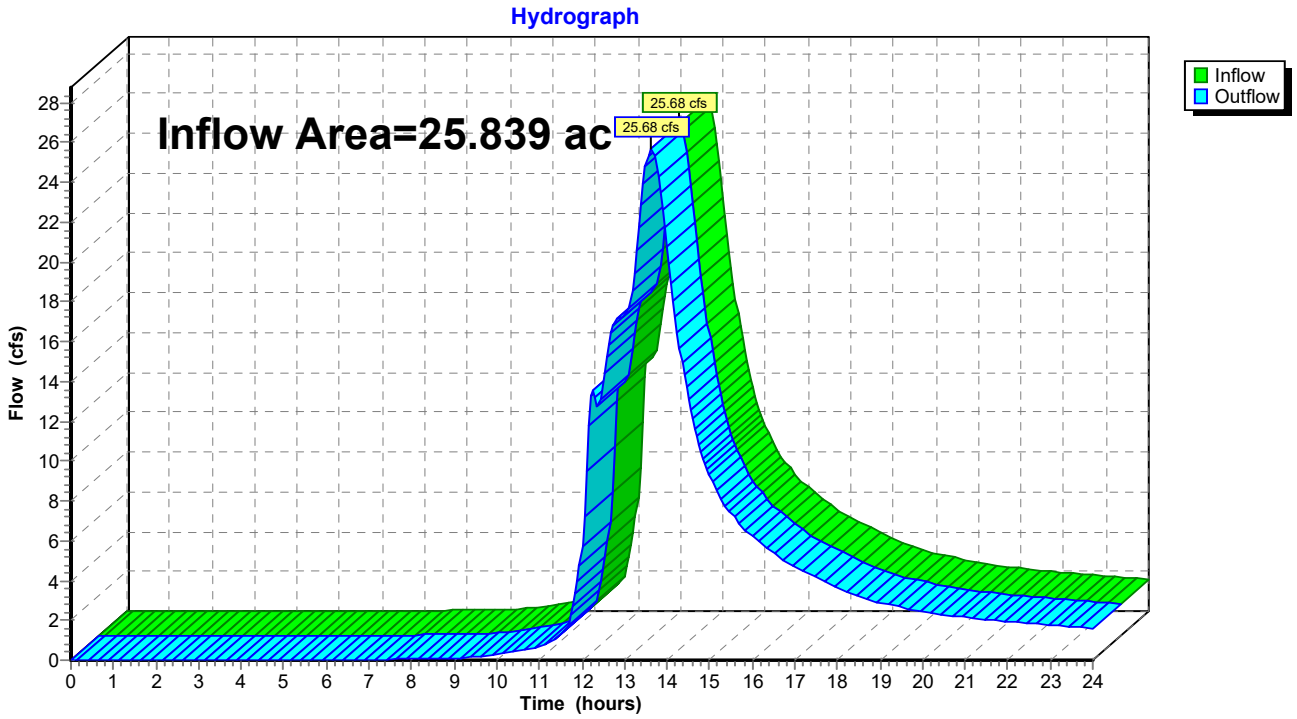


Summary for Reach EDP-2: Design Point 2

Inflow Area = 25.839 ac, 2.44% Impervious, Inflow Depth > 3.20" for 100-YR event
Inflow = 25.68 cfs @ 13.63 hrs, Volume= 6.889 af
Outflow = 25.68 cfs @ 13.63 hrs, Volume= 6.889 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-2: Design Point 2



Summary for Reach EDP-3: Design Point 3

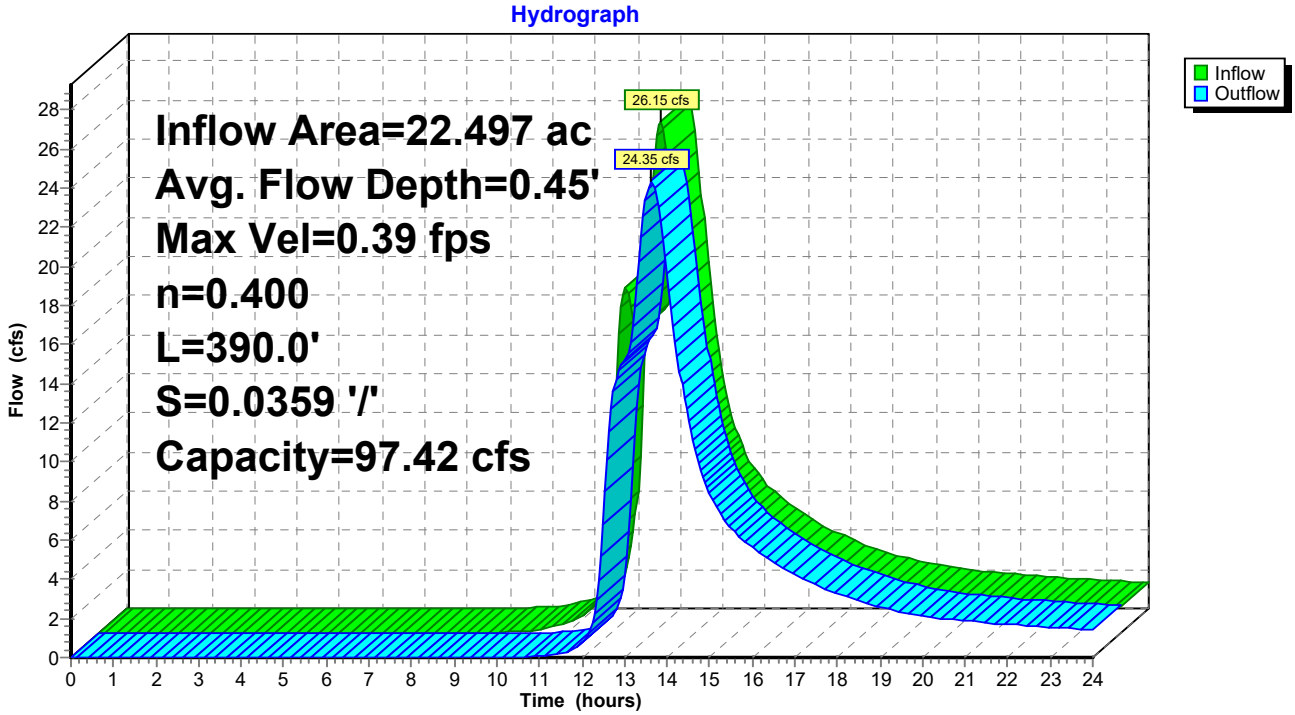
Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 3.10" for 100-YR event
Inflow = 26.15 cfs @ 13.19 hrs, Volume= 5.811 af
Outflow = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af, Atten= 7%, Lag= 26.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.39 fps, Min. Travel Time= 16.5 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 39.6 min

Peak Storage= 24,197 cf @ 13.35 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach EDP-3: Design Point 3



Summary for Reach EDP-4: Design Point 4

Inflow Area = 15.900 ac, 0.70% Impervious, Inflow Depth > 3.07" for 100-YR event
Inflow = 25.28 cfs @ 12.85 hrs, Volume= 4.062 af
Outflow = 23.10 cfs @ 13.21 hrs, Volume= 3.990 af, Atten= 9%, Lag= 21.9 min

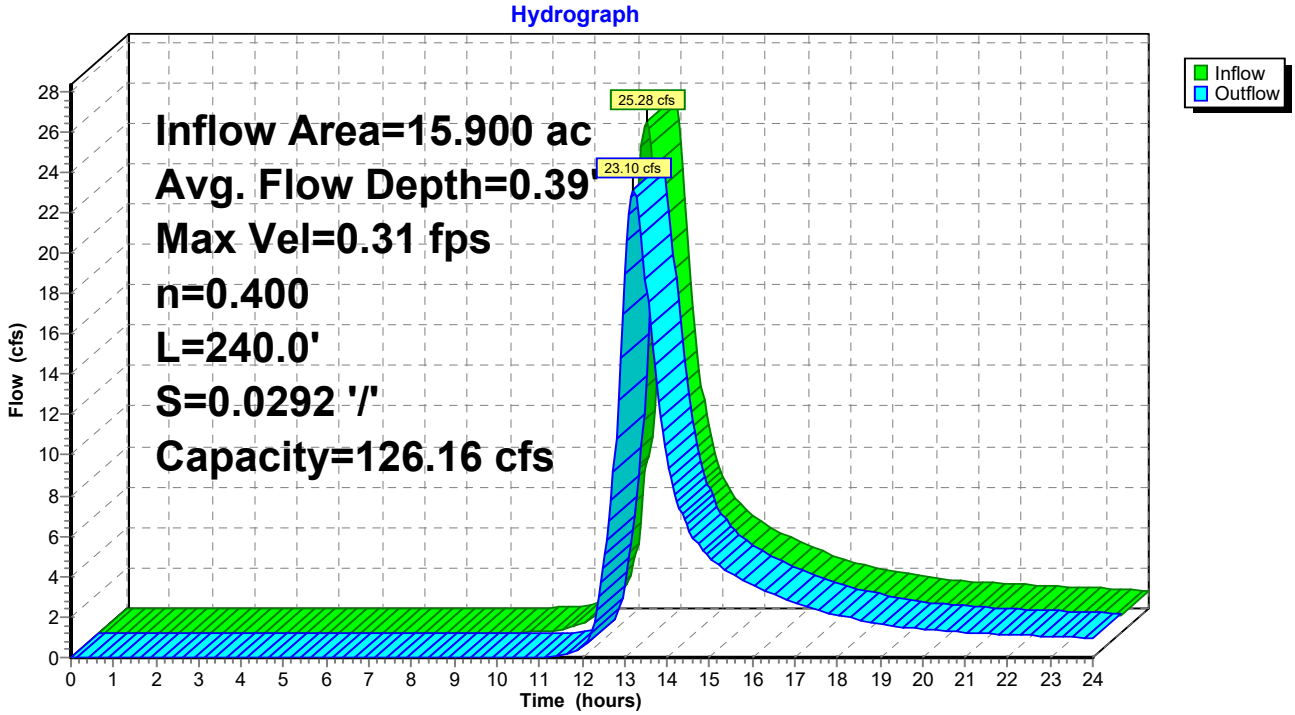
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 13.0 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 34.9 min

Peak Storage= 18,006 cf @ 13.00 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach EDP-4: Design Point 4



Summary for Reach EDP-5: Design Point 5

Inflow Area = 14.011 ac, 0.79% Impervious, Inflow Depth > 3.17" for 100-YR event
Inflow = 27.33 cfs @ 12.49 hrs, Volume= 3.697 af
Outflow = 24.39 cfs @ 12.85 hrs, Volume= 3.629 af, Atten= 11%, Lag= 21.6 min

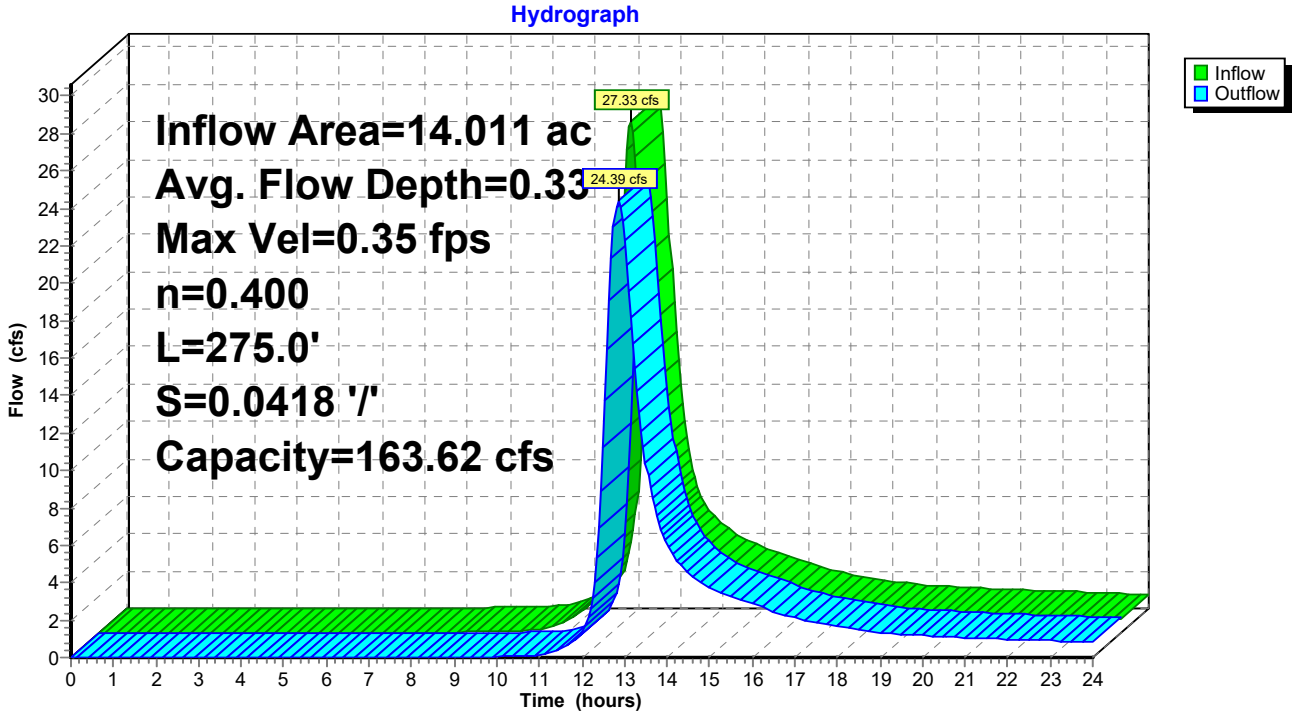
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.35 fps, Min. Travel Time= 13.1 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 39.2 min

Peak Storage= 19,258 cf @ 12.63 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach EDP-5: Design Point 5



Summary for Reach EDP-6: Design Point 6

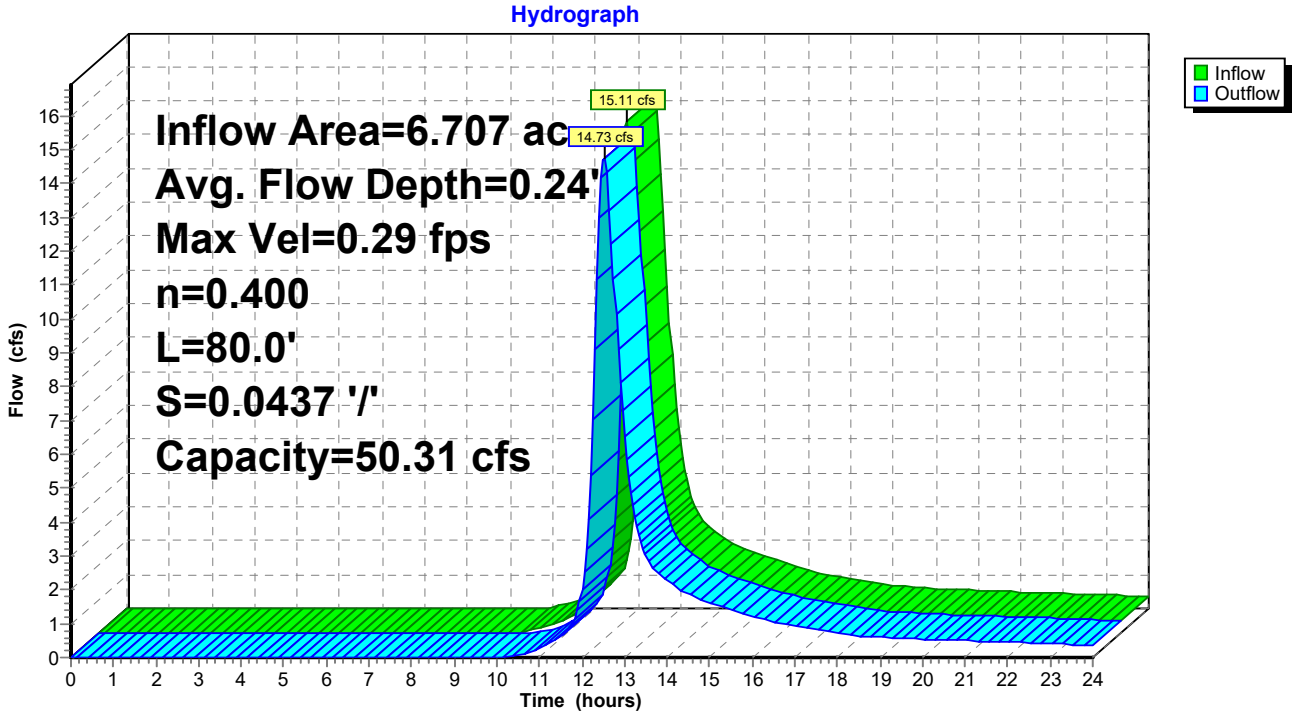
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 3.27" for 100-YR event
Inflow = 15.11 cfs @ 12.39 hrs, Volume= 1.829 af
Outflow = 14.73 cfs @ 12.52 hrs, Volume= 1.817 af, Atten= 3%, Lag= 7.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.29 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 13.1 min

Peak Storage= 4,012 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach EDP-6: Design Point 6

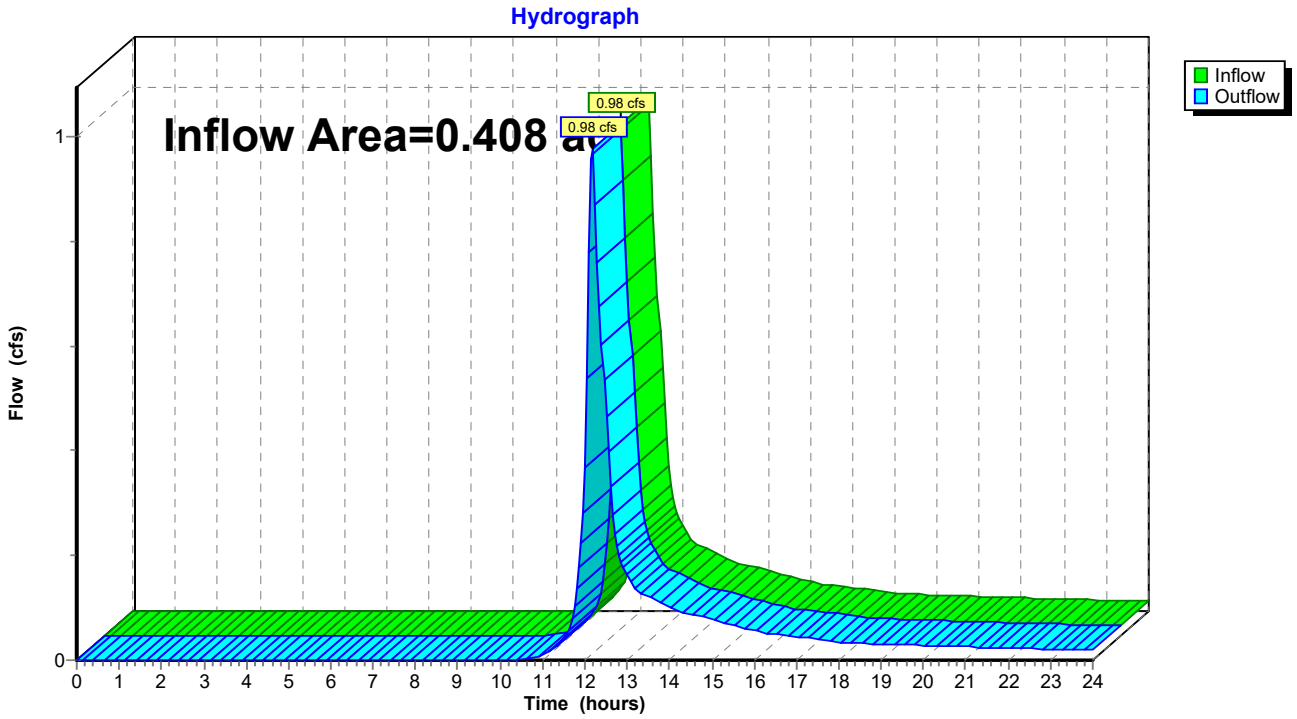


Summary for Reach EDP-7: Design Point 7 (Vernal Pool)

Inflow Area = 0.408 ac, 0.00% Impervious, Inflow Depth > 2.64" for 100-YR event
Inflow = 0.98 cfs @ 12.18 hrs, Volume= 0.090 af
Outflow = 0.98 cfs @ 12.18 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach EDP-7: Design Point 7 (Vernal Pool)



Summary for Pond RCP: 24" RCP

Inflow Area = 22.497 ac, 0.74% Impervious, Inflow Depth > 3.03" for 100-YR event
Inflow = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af
Outflow = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af, Atten= 0%, Lag= 0.1 min
Primary = 24.35 cfs @ 13.63 hrs, Volume= 5.685 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 603.76' @ 13.63 hrs Surf.Area= 38 sf Storage= 64 cf

Plug-Flow detention time= 0.0 min calculated for 5.685 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (927.9 - 927.8)

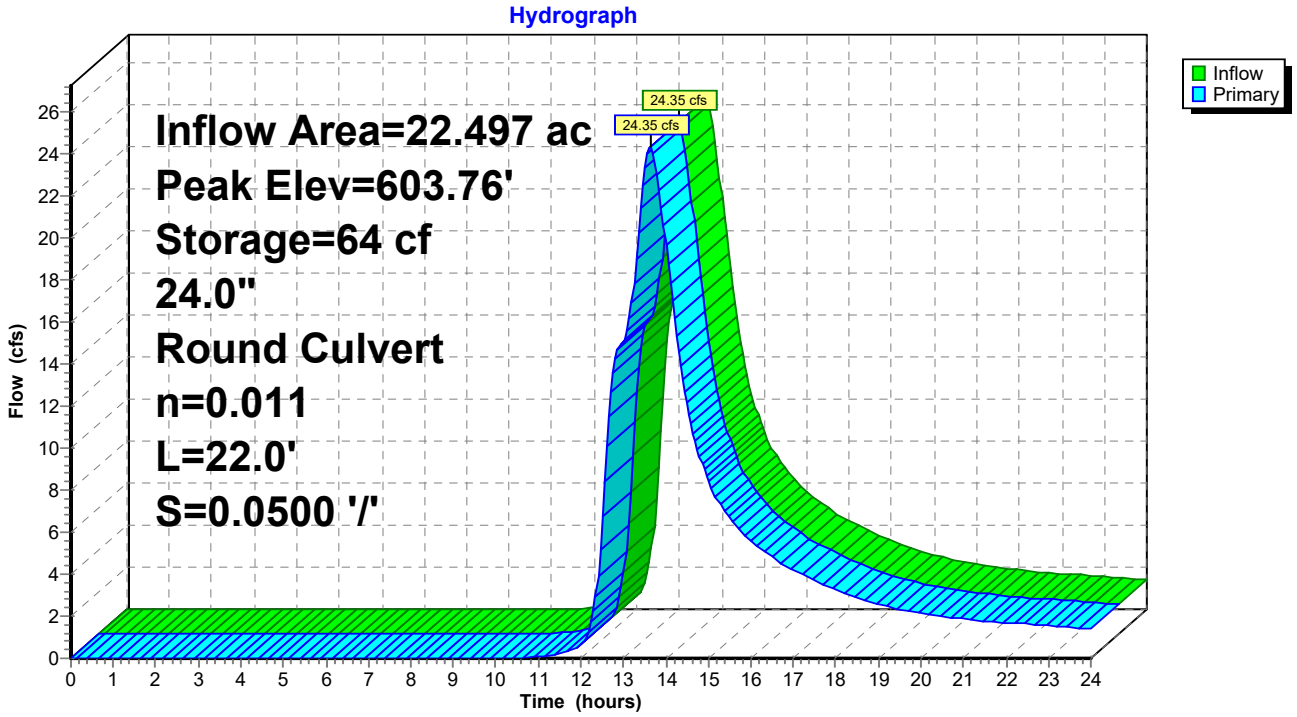
Volume	Invert	Avail.Storage	Storage Description
#1	601.10'	90 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.10	10	0	0
602.00	20	13	13
603.00	30	25	38
604.00	40	35	73
604.37	50	17	90

Device	Routing	Invert	Outlet Devices
#1	Primary	601.10'	**24.0" Round RCP_Round 24"** L= 22.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 601.10' / 600.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

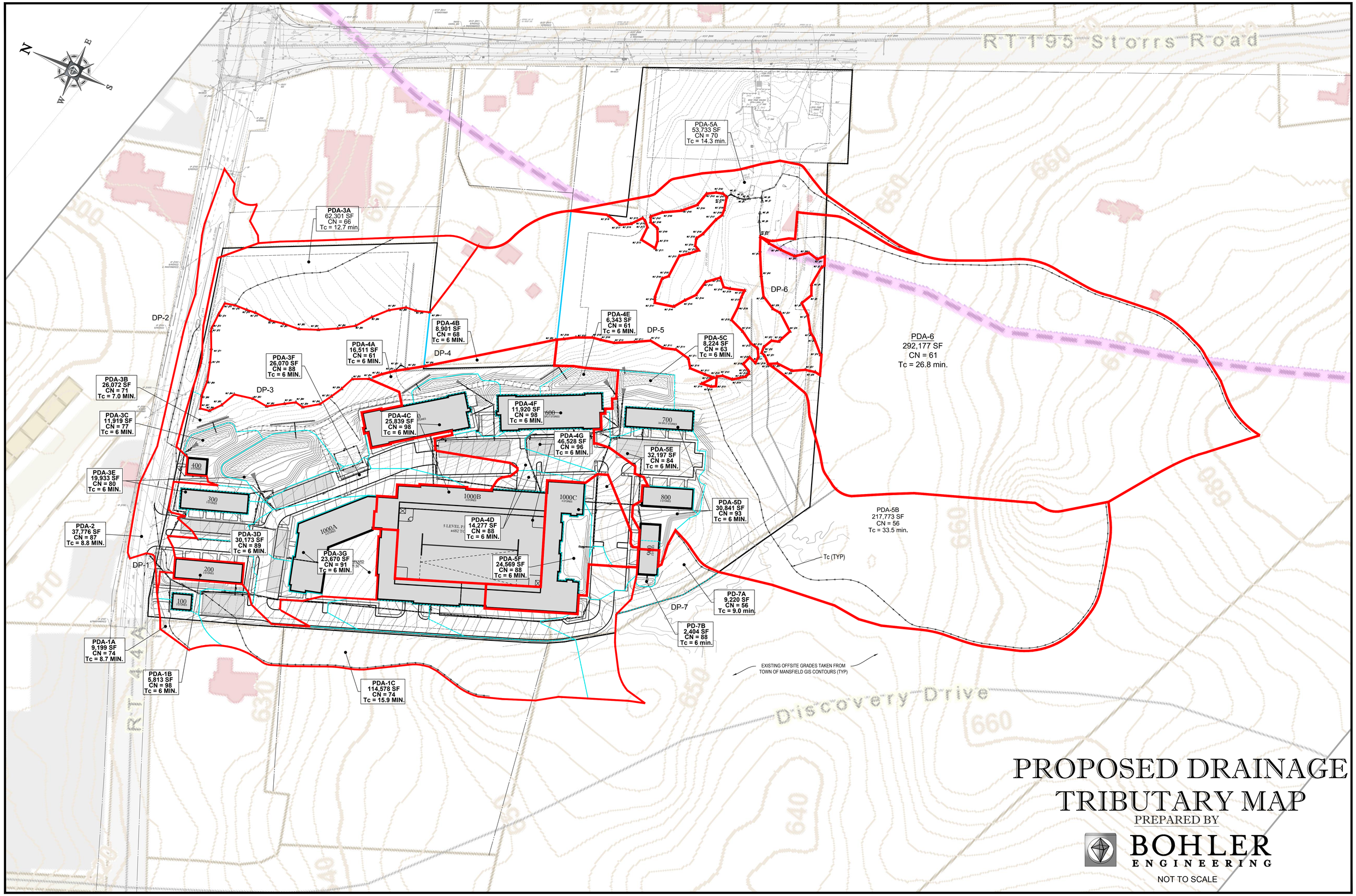
Primary OutFlow Max=24.32 cfs @ 13.63 hrs HW=603.75' (Free Discharge)
└─**1=RCP_Round 24"** (Inlet Controls 24.32 cfs @ 7.74 fps)

Pond RCP: 24" RCP



APPENDIX D: PROPOSED CONDITIONS HYDROLOGIC ANALYSIS

- *PROPOSED CONDITIONS DRAINAGE MAP*
- *PROPOSED CONDITIONS HYDROCAD CALCULATIONS*

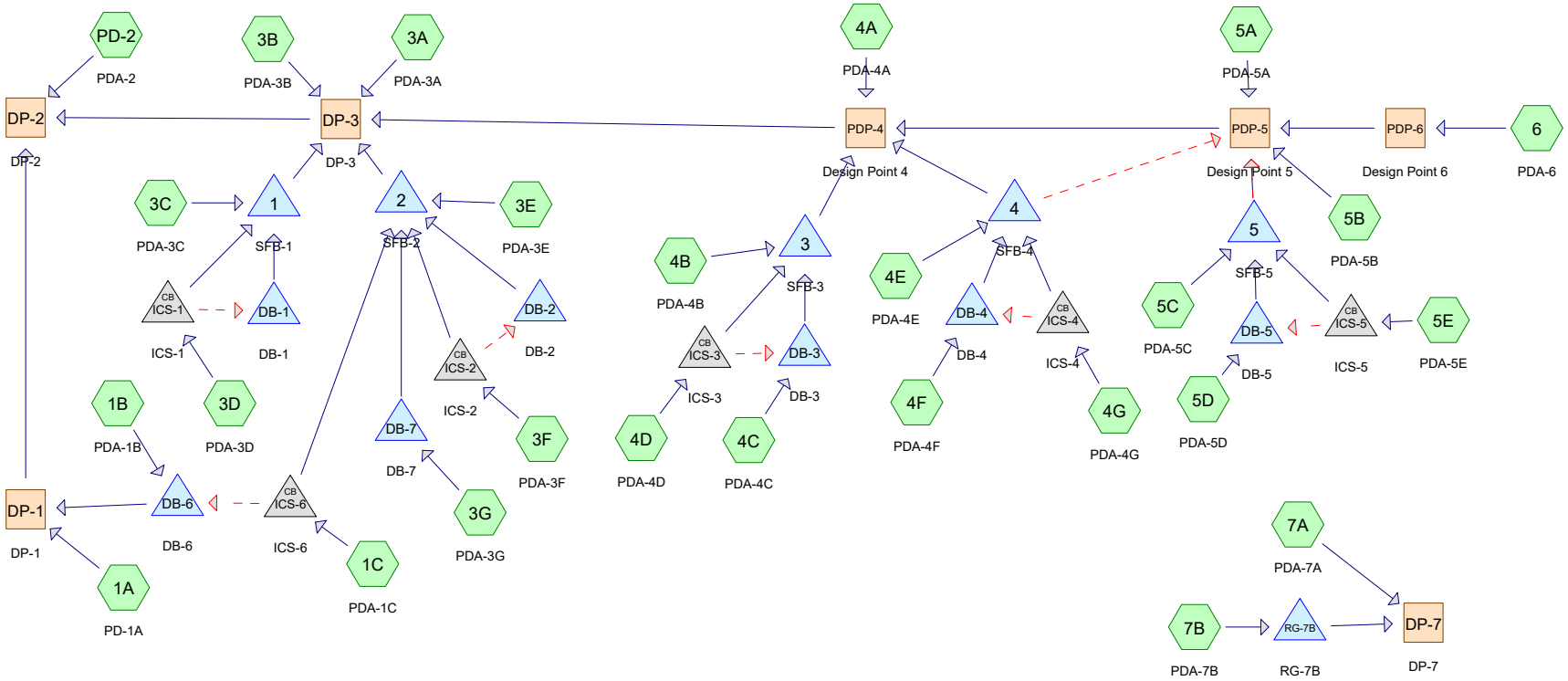


PROPOSED DRAINAGE TRIBUTARY MAP

PREPARED BY

BOHLER ENGINEERING

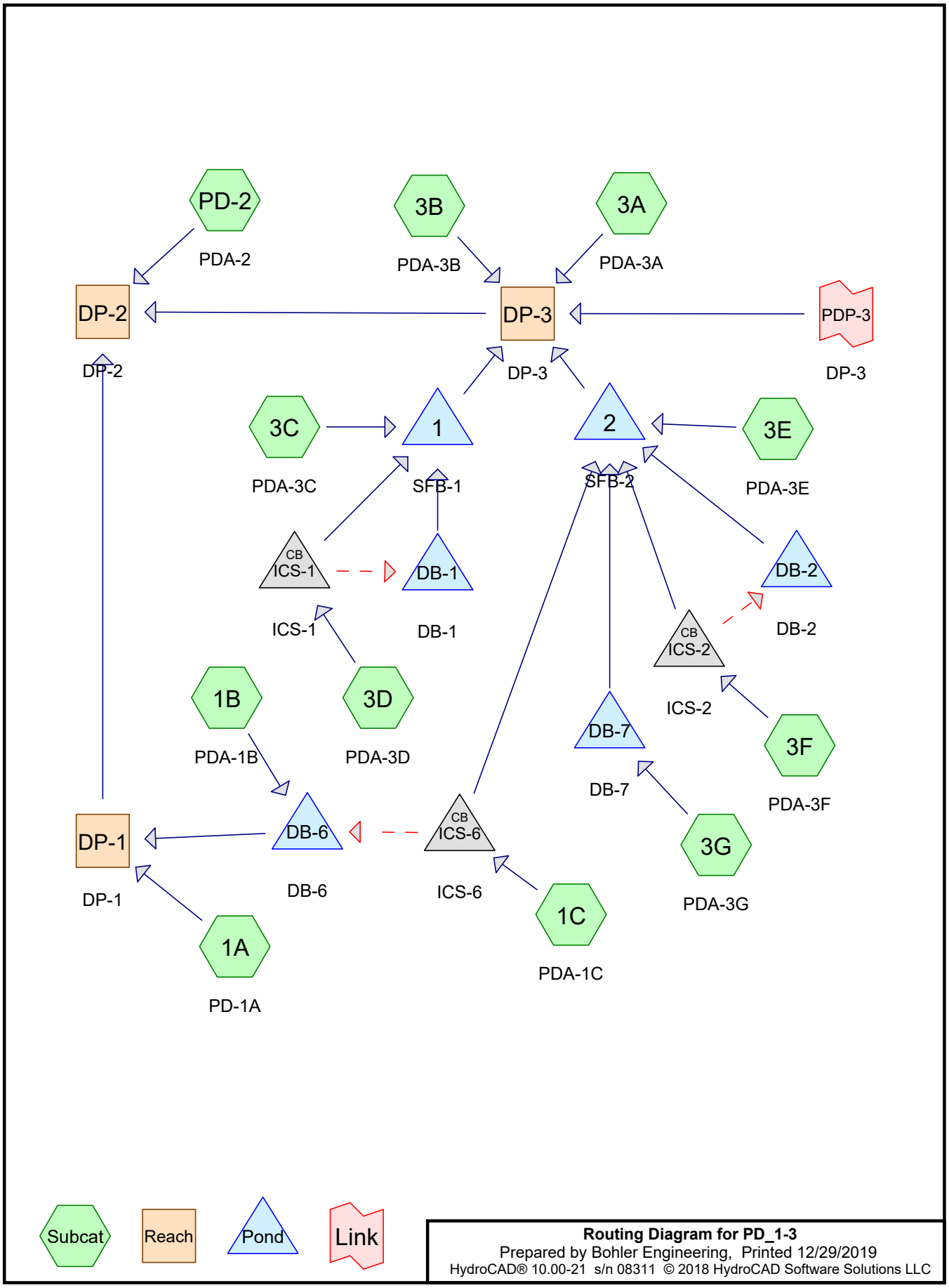
NOT TO SCALE



Note: The HydroCAD Model was split up into two models due to HydroCAD's max 40 node capacity . This diagram represents the overall view of how the model is interacting.

Subcat Reach Pond Link

Routing Diagram for PD_ 1-7
Prepared by Bohler Engineering, Printed 12/29/2019
HydroCAD® 10.00-21 s/n 08311 © 2018 HydroCAD Software Solutions LLC



Routing Diagram for PD_1-3
Prepared by Bohler Engineering, Printed 12/29/2019
HydroCAD® 10.00-21 s/n 08311 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 1A: PD-1A

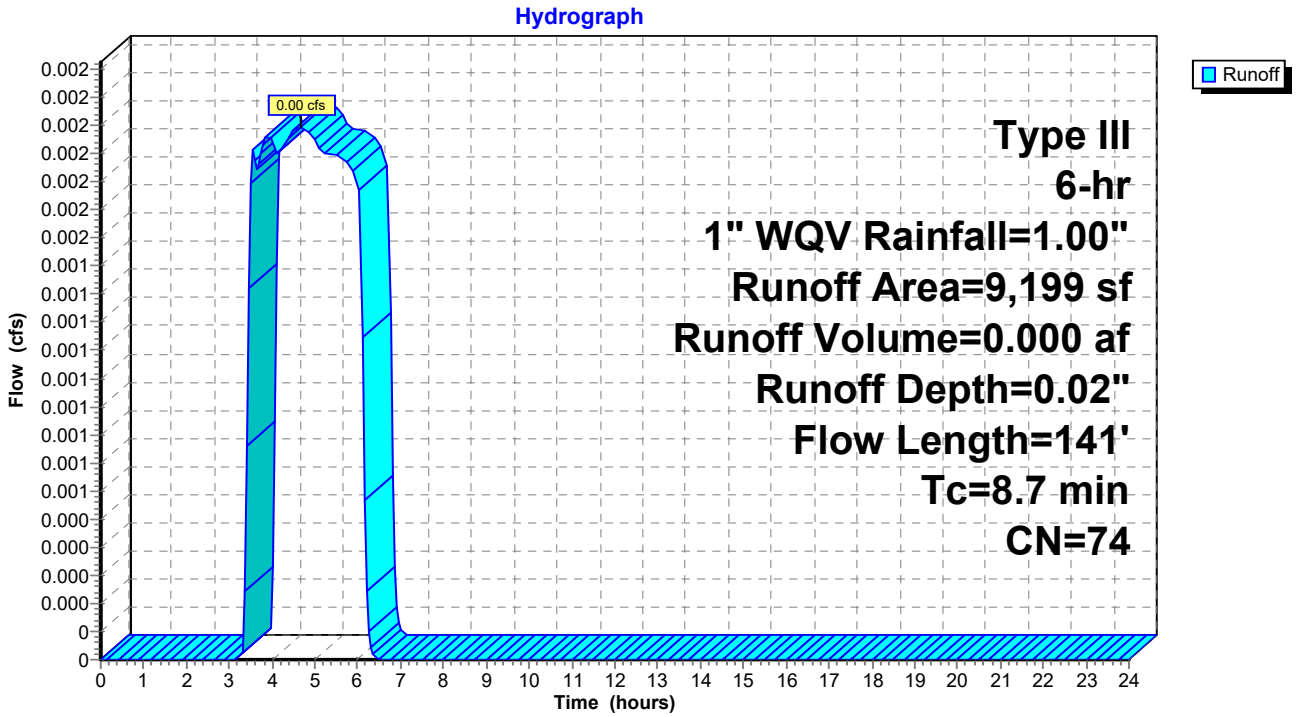
Runoff = 0.00 cfs @ 4.65 hrs, Volume= 0.000 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

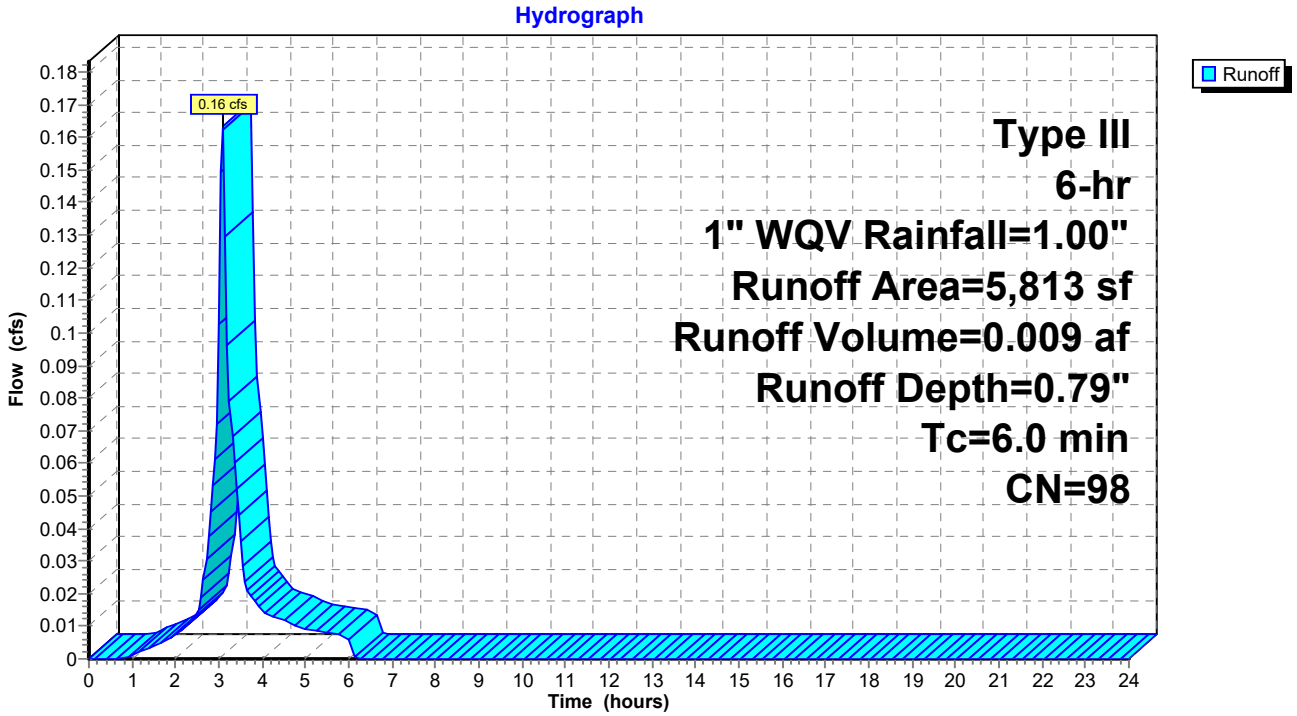
Runoff = 0.16 cfs @ 3.09 hrs, Volume= 0.009 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

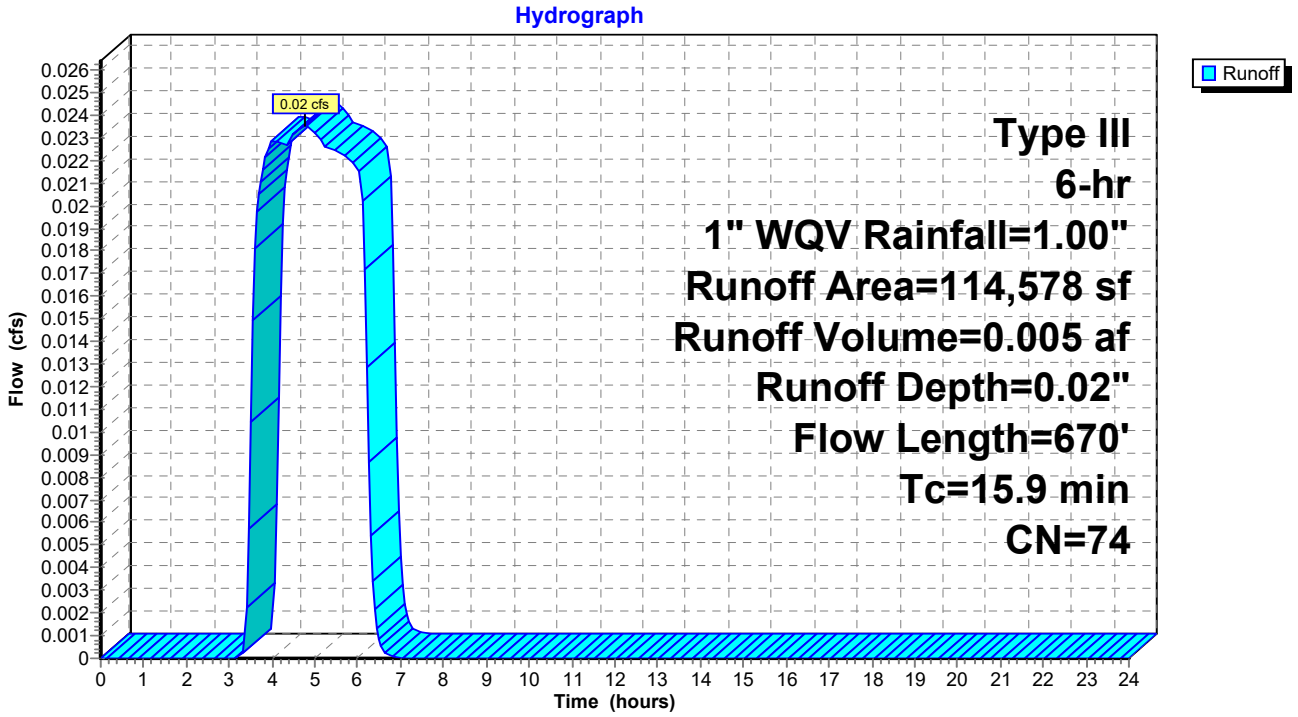
Runoff = 0.02 cfs @ 4.77 hrs, Volume= 0.005 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

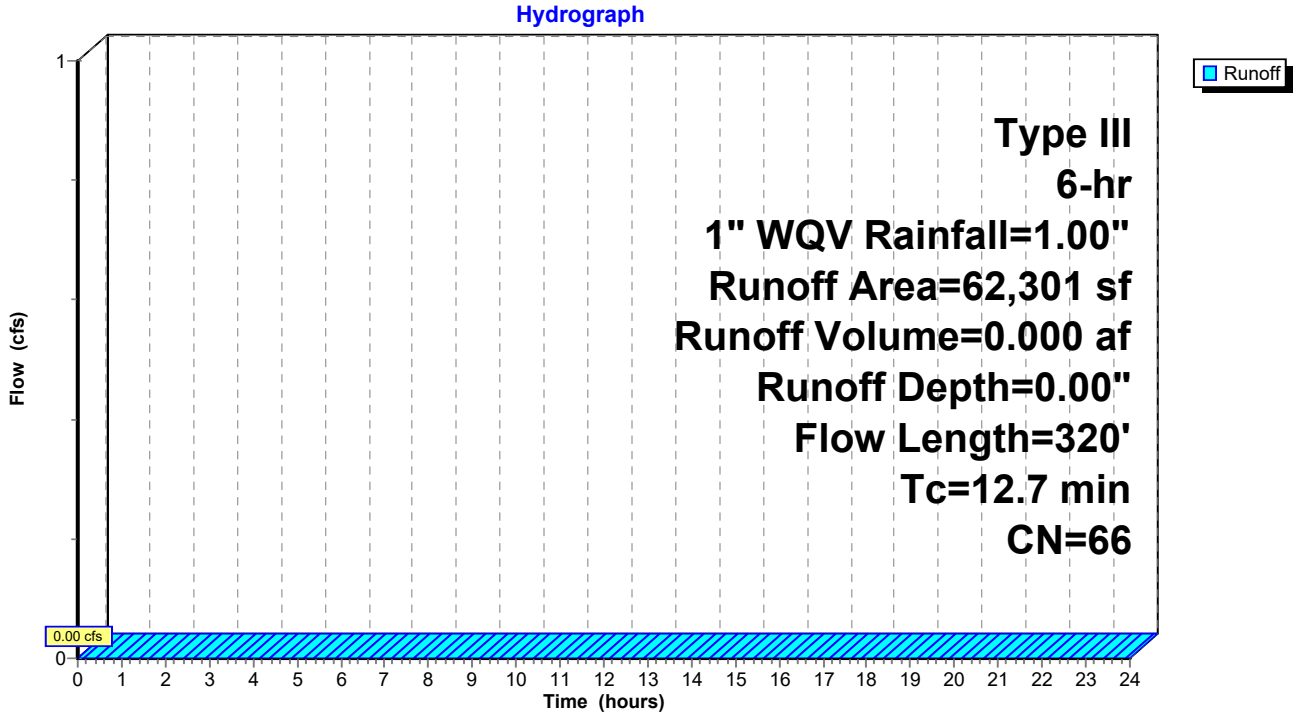
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

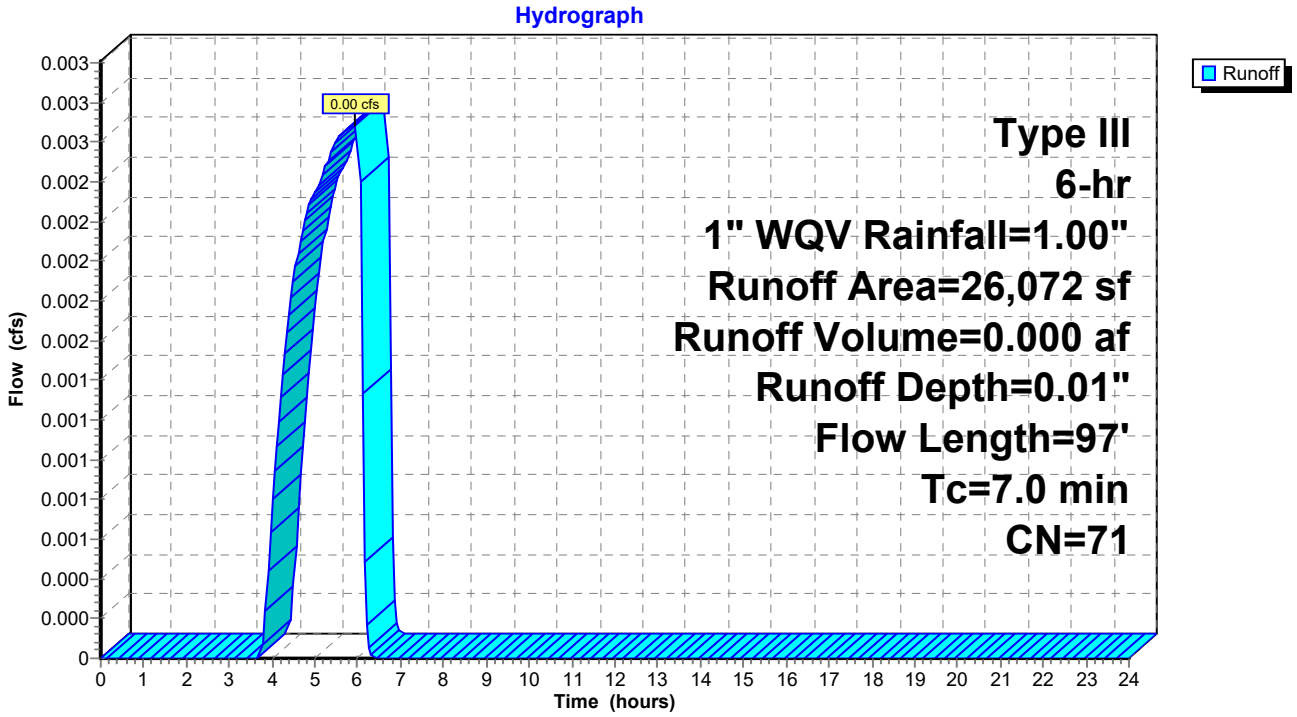
Runoff = 0.00 cfs @ 5.95 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

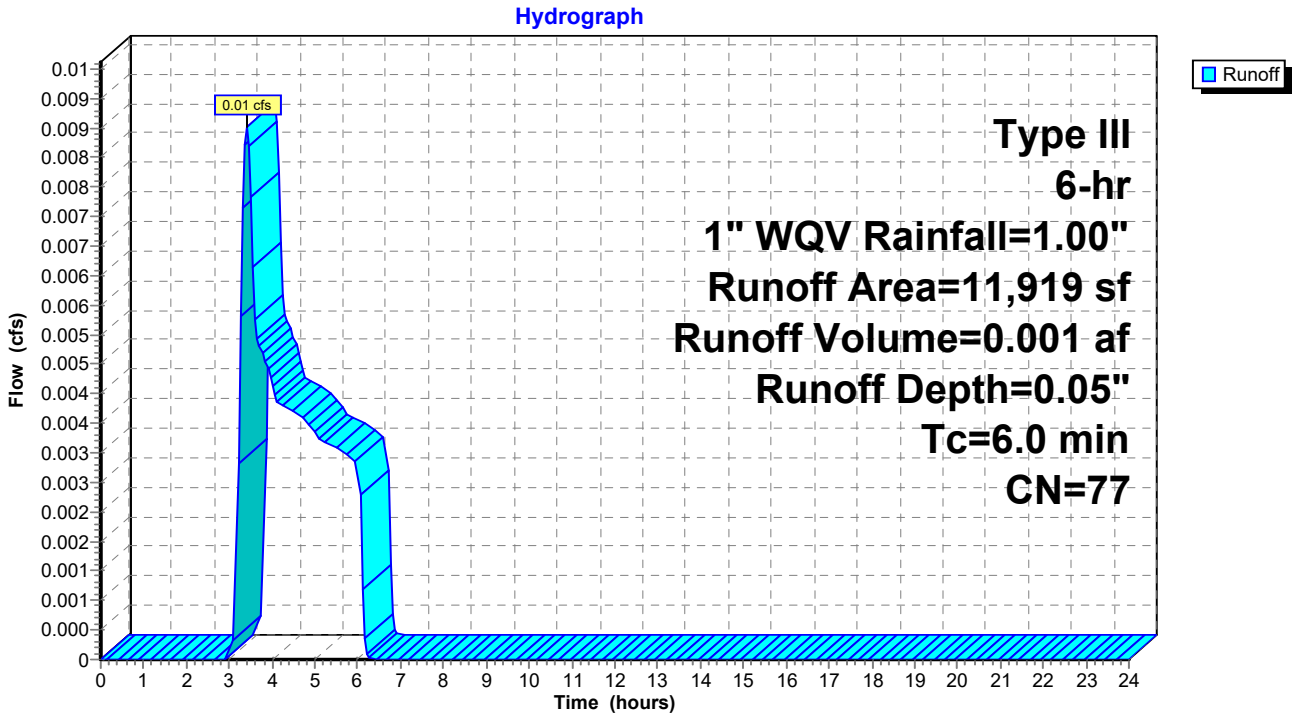
Runoff = 0.01 cfs @ 3.40 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

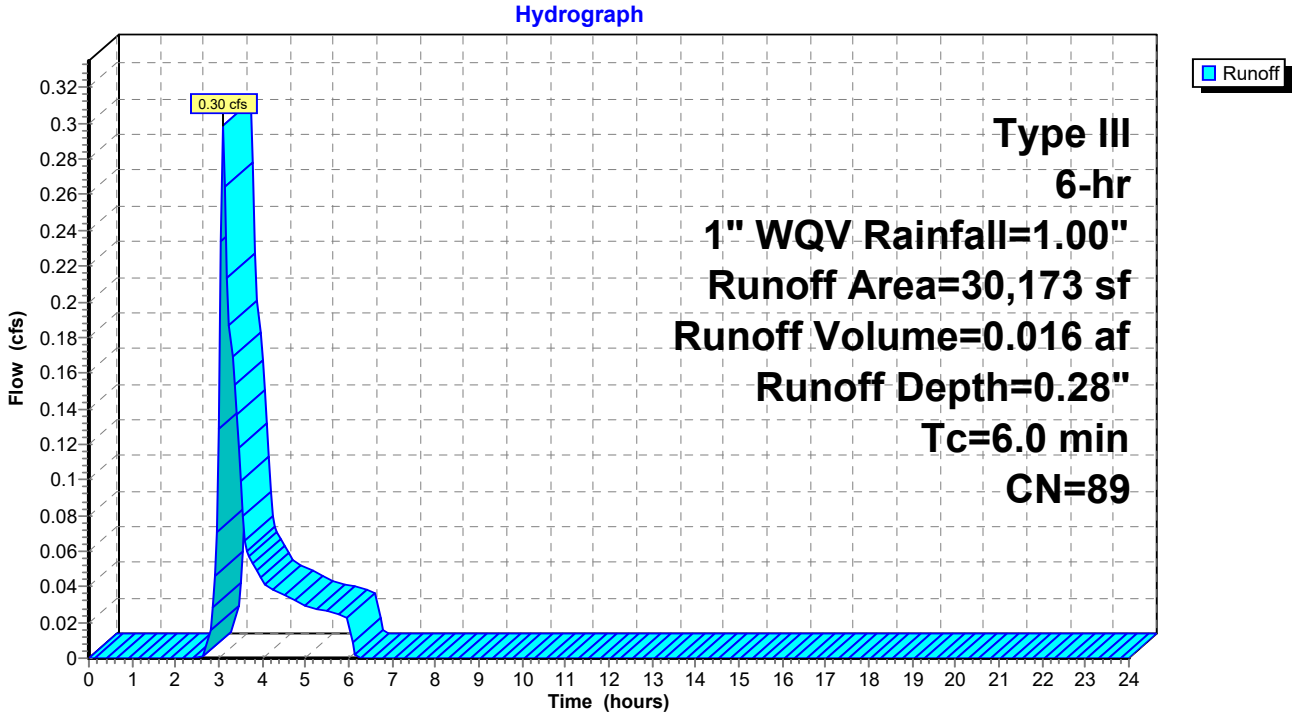
Runoff = 0.30 cfs @ 3.11 hrs, Volume= 0.016 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

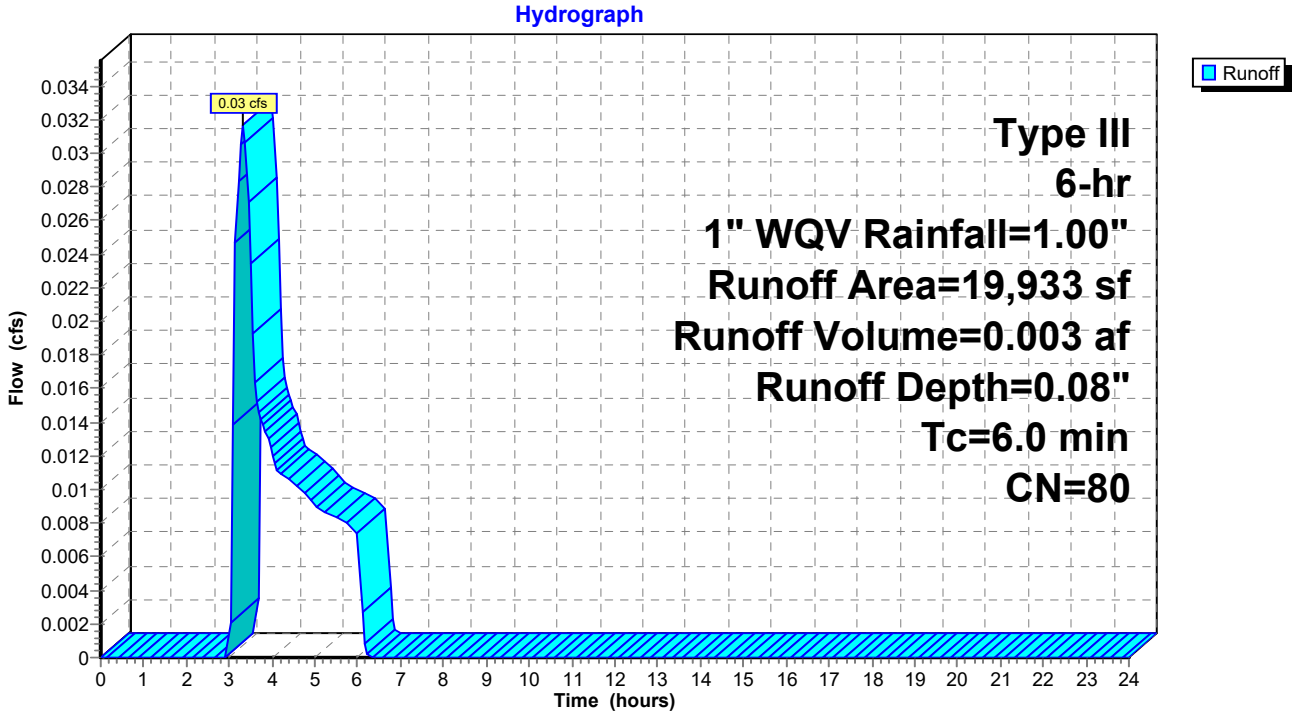
Runoff = 0.03 cfs @ 3.32 hrs, Volume= 0.003 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

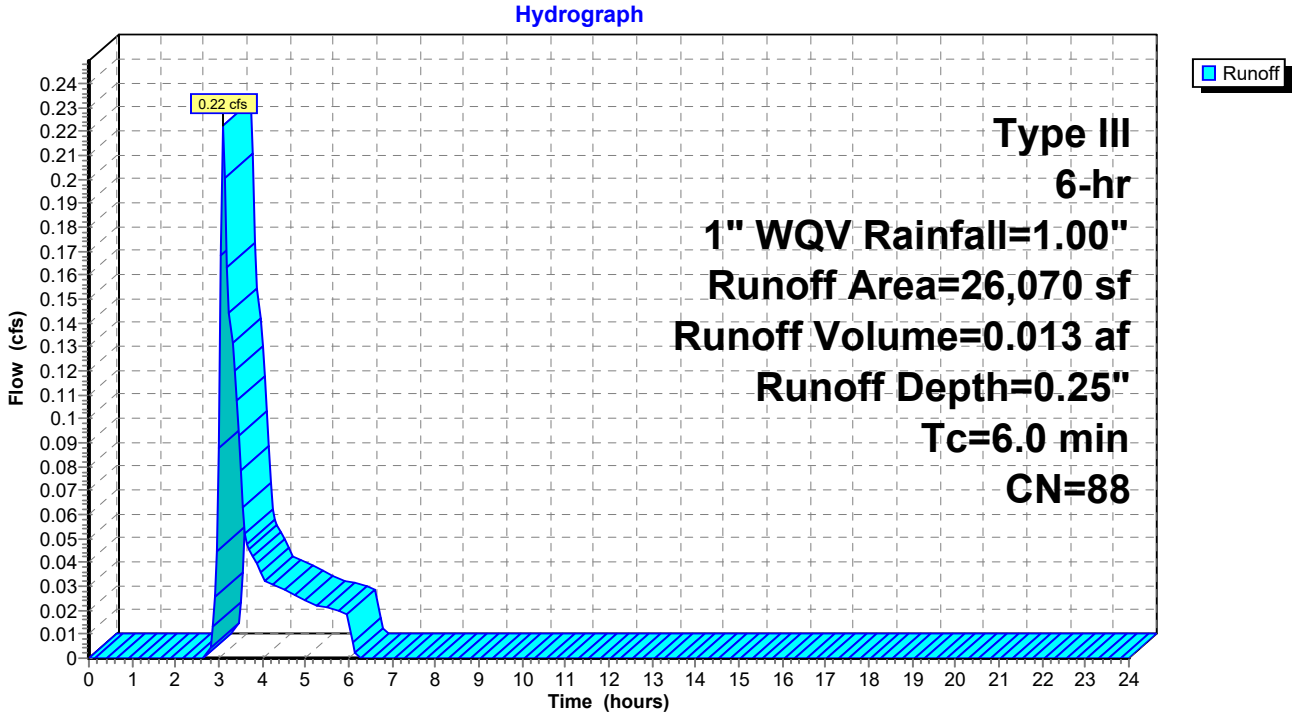
Runoff = 0.22 cfs @ 3.11 hrs, Volume= 0.013 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

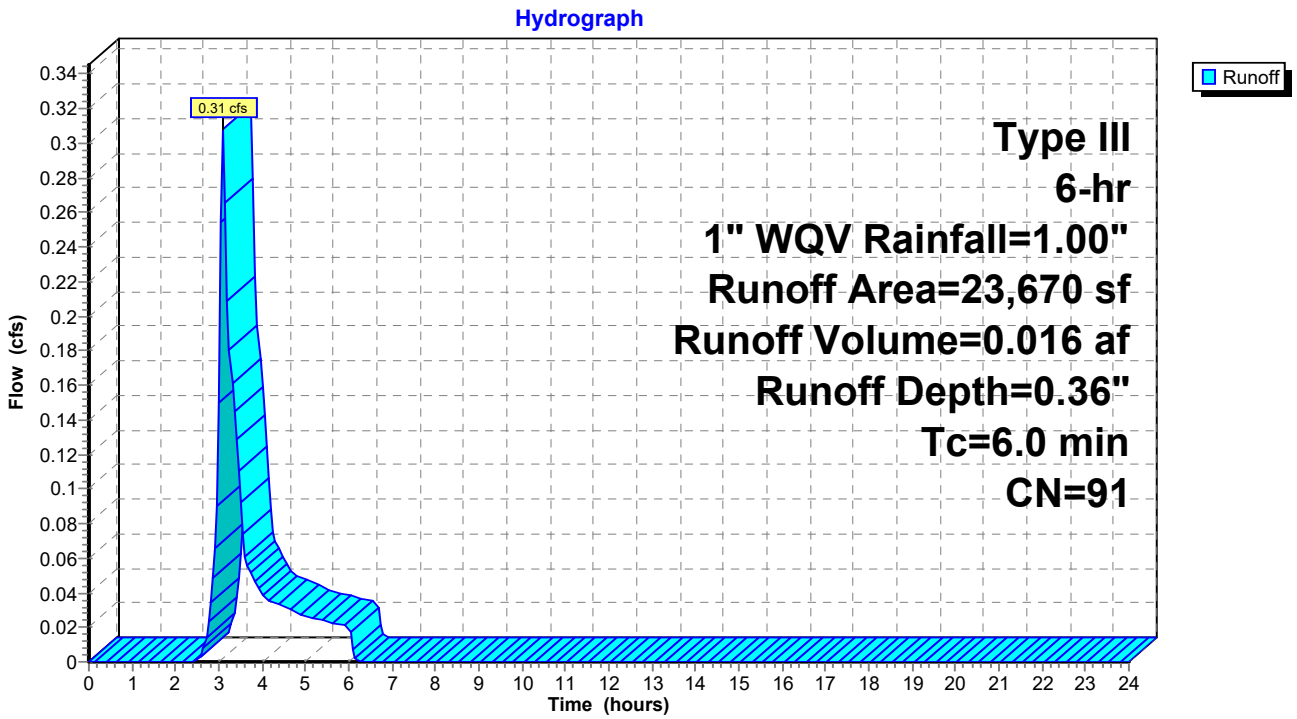
Runoff = 0.31 cfs @ 3.10 hrs, Volume= 0.016 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

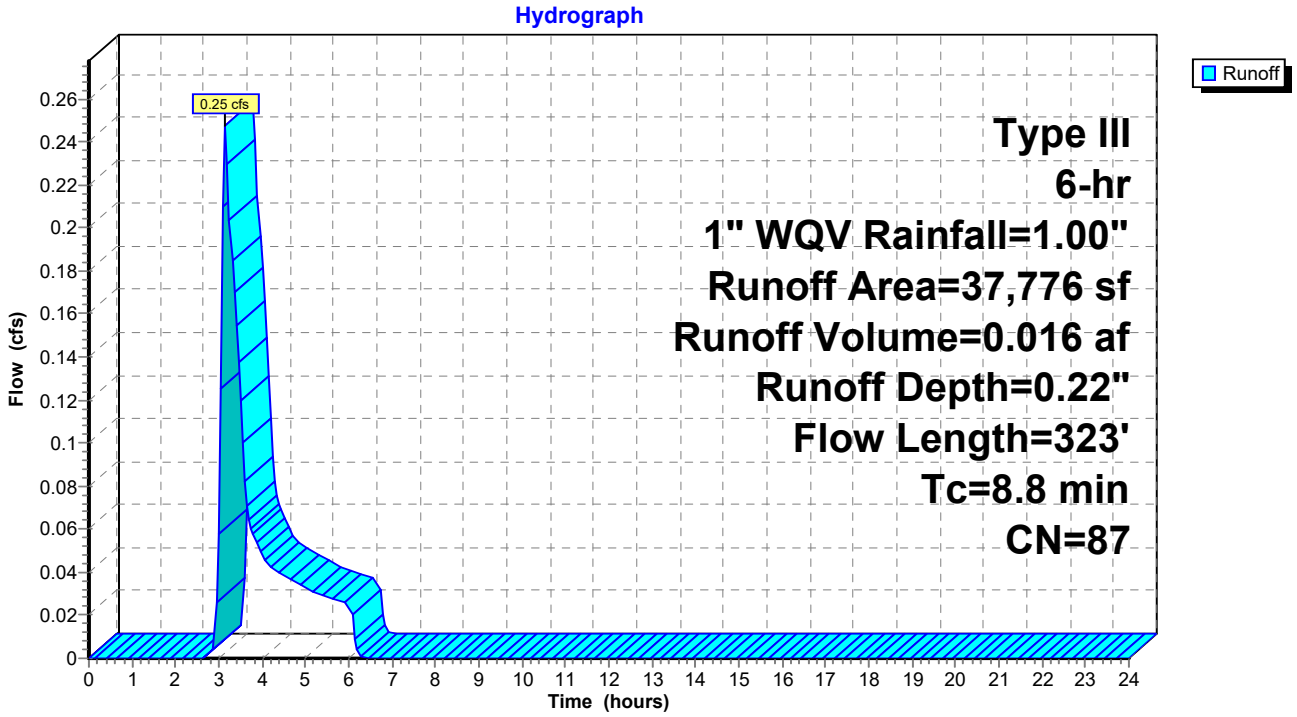
Runoff = 0.25 cfs @ 3.16 hrs, Volume= 0.016 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

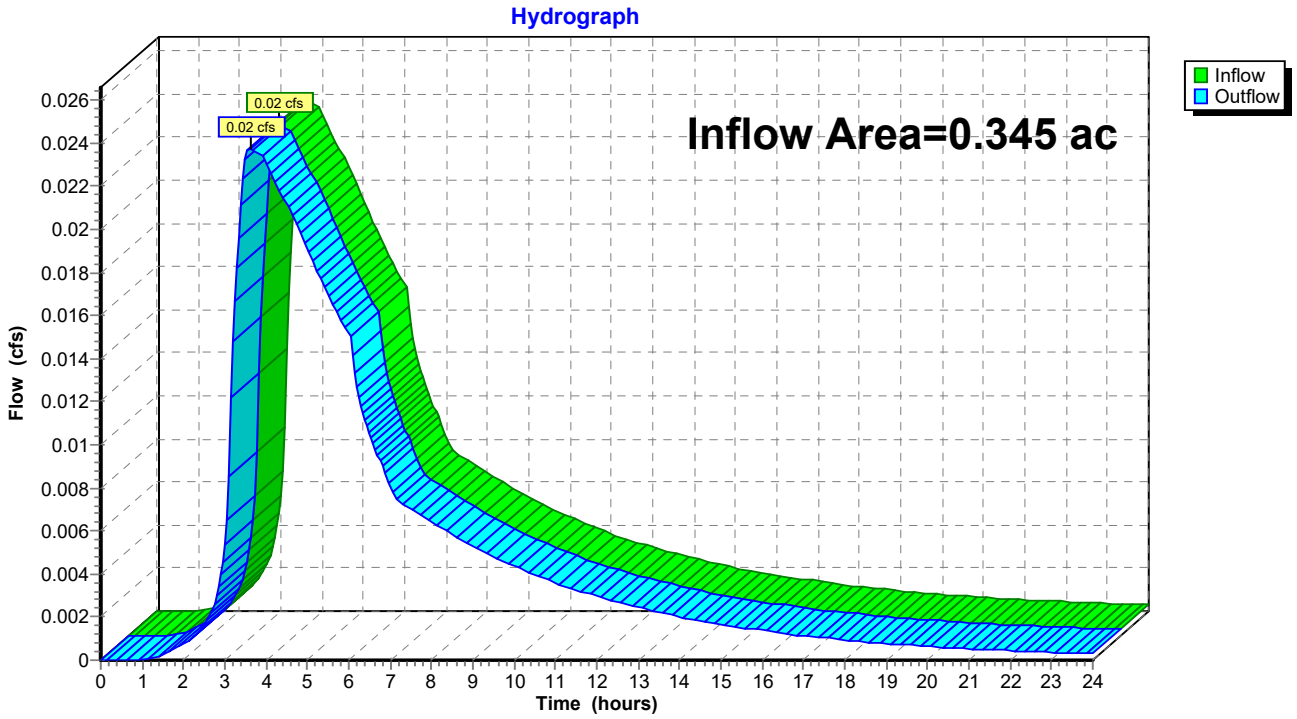


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 0.32" for 1" WQV event
Inflow = 0.02 cfs @ 3.61 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 3.61 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

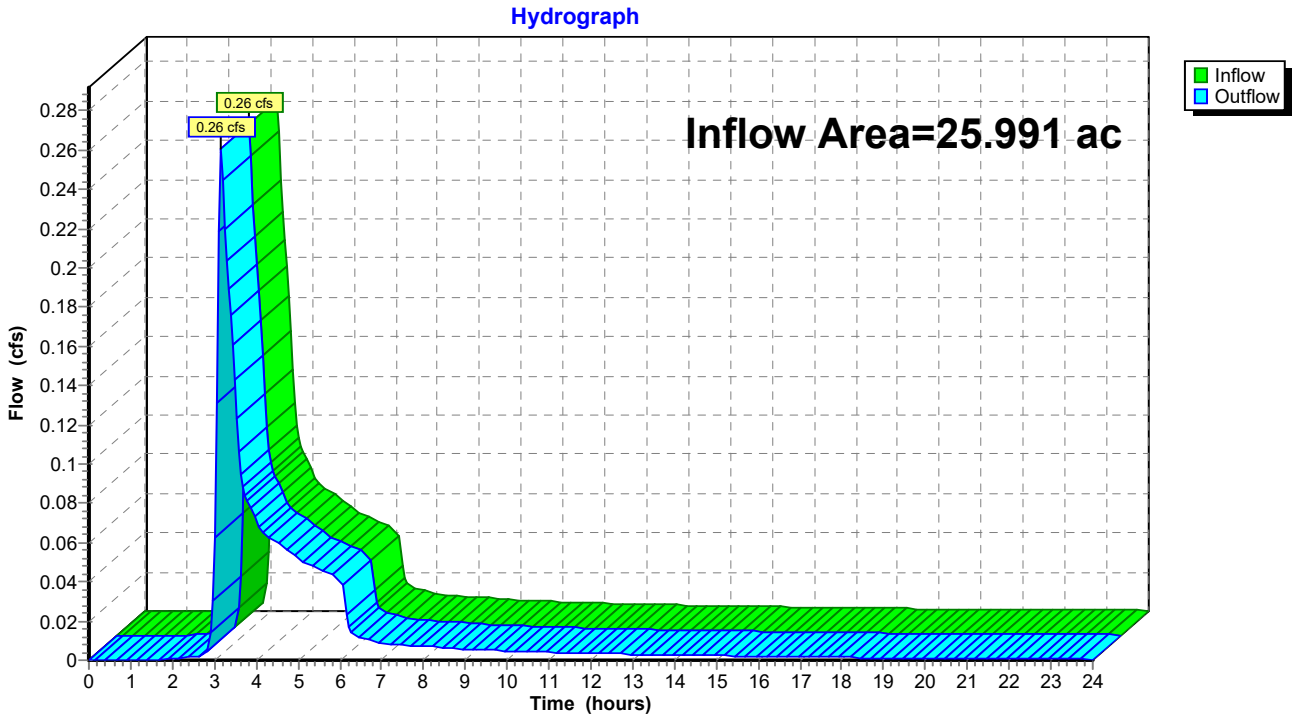


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 0.01" for 1" WQV event
Inflow = 0.26 cfs @ 3.16 hrs, Volume= 0.026 af
Outflow = 0.26 cfs @ 3.16 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

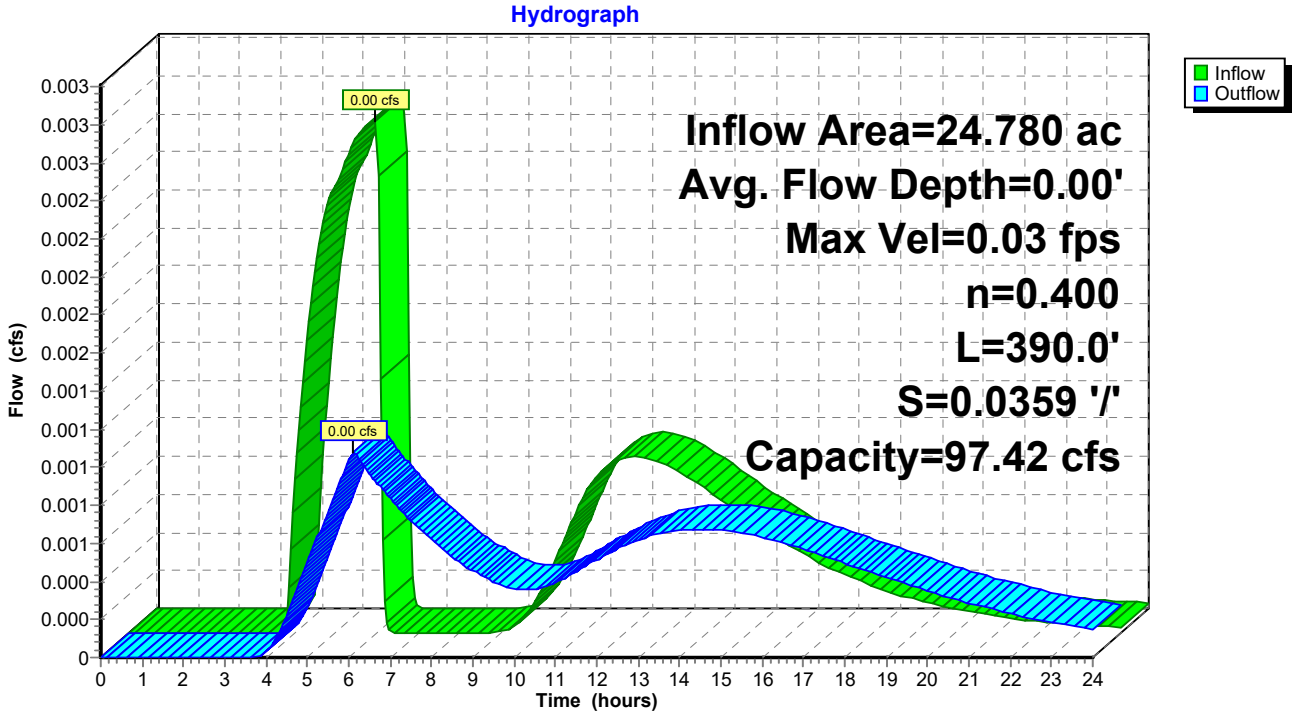
Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 5.95 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 6.12 hrs, Volume= 0.001 af, Atten= 60%, Lag= 10.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.03 fps, Min. Travel Time= 199.2 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 199.2 min

Peak Storage= 13 cf @ 6.12 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach DP-3: DP-3



Stage-Area-Storage for Reach DP-3: DP-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
618.00	0.0	0
618.01	1.3	508
618.02	2.6	1,017
618.03	3.9	1,528
618.04	5.2	2,041
618.05	6.6	2,555
618.06	7.9	3,071
618.07	9.2	3,589
618.08	10.5	4,108
618.09	11.9	4,629
618.10	13.2	5,152
618.11	14.6	5,676
618.12	15.9	6,202
618.13	17.3	6,729
618.14	18.6	7,259
618.15	20.0	7,789
618.16	21.3	8,322
618.17	22.7	8,856
618.18	24.1	9,391
618.19	25.5	9,929
618.20	26.8	10,468
618.21	28.2	11,008
618.22	29.6	11,550
618.23	31.0	12,094
618.24	32.4	12,640
618.25	33.8	13,187
618.26	35.2	13,736
618.27	36.6	14,286
618.28	38.0	14,838
618.29	39.5	15,392
618.30	40.9	15,947
618.31	42.3	16,504
618.32	43.8	17,063
618.33	45.2	17,623
618.34	46.6	18,185
618.35	48.1	18,748
618.36	49.5	19,313
618.37	51.0	19,880
618.38	52.4	20,449
618.39	53.9	21,019
618.40	55.4	21,590
618.41	56.8	22,164
618.42	58.3	22,739
618.43	59.8	23,315
618.44	61.3	23,894
618.45	62.8	24,473
618.46	64.2	25,055
618.47	65.7	25,638
618.48	67.2	26,223
618.49	68.7	26,809
618.50	70.3	27,398
618.51	71.8	27,987
618.52	73.3	28,579
618.53	74.8	29,172
618.54	76.3	29,766
618.55	77.9	30,362
618.56	79.4	30,960
618.57	80.9	31,560
618.58	82.5	32,161
618.59	84.0	32,764
618.60	85.6	33,368
618.61	87.1	33,974
618.62	88.7	34,582
618.63	90.2	35,192
618.64	91.8	35,803
618.65	93.4	36,415
618.66	94.9	37,030
618.67	96.5	37,645
618.68	98.1	38,263
618.69	99.7	38,882
618.70	101.3	39,503
618.71	102.9	40,126
618.72	104.5	40,750
618.73	106.1	41,375
618.74	107.7	42,003
618.75	109.3	42,632
618.76	110.9	43,263
618.77	112.6	43,895
618.78	114.2	44,529
618.79	115.8	45,164
618.80	117.4	45,802
618.81	119.1	46,440
618.82	120.7	47,081
618.83	122.4	47,723
618.84	124.0	48,367
618.85	125.7	49,012
618.86	127.3	49,659
618.87	129.0	50,308
618.88	130.7	50,958
618.89	132.3	51,610
618.90	134.0	52,264
618.91	135.7	52,919
618.92	137.4	53,576
618.93	139.1	54,235
618.94	140.8	54,895
618.95	142.5	55,556
618.96	144.2	56,220
618.97	145.9	56,885
618.98	147.6	57,552
618.99	149.3	58,220
619.00	**151.0**	**58,890**

Summary for Pond 1: SFB-1

Inflow Area =	0.966 ac, 48.65% Impervious, Inflow Depth = 0.22" for 1" WQV event				
Inflow =	0.30 cfs @	3.11 hrs,	Volume=	0.018 af	
Outflow =	0.06 cfs @	3.85 hrs,	Volume=	0.018 af,	Atten= 82%, Lag= 44.6 min
Discarded =	0.06 cfs @	3.85 hrs,	Volume=	0.018 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 607.67' @ 3.85 hrs Surf.Area= 1,321 sf Storage= 308 cf
Flood Elev= 611.00' Surf.Area= 3,452 sf Storage= 7,242 cf

Plug-Flow detention time= 69.3 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 69.4 min (301.2 - 231.8)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	6,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,597 cf Overall - 1,797 cf Embedded = 6,800 cf
#2	607.00'	165 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 413 cf Overall x 40.0% Voids
#3	607.50'	120 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 600 cf Overall x 20.0% Voids
#4	608.00'	157 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 784 cf Overall x 20.0% Voids
		7,242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
608.00	1,568	1,197	1,197
609.00	2,130	1,849	3,046
610.00	2,760	2,445	5,491
611.00	3,452	3,106	8,597

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
607.50	825	413	413

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.50	1,200	0	0
608.00	1,200	600	600

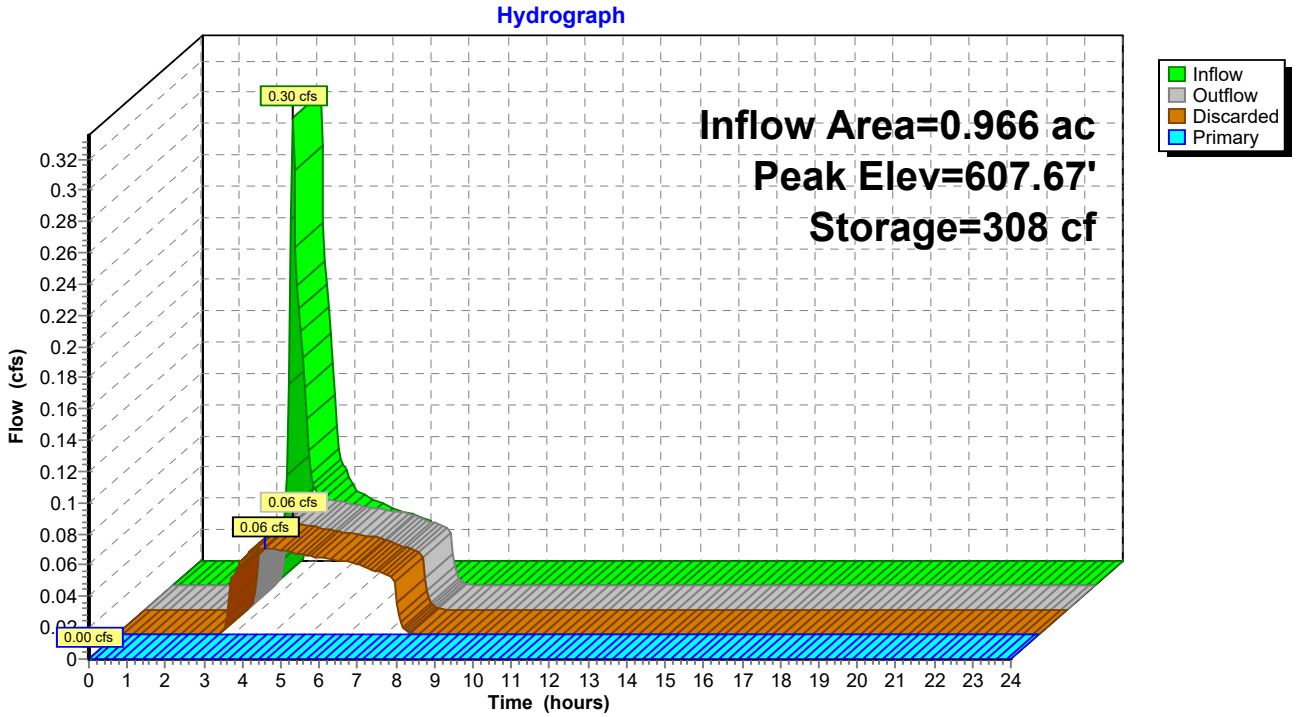
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,568	0	0
608.50	1,568	784	784

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.33' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	610.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 3.85 hrs HW=607.67' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=607.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1: SFB-1



Stage-Area-Storage for Pond 1: SFB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
607.00	825	0
607.05	862	17
607.10	899	37
607.15	936	58
607.20	974	81
607.25	1,011	106
607.30	1,048	132
607.35	1,085	161
607.40	1,122	191
607.45	1,159	224
607.50	1,197	258
607.55	1,234	271
607.60	1,271	285
607.65	1,308	302
607.70	1,345	320
607.75	1,382	340
607.80	1,419	362
607.85	1,457	386
607.90	1,494	412
607.95	1,531	440
608.00	1,568	469
608.05	1,596	485
608.10	1,624	503
608.15	1,652	522
608.20	1,680	543
608.25	1,709	565
608.30	1,737	588
608.35	1,765	613
608.40	1,793	639
608.45	1,821	667
608.50	1,849	696
608.55	1,877	789
608.60	1,905	884
608.65	1,933	980
608.70	1,961	1,077
608.75	1,990	1,176
608.80	2,018	1,276
608.85	2,046	1,378
608.90	2,074	1,481
608.95	2,102	1,585
609.00	2,130	1,691
609.05	2,161	1,798
609.10	2,193	1,907
609.15	2,224	2,017
609.20	2,256	2,129
609.25	2,288	2,243
609.30	2,319	2,358
609.35	2,351	2,475
609.40	2,382	2,593
609.45	2,414	2,713
609.50	2,445	2,835
609.55	2,476	2,958
609.60	2,508	3,082
609.65	2,539	3,208
609.70	2,571	3,336
609.75	2,603	3,465
609.80	2,634	3,596
609.85	2,666	3,729
609.90	2,697	3,863
609.95	2,729	3,999
610.00	2,760	4,136
610.05	2,795	4,275
610.10	2,829	4,415
610.15	2,864	4,558
610.20	2,898	4,702
610.25	2,933	4,847
610.30	2,968	4,995
610.35	3,002	5,144
610.40	3,037	5,295
610.45	3,071	5,448
610.50	3,106	5,602
610.55	3,141	5,758
610.60	3,175	5,916
610.65	3,210	6,076
610.70	3,244	6,237
610.75	3,279	6,400
610.80	3,314	6,565
610.85	3,348	6,732
610.90	3,383	6,900
610.95	3,417	7,070
611.00	**3,452**	**7,242**

Summary for Pond 2: SFB-2

Inflow Area =	4.230 ac, 47.33% Impervious, Inflow Depth > 0.10" for 1" WQV event				
Inflow =	0.25 cfs @	3.12 hrs,	Volume=	0.036 af	
Outflow =	0.13 cfs @	3.61 hrs,	Volume=	0.036 af,	Atten= 47%, Lag= 29.3 min
Discarded =	0.13 cfs @	3.61 hrs,	Volume=	0.036 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 613.16' @ 3.61 hrs Surf.Area= 2,385 sf Storage= 146 cf
Flood Elev= 617.00' Surf.Area= 9,273 sf Storage= 18,810 cf

Plug-Flow detention time= 10.5 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 10.0 min (325.0 - 315.0)

Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	17,591 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 22,460 cf Overall - 4,870 cf Embedded = 17,591 cf
#2	613.00'	491 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 1,227 cf Overall x 40.0% Voids
#3	613.50'	343 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,714 cf Overall x 20.0% Voids
#4	614.00'	386 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,929 cf Overall x 20.0% Voids
		18,810 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
614.00	3,857	2,982	2,982
615.00	5,537	4,697	7,679
616.00	7,376	6,457	14,136
617.00	9,273	8,325	22,460

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
613.50	2,800	1,227	1,227

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.50	3,000	0	0
614.00	3,857	1,714	1,714

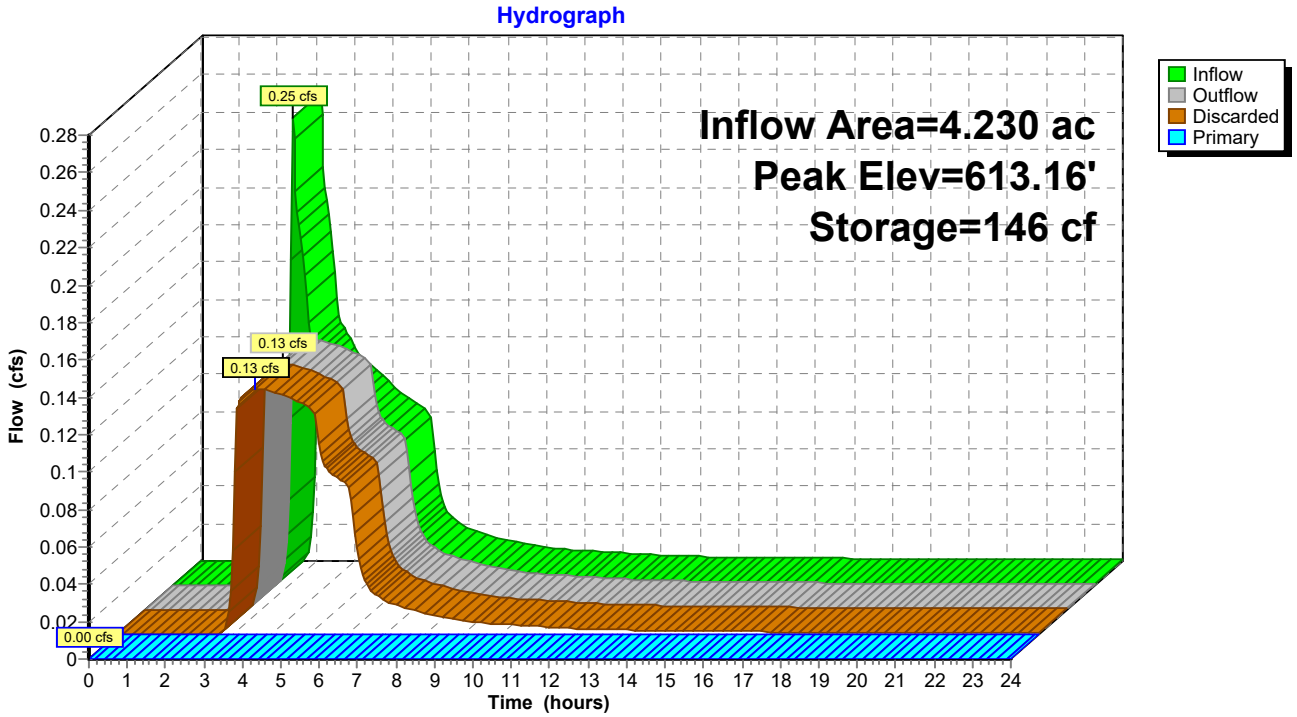
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.00	3,857	0	0
614.50	3,857	1,929	1,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.00'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.25'	**6.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.25' / 612.75' S= 0.0179 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.13 cfs @ 3.61 hrs HW=613.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=613.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2: SFB-2



Stage-Area-Storage for Pond 2: SFB-2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
613.00	2,107	0
613.05	2,194	43
613.10	2,282	89
613.15	2,369	137
613.20	2,457	187
613.25	2,545	239
613.30	2,632	294
613.35	2,720	351
613.40	2,807	411
613.45	2,895	472
613.50	2,982	536
613.55	3,069	566
613.60	3,157	596
613.65	3,244	628
613.70	3,332	660
613.75	3,420	694
613.80	3,507	728
613.85	3,595	763
613.90	3,682	799
613.95	3,770	836
614.00	3,857	875
614.05	3,941	915
614.10	4,025	960
614.15	4,109	1,009
614.20	4,193	1,062
614.25	4,277	1,120
614.30	4,361	1,182
614.35	4,445	1,247
614.40	4,529	1,318
614.45	4,613	1,392
614.50	4,697	1,470
614.55	4,781	1,707
614.60	4,865	1,948
614.65	4,949	2,194
614.70	5,033	2,443
614.75	5,117	2,697
614.80	5,201	2,955
614.85	5,285	3,217
614.90	5,369	3,483
614.95	5,453	3,754
615.00	5,537	4,029
615.05	5,629	4,308
615.10	5,721	4,592
615.15	5,813	4,880
615.20	5,905	5,173
615.25	5,997	5,470
615.30	6,089	5,773
615.35	6,181	6,079
615.40	6,273	6,391
615.45	6,365	6,707
615.50	6,457	7,027
615.55	6,548	7,352
615.60	6,640	7,682
615.65	6,732	8,016
615.70	6,824	8,355
615.75	6,916	8,699
615.80	7,008	9,047
615.85	7,100	9,400
615.90	7,192	9,757
615.95	7,284	10,119
616.00	7,376	10,485
616.05	7,471	10,856
616.10	7,566	11,232
616.15	7,661	11,613
616.20	7,755	11,998
616.25	7,850	12,389
616.30	7,945	12,783
616.35	8,040	13,183
616.40	8,135	13,587
616.45	8,230	13,997
616.50	8,325	14,410
616.55	8,419	14,829
616.60	8,514	15,252
616.65	8,609	15,680
616.70	8,704	16,113
616.75	8,799	16,551
616.80	8,894	16,993
616.85	8,988	17,440
616.90	9,083	17,892
616.95	9,178	18,348
617.00	**9,273**	**18,810**

Summary for Pond DB-1: DB-1

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.25' @ 0.00 hrs Surf.Area= 3,131 sf Storage= 0 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=609.25' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-1: DB-1 - Chamber Wizard Field A

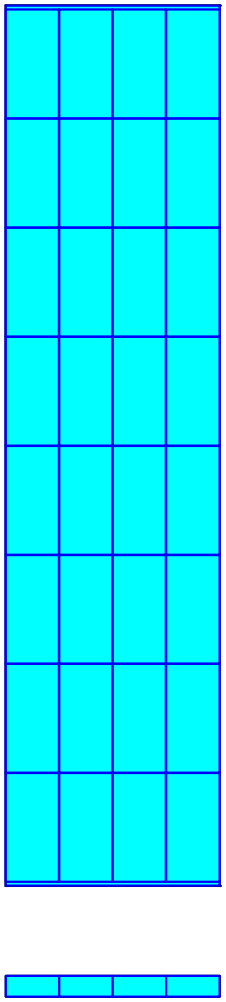
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

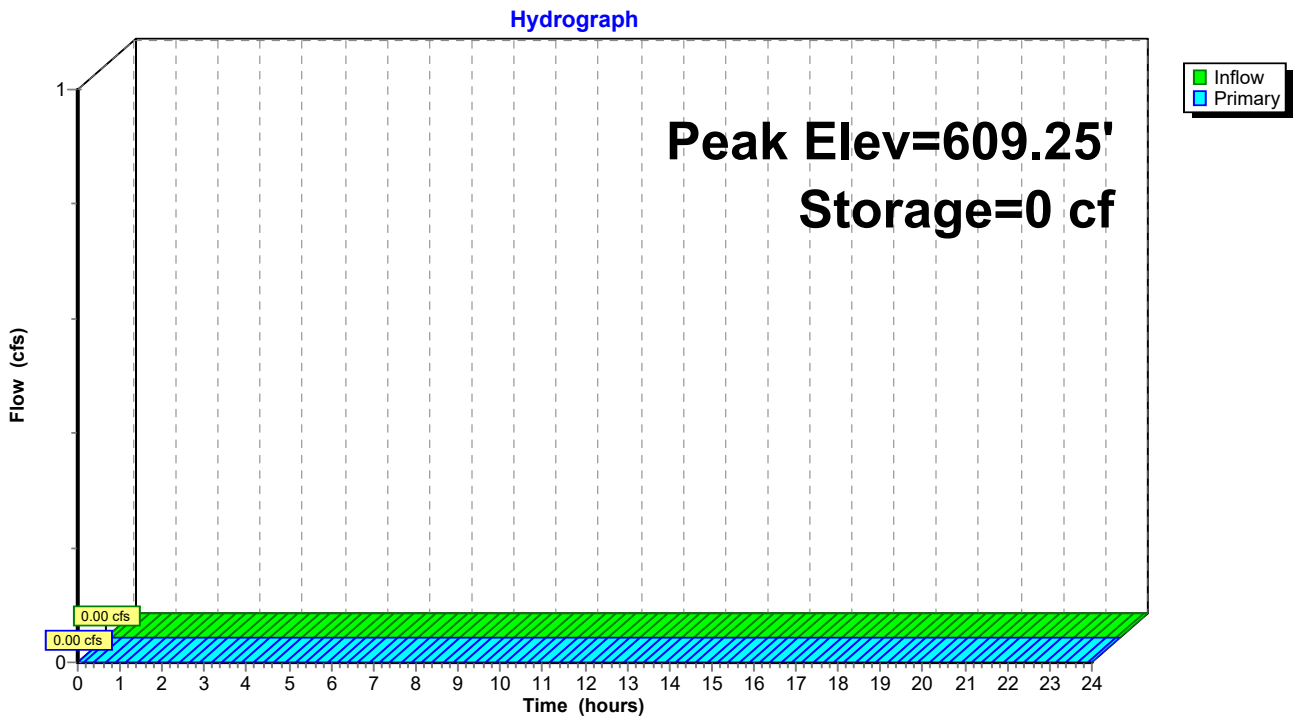
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Inflow
Primary
Peak Elev=609.25'
Storage=0 cf
Flow (cfs)
1
0
0.00 cfs
0.00 cfs
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Area-Storage for Pond DB-1: DB-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	0	610.29	2,771	611.33	5,328
609.27	53	610.31	2,824	611.35	5,328
609.29	107	610.33	2,877	611.37	5,328
609.31	160	610.35	2,930	611.39	5,328
609.33	213	610.37	2,984	611.41	5,328
609.35	266	610.39	3,037	611.43	5,328
609.37	320	610.41	3,090	611.45	5,328
609.39	373	610.43	3,144	611.47	5,328
609.41	426	610.45	3,197	611.49	5,328
609.43	480	610.47	3,250	611.51	5,328
609.45	533	610.49	3,303	611.53	5,328
609.47	586	610.51	3,357	611.55	5,328
609.49	639	610.53	3,410	611.57	5,328
609.51	693	610.55	3,463	611.59	5,328
609.53	746	610.57	3,516	611.61	5,328
609.55	799	610.59	3,570	611.63	5,328
609.57	852	610.61	3,623	611.65	5,328
609.59	906	610.63	3,676	611.67	5,328
609.61	959	610.65	3,730	611.69	5,328
609.63	1,012	610.67	3,783	611.71	5,328
609.65	1,066	610.69	3,836	611.73	5,328
609.67	1,119	610.71	3,889	611.75	5,328
609.69	1,172	610.73	3,943	611.77	5,328
609.71	1,225	610.75	3,996	611.79	5,328
609.73	1,279	610.77	4,049	611.81	5,328
609.75	1,332	610.79	4,103	611.83	5,328
609.77	1,385	610.81	4,156	611.85	5,328
609.79	1,439	610.83	4,209	611.87	5,328
609.81	1,492	610.85	4,262	611.89	5,328
609.83	1,545	610.87	4,316	611.91	**5,328**
609.85	1,598	610.89	4,369		
609.87	1,652	610.91	4,422		
609.89	1,705	610.93	4,476		
609.91	1,758	610.95	4,529		
609.93	1,812	610.97	4,582		
609.95	1,865	610.99	4,635		
609.97	1,918	611.01	4,689		
609.99	1,971	611.03	4,742		
610.01	2,025	611.05	4,795		
610.03	2,078	611.07	4,848		
610.05	2,131	611.09	4,902		
610.07	2,184	611.11	4,955		
610.09	2,238	611.13	5,008		
610.11	2,291	611.15	5,062		
610.13	2,344	611.17	5,115		
610.15	2,398	611.19	5,168		
610.17	2,451	611.21	5,221		
610.19	2,504	611.23	5,275		
610.21	2,557	611.25	5,328		
610.23	2,611	611.27	5,328		
610.25	2,664	611.29	5,328		
610.27	2,717	611.31	5,328		

Summary for Pond DB-2: DB-2

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 615.25' @ 0.00 hrs Surf.Area= 3,131 sf Storage= 0 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**6.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=615.25' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-2: DB-2 - Chamber Wizard Field A

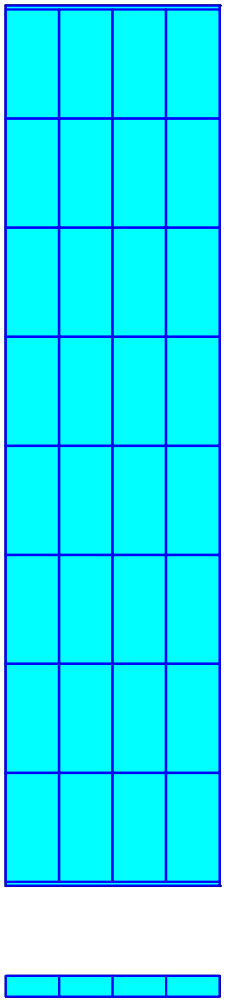
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

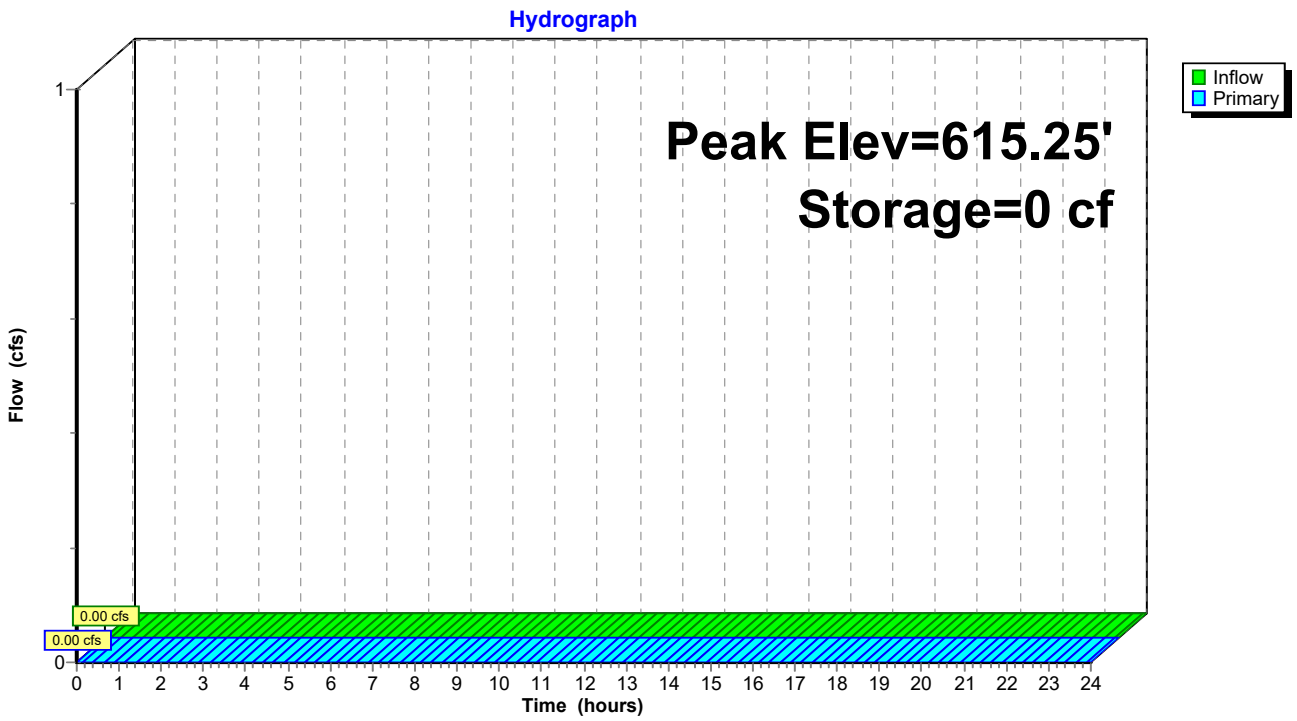
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Inflow
Primary
Peak Elev=615.25'
Storage=0 cf
Flow (cfs)
1
0
0.00 cfs
0.00 cfs
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Area-Storage for Pond DB-2: DB-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.25	0	616.29	2,771	617.33	5,328
615.27	53	616.31	2,824	617.35	5,328
615.29	107	616.33	2,877	617.37	5,328
615.31	160	616.35	2,930	617.39	5,328
615.33	213	616.37	2,984	617.41	5,328
615.35	266	616.39	3,037	617.43	5,328
615.37	320	616.41	3,090	617.45	5,328
615.39	373	616.43	3,144	617.47	5,328
615.41	426	616.45	3,197	617.49	5,328
615.43	480	616.47	3,250	617.51	5,328
615.45	533	616.49	3,303	617.53	5,328
615.47	586	616.51	3,357	617.55	5,328
615.49	639	616.53	3,410	617.57	5,328
615.51	693	616.55	3,463	617.59	5,328
615.53	746	616.57	3,516	617.61	5,328
615.55	799	616.59	3,570	617.63	5,328
615.57	852	616.61	3,623	617.65	5,328
615.59	906	616.63	3,676	617.67	5,328
615.61	959	616.65	3,730	617.69	5,328
615.63	1,012	616.67	3,783	617.71	5,328
615.65	1,066	616.69	3,836	617.73	5,328
615.67	1,119	616.71	3,889	617.75	5,328
615.69	1,172	616.73	3,943	617.77	5,328
615.71	1,225	616.75	3,996	617.79	5,328
615.73	1,279	616.77	4,049	617.81	5,328
615.75	1,332	616.79	4,103	617.83	5,328
615.77	1,385	616.81	4,156	617.85	5,328
615.79	1,439	616.83	4,209	617.87	5,328
615.81	1,492	616.85	4,262	617.89	5,328
615.83	1,545	616.87	4,316	617.91	**5,328**
615.85	1,598	616.89	4,369		
615.87	1,652	616.91	4,422		
615.89	1,705	616.93	4,476		
615.91	1,758	616.95	4,529		
615.93	1,812	616.97	4,582		
615.95	1,865	616.99	4,635		
615.97	1,918	617.01	4,689		
615.99	1,971	617.03	4,742		
616.01	2,025	617.05	4,795		
616.03	2,078	617.07	4,848		
616.05	2,131	617.09	4,902		
616.07	2,184	617.11	4,955		
616.09	2,238	617.13	5,008		
616.11	2,291	617.15	5,062		
616.13	2,344	617.17	5,115		
616.15	2,398	617.19	5,168		
616.17	2,451	617.21	5,221		
616.19	2,504	617.23	5,275		
616.21	2,557	617.25	5,328		
616.23	2,611	617.27	5,328		
616.25	2,664	617.29	5,328		
616.27	2,717	617.31	5,328		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth = 0.79" for 1" WQV event
Inflow = 0.16 cfs @ 3.09 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 3.64 hrs, Volume= 0.009 af, Atten= 87%, Lag= 32.9 min
Primary = 0.02 cfs @ 3.64 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.34' @ 3.64 hrs Surf.Area= 2,902 sf Storage= 240 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 231.5 min calculated for 0.009 af (98% of inflow)
Center-of-Mass det. time= 230.9 min (434.7 - 203.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.02 cfs @ 3.64 hrs HW=612.34' (Free Discharge)
└─**1=Culvert** (Passes 0.02 cfs of 0.03 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.04 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

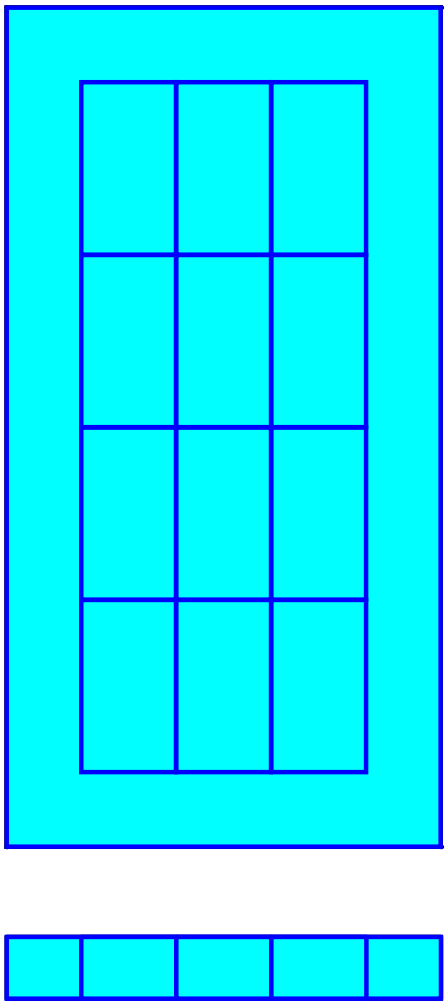
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

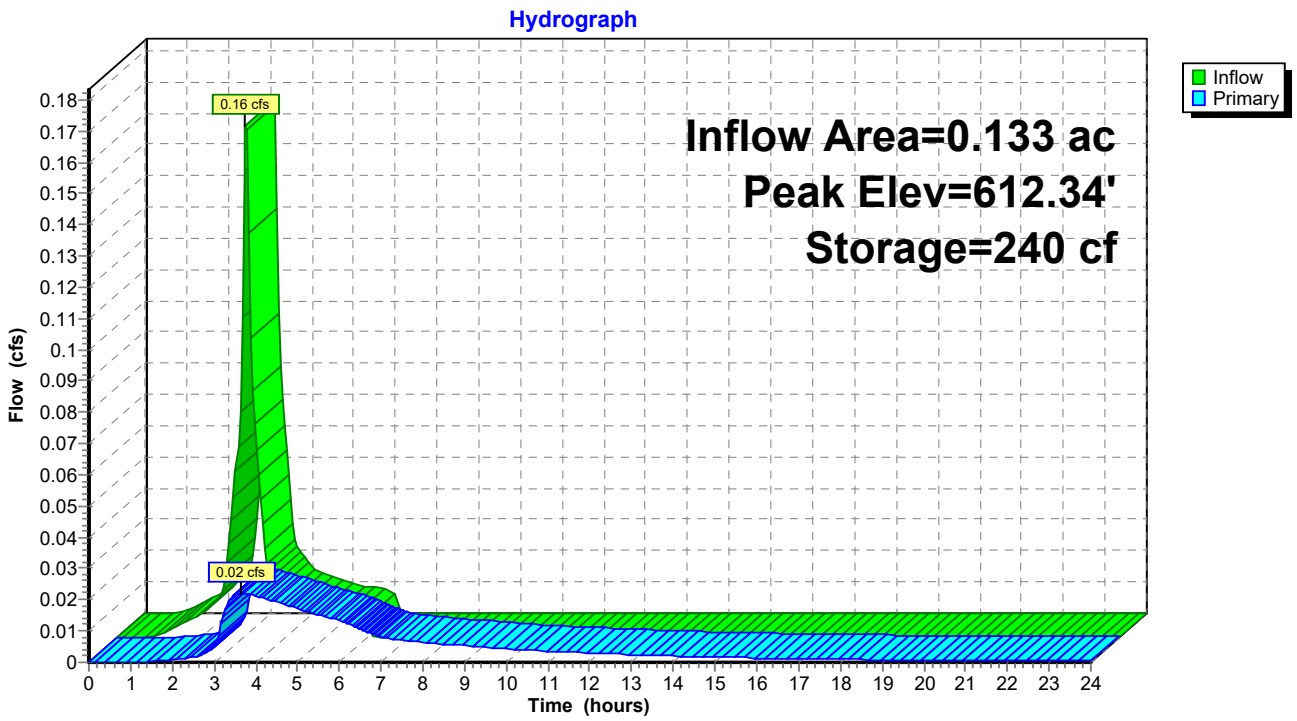
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow
Primary
0.16 cfs
0.02 cfs
Inflow Area=0.133 ac
Peak Elev=612.34'
Storage=240 cf
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-6: DB-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
612.25	0	614.33	5,355	616.41	10,710
612.29	103	614.37	5,458	616.45	10,813
612.33	206	614.41	5,561	616.49	10,916
612.37	309	614.45	5,664	616.53	11,019
612.41	412	614.49	5,767	616.57	11,122
612.45	515	614.53	5,870	616.61	11,225
612.49	618	614.57	5,973	616.65	11,328
612.53	721	614.61	6,076	616.69	11,431
612.57	824	614.65	6,179	616.73	11,534
612.61	927	614.69	6,282	616.77	11,637
612.65	1,030	614.73	6,385	616.81	11,740
612.69	1,133	614.77	6,488	616.85	11,843
612.73	1,236	614.81	6,591	616.89	11,946
612.77	1,339	614.85	6,694	616.93	12,049
612.81	1,442	614.89	6,797	616.97	12,152
612.85	1,545	614.93	6,900	617.01	12,255
612.89	1,648	614.97	7,003	617.05	12,358
612.93	1,751	615.01	7,106	617.09	12,461
612.97	1,854	615.05	7,209	617.13	12,564
613.01	1,957	615.09	7,312	617.17	12,667
613.05	2,060	615.13	7,415	617.21	12,770
613.09	2,163	615.17	7,518	617.25	12,873
613.13	2,266	615.21	7,621	617.29	12,873
613.17	2,369	615.25	7,724	617.33	12,873
613.21	2,472	615.29	7,827	617.37	12,873
613.25	2,575	615.33	7,930	617.41	12,873
613.29	2,678	615.37	8,033	617.45	**12,873**
613.33	2,781	615.41	8,136	617.49	12,873
613.37	2,884	615.45	8,239	617.53	12,873
613.41	2,987	615.49	8,342	617.57	12,873
613.45	3,090	615.53	8,445	617.61	12,873
613.49	3,193	615.57	8,548	617.65	12,873
613.53	3,296	615.61	8,651	617.69	12,873
613.57	3,399	615.65	8,754	617.73	12,873
613.61	3,502	615.69	8,857		
613.65	3,604	615.73	8,960		
613.69	3,707	615.77	9,063		
613.73	3,810	615.81	9,166		
613.77	3,913	615.85	9,269		
613.81	4,016	615.89	9,372		
613.85	4,119	615.93	9,475		
613.89	4,222	615.97	9,578		
613.93	4,325	616.01	9,681		
613.97	4,428	616.05	9,784		
614.01	4,531	616.09	9,887		
614.05	4,634	616.13	9,990		
614.09	4,737	616.17	10,093		
614.13	4,840	616.21	10,196		
614.17	4,943	616.25	10,299		
614.21	5,046	616.29	10,402		
614.25	5,149	616.33	10,505		
614.29	5,252	616.37	10,608		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth = 0.36" for 1" WQV event
Inflow = 0.31 cfs @ 3.10 hrs, Volume= 0.016 af
Outflow = 0.05 cfs @ 3.85 hrs, Volume= 0.016 af, Atten= 85%, Lag= 45.0 min
Primary = 0.05 cfs @ 3.85 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 615.94' @ 3.85 hrs Surf.Area= 3,131 sf Storage= 380 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 181.0 min calculated for 0.016 af (96% of inflow)
Center-of-Mass det. time= 177.2 min (402.3 - 225.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 3.85 hrs HW=615.94' (Free Discharge)
└─**1=Culvert** (Passes 0.05 cfs of 0.05 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.29 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-7: DB-7 - Chamber Wizard Field A

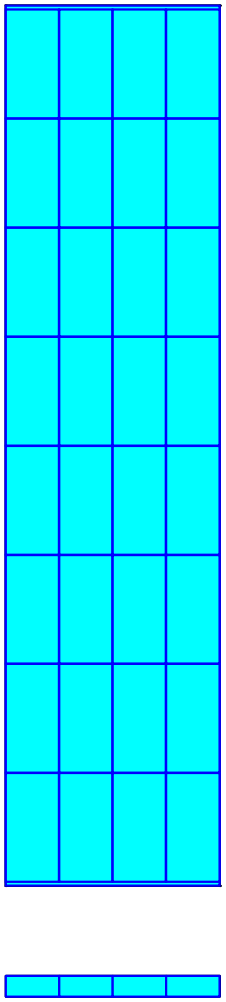
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

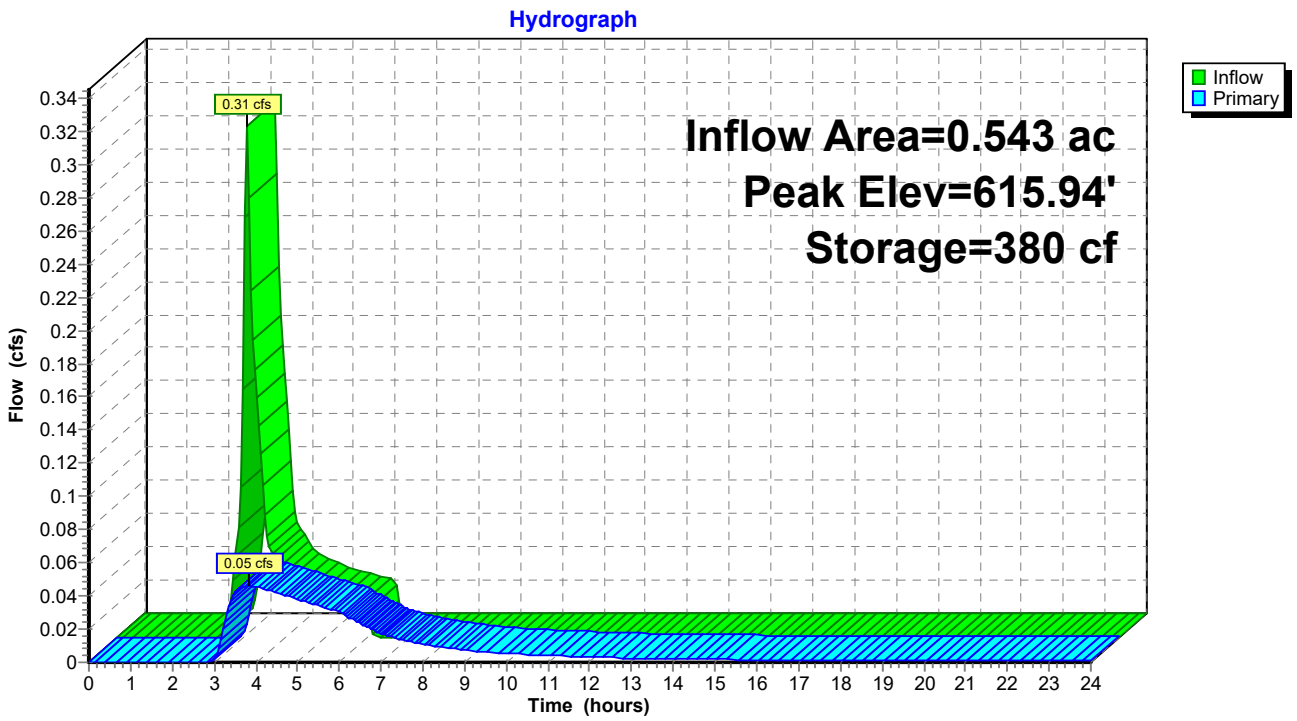
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow
Primary
0.31 cfs
0.05 cfs
Inflow Area=0.543 ac
Peak Elev=615.94'
Storage=380 cf
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-7: DB-7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.80	0	616.84	2,771	617.88	5,328
615.82	53	616.86	2,824	617.90	5,328
615.84	107	616.88	2,877	617.92	5,328
615.86	160	616.90	2,930	617.94	5,328
615.88	213	616.92	2,984	617.96	5,328
615.90	266	616.94	3,037	617.98	5,328
615.92	320	616.96	3,090	618.00	5,328
615.94	373	616.98	3,144	618.02	5,328
615.96	426	617.00	3,197	618.04	5,328
615.98	480	617.02	3,250	618.06	5,328
616.00	533	617.04	3,303	618.08	5,328
616.02	586	617.06	3,357	618.10	5,328
616.04	639	617.08	3,410	618.12	5,328
616.06	693	617.10	3,463	618.14	5,328
616.08	746	617.12	3,516	618.16	5,328
616.10	799	617.14	3,570	618.18	5,328
616.12	852	617.16	3,623	618.20	5,328
616.14	906	617.18	3,676	618.22	5,328
616.16	959	617.20	3,730	618.24	5,328
616.18	1,012	617.22	3,783	618.26	5,328
616.20	1,066	617.24	3,836	618.28	5,328
616.22	1,119	617.26	3,889	618.30	5,328
616.24	1,172	617.28	3,943	618.32	5,328
616.26	1,225	617.30	3,996	618.34	5,328
616.28	1,279	617.32	4,049	618.36	5,328
616.30	1,332	617.34	4,103	618.38	5,328
616.32	1,385	617.36	4,156	618.40	5,328
616.34	1,439	617.38	4,209	618.42	5,328
616.36	1,492	617.40	4,262	618.44	5,328
616.38	1,545	617.42	4,316	618.46	**5,328**
616.40	1,598	617.44	4,369		
616.42	1,652	617.46	4,422		
616.44	1,705	617.48	4,476		
616.46	1,758	617.50	4,529		
616.48	1,812	617.52	4,582		
616.50	1,865	617.54	4,635		
616.52	1,918	617.56	4,689		
616.54	1,971	617.58	4,742		
616.56	2,025	617.60	4,795		
616.58	2,078	617.62	4,848		
616.60	2,131	617.64	4,902		
616.62	2,184	617.66	4,955		
616.64	2,238	617.68	5,008		
616.66	2,291	617.70	5,062		
616.68	2,344	617.72	5,115		
616.70	2,398	617.74	5,168		
616.72	2,451	617.76	5,221		
616.74	2,504	617.78	5,275		
616.76	2,557	617.80	5,328		
616.78	2,611	617.82	5,328		
616.80	2,664	617.84	5,328		
616.82	2,717	617.86	5,328		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac, 62.75% Impervious, Inflow Depth = 0.28" for 1" WQV event				
Inflow =	0.30 cfs @	3.11 hrs,	Volume=	0.016 af	
Outflow =	0.30 cfs @	3.11 hrs,	Volume=	0.016 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.30 cfs @	3.11 hrs,	Volume=	0.016 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

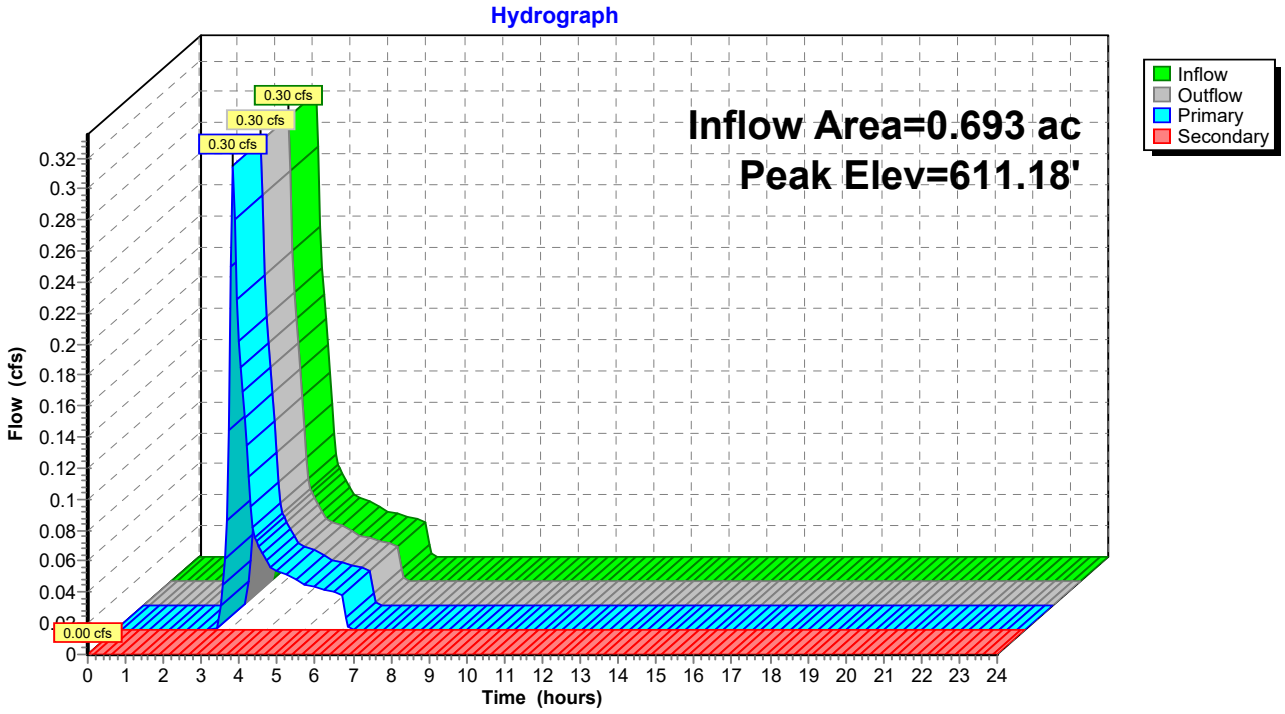
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 611.18' @ 3.11 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 3.11 hrs HW=611.08' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.29 cfs @ 3.36 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=609.25' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond ICS-1: ICS-1



Stage-Area-Storage for Pond ICS-1: ICS-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	**0**	611.85	0
609.30	0	611.90	0
609.35	0	611.95	0
609.40	0	612.00	0
609.45	0	612.05	0
609.50	0	612.10	0
609.55	0	612.15	0
609.60	0	612.20	0
609.65	0	612.25	0
609.70	0	612.30	0
609.75	0	612.35	0
609.80	0	612.40	0
609.85	0	612.45	0
609.90	0	612.50	0
609.95	0	612.55	0
610.00	0	612.60	0
610.05	0	612.65	0
610.10	0	612.70	0
610.15	0	612.75	0
610.20	0	612.80	0
610.25	0	612.85	0
610.30	0	612.90	0
610.35	0	612.95	0
610.40	0	613.00	0
610.45	0	613.05	0
610.50	0	613.10	0
610.55	0	613.15	0
610.60	0	613.20	0
610.65	0	613.25	0
610.70	0		
610.75	0		
610.80	0		
610.85	0		
610.90	0		
610.95	0		
611.00	0		
611.05	0		
611.10	0		
611.15	0		
611.20	0		
611.25	0		
611.30	0		
611.35	0		
611.40	0		
611.45	0		
611.50	0		
611.55	0		
611.60	0		
611.65	0		
611.70	0		
611.75	0		
611.80	0		

Summary for Pond ICS-2: ICS-2

Inflow Area =	0.598 ac, 70.86% Impervious, Inflow Depth = 0.25" for 1" WQV event			
Inflow =	0.22 cfs @	3.11 hrs, Volume=	0.013 af	
Outflow =	0.22 cfs @	3.11 hrs, Volume=	0.013 af, Atten= 0%, Lag= 0.0 min	
Primary =	0.22 cfs @	3.11 hrs, Volume=	0.013 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

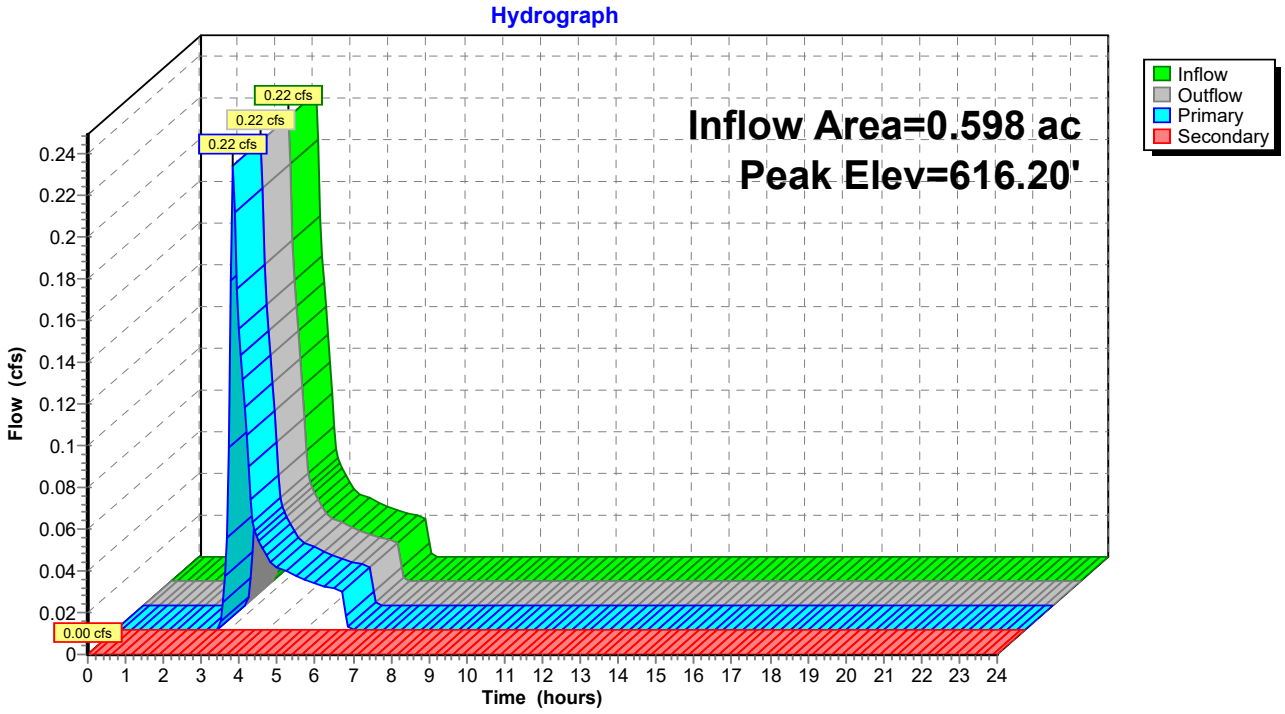
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.20' @ 3.11 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 3.11 hrs HW=616.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.22 cfs @ 2.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=615.85' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond ICS-2: ICS-2



Stage-Area-Storage for Pond ICS-2: ICS-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.85	**0**	616.37	0	616.89	0
615.86	0	616.38	0	616.90	0
615.87	0	616.39	0	616.91	0
615.88	0	616.40	0	616.92	0
615.89	0	616.41	0	616.93	0
615.90	0	616.42	0	616.94	0
615.91	0	616.43	0	616.95	0
615.92	0	616.44	0	616.96	0
615.93	0	616.45	0	616.97	0
615.94	0	616.46	0	616.98	0
615.95	0	616.47	0	616.99	0
615.96	0	616.48	0	617.00	0
615.97	0	616.49	0	617.01	0
615.98	0	616.50	0	617.02	0
615.99	0	616.51	0	617.03	0
616.00	0	616.52	0	617.04	0
616.01	0	616.53	0	617.05	0
616.02	0	616.54	0	617.06	0
616.03	0	616.55	0	617.07	0
616.04	0	616.56	0	617.08	0
616.05	0	616.57	0	617.09	0
616.06	0	616.58	0	617.10	0
616.07	0	616.59	0	617.11	0
616.08	0	616.60	0	617.12	0
616.09	0	616.61	0	617.13	0
616.10	0	616.62	0	617.14	0
616.11	0	616.63	0	617.15	0
616.12	0	616.64	0	617.16	0
616.13	0	616.65	0	617.17	0
616.14	0	616.66	0	617.18	0
616.15	0	616.67	0	617.19	0
616.16	0	616.68	0	617.20	0
616.17	0	616.69	0	617.21	0
616.18	0	616.70	0	617.22	0
616.19	0	616.71	0	617.23	0
616.20	0	616.72	0	617.24	0
616.21	0	616.73	0	617.25	0
616.22	0	616.74	0		
616.23	0	616.75	0		
616.24	0	616.76	0		
616.25	0	616.77	0		
616.26	0	616.78	0		
616.27	0	616.79	0		
616.28	0	616.80	0		
616.29	0	616.81	0		
616.30	0	616.82	0		
616.31	0	616.83	0		
616.32	0	616.84	0		
616.33	0	616.85	0		
616.34	0	616.86	0		
616.35	0	616.87	0		
616.36	0	616.88	0		

Summary for Pond ICS-6: ICS-6

Inflow Area =	2.630 ac, 39.25% Impervious, Inflow Depth = 0.02" for 1" WQV event				
Inflow =	0.02 cfs @	4.77 hrs,	Volume=	0.005 af	
Outflow =	0.02 cfs @	4.77 hrs,	Volume=	0.005 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.02 cfs @	4.77 hrs,	Volume=	0.005 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

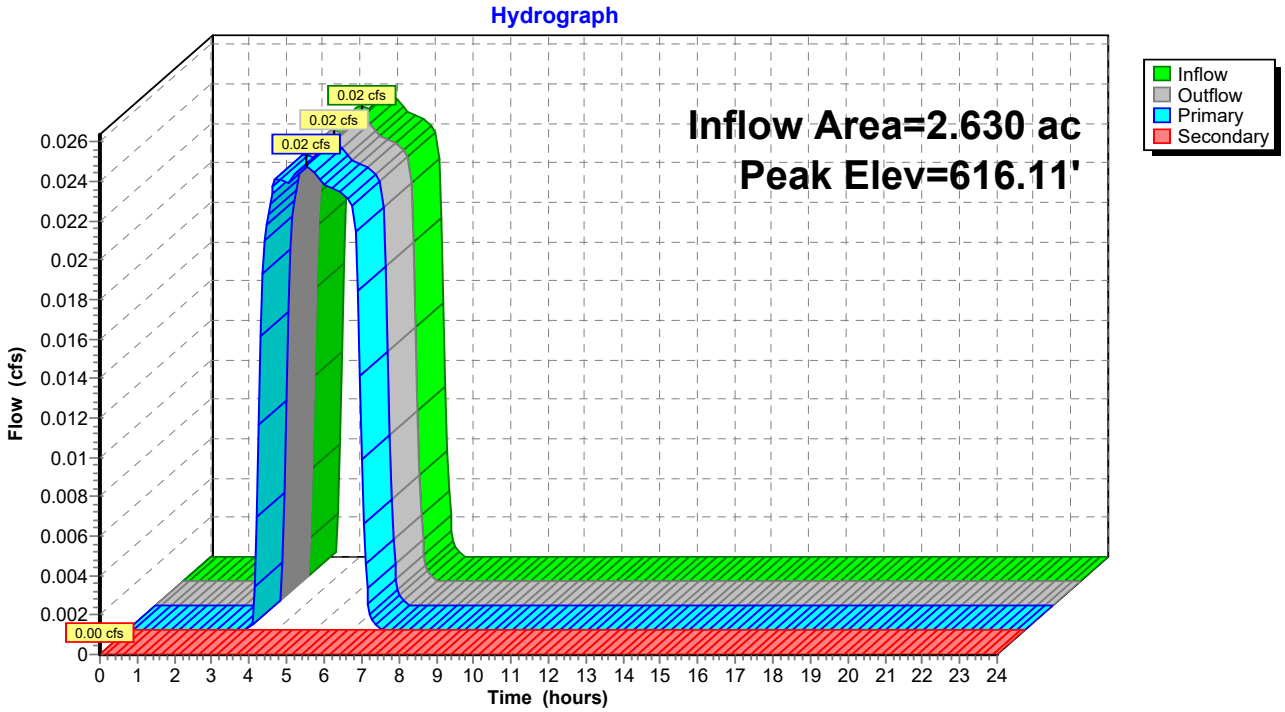
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.11' @ 4.77 hrs
Flood Elev= 617.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.02 cfs @ 4.77 hrs HW=616.11' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.02 cfs @ 1.39 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=616.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond ICS-6: ICS-6



Stage-Area-Storage for Pond ICS-6: ICS-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
616.00	**0**	616.52	0	617.04	0
616.01	0	616.53	0	617.05	0
616.02	0	616.54	0	617.06	0
616.03	0	616.55	0	617.07	0
616.04	0	616.56	0	617.08	0
616.05	0	616.57	0	617.09	0
616.06	0	616.58	0	617.10	0
616.07	0	616.59	0	617.11	0
616.08	0	616.60	0	617.12	0
616.09	0	616.61	0	617.13	0
616.10	0	616.62	0	617.14	0
616.11	0	616.63	0	617.15	0
616.12	0	616.64	0	617.16	0
616.13	0	616.65	0	617.17	0
616.14	0	616.66	0	617.18	0
616.15	0	616.67	0	617.19	0
616.16	0	616.68	0	617.20	0
616.17	0	616.69	0	617.21	0
616.18	0	616.70	0	617.22	0
616.19	0	616.71	0	617.23	0
616.20	0	616.72	0	617.24	0
616.21	0	616.73	0	617.25	0
616.22	0	616.74	0	617.26	0
616.23	0	616.75	0	617.27	0
616.24	0	616.76	0	617.28	0
616.25	0	616.77	0	617.29	0
616.26	0	616.78	0	617.30	0
616.27	0	616.79	0	617.31	0
616.28	0	616.80	0	617.32	0
616.29	0	616.81	0	617.33	0
616.30	0	616.82	0	617.34	0
616.31	0	616.83	0	617.35	0
616.32	0	616.84	0	617.36	0
616.33	0	616.85	0	617.37	0
616.34	0	616.86	0	617.38	0
616.35	0	616.87	0	617.39	0
616.36	0	616.88	0	617.40	0
616.37	0	616.89	0		
616.38	0	616.90	0		
616.39	0	616.91	0		
616.40	0	616.92	0		
616.41	0	616.93	0		
616.42	0	616.94	0		
616.43	0	616.95	0		
616.44	0	616.96	0		
616.45	0	616.97	0		
616.46	0	616.98	0		
616.47	0	616.99	0		
616.48	0	617.00	0		
616.49	0	617.01	0		
616.50	0	617.02	0		
616.51	0	617.03	0		

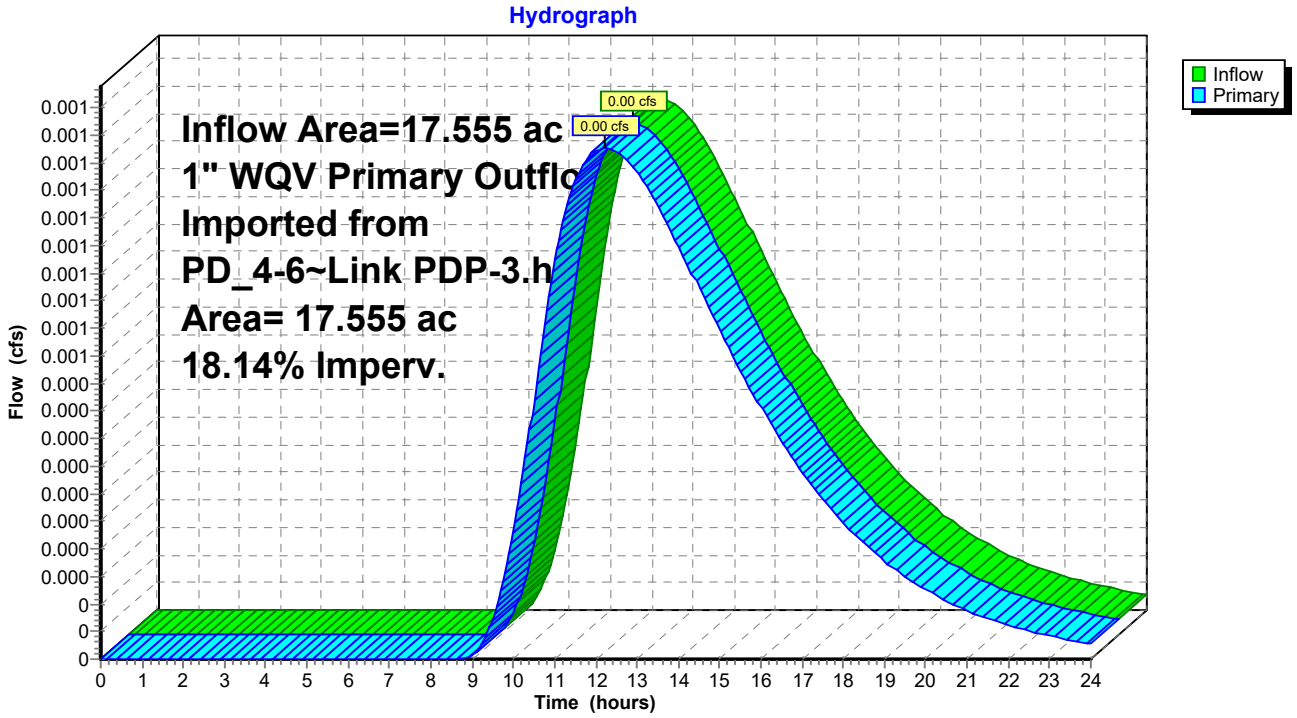
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 12.22 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 12.22 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

1" WQV Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

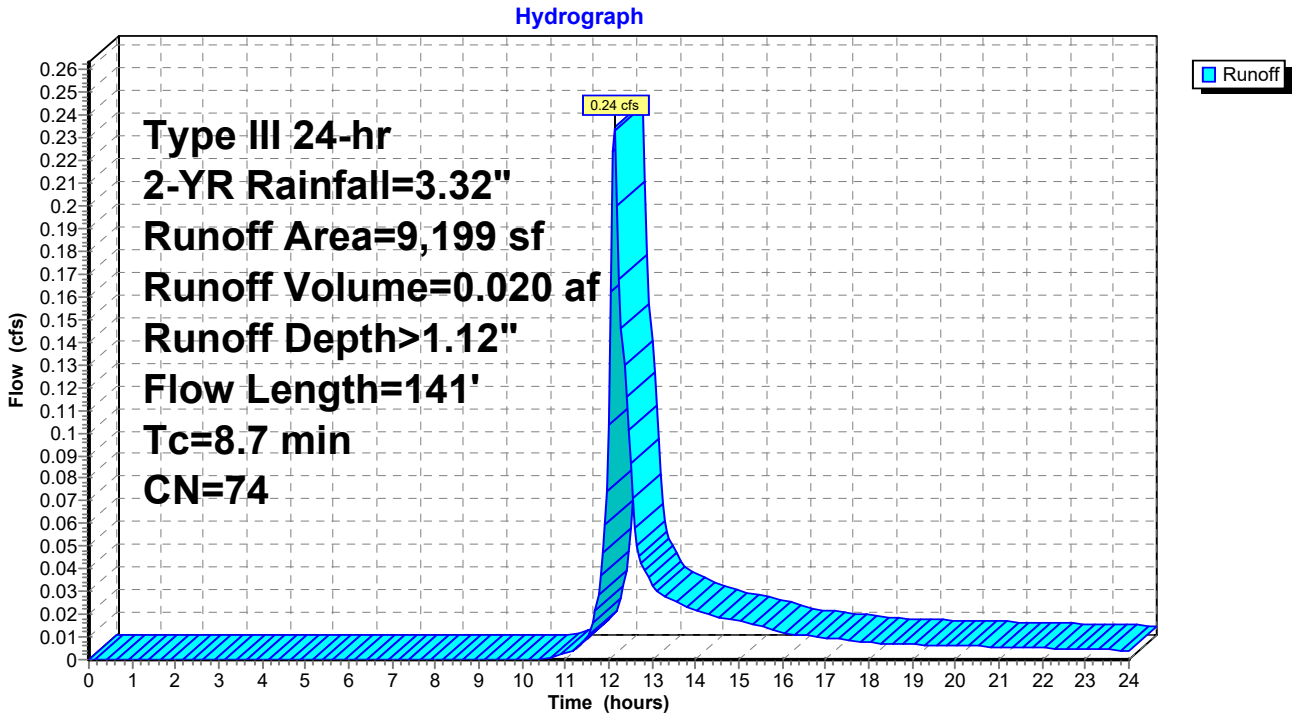
Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.020 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

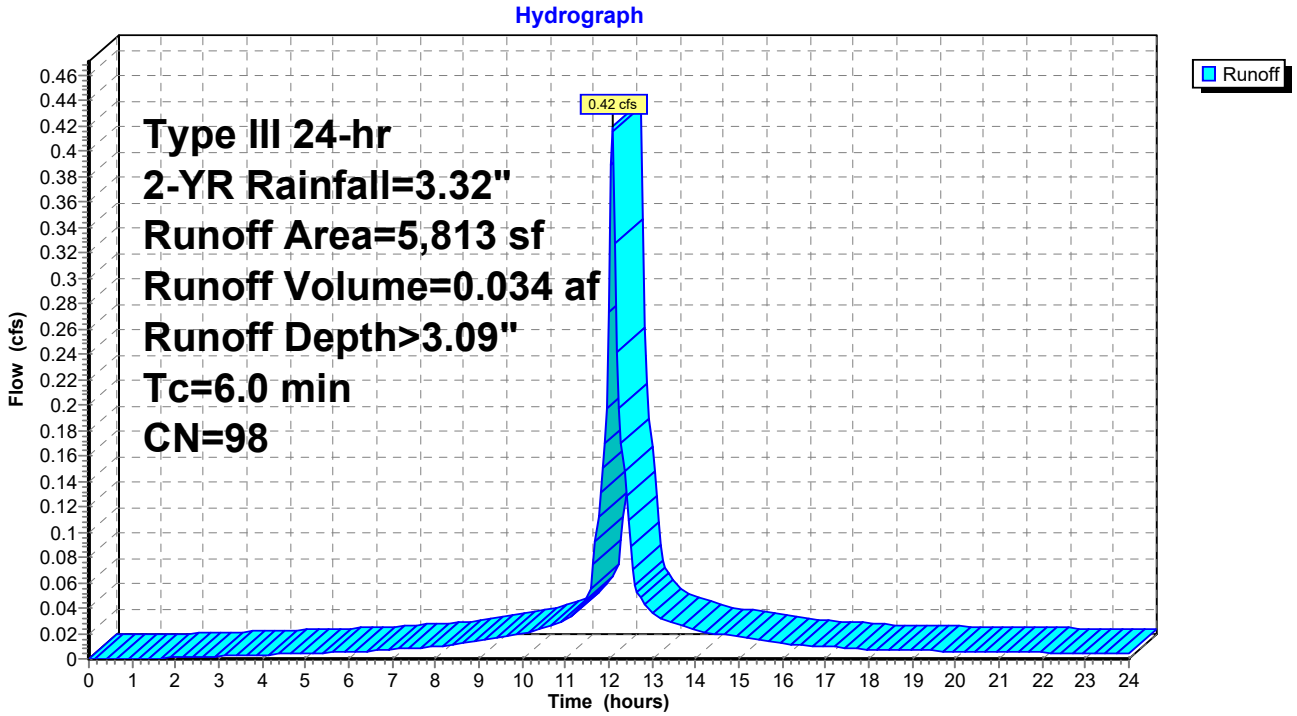
Runoff = 0.42 cfs @ 12.09 hrs, Volume= 0.034 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

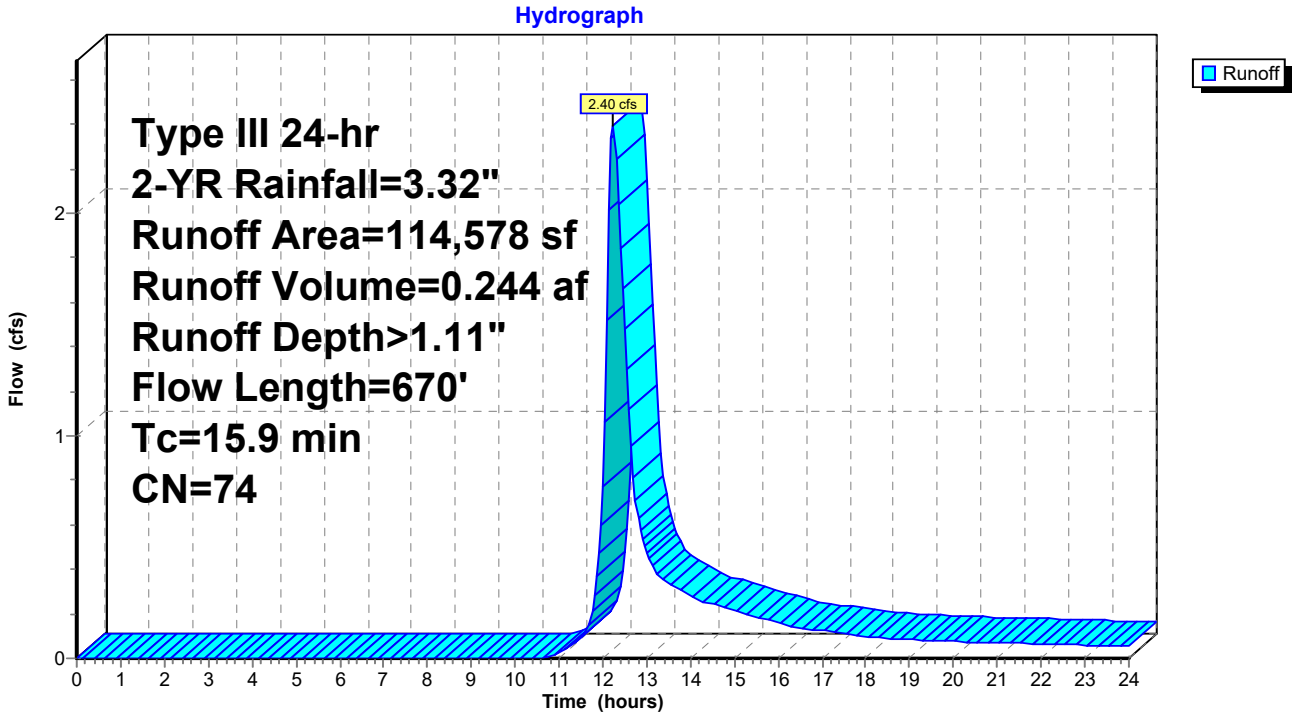
Runoff = 2.40 cfs @ 12.24 hrs, Volume= 0.244 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

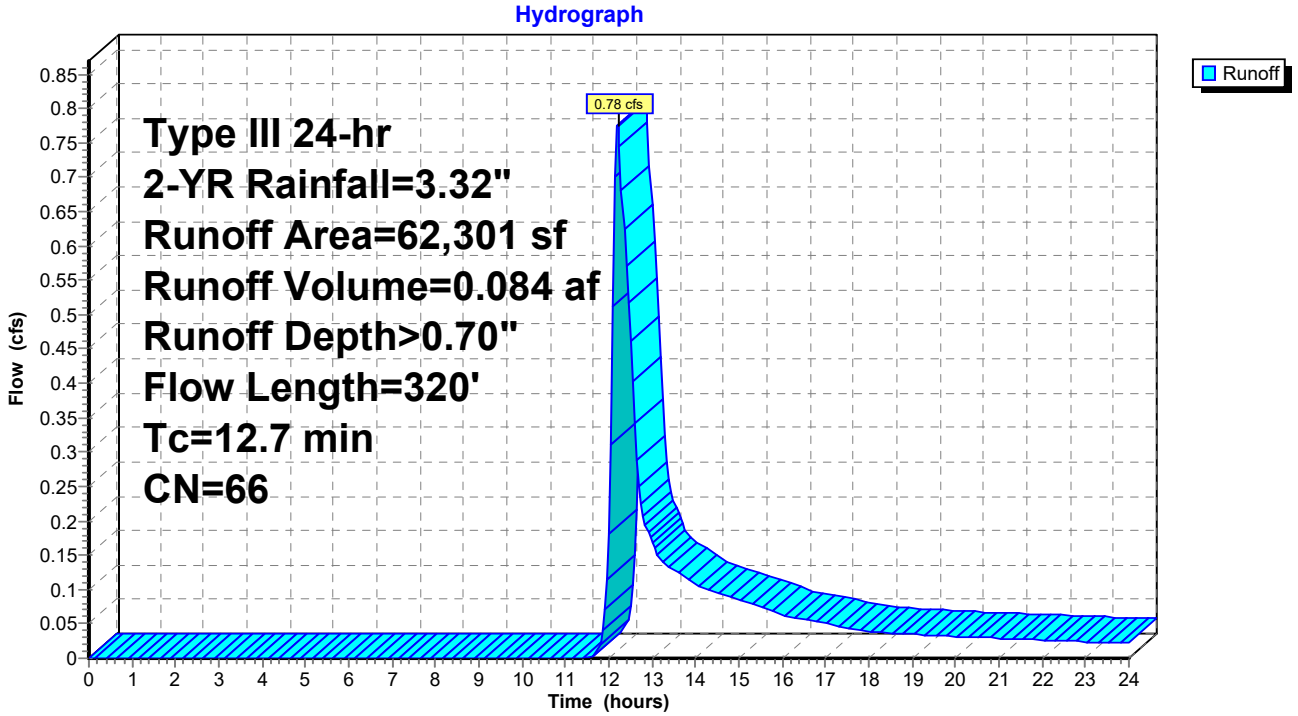
Runoff = 0.78 cfs @ 12.21 hrs, Volume= 0.084 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

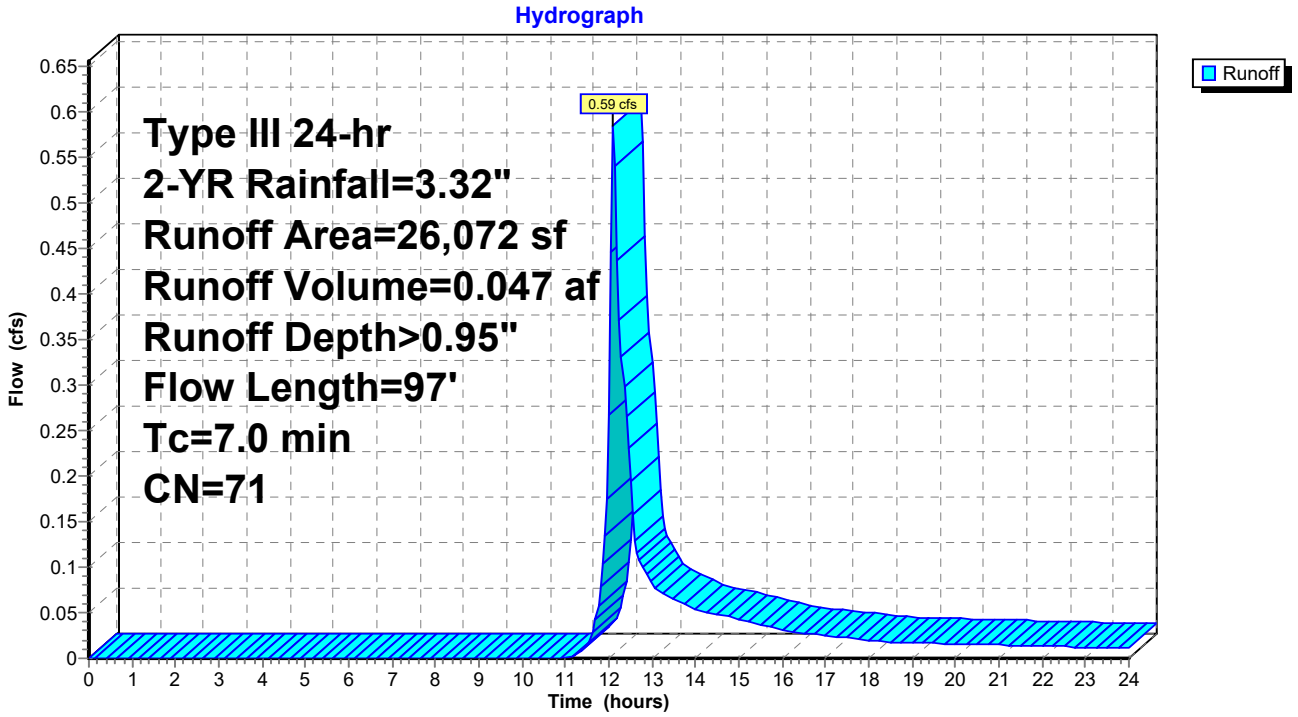
Runoff = 0.59 cfs @ 12.11 hrs, Volume= 0.047 af, Depth> 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

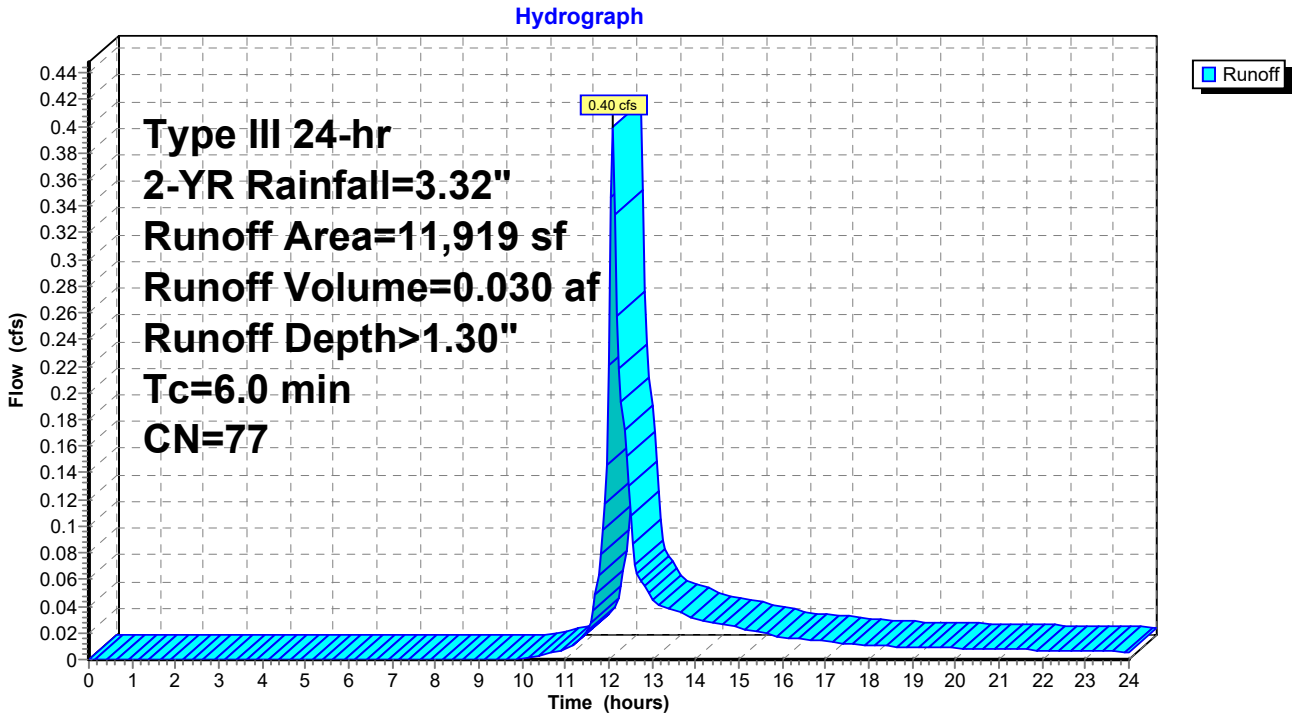
Runoff = 0.40 cfs @ 12.10 hrs, Volume= 0.030 af, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

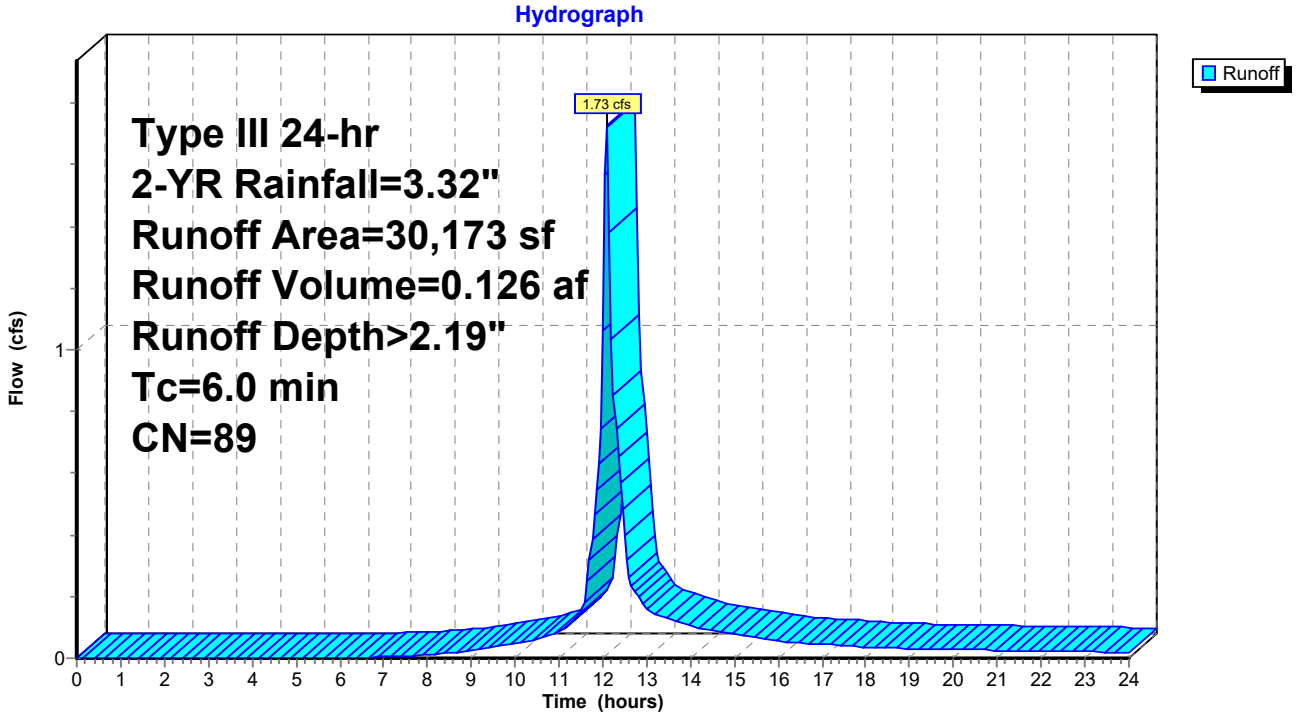
Runoff = 1.73 cfs @ 12.09 hrs, Volume= 0.126 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

