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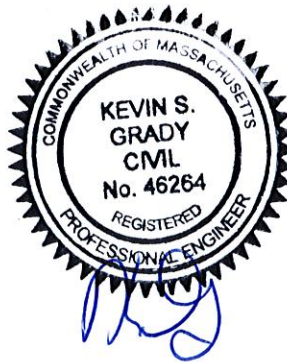
Registered Professional Civil Engineers & Land Surveyors

STORMWATER MANAGEMENT DESIGN CALCULATIONS

Proposed Parking Lot Reconfiguration

UPPAbaby

53 Airport Park Drive
Assessors Map 8 Lot 5



Prepared for

UPPAbaby
276 Weymouth Street
Rockland MA

February 23, 2024

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Soils Testing by Kevin Grady		
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SUMMARY

This analysis was prepared to demonstrate Compliance with the Massachusetts Stormwater Management Regulations and the Town of Rockland Planning Board Rules and Regulations Section III for Stormwater Management. The proposed project is for the reconfiguration of the parking lot at the UPPAbaby Corporate Headquarters. The owners have acquired 53 Airport Park Drive and plan to convert it to their research and development building. The project proposes to add 25 Parking Spaces and a loading dock.

The following analysis demonstrates that there is no increase in the rate and volume of run-off from pre-development to post-development conditions from the construction of the proposed parking lot expansion.

The attenuation of storm water flows has been achieved by routing runoff from the proposed development to the following Stormwater controls.

Catchments

Post 6 & Post 7 (outlet Post 5A compare to Pre 5A) The proposed parking lot will be located within existing woodland section of catchment areas 6 & 7. Runoff from the existing and proposed parking lot is routed through rip rap energy dissipater inlets and sediment forebays to infiltration basins 4 & 5. The basins outlet includes standpipes with orifice overflow to the drainage easement to the North via 8" HDPE pipe network. No infiltration credit taken during analysis as required by Rockland regulations.

Post 8 (outlet Post 8 compare to Pre 8) - consists of the unimproved woodland section of the development along the rear (western) property line. The remainder of the woodland remains as overland woodland flow. The reduced woodland area results in reduced peak rate and volume.

The analysis demonstrates that the proposed stormwater controls detailed above, reduce peak flows and volumes for the proposed development below that of the pre-development condition. The proposed stormwater controls meet the requirements of the Town of Rockland Planning Board rules and regulations for stormwater as follows:

1. *Ensure no increase in the rate and volume of run-off from pre-development to post-development conditions.* Demonstrated by the following calculations.
2. *Protect existing abutting homes and property.* Offsite Runoff rate and volume are reduced below the predevelopment rate.
3. *Prohibit direct discharges into any water body or resource area.* All runoff from developed portions of the lot are treated by stormwater controls prior to leaving the property and ultimately reaching any wetland or waterbody.
4. *Enhance groundwater recharge.* The proposed stormwater controls include infiltration basins, providing significant water quality treatment and infiltration.
5. *Create aesthetically pleasing designs which minimize disruption to existing natural and topographic features on the site and enhance views of the natural environment.* The industrial properties are largely developed. The site reconfiguration conforms to the zoning bylaw impervious coverage requirements.

6. *Minimize future maintenance of the system.* The drainage system proposes an subsurface detention basin, a subsurface infiltration basin, catch basins and manholes. All structures have access for maintenance.
7. *Ensure public safety.* Stormwater runoff rate and volume is reduced. The development protects the abutting property and surrounding areas from flooding above and beyond that of the current property use.

This analysis is divided into the following sections:

Section I	Overall Site Analysis
Section II	Compliance with Massachusetts Storm water Management Regulations
Section III	Operation And Maintenance Plan

The calculations have been performed for the 2, 10, 25, 100-year 24 hour storm event, using the Autodesk Storm and Sanitary Analysis 2015 extension for AutoCAD Civil 3D 2015 computer program. This computer program is based upon the Soils Conservation Service (SCS) TR-20 and TR-55 computer models and uses the SCS Curvilinear Unit rainfall distribution.

SUMMARY OF STORMWATER PEAK FLOWS

Pre-development

	100 yr	25 Yr	10 Yr	2Yr
Pre 1	9.81	7.76	6.42	4.49

Basin 4	171.43	171.14	171	170.57
Basin 5	170.49	169.93	169.62	169.2

Post-development

	100 yr	25 Yr	10 Yr	2Yr
Post1	7.49	5.77	4.79	3.41

Stor-07	169.76	168.19	167.37	166.36
Stor-06	170.33	170.17	169.94	169.02
Basin4	170.5	170.39	170.32	170.19
Basin5	172.01	171.91	171.83	171.51

Volume

Pre 1	44761	34894	28609	19551
Post 1	43390	33555	27237	18179

Section I

Stormwater Management

◆ **STANDARD #1 No New Stormwater Conveyances**

The proposed project proposes no new stormwater conveyances that discharge untreated stormwater off-site or cause down gradient erosion.

◆ **STANDARD #2 Post Development Peak Discharge**

The overall site analysis demonstrates that the stormwater management system has been designed so that the post-development peak discharge rates do not exceed the pre-development discharge rate for the 2yr, 10 yr, 25 yr & 100 yr 24 hr storm events.

◆ **STANDARD #3 RECHARGE TO GROUNDWATER**

New impervious area for the Site

Required: $15,265 \text{ sf (total)} \times (B) 0.35'' \times \frac{1'}{12''} = 445.23 \text{ cf}$

Total Proposed 726 CF 2 year exfiltration stor-06

Element ID	Stor-06
Maximum Exfiltration (cfs)	0.01
Minimum Exfiltration (cfs)	0.00
Event Mean Exfiltration (cfs)	0.01
Duration of Exceedances (hrs)	N/A
Duration of Deficits (hrs)	N/A
Number of Exceedances	N/A
Number of Deficits	N/A
Volume of Exceedance (ft³)	N/A
Volume of Deficit (ft³)	N/A
Total Exfiltration (ft³)	726.57
Detention Storage (ft³)	N/A
Exceedance	0
Deficit	0

Drawdown Within 72 Hours Subsurface Basin #2 (only new infiltration BMP)

Time = $\frac{549 \text{ CF (full volume)}}{(1.02'')(1' / 12'')(1545 \text{ SF})} = 4.1 \text{ hours} < 72 \text{ hours}$

549 cf below el=169.1

Bottom area =1,545 SF

◆ STANDARD #4 WATER QUALITY

WATER QUALITY TREATMENT VOLUME

$$V_{WQ} = (D_{WQ}/12 \text{ inches/foot}) * (A_{IMP} * 43,560 \text{ square feet/acre})$$

V_{WQ} = Required Water Quality Volume (in cubic feet)

D_{WQ} = Water Quality Depth: one-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater; **1/2-inch for discharges near or to other areas.**

A_{IMP} = Impervious Area (in acres)

The site is not located within a Zone II or Interim Wellhead Protection Area, or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater so a Water Quality Depth of 1/2-inch is required.

$$\begin{aligned} V_{WQ} &= (0.5 \text{ inch}/12 \text{ inches/foot}) * (15,265 \text{ square feet}) &&= 636 \text{ CF} \\ \text{Total exfiltration volume in 2 yr storm} &&&= 726 \text{ CF.} \end{aligned}$$

Mounding Analysis

“Mounding analysis is required when the vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four (4) feet and the recharge system is proposed to attenuate the peak discharge from a 10-year or higher 24-hour storm (e.g., 10-year, 25-year, 50-year, or 100-year 24-hour storm). In such cases, the mounding analysis must demonstrate that the Required Recharge Volume (e.g., infiltration basin storage) is fully dewatered within 72 hours (so the next storm can be stored for exfiltration). The mounding analysis must also show that the groundwater mound that forms under the recharge system will not break out above the land or water surface of a wetland (e.g., it doesn’t increase the water sheet elevation in a Bordering Vegetated Wetland, Salt Marsh, or Land Under Water within the 72-hour evaluation period).”

“The Hantush¹ or other equivalent method may be used to conduct the mounding analysis. The Hantush method predicts the maximum height of the groundwater mound beneath a rectangular or circular recharge area. It assumes unconfined groundwater flow, and that a linear relation exists between the water table elevation and water table decline rate. It results in a water table recession hydrograph depicting exponential decline. The Hantush method is available in proprietary software and free on-line calculators on the Web in automated format. If the analysis indicates the mound will prevent the infiltration BMP from fully draining within the 72-hour period, an iterative process must be employed to determine an alternative design that drains within the 72-hour period.”

¹ Hantush 1967 – See Reference for Standard 3.

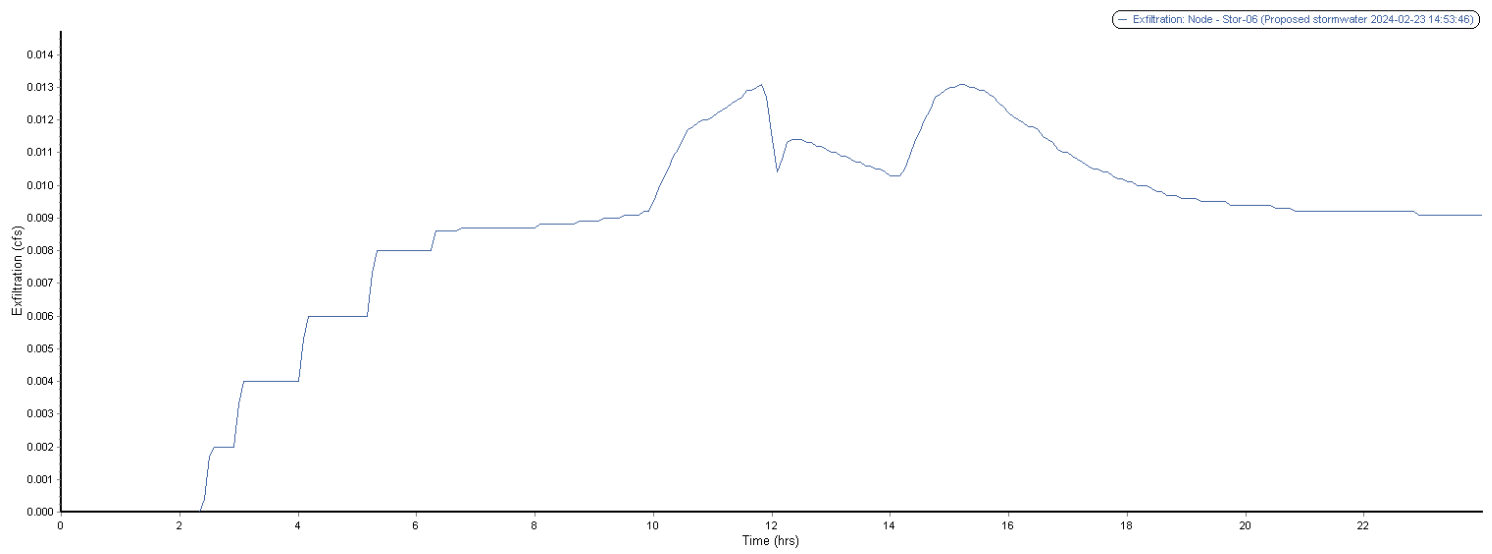
Soils testing by Kevin Grady, Grady Consulting, L.L.C. 2024-01-12.

Subsurface Basin #2

T.H.#	Depth	Groundwater	bottom El.
1	7'-0"	(165.71)	167.71

Basin #2 using the Hantush Method, 1,545 sf bottom area (120 x 12.875), volume below outlet 550 cf. Recharge infiltration rate = $550/1545 = 0.35$ ft/day and an initial saturated thickness of 20 feet, we calculated a groundwater mounding of 2.0 feet. Groundwater separation = (2.0) mounding will not breakout above the land

◆ **TSS REMOVAL** (see TSS Removal Work Sheet)



This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.

Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. **The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed** otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
0.3500	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.260	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
5.00	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
60.000	x	1/2 length of basin (x direction, in feet)			
6.400	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
20.000	hi(0)	initial thickness of saturated zone (feet)			
20.424	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
0.424	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

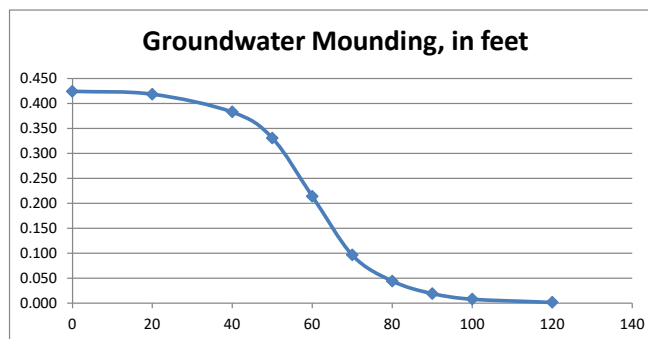
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

0.424	0
0.419	20
0.383	40
0.331	50
0.214	60
0.097	70
0.044	80
0.019	90
0.008	100
0.001	120



Re-Calculate Now



Disclaimer

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

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: 53 Airport Park Road

TSS Removal Calculation Worksheet	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
	Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
	Infiltration Basin	0.80	0.75	0.60	0.15
		0.00	0.15	0.00	0.15
		0.00	0.15	0.00	0.15
		0.00	0.15	0.00	0.15

Total TSS Removal =

85%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project: 23-287
Prepared By: KSG
Date: 2/23/2024

*Equals remaining load from previous BMP (E)
which enters the BMP

◆ **STANDARD #5 Land Uses With Higher Potential Pollutant Loads**

Commercial Office use is not a land use with higher potential pollutant load.

◆ **STANDARD #6 Critical Areas**

The site is not located within an aquifer protection Zone II or Interim Wellhead Protection Area.

◆ **STANDARD #7 Redevelopment**

The site is not a redevelopment.

◆ **STANDARD #8 Erosion & Sediment Control Plan**

Erosion and sediment controls are detailed within the site plan.

◆ **STANDARD #9 Operation & Maintenance Plan**

Operation and Maintenance plan is attached..

◆ **STANDARD #10 Illicit Discharge Statement**

“All illicit discharges to the stormwater management system are prohibited.”

Previous statement still valid.



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 8²
- 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.



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	2024-02-23
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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 Field¹
- ☒ 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.

Section II

Overall Site Analysis

Project Description

File Name Proposed stormwater.SPF
 Description J:\2016\16-006\DWG\Siteplan.dwg

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method SCS TR-20
 Time of Concentration (TOC) Method SCS TR-55
 Link Routing Method Hydrodynamic
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On Feb 16, 2016 00:00:00
 End Analysis On Feb 17, 2016 00:00:00
 Start Reporting On Feb 16, 2016 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

Qty
 Rain Gages 2
 Subbasins 15
 Nodes 35
 Junctions 19
 Outfalls 6
 Flow Diversions 0
 Inlets 6
 Storage Nodes 4
 Links 40
 Channels 0
 Pipes 30
 Pumps 0
 Orifices 6
 Weirs 4
 Outlets 0
 Pollutants 0
 Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	2 Year	Intensity	inches	Massachusetts	Plymouth	2	3.40	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate Factor	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ft ²)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	1/2Roof	18080.01	484.00	98.00	3.40	3.17	1.31	1.18	0 00:05:00
2	1/8Roof	4520.00	484.00	98.00	3.40	3.16	0.33	0.29	0 00:05:00
3	1/8Roof-2	4520.00	484.00	98.00	3.40	3.16	0.33	0.29	0 00:05:00
4	1/8Roof-3	4520.00	484.00	98.00	3.40	3.16	0.33	0.29	0 00:05:00
5	1/8Roof-4	4520.00	0.00	98.00	3.40	3.16	0.33	0.29	0 00:05:00
6	Post-06	18885.00	484.00	89.60	3.40	2.32	1.00	1.02	0 00:05:00
7	Post-1A	7754.99	484.00	94.53	3.40	2.79	0.50	0.48	0 00:05:00
8	Post-1B	2348.01	484.00	92.57	3.40	2.58	0.14	0.13	0 00:05:00
9	Post-1C	4143.99	484.00	96.30	3.40	2.97	0.28	0.27	0 00:05:00
10	Post-1D	4344.02	484.00	96.71	3.40	3.02	0.30	0.29	0 00:05:00
11	Post7A	10845.00	484.00	97.57	3.40	3.12	0.78	0.71	0 00:05:00
12	Post7B	19698.01	484.00	90.20	3.40	2.37	1.07	1.09	0 00:05:00
13	PRE-08	1080.98	484.00	73.00	3.40	0.93	0.02	0.02	0 00:16:04
14	Pre-1	85389.01	484.00	94.21	3.40	2.76	5.41	4.49	0 00:14:48
15	Sub-09	3079.00	484.00	79.00	3.40	1.48	0.10	0.11	0 00:05:00

Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	Junction	163.80	170.13	163.80	170.13	0.00	0.74	164.48	0.00	5.65	0 00:00	0.00	0.00
2 DMH(10)	Junction	162.00	165.40	162.00	165.40	0.00	1.18	163.03	0.00	2.37	0 00:00	0.00	0.00
3 DMH(3)	Junction	163.75	169.82	163.75	169.82	0.00	0.86	164.26	0.00	5.56	0 00:00	0.00	0.00
4 DMH(4)	Junction	163.30	170.24	163.30	170.24	0.00	1.82	163.95	0.00	6.29	0 00:00	0.00	0.00
5 DMH(5)	Junction	162.70	169.84	162.70	169.84	0.00	2.09	163.42	0.00	6.42	0 00:00	0.00	0.00
6 DMH(6)	Junction	162.55	173.51	162.55	173.51	0.00	2.30	163.21	0.00	10.29	0 00:00	0.00	0.00
7 DMH(8)	Junction	161.95	168.06	161.95	168.06	0.00	3.45	162.75	0.00	5.31	0 00:00	0.00	0.00
8 Jun-01	Junction	167.00	174.00	0.00	0.00	0.00	0.06	167.64	0.00	6.36	0 00:00	0.00	0.00
9 Jun-02	Junction	168.30	174.90	168.30	174.90	0.00	0.00	168.30	0.00	6.60	0 00:00	0.00	0.00
10 Jun-03	Junction	168.30	174.30	168.30	174.30	1000.00	0.06	168.46	0.00	5.84	0 00:00	0.00	0.00
11 Jun-05	Junction	166.70	172.70	166.70	172.70	0.00	0.06	166.93	0.00	5.77	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	Junction	168.50	171.00	168.50	171.00	0.00	0.13	169.24	0.00	1.76	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	Junction	161.01	171.00	161.01	0.00	0.00	0.00	161.01	0.00	9.99	0 00:00	0.00	0.00
14 Structure - (11)	Junction	167.68	171.00	167.68	168.62	0.00	0.00	167.68	0.00	3.32	0 00:00	0.00	0.00
15 Structure - (12)	Junction	161.54	171.00	161.54	162.48	0.00	0.29	168.21	0.00	2.79	0 00:00	0.00	0.00
16 Structure - (15)	Junction	164.88	171.00	164.88	165.82	0.00	0.29	168.21	0.00	2.79	0 00:00	0.00	0.00
17 Structure - (18)	Junction	168.50	171.00	168.50	171.00	0.00	0.04	169.24	0.00	1.76	0 00:00	0.00	0.00
18 Structure - (20)	Junction	168.25	171.00	168.25	168.25	0.00	0.30	169.24	0.00	1.76	0 00:00	0.00	0.00
19 Structure - (22)	Junction	168.25	171.00	168.25	171.00	0.00	0.30	169.24	0.00	1.76	0 00:00	0.00	0.00
20 Basin4out	Outfall	170.00					0.00	170.00					
21 Basin5out	Outfall	170.00					0.00	170.00					
22 Out-Post1-DP	Outfall	161.60					3.43	162.28					
23 Out-Pre-1	Outfall	163.20					4.49	163.20					
24 Post5A	Outfall	166.64					0.06	166.75					
25 Post8	Outfall	172.00					0.02	172.00					
26 Basin4	Storage Node	169.00	172.50	0.00		0.00	1.08	170.19				0.00	0.00
27 Basin5	Storage Node	170.00	172.50	0.00		0.00	1.01	171.51				0.00	0.00
28 Stor-06	Storage Node	167.70	171.00	0.00		0.00	0.43	169.23				0.00	0.00
29 Stor-07	Storage Node	165.36	171.00	0.00		0.00	0.89	166.36				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)
1 Link-01	Pipe	Inlet-04	DMH(6)	32.20	166.00	165.75	0.7800	12.000	0.0150	0.10	2.72	0.04	1.64	0.13
2 Link-02	Pipe	Structure - (22)	Structure - (31)	38.96	170.30	166.00	11.0400	4.000	0.0150	0.00	2.19	0.00	0.00	0.00
3 Link-03	Pipe	Out-1Pipe - (13) (1) (1)	DMH(6)	31.15	169.10	168.00	3.5300	6.000	0.0150	0.13	0.91	0.15	3.22	0.13
4 Link-04	Pipe	Basin4	Stor-07	35.30	170.00	168.50	4.2500	6.000	0.0150	0.56	2.00	0.28	4.19	0.19
5 Link-05	Pipe	Jun-01	Jun-05	216.63	167.50	166.70	0.3700	8.000	0.0150	0.06	0.64	0.09	1.06	0.19
6 Link-06	Pipe	Jun-02	Jun-03	163.00	169.00	168.35	0.4000	8.000	0.0150	0.00	0.66	0.00	0.00	0.05
7 Link-07	Pipe	DMH(1)	DMH(3)	55.66	164.00	163.80	0.3600	12.000	0.0150	0.74	1.85	0.40	2.03	0.47
8 Link-08	Pipe	Jun-03	Jun-01	85.00	168.35	167.50	1.0000	8.000	0.0150	0.06	1.05	0.06	1.35	0.12
9 Link-11	Pipe	Jun-05	Post5A	100.00	166.70	166.64	0.0600	8.000	0.0150	0.06	0.47	0.13	0.83	0.17
10 Pipe - (10)	Pipe	Structure - (12)	Stor-07	30.11	168.00	167.00	3.3200	6.000	0.0150	0.29	0.89	0.33	3.83	0.20
11 Pipe - (11)	Pipe	Structure - (15)	Stor-07	30.51	168.00	167.00	3.2800	6.000	0.0150	0.29	0.88	0.33	3.81	0.20
12 Pipe - (13)	Pipe	Structure - (18)	Structure - (20)	54.74	168.50	168.25	0.4600	10.000	0.0150	0.04	1.28	0.03	0.25	0.78
13 Pipe - (13) (1)	Pipe	Structure - (20)	Structure - (22)	45.20	168.25	168.25	0.0000	10.000	0.0150	0.06	0.85	0.08	0.12	0.83
14 Pipe - (13) (1) (1)	Pipe	Structure - (22)	Out-1Pipe - (13) (1) (1)	50.87	168.50	168.25	0.4900	10.000	0.0120	0.13	1.06	0.13	0.74	0.73
15 Pipe - (14)	Pipe	Structure - (20)	Stor-06	12.24	168.25	168.00	2.0400	6.000	0.0150	0.21	0.70	0.31	1.39	0.50
16 Pipe - (15)	Pipe	Structure - (22)	Stor-06	10.98	168.25	168.00	2.2800	6.000	0.0150	0.22	0.73	0.30	1.46	0.50
17 Pipe - (18)	Pipe	CB(1)	DMH(1)	18.00	164.50	164.00	2.7800	12.000	0.0120	0.48	6.43	0.07	2.10	0.33
18 Pipe - (20)	Pipe	Structure - (29)	DMH(4)	18.71	164.00	163.65	1.8700	12.000	0.0120	0.27	5.28	0.05	2.82	0.23
19 Pipe - (21)	Pipe	Structure - (31)	DMH(5)	28.88	164.00	163.20	2.7700	12.000	0.0120	0.28	6.42	0.04	3.75	0.18
20 Pipe - (3)	Pipe	DMH(3)	DMH(4)	38.84	163.75	163.65	0.2600	12.000	0.0120	0.86	1.96	0.44	2.52	0.45
21 Pipe - (3) (2)	Pipe	DMH(4)	DMH(5)	100.57	163.30	162.95	0.3500	15.000	0.0120	1.82	4.13	0.44	3.18	0.59
22 Pipe - (3) (2) (1)	Pipe	DMH(5)	DMH(6)	49.46	162.70	162.55	0.3000	18.000	0.0120	2.09	6.27	0.33	2.64	0.69
23 Pipe - (4)	Pipe	DMH(6)	DMH(8)	172.11	162.55	162.00	0.3200	18.000	0.0120	2.29	6.43	0.36	2.81	0.70
24 Pipe - (4) (1)	Pipe	DMH(8)	Out-Post1-DP	68.77	161.95	161.60	0.5100	18.000	0.0120	3.43	8.12	0.42	3.95	0.73
25 Pipe - (5)	Pipe	CB(2)	DMH(3)	6.17	163.85	163.80	0.8100	12.000	0.0120	0.13	3.48	0.04	0.69	0.43
26 Pipe - (6)	Pipe	DMH(8)	DMH(10)	249.75	162.00	162.50	-0.2000	15.000	0.0120	1.17	3.13	0.37	1.94	0.64
27 Pipe - (7)	Pipe	Structure - (9)	DMH(4)	108.19	165.00	163.65	1.2500	12.000	0.0120	0.70	7.47	0.09	5.40	0.25
28 Pipe - (8)	Pipe	Structure - (11)	Structure - (15)	34.98	168.50	168.00	1.4300	10.000	0.0150	0.00	2.27	0.00	0.00	0.11
29 Pipe - (8) (1)	Pipe	Structure - (15)	Structure - (12)	41.80	168.00	168.00	0.0000	10.000	0.0150	0.00	0.85	0.00	0.14	0.21
30 Pipe - (9)	Pipe	Out-1Pipe - (9)	Structure - (12)	52.56	168.50	168.00	0.9500	10.000	0.0150	0.00	1.85	0.00	0.00	0.11
31 Orifice-01	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.02				
32 Orifice-02	Orifice	Basin4	Jun-02		169.00	168.30		1.000		0.00				
33 Orifice-03	Orifice	Basin4	Jun-02		169.00	168.30		2.000		0.00				
34 Orifice-04	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.04				
35 Orifice-05	Orifice	Stor-06	DMH(6)		167.70	162.55		2.000		0.12				
36 Pipe - (12)	Orifice	DMH(1)	Stor-07		163.80	165.36		4.000		0.39				
37 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Weir	Basin4	Basin4out		169.00	170.00				0.00				
38 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Weir	Basin5	Basin5out		170.00	170.00				0.00				
39 Weir-03	Weir	Basin4	Jun-02		169.00	168.30				0.00				
40 Weir-04	Weir	Basin5	Jun-03		170.00	168.30				0.00				

Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition (min)	
0.14	0.00	Calculated
0.00	0.00	Calculated
0.26	0.00	Calculated
0.37	0.00	Calculated
0.28	0.00	Calculated
0.08	0.00	Calculated
0.47	0.00	Calculated
0.18	0.00	Calculated
0.26	0.00	Calculated
0.41	0.00	Calculated
0.41	0.00	Calculated
0.94	0.00	Calculated
1.00	39.00	SURCHARGED
0.88	0.00	Calculated
1.00	97.00	SURCHARGED
1.00	97.00	SURCHARGED
0.33	0.00	Calculated
0.23	0.00	Calculated
0.18	0.00	Calculated
0.45	0.00	Calculated
0.47	0.00	Calculated
0.46	0.00	Calculated
0.47	0.00	Calculated
0.49	0.00	Calculated
0.44	0.00	Calculated
0.51	0.00	Calculated
0.25	0.00	Calculated
0.13	0.00	Calculated
0.25	0.00	Calculated
0.13	0.00	Calculated

Inlet Summary

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation	Max (Rim) Elevation	Initial Water Elevation	Ponded Area	Peak Flow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Allowable Spread	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow
					(ft)	(ft)	(ft)	(ft²)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	164.50	0.00	0.48	N/A	N/A	N/A	7.00	0.00	169.52
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	163.85	200.00	0.13	N/A	N/A	N/A	7.00	0.00	166.41
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	164.00	200.00	0.11	N/A	N/A	N/A	7.00	0.00	169.01
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	164.00	0.00	0.27	N/A	N/A	N/A	7.00	0.00	170.51
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	164.00	0.00	0.28	N/A	N/A	N/A	7.00	0.00	172.61
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	167.70	0.00	0.70	N/A	N/A	N/A	7.00	0.00	172.00

Subbasin Hydrology

Subbasin : 1/2Roof

Input Data

Area (ft²) 18080.01
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

T_c = Time of Concentration (hr)
n = Manning's roughness
L_f = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (S_f^{0.5}) (unpaved surface)
V = 20.3282 * (S_f^{0.5}) (paved surface)
V = 15.0 * (S_f^{0.5}) (grassed waterway surface)
V = 10.0 * (S_f^{0.5}) (nearly bare & untilled surface)
V = 9.0 * (S_f^{0.5}) (cultivated straight rows surface)
V = 7.0 * (S_f^{0.5}) (short grass pasture surface)
V = 5.0 * (S_f^{0.5}) (woodland surface)
V = 2.5 * (S_f^{0.5}) (forest w/heavy litter surface)
T_c = (L_f / V) / (3600 sec/hr)

