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STORMWATER MANAGEMENT REPORT

SITE PLAN

ASSESSORS MAP 123 LOT 3
DOWNEY STREET
NEW BEDFORD, MASSACHUSETTS

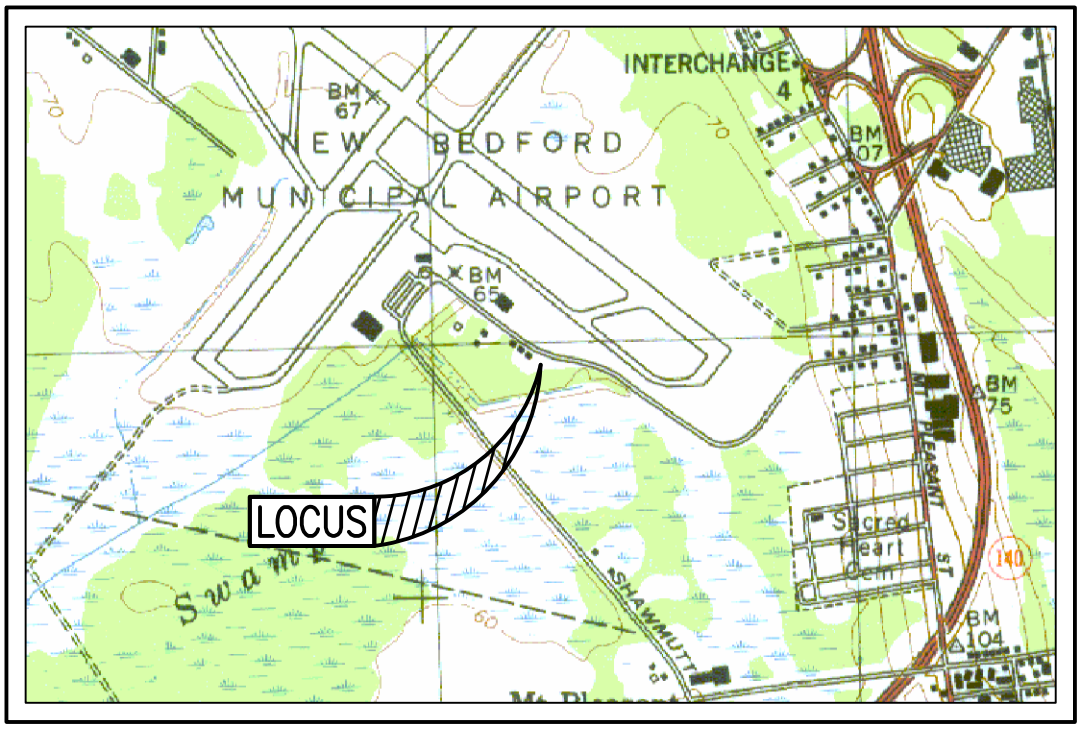

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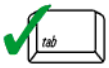
TABLE OF CONTENTS

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.

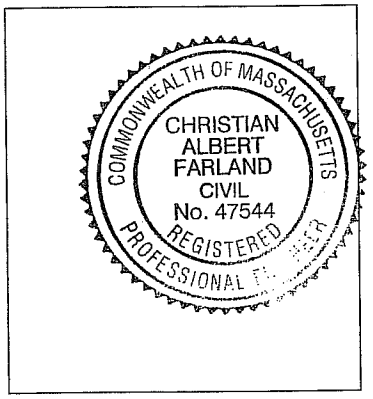
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



3-6-14

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): Water Quality Inlet

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.

STORMWATER MANAGEMENT REPORT AND HYDROLOGIC-HYDRAULIC ANALYSIS

Proposed Site Plan
Downey Street
New Bedford, Massachusetts

Project Summary

The subject property associated with this project is located on the northerly side of Downey Street in New Bedford, MA. This property is part of the New Bedford Regional Airport site. The parcel is situated in the Mixed Use Business District.

The applicant is seeking permission to construct a 120' x 100' airplane hanger building with associated 12 space bituminous concrete parking area, utilities, landscaping and stormwater drainage. Stormwater associated with the development will be controlled through a series of deep sump catch basins and a water quality inlet that ultimately ties into the existing city drainage system.

This project is considered to be a Re-development Project per the Massachusetts Stormwater Management Regulations. We are proposing to improve stormwater management to the existing stormwater system by providing water quality treatment to runoff before entering the city drainage.

Methodology

Drainage computations were performed using the Natural Resources Conservation Services (NRCS) TR-20 method and HydroCAD® Drainage Calculation Software. Sketches of the existing and proposed watershed areas, HydroCAD® Report, and copies of the calculation sheets are included as appendices to this report.

Existing Conditions

The soils underlying the site are identified in the Soil Survey of Bristol County. The soil that encompasses the lot is classified as Udorthents, smoothed, 0-15% slopes.

The soil has the following properties:

- Permeability: Excessively drained to moderately well drained
- Available water capacity: Moderately low to very high
- Depth to groundwater: More than 80 inches
- Hydrologic Soil Group: Unclassified

Proposed Conditions/Stormwater Management Overview

Existing Conditions:

Currently, the project area consists of mostly paved areas that have been utilized as a parking area used by the airport facilities. Stormwater from these areas flows overland, untreated, to a dry well where overflow ultimately reaches the existing wetland located south of Downey Street.

Proposed Conditions:

Under proposed conditions, runoff from the portion of proposed parking area will be collected by a proposed water quality inlet that will flow through a series of proposed drain manholes and ultimately to the existing city drainage. Roof drains from the eastern portion of the roof will collect and direct roof runoff to a 12" HDPE that flows to a proposed drain manhole and ultimately ties into the existing city drainage. Roof drains from the western portion of the roof will collect and direct roof runoff to a proposed 10" HDPE that also ultimately flows to the existing city drainage.

The design of the stormwater system was designed for the post-development conditions to handle all storms' peak discharges and runoff volume to include the 2, 10, 25 and 100-year storm events. The site drainage system was designed in consideration of the structural standards and techniques of the Best Management Practices (BMP) and Low Impact Development (LID) outlined in the "Stormwater Management Handbook".

The results of site drainage calculations are presented in the following Tables. The results are based upon evaluation of Pre-development conditions and the design of proposed surface and subsurface drainage systems for the Post-development condition. These results show the Post-Development offsite volume and runoff rates are reduced to less than the Pre-development conditions, thus meeting the BMP guidelines for this site development.

Table 1 - Comparison of Pre- versus Post-Development Offsite Runoff Rate, cfs

Frequency Storm	2-Year	10-Year	25-Year	100-Year
Pre-Development	2.81	4.11	4.84	6.12
Post-Development	0.20	0.36	0.46	0.62

Table 2 - Comparison of Pre- versus Post-Development Offsite Runoff Volume, af

Frequency Storm	2-Year	10-Year	25-Year	100-Year
Pre-Development	0.138	0.206	0.245	0.314
Post-Development	0.009	0.016	0.021	0.029

Groundwater recharge is a factor in the design of the subsurface drainage system. Table-3 below presents the minimum recharge required and the proposed recharge of stormwater based upon the BMP methods of the “Stormwater Management Handbook”. The proposed recharge quantities meet or exceed the required minimum recharges.

EXHIBIT "A"

PRE-DEVELOPMENT ANALYSIS

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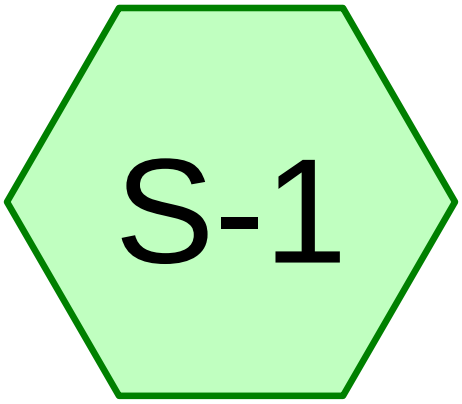


Pre-Development Runoff

Subcat Reach Pond Link

Drainage Diagram for 13894PRE
Prepared by Thompson Farland, Inc., Printed 2/12/2014

Summary for Subcatchment S-1: Pre-Development Runoff

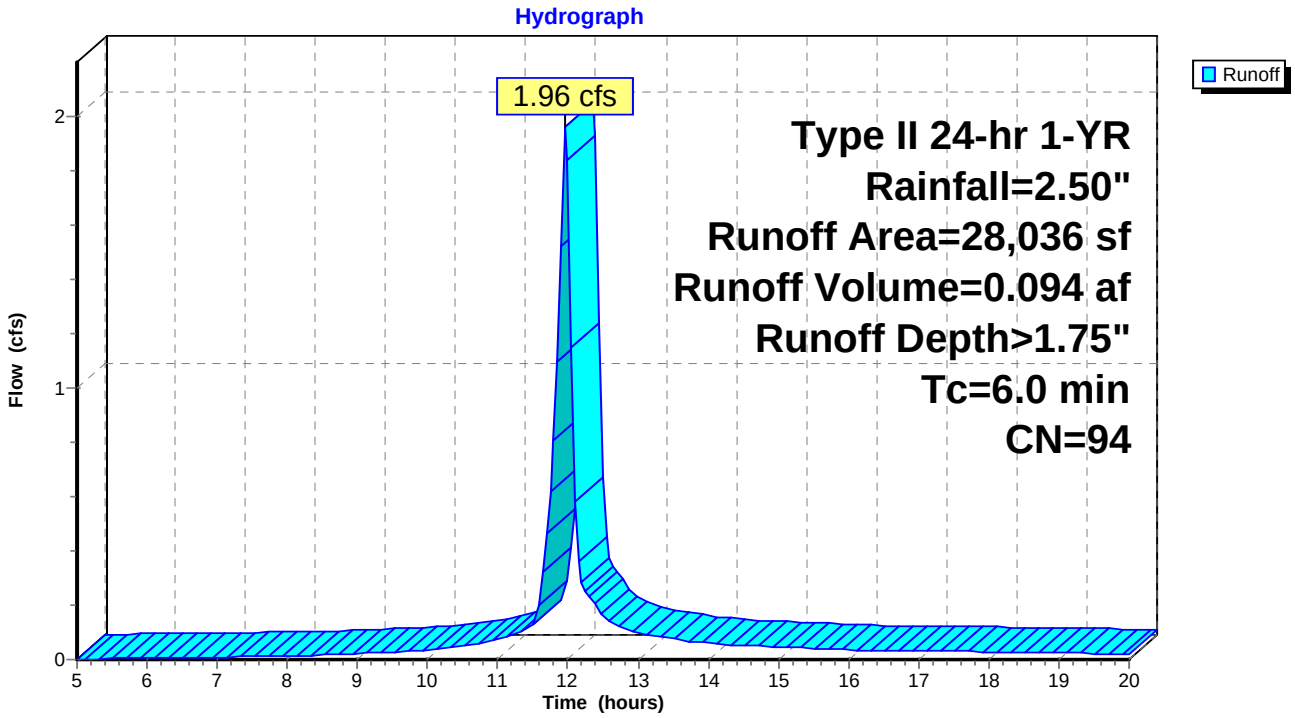
Runoff = 1.96 cfs @ 11.97 hrs, Volume= 0.094 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.50"

	Area (sf)	CN	Description
*	19,076	98	Pavement
	8,960	86	<50% Grass cover, Poor, HSG C
	28,036	94	Weighted Average
	8,960		Pervious Area
	19,076		Impervious Area

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

Subcatchment S-1: Pre-Development Runoff



Summary for Subcatchment S-1: Pre-Development Runoff

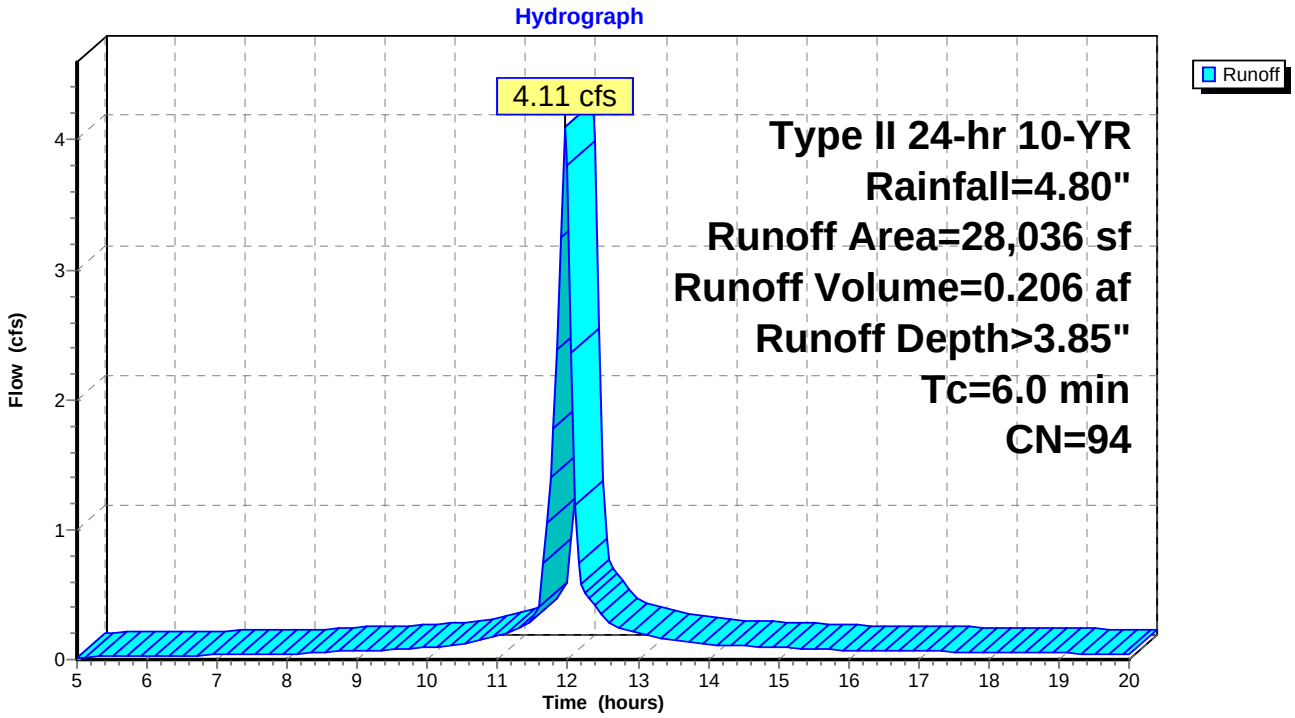
Runoff = 4.11 cfs @ 11.96 hrs, Volume= 0.206 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.80"

	Area (sf)	CN	Description
*	19,076	98	Pavement
	8,960	86	<50% Grass cover, Poor, HSG C
	28,036	94	Weighted Average
	8,960		Pervious Area
	19,076		Impervious Area

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

Subcatchment S-1: Pre-Development Runoff



Summary for Subcatchment S-1: Pre-Development Runoff

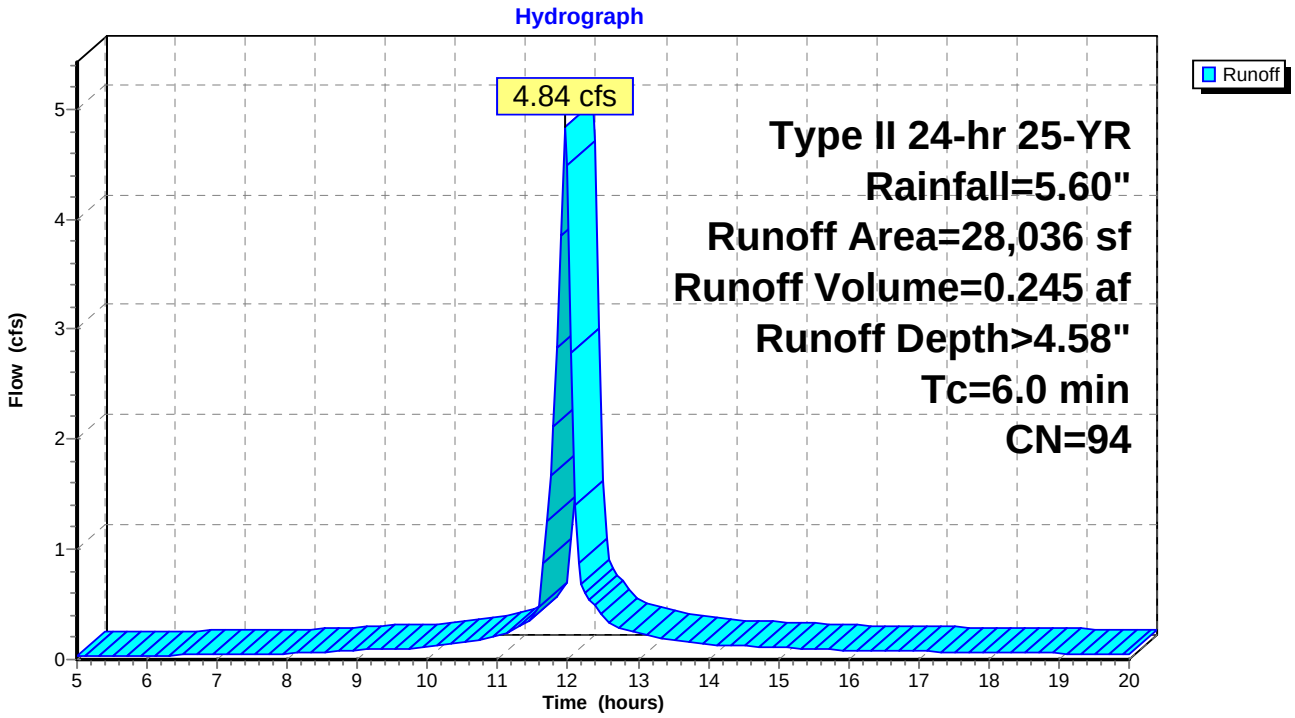
Runoff = 4.84 cfs @ 11.96 hrs, Volume= 0.245 af, Depth> 4.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.60"

	Area (sf)	CN	Description
*	19,076	98	Pavement
	8,960	86	<50% Grass cover, Poor, HSG C
	28,036	94	Weighted Average
	8,960		Pervious Area
	19,076		Impervious Area

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

Subcatchment S-1: Pre-Development Runoff



Summary for Subcatchment S-1: Pre-Development Runoff

Runoff = 6.12 cfs @ 11.96 hrs, Volume= 0.314 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.00"

	Area (sf)	CN	Description
*	19,076	98	Pavement
	8,960	86	<50% Grass cover, Poor, HSG C
	28,036	94	Weighted Average
	8,960		Pervious Area
	19,076		Impervious Area

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

Subcatchment S-1: Pre-Development Runoff

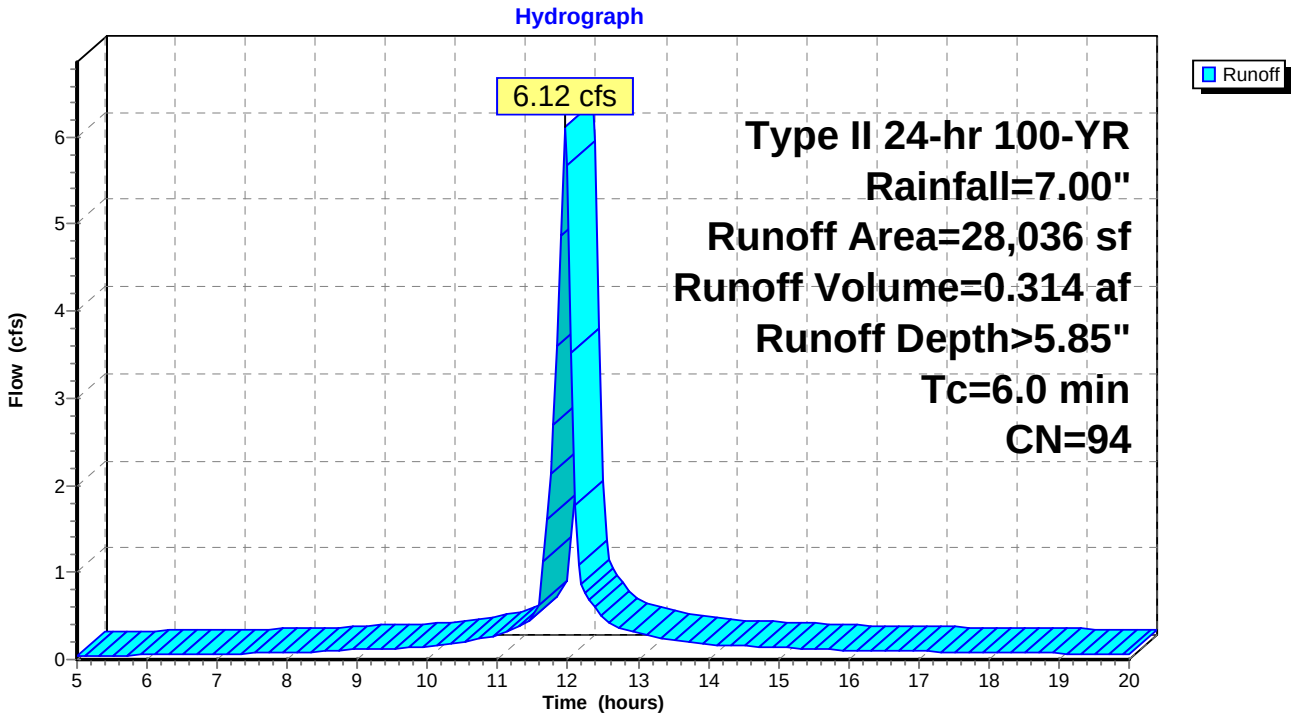


EXHIBIT "B"

POST-DEVELOPMENT ANALYSIS

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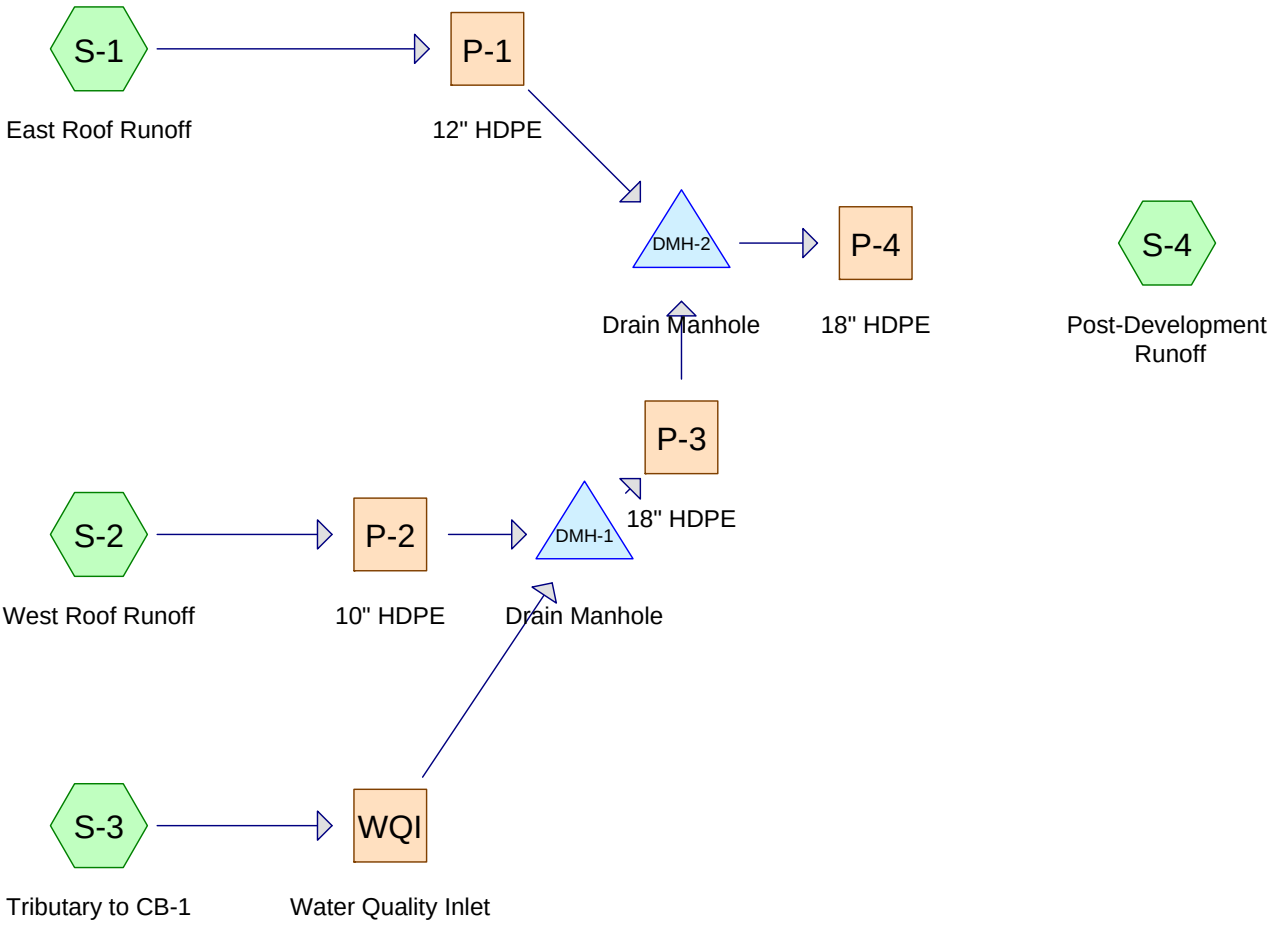