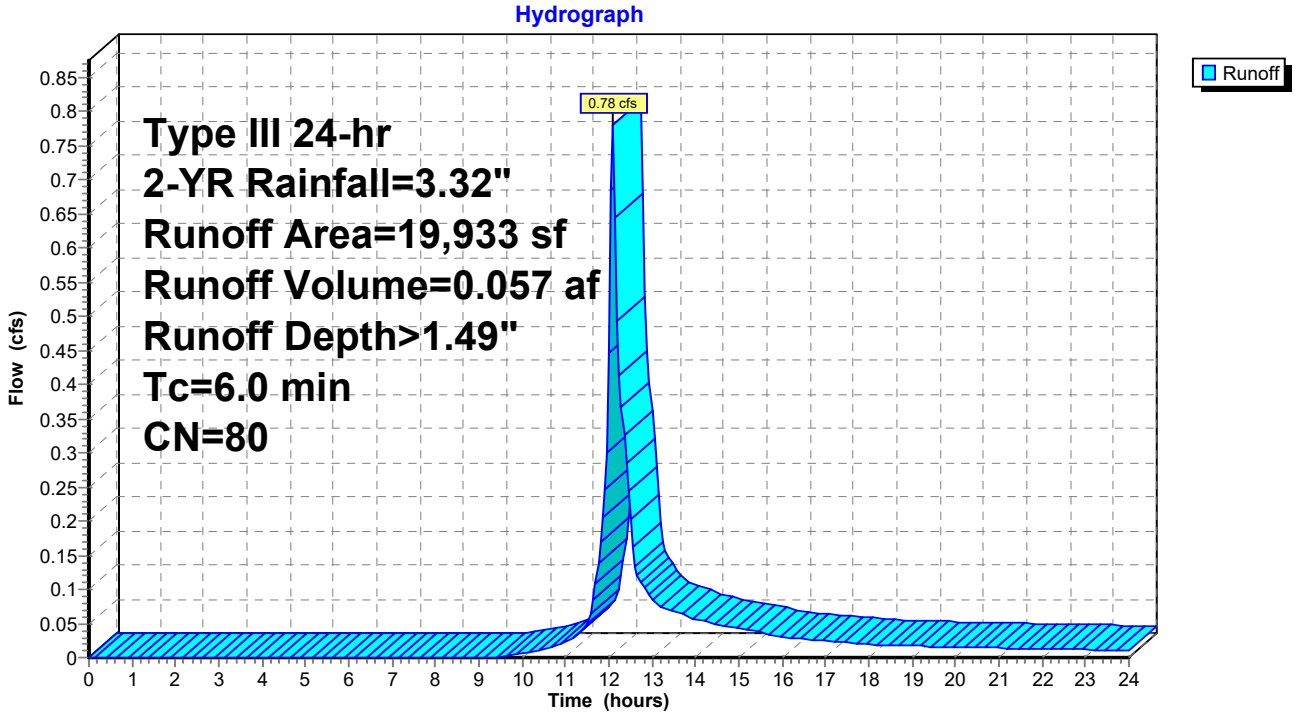
Runoff = 0.78 cfs @ 12.10 hrs, Volume= 0.057 af, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

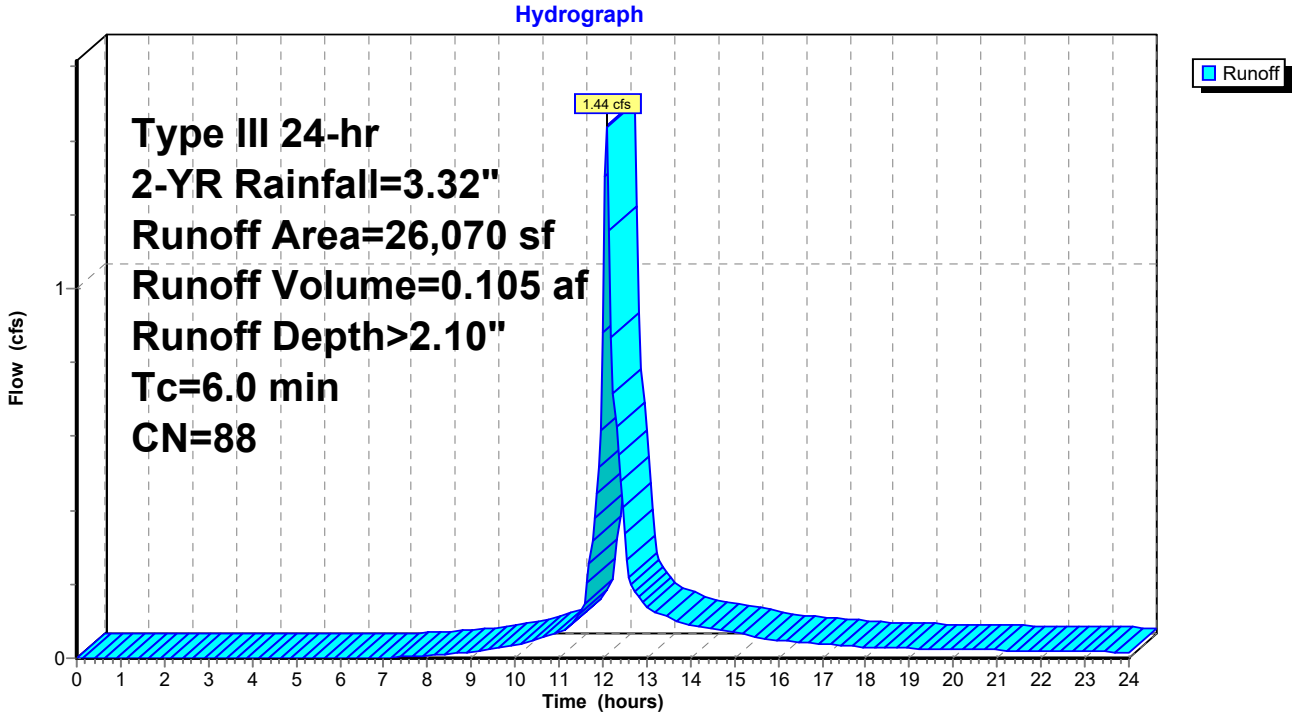
Runoff = 1.44 cfs @ 12.09 hrs, Volume= 0.105 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

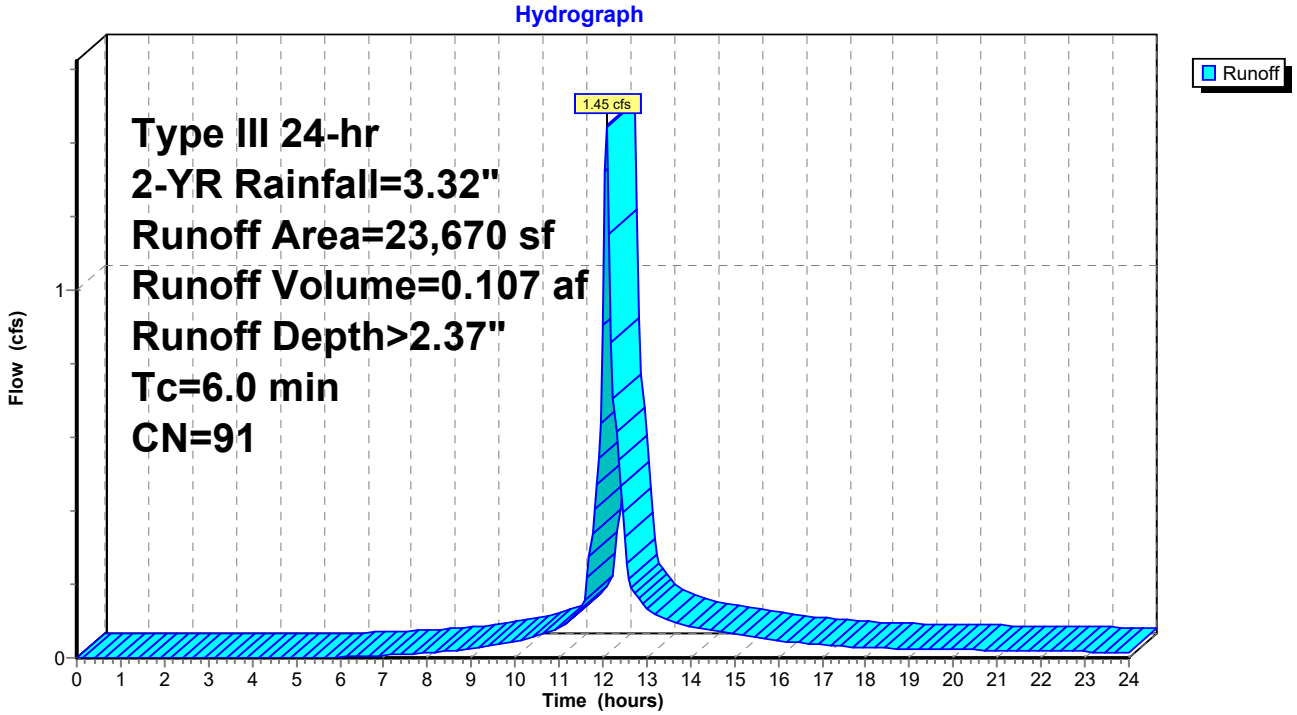
Runoff = 1.45 cfs @ 12.09 hrs, Volume= 0.107 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

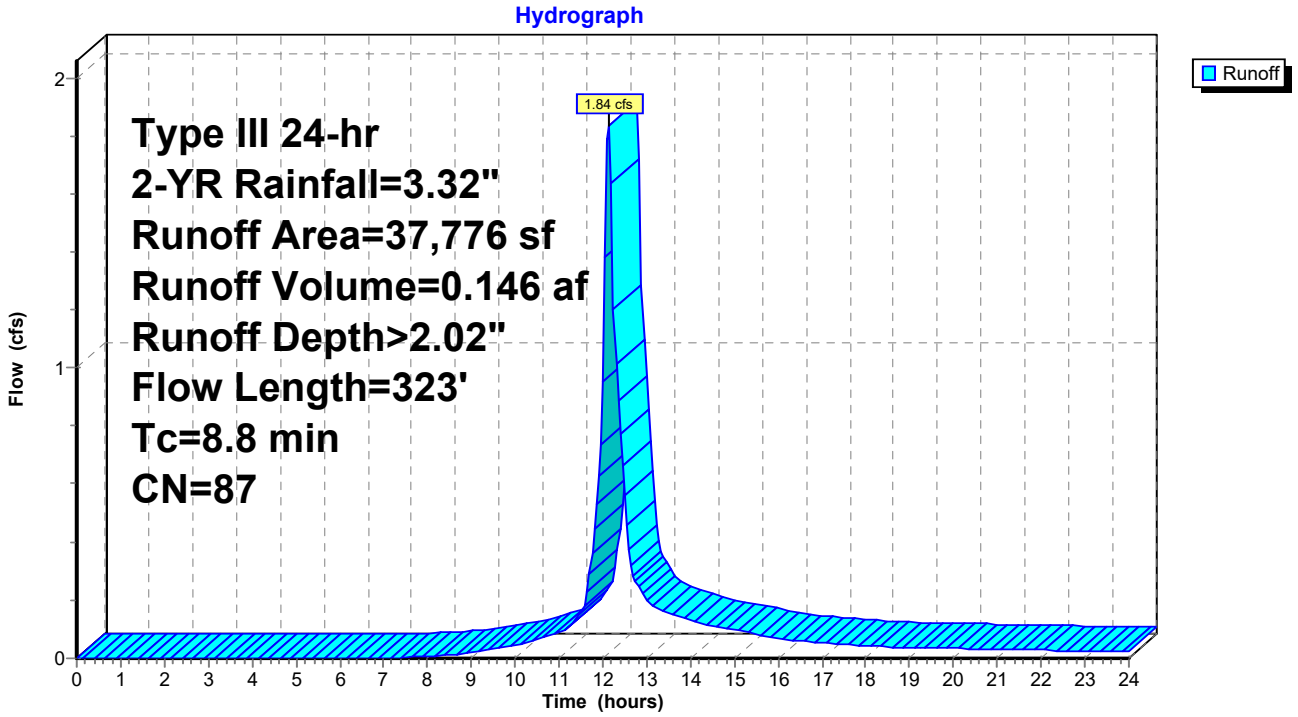
Runoff = 1.84 cfs @ 12.12 hrs, Volume= 0.146 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

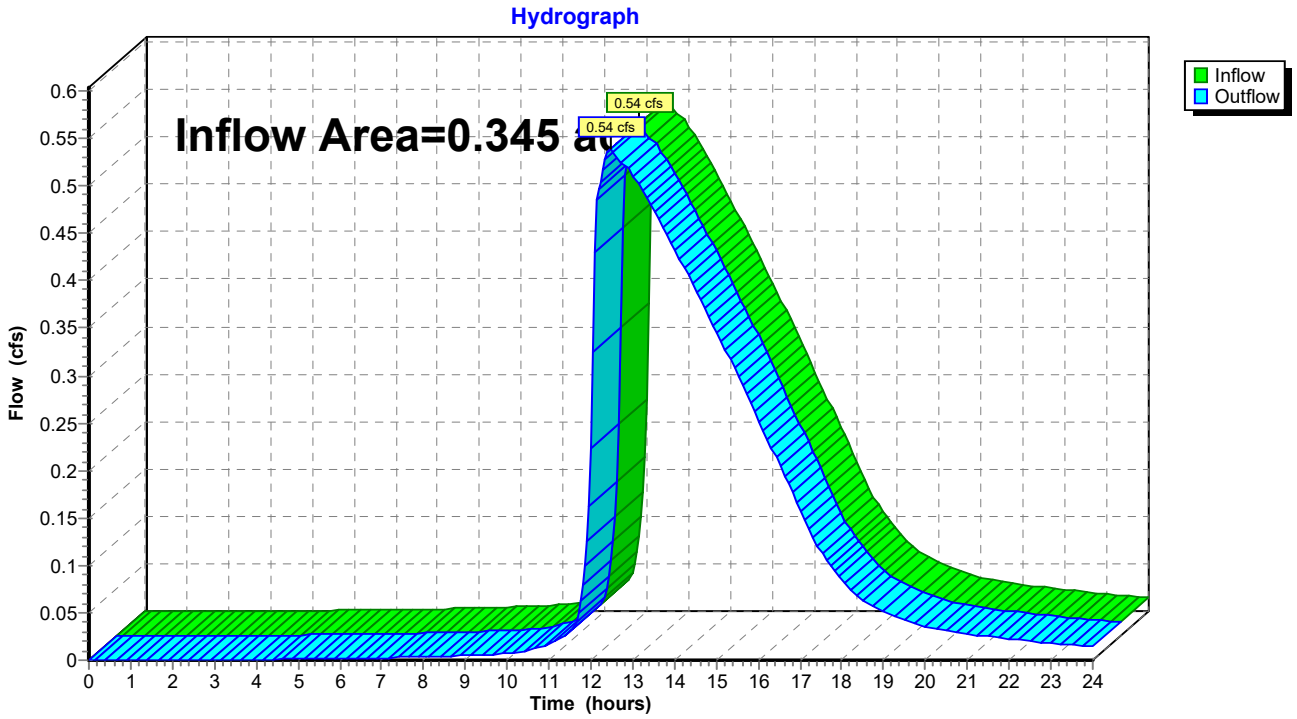


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 6.54" for 2-YR event
Inflow = 0.54 cfs @ 12.47 hrs, Volume= 0.188 af
Outflow = 0.54 cfs @ 12.47 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

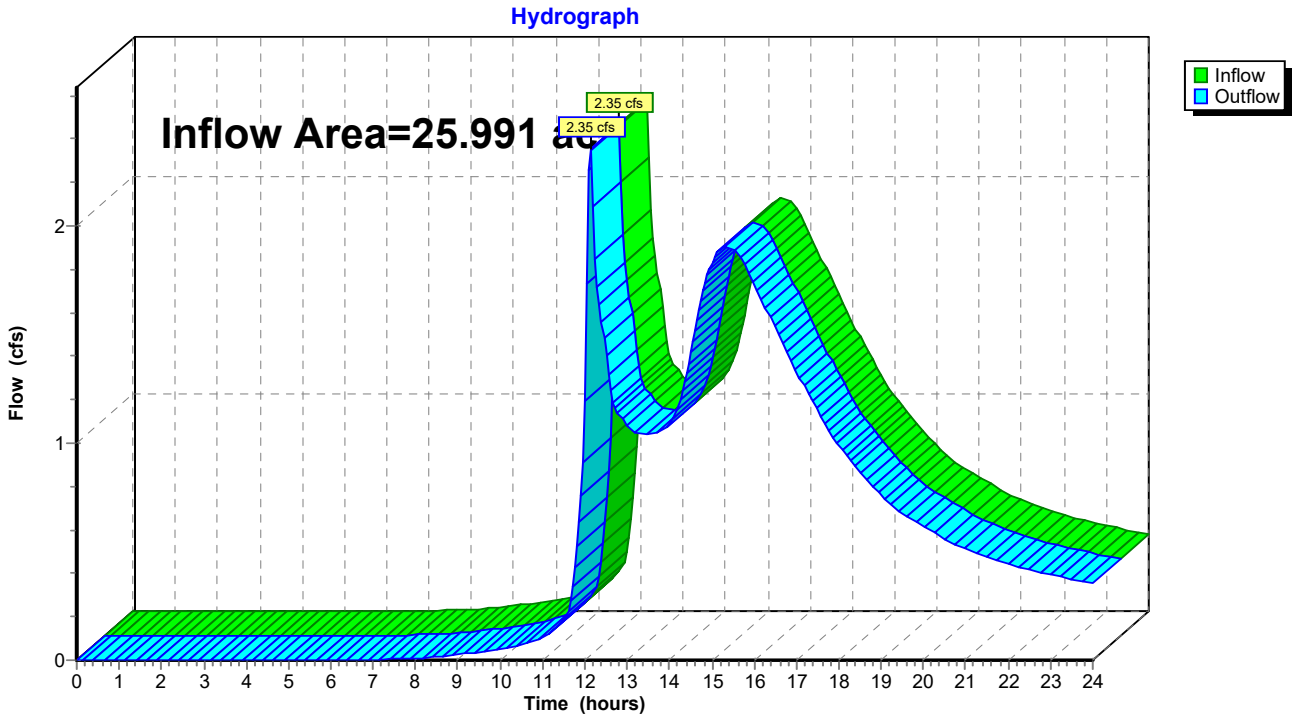


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 0.47" for 2-YR event
Inflow = 2.35 cfs @ 12.14 hrs, Volume= 1.020 af
Outflow = 2.35 cfs @ 12.14 hrs, Volume= 1.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

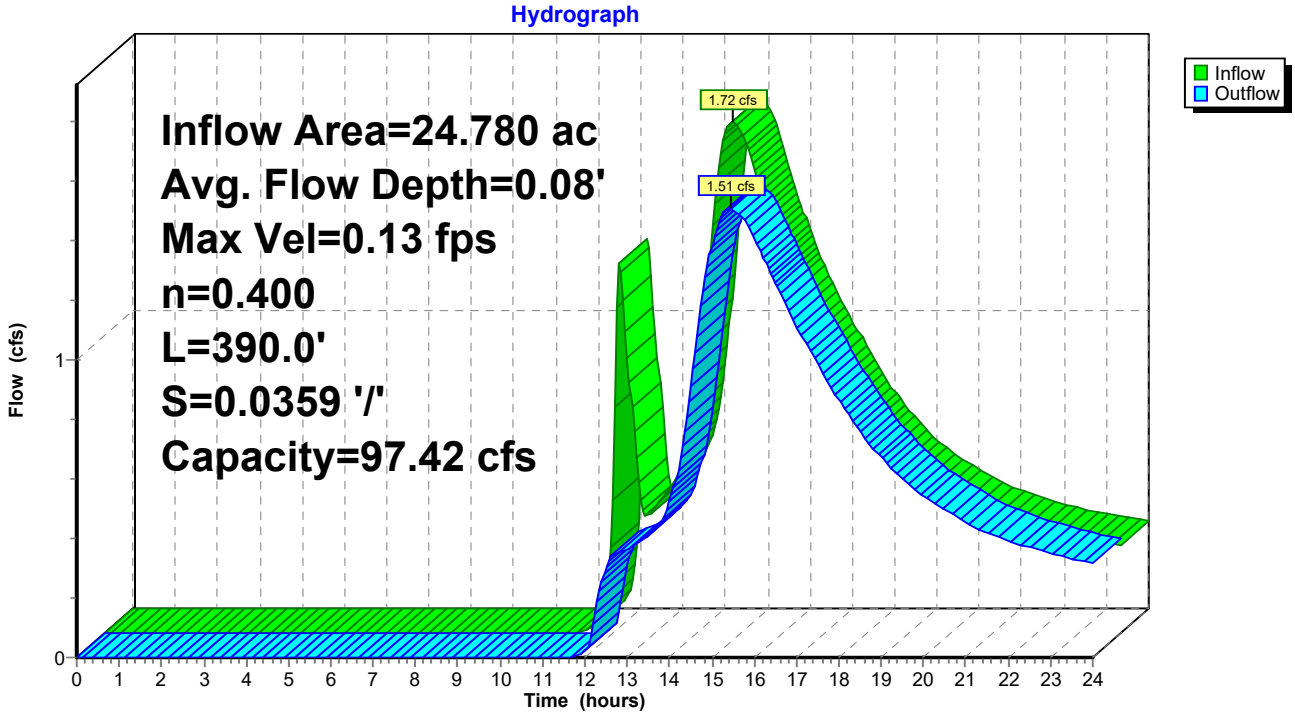
Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 0.35" for 2-YR event
Inflow = 1.72 cfs @ 14.83 hrs, Volume= 0.725 af
Outflow = 1.51 cfs @ 15.45 hrs, Volume= 0.687 af, Atten= 12%, Lag= 36.9 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.13 fps, Min. Travel Time= 48.2 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 71.4 min

Peak Storage= 4,360 cf @ 15.45 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach DP-3: DP-3



Stage-Area-Storage for Reach DP-3: DP-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
618.00	0.0	0
618.01	1.3	508
618.02	2.6	1,017
618.03	3.9	1,528
618.04	5.2	2,041
618.05	6.6	2,555
618.06	7.9	3,071
618.07	9.2	3,589
618.08	10.5	4,108
618.09	11.9	4,629
618.10	13.2	5,152
618.11	14.6	5,676
618.12	15.9	6,202
618.13	17.3	6,729
618.14	18.6	7,259
618.15	20.0	7,789
618.16	21.3	8,322
618.17	22.7	8,856
618.18	24.1	9,391
618.19	25.5	9,929
618.20	26.8	10,468
618.21	28.2	11,008
618.22	29.6	11,550
618.23	31.0	12,094
618.24	32.4	12,640
618.25	33.8	13,187
618.26	35.2	13,736
618.27	36.6	14,286
618.28	38.0	14,838
618.29	39.5	15,392
618.30	40.9	15,947
618.31	42.3	16,504
618.32	43.8	17,063
618.33	45.2	17,623
618.34	46.6	18,185
618.35	48.1	18,748
618.36	49.5	19,313
618.37	51.0	19,880
618.38	52.4	20,449
618.39	53.9	21,019
618.40	55.4	21,590
618.41	56.8	22,164
618.42	58.3	22,739
618.43	59.8	23,315
618.44	61.3	23,894
618.45	62.8	24,473
618.46	64.2	25,055
618.47	65.7	25,638
618.48	67.2	26,223
618.49	68.7	26,809
618.50	70.3	27,398
618.51	71.8	27,987
618.52	73.3	28,579
618.53	74.8	29,172
618.54	76.3	29,766
618.55	77.9	30,362
618.56	79.4	30,960
618.57	80.9	31,560
618.58	82.5	32,161
618.59	84.0	32,764
618.60	85.6	33,368
618.61	87.1	33,974
618.62	88.7	34,582
618.63	90.2	35,192
618.64	91.8	35,803
618.65	93.4	36,415
618.66	94.9	37,030
618.67	96.5	37,645
618.68	98.1	38,263
618.69	99.7	38,882
618.70	101.3	39,503
618.71	102.9	40,126
618.72	104.5	40,750
618.73	106.1	41,375
618.74	107.7	42,003
618.75	109.3	42,632
618.76	110.9	43,263
618.77	112.6	43,895
618.78	114.2	44,529
618.79	115.8	45,164
618.80	117.4	45,802
618.81	119.1	46,440
618.82	120.7	47,081
618.83	122.4	47,723
618.84	124.0	48,367
618.85	125.7	49,012
618.86	127.3	49,659
618.87	129.0	50,308
618.88	130.7	50,958
618.89	132.3	51,610
618.90	134.0	52,264
618.91	135.7	52,919
618.92	137.4	53,576
618.93	139.1	54,235
618.94	140.8	54,895
618.95	142.5	55,556
618.96	144.2	56,220
618.97	145.9	56,885
618.98	147.6	57,552
618.99	149.3	58,220
619.00	**151.0**	**58,890**

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 1.91" for 2-YR event
Inflow = 0.86 cfs @ 12.12 hrs, Volume= 0.154 af
Outflow = 0.17 cfs @ 14.24 hrs, Volume= 0.133 af, Atten= 80%, Lag= 127.6 min
Discarded = 0.10 cfs @ 14.24 hrs, Volume= 0.104 af
Primary = 0.07 cfs @ 14.24 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.53' @ 14.24 hrs Surf.Area= 2,463 sf Storage= 2,904 cf
Flood Elev= 611.00' Surf.Area= 3,452 sf Storage= 7,242 cf

Plug-Flow detention time= 217.2 min calculated for 0.133 af (86% of inflow)
Center-of-Mass det. time= 156.4 min (995.3 - 838.9)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	6,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,597 cf Overall - 1,797 cf Embedded = 6,800 cf
#2	607.00'	165 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 413 cf Overall x 40.0% Voids
#3	607.50'	120 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 600 cf Overall x 20.0% Voids
#4	608.00'	157 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 784 cf Overall x 20.0% Voids
		7,242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
608.00	1,568	1,197	1,197
609.00	2,130	1,849	3,046
610.00	2,760	2,445	5,491
611.00	3,452	3,106	8,597

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
607.50	825	413	413

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.50	1,200	0	0
608.00	1,200	600	600

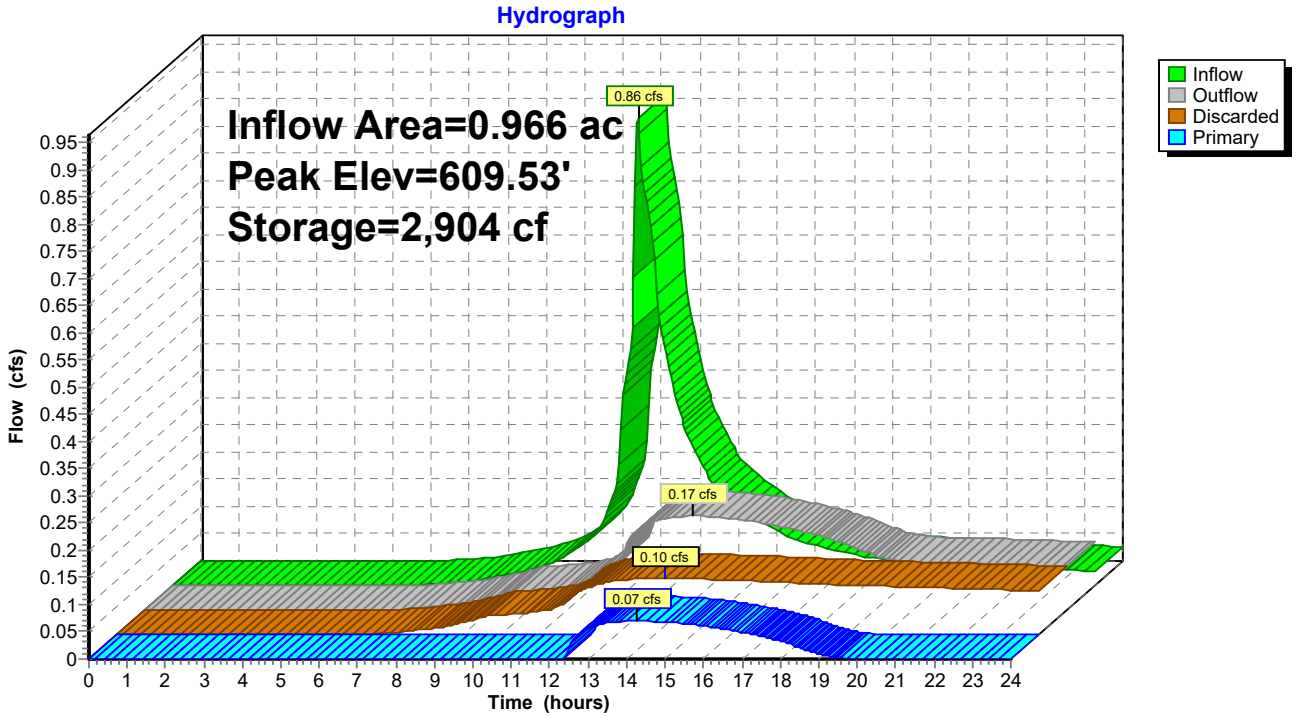
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,568	0	0
608.50	1,568	784	784

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.33' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	610.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.10 cfs @ 14.24 hrs HW=609.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.07 cfs @ 14.24 hrs HW=609.53' (Free Discharge)
└─**2=Culvert** (Passes 0.07 cfs of 1.73 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.21 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1: SFB-1



Stage-Area-Storage for Pond 1: SFB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
607.00	825	0
607.05	862	17
607.10	899	37
607.15	936	58
607.20	974	81
607.25	1,011	106
607.30	1,048	132
607.35	1,085	161
607.40	1,122	191
607.45	1,159	224
607.50	1,197	258
607.55	1,234	271
607.60	1,271	285
607.65	1,308	302
607.70	1,345	320
607.75	1,382	340
607.80	1,419	362
607.85	1,457	386
607.90	1,494	412
607.95	1,531	440
608.00	1,568	469
608.05	1,596	485
608.10	1,624	503
608.15	1,652	522
608.20	1,680	543
608.25	1,709	565
608.30	1,737	588
608.35	1,765	613
608.40	1,793	639
608.45	1,821	667
608.50	1,849	696
608.55	1,877	789
608.60	1,905	884
608.65	1,933	980
608.70	1,961	1,077
608.75	1,990	1,176
608.80	2,018	1,276
608.85	2,046	1,378
608.90	2,074	1,481
608.95	2,102	1,585
609.00	2,130	1,691
609.05	2,161	1,798
609.10	2,193	1,907
609.15	2,224	2,017
609.20	2,256	2,129
609.25	2,288	2,243
609.30	2,319	2,358
609.35	2,351	2,475
609.40	2,382	2,593
609.45	2,414	2,713
609.50	2,445	2,835
609.55	2,476	2,958
609.60	2,508	3,082
609.65	2,539	3,208
609.70	2,571	3,336
609.75	2,603	3,465
609.80	2,634	3,596
609.85	2,666	3,729
609.90	2,697	3,863
609.95	2,729	3,999
610.00	2,760	4,136
610.05	2,795	4,275
610.10	2,829	4,415
610.15	2,864	4,558
610.20	2,898	4,702
610.25	2,933	4,847
610.30	2,968	4,995
610.35	3,002	5,144
610.40	3,037	5,295
610.45	3,071	5,448
610.50	3,106	5,602
610.55	3,141	5,758
610.60	3,175	5,916
610.65	3,210	6,076
610.70	3,244	6,237
610.75	3,279	6,400
610.80	3,314	6,565
610.85	3,348	6,732
610.90	3,383	6,900
610.95	3,417	7,070
611.00	**3,452**	**7,242**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 1.04" for 2-YR event
Inflow = 1.65 cfs @ 12.10 hrs, Volume= 0.368 af
Outflow = 0.35 cfs @ 15.57 hrs, Volume= 0.331 af, Atten= 79%, Lag= 207.8 min
Discarded = 0.34 cfs @ 15.57 hrs, Volume= 0.329 af
Primary = 0.02 cfs @ 15.57 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 615.30' @ 15.57 hrs Surf.Area= 6,095 sf Storage= 5,793 cf
Flood Elev= 617.00' Surf.Area= 9,273 sf Storage= 18,810 cf

Plug-Flow detention time= 195.7 min calculated for 0.330 af (90% of inflow)
Center-of-Mass det. time= 148.3 min (1,041.1 - 892.8)

Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	17,591 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 22,460 cf Overall - 4,870 cf Embedded = 17,591 cf
#2	613.00'	491 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 1,227 cf Overall x 40.0% Voids
#3	613.50'	343 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,714 cf Overall x 20.0% Voids
#4	614.00'	386 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,929 cf Overall x 20.0% Voids
		18,810 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
614.00	3,857	2,982	2,982
615.00	5,537	4,697	7,679
616.00	7,376	6,457	14,136
617.00	9,273	8,325	22,460

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
613.50	2,800	1,227	1,227

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.50	3,000	0	0
614.00	3,857	1,714	1,714

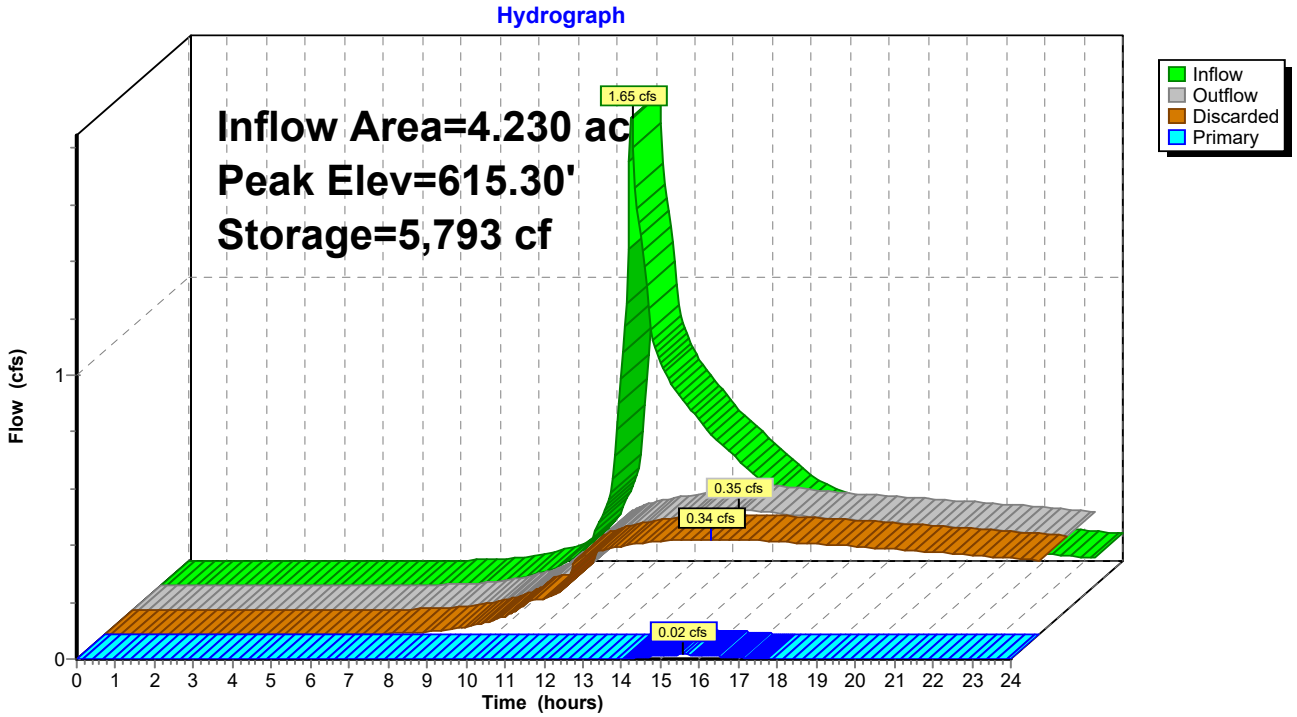
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.00	3,857	0	0
614.50	3,857	1,929	1,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.00'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.25'	**6.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.25' / 612.75' S= 0.0179 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.34 cfs @ 15.57 hrs HW=615.30' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.02 cfs @ 15.57 hrs HW=615.30' (Free Discharge)
└─**2=Culvert** (Passes 0.02 cfs of 1.00 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.09 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2: SFB-2



Stage-Area-Storage for Pond 2: SFB-2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
613.00	2,107	0
613.05	2,194	43
613.10	2,282	89
613.15	2,369	137
613.20	2,457	187
613.25	2,545	239
613.30	2,632	294
613.35	2,720	351
613.40	2,807	411
613.45	2,895	472
613.50	2,982	536
613.55	3,069	566
613.60	3,157	596
613.65	3,244	628
613.70	3,332	660
613.75	3,420	694
613.80	3,507	728
613.85	3,595	763
613.90	3,682	799
613.95	3,770	836
614.00	3,857	875
614.05	3,941	915
614.10	4,025	960
614.15	4,109	1,009
614.20	4,193	1,062
614.25	4,277	1,120
614.30	4,361	1,182
614.35	4,445	1,247
614.40	4,529	1,318
614.45	4,613	1,392
614.50	4,697	1,470
614.55	4,781	1,707
614.60	4,865	1,948
614.65	4,949	2,194
614.70	5,033	2,443
614.75	5,117	2,697
614.80	5,201	2,955
614.85	5,285	3,217
614.90	5,369	3,483
614.95	5,453	3,754
615.00	5,537	4,029
615.05	5,629	4,308
615.10	5,721	4,592
615.15	5,813	4,880
615.20	5,905	5,173
615.25	5,997	5,470
615.30	6,089	5,773
615.35	6,181	6,079
615.40	6,273	6,391
615.45	6,365	6,707
615.50	6,457	7,027
615.55	6,548	7,352
615.60	6,640	7,682
615.65	6,732	8,016
615.70	6,824	8,355
615.75	6,916	8,699
615.80	7,008	9,047
615.85	7,100	9,400
615.90	7,192	9,757
615.95	7,284	10,119
616.00	7,376	10,485
616.05	7,471	10,856
616.10	7,566	11,232
616.15	7,661	11,613
616.20	7,755	11,998
616.25	7,850	12,389
616.30	7,945	12,783
616.35	8,040	13,183
616.40	8,135	13,587
616.45	8,230	13,997
616.50	8,325	14,410
616.55	8,419	14,829
616.60	8,514	15,252
616.65	8,609	15,680
616.70	8,704	16,113
616.75	8,799	16,551
616.80	8,894	16,993
616.85	8,988	17,440
616.90	9,083	17,892
616.95	9,178	18,348
617.00	**9,273**	**18,810**

Summary for Pond DB-1: DB-1

Inflow	=	1.39 cfs @	12.09 hrs,	Volume=	0.034 af
Outflow	=	0.22 cfs @	12.42 hrs,	Volume=	0.032 af, Atten= 84%, Lag= 19.9 min
Primary	=	0.22 cfs @	12.42 hrs,	Volume=	0.032 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 609.69' @ 12.42 hrs Surf.Area= 3,131 sf Storage= 1,163 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 101.4 min calculated for 0.032 af (94% of inflow)
Center-of-Mass det. time= 101.5 min (828.6 - 727.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.22 cfs @ 12.42 hrs HW=609.69' (Free Discharge)
└─**1=Culvert** (Passes 0.22 cfs of 0.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.50 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-1: DB-1 - Chamber Wizard Field A

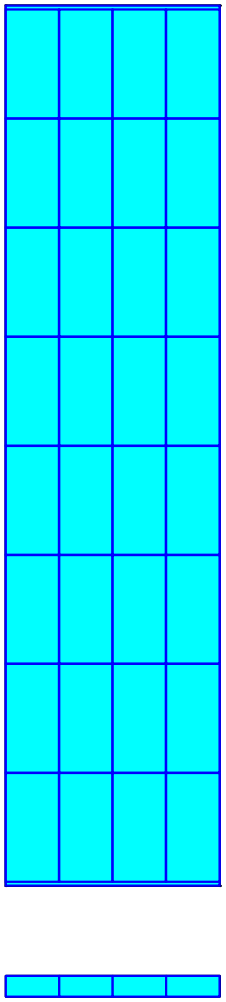
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

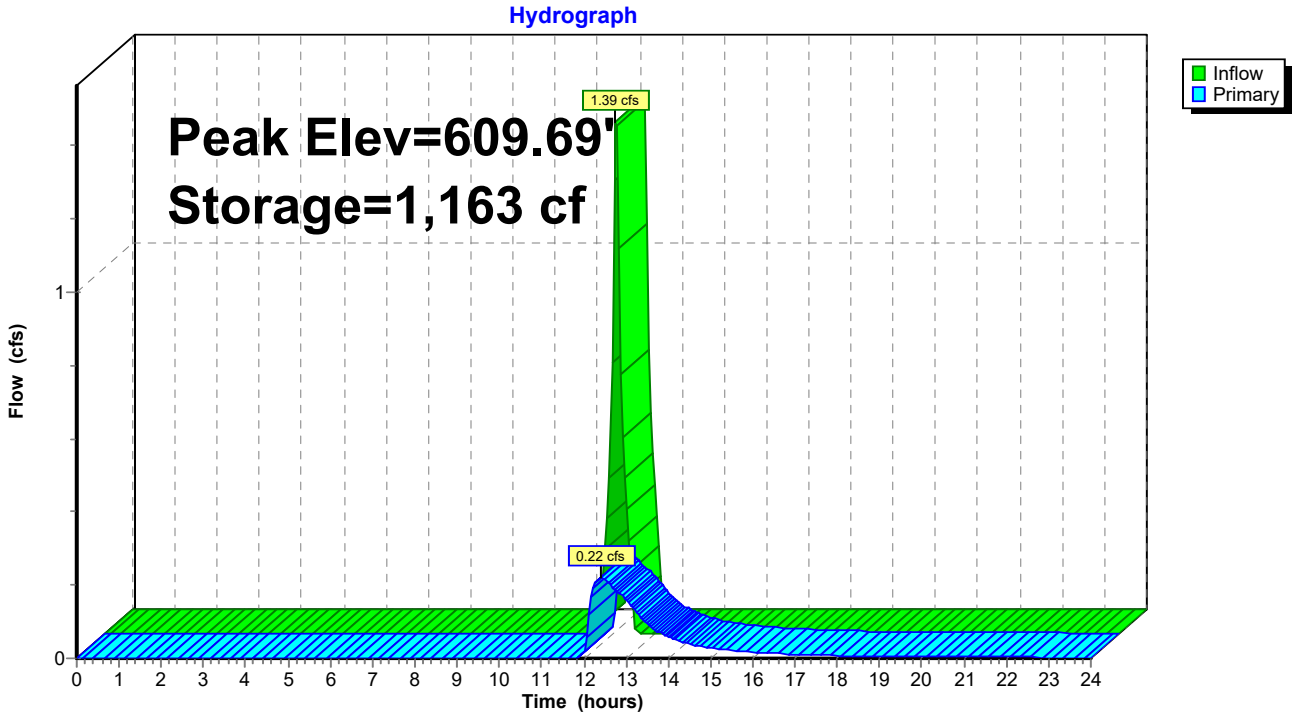
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Peak Elev=609.69'
Storage=1,163 cf
1.39 cfs
0.22 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-1: DB-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	0	610.29	2,771	611.33	5,328
609.27	53	610.31	2,824	611.35	5,328
609.29	107	610.33	2,877	611.37	5,328
609.31	160	610.35	2,930	611.39	5,328
609.33	213	610.37	2,984	611.41	5,328
609.35	266	610.39	3,037	611.43	5,328
609.37	320	610.41	3,090	611.45	5,328
609.39	373	610.43	3,144	611.47	5,328
609.41	426	610.45	3,197	611.49	5,328
609.43	480	610.47	3,250	611.51	5,328
609.45	533	610.49	3,303	611.53	5,328
609.47	586	610.51	3,357	611.55	5,328
609.49	639	610.53	3,410	611.57	5,328
609.51	693	610.55	3,463	611.59	5,328
609.53	746	610.57	3,516	611.61	5,328
609.55	799	610.59	3,570	611.63	5,328
609.57	852	610.61	3,623	611.65	5,328
609.59	906	610.63	3,676	611.67	5,328
609.61	959	610.65	3,730	611.69	5,328
609.63	1,012	610.67	3,783	611.71	5,328
609.65	1,066	610.69	3,836	611.73	5,328
609.67	1,119	610.71	3,889	611.75	5,328
609.69	1,172	610.73	3,943	611.77	5,328
609.71	1,225	610.75	3,996	611.79	5,328
609.73	1,279	610.77	4,049	611.81	5,328
609.75	1,332	610.79	4,103	611.83	5,328
609.77	1,385	610.81	4,156	611.85	5,328
609.79	1,439	610.83	4,209	611.87	5,328
609.81	1,492	610.85	4,262	611.89	5,328
609.83	1,545	610.87	4,316	611.91	**5,328**
609.85	1,598	610.89	4,369		
609.87	1,652	610.91	4,422		
609.89	1,705	610.93	4,476		
609.91	1,758	610.95	4,529		
609.93	1,812	610.97	4,582		
609.95	1,865	610.99	4,635		
609.97	1,918	611.01	4,689		
609.99	1,971	611.03	4,742		
610.01	2,025	611.05	4,795		
610.03	2,078	611.07	4,848		
610.05	2,131	611.09	4,902		
610.07	2,184	611.11	4,955		
610.09	2,238	611.13	5,008		
610.11	2,291	611.15	5,062		
610.13	2,344	611.17	5,115		
610.15	2,398	611.19	5,168		
610.17	2,451	611.21	5,221		
610.19	2,504	611.23	5,275		
610.21	2,557	611.25	5,328		
610.23	2,611	611.27	5,328		
610.25	2,664	611.29	5,328		
610.27	2,717	611.31	5,328		

Summary for Pond DB-2: DB-2

Inflow	=	1.04 cfs @	12.09 hrs,	Volume=	0.023 af
Outflow	=	0.05 cfs @	12.49 hrs,	Volume=	0.020 af, Atten= 95%, Lag= 24.1 min
Primary	=	0.05 cfs @	12.49 hrs,	Volume=	0.020 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 615.59' @ 12.49 hrs Surf.Area= 3,131 sf Storage= 904 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 199.4 min calculated for 0.020 af (89% of inflow)
Center-of-Mass det. time= 197.4 min (924.6 - 727.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**6.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 12.49 hrs HW=615.59' (Free Discharge)
└─**1=Culvert** (Passes 0.05 cfs of 0.22 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 2.44 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

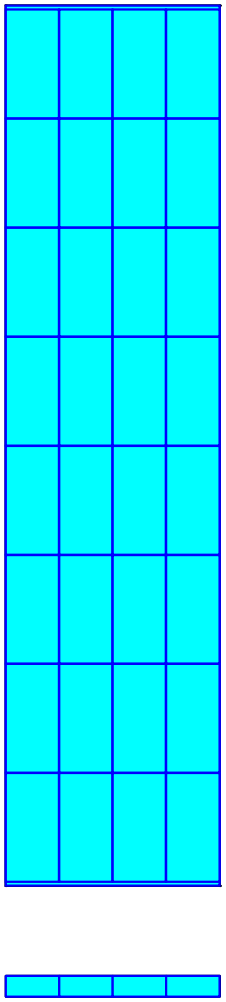
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

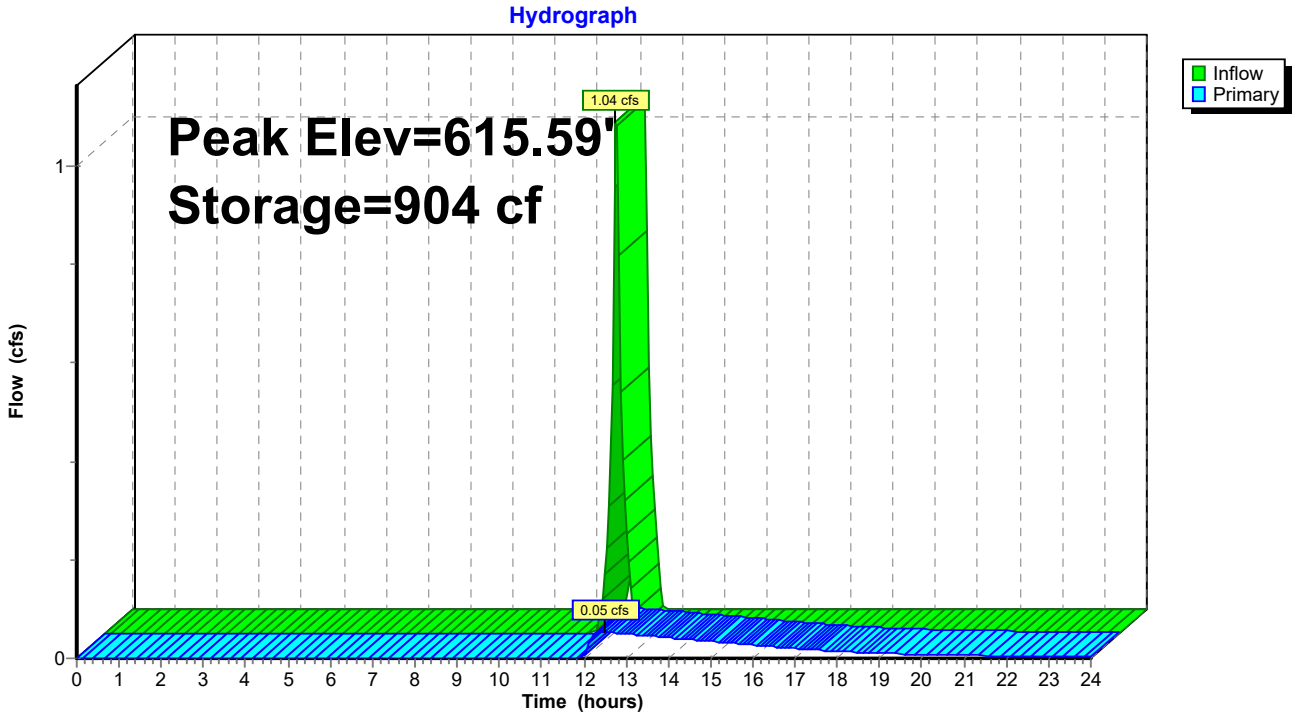
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Inflow
Primary
1.04 cfs
0.05 cfs
Peak Elev=615.59'
Storage=904 cf
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-2: DB-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.25	0	616.29	2,771	617.33	5,328
615.27	53	616.31	2,824	617.35	5,328
615.29	107	616.33	2,877	617.37	5,328
615.31	160	616.35	2,930	617.39	5,328
615.33	213	616.37	2,984	617.41	5,328
615.35	266	616.39	3,037	617.43	5,328
615.37	320	616.41	3,090	617.45	5,328
615.39	373	616.43	3,144	617.47	5,328
615.41	426	616.45	3,197	617.49	5,328
615.43	480	616.47	3,250	617.51	5,328
615.45	533	616.49	3,303	617.53	5,328
615.47	586	616.51	3,357	617.55	5,328
615.49	639	616.53	3,410	617.57	5,328
615.51	693	616.55	3,463	617.59	5,328
615.53	746	616.57	3,516	617.61	5,328
615.55	799	616.59	3,570	617.63	5,328
615.57	852	616.61	3,623	617.65	5,328
615.59	906	616.63	3,676	617.67	5,328
615.61	959	616.65	3,730	617.69	5,328
615.63	1,012	616.67	3,783	617.71	5,328
615.65	1,066	616.69	3,836	617.73	5,328
615.67	1,119	616.71	3,889	617.75	5,328
615.69	1,172	616.73	3,943	617.77	5,328
615.71	1,225	616.75	3,996	617.79	5,328
615.73	1,279	616.77	4,049	617.81	5,328
615.75	1,332	616.79	4,103	617.83	5,328
615.77	1,385	616.81	4,156	617.85	5,328
615.79	1,439	616.83	4,209	617.87	5,328
615.81	1,492	616.85	4,262	617.89	5,328
615.83	1,545	616.87	4,316	617.91	**5,328**
615.85	1,598	616.89	4,369		
615.87	1,652	616.91	4,422		
615.89	1,705	616.93	4,476		
615.91	1,758	616.95	4,529		
615.93	1,812	616.97	4,582		
615.95	1,865	616.99	4,635		
615.97	1,918	617.01	4,689		
615.99	1,971	617.03	4,742		
616.01	2,025	617.05	4,795		
616.03	2,078	617.07	4,848		
616.05	2,131	617.09	4,902		
616.07	2,184	617.11	4,955		
616.09	2,238	617.13	5,008		
616.11	2,291	617.15	5,062		
616.13	2,344	617.17	5,115		
616.15	2,398	617.19	5,168		
616.17	2,451	617.21	5,221		
616.19	2,504	617.23	5,275		
616.21	2,557	617.25	5,328		
616.23	2,611	617.27	5,328		
616.25	2,664	617.29	5,328		
616.27	2,717	617.31	5,328		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 15.46" for 2-YR event
Inflow = 2.39 cfs @ 12.23 hrs, Volume= 0.172 af
Outflow = 0.48 cfs @ 12.82 hrs, Volume= 0.168 af, Atten= 80%, Lag= 35.4 min
Primary = 0.48 cfs @ 12.82 hrs, Volume= 0.168 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 613.74' @ 12.82 hrs Surf.Area= 2,902 sf Storage= 3,825 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 113.8 min calculated for 0.168 af (98% of inflow)
Center-of-Mass det. time= 102.9 min (883.0 - 780.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0**x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.48 cfs @ 12.82 hrs HW=613.74' (Free Discharge)
└─**1=Culvert** (Passes 0.48 cfs of 2.96 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.53 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

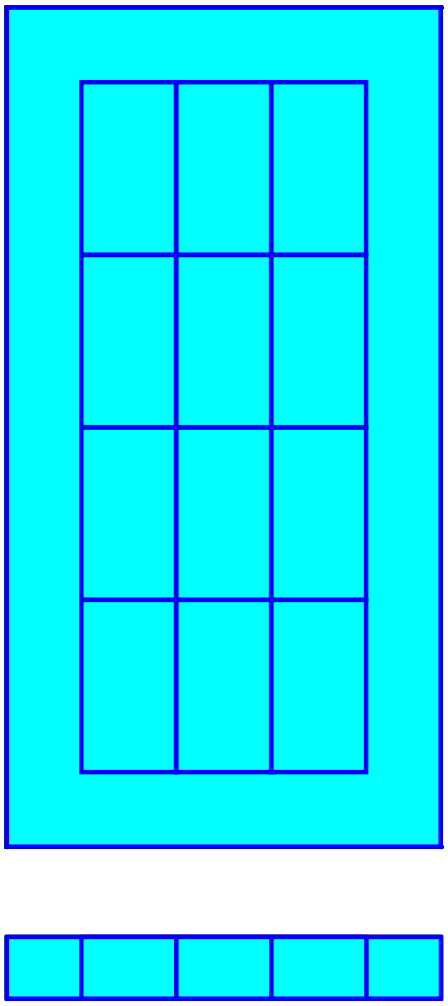
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

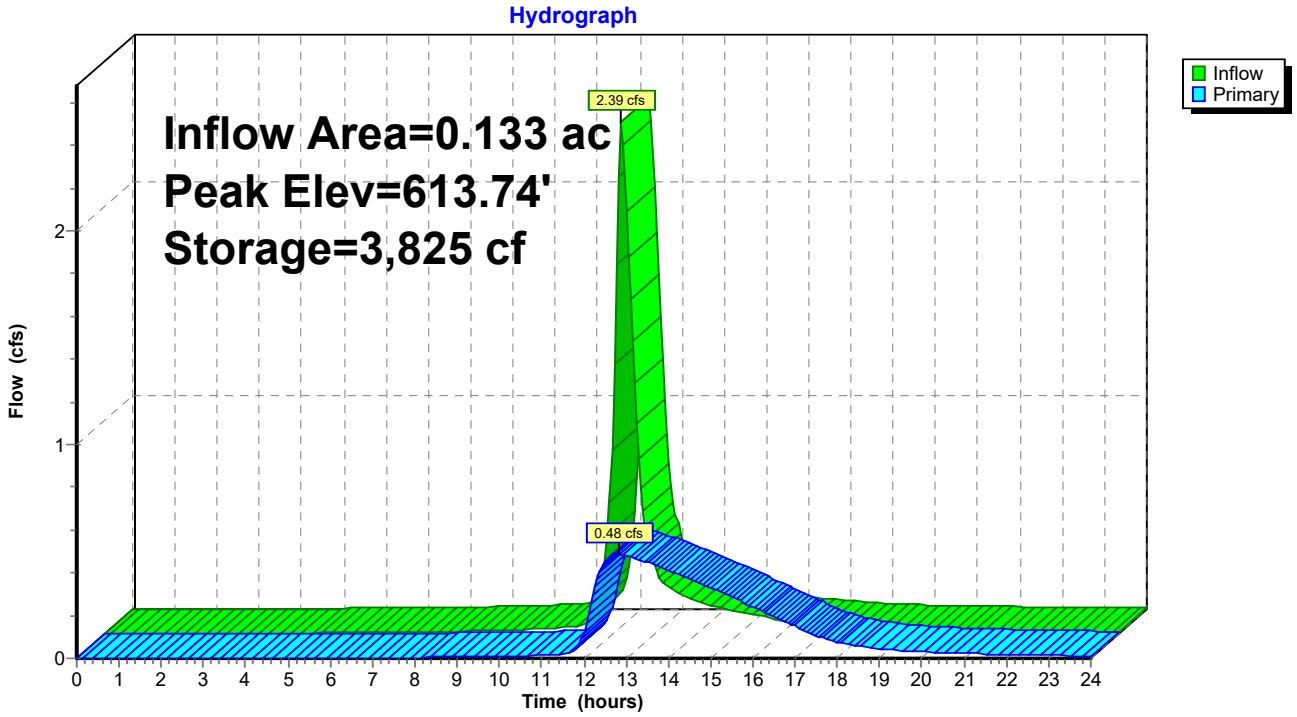
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=613.74'
Storage=3,825 cf
2.39 cfs
0.48 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-6: DB-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
612.25	0	614.33	5,355	616.41	10,710
612.29	103	614.37	5,458	616.45	10,813
612.33	206	614.41	5,561	616.49	10,916
612.37	309	614.45	5,664	616.53	11,019
612.41	412	614.49	5,767	616.57	11,122
612.45	515	614.53	5,870	616.61	11,225
612.49	618	614.57	5,973	616.65	11,328
612.53	721	614.61	6,076	616.69	11,431
612.57	824	614.65	6,179	616.73	11,534
612.61	927	614.69	6,282	616.77	11,637
612.65	1,030	614.73	6,385	616.81	11,740
612.69	1,133	614.77	6,488	616.85	11,843
612.73	1,236	614.81	6,591	616.89	11,946
612.77	1,339	614.85	6,694	616.93	12,049
612.81	1,442	614.89	6,797	616.97	12,152
612.85	1,545	614.93	6,900	617.01	12,255
612.89	1,648	614.97	7,003	617.05	12,358
612.93	1,751	615.01	7,106	617.09	12,461
612.97	1,854	615.05	7,209	617.13	12,564
613.01	1,957	615.09	7,312	617.17	12,667
613.05	2,060	615.13	7,415	617.21	12,770
613.09	2,163	615.17	7,518	617.25	12,873
613.13	2,266	615.21	7,621	617.29	12,873
613.17	2,369	615.25	7,724	617.33	12,873
613.21	2,472	615.29	7,827	617.37	12,873
613.25	2,575	615.33	7,930	617.41	12,873
613.29	2,678	615.37	8,033	617.45	**12,873**
613.33	2,781	615.41	8,136	617.49	12,873
613.37	2,884	615.45	8,239	617.53	12,873
613.41	2,987	615.49	8,342	617.57	12,873
613.45	3,090	615.53	8,445	617.61	12,873
613.49	3,193	615.57	8,548	617.65	12,873
613.53	3,296	615.61	8,651	617.69	12,873
613.57	3,399	615.65	8,754	617.73	12,873
613.61	3,502	615.69	8,857		
613.65	3,604	615.73	8,960		
613.69	3,707	615.77	9,063		
613.73	3,810	615.81	9,166		
613.77	3,913	615.85	9,269		
613.81	4,016	615.89	9,372		
613.85	4,119	615.93	9,475		
613.89	4,222	615.97	9,578		
613.93	4,325	616.01	9,681		
613.97	4,428	616.05	9,784		
614.01	4,531	616.09	9,887		
614.05	4,634	616.13	9,990		
614.09	4,737	616.17	10,093		
614.13	4,840	616.21	10,196		
614.17	4,943	616.25	10,299		
614.21	5,046	616.29	10,402		
614.25	5,149	616.33	10,505		
614.29	5,252	616.37	10,608		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 2.37" for 2-YR event
Inflow = 1.45 cfs @ 12.09 hrs, Volume= 0.107 af
Outflow = 0.31 cfs @ 12.51 hrs, Volume= 0.102 af, Atten= 79%, Lag= 25.4 min
Primary = 0.31 cfs @ 12.51 hrs, Volume= 0.102 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.51' @ 12.51 hrs Surf.Area= 3,131 sf Storage= 1,895 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 106.4 min calculated for 0.102 af (95% of inflow)
Center-of-Mass det. time= 79.2 min (879.9 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.31 cfs @ 12.51 hrs HW=616.51' (Free Discharge)
└─**1=Culvert** (Passes 0.31 cfs of 0.51 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.55 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-7: DB-7 - Chamber Wizard Field A

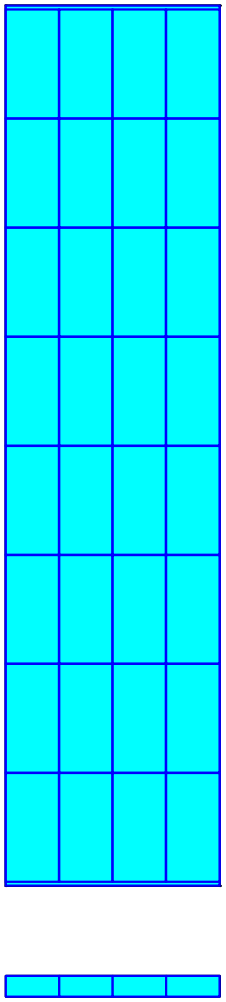
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

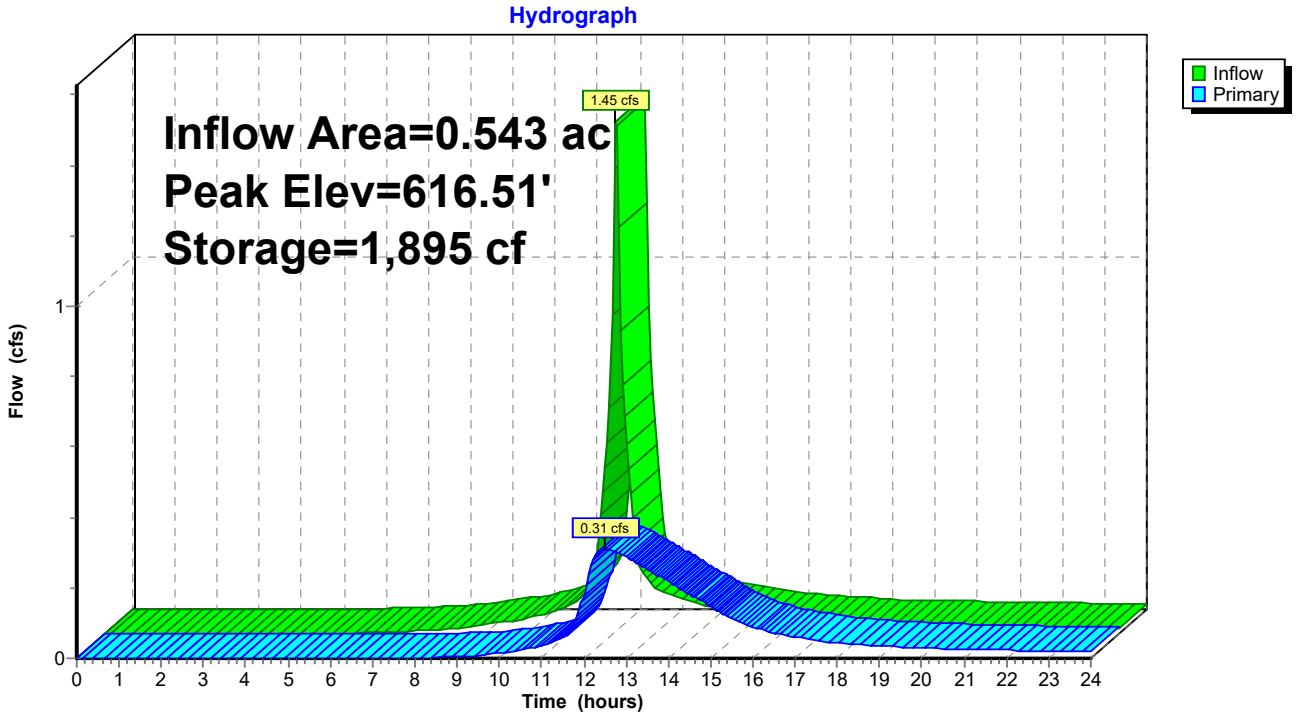
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=616.51'
Storage=1,895 cf
1.45 cfs
0.31 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-7: DB-7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.80	0	616.84	2,771	617.88	5,328
615.82	53	616.86	2,824	617.90	5,328
615.84	107	616.88	2,877	617.92	5,328
615.86	160	616.90	2,930	617.94	5,328
615.88	213	616.92	2,984	617.96	5,328
615.90	266	616.94	3,037	617.98	5,328
615.92	320	616.96	3,090	618.00	5,328
615.94	373	616.98	3,144	618.02	5,328
615.96	426	617.00	3,197	618.04	5,328
615.98	480	617.02	3,250	618.06	5,328
616.00	533	617.04	3,303	618.08	5,328
616.02	586	617.06	3,357	618.10	5,328
616.04	639	617.08	3,410	618.12	5,328
616.06	693	617.10	3,463	618.14	5,328
616.08	746	617.12	3,516	618.16	5,328
616.10	799	617.14	3,570	618.18	5,328
616.12	852	617.16	3,623	618.20	5,328
616.14	906	617.18	3,676	618.22	5,328
616.16	959	617.20	3,730	618.24	5,328
616.18	1,012	617.22	3,783	618.26	5,328
616.20	1,066	617.24	3,836	618.28	5,328
616.22	1,119	617.26	3,889	618.30	5,328
616.24	1,172	617.28	3,943	618.32	5,328
616.26	1,225	617.30	3,996	618.34	5,328
616.28	1,279	617.32	4,049	618.36	5,328
616.30	1,332	617.34	4,103	618.38	5,328
616.32	1,385	617.36	4,156	618.40	5,328
616.34	1,439	617.38	4,209	618.42	5,328
616.36	1,492	617.40	4,262	618.44	5,328
616.38	1,545	617.42	4,316	618.46	**5,328**
616.40	1,598	617.44	4,369		
616.42	1,652	617.46	4,422		
616.44	1,705	617.48	4,476		
616.46	1,758	617.50	4,529		
616.48	1,812	617.52	4,582		
616.50	1,865	617.54	4,635		
616.52	1,918	617.56	4,689		
616.54	1,971	617.58	4,742		
616.56	2,025	617.60	4,795		
616.58	2,078	617.62	4,848		
616.60	2,131	617.64	4,902		
616.62	2,184	617.66	4,955		
616.64	2,238	617.68	5,008		
616.66	2,291	617.70	5,062		
616.68	2,344	617.72	5,115		
616.70	2,398	617.74	5,168		
616.72	2,451	617.76	5,221		
616.74	2,504	617.78	5,275		
616.76	2,557	617.80	5,328		
616.78	2,611	617.82	5,328		
616.80	2,664	617.84	5,328		
616.82	2,717	617.86	5,328		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac, 62.75% Impervious, Inflow Depth > 2.19" for 2-YR event				
Inflow =	1.73 cfs @	12.09 hrs,	Volume=	0.126 af	
Outflow =	1.73 cfs @	12.09 hrs,	Volume=	0.126 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.33 cfs @	12.09 hrs,	Volume=	0.093 af	
Secondary =	1.39 cfs @	12.09 hrs,	Volume=	0.034 af	

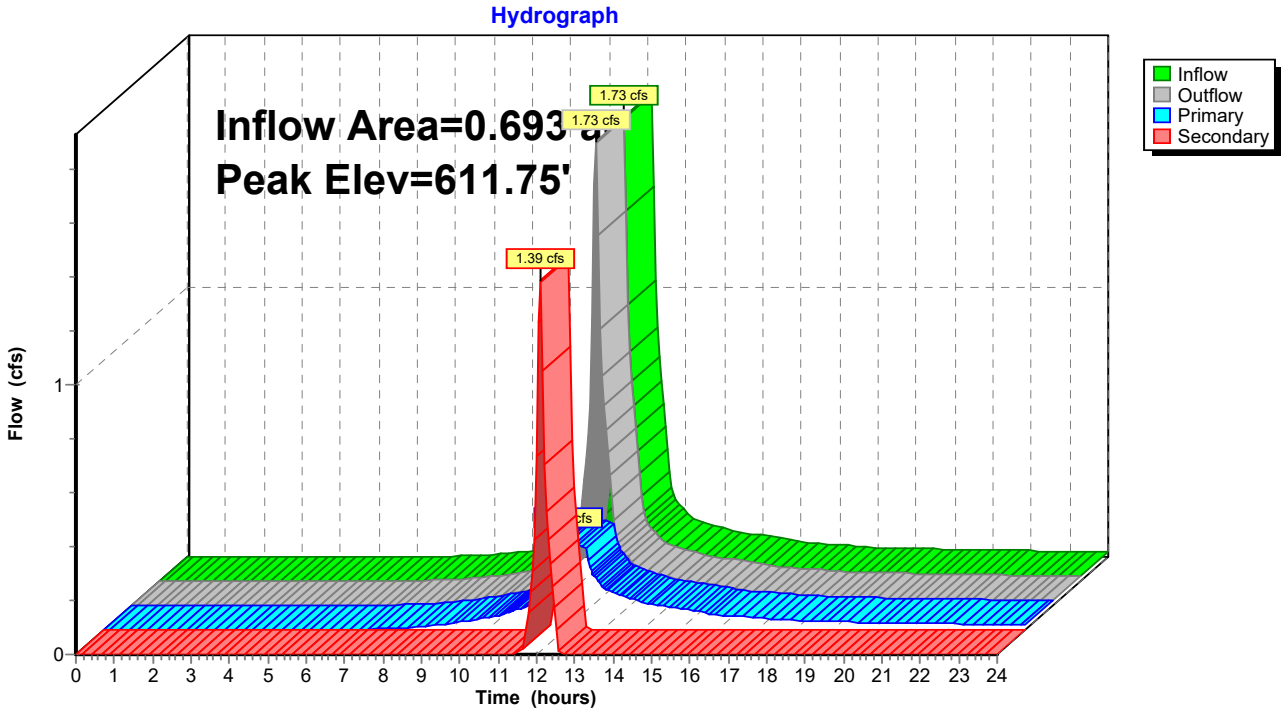
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 611.75' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.09 hrs HW=611.74' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.33 cfs @ 3.82 fps)

Secondary OutFlow Max=1.36 cfs @ 12.09 hrs HW=611.74' (Free Discharge)
└─**2=Culvert** (Inlet Controls 1.36 cfs @ 3.13 fps)

Pond ICS-1: ICS-1



Stage-Area-Storage for Pond ICS-1: ICS-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	**0**	611.85	0
609.30	0	611.90	0
609.35	0	611.95	0
609.40	0	612.00	0
609.45	0	612.05	0
609.50	0	612.10	0
609.55	0	612.15	0
609.60	0	612.20	0
609.65	0	612.25	0
609.70	0	612.30	0
609.75	0	612.35	0
609.80	0	612.40	0
609.85	0	612.45	0
609.90	0	612.50	0
609.95	0	612.55	0
610.00	0	612.60	0
610.05	0	612.65	0
610.10	0	612.70	0
610.15	0	612.75	0
610.20	0	612.80	0
610.25	0	612.85	0
610.30	0	612.90	0
610.35	0	612.95	0
610.40	0	613.00	0
610.45	0	613.05	0
610.50	0	613.10	0
610.55	0	613.15	0
610.60	0	613.20	0
610.65	0	613.25	0
610.70	0		
610.75	0		
610.80	0		
610.85	0		
610.90	0		
610.95	0		
611.00	0		
611.05	0		
611.10	0		
611.15	0		
611.20	0		
611.25	0		
611.30	0		
611.35	0		
611.40	0		
611.45	0		
611.50	0		
611.55	0		
611.60	0		
611.65	0		
611.70	0		
611.75	0		
611.80	0		

Summary for Pond ICS-2: ICS-2

Inflow Area = 0.598 ac, 70.86% Impervious, Inflow Depth > 2.10" for 2-YR event
Inflow = 1.44 cfs @ 12.09 hrs, Volume= 0.105 af
Outflow = 1.44 cfs @ 12.09 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.09 hrs, Volume= 0.082 af
Secondary = 1.04 cfs @ 12.09 hrs, Volume= 0.023 af

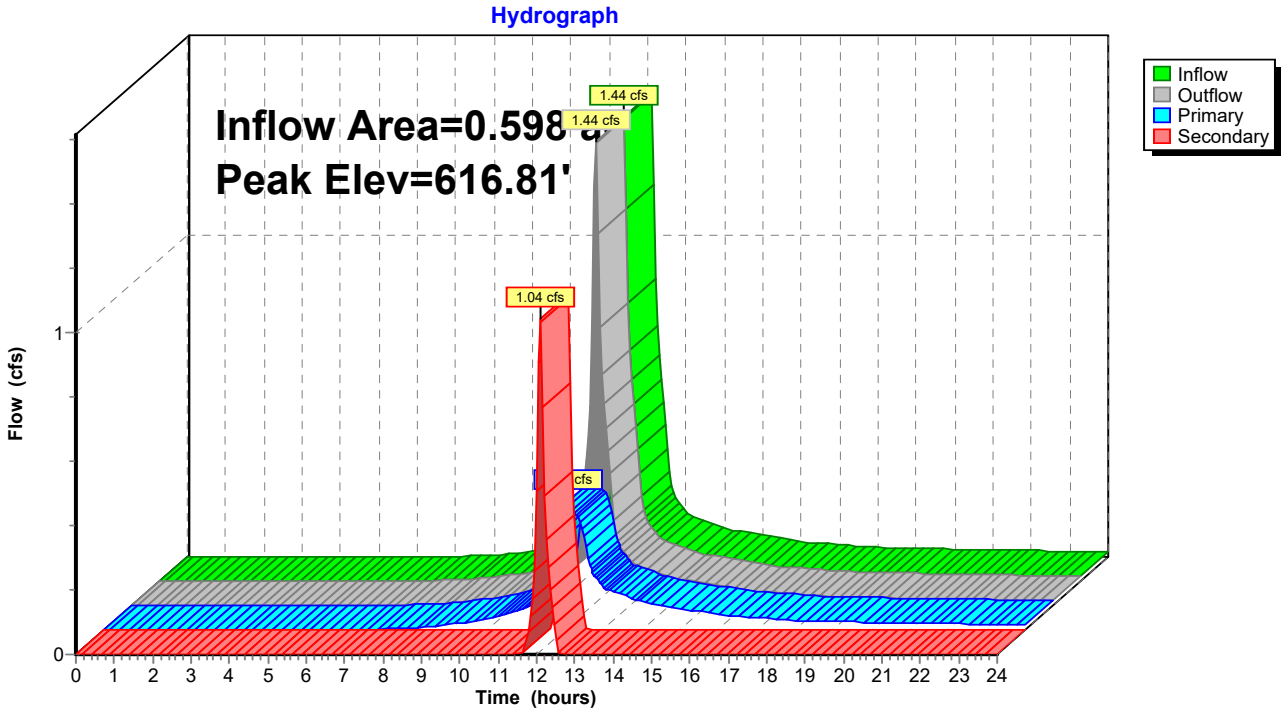
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.81' @ 12.09 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.09 hrs HW=616.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.40 cfs @ 4.58 fps)

Secondary OutFlow Max=1.01 cfs @ 12.09 hrs HW=616.80' (Free Discharge)
└**2=Culvert** (Barrel Controls 1.01 cfs @ 2.99 fps)

Pond ICS-2: ICS-2



Stage-Area-Storage for Pond ICS-2: ICS-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.85	**0**	616.37	0	616.89	0
615.86	0	616.38	0	616.90	0
615.87	0	616.39	0	616.91	0
615.88	0	616.40	0	616.92	0
615.89	0	616.41	0	616.93	0
615.90	0	616.42	0	616.94	0
615.91	0	616.43	0	616.95	0
615.92	0	616.44	0	616.96	0
615.93	0	616.45	0	616.97	0
615.94	0	616.46	0	616.98	0
615.95	0	616.47	0	616.99	0
615.96	0	616.48	0	617.00	0
615.97	0	616.49	0	617.01	0
615.98	0	616.50	0	617.02	0
615.99	0	616.51	0	617.03	0
616.00	0	616.52	0	617.04	0
616.01	0	616.53	0	617.05	0
616.02	0	616.54	0	617.06	0
616.03	0	616.55	0	617.07	0
616.04	0	616.56	0	617.08	0
616.05	0	616.57	0	617.09	0
616.06	0	616.58	0	617.10	0
616.07	0	616.59	0	617.11	0
616.08	0	616.60	0	617.12	0
616.09	0	616.61	0	617.13	0
616.10	0	616.62	0	617.14	0
616.11	0	616.63	0	617.15	0
616.12	0	616.64	0	617.16	0
616.13	0	616.65	0	617.17	0
616.14	0	616.66	0	617.18	0
616.15	0	616.67	0	617.19	0
616.16	0	616.68	0	617.20	0
616.17	0	616.69	0	617.21	0
616.18	0	616.70	0	617.22	0
616.19	0	616.71	0	617.23	0
616.20	0	616.72	0	617.24	0
616.21	0	616.73	0	617.25	0
616.22	0	616.74	0		
616.23	0	616.75	0		
616.24	0	616.76	0		
616.25	0	616.77	0		
616.26	0	616.78	0		
616.27	0	616.79	0		
616.28	0	616.80	0		
616.29	0	616.81	0		
616.30	0	616.82	0		
616.31	0	616.83	0		
616.32	0	616.84	0		
616.33	0	616.85	0		
616.34	0	616.86	0		
616.35	0	616.87	0		
616.36	0	616.88	0		

Summary for Pond ICS-6: ICS-6

Inflow Area =	2.630 ac, 39.25% Impervious, Inflow Depth > 1.11" for 2-YR event				
Inflow =	2.40 cfs @	12.24 hrs,	Volume=	0.244 af	
Outflow =	2.40 cfs @	12.24 hrs,	Volume=	0.244 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.21 cfs @	12.24 hrs,	Volume=	0.106 af	
Secondary =	2.18 cfs @	12.24 hrs,	Volume=	0.138 af	

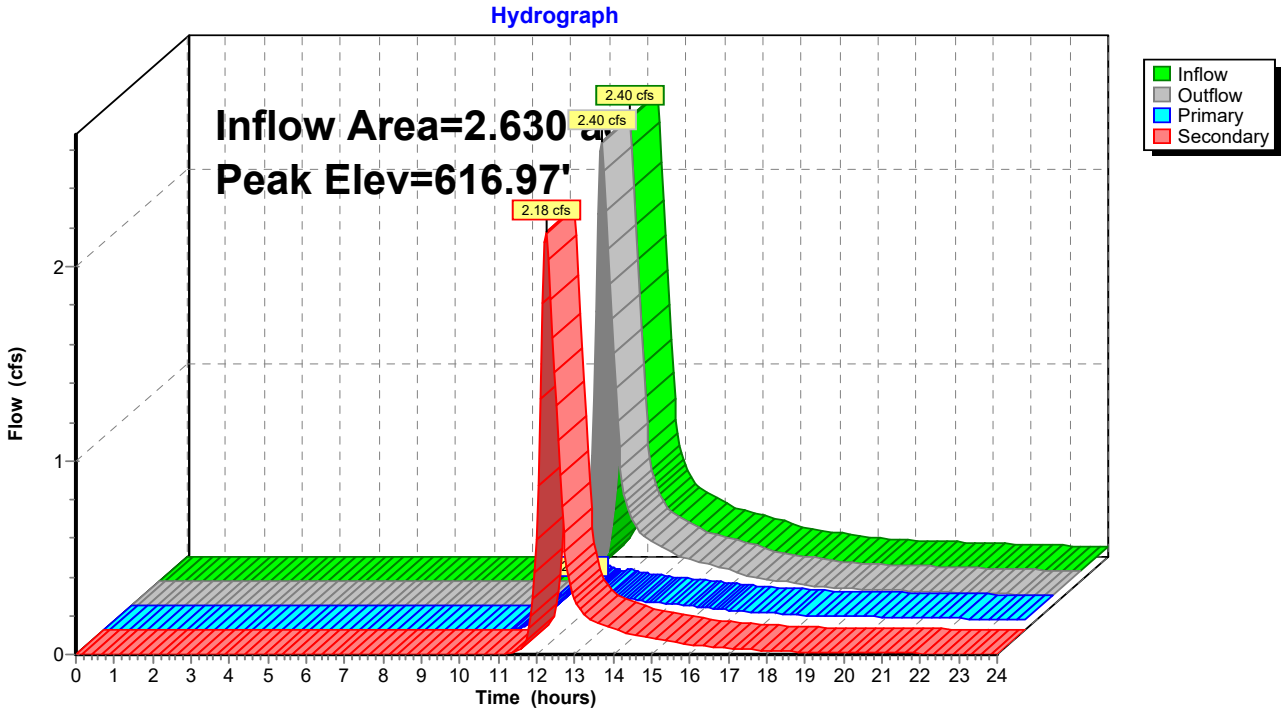
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.97' @ 12.24 hrs
Flood Elev= 617.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.21 cfs @ 12.24 hrs HW=616.97' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.21 cfs @ 2.46 fps)

Secondary OutFlow Max=2.17 cfs @ 12.24 hrs HW=616.97' (Free Discharge)
└**2=Culvert** (Barrel Controls 2.17 cfs @ 3.60 fps)

Pond ICS-6: ICS-6



Stage-Area-Storage for Pond ICS-6: ICS-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
616.00	**0**	616.52	0	617.04	0
616.01	0	616.53	0	617.05	0
616.02	0	616.54	0	617.06	0
616.03	0	616.55	0	617.07	0
616.04	0	616.56	0	617.08	0
616.05	0	616.57	0	617.09	0
616.06	0	616.58	0	617.10	0
616.07	0	616.59	0	617.11	0
616.08	0	616.60	0	617.12	0
616.09	0	616.61	0	617.13	0
616.10	0	616.62	0	617.14	0
616.11	0	616.63	0	617.15	0
616.12	0	616.64	0	617.16	0
616.13	0	616.65	0	617.17	0
616.14	0	616.66	0	617.18	0
616.15	0	616.67	0	617.19	0
616.16	0	616.68	0	617.20	0
616.17	0	616.69	0	617.21	0
616.18	0	616.70	0	617.22	0
616.19	0	616.71	0	617.23	0
616.20	0	616.72	0	617.24	0
616.21	0	616.73	0	617.25	0
616.22	0	616.74	0	617.26	0
616.23	0	616.75	0	617.27	0
616.24	0	616.76	0	617.28	0
616.25	0	616.77	0	617.29	0
616.26	0	616.78	0	617.30	0
616.27	0	616.79	0	617.31	0
616.28	0	616.80	0	617.32	0
616.29	0	616.81	0	617.33	0
616.30	0	616.82	0	617.34	0
616.31	0	616.83	0	617.35	0
616.32	0	616.84	0	617.36	0
616.33	0	616.85	0	617.37	0
616.34	0	616.86	0	617.38	0
616.35	0	616.87	0	617.39	0
616.36	0	616.88	0	617.40	0
616.37	0	616.89	0		
616.38	0	616.90	0		
616.39	0	616.91	0		
616.40	0	616.92	0		
616.41	0	616.93	0		
616.42	0	616.94	0		
616.43	0	616.95	0		
616.44	0	616.96	0		
616.45	0	616.97	0		
616.46	0	616.98	0		
616.47	0	616.99	0		
616.48	0	617.00	0		
616.49	0	617.01	0		
616.50	0	617.02	0		
616.51	0	617.03	0		

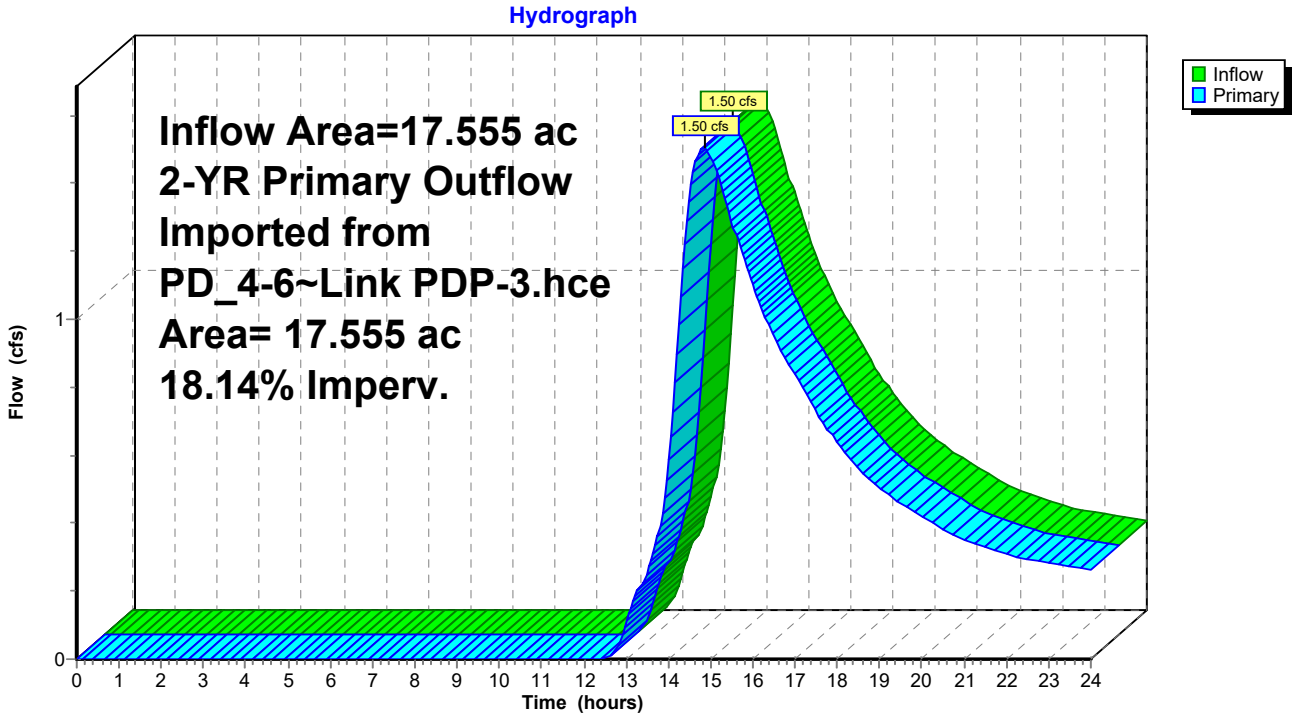
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 0.39" for 2-YR event
Inflow = 1.50 cfs @ 14.84 hrs, Volume= 0.563 af
Primary = 1.50 cfs @ 14.84 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

2-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

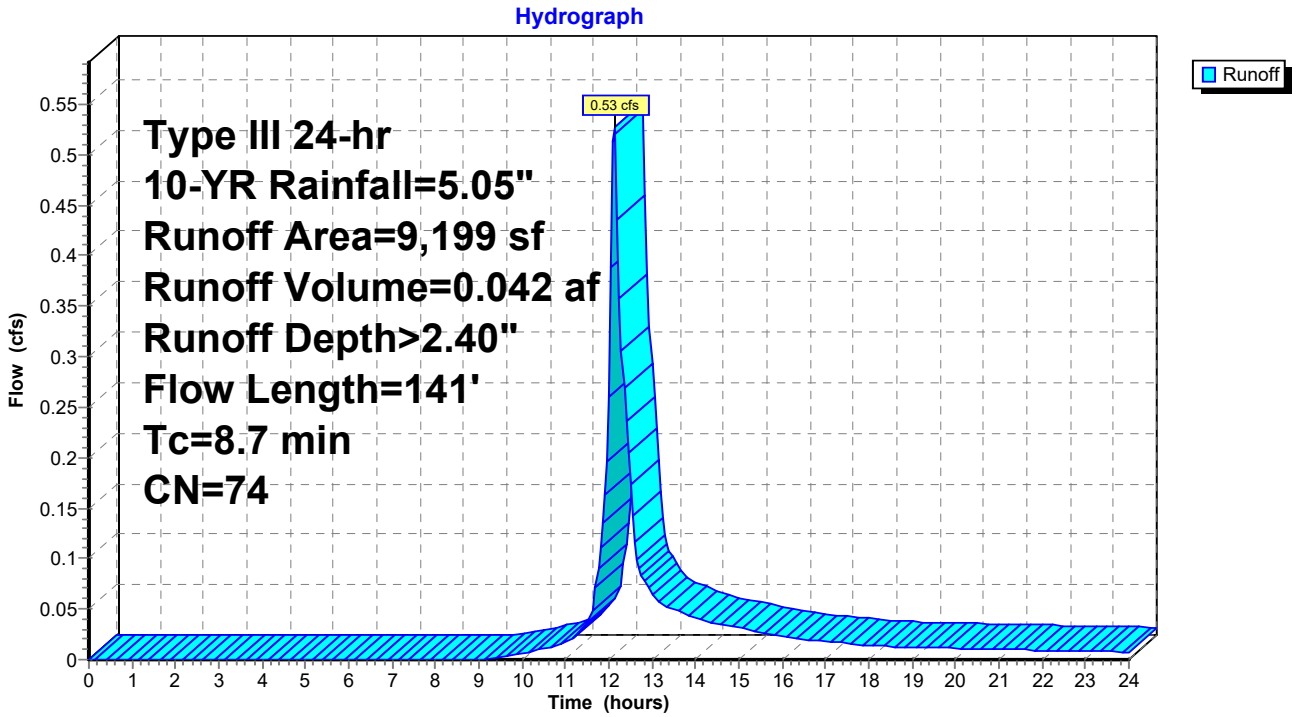
Runoff = 0.53 cfs @ 12.13 hrs, Volume= 0.042 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

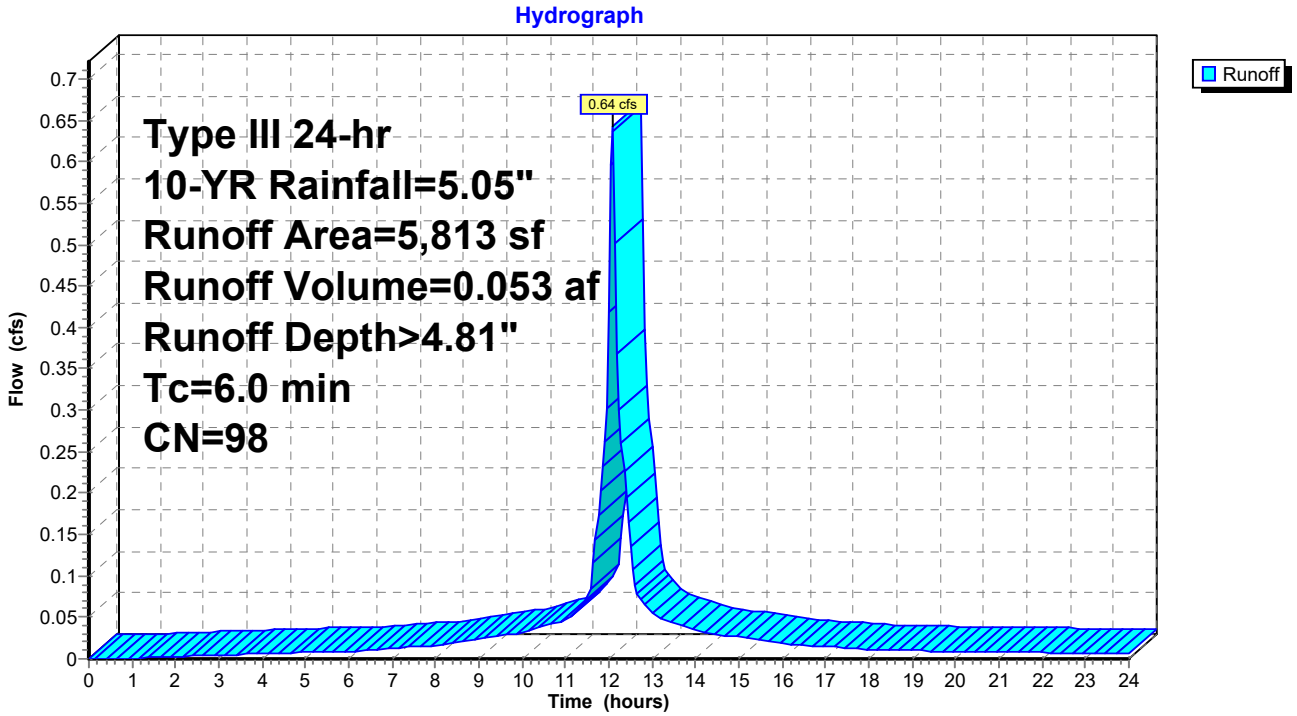
Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.053 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

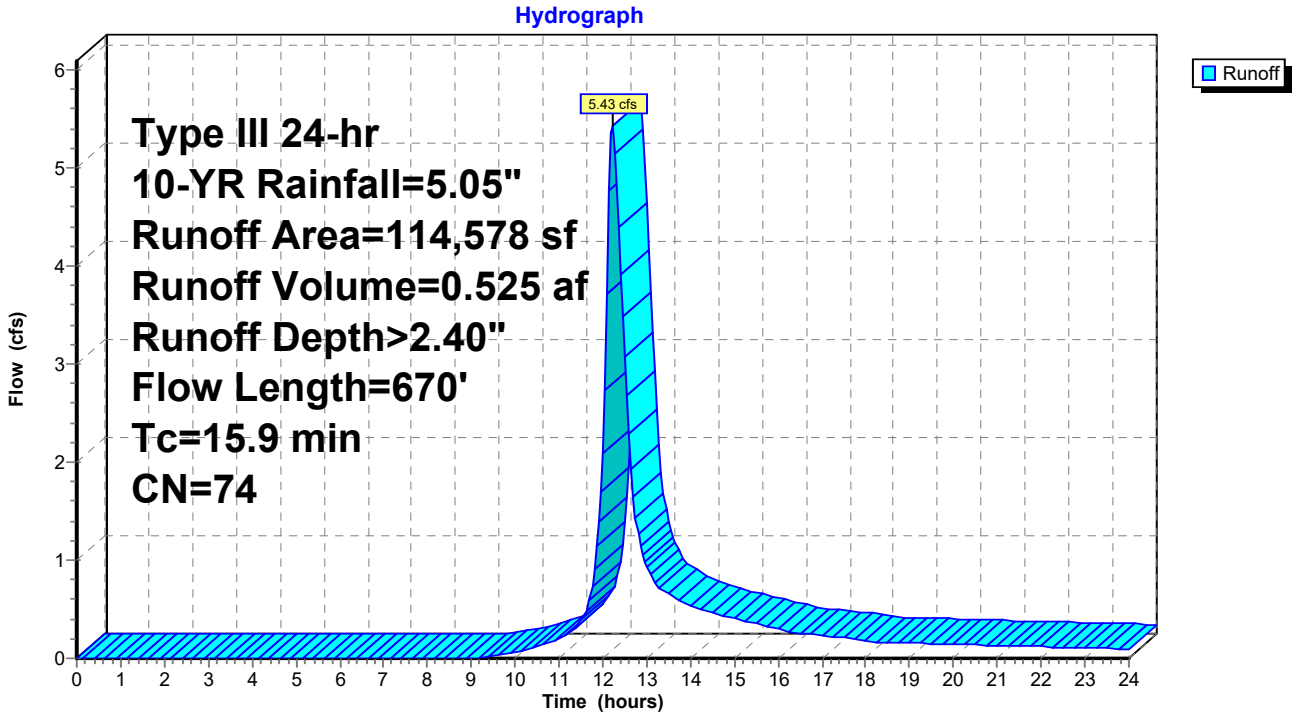
Runoff = 5.43 cfs @ 12.22 hrs, Volume= 0.525 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

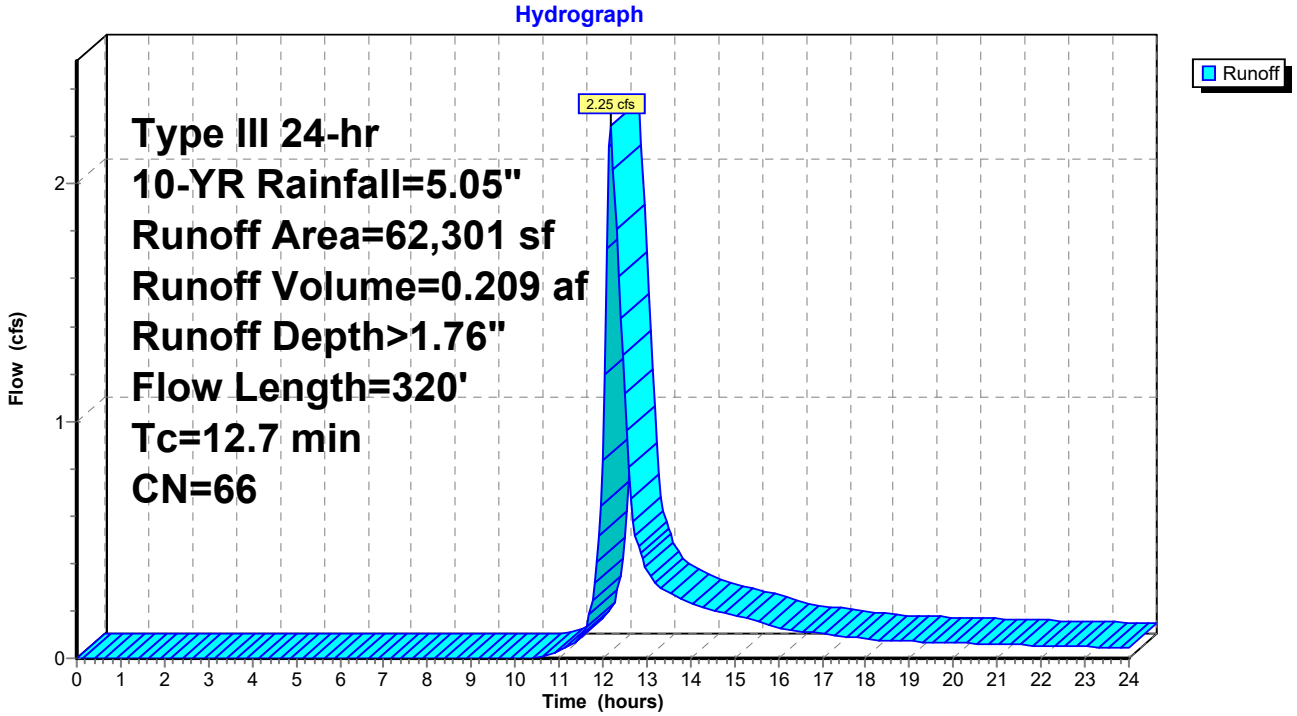
Runoff = 2.25 cfs @ 12.19 hrs, Volume= 0.209 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

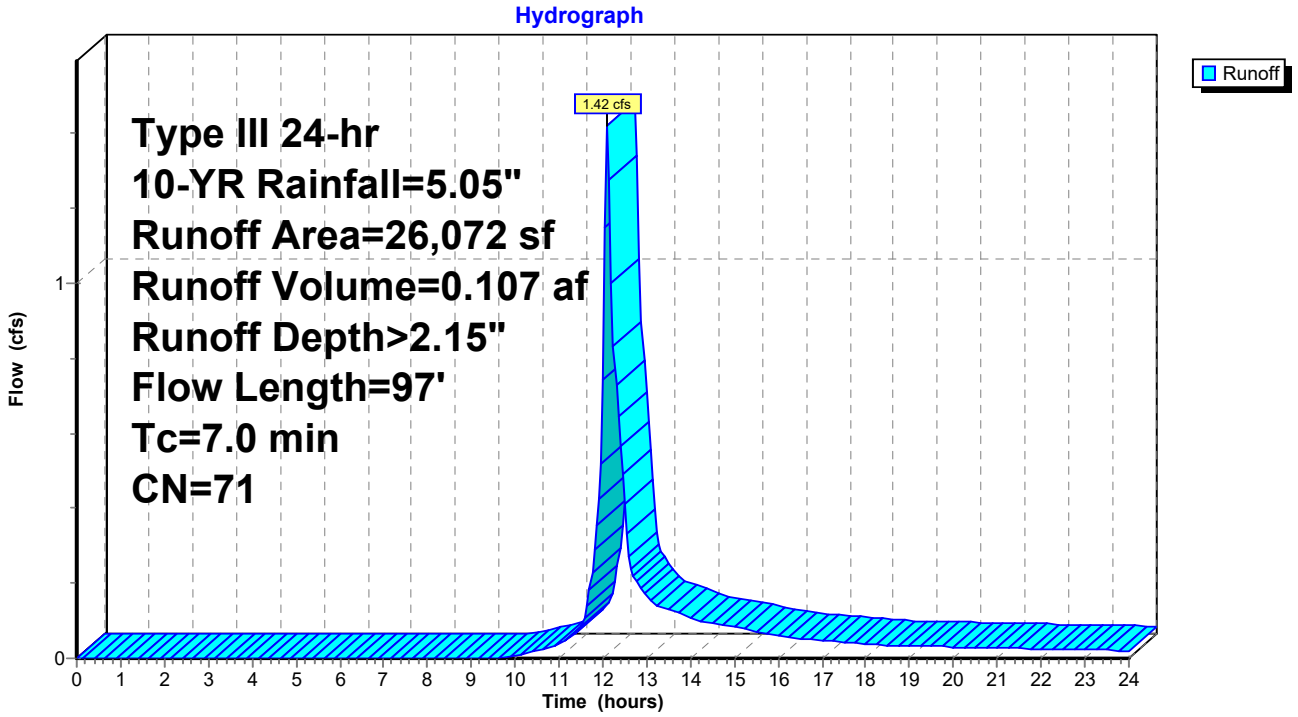
Runoff = 1.42 cfs @ 12.11 hrs, Volume= 0.107 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

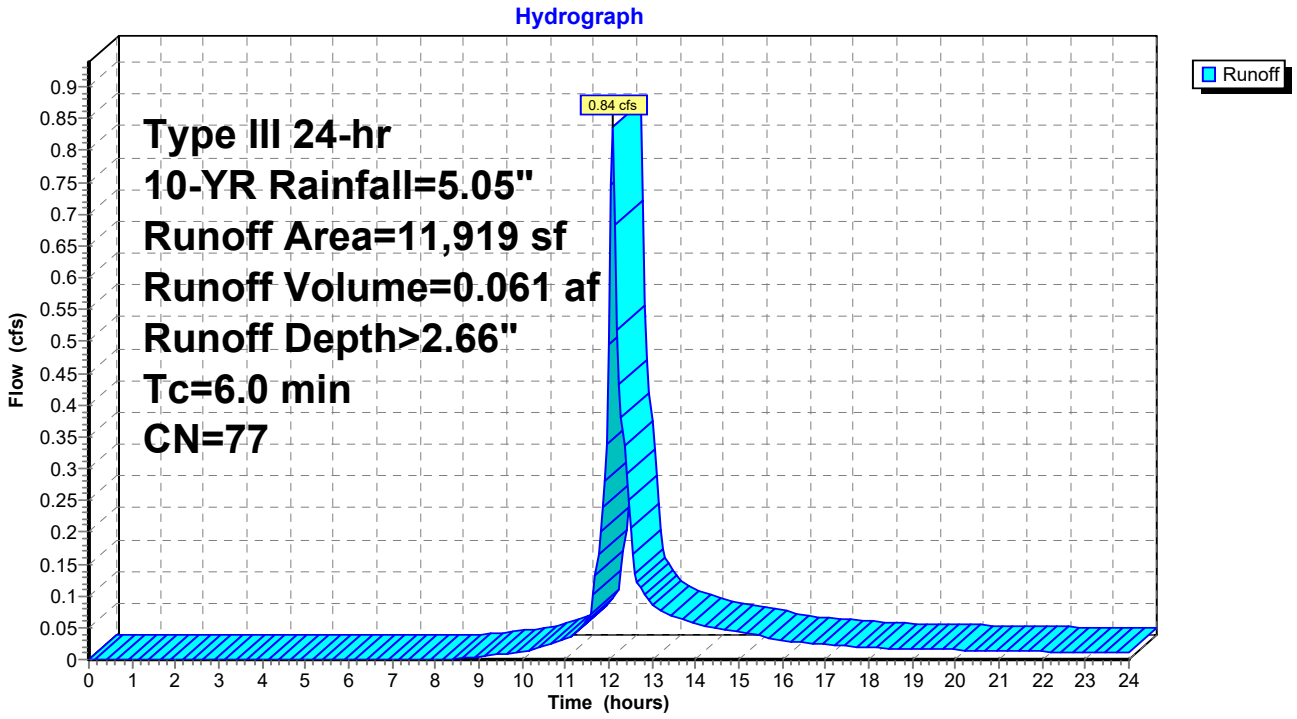
Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

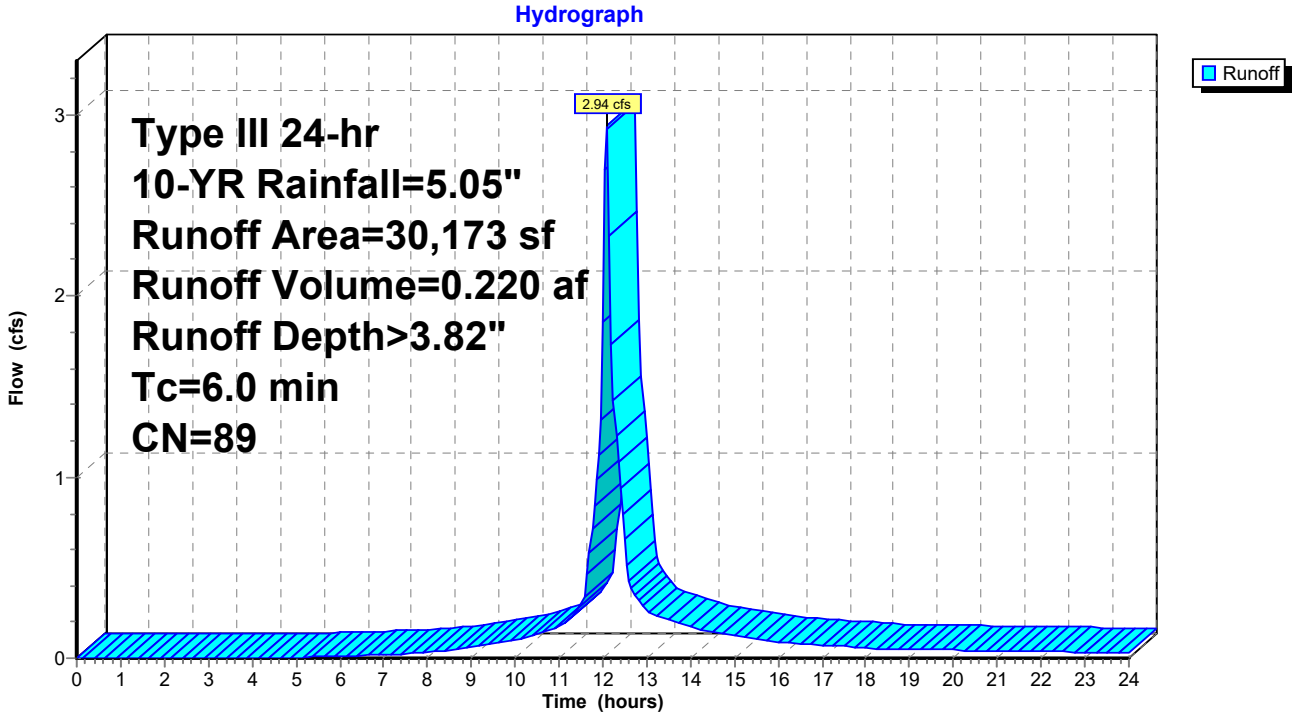
Runoff = 2.94 cfs @ 12.09 hrs, Volume= 0.220 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

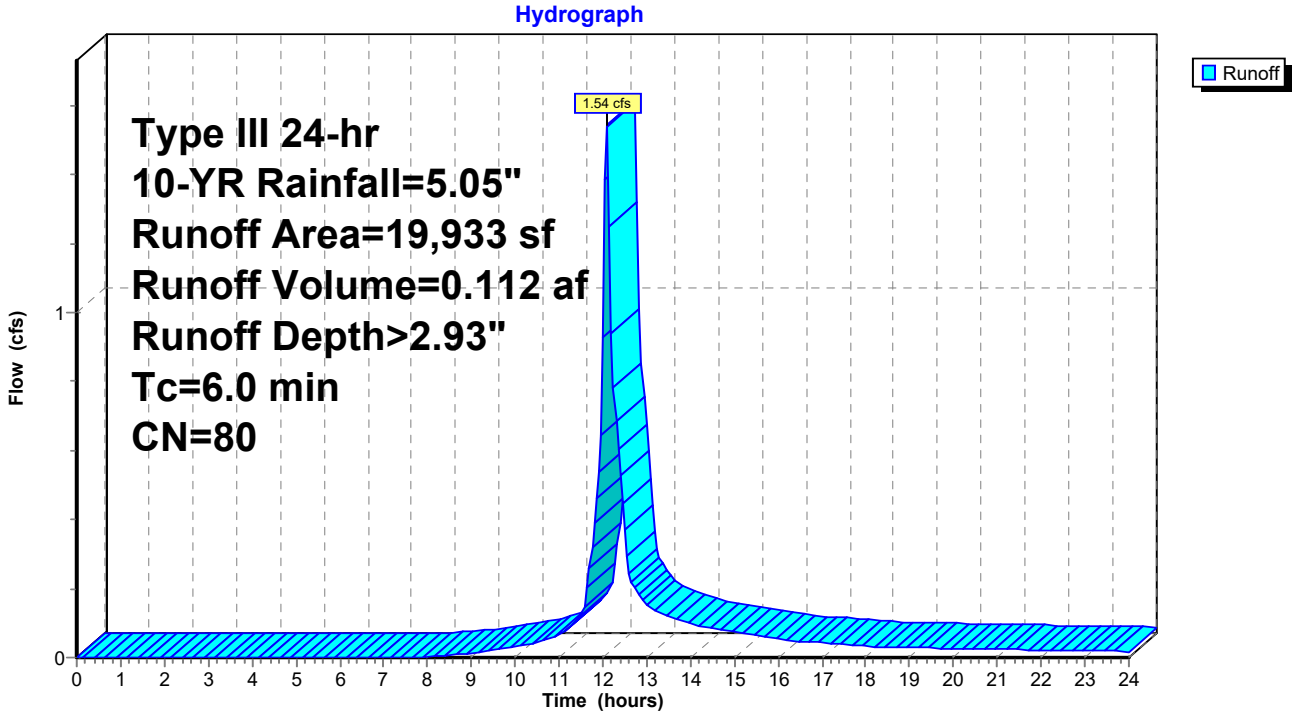
Runoff = 1.54 cfs @ 12.09 hrs, Volume= 0.112 af, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

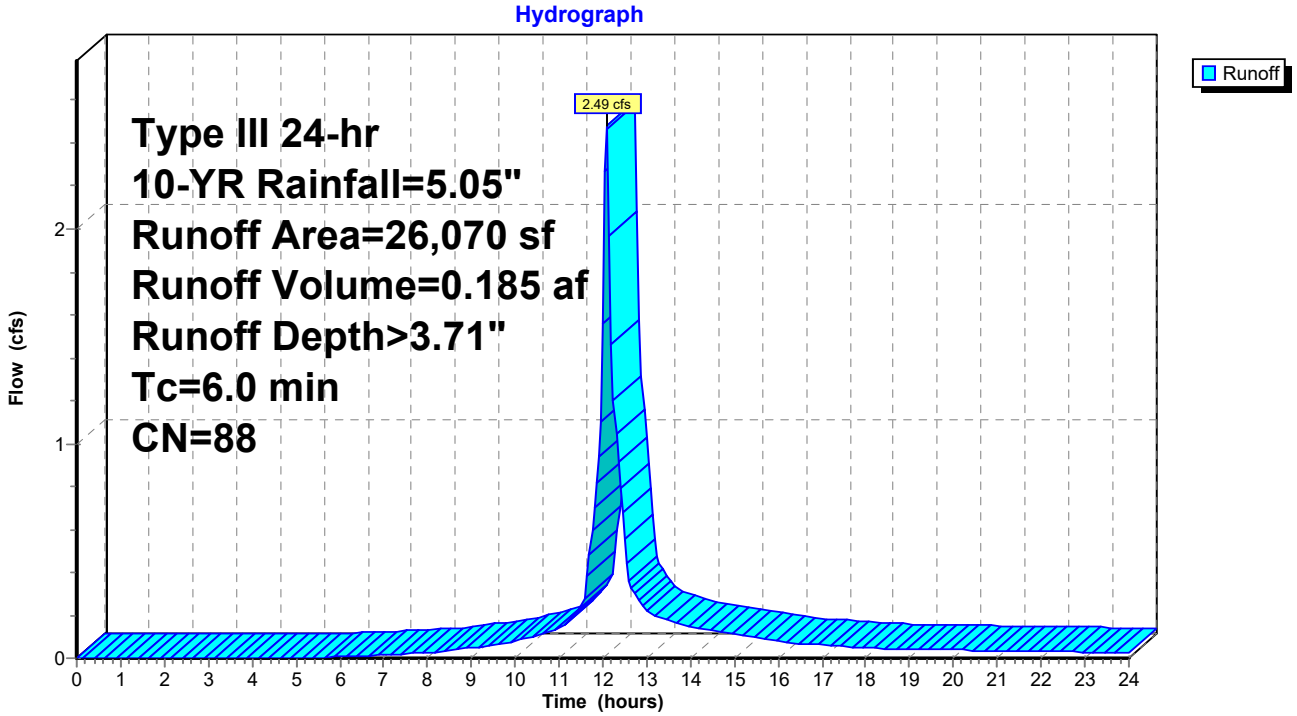
Runoff = 2.49 cfs @ 12.09 hrs, Volume= 0.185 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

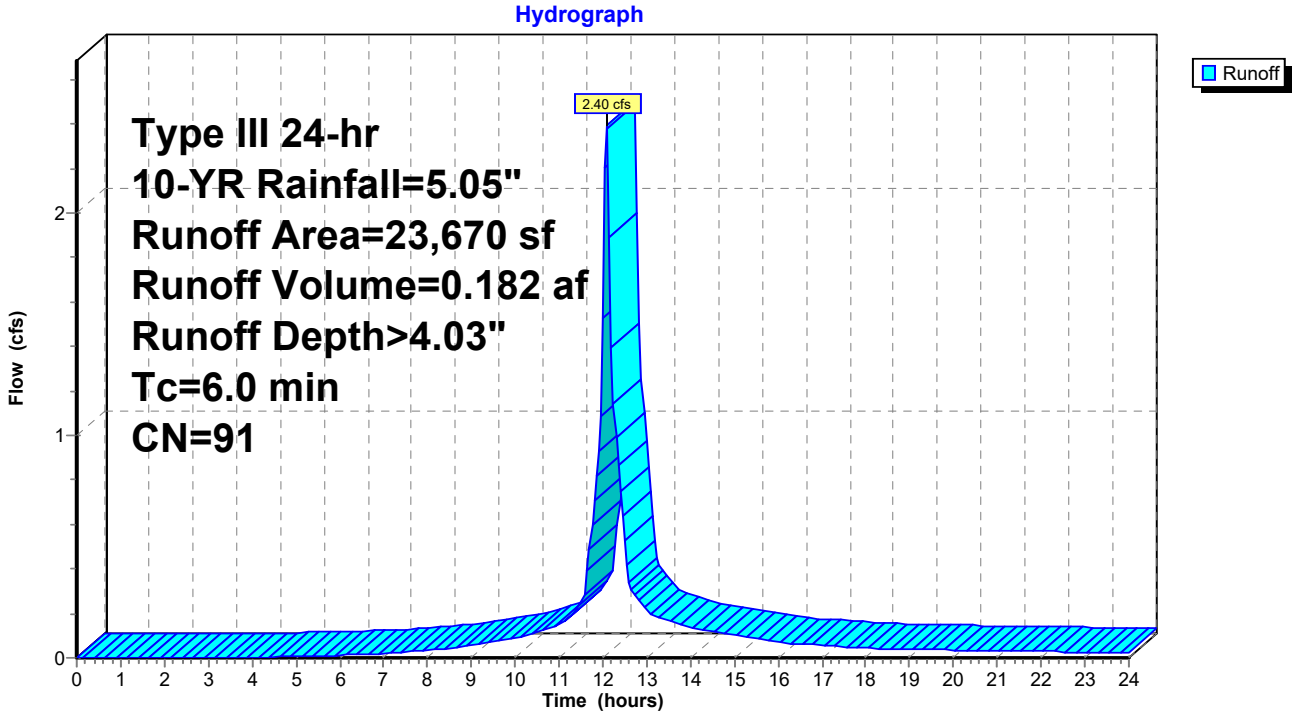
Runoff = 2.40 cfs @ 12.09 hrs, Volume= 0.182 af, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

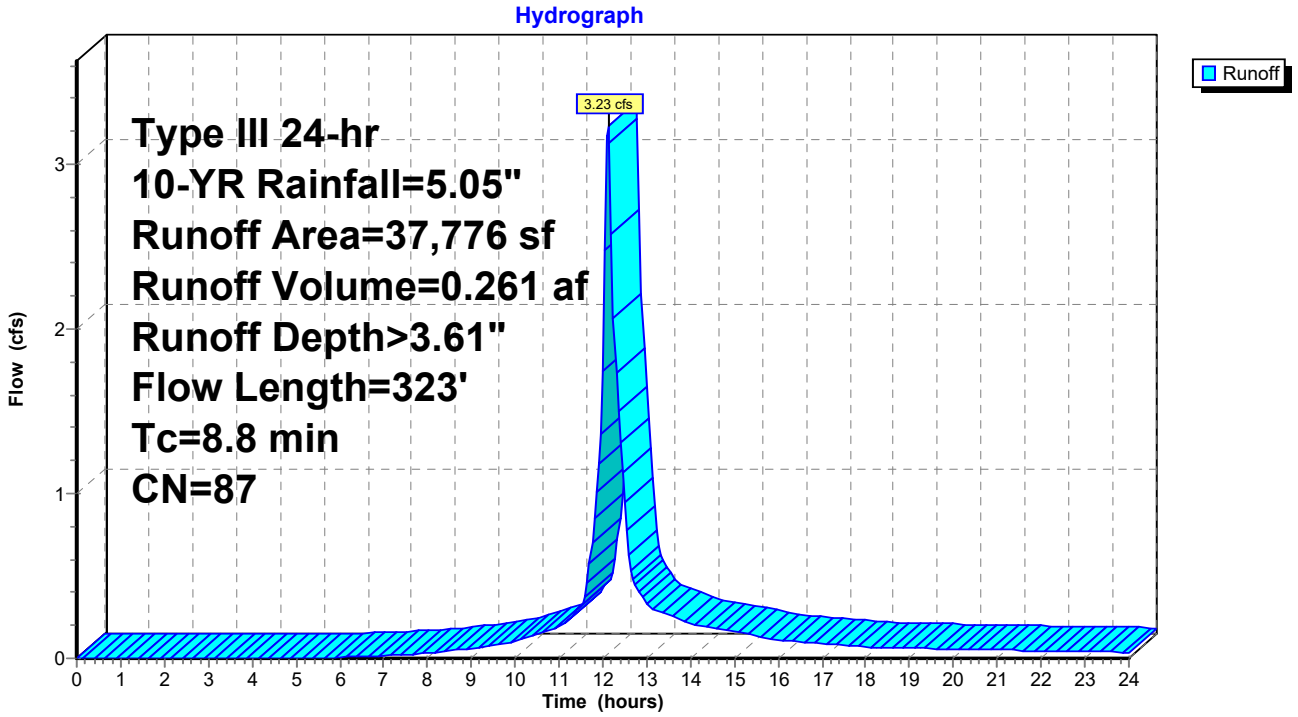
Runoff = 3.23 cfs @ 12.12 hrs, Volume= 0.261 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

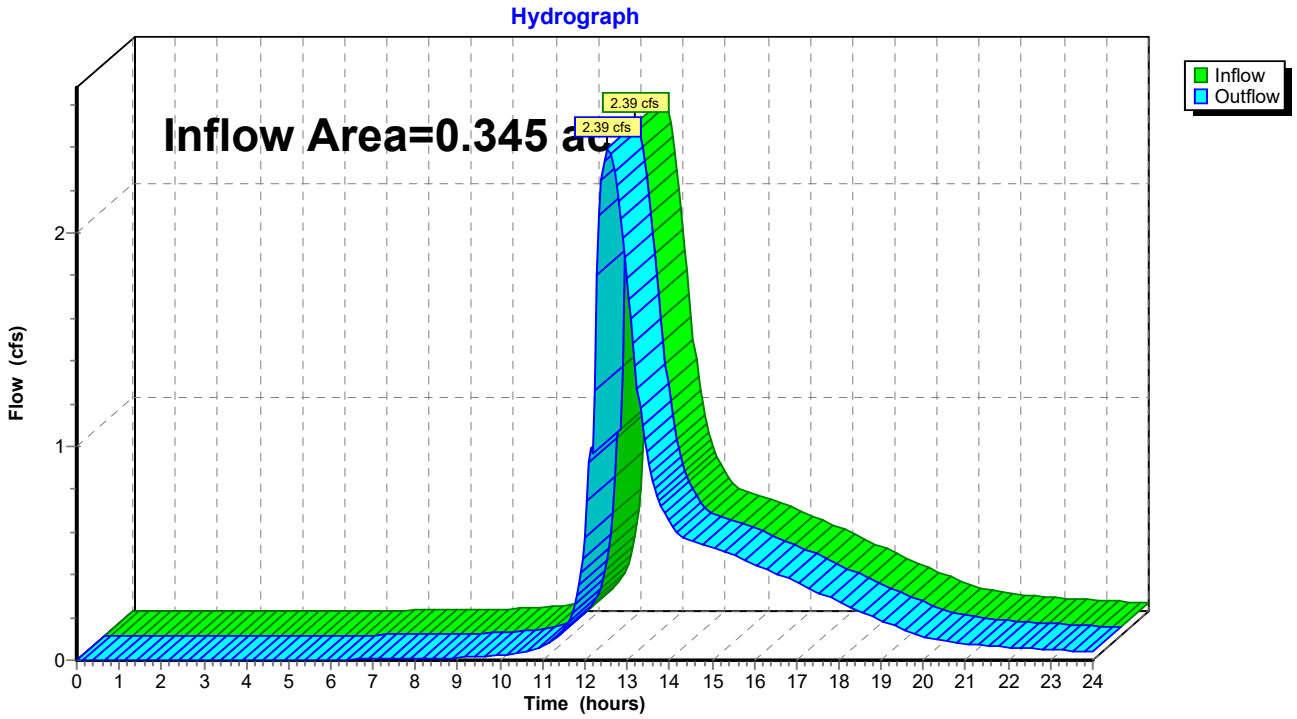


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 15.97" for 10-YR event
Inflow = 2.39 cfs @ 12.54 hrs, Volume= 0.459 af
Outflow = 2.39 cfs @ 12.54 hrs, Volume= 0.459 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

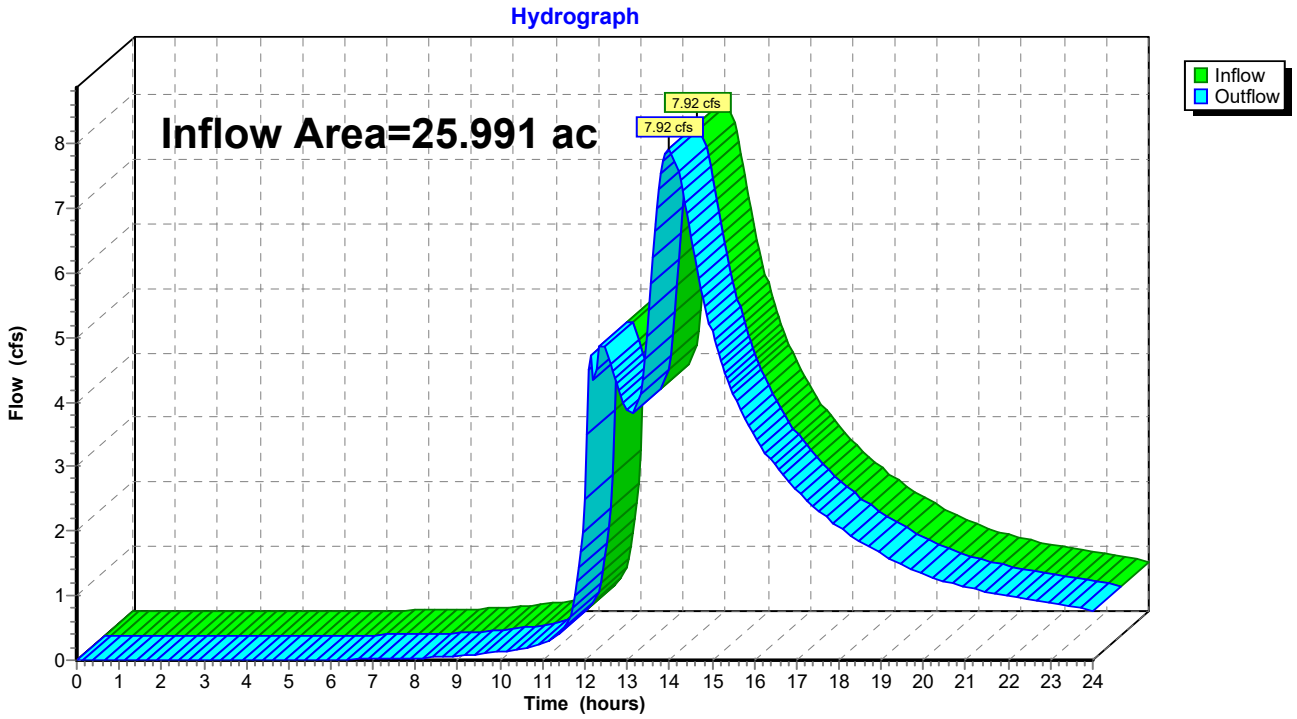


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 1.32" for 10-YR event
Inflow = 7.92 cfs @ 13.98 hrs, Volume= 2.864 af
Outflow = 7.92 cfs @ 13.98 hrs, Volume= 2.864 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 1.07" for 10-YR event
Inflow = 8.09 cfs @ 13.70 hrs, Volume= 2.207 af
Outflow = 7.06 cfs @ 14.01 hrs, Volume= 2.145 af, Atten= 13%, Lag= 18.2 min

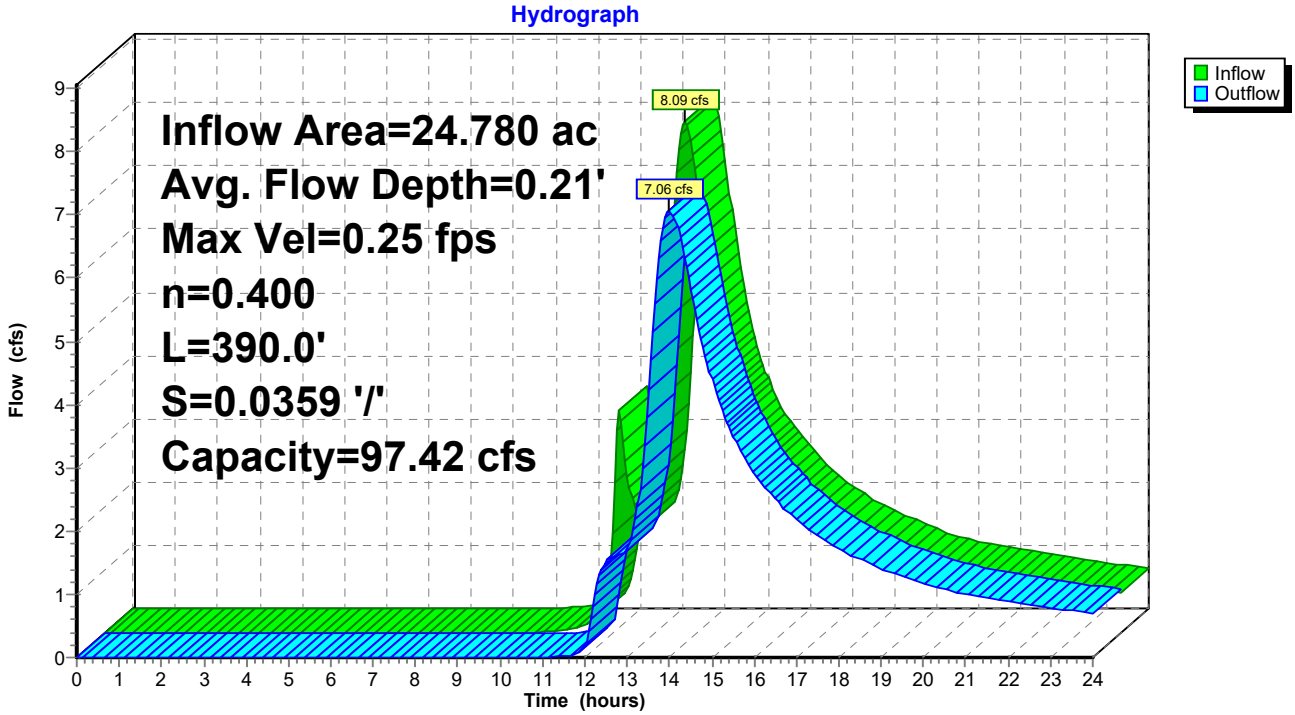
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 26.4 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 51.2 min

Peak Storage= 11,195 cf @ 14.01 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

‡

Reach DP-3: DP-3



Stage-Area-Storage for Reach DP-3: DP-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
618.00	0.0	0
618.01	1.3	508
618.02	2.6	1,017
618.03	3.9	1,528
618.04	5.2	2,041
618.05	6.6	2,555
618.06	7.9	3,071
618.07	9.2	3,589
618.08	10.5	4,108
618.09	11.9	4,629
618.10	13.2	5,152
618.11	14.6	5,676
618.12	15.9	6,202
618.13	17.3	6,729
618.14	18.6	7,259
618.15	20.0	7,789
618.16	21.3	8,322
618.17	22.7	8,856
618.18	24.1	9,391
618.19	25.5	9,929
618.20	26.8	10,468
618.21	28.2	11,008
618.22	29.6	11,550
618.23	31.0	12,094
618.24	32.4	12,640
618.25	33.8	13,187
618.26	35.2	13,736
618.27	36.6	14,286
618.28	38.0	14,838
618.29	39.5	15,392
618.30	40.9	15,947
618.31	42.3	16,504
618.32	43.8	17,063
618.33	45.2	17,623
618.34	46.6	18,185
618.35	48.1	18,748
618.36	49.5	19,313
618.37	51.0	19,880
618.38	52.4	20,449
618.39	53.9	21,019
618.40	55.4	21,590
618.41	56.8	22,164
618.42	58.3	22,739
618.43	59.8	23,315
618.44	61.3	23,894
618.45	62.8	24,473
618.46	64.2	25,055
618.47	65.7	25,638
618.48	67.2	26,223
618.49	68.7	26,809
618.50	70.3	27,398
618.51	71.8	27,987
618.52	73.3	28,579
618.53	74.8	29,172
618.54	76.3	29,766
618.55	77.9	30,362
618.56	79.4	30,960
618.57	80.9	31,560
618.58	82.5	32,161
618.59	84.0	32,764
618.60	85.6	33,368
618.61	87.1	33,974
618.62	88.7	34,582
618.63	90.2	35,192
618.64	91.8	35,803
618.65	93.4	36,415
618.66	94.9	37,030
618.67	96.5	37,645
618.68	98.1	38,263
618.69	99.7	38,882
618.70	101.3	39,503
618.71	102.9	40,126
618.72	104.5	40,750
618.73	106.1	41,375
618.74	107.7	42,003
618.75	109.3	42,632
618.76	110.9	43,263
618.77	112.6	43,895
618.78	114.2	44,529
618.79	115.8	45,164
618.80	117.4	45,802
618.81	119.1	46,440
618.82	120.7	47,081
618.83	122.4	47,723
618.84	124.0	48,367
618.85	125.7	49,012
618.86	127.3	49,659
618.87	129.0	50,308
618.88	130.7	50,958
618.89	132.3	51,610
618.90	134.0	52,264
618.91	135.7	52,919
618.92	137.4	53,576
618.93	139.1	54,235
618.94	140.8	54,895
618.95	142.5	55,556
618.96	144.2	56,220
618.97	145.9	56,885
618.98	147.6	57,552
618.99	149.3	58,220
619.00	**151.0**	**58,890**

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 3.46" for 10-YR event
Inflow = 1.45 cfs @ 12.10 hrs, Volume= 0.279 af
Outflow = 0.57 cfs @ 13.37 hrs, Volume= 0.240 af, Atten= 60%, Lag= 75.8 min
Discarded = 0.12 cfs @ 13.37 hrs, Volume= 0.127 af
Primary = 0.45 cfs @ 13.37 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.14' @ 13.37 hrs Surf.Area= 2,854 sf Storage= 4,518 cf
Flood Elev= 611.00' Surf.Area= 3,452 sf Storage= 7,242 cf

Plug-Flow detention time= 190.9 min calculated for 0.240 af (86% of inflow)
Center-of-Mass det. time= 132.2 min (960.3 - 828.0)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	6,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,597 cf Overall - 1,797 cf Embedded = 6,800 cf
#2	607.00'	165 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 413 cf Overall x 40.0% Voids
#3	607.50'	120 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 600 cf Overall x 20.0% Voids
#4	608.00'	157 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 784 cf Overall x 20.0% Voids
		7,242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
608.00	1,568	1,197	1,197
609.00	2,130	1,849	3,046
610.00	2,760	2,445	5,491
611.00	3,452	3,106	8,597

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
607.50	825	413	413

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.50	1,200	0	0
608.00	1,200	600	600

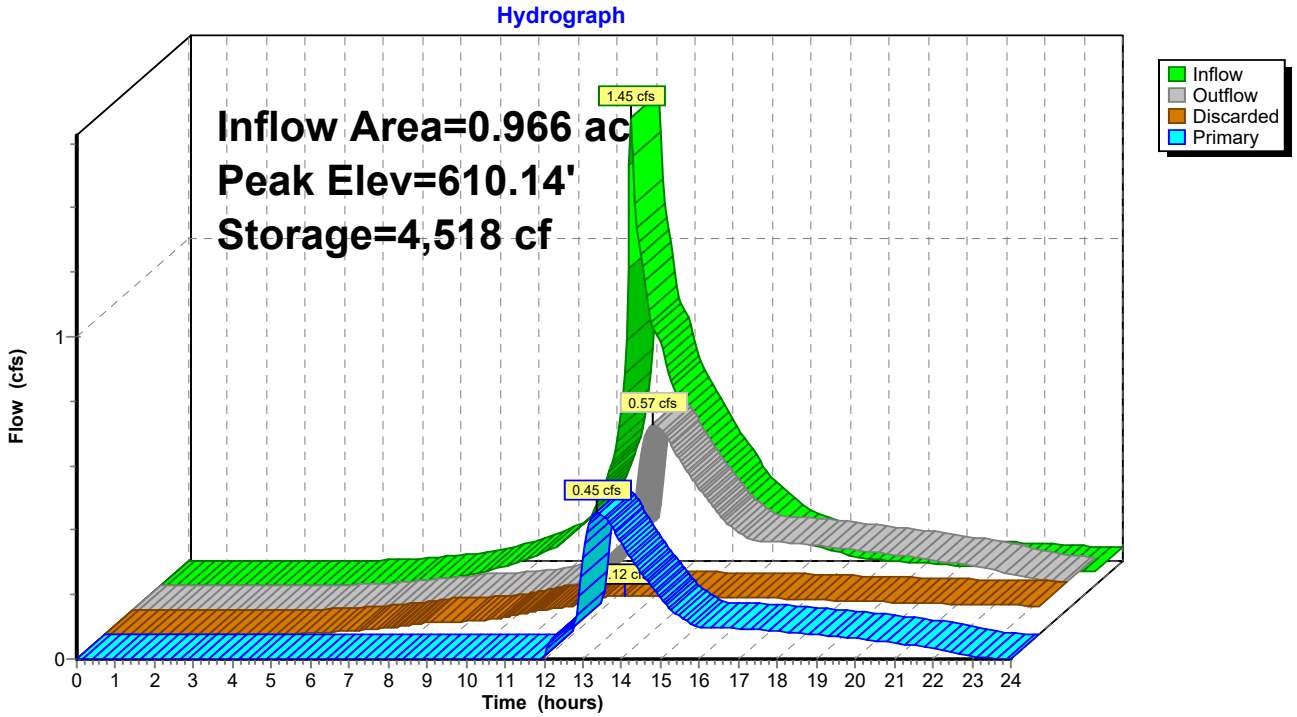
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,568	0	0
608.50	1,568	784	784

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.33' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	610.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 13.37 hrs HW=610.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.45 cfs @ 13.37 hrs HW=610.14' (Free Discharge)
└─**2=Culvert** (Passes 0.45 cfs of 2.01 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 4.94 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.34 cfs @ 1.21 fps)

Pond 1: SFB-1



Stage-Area-Storage for Pond 1: SFB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
607.00	825	0
607.05	862	17
607.10	899	37
607.15	936	58
607.20	974	81
607.25	1,011	106
607.30	1,048	132
607.35	1,085	161
607.40	1,122	191
607.45	1,159	224
607.50	1,197	258
607.55	1,234	271
607.60	1,271	285
607.65	1,308	302
607.70	1,345	320
607.75	1,382	340
607.80	1,419	362
607.85	1,457	386
607.90	1,494	412
607.95	1,531	440
608.00	1,568	469
608.05	1,596	485
608.10	1,624	503
608.15	1,652	522
608.20	1,680	543
608.25	1,709	565
608.30	1,737	588
608.35	1,765	613
608.40	1,793	639
608.45	1,821	667
608.50	1,849	696
608.55	1,877	789
608.60	1,905	884
608.65	1,933	980
608.70	1,961	1,077
608.75	1,990	1,176
608.80	2,018	1,276
608.85	2,046	1,378
608.90	2,074	1,481
608.95	2,102	1,585
609.00	2,130	1,691
609.05	2,161	1,798
609.10	2,193	1,907
609.15	2,224	2,017
609.20	2,256	2,129
609.25	2,288	2,243
609.30	2,319	2,358
609.35	2,351	2,475
609.40	2,382	2,593
609.45	2,414	2,713
609.50	2,445	2,835
609.55	2,476	2,958
609.60	2,508	3,082
609.65	2,539	3,208
609.70	2,571	3,336
609.75	2,603	3,465
609.80	2,634	3,596
609.85	2,666	3,729
609.90	2,697	3,863
609.95	2,729	3,999
610.00	2,760	4,136
610.05	2,795	4,275
610.10	2,829	4,415
610.15	2,864	4,558
610.20	2,898	4,702
610.25	2,933	4,847
610.30	2,968	4,995
610.35	3,002	5,144
610.40	3,037	5,295
610.45	3,071	5,448
610.50	3,106	5,602
610.55	3,141	5,758
610.60	3,175	5,916
610.65	3,210	6,076
610.70	3,244	6,237
610.75	3,279	6,400
610.80	3,314	6,565
610.85	3,348	6,732
610.90	3,383	6,900
610.95	3,417	7,070
611.00	**3,452**	**7,242**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 1.77" for 10-YR event
Inflow = 2.61 cfs @ 12.10 hrs, Volume= 0.623 af
Outflow = 0.52 cfs @ 16.20 hrs, Volume= 0.492 af, Atten= 80%, Lag= 245.8 min
Discarded = 0.41 cfs @ 16.20 hrs, Volume= 0.425 af
Primary = 0.11 cfs @ 16.20 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.02' @ 16.20 hrs Surf.Area= 7,417 sf Storage= 10,644 cf
Flood Elev= 617.00' Surf.Area= 9,273 sf Storage= 18,810 cf

Plug-Flow detention time= 231.9 min calculated for 0.492 af (79% of inflow)
Center-of-Mass det. time= 144.0 min (1,029.0 - 885.0)

Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	17,591 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 22,460 cf Overall - 4,870 cf Embedded = 17,591 cf
#2	613.00'	491 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 1,227 cf Overall x 40.0% Voids
#3	613.50'	343 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,714 cf Overall x 20.0% Voids
#4	614.00'	386 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,929 cf Overall x 20.0% Voids
		18,810 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
614.00	3,857	2,982	2,982
615.00	5,537	4,697	7,679
616.00	7,376	6,457	14,136
617.00	9,273	8,325	22,460

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
613.50	2,800	1,227	1,227

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.50	3,000	0	0
614.00	3,857	1,714	1,714

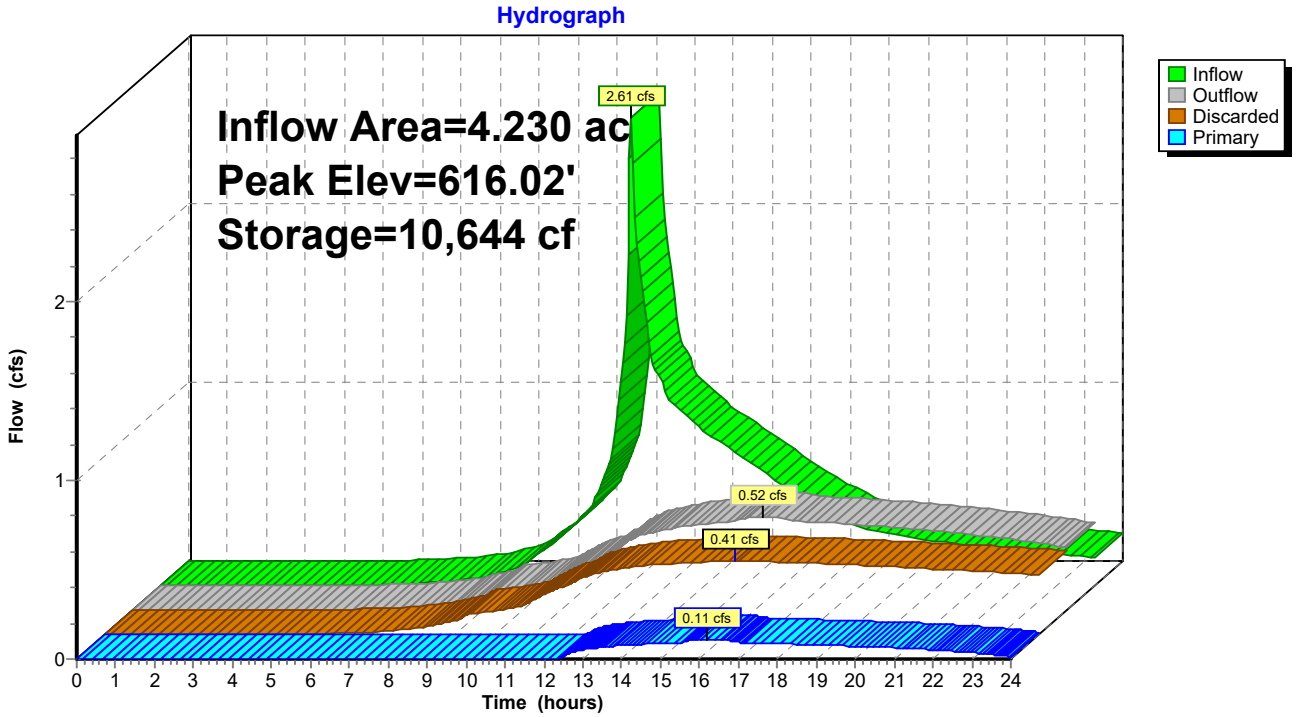
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.00	3,857	0	0
614.50	3,857	1,929	1,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.00'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.25'	**6.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.25' / 612.75' S= 0.0179 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.41 cfs @ 16.20 hrs HW=616.02' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.11 cfs @ 16.20 hrs HW=616.02' (Free Discharge)
└─**2=Culvert** (Passes 0.11 cfs of 1.19 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.14 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.48 fps)

Pond 2: SFB-2



Stage-Area-Storage for Pond 2: SFB-2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
613.00	2,107	0
613.05	2,194	43
613.10	2,282	89
613.15	2,369	137
613.20	2,457	187
613.25	2,545	239
613.30	2,632	294
613.35	2,720	351
613.40	2,807	411
613.45	2,895	472
613.50	2,982	536
613.55	3,069	566
613.60	3,157	596
613.65	3,244	628
613.70	3,332	660
613.75	3,420	694
613.80	3,507	728
613.85	3,595	763
613.90	3,682	799
613.95	3,770	836
614.00	3,857	875
614.05	3,941	915
614.10	4,025	960
614.15	4,109	1,009
614.20	4,193	1,062
614.25	4,277	1,120
614.30	4,361	1,182
614.35	4,445	1,247
614.40	4,529	1,318
614.45	4,613	1,392
614.50	4,697	1,470
614.55	4,781	1,707
614.60	4,865	1,948
614.65	4,949	2,194
614.70	5,033	2,443
614.75	5,117	2,697
614.80	5,201	2,955
614.85	5,285	3,217
614.90	5,369	3,483
614.95	5,453	3,754
615.00	5,537	4,029
615.05	5,629	4,308
615.10	5,721	4,592
615.15	5,813	4,880
615.20	5,905	5,173
615.25	5,997	5,470
615.30	6,089	5,773
615.35	6,181	6,079
615.40	6,273	6,391
615.45	6,365	6,707
615.50	6,457	7,027
615.55	6,548	7,352
615.60	6,640	7,682
615.65	6,732	8,016
615.70	6,824	8,355
615.75	6,916	8,699
615.80	7,008	9,047
615.85	7,100	9,400
615.90	7,192	9,757
615.95	7,284	10,119
616.00	7,376	10,485
616.05	7,471	10,856
616.10	7,566	11,232
616.15	7,661	11,613
616.20	7,755	11,998
616.25	7,850	12,389
616.30	7,945	12,783
616.35	8,040	13,183
616.40	8,135	13,587
616.45	8,230	13,997
616.50	8,325	14,410
616.55	8,419	14,829
616.60	8,514	15,252
616.65	8,609	15,680
616.70	8,704	16,113
616.75	8,799	16,551
616.80	8,894	16,993
616.85	8,988	17,440
616.90	9,083	17,892
616.95	9,178	18,348
617.00	**9,273**	**18,810**

Summary for Pond DB-1: DB-1

Inflow	=	2.60 cfs @	12.09 hrs,	Volume=	0.076 af
Outflow	=	0.37 cfs @	12.49 hrs,	Volume=	0.074 af, Atten= 86%, Lag= 23.9 min
Primary	=	0.37 cfs @	12.49 hrs,	Volume=	0.074 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.21' @ 12.49 hrs Surf.Area= 3,131 sf Storage= 2,563 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 100.4 min calculated for 0.074 af (97% of inflow)
Center-of-Mass det. time= 99.5 min (826.4 - 726.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.37 cfs @ 12.49 hrs HW=610.21' (Free Discharge)
└─**1=Culvert** (Passes 0.37 cfs of 0.47 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.29 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-1: DB-1 - Chamber Wizard Field A

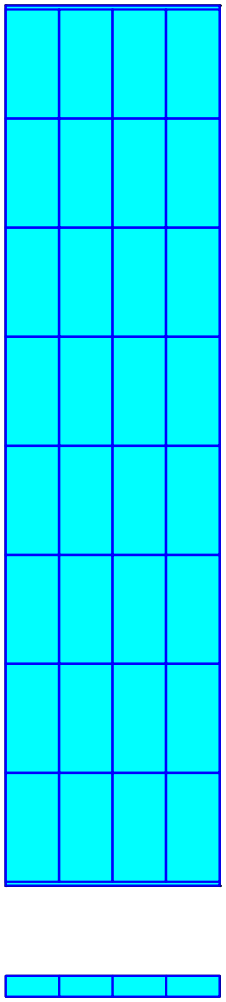
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

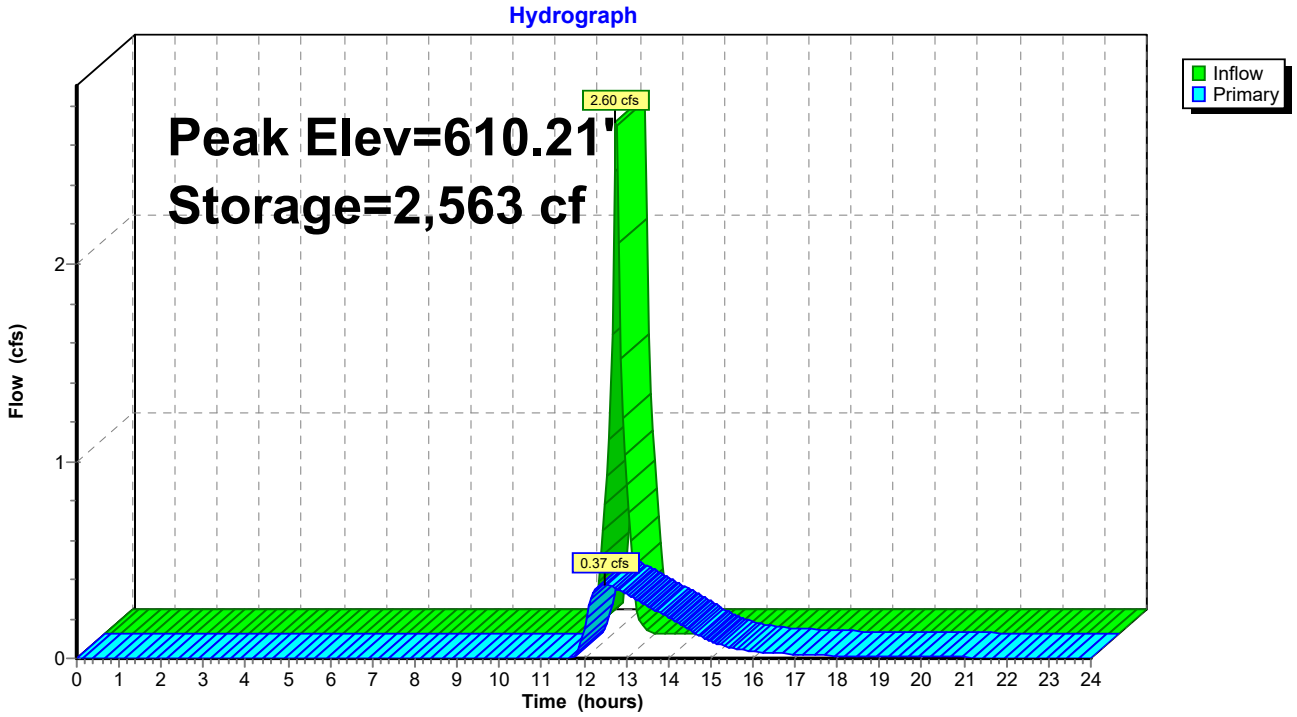
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Inflow
Primary
2.60 cfs
0.37 cfs
Peak Elev=610.21'
Storage=2,563 cf
Flow (cfs)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Area-Storage for Pond DB-1: DB-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	0	610.29	2,771	611.33	5,328
609.27	53	610.31	2,824	611.35	5,328
609.29	107	610.33	2,877	611.37	5,328
609.31	160	610.35	2,930	611.39	5,328
609.33	213	610.37	2,984	611.41	5,328
609.35	266	610.39	3,037	611.43	5,328
609.37	320	610.41	3,090	611.45	5,328
609.39	373	610.43	3,144	611.47	5,328
609.41	426	610.45	3,197	611.49	5,328
609.43	480	610.47	3,250	611.51	5,328
609.45	533	610.49	3,303	611.53	5,328
609.47	586	610.51	3,357	611.55	5,328
609.49	639	610.53	3,410	611.57	5,328
609.51	693	610.55	3,463	611.59	5,328
609.53	746	610.57	3,516	611.61	5,328
609.55	799	610.59	3,570	611.63	5,328
609.57	852	610.61	3,623	611.65	5,328
609.59	906	610.63	3,676	611.67	5,328
609.61	959	610.65	3,730	611.69	5,328
609.63	1,012	610.67	3,783	611.71	5,328
609.65	1,066	610.69	3,836	611.73	5,328
609.67	1,119	610.71	3,889	611.75	5,328
609.69	1,172	610.73	3,943	611.77	5,328
609.71	1,225	610.75	3,996	611.79	5,328
609.73	1,279	610.77	4,049	611.81	5,328
609.75	1,332	610.79	4,103	611.83	5,328
609.77	1,385	610.81	4,156	611.85	5,328
609.79	1,439	610.83	4,209	611.87	5,328
609.81	1,492	610.85	4,262	611.89	5,328
609.83	1,545	610.87	4,316	611.91	**5,328**
609.85	1,598	610.89	4,369		
609.87	1,652	610.91	4,422		
609.89	1,705	610.93	4,476		
609.91	1,758	610.95	4,529		
609.93	1,812	610.97	4,582		
609.95	1,865	610.99	4,635		
609.97	1,918	611.01	4,689		
609.99	1,971	611.03	4,742		
610.01	2,025	611.05	4,795		
610.03	2,078	611.07	4,848		
610.05	2,131	611.09	4,902		
610.07	2,184	611.11	4,955		
610.09	2,238	611.13	5,008		
610.11	2,291	611.15	5,062		
610.13	2,344	611.17	5,115		
610.15	2,398	611.19	5,168		
610.17	2,451	611.21	5,221		
610.19	2,504	611.23	5,275		
610.21	2,557	611.25	5,328		
610.23	2,611	611.27	5,328		
610.25	2,664	611.29	5,328		
610.27	2,717	611.31	5,328		

Summary for Pond DB-2: DB-2

Inflow	=	2.05 cfs @	12.09 hrs,	Volume=	0.056 af
Outflow	=	0.09 cfs @	12.57 hrs,	Volume=	0.051 af, Atten= 96%, Lag= 29.1 min
Primary	=	0.09 cfs @	12.57 hrs,	Volume=	0.051 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.08' @ 12.57 hrs Surf.Area= 3,131 sf Storage= 2,221 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 253.9 min calculated for 0.051 af (91% of inflow)
Center-of-Mass det. time= 252.7 min (979.6 - 726.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**6.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.09 cfs @ 12.57 hrs HW=616.08' (Free Discharge)
└─**1=Culvert** (Passes 0.09 cfs of 0.57 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.17 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

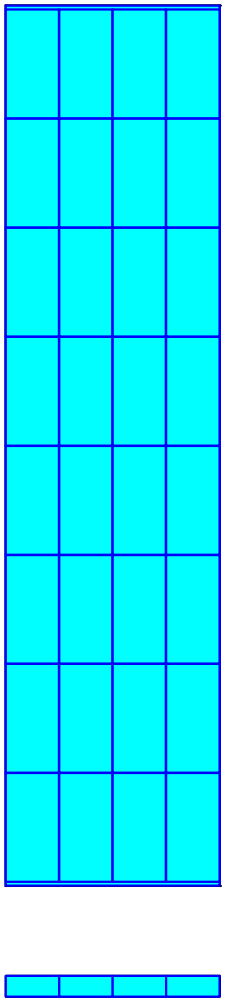
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

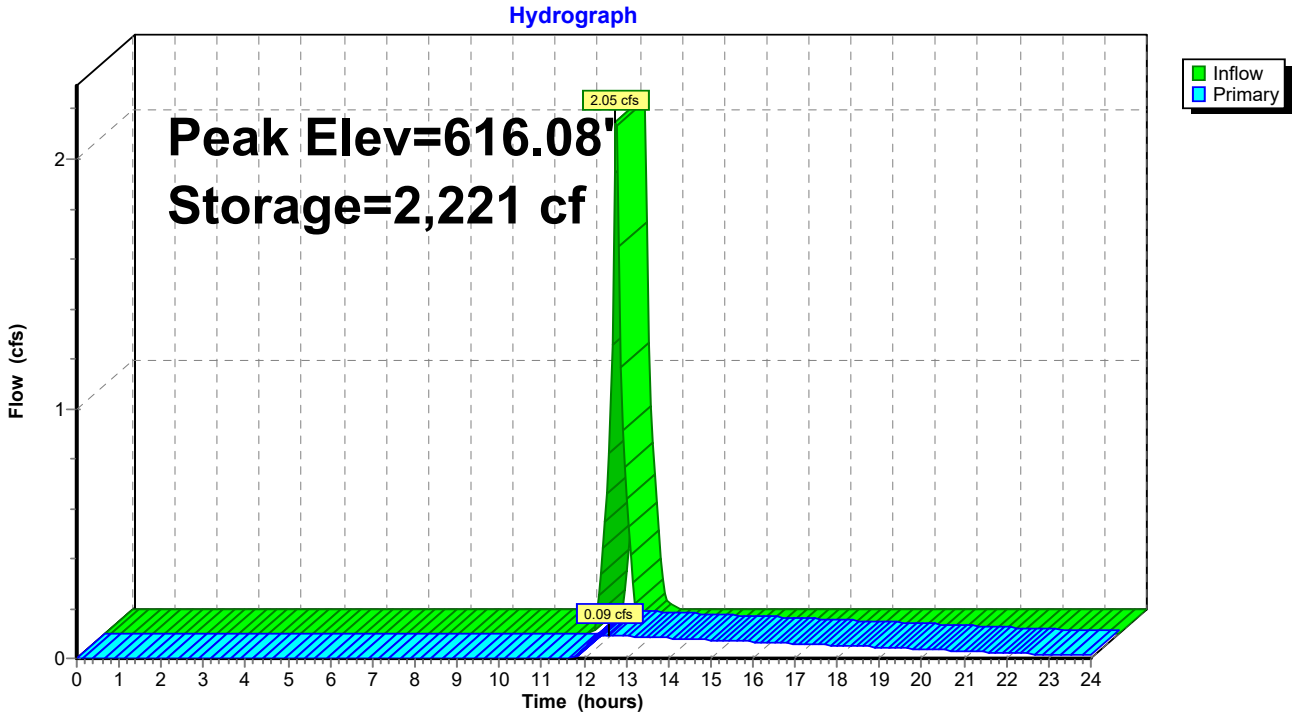
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Inflow
Primary
2.05 cfs
0.09 cfs
Peak Elev=616.08'
Storage=2,221 cf
Flow (cfs)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Area-Storage for Pond DB-2: DB-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.25	0	616.29	2,771	617.33	5,328
615.27	53	616.31	2,824	617.35	5,328
615.29	107	616.33	2,877	617.37	5,328
615.31	160	616.35	2,930	617.39	5,328
615.33	213	616.37	2,984	617.41	5,328
615.35	266	616.39	3,037	617.43	5,328
615.37	320	616.41	3,090	617.45	5,328
615.39	373	616.43	3,144	617.47	5,328
615.41	426	616.45	3,197	617.49	5,328
615.43	480	616.47	3,250	617.51	5,328
615.45	533	616.49	3,303	617.53	5,328
615.47	586	616.51	3,357	617.55	5,328
615.49	639	616.53	3,410	617.57	5,328
615.51	693	616.55	3,463	617.59	5,328
615.53	746	616.57	3,516	617.61	5,328
615.55	799	616.59	3,570	617.63	5,328
615.57	852	616.61	3,623	617.65	5,328
615.59	906	616.63	3,676	617.67	5,328
615.61	959	616.65	3,730	617.69	5,328
615.63	1,012	616.67	3,783	617.71	5,328
615.65	1,066	616.69	3,836	617.73	5,328
615.67	1,119	616.71	3,889	617.75	5,328
615.69	1,172	616.73	3,943	617.77	5,328
615.71	1,225	616.75	3,996	617.79	5,328
615.73	1,279	616.77	4,049	617.81	5,328
615.75	1,332	616.79	4,103	617.83	5,328
615.77	1,385	616.81	4,156	617.85	5,328
615.79	1,439	616.83	4,209	617.87	5,328
615.81	1,492	616.85	4,262	617.89	5,328
615.83	1,545	616.87	4,316	617.91	**5,328**
615.85	1,598	616.89	4,369		
615.87	1,652	616.91	4,422		
615.89	1,705	616.93	4,476		
615.91	1,758	616.95	4,529		
615.93	1,812	616.97	4,582		
615.95	1,865	616.99	4,635		
615.97	1,918	617.01	4,689		
615.99	1,971	617.03	4,742		
616.01	2,025	617.05	4,795		
616.03	2,078	617.07	4,848		
616.05	2,131	617.09	4,902		
616.07	2,184	617.11	4,955		
616.09	2,238	617.13	5,008		
616.11	2,291	617.15	5,062		
616.13	2,344	617.17	5,115		
616.15	2,398	617.19	5,168		
616.17	2,451	617.21	5,221		
616.19	2,504	617.23	5,275		
616.21	2,557	617.25	5,328		
616.23	2,611	617.27	5,328		
616.25	2,664	617.29	5,328		
616.27	2,717	617.31	5,328		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 38.05" for 10-YR event
Inflow = 5.51 cfs @ 12.22 hrs, Volume= 0.423 af
Outflow = 2.25 cfs @ 12.59 hrs, Volume= 0.416 af, Atten= 59%, Lag= 22.3 min
Primary = 2.25 cfs @ 12.59 hrs, Volume= 0.416 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 615.19' @ 12.59 hrs Surf.Area= 2,902 sf Storage= 7,569 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 94.0 min calculated for 0.415 af (98% of inflow)
Center-of-Mass det. time= 85.0 min (874.2 - 789.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0**x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.25 cfs @ 12.59 hrs HW=615.19' (Free Discharge)
└─**1=Culvert** (Passes 2.25 cfs of 4.66 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.70 cfs @ 8.01 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.55 cfs @ 4.45 fps)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

