"THE BIRCHES"

A 40B RESIDENTIAL PROJECT
OFF LONG RIDGE ROAD, CARLISLE, MASSACHUSETTS

STORMWATER MANAGEMENT REPORT
FOR PLAN P

VOLUME 2 OF 2

STORMWATER MANAGEMENT DESIGN

August 19, 2016

PREPARED FOR:

LIFETIME GREEN HOMES, LLC
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MBC JOB NUMBER: 2066

NO.	DATE	REVISION	BY
4			
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THE BIRCHES
STORMWATER MANAGEMENT REPORT – VOLUME 2 OF 2
A 40B RESIDENTIAL PROJECT OFF LONG RIDGE ROAD, CARLISLE, MA

THE FOLLOWING REPORT HAS BEEN PREPARED UNDER THE SUPERVISION OF A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF MASSACHUSETTS.

"THE BIRCHES"

OFF LONG RIDGE ROAD
CARLISLE, MASSACHUSETTS

Volume 2

STORMWATER MANAGEMENT DESIGN

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STORMWATER MANAGEMENT REPORT – VOLUME 2 OF 2
A 40B RESIDENTIAL PROJECT OFF LONG RIDGE ROAD, CARLISLE, MA

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STORMWATER CHECKLIST

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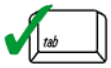
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☒ LID Site Design Credit Requested:

- ☐ Credit 1
- ☒ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☒ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☒ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☒ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

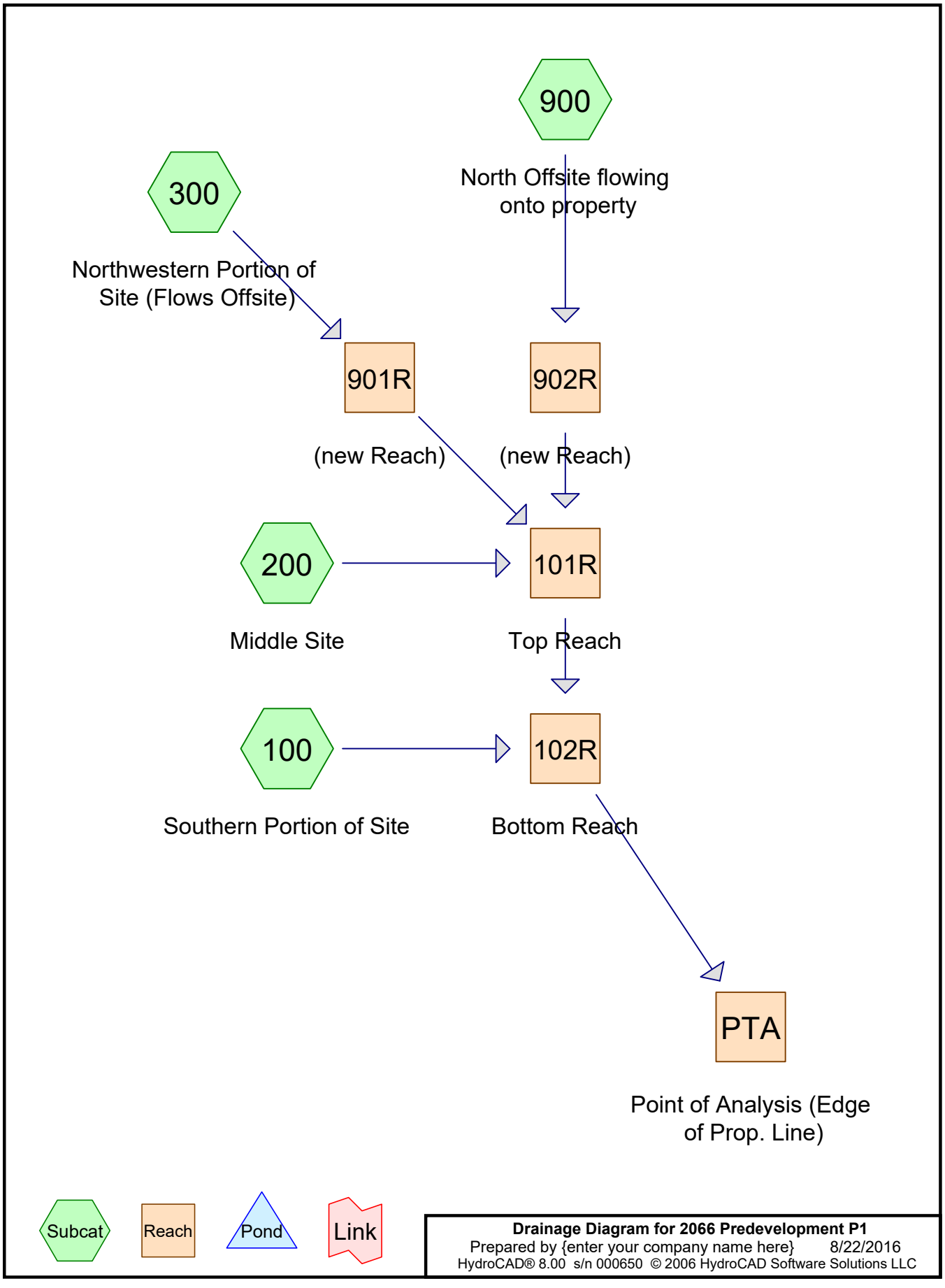
☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

HydroCAD Printouts

Pre Development

Storm Frequency: 2, 10, 25, 100 Year



Drainage Diagram for 2066 Predevelopment P1
Prepared by {enter your company name here} 8/22/2016

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcats)
143,231	70	Woods, Good, HSG C (100,200,300,900)
52,040	74	>75% Grass cover, Good, HSG C (100,300)
4,161	89	Gravel roads, HSG C (200)
74,919	91	Fallow, bare soil, HSG C (100,200,300)
20,909	98	Paved parking & roofs (100,200)
295,260		

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 100: Southern Portion of Site Runoff Area=134,123 sf Runoff Depth>1.07"
Flow Length=560' Tc=13.3 min CN=77 Runoff=2.94 cfs 11,931 cf

Subcatchment 200: Middle Site Runoff Area=78,511 sf Runoff Depth>1.44"
Flow Length=570' Tc=12.3 min CN=83 Runoff=2.48 cfs 9,439 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offs Runoff Area=68,550 sf Runoff Depth>1.07"
Flow Length=450' Tc=14.2 min CN=77 Runoff=1.46 cfs 6,096 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,076 sf Runoff Depth>0.71"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.19 cfs 835 cf

Reach 101R: Top Reach Avg. Depth=0.13' Max Vel=2.03 fps Inflow=4.09 cfs 16,370 cf
n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=4.00 cfs 16,341 cf

Reach 102R: Bottom Reach Avg. Depth=0.17' Max Vel=3.88 fps Inflow=6.92 cfs 28,272 cf
n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=6.91 cfs 28,259 cf

Reach 901R: (new Reach) Inflow=1.46 cfs 6,096 cf
Outflow=1.46 cfs 6,096 cf

Reach 902R: (new Reach) Inflow=0.19 cfs 835 cf
Outflow=0.19 cfs 835 cf

Reach PTA: Point of Analysis (Edge of Prop. Line) Inflow=6.91 cfs 28,259 cf
Outflow=6.91 cfs 28,259 cf

Total Runoff Area = 295,260 sf Runoff Volume = 28,301 cf Average Runoff Depth = 1.15"
92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf

Subcatchment 100: Southern Portion of Site

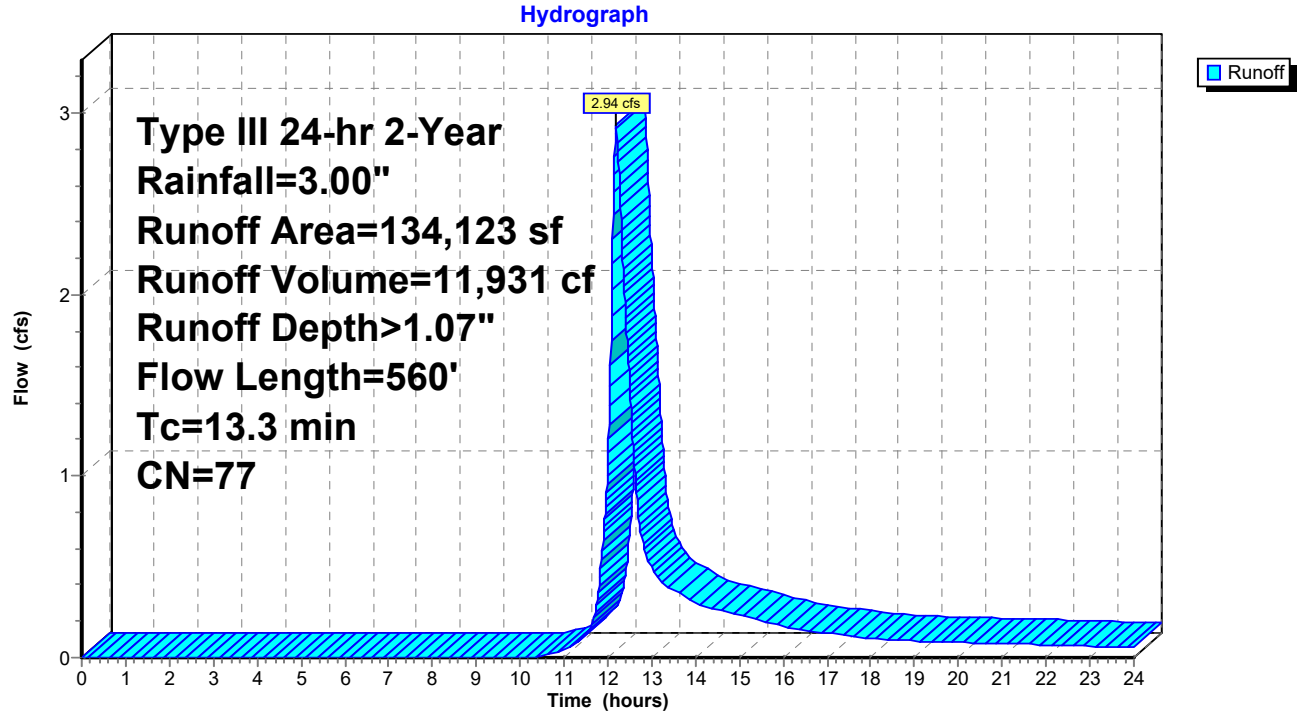
Runoff = 2.94 cfs @ 12.19 hrs, Volume= 11,931 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site



Subcatchment 200: Middle Site

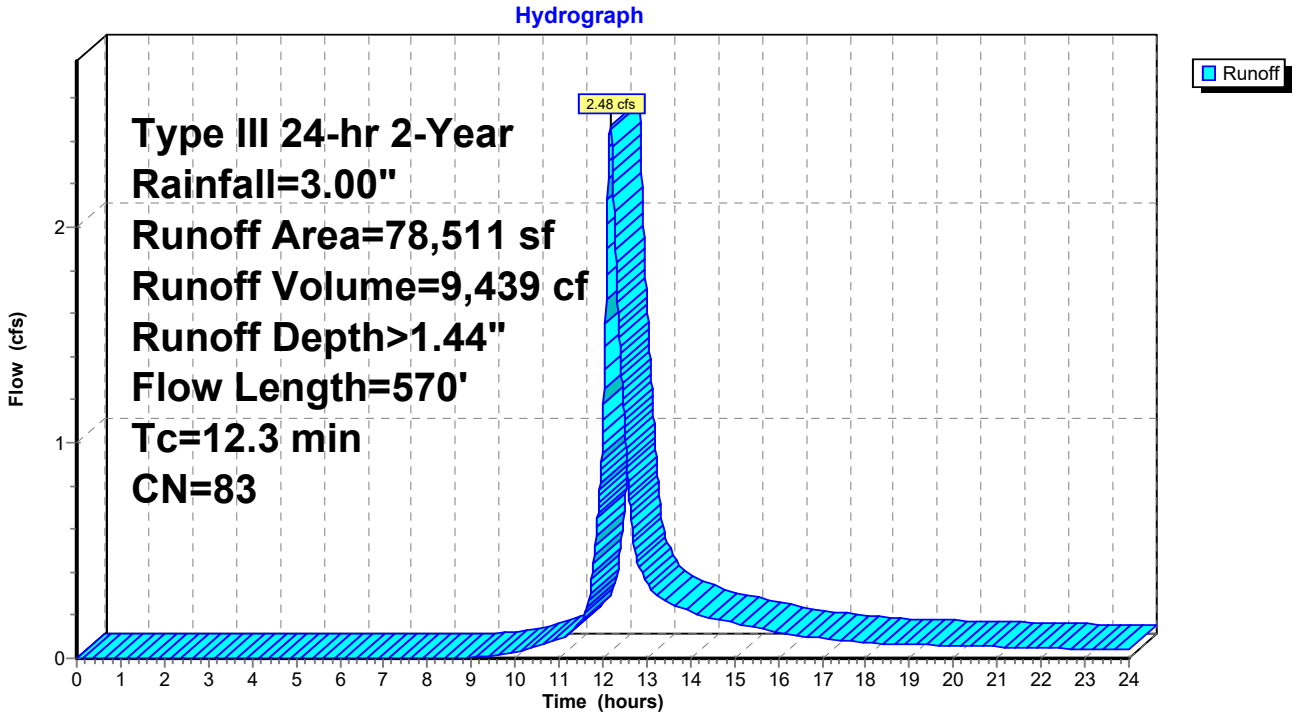
Runoff = 2.48 cfs @ 12.17 hrs, Volume= 9,439 cf, Depth> 1.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site



Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

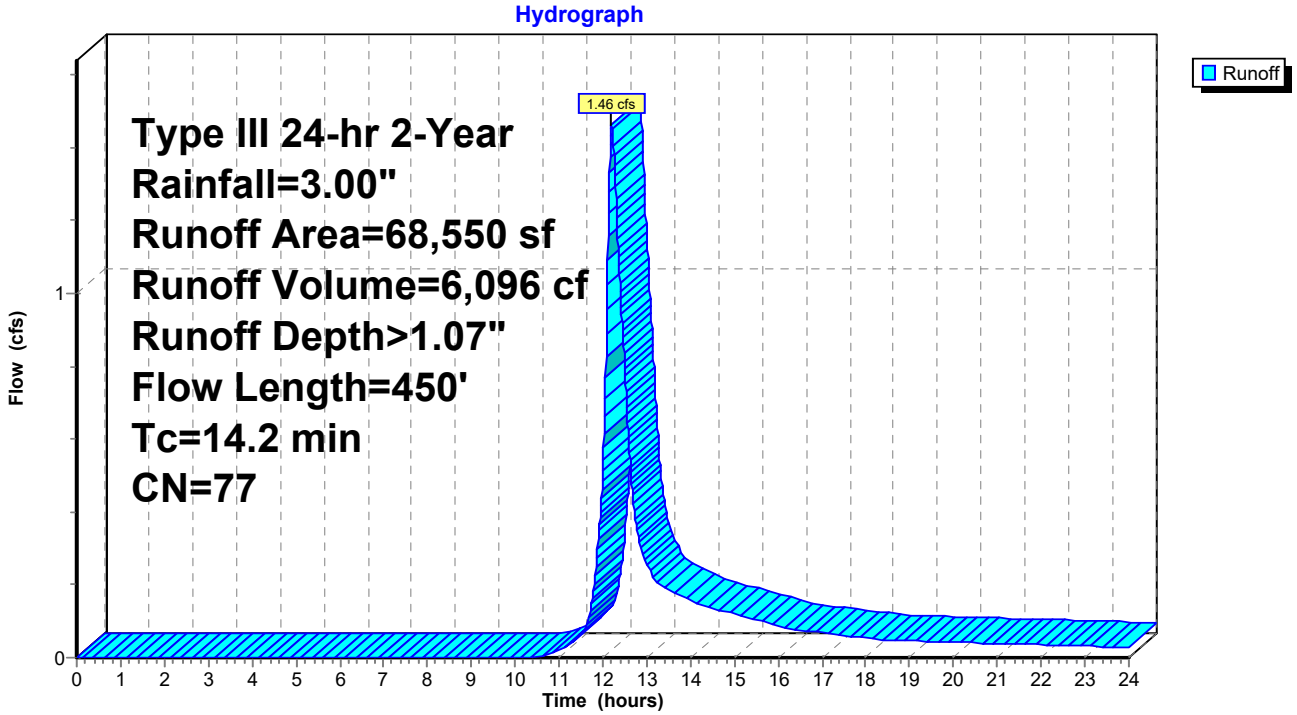
Runoff = 1.46 cfs @ 12.20 hrs, Volume= 6,096 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)



Subcatchment 900: North Offsite flowing onto property

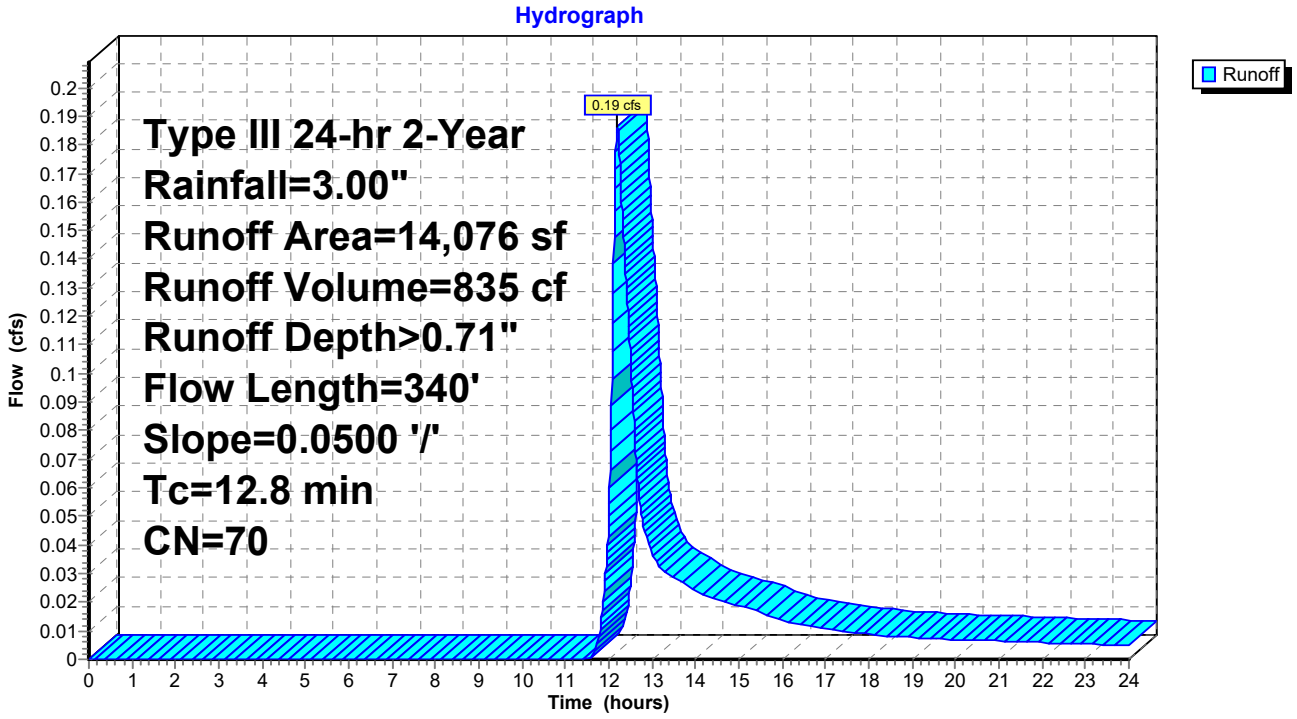
Runoff = 0.19 cfs @ 12.20 hrs, Volume= 835 cf, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 1.22" for 2-Year event
Inflow = 4.09 cfs @ 12.18 hrs, Volume= 16,370 cf
Outflow = 4.00 cfs @ 12.21 hrs, Volume= 16,341 cf, Atten= 2%, Lag= 1.7 min

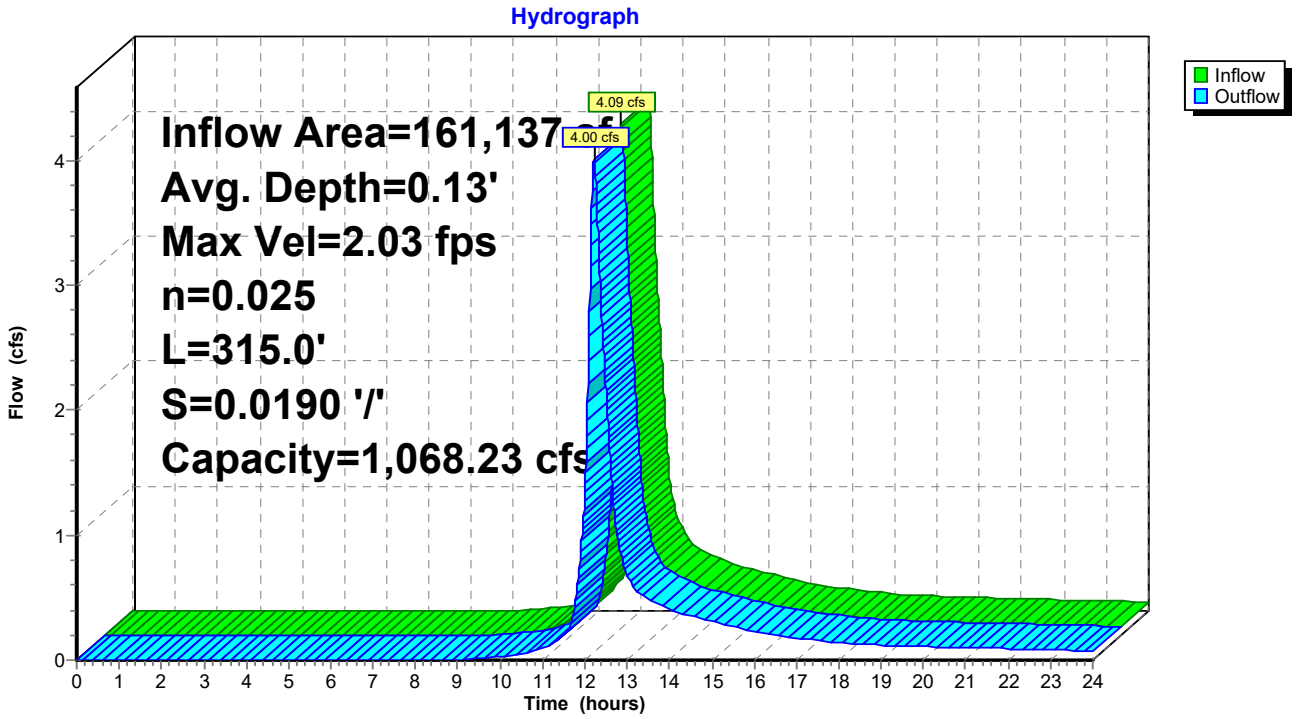
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.03 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 6.2 min

Peak Storage= 620 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 39.00'
Length= 315.0' Slope= 0.0190 '/'
Inlet Invert= 94.00', Outlet Invert= 88.00'

‡

Reach 101R: Top Reach



Reach 102R: Bottom Reach

[61] Hint: Submerged 3% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 1.15" for 2-Year event
Inflow = 6.92 cfs @ 12.21 hrs, Volume= 28,272 cf
Outflow = 6.91 cfs @ 12.21 hrs, Volume= 28,259 cf, Atten= 0%, Lag= 0.4 min

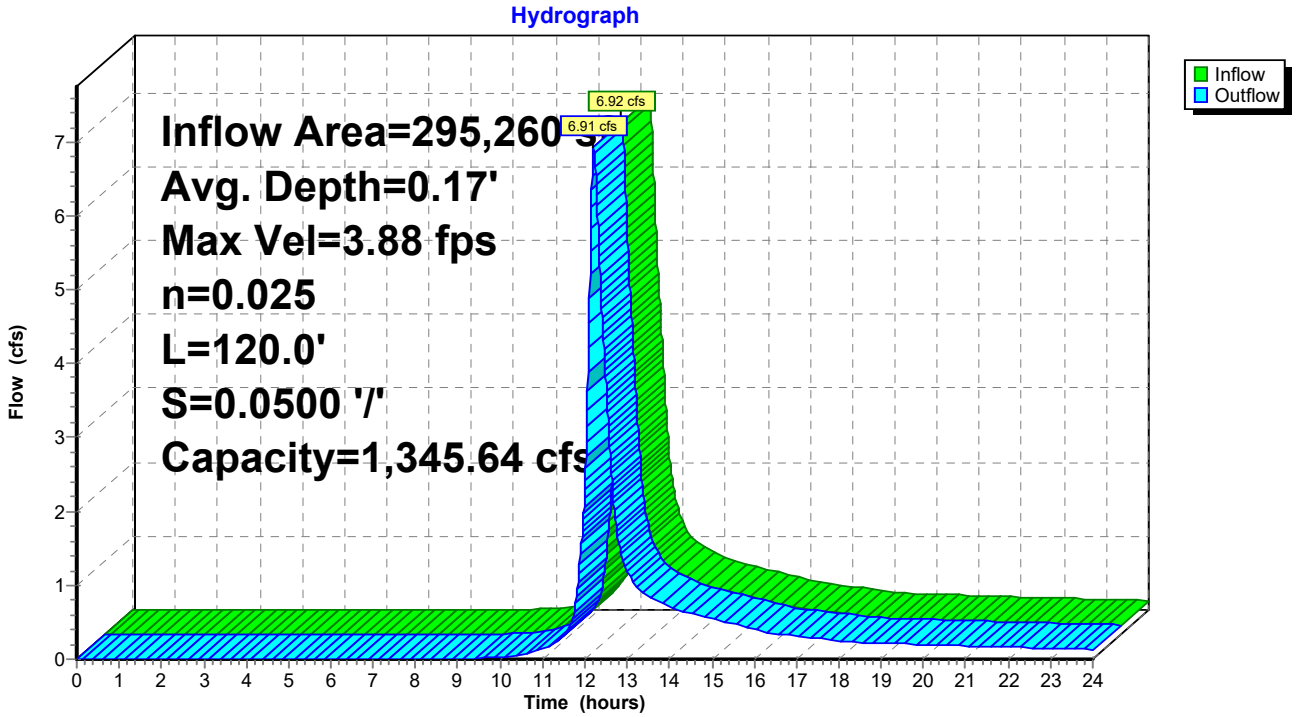
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.88 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 1.4 min

Peak Storage= 214 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 34.00'
Length= 120.0' Slope= 0.0500 '/'
Inlet Invert= 88.00', Outlet Invert= 82.00'

‡

Reach 102R: Bottom Reach



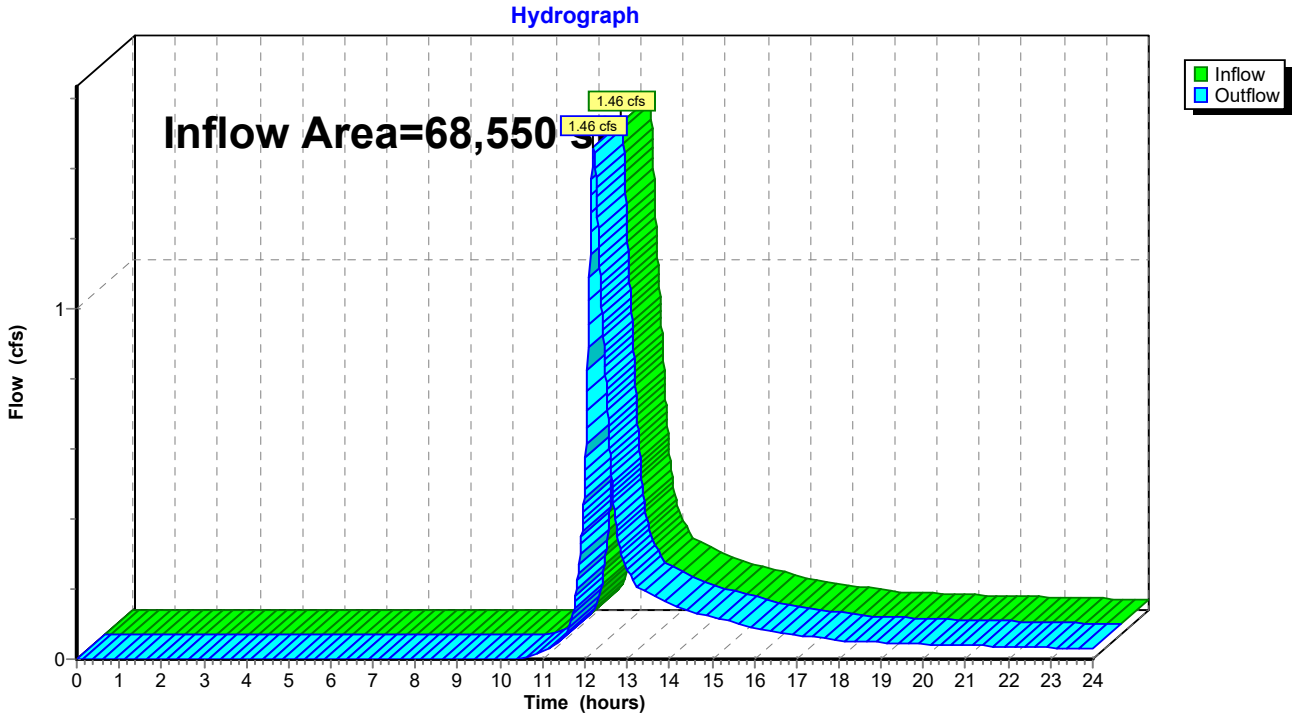
Reach 901R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 1.07" for 2-Year event
Inflow = 1.46 cfs @ 12.20 hrs, Volume= 6,096 cf
Outflow = 1.46 cfs @ 12.20 hrs, Volume= 6,096 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)



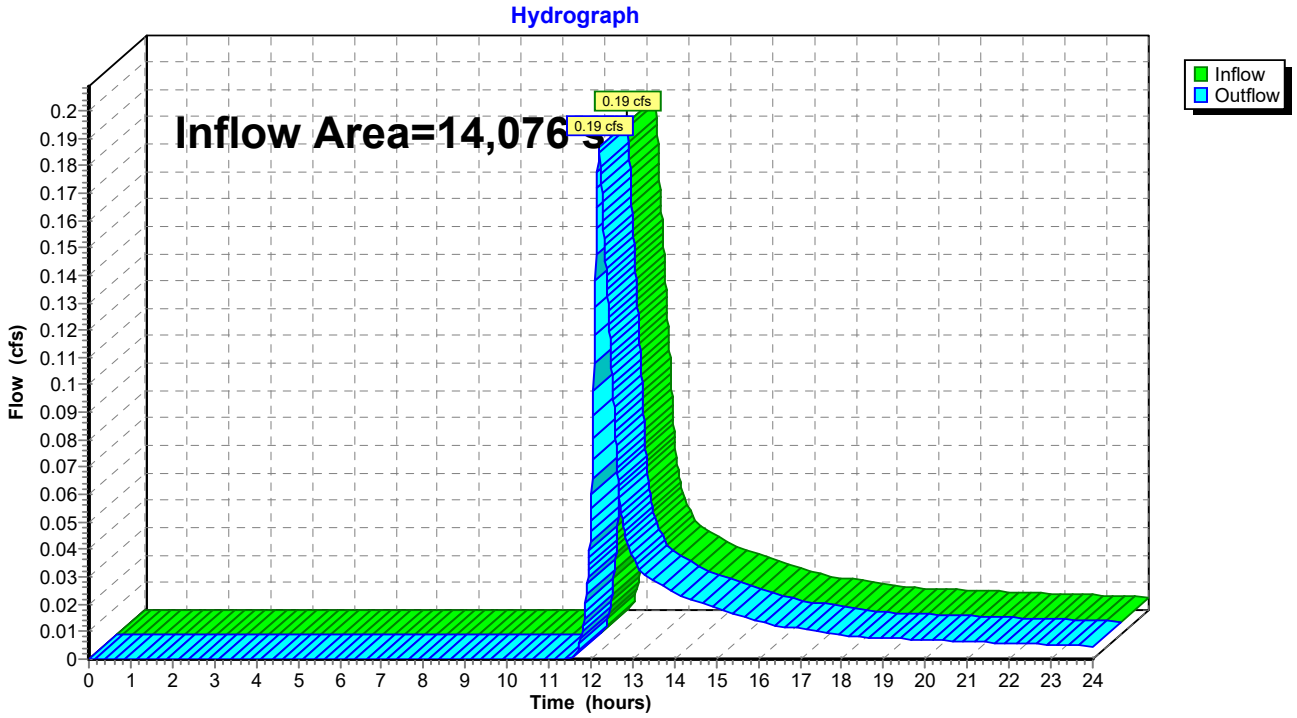
Reach 902R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 0.71" for 2-Year event
Inflow = 0.19 cfs @ 12.20 hrs, Volume= 835 cf
Outflow = 0.19 cfs @ 12.20 hrs, Volume= 835 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)



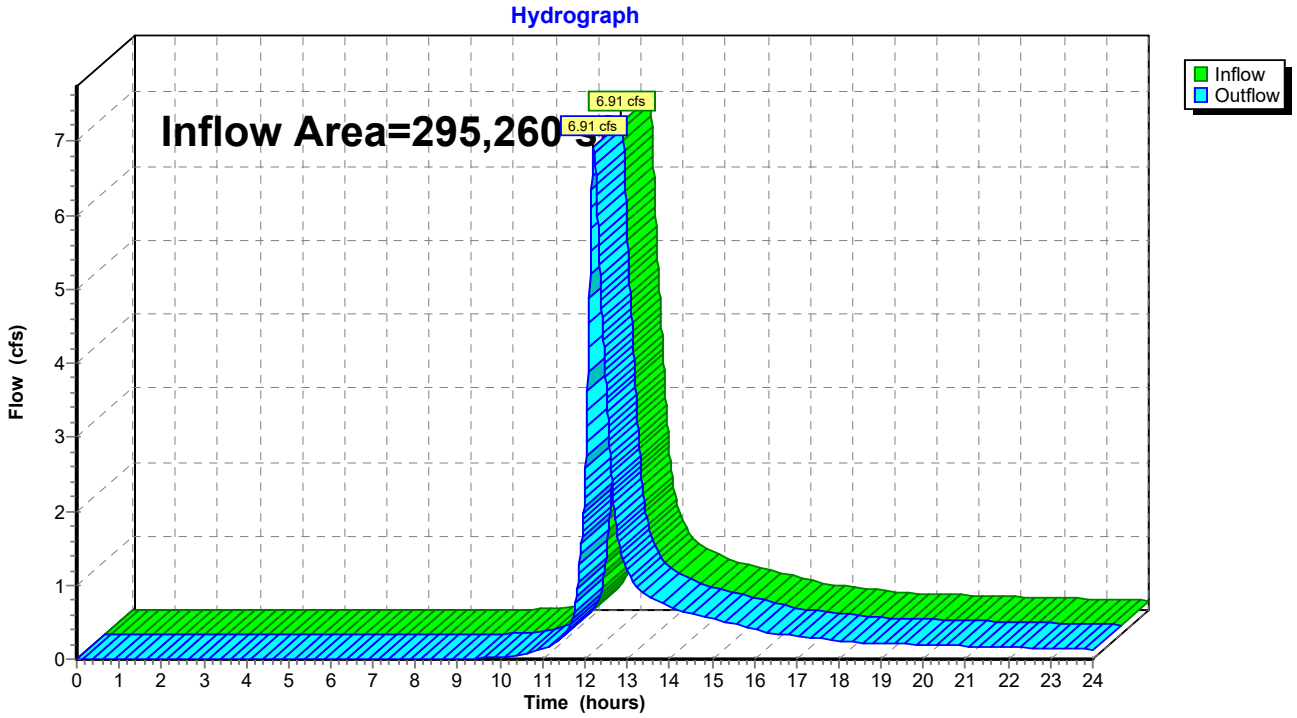
Reach PTA: Point of Analysis (Edge of Prop. Line)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 295,260 sf, Inflow Depth > 1.15" for 2-Year event
Inflow = 6.91 cfs @ 12.21 hrs, Volume= 28,259 cf
Outflow = 6.91 cfs @ 12.21 hrs, Volume= 28,259 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 100: Southern Portion of Site Runoff Area=134,123 sf Runoff Depth>2.20"
Flow Length=560' Tc=13.3 min CN=77 Runoff=6.30 cfs 24,637 cf

Subcatchment 200: Middle Site Runoff Area=78,511 sf Runoff Depth>2.72"
Flow Length=570' Tc=12.3 min CN=83 Runoff=4.69 cfs 17,790 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offs Runoff Area=68,550 sf Runoff Depth>2.20"
Flow Length=450' Tc=14.2 min CN=77 Runoff=3.14 cfs 12,589 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,076 sf Runoff Depth>1.67"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.49 cfs 1,957 cf

Reach 101R: Top Reach Avg. Depth=0.19' Max Vel=2.67 fps Inflow=8.27 cfs 32,337 cf
n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=8.16 cfs 32,287 cf

Reach 102R: Bottom Reach Avg. Depth=0.26' Max Vel=5.06 fps Inflow=14.43 cfs 56,924 cf
n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=14.42 cfs 56,903 cf

Reach 901R: (new Reach) Inflow=3.14 cfs 12,589 cf
Outflow=3.14 cfs 12,589 cf

Reach 902R: (new Reach) Inflow=0.49 cfs 1,957 cf
Outflow=0.49 cfs 1,957 cf

Reach PTA: Point of Analysis (Edge of Prop. Line) Inflow=14.42 cfs 56,903 cf
Outflow=14.42 cfs 56,903 cf

Total Runoff Area = 295,260 sf Runoff Volume = 56,974 cf Average Runoff Depth = 2.32"
92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf

Subcatchment 100: Southern Portion of Site

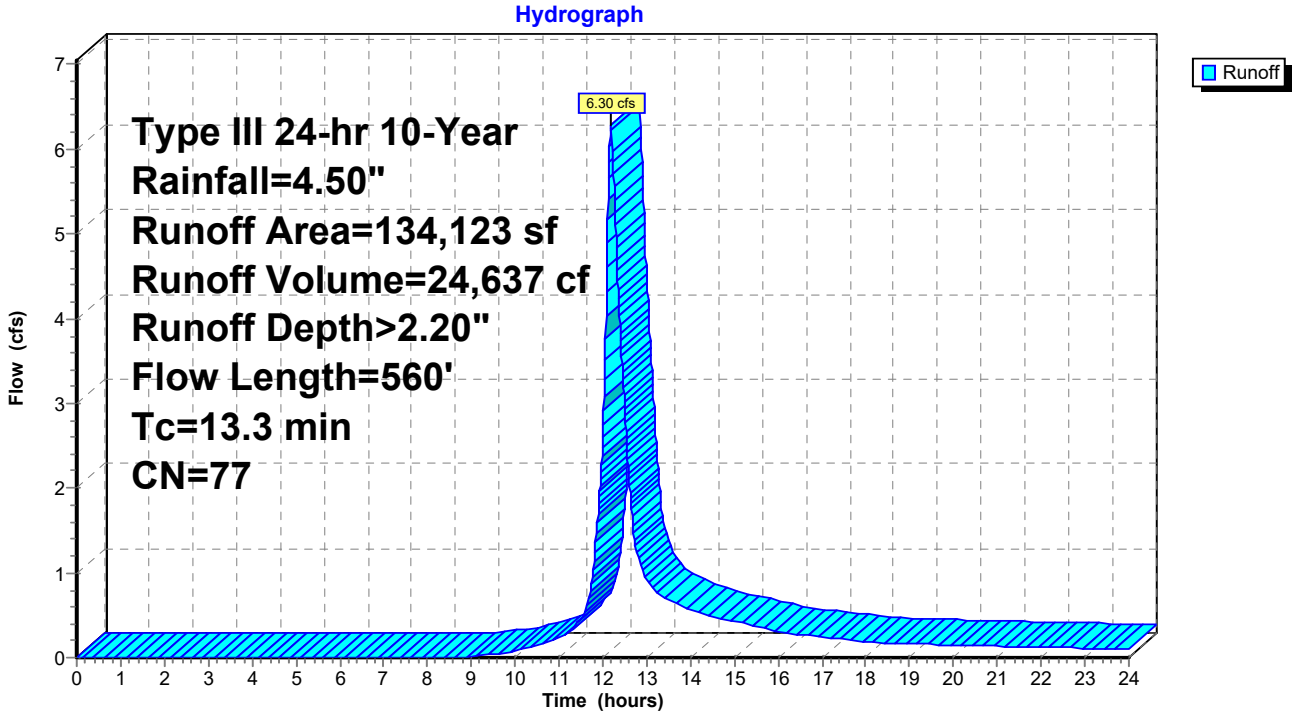
Runoff = 6.30 cfs @ 12.19 hrs, Volume= 24,637 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site



Subcatchment 200: Middle Site

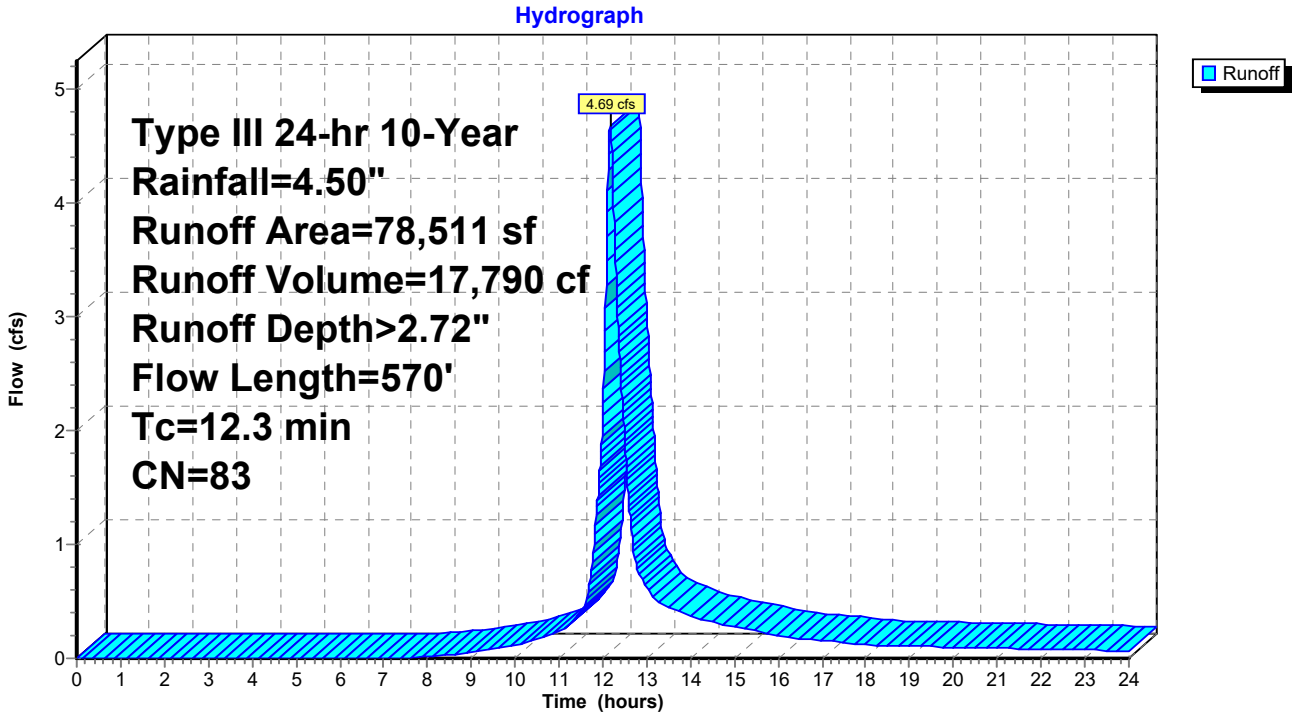
Runoff = 4.69 cfs @ 12.17 hrs, Volume= 17,790 cf, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site



Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

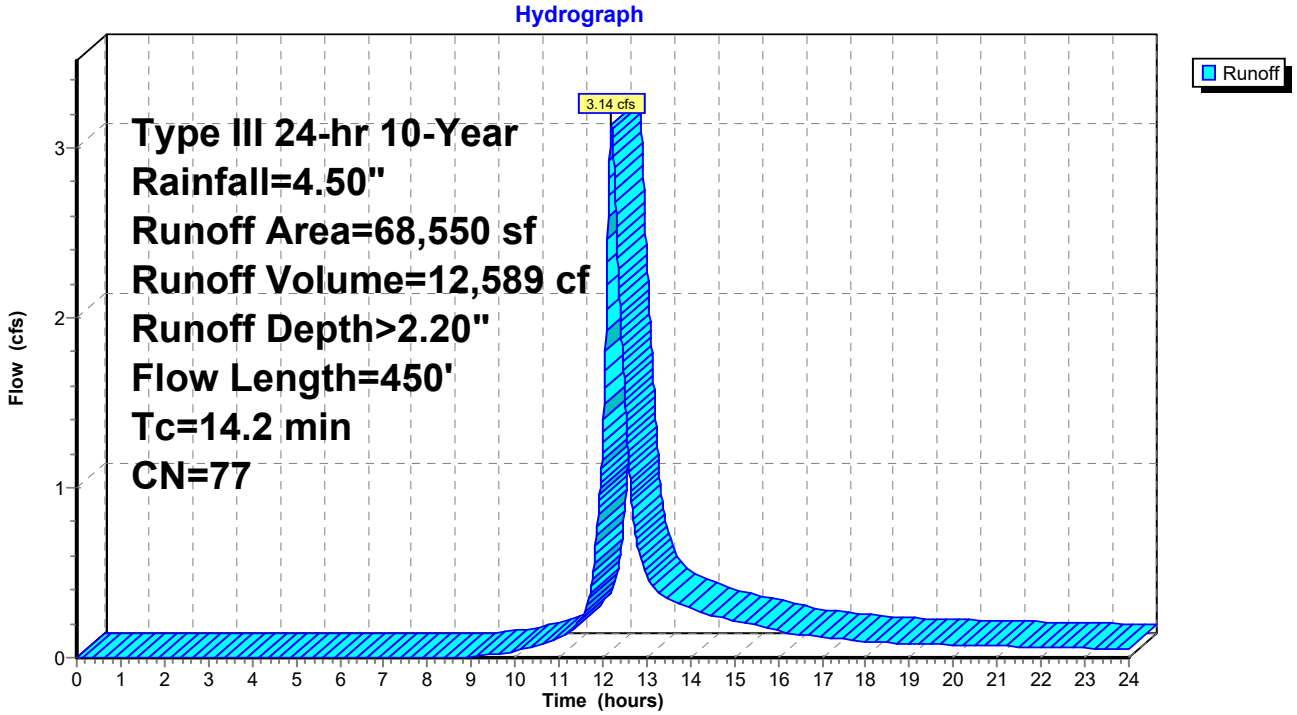
Runoff = 3.14 cfs @ 12.20 hrs, Volume= 12,589 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)



Subcatchment 900: North Offsite flowing onto property

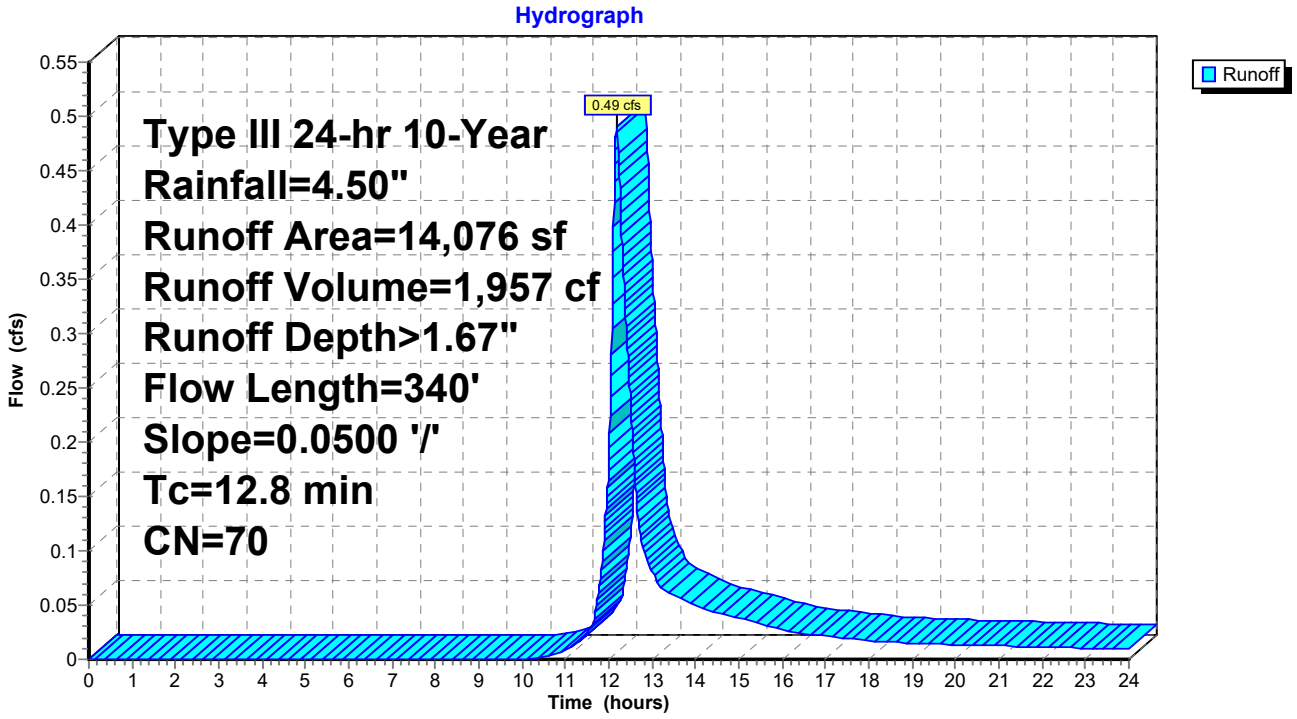
Runoff = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 2.41" for 10-Year event
Inflow = 8.27 cfs @ 12.18 hrs, Volume= 32,337 cf
Outflow = 8.16 cfs @ 12.20 hrs, Volume= 32,287 cf, Atten= 1%, Lag= 1.3 min

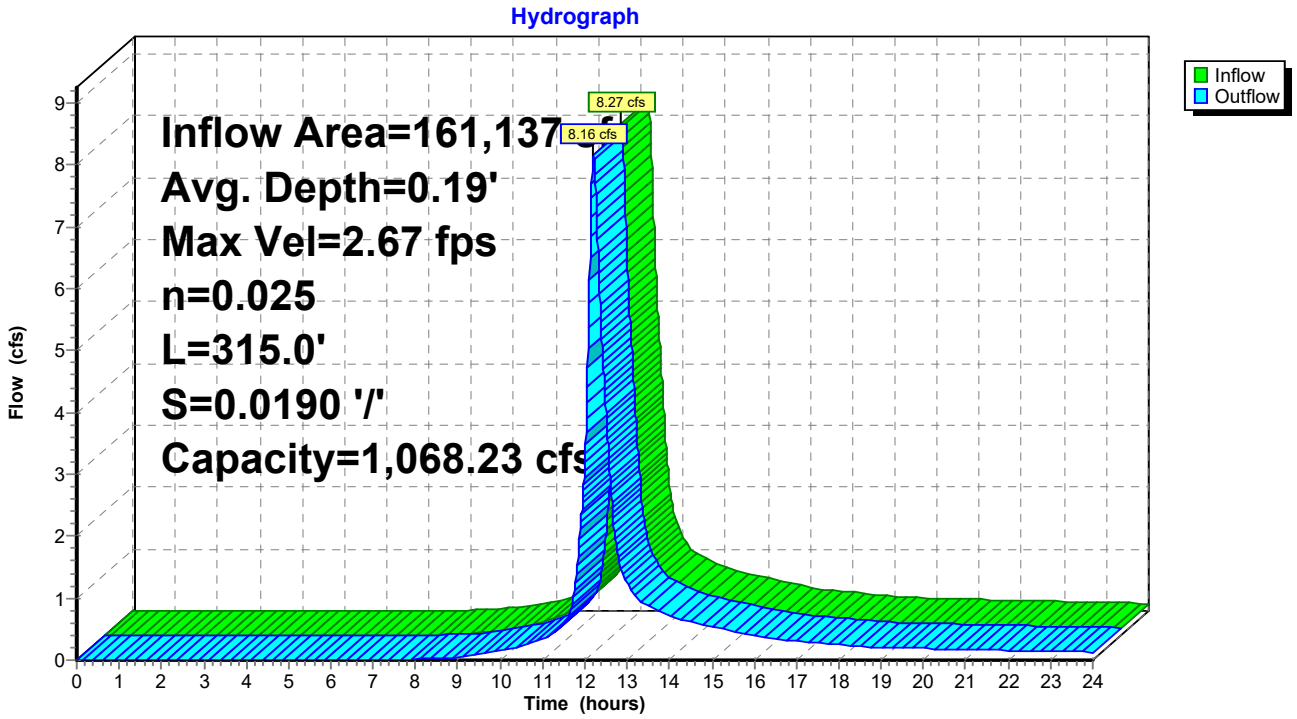
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.67 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 5.7 min

Peak Storage= 964 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 39.00'
Length= 315.0' Slope= 0.0190 '/'
Inlet Invert= 94.00', Outlet Invert= 88.00'

‡

Reach 101R: Top Reach



Reach 102R: Bottom Reach

[61] Hint: Submerged 4% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 2.31" for 10-Year event
Inflow = 14.43 cfs @ 12.19 hrs, Volume= 56,924 cf
Outflow = 14.42 cfs @ 12.20 hrs, Volume= 56,903 cf, Atten= 0%, Lag= 0.3 min

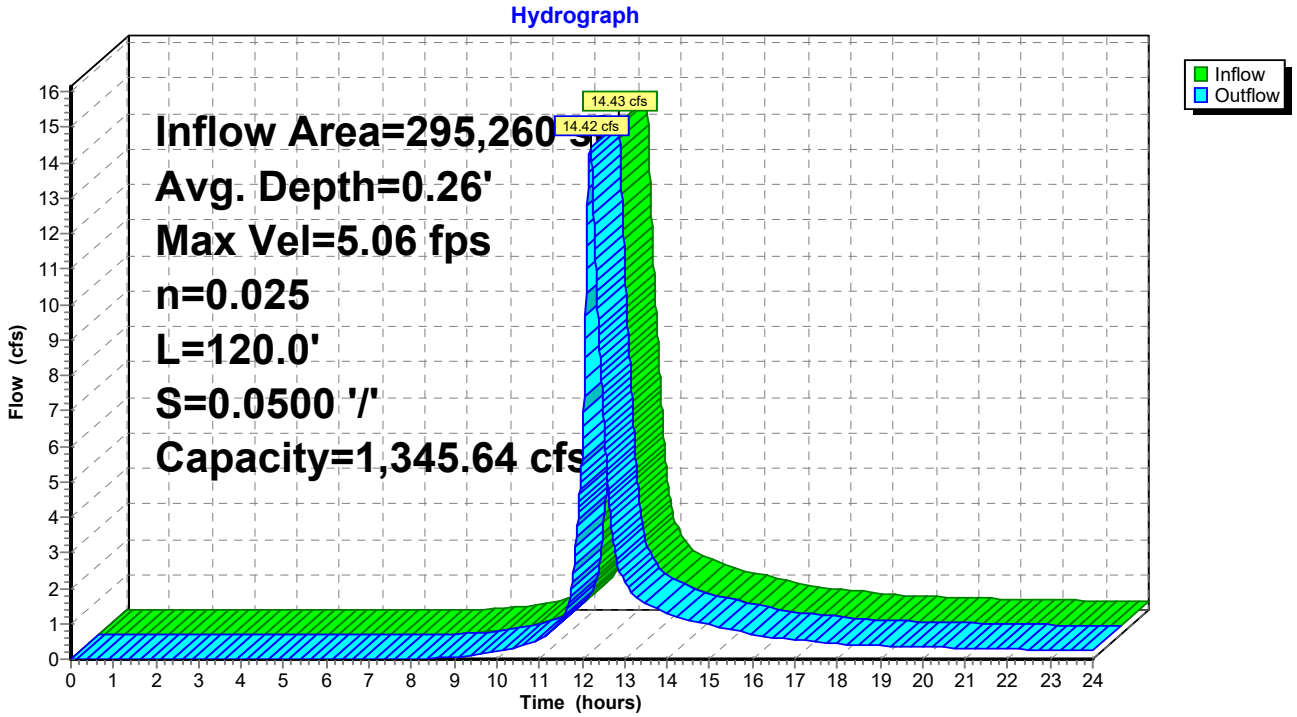
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.06 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 1.2 min

Peak Storage= 342 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 34.00'
Length= 120.0' Slope= 0.0500 '/'
Inlet Invert= 88.00', Outlet Invert= 82.00'

‡

Reach 102R: Bottom Reach



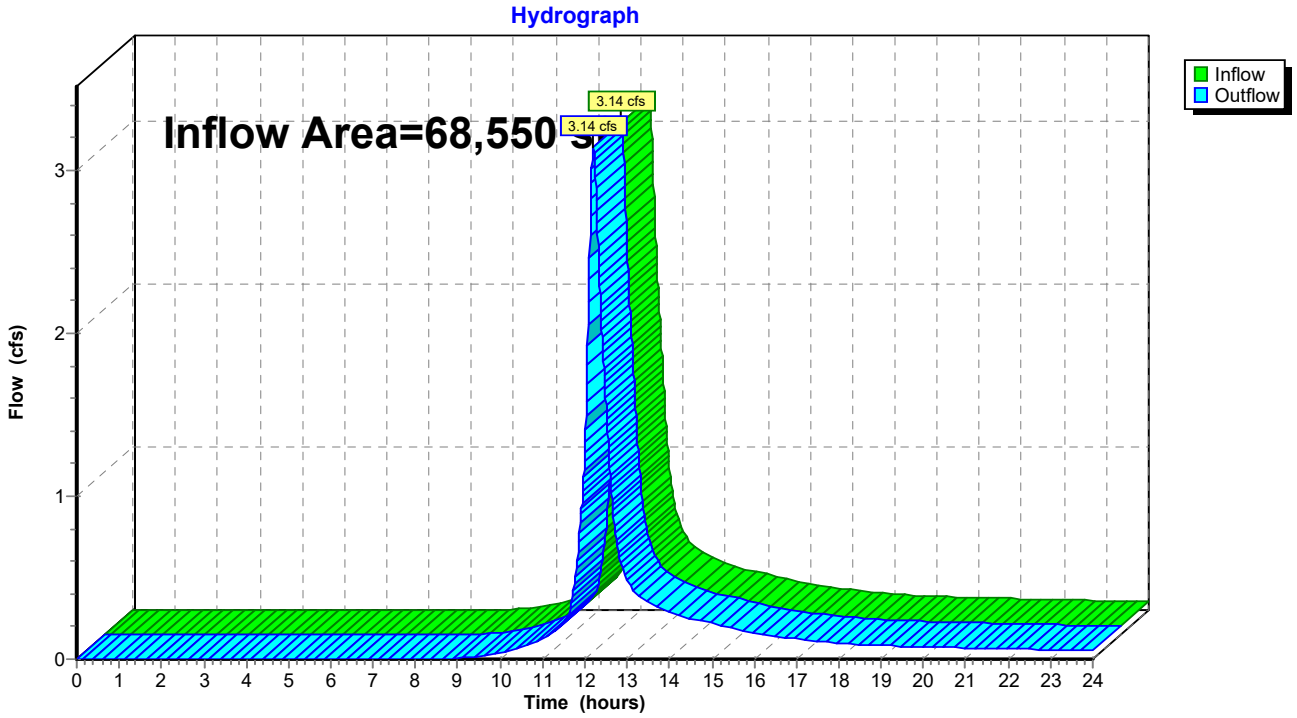
Reach 901R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 2.20" for 10-Year event
Inflow = 3.14 cfs @ 12.20 hrs, Volume= 12,589 cf
Outflow = 3.14 cfs @ 12.20 hrs, Volume= 12,589 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)



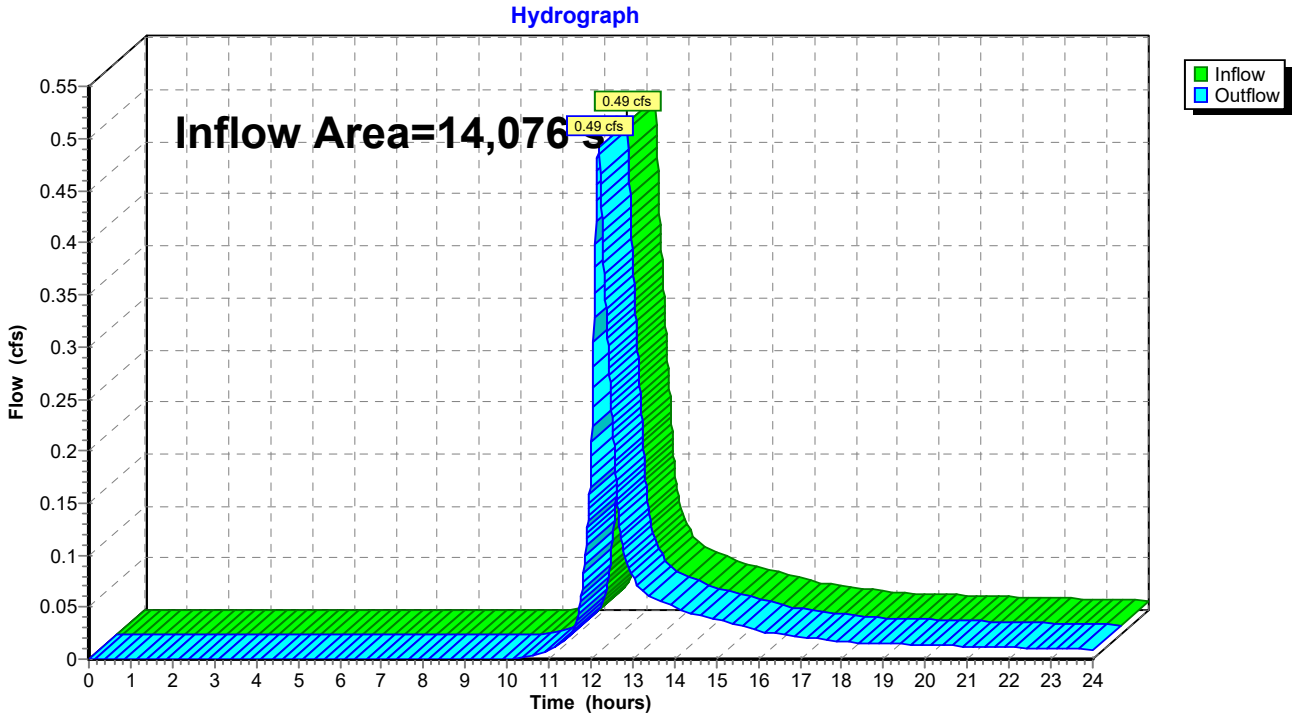
Reach 902R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 1.67" for 10-Year event
Inflow = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf
Outflow = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)