Subcat Reach Pond Link

Drainage Diagram for 13894POST
Prepared by Thompson Farland, Inc., Printed 3/5/2014

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: East Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>2.11"
Tc=6.0 min CN=98 Runoff=0.52 cfs 0.027 af

Subcatchment S-2: West Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>2.11"
Tc=6.0 min CN=98 Runoff=0.52 cfs 0.027 af

Subcatchment S-3: Tributary to CB-1 Runoff Area=11,232 sf 100.00% Impervious Runoff Depth>2.11"
Tc=6.0 min CN=98 Runoff=0.88 cfs 0.045 af

Subcatchment S-4: Post-Development Runoff Area=3,604 sf 17.15% Impervious Runoff Depth>0.71"
Tc=6.0 min CN=78 Runoff=0.11 cfs 0.005 af

Reach P-1: 12" HDPE Avg. Depth=0.31' Max Vel=2.50 fps Inflow=0.52 cfs 0.027 af
D=12.0" n=0.013 L=198.0' S=0.0050 '/' Capacity=2.52 cfs Outflow=0.49 cfs 0.027 af

Reach P-2: 10" HDPE Avg. Depth=0.20' Max Vel=5.09 fps Inflow=0.52 cfs 0.027 af
D=10.0" n=0.013 L=52.0' S=0.0344 '/' Capacity=4.07 cfs Outflow=0.51 cfs 0.027 af

Reach P-3: 18" HDPE Avg. Depth=0.44' Max Vel=3.18 fps Inflow=1.36 cfs 0.072 af
D=18.0" n=0.013 L=38.0' S=0.0050 '/' Capacity=7.43 cfs Outflow=1.37 cfs 0.072 af

Reach P-4: 18" HDPE Avg. Depth=0.47' Max Vel=3.86 fps Inflow=1.85 cfs 0.098 af
D=18.0" n=0.013 L=3.0' S=0.0067 '/' Capacity=8.58 cfs Outflow=1.85 cfs 0.098 af

Reach WQI: Water Quality Inlet Avg. Depth=0.40' Max Vel=2.91 fps Inflow=0.88 cfs 0.045 af
D=12.0" n=0.013 L=89.0' S=0.0051 '/' Capacity=2.53 cfs Outflow=0.86 cfs 0.045 af

Pond DMH-1: Drain Manhole Inflow=1.36 cfs 0.072 af
Primary=1.36 cfs 0.072 af

Pond DMH-2: Drain Manhole Inflow=1.85 cfs 0.098 af
Primary=1.85 cfs 0.098 af

Total Runoff Area = 0.644 ac Runoff Volume = 0.103 af Average Runoff Depth = 1.93"
10.65% Pervious = 0.069 ac 89.35% Impervious = 0.575 ac

Summary for Subcatchment S-1: East Roof Runoff

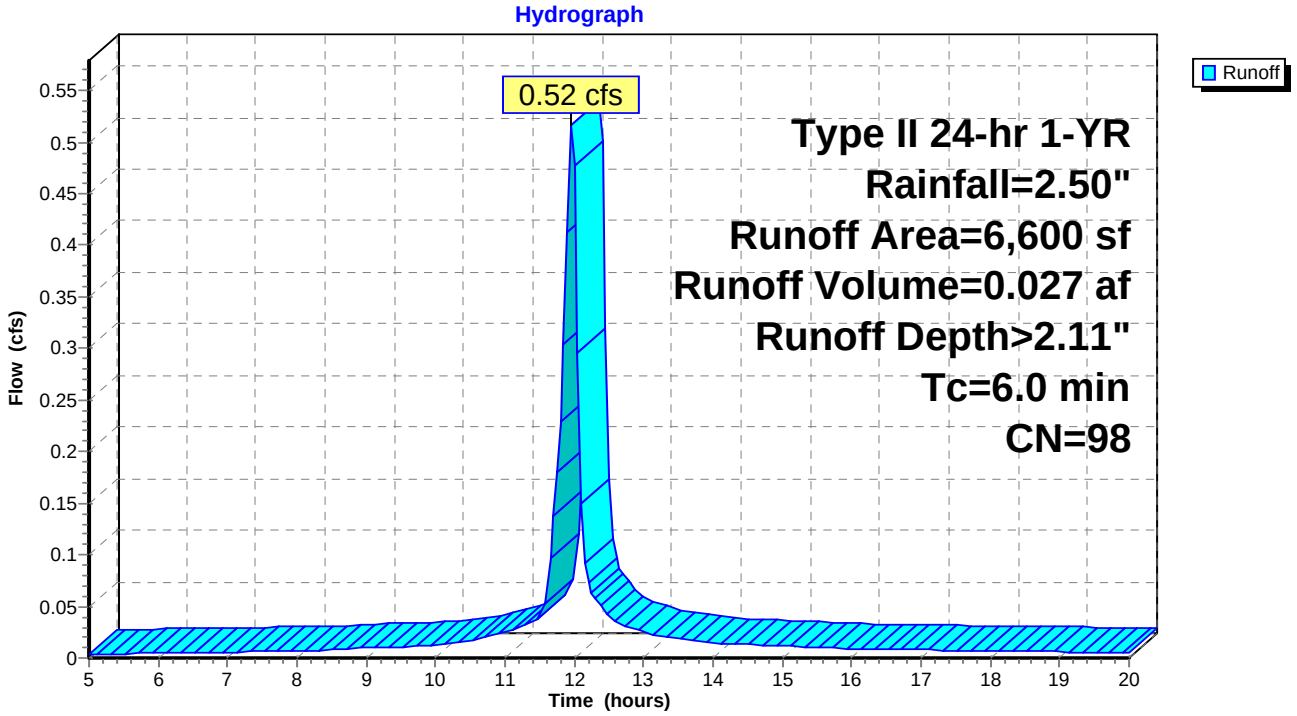
Runoff = 0.52 cfs @ 11.96 hrs, Volume= 0.027 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.50"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-1: East Roof Runoff



Summary for Subcatchment S-2: West Roof Runoff

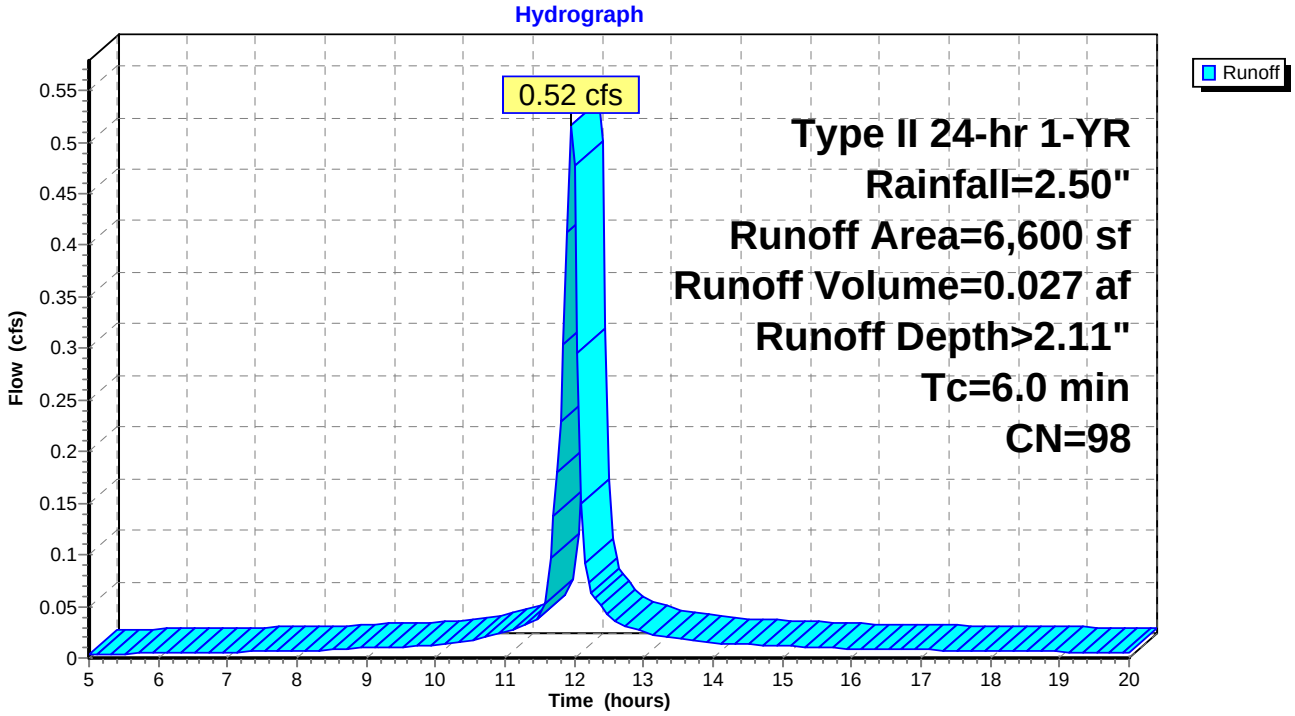
Runoff = 0.52 cfs @ 11.96 hrs, Volume= 0.027 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.50"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-2: West Roof Runoff



Summary for Subcatchment S-3: Tributary to CB-1

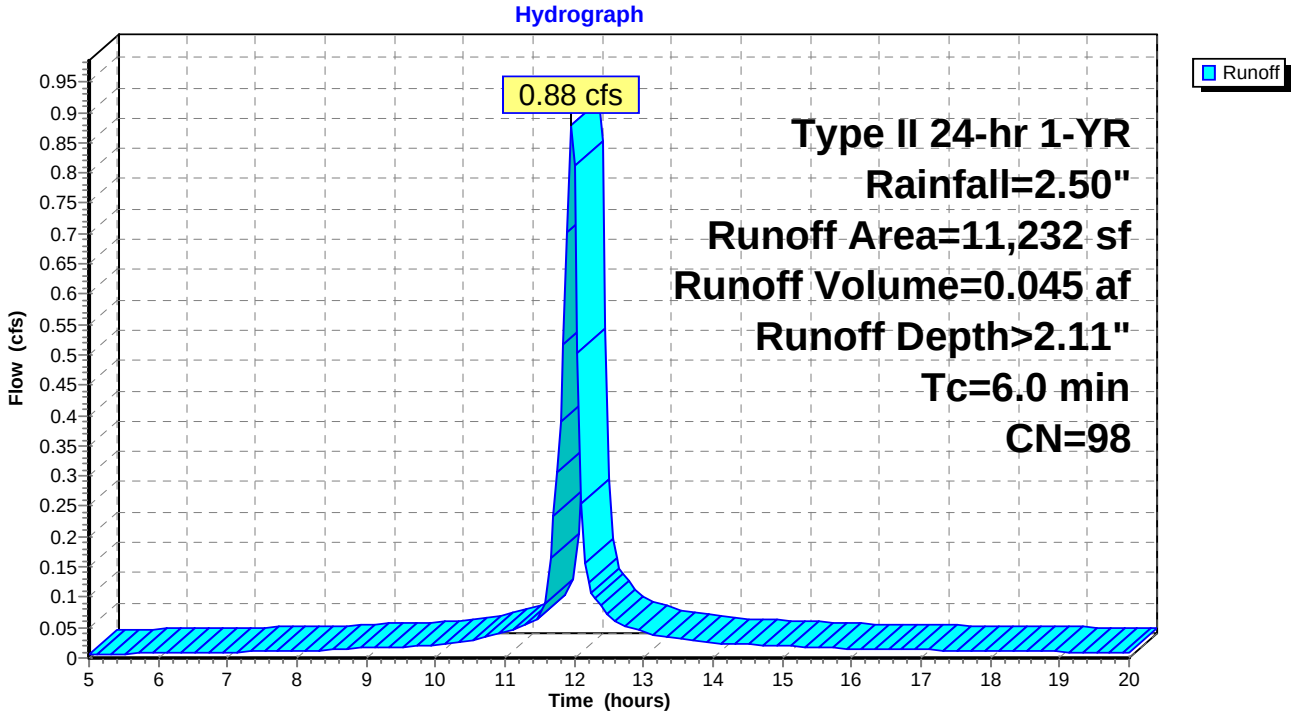
Runoff = 0.88 cfs @ 11.96 hrs, Volume= 0.045 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.50"

Area (sf)	CN	Description
11,232	98	Paved parking & roofs
11,232		Impervious Area

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

Subcatchment S-3: Tributary to CB-1



Summary for Subcatchment S-4: Post-Development Runoff

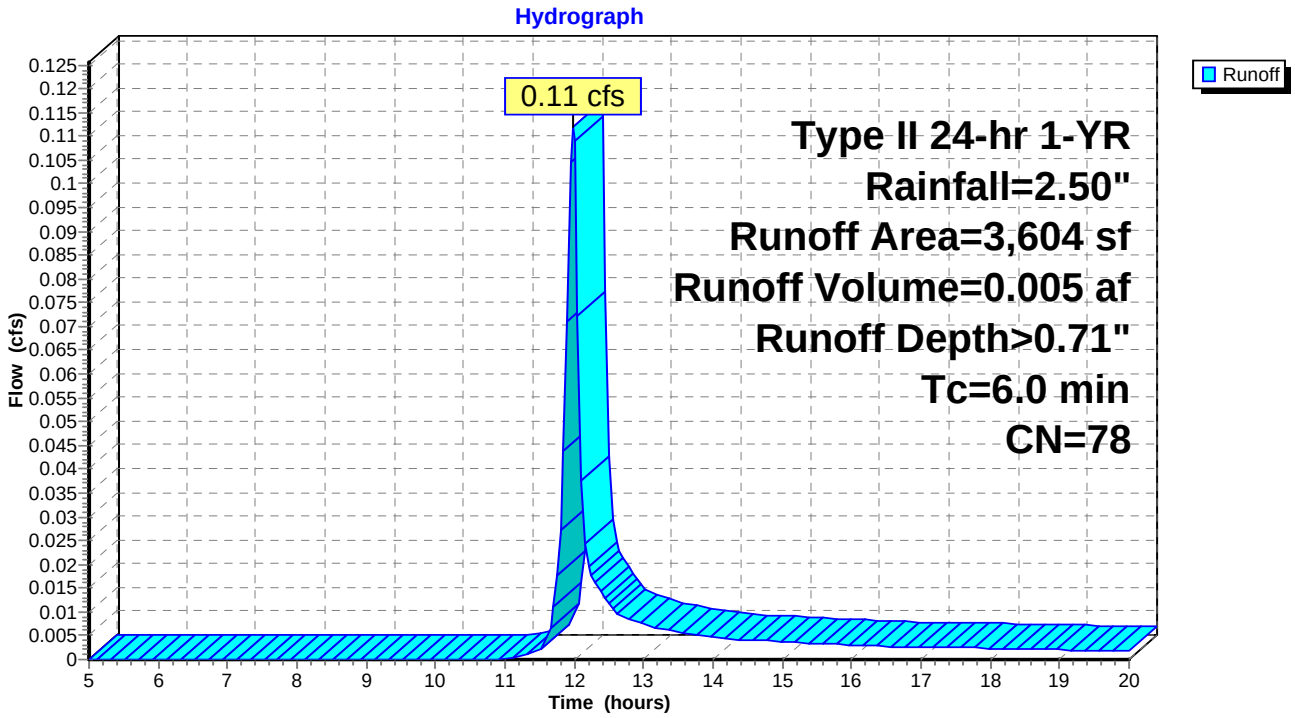
Runoff = 0.11 cfs @ 11.98 hrs, Volume= 0.005 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YR Rainfall=2.50"

	Area (sf)	CN	Description
*	618	98	Pavement
	2,986	74	>75% Grass cover, Good, HSG C
	3,604	78	Weighted Average
	2,986		Pervious Area
	618		Impervious Area

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

Subcatchment S-4: Post-Development Runoff



Summary for Reach P-1: 12" HDPE

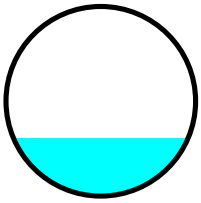
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

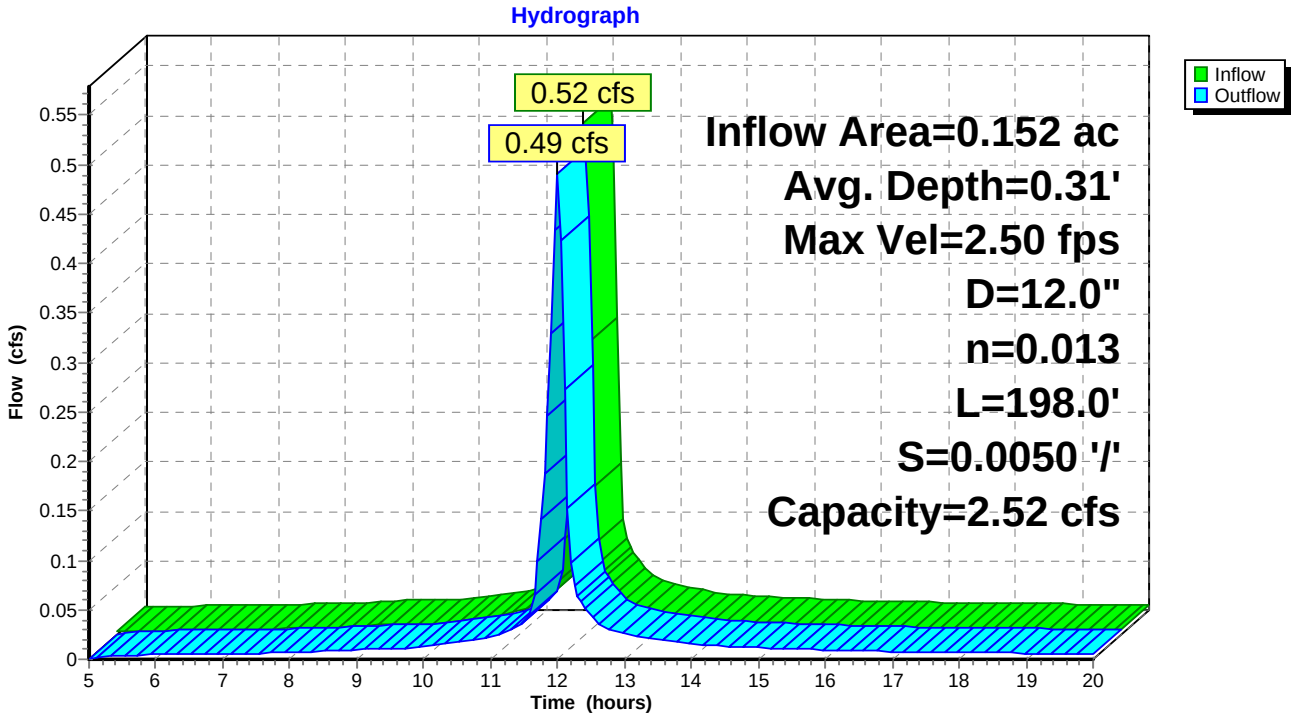
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 0.52 cfs @ 11.96 hrs, Volume= 0.027 af
Outflow = 0.49 cfs @ 12.00 hrs, Volume= 0.027 af, Atten= 5%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.50 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 4.0 min

Peak Storage= 40 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013
Length= 198.0' Slope= 0.0050 '/'
Inlet Invert= 58.64', Outlet Invert= 57.65'





Summary for Reach P-2: 10" HDPE

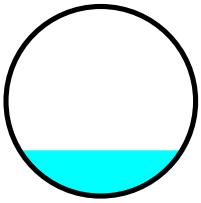
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

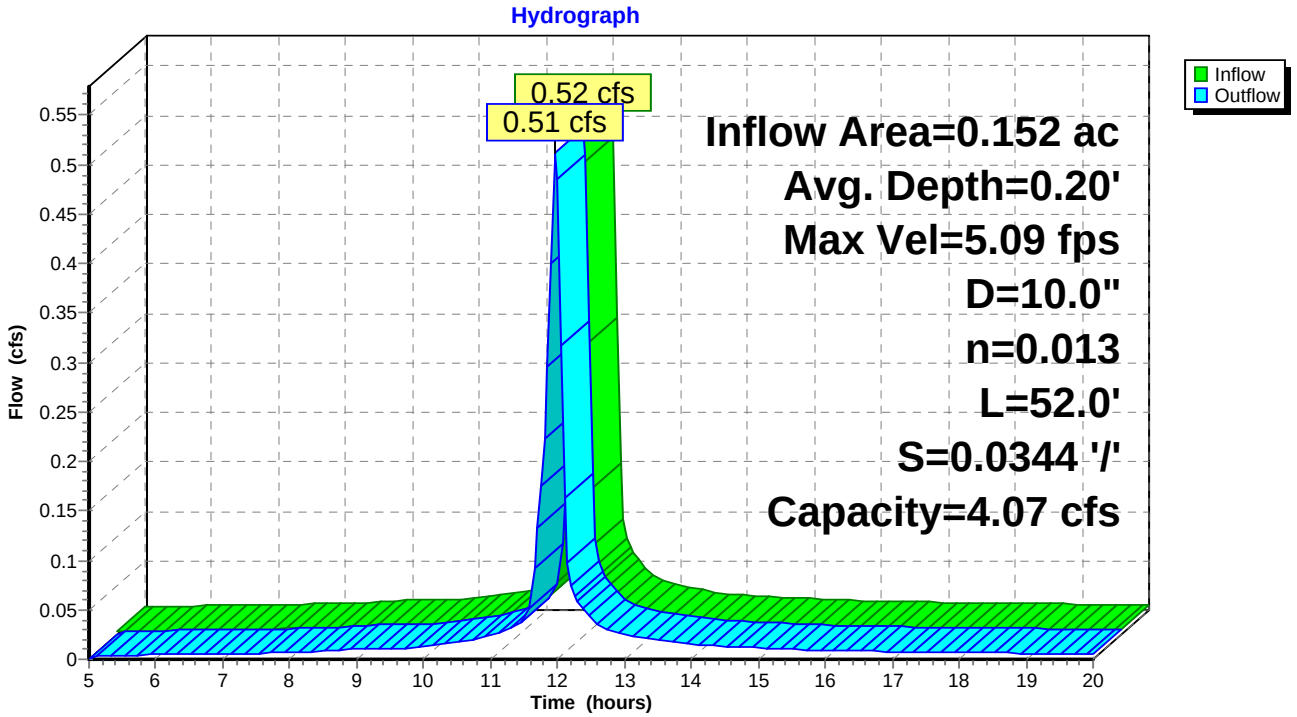
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 0.52 cfs @ 11.96 hrs, Volume= 0.027 af
Outflow = 0.51 cfs @ 11.97 hrs, Volume= 0.027 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.09 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.5 min

Peak Storage= 5 cf @ 11.97 hrs, Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.83', Capacity at Bank-Full= 4.07 cfs

10.0" Diameter Pipe, n= 0.013
Length= 52.0' Slope= 0.0344 '/'
Inlet Invert= 71.00', Outlet Invert= 69.21'





