STORMWATER MANAGEMENT REPORT

400 STEPS
WEST WINDSOR TOWNSHIP,
MERCER COUNTY, NEW JERSEY
April 20, 2020
Revised: October 16, 2020
Revised: December 3, 2020

Applicant:

400 Steps, LLC
3499 Route 9 North, Suite 1-E
Freehold, NJ 07728

PREPARED BY:

Robert E. Korkuch, PE
N.J. License No. 24GE03268100

ACT ENGINEERS
Engineering, Planning and Surveying
1 Washington Boulevard - Suite 3
Robbinsville, New Jersey 08691
(609) 918-0200
Fax (609) 918-1411
www.actengineers.com

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INTRODUCTION

The purpose of this report is to document and describe the design of the stormwater management facilities which will serve the project as described below and demonstrate their compliance with the regulations of West Windsor Township, Mercer County, and the Mercer Soil Conservation District.

1. PROJECT LOCATION

The proposed project is situated in West Windsor Township approximately 225 ft east of Princeton Hightstown Road and 400 ft north of Cranbury Road. The property is identified on the current municipal tax maps as Block 5, Lot 19 and contains a total area of 3.8± acres.

2. SITE SOILS

The USDA/NRCS's "Web Soil Survey" was used for identifying and mapping the approximate limits of the various soils present on and in the vicinity of the subject property. According to their website, the site consists entirely of:

- Downer Fine Sandy Loam, Gravelly Clay Loam Substratum, 0 to 5% slopes (DohgB) – about 60% coverage
- Glassboro and Woodstown Sandy Loams, 0 to 5% slopes (GKAWOB) – about 40% coverage
- Udorthents, Gravelly Substratum, 0 to 8% slopes (UdgB) – less than 1% coverage

The Downer soils (DohgB) are located on the southern side of the property and have a hydrological soil group (HSG) classification of "A". The Glassboro and Woodstown soils (GKAWOB) are located in the northern side of the property. These soils have a HSG classification of "A/D", indicating that the soils behave similar to HSG A soils when the

site is drained and similar to HSG D soils when the property is not drained. The Web Soil Survey was recently updated from HSG “B” to HSG “A/D”. For the purpose of this Stormwater Management Report, HSG “B” was used. The Udorthents soils (UdgB) make up a very small fraction of the site in the southwest corner of the property and are rated by the Web Soil Survey as HSG “D”. Soils mapping, along with relevant information from the aforementioned website is provided in Appendix A.

3. STORMWATER RUNOFF ANALYSIS METHODOLOGY

The analysis of stormwater runoff is based on the Soil Conservation Service (SCS) Method as described in Technical Release No. 20 (TR-20) and Technical Release No. 55 (TR-55). Theoretical storms are modeled utilizing a 24-hour standard SCS Unit Dimensionless Hydrograph and the Type III Rainfall Distribution. The SCS Method uses area, runoff curve numbers, and hydraulic time of concentration to determine the peak discharge from a study area. Pre- and post-development runoff curve numbers were taken from TR-55, Second Ed., June 1986, Table 2-2a. Proposed curve numbers are shown in the routing summary (Appendix C).

This information, as well as the 24-hour rainfall total, the 24-hour rainfall distribution (Type III) and the distribution shape factor per Department of Agriculture (Technical Bulletin Number NJ210-3-1), are utilized to create runoff hydrographs and peak runoff rates for the 2-year, 10-year, 25-year, and 100-year probability storm events.

The hydrograph generation and detention facility routing computations were accomplished using “HydroCAD” computer software program as licensed by HydroCAD Software Solutions, LLC. The inputs and results are shown in Appendix C.

4. EXISTING SITE HYDROLOGIC CONDITIONS

The existing 3.8+/- acre parcel consists of an abandoned two story retail building, an abandoned one story retail building, parking areas for both buildings, and a basin in the

northern corner of the property. The neighboring properties include retail buildings, parking areas, the driveway access to the subject site, and wooded areas between residential properties. The runoff from the subject site, as well as portions of these neighboring properties to the south, is presently being detained by the basin in the northern corner of the property ("Basin B").

The subject property generally slopes in a northeasterly direction at approximately 1 to 2 percent. An existing drainage system is present in the parking lot that covers approximately 40% of the site. The two existing retail buildings were built in the late 1990's or early 2000's.

5. SITE POST-DEVELOPED HYDROLOGIC CONDITIONS

The proposed redevelopment of the subject property will hydrologically alter the site due to a small increase in impervious surface area. Several apartment buildings are proposed to replace the two abandoned retail buildings which are to be demolished and some changes to the existing parking area are necessary. Basin B, the existing basin in the northern corner of the property, will be modified as part of the current project to address the water quantity and quality requirements of the NJDEP, DRCC, West Windsor Township, and Mercer County. Additionally, a small bioretention basin is proposed between the central apartment buildings for groundwater recharge.

The times of concentration (Tc) used for each sub-basin are shown on the Drainage Area Map (Appendix L). This information, as well as the 24-hour rainfall total, the 24-hour rainfall distribution (Type III) and the distribution shape factor, are utilized to create runoff hydrographs and peak runoff rates for the 2-, 10-, 25-, and 100-year probability storm events.

The following calculations were performed to achieve the goals of the various stormwater management systems:

A. The runoff hydrographs for the predeveloped site were created to determine predeveloped peak flows for the storm events noted above.

B. The runoff hydrographs for the proposed developed site for each of the drainage sub-areas were created to determine proposed peak flows for the storm events noted above.

C. Target flow reductions were applied to the peak discharge at Basin B for the 2-, 10-, and 100-year predeveloped storm events.

D. Post developed peak flow rates were compared to the allowable outflows based on the 50%, 75%, and 80% rate reduction factors to confirm that flow reductions were met for the 2-, 10-, and 100-year storms, respectively. Due to the relatively small increase in impervious surface proposed compared to the existing site and because the onsite runoff is already being detained by an existing basin, the rate reductions were only applied to the proportion of the site equal to the impervious cover increase, as shown in Table 1. The storm events are specifically addressed in local and state stormwater regulations; the 25-year event is of concern to county planning/engineering reviewers, as well as Mercer County SCD, and is not subject to a rate reduction requirement beyond remaining at, or less than, the existing condition flow.

E. The Water Quality storm was routed through all proposed stormwater management facilities to demonstrate that the extended detention basin detains the Water Quality storm for long enough to achieve the maximum 60% TSS removal rate, as outlined in the New Jersey Best Management Practices (BMP) Manual. A “Downstream Defender” by Hydro International will be placed at the inlet to the extended detention basin to provide an additional 50% TSS removal rate. The two water quality features in series provides the required 80% TSS removal rate for the proposed site.

F. Calculations were then made to address the design of conduit outlet protection for all pipes discharging into / out of the SWM facilities, as well as the need for such protection at spillways for the larger storm events. With regard to the latter, velocities of runoff flowing across all spillways were found to be lower than the maximum allowed for the prevailing soil type as specified in the state's manual addressing soil erosion & sediment control.

G. An Annual Groundwater Recharge Analysis was performed based on the New Jersey Geological Survey Report (GSR-32) spreadsheet to demonstrate that the recharge deficit caused by the additional impervious surface is recharged through the proposed Bioretention Basin.

H. A Groundwater Mounding Analysis was performed for the Bioretention Basin to demonstrate that the construction of the basin will not adversely affect the structures of the nearby buildings. The mounding analysis was performed using the Hantush Spreadsheet, as directed in the New Jersey Stormwater BMP Manual. A copy of the mounding analysis can be found in Appendix F of this report.

Table 1 on the following page summarizes the existing and proposed discharges for the various drainage subareas as well as the rate reductions achieved for the increased impervious land cover on the currently developed site. Detailed hydrograph and routing computations for the 2, 10, and 100-year storm events are provided as Appendix C to this report.

TABLE 1 – HYDROLOGIC SUMMARY FOR DRAINAGE SUB-AREAS

Existing Impervious Area = 3.05 Acres
Proposed Impervious Area = 3.49 Acres
Total Drainage Area (Existing & Proposed) = 6.10 Acres
Percentage Existing Impervious = 50.0%
Percentage Proposed Impervious = 57.2%
Percentage Increase in Impervious = 7.2%

TOTAL	2-Year Event (cfs)	10-Year Event (cfs)	100-Year Event (cfs)
Pre-Existing Peak Flows	0.46	0.56	8.60
7.2% Existing Peak Flow (To Be Reduced)	0.03	0.04	0.62
Rate Reductions (Percentage of Peak)	50%	75%	80%
Reduced Component of Existing Peak Flow	0.02	0.03	0.50
92.8% Existing Peak Flow (No Flow Reductions Applied)	0.43	0.52	7.98
Allowable Site Peak Discharge	0.45	0.55	8.48
Proposed Peak Flows	0.37	0.54	7.09
Reductions Met	YES	YES	YES

6. WATER QUALITY

State, local, and DRCC regulations addressing stormwater management require that provisions be made for water quality if the proposed site contains more than 0.25 acres of new impervious surfaces. Eighty percent TSS removal from the stormwater runoff during the water quality storm event (1.25" of rain in 2 hours) for the site is therefore required. Water quality will be provided by both a manufactured treatment device and the basin in the rear of the property in series. The manufactured treatment device is Hydro International's "Downstream Defender", located directly upstream of the basin's inlet pipe. The Downstream Defender is listed NJDEP's Best Management Practices (BMP) Manual as providing 50% TSS removal. The basin will operate as an extended detention basin, as described by the BMP Manual. The basin detains water for 25.75 hours after a water quality storm event and therefore provides 60% TSS removal. The manufactured treatment device and extended detention basin receive all runoff from all proposed impervious surfaces and lawn areas. The combination of the two water quality features

in series provide 80% TSS removal, calculated per the formula in N.J.A.C 7:8-5.5(c) as shown in Formula 1, below. Routings for the Water Quality Storm and calculations for the detention time of the basin can be found in Appendix D of this report.

FORMULA 1 – TSS REMOVAL RATE FOR BMPs IN SERIES

R = A + B – (A x B) / 100

Where,
R = total TSS percent load removal from application of both BMPs, and
A = the TSS percent removal rate applicable to the first BMP ("Downstream Defender" MTD, 50%), and
B = the TSS percent removal rate applicable to the second BMP (Extended Detention Basin, 60%)

R = 50 + 60 – (50 x 60)/100
R = 80% Combined TSS Removal Rate

7. GROUNDWATER RECHARGE

This site is in a PA2 area as designated by the State Planning Commission and therefore groundwater recharge must be addressed. Soil logs in areas where stormwater basins are proposed were conducted in February 2020. Permeability tests in the bioretention basin area demonstrate that the soils are capable of recharging the volume of runoff for the full range of anticipated storms. Calculations addressing groundwater recharge for this project in accordance with the NJDEP's GSR-32 spreadsheet are in Appendix F of this report.

A post-developed annual recharge deficit of 19,140 cubic feet caused by the additional impervious surface proposed on site was calculated. The dimensions of the proposed bioretention basin were entered into the Recharge BMP Input Parameters. The Post-Developed Impervious Area was populated with the area of impervious surface that the bioretention basin receives – 0.26 acres (11,326 sf), or half of the roof runoff from the adjacent buildings – instead of the total amount of impervious surface on site. A total of 27,718 cubic feet of annual recharge volume will be generated by the bioretention basin, which exceeds the 19,140 cf deficit from the increased impervious surface.

8. STORM SEWER SYSTEM DESIGN

The storm sewer collection system has been designed to convey the 100-year storm to Basin B. Routing calculations were performed with HydroCAD using the Simultaneous Routing Method, modeling each individual inlet drainage area in the proposed parking lot. These routings demonstrate that the pipes have sufficient capacity to convey the 100-year storm to Basin B without flooding into neighboring lots. Routings for the storm sewer system, as well as sizing calculations for the "Downstream Defender" Manufactured Treatment Device, are included in Appendix E of this report.

9. SOIL EROSION AND SEDIMENT CONTROL

Measures to prevent soil erosion and provide sediment control have been incorporated into the design. Temporary measures such as inlet protection, silt fence and stabilized construction entrances are proposed, along with permanent stabilization and landscaping measures. Riprap aprons are proposed at all areas where runoff is concentrated at either inflow or outfall components of the SWM facilities, and have been designed in accordance with the New Jersey State Standards for Soil Erosion and Sediment Control, along with any requirements specific to the Mercer County Soil Conservation District.

10. MERCER COUNTY STORMWATER CALCULATIONS

Additional stormwater calculations were performed to demonstrate compliance with the Mercer County Land Development Standards. According to the Mercer County Stormwater Management Standards, "All disturbed lands in the site shall be assumed after development to be in poor condition." Furthermore, the Mercer County Stormwater Standards requires that peak flows / hydrographs must be computed with curve numbers from the next higher Hydrologic Soil Group under the post-developed condition – i.e., if prevailing soils are HSGC "B", then the proposed SWM facilities must be analyzed assuming that they have become HSGC "C" soils. The proposed characteristics of disturbed areas were revised to reflect a poorly-maintained condition using higher curve

numbers and rerouted through all SWM facilities in order to verify that these would function properly. Table 2 below compares peak flows under existing and proposed conditions, assuming the deteriorated future condition as described. Stormwater Calculations for Mercer County Standards can be found in Appendix I.

TABLE 2 – HYDROLOGIC SUMMARY PER MERCER COUNTY STANDARDS

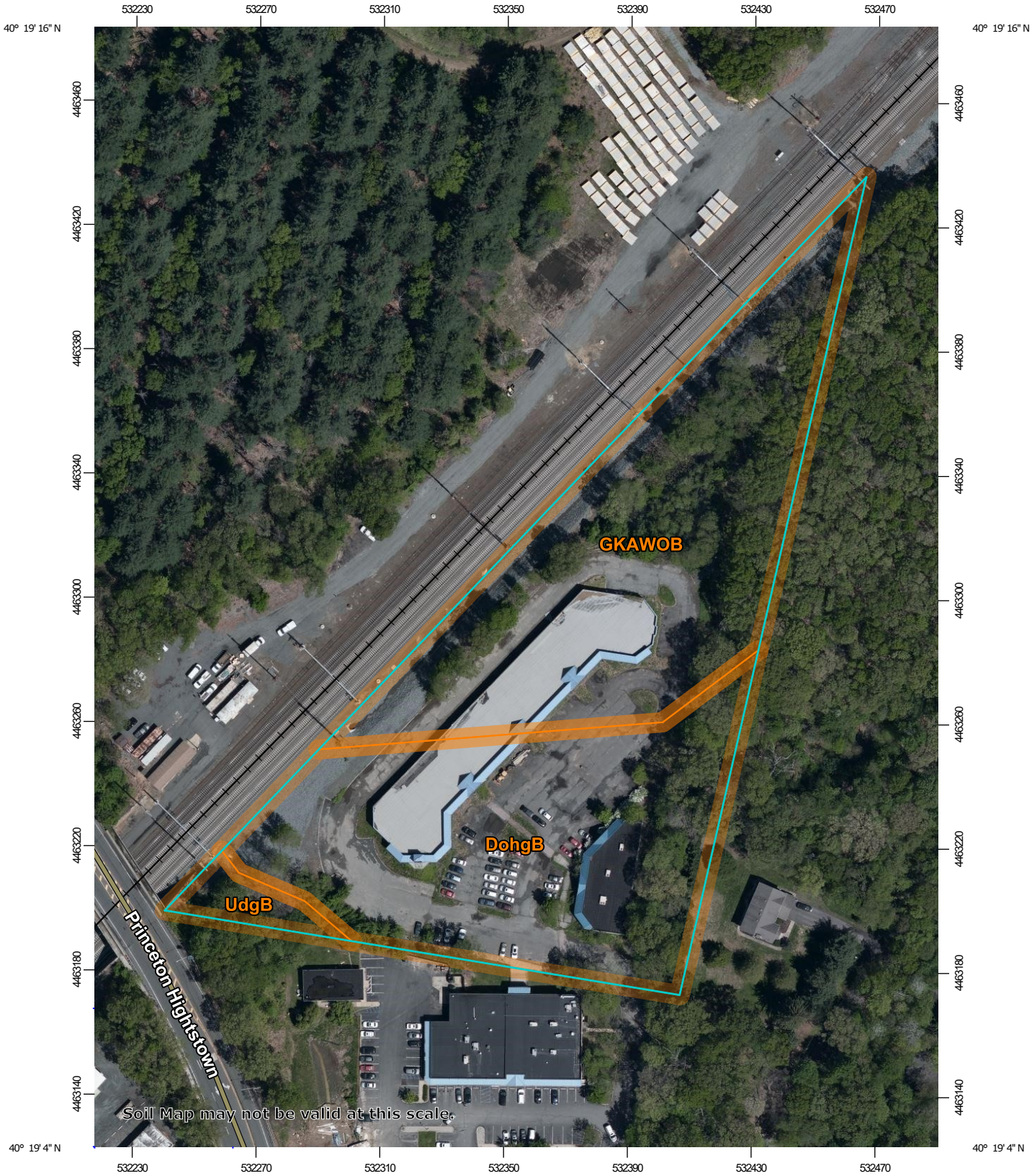
	2 Yr Event	10 Yr Event	100 Yr Event
Existing Discharge (cfs)	**0.46**	**0.56**	**8.60**
Proposed Discharge (cfs)*	**0.39**	**0.56**	**8.56**
Proposed Q < or = Existing Q	YES	YES	YES

11. GROUNDWATER MOUNDING ANALYSIS

A Groundwater Mounding Analysis was performed to demonstrate that the Bioretention Basin proposed between the central apartment buildings will not raise the Seasonal High Water Table to a level that adversely affects the structures of the buildings. The mounding analysis was performed using the Hantush Spreadsheet provided by New Jersey Department of Environmental Protection, as described in the New Jersey BMP Manual. A copy of the mounding analysis can be found in Appendix F. The operation of the Bioretention Basin is not anticipated to adversely affect the structures of the nearby apartment buildings.

APPENDIX A

NRCS Web Soil Survey Map



Map Scale: 1:1,760 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: May 2, 2019—Jul 9, 2019

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
DohgB	Downer fine sandy loam, gravelly clay loam substratum, 0 to 5 percent slopes	2.6	46.8%
GKAWOB	Glassboro and Woodstown sandy loams, 0 to 5 percent slopes	2.8	50.2%
UdgB	Udorthents, gravelly substratum, 0 to 8 percent slopes	0.2	2.9%
Totals for Area of Interest		**5.6**	**100.0%**

Mercer County, New Jersey

DohgB—Downer fine sandy loam, gravelly clay loam substratum, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 4jm8
Elevation: 10 to 450 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Downer, gravelly clay loam substratum, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Downer, Gravelly Clay Loam Substratum

Setting

Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits and/or gravelly fluviomarine deposits; over clayey estuarine deposits

Typical profile

Ap1 - 0 to 8 inches: fine sandy loam
Ap2 - 8 to 12 inches: fine sandy loam
Bt - 12 to 32 inches: fine sandy loam
C - 32 to 41 inches: sandy loam
2C - 41 to 66 inches: stratified gravelly clay loam to sandy clay

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 48 to 122 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

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

Minor Components

Fort mott

Percent of map unit: 5 percent
Landform: Terraces, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: No

Klej

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

Evesboro

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

Sassafras

Percent of map unit: 5 percent
Landform: Knolls, hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

Mercer County, New Jersey

GKAWOB—Glassboro and Woodstown sandy loams, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1jg7f
Elevation: 0 to 130 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Glassboro and similar soils: 45 percent
Woodstown and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glassboro

Setting

Landform: Flats
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits

Typical profile

A - 0 to 10 inches: sandy loam
BA - 10 to 13 inches: sandy loam
Bg - 13 to 18 inches: sandy loam
Btg - 18 to 26 inches: sandy loam
C - 26 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

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

Description of Woodstown

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Old alluvium and/or sandy marine deposits

Typical profile

Ap - 0 to 11 inches: sandy loam
BA - 11 to 17 inches: sandy loam
Bt - 17 to 23 inches: sandy loam
BC - 23 to 30 inches: sandy loam
C - 30 to 48 inches: sandy loam
2C - 48 to 60 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.7 inches)

Interpretive groups

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

Minor Components

Mullica, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Downer

Percent of map unit: 5 percent
Landform: Knolls, low hills
Landform position (three-dimensional): Nose slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear

Hydric soil rating: No

Fallsington

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

Data Source Information

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

Mercer County, New Jersey

UdgB—Udorthents, gravelly substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4jq1
Elevation: 400 to 1,500 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, gravel material, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Gravel Material

Setting

Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy lateral spread deposits over gravelly lateral spread deposits

Typical profile

C1 - 0 to 10 inches: gravelly sand
C2 - 10 to 72 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 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 2.3 inches)

Interpretive groups

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

Minor Components

Urban land

Percent of map unit: 5 percent
Landform: Low hills
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: Unranked

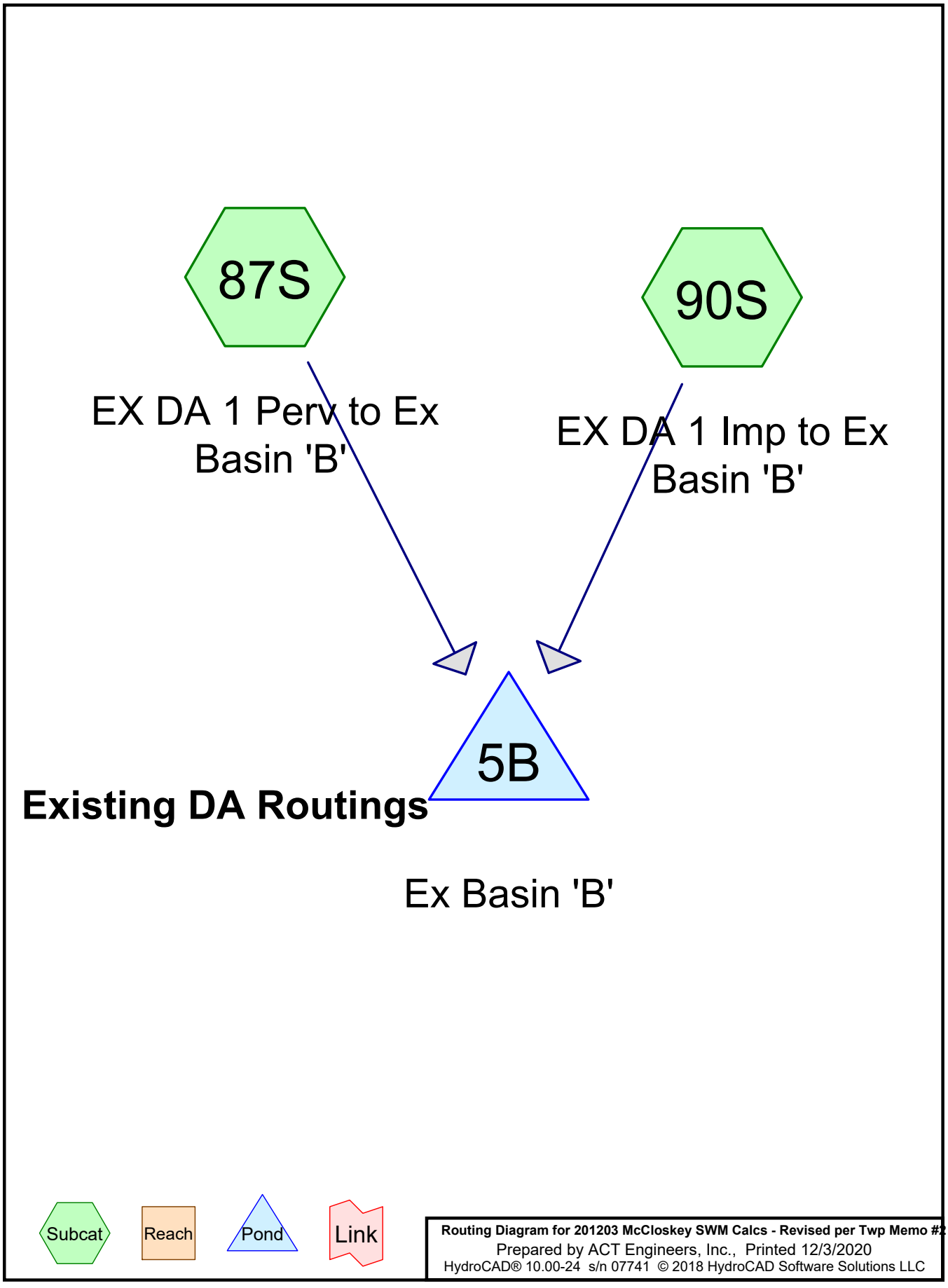
Data Source Information

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 15, Sep 16, 2019

APPENDIX B

Existing HydroCAD Routings

2, 10, 25, and 100-Year Storm Events


87S
90S
EX DA 1 Perv to Ex Basin 'B'
EX DA 1 Imp to Ex Basin 'B'
5B
Ex Basin 'B'
Existing DA Routings
Subcat
Reach
Pond
Link
Routing Diagram for 201203 McCloskey SWM Calcs - Revised per Twp Memo #2
Prepared by ACT Engineers, Inc., Printed 12/3/2020
HydroCAD® 10.00-24 s/n 07741 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'

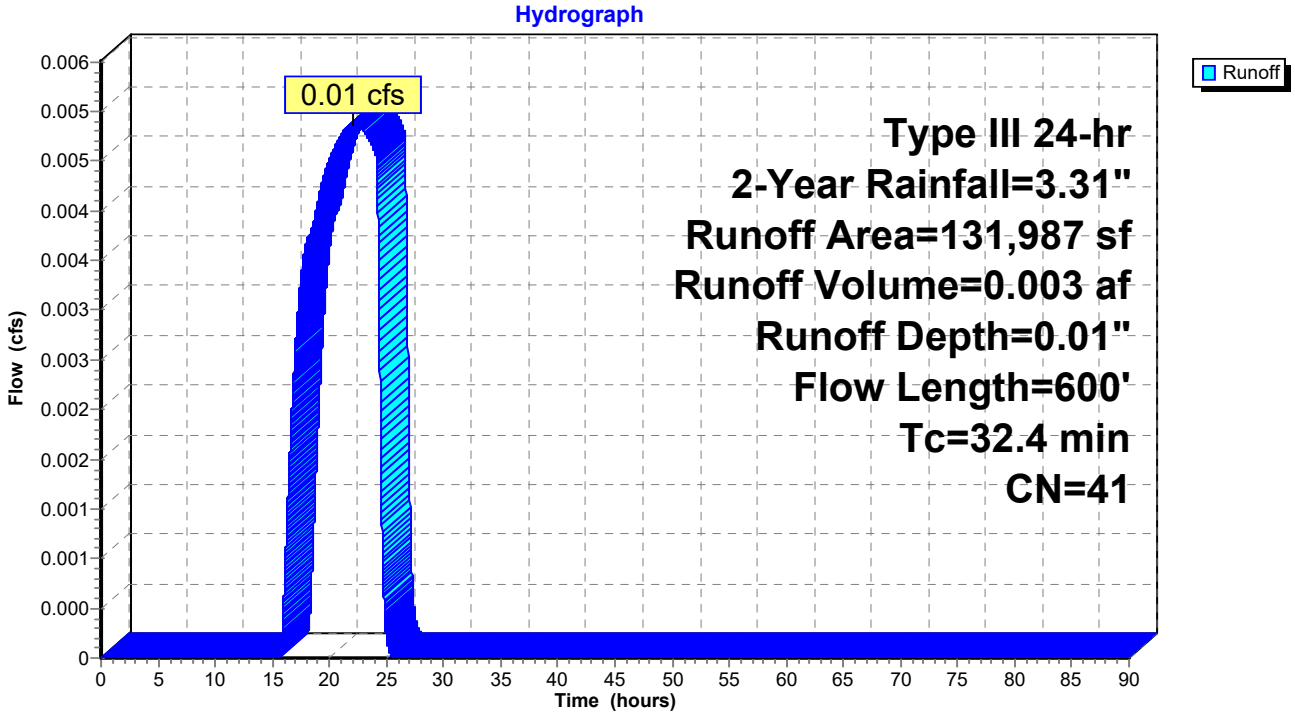
Runoff = 0.01 cfs @ 22.14 hrs, Volume= 0.003 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
44,431	39	>75% Grass cover, Good, HSG A
53,579	30	Woods, Good, HSG A
29,621	61	>75% Grass cover, Good, HSG B
2,178	55	Woods, Good, HSG B
2,178	77	Woods, Good, HSG D
131,987	41	Weighted Average
131,987		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	120	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
32.4	600	Total			

Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'



Summary for Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'

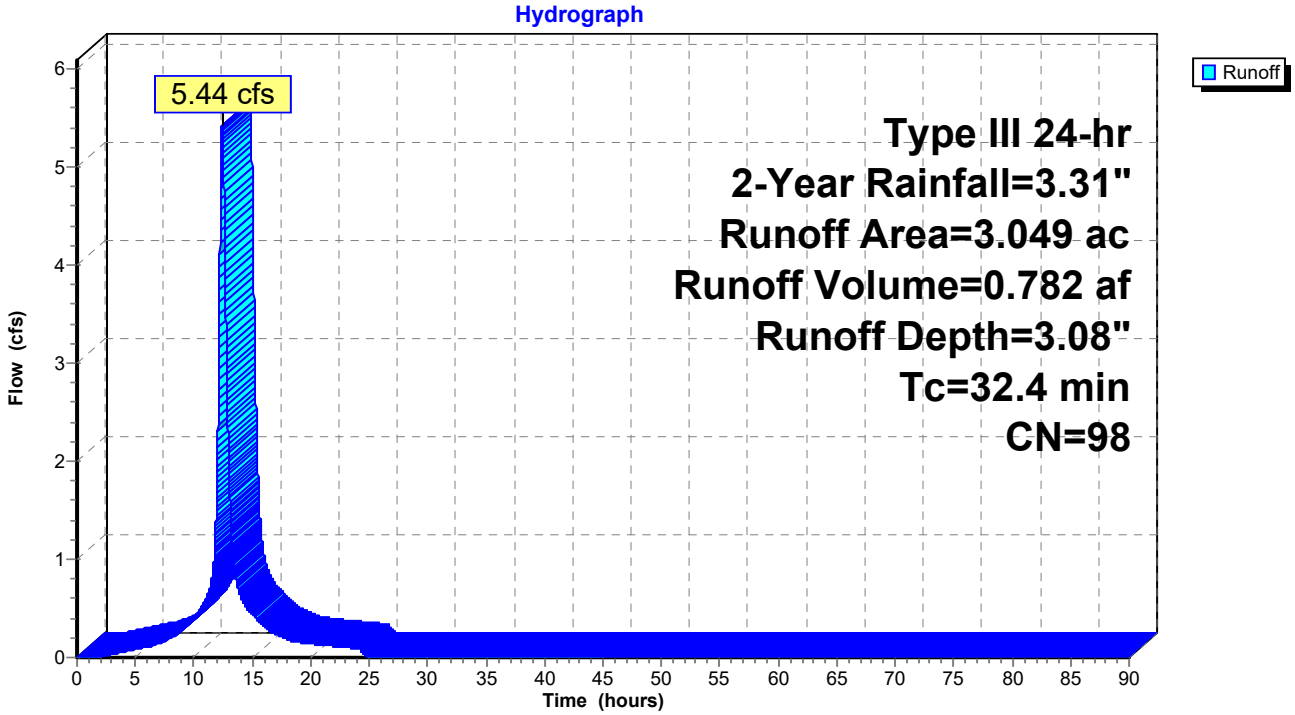
Runoff = 5.44 cfs @ 12.42 hrs, Volume= 0.782 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (ac)	CN	Description
*	3.049	98	Impervious
	3.049		100.00% Impervious Area

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

Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'



Summary for Pond 5B: Ex Basin 'B'

Inflow Area = 6.079 ac, 50.16% Impervious, Inflow Depth = 1.55" for 2-Year event
Inflow = 5.44 cfs @ 12.42 hrs, Volume= 0.785 af
Outflow = 0.46 cfs @ 14.80 hrs, Volume= 0.785 af, Atten= 91%, Lag= 142.8 min
Primary = 0.46 cfs @ 14.80 hrs, Volume= 0.785 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 74.98' @ 14.80 hrs Surf.Area= 7,360 sf Storage= 18,962 cf

Plug-Flow detention time= 436.2 min calculated for 0.785 af (100% of inflow)
Center-of-Mass det. time= 436.2 min (1,218.2 - 782.1)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	53,316 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

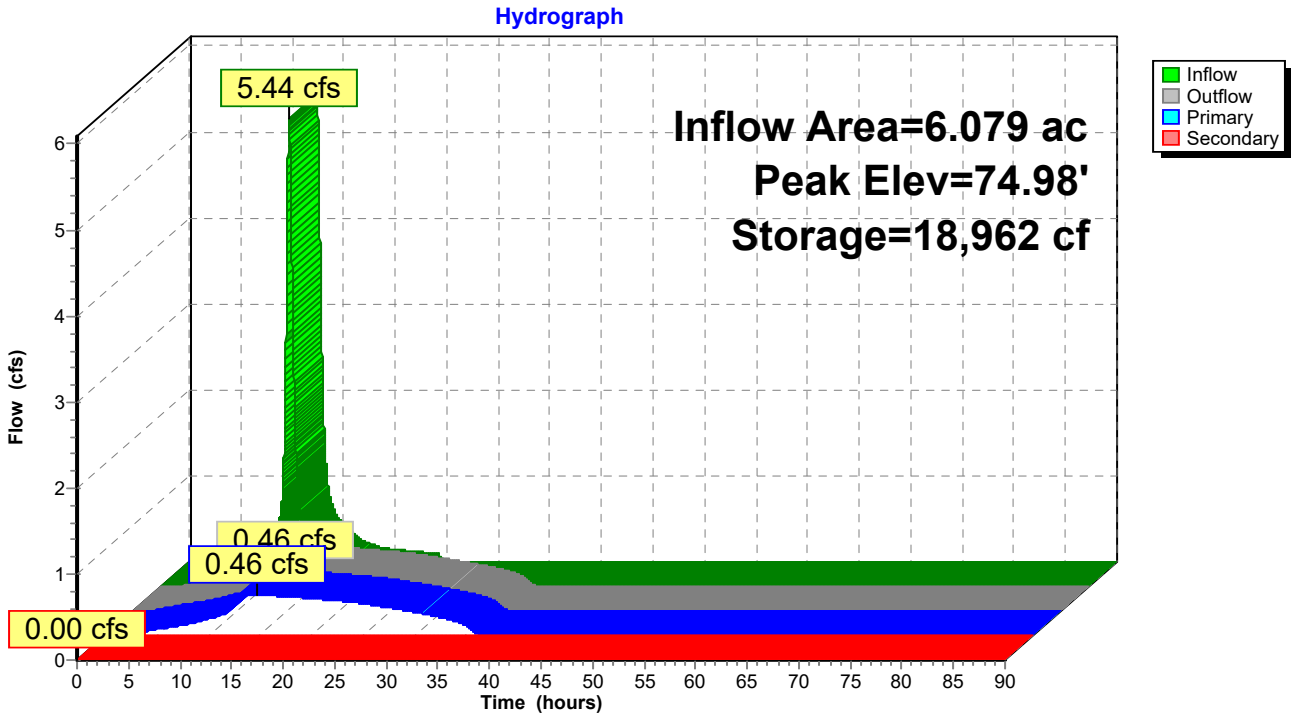
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	0	0	0
72.00	4,140	2,070	2,070
73.00	5,130	4,635	6,705
74.00	6,120	5,625	12,330
75.00	7,380	6,750	19,080
76.00	8,910	8,145	27,225
77.00	10,350	9,630	36,855
78.00	12,060	11,205	48,060
78.40	14,220	5,256	53,316

Device	Routing	Invert	Outlet Devices
#1	Primary	70.52'	**24.0" Round RCP_Round 24"** L= 7.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 70.52' / 70.50' S= 0.0029 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	71.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	77.25'	**48.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.25'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	78.25'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.46 cfs @ 14.80 hrs HW=74.98' (Free Discharge)
└**1=RCP_Round 24"** (Passes 0.46 cfs of 35.02 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 9.46 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=71.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5B: Ex Basin 'B'



Summary for Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'

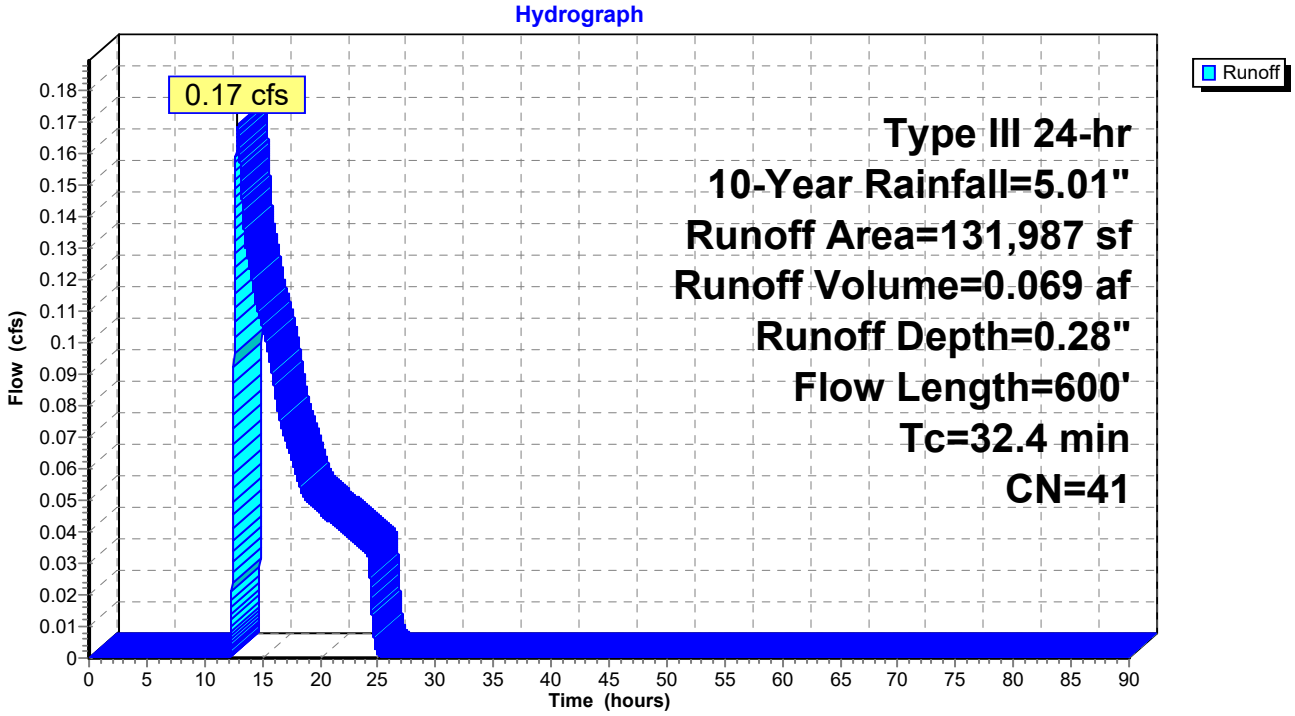
Runoff = 0.17 cfs @ 12.85 hrs, Volume= 0.069 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (sf)	CN	Description
44,431	39	>75% Grass cover, Good, HSG A
53,579	30	Woods, Good, HSG A
29,621	61	>75% Grass cover, Good, HSG B
2,178	55	Woods, Good, HSG B
2,178	77	Woods, Good, HSG D
131,987	41	Weighted Average
131,987		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	120	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
32.4	600	Total			

Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'



Summary for Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'

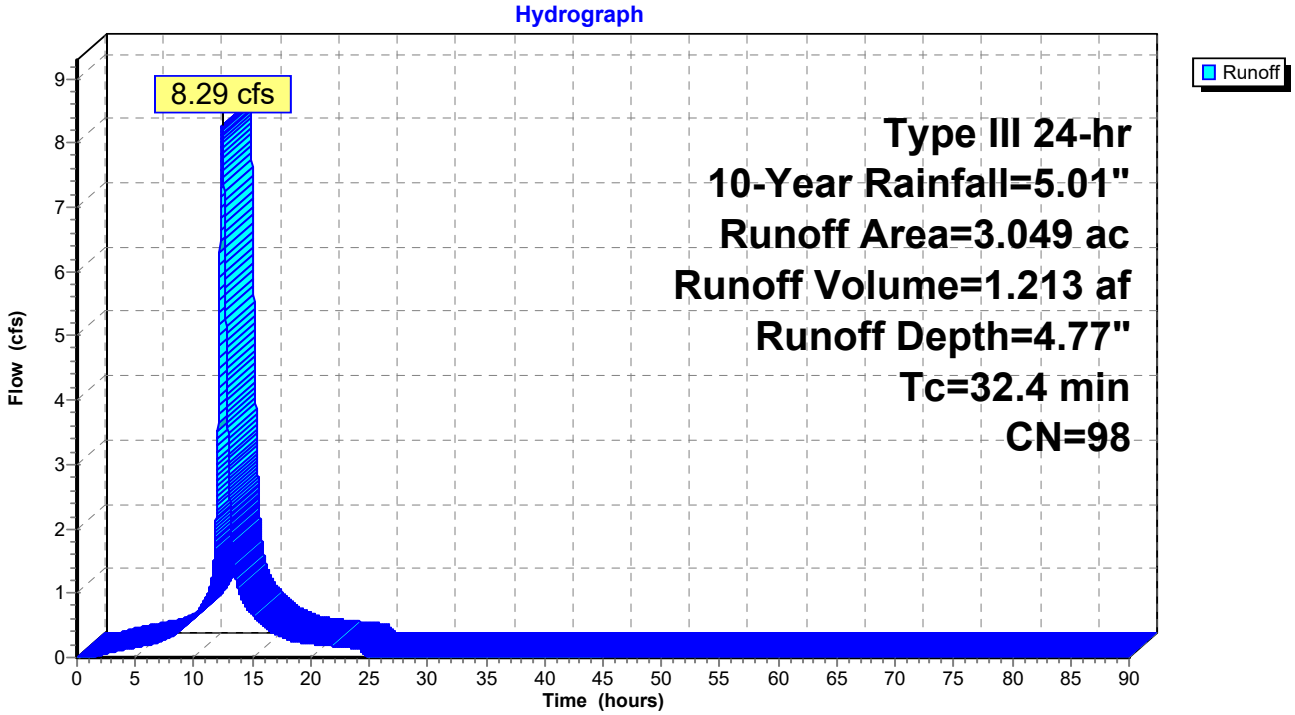
Runoff = 8.29 cfs @ 12.42 hrs, Volume= 1.213 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

	Area (ac)	CN	Description
*	3.049	98	Impervious
	3.049		100.00% Impervious Area

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

Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'



Summary for Pond 5B: Ex Basin 'B'

Inflow Area = 6.079 ac, 50.16% Impervious, Inflow Depth = 2.53" for 10-Year event
Inflow = 8.33 cfs @ 12.42 hrs, Volume= 1.282 af
Outflow = 0.56 cfs @ 16.09 hrs, Volume= 1.282 af, Atten= 93%, Lag= 220.2 min
Primary = 0.56 cfs @ 16.09 hrs, Volume= 1.282 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 76.67' @ 16.09 hrs Surf.Area= 9,880 sf Storage= 33,556 cf

Plug-Flow detention time= 648.0 min calculated for 1.282 af (100% of inflow)
Center-of-Mass det. time= 648.1 min (1,433.3 - 785.2)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	53,316 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

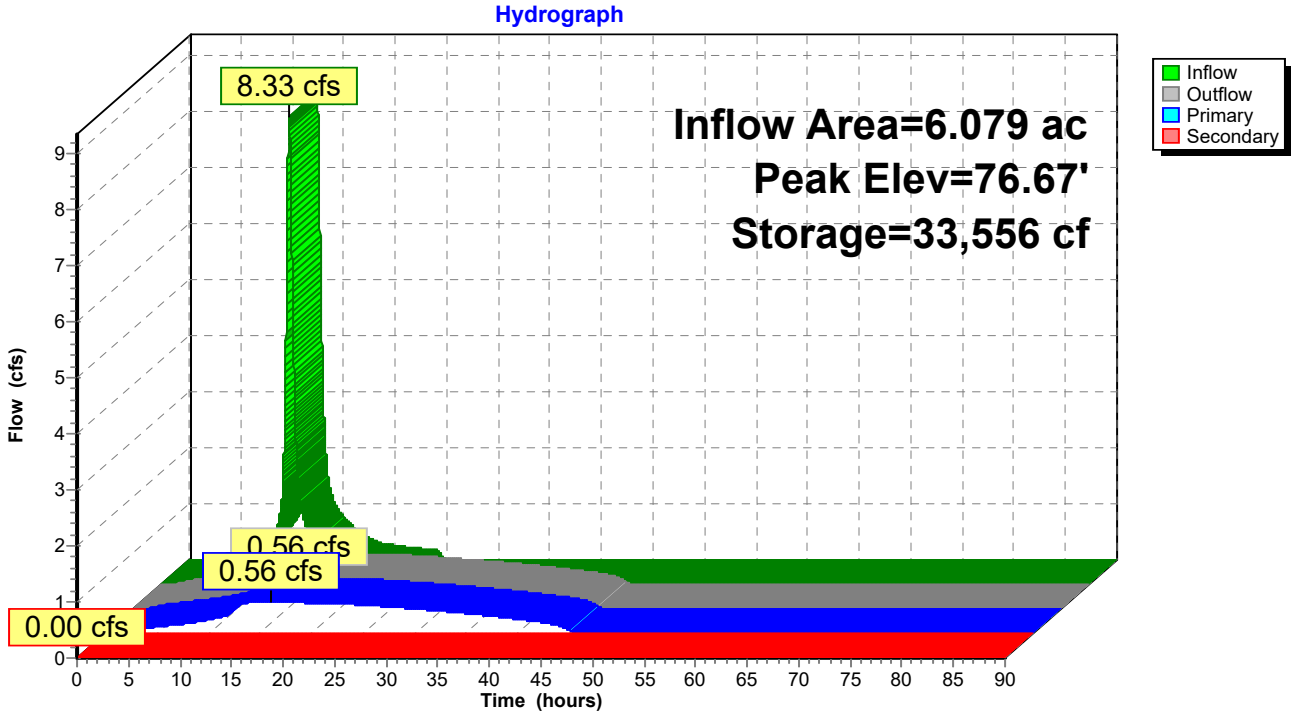
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	0	0	0
72.00	4,140	2,070	2,070
73.00	5,130	4,635	6,705
74.00	6,120	5,625	12,330
75.00	7,380	6,750	19,080
76.00	8,910	8,145	27,225
77.00	10,350	9,630	36,855
78.00	12,060	11,205	48,060
78.40	14,220	5,256	53,316

Device	Routing	Invert	Outlet Devices
#1	Primary	70.52'	**24.0" Round RCP_Round 24"** L= 7.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 70.52' / 70.50' S= 0.0029 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	71.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	77.25'	**48.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.25'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	78.25'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.56 cfs @ 16.09 hrs HW=76.67' (Free Discharge)
└**1=RCP_Round 24"** (Passes 0.56 cfs of 42.93 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.56 cfs @ 11.34 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=71.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5B: Ex Basin 'B'



Summary for Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'

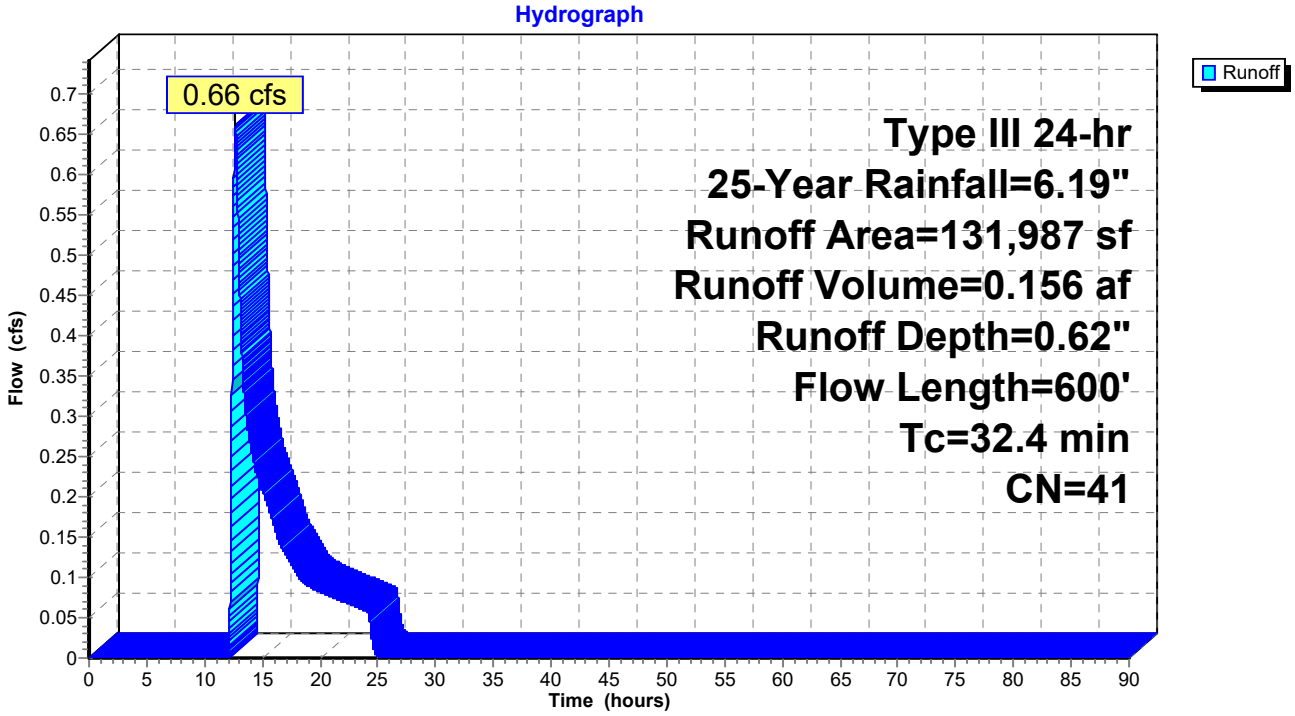
Runoff = 0.66 cfs @ 12.67 hrs, Volume= 0.156 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (sf)	CN	Description
44,431	39	>75% Grass cover, Good, HSG A
53,579	30	Woods, Good, HSG A
29,621	61	>75% Grass cover, Good, HSG B
2,178	55	Woods, Good, HSG B
2,178	77	Woods, Good, HSG D
131,987	41	Weighted Average
131,987		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	120	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
32.4	600	Total			

Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'



Summary for Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'

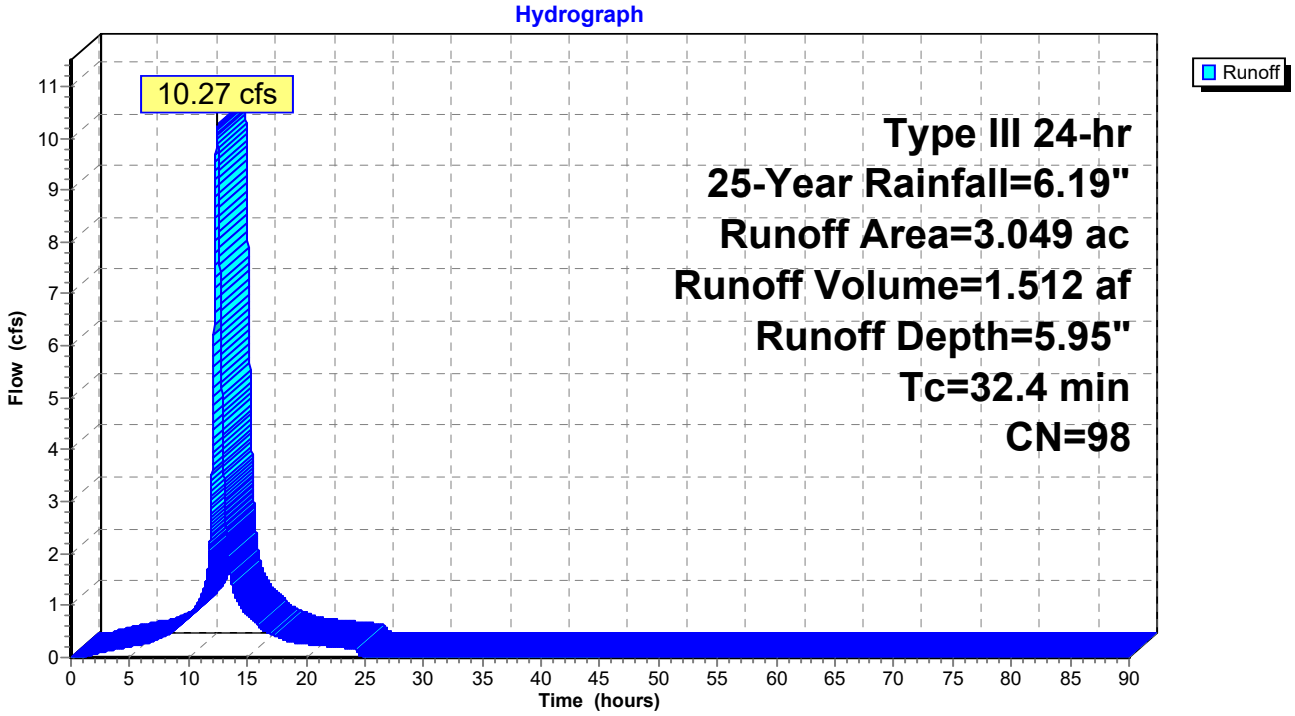
Runoff = 10.27 cfs @ 12.42 hrs, Volume= 1.512 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

	Area (ac)	CN	Description
*	3.049	98	Impervious
	3.049		100.00% Impervious Area

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

Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'



Summary for Pond 5B: Ex Basin 'B'

Inflow Area = 6.079 ac, 50.16% Impervious, Inflow Depth = 3.29" for 25-Year event
Inflow = 10.69 cfs @ 12.42 hrs, Volume= 1.669 af
Outflow = 1.50 cfs @ 13.90 hrs, Volume= 1.669 af, Atten= 86%, Lag= 88.7 min
Primary = 1.50 cfs @ 13.90 hrs, Volume= 1.669 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.38' @ 13.90 hrs Surf.Area= 11,001 sf Storage= 40,920 cf

Plug-Flow detention time= 675.6 min calculated for 1.668 af (100% of inflow)
Center-of-Mass det. time= 675.7 min (1,462.9 - 787.2)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	53,316 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

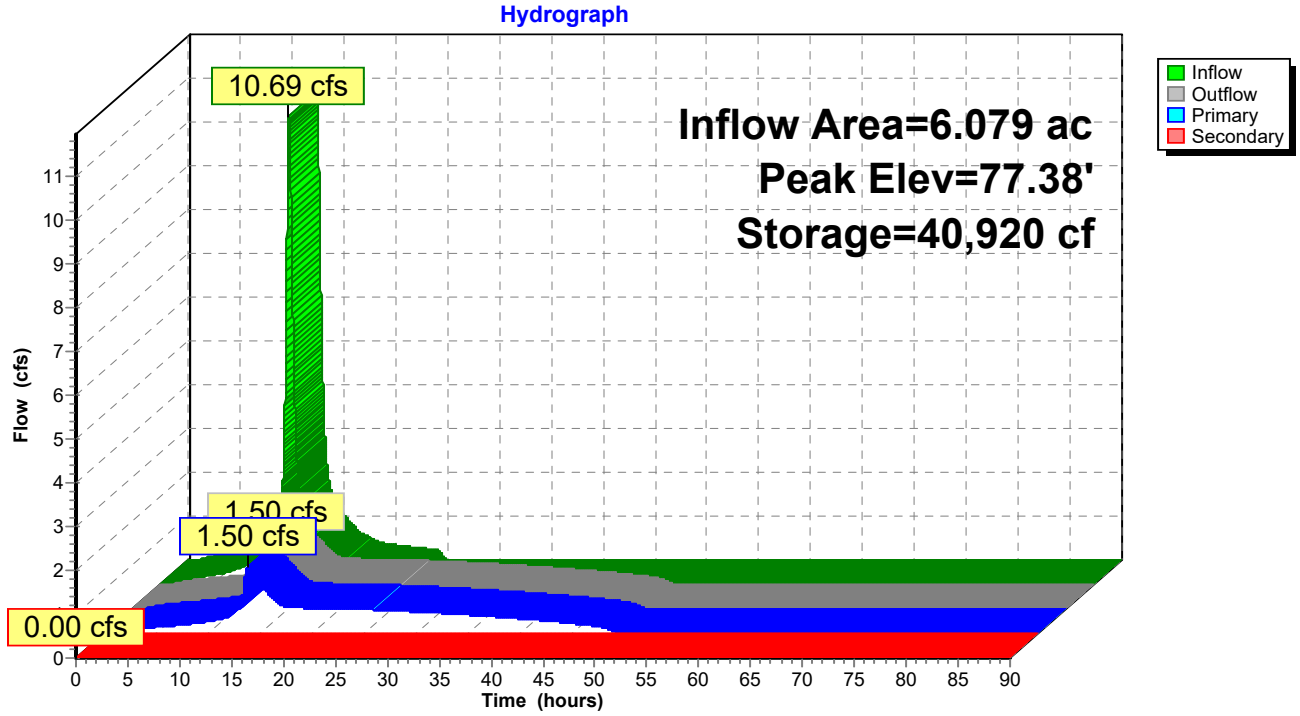
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	0	0	0
72.00	4,140	2,070	2,070
73.00	5,130	4,635	6,705
74.00	6,120	5,625	12,330
75.00	7,380	6,750	19,080
76.00	8,910	8,145	27,225
77.00	10,350	9,630	36,855
78.00	12,060	11,205	48,060
78.40	14,220	5,256	53,316

Device	Routing	Invert	Outlet Devices
#1	Primary	70.52'	**24.0" Round RCP_Round 24"** L= 7.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 70.52' / 70.50' S= 0.0029 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	71.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	77.25'	**48.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.25'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	78.25'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.50 cfs @ 13.90 hrs HW=77.38' (Free Discharge)
└**1=RCP_Round 24"** (Passes 1.50 cfs of 45.78 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.59 cfs @ 12.04 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 1.16 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.30 cfs @ 1.16 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=71.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5B: Ex Basin 'B'



Summary for Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'

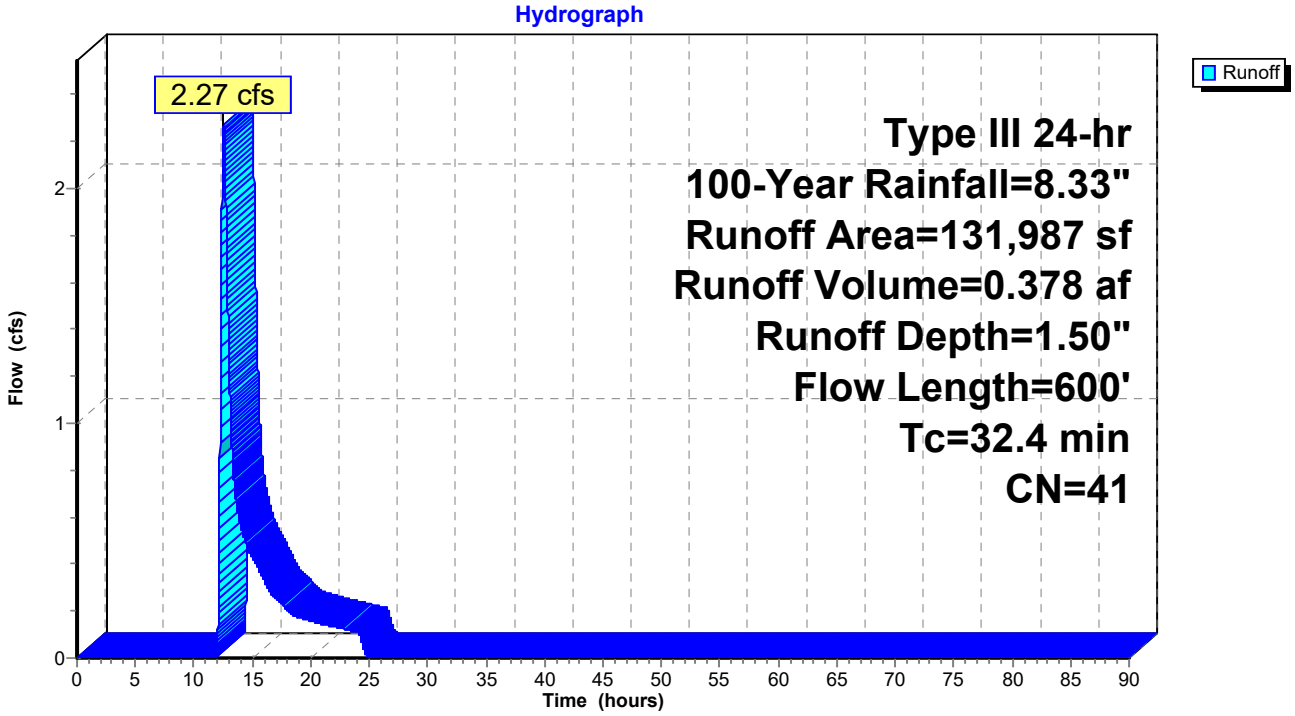
Runoff = 2.27 cfs @ 12.56 hrs, Volume= 0.378 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (sf)	CN	Description
44,431	39	>75% Grass cover, Good, HSG A
53,579	30	Woods, Good, HSG A
29,621	61	>75% Grass cover, Good, HSG B
2,178	55	Woods, Good, HSG B
2,178	77	Woods, Good, HSG D
131,987	41	Weighted Average
131,987		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	120	0.0167	0.65		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
32.4	600	Total			

Subcatchment 87S: EX DA 1 Perv to Ex Basin 'B'



Summary for Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'

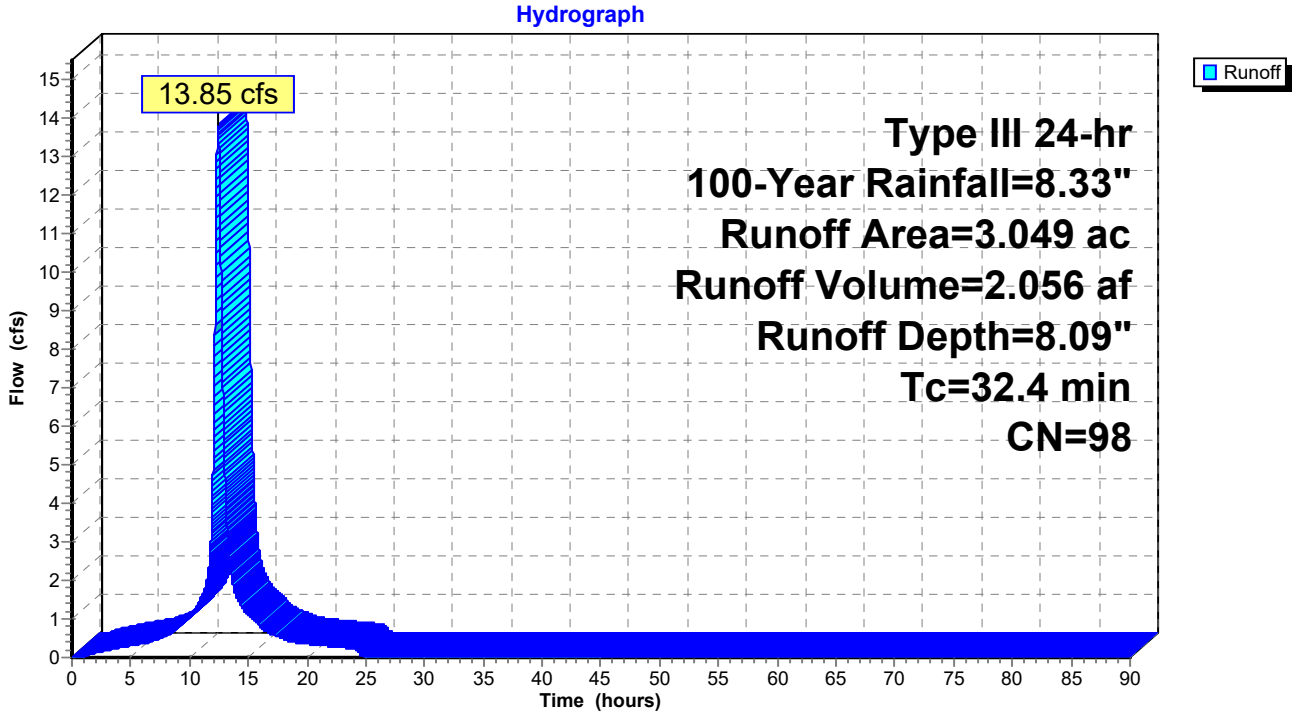
Runoff = 13.85 cfs @ 12.42 hrs, Volume= 2.056 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	3.049	98	Impervious
	3.049		100.00% Impervious Area

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

Subcatchment 90S: EX DA 1 Imp to Ex Basin 'B'



Summary for Pond 5B: Ex Basin 'B'

Inflow Area = 6.079 ac, 50.16% Impervious, Inflow Depth = 4.80" for 100-Year event
Inflow = 15.86 cfs @ 12.43 hrs, Volume= 2.434 af
Outflow = 8.60 cfs @ 12.84 hrs, Volume= 2.434 af, Atten= 46%, Lag= 24.8 min
Primary = 8.60 cfs @ 12.84 hrs, Volume= 2.434 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.81' @ 12.84 hrs Surf.Area= 11,729 sf Storage= 45,755 cf

Plug-Flow detention time= 521.4 min calculated for 2.434 af (100% of inflow)
Center-of-Mass det. time= 521.5 min (1,311.2 - 789.6)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	53,316 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