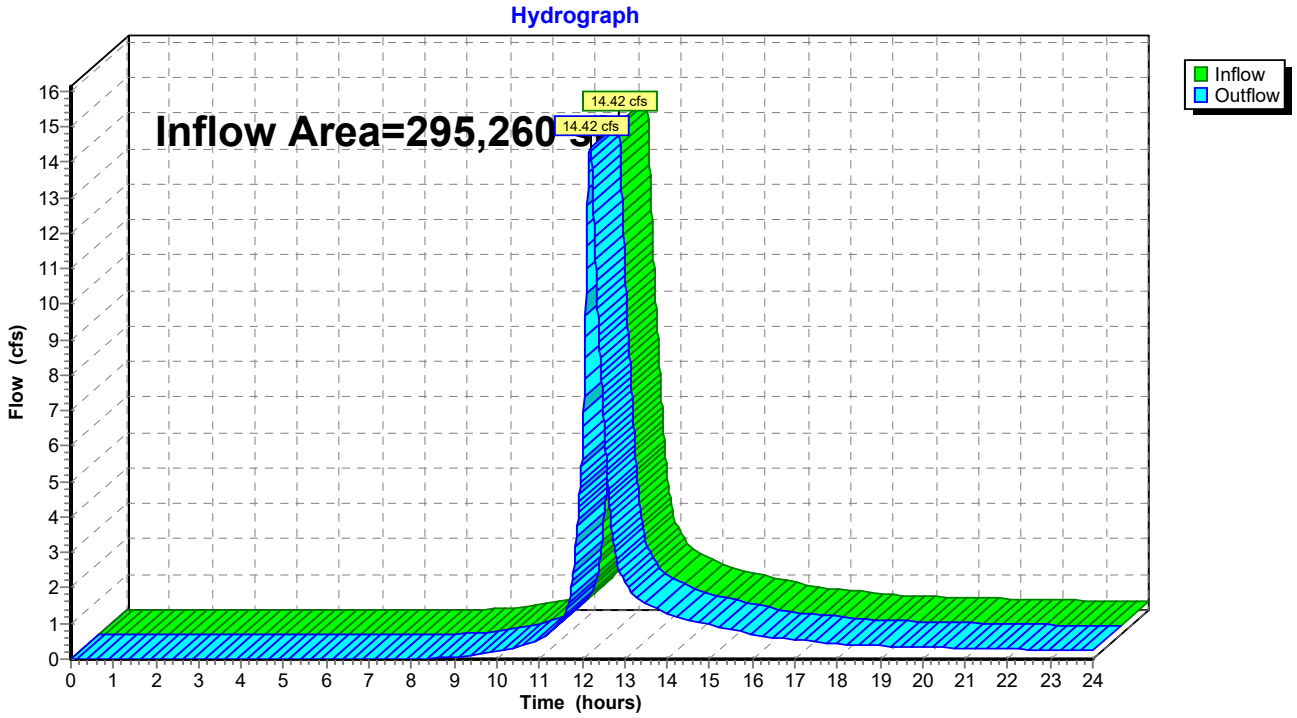
Reach PTA: Point of Analysis (Edge of Prop. Line)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 295,260 sf, Inflow Depth > 2.31" for 10-Year event
Inflow = 14.42 cfs @ 12.20 hrs, Volume= 56,903 cf
Outflow = 14.42 cfs @ 12.20 hrs, Volume= 56,903 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 100: Southern Portion of Site Runoff Area=134,123 sf Runoff Depth>2.87"
Flow Length=560' Tc=13.3 min CN=77 Runoff=8.22 cfs 32,056 cf

Subcatchment 200: Middle Site Runoff Area=78,511 sf Runoff Depth>3.44"
Flow Length=570' Tc=12.3 min CN=83 Runoff=5.90 cfs 22,500 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offs Runoff Area=68,550 sf Runoff Depth>2.87"
Flow Length=450' Tc=14.2 min CN=77 Runoff=4.10 cfs 16,381 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,076 sf Runoff Depth>2.25"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.68 cfs 2,645 cf

Reach 101R: Top Reach Avg. Depth=0.23' Max Vel=2.93 fps Inflow=10.62 cfs 41,526 cf
n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=10.50 cfs 41,465 cf

Reach 102R: Bottom Reach Avg. Depth=0.30' Max Vel=5.55 fps Inflow=18.70 cfs 73,521 cf
n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=18.69 cfs 73,495 cf

Reach 901R: (new Reach) Inflow=4.10 cfs 16,381 cf
Outflow=4.10 cfs 16,381 cf

Reach 902R: (new Reach) Inflow=0.68 cfs 2,645 cf
Outflow=0.68 cfs 2,645 cf

Reach PTA: Point of Analysis (Edge of Prop. Line) Inflow=18.69 cfs 73,495 cf
Outflow=18.69 cfs 73,495 cf

Total Runoff Area = 295,260 sf Runoff Volume = 73,582 cf Average Runoff Depth = 2.99"
92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf

Subcatchment 100: Southern Portion of Site

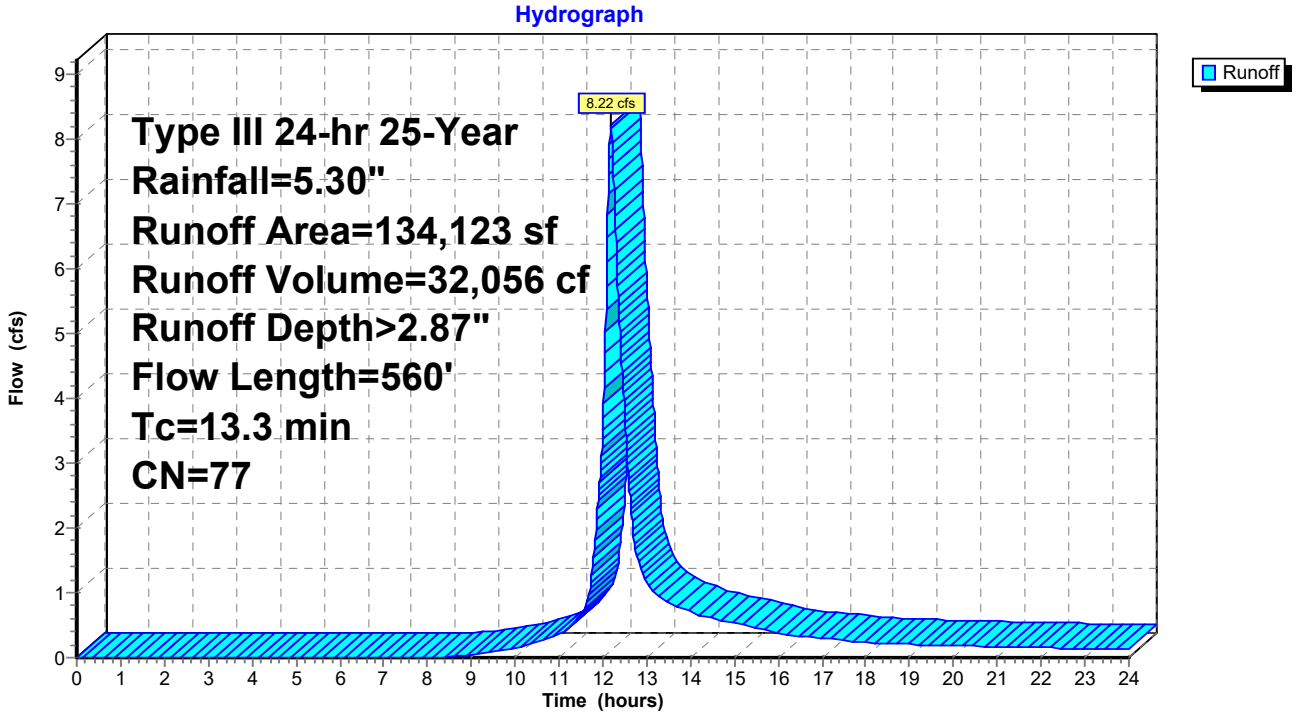
Runoff = 8.22 cfs @ 12.19 hrs, Volume= 32,056 cf, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site



Subcatchment 200: Middle Site

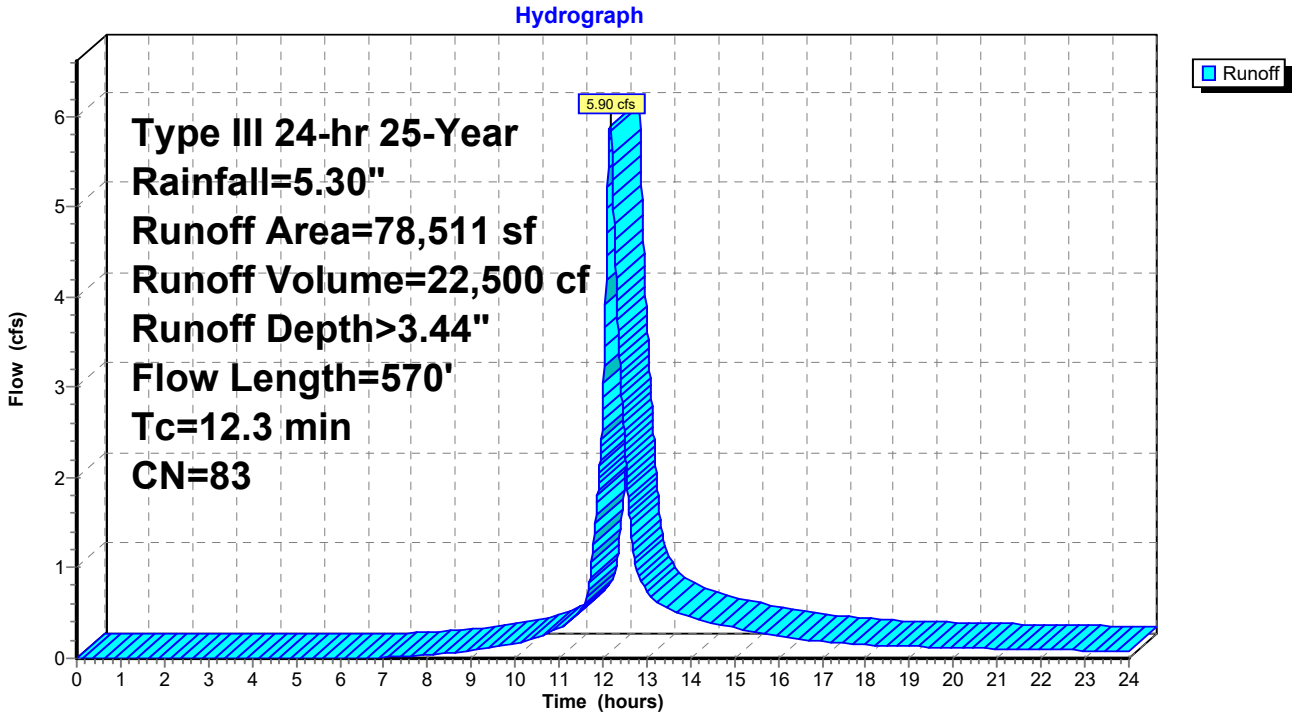
Runoff = 5.90 cfs @ 12.17 hrs, Volume= 22,500 cf, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site



Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

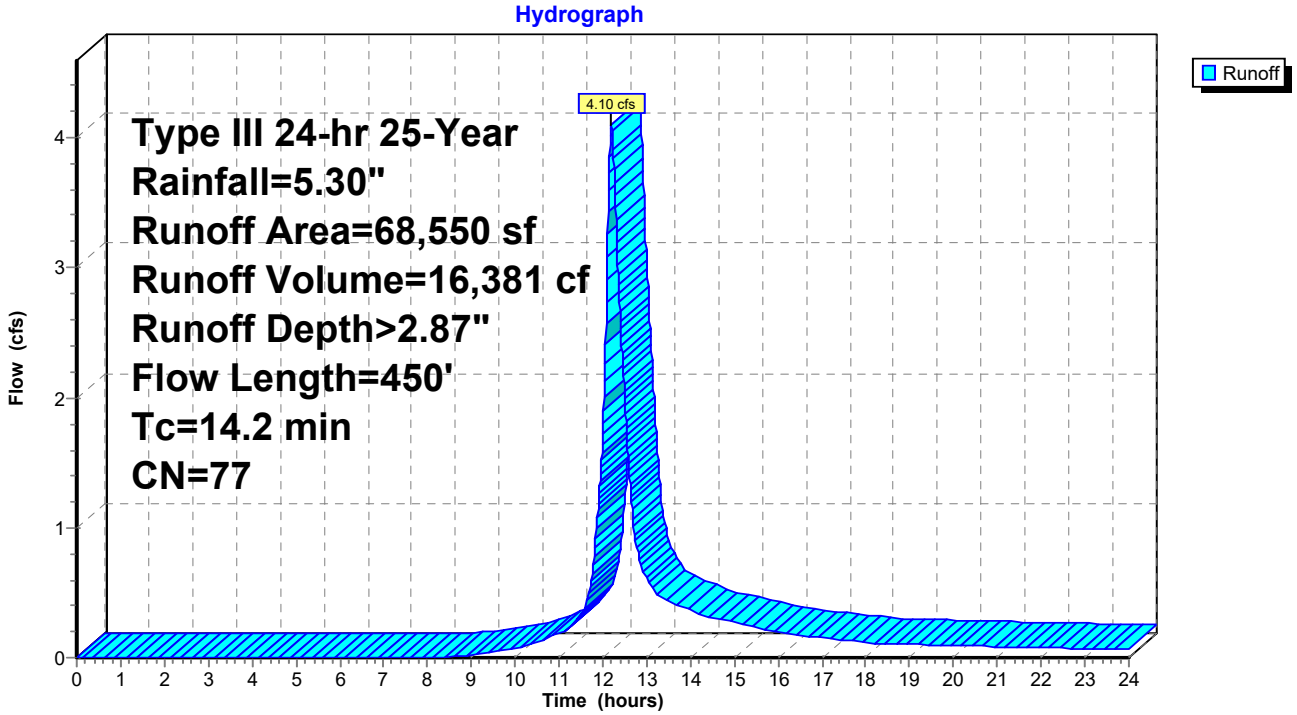
Runoff = 4.10 cfs @ 12.20 hrs, Volume= 16,381 cf, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)



Subcatchment 900: North Offsite flowing onto property

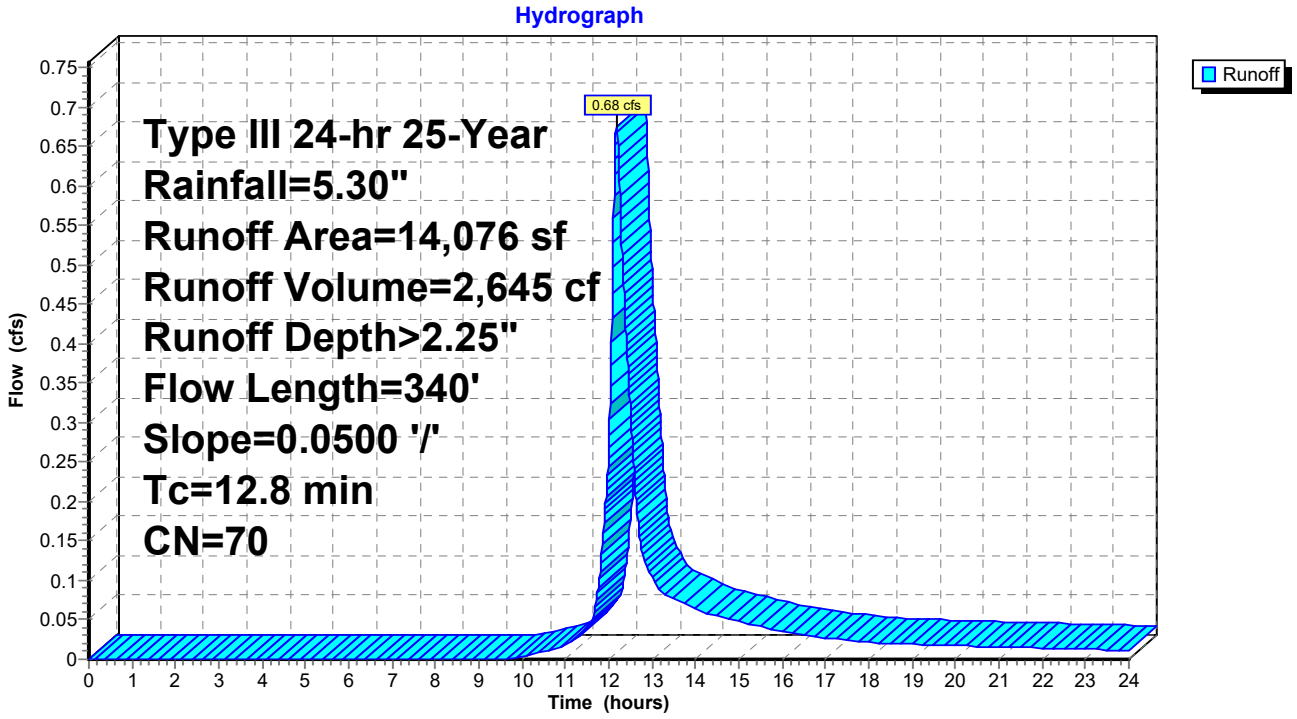
Runoff = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 3.09" for 25-Year event
Inflow = 10.62 cfs @ 12.18 hrs, Volume= 41,526 cf
Outflow = 10.50 cfs @ 12.20 hrs, Volume= 41,465 cf, Atten= 1%, Lag= 1.2 min

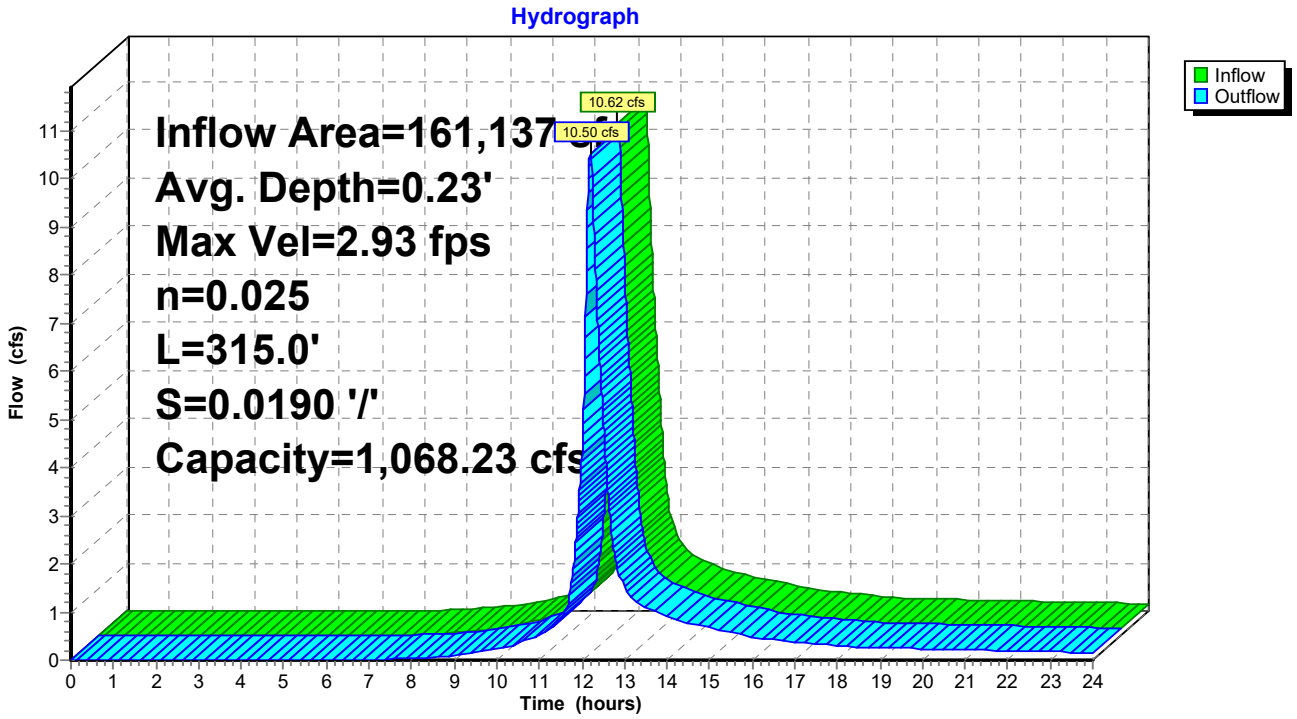
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 5.5 min

Peak Storage= 1,129 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 39.00'
Length= 315.0' Slope= 0.0190 '/'
Inlet Invert= 94.00', Outlet Invert= 88.00'

‡

Reach 101R: Top Reach



Reach 102R: Bottom Reach

[61] Hint: Submerged 5% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 2.99" for 25-Year event
Inflow = 18.70 cfs @ 12.19 hrs, Volume= 73,521 cf
Outflow = 18.69 cfs @ 12.20 hrs, Volume= 73,495 cf, Atten= 0%, Lag= 0.2 min

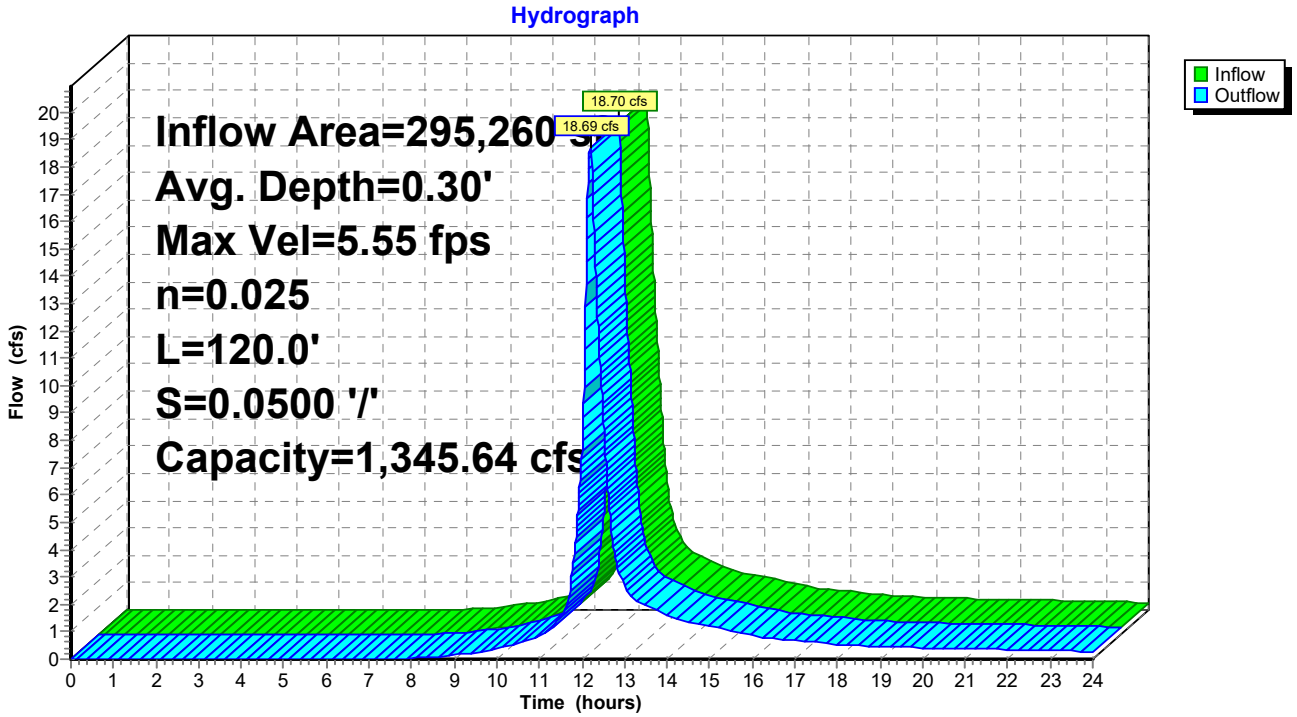
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.55 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.72 fps, Avg. Travel Time= 1.2 min

Peak Storage= 404 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 34.00'
Length= 120.0' Slope= 0.0500 '/'
Inlet Invert= 88.00', Outlet Invert= 82.00'

‡

Reach 102R: Bottom Reach



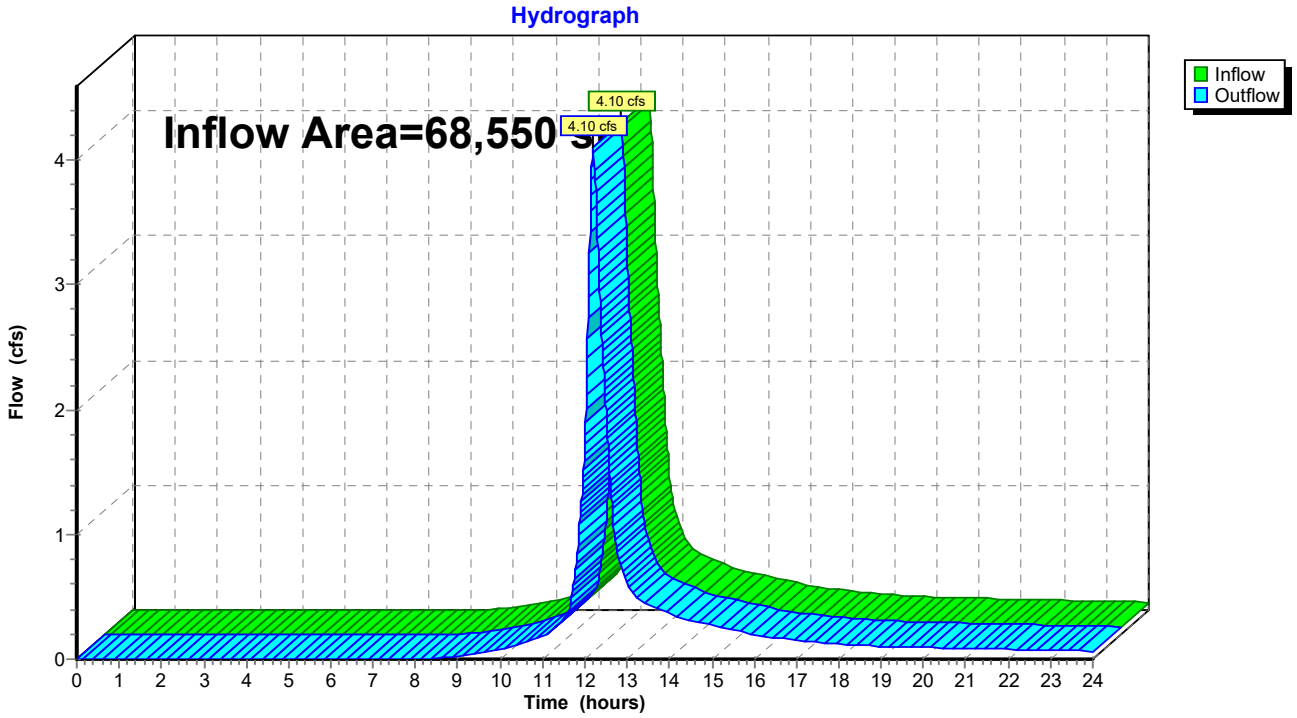
Reach 901R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 2.87" for 25-Year event
Inflow = 4.10 cfs @ 12.20 hrs, Volume= 16,381 cf
Outflow = 4.10 cfs @ 12.20 hrs, Volume= 16,381 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)



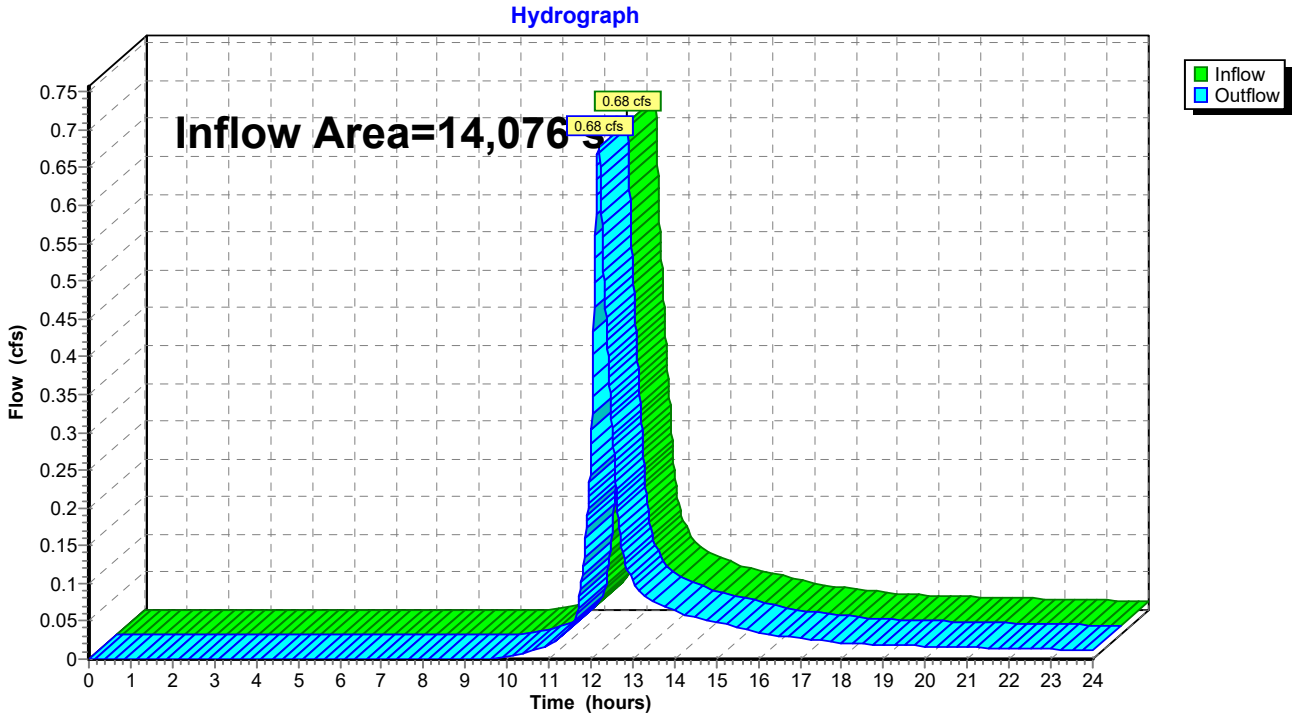
Reach 902R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 2.25" for 25-Year event
Inflow = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf
Outflow = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)



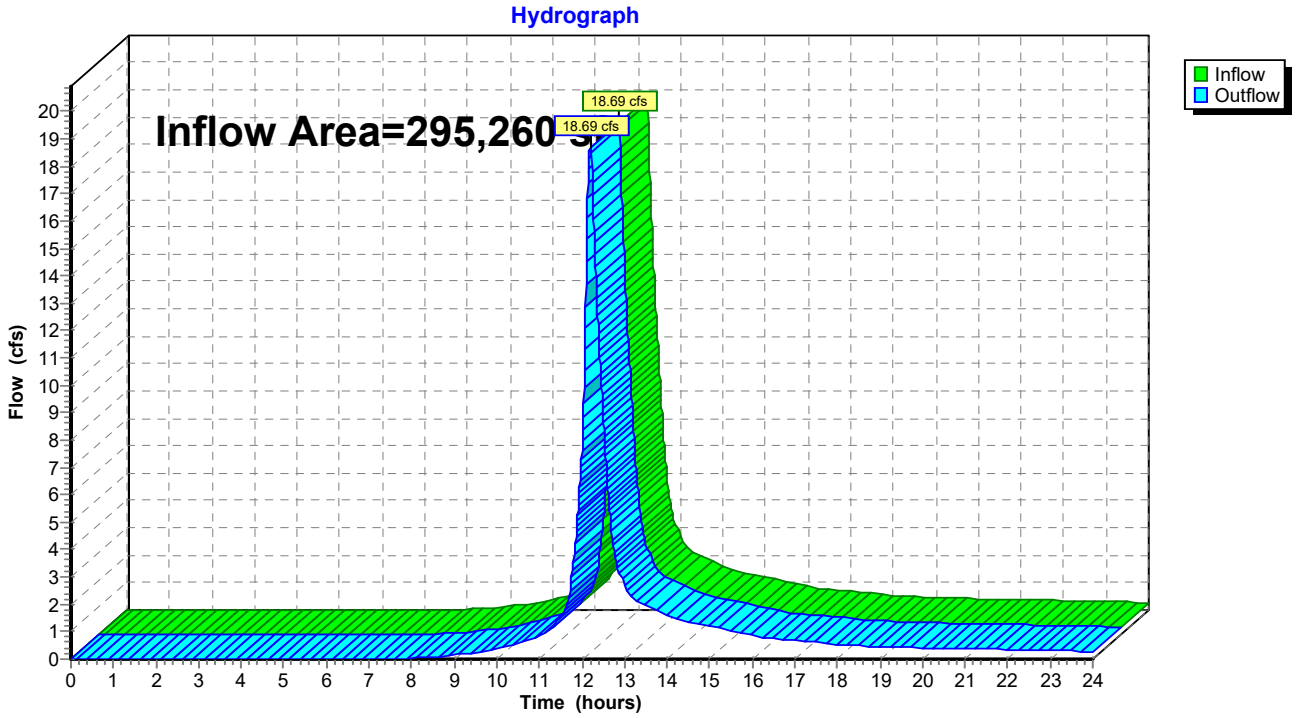
Reach PTA: Point of Analysis (Edge of Prop. Line)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 295,260 sf, Inflow Depth > 2.99" for 25-Year event
Inflow = 18.69 cfs @ 12.20 hrs, Volume= 73,495 cf
Outflow = 18.69 cfs @ 12.20 hrs, Volume= 73,495 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 100: Southern Portion of Site Runoff Area=134,123 sf Runoff Depth>3.91"
Flow Length=560' Tc=13.3 min CN=77 Runoff=11.19 cfs 43,694 cf

Subcatchment 200: Middle Site Runoff Area=78,511 sf Runoff Depth>4.55"
Flow Length=570' Tc=12.3 min CN=83 Runoff=7.74 cfs 29,755 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offs Runoff Area=68,550 sf Runoff Depth>3.91"
Flow Length=450' Tc=14.2 min CN=77 Runoff=5.59 cfs 22,328 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,076 sf Runoff Depth>3.20"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.97 cfs 3,752 cf

Reach 101R: Top Reach Avg. Depth=0.27' Max Vel=3.26 fps Inflow=14.23 cfs 55,834 cf
n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=14.09 cfs 55,757 cf

Reach 102R: Bottom Reach Avg. Depth=0.36' Max Vel=6.17 fps Inflow=25.27 cfs 99,450 cf
n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=25.25 cfs 99,417 cf

Reach 901R: (new Reach) Inflow=5.59 cfs 22,328 cf
Outflow=5.59 cfs 22,328 cf

Reach 902R: (new Reach) Inflow=0.97 cfs 3,752 cf
Outflow=0.97 cfs 3,752 cf

Reach PTA: Point of Analysis (Edge of Prop. Line) Inflow=25.25 cfs 99,417 cf
Outflow=25.25 cfs 99,417 cf

Total Runoff Area = 295,260 sf Runoff Volume = 99,528 cf Average Runoff Depth = 4.05"
92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf

Subcatchment 100: Southern Portion of Site

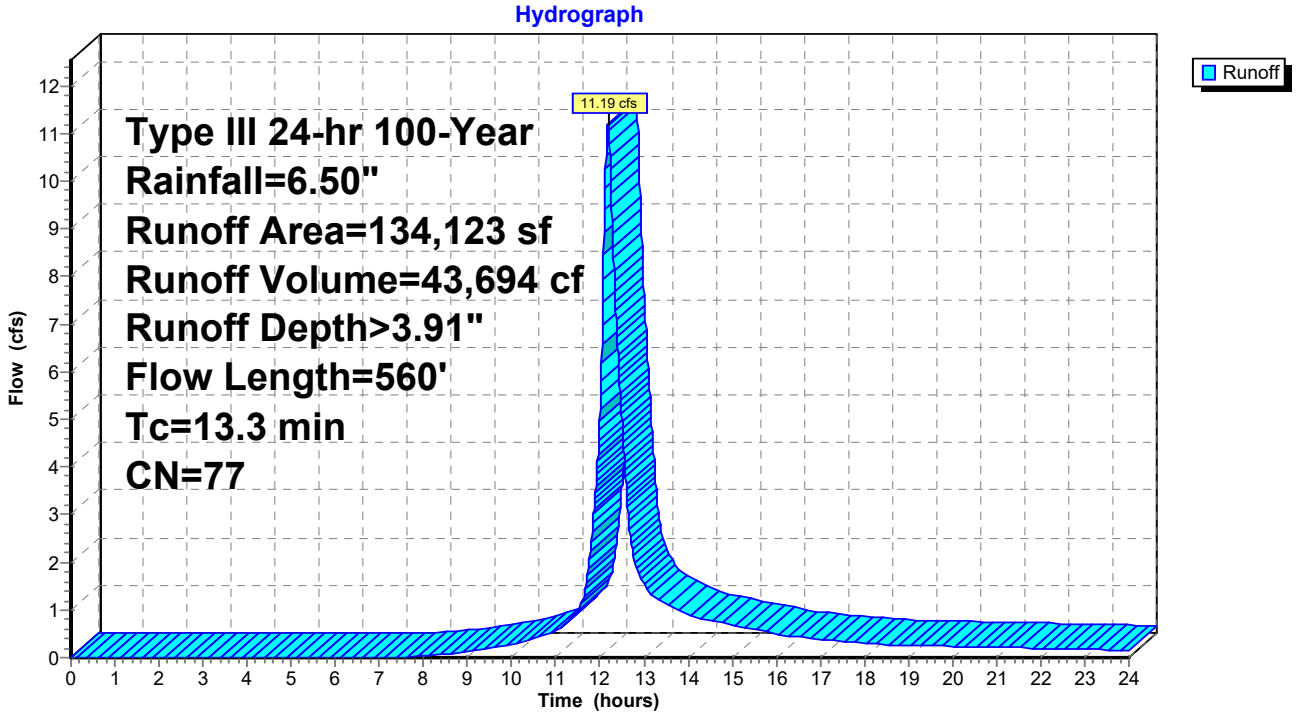
Runoff = 11.19 cfs @ 12.18 hrs, Volume= 43,694 cf, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site



Subcatchment 200: Middle Site

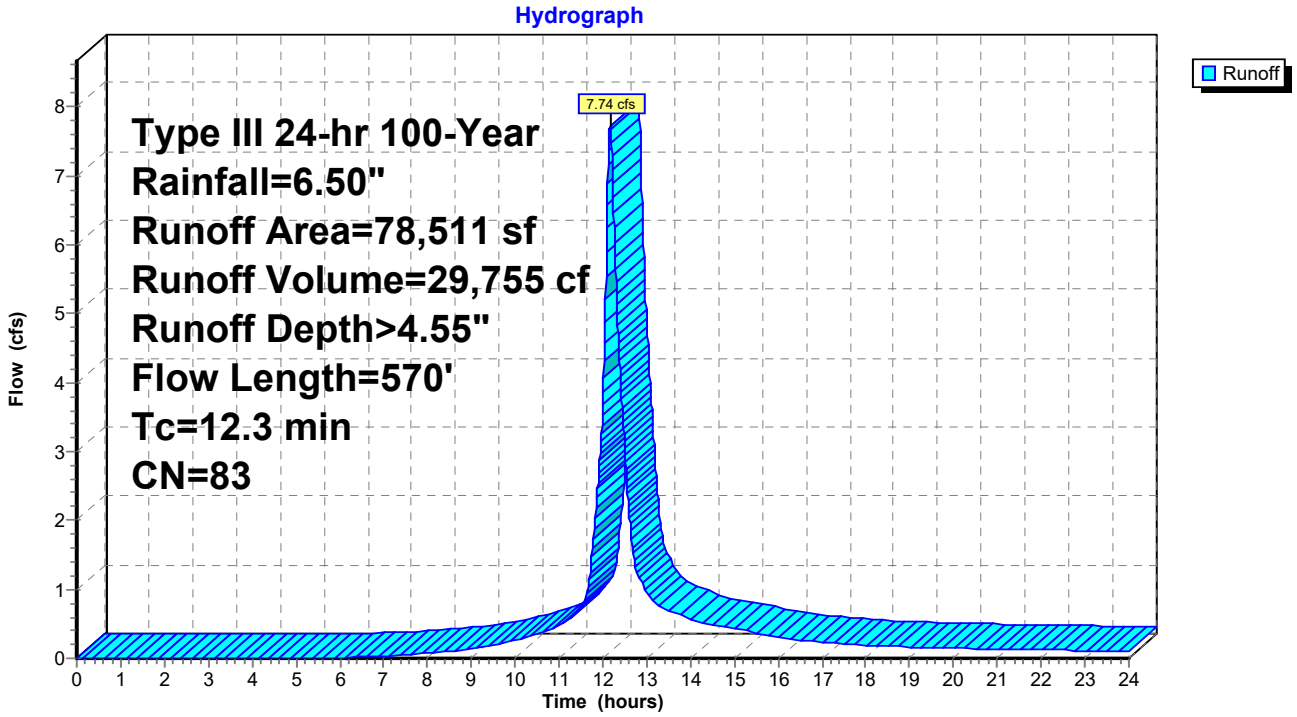
Runoff = 7.74 cfs @ 12.17 hrs, Volume= 29,755 cf, Depth> 4.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site



Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

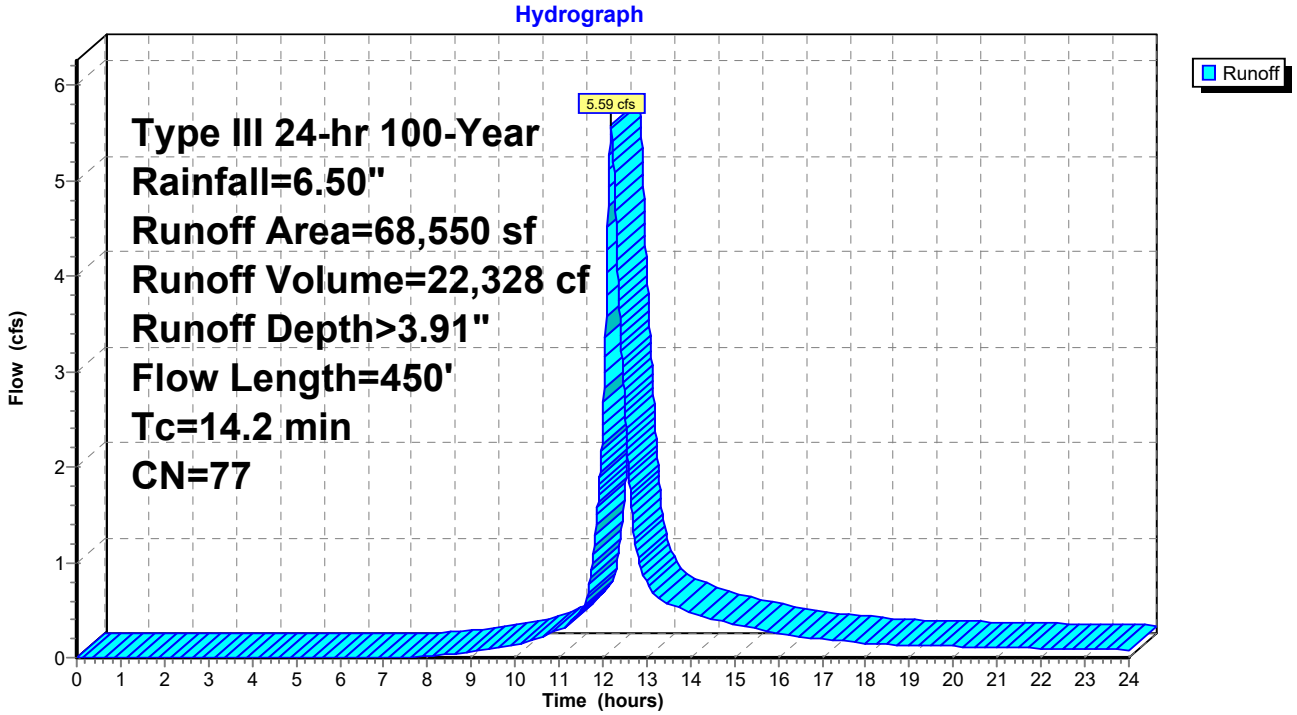
Runoff = 5.59 cfs @ 12.19 hrs, Volume= 22,328 cf, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)



Subcatchment 900: North Offsite flowing onto property

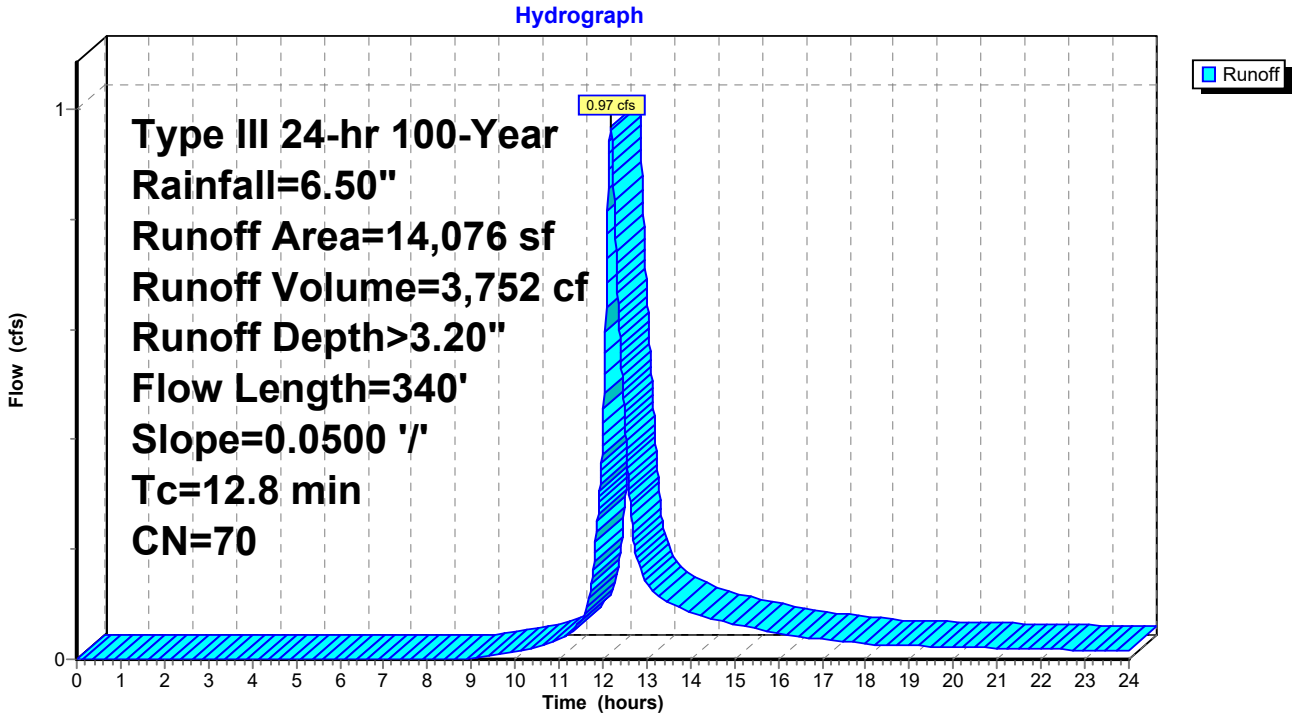
Runoff = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 4.16" for 100-Year event
Inflow = 14.23 cfs @ 12.18 hrs, Volume= 55,834 cf
Outflow = 14.09 cfs @ 12.19 hrs, Volume= 55,757 cf, Atten= 1%, Lag= 1.1 min

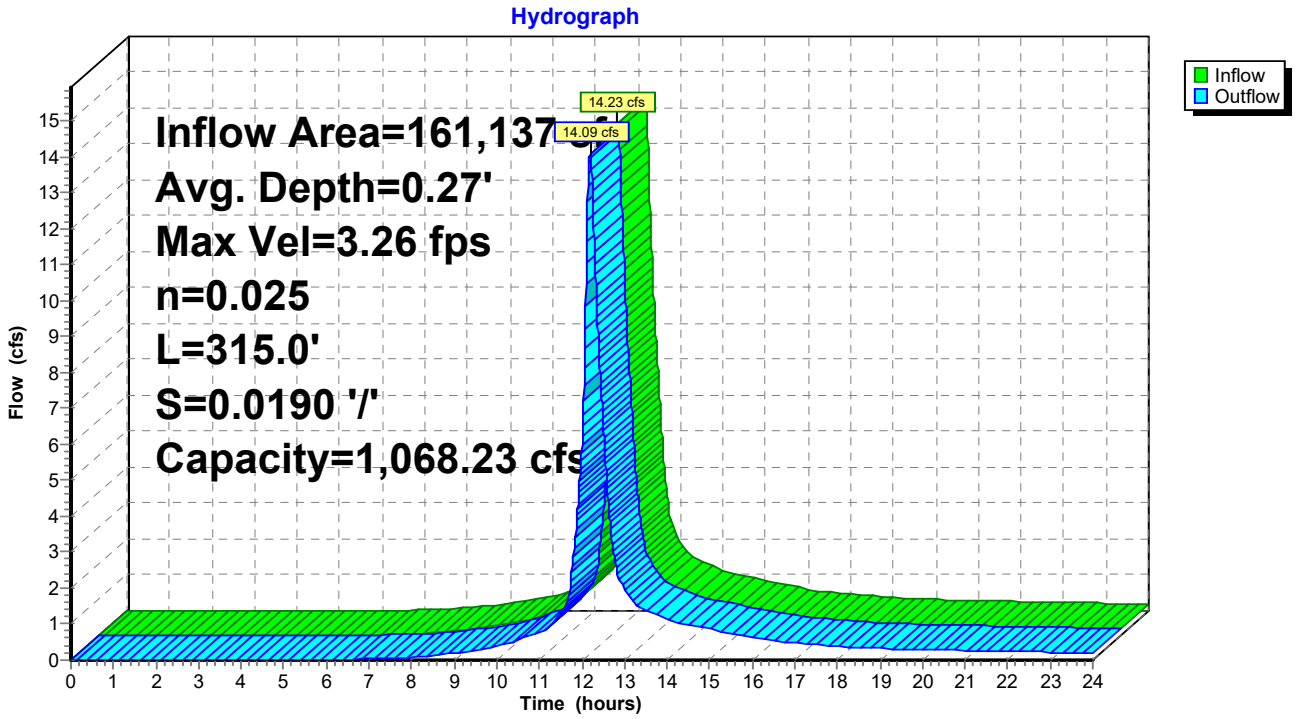
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 5.2 min

Peak Storage= 1,360 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 39.00'
Length= 315.0' Slope= 0.0190 '/'
Inlet Invert= 94.00', Outlet Invert= 88.00'

‡

Reach 101R: Top Reach



Reach 102R: Bottom Reach

[61] Hint: Submerged 6% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 4.04" for 100-Year event
Inflow = 25.27 cfs @ 12.19 hrs, Volume= 99,450 cf
Outflow = 25.25 cfs @ 12.19 hrs, Volume= 99,417 cf, Atten= 0%, Lag= 0.2 min

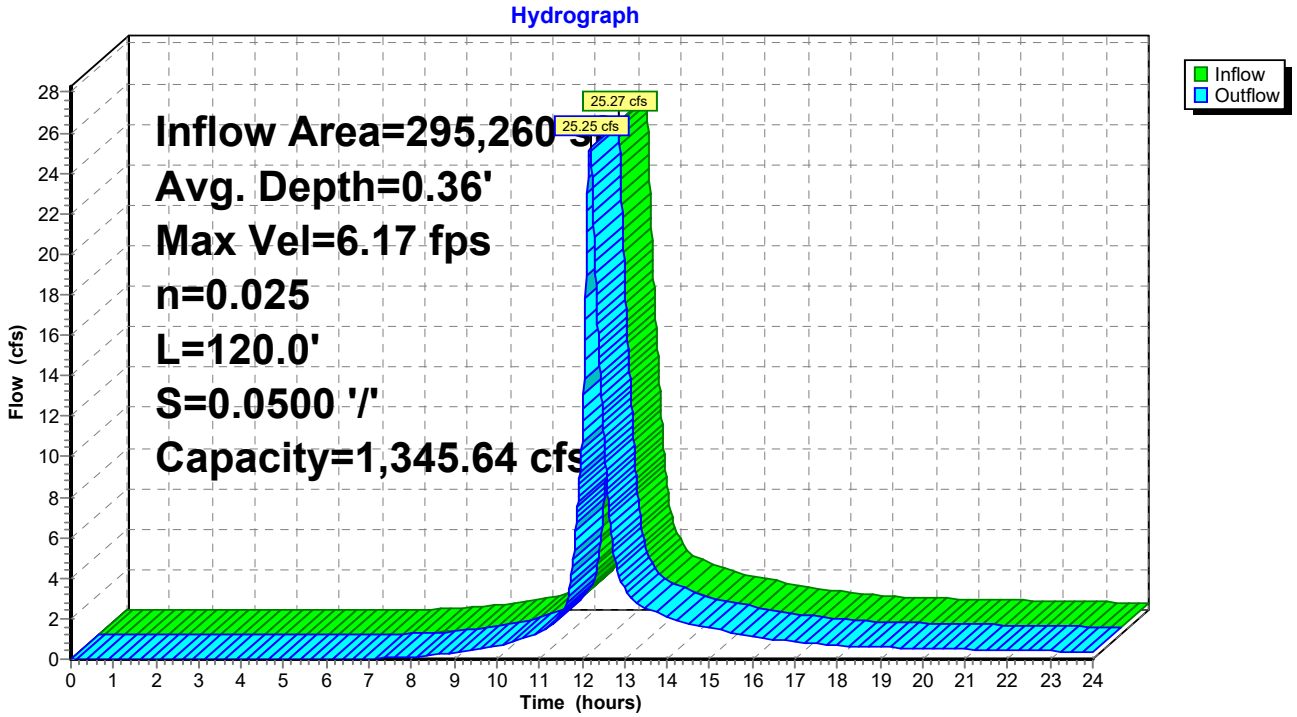
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.17 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.86 fps, Avg. Travel Time= 1.1 min

Peak Storage= 491 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 34.00'
Length= 120.0' Slope= 0.0500 '/'
Inlet Invert= 88.00', Outlet Invert= 82.00'

‡

Reach 102R: Bottom Reach



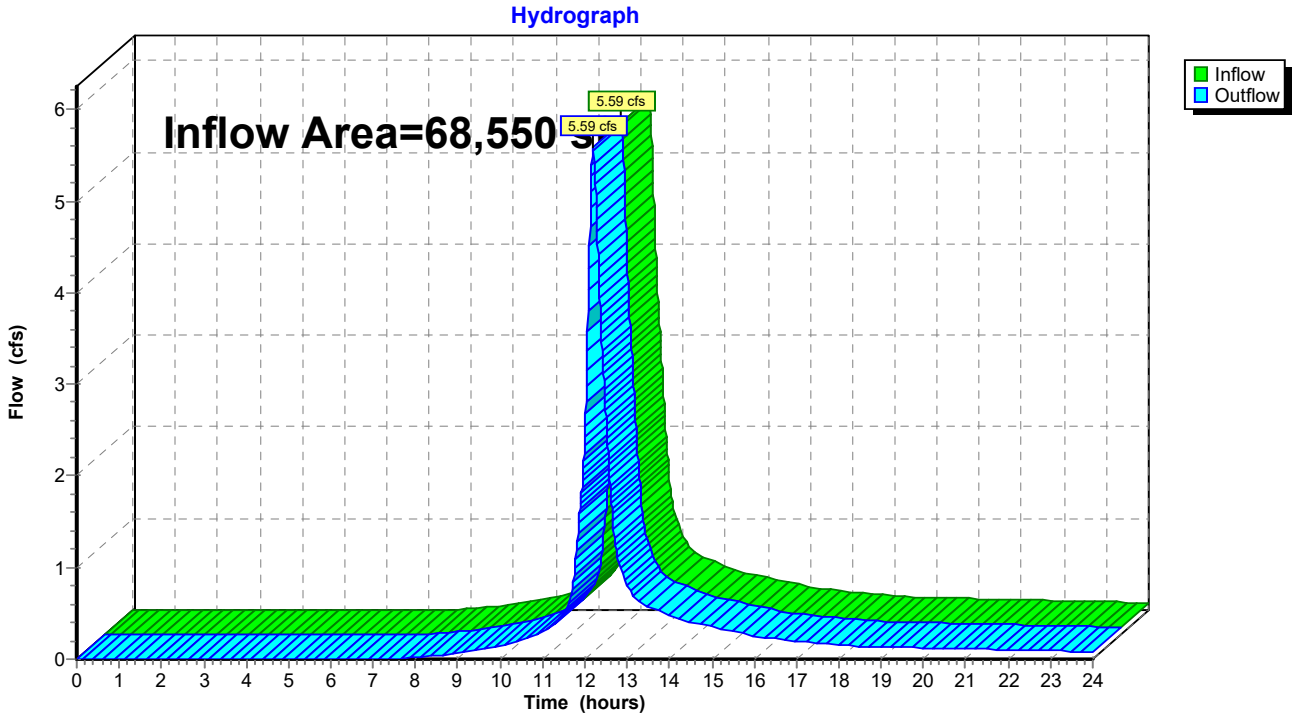
Reach 901R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 3.91" for 100-Year event
Inflow = 5.59 cfs @ 12.19 hrs, Volume= 22,328 cf
Outflow = 5.59 cfs @ 12.19 hrs, Volume= 22,328 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)



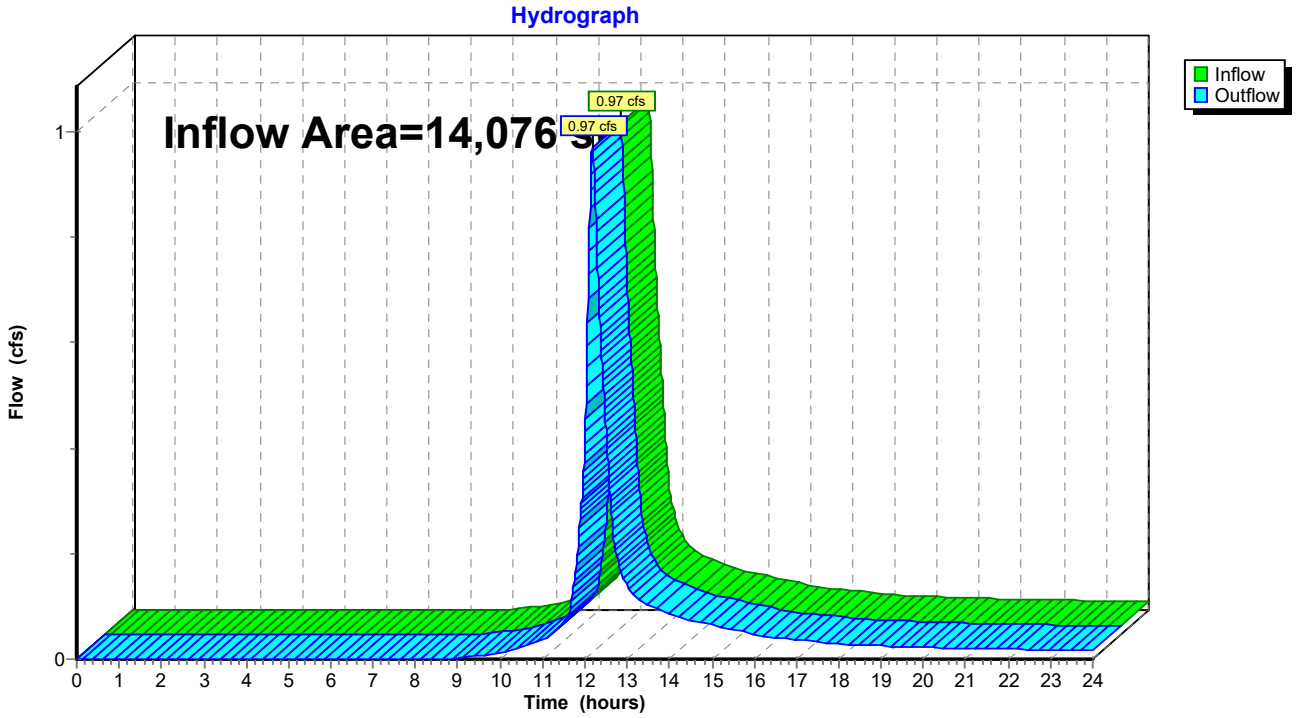
Reach 902R: (new Reach)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 3.20" for 100-Year event
Inflow = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf
Outflow = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)