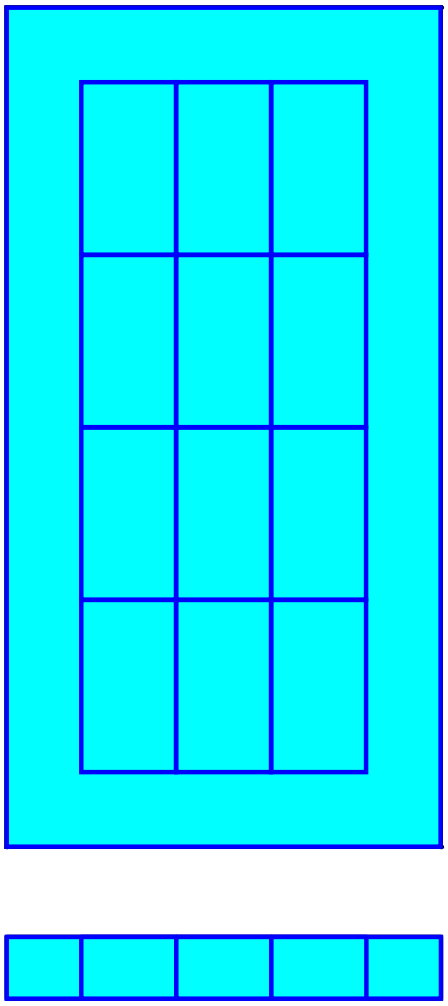
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

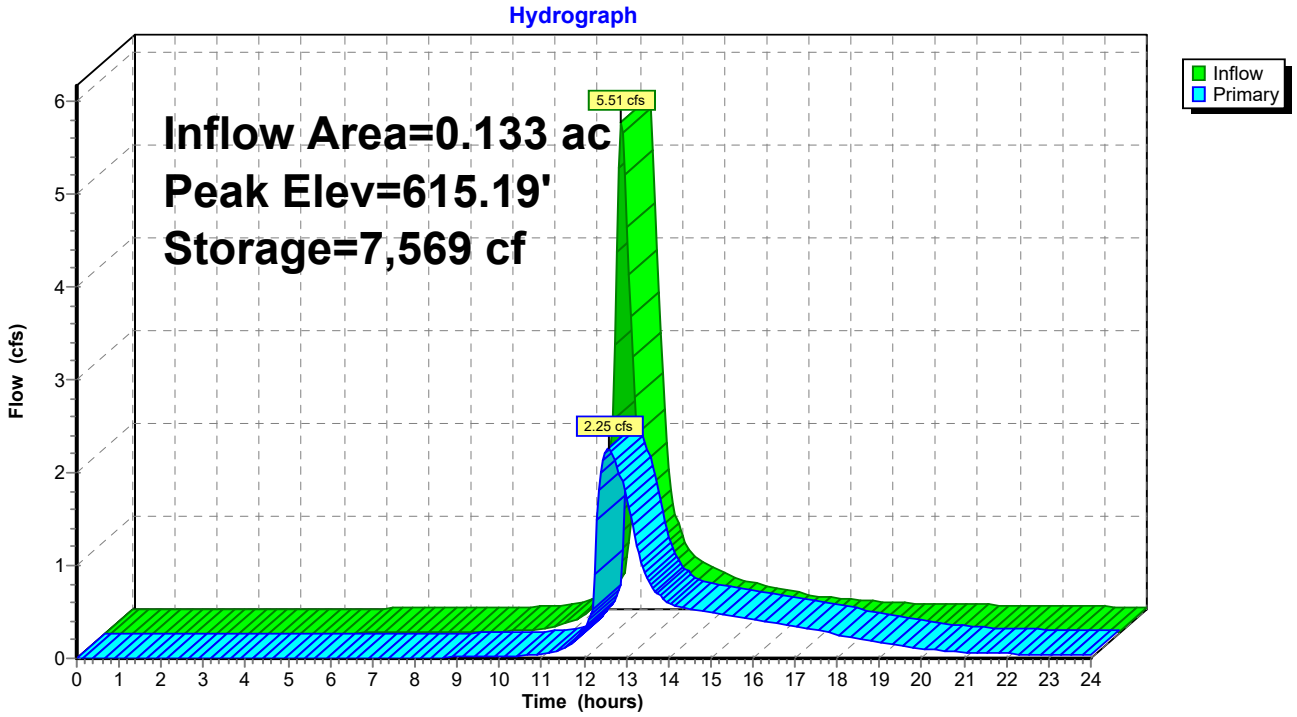
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=615.19'
Storage=7,569 cf
5.51 cfs
2.25 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Area-Storage for Pond DB-6: DB-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
612.25	0	614.33	5,355	616.41	10,710
612.29	103	614.37	5,458	616.45	10,813
612.33	206	614.41	5,561	616.49	10,916
612.37	309	614.45	5,664	616.53	11,019
612.41	412	614.49	5,767	616.57	11,122
612.45	515	614.53	5,870	616.61	11,225
612.49	618	614.57	5,973	616.65	11,328
612.53	721	614.61	6,076	616.69	11,431
612.57	824	614.65	6,179	616.73	11,534
612.61	927	614.69	6,282	616.77	11,637
612.65	1,030	614.73	6,385	616.81	11,740
612.69	1,133	614.77	6,488	616.85	11,843
612.73	1,236	614.81	6,591	616.89	11,946
612.77	1,339	614.85	6,694	616.93	12,049
612.81	1,442	614.89	6,797	616.97	12,152
612.85	1,545	614.93	6,900	617.01	12,255
612.89	1,648	614.97	7,003	617.05	12,358
612.93	1,751	615.01	7,106	617.09	12,461
612.97	1,854	615.05	7,209	617.13	12,564
613.01	1,957	615.09	7,312	617.17	12,667
613.05	2,060	615.13	7,415	617.21	12,770
613.09	2,163	615.17	7,518	617.25	12,873
613.13	2,266	615.21	7,621	617.29	12,873
613.17	2,369	615.25	7,724	617.33	12,873
613.21	2,472	615.29	7,827	617.37	12,873
613.25	2,575	615.33	7,930	617.41	12,873
613.29	2,678	615.37	8,033	617.45	**12,873**
613.33	2,781	615.41	8,136	617.49	12,873
613.37	2,884	615.45	8,239	617.53	12,873
613.41	2,987	615.49	8,342	617.57	12,873
613.45	3,090	615.53	8,445	617.61	12,873
613.49	3,193	615.57	8,548	617.65	12,873
613.53	3,296	615.61	8,651	617.69	12,873
613.57	3,399	615.65	8,754	617.73	12,873
613.61	3,502	615.69	8,857		
613.65	3,604	615.73	8,960		
613.69	3,707	615.77	9,063		
613.73	3,810	615.81	9,166		
613.77	3,913	615.85	9,269		
613.81	4,016	615.89	9,372		
613.85	4,119	615.93	9,475		
613.89	4,222	615.97	9,578		
613.93	4,325	616.01	9,681		
613.97	4,428	616.05	9,784		
614.01	4,531	616.09	9,887		
614.05	4,634	616.13	9,990		
614.09	4,737	616.17	10,093		
614.13	4,840	616.21	10,196		
614.17	4,943	616.25	10,299		
614.21	5,046	616.29	10,402		
614.25	5,149	616.33	10,505		
614.29	5,252	616.37	10,608		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 4.03" for 10-YR event
Inflow = 2.40 cfs @ 12.09 hrs, Volume= 0.182 af
Outflow = 0.43 cfs @ 12.55 hrs, Volume= 0.176 af, Atten= 82%, Lag= 27.5 min
Primary = 0.43 cfs @ 12.55 hrs, Volume= 0.176 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 617.02' @ 12.55 hrs Surf.Area= 3,131 sf Storage= 3,259 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 109.4 min calculated for 0.175 af (96% of inflow)
Center-of-Mass det. time= 88.4 min (874.4 - 786.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.43 cfs @ 12.55 hrs HW=617.02' (Free Discharge)
└─**1=Culvert** (Passes 0.43 cfs of 0.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.95 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-7: DB-7 - Chamber Wizard Field A

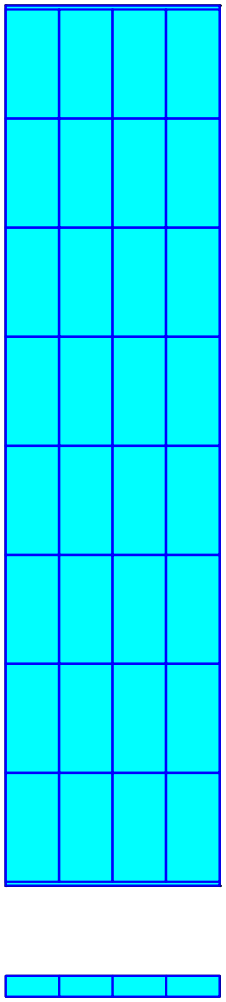
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

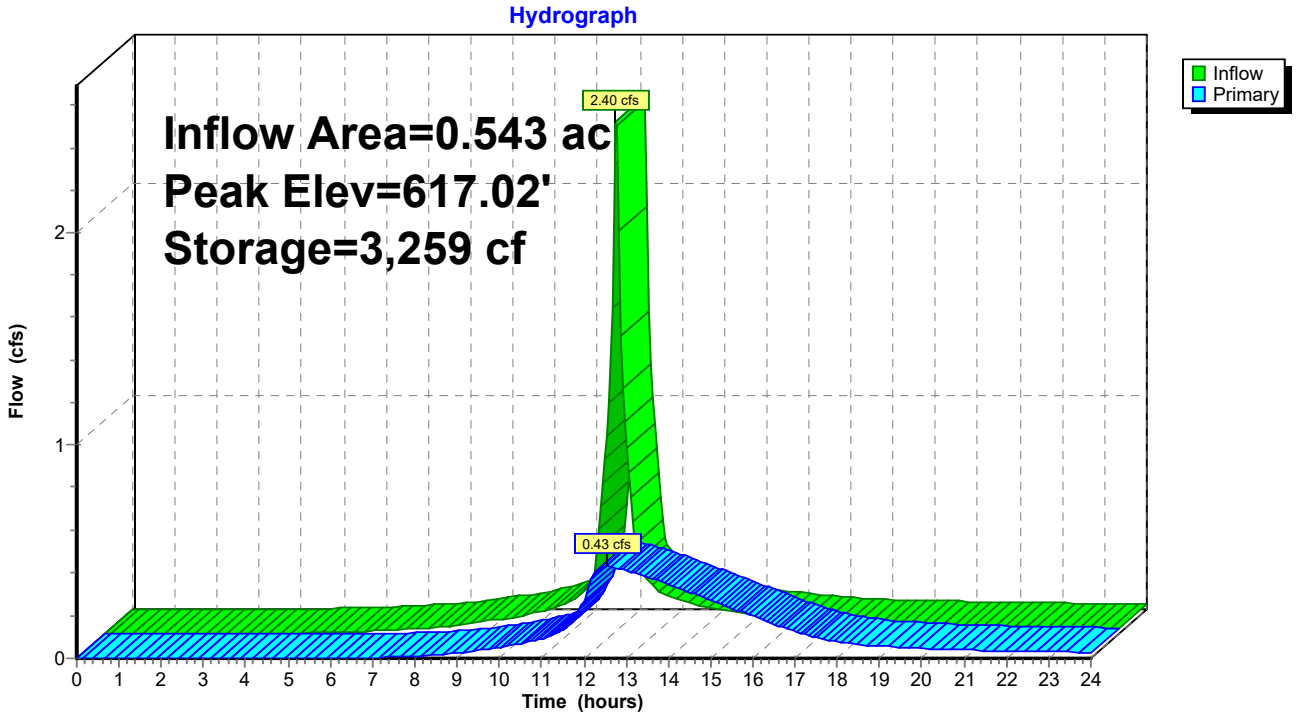
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=617.02'
Storage=3,259 cf
2.40 cfs
0.43 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-7: DB-7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.80	0	616.84	2,771	617.88	5,328
615.82	53	616.86	2,824	617.90	5,328
615.84	107	616.88	2,877	617.92	5,328
615.86	160	616.90	2,930	617.94	5,328
615.88	213	616.92	2,984	617.96	5,328
615.90	266	616.94	3,037	617.98	5,328
615.92	320	616.96	3,090	618.00	5,328
615.94	373	616.98	3,144	618.02	5,328
615.96	426	617.00	3,197	618.04	5,328
615.98	480	617.02	3,250	618.06	5,328
616.00	533	617.04	3,303	618.08	5,328
616.02	586	617.06	3,357	618.10	5,328
616.04	639	617.08	3,410	618.12	5,328
616.06	693	617.10	3,463	618.14	5,328
616.08	746	617.12	3,516	618.16	5,328
616.10	799	617.14	3,570	618.18	5,328
616.12	852	617.16	3,623	618.20	5,328
616.14	906	617.18	3,676	618.22	5,328
616.16	959	617.20	3,730	618.24	5,328
616.18	1,012	617.22	3,783	618.26	5,328
616.20	1,066	617.24	3,836	618.28	5,328
616.22	1,119	617.26	3,889	618.30	5,328
616.24	1,172	617.28	3,943	618.32	5,328
616.26	1,225	617.30	3,996	618.34	5,328
616.28	1,279	617.32	4,049	618.36	5,328
616.30	1,332	617.34	4,103	618.38	5,328
616.32	1,385	617.36	4,156	618.40	5,328
616.34	1,439	617.38	4,209	618.42	5,328
616.36	1,492	617.40	4,262	618.44	5,328
616.38	1,545	617.42	4,316	618.46	**5,328**
616.40	1,598	617.44	4,369		
616.42	1,652	617.46	4,422		
616.44	1,705	617.48	4,476		
616.46	1,758	617.50	4,529		
616.48	1,812	617.52	4,582		
616.50	1,865	617.54	4,635		
616.52	1,918	617.56	4,689		
616.54	1,971	617.58	4,742		
616.56	2,025	617.60	4,795		
616.58	2,078	617.62	4,848		
616.60	2,131	617.64	4,902		
616.62	2,184	617.66	4,955		
616.64	2,238	617.68	5,008		
616.66	2,291	617.70	5,062		
616.68	2,344	617.72	5,115		
616.70	2,398	617.74	5,168		
616.72	2,451	617.76	5,221		
616.74	2,504	617.78	5,275		
616.76	2,557	617.80	5,328		
616.78	2,611	617.82	5,328		
616.80	2,664	617.84	5,328		
616.82	2,717	617.86	5,328		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac, 62.75% Impervious, Inflow Depth > 3.82" for 10-YR event				
Inflow =	2.94 cfs @	12.09 hrs,	Volume=	0.220 af	
Outflow =	2.94 cfs @	12.09 hrs,	Volume=	0.220 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.35 cfs @	12.09 hrs,	Volume=	0.144 af	
Secondary =	2.60 cfs @	12.09 hrs,	Volume=	0.076 af	

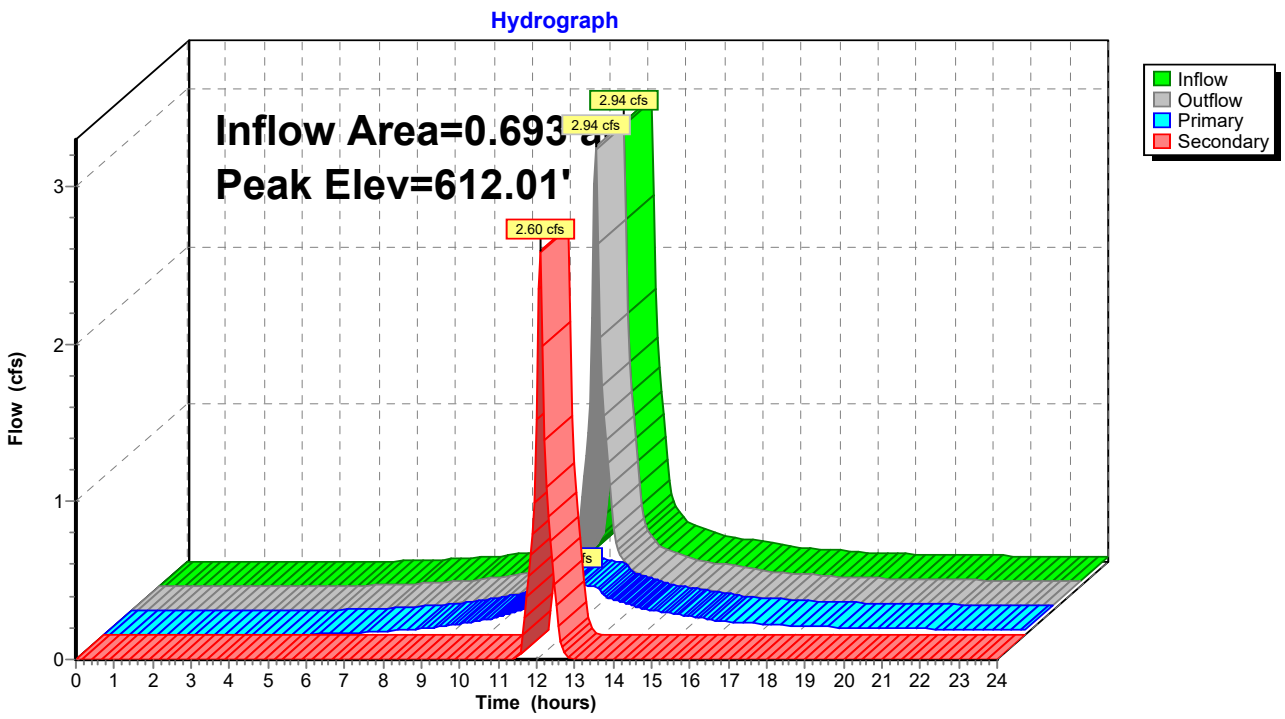
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.01' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.35 cfs @ 12.09 hrs HW=611.99' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.35 cfs @ 3.98 fps)

Secondary OutFlow Max=2.53 cfs @ 12.09 hrs HW=611.99' (Free Discharge)
└**2=Culvert** (Inlet Controls 2.53 cfs @ 3.79 fps)

Pond ICS-1: ICS-1



Stage-Area-Storage for Pond ICS-1: ICS-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	**0**	611.85	0
609.30	0	611.90	0
609.35	0	611.95	0
609.40	0	612.00	0
609.45	0	612.05	0
609.50	0	612.10	0
609.55	0	612.15	0
609.60	0	612.20	0
609.65	0	612.25	0
609.70	0	612.30	0
609.75	0	612.35	0
609.80	0	612.40	0
609.85	0	612.45	0
609.90	0	612.50	0
609.95	0	612.55	0
610.00	0	612.60	0
610.05	0	612.65	0
610.10	0	612.70	0
610.15	0	612.75	0
610.20	0	612.80	0
610.25	0	612.85	0
610.30	0	612.90	0
610.35	0	612.95	0
610.40	0	613.00	0
610.45	0	613.05	0
610.50	0	613.10	0
610.55	0	613.15	0
610.60	0	613.20	0
610.65	0	613.25	0
610.70	0		
610.75	0		
610.80	0		
610.85	0		
610.90	0		
610.95	0		
611.00	0		
611.05	0		
611.10	0		
611.15	0		
611.20	0		
611.25	0		
611.30	0		
611.35	0		
611.40	0		
611.45	0		
611.50	0		
611.55	0		
611.60	0		
611.65	0		
611.70	0		
611.75	0		
611.80	0		

Summary for Pond ICS-2: ICS-2

Inflow Area = 0.598 ac, 70.86% Impervious, Inflow Depth > 3.71" for 10-YR event
Inflow = 2.49 cfs @ 12.09 hrs, Volume= 0.185 af
Outflow = 2.49 cfs @ 12.09 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.129 af
Secondary = 2.05 cfs @ 12.09 hrs, Volume= 0.056 af

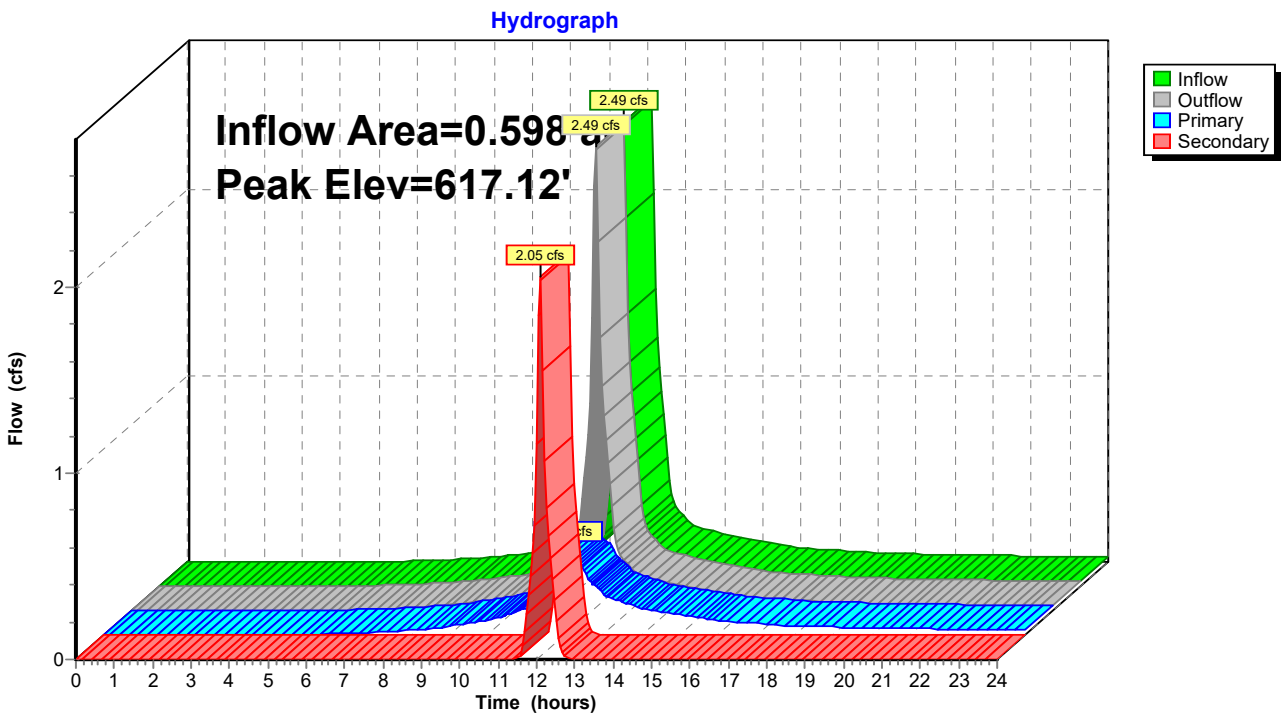
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.12' @ 12.09 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.44 cfs @ 12.09 hrs HW=617.10' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.44 cfs @ 5.02 fps)

Secondary OutFlow Max=1.99 cfs @ 12.09 hrs HW=617.10' (Free Discharge)
└**2=Culvert** (Barrel Controls 1.99 cfs @ 3.58 fps)

Pond ICS-2: ICS-2



Stage-Area-Storage for Pond ICS-2: ICS-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.85	**0**	616.37	0	616.89	0
615.86	0	616.38	0	616.90	0
615.87	0	616.39	0	616.91	0
615.88	0	616.40	0	616.92	0
615.89	0	616.41	0	616.93	0
615.90	0	616.42	0	616.94	0
615.91	0	616.43	0	616.95	0
615.92	0	616.44	0	616.96	0
615.93	0	616.45	0	616.97	0
615.94	0	616.46	0	616.98	0
615.95	0	616.47	0	616.99	0
615.96	0	616.48	0	617.00	0
615.97	0	616.49	0	617.01	0
615.98	0	616.50	0	617.02	0
615.99	0	616.51	0	617.03	0
616.00	0	616.52	0	617.04	0
616.01	0	616.53	0	617.05	0
616.02	0	616.54	0	617.06	0
616.03	0	616.55	0	617.07	0
616.04	0	616.56	0	617.08	0
616.05	0	616.57	0	617.09	0
616.06	0	616.58	0	617.10	0
616.07	0	616.59	0	617.11	0
616.08	0	616.60	0	617.12	0
616.09	0	616.61	0	617.13	0
616.10	0	616.62	0	617.14	0
616.11	0	616.63	0	617.15	0
616.12	0	616.64	0	617.16	0
616.13	0	616.65	0	617.17	0
616.14	0	616.66	0	617.18	0
616.15	0	616.67	0	617.19	0
616.16	0	616.68	0	617.20	0
616.17	0	616.69	0	617.21	0
616.18	0	616.70	0	617.22	0
616.19	0	616.71	0	617.23	0
616.20	0	616.72	0	617.24	0
616.21	0	616.73	0	617.25	0
616.22	0	616.74	0		
616.23	0	616.75	0		
616.24	0	616.76	0		
616.25	0	616.77	0		
616.26	0	616.78	0		
616.27	0	616.79	0		
616.28	0	616.80	0		
616.29	0	616.81	0		
616.30	0	616.82	0		
616.31	0	616.83	0		
616.32	0	616.84	0		
616.33	0	616.85	0		
616.34	0	616.86	0		
616.35	0	616.87	0		
616.36	0	616.88	0		

Summary for Pond ICS-6: ICS-6

Inflow Area =	2.630 ac, 39.25% Impervious, Inflow Depth > 2.40" for 10-YR event				
Inflow =	5.43 cfs @	12.22 hrs,	Volume=	0.525 af	
Outflow =	5.43 cfs @	12.22 hrs,	Volume=	0.525 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.25 cfs @	12.22 hrs,	Volume=	0.156 af	
Secondary =	5.18 cfs @	12.22 hrs,	Volume=	0.370 af	

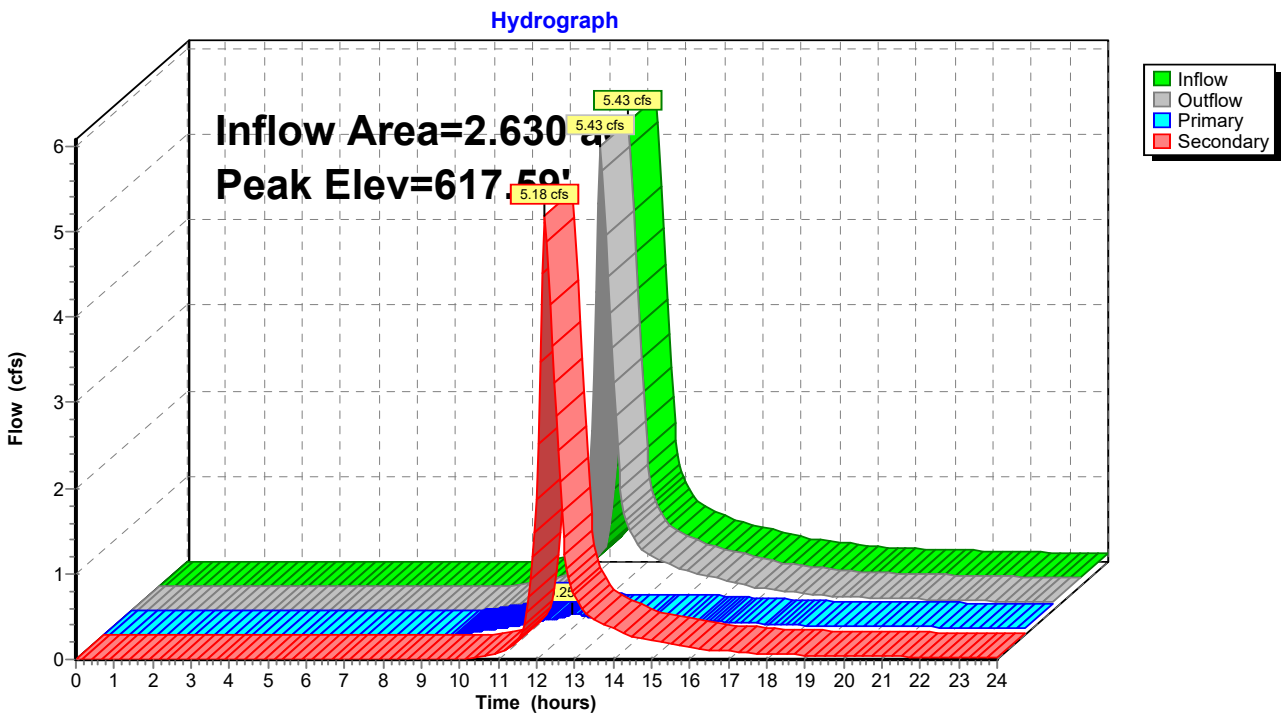
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.59' @ 12.22 hrs
Flood Elev= 617.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.25 cfs @ 12.22 hrs HW=617.57' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.25 cfs @ 2.88 fps)

Secondary OutFlow Max=5.10 cfs @ 12.22 hrs HW=617.57' (Free Discharge)
└─**2=Culvert** (Barrel Controls 5.10 cfs @ 4.57 fps)

Pond ICS-6: ICS-6



Stage-Area-Storage for Pond ICS-6: ICS-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
616.00	**0**	617.04	0
616.02	0	617.06	0
616.04	0	617.08	0
616.06	0	617.10	0
616.08	0	617.12	0
616.10	0	617.14	0
616.12	0	617.16	0
616.14	0	617.18	0
616.16	0	617.20	0
616.18	0	617.22	0
616.20	0	617.24	0
616.22	0	617.26	0
616.24	0	617.28	0
616.26	0	617.30	0
616.28	0	617.32	0
616.30	0	617.34	0
616.32	0	617.36	0
616.34	0	617.38	0
616.36	0	617.40	0
616.38	0	617.42	0
616.40	0	617.44	0
616.42	0	617.46	0
616.44	0	617.48	0
616.46	0	617.50	0
616.48	0	617.52	0
616.50	0	617.54	0
616.52	0	617.56	0
616.54	0	617.58	0
616.56	0		
616.58	0		
616.60	0		
616.62	0		
616.64	0		
616.66	0		
616.68	0		
616.70	0		
616.72	0		
616.74	0		
616.76	0		
616.78	0		
616.80	0		
616.82	0		
616.84	0		
616.86	0		
616.88	0		
616.90	0		
616.92	0		
616.94	0		
616.96	0		
616.98	0		
617.00	0		
617.02	0		

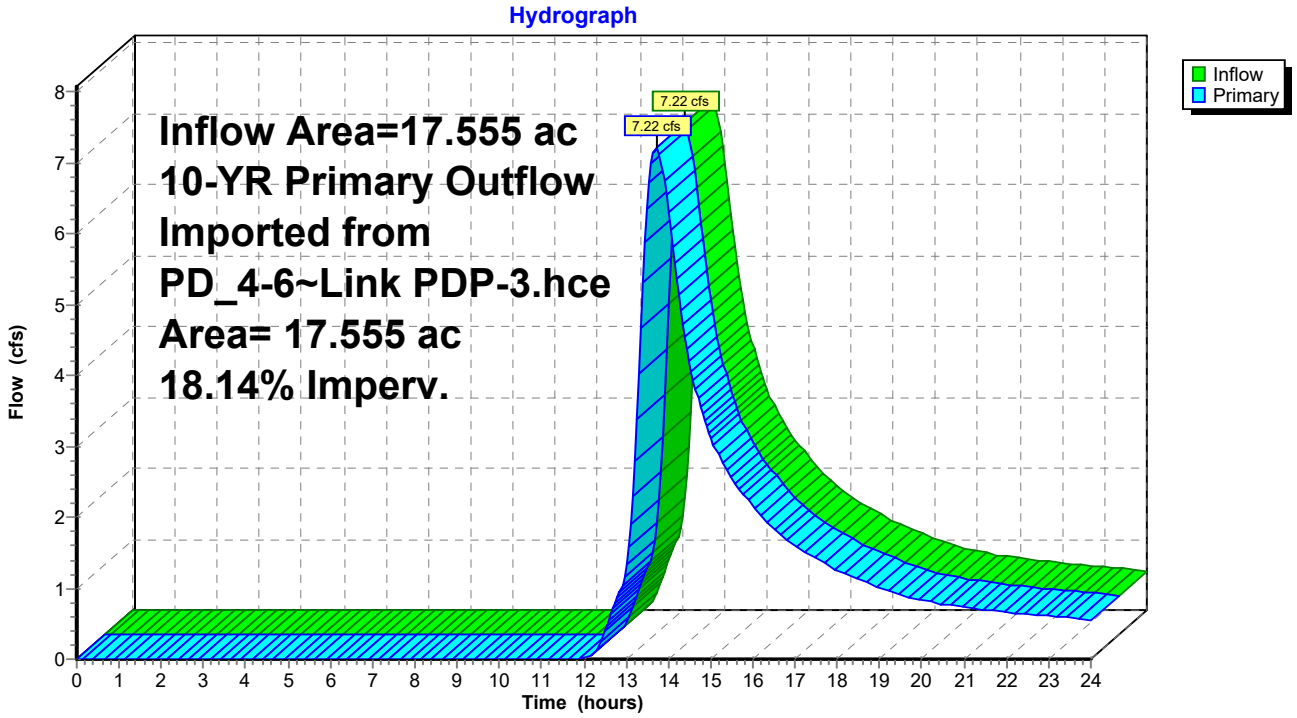
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 1.17" for 10-YR event
Inflow = 7.22 cfs @ 13.71 hrs, Volume= 1.710 af
Primary = 7.22 cfs @ 13.71 hrs, Volume= 1.710 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

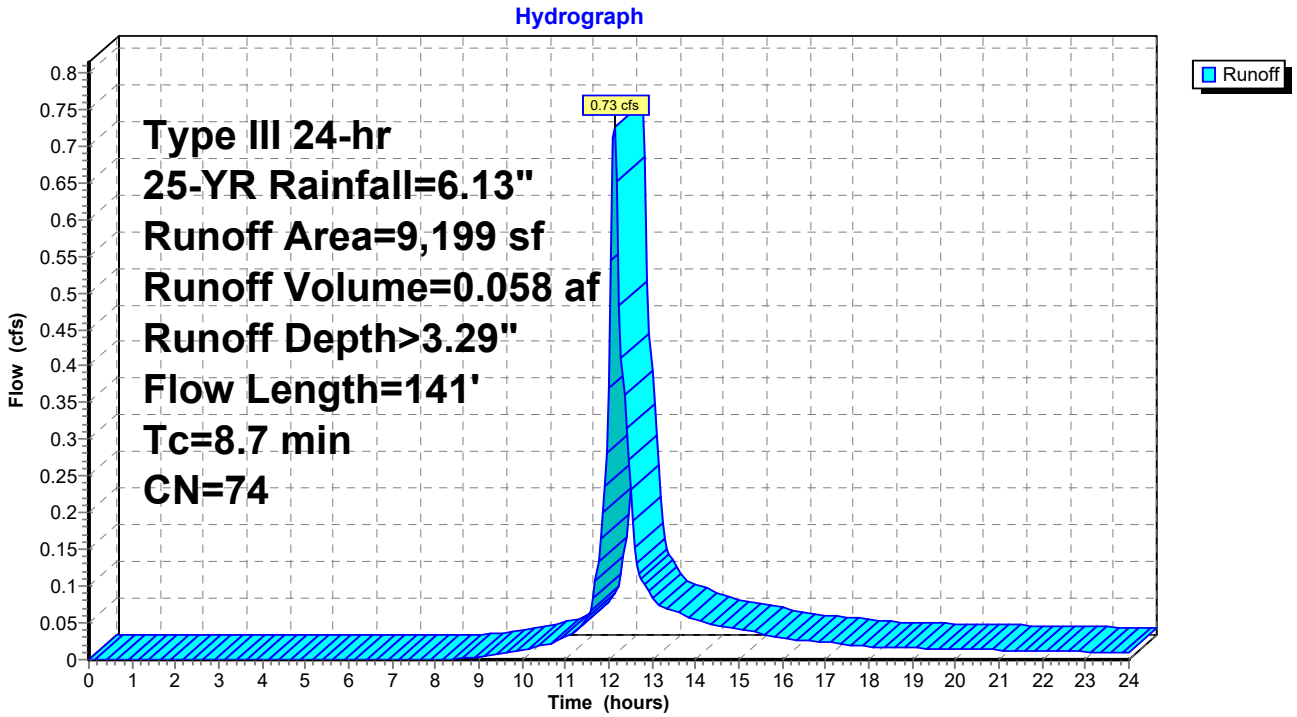
Runoff = 0.73 cfs @ 12.13 hrs, Volume= 0.058 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

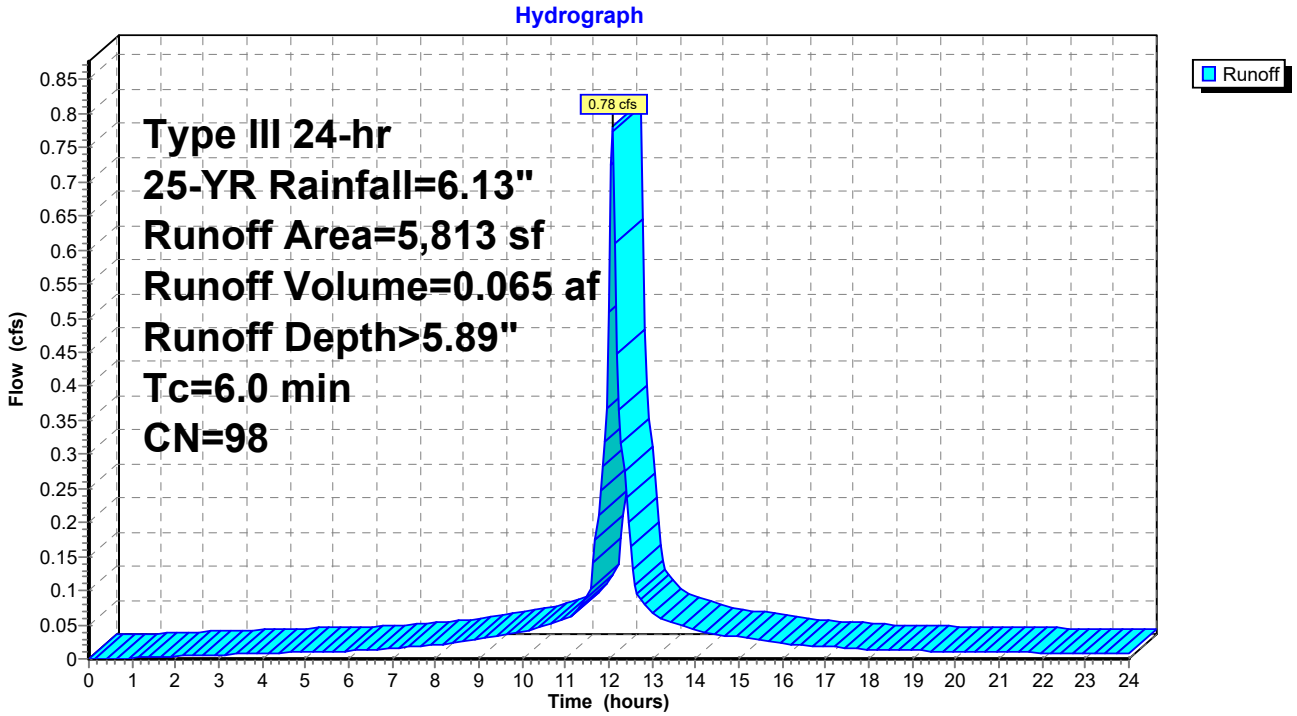
Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.065 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

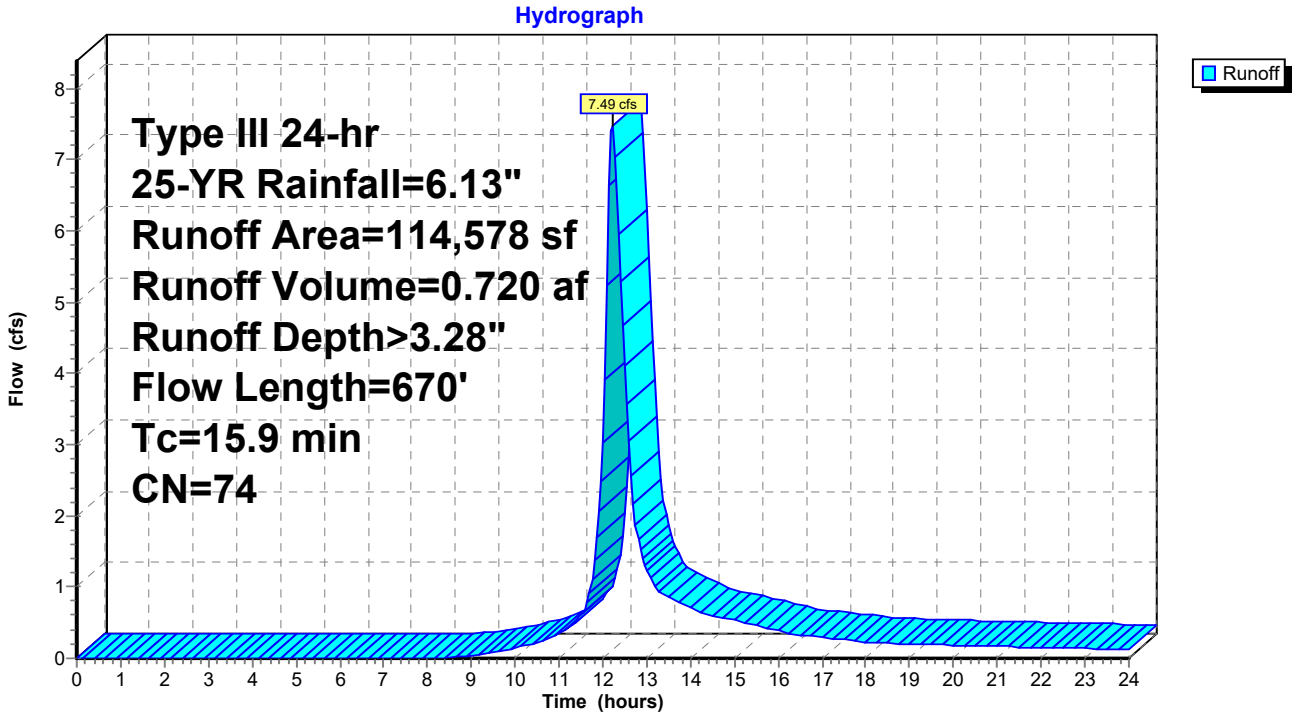
Runoff = 7.49 cfs @ 12.22 hrs, Volume= 0.720 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

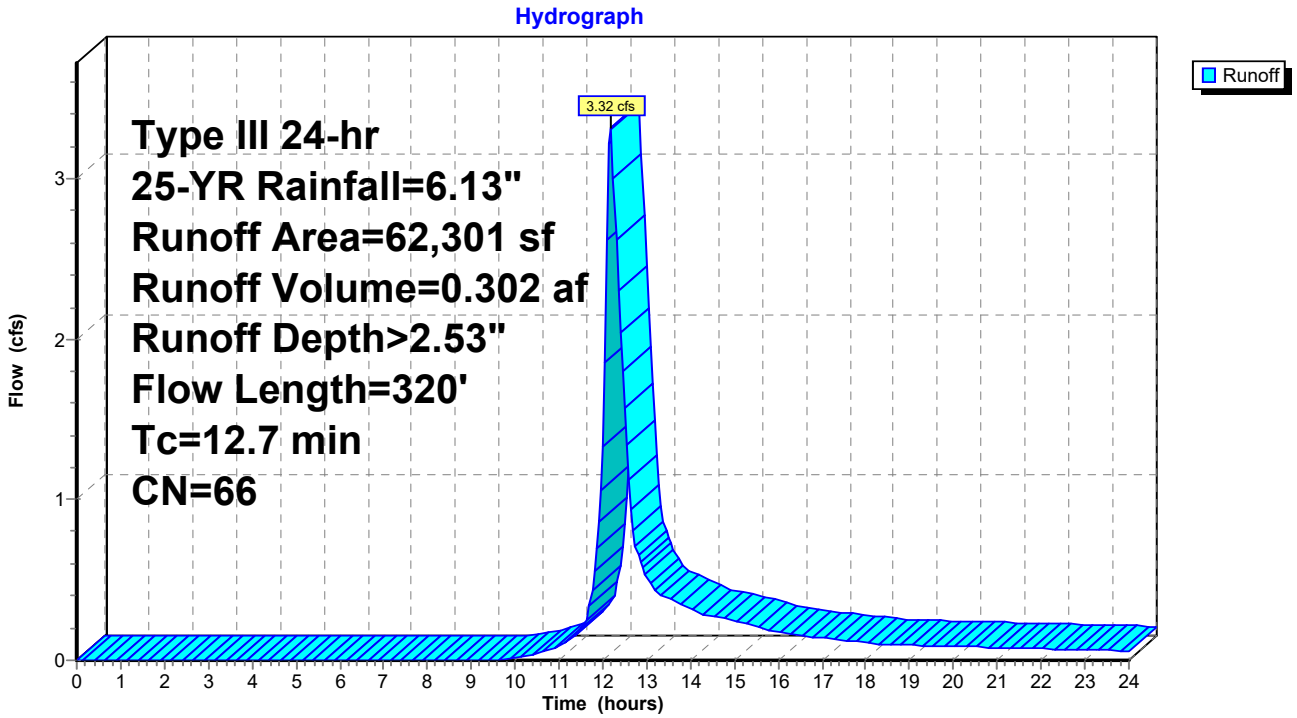
Runoff = 3.32 cfs @ 12.19 hrs, Volume= 0.302 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

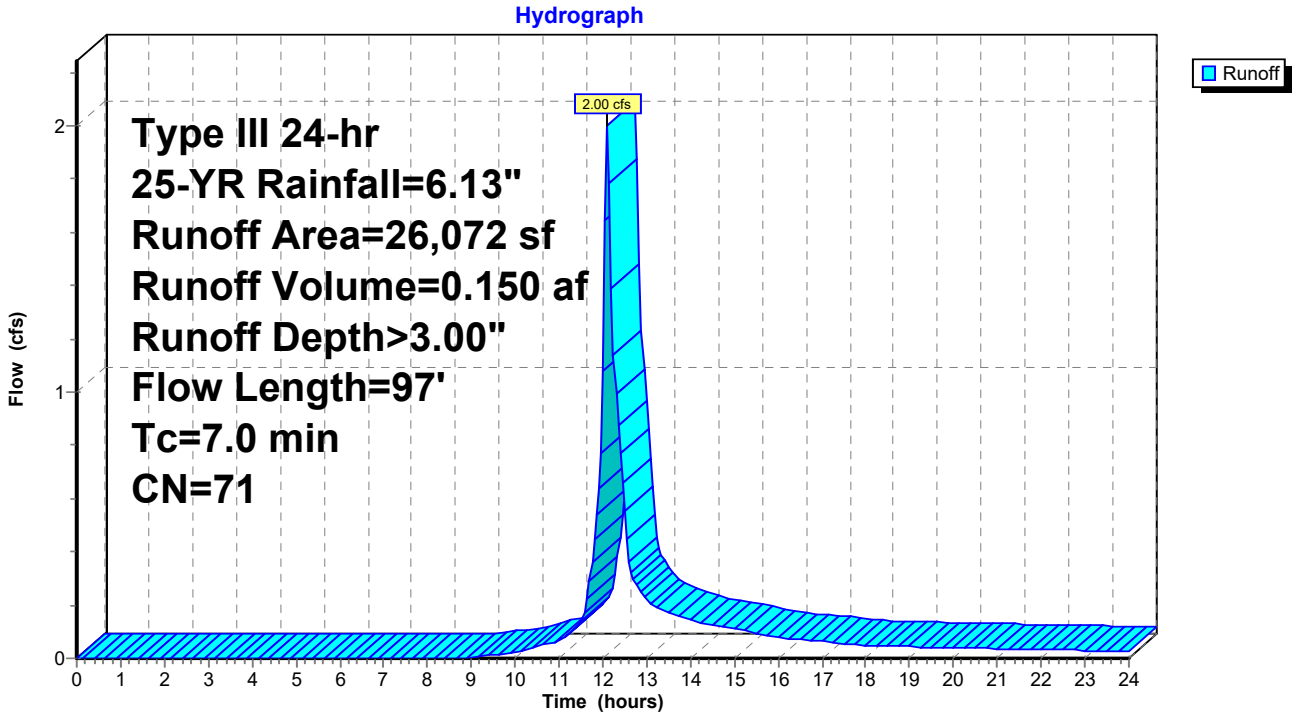
Runoff = 2.00 cfs @ 12.11 hrs, Volume= 0.150 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

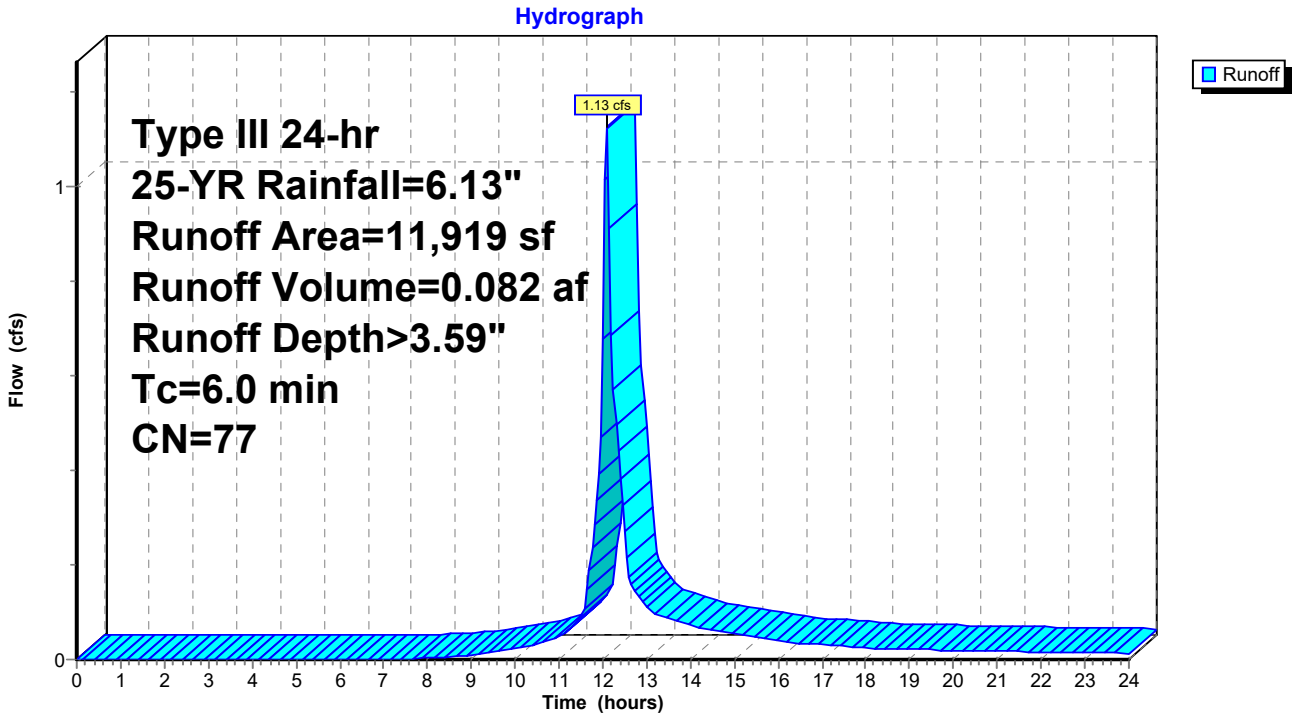
Runoff = 1.13 cfs @ 12.09 hrs, Volume= 0.082 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

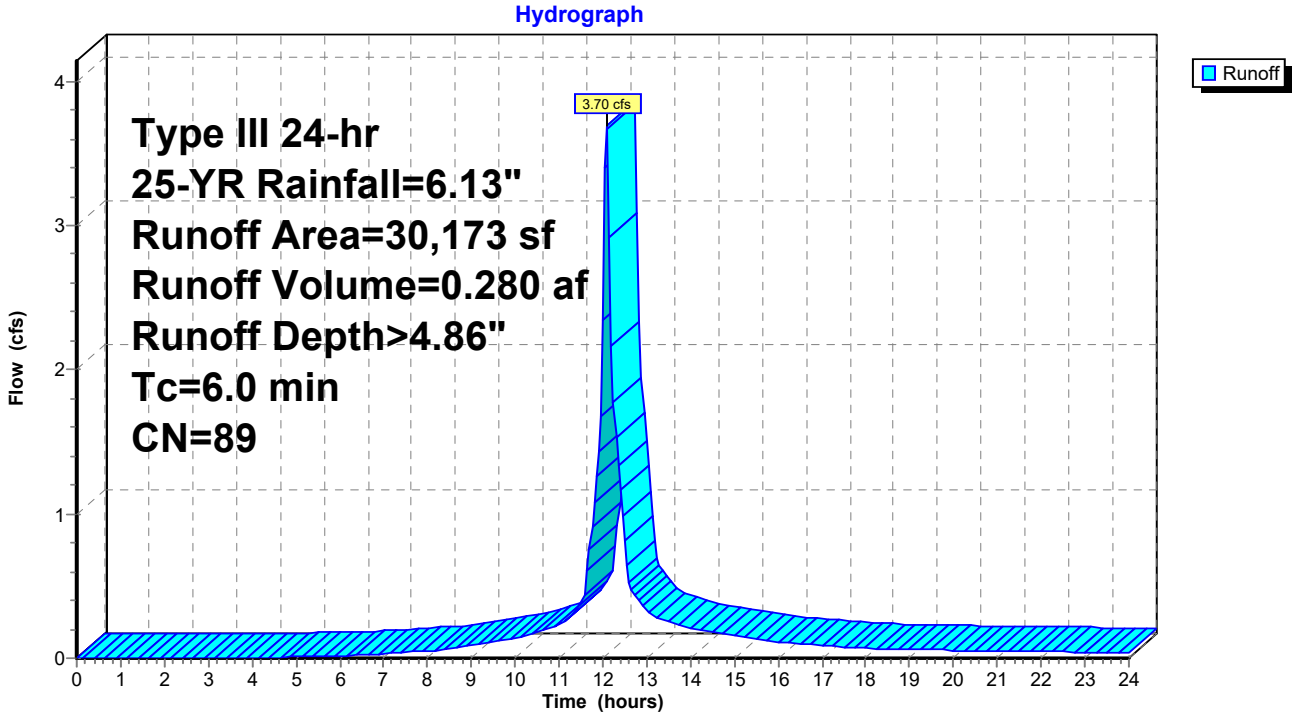
Runoff = 3.70 cfs @ 12.09 hrs, Volume= 0.280 af, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

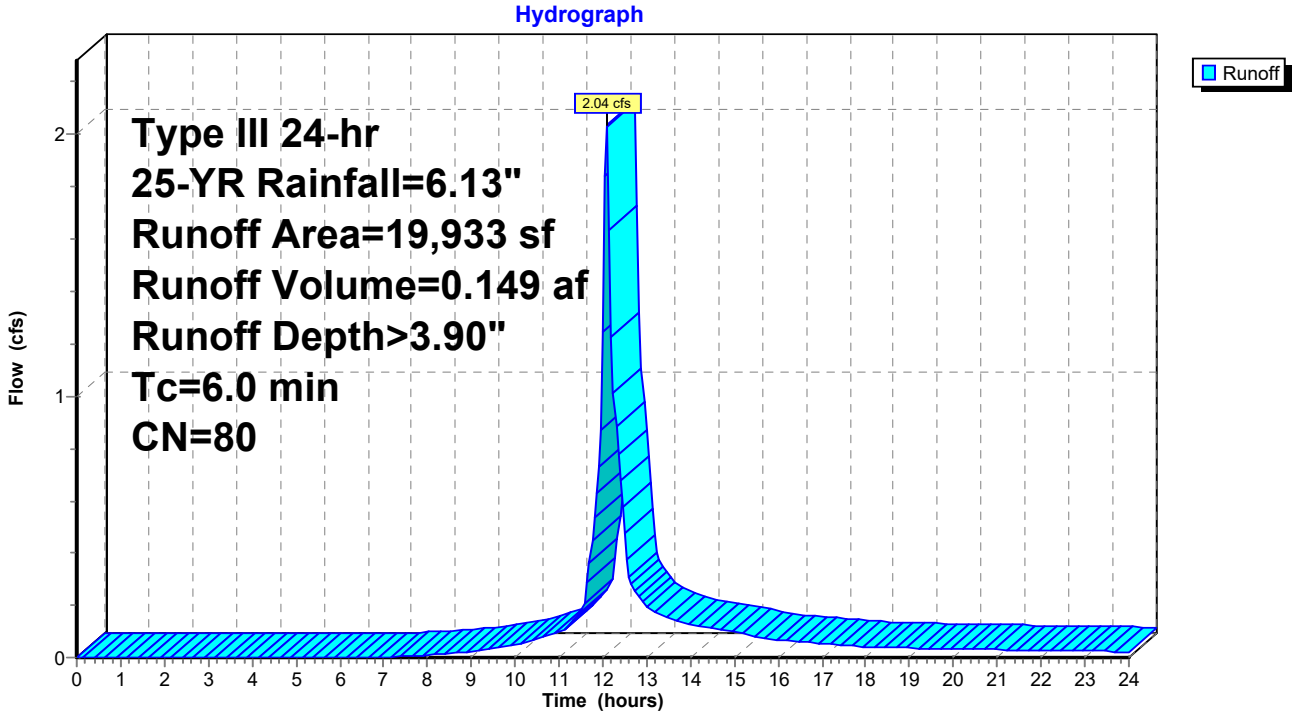
Runoff = 2.04 cfs @ 12.09 hrs, Volume= 0.149 af, Depth> 3.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

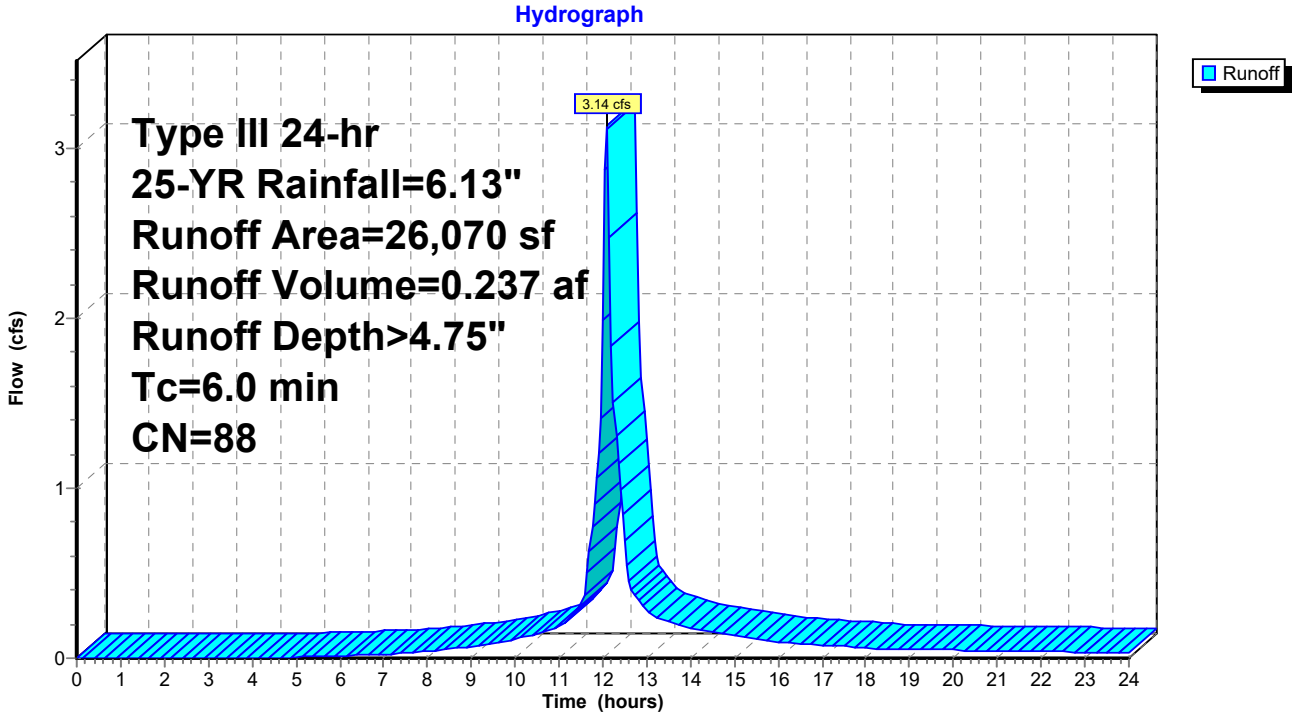
Runoff = 3.14 cfs @ 12.09 hrs, Volume= 0.237 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

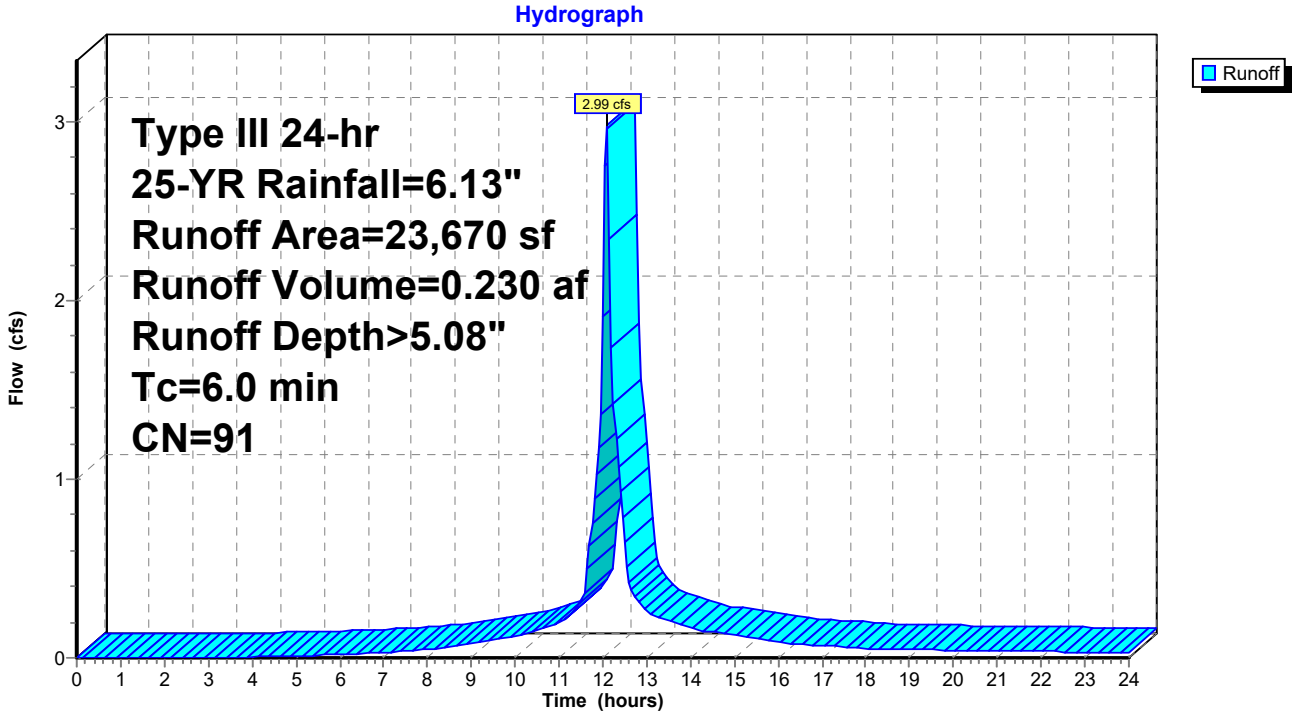
Runoff = 2.99 cfs @ 12.09 hrs, Volume= 0.230 af, Depth> 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

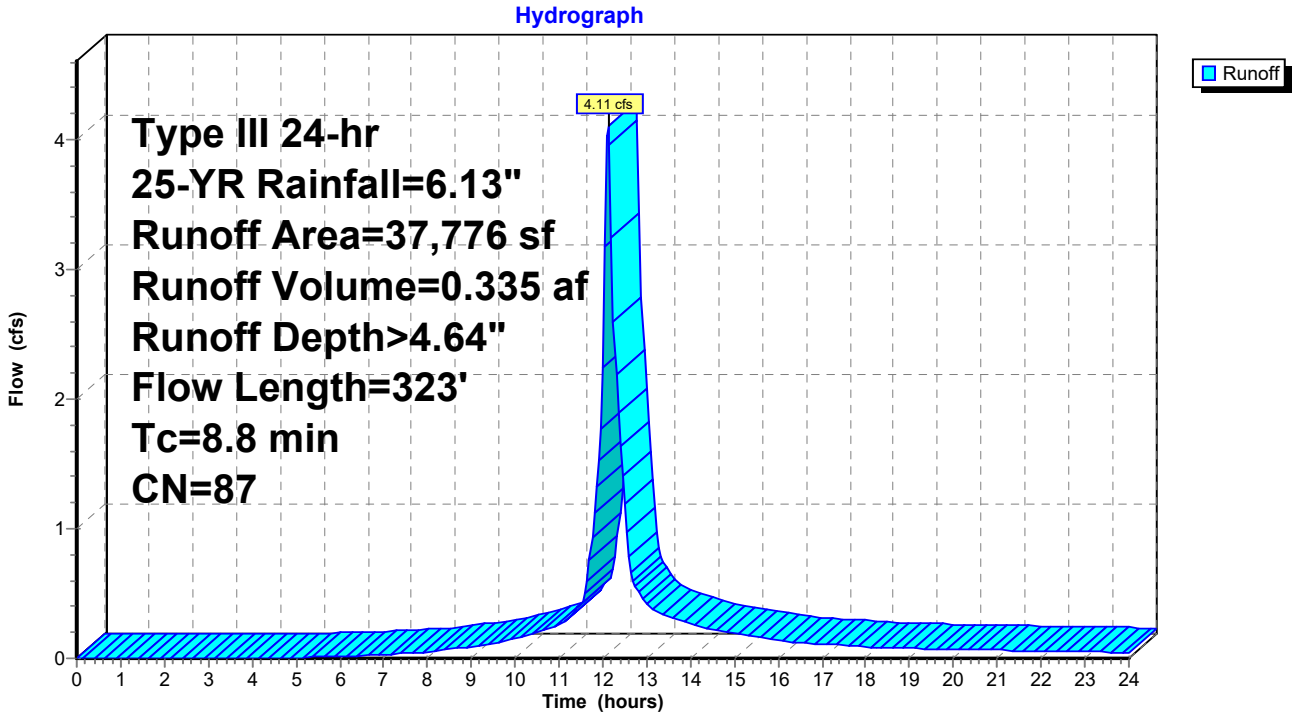
Runoff = 4.11 cfs @ 12.12 hrs, Volume= 0.335 af, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

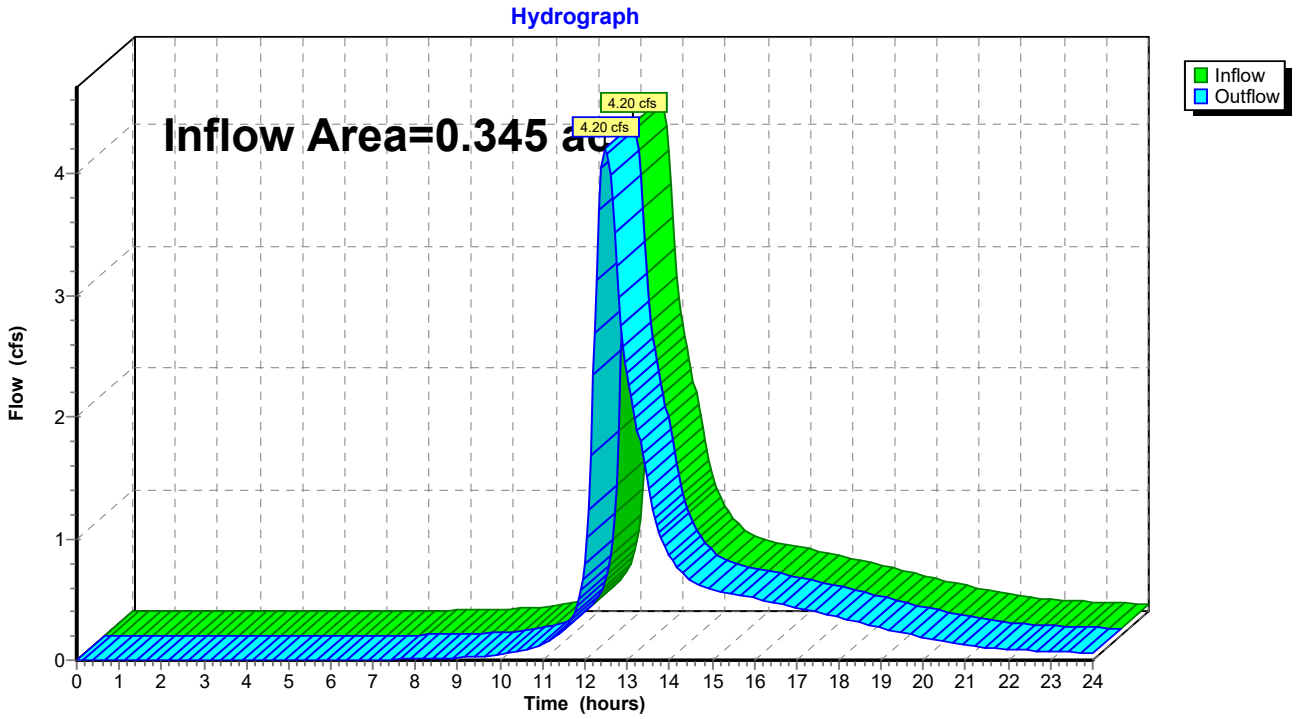


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 22.82" for 25-YR event
Inflow = 4.20 cfs @ 12.48 hrs, Volume= 0.655 af
Outflow = 4.20 cfs @ 12.48 hrs, Volume= 0.655 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

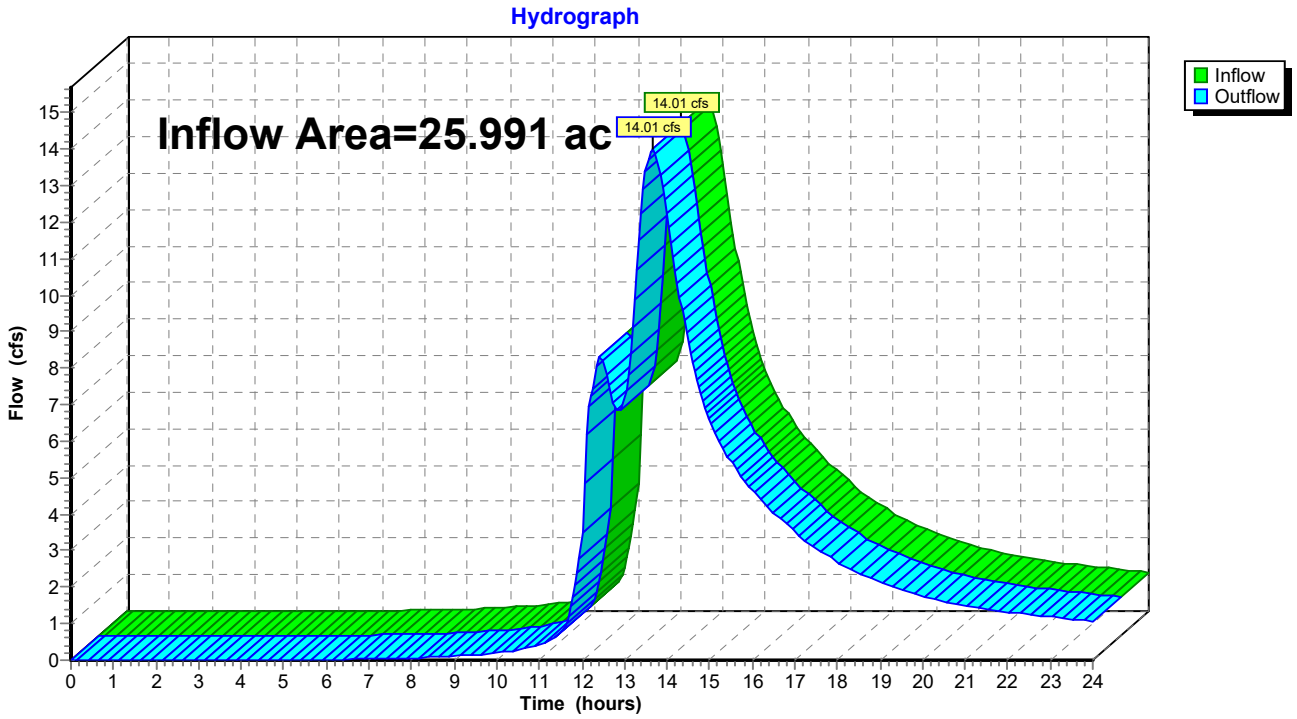


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 1.98" for 25-YR event
Inflow = 14.01 cfs @ 13.66 hrs, Volume= 4.297 af
Outflow = 14.01 cfs @ 13.66 hrs, Volume= 4.297 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 1.64" for 25-YR event
Inflow = 14.14 cfs @ 13.44 hrs, Volume= 3.383 af
Outflow = 12.57 cfs @ 13.69 hrs, Volume= 3.306 af, Atten= 11%, Lag= 14.7 min

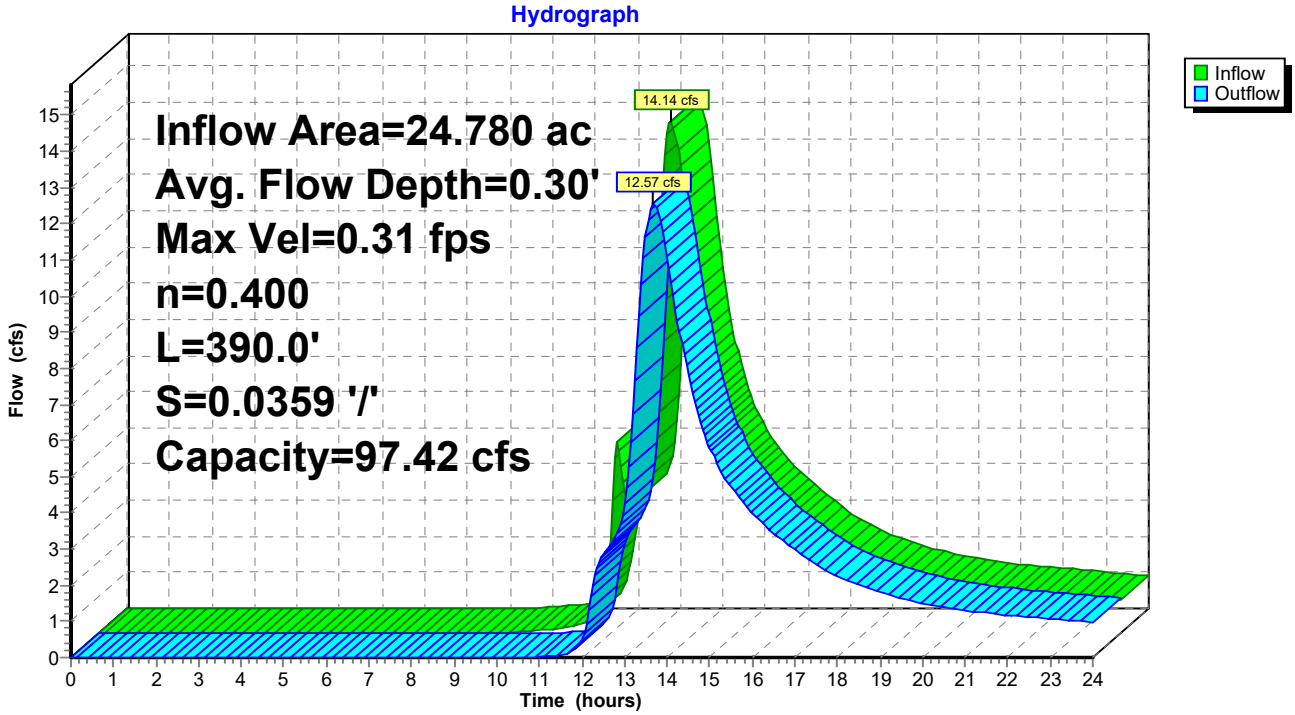
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 21.2 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 45.8 min

Peak Storage= 15,988 cf @ 13.69 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

‡

Reach DP-3: DP-3



Stage-Area-Storage for Reach DP-3: DP-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
618.00	0.0	0
618.01	1.3	508
618.02	2.6	1,017
618.03	3.9	1,528
618.04	5.2	2,041
618.05	6.6	2,555
618.06	7.9	3,071
618.07	9.2	3,589
618.08	10.5	4,108
618.09	11.9	4,629
618.10	13.2	5,152
618.11	14.6	5,676
618.12	15.9	6,202
618.13	17.3	6,729
618.14	18.6	7,259
618.15	20.0	7,789
618.16	21.3	8,322
618.17	22.7	8,856
618.18	24.1	9,391
618.19	25.5	9,929
618.20	26.8	10,468
618.21	28.2	11,008
618.22	29.6	11,550
618.23	31.0	12,094
618.24	32.4	12,640
618.25	33.8	13,187
618.26	35.2	13,736
618.27	36.6	14,286
618.28	38.0	14,838
618.29	39.5	15,392
618.30	40.9	15,947
618.31	42.3	16,504
618.32	43.8	17,063
618.33	45.2	17,623
618.34	46.6	18,185
618.35	48.1	18,748
618.36	49.5	19,313
618.37	51.0	19,880
618.38	52.4	20,449
618.39	53.9	21,019
618.40	55.4	21,590
618.41	56.8	22,164
618.42	58.3	22,739
618.43	59.8	23,315
618.44	61.3	23,894
618.45	62.8	24,473
618.46	64.2	25,055
618.47	65.7	25,638
618.48	67.2	26,223
618.49	68.7	26,809
618.50	70.3	27,398
618.51	71.8	27,987
618.52	73.3	28,579
618.53	74.8	29,172
618.54	76.3	29,766
618.55	77.9	30,362
618.56	79.4	30,960
618.57	80.9	31,560
618.58	82.5	32,161
618.59	84.0	32,764
618.60	85.6	33,368
618.61	87.1	33,974
618.62	88.7	34,582
618.63	90.2	35,192
618.64	91.8	35,803
618.65	93.4	36,415
618.66	94.9	37,030
618.67	96.5	37,645
618.68	98.1	38,263
618.69	99.7	38,882
618.70	101.3	39,503
618.71	102.9	40,126
618.72	104.5	40,750
618.73	106.1	41,375
618.74	107.7	42,003
618.75	109.3	42,632
618.76	110.9	43,263
618.77	112.6	43,895
618.78	114.2	44,529
618.79	115.8	45,164
618.80	117.4	45,802
618.81	119.1	46,440
618.82	120.7	47,081
618.83	122.4	47,723
618.84	124.0	48,367
618.85	125.7	49,012
618.86	127.3	49,659
618.87	129.0	50,308
618.88	130.7	50,958
618.89	132.3	51,610
618.90	134.0	52,264
618.91	135.7	52,919
618.92	137.4	53,576
618.93	139.1	54,235
618.94	140.8	54,895
618.95	142.5	55,556
618.96	144.2	56,220
618.97	145.9	56,885
618.98	147.6	57,552
618.99	149.3	58,220
619.00	**151.0**	**58,890**

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 4.47" for 25-YR event
Inflow = 1.81 cfs @ 12.10 hrs, Volume= 0.360 af
Outflow = 0.90 cfs @ 12.85 hrs, Volume= 0.317 af, Atten= 50%, Lag= 45.1 min
Discarded = 0.12 cfs @ 12.85 hrs, Volume= 0.135 af
Primary = 0.78 cfs @ 12.85 hrs, Volume= 0.182 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.21' @ 12.85 hrs Surf.Area= 2,907 sf Storage= 4,736 cf
Flood Elev= 611.00' Surf.Area= 3,452 sf Storage= 7,242 cf

Plug-Flow detention time= 161.9 min calculated for 0.316 af (88% of inflow)
Center-of-Mass det. time= 109.2 min (933.0 - 823.8)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	6,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,597 cf Overall - 1,797 cf Embedded = 6,800 cf
#2	607.00'	165 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 413 cf Overall x 40.0% Voids
#3	607.50'	120 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 600 cf Overall x 20.0% Voids
#4	608.00'	157 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 784 cf Overall x 20.0% Voids
		7,242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
608.00	1,568	1,197	1,197
609.00	2,130	1,849	3,046
610.00	2,760	2,445	5,491
611.00	3,452	3,106	8,597

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
607.50	825	413	413

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.50	1,200	0	0
608.00	1,200	600	600

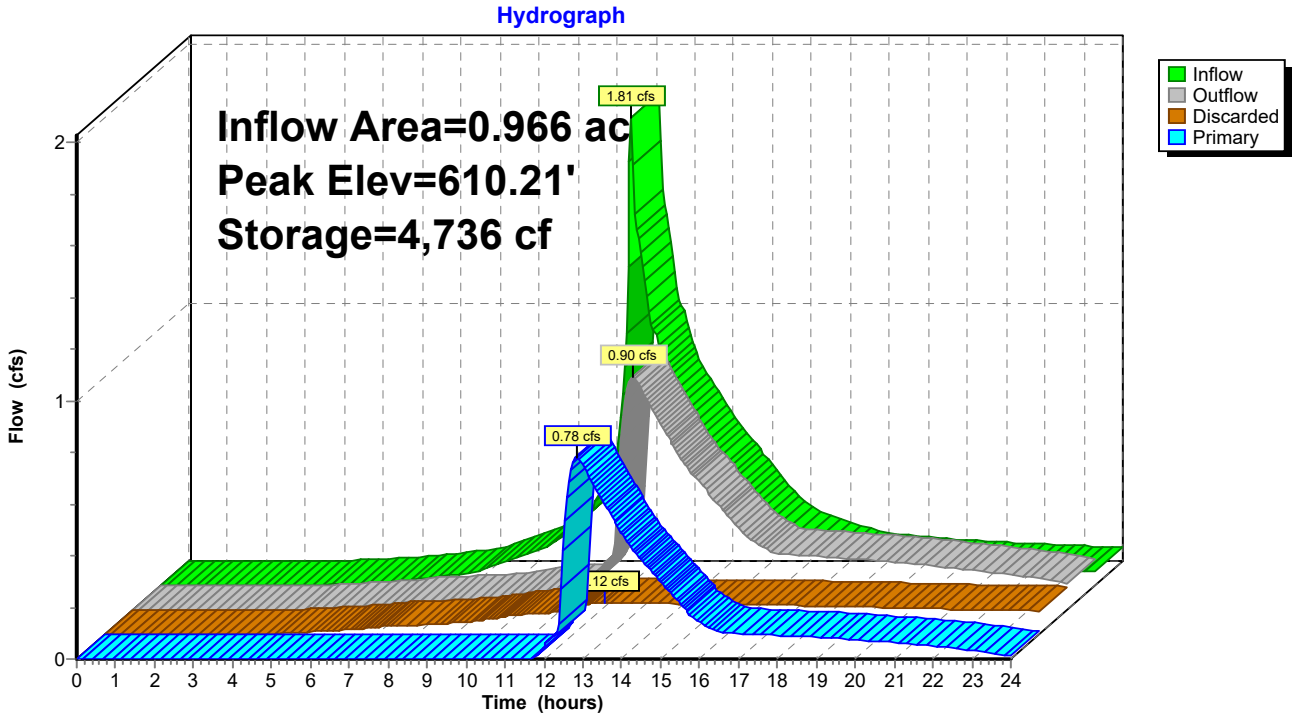
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,568	0	0
608.50	1,568	784	784

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert**
			L= 20.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 607.50' / 607.33' S= 0.0085 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	610.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 12.85 hrs HW=610.21' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.78 cfs @ 12.85 hrs HW=610.21' (Free Discharge)
└─**2=Culvert** (Passes 0.78 cfs of 2.05 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.11 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.67 cfs @ 1.51 fps)

Pond 1: SFB-1



Stage-Area-Storage for Pond 1: SFB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
607.00	825	0
607.05	862	17
607.10	899	37
607.15	936	58
607.20	974	81
607.25	1,011	106
607.30	1,048	132
607.35	1,085	161
607.40	1,122	191
607.45	1,159	224
607.50	1,197	258
607.55	1,234	271
607.60	1,271	285
607.65	1,308	302
607.70	1,345	320
607.75	1,382	340
607.80	1,419	362
607.85	1,457	386
607.90	1,494	412
607.95	1,531	440
608.00	1,568	469
608.05	1,596	485
608.10	1,624	503
608.15	1,652	522
608.20	1,680	543
608.25	1,709	565
608.30	1,737	588
608.35	1,765	613
608.40	1,793	639
608.45	1,821	667
608.50	1,849	696
608.55	1,877	789
608.60	1,905	884
608.65	1,933	980
608.70	1,961	1,077
608.75	1,990	1,176
608.80	2,018	1,276
608.85	2,046	1,378
608.90	2,074	1,481
608.95	2,102	1,585
609.00	2,130	1,691
609.05	2,161	1,798
609.10	2,193	1,907
609.15	2,224	2,017
609.20	2,256	2,129
609.25	2,288	2,243
609.30	2,319	2,358
609.35	2,351	2,475
609.40	2,382	2,593
609.45	2,414	2,713
609.50	2,445	2,835
609.55	2,476	2,958
609.60	2,508	3,082
609.65	2,539	3,208
609.70	2,571	3,336
609.75	2,603	3,465
609.80	2,634	3,596
609.85	2,666	3,729
609.90	2,697	3,863
609.95	2,729	3,999
610.00	2,760	4,136
610.05	2,795	4,275
610.10	2,829	4,415
610.15	2,864	4,558
610.20	2,898	4,702
610.25	2,933	4,847
610.30	2,968	4,995
610.35	3,002	5,144
610.40	3,037	5,295
610.45	3,071	5,448
610.50	3,106	5,602
610.55	3,141	5,758
610.60	3,175	5,916
610.65	3,210	6,076
610.70	3,244	6,237
610.75	3,279	6,400
610.80	3,314	6,565
610.85	3,348	6,732
610.90	3,383	6,900
610.95	3,417	7,070
611.00	**3,452**	**7,242**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 2.21" for 25-YR event
Inflow = 3.21 cfs @ 12.10 hrs, Volume= 0.779 af
Outflow = 0.85 cfs @ 14.93 hrs, Volume= 0.618 af, Atten= 73%, Lag= 170.2 min
Discarded = 0.42 cfs @ 14.93 hrs, Volume= 0.460 af
Primary = 0.43 cfs @ 14.93 hrs, Volume= 0.158 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.16' @ 14.93 hrs Surf.Area= 7,682 sf Storage= 11,701 cf
Flood Elev= 617.00' Surf.Area= 9,273 sf Storage= 18,810 cf

Plug-Flow detention time= 212.5 min calculated for 0.616 af (79% of inflow)
Center-of-Mass det. time= 124.3 min (1,006.4 - 882.1)

Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	17,591 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 22,460 cf Overall - 4,870 cf Embedded = 17,591 cf
#2	613.00'	491 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 1,227 cf Overall x 40.0% Voids
#3	613.50'	343 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,714 cf Overall x 20.0% Voids
#4	614.00'	386 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,929 cf Overall x 20.0% Voids
		18,810 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
614.00	3,857	2,982	2,982
615.00	5,537	4,697	7,679
616.00	7,376	6,457	14,136
617.00	9,273	8,325	22,460

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
613.50	2,800	1,227	1,227

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.50	3,000	0	0
614.00	3,857	1,714	1,714

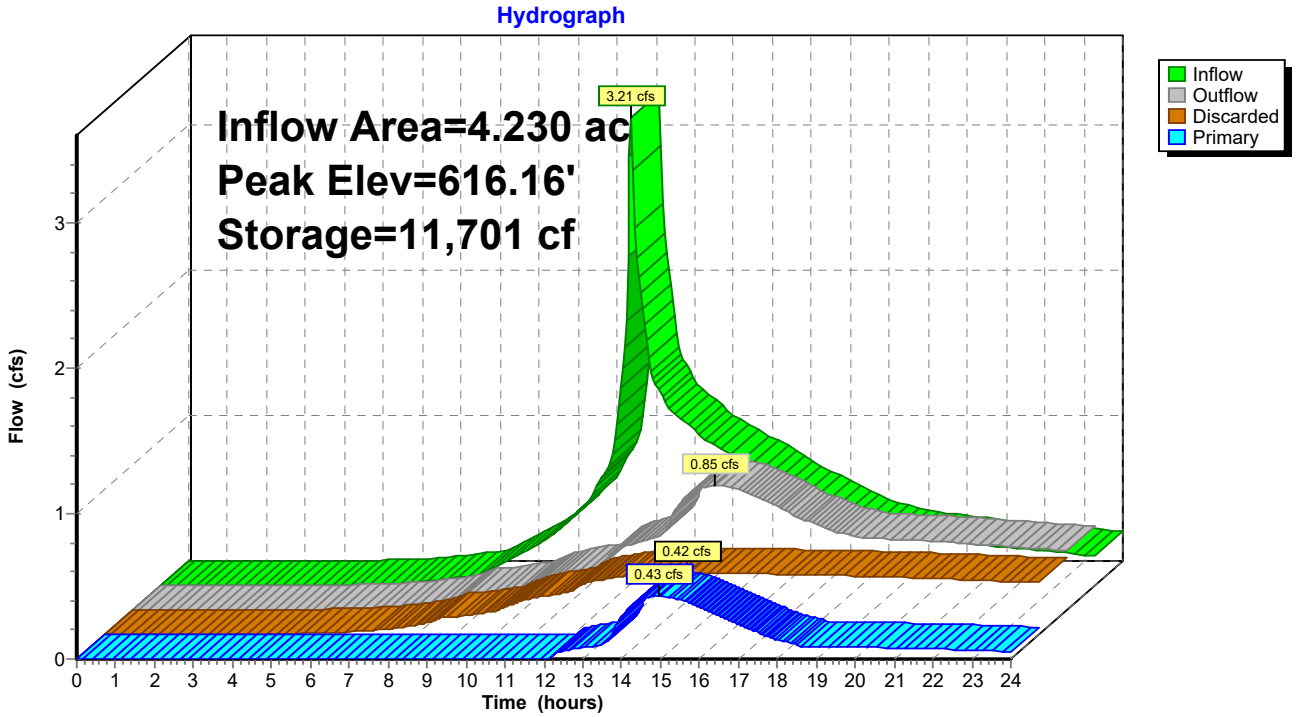
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.00	3,857	0	0
614.50	3,857	1,929	1,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.00'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.25'	**6.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 613.25' / 612.75' S= 0.0179 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.42 cfs @ 14.93 hrs HW=616.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.42 cfs)

Primary OutFlow Max=0.43 cfs @ 14.93 hrs HW=616.16' (Free Discharge)
└─**2=Culvert** (Passes 0.43 cfs of 1.22 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.51 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.33 cfs @ 1.31 fps)

Pond 2: SFB-2



Stage-Area-Storage for Pond 2: SFB-2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
613.00	2,107	0
613.05	2,194	43
613.10	2,282	89
613.15	2,369	137
613.20	2,457	187
613.25	2,545	239
613.30	2,632	294
613.35	2,720	351
613.40	2,807	411
613.45	2,895	472
613.50	2,982	536
613.55	3,069	566
613.60	3,157	596
613.65	3,244	628
613.70	3,332	660
613.75	3,420	694
613.80	3,507	728
613.85	3,595	763
613.90	3,682	799
613.95	3,770	836
614.00	3,857	875
614.05	3,941	915
614.10	4,025	960
614.15	4,109	1,009
614.20	4,193	1,062
614.25	4,277	1,120
614.30	4,361	1,182
614.35	4,445	1,247
614.40	4,529	1,318
614.45	4,613	1,392
614.50	4,697	1,470
614.55	4,781	1,707
614.60	4,865	1,948
614.65	4,949	2,194
614.70	5,033	2,443
614.75	5,117	2,697
614.80	5,201	2,955
614.85	5,285	3,217
614.90	5,369	3,483
614.95	5,453	3,754
615.00	5,537	4,029
615.05	5,629	4,308
615.10	5,721	4,592
615.15	5,813	4,880
615.20	5,905	5,173
615.25	5,997	5,470
615.30	6,089	5,773
615.35	6,181	6,079
615.40	6,273	6,391
615.45	6,365	6,707
615.50	6,457	7,027
615.55	6,548	7,352
615.60	6,640	7,682
615.65	6,732	8,016
615.70	6,824	8,355
615.75	6,916	8,699
615.80	7,008	9,047
615.85	7,100	9,400
615.90	7,192	9,757
615.95	7,284	10,119
616.00	7,376	10,485
616.05	7,471	10,856
616.10	7,566	11,232
616.15	7,661	11,613
616.20	7,755	11,998
616.25	7,850	12,389
616.30	7,945	12,783
616.35	8,040	13,183
616.40	8,135	13,587
616.45	8,230	13,997
616.50	8,325	14,410
616.55	8,419	14,829
616.60	8,514	15,252
616.65	8,609	15,680
616.70	8,704	16,113
616.75	8,799	16,551
616.80	8,894	16,993
616.85	8,988	17,440
616.90	9,083	17,892
616.95	9,178	18,348
617.00	**9,273**	**18,810**

Summary for Pond DB-1: DB-1

Inflow	=	3.34 cfs @	12.09 hrs,	Volume=	0.106 af
Outflow	=	0.53 cfs @	12.49 hrs,	Volume=	0.103 af, Atten= 84%, Lag= 24.1 min
Primary	=	0.53 cfs @	12.49 hrs,	Volume=	0.103 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.55' @ 12.49 hrs Surf.Area= 3,131 sf Storage= 3,454 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 101.6 min calculated for 0.103 af (98% of inflow)
Center-of-Mass det. time= 100.7 min (827.7 - 727.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.53 cfs @ 12.49 hrs HW=610.55' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.53 cfs @ 2.69 fps)
  ├─**2=Orifice/Grate** (Passes < 0.45 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 0.15 cfs potential flow)

Pond DB-1: DB-1 - Chamber Wizard Field A

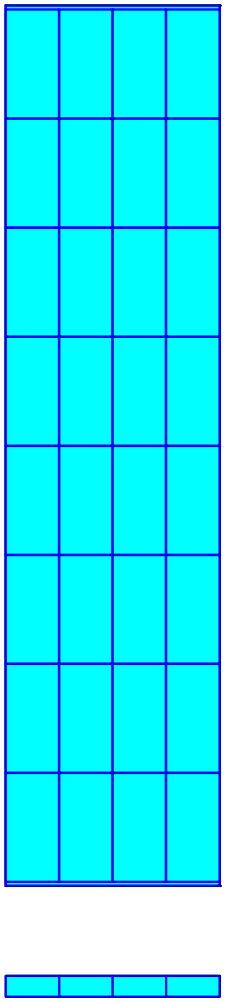
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

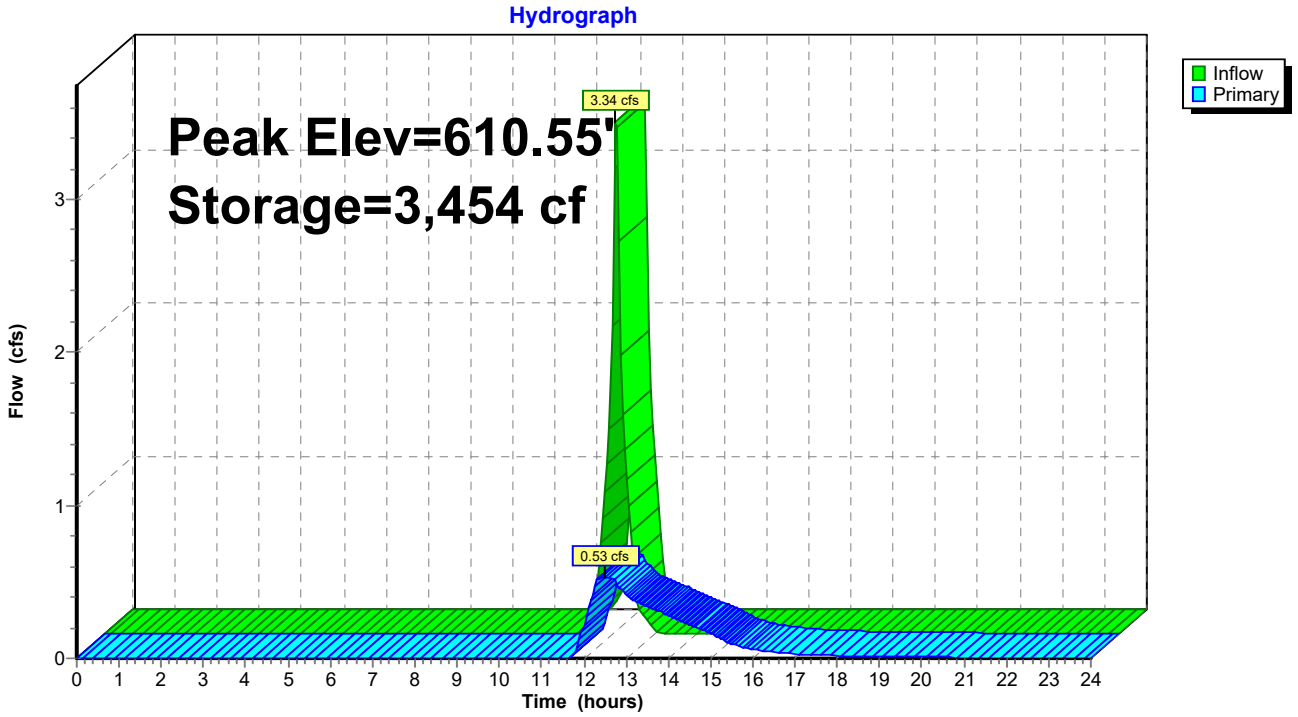
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Inflow
Primary
3.34 cfs
0.53 cfs
Peak Elev=610.55'
Storage=3,454 cf
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-1: DB-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	0	610.29	2,771	611.33	5,328
609.27	53	610.31	2,824	611.35	5,328
609.29	107	610.33	2,877	611.37	5,328
609.31	160	610.35	2,930	611.39	5,328
609.33	213	610.37	2,984	611.41	5,328
609.35	266	610.39	3,037	611.43	5,328
609.37	320	610.41	3,090	611.45	5,328
609.39	373	610.43	3,144	611.47	5,328
609.41	426	610.45	3,197	611.49	5,328
609.43	480	610.47	3,250	611.51	5,328
609.45	533	610.49	3,303	611.53	5,328
609.47	586	610.51	3,357	611.55	5,328
609.49	639	610.53	3,410	611.57	5,328
609.51	693	610.55	3,463	611.59	5,328
609.53	746	610.57	3,516	611.61	5,328
609.55	799	610.59	3,570	611.63	5,328
609.57	852	610.61	3,623	611.65	5,328
609.59	906	610.63	3,676	611.67	5,328
609.61	959	610.65	3,730	611.69	5,328
609.63	1,012	610.67	3,783	611.71	5,328
609.65	1,066	610.69	3,836	611.73	5,328
609.67	1,119	610.71	3,889	611.75	5,328
609.69	1,172	610.73	3,943	611.77	5,328
609.71	1,225	610.75	3,996	611.79	5,328
609.73	1,279	610.77	4,049	611.81	5,328
609.75	1,332	610.79	4,103	611.83	5,328
609.77	1,385	610.81	4,156	611.85	5,328
609.79	1,439	610.83	4,209	611.87	5,328
609.81	1,492	610.85	4,262	611.89	5,328
609.83	1,545	610.87	4,316	611.91	**5,328**
609.85	1,598	610.89	4,369		
609.87	1,652	610.91	4,422		
609.89	1,705	610.93	4,476		
609.91	1,758	610.95	4,529		
609.93	1,812	610.97	4,582		
609.95	1,865	610.99	4,635		
609.97	1,918	611.01	4,689		
609.99	1,971	611.03	4,742		
610.01	2,025	611.05	4,795		
610.03	2,078	611.07	4,848		
610.05	2,131	611.09	4,902		
610.07	2,184	611.11	4,955		
610.09	2,238	611.13	5,008		
610.11	2,291	611.15	5,062		
610.13	2,344	611.17	5,115		
610.15	2,398	611.19	5,168		
610.17	2,451	611.21	5,221		
610.19	2,504	611.23	5,275		
610.21	2,557	611.25	5,328		
610.23	2,611	611.27	5,328		
610.25	2,664	611.29	5,328		
610.27	2,717	611.31	5,328		

Summary for Pond DB-2: DB-2

Inflow	=	2.68 cfs @	12.09 hrs,	Volume=	0.079 af
Outflow	=	0.11 cfs @	12.62 hrs,	Volume=	0.070 af, Atten= 96%, Lag= 32.1 min
Primary	=	0.11 cfs @	12.62 hrs,	Volume=	0.070 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.43' @ 12.62 hrs Surf.Area= 3,131 sf Storage= 3,133 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 282.2 min calculated for 0.070 af (89% of inflow)
Center-of-Mass det. time= 279.1 min (1,006.1 - 727.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**6.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.11 cfs @ 12.62 hrs HW=616.43' (Free Discharge)
└─**1=Culvert** (Passes 0.11 cfs of 0.72 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.03 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

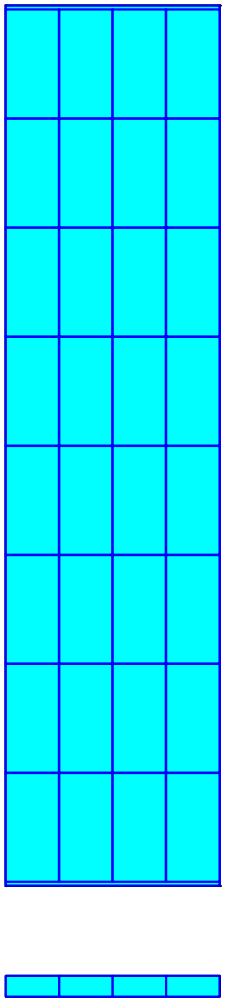
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

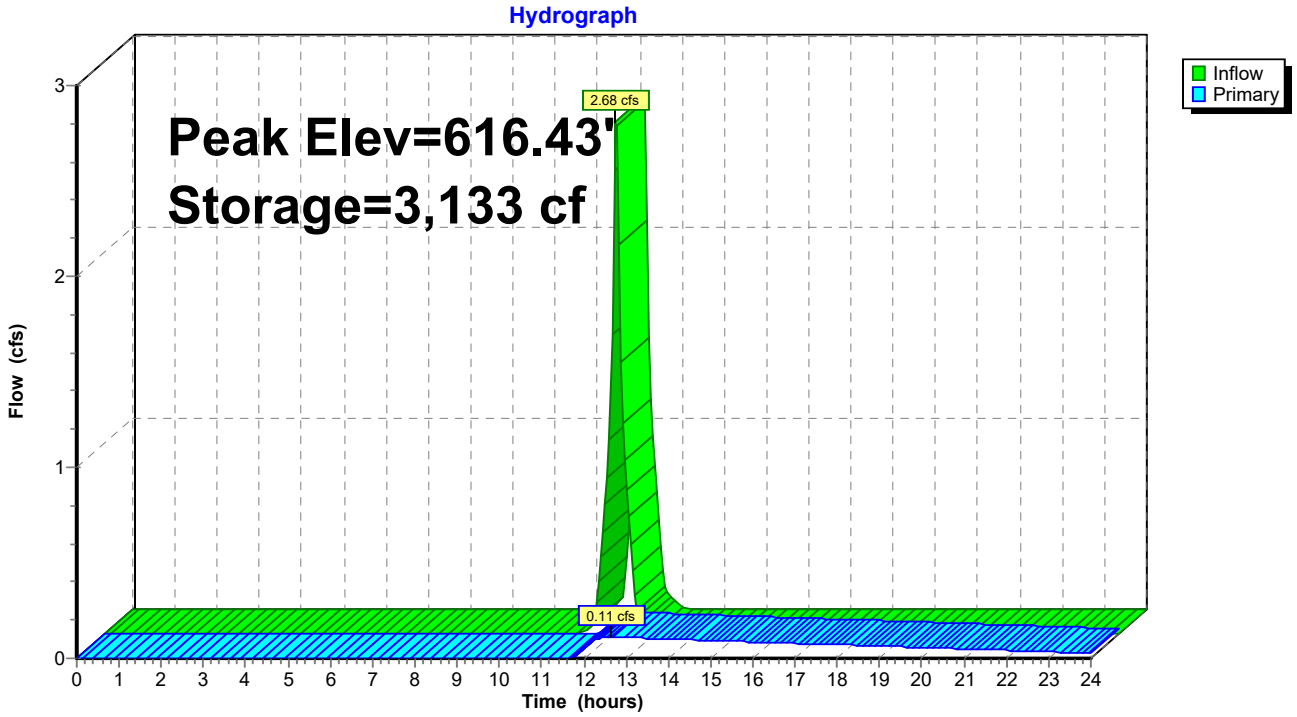
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Peak Elev=616.43'
Storage=3,133 cf
2.68 cfs
0.11 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-2: DB-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.25	0	616.29	2,771	617.33	5,328
615.27	53	616.31	2,824	617.35	5,328
615.29	107	616.33	2,877	617.37	5,328
615.31	160	616.35	2,930	617.39	5,328
615.33	213	616.37	2,984	617.41	5,328
615.35	266	616.39	3,037	617.43	5,328
615.37	320	616.41	3,090	617.45	5,328
615.39	373	616.43	3,144	617.47	5,328
615.41	426	616.45	3,197	617.49	5,328
615.43	480	616.47	3,250	617.51	5,328
615.45	533	616.49	3,303	617.53	5,328
615.47	586	616.51	3,357	617.55	5,328
615.49	639	616.53	3,410	617.57	5,328
615.51	693	616.55	3,463	617.59	5,328
615.53	746	616.57	3,516	617.61	5,328
615.55	799	616.59	3,570	617.63	5,328
615.57	852	616.61	3,623	617.65	5,328
615.59	906	616.63	3,676	617.67	5,328
615.61	959	616.65	3,730	617.69	5,328
615.63	1,012	616.67	3,783	617.71	5,328
615.65	1,066	616.69	3,836	617.73	5,328
615.67	1,119	616.71	3,889	617.75	5,328
615.69	1,172	616.73	3,943	617.77	5,328
615.71	1,225	616.75	3,996	617.79	5,328
615.73	1,279	616.77	4,049	617.81	5,328
615.75	1,332	616.79	4,103	617.83	5,328
615.77	1,385	616.81	4,156	617.85	5,328
615.79	1,439	616.83	4,209	617.87	5,328
615.81	1,492	616.85	4,262	617.89	5,328
615.83	1,545	616.87	4,316	617.91	**5,328**
615.85	1,598	616.89	4,369		
615.87	1,652	616.91	4,422		
615.89	1,705	616.93	4,476		
615.91	1,758	616.95	4,529		
615.93	1,812	616.97	4,582		
615.95	1,865	616.99	4,635		
615.97	1,918	617.01	4,689		
615.99	1,971	617.03	4,742		
616.01	2,025	617.05	4,795		
616.03	2,078	617.07	4,848		
616.05	2,131	617.09	4,902		
616.07	2,184	617.11	4,955		
616.09	2,238	617.13	5,008		
616.11	2,291	617.15	5,062		
616.13	2,344	617.17	5,115		
616.15	2,398	617.19	5,168		
616.17	2,451	617.21	5,221		
616.19	2,504	617.23	5,275		
616.21	2,557	617.25	5,328		
616.23	2,611	617.27	5,328		
616.25	2,664	617.29	5,328		
616.27	2,717	617.31	5,328		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 54.50" for 25-YR event
Inflow = 7.62 cfs @ 12.22 hrs, Volume= 0.606 af
Outflow = 3.97 cfs @ 12.51 hrs, Volume= 0.597 af, Atten= 48%, Lag= 17.5 min
Primary = 3.97 cfs @ 12.51 hrs, Volume= 0.597 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 615.96' @ 12.51 hrs Surf.Area= 2,902 sf Storage= 9,558 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 81.9 min calculated for 0.596 af (98% of inflow)
Center-of-Mass det. time= 73.8 min (864.3 - 790.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0** x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.97 cfs @ 12.51 hrs HW=615.96' (Free Discharge)
└─**1=Culvert** (Passes 3.97 cfs of 5.35 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.79 cfs @ 9.06 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 2.14 cfs @ 6.14 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 1.03 cfs @ 2.95 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-6: DB-6 - Chamber Wizard Field A

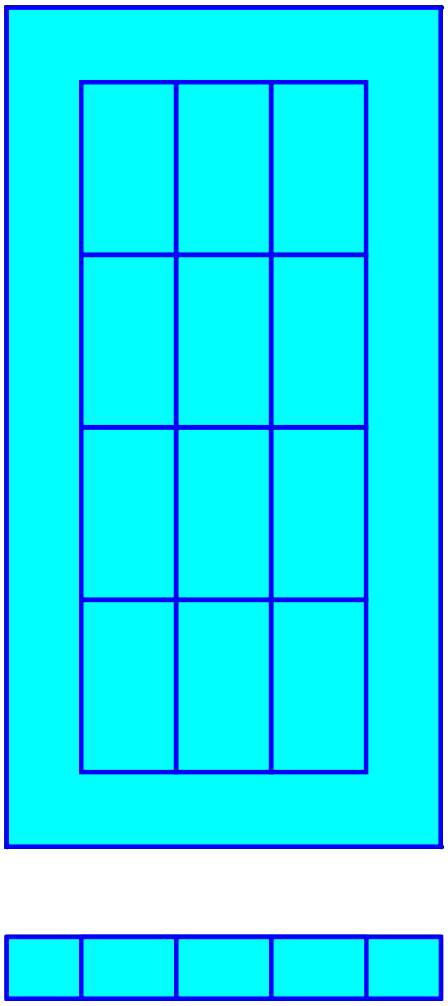
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

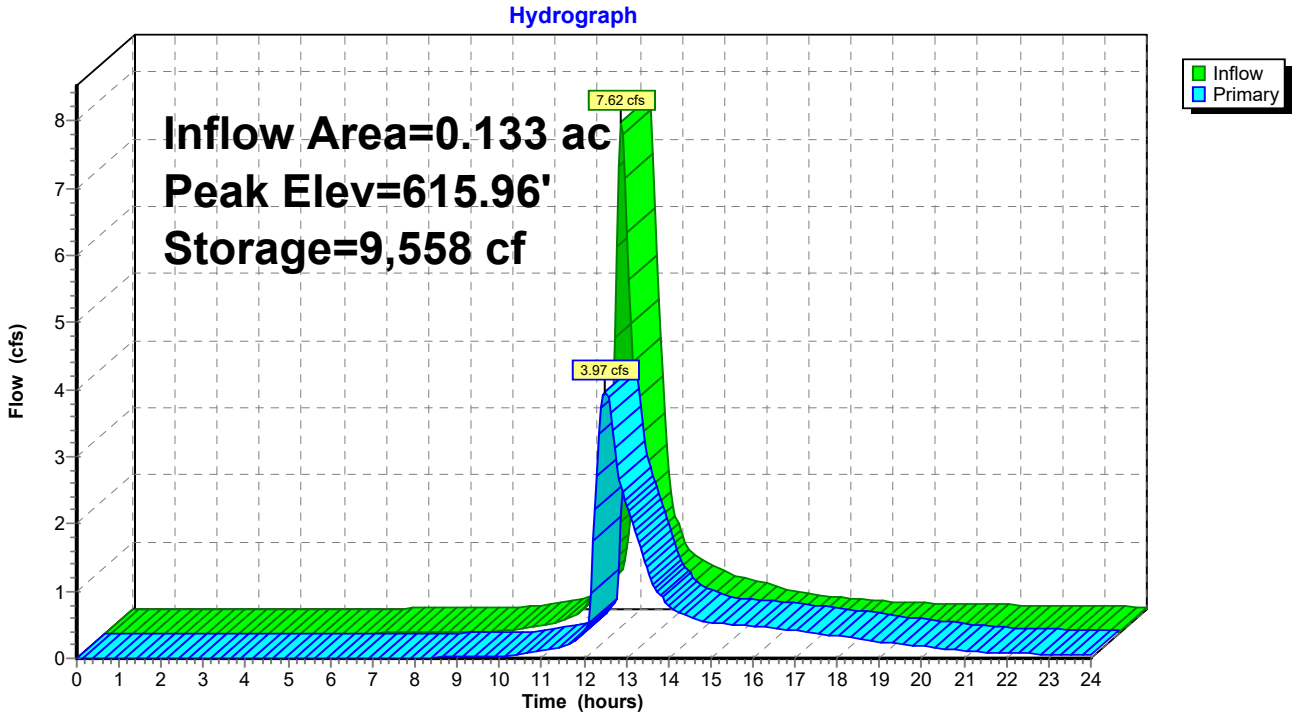
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=615.96'
Storage=9,558 cf
7.62 cfs
3.97 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-6: DB-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
612.25	0	614.33	5,355	616.41	10,710
612.29	103	614.37	5,458	616.45	10,813
612.33	206	614.41	5,561	616.49	10,916
612.37	309	614.45	5,664	616.53	11,019
612.41	412	614.49	5,767	616.57	11,122
612.45	515	614.53	5,870	616.61	11,225
612.49	618	614.57	5,973	616.65	11,328
612.53	721	614.61	6,076	616.69	11,431
612.57	824	614.65	6,179	616.73	11,534
612.61	927	614.69	6,282	616.77	11,637
612.65	1,030	614.73	6,385	616.81	11,740
612.69	1,133	614.77	6,488	616.85	11,843
612.73	1,236	614.81	6,591	616.89	11,946
612.77	1,339	614.85	6,694	616.93	12,049
612.81	1,442	614.89	6,797	616.97	12,152
612.85	1,545	614.93	6,900	617.01	12,255
612.89	1,648	614.97	7,003	617.05	12,358
612.93	1,751	615.01	7,106	617.09	12,461
612.97	1,854	615.05	7,209	617.13	12,564
613.01	1,957	615.09	7,312	617.17	12,667
613.05	2,060	615.13	7,415	617.21	12,770
613.09	2,163	615.17	7,518	617.25	12,873
613.13	2,266	615.21	7,621	617.29	12,873
613.17	2,369	615.25	7,724	617.33	12,873
613.21	2,472	615.29	7,827	617.37	12,873
613.25	2,575	615.33	7,930	617.41	12,873
613.29	2,678	615.37	8,033	617.45	**12,873**
613.33	2,781	615.41	8,136	617.49	12,873
613.37	2,884	615.45	8,239	617.53	12,873
613.41	2,987	615.49	8,342	617.57	12,873
613.45	3,090	615.53	8,445	617.61	12,873
613.49	3,193	615.57	8,548	617.65	12,873
613.53	3,296	615.61	8,651	617.69	12,873
613.57	3,399	615.65	8,754	617.73	12,873
613.61	3,502	615.69	8,857		
613.65	3,604	615.73	8,960		
613.69	3,707	615.77	9,063		
613.73	3,810	615.81	9,166		
613.77	3,913	615.85	9,269		
613.81	4,016	615.89	9,372		
613.85	4,119	615.93	9,475		
613.89	4,222	615.97	9,578		
613.93	4,325	616.01	9,681		
613.97	4,428	616.05	9,784		
614.01	4,531	616.09	9,887		
614.05	4,634	616.13	9,990		
614.09	4,737	616.17	10,093		
614.13	4,840	616.21	10,196		
614.17	4,943	616.25	10,299		
614.21	5,046	616.29	10,402		
614.25	5,149	616.33	10,505		
614.29	5,252	616.37	10,608		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 5.08" for 25-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.230 af
Outflow = 0.50 cfs @ 12.56 hrs, Volume= 0.223 af, Atten= 83%, Lag= 28.3 min
Primary = 0.50 cfs @ 12.56 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 617.35' @ 12.56 hrs Surf.Area= 3,131 sf Storage= 4,142 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 113.7 min calculated for 0.222 af (97% of inflow)
Center-of-Mass det. time= 94.8 min (874.8 - 779.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.50 cfs @ 12.56 hrs HW=617.35' (Free Discharge)
└─**1=Culvert** (Passes 0.50 cfs of 0.77 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.49 cfs @ 5.67 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.79 fps)

Pond DB-7: DB-7 - Chamber Wizard Field A

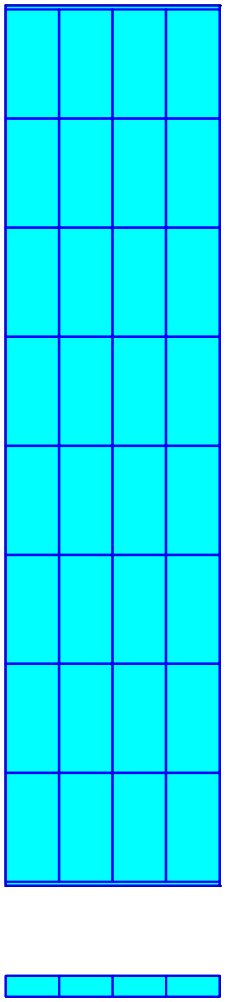
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

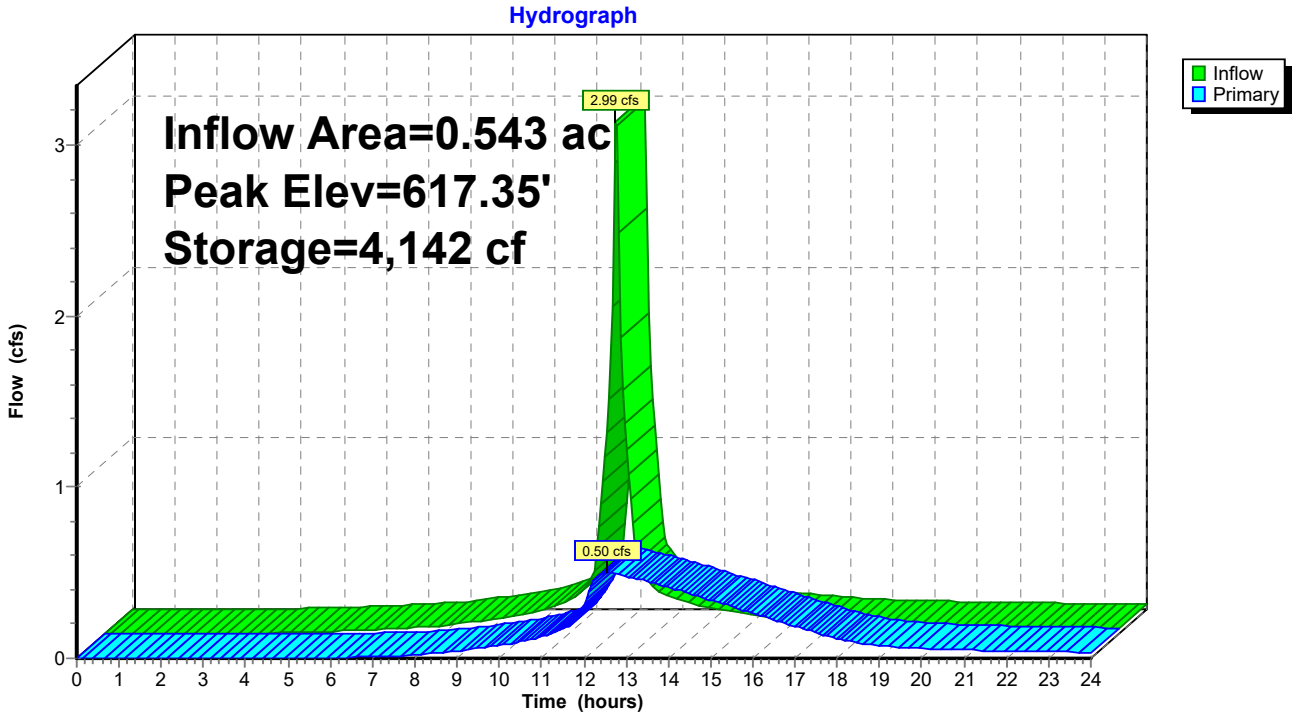
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=617.35'
Storage=4,142 cf
2.99 cfs
0.50 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-7: DB-7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.80	0	616.84	2,771	617.88	5,328
615.82	53	616.86	2,824	617.90	5,328
615.84	107	616.88	2,877	617.92	5,328
615.86	160	616.90	2,930	617.94	5,328
615.88	213	616.92	2,984	617.96	5,328
615.90	266	616.94	3,037	617.98	5,328
615.92	320	616.96	3,090	618.00	5,328
615.94	373	616.98	3,144	618.02	5,328
615.96	426	617.00	3,197	618.04	5,328
615.98	480	617.02	3,250	618.06	5,328
616.00	533	617.04	3,303	618.08	5,328
616.02	586	617.06	3,357	618.10	5,328
616.04	639	617.08	3,410	618.12	5,328
616.06	693	617.10	3,463	618.14	5,328
616.08	746	617.12	3,516	618.16	5,328
616.10	799	617.14	3,570	618.18	5,328
616.12	852	617.16	3,623	618.20	5,328
616.14	906	617.18	3,676	618.22	5,328
616.16	959	617.20	3,730	618.24	5,328
616.18	1,012	617.22	3,783	618.26	5,328
616.20	1,066	617.24	3,836	618.28	5,328
616.22	1,119	617.26	3,889	618.30	5,328
616.24	1,172	617.28	3,943	618.32	5,328
616.26	1,225	617.30	3,996	618.34	5,328
616.28	1,279	617.32	4,049	618.36	5,328
616.30	1,332	617.34	4,103	618.38	5,328
616.32	1,385	617.36	4,156	618.40	5,328
616.34	1,439	617.38	4,209	618.42	5,328
616.36	1,492	617.40	4,262	618.44	5,328
616.38	1,545	617.42	4,316	618.46	**5,328**
616.40	1,598	617.44	4,369		
616.42	1,652	617.46	4,422		
616.44	1,705	617.48	4,476		
616.46	1,758	617.50	4,529		
616.48	1,812	617.52	4,582		
616.50	1,865	617.54	4,635		
616.52	1,918	617.56	4,689		
616.54	1,971	617.58	4,742		
616.56	2,025	617.60	4,795		
616.58	2,078	617.62	4,848		
616.60	2,131	617.64	4,902		
616.62	2,184	617.66	4,955		
616.64	2,238	617.68	5,008		
616.66	2,291	617.70	5,062		
616.68	2,344	617.72	5,115		
616.70	2,398	617.74	5,168		
616.72	2,451	617.76	5,221		
616.74	2,504	617.78	5,275		
616.76	2,557	617.80	5,328		
616.78	2,611	617.82	5,328		
616.80	2,664	617.84	5,328		
616.82	2,717	617.86	5,328		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac, 62.75% Impervious, Inflow Depth > 4.86" for 25-YR event				
Inflow =	3.70 cfs @	12.09 hrs,	Volume=	0.280 af	
Outflow =	3.70 cfs @	12.09 hrs,	Volume=	0.280 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.36 cfs @	12.09 hrs,	Volume=	0.175 af	
Secondary =	3.34 cfs @	12.09 hrs,	Volume=	0.106 af	

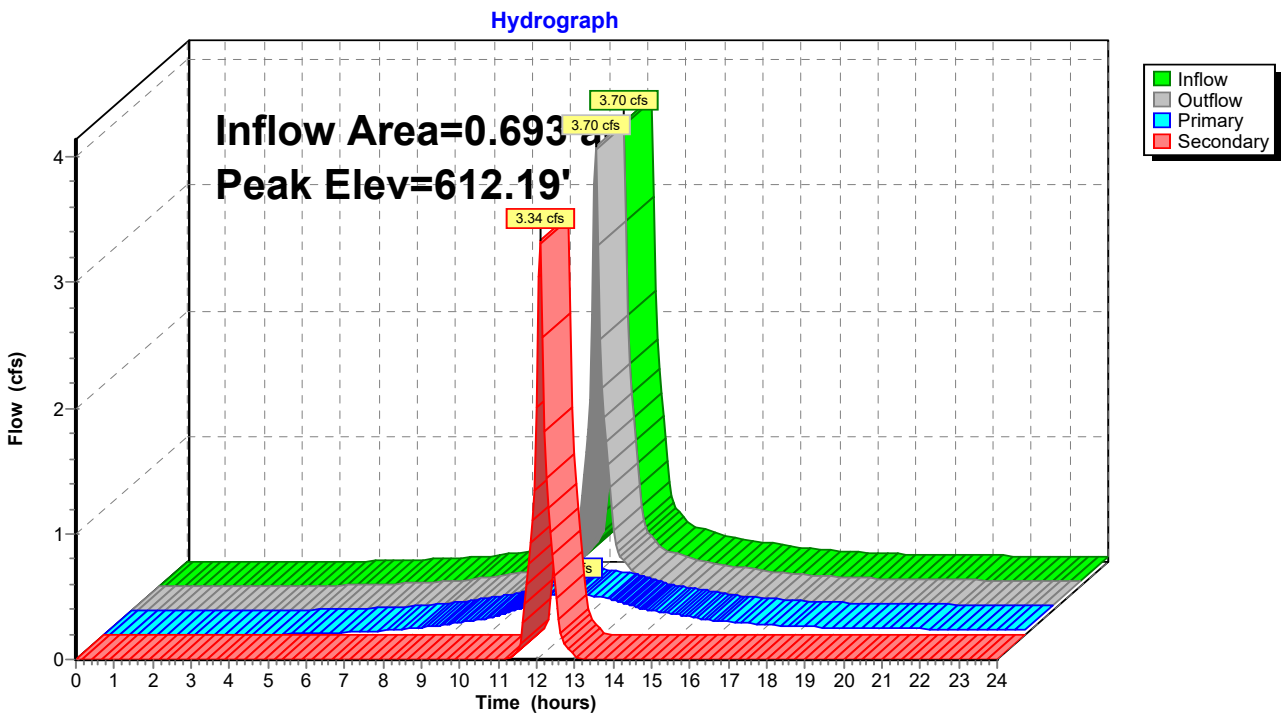
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.19' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=612.17' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.36 cfs @ 4.09 fps)

Secondary OutFlow Max=3.26 cfs @ 12.09 hrs HW=612.17' (Free Discharge)
└─**2=Culvert** (Inlet Controls 3.26 cfs @ 4.19 fps)

Pond ICS-1: ICS-1



Stage-Area-Storage for Pond ICS-1: ICS-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	**0**	611.85	0
609.30	0	611.90	0
609.35	0	611.95	0
609.40	0	612.00	0
609.45	0	612.05	0
609.50	0	612.10	0
609.55	0	612.15	0
609.60	0	612.20	0
609.65	0	612.25	0
609.70	0	612.30	0
609.75	0	612.35	0
609.80	0	612.40	0
609.85	0	612.45	0
609.90	0	612.50	0
609.95	0	612.55	0
610.00	0	612.60	0
610.05	0	612.65	0
610.10	0	612.70	0
610.15	0	612.75	0
610.20	0	612.80	0
610.25	0	612.85	0
610.30	0	612.90	0
610.35	0	612.95	0
610.40	0	613.00	0
610.45	0	613.05	0
610.50	0	613.10	0
610.55	0	613.15	0
610.60	0	613.20	0
610.65	0	613.25	0
610.70	0		
610.75	0		
610.80	0		
610.85	0		
610.90	0		
610.95	0		
611.00	0		
611.05	0		
611.10	0		
611.15	0		
611.20	0		
611.25	0		
611.30	0		
611.35	0		
611.40	0		
611.45	0		
611.50	0		
611.55	0		
611.60	0		
611.65	0		
611.70	0		
611.75	0		
611.80	0		

Summary for Pond ICS-2: ICS-2

Inflow Area =	0.598 ac, 70.86% Impervious, Inflow Depth > 4.75" for 25-YR event				
Inflow =	3.14 cfs @	12.09 hrs,	Volume=	0.237 af	
Outflow =	3.14 cfs @	12.09 hrs,	Volume=	0.237 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.46 cfs @	12.09 hrs,	Volume=	0.158 af	
Secondary =	2.68 cfs @	12.09 hrs,	Volume=	0.079 af	

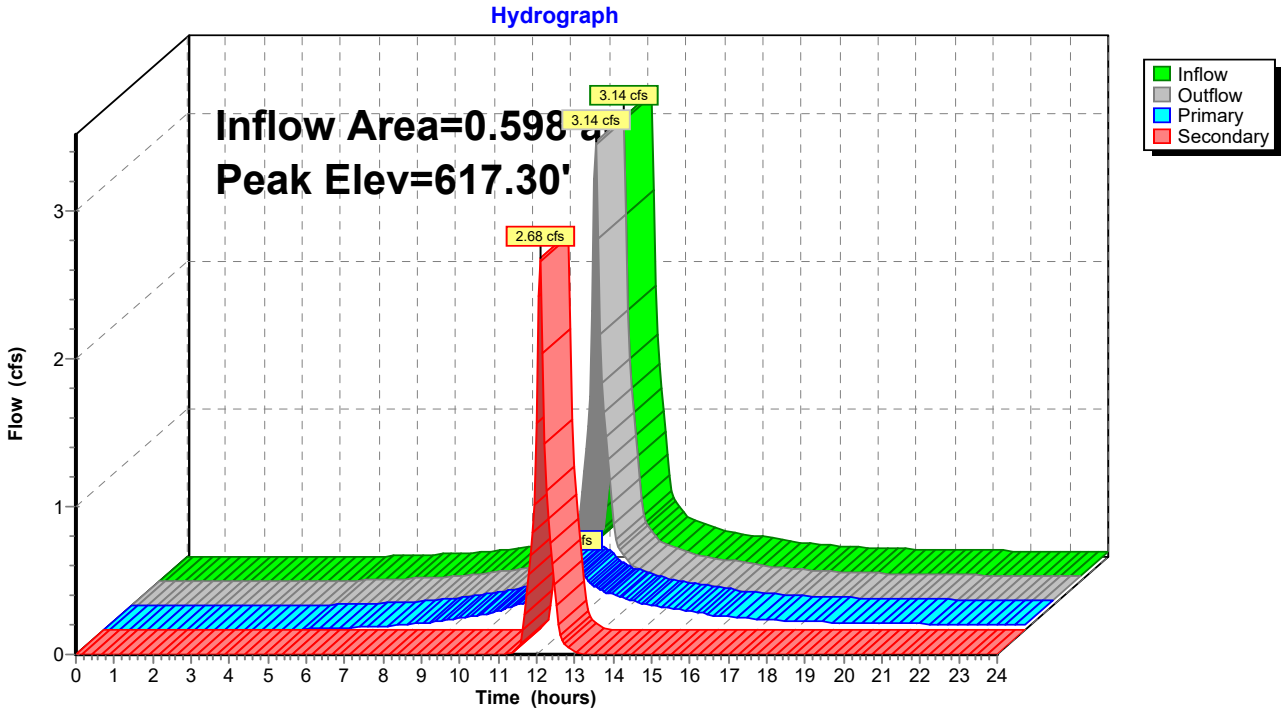
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.30' @ 12.09 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.09 hrs HW=617.28' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.46 cfs @ 5.27 fps)

Secondary OutFlow Max=2.61 cfs @ 12.09 hrs HW=617.28' (Free Discharge)
└**2=Culvert** (Barrel Controls 2.61 cfs @ 3.87 fps)

Pond ICS-2: ICS-2



Stage-Area-Storage for Pond ICS-2: ICS-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.85	**0**	616.37	0	616.89	0
615.86	0	616.38	0	616.90	0
615.87	0	616.39	0	616.91	0
615.88	0	616.40	0	616.92	0
615.89	0	616.41	0	616.93	0
615.90	0	616.42	0	616.94	0
615.91	0	616.43	0	616.95	0
615.92	0	616.44	0	616.96	0
615.93	0	616.45	0	616.97	0
615.94	0	616.46	0	616.98	0
615.95	0	616.47	0	616.99	0
615.96	0	616.48	0	617.00	0
615.97	0	616.49	0	617.01	0
615.98	0	616.50	0	617.02	0
615.99	0	616.51	0	617.03	0
616.00	0	616.52	0	617.04	0
616.01	0	616.53	0	617.05	0
616.02	0	616.54	0	617.06	0
616.03	0	616.55	0	617.07	0
616.04	0	616.56	0	617.08	0
616.05	0	616.57	0	617.09	0
616.06	0	616.58	0	617.10	0
616.07	0	616.59	0	617.11	0
616.08	0	616.60	0	617.12	0
616.09	0	616.61	0	617.13	0
616.10	0	616.62	0	617.14	0
616.11	0	616.63	0	617.15	0
616.12	0	616.64	0	617.16	0
616.13	0	616.65	0	617.17	0
616.14	0	616.66	0	617.18	0
616.15	0	616.67	0	617.19	0
616.16	0	616.68	0	617.20	0
616.17	0	616.69	0	617.21	0
616.18	0	616.70	0	617.22	0
616.19	0	616.71	0	617.23	0
616.20	0	616.72	0	617.24	0
616.21	0	616.73	0	617.25	0
616.22	0	616.74	0	617.26	0
616.23	0	616.75	0	617.27	0
616.24	0	616.76	0	617.28	0
616.25	0	616.77	0	617.29	0
616.26	0	616.78	0	617.30	0
616.27	0	616.79	0	617.31	0
616.28	0	616.80	0		
616.29	0	616.81	0		
616.30	0	616.82	0		
616.31	0	616.83	0		
616.32	0	616.84	0		
616.33	0	616.85	0		
616.34	0	616.86	0		
616.35	0	616.87	0		
616.36	0	616.88	0		

Summary for Pond ICS-6: ICS-6

Inflow Area =	2.630 ac, 39.25% Impervious, Inflow Depth > 3.28" for 25-YR event				
Inflow =	7.49 cfs @	12.22 hrs,	Volume=	0.720 af	
Outflow =	7.49 cfs @	12.22 hrs,	Volume=	0.720 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.28 cfs @	12.22 hrs,	Volume=	0.179 af	
Secondary =	7.21 cfs @	12.22 hrs,	Volume=	0.541 af	

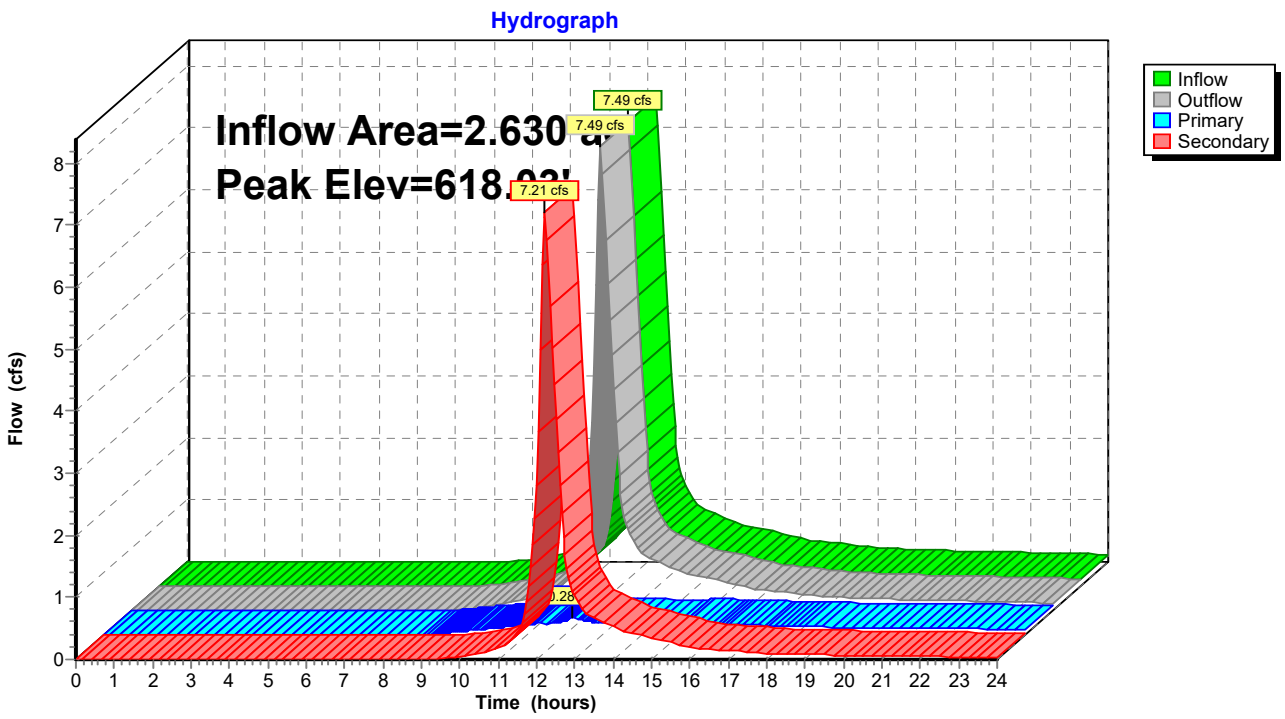
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 618.03' @ 12.22 hrs
Flood Elev= 617.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.27 cfs @ 12.22 hrs HW=618.01' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.27 cfs @ 3.15 fps)

Secondary OutFlow Max=7.11 cfs @ 12.22 hrs HW=618.01' (Free Discharge)
└**2=Culvert** (Barrel Controls 7.11 cfs @ 5.79 fps)

Pond ICS-6: ICS-6



Stage-Area-Storage for Pond ICS-6: ICS-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
616.00	**0**	617.04	0
616.02	0	617.06	0
616.04	0	617.08	0
616.06	0	617.10	0
616.08	0	617.12	0
616.10	0	617.14	0
616.12	0	617.16	0
616.14	0	617.18	0
616.16	0	617.20	0
616.18	0	617.22	0
616.20	0	617.24	0
616.22	0	617.26	0
616.24	0	617.28	0
616.26	0	617.30	0
616.28	0	617.32	0
616.30	0	617.34	0
616.32	0	617.36	0
616.34	0	617.38	0
616.36	0	617.40	0
616.38	0	617.42	0
616.40	0	617.44	0
616.42	0	617.46	0
616.44	0	617.48	0
616.46	0	617.50	0
616.48	0	617.52	0
616.50	0	617.54	0
616.52	0	617.56	0
616.54	0	617.58	0
616.56	0	617.60	0
616.58	0	617.62	0
616.60	0	617.64	0
616.62	0	617.66	0
616.64	0	617.68	0
616.66	0	617.70	0
616.68	0	617.72	0
616.70	0	617.74	0
616.72	0	617.76	0
616.74	0	617.78	0
616.76	0	617.80	0
616.78	0	617.82	0
616.80	0	617.84	0
616.82	0	617.86	0
616.84	0	617.88	0
616.86	0	617.90	0
616.88	0	617.92	0
616.90	0	617.94	0
616.92	0	617.96	0
616.94	0	617.98	0
616.96	0	618.00	0
616.98	0	618.02	0
617.00	0		
617.02	0		

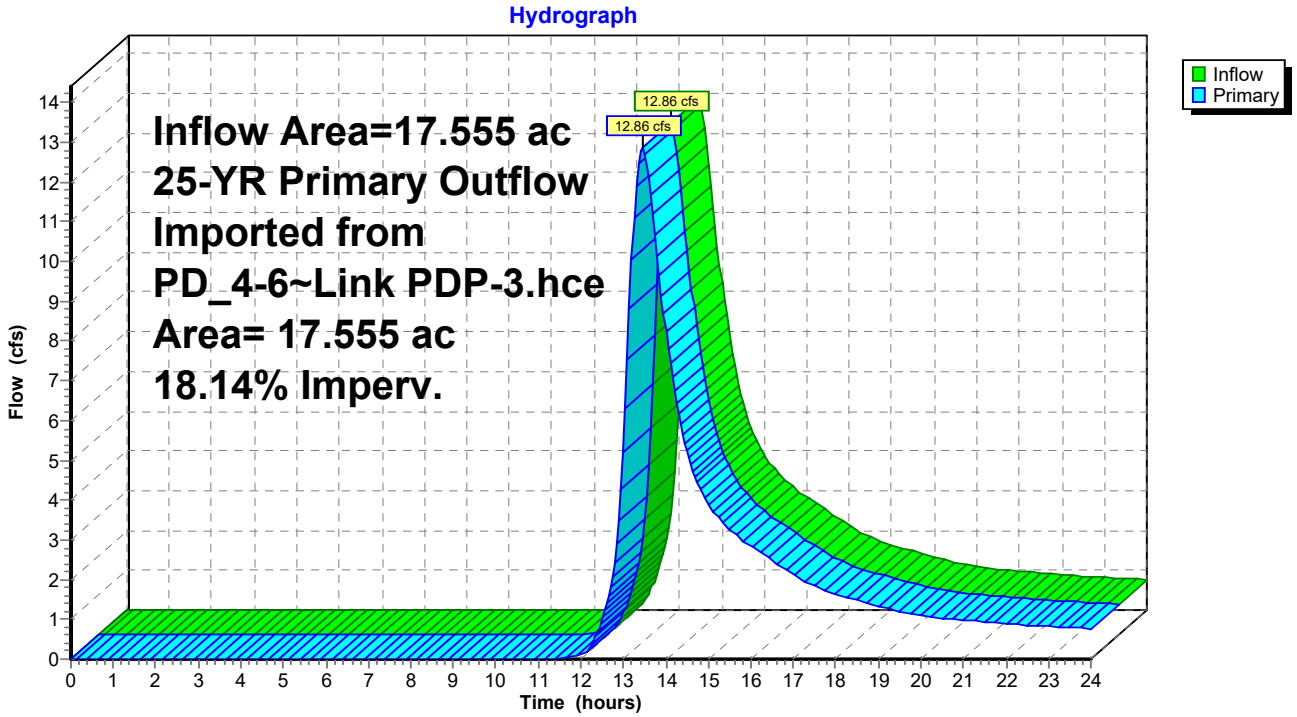
Summary for Link PDP-3: DP-3

Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 1.77" for 25-YR event
Inflow = 12.86 cfs @ 13.45 hrs, Volume= 2.591 af
Primary = 12.86 cfs @ 13.45 hrs, Volume= 2.591 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

25-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3



Summary for Subcatchment 1A: PD-1A

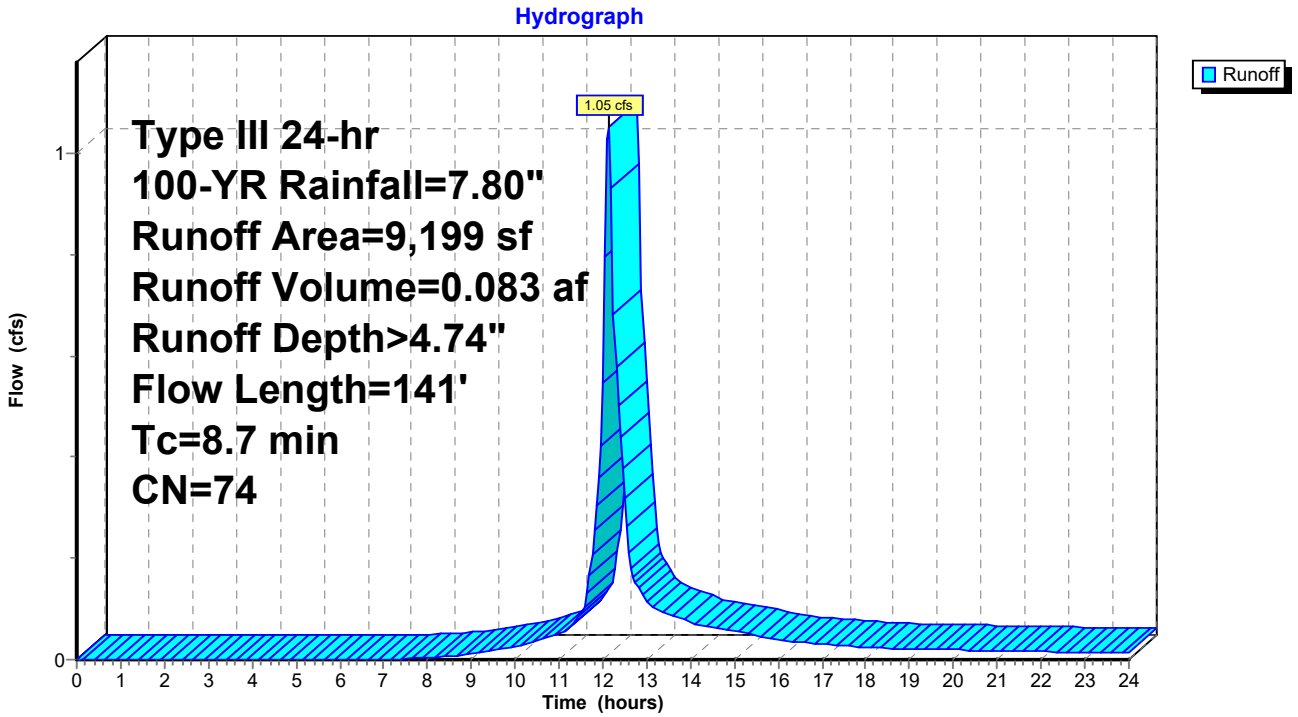
Runoff = 1.05 cfs @ 12.12 hrs, Volume= 0.083 af, Depth> 4.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
440	98	Paved parking, HSG C
5,095	74	>75% Grass cover, Good, HSG C
3,664	70	Woods, Good, HSG C
9,199	74	Weighted Average
8,759		95.22% Pervious Area
440		4.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	71	0.1100	0.15		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.3	14	0.0100	0.70		**Shallow Concentrated Flow, 1B-1C** Short Grass Pasture Kv= 7.0 fps
0.3	56	0.0050	3.18	1.11	**Pipe Channel, 1C-1D** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
8.7	141	Total			

Subcatchment 1A: PD-1A



Summary for Subcatchment 1B: PDA-1B

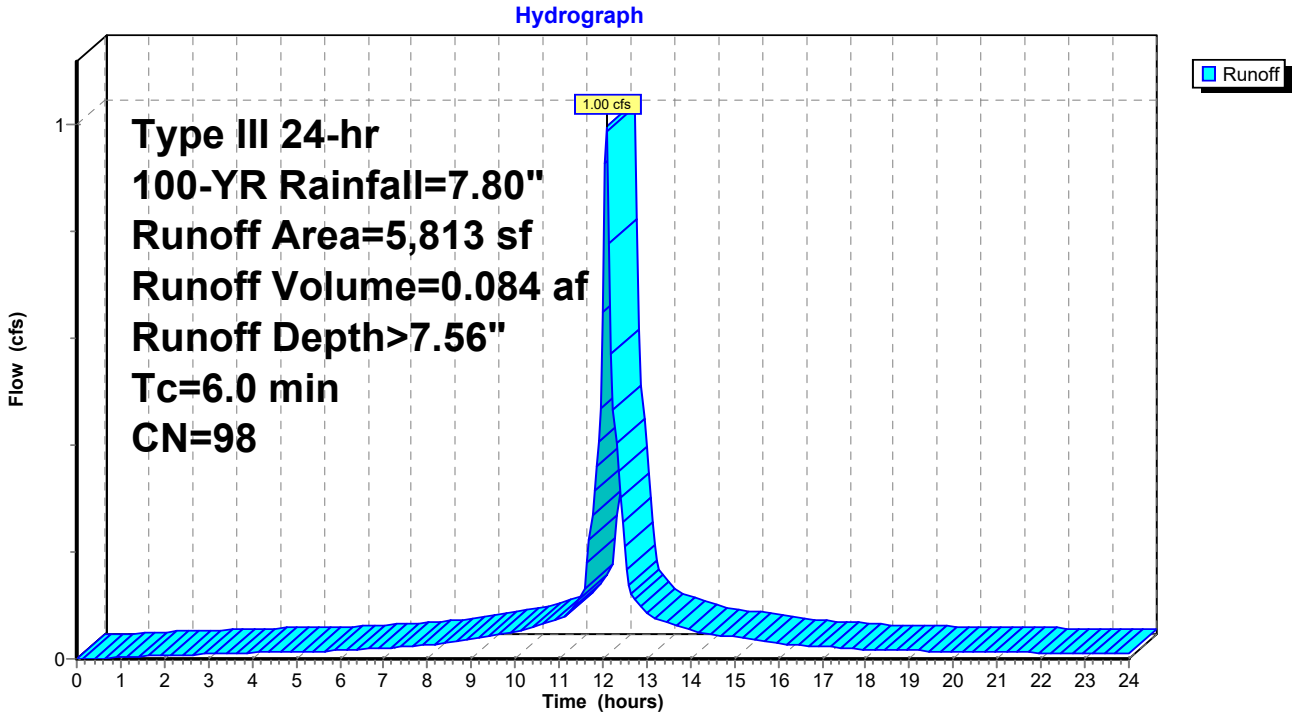
Runoff = 1.00 cfs @ 12.09 hrs, Volume= 0.084 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
5,813	98	Unconnected roofs, HSG C
5,813		100.00% Impervious Area
5,813		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 1B: PDA-1B



Summary for Subcatchment 1C: PDA-1C

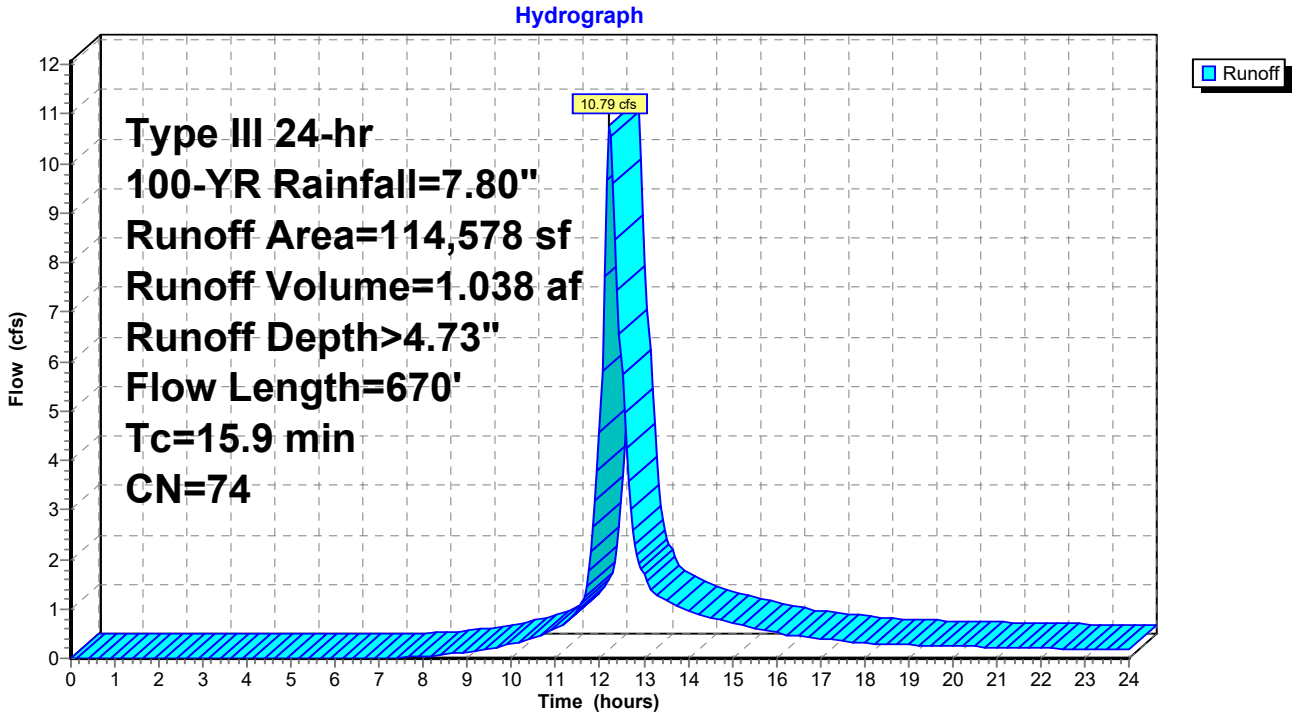
Runoff = 10.79 cfs @ 12.22 hrs, Volume= 1.038 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

	Area (sf)	CN	Description
*	33,778	98	Paved parking
	9,092	61	>75% Grass cover, Good, HSG B
	1,833	74	>75% Grass cover, Good, HSG C
	11,190	98	Roofs, HSG B
	47,970	55	Woods, Good, HSG B
	10,715	70	Woods, Good, HSG C
	114,578	74	Weighted Average
	69,610		60.75% Pervious Area
	44,968		39.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.32"
6.0	458	0.0655	1.28		**Shallow Concentrated Flow, 1B-1C** Woodland Kv= 5.0 fps
0.1	10	0.1500	2.71		**Shallow Concentrated Flow, 1C-1D** Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0400	4.06		**Shallow Concentrated Flow, 1D-1E** Paved Kv= 20.3 fps
0.3	74	0.0050	3.79	2.98	**Pipe Channel, 1E-1F** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
15.9	670	Total			

Subcatchment 1C: PDA-1C



Summary for Subcatchment 3A: PDA-3A

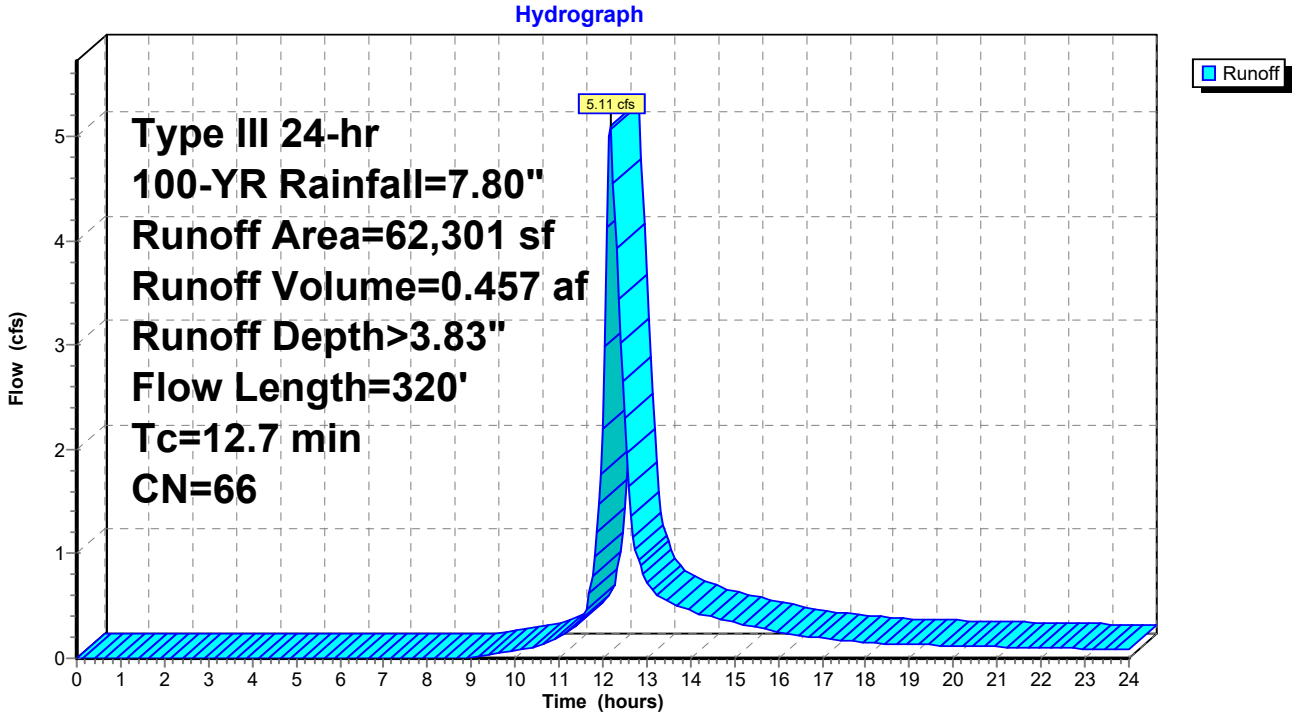
Runoff = 5.11 cfs @ 12.18 hrs, Volume= 0.457 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
21,831	55	Woods, Good, HSG B
38,070	70	Woods, Good, HSG C
2,400	98	Paved parking, HSG B
62,301	66	Weighted Average
59,901		96.15% Pervious Area
2,400		3.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.3	270	0.0444	1.05		**Shallow Concentrated Flow, 3B-EDP-3** Woodland Kv= 5.0 fps
12.7	320	Total			

Subcatchment 3A: PDA-3A



Summary for Subcatchment 3B: PDA-3B

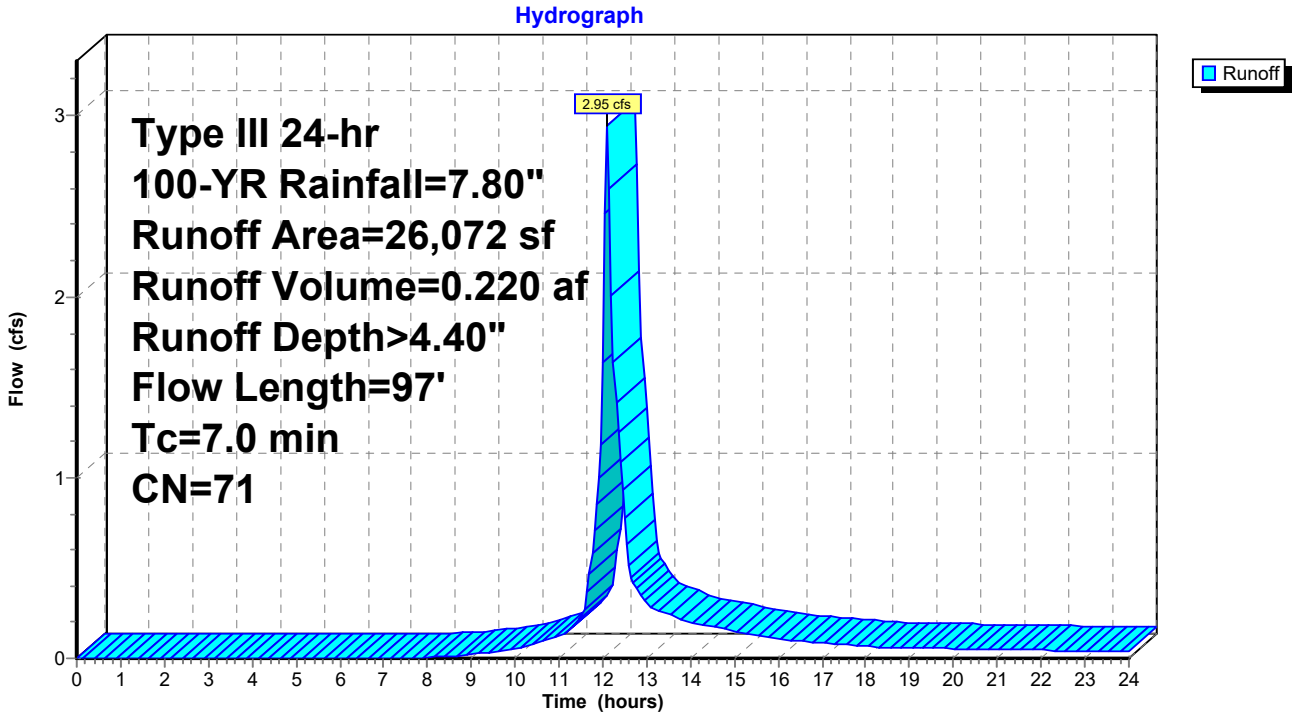
Runoff = 2.95 cfs @ 12.10 hrs, Volume= 0.220 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
9,275	74	>75% Grass cover, Good, HSG C
2,286	55	Woods, Good, HSG B
13,438	70	Woods, Good, HSG C
1,073	98	Paved parking, HSG C
26,072	71	Weighted Average
24,999		95.88% Pervious Area
1,073		4.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	51	0.1000	0.13		**Sheet Flow, 3A-3B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.0	6	0.3300	4.02		**Shallow Concentrated Flow, 3B-3C** Short Grass Pasture Kv= 7.0 fps
0.1	8	0.0150	1.97		**Shallow Concentrated Flow, 3C-3D** Unpaved Kv= 16.1 fps
0.0	7	0.2500	3.50		**Shallow Concentrated Flow, 3D-3E** Short Grass Pasture Kv= 7.0 fps
0.4	25	0.0500	1.12		**Shallow Concentrated Flow, 3E-EDP3** Woodland Kv= 5.0 fps
7.0	97	Total			

Subcatchment 3B: PDA-3B



Summary for Subcatchment 3C: PDA-3C

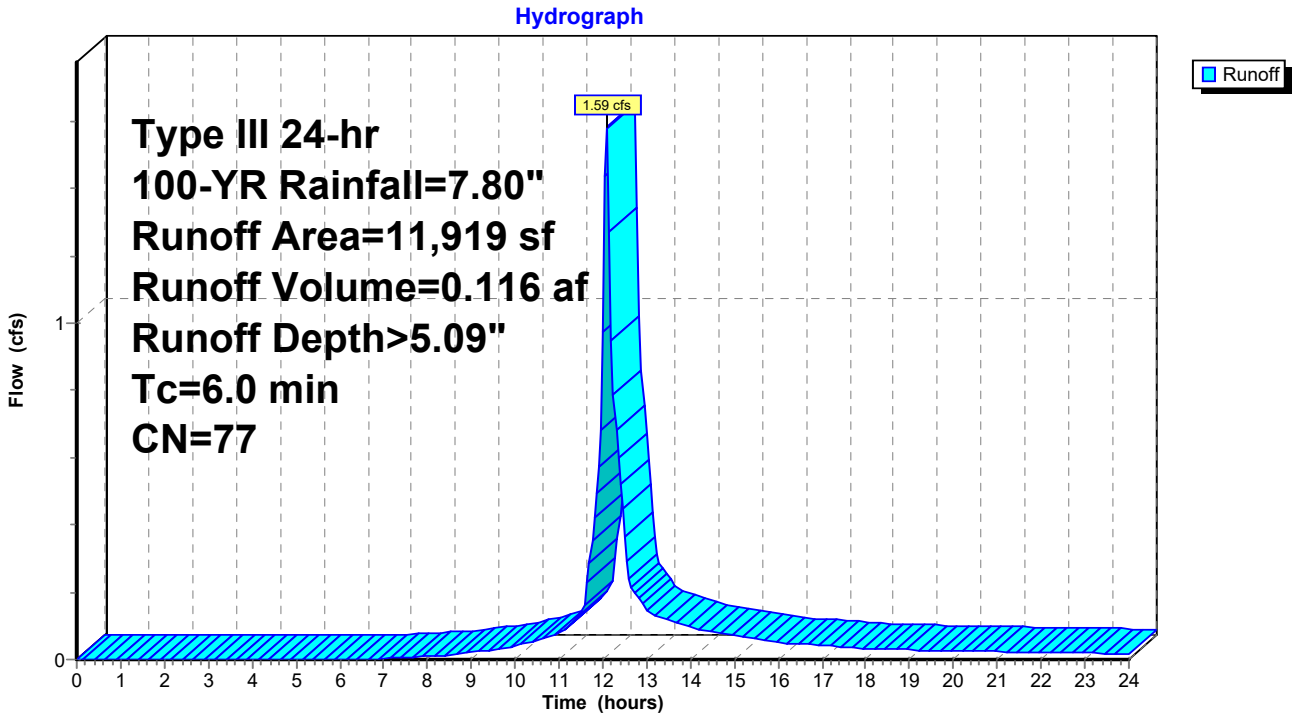
Runoff = 1.59 cfs @ 12.09 hrs, Volume= 0.116 af, Depth> 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
7,718	74	>75% Grass cover, Good, HSG C
336	98	Unconnected pavement, HSG C
2,657	74	>75% Grass cover, Good, HSG C
46	98	Unconnected pavement, HSG C
1,162	98	Roofs, HSG C
11,919	77	Weighted Average
10,375		87.05% Pervious Area
1,544		12.95% Impervious Area
382		24.74% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 MIN**