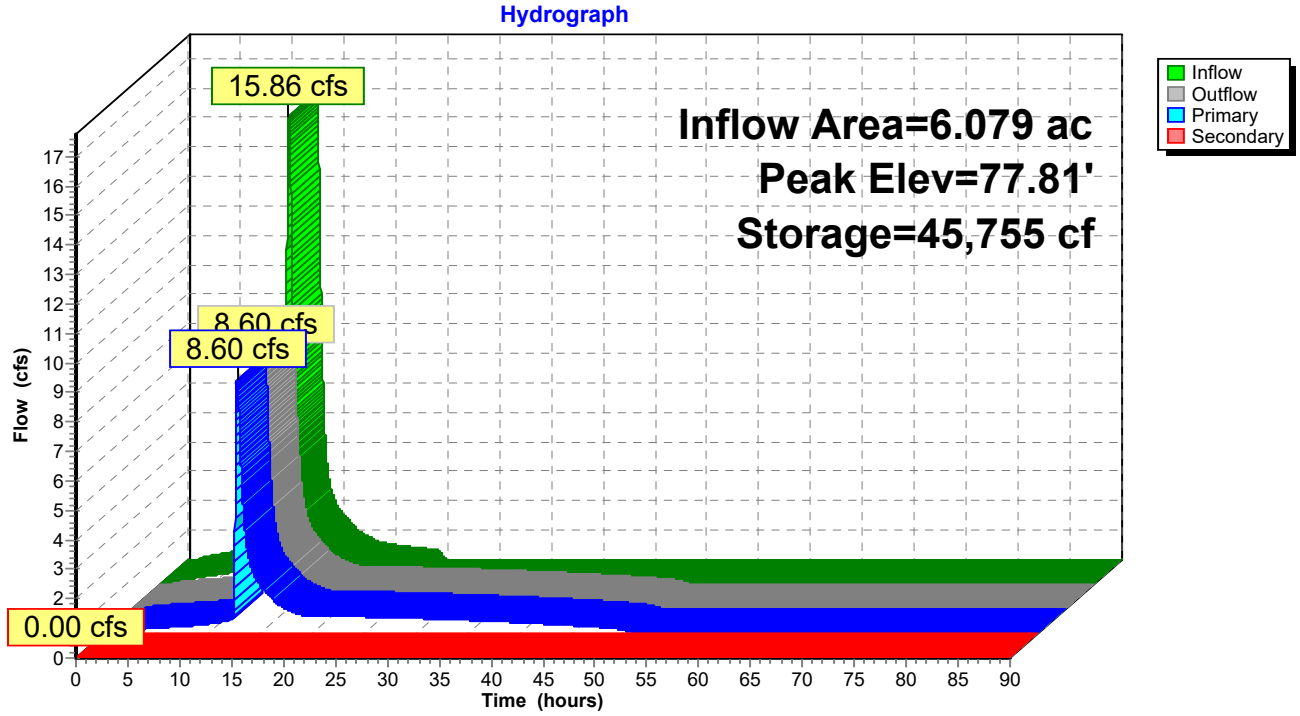
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	0	0	0
72.00	4,140	2,070	2,070
73.00	5,130	4,635	6,705
74.00	6,120	5,625	12,330
75.00	7,380	6,750	19,080
76.00	8,910	8,145	27,225
77.00	10,350	9,630	36,855
78.00	12,060	11,205	48,060
78.40	14,220	5,256	53,316

Device	Routing	Invert	Outlet Devices
#1	Primary	70.52'	**24.0" Round RCP_Round 24"** L= 7.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 70.52' / 70.50' S= 0.0029 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	71.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	77.25'	**48.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.25'	**24.0" W x 8.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	78.25'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.60 cfs @ 12.84 hrs HW=77.81' (Free Discharge)
└**1=RCP_Round 24"** (Passes 8.60 cfs of 47.41 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.61 cfs @ 12.45 fps)
  ├**3=Orifice/Grate** (Orifice Controls 5.33 cfs @ 2.39 fps)
  └**4=Orifice/Grate** (Orifice Controls 2.66 cfs @ 2.39 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=71.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

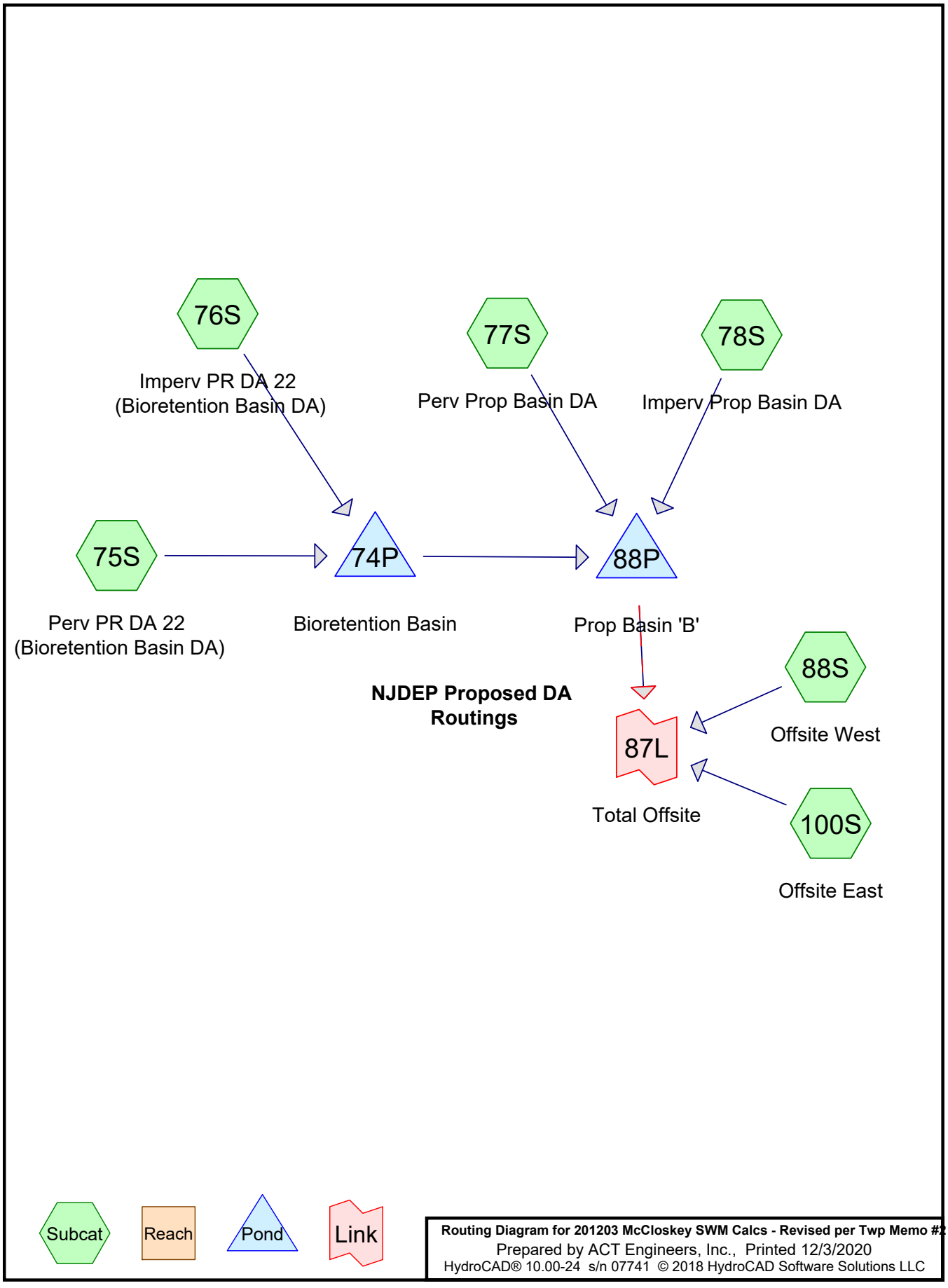
Pond 5B: Ex Basin 'B'



APPENDIX C

Proposed HydroCAD Routings

2, 10, 25, and 100-Year Storm Events



Routing Diagram for 201203 McCloskey SWM Calcs - Revised per Twp Memo #2

Prepared by ACT Engineers, Inc., Printed 12/3/2020

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Summary for Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)

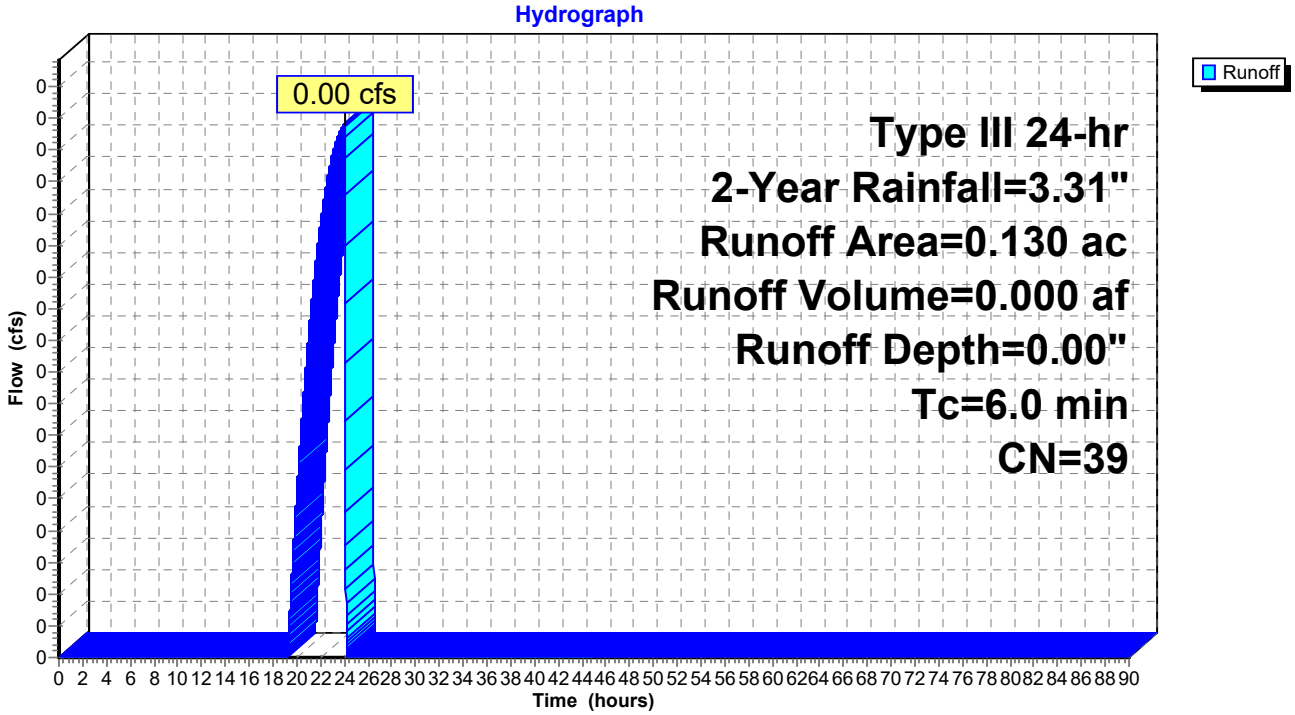
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.130	39	>75% Grass cover, Good, HSG A
0.130		100.00% Pervious Area

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

Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)

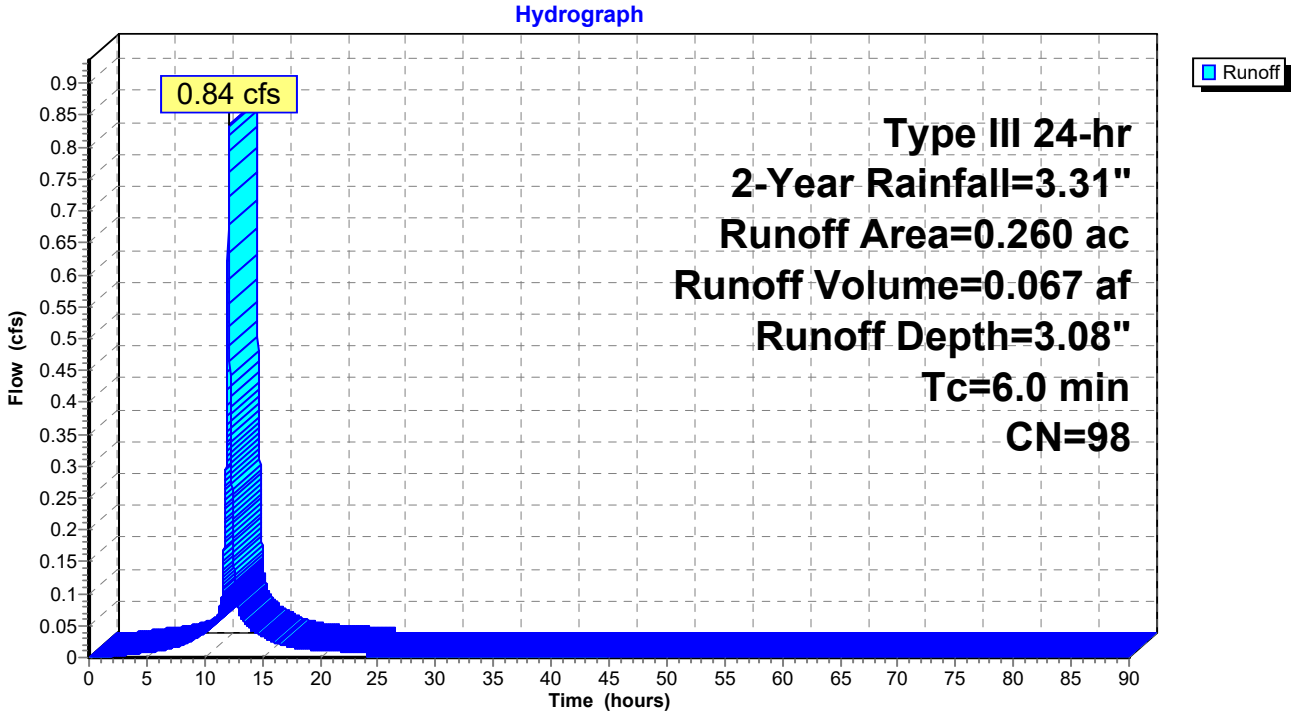
Runoff = 0.84 cfs @ 12.08 hrs, Volume= 0.067 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 77S: Perv Prop Basin DA

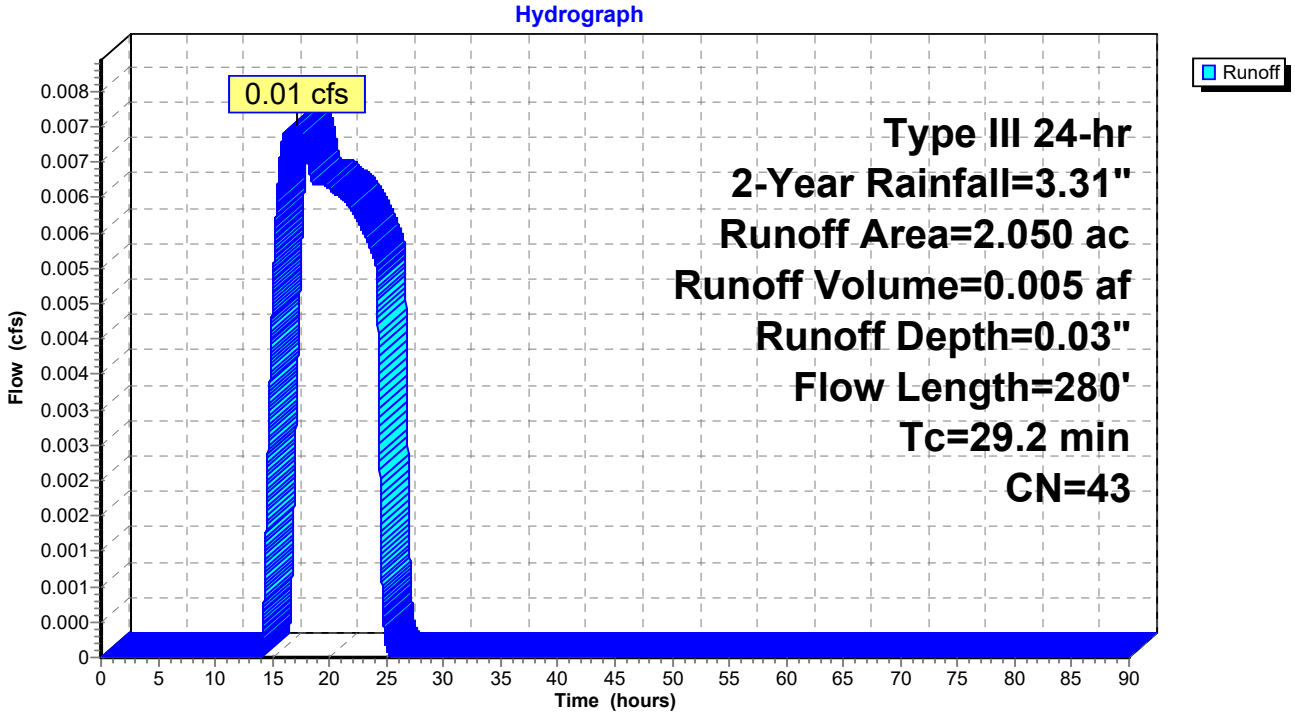
Runoff = 0.01 cfs @ 17.10 hrs, Volume= 0.005 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
1.640	39	>75% Grass cover, Good, HSG A
0.410	61	>75% Grass cover, Good, HSG B
2.050	43	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 77S: Perv Prop Basin DA



Summary for Subcatchment 78S: Imperv Prop Basin DA

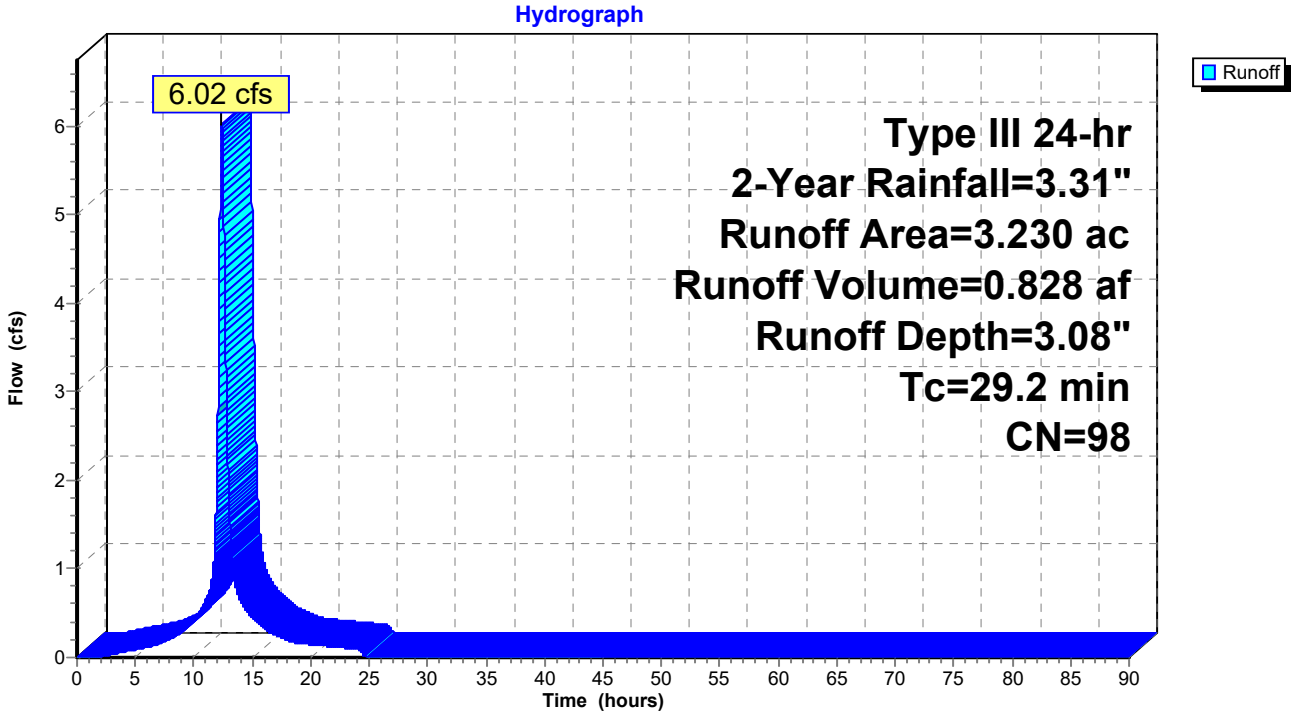
Runoff = 6.02 cfs @ 12.37 hrs, Volume= 0.828 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 78S: Imperv Prop Basin DA



Summary for Subcatchment 88S: Offsite West

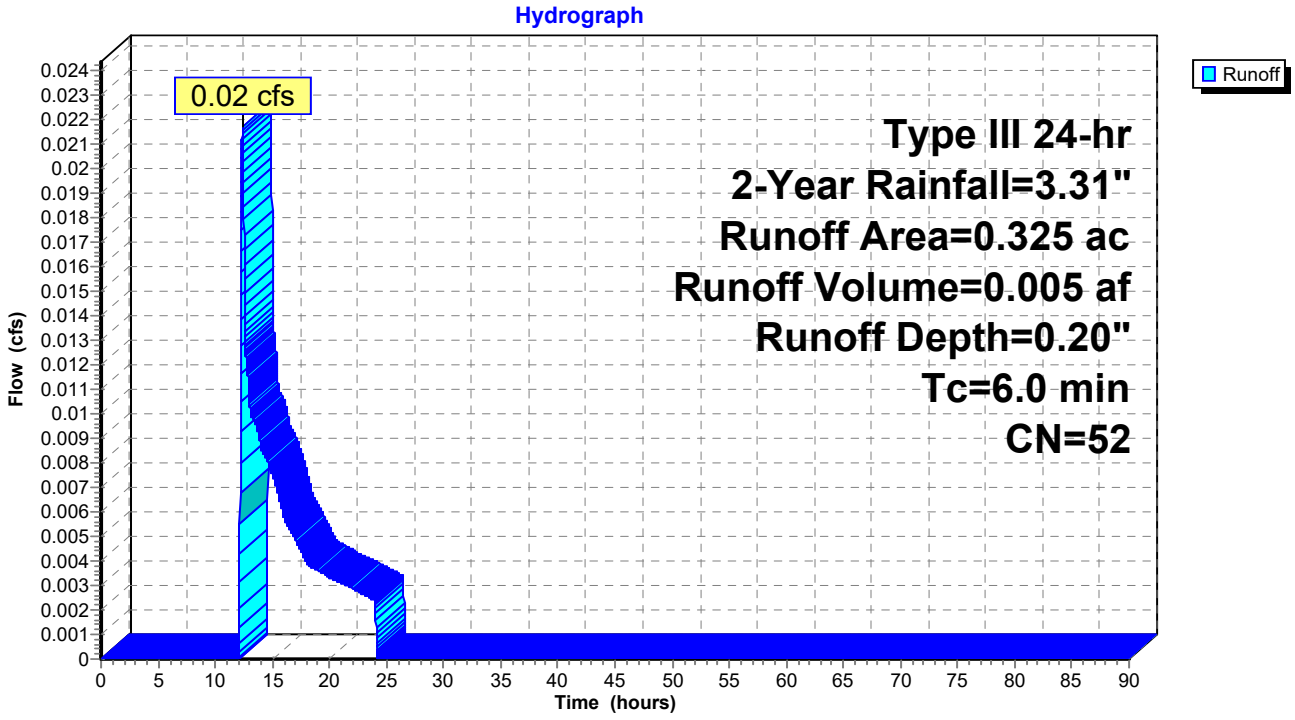
Runoff = 0.02 cfs @ 12.39 hrs, Volume= 0.005 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 88S: Offsite West



Summary for Subcatchment 100S: Offsite East

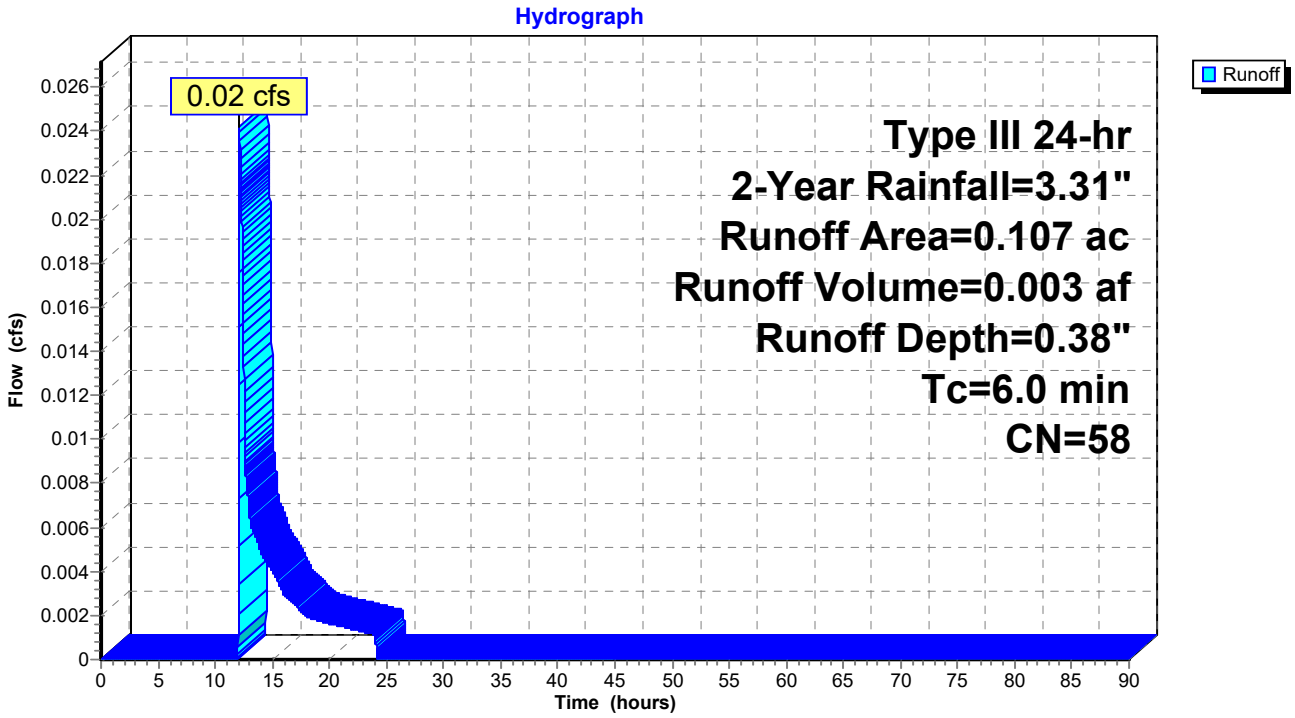
Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 100S: Offsite East



Summary for Pond 74P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 2.05" for 2-Year event
Inflow = 0.84 cfs @ 12.08 hrs, Volume= 0.067 af
Outflow = 0.49 cfs @ 12.19 hrs, Volume= 0.043 af, Atten= 41%, Lag= 6.4 min
Primary = 0.49 cfs @ 12.19 hrs, Volume= 0.043 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.09' @ 12.19 hrs Surf.Area= 2,652 sf Storage= 1,366 cf

Plug-Flow detention time= 212.6 min calculated for 0.043 af (65% of inflow)
Center-of-Mass det. time= 111.5 min (867.4 - 755.9)

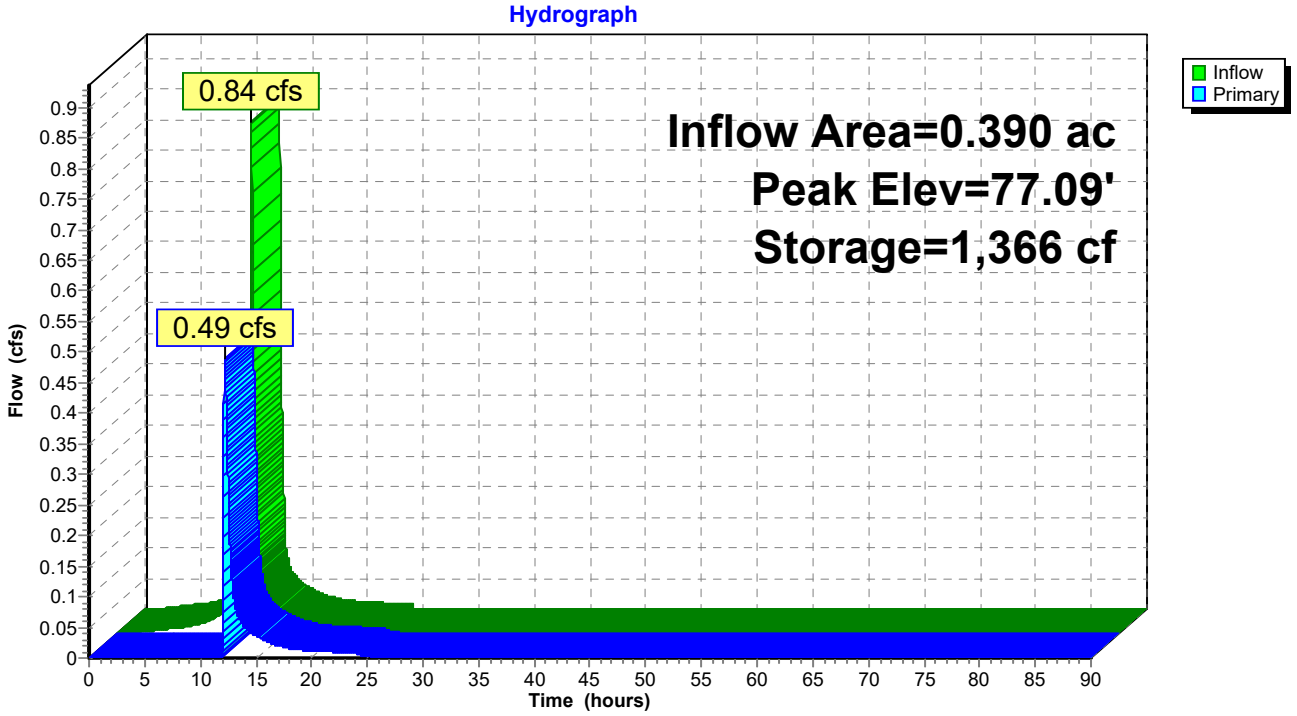
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.49 cfs @ 12.19 hrs HW=77.09' TW=68.10' (Dynamic Tailwater)
└**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 1.21 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 74P: Bioretention Basin



Summary for Pond 88P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 1.86" for 2-Year event
Inflow = 6.41 cfs @ 12.36 hrs, Volume= 0.877 af
Outflow = 0.36 cfs @ 16.05 hrs, Volume= 0.877 af, Atten= 94%, Lag= 221.2 min
Primary = 0.36 cfs @ 16.05 hrs, Volume= 0.877 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 70.41' @ 16.05 hrs Surf.Area= 7,728 sf Storage= 25,384 cf

Plug-Flow detention time= 1,065.3 min calculated for 0.877 af (100% of inflow)
Center-of-Mass det. time= 1,065.5 min (1,849.5 - 784.0)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

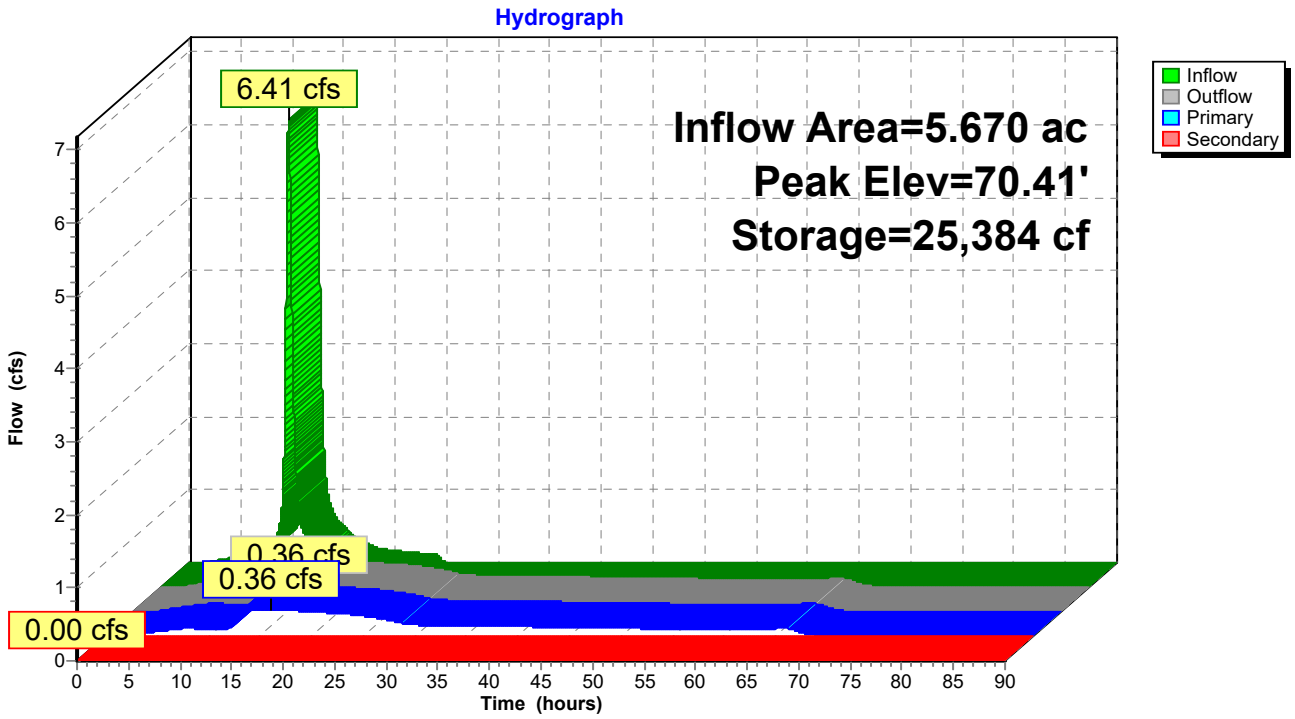
#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.36 cfs @ 16.05 hrs HW=70.41' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.36 cfs of 24.29 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.19 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.18 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 88P: Prop Basin 'B'

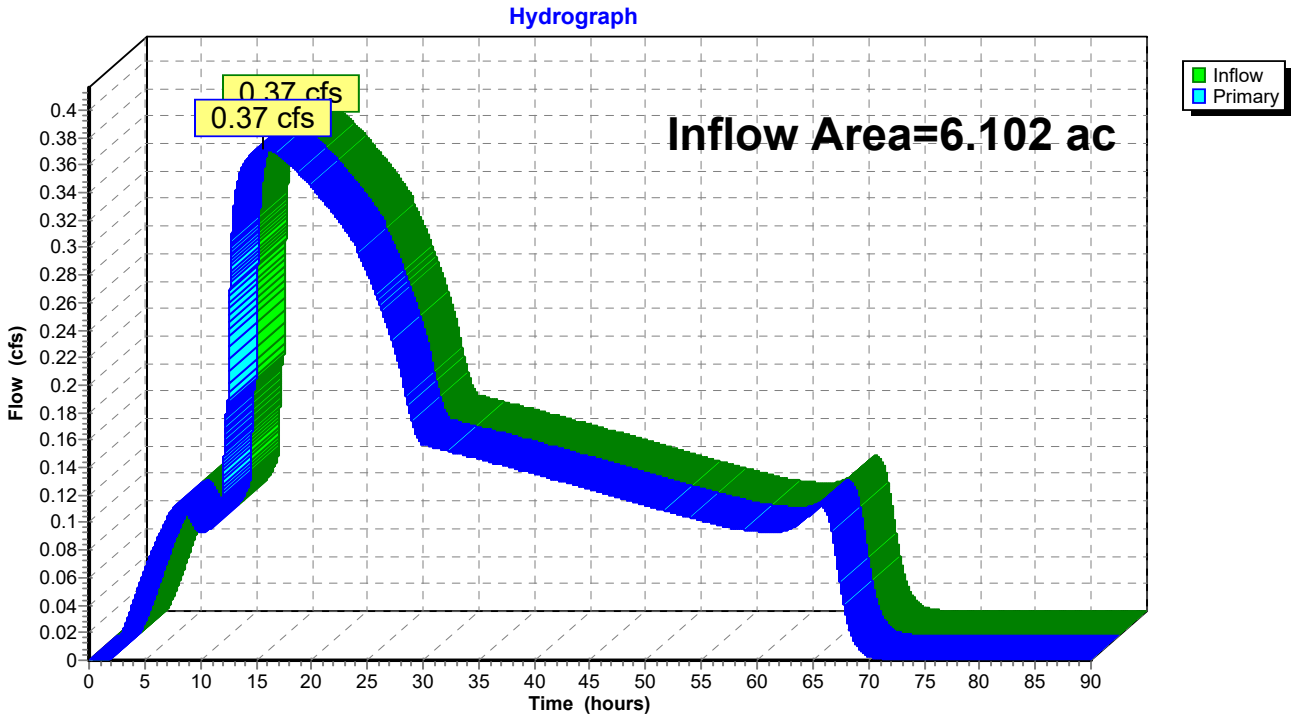


Summary for Link 87L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 1.74" for 2-Year event
Inflow = 0.37 cfs @ 15.54 hrs, Volume= 0.886 af
Primary = 0.37 cfs @ 15.54 hrs, Volume= 0.886 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 87L: Total Offsite



Summary for Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)

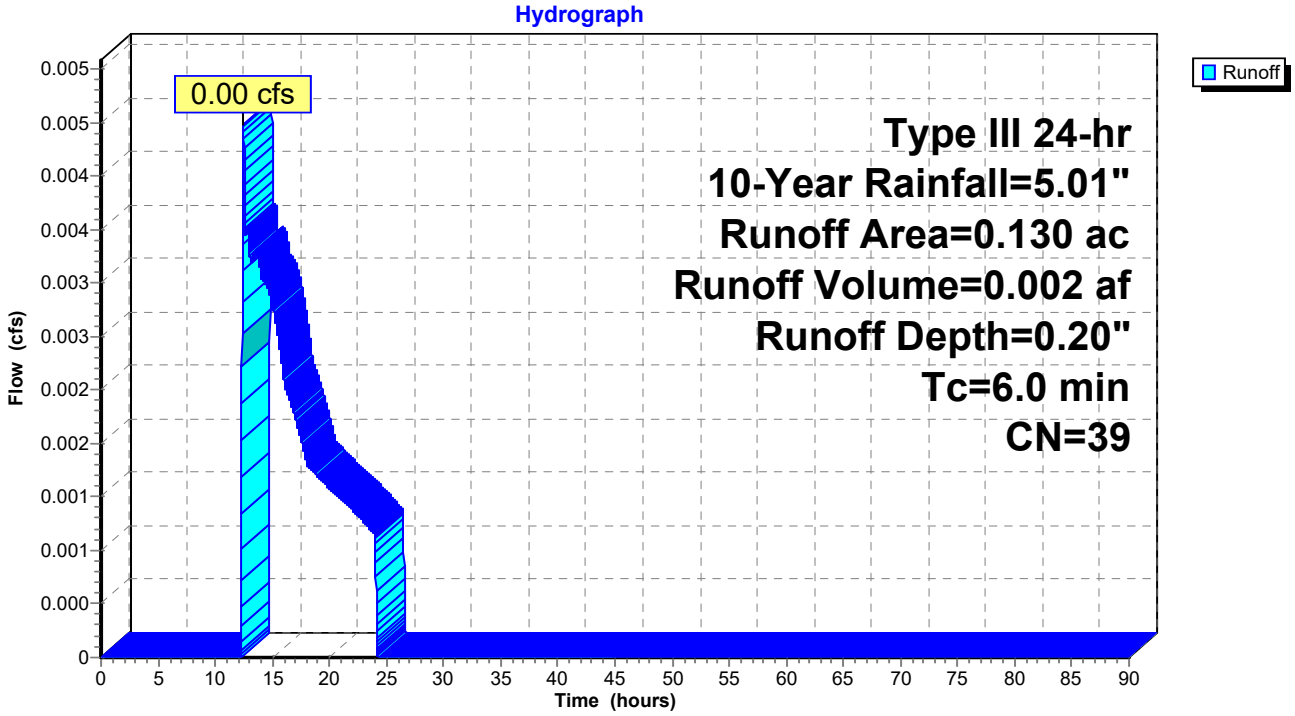
Runoff = 0.00 cfs @ 12.47 hrs, Volume= 0.002 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.130	39	>75% Grass cover, Good, HSG A
0.130		100.00% Pervious Area

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

Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)

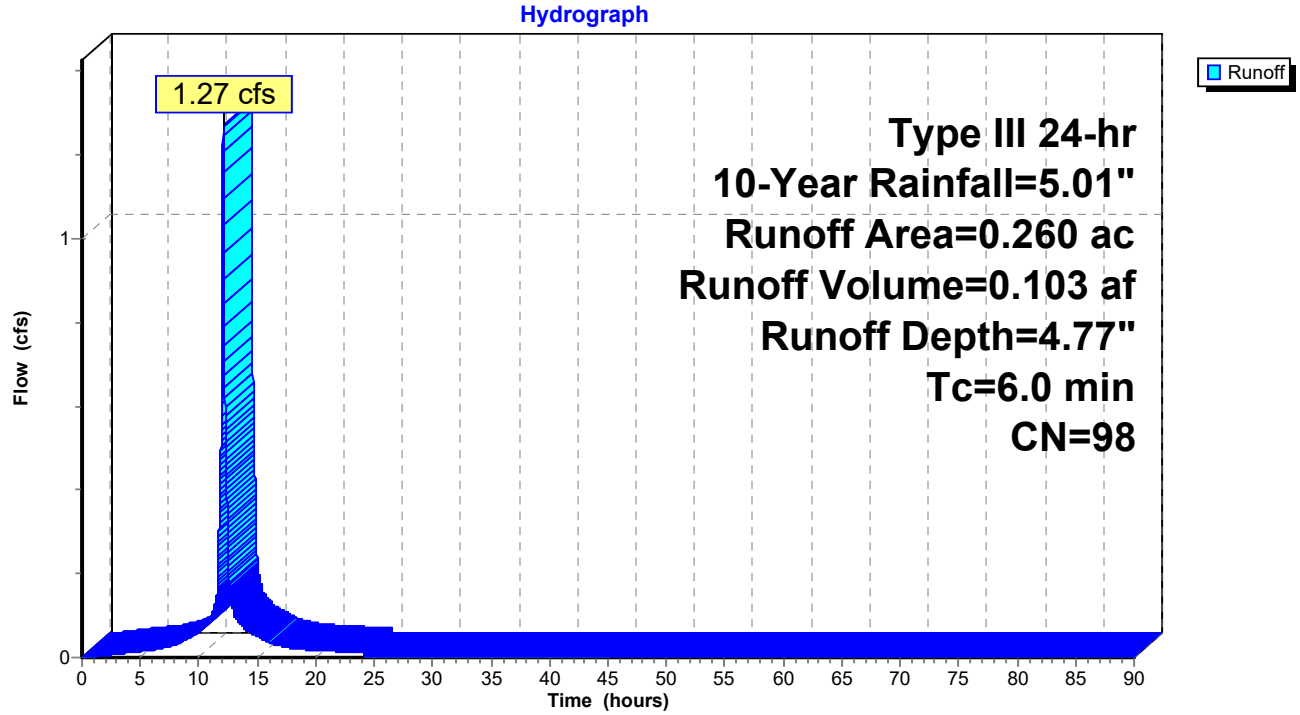
Runoff = 1.27 cfs @ 12.08 hrs, Volume= 0.103 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 77S: Perv Prop Basin DA

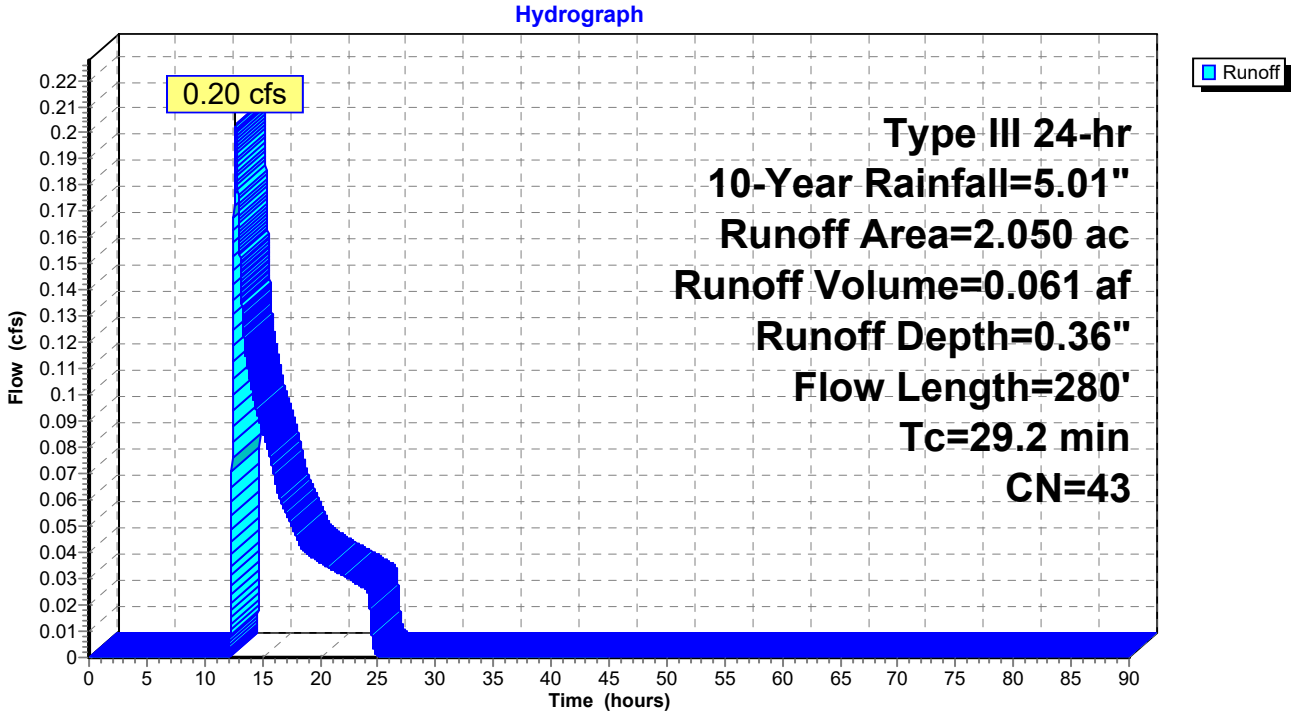
Runoff = 0.20 cfs @ 12.69 hrs, Volume= 0.061 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
1.640	39	>75% Grass cover, Good, HSG A
0.410	61	>75% Grass cover, Good, HSG B
2.050	43	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 77S: Perv Prop Basin DA



Summary for Subcatchment 78S: Imperv Prop Basin DA

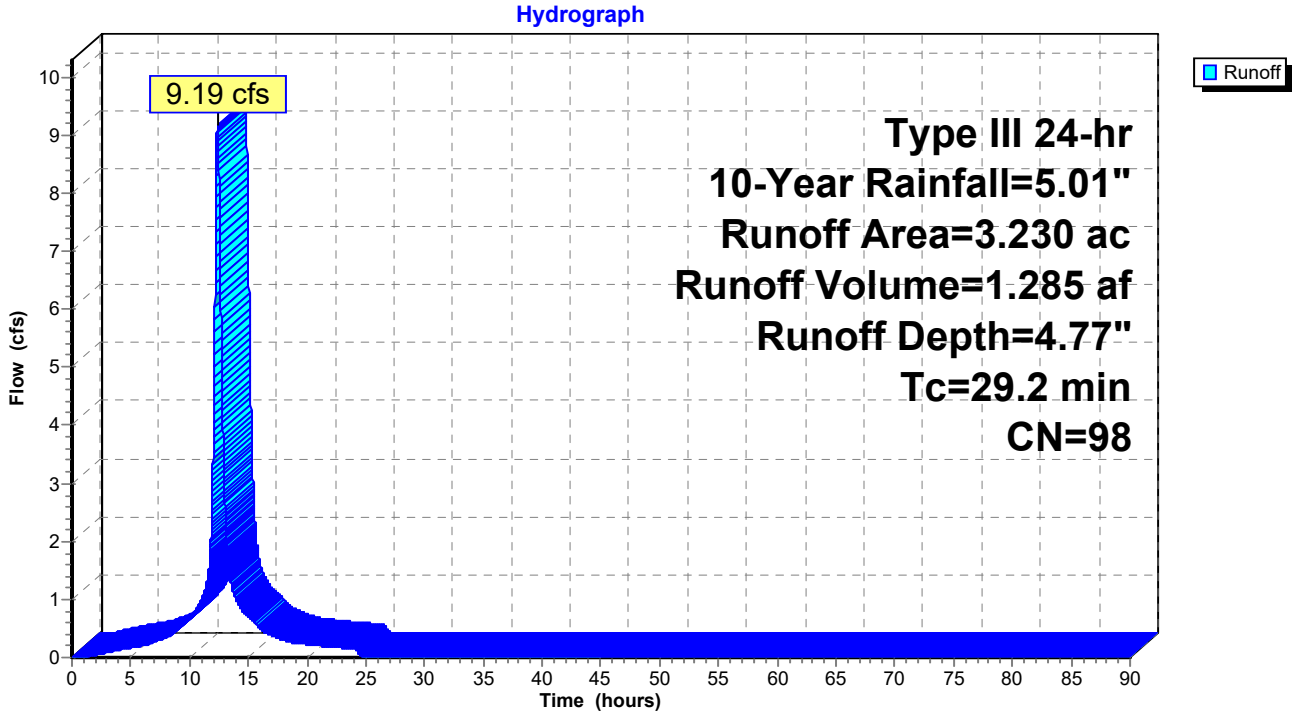
Runoff = 9.19 cfs @ 12.37 hrs, Volume= 1.285 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 78S: Imperv Prop Basin DA



Summary for Subcatchment 88S: Offsite West

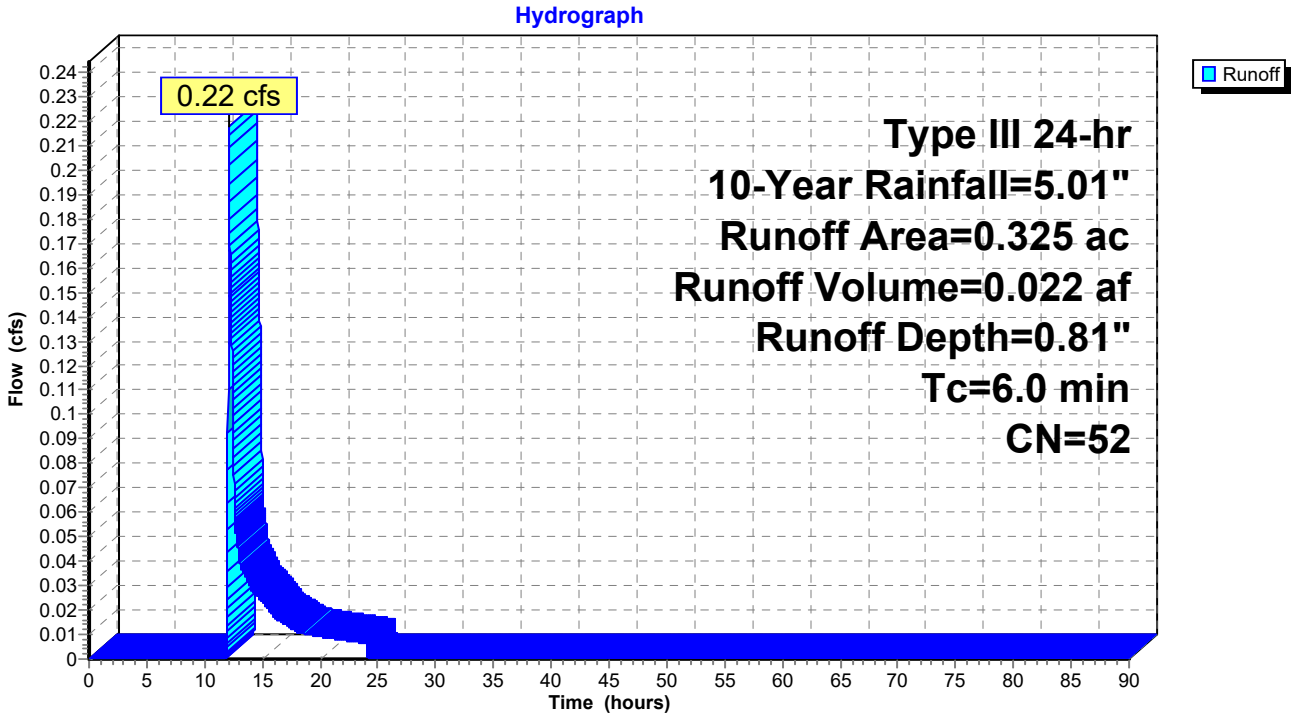
Runoff = 0.22 cfs @ 12.11 hrs, Volume= 0.022 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 88S: Offsite West



Summary for Subcatchment 100S: Offsite East

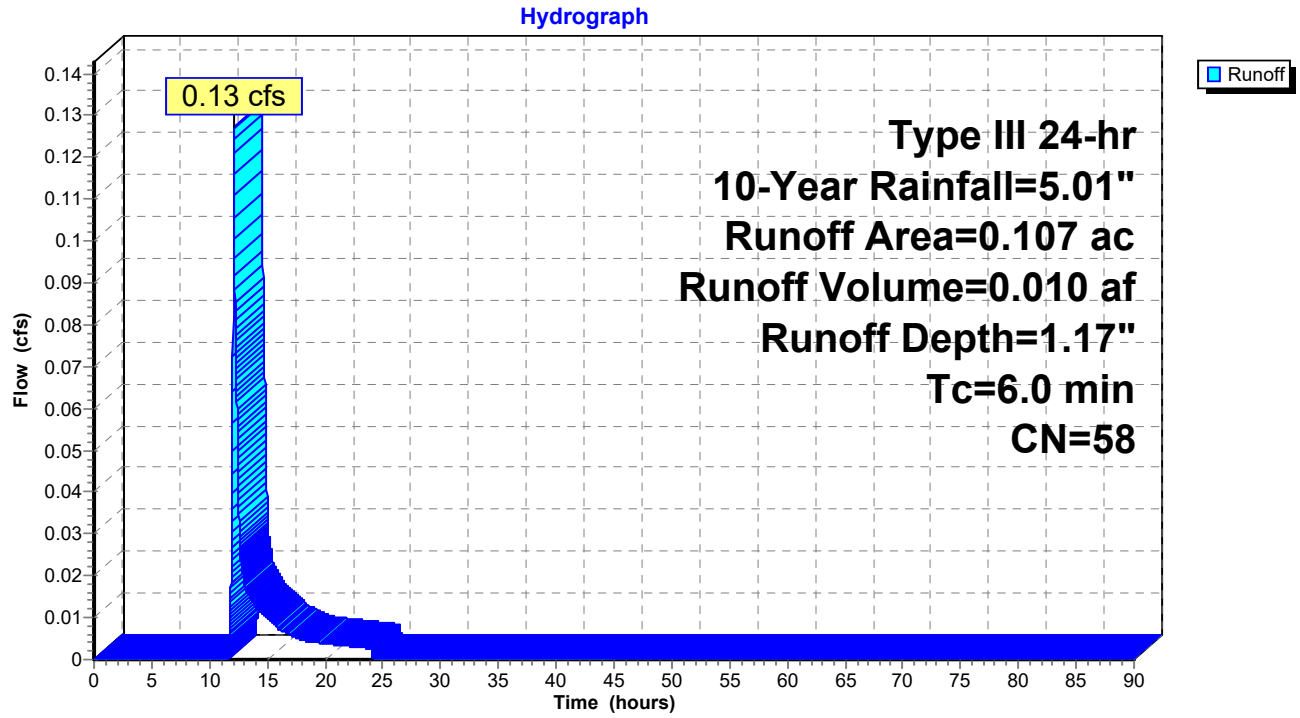
Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 100S: Offsite East



Summary for Pond 74P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 3.25" for 10-Year event
Inflow = 1.27 cfs @ 12.08 hrs, Volume= 0.106 af
Outflow = 0.94 cfs @ 12.15 hrs, Volume= 0.082 af, Atten= 26%, Lag= 4.3 min
Primary = 0.94 cfs @ 12.15 hrs, Volume= 0.082 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.16' @ 12.15 hrs Surf.Area= 2,702 sf Storage= 1,566 cf

Plug-Flow detention time= 172.7 min calculated for 0.082 af (78% of inflow)
Center-of-Mass det. time= 89.0 min (842.4 - 753.4)

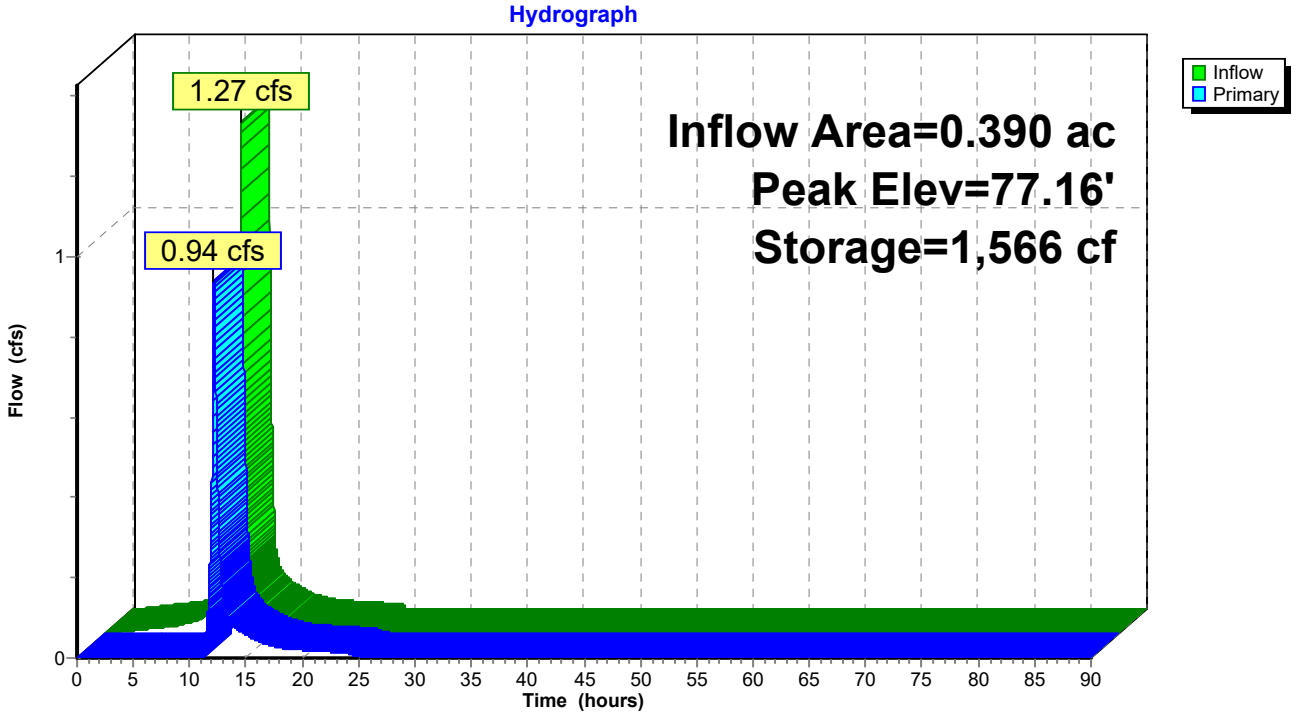
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.94 cfs @ 12.15 hrs HW=77.16' TW=69.10' (Dynamic Tailwater)
1=Sharp-Crested Rectangular Weir (Weir Controls 0.94 cfs @ 1.50 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 74P: Bioretention Basin



Summary for Pond 88P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 3.02" for 10-Year event
Inflow = 9.87 cfs @ 12.36 hrs, Volume= 1.428 af
Outflow = 0.51 cfs @ 16.59 hrs, Volume= 1.428 af, Atten= 95%, Lag= 253.8 min
Primary = 0.51 cfs @ 16.59 hrs, Volume= 1.428 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 72.49' @ 16.59 hrs Surf.Area= 9,223 sf Storage= 42,950 cf

Plug-Flow detention time= 1,180.9 min calculated for 1.428 af (100% of inflow)
Center-of-Mass det. time= 1,181.2 min (1,964.0 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

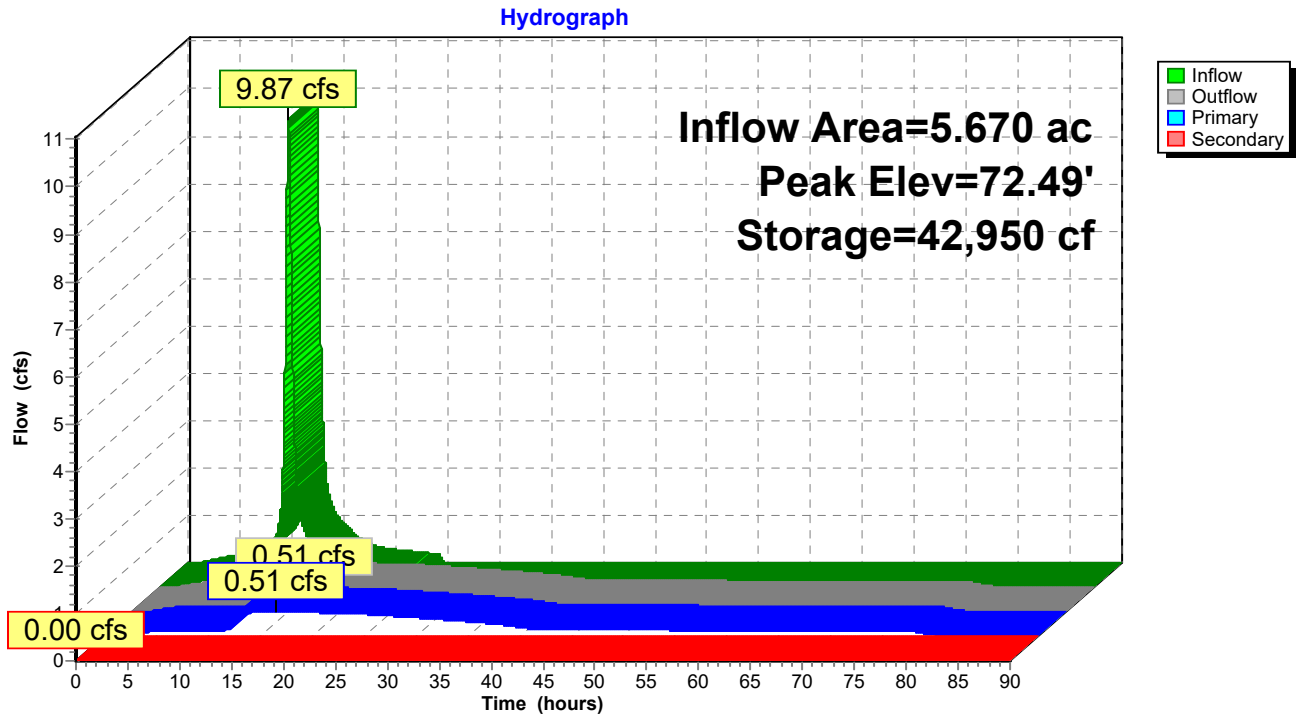
#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.51 cfs @ 16.59 hrs HW=72.49' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.51 cfs of 33.03 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.22 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 8.66 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 88P: Prop Basin 'B'

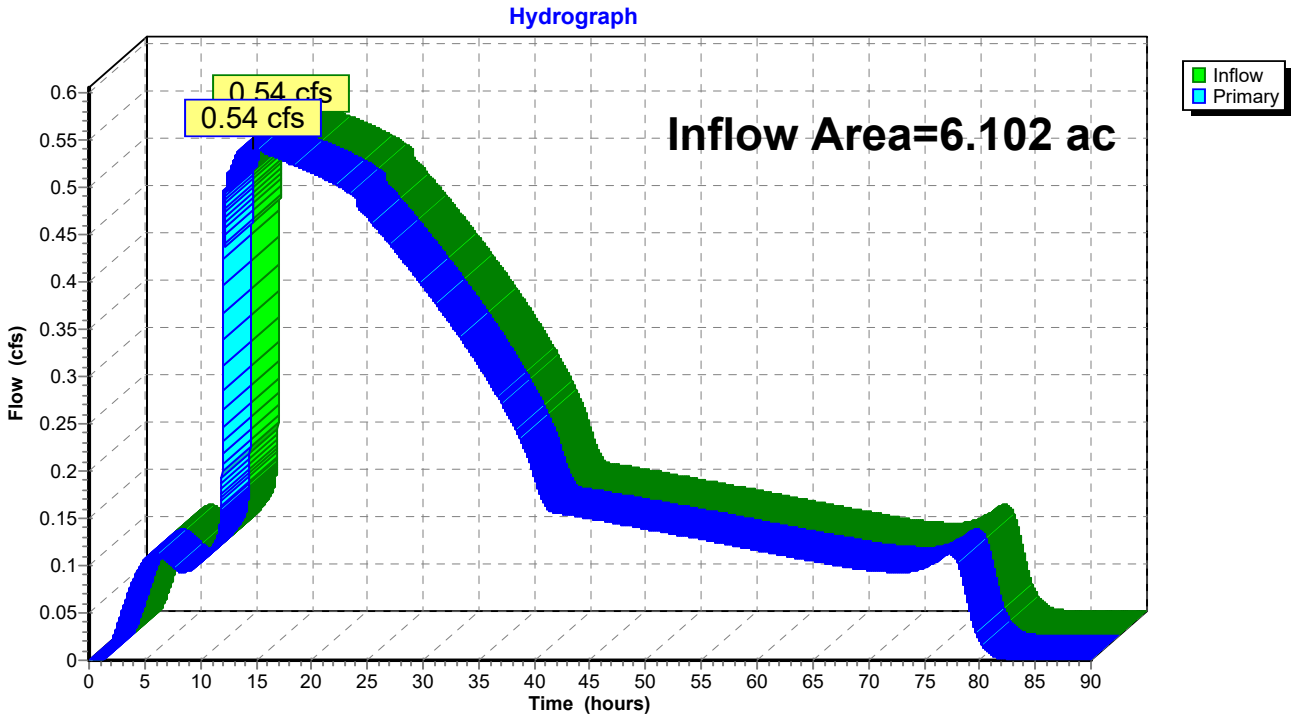


Summary for Link 87L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 2.87" for 10-Year event
Inflow = 0.54 cfs @ 14.66 hrs, Volume= 1.460 af
Primary = 0.54 cfs @ 14.66 hrs, Volume= 1.460 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 87L: Total Offsite



Summary for Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)