Summary for Reach P-3: 18" HDPE

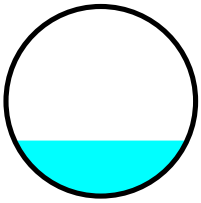
[52] Hint: Inlet/Outlet conditions not evaluated
[88] Warning: Qout>Qin may require Finer Routing>1

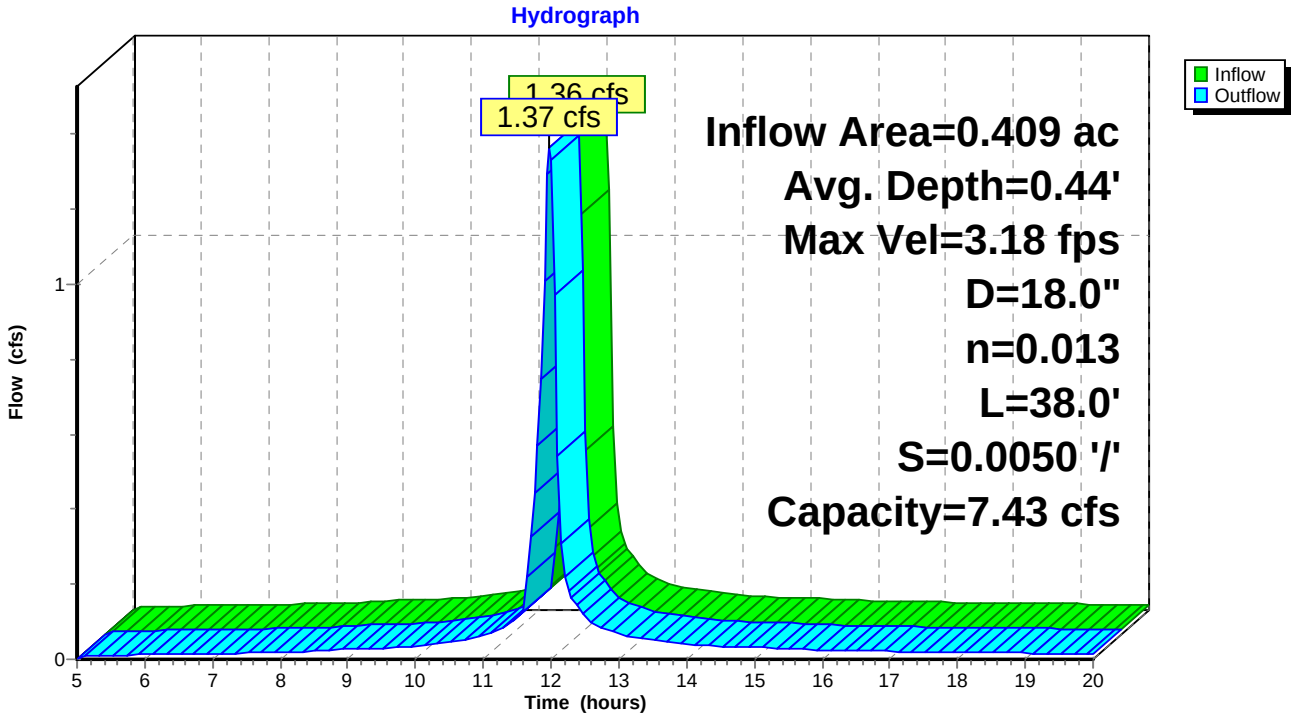
Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 1.36 cfs @ 11.97 hrs, Volume= 0.072 af
Outflow = 1.37 cfs @ 11.98 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.18 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 0.6 min

Peak Storage= 16 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.43 cfs

18.0" Diameter Pipe, n= 0.013
Length= 38.0' Slope= 0.0050 '/'
Inlet Invert= 57.84', Outlet Invert= 57.65'





Summary for Reach P-4: 18" HDPE

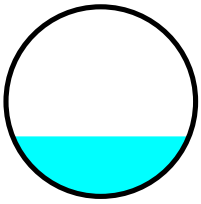
[52] Hint: Inlet/Outlet conditions not evaluated

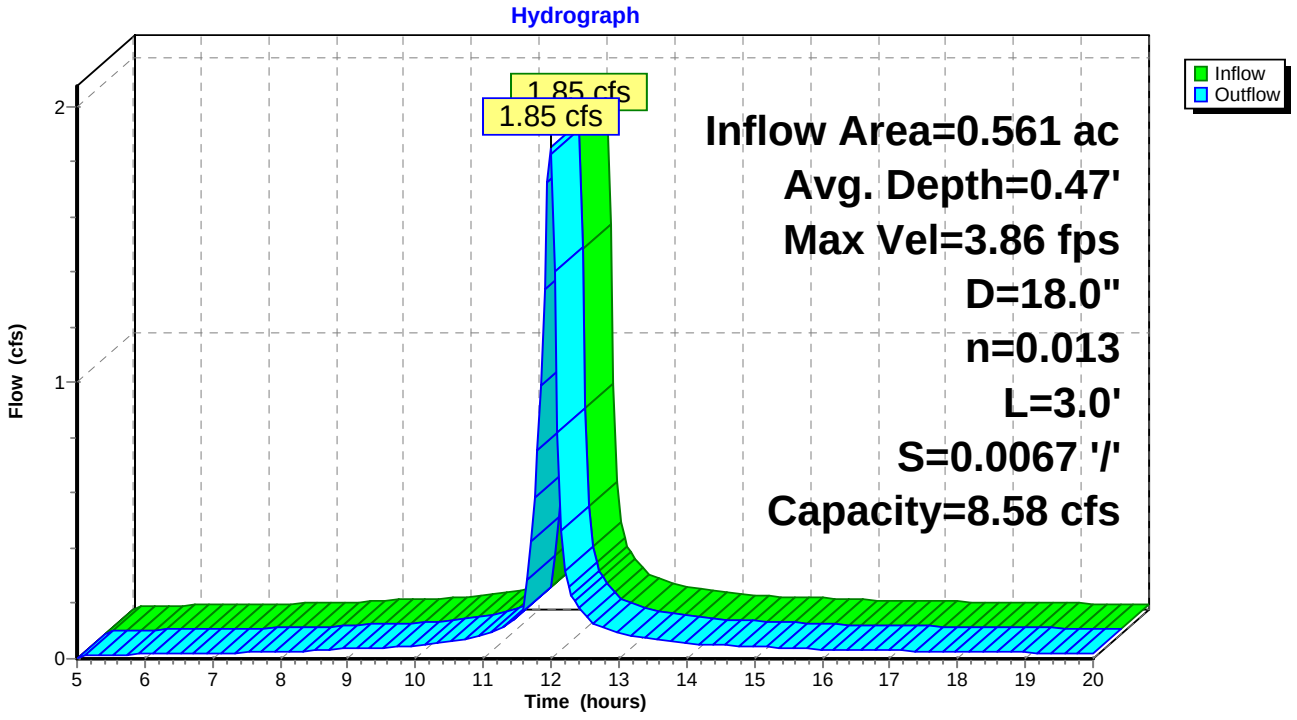
Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 1.85 cfs @ 11.98 hrs, Volume= 0.098 af
Outflow = 1.85 cfs @ 11.98 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.86 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 8.58 cfs

18.0" Diameter Pipe, n= 0.013
Length= 3.0' Slope= 0.0067 '/'
Inlet Invert= 57.65', Outlet Invert= 57.63'





Summary for Reach WQI: Water Quality Inlet

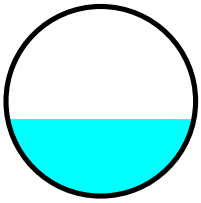
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.258 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 0.88 cfs @ 11.96 hrs, Volume= 0.045 af
Outflow = 0.86 cfs @ 11.98 hrs, Volume= 0.045 af, Atten= 2%, Lag= 1.0 min

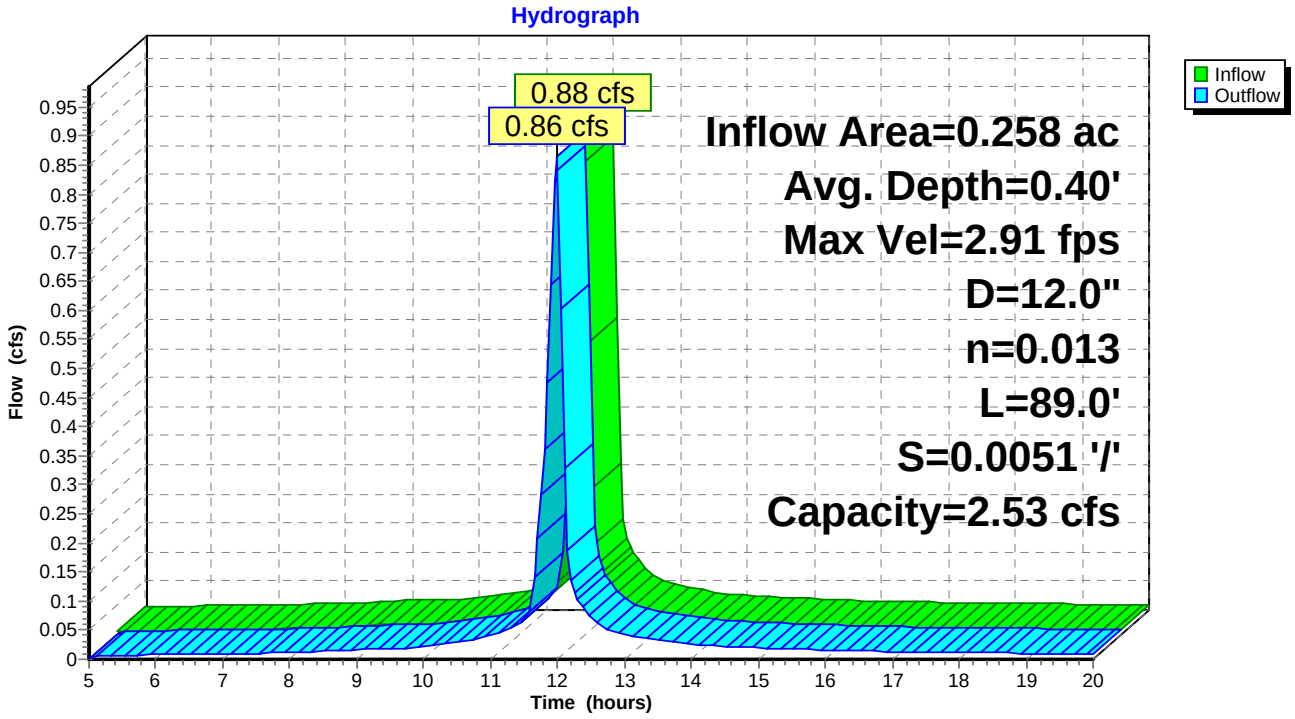
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.91 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 1.5 min

Peak Storage= 26 cf @ 11.97 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.53 cfs

12.0" Diameter Pipe, n= 0.013
Length= 89.0' Slope= 0.0051 '/'
Inlet Invert= 58.29', Outlet Invert= 57.84'



Reach WQI: Water Quality Inlet



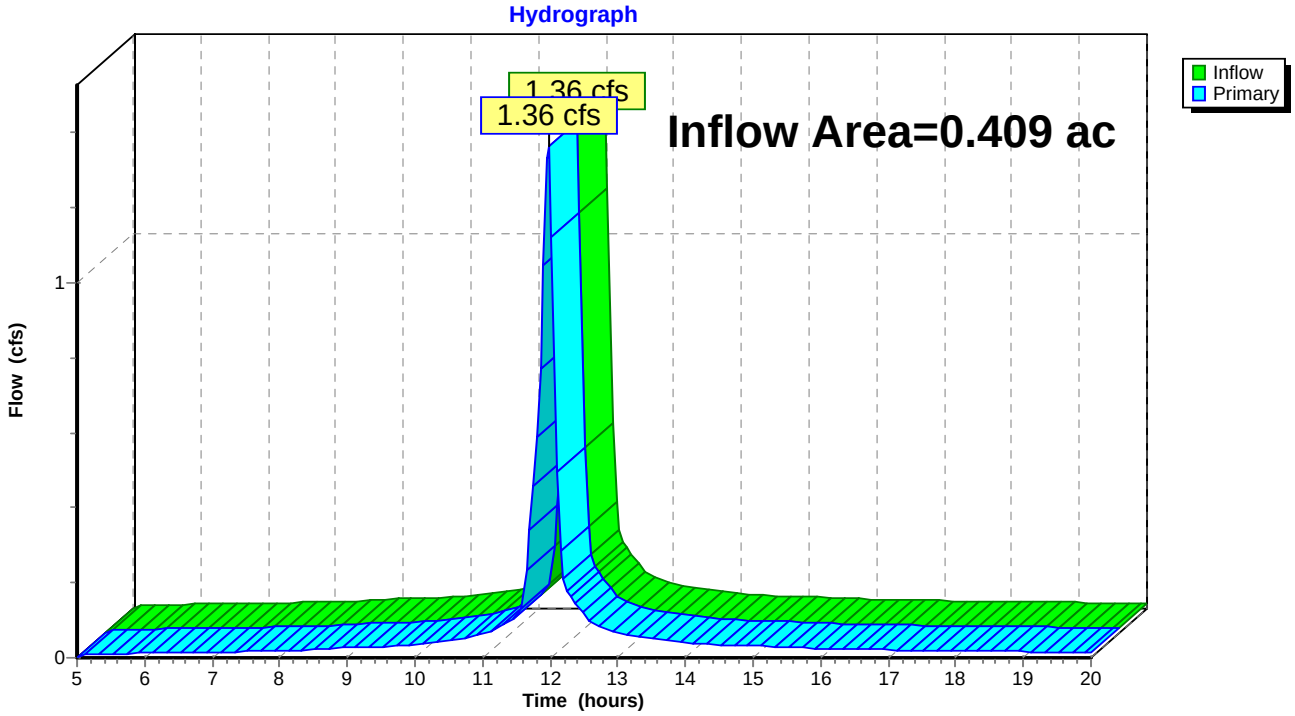
Summary for Pond DMH-1: Drain Manhole

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

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 1.36 cfs @ 11.97 hrs, Volume= 0.072 af
Primary = 1.36 cfs @ 11.97 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-1: Drain Manhole



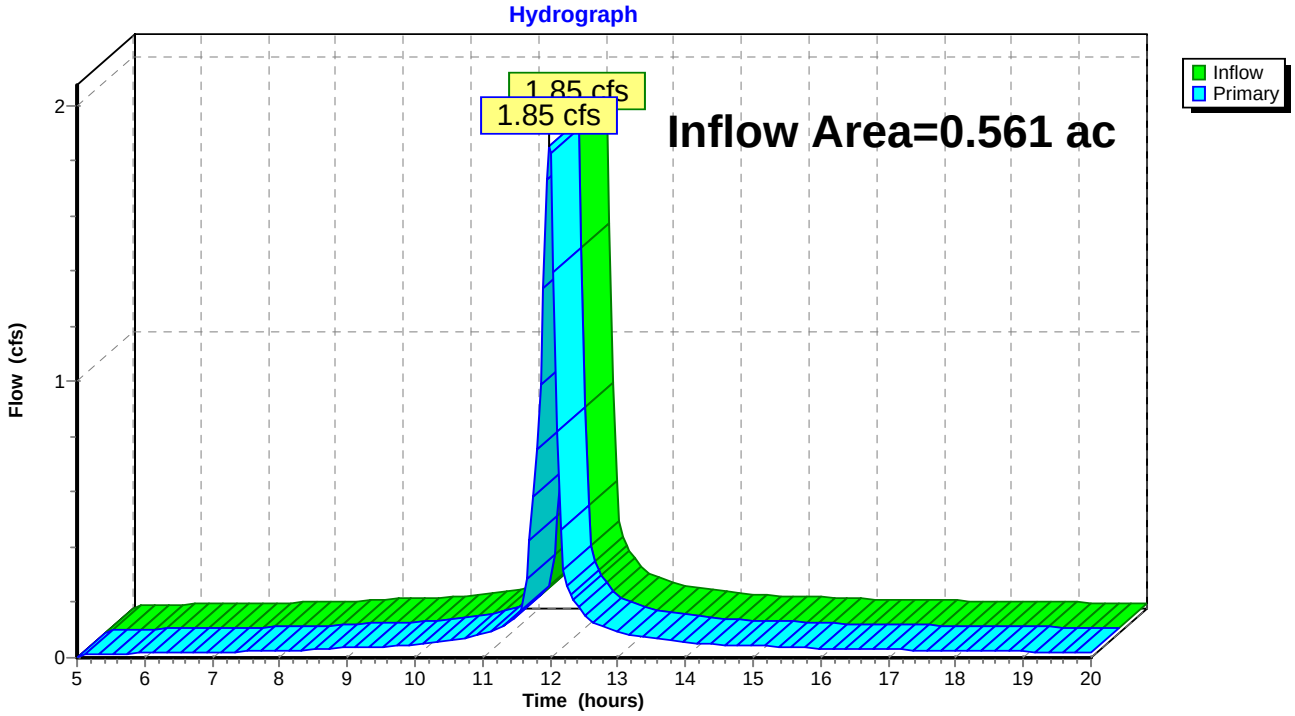
Summary for Pond DMH-2: Drain Manhole

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

Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 2.11" for 1-YR event
Inflow = 1.85 cfs @ 11.98 hrs, Volume= 0.098 af
Primary = 1.85 cfs @ 11.98 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-2: Drain Manhole



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: East Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>4.19"
Tc=6.0 min CN=98 Runoff=1.01 cfs 0.053 af

Subcatchment S-2: West Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>4.19"
Tc=6.0 min CN=98 Runoff=1.01 cfs 0.053 af

Subcatchment S-3: Tributary to CB-1 Runoff Area=11,232 sf 100.00% Impervious Runoff Depth>4.19"
Tc=6.0 min CN=98 Runoff=1.71 cfs 0.090 af

Subcatchment S-4: Post-Development Runoff Area=3,604 sf 17.15% Impervious Runoff Depth>2.35"
Tc=6.0 min CN=78 Runoff=0.36 cfs 0.016 af

Reach P-1: 12" HDPE Avg. Depth=0.44' Max Vel=3.00 fps Inflow=1.01 cfs 0.053 af
D=12.0" n=0.013 L=198.0' S=0.0050 '/' Capacity=2.52 cfs Outflow=0.96 cfs 0.053 af

Reach P-2: 10" HDPE Avg. Depth=0.28' Max Vel=6.16 fps Inflow=1.01 cfs 0.053 af
D=10.0" n=0.013 L=52.0' S=0.0344 '/' Capacity=4.07 cfs Outflow=1.00 cfs 0.053 af

Reach P-3: 18" HDPE Avg. Depth=0.62' Max Vel=3.83 fps Inflow=2.66 cfs 0.143 af
D=18.0" n=0.013 L=38.0' S=0.0050 '/' Capacity=7.43 cfs Outflow=2.67 cfs 0.143 af

Reach P-4: 18" HDPE Avg. Depth=0.68' Max Vel=4.62 fps Inflow=3.62 cfs 0.196 af
D=18.0" n=0.013 L=3.0' S=0.0067 '/' Capacity=8.58 cfs Outflow=3.62 cfs 0.196 af

Reach WQI: Water Quality Inlet Avg. Depth=0.60' Max Vel=3.44 fps Inflow=1.71 cfs 0.090 af
D=12.0" n=0.013 L=89.0' S=0.0051 '/' Capacity=2.53 cfs Outflow=1.69 cfs 0.090 af

Pond DMH-1: Drain Manhole Inflow=2.66 cfs 0.143 af
Primary=2.66 cfs 0.143 af

Pond DMH-2: Drain Manhole Inflow=3.62 cfs 0.196 af
Primary=3.62 cfs 0.196 af

Total Runoff Area = 0.644 ac Runoff Volume = 0.212 af Average Runoff Depth = 3.95"
10.65% Pervious = 0.069 ac 89.35% Impervious = 0.575 ac

Summary for Subcatchment S-1: East Roof Runoff

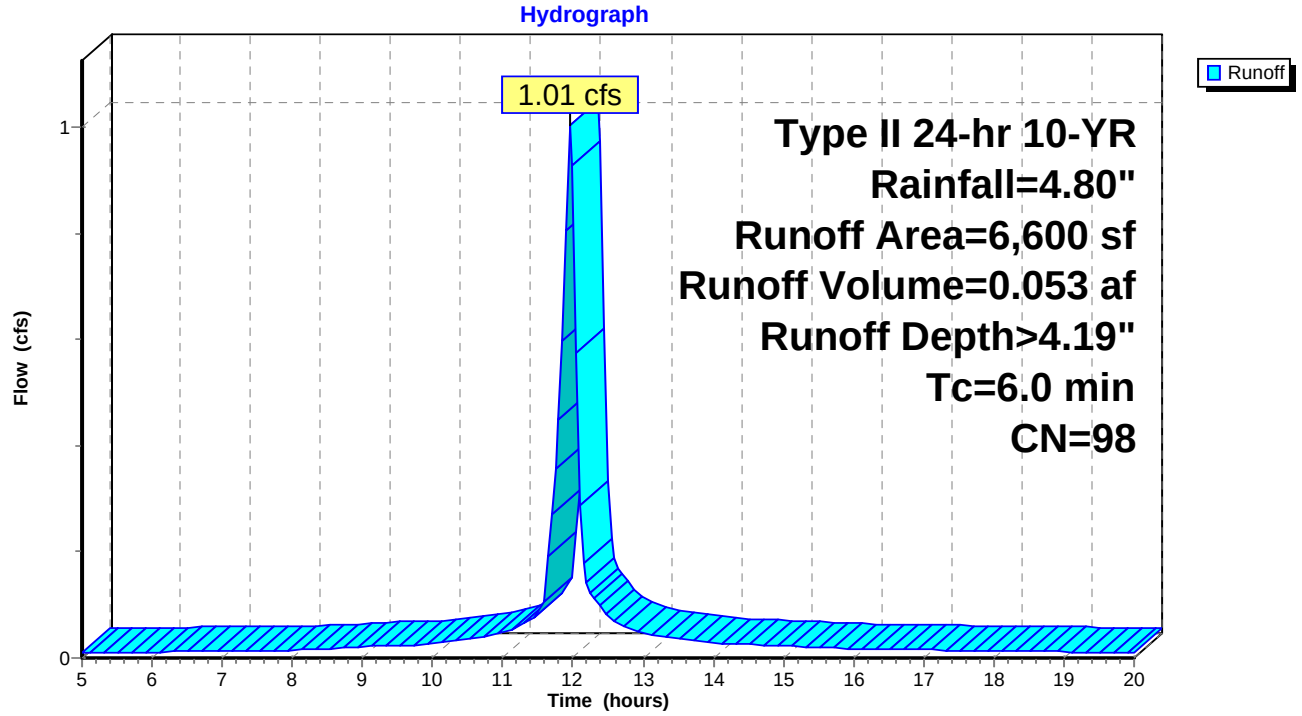
Runoff = 1.01 cfs @ 11.96 hrs, Volume= 0.053 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.80"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-1: East Roof Runoff