Where:

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n
R = A_q / W_p
T_c = (L_f / V) / (3600 sec/hr)

Where :

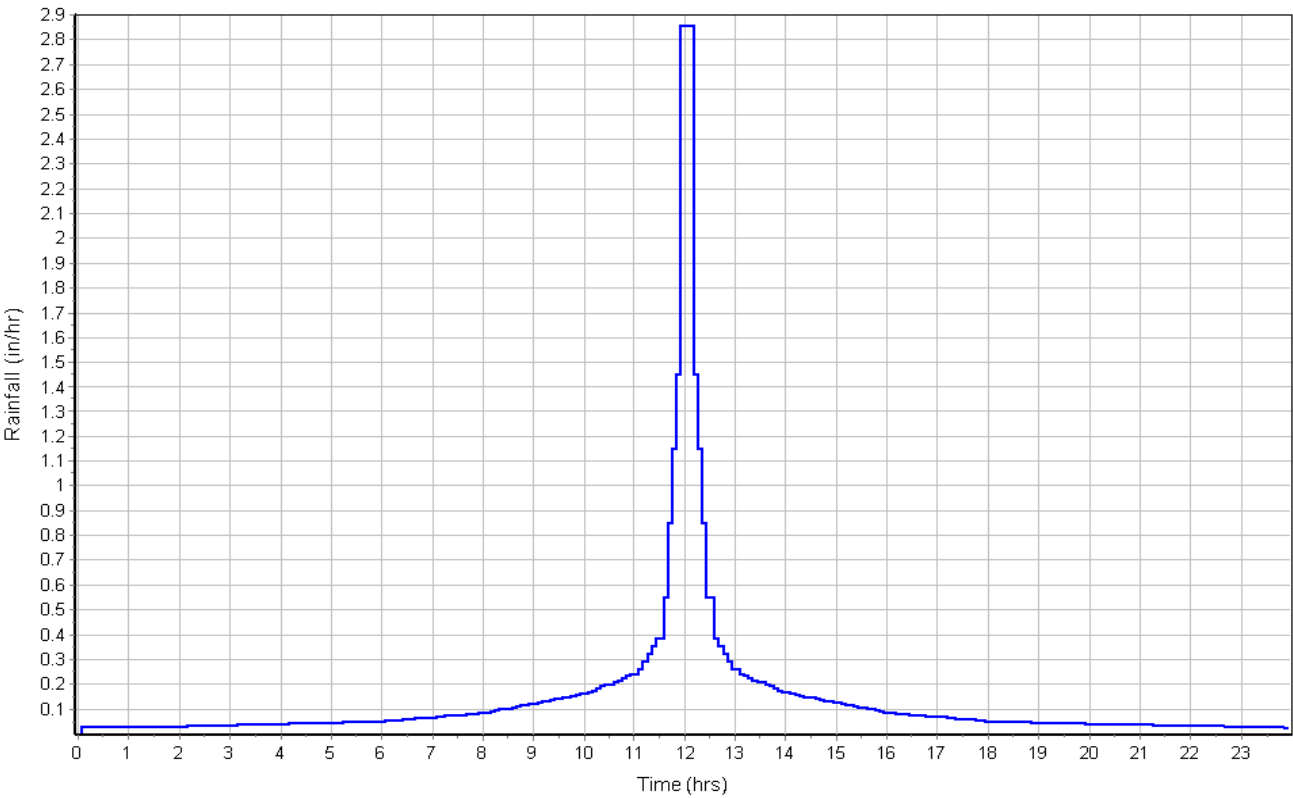
T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
R = Hydraulic Radius (ft)
A_q = Flow Area (ft²)
W_p = Wetted Perimeter (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5

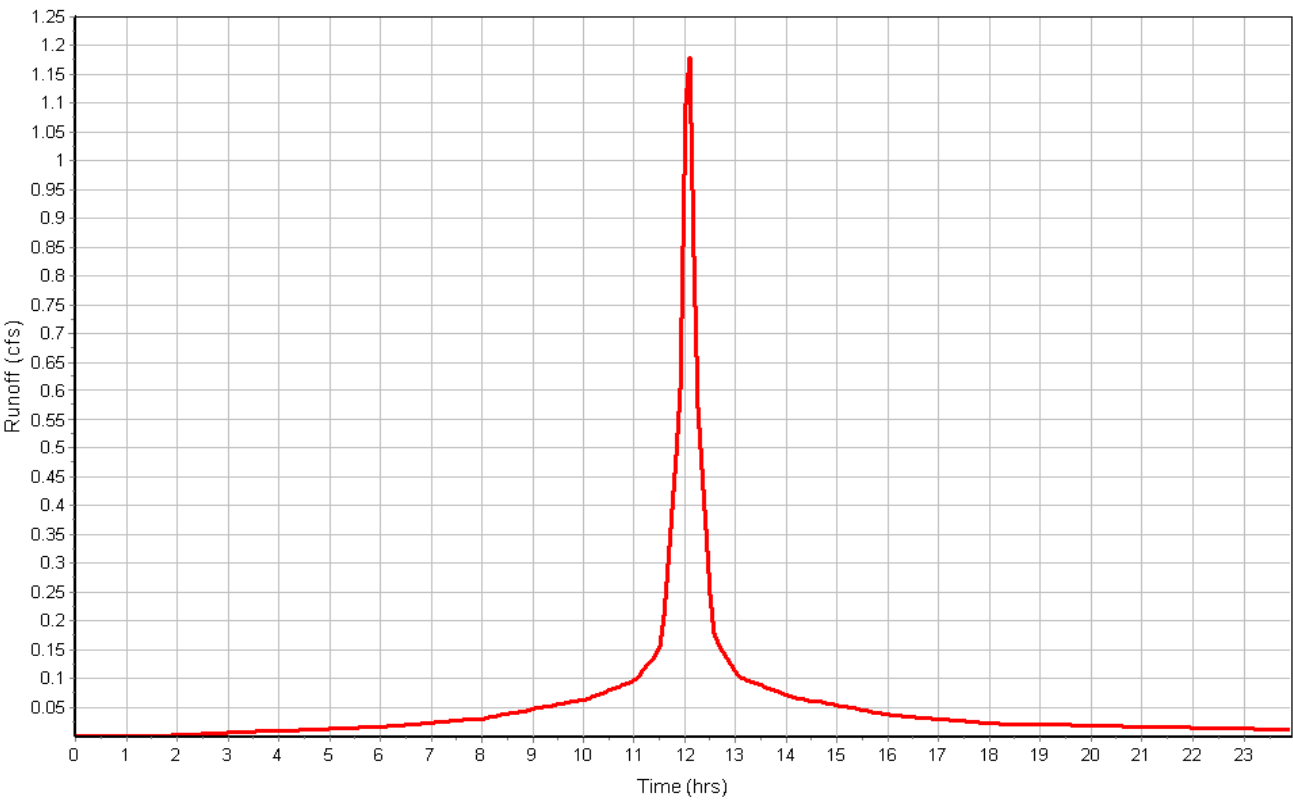
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 3.17
Peak Runoff (cfs) 1.18
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

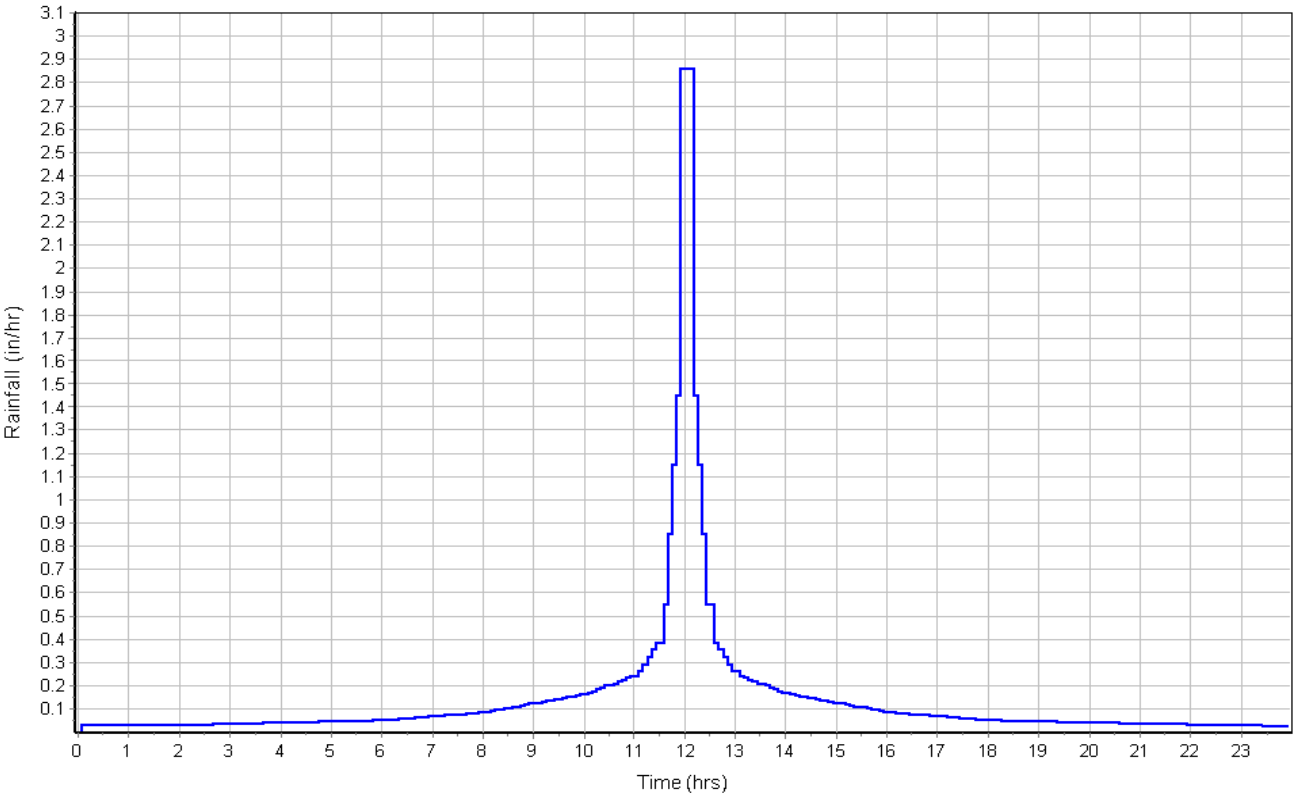
Time of Concentration

User-Defined TOC override (minutes): 5

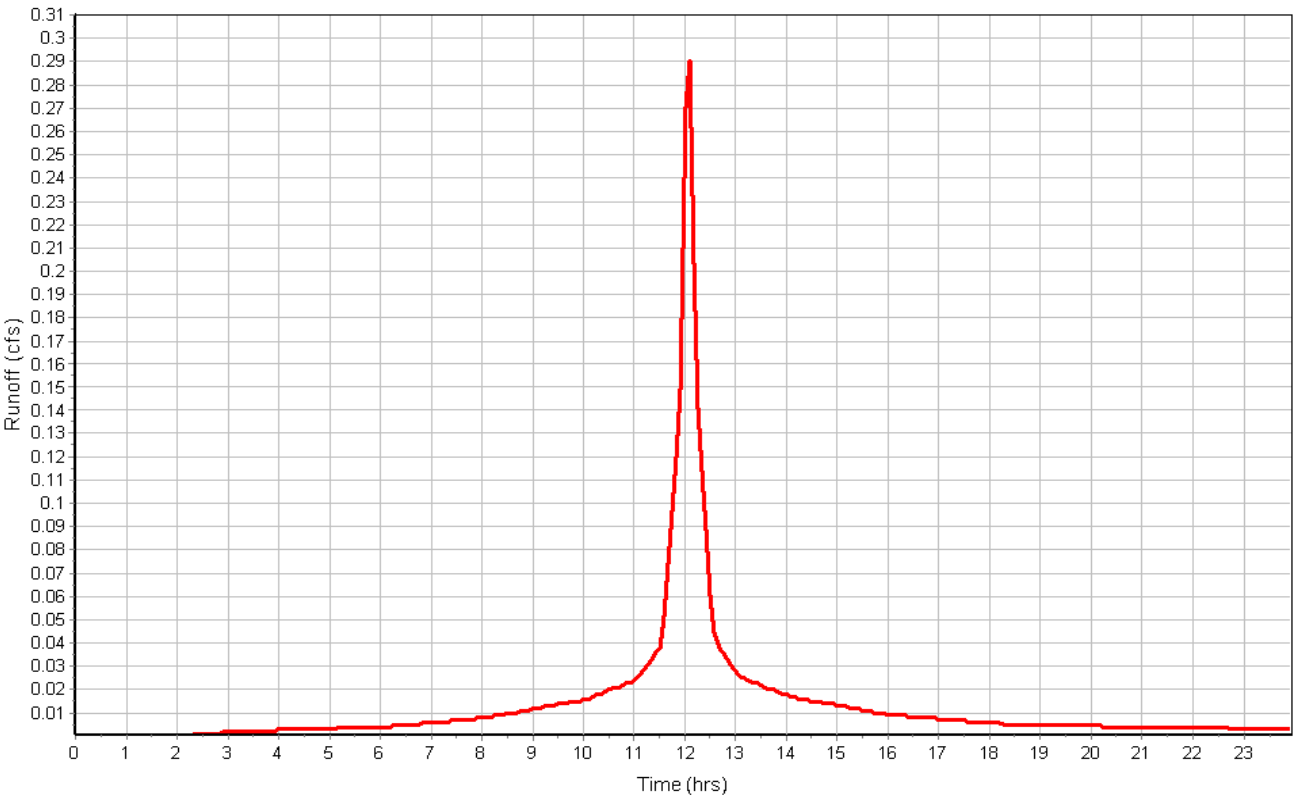
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 3.16
Peak Runoff (cfs) 0.29
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-2

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

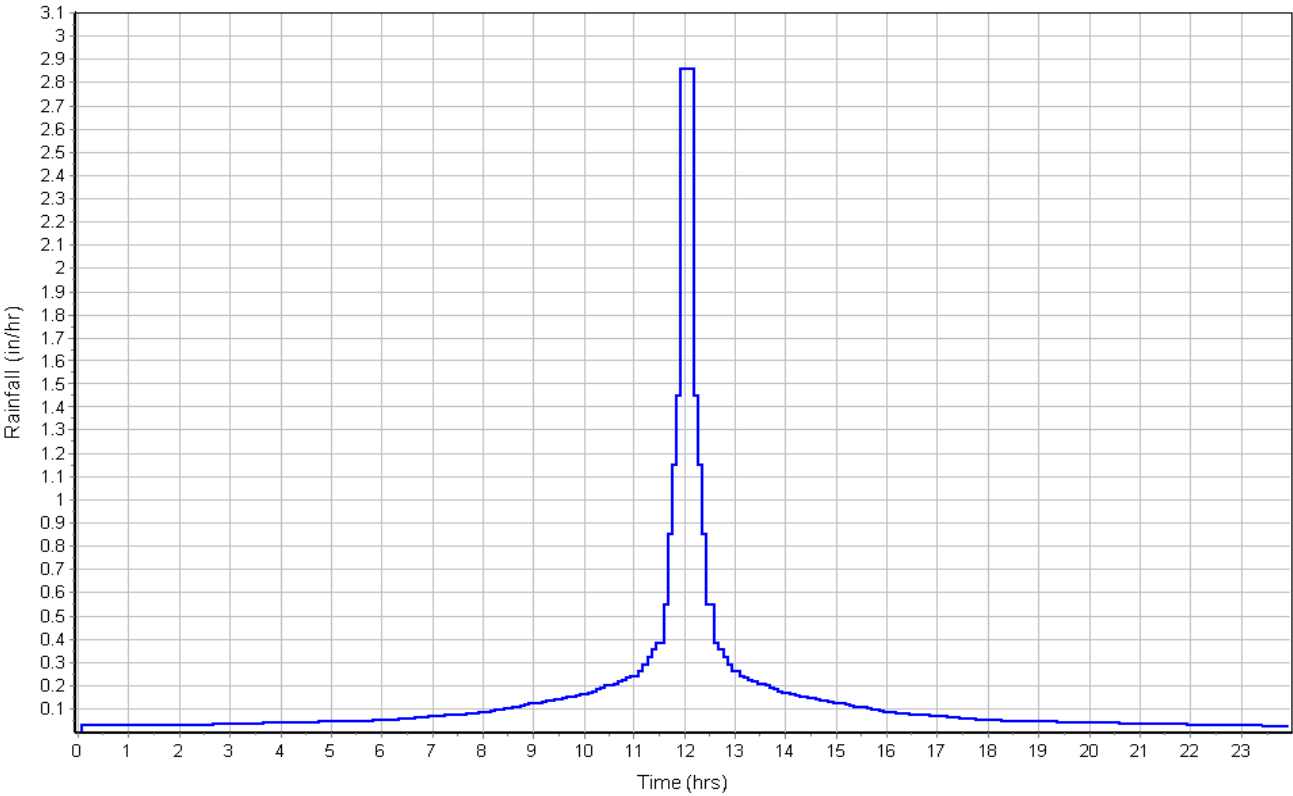
Time of Concentration

User-Defined TOC override (minutes): 5

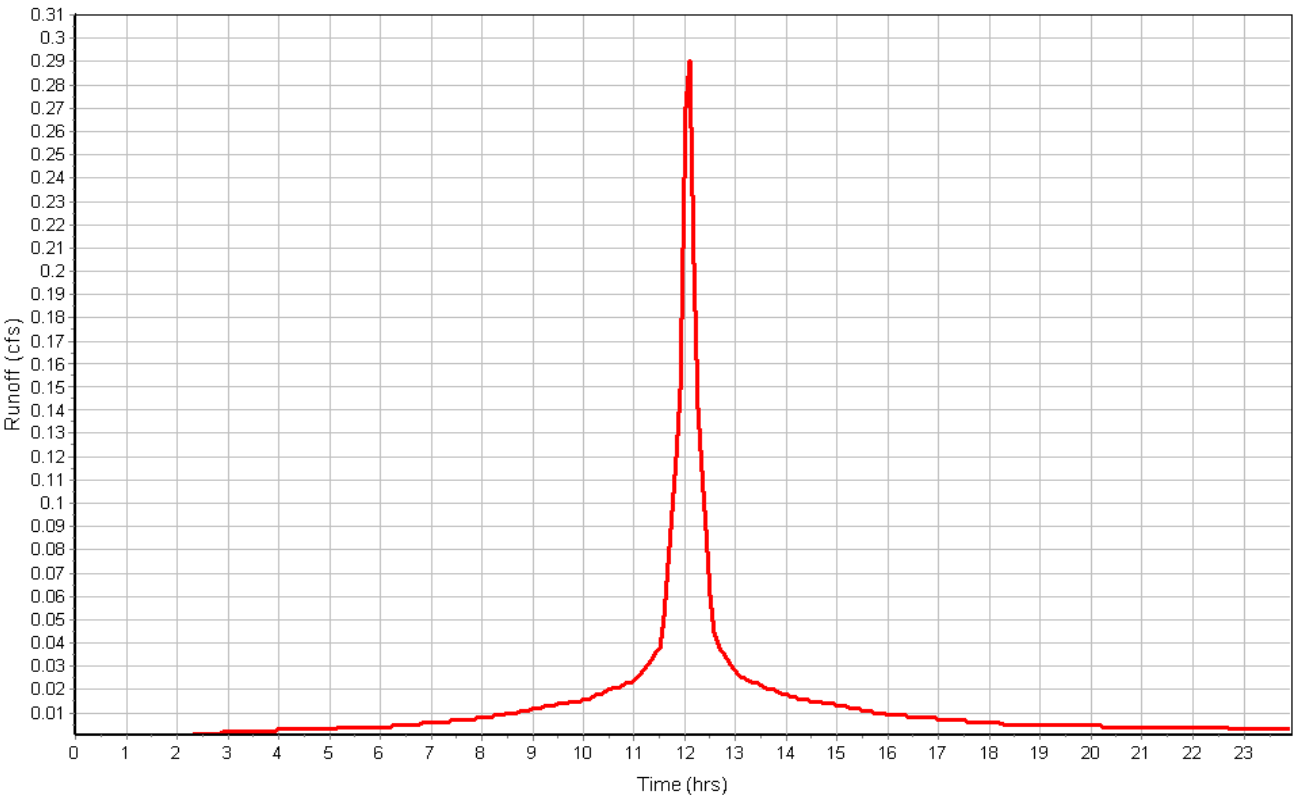
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 3.16
Peak Runoff (cfs) 0.29
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-3

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

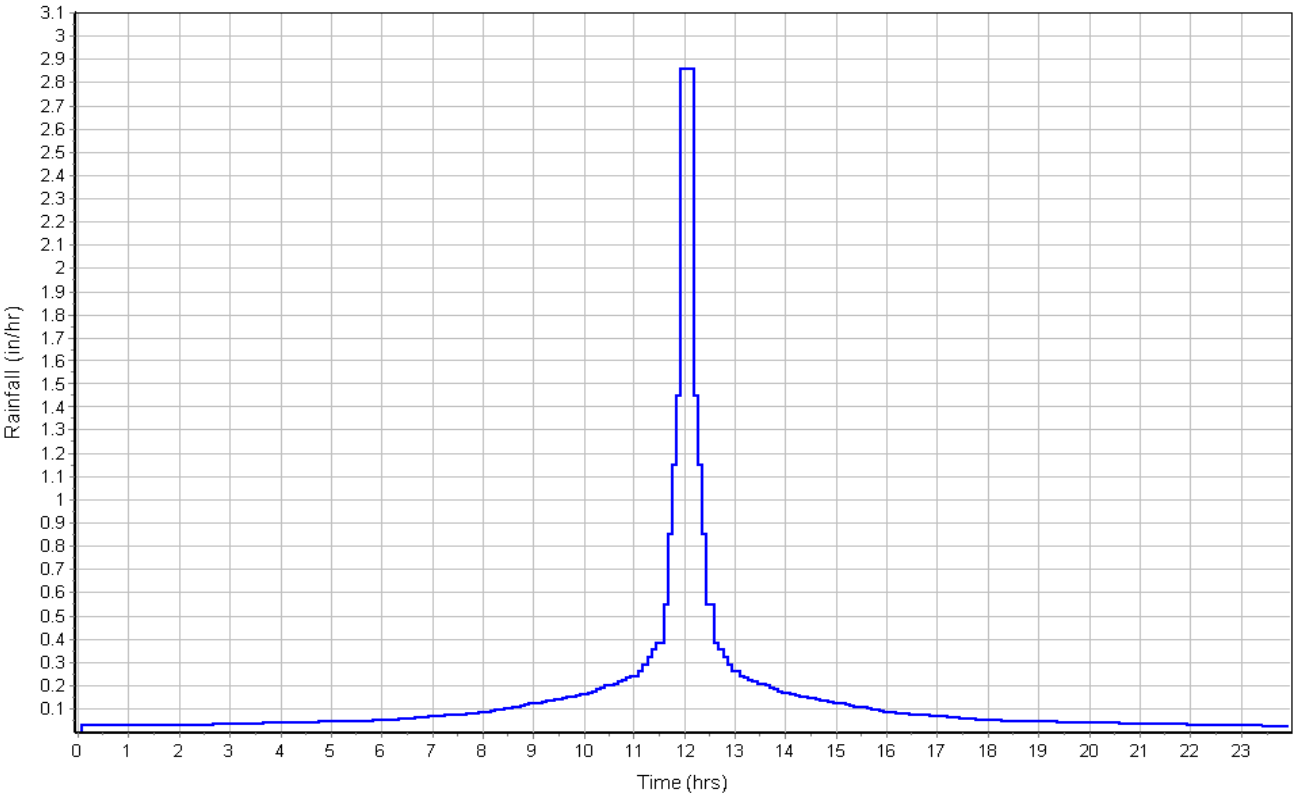
Time of Concentration

User-Defined TOC override (minutes): 5

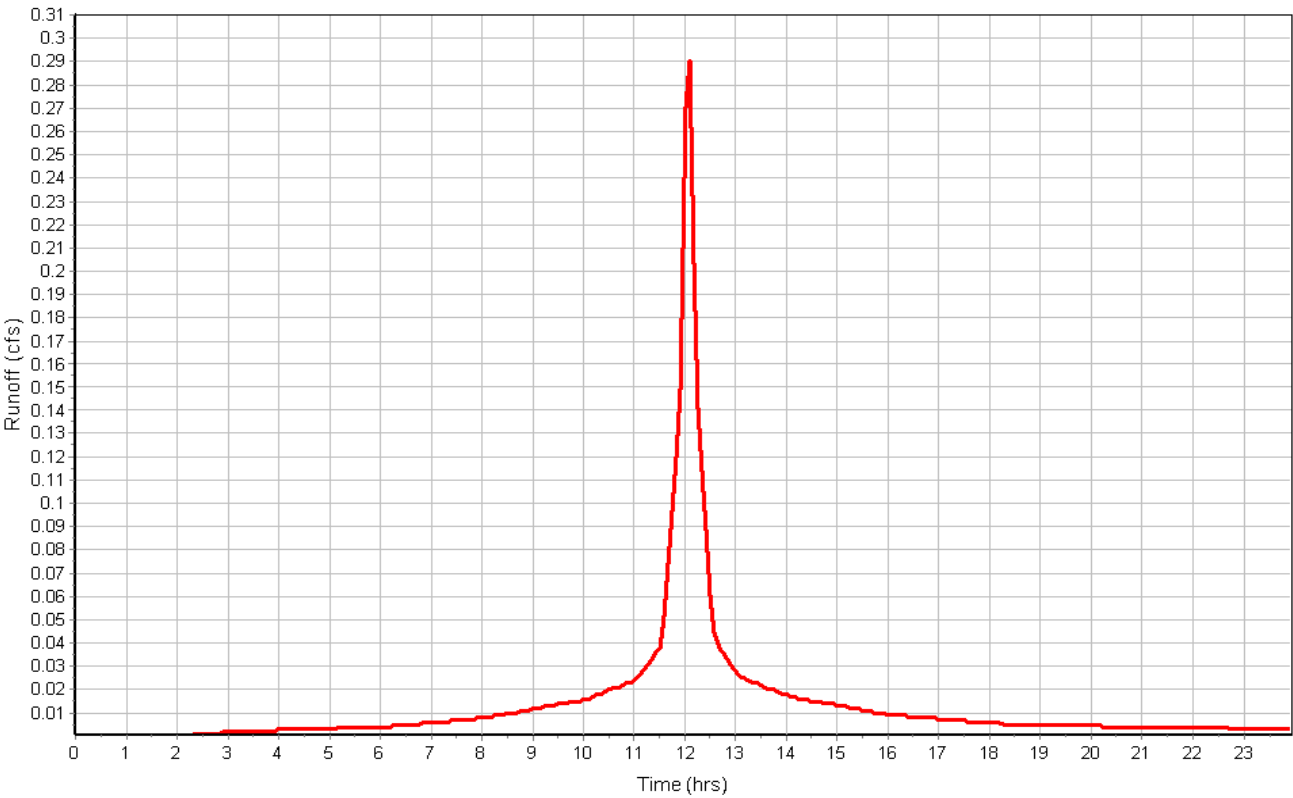
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 3.16
Peak Runoff (cfs) 0.29
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-4

Input Data

Area (ft²) 4520.00
Peak Rate Factor 0.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