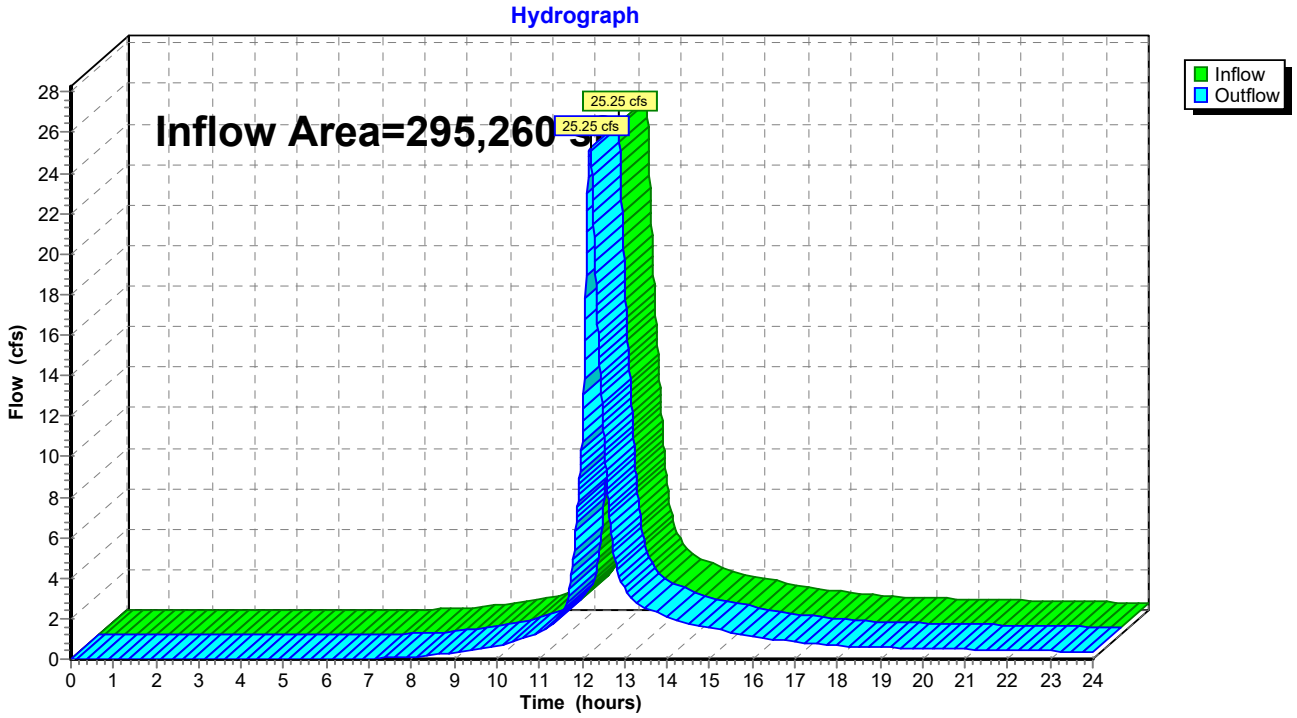
Reach PTA: Point of Analysis (Edge of Prop. Line)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 295,260 sf, Inflow Depth > 4.04" for 100-Year event
Inflow = 25.25 cfs @ 12.19 hrs, Volume= 99,417 cf
Outflow = 25.25 cfs @ 12.19 hrs, Volume= 99,417 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

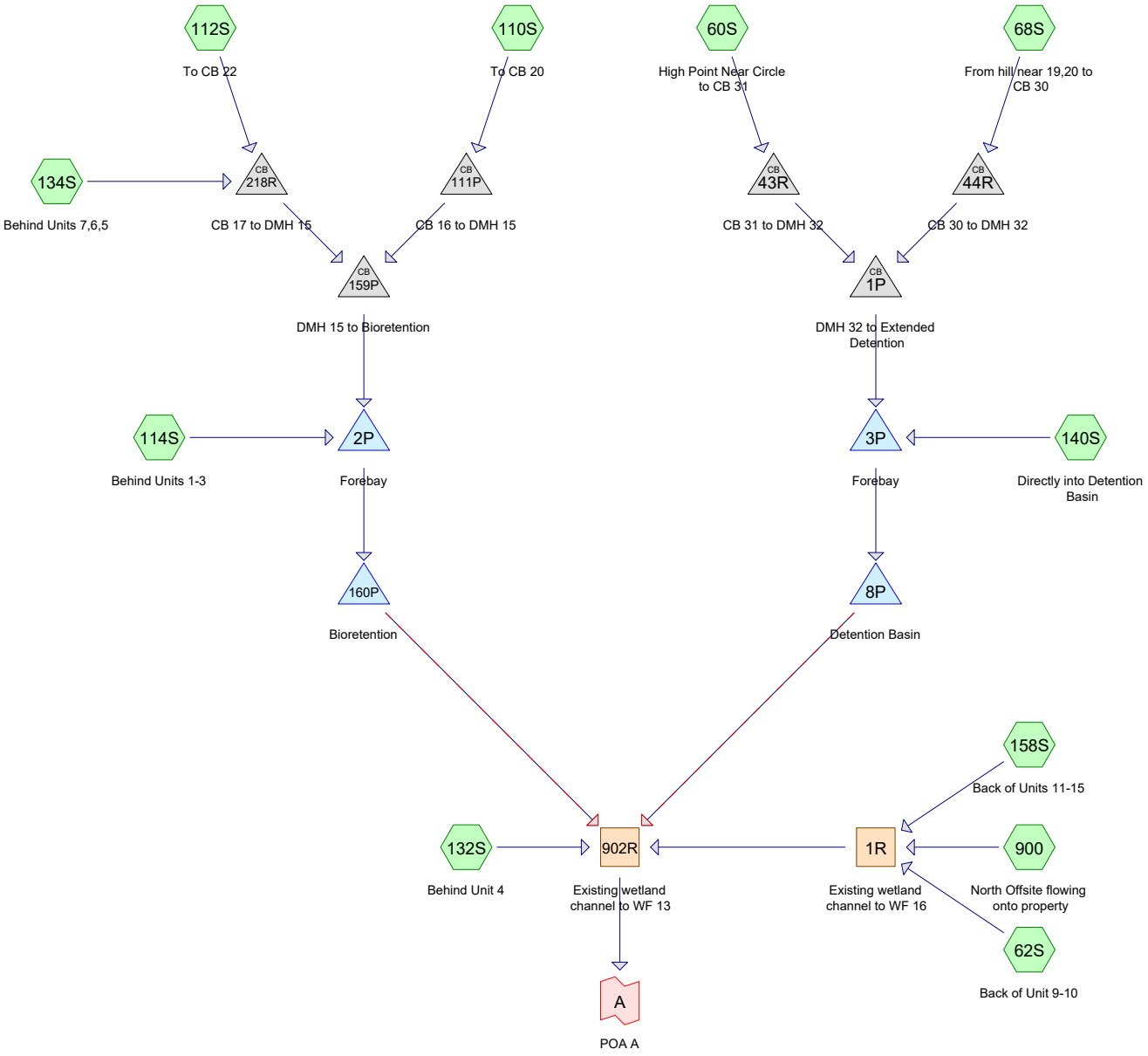
Reach PTA: Point of Analysis (Edge of Prop. Line)



HydroCAD Printouts

Post Development

Storm Frequency: 2, 10, 25, 100 Year



Subcat Reach Pond Link

Drainage Diagram for 2066 Postdevelopment P2

Prepared by {enter your company name here} 8/22/2016

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcats)
32,801	70	Woods, Good, HSG C (62S,132S,134S,140S,158S,900)
181,646	74	>75% Grass cover, Good, HSG C (60S,62S,68S,110S,112S,114S,132S,134S,140S,158S)
80,586	98	Paved parking & roofs (60S,62S,68S,110S,112S,114S,132S,134S,140S,158S)
295,033		

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 60S: High Point Near Circle to CB 31 Runoff Area=34,413 sf Runoff Depth>1.74"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=87 Runoff=1.94 cfs 4,987 cf

Subcatchment 62S: Back of Unit 9-10 Runoff Area=25,700 sf Runoff Depth>0.96"
Flow Length=230' Slope=0.0200 '/' Tc=8.6 min CN=75 Runoff=0.57 cfs 2,053 cf

Subcatchment 68S: From hill near 19,20 to CB 30 Runoff Area=31,363 sf Runoff Depth>1.66"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=86 Runoff=1.69 cfs 4,345 cf

Subcatchment 110S: To CB 20 Runoff Area=28,314 sf Runoff Depth>1.66"
Flow Length=270' Tc=3.7 min CN=86 Runoff=1.38 cfs 3,920 cf

Subcatchment 112S: To CB 22 Runoff Area=20,038 sf Runoff Depth>1.52"
Flow Length=280' Slope=0.0400 '/' Tc=3.8 min CN=84 Runoff=0.88 cfs 2,530 cf

Subcatchment 114S: Behind Units 1-3 Runoff Area=25,265 sf Runoff Depth>1.13"
Flow Length=130' Tc=8.0 min CN=78 Runoff=0.70 cfs 2,372 cf

Subcatchment 132S: Behind Unit 4 Runoff Area=21,345 sf Runoff Depth>1.01"
Flow Length=130' Tc=1.0 min CN=76 Runoff=0.67 cfs 1,805 cf

Subcatchment 134S: Behind Units 7,6,5 Runoff Area=34,848 sf Runoff Depth>1.07"
Flow Length=70' Slope=0.0200 '/' Tc=3.1 min CN=77 Runoff=1.08 cfs 3,108 cf

Subcatchment 140S: Directly into Detention Basin Runoff Area=30,492 sf Runoff Depth>1.01"
Flow Length=200' Slope=0.0100 '/' Tc=11.0 min CN=76 Runoff=0.67 cfs 2,572 cf

Subcatchment 158S: Back of Units 11-15 Runoff Area=29,185 sf Runoff Depth>1.19"
Flow Length=230' Tc=7.3 min CN=79 Runoff=0.87 cfs 2,886 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,070 sf Runoff Depth>0.71"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.19 cfs 834 cf

Reach 1R: Existing wetland channel to WF 1 Avg. Depth=0.10' Max Vel=2.55 fps Inflow=1.58 cfs 5,773 cf
n=0.022 L=300.0' S=0.0333 '/' Capacity=82.44 cfs Outflow=1.55 cfs 5,755 cf

Reach 902R: Existing wetland channel to W Avg. Depth=0.22' Max Vel=4.68 fps Inflow=6.69 cfs 28,911 cf
n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=6.69 cfs 28,896 cf

Pond 1P: DMH 32 to Extended Detention Peak Elev=102.01' Inflow=3.63 cfs 9,331 cf
15.0" x 41.0' Culvert Outflow=3.63 cfs 9,331 cf

Pond 2P: Forebay Peak Elev=101.31' Storage=1,230 cf Inflow=3.88 cfs 11,930 cf
Outflow=3.78 cfs 11,019 cf

Pond 3P: Forebay Peak Elev=99.31' Storage=1,264 cf Inflow=3.91 cfs 11,903 cf
Outflow=3.71 cfs 10,964 cf

Pond 8P: Detention Basin Peak Elev=97.87' Storage=517 cf Inflow=3.71 cfs 10,964 cf
Primary=3.35 cfs 10,932 cf Secondary=0.00 cfs 0 cf Outflow=3.35 cfs 10,932 cf

Pond 43R: CB 31 to DMH 32 Peak Elev=102.80' Inflow=1.94 cfs 4,987 cf
12.0" x 12.0' Culvert Outflow=1.94 cfs 4,987 cf

Pond 44R: CB 30 to DMH 32 Peak Elev=102.73' Inflow=1.69 cfs 4,345 cf
12.0" x 12.0' Culvert Outflow=1.69 cfs 4,345 cf

Pond 111P: CB 16 to DMH 15 Peak Elev=103.70' Inflow=1.38 cfs 3,920 cf
12.0" x 5.0' Culvert Outflow=1.38 cfs 3,920 cf

Pond 159P: DMH 15 to Bioretention Peak Elev=103.95' Inflow=3.34 cfs 9,558 cf
15.0" x 100.0' Culvert Outflow=3.34 cfs 9,558 cf

Pond 160P: Bioretention Peak Elev=100.75' Storage=1,814 cf Inflow=3.78 cfs 11,019 cf
Discarded=0.01 cfs 395 cf Primary=2.39 cfs 10,419 cf Secondary=0.00 cfs 0 cf Outflow=2.40 cfs 10,814 cf

Pond 218R: CB 17 to DMH 15 Peak Elev=104.78' Inflow=1.96 cfs 5,638 cf
12.0" x 35.0' Culvert Outflow=1.96 cfs 5,638 cf

Link A: POA A Inflow=6.69 cfs 28,896 cf
Primary=6.69 cfs 28,896 cf

Total Runoff Area = 295,033 sf Runoff Volume = 31,411 cf Average Runoff Depth = 1.28"
72.69% Pervious Area = 214,447 sf 27.31% Impervious Area = 80,586 sf

Subcatchment 60S: High Point Near Circle to CB 31

[49] Hint: Tc<2dt may require smaller dt

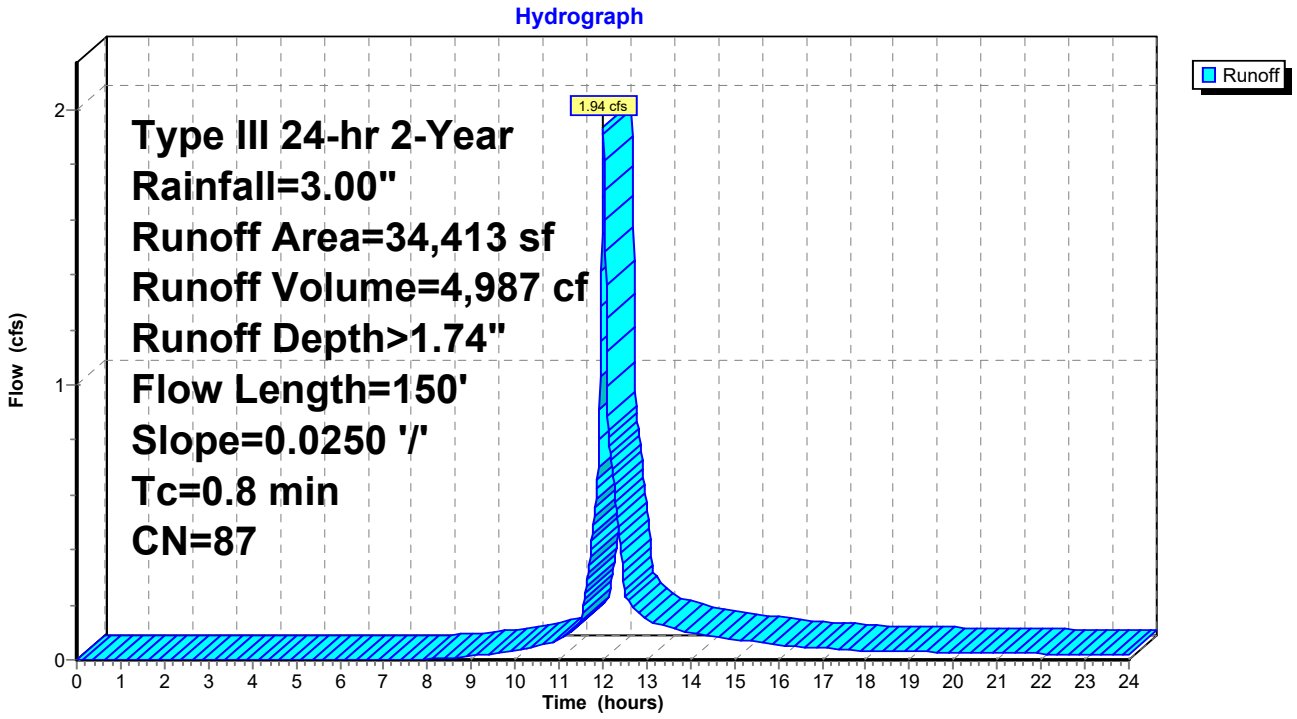
Runoff = 1.94 cfs @ 12.01 hrs, Volume= 4,987 cf, Depth> 1.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
18,731	98	Paved parking & roofs
15,682	74	>75% Grass cover, Good, HSG C
34,413	87	Weighted Average
15,682		Pervious Area
18,731		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 60S: High Point Near Circle to CB 31



Subcatchment 62S: Back of Unit 9-10

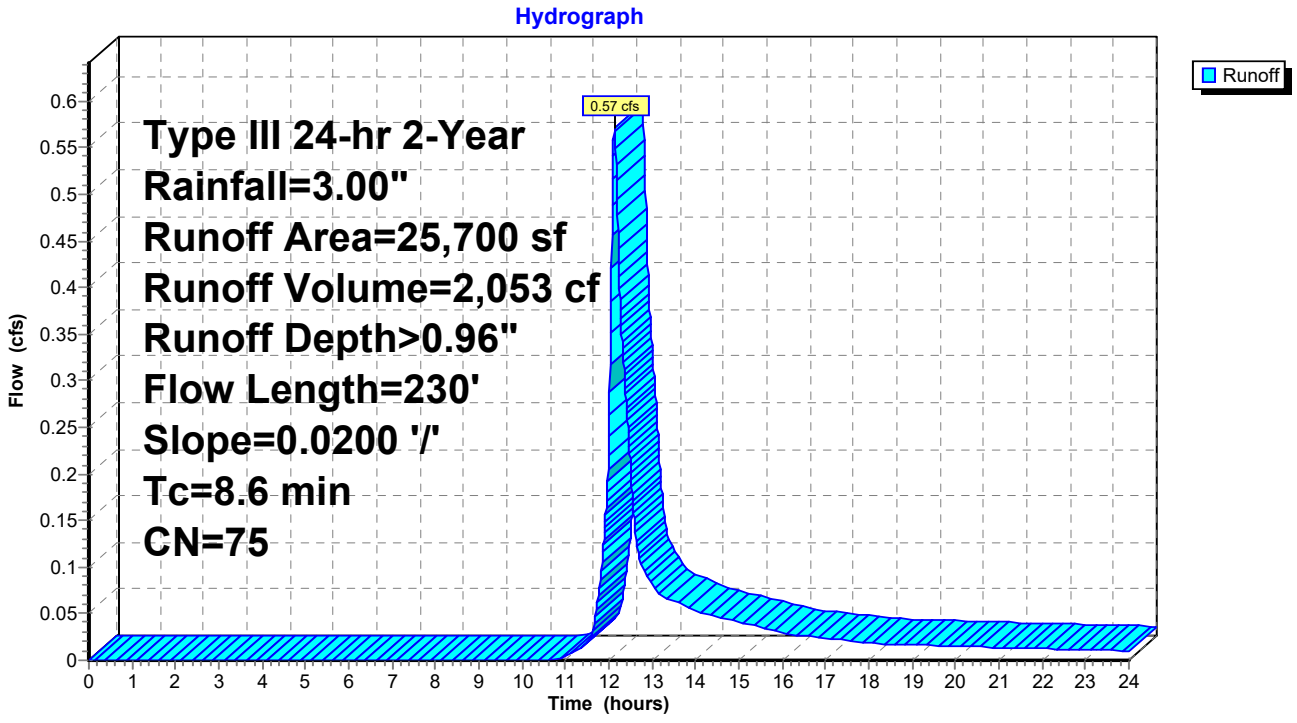
Runoff = 0.57 cfs @ 12.13 hrs, Volume= 2,053 cf, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,742	98	Paved parking & roofs
21,780	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
25,700	75	Weighted Average
23,958		Pervious Area
1,742		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.6	230	Total			

Subcatchment 62S: Back of Unit 9-10



Subcatchment 68S: From hill near 19,20 to CB 30

[49] Hint: Tc<2dt may require smaller dt

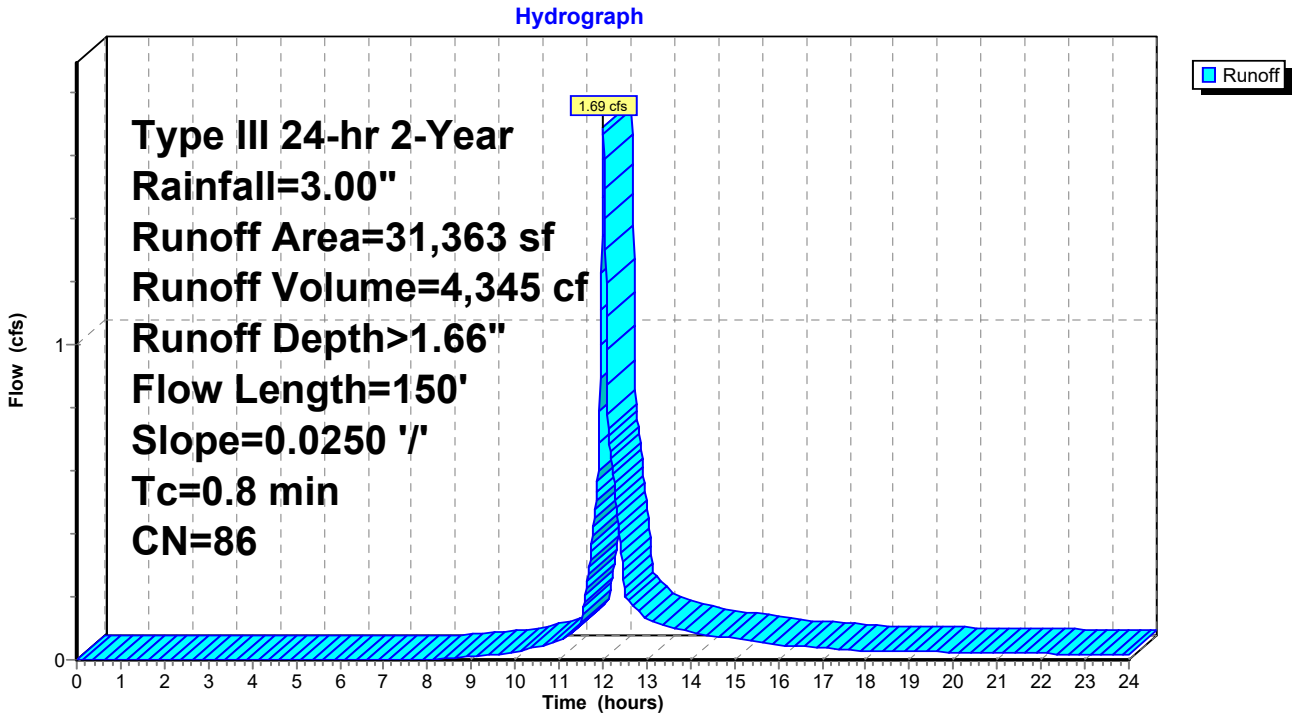
Runoff = 1.69 cfs @ 12.01 hrs, Volume= 4,345 cf, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
15,246	98	Paved parking & roofs
16,117	74	>75% Grass cover, Good, HSG C
31,363	86	Weighted Average
16,117		Pervious Area
15,246		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 68S: From hill near 19,20 to CB 30



Subcatchment 110S: To CB 20

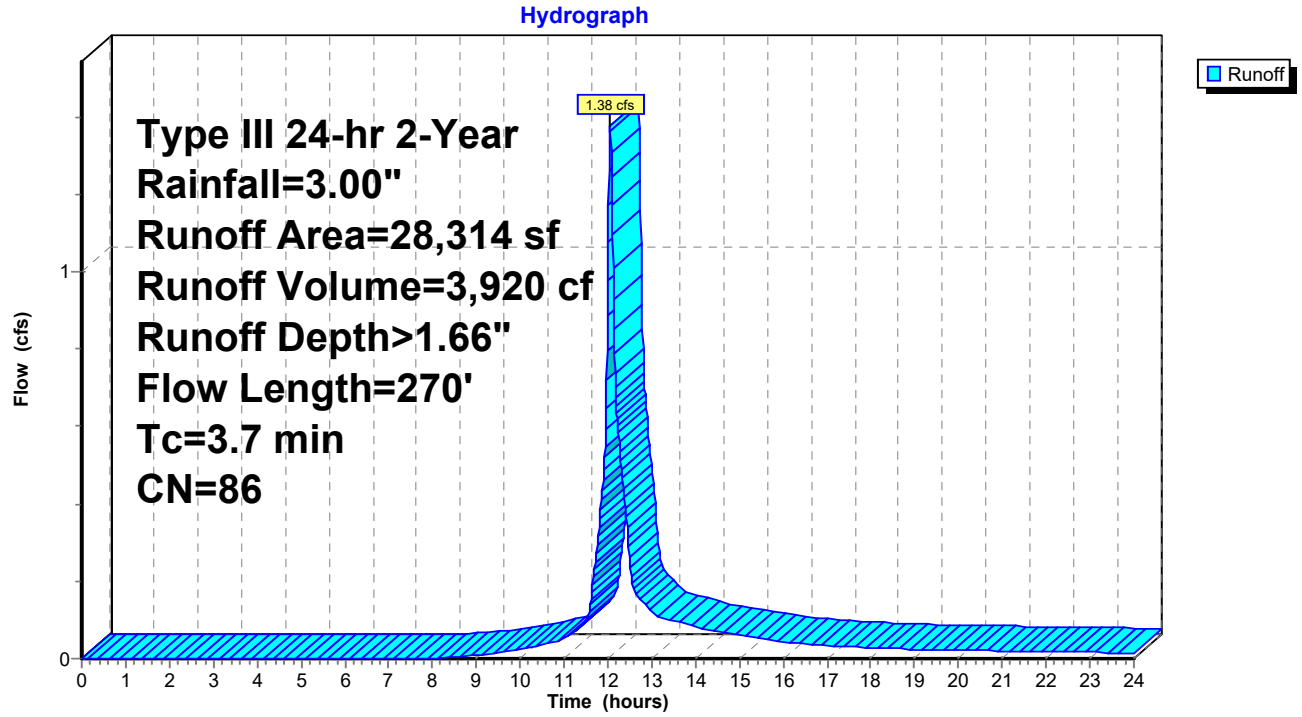
Runoff = 1.38 cfs @ 12.06 hrs, Volume= 3,920 cf, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
14,375	98	Paved parking & roofs
13,939	74	>75% Grass cover, Good, HSG C
28,314	86	Weighted Average
13,939		Pervious Area
14,375		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.7	270	Total			

Subcatchment 110S: To CB 20



Subcatchment 112S: To CB 22

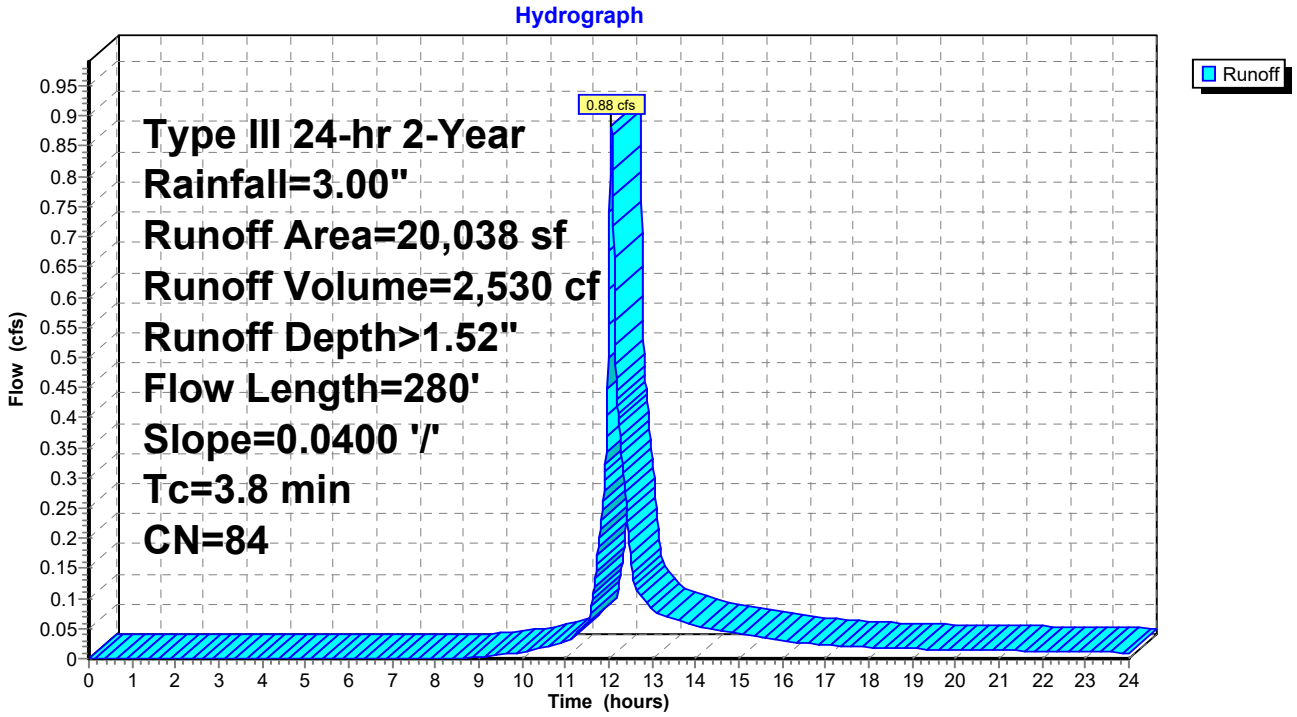
Runoff = 0.88 cfs @ 12.06 hrs, Volume= 2,530 cf, Depth> 1.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
8,712	98	Paved parking & roofs
11,326	74	>75% Grass cover, Good, HSG C
20,038	84	Weighted Average
11,326		Pervious Area
8,712		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	30	0.0400	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8	280	Total			

Subcatchment 112S: To CB 22



Subcatchment 114S: Behind Units 1-3

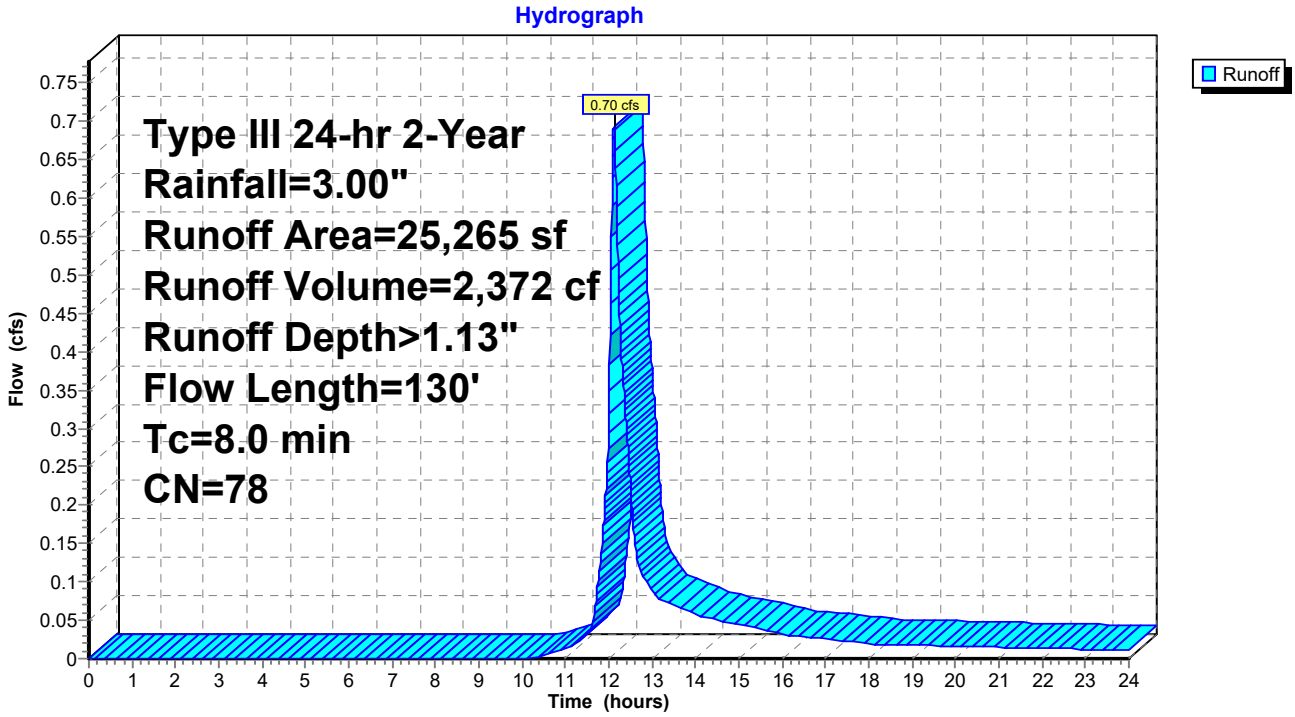
Runoff = 0.70 cfs @ 12.12 hrs, Volume= 2,372 cf, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
25,265	78	Weighted Average
20,909		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.6	80	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.0	130	Total			

Subcatchment 114S: Behind Units 1-3



Subcatchment 132S: Behind Unit 4

[49] Hint: Tc<2dt may require smaller dt

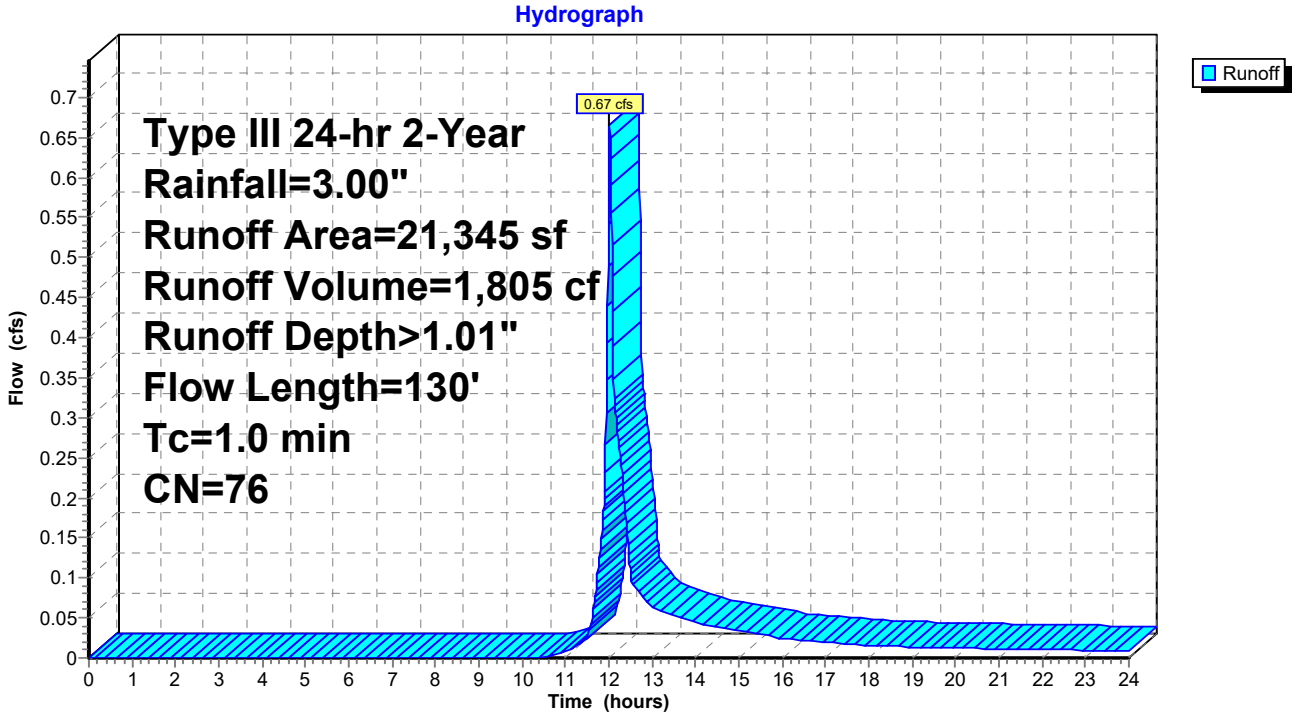
Runoff = 0.67 cfs @ 12.02 hrs, Volume= 1,805 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,485	98	Paved parking & roofs
8,712	74	>75% Grass cover, Good, HSG C
9,148	70	Woods, Good, HSG C
21,345	76	Weighted Average
17,860		Pervious Area
3,485		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	80	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	130	Total			

Subcatchment 132S: Behind Unit 4



Subcatchment 134S: Behind Units 7,6,5

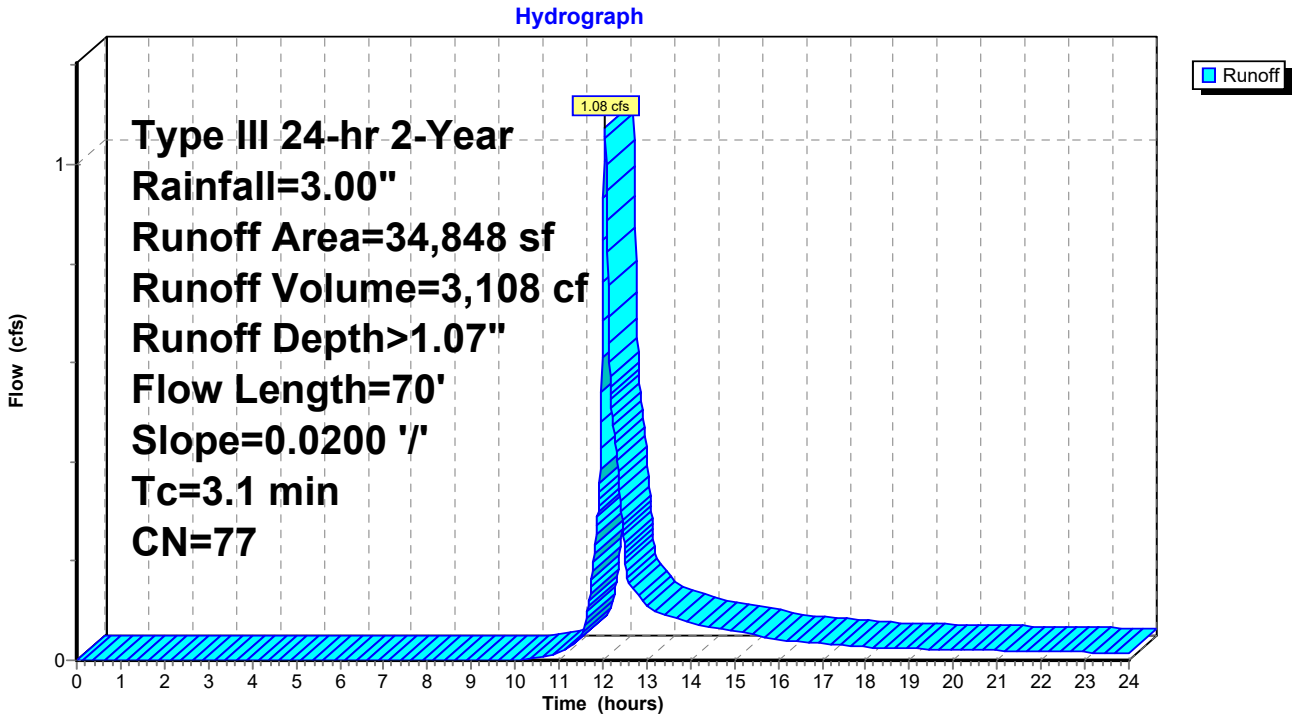
Runoff = 1.08 cfs @ 12.05 hrs, Volume= 3,108 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,792	98	Paved parking & roofs
28,314	74	>75% Grass cover, Good, HSG C
1,742	70	Woods, Good, HSG C
34,848	77	Weighted Average
30,056		Pervious Area
4,792		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: Behind Units 7,6,5



Subcatchment 140S: Directly into Detention Basin

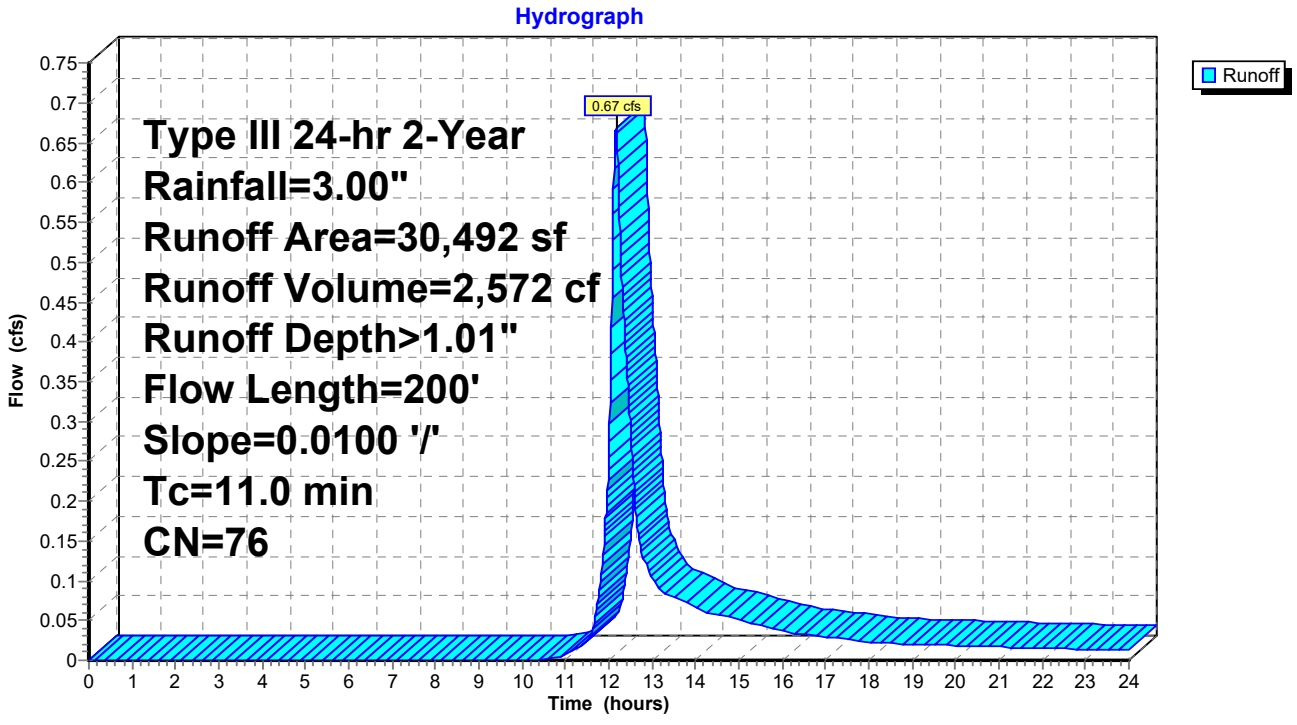
Runoff = 0.67 cfs @ 12.16 hrs, Volume= 2,572 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,049	98	Paved parking & roofs
23,958	74	>75% Grass cover, Good, HSG C
3,485	70	Woods, Good, HSG C
30,492	76	Weighted Average
27,443		Pervious Area
3,049		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.6	150	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.0	200	Total			

Subcatchment 140S: Directly into Detention Basin



Subcatchment 158S: Back of Units 11-15

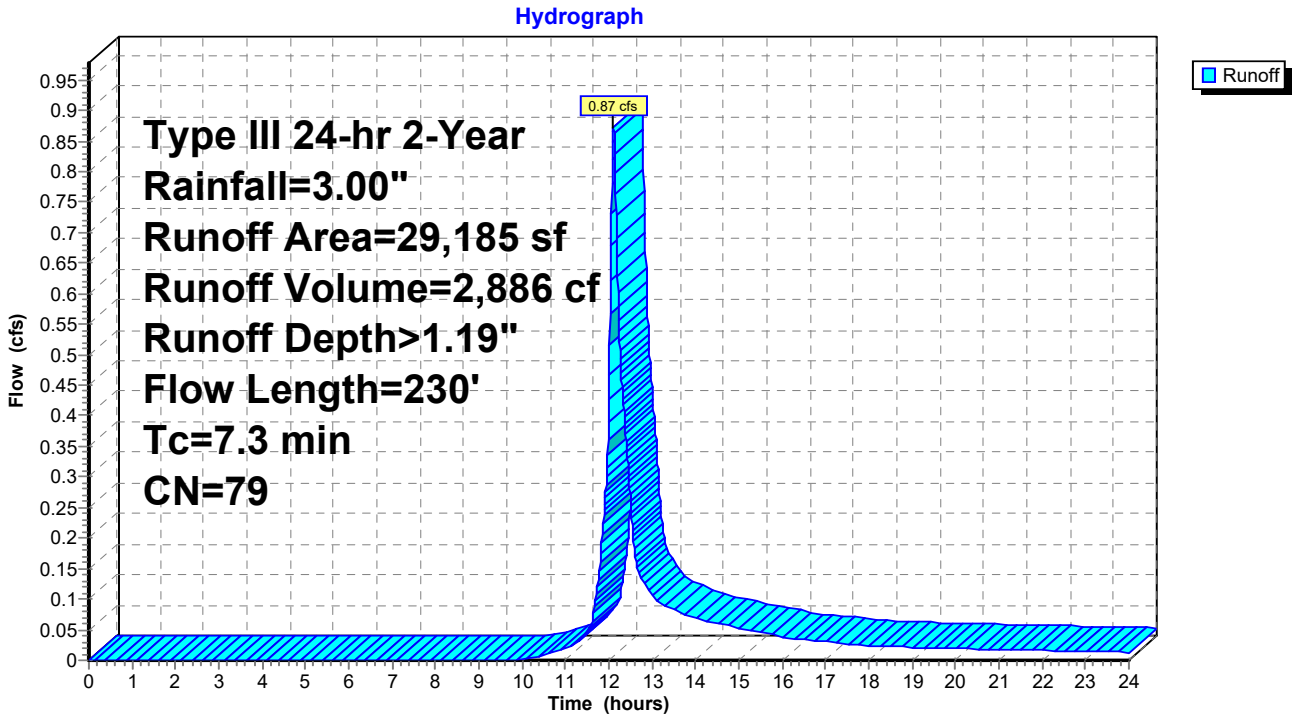
Runoff = 0.87 cfs @ 12.11 hrs, Volume= 2,886 cf, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
29,185	79	Weighted Average
23,087		Pervious Area
6,098		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	230	Total			

Subcatchment 158S: Back of Units 11-15



Subcatchment 900: North Offsite flowing onto property

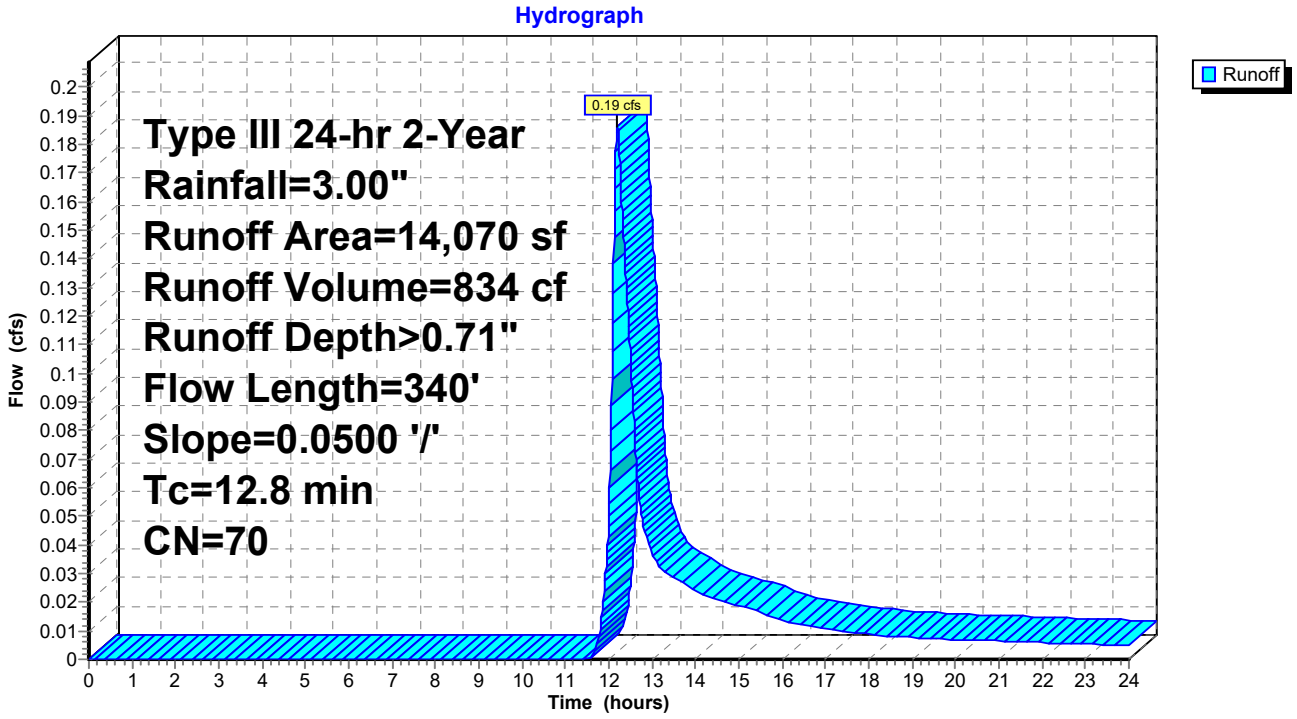
Runoff = 0.19 cfs @ 12.20 hrs, Volume= 834 cf, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
14,070	70	Woods, Good, HSG C
14,070		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 1R: Existing wetland channel to WF 16

Inflow Area = 68,955 sf, Inflow Depth > 1.00" for 2-Year event
Inflow = 1.58 cfs @ 12.12 hrs, Volume= 5,773 cf
Outflow = 1.55 cfs @ 12.18 hrs, Volume= 5,755 cf, Atten= 2%, Lag= 3.2 min

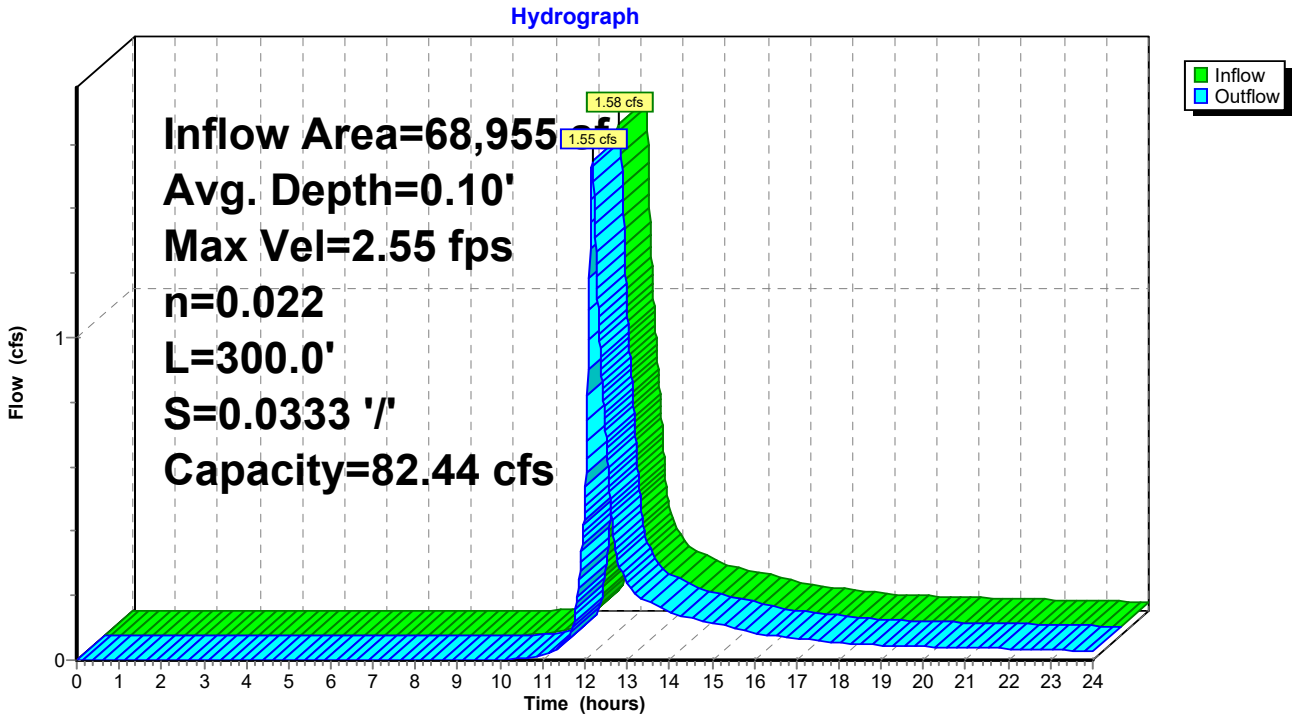
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.55 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 6.2 min

Peak Storage= 182 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'

‡

Reach 1R: Existing wetland channel to WF 16



Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 2% of Reach 1R bottom

Inflow Area = 295,033 sf, Inflow Depth > 1.18" for 2-Year event
Inflow = 6.69 cfs @ 12.14 hrs, Volume= 28,911 cf
Outflow = 6.69 cfs @ 12.15 hrs, Volume= 28,896 cf, Atten= 0%, Lag= 0.6 min

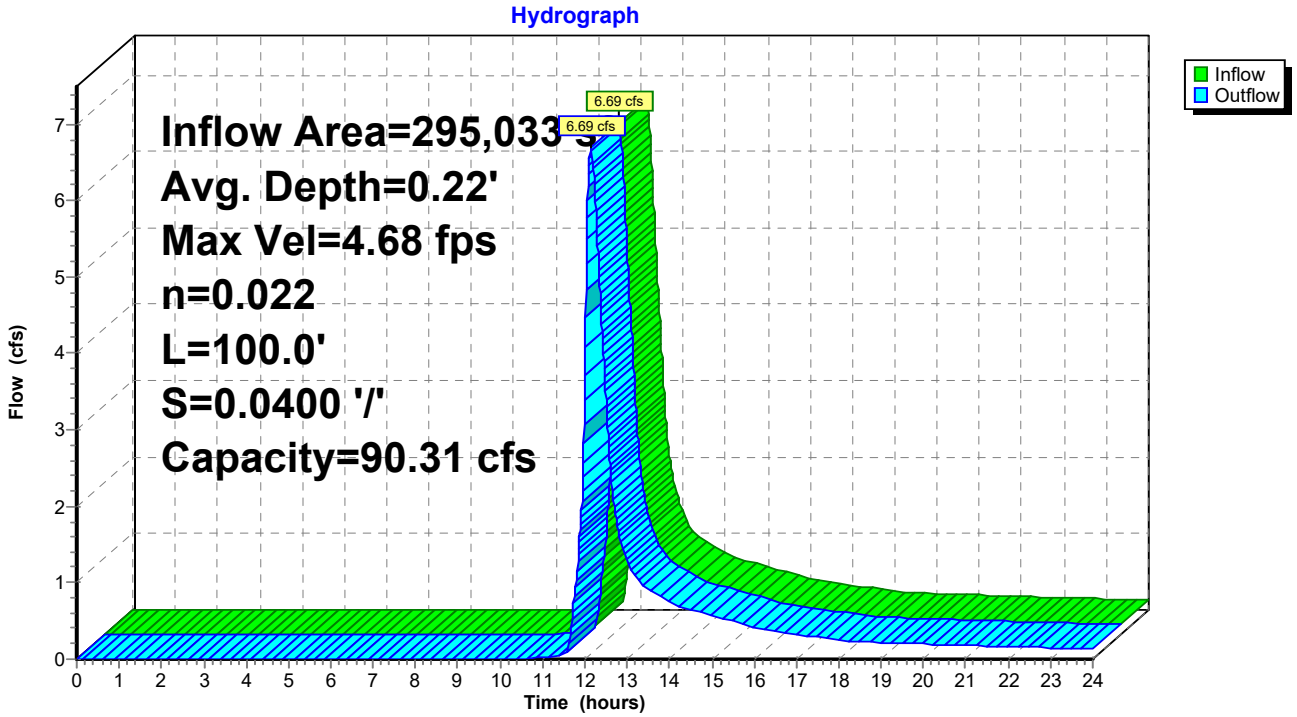
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.68 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 1.1 min

Peak Storage= 143 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0400 '/'
Inlet Invert= 86.00', Outlet Invert= 82.00'

‡

Reach 902R: Existing wetland channel to WF 13



Pond 1P: DMH 32 to Extended Detention

[79] Warning: Submerged Pond 43R Primary device # 1 INLET by 0.01'
[79] Warning: Submerged Pond 44R Primary device # 1 INLET by 0.01'

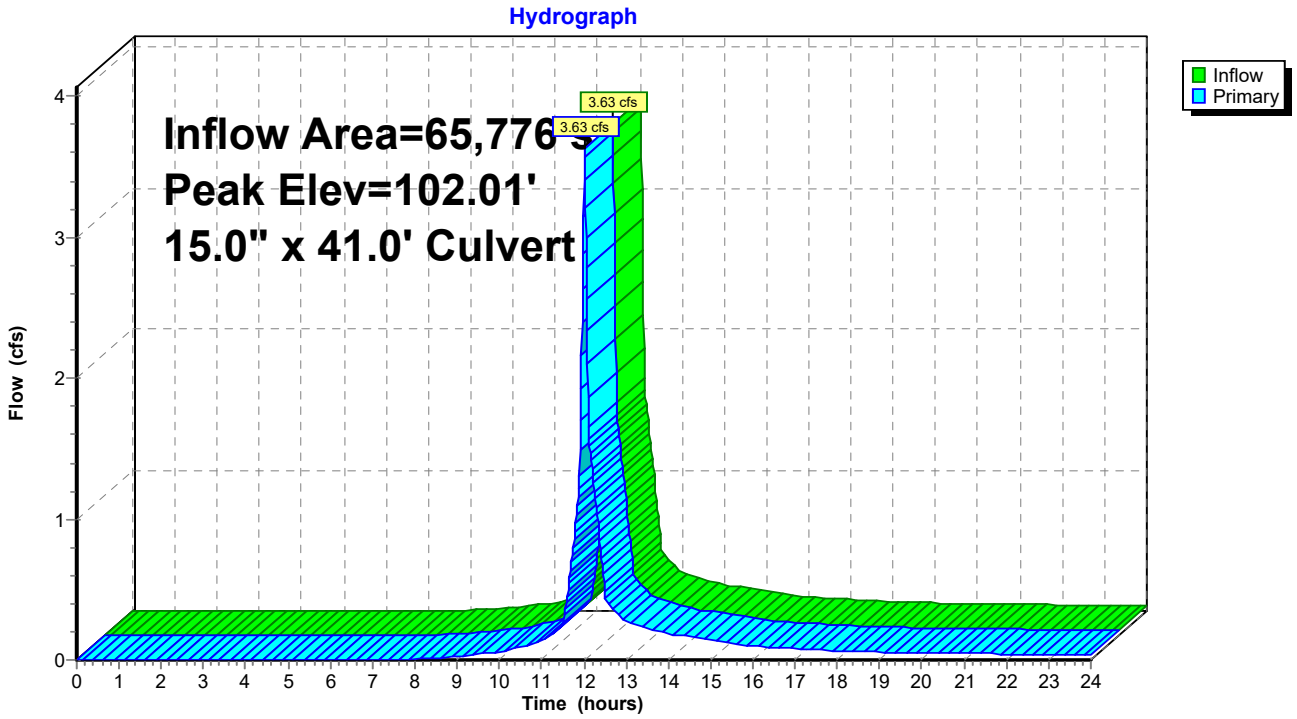
Inflow Area = 65,776 sf, Inflow Depth > 1.70" for 2-Year event
Inflow = 3.63 cfs @ 12.01 hrs, Volume= 9,331 cf
Outflow = 3.63 cfs @ 12.01 hrs, Volume= 9,331 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.63 cfs @ 12.01 hrs, Volume= 9,331 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 102.01' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**15.0" x 41.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0488 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=3.60 cfs @ 12.01 hrs HW=102.00' (Free Discharge)
1=Culvert (Inlet Controls 3.60 cfs @ 3.41 fps)

Pond 1P: DMH 32 to Extended Detention



Pond 2P: Forebay

[79] Warning: Submerged Pond 159P Primary device # 1 OUTLET by 0.31'

Inflow Area = 108,465 sf, Inflow Depth > 1.32" for 2-Year event
Inflow = 3.88 cfs @ 12.06 hrs, Volume= 11,930 cf
Outflow = 3.78 cfs @ 12.08 hrs, Volume= 11,019 cf, Atten= 3%, Lag= 1.1 min
Primary = 3.78 cfs @ 12.08 hrs, Volume= 11,019 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.31' @ 12.08 hrs Surf.Area= 1,115 sf Storage= 1,230 cf

Plug-Flow detention time= 55.3 min calculated for 11,015 cf (92% of inflow)
Center-of-Mass det. time= 16.5 min (854.8 - 838.3)