Summary for Subcatchment S-2: West Roof Runoff

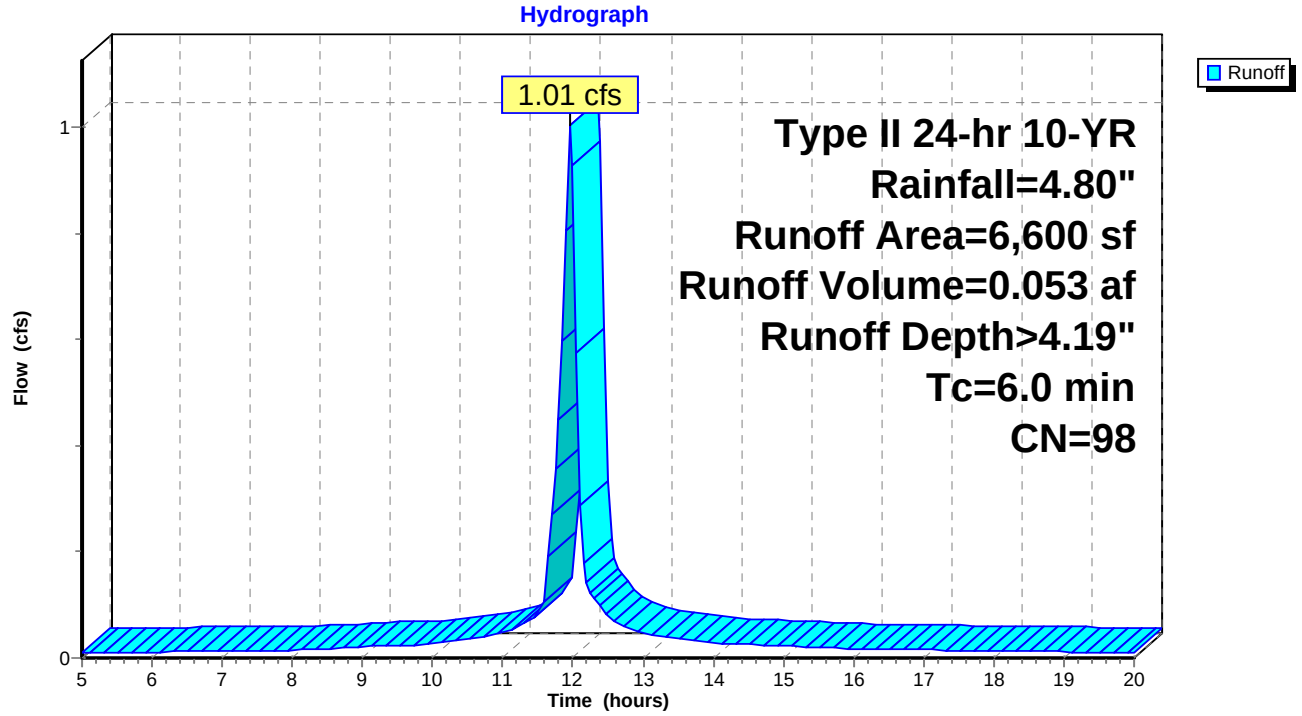
Runoff = 1.01 cfs @ 11.96 hrs, Volume= 0.053 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.80"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-2: West Roof Runoff



Summary for Subcatchment S-3: Tributary to CB-1

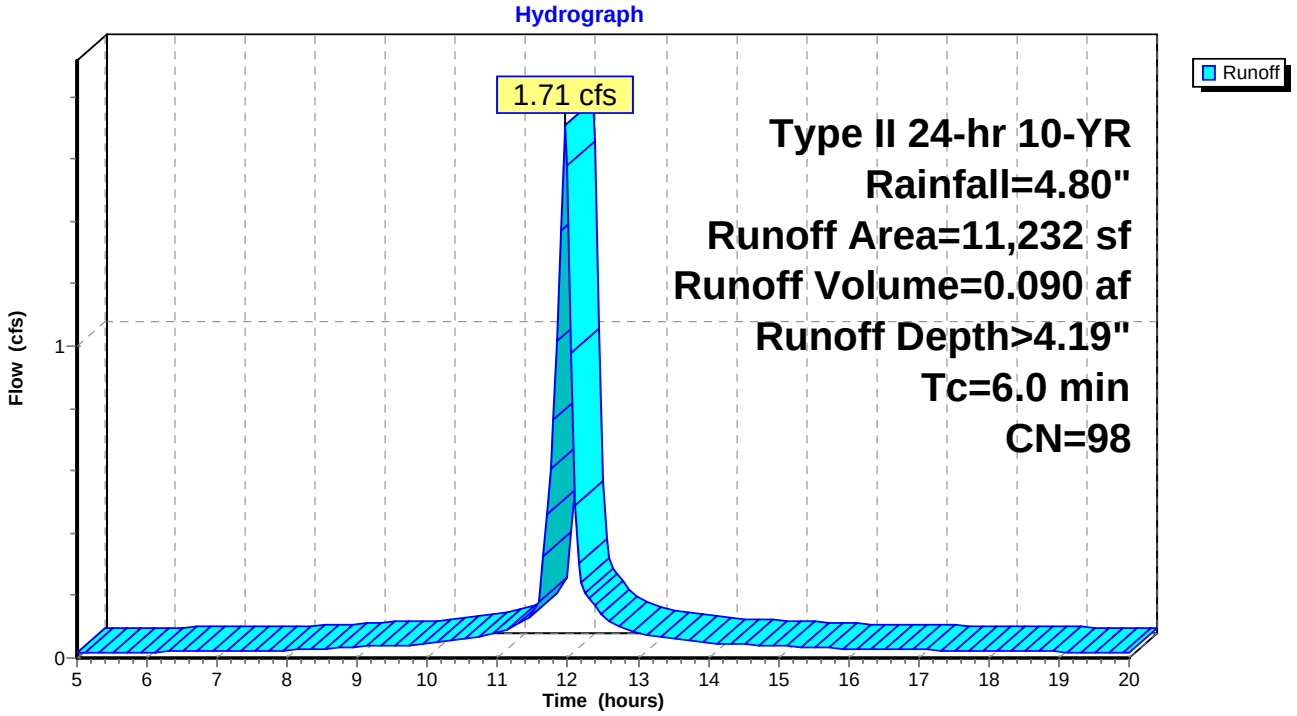
Runoff = 1.71 cfs @ 11.96 hrs, Volume= 0.090 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.80"

Area (sf)	CN	Description
11,232	98	Paved parking & roofs
11,232		Impervious Area

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

Subcatchment S-3: Tributary to CB-1



Summary for Subcatchment S-4: Post-Development Runoff

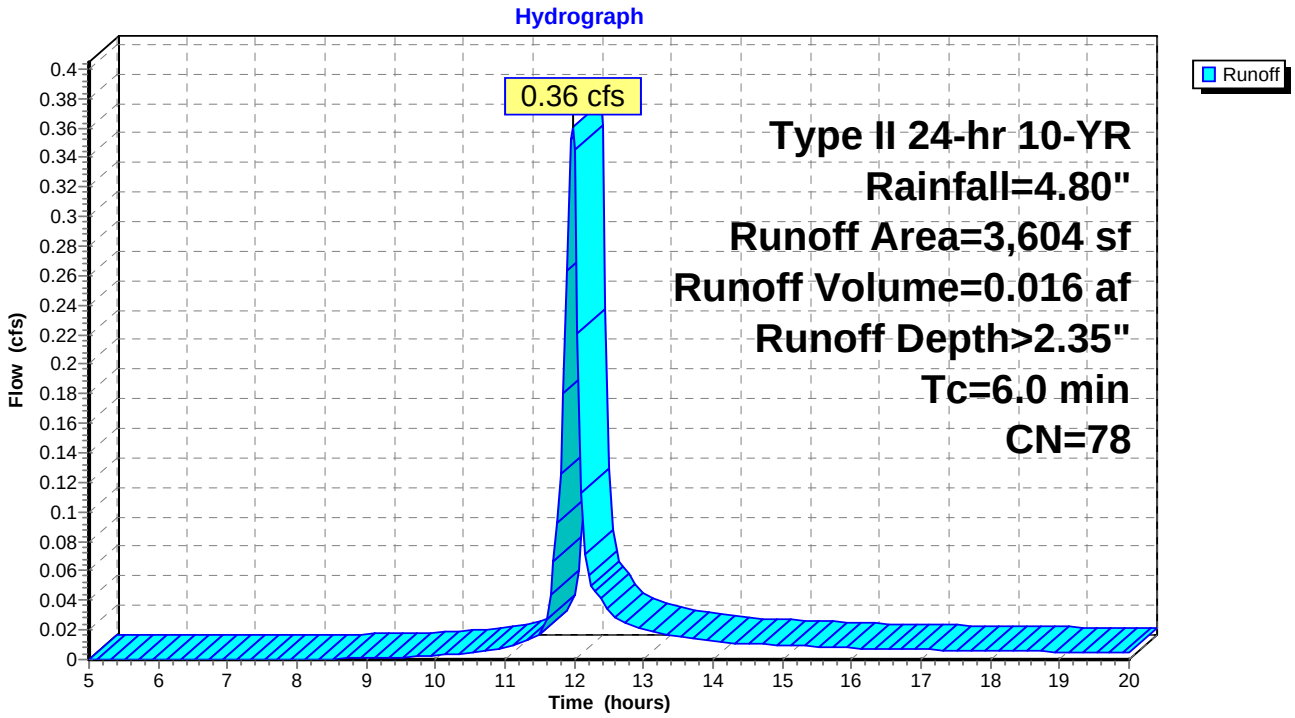
Runoff = 0.36 cfs @ 11.97 hrs, Volume= 0.016 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.80"

	Area (sf)	CN	Description
*	618	98	Pavement
	2,986	74	>75% Grass cover, Good, HSG C
	3,604	78	Weighted Average
	2,986		Pervious Area
	618		Impervious Area

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

Subcatchment S-4: Post-Development Runoff



Summary for Reach P-1: 12" HDPE

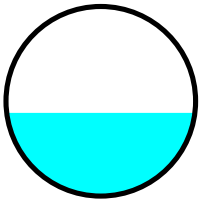
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

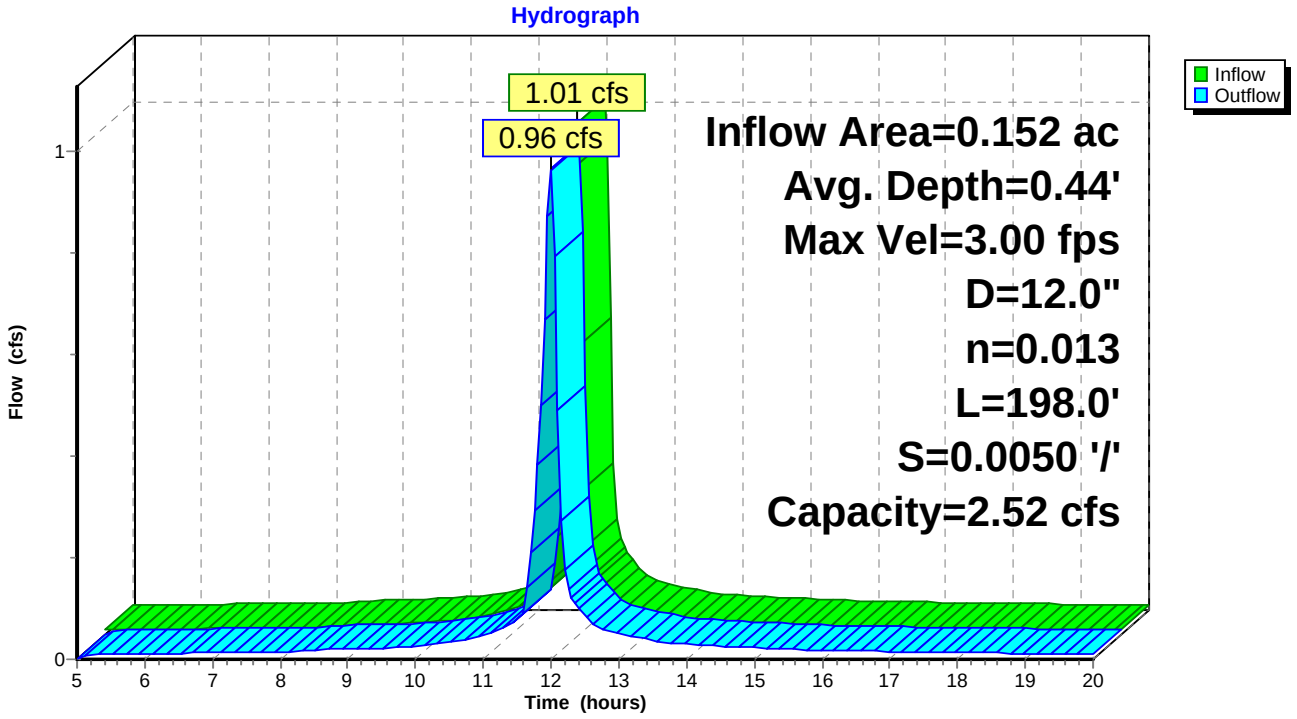
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 4.19" for 10-YR event
Inflow = 1.01 cfs @ 11.96 hrs, Volume= 0.053 af
Outflow = 0.96 cfs @ 11.99 hrs, Volume= 0.053 af, Atten= 4%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.00 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 3.2 min

Peak Storage= 65 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013
Length= 198.0' Slope= 0.0050 '/'
Inlet Invert= 58.64', Outlet Invert= 57.65'





Summary for Reach P-2: 10" HDPE

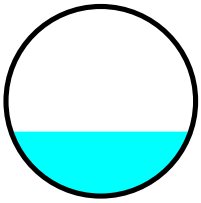
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

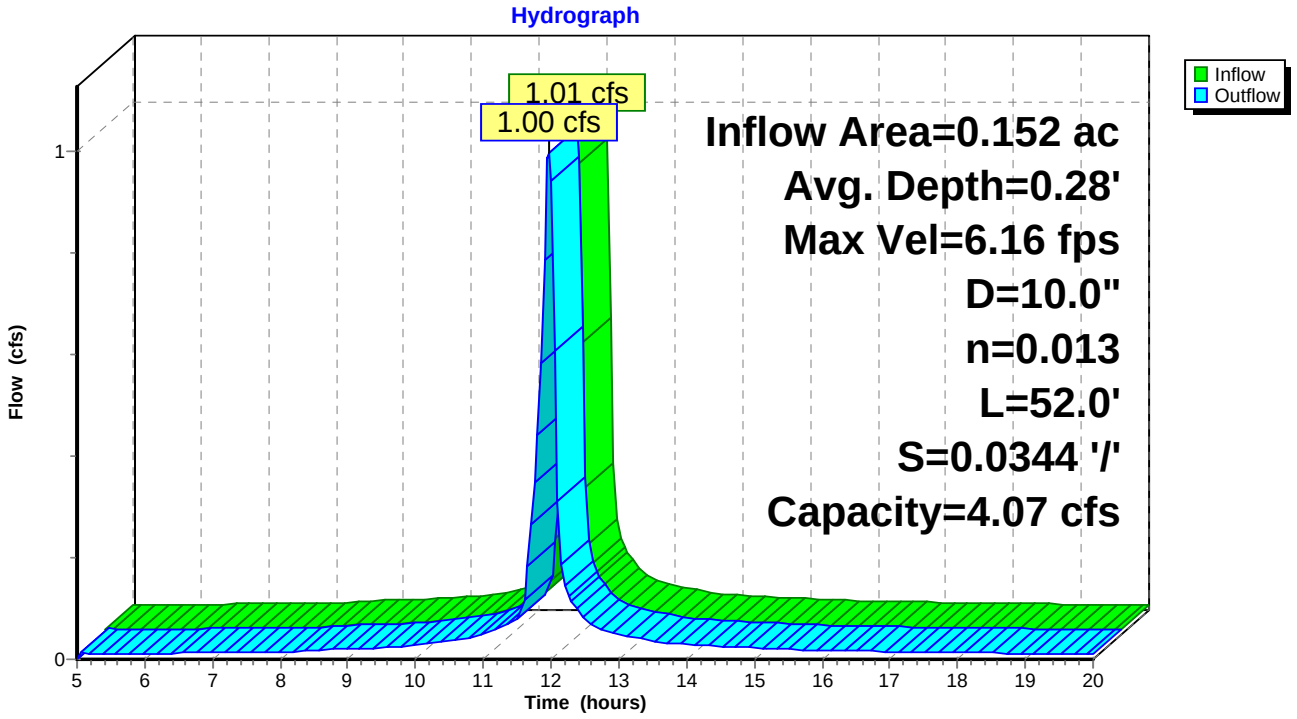
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 4.19" for 10-YR event
Inflow = 1.01 cfs @ 11.96 hrs, Volume= 0.053 af
Outflow = 1.00 cfs @ 11.97 hrs, Volume= 0.053 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.16 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.4 min

Peak Storage= 8 cf @ 11.96 hrs, Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.83', Capacity at Bank-Full= 4.07 cfs

10.0" Diameter Pipe, n= 0.013
Length= 52.0' Slope= 0.0344 '/'
Inlet Invert= 71.00', Outlet Invert= 69.21'





Summary for Reach P-3: 18" HDPE

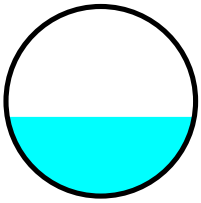
[52] Hint: Inlet/Outlet conditions not evaluated
[88] Warning: Qout>Qin may require Finer Routing>1

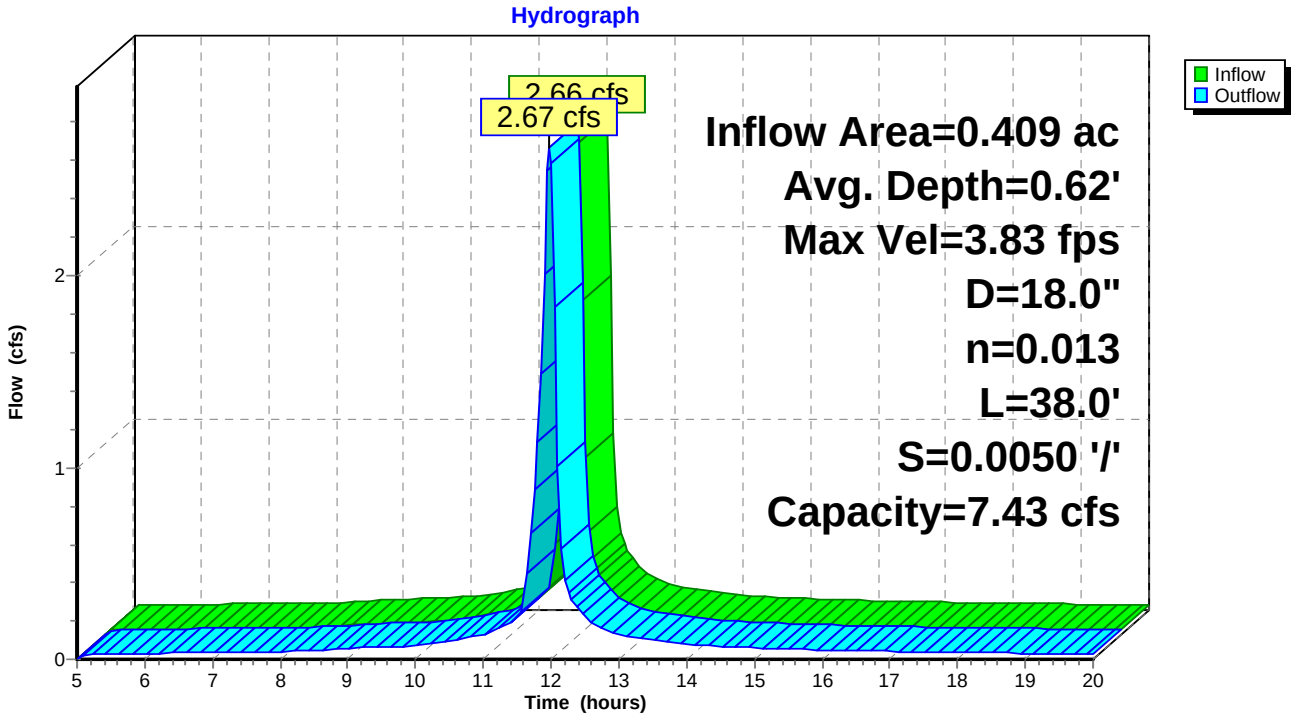
Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 4.19" for 10-YR event
Inflow = 2.66 cfs @ 11.97 hrs, Volume= 0.143 af
Outflow = 2.67 cfs @ 11.98 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.83 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 0.5 min

Peak Storage= 26 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.43 cfs

18.0" Diameter Pipe, n= 0.013
Length= 38.0' Slope= 0.0050 '/'
Inlet Invert= 57.84', Outlet Invert= 57.65'





Summary for Reach P-4: 18" HDPE

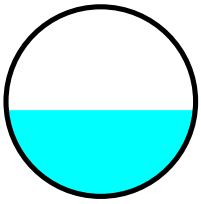
[52] Hint: Inlet/Outlet conditions not evaluated

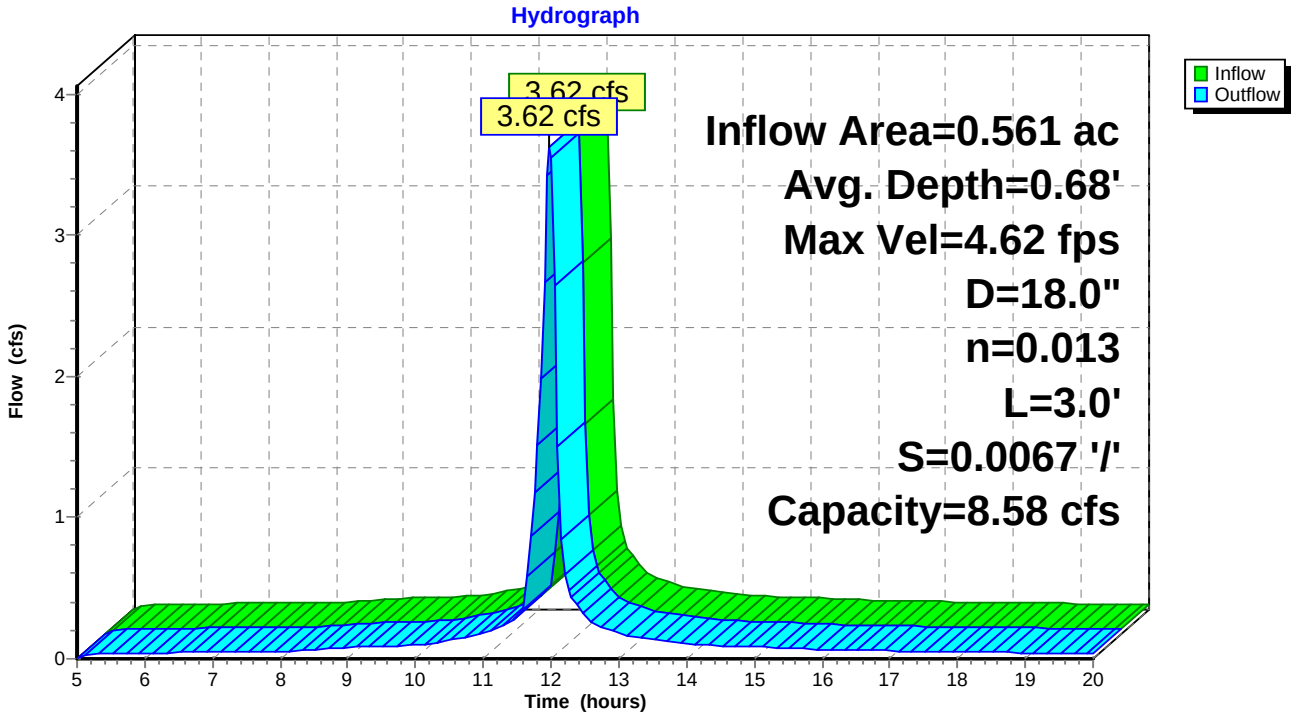
Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 4.18" for 10-YR event
Inflow = 3.62 cfs @ 11.98 hrs, Volume= 0.196 af
Outflow = 3.62 cfs @ 11.98 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.62 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 0.0 min

Peak Storage= 2 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 8.58 cfs

18.0" Diameter Pipe, n= 0.013
Length= 3.0' Slope= 0.0067 '/'
Inlet Invert= 57.65', Outlet Invert= 57.63'





Summary for Reach WQI: Water Quality Inlet

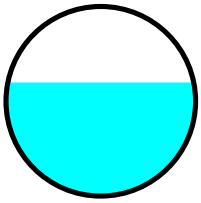
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