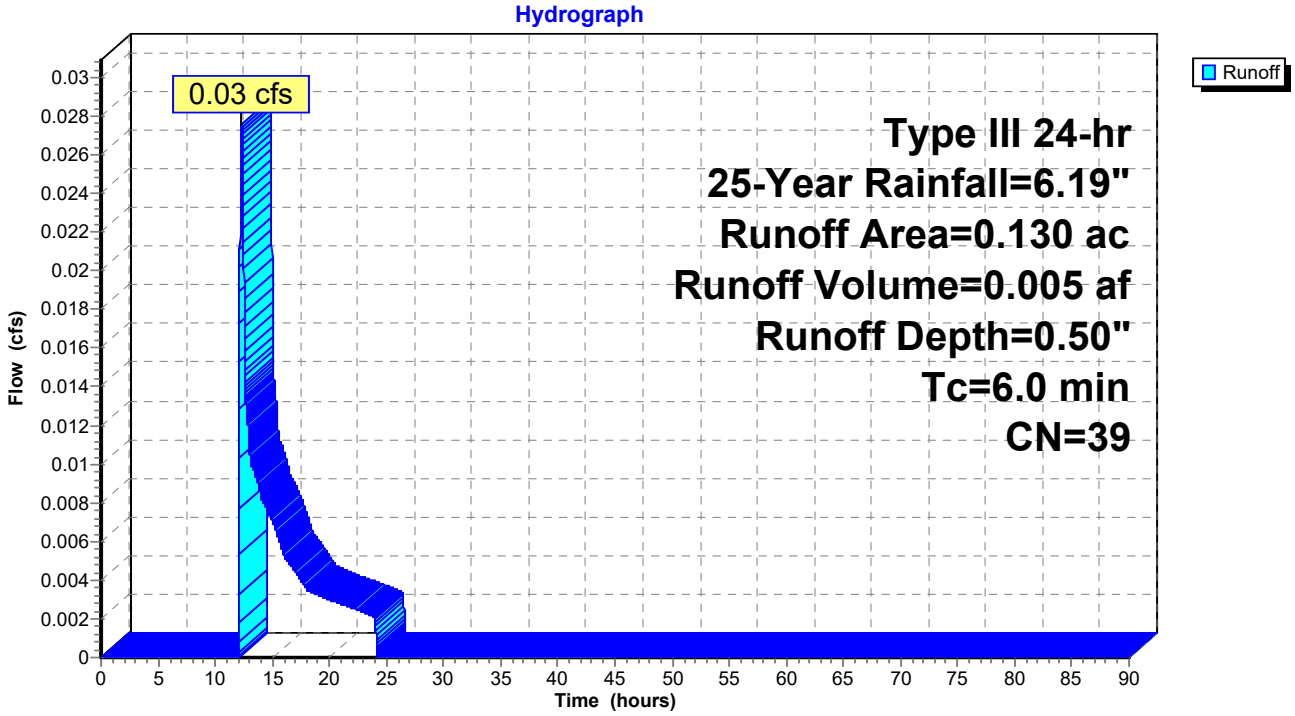
Runoff = 0.03 cfs @ 12.33 hrs, Volume= 0.005 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.130	39	>75% Grass cover, Good, HSG A
0.130		100.00% Pervious Area

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

Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)

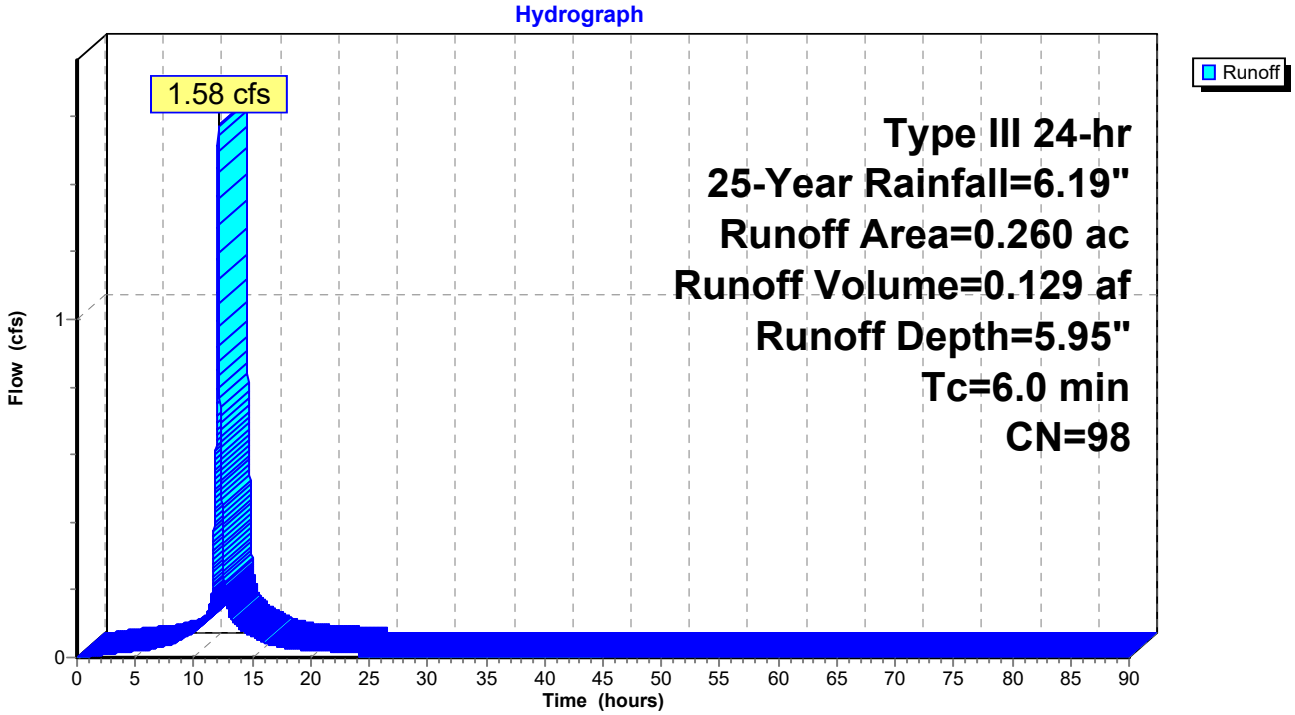
Runoff = 1.58 cfs @ 12.08 hrs, Volume= 0.129 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 77S: Perv Prop Basin DA

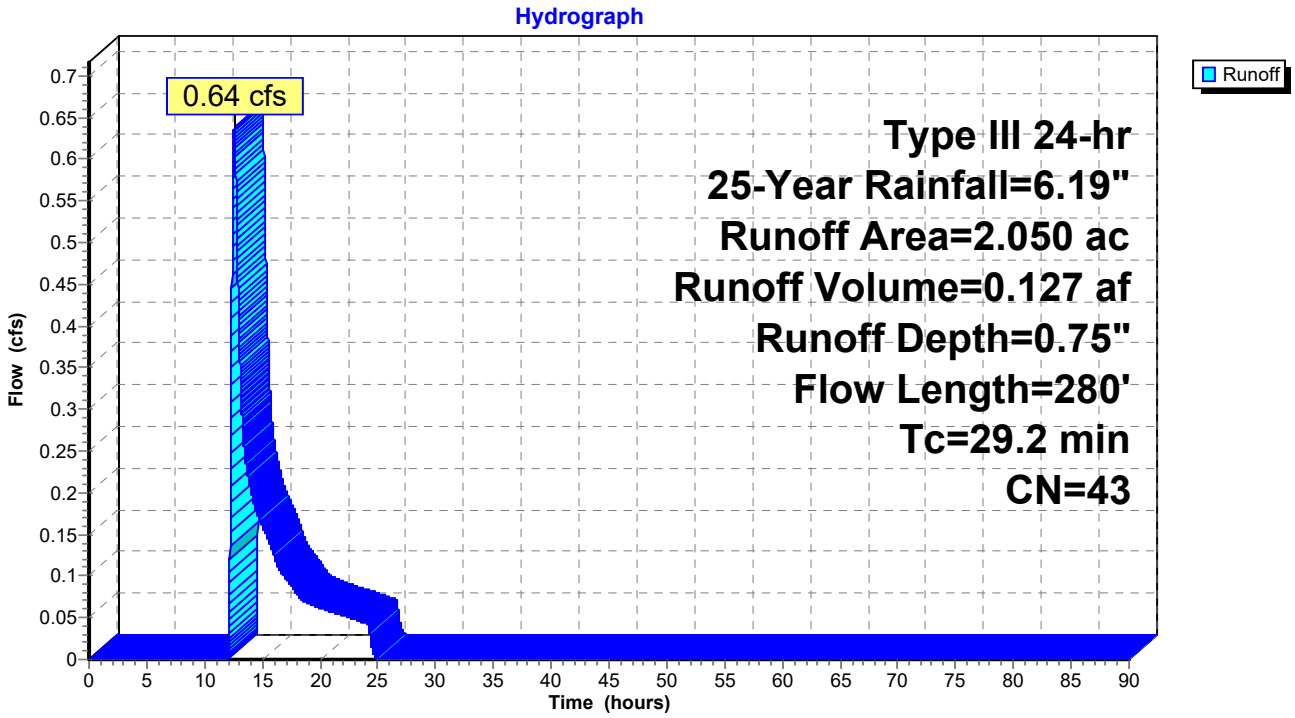
Runoff = 0.64 cfs @ 12.56 hrs, Volume= 0.127 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (ac)	CN	Description
1.640	39	>75% Grass cover, Good, HSG A
0.410	61	>75% Grass cover, Good, HSG B
2.050	43	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 77S: Perv Prop Basin DA



Summary for Subcatchment 78S: Imperv Prop Basin DA

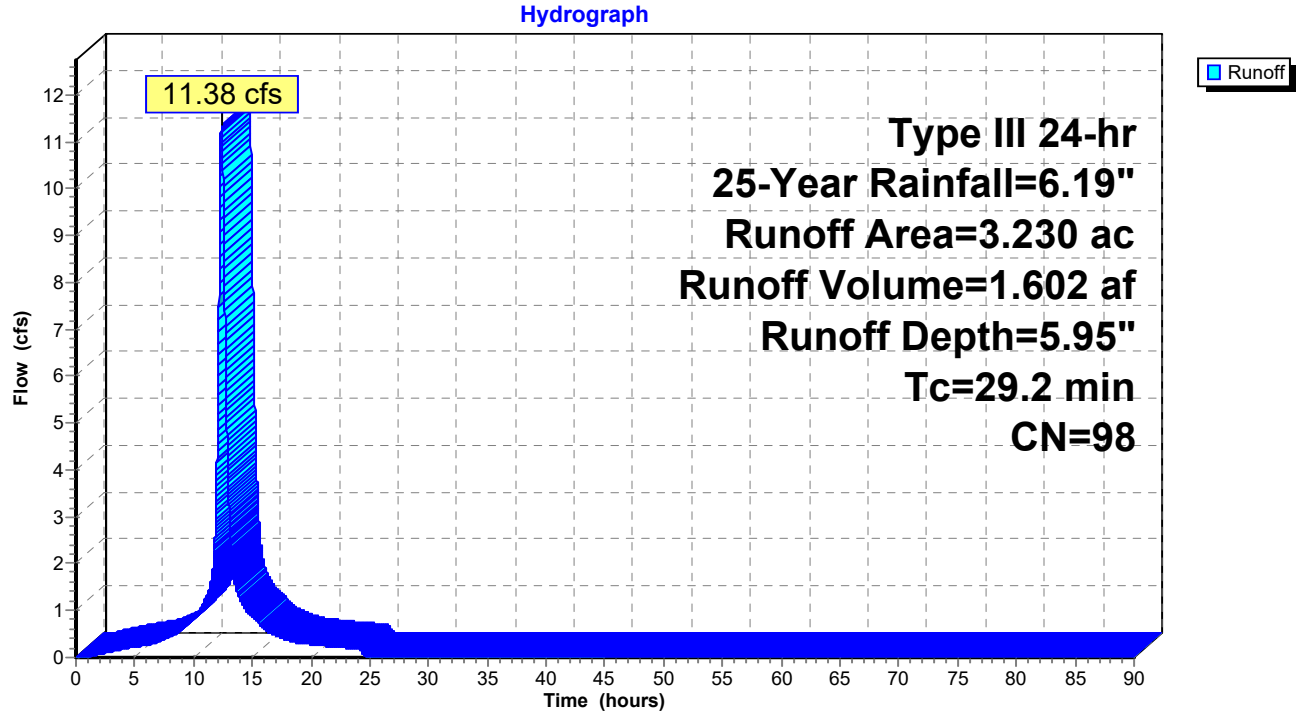
Runoff = 11.38 cfs @ 12.37 hrs, Volume= 1.602 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 78S: Imperv Prop Basin DA



Summary for Subcatchment 88S: Offsite West

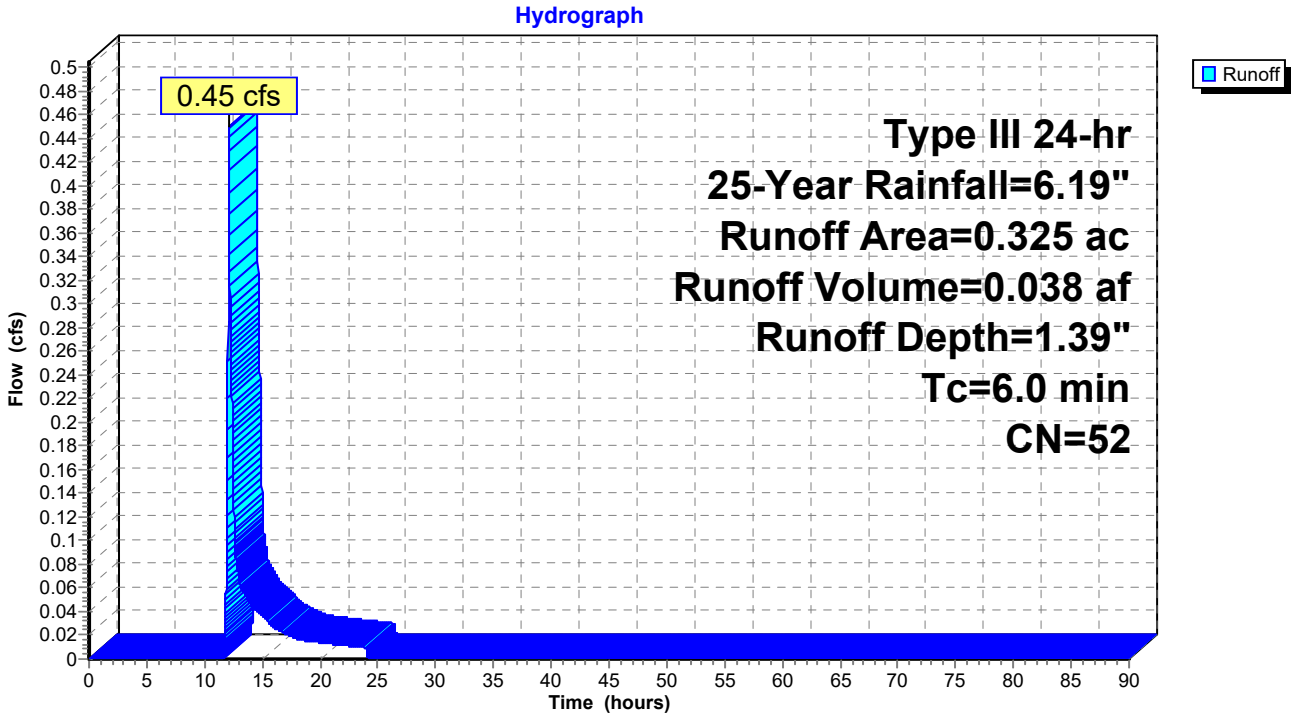
Runoff = 0.45 cfs @ 12.10 hrs, Volume= 0.038 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 88S: Offsite West



Summary for Subcatchment 100S: Offsite East

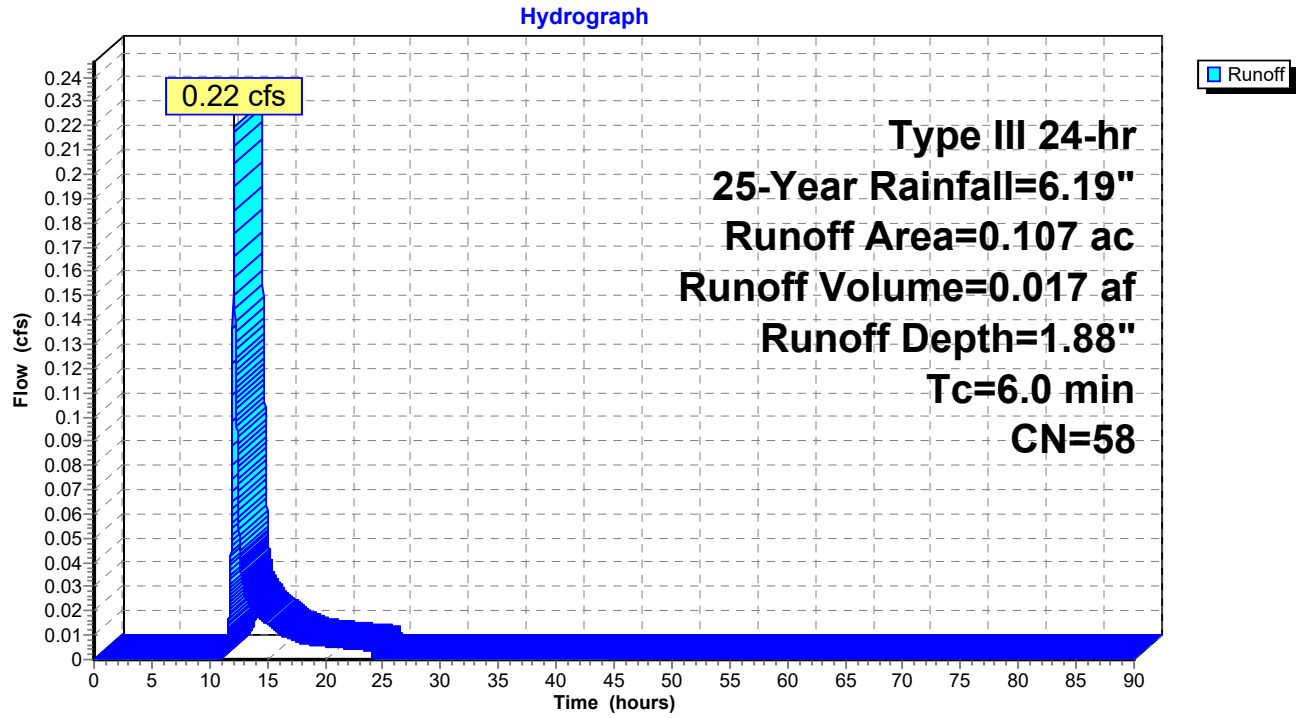
Runoff = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.19"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 100S: Offsite East



Summary for Pond 74P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 4.13" for 25-Year event
Inflow = 1.58 cfs @ 12.08 hrs, Volume= 0.134 af
Outflow = 1.20 cfs @ 12.15 hrs, Volume= 0.111 af, Atten= 24%, Lag= 4.1 min
Primary = 1.20 cfs @ 12.15 hrs, Volume= 0.111 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.20' @ 12.15 hrs Surf.Area= 2,726 sf Storage= 1,667 cf

Plug-Flow detention time= 153.1 min calculated for 0.111 af (83% of inflow)
Center-of-Mass det. time= 79.6 min (832.7 - 753.1)

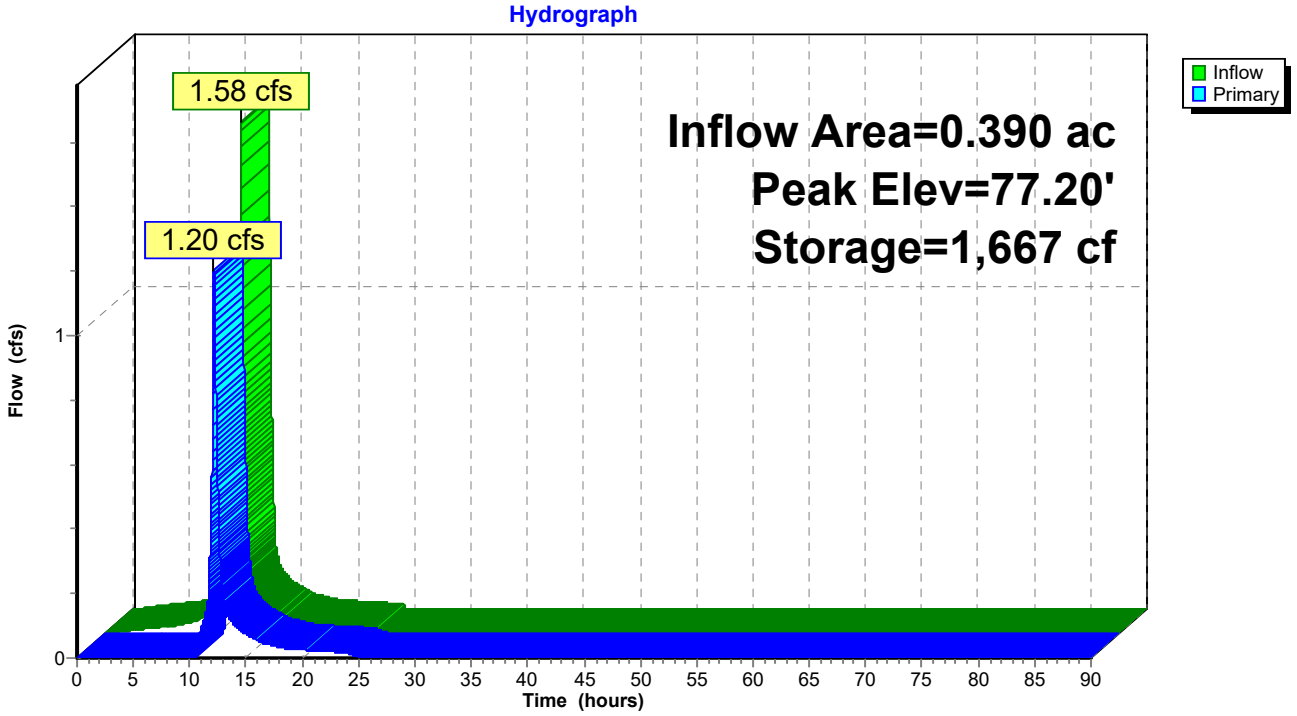
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.20 cfs @ 12.15 hrs HW=77.20' TW=69.81' (Dynamic Tailwater)
1=Sharp-Crested Rectangular Weir (Weir Controls 1.20 cfs @ 1.63 fps)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 74P: Bioretention Basin



Summary for Pond 88P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 3.90" for 25-Year event
Inflow = 12.58 cfs @ 12.37 hrs, Volume= 1.841 af
Outflow = 1.64 cfs @ 13.81 hrs, Volume= 1.841 af, Atten= 87%, Lag= 86.7 min
Primary = 1.64 cfs @ 13.81 hrs, Volume= 1.841 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 73.26' @ 13.81 hrs Surf.Area= 9,799 sf Storage= 50,302 cf

Plug-Flow detention time= 1,106.9 min calculated for 1.840 af (100% of inflow)
Center-of-Mass det. time= 1,107.1 min (1,889.8 - 782.6)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

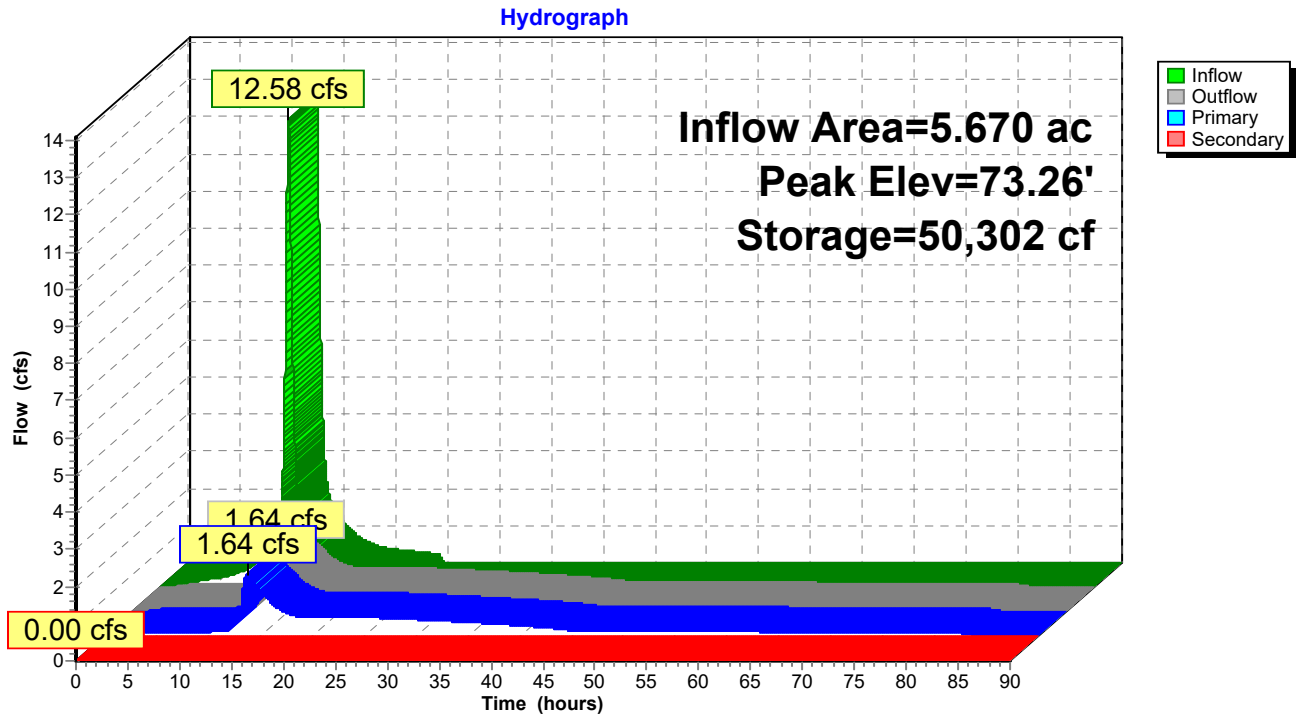
#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.64 cfs @ 13.81 hrs HW=73.26' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.64 cfs of 35.74 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.22 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.33 cfs @ 9.64 fps)
  - **4=Orifice/Grate** (Orifice Controls 1.10 cfs @ 1.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 88P: Prop Basin 'B'

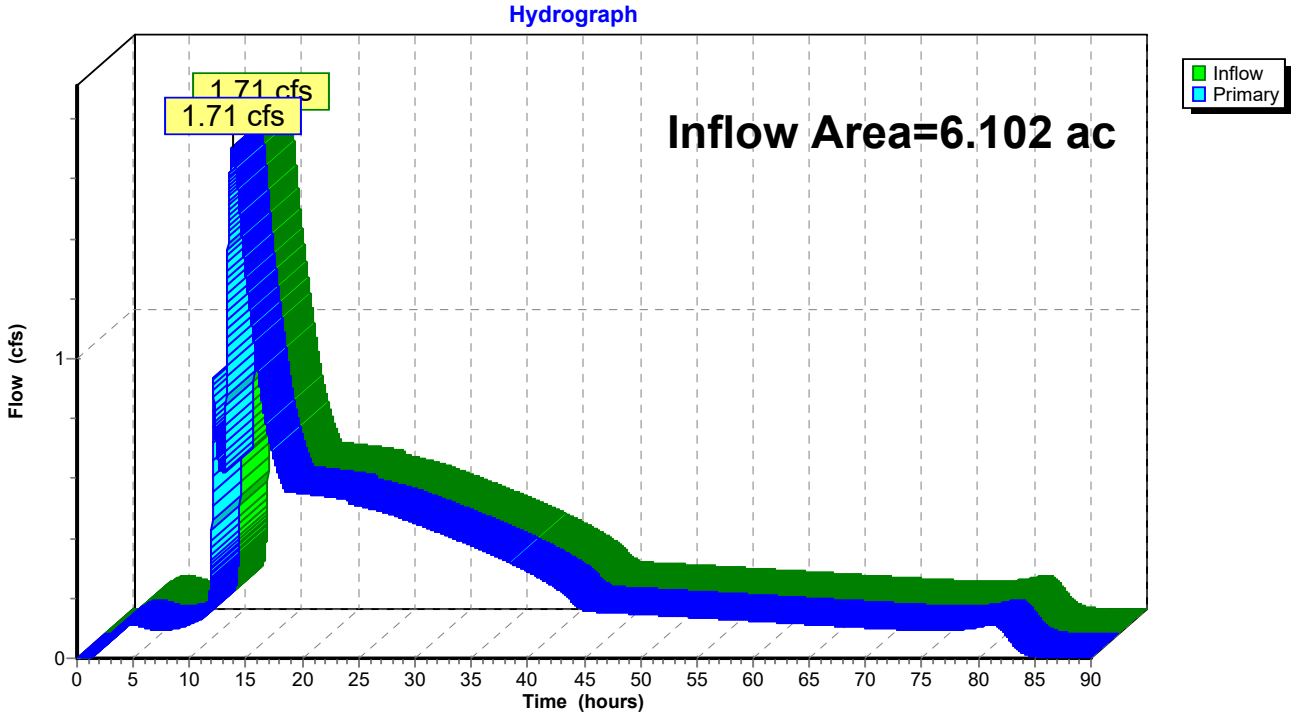


Summary for Link 87L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 3.73" for 25-Year event
Inflow = 1.71 cfs @ 13.80 hrs, Volume= 1.895 af
Primary = 1.71 cfs @ 13.80 hrs, Volume= 1.895 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 87L: Total Offsite



Summary for Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)

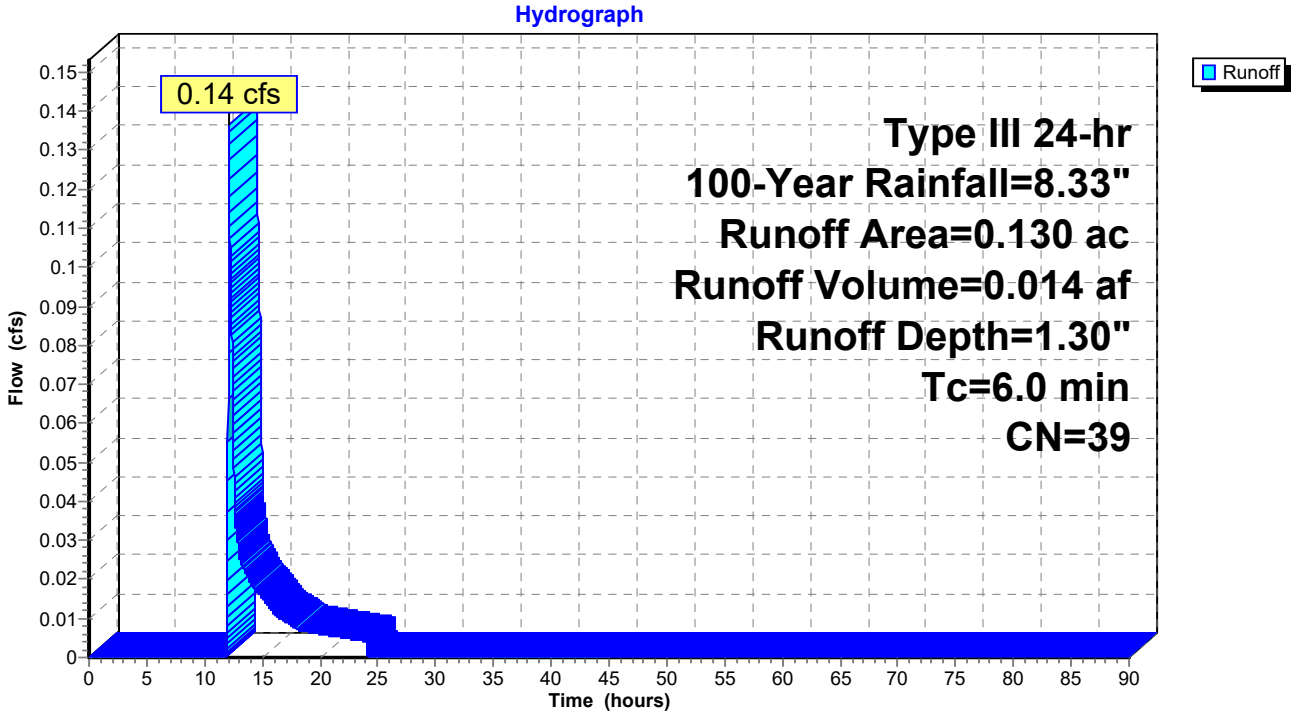
Runoff = 0.14 cfs @ 12.12 hrs, Volume= 0.014 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.130	39	>75% Grass cover, Good, HSG A
0.130		100.00% Pervious Area

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

Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)

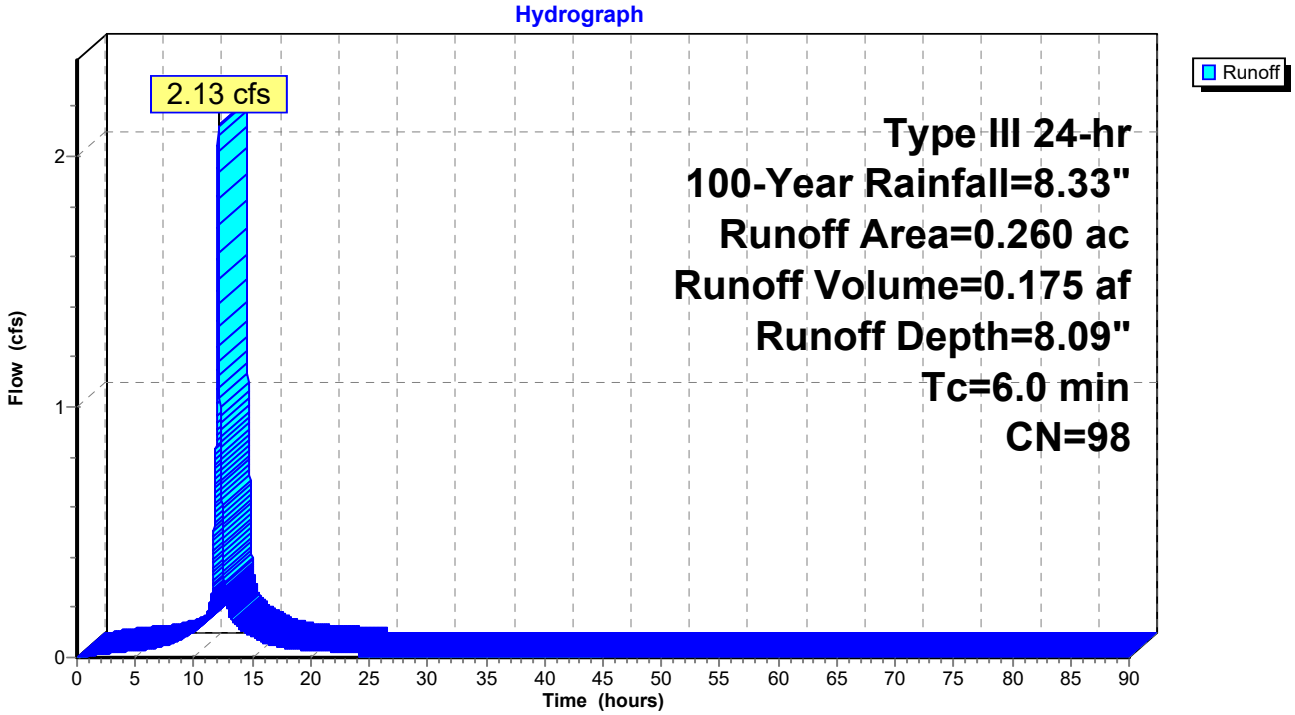
Runoff = 2.13 cfs @ 12.08 hrs, Volume= 0.175 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 77S: Perv Prop Basin DA

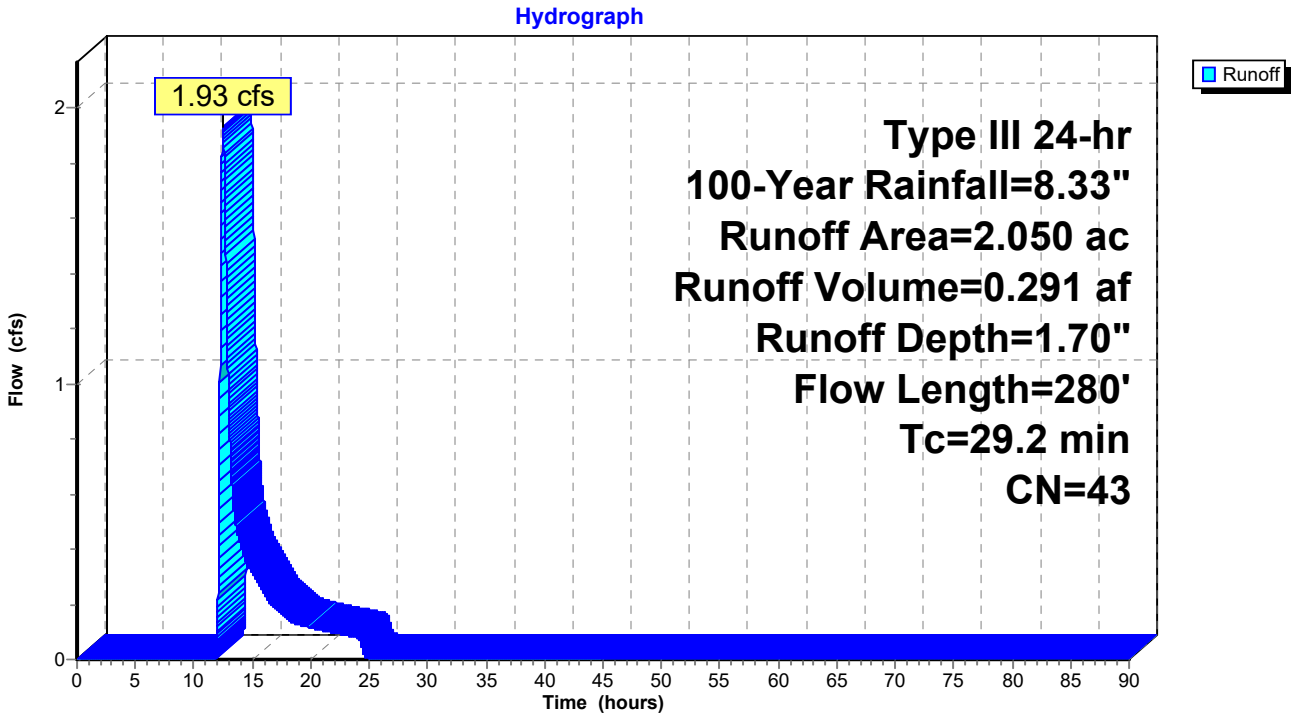
Runoff = 1.93 cfs @ 12.49 hrs, Volume= 0.291 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
1.640	39	>75% Grass cover, Good, HSG A
0.410	61	>75% Grass cover, Good, HSG B
2.050	43	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 77S: Perv Prop Basin DA



Summary for Subcatchment 78S: Imperv Prop Basin DA

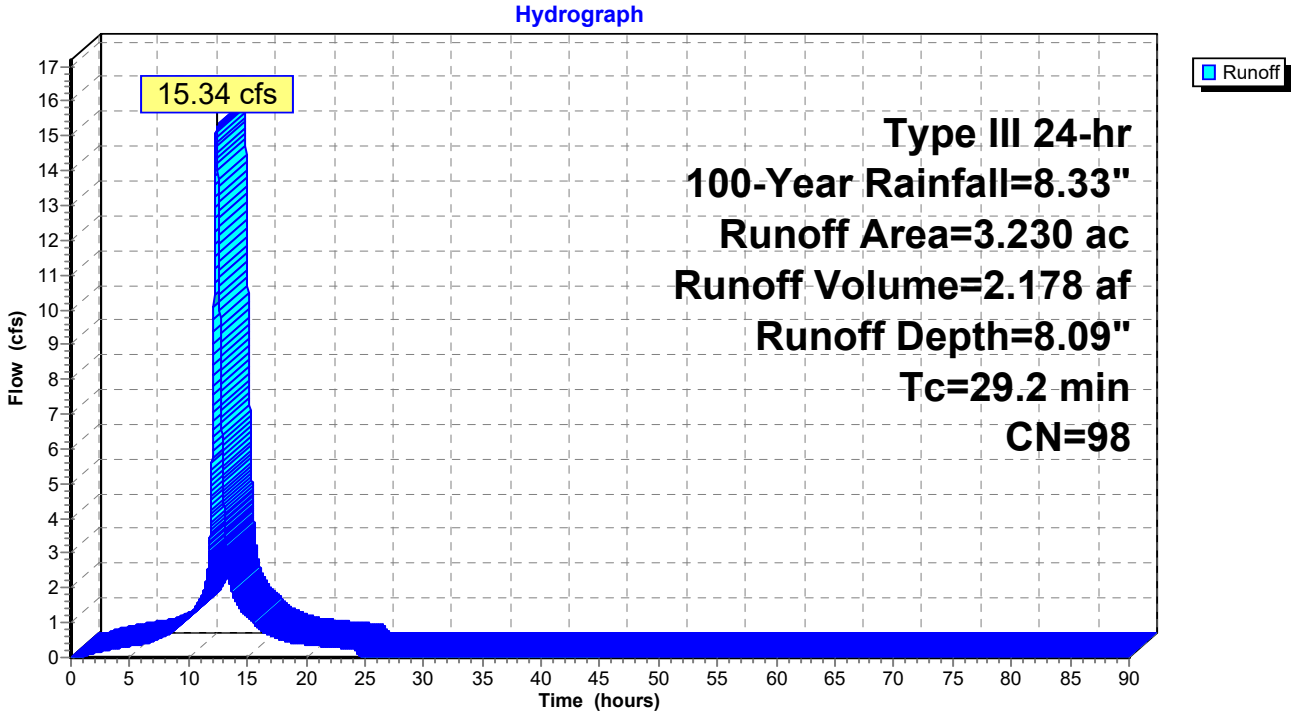
Runoff = 15.34 cfs @ 12.37 hrs, Volume= 2.178 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 78S: Imperv Prop Basin DA



Summary for Subcatchment 88S: Offsite West

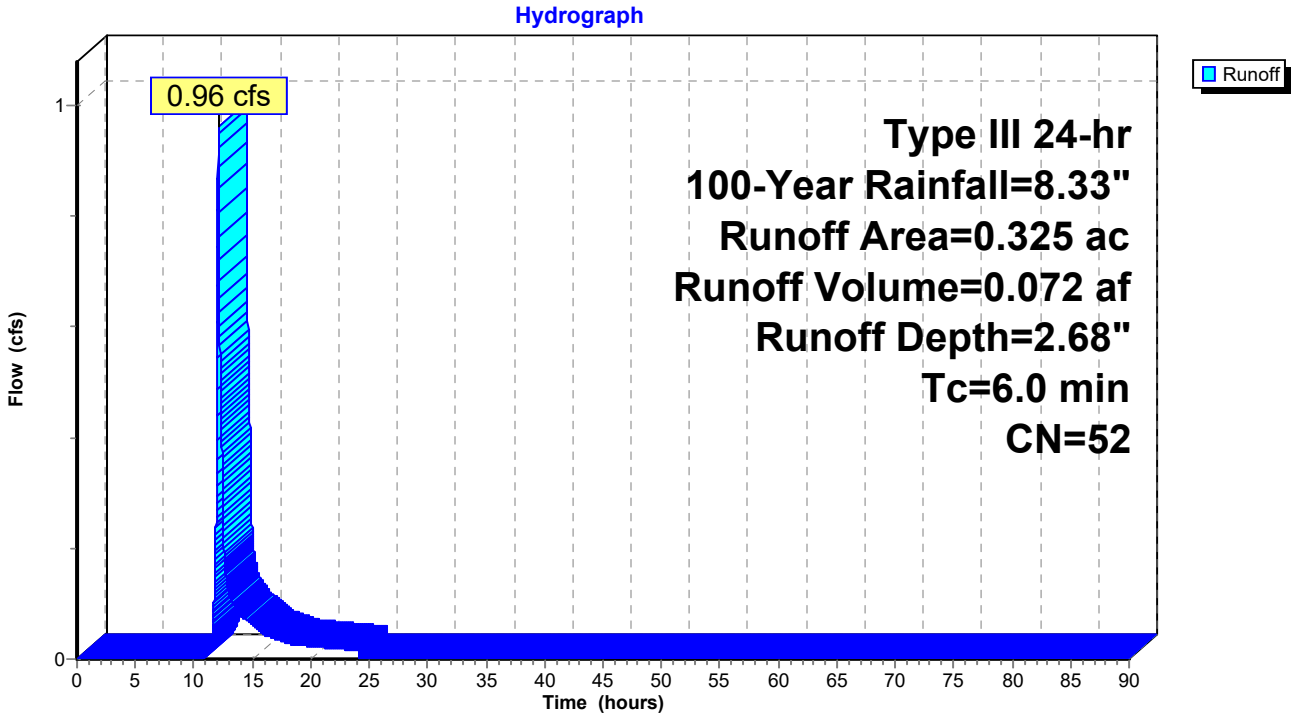
Runoff = 0.96 cfs @ 12.10 hrs, Volume= 0.072 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 88S: Offsite West



Summary for Subcatchment 100S: Offsite East

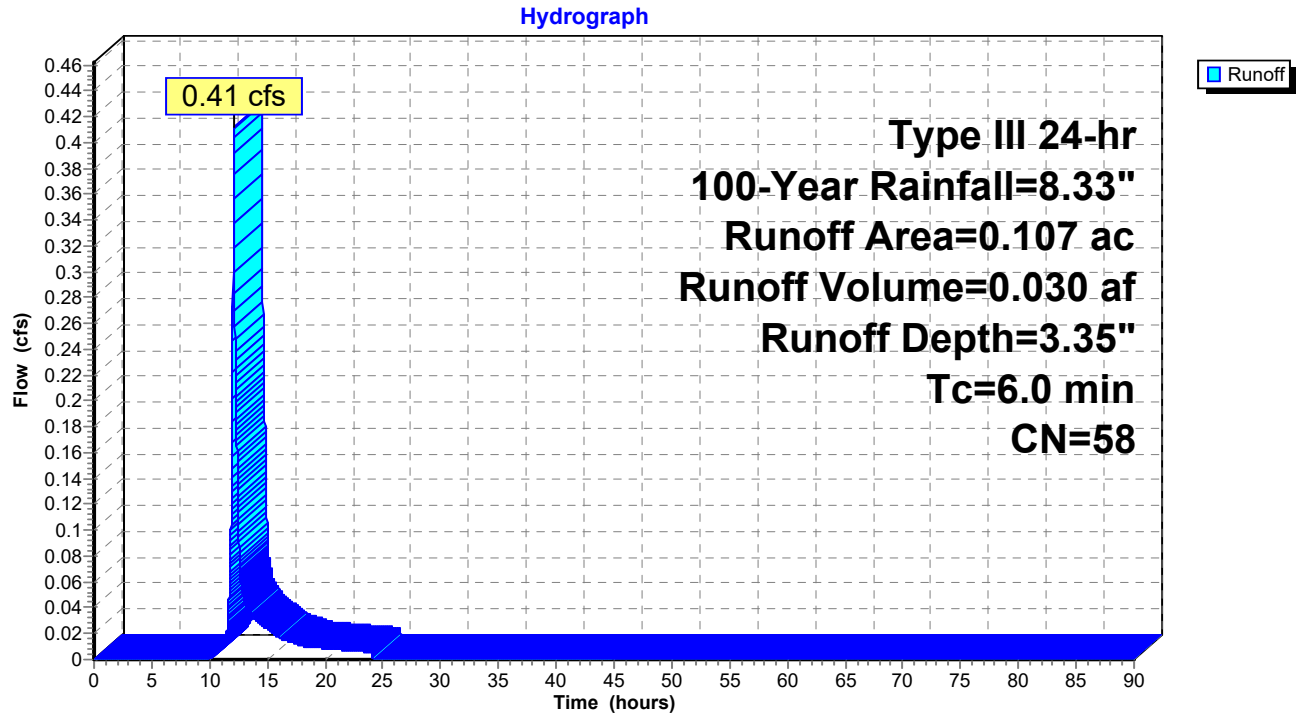
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 100S: Offsite East



Summary for Pond 74P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 5.83" for 100-Year event
Inflow = 2.25 cfs @ 12.09 hrs, Volume= 0.189 af
Outflow = 1.74 cfs @ 12.15 hrs, Volume= 0.166 af, Atten= 23%, Lag= 3.9 min
Primary = 1.74 cfs @ 12.15 hrs, Volume= 0.166 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.27' @ 12.15 hrs Surf.Area= 2,773 sf Storage= 1,864 cf

Plug-Flow detention time= 126.3 min calculated for 0.166 af (88% of inflow)
Center-of-Mass det. time= 67.0 min (820.0 - 753.1)

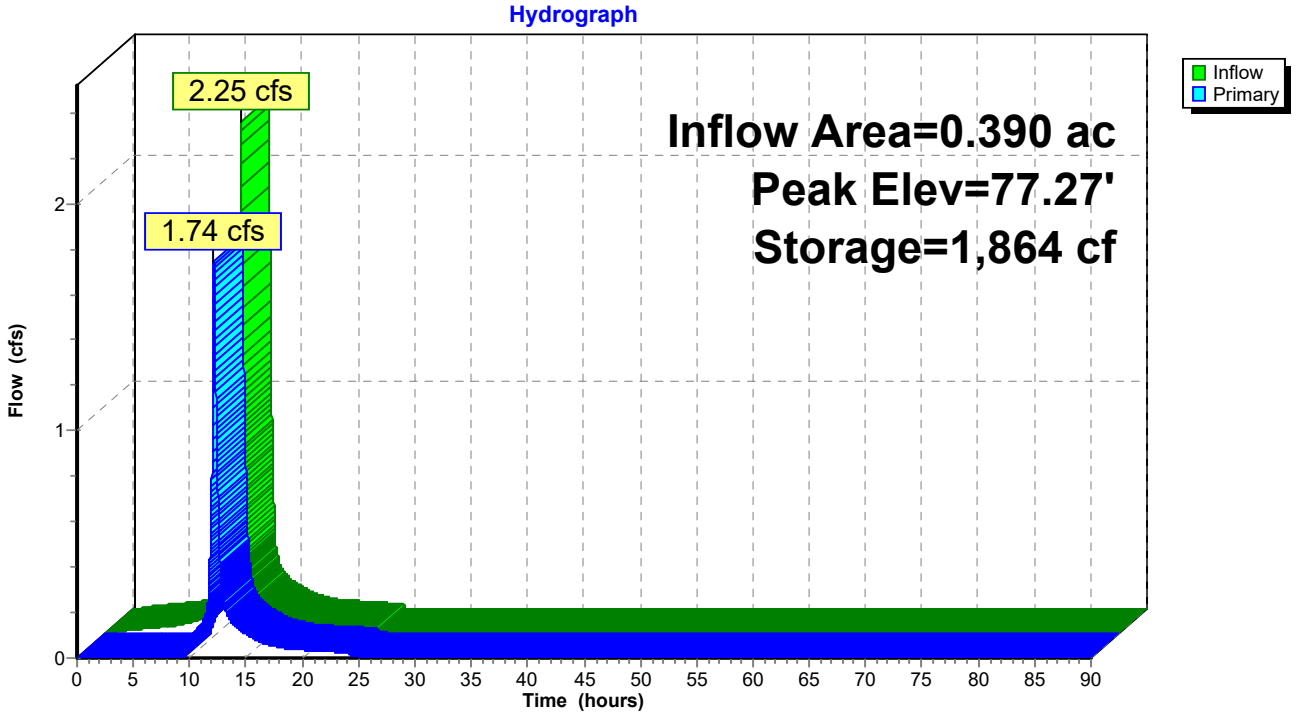
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.74 cfs @ 12.15 hrs HW=77.27' TW=71.00' (Dynamic Tailwater)
└**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.74 cfs @ 1.85 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 74P: Bioretention Basin



Summary for Pond 88P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 5.58" for 100-Year event
Inflow = 18.14 cfs @ 12.37 hrs, Volume= 2.635 af
Outflow = 6.90 cfs @ 12.91 hrs, Volume= 2.635 af, Atten= 62%, Lag= 32.1 min
Primary = 6.90 cfs @ 12.91 hrs, Volume= 2.635 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 74.07' @ 12.91 hrs Surf.Area= 10,455 sf Storage= 58,513 cf

Plug-Flow detention time= 836.6 min calculated for 2.635 af (100% of inflow)
Center-of-Mass det. time= 836.6 min (1,619.0 - 782.4)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

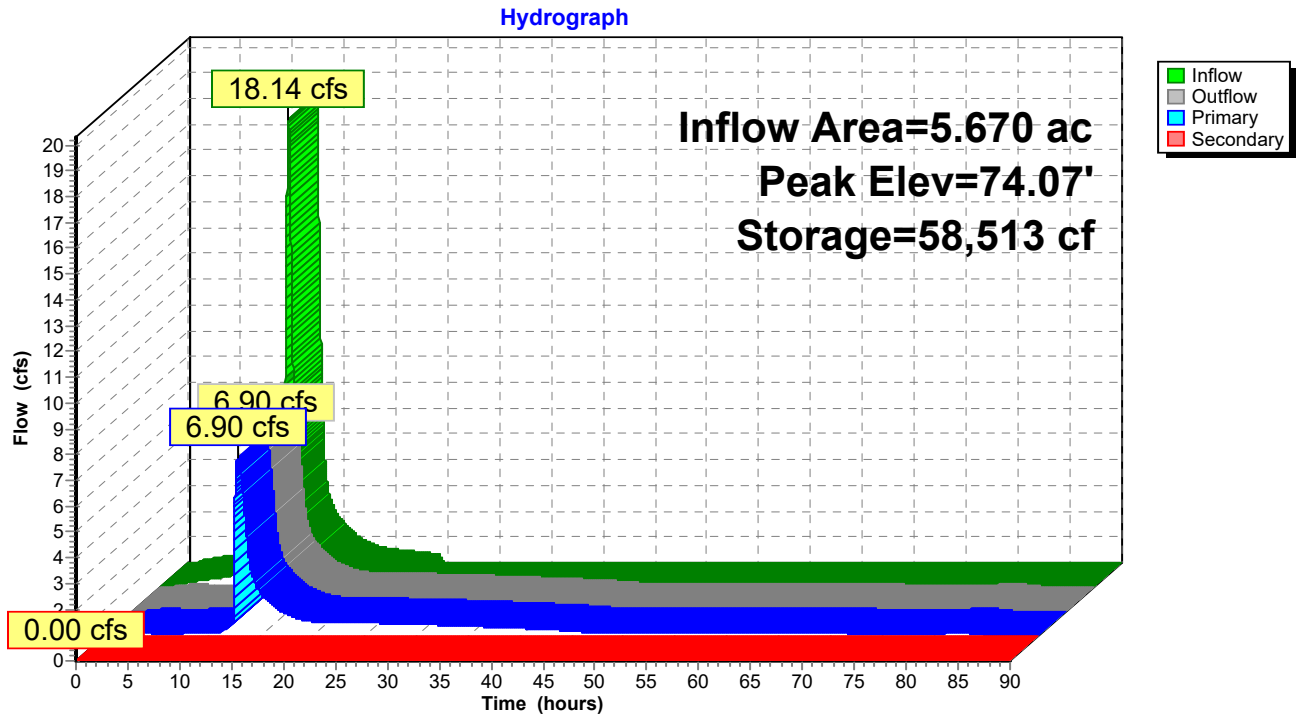
#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.90 cfs @ 12.91 hrs HW=74.07' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 6.90 cfs of 38.39 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.22 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.36 cfs @ 10.57 fps)
  - **4=Orifice/Grate** (Orifice Controls 6.33 cfs @ 4.34 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 88P: Prop Basin 'B'

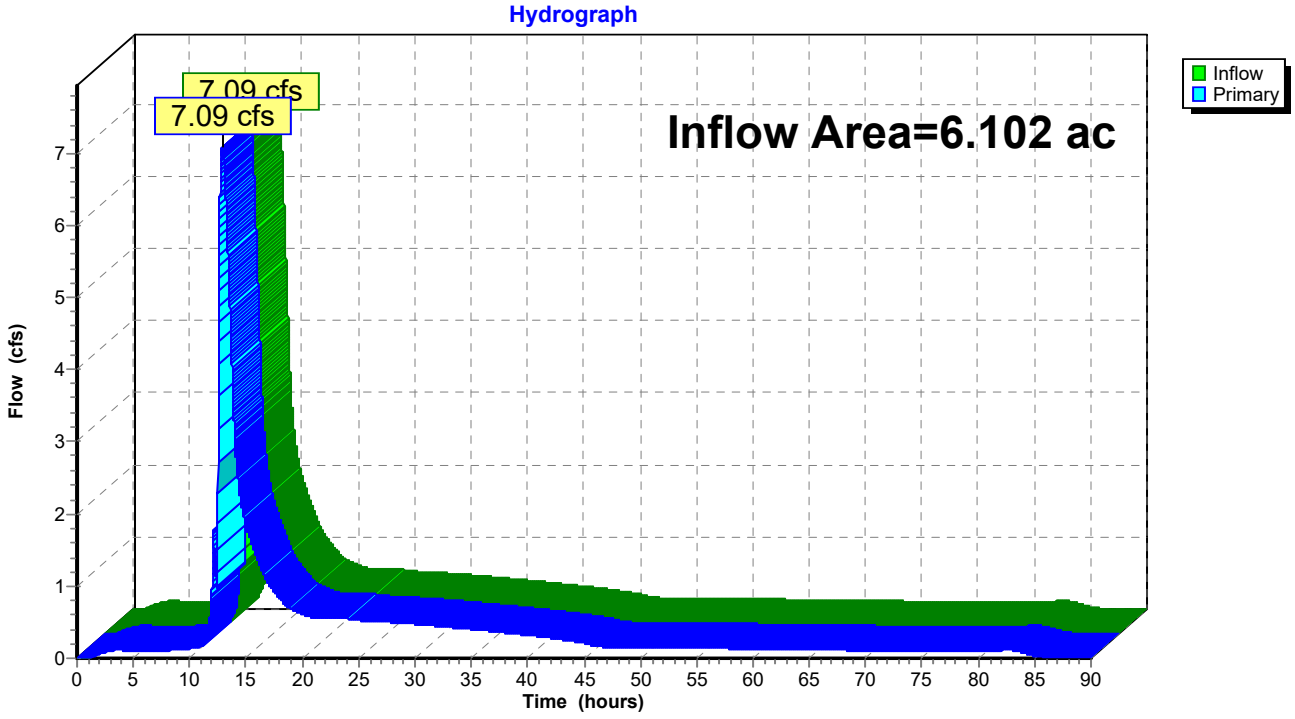


Summary for Link 87L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 5.38" for 100-Year event
Inflow = 7.09 cfs @ 12.90 hrs, Volume= 2.737 af
Primary = 7.09 cfs @ 12.90 hrs, Volume= 2.737 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

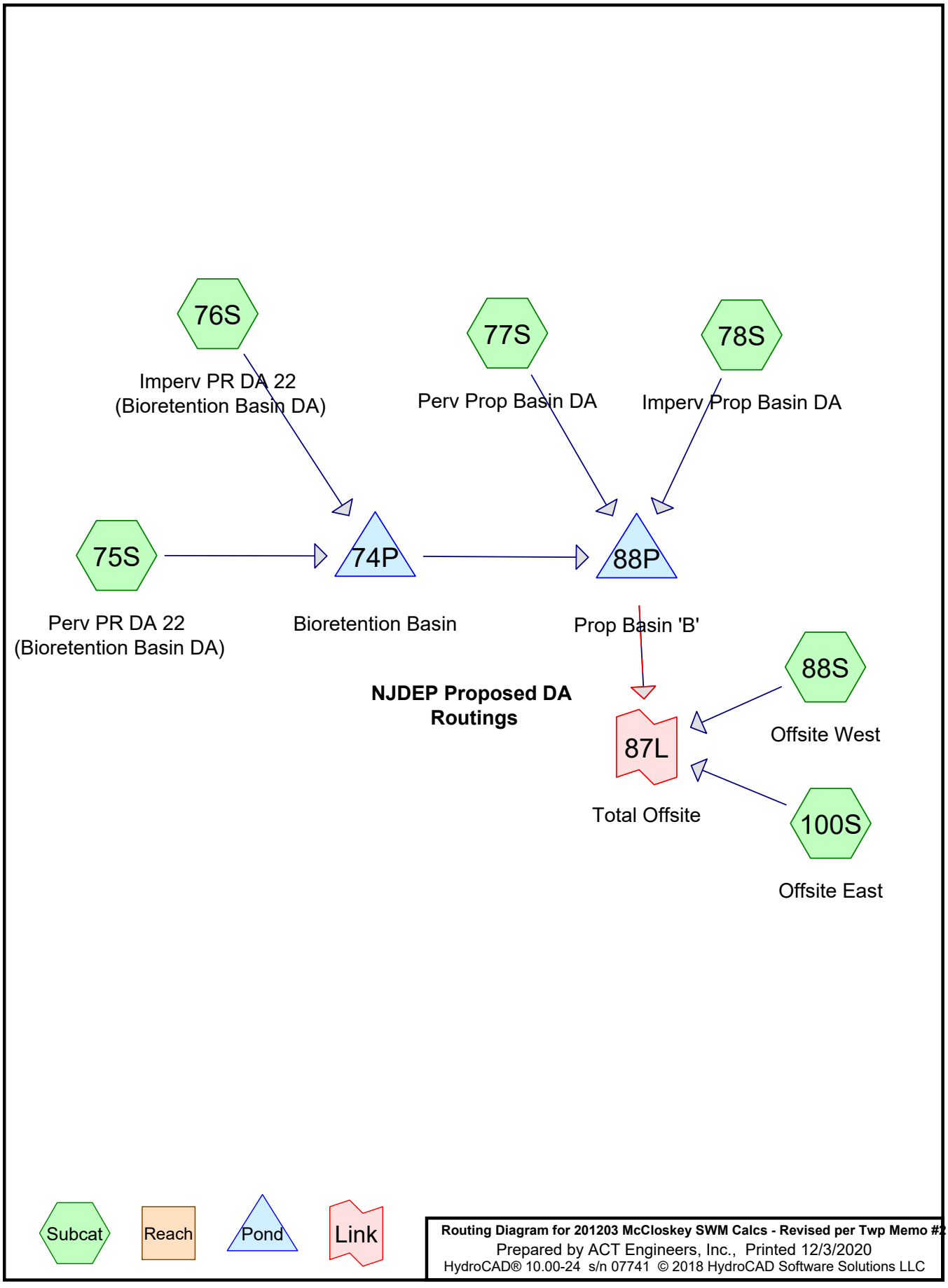
Link 87L: Total Offsite



APPENDIX D

HydroCAD Routings

Water Quality Storm Events



Routing Diagram for 201203 McCloskey SWM Calcs - Revised per Twp Memo #2

Prepared by ACT Engineers, Inc., Printed 12/3/2020

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Summary for Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)

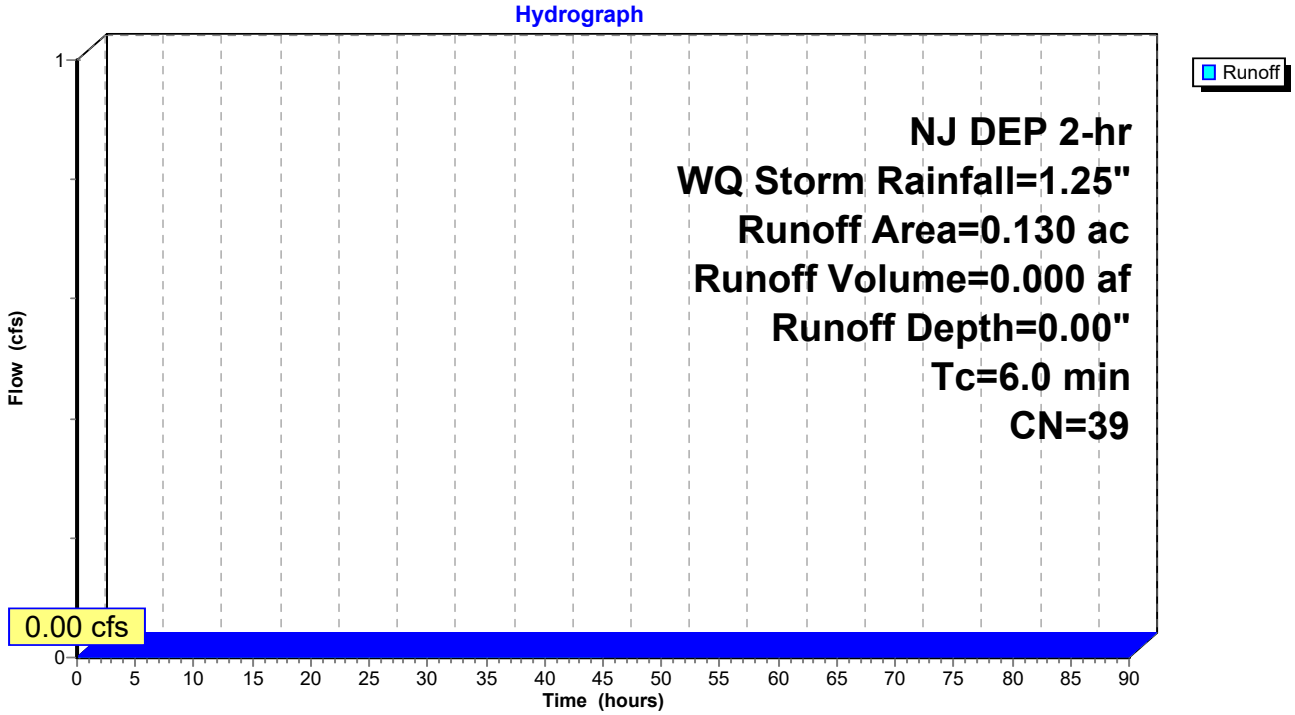
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (ac)	CN	Description
0.130	39	>75% Grass cover, Good, HSG A
0.130		100.00% Pervious Area

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

Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)