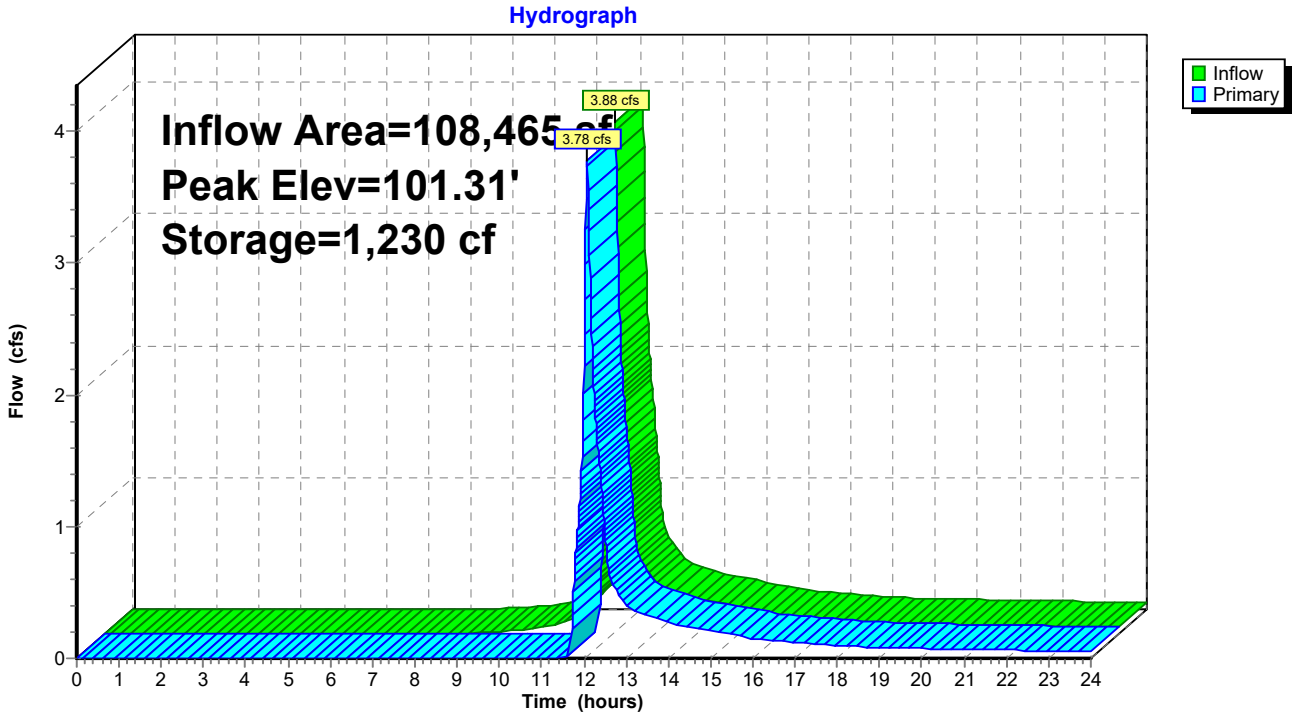
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	758	0	0
102.00	1,302	2,060	2,060

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**8.0' long x 25.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.77 cfs @ 12.08 hrs HW=101.31' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.77 cfs @ 1.51 fps)

Pond 2P: Forebay



Pond 3P: Forebay

[79] Warning: Submerged Pond 1P Primary device # 1 OUTLET by 0.31'

Inflow Area = 96,268 sf, Inflow Depth > 1.48" for 2-Year event
Inflow = 3.91 cfs @ 12.01 hrs, Volume= 11,903 cf
Outflow = 3.71 cfs @ 12.03 hrs, Volume= 10,964 cf, Atten= 5%, Lag= 1.1 min
Primary = 3.71 cfs @ 12.03 hrs, Volume= 10,964 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.31' @ 12.03 hrs Surf.Area= 1,145 sf Storage= 1,264 cf

Plug-Flow detention time= 58.5 min calculated for 10,964 cf (92% of inflow)
Center-of-Mass det. time= 18.3 min (846.3 - 828.0)

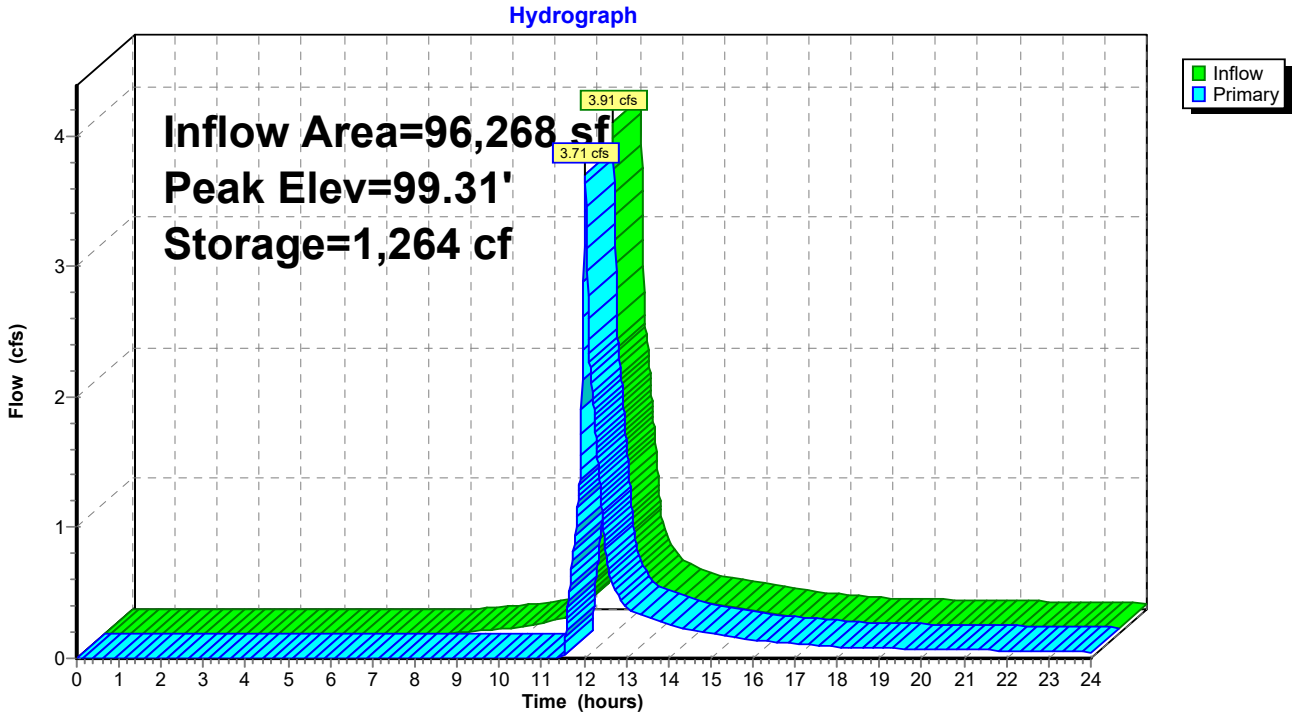
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	2,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	786	0	0
100.00	1,335	2,121	2,121

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**8.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.69 cfs @ 12.03 hrs HW=99.31' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.69 cfs @ 1.50 fps)

Pond 3P: Forebay



Pond 8P: Detention Basin

Inflow Area = 96,268 sf, Inflow Depth > 1.37" for 2-Year event
Inflow = 3.71 cfs @ 12.03 hrs, Volume= 10,964 cf
Outflow = 3.35 cfs @ 12.07 hrs, Volume= 10,932 cf, Atten= 10%, Lag= 2.1 min
Primary = 3.35 cfs @ 12.07 hrs, Volume= 10,932 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 97.87' @ 12.07 hrs Surf.Area= 879 sf Storage= 517 cf
Flood Elev= 100.00' Surf.Area= 2,037 sf Storage= 3,644 cf

Plug-Flow detention time= 4.9 min calculated for 10,932 cf (100% of inflow)
Center-of-Mass det. time= 3.2 min (849.4 - 846.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	3,644 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

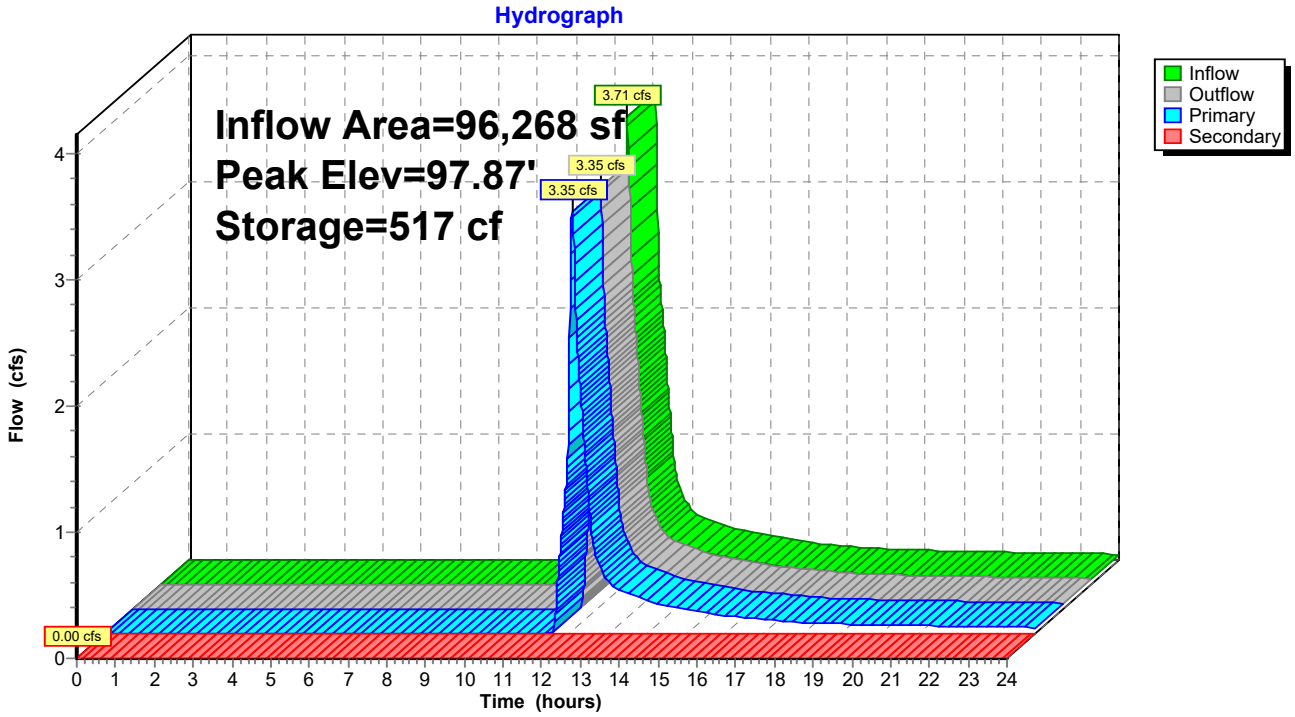
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	315	0	0
98.00	966	641	641
100.00	2,037	3,003	3,644

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**18.0" x 30.0' long Culvert** Ke= 0.500 Outlet Invert= 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean
#2	Secondary	99.50'	**8.0' 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=3.35 cfs @ 12.07 hrs HW=97.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.35 cfs @ 3.17 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Detention Basin



Pond 43R: CB 31 to DMH 32

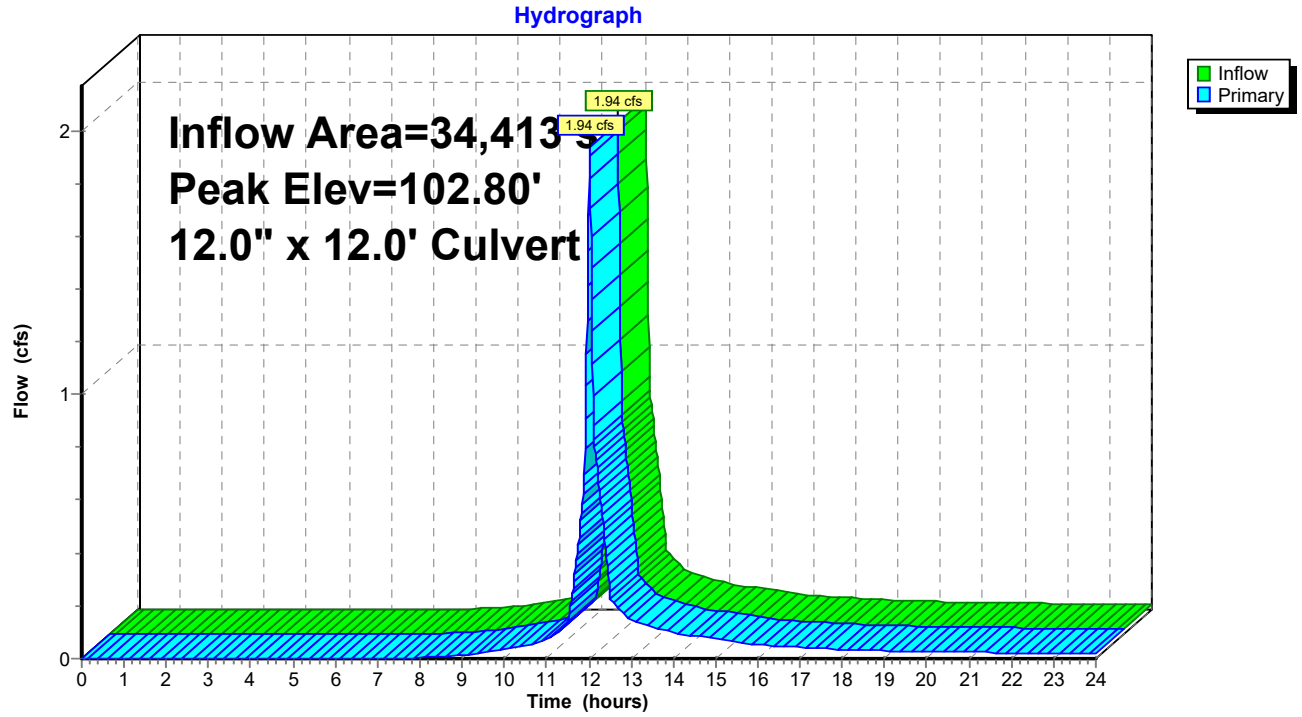
Inflow Area = 34,413 sf, Inflow Depth > 1.74" for 2-Year event
Inflow = 1.94 cfs @ 12.01 hrs, Volume= 4,987 cf
Outflow = 1.94 cfs @ 12.01 hrs, Volume= 4,987 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.94 cfs @ 12.01 hrs, Volume= 4,987 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 102.80' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.93 cfs @ 12.01 hrs HW=102.80' (Free Discharge)
1=Culvert (Barrel Controls 1.93 cfs @ 3.93 fps)

Pond 43R: CB 31 to DMH 32



Pond 44R: CB 30 to DMH 32

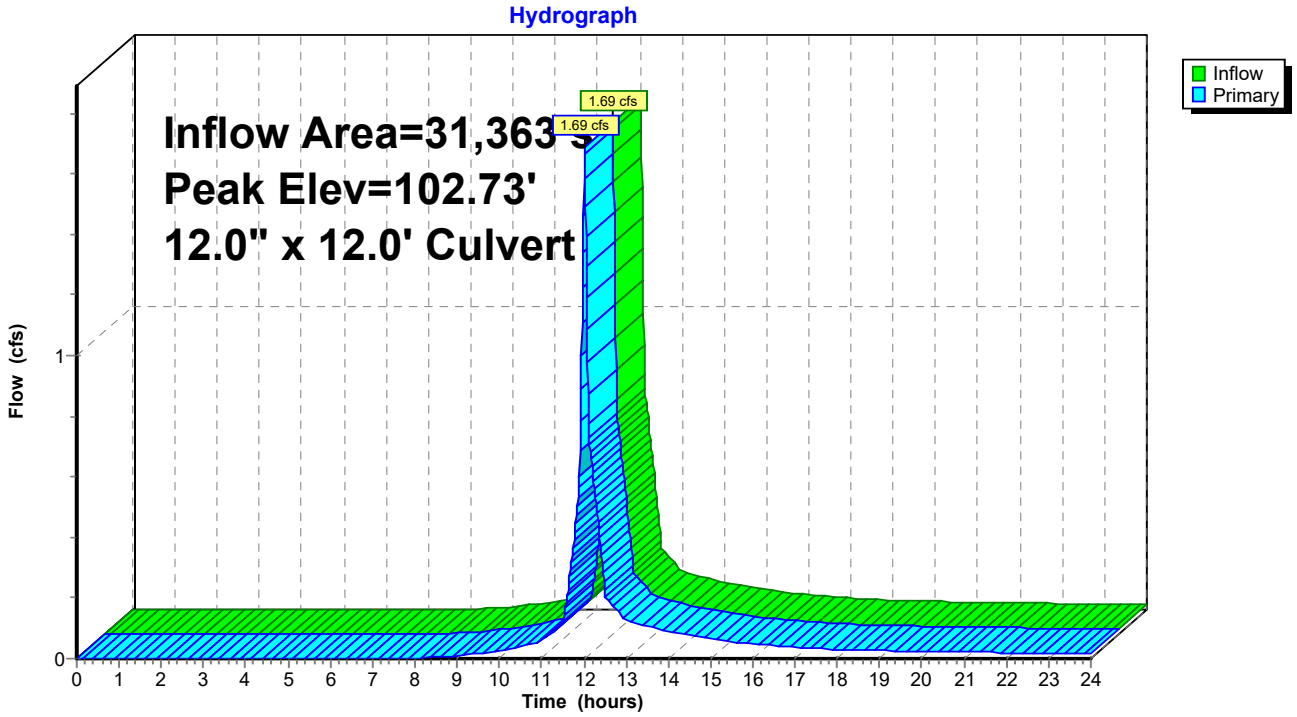
Inflow Area = 31,363 sf, Inflow Depth > 1.66" for 2-Year event
Inflow = 1.69 cfs @ 12.01 hrs, Volume= 4,345 cf
Outflow = 1.69 cfs @ 12.01 hrs, Volume= 4,345 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 12.01 hrs, Volume= 4,345 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 102.73' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.68 cfs @ 12.01 hrs HW=102.73' (Free Discharge)
1=Culvert (Barrel Controls 1.68 cfs @ 3.83 fps)

Pond 44R: CB 30 to DMH 32



Pond 111P: CB 16 to DMH 15

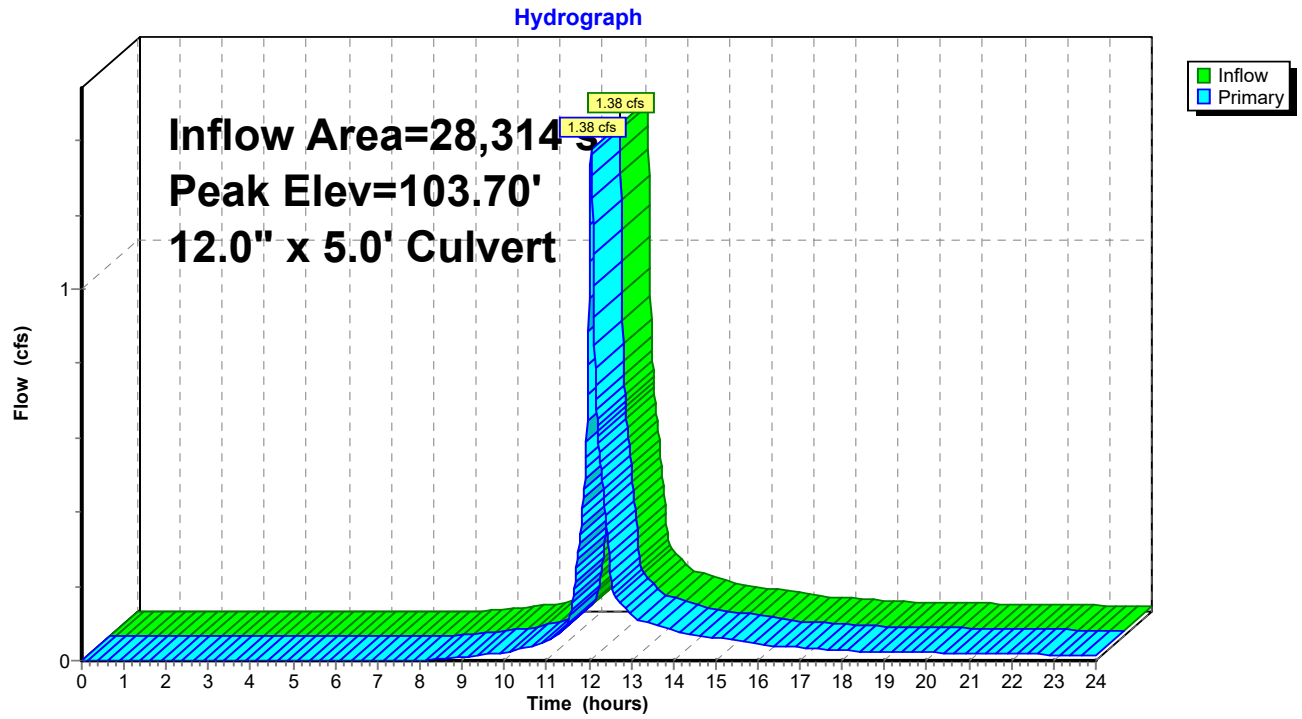
Inflow Area = 28,314 sf, Inflow Depth > 1.66" for 2-Year event
Inflow = 1.38 cfs @ 12.06 hrs, Volume= 3,920 cf
Outflow = 1.38 cfs @ 12.06 hrs, Volume= 3,920 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.38 cfs @ 12.06 hrs, Volume= 3,920 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.70' @ 12.06 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**12.0" x 5.0' long Culvert** RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 102.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.37 cfs @ 12.06 hrs HW=103.70' (Free Discharge)
1=Culvert (Barrel Controls 1.37 cfs @ 3.28 fps)

Pond 111P: CB 16 to DMH 15



Pond 159P: DMH 15 to Bioretention

[81] Warning: Exceeded Pond 111P by 0.25' @ 12.05 hrs
[79] Warning: Submerged Pond 218R Primary device # 1 OUTLET by 0.65'

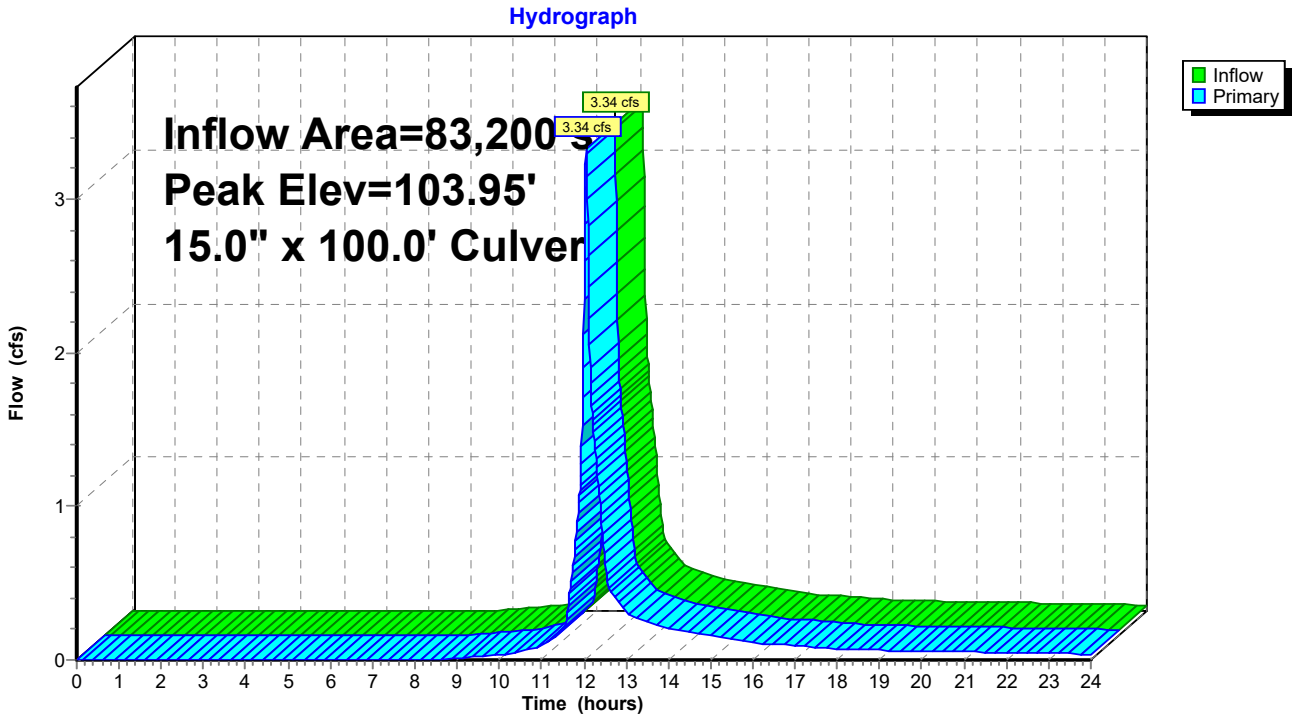
Inflow Area = 83,200 sf, Inflow Depth > 1.38" for 2-Year event
Inflow = 3.34 cfs @ 12.06 hrs, Volume= 9,558 cf
Outflow = 3.34 cfs @ 12.06 hrs, Volume= 9,558 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.34 cfs @ 12.06 hrs, Volume= 9,558 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.95' @ 12.06 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0" x 100.0' long Culvert** Ke= 0.500 Outlet Invert= 101.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=3.33 cfs @ 12.06 hrs HW=103.95' (Free Discharge)
1=Culvert (Inlet Controls 3.33 cfs @ 3.32 fps)

Pond 159P: DMH 15 to Bioretention



Pond 160P: Bioretention

Inflow Area = 108,465 sf, Inflow Depth > 1.22" for 2-Year event
Inflow = 3.78 cfs @ 12.08 hrs, Volume= 11,019 cf
Outflow = 2.40 cfs @ 12.19 hrs, Volume= 10,814 cf, Atten= 37%, Lag= 6.4 min
Discarded = 0.01 cfs @ 12.19 hrs, Volume= 395 cf
Primary = 2.39 cfs @ 12.19 hrs, Volume= 10,419 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 100.75' @ 12.19 hrs Surf.Area= 2,730 sf Storage= 1,814 cf
Flood Elev= 102.50' Surf.Area= 3,752 sf Storage= 5,871 cf

Plug-Flow detention time= 27.7 min calculated for 10,809 cf (98% of inflow)
Center-of-Mass det. time= 17.2 min (872.0 - 854.8)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	5,871 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	2,119	0	0
102.00	3,752	5,871	5,871

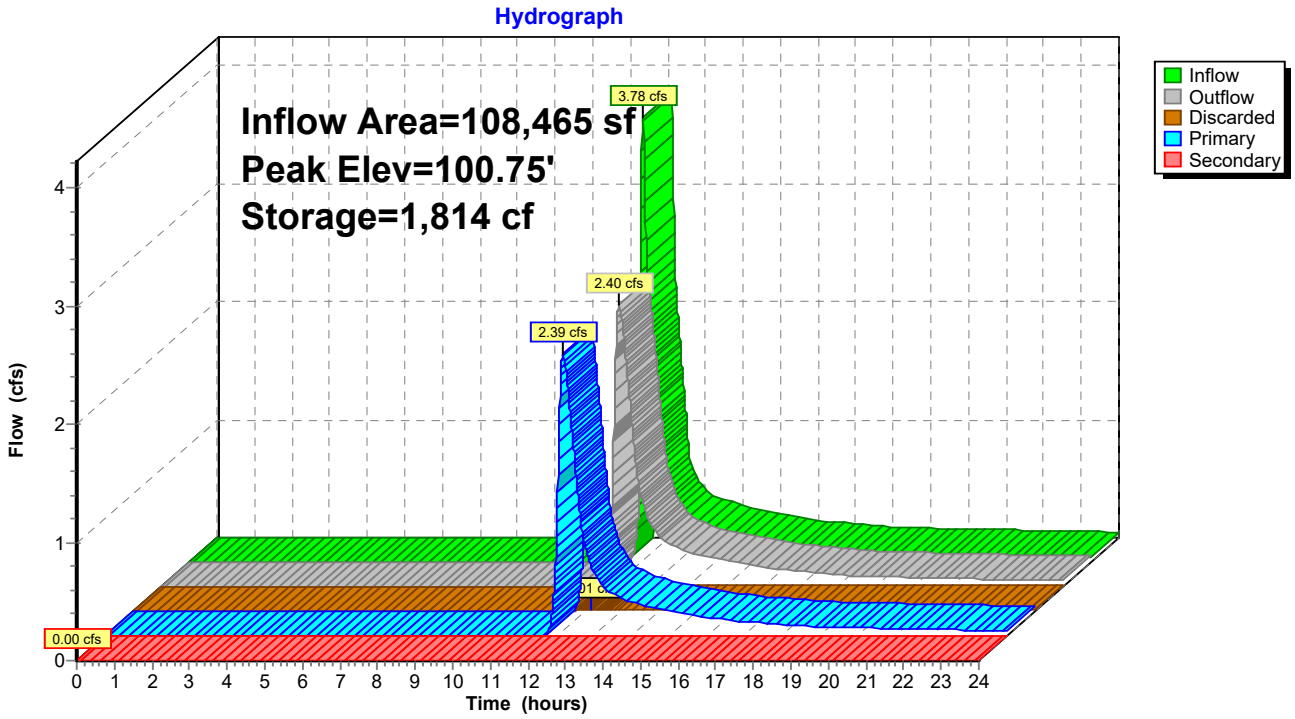
Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	100.00'	**15.0" x 21.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0476 '/' Cc= 0.900 n= 0.013
#3	Device 8	100.25'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#4	Device 8	100.42'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#5	Device 8	100.58'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#6	Device 8	100.75'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#7	Device 8	101.00'	**8.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#8	Primary	98.00'	**12.0" x 43.0' long Culvert** Ke= 0.500 Outlet Invert= 97.14' S= 0.0200 '/' Cc= 0.900 n= 0.013
#9	Secondary	102.00'	**8.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.19 hrs HW=100.75' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.38 cfs @ 12.19 hrs HW=100.75' (Free Discharge)
├**2=Culvert** (Inlet Controls 2.26 cfs @ 2.94 fps)
└**8=Culvert** (Passes 0.13 cfs of 5.67 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.05 cfs @ 3.33 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.04 cfs @ 2.67 fps)
  ├**5=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.85 fps)
  ├**6=Orifice/Grate** (Controls 0.00 cfs)
  └**7=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
└**9=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 160P: Bioretention



Pond 218R: CB 17 to DMH 15

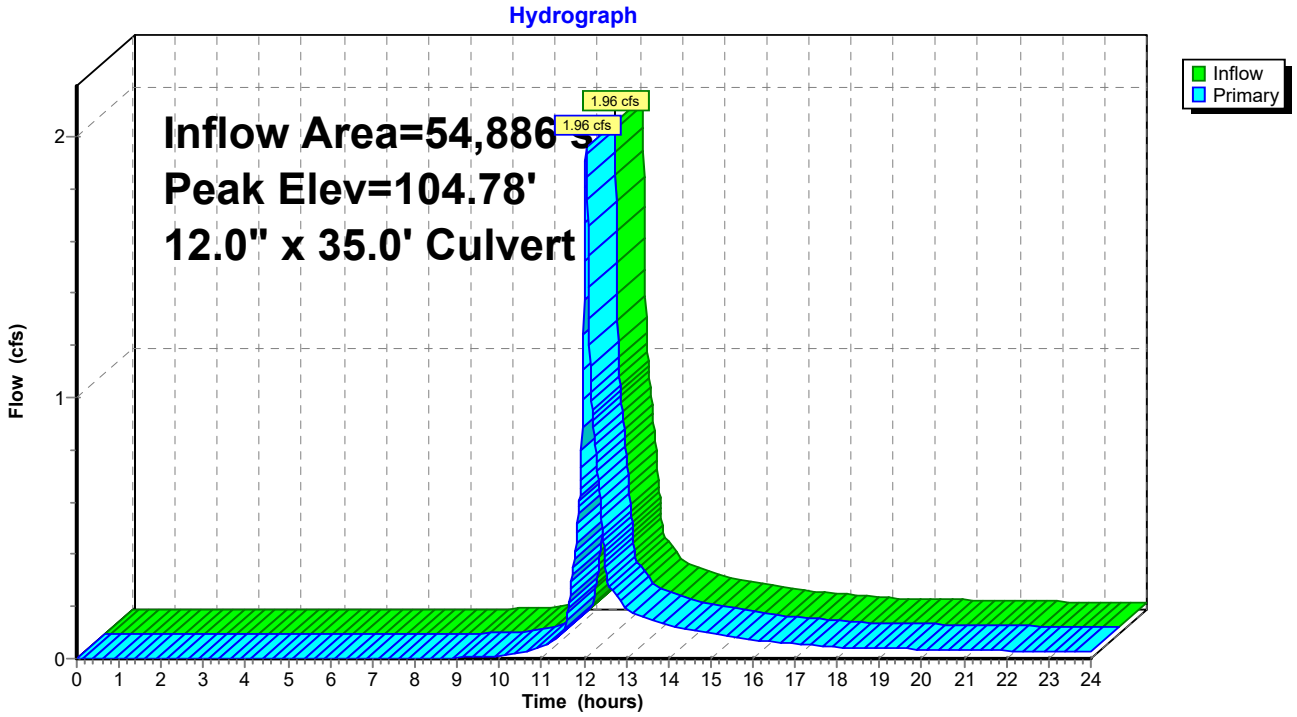
Inflow Area = 54,886 sf, Inflow Depth > 1.23" for 2-Year event
Inflow = 1.96 cfs @ 12.05 hrs, Volume= 5,638 cf
Outflow = 1.96 cfs @ 12.05 hrs, Volume= 5,638 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.96 cfs @ 12.05 hrs, Volume= 5,638 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.78' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.00'	**12.0" x 35.0' long Culvert** Ke= 0.500 Outlet Invert= 103.30' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=1.95 cfs @ 12.05 hrs HW=104.77' (Free Discharge)
1=Culvert (Inlet Controls 1.95 cfs @ 3.00 fps)

Pond 218R: CB 17 to DMH 15



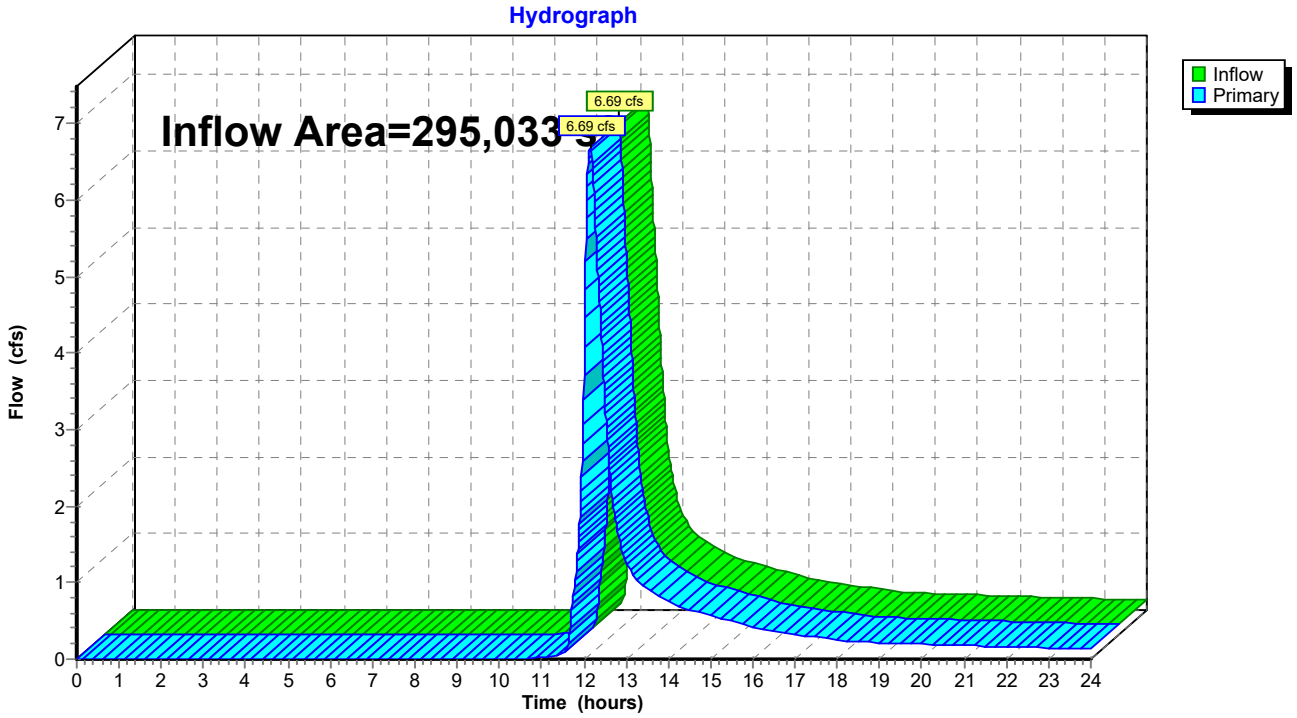
Link A: POA A

Inflow Area = 295,033 sf, Inflow Depth > 1.18" for 2-Year event
Inflow = 6.69 cfs @ 12.15 hrs, Volume= 28,896 cf
Primary = 6.69 cfs @ 12.15 hrs, Volume= 28,896 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 60S: High Point Near Circle to CB 31 Runoff Area=34,413 sf Runoff Depth>3.10"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=87 Runoff=3.41 cfs 8,886 cf

Subcatchment 62S: Back of Unit 9-10 Runoff Area=25,700 sf Runoff Depth>2.05"
Flow Length=230' Slope=0.0200 '/' Tc=8.6 min CN=75 Runoff=1.29 cfs 4,383 cf

Subcatchment 68S: From hill near 19,20 to CB 30 Runoff Area=31,363 sf Runoff Depth>3.00"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=86 Runoff=3.02 cfs 7,849 cf

Subcatchment 110S: To CB 20 Runoff Area=28,314 sf Runoff Depth>3.00"
Flow Length=270' Tc=3.7 min CN=86 Runoff=2.46 cfs 7,082 cf

Subcatchment 112S: To CB 22 Runoff Area=20,038 sf Runoff Depth>2.81"
Flow Length=280' Slope=0.0400 '/' Tc=3.8 min CN=84 Runoff=1.64 cfs 4,700 cf

Subcatchment 114S: Behind Units 1-3 Runoff Area=25,265 sf Runoff Depth>2.29"
Flow Length=130' Tc=8.0 min CN=78 Runoff=1.45 cfs 4,819 cf

Subcatchment 132S: Behind Unit 4 Runoff Area=21,345 sf Runoff Depth>2.13"
Flow Length=130' Tc=1.0 min CN=76 Runoff=1.45 cfs 3,788 cf

Subcatchment 134S: Behind Units 7,6,5 Runoff Area=34,848 sf Runoff Depth>2.21"
Flow Length=70' Slope=0.0200 '/' Tc=3.1 min CN=77 Runoff=2.30 cfs 6,416 cf

Subcatchment 140S: Directly into Detention Basin Runoff Area=30,492 sf Runoff Depth>2.12"
Flow Length=200' Slope=0.0100 '/' Tc=11.0 min CN=76 Runoff=1.47 cfs 5,399 cf

Subcatchment 158S: Back of Units 11-15 Runoff Area=29,185 sf Runoff Depth>2.37"
Flow Length=230' Tc=7.3 min CN=79 Runoff=1.78 cfs 5,771 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,070 sf Runoff Depth>1.67"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.49 cfs 1,956 cf

Reach 1R: Existing wetland channel to WF Avg. Depth=0.16' Max Vel=3.45 fps Inflow=3.47 cfs 12,110 cf
n=0.022 L=300.0' S=0.0333 '/' Capacity=82.44 cfs Outflow=3.42 cfs 12,084 cf

Reach 902R: Existing wetland channel to Avg. Depth=0.35' Max Vel=6.17 fps Inflow=14.37 cfs 58,396 cf
n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=14.36 cfs 58,375 cf

Pond 1P: DMH 32 to Extended Detention Peak Elev=102.81' Inflow=6.43 cfs 16,735 cf
15.0" x 41.0' Culvert Outflow=6.43 cfs 16,735 cf

Pond 2P: Forebay Peak Elev=101.49' Storage=1,431 cf Inflow=7.55 cfs 23,017 cf
Outflow=7.41 cfs 22,098 cf

Pond 3P: Forebay Peak Elev=99.46' Storage=1,445 cf Inflow=7.13 cfs 22,134 cf
Outflow=6.83 cfs 21,186 cf

Pond 8P: Detention Basin Peak Elev=98.26' Storage=913 cf Inflow=6.83 cfs 21,186 cf
Primary=6.08 cfs 21,144 cf Secondary=0.00 cfs 0 cf Outflow=6.08 cfs 21,144 cf

Pond 43R: CB 31 to DMH 32 Peak Elev=103.31' Inflow=3.41 cfs 8,886 cf
12.0" x 12.0' Culvert Outflow=3.41 cfs 8,886 cf

Pond 44R: CB 30 to DMH 32 Peak Elev=103.14' Inflow=3.02 cfs 7,849 cf
12.0" x 12.0' Culvert Outflow=3.02 cfs 7,849 cf

Pond 111P: CB 16 to DMH 15 Peak Elev=104.03' Inflow=2.46 cfs 7,082 cf
12.0" x 5.0' Culvert Outflow=2.46 cfs 7,082 cf

Pond 159P: DMH 15 to Bioretention Peak Elev=104.80' Inflow=6.39 cfs 18,198 cf
15.0" x 100.0' Culvert Outflow=6.39 cfs 18,198 cf

Pond 160P: Bioretention Peak Elev=101.20' Storage=3,128 cf Inflow=7.41 cfs 22,098 cf
Discarded=0.01 cfs 441 cf Primary=5.38 cfs 21,380 cf Secondary=0.00 cfs 0 cf Outflow=5.39 cfs 21,821 cf

Pond 218R: CB 17 to DMH 15 Peak Elev=105.58' Inflow=3.93 cfs 11,116 cf
12.0" x 35.0' Culvert Outflow=3.93 cfs 11,116 cf

Link A: POA A Inflow=14.36 cfs 58,375 cf
Primary=14.36 cfs 58,375 cf

Total Runoff Area = 295,033 sf Runoff Volume = 61,049 cf Average Runoff Depth = 2.48"
72.69% Pervious Area = 214,447 sf 27.31% Impervious Area = 80,586 sf

Subcatchment 60S: High Point Near Circle to CB 31

[49] Hint: Tc<2dt may require smaller dt

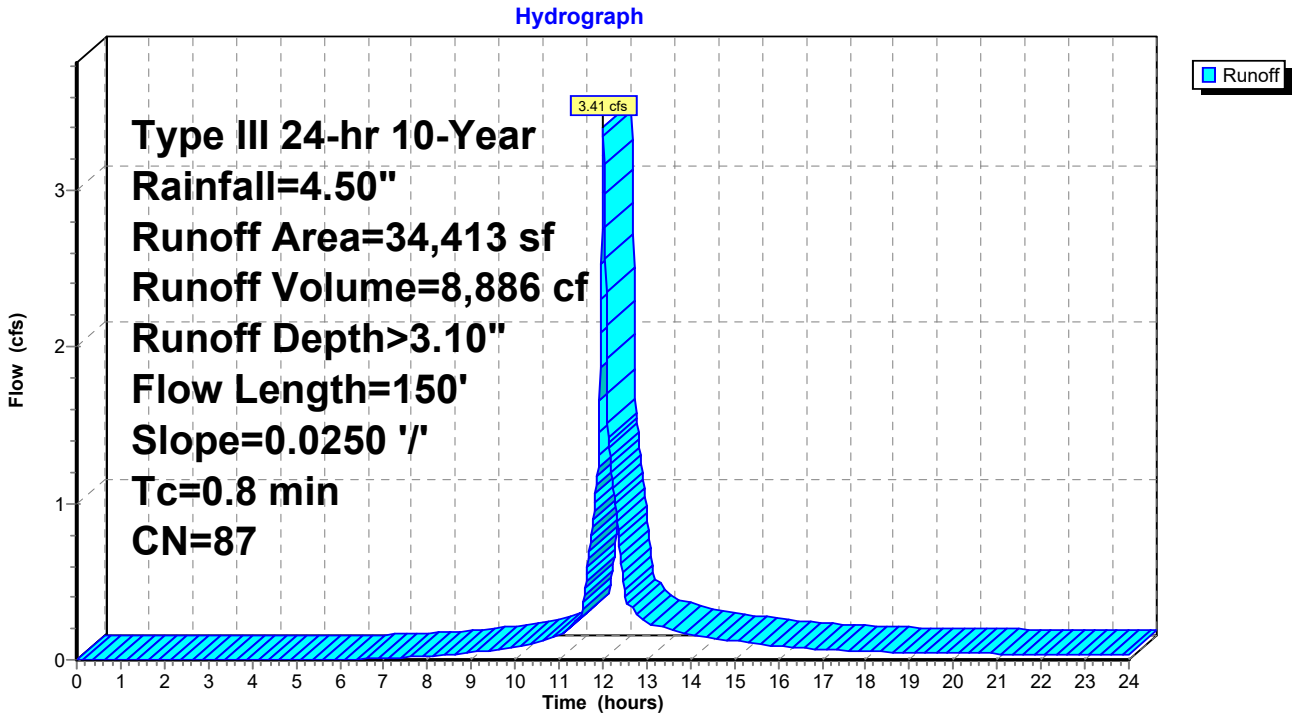
Runoff = 3.41 cfs @ 12.01 hrs, Volume= 8,886 cf, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
18,731	98	Paved parking & roofs
15,682	74	>75% Grass cover, Good, HSG C
34,413	87	Weighted Average
15,682		Pervious Area
18,731		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 60S: High Point Near Circle to CB 31



Subcatchment 62S: Back of Unit 9-10

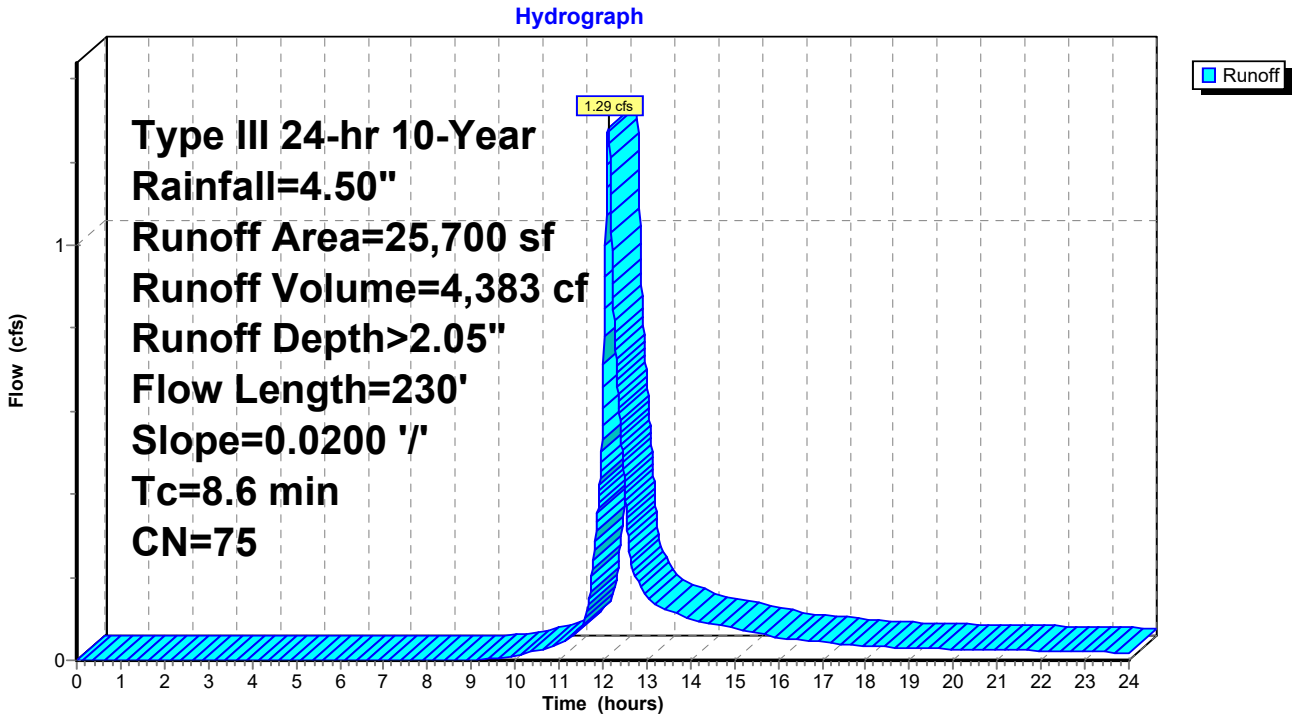
Runoff = 1.29 cfs @ 12.13 hrs, Volume= 4,383 cf, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,742	98	Paved parking & roofs
21,780	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
25,700	75	Weighted Average
23,958		Pervious Area
1,742		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.6	230	Total			

Subcatchment 62S: Back of Unit 9-10



Subcatchment 68S: From hill near 19,20 to CB 30

[49] Hint: Tc<2dt may require smaller dt

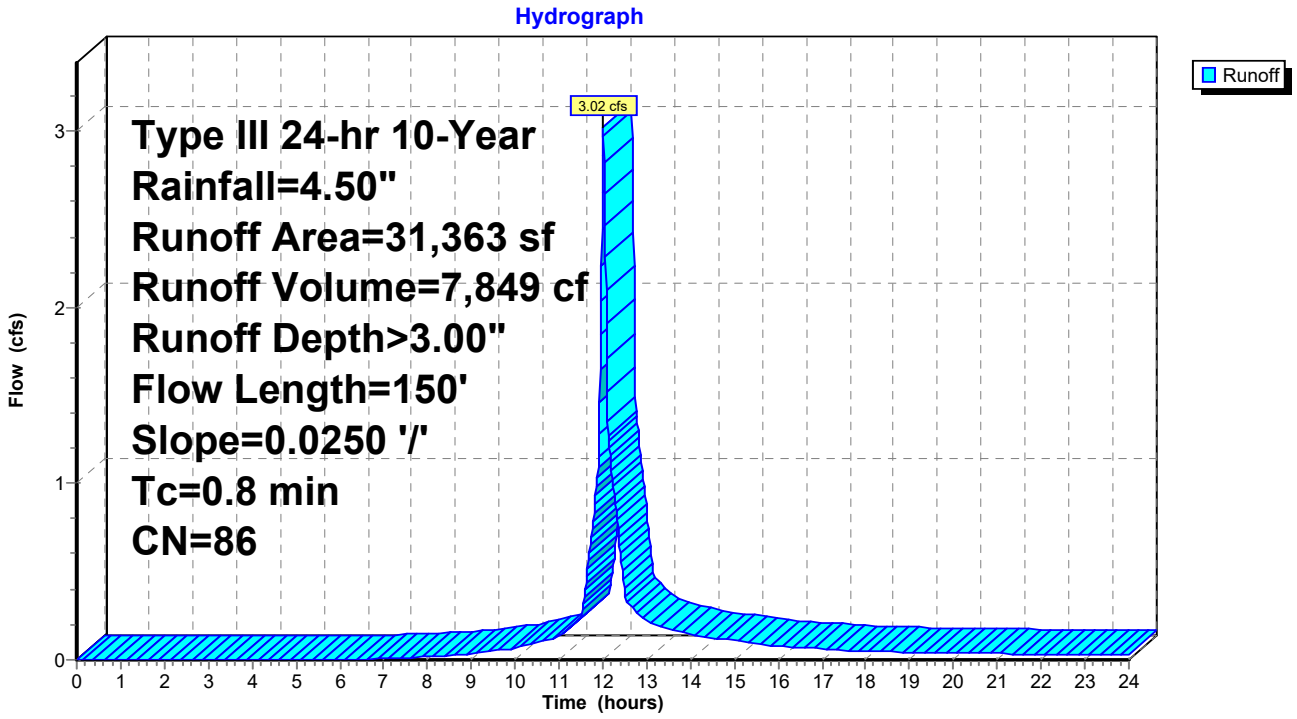
Runoff = 3.02 cfs @ 12.01 hrs, Volume= 7,849 cf, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
15,246	98	Paved parking & roofs
16,117	74	>75% Grass cover, Good, HSG C
31,363	86	Weighted Average
16,117		Pervious Area
15,246		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 68S: From hill near 19,20 to CB 30



Subcatchment 110S: To CB 20

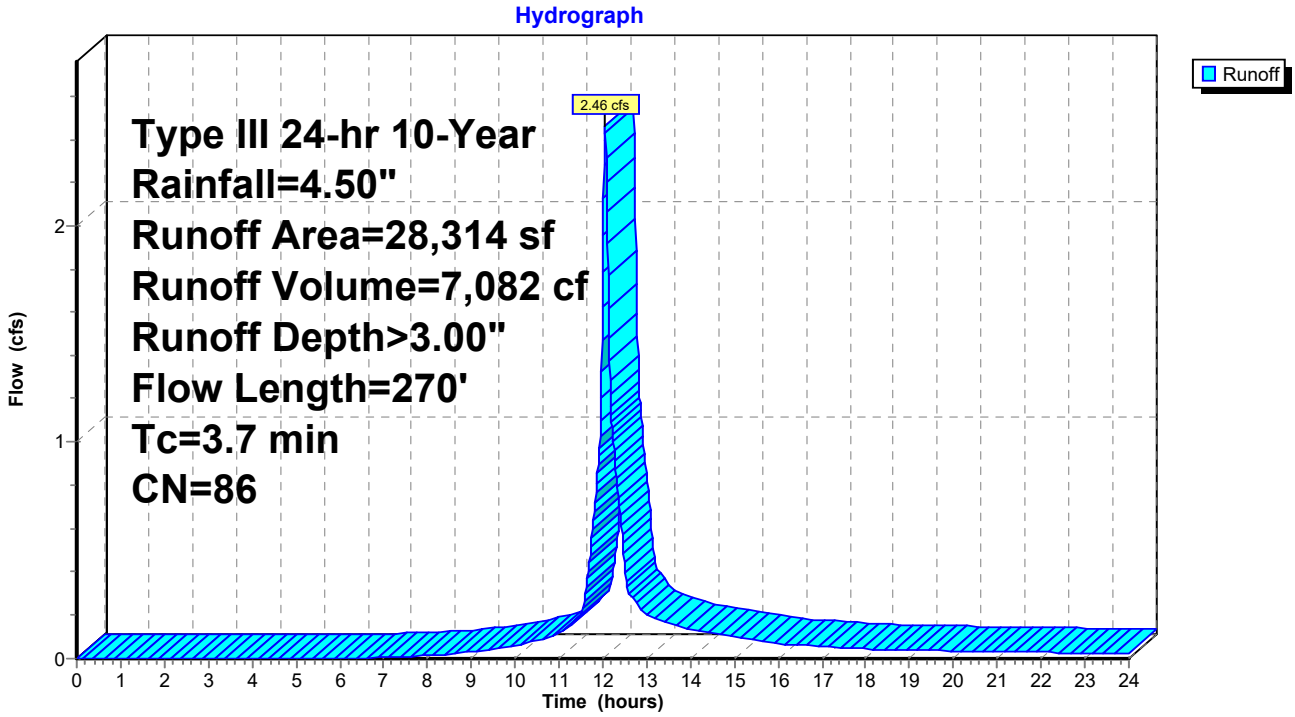
Runoff = 2.46 cfs @ 12.05 hrs, Volume= 7,082 cf, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
14,375	98	Paved parking & roofs
13,939	74	>75% Grass cover, Good, HSG C
28,314	86	Weighted Average
13,939		Pervious Area
14,375		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.7	270	Total			

Subcatchment 110S: To CB 20



Subcatchment 112S: To CB 22

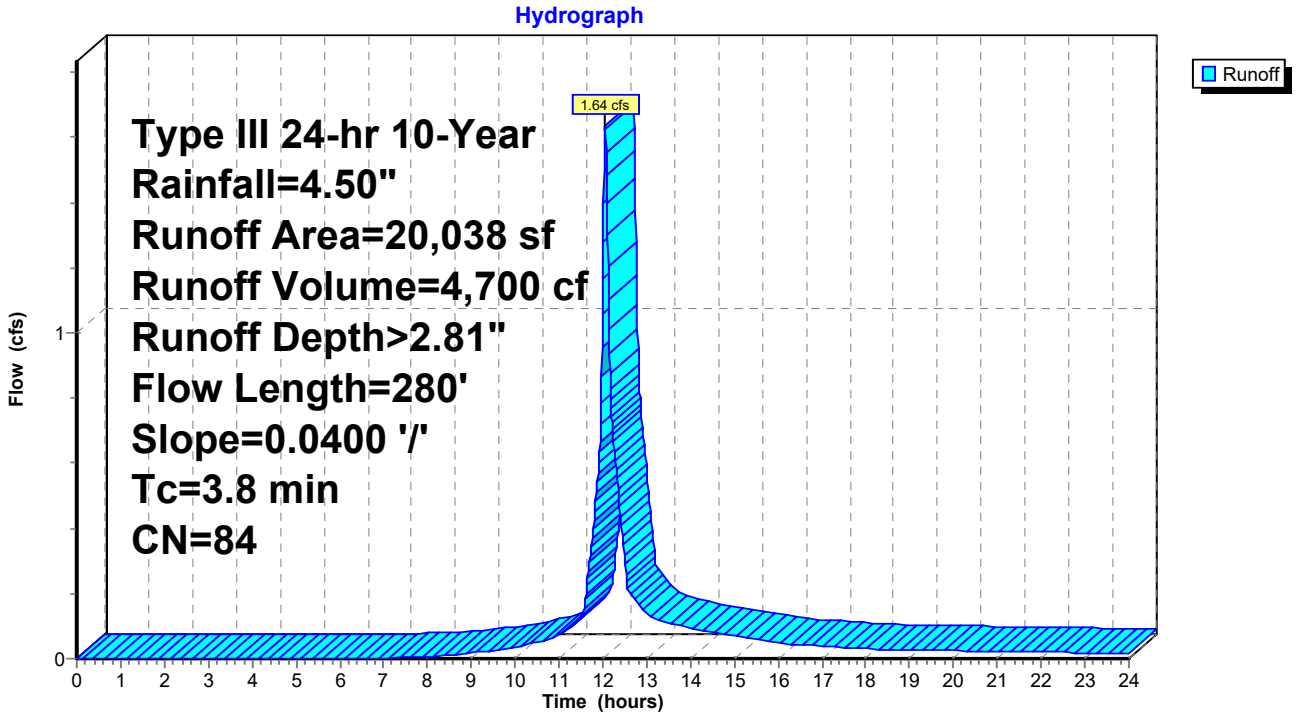
Runoff = 1.64 cfs @ 12.06 hrs, Volume= 4,700 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
8,712	98	Paved parking & roofs
11,326	74	>75% Grass cover, Good, HSG C
20,038	84	Weighted Average
11,326		Pervious Area
8,712		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	30	0.0400	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8	280	Total			

Subcatchment 112S: To CB 22



Subcatchment 114S: Behind Units 1-3

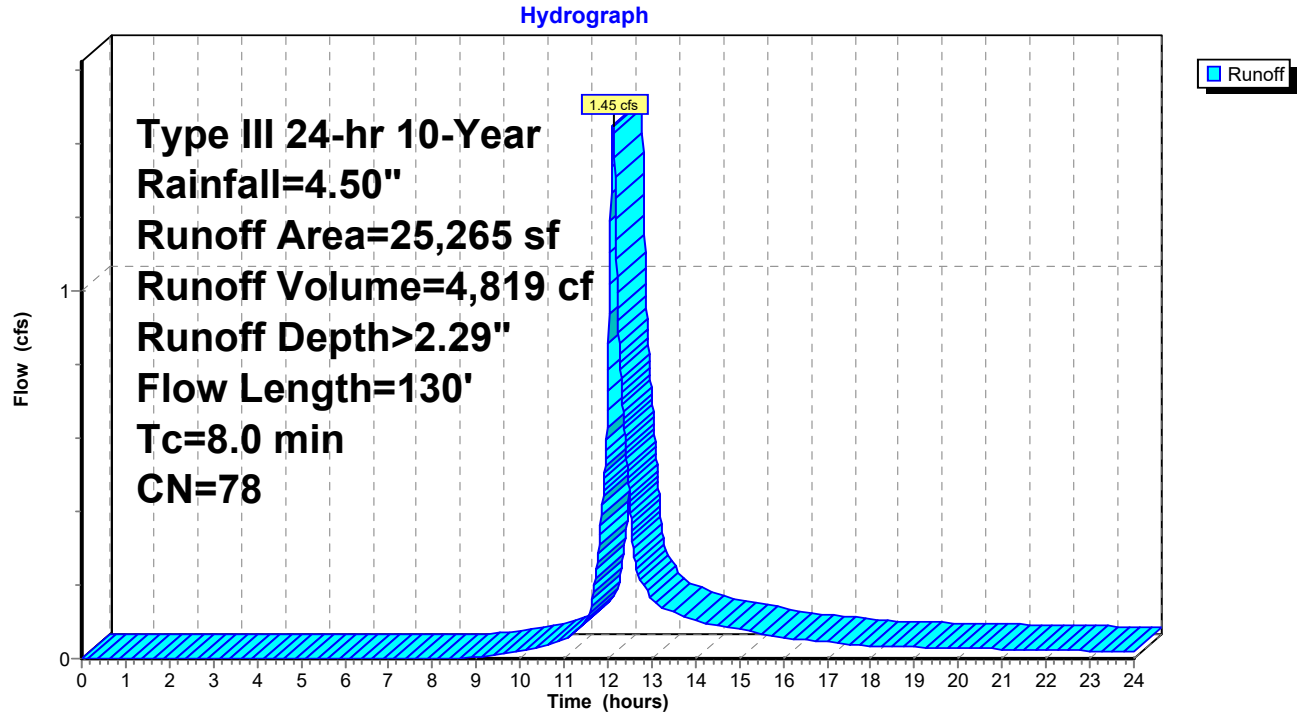
Runoff = 1.45 cfs @ 12.12 hrs, Volume= 4,819 cf, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
25,265	78	Weighted Average
20,909		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.6	80	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.0	130	Total			