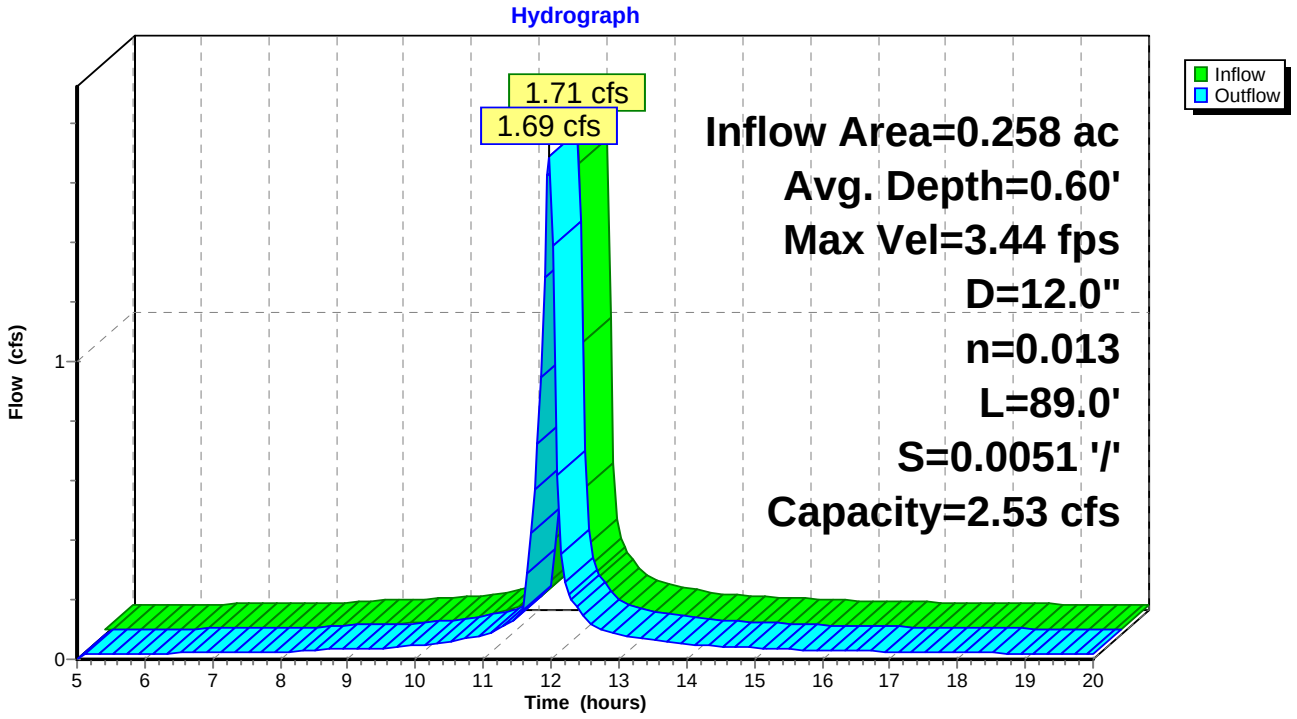
Inflow Area = 0.258 ac,100.00% Impervious, Inflow Depth > 4.19" for 10-YR event
Inflow = 1.71 cfs @ 11.96 hrs, Volume= 0.090 af
Outflow = 1.69 cfs @ 11.98 hrs, Volume= 0.090 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.44 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 1.2 min

Peak Storage= 44 cf @ 11.97 hrs, Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.53 cfs

12.0" Diameter Pipe, n= 0.013
Length= 89.0' Slope= 0.0051 '/'
Inlet Invert= 58.29', Outlet Invert= 57.84'





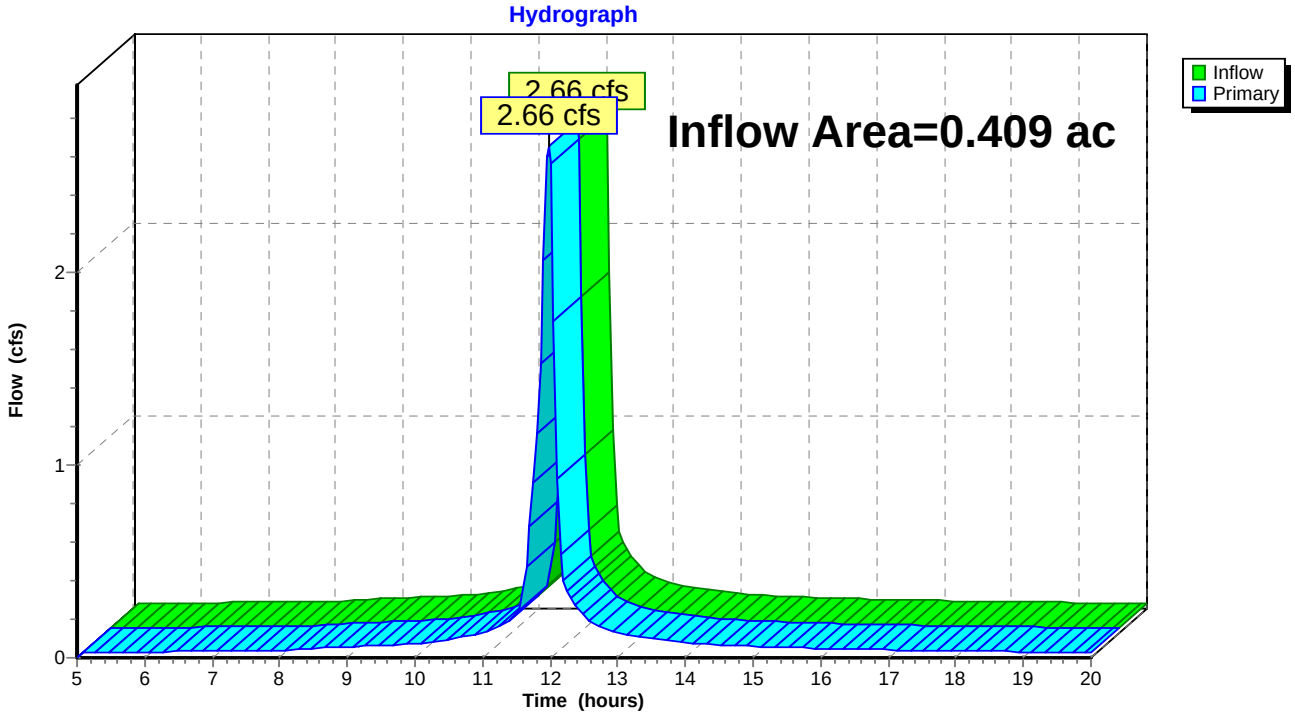
Summary for Pond DMH-1: Drain Manhole

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

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 4.19" for 10-YR event
Inflow = 2.66 cfs @ 11.97 hrs, Volume= 0.143 af
Primary = 2.66 cfs @ 11.97 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-1: Drain Manhole



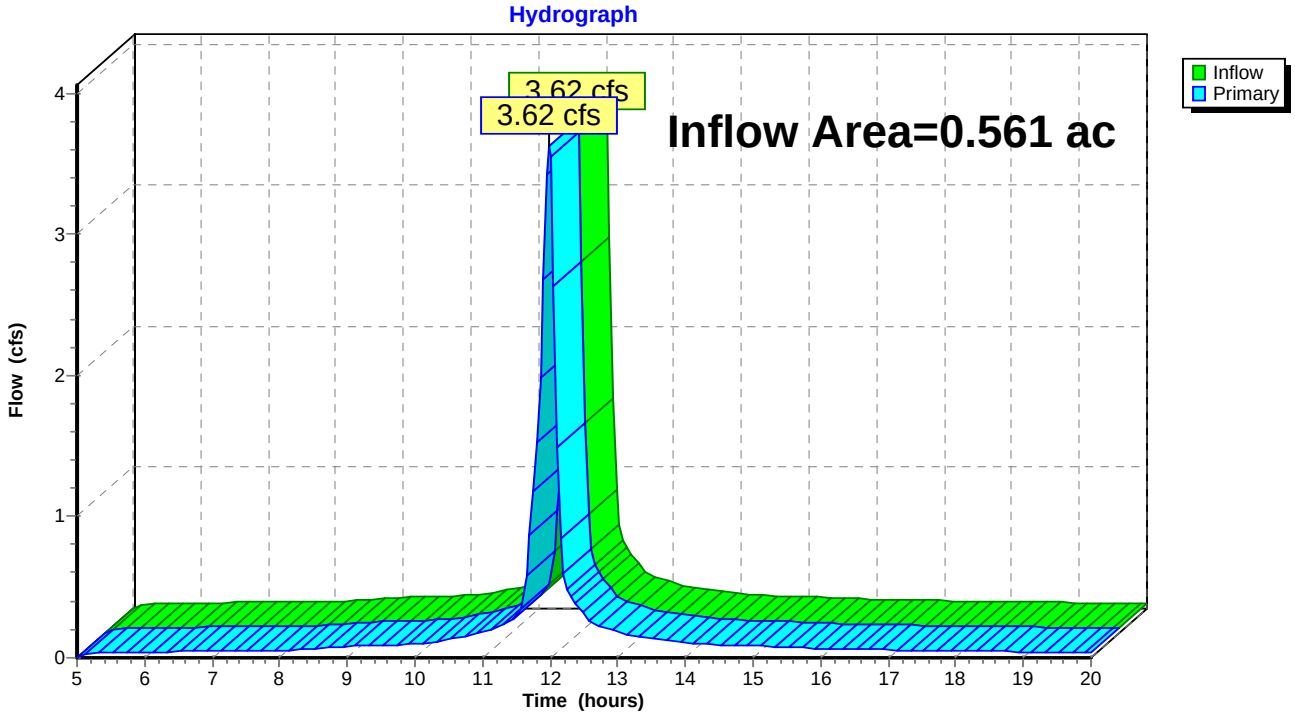
Summary for Pond DMH-2: Drain Manhole

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

Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 4.18" for 10-YR event
Inflow = 3.62 cfs @ 11.98 hrs, Volume= 0.196 af
Primary = 3.62 cfs @ 11.98 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-2: Drain Manhole



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: East Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>4.91"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.062 af

Subcatchment S-2: West Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>4.91"
Tc=6.0 min CN=98 Runoff=1.18 cfs 0.062 af

Subcatchment S-3: Tributary to CB-1 Runoff Area=11,232 sf 100.00% Impervious Runoff Depth>4.91"
Tc=6.0 min CN=98 Runoff=2.00 cfs 0.105 af

Subcatchment S-4: Post-Development Runoff Area=3,604 sf 17.15% Impervious Runoff Depth>2.99"
Tc=6.0 min CN=78 Runoff=0.46 cfs 0.021 af

Reach P-1: 12" HDPE Avg. Depth=0.48' Max Vel=3.12 fps Inflow=1.18 cfs 0.062 af
D=12.0" n=0.013 L=198.0' S=0.0050 '/' Capacity=2.52 cfs Outflow=1.13 cfs 0.062 af

Reach P-2: 10" HDPE Avg. Depth=0.31' Max Vel=6.43 fps Inflow=1.18 cfs 0.062 af
D=10.0" n=0.013 L=52.0' S=0.0344 '/' Capacity=4.07 cfs Outflow=1.16 cfs 0.062 af

Reach P-3: 18" HDPE Avg. Depth=0.68' Max Vel=3.99 fps Inflow=3.11 cfs 0.167 af
D=18.0" n=0.013 L=38.0' S=0.0050 '/' Capacity=7.43 cfs Outflow=3.12 cfs 0.167 af

Reach P-4: 18" HDPE Avg. Depth=0.75' Max Vel=4.81 fps Inflow=4.24 cfs 0.229 af
D=18.0" n=0.013 L=3.0' S=0.0067 '/' Capacity=8.58 cfs Outflow=4.24 cfs 0.229 af

Reach WQI: Water Quality Inlet Avg. Depth=0.67' Max Vel=3.56 fps Inflow=2.00 cfs 0.105 af
D=12.0" n=0.013 L=89.0' S=0.0051 '/' Capacity=2.53 cfs Outflow=1.97 cfs 0.105 af

Pond DMH-1: Drain Manhole Inflow=3.11 cfs 0.167 af
Primary=3.11 cfs 0.167 af

Pond DMH-2: Drain Manhole Inflow=4.24 cfs 0.229 af
Primary=4.24 cfs 0.229 af

Total Runoff Area = 0.644 ac Runoff Volume = 0.250 af Average Runoff Depth = 4.66"
10.65% Pervious = 0.069 ac 89.35% Impervious = 0.575 ac

Summary for Subcatchment S-1: East Roof Runoff

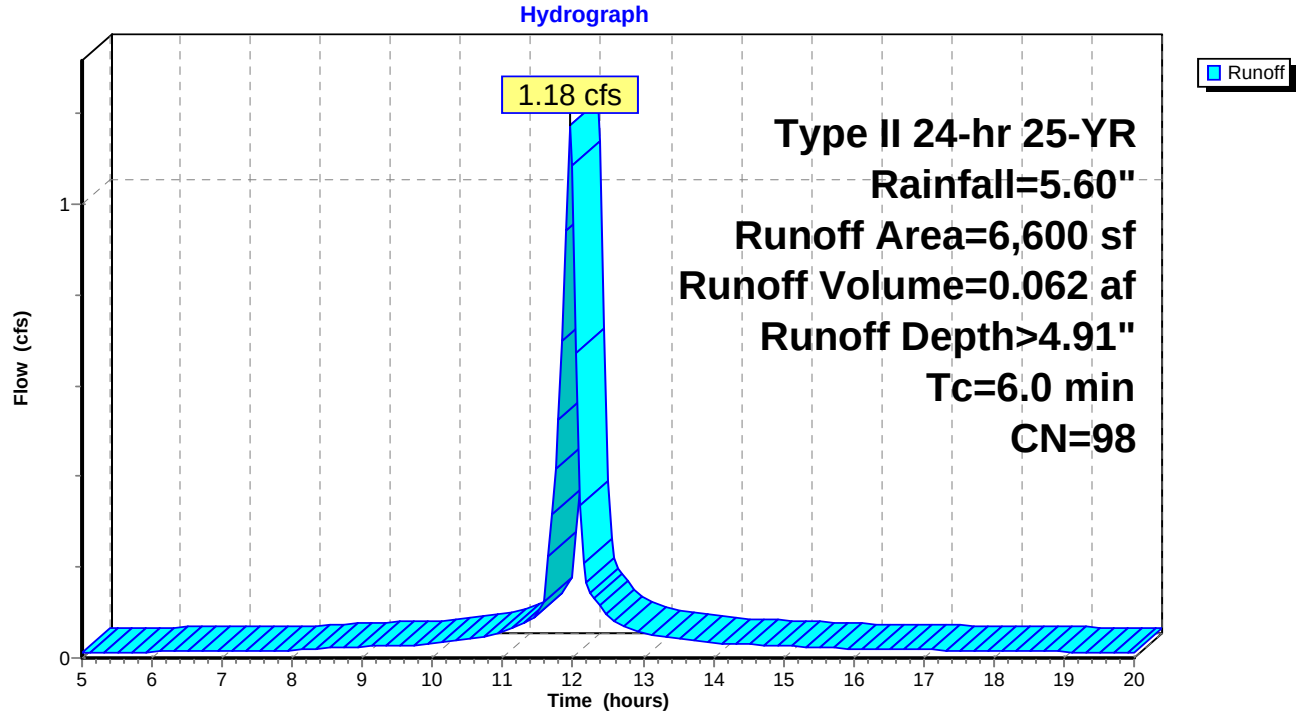
Runoff = 1.18 cfs @ 11.96 hrs, Volume= 0.062 af, Depth> 4.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.60"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-1: East Roof Runoff



Summary for Subcatchment S-2: West Roof Runoff

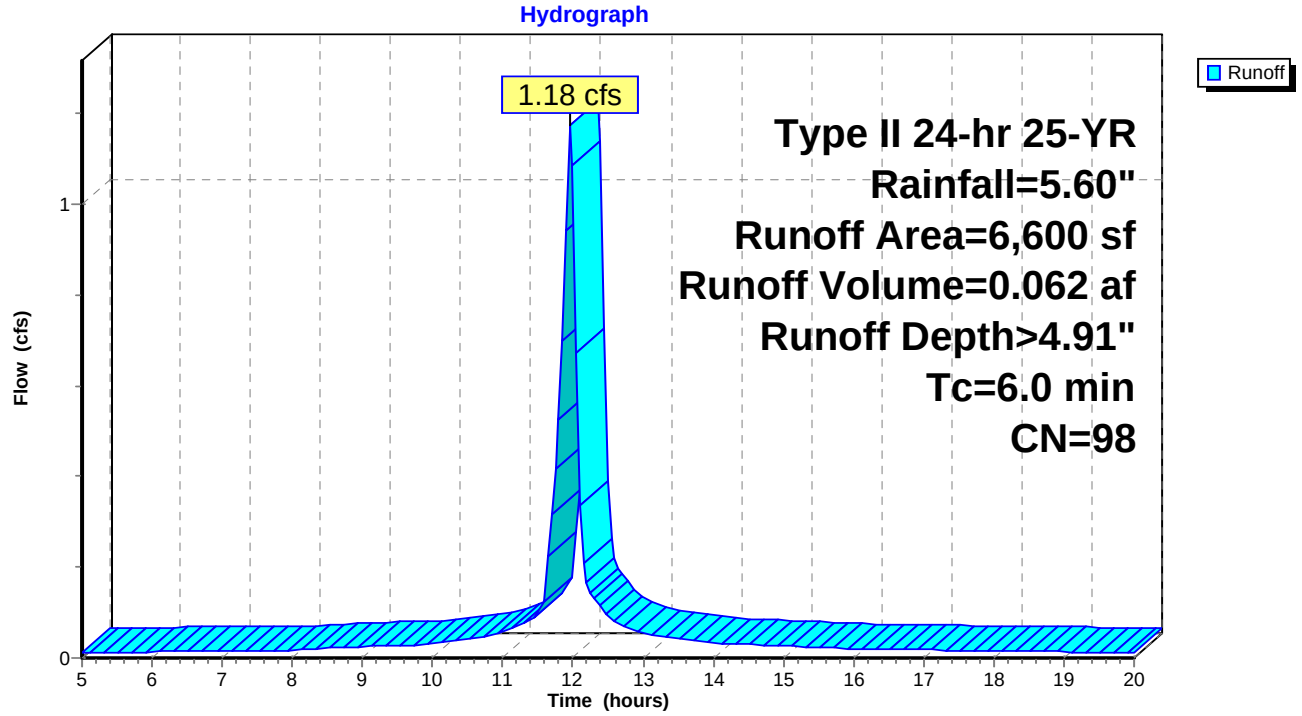
Runoff = 1.18 cfs @ 11.96 hrs, Volume= 0.062 af, Depth> 4.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.60"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-2: West Roof Runoff



Summary for Subcatchment S-3: Tributary to CB-1

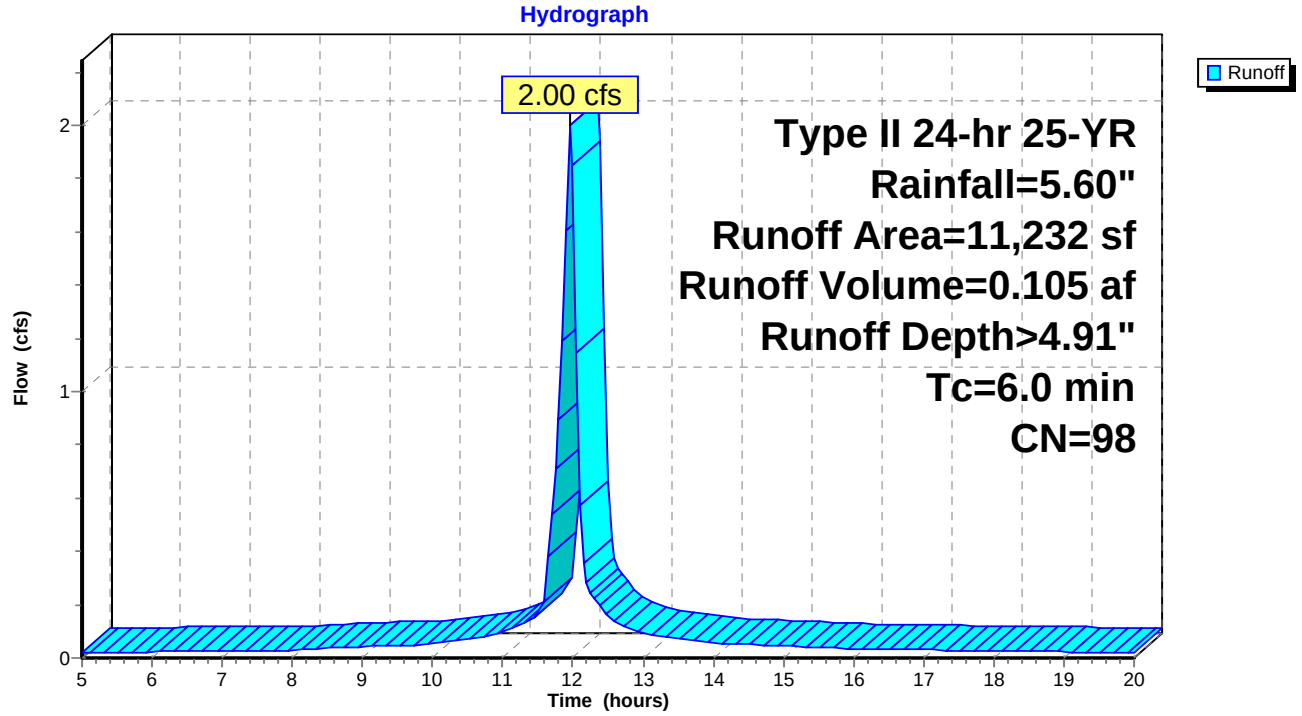
Runoff = 2.00 cfs @ 11.96 hrs, Volume= 0.105 af, Depth> 4.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.60"

Area (sf)	CN	Description
11,232	98	Paved parking & roofs
11,232		Impervious Area

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

Subcatchment S-3: Tributary to CB-1



Summary for Subcatchment S-4: Post-Development Runoff

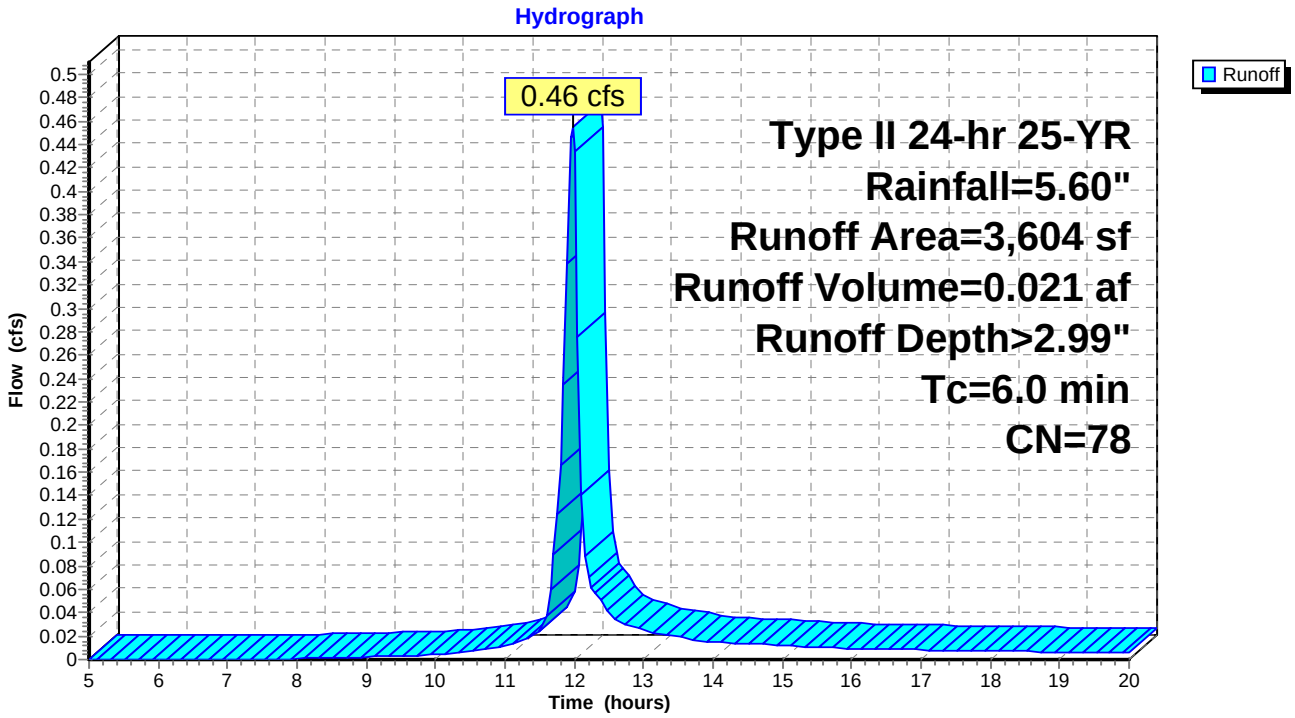
Runoff = 0.46 cfs @ 11.97 hrs, Volume= 0.021 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.60"