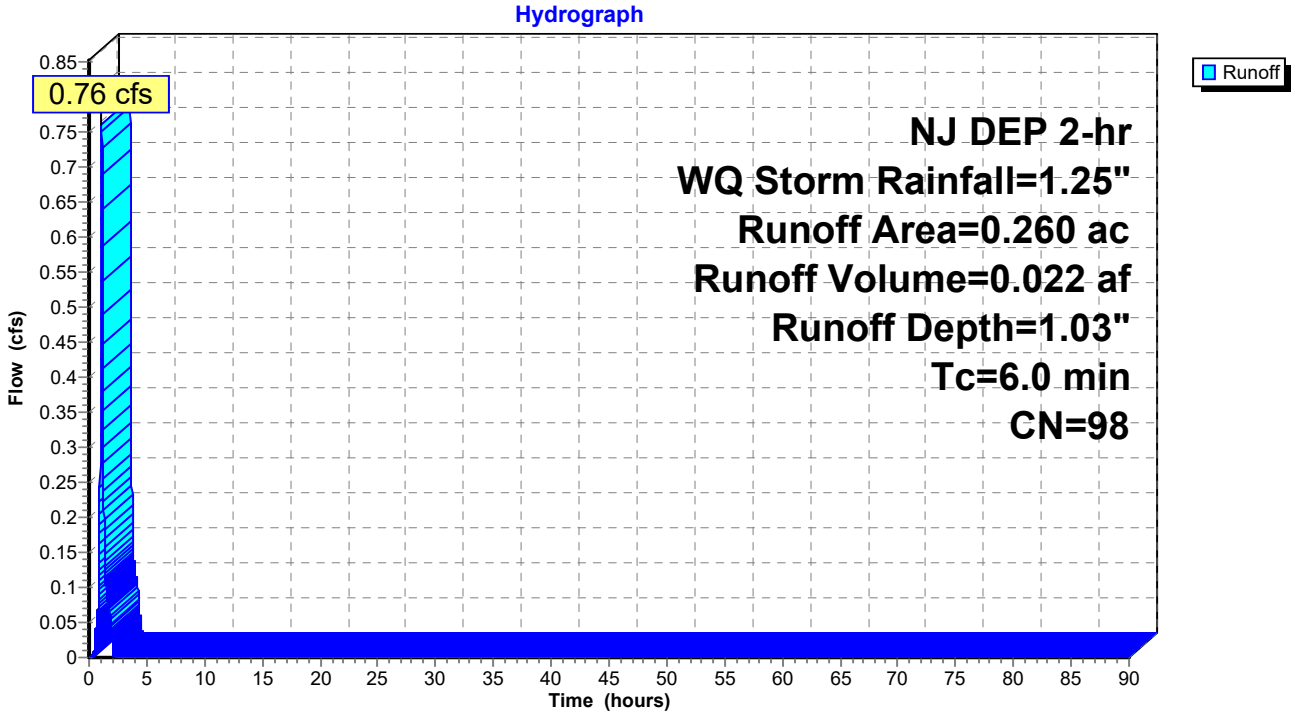
Runoff = 0.76 cfs @ 1.11 hrs, Volume= 0.022 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 77S: Perv Prop Basin DA

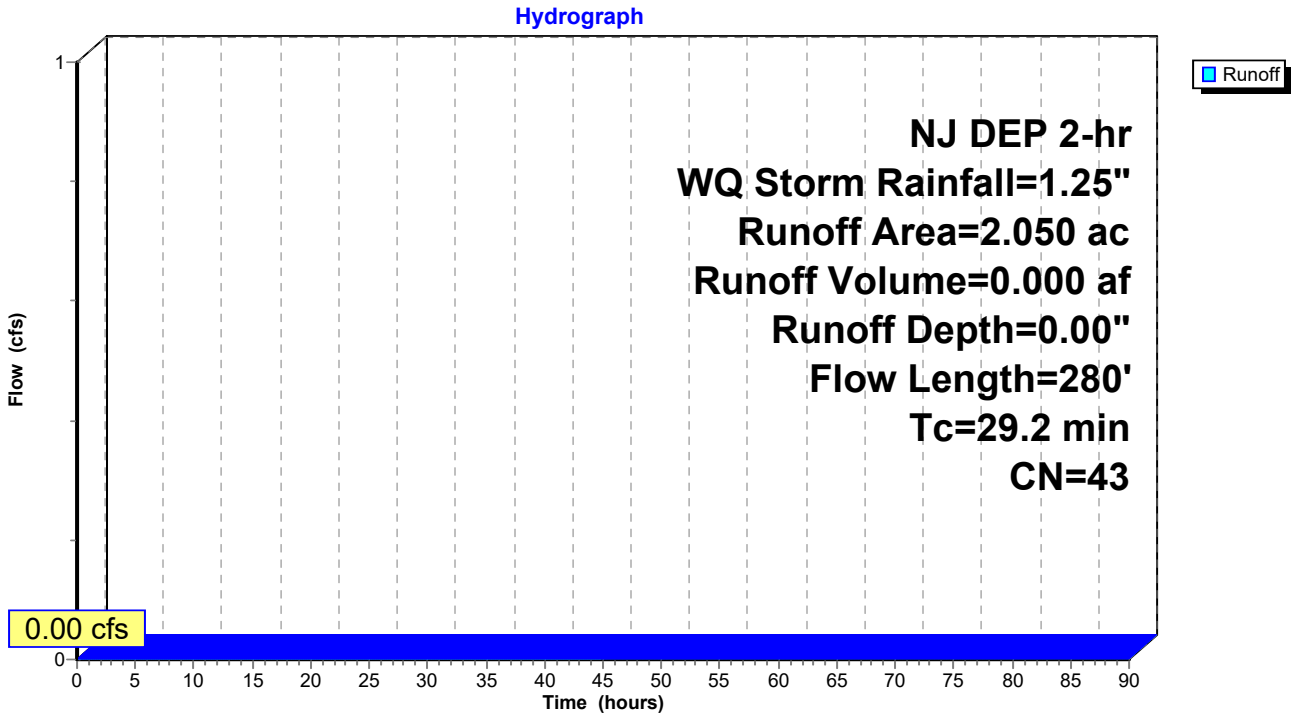
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (ac)	CN	Description
1.640	39	>75% Grass cover, Good, HSG A
0.410	61	>75% Grass cover, Good, HSG B
2.050	43	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 77S: Perv Prop Basin DA



Summary for Subcatchment 78S: Imperv Prop Basin DA

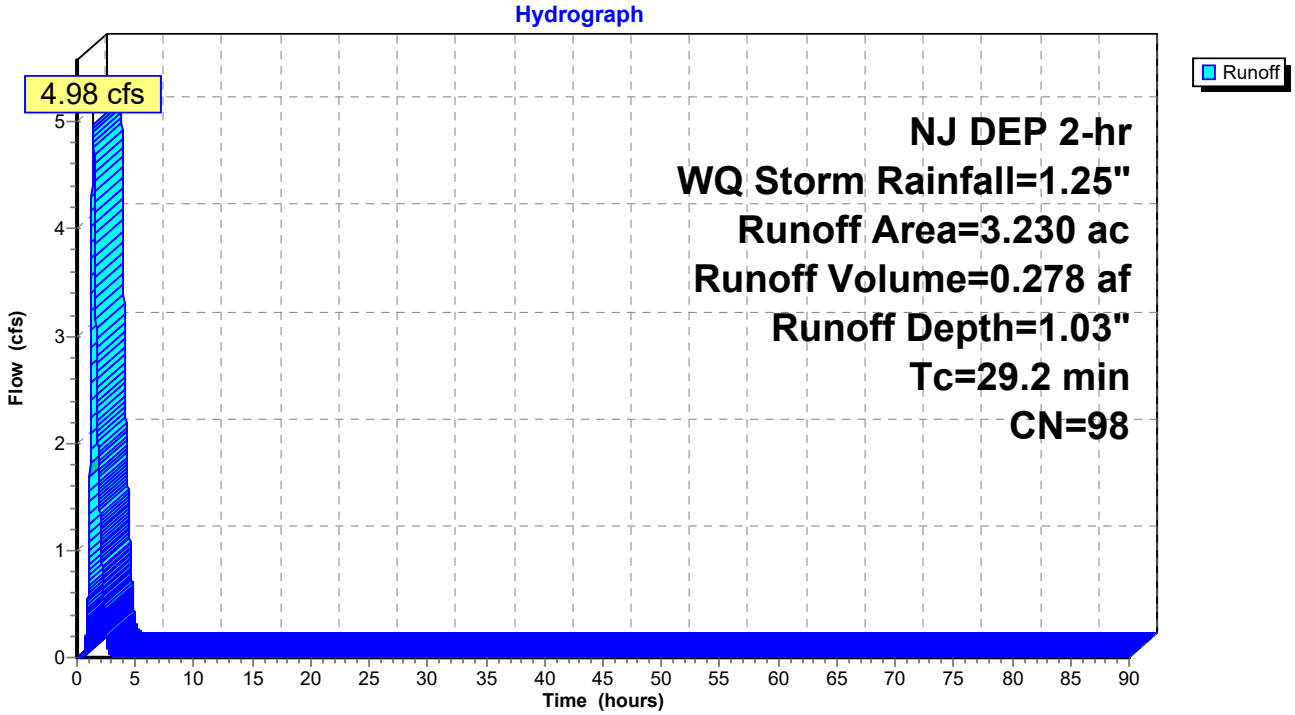
Runoff = 4.98 cfs @ 1.39 hrs, Volume= 0.278 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 78S: Imperv Prop Basin DA



Summary for Subcatchment 88S: Offsite West

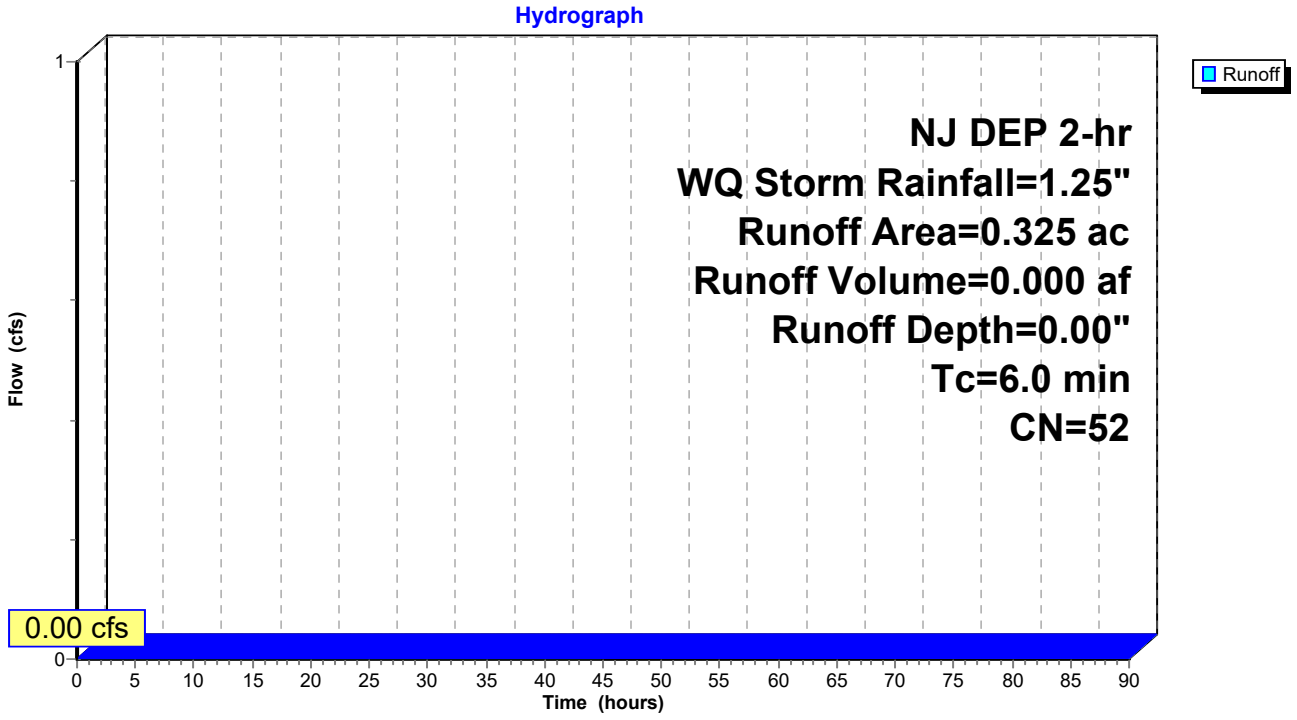
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 88S: Offsite West



Summary for Subcatchment 100S: Offsite East

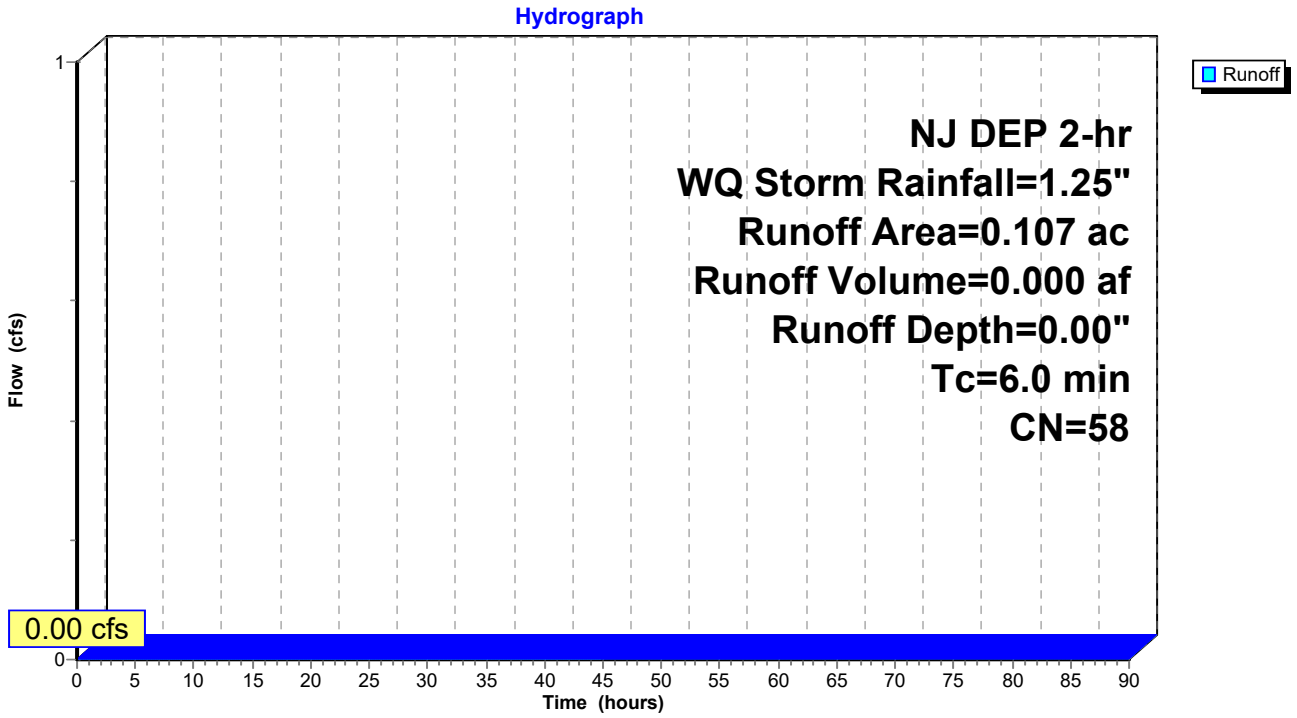
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr WQ Storm Rainfall=1.25"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 100S: Offsite East



Summary for Pond 74P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 0.69" for WQ Storm event
Inflow = 0.76 cfs @ 1.11 hrs, Volume= 0.022 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 76.94' @ 2.34 hrs Surf.Area= 2,514 sf Storage= 976 cf

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

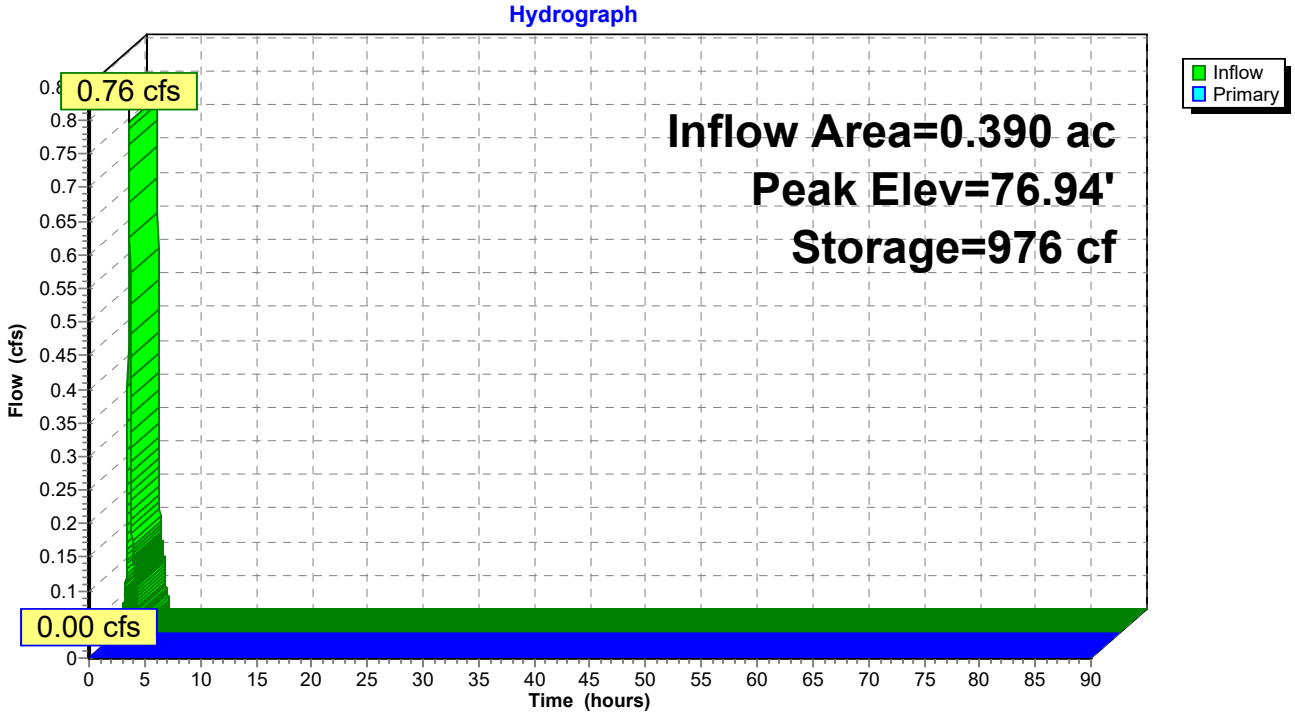
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.50' TW=66.00' (Dynamic Tailwater)
1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 74P: Bioretention Basin



Summary for Pond 88P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 0.59" for WQ Storm event
Inflow = 4.98 cfs @ 1.39 hrs, Volume= 0.278 af
Outflow = 0.14 cfs @ 2.56 hrs, Volume= 0.279 af, Atten= 97%, Lag= 70.3 min
Primary = 0.14 cfs @ 2.56 hrs, Volume= 0.279 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 68.42' @ 2.56 hrs Surf.Area= 6,414 sf Storage= 11,303 cf

Plug-Flow detention time= 819.1 min calculated for 0.278 af (100% of inflow)
Center-of-Mass det. time= 819.6 min (911.4 - 91.8)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

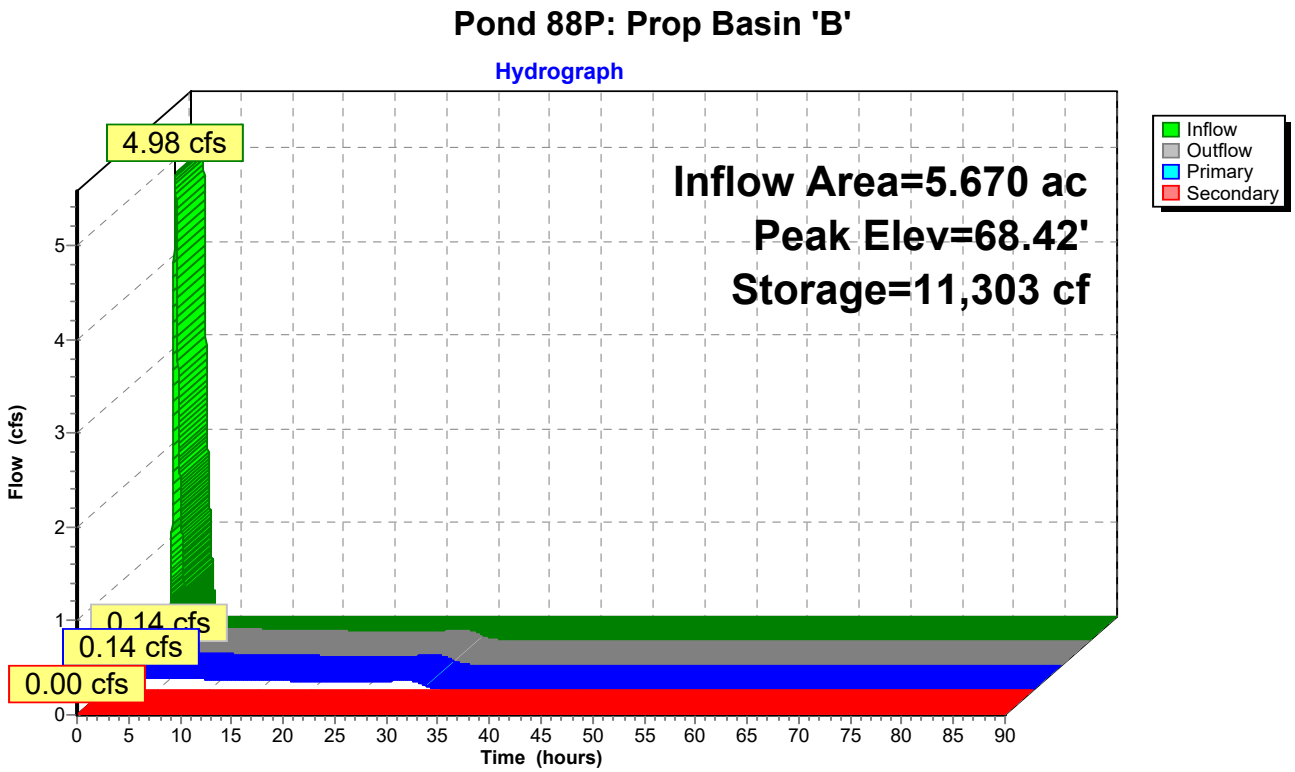
0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.14 cfs @ 2.56 hrs HW=68.42' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.14 cfs of 12.52 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.14 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=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

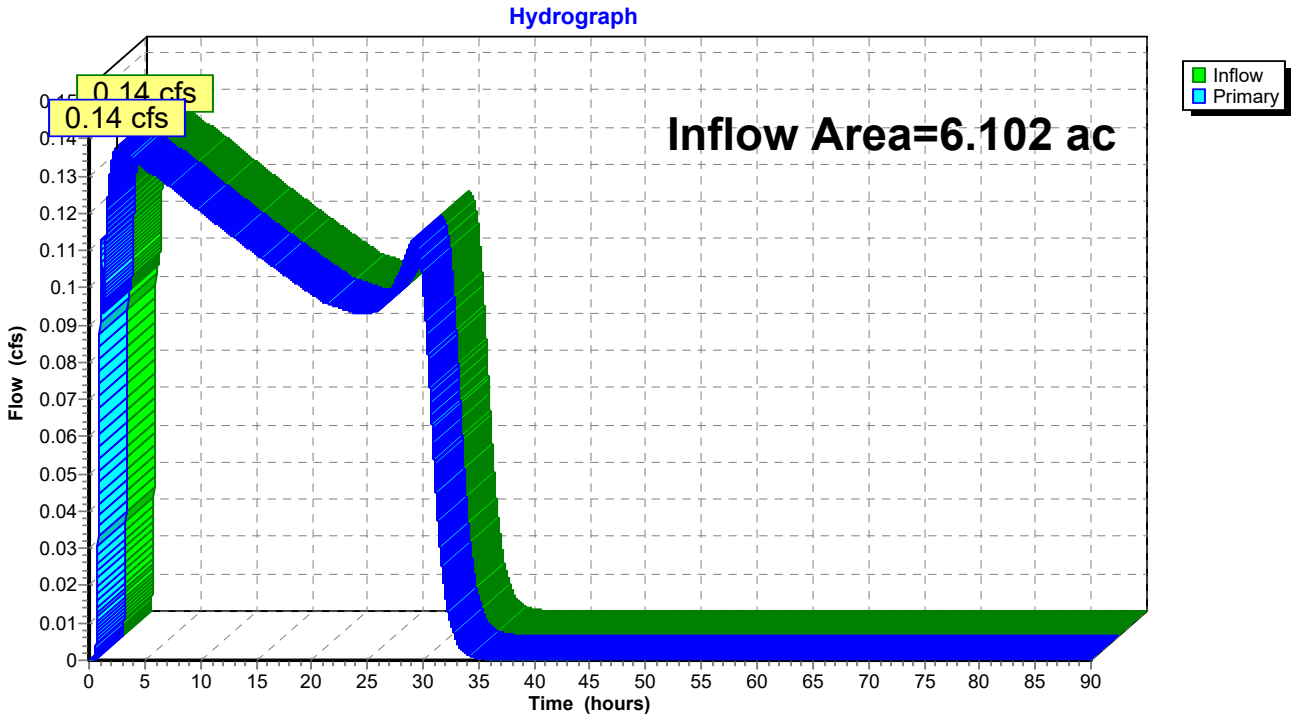


Summary for Link 87L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 0.55" for WQ Storm event
Inflow = 0.14 cfs @ 2.56 hrs, Volume= 0.279 af
Primary = 0.14 cfs @ 2.56 hrs, Volume= 0.279 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 87L: Total Offsite



400 STEPS - EVEREST REALTY RN 12/3/20

WATER QUALITY DETENTION CALCS

WQ DESIGN STORM

TIME TO PEAK ELEVATION = 2.55 HR

PEAK STORAGE VOLUME = 11,303 CF

10% PEAK STORAGE VOLUME = 1,130 CF

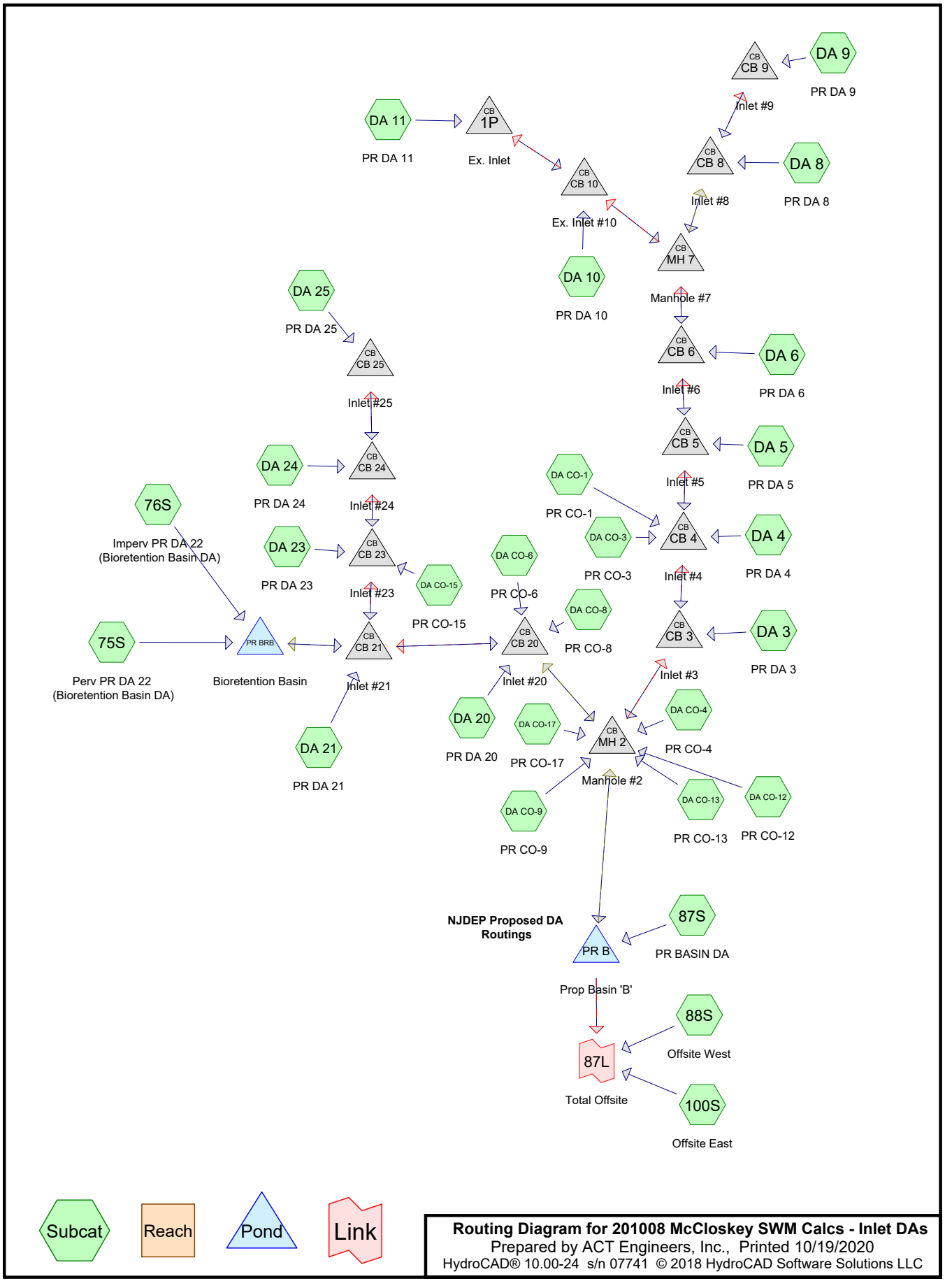
TIME TO 10% WQ VOLUME = 28.30 hr

DETENTION TIME = 28.55 - 2.55 = 25.75 hr > 24 hr

MAXIMUM % TSS REMOVAL = 60%

APPENDIX E

Stormwater Collection System & MTD Sizing



Routing Diagram for 201008 McCloskey SWM Calcs - Inlet DAs
Prepared by ACT Engineers, Inc., Printed 10/19/2020
HydroCAD® 10.00-24 s/n 07741 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)

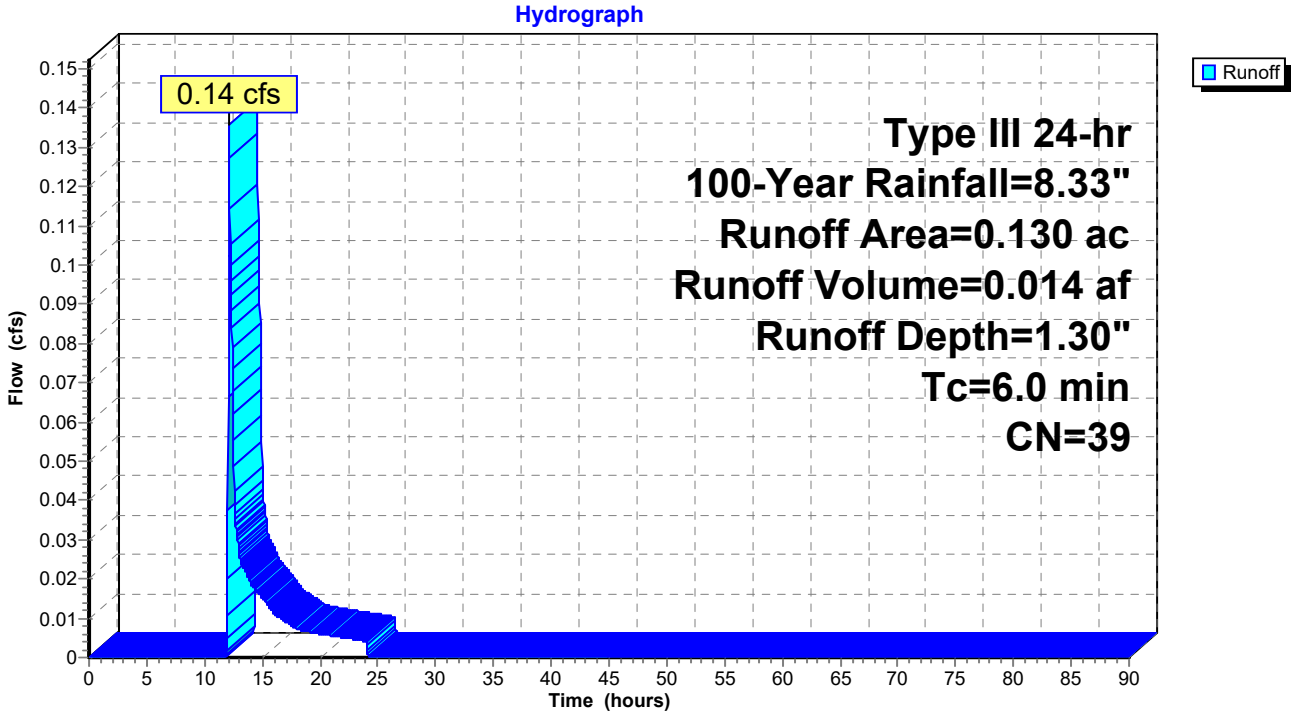
Runoff = 0.14 cfs @ 12.12 hrs, Volume= 0.014 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.130	39	>75% Grass cover, Good, HSG A
0.130		100.00% Pervious Area

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

Subcatchment 75S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)

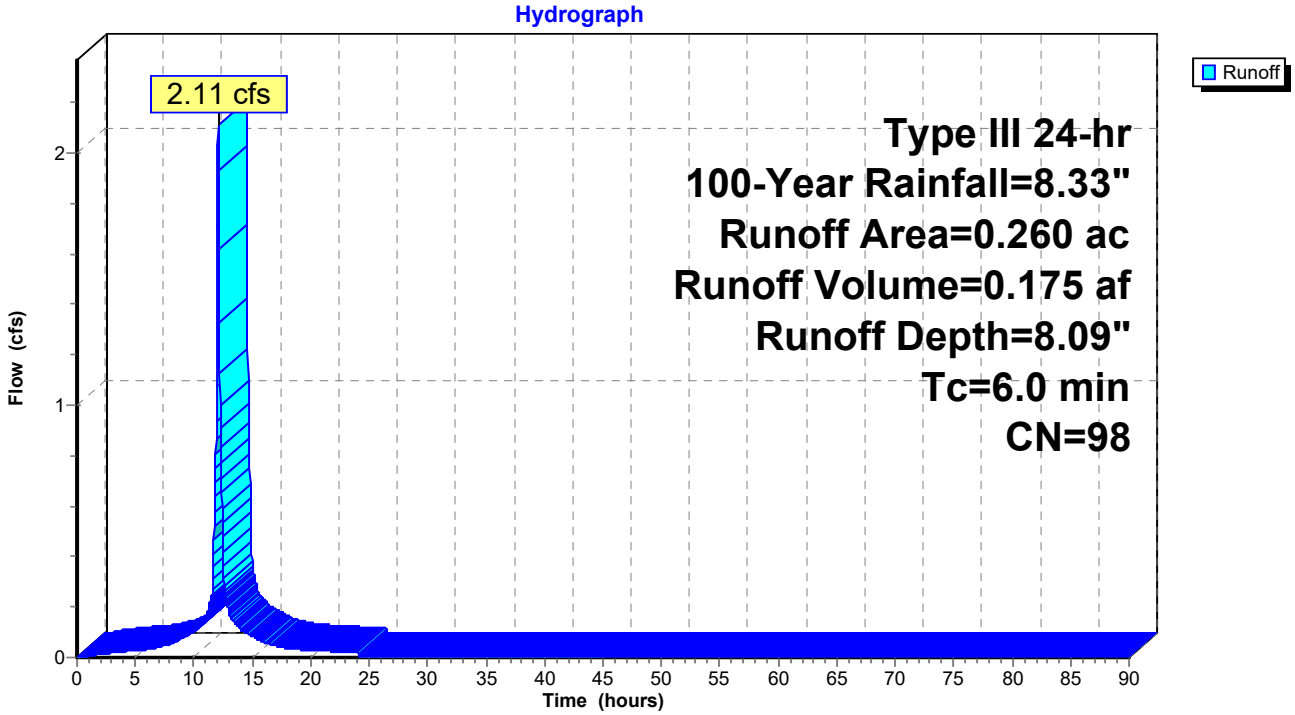
Runoff = 2.11 cfs @ 12.08 hrs, Volume= 0.175 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 76S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 87S: PR BASIN DA

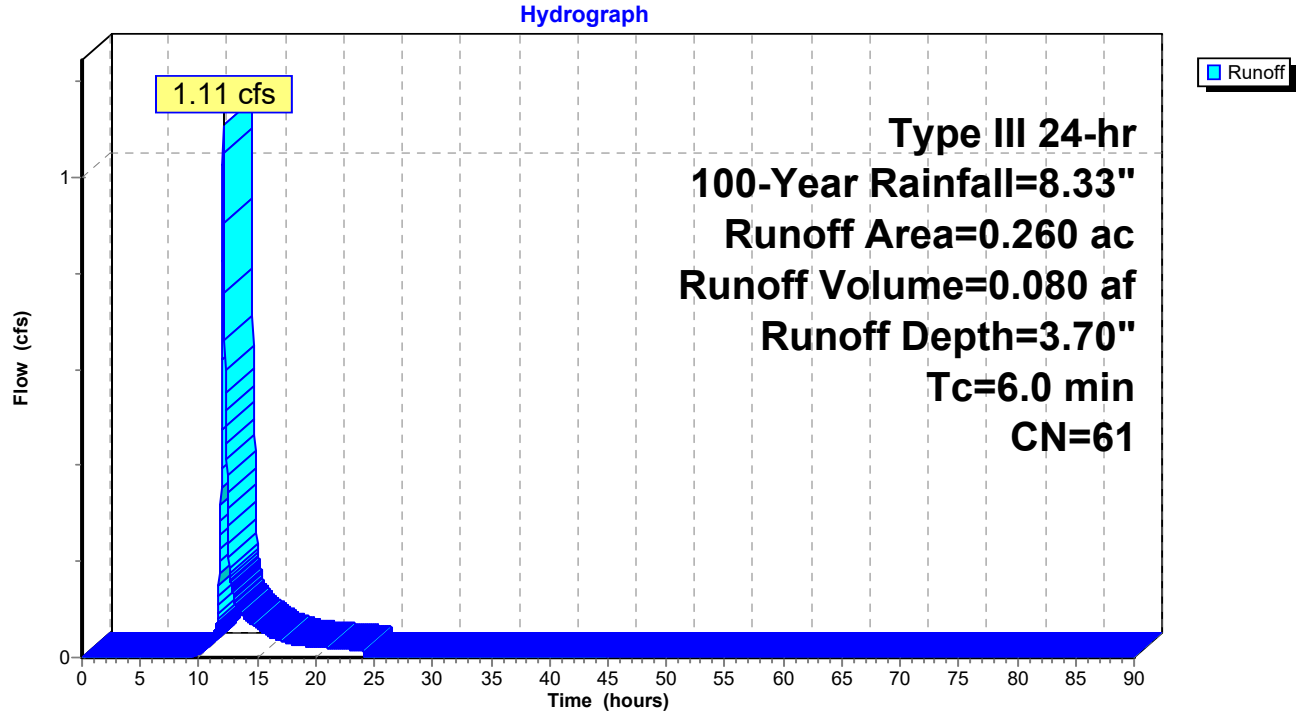
Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.080 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.260	61	>75% Grass cover, Good, HSG B
0.260		100.00% Pervious Area

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

Subcatchment 87S: PR BASIN DA



Summary for Subcatchment 88S: Offsite West

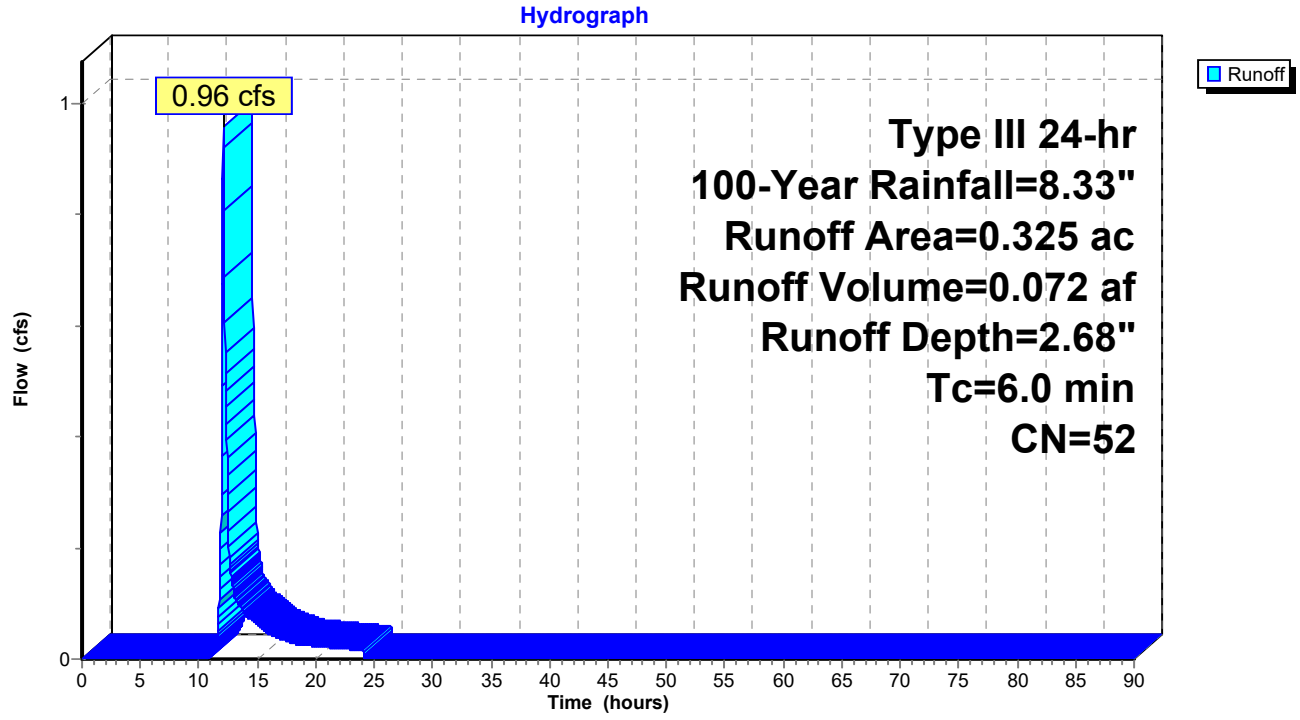
Runoff = 0.96 cfs @ 12.10 hrs, Volume= 0.072 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 88S: Offsite West



Summary for Subcatchment 100S: Offsite East

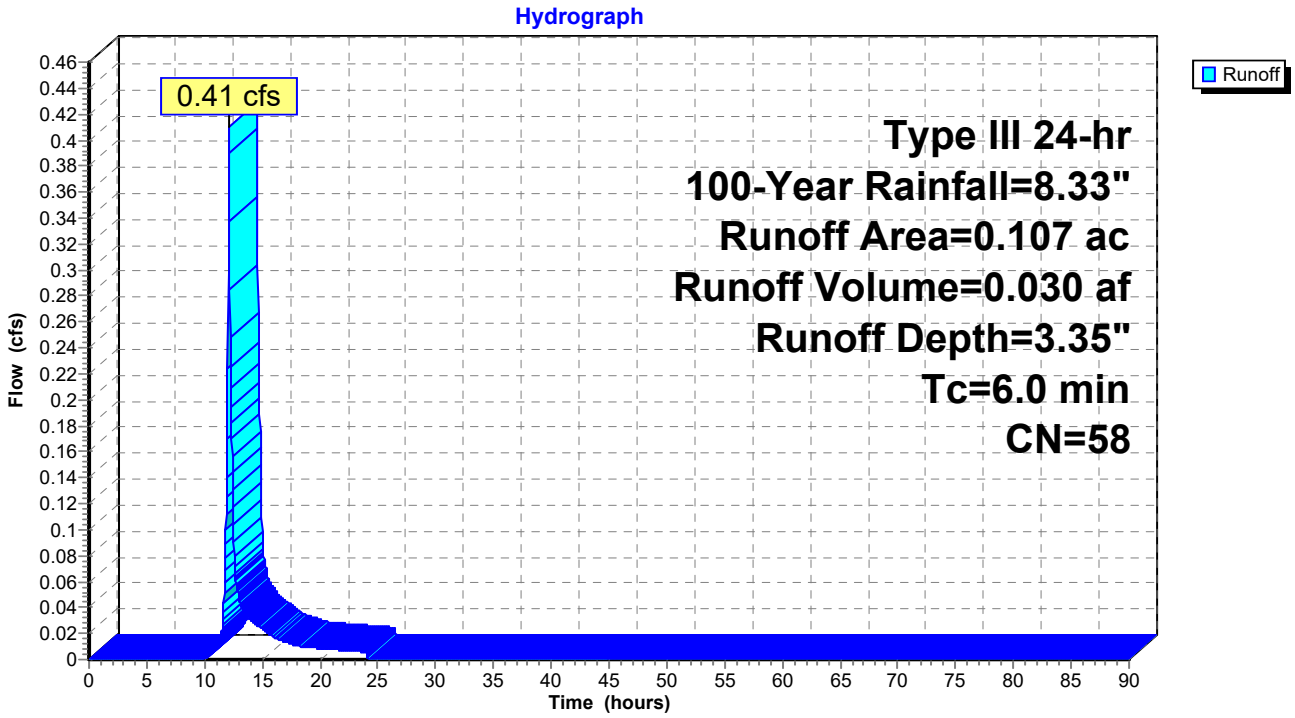
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 100S: Offsite East



Summary for Subcatchment DA 10: PR DA 10

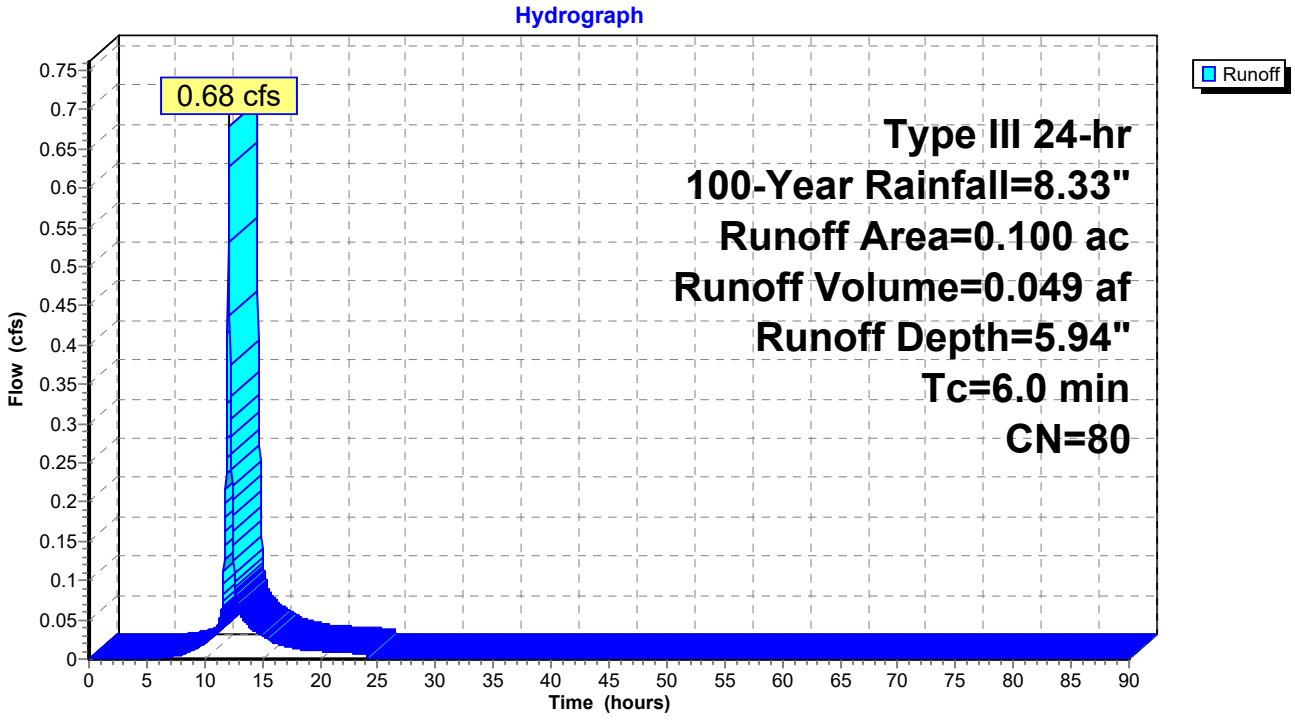
Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.030	39	>75% Grass cover, Good, HSG A
*	0.070	98	
	0.100	80	Weighted Average
	0.030		30.00% Pervious Area
	0.070		70.00% Impervious Area

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

Subcatchment DA 10: PR DA 10



Summary for Subcatchment DA 11: PR DA 11

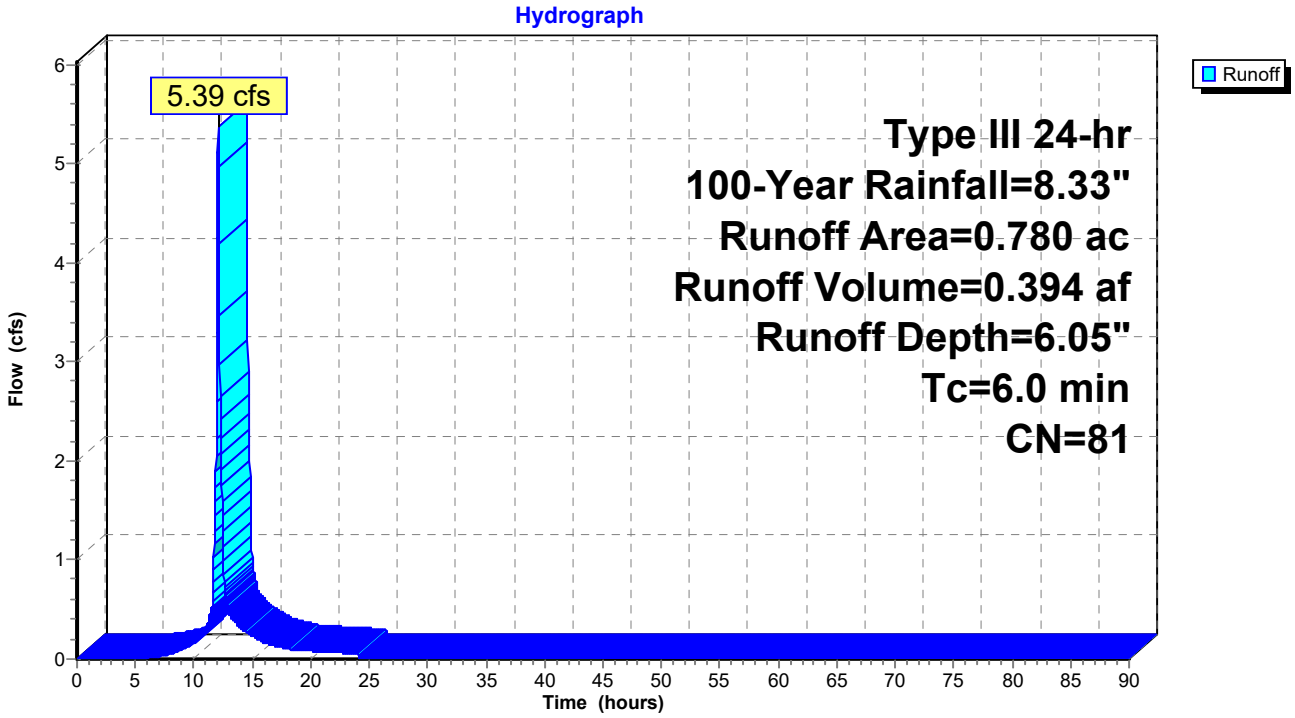
Runoff = 5.39 cfs @ 12.09 hrs, Volume= 0.394 af, Depth= 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.230	39	>75% Grass cover, Good, HSG A
*	0.550	98	
	0.780	81	Weighted Average
	0.230		29.49% Pervious Area
	0.550		70.51% Impervious Area

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

Subcatchment DA 11: PR DA 11



Summary for Subcatchment DA 20: PR DA 20

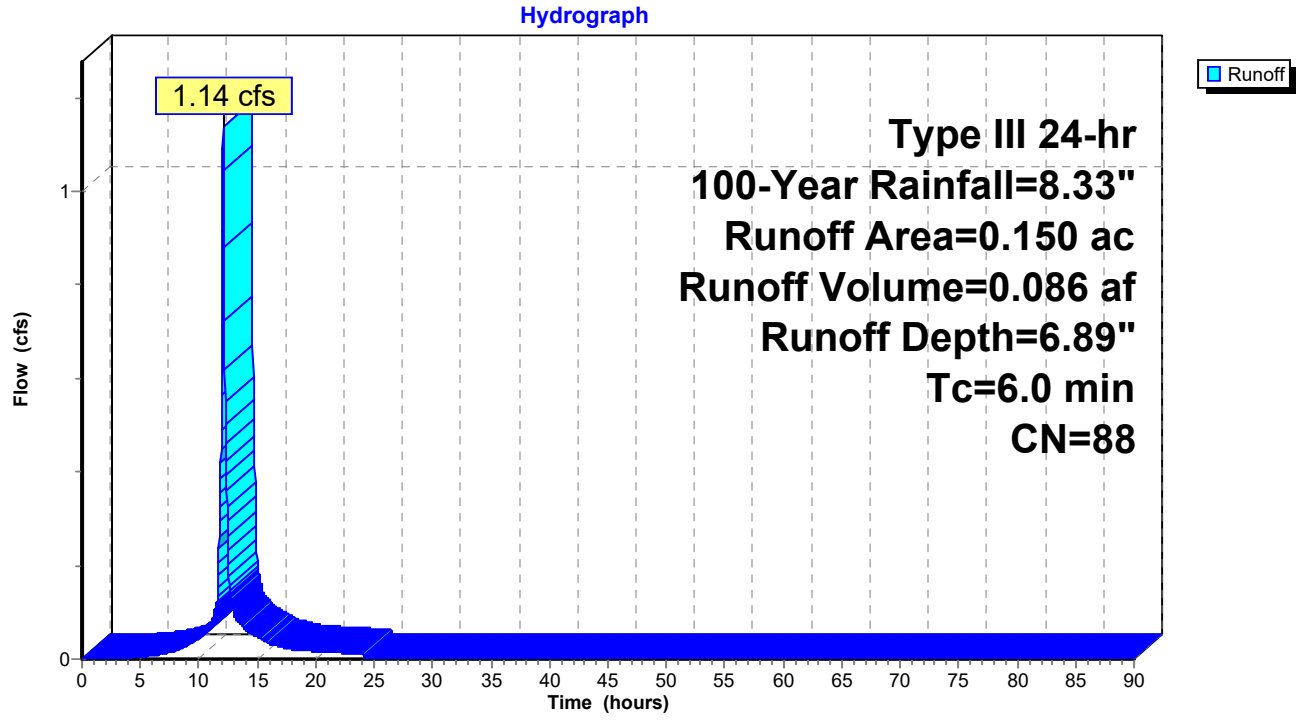
Runoff = 1.14 cfs @ 12.09 hrs, Volume= 0.086 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.040	61	>75% Grass cover, Good, HSG B
*	0.110	98	
	0.150	88	Weighted Average
	0.040		26.67% Pervious Area
	0.110		73.33% Impervious Area

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

Subcatchment DA 20: PR DA 20



Summary for Subcatchment DA 21: PR DA 21

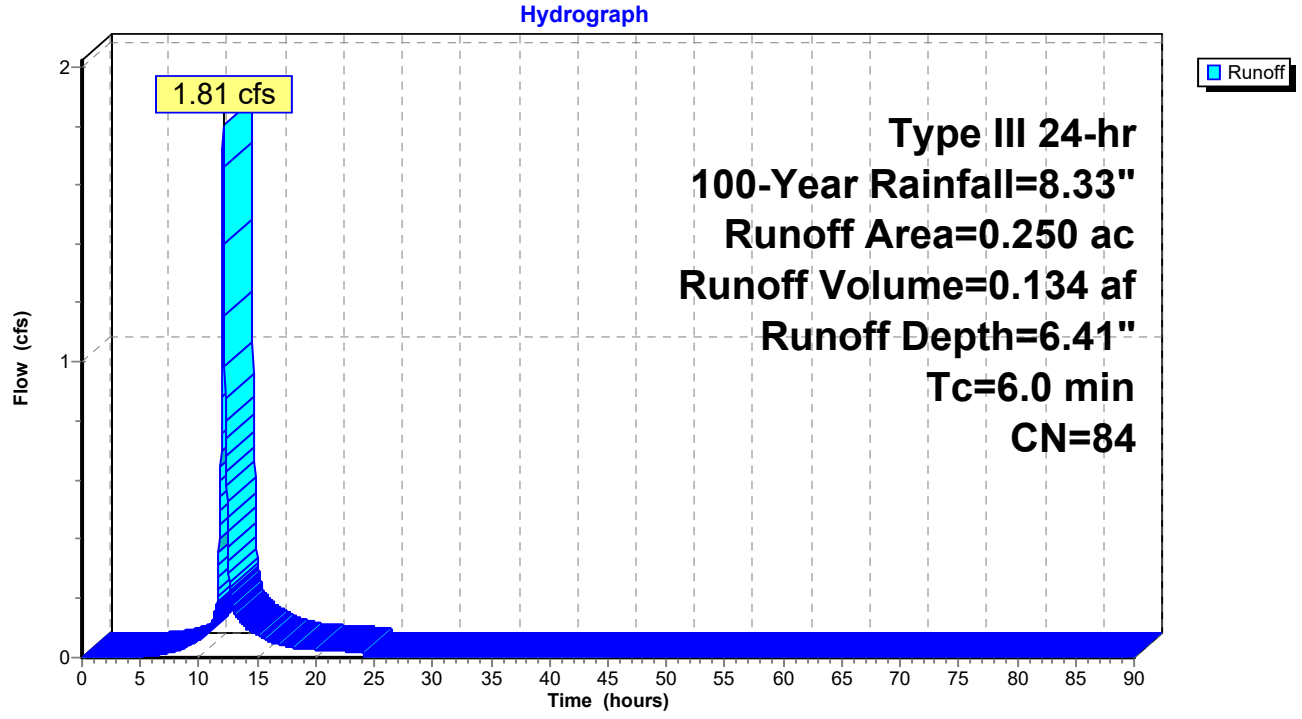
Runoff = 1.81 cfs @ 12.09 hrs, Volume= 0.134 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.080	61	>75% Grass cover, Good, HSG B
	0.010	39	>75% Grass cover, Good, HSG A
*	0.160	98	
	0.250	84	Weighted Average
	0.090		36.00% Pervious Area
	0.160		64.00% Impervious Area

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

Subcatchment DA 21: PR DA 21



Summary for Subcatchment DA 23: PR DA 23

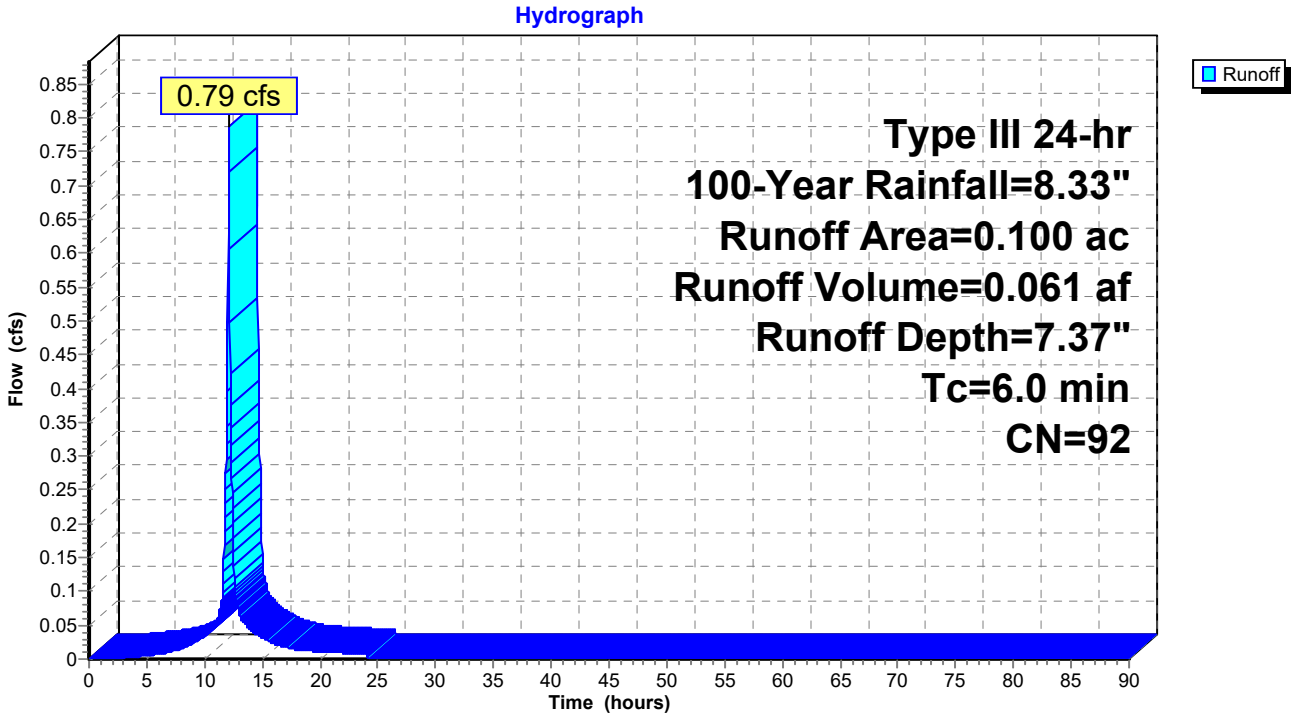
Runoff = 0.79 cfs @ 12.08 hrs, Volume= 0.061 af, Depth= 7.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.010	39	>75% Grass cover, Good, HSG A
*	0.090	98	
	0.100	92	Weighted Average
	0.010		10.00% Pervious Area
	0.090		90.00% Impervious Area

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

Subcatchment DA 23: PR DA 23



Summary for Subcatchment DA 24: PR DA 24

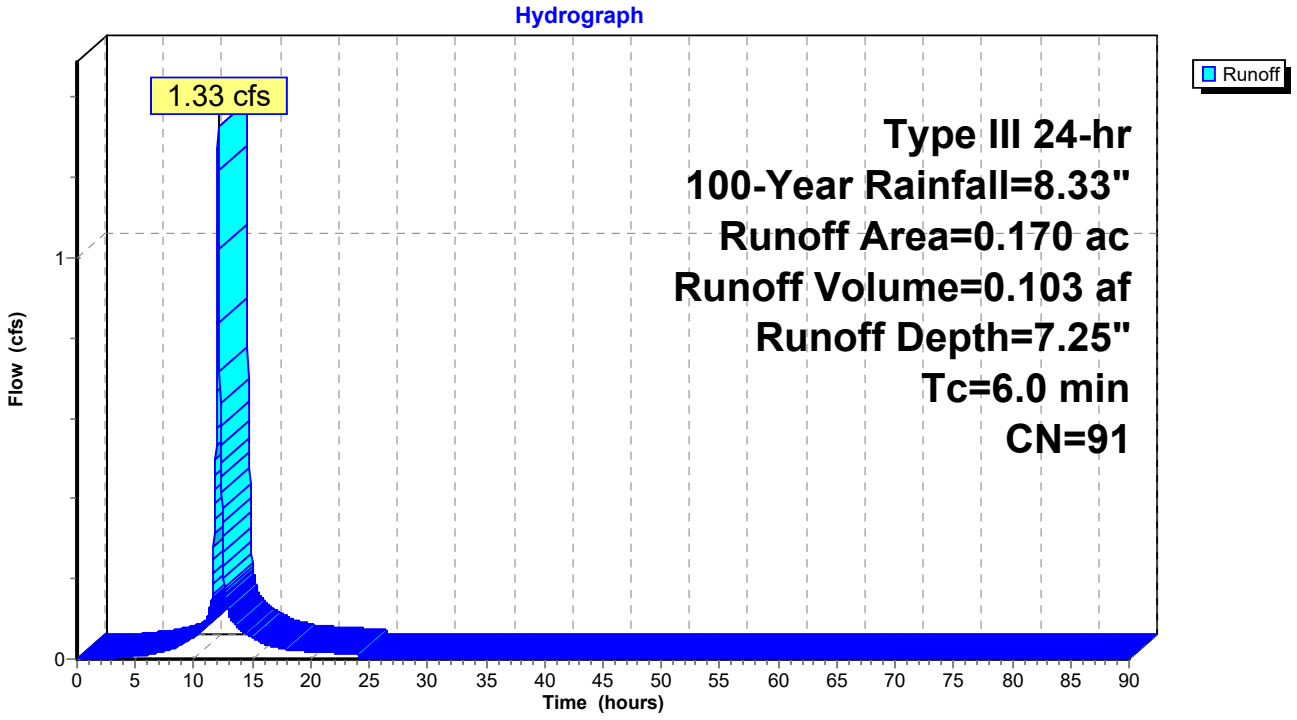
Runoff = 1.33 cfs @ 12.08 hrs, Volume= 0.103 af, Depth= 7.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.020	39	>75% Grass cover, Good, HSG A
*	0.150	98	
	0.170	91	Weighted Average
	0.020		11.76% Pervious Area
	0.150		88.24% Impervious Area

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

Subcatchment DA 24: PR DA 24



Summary for Subcatchment DA 25: PR DA 25

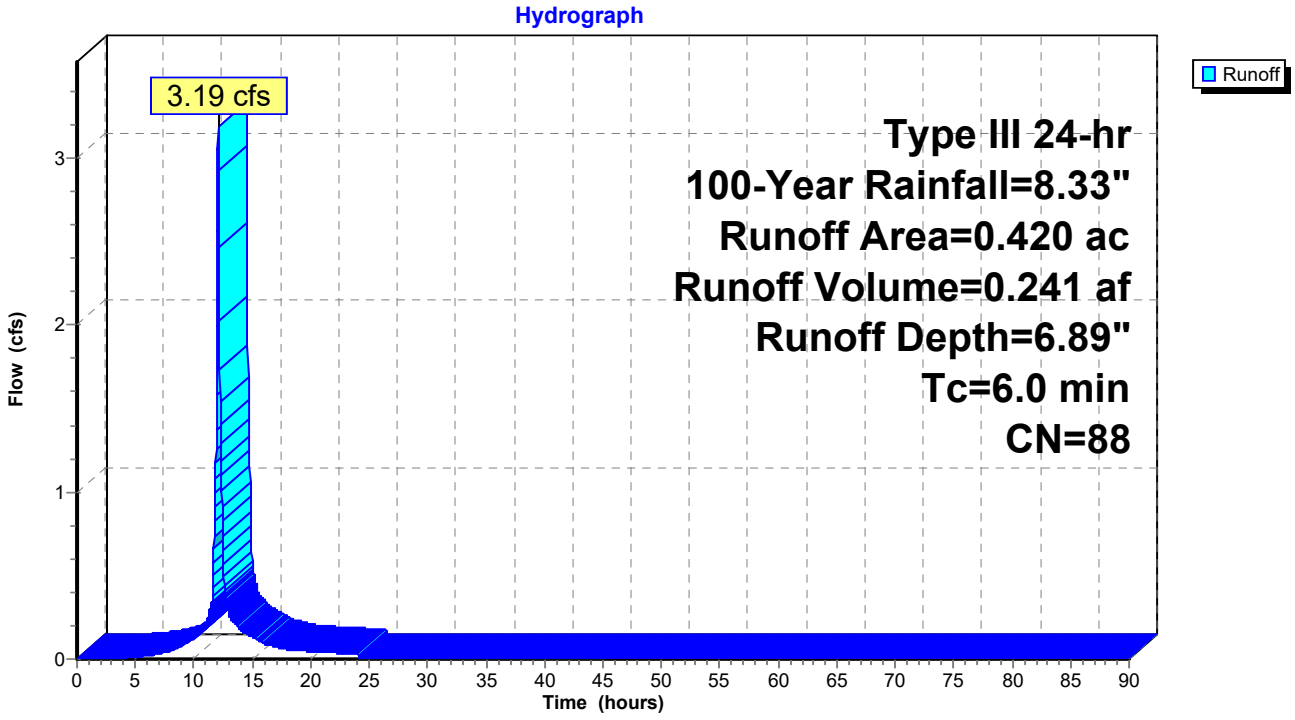
Runoff = 3.19 cfs @ 12.09 hrs, Volume= 0.241 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.070	39	>75% Grass cover, Good, HSG A
*	0.350	98	
	0.420	88	Weighted Average
	0.070		16.67% Pervious Area
	0.350		83.33% Impervious Area