Subcatchment 3C: PDA-3C



Summary for Subcatchment 3D: PDA-3D

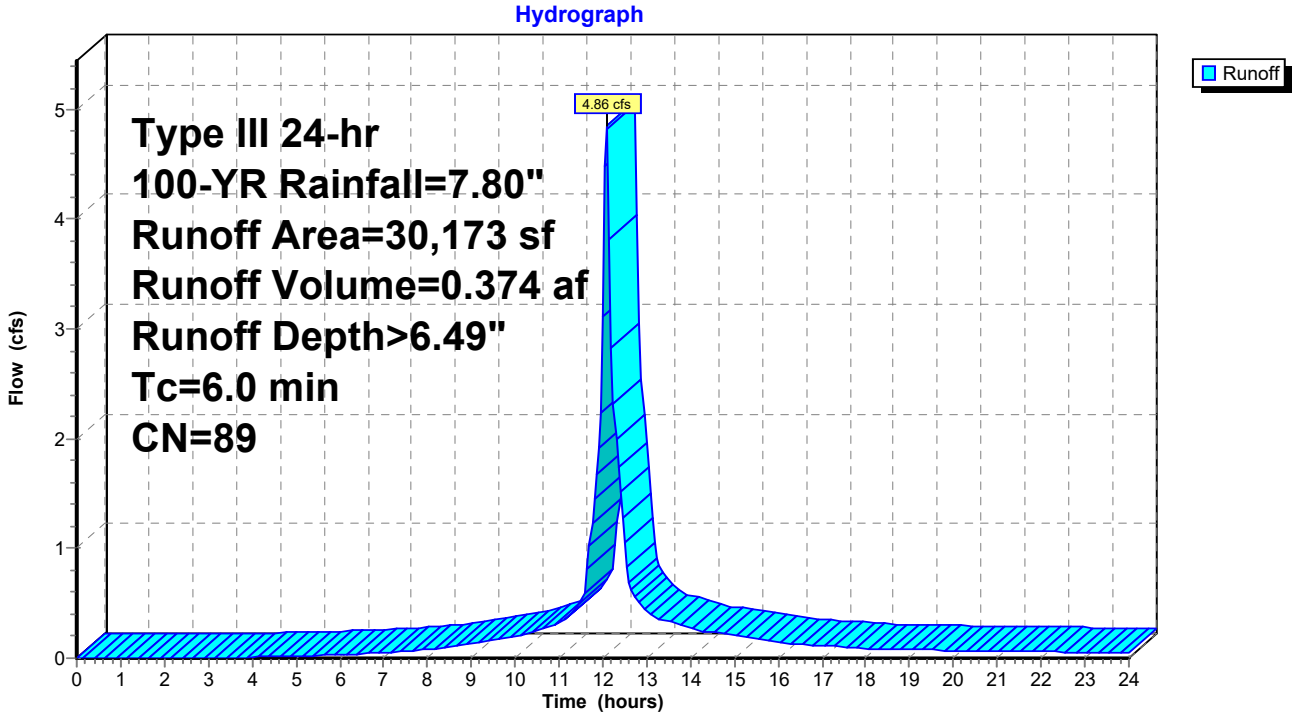
Runoff = 4.86 cfs @ 12.09 hrs, Volume= 0.374 af, Depth> 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
18,935	98	Paved parking, HSG D
11,071	74	>75% Grass cover, Good, HSG C
167	61	>75% Grass cover, Good, HSG B
30,173	89	Weighted Average
11,238		37.25% Pervious Area
18,935		62.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3D: PDA-3D



Summary for Subcatchment 3E: PDA-3E

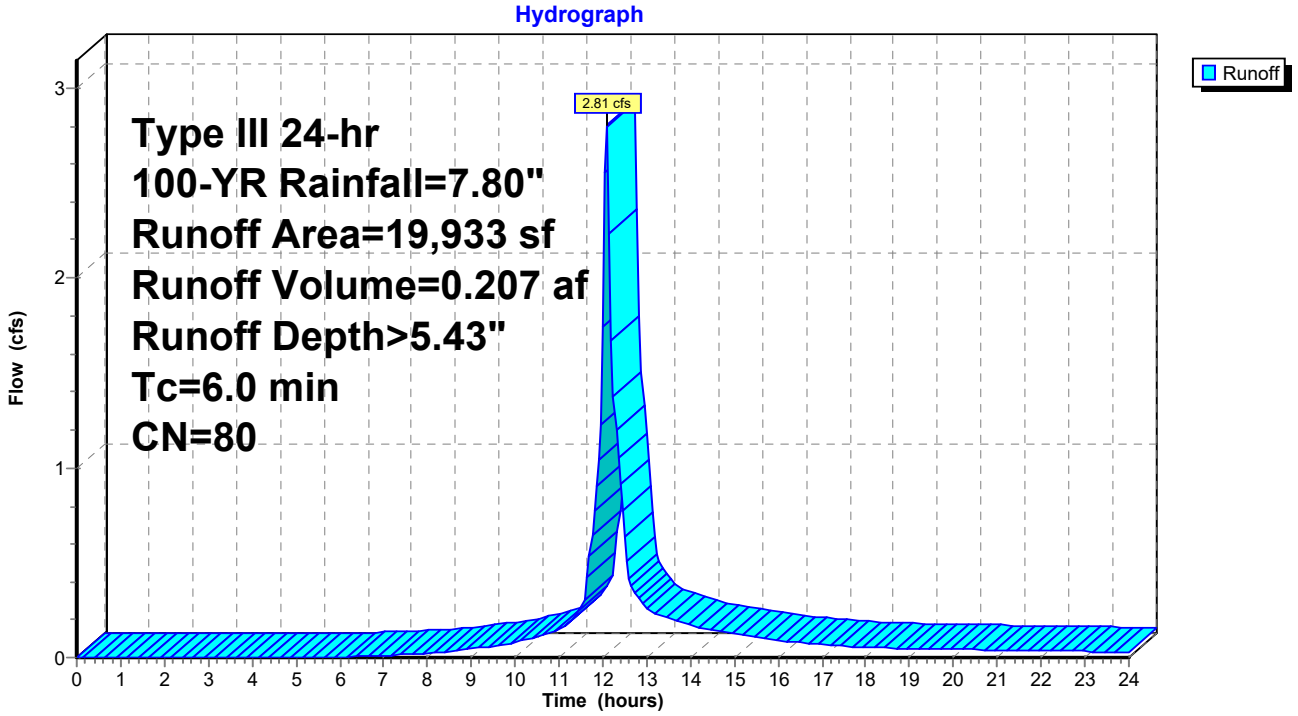
Runoff = 2.81 cfs @ 12.09 hrs, Volume= 0.207 af, Depth> 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
14,823	74	>75% Grass cover, Good, HSG C
460	98	Unconnected pavement, HSG C
4,650	98	Roofs, HSG C
19,933	80	Weighted Average
14,823		74.36% Pervious Area
5,110		25.64% Impervious Area
460		9.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, A-B**

Subcatchment 3E: PDA-3E



Summary for Subcatchment 3F: PDA-3F

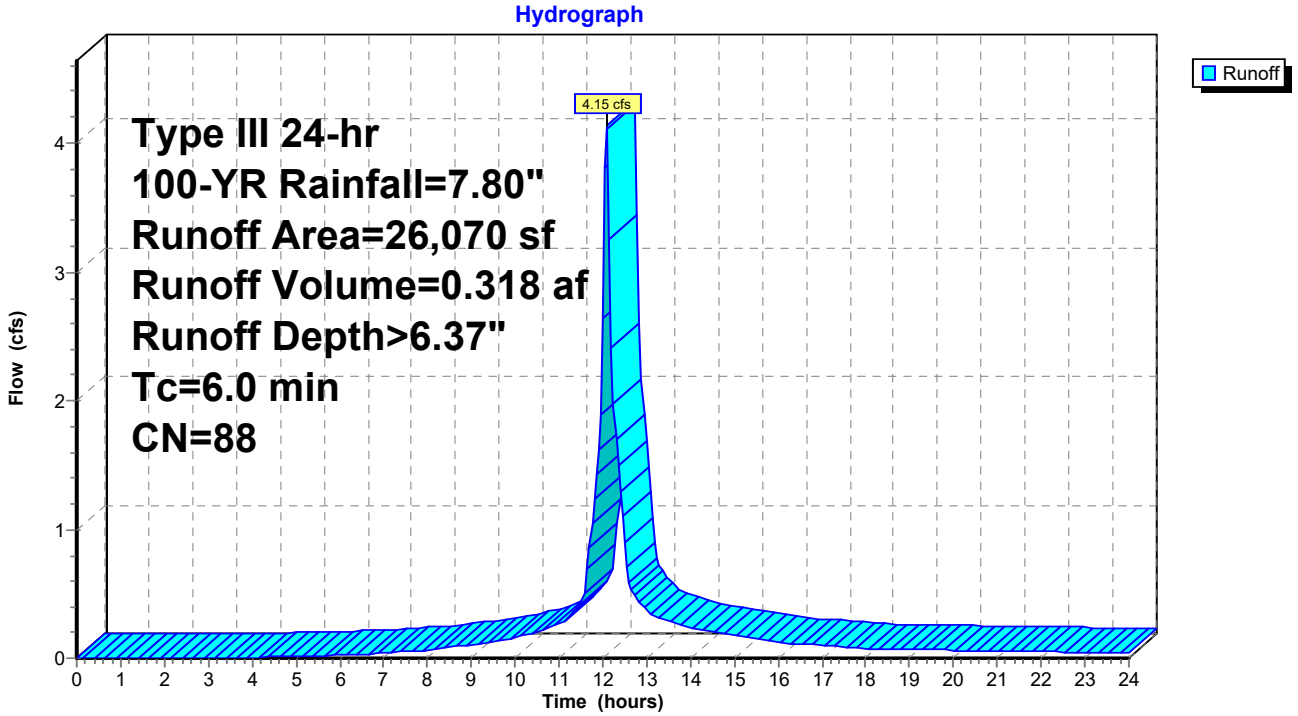
Runoff = 4.15 cfs @ 12.09 hrs, Volume= 0.318 af, Depth> 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
18,472	98	Paved parking, HSG B
1,202	74	>75% Grass cover, Good, HSG C
6,396	61	>75% Grass cover, Good, HSG B
26,070	88	Weighted Average
7,598		29.14% Pervious Area
18,472		70.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3F: PDA-3F



Summary for Subcatchment 3G: PDA-3G

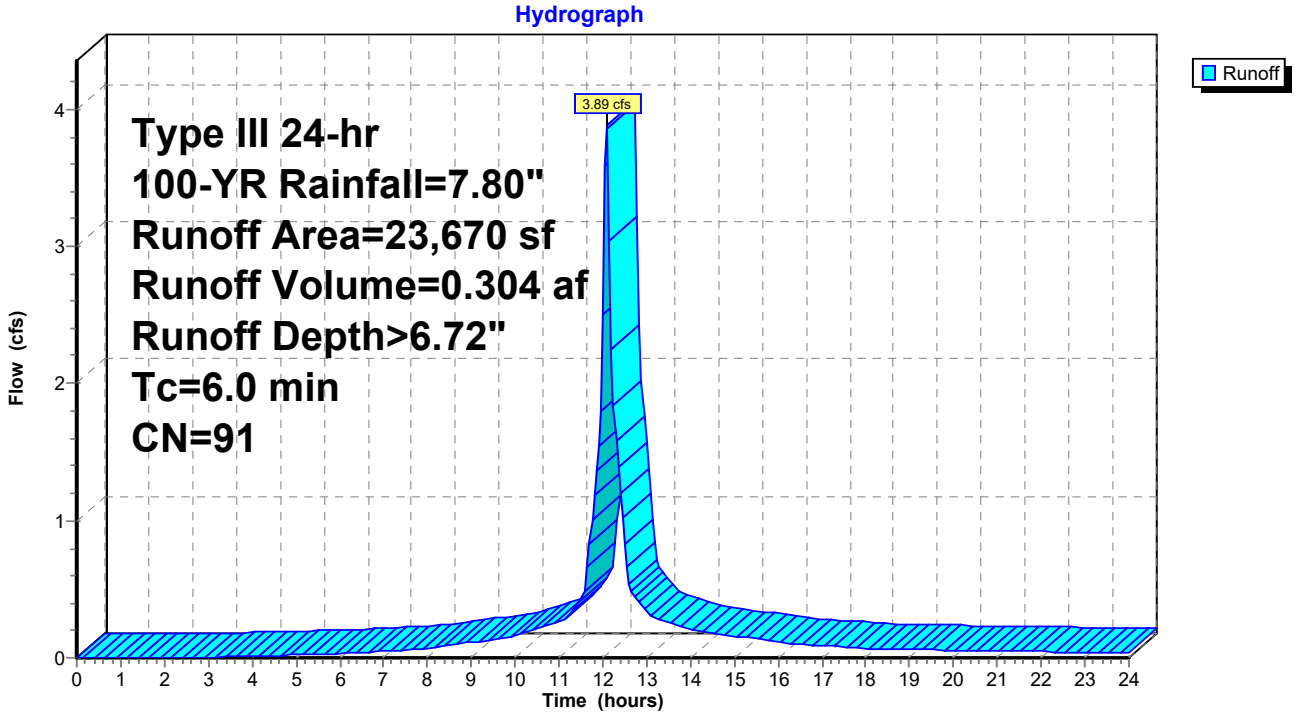
Runoff = 3.89 cfs @ 12.09 hrs, Volume= 0.304 af, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
13,660	98	Roofs, HSG B
892	74	>75% Grass cover, Good, HSG C
4,113	61	>75% Grass cover, Good, HSG B
5,005	98	Unconnected pavement, HSG B
23,670	91	Weighted Average
5,005		21.14% Pervious Area
18,665		78.86% Impervious Area
5,005		26.81% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3G: PDA-3G



Summary for Subcatchment PD-2: PDA-2

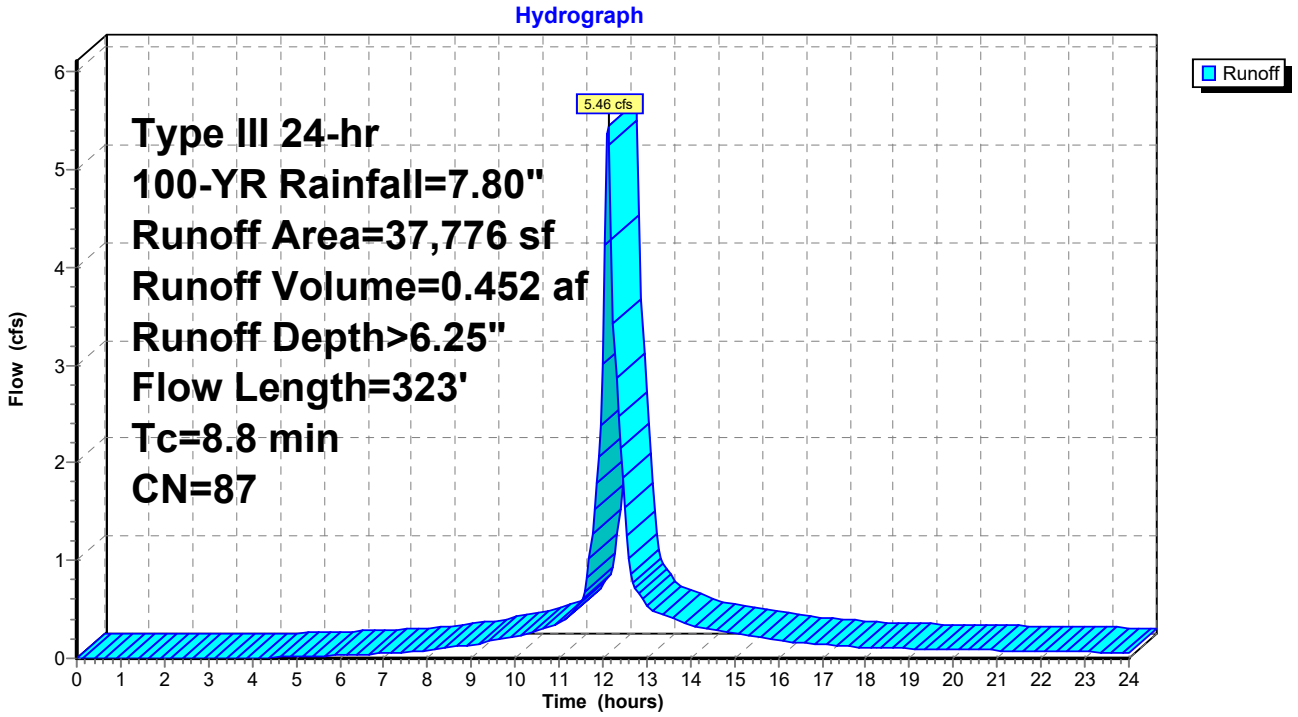
Runoff = 5.46 cfs @ 12.12 hrs, Volume= 0.452 af, Depth> 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
4,628	74	>75% Grass cover, Good, HSG C
23,547	98	Paved parking, HSG D
3,336	55	Woods, Good, HSG B
6,265	70	Woods, Good, HSG C
37,776	87	Weighted Average
14,229		37.67% Pervious Area
23,547		62.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0100	0.11		**Sheet Flow, 2A-2B** Grass: Short n= 0.150 P2= 3.32"
0.1	34	0.0500	4.54		**Shallow Concentrated Flow, 2B-2C** Paved Kv= 20.3 fps
0.1	19	0.1450	2.67		**Shallow Concentrated Flow, 2C-2D** Short Grass Pasture Kv= 7.0 fps
1.3	220	0.0185	2.76		**Shallow Concentrated Flow, 2D-ED2** Paved Kv= 20.3 fps
8.8	323	Total			

Subcatchment PD-2: PDA-2

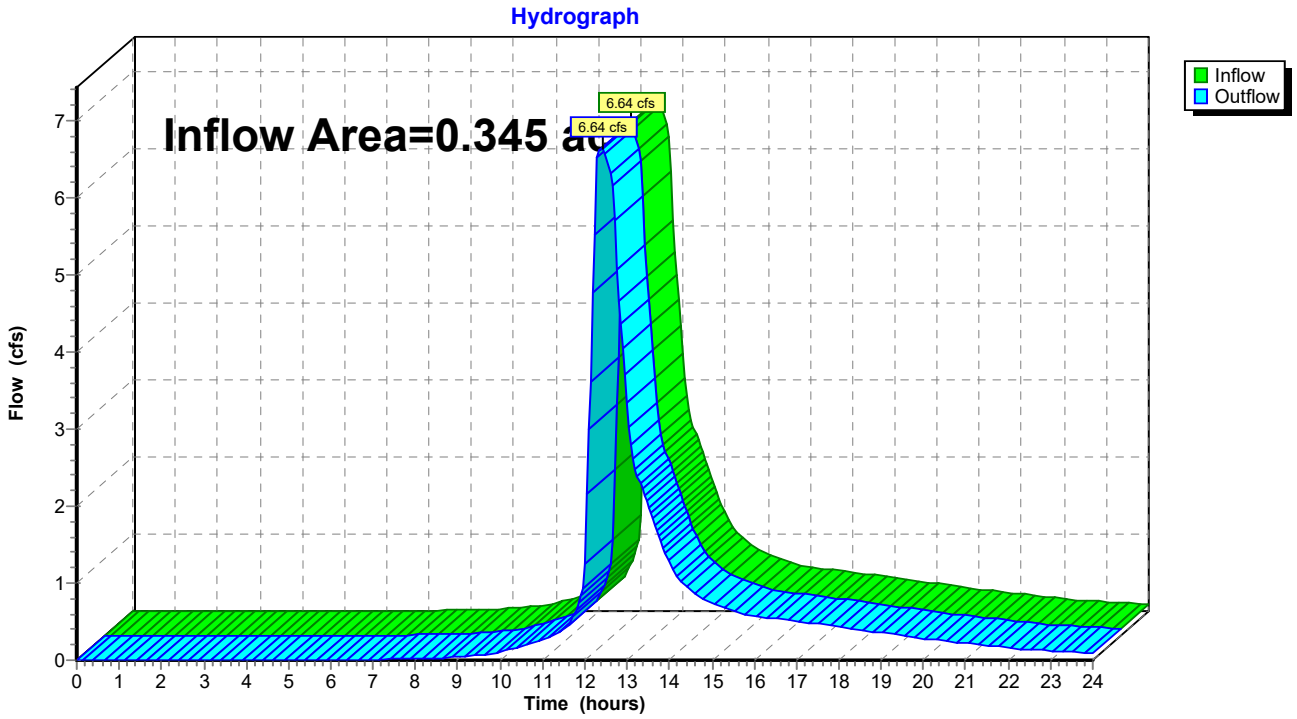


Summary for Reach DP-1: DP-1

Inflow Area = 0.345 ac, 41.65% Impervious, Inflow Depth > 34.24" for 100-YR event
Inflow = 6.64 cfs @ 12.40 hrs, Volume= 0.983 af
Outflow = 6.64 cfs @ 12.40 hrs, Volume= 0.983 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: DP-1

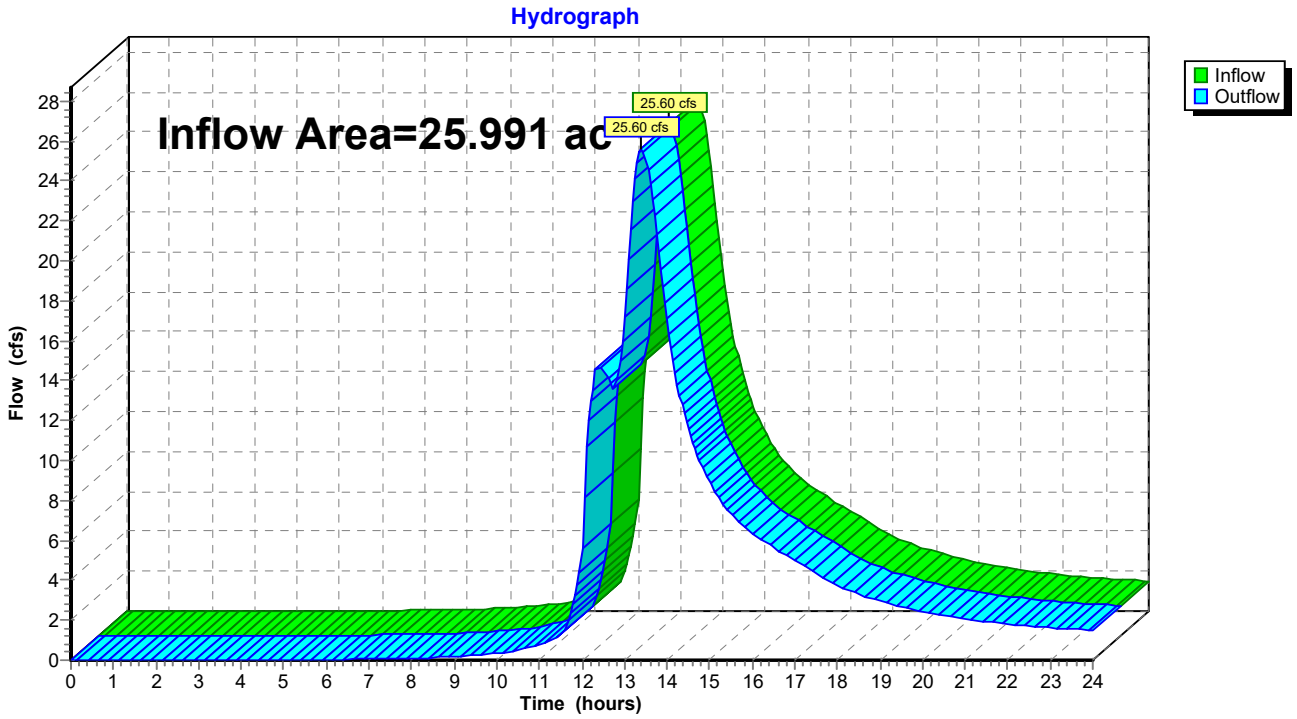


Summary for Reach DP-2: DP-2

Inflow Area = 25.991 ac, 24.71% Impervious, Inflow Depth > 3.11" for 100-YR event
Inflow = 25.60 cfs @ 13.40 hrs, Volume= 6.746 af
Outflow = 25.60 cfs @ 13.40 hrs, Volume= 6.746 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: DP-2



Summary for Reach DP-3: DP-3

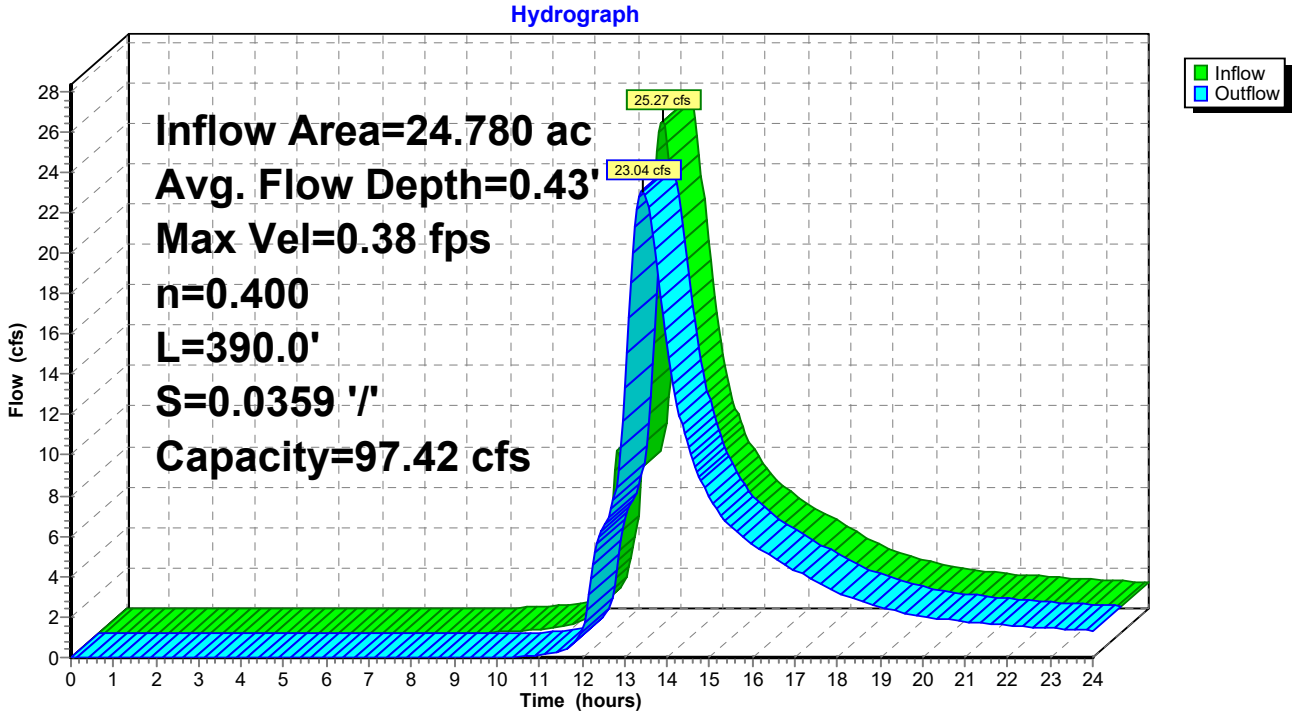
Inflow Area = 24.780 ac, 23.15% Impervious, Inflow Depth > 2.62" for 100-YR event
Inflow = 25.27 cfs @ 13.23 hrs, Volume= 5.404 af
Outflow = 23.04 cfs @ 13.42 hrs, Volume= 5.312 af, Atten= 9%, Lag= 11.5 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.38 fps, Min. Travel Time= 16.9 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 40.6 min

Peak Storage= 23,353 cf @ 13.42 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.00' Flow Area= 151.0 sf, Capacity= 97.42 cfs

130.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 12.0 30.0 '/' Top Width= 172.00'
Length= 390.0' Slope= 0.0359 '/'
Inlet Invert= 618.00', Outlet Invert= 604.00'

Reach DP-3: DP-3



Stage-Area-Storage for Reach DP-3: DP-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
618.00	0.0	0
618.01	1.3	508
618.02	2.6	1,017
618.03	3.9	1,528
618.04	5.2	2,041
618.05	6.6	2,555
618.06	7.9	3,071
618.07	9.2	3,589
618.08	10.5	4,108
618.09	11.9	4,629
618.10	13.2	5,152
618.11	14.6	5,676
618.12	15.9	6,202
618.13	17.3	6,729
618.14	18.6	7,259
618.15	20.0	7,789
618.16	21.3	8,322
618.17	22.7	8,856
618.18	24.1	9,391
618.19	25.5	9,929
618.20	26.8	10,468
618.21	28.2	11,008
618.22	29.6	11,550
618.23	31.0	12,094
618.24	32.4	12,640
618.25	33.8	13,187
618.26	35.2	13,736
618.27	36.6	14,286
618.28	38.0	14,838
618.29	39.5	15,392
618.30	40.9	15,947
618.31	42.3	16,504
618.32	43.8	17,063
618.33	45.2	17,623
618.34	46.6	18,185
618.35	48.1	18,748
618.36	49.5	19,313
618.37	51.0	19,880
618.38	52.4	20,449
618.39	53.9	21,019
618.40	55.4	21,590
618.41	56.8	22,164
618.42	58.3	22,739
618.43	59.8	23,315
618.44	61.3	23,894
618.45	62.8	24,473
618.46	64.2	25,055
618.47	65.7	25,638
618.48	67.2	26,223
618.49	68.7	26,809
618.50	70.3	27,398
618.51	71.8	27,987
618.52	73.3	28,579
618.53	74.8	29,172
618.54	76.3	29,766
618.55	77.9	30,362
618.56	79.4	30,960
618.57	80.9	31,560
618.58	82.5	32,161
618.59	84.0	32,764
618.60	85.6	33,368
618.61	87.1	33,974
618.62	88.7	34,582
618.63	90.2	35,192
618.64	91.8	35,803
618.65	93.4	36,415
618.66	94.9	37,030
618.67	96.5	37,645
618.68	98.1	38,263
618.69	99.7	38,882
618.70	101.3	39,503
618.71	102.9	40,126
618.72	104.5	40,750
618.73	106.1	41,375
618.74	107.7	42,003
618.75	109.3	42,632
618.76	110.9	43,263
618.77	112.6	43,895
618.78	114.2	44,529
618.79	115.8	45,164
618.80	117.4	45,802
618.81	119.1	46,440
618.82	120.7	47,081
618.83	122.4	47,723
618.84	124.0	48,367
618.85	125.7	49,012
618.86	127.3	49,659
618.87	129.0	50,308
618.88	130.7	50,958
618.89	132.3	51,610
618.90	134.0	52,264
618.91	135.7	52,919
618.92	137.4	53,576
618.93	139.1	54,235
618.94	140.8	54,895
618.95	142.5	55,556
618.96	144.2	56,220
618.97	145.9	56,885
618.98	147.6	57,552
618.99	149.3	58,220
619.00	**151.0**	**58,890**

Summary for Pond 1: SFB-1

Inflow Area = 0.966 ac, 48.65% Impervious, Inflow Depth > 6.06" for 100-YR event
Inflow = 2.42 cfs @ 12.10 hrs, Volume= 0.488 af
Outflow = 1.23 cfs @ 12.55 hrs, Volume= 0.436 af, Atten= 49%, Lag= 27.2 min
Discarded = 0.13 cfs @ 12.55 hrs, Volume= 0.146 af
Primary = 1.11 cfs @ 12.55 hrs, Volume= 0.291 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 610.35' @ 12.55 hrs Surf.Area= 3,000 sf Storage= 5,136 cf
Flood Elev= 611.00' Surf.Area= 3,452 sf Storage= 7,242 cf

Plug-Flow detention time= 133.4 min calculated for 0.436 af (89% of inflow)
Center-of-Mass det. time= 85.9 min (907.3 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	607.00'	6,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 8,597 cf Overall - 1,797 cf Embedded = 6,800 cf
#2	607.00'	165 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 413 cf Overall x 40.0% Voids
#3	607.50'	120 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 600 cf Overall x 20.0% Voids
#4	608.00'	157 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 784 cf Overall x 20.0% Voids
		7,242 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
608.00	1,568	1,197	1,197
609.00	2,130	1,849	3,046
610.00	2,760	2,445	5,491
611.00	3,452	3,106	8,597

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.00	825	0	0
607.50	825	413	413

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
607.50	1,200	0	0
608.00	1,200	600	600

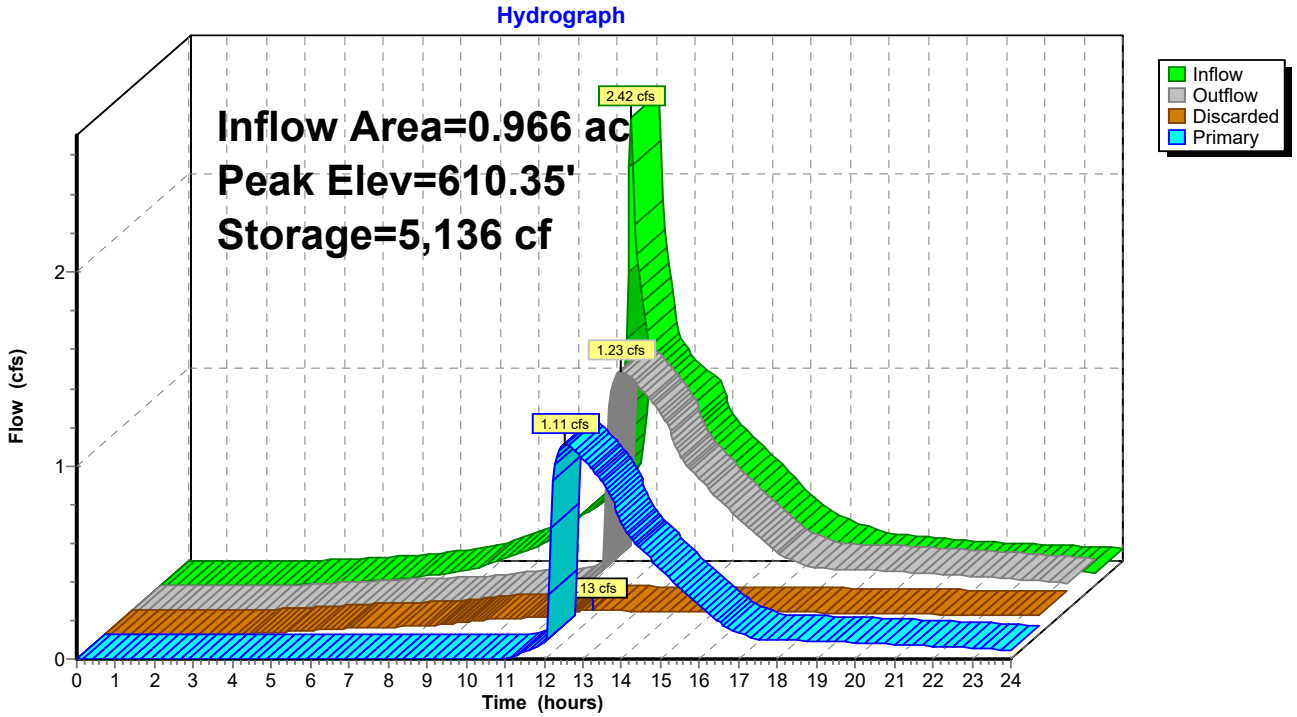
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
608.00	1,568	0	0
608.50	1,568	784	784

Device	Routing	Invert	Outlet Devices
#1	Discarded	607.00'	**1.805 in/hr Exfiltration over Surface area**
#2	Primary	607.50'	**8.0" Round Culvert** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 607.50' / 607.33' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf
#3	Device 2	609.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	610.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.13 cfs @ 12.55 hrs HW=610.35' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=1.11 cfs @ 12.55 hrs HW=610.35' (Free Discharge)
└─**2=Culvert** (Passes 1.11 cfs of 2.10 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.41 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.99 cfs @ 2.84 fps)

Pond 1: SFB-1



Stage-Area-Storage for Pond 1: SFB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
607.00	825	0
607.05	862	17
607.10	899	37
607.15	936	58
607.20	974	81
607.25	1,011	106
607.30	1,048	132
607.35	1,085	161
607.40	1,122	191
607.45	1,159	224
607.50	1,197	258
607.55	1,234	271
607.60	1,271	285
607.65	1,308	302
607.70	1,345	320
607.75	1,382	340
607.80	1,419	362
607.85	1,457	386
607.90	1,494	412
607.95	1,531	440
608.00	1,568	469
608.05	1,596	485
608.10	1,624	503
608.15	1,652	522
608.20	1,680	543
608.25	1,709	565
608.30	1,737	588
608.35	1,765	613
608.40	1,793	639
608.45	1,821	667
608.50	1,849	696
608.55	1,877	789
608.60	1,905	884
608.65	1,933	980
608.70	1,961	1,077
608.75	1,990	1,176
608.80	2,018	1,276
608.85	2,046	1,378
608.90	2,074	1,481
608.95	2,102	1,585
609.00	2,130	1,691
609.05	2,161	1,798
609.10	2,193	1,907
609.15	2,224	2,017
609.20	2,256	2,129
609.25	2,288	2,243
609.30	2,319	2,358
609.35	2,351	2,475
609.40	2,382	2,593
609.45	2,414	2,713
609.50	2,445	2,835
609.55	2,476	2,958
609.60	2,508	3,082
609.65	2,539	3,208
609.70	2,571	3,336
609.75	2,603	3,465
609.80	2,634	3,596
609.85	2,666	3,729
609.90	2,697	3,863
609.95	2,729	3,999
610.00	2,760	4,136
610.05	2,795	4,275
610.10	2,829	4,415
610.15	2,864	4,558
610.20	2,898	4,702
610.25	2,933	4,847
610.30	2,968	4,995
610.35	3,002	5,144
610.40	3,037	5,295
610.45	3,071	5,448
610.50	3,106	5,602
610.55	3,141	5,758
610.60	3,175	5,916
610.65	3,210	6,076
610.70	3,244	6,237
610.75	3,279	6,400
610.80	3,314	6,565
610.85	3,348	6,732
610.90	3,383	6,900
610.95	3,417	7,070
611.00	**3,452**	**7,242**

Summary for Pond 2: SFB-2

Inflow Area = 4.230 ac, 47.33% Impervious, Inflow Depth > 2.87" for 100-YR event
Inflow = 4.14 cfs @ 12.09 hrs, Volume= 1.010 af
Outflow = 1.13 cfs @ 14.30 hrs, Volume= 0.815 af, Atten= 73%, Lag= 132.1 min
Discarded = 0.45 cfs @ 14.30 hrs, Volume= 0.501 af
Primary = 0.68 cfs @ 14.30 hrs, Volume= 0.313 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 616.37' @ 14.30 hrs Surf.Area= 8,078 sf Storage= 13,347 cf
Flood Elev= 617.00' Surf.Area= 9,273 sf Storage= 18,810 cf

Plug-Flow detention time= 187.8 min calculated for 0.815 af (81% of inflow)
Center-of-Mass det. time= 101.3 min (976.2 - 874.9)

Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	17,591 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 22,460 cf Overall - 4,870 cf Embedded = 17,591 cf
#2	613.00'	491 cf	**Crush Stone (Prismatic)** Listed below (Recalc) Inside #1 1,227 cf Overall x 40.0% Voids
#3	613.50'	343 cf	**Sand Media (Prismatic)** Listed below (Recalc) Inside #1 1,714 cf Overall x 20.0% Voids
#4	614.00'	386 cf	**Infiltration Seed Mix (Prismatic)** Listed below (Recalc) Inside #1 1,929 cf Overall x 20.0% Voids
		18,810 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
614.00	3,857	2,982	2,982
615.00	5,537	4,697	7,679
616.00	7,376	6,457	14,136
617.00	9,273	8,325	22,460

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.00	2,107	0	0
613.50	2,800	1,227	1,227

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
613.50	3,000	0	0
614.00	3,857	1,714	1,714

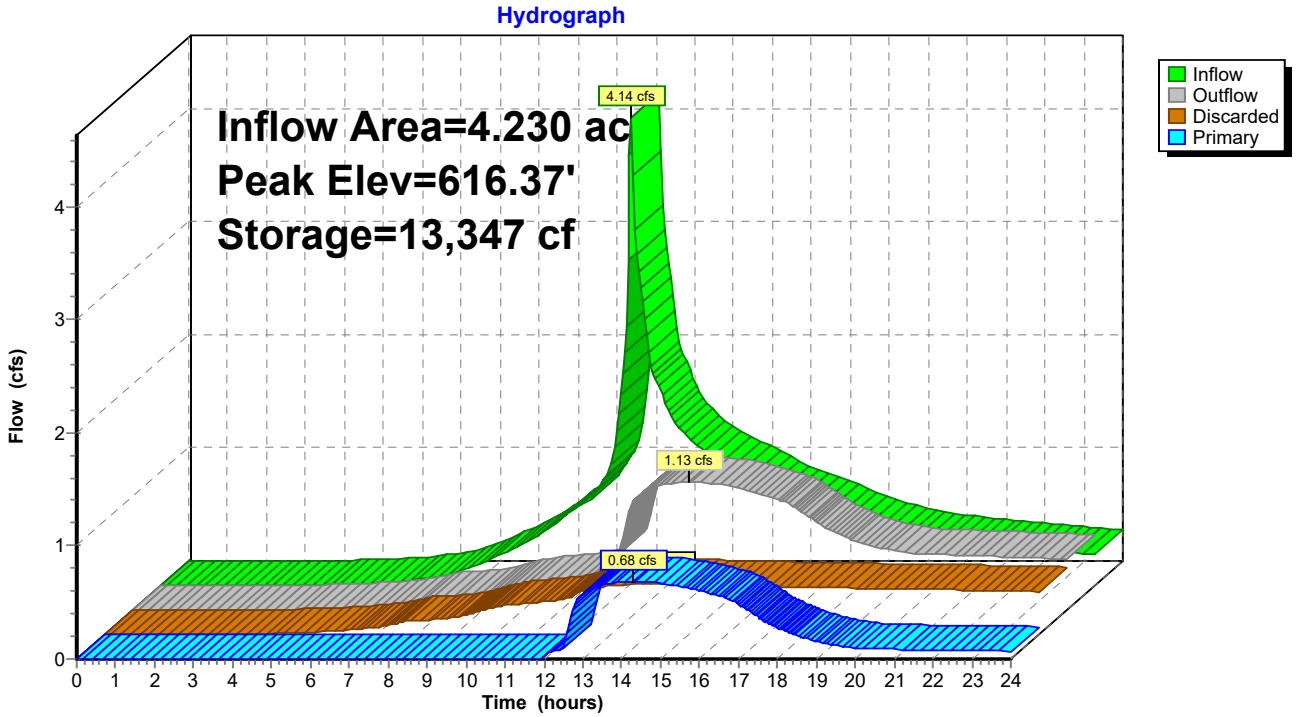
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
614.00	3,857	0	0
614.50	3,857	1,929	1,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	613.00'	**2.380 in/hr Exfiltration over Surface area**
#2	Primary	613.25'	**6.0" Round Culvert**
			L= 28.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 613.25' / 612.75' S= 0.0179 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	615.20'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	616.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.45 cfs @ 14.30 hrs HW=616.37' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.45 cfs)

Primary OutFlow Max=0.68 cfs @ 14.30 hrs HW=616.37' (Free Discharge)
└─**2=Culvert** (Passes 0.68 cfs of 1.26 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.02 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.58 cfs @ 2.93 fps)

Pond 2: SFB-2



Stage-Area-Storage for Pond 2: SFB-2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
613.00	2,107	0
613.05	2,194	43
613.10	2,282	89
613.15	2,369	137
613.20	2,457	187
613.25	2,545	239
613.30	2,632	294
613.35	2,720	351
613.40	2,807	411
613.45	2,895	472
613.50	2,982	536
613.55	3,069	566
613.60	3,157	596
613.65	3,244	628
613.70	3,332	660
613.75	3,420	694
613.80	3,507	728
613.85	3,595	763
613.90	3,682	799
613.95	3,770	836
614.00	3,857	875
614.05	3,941	915
614.10	4,025	960
614.15	4,109	1,009
614.20	4,193	1,062
614.25	4,277	1,120
614.30	4,361	1,182
614.35	4,445	1,247
614.40	4,529	1,318
614.45	4,613	1,392
614.50	4,697	1,470
614.55	4,781	1,707
614.60	4,865	1,948
614.65	4,949	2,194
614.70	5,033	2,443
614.75	5,117	2,697
614.80	5,201	2,955
614.85	5,285	3,217
614.90	5,369	3,483
614.95	5,453	3,754
615.00	5,537	4,029
615.05	5,629	4,308
615.10	5,721	4,592
615.15	5,813	4,880
615.20	5,905	5,173
615.25	5,997	5,470
615.30	6,089	5,773
615.35	6,181	6,079
615.40	6,273	6,391
615.45	6,365	6,707
615.50	6,457	7,027
615.55	6,548	7,352
615.60	6,640	7,682
615.65	6,732	8,016
615.70	6,824	8,355
615.75	6,916	8,699
615.80	7,008	9,047
615.85	7,100	9,400
615.90	7,192	9,757
615.95	7,284	10,119
616.00	7,376	10,485
616.05	7,471	10,856
616.10	7,566	11,232
616.15	7,661	11,613
616.20	7,755	11,998
616.25	7,850	12,389
616.30	7,945	12,783
616.35	8,040	13,183
616.40	8,135	13,587
616.45	8,230	13,997
616.50	8,325	14,410
616.55	8,419	14,829
616.60	8,514	15,252
616.65	8,609	15,680
616.70	8,704	16,113
616.75	8,799	16,551
616.80	8,894	16,993
616.85	8,988	17,440
616.90	9,083	17,892
616.95	9,178	18,348
617.00	**9,273**	**18,810**

Summary for Pond DB-1: DB-1

Inflow	=	4.48 cfs @	12.09 hrs,	Volume=	0.157 af
Outflow	=	0.62 cfs @	12.52 hrs,	Volume=	0.154 af, Atten= 86%, Lag= 26.2 min
Primary	=	0.62 cfs @	12.52 hrs,	Volume=	0.154 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 611.13' @ 12.52 hrs Surf.Area= 3,131 sf Storage= 5,021 cf
Flood Elev= 611.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 110.2 min calculated for 0.154 af (98% of inflow)
Center-of-Mass det. time= 109.1 min (836.7 - 727.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	609.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	609.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**6.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	609.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	610.25'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.62 cfs @ 12.52 hrs HW=611.13' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.62 cfs @ 3.16 fps)
  ├─**2=Orifice/Grate** (Passes < 0.55 cfs potential flow)
  └─**3=Orifice/Grate** (Passes < 0.36 cfs potential flow)

Pond DB-1: DB-1 - Chamber Wizard Field A

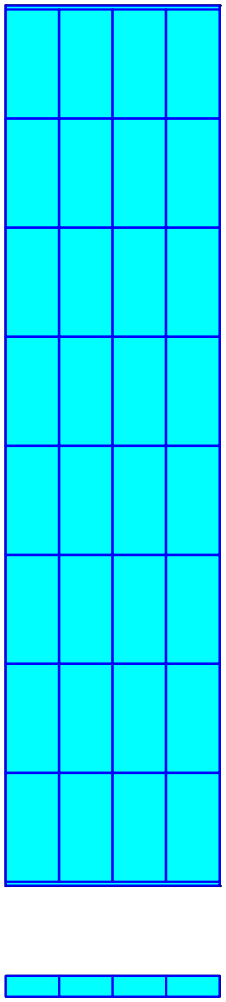
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

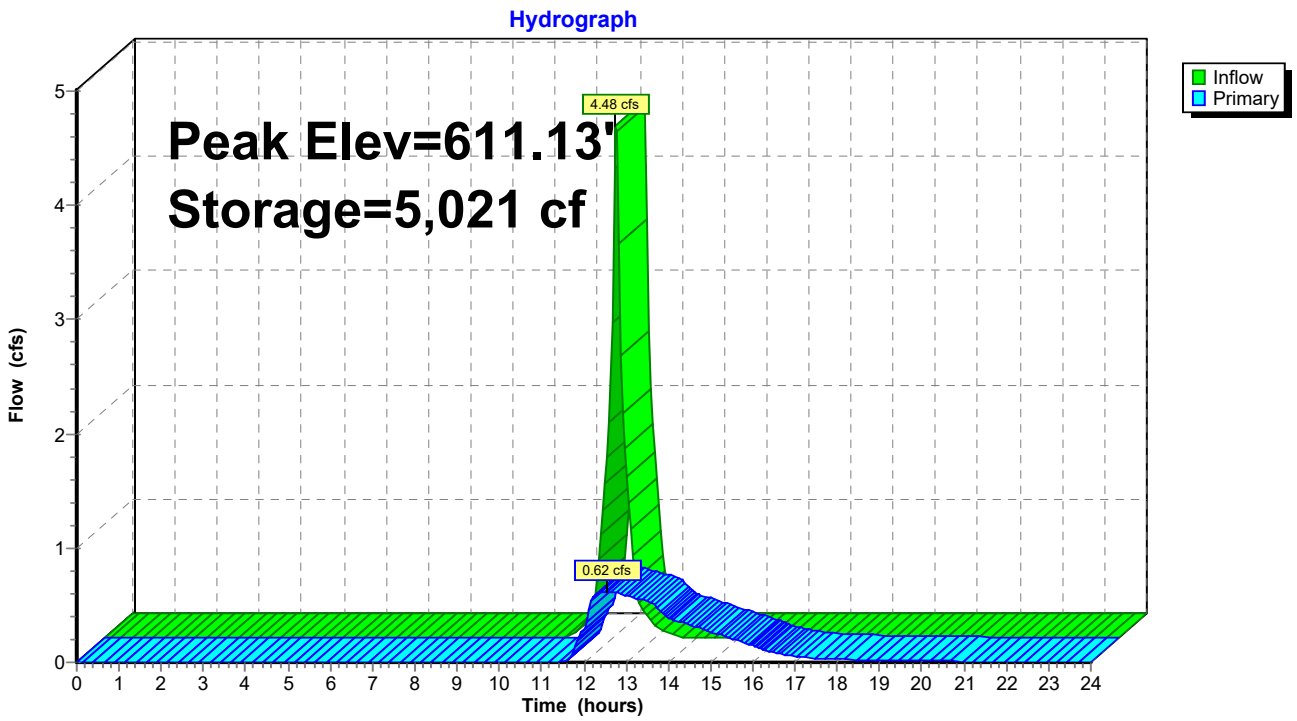
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-1: DB-1


Hydrograph
Inflow
Primary
4.48 cfs
0.62 cfs
Peak Elev=611.13'
Storage=5,021 cf
Flow (cfs)
Time (hours)
0
1
2
3
4
5
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-1: DB-1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
609.25	0	610.29	2,771	611.33	5,328
609.27	53	610.31	2,824	611.35	5,328
609.29	107	610.33	2,877	611.37	5,328
609.31	160	610.35	2,930	611.39	5,328
609.33	213	610.37	2,984	611.41	5,328
609.35	266	610.39	3,037	611.43	5,328
609.37	320	610.41	3,090	611.45	5,328
609.39	373	610.43	3,144	611.47	5,328
609.41	426	610.45	3,197	611.49	5,328
609.43	480	610.47	3,250	611.51	5,328
609.45	533	610.49	3,303	611.53	5,328
609.47	586	610.51	3,357	611.55	5,328
609.49	639	610.53	3,410	611.57	5,328
609.51	693	610.55	3,463	611.59	5,328
609.53	746	610.57	3,516	611.61	5,328
609.55	799	610.59	3,570	611.63	5,328
609.57	852	610.61	3,623	611.65	5,328
609.59	906	610.63	3,676	611.67	5,328
609.61	959	610.65	3,730	611.69	5,328
609.63	1,012	610.67	3,783	611.71	5,328
609.65	1,066	610.69	3,836	611.73	5,328
609.67	1,119	610.71	3,889	611.75	5,328
609.69	1,172	610.73	3,943	611.77	5,328
609.71	1,225	610.75	3,996	611.79	5,328
609.73	1,279	610.77	4,049	611.81	5,328
609.75	1,332	610.79	4,103	611.83	5,328
609.77	1,385	610.81	4,156	611.85	5,328
609.79	1,439	610.83	4,209	611.87	5,328
609.81	1,492	610.85	4,262	611.89	5,328
609.83	1,545	610.87	4,316	611.91	**5,328**
609.85	1,598	610.89	4,369		
609.87	1,652	610.91	4,422		
609.89	1,705	610.93	4,476		
609.91	1,758	610.95	4,529		
609.93	1,812	610.97	4,582		
609.95	1,865	610.99	4,635		
609.97	1,918	611.01	4,689		
609.99	1,971	611.03	4,742		
610.01	2,025	611.05	4,795		
610.03	2,078	611.07	4,848		
610.05	2,131	611.09	4,902		
610.07	2,184	611.11	4,955		
610.09	2,238	611.13	5,008		
610.11	2,291	611.15	5,062		
610.13	2,344	611.17	5,115		
610.15	2,398	611.19	5,168		
610.17	2,451	611.21	5,221		
610.19	2,504	611.23	5,275		
610.21	2,557	611.25	5,328		
610.23	2,611	611.27	5,328		
610.25	2,664	611.29	5,328		
610.27	2,717	611.31	5,328		

Summary for Pond DB-2: DB-2

Inflow	=	3.65 cfs @	12.09 hrs,	Volume=	0.119 af
Outflow	=	0.14 cfs @	12.77 hrs,	Volume=	0.098 af, Atten= 96%, Lag= 40.7 min
Primary	=	0.14 cfs @	12.77 hrs,	Volume=	0.098 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 616.99' @ 12.77 hrs Surf.Area= 3,131 sf Storage= 4,645 cf
Flood Elev= 617.25' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 303.6 min calculated for 0.098 af (82% of inflow)
Center-of-Mass det. time= 298.8 min (1,026.2 - 727.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.25'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.25'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.25'	**6.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.25' / 615.00' S= 0.0057 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.25'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.14 cfs @ 12.77 hrs HW=616.99' (Free Discharge)
└─**1=Culvert** (Passes 0.14 cfs of 0.91 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.20 fps)

Pond DB-2: DB-2 - Chamber Wizard Field A

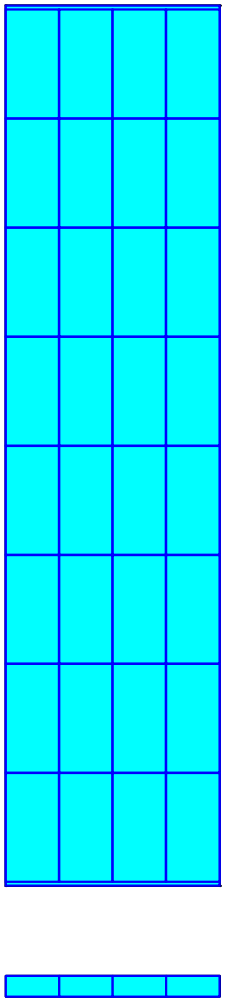
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

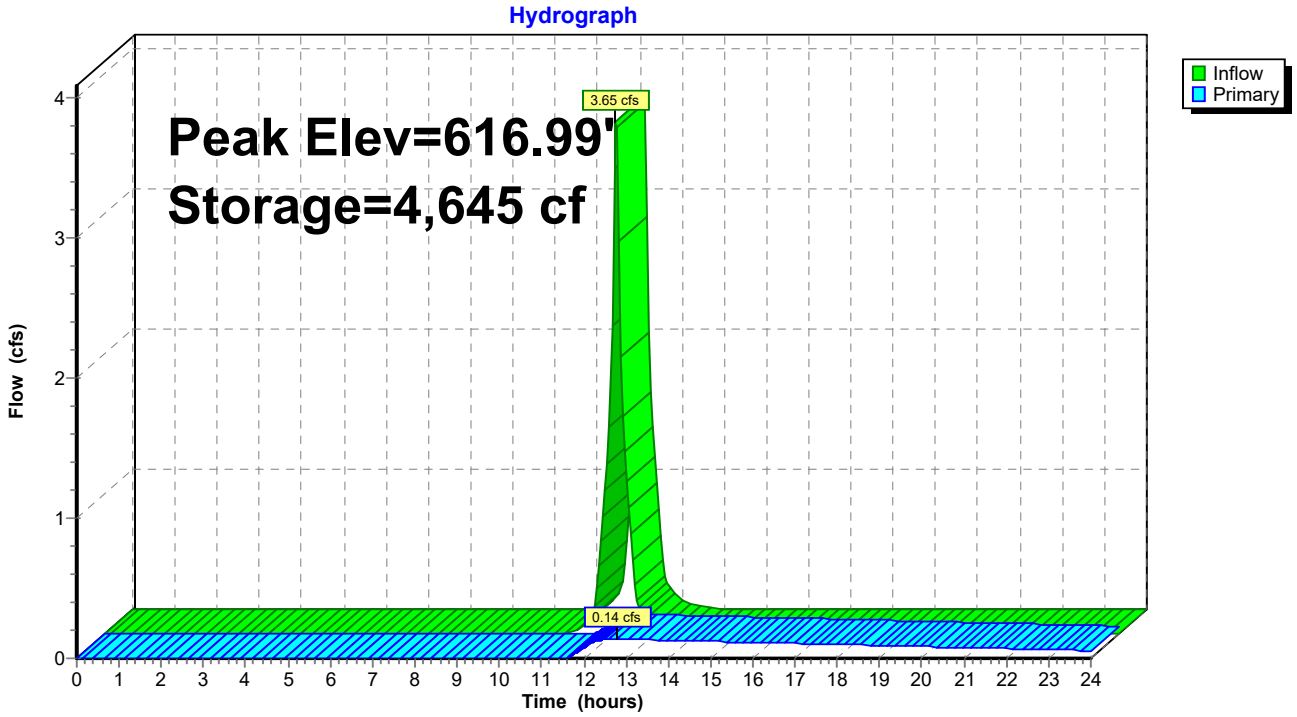
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-2: DB-2


Hydrograph
Peak Elev=616.99'
Storage=4,645 cf
3.65 cfs
0.14 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-2: DB-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.25	0	616.29	2,771	617.33	5,328
615.27	53	616.31	2,824	617.35	5,328
615.29	107	616.33	2,877	617.37	5,328
615.31	160	616.35	2,930	617.39	5,328
615.33	213	616.37	2,984	617.41	5,328
615.35	266	616.39	3,037	617.43	5,328
615.37	320	616.41	3,090	617.45	5,328
615.39	373	616.43	3,144	617.47	5,328
615.41	426	616.45	3,197	617.49	5,328
615.43	480	616.47	3,250	617.51	5,328
615.45	533	616.49	3,303	617.53	5,328
615.47	586	616.51	3,357	617.55	5,328
615.49	639	616.53	3,410	617.57	5,328
615.51	693	616.55	3,463	617.59	5,328
615.53	746	616.57	3,516	617.61	5,328
615.55	799	616.59	3,570	617.63	5,328
615.57	852	616.61	3,623	617.65	5,328
615.59	906	616.63	3,676	617.67	5,328
615.61	959	616.65	3,730	617.69	5,328
615.63	1,012	616.67	3,783	617.71	5,328
615.65	1,066	616.69	3,836	617.73	5,328
615.67	1,119	616.71	3,889	617.75	5,328
615.69	1,172	616.73	3,943	617.77	5,328
615.71	1,225	616.75	3,996	617.79	5,328
615.73	1,279	616.77	4,049	617.81	5,328
615.75	1,332	616.79	4,103	617.83	5,328
615.77	1,385	616.81	4,156	617.85	5,328
615.79	1,439	616.83	4,209	617.87	5,328
615.81	1,492	616.85	4,262	617.89	5,328
615.83	1,545	616.87	4,316	617.91	**5,328**
615.85	1,598	616.89	4,369		
615.87	1,652	616.91	4,422		
615.89	1,705	616.93	4,476		
615.91	1,758	616.95	4,529		
615.93	1,812	616.97	4,582		
615.95	1,865	616.99	4,635		
615.97	1,918	617.01	4,689		
615.99	1,971	617.03	4,742		
616.01	2,025	617.05	4,795		
616.03	2,078	617.07	4,848		
616.05	2,131	617.09	4,902		
616.07	2,184	617.11	4,955		
616.09	2,238	617.13	5,008		
616.11	2,291	617.15	5,062		
616.13	2,344	617.17	5,115		
616.15	2,398	617.19	5,168		
616.17	2,451	617.21	5,221		
616.19	2,504	617.23	5,275		
616.21	2,557	617.25	5,328		
616.23	2,611	617.27	5,328		
616.25	2,664	617.29	5,328		
616.27	2,717	617.31	5,328		

Summary for Pond DB-6: DB-6

Inflow Area = 0.133 ac,100.00% Impervious, Inflow Depth > 81.96" for 100-YR event
Inflow = 11.00 cfs @ 12.21 hrs, Volume= 0.911 af
Outflow = 6.25 cfs @ 12.47 hrs, Volume= 0.900 af, Atten= 43%, Lag= 15.4 min
Primary = 6.25 cfs @ 12.47 hrs, Volume= 0.900 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.13' @ 12.47 hrs Surf.Area= 2,902 sf Storage= 12,555 cf
Flood Elev= 617.25' Surf.Area= 2,902 sf Storage= 12,873 cf

Plug-Flow detention time= 70.2 min calculated for 0.898 af (99% of inflow)
Center-of-Mass det. time= 62.8 min (853.0 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	612.25'	0 cf	**38.75'W x 74.90'L x 5.50'H Field A** 15,962 cf Overall - 15,962 cf Embedded = 0 cf x 40.0% Voids
#2A	612.25'	12,873 cf	**StormTrap ST2 SingleTrap 5-0**x 12 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 3 Rows of 4 Chambers 25.44' x 61.58' Core + 6.66' Border = 38.75' x 74.90' System
		12,873 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	612.25'	**12.0" Round Culvert** L= 110.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 612.25' / 609.60' S= 0.0241 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	612.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	614.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	615.25'	**8.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	616.25'	**12.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=6.24 cfs @ 12.47 hrs HW=617.12' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.24 cfs @ 7.95 fps)
  ├─**2=Orifice/Grate** (Passes < 0.91 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 2.81 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 2.08 cfs potential flow)
  └─**5=Orifice/Grate** (Passes < 2.30 cfs potential flow)

Pond DB-6: DB-6 - Chamber Wizard Field A

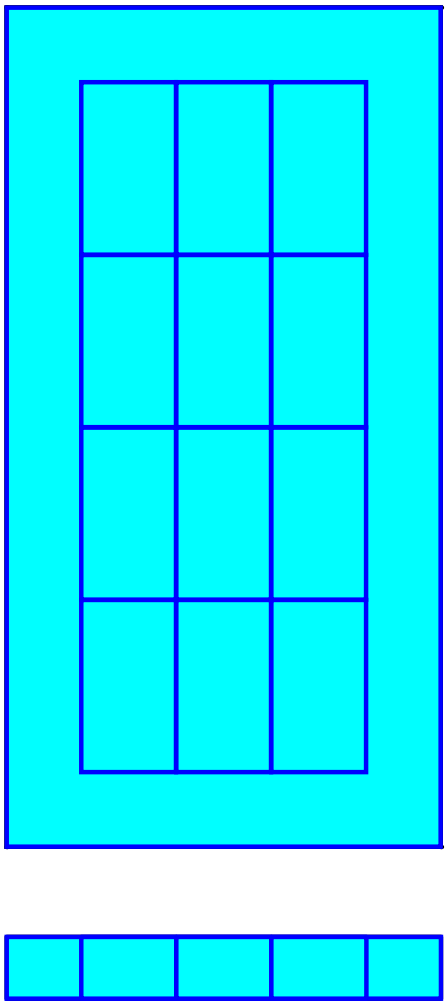
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

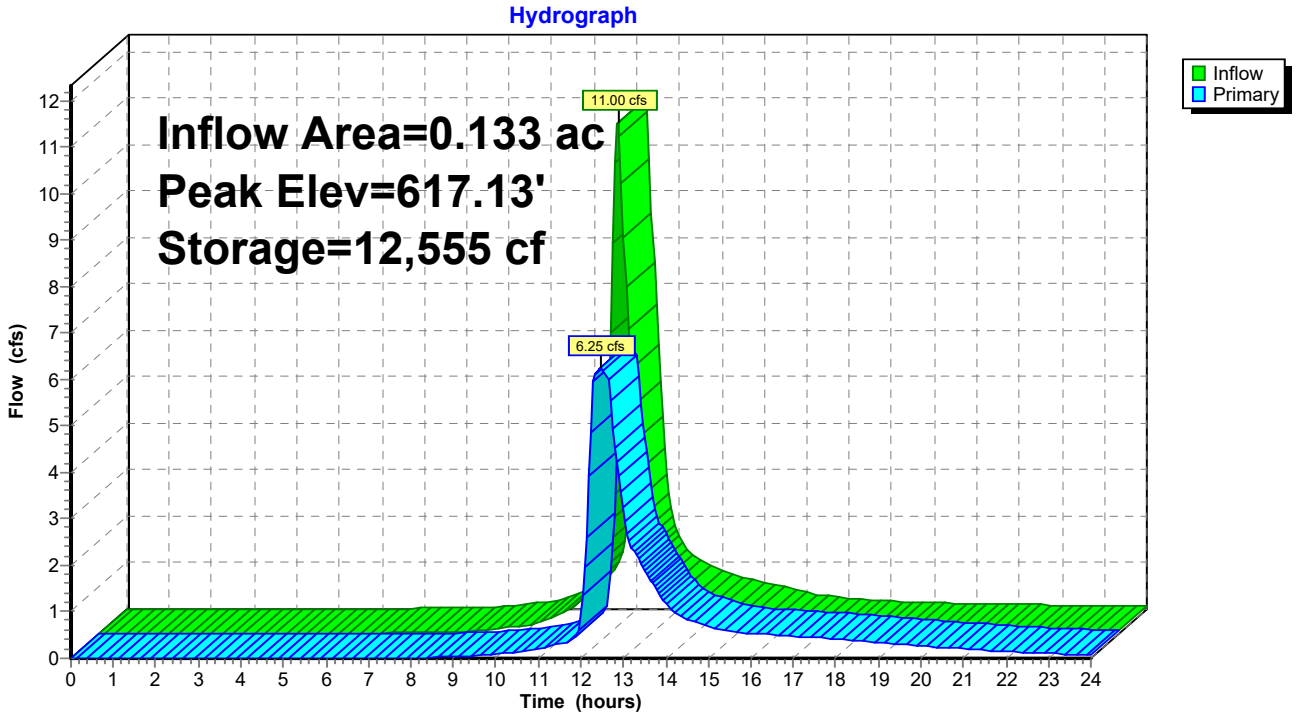
12 Chambers x 590.2 cf + 5,791.0 cf Border = 12,873.2 cf Chamber Storage
12 Chambers x 718.0 cf + 7,346.3 cf Border = 15,962.2 cf Displacement

Chamber Storage = 12,873.2 cf = 0.296 af
Overall Storage Efficiency = 80.6%
Overall System Size = 74.90' x 38.75' x 5.50'

12 Chambers (plus border)
591.2 cy Field



Pond DB-6: DB-6


Hydrograph
Inflow Area=0.133 ac
Peak Elev=617.13'
Storage=12,555 cf
11.00 cfs
6.25 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-6: DB-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
612.25	0	614.33	5,355	616.41	10,710
612.29	103	614.37	5,458	616.45	10,813
612.33	206	614.41	5,561	616.49	10,916
612.37	309	614.45	5,664	616.53	11,019
612.41	412	614.49	5,767	616.57	11,122
612.45	515	614.53	5,870	616.61	11,225
612.49	618	614.57	5,973	616.65	11,328
612.53	721	614.61	6,076	616.69	11,431
612.57	824	614.65	6,179	616.73	11,534
612.61	927	614.69	6,282	616.77	11,637
612.65	1,030	614.73	6,385	616.81	11,740
612.69	1,133	614.77	6,488	616.85	11,843
612.73	1,236	614.81	6,591	616.89	11,946
612.77	1,339	614.85	6,694	616.93	12,049
612.81	1,442	614.89	6,797	616.97	12,152
612.85	1,545	614.93	6,900	617.01	12,255
612.89	1,648	614.97	7,003	617.05	12,358
612.93	1,751	615.01	7,106	617.09	12,461
612.97	1,854	615.05	7,209	617.13	12,564
613.01	1,957	615.09	7,312	617.17	12,667
613.05	2,060	615.13	7,415	617.21	12,770
613.09	2,163	615.17	7,518	617.25	12,873
613.13	2,266	615.21	7,621	617.29	12,873
613.17	2,369	615.25	7,724	617.33	12,873
613.21	2,472	615.29	7,827	617.37	12,873
613.25	2,575	615.33	7,930	617.41	12,873
613.29	2,678	615.37	8,033	617.45	**12,873**
613.33	2,781	615.41	8,136	617.49	12,873
613.37	2,884	615.45	8,239	617.53	12,873
613.41	2,987	615.49	8,342	617.57	12,873
613.45	3,090	615.53	8,445	617.61	12,873
613.49	3,193	615.57	8,548	617.65	12,873
613.53	3,296	615.61	8,651	617.69	12,873
613.57	3,399	615.65	8,754	617.73	12,873
613.61	3,502	615.69	8,857		
613.65	3,604	615.73	8,960		
613.69	3,707	615.77	9,063		
613.73	3,810	615.81	9,166		
613.77	3,913	615.85	9,269		
613.81	4,016	615.89	9,372		
613.85	4,119	615.93	9,475		
613.89	4,222	615.97	9,578		
613.93	4,325	616.01	9,681		
613.97	4,428	616.05	9,784		
614.01	4,531	616.09	9,887		
614.05	4,634	616.13	9,990		
614.09	4,737	616.17	10,093		
614.13	4,840	616.21	10,196		
614.17	4,943	616.25	10,299		
614.21	5,046	616.29	10,402		
614.25	5,149	616.33	10,505		
614.29	5,252	616.37	10,608		

Summary for Pond DB-7: DB-7

Inflow Area = 0.543 ac, 78.86% Impervious, Inflow Depth > 6.72" for 100-YR event
Inflow = 3.89 cfs @ 12.09 hrs, Volume= 0.304 af
Outflow = 0.81 cfs @ 12.51 hrs, Volume= 0.296 af, Atten= 79%, Lag= 25.3 min
Primary = 0.81 cfs @ 12.51 hrs, Volume= 0.296 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 617.79' @ 12.51 hrs Surf.Area= 3,131 sf Storage= 5,305 cf
Flood Elev= 617.80' Surf.Area= 3,131 sf Storage= 5,328 cf

Plug-Flow detention time= 111.5 min calculated for 0.296 af (97% of inflow)
Center-of-Mass det. time= 94.9 min (867.7 - 772.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	615.80'	0 cf	**27.58'W x 113.50'L x 2.67'H Field A** 8,349 cf Overall - 8,349 cf Embedded = 0 cf x 40.0% Voids
#2A	615.80'	5,328 cf	**StormTrap ST1 SingleTrap 2-0** x 32 Inside #1 Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		5,328 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	615.80'	**6.0" Round Culvert** L= 124.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 615.80' / 615.00' S= 0.0065 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	615.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	617.30'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.81 cfs @ 12.51 hrs HW=617.79' (Free Discharge)
└─**1=Culvert** (Passes 0.81 cfs of 0.86 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.57 cfs @ 6.50 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.24 cfs @ 2.74 fps)

Pond DB-7: DB-7 - Chamber Wizard Field A

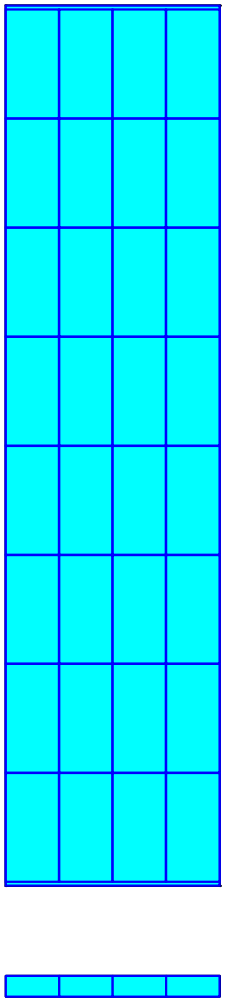
Chamber Model = StormTrap ST1 SingleTrap 2-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 24.0"H => 11.84 sf x 14.06'L = 166.5 cf
Outside= 82.7"W x 32.0"H => 18.39 sf x 14.06'L = 258.6 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
32.0" Chamber Height = 2.67' Field Height

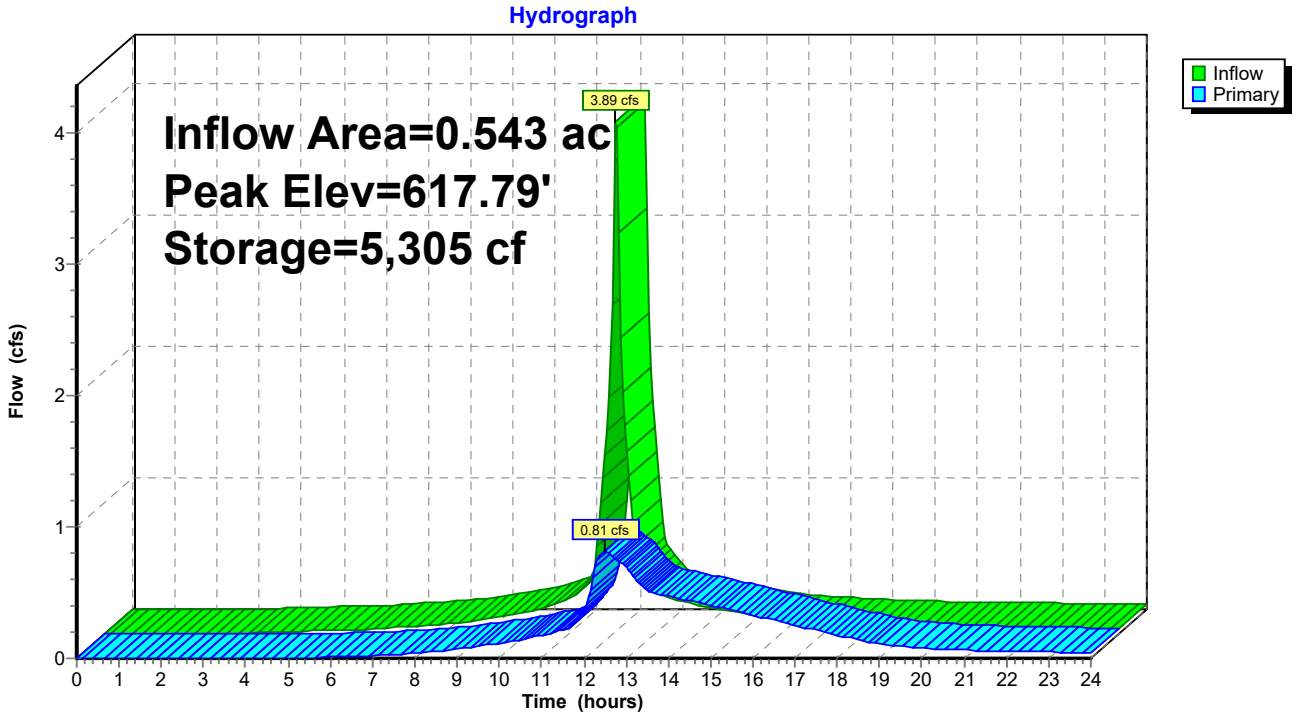
32 Chambers x 166.5 cf = 5,328.0 cf Chamber Storage
32 Chambers x 258.6 cf + 73.6 cf Border = 8,348.6 cf Displacement

Chamber Storage = 5,328.0 cf = 0.122 af
Overall Storage Efficiency = 63.8%
Overall System Size = 113.50' x 27.58' x 2.67'

32 Chambers (plus border)
309.2 cy Field



Pond DB-7: DB-7


Hydrograph
Inflow Area=0.543 ac
Peak Elev=617.79'
Storage=5,305 cf
3.89 cfs
0.81 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Area-Storage for Pond DB-7: DB-7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.80	0	616.84	2,771	617.88	5,328
615.82	53	616.86	2,824	617.90	5,328
615.84	107	616.88	2,877	617.92	5,328
615.86	160	616.90	2,930	617.94	5,328
615.88	213	616.92	2,984	617.96	5,328
615.90	266	616.94	3,037	617.98	5,328
615.92	320	616.96	3,090	618.00	5,328
615.94	373	616.98	3,144	618.02	5,328
615.96	426	617.00	3,197	618.04	5,328
615.98	480	617.02	3,250	618.06	5,328
616.00	533	617.04	3,303	618.08	5,328
616.02	586	617.06	3,357	618.10	5,328
616.04	639	617.08	3,410	618.12	5,328
616.06	693	617.10	3,463	618.14	5,328
616.08	746	617.12	3,516	618.16	5,328
616.10	799	617.14	3,570	618.18	5,328
616.12	852	617.16	3,623	618.20	5,328
616.14	906	617.18	3,676	618.22	5,328
616.16	959	617.20	3,730	618.24	5,328
616.18	1,012	617.22	3,783	618.26	5,328
616.20	1,066	617.24	3,836	618.28	5,328
616.22	1,119	617.26	3,889	618.30	5,328
616.24	1,172	617.28	3,943	618.32	5,328
616.26	1,225	617.30	3,996	618.34	5,328
616.28	1,279	617.32	4,049	618.36	5,328
616.30	1,332	617.34	4,103	618.38	5,328
616.32	1,385	617.36	4,156	618.40	5,328
616.34	1,439	617.38	4,209	618.42	5,328
616.36	1,492	617.40	4,262	618.44	5,328
616.38	1,545	617.42	4,316	618.46	**5,328**
616.40	1,598	617.44	4,369		
616.42	1,652	617.46	4,422		
616.44	1,705	617.48	4,476		
616.46	1,758	617.50	4,529		
616.48	1,812	617.52	4,582		
616.50	1,865	617.54	4,635		
616.52	1,918	617.56	4,689		
616.54	1,971	617.58	4,742		
616.56	2,025	617.60	4,795		
616.58	2,078	617.62	4,848		
616.60	2,131	617.64	4,902		
616.62	2,184	617.66	4,955		
616.64	2,238	617.68	5,008		
616.66	2,291	617.70	5,062		
616.68	2,344	617.72	5,115		
616.70	2,398	617.74	5,168		
616.72	2,451	617.76	5,221		
616.74	2,504	617.78	5,275		
616.76	2,557	617.80	5,328		
616.78	2,611	617.82	5,328		
616.80	2,664	617.84	5,328		
616.82	2,717	617.86	5,328		

Summary for Pond ICS-1: ICS-1

Inflow Area =	0.693 ac, 62.75% Impervious, Inflow Depth > 6.49" for 100-YR event				
Inflow =	4.86 cfs @	12.09 hrs,	Volume=	0.374 af	
Outflow =	4.86 cfs @	12.09 hrs,	Volume=	0.374 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.38 cfs @	12.09 hrs,	Volume=	0.218 af	
Secondary =	4.48 cfs @	12.09 hrs,	Volume=	0.157 af	

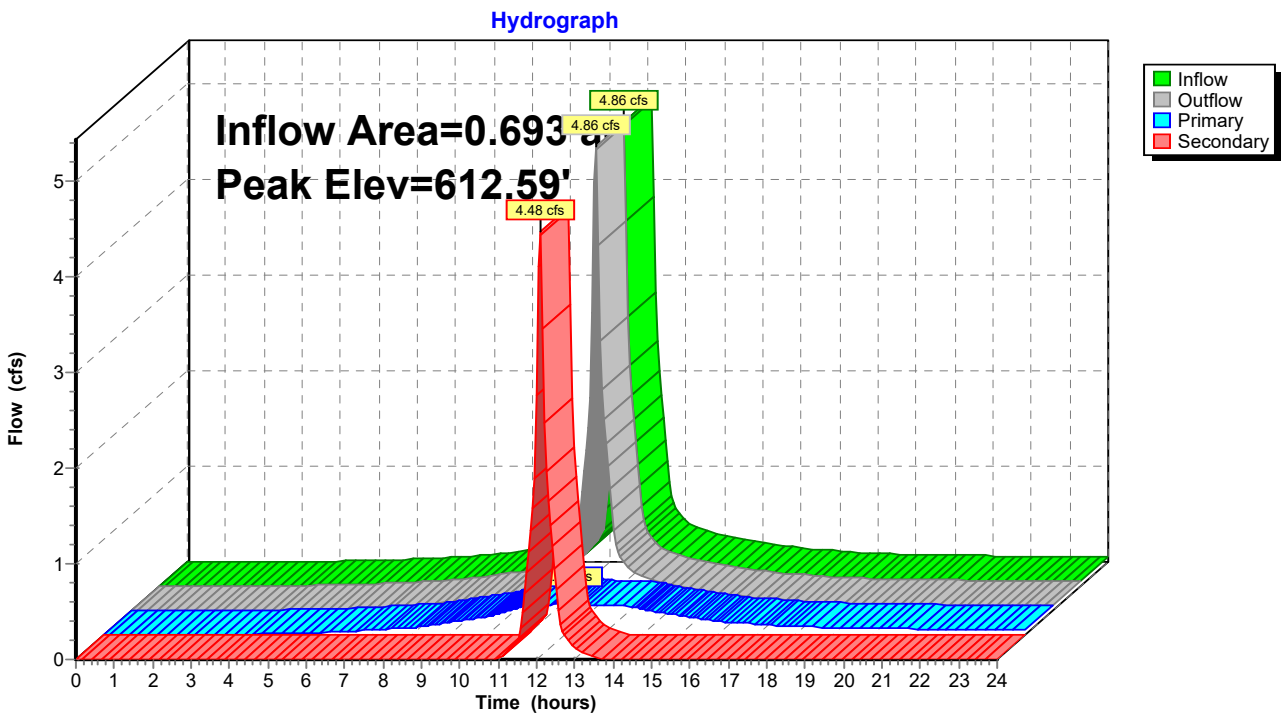
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 612.59' @ 12.09 hrs
Flood Elev= 613.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	609.25'	**4.0" Round Culvert** L= 145.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 609.25' / 608.50' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	611.20'	**12.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 611.20' / 610.20' S= 0.2000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.38 cfs @ 12.09 hrs HW=612.55' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.38 cfs @ 4.32 fps)

Secondary OutFlow Max=4.36 cfs @ 12.09 hrs HW=612.55' (Free Discharge)
└**2=Culvert** (Inlet Controls 4.36 cfs @ 5.55 fps)

Pond ICS-1: ICS-1



Stage-Area-Storage for Pond ICS-1: ICS-1

Elevation (feet)	Storage (cubic-feet)
609.25	**0**
609.30	0
609.35	0
609.40	0
609.45	0
609.50	0
609.55	0
609.60	0
609.65	0
609.70	0
609.75	0
609.80	0
609.85	0
609.90	0
609.95	0
610.00	0
610.05	0
610.10	0
610.15	0
610.20	0
610.25	0
610.30	0
610.35	0
610.40	0
610.45	0
610.50	0
610.55	0
610.60	0
610.65	0
610.70	0
610.75	0
610.80	0
610.85	0
610.90	0
610.95	0
611.00	0
611.05	0
611.10	0
611.15	0
611.20	0
611.25	0
611.30	0
611.35	0
611.40	0
611.45	0
611.50	0
611.55	0
611.60	0
611.65	0
611.70	0
611.75	0
611.80	0
611.85	0
611.90	0
611.95	0
612.00	0
612.05	0
612.10	0
612.15	0
612.20	0
612.25	0
612.30	0
612.35	0
612.40	0
612.45	0
612.50	0
612.55	0
612.60	0
612.65	0
612.70	0
612.75	0
612.80	0
612.85	0
612.90	0
612.95	0
613.00	0
613.05	0
613.10	0
613.15	0
613.20	0
613.25	0

Summary for Pond ICS-2: ICS-2

Inflow Area =	0.598 ac, 70.86% Impervious, Inflow Depth > 6.37" for 100-YR event				
Inflow =	4.15 cfs @	12.09 hrs,	Volume=	0.318 af	
Outflow =	4.15 cfs @	12.09 hrs,	Volume=	0.318 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.50 cfs @	12.08 hrs,	Volume=	0.199 af	
Secondary =	3.65 cfs @	12.09 hrs,	Volume=	0.119 af	

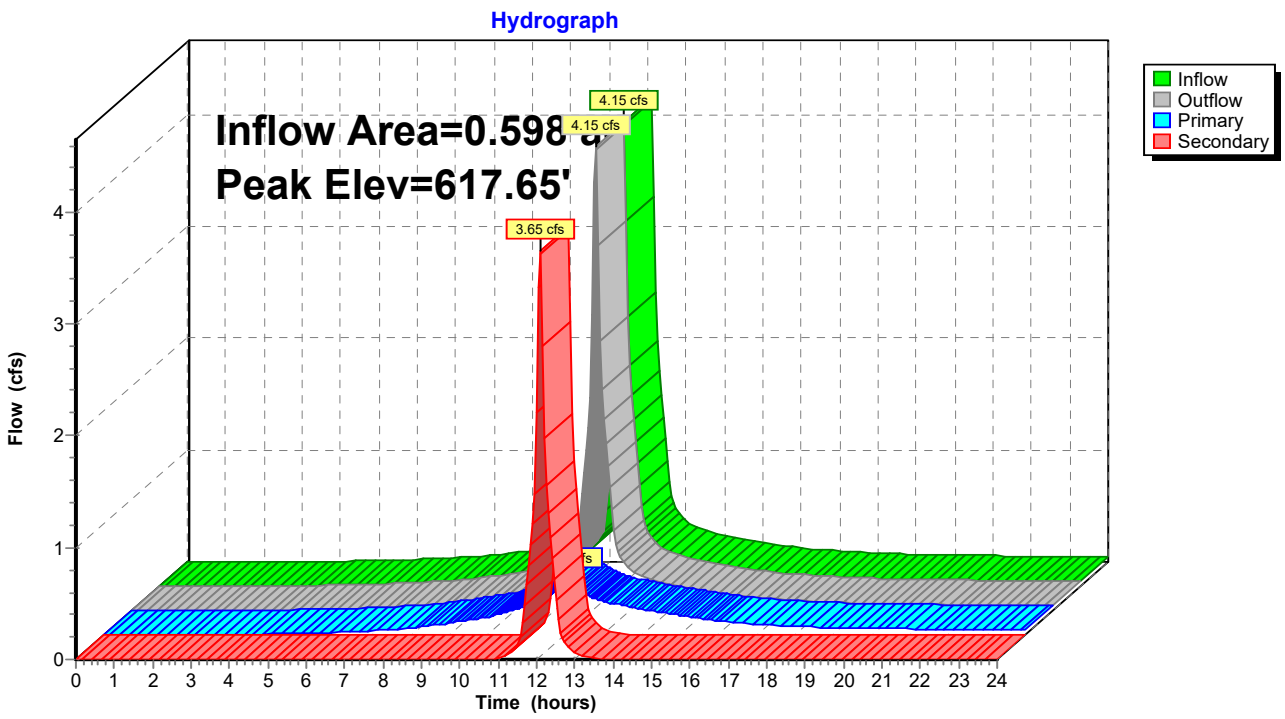
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 617.65' @ 12.08 hrs
Flood Elev= 617.25'

Device	Routing	Invert	Outlet Devices
#1	Primary	615.85'	**4.0" Round Culvert** L= 34.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 615.85' / 615.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Secondary	616.21'	**12.0" Round Culvert** L= 12.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.21' / 616.15' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.08 hrs HW=617.61' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.50 cfs @ 5.71 fps)

Secondary OutFlow Max=3.55 cfs @ 12.09 hrs HW=617.62' (Free Discharge)
└**2=Culvert** (Barrel Controls 3.55 cfs @ 4.52 fps)

Pond ICS-2: ICS-2



Stage-Area-Storage for Pond ICS-2: ICS-2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
615.85	**0**	616.89	0
615.87	0	616.91	0
615.89	0	616.93	0
615.91	0	616.95	0
615.93	0	616.97	0
615.95	0	616.99	0
615.97	0	617.01	0
615.99	0	617.03	0
616.01	0	617.05	0
616.03	0	617.07	0
616.05	0	617.09	0
616.07	0	617.11	0
616.09	0	617.13	0
616.11	0	617.15	0
616.13	0	617.17	0
616.15	0	617.19	0
616.17	0	617.21	0
616.19	0	617.23	0
616.21	0	617.25	0
616.23	0	617.27	0
616.25	0	617.29	0
616.27	0	617.31	0
616.29	0	617.33	0
616.31	0	617.35	0
616.33	0	617.37	0
616.35	0	617.39	0
616.37	0	617.41	0
616.39	0	617.43	0
616.41	0	617.45	0
616.43	0	617.47	0
616.45	0	617.49	0
616.47	0	617.51	0
616.49	0	617.53	0
616.51	0	617.55	0
616.53	0	617.57	0
616.55	0	617.59	0
616.57	0	617.61	0
616.59	0	617.63	0
616.61	0		
616.63	0		
616.65	0		
616.67	0		
616.69	0		
616.71	0		
616.73	0		
616.75	0		
616.77	0		
616.79	0		
616.81	0		
616.83	0		
616.85	0		
616.87	0		

Summary for Pond ICS-6: ICS-6

Inflow Area = 2.630 ac, 39.25% Impervious, Inflow Depth > 4.73" for 100-YR event
Inflow = 10.79 cfs @ 12.22 hrs, Volume= 1.038 af
Outflow = 10.79 cfs @ 12.22 hrs, Volume= 1.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.22 hrs, Volume= 0.210 af
Secondary = 10.47 cfs @ 12.22 hrs, Volume= 0.827 af

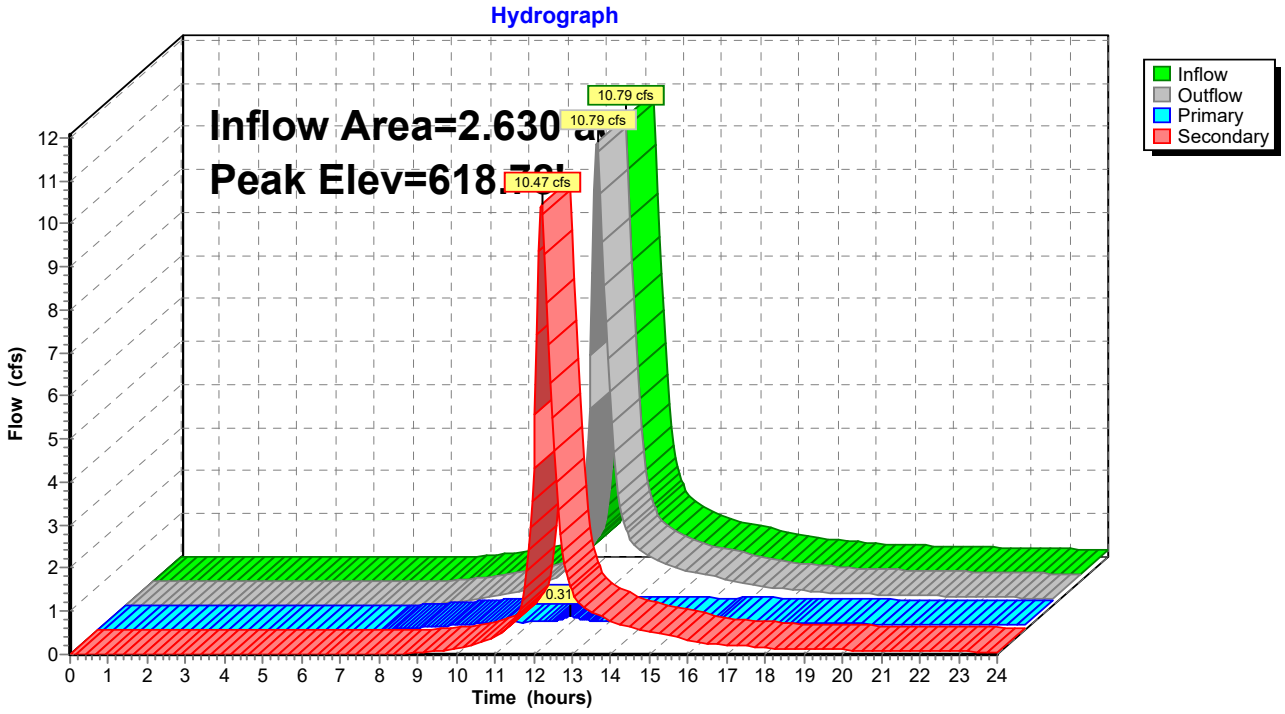
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 618.78' @ 12.22 hrs
Flood Elev= 617.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	616.00'	**4.0" Round Culvert** L= 202.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.00' / 615.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Secondary	616.15'	**15.0" Round Culvert** L= 5.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 616.15' / 616.10' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.31 cfs @ 12.22 hrs HW=618.75' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.31 cfs @ 3.55 fps)

Secondary OutFlow Max=10.34 cfs @ 12.22 hrs HW=618.75' (Free Discharge)
└**2=Culvert** (Barrel Controls 10.34 cfs @ 8.42 fps)

Pond ICS-6: ICS-6



Stage-Area-Storage for Pond ICS-6: ICS-6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
616.00	**0**	617.04	0	618.08	0
616.02	0	617.06	0	618.10	0
616.04	0	617.08	0	618.12	0
616.06	0	617.10	0	618.14	0
616.08	0	617.12	0	618.16	0
616.10	0	617.14	0	618.18	0
616.12	0	617.16	0	618.20	0
616.14	0	617.18	0	618.22	0
616.16	0	617.20	0	618.24	0
616.18	0	617.22	0	618.26	0
616.20	0	617.24	0	618.28	0
616.22	0	617.26	0	618.30	0
616.24	0	617.28	0	618.32	0
616.26	0	617.30	0	618.34	0
616.28	0	617.32	0	618.36	0
616.30	0	617.34	0	618.38	0
616.32	0	617.36	0	618.40	0
616.34	0	617.38	0	618.42	0
616.36	0	617.40	0	618.44	0
616.38	0	617.42	0	618.46	0
616.40	0	617.44	0	618.48	0
616.42	0	617.46	0	618.50	0
616.44	0	617.48	0	618.52	0
616.46	0	617.50	0	618.54	0
616.48	0	617.52	0	618.56	0
616.50	0	617.54	0	618.58	0
616.52	0	617.56	0	618.60	0
616.54	0	617.58	0	618.62	0
616.56	0	617.60	0	618.64	0
616.58	0	617.62	0	618.66	0
616.60	0	617.64	0	618.68	0
616.62	0	617.66	0	618.70	0
616.64	0	617.68	0	618.72	0
616.66	0	617.70	0	618.74	0
616.68	0	617.72	0	618.76	0
616.70	0	617.74	0		
616.72	0	617.76	0		
616.74	0	617.78	0		
616.76	0	617.80	0		
616.78	0	617.82	0		
616.80	0	617.84	0		
616.82	0	617.86	0		
616.84	0	617.88	0		
616.86	0	617.90	0		
616.88	0	617.92	0		
616.90	0	617.94	0		
616.92	0	617.96	0		
616.94	0	617.98	0		
616.96	0	618.00	0		
616.98	0	618.02	0		
617.00	0	618.04	0		
617.02	0	618.06	0		

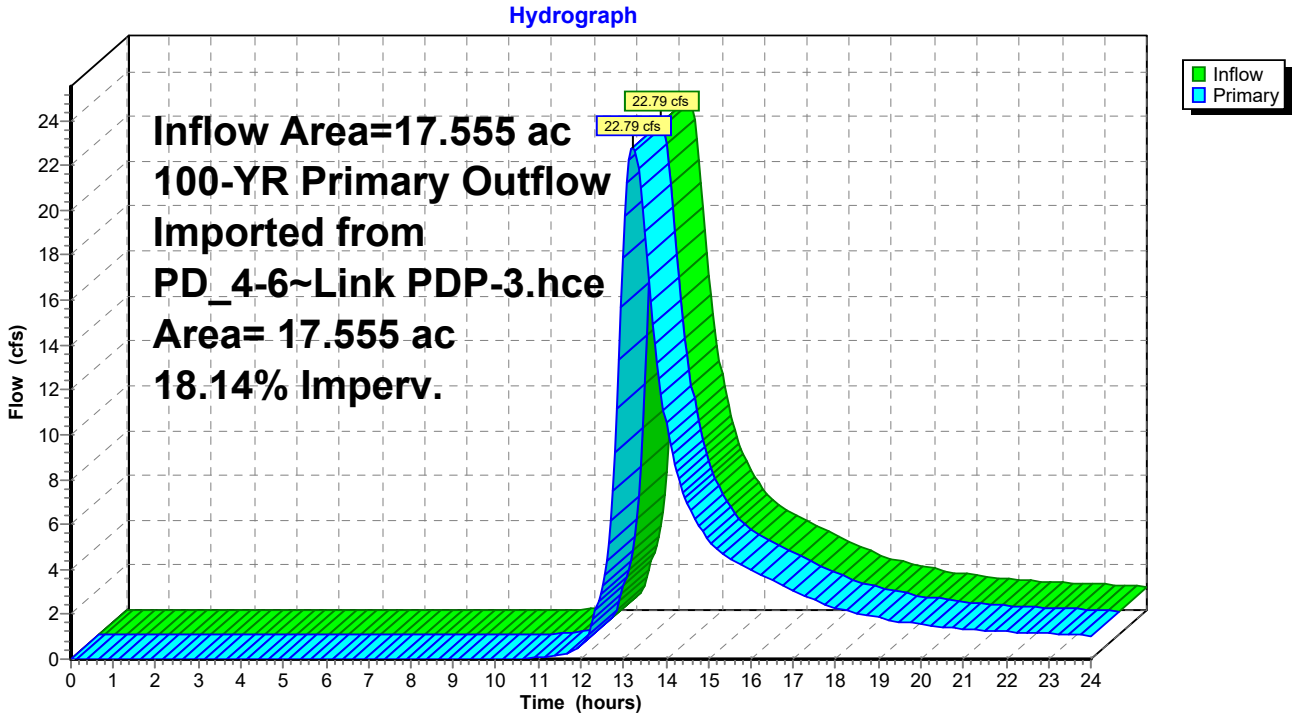
Summary for Link PDP-3: DP-3

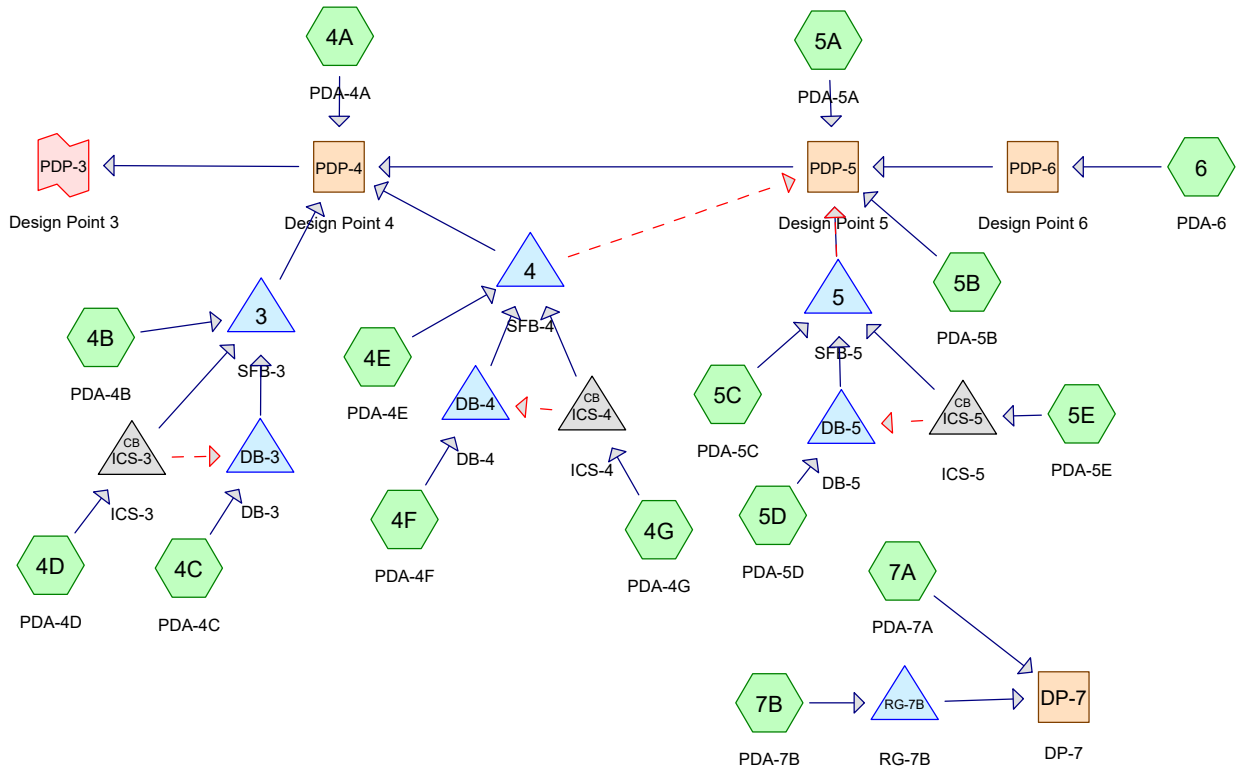
Inflow Area = 17.555 ac, 18.14% Impervious, Inflow Depth > 2.82" for 100-YR event
Inflow = 22.79 cfs @ 13.23 hrs, Volume= 4.124 af
Primary = 22.79 cfs @ 13.23 hrs, Volume= 4.124 af, Atten= 0%, Lag= 0.0 min

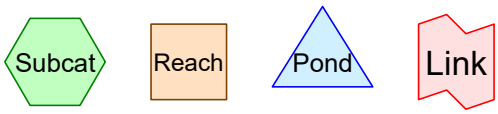
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

100-YR Primary Outflow Imported from PD_4-6~Link PDP-3.hce

Link PDP-3: DP-3







Routing Diagram for PD_4-7
Prepared by Bohler Engineering, Printed 12/29/2019
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Summary for Subcatchment 4A: PDA-4A

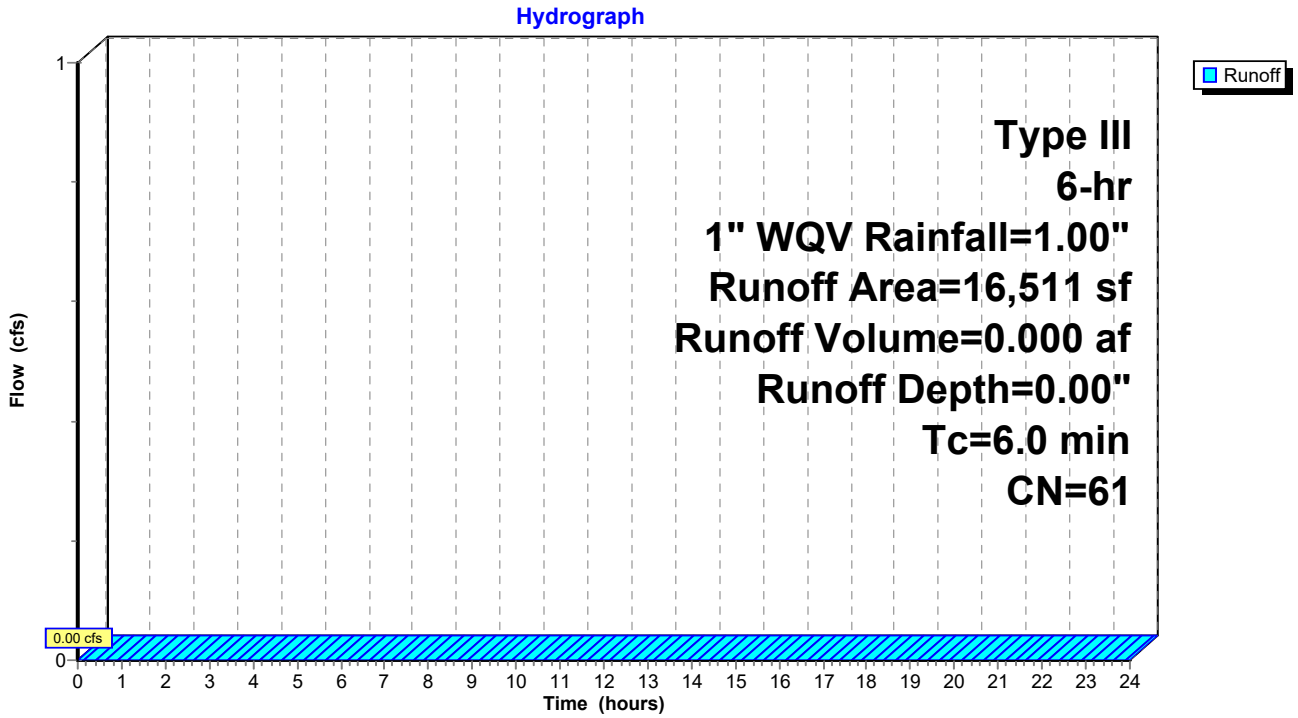
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

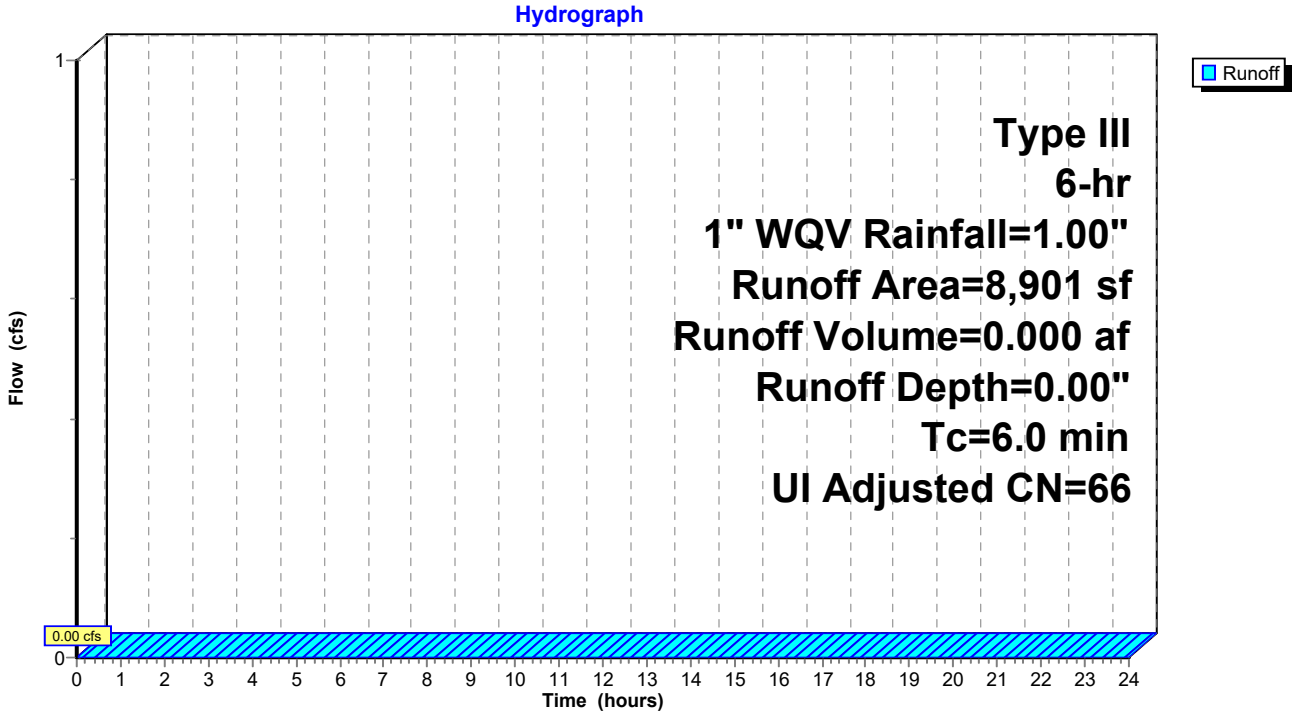
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

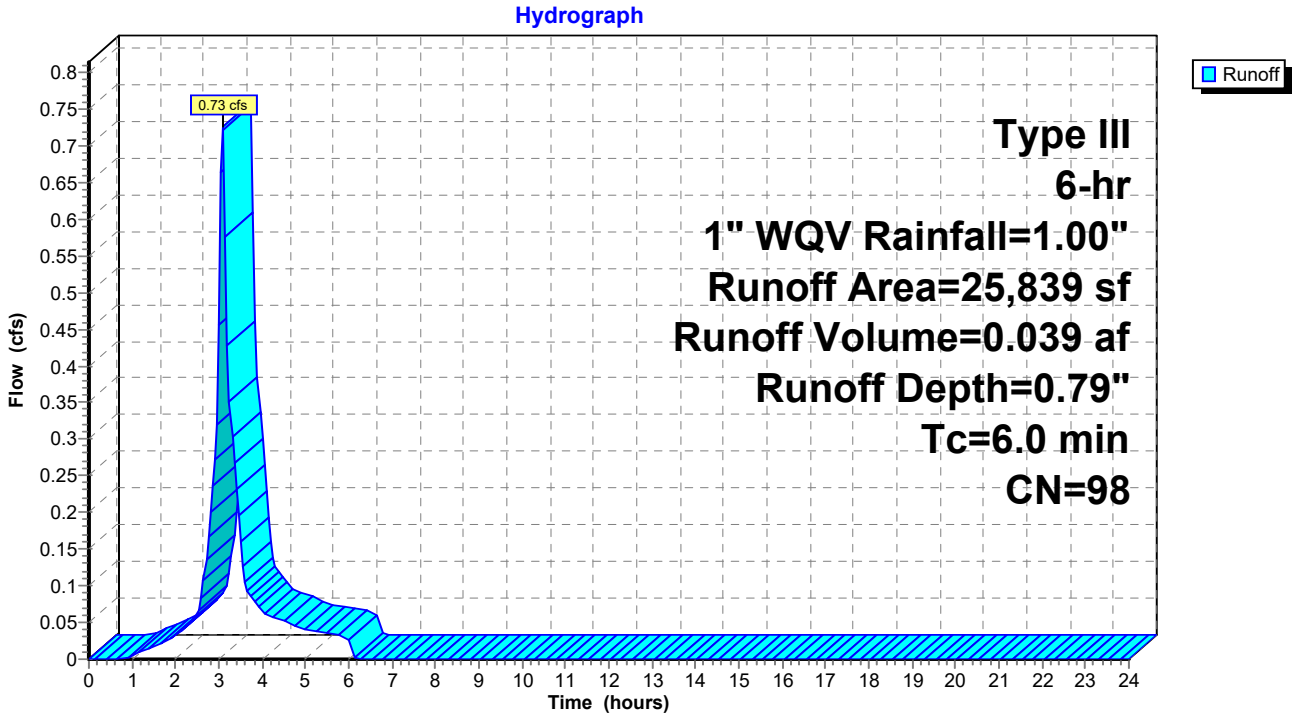
Runoff = 0.73 cfs @ 3.09 hrs, Volume= 0.039 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

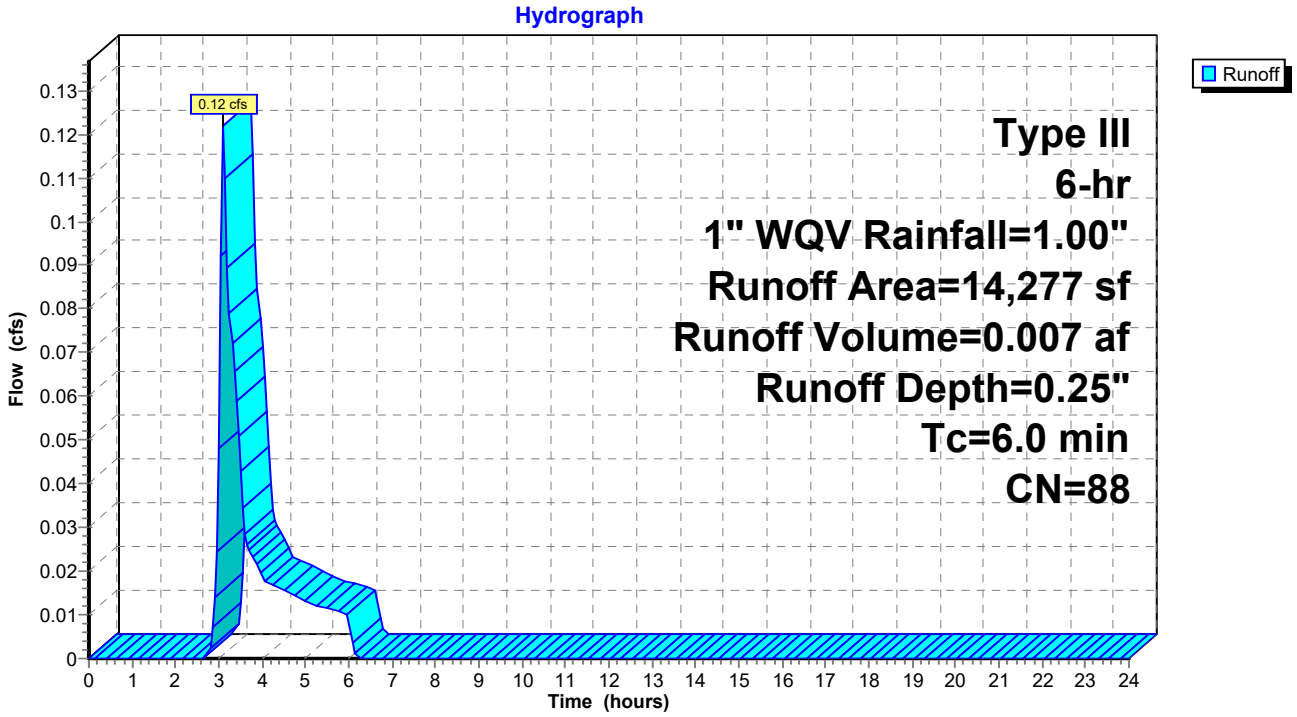
Runoff = 0.12 cfs @ 3.11 hrs, Volume= 0.007 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

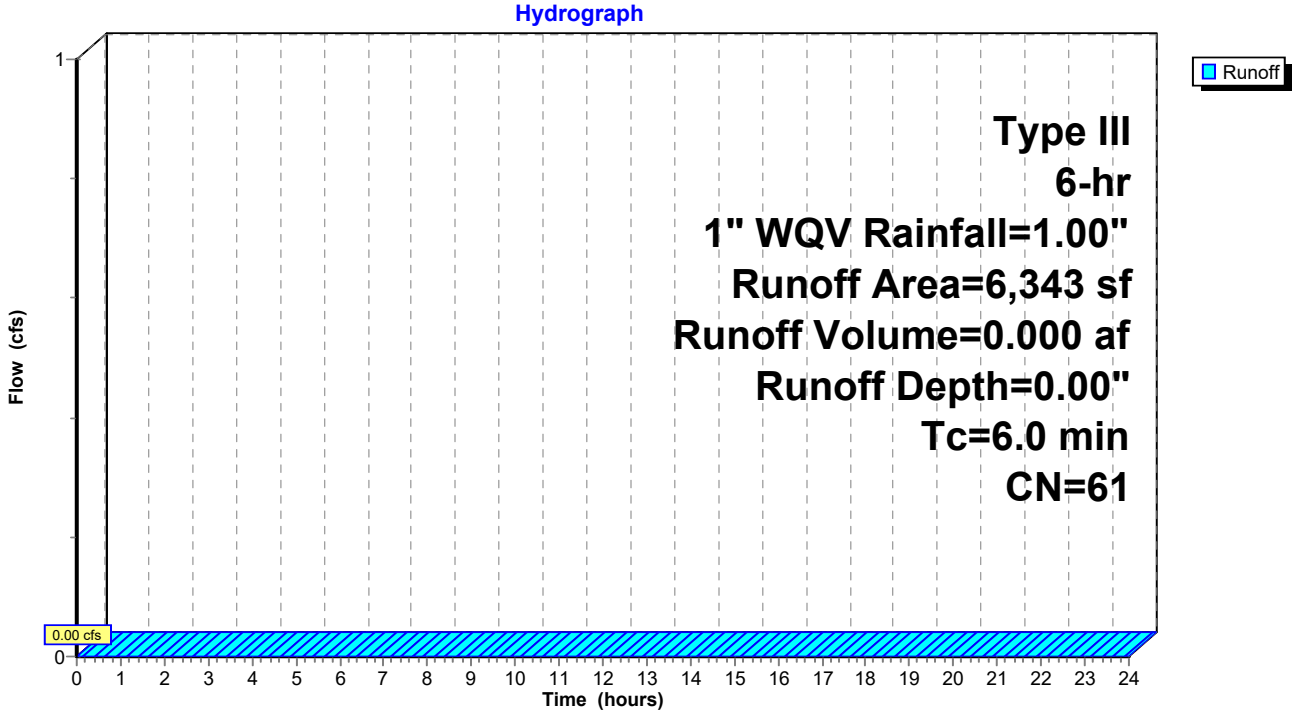
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

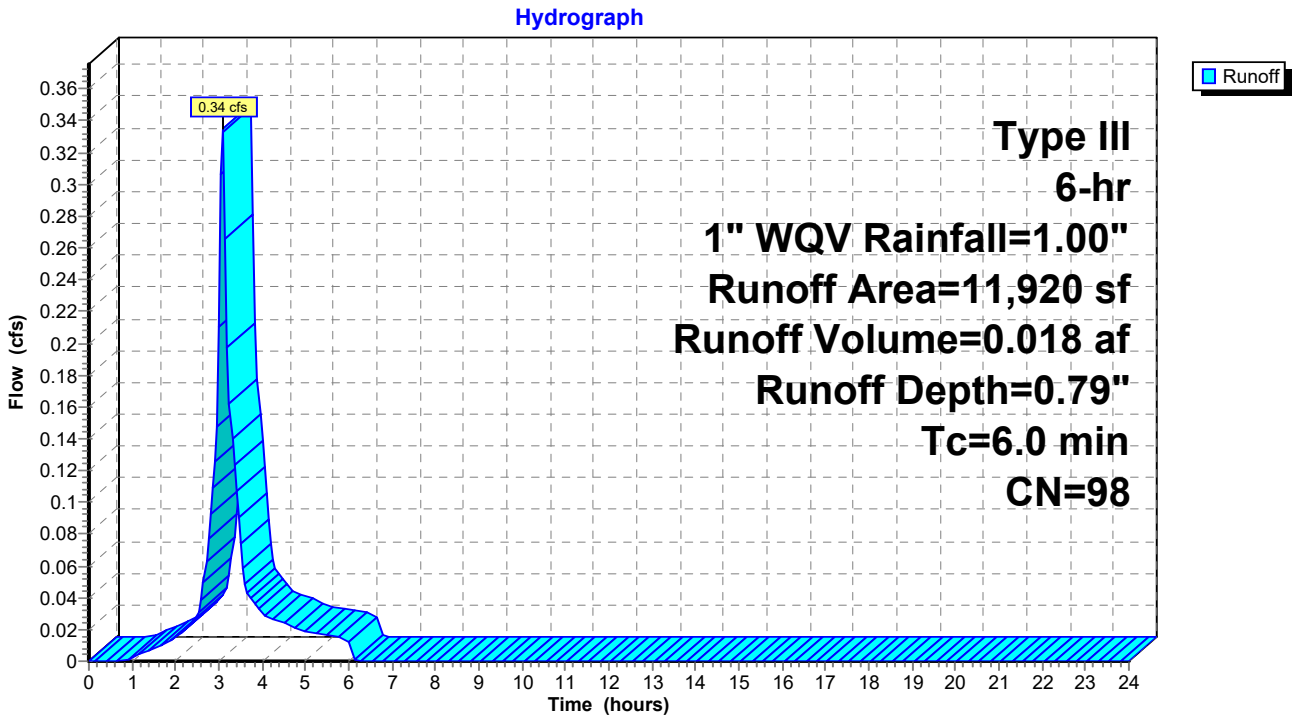
Runoff = 0.34 cfs @ 3.09 hrs, Volume= 0.018 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

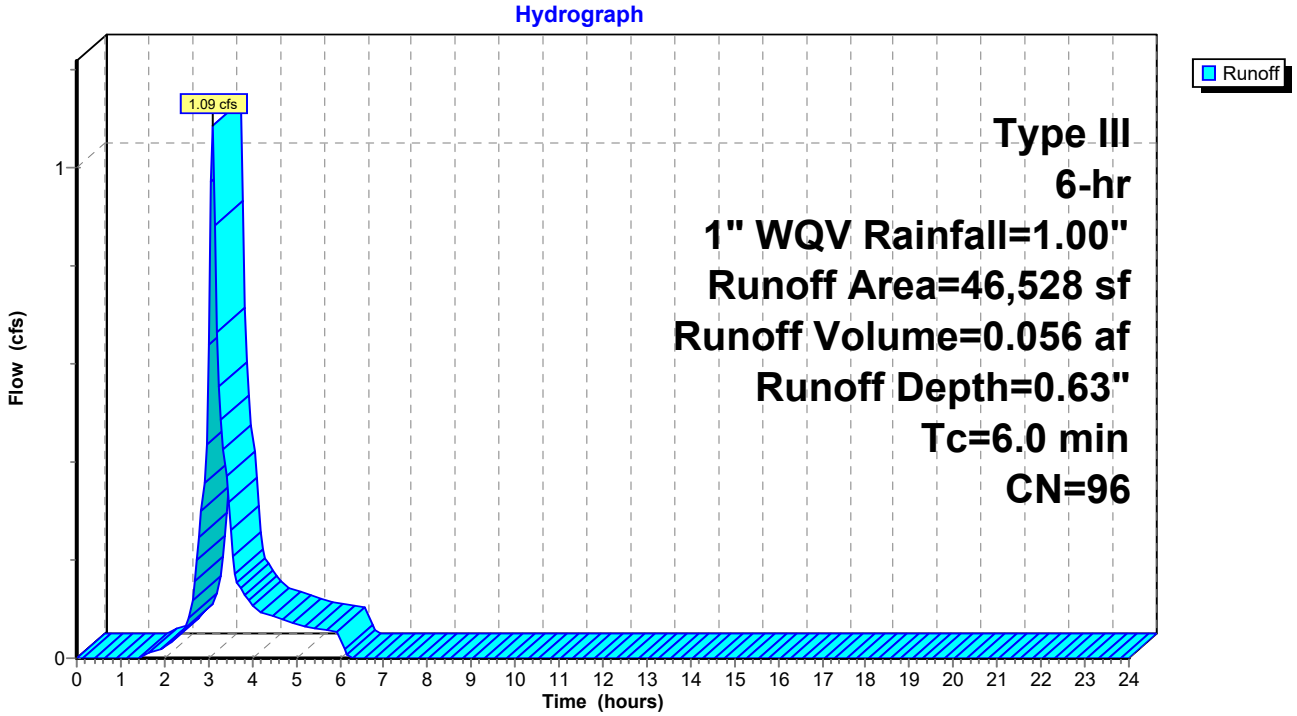
Runoff = 1.09 cfs @ 3.09 hrs, Volume= 0.056 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

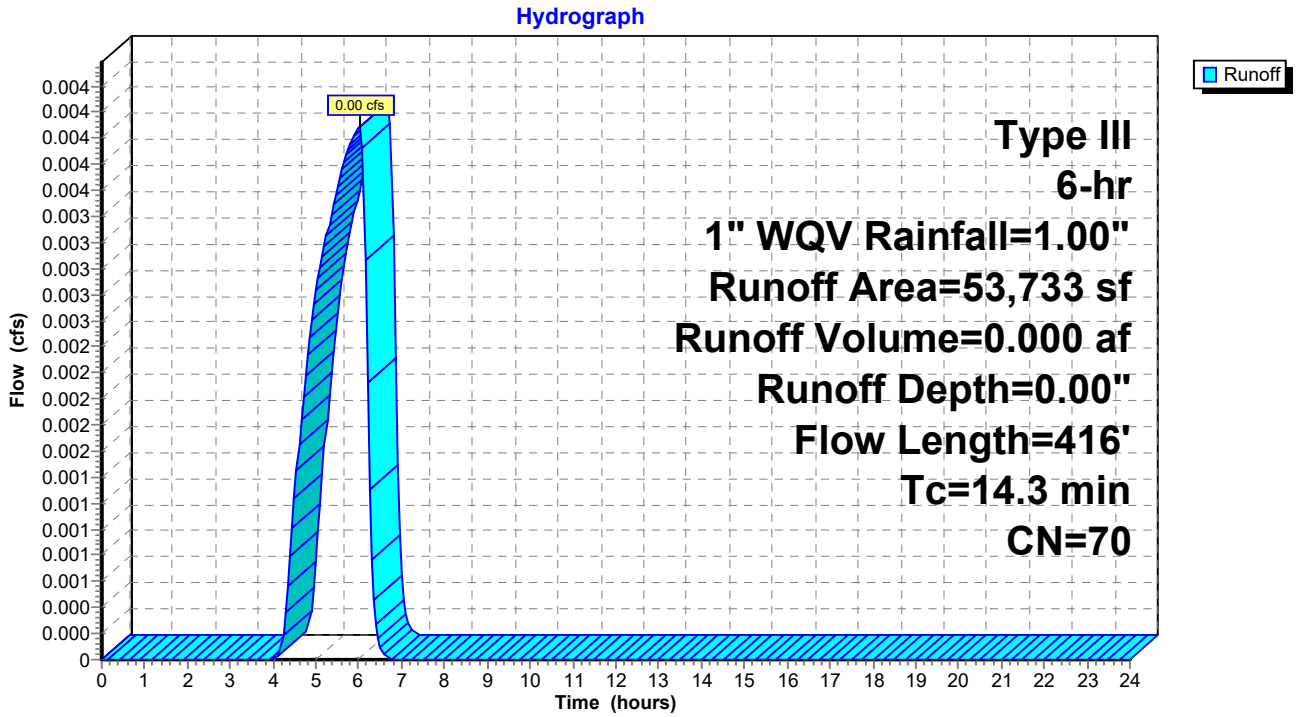
Runoff = 0.00 cfs @ 6.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

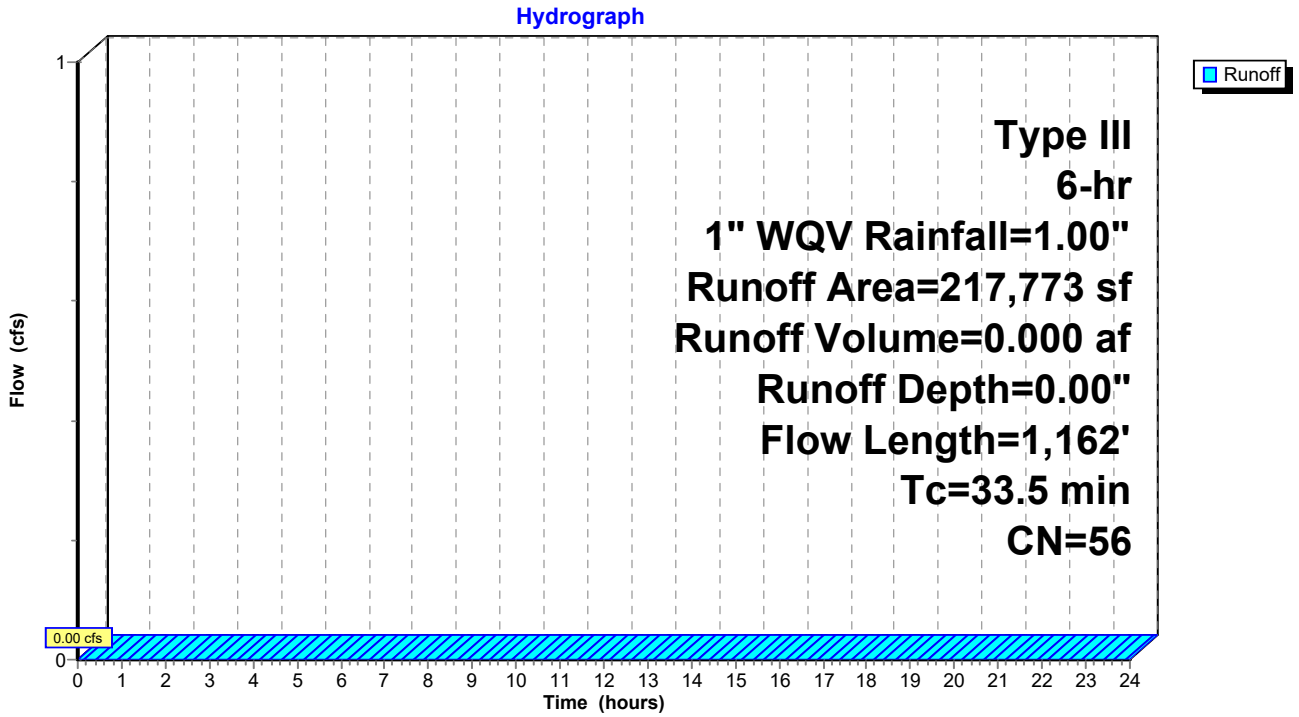
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

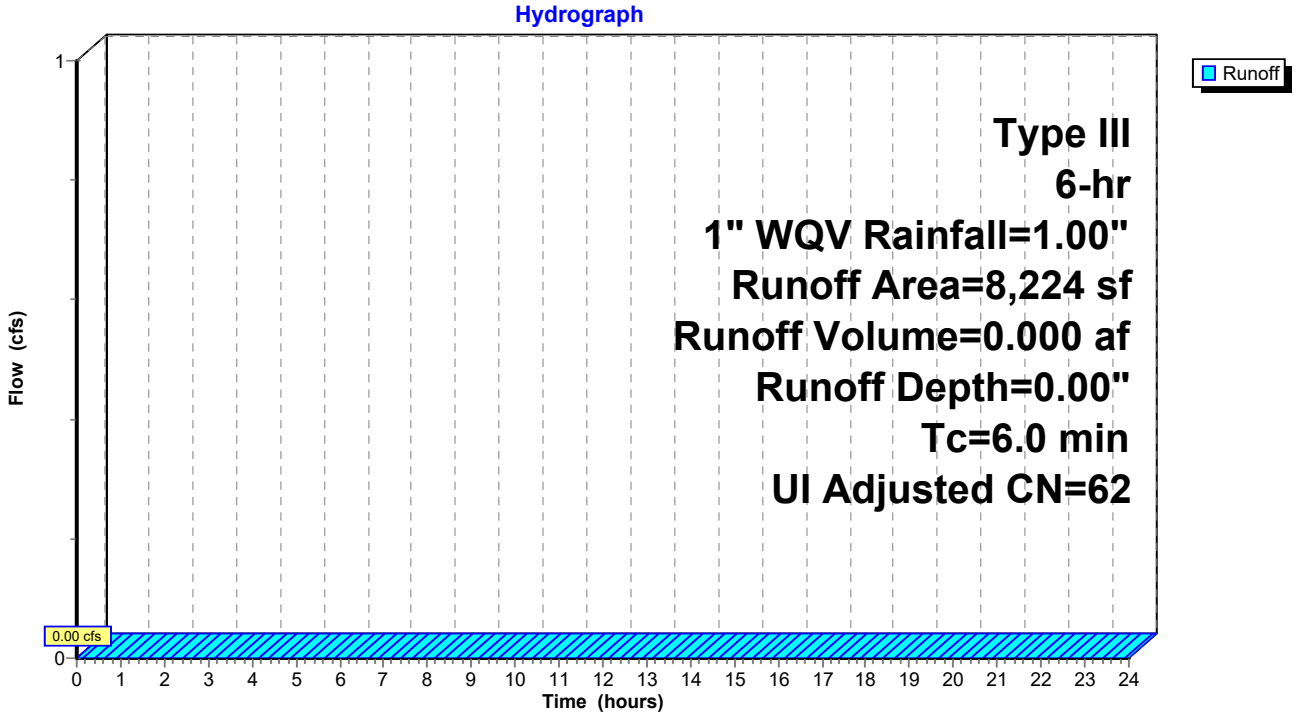
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

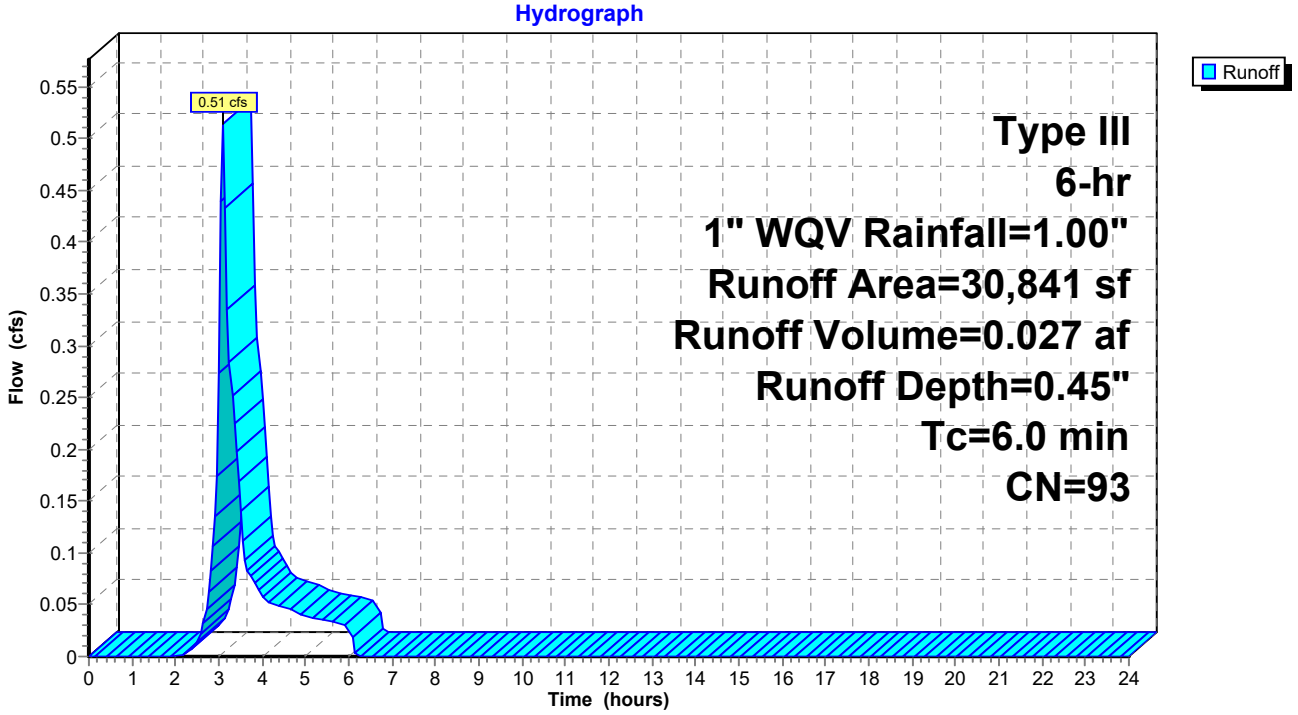
Runoff = 0.51 cfs @ 3.10 hrs, Volume= 0.027 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

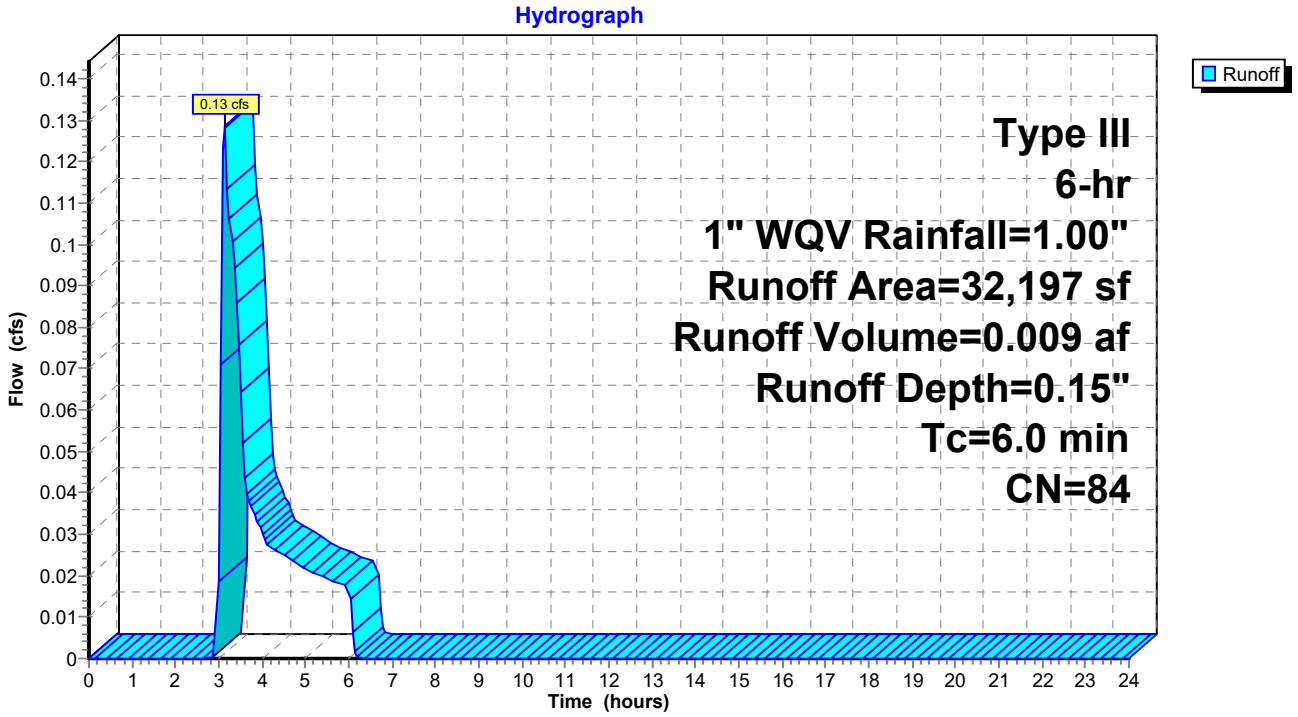
Runoff = 0.13 cfs @ 3.14 hrs, Volume= 0.009 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

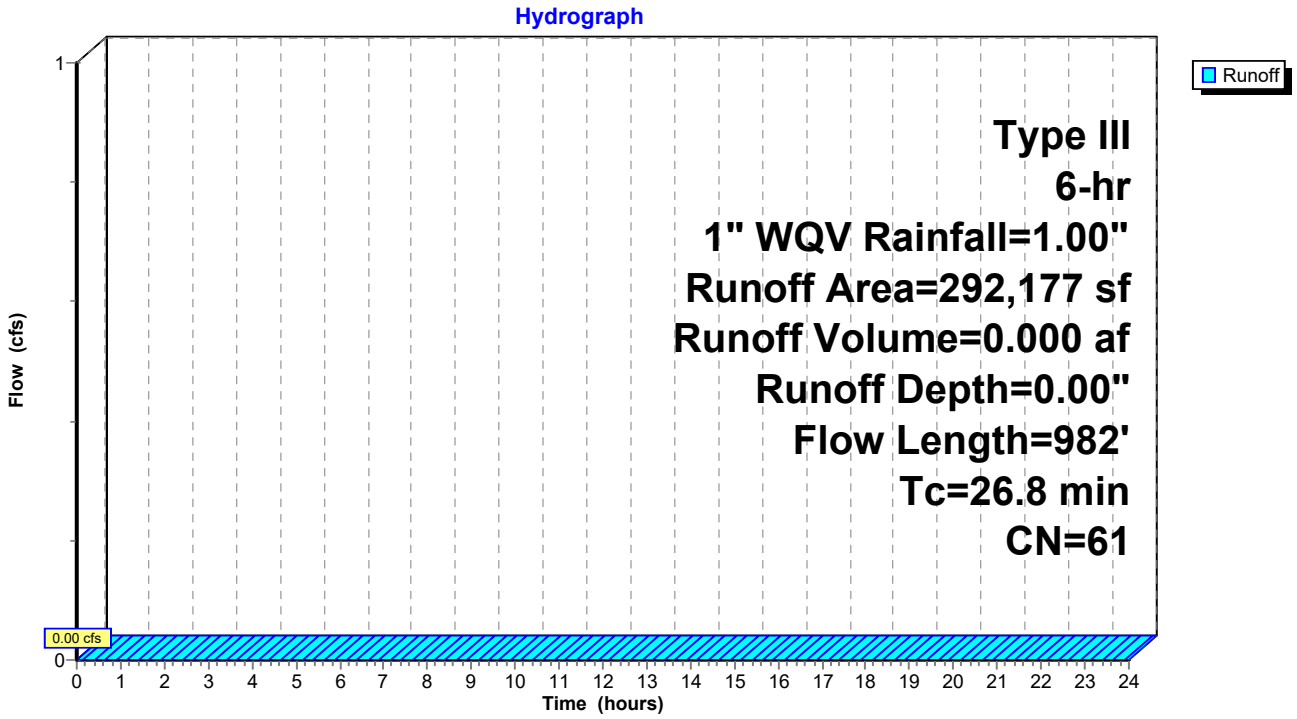
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

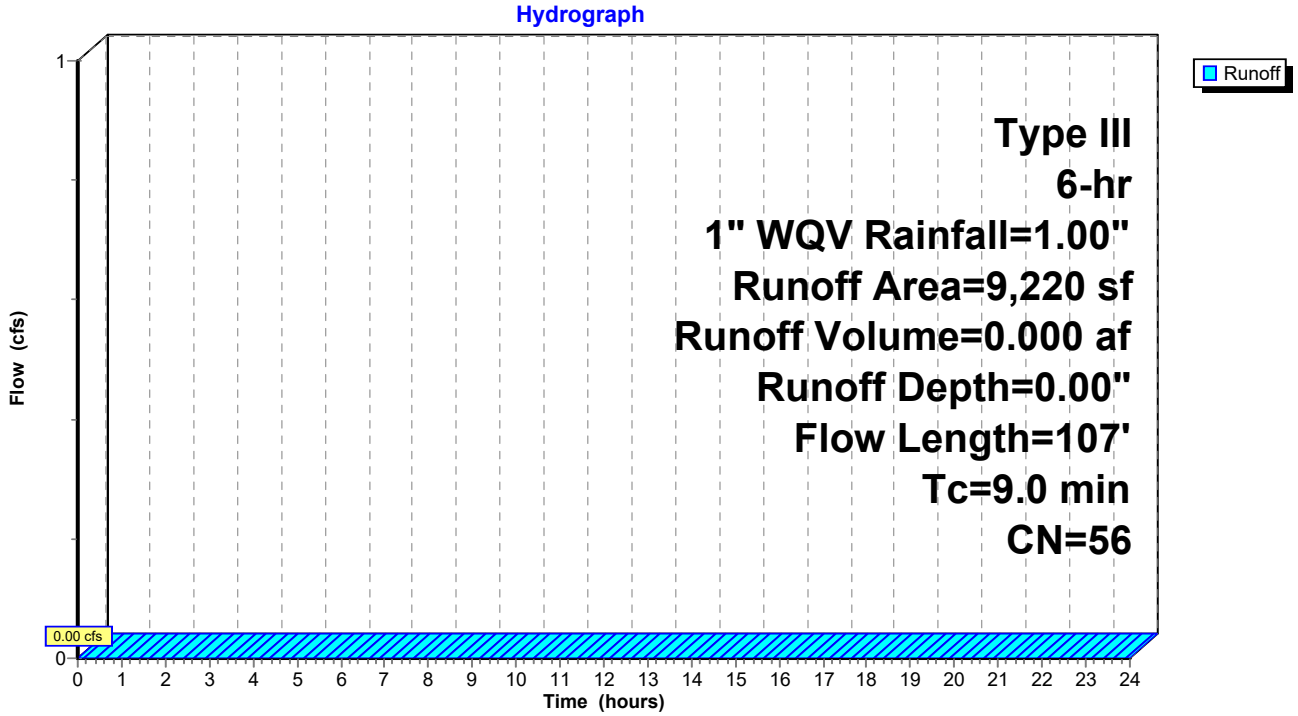
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

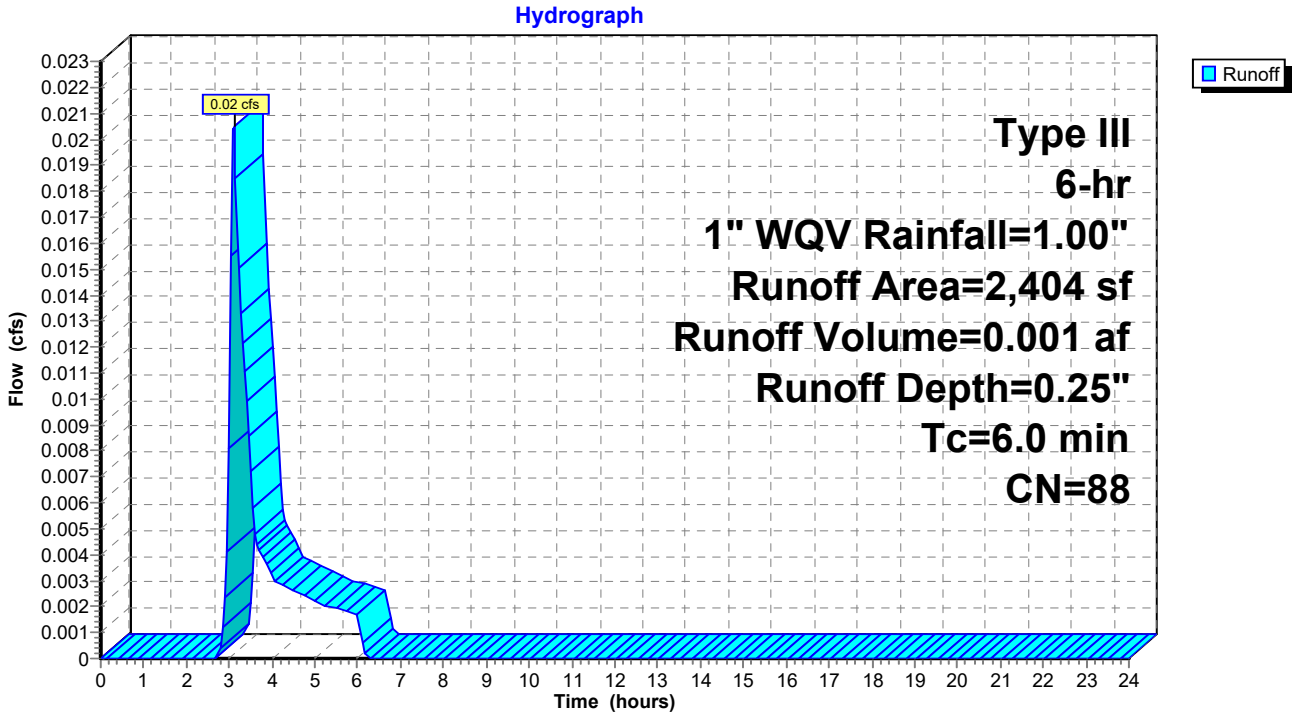
Runoff = 0.02 cfs @ 3.11 hrs, Volume= 0.001 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 6-hr 1" WQV Rainfall=1.00"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

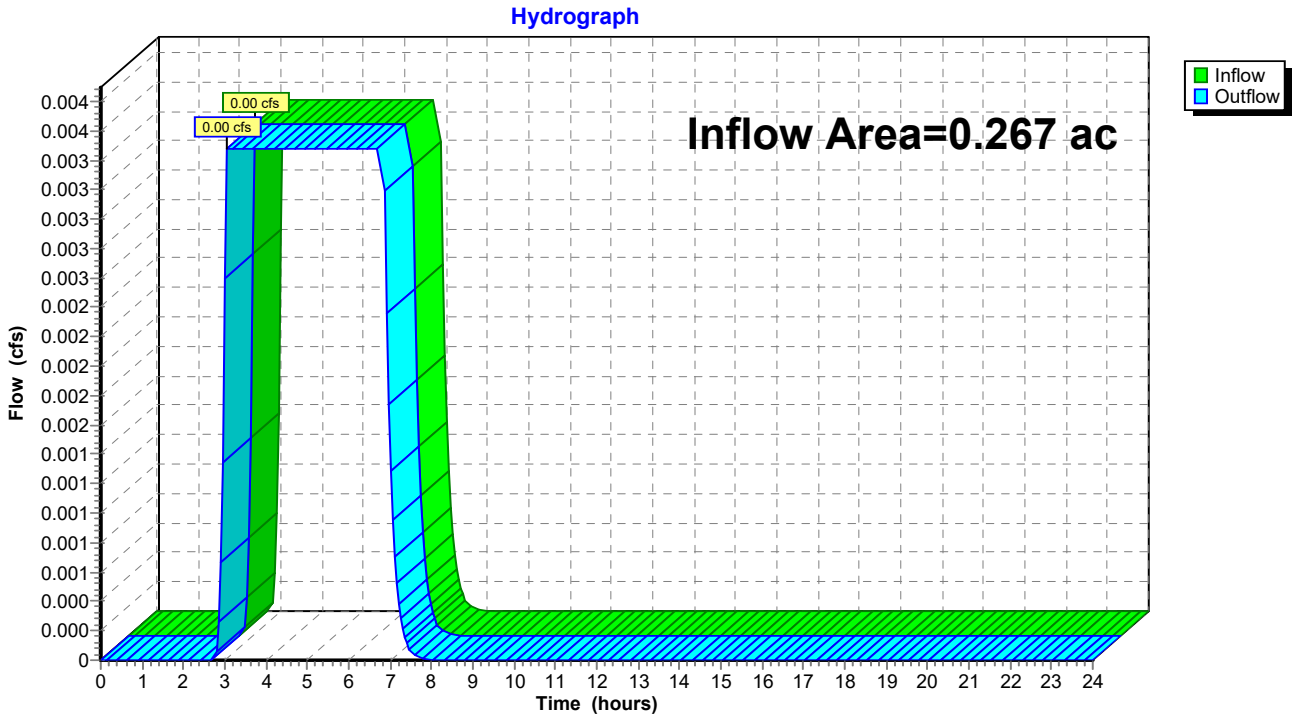


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth = 0.05" for 1" WQV event
Inflow = 0.00 cfs @ 3.05 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 3.05 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 6.22 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 7.78 hrs, Volume= 0.000 af, Atten= 49%, Lag= 93.7 min

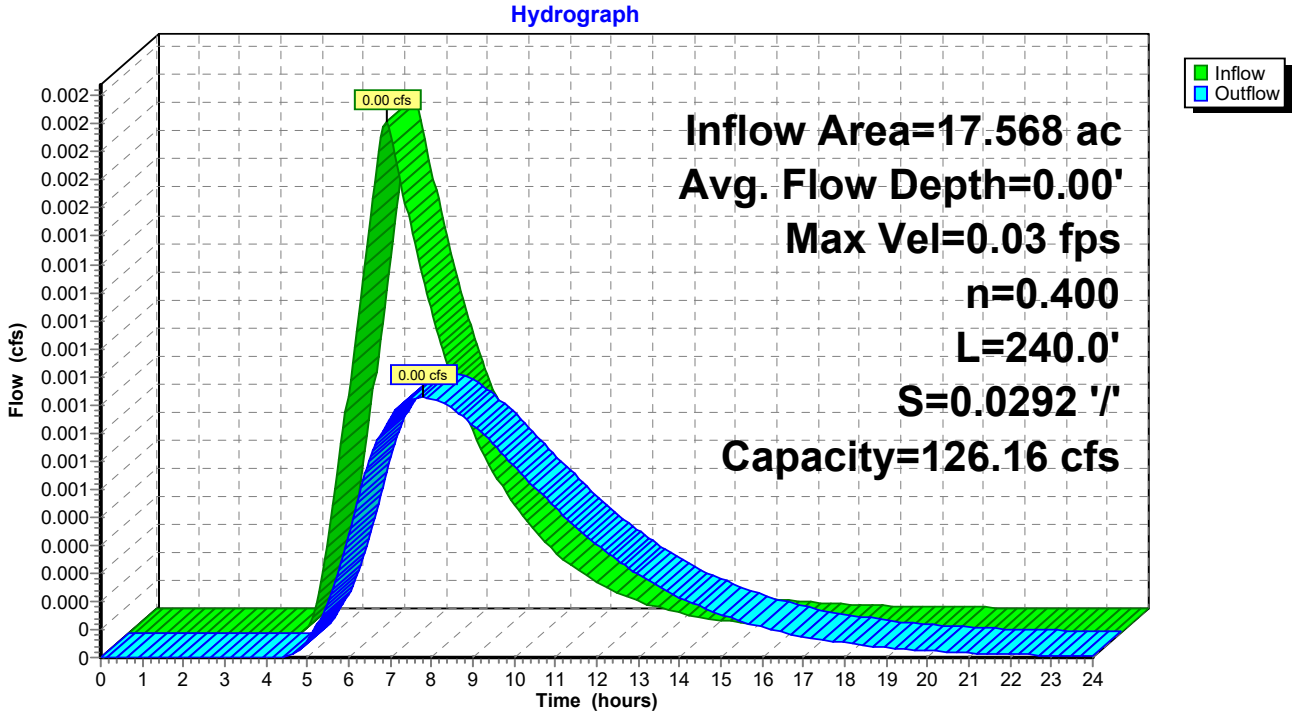
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.03 fps, Min. Travel Time= 136.2 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 136.2 min

Peak Storage= 8 cf @ 7.78 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Area-Storage for Reach PDP-4: Design Point 4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
625.00	0.0	0
625.01	1.7	398
625.02	3.3	799
625.03	5.0	1,204
625.04	6.7	1,612
625.05	8.4	2,024
625.06	10.2	2,439
625.07	11.9	2,857
625.08	13.7	3,279
625.09	15.4	3,705
625.10	17.2	4,134
625.11	19.0	4,567
625.12	20.8	5,003
625.13	22.7	5,442
625.14	24.5	5,885
625.15	26.4	6,331
625.16	28.3	6,781
625.17	30.1	7,235
625.18	32.0	7,692
625.19	34.0	8,152
625.20	35.9	8,616
625.21	37.8	9,083
625.22	39.8	9,554
625.23	41.8	10,028
625.24	43.8	10,506
625.25	45.8	10,988
625.26	47.8	11,472
625.27	49.8	11,960
625.28	51.9	12,452
625.29	53.9	12,947
625.30	56.0	13,446
625.31	58.1	13,948
625.32	60.2	14,454
625.33	62.3	14,963
625.34	64.5	15,475
625.35	66.6	15,992
625.36	68.8	16,511
625.37	71.0	17,034
625.38	73.2	17,561
625.39	75.4	18,091
625.40	77.6	18,624
625.41	79.8	19,161
625.42	82.1	19,701
625.43	84.4	20,245
625.44	86.6	20,793
625.45	88.9	21,344
625.46	91.2	21,898
625.47	93.6	22,456
625.48	95.9	23,017
625.49	98.3	23,582
625.50	100.6	24,150
625.51	103.0	24,722
625.52	105.4	25,297
625.53	107.8	25,876
625.54	110.2	26,458
625.55	112.7	27,044
625.56	115.1	27,633
625.57	117.6	28,225
625.58	120.1	28,821
625.59	122.6	29,421
625.60	125.1	30,024
625.61	127.6	30,631
625.62	130.2	31,241
625.63	132.7	31,854
625.64	135.3	32,471
625.65	137.9	33,092
625.66	140.5	33,715
625.67	143.1	34,343
625.68	145.7	34,974
625.69	148.4	35,608
625.70	151.0	36,246
625.71	153.7	36,887
625.72	156.4	37,532
625.73	159.1	38,180
625.74	161.8	38,832
625.75	164.5	39,488
625.76	167.3	40,146
625.77	170.0	40,808
625.78	172.8	41,474
625.79	175.6	42,143
625.80	178.4	42,816
625.81	181.2	43,492
625.82	184.0	44,172
625.83	186.9	44,855
625.84	189.8	45,541
625.85	192.6	46,232
625.86	195.5	46,925
625.87	198.4	47,622
625.88	201.3	48,323
625.89	204.3	49,027
625.90	207.2	49,734
625.91	210.2	50,445
625.92	213.2	51,159
625.93	216.2	51,877
625.94	219.2	52,599
625.95	222.2	53,324
625.96	225.2	54,052
625.97	228.3	54,784
625.98	231.3	55,519
625.99	234.4	56,258
626.00	**237.5**	**57,000**

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 6.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 6.22 hrs, Volume= 0.000 af, Atten= 55%, Lag= 12.9 min

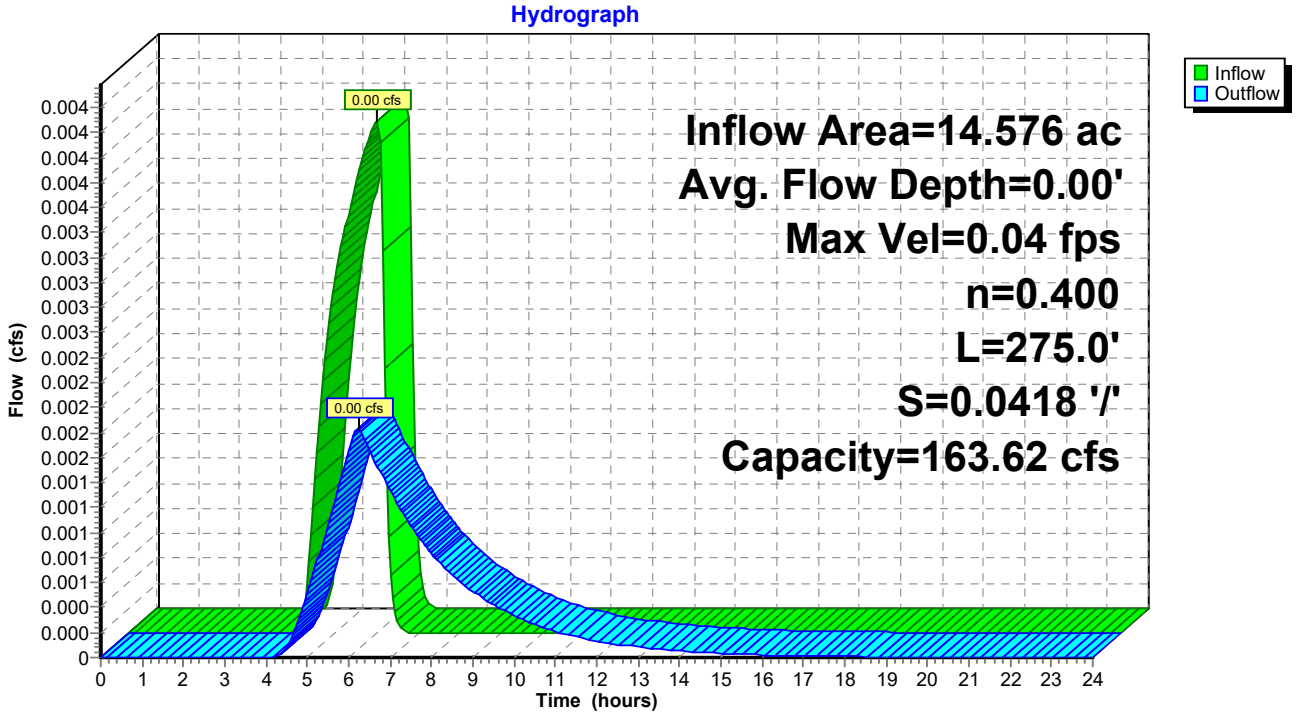
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.04 fps, Min. Travel Time= 130.1 min
Avg. Velocity = 0.04 fps, Avg. Travel Time= 130.1 min

Peak Storage= 14 cf @ 6.22 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Area-Storage for Reach PDP-5: Design Point 5

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
636.50	0.0	0
636.51	2.0	551
636.52	4.0	1,104
636.53	6.0	1,659
636.54	8.1	2,217
636.55	10.1	2,776
636.56	12.1	3,337
636.57	14.2	3,901
636.58	16.2	4,466
636.59	18.3	5,034
636.60	20.4	5,603
636.61	22.5	6,175
636.62	24.5	6,749
636.63	26.6	7,324
636.64	28.7	7,902
636.65	30.8	8,482
636.66	33.0	9,064
636.67	35.1	9,648
636.68	37.2	10,234
636.69	39.4	10,822
636.70	41.5	11,413
636.71	43.7	12,005
636.72	45.8	12,599
636.73	48.0	13,196
636.74	50.2	13,794
636.75	52.3	14,395
636.76	54.5	14,997
636.77	56.7	15,602
636.78	58.9	16,209
636.79	61.2	16,817
636.80	63.4	17,428
636.81	65.6	18,041
636.82	67.8	18,656
636.83	70.1	19,273
636.84	72.3	19,892
636.85	74.6	20,513
636.86	76.9	21,137
636.87	79.1	21,762
636.88	81.4	22,389
636.89	83.7	23,019
636.90	86.0	23,650
636.91	88.3	24,284
636.92	90.6	24,919
636.93	92.9	25,557
636.94	95.3	26,197
636.95	97.6	26,838
636.96	99.9	27,482
636.97	102.3	28,128
636.98	104.6	28,776
636.99	107.0	29,426
637.00	109.4	30,078
637.01	111.8	30,732
637.02	114.1	31,389
637.03	116.5	32,047
637.04	118.9	32,707
637.05	121.3	33,370
637.06	123.8	34,034
637.07	126.2	34,701
637.08	128.6	35,369
637.09	131.1	36,040
637.10	133.5	36,713
637.11	136.0	37,387
637.12	138.4	38,064
637.13	140.9	38,743
637.14	143.4	39,424
637.15	145.8	40,107
637.16	148.3	40,792
637.17	150.8	41,479
637.18	153.3	42,169
637.19	155.9	42,860
637.20	158.4	43,553
637.21	160.9	44,249
637.22	163.4	44,946
637.23	166.0	45,646
637.24	168.5	46,347
637.25	171.1	47,051
637.26	173.7	47,757
637.27	176.2	48,464
637.28	178.8	49,174
637.29	181.4	49,886
637.30	184.0	50,600
637.31	186.6	51,316
637.32	189.2	52,034
637.33	191.8	52,754
637.34	194.5	53,476
637.35	197.1	54,201
637.36	199.7	54,927
637.37	202.4	55,656
637.38	205.0	56,386
637.39	207.7	57,119
637.40	210.4	57,853
637.41	213.1	58,590
637.42	215.7	59,329
637.43	218.4	60,069
637.44	221.1	60,812
637.45	223.8	61,557
637.46	226.6	62,304
637.47	229.3	63,053
637.48	232.0	63,804
637.49	234.8	64,557
637.50	**237.5**	**65,313**