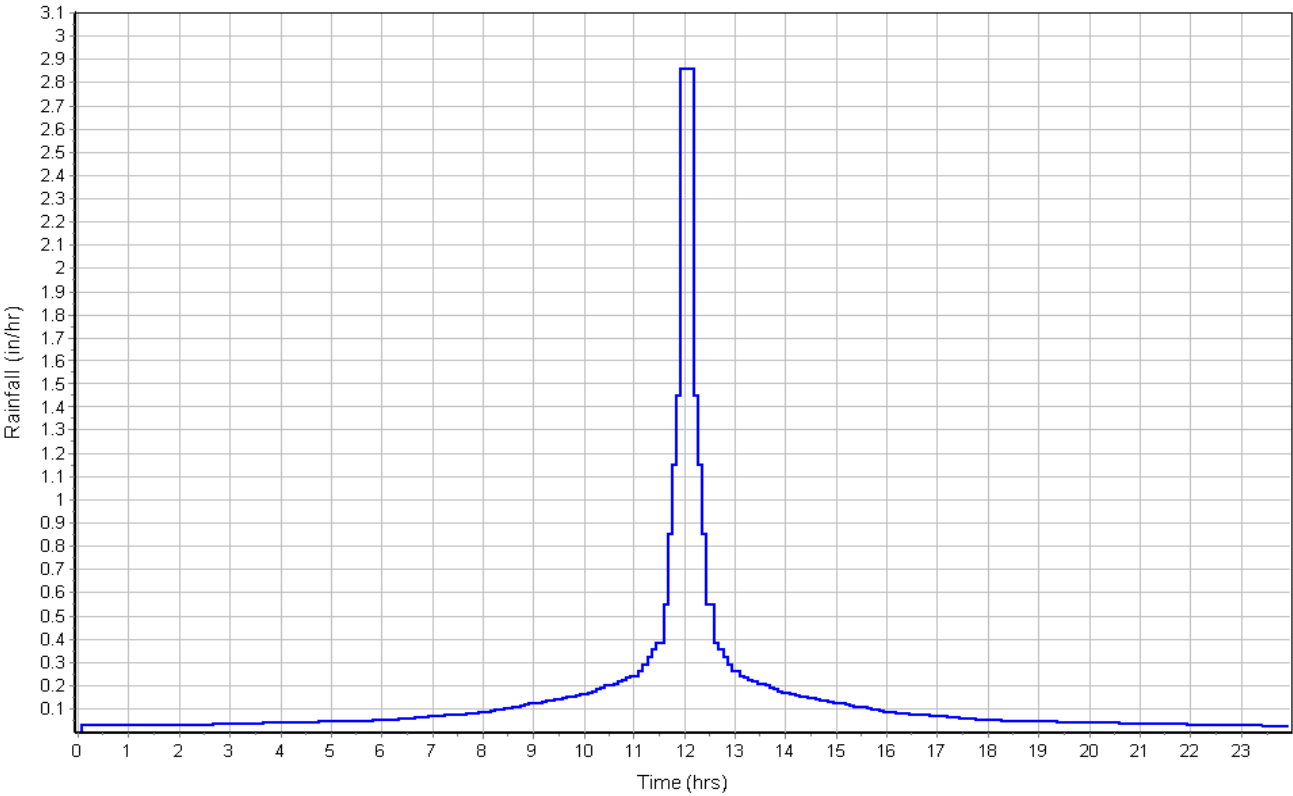
Time of Concentration

User-Defined TOC override (minutes): 5

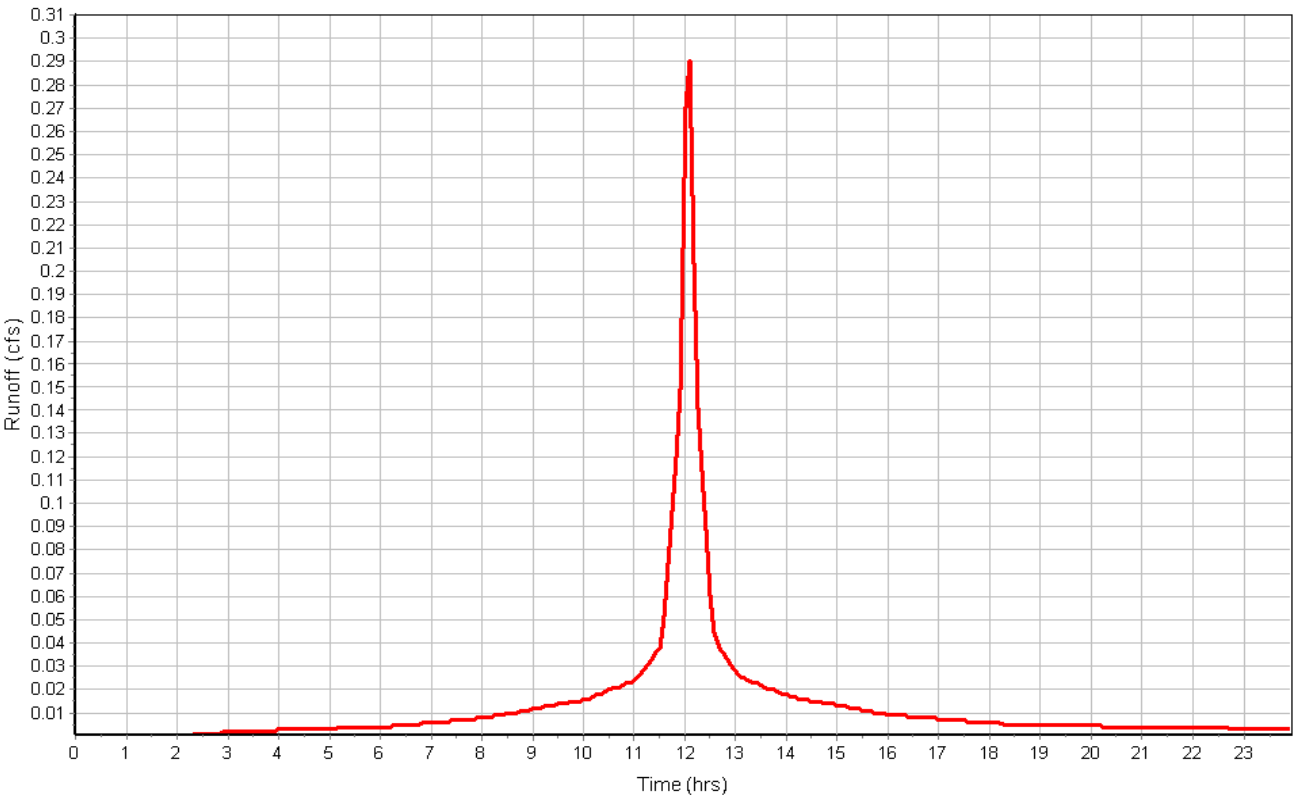
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 3.16
Peak Runoff (cfs) 0.29
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-06

Input Data

Area (ft²) 18885.00
Peak Rate Factor 484.00
Weighted Curve Number 89.60
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	11590.01	C	98.00
50 - 75% grass cover, Fair	3967.01	C	79.00
Woods, Fair	3327.98	C	73.00
Composite Area & Weighted CN	18885.00		89.60

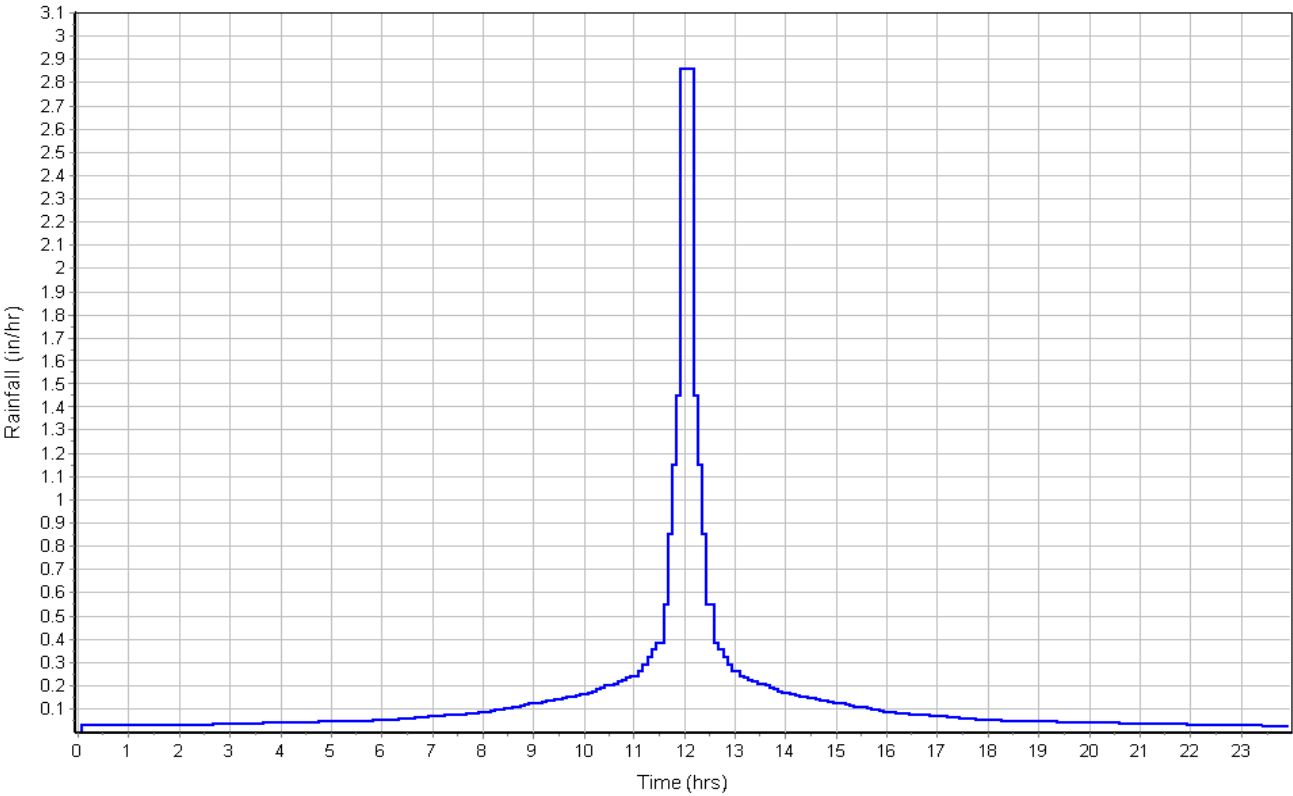
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	2	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	1.08	0.00	0.00
Computed Flow Time (min) :	0.77	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	153	0.00	0.00
Slope (%) :	1.5	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.49	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Total TOC (min)	1.80		

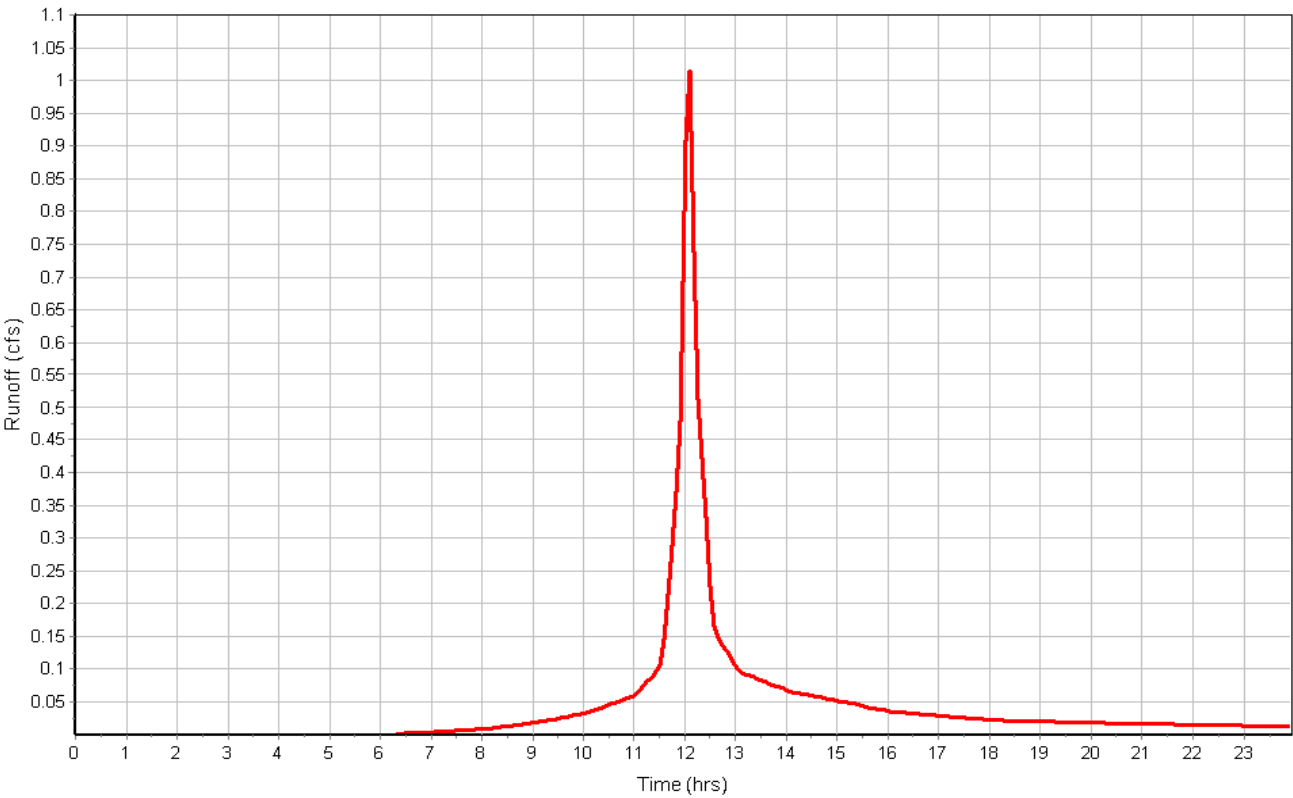
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 2.32
Peak Runoff (cfs) 1.02
Weighted Curve Number 89.60
Time of Concentration (days hh:mm:ss) 0 00:01:48

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1A

Input Data

Area (ft²) 7754.99
Peak Rate Factor 484.00
Weighted Curve Number 94.53
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	6337.02	C	98.00
50 - 75% grass cover, Fair	1418.01	C	79.00
Composite Area & Weighted CN	7755.03		94.53

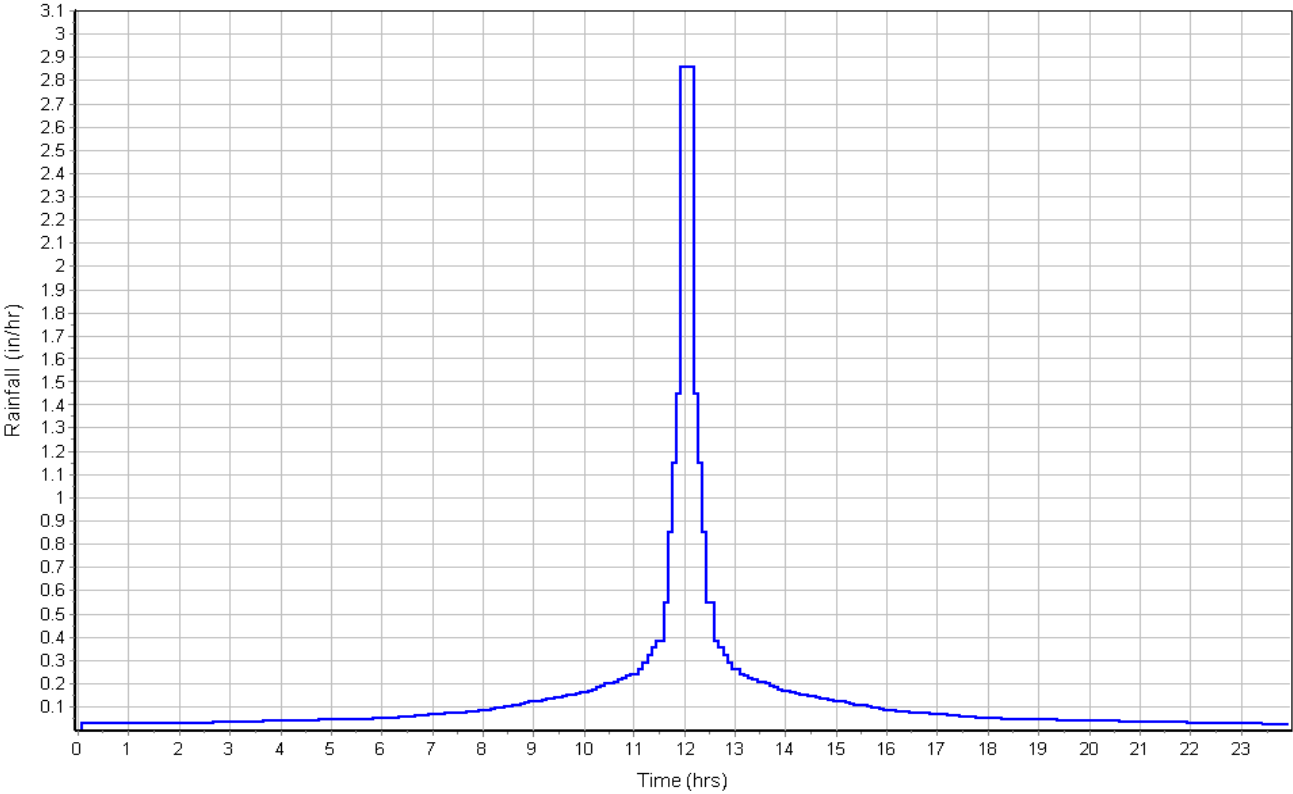
Time of Concentration

User-Defined TOC override (minutes): 5

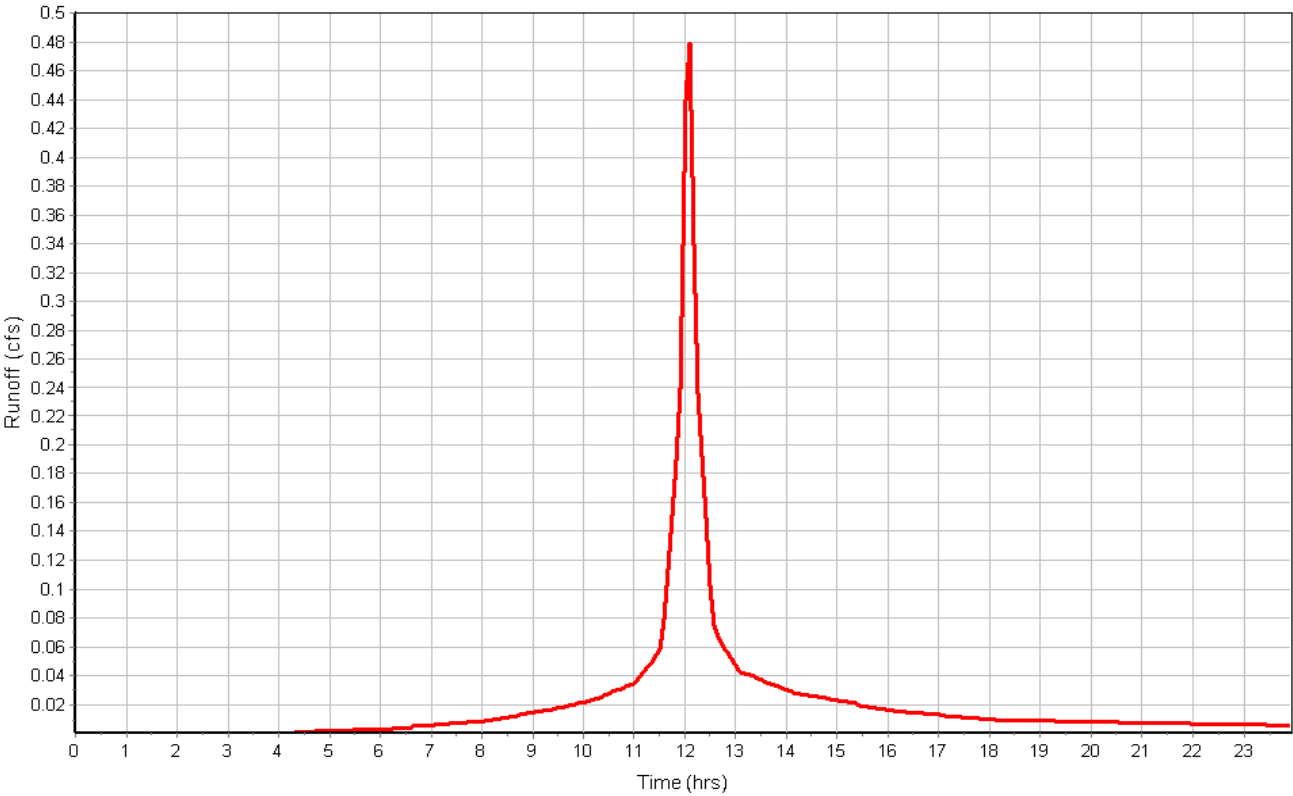
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 2.79
Peak Runoff (cfs) 0.48
Weighted Curve Number 94.53
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1B

Input Data

Area (ft²) 2348.01
Peak Rate Factor 484.00
Weighted Curve Number 92.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	1677.02	C	98.00
50 - 75% grass cover, Fair	671.00	C	79.00
Composite Area & Weighted CN	2348.02		92.57

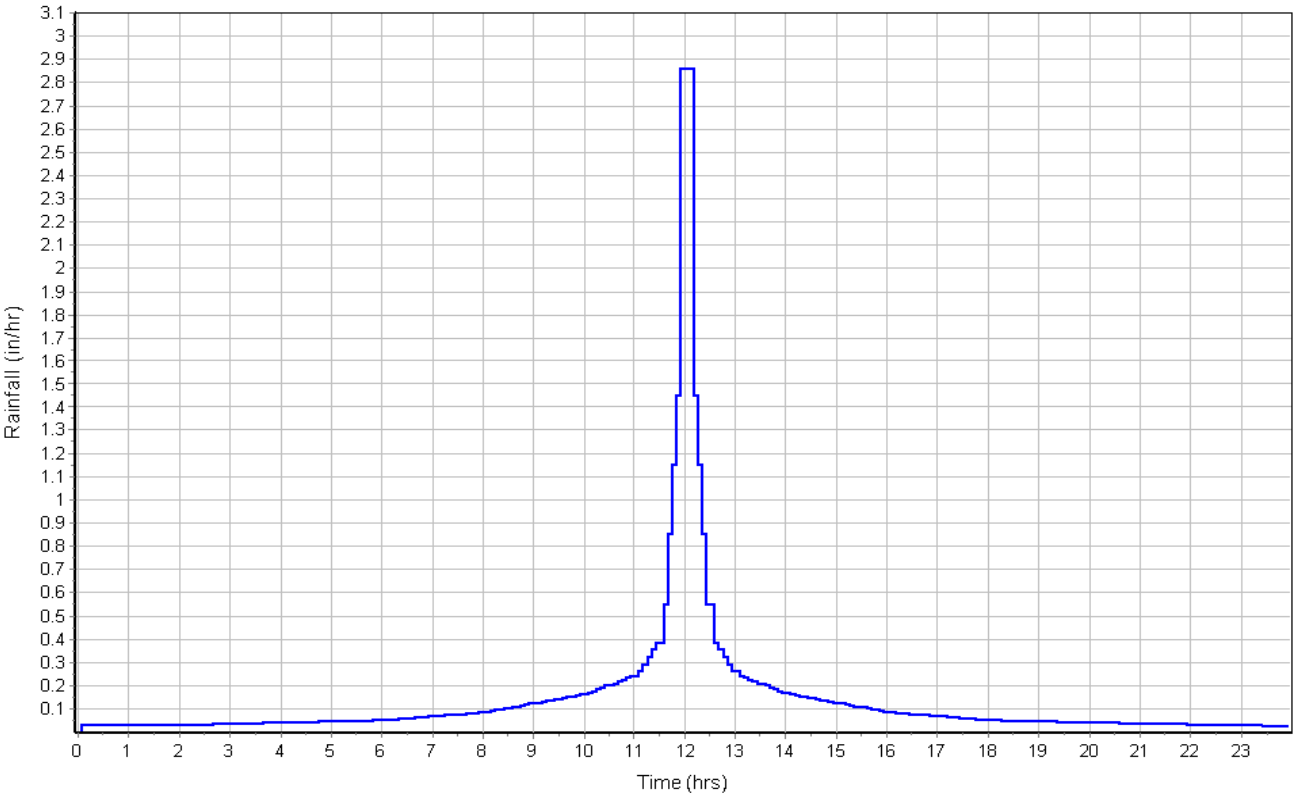
Time of Concentration

User-Defined TOC override (minutes): 5

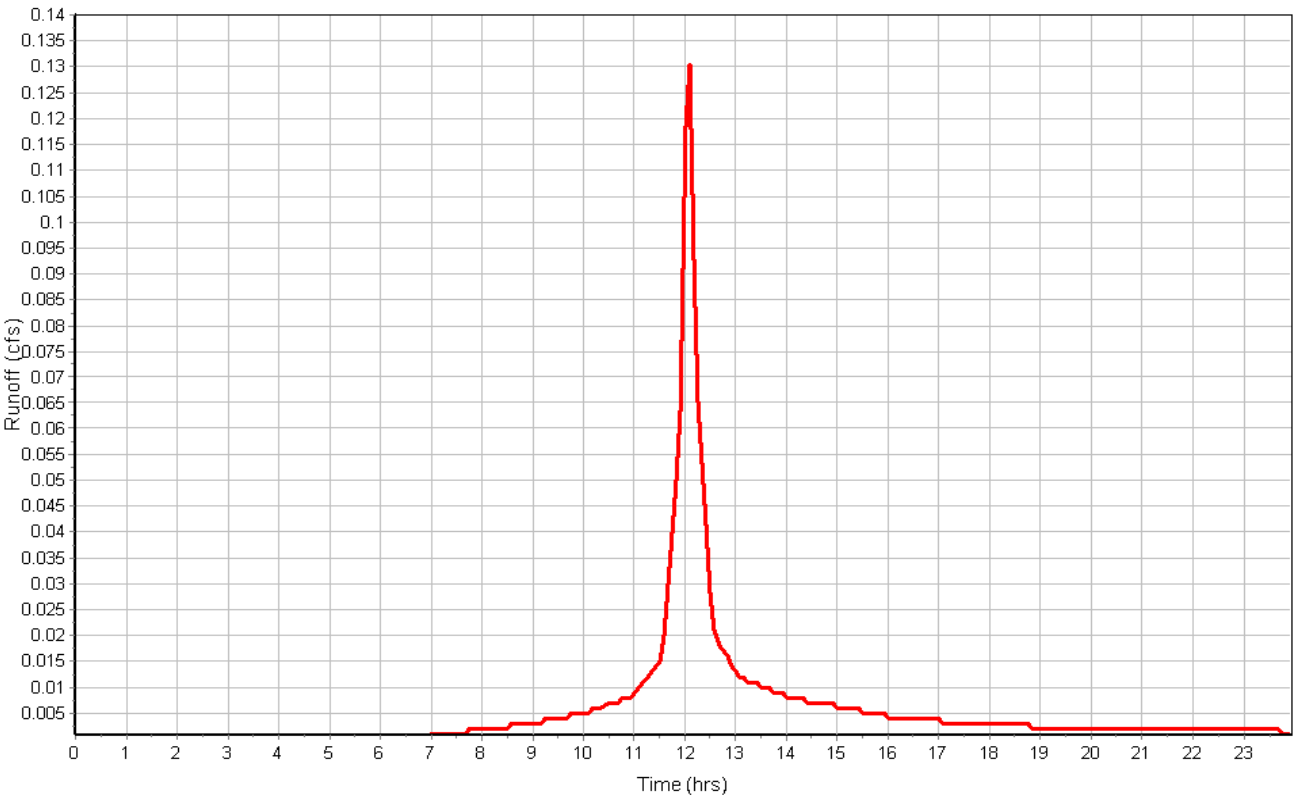
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 2.58
Peak Runoff (cfs) 0.13
Weighted Curve Number 92.57
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1C

Input Data

Area (ft²) 4143.99
Peak Rate Factor 484.00
Weighted Curve Number 96.30
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	3773.99	C	98.00
50 - 75% grass cover, Fair	370.00	C	79.00
Composite Area & Weighted CN	4143.99		96.30