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

Subcatchment DA 25: PR DA 25



Summary for Subcatchment DA 3: PR DA 3

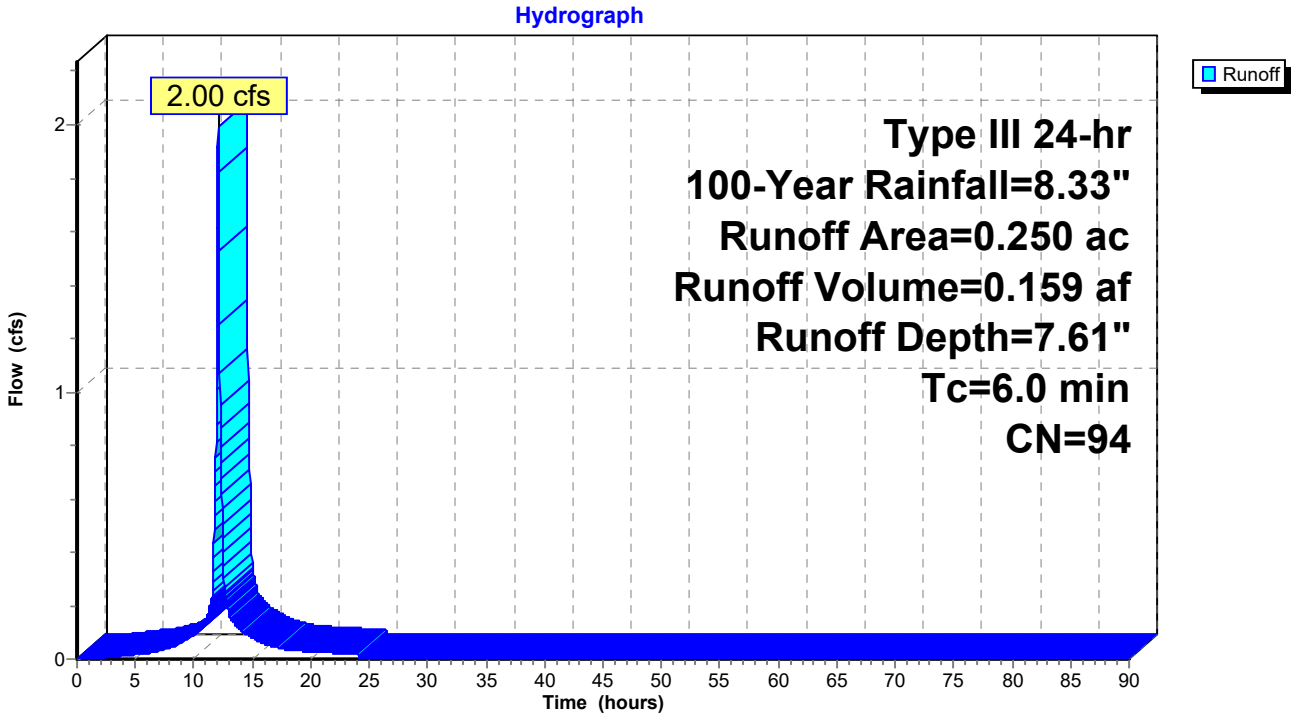
Runoff = 2.00 cfs @ 12.08 hrs, Volume= 0.159 af, Depth= 7.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.030	61	>75% Grass cover, Good, HSG B
*	0.220	98	Impervious
	0.250	94	Weighted Average
	0.030		12.00% Pervious Area
	0.220		88.00% Impervious Area

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

Subcatchment DA 3: PR DA 3



Summary for Subcatchment DA 4: PR DA 4

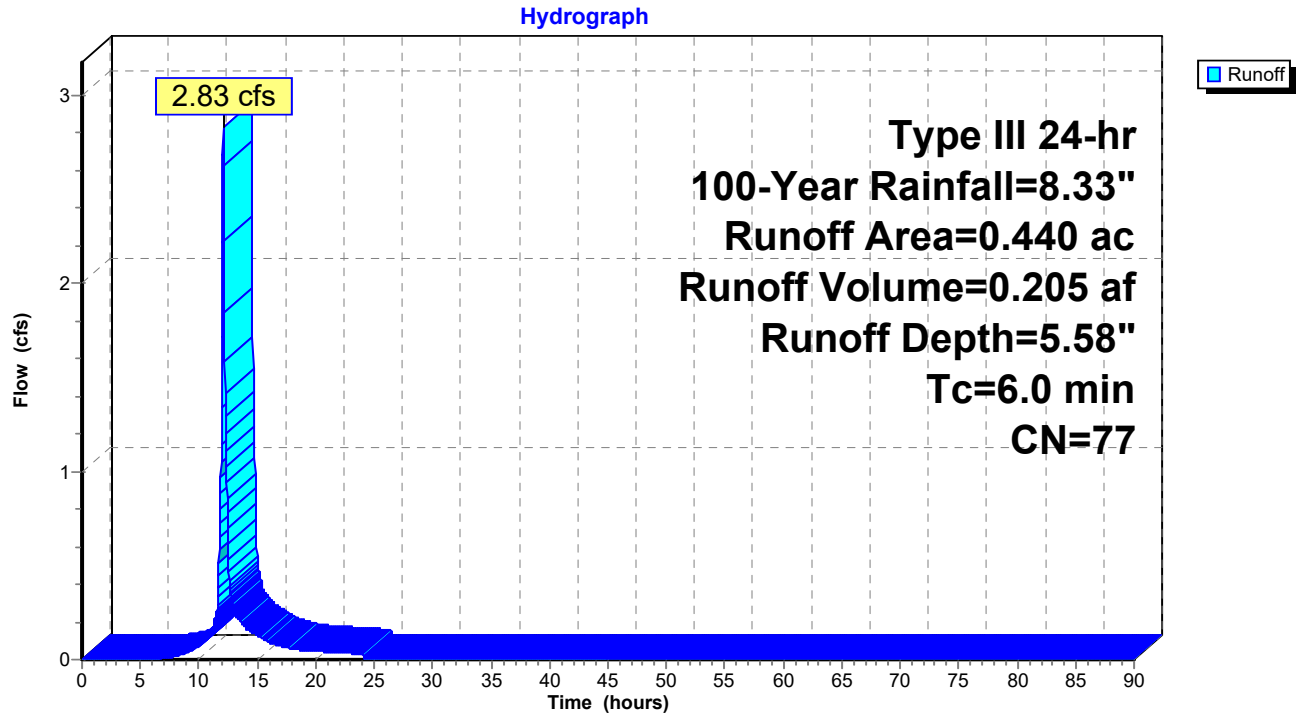
Runoff = 2.83 cfs @ 12.09 hrs, Volume= 0.205 af, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.150	39	>75% Grass cover, Good, HSG A
	0.010	61	>75% Grass cover, Good, HSG B
*	0.280	98	
	0.440	77	Weighted Average
	0.160		36.36% Pervious Area
	0.280		63.64% Impervious Area

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

Subcatchment DA 4: PR DA 4



Summary for Subcatchment DA 5: PR DA 5

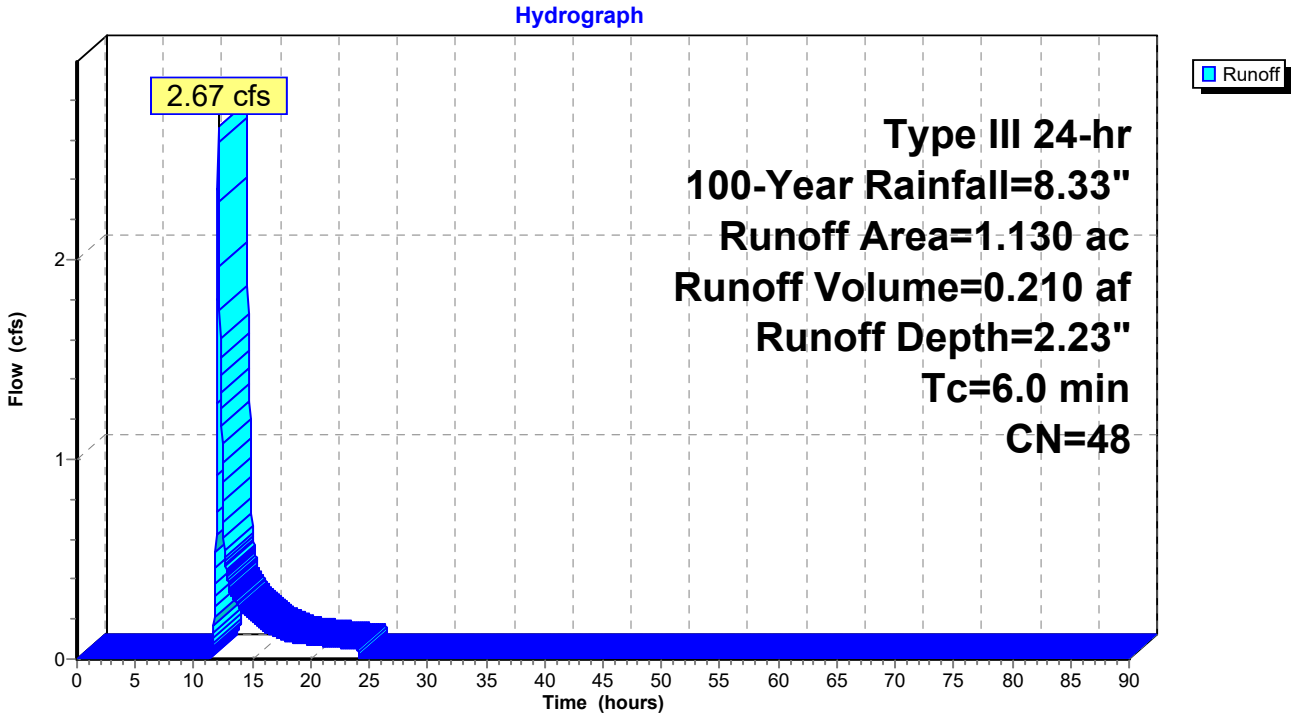
Runoff = 2.67 cfs @ 12.10 hrs, Volume= 0.210 af, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.950	39	>75% Grass cover, Good, HSG A
*	0.180	98	
	1.130	48	Weighted Average
	0.950		84.07% Pervious Area
	0.180		15.93% Impervious Area

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

Subcatchment DA 5: PR DA 5



Summary for Subcatchment DA 6: PR DA 6

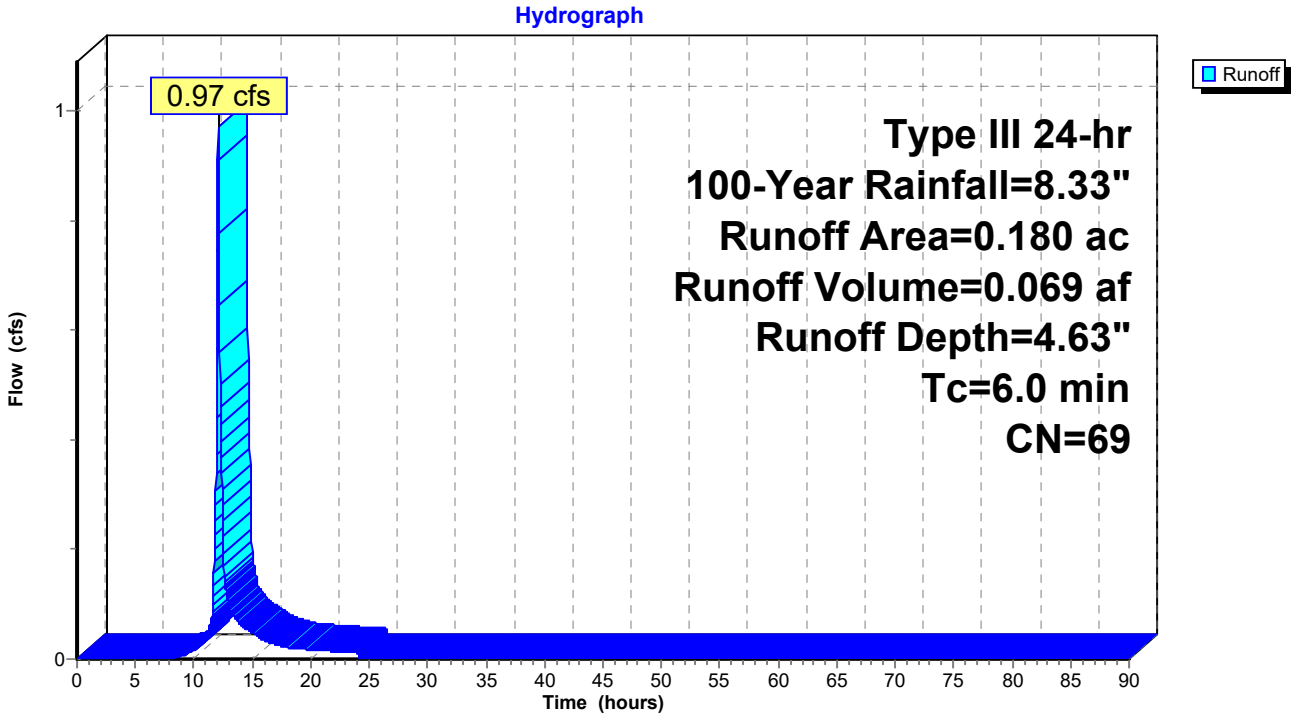
Runoff = 0.97 cfs @ 12.09 hrs, Volume= 0.069 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.090	39	>75% Grass cover, Good, HSG A
*	0.090	98	
	0.180	69	Weighted Average
	0.090		50.00% Pervious Area
	0.090		50.00% Impervious Area

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

Subcatchment DA 6: PR DA 6



Summary for Subcatchment DA 8: PR DA 8

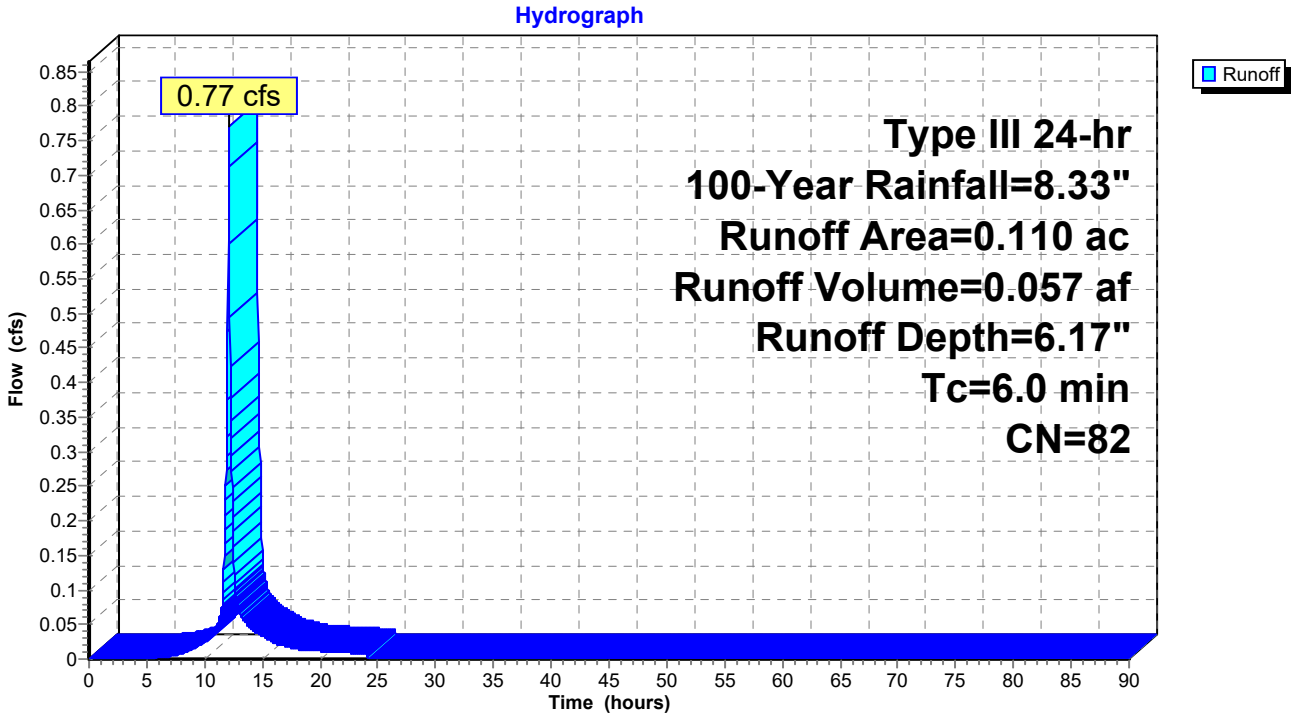
Runoff = 0.77 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 6.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.030	39	>75% Grass cover, Good, HSG A
*	0.080	98	
	0.110	82	Weighted Average
	0.030		27.27% Pervious Area
	0.080		72.73% Impervious Area

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

Subcatchment DA 8: PR DA 8



Summary for Subcatchment DA 9: PR DA 9

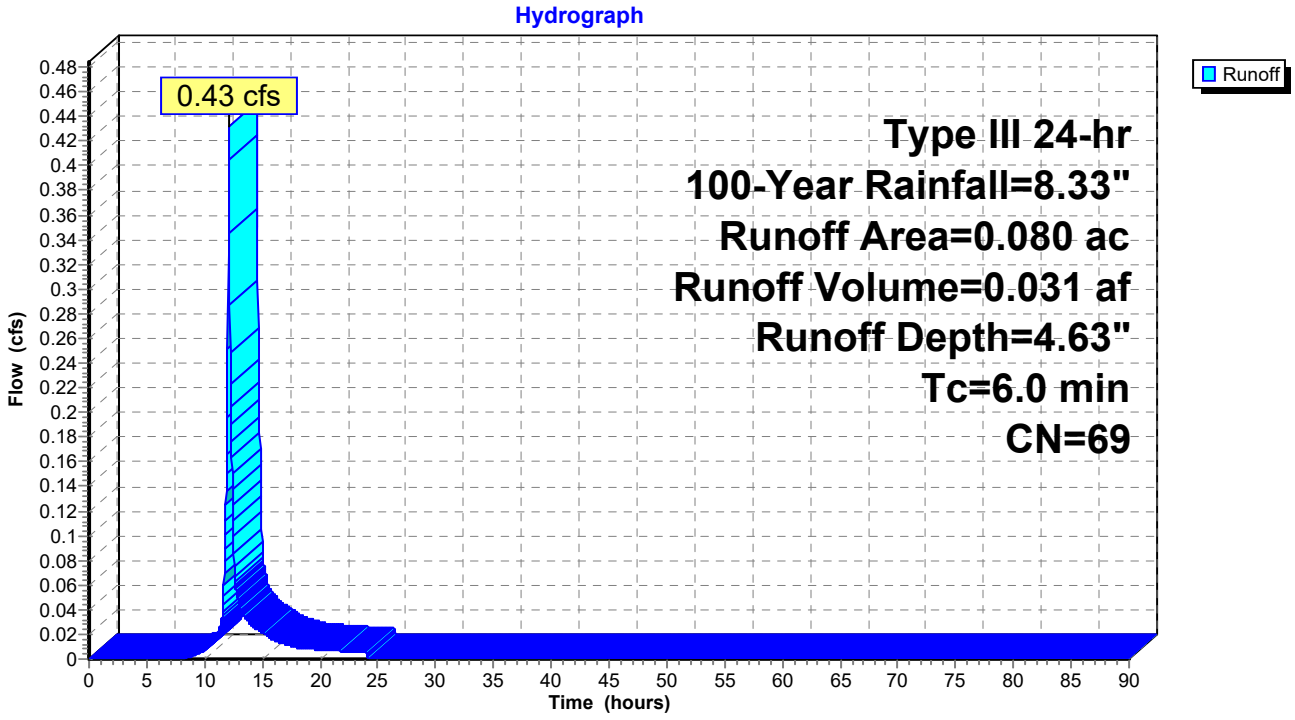
Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
	0.040	39	>75% Grass cover, Good, HSG A
*	0.040	98	
	0.080	69	Weighted Average
	0.040		50.00% Pervious Area
	0.040		50.00% Impervious Area

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

Subcatchment DA 9: PR DA 9



Summary for Subcatchment DA CO-1: PR CO-1

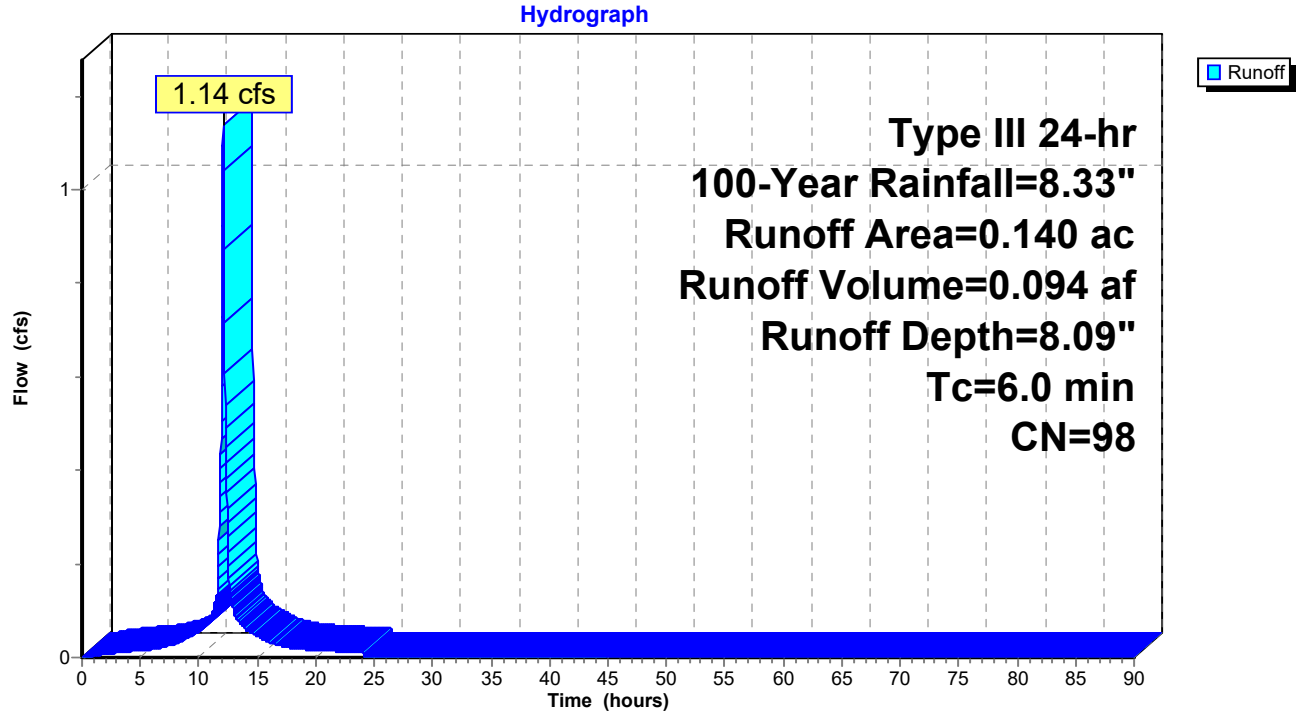
Runoff = 1.14 cfs @ 12.08 hrs, Volume= 0.094 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

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

Subcatchment DA CO-1: PR CO-1



Summary for Subcatchment DA CO-12: PR CO-12

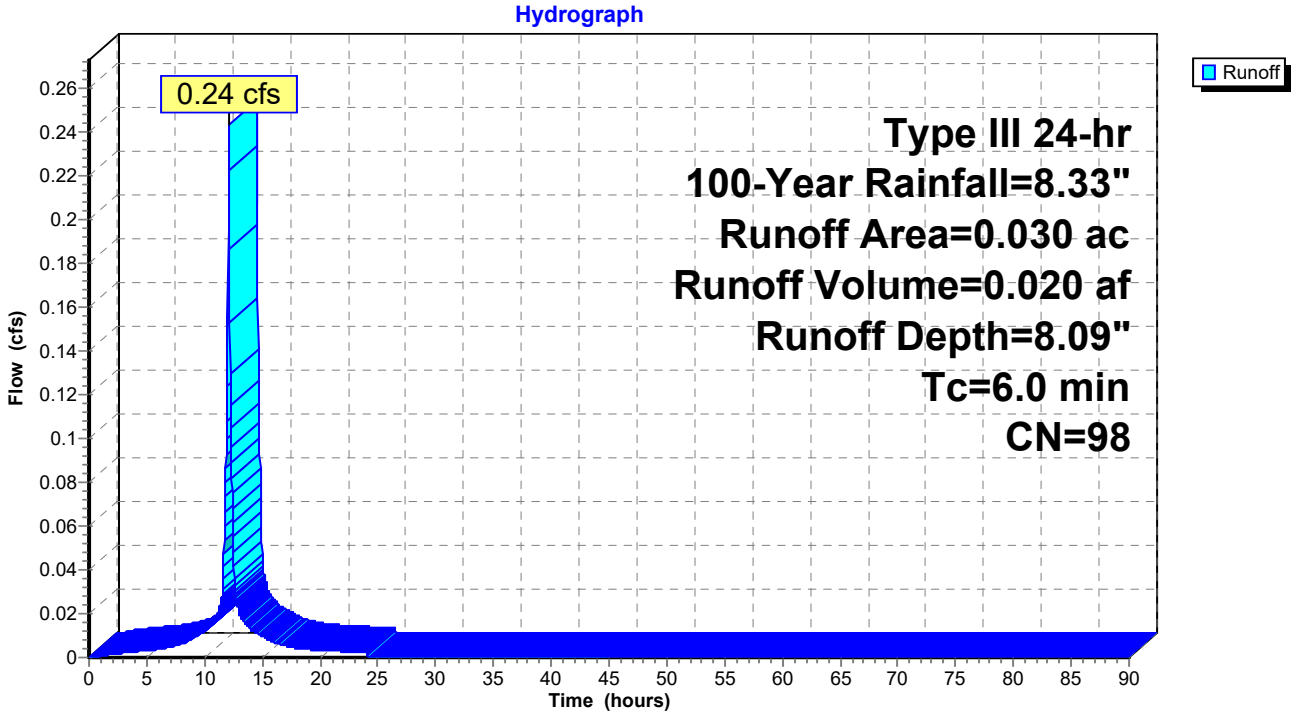
Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.020 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.030	98	
	0.030		100.00% Impervious Area

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

Subcatchment DA CO-12: PR CO-12



Summary for Subcatchment DA CO-13: PR CO-13

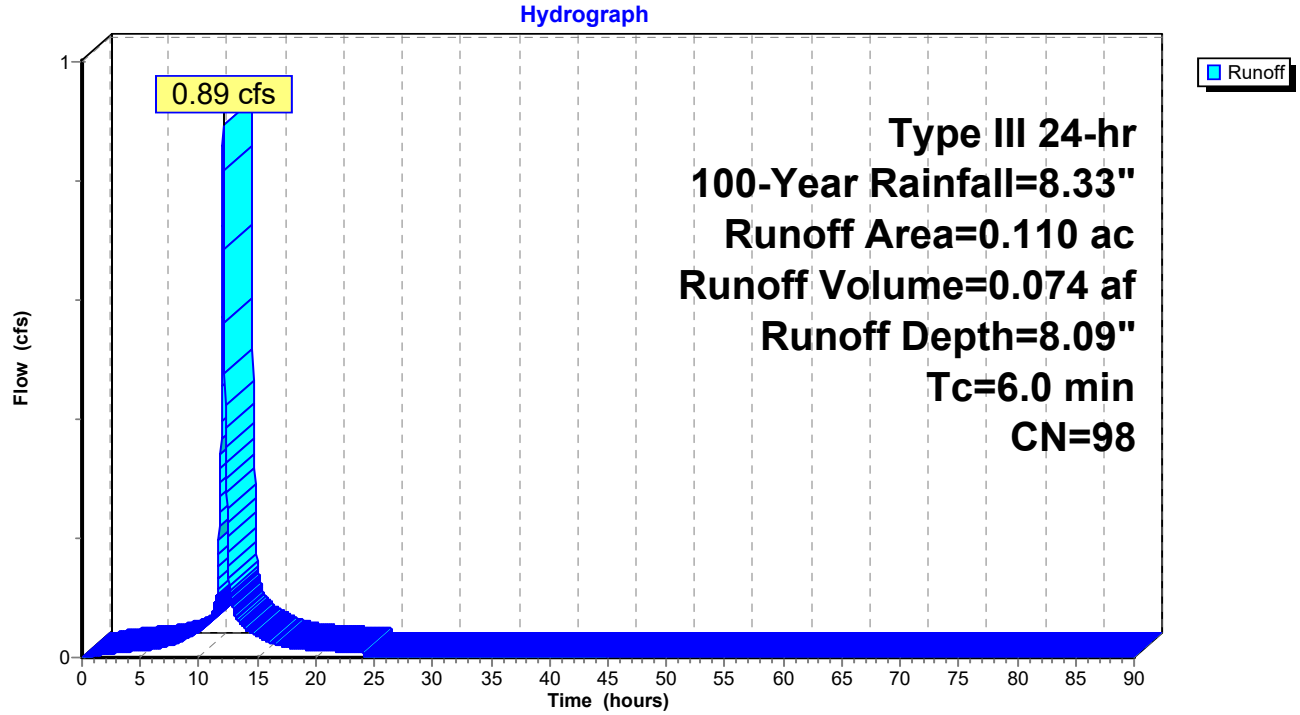
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 0.074 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.110	98	
	0.110		100.00% Impervious Area

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

Subcatchment DA CO-13: PR CO-13



Summary for Subcatchment DA CO-15: PR CO-15

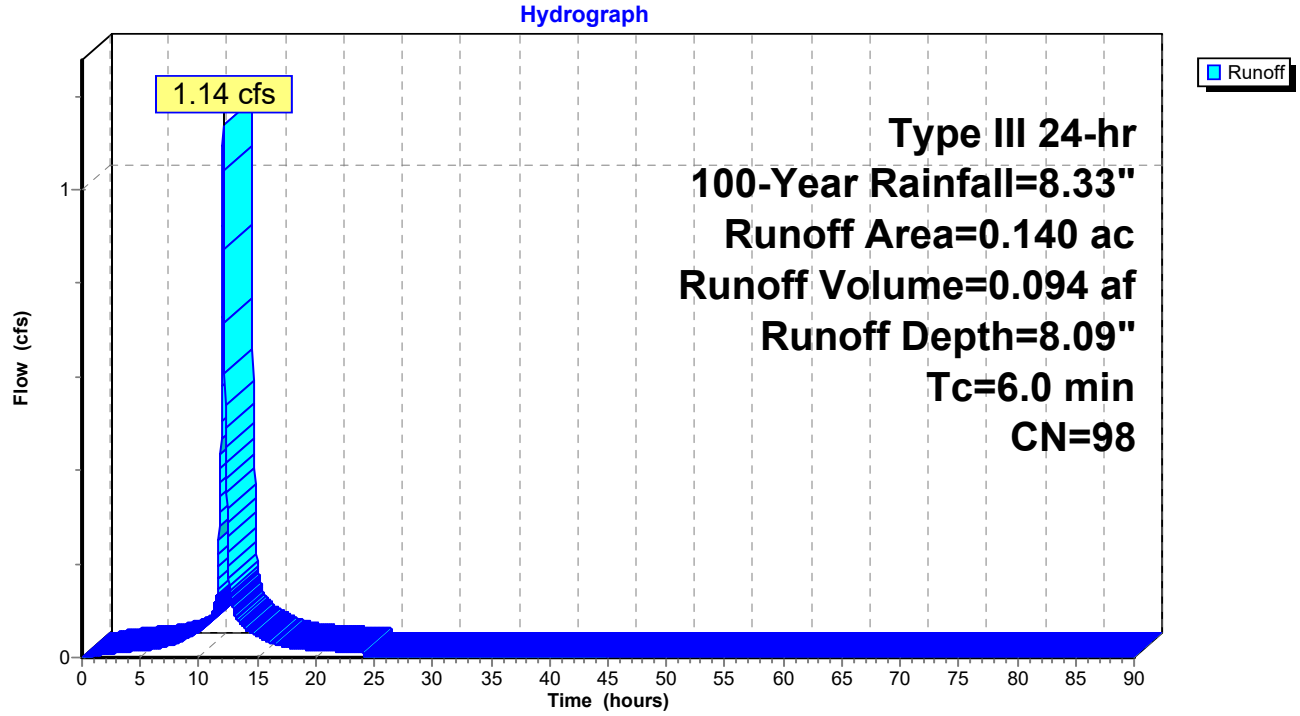
Runoff = 1.14 cfs @ 12.08 hrs, Volume= 0.094 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

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

Subcatchment DA CO-15: PR CO-15



Summary for Subcatchment DA CO-17: PR CO-17

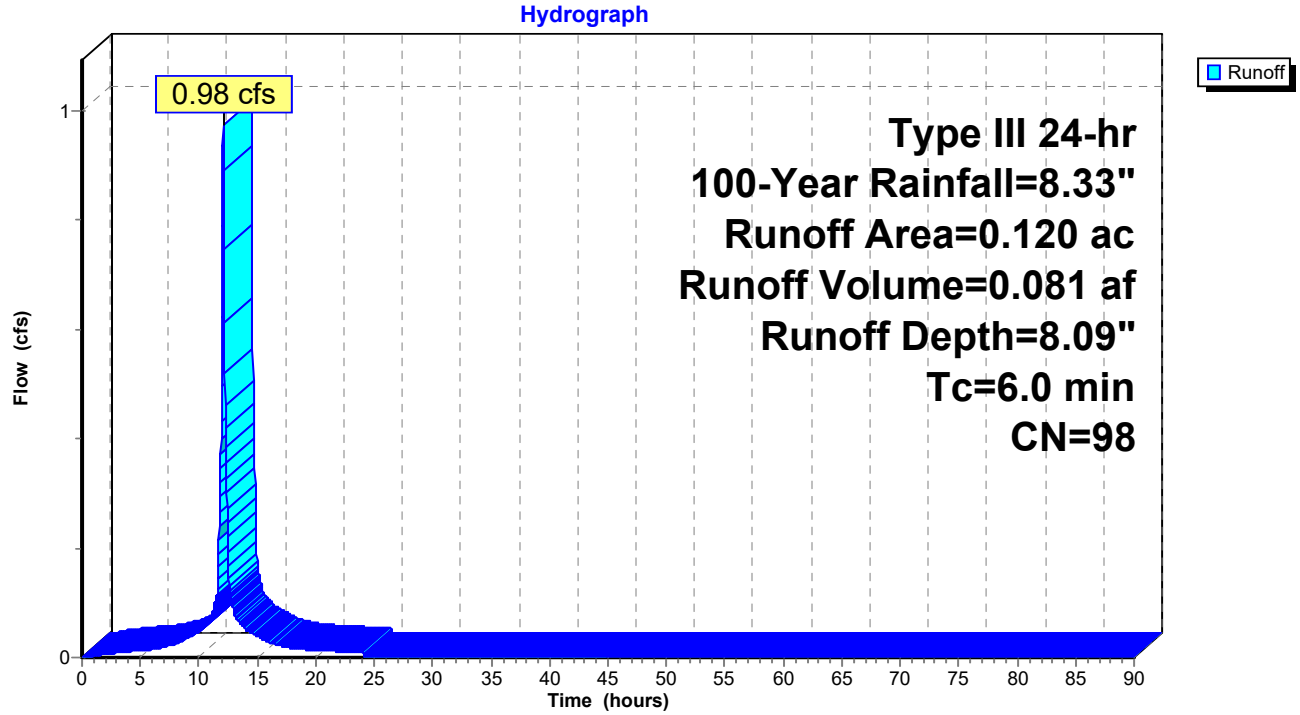
Runoff = 0.98 cfs @ 12.08 hrs, Volume= 0.081 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.120	98	
	0.120		100.00% Impervious Area

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

Subcatchment DA CO-17: PR CO-17



Summary for Subcatchment DA CO-3: PR CO-3

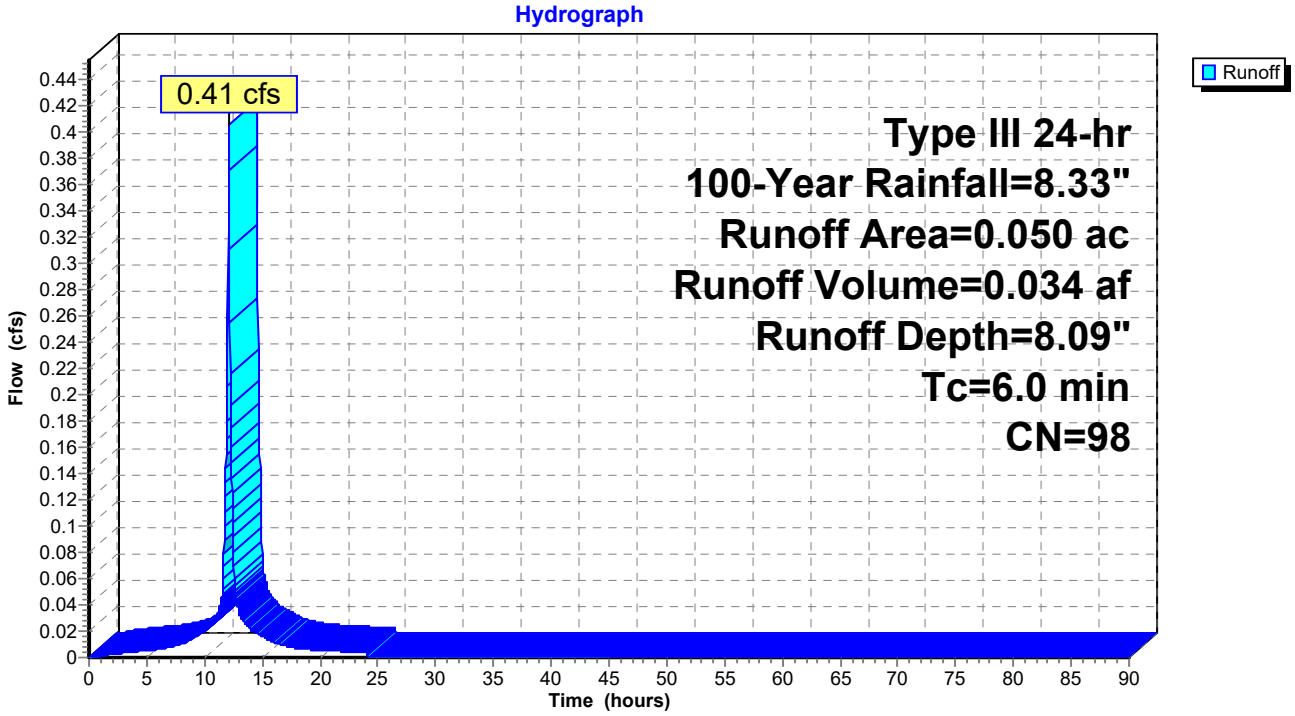
Runoff = 0.41 cfs @ 12.08 hrs, Volume= 0.034 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

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

Subcatchment DA CO-3: PR CO-3



Summary for Subcatchment DA CO-4: PR CO-4

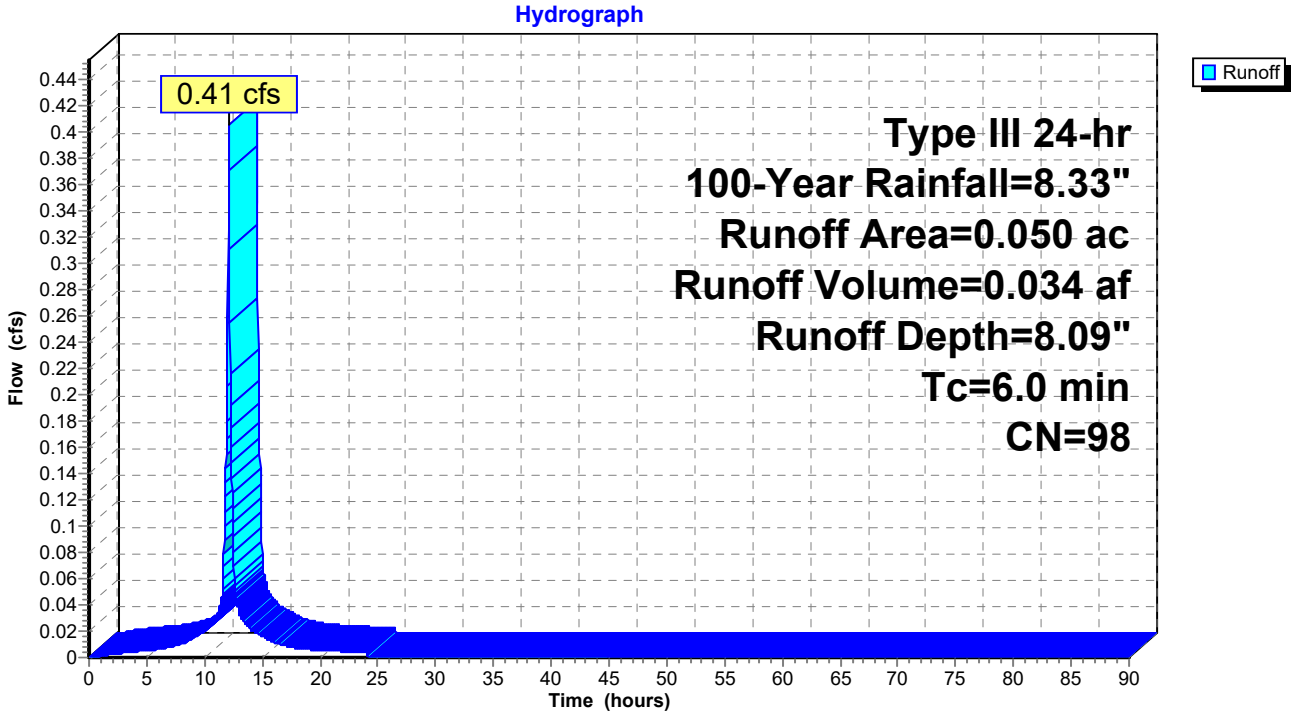
Runoff = 0.41 cfs @ 12.08 hrs, Volume= 0.034 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

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

Subcatchment DA CO-4: PR CO-4



Summary for Subcatchment DA CO-6: PR CO-6

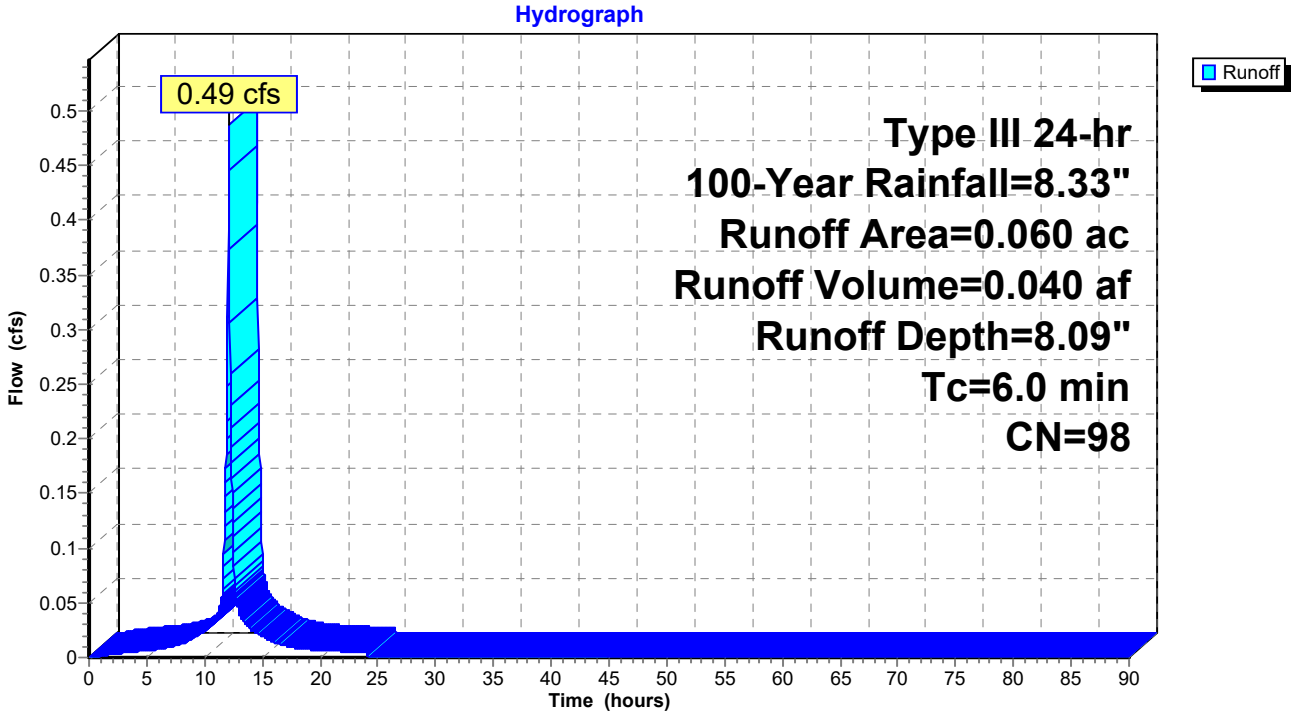
Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.060	98	
	0.060		100.00% Impervious Area

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

Subcatchment DA CO-6: PR CO-6



Summary for Subcatchment DA CO-8: PR CO-8

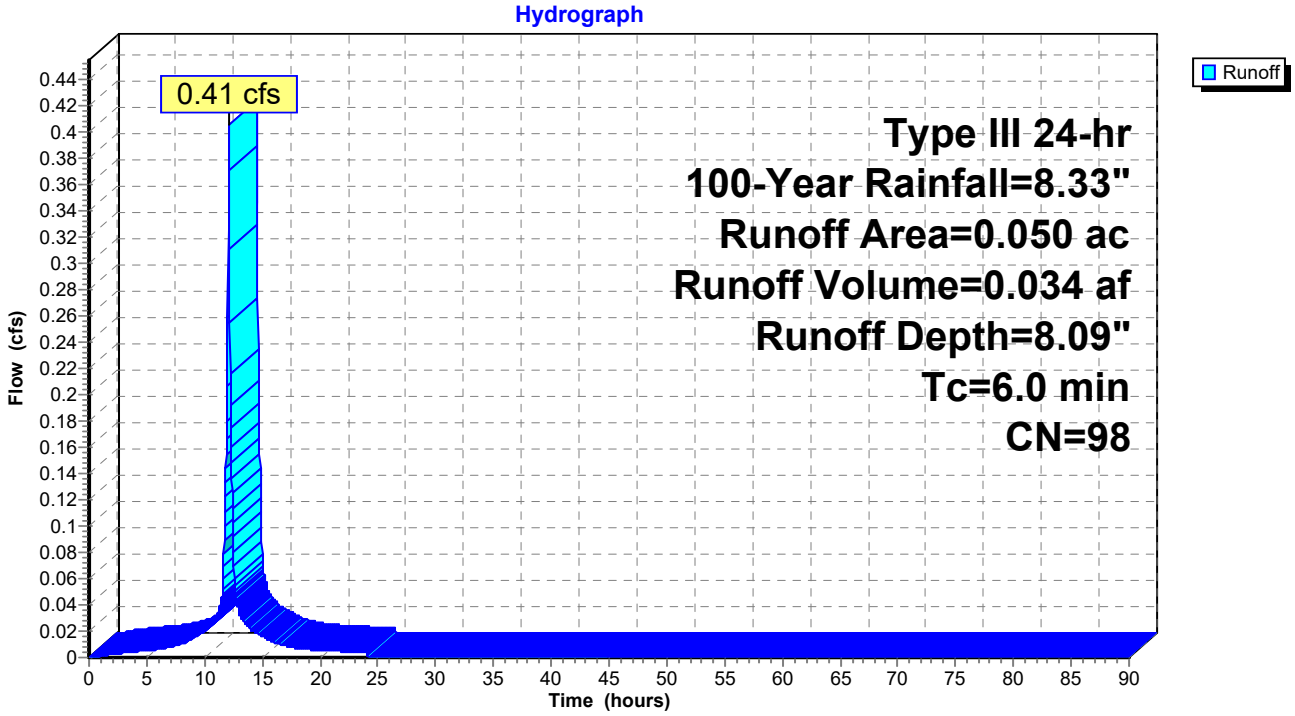
Runoff = 0.41 cfs @ 12.08 hrs, Volume= 0.034 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

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

Subcatchment DA CO-8: PR CO-8



Summary for Subcatchment DA CO-9: PR CO-9

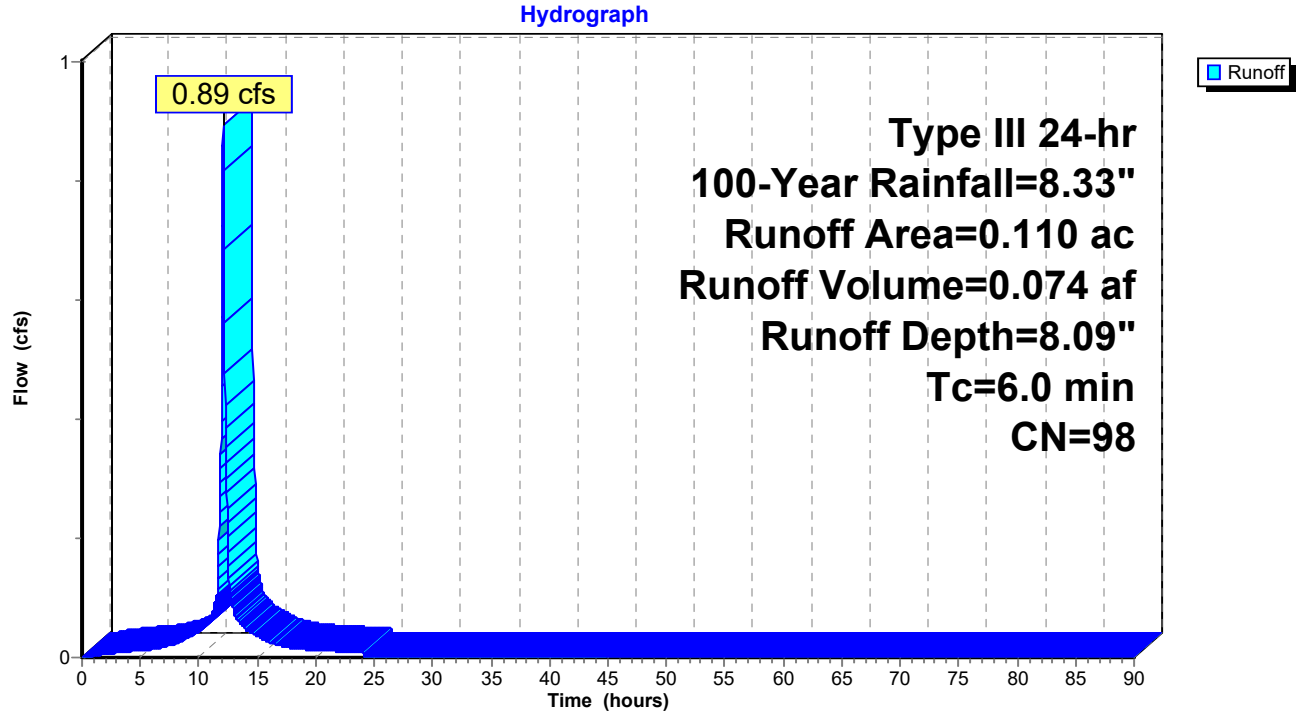
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 0.074 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	0.110	98	
	0.110		100.00% Impervious Area

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

Subcatchment DA CO-9: PR CO-9



Summary for Pond 1P: Ex. Inlet

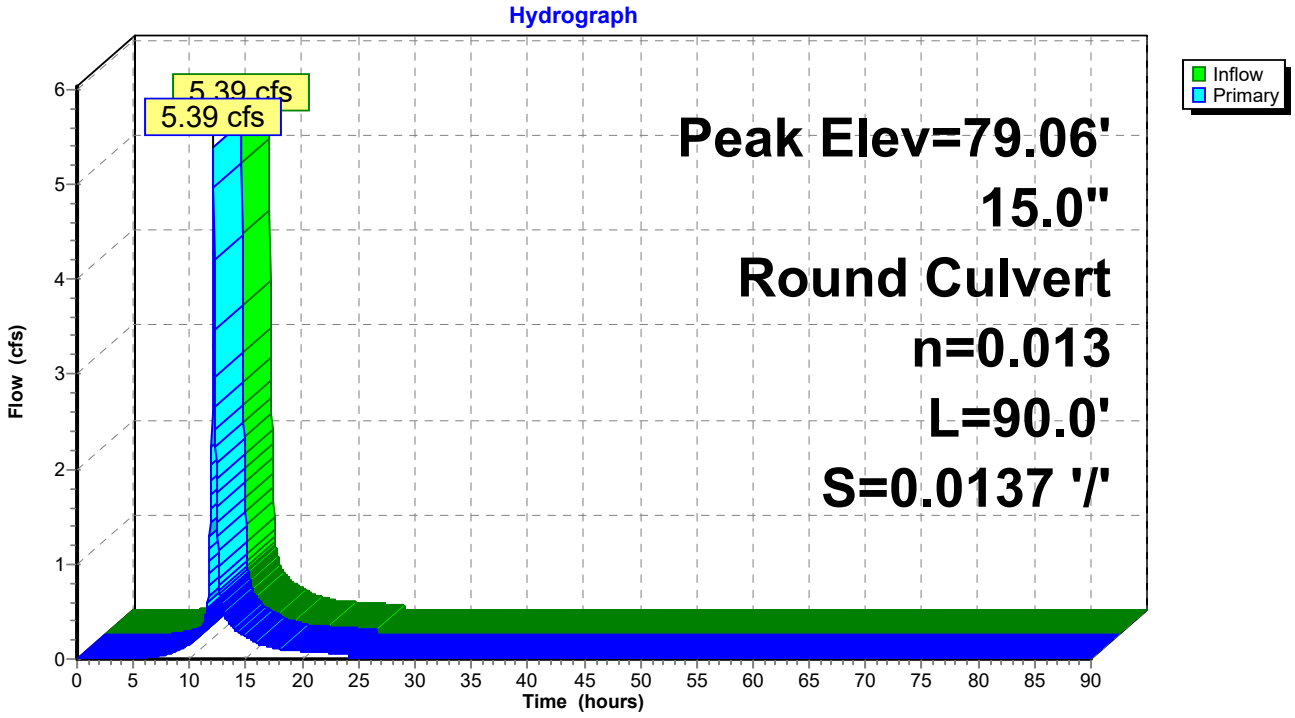
Inflow	=	5.39 cfs @	12.09 hrs, Volume=	0.394 af
Outflow	=	5.39 cfs @	12.12 hrs, Volume=	0.394 af, Atten= 0%, Lag= 1.8 min
Primary	=	5.39 cfs @	12.12 hrs, Volume=	0.394 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 79.06' @ 12.12 hrs
Flood Elev= 82.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	77.60'	**15.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 77.60' / 76.37' S= 0.0137 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=5.36 cfs @ 12.12 hrs HW=79.05' TW=75.13' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.36 cfs @ 4.36 fps)

Pond 1P: Ex. Inlet



Summary for Pond CB 10: Ex. Inlet #10

Inflow	=	6.03 cfs @	12.11 hrs, Volume=	0.449 af
Outflow	=	6.03 cfs @	12.14 hrs, Volume=	0.449 af, Atten= 0%, Lag= 1.8 min
Primary	=	6.03 cfs @	12.14 hrs, Volume=	0.449 af
Secondary	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af

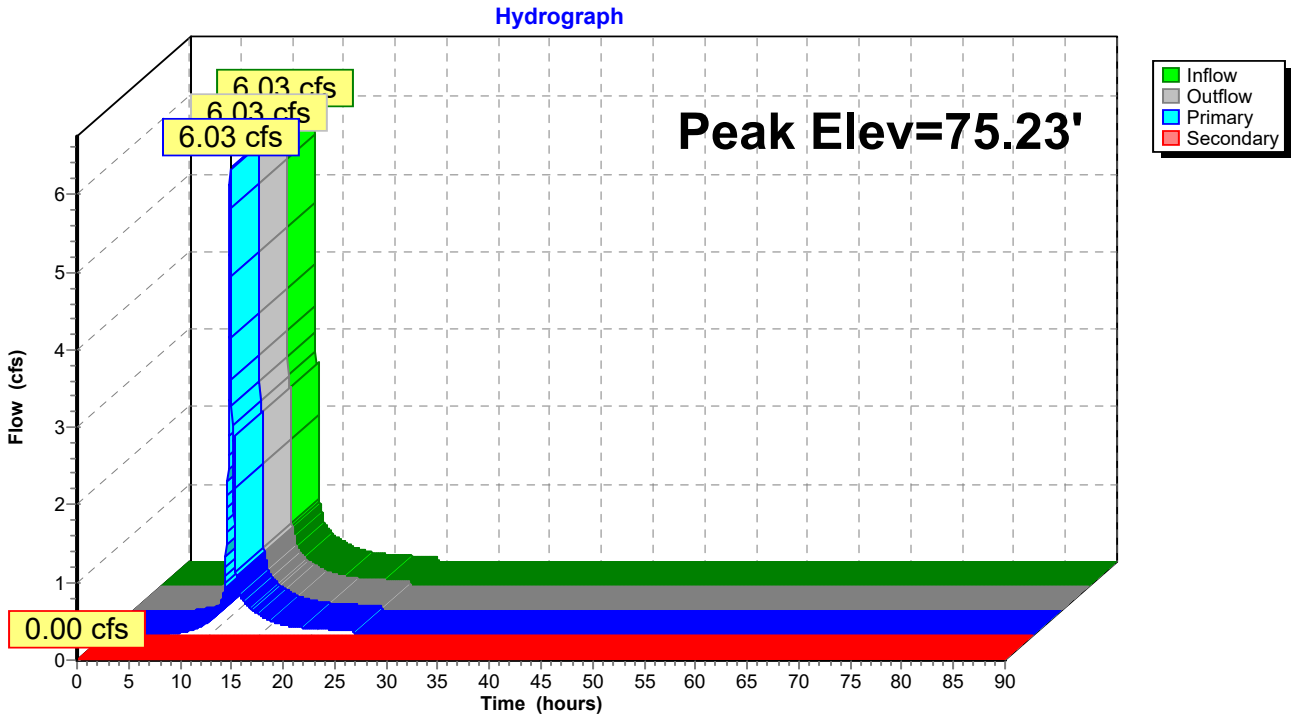
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.23' @ 12.14 hrs
Flood Elev= 79.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.57'	**15.0" Round Culvert** L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.57' / 72.52' S= 0.0175 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Secondary	77.60'	**15.0" Round Culvert** L= 90.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 76.37' / 77.60' S= -0.0137 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=5.97 cfs @ 12.14 hrs HW=75.22' TW=73.86' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.97 cfs @ 4.86 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=73.57' TW=77.60' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond CB 10: Ex. Inlet #10



Summary for Pond CB 20: Inlet #20

Inflow	=	19.76 cfs @	12.15 hrs,	Volume=	1.198 af
Outflow	=	19.76 cfs @	12.18 hrs,	Volume=	1.198 af, Atten= 0%, Lag= 1.8 min
Primary	=	12.35 cfs @	12.18 hrs,	Volume=	1.056 af
Secondary	=	10.23 cfs @	12.12 hrs,	Volume=	0.141 af

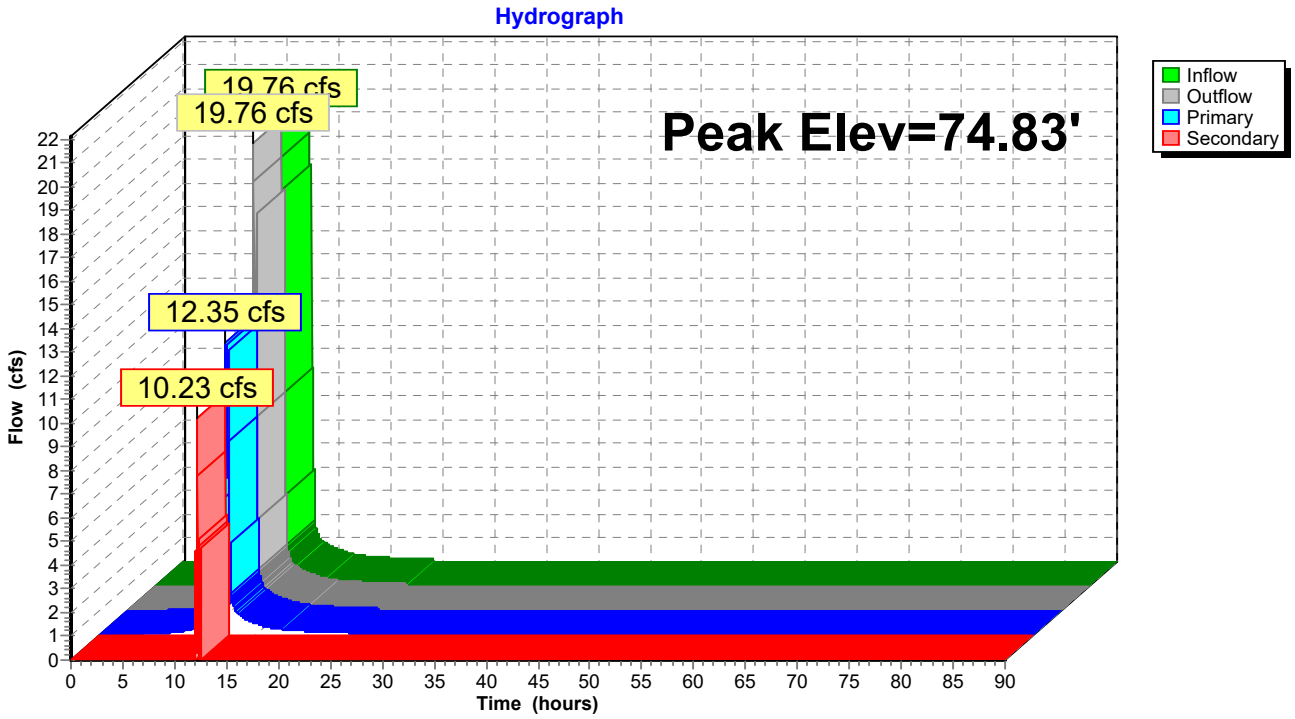
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.83' @ 12.44 hrs
Flood Elev= 75.37'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.99'	**24.0" Round Culvert** L= 172.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 68.99' / 68.03' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	69.43'	**24.0" Round Culvert** L= 68.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.09' / 69.43' S= -0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=11.41 cfs @ 12.18 hrs HW=72.89' TW=72.14' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 11.41 cfs @ 3.63 fps)

Secondary OutFlow Max=0.00 cfs @ 12.12 hrs HW=71.88' TW=71.97' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond CB 20: Inlet #20



Summary for Pond CB 21: Inlet #21

Inflow	=	19.57 cfs @	12.12 hrs,	Volume=	0.997 af
Outflow	=	19.57 cfs @	12.15 hrs,	Volume=	0.996 af, Atten= 0%, Lag= 1.8 min
Primary	=	13.90 cfs @	12.41 hrs,	Volume=	0.940 af
Secondary	=	6.26 cfs @	12.15 hrs,	Volume=	0.056 af
Tertiary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.08' @ 12.48 hrs
Flood Elev= 75.73'

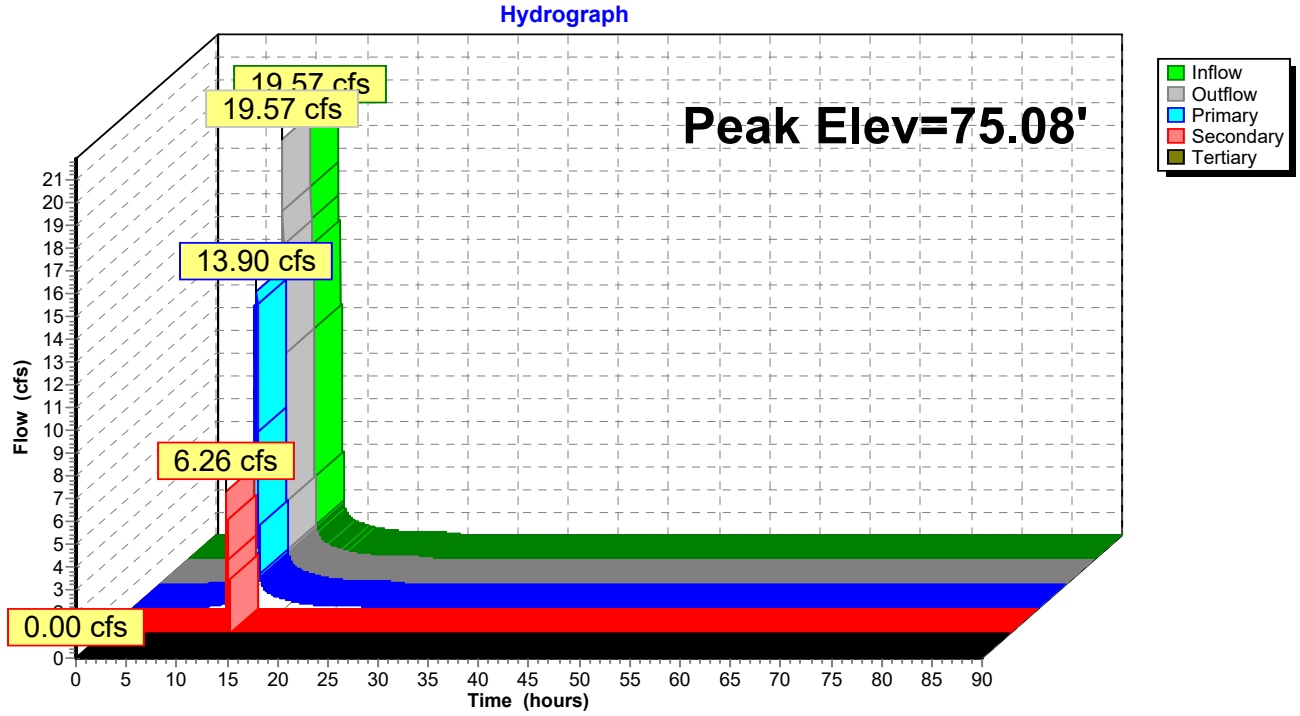
Device	Routing	Invert	Outlet Devices
#1	Primary	69.43'	**24.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 69.43' / 69.09' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	70.46'	**18.0" Round Culvert** L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 69.93' / 70.46' S= -0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#3	Tertiary	72.77'	**15.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 71.37' / 72.77' S= -0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.10 cfs @ 12.41 hrs HW=74.71' TW=74.49' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 7.10 cfs @ 2.26 fps)