Subcatchment 114S: Behind Units 1-3



Subcatchment 132S: Behind Unit 4

[49] Hint: Tc<2dt may require smaller dt

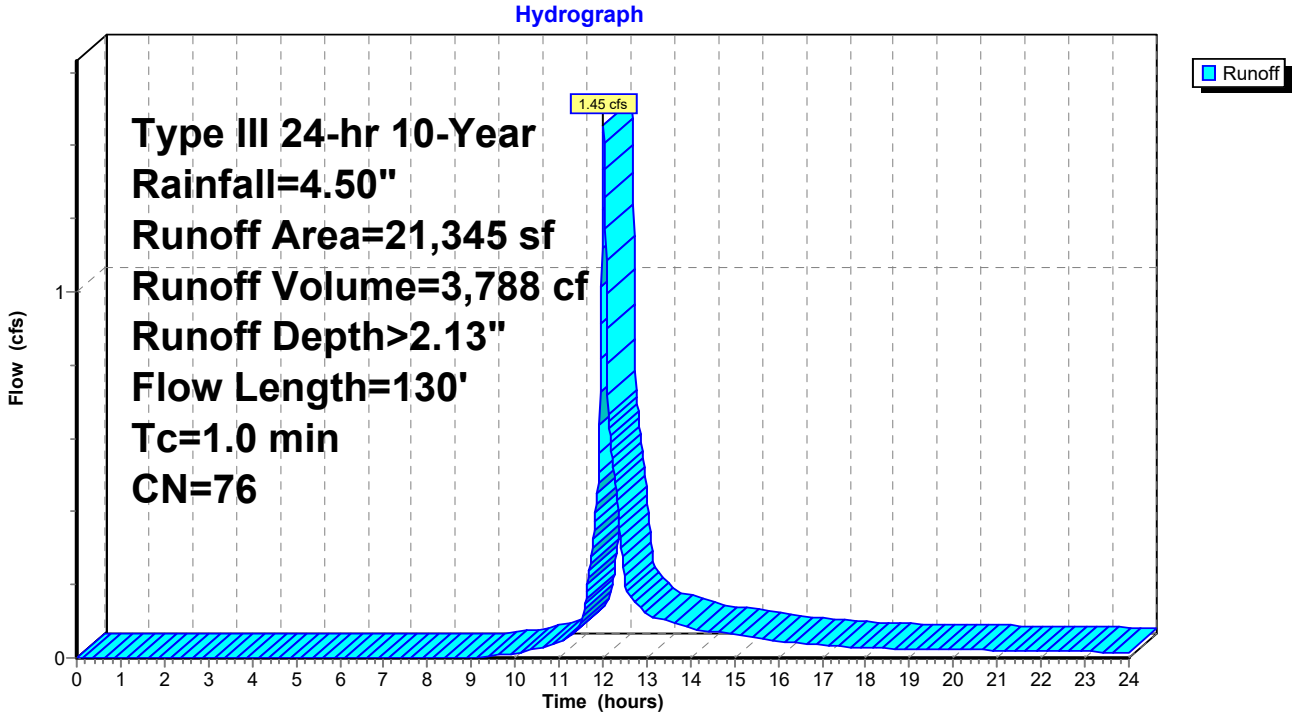
Runoff = 1.45 cfs @ 12.02 hrs, Volume= 3,788 cf, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,485	98	Paved parking & roofs
8,712	74	>75% Grass cover, Good, HSG C
9,148	70	Woods, Good, HSG C
21,345	76	Weighted Average
17,860		Pervious Area
3,485		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	80	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	130	Total			

Subcatchment 132S: Behind Unit 4



Subcatchment 134S: Behind Units 7,6,5

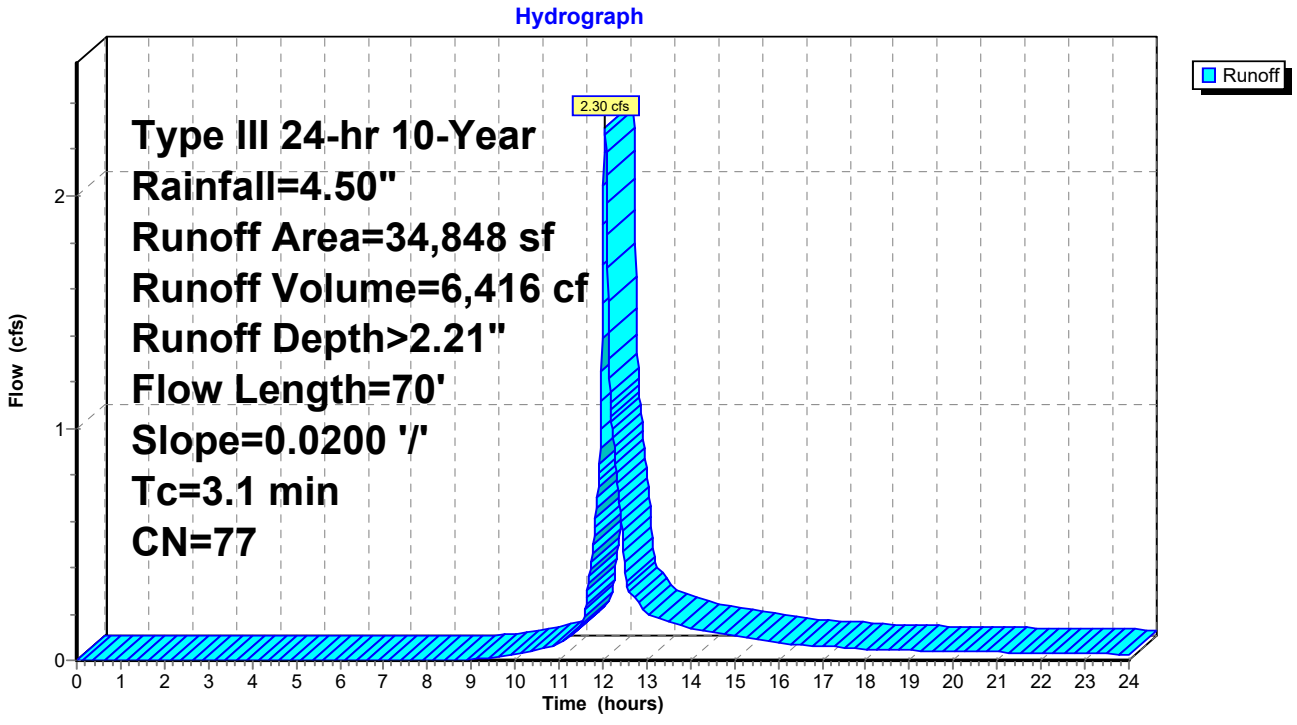
Runoff = 2.30 cfs @ 12.05 hrs, Volume= 6,416 cf, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,792	98	Paved parking & roofs
28,314	74	>75% Grass cover, Good, HSG C
1,742	70	Woods, Good, HSG C
34,848	77	Weighted Average
30,056		Pervious Area
4,792		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: Behind Units 7,6,5



Subcatchment 140S: Directly into Detention Basin

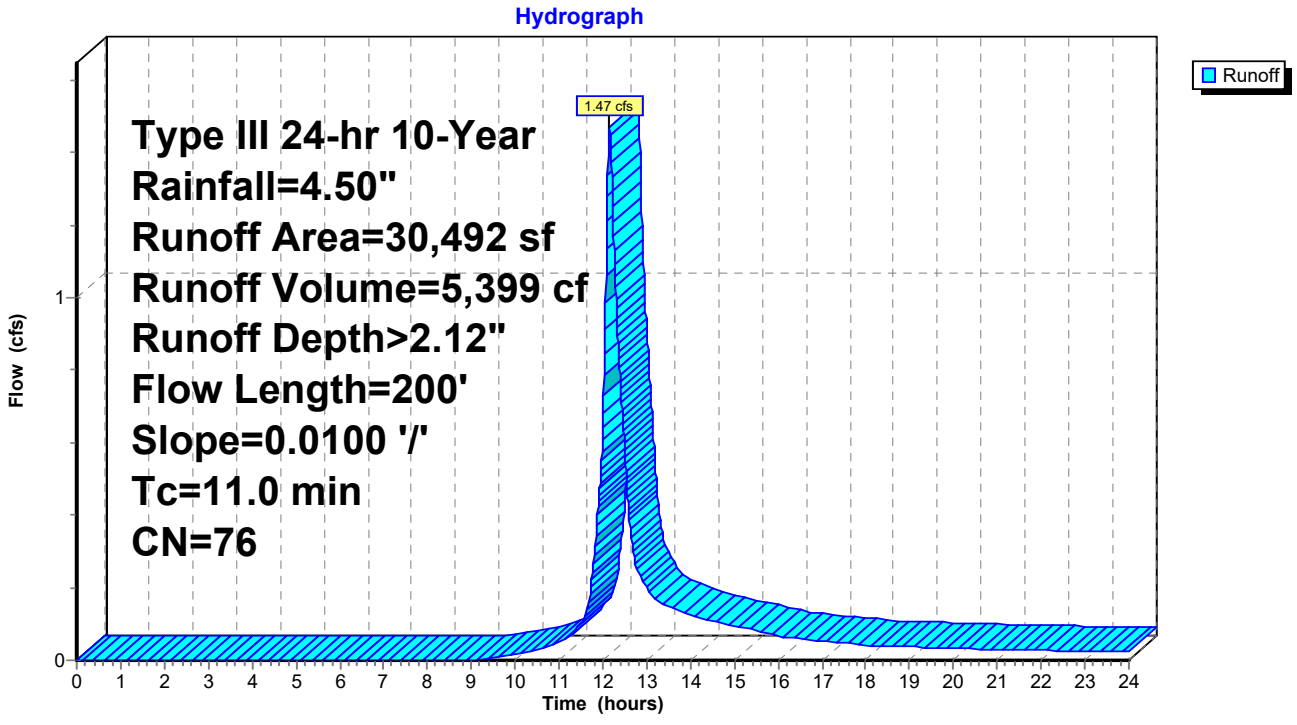
Runoff = 1.47 cfs @ 12.16 hrs, Volume= 5,399 cf, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,049	98	Paved parking & roofs
23,958	74	>75% Grass cover, Good, HSG C
3,485	70	Woods, Good, HSG C
30,492	76	Weighted Average
27,443		Pervious Area
3,049		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.6	150	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.0	200	Total			

Subcatchment 140S: Directly into Detention Basin



Subcatchment 158S: Back of Units 11-15

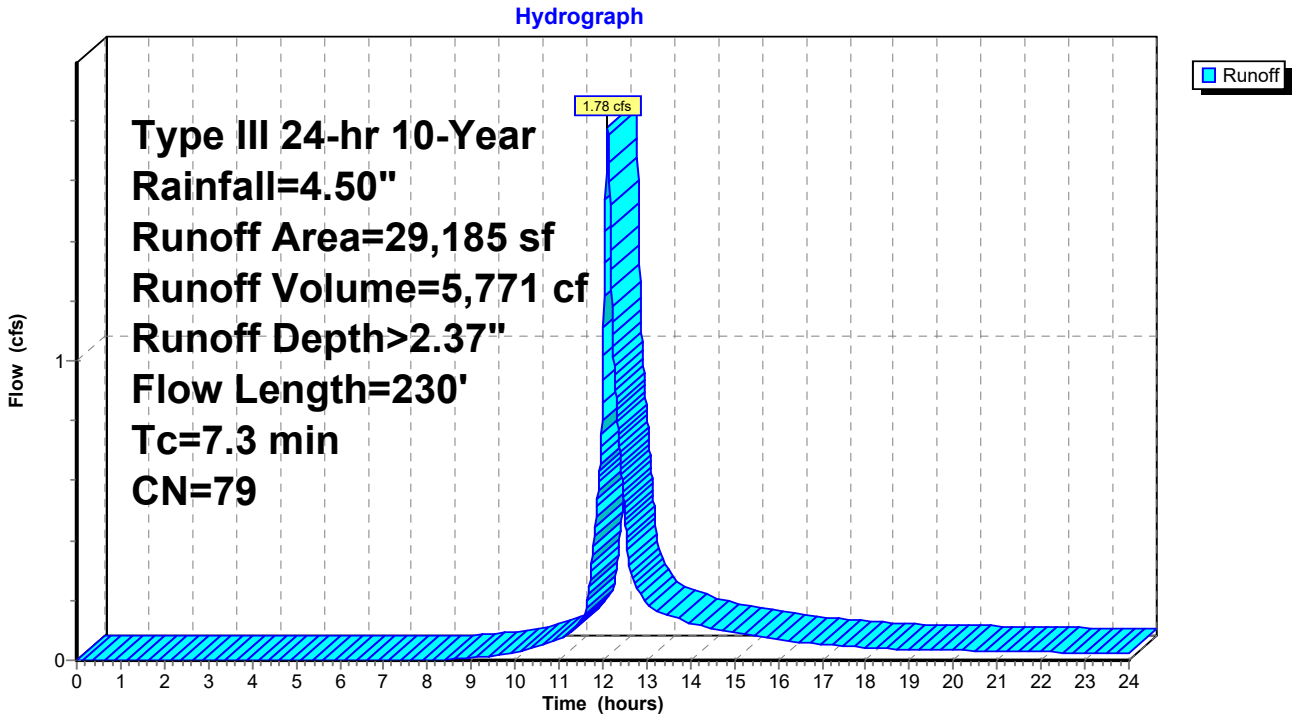
Runoff = 1.78 cfs @ 12.11 hrs, Volume= 5,771 cf, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
29,185	79	Weighted Average
23,087		Pervious Area
6,098		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	230	Total			

Subcatchment 158S: Back of Units 11-15



Subcatchment 900: North Offsite flowing onto property

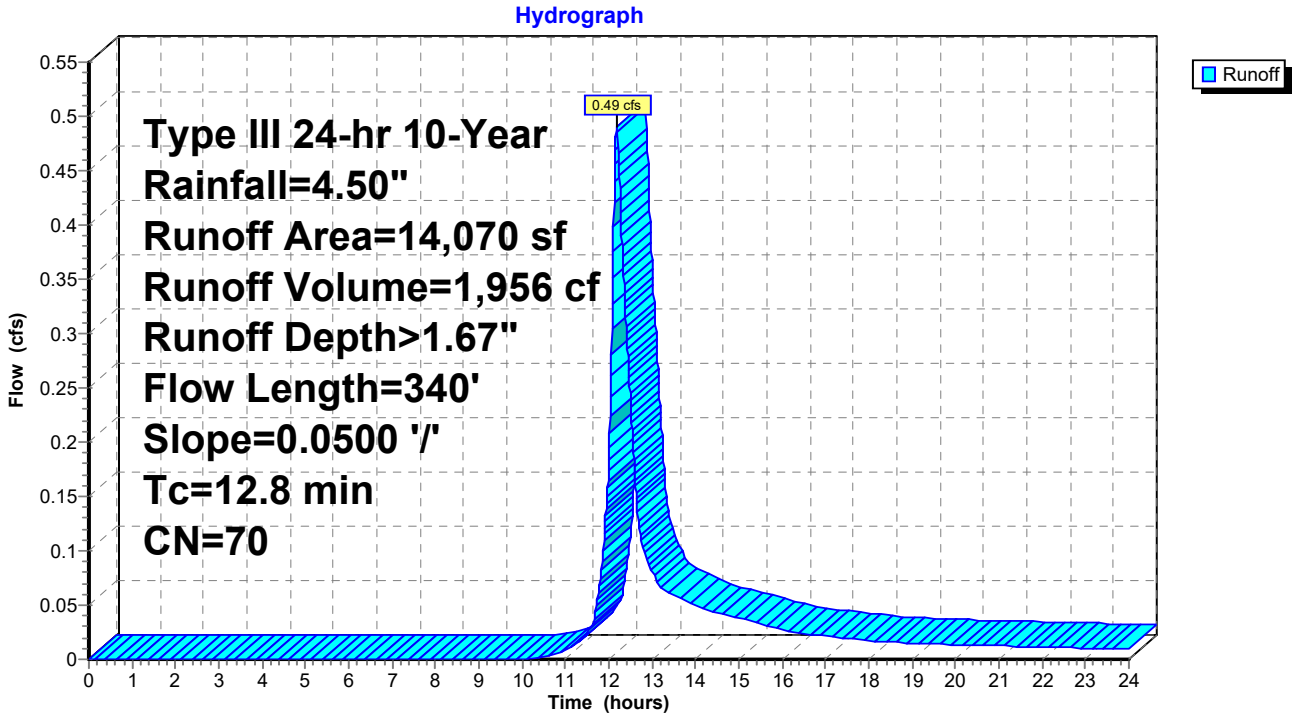
Runoff = 0.49 cfs @ 12.19 hrs, Volume= 1,956 cf, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
14,070	70	Woods, Good, HSG C
14,070		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 1R: Existing wetland channel to WF 16

Inflow Area = 68,955 sf, Inflow Depth > 2.11" for 10-Year event
Inflow = 3.47 cfs @ 12.12 hrs, Volume= 12,110 cf
Outflow = 3.42 cfs @ 12.16 hrs, Volume= 12,084 cf, Atten= 1%, Lag= 2.4 min

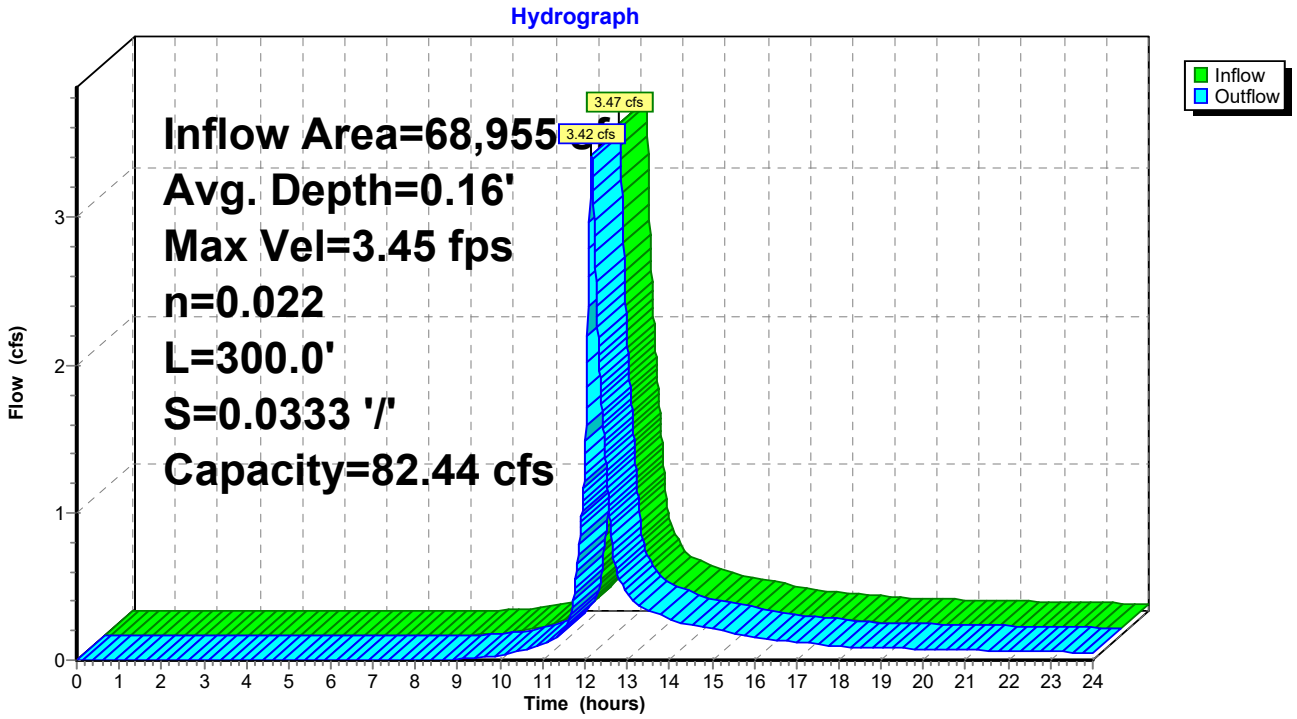
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.45 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 5.0 min

Peak Storage= 298 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'

‡

Reach 1R: Existing wetland channel to WF 16



Reach 902R: Existing wetland channel to WF 13

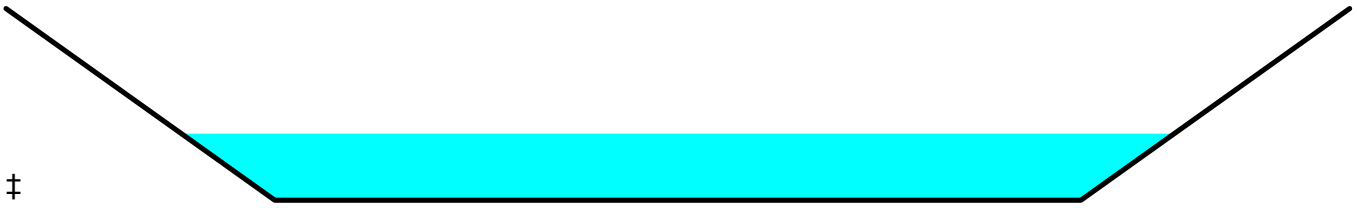
[61] Hint: Submerged 3% of Reach 1R bottom

Inflow Area = 295,033 sf, Inflow Depth > 2.38" for 10-Year event
Inflow = 14.37 cfs @ 12.12 hrs, Volume= 58,396 cf
Outflow = 14.36 cfs @ 12.13 hrs, Volume= 58,375 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.17 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.9 min

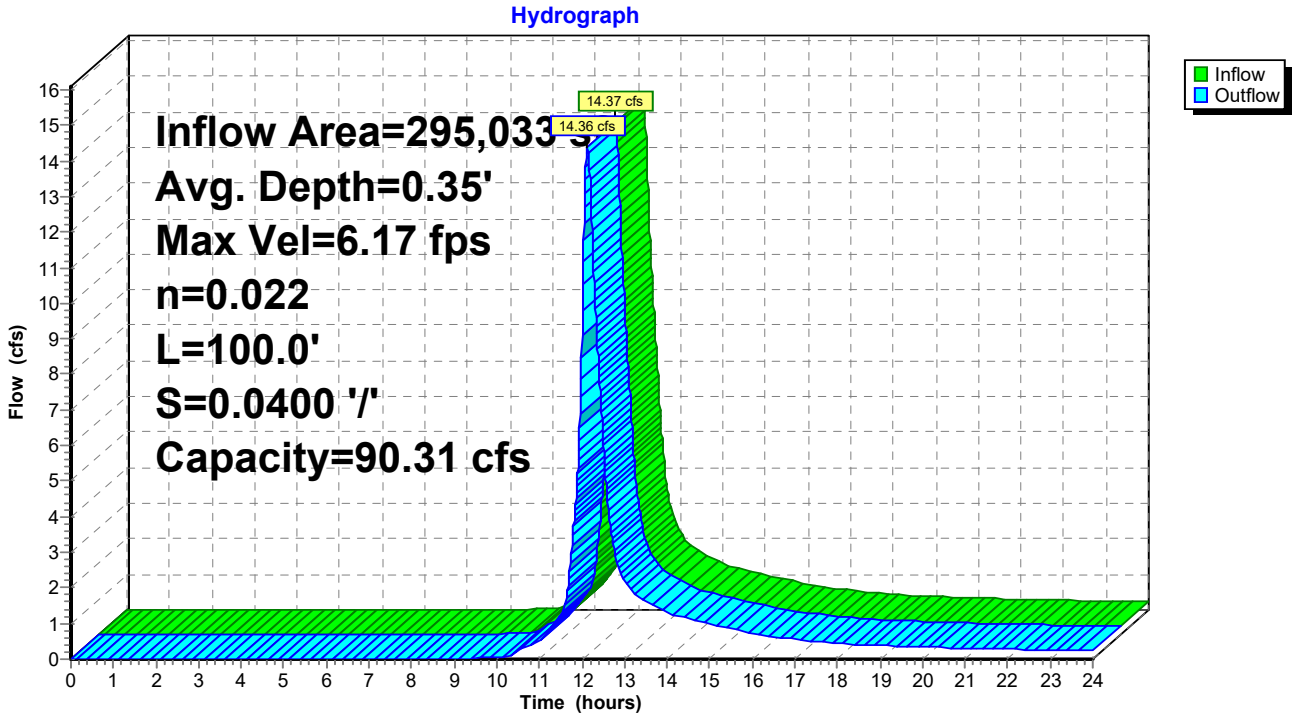
Peak Storage= 233 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0400 '/'
Inlet Invert= 86.00', Outlet Invert= 82.00'



‡

Reach 902R: Existing wetland channel to WF 13



Pond 1P: DMH 32 to Extended Detention

[79] Warning: Submerged Pond 43R Primary device # 1 INLET by 0.80'
[79] Warning: Submerged Pond 44R Primary device # 1 INLET by 0.80'

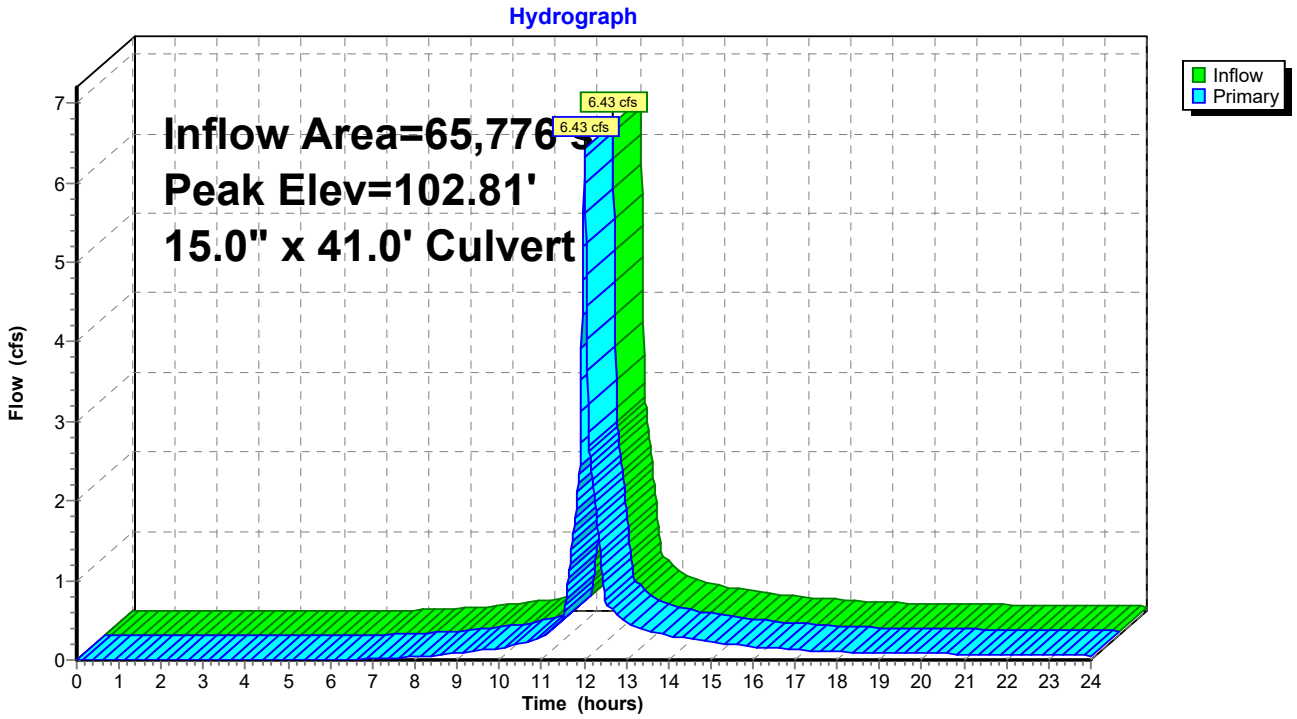
Inflow Area = 65,776 sf, Inflow Depth > 3.05" for 10-Year event
Inflow = 6.43 cfs @ 12.01 hrs, Volume= 16,735 cf
Outflow = 6.43 cfs @ 12.01 hrs, Volume= 16,735 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.43 cfs @ 12.01 hrs, Volume= 16,735 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 102.81' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**15.0" x 41.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0488 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=6.39 cfs @ 12.01 hrs HW=102.79' (Free Discharge)
1=Culvert (Inlet Controls 6.39 cfs @ 5.21 fps)

Pond 1P: DMH 32 to Extended Detention



Pond 2P: Forebay

[79] Warning: Submerged Pond 159P Primary device # 1 OUTLET by 0.49'

Inflow Area = 108,465 sf, Inflow Depth > 2.55" for 10-Year event
Inflow = 7.55 cfs @ 12.06 hrs, Volume= 23,017 cf
Outflow = 7.41 cfs @ 12.07 hrs, Volume= 22,098 cf, Atten= 2%, Lag= 0.9 min
Primary = 7.41 cfs @ 12.07 hrs, Volume= 22,098 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.49' @ 12.07 hrs Surf.Area= 1,163 sf Storage= 1,431 cf

Plug-Flow detention time= 33.9 min calculated for 22,089 cf (96% of inflow)
Center-of-Mass det. time= 11.7 min (831.7 - 820.0)

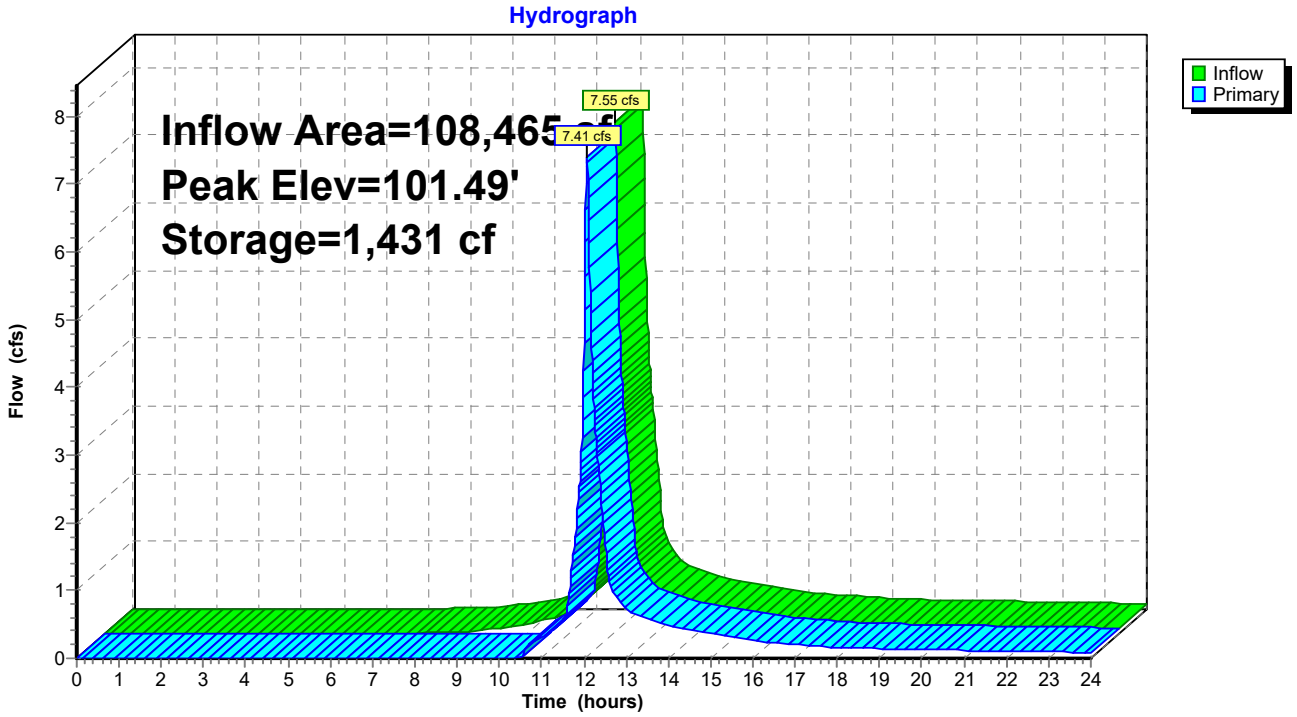
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	758	0	0
102.00	1,302	2,060	2,060

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**8.0' long x 25.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.39 cfs @ 12.07 hrs HW=101.49' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.39 cfs @ 1.89 fps)

Pond 2P: Forebay



Pond 3P: Forebay

[79] Warning: Submerged Pond 1P Primary device # 1 OUTLET by 0.46'

Inflow Area = 96,268 sf, Inflow Depth > 2.76" for 10-Year event
Inflow = 7.13 cfs @ 12.01 hrs, Volume= 22,134 cf
Outflow = 6.83 cfs @ 12.03 hrs, Volume= 21,186 cf, Atten= 4%, Lag= 0.9 min
Primary = 6.83 cfs @ 12.03 hrs, Volume= 21,186 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.46' @ 12.03 hrs Surf.Area= 1,188 sf Storage= 1,445 cf

Plug-Flow detention time= 37.4 min calculated for 21,186 cf (96% of inflow)
Center-of-Mass det. time= 13.4 min (824.7 - 811.3)

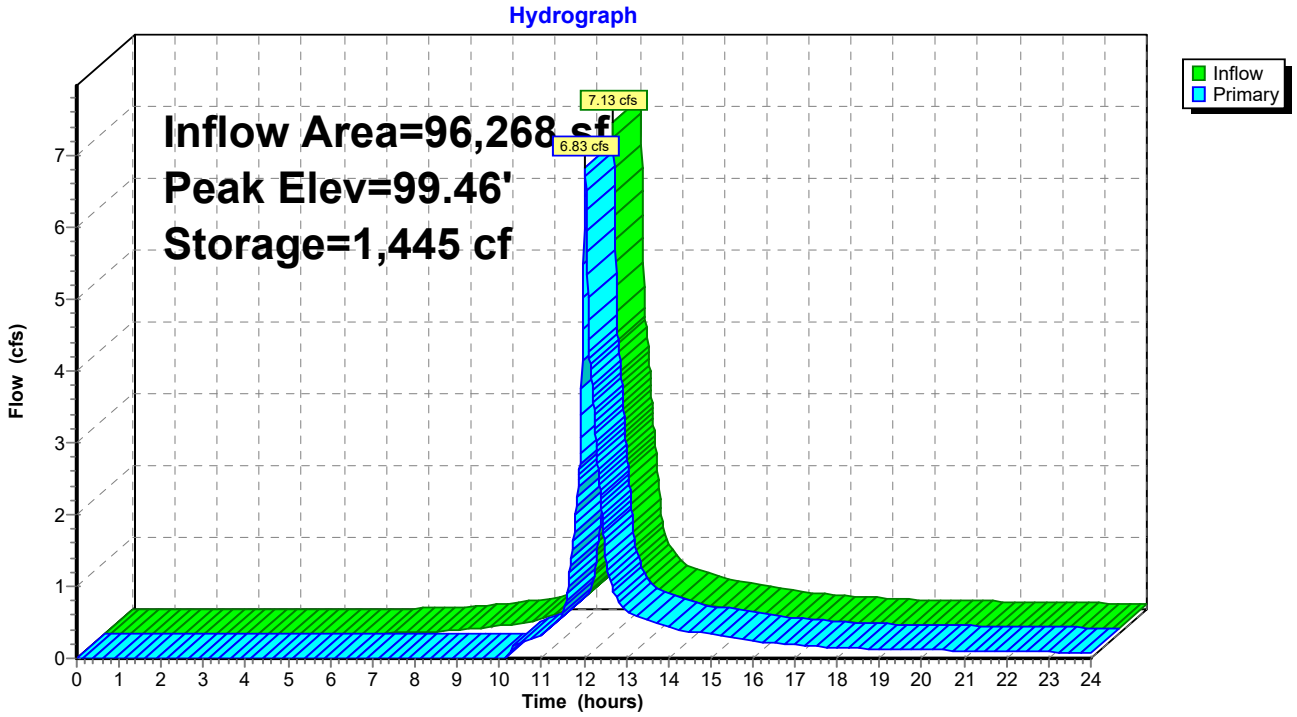
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	2,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	786	0	0
100.00	1,335	2,121	2,121

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**8.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.83 cfs @ 12.03 hrs HW=99.46' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 6.83 cfs @ 1.84 fps)

Pond 3P: Forebay



Pond 8P: Detention Basin

Inflow Area = 96,268 sf, Inflow Depth > 2.64" for 10-Year event
Inflow = 6.83 cfs @ 12.03 hrs, Volume= 21,186 cf
Outflow = 6.08 cfs @ 12.07 hrs, Volume= 21,144 cf, Atten= 11%, Lag= 2.2 min
Primary = 6.08 cfs @ 12.07 hrs, Volume= 21,144 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 98.26' @ 12.07 hrs Surf.Area= 1,107 sf Storage= 913 cf
Flood Elev= 100.00' Surf.Area= 2,037 sf Storage= 3,644 cf

Plug-Flow detention time= 4.1 min calculated for 21,135 cf (100% of inflow)
Center-of-Mass det. time= 2.9 min (827.5 - 824.7)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	3,644 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

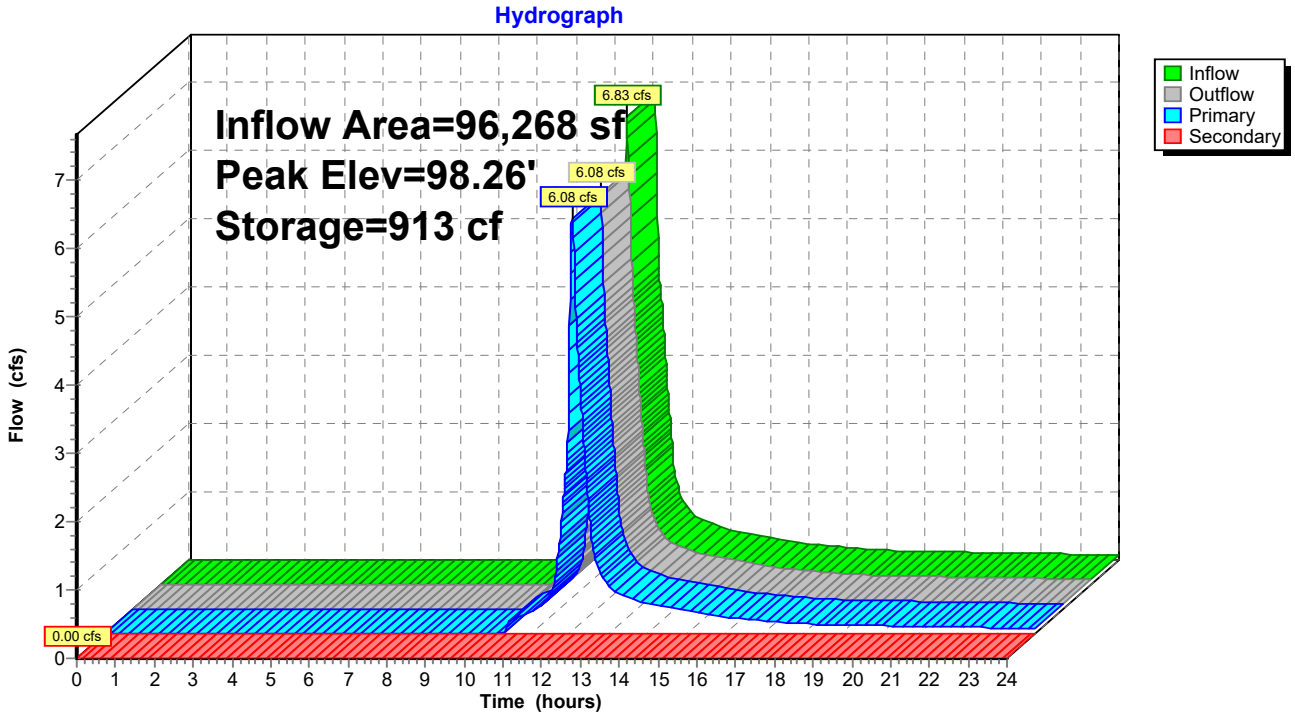
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	315	0	0
98.00	966	641	641
100.00	2,037	3,003	3,644

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**18.0" x 30.0' long Culvert** Ke= 0.500 Outlet Invert= 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean
#2	Secondary	99.50'	**8.0' 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=6.07 cfs @ 12.07 hrs HW=98.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.07 cfs @ 3.83 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Detention Basin



Pond 43R: CB 31 to DMH 32

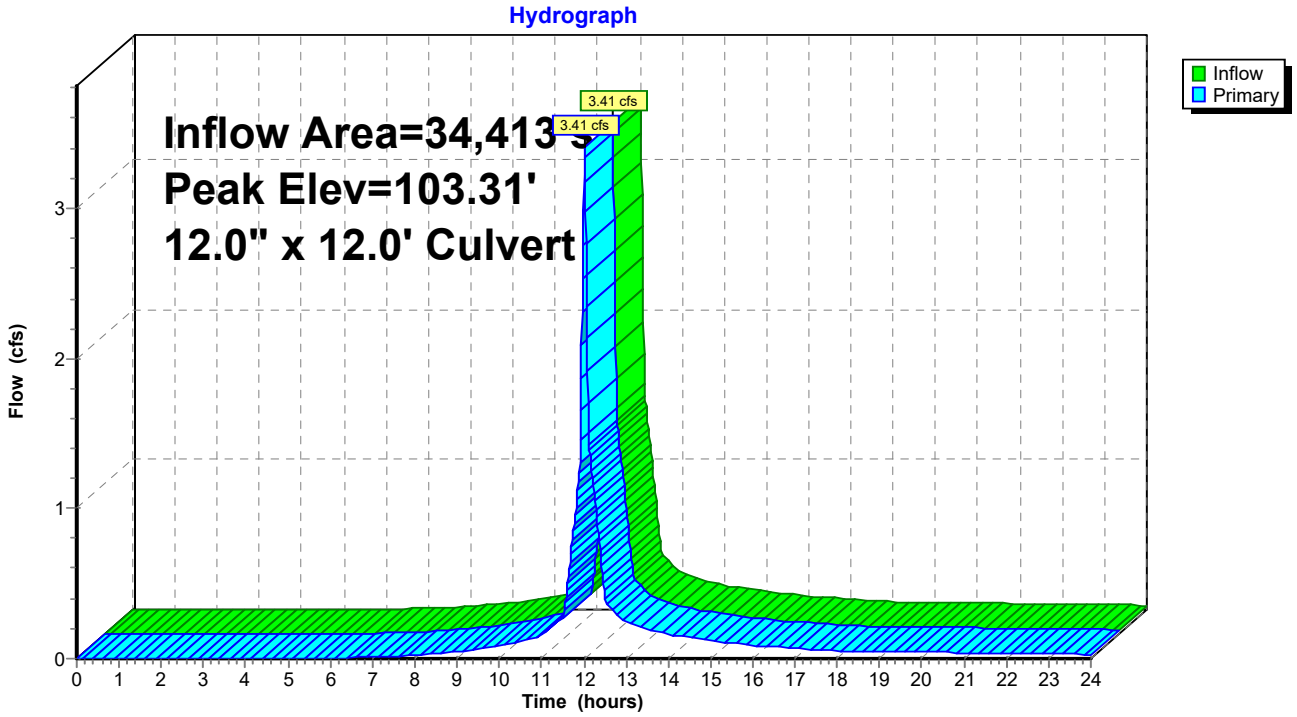
Inflow Area = 34,413 sf, Inflow Depth > 3.10" for 10-Year event
Inflow = 3.41 cfs @ 12.01 hrs, Volume= 8,886 cf
Outflow = 3.41 cfs @ 12.01 hrs, Volume= 8,886 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.41 cfs @ 12.01 hrs, Volume= 8,886 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.31' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.39 cfs @ 12.01 hrs HW=103.30' (Free Discharge)
1=Culvert (Inlet Controls 3.39 cfs @ 4.31 fps)

Pond 43R: CB 31 to DMH 32



Pond 44R: CB 30 to DMH 32

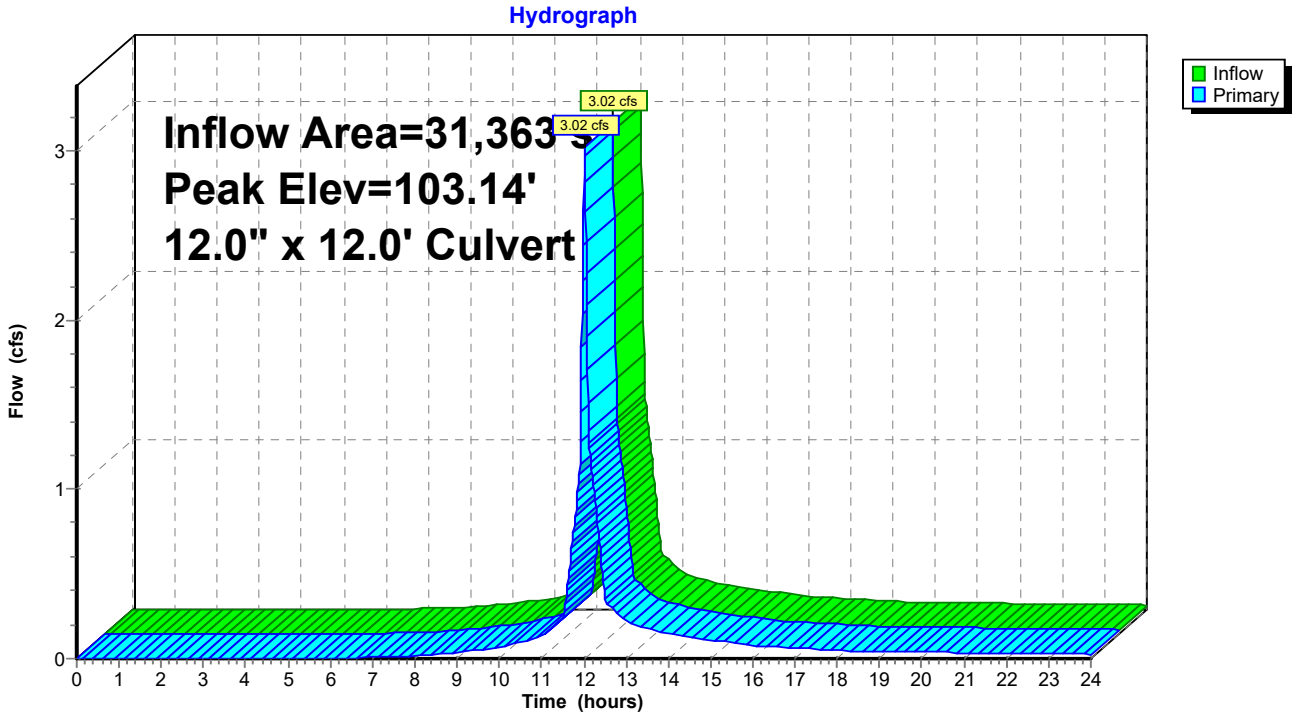
Inflow Area = 31,363 sf, Inflow Depth > 3.00" for 10-Year event
Inflow = 3.02 cfs @ 12.01 hrs, Volume= 7,849 cf
Outflow = 3.02 cfs @ 12.01 hrs, Volume= 7,849 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.02 cfs @ 12.01 hrs, Volume= 7,849 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.14' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.00 cfs @ 12.01 hrs HW=103.13' (Free Discharge)
1=Culvert (Inlet Controls 3.00 cfs @ 3.82 fps)

Pond 44R: CB 30 to DMH 32



Pond 111P: CB 16 to DMH 15

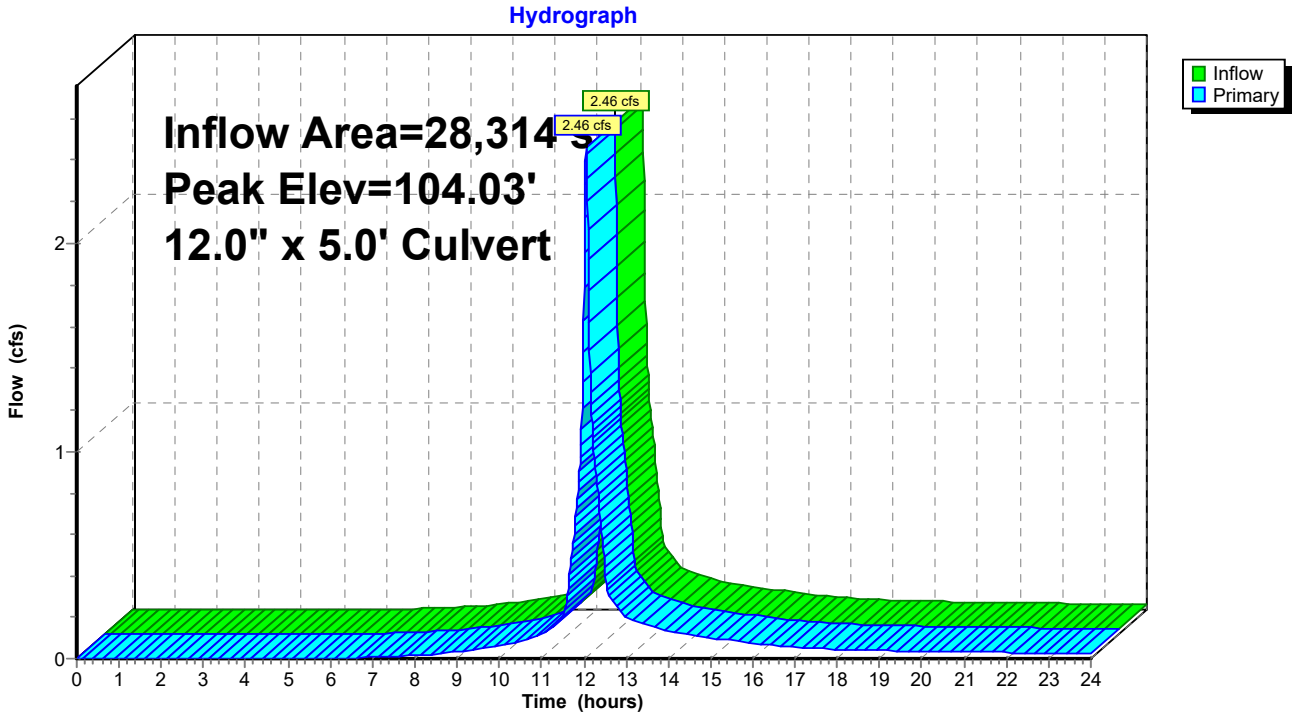
Inflow Area = 28,314 sf, Inflow Depth > 3.00" for 10-Year event
Inflow = 2.46 cfs @ 12.05 hrs, Volume= 7,082 cf
Outflow = 2.46 cfs @ 12.05 hrs, Volume= 7,082 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.46 cfs @ 12.05 hrs, Volume= 7,082 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.03' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**12.0" x 5.0' long Culvert** RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 102.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.46 cfs @ 12.05 hrs HW=104.03' (Free Discharge)
1=Culvert (Barrel Controls 2.46 cfs @ 3.77 fps)

Pond 111P: CB 16 to DMH 15



Pond 159P: DMH 15 to Bioretention

[81] Warning: Exceeded Pond 111P by 0.76' @ 12.05 hrs
[79] Warning: Submerged Pond 218R Primary device # 1 INLET by 0.79'

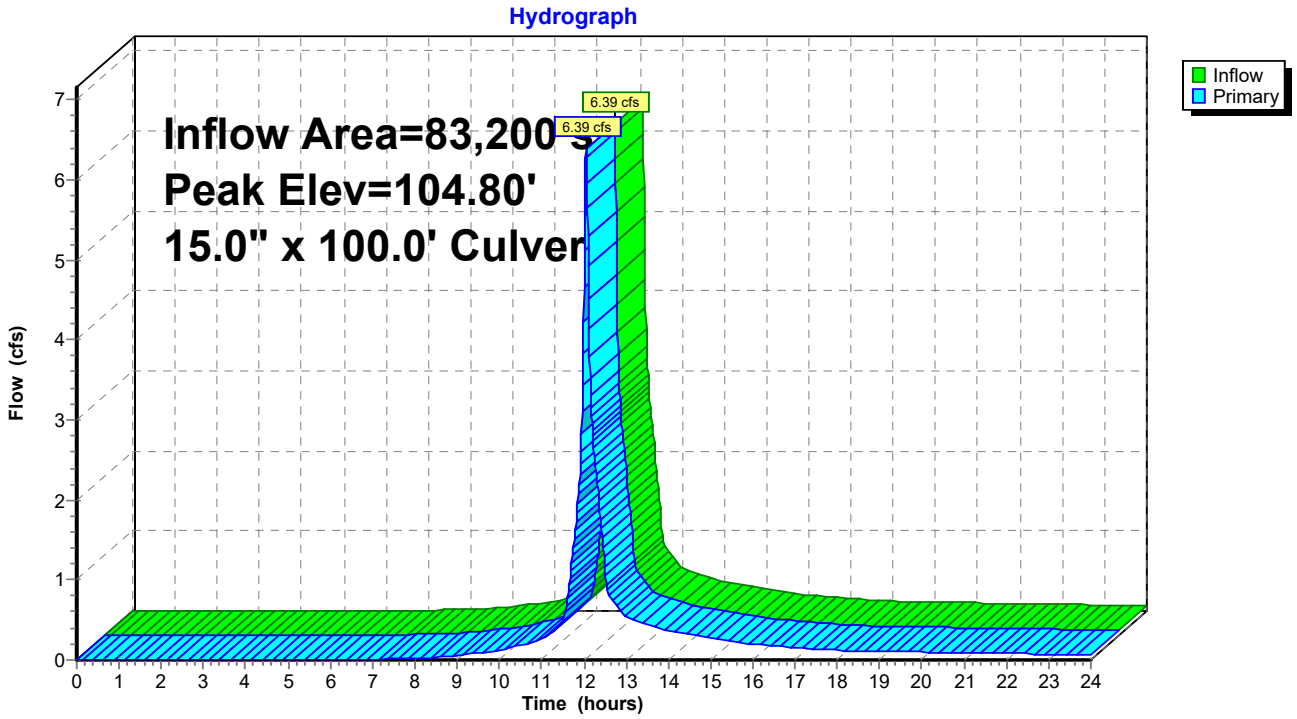
Inflow Area = 83,200 sf, Inflow Depth > 2.62" for 10-Year event
Inflow = 6.39 cfs @ 12.05 hrs, Volume= 18,198 cf
Outflow = 6.39 cfs @ 12.05 hrs, Volume= 18,198 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.39 cfs @ 12.05 hrs, Volume= 18,198 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.80' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0" x 100.0' long Culvert** Ke= 0.500 Outlet Invert= 101.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=6.38 cfs @ 12.05 hrs HW=104.79' (Free Discharge)
1=Culvert (Inlet Controls 6.38 cfs @ 5.20 fps)

Pond 159P: DMH 15 to Bioretention



Pond 160P: Bioretention

[79] Warning: Submerged Pond 2P Primary device # 1 by 0.20'

Inflow Area =	108,465 sf,	Inflow Depth >	2.44"	for	10-Year event
Inflow =	7.41 cfs @	12.07 hrs,	Volume=	22,098 cf	
Outflow =	5.39 cfs @	12.15 hrs,	Volume=	21,821 cf,	Atten= 27%, Lag= 4.6 min
Discarded =	0.01 cfs @	12.15 hrs,	Volume=	441 cf	
Primary =	5.38 cfs @	12.15 hrs,	Volume=	21,380 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.20' @ 12.15 hrs Surf.Area= 3,098 sf Storage= 3,128 cf
Flood Elev= 102.50' Surf.Area= 3,752 sf Storage= 5,871 cf

Plug-Flow detention time= 21.1 min calculated for 21,821 cf (99% of inflow)
Center-of-Mass det. time= 13.7 min (845.4 - 831.7)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	5,871 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	2,119	0	0
102.00	3,752	5,871	5,871

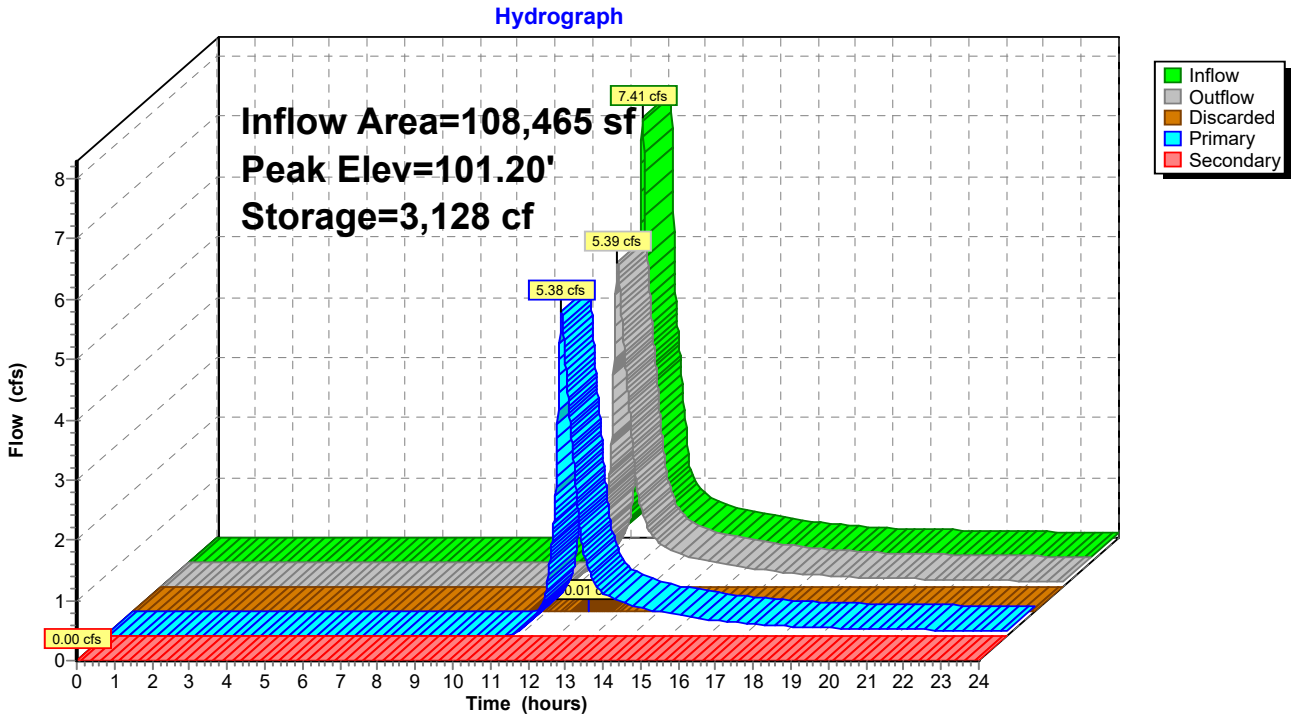
Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	100.00'	**15.0" x 21.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0476 '/' Cc= 0.900 n= 0.013
#3	Device 8	100.25'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#4	Device 8	100.42'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#5	Device 8	100.58'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#6	Device 8	100.75'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#7	Device 8	101.00'	**8.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#8	Primary	98.00'	**12.0" x 43.0' long Culvert** Ke= 0.500 Outlet Invert= 97.14' S= 0.0200 '/' Cc= 0.900 n= 0.013
#9	Secondary	102.00'	**8.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=101.20' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=5.38 cfs @ 12.15 hrs HW=101.20' (Free Discharge)
├**2=Culvert** (Inlet Controls 4.51 cfs @ 3.73 fps)
└**8=Culvert** (Passes 0.86 cfs of 6.21 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.64 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.07 cfs @ 4.19 fps)
  ├**5=Orifice/Grate** (Orifice Controls 0.06 cfs @ 3.72 fps)
  ├**6=Orifice/Grate** (Orifice Controls 0.05 cfs @ 3.15 fps)
  └**7=Orifice/Grate** (Weir Controls 0.61 cfs @ 1.46 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
└**9=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 160P: Bioretention