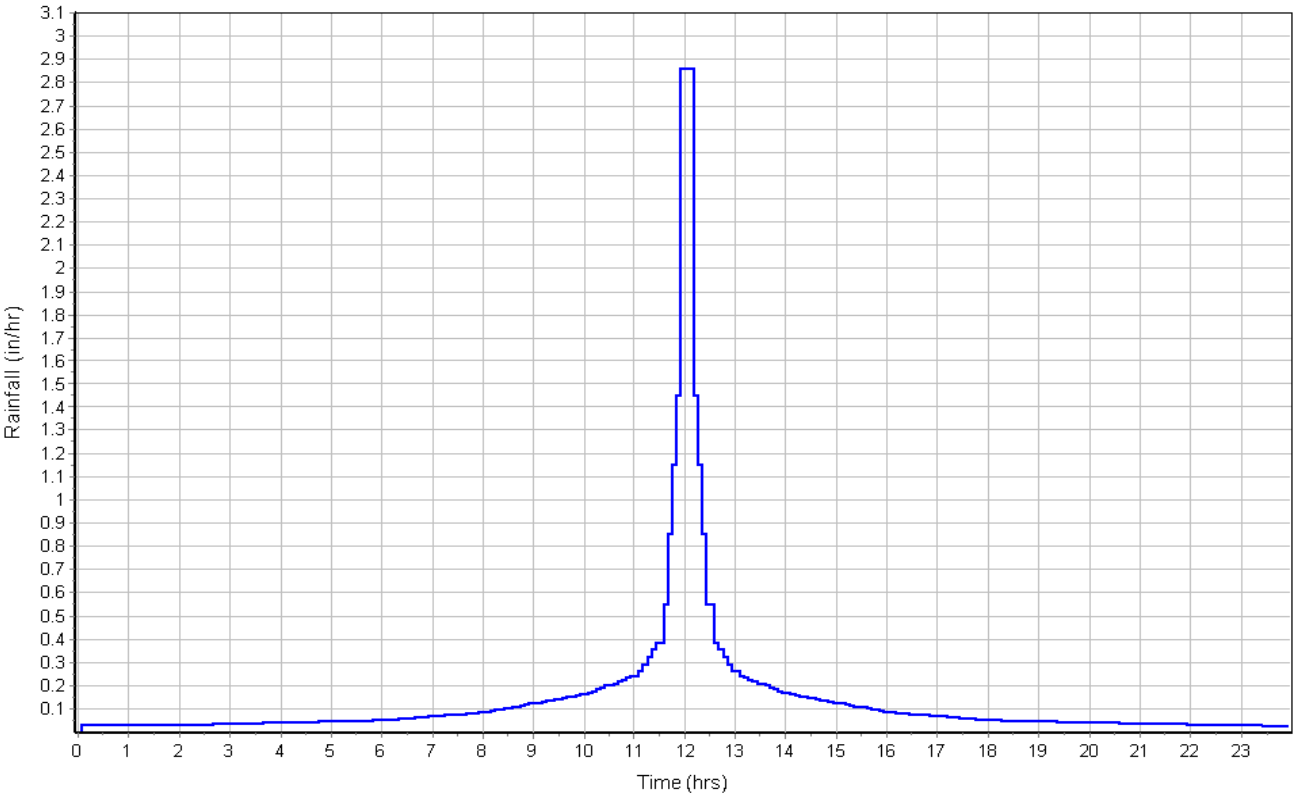
Time of Concentration

User-Defined TOC override (minutes): 5

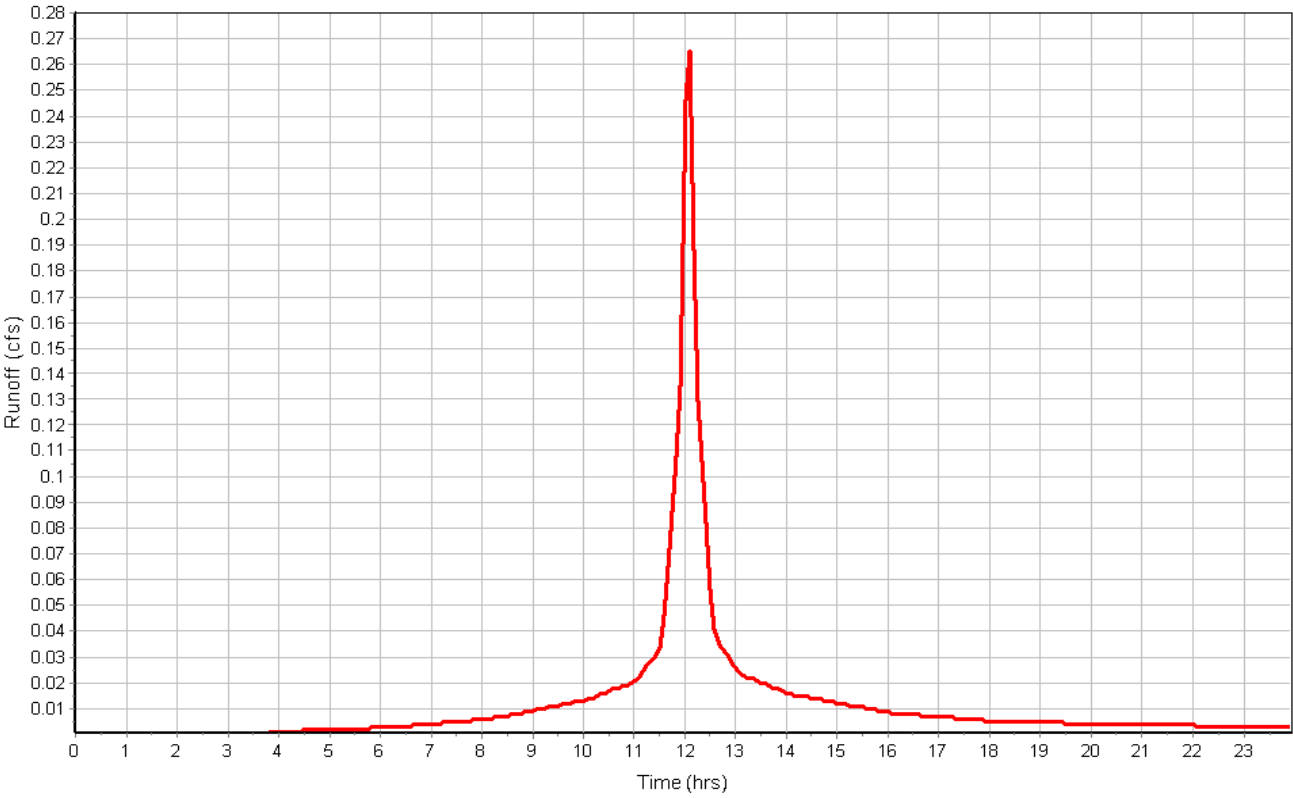
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 2.97
Peak Runoff (cfs) 0.27
Weighted Curve Number 96.30
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1D

Input Data

Area (ft²) 4344.02
Peak Rate Factor 484.00
Weighted Curve Number 96.71
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	4047.99	C	98.00
50 - 75% grass cover, Fair	295.99	C	79.00
Composite Area & Weighted CN	4343.98		96.71

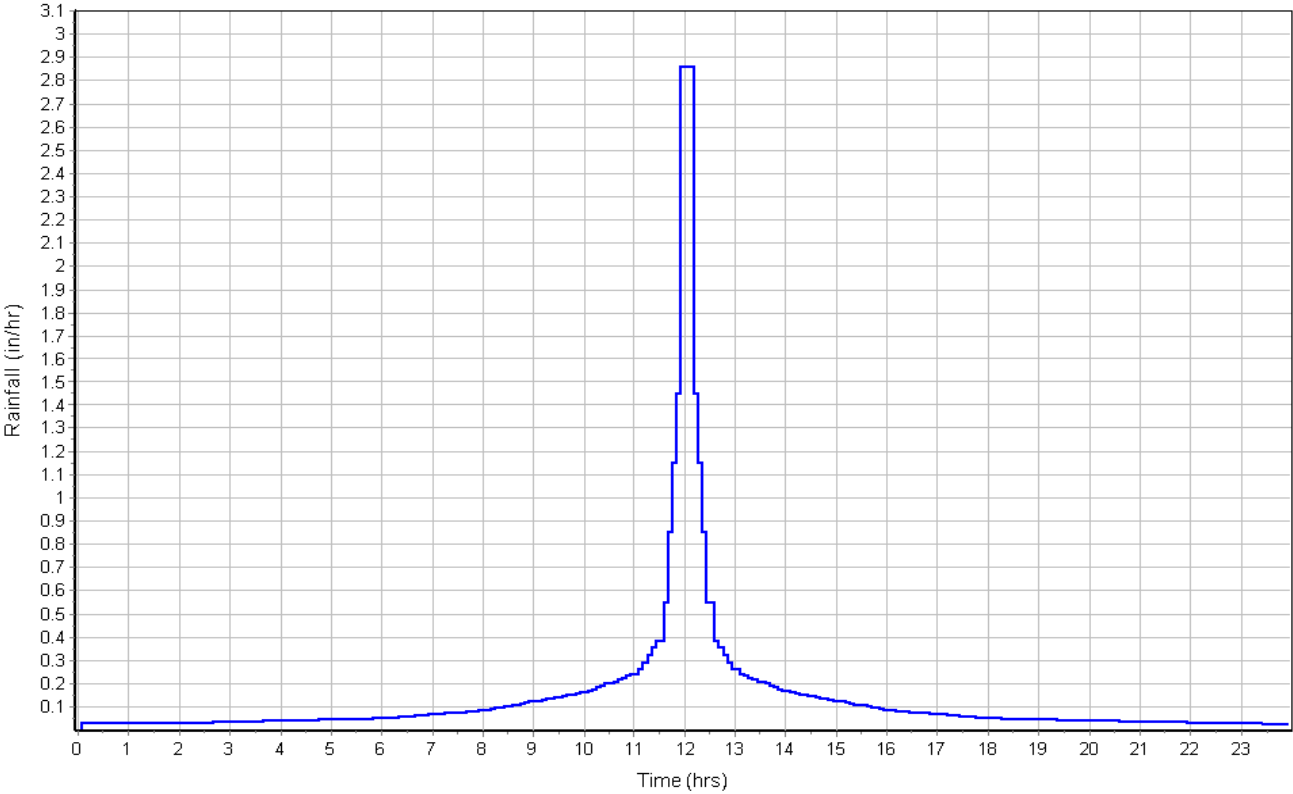
Time of Concentration

User-Defined TOC override (minutes): 5

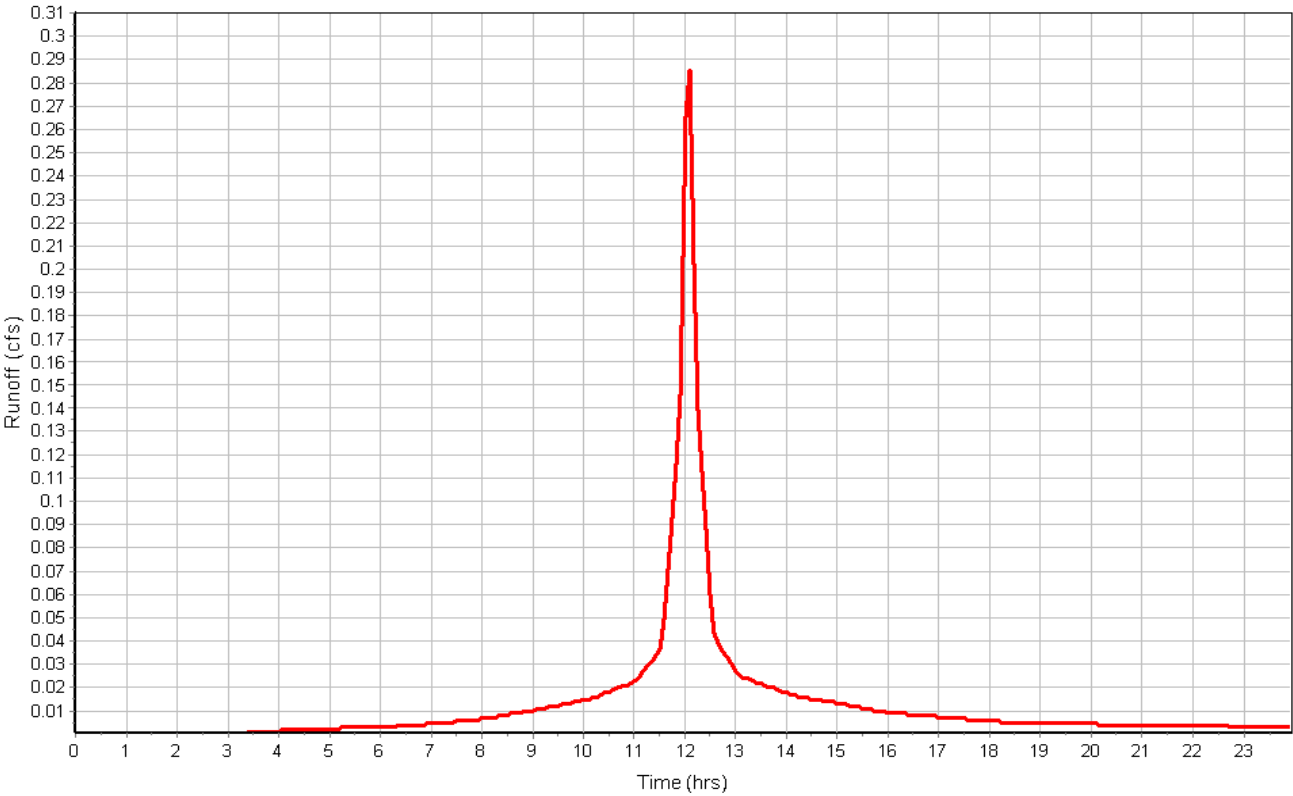
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 3.02
Peak Runoff (cfs) 0.29
Weighted Curve Number 96.71
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7A

Input Data

Area (ft²) 10845.00
 Peak Rate Factor 484.00
 Weighted Curve Number 97.57
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	10597.02	C	98.00
50 - 75% grass cover, Fair	247.99	C	79.00
Woods, Fair	0.00	C	73.00
Composite Area & Weighted CN	10845.01		97.57

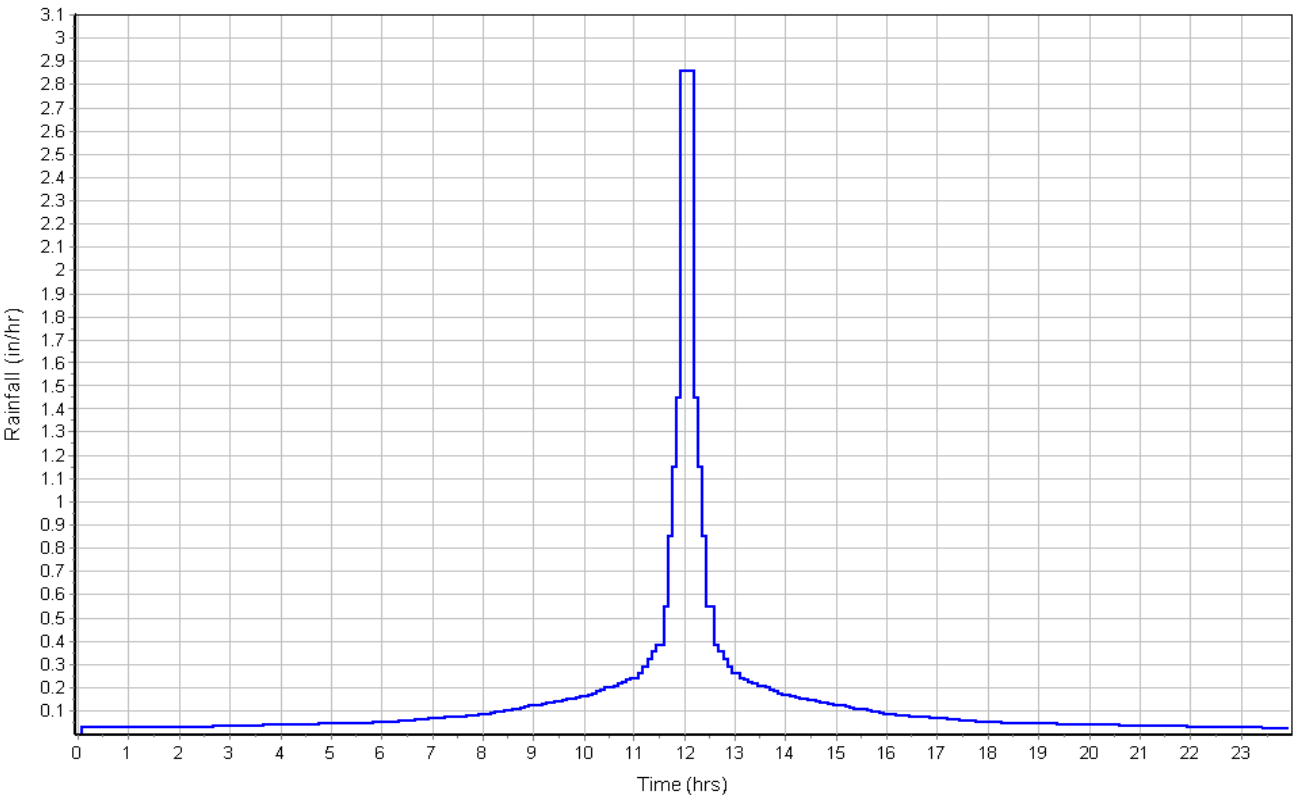
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

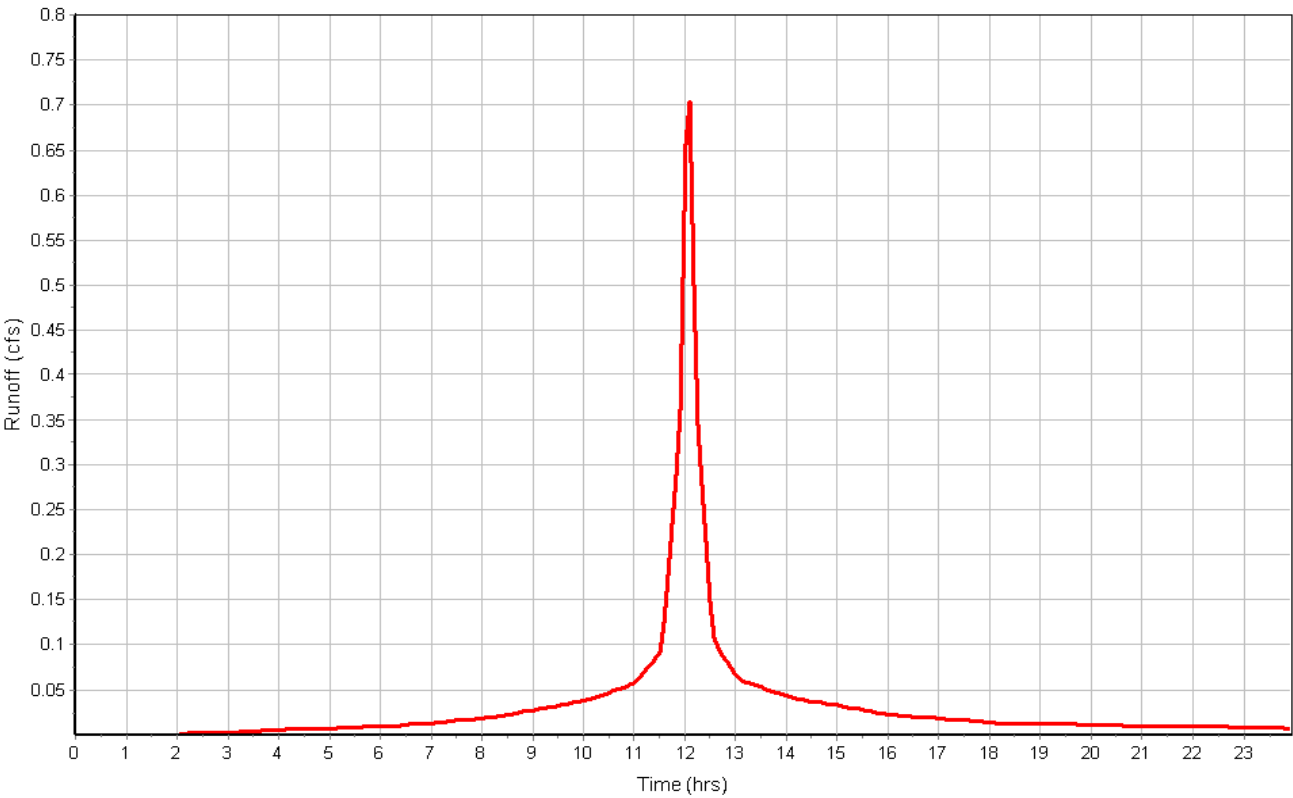
Subbasin Runoff Results

Total Rainfall (in) 3.40
 Total Runoff (in) 3.12
 Peak Runoff (cfs) 0.71
 Weighted Curve Number 97.57
 Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7B

Input Data

Area (ft²) 19698.01
Peak Rate Factor 484.00
Weighted Curve Number 90.20
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	11902.99	C	98.00
50 - 75% grass cover, Fair	6880.00	C	79.00
Woods, Fair	915.02	C	73.00
Composite Area & Weighted CN	19698.01		90.20

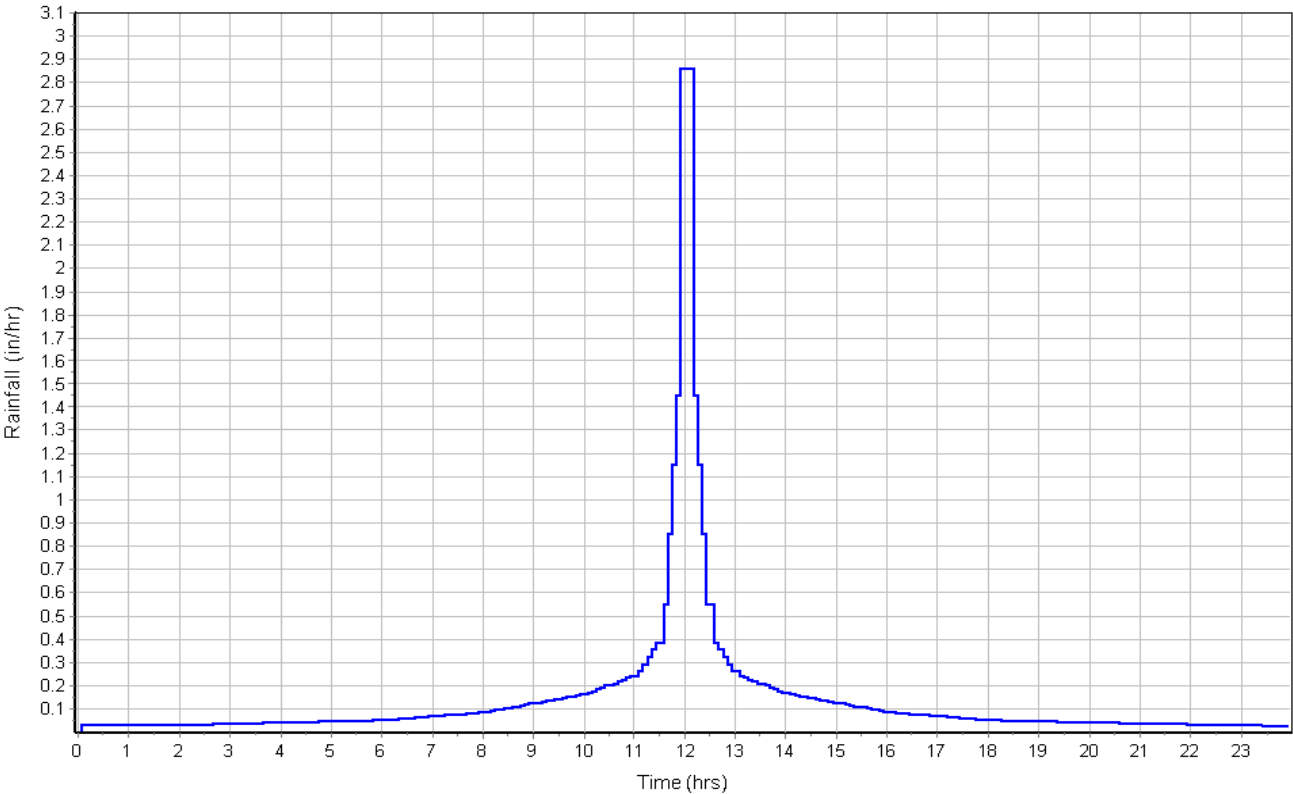
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

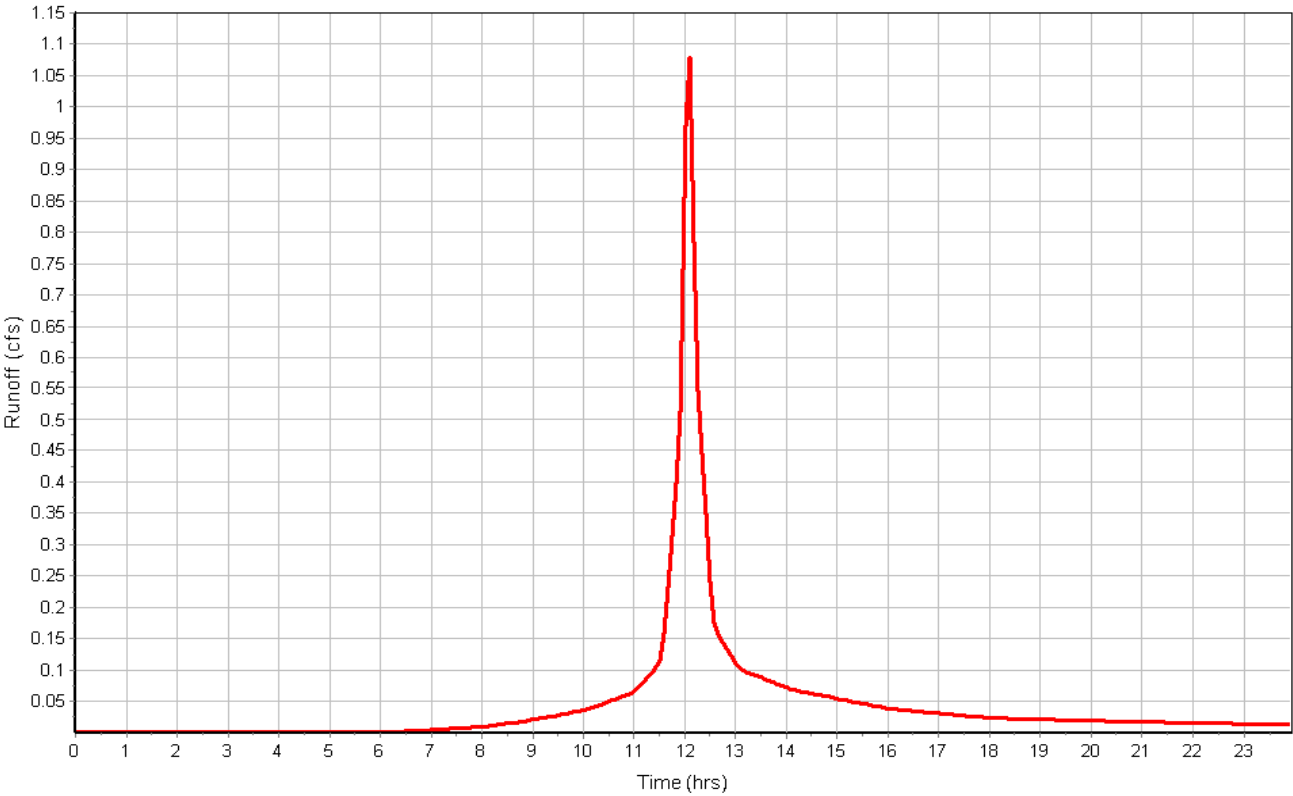
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 2.37
Peak Runoff (cfs) 1.09
Weighted Curve Number 90.20
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : PRE-08

Input Data

Area (ft²) 1080.98
Peak Rate Factor 484.00
Weighted Curve Number 73.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Woods, Fair	1080.98	C	73.00
Composite Area & Weighted CN	1080.98		73.00

Time of Concentration

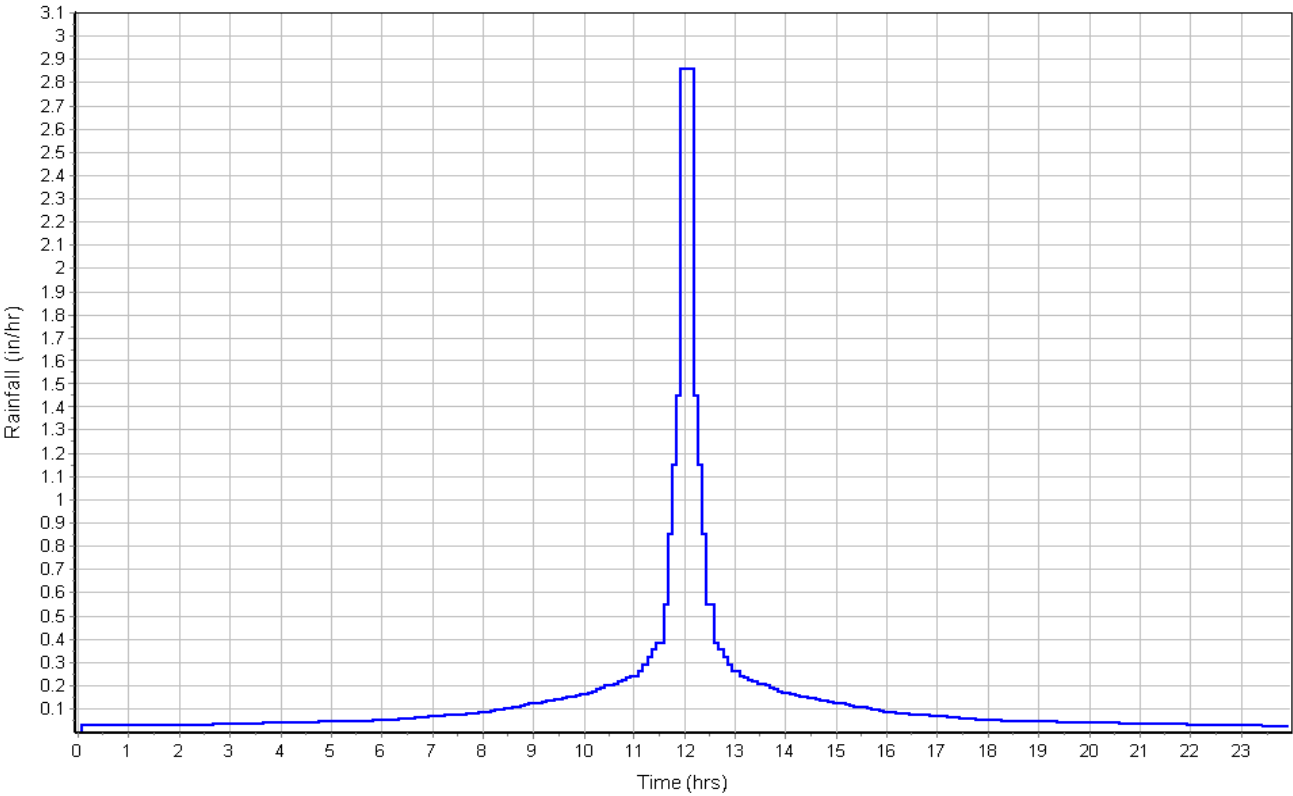
	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	15.79	0.00	0.00