Secondary OutFlow Max=2.83 cfs @ 12.15 hrs HW=72.65' TW=72.53' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 2.83 cfs @ 1.60 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=69.43' TW=75.50' (Dynamic Tailwater)
↑—**3=Culvert** (Controls 0.00 cfs)

Pond CB 21: Inlet #21



Summary for Pond CB 23: Inlet #23

Inflow	=	12.14 cfs @	12.15 hrs,	Volume=	0.617 af
Outflow	=	12.14 cfs @	12.18 hrs,	Volume=	0.617 af, Atten= 0%, Lag= 1.8 min
Primary	=	9.52 cfs @	12.30 hrs,	Volume=	0.556 af
Secondary	=	6.21 cfs @	12.18 hrs,	Volume=	0.061 af

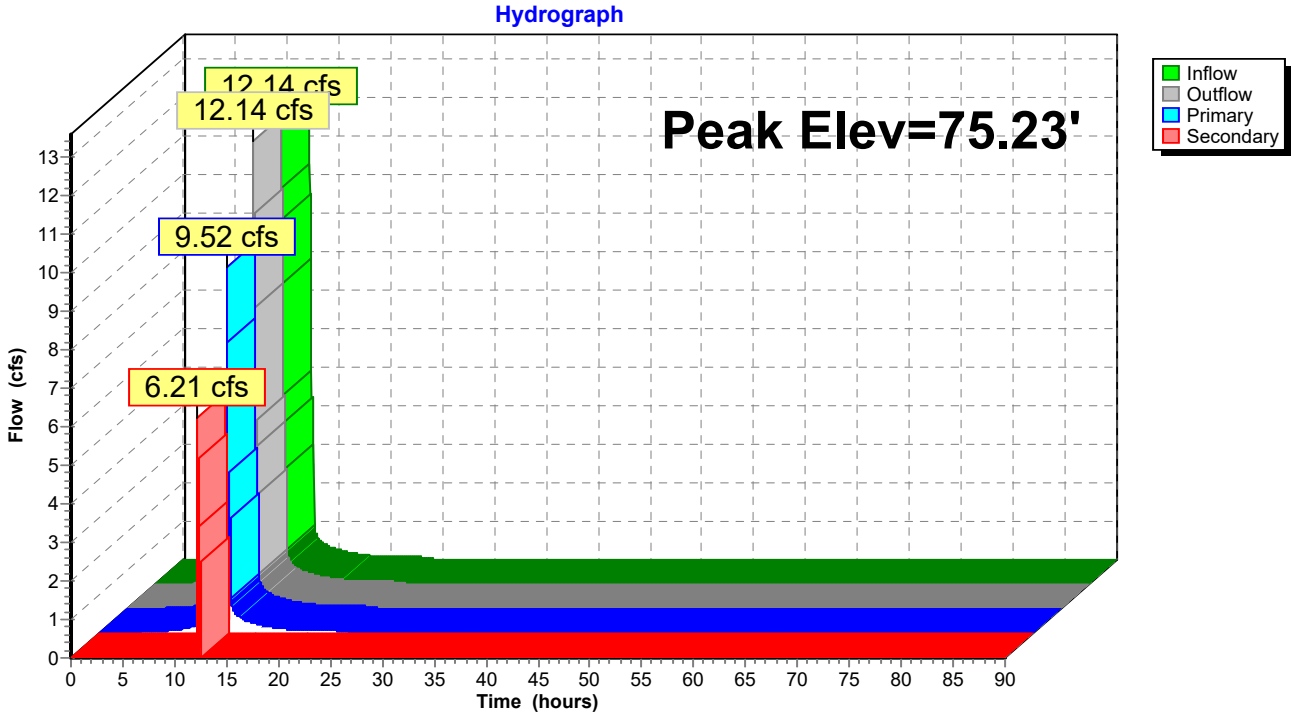
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.23' @ 12.30 hrs
Flood Elev= 76.58'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.46'	**18.0" Round Culvert** L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 70.46' / 69.93' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	71.09'	**18.0" Round Culvert** L= 106.0' Ke= 0.500 Inlet / Outlet Invert= 70.56' / 71.09' S= -0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=10.29 cfs @ 12.30 hrs HW=75.23' TW=73.59' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 10.29 cfs @ 5.82 fps)

Secondary OutFlow Max=4.56 cfs @ 12.18 hrs HW=73.18' TW=72.83' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 4.56 cfs @ 2.58 fps)

Pond CB 23: Inlet #23



Summary for Pond CB 24: Inlet #24

Inflow	=	12.08 cfs @	12.24 hrs, Volume=	0.449 af
Outflow	=	12.08 cfs @	12.27 hrs, Volume=	0.449 af, Atten= 0%, Lag= 1.8 min
Primary	=	8.69 cfs @	12.27 hrs, Volume=	0.405 af
Secondary	=	4.76 cfs @	12.21 hrs, Volume=	0.044 af

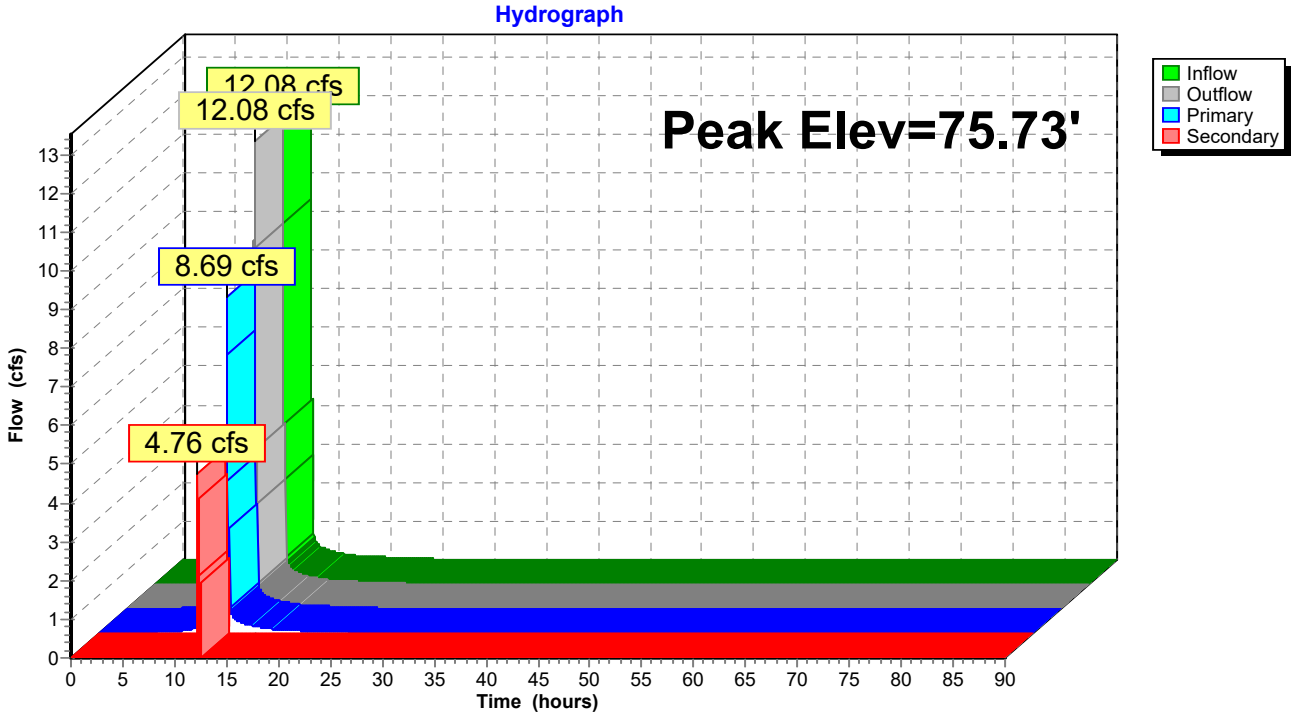
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.73' @ 12.34 hrs
Flood Elev= 76.58'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.09'	**18.0" Round Culvert** L= 106.0' Ke= 0.500 Inlet / Outlet Invert= 71.09' / 70.56' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	71.69'	**15.0" Round Culvert** L= 69.0' Ke= 0.500 Inlet / Outlet Invert= 71.34' / 71.69' S= -0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=10.25 cfs @ 12.27 hrs HW=75.24' TW=73.45' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 10.25 cfs @ 5.80 fps)

Secondary OutFlow Max=4.23 cfs @ 12.21 hrs HW=73.57' TW=73.00' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 4.23 cfs @ 3.45 fps)

Pond CB 24: Inlet #24



Summary for Pond CB 25: Inlet #25

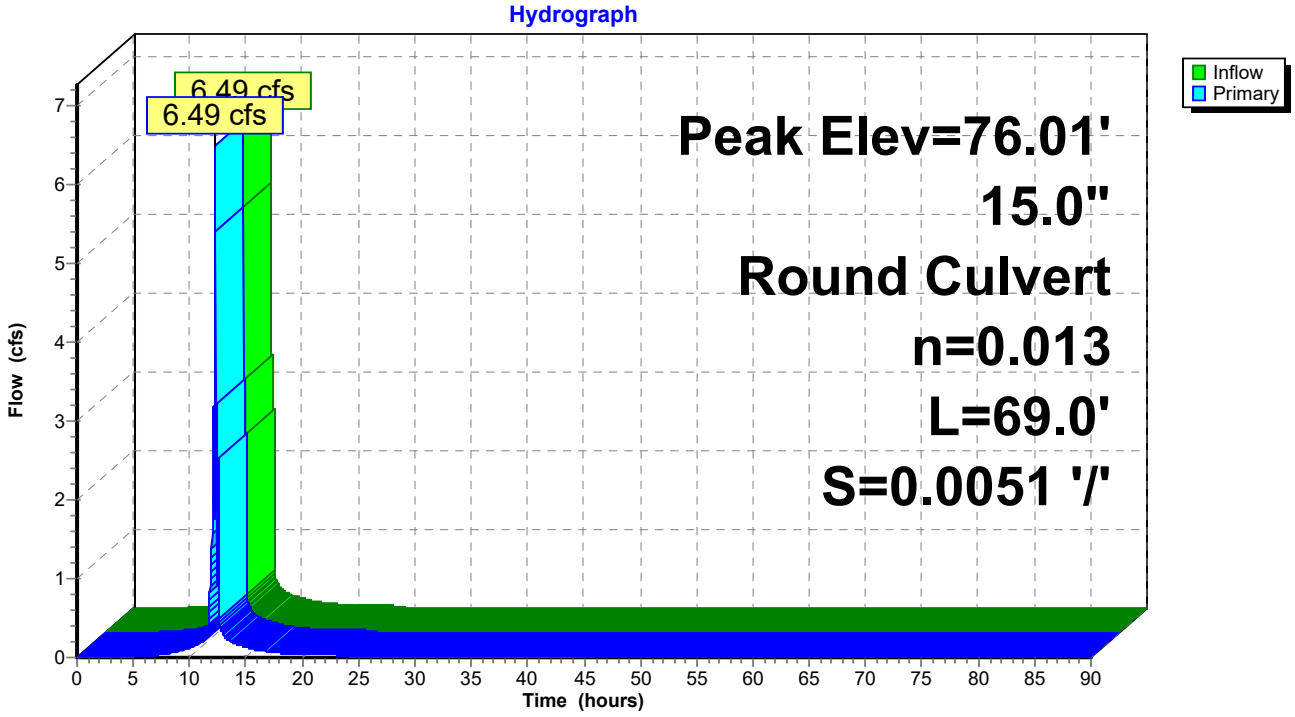
Inflow	=	6.49 cfs @	12.21 hrs, Volume=	0.285 af
Outflow	=	6.49 cfs @	12.24 hrs, Volume=	0.285 af, Atten= 0%, Lag= 1.8 min
Primary	=	6.49 cfs @	12.24 hrs, Volume=	0.285 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 76.01' @ 12.31 hrs
Flood Elev= 76.63'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.69'	**15.0" Round Culvert** L= 69.0' Ke= 0.500 Inlet / Outlet Invert= 71.69' / 71.34' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.72 cfs @ 12.24 hrs HW=74.90' TW=72.98' (Dynamic Tailwater)
↳**1=Culvert** (Outlet Controls 7.72 cfs @ 6.29 fps)

Pond CB 25: Inlet #25



Summary for Pond CB 3: Inlet #3

Inflow	=	23.16 cfs @	12.27 hrs, Volume=	1.701 af
Outflow	=	23.16 cfs @	12.30 hrs, Volume=	1.701 af, Atten= 0%, Lag= 1.8 min
Primary	=	19.59 cfs @	12.14 hrs, Volume=	1.575 af
Secondary	=	7.14 cfs @	12.25 hrs, Volume=	0.126 af

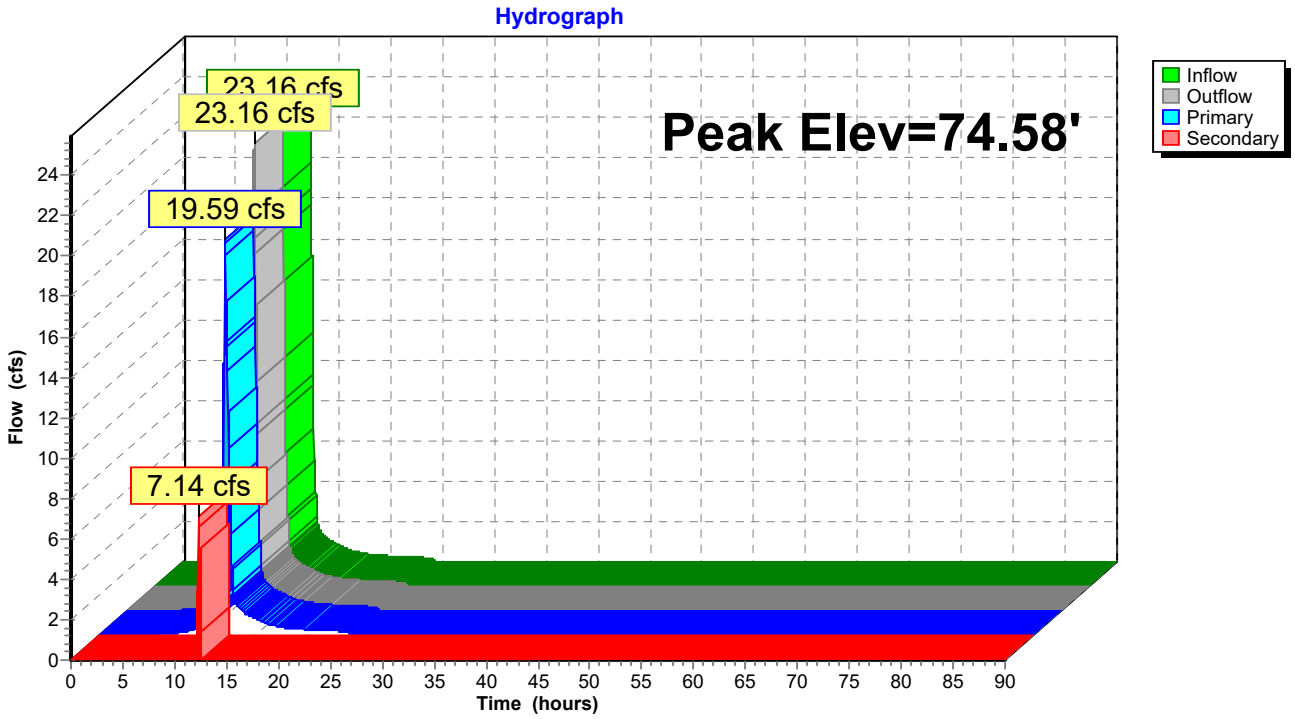
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.58' @ 12.48 hrs
Flood Elev= 75.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**30.0" Round Culvert** L= 47.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 68.50' / 68.26' S= 0.0051 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Secondary	70.36'	**30.0" Round Culvert** L= 170.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 69.00' / 70.36' S= -0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf

Primary OutFlow Max=10.92 cfs @ 12.14 hrs HW=72.07' TW=71.85' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 10.92 cfs @ 2.22 fps)

Secondary OutFlow Max=0.00 cfs @ 12.25 hrs HW=73.06' TW=73.26' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond CB 3: Inlet #3



Summary for Pond CB 4: Inlet #4

Inflow	=	17.19 cfs @	12.24 hrs, Volume=	1.301 af
Outflow	=	17.19 cfs @	12.27 hrs, Volume=	1.301 af, Atten= 0%, Lag= 1.8 min
Primary	=	15.87 cfs @	12.27 hrs, Volume=	1.269 af
Secondary	=	3.25 cfs @	12.54 hrs, Volume=	0.033 af

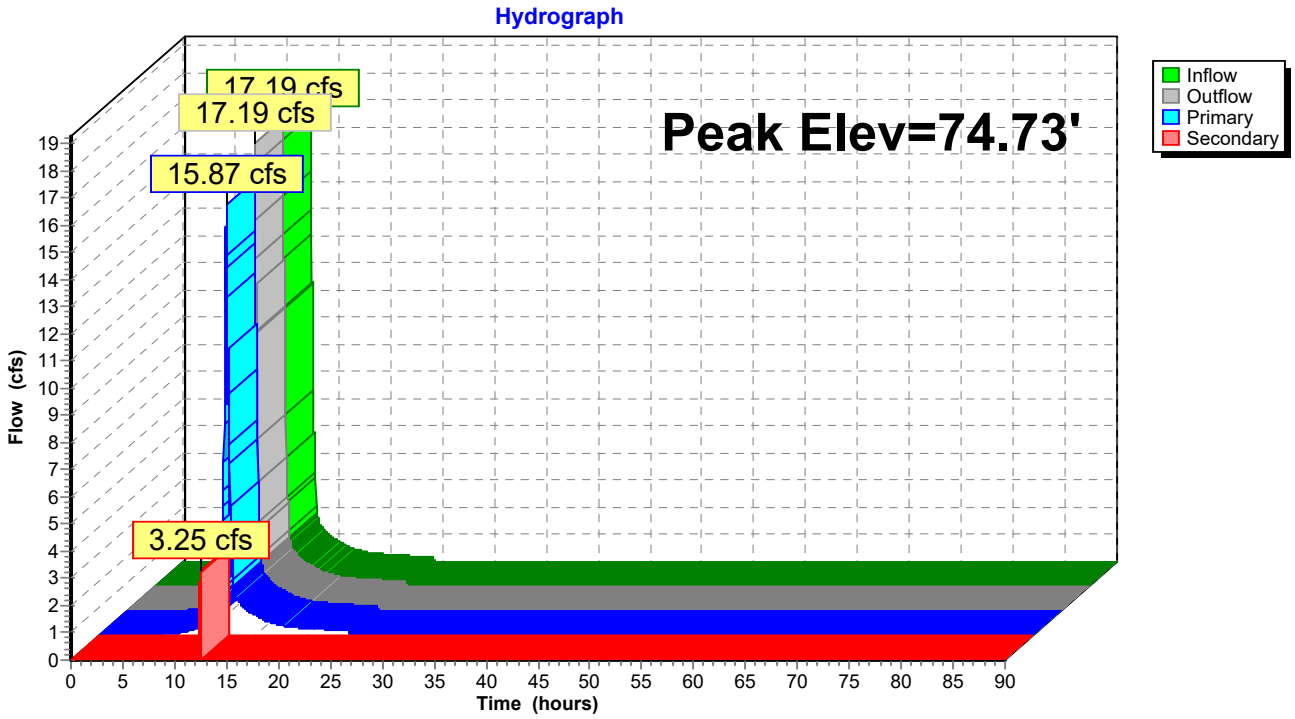
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.73' @ 12.51 hrs
Flood Elev= 75.83'

Device	Routing	Invert	Outlet Devices
#1	Primary	70.36'	**30.0" Round Culvert** L= 170.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 70.36' / 69.00' S= 0.0080 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 4.91 sf
#2	Secondary	71.50'	**24.0" Round Culvert** L= 208.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 70.46' / 71.50' S= -0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=11.30 cfs @ 12.27 hrs HW=73.49' TW=73.25' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 11.30 cfs @ 2.36 fps)

Secondary OutFlow Max=0.00 cfs @ 12.54 hrs HW=74.39' TW=74.74' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond CB 4: Inlet #4



Summary for Pond CB 5: Inlet #5

Inflow	=	9.25 cfs @	12.16 hrs, Volume=	0.862 af
Outflow	=	9.25 cfs @	12.19 hrs, Volume=	0.862 af, Atten= 0%, Lag= 1.8 min
Primary	=	9.25 cfs @	12.19 hrs, Volume=	0.843 af
Secondary	=	2.43 cfs @	12.57 hrs, Volume=	0.019 af

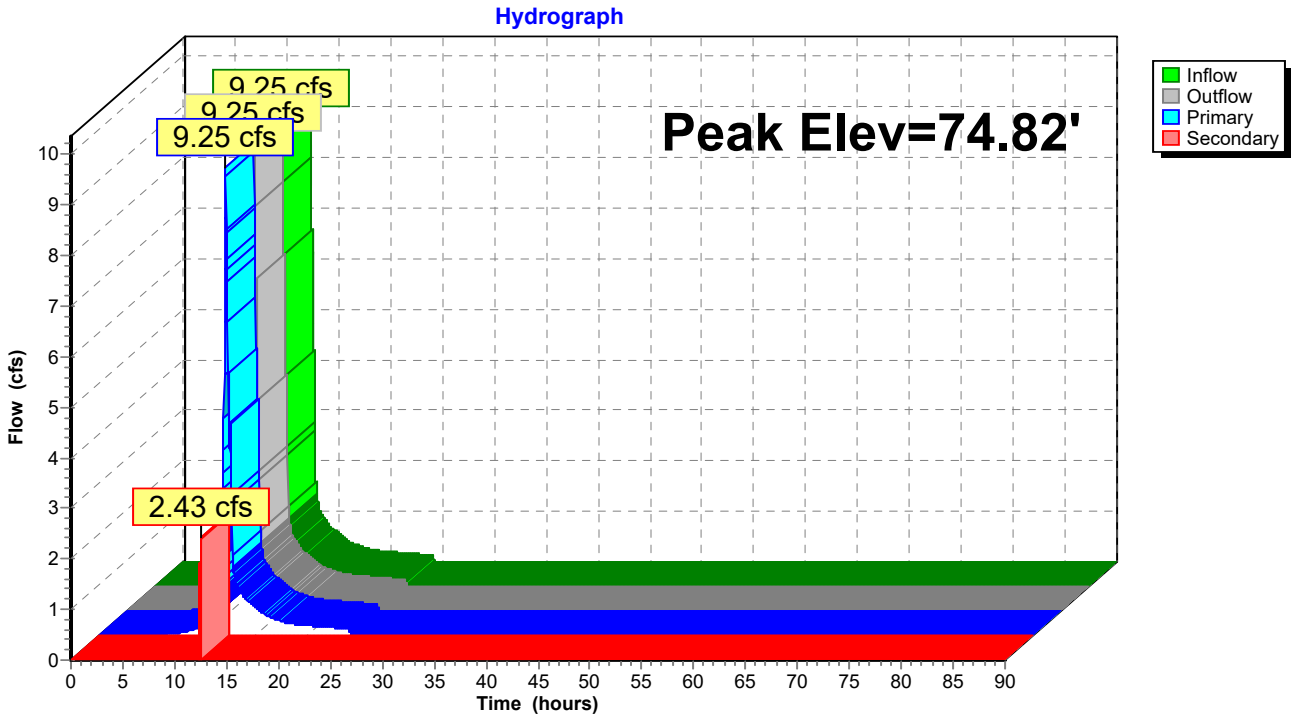
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.82' @ 12.54 hrs
Flood Elev= 77.58'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.50'	**24.0" Round Culvert** L= 208.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 71.50' / 70.46' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Secondary	71.83'	**18.0" Round Culvert** L= 41.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 71.60' / 71.83' S= -0.0056 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=7.90 cfs @ 12.19 hrs HW=73.42' TW=72.83' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 7.90 cfs @ 3.27 fps)

Secondary OutFlow Max=0.00 cfs @ 12.57 hrs HW=74.50' TW=74.88' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond CB 5: Inlet #5



Summary for Pond CB 6: Inlet #6

Inflow	=	7.16 cfs @	12.14 hrs, Volume=	0.640 af
Outflow	=	7.16 cfs @	12.17 hrs, Volume=	0.640 af, Atten= 0%, Lag= 1.8 min
Primary	=	7.16 cfs @	12.17 hrs, Volume=	0.619 af
Secondary	=	2.53 cfs @	12.60 hrs, Volume=	0.022 af

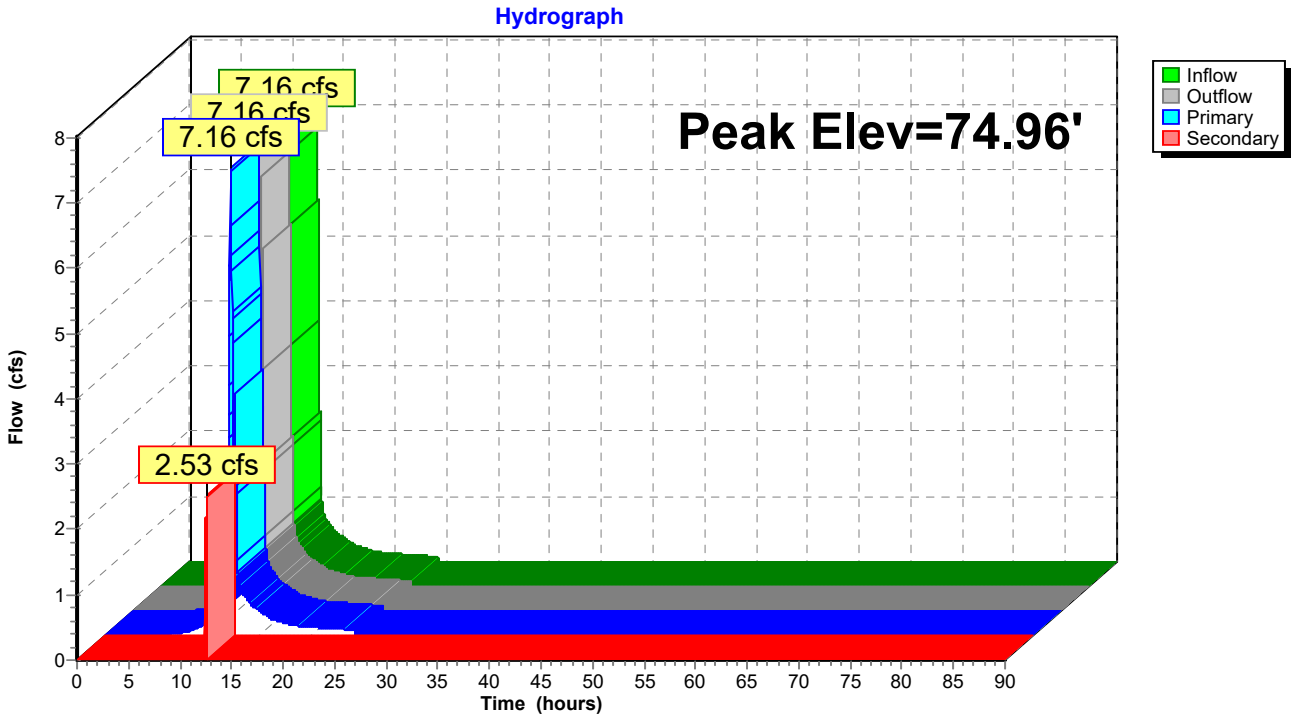
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.96' @ 12.57 hrs
Flood Elev= 77.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	71.83'	**18.0" Round Culvert** L= 41.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 71.83' / 71.60' S= 0.0056 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Secondary	72.27'	**18.0" Round Culvert** L= 45.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 71.93' / 72.27' S= -0.0076 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=5.75 cfs @ 12.17 hrs HW=73.75' TW=73.29' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.75 cfs @ 3.25 fps)

Secondary OutFlow Max=0.00 cfs @ 12.60 hrs HW=74.63' TW=75.03' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Pond CB 6: Inlet #6



Summary for Pond CB 8: Inlet #8

Inflow	=	2.76 cfs @	12.23 hrs, Volume=	0.144 af
Outflow	=	2.76 cfs @	12.26 hrs, Volume=	0.144 af, Atten= 0%, Lag= 1.8 min
Primary	=	1.78 cfs @	12.52 hrs, Volume=	0.112 af
Secondary	=	1.79 cfs @	12.46 hrs, Volume=	0.032 af

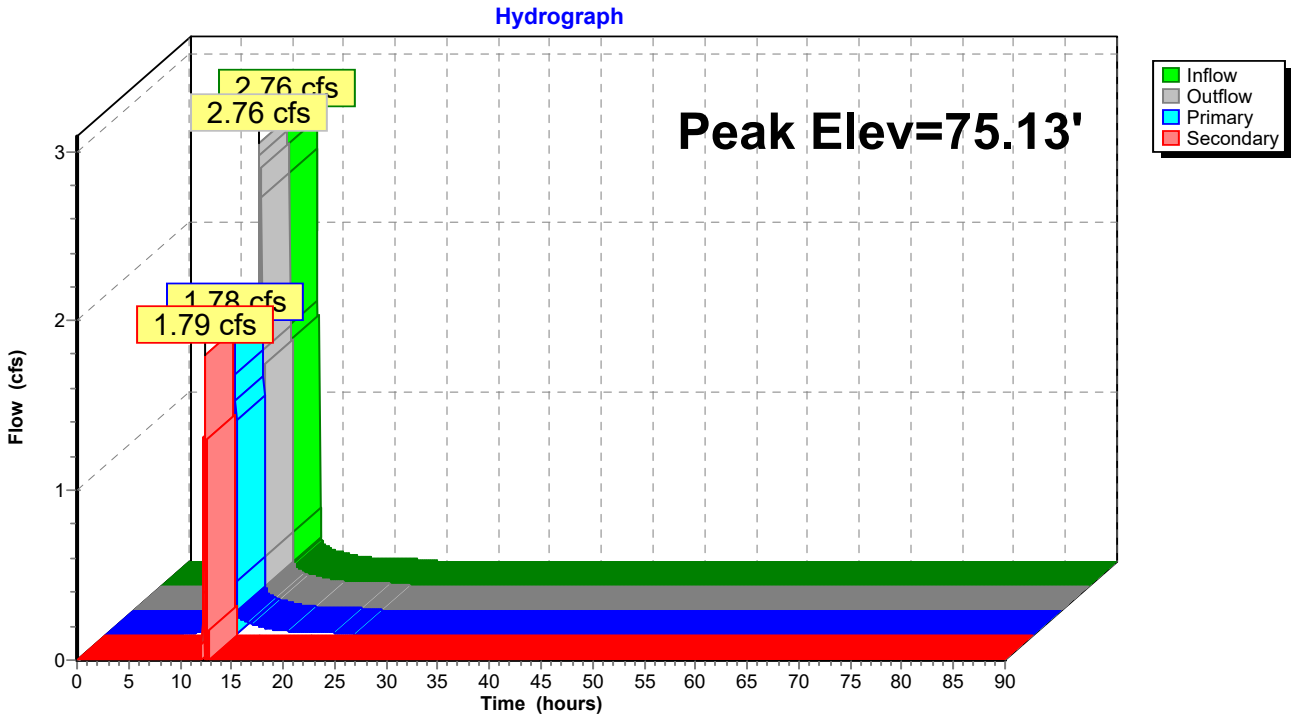
Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.13' @ 12.63 hrs
Flood Elev= 75.35'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.12'	**12.0" Round Culvert** L= 70.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.12' / 72.77' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf
#2	Secondary	73.41'	**12.0" Round Culvert** L= 38.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.22' / 73.41' S= -0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=1.79 cfs @ 12.52 hrs HW=74.91' TW=74.62' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.79 cfs @ 2.27 fps)

Secondary OutFlow Max=1.50 cfs @ 12.46 hrs HW=74.73' TW=74.57' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 1.50 cfs @ 1.90 fps)

Pond CB 8: Inlet #8



Summary for Pond CB 9: Inlet #9

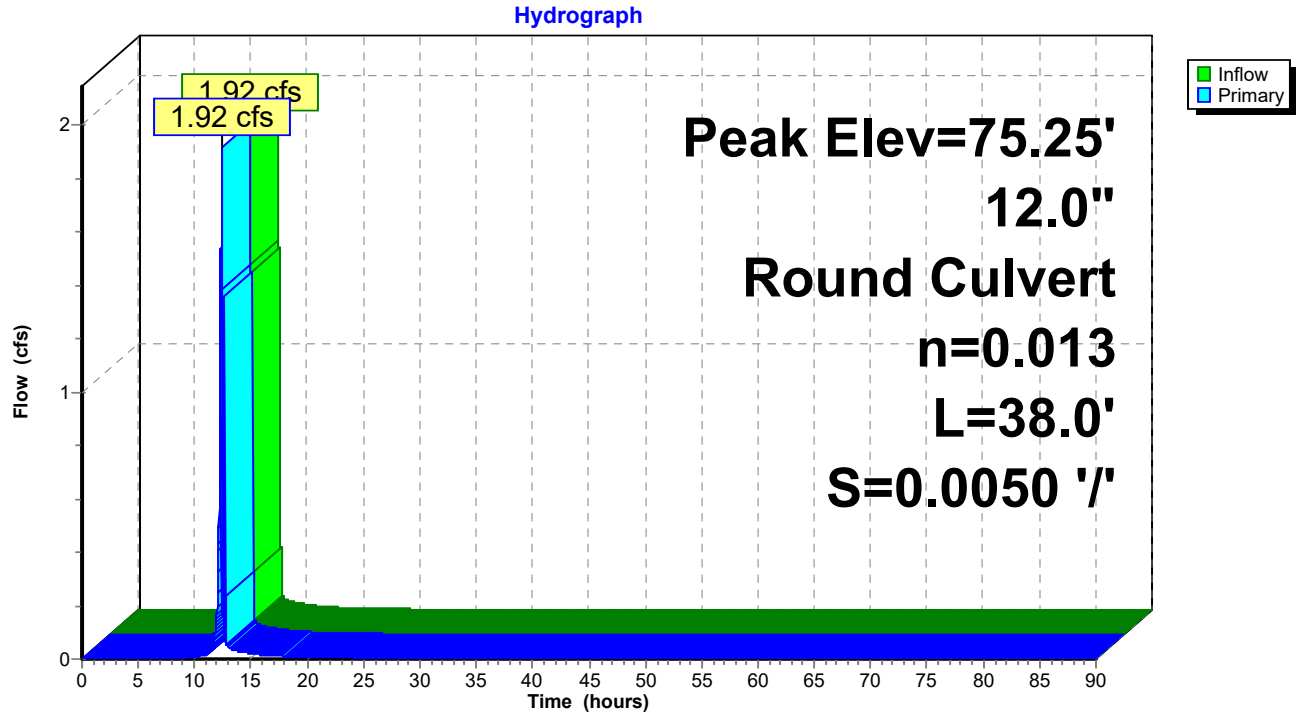
Inflow	=	1.92 cfs @	12.46 hrs, Volume=	0.062 af
Outflow	=	1.92 cfs @	12.49 hrs, Volume=	0.062 af, Atten= 0%, Lag= 1.8 min
Primary	=	1.92 cfs @	12.49 hrs, Volume=	0.062 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.25' @ 12.66 hrs
Flood Elev= 75.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.41'	**12.0" Round Culvert** L= 38.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.41' / 73.22' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=2.03 cfs @ 12.49 hrs HW=74.95' TW=74.67' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.03 cfs @ 2.59 fps)

Pond CB 9: Inlet #9



Summary for Pond MH 2: Manhole #2

Inflow	=	35.50 cfs @	12.07 hrs,	Volume=	3.019 af
Outflow	=	35.50 cfs @	12.10 hrs,	Volume=	3.019 af, Atten= 0%, Lag= 1.8 min
Primary	=	23.42 cfs @	12.22 hrs,	Volume=	2.648 af
Secondary	=	10.66 cfs @	12.11 hrs,	Volume=	0.274 af
Tertiary	=	8.36 cfs @	12.09 hrs,	Volume=	0.097 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.36' @ 12.46 hrs
Flood Elev= 76.45'

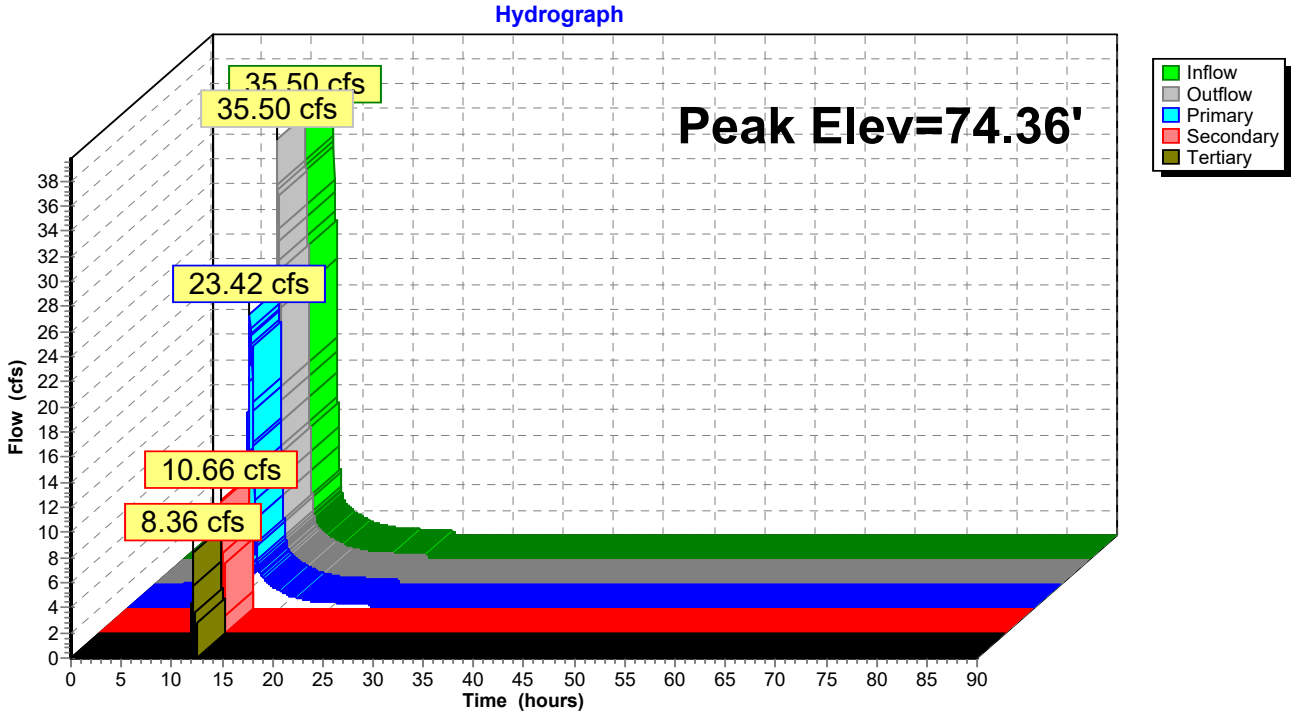
Device	Routing	Invert	Outlet Devices
#1	Primary	68.04'	**30.0" Round Culvert** L= 28.0' Ke= 0.500 Inlet / Outlet Invert= 68.04' / 66.40' S= 0.0586 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	68.50'	**30.0" Round Culvert** L= 47.0' Ke= 0.500 Inlet / Outlet Invert= 68.26' / 68.50' S= -0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#3	Tertiary	68.99'	**24.0" Round Culvert** L= 172.0' Ke= 0.500 Inlet / Outlet Invert= 68.03' / 68.99' S= -0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=19.53 cfs @ 12.22 hrs HW=72.68' TW=72.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 19.53 cfs @ 3.98 fps)

Secondary OutFlow Max=0.00 cfs @ 12.11 hrs HW=71.40' TW=71.81' (Dynamic Tailwater)
↑—**2=Culvert** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 12.09 hrs HW=71.36' TW=71.55' (Dynamic Tailwater)
↑—**3=Culvert** (Controls 0.00 cfs)

Pond MH 2: Manhole #2



Summary for Pond MH 7: Manhole #7

Inflow	=	6.98 cfs @	12.14 hrs,	Volume=	0.583 af
Outflow	=	6.98 cfs @	12.17 hrs,	Volume=	0.583 af, Atten= 0%, Lag= 1.8 min
Primary	=	6.36 cfs @	12.15 hrs,	Volume=	0.552 af
Secondary	=	1.32 cfs @	12.54 hrs,	Volume=	0.006 af
Tertiary	=	1.52 cfs @	12.43 hrs,	Volume=	0.025 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 75.13' @ 12.60 hrs
Flood Elev= 78.30'

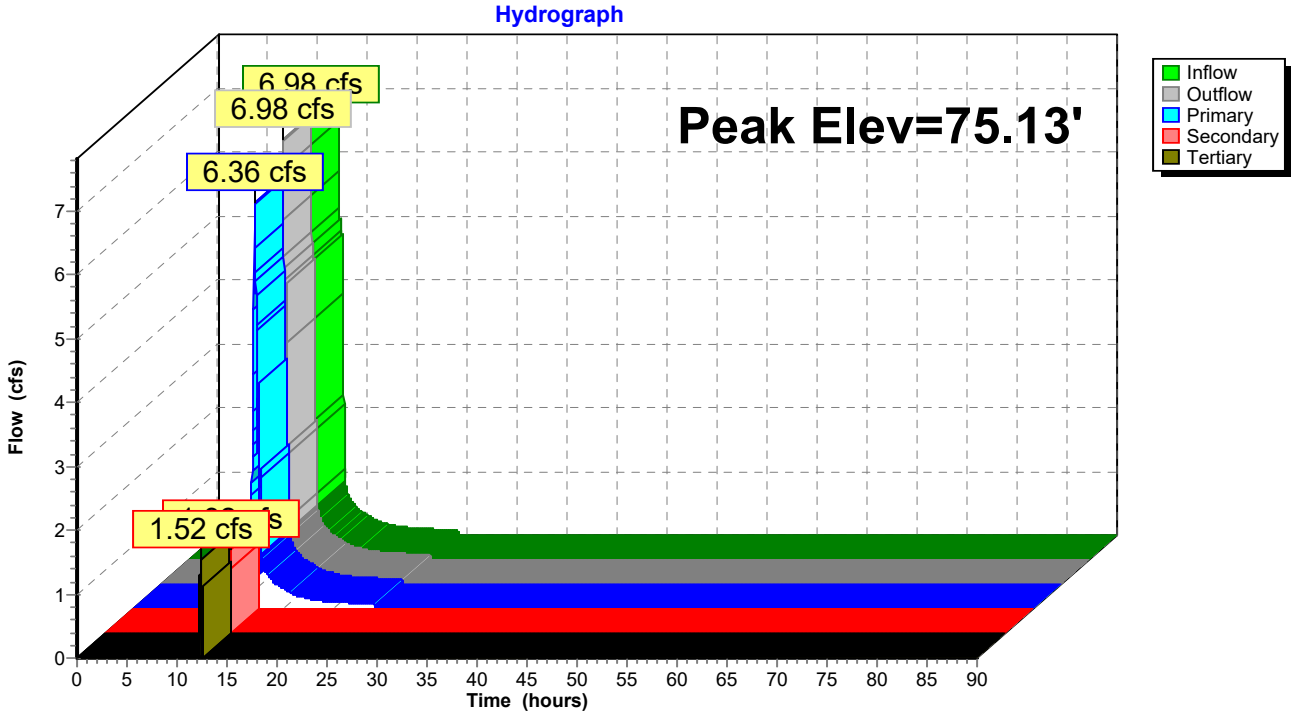
Device	Routing	Invert	Outlet Devices
#1	Primary	72.27'	**18.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 72.27' / 71.93' S= 0.0076 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	73.57'	**15.0" Round Culvert** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 72.52' / 73.57' S= -0.0175 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Tertiary	73.12'	**12.0" Round Culvert** L= 70.0' Ke= 0.500 Inlet / Outlet Invert= 72.77' / 73.12' S= -0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.40 cfs @ 12.15 hrs HW=73.87' TW=73.58' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.40 cfs @ 2.91 fps)

Secondary OutFlow Max=3.48 cfs @ 12.54 hrs HW=74.94' TW=74.58' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 3.48 cfs @ 2.83 fps)

Tertiary OutFlow Max=1.36 cfs @ 12.43 hrs HW=74.66' TW=74.49' (Dynamic Tailwater)
↑—**3=Culvert** (Outlet Controls 1.36 cfs @ 1.73 fps)

Pond MH 7: Manhole #7



Summary for Pond PR B: Prop Basin 'B'

Inflow	=	24.07 cfs @	12.22 hrs, Volume=	2.728 af
Outflow	=	10.46 cfs @	11.91 hrs, Volume=	2.728 af, Atten= 57%, Lag= 0.0 min
Primary	=	9.79 cfs @	12.69 hrs, Volume=	2.624 af
Secondary	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Tertiary	=	10.04 cfs @	11.91 hrs, Volume=	0.104 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 74.10' @ 12.69 hrs Surf.Area= 10,208 sf Storage= 53,595 cf

Plug-Flow detention time= 437.1 min calculated for 2.728 af (100% of inflow)
Center-of-Mass det. time= 436.9 min (1,231.6 - 794.7)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	63,135 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	4,507	2,254	2,254
68.00	5,193	4,850	7,104
69.00	5,934	5,564	12,667
70.00	6,726	6,330	18,997
71.00	7,528	7,127	26,124
72.00	8,384	7,956	34,080
73.00	9,241	8,813	42,893
74.00	10,118	9,680	52,572
75.00	11,008	10,563	63,135

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

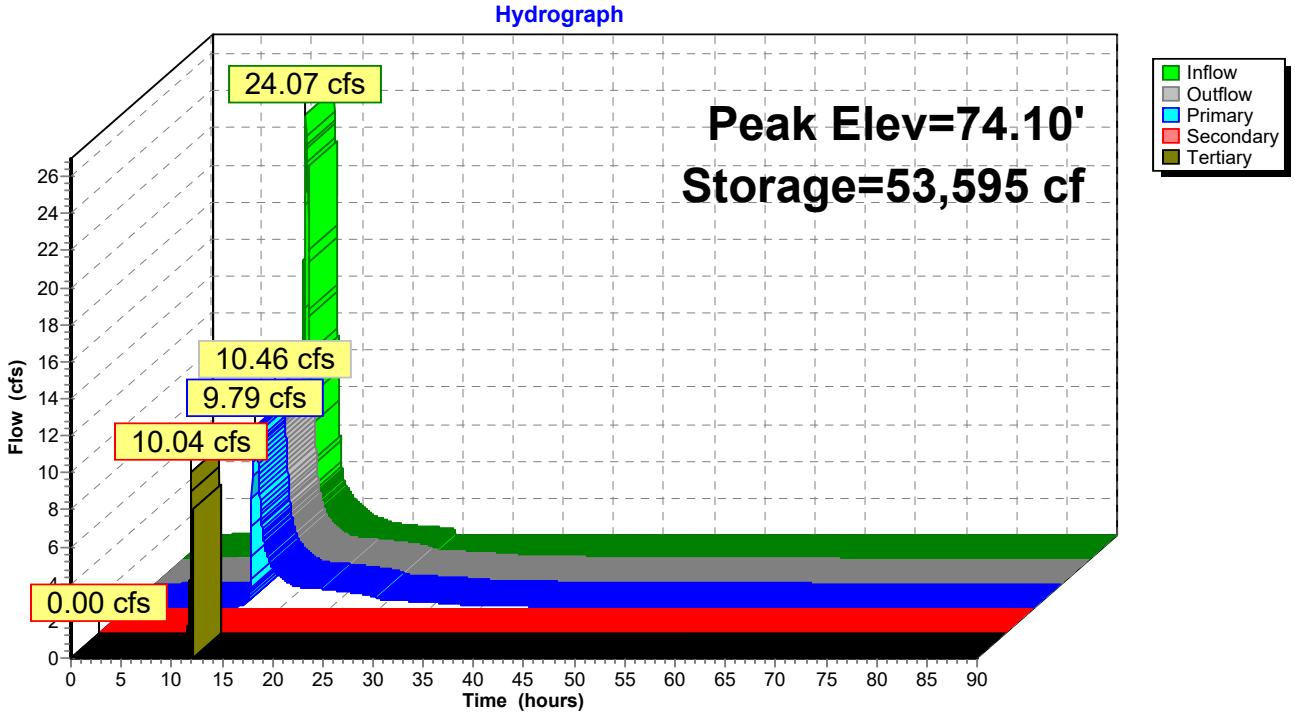
#3	Device 1	69.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	70.80'	**4.0" Vert. Orifice/Grate** C= 0.600
#5	Device 1	72.60'	**24.0" W x 10.0" H Vert. Orifice/Grate** C= 0.600
#6	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#7	Tertiary	68.04'	**36.0" Round Culvert** L= 28.0' Ke= 0.500
			Inlet / Outlet Invert= 66.40' / 68.04' S= -0.0586 '/' Cc= 0.900
			n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=9.79 cfs @ 12.69 hrs HW=74.10' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.79 cfs of 38.47 cfs potential flow)
  ├─**2=HydroBrake 3in** (Custom Controls 0.22 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 10.74 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.74 cfs @ 8.52 fps)
  └─**5=Orifice/Grate** (Orifice Controls 8.30 cfs @ 4.98 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 11.91 hrs HW=70.13' TW=70.31' (Dynamic Tailwater)
└─**7=Culvert** (Controls 0.00 cfs)

Pond PR B: Prop Basin 'B'



Summary for Pond PR BRB: Bioretention Basin

Inflow	=	2.24 cfs @	12.09 hrs,	Volume=	0.189 af
Outflow	=	1.99 cfs @	12.15 hrs,	Volume=	0.166 af, Atten= 11%, Lag= 3.6 min
Primary	=	1.99 cfs @	12.15 hrs,	Volume=	0.166 af

Routing by Sim-Route method, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs
Peak Elev= 76.90' @ 12.15 hrs Surf.Area= 2,075 sf Storage= 1,677 cf

Plug-Flow detention time= 121.7 min calculated for 0.166 af (88% of inflow)
Center-of-Mass det. time= 62.0 min (815.1 - 753.1)

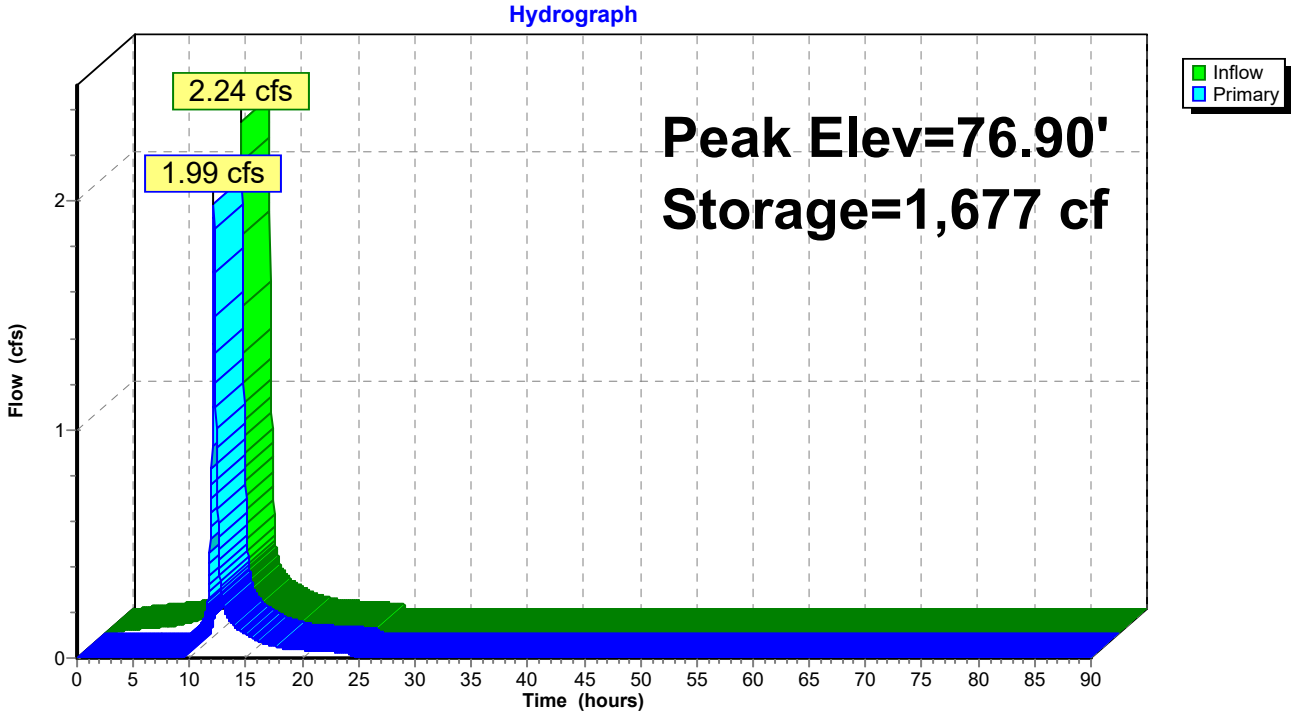
Volume	Invert	Avail.Storage	Storage Description
#1	75.50'	3,172 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
75.50	376	0	0
76.00	927	326	326
77.00	2,202	1,565	1,890
77.50	2,925	1,282	3,172

Device	Routing	Invert	Outlet Devices
#1	Primary	76.55'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.98 cfs @ 12.15 hrs HW=76.90' TW=72.56' (Dynamic Tailwater)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.98 cfs @ 1.93 fps)

Pond PR BRB: Bioretention Basin

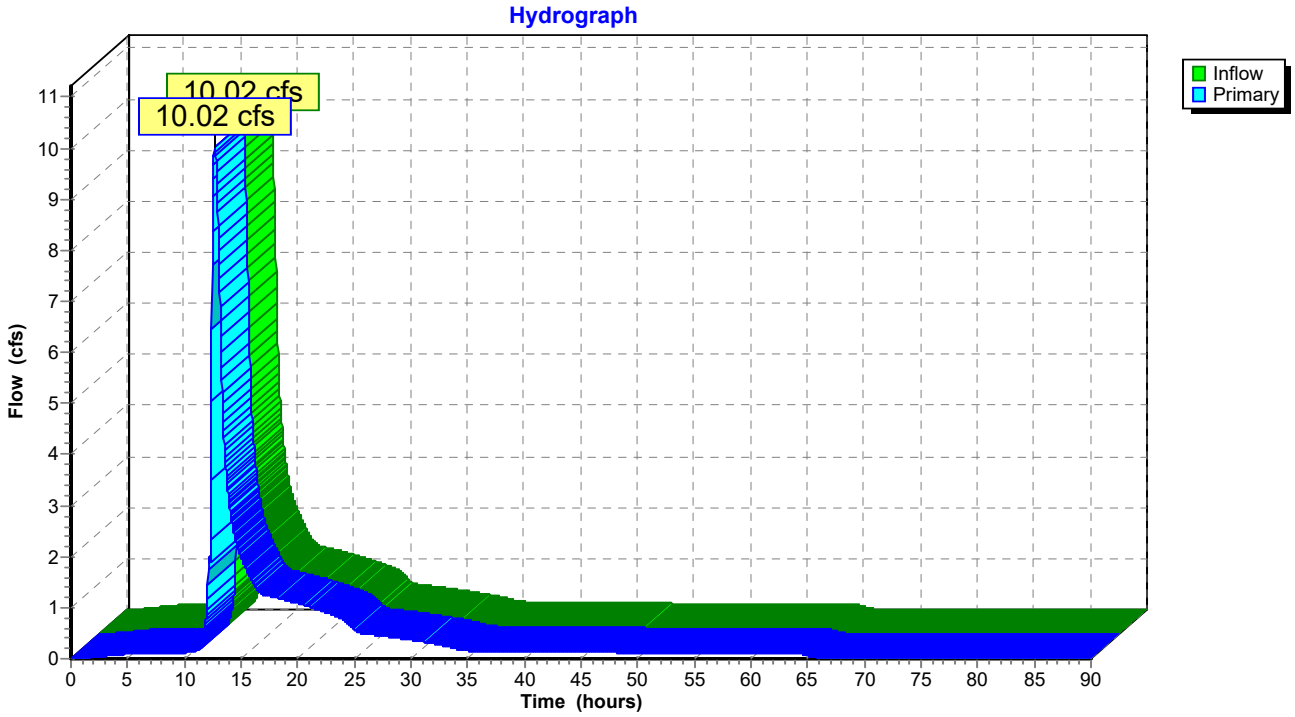


Summary for Link 87L: Total Offsite

Inflow = 10.02 cfs @ 12.63 hrs, Volume= 2.726 af
Primary = 10.02 cfs @ 12.66 hrs, Volume= 2.726 af, Atten= 0%, Lag= 1.8 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.03 hrs

Link 87L: Total Offsite



DOWNSTREAM DEFENDER SIZING CALCULATIONS

9/22/20
RN

Model Number and Diameter		Peak Treatment Flow Rate		Maximum Pipe Diameter		Oil Storage Capacity		Sediment Storage Capacity		Minimum Distance from Outlet Invert to Top of Rim		Standard Height from Outlet Invert to Sump Floor	
(ft)	(m)	(cfs)	(L/s)	(in)	(mm)	(gal)	(L)	(yd^3)	(m^3)	(ft)	(m)	(ft)	(m)
4	1.2	3.0	85	12	300	70	265	0.70	0.53	2.8	0.85	4.1	1.25
6	1.8	8.0	227	18	450	216	818	2.10	1.61	3.2	0.98	5.9	1.80
8	2.4	15.0	425	24	600	540	2,044	4.65	3.56	4.2	1.28	7.7	2.35
10	3.0	25.0	708	30	750	1,050	3,975	8.70	6.65	5.0	1.52	9.4	2.85
12*	3.7	38.0	1,076	36	900	1,770	6,700	14.70	11.24	5.6	1.71	11.2	3.41

100-yr Storm Peak Inflow to Proposed Basin B* = 21.4 cfs (see Hydro CAD Routings) < 25.0 cfs OK

*Peak Inflow to Proposed Basin B = Downstream Defender Peak Flow

Use 10' diameter DownStream Defender

APPENDIX F

Groundwater Recharge & Mounding Calculations

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MERCER CO., WEST WINDSOR TWP	44.9	1.43

Project Name:	Everest Realty
Description:	McCloskey
Analysis Date:	12/03/20

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.8	Open space	Downer	14.2	41,199
2	0.73	Open space	Woodstown	11.3	29,929
3	0.03	Open space	Udorthents	0.0	-
4	2.28	Impervious areas	Woodstown	0.0	-
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	3.8			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				5.1	71,128

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.5	Open space	Downer	14.2	25,750
2	0.64	Open space	Woodstown	11.3	26,239
3	0.01	Open space	Udorthents	0.0	-
4	2.69	Impervious areas	Woodstown	0.0	-
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	3.8			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				3.7	51,988

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft) 117,176
Post-Development Annual Recharge Deficit=	*19,140*	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	2.74	(in)	DRWC=	2.74	(in)
ERWC =	0.78	(in)	EDRWC=	0.78	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

Project Name	Description	Analysis Date	BMP or LID Type
Everest Realty	McCloskey	12/03/20	BioRetention Basin

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	1959.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	6.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-18.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	1	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.75	in
ERWC Modified to consider dEXC	EDRWC	0.75	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.60	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	1.10	in
Inches of Rainfall to capture	Pdesign	1.31	in
Recharge Provided Avg. over Imp. Area		23.0	in
Runoff Captured Avg. over imp. Area		30.7	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.17	unitless
BMP Volume	VBMP	980	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> **Solve Problem to satisfy Annual Recharge**
dBMP Check---> **OK**
dEXC Check---> **OK**
BMP Location---> **OK**

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	19,140	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	11,326	sq.ft
Root Zone Water Capacity	RWC	2.63	in
RWC Modified to consider dEXC	DRWC	2.63	in
Climatic Factor	C-factor	1.43	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	2.0	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		21,718	cu.ft
Avg BMP Recharge Efficiency		75.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		87.9%	%
%Runoff Recharged		6.4%	%
%Rainfall Recharged		5.0%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Bio Retention Basin Groundwater Mounding Calculations

9/22/20
RN

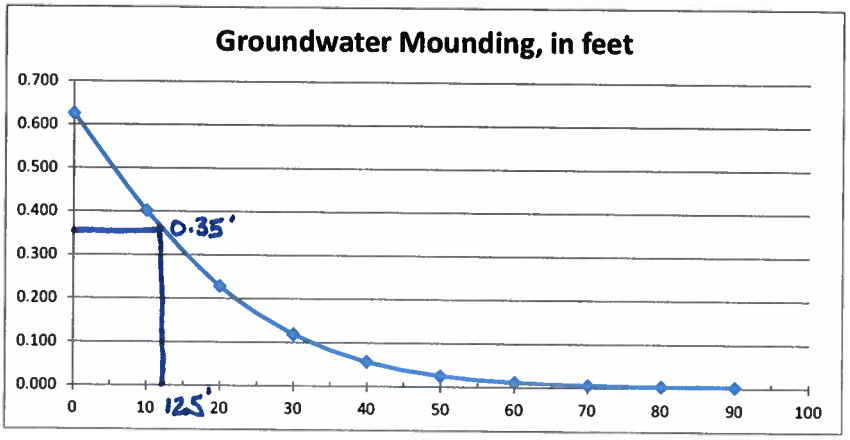
Input Values

0.38	R	Recharge rate (permeability rate) (in/hr)
0.150	Sy	Specific yield, Sy (dimensionless) default value is 0.15; max value is 0.2 provided that a lab test data is submitted
1.90	Kh	Horizontal hydraulic conductivity (in/hr) Kh = 5xRecharge Rate (R) in the costal plan; Kh=R outside the coastal plan
1.500	x	1/2 length of basin (x direction, in feet)
69.000	y	1/2 width of basin (y direction, in feet)
36.20	t	Duration of infiltration period (hours)
10.00	hi(0)	Initial thickness of saturated zone (feet)

10.626	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
0.626	Δh(max)	Maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
0.626	0
0.402	10
0.229	20
0.119	30
0.057	40
0.026	50
0.011	60
0.006	70
0.003	80
0.003	90

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

- Min. Tested Permeability Rate = 0.76 in/hr, with safety factor of 2 → R = 0.38 in/hr
- Default Sy used
- Kh = 5x R = 5x 0.38 = 1.90
- x = 1/2 · 3' = 1.5'
- y = 1/2 · 138' = 69.0'
- $t = \frac{12V}{AxR} = \frac{12x475}{414x\,0.38} = 36.2$ hr
- $h_i(0)$ = 10 ft (soil log total depth = 9.5', use 10' default)

Mottling observed @ 49". Existing Grade @ 77.0'. SHWT Elevation = 72.92'
Nearest building footprint = 12.5' from center of BioRetention Basin (x-direction) (Building 2)
From graph, Groundwater Mounding @ 12.5' = 0.35'
SHWT w/ Mounding = Elevation 73.27'
Finished Floor Elevation Building 2 = 78.00'

APPENDIX G

Emergency Spillway and Conduit Outlet Protection Calculations

Emergency Spillway Design

BASIN

Input Data:

100 year storm WSE =	74.07
Emergency spillway elevation =	74.50
Top of Berm=	75.75
Width of spillway (LF) =	50
Breadth of spillway (LF) =	10

Assume the spillway acts as a broad-crested weir:

where:

c = 3.2 (Ref: Standard Handbook for Civil Engineers Table 21.15)

Q (cfs) = 18.01 (100 Year Storm Event with the primary spillway blocked and no storage below the first stage outlet)

$H=(Q/CL)^{2/3}$ H = 0.23 feet above the invert of the spillway.

Height is : 0.23 feet, which is less than 1.5 ft limit -- OK!

Check Velocity:

where:

Q (cfs) = 18.01

A (ft^2) = 11.66 (wetted perimeter of spillway)

V=Q/A V = 1.55 fps in the spillway

Velocity is: 1.55 fps, which is less than 3 fps limit -- OK!.