Summary for Reach PDP-6: Design Point 6

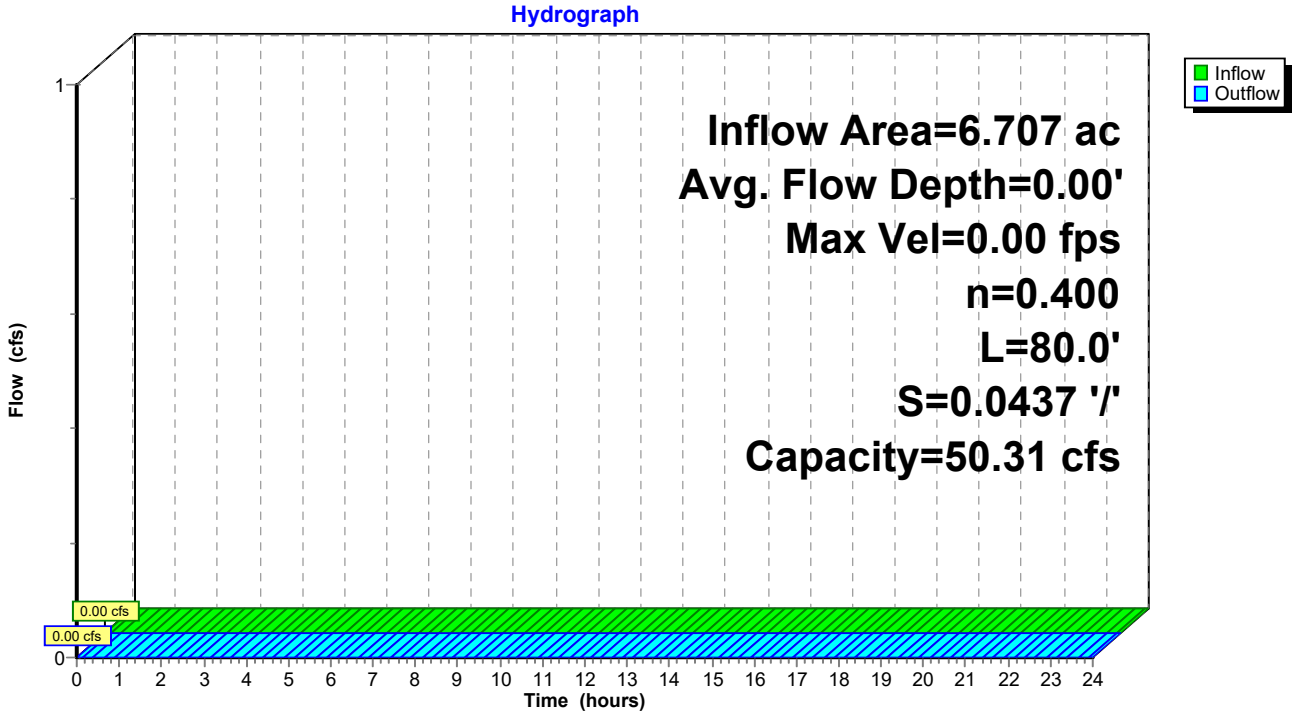
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Area-Storage for Reach PDP-6: Design Point 6

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
642.50	0.0	0
642.51	2.0	160
642.52	4.0	321
642.53	6.0	482
642.54	8.0	644
642.55	10.1	806
642.56	12.1	969
642.57	14.1	1,132
642.58	16.2	1,295
642.59	18.2	1,459
642.60	20.3	1,624
642.61	22.4	1,789
642.62	24.4	1,955
642.63	26.5	2,121
642.64	28.6	2,287
642.65	30.7	2,454
642.66	32.8	2,621
642.67	34.9	2,789
642.68	37.0	2,958
642.69	39.1	3,127
642.70	41.2	3,296
642.71	43.3	3,466
642.72	45.5	3,636
642.73	47.6	3,807
642.74	49.7	3,978
642.75	51.9	4,150
642.76	54.0	4,322
642.77	56.2	4,495
642.78	58.4	4,668
642.79	60.5	4,842
642.80	62.7	5,016
642.81	64.9	5,191
642.82	67.1	5,366
642.83	69.3	5,541
642.84	71.5	5,717
642.85	73.7	5,894
642.86	75.9	6,071
642.87	78.1	6,249
642.88	80.3	6,427
642.89	82.6	6,605
642.90	84.8	6,784
642.91	87.0	6,963
642.92	89.3	7,143
642.93	91.5	7,324
642.94	93.8	7,505
642.95	96.1	7,686
642.96	98.3	7,868
642.97	100.6	8,050
642.98	102.9	8,233
642.99	105.2	8,416
643.00	**107.5**	**8,600**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 0.47" for 1" WQV event
Inflow = 0.16 cfs @ 3.12 hrs, Volume= 0.044 af
Outflow = 0.04 cfs @ 7.74 hrs, Volume= 0.044 af, Atten= 73%, Lag= 277.6 min
Discarded = 0.04 cfs @ 7.74 hrs, Volume= 0.044 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 621.61' @ 7.74 hrs Surf.Area= 935 sf Storage= 550 cf
Flood Elev= 623.00' Surf.Area= 1,864 sf Storage= 2,469 cf

Plug-Flow detention time= 152.4 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 151.7 min (593.2 - 441.5)

Volume	Invert	Avail.Storage	Storage Description
#1	619.75'	2,238 cf	**Overall storage (Prismatic)** Listed below (Recalc) 3,104 cf Overall - 866 cf Embedded = 2,238 cf
#2	619.75'	115 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 40.0% Voids
#3	620.25'	58 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
#4	620.75'	58 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
		2,469 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
621.00	577	721	721
622.00	1,162	870	1,591
623.00	1,864	1,513	3,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
620.25	577	289	289

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.25	577	0	0
620.75	577	289	289

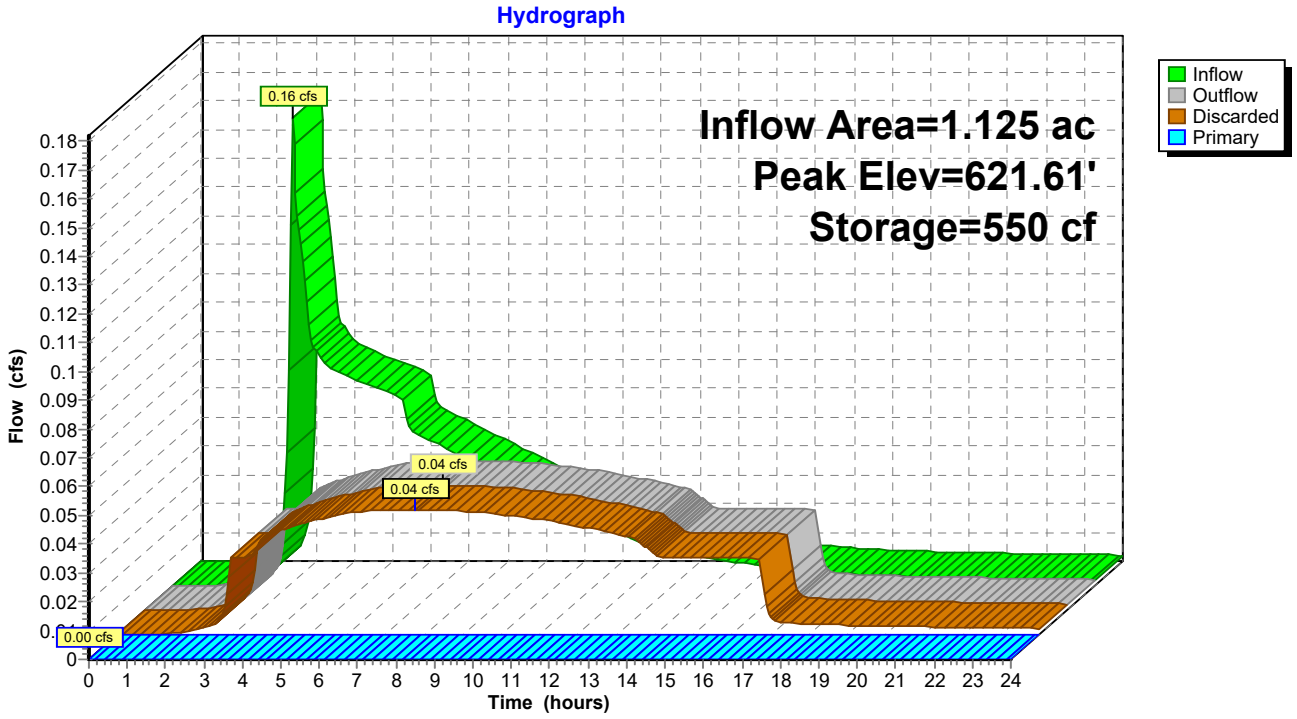
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.75	577	0	0
621.25	577	289	289

Device	Routing	Invert	Outlet Devices
#1	Discarded	619.75'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.64'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.64' / 620.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	622.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 7.74 hrs HW=621.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=619.75' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 3: SFB-3



Stage-Area-Storage for Pond 3: SFB-3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
619.75	577	0
619.80	577	12
619.85	577	23
619.90	577	35
619.95	577	46
620.00	577	58
620.05	577	69
620.10	577	81
620.15	577	92
620.20	577	104
620.25	577	115
620.30	577	121
620.35	577	127
620.40	577	133
620.45	577	138
620.50	577	144
620.55	577	150
620.60	577	156
620.65	577	162
620.70	577	167
620.75	577	173
620.80	577	179
620.85	577	185
620.90	577	190
620.95	577	196
621.00	577	202
621.05	606	208
621.10	636	216
621.15	665	226
621.20	694	237
621.25	723	249
621.30	752	286
621.35	782	324
621.40	811	364
621.45	840	405
621.50	870	448
621.55	899	492
621.60	928	538
621.65	957	585
621.70	987	634
621.75	1,016	684
621.80	1,045	735
621.85	1,074	788
621.90	1,103	843
621.95	1,133	899
622.00	1,162	956
622.05	1,197	1,015
622.10	1,232	1,076
622.15	1,267	1,138
622.20	1,302	1,202
622.25	1,338	1,268
622.30	1,373	1,336
622.35	1,408	1,406
622.40	1,443	1,477
622.45	1,478	1,550
622.50	1,513	1,625
622.55	1,548	1,701
622.60	1,583	1,780
622.65	1,618	1,860
622.70	1,653	1,941
622.75	1,689	2,025
622.80	1,724	2,110
622.85	1,759	2,197
622.90	1,794	2,286
622.95	1,829	2,377
623.00	**1,864**	**2,469**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 0.59" for 1" WQV event				
Inflow =	1.10 cfs @	3.09 hrs,	Volume=	0.073 af	
Outflow =	0.31 cfs @	3.48 hrs,	Volume=	0.073 af,	Atten= 72%, Lag= 23.5 min
Discarded =	0.31 cfs @	3.48 hrs,	Volume=	0.073 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 631.51' @ 3.48 hrs Surf.Area= 2,051 sf Storage= 777 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,324 cf

Plug-Flow detention time= 20.1 min calculated for 0.073 af (100% of inflow)
Center-of-Mass det. time= 19.2 min (288.2 - 269.0)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	329 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 40.0% Voids
#3	630.50'	164 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
#4	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,324 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
630.50	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.50	1,643	0	0
631.00	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

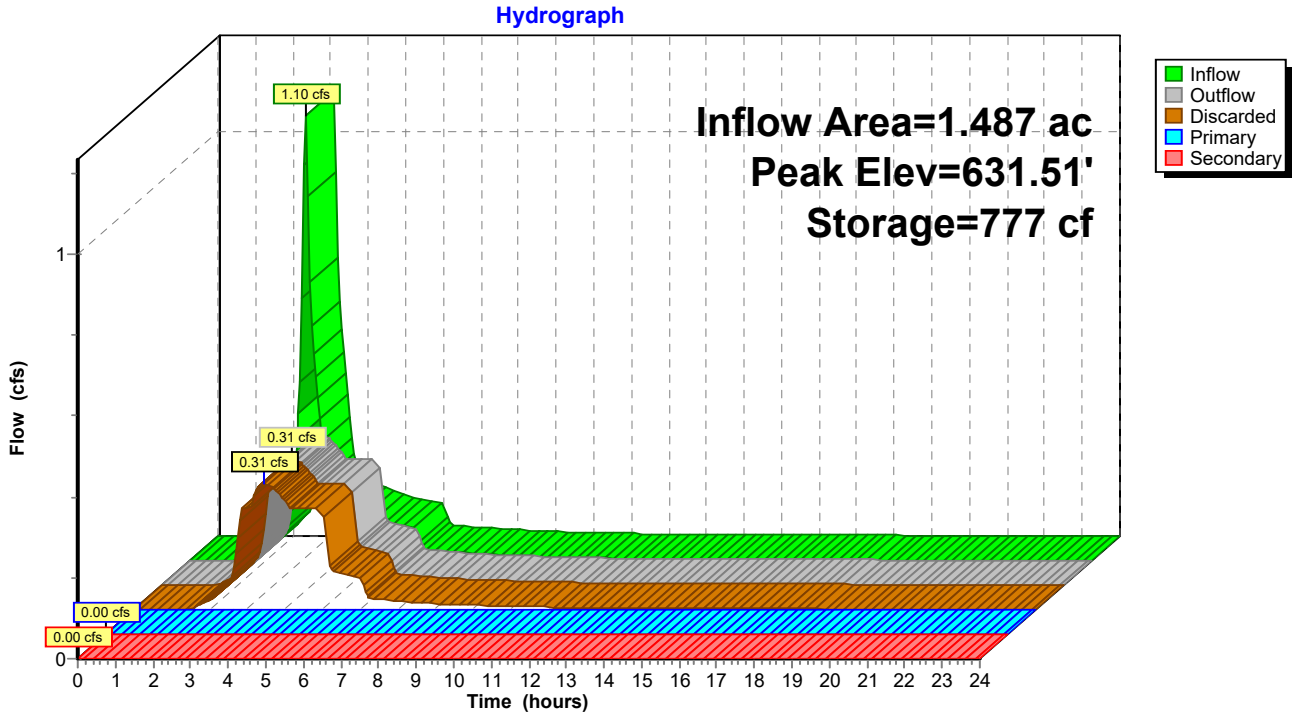
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	633.30'	**50.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.31 cfs @ 3.48 hrs HW=631.51' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Area-Storage for Pond 4: SFB-4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
630.00	1,643	0
630.05	1,643	33
630.10	1,643	66
630.15	1,643	99
630.20	1,643	131
630.25	1,643	164
630.30	1,643	197
630.35	1,643	230
630.40	1,643	263
630.45	1,643	296
630.50	1,643	329
630.55	1,643	345
630.60	1,643	361
630.65	1,643	378
630.70	1,643	394
630.75	1,643	411
630.80	1,643	427
630.85	1,643	444
630.90	1,643	460
630.95	1,643	476
631.00	1,643	493
631.05	1,683	510
631.10	1,723	530
631.15	1,763	551
631.20	1,803	575
631.25	1,843	600
631.30	1,883	627
631.35	1,923	657
631.40	1,963	688
631.45	2,003	722
631.50	2,043	757
631.55	2,083	860
631.60	2,123	966
631.65	2,163	1,073
631.70	2,203	1,182
631.75	2,243	1,293
631.80	2,283	1,406
631.85	2,323	1,521
631.90	2,363	1,638
631.95	2,403	1,758
632.00	2,443	1,879
632.05	2,482	2,002
632.10	2,521	2,127
632.15	2,560	2,254
632.20	2,599	2,383
632.25	2,638	2,514
632.30	2,677	2,647
632.35	2,716	2,782
632.40	2,755	2,918
632.45	2,794	3,057
632.50	2,834	3,198
632.55	2,873	3,340
632.60	2,912	3,485
632.65	2,951	3,632
632.70	2,990	3,780
632.75	3,029	3,931
632.80	3,068	4,083
632.85	3,107	4,237
632.90	3,146	4,394
632.95	3,185	4,552
633.00	3,224	4,712
633.05	3,263	4,874
633.10	3,302	5,038
633.15	3,340	5,205
633.20	3,379	5,373
633.25	3,418	5,542
633.30	3,457	5,714
633.35	3,496	5,888
633.40	3,534	6,064
633.45	3,573	6,242
633.50	3,612	6,421
633.55	3,651	6,603
633.60	3,690	6,786
633.65	3,728	6,972
633.70	3,767	7,159
633.75	3,806	7,348
633.80	3,845	7,540
633.85	3,884	7,733
633.90	3,922	7,928
633.95	3,961	8,125
634.00	**4,000**	**8,324**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth = 0.26" for 1" WQV event				
Inflow =	0.20 cfs @	3.14 hrs,	Volume=	0.036 af	
Outflow =	0.10 cfs @	3.10 hrs,	Volume=	0.036 af,	Atten= 51%, Lag= 0.0 min
Discarded =	0.10 cfs @	3.10 hrs,	Volume=	0.036 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 632.32' @ 4.85 hrs Surf.Area= 1,505 sf Storage= 191 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,544 cf

Plug-Flow detention time= 24.4 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 24.3 min (298.9 - 274.7)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	301 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 40.0% Voids
#3	632.50'	151 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
#4	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,544 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
632.50	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.50	1,505	0	0
633.00	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

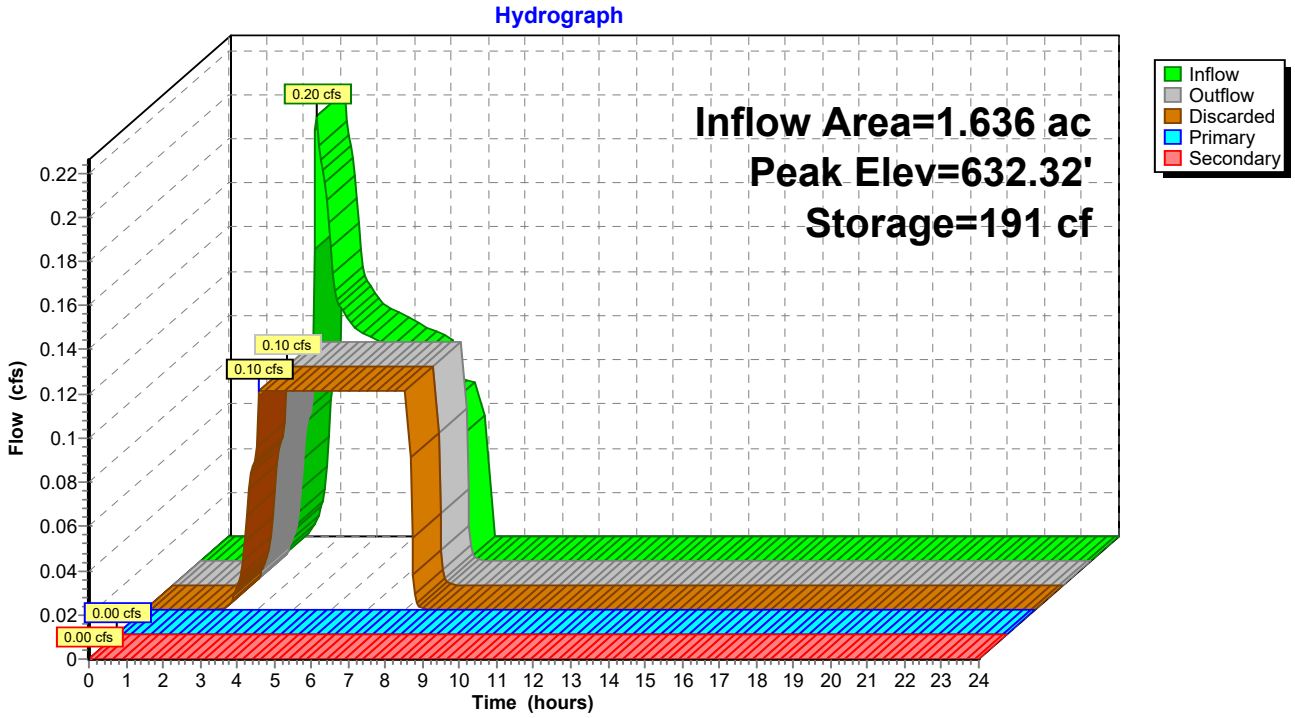
Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.10 cfs @ 3.10 hrs HW=632.06' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Area-Storage for Pond 5: SFB-5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
632.00	1,505	0
632.05	1,505	30
632.10	1,505	60
632.15	1,505	90
632.20	1,505	120
632.25	1,505	151
632.30	1,505	181
632.35	1,505	211
632.40	1,505	241
632.45	1,505	271
632.50	1,505	301
632.55	1,505	316
632.60	1,505	331
632.65	1,505	346
632.70	1,505	361
632.75	1,505	376
632.80	1,505	391
632.85	1,505	406
632.90	1,505	421
632.95	1,505	436
633.00	1,505	452
633.05	1,505	467
633.10	1,505	482
633.15	1,505	497
633.20	1,505	512
633.25	1,505	527
633.30	1,505	542
633.35	1,505	557
633.40	1,505	572
633.45	1,505	587
633.50	1,505	602
633.55	1,629	680
633.60	1,752	765
633.65	1,876	856
633.70	1,999	952
633.75	2,123	1,056
633.80	2,247	1,165
633.85	2,370	1,280
633.90	2,494	1,402
633.95	2,617	1,530
634.00	2,741	1,664
634.05	2,778	1,801
634.10	2,815	1,941
634.15	2,853	2,083
634.20	2,890	2,227
634.25	2,927	2,372
634.30	2,964	2,519
634.35	3,001	2,668
634.40	3,039	2,819
634.45	3,076	2,972
634.50	3,113	3,127
634.55	3,150	3,284
634.60	3,187	3,442
634.65	3,225	3,602
634.70	3,262	3,764
634.75	3,299	3,929
634.80	3,336	4,094
634.85	3,373	4,262
634.90	3,411	4,432
634.95	3,448	4,603
635.00	3,485	4,776
635.05	3,513	4,951
635.10	3,542	5,128
635.15	3,570	5,306
635.20	3,598	5,485
635.25	3,626	5,665
635.30	3,654	5,847
635.35	3,683	6,031
635.40	3,711	6,216
635.45	3,739	6,402
635.50	3,768	6,590
635.55	3,796	6,779
635.60	3,824	6,969
635.65	3,852	7,161
635.70	3,881	7,354
635.75	3,909	7,549
635.80	3,937	7,745
635.85	3,965	7,943
635.90	3,993	8,142
635.95	4,022	8,342
636.00	**4,050**	**8,544**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth = 0.79" for 1" WQV event
Inflow = 0.73 cfs @ 3.09 hrs, Volume= 0.039 af
Outflow = 0.06 cfs @ 4.17 hrs, Volume= 0.037 af, Atten= 92%, Lag= 65.0 min
Primary = 0.06 cfs @ 4.17 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 626.39' @ 4.17 hrs Surf.Area= 0.081 ac Storage= 0.027 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 283.6 min calculated for 0.037 af (95% of inflow)
Center-of-Mass det. time= 276.7 min (480.4 - 203.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**4.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 620.60' S= 0.0225 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 4.17 hrs HW=626.39' (Free Discharge)
└─**1=Culvert** (Passes 0.06 cfs of 0.16 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.65 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

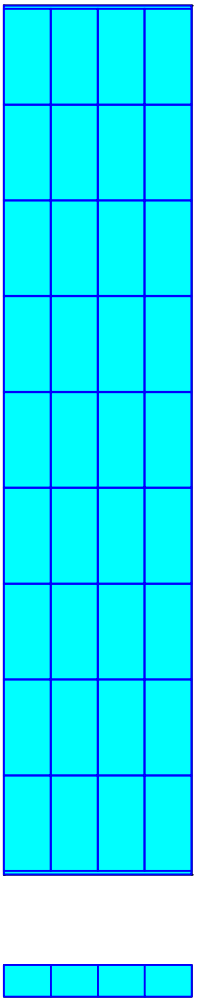
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

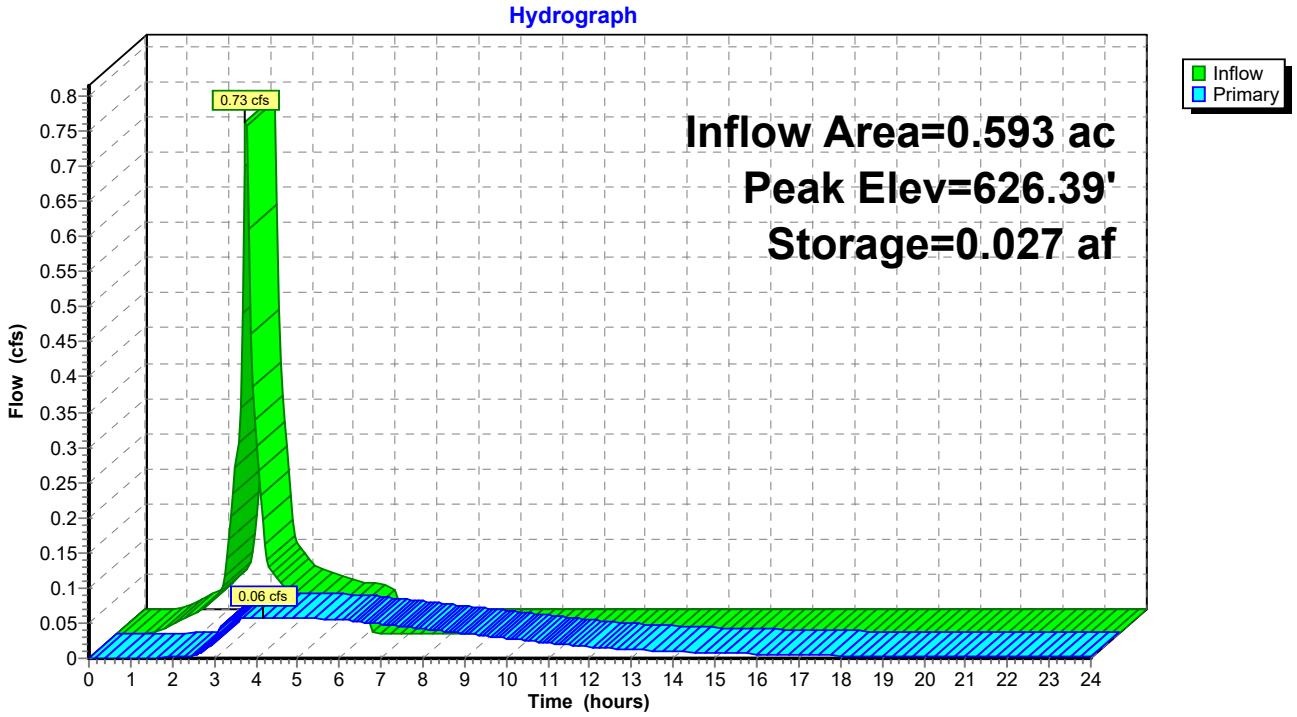
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow
Primary
0.73 cfs
0.06 cfs
Inflow Area=0.593 ac
Peak Elev=626.39'
Storage=0.027 af
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-3: DB-3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
626.00	0.000	628.60	0.180
626.05	0.003	628.65	0.183
626.10	0.007	628.70	0.187
626.15	0.010	628.75	0.190
626.20	0.014	628.80	0.194
626.25	0.017	628.85	0.197
626.30	0.021	628.90	0.200
626.35	0.024	628.95	0.204
626.40	0.028	629.00	0.207
626.45	0.031	629.05	0.211
626.50	0.035	629.10	0.214
626.55	0.038	629.15	0.218
626.60	0.041	629.20	0.221
626.65	0.045	629.25	0.225
626.70	0.048	629.30	0.228
626.75	0.052	629.35	0.232
626.80	0.055	629.40	0.235
626.85	0.059	629.45	0.238
626.90	0.062	629.50	0.242
626.95	0.066	629.55	0.245
627.00	0.069	629.60	0.249
627.05	0.073	629.65	0.252
627.10	0.076	629.70	0.256
627.15	0.079	629.75	0.259
627.20	0.083	629.80	0.263
627.25	0.086	629.85	0.266
627.30	0.090	629.90	0.270
627.35	0.093	629.95	0.273
627.40	0.097	630.00	0.276
627.45	0.100	630.05	0.276
627.50	0.104	630.10	0.276
627.55	0.107	630.15	0.276
627.60	0.111	630.20	0.276
627.65	0.114	630.25	0.276
627.70	0.117	630.30	0.276
627.75	0.121	630.35	0.276
627.80	0.124	630.40	0.276
627.85	0.128	630.45	0.276
627.90	0.131	630.50	0.276
627.95	0.135	630.55	0.276
628.00	0.138	630.60	0.276
628.05	0.142	630.65	**0.276**
628.10	0.145		
628.15	0.149		
628.20	0.152		
628.25	0.156		
628.30	0.159		
628.35	0.162		
628.40	0.166		
628.45	0.169		
628.50	0.173		
628.55	0.176		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth = 0.79" for 1" WQV event
Inflow = 0.34 cfs @ 3.09 hrs, Volume= 0.018 af
Outflow = 0.03 cfs @ 3.88 hrs, Volume= 0.017 af, Atten= 90%, Lag= 47.2 min
Primary = 0.03 cfs @ 3.88 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 634.19' @ 3.88 hrs Surf.Area= 0.072 ac Storage= 0.012 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 257.6 min calculated for 0.017 af (95% of inflow)
Center-of-Mass det. time= 252.0 min (455.7 - 203.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.03 cfs @ 3.88 hrs HW=634.19' (Free Discharge)
└─**1=Culvert** (Passes 0.03 cfs of 0.08 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.59 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

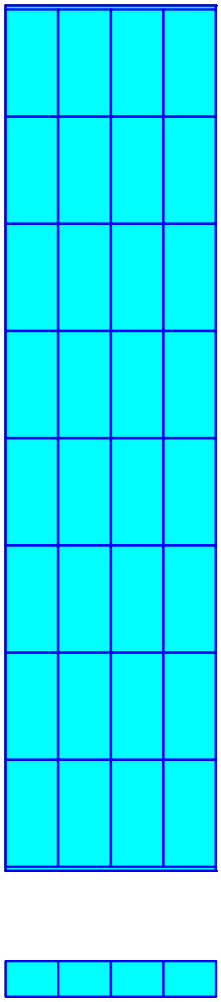
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

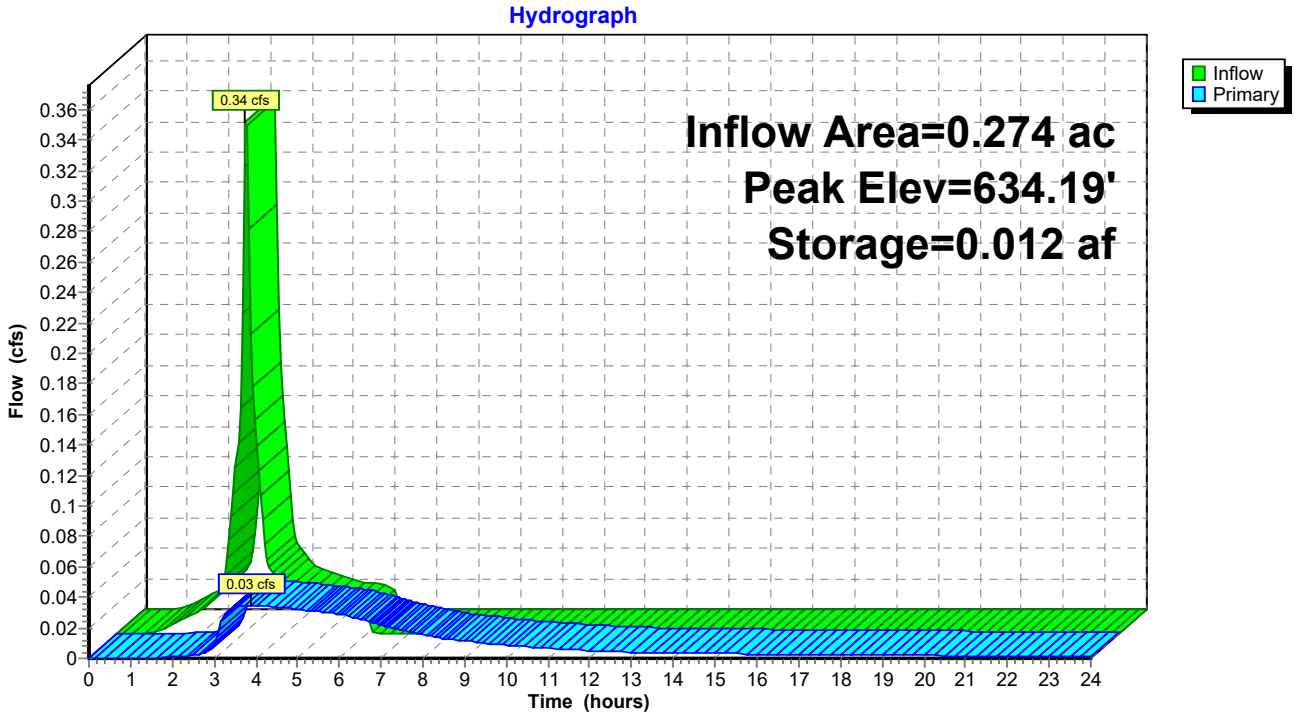
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow
Primary
0.34 cfs
0.03 cfs
Inflow Area=0.274 ac
Peak Elev=634.19'
Storage=0.012 af
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-4: DB-4

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
634.00	0.000	636.60	0.160
634.05	0.003	636.65	0.163
634.10	0.006	636.70	0.166
634.15	0.009	636.75	0.169
634.20	0.012	636.80	0.172
634.25	0.015	636.85	0.175
634.30	0.018	636.90	0.178
634.35	0.022	636.95	0.181
634.40	0.025	637.00	0.184
634.45	0.028	637.05	0.187
634.50	0.031	637.10	0.190
634.55	0.034	637.15	0.194
634.60	0.037	637.20	0.197
634.65	0.040	637.25	0.200
634.70	0.043	637.30	0.203
634.75	0.046	637.35	0.206
634.80	0.049	637.40	0.209
634.85	0.052	637.45	0.212
634.90	0.055	637.50	0.215
634.95	0.058	637.55	0.218
635.00	0.061	637.60	0.221
635.05	0.065	637.65	0.224
635.10	0.068	637.70	0.227
635.15	0.071	637.75	0.230
635.20	0.074	637.80	0.233
635.25	0.077	637.85	0.237
635.30	0.080	637.90	0.240
635.35	0.083	637.95	0.243
635.40	0.086	638.00	0.246
635.45	0.089	638.05	0.246
635.50	0.092	638.10	0.246
635.55	0.095	638.15	0.246
635.60	0.098	638.20	0.246
635.65	0.101	638.25	0.246
635.70	0.104	638.30	0.246
635.75	0.108	638.35	0.246
635.80	0.111	638.40	0.246
635.85	0.114	638.45	0.246
635.90	0.117	638.50	0.246
635.95	0.120	638.55	0.246
636.00	0.123	638.60	0.246
636.05	0.126	638.65	**0.246**
636.10	0.129		
636.15	0.132		
636.20	0.135		
636.25	0.138		
636.30	0.141		
636.35	0.144		
636.40	0.147		
636.45	0.151		
636.50	0.154		
636.55	0.157		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth = 0.45" for 1" WQV event
Inflow = 0.51 cfs @ 3.10 hrs, Volume= 0.027 af
Outflow = 0.08 cfs @ 3.71 hrs, Volume= 0.027 af, Atten= 85%, Lag= 36.9 min
Primary = 0.08 cfs @ 3.71 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 638.14' @ 3.71 hrs Surf.Area= 0.090 ac Storage= 0.011 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 65.8 min (286.3 - 220.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.08 cfs @ 3.71 hrs HW=638.14' (Free Discharge)
└─**1=Culvert** (Passes 0.08 cfs of 0.79 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.58 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

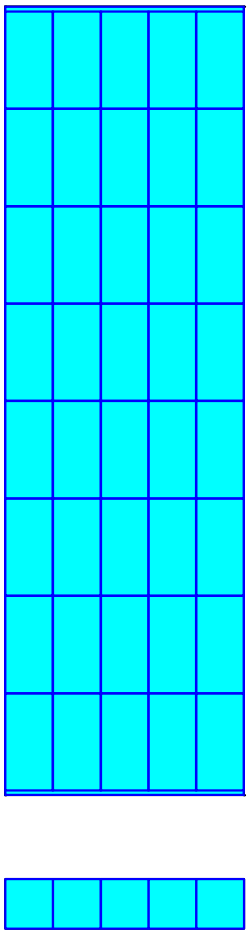
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

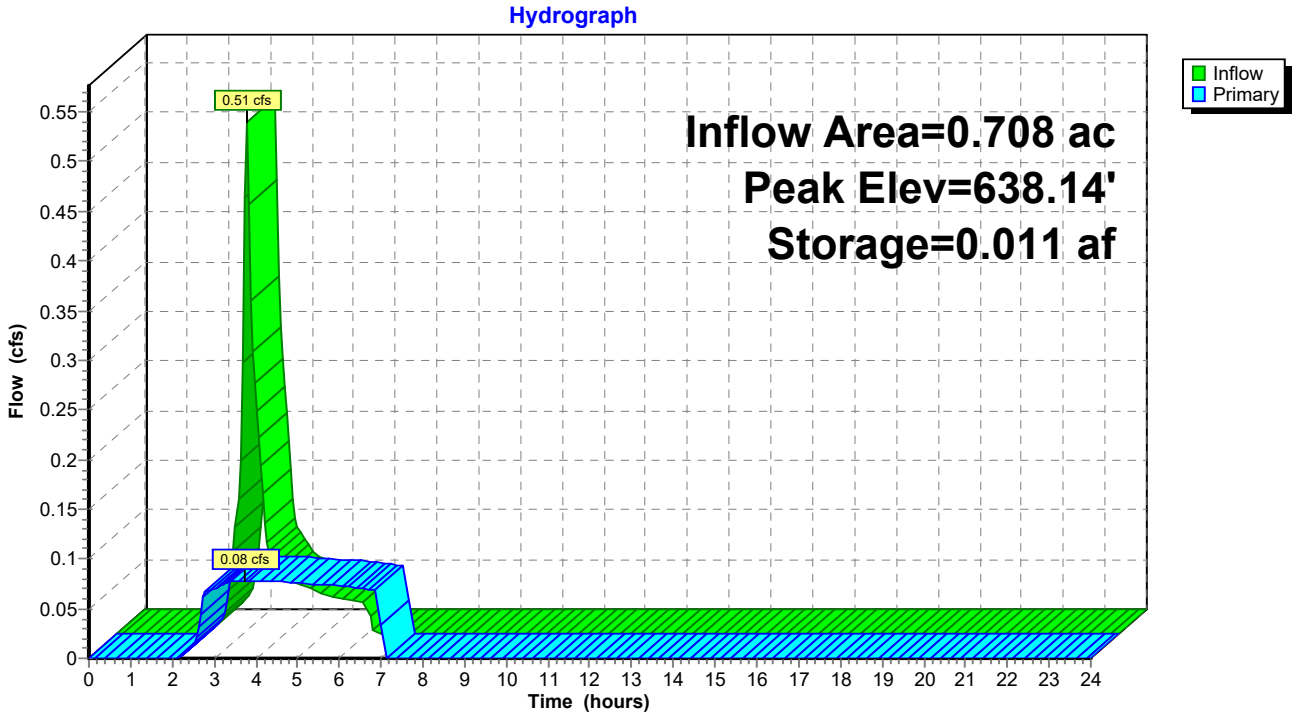
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow
Primary
0.51 cfs
0.08 cfs
Inflow Area=0.708 ac
Peak Elev=638.14'
Storage=0.011 af
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-5: DB-5

Elevation (feet)	Storage (acre-feet)
637.50	0.000
637.60	0.000
637.70	0.000
637.80	0.000
637.90	0.000
638.00	0.000
638.10	0.008
638.20	0.016
638.30	0.025
638.40	0.033
638.50	0.041
638.60	0.049
638.70	0.057
638.80	0.065
638.90	0.074
639.00	0.082
639.10	0.090
639.20	0.098
639.30	0.106
639.40	0.114
639.50	0.123
639.60	0.131
639.70	0.139
639.80	0.147
639.90	0.155
640.00	0.163
640.10	0.172
640.20	0.180
640.30	0.188
640.40	0.196
640.50	0.204
640.60	0.212
640.70	0.221
640.80	0.229
640.90	0.237
641.00	0.245
641.10	0.253
641.20	0.262
641.30	0.270
641.40	0.278
641.50	0.286
641.60	0.294
641.70	0.302
641.80	0.311
641.90	0.319
642.00	0.327
642.10	0.335
642.20	0.343
642.30	0.351
642.40	0.360
642.50	0.368
642.60	0.376
642.70	0.384
642.80	0.392
642.90	0.400
643.00	0.409
643.10	0.417
643.20	0.425
643.30	0.433
643.40	0.441
643.50	0.449
643.60	0.458
643.70	0.466
643.80	0.474
643.90	0.482
644.00	**0.490**
644.10	**0.490**
644.20	0.490
644.30	0.490
644.40	0.490
644.50	0.490
644.60	0.490

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac, 72.22% Impervious, Inflow Depth = 0.25" for 1" WQV event				
Inflow =	0.12 cfs @	3.11 hrs,	Volume=	0.007 af	
Outflow =	0.12 cfs @	3.11 hrs,	Volume=	0.007 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.12 cfs @	3.11 hrs,	Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

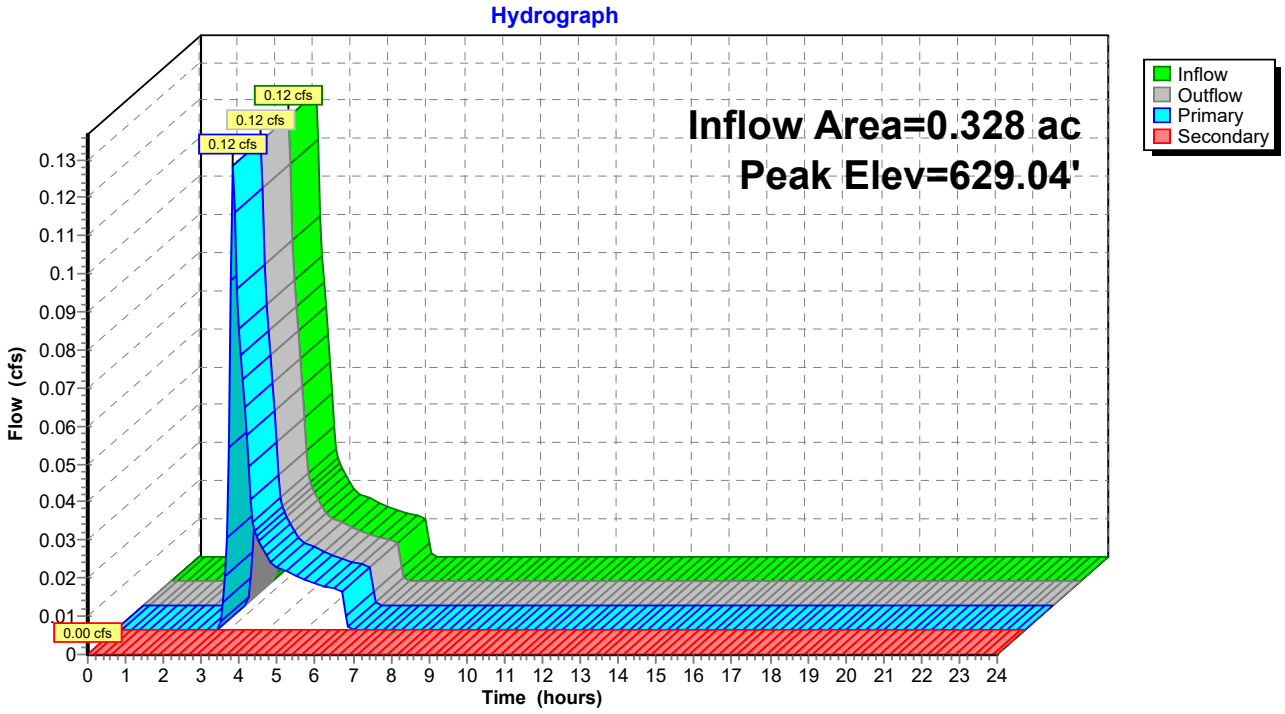
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 629.04' @ 3.11 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**6.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 620.60' S= 0.0344 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.12 cfs @ 3.11 hrs HW=629.03' TW=623.03' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.12 cfs @ 1.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=628.85' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond ICS-3: ICS-3



Stage-Area-Storage for Pond ICS-3: ICS-3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
628.85	**0**	631.45	0
628.90	0	631.50	0
628.95	0	631.55	0
629.00	0	631.60	0
629.05	0	631.65	0
629.10	0	631.70	0
629.15	0	631.75	0
629.20	0	631.80	0
629.25	0	631.85	0
629.30	0	631.90	0
629.35	0	631.95	0
629.40	0	632.00	0
629.45	0	632.05	0
629.50	0	632.10	0
629.55	0	632.15	0
629.60	0	632.20	0
629.65	0	632.25	0
629.70	0	632.30	0
629.75	0	632.35	0
629.80	0	632.40	0
629.85	0	632.45	0
629.90	0	632.50	0
629.95	0		
630.00	0		
630.05	0		
630.10	0		
630.15	0		
630.20	0		
630.25	0		
630.30	0		
630.35	0		
630.40	0		
630.45	0		
630.50	0		
630.55	0		
630.60	0		
630.65	0		
630.70	0		
630.75	0		
630.80	0		
630.85	0		
630.90	0		
630.95	0		
631.00	0		
631.05	0		
631.10	0		
631.15	0		
631.20	0		
631.25	0		
631.30	0		
631.35	0		
631.40	0		

Summary for Pond ICS-4: ICS-4

Inflow Area = 1.068 ac, 93.43% Impervious, Inflow Depth = 0.63" for 1" WQV event
Inflow = 1.09 cfs @ 3.09 hrs, Volume= 0.056 af
Outflow = 1.09 cfs @ 3.09 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 3.09 hrs, Volume= 0.056 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

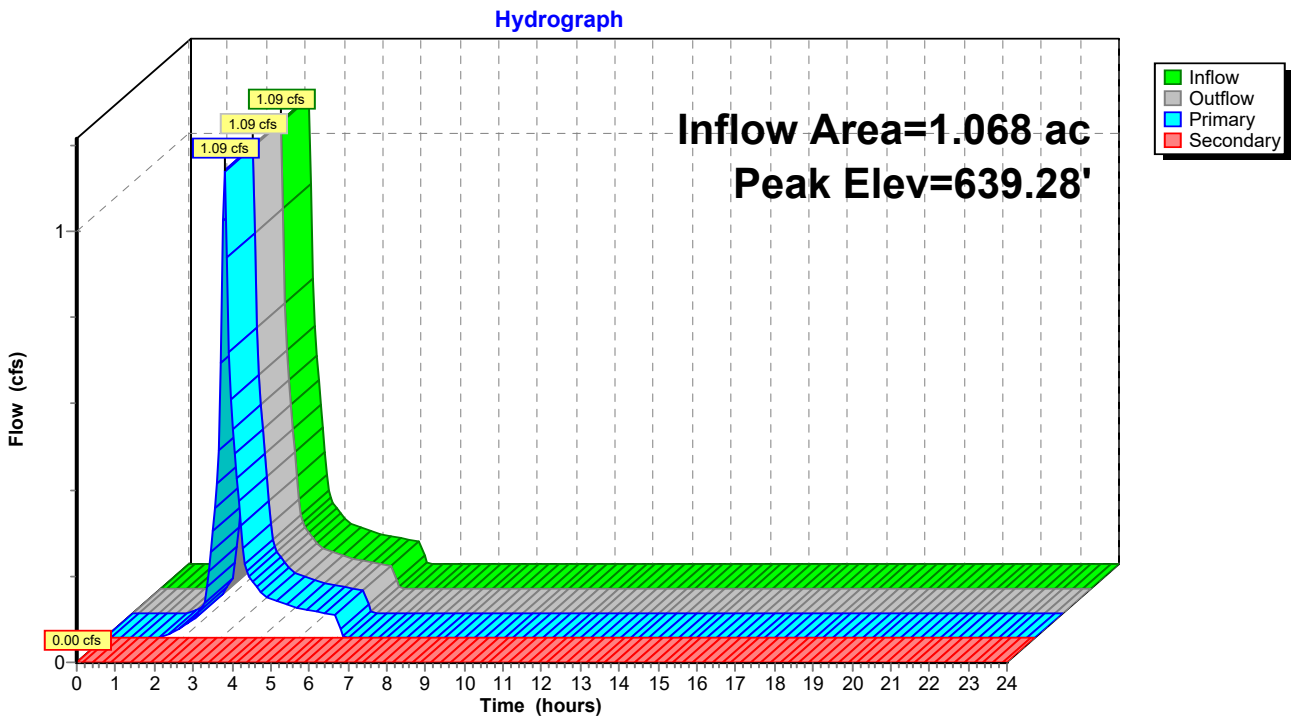
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 639.28' @ 3.09 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.07 cfs @ 3.09 hrs HW=639.10' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.07 cfs @ 5.44 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=636.50' (Free Discharge)
└─**3=Culvert** (Controls 0.00 cfs)
  └─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ICS-4: ICS-4



Stage-Area-Storage for Pond ICS-4: ICS-4

Elevation (feet)	Storage (cubic-feet)
636.50	**0**
636.55	0
636.60	0
636.65	0
636.70	0
636.75	0
636.80	0
636.85	0
636.90	0
636.95	0
637.00	0
637.05	0
637.10	0
637.15	0
637.20	0
637.25	0
637.30	0
637.35	0
637.40	0
637.45	0
637.50	0
637.55	0
637.60	0
637.65	0
637.70	0
637.75	0
637.80	0
637.85	0
637.90	0
637.95	0
638.00	0
638.05	0
638.10	0
638.15	0
638.20	0
638.25	0
638.30	0
638.35	0
638.40	0
638.45	0
638.50	0
638.55	0
638.60	0
638.65	0
638.70	0
638.75	0
638.80	0
638.85	0
638.90	0
638.95	0
639.00	0
639.05	0
639.10	0
639.15	0
639.20	0
639.25	0
639.30	0
639.35	0
639.40	0
639.45	0
639.50	0
639.55	0
639.60	0
639.65	0
639.70	0
639.75	0
639.80	0
639.85	0
639.90	0
639.95	0
640.00	0

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac, 62.40% Impervious, Inflow Depth = 0.15" for 1" WQV event				
Inflow =	0.13 cfs @	3.14 hrs,	Volume=	0.009 af	
Outflow =	0.13 cfs @	3.14 hrs,	Volume=	0.009 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.13 cfs @	3.14 hrs,	Volume=	0.009 af	
Secondary =	0.00 cfs @	3.15 hrs,	Volume=	0.000 af	

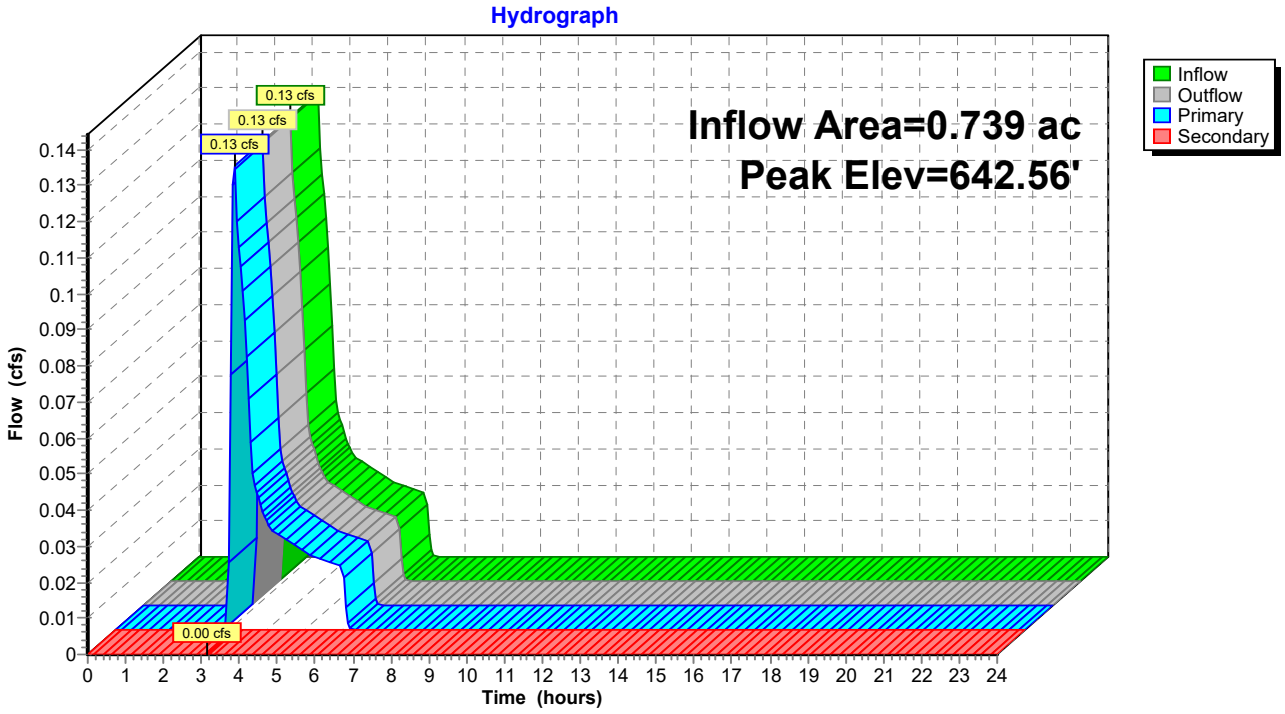
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 642.56' @ 3.14 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 637.00' S= 0.0656 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.13 cfs @ 3.14 hrs HW=642.56' TW=636.56' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.13 cfs @ 2.58 fps)

Secondary OutFlow Max=0.00 cfs @ 3.15 hrs HW=642.56' TW=636.56' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 0.00 cfs @ 0.18 fps)

Pond ICS-5: ICS-5



Stage-Area-Storage for Pond ICS-5: ICS-5

Elevation (feet)	Storage (cubic-feet)
642.25	**0**
642.30	0
642.35	0
642.40	0
642.45	0
642.50	0
642.55	0
642.60	0
642.65	0
642.70	0
642.75	0
642.80	0
642.85	0
642.90	0
642.95	0
643.00	0
643.05	0
643.10	0
643.15	0
643.20	0
643.25	0
643.30	0
643.35	0
643.40	0
643.45	0
643.50	0
643.55	0
643.60	0
643.65	0
643.70	0
643.75	0
643.80	0
643.85	0
643.90	0
643.95	0
644.00	0
644.05	0
644.10	0
644.15	0
644.20	0
644.25	0
644.30	0
644.35	0
644.40	0
644.45	0
644.50	0
644.55	0
644.60	0
644.65	0
644.70	0
644.75	0
644.80	0
644.85	0
644.90	0
644.95	0
645.00	0
645.05	0
645.10	0
645.15	0
645.20	0
645.25	0
645.30	0
645.35	0
645.40	0
645.45	0
645.50	0

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth = 0.25" for 1" WQV event
Inflow = 0.02 cfs @ 3.11 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 3.05 hrs, Volume= 0.001 af, Atten= 83%, Lag= 0.0 min
Primary = 0.00 cfs @ 3.05 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 653.20' @ 3.92 hrs Surf.Area= 259 sf Storage= 21 cf

Plug-Flow detention time= 67.1 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 67.1 min (298.8 - 231.8)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

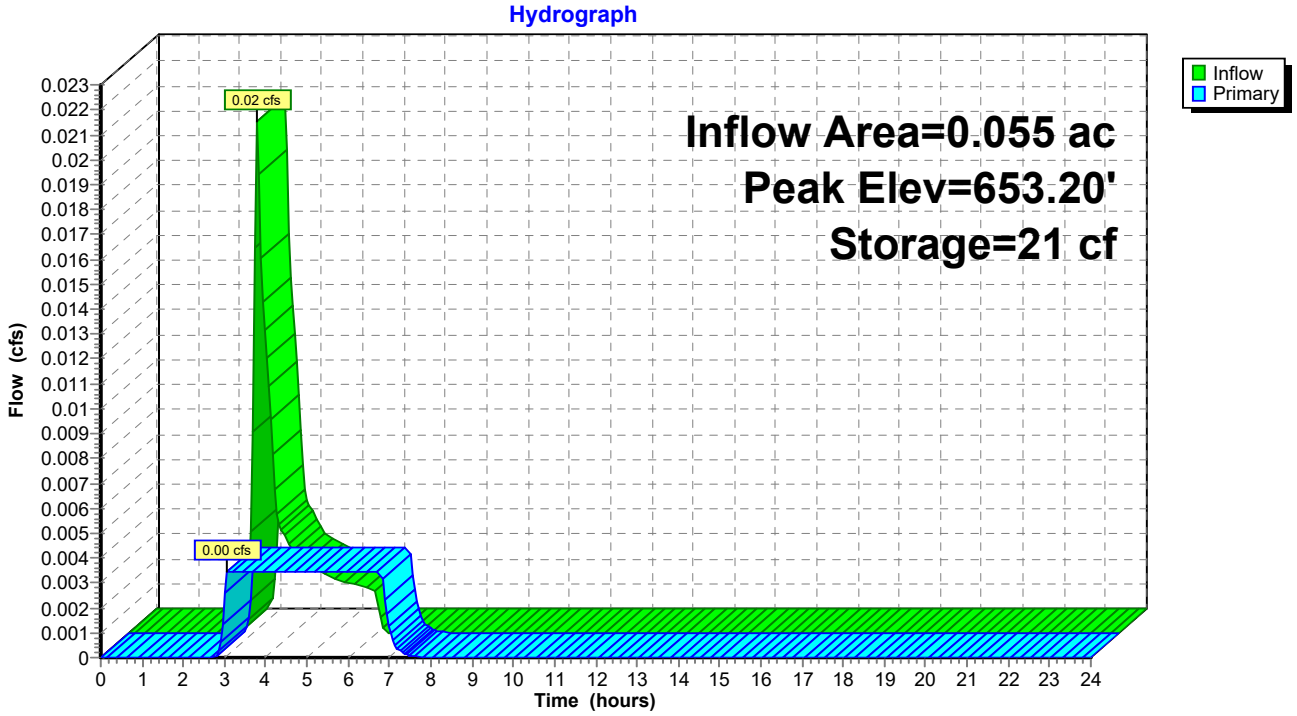
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 3.05 hrs HW=653.03' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Pond RG-7B: RG-7B



Stage-Area-Storage for Pond RG-7B: RG-7B

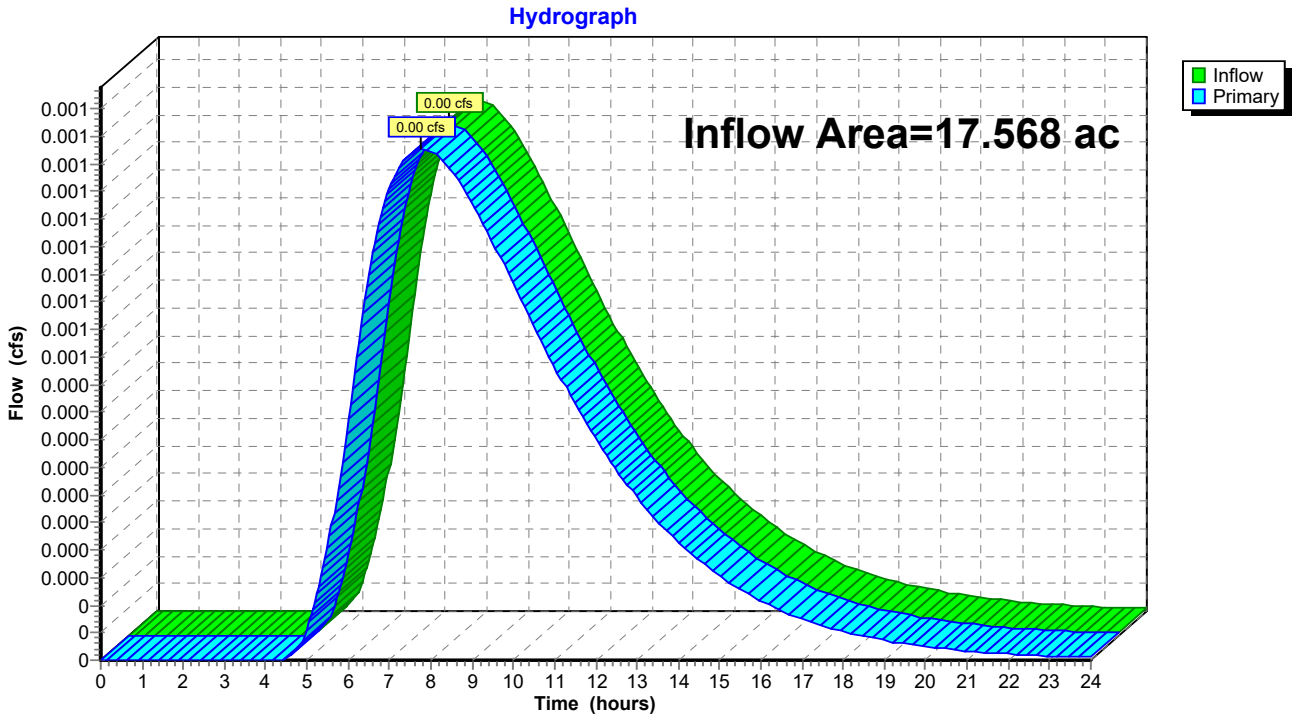
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
653.00	259	0
653.02	259	2
653.04	259	4
653.06	259	6
653.08	259	8
653.10	259	10
653.12	259	12
653.14	259	15
653.16	259	17
653.18	259	19
653.20	259	21
653.22	259	23
653.24	259	25
653.26	259	27
653.28	259	29
653.30	259	31
653.32	259	33
653.34	259	35
653.36	259	37
653.38	259	39
653.40	259	41
653.42	259	44
653.44	259	46
653.46	259	48
653.48	259	50
653.50	259	52
653.52	259	53
653.54	259	55
653.56	259	56
653.58	259	58
653.60	259	60
653.62	259	61
653.64	259	63
653.66	259	64
653.68	259	66
653.70	259	67
653.72	259	69
653.74	259	70
653.76	259	72
653.78	259	74
653.80	259	75
653.82	259	77
653.84	259	78
653.86	259	80
653.88	259	81
653.90	259	83
653.92	259	84
653.94	259	86
653.96	259	88
653.98	259	89
654.00	259	91
654.02	263	92
654.04	268	94
654.06	272	96
654.08	276	98
654.10	281	99
654.12	285	102
654.14	289	104
654.16	294	106
654.18	298	108
654.20	303	111
654.22	308	113
654.24	312	116
654.26	317	118
654.28	321	120
654.30	326	123
654.32	331	125
654.34	336	127
654.36	341	130
654.38	345	133
654.40	350	136
654.42	355	139
654.44	360	142
654.46	365	145
654.48	370	148
654.50	375	151
654.52	380	159
654.54	385	166
654.56	391	174
654.58	396	182
654.60	401	190
654.62	406	198
654.64	412	206
654.66	417	215
654.68	422	223
654.70	428	231
654.72	433	240
654.74	439	249
654.76	444	258
654.78	450	267
654.80	455	276
654.82	461	285
654.84	467	294
654.86	472	303
654.88	478	313
654.90	484	323
654.92	490	332
654.94	495	342
654.96	501	352
654.98	507	362
655.00	**513**	**372**

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 0.00" for 1" WQV event
Inflow = 0.00 cfs @ 7.78 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 7.78 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

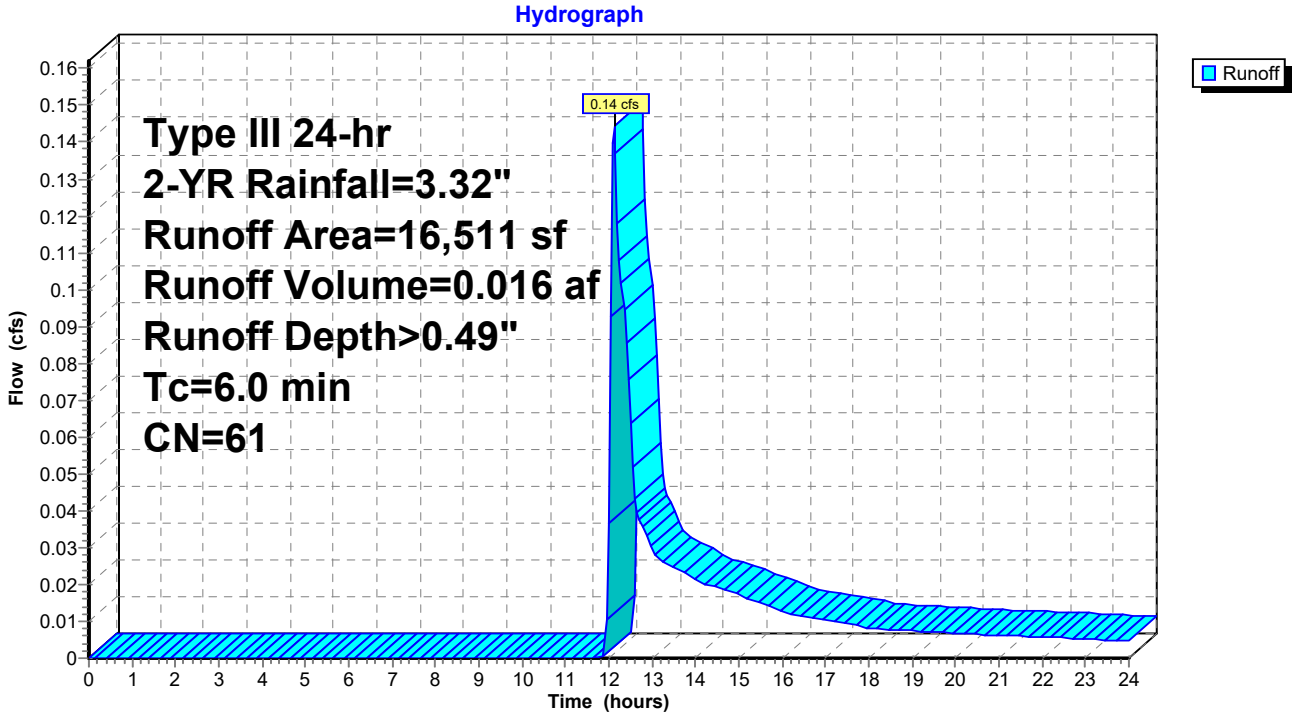
Runoff = 0.14 cfs @ 12.12 hrs, Volume= 0.016 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

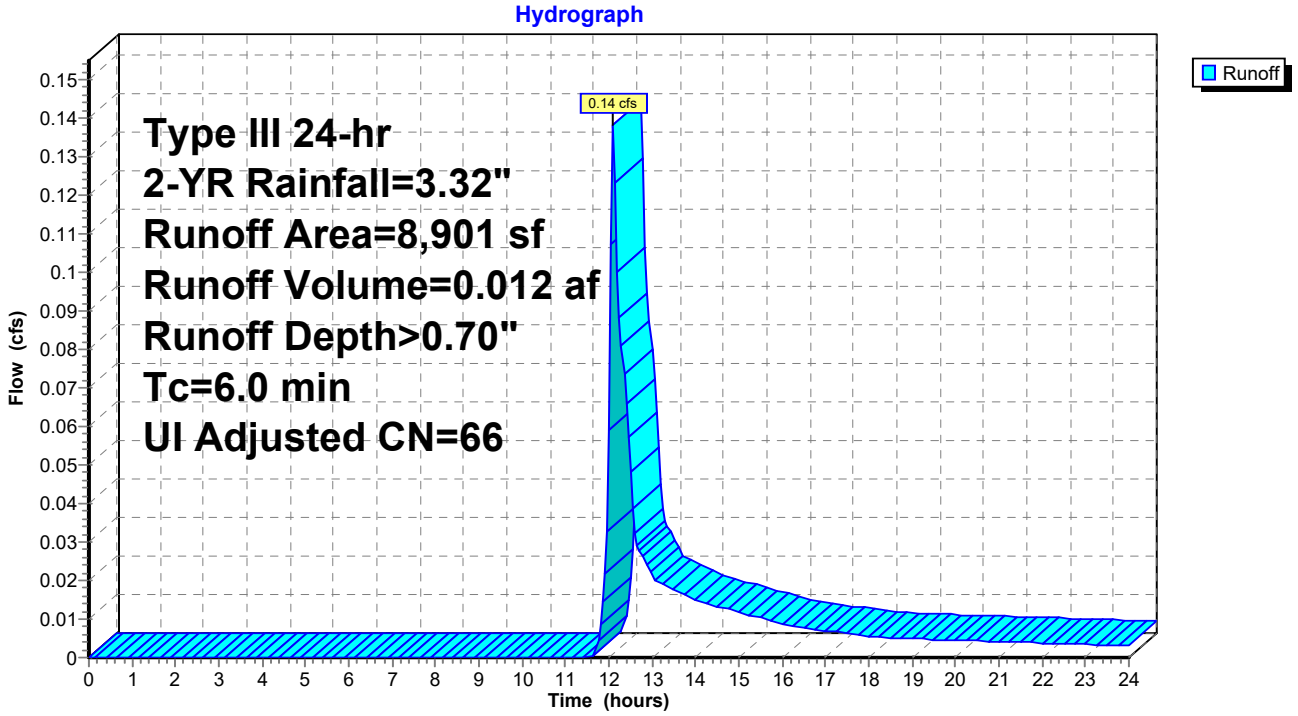
Runoff = 0.14 cfs @ 12.11 hrs, Volume= 0.012 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

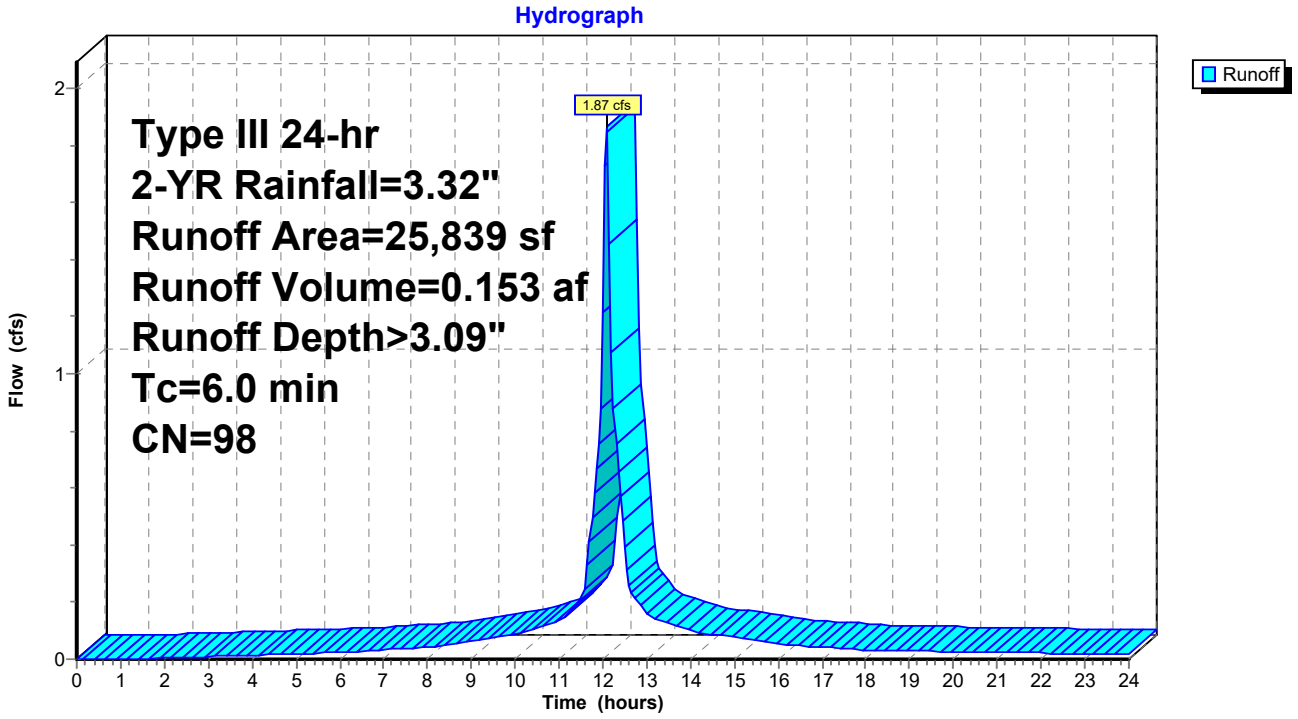
Runoff = 1.87 cfs @ 12.09 hrs, Volume= 0.153 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

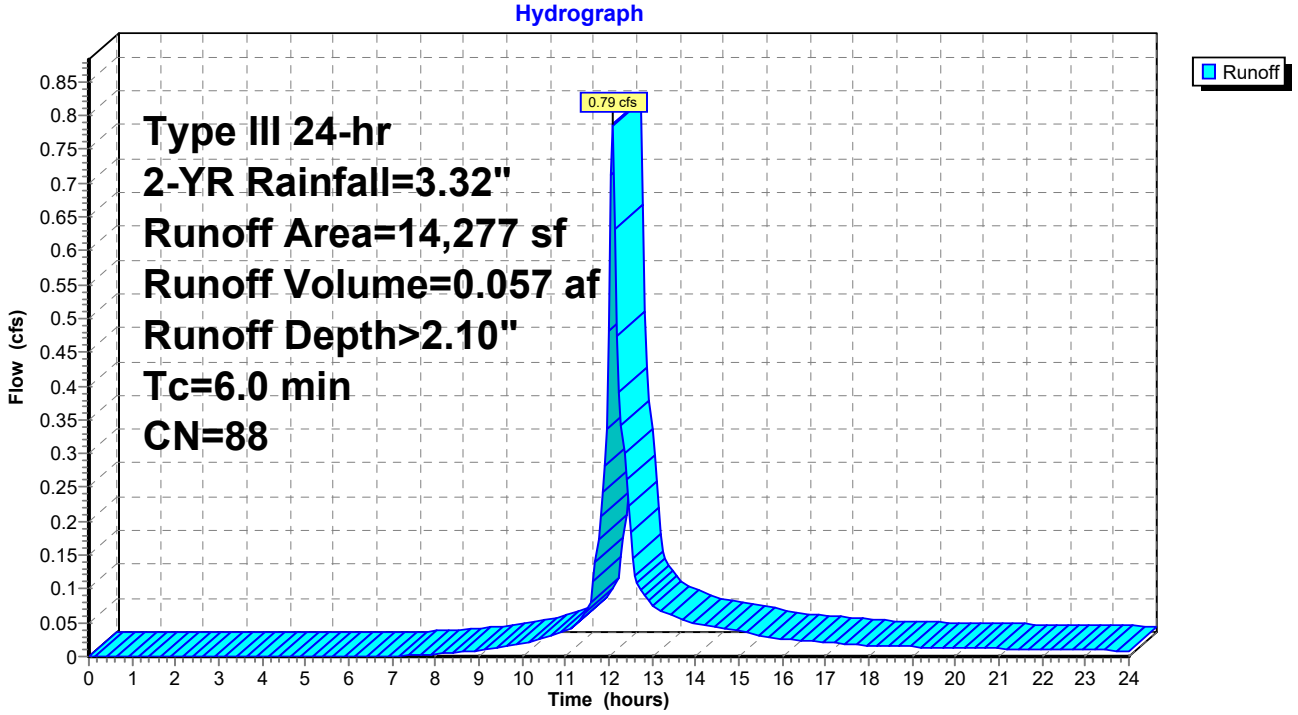
Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.057 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

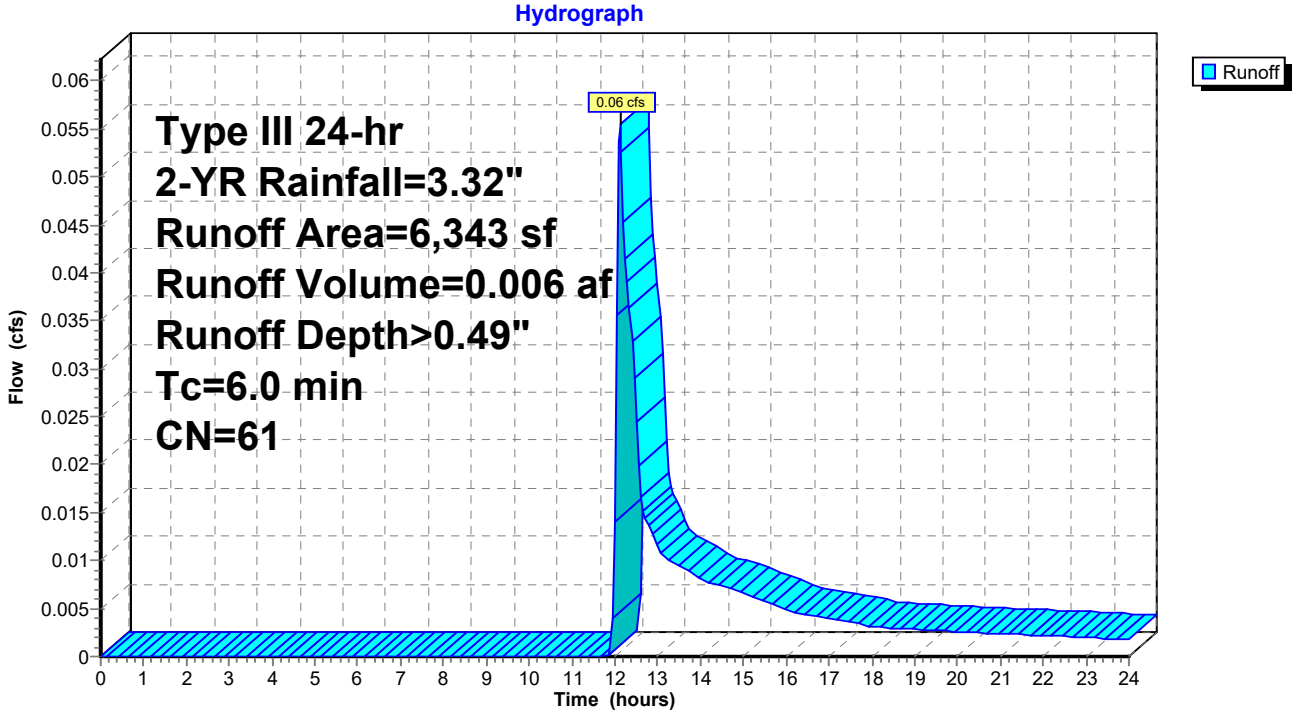
Runoff = 0.06 cfs @ 12.12 hrs, Volume= 0.006 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

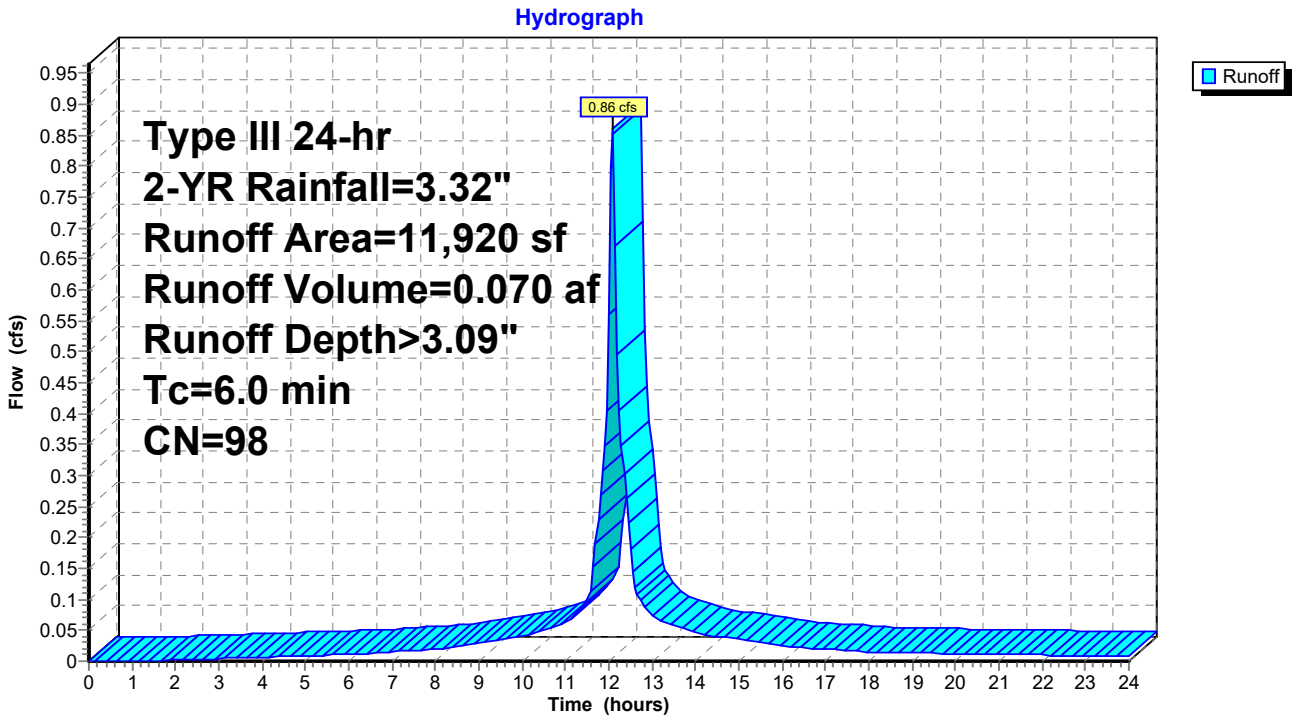
Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.070 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

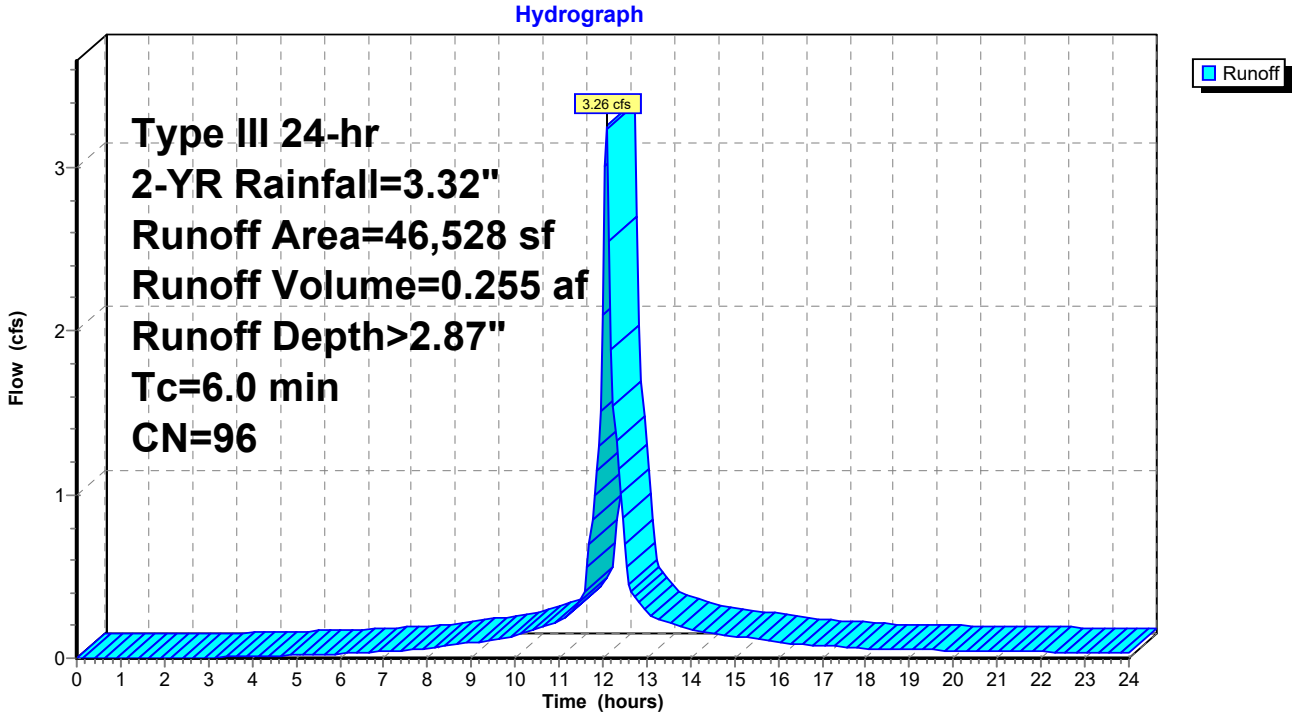
Runoff = 3.26 cfs @ 12.09 hrs, Volume= 0.255 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

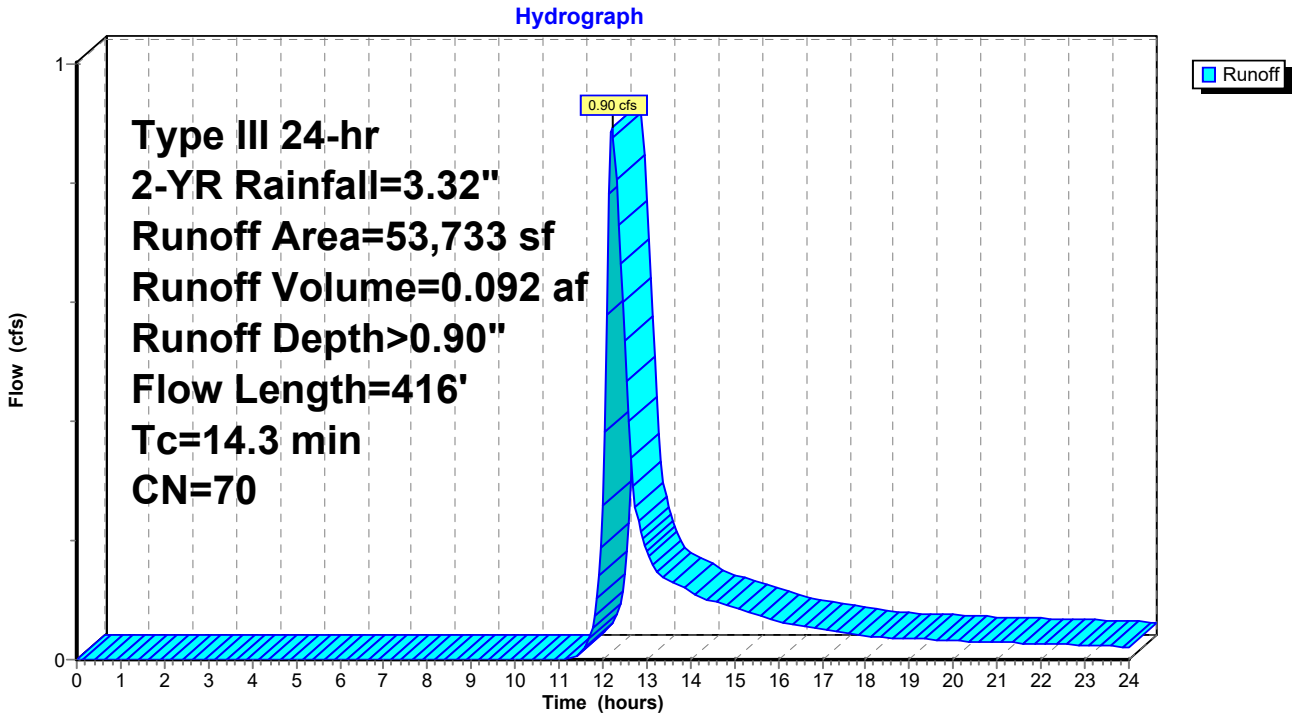
Runoff = 0.90 cfs @ 12.22 hrs, Volume= 0.092 af, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

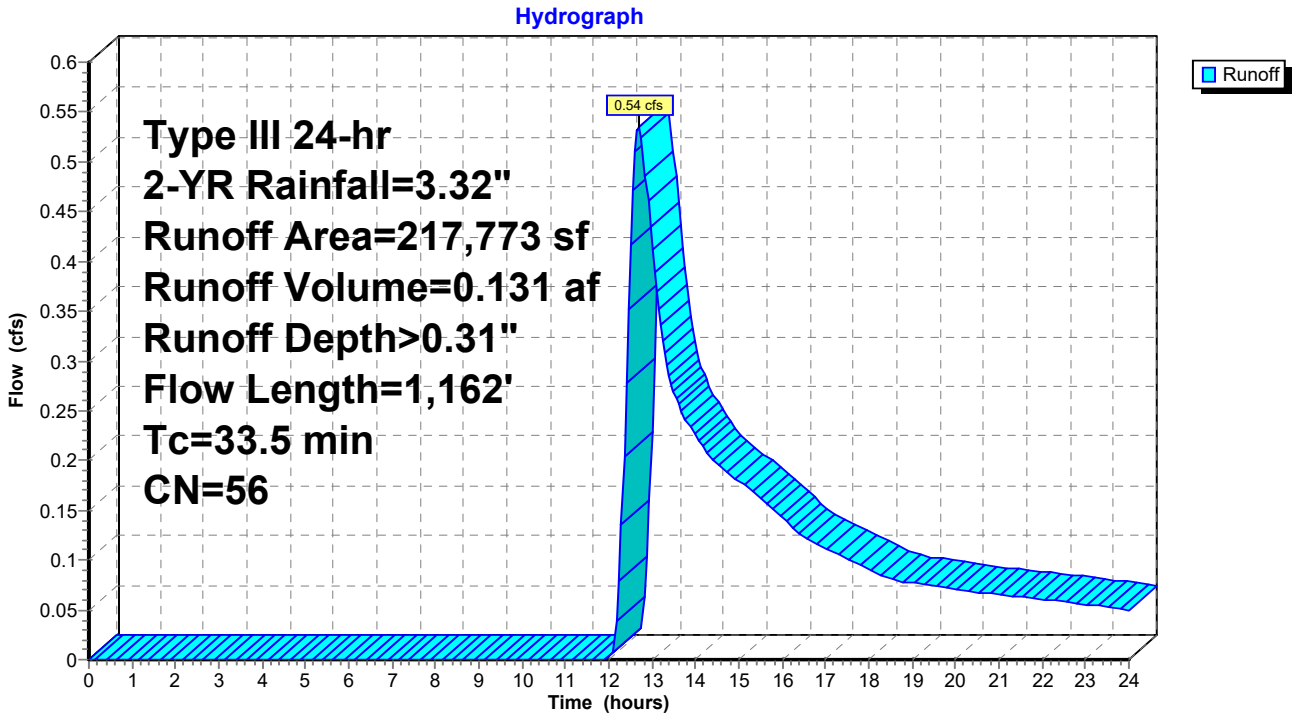
Runoff = 0.54 cfs @ 12.69 hrs, Volume= 0.131 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

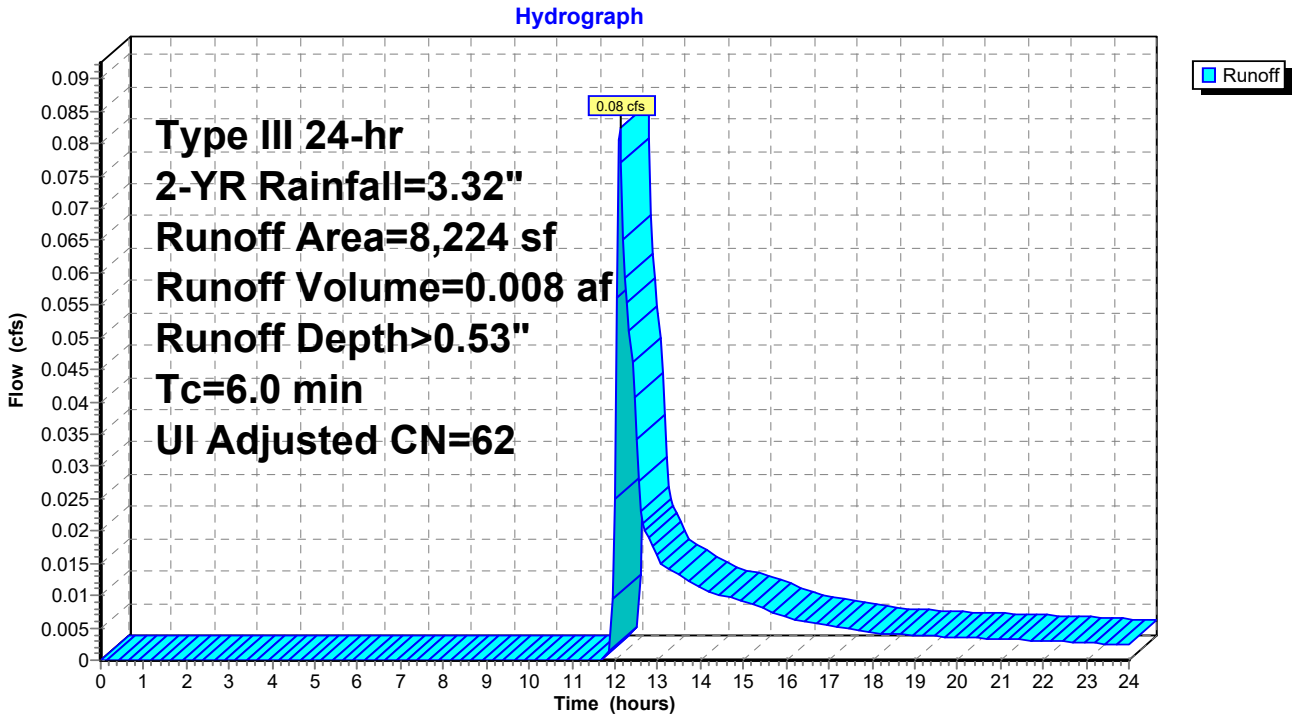
Runoff = 0.08 cfs @ 12.12 hrs, Volume= 0.008 af, Depth> 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

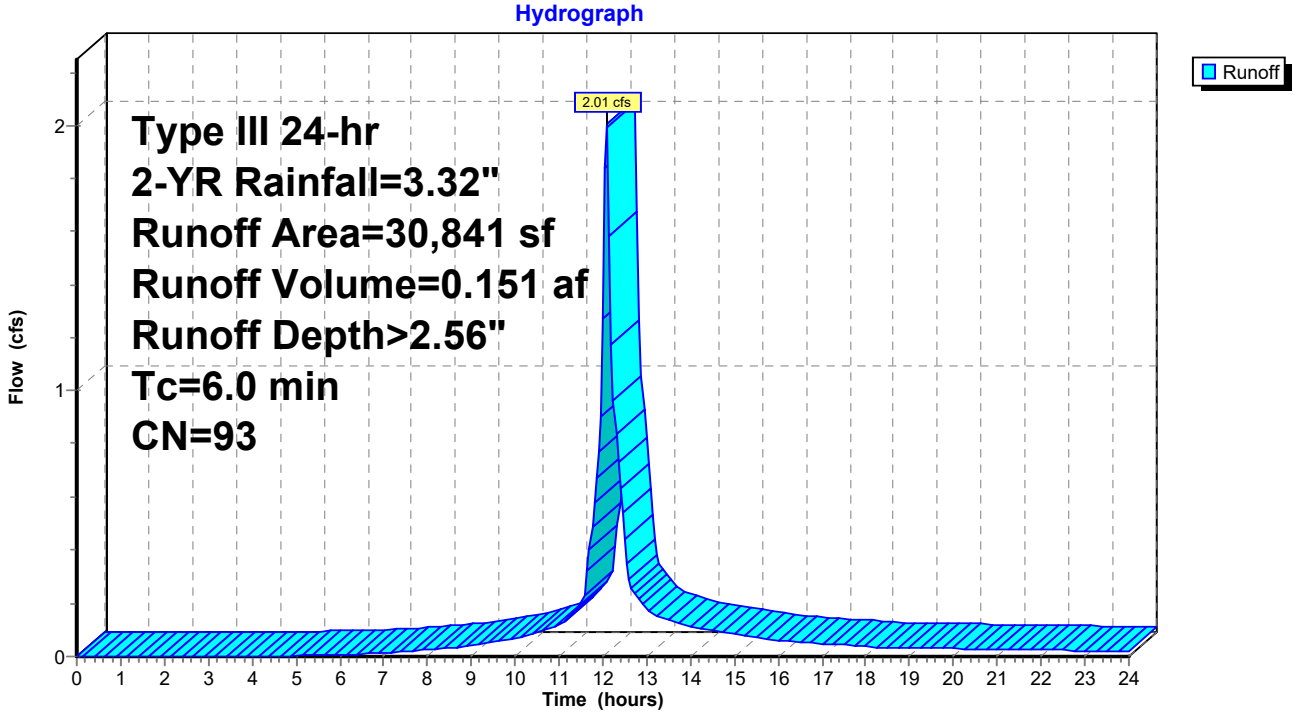
Runoff = 2.01 cfs @ 12.09 hrs, Volume= 0.151 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

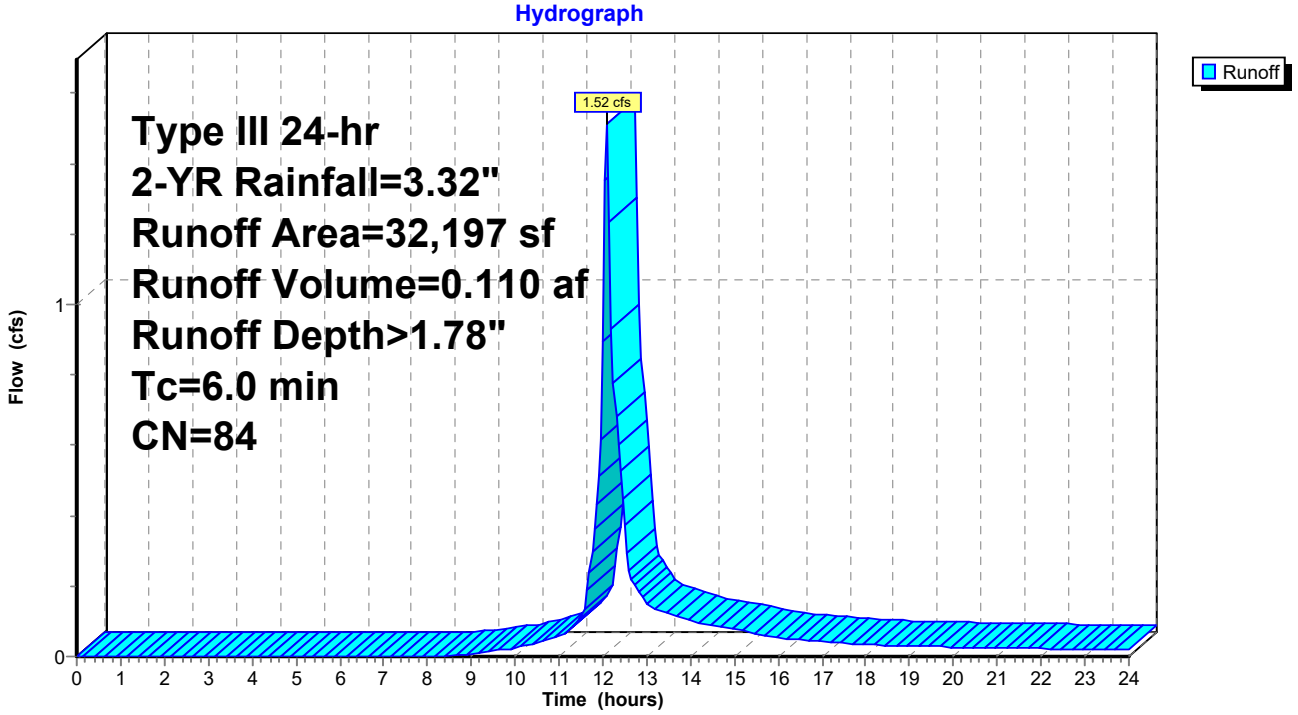
Runoff = 1.52 cfs @ 12.09 hrs, Volume= 0.110 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

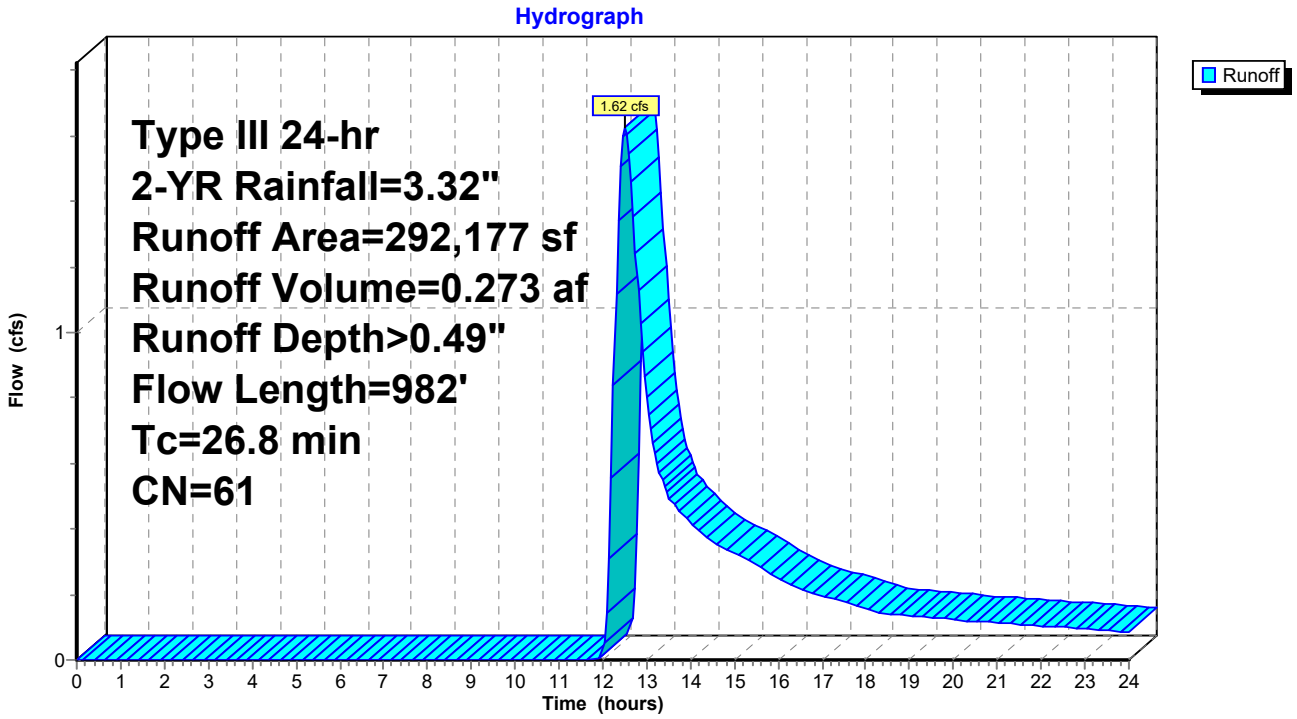
Runoff = 1.62 cfs @ 12.50 hrs, Volume= 0.273 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

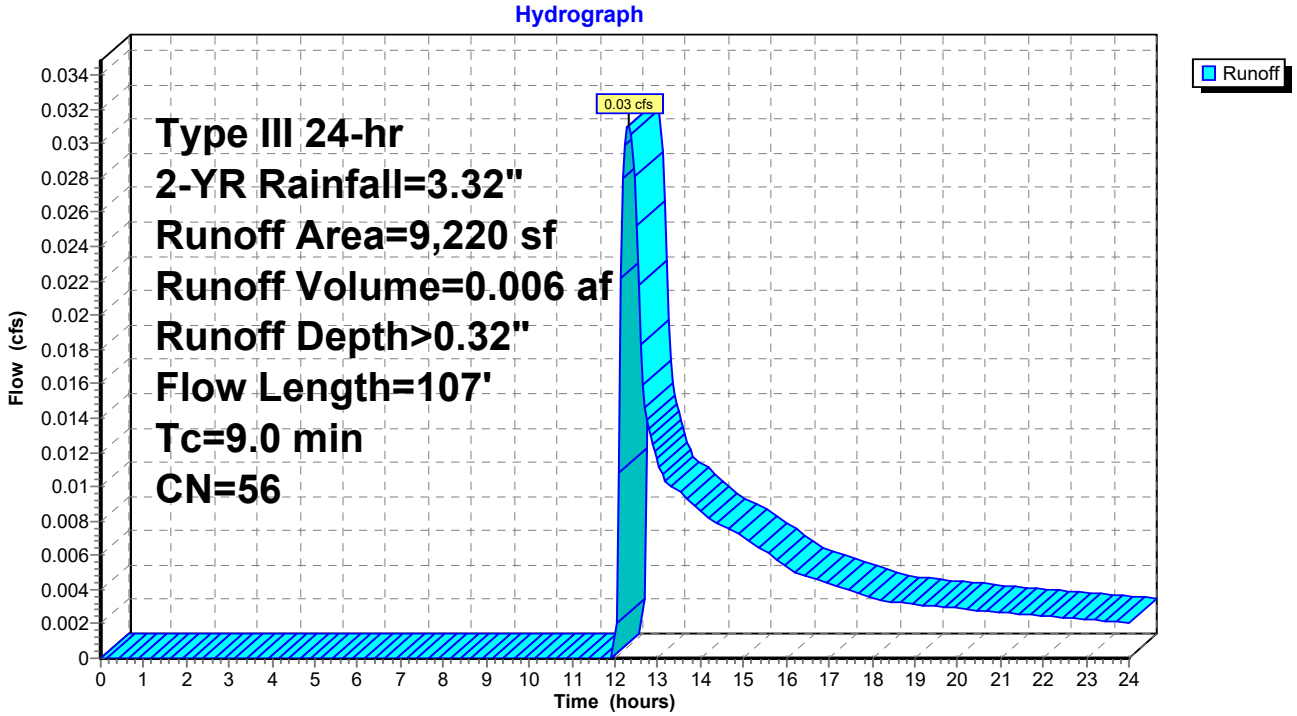
Runoff = 0.03 cfs @ 12.33 hrs, Volume= 0.006 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

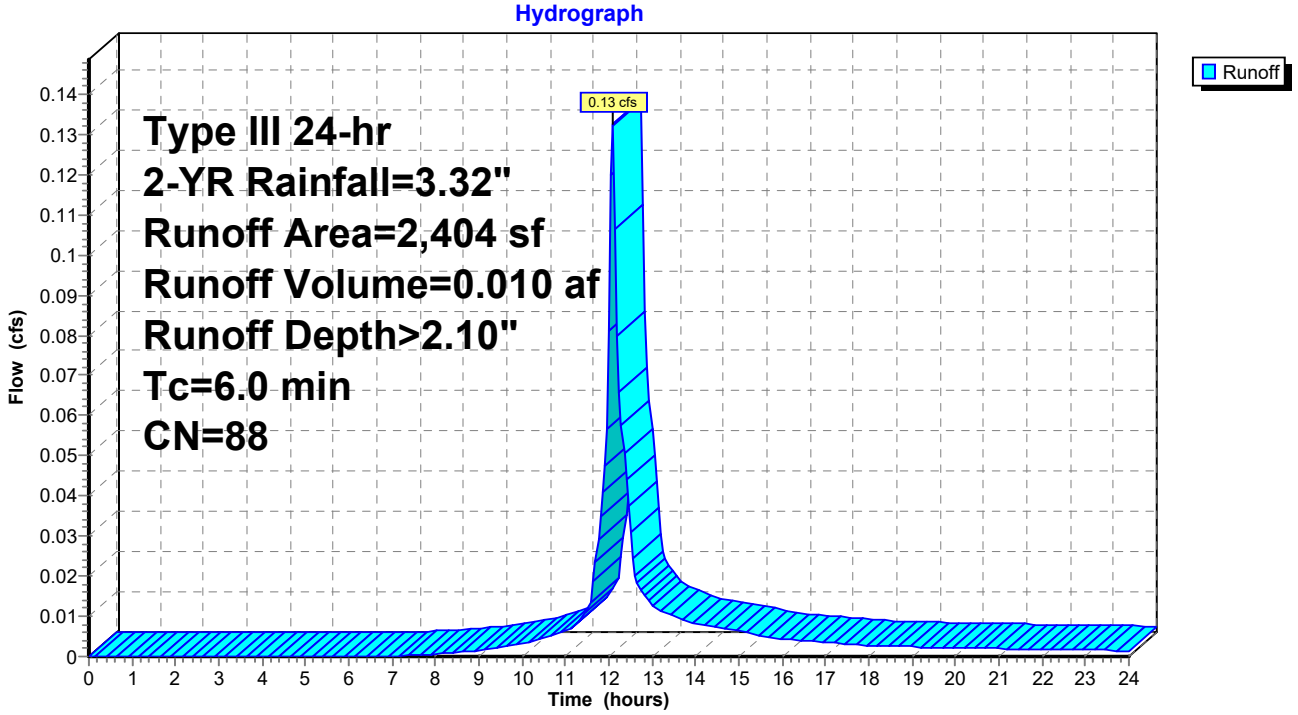
Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.32"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

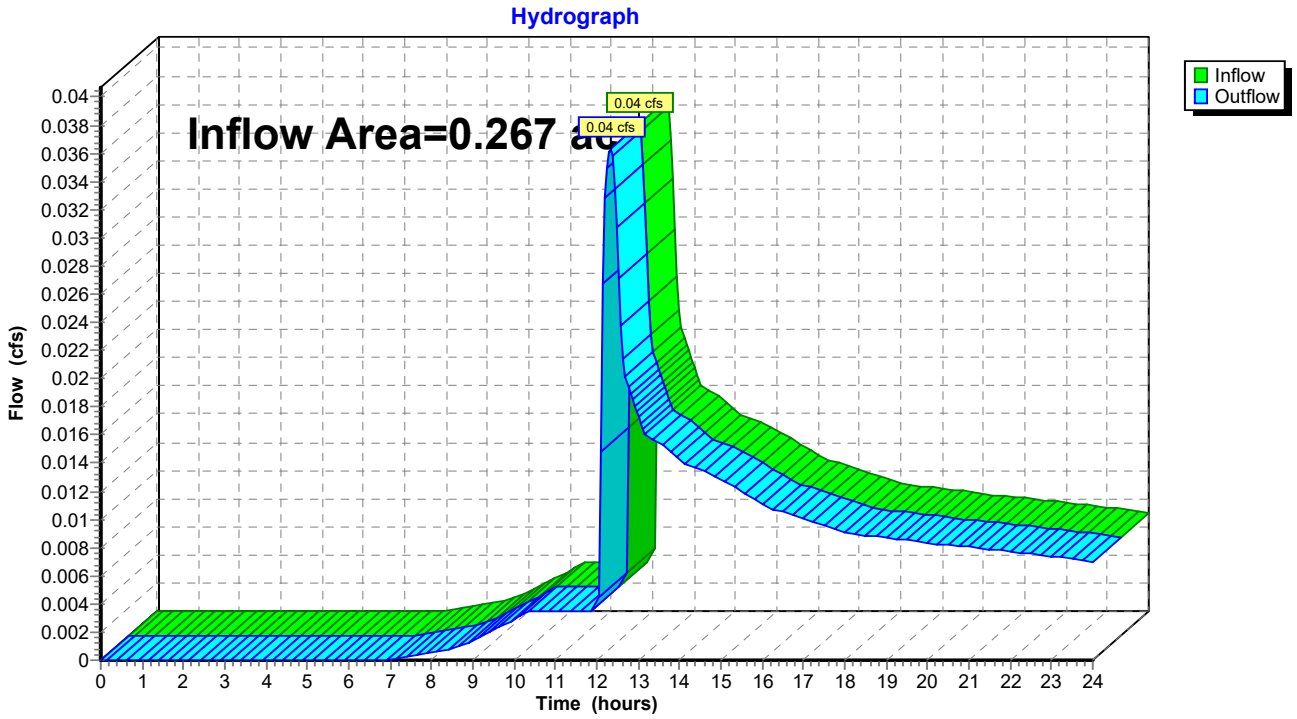


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth > 0.53" for 2-YR event
Inflow = 0.04 cfs @ 12.33 hrs, Volume= 0.012 af
Outflow = 0.04 cfs @ 12.33 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

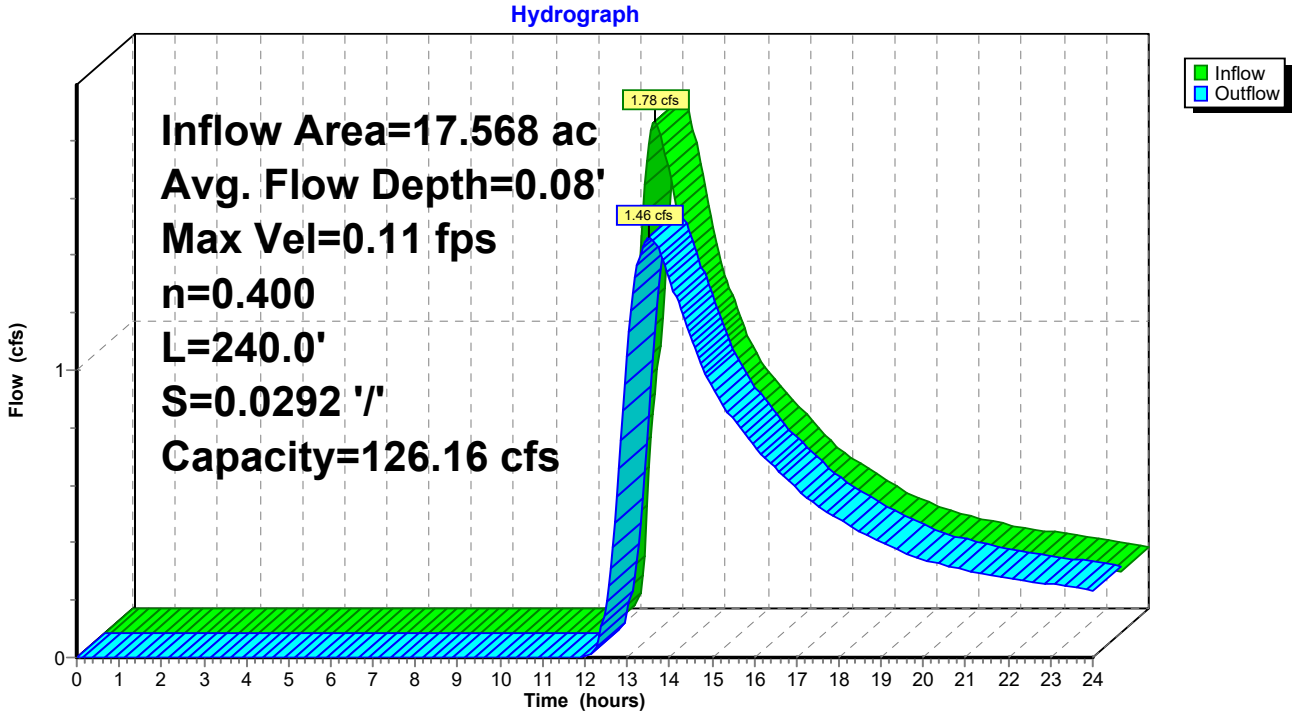
Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 0.40" for 2-YR event
Inflow = 1.78 cfs @ 13.00 hrs, Volume= 0.583 af
Outflow = 1.46 cfs @ 13.52 hrs, Volume= 0.560 af, Atten= 18%, Lag= 31.1 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.11 fps, Min. Travel Time= 35.7 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 55.8 min

Peak Storage= 3,131 cf @ 13.52 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

Reach PDP-4: Design Point 4



Stage-Area-Storage for Reach PDP-4: Design Point 4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
625.00	0.0	0
625.01	1.7	398
625.02	3.3	799
625.03	5.0	1,204
625.04	6.7	1,612
625.05	8.4	2,024
625.06	10.2	2,439
625.07	11.9	2,857
625.08	13.7	3,279
625.09	15.4	3,705
625.10	17.2	4,134
625.11	19.0	4,567
625.12	20.8	5,003
625.13	22.7	5,442
625.14	24.5	5,885
625.15	26.4	6,331
625.16	28.3	6,781
625.17	30.1	7,235
625.18	32.0	7,692
625.19	34.0	8,152
625.20	35.9	8,616
625.21	37.8	9,083
625.22	39.8	9,554
625.23	41.8	10,028
625.24	43.8	10,506
625.25	45.8	10,988
625.26	47.8	11,472
625.27	49.8	11,960
625.28	51.9	12,452
625.29	53.9	12,947
625.30	56.0	13,446
625.31	58.1	13,948
625.32	60.2	14,454
625.33	62.3	14,963
625.34	64.5	15,475
625.35	66.6	15,992
625.36	68.8	16,511
625.37	71.0	17,034
625.38	73.2	17,561
625.39	75.4	18,091
625.40	77.6	18,624
625.41	79.8	19,161
625.42	82.1	19,701
625.43	84.4	20,245
625.44	86.6	20,793
625.45	88.9	21,344
625.46	91.2	21,898
625.47	93.6	22,456
625.48	95.9	23,017
625.49	98.3	23,582
625.50	100.6	24,150
625.51	103.0	24,722
625.52	105.4	25,297
625.53	107.8	25,876
625.54	110.2	26,458
625.55	112.7	27,044
625.56	115.1	27,633
625.57	117.6	28,225
625.58	120.1	28,821
625.59	122.6	29,421
625.60	125.1	30,024
625.61	127.6	30,631
625.62	130.2	31,241
625.63	132.7	31,854
625.64	135.3	32,471
625.65	137.9	33,092
625.66	140.5	33,715
625.67	143.1	34,343
625.68	145.7	34,974
625.69	148.4	35,608
625.70	151.0	36,246
625.71	153.7	36,887
625.72	156.4	37,532
625.73	159.1	38,180
625.74	161.8	38,832
625.75	164.5	39,488
625.76	167.3	40,146
625.77	170.0	40,808
625.78	172.8	41,474
625.79	175.6	42,143
625.80	178.4	42,816
625.81	181.2	43,492
625.82	184.0	44,172
625.83	186.9	44,855
625.84	189.8	45,541
625.85	192.6	46,232
625.86	195.5	46,925
625.87	198.4	47,622
625.88	201.3	48,323
625.89	204.3	49,027
625.90	207.2	49,734
625.91	210.2	50,445
625.92	213.2	51,159
625.93	216.2	51,877
625.94	219.2	52,599
625.95	222.2	53,324
625.96	225.2	54,052
625.97	228.3	54,784
625.98	231.3	55,519
625.99	234.4	56,258
626.00	**237.5**	**57,000**

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth > 0.41" for 2-YR event
Inflow = 2.34 cfs @ 12.61 hrs, Volume= 0.492 af
Outflow = 1.53 cfs @ 13.03 hrs, Volume= 0.471 af, Atten= 35%, Lag= 24.8 min

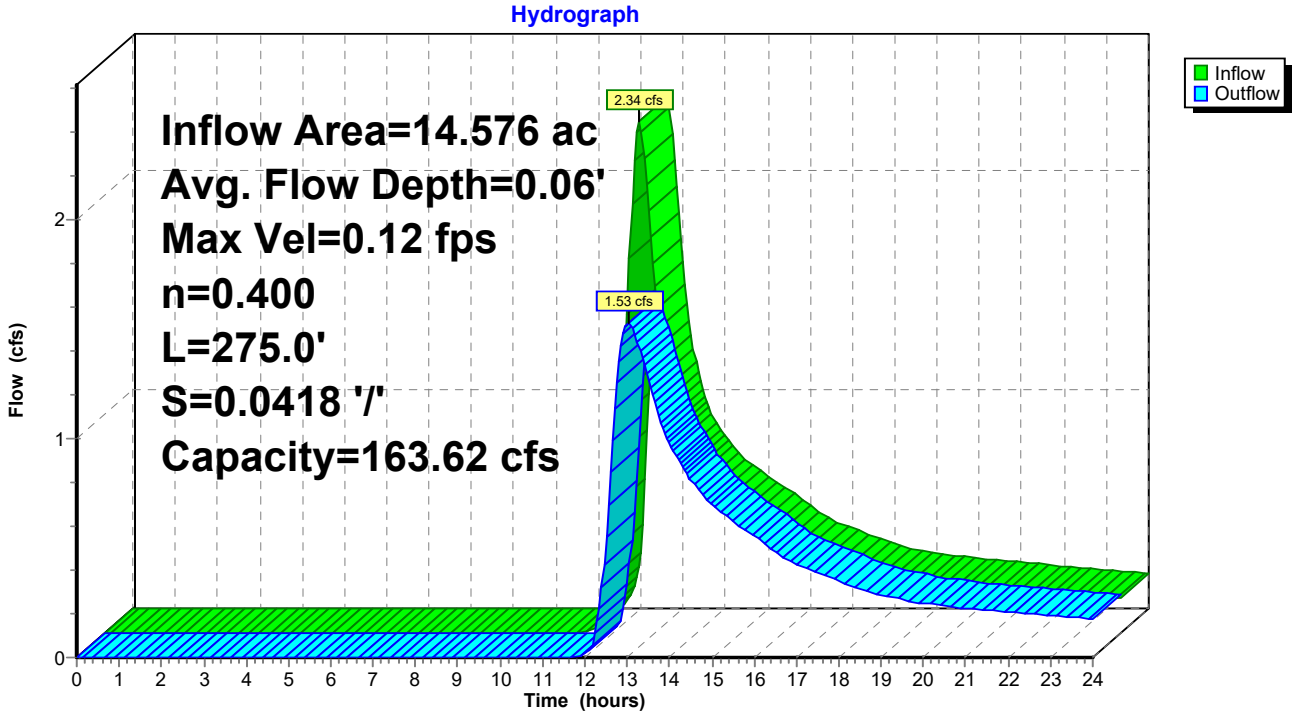
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.12 fps, Min. Travel Time= 38.3 min
Avg. Velocity = 0.07 fps, Avg. Travel Time= 66.2 min

Peak Storage= 3,511 cf @ 13.03 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Area-Storage for Reach PDP-5: Design Point 5

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
636.50	0.0	0
636.51	2.0	551
636.52	4.0	1,104
636.53	6.0	1,659
636.54	8.1	2,217
636.55	10.1	2,776
636.56	12.1	3,337
636.57	14.2	3,901
636.58	16.2	4,466
636.59	18.3	5,034
636.60	20.4	5,603
636.61	22.5	6,175
636.62	24.5	6,749
636.63	26.6	7,324
636.64	28.7	7,902
636.65	30.8	8,482
636.66	33.0	9,064
636.67	35.1	9,648
636.68	37.2	10,234
636.69	39.4	10,822
636.70	41.5	11,413
636.71	43.7	12,005
636.72	45.8	12,599
636.73	48.0	13,196
636.74	50.2	13,794
636.75	52.3	14,395
636.76	54.5	14,997
636.77	56.7	15,602
636.78	58.9	16,209
636.79	61.2	16,817
636.80	63.4	17,428
636.81	65.6	18,041
636.82	67.8	18,656
636.83	70.1	19,273
636.84	72.3	19,892
636.85	74.6	20,513
636.86	76.9	21,137
636.87	79.1	21,762
636.88	81.4	22,389
636.89	83.7	23,019
636.90	86.0	23,650
636.91	88.3	24,284
636.92	90.6	24,919
636.93	92.9	25,557
636.94	95.3	26,197
636.95	97.6	26,838
636.96	99.9	27,482
636.97	102.3	28,128
636.98	104.6	28,776
636.99	107.0	29,426
637.00	109.4	30,078
637.01	111.8	30,732
637.02	114.1	31,389
637.03	116.5	32,047
637.04	118.9	32,707
637.05	121.3	33,370
637.06	123.8	34,034
637.07	126.2	34,701
637.08	128.6	35,369
637.09	131.1	36,040
637.10	133.5	36,713
637.11	136.0	37,387
637.12	138.4	38,064
637.13	140.9	38,743
637.14	143.4	39,424
637.15	145.8	40,107
637.16	148.3	40,792
637.17	150.8	41,479
637.18	153.3	42,169
637.19	155.9	42,860
637.20	158.4	43,553
637.21	160.9	44,249
637.22	163.4	44,946
637.23	166.0	45,646
637.24	168.5	46,347
637.25	171.1	47,051
637.26	173.7	47,757
637.27	176.2	48,464
637.28	178.8	49,174
637.29	181.4	49,886
637.30	184.0	50,600
637.31	186.6	51,316
637.32	189.2	52,034
637.33	191.8	52,754
637.34	194.5	53,476
637.35	197.1	54,201
637.36	199.7	54,927
637.37	202.4	55,656
637.38	205.0	56,386
637.39	207.7	57,119
637.40	210.4	57,853
637.41	213.1	58,590
637.42	215.7	59,329
637.43	218.4	60,069
637.44	221.1	60,812
637.45	223.8	61,557
637.46	226.6	62,304
637.47	229.3	63,053
637.48	232.0	63,804
637.49	234.8	64,557
637.50	**237.5**	**65,313**

Summary for Reach PDP-6: Design Point 6

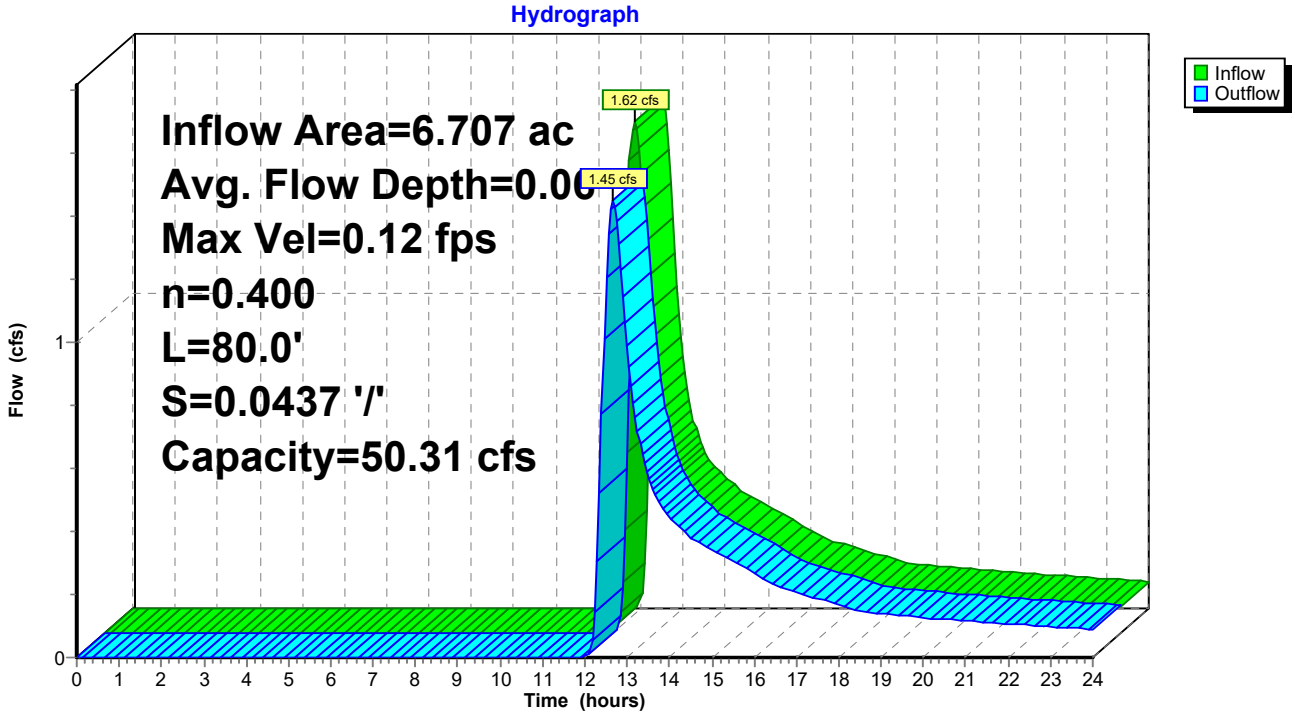
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 0.49" for 2-YR event
Inflow = 1.62 cfs @ 12.50 hrs, Volume= 0.273 af
Outflow = 1.45 cfs @ 12.65 hrs, Volume= 0.269 af, Atten= 11%, Lag= 9.1 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.12 fps, Min. Travel Time= 11.2 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 23.7 min

Peak Storage= 976 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Area-Storage for Reach PDP-6: Design Point 6

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
642.50	0.0	0
642.51	2.0	160
642.52	4.0	321
642.53	6.0	482
642.54	8.0	644
642.55	10.1	806
642.56	12.1	969
642.57	14.1	1,132
642.58	16.2	1,295
642.59	18.2	1,459
642.60	20.3	1,624
642.61	22.4	1,789
642.62	24.4	1,955
642.63	26.5	2,121
642.64	28.6	2,287
642.65	30.7	2,454
642.66	32.8	2,621
642.67	34.9	2,789
642.68	37.0	2,958
642.69	39.1	3,127
642.70	41.2	3,296
642.71	43.3	3,466
642.72	45.5	3,636
642.73	47.6	3,807
642.74	49.7	3,978
642.75	51.9	4,150
642.76	54.0	4,322
642.77	56.2	4,495
642.78	58.4	4,668
642.79	60.5	4,842
642.80	62.7	5,016
642.81	64.9	5,191
642.82	67.1	5,366
642.83	69.3	5,541
642.84	71.5	5,717
642.85	73.7	5,894
642.86	75.9	6,071
642.87	78.1	6,249
642.88	80.3	6,427
642.89	82.6	6,605
642.90	84.8	6,784
642.91	87.0	6,963
642.92	89.3	7,143
642.93	91.5	7,324
642.94	93.8	7,505
642.95	96.1	7,686
642.96	98.3	7,868
642.97	100.6	8,050
642.98	102.9	8,233
642.99	105.2	8,416
643.00	**107.5**	**8,600**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 1.93" for 2-YR event
Inflow = 0.80 cfs @ 12.10 hrs, Volume= 0.181 af
Outflow = 0.46 cfs @ 12.34 hrs, Volume= 0.158 af, Atten= 42%, Lag= 14.6 min
Discarded = 0.06 cfs @ 12.34 hrs, Volume= 0.068 af
Primary = 0.40 cfs @ 12.34 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 622.19' @ 12.34 hrs Surf.Area= 1,293 sf Storage= 1,184 cf
Flood Elev= 623.00' Surf.Area= 1,864 sf Storage= 2,469 cf

Plug-Flow detention time= 100.3 min calculated for 0.158 af (87% of inflow)
Center-of-Mass det. time= 40.2 min (976.0 - 935.7)

Volume	Invert	Avail.Storage	Storage Description
#1	619.75'	2,238 cf	**Overall storage (Prismatic)** Listed below (Recalc) 3,104 cf Overall - 866 cf Embedded = 2,238 cf
#2	619.75'	115 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 40.0% Voids
#3	620.25'	58 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
#4	620.75'	58 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
		2,469 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
621.00	577	721	721
622.00	1,162	870	1,591
623.00	1,864	1,513	3,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
620.25	577	289	289

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.25	577	0	0
620.75	577	289	289

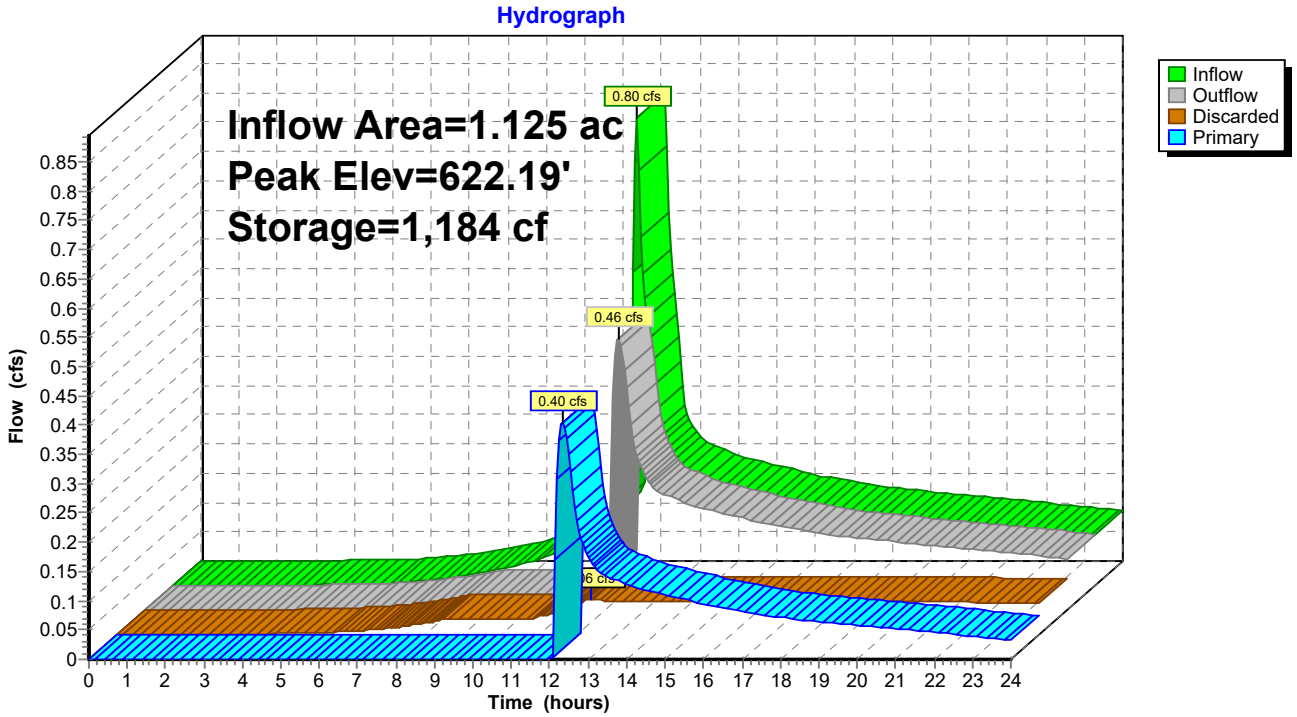
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.75	577	0	0
621.25	577	289	289

Device	Routing	Invert	Outlet Devices
#1	Discarded	619.75'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.64'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.64' / 620.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	622.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.34 hrs HW=622.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.41 cfs @ 12.34 hrs HW=622.19' (Free Discharge)
└─**2=Culvert** (Passes 0.41 cfs of 0.85 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 2.07 fps)

Pond 3: SFB-3



Stage-Area-Storage for Pond 3: SFB-3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
619.75	577	0
619.80	577	12
619.85	577	23
619.90	577	35
619.95	577	46
620.00	577	58
620.05	577	69
620.10	577	81
620.15	577	92
620.20	577	104
620.25	577	115
620.30	577	121
620.35	577	127
620.40	577	133
620.45	577	138
620.50	577	144
620.55	577	150
620.60	577	156
620.65	577	162
620.70	577	167
620.75	577	173
620.80	577	179
620.85	577	185
620.90	577	190
620.95	577	196
621.00	577	202
621.05	606	208
621.10	636	216
621.15	665	226
621.20	694	237
621.25	723	249
621.30	752	286
621.35	782	324
621.40	811	364
621.45	840	405
621.50	870	448
621.55	899	492
621.60	928	538
621.65	957	585
621.70	987	634
621.75	1,016	684
621.80	1,045	735
621.85	1,074	788
621.90	1,103	843
621.95	1,133	899
622.00	1,162	956
622.05	1,197	1,015
622.10	1,232	1,076
622.15	1,267	1,138
622.20	1,302	1,202
622.25	1,338	1,268
622.30	1,373	1,336
622.35	1,408	1,406
622.40	1,443	1,477
622.45	1,478	1,550
622.50	1,513	1,625
622.55	1,548	1,701
622.60	1,583	1,780
622.65	1,618	1,860
622.70	1,653	1,941
622.75	1,689	2,025
622.80	1,724	2,110
622.85	1,759	2,197
622.90	1,794	2,286
622.95	1,829	2,377
623.00	**1,864**	**2,469**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 2.53" for 2-YR event				
Inflow =	1.25 cfs @	12.14 hrs,	Volume=	0.314 af	
Outflow =	0.46 cfs @	12.84 hrs,	Volume=	0.314 af,	Atten= 63%, Lag= 41.8 min
Discarded =	0.41 cfs @	12.84 hrs,	Volume=	0.307 af	
Primary =	0.05 cfs @	12.84 hrs,	Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 632.32' @ 12.84 hrs Surf.Area= 2,691 sf Storage= 2,695 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,324 cf

Plug-Flow detention time= 47.2 min calculated for 0.314 af (100% of inflow)
Center-of-Mass det. time= 46.8 min (890.9 - 844.1)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	329 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 40.0% Voids
#3	630.50'	164 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
#4	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,324 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
630.50	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.50	1,643	0	0
631.00	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

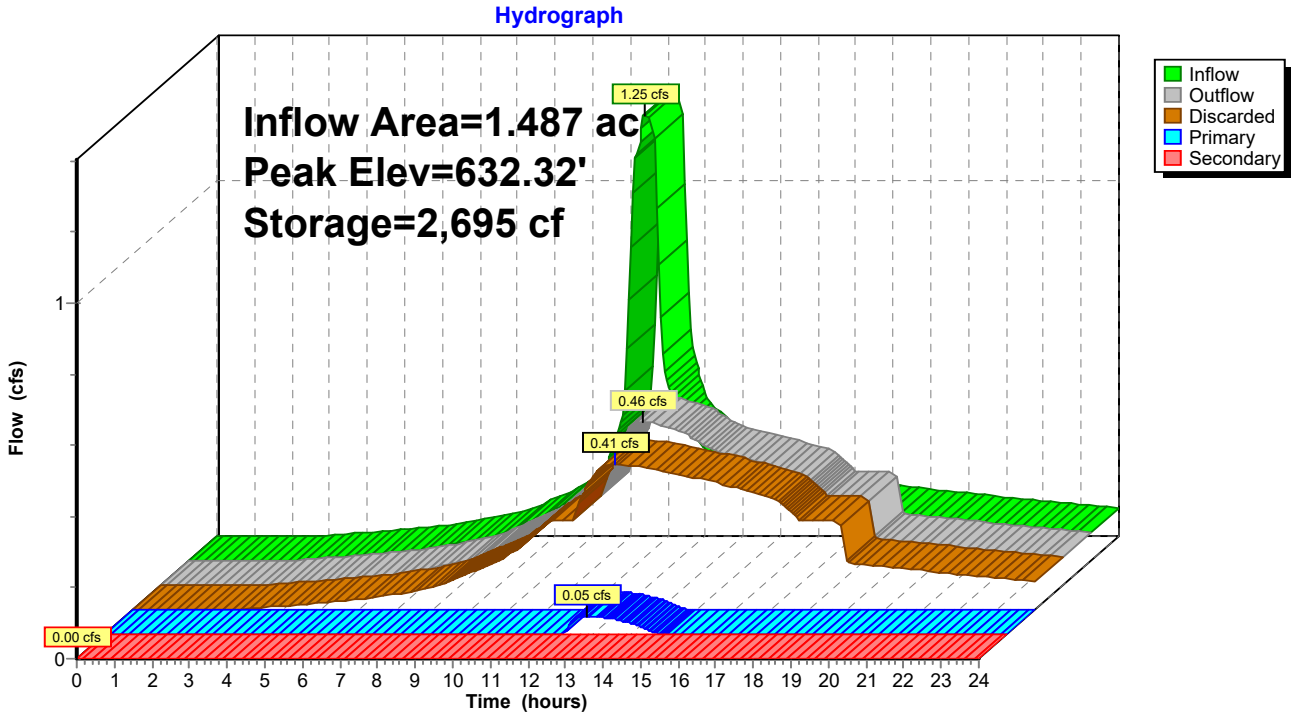
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	633.30'	**50.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.41 cfs @ 12.84 hrs HW=632.32' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.05 cfs @ 12.84 hrs HW=632.32' (Free Discharge)
└─**2=Culvert** (Passes 0.05 cfs of 0.49 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 2.33 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Area-Storage for Pond 4: SFB-4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
630.00	1,643	0
630.05	1,643	33
630.10	1,643	66
630.15	1,643	99
630.20	1,643	131
630.25	1,643	164
630.30	1,643	197
630.35	1,643	230
630.40	1,643	263
630.45	1,643	296
630.50	1,643	329
630.55	1,643	345
630.60	1,643	361
630.65	1,643	378
630.70	1,643	394
630.75	1,643	411
630.80	1,643	427
630.85	1,643	444
630.90	1,643	460
630.95	1,643	476
631.00	1,643	493
631.05	1,683	510
631.10	1,723	530
631.15	1,763	551
631.20	1,803	575
631.25	1,843	600
631.30	1,883	627
631.35	1,923	657
631.40	1,963	688
631.45	2,003	722
631.50	2,043	757
631.55	2,083	860
631.60	2,123	966
631.65	2,163	1,073
631.70	2,203	1,182
631.75	2,243	1,293
631.80	2,283	1,406
631.85	2,323	1,521
631.90	2,363	1,638
631.95	2,403	1,758
632.00	2,443	1,879
632.05	2,482	2,002
632.10	2,521	2,127
632.15	2,560	2,254
632.20	2,599	2,383
632.25	2,638	2,514
632.30	2,677	2,647
632.35	2,716	2,782
632.40	2,755	2,918
632.45	2,794	3,057
632.50	2,834	3,198
632.55	2,873	3,340
632.60	2,912	3,485
632.65	2,951	3,632
632.70	2,990	3,780
632.75	3,029	3,931
632.80	3,068	4,083
632.85	3,107	4,237
632.90	3,146	4,394
632.95	3,185	4,552
633.00	3,224	4,712
633.05	3,263	4,874
633.10	3,302	5,038
633.15	3,340	5,205
633.20	3,379	5,373
633.25	3,418	5,542
633.30	3,457	5,714
633.35	3,496	5,888
633.40	3,534	6,064
633.45	3,573	6,242
633.50	3,612	6,421
633.55	3,651	6,603
633.60	3,690	6,786
633.65	3,728	6,972
633.70	3,767	7,159
633.75	3,806	7,348
633.80	3,845	7,540
633.85	3,884	7,733
633.90	3,922	7,928
633.95	3,961	8,125
634.00	**4,000**	**8,324**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth > 1.67" for 2-YR event				
Inflow =	0.46 cfs @	12.11 hrs,	Volume=	0.227 af	
Outflow =	0.19 cfs @	16.62 hrs,	Volume=	0.199 af,	Atten= 60%, Lag= 270.2 min
Discarded =	0.19 cfs @	16.62 hrs,	Volume=	0.199 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 634.10' @ 16.62 hrs Surf.Area= 2,815 sf Storage= 1,940 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,544 cf

Plug-Flow detention time= 124.6 min calculated for 0.199 af (87% of inflow)
Center-of-Mass det. time= 66.2 min (1,016.3 - 950.1)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	301 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 40.0% Voids
#3	632.50'	151 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
#4	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,544 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
632.50	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.50	1,505	0	0
633.00	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

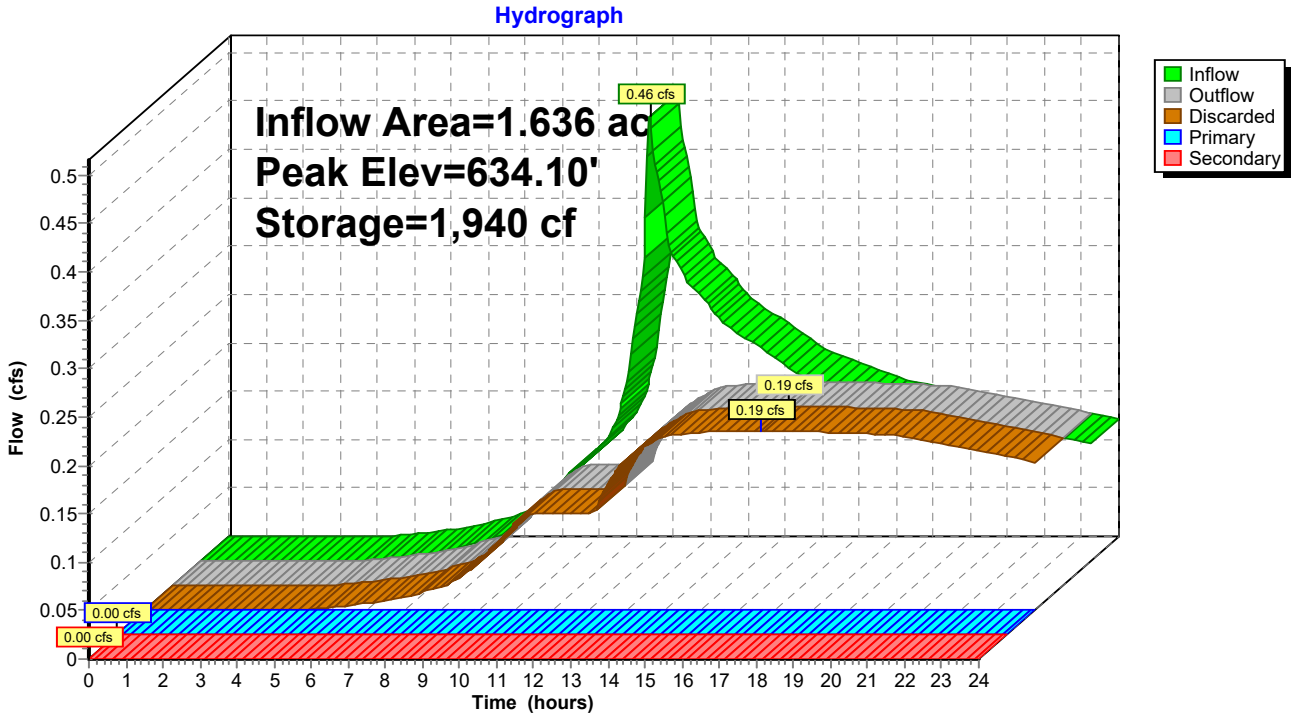
Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.19 cfs @ 16.62 hrs HW=634.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Area-Storage for Pond 5: SFB-5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
632.00	1,505	0
632.05	1,505	30
632.10	1,505	60
632.15	1,505	90
632.20	1,505	120
632.25	1,505	151
632.30	1,505	181
632.35	1,505	211
632.40	1,505	241
632.45	1,505	271
632.50	1,505	301
632.55	1,505	316
632.60	1,505	331
632.65	1,505	346
632.70	1,505	361
632.75	1,505	376
632.80	1,505	391
632.85	1,505	406
632.90	1,505	421
632.95	1,505	436
633.00	1,505	452
633.05	1,505	467
633.10	1,505	482
633.15	1,505	497
633.20	1,505	512
633.25	1,505	527
633.30	1,505	542
633.35	1,505	557
633.40	1,505	572
633.45	1,505	587
633.50	1,505	602
633.55	1,629	680
633.60	1,752	765
633.65	1,876	856
633.70	1,999	952
633.75	2,123	1,056
633.80	2,247	1,165
633.85	2,370	1,280
633.90	2,494	1,402
633.95	2,617	1,530
634.00	2,741	1,664
634.05	2,778	1,801
634.10	2,815	1,941
634.15	2,853	2,083
634.20	2,890	2,227
634.25	2,927	2,372
634.30	2,964	2,519
634.35	3,001	2,668
634.40	3,039	2,819
634.45	3,076	2,972
634.50	3,113	3,127
634.55	3,150	3,284
634.60	3,187	3,442
634.65	3,225	3,602
634.70	3,262	3,764
634.75	3,299	3,929
634.80	3,336	4,094
634.85	3,373	4,262
634.90	3,411	4,432
634.95	3,448	4,603
635.00	3,485	4,776
635.05	3,513	4,951
635.10	3,542	5,128
635.15	3,570	5,306
635.20	3,598	5,485
635.25	3,626	5,665
635.30	3,654	5,847
635.35	3,683	6,031
635.40	3,711	6,216
635.45	3,739	6,402
635.50	3,768	6,590
635.55	3,796	6,779
635.60	3,824	6,969
635.65	3,852	7,161
635.70	3,881	7,354
635.75	3,909	7,549
635.80	3,937	7,745
635.85	3,965	7,943
635.90	3,993	8,142
635.95	4,022	8,342
636.00	**4,050**	**8,544**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth > 3.16" for 2-YR event
Inflow = 2.09 cfs @ 12.09 hrs, Volume= 0.156 af
Outflow = 0.12 cfs @ 13.67 hrs, Volume= 0.115 af, Atten= 94%, Lag= 94.8 min
Primary = 0.12 cfs @ 13.67 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 627.32' @ 13.67 hrs Surf.Area= 0.081 ac Storage= 0.091 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 325.9 min calculated for 0.115 af (74% of inflow)
Center-of-Mass det. time= 240.5 min (995.0 - 754.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**4.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 620.60' S= 0.0225 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.12 cfs @ 13.67 hrs HW=627.32' (Free Discharge)
└─**1=Culvert** (Passes 0.12 cfs of 0.35 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.36 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

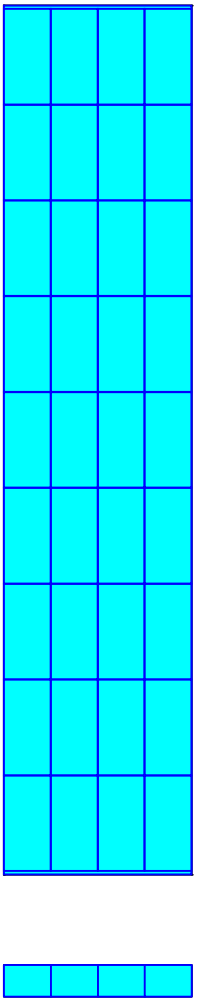
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

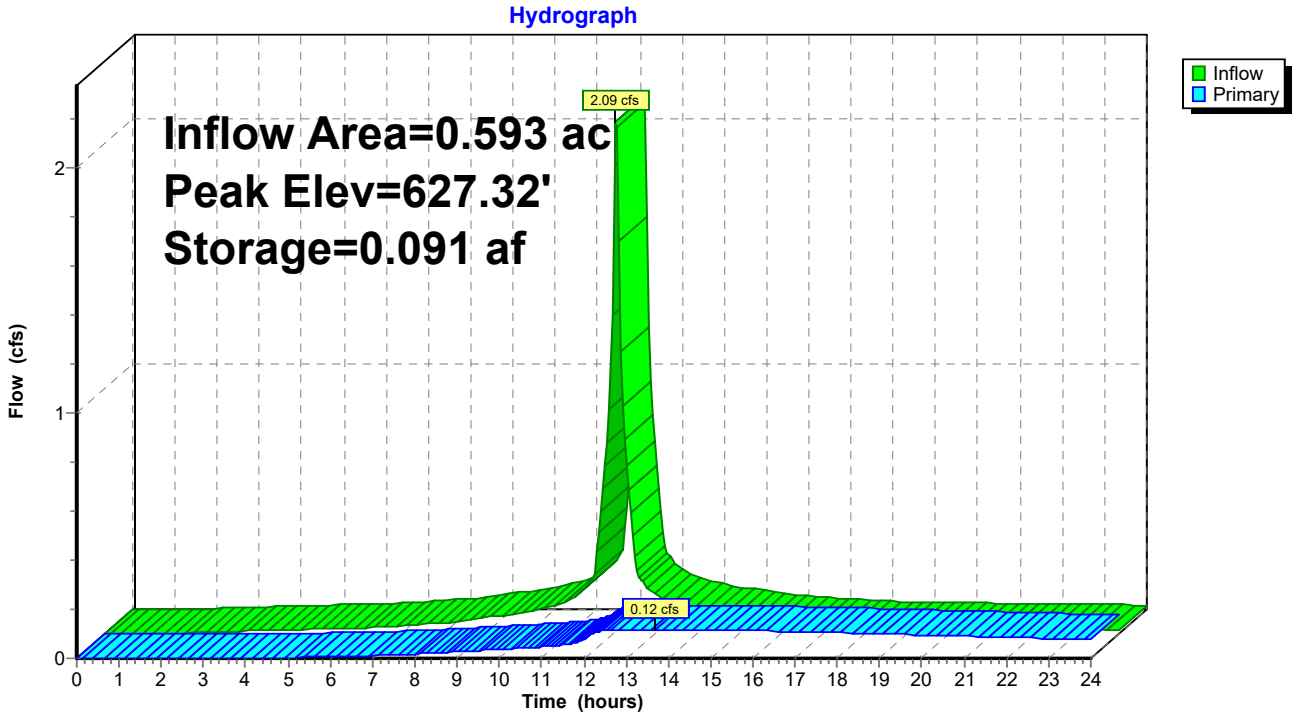
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow Area=0.593 ac
Peak Elev=627.32'
Storage=0.091 af
2.09 cfs
0.12 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-3: DB-3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
626.00	0.000	628.60	0.180
626.05	0.003	628.65	0.183
626.10	0.007	628.70	0.187
626.15	0.010	628.75	0.190
626.20	0.014	628.80	0.194
626.25	0.017	628.85	0.197
626.30	0.021	628.90	0.200
626.35	0.024	628.95	0.204
626.40	0.028	629.00	0.207
626.45	0.031	629.05	0.211
626.50	0.035	629.10	0.214
626.55	0.038	629.15	0.218
626.60	0.041	629.20	0.221
626.65	0.045	629.25	0.225
626.70	0.048	629.30	0.228
626.75	0.052	629.35	0.232
626.80	0.055	629.40	0.235
626.85	0.059	629.45	0.238
626.90	0.062	629.50	0.242
626.95	0.066	629.55	0.245
627.00	0.069	629.60	0.249
627.05	0.073	629.65	0.252
627.10	0.076	629.70	0.256
627.15	0.079	629.75	0.259
627.20	0.083	629.80	0.263
627.25	0.086	629.85	0.266
627.30	0.090	629.90	0.270
627.35	0.093	629.95	0.273
627.40	0.097	630.00	0.276
627.45	0.100	630.05	0.276
627.50	0.104	630.10	0.276
627.55	0.107	630.15	0.276
627.60	0.111	630.20	0.276
627.65	0.114	630.25	0.276
627.70	0.117	630.30	0.276
627.75	0.121	630.35	0.276
627.80	0.124	630.40	0.276
627.85	0.128	630.45	0.276
627.90	0.131	630.50	0.276
627.95	0.135	630.55	0.276
628.00	0.138	630.60	0.276
628.05	0.142	630.65	**0.276**
628.10	0.145		
628.15	0.149		
628.20	0.152		
628.25	0.156		
628.30	0.159		
628.35	0.162		
628.40	0.166		
628.45	0.169		
628.50	0.173		
628.55	0.176		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth > 4.66" for 2-YR event
Inflow = 3.01 cfs @ 12.09 hrs, Volume= 0.106 af
Outflow = 0.11 cfs @ 12.64 hrs, Volume= 0.089 af, Atten= 96%, Lag= 33.4 min
Primary = 0.11 cfs @ 12.64 hrs, Volume= 0.089 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 635.16' @ 12.64 hrs Surf.Area= 0.072 ac Storage= 0.071 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 303.8 min calculated for 0.089 af (84% of inflow)
Center-of-Mass det. time= 252.0 min (997.2 - 745.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.11 cfs @ 12.64 hrs HW=635.16' (Free Discharge)
└─**1=Culvert** (Passes 0.11 cfs of 0.71 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.00 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

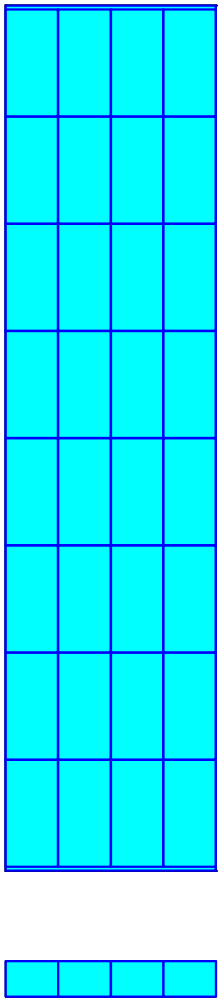
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

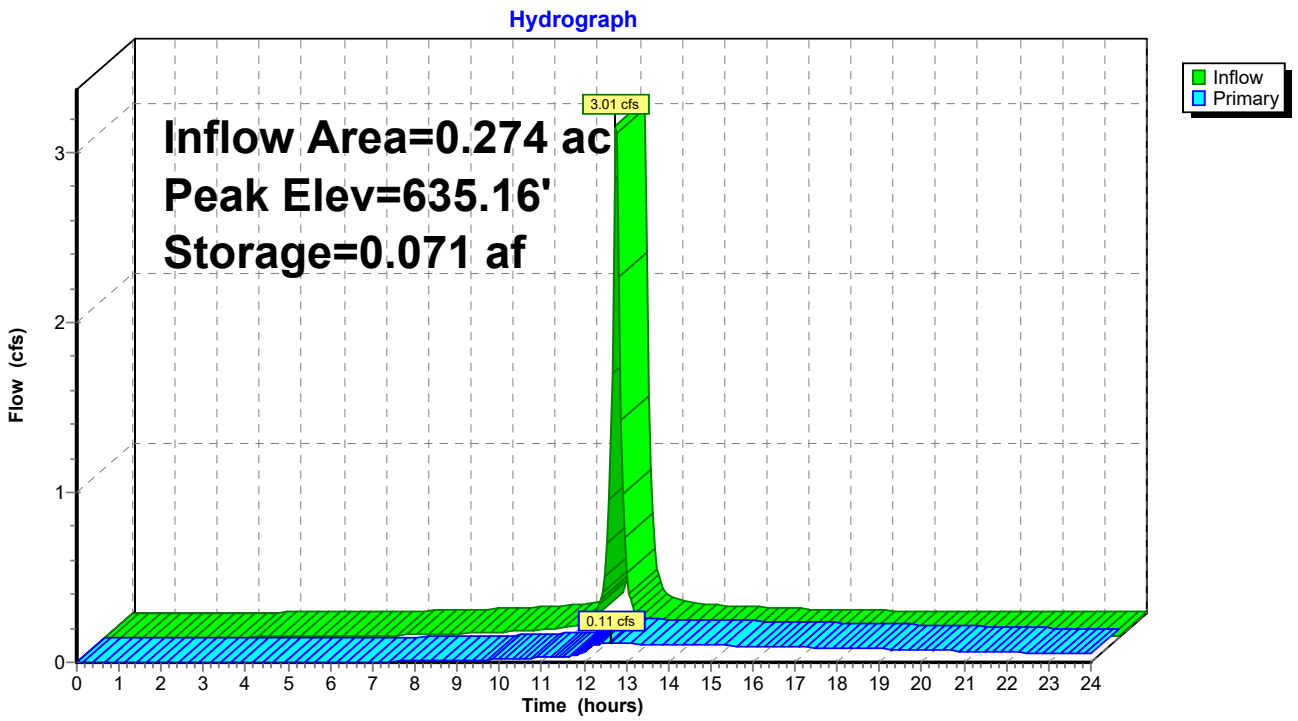
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow Area=0.274 ac
Peak Elev=635.16'
Storage=0.071 af
3.01 cfs
0.11 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-4: DB-4

Elevation (feet)	Storage (acre-feet)
634.00	0.000
634.05	0.003
634.10	0.006
634.15	0.009
634.20	0.012
634.25	0.015
634.30	0.018
634.35	0.022
634.40	0.025
634.45	0.028
634.50	0.031
634.55	0.034
634.60	0.037
634.65	0.040
634.70	0.043
634.75	0.046
634.80	0.049
634.85	0.052
634.90	0.055
634.95	0.058
635.00	0.061
635.05	0.065
635.10	0.068
635.15	0.071
635.20	0.074
635.25	0.077
635.30	0.080
635.35	0.083
635.40	0.086
635.45	0.089
635.50	0.092
635.55	0.095
635.60	0.098
635.65	0.101
635.70	0.104
635.75	0.108
635.80	0.111
635.85	0.114
635.90	0.117
635.95	0.120
636.00	0.123
636.05	0.126
636.10	0.129
636.15	0.132
636.20	0.135
636.25	0.138
636.30	0.141
636.35	0.144
636.40	0.147
636.45	0.151
636.50	0.154
636.55	0.157
636.60	0.160
636.65	0.163
636.70	0.166
636.75	0.169
636.80	0.172
636.85	0.175
636.90	0.178
636.95	0.181
637.00	0.184
637.05	0.187
637.10	0.190
637.15	0.194
637.20	0.197
637.25	0.200
637.30	0.203
637.35	0.206
637.40	0.209
637.45	0.212
637.50	0.215
637.55	0.218
637.60	0.221
637.65	0.224
637.70	0.227
637.75	0.230
637.80	0.233
637.85	0.237
637.90	0.240
637.95	0.243
638.00	0.246
638.05	0.246
638.10	0.246
638.15	0.246
638.20	0.246
638.25	0.246
638.30	0.246
638.35	0.246
638.40	0.246
638.45	0.246
638.50	0.246
638.55	0.246
638.60	0.246
638.65	**0.246**

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth > 3.17" for 2-YR event
Inflow = 3.25 cfs @ 12.09 hrs, Volume= 0.187 af
Outflow = 0.14 cfs @ 13.57 hrs, Volume= 0.145 af, Atten= 96%, Lag= 88.6 min
Primary = 0.14 cfs @ 13.57 hrs, Volume= 0.145 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 639.31' @ 13.57 hrs Surf.Area= 0.090 ac Storage= 0.107 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= 282.1 min calculated for 0.145 af (78% of inflow)
Center-of-Mass det. time= 212.0 min (991.2 - 779.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.14 cfs @ 13.57 hrs HW=639.31' (Free Discharge)
└─**1=Culvert** (Passes 0.14 cfs of 0.97 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.32 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

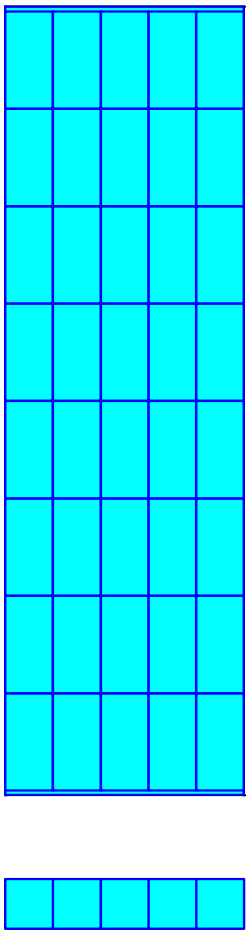
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

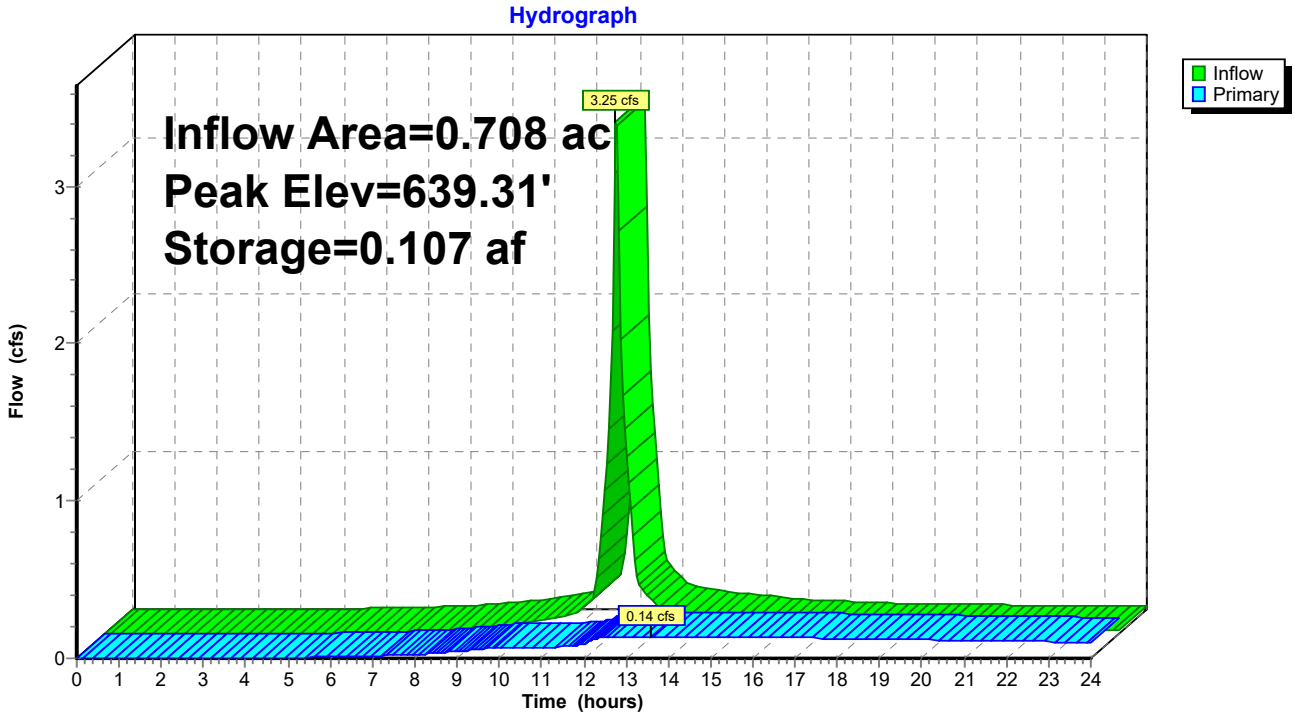
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow Area=0.708 ac
Peak Elev=639.31'
Storage=0.107 af
3.25 cfs
0.14 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-5: DB-5