Pond 218R: CB 17 to DMH 15

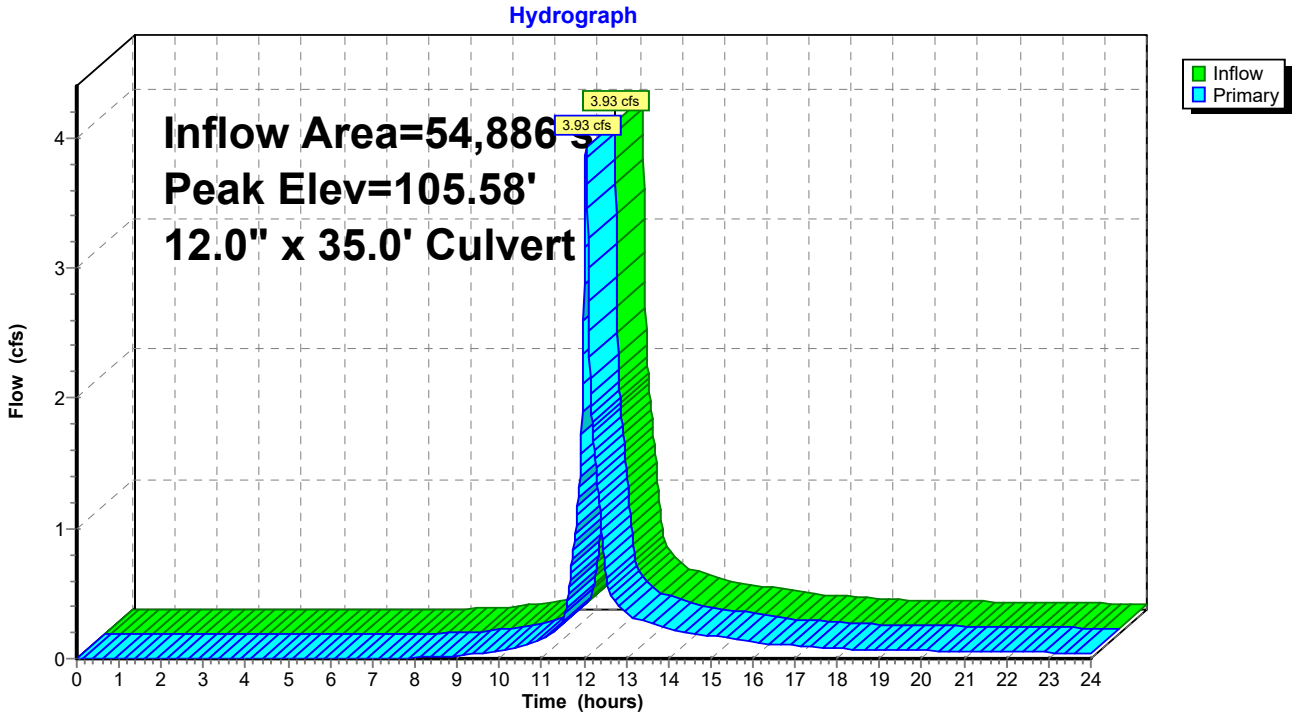
Inflow Area = 54,886 sf, Inflow Depth > 2.43" for 10-Year event
Inflow = 3.93 cfs @ 12.05 hrs, Volume= 11,116 cf
Outflow = 3.93 cfs @ 12.05 hrs, Volume= 11,116 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.93 cfs @ 12.05 hrs, Volume= 11,116 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 105.58' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.00'	**12.0" x 35.0' long Culvert** Ke= 0.500 Outlet Invert= 103.30' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=3.92 cfs @ 12.05 hrs HW=105.58' (Free Discharge)
1=Culvert (Inlet Controls 3.92 cfs @ 5.00 fps)

Pond 218R: CB 17 to DMH 15



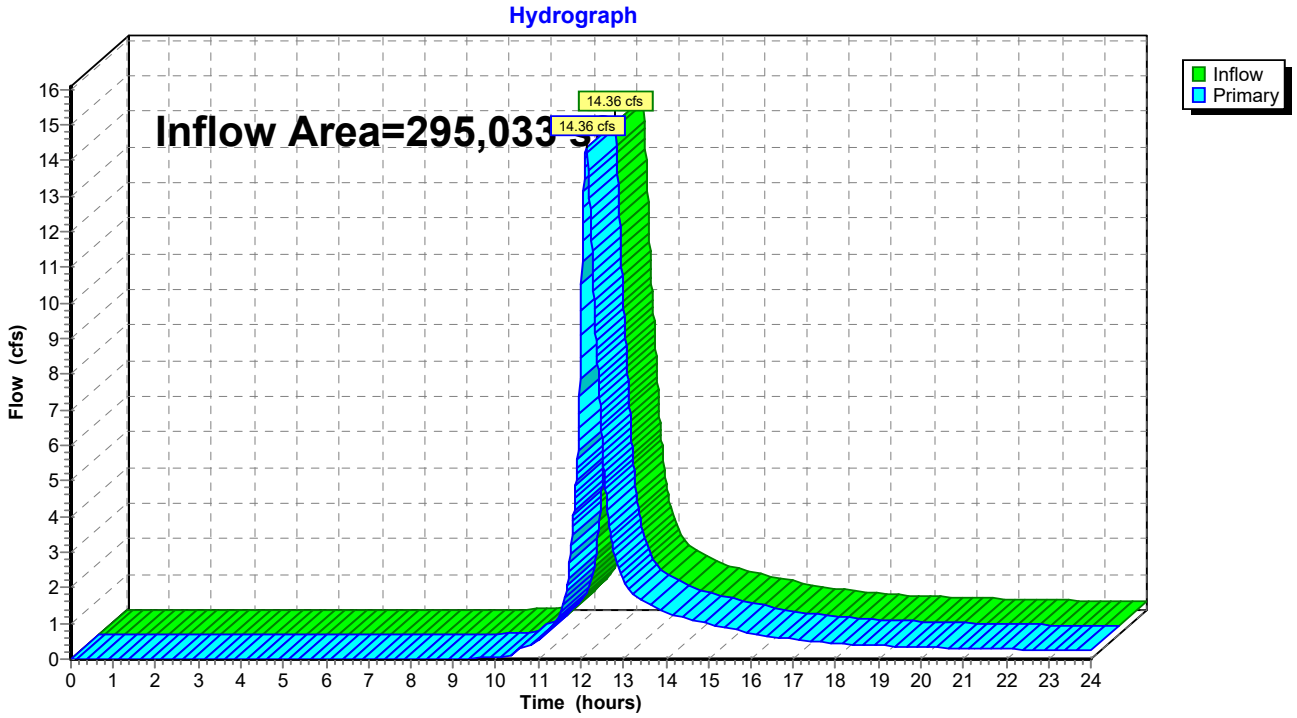
Link A: POA A

Inflow Area = 295,033 sf, Inflow Depth > 2.37" for 10-Year event
Inflow = 14.36 cfs @ 12.13 hrs, Volume= 58,375 cf
Primary = 14.36 cfs @ 12.13 hrs, Volume= 58,375 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 60S: High Point Near Circle to CB 31 Runoff Area=34,413 sf Runoff Depth>3.85"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=87 Runoff=4.20 cfs 11,042 cf

Subcatchment 62S: Back of Unit 9-10 Runoff Area=25,700 sf Runoff Depth>2.69"
Flow Length=230' Slope=0.0200 '/' Tc=8.6 min CN=75 Runoff=1.70 cfs 5,761 cf

Subcatchment 68S: From hill near 19,20 to CB 30 Runoff Area=31,363 sf Runoff Depth>3.75"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=86 Runoff=3.74 cfs 9,795 cf

Subcatchment 110S: To CB 20 Runoff Area=28,314 sf Runoff Depth>3.75"
Flow Length=270' Tc=3.7 min CN=86 Runoff=3.05 cfs 8,838 cf

Subcatchment 112S: To CB 22 Runoff Area=20,038 sf Runoff Depth>3.54"
Flow Length=280' Slope=0.0400 '/' Tc=3.8 min CN=84 Runoff=2.05 cfs 5,917 cf

Subcatchment 114S: Behind Units 1-3 Runoff Area=25,265 sf Runoff Depth>2.96"
Flow Length=130' Tc=8.0 min CN=78 Runoff=1.88 cfs 6,239 cf

Subcatchment 132S: Behind Unit 4 Runoff Area=21,345 sf Runoff Depth>2.78"
Flow Length=130' Tc=1.0 min CN=76 Runoff=1.91 cfs 4,953 cf

Subcatchment 134S: Behind Units 7,6,5 Runoff Area=34,848 sf Runoff Depth>2.87"
Flow Length=70' Slope=0.0200 '/' Tc=3.1 min CN=77 Runoff=3.00 cfs 8,347 cf

Subcatchment 140S: Directly into Detention Basin Runoff Area=30,492 sf Runoff Depth>2.78"
Flow Length=200' Slope=0.0100 '/' Tc=11.0 min CN=76 Runoff=1.93 cfs 7,060 cf

Subcatchment 158S: Back of Units 11-15 Runoff Area=29,185 sf Runoff Depth>3.06"
Flow Length=230' Tc=7.3 min CN=79 Runoff=2.30 cfs 7,436 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,070 sf Runoff Depth>2.25"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.68 cfs 2,644 cf

Reach 1R: Existing wetland channel to WF Avg. Depth=0.19' Max Vel=3.82 fps Inflow=4.55 cfs 15,840 cf
n=0.022 L=300.0' S=0.0333 '/' Capacity=82.44 cfs Outflow=4.51 cfs 15,811 cf

Reach 902R: Existing wetland channel to Avg. Depth=0.40' Max Vel=6.72 fps Inflow=18.39 cfs 75,307 cf
n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=18.38 cfs 75,283 cf

Pond 1P: DMH 32 to Extended Detention Peak Elev=103.43' Inflow=7.94 cfs 20,836 cf
15.0" x 41.0' Culvert Outflow=7.94 cfs 20,836 cf

Pond 2P: Forebay Peak Elev=101.58' Storage=1,532 cf Inflow=9.60 cfs 29,342 cf
Outflow=9.43 cfs 28,419 cf

Pond 3P: Forebay Peak Elev=99.54' Storage=1,535 cf Inflow=8.89 cfs 27,896 cf
Outflow=8.54 cfs 26,946 cf

Pond 8P: Detention Basin Peak Elev=98.49' Storage=1,180 cf Inflow=8.54 cfs 26,946 cf
Primary=7.34 cfs 26,899 cf Secondary=0.00 cfs 0 cf Outflow=7.34 cfs 26,899 cf

Pond 43R: CB 31 to DMH 32 Peak Elev=103.73' Inflow=4.20 cfs 11,042 cf
12.0" x 12.0' Culvert Outflow=4.20 cfs 11,042 cf

Pond 44R: CB 30 to DMH 32 Peak Elev=103.48' Inflow=3.74 cfs 9,795 cf
12.0" x 12.0' Culvert Outflow=3.74 cfs 9,795 cf

Pond 111P: CB 16 to DMH 15 Peak Elev=104.23' Inflow=3.05 cfs 8,838 cf
12.0" x 5.0' Culvert Outflow=3.05 cfs 8,838 cf

Pond 159P: DMH 15 to Bioretention Peak Elev=105.50' Inflow=8.09 cfs 23,102 cf
15.0" x 100.0' Culvert Outflow=8.09 cfs 23,102 cf

Pond 160P: Bioretention Peak Elev=101.42' Storage=3,823 cf Inflow=9.43 cfs 28,419 cf
Discarded=0.01 cfs 466 cf Primary=6.64 cfs 27,644 cf Secondary=0.00 cfs 0 cf Outflow=6.65 cfs 28,110 cf

Pond 218R: CB 17 to DMH 15 Peak Elev=106.28' Inflow=5.04 cfs 14,264 cf
12.0" x 35.0' Culvert Outflow=5.04 cfs 14,264 cf

Link A: POA A Inflow=18.38 cfs 75,283 cf
Primary=18.38 cfs 75,283 cf

Total Runoff Area = 295,033 sf Runoff Volume = 78,031 cf Average Runoff Depth = 3.17"
72.69% Pervious Area = 214,447 sf 27.31% Impervious Area = 80,586 sf

Subcatchment 60S: High Point Near Circle to CB 31

[49] Hint: Tc<2dt may require smaller dt

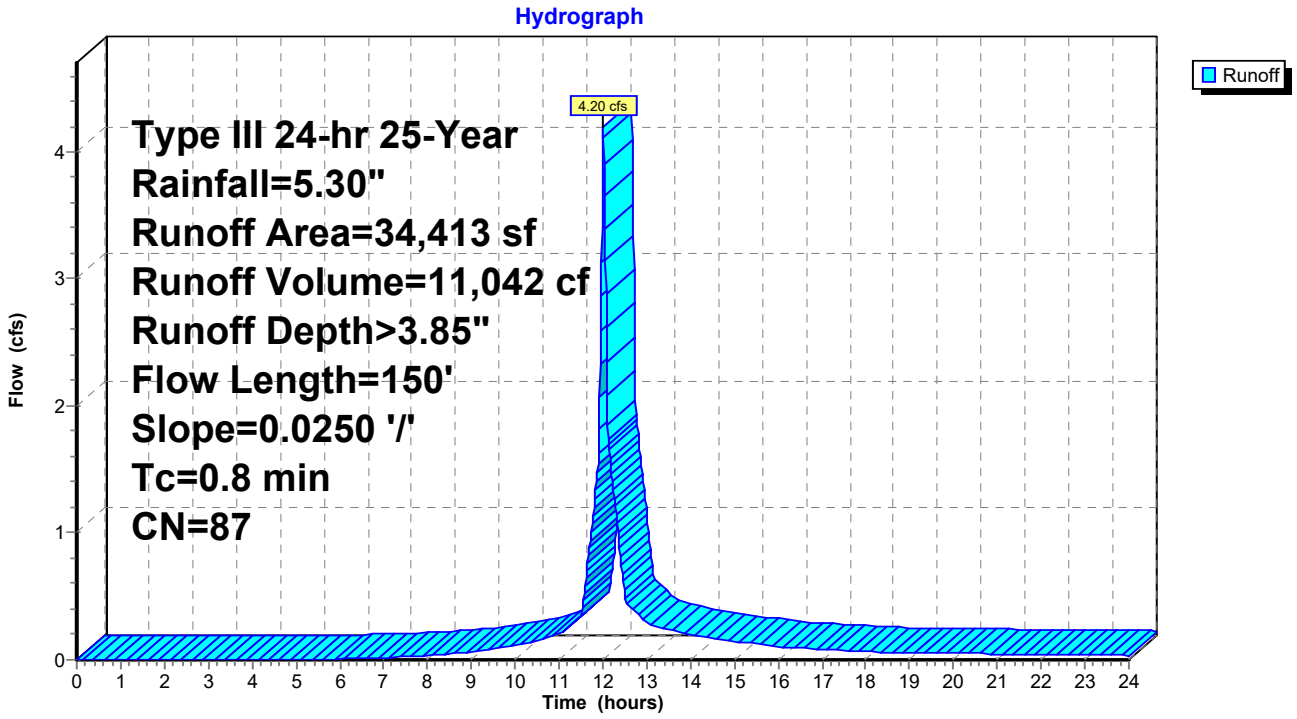
Runoff = 4.20 cfs @ 12.01 hrs, Volume= 11,042 cf, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
18,731	98	Paved parking & roofs
15,682	74	>75% Grass cover, Good, HSG C
34,413	87	Weighted Average
15,682		Pervious Area
18,731		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 60S: High Point Near Circle to CB 31



Subcatchment 62S: Back of Unit 9-10

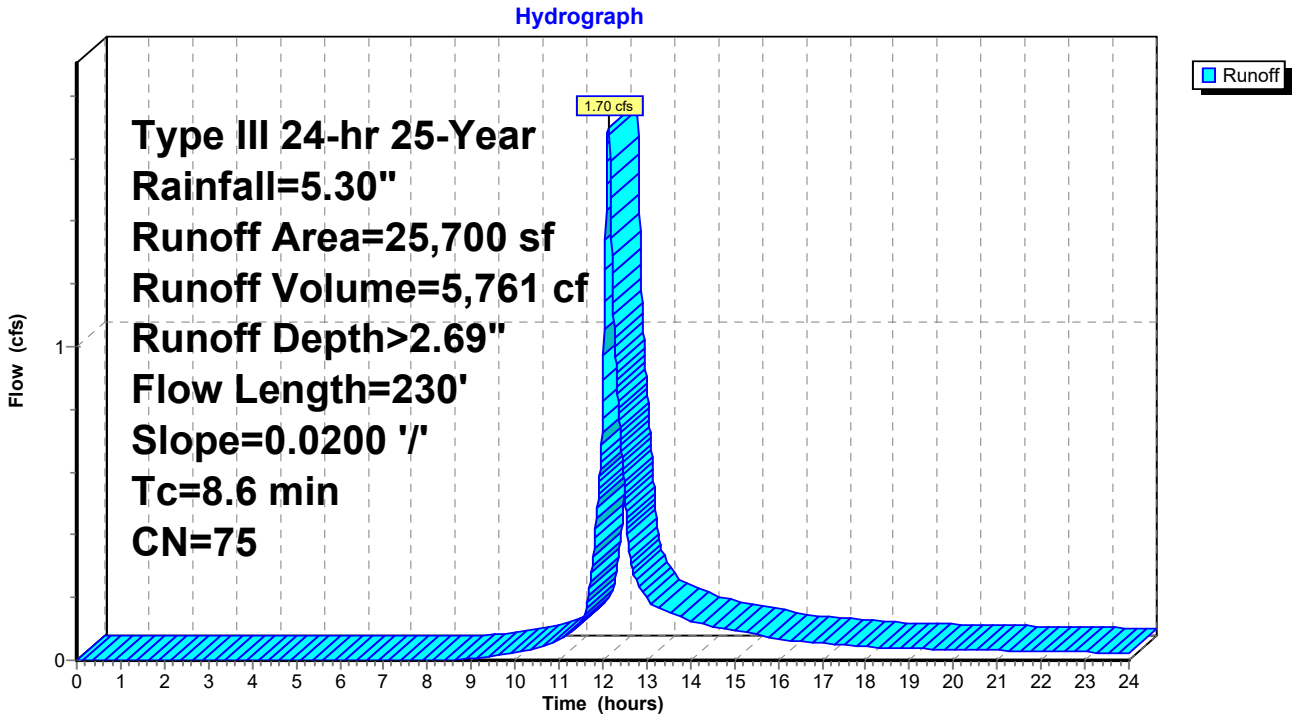
Runoff = 1.70 cfs @ 12.12 hrs, Volume= 5,761 cf, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,742	98	Paved parking & roofs
21,780	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
25,700	75	Weighted Average
23,958		Pervious Area
1,742		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.6	230	Total			

Subcatchment 62S: Back of Unit 9-10



Subcatchment 68S: From hill near 19,20 to CB 30

[49] Hint: Tc<2dt may require smaller dt

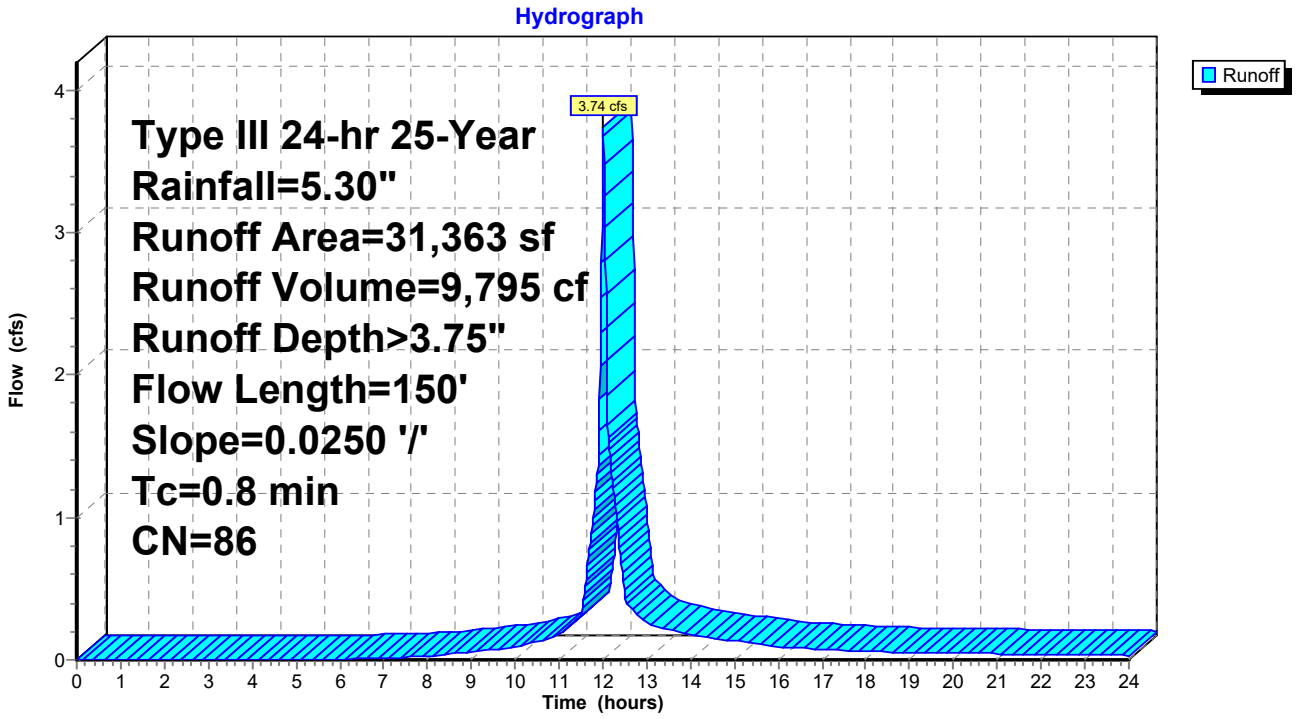
Runoff = 3.74 cfs @ 12.01 hrs, Volume= 9,795 cf, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
15,246	98	Paved parking & roofs
16,117	74	>75% Grass cover, Good, HSG C
31,363	86	Weighted Average
16,117		Pervious Area
15,246		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 68S: From hill near 19,20 to CB 30



Subcatchment 110S: To CB 20

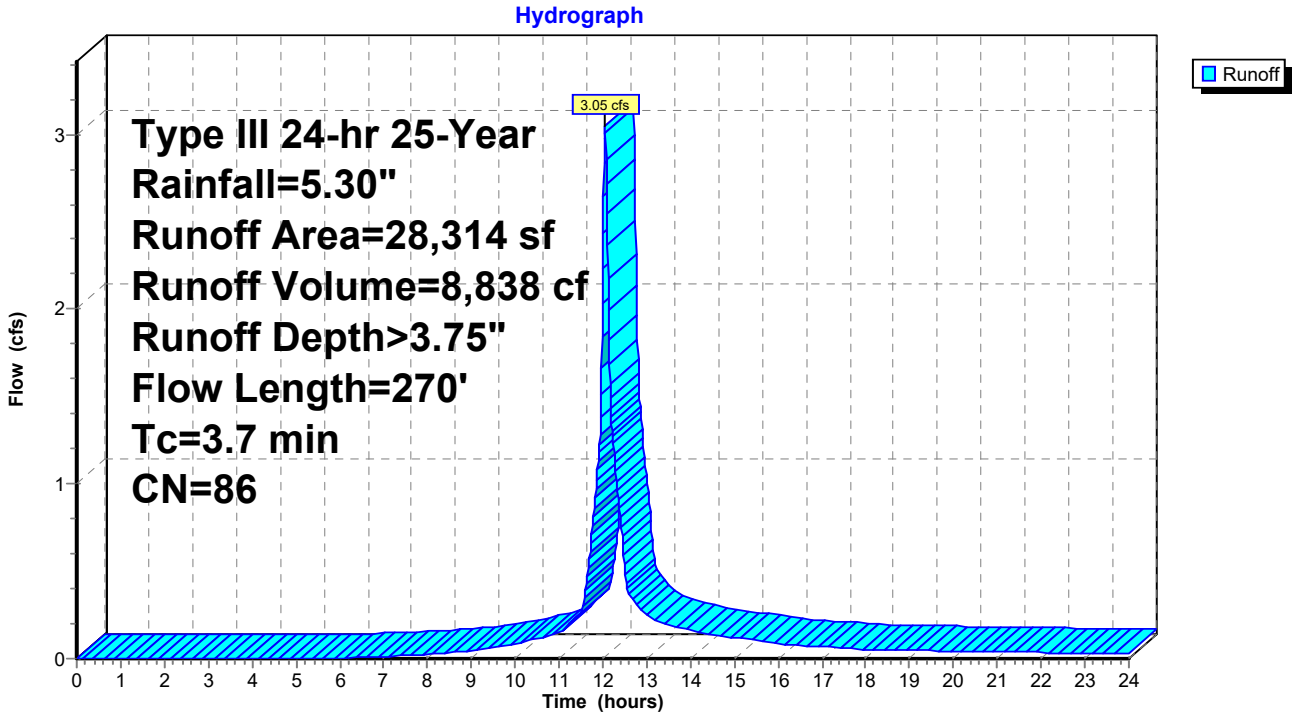
Runoff = 3.05 cfs @ 12.05 hrs, Volume= 8,838 cf, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
14,375	98	Paved parking & roofs
13,939	74	>75% Grass cover, Good, HSG C
28,314	86	Weighted Average
13,939		Pervious Area
14,375		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.7	270	Total			

Subcatchment 110S: To CB 20



Subcatchment 112S: To CB 22

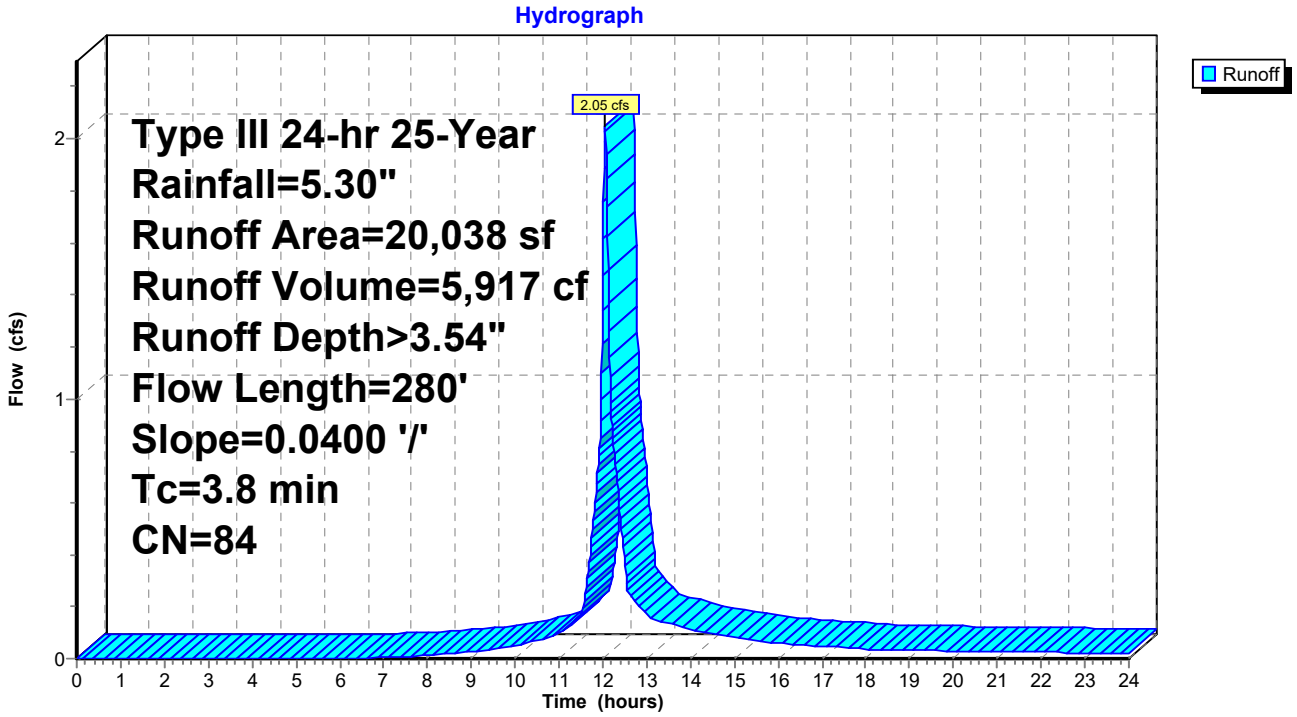
Runoff = 2.05 cfs @ 12.06 hrs, Volume= 5,917 cf, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
8,712	98	Paved parking & roofs
11,326	74	>75% Grass cover, Good, HSG C
20,038	84	Weighted Average
11,326		Pervious Area
8,712		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	30	0.0400	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8	280	Total			

Subcatchment 112S: To CB 22



Subcatchment 114S: Behind Units 1-3

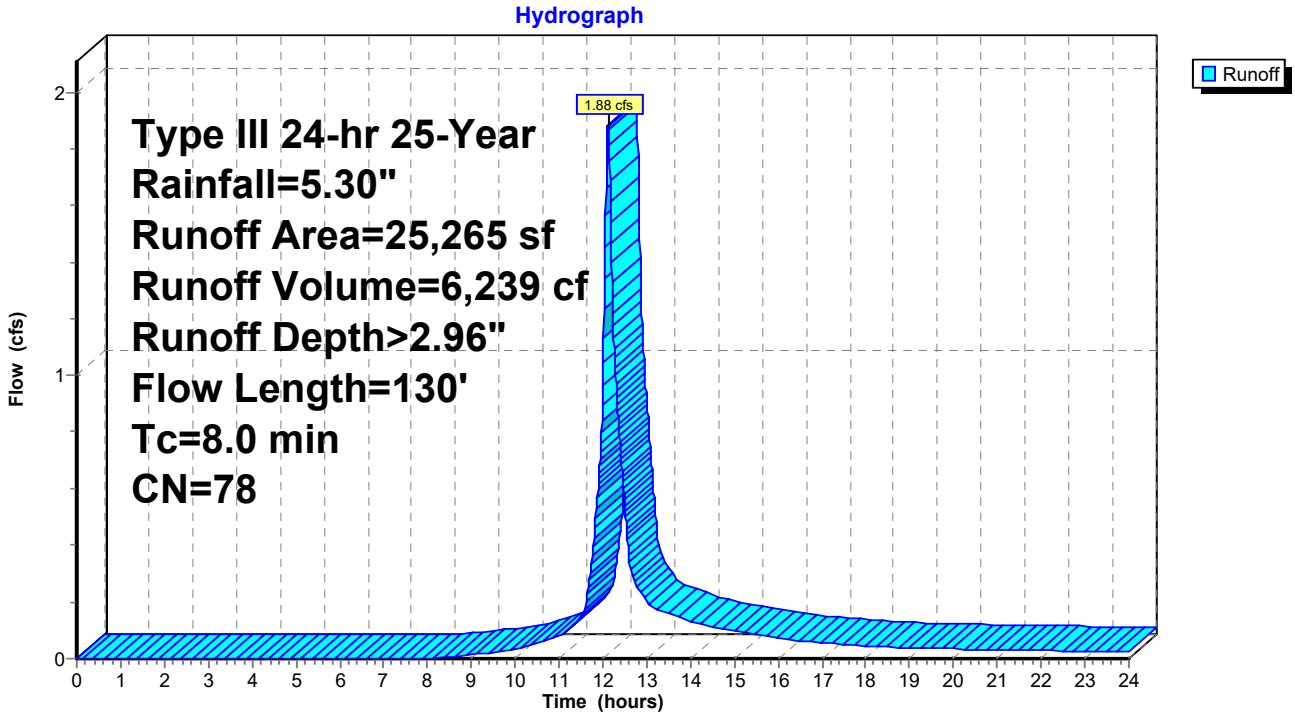
Runoff = 1.88 cfs @ 12.11 hrs, Volume= 6,239 cf, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
25,265	78	Weighted Average
20,909		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.6	80	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.0	130	Total			

Subcatchment 114S: Behind Units 1-3



Subcatchment 132S: Behind Unit 4

[49] Hint: Tc<2dt may require smaller dt

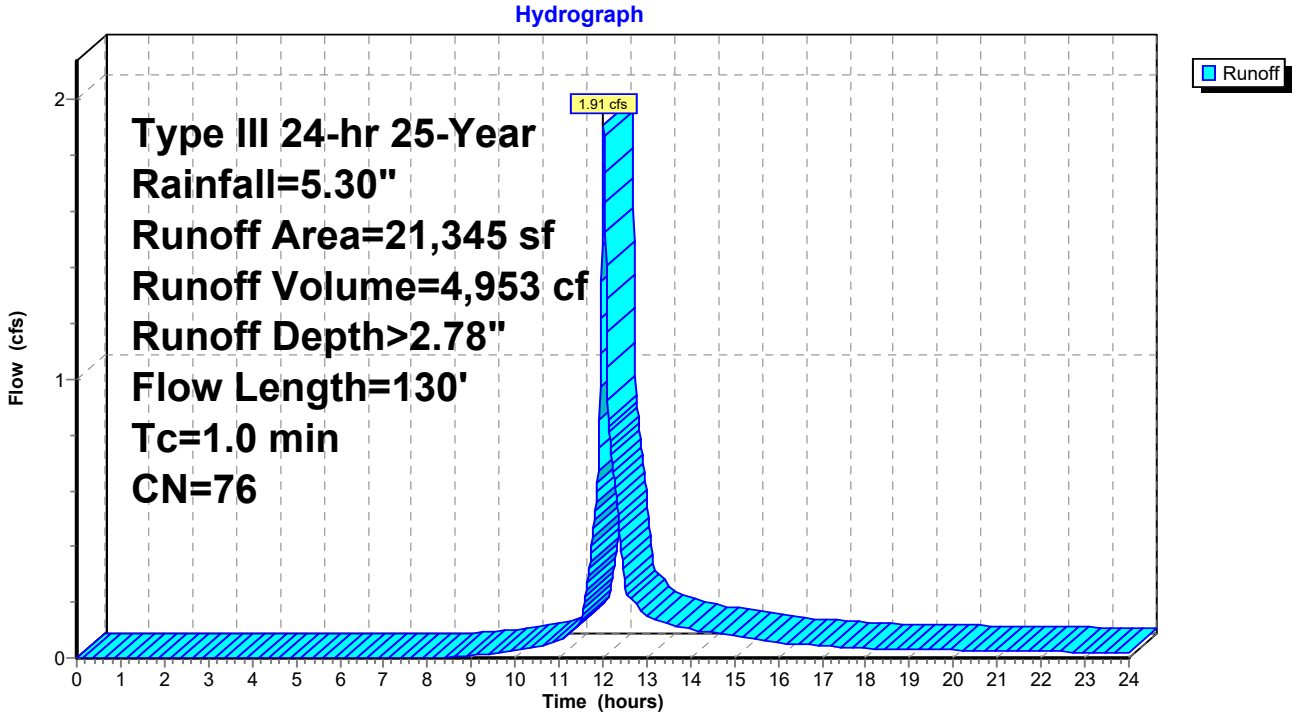
Runoff = 1.91 cfs @ 12.02 hrs, Volume= 4,953 cf, Depth> 2.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
3,485	98	Paved parking & roofs
8,712	74	>75% Grass cover, Good, HSG C
9,148	70	Woods, Good, HSG C
21,345	76	Weighted Average
17,860		Pervious Area
3,485		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	80	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	130	Total			

Subcatchment 132S: Behind Unit 4



Subcatchment 134S: Behind Units 7,6,5

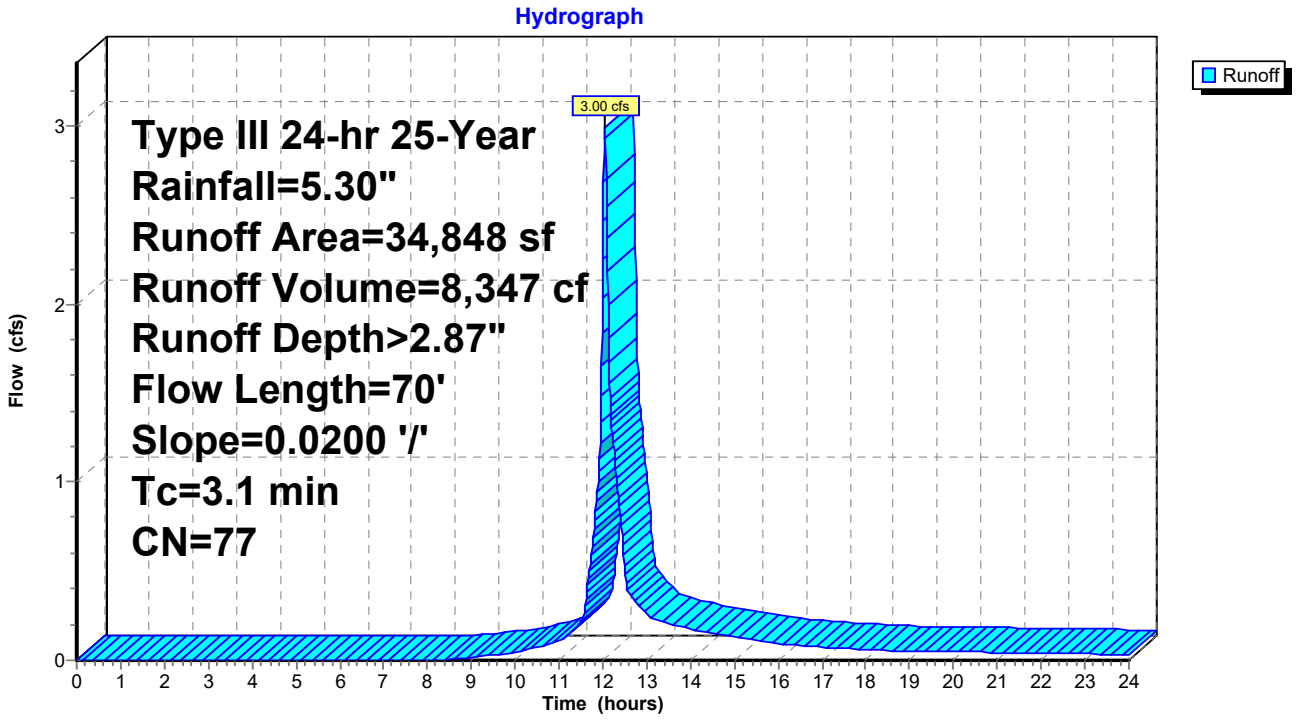
Runoff = 3.00 cfs @ 12.05 hrs, Volume= 8,347 cf, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,792	98	Paved parking & roofs
28,314	74	>75% Grass cover, Good, HSG C
1,742	70	Woods, Good, HSG C
34,848	77	Weighted Average
30,056		Pervious Area
4,792		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: Behind Units 7,6,5



Subcatchment 140S: Directly into Detention Basin

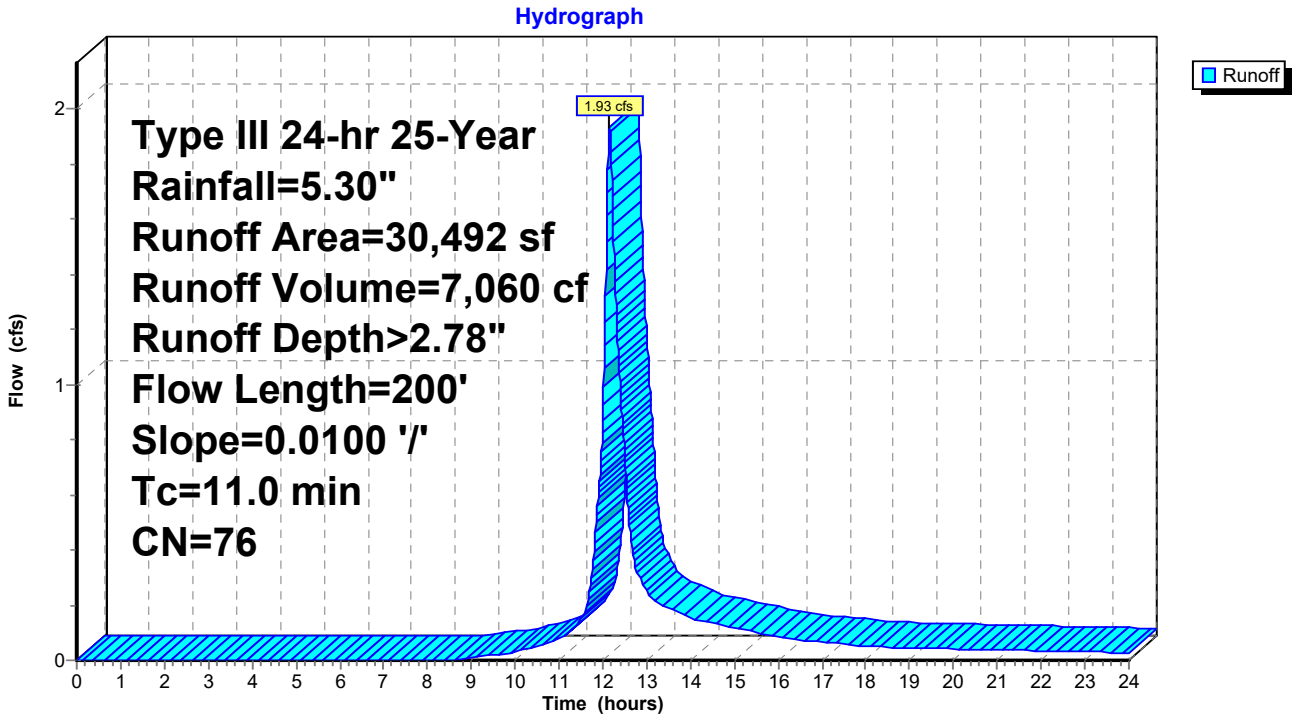
Runoff = 1.93 cfs @ 12.16 hrs, Volume= 7,060 cf, Depth> 2.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
3,049	98	Paved parking & roofs
23,958	74	>75% Grass cover, Good, HSG C
3,485	70	Woods, Good, HSG C
30,492	76	Weighted Average
27,443		Pervious Area
3,049		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.6	150	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.0	200	Total			

Subcatchment 140S: Directly into Detention Basin



Subcatchment 158S: Back of Units 11-15

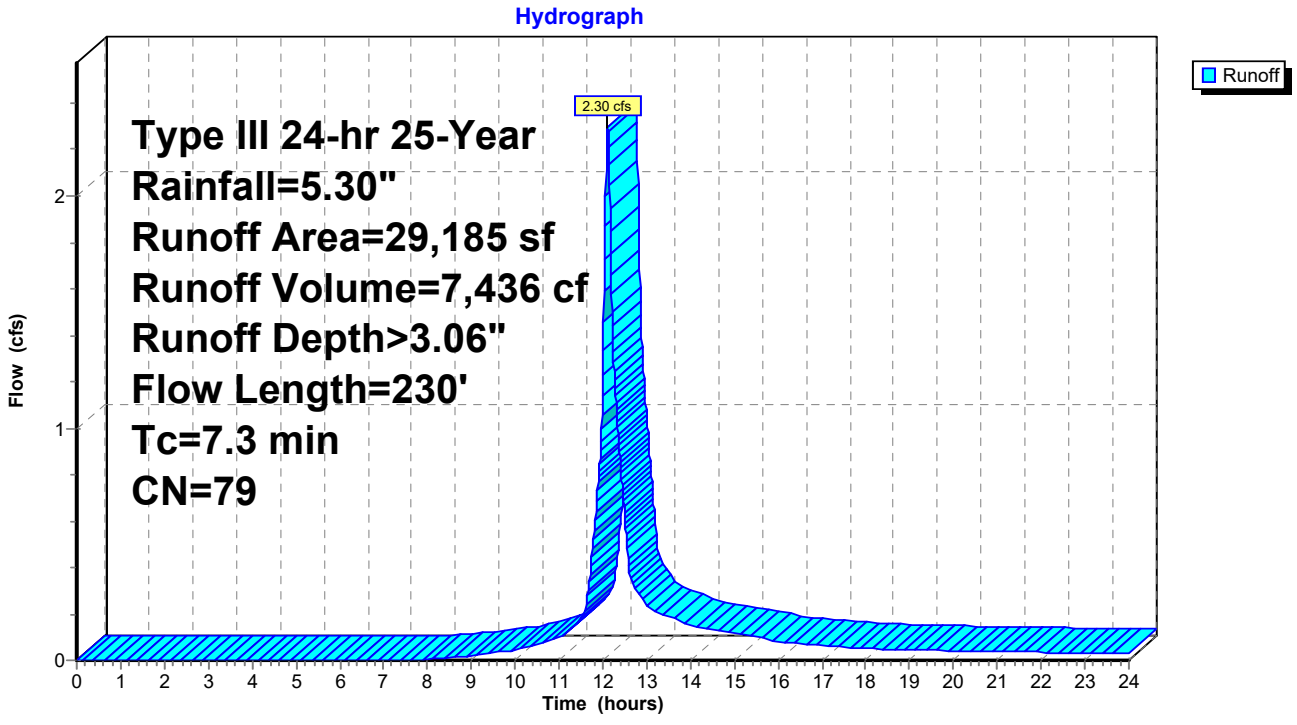
Runoff = 2.30 cfs @ 12.11 hrs, Volume= 7,436 cf, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
29,185	79	Weighted Average
23,087		Pervious Area
6,098		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	230	Total			

Subcatchment 158S: Back of Units 11-15



Subcatchment 900: North Offsite flowing onto property

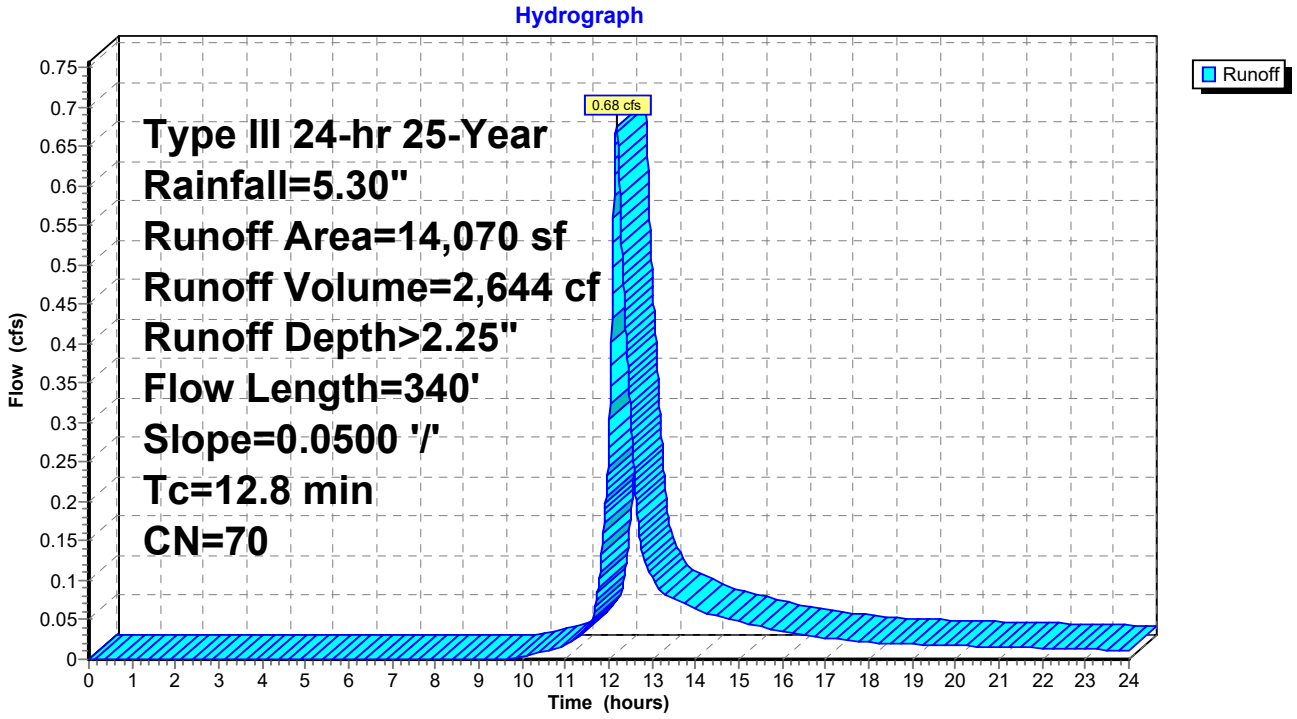
Runoff = 0.68 cfs @ 12.18 hrs, Volume= 2,644 cf, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
14,070	70	Woods, Good, HSG C
14,070		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 1R: Existing wetland channel to WF 16

Inflow Area = 68,955 sf, Inflow Depth > 2.76" for 25-Year event
Inflow = 4.55 cfs @ 12.12 hrs, Volume= 15,840 cf
Outflow = 4.51 cfs @ 12.15 hrs, Volume= 15,811 cf, Atten= 1%, Lag= 2.2 min

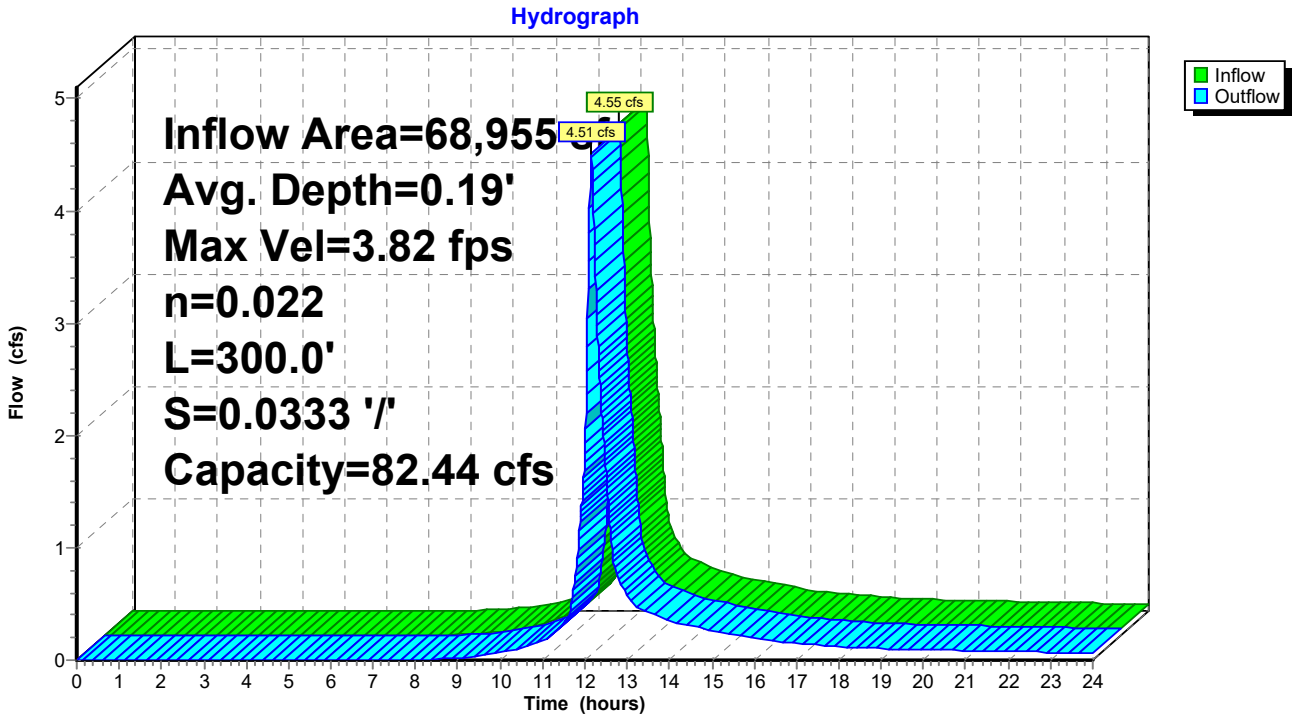
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.82 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 4.6 min

Peak Storage= 354 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'

‡

Reach 1R: Existing wetland channel to WF 16



Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 4% of Reach 1R bottom

Inflow Area = 295,033 sf, Inflow Depth > 3.06" for 25-Year event
Inflow = 18.39 cfs @ 12.12 hrs, Volume= 75,307 cf
Outflow = 18.38 cfs @ 12.13 hrs, Volume= 75,283 cf, Atten= 0%, Lag= 0.4 min

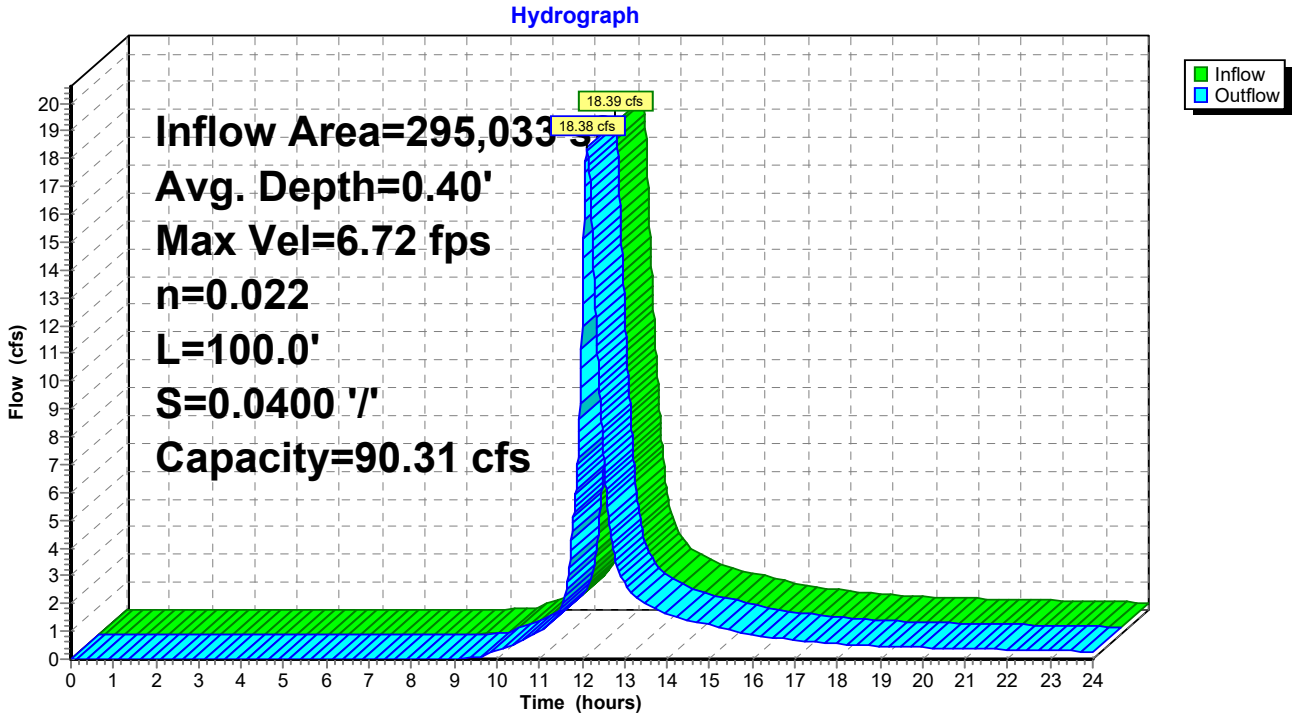
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.72 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 0.8 min

Peak Storage= 274 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0400 '/'
Inlet Invert= 86.00', Outlet Invert= 82.00'

‡

Reach 902R: Existing wetland channel to WF 13



Pond 1P: DMH 32 to Extended Detention

[79] Warning: Submerged Pond 43R Primary device # 1 INLET by 1.42'
[79] Warning: Submerged Pond 44R Primary device # 1 INLET by 1.42'

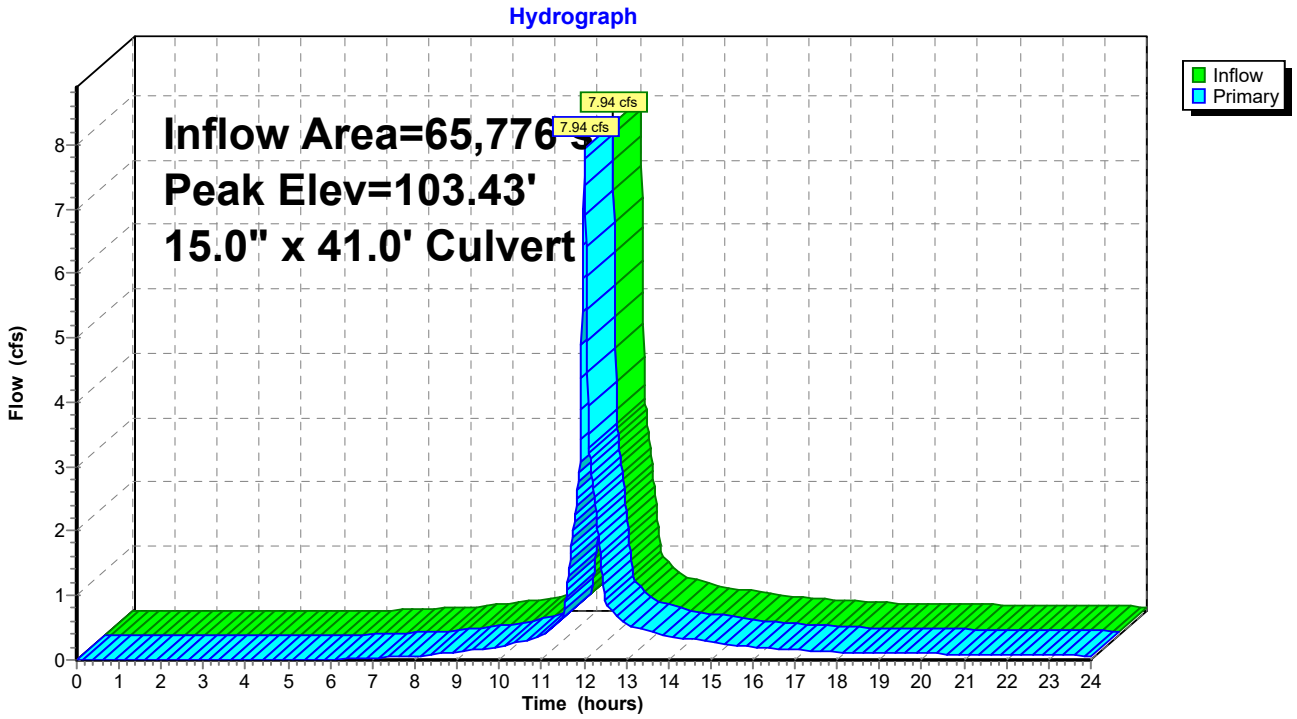
Inflow Area = 65,776 sf, Inflow Depth > 3.80" for 25-Year event
Inflow = 7.94 cfs @ 12.01 hrs, Volume= 20,836 cf
Outflow = 7.94 cfs @ 12.01 hrs, Volume= 20,836 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.94 cfs @ 12.01 hrs, Volume= 20,836 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.43' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**15.0" x 41.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0488 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=7.89 cfs @ 12.01 hrs HW=103.41' (Free Discharge)
1=Culvert (Inlet Controls 7.89 cfs @ 6.43 fps)

Pond 1P: DMH 32 to Extended Detention



Pond 2P: Forebay

[79] Warning: Submerged Pond 159P Primary device # 1 OUTLET by 0.58'

Inflow Area = 108,465 sf, Inflow Depth > 3.25" for 25-Year event
Inflow = 9.60 cfs @ 12.06 hrs, Volume= 29,342 cf
Outflow = 9.43 cfs @ 12.07 hrs, Volume= 28,419 cf, Atten= 2%, Lag= 0.9 min
Primary = 9.43 cfs @ 12.07 hrs, Volume= 28,419 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.58' @ 12.07 hrs Surf.Area= 1,187 sf Storage= 1,532 cf

Plug-Flow detention time= 28.4 min calculated for 28,419 cf (97% of inflow)
Center-of-Mass det. time= 10.4 min (823.7 - 813.3)

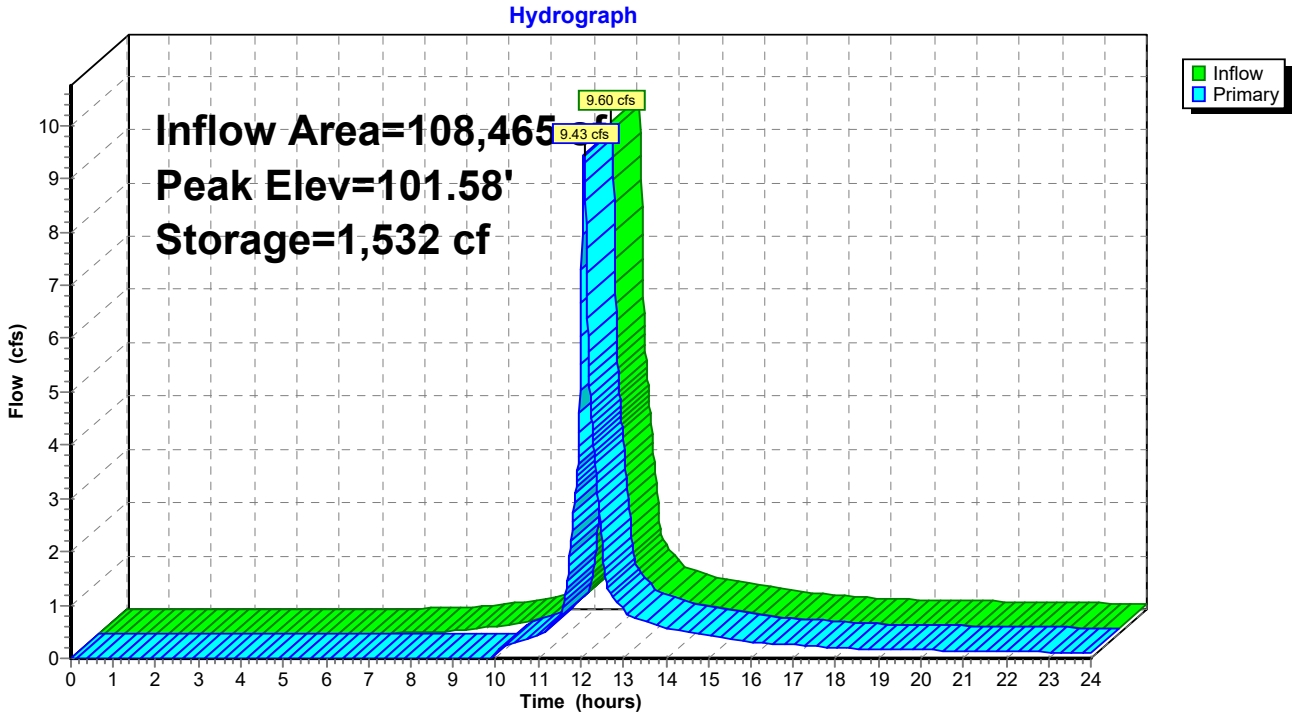
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	758	0	0
102.00	1,302	2,060	2,060