	Area (sf)	CN	Description
*	618	98	Pavement
	2,986	74	>75% Grass cover, Good, HSG C
	3,604	78	Weighted Average
	2,986		Pervious Area
	618		Impervious Area

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

Subcatchment S-4: Post-Development Runoff



Summary for Reach P-1: 12" HDPE

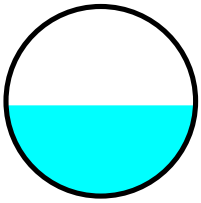
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

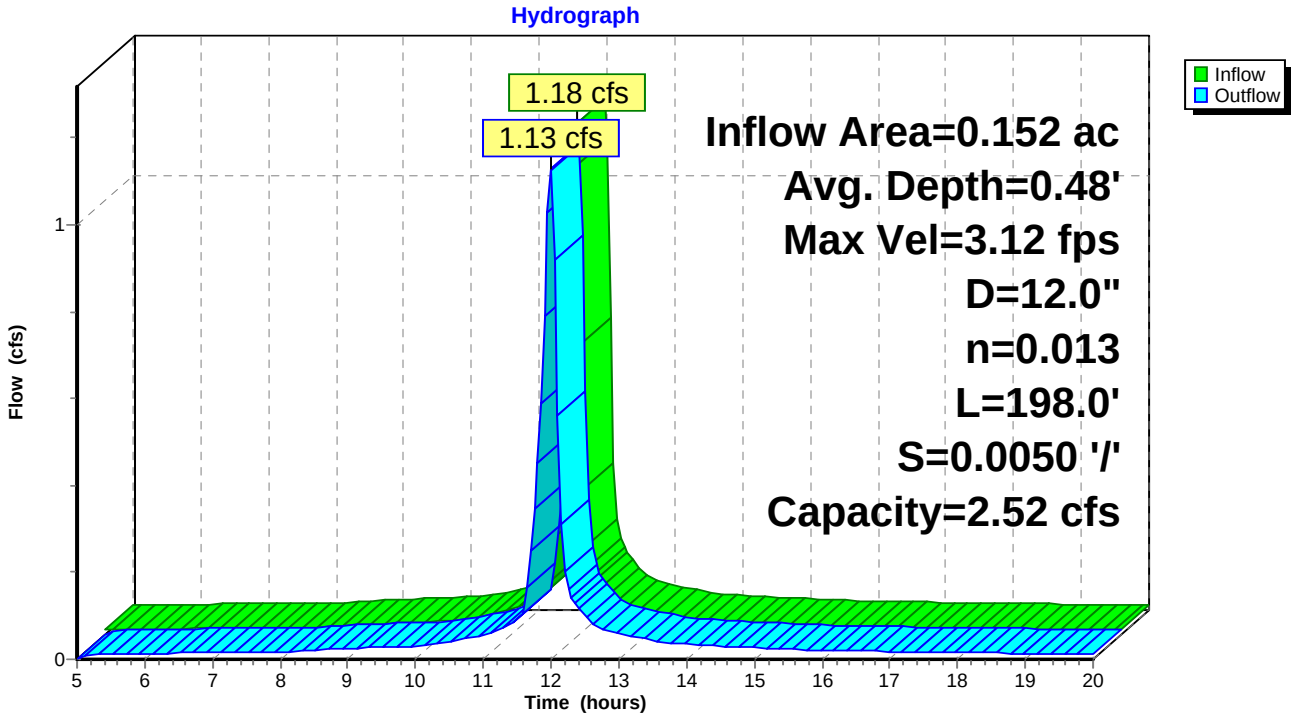
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 4.91" for 25-YR event
Inflow = 1.18 cfs @ 11.96 hrs, Volume= 0.062 af
Outflow = 1.13 cfs @ 11.99 hrs, Volume= 0.062 af, Atten= 4%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.12 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 3.0 min

Peak Storage= 73 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013
Length= 198.0' Slope= 0.0050 '/'
Inlet Invert= 58.64', Outlet Invert= 57.65'





Summary for Reach P-2: 10" HDPE

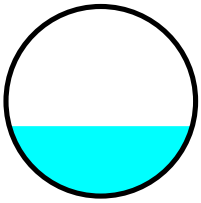
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

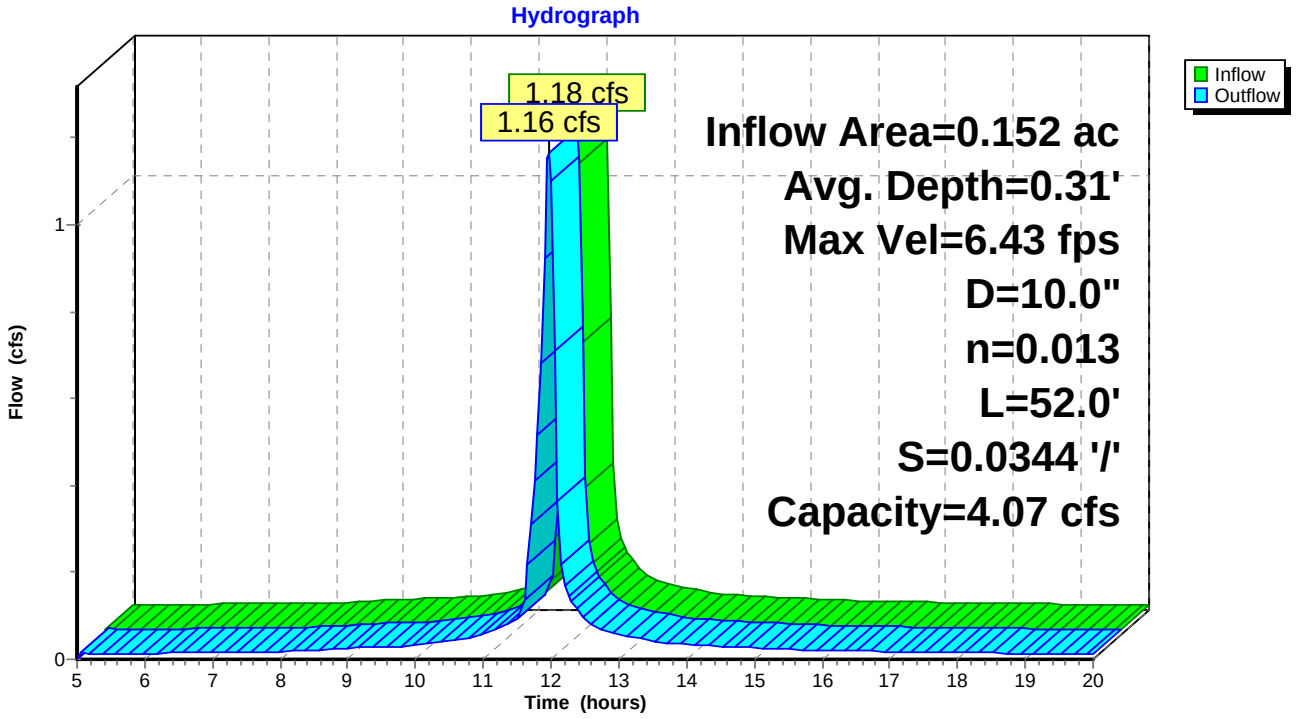
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 4.91" for 25-YR event
Inflow = 1.18 cfs @ 11.96 hrs, Volume= 0.062 af
Outflow = 1.16 cfs @ 11.97 hrs, Volume= 0.062 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.43 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.18 fps, Avg. Travel Time= 0.4 min

Peak Storage= 9 cf @ 11.96 hrs, Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 0.83', Capacity at Bank-Full= 4.07 cfs

10.0" Diameter Pipe, n= 0.013
Length= 52.0' Slope= 0.0344 '/'
Inlet Invert= 71.00', Outlet Invert= 69.21'





Summary for Reach P-3: 18" HDPE

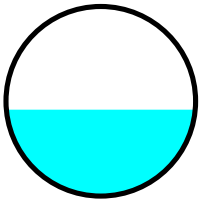
[52] Hint: Inlet/Outlet conditions not evaluated
[88] Warning: Qout>Qin may require Finer Routing>1

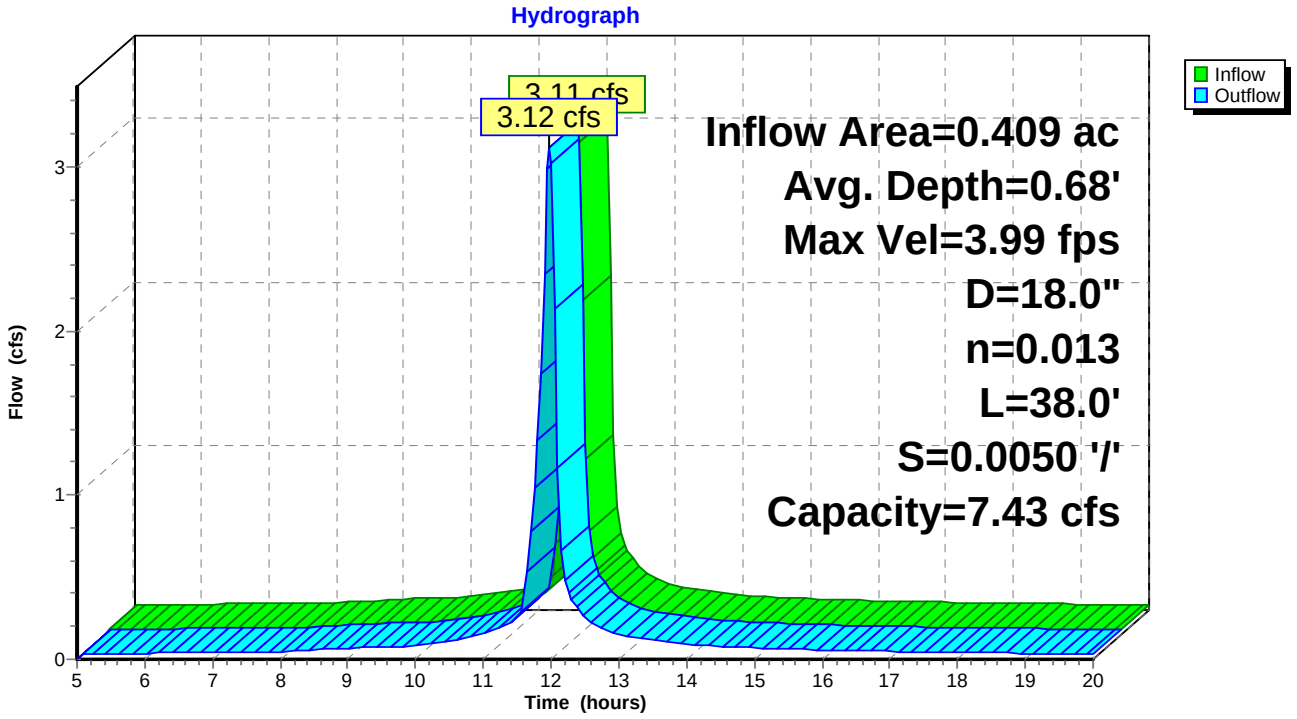
Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 4.91" for 25-YR event
Inflow = 3.11 cfs @ 11.97 hrs, Volume= 0.167 af
Outflow = 3.12 cfs @ 11.98 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.5 min

Peak Storage= 30 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.43 cfs

18.0" Diameter Pipe, n= 0.013
Length= 38.0' Slope= 0.0050 '/'
Inlet Invert= 57.84', Outlet Invert= 57.65'





Summary for Reach P-4: 18" HDPE

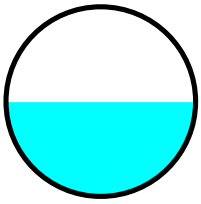
[52] Hint: Inlet/Outlet conditions not evaluated

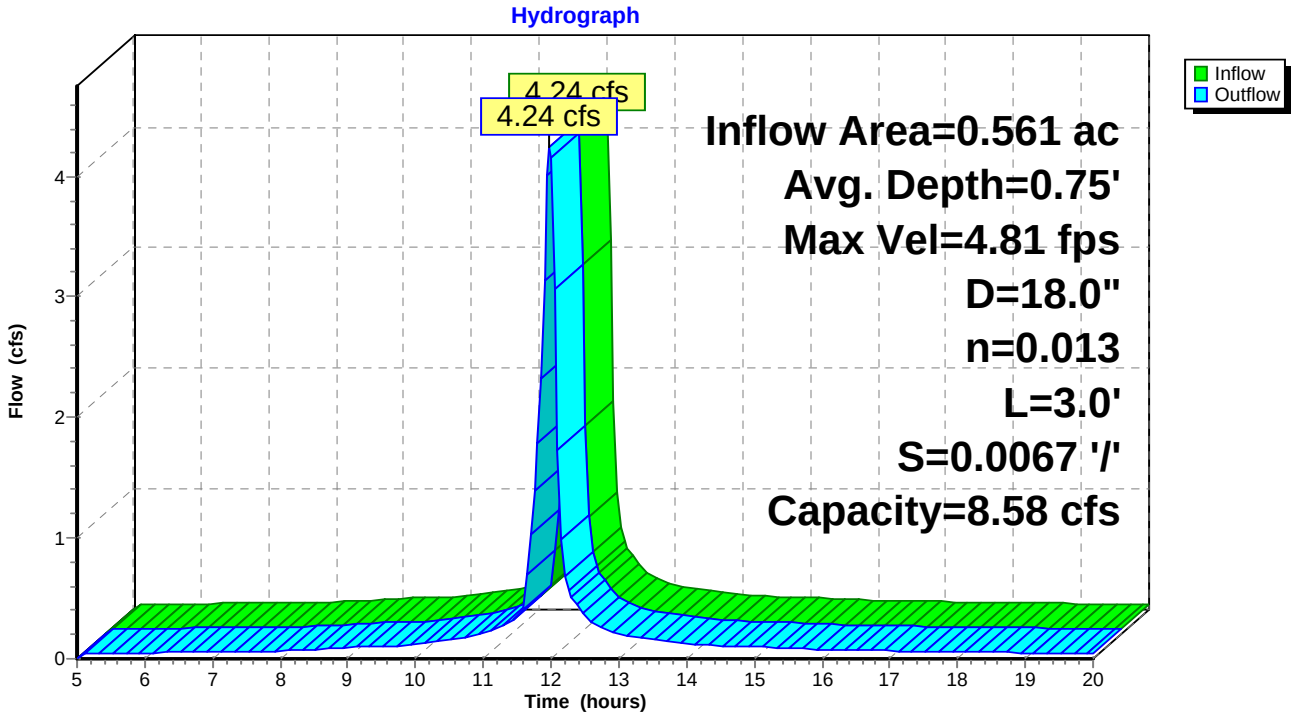
Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 4.90" for 25-YR event
Inflow = 4.24 cfs @ 11.98 hrs, Volume= 0.229 af
Outflow = 4.24 cfs @ 11.98 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.81 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.0 min

Peak Storage= 3 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 8.58 cfs

18.0" Diameter Pipe, n= 0.013
Length= 3.0' Slope= 0.0067 '/'
Inlet Invert= 57.65', Outlet Invert= 57.63'





Summary for Reach WQI: Water Quality Inlet

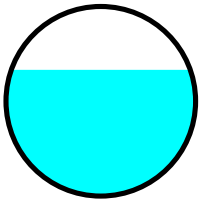
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

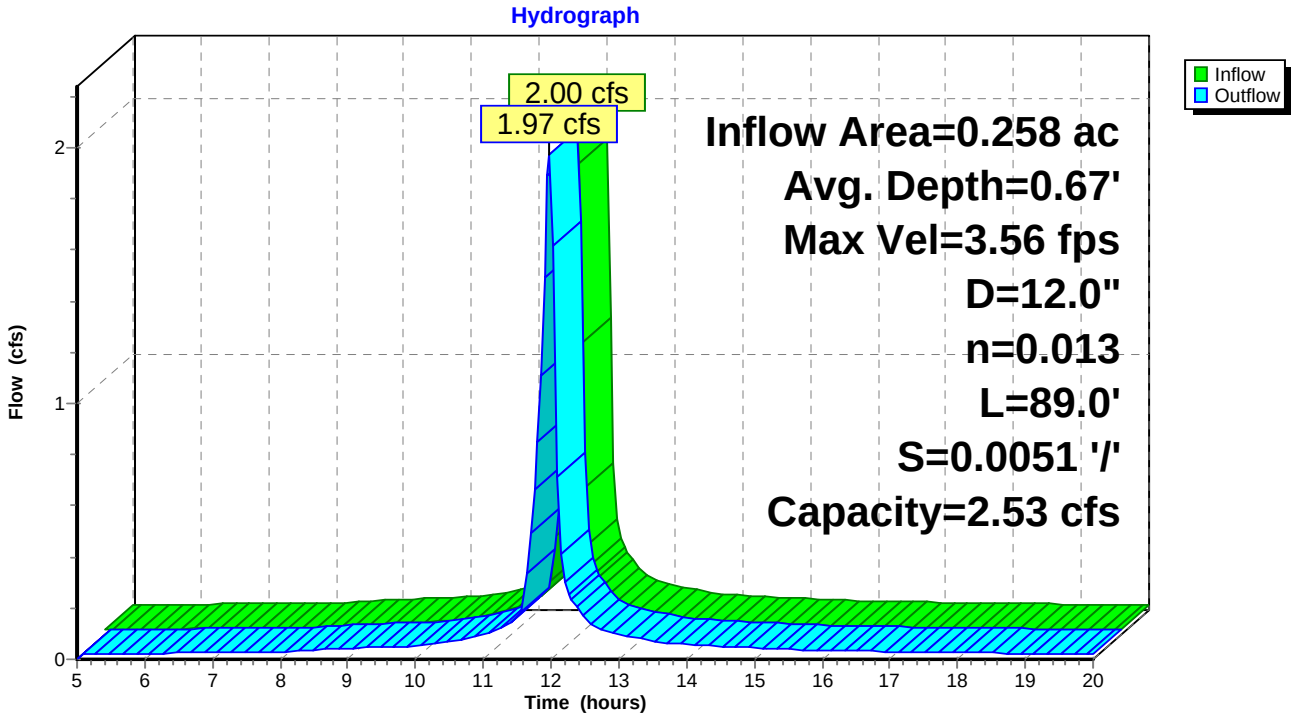
Inflow Area = 0.258 ac,100.00% Impervious, Inflow Depth > 4.91" for 25-YR event
Inflow = 2.00 cfs @ 11.96 hrs, Volume= 0.105 af
Outflow = 1.97 cfs @ 11.98 hrs, Volume= 0.105 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.56 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 1.2 min

Peak Storage= 49 cf @ 11.97 hrs, Average Depth at Peak Storage= 0.67'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.53 cfs

12.0" Diameter Pipe, n= 0.013
Length= 89.0' Slope= 0.0051 '/'
Inlet Invert= 58.29', Outlet Invert= 57.84'





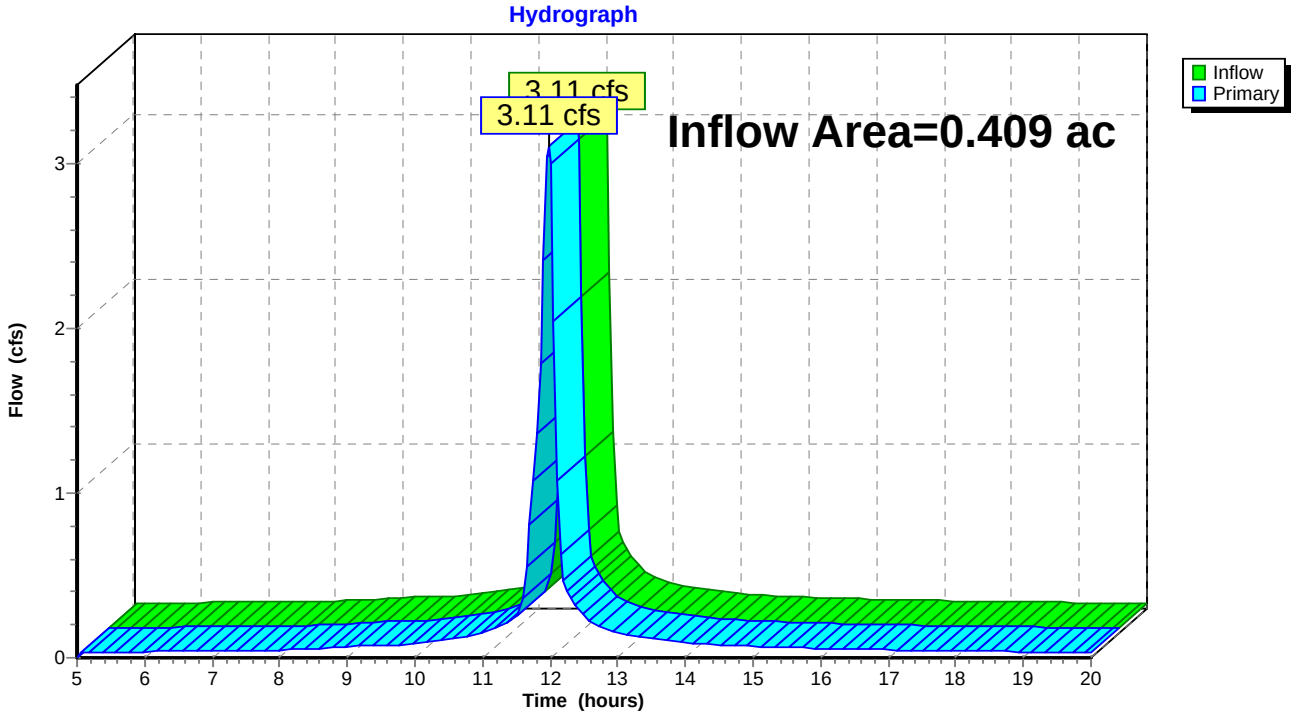
Summary for Pond DMH-1: Drain Manhole

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

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 4.91" for 25-YR event
Inflow = 3.11 cfs @ 11.97 hrs, Volume= 0.167 af
Primary = 3.11 cfs @ 11.97 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-1: Drain Manhole



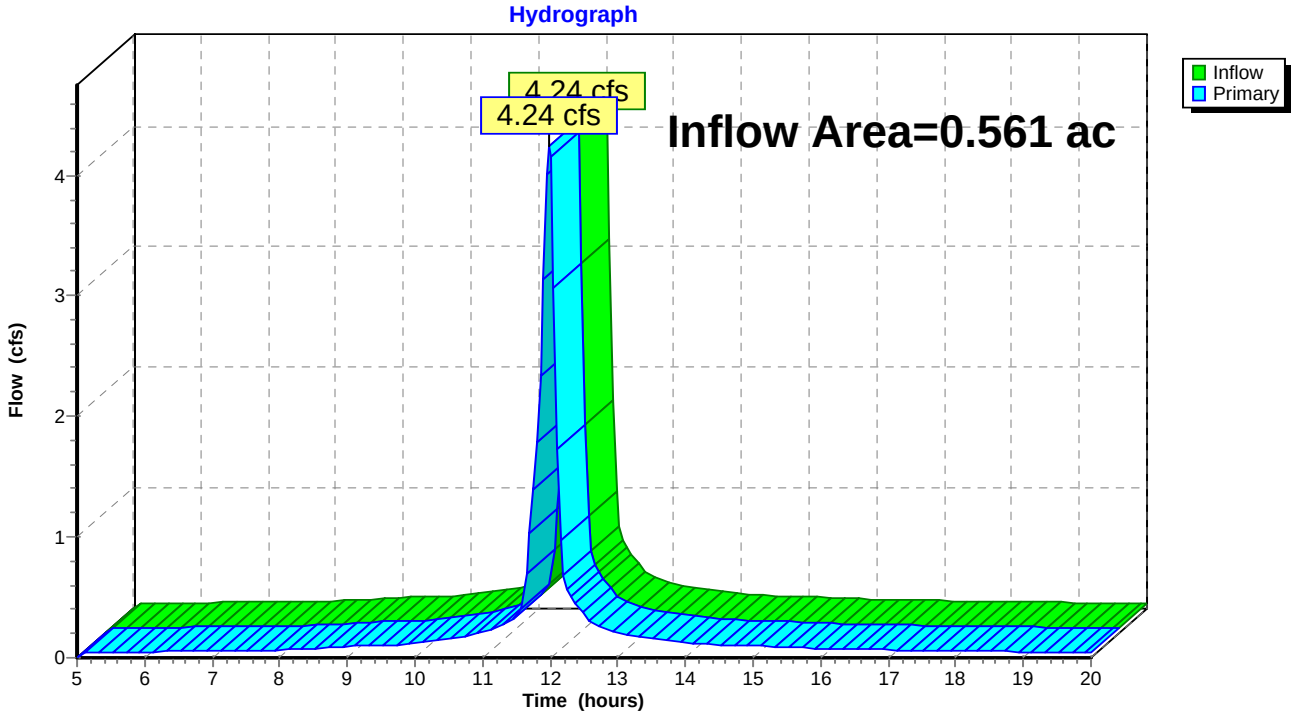
Summary for Pond DMH-2: Drain Manhole

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

Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 4.90" for 25-YR event
Inflow = 4.24 cfs @ 11.98 hrs, Volume= 0.229 af
Primary = 4.24 cfs @ 11.98 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-2: Drain Manhole