	Subarea A	Subarea B	Subarea C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	28	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.61	0.00	0.00
Computed Flow Time (min) :	0.29	0.00	0.00
Total TOC (min)	16.08		

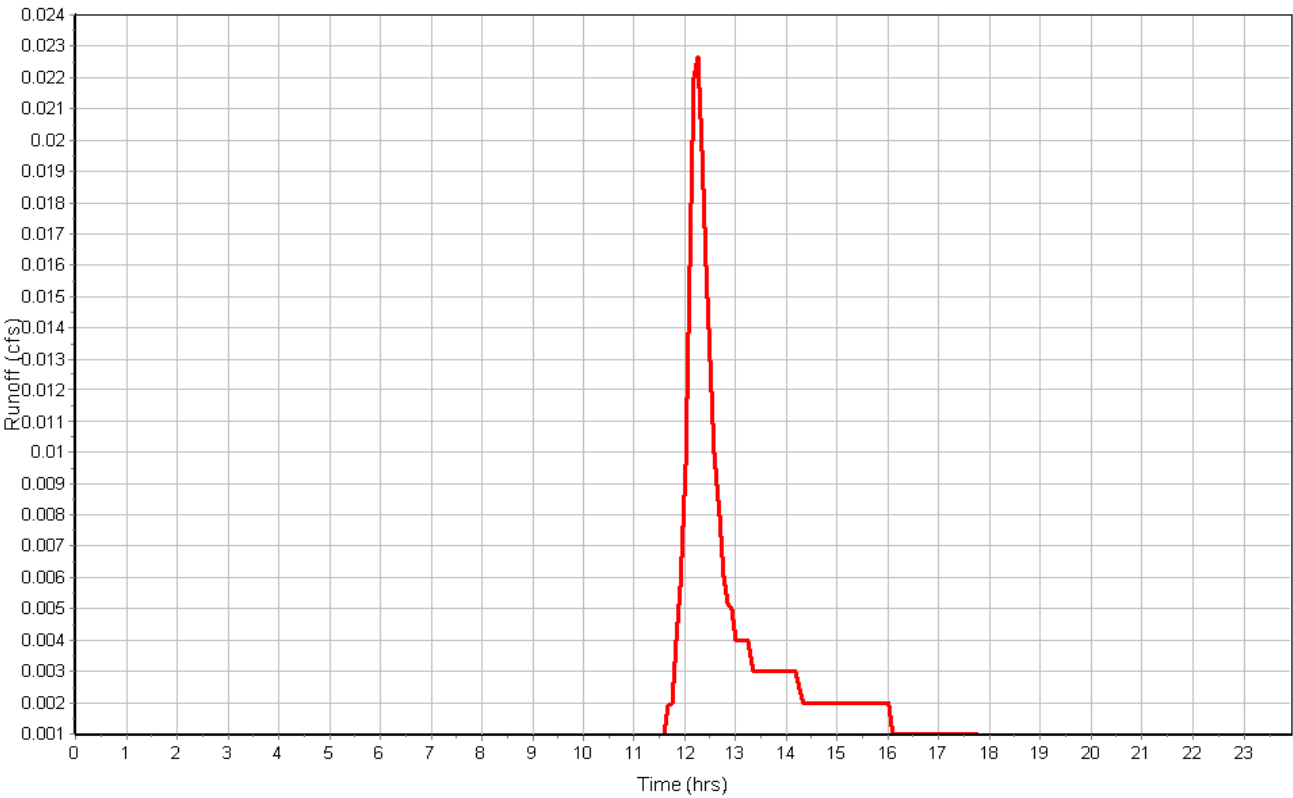
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 0.93
Peak Runoff (cfs) 0.02
Weighted Curve Number 73.00
Time of Concentration (days hh:mm:ss) 0 00:16:05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Pre-1

Input Data

Area (ft²) 85389.01
Peak Rate Factor 484.00
Weighted Curve Number 94.21
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	32210.01	C	98.00
50 - 75% grass cover, Fair	17018.98	C	79.00
Paved parking & roofs	36159.98	C	98.00
Composite Area & Weighted CN	85388.97		94.21

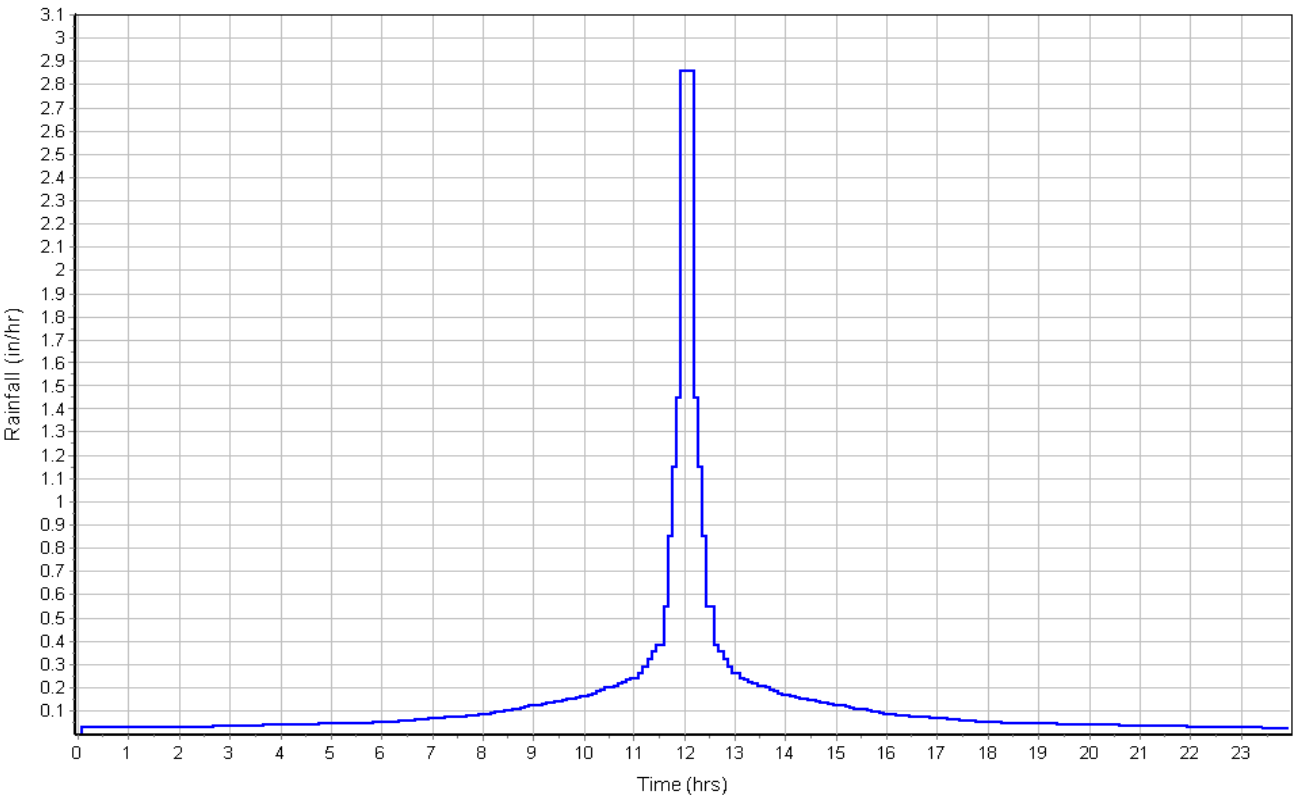
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.4	0.00
Flow Length (ft) :	25	25	0.00
Slope (%) :	6	5	0.00
2 yr, 24 hr Rainfall (in) :	3.4	3.4	0.00
Velocity (ft/sec) :	0.09	0.09	0.00
Computed Flow Time (min) :	4.43	4.76	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	302	166	220
Slope (%) :	1	2	2
Surface Type :	Unpaved	Unpaved	Paved
Velocity (ft/sec) :	1.61	2.28	2.87
Computed Flow Time (min) :	3.13	1.21	1.28
Total TOC (min)	14.81		

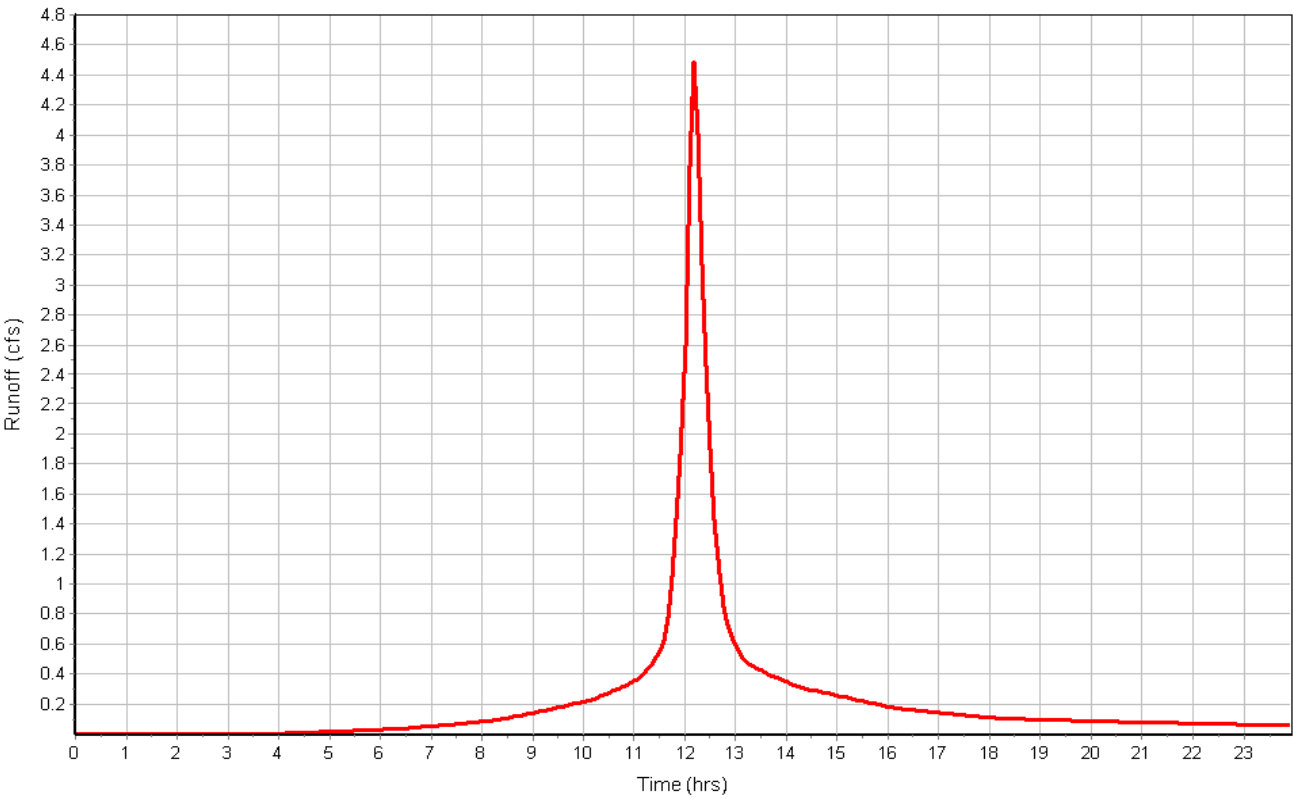
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 2.76
Peak Runoff (cfs) 4.49
Weighted Curve Number 94.21
Time of Concentration (days hh:mm:ss) 0 00:14:49

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-09

Input Data

Area (ft²) 3079.00
Peak Rate Factor 484.00
Weighted Curve Number 79.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
50 - 75% grass cover, Fair	3079.00	C	79.00
Composite Area & Weighted CN	3079.00		79.00

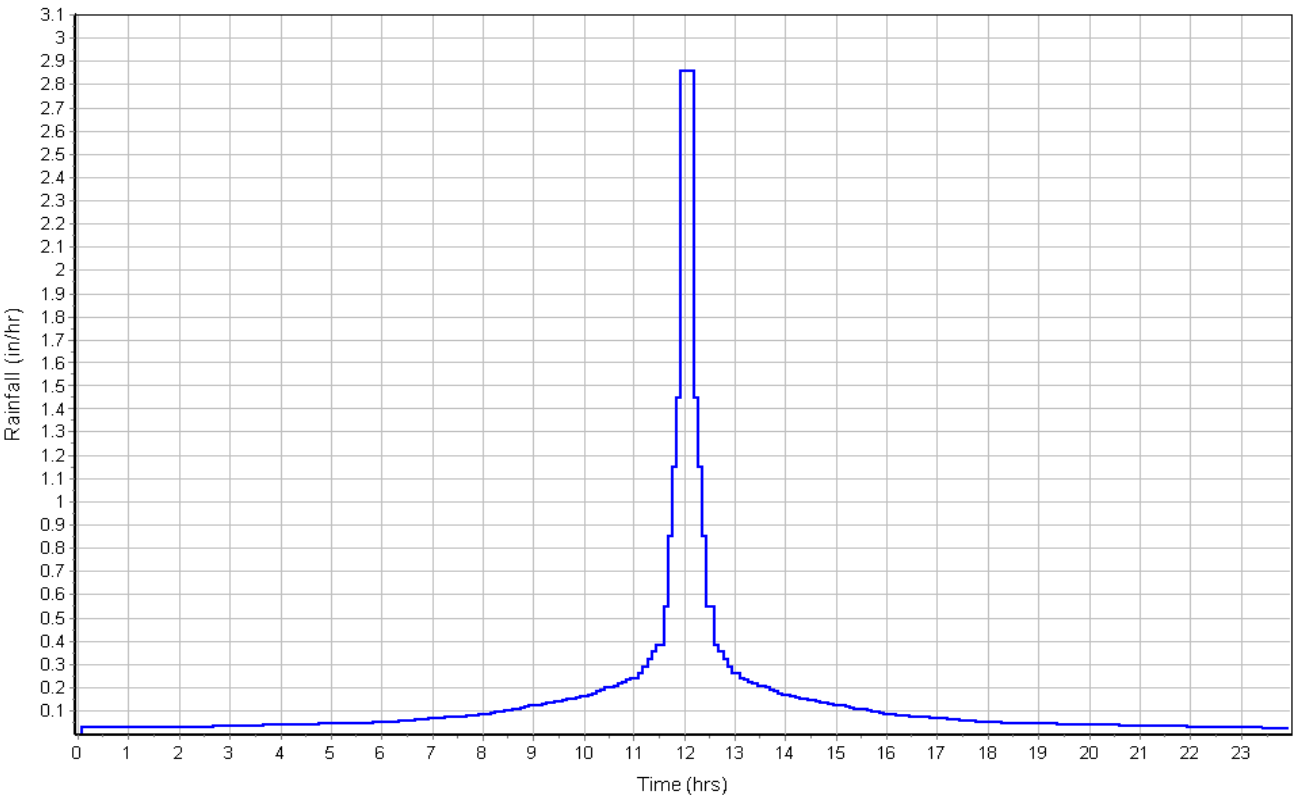
Time of Concentration

User-Defined TOC override (minutes): 5

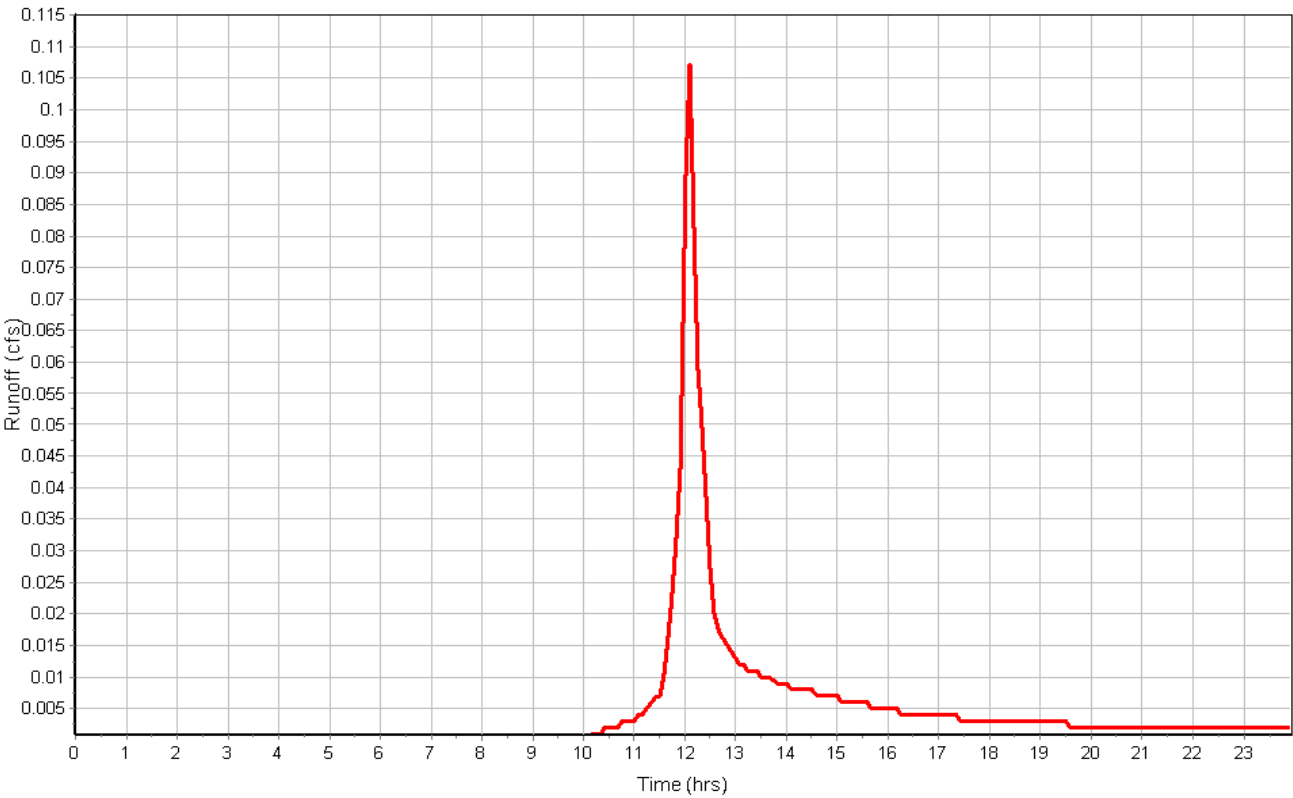
Subbasin Runoff Results

Total Rainfall (in) 3.40
Total Runoff (in) 1.48
Peak Runoff (cfs) 0.11
Weighted Curve Number 79.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation	Ground/Rim (Max) Offset	Initial Water Elevation	Initial Water Depth	Surcharge Elevation	Surcharge Depth	Ponded Area	Minimum Pipe Cover
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft²)	(in)
1 DMH(1)	163.80	170.13	6.33	163.80	0.00	170.13	0.00	0.00	0.00
2 DMH(10)	162.00	165.40	3.40	162.00	0.00	165.40	0.00	0.00	19.80
3 DMH(3)	163.75	169.82	6.07	163.75	0.00	169.82	0.00	0.00	60.22
4 DMH(4)	163.30	170.24	6.94	163.30	0.00	170.24	0.00	0.00	67.05
5 DMH(5)	162.70	169.84	7.14	162.70	0.00	169.84	0.00	0.00	67.69
6 DMH(6)	162.55	173.51	10.96	162.55	0.00	173.51	0.00	0.00	0.00
7 DMH(8)	161.95	168.06	6.11	161.95	0.00	168.06	0.00	0.00	54.74
8 Jun-01	167.00	174.00	7.00	0.00	-167.00	0.00	-174.00	0.00	70.00
9 Jun-02	168.30	174.90	6.60	168.30	0.00	174.90	0.00	0.00	0.00
10 Jun-03	168.30	174.30	6.00	168.30	0.00	174.30	0.00	1000.00	0.00
11 Jun-05	166.70	172.70	6.00	166.70	0.00	172.70	0.00	0.00	64.00
12 Out-1Pipe - (13) (1) (1)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	16.80
13 Out-1Pipe - (9)	161.01	171.00	9.99	161.01	0.00	0.00	-171.00	0.00	20.00
14 Structure - (11)	167.68	171.00	3.32	167.68	0.00	168.62	-2.38	0.00	20.00
15 Structure - (12)	161.54	171.00	9.46	161.54	0.00	162.48	-8.52	0.00	26.00
16 Structure - (15)	164.88	171.00	6.12	164.88	0.00	165.82	-5.18	0.00	26.00
17 Structure - (18)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	20.00
18 Structure - (20)	168.25	171.00	2.75	168.25	0.00	168.25	-2.75	0.00	23.00
19 Structure - (22)	168.25	171.00	2.75	168.25	0.00	171.00	0.00	0.00	4.40

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	0.74	0.00	164.48	0.68	0.00	5.65	164.18	0.38	0 12:10	0 00:00	0.00	0.00
2 DMH(10)	1.18	1.18	163.03	1.03	0.00	2.37	162.64	0.64	0 12:10	0 00:00	0.00	0.00
3 DMH(3)	0.86	0.00	164.26	0.51	0.00	5.56	163.95	0.20	0 12:10	0 00:00	0.00	0.00
4 DMH(4)	1.82	0.00	163.95	0.65	0.00	6.29	163.52	0.22	0 12:10	0 00:00	0.00	0.00
5 DMH(5)	2.09	0.00	163.42	0.72	0.00	6.42	162.94	0.24	0 12:10	0 00:00	0.00	0.00
6 DMH(6)	2.30	0.00	163.21	0.66	0.00	10.29	162.79	0.24	0 12:10	0 00:00	0.00	0.00
7 DMH(8)	3.45	0.00	162.75	0.80	0.00	5.31	162.21	0.26	0 12:11	0 00:00	0.00	0.00
8 Jun-01	0.06	0.00	167.64	0.64	0.00	6.36	167.40	0.40	0 14:36	0 00:00	0.00	0.00
9 Jun-02	0.00	0.00	168.30	0.00	0.00	6.60	168.30	0.00	0 00:00	0 00:00	0.00	0.00
10 Jun-03	0.06	0.00	168.46	0.16	0.00	5.84	168.40	0.10	0 14:35	0 00:00	0.00	0.00
11 Jun-05	0.06	0.00	166.93	0.23	0.00	5.77	166.83	0.13	0 14:40	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	0.13	0.00	169.24	0.74	0.00	1.76	168.62	0.12	0 12:22	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	0.00	0.00	161.01	0.00	0.00	9.99	161.01	0.00	0 00:00	0 00:00	0.00	0.00
14 Structure - (11)	0.00	0.00	167.68	0.00	0.00	3.32	167.68	0.00	0 00:00	0 00:00	0.00	0.00
15 Structure - (12)	0.29	0.29	168.21	6.67	0.00	2.79	167.22	5.68	0 12:10	0 00:00	0.00	0.00
16 Structure - (15)	0.29	0.29	168.21	3.33	0.00	2.79	167.74	2.86	0 12:10	0 00:00	0.00	0.00
17 Structure - (18)	0.04	0.00	169.24	0.74	0.00	1.76	168.62	0.12	0 12:21	0 00:00	0.00	0.00
18 Structure - (20)	0.30	0.29	169.24	0.99	0.00	1.76	168.49	0.24	0 12:21	0 00:00	0.00	0.00
19 Structure - (22)	0.30	0.29	169.24	0.99	0.00	1.76	168.49	0.24	0 12:21	0 00:00	0.00	0.00

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1 Link-01	32.20	166.00	0.00	165.75	3.20	0.25	0.7800	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
2 Link-02	38.96	170.30	2.05	166.00	2.00	4.30	11.0400	CIRCULAR	3.960	3.960	0.0150	0.5000	0.5000	0.0000	0.00	No
3 Link-03	31.15	169.10	0.60	168.00	5.45	1.10	3.5300	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
4 Link-04	35.30	170.00	1.00	168.50	3.14	1.50	4.2500	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
5 Link-05	216.63	167.50	0.50	166.70	0.00	0.80	0.3700	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
6 Link-06	163.00	169.00	0.70	168.35	0.05	0.65	0.4000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
7 Link-07	55.66	164.00	0.20	163.80	0.05	0.20	0.3600	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
8 Link-08	85.00	168.35	0.05	167.50	0.50	0.85	1.0000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
9 Link-11	100.00	166.70	0.00	166.64	0.00	0.06	0.0600	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
10 Pipe - (10)	30.11	168.00	6.46	167.00	1.64	1.00	3.3200	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
11 Pipe - (11)	30.51	168.00	3.12	167.00	1.64	1.00	3.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
12 Pipe - (13)	54.74	168.50	0.00	168.25	0.00	0.25	0.4600	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
13 Pipe - (13) (1)	45.20	168.25	0.00	168.25	0.00	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
14 Pipe - (13) (1) (1)	50.87	168.50	0.25	168.25	-0.25	0.25	0.4900	CIRCULAR	9.960	9.960	0.0120	0.5000	0.5000	0.0000	0.00	No
15 Pipe - (14)	12.24	168.25	0.00	168.00	0.30	0.25	2.0400	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
16 Pipe - (15)	10.98	168.25	0.00	168.00	0.30	0.25	2.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
17 Pipe - (18)	18.00	164.50	0.00	164.00	0.20	0.50	2.7800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
18 Pipe - (20)	18.71	164.00	0.00	163.65	0.35	0.35	1.8700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
19 Pipe - (21)	28.88	164.00	0.00	163.20	0.50	0.80	2.7700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
20 Pipe - (3)	38.84	163.75	0.00	163.65	0.35	0.10	0.2600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
21 Pipe - (3) (2)	100.57	163.30	0.00	162.95	0.25	0.35	0.3500	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
22 Pipe - (3) (2) (1)	49.46	162.70	0.00	162.55	0.00	0.15	0.3000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
23 Pipe - (4)	172.11	162.55	0.00	162.00	0.05	0.55	0.3200	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
24 Pipe - (4) (1)	68.77	161.95	0.00	161.60	0.00	0.35	0.5100	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25 Pipe - (5)	6.17	163.85	0.00	163.80	0.05	0.05	0.8100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
26 Pipe - (6)	249.75	162.00	0.05	162.50	0.50	-0.50	-0.2000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
27 Pipe - (7)	108.19	165.00	-2.70	163.65	0.35	1.35	1.2500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
28 Pipe - (8)	34.98	168.50	0.82	168.00	3.12	0.50	1.4300	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
29 Pipe - (8) (1)	41.80	168.00	3.12	168.00	6.46	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
30 Pipe - (9)	52.56	168.50	7.49	168.00	6.46	0.50	0.9500	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No

[illegible]

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-01	0.10	0 12:10	2.72	0.04	1.64	0.33	0.13	0.14	0.00		Calculated
2 Link-02	0.00	0 00:00	2.19	0.00	0.00		0.00	0.00	0.00		Calculated
3 Link-03	0.13	0 12:22	0.91	0.15	3.22	0.16	0.13	0.26	0.00		Calculated
4 Link-04	0.56	0 12:19	2.00	0.28	4.19	0.14	0.19	0.37	0.00		Calculated
5 Link-05	0.06	0 14:36	0.64	0.09	1.06	3.41	0.19	0.28	0.00		Calculated
6 Link-06	0.00	0 00:00	0.66	0.00	0.00		0.05	0.08	0.00		Calculated
7 Link-07	0.74	0 12:10	1.85	0.40	2.03	0.46	0.47	0.47	0.00		Calculated
8 Link-08	0.06	0 14:35	1.05	0.06	1.35	1.05	0.12	0.18	0.00		Calculated
9 Link-11	0.06	0 14:40	0.47	0.13	0.83	2.01	0.17	0.26	0.00		Calculated
10 Pipe - (10)	0.29	0 12:10	0.89	0.33	3.83	0.13	0.20	0.41	0.00		Calculated
11 Pipe - (11)	0.29	0 12:10	0.88	0.33	3.81	0.13	0.20	0.41	0.00		Calculated
12 Pipe - (13)	0.04	0 12:06	1.28	0.03	0.25	3.65	0.78	0.94	0.00		Calculated
13 Pipe - (13) (1)	0.06	0 12:21	0.85	0.08	0.12	6.28	0.83	1.00	39.00		SURCHARGED
14 Pipe - (13) (1) (1)	0.13	0 12:21	1.06	0.13	0.74	1.15	0.73	0.88	0.00		Calculated
15 Pipe - (14)	0.21	0 12:10	0.70	0.31	1.39	0.15	0.50	1.00	97.00		SURCHARGED
16 Pipe - (15)	0.22	0 12:09	0.73	0.30	1.46	0.13	0.50	1.00	97.00		SURCHARGED
17 Pipe - (18)	0.48	0 12:10	6.43	0.07	2.10	0.14	0.33	0.33	0.00		Calculated
18 Pipe - (20)	0.27	0 12:10	5.28	0.05	2.82	0.11	0.23	0.23	0.00		Calculated
19 Pipe - (21)	0.28	0 12:10	6.42	0.04	3.75	0.13	0.18	0.18	0.00		Calculated
20 Pipe - (3)	0.86	0 12:10	1.96	0.44	2.52	0.26	0.45	0.45	0.00		Calculated
21 Pipe - (3) (2)	1.82	0 12:10	4.13	0.44	3.18	0.53	0.59	0.47	0.00		Calculated
22 Pipe - (3) (2) (1)	2.09	0 12:10	6.27	0.33	2.64	0.31	0.69	0.46	0.00		Calculated
23 Pipe - (4)	2.29	0 12:11	6.43	0.36	2.81	1.02	0.70	0.47	0.00		Calculated
24 Pipe - (4) (1)	3.43	0 12:11	8.12	0.42	3.95	0.29	0.73	0.49	0.00		Calculated
25 Pipe - (5)	0.13	0 12:10	3.48	0.04	0.69	0.15	0.43	0.44	0.00		Calculated
26 Pipe - (6)	1.17	0 12:10	3.13	0.37	1.94	2.15	0.64	0.51	0.00		Calculated
27 Pipe - (7)	0.70	0 12:10	7.47	0.09	5.40	0.33	0.25	0.25	0.00		Calculated
28 Pipe - (8)	0.00	0 00:00	2.27	0.00	0.00		0.11	0.13	0.00		Calculated
29 Pipe - (8) (1)	0.00	0 12:05	0.85	0.00	0.14	4.98	0.21	0.25	0.00		Calculated
30 Pipe - (9)	0.00	0 00:00	1.85	0.00	0.00		0.11	0.13	0.00		Calculated