Elevation (feet)	Storage (acre-feet)
637.50	0.000
637.60	0.000
637.70	0.000
637.80	0.000
637.90	0.000
638.00	0.000
638.10	0.008
638.20	0.016
638.30	0.025
638.40	0.033
638.50	0.041
638.60	0.049
638.70	0.057
638.80	0.065
638.90	0.074
639.00	0.082
639.10	0.090
639.20	0.098
639.30	0.106
639.40	0.114
639.50	0.123
639.60	0.131
639.70	0.139
639.80	0.147
639.90	0.155
640.00	0.163
640.10	0.172
640.20	0.180
640.30	0.188
640.40	0.196
640.50	0.204
640.60	0.212
640.70	0.221
640.80	0.229
640.90	0.237
641.00	0.245
641.10	0.253
641.20	0.262
641.30	0.270
641.40	0.278
641.50	0.286
641.60	0.294
641.70	0.302
641.80	0.311
641.90	0.319
642.00	0.327
642.10	0.335
642.20	0.343
642.30	0.351
642.40	0.360
642.50	0.368
642.60	0.376
642.70	0.384
642.80	0.392
642.90	0.400
643.00	0.409
643.10	0.417
643.20	0.425
643.30	0.433
643.40	0.441
643.50	0.449
643.60	0.458
643.70	0.466
643.80	0.474
643.90	0.482
644.00	**0.490**
644.10	**0.490**
644.20	0.490
644.30	0.490
644.40	0.490
644.50	0.490
644.60	0.490

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac, 72.22% Impervious, Inflow Depth > 2.10" for 2-YR event				
Inflow =	0.79 cfs @	12.09 hrs,	Volume=	0.057 af	
Outflow =	0.79 cfs @	12.09 hrs,	Volume=	0.057 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.57 cfs @	12.09 hrs,	Volume=	0.054 af	
Secondary =	0.22 cfs @	12.09 hrs,	Volume=	0.004 af	

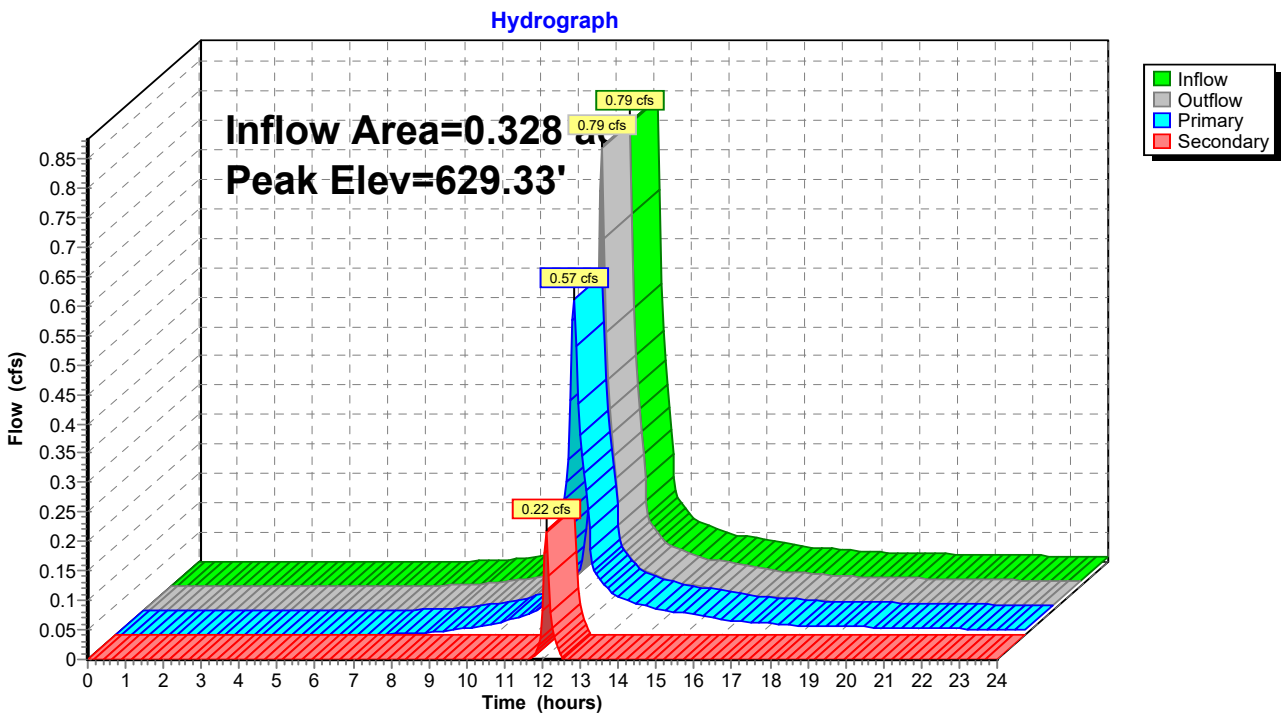
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 629.33' @ 12.09 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**6.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 620.60' S= 0.0344 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.09 hrs HW=629.32' TW=623.32' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.56 cfs @ 2.93 fps)

Secondary OutFlow Max=0.21 cfs @ 12.09 hrs HW=629.32' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.21 cfs @ 1.79 fps)

Pond ICS-3: ICS-3



Stage-Area-Storage for Pond ICS-3: ICS-3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
628.85	**0**	631.45	0
628.90	0	631.50	0
628.95	0	631.55	0
629.00	0	631.60	0
629.05	0	631.65	0
629.10	0	631.70	0
629.15	0	631.75	0
629.20	0	631.80	0
629.25	0	631.85	0
629.30	0	631.90	0
629.35	0	631.95	0
629.40	0	632.00	0
629.45	0	632.05	0
629.50	0	632.10	0
629.55	0	632.15	0
629.60	0	632.20	0
629.65	0	632.25	0
629.70	0	632.30	0
629.75	0	632.35	0
629.80	0	632.40	0
629.85	0	632.45	0
629.90	0	632.50	0
629.95	0		
630.00	0		
630.05	0		
630.10	0		
630.15	0		
630.20	0		
630.25	0		
630.30	0		
630.35	0		
630.40	0		
630.45	0		
630.50	0		
630.55	0		
630.60	0		
630.65	0		
630.70	0		
630.75	0		
630.80	0		
630.85	0		
630.90	0		
630.95	0		
631.00	0		
631.05	0		
631.10	0		
631.15	0		
631.20	0		
631.25	0		
631.30	0		
631.35	0		
631.40	0		

Summary for Pond ICS-4: ICS-4

Inflow Area = 1.068 ac, 93.43% Impervious, Inflow Depth > 2.87" for 2-YR event
Inflow = 3.26 cfs @ 12.09 hrs, Volume= 0.255 af
Outflow = 3.26 cfs @ 12.09 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 1.11 cfs @ 12.09 hrs, Volume= 0.219 af
Secondary = 2.15 cfs @ 12.09 hrs, Volume= 0.036 af

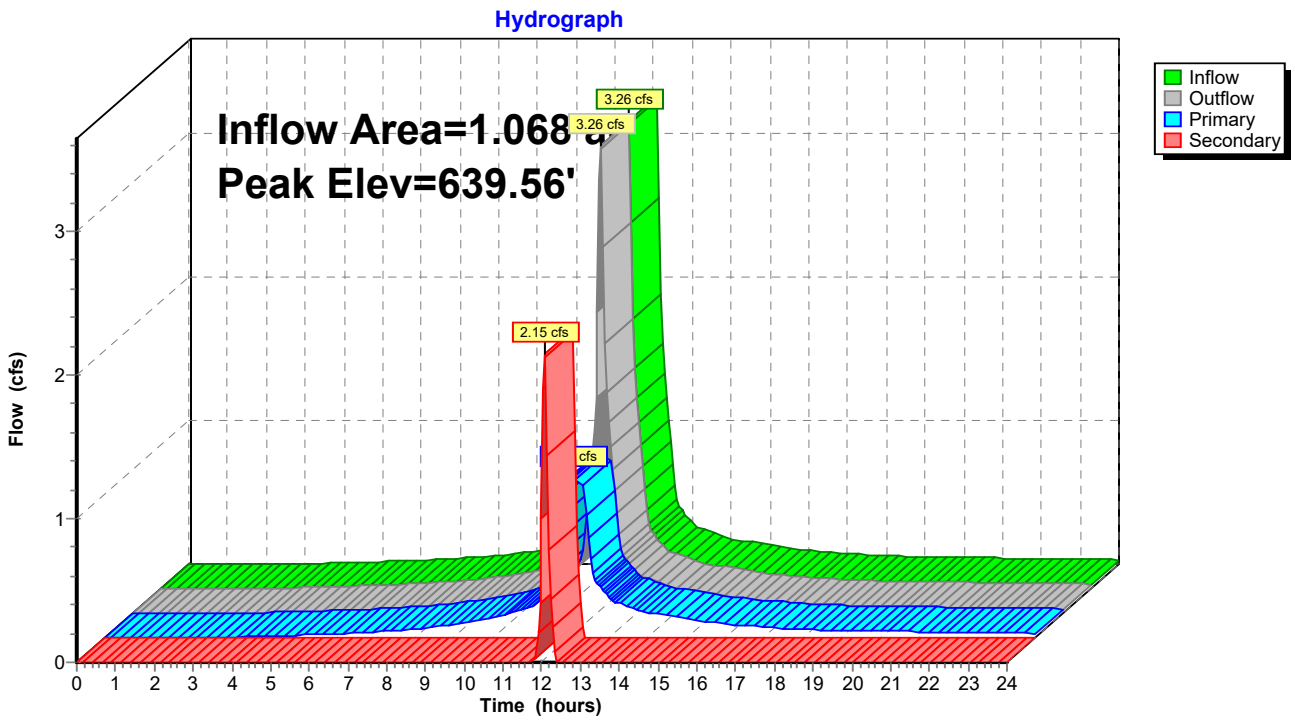
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 639.56' @ 12.09 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.11 cfs @ 12.09 hrs HW=639.56' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.11 cfs @ 5.65 fps)

Secondary OutFlow Max=2.06 cfs @ 12.09 hrs HW=639.56' (Free Discharge)
└─**3=Culvert** (Passes 2.06 cfs of 6.48 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 2.06 cfs @ 1.49 fps)

Pond ICS-4: ICS-4



Stage-Area-Storage for Pond ICS-4: ICS-4

Elevation (feet)	Storage (cubic-feet)
636.50	**0**
636.55	0
636.60	0
636.65	0
636.70	0
636.75	0
636.80	0
636.85	0
636.90	0
636.95	0
637.00	0
637.05	0
637.10	0
637.15	0
637.20	0
637.25	0
637.30	0
637.35	0
637.40	0
637.45	0
637.50	0
637.55	0
637.60	0
637.65	0
637.70	0
637.75	0
637.80	0
637.85	0
637.90	0
637.95	0
638.00	0
638.05	0
638.10	0
638.15	0
638.20	0
638.25	0
638.30	0
638.35	0
638.40	0
638.45	0
638.50	0
638.55	0
638.60	0
638.65	0
638.70	0
638.75	0
638.80	0
638.85	0
638.90	0
638.95	0
639.00	0
639.05	0
639.10	0
639.15	0
639.20	0
639.25	0
639.30	0
639.35	0
639.40	0
639.45	0
639.50	0
639.55	0
639.60	0
639.65	0
639.70	0
639.75	0
639.80	0
639.85	0
639.90	0
639.95	0
640.00	0

Summary for Pond ICS-5: ICS-5

Inflow Area = 0.739 ac, 62.40% Impervious, Inflow Depth > 1.78" for 2-YR event
Inflow = 1.52 cfs @ 12.09 hrs, Volume= 0.110 af
Outflow = 1.52 cfs @ 12.09 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 0.27 cfs @ 12.09 hrs, Volume= 0.074 af
Secondary = 1.25 cfs @ 12.09 hrs, Volume= 0.036 af

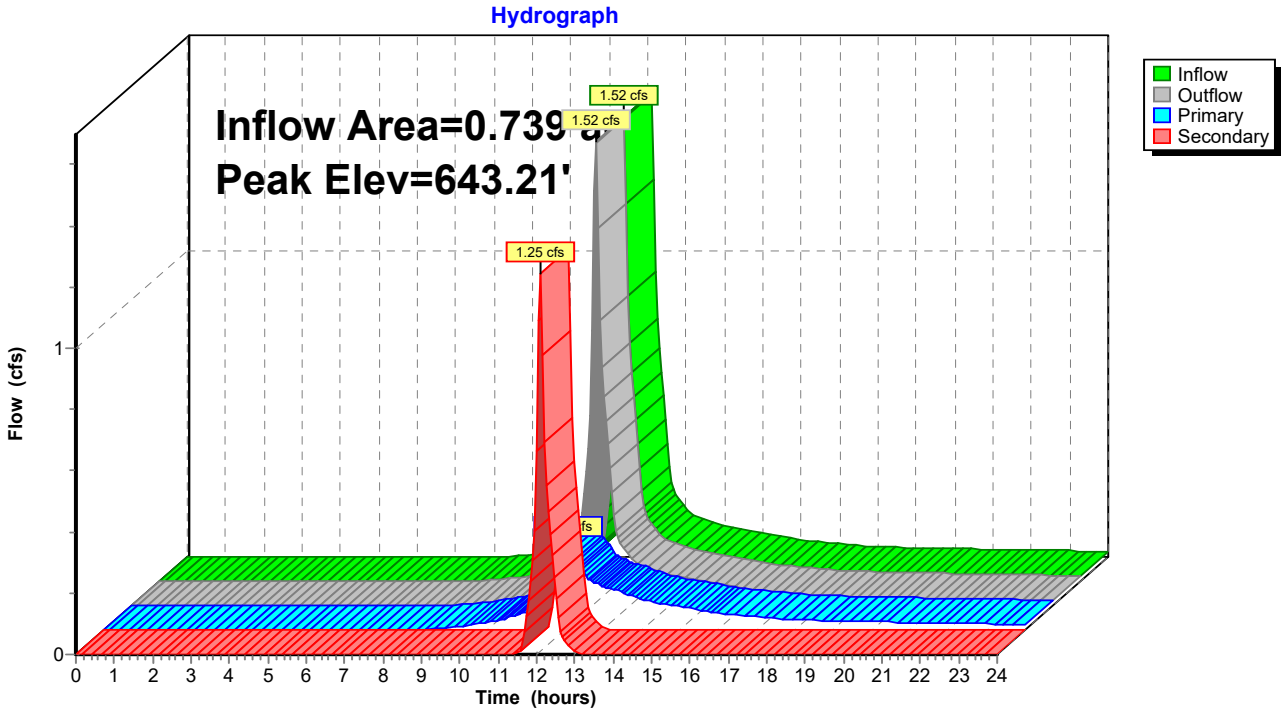
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 643.21' @ 12.09 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 637.00' S= 0.0656 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.09 hrs HW=643.20' TW=637.20' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.27 cfs @ 5.46 fps)

Secondary OutFlow Max=1.22 cfs @ 12.09 hrs HW=643.20' TW=637.20' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 1.22 cfs @ 3.28 fps)

Pond ICS-5: ICS-5



Stage-Area-Storage for Pond ICS-5: ICS-5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
642.25	**0**	644.85	0
642.30	0	644.90	0
642.35	0	644.95	0
642.40	0	645.00	0
642.45	0	645.05	0
642.50	0	645.10	0
642.55	0	645.15	0
642.60	0	645.20	0
642.65	0	645.25	0
642.70	0	645.30	0
642.75	0	645.35	0
642.80	0	645.40	0
642.85	0	645.45	0
642.90	0	645.50	0
642.95	0		
643.00	0		
643.05	0		
643.10	0		
643.15	0		
643.20	0		
643.25	0		
643.30	0		
643.35	0		
643.40	0		
643.45	0		
643.50	0		
643.55	0		
643.60	0		
643.65	0		
643.70	0		
643.75	0		
643.80	0		
643.85	0		
643.90	0		
643.95	0		
644.00	0		
644.05	0		
644.10	0		
644.15	0		
644.20	0		
644.25	0		
644.30	0		
644.35	0		
644.40	0		
644.45	0		
644.50	0		
644.55	0		
644.60	0		
644.65	0		
644.70	0		
644.75	0		
644.80	0		

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth > 2.10" for 2-YR event
Inflow = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 15.26 hrs, Volume= 0.006 af, Atten= 96%, Lag= 190.1 min
Primary = 0.01 cfs @ 15.26 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 654.71' @ 15.26 hrs Surf.Area= 431 sf Storage= 237 cf

Plug-Flow detention time= 301.5 min calculated for 0.006 af (65% of inflow)
Center-of-Mass det. time= 202.1 min (1,015.2 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

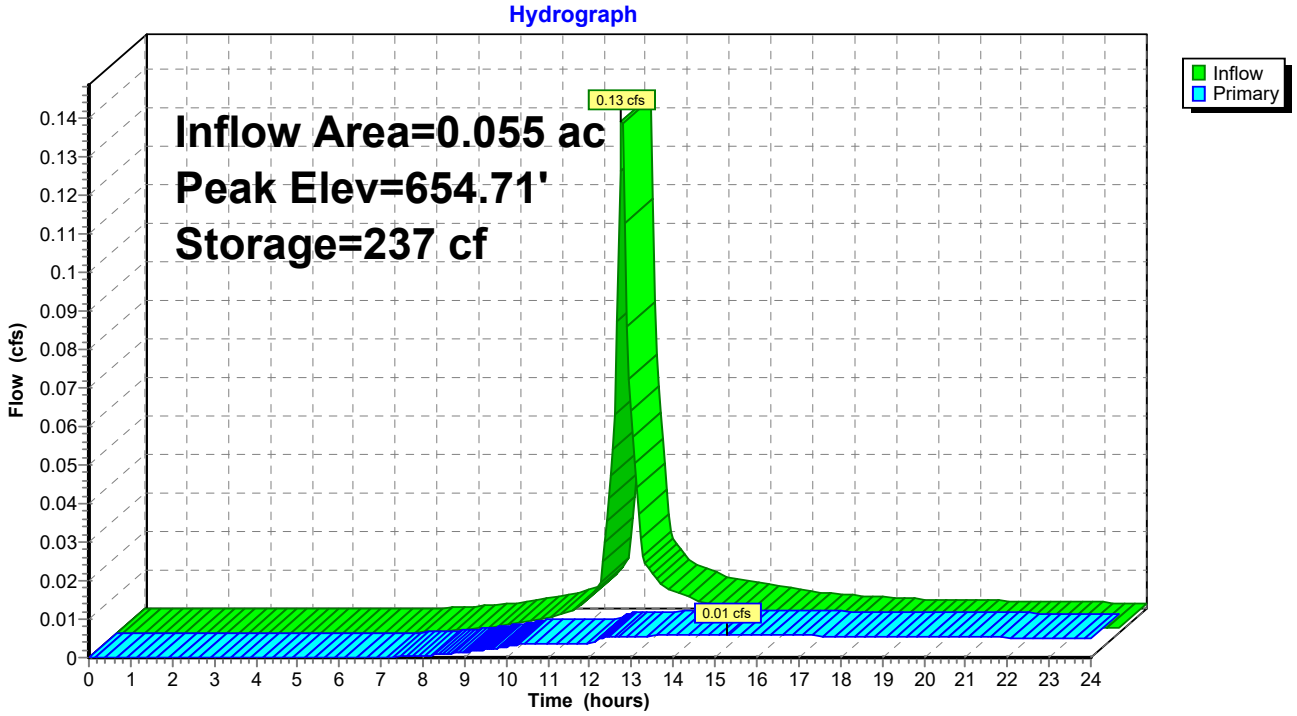
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 15.26 hrs HW=654.71' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Area-Storage for Pond RG-7B: RG-7B

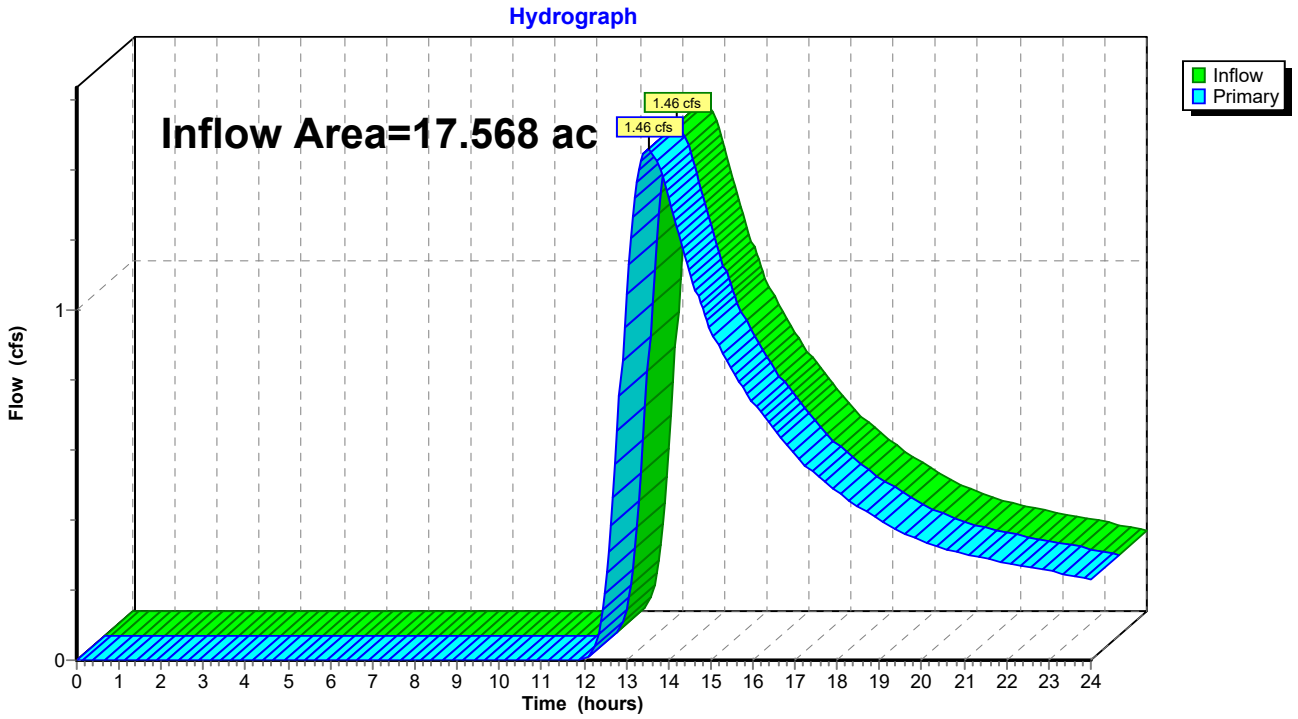
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
653.00	259	0
653.02	259	2
653.04	259	4
653.06	259	6
653.08	259	8
653.10	259	10
653.12	259	12
653.14	259	15
653.16	259	17
653.18	259	19
653.20	259	21
653.22	259	23
653.24	259	25
653.26	259	27
653.28	259	29
653.30	259	31
653.32	259	33
653.34	259	35
653.36	259	37
653.38	259	39
653.40	259	41
653.42	259	44
653.44	259	46
653.46	259	48
653.48	259	50
653.50	259	52
653.52	259	53
653.54	259	55
653.56	259	56
653.58	259	58
653.60	259	60
653.62	259	61
653.64	259	63
653.66	259	64
653.68	259	66
653.70	259	67
653.72	259	69
653.74	259	70
653.76	259	72
653.78	259	74
653.80	259	75
653.82	259	77
653.84	259	78
653.86	259	80
653.88	259	81
653.90	259	83
653.92	259	84
653.94	259	86
653.96	259	88
653.98	259	89
654.00	259	91
654.02	263	92
654.04	268	94
654.06	272	96
654.08	276	98
654.10	281	99
654.12	285	102
654.14	289	104
654.16	294	106
654.18	298	108
654.20	303	111
654.22	308	113
654.24	312	116
654.26	317	118
654.28	321	120
654.30	326	123
654.32	331	125
654.34	336	127
654.36	341	130
654.38	345	133
654.40	350	136
654.42	355	139
654.44	360	142
654.46	365	145
654.48	370	148
654.50	375	151
654.52	380	159
654.54	385	166
654.56	391	174
654.58	396	182
654.60	401	190
654.62	406	198
654.64	412	206
654.66	417	215
654.68	422	223
654.70	428	231
654.72	433	240
654.74	439	249
654.76	444	258
654.78	450	267
654.80	455	276
654.82	461	285
654.84	467	294
654.86	472	303
654.88	478	313
654.90	484	323
654.92	490	332
654.94	495	342
654.96	501	352
654.98	507	362
655.00	**513**	**372**

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 0.38" for 2-YR event
Inflow = 1.46 cfs @ 13.52 hrs, Volume= 0.560 af
Primary = 1.46 cfs @ 13.52 hrs, Volume= 0.560 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

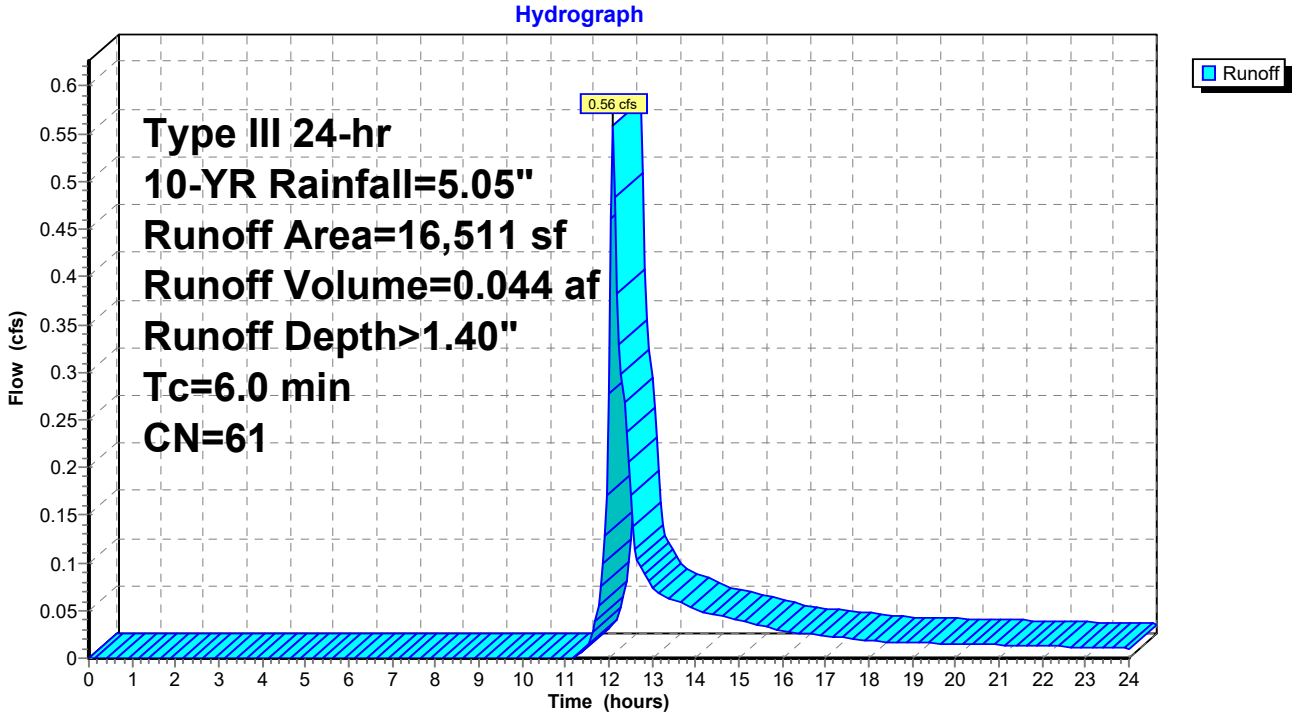
Runoff = 0.56 cfs @ 12.10 hrs, Volume= 0.044 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

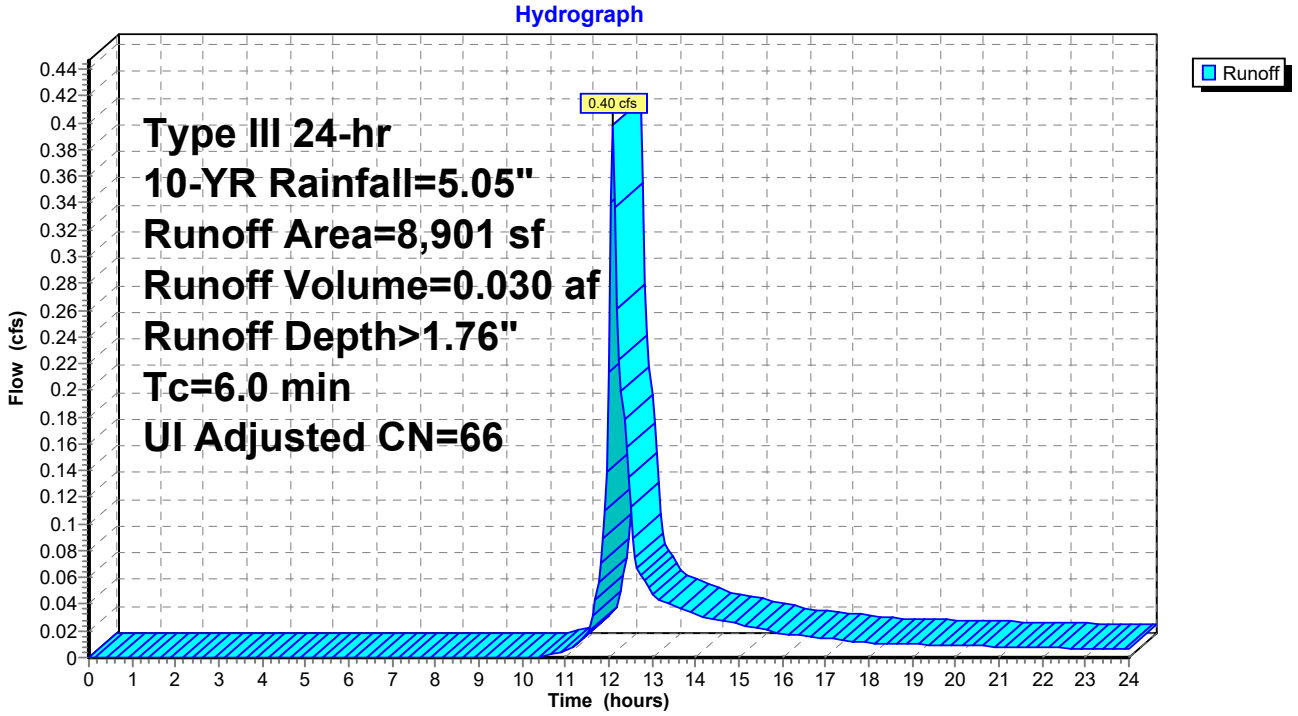
Runoff = 0.40 cfs @ 12.10 hrs, Volume= 0.030 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

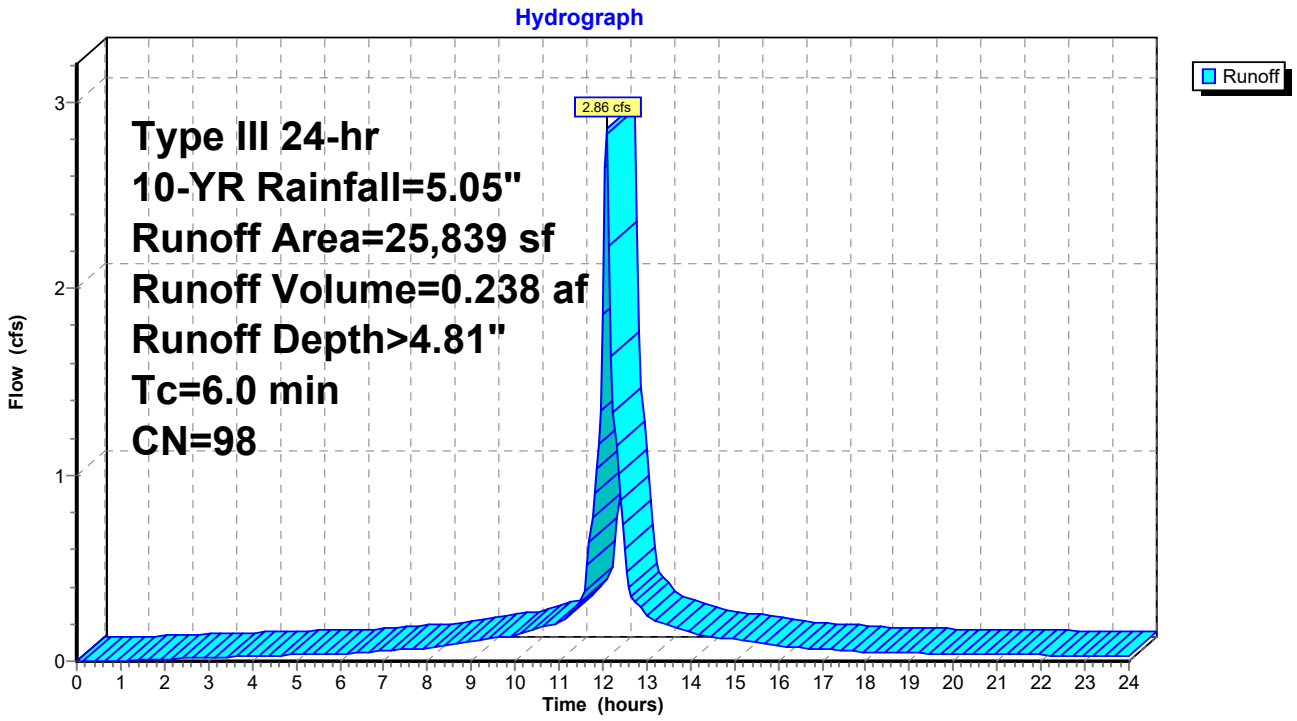
Runoff = 2.86 cfs @ 12.09 hrs, Volume= 0.238 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

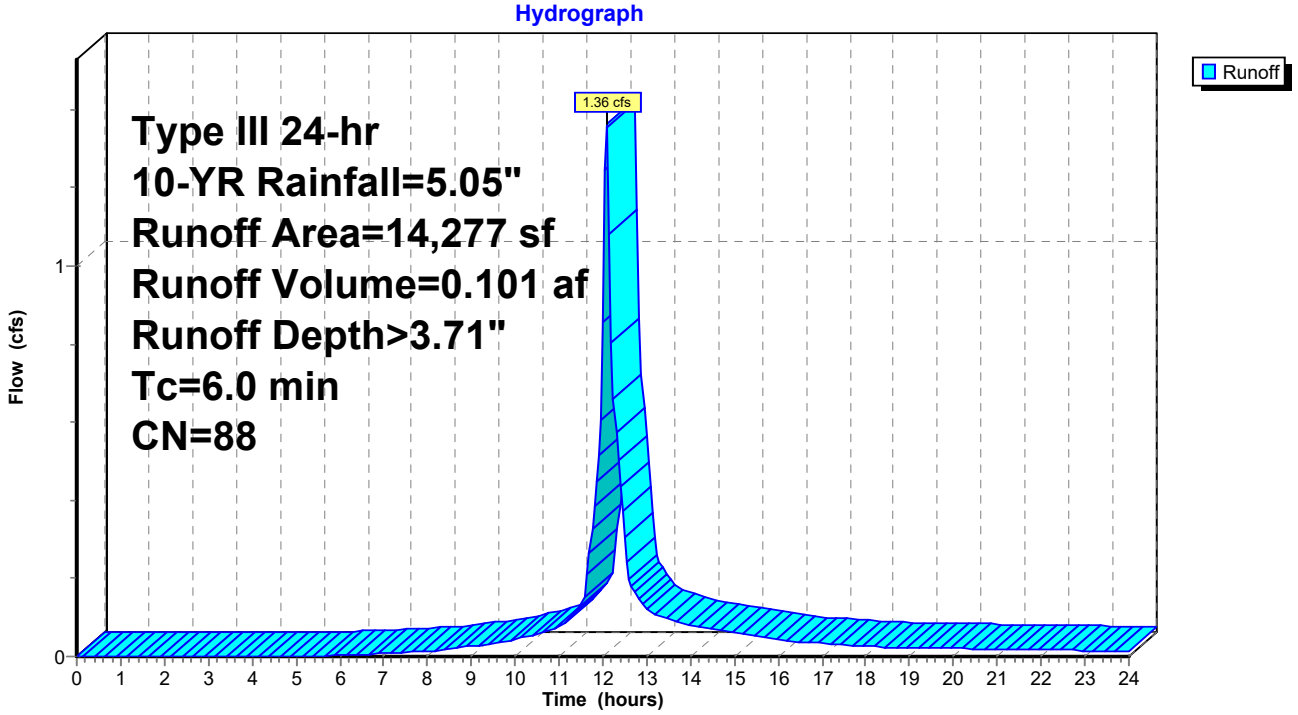
Runoff = 1.36 cfs @ 12.09 hrs, Volume= 0.101 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

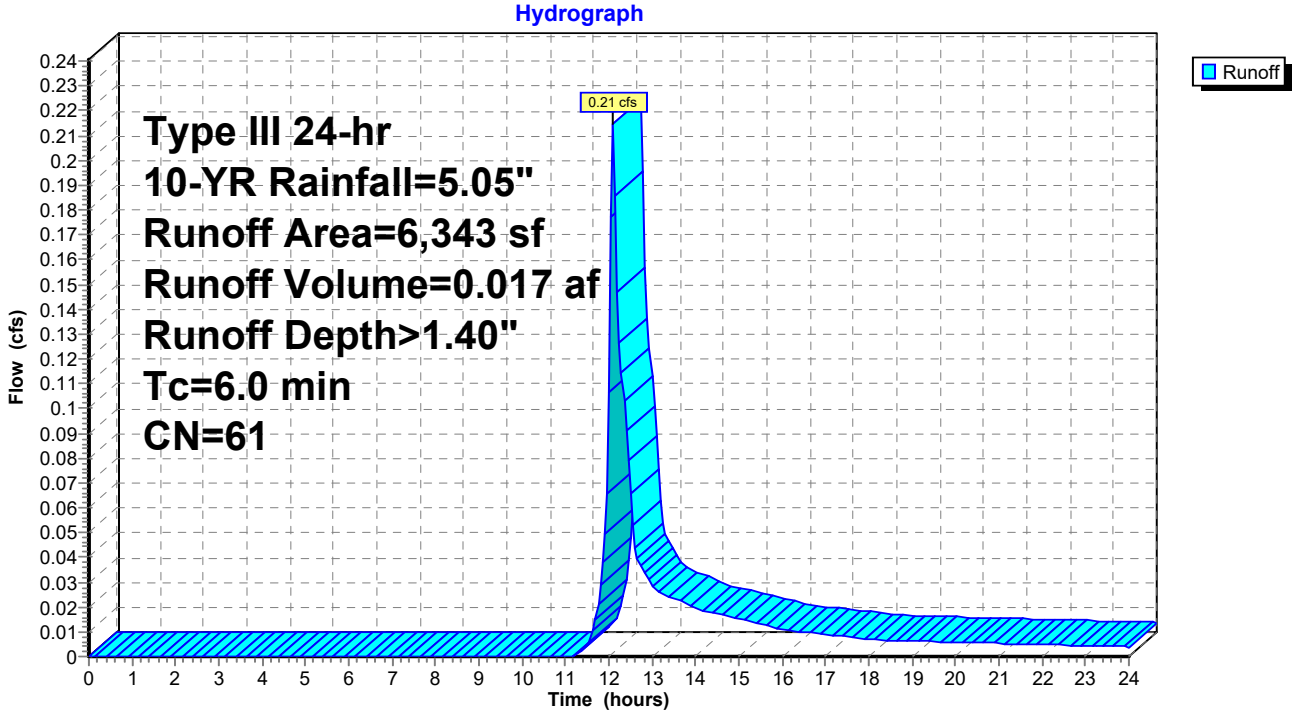
Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.017 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

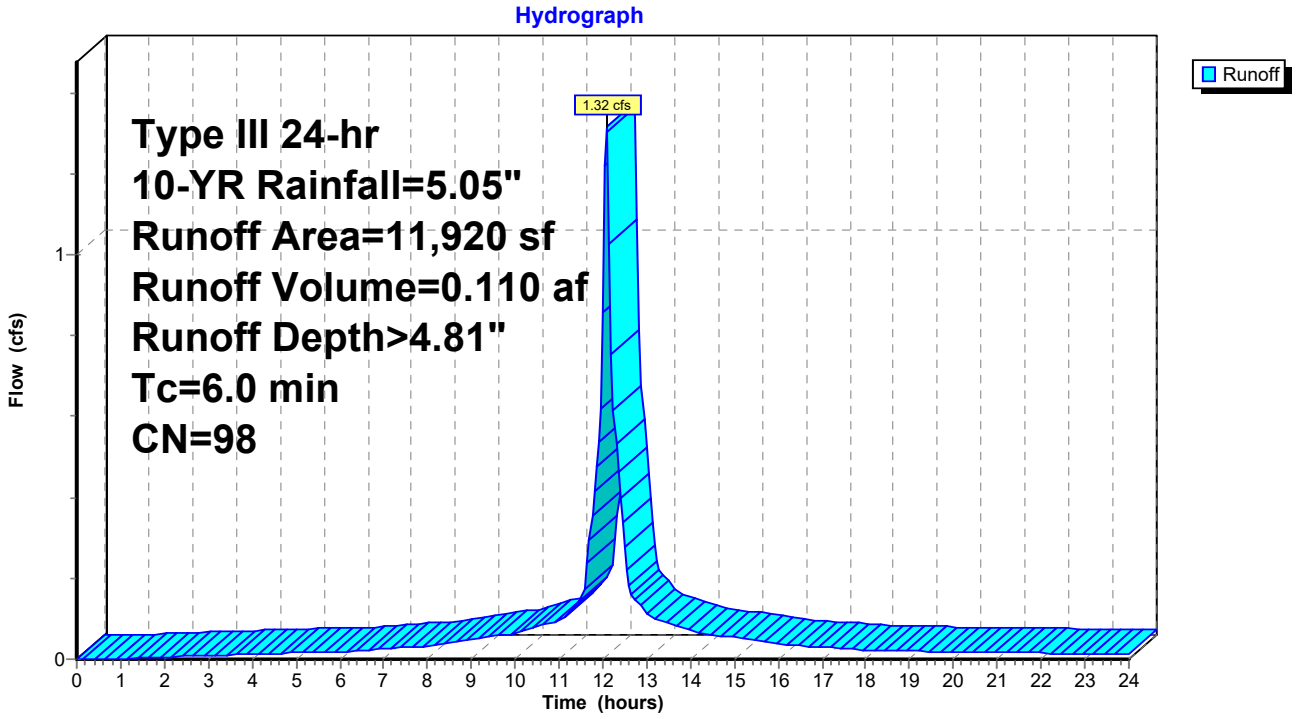
Runoff = 1.32 cfs @ 12.09 hrs, Volume= 0.110 af, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

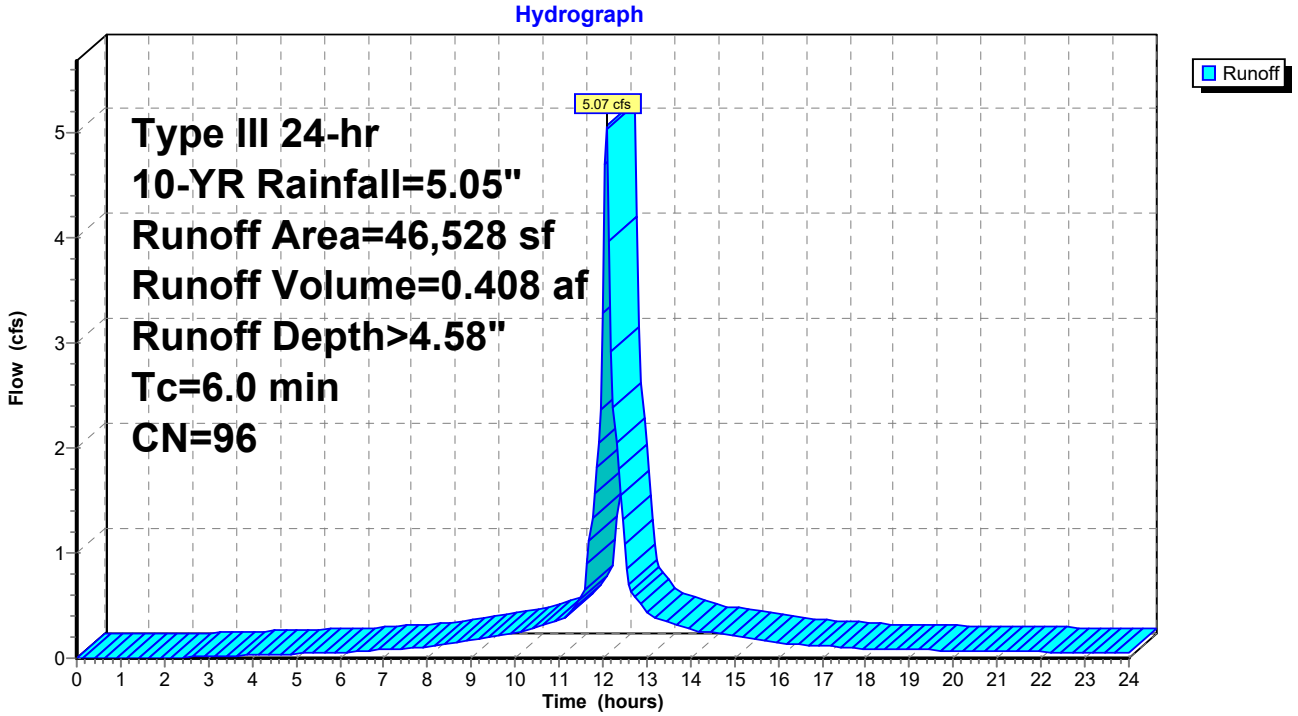
Runoff = 5.07 cfs @ 12.09 hrs, Volume= 0.408 af, Depth> 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

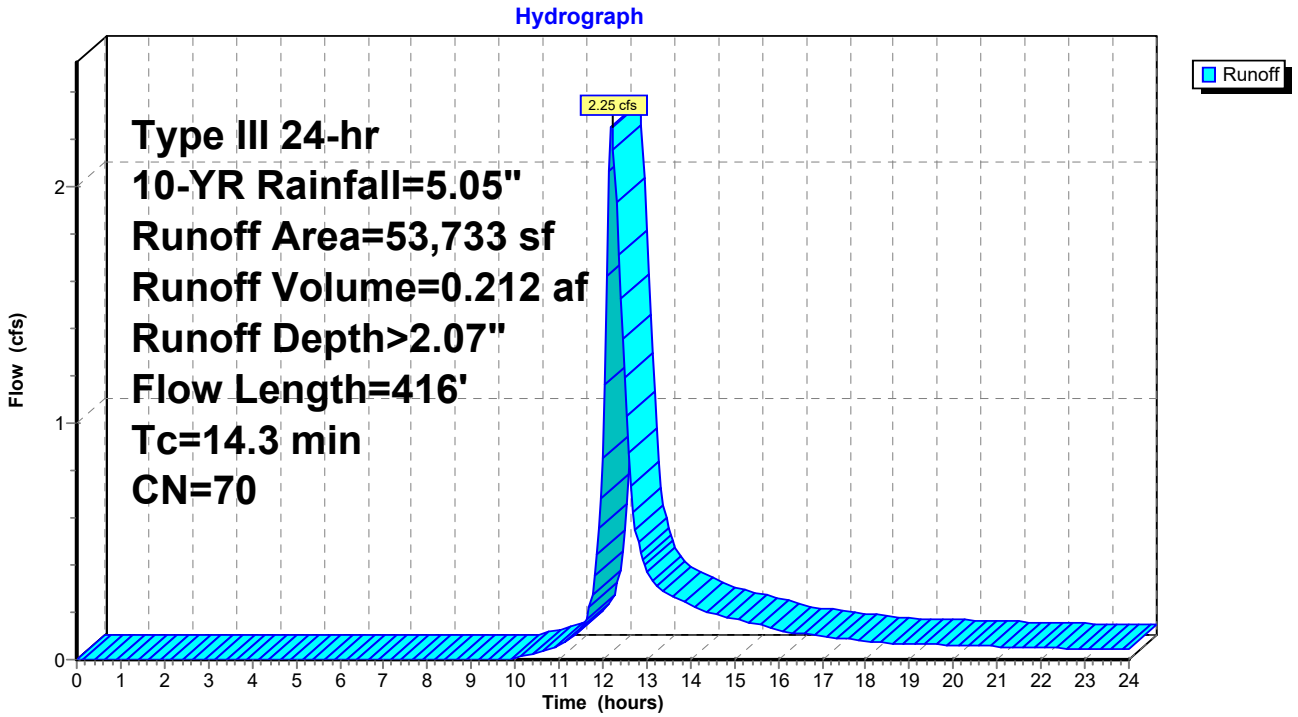
Runoff = 2.25 cfs @ 12.21 hrs, Volume= 0.212 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

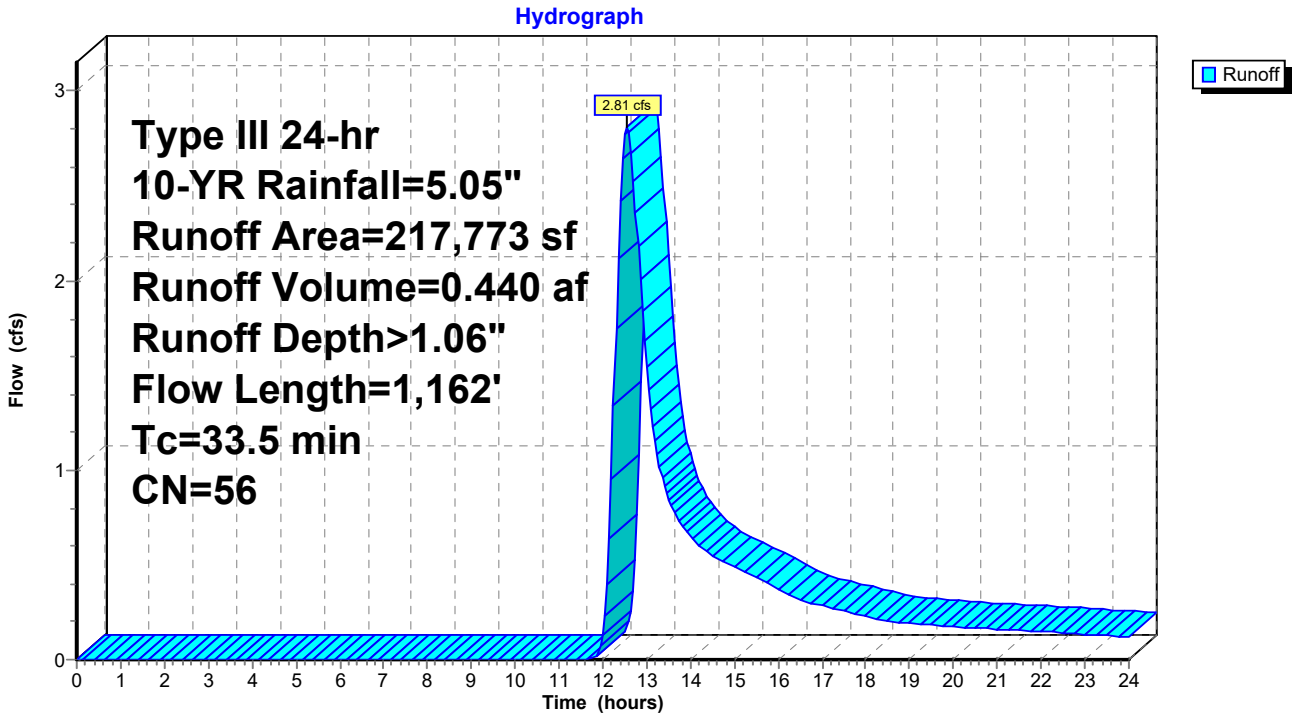
Runoff = 2.81 cfs @ 12.55 hrs, Volume= 0.440 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

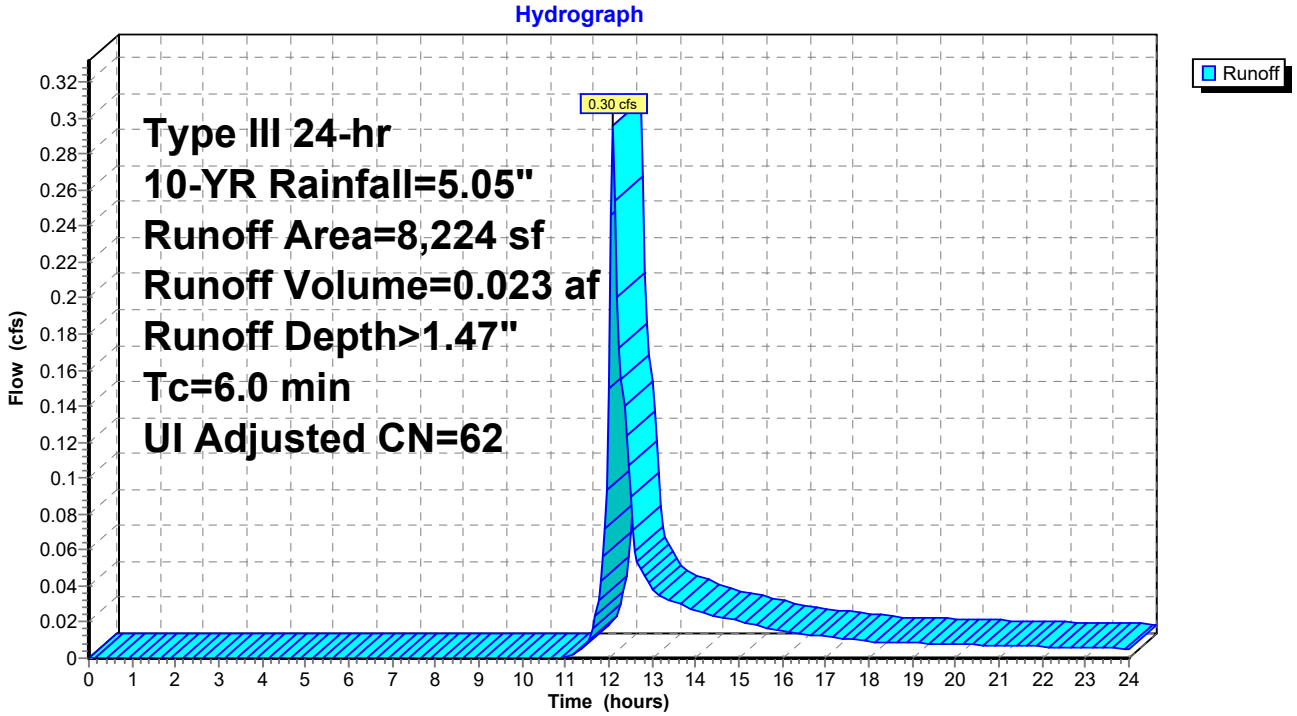
Runoff = 0.30 cfs @ 12.10 hrs, Volume= 0.023 af, Depth> 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

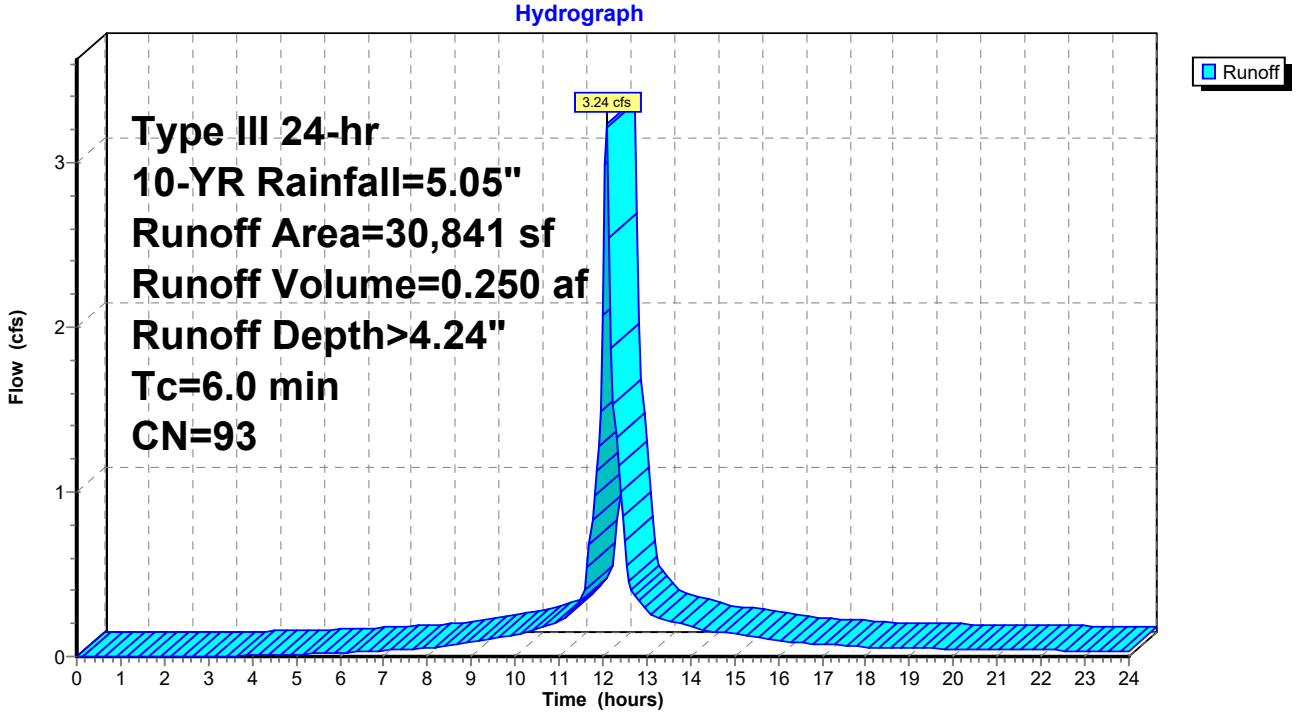
Runoff = 3.24 cfs @ 12.09 hrs, Volume= 0.250 af, Depth> 4.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

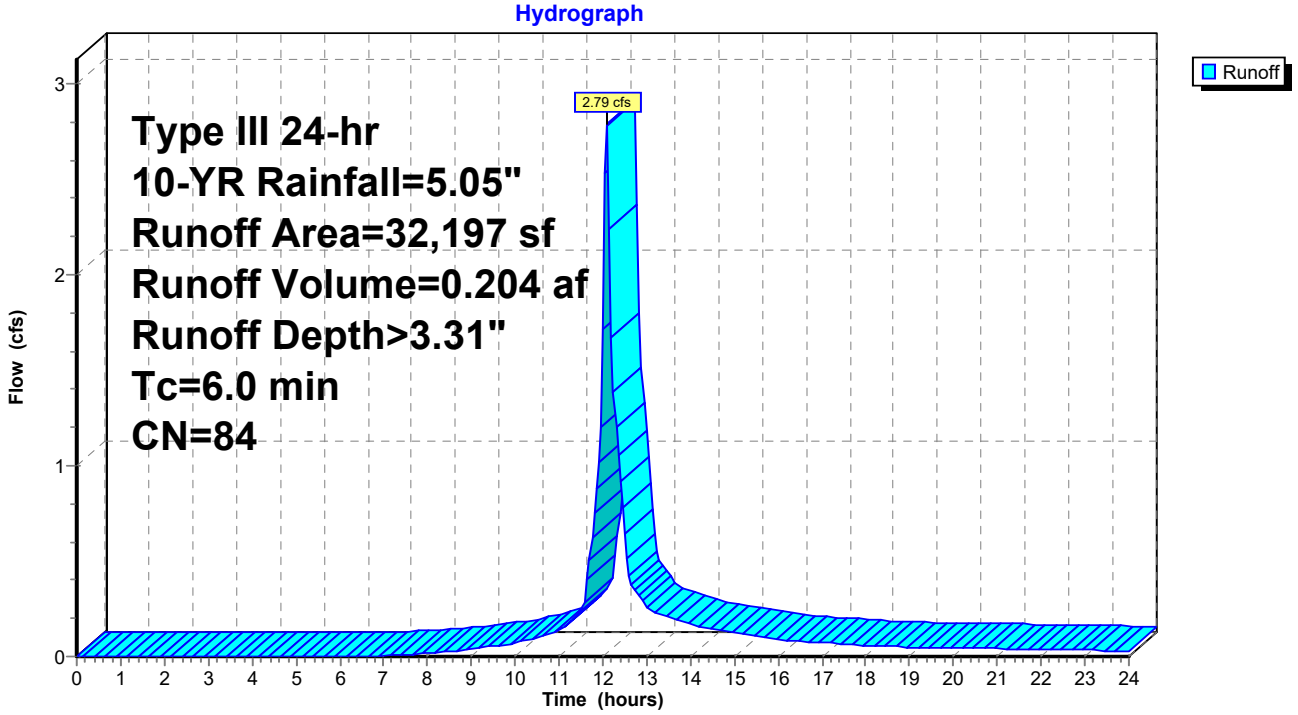
Runoff = 2.79 cfs @ 12.09 hrs, Volume= 0.204 af, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

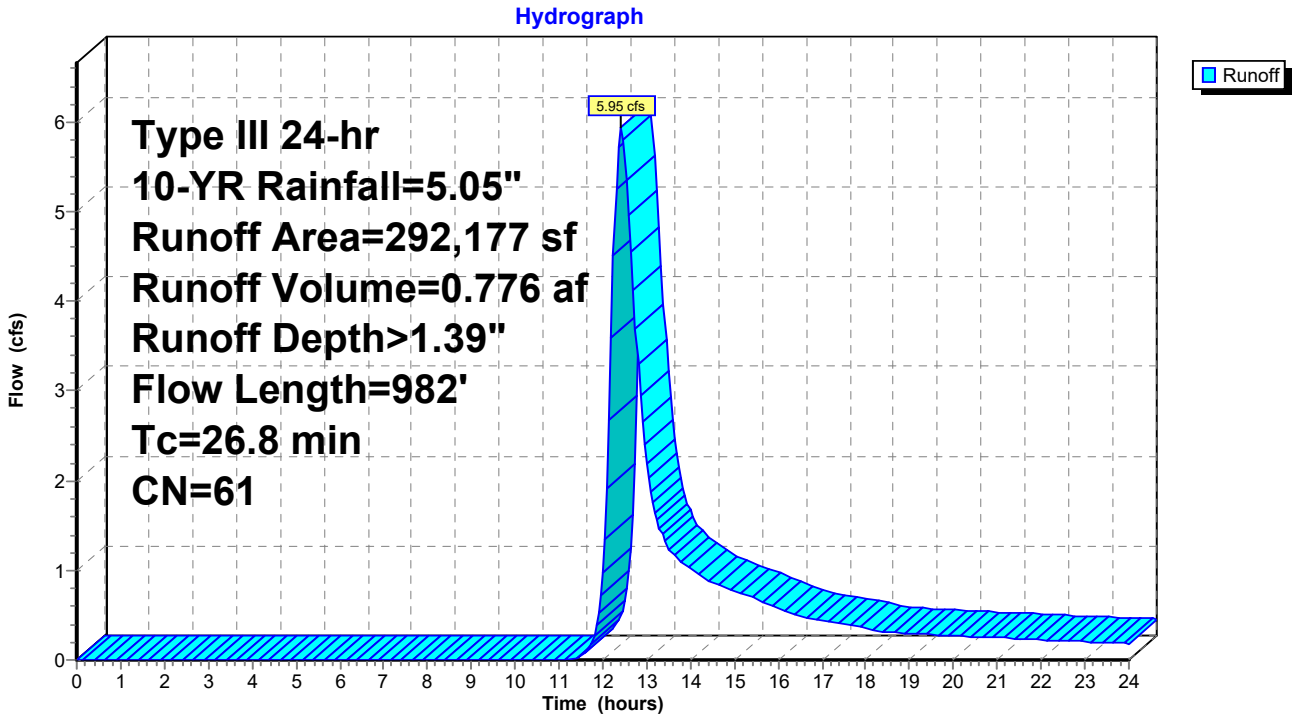
Runoff = 5.95 cfs @ 12.42 hrs, Volume= 0.776 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

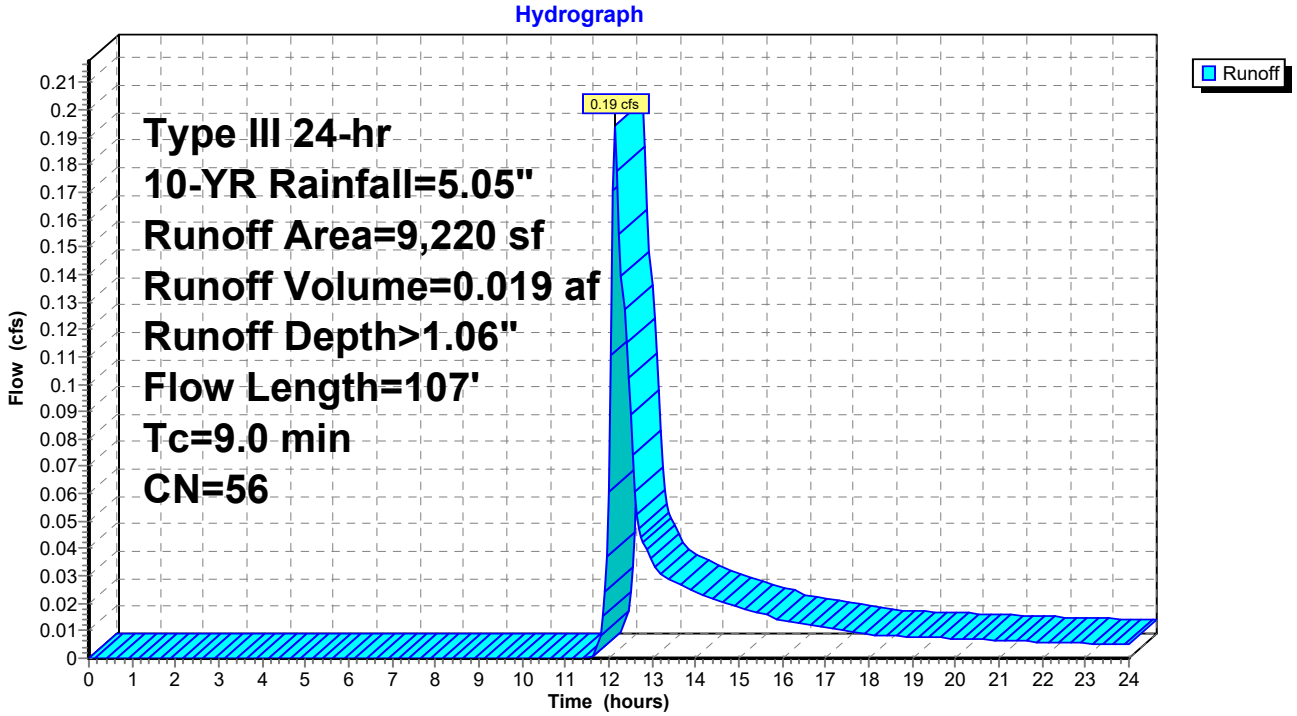
Runoff = 0.19 cfs @ 12.15 hrs, Volume= 0.019 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

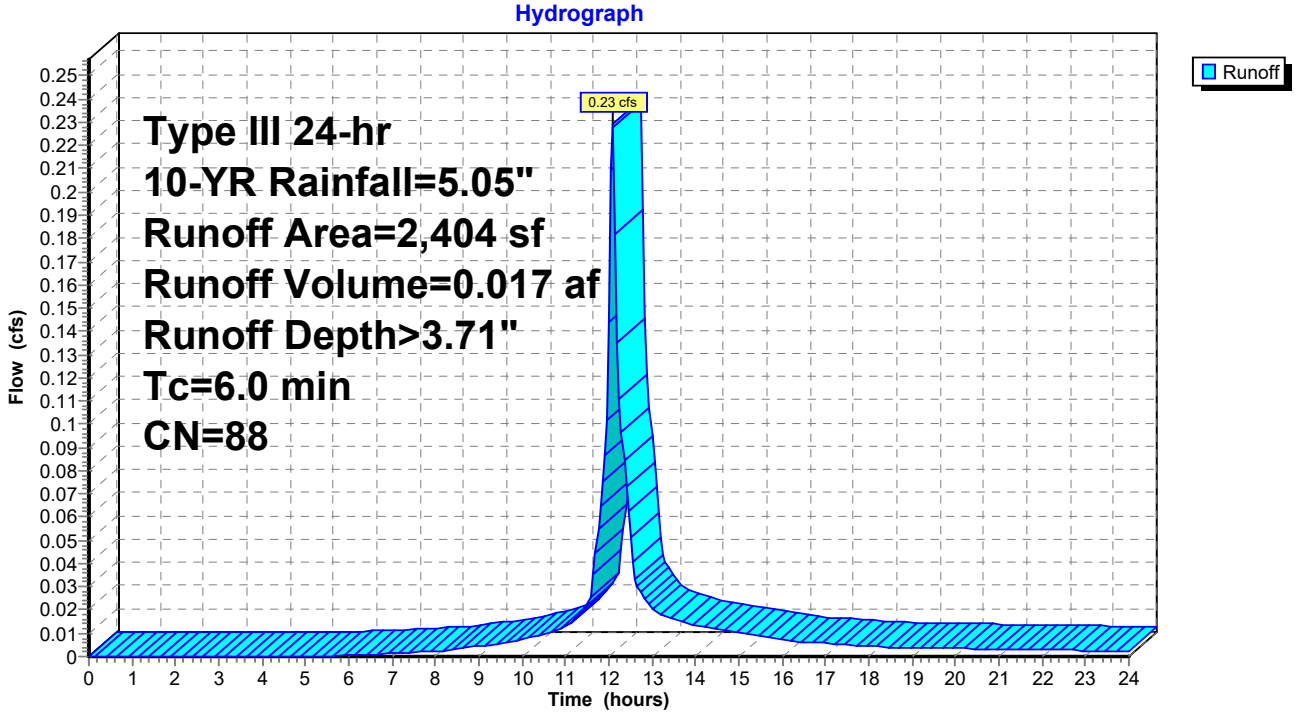
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.05"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

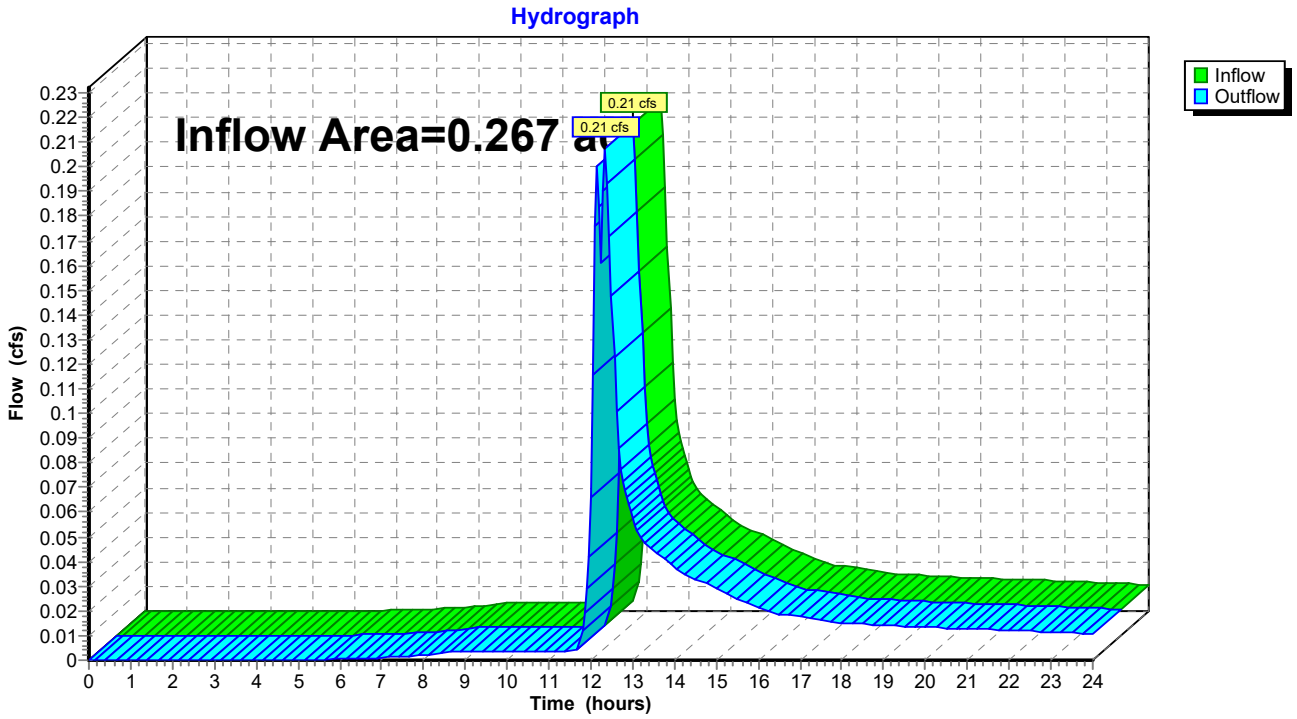


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth > 1.35" for 10-YR event
Inflow = 0.21 cfs @ 12.35 hrs, Volume= 0.030 af
Outflow = 0.21 cfs @ 12.35 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 1.15" for 10-YR event
Inflow = 8.54 cfs @ 12.71 hrs, Volume= 1.678 af
Outflow = 7.27 cfs @ 12.96 hrs, Volume= 1.640 af, Atten= 15%, Lag= 14.9 min

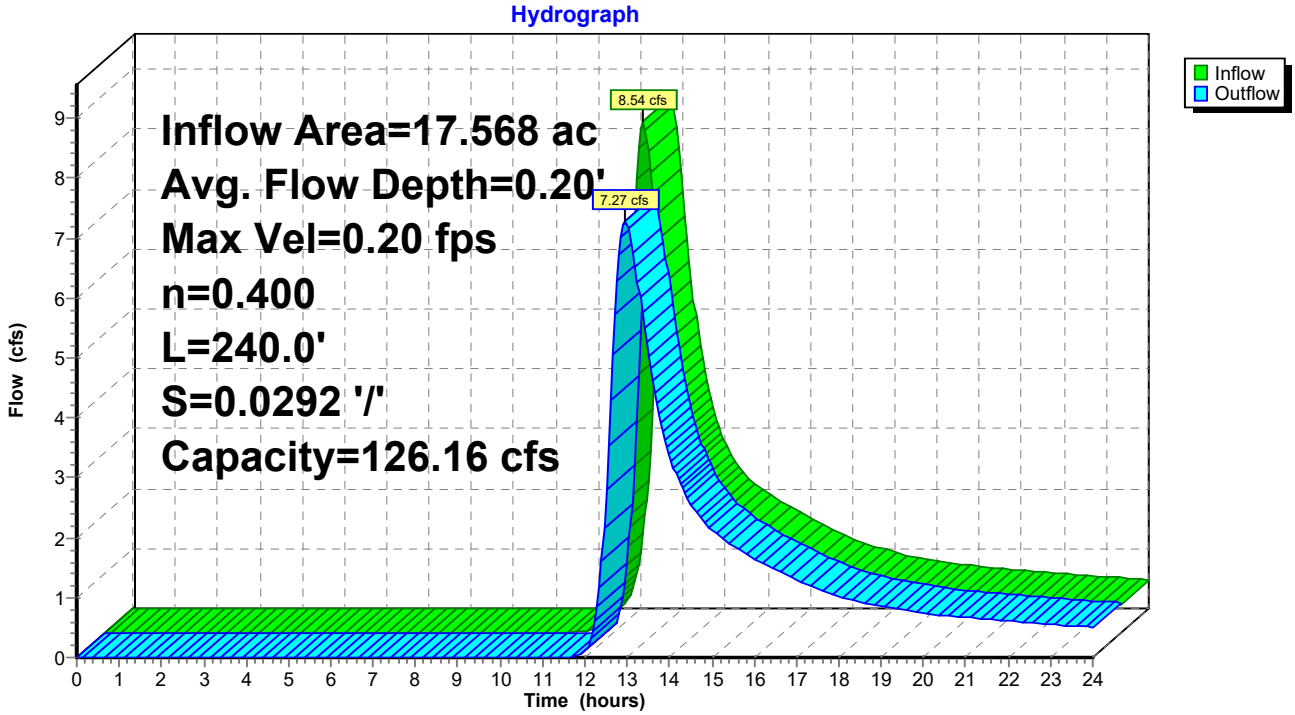
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.20 fps, Min. Travel Time= 19.5 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 41.6 min

Peak Storage= 8,524 cf @ 12.96 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Area-Storage for Reach PDP-4: Design Point 4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
625.00	0.0	0
625.01	1.7	398
625.02	3.3	799
625.03	5.0	1,204
625.04	6.7	1,612
625.05	8.4	2,024
625.06	10.2	2,439
625.07	11.9	2,857
625.08	13.7	3,279
625.09	15.4	3,705
625.10	17.2	4,134
625.11	19.0	4,567
625.12	20.8	5,003
625.13	22.7	5,442
625.14	24.5	5,885
625.15	26.4	6,331
625.16	28.3	6,781
625.17	30.1	7,235
625.18	32.0	7,692
625.19	34.0	8,152
625.20	35.9	8,616
625.21	37.8	9,083
625.22	39.8	9,554
625.23	41.8	10,028
625.24	43.8	10,506
625.25	45.8	10,988
625.26	47.8	11,472
625.27	49.8	11,960
625.28	51.9	12,452
625.29	53.9	12,947
625.30	56.0	13,446
625.31	58.1	13,948
625.32	60.2	14,454
625.33	62.3	14,963
625.34	64.5	15,475
625.35	66.6	15,992
625.36	68.8	16,511
625.37	71.0	17,034
625.38	73.2	17,561
625.39	75.4	18,091
625.40	77.6	18,624
625.41	79.8	19,161
625.42	82.1	19,701
625.43	84.4	20,245
625.44	86.6	20,793
625.45	88.9	21,344
625.46	91.2	21,898
625.47	93.6	22,456
625.48	95.9	23,017
625.49	98.3	23,582
625.50	100.6	24,150
625.51	103.0	24,722
625.52	105.4	25,297
625.53	107.8	25,876
625.54	110.2	26,458
625.55	112.7	27,044
625.56	115.1	27,633
625.57	117.6	28,225
625.58	120.1	28,821
625.59	122.6	29,421
625.60	125.1	30,024
625.61	127.6	30,631
625.62	130.2	31,241
625.63	132.7	31,854
625.64	135.3	32,471
625.65	137.9	33,092
625.66	140.5	33,715
625.67	143.1	34,343
625.68	145.7	34,974
625.69	148.4	35,608
625.70	151.0	36,246
625.71	153.7	36,887
625.72	156.4	37,532
625.73	159.1	38,180
625.74	161.8	38,832
625.75	164.5	39,488
625.76	167.3	40,146
625.77	170.0	40,808
625.78	172.8	41,474
625.79	175.6	42,143
625.80	178.4	42,816
625.81	181.2	43,492
625.82	184.0	44,172
625.83	186.9	44,855
625.84	189.8	45,541
625.85	192.6	46,232
625.86	195.5	46,925
625.87	198.4	47,622
625.88	201.3	48,323
625.89	204.3	49,027
625.90	207.2	49,734
625.91	210.2	50,445
625.92	213.2	51,159
625.93	216.2	51,877
625.94	219.2	52,599
625.95	222.2	53,324
625.96	225.2	54,052
625.97	228.3	54,784
625.98	231.3	55,519
625.99	234.4	56,258
626.00	**237.5**	**57,000**

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth > 1.19" for 10-YR event
Inflow = 9.67 cfs @ 12.49 hrs, Volume= 1.442 af
Outflow = 7.63 cfs @ 12.72 hrs, Volume= 1.407 af, Atten= 21%, Lag= 13.8 min

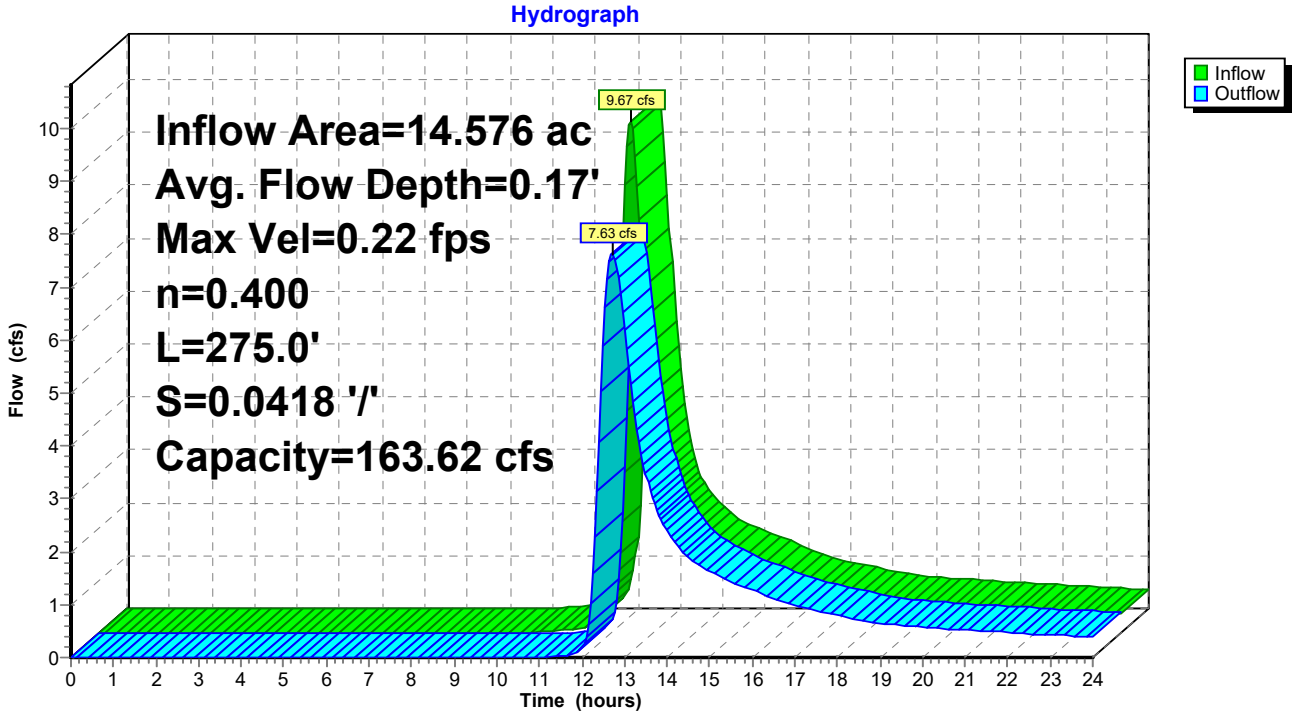
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.22 fps, Min. Travel Time= 20.5 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 48.6 min

Peak Storage= 9,358 cf @ 12.72 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Area-Storage for Reach PDP-5: Design Point 5

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
636.50	0.0	0
636.51	2.0	551
636.52	4.0	1,104
636.53	6.0	1,659
636.54	8.1	2,217
636.55	10.1	2,776
636.56	12.1	3,337
636.57	14.2	3,901
636.58	16.2	4,466
636.59	18.3	5,034
636.60	20.4	5,603
636.61	22.5	6,175
636.62	24.5	6,749
636.63	26.6	7,324
636.64	28.7	7,902
636.65	30.8	8,482
636.66	33.0	9,064
636.67	35.1	9,648
636.68	37.2	10,234
636.69	39.4	10,822
636.70	41.5	11,413
636.71	43.7	12,005
636.72	45.8	12,599
636.73	48.0	13,196
636.74	50.2	13,794
636.75	52.3	14,395
636.76	54.5	14,997
636.77	56.7	15,602
636.78	58.9	16,209
636.79	61.2	16,817
636.80	63.4	17,428
636.81	65.6	18,041
636.82	67.8	18,656
636.83	70.1	19,273
636.84	72.3	19,892
636.85	74.6	20,513
636.86	76.9	21,137
636.87	79.1	21,762
636.88	81.4	22,389
636.89	83.7	23,019
636.90	86.0	23,650
636.91	88.3	24,284
636.92	90.6	24,919
636.93	92.9	25,557
636.94	95.3	26,197
636.95	97.6	26,838
636.96	99.9	27,482
636.97	102.3	28,128
636.98	104.6	28,776
636.99	107.0	29,426
637.00	109.4	30,078
637.01	111.8	30,732
637.02	114.1	31,389
637.03	116.5	32,047
637.04	118.9	32,707
637.05	121.3	33,370
637.06	123.8	34,034
637.07	126.2	34,701
637.08	128.6	35,369
637.09	131.1	36,040
637.10	133.5	36,713
637.11	136.0	37,387
637.12	138.4	38,064
637.13	140.9	38,743
637.14	143.4	39,424
637.15	145.8	40,107
637.16	148.3	40,792
637.17	150.8	41,479
637.18	153.3	42,169
637.19	155.9	42,860
637.20	158.4	43,553
637.21	160.9	44,249
637.22	163.4	44,946
637.23	166.0	45,646
637.24	168.5	46,347
637.25	171.1	47,051
637.26	173.7	47,757
637.27	176.2	48,464
637.28	178.8	49,174
637.29	181.4	49,886
637.30	184.0	50,600
637.31	186.6	51,316
637.32	189.2	52,034
637.33	191.8	52,754
637.34	194.5	53,476
637.35	197.1	54,201
637.36	199.7	54,927
637.37	202.4	55,656
637.38	205.0	56,386
637.39	207.7	57,119
637.40	210.4	57,853
637.41	213.1	58,590
637.42	215.7	59,329
637.43	218.4	60,069
637.44	221.1	60,812
637.45	223.8	61,557
637.46	226.6	62,304
637.47	229.3	63,053
637.48	232.0	63,804
637.49	234.8	64,557
637.50	**237.5**	**65,313**

Summary for Reach PDP-6: Design Point 6

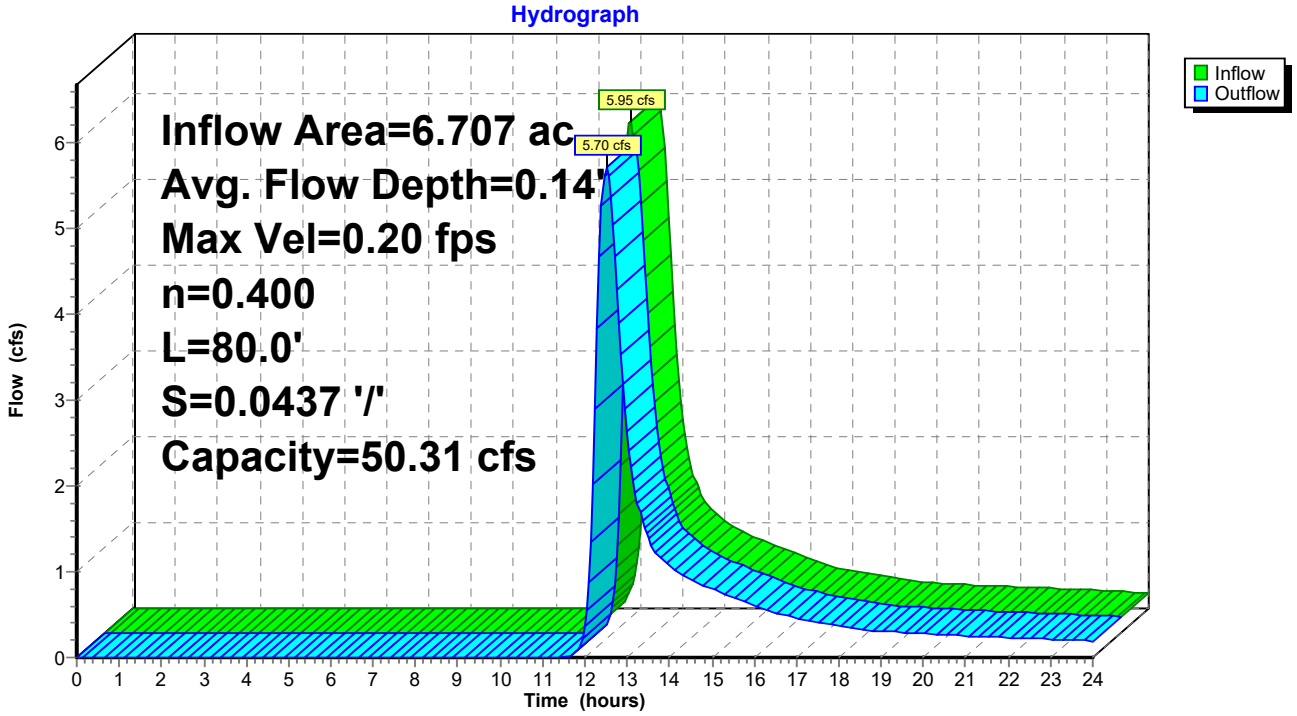
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 1.39" for 10-YR event
Inflow = 5.95 cfs @ 12.42 hrs, Volume= 0.776 af
Outflow = 5.70 cfs @ 12.50 hrs, Volume= 0.770 af, Atten= 4%, Lag= 4.8 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.20 fps, Min. Travel Time= 6.5 min
Avg. Velocity = 0.08 fps, Avg. Travel Time= 17.0 min

Peak Storage= 2,238 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Area-Storage for Reach PDP-6: Design Point 6

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
642.50	0.0	0
642.51	2.0	160
642.52	4.0	321
642.53	6.0	482
642.54	8.0	644
642.55	10.1	806
642.56	12.1	969
642.57	14.1	1,132
642.58	16.2	1,295
642.59	18.2	1,459
642.60	20.3	1,624
642.61	22.4	1,789
642.62	24.4	1,955
642.63	26.5	2,121
642.64	28.6	2,287
642.65	30.7	2,454
642.66	32.8	2,621
642.67	34.9	2,789
642.68	37.0	2,958
642.69	39.1	3,127
642.70	41.2	3,296
642.71	43.3	3,466
642.72	45.5	3,636
642.73	47.6	3,807
642.74	49.7	3,978
642.75	51.9	4,150
642.76	54.0	4,322
642.77	56.2	4,495
642.78	58.4	4,668
642.79	60.5	4,842
642.80	62.7	5,016
642.81	64.9	5,191
642.82	67.1	5,366
642.83	69.3	5,541
642.84	71.5	5,717
642.85	73.7	5,894
642.86	75.9	6,071
642.87	78.1	6,249
642.88	80.3	6,427
642.89	82.6	6,605
642.90	84.8	6,784
642.91	87.0	6,963
642.92	89.3	7,143
642.93	91.5	7,324
642.94	93.8	7,505
642.95	96.1	7,686
642.96	98.3	7,868
642.97	100.6	8,050
642.98	102.9	8,233
642.99	105.2	8,416
643.00	**107.5**	**8,600**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 3.00" for 10-YR event
Inflow = 1.30 cfs @ 12.10 hrs, Volume= 0.282 af
Outflow = 0.76 cfs @ 12.33 hrs, Volume= 0.258 af, Atten= 41%, Lag= 14.0 min
Discarded = 0.07 cfs @ 12.33 hrs, Volume= 0.076 af
Primary = 0.69 cfs @ 12.33 hrs, Volume= 0.182 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 622.53' @ 12.33 hrs Surf.Area= 1,533 sf Storage= 1,668 cf
Flood Elev= 623.00' Surf.Area= 1,864 sf Storage= 2,469 cf

Plug-Flow detention time= 74.1 min calculated for 0.258 af (92% of inflow)
Center-of-Mass det. time= 31.7 min (948.9 - 917.2)

Volume	Invert	Avail.Storage	Storage Description
#1	619.75'	2,238 cf	**Overall storage (Prismatic)** Listed below (Recalc) 3,104 cf Overall - 866 cf Embedded = 2,238 cf
#2	619.75'	115 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 40.0% Voids
#3	620.25'	58 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
#4	620.75'	58 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
		2,469 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
621.00	577	721	721
622.00	1,162	870	1,591
623.00	1,864	1,513	3,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
620.25	577	289	289

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.25	577	0	0
620.75	577	289	289

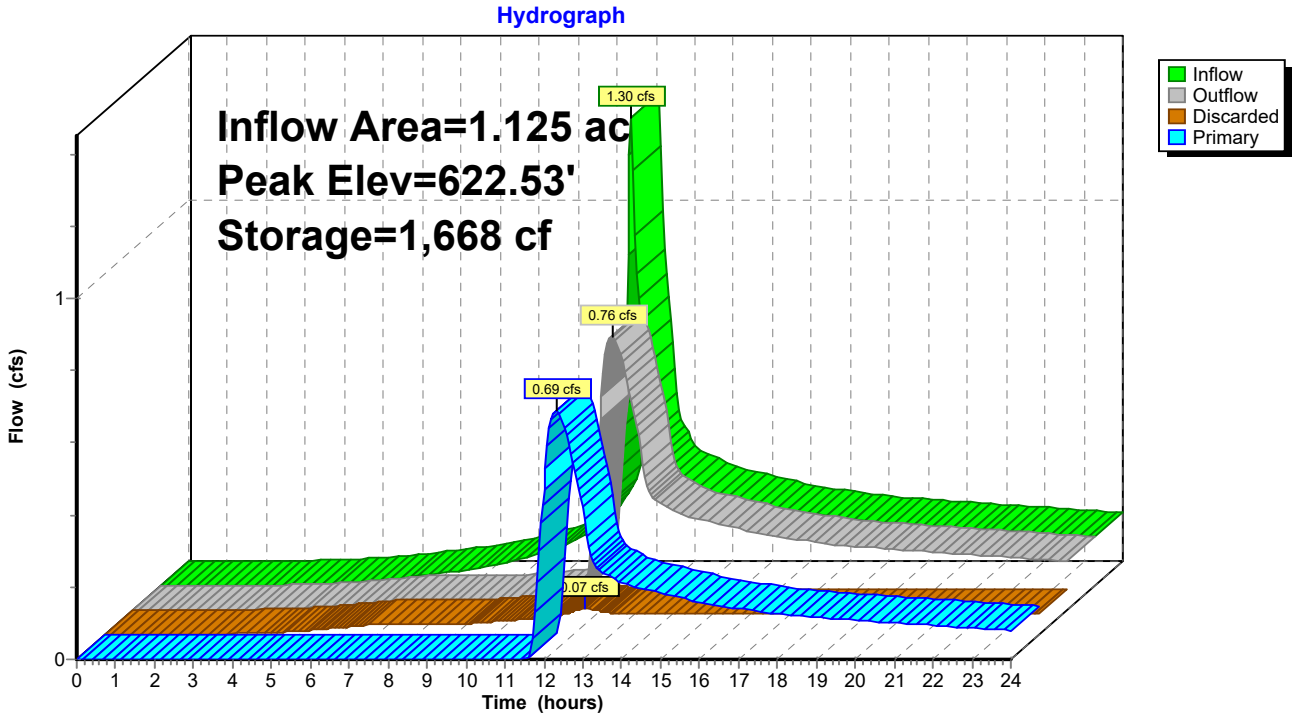
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.75	577	0	0
621.25	577	289	289

Device	Routing	Invert	Outlet Devices
#1	Discarded	619.75'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.64'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.64' / 620.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	622.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 12.33 hrs HW=622.53' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.69 cfs @ 12.33 hrs HW=622.53' (Free Discharge)
└─**2=Culvert** (Passes 0.69 cfs of 0.96 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.69 cfs @ 3.50 fps)

Pond 3: SFB-3



Stage-Area-Storage for Pond 3: SFB-3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
619.75	577	0
619.80	577	12
619.85	577	23
619.90	577	35
619.95	577	46
620.00	577	58
620.05	577	69
620.10	577	81
620.15	577	92
620.20	577	104
620.25	577	115
620.30	577	121
620.35	577	127
620.40	577	133
620.45	577	138
620.50	577	144
620.55	577	150
620.60	577	156
620.65	577	162
620.70	577	167
620.75	577	173
620.80	577	179
620.85	577	185
620.90	577	190
620.95	577	196
621.00	577	202
621.05	606	208
621.10	636	216
621.15	665	226
621.20	694	237
621.25	723	249
621.30	752	286
621.35	782	324
621.40	811	364
621.45	840	405
621.50	870	448
621.55	899	492
621.60	928	538
621.65	957	585
621.70	987	634
621.75	1,016	684
621.80	1,045	735
621.85	1,074	788
621.90	1,103	843
621.95	1,133	899
622.00	1,162	956
622.05	1,197	1,015
622.10	1,232	1,076
622.15	1,267	1,138
622.20	1,302	1,202
622.25	1,338	1,268
622.30	1,373	1,336
622.35	1,408	1,406
622.40	1,443	1,477
622.45	1,478	1,550
622.50	1,513	1,625
622.55	1,548	1,701
622.60	1,583	1,780
622.65	1,618	1,860
622.70	1,653	1,941
622.75	1,689	2,025
622.80	1,724	2,110
622.85	1,759	2,197
622.90	1,794	2,286
622.95	1,829	2,377
623.00	**1,864**	**2,469**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 3.91" for 10-YR event				
Inflow =	1.48 cfs @	12.43 hrs,	Volume=	0.485 af	
Outflow =	0.73 cfs @	12.98 hrs,	Volume=	0.484 af,	Atten= 50%, Lag= 32.8 min
Discarded =	0.47 cfs @	12.98 hrs,	Volume=	0.439 af	
Primary =	0.27 cfs @	12.98 hrs,	Volume=	0.045 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 632.82' @ 12.98 hrs Surf.Area= 3,087 sf Storage= 4,158 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,324 cf

Plug-Flow detention time= 65.2 min calculated for 0.484 af (100% of inflow)
Center-of-Mass det. time= 64.8 min (906.1 - 841.4)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	329 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 40.0% Voids
#3	630.50'	164 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
#4	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,324 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
630.50	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.50	1,643	0	0
631.00	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

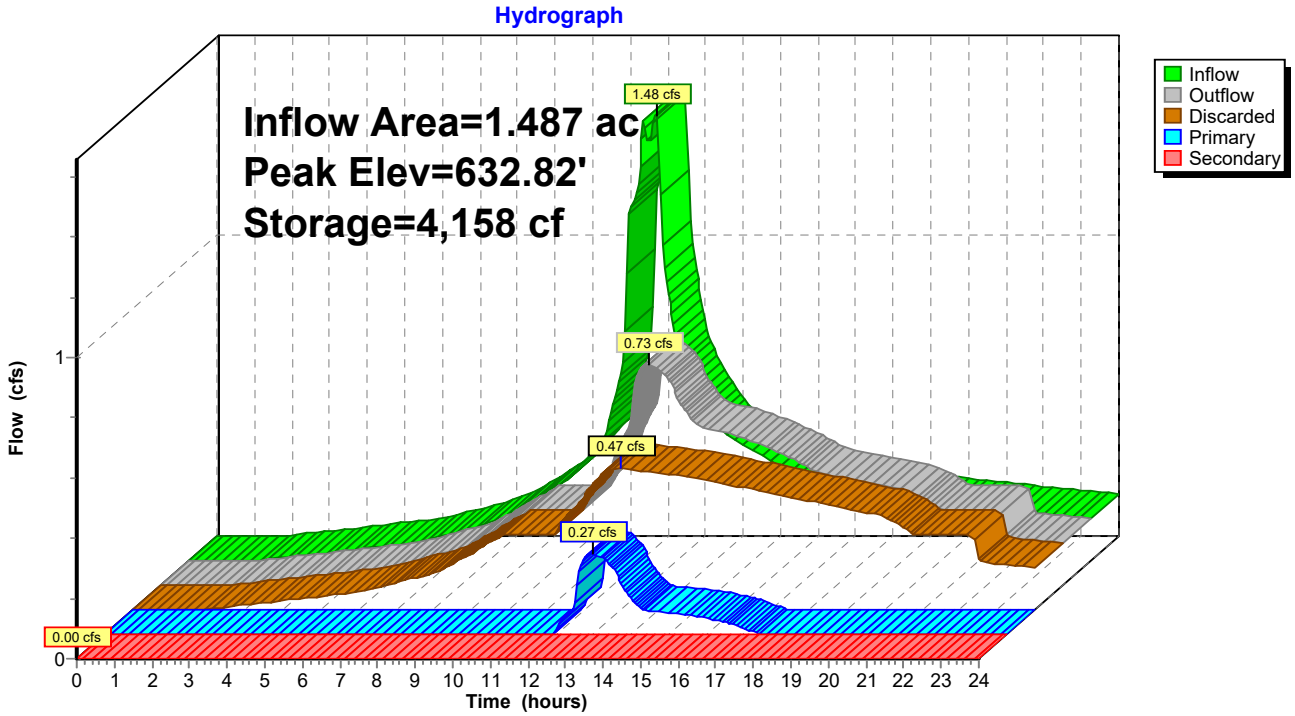
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	633.30'	**50.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.47 cfs @ 12.98 hrs HW=632.82' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.47 cfs)

Primary OutFlow Max=0.27 cfs @ 12.98 hrs HW=632.82' (Free Discharge)
└─**2=Culvert** (Passes 0.27 cfs of 0.54 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.14 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 2.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Area-Storage for Pond 4: SFB-4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
630.00	1,643	0
630.05	1,643	33
630.10	1,643	66
630.15	1,643	99
630.20	1,643	131
630.25	1,643	164
630.30	1,643	197
630.35	1,643	230
630.40	1,643	263
630.45	1,643	296
630.50	1,643	329
630.55	1,643	345
630.60	1,643	361
630.65	1,643	378
630.70	1,643	394
630.75	1,643	411
630.80	1,643	427
630.85	1,643	444
630.90	1,643	460
630.95	1,643	476
631.00	1,643	493
631.05	1,683	510
631.10	1,723	530
631.15	1,763	551
631.20	1,803	575
631.25	1,843	600
631.30	1,883	627
631.35	1,923	657
631.40	1,963	688
631.45	2,003	722
631.50	2,043	757
631.55	2,083	860
631.60	2,123	966
631.65	2,163	1,073
631.70	2,203	1,182
631.75	2,243	1,293
631.80	2,283	1,406
631.85	2,323	1,521
631.90	2,363	1,638
631.95	2,403	1,758
632.00	2,443	1,879
632.05	2,482	2,002
632.10	2,521	2,127
632.15	2,560	2,254
632.20	2,599	2,383
632.25	2,638	2,514
632.30	2,677	2,647
632.35	2,716	2,782
632.40	2,755	2,918
632.45	2,794	3,057
632.50	2,834	3,198
632.55	2,873	3,340
632.60	2,912	3,485
632.65	2,951	3,632
632.70	2,990	3,780
632.75	3,029	3,931
632.80	3,068	4,083
632.85	3,107	4,237
632.90	3,146	4,394
632.95	3,185	4,552
633.00	3,224	4,712
633.05	3,263	4,874
633.10	3,302	5,038
633.15	3,340	5,205
633.20	3,379	5,373
633.25	3,418	5,542
633.30	3,457	5,714
633.35	3,496	5,888
633.40	3,534	6,064
633.45	3,573	6,242
633.50	3,612	6,421
633.55	3,651	6,603
633.60	3,690	6,786
633.65	3,728	6,972
633.70	3,767	7,159
633.75	3,806	7,348
633.80	3,845	7,540
633.85	3,884	7,733
633.90	3,922	7,928
633.95	3,961	8,125
634.00	**4,000**	**8,324**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth > 2.52" for 10-YR event				
Inflow =	0.73 cfs @	12.11 hrs,	Volume=	0.343 af	
Outflow =	0.25 cfs @	17.53 hrs,	Volume=	0.268 af,	Atten= 66%, Lag= 325.5 min
Discarded =	0.21 cfs @	17.53 hrs,	Volume=	0.248 af	
Primary =	0.04 cfs @	17.53 hrs,	Volume=	0.020 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 634.71' @ 17.53 hrs Surf.Area= 3,268 sf Storage= 3,792 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,544 cf

Plug-Flow detention time= 172.6 min calculated for 0.268 af (78% of inflow)
Center-of-Mass det. time= 69.3 min (1,007.2 - 937.9)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	301 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 40.0% Voids
#3	632.50'	151 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
#4	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,544 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
632.50	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.50	1,505	0	0
633.00	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

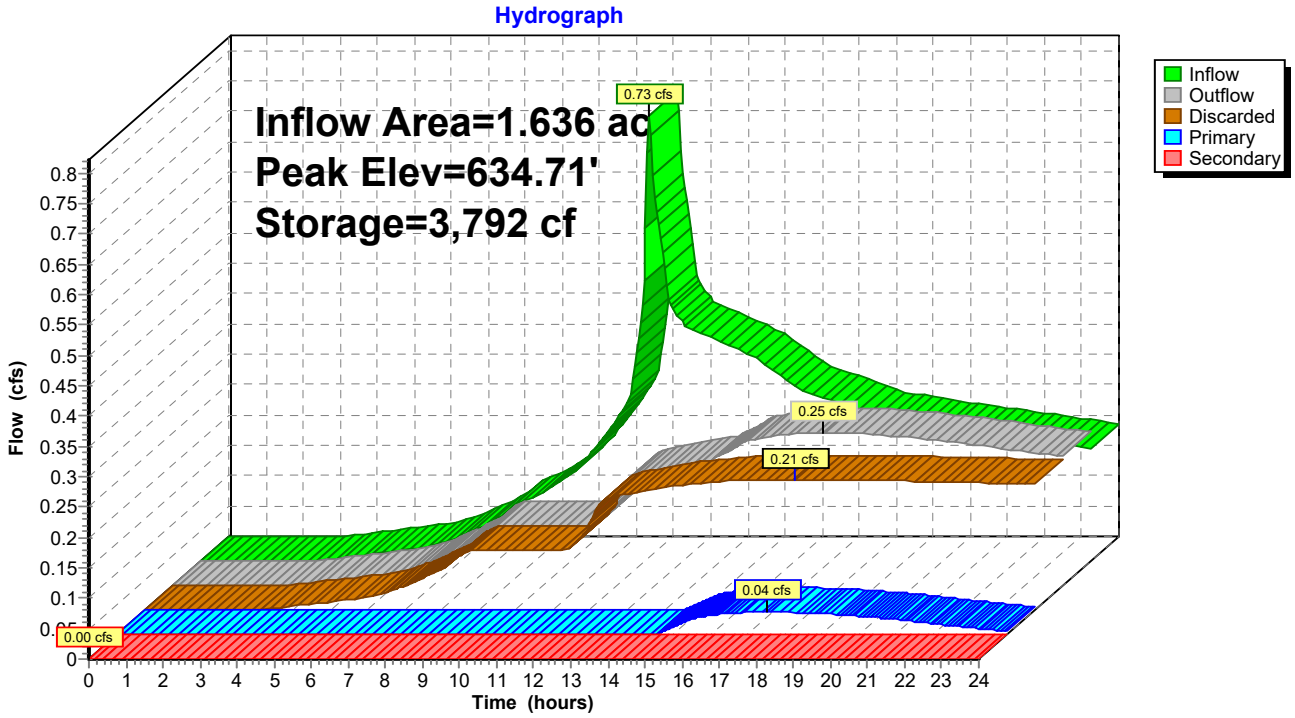
Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 17.53 hrs HW=634.71' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.04 cfs @ 17.53 hrs HW=634.71' (Free Discharge)
└─**2=Culvert** (Passes 0.04 cfs of 0.29 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.70 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Area-Storage for Pond 5: SFB-5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
632.00	1,505	0
632.05	1,505	30
632.10	1,505	60
632.15	1,505	90
632.20	1,505	120
632.25	1,505	151
632.30	1,505	181
632.35	1,505	211
632.40	1,505	241
632.45	1,505	271
632.50	1,505	301
632.55	1,505	316
632.60	1,505	331
632.65	1,505	346
632.70	1,505	361
632.75	1,505	376
632.80	1,505	391
632.85	1,505	406
632.90	1,505	421
632.95	1,505	436
633.00	1,505	452
633.05	1,505	467
633.10	1,505	482
633.15	1,505	497
633.20	1,505	512
633.25	1,505	527
633.30	1,505	542
633.35	1,505	557
633.40	1,505	572
633.45	1,505	587
633.50	1,505	602
633.55	1,629	680
633.60	1,752	765
633.65	1,876	856
633.70	1,999	952
633.75	2,123	1,056
633.80	2,247	1,165
633.85	2,370	1,280
633.90	2,494	1,402
633.95	2,617	1,530
634.00	2,741	1,664
634.05	2,778	1,801
634.10	2,815	1,941
634.15	2,853	2,083
634.20	2,890	2,227
634.25	2,927	2,372
634.30	2,964	2,519
634.35	3,001	2,668
634.40	3,039	2,819
634.45	3,076	2,972
634.50	3,113	3,127
634.55	3,150	3,284
634.60	3,187	3,442
634.65	3,225	3,602
634.70	3,262	3,764
634.75	3,299	3,929
634.80	3,336	4,094
634.85	3,373	4,262
634.90	3,411	4,432
634.95	3,448	4,603
635.00	3,485	4,776
635.05	3,513	4,951
635.10	3,542	5,128
635.15	3,570	5,306
635.20	3,598	5,485
635.25	3,626	5,665
635.30	3,654	5,847
635.35	3,683	6,031
635.40	3,711	6,216
635.45	3,739	6,402
635.50	3,768	6,590
635.55	3,796	6,779
635.60	3,824	6,969
635.65	3,852	7,161
635.70	3,881	7,354
635.75	3,909	7,549
635.80	3,937	7,745
635.85	3,965	7,943
635.90	3,993	8,142
635.95	4,022	8,342
636.00	**4,050**	**8,544**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth > 5.05" for 10-YR event
Inflow = 3.45 cfs @ 12.09 hrs, Volume= 0.250 af
Outflow = 0.15 cfs @ 14.01 hrs, Volume= 0.162 af, Atten= 96%, Lag= 115.6 min
Primary = 0.15 cfs @ 14.01 hrs, Volume= 0.162 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 628.22' @ 14.01 hrs Surf.Area= 0.081 ac Storage= 0.153 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 340.4 min calculated for 0.162 af (65% of inflow)
Center-of-Mass det. time= 243.0 min (989.4 - 746.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**4.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 620.60' S= 0.0225 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.15 cfs @ 14.01 hrs HW=628.22' (Free Discharge)
└─**1=Culvert** (Passes 0.15 cfs of 0.38 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 7.03 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

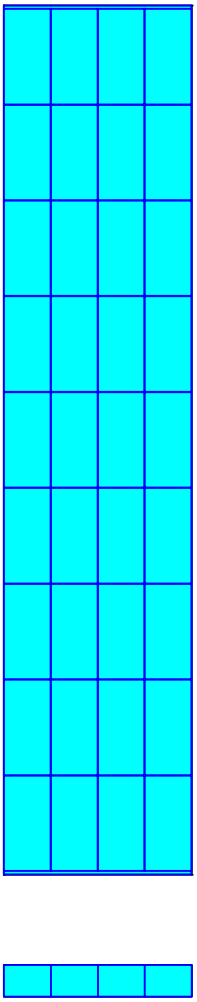
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

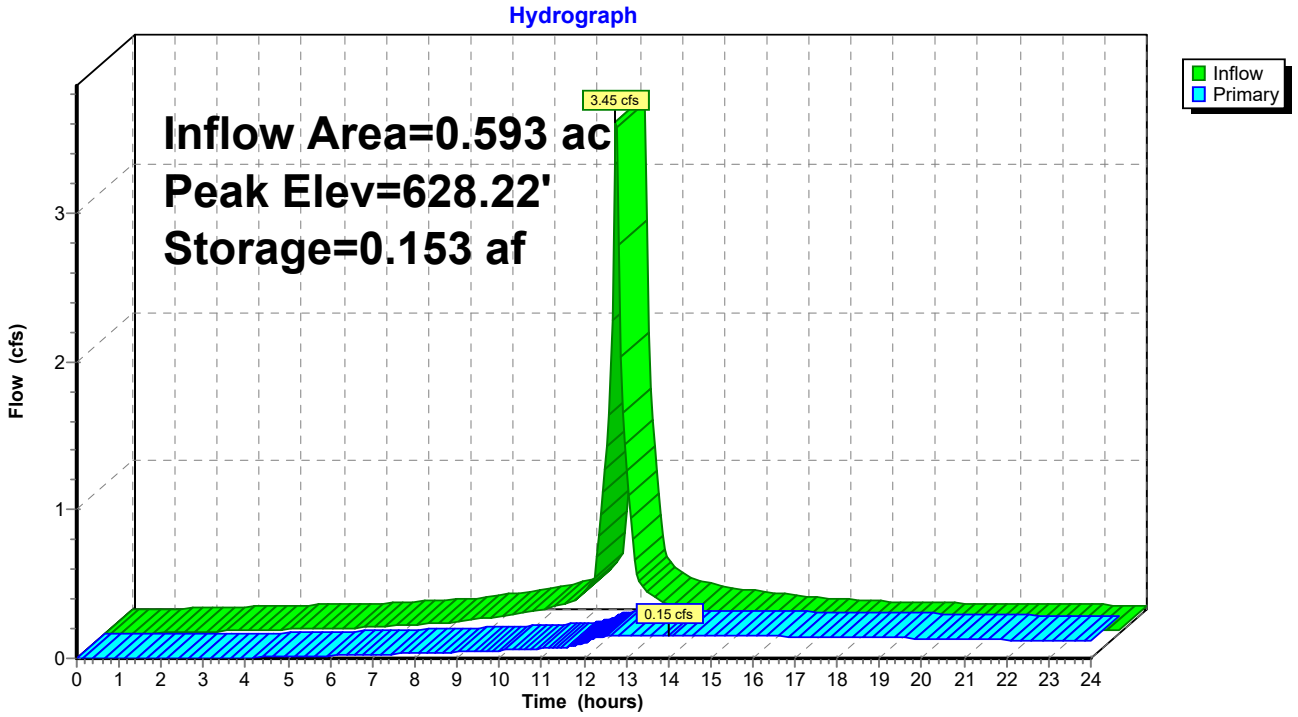
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow Area=0.593 ac
Peak Elev=628.22'
Storage=0.153 af
3.45 cfs
0.15 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Area-Storage for Pond DB-3: DB-3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
626.00	0.000	628.60	0.180
626.05	0.003	628.65	0.183
626.10	0.007	628.70	0.187
626.15	0.010	628.75	0.190
626.20	0.014	628.80	0.194
626.25	0.017	628.85	0.197
626.30	0.021	628.90	0.200
626.35	0.024	628.95	0.204
626.40	0.028	629.00	0.207
626.45	0.031	629.05	0.211
626.50	0.035	629.10	0.214
626.55	0.038	629.15	0.218
626.60	0.041	629.20	0.221
626.65	0.045	629.25	0.225
626.70	0.048	629.30	0.228
626.75	0.052	629.35	0.232
626.80	0.055	629.40	0.235
626.85	0.059	629.45	0.238
626.90	0.062	629.50	0.242
626.95	0.066	629.55	0.245
627.00	0.069	629.60	0.249
627.05	0.073	629.65	0.252
627.10	0.076	629.70	0.256
627.15	0.079	629.75	0.259
627.20	0.083	629.80	0.263
627.25	0.086	629.85	0.266
627.30	0.090	629.90	0.270
627.35	0.093	629.95	0.273
627.40	0.097	630.00	0.276
627.45	0.100	630.05	0.276
627.50	0.104	630.10	0.276
627.55	0.107	630.15	0.276
627.60	0.111	630.20	0.276
627.65	0.114	630.25	0.276
627.70	0.117	630.30	0.276
627.75	0.121	630.35	0.276
627.80	0.124	630.40	0.276
627.85	0.128	630.45	0.276
627.90	0.131	630.50	0.276
627.95	0.135	630.55	0.276
628.00	0.138	630.60	0.276
628.05	0.142	630.65	**0.276**
628.10	0.145		
628.15	0.149		
628.20	0.152		
628.25	0.156		
628.30	0.159		
628.35	0.162		
628.40	0.166		
628.45	0.169		
628.50	0.173		
628.55	0.176		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth > 8.72" for 10-YR event
Inflow = 5.27 cfs @ 12.09 hrs, Volume= 0.199 af
Outflow = 0.31 cfs @ 12.51 hrs, Volume= 0.149 af, Atten= 94%, Lag= 25.2 min
Primary = 0.31 cfs @ 12.51 hrs, Volume= 0.149 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 636.31' @ 12.51 hrs Surf.Area= 0.072 ac Storage= 0.142 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 299.5 min calculated for 0.149 af (75% of inflow)
Center-of-Mass det. time= 248.6 min (986.3 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.31 cfs @ 12.51 hrs HW=636.31' (Free Discharge)
└─**1=Culvert** (Passes 0.31 cfs of 0.96 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.18 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.88 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

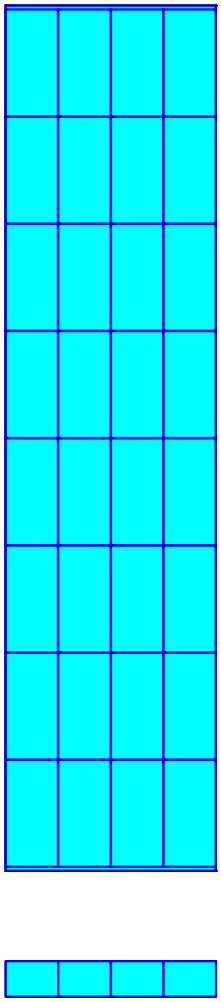
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

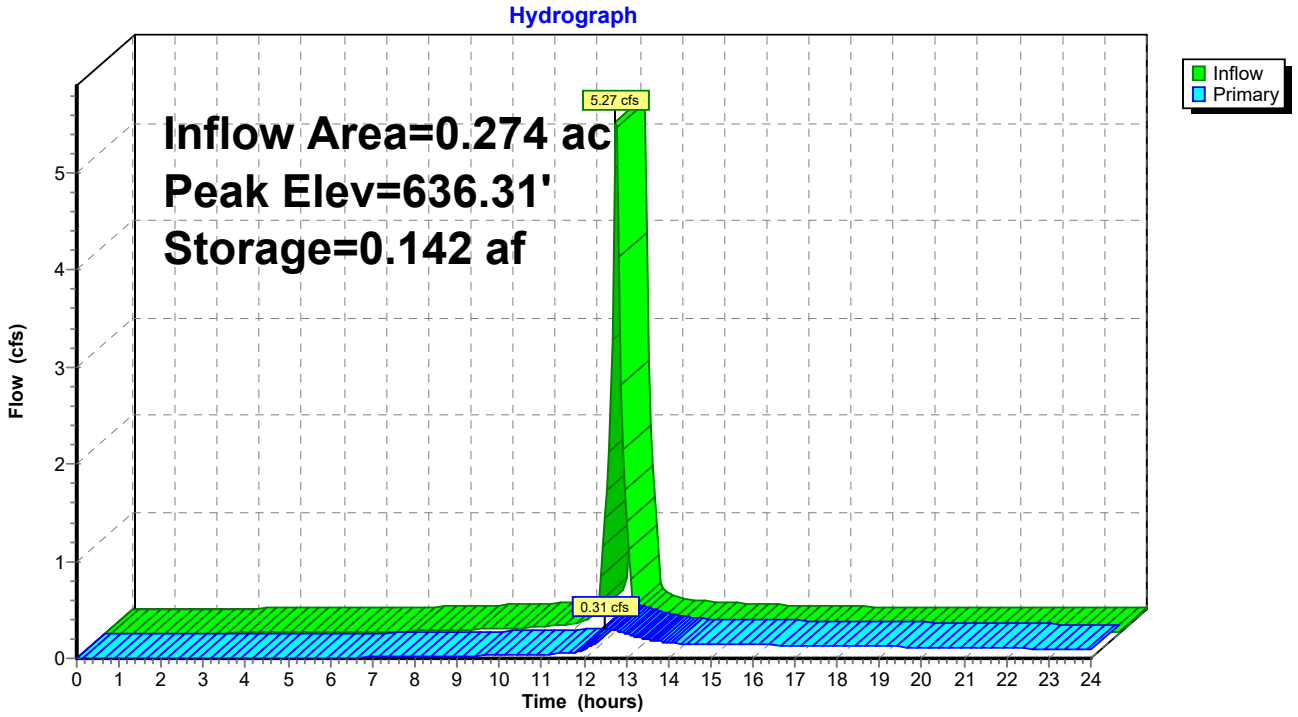
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow Area=0.274 ac
Peak Elev=636.31'
Storage=0.142 af
5.27 cfs
0.31 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Area-Storage for Pond DB-4: DB-4

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
634.00	0.000	636.60	0.160
634.05	0.003	636.65	0.163
634.10	0.006	636.70	0.166
634.15	0.009	636.75	0.169
634.20	0.012	636.80	0.172
634.25	0.015	636.85	0.175
634.30	0.018	636.90	0.178
634.35	0.022	636.95	0.181
634.40	0.025	637.00	0.184
634.45	0.028	637.05	0.187
634.50	0.031	637.10	0.190
634.55	0.034	637.15	0.194
634.60	0.037	637.20	0.197
634.65	0.040	637.25	0.200
634.70	0.043	637.30	0.203
634.75	0.046	637.35	0.206
634.80	0.049	637.40	0.209
634.85	0.052	637.45	0.212
634.90	0.055	637.50	0.215
634.95	0.058	637.55	0.218
635.00	0.061	637.60	0.221
635.05	0.065	637.65	0.224
635.10	0.068	637.70	0.227
635.15	0.071	637.75	0.230
635.20	0.074	637.80	0.233
635.25	0.077	637.85	0.237
635.30	0.080	637.90	0.240
635.35	0.083	637.95	0.243
635.40	0.086	638.00	0.246
635.45	0.089	638.05	0.246
635.50	0.092	638.10	0.246
635.55	0.095	638.15	0.246
635.60	0.098	638.20	0.246
635.65	0.101	638.25	0.246
635.70	0.104	638.30	0.246
635.75	0.108	638.35	0.246
635.80	0.111	638.40	0.246
635.85	0.114	638.45	0.246
635.90	0.117	638.50	0.246
635.95	0.120	638.55	0.246
636.00	0.123	638.60	0.246
636.05	0.126	638.65	**0.246**
636.10	0.129		
636.15	0.132		
636.20	0.135		
636.25	0.138		
636.30	0.141		
636.35	0.144		
636.40	0.147		
636.45	0.151		
636.50	0.154		
636.55	0.157		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth > 5.73" for 10-YR event
Inflow = 5.73 cfs @ 12.09 hrs, Volume= 0.338 af
Outflow = 0.18 cfs @ 14.16 hrs, Volume= 0.204 af, Atten= 97%, Lag= 124.5 min
Primary = 0.18 cfs @ 14.16 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 640.68' @ 14.16 hrs Surf.Area= 0.090 ac Storage= 0.219 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 220.1 min (986.0 - 765.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.18 cfs @ 14.16 hrs HW=640.68' (Free Discharge)
└─**1=Culvert** (Passes 0.18 cfs of 1.18 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.47 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

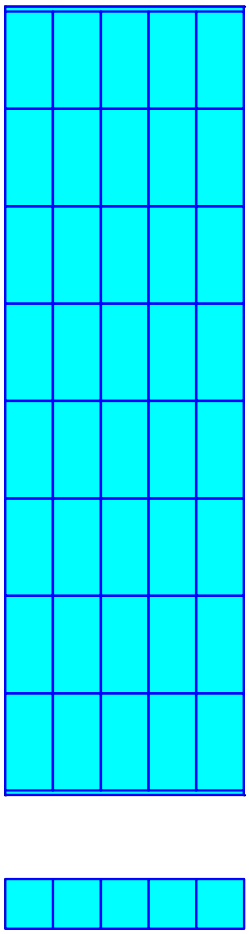
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

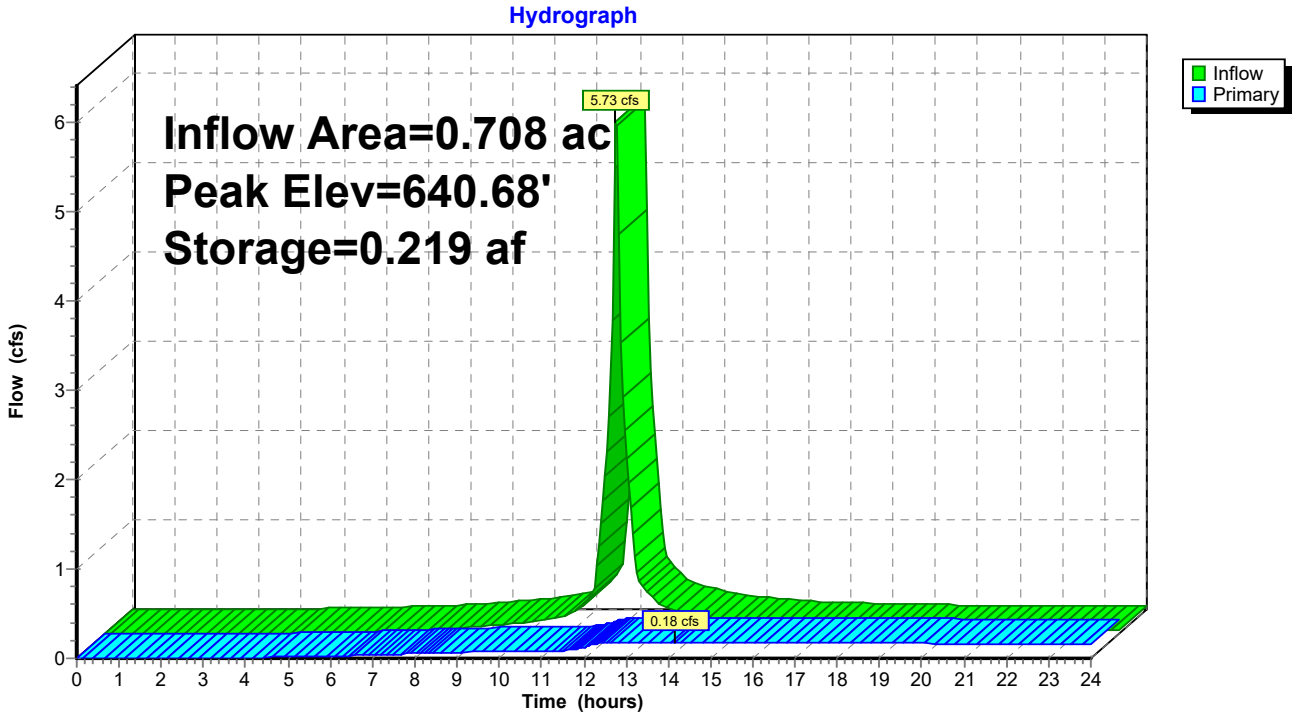
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow Area=0.708 ac
Peak Elev=640.68'
Storage=0.219 af
5.73 cfs
0.18 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Area-Storage for Pond DB-5: DB-5

Elevation (feet)	Storage (acre-feet)
637.50	0.000
637.60	0.000
637.70	0.000
637.80	0.000
637.90	0.000
638.00	0.000
638.10	0.008
638.20	0.016
638.30	0.025
638.40	0.033
638.50	0.041
638.60	0.049
638.70	0.057
638.80	0.065
638.90	0.074
639.00	0.082
639.10	0.090
639.20	0.098
639.30	0.106
639.40	0.114
639.50	0.123
639.60	0.131
639.70	0.139
639.80	0.147
639.90	0.155
640.00	0.163
640.10	0.172
640.20	0.180
640.30	0.188
640.40	0.196
640.50	0.204
640.60	0.212
640.70	0.221
640.80	0.229
640.90	0.237
641.00	0.245
641.10	0.253
641.20	0.262
641.30	0.270
641.40	0.278
641.50	0.286
641.60	0.294
641.70	0.302
641.80	0.311
641.90	0.319
642.00	0.327
642.10	0.335
642.20	0.343
642.30	0.351
642.40	0.360
642.50	0.368
642.60	0.376
642.70	0.384
642.80	0.392
642.90	0.400
643.00	0.409
643.10	0.417
643.20	0.425
643.30	0.433
643.40	0.441
643.50	0.449
643.60	0.458
643.70	0.466
643.80	0.474
643.90	0.482
644.00	**0.490**
644.10	**0.490**
644.20	0.490
644.30	0.490
644.40	0.490
644.50	0.490
644.60	0.490

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac, 72.22% Impervious, Inflow Depth > 3.71" for 10-YR event				
Inflow =	1.36 cfs @	12.09 hrs,	Volume=	0.101 af	
Outflow =	1.36 cfs @	12.09 hrs,	Volume=	0.101 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.78 cfs @	12.09 hrs,	Volume=	0.089 af	
Secondary =	0.58 cfs @	12.09 hrs,	Volume=	0.012 af	

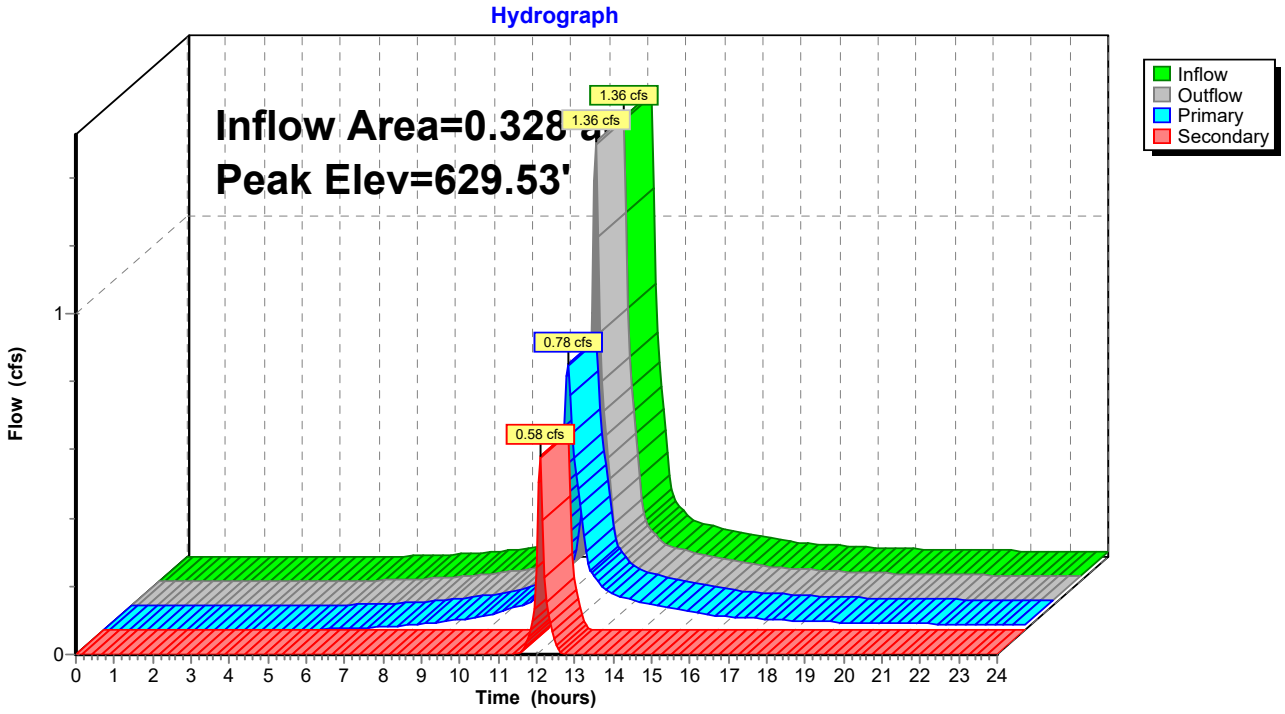
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 629.53' @ 12.09 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**6.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 620.60' S= 0.0344 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.77 cfs @ 12.09 hrs HW=629.52' TW=623.52' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.77 cfs @ 3.92 fps)

Secondary OutFlow Max=0.56 cfs @ 12.09 hrs HW=629.52' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.56 cfs @ 2.24 fps)

Pond ICS-3: ICS-3



Stage-Area-Storage for Pond ICS-3: ICS-3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
628.85	**0**	631.45	0
628.90	0	631.50	0
628.95	0	631.55	0
629.00	0	631.60	0
629.05	0	631.65	0
629.10	0	631.70	0
629.15	0	631.75	0
629.20	0	631.80	0
629.25	0	631.85	0
629.30	0	631.90	0
629.35	0	631.95	0
629.40	0	632.00	0
629.45	0	632.05	0
629.50	0	632.10	0
629.55	0	632.15	0
629.60	0	632.20	0
629.65	0	632.25	0
629.70	0	632.30	0
629.75	0	632.35	0
629.80	0	632.40	0
629.85	0	632.45	0
629.90	0	632.50	0
629.95	0		
630.00	0		
630.05	0		
630.10	0		
630.15	0		
630.20	0		
630.25	0		
630.30	0		
630.35	0		
630.40	0		
630.45	0		
630.50	0		
630.55	0		
630.60	0		
630.65	0		
630.70	0		
630.75	0		
630.80	0		
630.85	0		
630.90	0		
630.95	0		
631.00	0		
631.05	0		
631.10	0		
631.15	0		
631.20	0		
631.25	0		
631.30	0		
631.35	0		
631.40	0		

Summary for Pond ICS-4: ICS-4

Inflow Area =	1.068 ac, 93.43% Impervious, Inflow Depth > 4.58" for 10-YR event				
Inflow =	5.07 cfs @	12.09 hrs,	Volume=	0.408 af	
Outflow =	5.07 cfs @	12.09 hrs,	Volume=	0.408 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.12 cfs @	12.09 hrs,	Volume=	0.318 af	
Secondary =	3.95 cfs @	12.09 hrs,	Volume=	0.089 af	

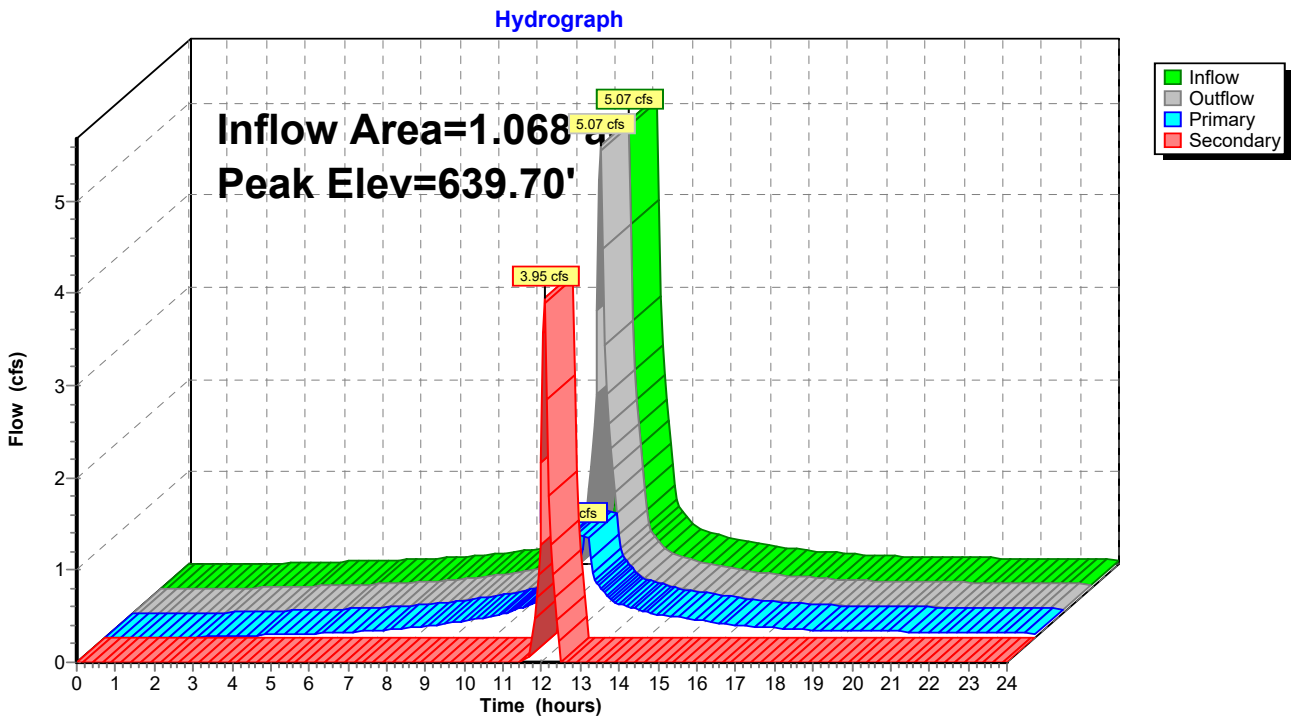
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 639.70' @ 12.09 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.12 cfs @ 12.09 hrs HW=639.69' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.12 cfs @ 5.72 fps)

Secondary OutFlow Max=3.81 cfs @ 12.09 hrs HW=639.69' (Free Discharge)
└─**3=Culvert** (Passes 3.81 cfs of 6.70 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 3.81 cfs @ 1.87 fps)

Pond ICS-4: ICS-4



Stage-Area-Storage for Pond ICS-4: ICS-4

Elevation (feet)	Storage (cubic-feet)
636.50	**0**
636.55	0
636.60	0
636.65	0
636.70	0
636.75	0
636.80	0
636.85	0
636.90	0
636.95	0
637.00	0
637.05	0
637.10	0
637.15	0
637.20	0
637.25	0
637.30	0
637.35	0
637.40	0
637.45	0
637.50	0
637.55	0
637.60	0
637.65	0
637.70	0
637.75	0
637.80	0
637.85	0
637.90	0
637.95	0
638.00	0
638.05	0
638.10	0
638.15	0
638.20	0
638.25	0
638.30	0
638.35	0
638.40	0
638.45	0
638.50	0
638.55	0
638.60	0
638.65	0
638.70	0
638.75	0
638.80	0
638.85	0
638.90	0
638.95	0
639.00	0
639.05	0
639.10	0
639.15	0
639.20	0
639.25	0
639.30	0
639.35	0
639.40	0
639.45	0
639.50	0
639.55	0
639.60	0
639.65	0
639.70	0
639.75	0
639.80	0
639.85	0
639.90	0
639.95	0
640.00	0

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac, 62.40% Impervious, Inflow Depth > 3.31" for 10-YR event				
Inflow =	2.79 cfs @	12.09 hrs,	Volume=	0.204 af	
Outflow =	2.79 cfs @	12.09 hrs,	Volume=	0.204 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.30 cfs @	12.05 hrs,	Volume=	0.116 af	
Secondary =	2.50 cfs @	12.09 hrs,	Volume=	0.088 af	

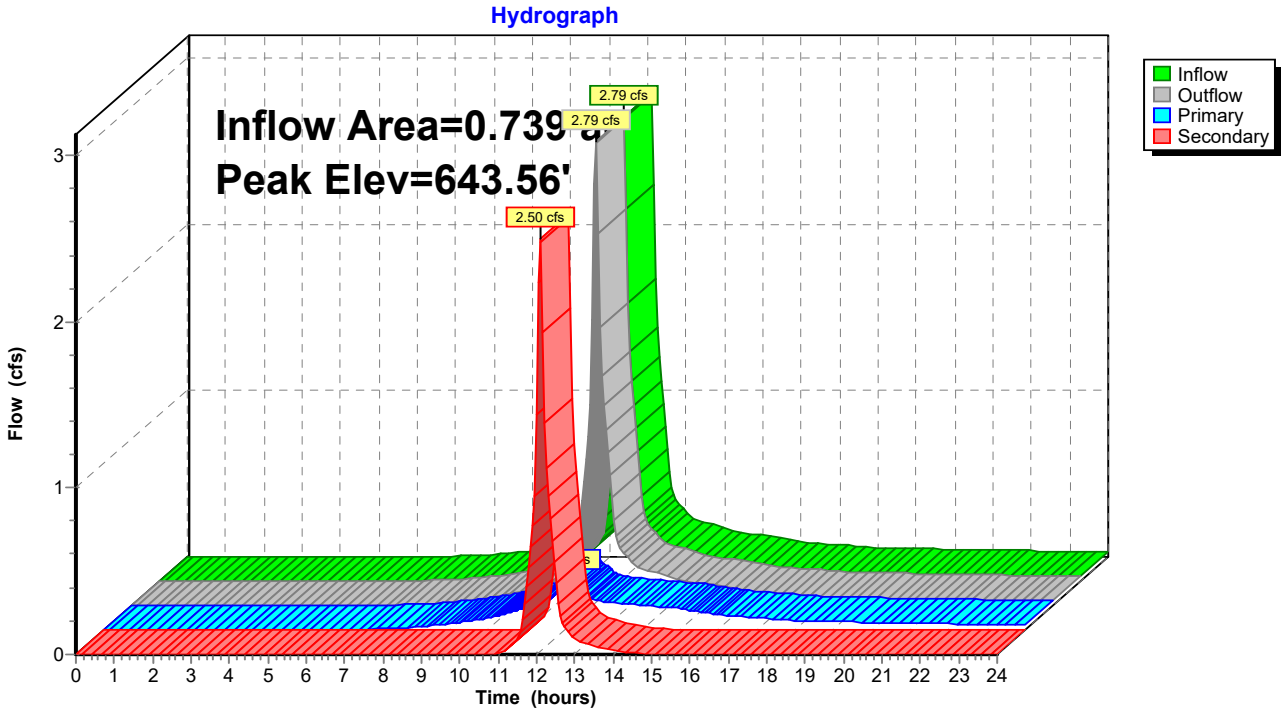
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 643.56' @ 12.09 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 637.00' S= 0.0656 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.05 hrs HW=643.49' TW=637.49' (TW follows 6.00' below HW)
└─**1=Culvert** (Outlet Controls 0.30 cfs @ 6.03 fps)

Secondary OutFlow Max=2.44 cfs @ 12.09 hrs HW=643.55' TW=637.55' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 2.44 cfs @ 3.91 fps)

Pond ICS-5: ICS-5



Stage-Area-Storage for Pond ICS-5: ICS-5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
642.25	**0**	644.85	0
642.30	0	644.90	0
642.35	0	644.95	0
642.40	0	645.00	0
642.45	0	645.05	0
642.50	0	645.10	0
642.55	0	645.15	0
642.60	0	645.20	0
642.65	0	645.25	0
642.70	0	645.30	0
642.75	0	645.35	0
642.80	0	645.40	0
642.85	0	645.45	0
642.90	0	645.50	0
642.95	0		
643.00	0		
643.05	0		
643.10	0		
643.15	0		
643.20	0		
643.25	0		
643.30	0		
643.35	0		
643.40	0		
643.45	0		
643.50	0		
643.55	0		
643.60	0		
643.65	0		
643.70	0		
643.75	0		
643.80	0		
643.85	0		
643.90	0		
643.95	0		
644.00	0		
644.05	0		
644.10	0		
644.15	0		
644.20	0		
644.25	0		
644.30	0		
644.35	0		
644.40	0		
644.45	0		
644.50	0		
644.55	0		
644.60	0		
644.65	0		
644.70	0		
644.75	0		
644.80	0		

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth > 3.71" for 10-YR event
Inflow = 0.23 cfs @ 12.09 hrs, Volume= 0.017 af
Outflow = 0.08 cfs @ 12.37 hrs, Volume= 0.011 af, Atten= 64%, Lag= 16.9 min
Primary = 0.08 cfs @ 12.37 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 654.92' @ 12.37 hrs Surf.Area= 490 sf Storage= 333 cf

Plug-Flow detention time= 223.2 min calculated for 0.011 af (66% of inflow)
Center-of-Mass det. time= 126.5 min (923.6 - 797.0)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

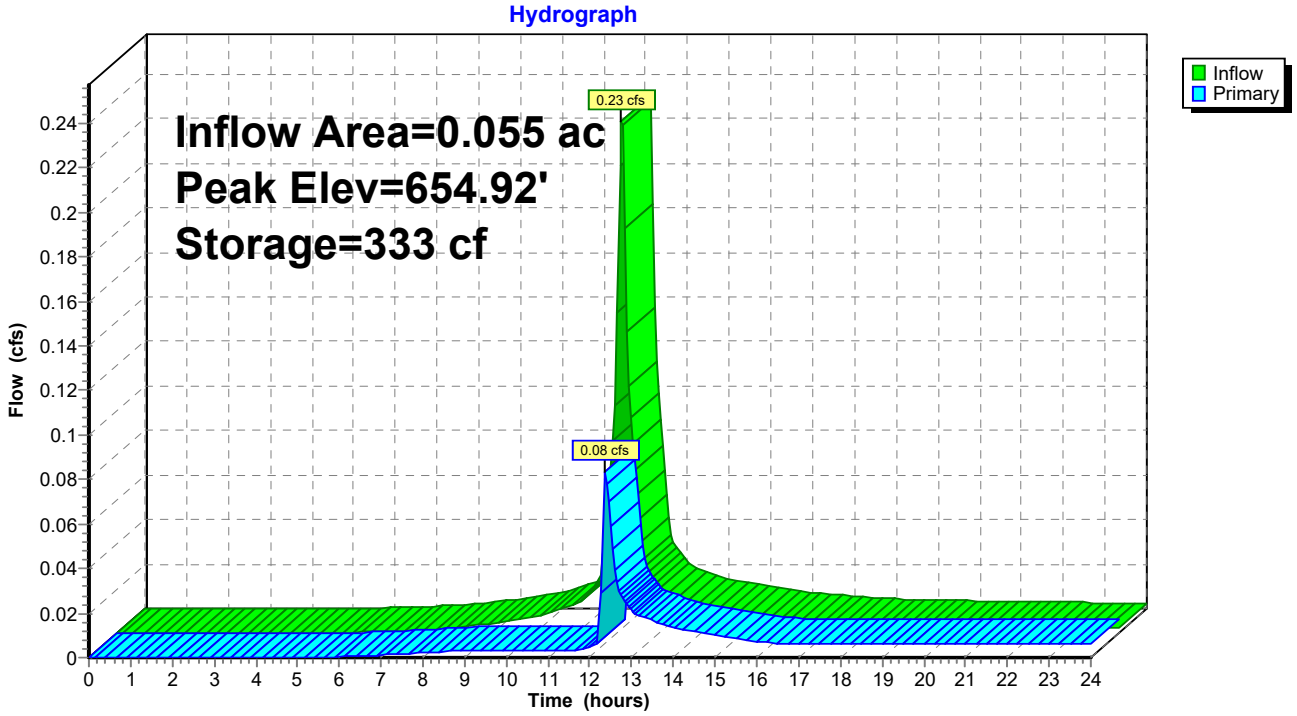
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.08 cfs @ 12.37 hrs HW=654.92' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.36 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Area-Storage for Pond RG-7B: RG-7B

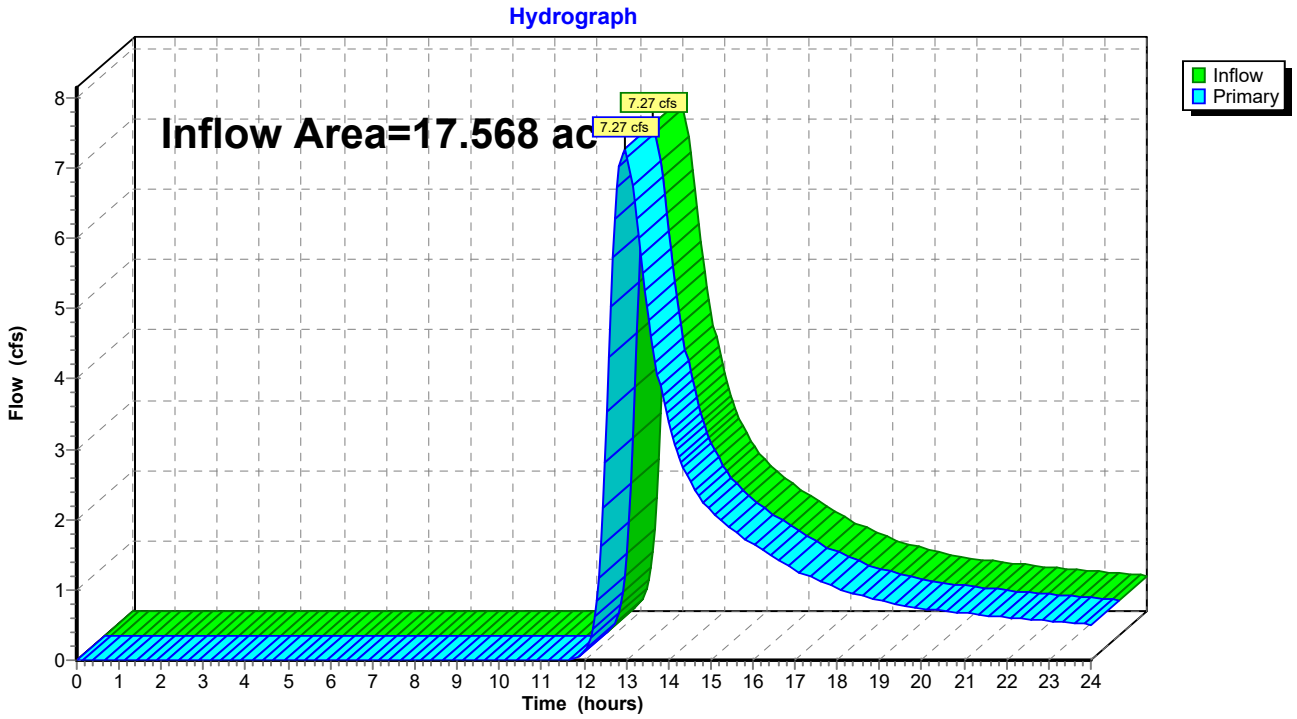
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
653.00	259	0
653.02	259	2
653.04	259	4
653.06	259	6
653.08	259	8
653.10	259	10
653.12	259	12
653.14	259	15
653.16	259	17
653.18	259	19
653.20	259	21
653.22	259	23
653.24	259	25
653.26	259	27
653.28	259	29
653.30	259	31
653.32	259	33
653.34	259	35
653.36	259	37
653.38	259	39
653.40	259	41
653.42	259	44
653.44	259	46
653.46	259	48
653.48	259	50
653.50	259	52
653.52	259	53
653.54	259	55
653.56	259	56
653.58	259	58
653.60	259	60
653.62	259	61
653.64	259	63
653.66	259	64
653.68	259	66
653.70	259	67
653.72	259	69
653.74	259	70
653.76	259	72
653.78	259	74
653.80	259	75
653.82	259	77
653.84	259	78
653.86	259	80
653.88	259	81
653.90	259	83
653.92	259	84
653.94	259	86
653.96	259	88
653.98	259	89
654.00	259	91
654.02	263	92
654.04	268	94
654.06	272	96
654.08	276	98
654.10	281	99
654.12	285	102
654.14	289	104
654.16	294	106
654.18	298	108
654.20	303	111
654.22	308	113
654.24	312	116
654.26	317	118
654.28	321	120
654.30	326	123
654.32	331	125
654.34	336	127
654.36	341	130
654.38	345	133
654.40	350	136
654.42	355	139
654.44	360	142
654.46	365	145
654.48	370	148
654.50	375	151
654.52	380	159
654.54	385	166
654.56	391	174
654.58	396	182
654.60	401	190
654.62	406	198
654.64	412	206
654.66	417	215
654.68	422	223
654.70	428	231
654.72	433	240
654.74	439	249
654.76	444	258
654.78	450	267
654.80	455	276
654.82	461	285
654.84	467	294
654.86	472	303
654.88	478	313
654.90	484	323
654.92	490	332
654.94	495	342
654.96	501	352
654.98	507	362
655.00	**513**	**372**

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 1.12" for 10-YR event
Inflow = 7.27 cfs @ 12.96 hrs, Volume= 1.640 af
Primary = 7.27 cfs @ 12.96 hrs, Volume= 1.640 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

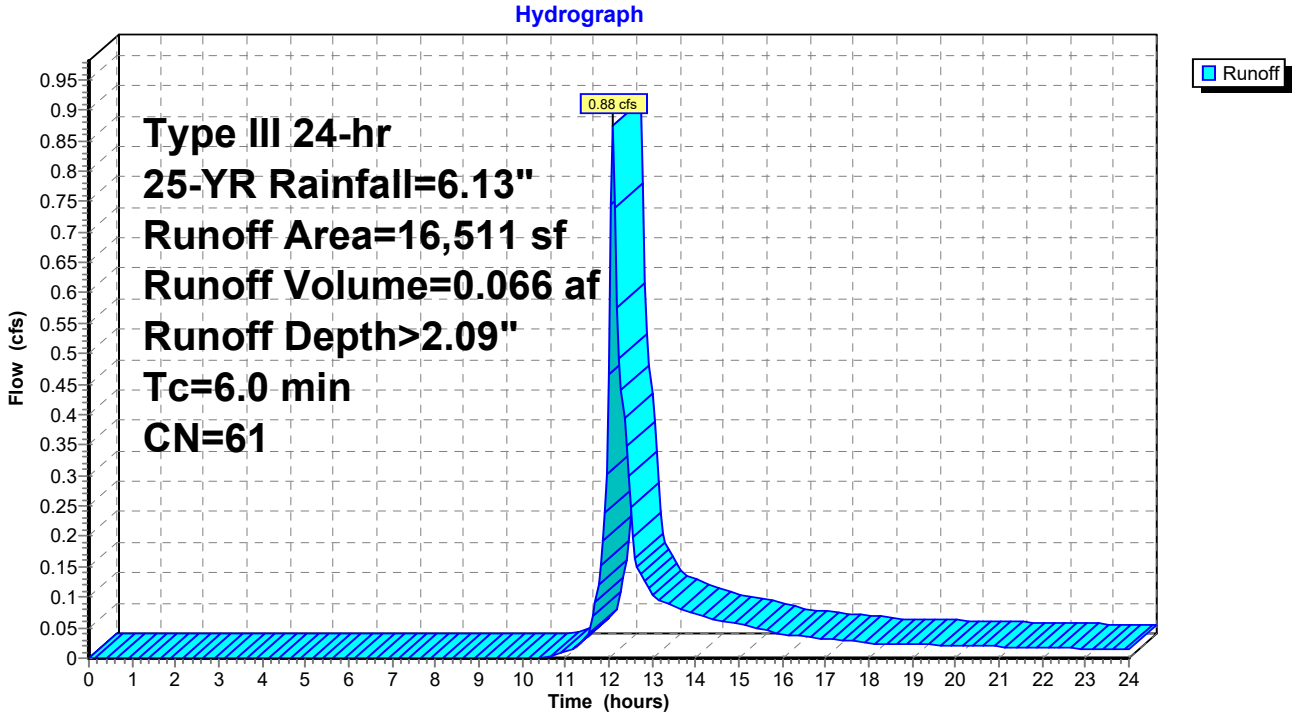
Runoff = 0.88 cfs @ 12.10 hrs, Volume= 0.066 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

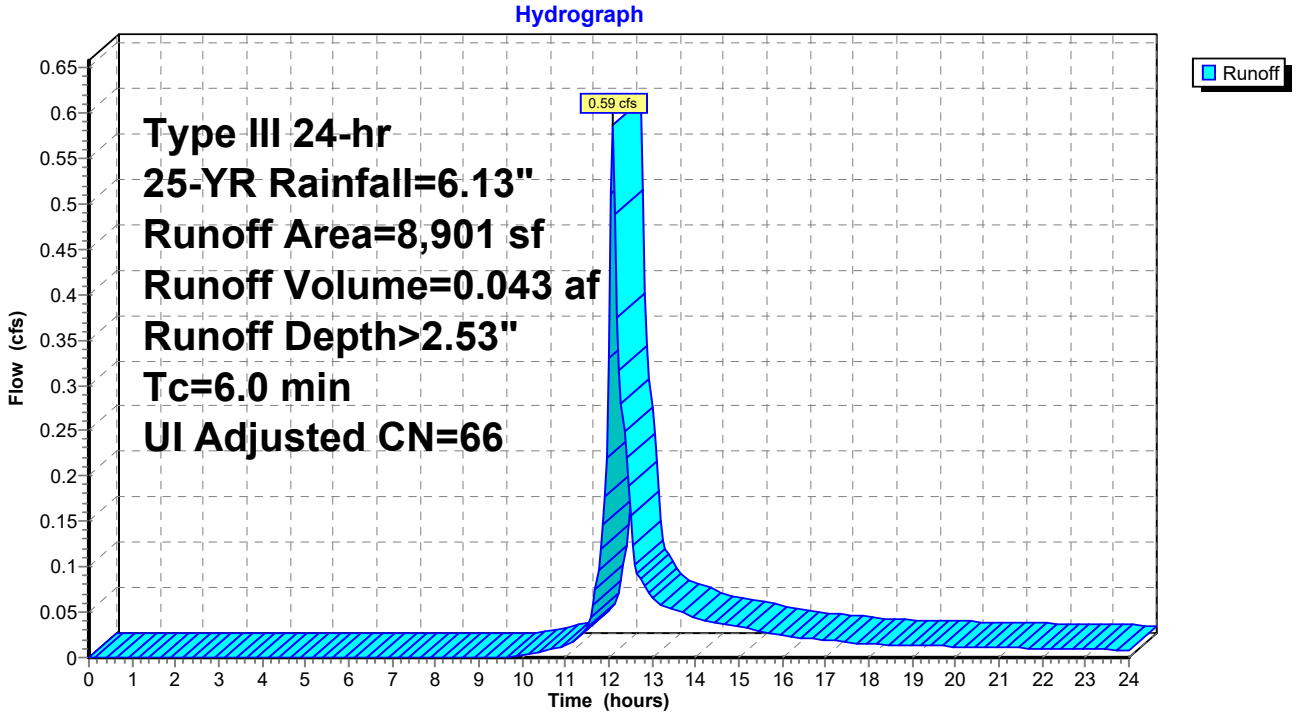
Runoff = 0.59 cfs @ 12.10 hrs, Volume= 0.043 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

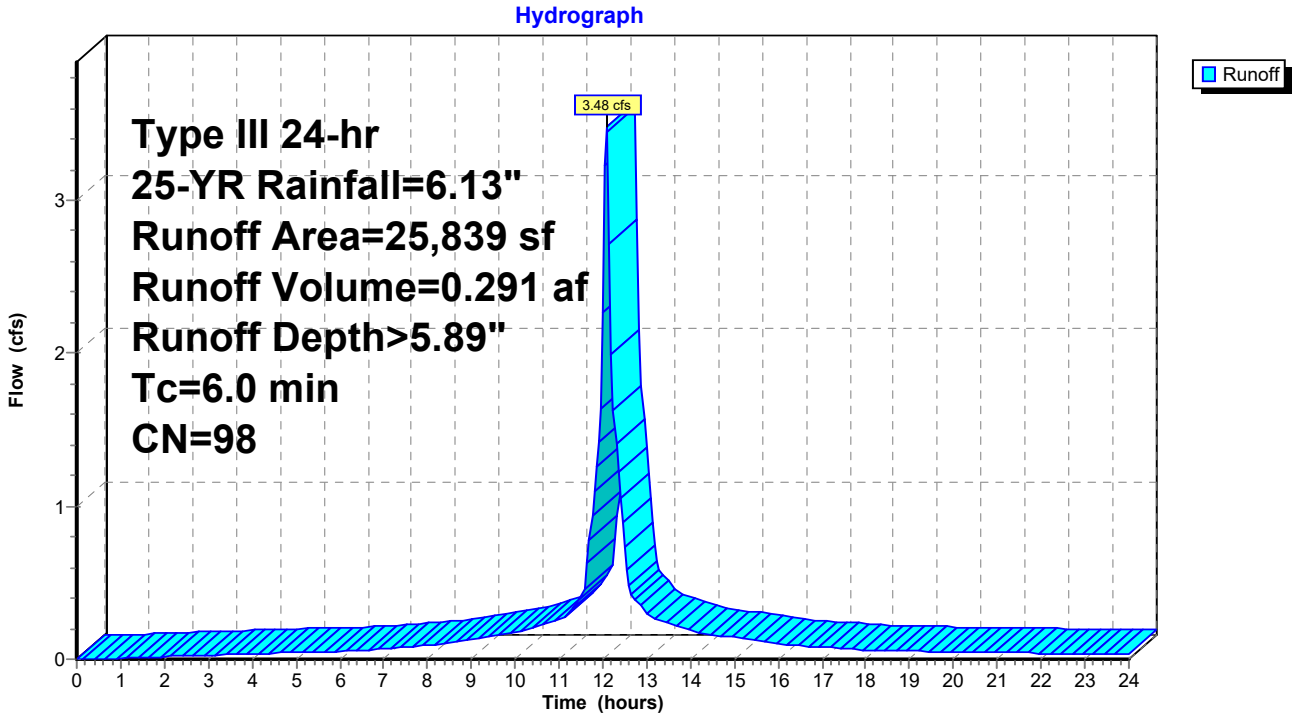
Runoff = 3.48 cfs @ 12.09 hrs, Volume= 0.291 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