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**8.0' long x 25.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.41 cfs @ 12.07 hrs HW=101.57' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.41 cfs @ 2.05 fps)

Pond 2P: Forebay



Pond 3P: Forebay

[79] Warning: Submerged Pond 1P Primary device # 1 OUTLET by 0.54'

Inflow Area = 96,268 sf, Inflow Depth > 3.48" for 25-Year event
Inflow = 8.89 cfs @ 12.01 hrs, Volume= 27,896 cf
Outflow = 8.54 cfs @ 12.03 hrs, Volume= 26,946 cf, Atten= 4%, Lag= 0.9 min
Primary = 8.54 cfs @ 12.03 hrs, Volume= 26,946 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.54' @ 12.03 hrs Surf.Area= 1,208 sf Storage= 1,535 cf

Plug-Flow detention time= 31.6 min calculated for 26,934 cf (97% of inflow)
Center-of-Mass det. time= 12.0 min (817.1 - 805.1)

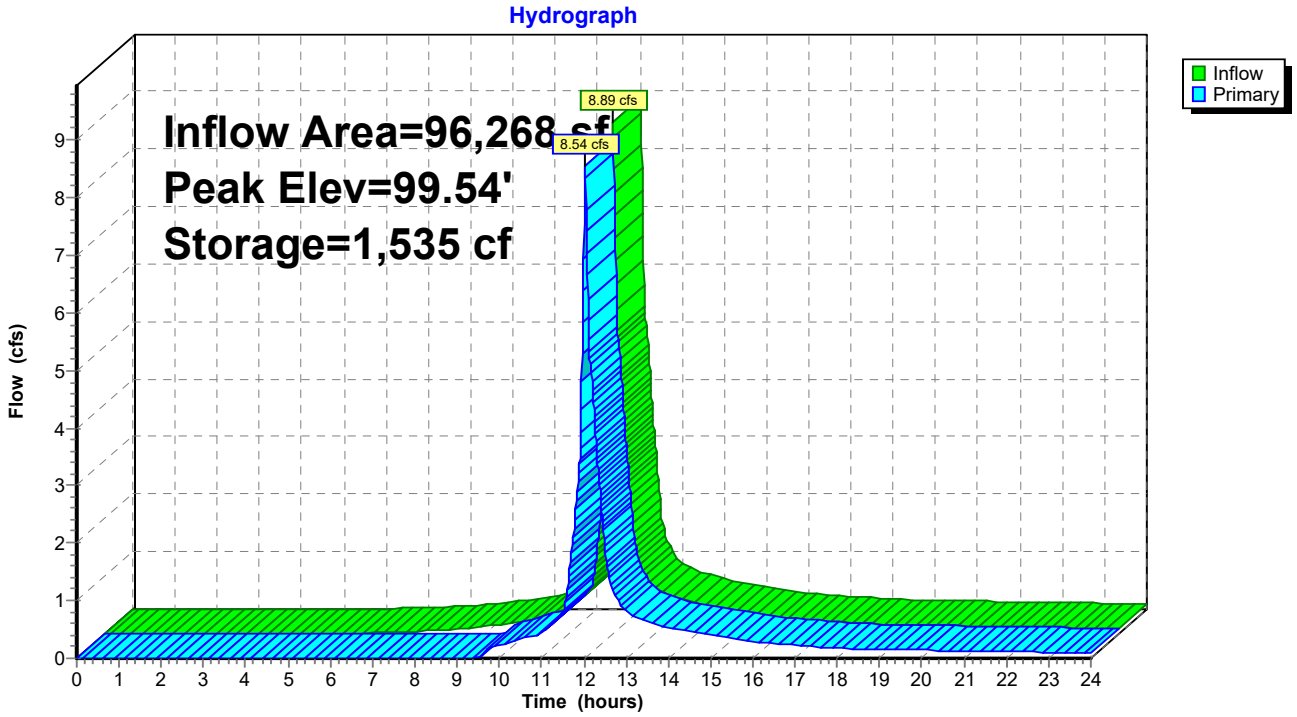
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	2,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	786	0	0
100.00	1,335	2,121	2,121

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**8.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=8.53 cfs @ 12.03 hrs HW=99.54' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.53 cfs @ 1.98 fps)

Pond 3P: Forebay



Pond 8P: Detention Basin

Inflow Area = 96,268 sf, Inflow Depth > 3.36" for 25-Year event
Inflow = 8.54 cfs @ 12.03 hrs, Volume= 26,946 cf
Outflow = 7.34 cfs @ 12.07 hrs, Volume= 26,899 cf, Atten= 14%, Lag= 2.6 min
Primary = 7.34 cfs @ 12.07 hrs, Volume= 26,899 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 98.49' @ 12.07 hrs Surf.Area= 1,229 sf Storage= 1,180 cf
Flood Elev= 100.00' Surf.Area= 2,037 sf Storage= 3,644 cf

Plug-Flow detention time= 3.9 min calculated for 26,888 cf (100% of inflow)
Center-of-Mass det. time= 2.8 min (819.9 - 817.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	3,644 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

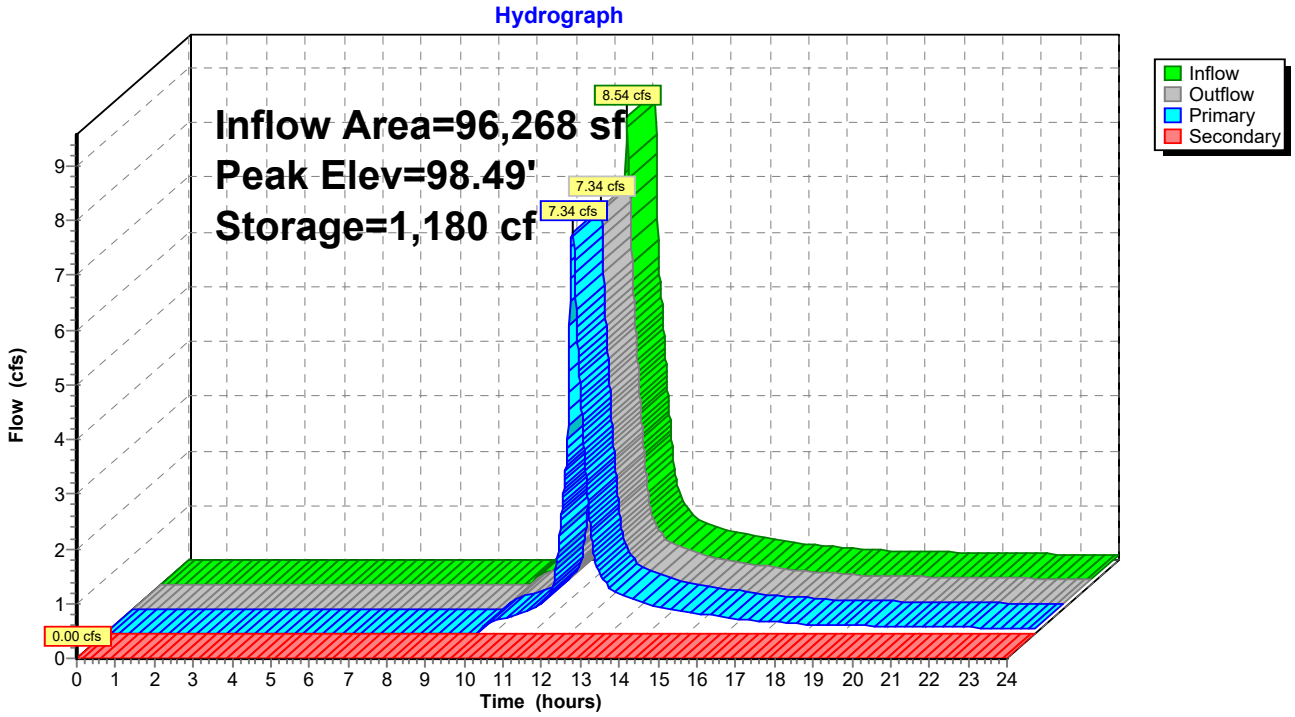
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	315	0	0
98.00	966	641	641
100.00	2,037	3,003	3,644

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**18.0" x 30.0' long Culvert** Ke= 0.500 Outlet Invert= 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean
#2	Secondary	99.50'	**8.0' 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=7.34 cfs @ 12.07 hrs HW=98.49' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.34 cfs @ 4.16 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Detention Basin



Pond 43R: CB 31 to DMH 32

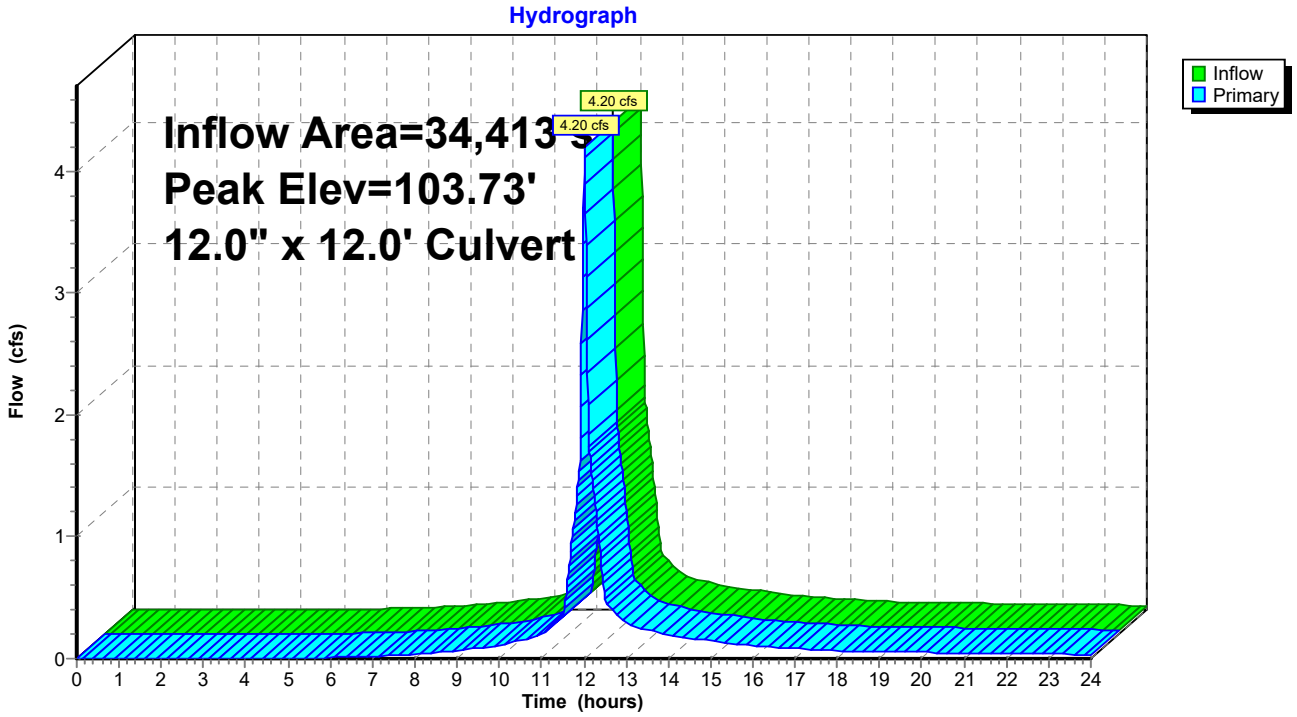
Inflow Area = 34,413 sf, Inflow Depth > 3.85" for 25-Year event
Inflow = 4.20 cfs @ 12.01 hrs, Volume= 11,042 cf
Outflow = 4.20 cfs @ 12.01 hrs, Volume= 11,042 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.20 cfs @ 12.01 hrs, Volume= 11,042 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.73' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=4.17 cfs @ 12.01 hrs HW=103.72' (Free Discharge)
1=Culvert (Inlet Controls 4.17 cfs @ 5.31 fps)

Pond 43R: CB 31 to DMH 32



Pond 44R: CB 30 to DMH 32

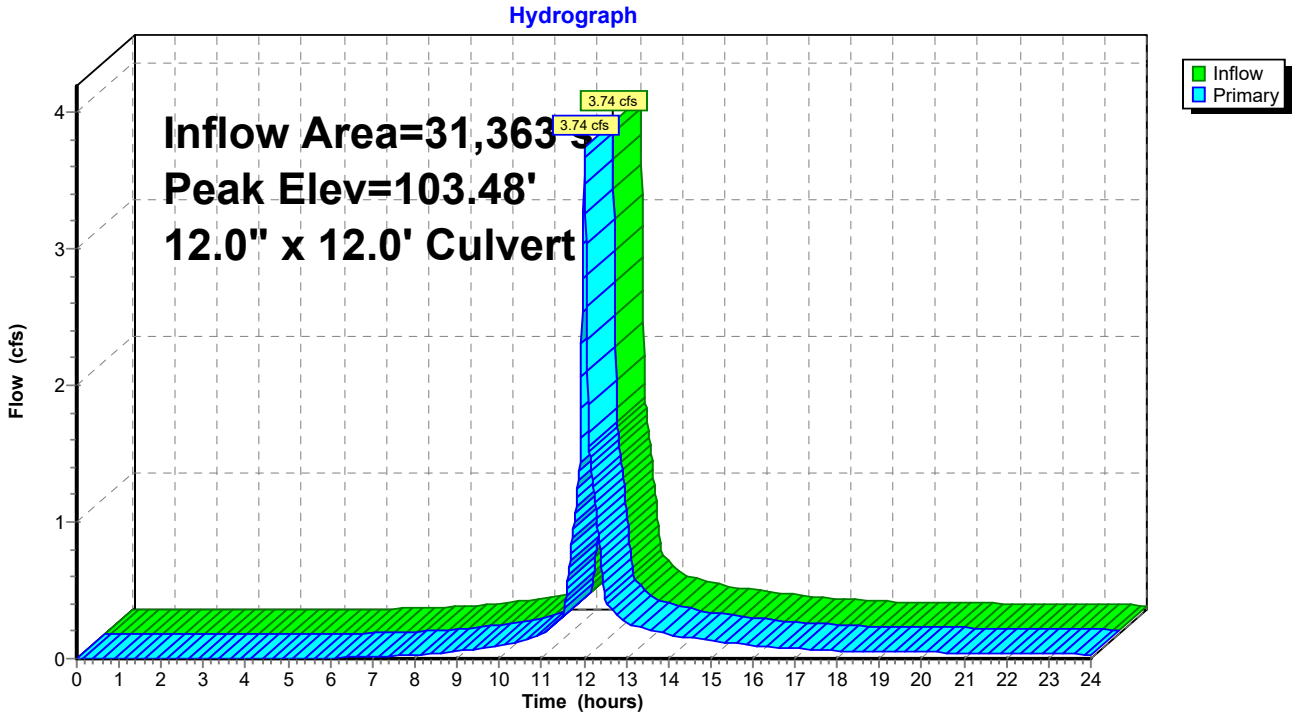
Inflow Area = 31,363 sf, Inflow Depth > 3.75" for 25-Year event
Inflow = 3.74 cfs @ 12.01 hrs, Volume= 9,795 cf
Outflow = 3.74 cfs @ 12.01 hrs, Volume= 9,795 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.74 cfs @ 12.01 hrs, Volume= 9,795 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.48' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.72 cfs @ 12.01 hrs HW=103.47' (Free Discharge)
1=Culvert (Inlet Controls 3.72 cfs @ 4.74 fps)

Pond 44R: CB 30 to DMH 32



Pond 111P: CB 16 to DMH 15

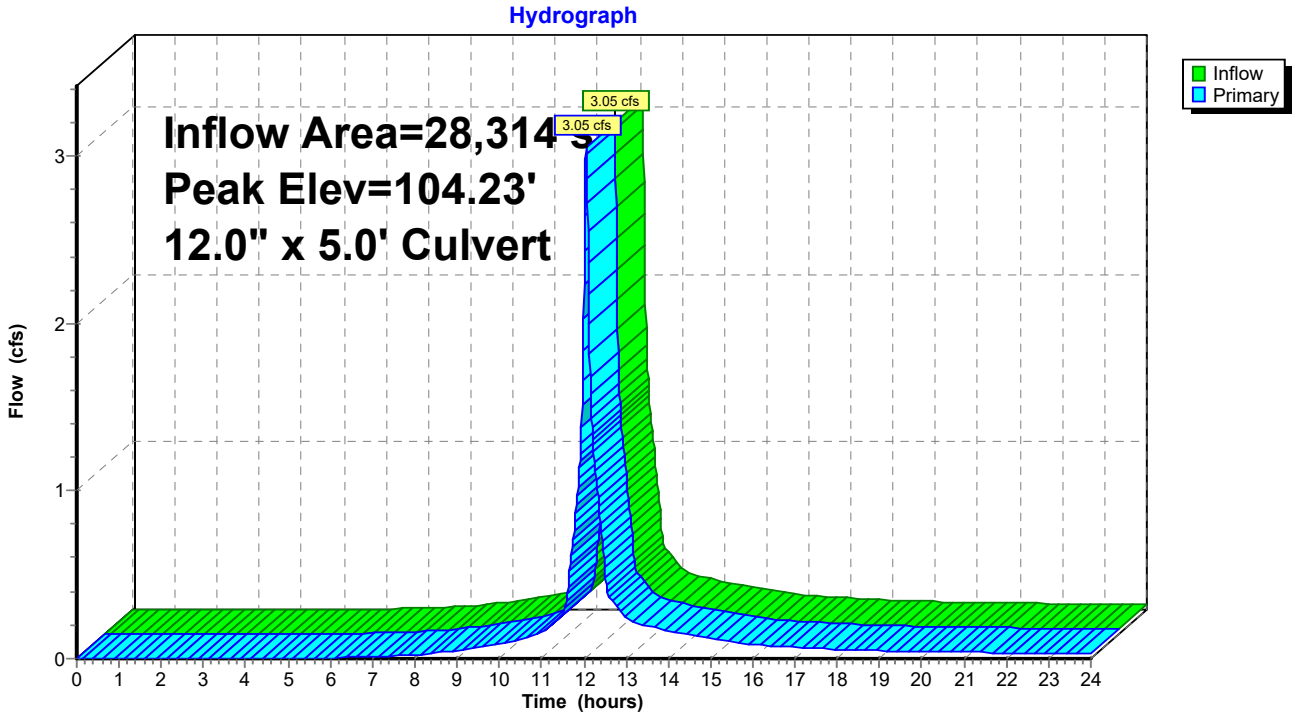
Inflow Area = 28,314 sf, Inflow Depth > 3.75" for 25-Year event
Inflow = 3.05 cfs @ 12.05 hrs, Volume= 8,838 cf
Outflow = 3.05 cfs @ 12.05 hrs, Volume= 8,838 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.05 cfs @ 12.05 hrs, Volume= 8,838 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.23' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**12.0" x 5.0' long Culvert** RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 102.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.04 cfs @ 12.05 hrs HW=104.23' (Free Discharge)
1=Culvert (Barrel Controls 3.04 cfs @ 4.02 fps)

Pond 111P: CB 16 to DMH 15



Pond 159P: DMH 15 to Bioretention

[81] Warning: Exceeded Pond 111P by 1.26' @ 12.05 hrs
[79] Warning: Submerged Pond 218R Primary device # 1 INLET by 1.50'

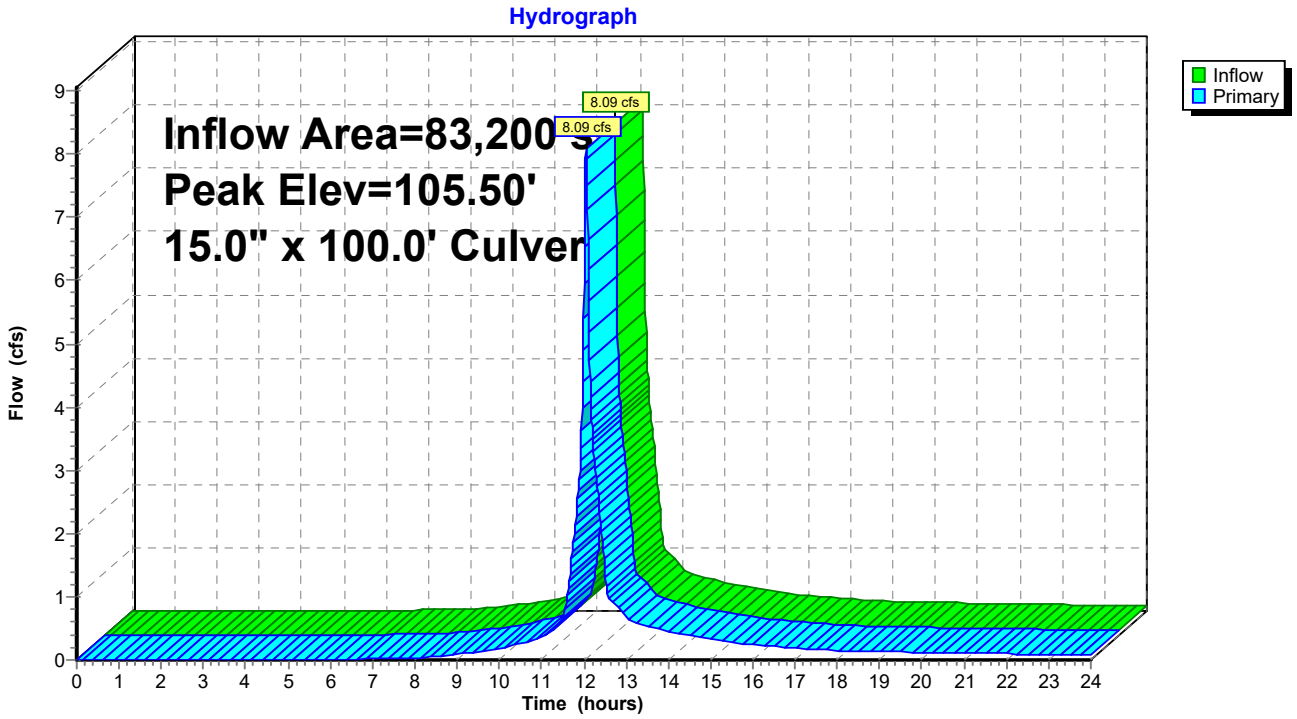
Inflow Area = 83,200 sf, Inflow Depth > 3.33" for 25-Year event
Inflow = 8.09 cfs @ 12.05 hrs, Volume= 23,102 cf
Outflow = 8.09 cfs @ 12.05 hrs, Volume= 23,102 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.09 cfs @ 12.05 hrs, Volume= 23,102 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 105.50' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0" x 100.0' long Culvert** Ke= 0.500 Outlet Invert= 101.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=8.07 cfs @ 12.05 hrs HW=105.49' (Free Discharge)
1=Culvert (Inlet Controls 8.07 cfs @ 6.58 fps)

Pond 159P: DMH 15 to Bioretention



Pond 160P: Bioretention

[79] Warning: Submerged Pond 2P Primary device # 1 by 0.42'

Inflow Area =	108,465 sf,	Inflow Depth >	3.14"	for	25-Year event
Inflow =	9.43 cfs @	12.07 hrs,	Volume=	28,419 cf	
Outflow =	6.65 cfs @	12.15 hrs,	Volume=	28,110 cf,	Atten= 29%, Lag= 4.8 min
Discarded =	0.01 cfs @	12.15 hrs,	Volume=	466 cf	
Primary =	6.64 cfs @	12.15 hrs,	Volume=	27,644 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.42' @ 12.15 hrs Surf.Area= 3,276 sf Storage= 3,823 cf
Flood Elev= 102.50' Surf.Area= 3,752 sf Storage= 5,871 cf

Plug-Flow detention time= 19.4 min calculated for 28,110 cf (99% of inflow)
Center-of-Mass det. time= 12.9 min (836.6 - 823.7)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	5,871 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	2,119	0	0
102.00	3,752	5,871	5,871

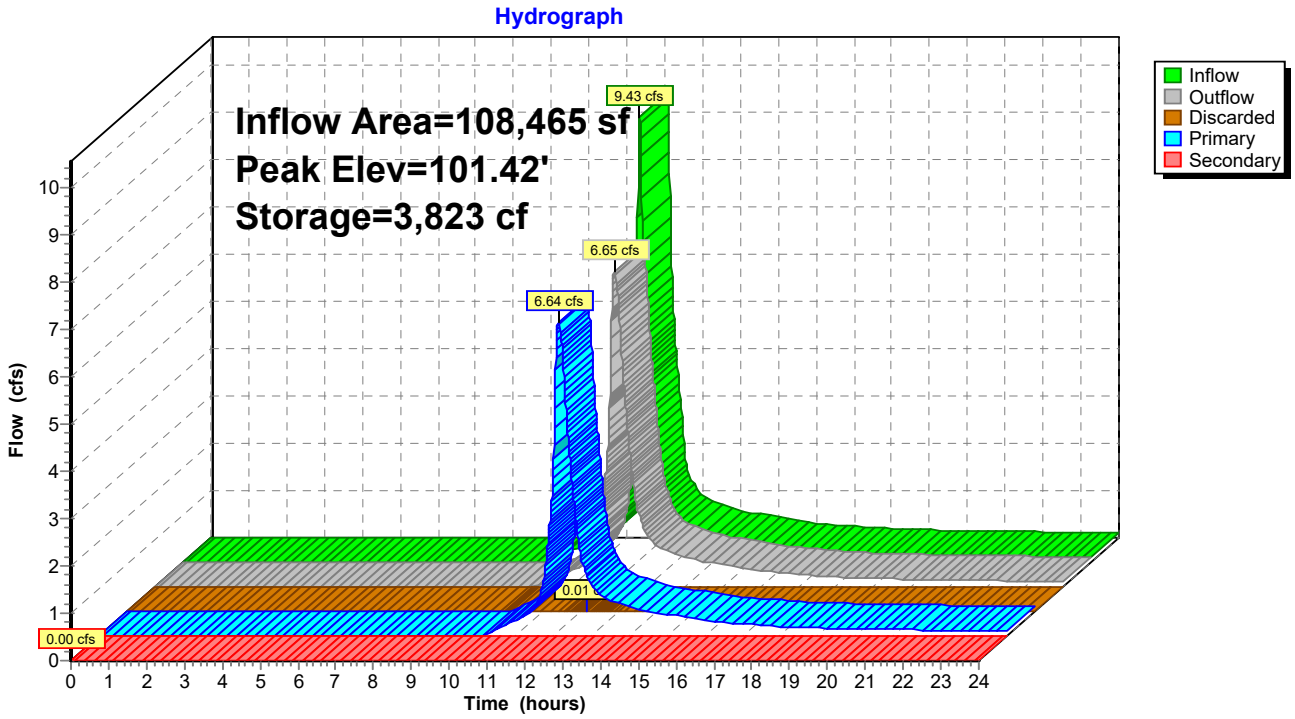
Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	100.00'	**15.0" x 21.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0476 '/' Cc= 0.900 n= 0.013
#3	Device 8	100.25'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#4	Device 8	100.42'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#5	Device 8	100.58'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#6	Device 8	100.75'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#7	Device 8	101.00'	**8.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#8	Primary	98.00'	**12.0" x 43.0' long Culvert** Ke= 0.500 Outlet Invert= 97.14' S= 0.0200 '/' Cc= 0.900 n= 0.013
#9	Secondary	102.00'	**8.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=101.42' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=6.64 cfs @ 12.15 hrs HW=101.42' (Free Discharge)
├**2=Culvert** (Inlet Controls 5.26 cfs @ 4.28 fps)
└**8=Culvert** (Passes 1.38 cfs of 6.46 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.08 cfs @ 5.15 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.76 fps)
  ├**5=Orifice/Grate** (Orifice Controls 0.07 cfs @ 4.35 fps)
  ├**6=Orifice/Grate** (Orifice Controls 0.06 cfs @ 3.87 fps)
  └**7=Orifice/Grate** (Orifice Controls 1.08 cfs @ 3.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
└**9=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 160P: Bioretention



Pond 218R: CB 17 to DMH 15

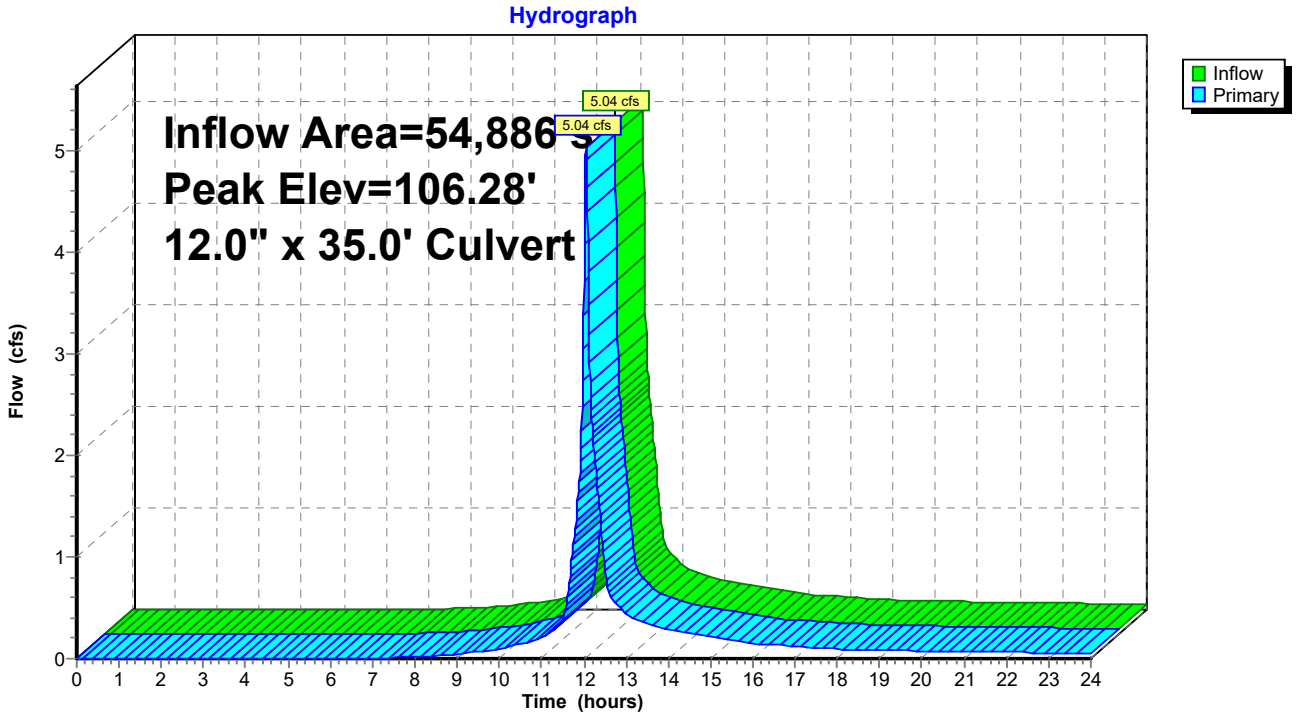
Inflow Area = 54,886 sf, Inflow Depth > 3.12" for 25-Year event
Inflow = 5.04 cfs @ 12.05 hrs, Volume= 14,264 cf
Outflow = 5.04 cfs @ 12.05 hrs, Volume= 14,264 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.04 cfs @ 12.05 hrs, Volume= 14,264 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 106.28' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.00'	**12.0" x 35.0' long Culvert** Ke= 0.500 Outlet Invert= 103.30' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=5.03 cfs @ 12.05 hrs HW=106.27' (Free Discharge)
1=Culvert (Inlet Controls 5.03 cfs @ 6.41 fps)

Pond 218R: CB 17 to DMH 15



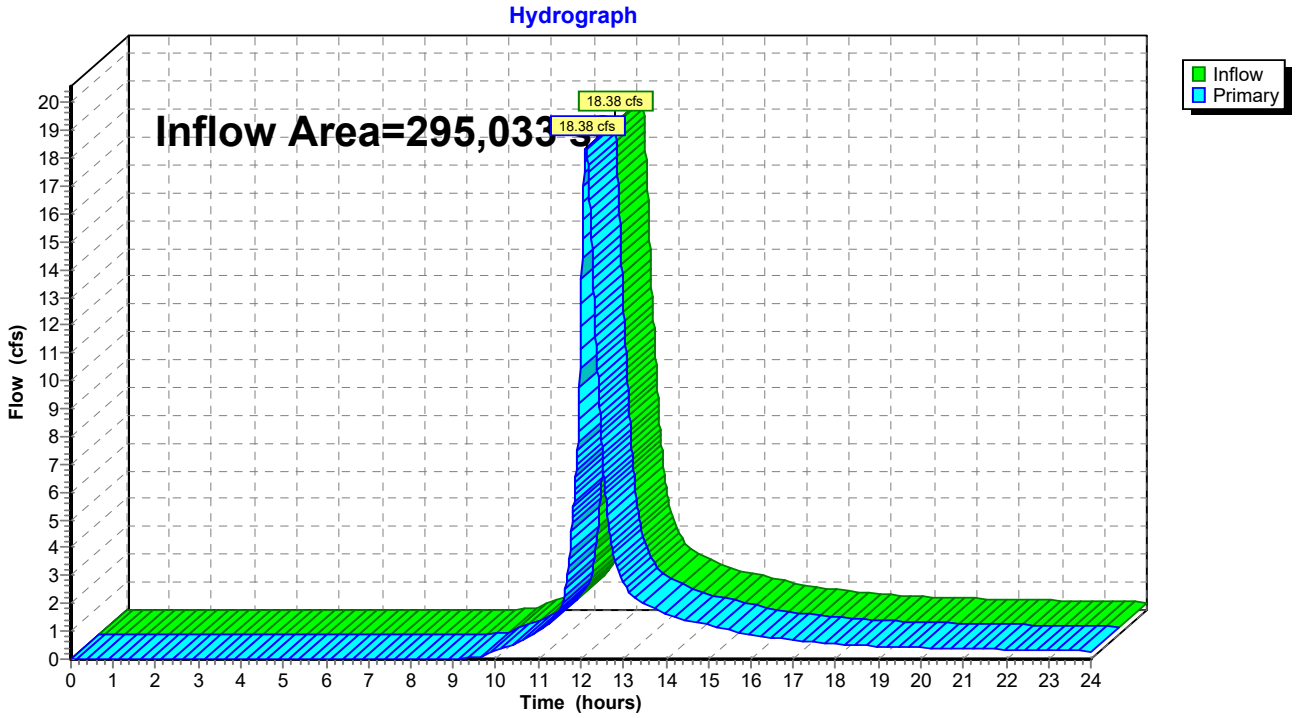
Link A: POA A

Inflow Area = 295,033 sf, Inflow Depth > 3.06" for 25-Year event
Inflow = 18.38 cfs @ 12.13 hrs, Volume= 75,283 cf
Primary = 18.38 cfs @ 12.13 hrs, Volume= 75,283 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 60S: High Point Near Circle to CB 31 Runoff Area=34,413 sf Runoff Depth>5.00"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=87 Runoff=5.38 cfs 14,329 cf

Subcatchment 62S: Back of Unit 9-10 Runoff Area=25,700 sf Runoff Depth>3.71"
Flow Length=230' Slope=0.0200 '/' Tc=8.6 min CN=75 Runoff=2.35 cfs 7,937 cf

Subcatchment 68S: From hill near 19,20 to CB 30 Runoff Area=31,363 sf Runoff Depth>4.89"
Flow Length=150' Slope=0.0250 '/' Tc=0.8 min CN=86 Runoff=4.82 cfs 12,769 cf

Subcatchment 110S: To CB 20 Runoff Area=28,314 sf Runoff Depth>4.88"
Flow Length=270' Tc=3.7 min CN=86 Runoff=3.93 cfs 11,522 cf

Subcatchment 112S: To CB 22 Runoff Area=20,038 sf Runoff Depth>4.66"
Flow Length=280' Slope=0.0400 '/' Tc=3.8 min CN=84 Runoff=2.67 cfs 7,788 cf

Subcatchment 114S: Behind Units 1-3 Runoff Area=25,265 sf Runoff Depth>4.02"
Flow Length=130' Tc=8.0 min CN=78 Runoff=2.55 cfs 8,459 cf

Subcatchment 132S: Behind Unit 4 Runoff Area=21,345 sf Runoff Depth>3.81"
Flow Length=130' Tc=1.0 min CN=76 Runoff=2.62 cfs 6,786 cf

Subcatchment 134S: Behind Units 7,6,5 Runoff Area=34,848 sf Runoff Depth>3.92"
Flow Length=70' Slope=0.0200 '/' Tc=3.1 min CN=77 Runoff=4.08 cfs 11,375 cf

Subcatchment 140S: Directly into Detention Basin Runoff Area=30,492 sf Runoff Depth>3.81"
Flow Length=200' Slope=0.0100 '/' Tc=11.0 min CN=76 Runoff=2.65 cfs 9,674 cf

Subcatchment 158S: Back of Units 11-15 Runoff Area=29,185 sf Runoff Depth>4.12"
Flow Length=230' Tc=7.3 min CN=79 Runoff=3.09 cfs 10,029 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,070 sf Runoff Depth>3.20"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.97 cfs 3,750 cf

Reach 1R: Existing wetland channel to WF Avg. Depth=0.22' Max Vel=4.30 fps Inflow=6.24 cfs 21,716 cf
n=0.022 L=300.0' S=0.0333 '/' Capacity=82.44 cfs Outflow=6.19 cfs 21,682 cf

Reach 902R: Existing wetland channel to Avg. Depth=0.47' Max Vel=7.34 fps Inflow=23.81 cfs 101,598 cf
n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=23.80 cfs 101,570 cf

Pond 1P: DMH 32 to Extended Detention Peak Elev=104.61' Inflow=10.20 cfs 27,099 cf
15.0" x 41.0' Culvert Outflow=10.20 cfs 27,099 cf

Pond 2P: Forebay Peak Elev=101.70' Storage=1,681 cf Inflow=12.72 cfs 39,145 cf
Outflow=12.50 cfs 38,217 cf

Pond 3P: Forebay Peak Elev=99.64' Storage=1,663 cf Inflow=11.53 cfs 36,773 cf
Outflow=11.11 cfs 35,817 cf

Pond 8P: Detention Basin Peak Elev=98.88' Storage=1,703 cf Inflow=11.11 cfs 35,817 cf
Primary=9.06 cfs 35,764 cf Secondary=0.00 cfs 0 cf Outflow=9.06 cfs 35,764 cf

Pond 43R: CB 31 to DMH 32 Peak Elev=104.52' Inflow=5.38 cfs 14,329 cf
12.0" x 12.0' Culvert Outflow=5.38 cfs 14,329 cf

Pond 44R: CB 30 to DMH 32 Peak Elev=104.13' Inflow=4.82 cfs 12,769 cf
12.0" x 12.0' Culvert Outflow=4.82 cfs 12,769 cf

Pond 111P: CB 16 to DMH 15 Peak Elev=104.58' Inflow=3.93 cfs 11,522 cf
12.0" x 5.0' Culvert Outflow=3.93 cfs 11,522 cf

Pond 159P: DMH 15 to Bioretention Peak Elev=106.88' Inflow=10.66 cfs 30,685 cf
15.0" x 100.0' Culvert Outflow=10.66 cfs 30,685 cf

Pond 160P: Bioretention Peak Elev=101.78' Storage=5,082 cf Inflow=12.50 cfs 38,217 cf
Discarded=0.01 cfs 499 cf Primary=8.20 cfs 37,366 cf Secondary=0.00 cfs 0 cf Outflow=8.22 cfs 37,865 cf

Pond 218R: CB 17 to DMH 15 Peak Elev=107.67' Inflow=6.74 cfs 19,163 cf
12.0" x 35.0' Culvert Outflow=6.74 cfs 19,163 cf

Link A: POA A Inflow=23.80 cfs 101,570 cf
Primary=23.80 cfs 101,570 cf

Total Runoff Area = 295,033 sf Runoff Volume = 104,419 cf Average Runoff Depth = 4.25"
72.69% Pervious Area = 214,447 sf 27.31% Impervious Area = 80,586 sf

Subcatchment 60S: High Point Near Circle to CB 31

[49] Hint: Tc<2dt may require smaller dt

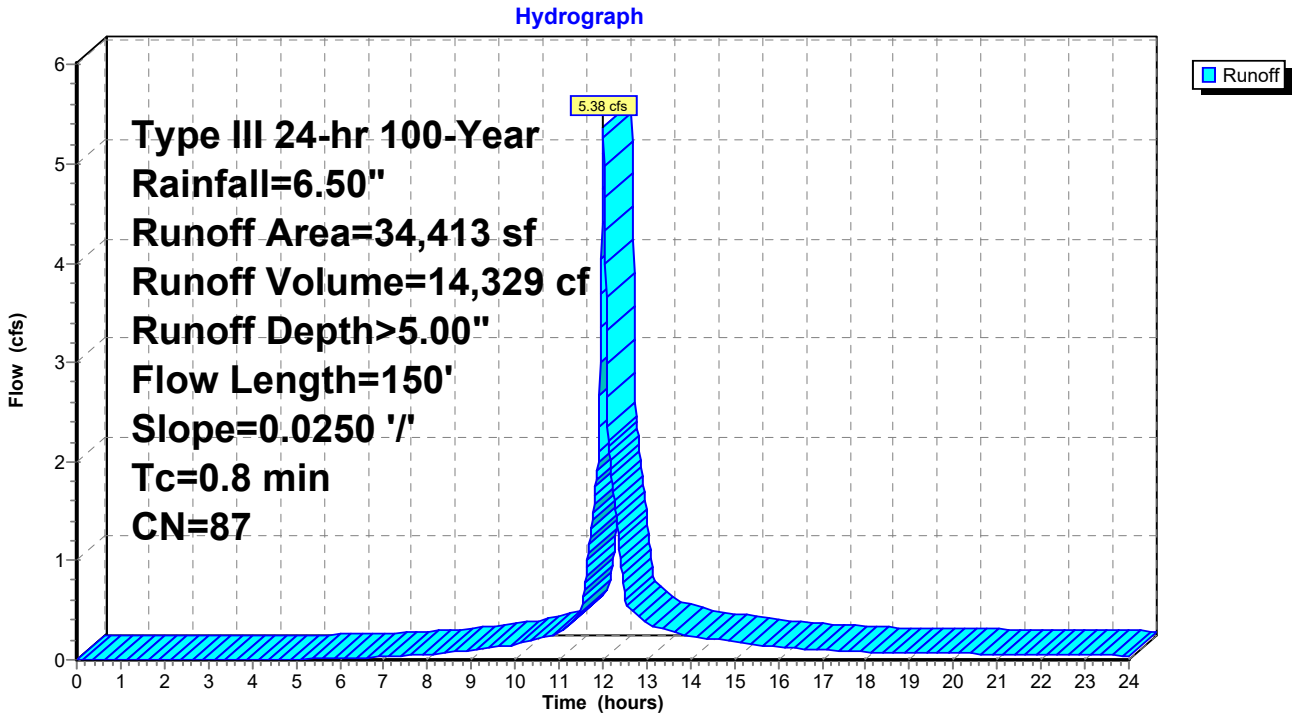
Runoff = 5.38 cfs @ 12.01 hrs, Volume= 14,329 cf, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
18,731	98	Paved parking & roofs
15,682	74	>75% Grass cover, Good, HSG C
34,413	87	Weighted Average
15,682		Pervious Area
18,731		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 60S: High Point Near Circle to CB 31



Subcatchment 62S: Back of Unit 9-10

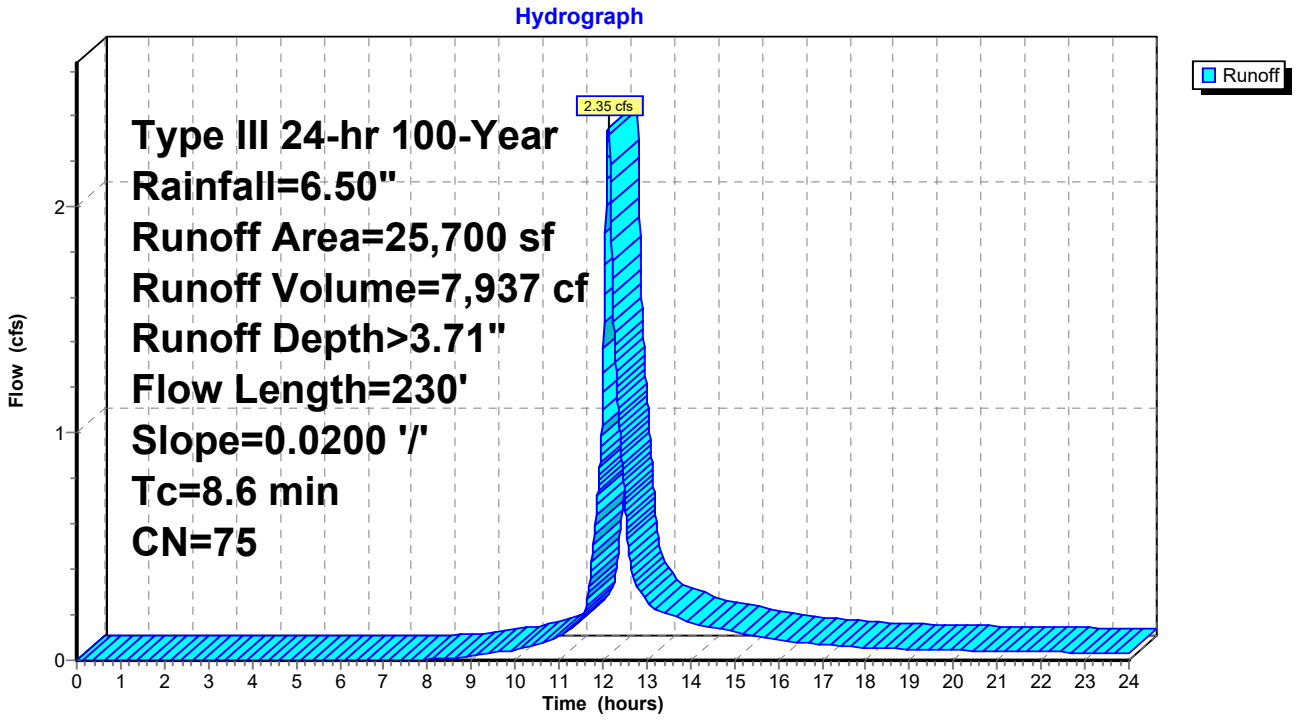
Runoff = 2.35 cfs @ 12.12 hrs, Volume= 7,937 cf, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,742	98	Paved parking & roofs
21,780	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
25,700	75	Weighted Average
23,958		Pervious Area
1,742		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.6	230	Total			

Subcatchment 62S: Back of Unit 9-10



Subcatchment 68S: From hill near 19,20 to CB 30

[49] Hint: Tc<2dt may require smaller dt

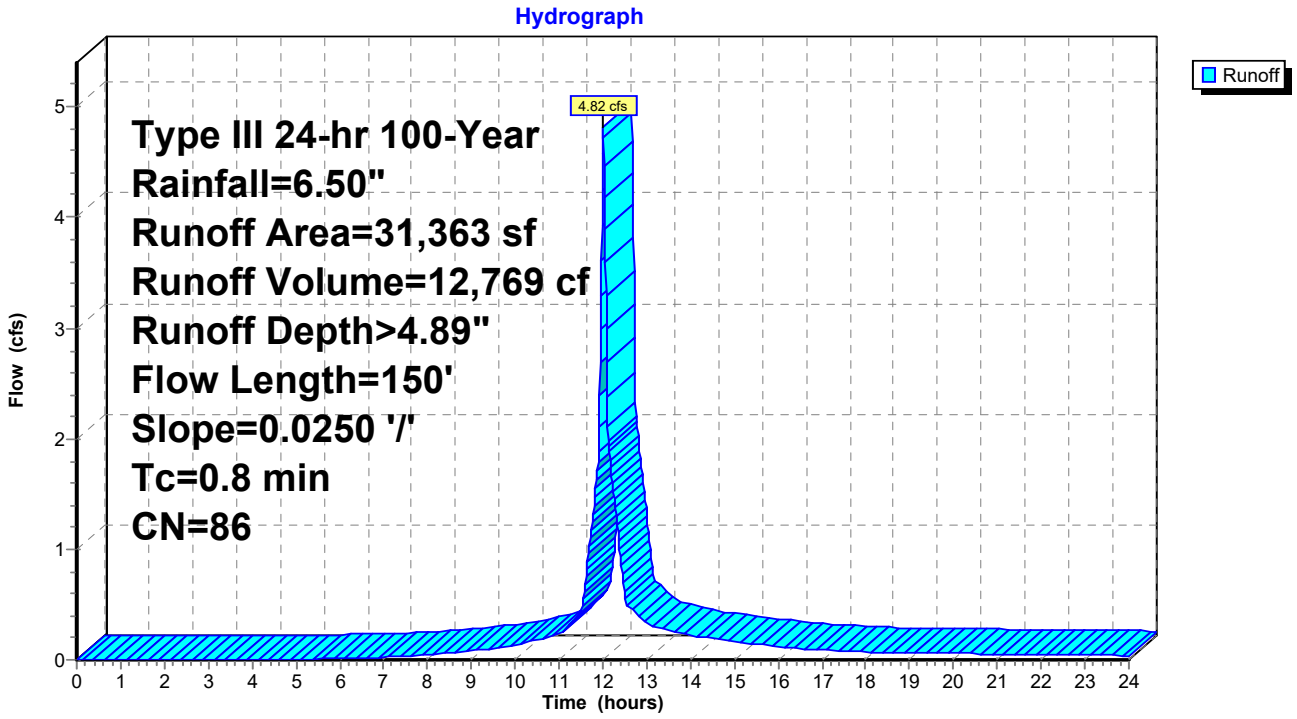
Runoff = 4.82 cfs @ 12.01 hrs, Volume= 12,769 cf, Depth> 4.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
15,246	98	Paved parking & roofs
16,117	74	>75% Grass cover, Good, HSG C
31,363	86	Weighted Average
16,117		Pervious Area
15,246		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	150	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 68S: From hill near 19,20 to CB 30



Subcatchment 110S: To CB 20

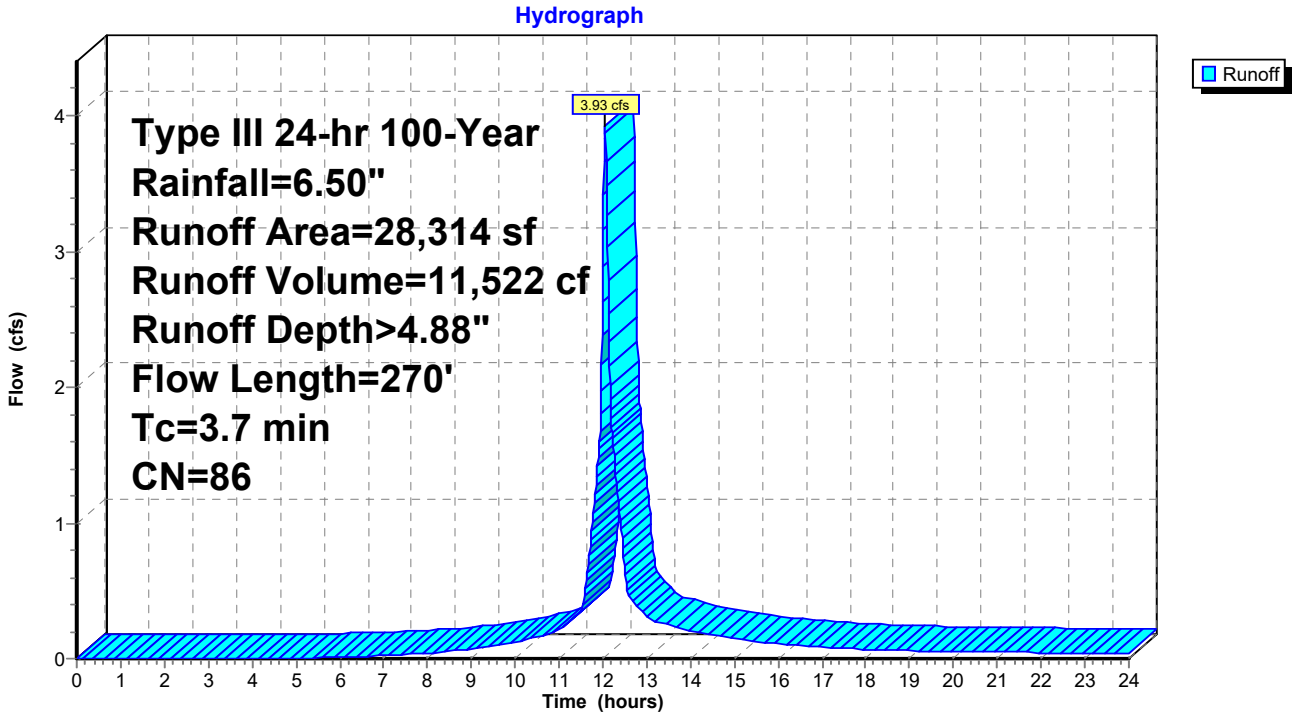
Runoff = 3.93 cfs @ 12.05 hrs, Volume= 11,522 cf, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
14,375	98	Paved parking & roofs
13,939	74	>75% Grass cover, Good, HSG C
28,314	86	Weighted Average
13,939		Pervious Area
14,375		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.7	270	Total			

Subcatchment 110S: To CB 20



Subcatchment 112S: To CB 22

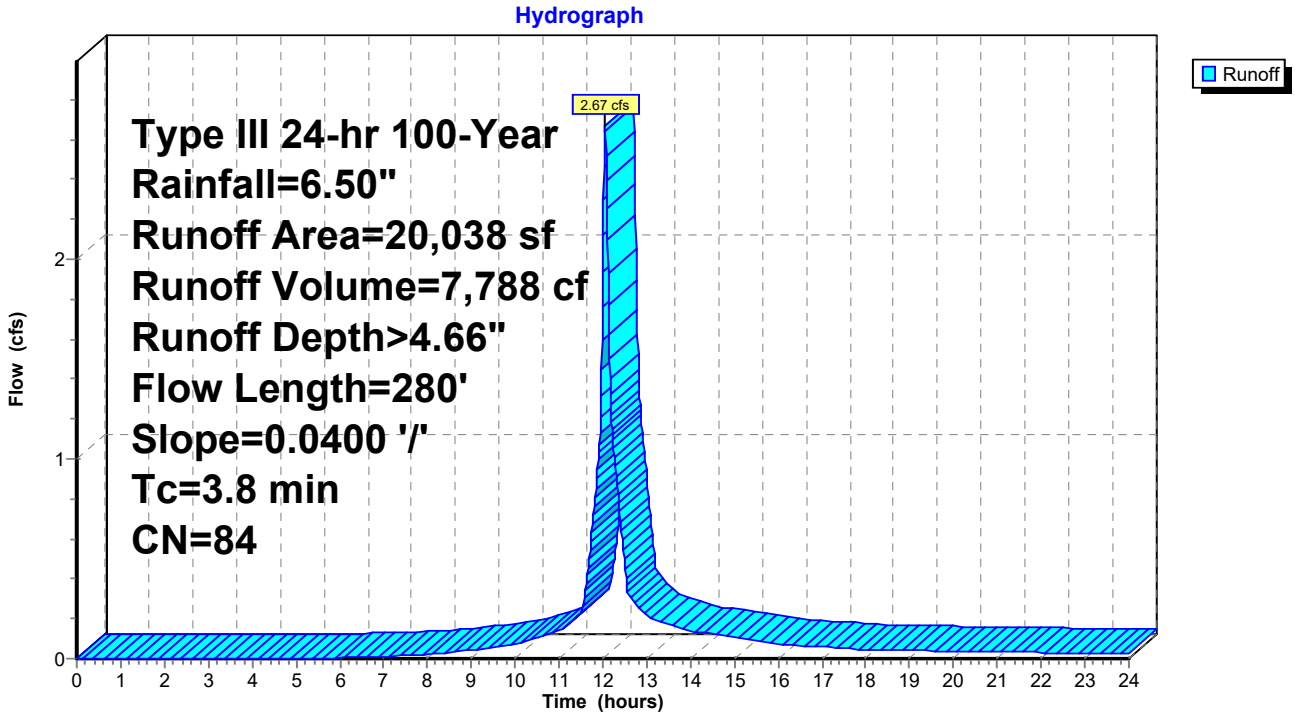
Runoff = 2.67 cfs @ 12.06 hrs, Volume= 7,788 cf, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
8,712	98	Paved parking & roofs
11,326	74	>75% Grass cover, Good, HSG C
20,038	84	Weighted Average
11,326		Pervious Area
8,712		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	30	0.0400	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.0	250	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.8	280	Total			

Subcatchment 112S: To CB 22



Subcatchment 114S: Behind Units 1-3

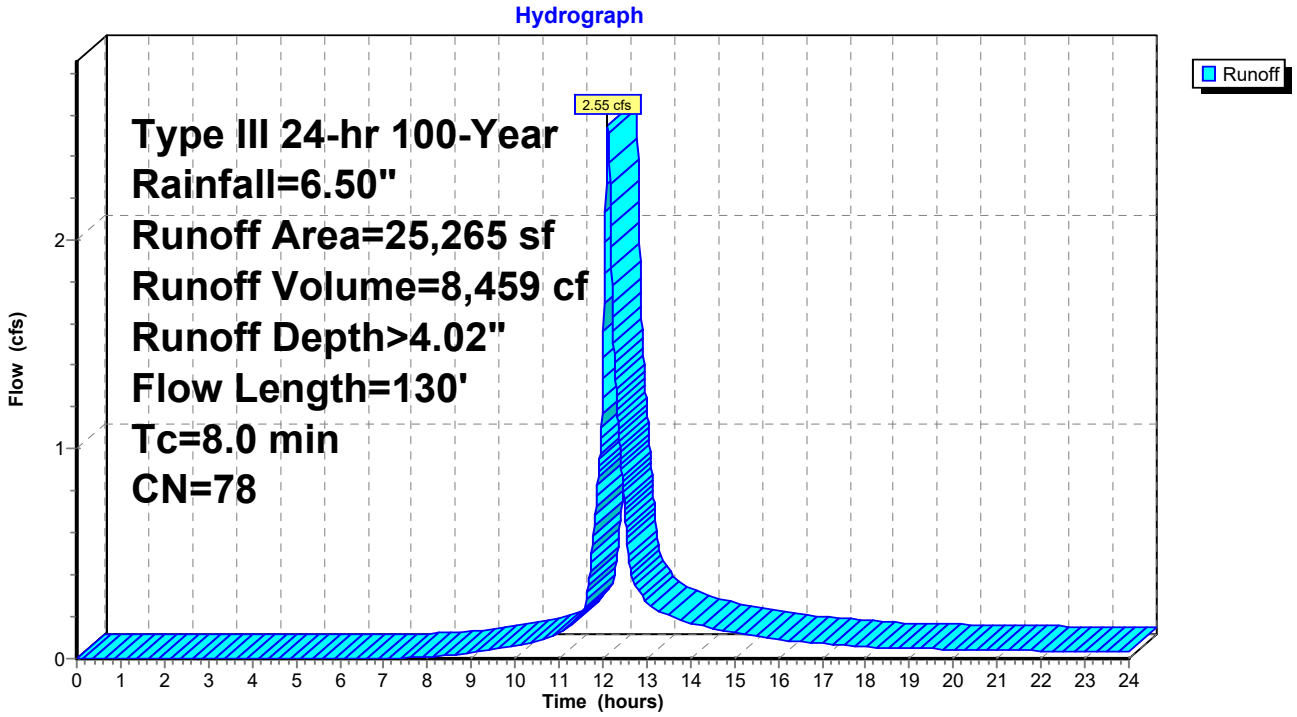
Runoff = 2.55 cfs @ 12.11 hrs, Volume= 8,459 cf, Depth> 4.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,356	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
25,265	78	Weighted Average
20,909		Pervious Area
4,356		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.6	80	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.0	130	Total			

Subcatchment 114S: Behind Units 1-3



Subcatchment 132S: Behind Unit 4

[49] Hint: Tc<2dt may require smaller dt

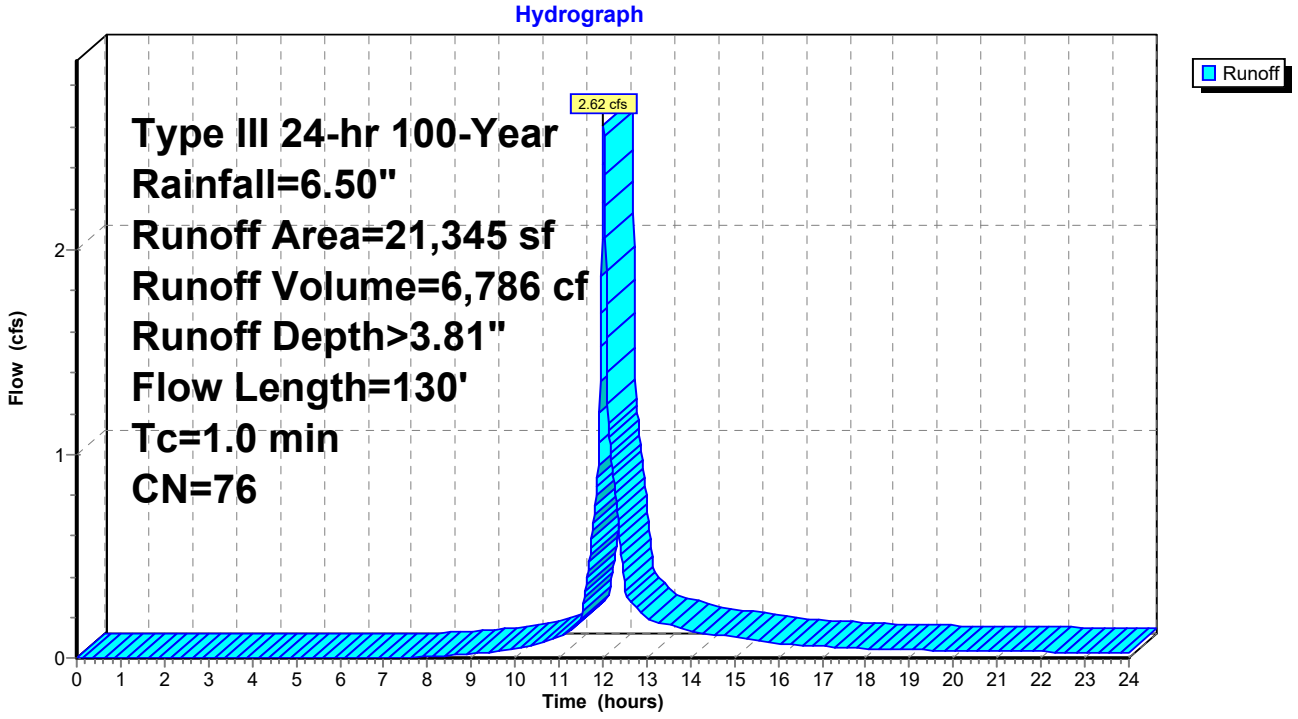
Runoff = 2.62 cfs @ 12.02 hrs, Volume= 6,786 cf, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,485	98	Paved parking & roofs
8,712	74	>75% Grass cover, Good, HSG C
9,148	70	Woods, Good, HSG C
21,345	76	Weighted Average
17,860		Pervious Area
3,485		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	80	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	130	Total			