Design of Horizontal RipRap Apron
RIPRAP APRON at FES into Basin 'B'

Equation for Median Size:

$d_{50} = 0.02/TW \times (Q/W)^{4/3}$ where: TW (ft) = 2.5 **(Assume TW = Pipe Dia.)***

d_{50} (ft) = 0.11 D (ft) = 2.5 **(Conduit Height)**

d_{50} (in) = 1 W(ft)= 2.5 **(Conduit Width)**

Q (cfs) = 18.14 **(Use 100 YR Storm Event for this outfall)***

(USE 4 INCHES)

Guidance for RipRap Gradation:

$d_{100} = 1.5 \times d_{50}$	d_{100} (ft) =	0.5	d_{100} (in) =	6
$d_{75} = 1.25 \times d_{50}$	d_{75} (ft) =	0.416667	d_{75} (in) =	5
$d_{15} = 0.5 \times d_{50}$	d_{15} (ft) =	0.166667	d_{15} (in) =	2

Apron Thickness:

with filter layer = $2 \times d_{50}$ w (ft) = 0.666667 w (in) = **8**

(NOTE: 8" w/FILTER FABRIC, 12" w/o FABRIC)

Apron Dimensions: Unconfined Outlets

TW < 0.5 D $La = 1.8(Q/W)/D^{.5} + 7D$

La (ft) = 25.8 Nearest in 26

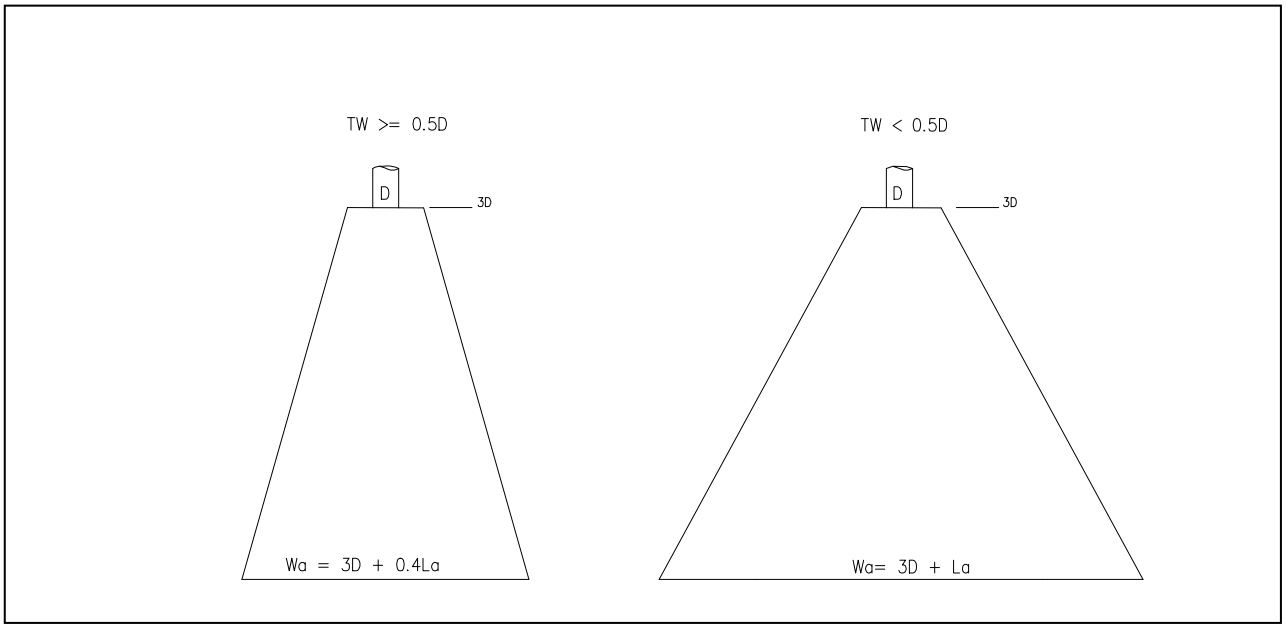
TW ≥ 0.5 D $La = 3(Q/W)/D^{.5}$ TW > = 0.5 D

La (ft) = 13.8 Nearest in 14.00 **USE 17**

3D (ft) = 7.5 Nearest in 8

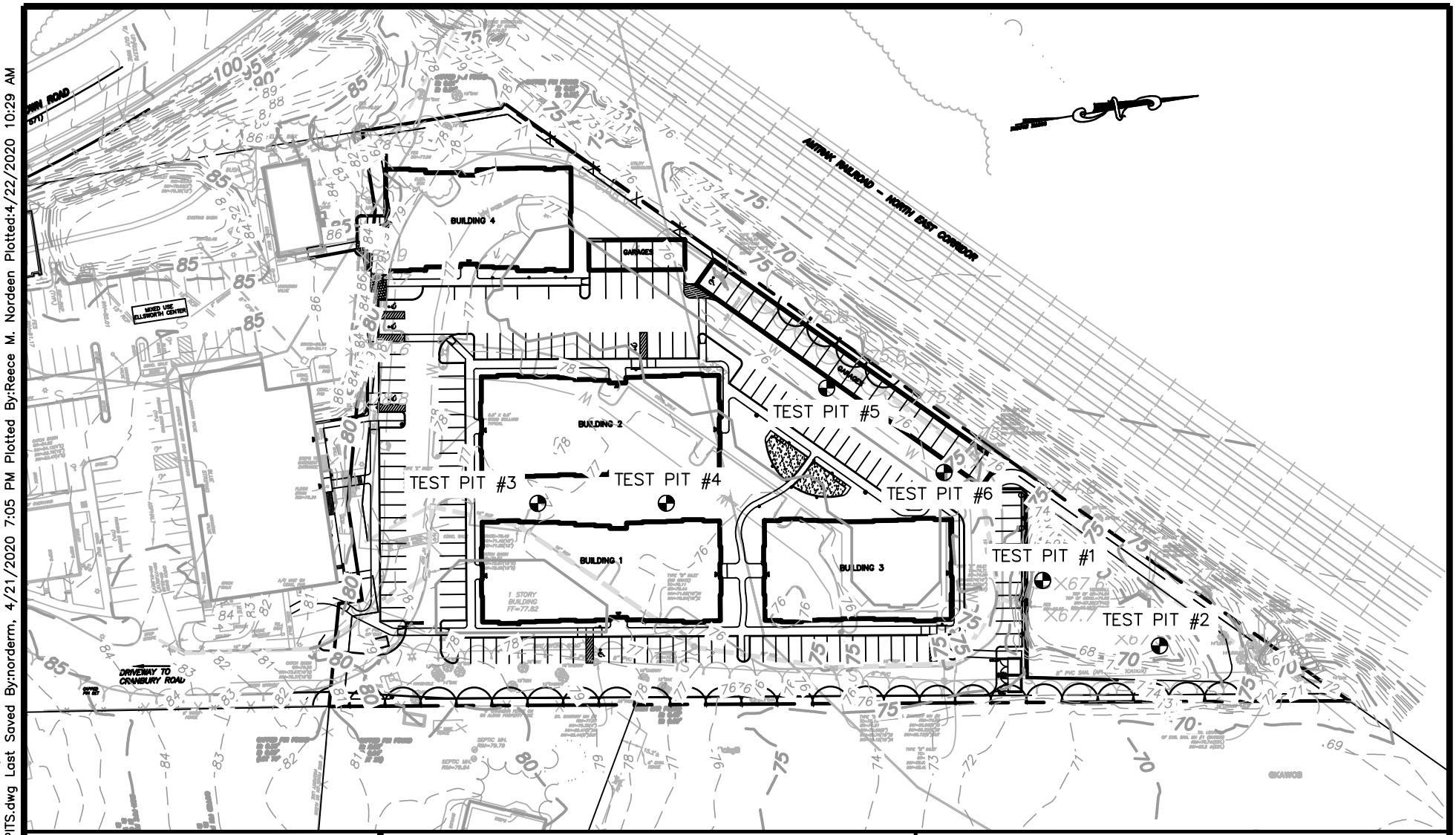
TW < 0.5D Wa = 3W + La Wa (ft) = 25 TW > = 0.5 D

TW > = 0.5D Wa = 3W + 0.4La Wa (ft) = 13.01 **USE 14.0**



APPENDIX H

Soil Logs



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1 WASHINGTON BOULEVARD
SUITE 3
ROBBINSVILLE, NJ 08691
Voice (609) 918-0200
www.actengineers.com

ACT ENGINEERS, INC.
A SMALL BUSINESS ENTERPRISE

CIVIL ENGINEERING ◻ LAND SURVEYING ◻ ENVIRONMENTAL PERMITTING
NEW JERSEY CERTIFICATE of AUTHORIZATION No. 24GA27936900

TEST PIT LOCATION PLAN
FOR
400 STEPS
LOT 19 BLOCK 5

SITUATED IN

WEST WINDSOR TOWNSHIP MERCER COUNTY NEW JERSEY

CADD FILE	PROJECT NO.	DRAWN BY	CHECKED BY	SCALE	DATE	SHEET
F-TEST PITS	170201-05	RN	JR	1"=100'	4/15/20	1 OF 1

Xrefs: R-BASE.dwg; R-SITE.dwg; R-XTOPO.dwg
Layout Tab Name: Layout1, Images: G10D2.sid;
S:\2017\170201-05\dwg\F-TEST PITS.dwg Last Saved By:norderm, 4/21/2020 7:05 PM Plotted By:Reece M. Nordeen Plotted:4/22/2020 10:29 AM

EVEREST REALTY
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

Soil Log and Interpretation
Lot 19 Block 5

1. Log Number TP-1 Method (Check One): X Profile Pit ___Boring

2. Soil Log Total Depth (inches) 126

Existing basin, along side closest to the parking lot drive aisle.

0" - 8"	Leaves, twigs, and topsoil
8" - 34"	Darker brown (7.5YR 4/2) silty clay with some rocks, wet. Heavy seepage from 18"-24" from side of the test pit closest to the low flow channel.
34" - 72"	Lighter brown (7.5YR 5/8) silty medium to coarse sand with cobbles, loose.
72" - 126"	Black organic material with chainsawed tree limbs and branches.

3. Ground Water Observations:

X Seepage—Indicate Depth 18"

4. Soil Limiting Zones:

X Hydraulically Restrictive Feature—Depth to Top 8"

Signature of Site Evaluator R Nordeen Date 2/20/20

Reece Nordeen, EIT

EVEREST REALTY
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

Soil Log and Interpretation
Lot 19 Block 5

1. Log Number TP-2 Method (Check One): X Profile Pit ___Boring

2. Soil Log Total Depth (inches) 132

Corner of existing basin furthest from the parking lot.

0" - 8"	Leaves, twigs, and topsoil
8" - 18"	Dark brown (5YR 4/2) silty clay with small pebbles and rocks, wet.
18" - 23"	Light grey clay (10YR 7/1) with light brown (7.5YR 6/6) distinct mottling, many small pebbles and rocks, blocky, wet.
23" - 72"	Darker brown (10YR 4/3) clayey silt with some pebbles and rocks, subangular blocky
72" - 132"	Lighter brown (7.5YR 5/8) silty medium to coarse sand with cobbles, loose. Seepage encountered at 114".

3. Ground Water Observations:

X Seepage—Indicate Depth 114"

4. Soil Limiting Zones:

X Hydraulically Restrictive Feature—Depth to Top 8"

Signature of Site Evaluator R Nordeen Date 2/20/20

Reece Nordeen, EIT

EVEREST REALTY
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

Soil Log and Interpretation
Lot 19 Block 5

1. Log Number TP-3 Method (Check One): X Profile Pit ___Boring

2. Soil Log Total Depth (inches) 115

Parking lot, near crosswalk.

0" - 3"	Asphalt
3" - 9"	Subbase stone
9" - 17"	Grey brown (5YR 5/3) clay with cobbles, little silt
17" - 77"	Orange brown (5YR 5/8) coarse sand with some clay and some cobbles. Dark red (5YR 3/6) mottling encountered at 49".
77" - 97"	Lighter orange (7.5YR 6/8) coarse silty sand with some clay.
97" - 115"	Tan/orange (2.5YR 7/4) fine to medium sand, loose.

3. Ground Water Observations:

___Seepage—Indicate Depth N/A

4. Soil Limiting Zones:

X Hydraulically Restrictive Feature—Depth to Top 9"

Signature of Site Evaluator R Nord Date 2/2/20

Reece Nordeen, EIT

EVEREST REALTY
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

Soil Log and Interpretation
Lot 19 Block 5

1. Log Number TP-4 Method (Check One): X Profile Pit ___Boring

2. Soil Log Total Depth (inches) 124

Center of parking lot, near the middle of the existing building.

0" - 3"	Asphalt
3" - 9"	Subbase stone
9" - 52"	Light brown (7.5YR 5/4) medium to coarse sand with little silt and cobbles.
52" - 70"	Dark grey (7.5YR 2.5/1) clayey silt, subangular blocky, some roots.
70" - 84"	Brown (5YR 4/6) silt with some clay, subangular blocky.
84" - 124"	Orange (5YR 5/8) medium sand with little silt and little cobbles

3. Ground Water Observations:

___Seepage—Indicate Depth N/A

4. Soil Limiting Zones:

X Hydraulically Restrictive Feature—Depth to Top 52"

Signature of Site Evaluator R Nordeen Date 2/20/20

Reece Nordeen, EIT

EVEREST REALTY
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

Soil Log and Interpretation
Lot 19 Block 5

1. Log Number TP-5 Method (Check One): X Profile Pit ___Boring

2. Soil Log Total Depth (inches) 126

Middle of the drive lane behind the existing building.

0" - 3"	Asphalt
3" - 9"	Stone subbase
9" - 44"	Grey (10YR 5/3) rocky fill material
44" - 62"	Light brown (5YR 4/4) medium sand with little silt and some cobbles
62" - 114"	Light reddish brown (5YR 5/3) clayey silt, blocky, with orange red (5YR 5/8) mottling observed at 76"
114" - 126"	Orange (7.5YR 6/8) fine to medium sand with little silt and some cobbles.

3. Ground Water Observations:

___Seepage—Indicate Depth N/A

4. Soil Limiting Zones:

X Hydraulically Restrictive Feature—Depth to Top 62"

Signature of Site Evaluator R Nordeen Date 2/20/20

Reece Nordeen, EIT

EVEREST REALTY
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

Soil Log and Interpretation
Lot 19 Block 5

1. Log Number TP-6 Method (Check One): X Profile Pit ___Boring

2. Soil Log Total Depth (inches) 125

In the wooded lot, opposite side of the fence to the existing intersection.

0" - 3"	Asphalt
3" - 9"	Subbase stone
9" - 43"	Grey (7.5YR 6/1) rocky fill material with some silt
43" - 62"	Light brown (5YR 5/4) rocky sandy silt
62" - 72"	Orange brown (7.5YR 6/8) medium sand with cobbles
72" - 94"	Light reddish brown (7.5YR 5/3) clayey silt, blocky
94" – 125"	Orange (7.5YR 6/8) fine to medium sand with little silt and some cobbles

3. Ground Water Observations:

___Seepage—Indicate Depth N/A

4. Soil Limiting Zones:

X Hydraulically Restrictive Feature—Depth to Top 72"

Signature of Site Evaluator R Nordeen Date 2/20/20

Reece Nordeen, EIT

ACT ENGINEERS, INC.
1 Washington Blvd, Suite 3
Robbinsville, NJ 08691

TEST PIT # 3 , REPLICATE A

PROJECT: McCloskey 170201-04

1	Test No.	**3**	Replicate (letter)	**A**	Date Collected	3/3/20
2	Material Tested		Native Soil Test- depth			24" - 30"
3	Type of sample:	**xx** Undisturbed		Disturbed		
4	Sample dimensions: Inside radius of sample tube, R (cm)					2.54
	Length of sample, L (inches)					4.9375
5	Bulk density determination (disturbed samples only):					N/A
	Sample weight (grams)			N/A		
	Sample volume (L x 2.54 cm/in. x (3.14r2)			N/A		
	Bulk density (Sample weight/Sample volume)			N/A		
6	Standpipe Used:		Yes		**X** No	
	Indicate Internal Radius					N/A
7	Height of water above rim of test basin, inches	Refer to following table				
	At the beginning of each test interval,H1	Refer to following table				
	At the end of each test interval H2	Refer to following table				

Rate of water level drop

	H1 (in)	H2 (in)	Time, Start of Test Interval, T1 (min)	Time, End of Test Interval, T2 (mi	Length of Test Interval, T, minutes
Test 1	4.9375	4.8750	0.00	5.00	5.00
Test 2	4.9375	4.6250	0.00	12.50	12.50
Test 3	4.9375	4.5000	0.00	19.08	19.08
Test 4	4.9375	4.3750	0.00	26.50	26.50
Test 5	4.9375	4.2500	0.00	34.00	34.00

8 **Calculation of Permeability:**

K, (in/hr)= 60 min/hr*L(in)/T(min)*Ln (H1/H2)

Test 1	K_1 (in/hr)=	0.755	K2	Soil Permeability Class
Test 2	K_2 (in/hr)=	1.550	K2	Soil Permeability Class
Test 3	K_3 (in/hr)=	1.440	K2	Soil Permeability Class
Test 4	K_4 (in/hr)=	1.352	K2	Soil Permeability Class
Test 5	K_5 (in/hr)=	1.306	K2	Soil Permeability Class

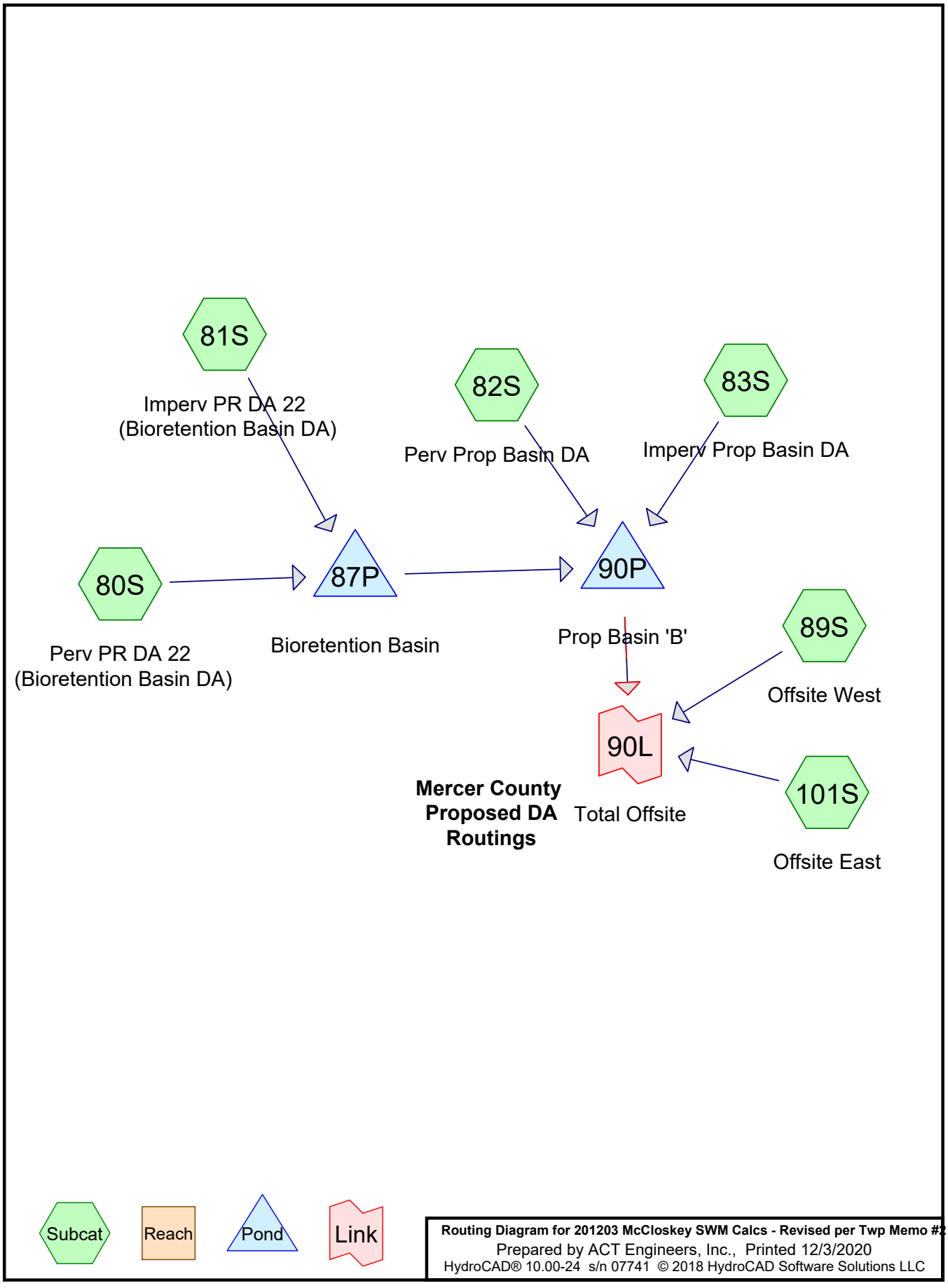
9 I hereby certify that the information furnished on this form is true and accurate.

Signature of Soil Evaluator *Juan Cruz Berríos* Date 3/9/20

Signature of Professional Engineer _____ Lic. # _____

APPENDIX I

Mercer County HydroCAD Routings



Routing Diagram for 201203 McCloskey SWM Calcs - Revised per Twp Memo #2

Prepared by ACT Engineers, Inc., Printed 12/3/2020

HydroCAD® 10.00-24 s/n 07741 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 80S: Perv PR DA 22 (Bioretention Basin DA)

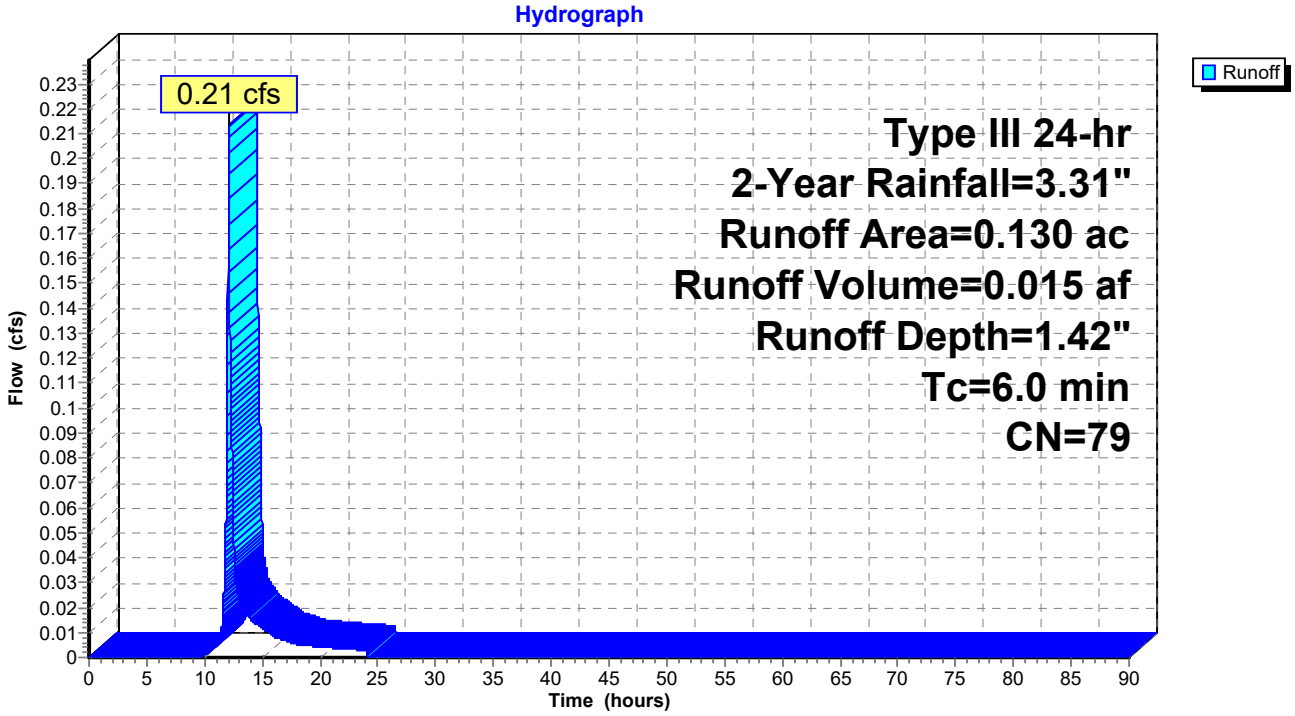
Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.130	79	<50% Grass cover, Poor, HSG B
0.130		100.00% Pervious Area

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

Subcatchment 80S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 81S: Imperv PR DA 22 (Bioretention Basin DA)

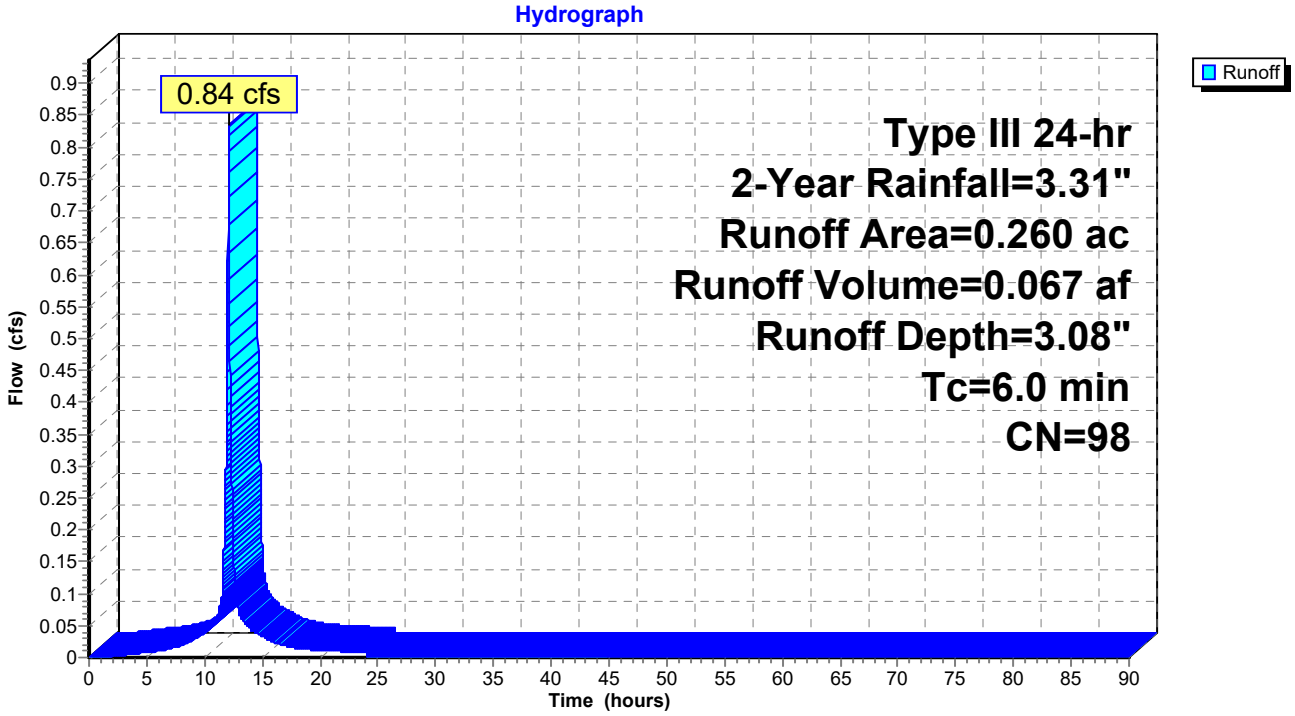
Runoff = 0.84 cfs @ 12.08 hrs, Volume= 0.067 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 81S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 82S: Perv Prop Basin DA

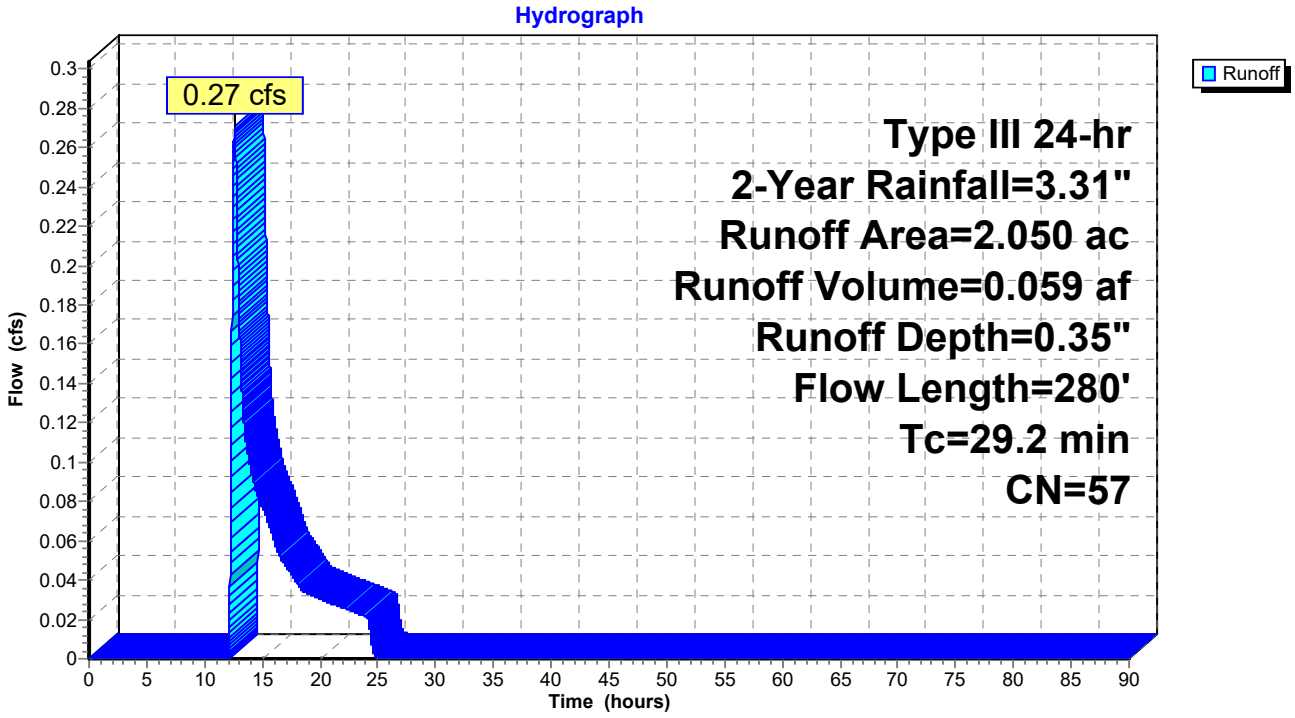
Runoff = 0.27 cfs @ 12.62 hrs, Volume= 0.059 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.430	79	<50% Grass cover, Poor, HSG B
0.410	86	<50% Grass cover, Poor, HSG C
1.210	39	>75% Grass cover, Good, HSG A
2.050	57	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 82S: Perv Prop Basin DA



Summary for Subcatchment 83S: Imperv Prop Basin DA

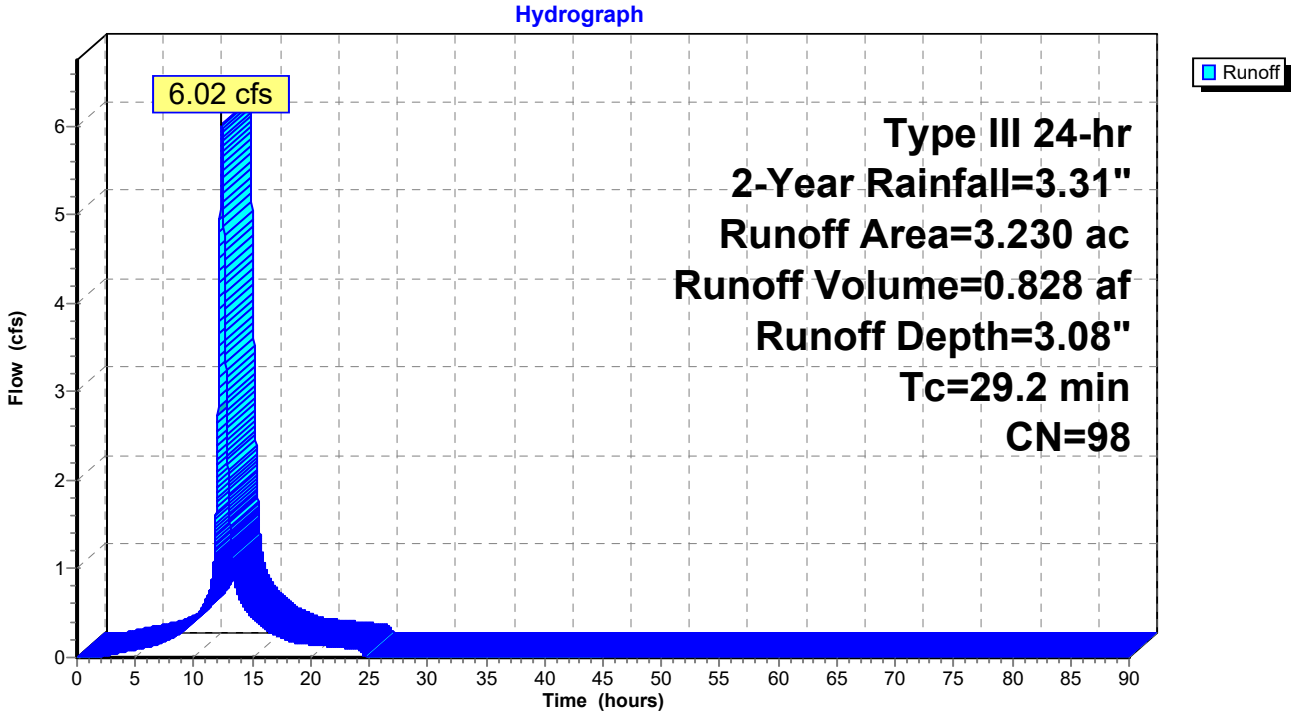
Runoff = 6.02 cfs @ 12.37 hrs, Volume= 0.828 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 83S: Imperv Prop Basin DA



Summary for Subcatchment 89S: Offsite West

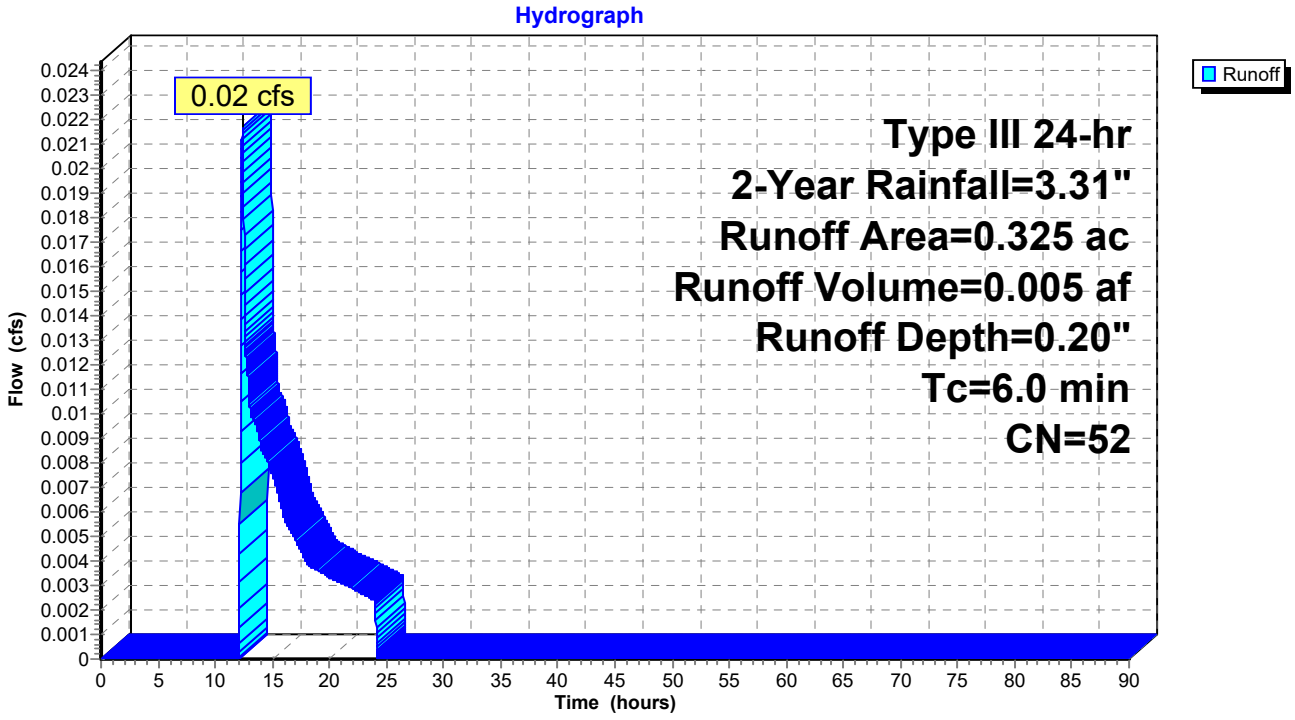
Runoff = 0.02 cfs @ 12.39 hrs, Volume= 0.005 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 89S: Offsite West



Summary for Subcatchment 101S: Offsite East

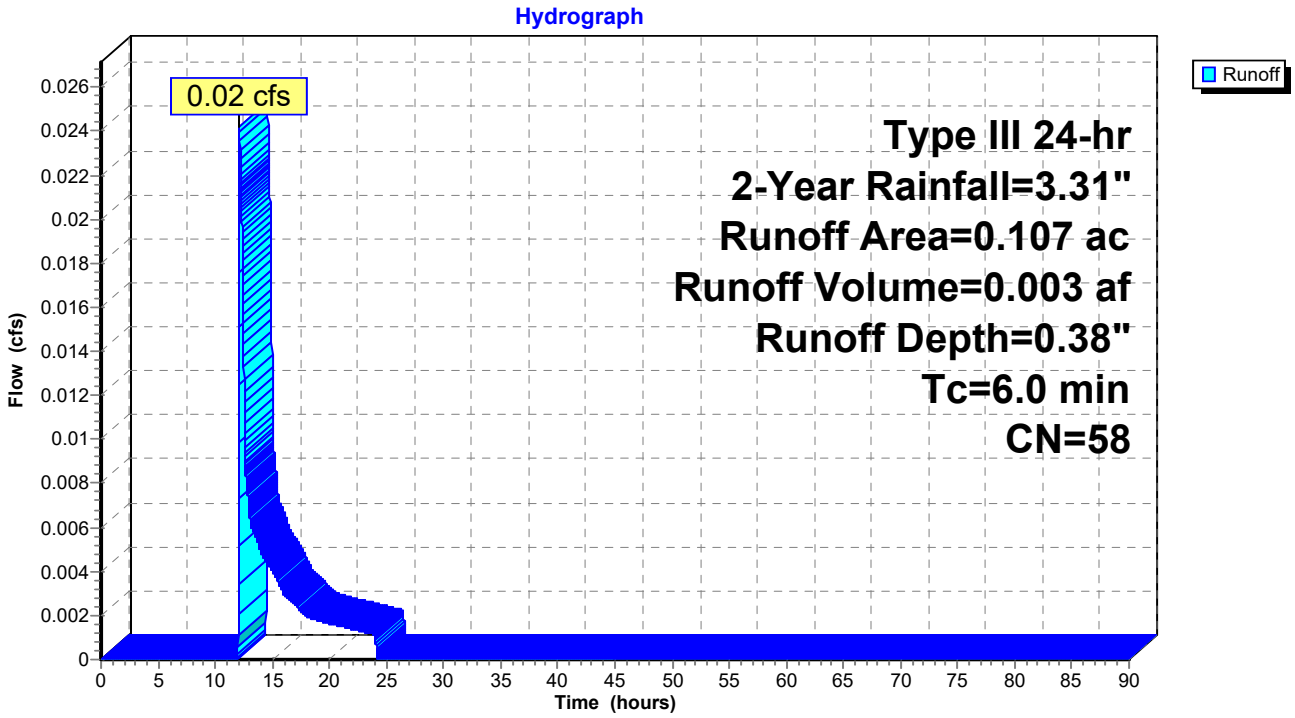
Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 101S: Offsite East



Summary for Pond 87P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 2.52" for 2-Year event
Inflow = 1.05 cfs @ 12.09 hrs, Volume= 0.082 af
Outflow = 0.68 cfs @ 12.18 hrs, Volume= 0.059 af, Atten= 35%, Lag= 5.5 min
Primary = 0.68 cfs @ 12.18 hrs, Volume= 0.059 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.12' @ 12.18 hrs Surf.Area= 2,674 sf Storage= 1,454 cf

Plug-Flow detention time= 187.2 min calculated for 0.059 af (72% of inflow)
Center-of-Mass det. time= 93.5 min (865.8 - 772.3)

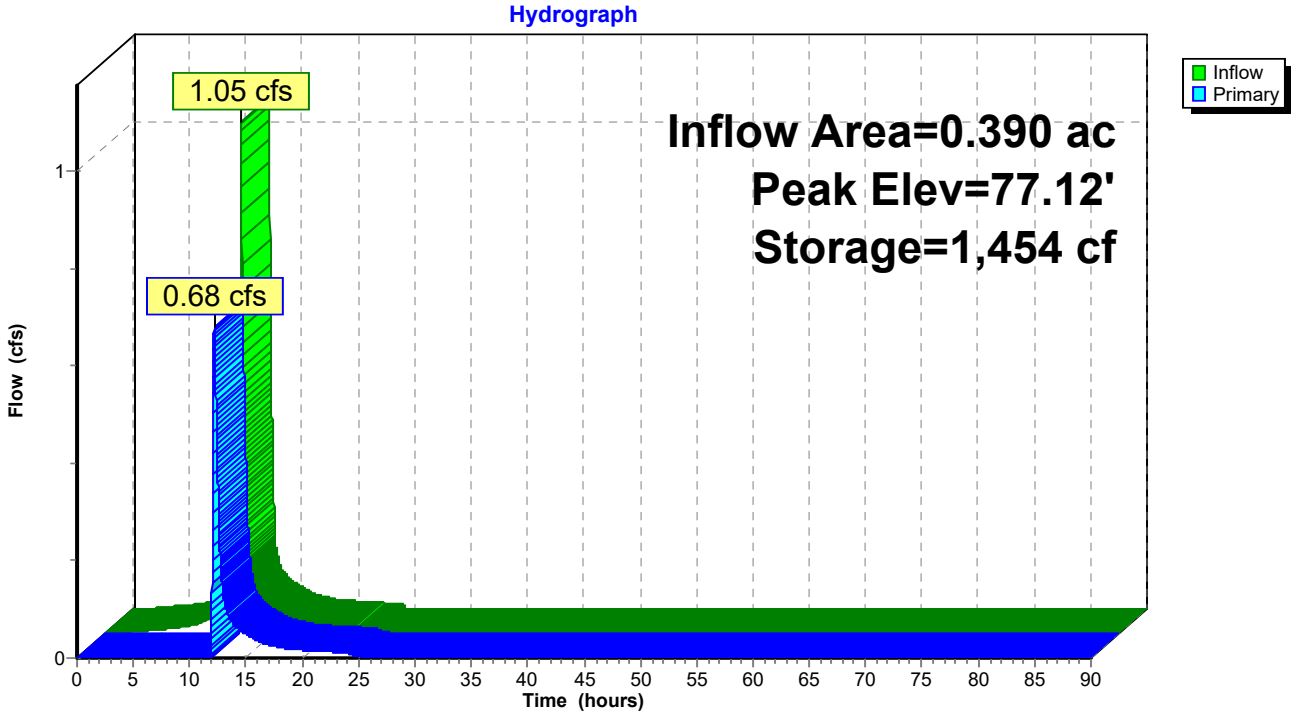
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.68 cfs @ 12.18 hrs HW=77.12' TW=68.09' (Dynamic Tailwater)
└**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.68 cfs @ 1.35 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 87P: Bioretention Basin



Summary for Pond 90P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 2.00" for 2-Year event
Inflow = 6.69 cfs @ 12.37 hrs, Volume= 0.946 af
Outflow = 0.38 cfs @ 16.32 hrs, Volume= 0.946 af, Atten= 94%, Lag= 236.9 min
Primary = 0.38 cfs @ 16.32 hrs, Volume= 0.946 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 70.65' @ 16.32 hrs Surf.Area= 7,892 sf Storage= 27,258 cf

Plug-Flow detention time= 1,074.6 min calculated for 0.946 af (100% of inflow)
Center-of-Mass det. time= 1,074.8 min (1,868.7 - 793.9)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

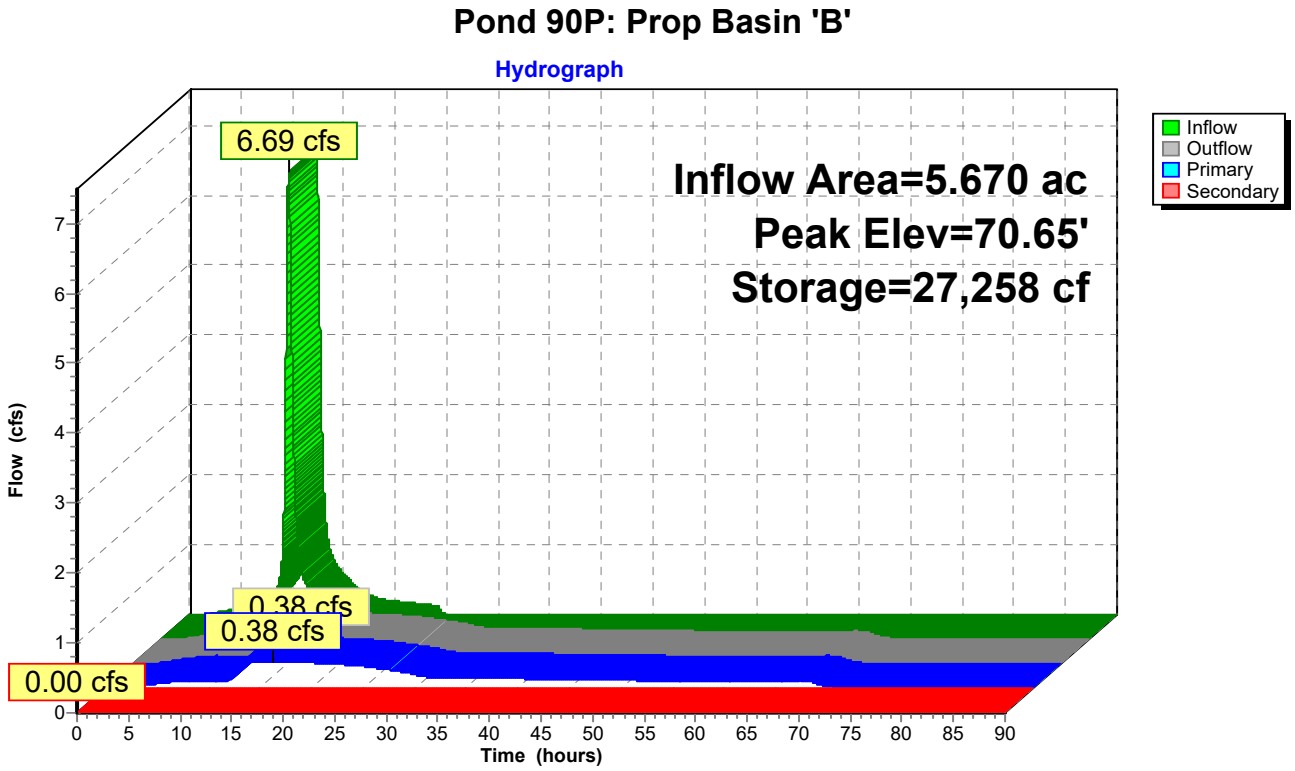
0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.38 cfs @ 16.32 hrs HW=70.65' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.38 cfs of 25.45 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.19 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.70 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

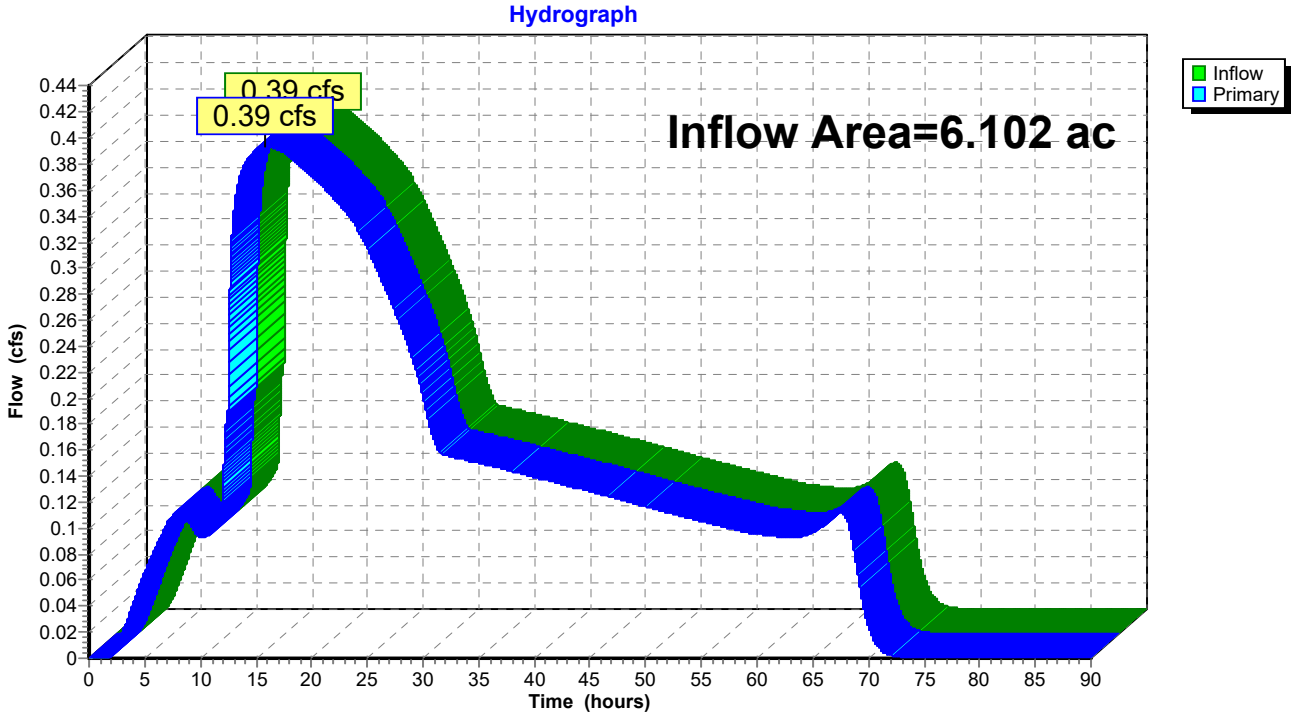


Summary for Link 90L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 1.88" for 2-Year event
Inflow = 0.39 cfs @ 15.82 hrs, Volume= 0.955 af
Primary = 0.39 cfs @ 15.82 hrs, Volume= 0.955 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 90L: Total Offsite



Summary for Subcatchment 80S: Perv PR DA 22 (Bioretention Basin DA)

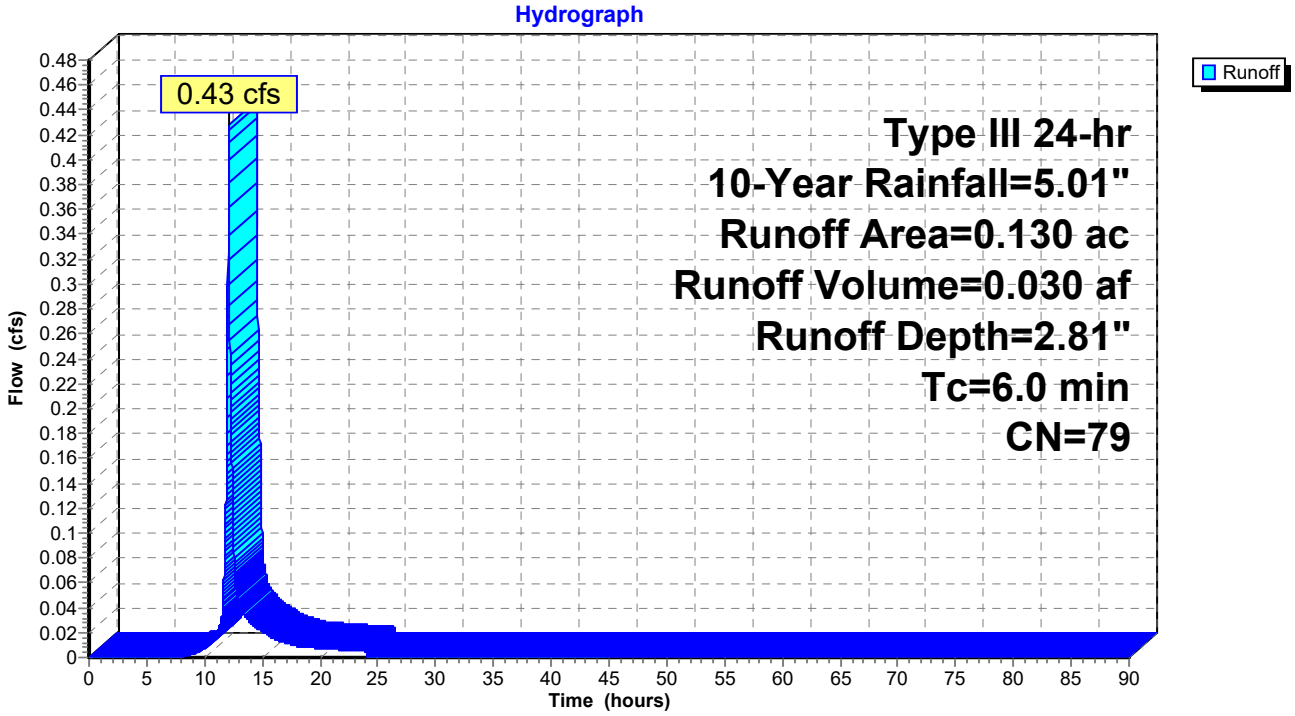
Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.130	79	<50% Grass cover, Poor, HSG B
0.130		100.00% Pervious Area

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

Subcatchment 80S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 81S: Imperv PR DA 22 (Bioretention Basin DA)

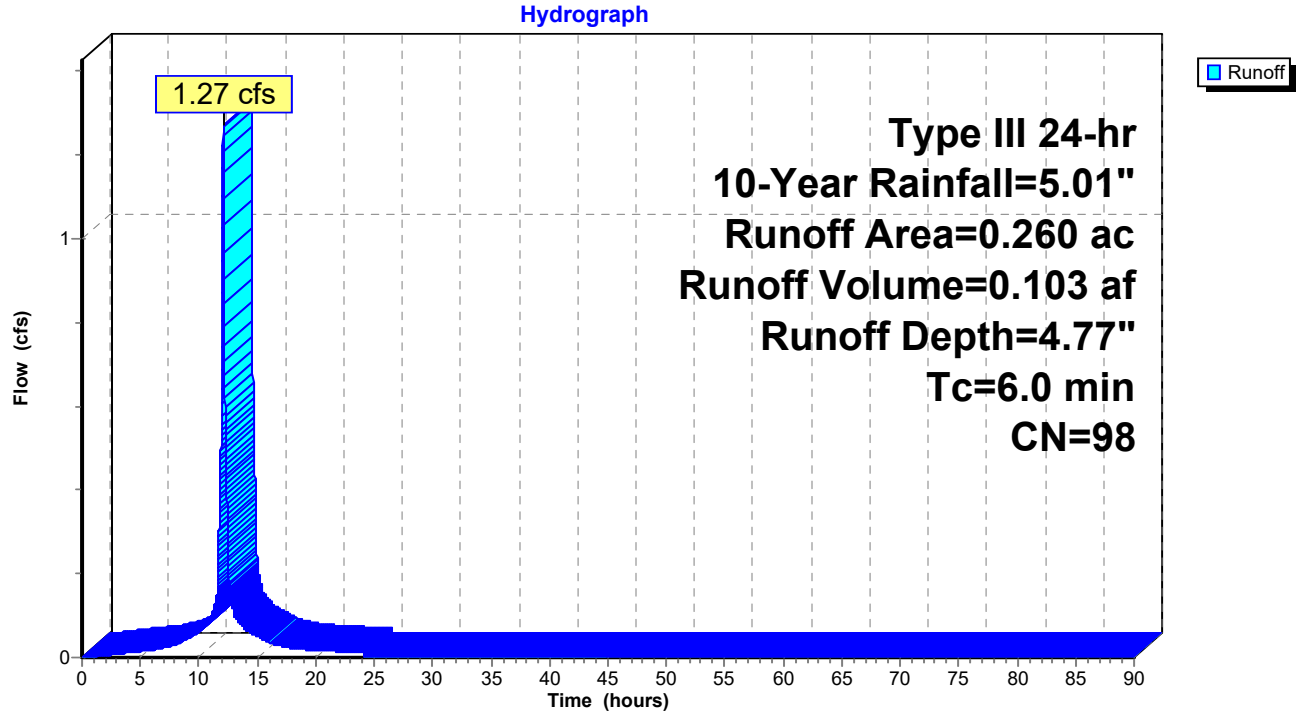
Runoff = 1.27 cfs @ 12.08 hrs, Volume= 0.103 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 81S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 82S: Perv Prop Basin DA

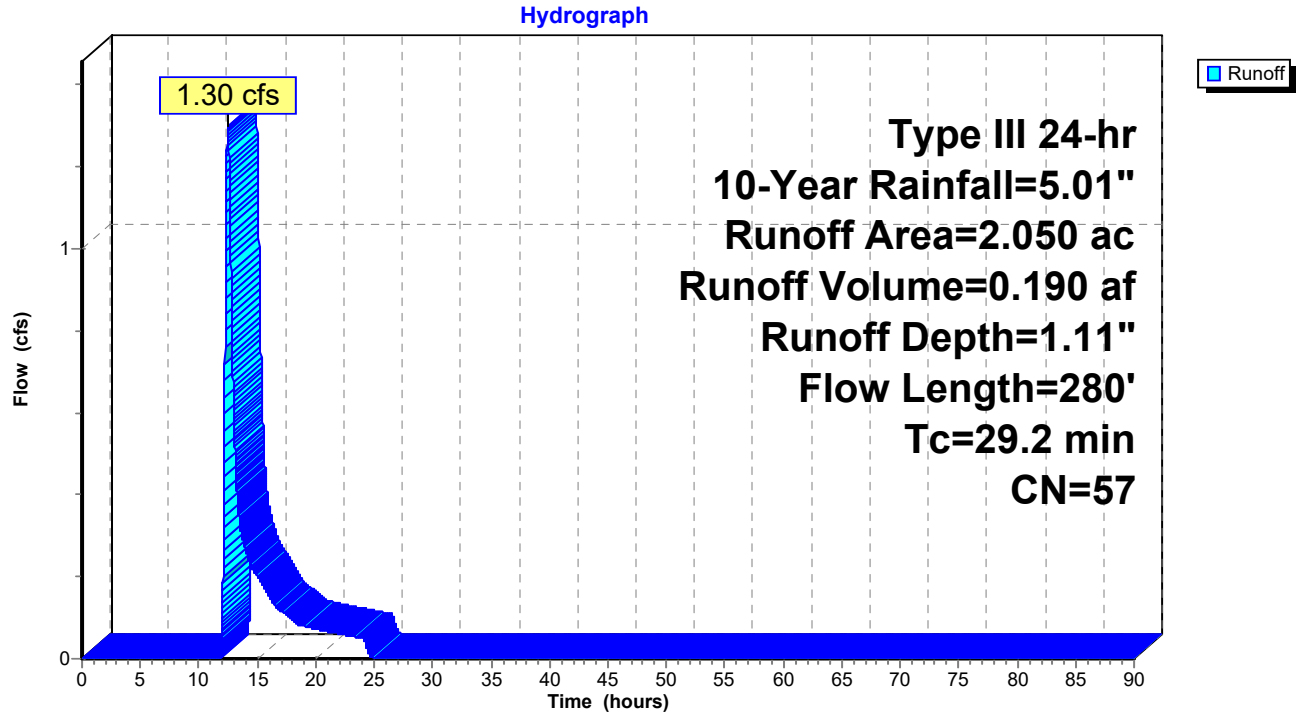
Runoff = 1.30 cfs @ 12.49 hrs, Volume= 0.190 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.430	79	<50% Grass cover, Poor, HSG B
0.410	86	<50% Grass cover, Poor, HSG C
1.210	39	>75% Grass cover, Good, HSG A
2.050	57	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 82S: Perv Prop Basin DA



Summary for Subcatchment 83S: Imperv Prop Basin DA

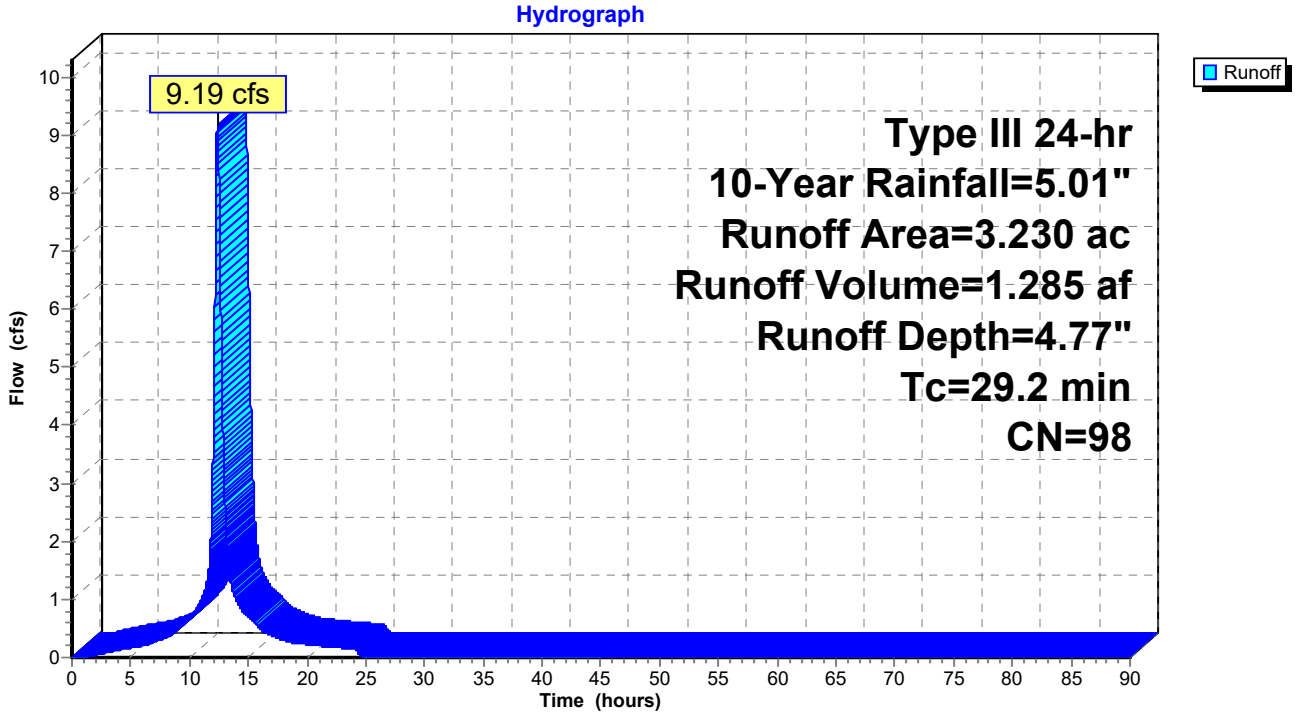
Runoff = 9.19 cfs @ 12.37 hrs, Volume= 1.285 af, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 83S: Imperv Prop Basin DA



Summary for Subcatchment 89S: Offsite West

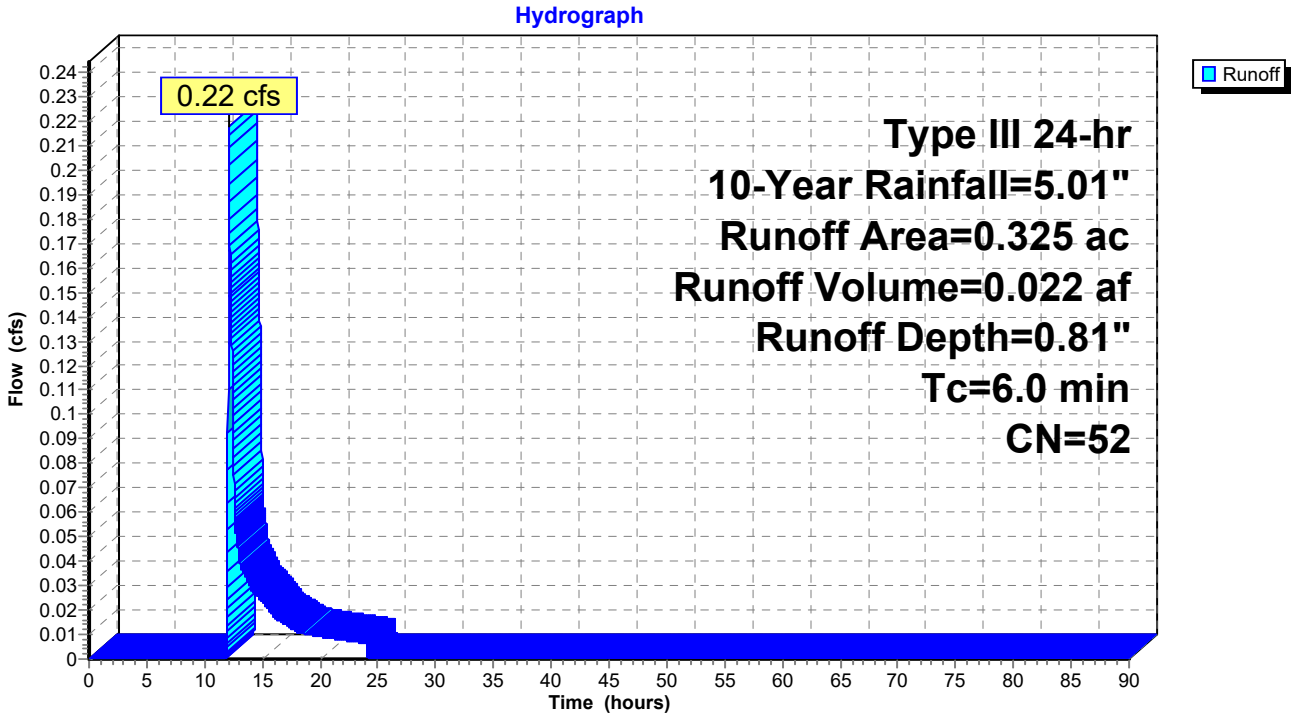
Runoff = 0.22 cfs @ 12.11 hrs, Volume= 0.022 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 89S: Offsite West