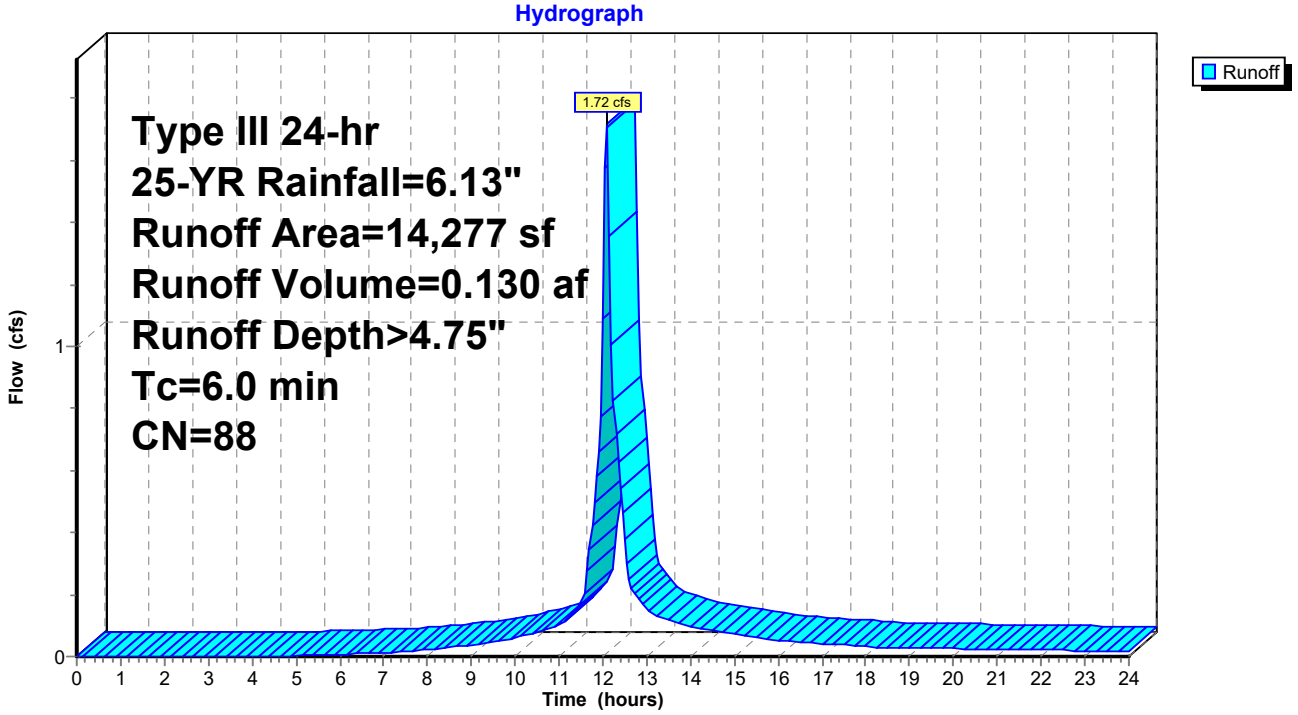
Runoff = 1.72 cfs @ 12.09 hrs, Volume= 0.130 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

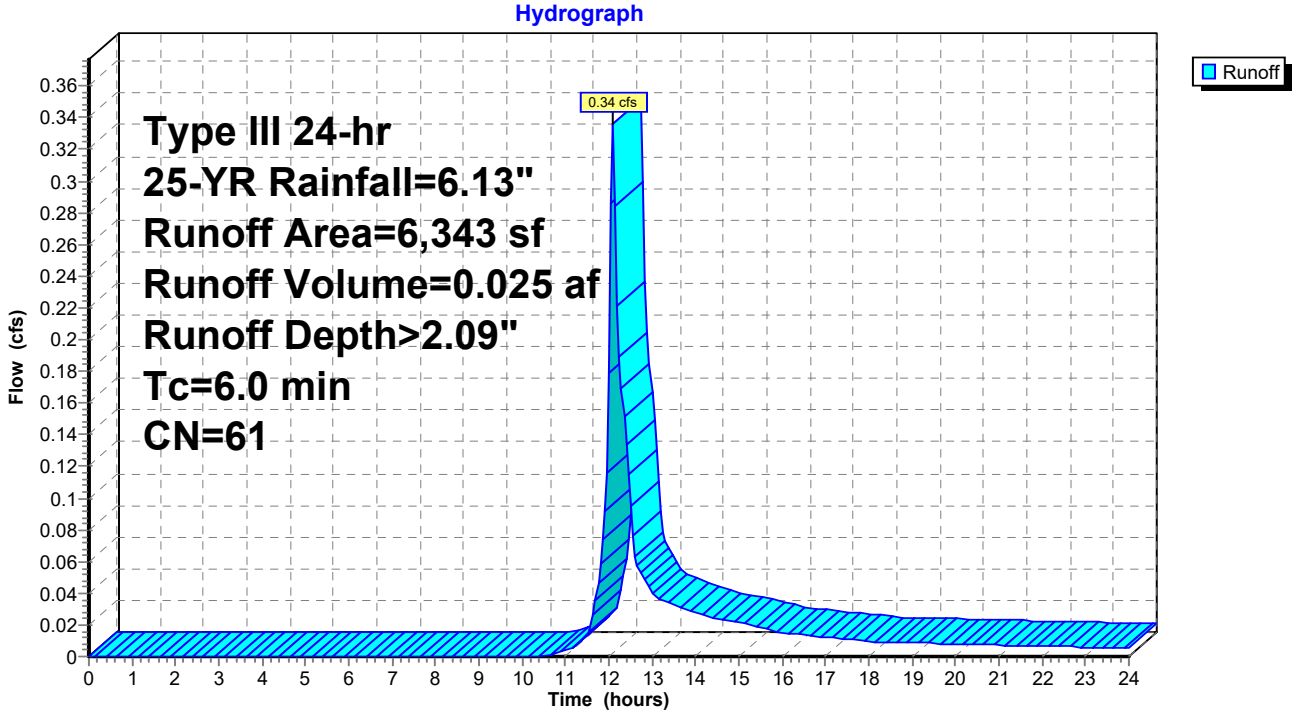
Runoff = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

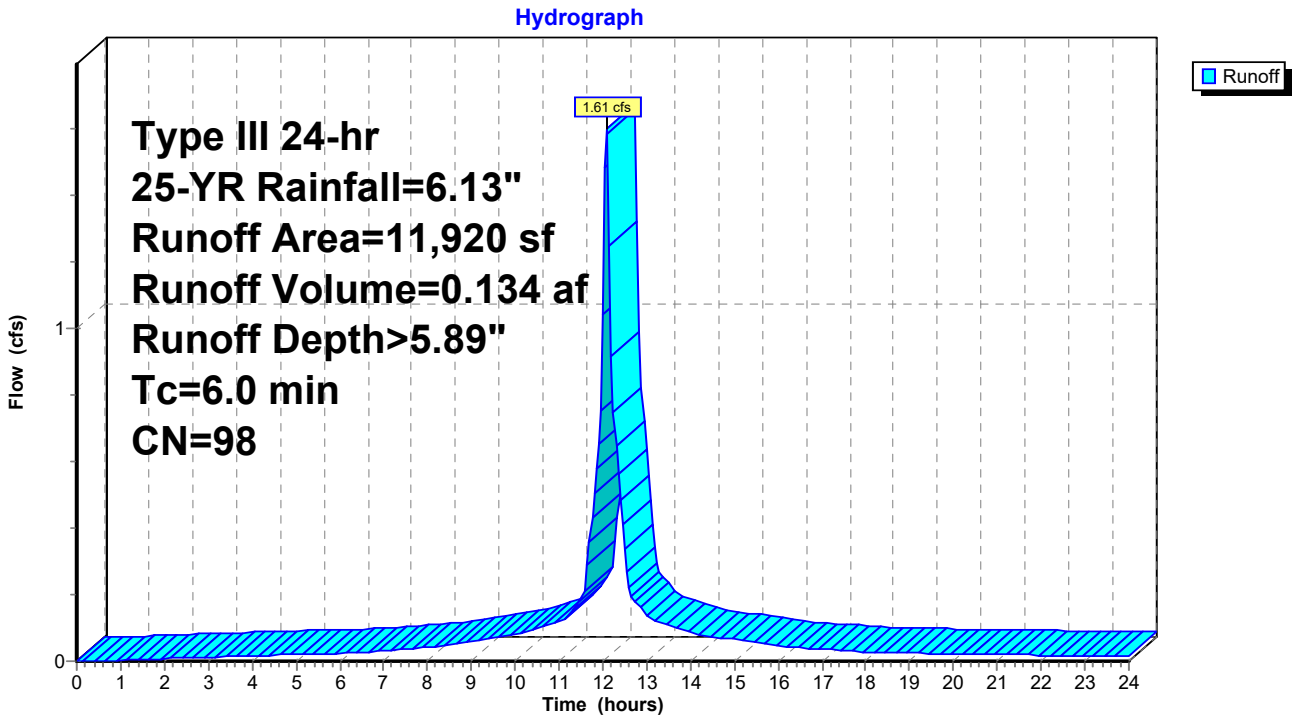
Runoff = 1.61 cfs @ 12.09 hrs, Volume= 0.134 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

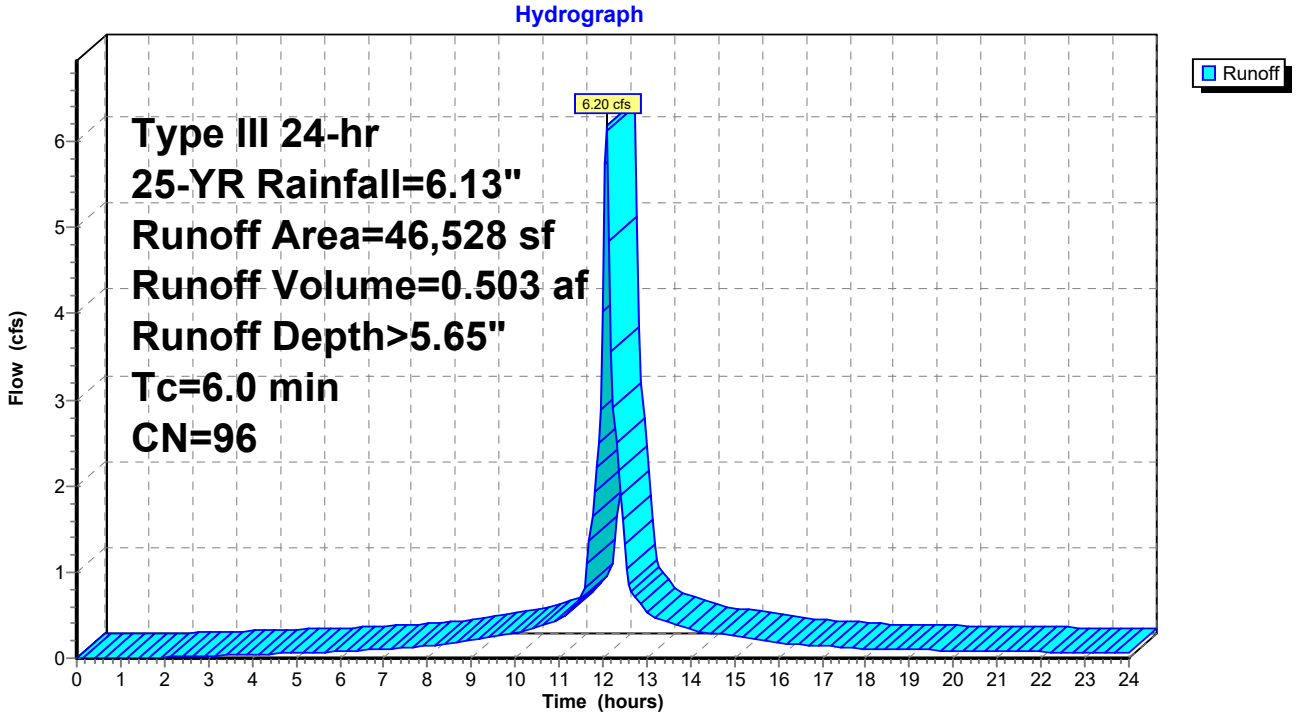
Runoff = 6.20 cfs @ 12.09 hrs, Volume= 0.503 af, Depth> 5.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

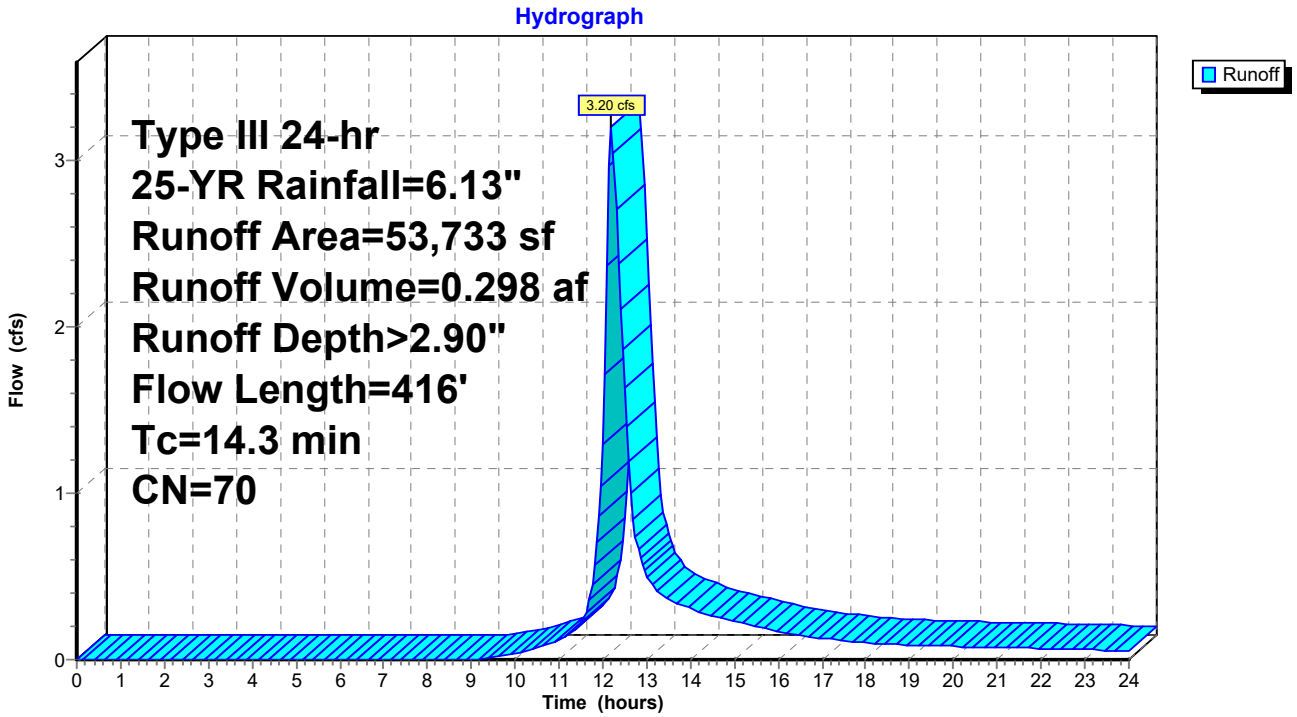
Runoff = 3.20 cfs @ 12.20 hrs, Volume= 0.298 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

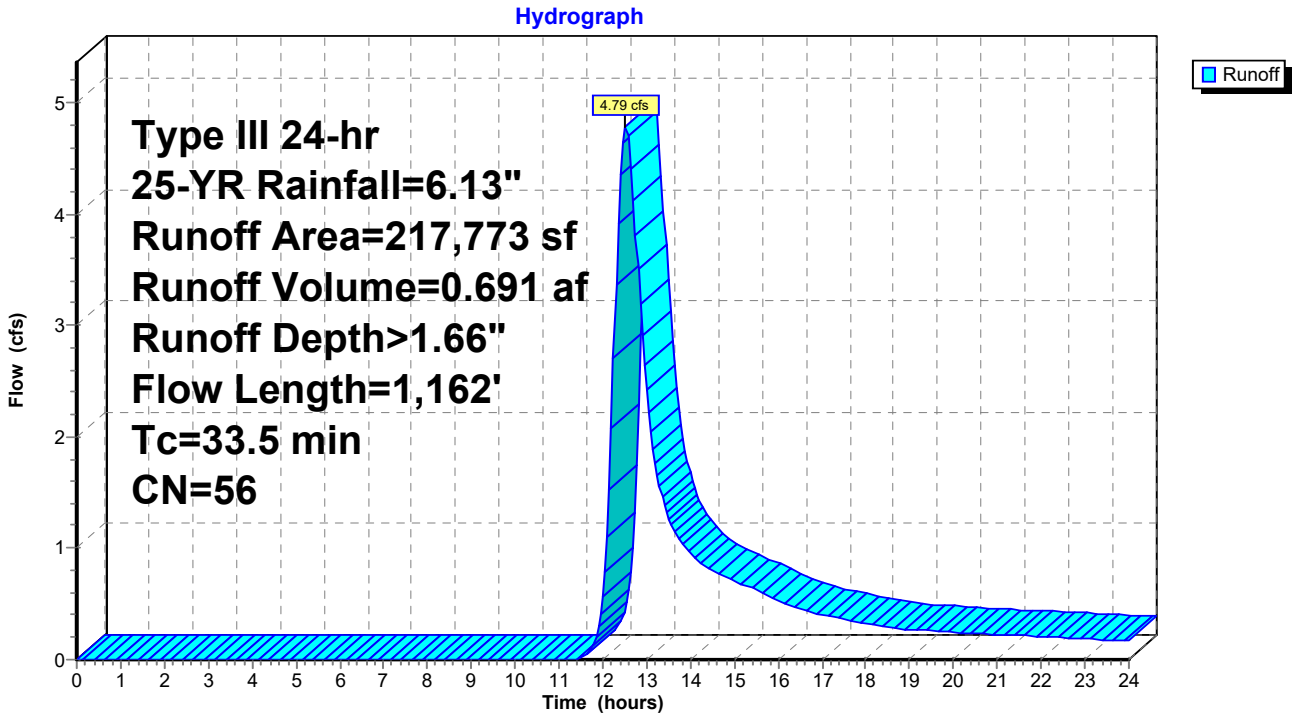
Runoff = 4.79 cfs @ 12.52 hrs, Volume= 0.691 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

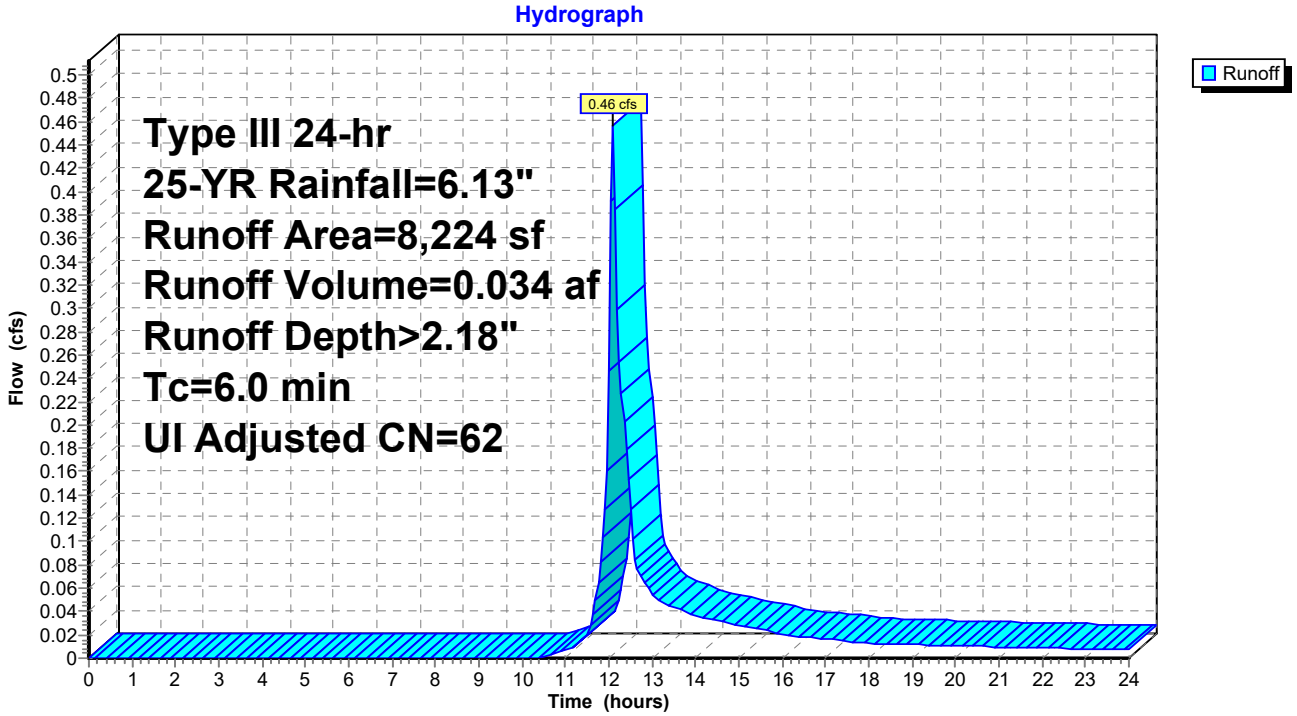
Runoff = 0.46 cfs @ 12.10 hrs, Volume= 0.034 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

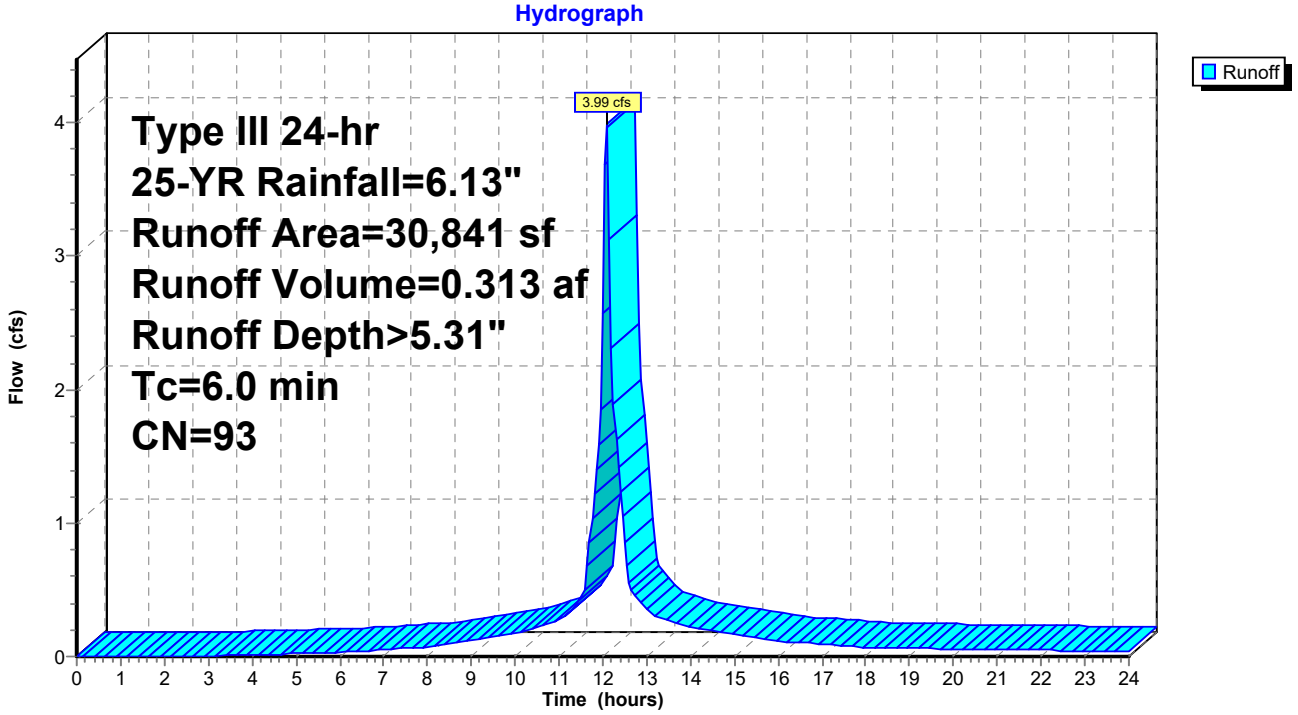
Runoff = 3.99 cfs @ 12.09 hrs, Volume= 0.313 af, Depth> 5.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

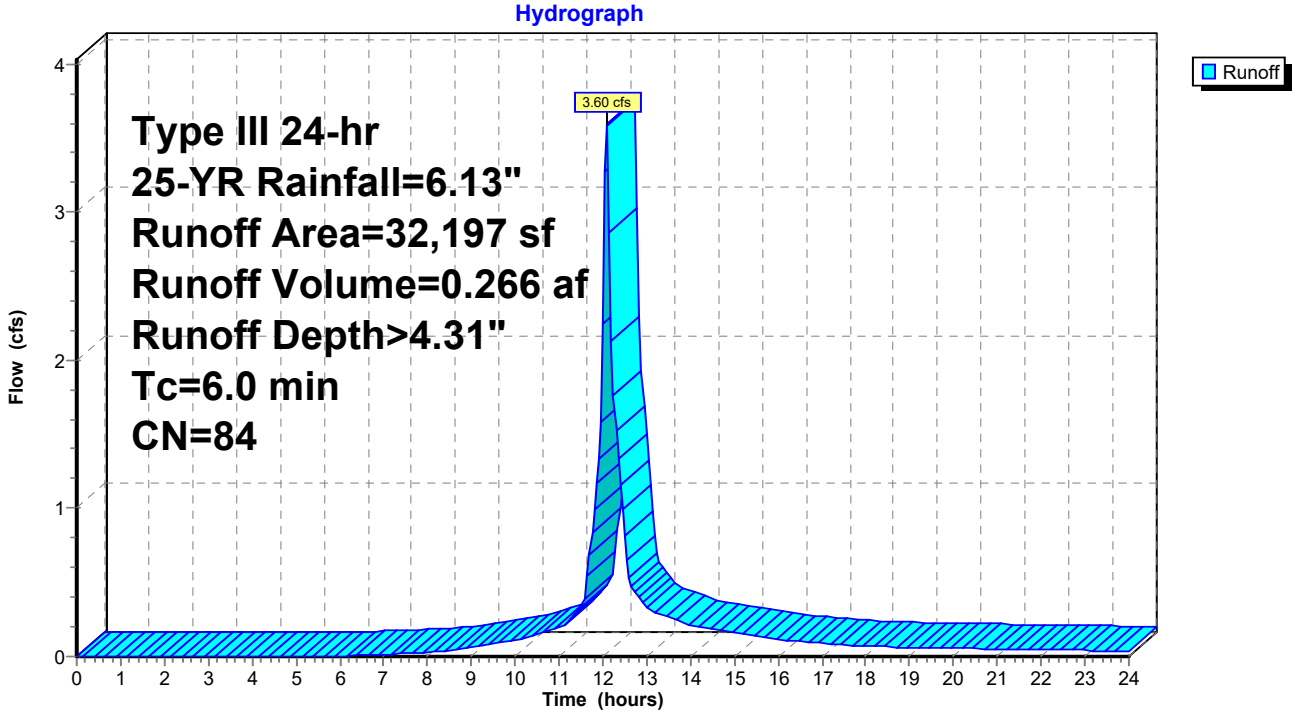
Runoff = 3.60 cfs @ 12.09 hrs, Volume= 0.266 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

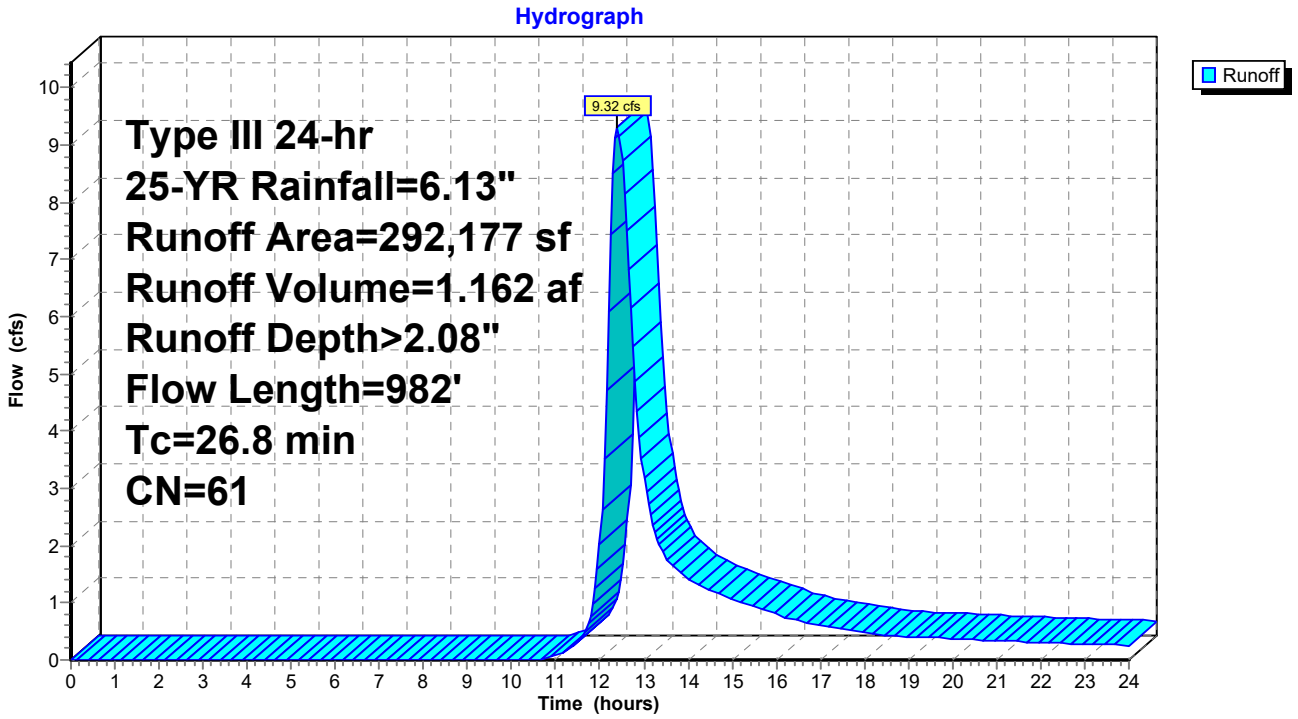
Runoff = 9.32 cfs @ 12.40 hrs, Volume= 1.162 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

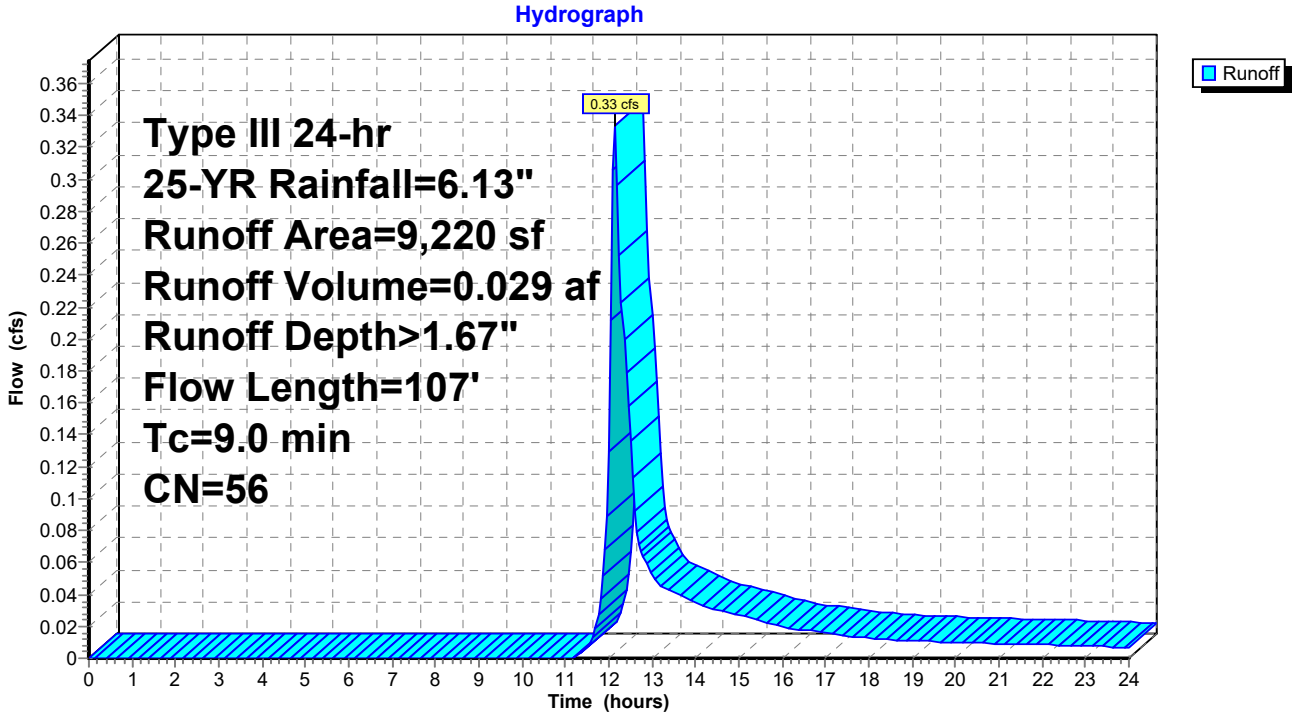
Runoff = 0.33 cfs @ 12.15 hrs, Volume= 0.029 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

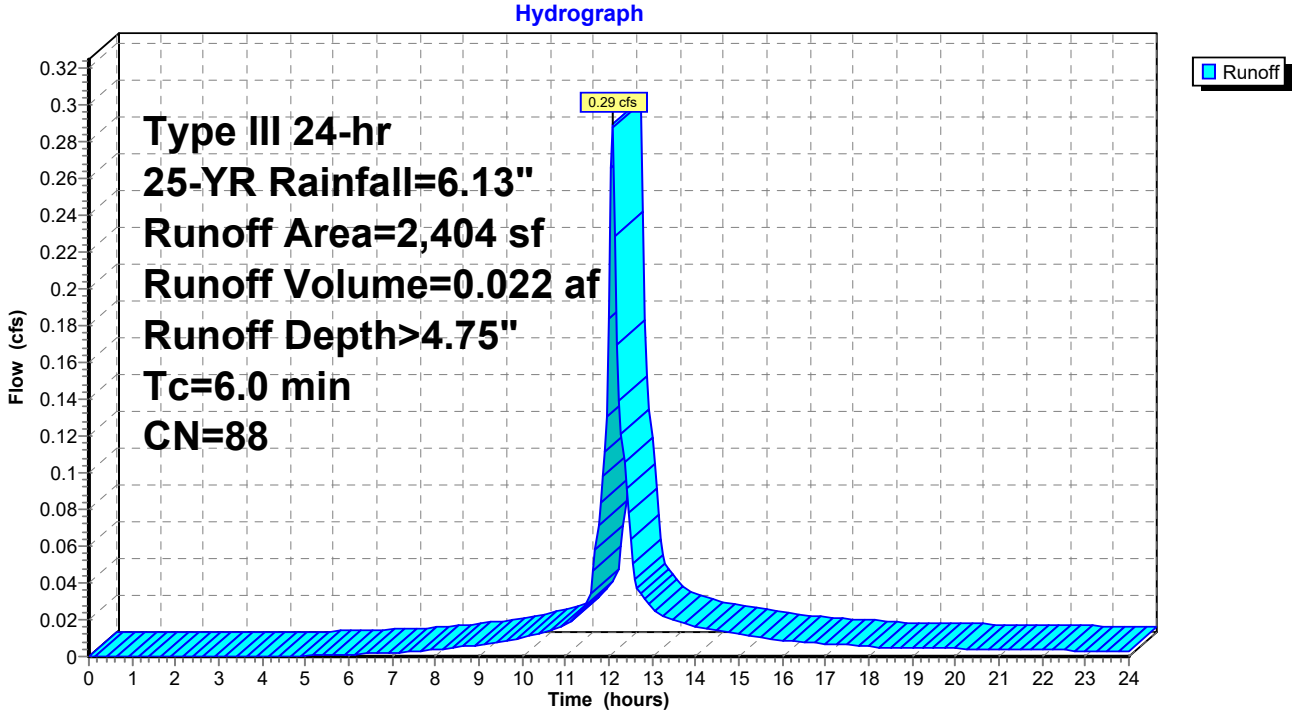
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.13"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

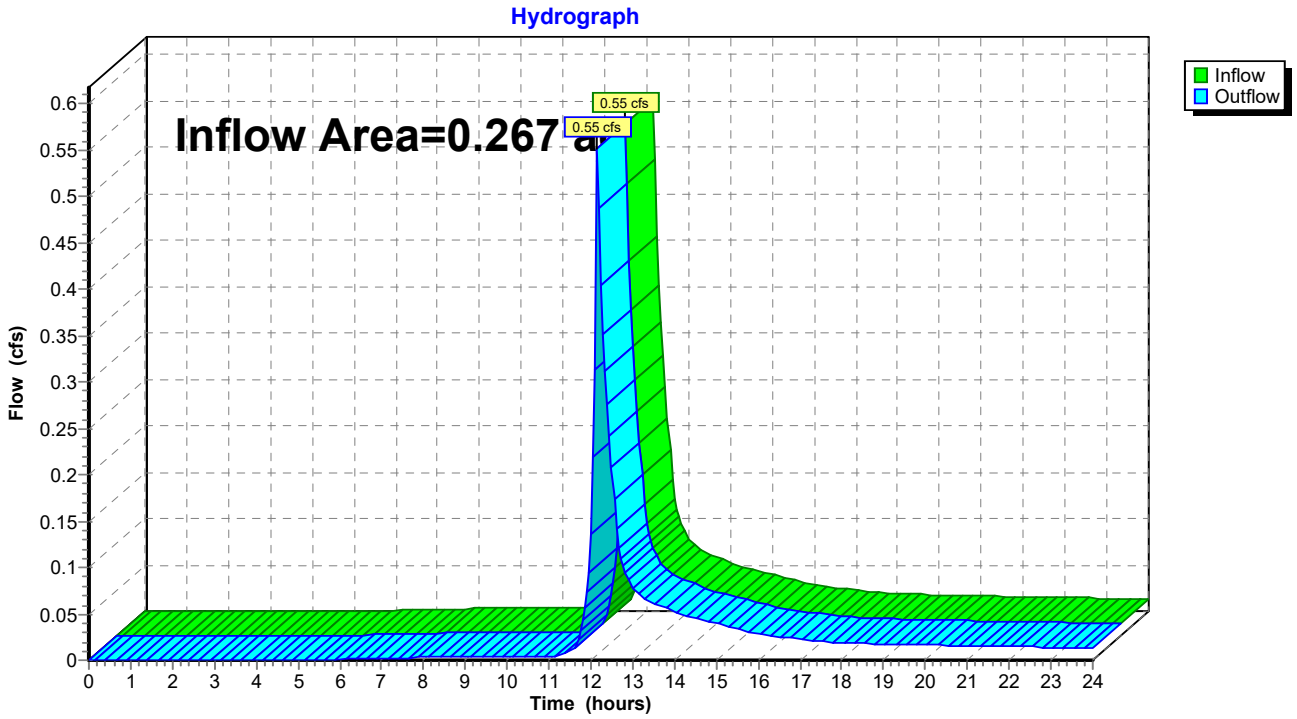


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth > 2.03" for 25-YR event
Inflow = 0.55 cfs @ 12.17 hrs, Volume= 0.045 af
Outflow = 0.55 cfs @ 12.17 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 1.75" for 25-YR event
Inflow = 14.32 cfs @ 12.64 hrs, Volume= 2.558 af
Outflow = 12.61 cfs @ 12.84 hrs, Volume= 2.512 af, Atten= 12%, Lag= 12.1 min

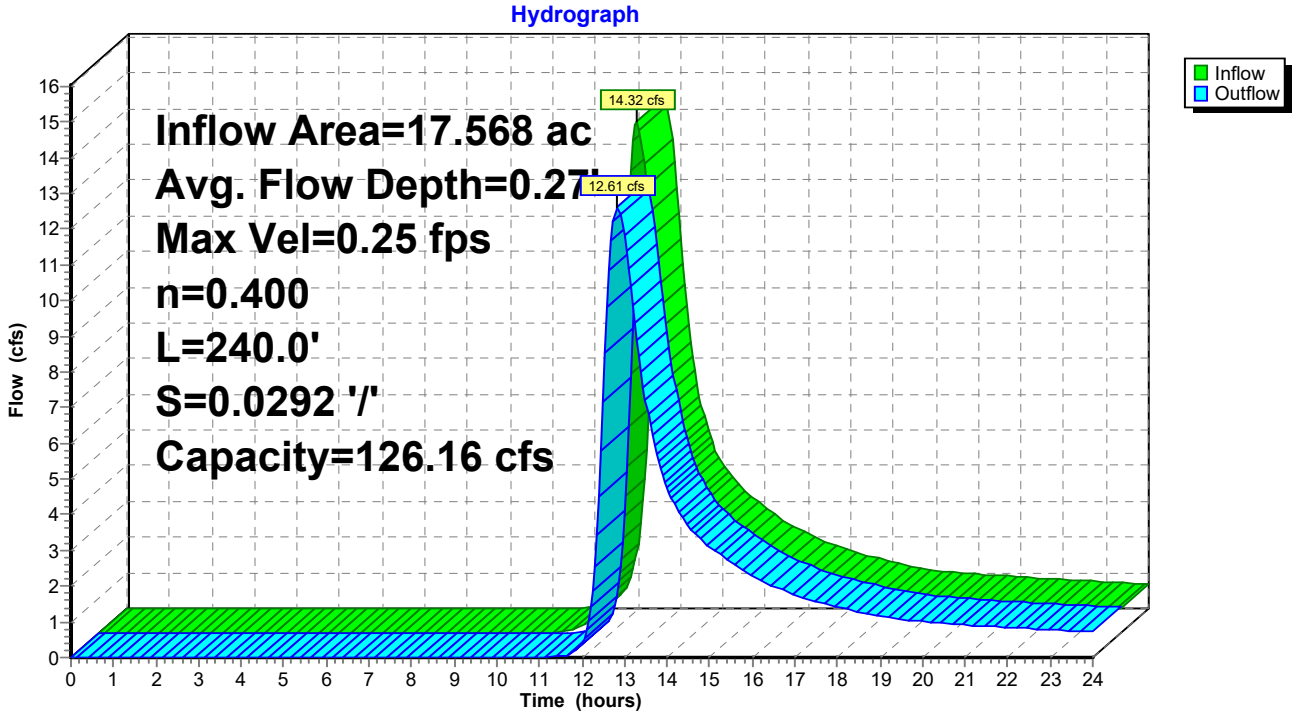
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.25 fps, Min. Travel Time= 16.0 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 37.4 min

Peak Storage= 12,119 cf @ 12.84 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Area-Storage for Reach PDP-4: Design Point 4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
625.00	0.0	0
625.01	1.7	398
625.02	3.3	799
625.03	5.0	1,204
625.04	6.7	1,612
625.05	8.4	2,024
625.06	10.2	2,439
625.07	11.9	2,857
625.08	13.7	3,279
625.09	15.4	3,705
625.10	17.2	4,134
625.11	19.0	4,567
625.12	20.8	5,003
625.13	22.7	5,442
625.14	24.5	5,885
625.15	26.4	6,331
625.16	28.3	6,781
625.17	30.1	7,235
625.18	32.0	7,692
625.19	34.0	8,152
625.20	35.9	8,616
625.21	37.8	9,083
625.22	39.8	9,554
625.23	41.8	10,028
625.24	43.8	10,506
625.25	45.8	10,988
625.26	47.8	11,472
625.27	49.8	11,960
625.28	51.9	12,452
625.29	53.9	12,947
625.30	56.0	13,446
625.31	58.1	13,948
625.32	60.2	14,454
625.33	62.3	14,963
625.34	64.5	15,475
625.35	66.6	15,992
625.36	68.8	16,511
625.37	71.0	17,034
625.38	73.2	17,561
625.39	75.4	18,091
625.40	77.6	18,624
625.41	79.8	19,161
625.42	82.1	19,701
625.43	84.4	20,245
625.44	86.6	20,793
625.45	88.9	21,344
625.46	91.2	21,898
625.47	93.6	22,456
625.48	95.9	23,017
625.49	98.3	23,582
625.50	100.6	24,150
625.51	103.0	24,722
625.52	105.4	25,297
625.53	107.8	25,876
625.54	110.2	26,458
625.55	112.7	27,044
625.56	115.1	27,633
625.57	117.6	28,225
625.58	120.1	28,821
625.59	122.6	29,421
625.60	125.1	30,024
625.61	127.6	30,631
625.62	130.2	31,241
625.63	132.7	31,854
625.64	135.3	32,471
625.65	137.9	33,092
625.66	140.5	33,715
625.67	143.1	34,343
625.68	145.7	34,974
625.69	148.4	35,608
625.70	151.0	36,246
625.71	153.7	36,887
625.72	156.4	37,532
625.73	159.1	38,180
625.74	161.8	38,832
625.75	164.5	39,488
625.76	167.3	40,146
625.77	170.0	40,808
625.78	172.8	41,474
625.79	175.6	42,143
625.80	178.4	42,816
625.81	181.2	43,492
625.82	184.0	44,172
625.83	186.9	44,855
625.84	189.8	45,541
625.85	192.6	46,232
625.86	195.5	46,925
625.87	198.4	47,622
625.88	201.3	48,323
625.89	204.3	49,027
625.90	207.2	49,734
625.91	210.2	50,445
625.92	213.2	51,159
625.93	216.2	51,877
625.94	219.2	52,599
625.95	222.2	53,324
625.96	225.2	54,052
625.97	228.3	54,784
625.98	231.3	55,519
625.99	234.4	56,258
626.00	**237.5**	**57,000**

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth > 1.80" for 25-YR event
Inflow = 15.53 cfs @ 12.46 hrs, Volume= 2.192 af
Outflow = 13.07 cfs @ 12.65 hrs, Volume= 2.148 af, Atten= 16%, Lag= 11.2 min

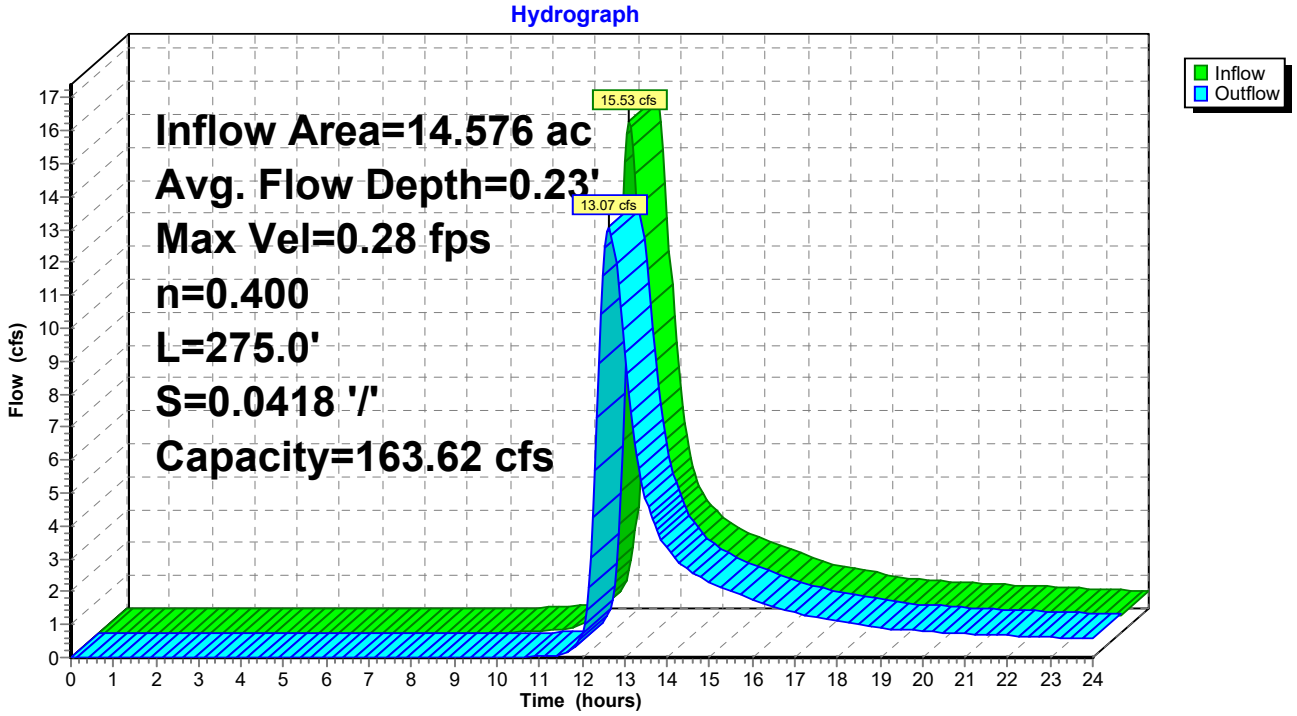
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.28 fps, Min. Travel Time= 16.6 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 43.4 min

Peak Storage= 13,039 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Area-Storage for Reach PDP-5: Design Point 5

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
636.50	0.0	0
636.51	2.0	551
636.52	4.0	1,104
636.53	6.0	1,659
636.54	8.1	2,217
636.55	10.1	2,776
636.56	12.1	3,337
636.57	14.2	3,901
636.58	16.2	4,466
636.59	18.3	5,034
636.60	20.4	5,603
636.61	22.5	6,175
636.62	24.5	6,749
636.63	26.6	7,324
636.64	28.7	7,902
636.65	30.8	8,482
636.66	33.0	9,064
636.67	35.1	9,648
636.68	37.2	10,234
636.69	39.4	10,822
636.70	41.5	11,413
636.71	43.7	12,005
636.72	45.8	12,599
636.73	48.0	13,196
636.74	50.2	13,794
636.75	52.3	14,395
636.76	54.5	14,997
636.77	56.7	15,602
636.78	58.9	16,209
636.79	61.2	16,817
636.80	63.4	17,428
636.81	65.6	18,041
636.82	67.8	18,656
636.83	70.1	19,273
636.84	72.3	19,892
636.85	74.6	20,513
636.86	76.9	21,137
636.87	79.1	21,762
636.88	81.4	22,389
636.89	83.7	23,019
636.90	86.0	23,650
636.91	88.3	24,284
636.92	90.6	24,919
636.93	92.9	25,557
636.94	95.3	26,197
636.95	97.6	26,838
636.96	99.9	27,482
636.97	102.3	28,128
636.98	104.6	28,776
636.99	107.0	29,426
637.00	109.4	30,078
637.01	111.8	30,732
637.02	114.1	31,389
637.03	116.5	32,047
637.04	118.9	32,707
637.05	121.3	33,370
637.06	123.8	34,034
637.07	126.2	34,701
637.08	128.6	35,369
637.09	131.1	36,040
637.10	133.5	36,713
637.11	136.0	37,387
637.12	138.4	38,064
637.13	140.9	38,743
637.14	143.4	39,424
637.15	145.8	40,107
637.16	148.3	40,792
637.17	150.8	41,479
637.18	153.3	42,169
637.19	155.9	42,860
637.20	158.4	43,553
637.21	160.9	44,249
637.22	163.4	44,946
637.23	166.0	45,646
637.24	168.5	46,347
637.25	171.1	47,051
637.26	173.7	47,757
637.27	176.2	48,464
637.28	178.8	49,174
637.29	181.4	49,886
637.30	184.0	50,600
637.31	186.6	51,316
637.32	189.2	52,034
637.33	191.8	52,754
637.34	194.5	53,476
637.35	197.1	54,201
637.36	199.7	54,927
637.37	202.4	55,656
637.38	205.0	56,386
637.39	207.7	57,119
637.40	210.4	57,853
637.41	213.1	58,590
637.42	215.7	59,329
637.43	218.4	60,069
637.44	221.1	60,812
637.45	223.8	61,557
637.46	226.6	62,304
637.47	229.3	63,053
637.48	232.0	63,804
637.49	234.8	64,557
637.50	**237.5**	**65,313**

Summary for Reach PDP-6: Design Point 6

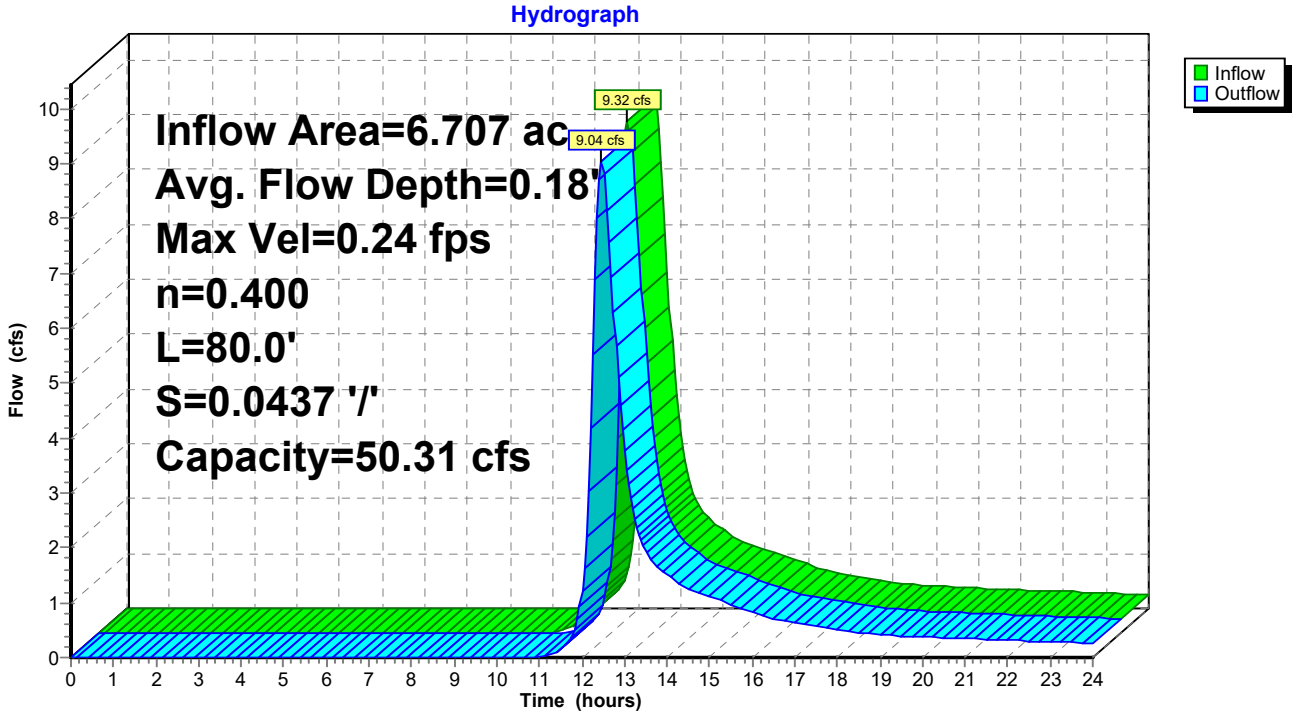
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 2.08" for 25-YR event
Inflow = 9.32 cfs @ 12.40 hrs, Volume= 1.162 af
Outflow = 9.04 cfs @ 12.47 hrs, Volume= 1.154 af, Atten= 3%, Lag= 3.8 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.24 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 0.09 fps, Avg. Travel Time= 15.1 min

Peak Storage= 2,966 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Area-Storage for Reach PDP-6: Design Point 6

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
642.50	0.0	0
642.51	2.0	160
642.52	4.0	321
642.53	6.0	482
642.54	8.0	644
642.55	10.1	806
642.56	12.1	969
642.57	14.1	1,132
642.58	16.2	1,295
642.59	18.2	1,459
642.60	20.3	1,624
642.61	22.4	1,789
642.62	24.4	1,955
642.63	26.5	2,121
642.64	28.6	2,287
642.65	30.7	2,454
642.66	32.8	2,621
642.67	34.9	2,789
642.68	37.0	2,958
642.69	39.1	3,127
642.70	41.2	3,296
642.71	43.3	3,466
642.72	45.5	3,636
642.73	47.6	3,807
642.74	49.7	3,978
642.75	51.9	4,150
642.76	54.0	4,322
642.77	56.2	4,495
642.78	58.4	4,668
642.79	60.5	4,842
642.80	62.7	5,016
642.81	64.9	5,191
642.82	67.1	5,366
642.83	69.3	5,541
642.84	71.5	5,717
642.85	73.7	5,894
642.86	75.9	6,071
642.87	78.1	6,249
642.88	80.3	6,427
642.89	82.6	6,605
642.90	84.8	6,784
642.91	87.0	6,963
642.92	89.3	7,143
642.93	91.5	7,324
642.94	93.8	7,505
642.95	96.1	7,686
642.96	98.3	7,868
642.97	100.6	8,050
642.98	102.9	8,233
642.99	105.2	8,416
643.00	**107.5**	**8,600**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 3.65" for 25-YR event
Inflow = 1.60 cfs @ 12.09 hrs, Volume= 0.342 af
Outflow = 0.87 cfs @ 12.37 hrs, Volume= 0.318 af, Atten= 45%, Lag= 16.2 min
Discarded = 0.08 cfs @ 12.36 hrs, Volume= 0.081 af
Primary = 0.80 cfs @ 12.37 hrs, Volume= 0.238 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 622.71' @ 12.36 hrs Surf.Area= 1,661 sf Storage= 1,960 cf
Flood Elev= 623.00' Surf.Area= 1,864 sf Storage= 2,469 cf

Plug-Flow detention time= 66.1 min calculated for 0.318 af (93% of inflow)
Center-of-Mass det. time= 30.0 min (938.5 - 908.5)

Volume	Invert	Avail.Storage	Storage Description
#1	619.75'	2,238 cf	**Overall storage (Prismatic)** Listed below (Recalc) 3,104 cf Overall - 866 cf Embedded = 2,238 cf
#2	619.75'	115 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 40.0% Voids
#3	620.25'	58 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
#4	620.75'	58 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
		2,469 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
621.00	577	721	721
622.00	1,162	870	1,591
623.00	1,864	1,513	3,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
620.25	577	289	289

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.25	577	0	0
620.75	577	289	289

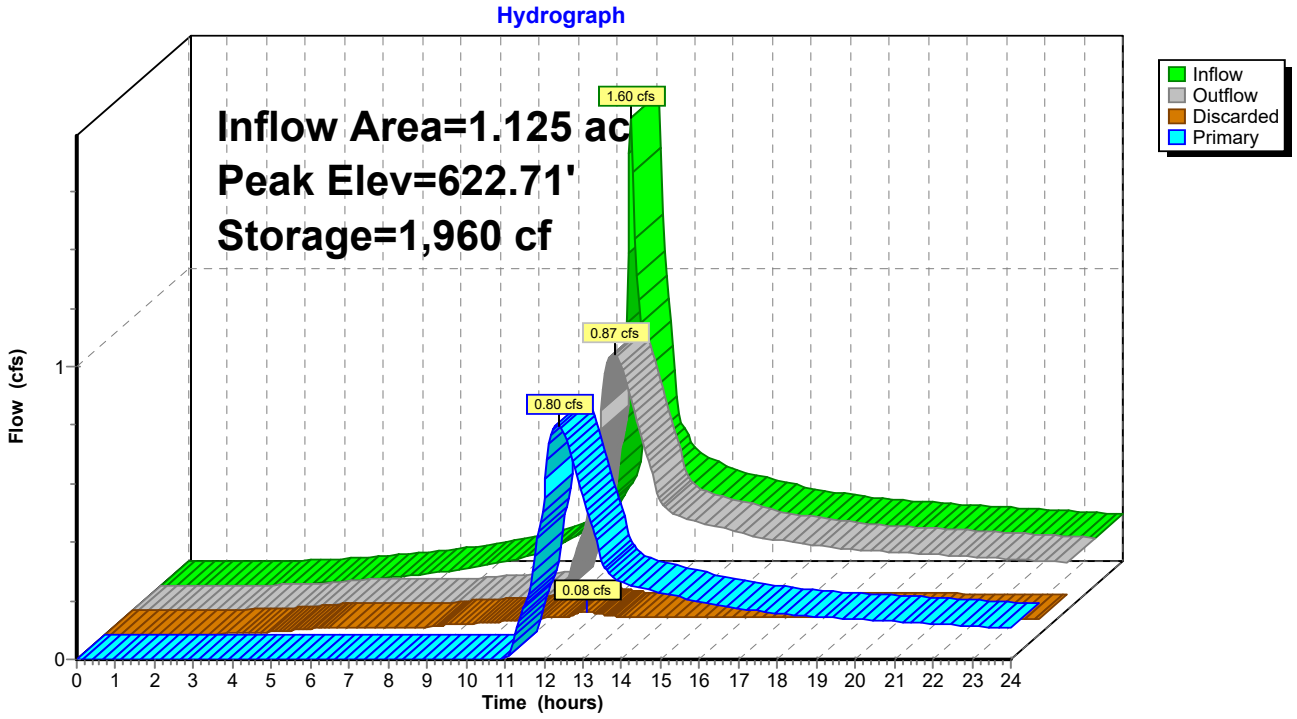
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.75	577	0	0
621.25	577	289	289

Device	Routing	Invert	Outlet Devices
#1	Discarded	619.75'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.64'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.64' / 620.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	622.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 12.36 hrs HW=622.71' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.80 cfs @ 12.37 hrs HW=622.71' (Free Discharge)
└─**2=Culvert** (Passes 0.80 cfs of 1.01 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.80 cfs @ 4.06 fps)

Pond 3: SFB-3



Stage-Area-Storage for Pond 3: SFB-3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
619.75	577	0
619.80	577	12
619.85	577	23
619.90	577	35
619.95	577	46
620.00	577	58
620.05	577	69
620.10	577	81
620.15	577	92
620.20	577	104
620.25	577	115
620.30	577	121
620.35	577	127
620.40	577	133
620.45	577	138
620.50	577	144
620.55	577	150
620.60	577	156
620.65	577	162
620.70	577	167
620.75	577	173
620.80	577	179
620.85	577	185
620.90	577	190
620.95	577	196
621.00	577	202
621.05	606	208
621.10	636	216
621.15	665	226
621.20	694	237
621.25	723	249
621.30	752	286
621.35	782	324
621.40	811	364
621.45	840	405
621.50	870	448
621.55	899	492
621.60	928	538
621.65	957	585
621.70	987	634
621.75	1,016	684
621.80	1,045	735
621.85	1,074	788
621.90	1,103	843
621.95	1,133	899
622.00	1,162	956
622.05	1,197	1,015
622.10	1,232	1,076
622.15	1,267	1,138
622.20	1,302	1,202
622.25	1,338	1,268
622.30	1,373	1,336
622.35	1,408	1,406
622.40	1,443	1,477
622.45	1,478	1,550
622.50	1,513	1,625
622.55	1,548	1,701
622.60	1,583	1,780
622.65	1,618	1,860
622.70	1,653	1,941
622.75	1,689	2,025
622.80	1,724	2,110
622.85	1,759	2,197
622.90	1,794	2,286
622.95	1,829	2,377
623.00	**1,864**	**2,469**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 4.89" for 25-YR event				
Inflow =	1.78 cfs @	12.35 hrs,	Volume=	0.606 af	
Outflow =	0.94 cfs @	13.28 hrs,	Volume=	0.605 af,	Atten= 47%, Lag= 55.3 min
Discarded =	0.51 cfs @	13.28 hrs,	Volume=	0.499 af	
Primary =	0.43 cfs @	13.28 hrs,	Volume=	0.106 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 633.21' @ 13.28 hrs Surf.Area= 3,387 sf Storage= 5,405 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,324 cf

Plug-Flow detention time= 71.1 min calculated for 0.604 af (100% of inflow)
Center-of-Mass det. time= 70.6 min (900.4 - 829.8)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	329 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 40.0% Voids
#3	630.50'	164 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
#4	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,324 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
630.50	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.50	1,643	0	0
631.00	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

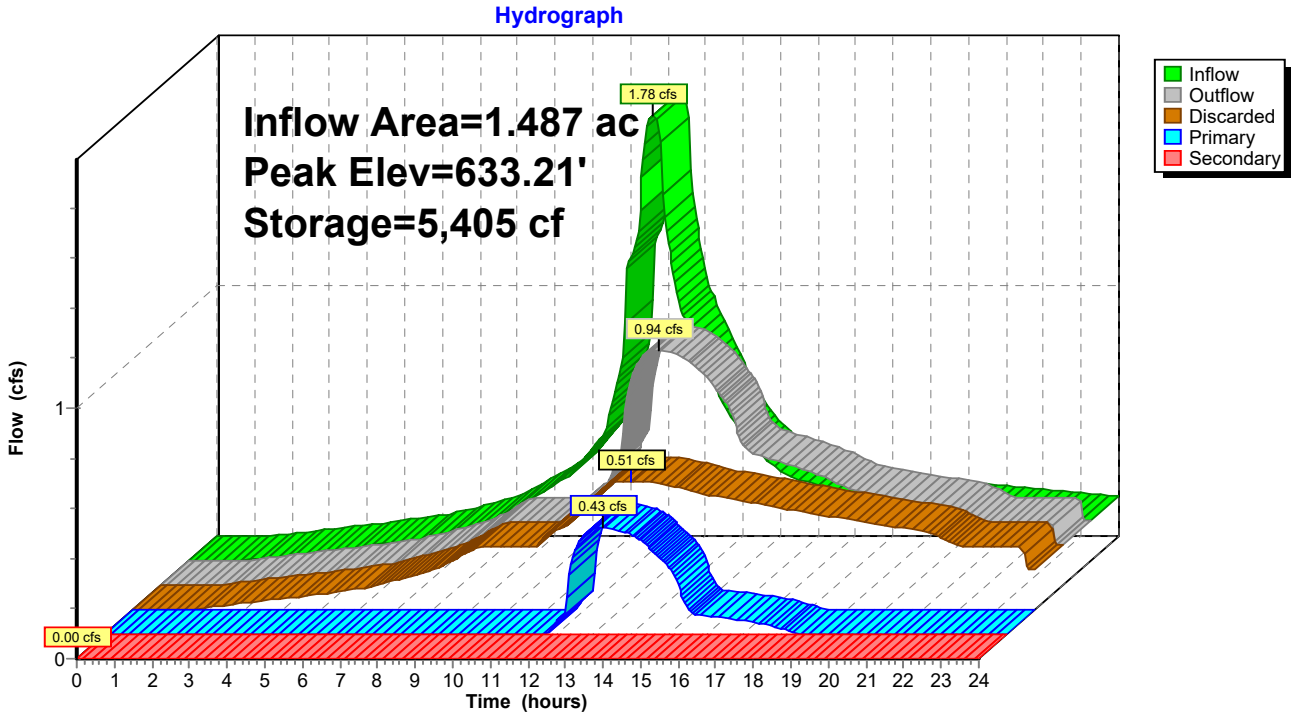
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	633.30'	**50.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.51 cfs @ 13.28 hrs HW=633.21' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.51 cfs)

Primary OutFlow Max=0.43 cfs @ 13.28 hrs HW=633.21' (Free Discharge)
└─**2=Culvert** (Passes 0.43 cfs of 0.58 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.11 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.60 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=630.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4: SFB-4



Stage-Area-Storage for Pond 4: SFB-4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
630.00	1,643	0
630.05	1,643	33
630.10	1,643	66
630.15	1,643	99
630.20	1,643	131
630.25	1,643	164
630.30	1,643	197
630.35	1,643	230
630.40	1,643	263
630.45	1,643	296
630.50	1,643	329
630.55	1,643	345
630.60	1,643	361
630.65	1,643	378
630.70	1,643	394
630.75	1,643	411
630.80	1,643	427
630.85	1,643	444
630.90	1,643	460
630.95	1,643	476
631.00	1,643	493
631.05	1,683	510
631.10	1,723	530
631.15	1,763	551
631.20	1,803	575
631.25	1,843	600
631.30	1,883	627
631.35	1,923	657
631.40	1,963	688
631.45	2,003	722
631.50	2,043	757
631.55	2,083	860
631.60	2,123	966
631.65	2,163	1,073
631.70	2,203	1,182
631.75	2,243	1,293
631.80	2,283	1,406
631.85	2,323	1,521
631.90	2,363	1,638
631.95	2,403	1,758
632.00	2,443	1,879
632.05	2,482	2,002
632.10	2,521	2,127
632.15	2,560	2,254
632.20	2,599	2,383
632.25	2,638	2,514
632.30	2,677	2,647
632.35	2,716	2,782
632.40	2,755	2,918
632.45	2,794	3,057
632.50	2,834	3,198
632.55	2,873	3,340
632.60	2,912	3,485
632.65	2,951	3,632
632.70	2,990	3,780
632.75	3,029	3,931
632.80	3,068	4,083
632.85	3,107	4,237
632.90	3,146	4,394
632.95	3,185	4,552
633.00	3,224	4,712
633.05	3,263	4,874
633.10	3,302	5,038
633.15	3,340	5,205
633.20	3,379	5,373
633.25	3,418	5,542
633.30	3,457	5,714
633.35	3,496	5,888
633.40	3,534	6,064
633.45	3,573	6,242
633.50	3,612	6,421
633.55	3,651	6,603
633.60	3,690	6,786
633.65	3,728	6,972
633.70	3,767	7,159
633.75	3,806	7,348
633.80	3,845	7,540
633.85	3,884	7,733
633.90	3,922	7,928
633.95	3,961	8,125
634.00	**4,000**	**8,324**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth > 3.01" for 25-YR event				
Inflow =	0.91 cfs @	12.10 hrs,	Volume=	0.410 af	
Outflow =	0.29 cfs @	17.77 hrs,	Volume=	0.318 af,	Atten= 68%, Lag= 340.1 min
Discarded =	0.23 cfs @	17.77 hrs,	Volume=	0.269 af	
Primary =	0.07 cfs @	17.77 hrs,	Volume=	0.049 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 634.97' @ 17.77 hrs Surf.Area= 3,461 sf Storage= 4,664 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,544 cf

Plug-Flow detention time= 181.8 min calculated for 0.317 af (77% of inflow)
Center-of-Mass det. time= 74.9 min (1,007.0 - 932.2)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	301 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 40.0% Voids
#3	632.50'	151 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
#4	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,544 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
632.50	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.50	1,505	0	0
633.00	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

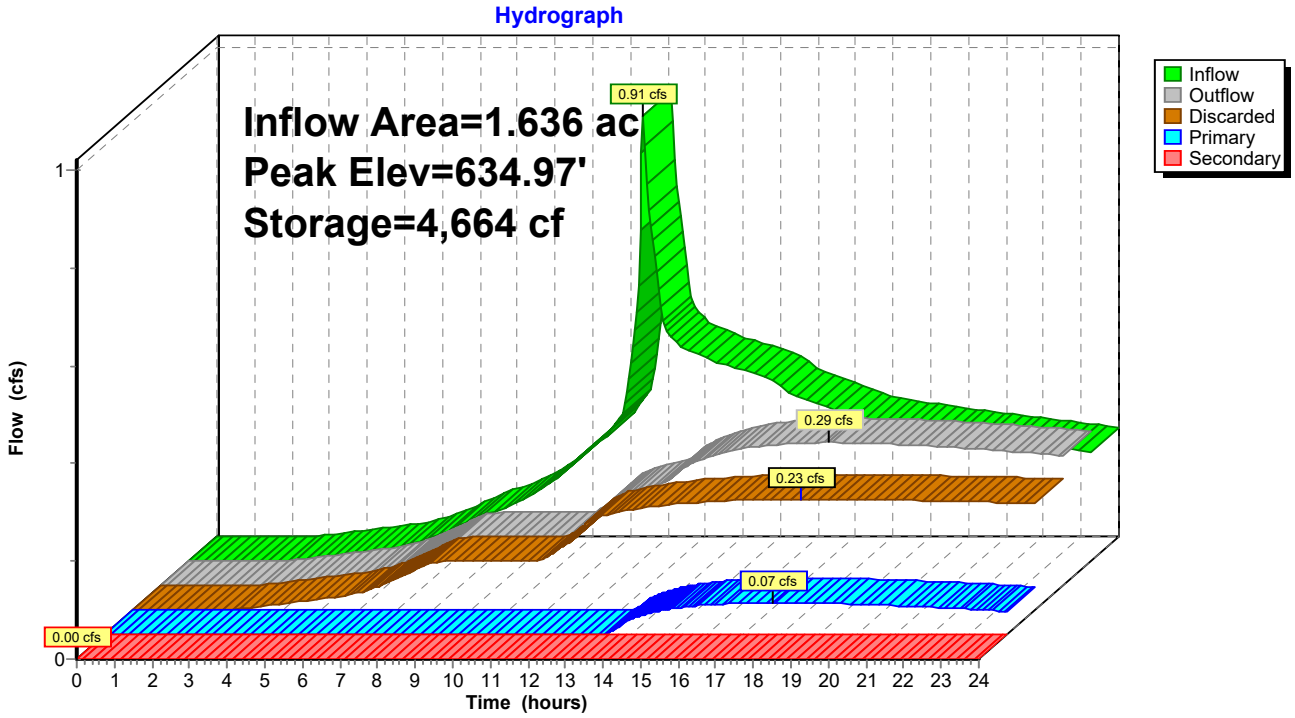
Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.23 cfs @ 17.77 hrs HW=634.97' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.07 cfs @ 17.77 hrs HW=634.97' (Free Discharge)
└─**2=Culvert** (Passes 0.07 cfs of 0.33 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 2.98 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=632.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 5: SFB-5



Stage-Area-Storage for Pond 5: SFB-5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
632.00	1,505	0
632.05	1,505	30
632.10	1,505	60
632.15	1,505	90
632.20	1,505	120
632.25	1,505	151
632.30	1,505	181
632.35	1,505	211
632.40	1,505	241
632.45	1,505	271
632.50	1,505	301
632.55	1,505	316
632.60	1,505	331
632.65	1,505	346
632.70	1,505	361
632.75	1,505	376
632.80	1,505	391
632.85	1,505	406
632.90	1,505	421
632.95	1,505	436
633.00	1,505	452
633.05	1,505	467
633.10	1,505	482
633.15	1,505	497
633.20	1,505	512
633.25	1,505	527
633.30	1,505	542
633.35	1,505	557
633.40	1,505	572
633.45	1,505	587
633.50	1,505	602
633.55	1,629	680
633.60	1,752	765
633.65	1,876	856
633.70	1,999	952
633.75	2,123	1,056
633.80	2,247	1,165
633.85	2,370	1,280
633.90	2,494	1,402
633.95	2,617	1,530
634.00	2,741	1,664
634.05	2,778	1,801
634.10	2,815	1,941
634.15	2,853	2,083
634.20	2,890	2,227
634.25	2,927	2,372
634.30	2,964	2,519
634.35	3,001	2,668
634.40	3,039	2,819
634.45	3,076	2,972
634.50	3,113	3,127
634.55	3,150	3,284
634.60	3,187	3,442
634.65	3,225	3,602
634.70	3,262	3,764
634.75	3,299	3,929
634.80	3,336	4,094
634.85	3,373	4,262
634.90	3,411	4,432
634.95	3,448	4,603
635.00	3,485	4,776
635.05	3,513	4,951
635.10	3,542	5,128
635.15	3,570	5,306
635.20	3,598	5,485
635.25	3,626	5,665
635.30	3,654	5,847
635.35	3,683	6,031
635.40	3,711	6,216
635.45	3,739	6,402
635.50	3,768	6,590
635.55	3,796	6,779
635.60	3,824	6,969
635.65	3,852	7,161
635.70	3,881	7,354
635.75	3,909	7,549
635.80	3,937	7,745
635.85	3,965	7,943
635.90	3,993	8,142
635.95	4,022	8,342
636.00	**4,050**	**8,544**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth > 6.26" for 25-YR event
Inflow = 4.33 cfs @ 12.09 hrs, Volume= 0.310 af
Outflow = 0.17 cfs @ 14.23 hrs, Volume= 0.188 af, Atten= 96%, Lag= 128.7 min
Primary = 0.17 cfs @ 14.23 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 628.81' @ 14.23 hrs Surf.Area= 0.081 ac Storage= 0.194 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 346.5 min calculated for 0.188 af (61% of inflow)
Center-of-Mass det. time= 243.1 min (986.5 - 743.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**4.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 620.60' S= 0.0225 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.17 cfs @ 14.23 hrs HW=628.81' (Free Discharge)
└─**1=Culvert** (Passes 0.17 cfs of 0.39 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.95 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

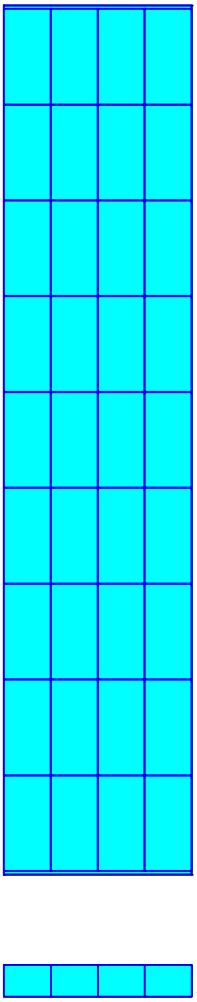
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

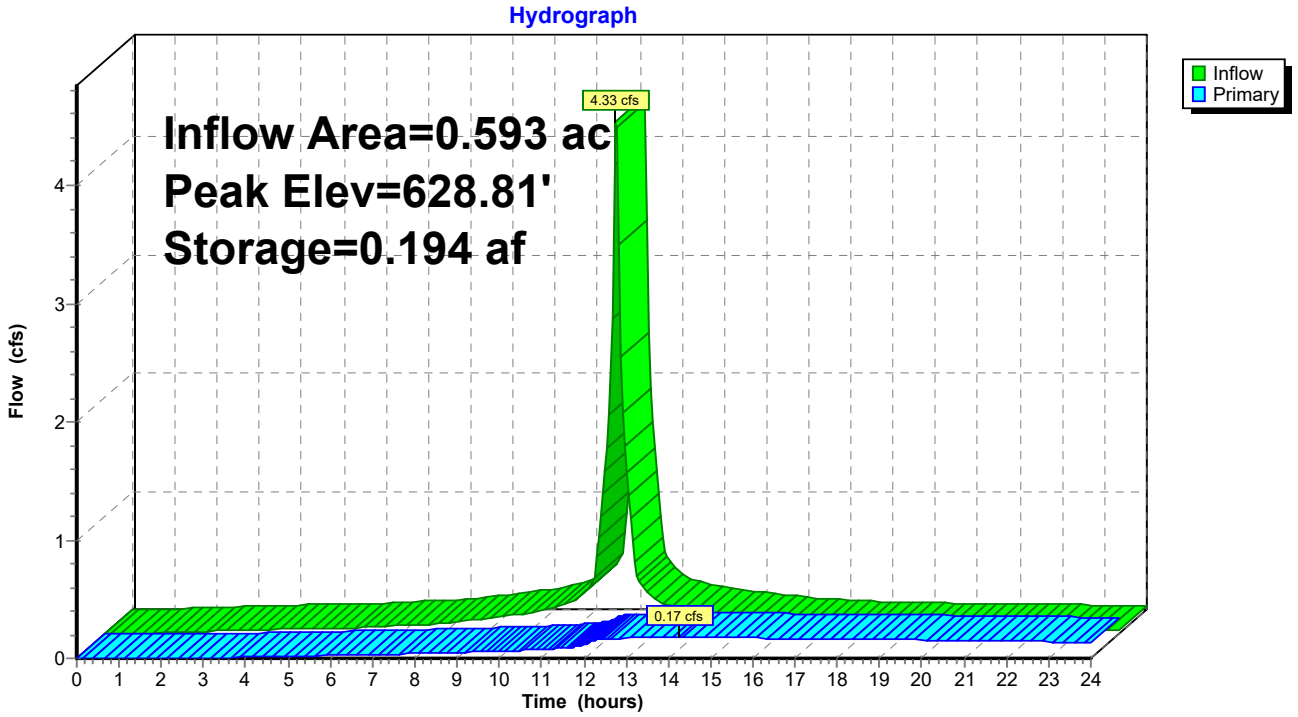
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow Area=0.593 ac
Peak Elev=628.81'
Storage=0.194 af
4.33 cfs
0.17 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Stage-Area-Storage for Pond DB-3: DB-3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
626.00	0.000	628.60	0.180
626.05	0.003	628.65	0.183
626.10	0.007	628.70	0.187
626.15	0.010	628.75	0.190
626.20	0.014	628.80	0.194
626.25	0.017	628.85	0.197
626.30	0.021	628.90	0.200
626.35	0.024	628.95	0.204
626.40	0.028	629.00	0.207
626.45	0.031	629.05	0.211
626.50	0.035	629.10	0.214
626.55	0.038	629.15	0.218
626.60	0.041	629.20	0.221
626.65	0.045	629.25	0.225
626.70	0.048	629.30	0.228
626.75	0.052	629.35	0.232
626.80	0.055	629.40	0.235
626.85	0.059	629.45	0.238
626.90	0.062	629.50	0.242
626.95	0.066	629.55	0.245
627.00	0.069	629.60	0.249
627.05	0.073	629.65	0.252
627.10	0.076	629.70	0.256
627.15	0.079	629.75	0.259
627.20	0.083	629.80	0.263
627.25	0.086	629.85	0.266
627.30	0.090	629.90	0.270
627.35	0.093	629.95	0.273
627.40	0.097	630.00	0.276
627.45	0.100	630.05	0.276
627.50	0.104	630.10	0.276
627.55	0.107	630.15	0.276
627.60	0.111	630.20	0.276
627.65	0.114	630.25	0.276
627.70	0.117	630.30	0.276
627.75	0.121	630.35	0.276
627.80	0.124	630.40	0.276
627.85	0.128	630.45	0.276
627.90	0.131	630.50	0.276
627.95	0.135	630.55	0.276
628.00	0.138	630.60	0.276
628.05	0.142	630.65	**0.276**
628.10	0.145		
628.15	0.149		
628.20	0.152		
628.25	0.156		
628.30	0.159		
628.35	0.162		
628.40	0.166		
628.45	0.169		
628.50	0.173		
628.55	0.176		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth > 11.41" for 25-YR event
Inflow = 6.67 cfs @ 12.09 hrs, Volume= 0.260 af
Outflow = 0.56 cfs @ 12.50 hrs, Volume= 0.203 af, Atten= 92%, Lag= 25.0 min
Primary = 0.56 cfs @ 12.50 hrs, Volume= 0.203 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 636.98' @ 12.50 hrs Surf.Area= 0.072 ac Storage= 0.183 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 252.1 min calculated for 0.203 af (78% of inflow)
Center-of-Mass det. time= 206.1 min (941.4 - 735.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.56 cfs @ 12.50 hrs HW=636.98' (Free Discharge)
└─**1=Culvert** (Passes 0.56 cfs of 1.07 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.20 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.35 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond DB-4: DB-4 - Chamber Wizard Field A

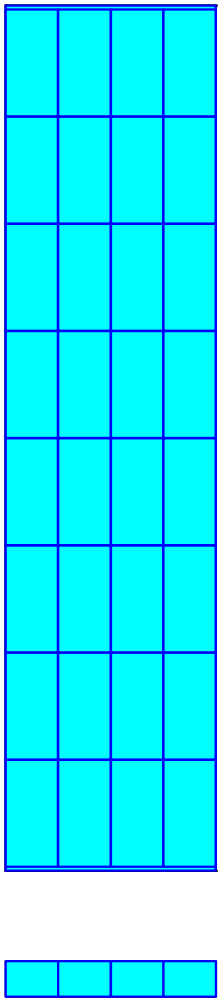
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

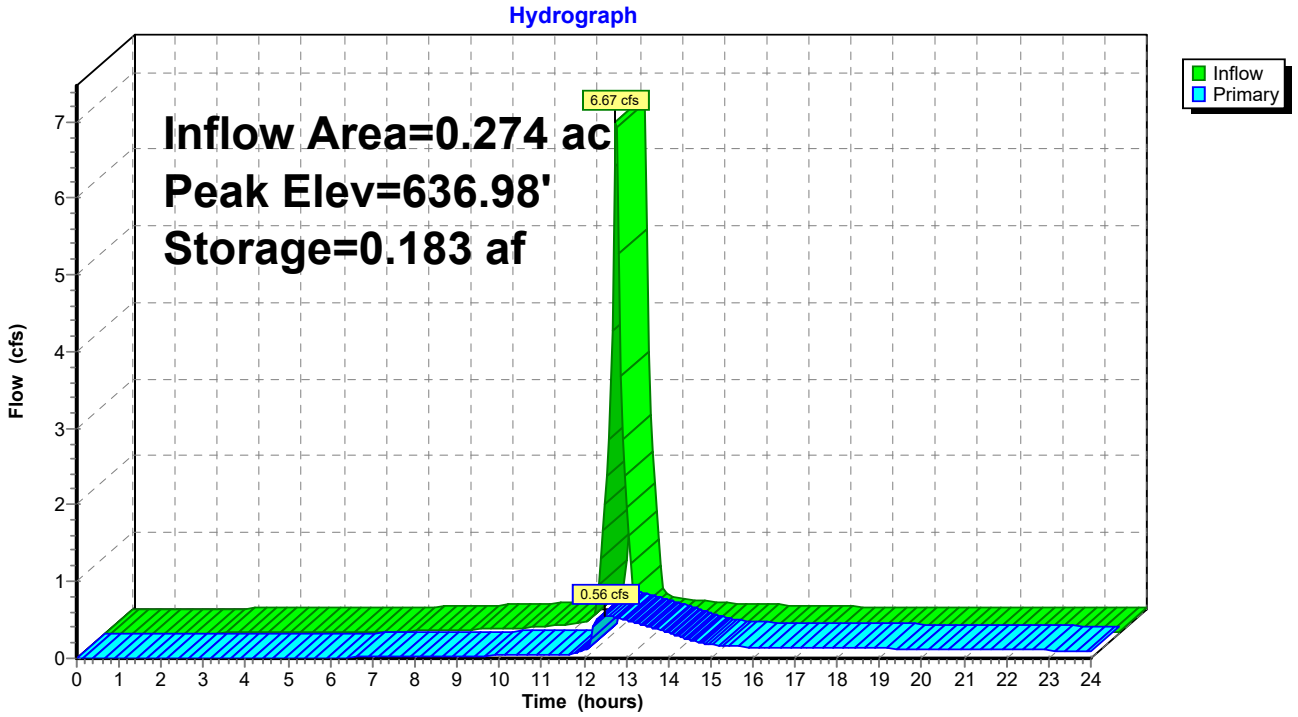
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow Area=0.274 ac
Peak Elev=636.98'
Storage=0.183 af
6.67 cfs
0.56 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
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24

Stage-Area-Storage for Pond DB-4: DB-4

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
634.00	0.000	636.60	0.160
634.05	0.003	636.65	0.163
634.10	0.006	636.70	0.166
634.15	0.009	636.75	0.169
634.20	0.012	636.80	0.172
634.25	0.015	636.85	0.175
634.30	0.018	636.90	0.178
634.35	0.022	636.95	0.181
634.40	0.025	637.00	0.184
634.45	0.028	637.05	0.187
634.50	0.031	637.10	0.190
634.55	0.034	637.15	0.194
634.60	0.037	637.20	0.197
634.65	0.040	637.25	0.200
634.70	0.043	637.30	0.203
634.75	0.046	637.35	0.206
634.80	0.049	637.40	0.209
634.85	0.052	637.45	0.212
634.90	0.055	637.50	0.215
634.95	0.058	637.55	0.218
635.00	0.061	637.60	0.221
635.05	0.065	637.65	0.224
635.10	0.068	637.70	0.227
635.15	0.071	637.75	0.230
635.20	0.074	637.80	0.233
635.25	0.077	637.85	0.237
635.30	0.080	637.90	0.240
635.35	0.083	637.95	0.243
635.40	0.086	638.00	0.246
635.45	0.089	638.05	0.246
635.50	0.092	638.10	0.246
635.55	0.095	638.15	0.246
635.60	0.098	638.20	0.246
635.65	0.101	638.25	0.246
635.70	0.104	638.30	0.246
635.75	0.108	638.35	0.246
635.80	0.111	638.40	0.246
635.85	0.114	638.45	0.246
635.90	0.117	638.50	0.246
635.95	0.120	638.55	0.246
636.00	0.123	638.60	0.246
636.05	0.126	638.65	**0.246**
636.10	0.129		
636.15	0.132		
636.20	0.135		
636.25	0.138		
636.30	0.141		
636.35	0.144		
636.40	0.147		
636.45	0.151		
636.50	0.154		
636.55	0.157		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth > 7.46" for 25-YR event
Inflow = 7.30 cfs @ 12.09 hrs, Volume= 0.440 af
Outflow = 0.21 cfs @ 14.63 hrs, Volume= 0.237 af, Atten= 97%, Lag= 152.7 min
Primary = 0.21 cfs @ 14.63 hrs, Volume= 0.237 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 641.63' @ 14.63 hrs Surf.Area= 0.090 ac Storage= 0.297 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 222.2 min (983.4 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.21 cfs @ 14.63 hrs HW=641.63' (Free Discharge)
└─**1=Culvert** (Passes 0.21 cfs of 1.31 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.69 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

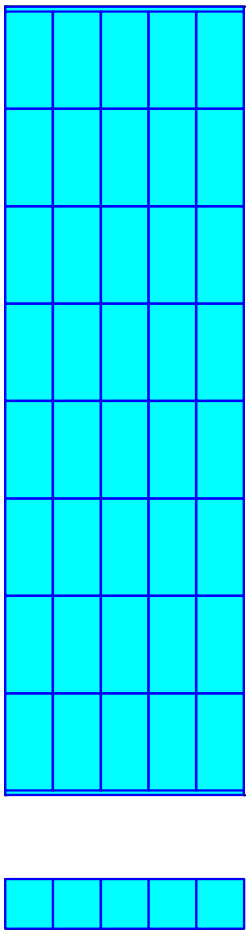
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

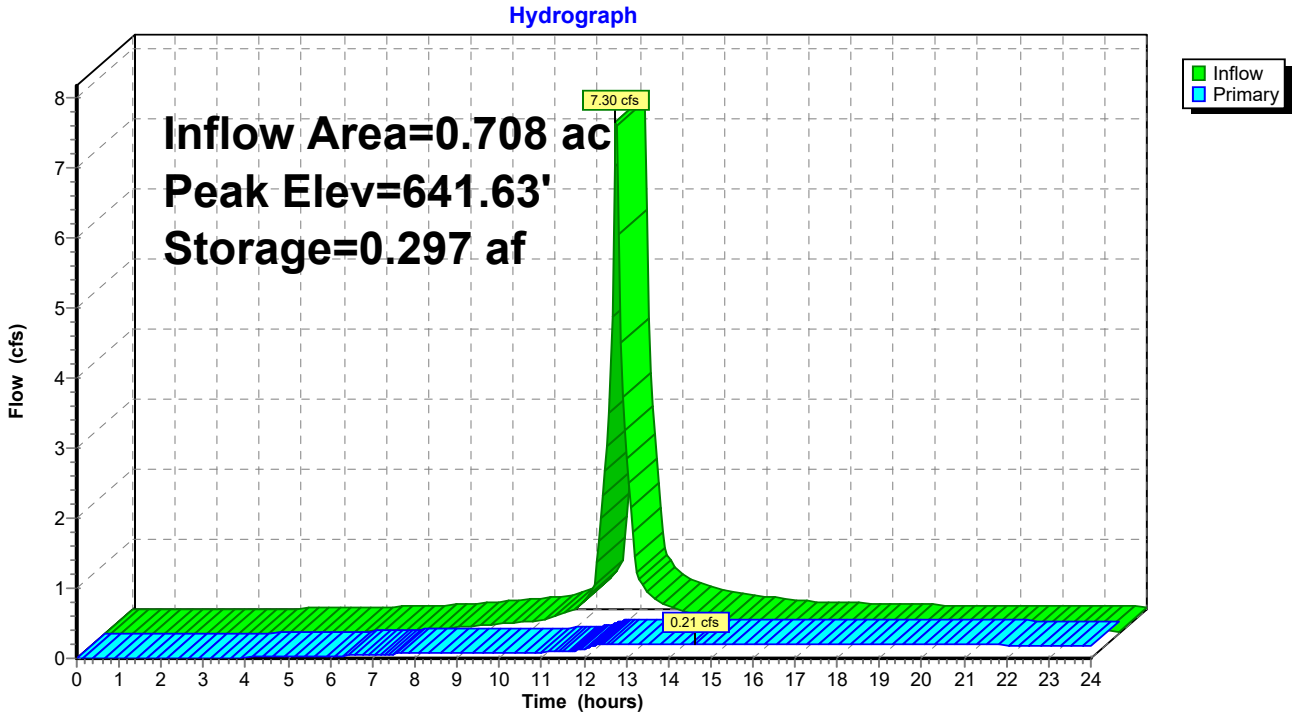
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow Area=0.708 ac
Peak Elev=641.63'
Storage=0.297 af
7.30 cfs
0.21 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-5: DB-5

Elevation (feet)	Storage (acre-feet)
637.50	0.000
637.60	0.000
637.70	0.000
637.80	0.000
637.90	0.000
638.00	0.000
638.10	0.008
638.20	0.016
638.30	0.025
638.40	0.033
638.50	0.041
638.60	0.049
638.70	0.057
638.80	0.065
638.90	0.074
639.00	0.082
639.10	0.090
639.20	0.098
639.30	0.106
639.40	0.114
639.50	0.123
639.60	0.131
639.70	0.139
639.80	0.147
639.90	0.155
640.00	0.163
640.10	0.172
640.20	0.180
640.30	0.188
640.40	0.196
640.50	0.204
640.60	0.212
640.70	0.221
640.80	0.229
640.90	0.237
641.00	0.245
641.10	0.253
641.20	0.262
641.30	0.270
641.40	0.278
641.50	0.286
641.60	0.294
641.70	0.302
641.80	0.311
641.90	0.319
642.00	0.327
642.10	0.335
642.20	0.343
642.30	0.351
642.40	0.360
642.50	0.368
642.60	0.376
642.70	0.384
642.80	0.392
642.90	0.400
643.00	0.409
643.10	0.417
643.20	0.425
643.30	0.433
643.40	0.441
643.50	0.449
643.60	0.458
643.70	0.466
643.80	0.474
643.90	0.482
644.00	**0.490**
644.10	**0.490**
644.20	0.490
644.30	0.490
644.40	0.490
644.50	0.490
644.60	0.490

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac, 72.22% Impervious, Inflow Depth > 4.75" for 25-YR event				
Inflow =	1.72 cfs @	12.09 hrs,	Volume=	0.130 af	
Outflow =	1.72 cfs @	12.09 hrs,	Volume=	0.130 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.88 cfs @	12.09 hrs,	Volume=	0.111 af	
Secondary =	0.85 cfs @	12.09 hrs,	Volume=	0.019 af	

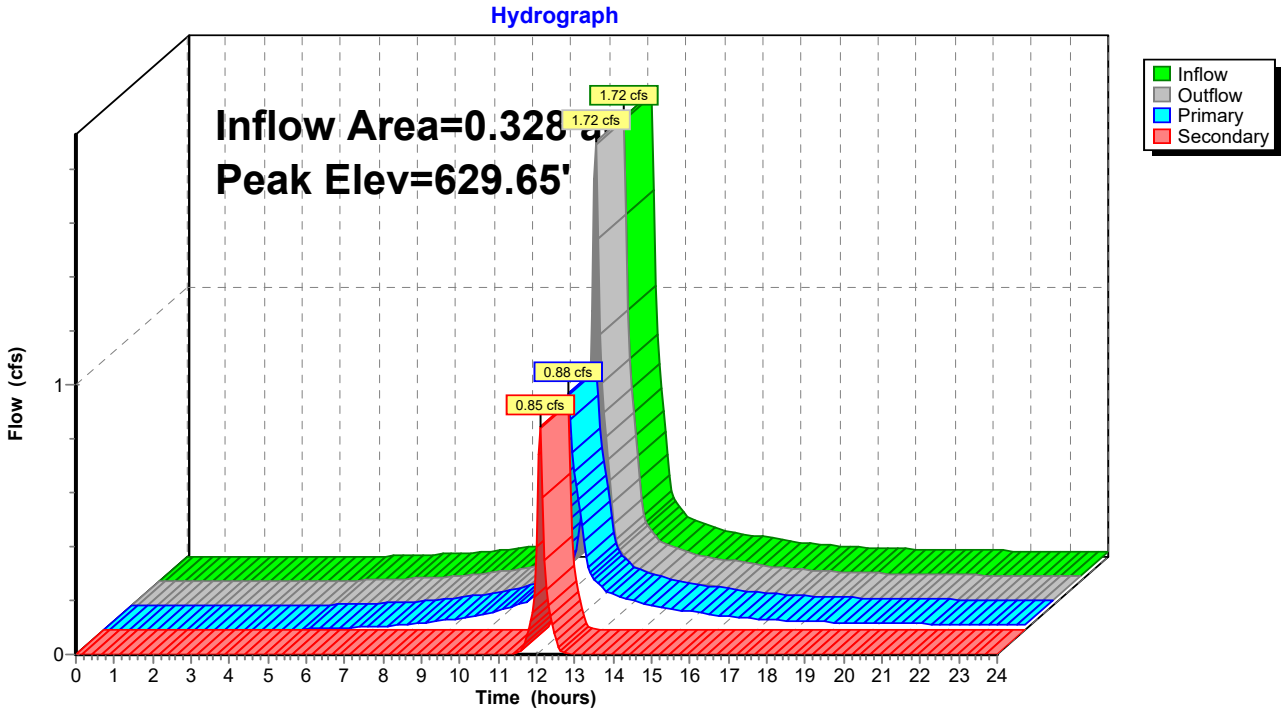
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 629.65' @ 12.09 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**6.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 620.60' S= 0.0344 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.86 cfs @ 12.09 hrs HW=629.64' TW=623.64' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.86 cfs @ 4.40 fps)

Secondary OutFlow Max=0.81 cfs @ 12.09 hrs HW=629.64' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.81 cfs @ 2.45 fps)

Pond ICS-3: ICS-3



Stage-Area-Storage for Pond ICS-3: ICS-3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
628.85	**0**	631.45	0
628.90	0	631.50	0
628.95	0	631.55	0
629.00	0	631.60	0
629.05	0	631.65	0
629.10	0	631.70	0
629.15	0	631.75	0
629.20	0	631.80	0
629.25	0	631.85	0
629.30	0	631.90	0
629.35	0	631.95	0
629.40	0	632.00	0
629.45	0	632.05	0
629.50	0	632.10	0
629.55	0	632.15	0
629.60	0	632.20	0
629.65	0	632.25	0
629.70	0	632.30	0
629.75	0	632.35	0
629.80	0	632.40	0
629.85	0	632.45	0
629.90	0	632.50	0
629.95	0		
630.00	0		
630.05	0		
630.10	0		
630.15	0		
630.20	0		
630.25	0		
630.30	0		
630.35	0		
630.40	0		
630.45	0		
630.50	0		
630.55	0		
630.60	0		
630.65	0		
630.70	0		
630.75	0		
630.80	0		
630.85	0		
630.90	0		
630.95	0		
631.00	0		
631.05	0		
631.10	0		
631.15	0		
631.20	0		
631.25	0		
631.30	0		
631.35	0		
631.40	0		

Summary for Pond ICS-4: ICS-4

Inflow Area =	1.068 ac, 93.43% Impervious, Inflow Depth > 5.65" for 25-YR event				
Inflow =	6.20 cfs @	12.09 hrs,	Volume=	0.503 af	
Outflow =	6.20 cfs @	12.09 hrs,	Volume=	0.503 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.13 cfs @	12.09 hrs,	Volume=	0.377 af	
Secondary =	5.07 cfs @	12.09 hrs,	Volume=	0.126 af	

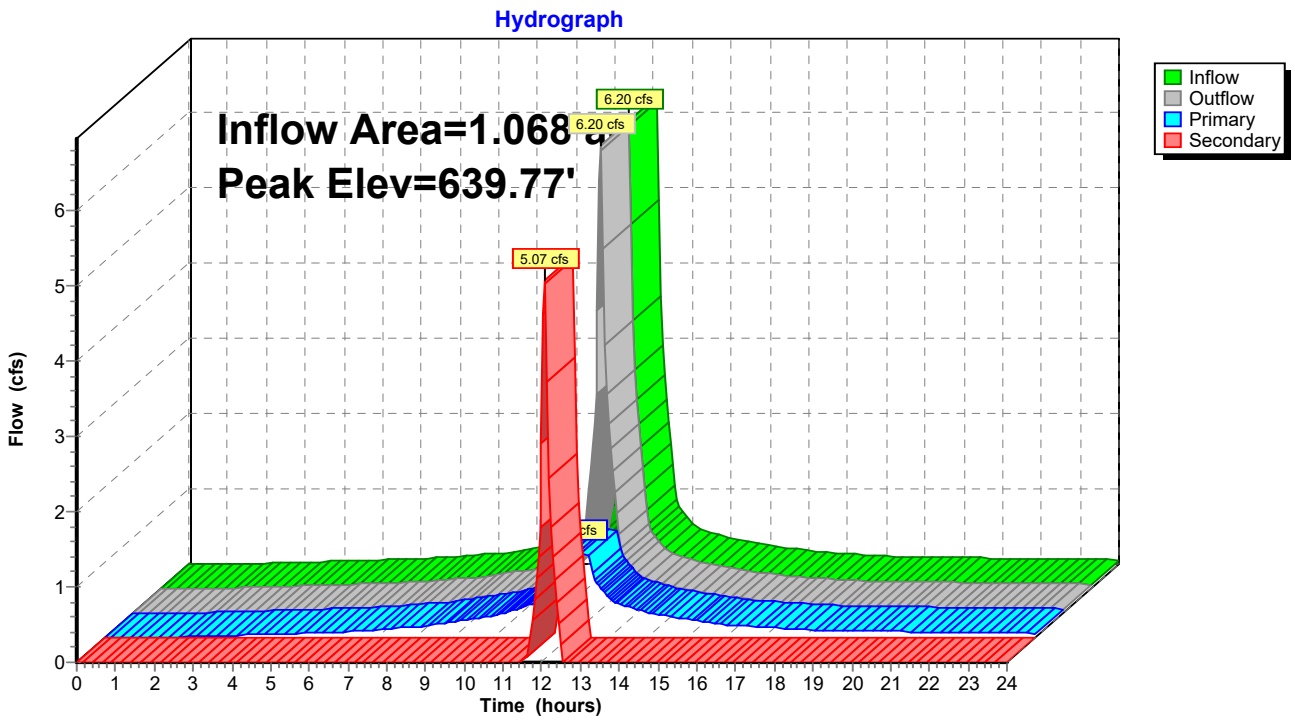
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 639.77' @ 12.09 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.13 cfs @ 12.09 hrs HW=639.76' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.13 cfs @ 5.75 fps)

Secondary OutFlow Max=4.90 cfs @ 12.09 hrs HW=639.76' (Free Discharge)
└─**3=Culvert** (Passes 4.90 cfs of 6.81 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 4.90 cfs @ 2.06 fps)

Pond ICS-4: ICS-4



Stage-Area-Storage for Pond ICS-4: ICS-4

Elevation (feet)	Storage (cubic-feet)
636.50	**0**
636.55	0
636.60	0
636.65	0
636.70	0
636.75	0
636.80	0
636.85	0
636.90	0
636.95	0
637.00	0
637.05	0
637.10	0
637.15	0
637.20	0
637.25	0
637.30	0
637.35	0
637.40	0
637.45	0
637.50	0
637.55	0
637.60	0
637.65	0
637.70	0
637.75	0
637.80	0
637.85	0
637.90	0
637.95	0
638.00	0
638.05	0
638.10	0
638.15	0
638.20	0
638.25	0
638.30	0
638.35	0
638.40	0
638.45	0
638.50	0
638.55	0
638.60	0
638.65	0
638.70	0
638.75	0
638.80	0
638.85	0
638.90	0
638.95	0
639.00	0
639.05	0
639.10	0
639.15	0
639.20	0
639.25	0
639.30	0
639.35	0
639.40	0
639.45	0
639.50	0
639.55	0
639.60	0
639.65	0
639.70	0
639.75	0
639.80	0
639.85	0
639.90	0
639.95	0
640.00	0

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac, 62.40% Impervious, Inflow Depth > 4.31" for 25-YR event				
Inflow =	3.60 cfs @	12.09 hrs,	Volume=	0.266 af	
Outflow =	3.60 cfs @	12.09 hrs,	Volume=	0.266 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.30 cfs @	12.00 hrs,	Volume=	0.139 af	
Secondary =	3.31 cfs @	12.09 hrs,	Volume=	0.127 af	

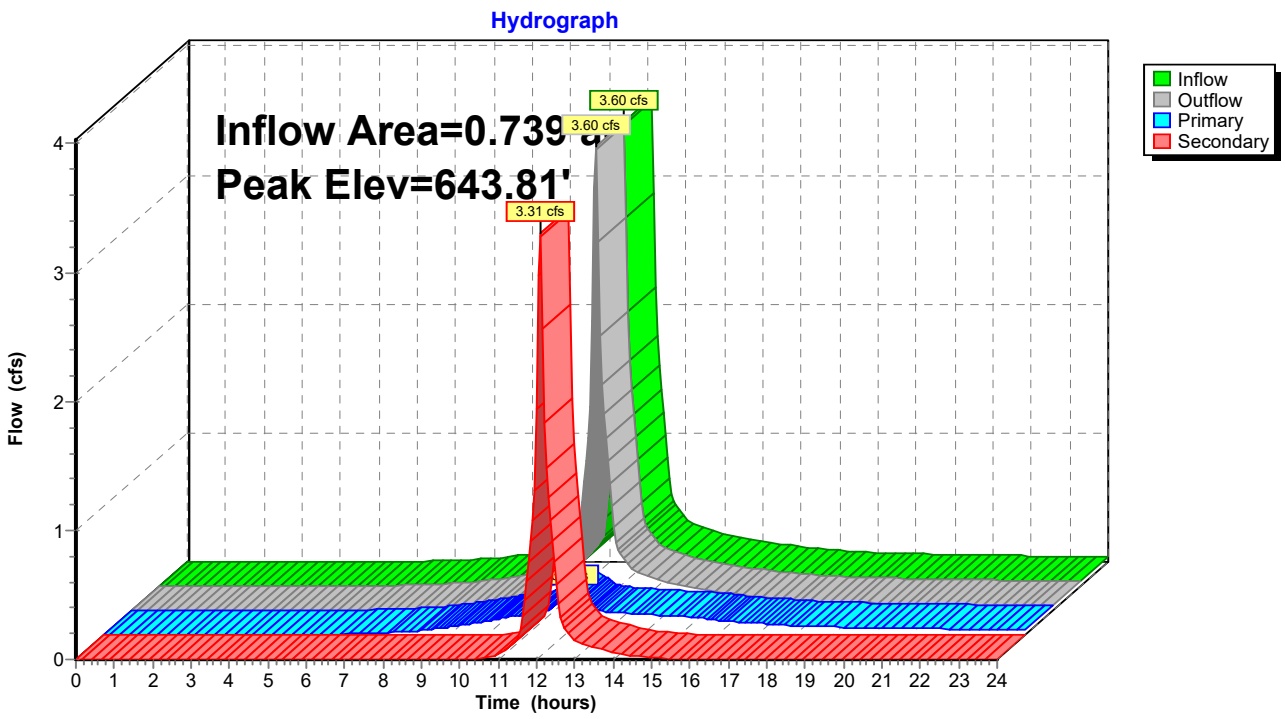
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 643.81' @ 12.09 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 637.00' S= 0.0656 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.00 hrs HW=643.41' TW=637.41' (TW follows 6.00' below HW)
└─**1=Culvert** (Outlet Controls 0.30 cfs @ 6.03 fps)

Secondary OutFlow Max=3.23 cfs @ 12.09 hrs HW=643.78' TW=637.78' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 3.23 cfs @ 4.28 fps)

Pond ICS-5: ICS-5



Stage-Area-Storage for Pond ICS-5: ICS-5

Elevation (feet)	Storage (cubic-feet)
642.25	**0**
642.30	0
642.35	0
642.40	0
642.45	0
642.50	0
642.55	0
642.60	0
642.65	0
642.70	0
642.75	0
642.80	0
642.85	0
642.90	0
642.95	0
643.00	0
643.05	0
643.10	0
643.15	0
643.20	0
643.25	0
643.30	0
643.35	0
643.40	0
643.45	0
643.50	0
643.55	0
643.60	0
643.65	0
643.70	0
643.75	0
643.80	0
643.85	0
643.90	0
643.95	0
644.00	0
644.05	0
644.10	0
644.15	0
644.20	0
644.25	0
644.30	0
644.35	0
644.40	0
644.45	0
644.50	0
644.55	0
644.60	0
644.65	0
644.70	0
644.75	0
644.80	0
644.85	0
644.90	0
644.95	0
645.00	0
645.05	0
645.10	0
645.15	0
645.20	0
645.25	0
645.30	0
645.35	0
645.40	0
645.45	0
645.50	0

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth > 4.75" for 25-YR event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.22 cfs @ 12.17 hrs, Volume= 0.016 af, Atten= 23%, Lag= 5.0 min
Primary = 0.22 cfs @ 12.17 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 654.94' @ 12.15 hrs Surf.Area= 495 sf Storage= 342 cf

Plug-Flow detention time= 176.1 min calculated for 0.016 af (71% of inflow)
Center-of-Mass det. time= 86.4 min (876.7 - 790.3)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

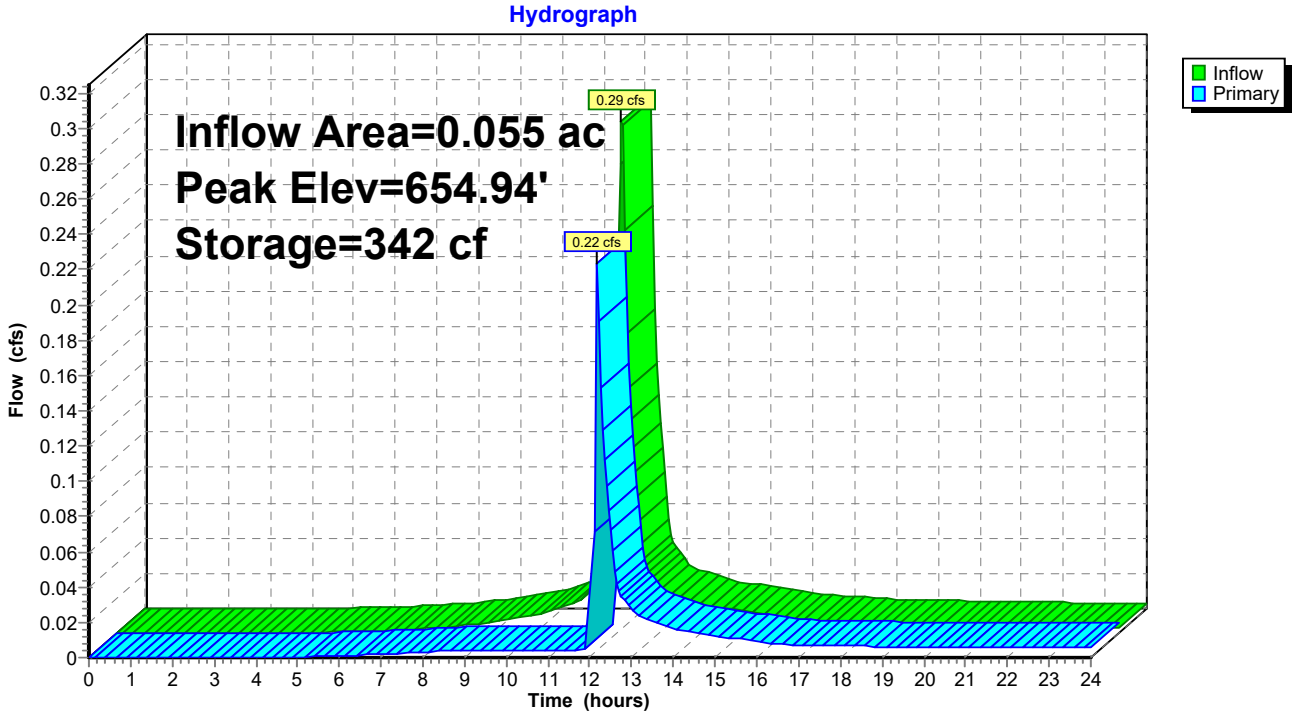
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.20 cfs @ 12.17 hrs HW=654.94' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.50 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Area-Storage for Pond RG-7B: RG-7B

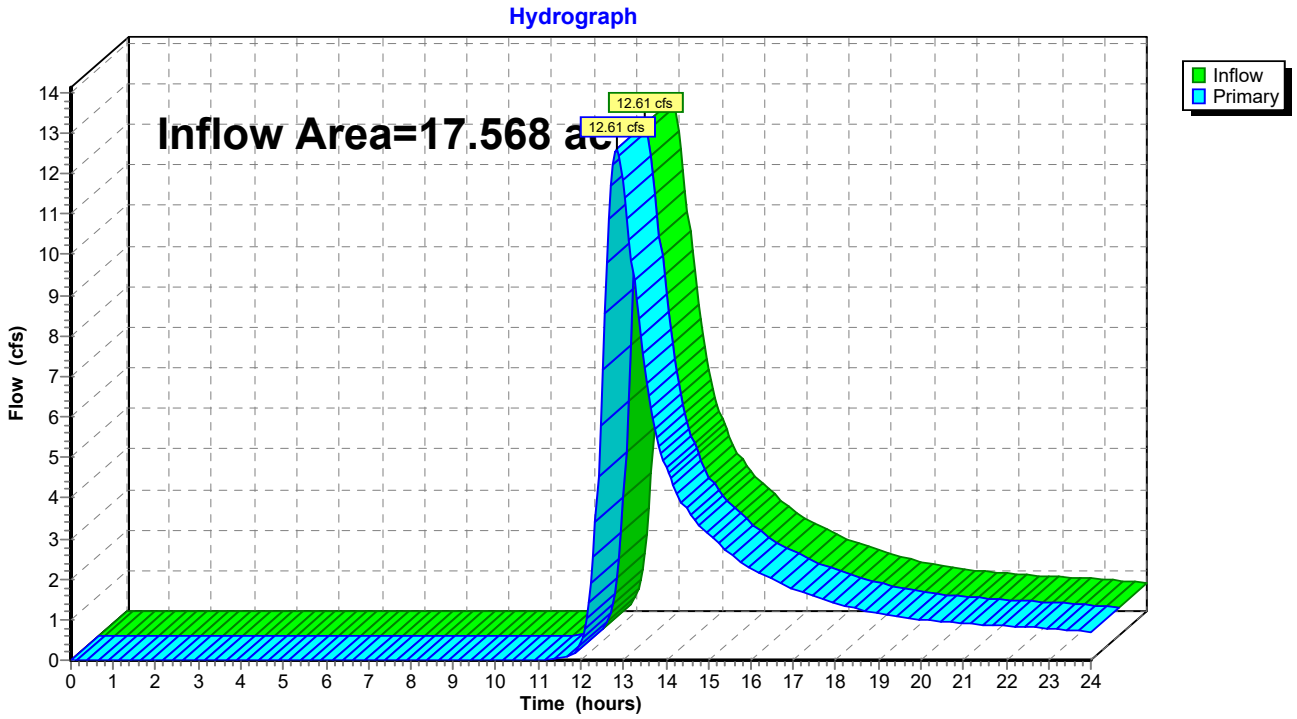
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
653.00	259	0
653.02	259	2
653.04	259	4
653.06	259	6
653.08	259	8
653.10	259	10
653.12	259	12
653.14	259	15
653.16	259	17
653.18	259	19
653.20	259	21
653.22	259	23
653.24	259	25
653.26	259	27
653.28	259	29
653.30	259	31
653.32	259	33
653.34	259	35
653.36	259	37
653.38	259	39
653.40	259	41
653.42	259	44
653.44	259	46
653.46	259	48
653.48	259	50
653.50	259	52
653.52	259	53
653.54	259	55
653.56	259	56
653.58	259	58
653.60	259	60
653.62	259	61
653.64	259	63
653.66	259	64
653.68	259	66
653.70	259	67
653.72	259	69
653.74	259	70
653.76	259	72
653.78	259	74
653.80	259	75
653.82	259	77
653.84	259	78
653.86	259	80
653.88	259	81
653.90	259	83
653.92	259	84
653.94	259	86
653.96	259	88
653.98	259	89
654.00	259	91
654.02	263	92
654.04	268	94
654.06	272	96
654.08	276	98
654.10	281	99
654.12	285	102
654.14	289	104
654.16	294	106
654.18	298	108
654.20	303	111
654.22	308	113
654.24	312	116
654.26	317	118
654.28	321	120
654.30	326	123
654.32	331	125
654.34	336	127
654.36	341	130
654.38	345	133
654.40	350	136
654.42	355	139
654.44	360	142
654.46	365	145
654.48	370	148
654.50	375	151
654.52	380	159
654.54	385	166
654.56	391	174
654.58	396	182
654.60	401	190
654.62	406	198
654.64	412	206
654.66	417	215
654.68	422	223
654.70	428	231
654.72	433	240
654.74	439	249
654.76	444	258
654.78	450	267
654.80	455	276
654.82	461	285
654.84	467	294
654.86	472	303
654.88	478	313
654.90	484	323
654.92	490	332
654.94	495	342
654.96	501	352
654.98	507	362
655.00	**513**	**372**

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 1.72" for 25-YR event
Inflow = 12.61 cfs @ 12.84 hrs, Volume= 2.512 af
Primary = 12.61 cfs @ 12.84 hrs, Volume= 2.512 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PDP-3: Design Point 3



Summary for Subcatchment 4A: PDA-4A

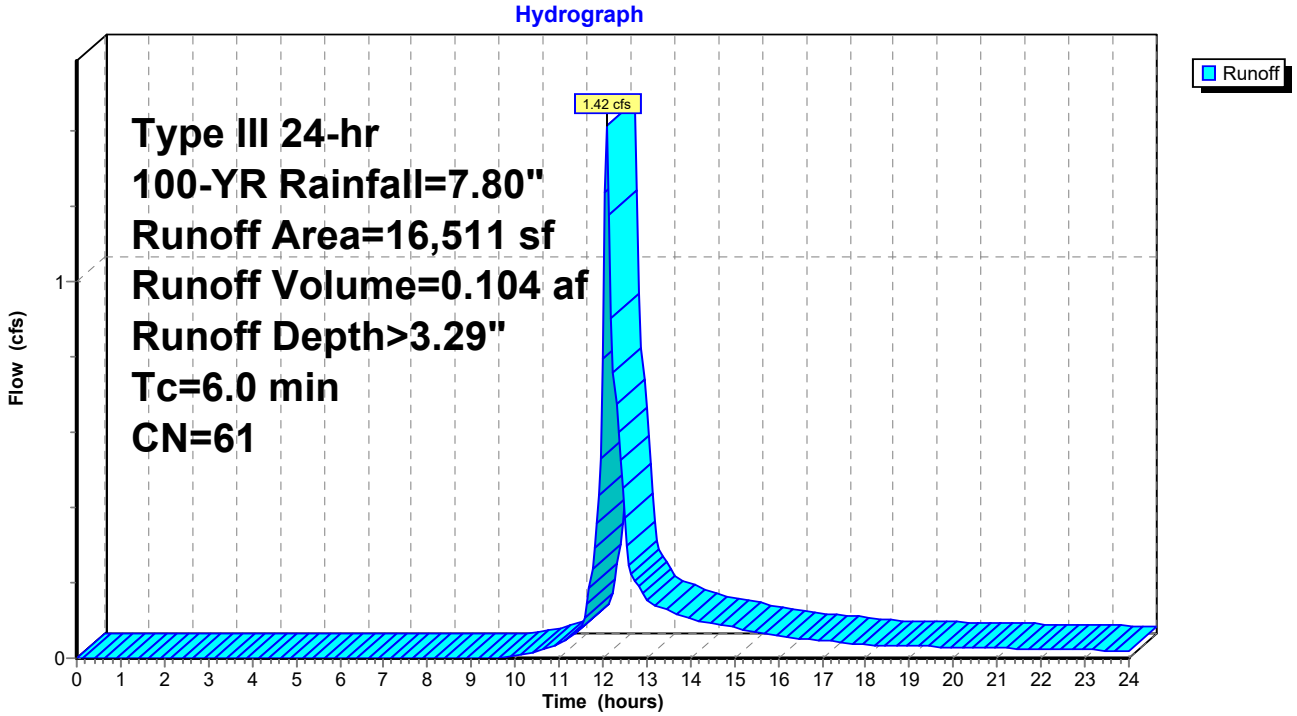
Runoff = 1.42 cfs @ 12.10 hrs, Volume= 0.104 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

	Area (sf)	CN	Description
*	7,284	55	Woods, Good, HSG B
	3,480	70	Woods, Good, HSG C
	1,370	74	>75% Grass cover, Good, HSG C
	4,377	61	>75% Grass cover, Good, HSG B
	16,511	61	Weighted Average
	16,511		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min.**

Subcatchment 4A: PDA-4A



Summary for Subcatchment 4B: PDA-4B

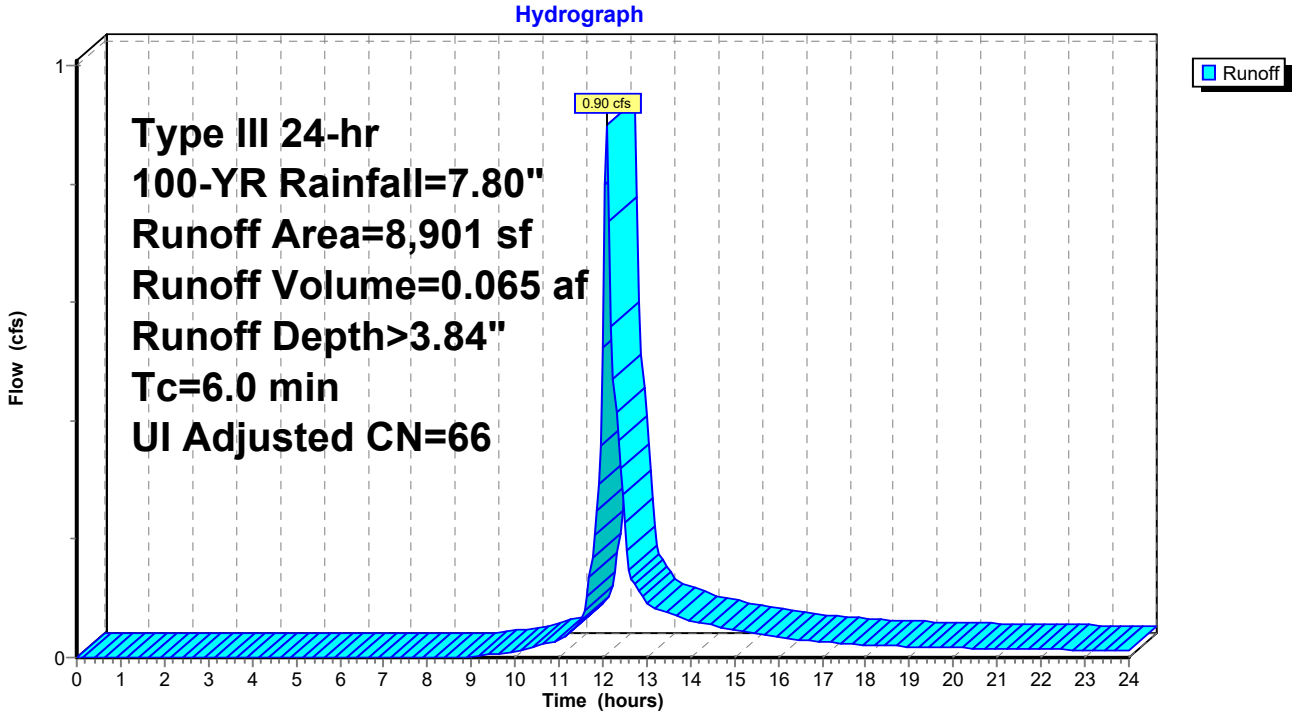
Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.065 af, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Adj	Description
5,978	61		>75% Grass cover, Good, HSG B
2,026	74		>75% Grass cover, Good, HSG C
897	98		Unconnected pavement, HSG B
8,901	68	66	Weighted Average, UI Adjusted
8,004			89.92% Pervious Area
897			10.08% Impervious Area
897			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4B: PDA-4B



Summary for Subcatchment 4C: PDA-4C

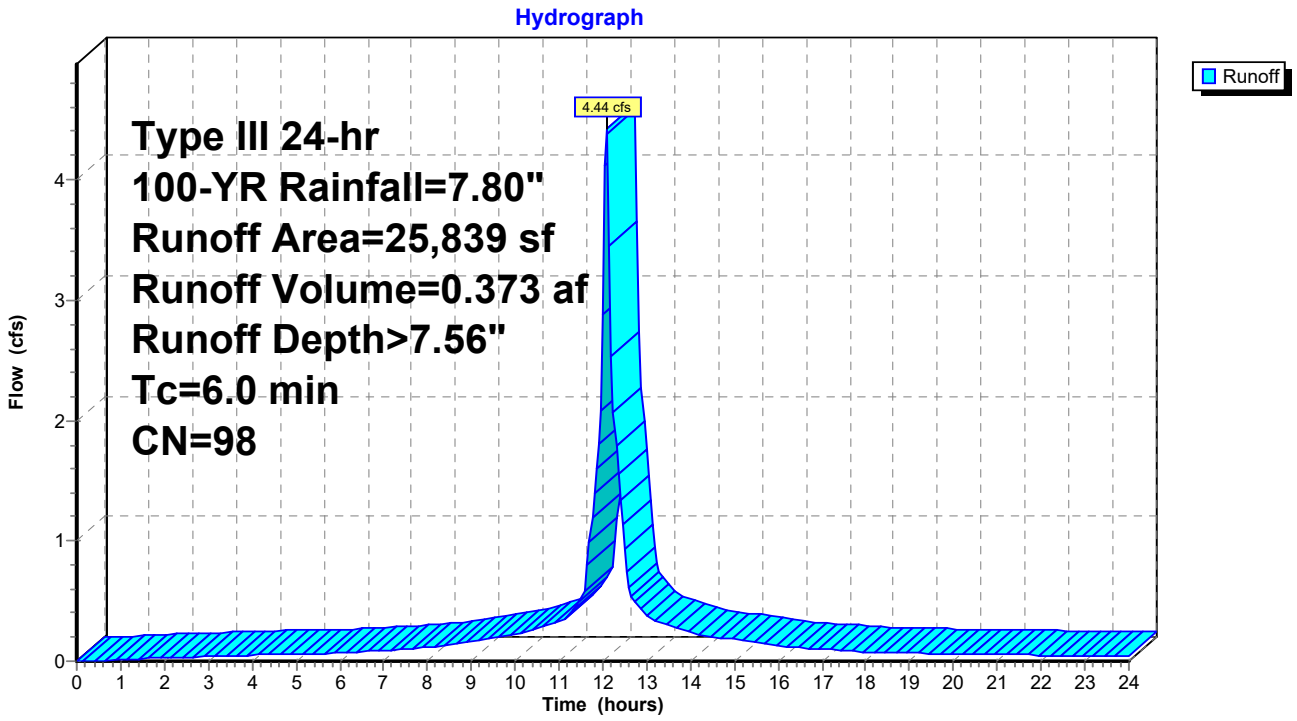
Runoff = 4.44 cfs @ 12.09 hrs, Volume= 0.373 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
25,839	98	Roofs, HSG B
25,839		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4C: PDA-4C



Summary for Subcatchment 4D: PDA-4D

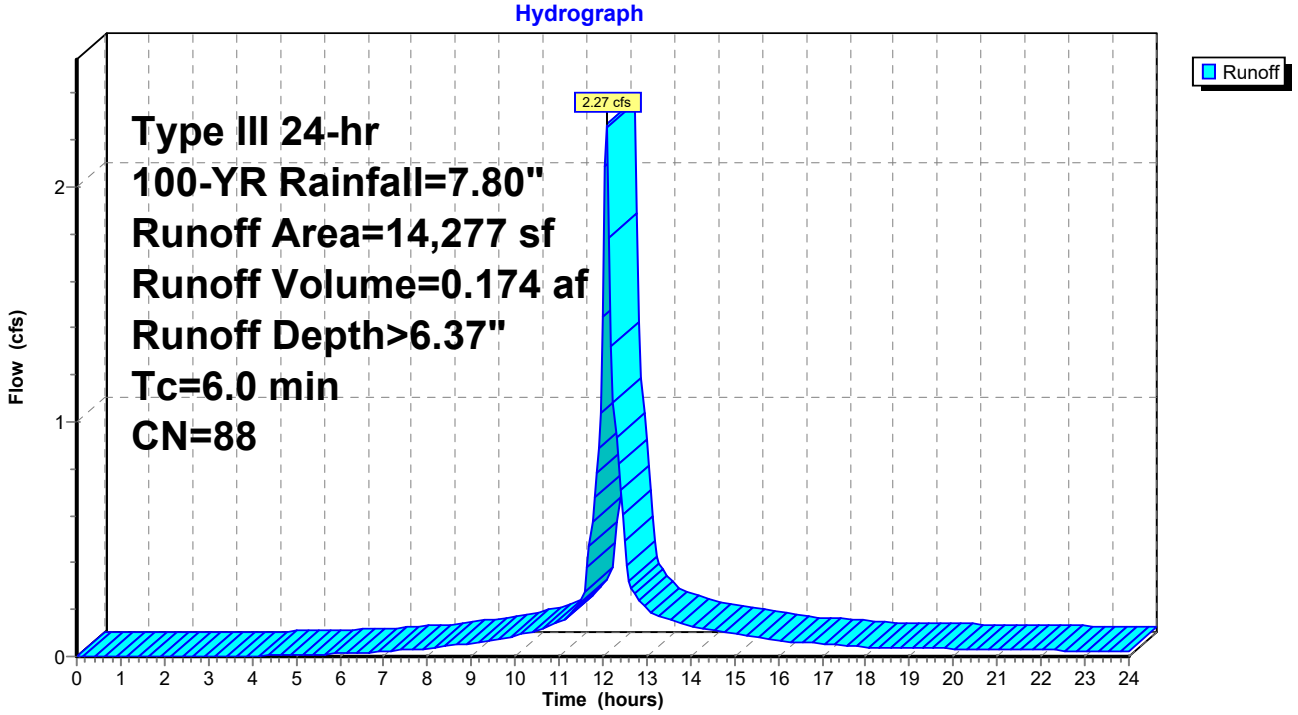
Runoff = 2.27 cfs @ 12.09 hrs, Volume= 0.174 af, Depth> 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
10,311	98	Paved parking, HSG B
3,966	61	>75% Grass cover, Good, HSG B
14,277	88	Weighted Average
3,966		27.78% Pervious Area
10,311		72.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4D: PDA-4D



Summary for Subcatchment 4E: PDA-4E

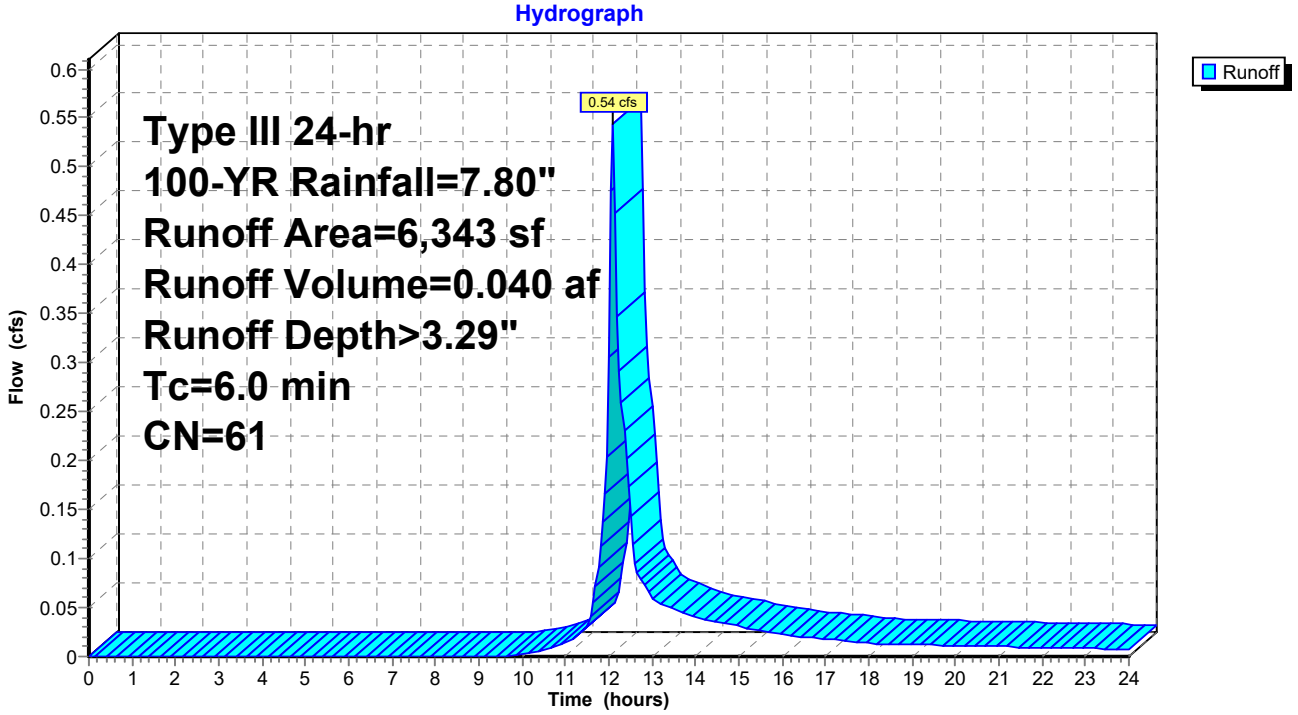
Runoff = 0.54 cfs @ 12.10 hrs, Volume= 0.040 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
6,331	61	>75% Grass cover, Good, HSG B
12	98	Paved parking, HSG B
6,343	61	Weighted Average
6,331		99.81% Pervious Area
12		0.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4E: PDA-4E



Summary for Subcatchment 4F: PDA-4F

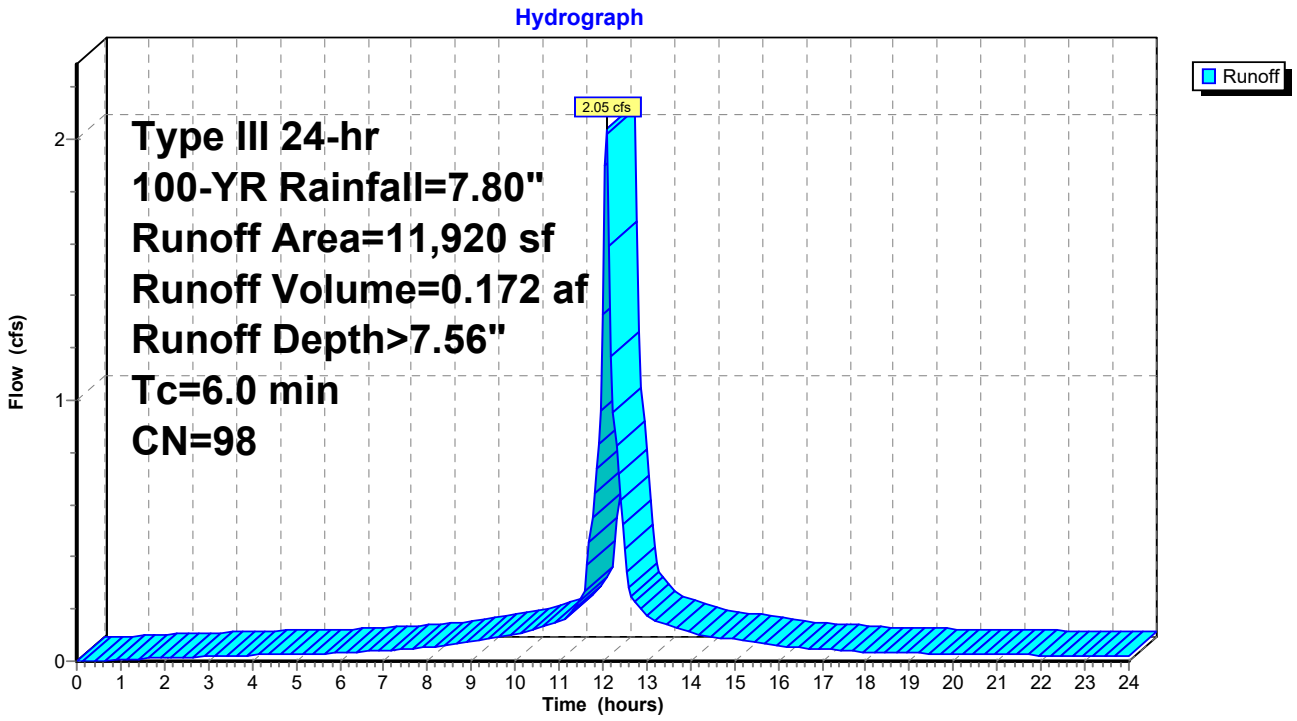
Runoff = 2.05 cfs @ 12.09 hrs, Volume= 0.172 af, Depth> 7.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
11,920	98	Roofs, HSG B
11,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 4F: PDA-4F



Summary for Subcatchment 4G: PDA-4G

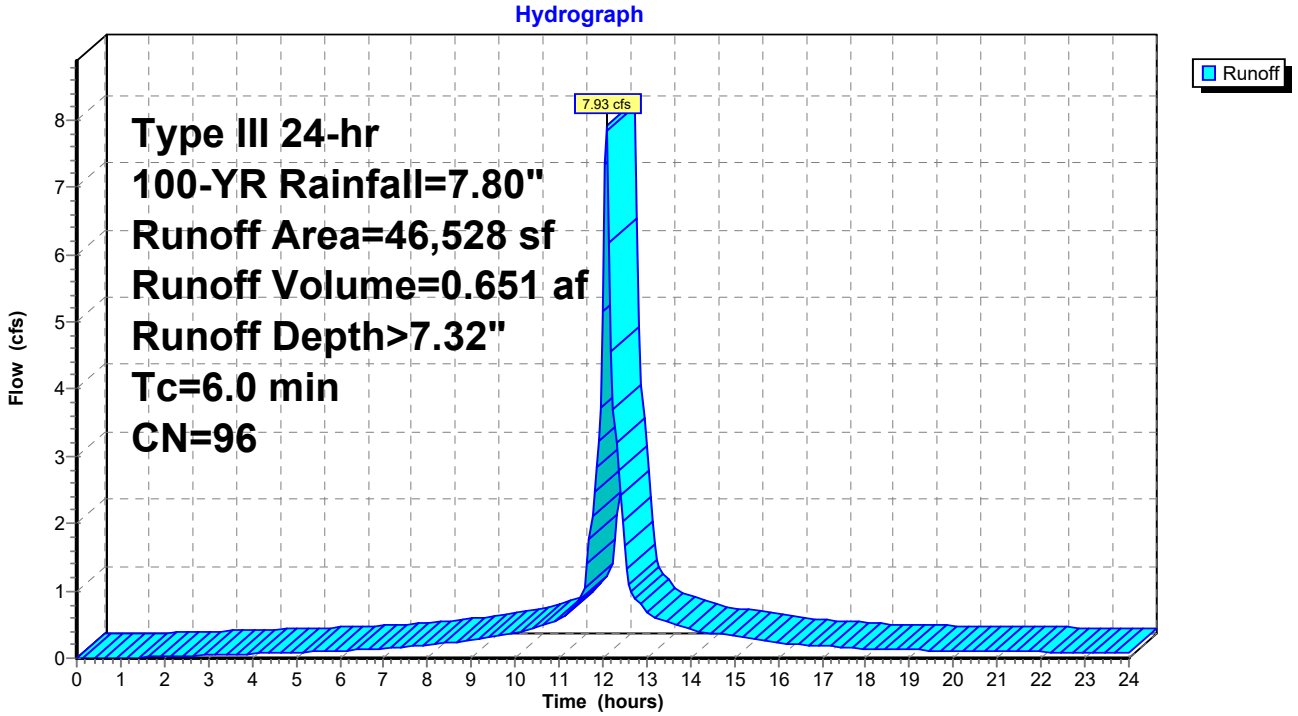
Runoff = 7.93 cfs @ 12.09 hrs, Volume= 0.651 af, Depth> 7.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
10,383	98	Paved parking, HSG B
3,055	61	>75% Grass cover, Good, HSG B
33,090	98	Roofs, HSG B
46,528	96	Weighted Average
3,055		6.57% Pervious Area
43,473		93.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 4G: PDA-4G



Summary for Subcatchment 5A: PDA-5A

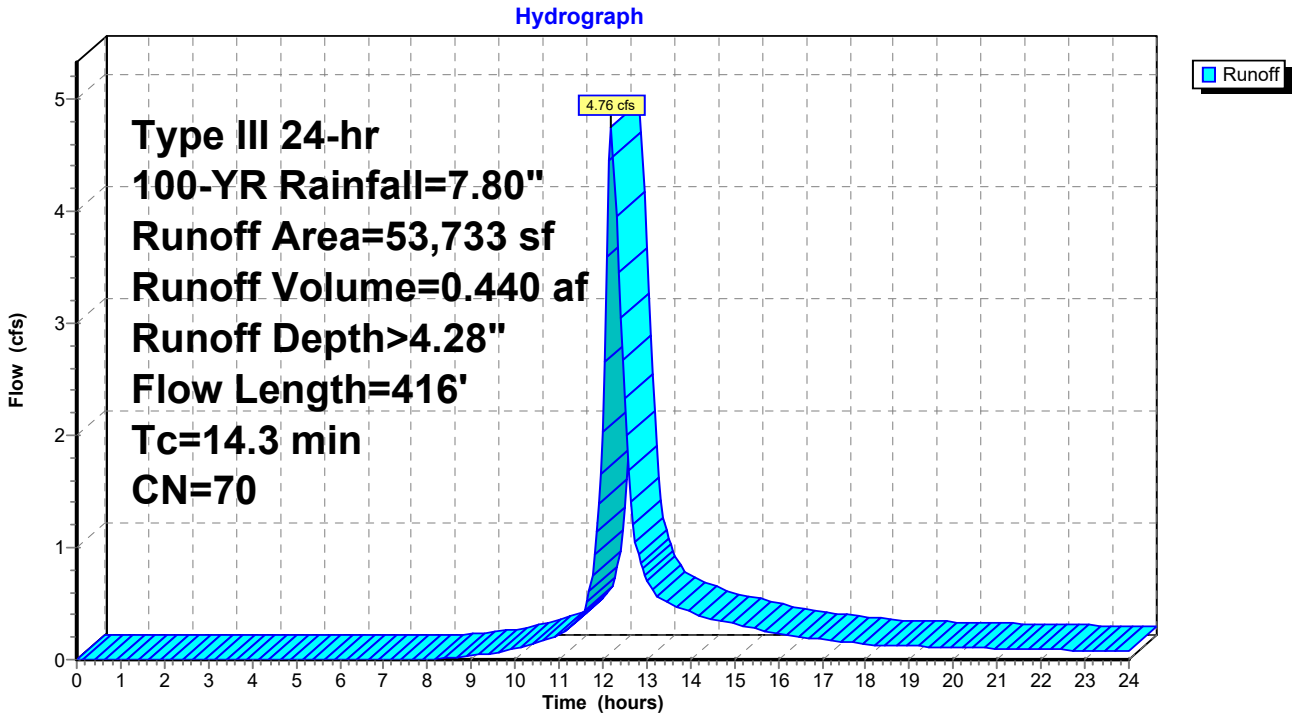
Runoff = 4.76 cfs @ 12.20 hrs, Volume= 0.440 af, Depth> 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
53,733	70	Woods, Good, HSG C
53,733		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0334	0.08		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
3.3	239	0.0566	1.19		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
0.3	62	0.0450	3.42		**Shallow Concentrated Flow, swale/ditch** Unpaved Kv= 16.1 fps
0.1	23	0.0100	4.91	3.86	**Pipe Channel, 12" CPP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
0.7	42	0.0430	1.04		**Shallow Concentrated Flow, 5E-EDP-5** Woodland Kv= 5.0 fps
14.3	416	Total			

Subcatchment 5A: PDA-5A



Summary for Subcatchment 5B: PDA-5B

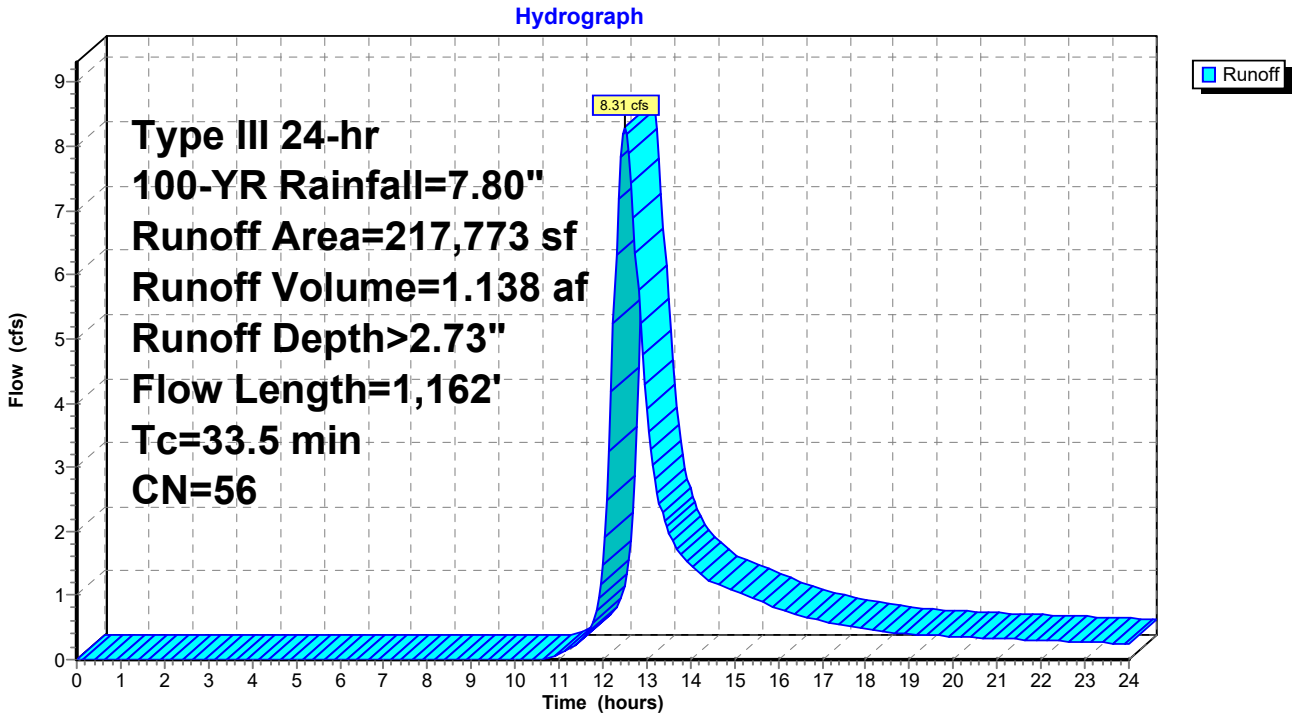
Runoff = 8.31 cfs @ 12.50 hrs, Volume= 1.138 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
200,443	55	Woods, Good, HSG B
13,852	77	Woods, Good, HSG D
3,478	61	>75% Grass cover, Good, HSG B
217,773	56	Weighted Average
217,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0400	0.09		**Sheet Flow, 5A-5B** Woods: Light underbrush n= 0.400 P2= 3.32"
9.9	553	0.0350	0.94		**Shallow Concentrated Flow, 5B-5C** Woodland Kv= 5.0 fps
13.3	455	0.0130	0.57		**Shallow Concentrated Flow, 5C-5D** Woodland Kv= 5.0 fps
1.1	104	0.0913	1.51		**Shallow Concentrated Flow, 5D-EDP-5** Woodland Kv= 5.0 fps
33.5	1,162	Total			

Subcatchment 5B: PDA-5B



Summary for Subcatchment 5C: PDA-5C

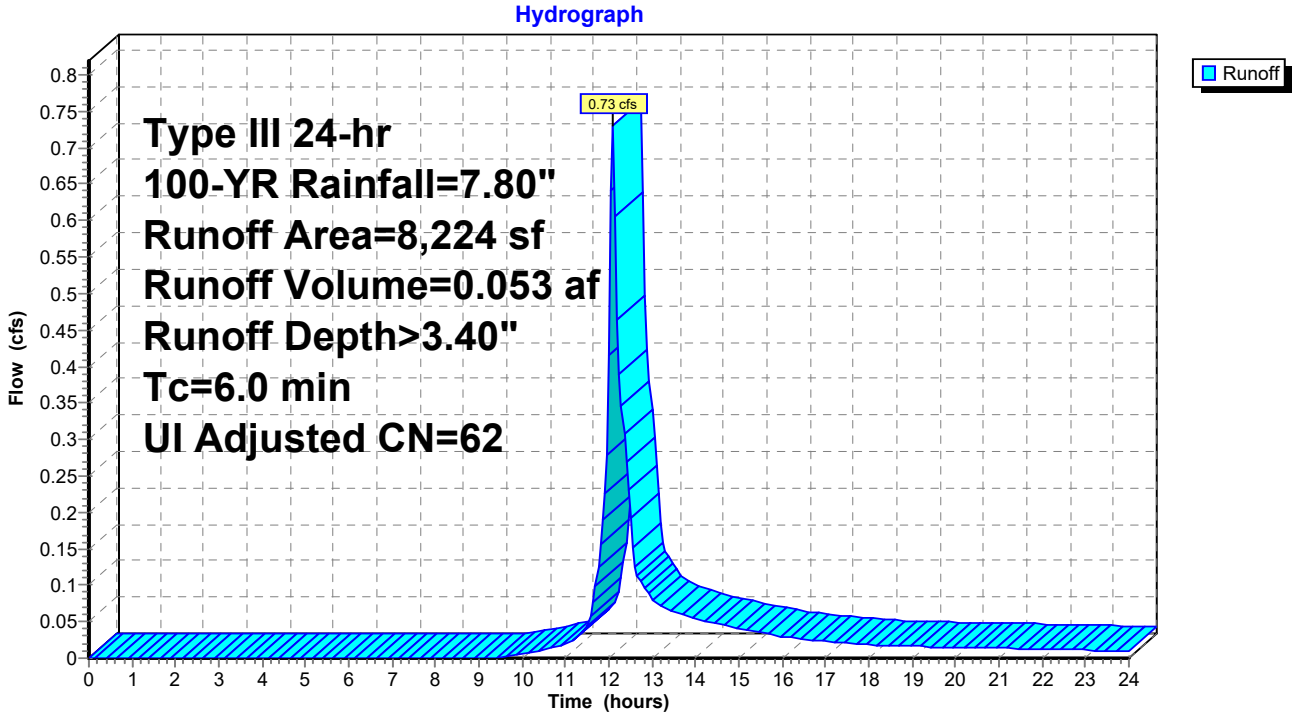
Runoff = 0.73 cfs @ 12.10 hrs, Volume= 0.053 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Adj	Description
7,872	61		>75% Grass cover, Good, HSG B
352	98		Unconnected pavement, HSG B
8,224	63	62	Weighted Average, UI Adjusted
7,872			95.72% Pervious Area
352			4.28% Impervious Area
352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5C: PDA-5C



Summary for Subcatchment 5D: PDA-5D

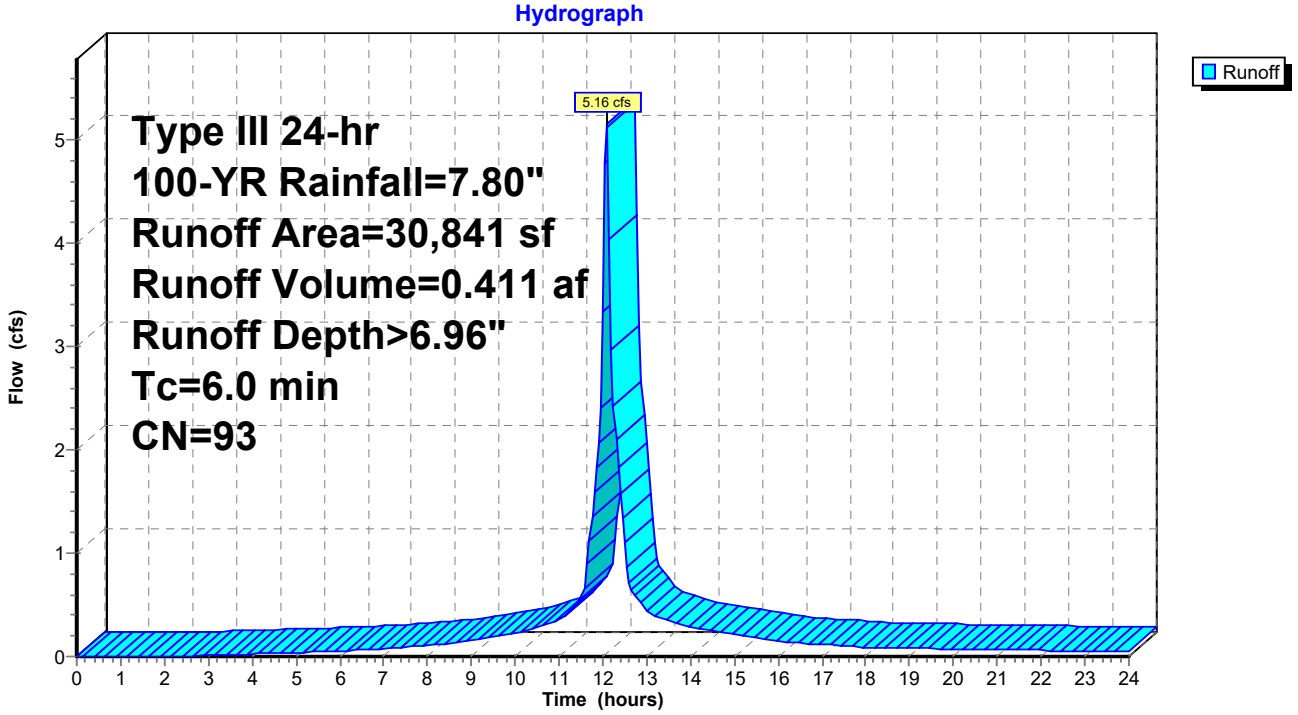
Runoff = 5.16 cfs @ 12.09 hrs, Volume= 0.411 af, Depth> 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
4,408	61	>75% Grass cover, Good, HSG B
26,433	98	Roofs, HSG B
30,841	93	Weighted Average
4,408		14.29% Pervious Area
26,433		85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5D: PDA-5D



Summary for Subcatchment 5E: PDA-5E

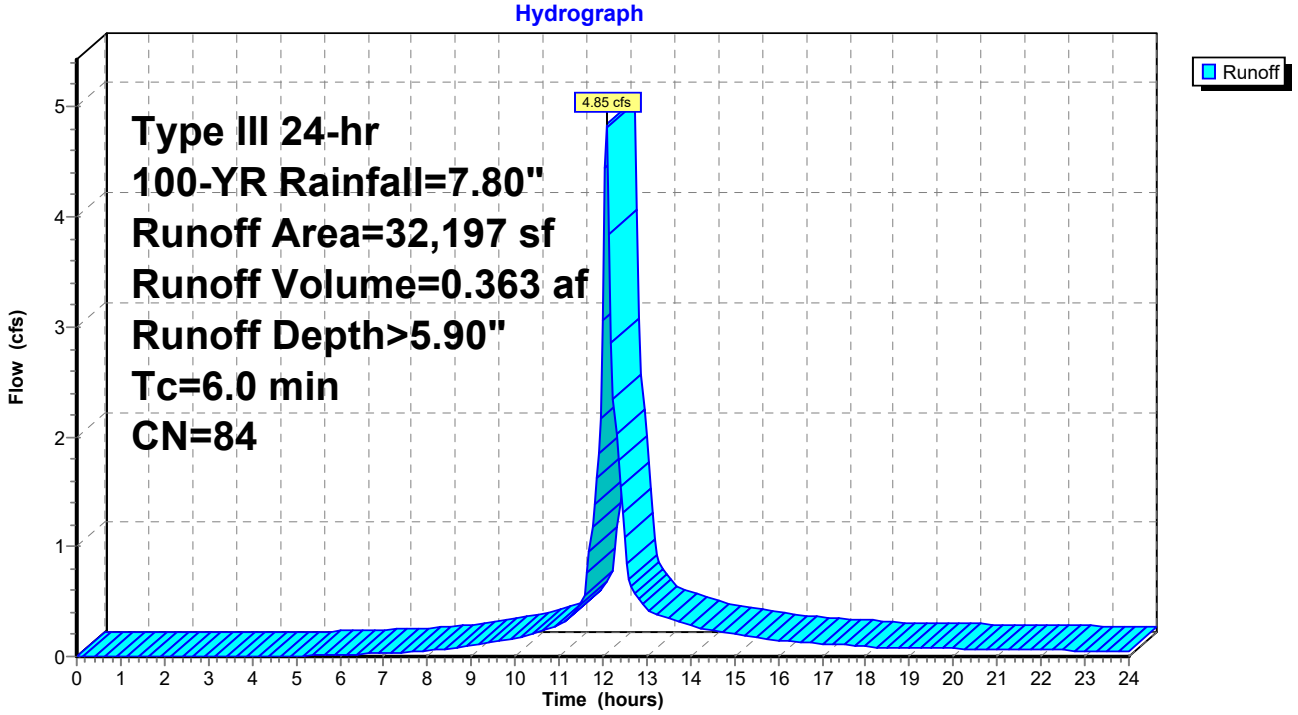
Runoff = 4.85 cfs @ 12.09 hrs, Volume= 0.363 af, Depth> 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
20,092	98	Paved parking, HSG B
12,105	61	>75% Grass cover, Good, HSG B
32,197	84	Weighted Average
12,105		37.60% Pervious Area
20,092		62.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6 min**

Subcatchment 5E: PDA-5E



Summary for Subcatchment 6: PDA-6

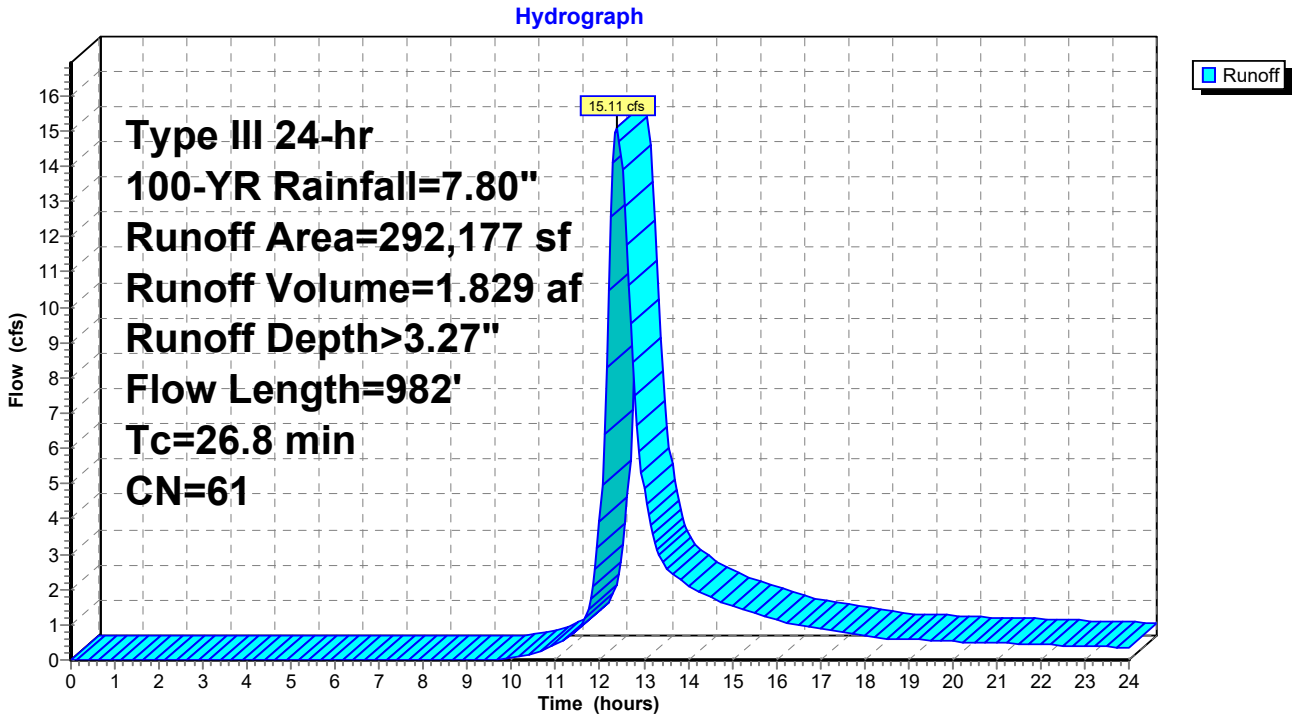
Runoff = 15.11 cfs @ 12.39 hrs, Volume= 1.829 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
113,079	70	Woods, Good, HSG C
179,098	55	Woods, Good, HSG B
292,177	61	Weighted Average
292,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0250	0.08		**Sheet Flow, 6A-6B** Woods: Light underbrush n= 0.400 P2= 3.32"
4.7	306	0.0474	1.09		**Shallow Concentrated Flow, 6B-6C** Woodland Kv= 5.0 fps
3.5	130	0.0154	0.62		**Shallow Concentrated Flow, 6C-6D** Woodland Kv= 5.0 fps
7.5	496	0.0484	1.10		**Shallow Concentrated Flow, 6D-EDP-6** Woodland Kv= 5.0 fps
26.8	982	Total			

Subcatchment 6: PDA-6



Summary for Subcatchment 7A: PDA-7A

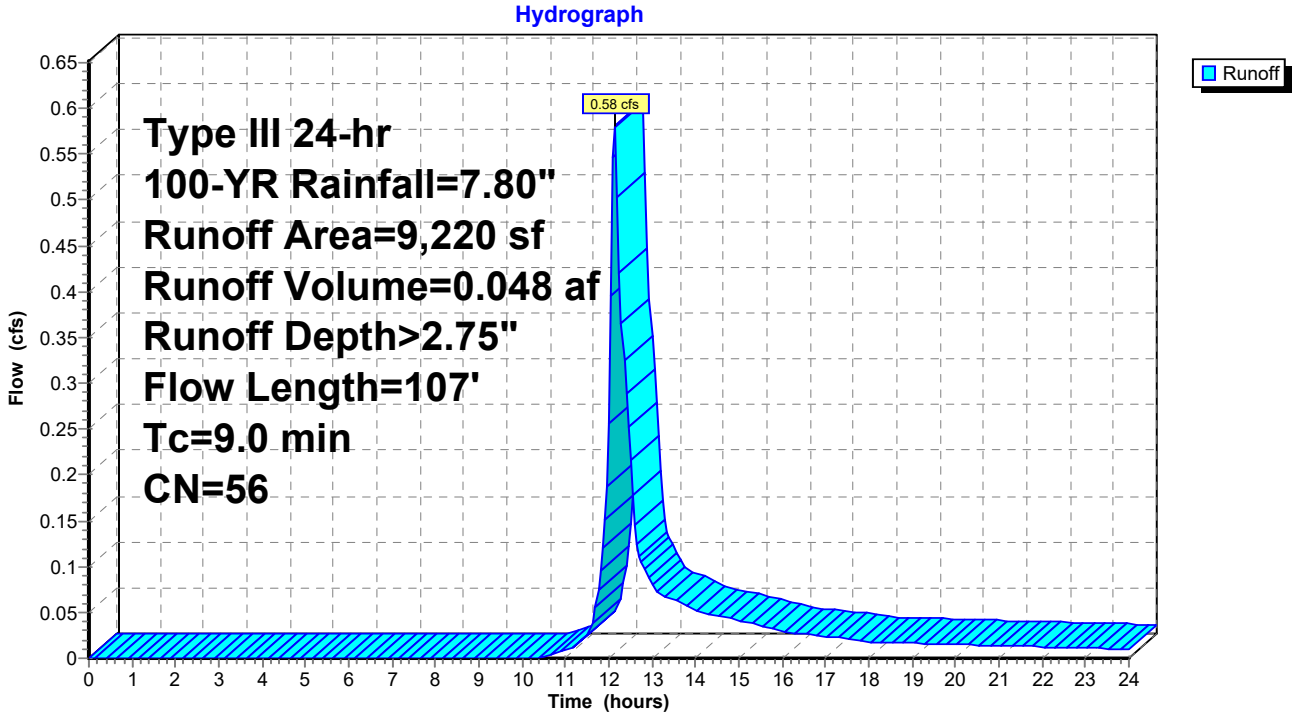
Runoff = 0.58 cfs @ 12.14 hrs, Volume= 0.048 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
1,048	61	>75% Grass cover, Good, HSG B
8,172	55	Woods, Good, HSG B
9,220	56	Weighted Average
9,220		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0550	0.10		**Sheet Flow, 7A-7B** Woods: Light underbrush n= 0.400 P2= 3.32"
0.9	57	0.0480	1.10		**Shallow Concentrated Flow, 7B-7C** Woodland Kv= 5.0 fps
9.0	107	Total			