Inlet Input

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	5.00	164.50	0.00	0.00	0.00
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	2.55	163.85	0.00	200.00	0.00
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	3.00	164.00	-2.00	200.00	0.00
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	6.50	164.00	0.00	0.00	0.00
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	8.59	164.00	0.00	0.00	0.00
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	4.26	167.70	0.00	0.00	0.00

Roadway & Gutter Input

SN Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1 CB(1)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2 CB(2)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3 Inlet-04	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4 Structure - (29)	N/A	0.0200	0.0160	0.0620	2.00	0.0657	7.00
5 Structure - (31)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6 Structure - (9)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN Element ID	Peak Flow	Peak Lateral Inflow	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1 CB(1)	0.48	0.48	N/A	N/A	N/A	0.00	169.52	0.02	0 12:10	0.00	0.00
2 CB(2)	0.13	0.13	N/A	N/A	N/A	0.00	166.41	0.01	0 12:10	0.00	0.00
3 Inlet-04	0.11	0.11	N/A	N/A	N/A	0.00	169.01	0.01	0 12:10	0.00	0.00
4 Structure - (29)	0.27	0.27	N/A	N/A	N/A	0.00	170.51	0.01	0 12:05	0.00	0.00
5 Structure - (31)	0.28	0.28	N/A	N/A	N/A	0.00	172.61	0.01	0 12:05	0.00	0.00
6 Structure - (9)	0.70	0.70	N/A	N/A	N/A	0.00	172.00	0.04	0 12:10	0.00	0.00

Storage Nodes

Storage Node : Basin4

Input Data

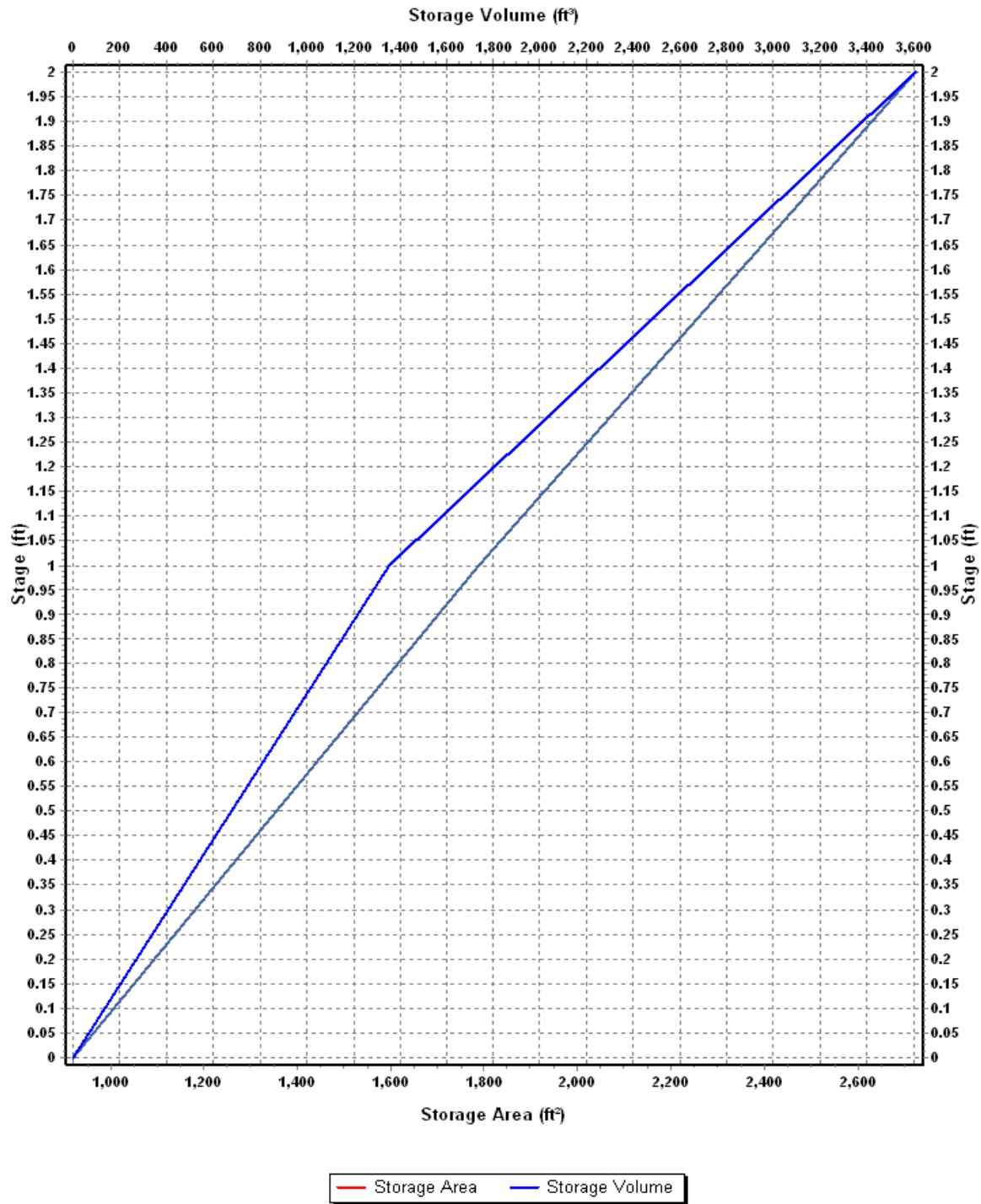
Invert Elevation (ft)	169.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-169.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-01

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	920	0.000
1	1787	1353.50
2	2722	3608.00

Storage Area Volume Curves



Storage Node : Basin4 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Trapezoidal	No	172.00	3.00	2.00	0.50	3.33
2 Weir-03	Rectangular	No	172.50	3.50	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-02	Side	CIRCULAR	No	1.00			170.25
2 Orifice-03	Side	CIRCULAR	No	2.00			171.80

Output Summary Results

Peak Inflow (cfs)	1.08
Peak Lateral Inflow (cfs)	1.08
Peak Outflow (cfs)	0.56
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	170.19
Max HGL Depth Attained (ft)	1.19
Average HGL Elevation Attained (ft)	169.74
Average HGL Depth Attained (ft)	0.74
Time of Max HGL Occurrence (days hh:mm)	0 12:19
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Basin5

Input Data

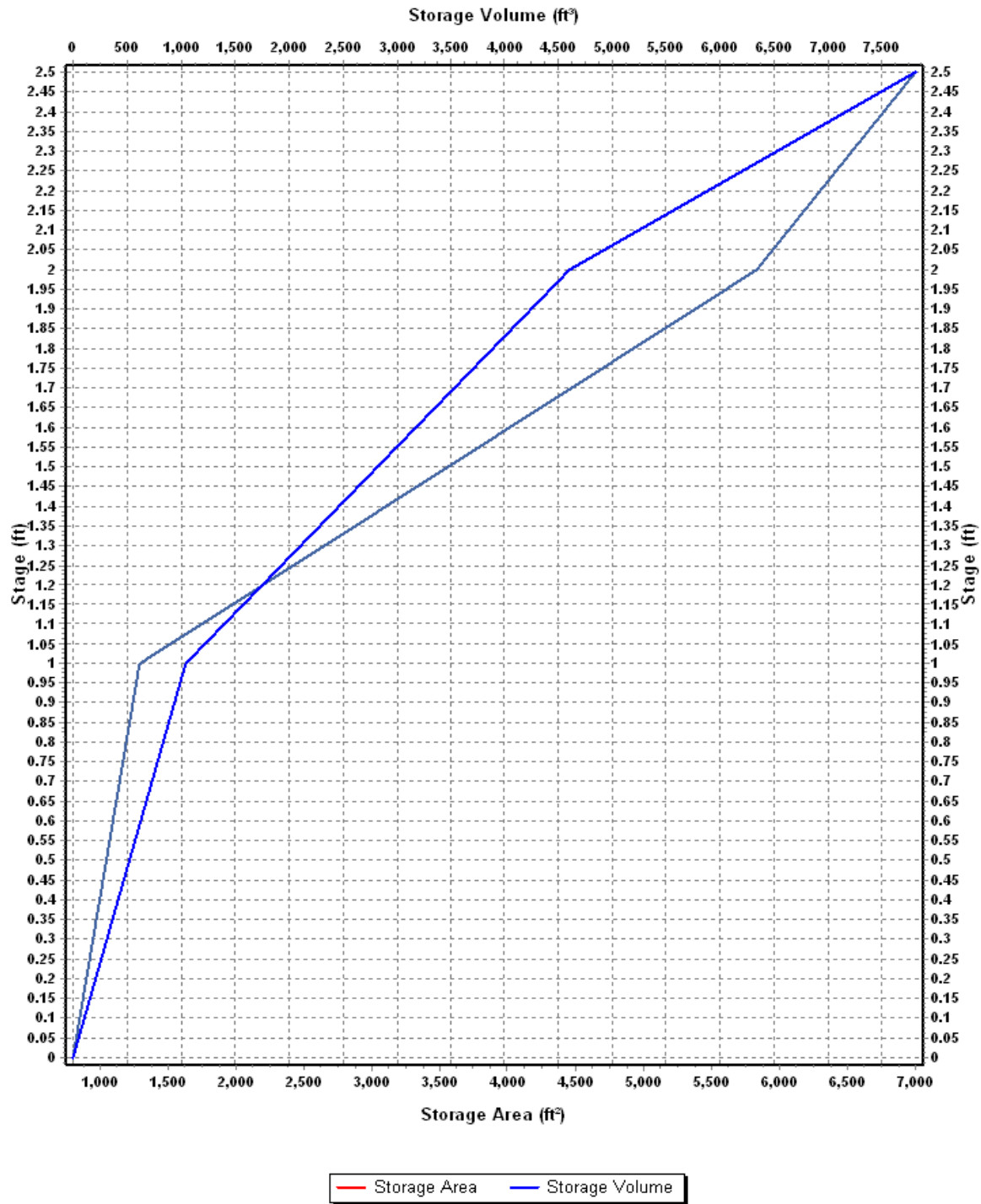
Invert Elevation (ft)	170.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	2.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-170.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-11

Stage	Storage Area	Storage Volume
(ft)	(ft²)	(ft³)
0	801.21	0.000
1	1286.66	1043.94
2	5828.53	4601.54
2.5	7000	7808.67

Storage Area Volume Curves



Storage Node : Basin5 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Trapezoidal	No	172.00	2.00	2.00	0.50	3.33
2 Weir-04	Rectangular	No	171.85	1.85	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-01	Side	CIRCULAR	No	1.25			171.25
2 Orifice-04	Side	CIRCULAR	No	1.25			170.55

Output Summary Results

Peak Inflow (cfs)	1.01
Peak Lateral Inflow (cfs)	1.01
Peak Outflow (cfs)	0.06
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	171.51
Max HGL Depth Attained (ft)	1.51
Average HGL Elevation Attained (ft)	170.96
Average HGL Depth Attained (ft)	0.96
Time of Max HGL Occurrence (days hh:mm)	0 14:33
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Stor-06

Input Data

Invert Elevation (ft)	167.70
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-167.70
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

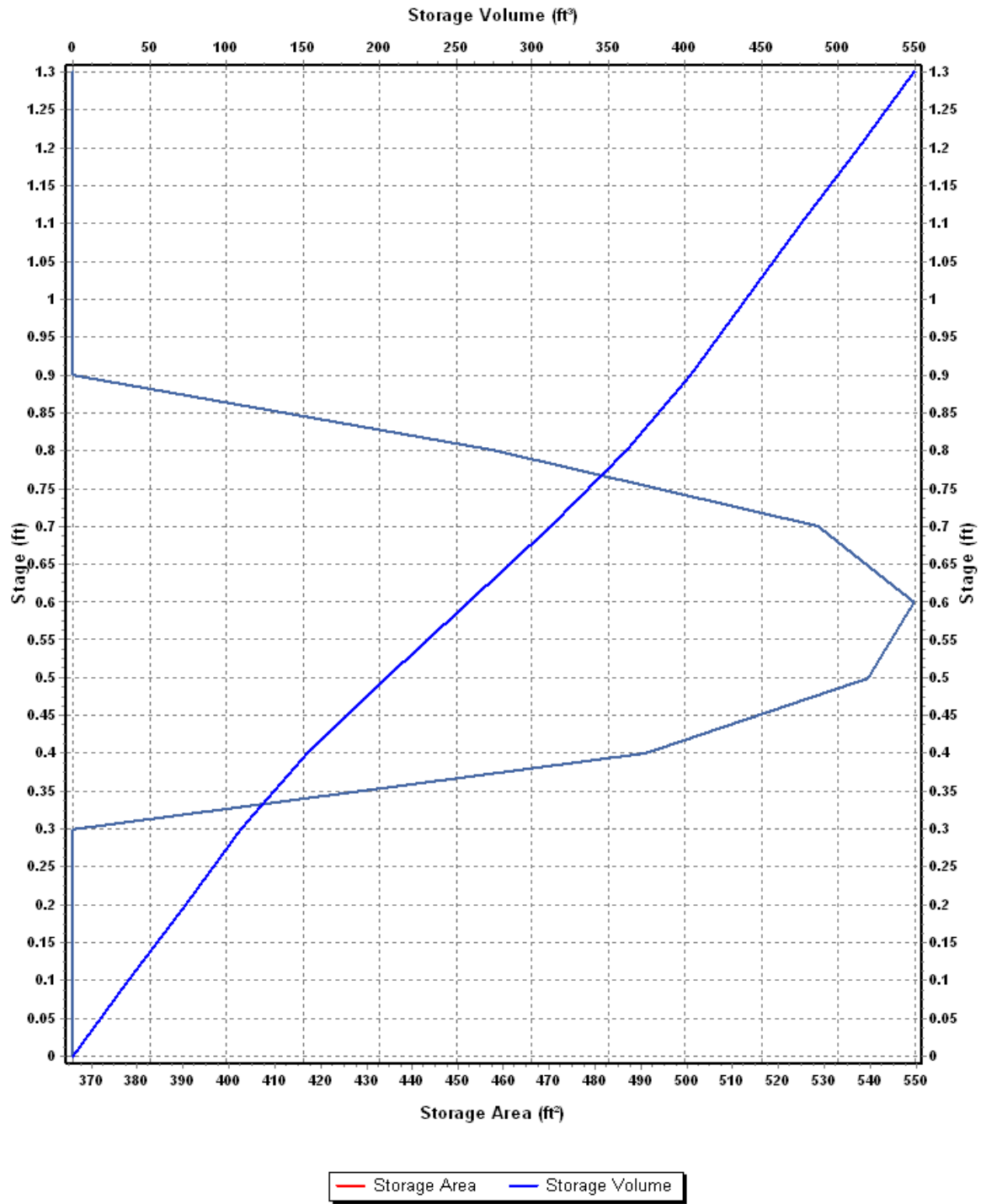
Exfiltration Rate (in/hr)	1.0200
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Storage Area Volume Curves

Storage Curve : Storage-08

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	366.0000	0.000
0.1	366.0000	36.60
0.2	366.0000	73.20
0.3	366.0000	109.80
0.4	491.0282	152.65
0.5	539.3827	204.17
0.6	549.4909	258.61
0.7	528.6472	312.52
0.8	457.7450	361.84
0.9	366.0000	403.03
1	366.0000	439.63
1.1	366.0000	476.23
1.2	366.0000	512.83
1.3	366.0000	549.43

Storage Area Volume Curves



Storage Node : Stor-06 (continued)

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-05	Side	CIRCULAR	No	2.00			168.00

Output Summary Results

Peak Inflow (cfs)	0.43
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.12
Peak Exfiltration Flow Rate (cfm)	0.79
Max HGL Elevation Attained (ft)	169.23
Max HGL Depth Attained (ft)	1.53
Average HGL Elevation Attained (ft)	168.30
Average HGL Depth Attained (ft)	0.6
Time of Max HGL Occurrence (days hh:mm)	0 12:22
Total Exfiltration Volume (1000-ft ³)	0.728
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61

Storage Node : Stor-07

Input Data

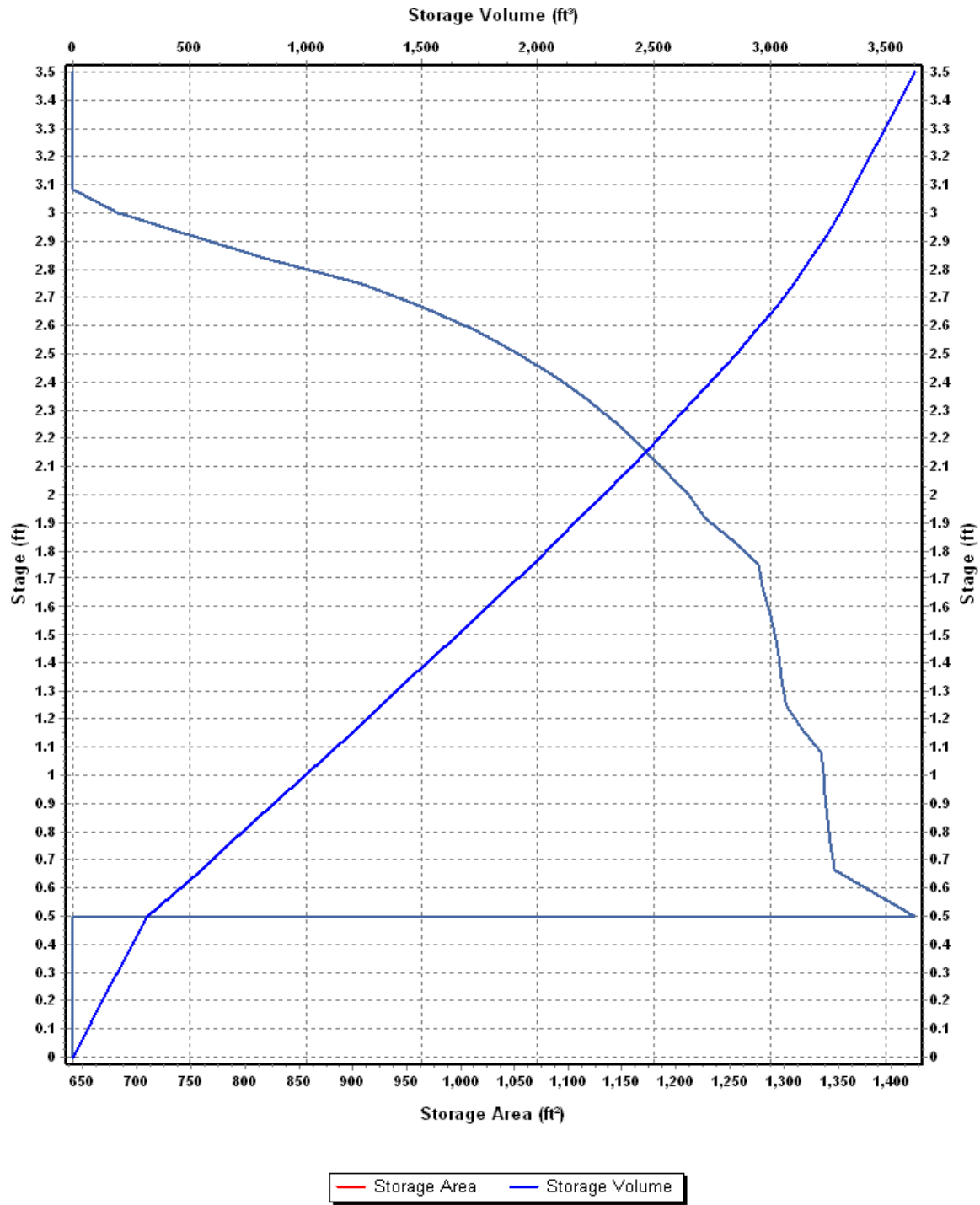
Invert Elevation (ft)	165.36
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	5.64
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-165.36
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-07

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0.000	640.8000	0.000
0.083	640.8000	53.19
0.167	640.8000	107.02
0.250	640.8000	160.21
0.333	640.8000	213.40
0.417	640.8000	267.23
0.500	640.800	320.42
0.501	1420.9200	321.45
0.667	1347.1200	551.20
0.750	1342.8000	662.83
0.833	1340.6400	774.19
0.917	1338.4800	886.71
1.000	1336.3200	997.71
1.083	1334.1600	1108.53
1.167	1316.8800	1219.87
1.250	1301.7600	1328.54
1.333	1297.4400	1436.41
1.417	1295.2800	1545.30
1.500	1290.9600	1652.63
1.583	1286.6400	1759.60
1.667	1280.1600	1867.41
1.750	1275.8400	1973.48
1.833	1252.0800	2078.39
1.917	1226.1600	2182.48
2.000	1211.0400	2283.62
2.083	1189.4400	2383.24
2.167	1167.8400	2482.25
2.250	1144.0800	2578.19
2.333	1118.1600	2672.07
2.417	1087.9200	2764.73
2.500	1053.3600	2853.59
2.583	1014.4800	2939.41
2.667	964.8000	3022.54
2.750	908.6400	3100.29
2.833	822.2400	3172.12
2.917	750.9600	3238.19
3.000	681.8400	3297.65
3.083	640.8000	3352.54
3.167	640.8000	3406.37
3.250	640.8000	3459.56
3.333	640.8000	3512.75
3.417	640.8000	3566.58
3.500	640.8000	3619.77

Storage Area Volume Curves



Storage Node : Stor-07 (continued)

Output Summary Results

Peak Inflow (cfs)	0.89
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.39
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	166.36
Max HGL Depth Attained (ft)	1
Average HGL Elevation Attained (ft)	165.65
Average HGL Depth Attained (ft)	0.29
Time of Max HGL Occurrence (days hh:mm)	0 12:39
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name Proposed stormwater.SPF
 Description J:\2016\16-006\DWG\Siteplan.dwg

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method SCS TR-20
 Time of Concentration (TOC) Method SCS TR-55
 Link Routing Method Hydrodynamic
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On Feb 16, 2016 00:00:00
 End Analysis On Feb 17, 2016 00:00:00
 Start Reporting On Feb 16, 2016 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

Qty
 Rain Gages 2
 Subbasins 15
 Nodes 35
 Junctions 19
 Outfalls 6
 Flow Diversions 0
 Inlets 6
 Storage Nodes 4
 Links 40
 Channels 0
 Pipes 30
 Pumps 0
 Orifices 6
 Weirs 4
 Outlets 0
 Pollutants 0
 Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	10 Year	Intensity	inches	Massachusetts	Plymouth	10	4.70	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate Factor	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ft ²)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	1/2Roof	18080.01	484.00	98.00	4.70	4.46	1.85	1.64	0 00:05:00
2	1/8Roof	4520.00	484.00	98.00	4.70	4.46	0.46	0.40	0 00:05:00
3	1/8Roof-2	4520.00	484.00	98.00	4.70	4.46	0.46	0.40	0 00:05:00
4	1/8Roof-3	4520.00	484.00	98.00	4.70	4.46	0.46	0.40	0 00:05:00
5	1/8Roof-4	4520.00	0.00	98.00	4.70	4.46	0.46	0.40	0 00:05:00
6	Post-06	18885.00	484.00	89.60	4.70	3.55	1.54	1.53	0 00:05:00
7	Post-1A	7754.99	484.00	94.53	4.70	4.07	0.72	0.68	0 00:05:00
8	Post-1B	2348.01	484.00	92.57	4.70	3.84	0.21	0.19	0 00:05:00
9	Post-1C	4143.99	484.00	96.30	4.70	4.26	0.41	0.37	0 00:05:00
10	Post-1D	4344.02	484.00	96.71	4.70	4.31	0.43	0.40	0 00:05:00
11	Post7A	10845.00	484.00	97.57	4.70	4.41	1.10	0.98	0 00:05:00
12	Post7B	19698.01	484.00	90.20	4.70	3.61	1.63	1.62	0 00:05:00
13	PRE-08	1080.98	484.00	73.00	4.70	1.96	0.05	0.04	0 00:16:04
14	Pre-1	85389.01	484.00	94.21	4.70	4.04	7.91	6.43	0 00:14:48
15	Sub-09	3079.00	484.00	79.00	4.70	2.54	0.18	0.19	0 00:05:00

Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	Junction	163.80	170.13	163.80	170.13	0.00	1.07	164.61	0.00	5.52	0 00:00	0.00	0.00
2 DMH(10)	Junction	162.00	165.40	162.00	165.40	0.00	1.64	163.20	0.00	2.20	0 00:00	0.00	0.00
3 DMH(3)	Junction	163.75	169.82	163.75	169.82	0.00	1.25	164.38	0.00	5.44	0 00:00	0.00	0.00
4 DMH(4)	Junction	163.30	170.24	163.30	170.24	0.00	2.59	164.11	0.00	6.12	0 00:00	0.00	0.00
5 DMH(5)	Junction	162.70	169.84	162.70	169.84	0.00	2.96	163.63	0.00	6.21	0 00:00	0.00	0.00
6 DMH(6)	Junction	162.55	173.51	162.55	173.51	0.00	3.65	163.46	0.00	10.05	0 00:00	0.00	0.00
7 DMH(8)	Junction	161.95	168.06	161.95	168.06	0.00	5.19	163.01	0.00	5.05	0 00:00	0.00	0.00
8 Jun-01	Junction	167.00	174.00	0.00	0.00	0.00	0.08	167.66	0.00	6.34	0 00:00	0.00	0.00
9 Jun-02	Junction	168.30	174.90	168.30	174.90	0.00	0.00	168.52	0.00	6.38	0 00:00	0.00	0.00
10 Jun-03	Junction	168.30	174.30	168.30	174.30	1000.00	0.08	168.47	0.00	5.83	0 00:00	0.00	0.00
11 Jun-05	Junction	166.70	172.70	166.70	172.70	0.00	0.08	166.96	0.00	5.74	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	Junction	168.50	171.00	168.50	171.00	0.00	0.47	169.38	0.00	1.62	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	Junction	161.01	171.00	161.01	0.00	0.00	0.00	161.01	0.00	9.99	0 00:00	0.00	0.00
14 Structure - (11)	Junction	167.68	171.00	167.68	168.62	0.00	0.00	167.68	0.00	3.32	0 00:00	0.00	0.00
15 Structure - (12)	Junction	161.54	171.00	161.54	162.48	0.00	0.40	168.26	0.00	2.74	0 00:00	0.00	0.00
16 Structure - (15)	Junction	164.88	171.00	164.88	165.82	0.00	0.40	168.26	0.00	2.74	0 00:00	0.00	0.00
17 Structure - (18)	Junction	168.50	171.00	168.50	171.00	0.00	0.06	169.42	0.00	1.58	0 00:00	0.00	0.00
18 Structure - (20)	Junction	168.25	171.00	168.25	168.25	0.00	0.40	169.42	0.00	1.58	0 00:00	0.00	0.00
19 Structure - (22)	Junction	168.25	171.00	168.25	171.00	0.00	0.59	169.41	0.00	1.59	0 00:00	0.00	0.00
20 Basin4out	Outfall	170.00					0.00	170.00					
21 Basin5out	Outfall	170.00					0.00	170.00					
22 Out-Post1-DP	Outfall	161.60					5.15	162.47					
23 Out-Pre-1	Outfall	163.20					6.42	163.20					
24 Post5A	Outfall	166.64					0.08	166.77					
25 Post8	Outfall	172.00					0.04	172.00					
26 Basin4	Storage Node	169.00	172.50	0.00		0.00	1.60	170.32				0.00	0.00
27 Basin5	Storage Node	170.00	172.50	0.00		0.00	1.52	171.83				0.00	0.00
28 Stor-06	Storage Node	167.70	171.00	0.00		0.00	0.60	169.41				0.00	0.00
29 Stor-07	Storage Node	165.36	171.00	0.00		0.00	2.02	167.37				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)
1 Link-01	Pipe	Inlet-04	DMH(6)	32.20	166.00	165.75	0.7800	12.000	0.0150	0.18	2.72	0.07	1.89	0.18
2 Link-02	Pipe	Structure - (22)	Structure - (31)	38.96	170.30	166.00	11.0400	4.000	0.0150	0.00	2.19	0.00	0.00	0.00
3 Link-03	Pipe	Out-1Pipe - (13) (1) (1)	DMH(6)	31.15	169.10	168.00	3.5300	6.000	0.0150	0.47	0.91	0.52	4.40	0.27
4 Link-04	Pipe	Basin4	Stor-07	35.30	170.00	168.50	4.2500	6.000	0.0150	1.29	2.00	0.64	5.07	0.31
5 Link-05	Pipe	Jun-01	Jun-05	216.63	167.50	166.70	0.3700	8.000	0.0150	0.08	0.64	0.12	0.93	0.21
6 Link-06	Pipe	Jun-02	Jun-03	163.00	169.00	168.35	0.4000	8.000	0.0150	0.00	0.66	0.00	0.00	0.06
7 Link-07	Pipe	DMH(1)	DMH(3)	55.66	164.00	163.80	0.3600	12.000	0.0150	1.07	1.85	0.58	2.18	0.59
8 Link-08	Pipe	Jun-03	Jun-01	85.00	168.35	167.50	1.0000	8.000	0.0150	0.08	1.05	0.07	1.45	0.14
9 Link-11	Pipe	Jun-05	Post5A	100.00	166.70	166.64	0.0600	8.000	0.0150	0.08	0.47	0.16	0.91	0.19
10 Pipe - (10)	Pipe	Structure - (12)	Stor-07	30.11	168.00	167.00	3.3200	6.000	0.0150	0.40	0.89	0.45	4.14	0.25
11 Pipe - (11)	Pipe	Structure - (15)	Stor-07	30.51	168.00	167.00	3.2800	6.000	0.0150	0.40	0.88	0.45	4.12	0.25
12 Pipe - (13)	Pipe	Structure - (18)	Structure - (20)	54.74	168.50	168.25	0.4600	10.000	0.0150	0.06	1.28	0.04	0.19	0.83
13 Pipe - (13) (1)	Pipe	Structure - (20)	Structure - (22)	45.20	168.25	168.25	0.0000	10.000	0.0150	0.21	0.85	0.25	0.39	0.83
14 Pipe - (13) (1) (1)	Pipe	Structure - (22)	Out-1Pipe - (13) (1) (1)	50.87	168.50	168.25	0.4900	10.000	0.0120	0.47	1.06	0.44	0.86	0.83
15 Pipe - (14)	Pipe	Structure - (20)	Stor-06	12.24	168.25	168.00	2.0400	6.000	0.0150	0.30	0.70	0.43	1.51	0.50
16 Pipe - (15)	Pipe	Structure - (22)	Stor-06	10.98	168.25	168.00	2.2800	6.000	0.0150	0.30	0.73	0.41	1.54	0.50
17 Pipe - (18)	Pipe	CB(1)	DMH(1)	18.00	164.50	164.00	2.7800	12.000	0.0120	0.68	6.43	0.11	2.28	0.42
18 Pipe - (20)	Pipe	Structure - (29)	DMH(4)	18.71	164.00	163.65	1.8700	12.000	0.0120	0.37	5.28	0.07	2.75	0.32
19 Pipe - (21)	Pipe	Structure - (31)	DMH(5)	28.88	164.00	163.20	2.7700	12.000	0.0120	0.40	6.42	0.06	3.72	0.30
20 Pipe - (3)	Pipe	DMH(3)	DMH(4)	38.84	163.75	163.65	0.2600	12.000	0.0120	1.25	1.96	0.64	2.81	0.55
21 Pipe - (3) (2)	Pipe	DMH(4)	DMH(5)	100.57	163.30	162.95	0.3500	15.000	0.0120	2.57	4.13	0.62	3.43	0.74
22 Pipe - (3) (2) (1)	Pipe	DMH(5)	DMH(6)	49.46	162.70	162.55	0.3000	18.000	0.0120	2.94	6.27	0.47	2.78	0.90
23 Pipe - (4)	Pipe	DMH(6)	DMH(8)	172.11	162.55	162.00	0.3200	18.000	0.0120	3.64	6.43	0.57	3.05	0.93
24 Pipe - (4) (1)	Pipe	DMH(8)	Out-Post1-DP	68.77	161.95	161.60	0.5100	18.000	0.0120	5.15	8.12	0.63	4.29	0.94
25 Pipe - (5)	Pipe	CB(2)	DMH(3)	6.17	163.85	163.80	0.8100	12.000	0.0120	0.19	3.48	0.05	0.85	0.55
26 Pipe - (6)	Pipe	DMH(8)	DMH(10)	249.75	162.00	162.50	-0.2000	15.000	0.0120	1.59	3.13	0.51	2.01	0.84
27 Pipe - (7)	Pipe	Structure - (9)	DMH(4)	108.19	165.00	163.65	1.2500	12.000	0.0120	0.98	7.47	0.13	5.21	0.35
28 Pipe - (8)	Pipe	Structure - (11)	Structure - (15)	34.98	168.50	168.00	1.4300	10.000	0.0150	0.00	2.27	0.00	0.00	0.13
29 Pipe - (8) (1)	Pipe	Structure - (15)	Structure - (12)	41.80	168.00	168.00	0.0000	10.000	0.0150	0.00	0.85	0.00	0.14	0.26
30 Pipe - (9)	Pipe	Out-1Pipe - (9)	Structure - (12)	52.56	168.50	168.00	0.9500	10.000	0.0150	0.00	1.85	0.00	0.00	0.13
31 Orifice-01	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.03				
32 Orifice-02	Orifice	Basin4	Jun-02		169.00	168.30		1.000		0.00				
33 Orifice-03	Orifice	Basin4	Jun-02		169.00	168.30		2.000		0.00				
34 Orifice-04	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.05				
35 Orifice-05	Orifice	Stor-06	DMH(6)		167.70	162.55		2.000		0.12				
36 Pipe - (12)	Orifice	DMH(1)	Stor-07		163.80	165.36		4.000		0.58				
37 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Weir	Basin4	Basin4out		169.00	170.00				0.00				
38 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Weir	Basin5	Basin5out		170.00	170.00				0.00				
39 Weir-03	Weir	Basin4	Jun-02		169.00	168.30				0.00				
40 Weir-04	Weir	Basin5	Jun-03		170.00	168.30				0.00				

Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition (min)	
0.18	0.00	Calculated
0.00	0.00	Calculated
0.54	0.00	Calculated
0.62	0.00	Calculated
0.31	0.00	Calculated
0.09	0.00	Calculated
0.60	0.00	Calculated
0.21	0.00	Calculated
0.29	0.00	Calculated
0.50	0.00	Calculated
0.50	0.00	Calculated
1.00	13.00	SURCHARGED
1.00	58.00	SURCHARGED
1.00	11.00	SURCHARGED
1.00	125.00	SURCHARGED
1.00	125.00	SURCHARGED
0.42	0.00	Calculated
0.32	0.00	Calculated
0.30	0.00	Calculated
0.55	0.00	Calculated
0.60	0.00	Calculated
0.61	0.00	Calculated
0.64	0.00	Calculated
0.64	0.00	Calculated
0.56	0.00	Calculated
0.68	0.00	Calculated
0.35	0.00	Calculated
0.16	0.00	Calculated
0.31	0.00	Calculated
0.16	0.00	Calculated

Inlet Summary

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation	Max (Rim) Elevation	Initial Water Elevation	Ponded Area	Peak Flow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Allowable Spread	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow
					(ft)	(ft)	(ft)	(ft²)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	164.50	0.00	0.68	N/A	N/A	N/A	7.00	0.00	169.53
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	163.85	200.00	0.19	N/A	N/A	N/A	7.00	0.00	166.41
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	164.00	200.00	0.18	N/A	N/A	N/A	7.00	0.00	169.01
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	164.00	0.00	0.37	N/A	N/A	N/A	7.00	0.00	170.52
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	164.00	0.00	0.40	N/A	N/A	N/A	7.00	0.00	172.61
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	167.70	0.00	0.98	N/A	N/A	N/A	7.00	0.00	172.02

Subbasin Hydrology

Subbasin : 1/2Roof

Input Data

Area (ft²) 18080.01
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

T_c = Time of Concentration (hr)
n = Manning's roughness
L_f = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (S_f^{0.5}) (unpaved surface)
V = 20.3282 * (S_f^{0.5}) (paved surface)
V = 15.0 * (S_f^{0.5}) (grassed waterway surface)
V = 10.0 * (S_f^{0.5}) (nearly bare & untilled surface)
V = 9.0 * (S_f^{0.5}) (cultivated straight rows surface)
V = 7.0 * (S_f^{0.5}) (short grass pasture surface)
V = 5.0 * (S_f^{0.5}) (woodland surface)
V = 2.5 * (S_f^{0.5}) (forest w/heavy litter surface)
T_c = (L_f / V) / (3600 sec/hr)

Where:

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n
R = A_q / W_p
T_c = (L_f / V) / (3600 sec/hr)

Where :

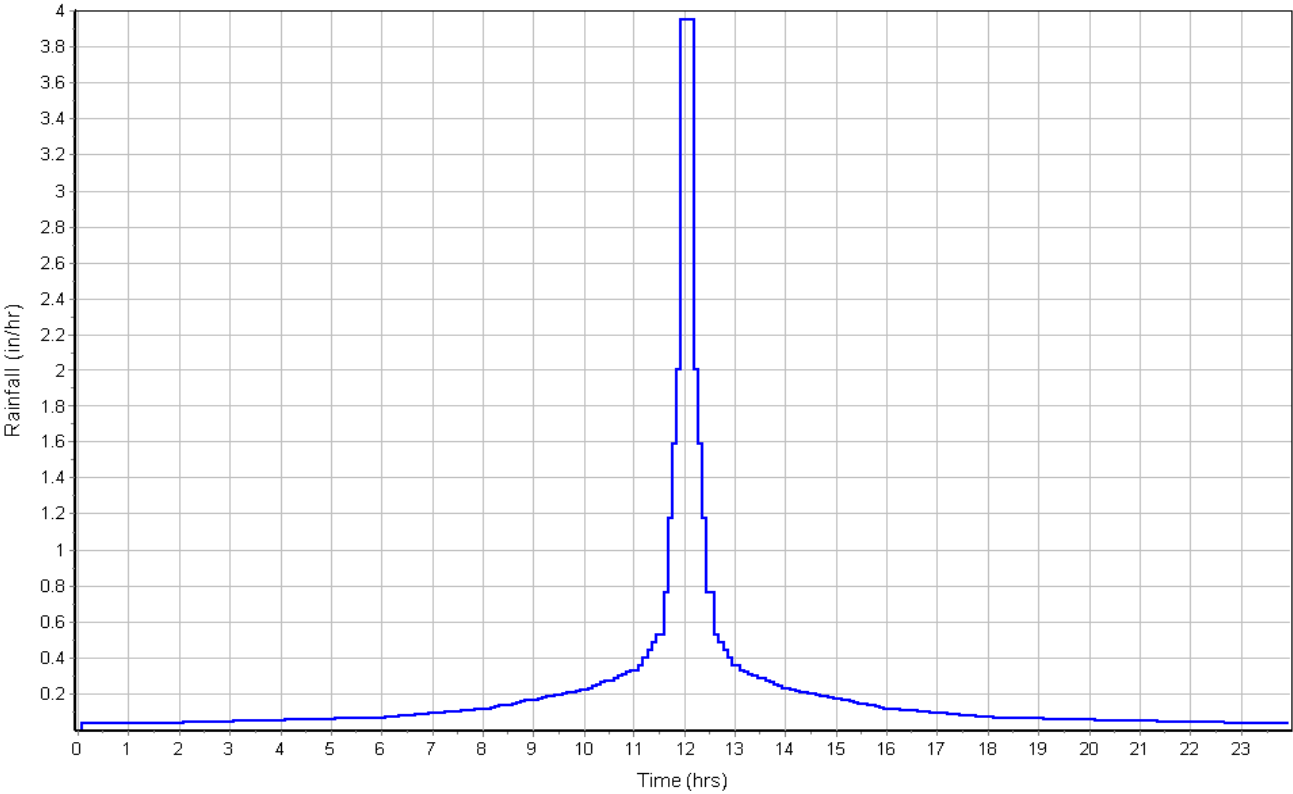
T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
R = Hydraulic Radius (ft)
A_q = Flow Area (ft²)
W_p = Wetted Perimeter (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5

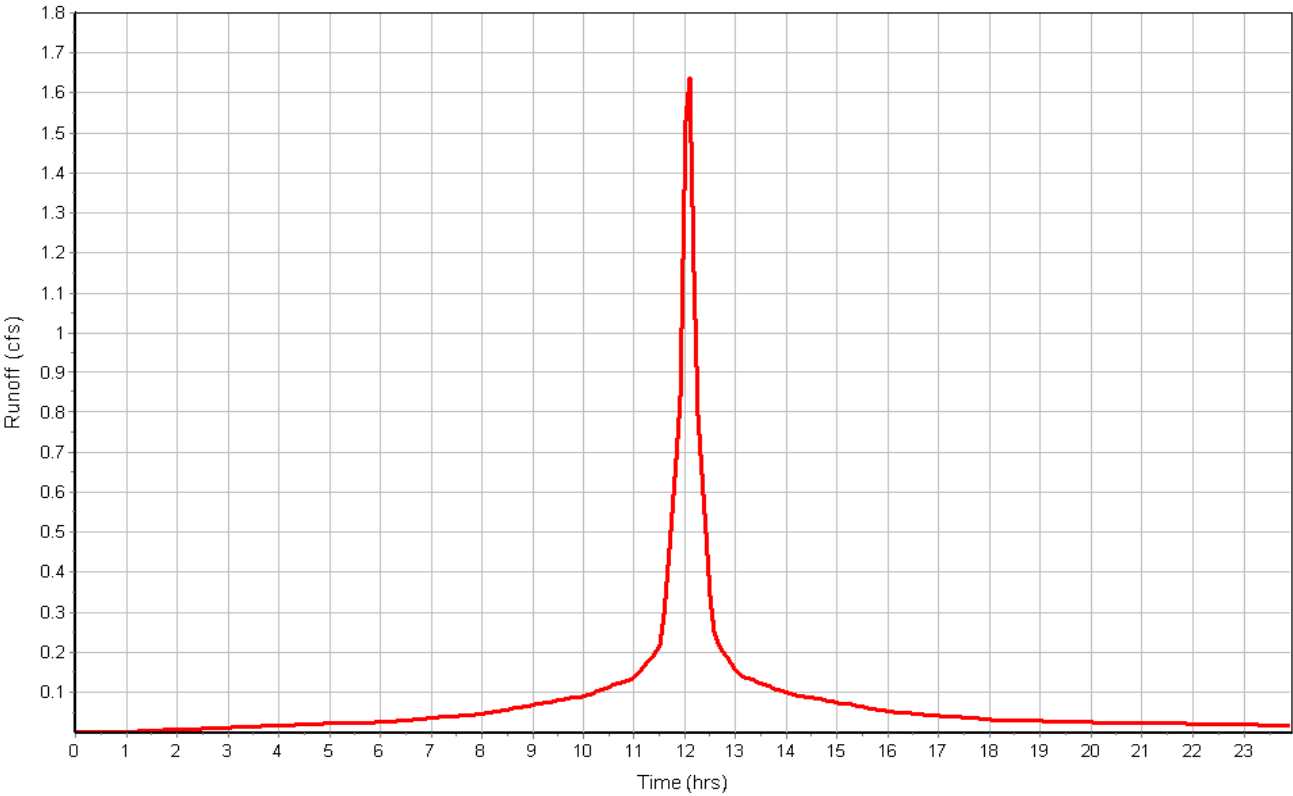
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.46
Peak Runoff (cfs) 1.64
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

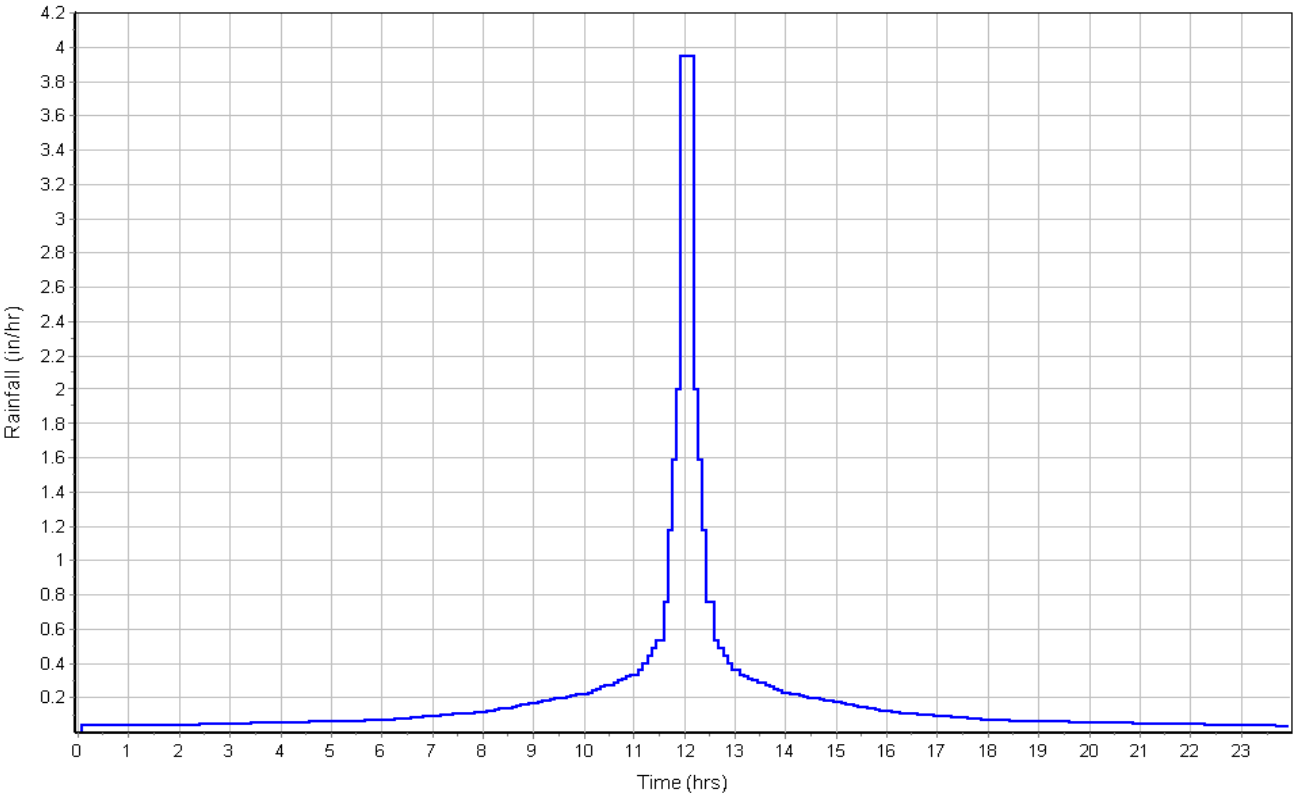
Time of Concentration

User-Defined TOC override (minutes): 5

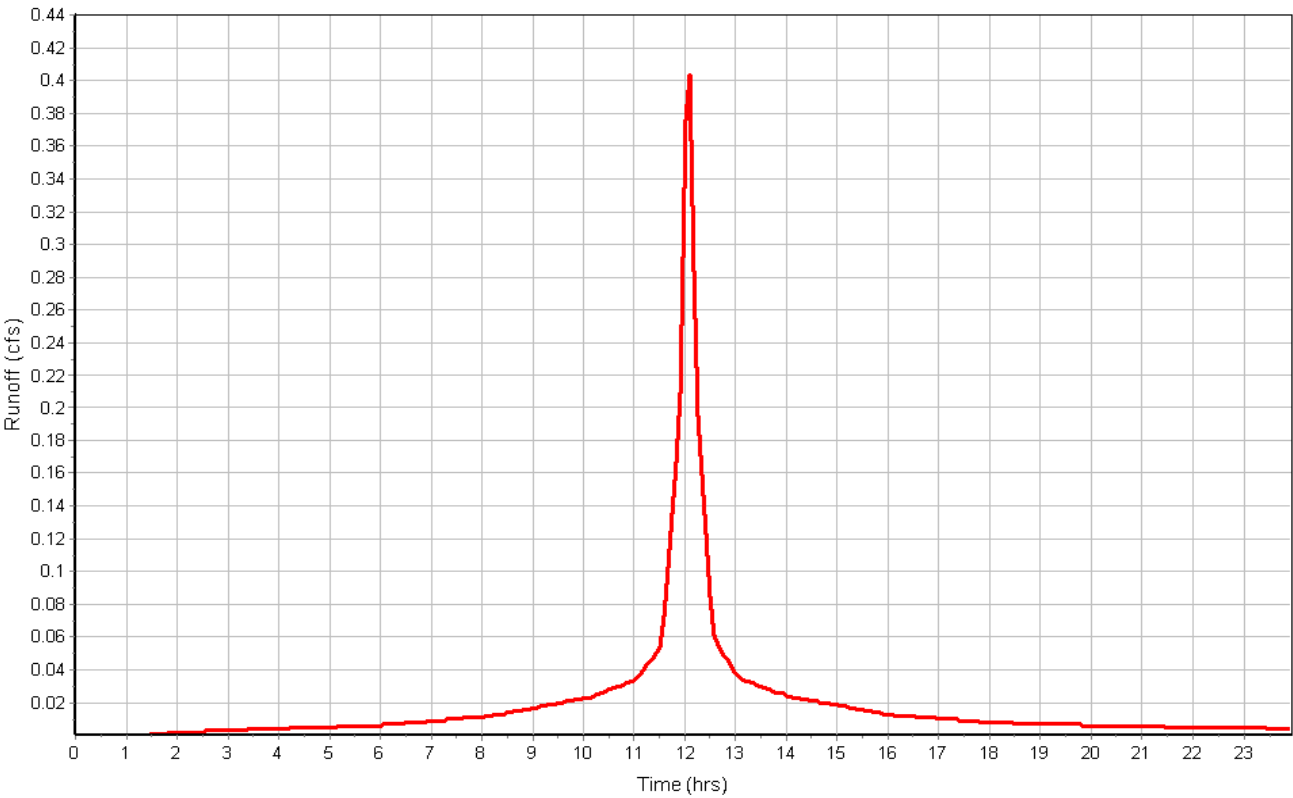
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.46
Peak Runoff (cfs) 0.40
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-2

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

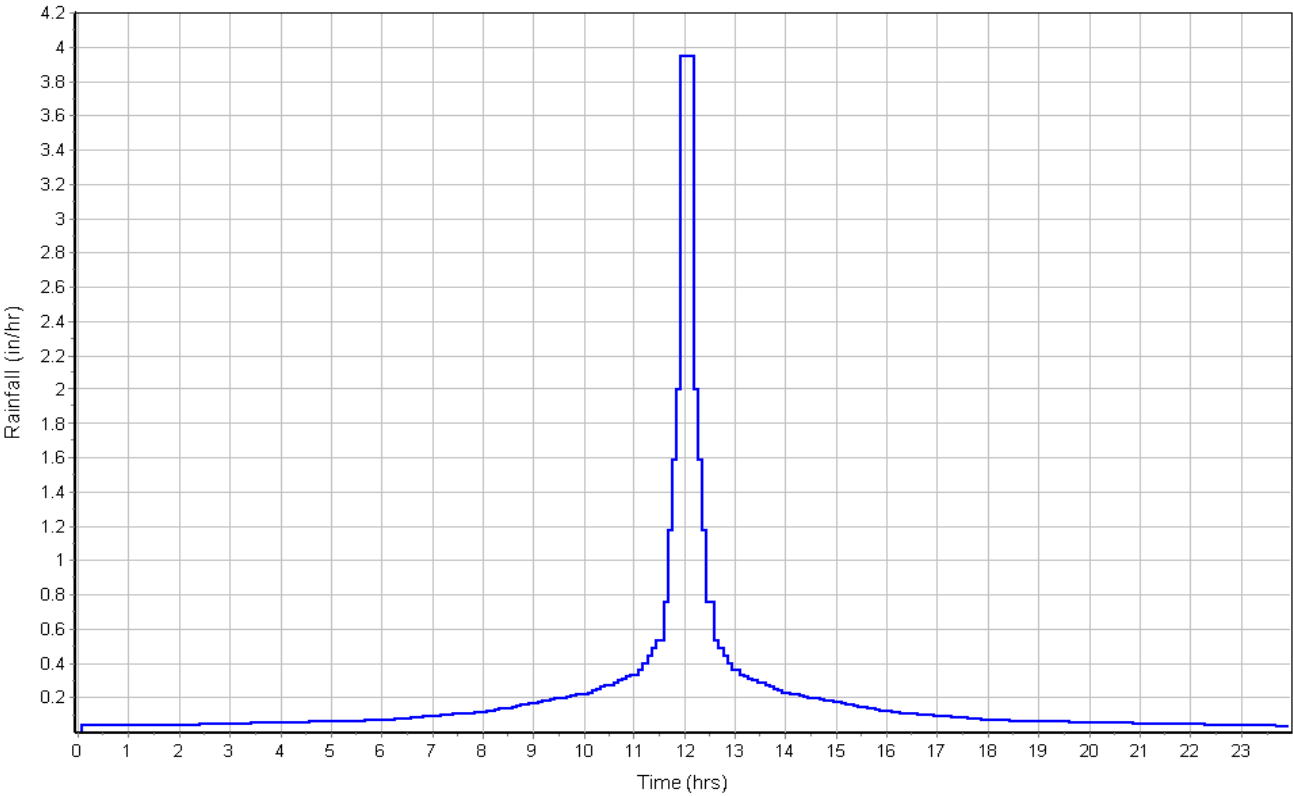
Time of Concentration

User-Defined TOC override (minutes): 5

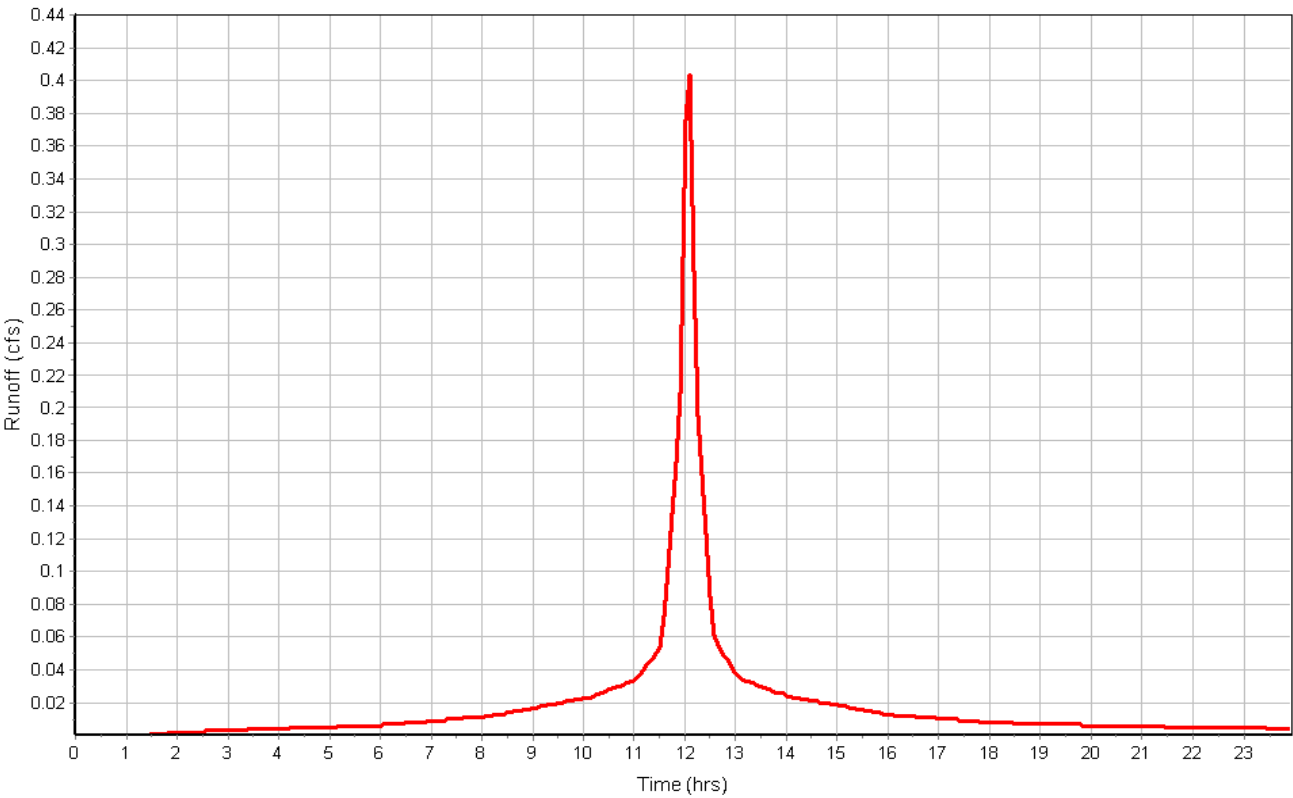
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.46
Peak Runoff (cfs) 0.40
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-3