Summary for Subcatchment 101S: Offsite East

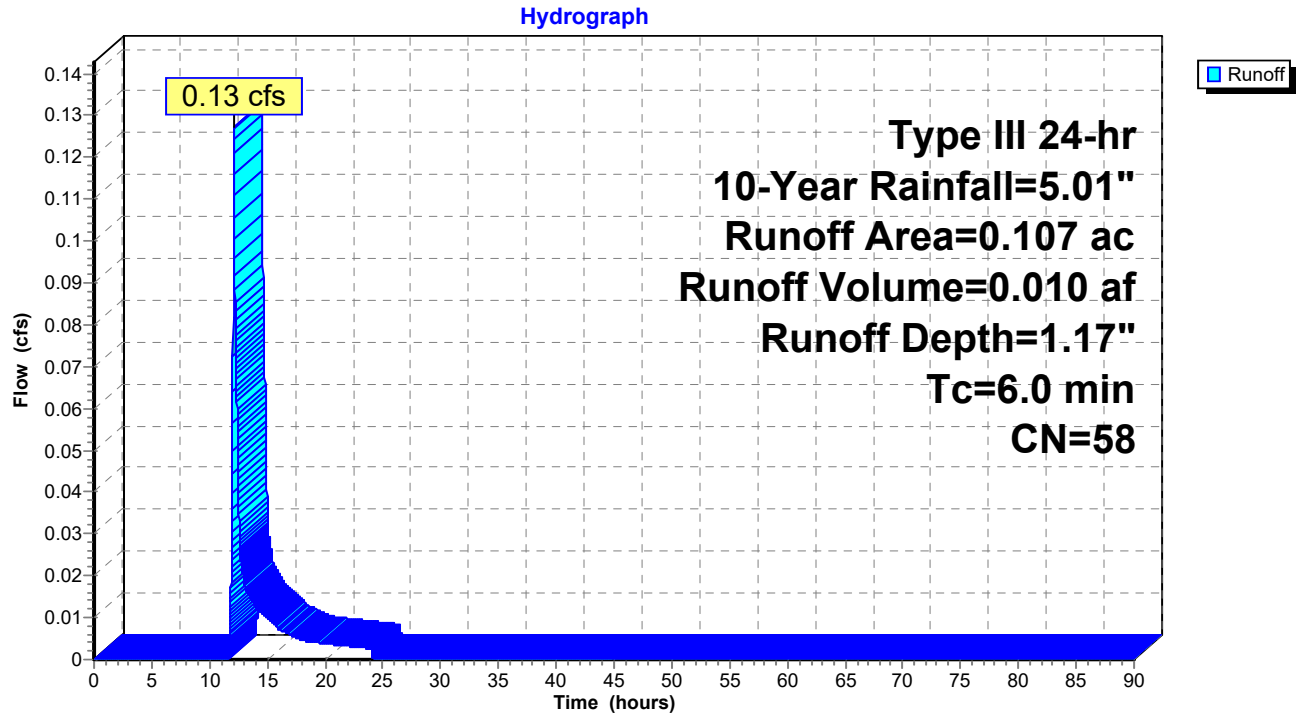
Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.01"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 101S: Offsite East



Summary for Pond 87P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 4.12" for 10-Year event
Inflow = 1.70 cfs @ 12.08 hrs, Volume= 0.134 af
Outflow = 1.28 cfs @ 12.15 hrs, Volume= 0.111 af, Atten= 25%, Lag= 4.1 min
Primary = 1.28 cfs @ 12.15 hrs, Volume= 0.111 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.21' @ 12.15 hrs Surf.Area= 2,734 sf Storage= 1,700 cf

Plug-Flow detention time= 144.5 min calculated for 0.111 af (83% of inflow)
Center-of-Mass det. time= 72.7 min (838.0 - 765.4)

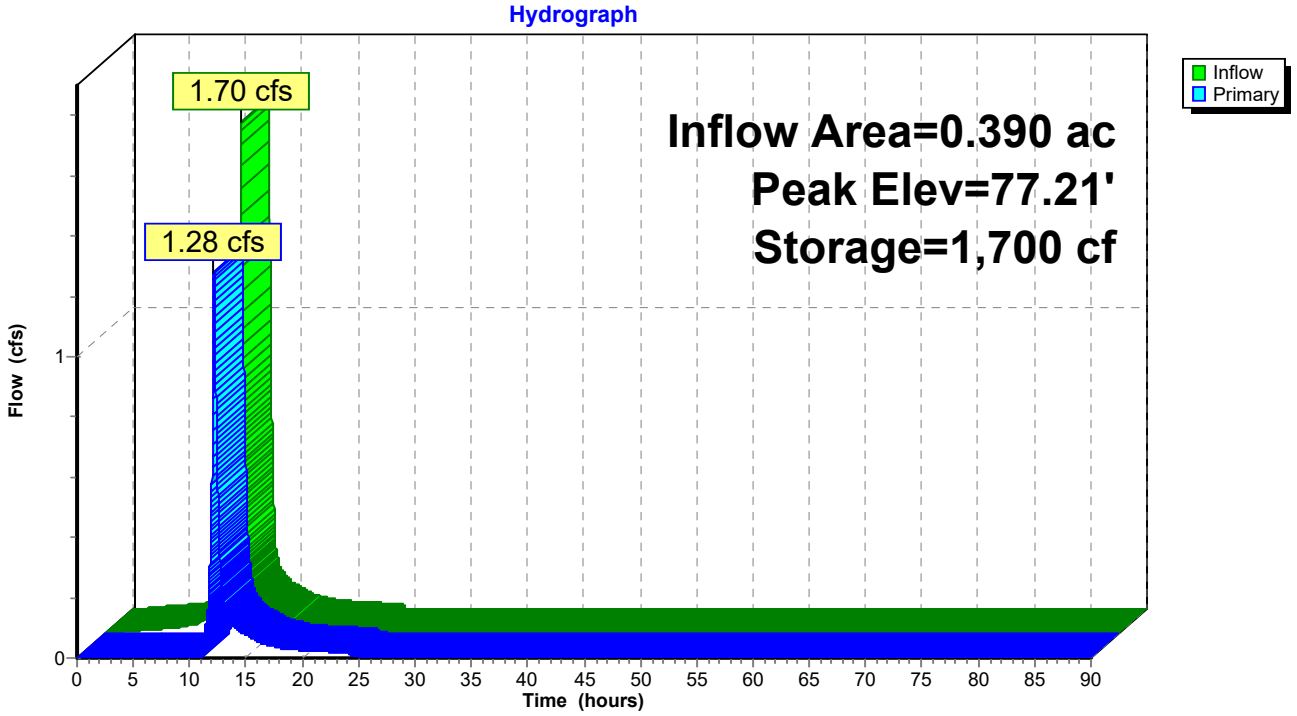
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.28 cfs @ 12.15 hrs HW=77.21' TW=69.17' (Dynamic Tailwater)
└**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.28 cfs @ 1.67 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 87P: Bioretention Basin



Summary for Pond 90P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 3.35" for 10-Year event
Inflow = 11.18 cfs @ 12.37 hrs, Volume= 1.585 af
Outflow = 0.54 cfs @ 17.04 hrs, Volume= 1.585 af, Atten= 95%, Lag= 279.9 min
Primary = 0.54 cfs @ 17.04 hrs, Volume= 1.585 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 73.05' @ 17.04 hrs Surf.Area= 9,638 sf Storage= 48,237 cf

Plug-Flow detention time= 1,228.6 min calculated for 1.585 af (100% of inflow)
Center-of-Mass det. time= 1,228.8 min (2,019.5 - 790.7)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

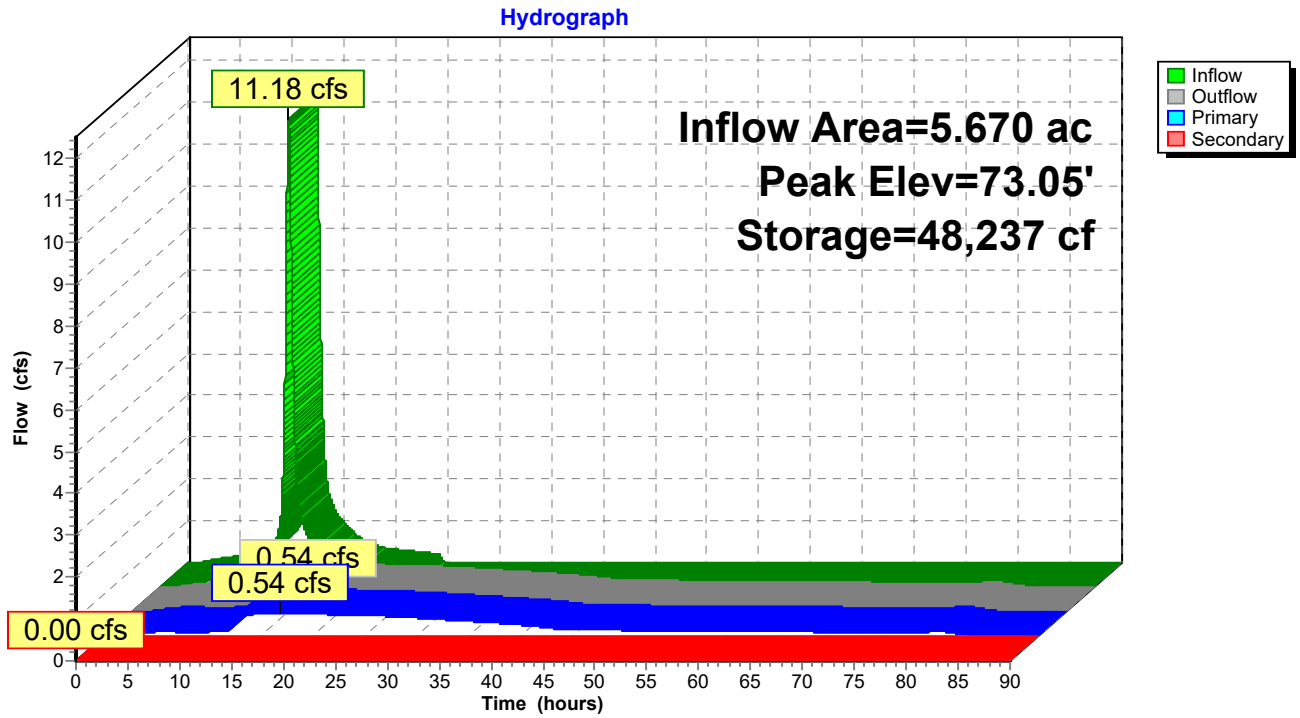
#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.54 cfs @ 17.04 hrs HW=73.05' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.54 cfs of 35.02 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.22 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 9.38 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 90P: Prop Basin 'B'

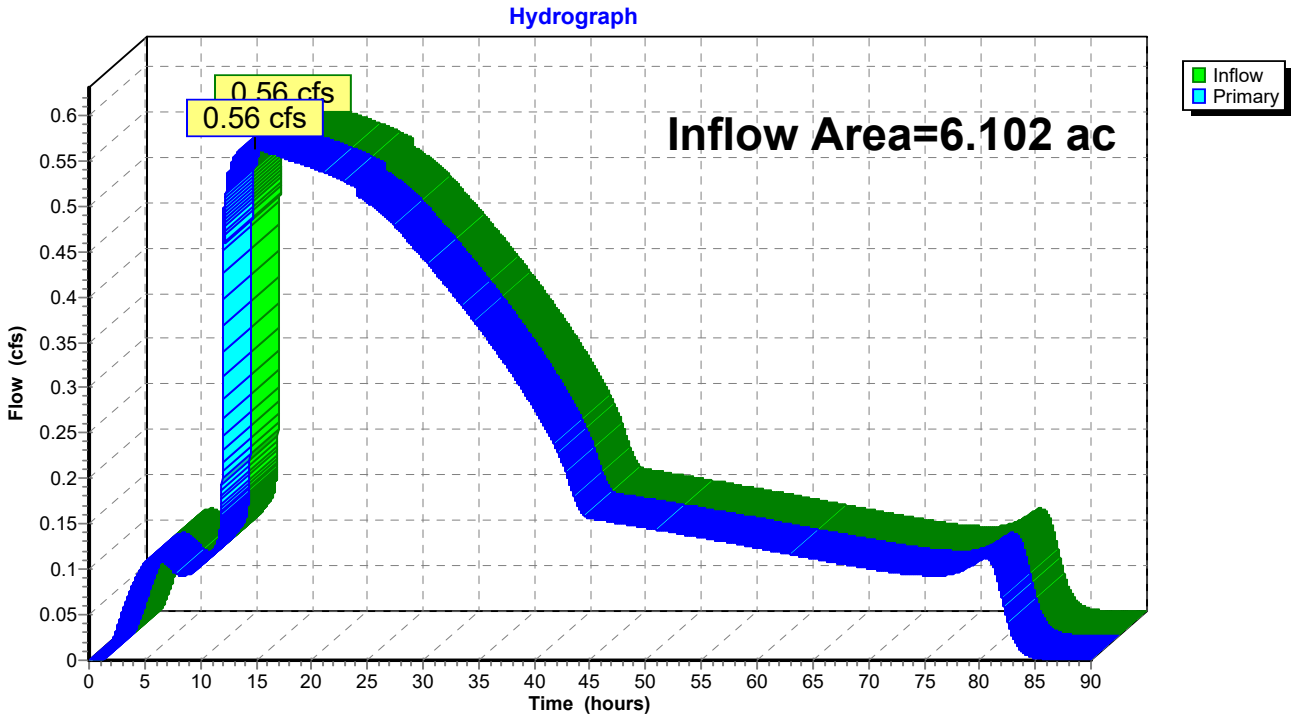


Summary for Link 90L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 3.18" for 10-Year event
Inflow = 0.56 cfs @ 14.82 hrs, Volume= 1.617 af
Primary = 0.56 cfs @ 14.82 hrs, Volume= 1.617 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 90L: Total Offsite



Summary for Subcatchment 80S: Perv PR DA 22 (Bioretention Basin DA)

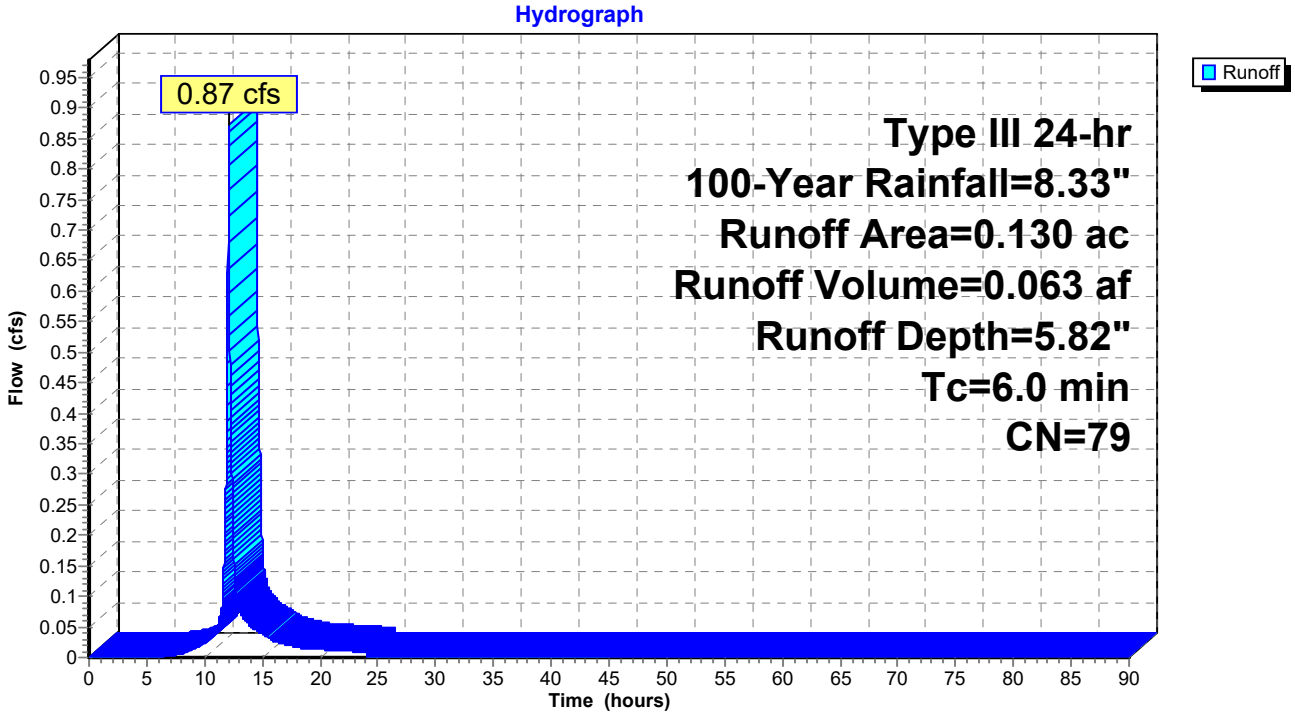
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.063 af, Depth= 5.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.130	79	<50% Grass cover, Poor, HSG B
0.130		100.00% Pervious Area

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

Subcatchment 80S: Perv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 81S: Imperv PR DA 22 (Bioretention Basin DA)

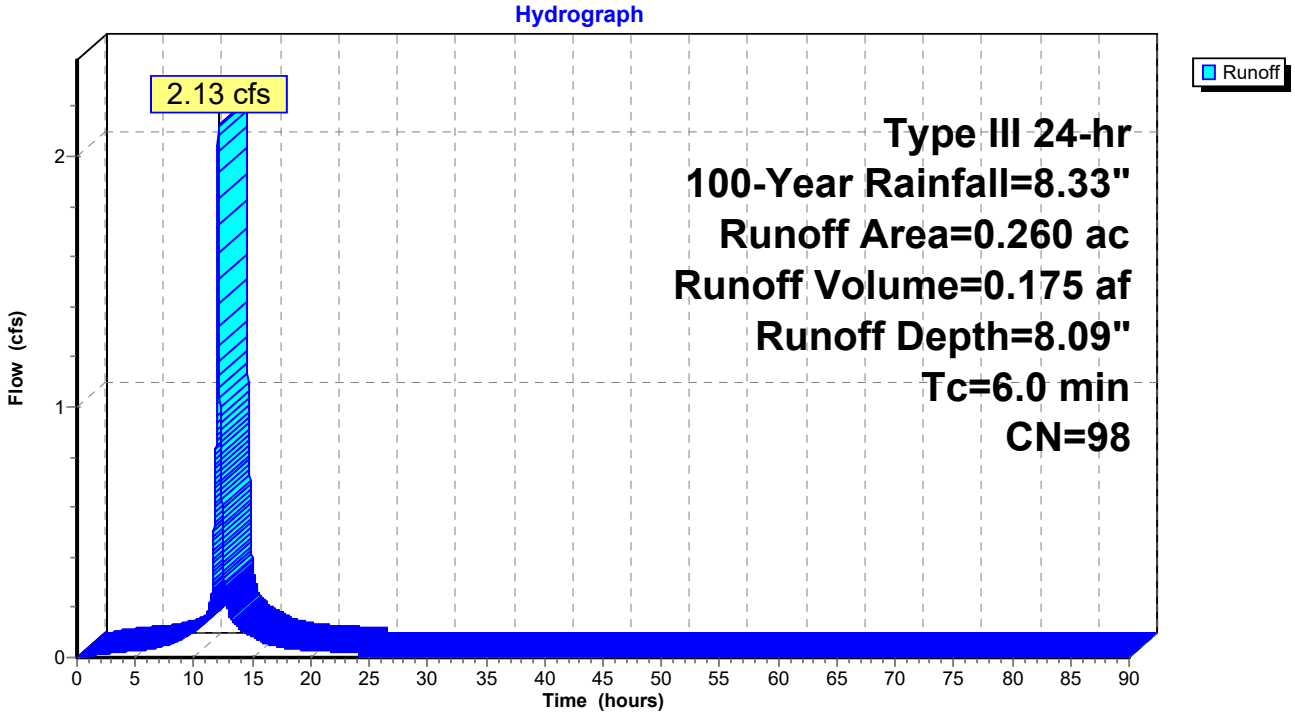
Runoff = 2.13 cfs @ 12.08 hrs, Volume= 0.175 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.260	98	Roofs, HSG A
0.260		100.00% Impervious Area

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

Subcatchment 81S: Imperv PR DA 22 (Bioretention Basin DA)



Summary for Subcatchment 82S: Perv Prop Basin DA

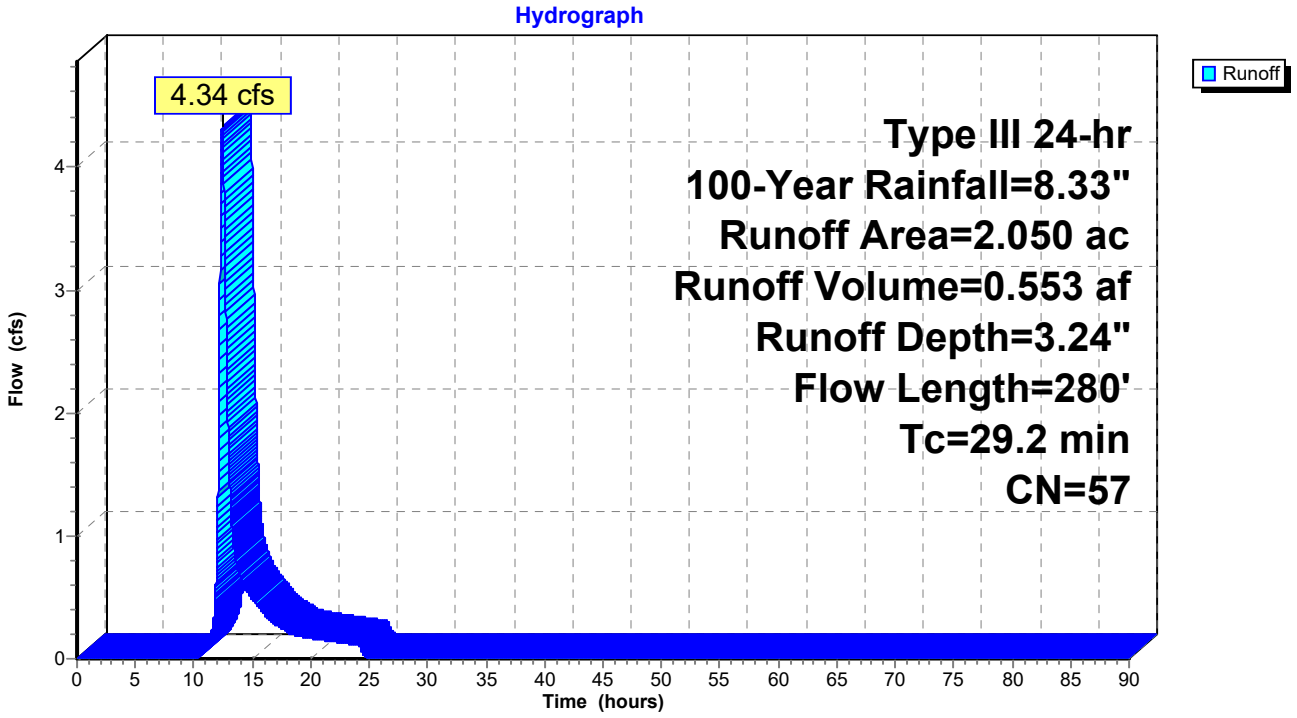
Runoff = 4.34 cfs @ 12.43 hrs, Volume= 0.553 af, Depth= 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.430	79	<50% Grass cover, Poor, HSG B
0.410	86	<50% Grass cover, Poor, HSG C
1.210	39	>75% Grass cover, Good, HSG A
2.050	57	Weighted Average
2.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	75	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
13.3	75	0.0360	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.30"
2.9	130	0.0220	0.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4					**Direct Entry, Inlet Time**
29.2	280	Total			

Subcatchment 82S: Perv Prop Basin DA



Summary for Subcatchment 83S: Imperv Prop Basin DA

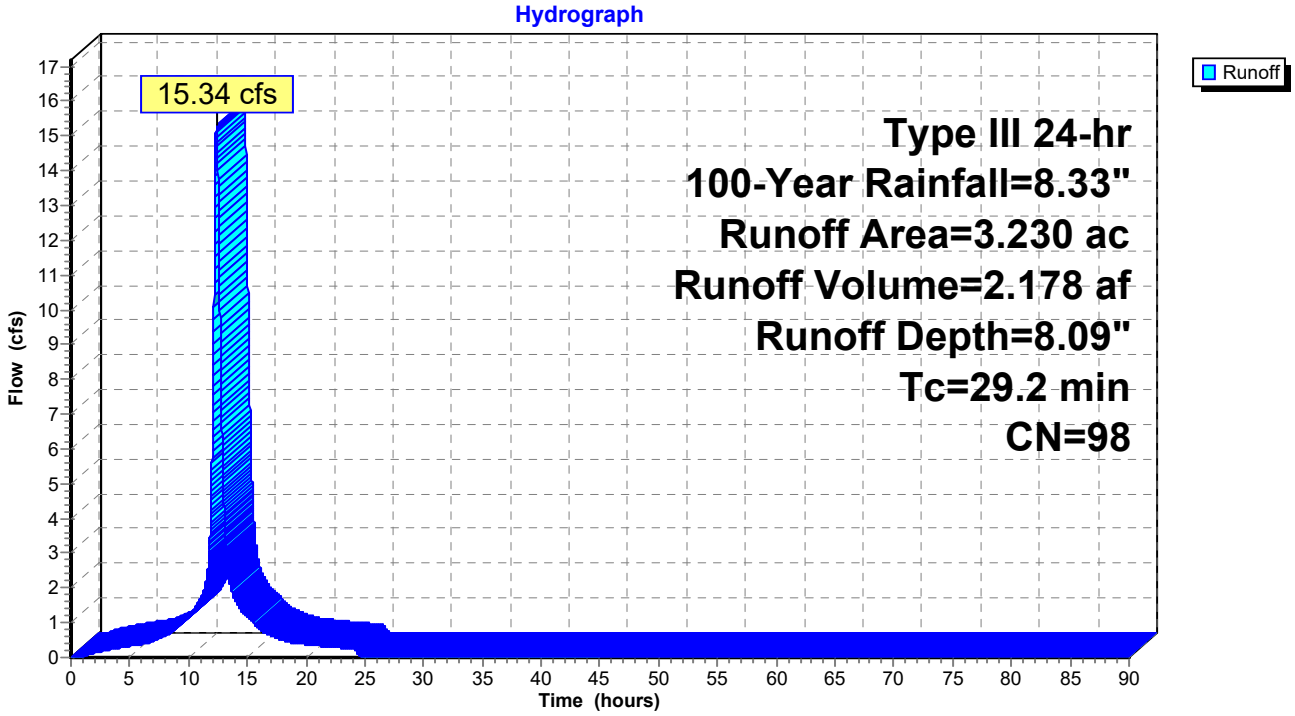
Runoff = 15.34 cfs @ 12.37 hrs, Volume= 2.178 af, Depth= 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

	Area (ac)	CN	Description
*	3.230	98	Impervious
	3.230		100.00% Impervious Area

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

Subcatchment 83S: Imperv Prop Basin DA



Summary for Subcatchment 89S: Offsite West

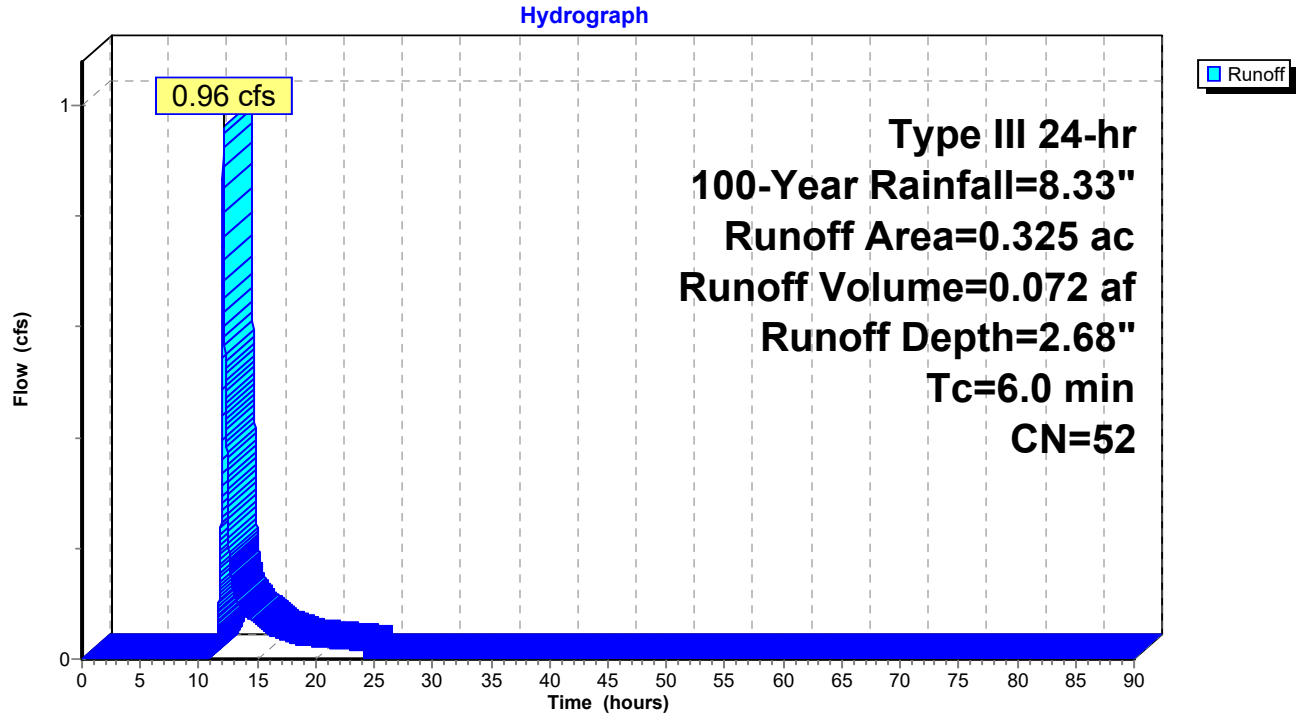
Runoff = 0.96 cfs @ 12.10 hrs, Volume= 0.072 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.026	80	>75% Grass cover, Good, HSG D
0.156	39	>75% Grass cover, Good, HSG A
0.143	61	>75% Grass cover, Good, HSG B
0.325	52	Weighted Average
0.325		100.00% Pervious Area

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

Subcatchment 89S: Offsite West



Summary for Subcatchment 101S: Offsite East

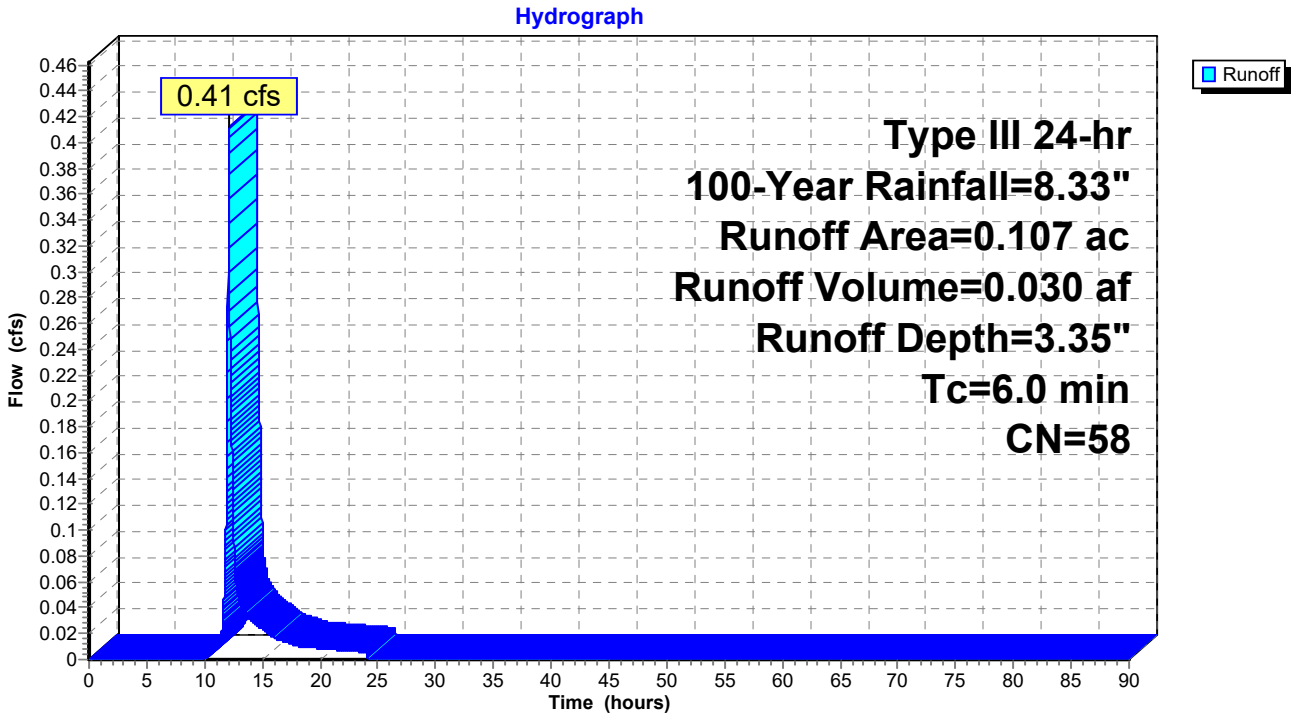
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.030 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.33"

Area (ac)	CN	Description
0.016	39	>75% Grass cover, Good, HSG A
0.091	61	>75% Grass cover, Good, HSG B
0.107	58	Weighted Average
0.107		100.00% Pervious Area

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

Subcatchment 101S: Offsite East



Summary for Pond 87P: Bioretention Basin

Inflow Area = 0.390 ac, 66.67% Impervious, Inflow Depth = 7.33" for 100-Year event
Inflow = 3.00 cfs @ 12.08 hrs, Volume= 0.238 af
Outflow = 2.52 cfs @ 12.14 hrs, Volume= 0.215 af, Atten= 16%, Lag= 3.1 min
Primary = 2.52 cfs @ 12.14 hrs, Volume= 0.215 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 77.34' @ 12.14 hrs Surf.Area= 2,817 sf Storage= 2,049 cf

Plug-Flow detention time= 104.2 min calculated for 0.215 af (90% of inflow)
Center-of-Mass det. time= 54.9 min (812.2 - 757.4)

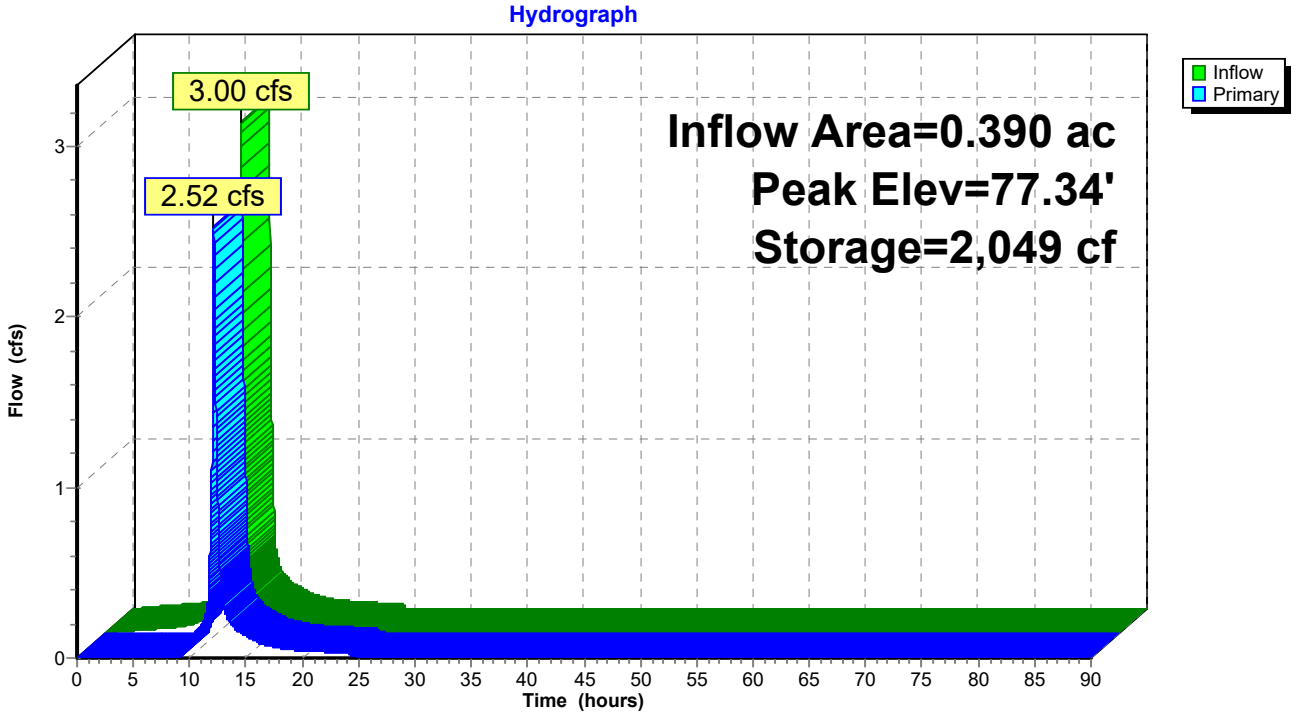
Volume	Invert	Avail.Storage	Storage Description
#1	76.50'	2,519 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.50	1,959	0	0
77.00	2,595	1,139	1,139
77.50	2,925	1,380	2,519

Device	Routing	Invert	Outlet Devices
#1	Primary	76.95'	**3.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Primary	77.30'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.52 cfs @ 12.14 hrs HW=77.34' TW=71.22' (Dynamic Tailwater)
1=Sharp-Crested Rectangular Weir (Weir Controls 2.29 cfs @ 2.03 fps)
2=Orifice/Grate (Weir Controls 0.23 cfs @ 0.62 fps)

Pond 87P: Bioretention Basin



Summary for Pond 90P: Prop Basin 'B'

Inflow Area = 5.670 ac, 61.55% Impervious, Inflow Depth = 6.23" for 100-Year event
Inflow = 20.91 cfs @ 12.37 hrs, Volume= 2.946 af
Outflow = 8.38 cfs @ 12.88 hrs, Volume= 2.946 af, Atten= 60%, Lag= 30.6 min
Primary = 8.38 cfs @ 12.88 hrs, Volume= 2.946 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 74.49' @ 12.88 hrs Surf.Area= 10,996 sf Storage= 62,975 cf

Plug-Flow detention time= 760.9 min calculated for 2.946 af (100% of inflow)
Center-of-Mass det. time= 760.9 min (1,547.4 - 786.5)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	68,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
66.00	0	0	0
67.00	5,595	2,798	2,798
68.00	6,155	5,875	8,673
69.00	6,773	6,464	15,137
70.00	7,446	7,110	22,246
71.00	8,128	7,787	30,033
72.00	8,863	8,496	38,529
73.00	9,600	9,232	47,760
74.00	10,358	9,979	57,739
75.00	11,660	11,009	68,748

Device	Routing	Invert	Outlet Devices
#1	Primary	66.00'	**24.0" Round Culvert** L= 115.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 66.00' / 65.97' S= 0.0003 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	66.00'	**HydroBrake 3in** Head (feet) 0.00 0.06 0.12 0.18 0.24 0.30 0.36 0.42 0.48 0.54 0.60 0.66 0.72 0.78 0.84 0.90 0.96 1.02 1.08 1.14 1.20 1.26 1.32 1.38 1.44 1.50 1.56 1.62 1.68 1.74 1.80 1.86 1.92 1.98 2.04 2.10 2.16 2.22 2.28 2.34 2.40 2.46 2.52 2.58 2.64 2.70 2.76 2.82 2.88 2.94 3.00 3.06 3.12 3.18 3.24 3.30 3.36 3.42 3.48 3.54 3.60 3.66 3.72 3.78 3.84 3.90 3.96 4.02 4.08 4.14 4.20 4.26 4.32 4.38 4.44 4.50 4.56 4.62 4.68 4.74 4.80 4.86 4.92 4.98 5.04 5.10 5.16 5.22 5.28 5.34 5.40 5.46 5.52 5.58 5.64 5.70 5.76 5.82 5.88 5.94 6.00 10.00 Disch. (cfs) 0.000 0.003 0.013 0.029 0.050 0.072 0.091 0.105 0.111 0.113 0.110 0.105 0.101 0.097 0.094 0.093 0.093 0.094 0.095 0.096 0.098 0.100 0.102 0.104 0.106 0.108 0.110 0.112 0.114 0.116 0.118 0.120 0.122 0.124 0.126 0.128 0.130 0.131 0.133 0.135 0.137 0.138 0.140 0.142 0.143 0.145 0.147 0.148 0.150 0.151 0.153 0.154 0.156 0.157 0.159 0.160 0.162 0.163

0.165 0.166 0.167 0.169 0.170 0.171 0.173 0.174 0.176 0.177
0.178 0.179 0.181 0.182 0.183 0.185 0.186 0.187 0.188 0.190
0.191 0.192 0.193 0.194 0.196 0.197 0.198 0.199 0.200 0.202
0.203 0.204 0.205 0.206 0.207 0.208 0.209 0.211 0.212 0.213
0.214 0.215 0.216 0.216

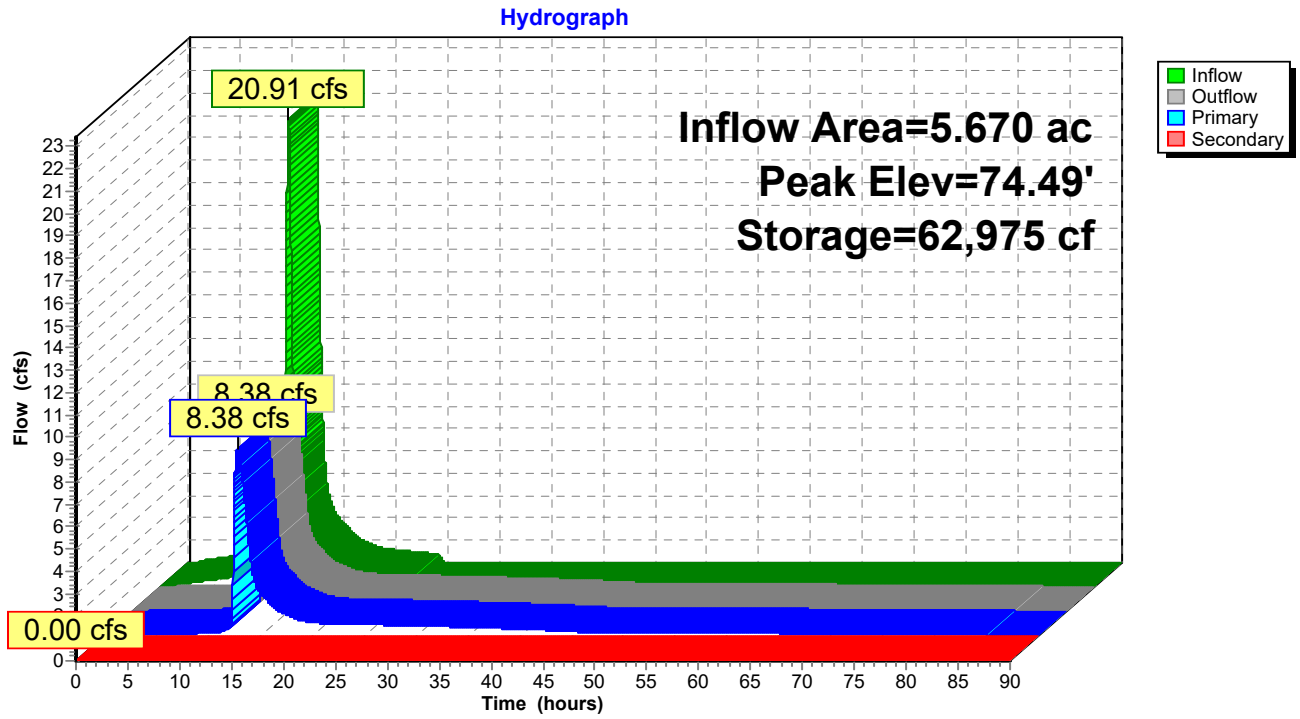
#3	Device 1	69.15'	**2.5" Vert. Orifice/Grate** C= 0.600
#4	Device 1	73.05'	**42.0" W x 5.0" H Vert. Orifice/Grate** C= 0.600
#5	Secondary	74.50'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.38 cfs @ 12.88 hrs HW=74.49' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 8.38 cfs of 39.67 cfs potential flow)
  - **2=HydroBrake 3in** (Custom Controls 0.22 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.38 cfs @ 11.02 fps)
  - **4=Orifice/Grate** (Orifice Controls 7.78 cfs @ 5.34 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' TW=0.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 90P: Prop Basin 'B'

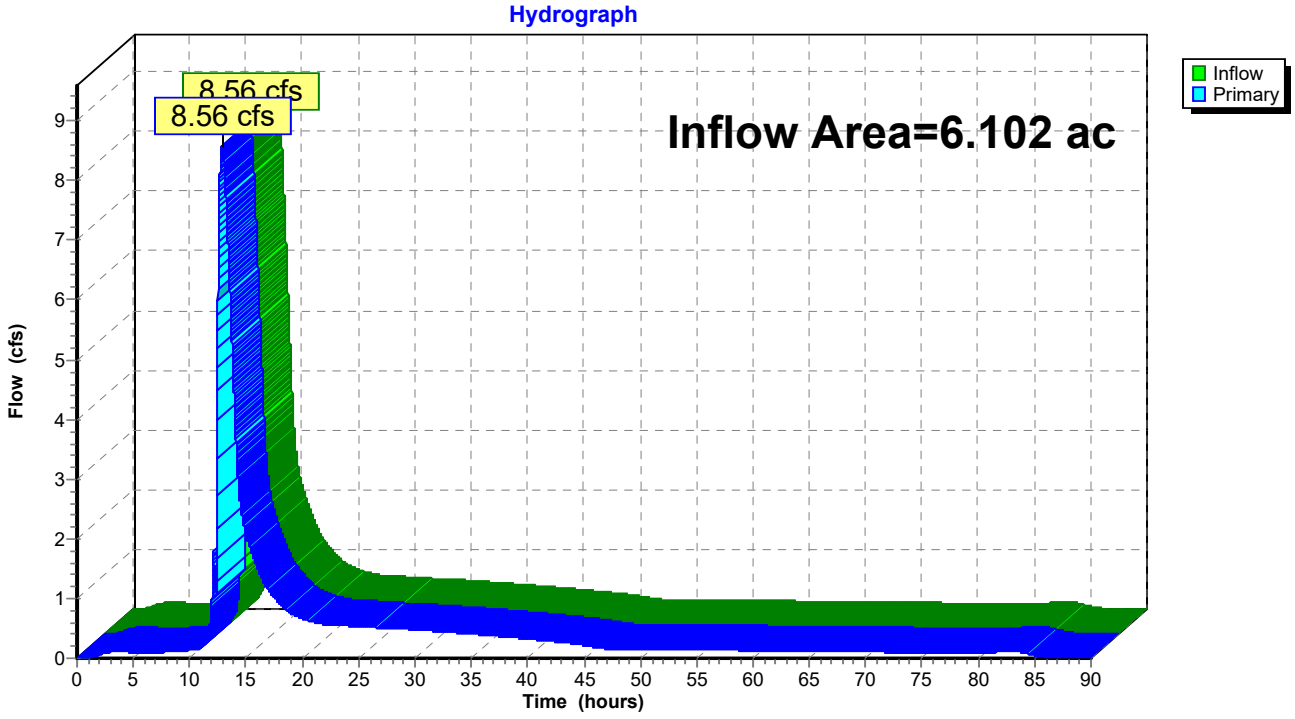


Summary for Link 90L: Total Offsite

Inflow Area = 6.102 ac, 57.19% Impervious, Inflow Depth = 5.99" for 100-Year event
Inflow = 8.56 cfs @ 12.87 hrs, Volume= 3.048 af
Primary = 8.56 cfs @ 12.87 hrs, Volume= 3.048 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-90.00 hrs, dt= 0.01 hrs

Link 90L: Total Offsite



APPENDIX J

Nonstructural Strategies Point System Spreadsheet

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project:	400 Steps - Everest Realty Group
Date:	April 13, 2020
User:	Reece Nordeen
Notes:	

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 3.9 **Acres**

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:	PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5	Total % Area
Percent of Each Planning Area within Site:		100.0%					100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals		Points
		HSG A	HSG B	HSG C	HSG D			
1	Wetlands and Undisturbed Stream Buffers					0.0		0
2	Lawn and Open Space	0.7	0.7		0.0	1.5		156
3	Brush and Shrub					0.0		0
4	Meadow, Pasture, Grassland, or Range					0.0		0
5	Row Crop					0.0		0
6	Small Grain and Legumes					0.0		0
7	Woods - Indigenous					0.0		0
8	Woods - Planted					0.0		0
9	Woods and Grass Combination					0.0		0
10	Ponds, Lakes, and Other Open Water					0.0		0
11	Gravel and Dirt					0.0		0
12	Porous and Permeable Paving					0.0		0
13	Directly Connected Impervious	1.6	0.9			2.4		0
14	Unconnected Impervious with Small D/S Pervious					0.0		0
15	Unconnected Impervious with Large D/S Pervious					0.0		0
	HSG Subtotals (Acres):	2.3	1.6	0.0	0.0		**Total Area:**	3.9
	HSG Subtotals (%):	58.8%	40.4%	0.0%	0.8%		**Total % Area:**	100.0%

Points Subtotal: **156**

Total Existing Site Points: **156**

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals		Points
		HSG A	HSG B	HSG C	HSG D			
1	Wetlands and Undisturbed Stream Buffers					0.0		0
2	Lawn and Open Space	0.5	0.7		0.0	1.3		131
3	Brush and Shrub					0.0		0
4	Meadow, Pasture, Grassland, or Range					0.0		0
5	Row Crop					0.0		0
6	Small Grain and Legumes					0.0		0
7	Woods - Indigenous					0.0		0
8	Woods - Planted					0.0		0
9	Woods and Grass Combination					0.0		0
10	Ponds, Lakes, and Other Open Water					0.0		0
11	Gravel and Dirt					0.0		0
12	Porous and Permeable Paving					0.0		0
13	Directly Connected Impervious	1.7	0.9			2.6		0
14	Unconnected Impervious with Small D/S Pervious					0.0		0
15	Unconnected Impervious with Large D/S Pervious					0.0		0
	HSG Subtotals (Acres):	2.3	1.6	0.0	0.0		**Total Area:**	3.9
	HSG Subtotals (%):	58.8%	40.4%	0.0%	0.8%		**Total % Area:**	100.0%
							Points Subtotal:	**131**

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =	67%	% of Site
Total Unconnected Impervious Coverage with Small D/S Pervious =	0%	% of Site
Total Unconnected Impervious Coverage with Large D/S Pervious =	0%	% of Site
Total Site Impervious Coverage =	67%	% of Site
Effective Site Impervious Coverage =	67%	% of Site
Specify Source of Maximum Allowable Impervious Coverage:	None	(None or Table)

Points Subtotal: 0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =	90%	% of Site
Maximum Allowable Site Disturbance by Municipal Ordinance =	100%	% of Site

Points Subtotal: 9

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =	2800	Feet
Length of Vegetated Runoff Conveyance System =	500	Feet
% of Total Runoff Conveyance System That is Vegetated =	18%	

Points Subtotal: 31

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =		% of Site
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =		Acres
Maximum Proposed Cluster Lot Size (Note:1/4 Acre or Less) =		Acres
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =		% of Clustered Site Portion

Points Subtotal: 0

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:	No	(Yes or No)
Percent of Proposed Lawn Areas to be Graded with Such Equipment:	0%	% of Lawn Areas

Points Subtotal: 0

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):	No	(Yes or No)
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):	No	(Yes or No)
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):	No	(Yes or No)

Points Subtotal: 0

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points: 170

Ratio of Proposed to Existing Site Points: 109%

Required Site Points Ratio: 87%

Nonstructural Point System Results: Proposed Nonstructural Measures are Adequate

APPENDIX K

Major Development Stormwater Summary

Attachment D – Major Development Stormwater Summary

General Information

1. Project Name: 400 Steps – Everest Realty Group
2. Municipality: West Windsor Twp County: Mercer Block(s): 5 Lot(s): 19
3. Site Location (State Plane Coordinates – NAD83): E: 458,900 N: 541,100
4. Date of Final Approval for Construction by Municipality: TBD
   Date of Certificate of Occupancy: TBD
5. Project Type (check all that apply):
   Residential [X] Commercial [X] Industrial [ ] Other (please specify) _____
6. Soil Conservation District Project Number: TBD
7. Did project require an NJDEP Land Use Permit? Yes (X) No ( ) Land Use Permit #: TBD
8. Did project require the use of any mitigation measures? Yes ( ) No (X)
   If yes, which standard was mitigated? _____

Site Design Specifications

1. Area of Disturbance (acres): 3.8 Area of Proposed Impervious (acres): 0.2 Ac New Imperv.
2. List all Hydrologic Soil Groups: A, B, D
3. Please Identify the Amount of Each Best Management Practices (BMPs) Utilized in Design Below:
   Bioretention Systems 1 Constructed Wetlands ___ Dry Wells ___ Extended Detention Basins 1
   Infiltration Basins ___ Combination Infiltration/Detention Basins ___ Manufactured Treatment Devices 1
   Pervious Paving Systems ___ Sand Filters ___ Vegetative Filter Strips ___ Wet Ponds ___
   Grass Swales ___ Subsurface Gravel Wetlands ___ Other _____

Storm Event Information

Storm Event - Rainfall (inches and duration): 2 yr.: 3.31" - 24 hr 10 yr.: 5.01" - 24 hr
100 yr.: 8.33" - 24-hr WQDS: 1.25" - 2 hr

Runoff Computation Method:
NRCS: Dimensionless Unit Hydrograph [X] NRCS: Delmarva Unit Hydrograph [ ] Rational [ ] Modified Rational [ ]
Other: _____

Basin Specifications (answer all that apply)

If more than one basin, attach multiple sheets

1. Type of Basin: Extended Detention Surface/Subsurface (select one): Surface (X) Subsurface ( )
2. Owner (select one):
   ( ) Public (X) Private: If so, Name: 400 Steps, LLC Phone number: 732-625-1055
3. Basin Construction Completion Date: TBD
4. Drain Down Time (hr.): 25.3 hr
5. Design Soil Permeability (in./hr.): N/A
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): 7.9 ft Date Obtained: 2/20/20
7. Groundwater Recharge Methodology (select one): 2 Year Difference ( ) NJGRS ( ) Other ( ) NA (X)
8. Groundwater Mounding Analysis (select one): Yes ( ) No (X) If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes (X) No ( ) Is the Basin Deed Restricted: Yes (X) No ( )

Comments:

Name of Person Filling Out This Form: _____ Signature: _____

Title: _____ Date: _____ 2/2/2018

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*	
1. Type of Basin: BIORETENTION	Surface/Subsurface (select one): Surface ⊗ Subsurface ○
2. Owner (select one): ○ Public	⊗ Private: If so, Name: 400 STEPS, LLC Phone number: 732-625-1055
3. Basin Construction Completion Date: TBD	
4. Drain Down Time (hr.): 17.1 hr	
5. Design Soil Permeability (in./hr.): 0.8 in/hr	
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): 3.08 ft	Date Obtained: 2/20/20
7. Groundwater Recharge Methodology (select one): 2 Year Difference ○	NJGRS ⊗ Other ○ NA ○
8. Groundwater Mounding Analysis (select one): Yes ⊗ No ○	If, Yes Methodology Used: HANTUSH EQ
9. Maintenance Plan Submitted: Yes ⊗ No ○	Is the Basin Deed Restricted: Yes ⊗ No ○

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*	
1. Type of Basin:	Surface/Subsurface (select one): Surface ○ Subsurface ○
2. Owner (select one): ○ Public	○ Private: If so, Name: Phone number:
3. Basin Construction Completion Date:	
4. Drain Down Time (hr.):	
5. Design Soil Permeability (in./hr.):	
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained:
7. Groundwater Recharge Methodology (select one): 2 Year Difference ○	NJGRS ○ Other ○ NA ○
8. Groundwater Mounding Analysis (select one): Yes ○ No ○	If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes ○ No ○	Is the Basin Deed Restricted: Yes ○ No ○

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*	
1. Type of Basin:	Surface/Subsurface (select one): Surface ○ Subsurface ○
2. Owner (select one): ○ Public	○ Private: If so, Name: Phone number:
3. Basin Construction Completion Date:	
4. Drain Down Time (hr.):	
5. Design Soil Permeability (in./hr.):	
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained:
7. Groundwater Recharge Methodology (select one): 2 Year Difference ○	NJGRS ○ Other ○ NA ○
8. Groundwater Mounding Analysis (select one): Yes ○ No ○	If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes ○ No ○	Is the Basin Deed Restricted: Yes ○ No ○

Name of Person Filling Out This Form: REECE NORDEEN

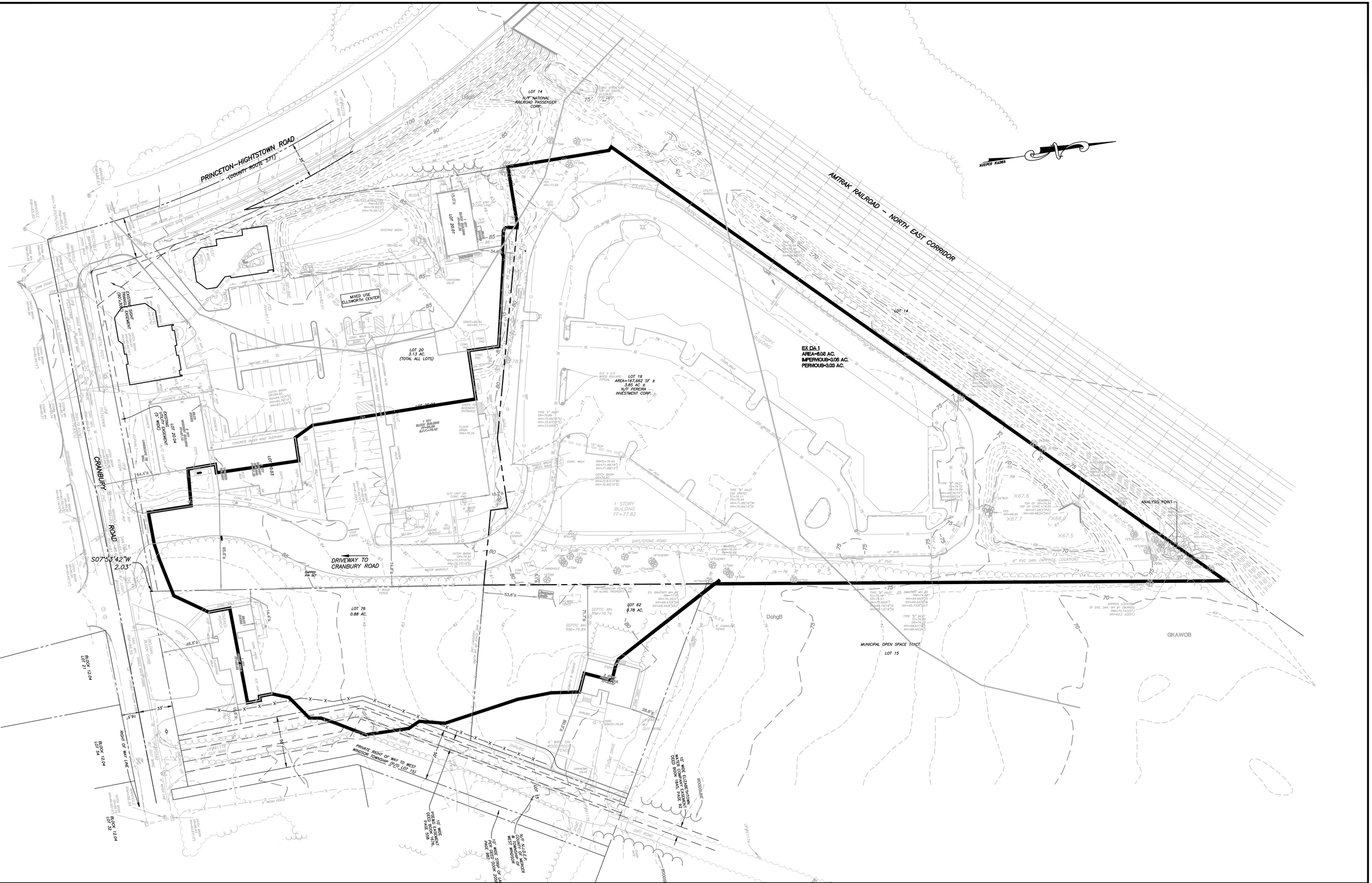
Signature: R Nordeen

Title: ENGINEER IN TRAINING (EIT)

Date: 10/15/20

APPENDIX L

Drainage Area Plans



NO.	DATE	REVISION	DRAWN	CHK	REL

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HORIZONTAL SCALE IN FEET

1 WASHINGTON BOULEVARD
SUITE 3
ROBBINSVILLE, NJ 08691
Voice (609) 918-0200
www.actengineers.com

ACT ENGINEERS, INC.
A SMALL BUSINESS ENTERPRISE

CIVIL ENGINEERING ❐ LAND SURVEYING ❐ ENVIRONMENTAL PERMITTING
NEW JERSEY CERTIFICATE of AUTHORIZATION No. 24GA27930900

PREDEVELOPED DRAINAGE AREA MAP
FOR
400 STEPS
LOT 19 BLOCK 5

SITUATED IN
WEST WINDSOR TOWNSHIP MERCER COUNTY NEW JERSEY

CADD FILE	F-PREDEV DA
PROJECT NO.	170201-05
DRAWN BY	RN
CHECKED BY	JR
SCALE	1"=40'
DATE	4/15/20
	ACT ENGINEERS, INC.
SHEET	1 OF 1

Xrefs: F-PREDEV DA.dwg; R-XTOPO.dwg; R-BASE.dwg
Xrefs: F-PREDEV DA.dwg; R-XTOPO.dwg; R-BASE.dwg
S:\2017\T\170201-05\dwg\F-PREDEV DA.dwg Last Saved Bymortern, 11/25/2020 5:20 PM Plotted ByReece M. Nordsen Plotted:12/3/2020 5:59 PM

PRINCETON–HIGHTSTOWN ROAD
(COUNTY ROUTE 571)

AMTRAK RAILROAD – NORTH EAST CORRIDOR

CRANBURY ROAD

DRIVEWAY TO CRANBURY ROAD

S07°53'42"W 2.03'

RIGHT OF WAY LINE

BUILDING 4

BUILDING 2

BUILDING 1

MIXED USE ELLSWORTH CENTER

PR. OFFSITE WEST DA
AREA=0.92 AC.
PERVIOUS=0.32 AC.
IMPERVIOUS=0.00 AC.

PR. CO-9
AREA=0.11 AC.

PR. CO-13
AREA=0.11 AC.

PR. CO-12
AREA=0.03 AC.

PR. DA 24
AREA=0.17 AC.
PERVIOUS=0.02 AC.
IMPERVIOUS=0.15 AC.

PR. DA 23
AREA=0.10 AC.
PERVIOUS=0.01 AC.
IMPERVIOUS=0.09 AC.

PR. DA 25
AREA=0.42 AC.
PERVIOUS=0.07 AC.
IMPERVIOUS=0.35 AC.

PR. CO-15
AREA=0.14 AC.

PR. DA 21
AREA=0.25 AC.
PERVIOUS=0.09 AC.
IMPERVIOUS=0.16 AC.

PR. CO-2
AREA=0.09 AC.

PR. DA 22
AREA=0.39 AC.
PERVIOUS=0.13 AC.
IMPERVIOUS=0.26 AC.

PR. DA 20
AREA=0.15 AC.
PERVIOUS=0.04 AC.
IMPERVIOUS=0.11 AC.

PR. CO-6
AREA=0.06 AC.

PR. CO-8
AREA=0.05AC.

PR. CO-1
AREA=0.14 AC.

PR. CO-3
AREA=0.05 AC.

PR. CO-4
AREA=0.05 AC.

PR. DA 4
AREA=0.44 AC.
PERVIOUS=0.16 AC.
IMPERVIOUS=0.28 AC.

PR. DA 3
AREA=0.25 AC.
PERVIOUS=0.03 AC.
IMPERVIOUS=0.22 AC.

PR. DA 9
AREA=0.08 AC.
PERVIOUS=0.04 AC.
IMPERVIOUS=0.04 AC.

PR. DA 8
AREA=0.11 AC.
PERVIOUS=0.03 AC.
IMPERVIOUS=0.08 AC.

PR. DA 6
AREA=0.18 AC.
PERVIOUS=0.09 AC.
IMPERVIOUS=0.09 AC.

PR. DA 11
AREA=0.78 AC.
PERVIOUS=0.23 AC.
IMPERVIOUS=0.55 AC.

PR. DA 10
AREA=0.10 AC.
PERVIOUS=0.03 AC.
IMPERVIOUS=0.07 AC.

PR. DA 5
AREA=1.13 AC.
PERVIOUS=0.95 AC.
IMPERVIOUS=0.18 AC.

PR. BASIN DA
AREA=0.26 AC.
PERVIOUS=0.26 AC.
IMPERVIOUS=0.00 AC.

PR. OFFSITE EAST DA
AREA=0.11 AC.
PERVIOUS=0.11 AC.
IMPERVIOUS=0.00 AC.

6' HIGH CONCRETE FENCE

END CONCRETE FENCE, PROVIDE GATE AT CORNER
25 LF-18" HDPE @ 0.5%

6' HIGH CHAIN LINK FENCE

END 6' HIGH CHAIN LINK FENCE

BRICK PAVER AREA, TYPICAL

5' WIDE SIDEWALK

6' WIDE CONC. SIDEWALK

8' WIDE CONC. SIDEWALK

HANDICAP SIGN, TYP.

CONC. WHEELSTOP

VAN ACCESSIBLE PVC HANDICAP SIGN

PAINTED STRIPING (TYP.)

DECORATIVE PATTERN CROSSWALK (SEE DETAIL)

PR. CURB MEETS EXG. CURB

FUTURE SIDEWALK CONNECTION

PREVENTER ENCLOSURE

FIRE LANE SIGN
NO PARKING

METAL STAIRCASE/LANDING FOR FIRST FLOOR ACCESS (SEE ARCH. DRAWINGS)

2ND FLOOR ENTRANCE

DAS GRILL (TYP. SEE DETAIL)

"U" BIKE RACK ON 4'x6' CONC. PAD

CRUSHED STONE GRILLING AREA (TYP.)

BITUM. PAVEMENT

CONCRETE APRON AND BOLLARDS

DEPRESSED CURB

TRASH & RECYCLING ENCLOSURES

PROPOSED DRAINAGE EASEMENT

PROPOSED TREELINE

FIRE LANE SIGN
NO PARKING

PAINTED WHITE FIRE LANE MARKING TYP.

MANAGEMENT OFFICE SIGN

1 STORY BUILDING F=77.82

GATE

QKAWOB

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DRAINAGE AREA PLAN - PROPOSED
FOR
400 STEPS
LOT 19 BLOCK 5

SITUATED IN
WEST WINDSOR TOWNSHIP — MERCER COUNTY — NEW JERSEY

CADD FILE	F-DA-PR
PROJECT NO.	170201-05
DRAWN BY	JR
CHECKED BY	REK
SCALE	1"=40'
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ACT ENGINEERS, INC.

SHEET
1 OF 1

Xrefs: R-DA_PR.dwg, R-BASE.dwg, R-STM.dwg, R-XTOPO.dwg, R-XTOPO.dwg, R-SITE.dwg
S:\2017\170201-05\Dwg\F-DA-PR.dwg Last Saved By:nordsen, 11/19/2020 3:04 PM Plotted By:Reece M. Nordsen Plotted:12/3/2020 5:40 PM