Subcatchment 7A: PDA-7A



Summary for Subcatchment 7B: PDA-7B

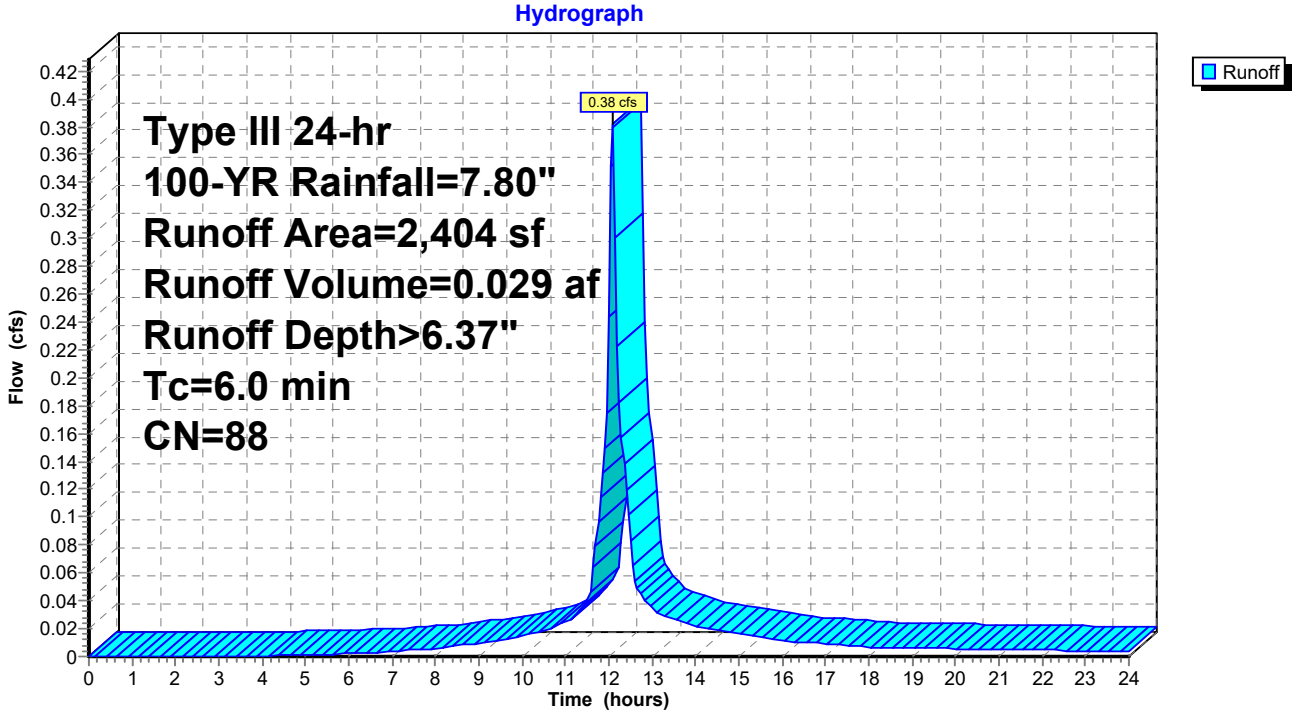
Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=7.80"

Area (sf)	CN	Description
1,743	98	Roofs, HSG B
661	61	>75% Grass cover, Good, HSG B
2,404	88	Weighted Average
661		27.50% Pervious Area
1,743		72.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, 6**

Subcatchment 7B: PDA-7B

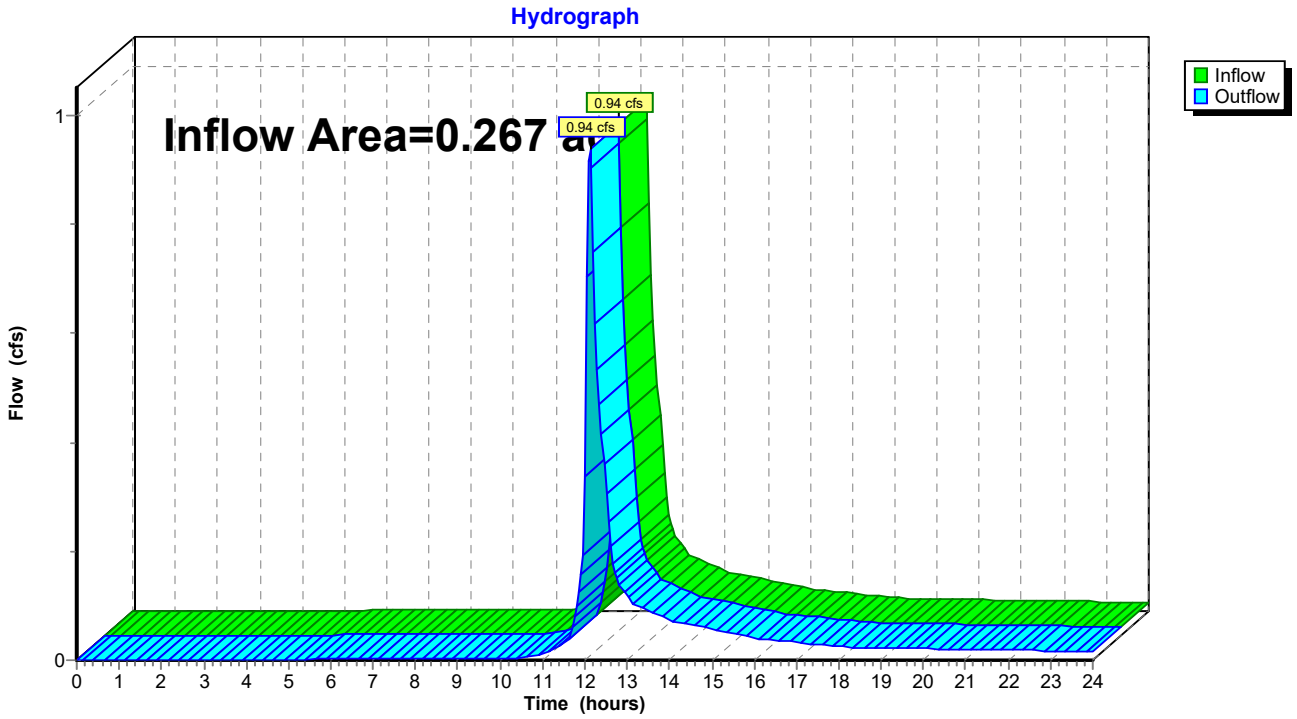


Summary for Reach DP-7: DP-7

Inflow Area = 0.267 ac, 14.99% Impervious, Inflow Depth > 3.19" for 100-YR event
Inflow = 0.94 cfs @ 12.12 hrs, Volume= 0.071 af
Outflow = 0.94 cfs @ 12.12 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-7: DP-7



Summary for Reach PDP-4: Design Point 4

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 2.81" for 100-YR event
Inflow = 25.26 cfs @ 12.60 hrs, Volume= 4.110 af
Outflow = 22.91 cfs @ 12.75 hrs, Volume= 4.054 af, Atten= 9%, Lag= 9.4 min

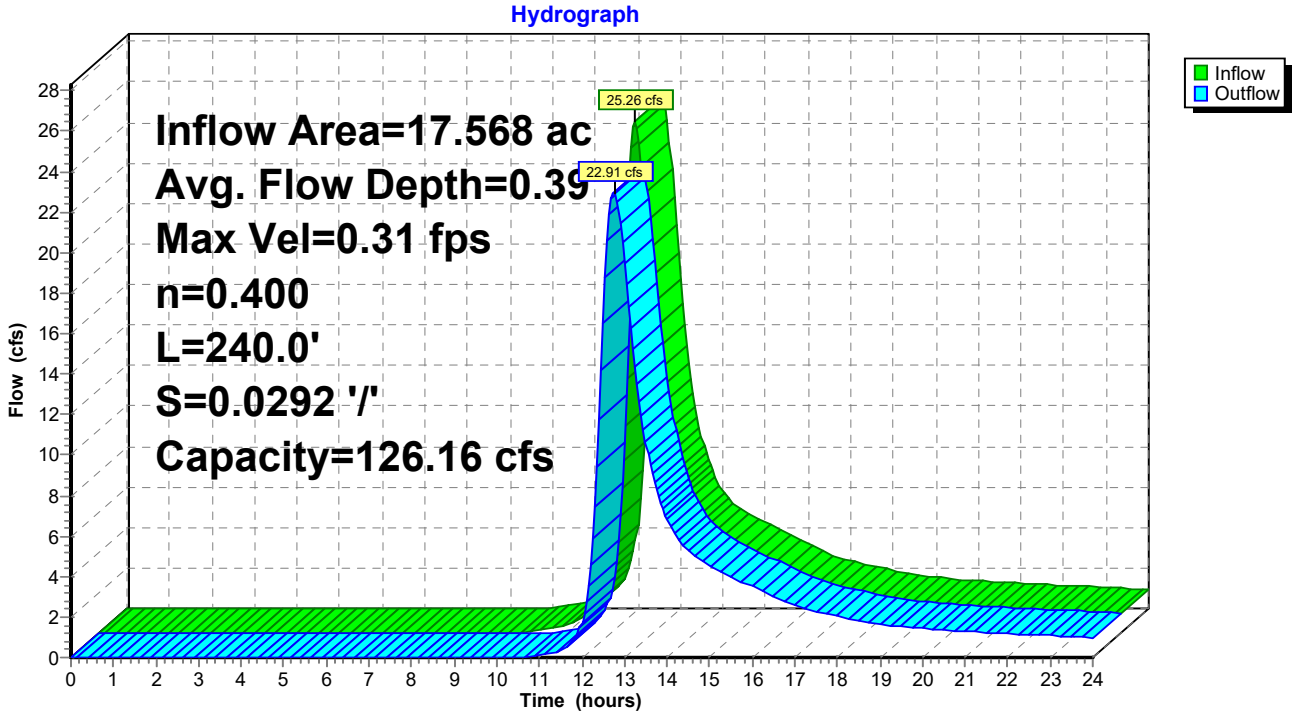
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.31 fps, Min. Travel Time= 13.0 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 33.0 min

Peak Storage= 17,888 cf @ 12.75 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 126.16 cfs

165.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 80.0 65.0 '/' Top Width= 310.00'
Length= 240.0' Slope= 0.0292 '/'
Inlet Invert= 625.00', Outlet Invert= 618.00'

‡

Reach PDP-4: Design Point 4



Stage-Area-Storage for Reach PDP-4: Design Point 4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
625.00	0.0	0
625.01	1.7	398
625.02	3.3	799
625.03	5.0	1,204
625.04	6.7	1,612
625.05	8.4	2,024
625.06	10.2	2,439
625.07	11.9	2,857
625.08	13.7	3,279
625.09	15.4	3,705
625.10	17.2	4,134
625.11	19.0	4,567
625.12	20.8	5,003
625.13	22.7	5,442
625.14	24.5	5,885
625.15	26.4	6,331
625.16	28.3	6,781
625.17	30.1	7,235
625.18	32.0	7,692
625.19	34.0	8,152
625.20	35.9	8,616
625.21	37.8	9,083
625.22	39.8	9,554
625.23	41.8	10,028
625.24	43.8	10,506
625.25	45.8	10,988
625.26	47.8	11,472
625.27	49.8	11,960
625.28	51.9	12,452
625.29	53.9	12,947
625.30	56.0	13,446
625.31	58.1	13,948
625.32	60.2	14,454
625.33	62.3	14,963
625.34	64.5	15,475
625.35	66.6	15,992
625.36	68.8	16,511
625.37	71.0	17,034
625.38	73.2	17,561
625.39	75.4	18,091
625.40	77.6	18,624
625.41	79.8	19,161
625.42	82.1	19,701
625.43	84.4	20,245
625.44	86.6	20,793
625.45	88.9	21,344
625.46	91.2	21,898
625.47	93.6	22,456
625.48	95.9	23,017
625.49	98.3	23,582
625.50	100.6	24,150
625.51	103.0	24,722
625.52	105.4	25,297
625.53	107.8	25,876
625.54	110.2	26,458
625.55	112.7	27,044
625.56	115.1	27,633
625.57	117.6	28,225
625.58	120.1	28,821
625.59	122.6	29,421
625.60	125.1	30,024
625.61	127.6	30,631
625.62	130.2	31,241
625.63	132.7	31,854
625.64	135.3	32,471
625.65	137.9	33,092
625.66	140.5	33,715
625.67	143.1	34,343
625.68	145.7	34,974
625.69	148.4	35,608
625.70	151.0	36,246
625.71	153.7	36,887
625.72	156.4	37,532
625.73	159.1	38,180
625.74	161.8	38,832
625.75	164.5	39,488
625.76	167.3	40,146
625.77	170.0	40,808
625.78	172.8	41,474
625.79	175.6	42,143
625.80	178.4	42,816
625.81	181.2	43,492
625.82	184.0	44,172
625.83	186.9	44,855
625.84	189.8	45,541
625.85	192.6	46,232
625.86	195.5	46,925
625.87	198.4	47,622
625.88	201.3	48,323
625.89	204.3	49,027
625.90	207.2	49,734
625.91	210.2	50,445
625.92	213.2	51,159
625.93	216.2	51,877
625.94	219.2	52,599
625.95	222.2	53,324
625.96	225.2	54,052
625.97	228.3	54,784
625.98	231.3	55,519
625.99	234.4	56,258
626.00	**237.5**	**57,000**

Summary for Reach PDP-5: Design Point 5

Inflow Area = 14.576 ac, 7.38% Impervious, Inflow Depth > 2.95" for 100-YR event
Inflow = 26.63 cfs @ 12.47 hrs, Volume= 3.579 af
Outflow = 23.64 cfs @ 12.60 hrs, Volume= 3.525 af, Atten= 11%, Lag= 7.9 min

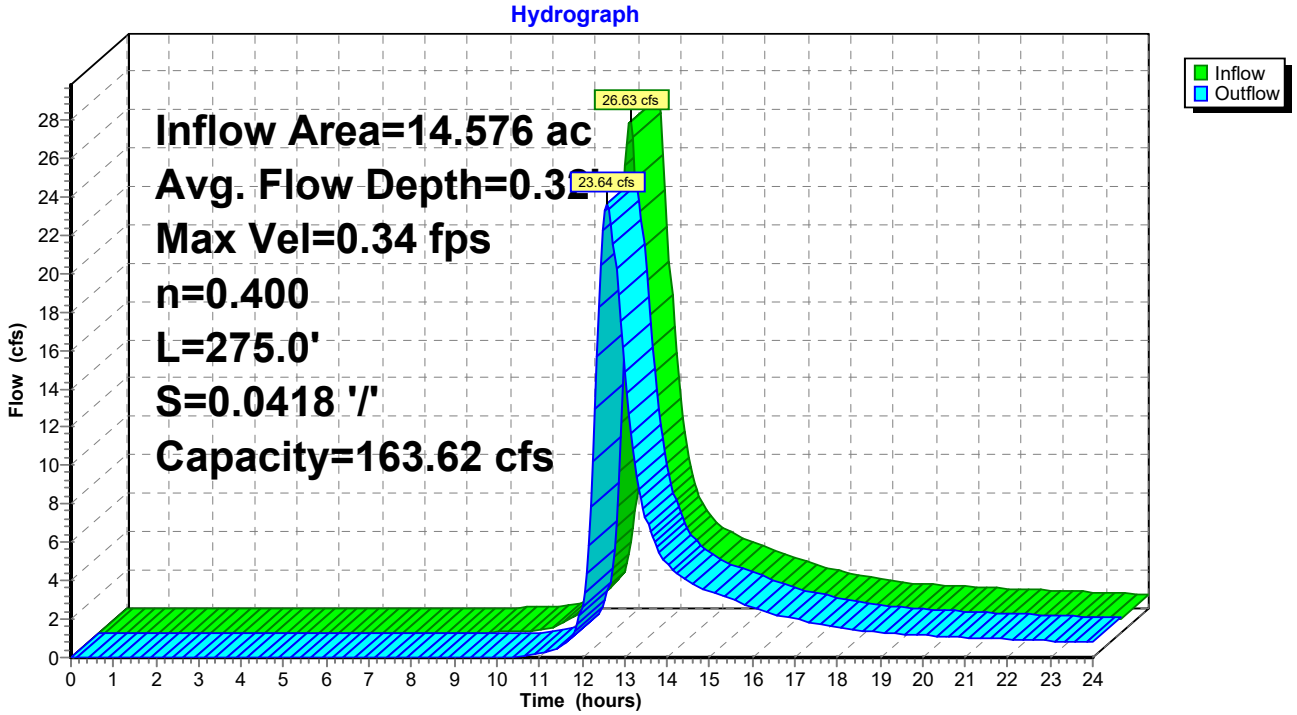
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.34 fps, Min. Travel Time= 13.3 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 37.9 min

Peak Storage= 18,853 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00' Flow Area= 237.5 sf, Capacity= 163.62 cfs

200.00' x 1.00' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 50.0 25.0 '/' Top Width= 275.00'
Length= 275.0' Slope= 0.0418 '/'
Inlet Invert= 636.50', Outlet Invert= 625.00'

‡

Reach PDP-5: Design Point 5



Stage-Area-Storage for Reach PDP-5: Design Point 5

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
636.50	0.0	0
636.51	2.0	551
636.52	4.0	1,104
636.53	6.0	1,659
636.54	8.1	2,217
636.55	10.1	2,776
636.56	12.1	3,337
636.57	14.2	3,901
636.58	16.2	4,466
636.59	18.3	5,034
636.60	20.4	5,603
636.61	22.5	6,175
636.62	24.5	6,749
636.63	26.6	7,324
636.64	28.7	7,902
636.65	30.8	8,482
636.66	33.0	9,064
636.67	35.1	9,648
636.68	37.2	10,234
636.69	39.4	10,822
636.70	41.5	11,413
636.71	43.7	12,005
636.72	45.8	12,599
636.73	48.0	13,196
636.74	50.2	13,794
636.75	52.3	14,395
636.76	54.5	14,997
636.77	56.7	15,602
636.78	58.9	16,209
636.79	61.2	16,817
636.80	63.4	17,428
636.81	65.6	18,041
636.82	67.8	18,656
636.83	70.1	19,273
636.84	72.3	19,892
636.85	74.6	20,513
636.86	76.9	21,137
636.87	79.1	21,762
636.88	81.4	22,389
636.89	83.7	23,019
636.90	86.0	23,650
636.91	88.3	24,284
636.92	90.6	24,919
636.93	92.9	25,557
636.94	95.3	26,197
636.95	97.6	26,838
636.96	99.9	27,482
636.97	102.3	28,128
636.98	104.6	28,776
636.99	107.0	29,426
637.00	109.4	30,078
637.01	111.8	30,732
637.02	114.1	31,389
637.03	116.5	32,047
637.04	118.9	32,707
637.05	121.3	33,370
637.06	123.8	34,034
637.07	126.2	34,701
637.08	128.6	35,369
637.09	131.1	36,040
637.10	133.5	36,713
637.11	136.0	37,387
637.12	138.4	38,064
637.13	140.9	38,743
637.14	143.4	39,424
637.15	145.8	40,107
637.16	148.3	40,792
637.17	150.8	41,479
637.18	153.3	42,169
637.19	155.9	42,860
637.20	158.4	43,553
637.21	160.9	44,249
637.22	163.4	44,946
637.23	166.0	45,646
637.24	168.5	46,347
637.25	171.1	47,051
637.26	173.7	47,757
637.27	176.2	48,464
637.28	178.8	49,174
637.29	181.4	49,886
637.30	184.0	50,600
637.31	186.6	51,316
637.32	189.2	52,034
637.33	191.8	52,754
637.34	194.5	53,476
637.35	197.1	54,201
637.36	199.7	54,927
637.37	202.4	55,656
637.38	205.0	56,386
637.39	207.7	57,119
637.40	210.4	57,853
637.41	213.1	58,590
637.42	215.7	59,329
637.43	218.4	60,069
637.44	221.1	60,812
637.45	223.8	61,557
637.46	226.6	62,304
637.47	229.3	63,053
637.48	232.0	63,804
637.49	234.8	64,557
637.50	**237.5**	**65,313**

Summary for Reach PDP-6: Design Point 6

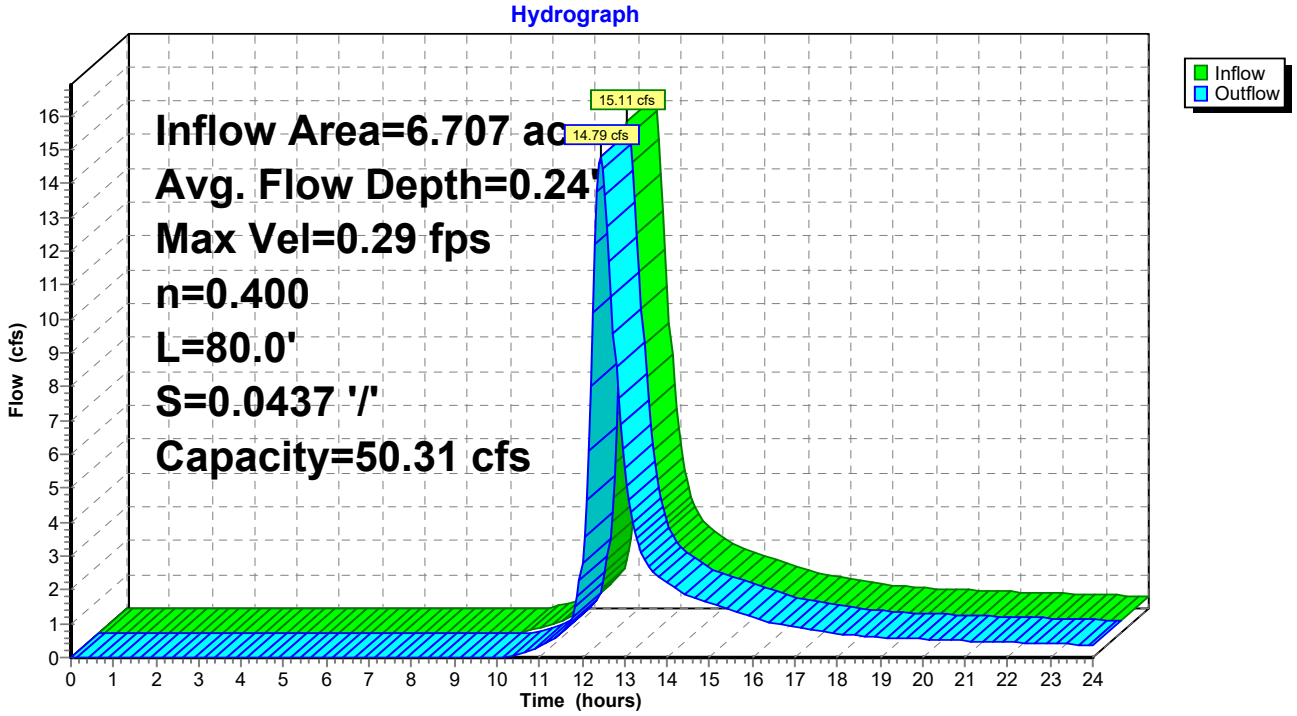
Inflow Area = 6.707 ac, 0.00% Impervious, Inflow Depth > 3.27" for 100-YR event
Inflow = 15.11 cfs @ 12.39 hrs, Volume= 1.829 af
Outflow = 14.79 cfs @ 12.44 hrs, Volume= 1.820 af, Atten= 2%, Lag= 3.1 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.29 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 13.1 min

Peak Storage= 4,012 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50' Flow Area= 107.5 sf, Capacity= 50.31 cfs

200.00' x 0.50' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 30.0 '/' Top Width= 230.00'
Length= 80.0' Slope= 0.0437 '/'
Inlet Invert= 642.50', Outlet Invert= 639.00'

Reach PDP-6: Design Point 6



Stage-Area-Storage for Reach PDP-6: Design Point 6

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
642.50	0.0	0
642.51	2.0	160
642.52	4.0	321
642.53	6.0	482
642.54	8.0	644
642.55	10.1	806
642.56	12.1	969
642.57	14.1	1,132
642.58	16.2	1,295
642.59	18.2	1,459
642.60	20.3	1,624
642.61	22.4	1,789
642.62	24.4	1,955
642.63	26.5	2,121
642.64	28.6	2,287
642.65	30.7	2,454
642.66	32.8	2,621
642.67	34.9	2,789
642.68	37.0	2,958
642.69	39.1	3,127
642.70	41.2	3,296
642.71	43.3	3,466
642.72	45.5	3,636
642.73	47.6	3,807
642.74	49.7	3,978
642.75	51.9	4,150
642.76	54.0	4,322
642.77	56.2	4,495
642.78	58.4	4,668
642.79	60.5	4,842
642.80	62.7	5,016
642.81	64.9	5,191
642.82	67.1	5,366
642.83	69.3	5,541
642.84	71.5	5,717
642.85	73.7	5,894
642.86	75.9	6,071
642.87	78.1	6,249
642.88	80.3	6,427
642.89	82.6	6,605
642.90	84.8	6,784
642.91	87.0	6,963
642.92	89.3	7,143
642.93	91.5	7,324
642.94	93.8	7,505
642.95	96.1	7,686
642.96	98.3	7,868
642.97	100.6	8,050
642.98	102.9	8,233
642.99	105.2	8,416
643.00	**107.5**	**8,600**

Summary for Pond 3: SFB-3

Inflow Area = 1.125 ac, 75.58% Impervious, Inflow Depth > 4.62" for 100-YR event
Inflow = 2.06 cfs @ 12.09 hrs, Volume= 0.434 af
Outflow = 1.02 cfs @ 12.41 hrs, Volume= 0.409 af, Atten= 50%, Lag= 18.9 min
Discarded = 0.09 cfs @ 12.41 hrs, Volume= 0.087 af
Primary = 0.94 cfs @ 12.41 hrs, Volume= 0.322 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 622.99' @ 12.41 hrs Surf.Area= 1,854 sf Storage= 2,441 cf
Flood Elev= 623.00' Surf.Area= 1,864 sf Storage= 2,469 cf

Plug-Flow detention time= 58.6 min calculated for 0.408 af (94% of inflow)
Center-of-Mass det. time= 28.8 min (926.8 - 898.0)

Volume	Invert	Avail.Storage	Storage Description
#1	619.75'	2,238 cf	**Overall storage (Prismatic)** Listed below (Recalc) 3,104 cf Overall - 866 cf Embedded = 2,238 cf
#2	619.75'	115 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 40.0% Voids
#3	620.25'	58 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
#4	620.75'	58 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 289 cf Overall x 20.0% Voids
		2,469 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
621.00	577	721	721
622.00	1,162	870	1,591
623.00	1,864	1,513	3,104

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
619.75	577	0	0
620.25	577	289	289

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.25	577	0	0
620.75	577	289	289

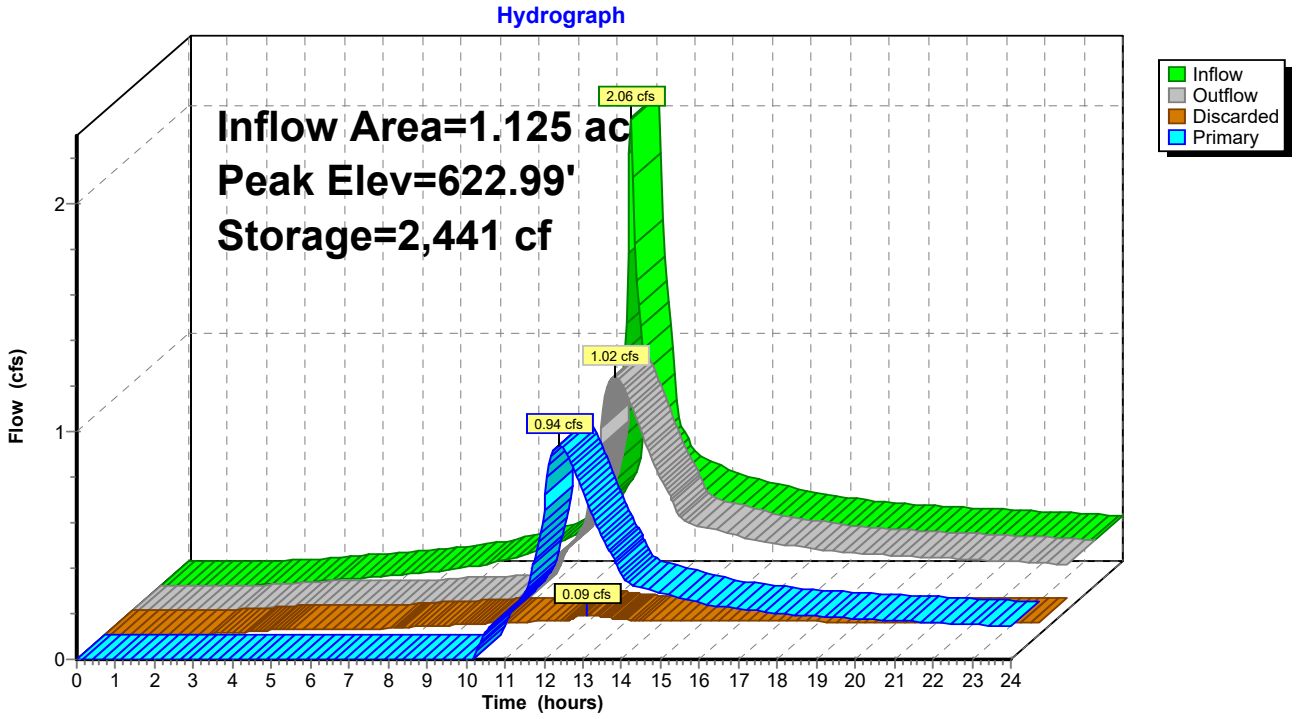
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
620.75	577	0	0
621.25	577	289	289

Device	Routing	Invert	Outlet Devices
#1	Discarded	619.75'	**2.010 in/hr Exfiltration over Surface area**
#2	Primary	620.64'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 620.64' / 620.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 2	622.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 12.41 hrs HW=622.98' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.94 cfs @ 12.41 hrs HW=622.98' (Free Discharge)
└─**2=Culvert** (Passes 0.94 cfs of 1.08 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.78 fps)

Pond 3: SFB-3



Stage-Area-Storage for Pond 3: SFB-3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
619.75	577	0
619.80	577	12
619.85	577	23
619.90	577	35
619.95	577	46
620.00	577	58
620.05	577	69
620.10	577	81
620.15	577	92
620.20	577	104
620.25	577	115
620.30	577	121
620.35	577	127
620.40	577	133
620.45	577	138
620.50	577	144
620.55	577	150
620.60	577	156
620.65	577	162
620.70	577	167
620.75	577	173
620.80	577	179
620.85	577	185
620.90	577	190
620.95	577	196
621.00	577	202
621.05	606	208
621.10	636	216
621.15	665	226
621.20	694	237
621.25	723	249
621.30	752	286
621.35	782	324
621.40	811	364
621.45	840	405
621.50	870	448
621.55	899	492
621.60	928	538
621.65	957	585
621.70	987	634
621.75	1,016	684
621.80	1,045	735
621.85	1,074	788
621.90	1,103	843
621.95	1,133	899
622.00	1,162	956
622.05	1,197	1,015
622.10	1,232	1,076
622.15	1,267	1,138
622.20	1,302	1,202
622.25	1,338	1,268
622.30	1,373	1,336
622.35	1,408	1,406
622.40	1,443	1,477
622.45	1,478	1,550
622.50	1,513	1,625
622.55	1,548	1,701
622.60	1,583	1,780
622.65	1,618	1,860
622.70	1,653	1,941
622.75	1,689	2,025
622.80	1,724	2,110
622.85	1,759	2,197
622.90	1,794	2,286
622.95	1,829	2,377
623.00	**1,864**	**2,469**

Summary for Pond 4: SFB-4

Inflow Area =	1.487 ac, 85.51% Impervious, Inflow Depth > 6.44" for 100-YR event				
Inflow =	2.44 cfs @	12.37 hrs,	Volume=	0.798 af	
Outflow =	2.36 cfs @	12.54 hrs,	Volume=	0.790 af,	Atten= 3%, Lag= 10.1 min
Discarded =	0.53 cfs @	12.54 hrs,	Volume=	0.559 af	
Primary =	0.47 cfs @	12.54 hrs,	Volume=	0.159 af	
Secondary =	1.36 cfs @	12.54 hrs,	Volume=	0.072 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 633.34' @ 12.54 hrs Surf.Area= 3,491 sf Storage= 5,869 cf
Flood Elev= 634.00' Surf.Area= 4,000 sf Storage= 8,324 cf

Plug-Flow detention time= 69.7 min calculated for 0.789 af (99% of inflow)
Center-of-Mass det. time= 63.4 min (880.7 - 817.3)

Volume	Invert	Avail.Storage	Storage Description
#1	630.00'	7,667 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,132 cf Overall - 2,465 cf Embedded = 7,667 cf
#2	630.00'	329 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 40.0% Voids
#3	630.50'	164 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
#4	631.00'	164 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 822 cf Overall x 20.0% Voids
		8,324 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
631.00	1,643	1,643	1,643
632.00	2,443	2,043	3,686
633.00	3,224	2,834	6,520
634.00	4,000	3,612	10,132

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.00	1,643	0	0
630.50	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
630.50	1,643	0	0
631.00	1,643	822	822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
631.00	1,643	0	0
631.50	1,643	822	822

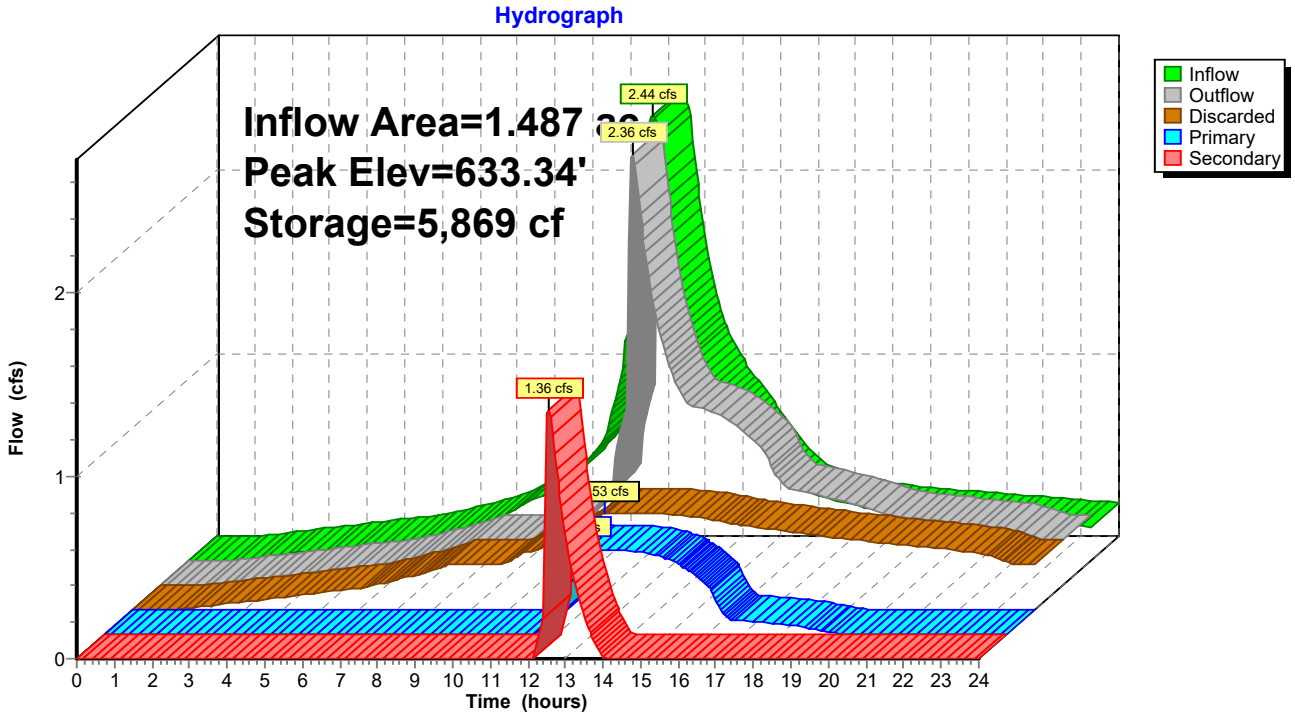
Device	Routing	Invert	Outlet Devices
#1	Discarded	630.00'	**6.560 in/hr Exfiltration over Surface area**
#2	Primary	630.00'	**4.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 630.00' / 629.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	632.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Device 2	632.65'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	633.30'	**50.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.53 cfs @ 12.54 hrs HW=633.34' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.47 cfs @ 12.54 hrs HW=633.34' (Free Discharge)
└─**2=Culvert** (Passes 0.47 cfs of 0.59 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.41 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.35 cfs @ 4.01 fps)

Secondary OutFlow Max=1.26 cfs @ 12.54 hrs HW=633.34' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 1.26 cfs @ 0.57 fps)

Pond 4: SFB-4



Stage-Area-Storage for Pond 4: SFB-4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
630.00	1,643	0
630.05	1,643	33
630.10	1,643	66
630.15	1,643	99
630.20	1,643	131
630.25	1,643	164
630.30	1,643	197
630.35	1,643	230
630.40	1,643	263
630.45	1,643	296
630.50	1,643	329
630.55	1,643	345
630.60	1,643	361
630.65	1,643	378
630.70	1,643	394
630.75	1,643	411
630.80	1,643	427
630.85	1,643	444
630.90	1,643	460
630.95	1,643	476
631.00	1,643	493
631.05	1,683	510
631.10	1,723	530
631.15	1,763	551
631.20	1,803	575
631.25	1,843	600
631.30	1,883	627
631.35	1,923	657
631.40	1,963	688
631.45	2,003	722
631.50	2,043	757
631.55	2,083	860
631.60	2,123	966
631.65	2,163	1,073
631.70	2,203	1,182
631.75	2,243	1,293
631.80	2,283	1,406
631.85	2,323	1,521
631.90	2,363	1,638
631.95	2,403	1,758
632.00	2,443	1,879
632.05	2,482	2,002
632.10	2,521	2,127
632.15	2,560	2,254
632.20	2,599	2,383
632.25	2,638	2,514
632.30	2,677	2,647
632.35	2,716	2,782
632.40	2,755	2,918
632.45	2,794	3,057
632.50	2,834	3,198
632.55	2,873	3,340
632.60	2,912	3,485
632.65	2,951	3,632
632.70	2,990	3,780
632.75	3,029	3,931
632.80	3,068	4,083
632.85	3,107	4,237
632.90	3,146	4,394
632.95	3,185	4,552
633.00	3,224	4,712
633.05	3,263	4,874
633.10	3,302	5,038
633.15	3,340	5,205
633.20	3,379	5,373
633.25	3,418	5,542
633.30	3,457	5,714
633.35	3,496	5,888
633.40	3,534	6,064
633.45	3,573	6,242
633.50	3,612	6,421
633.55	3,651	6,603
633.60	3,690	6,786
633.65	3,728	6,972
633.70	3,767	7,159
633.75	3,806	7,348
633.80	3,845	7,540
633.85	3,884	7,733
633.90	3,922	7,928
633.95	3,961	8,125
634.00	**4,000**	**8,324**

Summary for Pond 5: SFB-5

Inflow Area =	1.636 ac, 65.78% Impervious, Inflow Depth > 3.72" for 100-YR event				
Inflow =	1.21 cfs @	12.10 hrs,	Volume=	0.507 af	
Outflow =	0.47 cfs @	14.26 hrs,	Volume=	0.399 af,	Atten= 61%, Lag= 129.4 min
Discarded =	0.23 cfs @	14.26 hrs,	Volume=	0.289 af	
Primary =	0.07 cfs @	14.26 hrs,	Volume=	0.062 af	
Secondary =	0.17 cfs @	14.26 hrs,	Volume=	0.047 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 635.00' @ 14.26 hrs Surf.Area= 3,487 sf Storage= 4,790 cf
Flood Elev= 636.00' Surf.Area= 4,050 sf Storage= 8,544 cf

Plug-Flow detention time= 165.6 min calculated for 0.399 af (79% of inflow)
Center-of-Mass det. time= 61.7 min (986.8 - 925.1)

Volume	Invert	Avail.Storage	Storage Description
#1	632.00'	7,942 cf	**Overall storage (Prismatic)** Listed below (Recalc) 10,200 cf Overall - 2,258 cf Embedded = 7,942 cf
#2	632.00'	301 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 40.0% Voids
#3	632.50'	151 cf	**Sand media (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
#4	633.00'	151 cf	**Infiltration Seed mix (Prismatic)** Listed below (Recalc) Inside #1 753 cf Overall x 20.0% Voids
		8,544 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
633.50	1,505	2,258	2,258
634.00	2,741	1,062	3,319
635.00	3,485	3,113	6,432
636.00	4,050	3,768	10,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.00	1,505	0	0
632.50	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
632.50	1,505	0	0
633.00	1,505	753	753

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
633.00	1,505	0	0
633.50	1,505	753	753

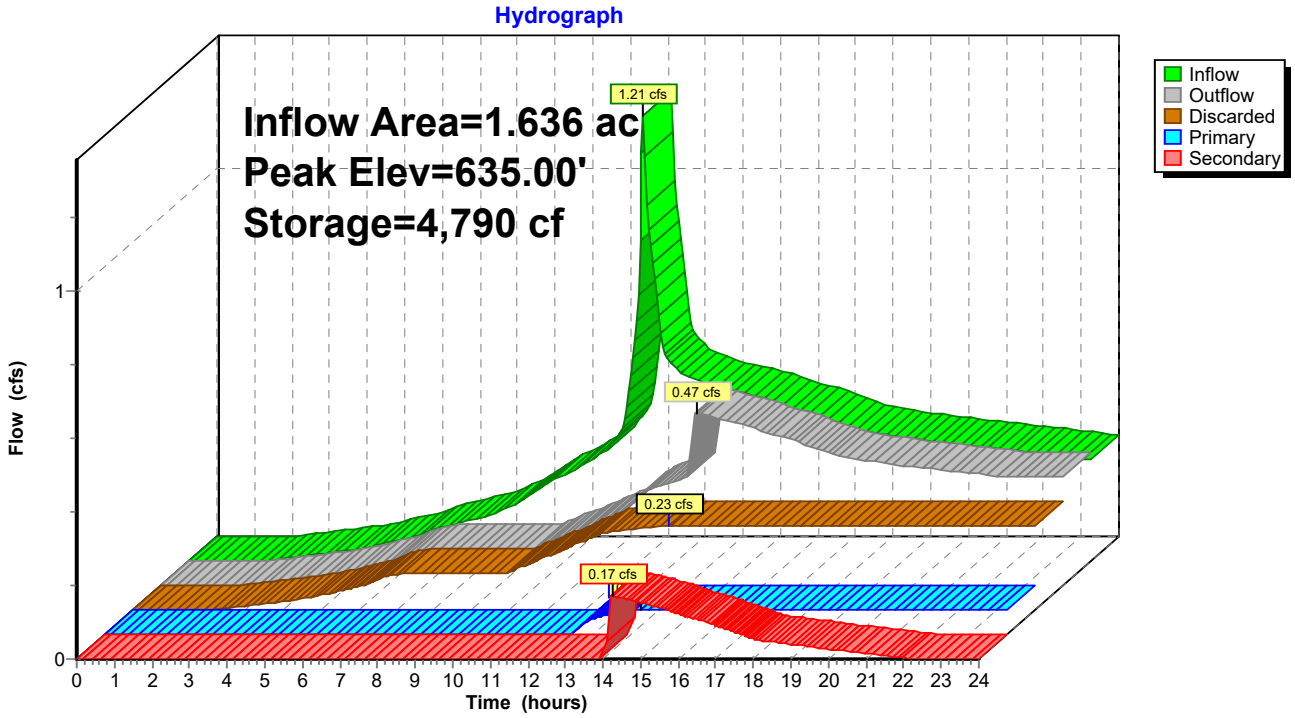
Device	Routing	Invert	Outlet Devices
#1	Discarded	632.00'	**2.840 in/hr Exfiltration over Surface area**
#2	Primary	633.80'	**4.0" Round Culvert** L= 5.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 633.80' / 633.75' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#3	Device 2	634.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#4	Secondary	635.00'	**80.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.23 cfs @ 14.26 hrs HW=635.00' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.07 cfs @ 14.26 hrs HW=635.00' (Free Discharge)
└─**2=Culvert** (Passes 0.07 cfs of 0.34 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.12 fps)

Secondary OutFlow Max=0.05 cfs @ 14.26 hrs HW=635.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.17 fps)

Pond 5: SFB-5



Stage-Area-Storage for Pond 5: SFB-5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
632.00	1,505	0
632.05	1,505	30
632.10	1,505	60
632.15	1,505	90
632.20	1,505	120
632.25	1,505	151
632.30	1,505	181
632.35	1,505	211
632.40	1,505	241
632.45	1,505	271
632.50	1,505	301
632.55	1,505	316
632.60	1,505	331
632.65	1,505	346
632.70	1,505	361
632.75	1,505	376
632.80	1,505	391
632.85	1,505	406
632.90	1,505	421
632.95	1,505	436
633.00	1,505	452
633.05	1,505	467
633.10	1,505	482
633.15	1,505	497
633.20	1,505	512
633.25	1,505	527
633.30	1,505	542
633.35	1,505	557
633.40	1,505	572
633.45	1,505	587
633.50	1,505	602
633.55	1,629	680
633.60	1,752	765
633.65	1,876	856
633.70	1,999	952
633.75	2,123	1,056
633.80	2,247	1,165
633.85	2,370	1,280
633.90	2,494	1,402
633.95	2,617	1,530
634.00	2,741	1,664
634.05	2,778	1,801
634.10	2,815	1,941
634.15	2,853	2,083
634.20	2,890	2,227
634.25	2,927	2,372
634.30	2,964	2,519
634.35	3,001	2,668
634.40	3,039	2,819
634.45	3,076	2,972
634.50	3,113	3,127
634.55	3,150	3,284
634.60	3,187	3,442
634.65	3,225	3,602
634.70	3,262	3,764
634.75	3,299	3,929
634.80	3,336	4,094
634.85	3,373	4,262
634.90	3,411	4,432
634.95	3,448	4,603
635.00	3,485	4,776
635.05	3,513	4,951
635.10	3,542	5,128
635.15	3,570	5,306
635.20	3,598	5,485
635.25	3,626	5,665
635.30	3,654	5,847
635.35	3,683	6,031
635.40	3,711	6,216
635.45	3,739	6,402
635.50	3,768	6,590
635.55	3,796	6,779
635.60	3,824	6,969
635.65	3,852	7,161
635.70	3,881	7,354
635.75	3,909	7,549
635.80	3,937	7,745
635.85	3,965	7,943
635.90	3,993	8,142
635.95	4,022	8,342
636.00	**4,050**	**8,544**

Summary for Pond DB-3: DB-3

Inflow Area = 0.593 ac,100.00% Impervious, Inflow Depth > 8.17" for 100-YR event
Inflow = 5.71 cfs @ 12.09 hrs, Volume= 0.404 af
Outflow = 0.20 cfs @ 14.58 hrs, Volume= 0.225 af, Atten= 96%, Lag= 149.8 min
Primary = 0.20 cfs @ 14.58 hrs, Volume= 0.225 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 629.78' @ 14.58 hrs Surf.Area= 0.081 ac Storage= 0.261 af
Flood Elev= 630.00' Surf.Area= 0.081 ac Storage= 0.276 af

Plug-Flow detention time= 355.3 min calculated for 0.225 af (56% of inflow)
Center-of-Mass det. time= 242.7 min (982.7 - 740.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	626.00'	0.000 af	**27.58'W x 127.56'L x 4.67'H Field A** 0.377 af Overall - 0.377 af Embedded = 0.000 af x 0.0% Voids
#2A	626.00'	0.276 af	**StormTrap ST1 SingleTrap 4-0** x 36 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 9 Chambers 27.58' x 126.56' Core + 0.00' x 0.50' Border = 27.58' x 127.56' System
		0.276 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	626.00'	**4.0" Round Culvert** L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 626.00' / 620.60' S= 0.0225 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.09 sf
#2	Device 1	626.00'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.20 cfs @ 14.58 hrs HW=629.78' (Free Discharge)
└─**1=Culvert** (Passes 0.20 cfs of 0.41 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.26 fps)

Pond DB-3: DB-3 - Chamber Wizard Field A

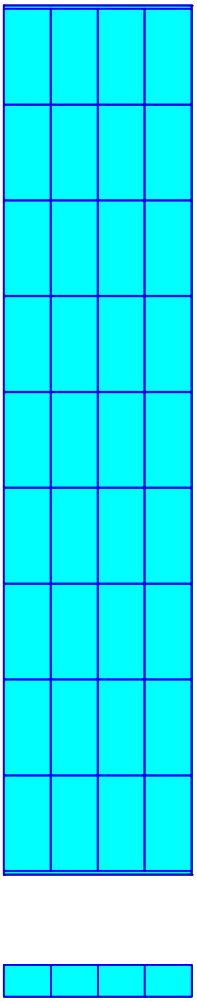
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

9 Chambers/Row x 14.06' Long = 126.56' Row Length +6.0" Border x 2 = 127.56' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

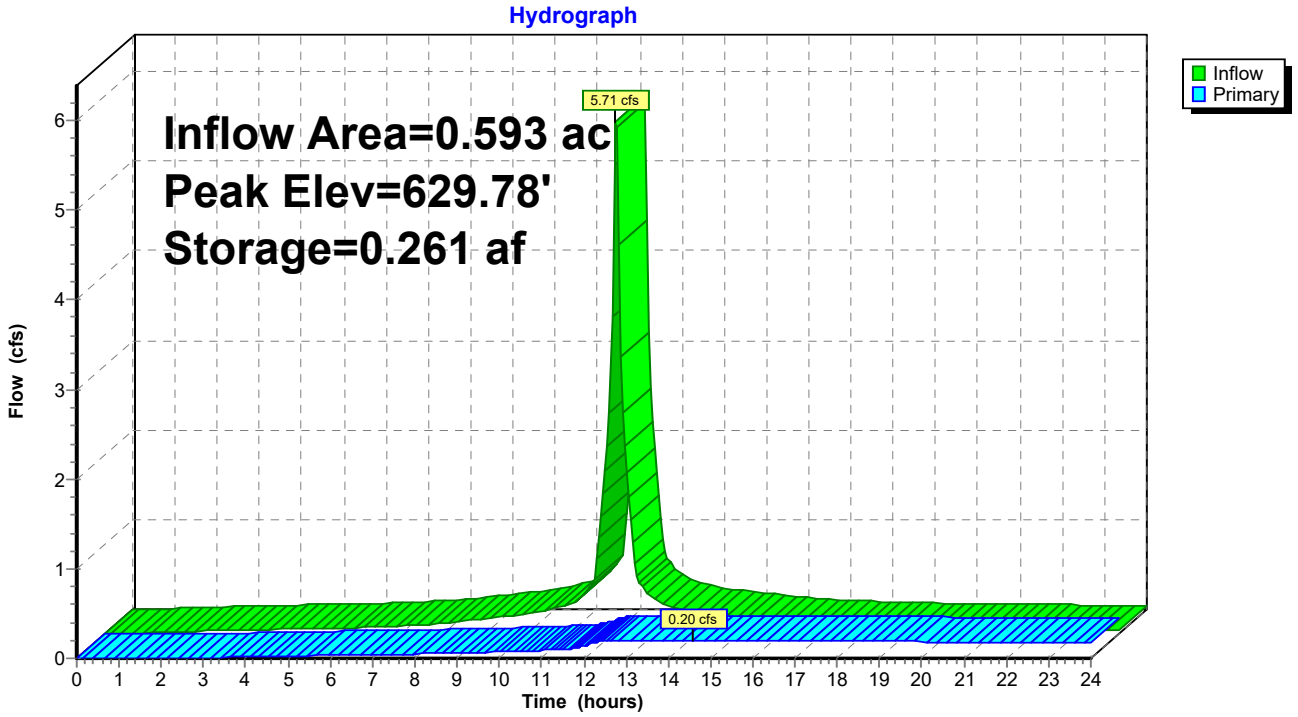
36 Chambers x 334.5 cf = 12,042.0 cf Chamber Storage
36 Chambers x 452.5 cf + 128.7 cf Border = 16,420.1 cf Displacement

Chamber Storage = 12,042.0 cf = 0.276 af
Overall Storage Efficiency = 73.3%
Overall System Size = 127.56' x 27.58' x 4.67'

36 Chambers (plus border)
608.2 cy Field



Pond DB-3: DB-3


Hydrograph
Inflow Area=0.593 ac
Peak Elev=629.78'
Storage=0.261 af
5.71 cfs
0.20 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-3: DB-3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
626.00	0.000	628.60	0.180
626.05	0.003	628.65	0.183
626.10	0.007	628.70	0.187
626.15	0.010	628.75	0.190
626.20	0.014	628.80	0.194
626.25	0.017	628.85	0.197
626.30	0.021	628.90	0.200
626.35	0.024	628.95	0.204
626.40	0.028	629.00	0.207
626.45	0.031	629.05	0.211
626.50	0.035	629.10	0.214
626.55	0.038	629.15	0.218
626.60	0.041	629.20	0.221
626.65	0.045	629.25	0.225
626.70	0.048	629.30	0.228
626.75	0.052	629.35	0.232
626.80	0.055	629.40	0.235
626.85	0.059	629.45	0.238
626.90	0.062	629.50	0.242
626.95	0.066	629.55	0.245
627.00	0.069	629.60	0.249
627.05	0.073	629.65	0.252
627.10	0.076	629.70	0.256
627.15	0.079	629.75	0.259
627.20	0.083	629.80	0.263
627.25	0.086	629.85	0.266
627.30	0.090	629.90	0.270
627.35	0.093	629.95	0.273
627.40	0.097	630.00	0.276
627.45	0.100	630.05	0.276
627.50	0.104	630.10	0.276
627.55	0.107	630.15	0.276
627.60	0.111	630.20	0.276
627.65	0.114	630.25	0.276
627.70	0.117	630.30	0.276
627.75	0.121	630.35	0.276
627.80	0.124	630.40	0.276
627.85	0.128	630.45	0.276
627.90	0.131	630.50	0.276
627.95	0.135	630.55	0.276
628.00	0.138	630.60	0.276
628.05	0.142	630.65	**0.276**
628.10	0.145		
628.15	0.149		
628.20	0.152		
628.25	0.156		
628.30	0.159		
628.35	0.162		
628.40	0.166		
628.45	0.169		
628.50	0.173		
628.55	0.176		

Summary for Pond DB-4: DB-4

Inflow Area = 0.274 ac,100.00% Impervious, Inflow Depth > 15.66" for 100-YR event
Inflow = 8.84 cfs @ 12.09 hrs, Volume= 0.357 af
Outflow = 1.15 cfs @ 12.49 hrs, Volume= 0.292 af, Atten= 87%, Lag= 23.9 min
Primary = 1.15 cfs @ 12.49 hrs, Volume= 0.292 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 637.98' @ 12.49 hrs Surf.Area= 0.072 ac Storage= 0.244 af
Flood Elev= 638.00' Surf.Area= 0.072 ac Storage= 0.246 af

Plug-Flow detention time= 208.9 min calculated for 0.292 af (82% of inflow)
Center-of-Mass det. time= 167.1 min (900.2 - 733.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	634.00'	0.000 af	**27.58'W x 113.50'L x 4.67'H Field A** 0.335 af Overall - 0.335 af Embedded = 0.000 af x 0.0% Voids
#2A	634.00'	0.246 af	**StormTrap ST1 SingleTrap 4-0** x 32 Inside #1 Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf 4 Rows of 8 Chambers 27.58' x 112.50' Core + 0.00' x 0.50' Border = 27.58' x 113.50' System
		0.246 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	634.00'	**6.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 634.00' / 633.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.20 sf
#2	Device 1	634.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	636.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	637.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.15 cfs @ 12.49 hrs HW=637.97' (Free Discharge)
└─**1=Culvert** (Passes 1.15 cfs of 1.21 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.50 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.56 cfs @ 6.47 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.33 fps)

Pond DB-4: DB-4 - Chamber Wizard Field A

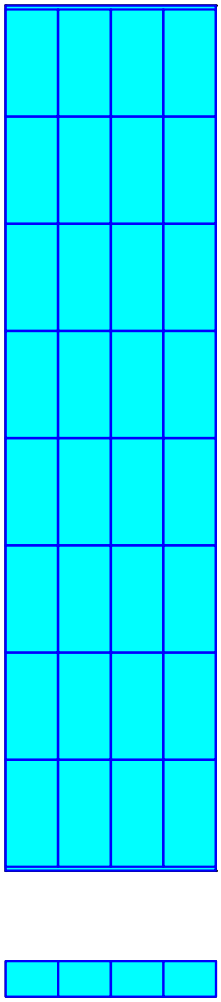
Chamber Model = StormTrap ST1 SingleTrap 4-0 (StormTrap ST1 SingleTrap® Type VI)
Inside= 82.7"W x 48.0"H => 23.79 sf x 14.06'L = 334.5 cf
Outside= 82.7"W x 56.0"H => 32.18 sf x 14.06'L = 452.5 cf

8 Chambers/Row x 14.06' Long = 112.50' Row Length +6.0" Border x 2 = 113.50' Base Length
4 Rows x 82.7" Wide = 27.58' Base Width
56.0" Chamber Height = 4.67' Field Height

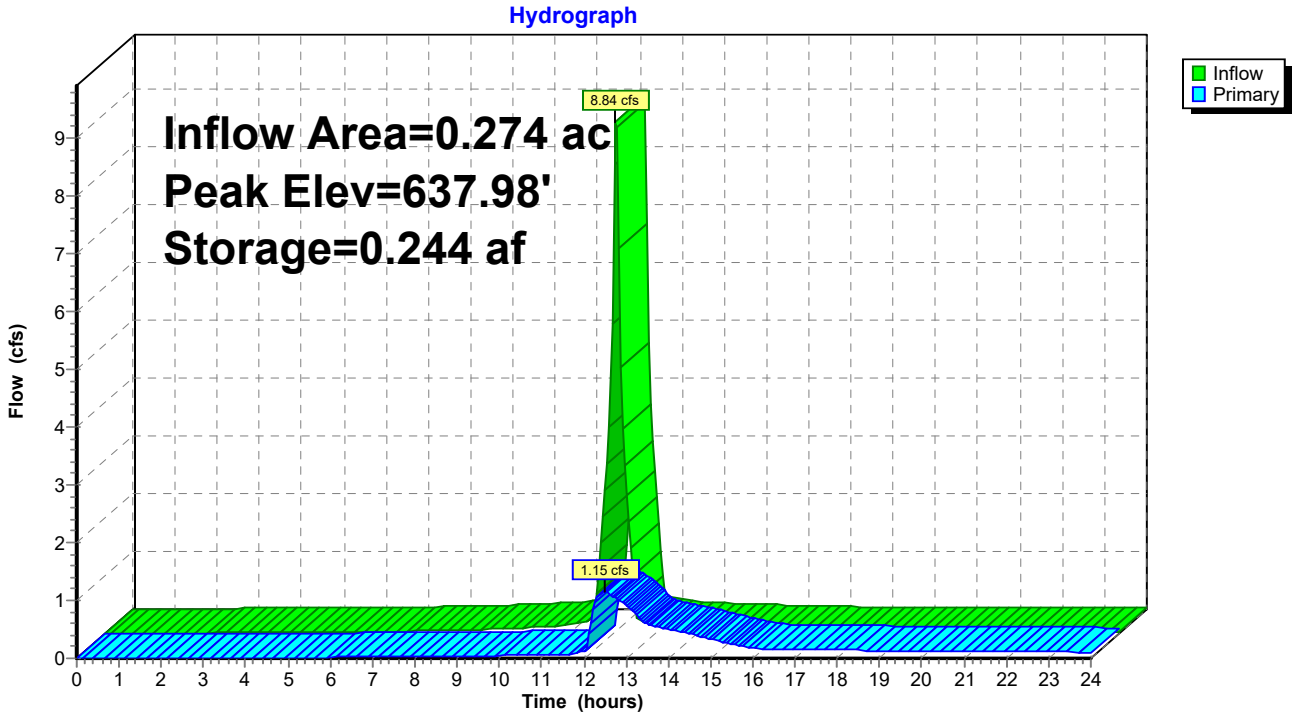
32 Chambers x 334.5 cf = 10,704.0 cf Chamber Storage
32 Chambers x 452.5 cf + 128.7 cf Border = 14,610.0 cf Displacement

Chamber Storage = 10,704.0 cf = 0.246 af
Overall Storage Efficiency = 73.3%
Overall System Size = 113.50' x 27.58' x 4.67'

32 Chambers (plus border)
541.1 cy Field



Pond DB-4: DB-4


Hydrograph
Inflow Area=0.274 ac
Peak Elev=637.98'
Storage=0.244 af
8.84 cfs
1.15 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-4: DB-4

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
634.00	0.000	636.60	0.160
634.05	0.003	636.65	0.163
634.10	0.006	636.70	0.166
634.15	0.009	636.75	0.169
634.20	0.012	636.80	0.172
634.25	0.015	636.85	0.175
634.30	0.018	636.90	0.178
634.35	0.022	636.95	0.181
634.40	0.025	637.00	0.184
634.45	0.028	637.05	0.187
634.50	0.031	637.10	0.190
634.55	0.034	637.15	0.194
634.60	0.037	637.20	0.197
634.65	0.040	637.25	0.200
634.70	0.043	637.30	0.203
634.75	0.046	637.35	0.206
634.80	0.049	637.40	0.209
634.85	0.052	637.45	0.212
634.90	0.055	637.50	0.215
634.95	0.058	637.55	0.218
635.00	0.061	637.60	0.221
635.05	0.065	637.65	0.224
635.10	0.068	637.70	0.227
635.15	0.071	637.75	0.230
635.20	0.074	637.80	0.233
635.25	0.077	637.85	0.237
635.30	0.080	637.90	0.240
635.35	0.083	637.95	0.243
635.40	0.086	638.00	0.246
635.45	0.089	638.05	0.246
635.50	0.092	638.10	0.246
635.55	0.095	638.15	0.246
635.60	0.098	638.20	0.246
635.65	0.101	638.25	0.246
635.70	0.104	638.30	0.246
635.75	0.108	638.35	0.246
635.80	0.111	638.40	0.246
635.85	0.114	638.45	0.246
635.90	0.117	638.50	0.246
635.95	0.120	638.55	0.246
636.00	0.123	638.60	0.246
636.05	0.126	638.65	**0.246**
636.10	0.129		
636.15	0.132		
636.20	0.135		
636.25	0.138		
636.30	0.141		
636.35	0.144		
636.40	0.147		
636.45	0.151		
636.50	0.154		
636.55	0.157		

Summary for Pond DB-5: DB-5

Inflow Area = 0.708 ac, 85.71% Impervious, Inflow Depth > 10.25" for 100-YR event
Inflow = 9.71 cfs @ 12.09 hrs, Volume= 0.605 af
Outflow = 0.25 cfs @ 15.13 hrs, Volume= 0.284 af, Atten= 97%, Lag= 182.7 min
Primary = 0.25 cfs @ 15.13 hrs, Volume= 0.284 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 643.22' @ 15.13 hrs Surf.Area= 0.090 ac Storage= 0.427 af
Flood Elev= 643.50' Surf.Area= 0.090 ac Storage= 0.449 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 224.1 min (980.4 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	637.50'	0.000 af	**34.48'W x 113.83'L x 7.17'H Field A** 0.646 af Overall - 0.646 af Embedded = 0.000 af x 0.0% Voids
#2A	637.50'	0.490 af	**StormTrap ST1 DoubleTrap 6-0**x 40 Inside #1 Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf 5 Rows adjusted for 602.1 cf perimeter wall 34.48' x 112.50' Core + 0.00' x 0.67' Border = 34.48' x 113.83' System
		0.490 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	637.50'	**6.0" Round Culvert** L= 80.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 637.50' / 636.00' S= 0.0187 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	637.50'	**2.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.25 cfs @ 15.13 hrs HW=643.22' (Free Discharge)
└─**1=Culvert** (Passes 0.25 cfs of 1.50 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.43 fps)

Pond DB-5: DB-5 - Chamber Wizard Field A

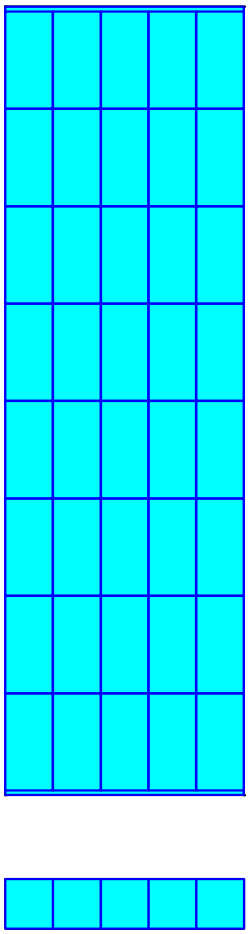
Chamber Model = StormTrap ST1 DoubleTrap 6-0 (StormTrap ST1 DoubleTrap® Type I/III/VI)
Inside= 82.7"W x 72.0"H => 37.97 sf x 14.06'L = 534.0 cf
Outside= 82.7"W x 86.0"H => 49.42 sf x 14.06'L = 695.0 cf
5 Rows adjusted for 602.1 cf perimeter wall

8 Chambers/Row x 14.06' Long = 112.50' Row Length +8.0" Border x 2 = 113.83' Base Length
5 Rows x 82.7" Wide = 34.48' Base Width
86.0" Chamber Height = 7.17' Field Height

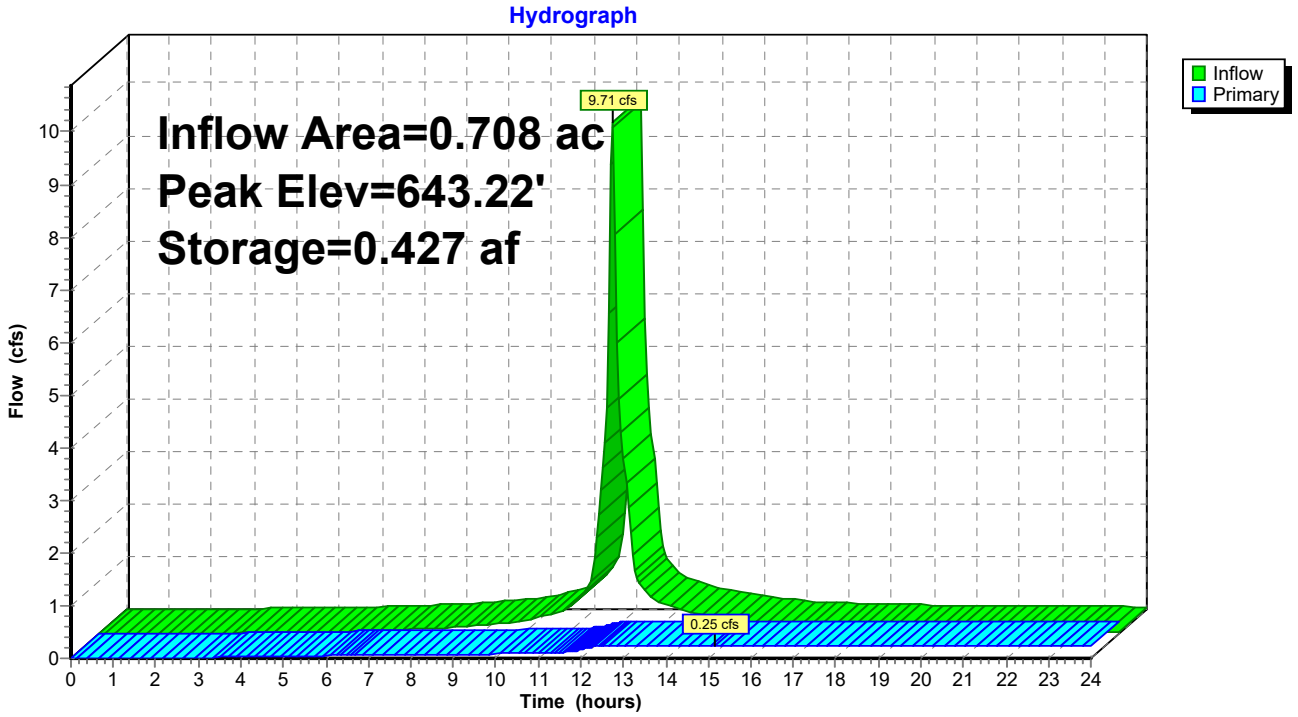
17.0 cf Sidewall x 8 x 2 + 33.0 cf Endwall x 5 x 2 = 602.1 cf Perimeter Wall
40 Chambers x 534.0 cf - 602.1 cf Perimeter wall = 20,757.8 cf Chamber Storage
40 Chambers x 695.0 cf + 329.5 cf Border = 28,128.3 cf Displacement

Chamber Storage = 20,757.8 cf = 0.477 af
Overall Storage Efficiency = 73.8%
Overall System Size = 113.83' x 34.48' x 7.17'

40 Chambers (plus border)
1,041.8 cy Field



Pond DB-5: DB-5


Hydrograph
Inflow Area=0.708 ac
Peak Elev=643.22'
Storage=0.427 af
9.71 cfs
0.25 cfs
Inflow
Primary
Flow (cfs)
Time (hours)

Stage-Area-Storage for Pond DB-5: DB-5

Elevation (feet)	Storage (acre-feet)
637.50	0.000
637.60	0.000
637.70	0.000
637.80	0.000
637.90	0.000
638.00	0.000
638.10	0.008
638.20	0.016
638.30	0.025
638.40	0.033
638.50	0.041
638.60	0.049
638.70	0.057
638.80	0.065
638.90	0.074
639.00	0.082
639.10	0.090
639.20	0.098
639.30	0.106
639.40	0.114
639.50	0.123
639.60	0.131
639.70	0.139
639.80	0.147
639.90	0.155
640.00	0.163
640.10	0.172
640.20	0.180
640.30	0.188
640.40	0.196
640.50	0.204
640.60	0.212
640.70	0.221
640.80	0.229
640.90	0.237
641.00	0.245
641.10	0.253
641.20	0.262
641.30	0.270
641.40	0.278
641.50	0.286
641.60	0.294
641.70	0.302
641.80	0.311
641.90	0.319
642.00	0.327
642.10	0.335
642.20	0.343
642.30	0.351
642.40	0.360
642.50	0.368
642.60	0.376
642.70	0.384
642.80	0.392
642.90	0.400
643.00	0.409
643.10	0.417
643.20	0.425
643.30	0.433
643.40	0.441
643.50	0.449
643.60	0.458
643.70	0.466
643.80	0.474
643.90	0.482
644.00	**0.490**
644.10	**0.490**
644.20	0.490
644.30	0.490
644.40	0.490
644.50	0.490
644.60	0.490

Summary for Pond ICS-3: ICS-3

Inflow Area =	0.328 ac, 72.22% Impervious, Inflow Depth > 6.37" for 100-YR event				
Inflow =	2.27 cfs @	12.09 hrs,	Volume=	0.174 af	
Outflow =	2.27 cfs @	12.09 hrs,	Volume=	0.174 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.00 cfs @	12.09 hrs,	Volume=	0.143 af	
Secondary =	1.27 cfs @	12.09 hrs,	Volume=	0.031 af	

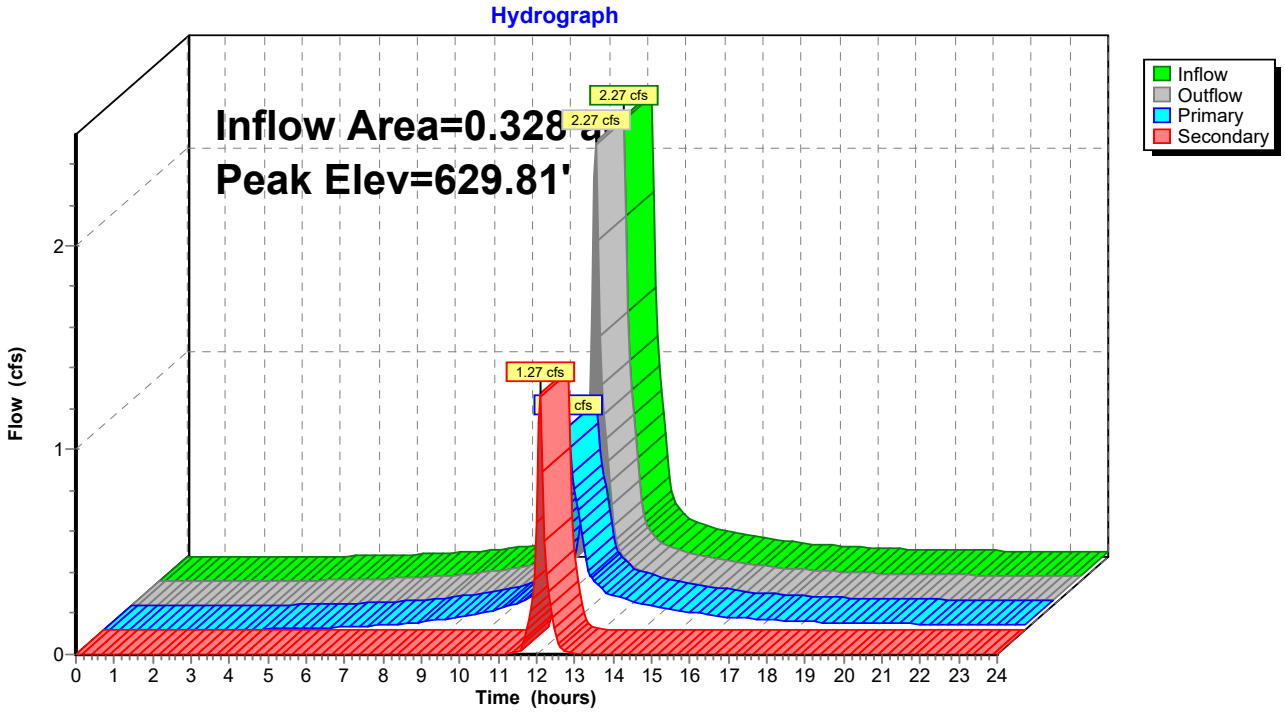
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 629.81' @ 12.09 hrs
Flood Elev= 632.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	628.85'	**6.0" Round Culvert** L= 240.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 628.85' / 620.60' S= 0.0344 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	629.05'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 629.05' / 629.00' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.99 cfs @ 12.09 hrs HW=629.80' TW=623.80' (TW follows 6.00' below HW)
└─**1=Culvert** (Inlet Controls 0.99 cfs @ 5.02 fps)

Secondary OutFlow Max=1.23 cfs @ 12.09 hrs HW=629.80' (Free Discharge)
└─**2=Culvert** (Barrel Controls 1.23 cfs @ 2.71 fps)

Pond ICS-3: ICS-3



Stage-Area-Storage for Pond ICS-3: ICS-3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
628.85	**0**	631.45	0
628.90	0	631.50	0
628.95	0	631.55	0
629.00	0	631.60	0
629.05	0	631.65	0
629.10	0	631.70	0
629.15	0	631.75	0
629.20	0	631.80	0
629.25	0	631.85	0
629.30	0	631.90	0
629.35	0	631.95	0
629.40	0	632.00	0
629.45	0	632.05	0
629.50	0	632.10	0
629.55	0	632.15	0
629.60	0	632.20	0
629.65	0	632.25	0
629.70	0	632.30	0
629.75	0	632.35	0
629.80	0	632.40	0
629.85	0	632.45	0
629.90	0	632.50	0
629.95	0		
630.00	0		
630.05	0		
630.10	0		
630.15	0		
630.20	0		
630.25	0		
630.30	0		
630.35	0		
630.40	0		
630.45	0		
630.50	0		
630.55	0		
630.60	0		
630.65	0		
630.70	0		
630.75	0		
630.80	0		
630.85	0		
630.90	0		
630.95	0		
631.00	0		
631.05	0		
631.10	0		
631.15	0		
631.20	0		
631.25	0		
631.30	0		
631.35	0		
631.40	0		

Summary for Pond ICS-4: ICS-4

Inflow Area =	1.068 ac, 93.43% Impervious, Inflow Depth > 7.32" for 100-YR event				
Inflow =	7.93 cfs @	12.09 hrs,	Volume=	0.651 af	
Outflow =	7.93 cfs @	12.09 hrs,	Volume=	0.651 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.14 cfs @	12.09 hrs,	Volume=	0.466 af	
Secondary =	6.79 cfs @	12.09 hrs,	Volume=	0.185 af	

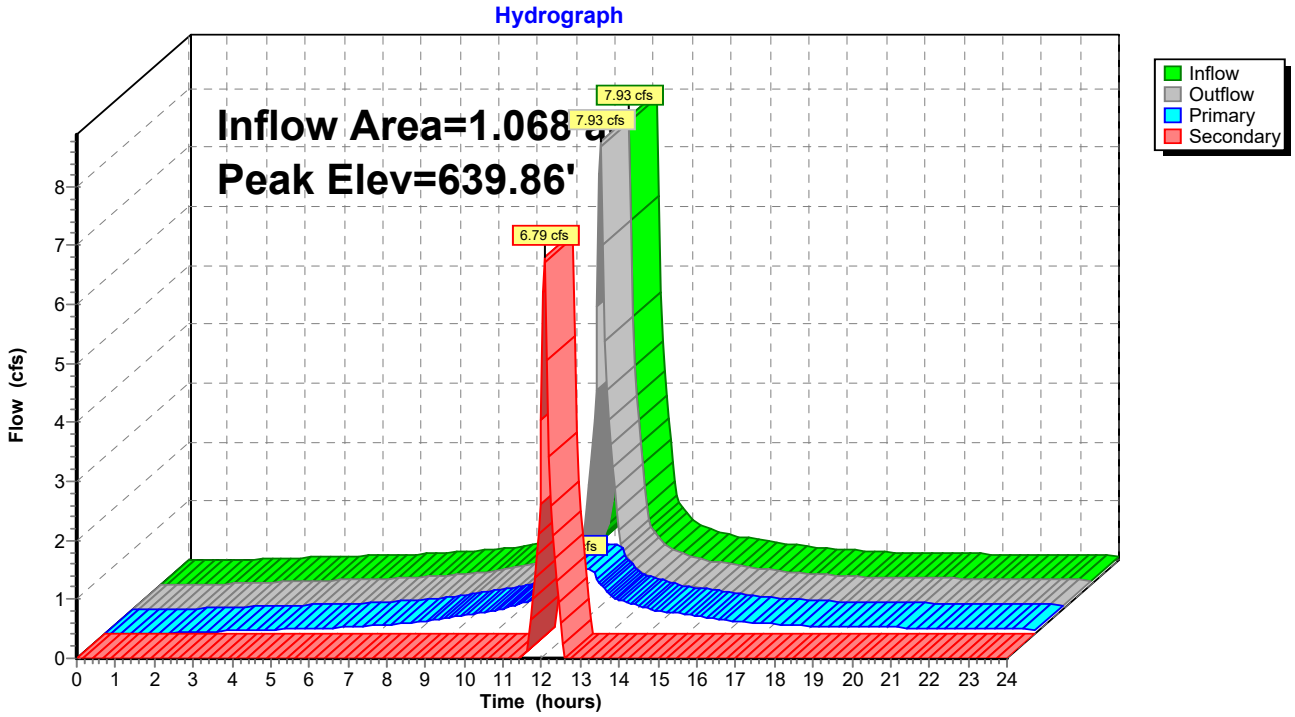
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 639.86' @ 12.09 hrs
Flood Elev= 640.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	636.50'	**6.0" Round Culvert** L= 235.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 636.50' / 633.00' S= 0.0149 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 3	639.28'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	637.00'	**15.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 637.00' / 636.75' S= 0.0250 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.14 cfs @ 12.09 hrs HW=639.85' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.14 cfs @ 5.79 fps)

Secondary OutFlow Max=6.57 cfs @ 12.09 hrs HW=639.85' (Free Discharge)
└─**3=Culvert** (Passes 6.57 cfs of 6.96 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Weir Controls 6.57 cfs @ 2.31 fps)

Pond ICS-4: ICS-4



Stage-Area-Storage for Pond ICS-4: ICS-4

Elevation (feet)	Storage (cubic-feet)
636.50	**0**
636.55	0
636.60	0
636.65	0
636.70	0
636.75	0
636.80	0
636.85	0
636.90	0
636.95	0
637.00	0
637.05	0
637.10	0
637.15	0
637.20	0
637.25	0
637.30	0
637.35	0
637.40	0
637.45	0
637.50	0
637.55	0
637.60	0
637.65	0
637.70	0
637.75	0
637.80	0
637.85	0
637.90	0
637.95	0
638.00	0
638.05	0
638.10	0
638.15	0
638.20	0
638.25	0
638.30	0
638.35	0
638.40	0
638.45	0
638.50	0
638.55	0
638.60	0
638.65	0
638.70	0
638.75	0
638.80	0
638.85	0
638.90	0
638.95	0
639.00	0
639.05	0
639.10	0
639.15	0
639.20	0
639.25	0
639.30	0
639.35	0
639.40	0
639.45	0
639.50	0
639.55	0
639.60	0
639.65	0
639.70	0
639.75	0
639.80	0
639.85	0
639.90	0
639.95	0
640.00	0

Summary for Pond ICS-5: ICS-5

Inflow Area =	0.739 ac, 62.40% Impervious, Inflow Depth > 5.90" for 100-YR event				
Inflow =	4.85 cfs @	12.09 hrs,	Volume=	0.363 af	
Outflow =	4.85 cfs @	12.09 hrs,	Volume=	0.363 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.30 cfs @	11.95 hrs,	Volume=	0.169 af	
Secondary =	4.56 cfs @	12.09 hrs,	Volume=	0.194 af	

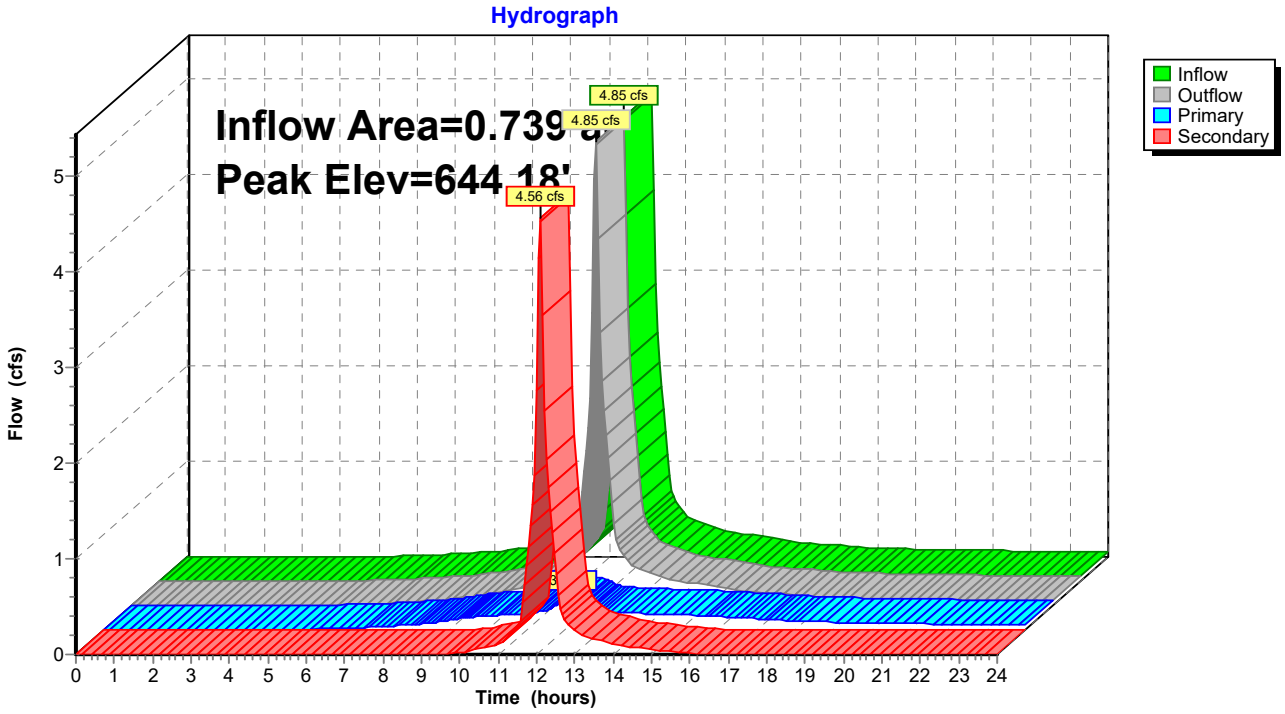
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 644.18' @ 12.09 hrs
Flood Elev= 645.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	642.25'	**3.0" Round Culvert** L= 80.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.25' / 637.00' S= 0.0656 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.05 sf
#2	Secondary	642.56'	**12.0" Round Culvert** L= 6.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 642.56' / 642.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 11.95 hrs HW=643.39' TW=637.39' (TW follows 6.00' below HW)
└─**1=Culvert** (Outlet Controls 0.30 cfs @ 6.03 fps)

Secondary OutFlow Max=4.44 cfs @ 12.09 hrs HW=644.15' TW=638.15' (TW follows 6.00' below HW)
└─**2=Culvert** (Barrel Controls 4.44 cfs @ 5.66 fps)

Pond ICS-5: ICS-5



Stage-Area-Storage for Pond ICS-5: ICS-5

Elevation (feet)	Storage (cubic-feet)
642.25	**0**
642.30	0
642.35	0
642.40	0
642.45	0
642.50	0
642.55	0
642.60	0
642.65	0
642.70	0
642.75	0
642.80	0
642.85	0
642.90	0
642.95	0
643.00	0
643.05	0
643.10	0
643.15	0
643.20	0
643.25	0
643.30	0
643.35	0
643.40	0
643.45	0
643.50	0
643.55	0
643.60	0
643.65	0
643.70	0
643.75	0
643.80	0
643.85	0
643.90	0
643.95	0
644.00	0
644.05	0
644.10	0
644.15	0
644.20	0
644.25	0
644.30	0
644.35	0
644.40	0
644.45	0
644.50	0
644.55	0
644.60	0
644.65	0
644.70	0
644.75	0
644.80	0
644.85	0
644.90	0
644.95	0
645.00	0
645.05	0
645.10	0
645.15	0
645.20	0
645.25	0
645.30	0
645.35	0
645.40	0
645.45	0
645.50	0

Summary for Pond RG-7B: RG-7B

Inflow Area = 0.055 ac, 72.50% Impervious, Inflow Depth > 6.37" for 100-YR event
Inflow = 0.38 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.37 cfs @ 12.10 hrs, Volume= 0.023 af, Atten= 3%, Lag= 1.0 min
Primary = 0.37 cfs @ 12.10 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 654.96' @ 12.10 hrs Surf.Area= 501 sf Storage= 351 cf

Plug-Flow detention time= 137.1 min calculated for 0.023 af (77% of inflow)
Center-of-Mass det. time= 56.2 min (838.6 - 782.4)

Volume	Invert	Avail.Storage	Storage Description
#1	653.00'	249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 638 cf Overall - 389 cf Embedded = 249 cf
#2	653.00'	52 cf	**Crushed Stone (Prismatic)** Listed below (Recalc) Inside #1 130 cf Overall x 40.0% Voids
#3	653.50'	58 cf	**Bio Mix Media (Prismatic)** Listed below (Recalc) Inside #1 194 cf Overall x 30.0% Voids
#4	654.25'	13 cf	**Mulch (Prismatic)** Listed below (Recalc) Inside #1 65 cf Overall x 20.0% Voids
		372 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
653.00	259	0	0	259
654.00	259	259	259	316
655.00	513	379	638	579

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.00	259	0	0
653.50	259	130	130

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
653.50	259	0	0
654.25	259	194	194

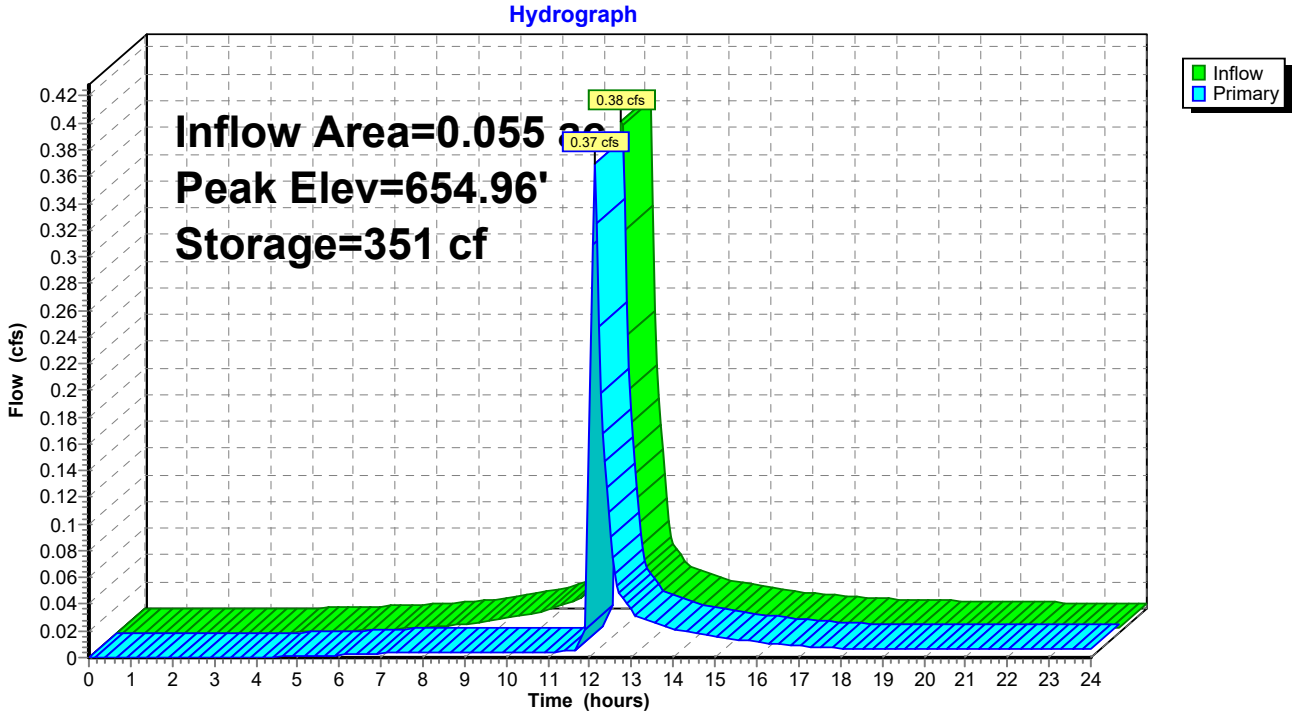
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
654.25	259	0	0
654.50	259	65	65

Device	Routing	Invert	Outlet Devices
#1	Primary	654.90'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

#2 Primary 653.00' **0.580 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.36 cfs @ 12.10 hrs HW=654.96' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.36 cfs @ 0.61 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond RG-7B: RG-7B



Stage-Area-Storage for Pond RG-7B: RG-7B

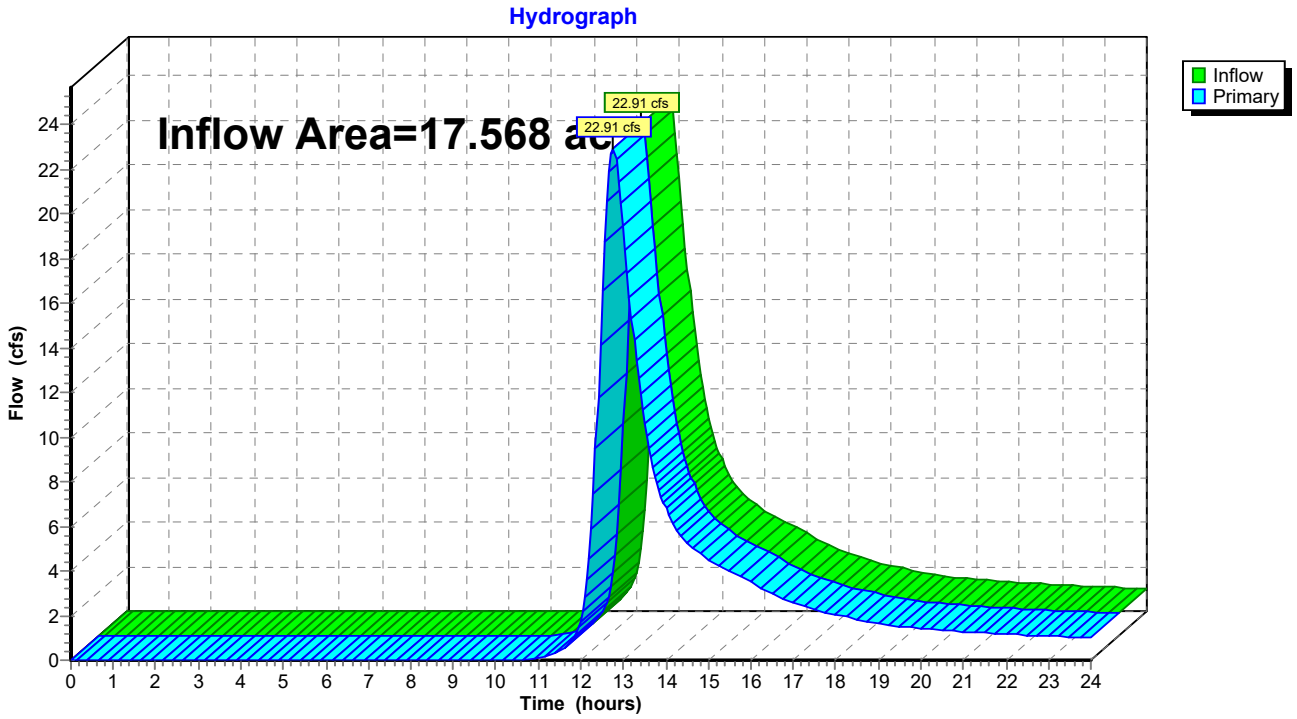
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
653.00	259	0
653.02	259	2
653.04	259	4
653.06	259	6
653.08	259	8
653.10	259	10
653.12	259	12
653.14	259	15
653.16	259	17
653.18	259	19
653.20	259	21
653.22	259	23
653.24	259	25
653.26	259	27
653.28	259	29
653.30	259	31
653.32	259	33
653.34	259	35
653.36	259	37
653.38	259	39
653.40	259	41
653.42	259	44
653.44	259	46
653.46	259	48
653.48	259	50
653.50	259	52
653.52	259	53
653.54	259	55
653.56	259	56
653.58	259	58
653.60	259	60
653.62	259	61
653.64	259	63
653.66	259	64
653.68	259	66
653.70	259	67
653.72	259	69
653.74	259	70
653.76	259	72
653.78	259	74
653.80	259	75
653.82	259	77
653.84	259	78
653.86	259	80
653.88	259	81
653.90	259	83
653.92	259	84
653.94	259	86
653.96	259	88
653.98	259	89
654.00	259	91
654.02	263	92
654.04	268	94
654.06	272	96
654.08	276	98
654.10	281	99
654.12	285	102
654.14	289	104
654.16	294	106
654.18	298	108
654.20	303	111
654.22	308	113
654.24	312	116
654.26	317	118
654.28	321	120
654.30	326	123
654.32	331	125
654.34	336	127
654.36	341	130
654.38	345	133
654.40	350	136
654.42	355	139
654.44	360	142
654.46	365	145
654.48	370	148
654.50	375	151
654.52	380	159
654.54	385	166
654.56	391	174
654.58	396	182
654.60	401	190
654.62	406	198
654.64	412	206
654.66	417	215
654.68	422	223
654.70	428	231
654.72	433	240
654.74	439	249
654.76	444	258
654.78	450	267
654.80	455	276
654.82	461	285
654.84	467	294
654.86	472	303
654.88	478	313
654.90	484	323
654.92	490	332
654.94	495	342
654.96	501	352
654.98	507	362
655.00	**513**	**372**

Summary for Link PDP-3: Design Point 3

Inflow Area = 17.568 ac, 18.21% Impervious, Inflow Depth > 2.77" for 100-YR event
Inflow = 22.91 cfs @ 12.75 hrs, Volume= 4.054 af
Primary = 22.91 cfs @ 12.75 hrs, Volume= 4.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PDP-3: Design Point 3



APPENDIX E: STORMWATER CALCULATIONS

- *NOAA RAINFALL DATA*
- *WATER QUALITY VOLUME CALCULATIONS*
- *GROUNDWATER RECHARGE VOLUME CALCULATION*
- *TSS REMOVAL*
- *PIPE SIZING CALCULATIONS*
- *RIPRAP SIZING*

NOAA Atlas 14, Volume 10, Version 3
Location name: Storrs Mansfield, Connecticut, USA*
Latitude: 41.8251°, Longitude: -72.2676°
Elevation: 640.98 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.328 (0.258-0.417)	0.394 (0.310-0.501)	0.502 (0.393-0.641)	0.592 (0.461-0.760)	0.715 (0.538-0.960)	0.808 (0.595-1.11)	0.905 (0.646-1.29)	1.01 (0.684-1.48)	1.17 (0.756-1.77)	1.29 (0.817-2.00)
10-min	0.465 (0.366-0.591)	0.559 (0.439-0.710)	0.712 (0.557-0.908)	0.839 (0.653-1.08)	1.01 (0.762-1.36)	1.15 (0.843-1.57)	1.28 (0.915-1.83)	1.44 (0.969-2.10)	1.65 (1.07-2.51)	1.83 (1.16-2.83)
15-min	0.547 (0.431-0.695)	0.657 (0.517-0.835)	0.837 (0.656-1.07)	0.986 (0.768-1.26)	1.19 (0.897-1.60)	1.35 (0.992-1.85)	1.51 (1.08-2.15)	1.69 (1.14-2.47)	1.94 (1.26-2.95)	2.15 (1.36-3.33)
30-min	0.749 (0.590-0.951)	0.900 (0.707-1.14)	1.15 (0.898-1.46)	1.35 (1.05-1.73)	1.63 (1.23-2.19)	1.84 (1.36-2.53)	2.07 (1.47-2.95)	2.31 (1.56-3.38)	2.66 (1.73-4.04)	2.95 (1.87-4.56)
60-min	0.951 (0.748-1.21)	1.14 (0.898-1.45)	1.46 (1.14-1.86)	1.72 (1.34-2.20)	2.07 (1.56-2.78)	2.34 (1.72-3.22)	2.62 (1.87-3.74)	2.94 (1.98-4.29)	3.38 (2.19-5.13)	3.74 (2.37-5.79)
2-hr	1.23 (0.969-1.55)	1.47 (1.16-1.86)	1.87 (1.47-2.37)	2.20 (1.72-2.80)	2.65 (2.01-3.55)	2.99 (2.22-4.10)	3.36 (2.42-4.80)	3.79 (2.56-5.51)	4.43 (2.88-6.68)	4.97 (3.16-7.66)
3-hr	1.42 (1.13-1.79)	1.70 (1.35-2.14)	2.16 (1.71-2.73)	2.54 (2.00-3.23)	3.07 (2.33-4.10)	3.46 (2.58-4.73)	3.88 (2.81-5.54)	4.39 (2.98-6.36)	5.17 (3.37-7.76)	5.83 (3.71-8.95)
6-hr	1.82 (1.45-2.27)	2.18 (1.74-2.73)	2.77 (2.20-3.48)	3.26 (2.57-4.12)	3.94 (3.01-5.23)	4.44 (3.32-6.05)	4.98 (3.63-7.09)	5.64 (3.84-8.13)	6.66 (4.35-9.95)	7.54 (4.81-11.5)
12-hr	2.29 (1.84-2.85)	2.76 (2.21-3.43)	3.52 (2.81-4.39)	4.15 (3.29-5.21)	5.01 (3.85-6.62)	5.66 (4.25-7.65)	6.35 (4.64-8.96)	7.19 (4.91-10.3)	8.46 (5.55-12.5)	9.54 (6.10-14.4)
24-hr	2.74 (2.20-3.38)	3.32 (2.67-4.10)	4.26 (3.42-5.29)	5.05 (4.02-6.31)	6.13 (4.73-8.05)	6.93 (5.24-9.32)	7.80 (5.73-10.9)	8.84 (6.06-12.6)	10.4 (6.86-15.4)	11.8 (7.56-17.7)
2-day	3.09 (2.50-3.79)	3.78 (3.06-4.65)	4.92 (3.97-6.07)	5.87 (4.70-7.28)	7.17 (5.56-9.37)	8.13 (6.18-10.9)	9.17 (6.79-12.8)	10.5 (7.20-14.8)	12.5 (8.22-18.3)	14.2 (9.13-21.2)
3-day	3.35 (2.72-4.09)	4.11 (3.34-5.04)	5.36 (4.34-6.60)	6.40 (5.14-7.92)	7.83 (6.10-10.2)	8.88 (6.78-11.9)	10.0 (7.45-14.0)	11.5 (7.91-16.2)	13.7 (9.06-20.0)	15.7 (10.1-23.3)
4-day	3.58 (2.91-4.37)	4.40 (3.58-5.38)	5.74 (4.65-7.04)	6.85 (5.51-8.45)	8.38 (6.53-10.9)	9.50 (7.26-12.7)	10.7 (7.99-15.0)	12.3 (8.48-17.3)	14.7 (9.73-21.4)	16.8 (10.8-24.9)
7-day	4.22 (3.45-5.13)	5.15 (4.21-6.27)	6.68 (5.44-8.15)	7.95 (6.43-9.76)	9.69 (7.59-12.5)	11.0 (8.42-14.6)	12.4 (9.25-17.2)	14.1 (9.79-19.8)	16.9 (11.2-24.5)	19.3 (12.5-28.5)
10-day	4.87 (3.99-5.90)	5.86 (4.81-7.11)	7.50 (6.12-9.12)	8.85 (7.18-10.8)	10.7 (8.40-13.8)	12.1 (9.28-15.9)	13.6 (10.1-18.7)	15.4 (10.7-21.5)	18.3 (12.2-26.4)	20.8 (13.5-30.5)
20-day	6.93 (5.72-8.34)	8.00 (6.59-9.64)	9.74 (8.00-11.8)	11.2 (9.13-13.6)	13.2 (10.4-16.8)	14.7 (11.3-19.1)	16.3 (12.1-21.9)	18.1 (12.6-24.9)	20.7 (13.8-29.5)	22.8 (14.8-33.3)
30-day	8.69 (7.19-10.4)	9.78 (8.09-11.7)	11.6 (9.52-13.9)	13.0 (10.7-15.8)	15.1 (11.9-19.0)	16.6 (12.8-21.4)	18.2 (13.4-24.2)	19.9 (13.9-27.3)	22.1 (14.8-31.5)	23.9 (15.6-34.8)
45-day	10.9 (9.05-13.0)	12.0 (9.96-14.4)	13.8 (11.4-16.6)	15.3 (12.6-18.5)	17.4 (13.7-21.7)	19.0 (14.6-24.2)	20.6 (15.1-27.0)	22.1 (15.5-30.2)	24.0 (16.1-34.0)	25.3 (16.5-36.7)
60-day	12.8 (10.6-15.2)	13.9 (11.5-16.6)	15.7 (13.0-18.8)	17.3 (14.2-20.8)	19.4 (15.3-24.1)	21.0 (16.1-26.6)	22.6 (16.6-29.4)	24.0 (16.9-32.6)	25.6 (17.3-36.2)	26.7 (17.5-38.6)

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

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

Please refer to NOAA Atlas 14 document for more information.

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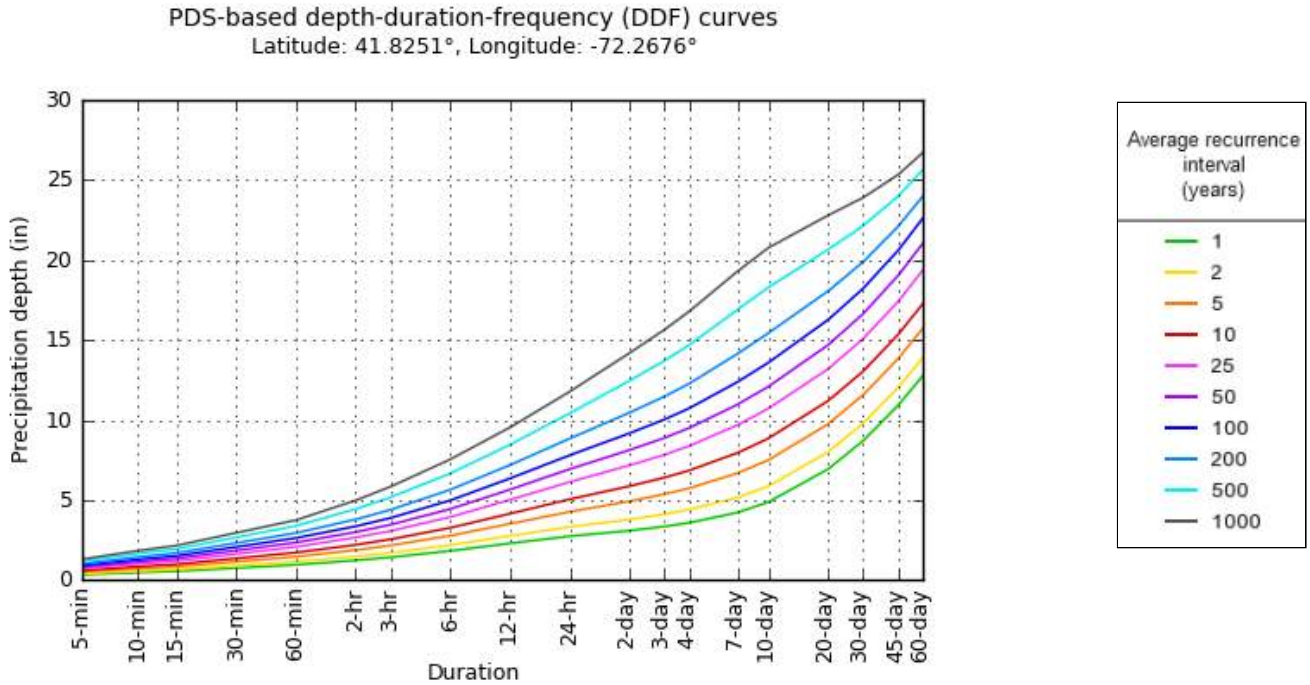
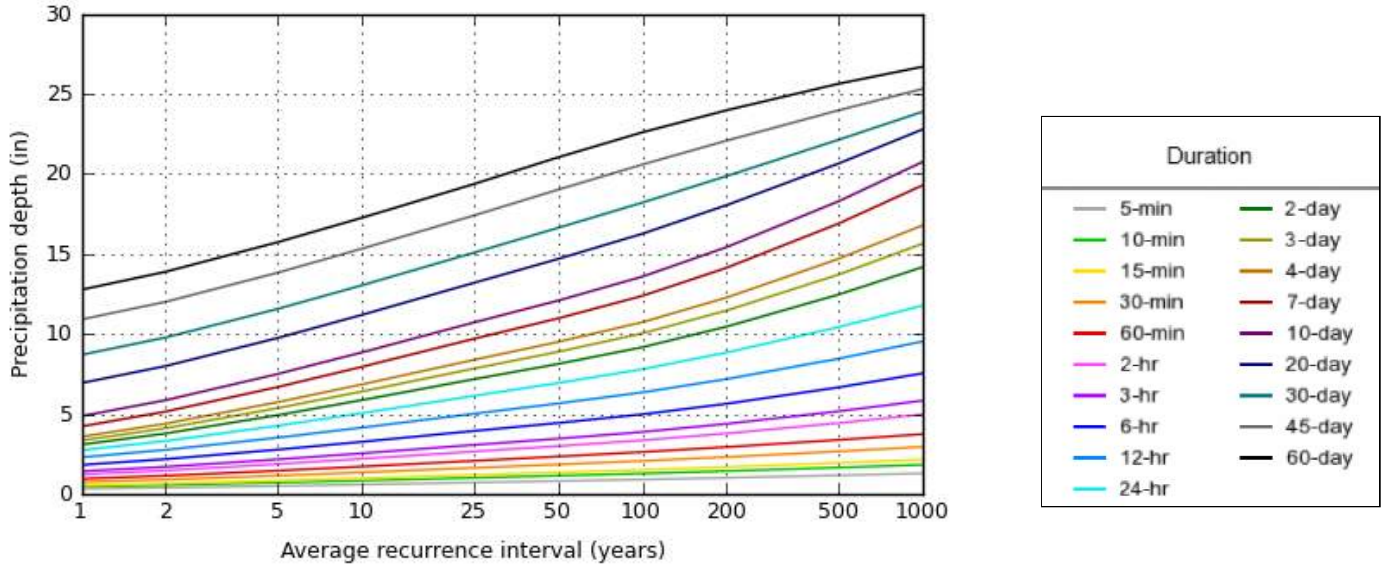
PF graphical





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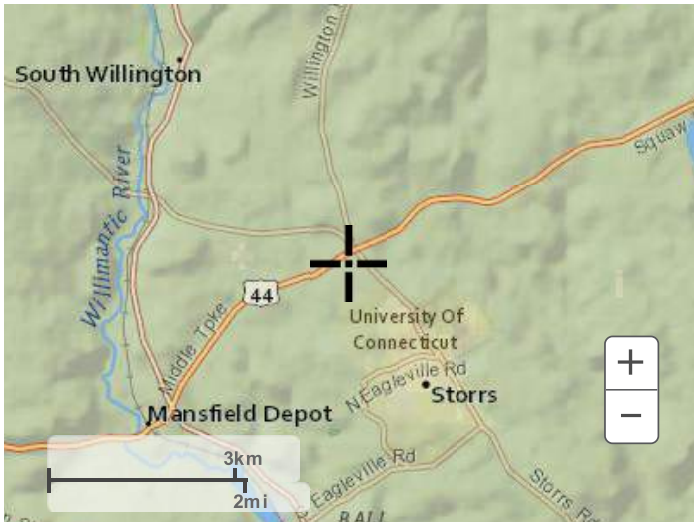
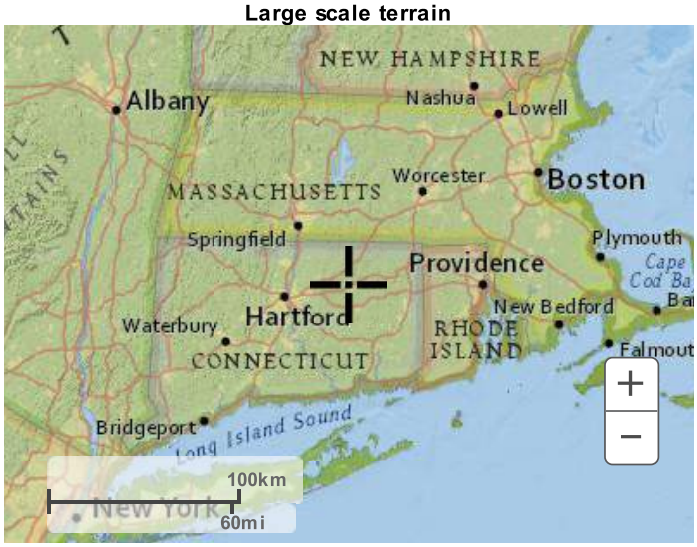
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map

Large scale aerial

Water Quality Calculations

From CT 2004 Stormwater Quality Manual:

$$WQV = \frac{(1'')(R)(A)}{12}$$

$$R = 0.05 + 0.009(I)$$

WQV = water quality volume (ac-ft)
R = volumetric runoff coefficient
I = percent impervious cover (pavement, sidewalks, parking garage)
A = site area in acres

Area	Treatment	Total Area		Impervious Area (not including clean roofs)		Impervious Cover	Volumetric Runoff Coefficient	Water Quality Volume Required (WQV)		WQV Provided
ID	Location	ac	ft^2	ac	ft^2	%	R	acre-feet	ft^3	ft^3
SFB-1	Sand Filter Basin	0.966	42,079	0.443	19,309	45.86	0.463	0.037	1,612	1,691
SFB-2	Sand Filter Basin	4.230	184,259	1.325	57,710	31.32	0.332	0.117	5,097	5,173
SFB-3	Sand Filter Basin	1.125	49,005	0.257	11,199	22.84	0.256	0.024	1,045	957
SFB-4	Sand Filter Basin	1.487	64,773	0.238	10,378	16.01	0.194	0.024	1,045	1,879
SFB-5	Sand Filter Basin	1.636	71,264	0.469	20,445	28.67	0.308	0.042	1,830	3,127
RG-703	Rain Garden	0.055	2,396	0.000	0	0.00	0.050	0.000	0	323
TOTAL		9.499	413,776	2.733	119,040	28.77	0.309	0.244	10,629	13,150

Groundwater Recharge Volume Calculations

Groundwater Recharge Volume

From CT 2004 Stormwater Quality Manual:

$$GVR = \frac{(D)(A)(I)}{12}$$

GRV Groundwater Recharge Volume (ac-ft)
D = Depth of Runoff to be Recharged (table 7-4)
A = site area in acres
I = impervious cover (decimal)

Table 7-4
Groundwater Recharge Depth

NRCS Hydrologic Soil Group	Average Annual Recharge	Groundwater Recharge Depth (D)
A	18 inches/year	0.4 inches
B	12 inches/year	0.25 inches
C	6 inches/year	0.10 inches
D	3 inches/year	0 inches (waived)

Source: MADEP, 1997.
NRCS – Natural Resources Conservation Service

	A									I				
	Total Developed Area (AC)	Site Area by NRCS Hydrologic Soil Group				Impervious Cover by NRCS Hydrologic Soil Group				Site Imperviousness (Decimal) by NRCS Hydrologic Soil Group				GRV Required (cubic-ft)
		A	B	C	D	A	B	C	D	A	B	C	D	
Proposed	9.63	0.00	6.58	3.051	0.00	0.00	4.00	1.84	0.00	0.00	0.61	0.60	0.00	4296

* Groundwater recharge volumes based upon the total developed areage of the site. See PD-Map for full site area delineation.

Location: Drainage System DP 1-4

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Street Sweeping - 5%	**0.05**	**1.00**	**0.05**	**0.95**
Deep Sump and Hooded Catch Basin	**0.25**	**0.95**	**0.24**	**0.71**
Infiltration Basin	**0.80**	**0.71**	**0.57**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**

Total TSS Removal = 86%

Project: **Mansfield Res. Development**
Prepared By: **MAA**
Date: **8/22/2019**

*Equals remaining load from previous BMP (E) which enters the BMP

Capstone Collegiate
1621 Storrs Road
Mansfield, CT
CT181007
December 30, 2019

Rational Pipe Sizing Calculations

Design Period Storm:		10	Year	Design Period Intensity*			5.78	in/hr									
LOCATION		IMPERVIOUS			OTHER												
FROM	TO	A	C	CA	A	C	CA	SUM CA	Tc (min)	I (in/hr)	Q (cfs)	D (in)	S (ft/ft)	Material	n	Q Full (cfs)	V Full (fps)
CB-111	CB-110	0.12	0.95	0.11	0.08	0.30	0.02	0.13	6	5.78	0.77	12	0.050	HDPE	0.012	8.63	10.99
CB-110	CB-109	0.15	0.95	0.14	0.04	0.30	0.01	0.15	6	5.78	0.89	12	0.028	HDPE	0.012	6.46	8.22
CB-109	CDS-108	0.10	0.95	0.09	0.06	0.30	0.02	0.11	6	5.78	1.51	12	0.011	HDPE	0.012	4.05	5.15
CDS-108	ICS-107	0.11	0.95	0.10	0.05	0.30	0.01	0.12	6	5.78	2.19	12	0.017	HDPE	0.012	4.99	6.35
OCS-105	YD-104	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.72	12	0.005	HDPE	0.012	2.73	3.47
YD-104	MH-103	0.00	0.95	0.00	0.06	0.30	0.02	0.02	6	5.78	0.83	12	0.005	HDPE	0.012	2.73	3.47
ROOF DRAIN	MH-103	0.03	0.95	0.03	0.00	0.30	0.00	0.03	6	5.78	0.15	6	0.005	HDPE	0.012	0.43	2.19
MH-103	FES-102	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.98	12	0.005	HDPE	0.012	2.73	3.47
CB-210	MH-209	0.22	0.95	0.21	0.08	0.30	0.02	0.23	6	5.78	1.35	12	0.005	HDPE	0.012	2.73	3.47
MH-209	MH-208	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.35	12	0.043	HDPE	0.012	8.00	10.19
MH-208	CDS-207	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.35	12	0.005	HDPE	0.012	2.73	3.47
CDS-207	ICS-206	0.20	0.95	0.19	0.10	0.30	0.03	0.22	6	5.78	2.63	12	0.010	HDPE	0.012	3.86	4.91
ROOF DRAIN	MH-203	0.11	0.95	0.10	0.00	0.30	0.00	0.10	6	5.78	0.59	8	0.053	HDPE	0.012	3.01	8.63
ICS-206	MH-203	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.41	12	0.010	HDPE	0.012	3.86	4.91
ICS-605	MH-211	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.26	4	0.078	HDPE	0.012	0.58	6.60
MH-211	MH-203	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.26	12	0.005	HDPE	0.012	2.73	3.47
OCS-204	MH-203	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.41	6	0.019	HDPE	0.012	0.84	4.27
MH-203	FES-202	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.67	15	0.005	HDPE	0.012	4.95	4.03
TD-311	MH-310	0.03	0.95	0.03	0.04	0.30	0.01	0.05	6	5.78	0.26	12	0.041	HDPE	0.012	7.82	9.95
MH-310	CDS-309	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.26	12	0.005	HDPE	0.012	2.73	3.47
CDS-309	ICS-308	0.20	0.95	0.19	0.05	0.30	0.01	0.21	6	5.78	1.46	12	0.013	HDPE	0.012	4.32	5.49
OCS-306	MH-304	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.93	10	0.005	HDPE	0.012	1.68	3.08
YD-305	MH-304	0.01	0.95	0.01	0.06	0.30	0.02	0.02	6	5.78	0.14	4	0.100	HDPE	0.012	0.65	7.47
MH-304	YD-303	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.14	6	0.100	HDPE	0.012	1.92	9.79
YD-303	FES-302	0.01	0.95	0.01	0.06	0.30	0.02	0.02	6	5.78	0.29	6	0.005	HDPE	0.012	0.43	2.19
RD-500	MH-312	0.27	0.95	0.26	0.00	0.30	0.00	0.26	6	5.78	1.50	12	0.010	HDPE	0.012	3.86	4.91
RD-1000B1	MH-312	0.32	0.95	0.30	0.00	0.30	0.00	0.30	6	5.78	1.76	12	0.005	HDPE	0.012	2.73	3.47
MH-312	UGB-307	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	3.26	12	0.032	HDPE	0.012	6.90	8.79
RD-1000B2	MH-411	0.77	0.95	0.73	0.00	0.30	0.00	0.73	6	5.78	4.21	15	0.005	HDPE	0.012	4.95	4.03
MH-411	CDS-410	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	4.21	15	0.005	HDPE	0.012	4.95	4.03
CDS-410	ICS-409	0.24	0.95	0.23	0.00	0.30	0.00	0.23	6	5.78	5.52	15	0.010	HDPE	0.012	7.00	5.70
ICS-409	OCS-407	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.20	12	0.005	HDPE	0.012	2.73	3.47
OCS-407	MH-405	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.50	12	0.005	HDPE	0.012	2.73	3.47
YD-406	MH-405	0.00	0.95	0.00	0.01	0.30	0.00	0.00	6	5.78	0.02	8	0.005	HDPE	0.012	0.93	2.65
MH-405	MH-404	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.52	12	0.010	HDPE	0.012	3.86	4.91
MH-404	FES-403	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	1.52	12	0.010	HDPE	0.012	3.86	4.91
YD-511	CB-510	0.11	0.95	0.11	0.01	0.30	0.00	0.11	6	5.78	0.65	8	0.010	HDPE	0.012	1.31	3.75
CB-510	CB-509	0.11	0.95	0.11	0.01	0.30	0.00	0.11	6	5.78	1.29	12	0.017	HDPE	0.012	5.03	6.41
CB-509	CDS-507	0.19	0.95	0.18	0.03	0.30	0.01	0.19	6	5.78	2.39	12	0.021	HDPE	0.012	5.59	7.12
YD-508	CDS-507	0.01	0.95	0.01	0.01	0.30	0.00	0.01	6	5.78	0.05	6	0.005	HDPE	0.012	0.43	2.19
CDS-507	ICS-506	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	2.44	12	0.005	HDPE	0.012	2.73	3.47
ICS-506	OCS-504	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.30	8	0.005	HDPE	0.012	0.93	2.65
OCS-504	FES-503	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.48	12	0.028	HDPE	0.012	6.46	8.22
CB-612	MH-611	0.09	0.95	0.08	0.01	0.30	0.00	0.08	6	5.78	0.48	12	0.048	HDPE	0.012	8.46	10.77
MH-611	CB-610	0.00	0.95	0.00	0.00	0.30	0.00	0.00	6	5.78	0.48	12	0.054	HDPE	0.012	8.97	11.42
CB-610	CB-609	0.10	0.95	0.09	0.27	0.30	0.08	0.17	6	5.78	1.47	12	0.045	HDPE	0.012	8.19	10.42
CB-609	CB-608	0.19	0.95	0.18	0.07	0.30	0.02	0.20	6	5.78	2.62	12	0.049	HDPE	0.012	8.54	10.88
CB-608	CDS-607	0.18	0.95	0.17	0.04	0.30	0.01	0.19	6	5.78	3.70	12	0.044	HDPE	0.012	8.10	10.31
CDS-607	ICS-605	0.09	0.95	0.09	0.01	0.30	0.00	0.09	6	5.78	4.22	12	0.057	HDPE	0.012	9.21	11.73

Prepared By:
Bohler Engineering
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 12/27/2019
Prepared By: BTJ

FES-102

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	0.98	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	9.666	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	6.8664	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	12.666	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.5	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	0.98	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.038937	ft	Median stone diameter in feet
	0.467243	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-102

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 12/27/2019
Prepared By: BTJ

FES-202

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	1.67	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	10.839	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	7.3356	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	13.839	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.5	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	1.67	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.079253	ft	Median stone diameter in feet
	0.951035	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-202

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 8/20/2019
Prepared By: DTB

FES-302

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	0.67	ft	Inside diameter of culvert
Q	0.29	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	6.258948	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	2.01	ft	Width of apron at the culvert (minimum)
W end	4.513579	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	2.01	ft	Width of apron at the culvert (minimum)
W end	8.268948	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	1	ft	Tailwater depth above the invert of the culvert
Do	0.67	ft	Inside diameter of culvert (defined in apron sizing)
Q	0.29	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.006548	ft	Median stone diameter in feet
	0.078579	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-302

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 8/20/2019
Prepared By: DTB

FES-403

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	1.52	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	10.584	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	7.2336	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	13.584	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.75	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	1.52	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.046604	ft	Median stone diameter in feet
	0.559253	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-403

Rip Rap and Apron Sizing Worksheet

Address: Capstone Collegiate Communites
Mansfield CT

Project No.: CT18007
Date: 12/27/2019
Prepared By: BTJ

FES-503

Apron Sizing:

$$La = \frac{1.7Q}{Do^{3/2}} + 8Do$$

$$W\ end = 3Do + 0.4La\ for\ Tailwater\ \geq 0.5Do$$
$$W\ end = 3Do + La\ for\ Tailwater < 0.5Do$$

INPUT	Quantity	Units	Notes
Do	1	ft	Inside diameter of culvert
Q	0.48	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater

OUTPUT	Quantity	Units	Notes
La	8.816	ft	Length of apron (minimum)
For tailwater elevation greater than or equal to the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	6.5264	ft	Width of apron end (minimum)
For tailwater elevation less than the elevation of the center of the pipe:			
W start	3	ft	Width of apron at the culvert (minimum)
W end	11.816	ft	Width of apron end (minimum)

Rip Rap Sizing:

$$d - 50 = \frac{0.02}{TW} * (\frac{Q}{Do})^{4/3}$$

INPUT	Quantity	Units	Notes
TW	0.75	ft	Tailwater depth above the invert of the culvert
Do	1	ft	Inside diameter of culvert (defined in apron sizing)
Q	0.48	cfs	Pipe discharge for conduit design storm or 25 year storm, whichever is greater (defined in apron sizing)

OUTPUT	Quantity	Units	Notes
d-50	0.010022	ft	Median stone diameter in feet
	0.120265	in	Median stone diameter in inches

NOTE: calculations based on 10 Year storm to FES-503

APPENDIX F: OPERATION AND MAINTENANCE

STORMWATER OPERATION AND SITE MAINTENANCE PLAN

For

CAPSTONE
COLLEGIATE COMMUNITIES

PROPOSED

Residential Community

1621 Storrs Road, Parcels 9.23.7 and 9.23.1
Town of Mansfield,
Tolland County,
Connecticut

Prepared by:

BOHLER ENGINEERING
16 Old Forge Road
Rocky Hill, CT 06067

BOHLER
ENGINEERING

December 30, 2019
#CT181007

CONTACT / RESPONSIBLE PARTY:

Ben Walker
Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

MANAGEMENT COMPANY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060
(Local contact information will be designated before project construction.)

(Note: The contact information for the Contact/ Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, the CTDEEP Construction General Permit and the Stormwater Pollution Prevention Plan (SWPPP) if applicable. Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Contact information of the OWNER and CONTRACTOR shall be listed in the SWPPP for this site. The SWPPP also includes information regarding construction period allowable, housekeeping and emergency response procedures.

Post Development Controls

Once construction is completed, the post development stormwater Best Management Practices (BMP's) are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. **Litter and Debris Removal:** Litter/Debris to be removed and disposed of weekly.

2. **Parking lots and on-site driveways:** Sweep at least four (4) times per year and on a more frequent basis depending on operations. All resulting sweepings shall be collected and properly disposed of off-site in accordance with CTDEEP and other applicable requirements.

3. **Catch basins, yard drains, trench drains, manholes and piping:** Inspect four (4) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned four (4) times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the catch basin or underground system. Accumulated sediment and hydrocarbons present must be removed

and properly disposed of off-site in accordance with CTDEEP and other applicable requirements.

4. **Water Quality Unit (Proprietary Separator):** Twice per year (Spring and Fall), Per manufacturers recommendations (attached).

5. **Water Quality Filtration Basin:** Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. Remove trash and debris at inlet riprap stilling pad, mow and remove grass clippings and accumulated organic matter. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

6. **Underground Detention Basins:** Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

7. **Rain Gardens:** shall be inspected and cleared of trash monthly; mowed 2 to 12 times per year; mulched annually; fertilized annually; dead vegetation removed annually; pruned annually; replace entire media and all vegetation as needed. Any sediment removed shall be disposed of in accordance with CTDEEP and other applicable requirements.

8. **Landscape Replacement/ Restoration of Eroded Areas:** Landscaped areas shall be monitored, maintained and mulched as necessary, but at a minimum of twice annually. Plants shall be replaced as needed.

9. **Maintenance Access Roads:** Maintenance access roads shall be kept clear of debris and litter. Area shall be inspected annually, and woodchips shall be replaced as necessary to maintain a functional pathway.

10. **Trash Removal Procedures:** Exterior waste areas shall be cleaned weekly and waste screening will be inspected quarterly and repair on an as needed basis.

11. **Integrated Pest Management:** Operator will contract with a licensed pest management company to review the proposed site conditions and provide appropriate measures, procedures and controls to minimize potential pest issues.

Overall Site Operation and BMP Maintenance Schedule			
BMP	**Maintenance Protocol**	**Frequency of Maintenance**	**Responsible Party**
General	Litter & Debris Removal	Weekly	Management Company
Parking Lot sweeping	Sweep parking lots, collect and properly dispose	Minimum 4 times annually	3rd Party/ Management Company
General	Inspect and Clean stormwater structures and piping	Minimum 4 times annually	3rd Party/ Management Company
Water Quality Separator	Follow Manufacturer's Recommendations	2 times annually (Spring & Fall)	CDS Engineered Solutions/ Management Company
Water Quality Filter Basin	Inspection and Preventative maintenance. Rake bottom, remove trash and debris, mow and remove glass clippings and accumulated organic matter	After every major storm event for the first 3 months of install, and minimum 2 times annually, thereafter	Management Company
Underground Detention Basins	Outlet of basin to be inspected for erosion and sedimentation. Sediment collecting in the bottom of the basin shall be vacuumed and removed when sediment reaches a depth of six inches.	After every major storm event for the first 3 months of install, and minimum 2 times annually, thereafter	3rd Party/ Management Company
Rain Garden	Shall be inspected and cleared of trash	Monthly	Management Company
	Mowed	2-12 times per year	
	Dead debris removed, mulched, fertilized, pruned	Annually	
General	Landscaped areas to be maintained and mulched as necessary. Plants shall be replaced as needed	Minimum 2 times annually	Management Company
General	Exterior trash enclosure areas shall be inspected and cleaned	Weekly	Management Company

LONG-TERM POLLUTION PREVENTION PLAN

CONTACT / RESPONSIBLE PARTY:

Ben Walker
Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

MANAGEMENT COMPANY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- No outdoor maintenance or washing of vehicles allowed.
- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.
- Proper storage and removal of solid waste (dumpsters). Disposal of debris, trash, sediment, and other waste material should be done at a suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations. Exterior waste areas will be cleaned weekly and waste screen
- Sweeping of driveways, a minimum of four times per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".
- Landscape Plantings shall be monitored a minimum of four times per year and are to be replaced as necessary.
- Snow removal and ice management shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in forebays, water quality filtration basins, rain gardens or similar stormwater controls. Salting of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals. Sanding is not recommended due to the use of pervious pavements. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt shall be utilized to the minimum extent practical.

OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house and 3rd-Party Management training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Storm Water Pollution Prevention Plan (SWPPP). Annual training will include the following:

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures
- Explain goals and requirements of Landscaping program:
    - Reseed any bare areas as soon as they occur. Erosion control measures shall be installed in these areas to prevent deposits of sediment from entering the drainage system.
    - Grass shall be maintained at a minimum blade height of two to three inches and only 1/3 of the plant height shall be removed at a time. Clippings shall not be disposed of within stormwater management areas or adjacent resource areas.
    - Plants shall be pruned as necessary.
    - The use of fertilizers will be by licensed professionals and shall be employed only to the extent necessary to maintain healthy landscaping.
    - The use of pesticides will be by licensed professionals and shall be employed only to the extent necessary to maintain healthy landscaping. Where possible mechanical methods (i.e. pest traps) or biological methods (i.e. beneficial insects) of pest control shall be implemented.
- Explain the Snow Removal requirements of the Snow Removal program:
    - Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter in to the soil.
    - In no case shall snow be disposed of or stored in resource areas (wetlands, floodplain, streams or other water bodies).
    - In no case shall snow be disposed of or stored in the infiltration basins.
    - If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.
    - The amount of deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.

STORMWATER MANAGEMENT SYSTEM

POST-CONSTRUCTION INSPECTION REPORT

LOCATION:

1621 Storrs Road, Parcel 9.23.1 & 9.23.7
Mansfield, Connecticut

RESPONSIBLE PARTY:

Capstone Properties, LLC
431 Office Park Drive
Birmingham, Alabama 35223
Phone: (205) 949-2060
(Local contact information will be designated before project construction.)

NAME OF INSPECTOR:	INSPECTION DATE:
Note Condition of the Following (sediment depth, debris, standing water, damage, etc.):	
Litter & Debris removal:	
Parking lots and on-site driveways:	
Catch basins, yard drains, trench drains, manholes and piping:	
Water Quality Unit (Proprietary Separator):	
Water Quality Filtration Basin:	

Underground Detention Basins:
Rain Gardens:
Landscape Replacement/ Restoration of Eroded Areas:
Maintenance Access Roads:
Trash Removal Procedures:
Other
Comments:

STORMWATER INSPECTION AND MAINTENANCE LOG FORM

1621 Storrs Road, Parcel 9.23.1 & 9.23.7
Mansfield, Connecticut

Stormwater Management Practice	Responsible Party	Frequency	Maintenance Activity Performed

LANDTECH

Civil Engineering · Site Planning
Environmental Science & Engineering
Structural Engineering · Land Surveying
Permit Coordination & Management
Construction Management & Financing

January 3, 2020

Jennifer Kaufman, AICP
Senior Planner/Inland Wetlands Agent
Town of Mansfield
4 South Eaglesville Road
Mansfield, CT 06268

RE: Mansfield Inland Wetlands Application Review
1621 Storrs Road and Middle Turnpike

Dear Ms. Kaufmann:

We appreciate this opportunity to submit this proposal to review the inland wetlands application for the proposed Capstone Collegiate Communities Residential Development.

This proposal includes our project approach, fee estimate and staff that would be involved in this review. We anticipate that the peer review will involve a review of submitted application documents, submission of a letter of findings, review of applicant responses, and attendance at one meeting of the Mansfield Conservation Commission and two meetings of the Mansfield Inland Wetlands and Watercourses Commission.

If you need any further clarification of our proposal or additional information, please call me on 203-910-5405.

Very truly yours
LANDTECH, INC.

Christopher Allan, Senior Associate
Registered Professional Soil Scientist
Professional Wetland Scientist

Project Approach

- Review all documents submitted to the Inland Wetlands Commission as part of the permit application.
- Evaluate potential impacts of the development on inland wetlands, watercourses, water quality, and vernal pools.
- Evaluate the efficacy of proposed impact mitigation measures, including erosion and sediment controls, stormwater management, and other measures.
- Assist the Commission in determining if feasible and prudent alternatives to mitigate wetland impacts have been satisfied.
- Prepare written reports addressing the application review and applicant responses.
- Participate in telephone calls, digital communications and/or meetings with applicant and town staff as needed.
- Attend meeting(s) with town staff and applicant to review comments, address concerns and evaluate applicant responses.
- Evaluate and provide comments, as needed regarding meeting testimony and submitted comments provided by the applicant, intervenors, town staff, city engineer and the public.
- Prepare a final report to the Agency addressing findings and recommendations based on applicant's revised plans and responses to review comments.
- Assist the Commission in developing its findings and resolution of the permit application and any recommended special permit conditions.
- Attend Commission meetings and public hearings, as requested, to provided comment and testimony. LandTech will be prepared to address any comments from Town staff or the Inland Wetlands Commission. LandTech has GIS and CAD capabilities to prepare graphics and figures to be displayed on presentation boards if needed.

Fee Estimate

Application Review	Hours	Rate	Travel	Expenses	Total
Robert Pryor	8	$ 195			$ 1,560
Chris Allan	8	$ 185			$ 1,480
Comment Letter					
Robert Pryor	8	$ 195			$ 1,560
Chris Allan	8	$ 185			$ 1,480
Response Letter					
Robert Pryor	6	$ 195			$ 1,170
Chris Allan	6	$ 185			$ 1,110
Conservation Commission Meeting					
Robert Pryor	6	$ 195			$ 1,170
Chris Allan	6	$ 185			$ 1,110
IWA Meeting					
Robert Pryor	6	$ 195			$ 1,170
Chris Allan	6	$ 185			$ 1,110
2nd IWA Meeting					
Robert Pryor	6	$ 195			$ 1,170
Chris Allan	6	$ 185			$ 1,110
				Total:	**$ 12,920**

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep/dams Affirmative Action/Equal Opportunity Employer

John A. Berman
664 Farmington Avenue
Hartford, CT 06105

Re: Request for Engineering and Maintenance Work
McLaughlin Pond Dam, Dam ID#: 7811
Hazard Class: B, Significant
Registration#: N/A
Municipality: Mansfield

Dear Mr. Berman:

Thank you for having the McLaughlin Pond Dam inspected. The inspection report submitted to this office on March 18, 2016 was based on a December 2015 inspection by Karl F. Acimovic, P.E. We have reviewed the report.

Your consultant identified that there are two separate embankments with two separate outflow areas, and has identified them as the east dam and the south dam. Your consultant has assessed the east dam to be in Poor to Fair condition and the south dam to be in Poor condition. Based on the information in the report, we concur with that assessment because a detailed hydraulic and hydrology evaluation should be performed. In addition to that there is heavy tree and brush growth on both dams and the downstream stone wall of the south dam needs to be repaired.

Your consultant has also recommended that the hazard classification of the dam be changed to BB. We cannot concur with this recommendation because: There is a major roadway (State Route 89) and intersection less than half a mile downstream of the dam that would be impacted were the dam to breach. The two outlet channels converge and go under Route 89 in what was identified as a 4 foot culvert. Therefore, we believe that the dam should remain a B (Significant) hazard dam.

The consultant's report identified deficiencies with the dam. Below are recommendations made by your engineer with which the DEEP concurs, as well as additional work that DEEP deems necessary. The requested repairs, investigations, and maintenance to be completed include, but are not necessarily limited to the following:

ENGINEERING REPAIRS/INVESTIGATIONS: The completion of the requested investigations and engineered and permit-authorized repairs are necessary to ensure the dam is stable and capable of safely discharging the spillway design flood.

1. Perform a hydrologic and hydraulic (H&H) analysis to determine the appropriate spillway design flood, evaluate spillway adequacy, and evaluate overtopping potential. The spillway must be minimally designed to safely pass the 100-year return frequency flood flow with one

foot of freeboard. The most current rainfall data, NOAA's Atlas 14, should be used for the most accurate and up to date results.

2. Cut and clear all trees and woody vegetation on and within 25 feet of the dam. Removal of roots of trees or brush larger than 3 inches in diameter must be done under the supervision of a professional engineer to determine its impact on the dam embankment and to re-fill voids with proper materials and compaction. You may preliminarily cut trees flush to the ground as a maintenance activity under a GP-014 until you receive appropriate authorization from DEEP and a professional engineer can oversee the root removal.

3. We have decided that the hazard classification for McLaughlin Pond Dam should remain a B (Significant) Hazard dam. There is currently no EAP on record for this dam. A Notice of EAP Non-Compliance dated February 23, 2018 was mailed that required an EAP be prepared and submitted. As of the date of this letter, the DEEP has not received an EAP for your dam.

The engineered repair items listed above require authorization under DEEP's Dam Safety permitting process, unless noted otherwise. There are two types of Dam Safety permits available: individual and general. The activities that can be undertaken by a general permit are listed in the General Permit Authorization Table at the following address: www.ct.gov/deep/dams under the General Permits link. Work that is not eligible under a general permit requires an individual permit. Review the Permit Application Guidance document which is also available on the Dam Safety website for more information about individual permits.

MAINTENANCE ITEMS: The completion of these maintenance measures will help to prevent serious structural deficiencies from developing. If you have not already addressed these issues, please schedule to complete the following:

1. Clearance of the debris and the built-up organic matter in both the weir and downstream channel areas of both the east and south dam embankments.

2. Subsequent to removal of trees and brush as noted above, the downstream embankment walls of both the east and south dams should continue to be monitored, particularly where stumps and root bases may be left in place in order to avoid depressions in the embankment where such roots or stumps may decay or decompose in place.

Maintenance level work to dams normally does not require prior authorization from the Dam Safety Program and should be undertaken as soon as is practical.

Authorization (including an exemption from local wetlands permitting requirements) for activities in wetlands or involving drawdowns be may be available through the non-filing Dam Safety General Permit (GP014) provided the quantities of work are as authorized in that permit. If the work quantity exceeds the non-filing permit thresholds, it is considered a repair requiring authorization through the other General Permits (GP015 or GP016) or by an individual permit pursuant to Section 22a-403 of Chapter 446j of the Connecticut General Statutes.

ADDITIONAL ITEMS:

1. Please find the enclosed copy of the Certificate of Dam Registration for your dam. Keep it for your records and inform us of any change of ownership in the future in the space provided on the certificate.

2. Dam Recordation: It appears that the required notice of a high or significant hazard for this dam may not have been filed on the municipal land records. Pursuant to Section 22a-409(a) of the Connecticut General Statutes, the owners of real property where a high hazard or significant hazard dam is located shall cause to be recorded on the land records in the municipality where the property is located a document that identifies the existence of the dam and whether the dam is categorized as a high hazard dam or a significant hazard dam. Each owner is required to file this form.

   The form may be downloaded from the DEEP website www.ct.gov/deep/dams scrolling down to the Dam Recordation section. The form is also attached for your use. The completed form is then recorded on the land records of Mansfield and a certified copy of the recorded notice from the Clerk's office must be submitted to the CT DEEP Dam Safety Program, 79 Elm Street, Hartford, CT 06106.

The Dam Safety Regulation requires you as the owner of a hazard class B dam to informally inspect your dam minimally quarterly and maintain a record of the inspections. Frequent inspections will allow you to identify potential problems and schedule maintenance work. You should also examine your dam after all major weather events to assure no unsafe conditions are developing. You are required to report any major changes found during your inspection to the Dam Safety Program immediately.

The Dam Safety Program must be notified of your proposed schedule to undertake the investigations, repairs and maintenance within 30 days of receipt of this letter. You may email the proposed schedule to us at DEEP.Damsafety@ct.gov and you may contact Dan Lesniewski at (860) 424-3384 or me at (860) 424-3716 to answer any questions you may have regarding this matter.

Sincerely,

Date: 12/10/19

Ivonne Grajko Hall, P.E.
Supervising Civil Engineer
Dam Safety Program
Water Planning and Management Division

Enclosures: Certificate of Dam Registration
Dam Recordation Form: Notification of High Hazard Dam or Significant Hazard Dam

cc: Mansfield Chief Elected Official
Mansfield Inland Wetland Commission
Karl Acimovic; 588 Stonehouse Road Coventry, CT 06238

Connecticut Department of
Energy & Environmental Protection
Bureau of Water Protection & Land Reuse
Inland Water Resources Division

NOTIFICATION OF A HIGH HAZARD DAM OR A SIGNIFICANT HAZARD DAM

This form, prescribed by the Commissioner of the Department of Energy and Environmental Protection, is to be recorded on the land records pursuant to section 22a-409(a) of the Connecticut General Statutes (CGS). Effective October 1, 2007, section 22a-409(a) CGS requires that an owner of property containing a high hazard dam or significant hazard dam, record on the land records in the municipality where the dam is located, a document that identifies the existence of the dam and whether the dam is categorized as a high hazard dam or a significant hazard dam. To comply with this requirement, please complete and record this form on the land records in accordance with the instructions (DEEP-DAM-INST-001).

Print legibly or type unless otherwise noted.

Part I: Name of the Owner(s) of Real Property/ Hazard Categorization of the Dam

Legal Name:

Mailing Address:

City/Town: State: Zip Code:

Business Phone: ext.:

Contact Person: Phone: ext.

E-mail:

☐ Check here if there is more than one owner of the property or if the owner is a partnership, corporation, LLC, estate, or trust. If so, attach a complete list of the name and address of each owner, partner, member, shareholder, or beneficiary.

Part II: Dam Information

1. Type of Dam: (check one) ☐ High Hazard Dam ☐ Significant Hazard Dam

2. Street Address or Description of Location:

   City/Town: State: Zip Code:

3. Tax Assessor's Reference (Property Where Dam is Located):

   Map Block Lot

   Deeded Land Record: Volume Page Year

4. Connecticut Dam Inventory Number (if known):

Part III: Oath Certifying the Information Provided is True to the Best of the Property Owner's Knowledge

Each owner must sign this part. This notification will be considered incomplete unless all required signatures are provided. *Affidavit is to be made before a Notary Public or other official qualified by law to administer oaths.*

"I, being first duly sworn under oath, certify that to the best of my knowledge, information, and belief such contents of this Form are true and that this Form has been or will be recorded on the land records in the municipality where the dam is located. I understand that any false statement made herein may be punishable as a criminal offense under section 53a-157b(a) of the Connecticut General Statutes.

I certify that this notification is on complete and accurate forms as prescribed by the commissioner without alteration of the text."

_____ _____

(Signature of Owner) *(Date)*

_____ _____

(Signature of Owner) *(Date)*

_____ _____

(Signature of Owner) *(Date)*

STATE OF _____ }
} ss. _____
COUNTY OF _____ } *(Town)*

The foregoing was subscribed to and sworn to before me this _____ day of
(day)

_____ , _____ by _____.
(month) *(year)*

_____
(Signature of Notary Public or other official)

_____
(Name of Notary Public or other official)

My commission expires _____.

☐ Check here if additional signatures are required. If so, please reproduce this sheet and attach signed copies to this sheet.

Note: Once fully completed, record this form on the land records in the municipality where the dam is located. ***After*** this form has been recorded, please request a certified copy from the Town Clerk where the form was recorded and submit the certified copy of the form to:

INLAND WATER RESOURCES DIVISION
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 ELM STREET, 3RD FLOOR
HARTFORD, CT 06106-5127

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFICATE OF DAM REGISTRATION

The Commissioner of the Department of Environmental Protection hereby certifies that an application for a dam registration for the dam and owner described below has been duly filed. The registration complies with State of Connecticut Regulation 22a-409-1 (Registration of dams and similar structures) and is on file with this agency.

DAM NAME/#: McLaughlin Pond - # 07811

OWNER'S NAME: John Berman

ADDRESS: 37 Glenwood Rd.
West Hartford, CT 06107

TOWN DAM IS LOCATED IN: Mansfield

HEIGHT: 8.00 FEE RECEIVED: $ 25.00

DATE OF ISSUE: 8/4/89

Leslie Carothers

Leslie Carothers, Commissioner

TRANSFER OF OWNERSHIP

To be filled in by the seller at the time of transfer of the above referenced dam and sent to the Department of Environmental Protection, Water Resources Unit, Dam Safety Section, State Office Building, Hartford, CT 06106.

DAM NAME/#: McLaughlin Pond - # 07811

BUYERS NAME:

BUYERS ADDRESS:

DATE SOLD:

Phone:
165 Capitol Avenue • Hartford, Connecticut 06106
An Equal Opportunity Employer

Mansfield #11

State ID #
US Quad Sheet

Diversion
(yes, no)
For DEP Use Only

DAM REGISTRATION FORM
Department of Environmental Protection
State of Connecticut

Section I

1. Name of Dam or Similar Structure and Impoundment (i.e., water body)
McLaughlin's Pond

2. Owner's Name: John Berman Phone: 203 521 5707
Address: 37 Glenwood Rd W. Hfd, CT 06107

3. Operator's Name: Same Phone: ( )
Address:

4. Location of Dam or Similar Structure
a. Town Mansfield Stream not known
*NOTE: Attach map or sketch indicating exact location and directions for access. Rt. 89 dirt road on Pevreault property

5. Impounded Water Used For: (water supply, hydropower, recreation, other-specify)
pond - recreation

6. Impoundment Dimensions If Not Available Please Check ✓
a. Surface Area (acres) c. Drainage Area
b. Volume at Dam Crest ? (acre-ft.)

7. Dam(s) Design Data (If more than one dam list data for all using separate sheet)
a. Height 5 (ft.) d. Type of Construction (earth embankment, masonry/earth, concrete, timber crib, other-specify)
b. Total Length 150 (ft.)
c. Low Level Outlet Operable? (yes, no)

8. Spillway(s) Design Data
a. Length 15 (ft.) b. Freeboard Height 4 (ft.)

9. Conditions Downstream From Dam
Floodplain is (circle one) heavily, moderately, sparsely, developed.

10. Present Condition of Dam (circle one) intact, breached

11. Water Diversions:
Has dam been registered with DEP under Section 4 of the Connecticut Water Diversion Policy Act, Section 22a-368(a) of the CT General Statutes? (yes, no) No

RECEIVED
SEP 18 1984
WATER RESOURCES UNIT

Section II
Fee Enclosed - Please enclose check or money order payable to "D.E.P.-Water Resources Unit".

Dam Height	Fee (check one)
5-15 ft.	$25
15-25 ft.	$50
25 ft,	$100

No Payment Required for Dams Less Than 5 Feet in Height

I hereby certify to the best of my knowledge that the information provided on this form is correct.

John A Berman — 9-17-84
Signature of Owner — Date

Signature of Agent — Date

Any false statement made herein is punishable as a criminal offense under Section 53a-157 of the CT General Statutes.

October 1983

DAM REGISTRATION

Public Act 83-38 enacted by the June session of the Connecticut General Assembly requires the registration of all dams or similar structres by their owners with the Commissioner of Environmental Protection on or before July 1, 1984. To register, the reverse side of this sheet must be completed and submitted with the appropriate fee, as noted in Section II, to: Department of Environmental Protection, Water Resources Unit, Room 207, State Office Building, Hartford, Connecticut 06106.

In accordance with P.A. 83-38 all dams, dikes, weirs, or other similar structures which impound or are capable of impounding the flow of water, including breached dams, must be registered. No registration fee is required for dams owned by the State or Federal Government.

Failure to register in accordance with P.A. 83-38 may subject the dam owner to a fine of up to five hundred dollars for each offense.

Upon receipt and approval of the Dam Registration Form, a Certificate of Registration will be provided each dam owner.

The following definitions are presented for clarity:

"Dam Height" means the vertical distance measured from the crest of the dam to the lowest elevation at the downstream toe of the dam or similar structure.

"Freeboard Height" means the vertical distance measured from the crest of the dam to the spillway crest.

Conditions Downstream From Dam

"Heavily Developed" means an urban setting with many structures along the streambanks and within the floodplain.

"Moderately Developed" means a suburban setting with structures along the streambanks and/or within the floodplain.

"Sparsely Developed" means a rural setting with few, if any, structures along the streambanks or floodplain.

This form will also be utilized by the Department to assist in its determination of permit need pursuant to Section 22a-368(a) of the Connecticut General Statutes, regarding the Water Diversion Policy Act.

Please print or type and answer all questions with appropriate information. If no answer exists, label accordingly.

Questions pertaining to dam registration may be addressed to the Department of Environmental Protection, Water Resources Unit - Flood Management Section, Room 215, State Office Building, Hartford, Connecticut 06106 at telephone number 566-7245.

CACIWC Annual Meeting
November 23, 2019

Janet P. Brooks
Attorney at Law, LLC
1224 Mill Street, Bldg. B, Suite 212
East Berlin, Connecticut 06023
(860) 828-2092
jb@attorneyjanetbrooks.com
www.ctwetlandslaw.com

Procuring and Using Experts

I. Statutory authority to assess fee to cover costs of experts

A. General Statutes § 22a-42a (e)

"The inland wetlands agency may require a filing fee to be deposited with the agency. The amount of such fee shall be sufficient to cover the reasonable cost of reviewing and acting on applications and petitions, including, but not limited to, the costs of certified mailings, publications of notices and decisions and monitoring compliance with permit conditions or agency orders."

B. Before exercising statutory authority to impose fees, adopt a regulation

1. 2006 DEP Inland Wetlands and Watercourses Model Municipal Regulations, 4th Ed.

"§19.5 Fee Schedule. Application fees shall be based on the following schedule:

a. Regulated Activities:

. . .

Complex Application Fee ..... The Inland Wetlands Agency may charge an additional fee sufficient to cover the cost of reviewing and acting on complex applications. Such fee may include, but not be limited to, the cost of retaining experts to analyze, review, and report on issues requiring such experts. The Agency or the duly authorized agent shall estimate the complex application fee which shall be paid pursuant to section 19.1 of these regulations within 10 days of the applicant's receipt or notice of such estimate. Any portion of the complex application fee in excess of the actual cost shall be refunded to the applicant no later than 30 days after publication of the agency's decision.

. . .

f. Monitoring Compliance Fee .....$ XX.XX"

2. Alternative approach to monitoring fee: independent site monitor

Example from East Hampton Inland Wetlands and Watercourses permit format:

"C. Other Conditions

1. *Site monitor (* = optional, condition imposed on a case-by-case basis)

   a. There shall be a site monitor designated by the Agency whose duty shall be to monitor the permittee's compliance with the permit and report such findings to the Agency prior to the Agency's regularly scheduled meetings. The site monitor shall not be a consultant to the permittee at any phase in the development of the project. The permittee may petition the Agency for a modification or clarification of the duties or designation of the site monitor.

   b. The permittee shall timely pay for the reasonable costs of services of the site monitor required by this permit. The permittee's failure to timely pay the fees for the consultant shall be a violation of the permit and a basis to suspend or revoke the permit.

   c. During any month in which activities authorized by the permit have occurred the site monitor shall monitor the site. "Monitoring" means 1) inspection of all construction activities, including but not limited to, land development, infrastructure improvements, storm water collection systems, and individual lot development consistent with the NPDES permit issued for construction at this site; and 2) collection of water quality data in accordance with the monitoring plan submitted by _____ dated _____.

   d. Even if no activities authorized by the permit have occurred in a given month or in addition to the duties set out in 3.c above, the site monitor shall monitor the site within twenty-four hours of a rainfall of 0.5 inches or greater within a 24-hour period and file a report with the Agency.

   e. Even if no activities authorized by the permit have occurred in a given month, in response to a weather prediction by the National Weather Service of 0.5 inches of rainfall or greater within a 24-hour period the site monitor shall confirm that adequate sediment and erosion controls are in place and functioning as designed. The site monitor shall submit such report promptly to the Agency.

   f. The permittee shall notify the site monitor at least three days prior to the initiation of any activity authorized under this permit and, in any month when activities authorized under this permit occur, the permittee shall inform the site monitor on a weekly basis as to the progress of all activities related to this permit.

   g. Prior to initiation of each phase of construction, all sedimentation and erosion control measures shall be in place and inspected by the site monitor."

II. Experts and "substantial evidence"

A. River Bend Associates, Inc. v. Conservation & Inland Wetlands Commission, 269 Conn. 57 (2004)

1. credibility of the witnesses and determination of facts within the agency's province

2. there can be contradictory evidence, the possibility of drawing two different conclusions

3. need for expert evidence: "[A] lay commission acts without substantial evidence, and arbitrarily, when it relies on its own knowledge and experience concerning technically complex issues such as pollution control, in disregard of contrary expert testimony, without affording a timely opportunity for rebuttal of its point of view. Feinson v. Conservation Commission, 180 Conn. 421, 429 (1980)

4. adverse impact to the wetlands or watercourses at the site: "The sine qua non of review of inland wetlands applications is a determination whether the proposed activity will cause an adverse impact to a wetland or watercourse." River Bend Associates, Inc., supra, 269 Conn. 74.

5. The following phrases are ***not*** substantial evidence: "may increase risk," "may result in adverse impact," "could harm the wetlands," "can't swear that it won't increase the run off."

   After significant expert evidence on both sides, the agency in River Bend found that the soil mixing plan ***may*** increase pesticide mobility and result in greater pesticide transport into wetlands and watercourses. "The defendant may have inferred from the expert testimony that the plaintiffs' proposed actions would adversely impact the wetlands and watercourses. Such an inference, however, would be improper in this case." page 78 n.27. An expert is required to establish the adverse impact on the wetland or watercourse.

B. Toll Brothers, Inc. v. Inland Wetlands Commission, 101 Conn. App. 597 (2007)

1. The **Appellate Court** held:

- the commission had a duty to evaluate the plan based on evidence, "**but the commission appears instead merely to have assumed that any proposed alterations to wetlands A and B justified a denial of that application. That assumption was improper.**"
- The record lacks substantial evidence to deny based on the activities to A and B.
- The wetlands impact of the density of the project is "**merely speculative.**"
- As for the retaining wall near wetlands D, the commission "**improperly relied on evidence of general environmental impacts such as a statement by Sean Hayden, a soil scientist, who indicated that excessive development harms wetlands.**"
- "The commission has failed to identify any evidence in the record that satisfies the substantial evidence rule."

C. **Lord Family of Windsor, LLC v. Inland Wetlands & Watercourses Commission, 103 Conn. App. 354 (2007)**

1. The developer won its appeal; commission denied the modification to the permit.

2. The **record** contained the following facts:

- commission member "**concerned** that consolidating all of the traffic onto one road **might** contaminate the [brook]."
- commission member and agent "stated that **there might be other pollutants**, besides runoff water, created by the increased traffic."
- Commission member stated not in support of modification **"because it doesn't take a rocket scientist to figure out that sometimes cars drop oil, and salts get into the wetlands and all kinds of things happen."**

3. The **Appellate Court** held:

- Vehicles coming to the site and crossing the brook constitute a regulated activity: "any operation within or use of a wetland or watercourse involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses . . ." This is the statutory definition.
- Relied on *RiverBend* case above, **"evidence of general environmental impacts, mere speculation, or general concerns do not qualify as substantial evidence."**
- The member's **"conclusion that passing traffic might drop pollutants into the wetlands fails to satisfy the substantial evidence test."**
- The member's statement **"we don't know how sound that thing [the culvert] really is"** unsupported by the record. The applicants offered facts that the culvert supported the weight of a truck with 20,000 to 30,000 yards of fill recently.
- **"A mere worry is not substantial evidence."**

D. **AvalonBay Communities, Inc. v. Inland Wetlands & Watercourses Agency, 130 Conn. App. 69, cert. denied, 303 Conn. 908 (2011).**

1. Application for an affordable housing apartment project not sited in wetlands, watercourse or upland review area. Agency gave four reasons for denial. The trial court overturned the denial and ordered the permit granted; the Appellate Court affirmed the lower court's reversal of the denial. The Supreme Court's reasoning in River Bend Associates, Inc. v. Conservation & Inland Wetlands Commission, 269 Conn. 57 (2004) is heavily relied on: "Evidence of general environmental impacts, mere speculation, or general concerns do not qualify as substantial evidence;" id., 70-71; "[t]he sine qua non of review of inland wetlands applications is a determination whether the proposed activity will cause an *adverse impact* to a wetland or watercourse." Id., 74 (emphasis in original).

   a) **Reason 1:** the wetlands and watercourses will be negatively impacted by sedimentation. The agency relied on the existence of sediment reaching the resource to constitute an adverse impact. **Court**: the agency never moved beyond speculation. Neither quantitative (amount of flow) nor qualitative

(whether the impact would be adverse) evidence was in the record. The agency **"could not simply assume that the entry of sediment and siltation would adversely affect the wetlands and watercourse without evidence that it would in fact do so."**

b) **Reason 2:** "the proposed intense development of the site will clearly alter the hydrologic regime." **Court:** merely generalized concerns, which did not rise above speculation. The fact that **"hydrologic changes would occur did not necessarily mean that those changes would adversely affect [wetlands.]"**

c) **Reason 3:** "pocket wetland would be totally lost." Court found that the wetland was 360 square feet, consisted of a man-made drainage ditch and earthen berm. The watershed serving the wetland would be reduced from 2.4 acres to .99 acre with sufficient flow to maintain the wetland. **"[N]o evidence supports the [agency's] finding that any impact necessarily would be adverse."**

d) **Reason 4:** "potential for acid generation from the rock exposed by blasting at the site." Court: while the agency **"was free to reject the plaintiff's [applicant's] expert evidence, which concluded that the potential for environmental impact due to acid rock drainage was minimal, it was not entitled to conclude that the opposite was true without any evidence to justify that conclusion."**

E. Estate of Casimir Machowski v. Inland Wetlands Commission, 137 Conn. App. 830 (2012)

1. The applicant proposed to construct, on a 16 acre parcel containing 1.8 acres of wetlands/watercourses, 18 units in 9 duplex buildings on steep slopes in the upland review area. The applicant and the commission presented experts. The agency denied the application. The trial court dismissed the applicant's appeal. The Appellate Court reversed and overturned the denial of the permit.

   a) **The trial court failed** to require **"that there be specific evidence in the record showing that the [applicant's] activities would adversely impact wetlands or watercourses."** Id., 835.

   b) The Appellate Court quoted extensively from the River Bend case cited above in II.B.1.

   c) The Appellate Court reviewed the expert reports and concluded there was no evidence that the proposed activity would have an adverse effect on the wetlands or that the amount of fill would probably erode into the wetlands.

   d) The agency's expert referred to "potential damage to wetlands" if the detention basins fail. **The Appellate Court: "Evidence regarding *potential* impacts to wetlands *in the event* of a failure of the detention basin does not in itself amount to substantial evidence."** (Emphasis in original). Id., 840, citing AvalonBay case referred to in II.B.1 above.

e) The agency's expert stated that the location of the detention basin was not consistent with the 2002 Guidelines for Soil Erosion and Sediment Control due to the steep slope. The Appellate Court: **"although they [the guidelines] may contain a set of beneficial recommendations, non-adherence does not in itself imply a likelihood of adverse impact on wetlands. The requirements of *River Bend Associates, Inc.* still must be met to justify a denial in these circumstances."** Id., 841.

f) The neighbors testified about past experiences with flooding in the area. The Appellate Court concluded: **None** of that testimony **addressed "what specific impact the proposed regulated activity would have on the wetlands."**

g) All of the evidence that the agency relied on was speculative in nature or simply a guideline.

F. <u>Three Levels Corporation v. Conservation Commission</u>, 148 Conn. App. 91 (2014)

1. The Redding wetlands agency considered an application for a ten-unit housing development on 14 acres with 1.75 acres of wetlands on property and adjacent to floodplain wetlands and a river. The agency denied the application for four reasons.

2. The Superior Court ruled for the applicant, reversing the agency denial, which the Appellate Court reversed in part.

3. Expert evidence that was insufficient as a matter of law:

   "It certainly, in my opinion, is not sufficient to avoid having **some type of adverse impact** on the wetlands due to sediment and erosion materials getting into the wetland, the pond and the riverine system." The town's expert continued and noted that the "likelihood of that adverse impact 'is very strong.' " → ***<u>what</u>*** type of adverse impact?

   "If it's not maintained, and this is a hypothetical, then you would have adverse impact on the wetland system both from excessive runoff and from the lack of removal of the impurities . . ."

4. Appellate Court concluded: "There also was no evidence *specifically indicating what effect, if any, a failure of the detention basin would have on the downslope wetlands.*"

   Also: "The substantial evidence test is not met by a general statement by an expert that 'some type' of adverse impact is likely to result from the proposed regulated activities. . . Absent evidence that identifies and specifies the actual harm resulting therefrom, a commission cannot find that the proposed activities will, or are likely to, adversely impact wetlands or watercourses."