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S-1: East Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>6.17"
Tc=6.0 min CN=98 Runoff=1.47 cfs 0.078 af

Subcatchment S-2: West Roof Runoff Runoff Area=6,600 sf 100.00% Impervious Runoff Depth>6.17"
Tc=6.0 min CN=98 Runoff=1.47 cfs 0.078 af

Subcatchment S-3: Tributary to CB-1 Runoff Area=11,232 sf 100.00% Impervious Runoff Depth>6.17"
Tc=6.0 min CN=98 Runoff=2.50 cfs 0.132 af

Subcatchment S-4: Post-Development Runoff Area=3,604 sf 17.15% Impervious Runoff Depth>4.17"
Tc=6.0 min CN=78 Runoff=0.62 cfs 0.029 af

Reach P-1: 12" HDPE Avg. Depth=0.55' Max Vel=3.30 fps Inflow=1.47 cfs 0.078 af
D=12.0" n=0.013 L=198.0' S=0.0050 '/' Capacity=2.52 cfs Outflow=1.42 cfs 0.078 af

Reach P-2: 10" HDPE Avg. Depth=0.35' Max Vel=6.83 fps Inflow=1.47 cfs 0.078 af
D=10.0" n=0.013 L=52.0' S=0.0344 '/' Capacity=4.07 cfs Outflow=1.46 cfs 0.078 af

Reach P-3: 18" HDPE Avg. Depth=0.77' Max Vel=4.22 fps Inflow=3.89 cfs 0.210 af
D=18.0" n=0.013 L=38.0' S=0.0050 '/' Capacity=7.43 cfs Outflow=3.91 cfs 0.210 af

Reach P-4: 18" HDPE Avg. Depth=0.85' Max Vel=5.08 fps Inflow=5.32 cfs 0.288 af
D=18.0" n=0.013 L=3.0' S=0.0067 '/' Capacity=8.58 cfs Outflow=5.31 cfs 0.288 af

Reach WQI: Water Quality Inlet Avg. Depth=0.80' Max Vel=3.67 fps Inflow=2.50 cfs 0.132 af
D=12.0" n=0.013 L=89.0' S=0.0051 '/' Capacity=2.53 cfs Outflow=2.47 cfs 0.132 af

Pond DMH-1: Drain Manhole Inflow=3.89 cfs 0.210 af
Primary=3.89 cfs 0.210 af

Pond DMH-2: Drain Manhole Inflow=5.32 cfs 0.288 af
Primary=5.32 cfs 0.288 af

Total Runoff Area = 0.644 ac Runoff Volume = 0.317 af Average Runoff Depth = 5.91"
10.65% Pervious = 0.069 ac 89.35% Impervious = 0.575 ac

Summary for Subcatchment S-1: East Roof Runoff

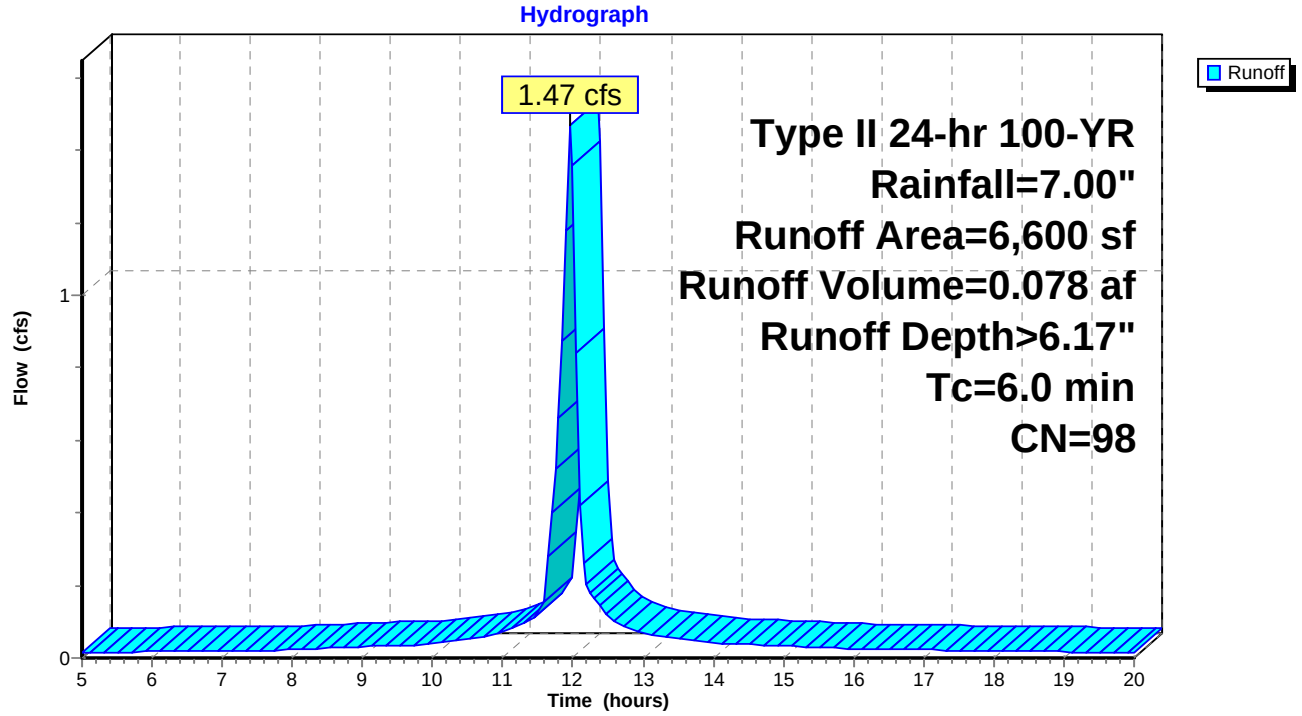
Runoff = 1.47 cfs @ 11.96 hrs, Volume= 0.078 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.00"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-1: East Roof Runoff



Summary for Subcatchment S-2: West Roof Runoff

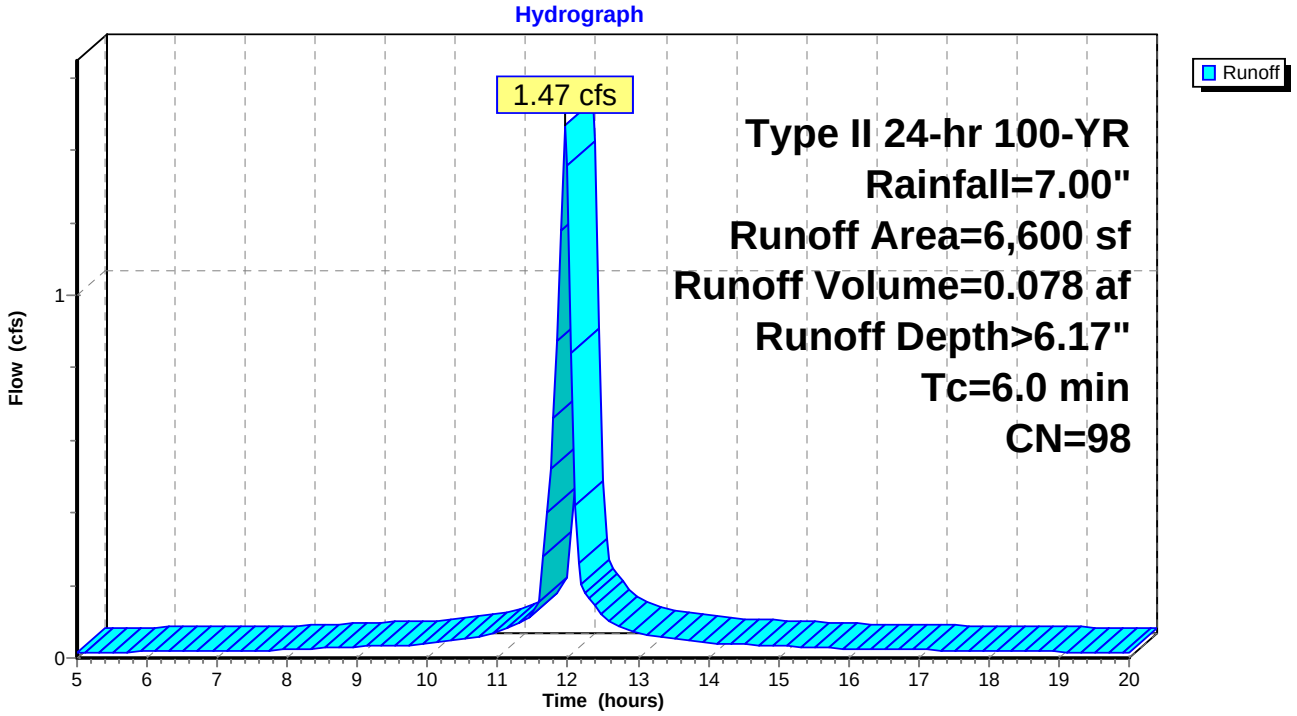
Runoff = 1.47 cfs @ 11.96 hrs, Volume= 0.078 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.00"

	Area (sf)	CN	Description
*	6,600	98	Roof Runoff
	6,600		Impervious Area

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

Subcatchment S-2: West Roof Runoff



Summary for Subcatchment S-3: Tributary to CB-1

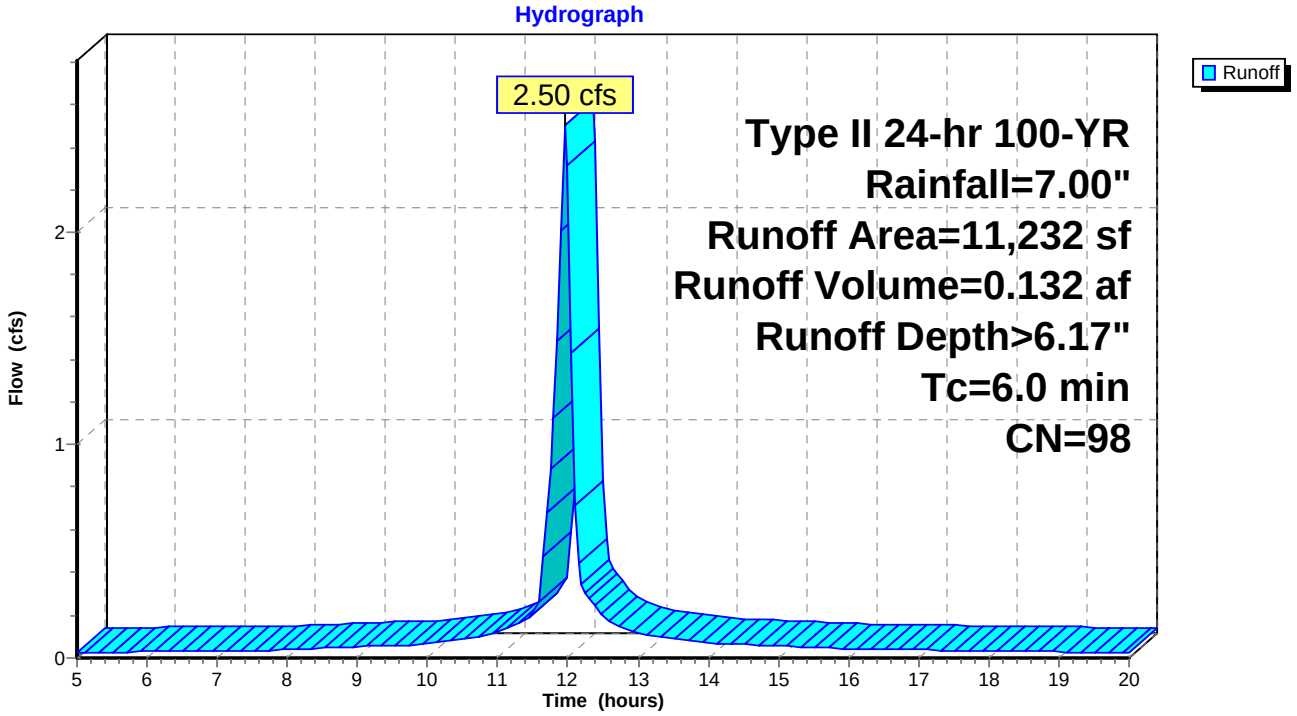
Runoff = 2.50 cfs @ 11.96 hrs, Volume= 0.132 af, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.00"

Area (sf)	CN	Description
11,232	98	Paved parking & roofs
11,232		Impervious Area

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

Subcatchment S-3: Tributary to CB-1



Summary for Subcatchment S-4: Post-Development Runoff

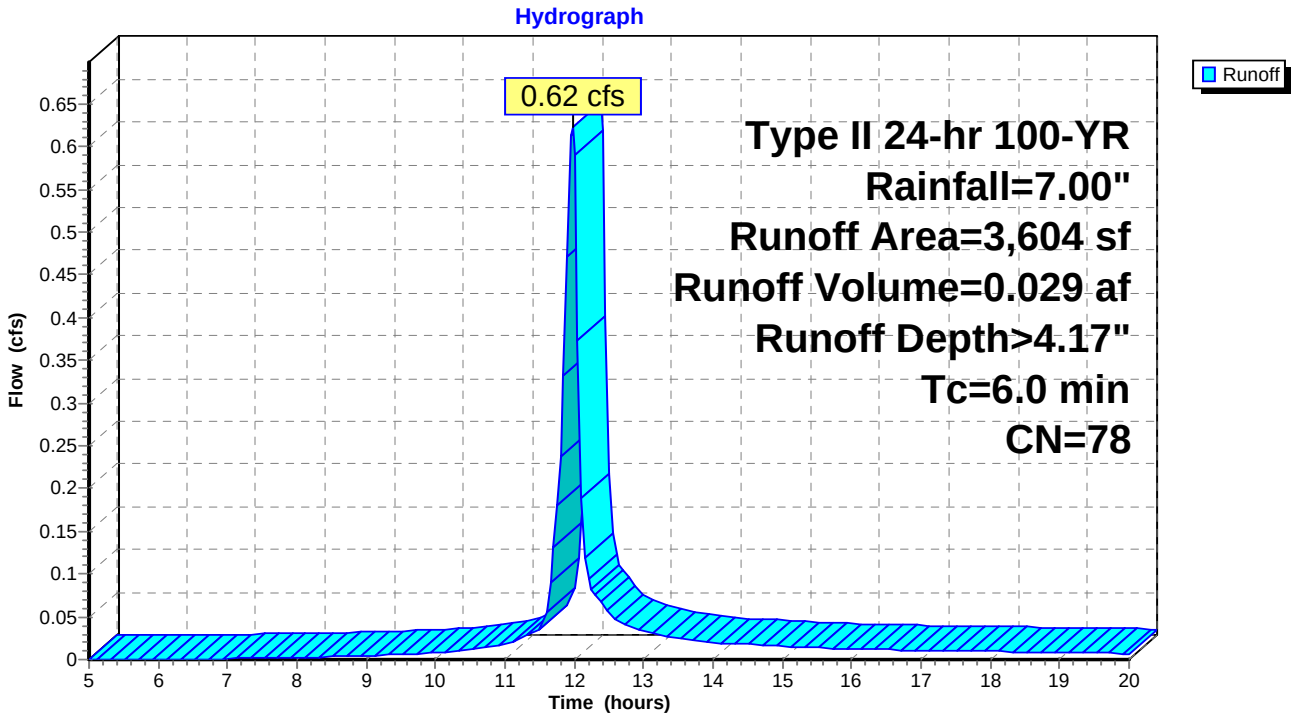
Runoff = 0.62 cfs @ 11.97 hrs, Volume= 0.029 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.00"

	Area (sf)	CN	Description
*	618	98	Pavement
	2,986	74	>75% Grass cover, Good, HSG C
	3,604	78	Weighted Average
	2,986		Pervious Area
	618		Impervious Area

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

Subcatchment S-4: Post-Development Runoff



Summary for Reach P-1: 12" HDPE

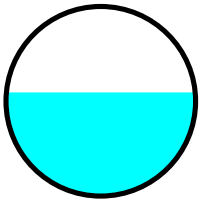
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

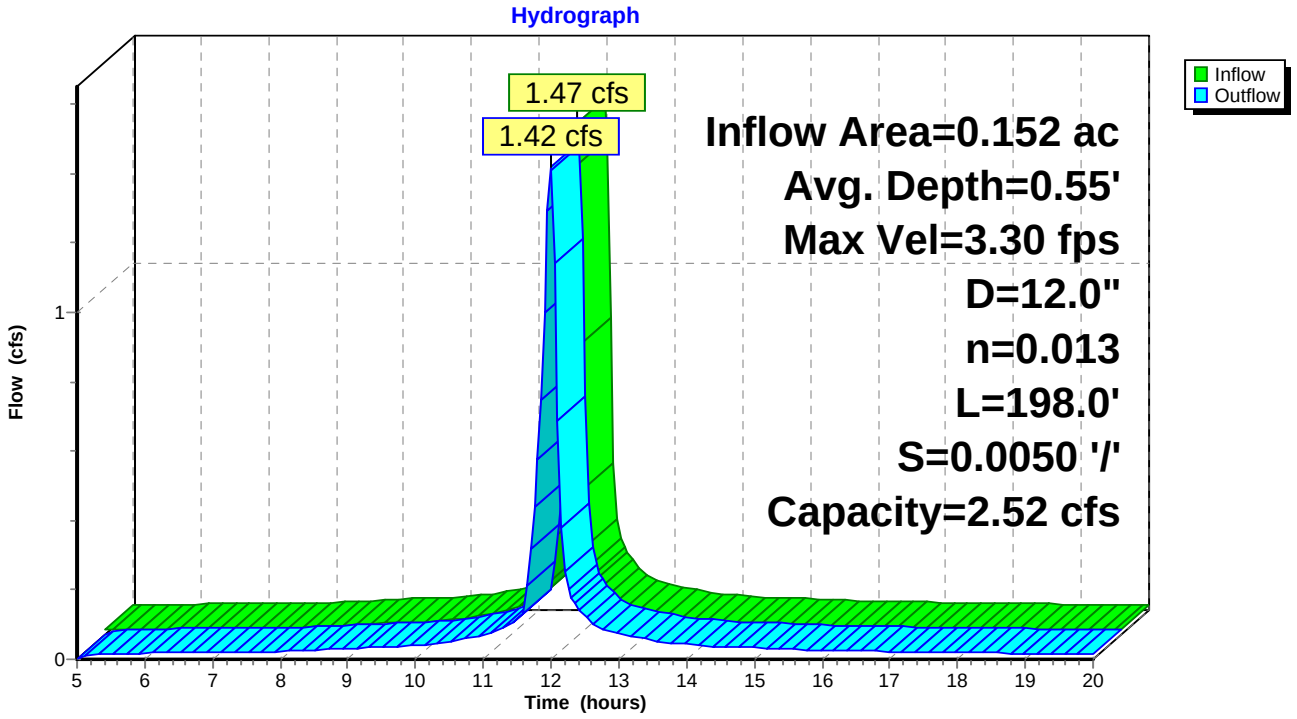
Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 6.17" for 100-YR event
Inflow = 1.47 cfs @ 11.96 hrs, Volume= 0.078 af
Outflow = 1.42 cfs @ 11.99 hrs, Volume= 0.078 af, Atten= 4%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.30 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 2.8 min

Peak Storage= 87 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.52 cfs

12.0" Diameter Pipe, n= 0.013
Length= 198.0' Slope= 0.0050 '/'
Inlet Invert= 58.64', Outlet Invert= 57.65'





Summary for Reach P-2: 10" HDPE

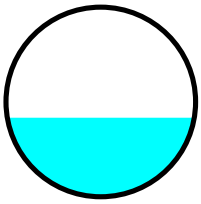
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span
[85] Warning: Oscillations may require Finer Routing>1

Inflow Area = 0.152 ac,100.00% Impervious, Inflow Depth > 6.17" for 100-YR event
Inflow = 1.47 cfs @ 11.96 hrs, Volume= 0.078 af
Outflow = 1.46 cfs @ 11.97 hrs, Volume= 0.078 af, Atten= 1%, Lag= 0.2 min

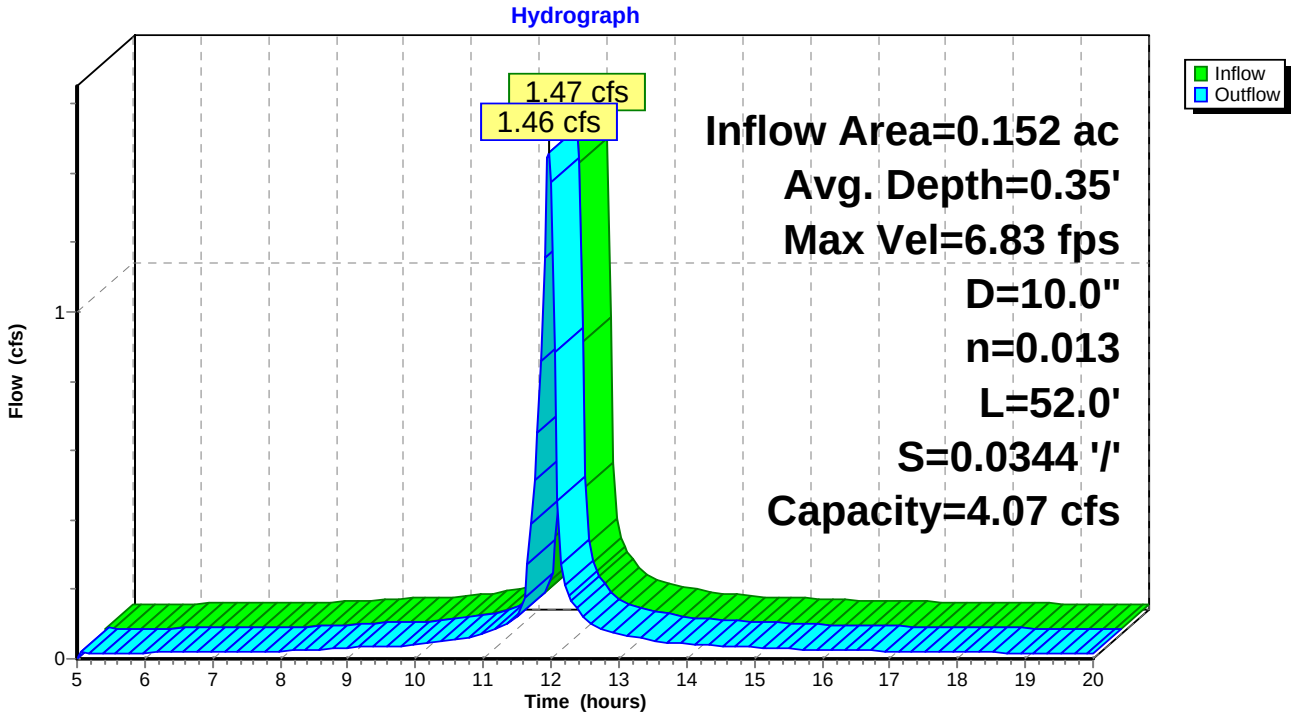
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.83 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.34 fps, Avg. Travel Time= 0.4 min