Subcatchment 132S: Behind Unit 4



Subcatchment 134S: Behind Units 7,6,5

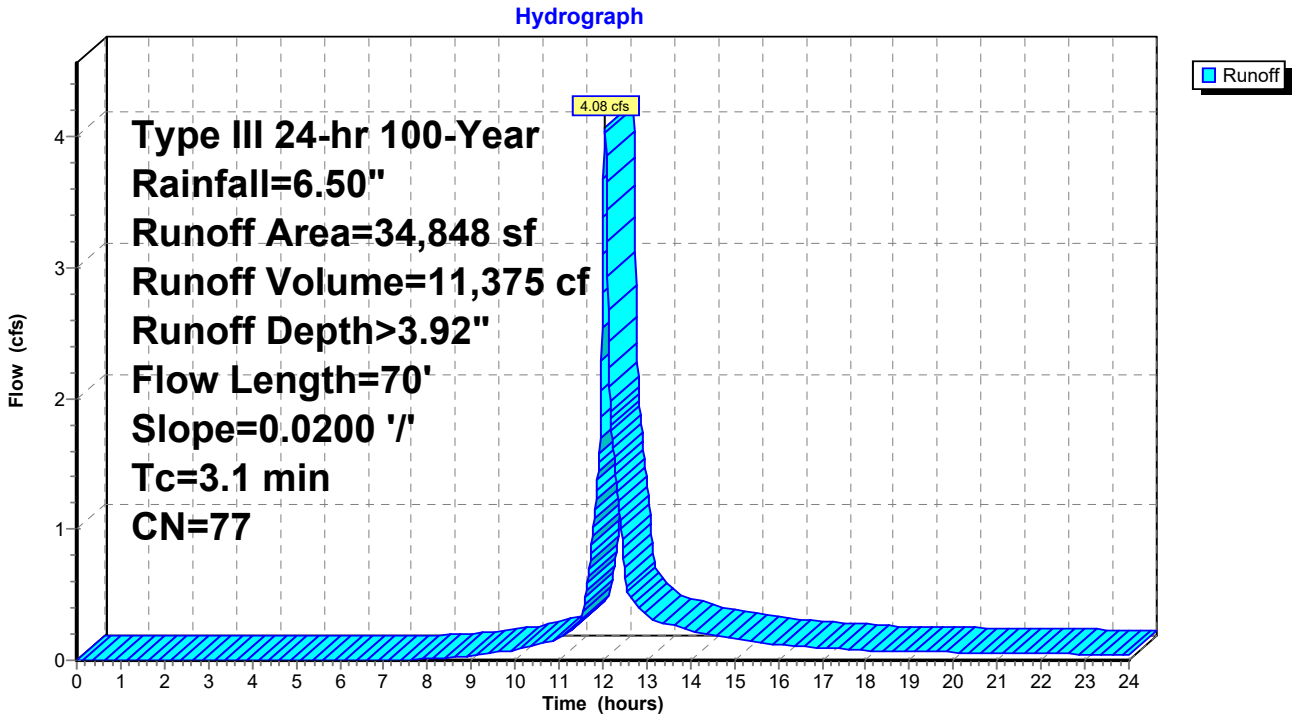
Runoff = 4.08 cfs @ 12.05 hrs, Volume= 11,375 cf, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,792	98	Paved parking & roofs
28,314	74	>75% Grass cover, Good, HSG C
1,742	70	Woods, Good, HSG C
34,848	77	Weighted Average
30,056		Pervious Area
4,792		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: Behind Units 7,6,5



Subcatchment 140S: Directly into Detention Basin

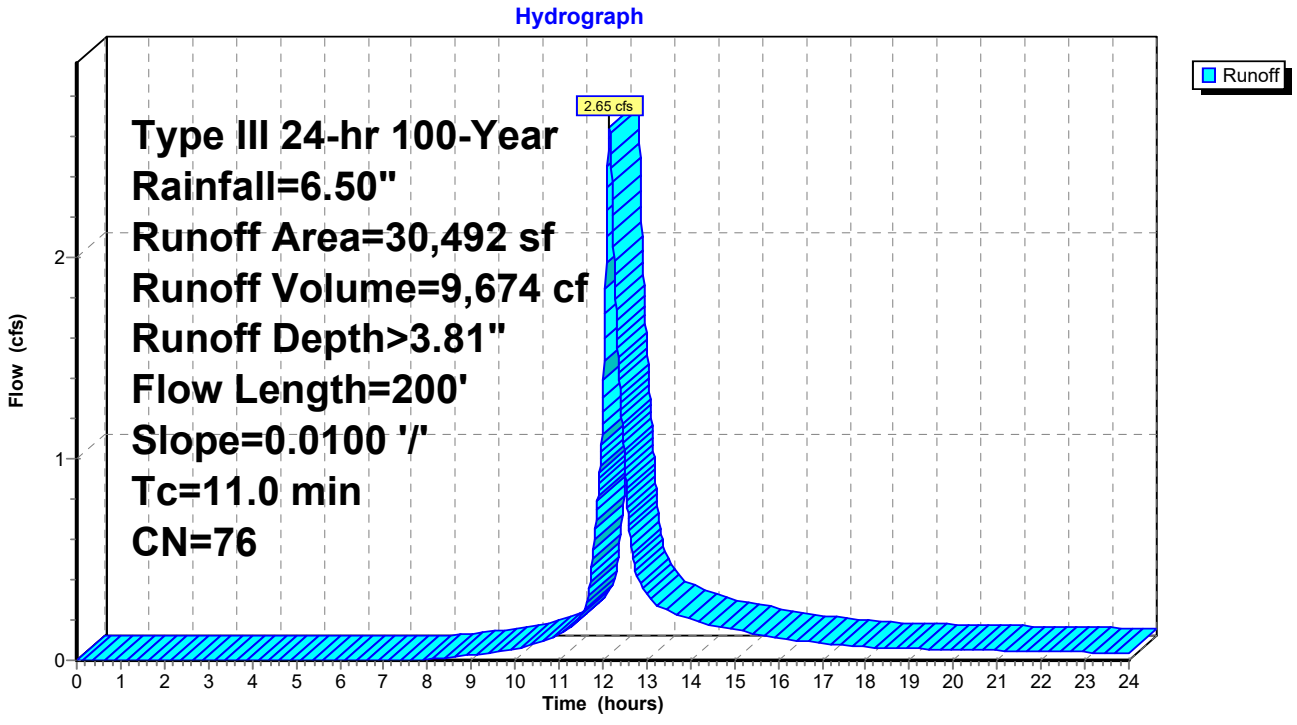
Runoff = 2.65 cfs @ 12.15 hrs, Volume= 9,674 cf, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,049	98	Paved parking & roofs
23,958	74	>75% Grass cover, Good, HSG C
3,485	70	Woods, Good, HSG C
30,492	76	Weighted Average
27,443		Pervious Area
3,049		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.6	150	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.0	200	Total			

Subcatchment 140S: Directly into Detention Basin



Subcatchment 158S: Back of Units 11-15

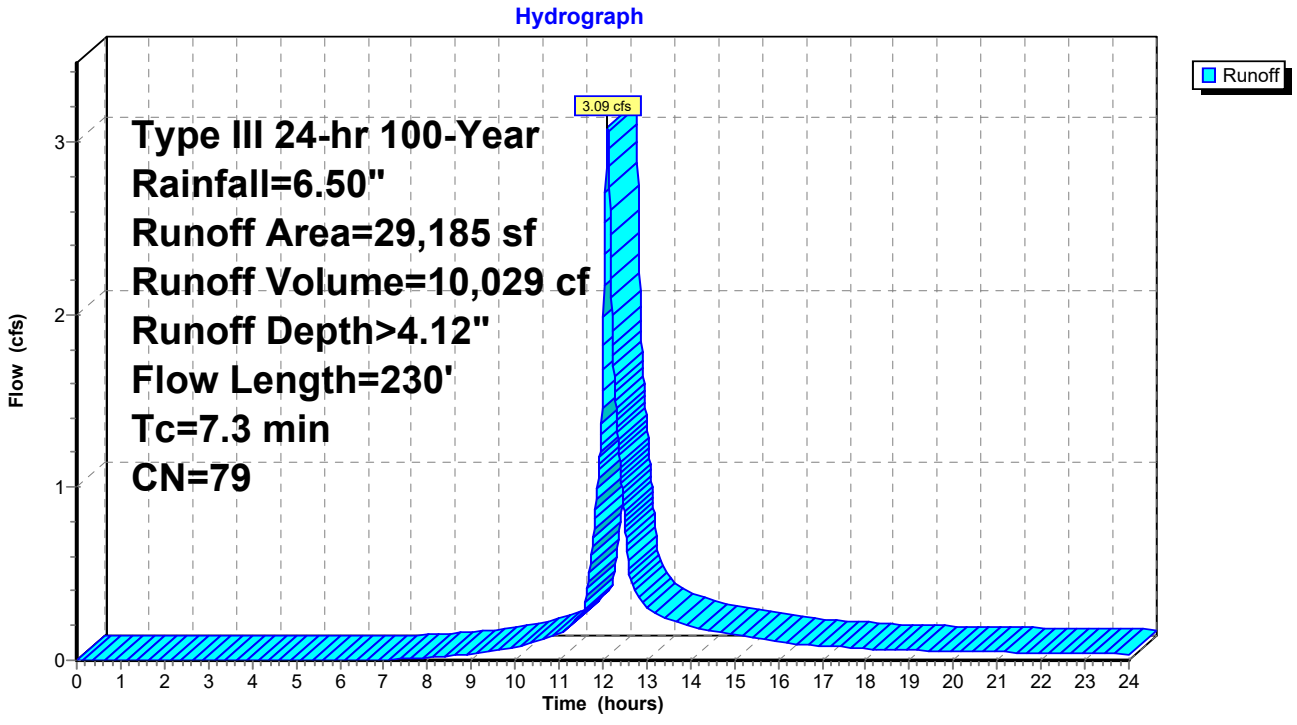
Runoff = 3.09 cfs @ 12.10 hrs, Volume= 10,029 cf, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
6,098	98	Paved parking & roofs
20,909	74	>75% Grass cover, Good, HSG C
2,178	70	Woods, Good, HSG C
29,185	79	Weighted Average
23,087		Pervious Area
6,098		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	230	Total			

Subcatchment 158S: Back of Units 11-15



Subcatchment 900: North Offsite flowing onto property

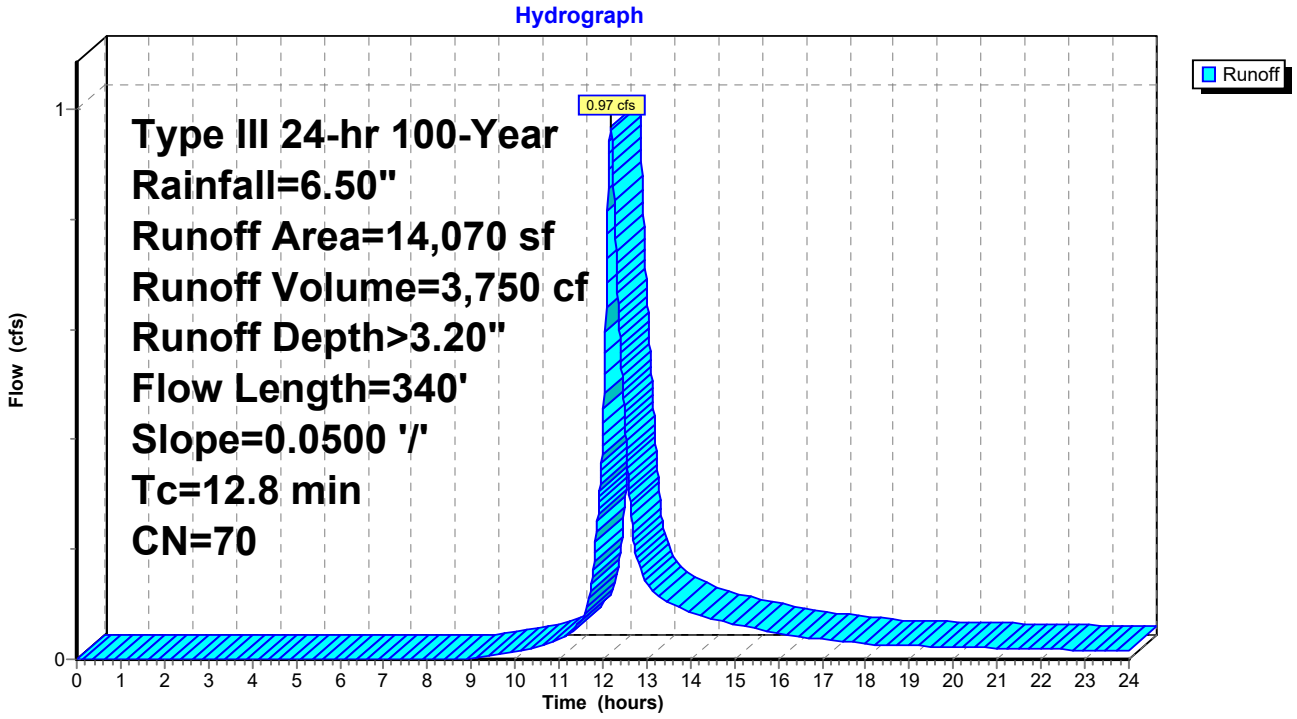
Runoff = 0.97 cfs @ 12.18 hrs, Volume= 3,750 cf, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
14,070	70	Woods, Good, HSG C
14,070		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property



Reach 1R: Existing wetland channel to WF 16

Inflow Area = 68,955 sf, Inflow Depth > 3.78" for 100-Year event
Inflow = 6.24 cfs @ 12.12 hrs, Volume= 21,716 cf
Outflow = 6.19 cfs @ 12.15 hrs, Volume= 21,682 cf, Atten= 1%, Lag= 1.9 min

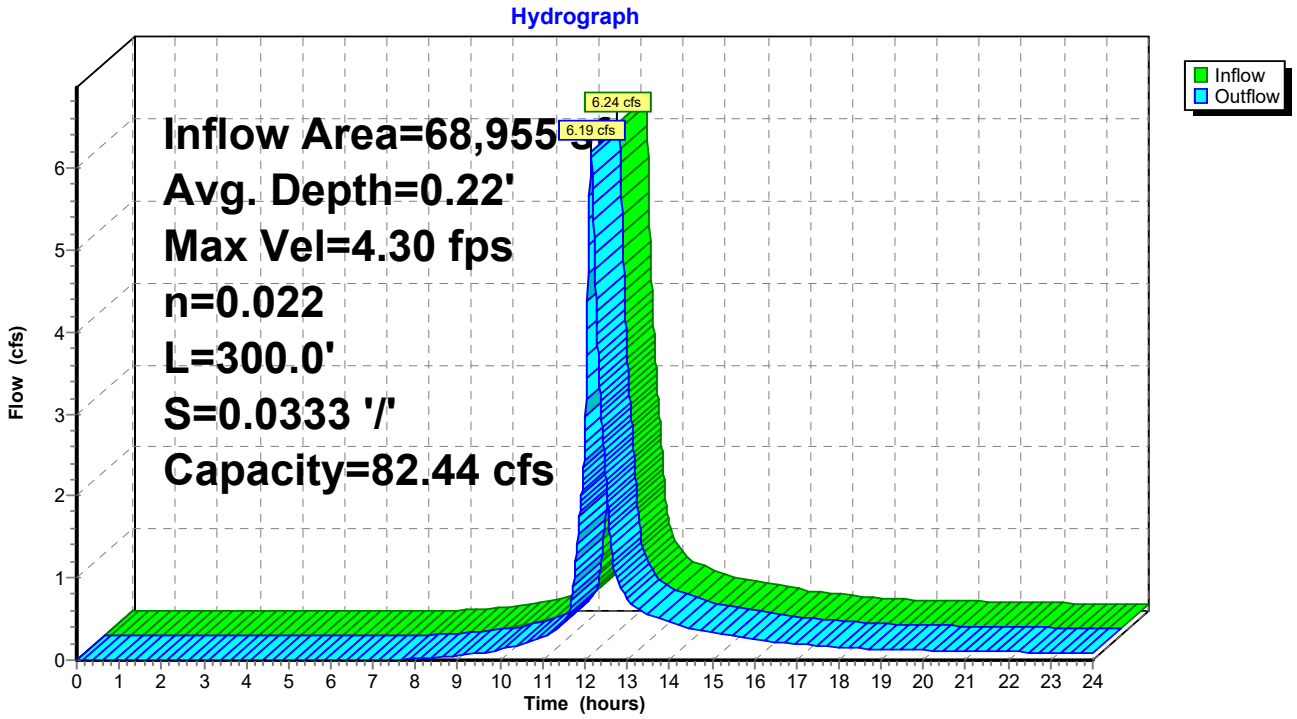
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.30 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 4.2 min

Peak Storage= 432 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'

‡

Reach 1R: Existing wetland channel to WF 16



Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 5% of Reach 1R bottom

Inflow Area = 295,033 sf, Inflow Depth > 4.13" for 100-Year event
Inflow = 23.81 cfs @ 12.13 hrs, Volume= 101,598 cf
Outflow = 23.80 cfs @ 12.14 hrs, Volume= 101,570 cf, Atten= 0%, Lag= 0.4 min

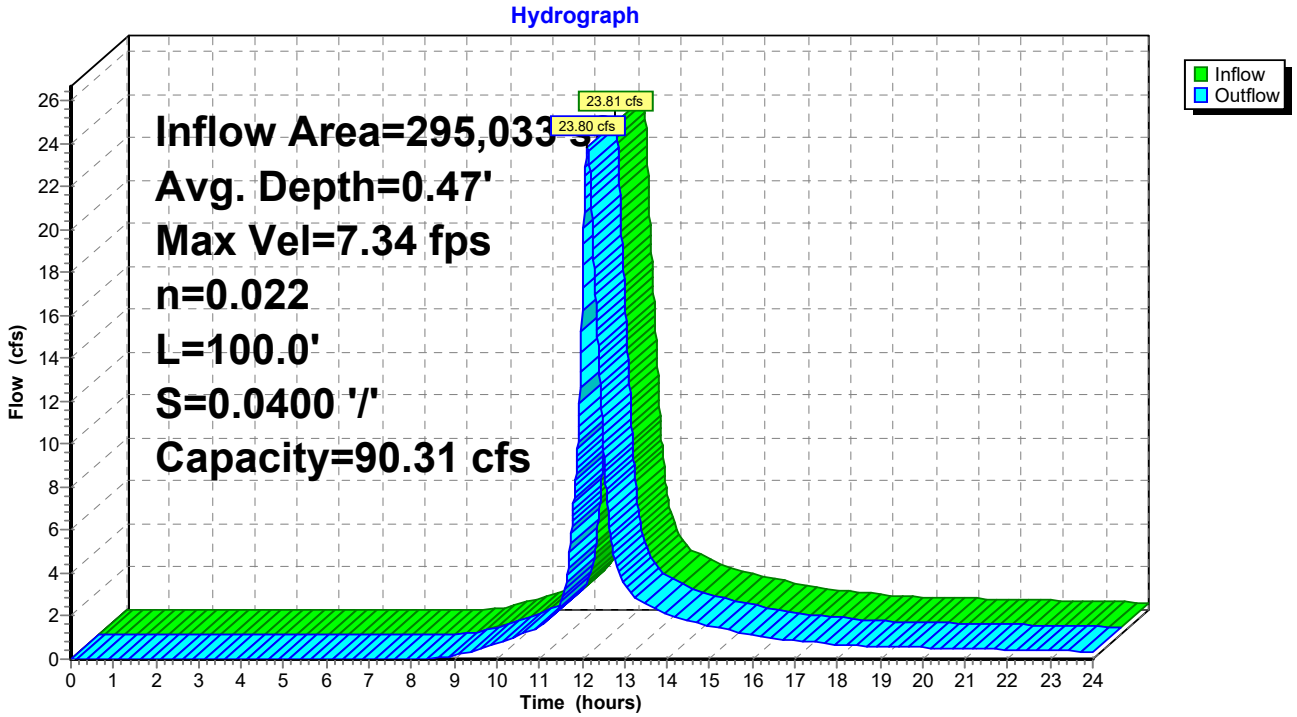
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.34 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.21 fps, Avg. Travel Time= 0.8 min

Peak Storage= 324 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0400 '/'
Inlet Invert= 86.00', Outlet Invert= 82.00'

‡

Reach 902R: Existing wetland channel to WF 13



Pond 1P: DMH 32 to Extended Detention

[81] Warning: Exceeded Pond 43R by 0.08' @ 12.01 hrs
[81] Warning: Exceeded Pond 44R by 0.48' @ 12.01 hrs

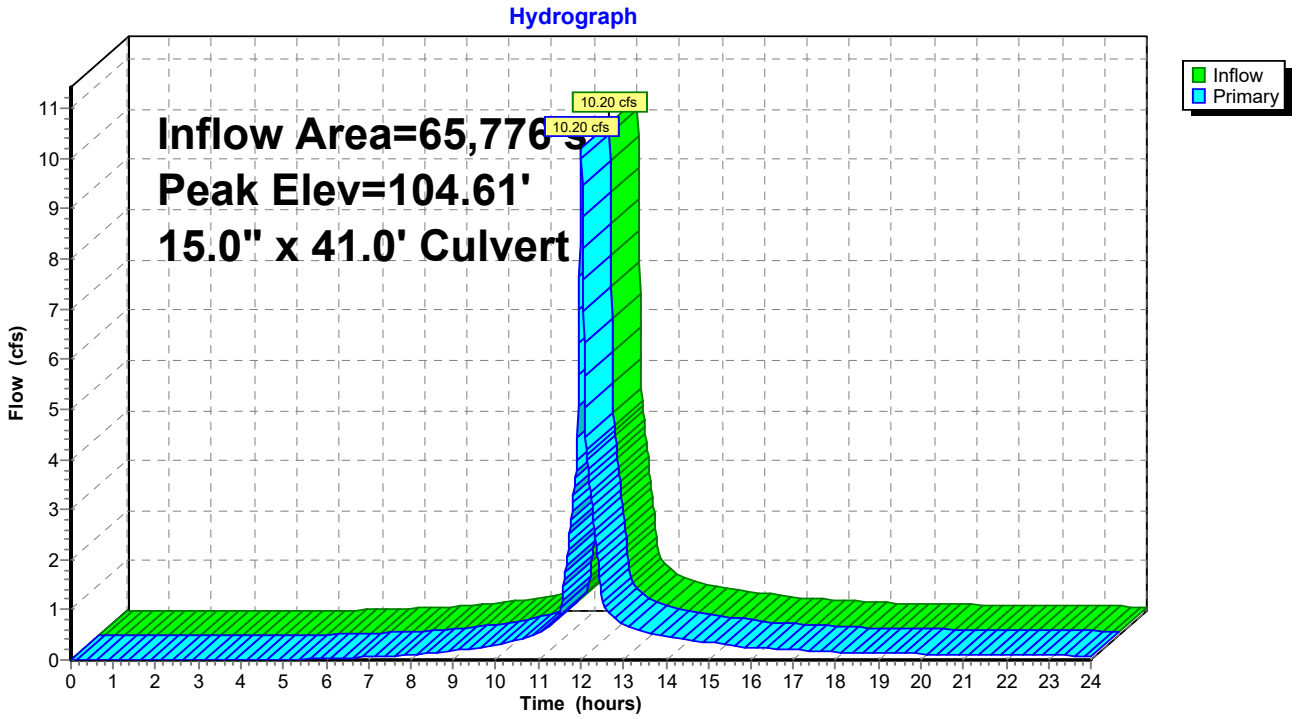
Inflow Area = 65,776 sf, Inflow Depth > 4.94" for 100-Year event
Inflow = 10.20 cfs @ 12.01 hrs, Volume= 27,099 cf
Outflow = 10.20 cfs @ 12.01 hrs, Volume= 27,099 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.20 cfs @ 12.01 hrs, Volume= 27,099 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.61' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**15.0" x 41.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0488 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=10.14 cfs @ 12.01 hrs HW=104.57' (Free Discharge)
1=Culvert (Inlet Controls 10.14 cfs @ 8.26 fps)

Pond 1P: DMH 32 to Extended Detention



Pond 2P: Forebay

[79] Warning: Submerged Pond 159P Primary device # 1 OUTLET by 0.70'

Inflow Area = 108,465 sf, Inflow Depth > 4.33" for 100-Year event
Inflow = 12.72 cfs @ 12.06 hrs, Volume= 39,145 cf
Outflow = 12.50 cfs @ 12.07 hrs, Volume= 38,217 cf, Atten= 2%, Lag= 0.8 min
Primary = 12.50 cfs @ 12.07 hrs, Volume= 38,217 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.70' @ 12.07 hrs Surf.Area= 1,220 sf Storage= 1,681 cf

Plug-Flow detention time= 23.0 min calculated for 38,201 cf (98% of inflow)
Center-of-Mass det. time= 9.0 min (814.4 - 805.4)

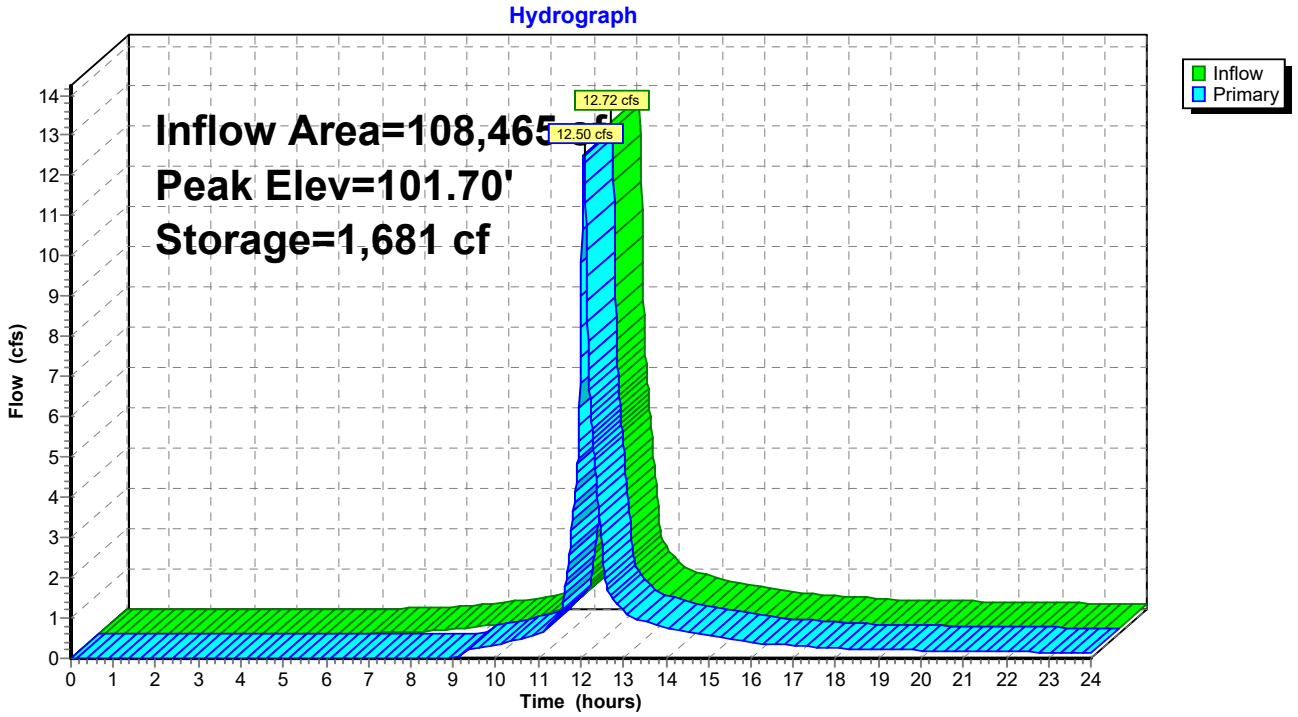
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	2,060 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	758	0	0
102.00	1,302	2,060	2,060

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**8.0' long x 25.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=12.48 cfs @ 12.07 hrs HW=101.70' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 12.48 cfs @ 2.23 fps)

Pond 2P: Forebay



Pond 3P: Forebay

[79] Warning: Submerged Pond 1P Primary device # 1 OUTLET by 0.64'

Inflow Area = 96,268 sf, Inflow Depth > 4.58" for 100-Year event
Inflow = 11.53 cfs @ 12.01 hrs, Volume= 36,773 cf
Outflow = 11.11 cfs @ 12.03 hrs, Volume= 35,817 cf, Atten= 4%, Lag= 0.8 min
Primary = 11.11 cfs @ 12.03 hrs, Volume= 35,817 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.64' @ 12.03 hrs Surf.Area= 1,237 sf Storage= 1,663 cf

Plug-Flow detention time= 25.9 min calculated for 35,817 cf (97% of inflow)
Center-of-Mass det. time= 10.5 min (808.2 - 797.7)

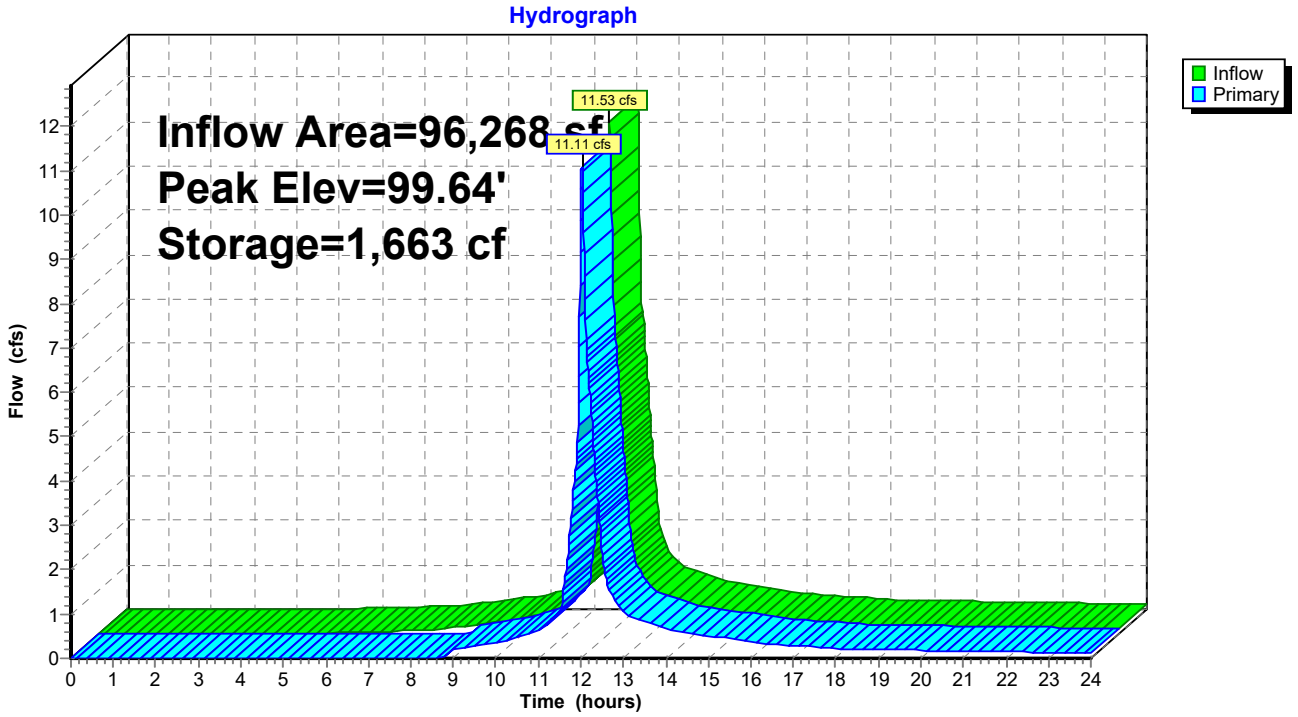
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	2,121 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	786	0	0
100.00	1,335	2,121	2,121

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**8.0' long x 30.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=11.09 cfs @ 12.03 hrs HW=99.64' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 11.09 cfs @ 2.15 fps)

Pond 3P: Forebay



Pond 8P: Detention Basin

Inflow Area = 96,268 sf, Inflow Depth > 4.46" for 100-Year event
Inflow = 11.11 cfs @ 12.03 hrs, Volume= 35,817 cf
Outflow = 9.06 cfs @ 12.08 hrs, Volume= 35,764 cf, Atten= 18%, Lag= 3.2 min
Primary = 9.06 cfs @ 12.08 hrs, Volume= 35,764 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 98.88' @ 12.08 hrs Surf.Area= 1,439 sf Storage= 1,703 cf
Flood Elev= 100.00' Surf.Area= 2,037 sf Storage= 3,644 cf

Plug-Flow detention time= 3.7 min calculated for 35,749 cf (100% of inflow)
Center-of-Mass det. time= 2.8 min (811.0 - 808.2)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	3,644 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

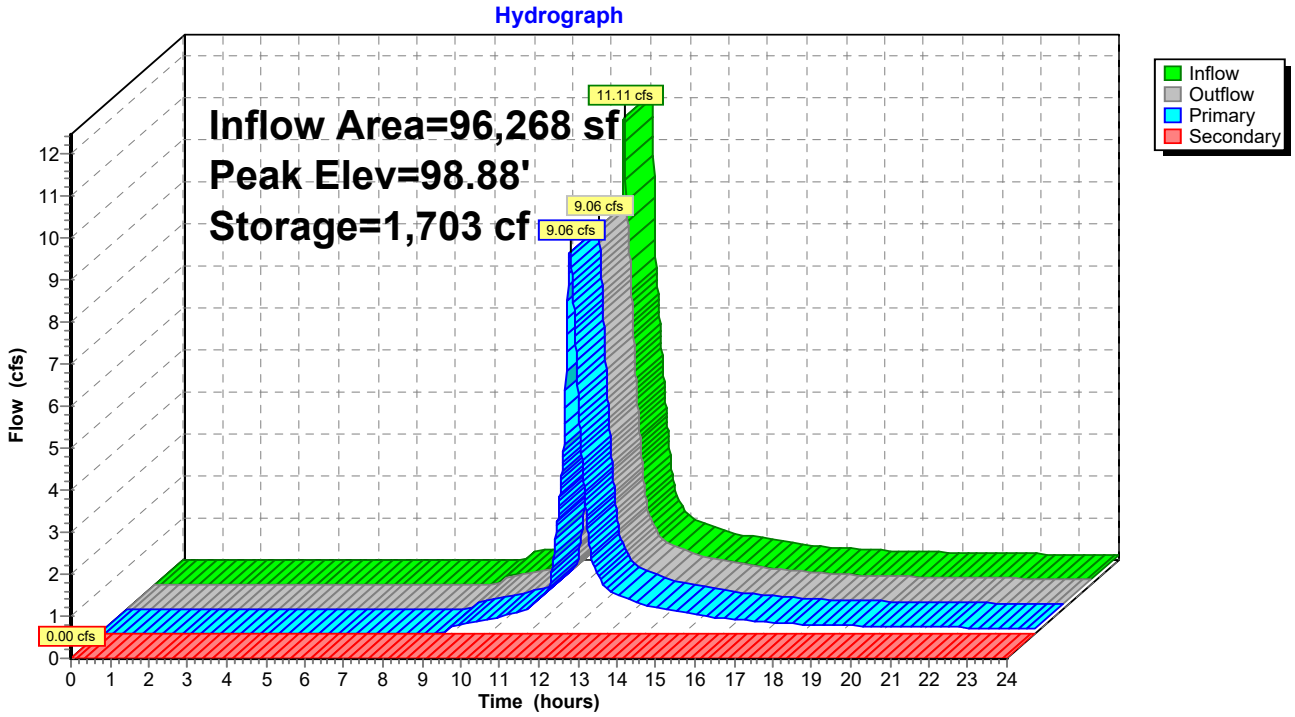
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	315	0	0
98.00	966	641	641
100.00	2,037	3,003	3,644

Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**18.0" x 30.0' long Culvert** Ke= 0.500 Outlet Invert= 96.00' S= 0.0333 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean
#2	Secondary	99.50'	**8.0' 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=9.06 cfs @ 12.08 hrs HW=98.88' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.06 cfs @ 5.12 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Detention Basin



Pond 43R: CB 31 to DMH 32

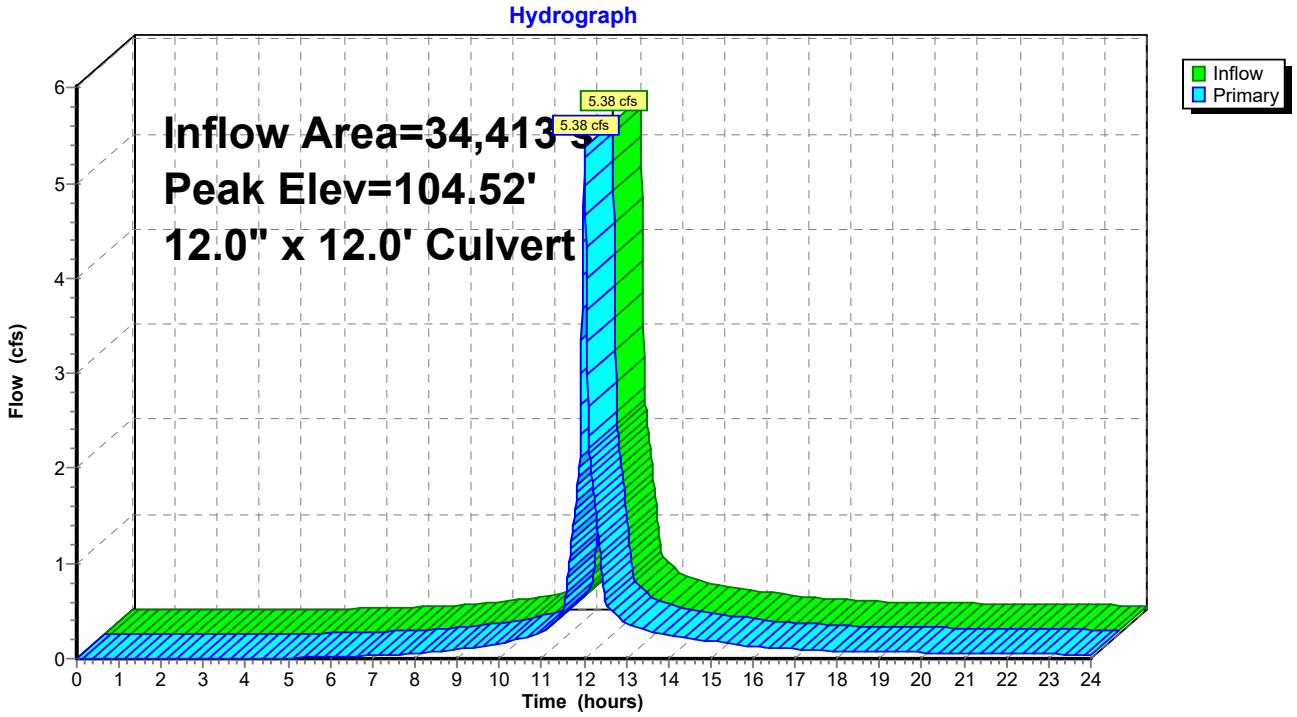
Inflow Area = 34,413 sf, Inflow Depth > 5.00" for 100-Year event
Inflow = 5.38 cfs @ 12.01 hrs, Volume= 14,329 cf
Outflow = 5.38 cfs @ 12.01 hrs, Volume= 14,329 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.38 cfs @ 12.01 hrs, Volume= 14,329 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.52' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=5.35 cfs @ 12.01 hrs HW=104.50' (Free Discharge)
1=Culvert (Inlet Controls 5.35 cfs @ 6.81 fps)

Pond 43R: CB 31 to DMH 32



Pond 44R: CB 30 to DMH 32

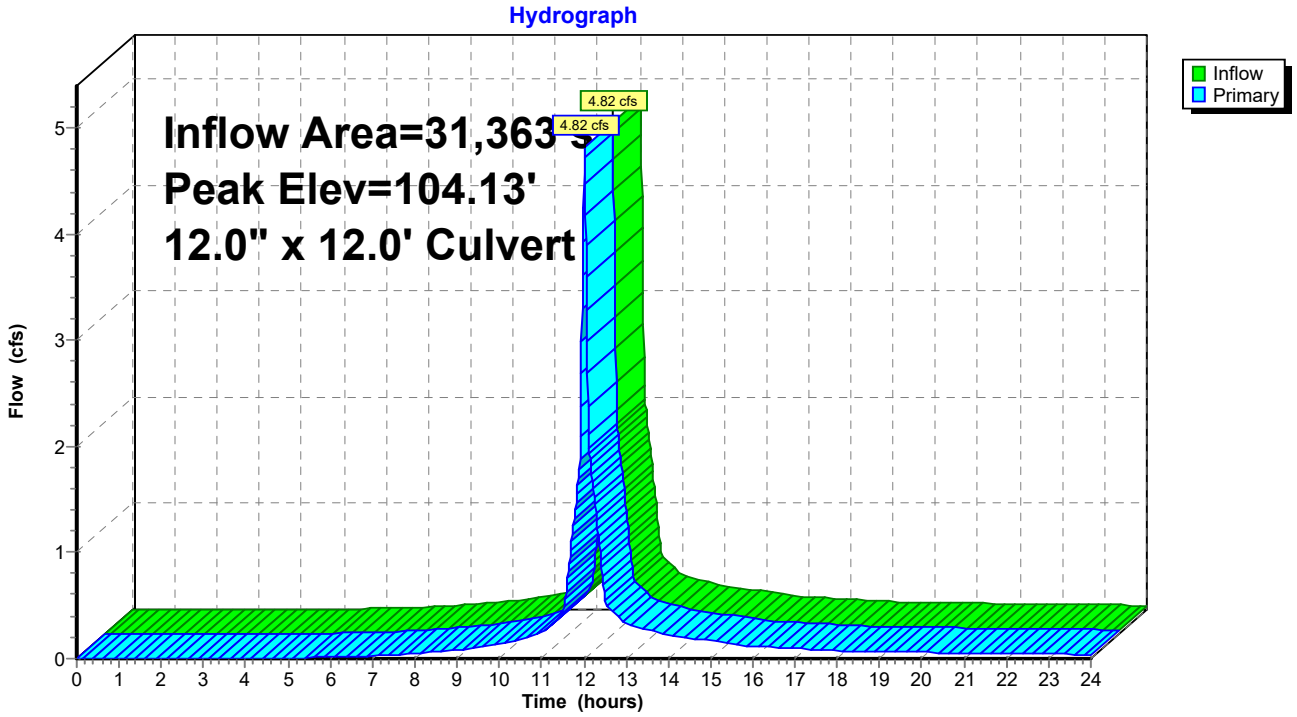
Inflow Area = 31,363 sf, Inflow Depth > 4.89" for 100-Year event
Inflow = 4.82 cfs @ 12.01 hrs, Volume= 12,769 cf
Outflow = 4.82 cfs @ 12.01 hrs, Volume= 12,769 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.82 cfs @ 12.01 hrs, Volume= 12,769 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.13' @ 12.01 hrs
Flood Elev= 106.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	102.00'	**12.0" x 12.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.76' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=4.79 cfs @ 12.01 hrs HW=104.11' (Free Discharge)
1=Culvert (Inlet Controls 4.79 cfs @ 6.10 fps)

Pond 44R: CB 30 to DMH 32



Pond 111P: CB 16 to DMH 15

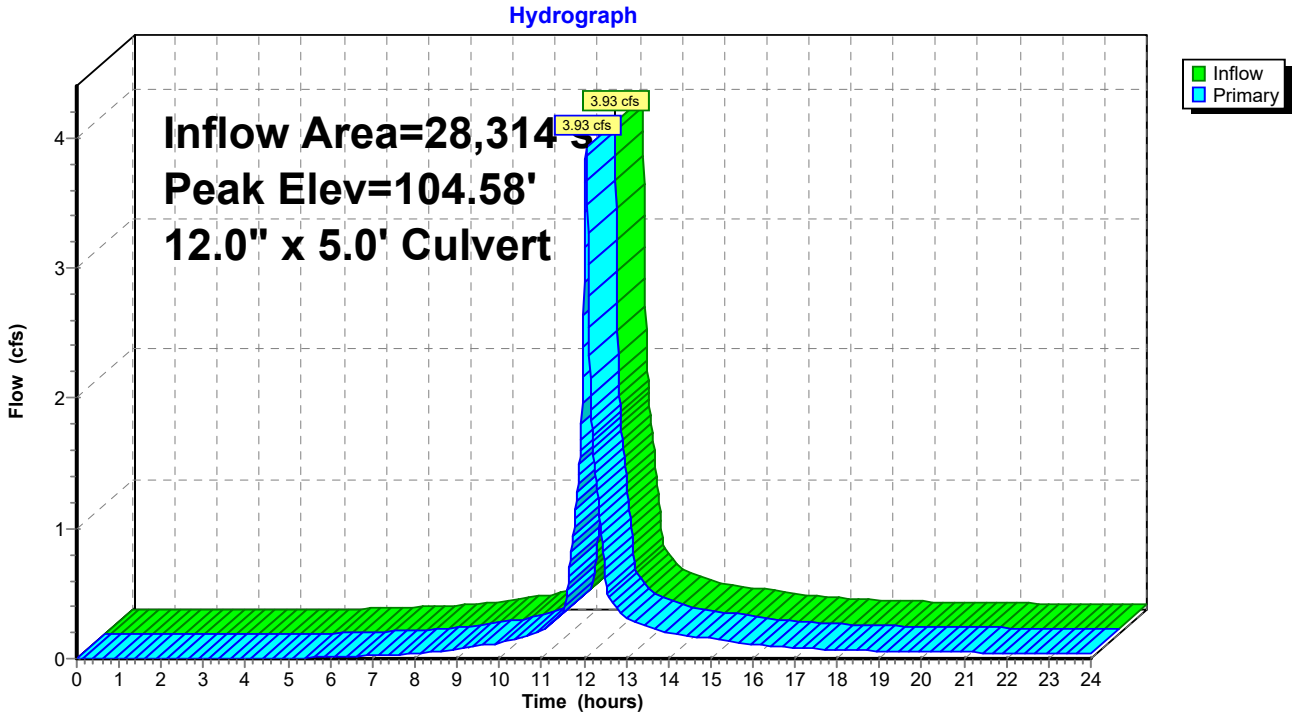
Inflow Area = 28,314 sf, Inflow Depth > 4.88" for 100-Year event
Inflow = 3.93 cfs @ 12.05 hrs, Volume= 11,522 cf
Outflow = 3.93 cfs @ 12.05 hrs, Volume= 11,522 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.93 cfs @ 12.05 hrs, Volume= 11,522 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.58' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**12.0" x 5.0' long Culvert** RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 102.90' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.92 cfs @ 12.05 hrs HW=104.57' (Free Discharge)
1=Culvert (Inlet Controls 3.92 cfs @ 4.99 fps)

Pond 111P: CB 16 to DMH 15



Pond 159P: DMH 15 to Bioretention

[81] Warning: Exceeded Pond 111P by 2.30' @ 12.05 hrs
[79] Warning: Submerged Pond 218R Primary device # 1 INLET by 2.88'

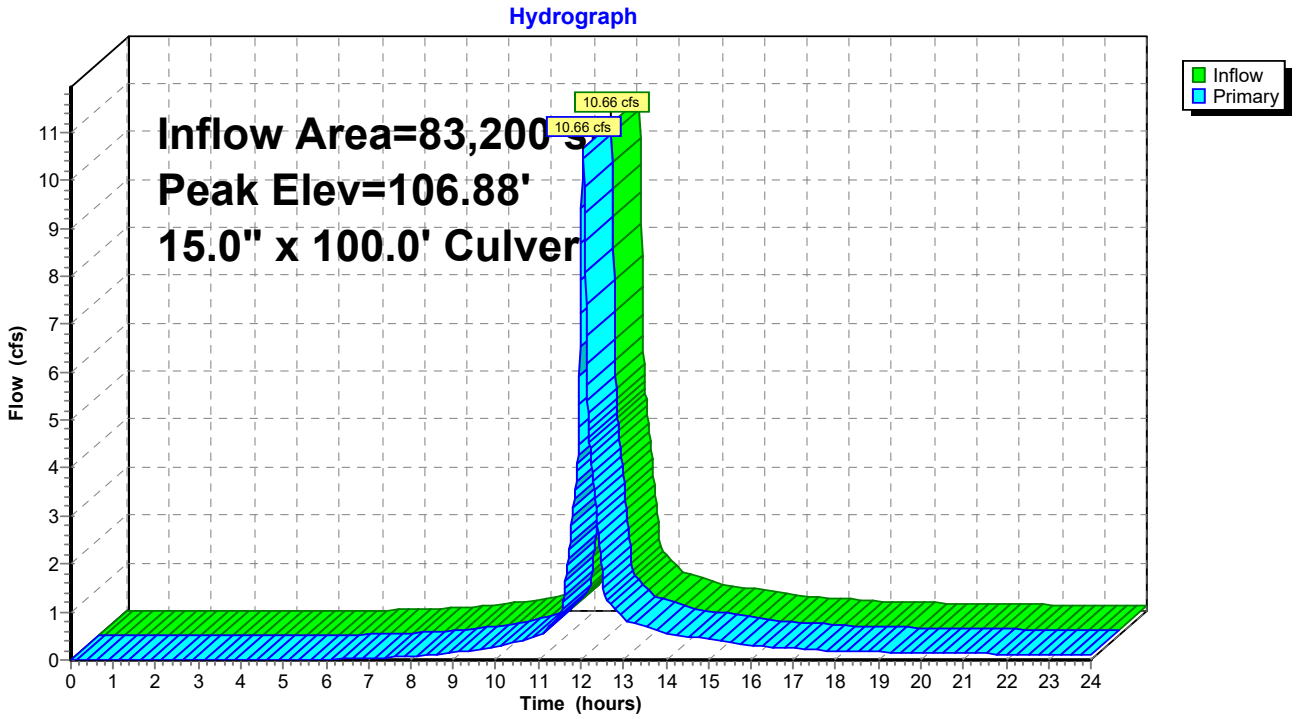
Inflow Area = 83,200 sf, Inflow Depth > 4.43" for 100-Year event
Inflow = 10.66 cfs @ 12.05 hrs, Volume= 30,685 cf
Outflow = 10.66 cfs @ 12.05 hrs, Volume= 30,685 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.66 cfs @ 12.05 hrs, Volume= 30,685 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 106.88' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0" x 100.0' long Culvert** Ke= 0.500 Outlet Invert= 101.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean

Primary OutFlow Max=10.65 cfs @ 12.05 hrs HW=106.87' (Free Discharge)
1=Culvert (Inlet Controls 10.65 cfs @ 8.67 fps)

Pond 159P: DMH 15 to Bioretention



Pond 160P: Bioretention

[81] Warning: Exceeded Pond 2P by 0.29' @ 12.20 hrs

Inflow Area =	108,465 sf,	Inflow Depth >	4.23"	for	100-Year event
Inflow =	12.50 cfs @	12.07 hrs,	Volume=	38,217 cf	
Outflow =	8.22 cfs @	12.16 hrs,	Volume=	37,865 cf,	Atten= 34%, Lag= 5.5 min
Discarded =	0.01 cfs @	12.16 hrs,	Volume=	499 cf	
Primary =	8.20 cfs @	12.16 hrs,	Volume=	37,366 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 101.78' @ 12.16 hrs Surf.Area= 3,576 sf Storage= 5,082 cf
Flood Elev= 102.50' Surf.Area= 3,752 sf Storage= 5,871 cf

Plug-Flow detention time= 17.8 min calculated for 37,865 cf (99% of inflow)
Center-of-Mass det. time= 12.2 min (826.6 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	5,871 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
100.00	2,119	0	0
102.00	3,752	5,871	5,871

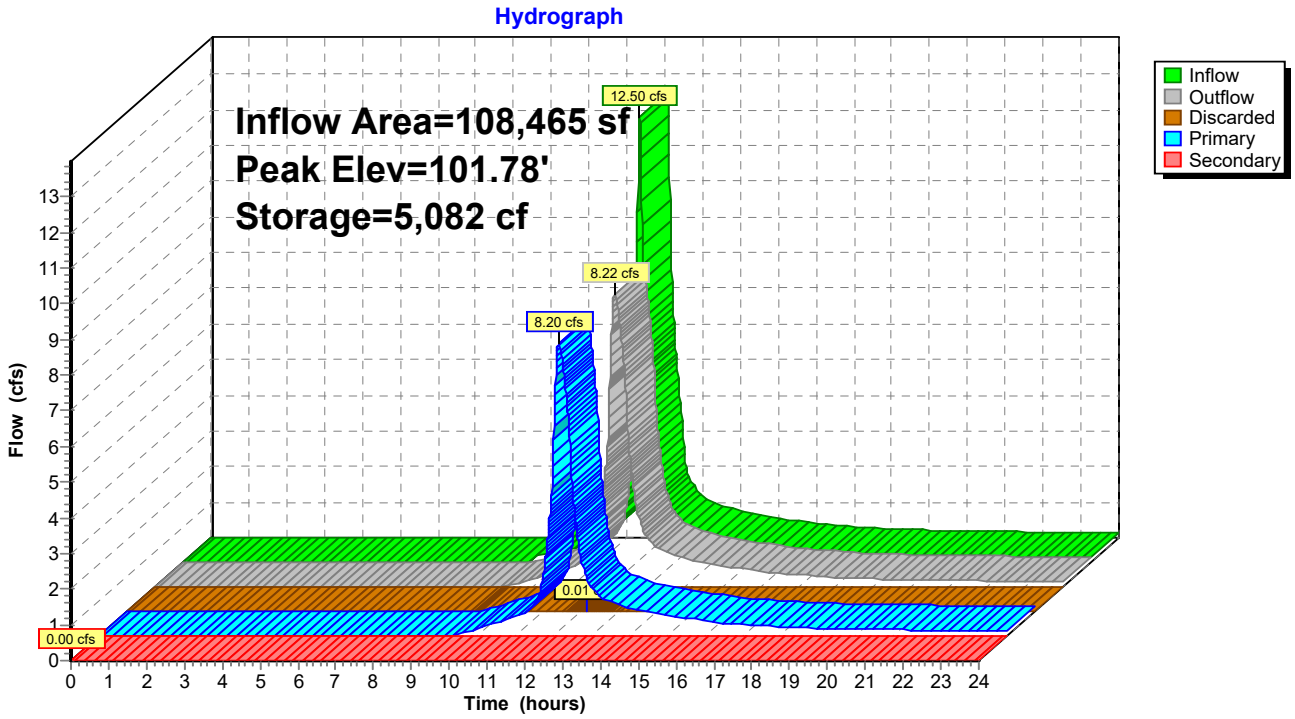
Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.170 in/hr Exfiltration over Surface area**
#2	Primary	100.00'	**15.0" x 21.0' long Culvert** Ke= 0.500 Outlet Invert= 99.00' S= 0.0476 '/' Cc= 0.900 n= 0.013
#3	Device 8	100.25'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#4	Device 8	100.42'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#5	Device 8	100.58'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#6	Device 8	100.75'	**0.5" Vert. Orifice/Grate X 12.00** C= 0.600
#7	Device 8	101.00'	**8.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#8	Primary	98.00'	**12.0" x 43.0' long Culvert** Ke= 0.500 Outlet Invert= 97.14' S= 0.0200 '/' Cc= 0.900 n= 0.013
#9	Secondary	102.00'	**8.0' 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

Discarded OutFlow Max=0.01 cfs @ 12.16 hrs HW=101.78' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=8.20 cfs @ 12.16 hrs HW=101.78' (Free Discharge)
├**2=Culvert** (Inlet Controls 6.36 cfs @ 5.18 fps)
└**8=Culvert** (Passes 1.84 cfs of 6.85 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 5.92 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.09 cfs @ 5.58 fps)
  ├**5=Orifice/Grate** (Orifice Controls 0.09 cfs @ 5.24 fps)
  ├**6=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.85 fps)
  └**7=Orifice/Grate** (Orifice Controls 1.49 cfs @ 4.26 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
└**9=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 160P: Bioretention



Pond 218R: CB 17 to DMH 15

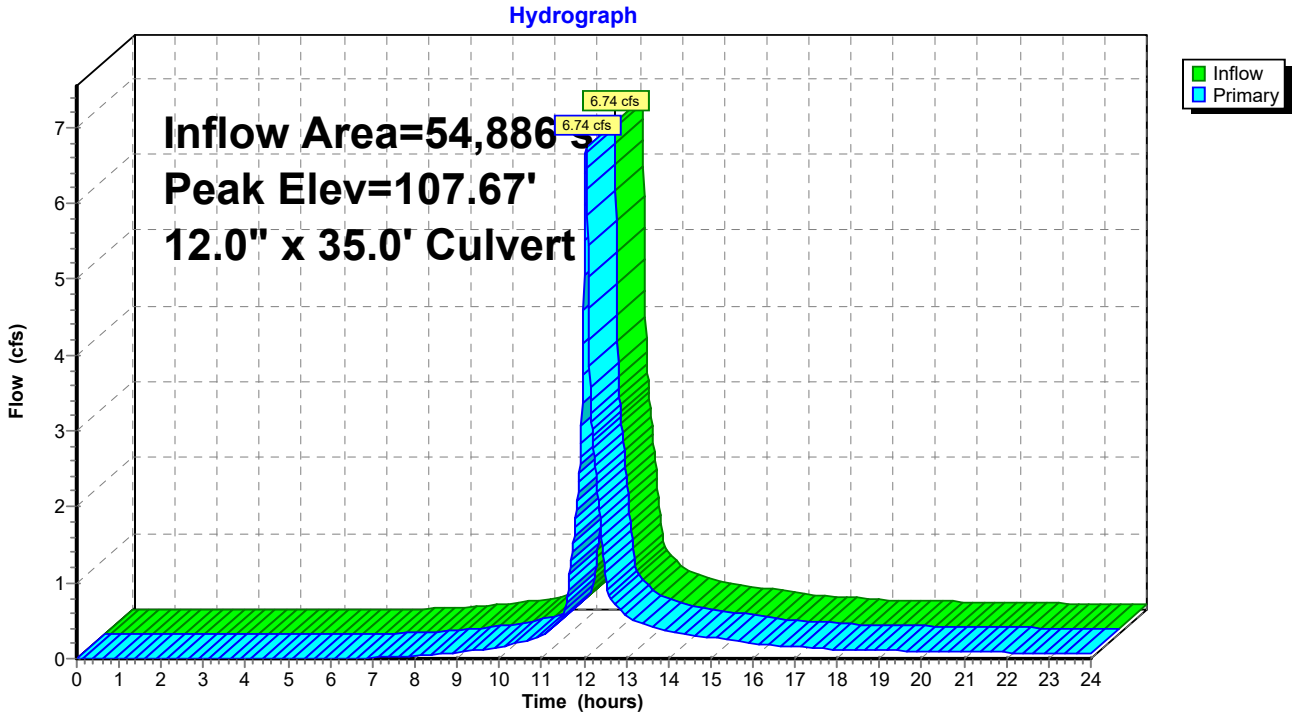
Inflow Area = 54,886 sf, Inflow Depth > 4.19" for 100-Year event
Inflow = 6.74 cfs @ 12.05 hrs, Volume= 19,163 cf
Outflow = 6.74 cfs @ 12.05 hrs, Volume= 19,163 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.74 cfs @ 12.05 hrs, Volume= 19,163 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 107.67' @ 12.05 hrs
Flood Elev= 108.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	104.00'	**12.0" x 35.0' long Culvert** Ke= 0.500 Outlet Invert= 103.30' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=6.73 cfs @ 12.05 hrs HW=107.67' (Free Discharge)
1=Culvert (Inlet Controls 6.73 cfs @ 8.57 fps)

Pond 218R: CB 17 to DMH 15



Link A: POA A

Inflow Area = 295,033 sf, Inflow Depth > 4.13" for 100-Year event
Inflow = 23.80 cfs @ 12.14 hrs, Volume= 101,570 cf
Primary = 23.80 cfs @ 12.14 hrs, Volume= 101,570 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A