Peak Storage= 11 cf @ 11.96 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.83', Capacity at Bank-Full= 4.07 cfs

10.0" Diameter Pipe, n= 0.013
Length= 52.0' Slope= 0.0344 '/'
Inlet Invert= 71.00', Outlet Invert= 69.21'



Reach P-2: 10" HDPE



Summary for Reach P-3: 18" HDPE

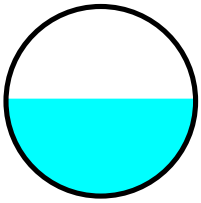
[52] Hint: Inlet/Outlet conditions not evaluated
[88] Warning: Qout>Qin may require Finer Routing>1

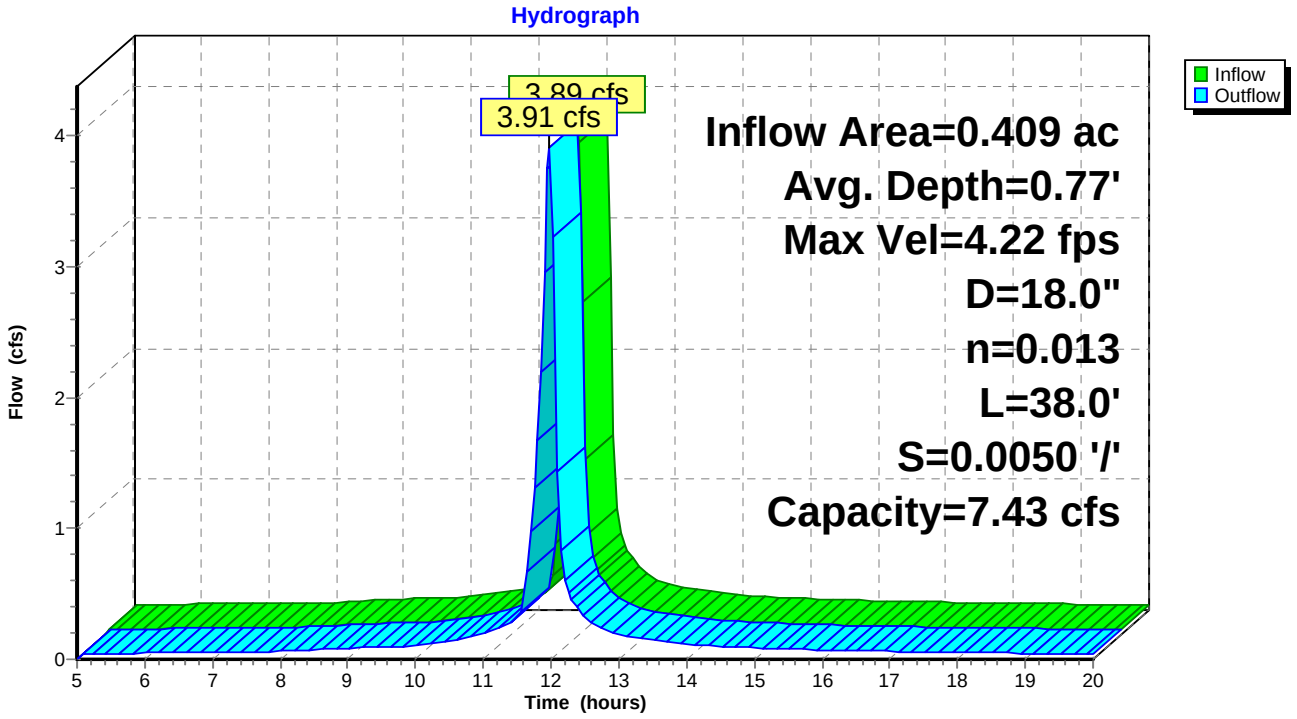
Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 6.16" for 100-YR event
Inflow = 3.89 cfs @ 11.97 hrs, Volume= 0.210 af
Outflow = 3.91 cfs @ 11.98 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.22 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 0.4 min

Peak Storage= 35 cf @ 11.97 hrs, Average Depth at Peak Storage= 0.77'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 7.43 cfs

18.0" Diameter Pipe, n= 0.013
Length= 38.0' Slope= 0.0050 '/'
Inlet Invert= 57.84', Outlet Invert= 57.65'





Summary for Reach P-4: 18" HDPE

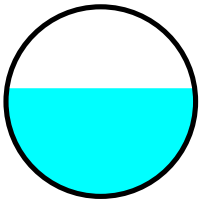
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 6.16" for 100-YR event
Inflow = 5.32 cfs @ 11.98 hrs, Volume= 0.288 af
Outflow = 5.31 cfs @ 11.98 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min

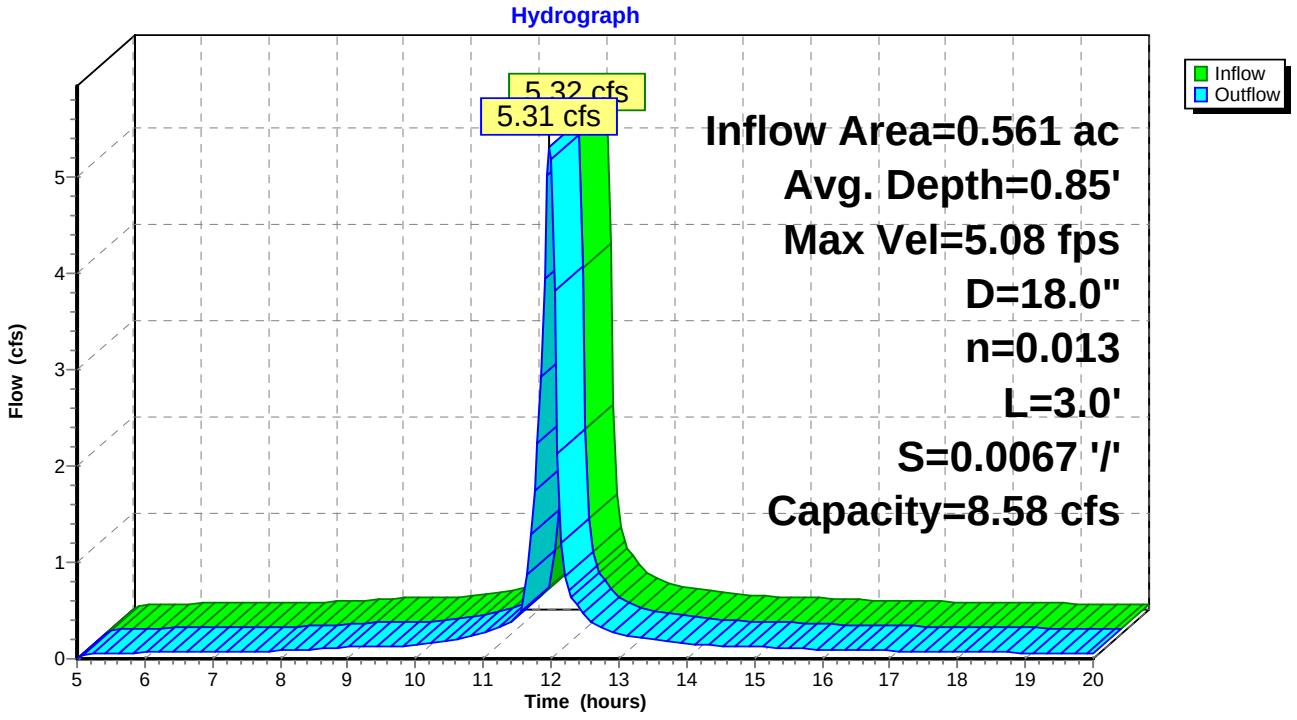
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.08 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.0 min

Peak Storage= 3 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 8.58 cfs

18.0" Diameter Pipe, n= 0.013
Length= 3.0' Slope= 0.0067 '/'
Inlet Invert= 57.65', Outlet Invert= 57.63'



Reach P-4: 18" HDPE



Summary for Reach WQI: Water Quality Inlet

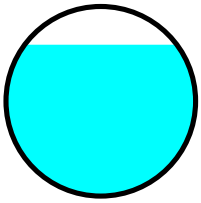
[52] Hint: Inlet/Outlet conditions not evaluated
[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.258 ac,100.00% Impervious, Inflow Depth > 6.17" for 100-YR event
Inflow = 2.50 cfs @ 11.96 hrs, Volume= 0.132 af
Outflow = 2.47 cfs @ 11.98 hrs, Volume= 0.132 af, Atten= 1%, Lag= 0.9 min

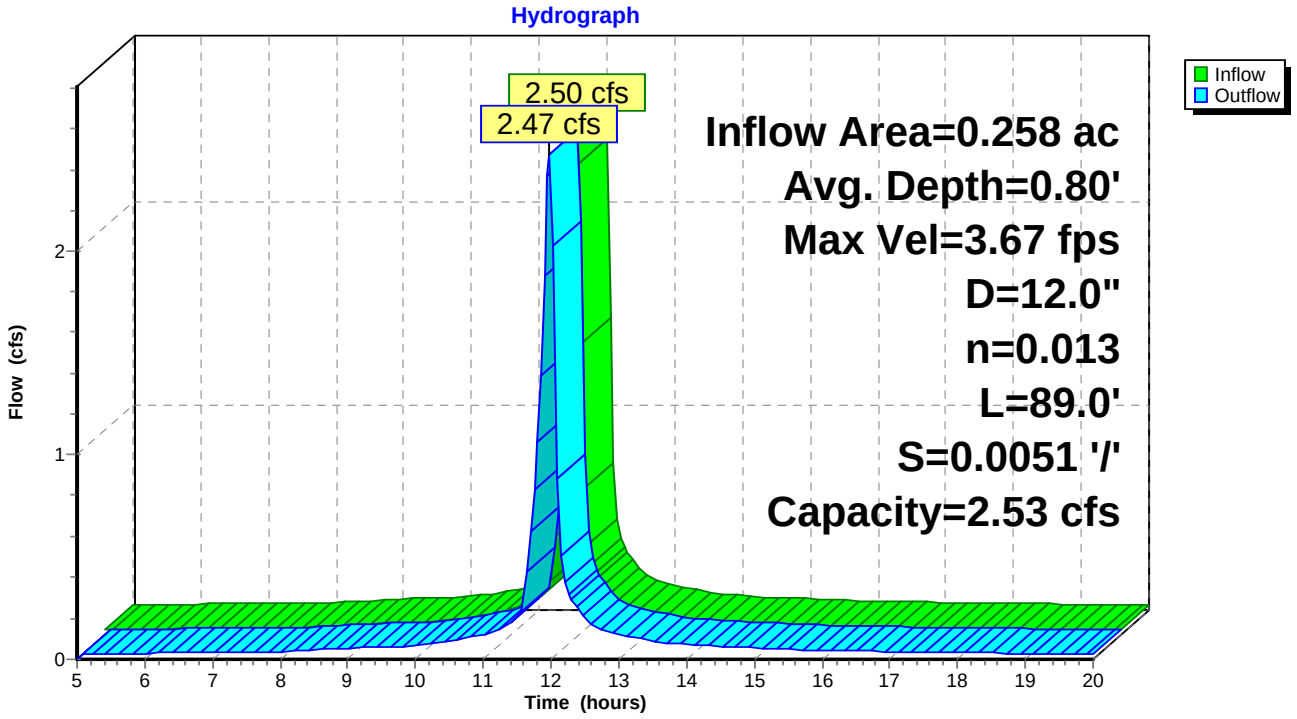
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.67 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 1.1 min

Peak Storage= 60 cf @ 11.97 hrs, Average Depth at Peak Storage= 0.80'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 2.53 cfs

12.0" Diameter Pipe, n= 0.013
Length= 89.0' Slope= 0.0051 '/'
Inlet Invert= 58.29', Outlet Invert= 57.84'



Reach WQI: Water Quality Inlet



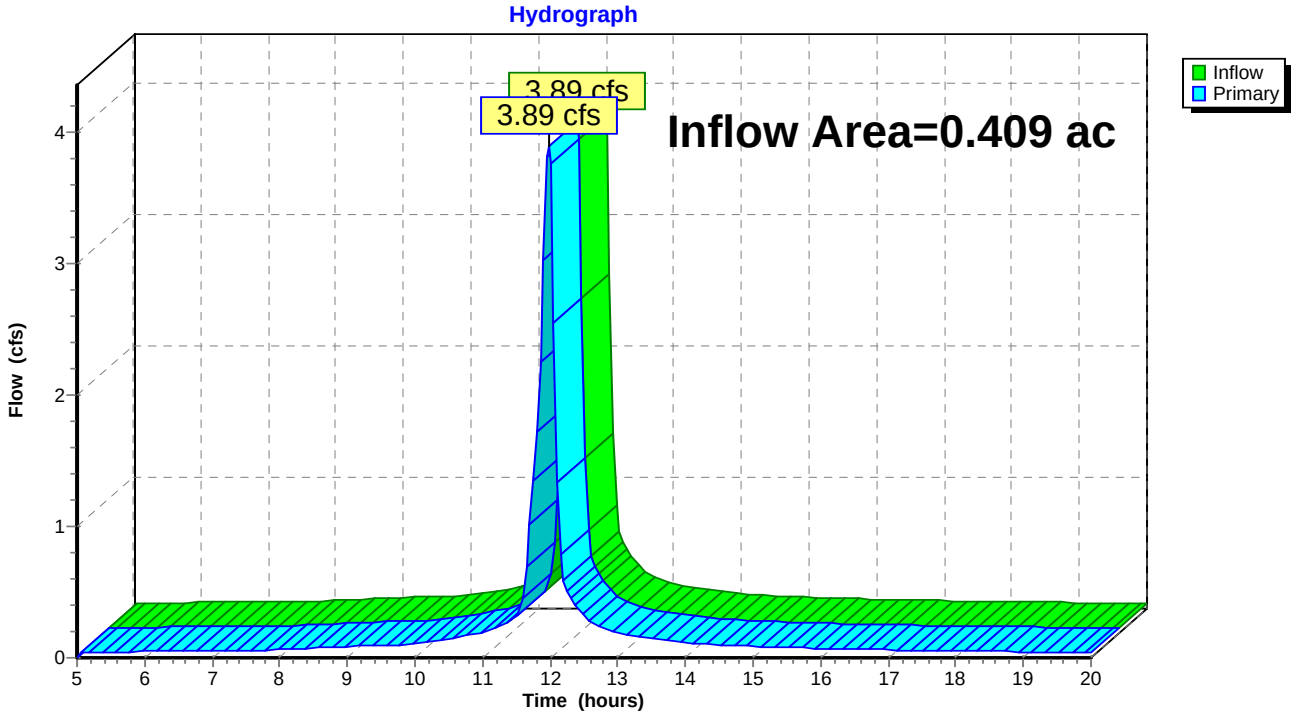
Summary for Pond DMH-1: Drain Manhole

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

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth > 6.16" for 100-YR event
Inflow = 3.89 cfs @ 11.97 hrs, Volume= 0.210 af
Primary = 3.89 cfs @ 11.97 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-1: Drain Manhole



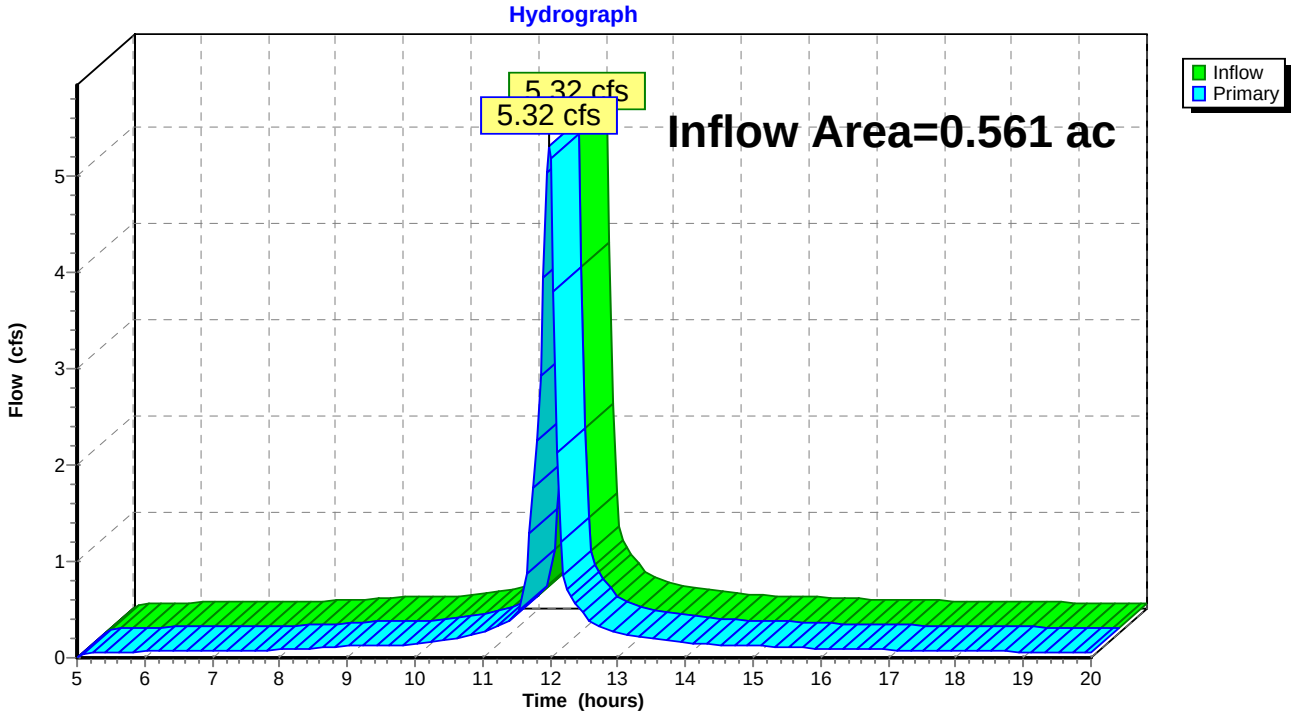
Summary for Pond DMH-2: Drain Manhole

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

Inflow Area = 0.561 ac,100.00% Impervious, Inflow Depth > 6.16" for 100-YR event
Inflow = 5.32 cfs @ 11.98 hrs, Volume= 0.288 af
Primary = 5.32 cfs @ 11.98 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond DMH-2: Drain Manhole



March 4, 2013

New Bedford Conservation Commission
Sarah Porter
City Hall
133 William Street
New Bedford, MA 02740

RE: Hanger Building, Downey Street
Illicit Discharge Compliance Statement (IDCS)

Dear Sarah,

As required, we are submitting this Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the site or are proposed. We have included in the pollution prevention plan measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

The site plan identifies the location of any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater management systems and the location of any measures taken to prevent the entry of illicit discharges into the stormwater management system.

Please feel free to contact us if you should need any further information.

Very Truly Yours,

THOMPSON FARLAND, INC.

Christian A. Farland

Christian A. Farland , P.E., LEED AP
Principal Engineer and President

cc: Client
File

THOMPSONFARLAND
PROFESSIONAL ENGINEERS // LAND SURVEYORS

Hayward-Boynton & Williams
A THOMPSON FARLAND COMPANY

Cullinan Engineering
A THOMPSON FARLAND COMPANY

Long Term Operation and Maintenance Plan

Site Plan
Downey Street
New Bedford, MA

March 5, 2014

Owner:

City of New Bedford, Airport Commission
131 William Street
New Bedford, MA 02740

Prepared For:

Claremont Companies
1 Lakeside Center
Bridgewater, MA 02324

Prepared By:

Christian A. Farland, P.E.
Thompson Farland, Inc.
Project No. 13-894

Street Sweeping

It shall be the responsibility of the owner to:

Inspections:

Inspect sediment deposit accumulations on the parking lots quarterly.

Maintenance:

Sweep parking lots at least annually.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.

Deep Sump Catch Basins

The catch basins and manholes are to be inspected and maintained by the owner.
It shall be the responsibility of the owner to:

Inspections:

Inspect the catch basins and manholes quarterly.

Maintenance:

Remove accumulated sediment, trash, leaves and debris when the depth of deposits is greater than or equal to one half the depth from the bottom invert of the lowest pipe in the basin and/or manhole to the bottom elevation of the basin or manhole.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.

Stormceptor Units

The units are to be inspected and maintained by the owner.

It shall be the responsibility of the owner to:

Inspections:

Inspect the units quarterly.

Prepare inspection reports as part of each inspection and include the following information:

1. Date of inspection
2. Maintenance personnel
3. Location of unit (GPS coordinates if possible)

4. Time since last rainfall
5. Installation deficiencies (missing parts, incorrect installation of parts)
6. Structural Deficiencies (concrete cracks, broken parts)
7. Operational deficiencies (leaks, blockages)
8. Presence of oil sheen of depth of oil layer
9. Estimate of depth/ volume of floatables (trash, leaves) captured
10. Sediment depth measured
11. Recommendations for any repairs and/ or maintenance for the units
12. Estimation of time before maintenance is required if not required at time of inspection.

Maintenance:

Typically, the unit is maintained using a vaccuum truck or clam shell bucket.

The Stormceptor Unit shall be cleaned once the sediment depth reaches 15% of the storage capacity.

To remove oil and other hydrocarbons that accumulate, it may be preferable to use adsorbent pads.

Dispose of the accumulated sediment and hydrocarbons in accordance with local, state, and federal guidelines and regulations.

Drain Lines

After construction, the drain lines shall be inspected after every major storm for the first few months to ensure proper functions. Presence of accumulated sand and silt would indicate more frequent maintenance of the pre-treatment devices is required. Thereafter, the drain lines shall be inspected at least once per year. Accumulated silt shall be removed by a vactor truck or other method preferred.

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PROFESSIONAL ENGINEERS // LAND SURVEYORS

Hayward-Boynton & Williams
A THOMPSON FARLAND COMPANY

Cullinan Engineering
A THOMPSON FARLAND COMPANY

Long Term Pollution Prevention Plan

Site Plan
Downey Street
New Bedford, MA 02745

March 6, 2014

Owner:

City of New Bedford, Airport Commission
131 William Street
New Bedford, MA 02740

Prepared For:

Claremont Companies
1 Lakeside Center
Bridgewater, MA 02324

Prepared By:

Christian A. Farland, P.E., LEED AP
Thompson Farland, Inc.

Project No. 13-894

www.ThompsonFarland.com

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54 Longmeadow Road, **Taunton**, MA 02780 · P.508.822.9870
2 Canal Park, 5th Floor, **Cambridge**, MA 02141 · P.617.679.1601
241 Boston Post Road, West, 1st Floor, **Marlborough**, MA 01752 · P.508.832.5811

Long Term Pollution Prevention Plan

This Long Term Pollution Prevention Plan serves to outline good housekeeping practices in order to prevent pollution of the wetland resource areas and surrounding environment. The Long Term Operation & Maintenance Plan shall be taken as part of this document as it is a critical part of this plan and shall be adhered to. Proper operation and maintenance records shall be kept on file at all times.

Snow disposal shall be carried out by the owner. The owner should follow DEP guideline #BRPG 01-01 for all snow removal requirements.

The following areas shall be avoided for snow disposal:

- Avoid dumping the snow in the bordering vegetated wetlands.
- Avoid dumping of snow on top of storm drain catch basins or water quality inlet. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

In the event of oil, gasoline or other hazardous waste spill on-site, the City of New Bedford Fire Department, DEP and the Conservation Agent shall be notified immediately. Any catch basin that may be affected by the spill shall be covered immediately to prevent any contamination into the drainage system. Proper cleanup and disposal of hazardous wastes must follow all applicable local and state regulations and must be carried out by a qualified contractor.

The maintenance of all individual lawns, gardens and landscaped areas shall be performed by the owner. The site is not located within or near an Area of Critical Environmental Concern. However, good housekeeping practices should include proper storage and minimal use of cleaning products and fertilizers.