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

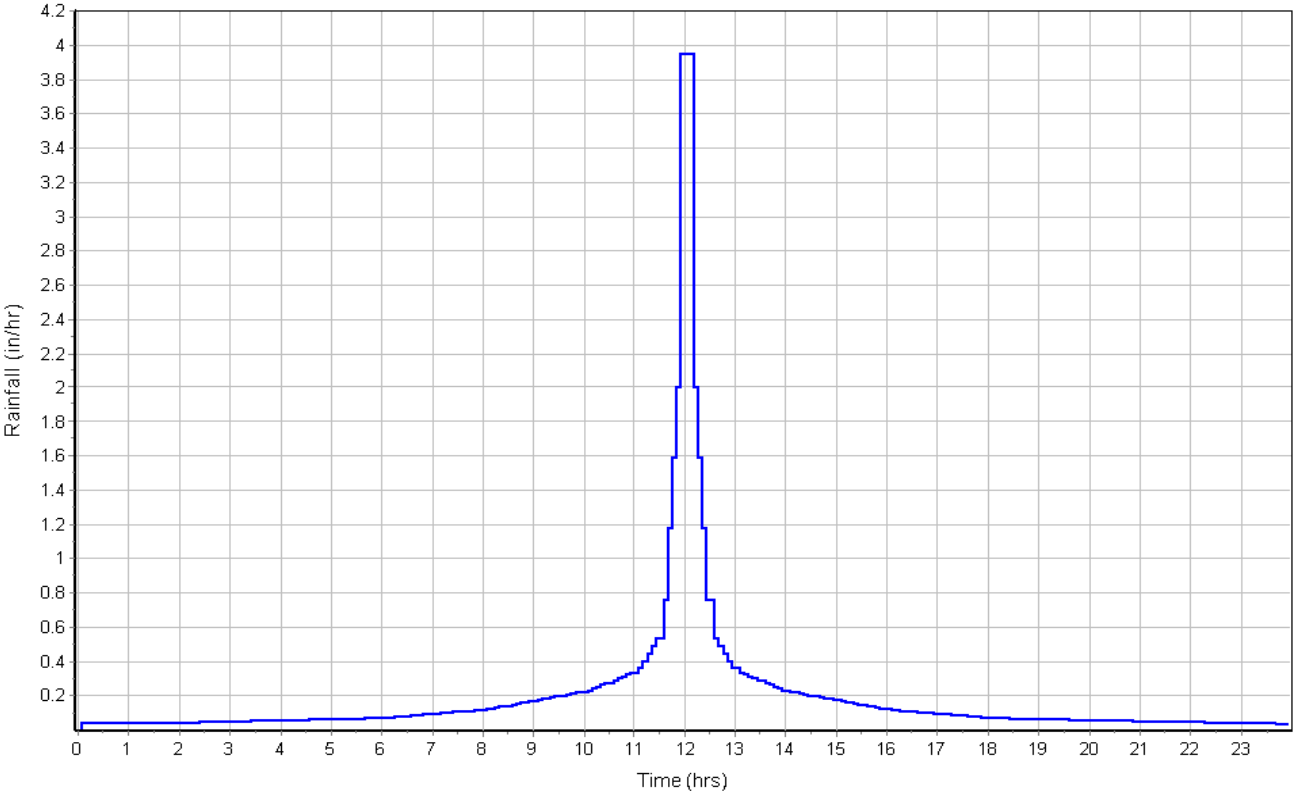
Time of Concentration

User-Defined TOC override (minutes): 5

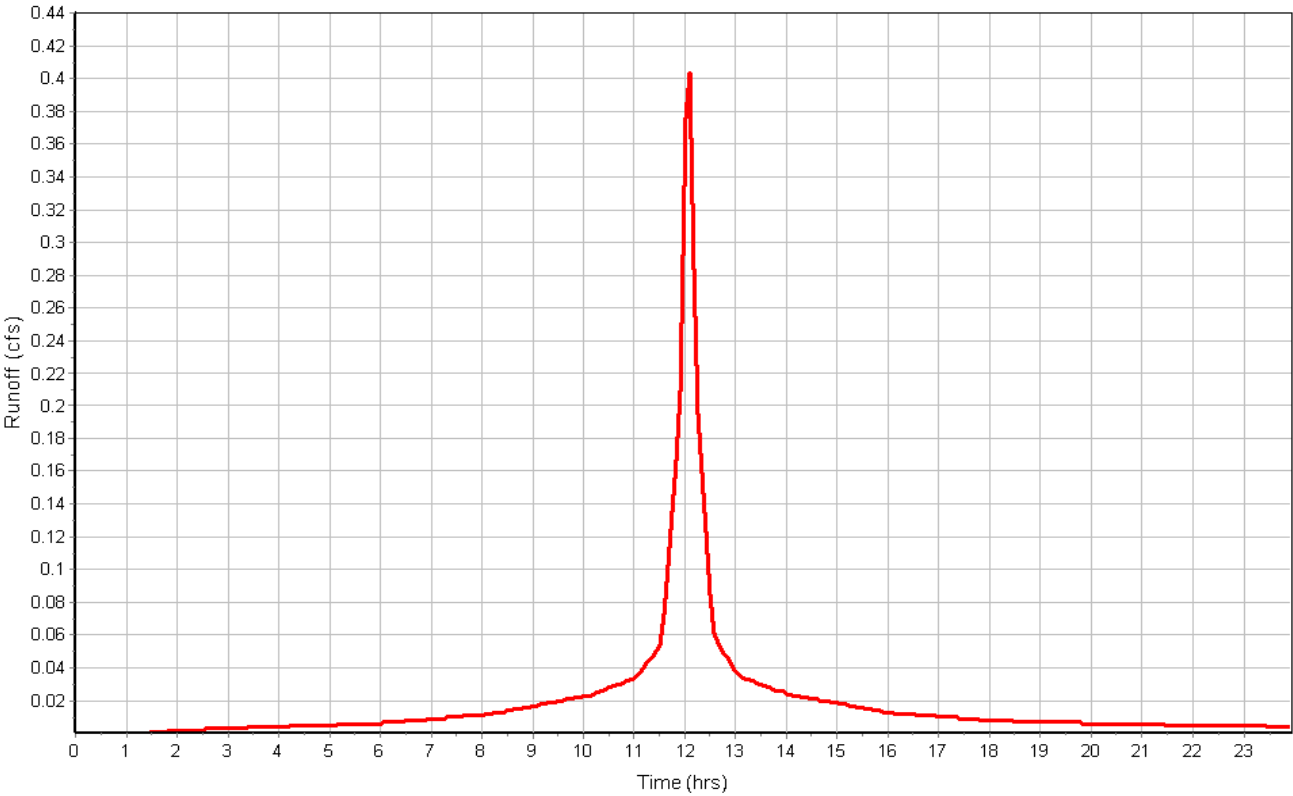
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.46
Peak Runoff (cfs) 0.40
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-4

Input Data

Area (ft²) 4520.00
Peak Rate Factor 0.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

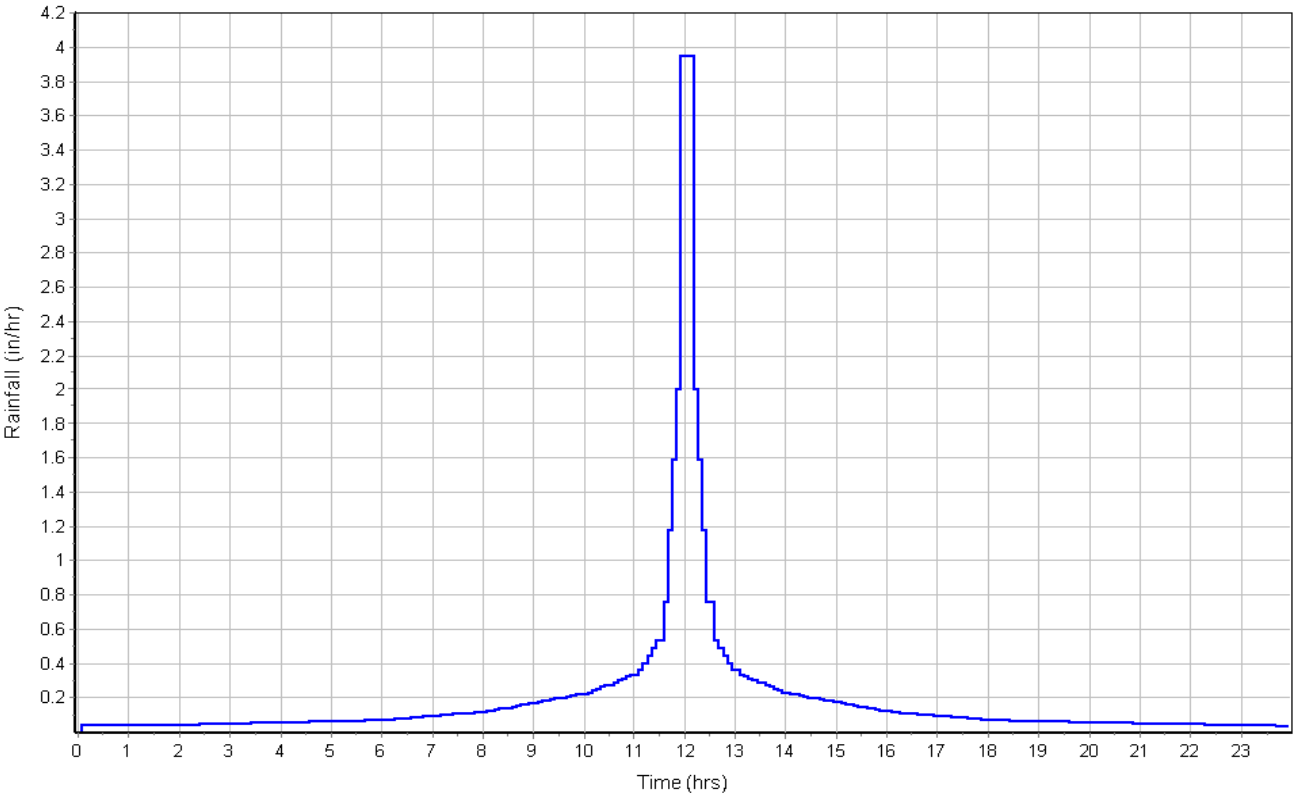
Time of Concentration

User-Defined TOC override (minutes): 5

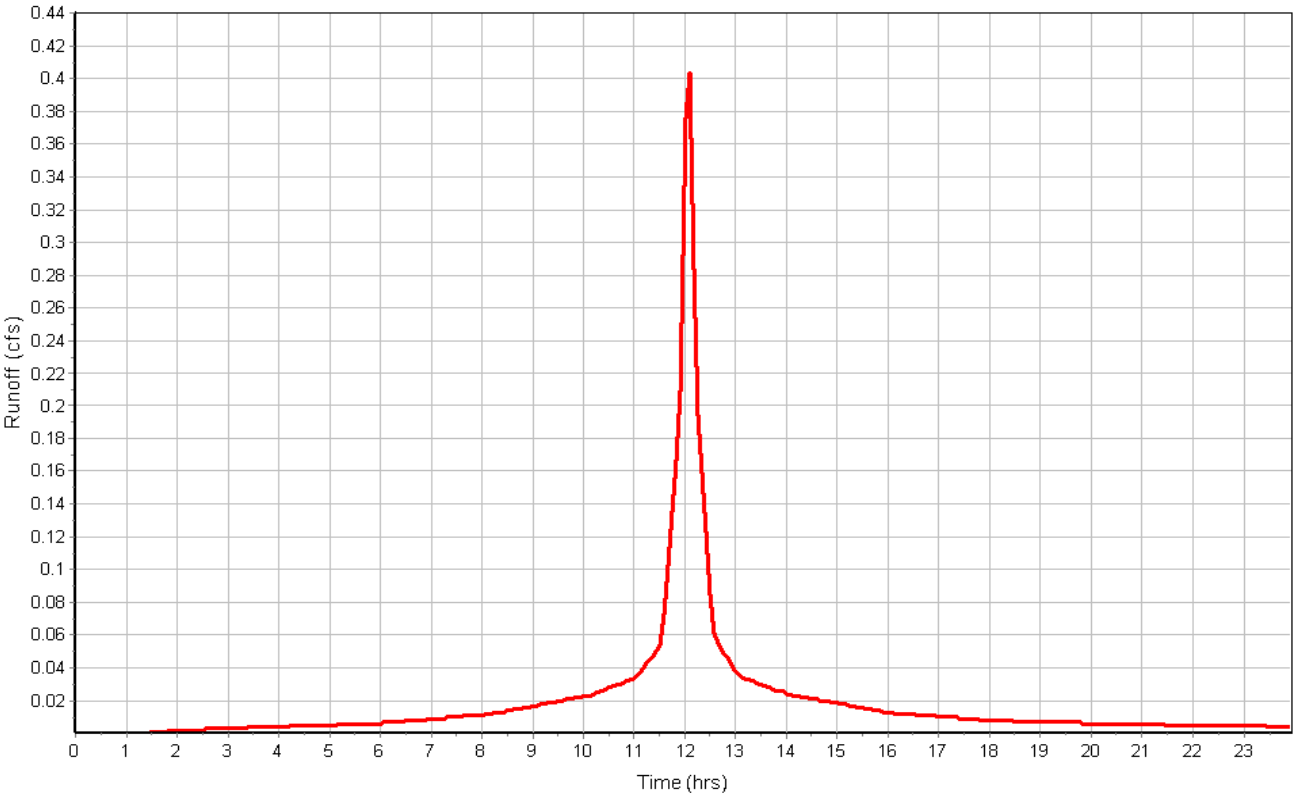
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.46
Peak Runoff (cfs) 0.40
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-06

Input Data

Area (ft²) 18885.00
Peak Rate Factor 484.00
Weighted Curve Number 89.60
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	11590.01	C	98.00
50 - 75% grass cover, Fair	3967.01	C	79.00
Woods, Fair	3327.98	C	73.00
Composite Area & Weighted CN	18885.00		89.60

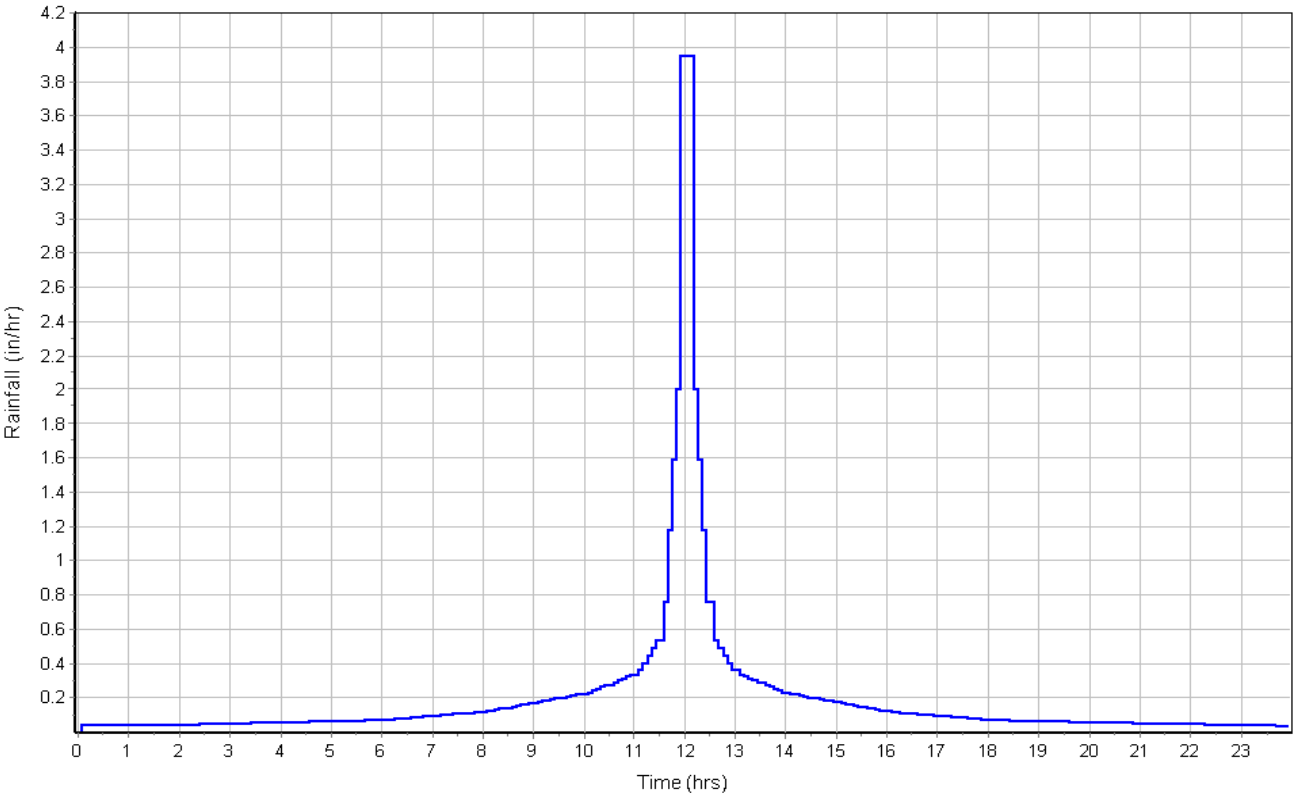
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	2	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	1.08	0.00	0.00
Computed Flow Time (min) :	0.77	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	153	0.00	0.00
Slope (%) :	1.5	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.49	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Total TOC (min)	1.80		

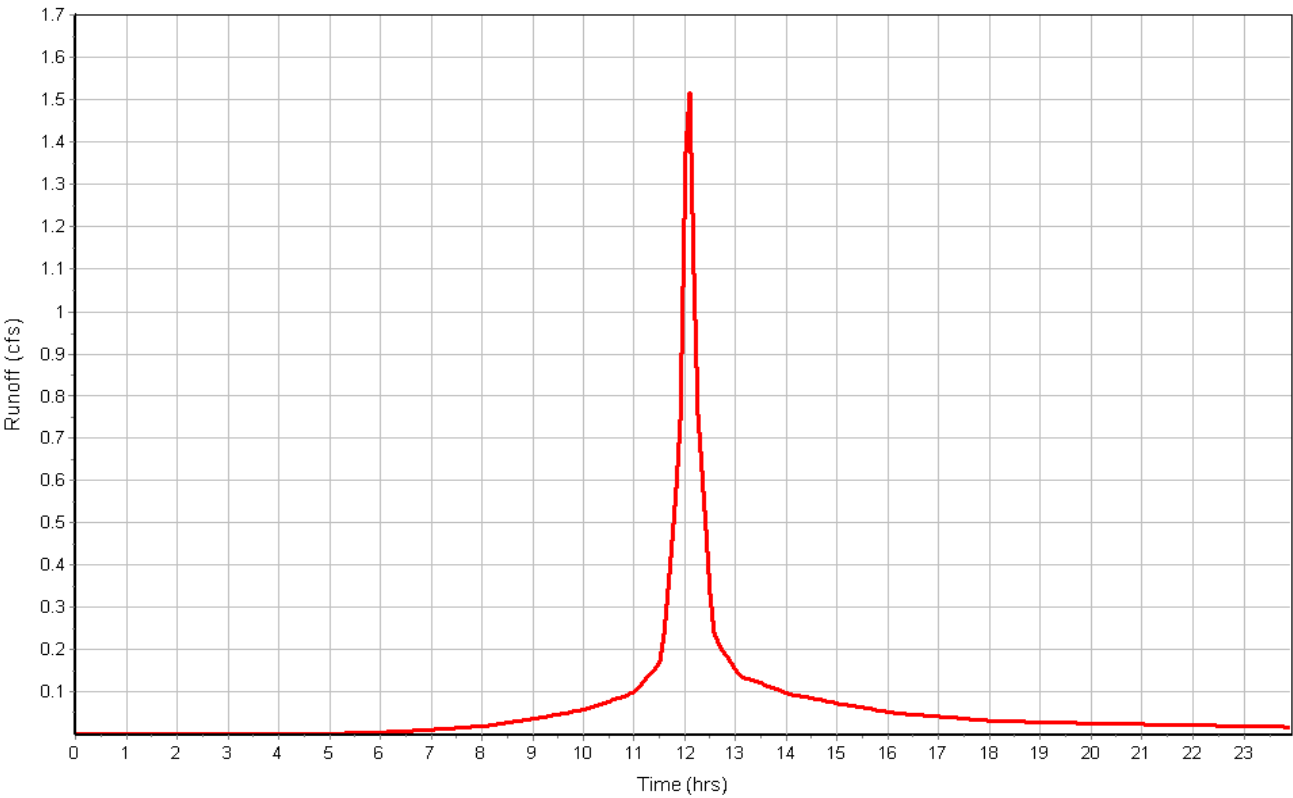
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 3.55
Peak Runoff (cfs) 1.53
Weighted Curve Number 89.60
Time of Concentration (days hh:mm:ss) 0 00:01:48

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1A

Input Data

Area (ft²) 7754.99
Peak Rate Factor 484.00
Weighted Curve Number 94.53
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	6337.02	C	98.00
50 - 75% grass cover, Fair	1418.01	C	79.00
Composite Area & Weighted CN	7755.03		94.53

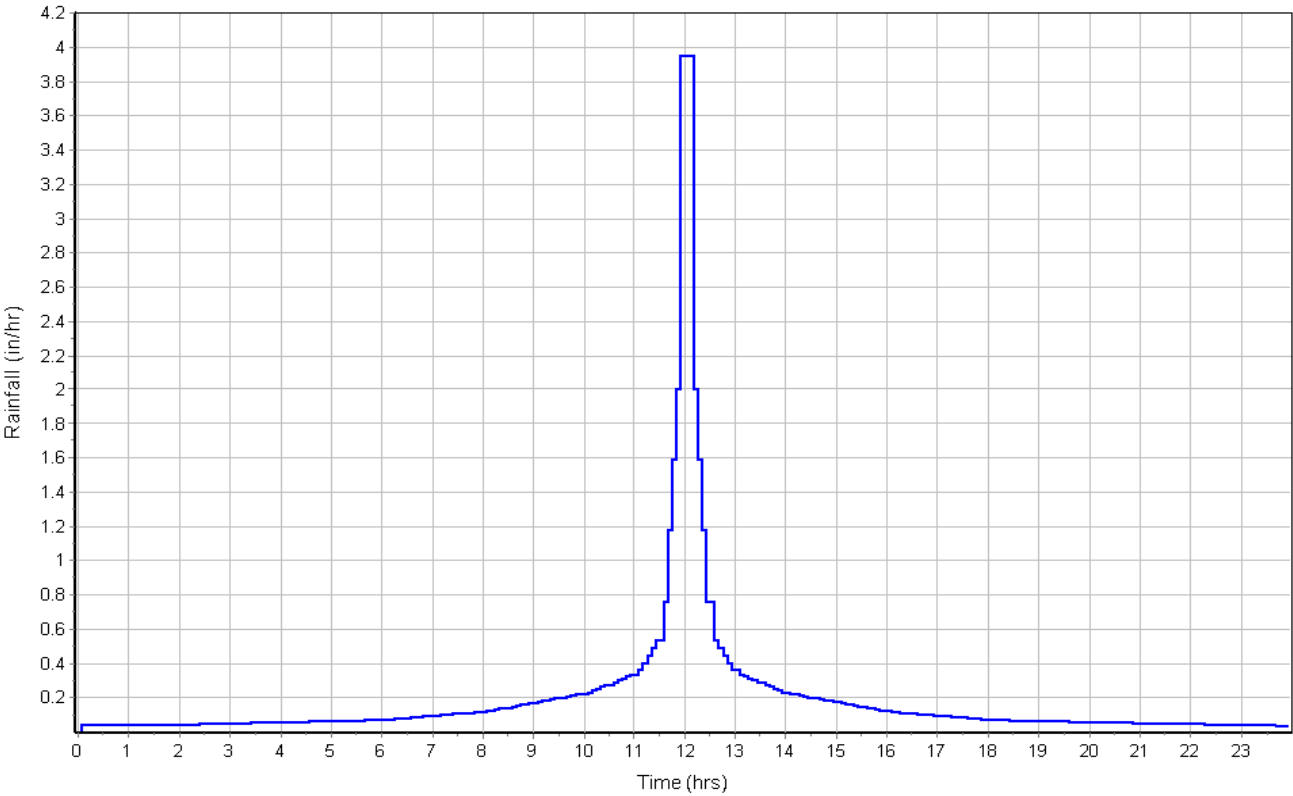
Time of Concentration

User-Defined TOC override (minutes): 5

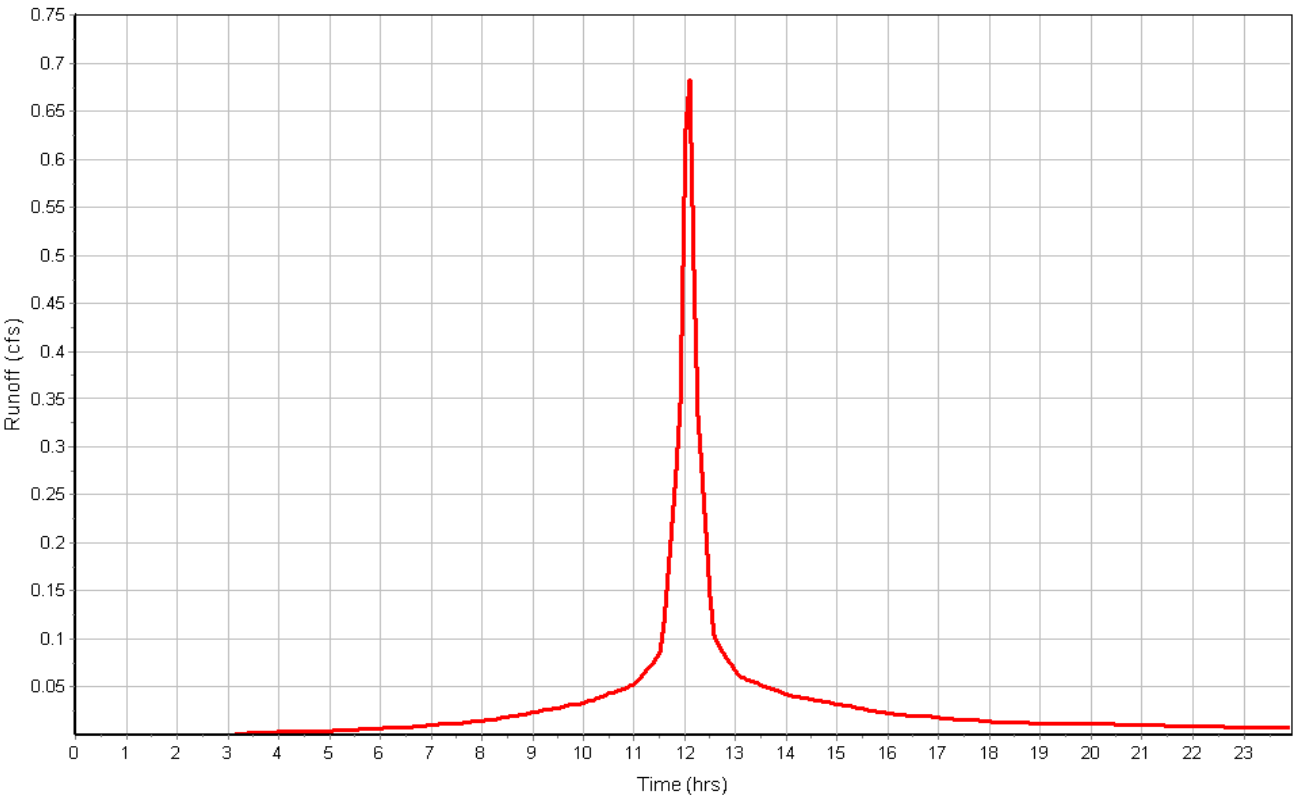
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.07
Peak Runoff (cfs) 0.68
Weighted Curve Number 94.53
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1B

Input Data

Area (ft²) 2348.01
Peak Rate Factor 484.00
Weighted Curve Number 92.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	1677.02	C	98.00
50 - 75% grass cover, Fair	671.00	C	79.00
Composite Area & Weighted CN	2348.02		92.57

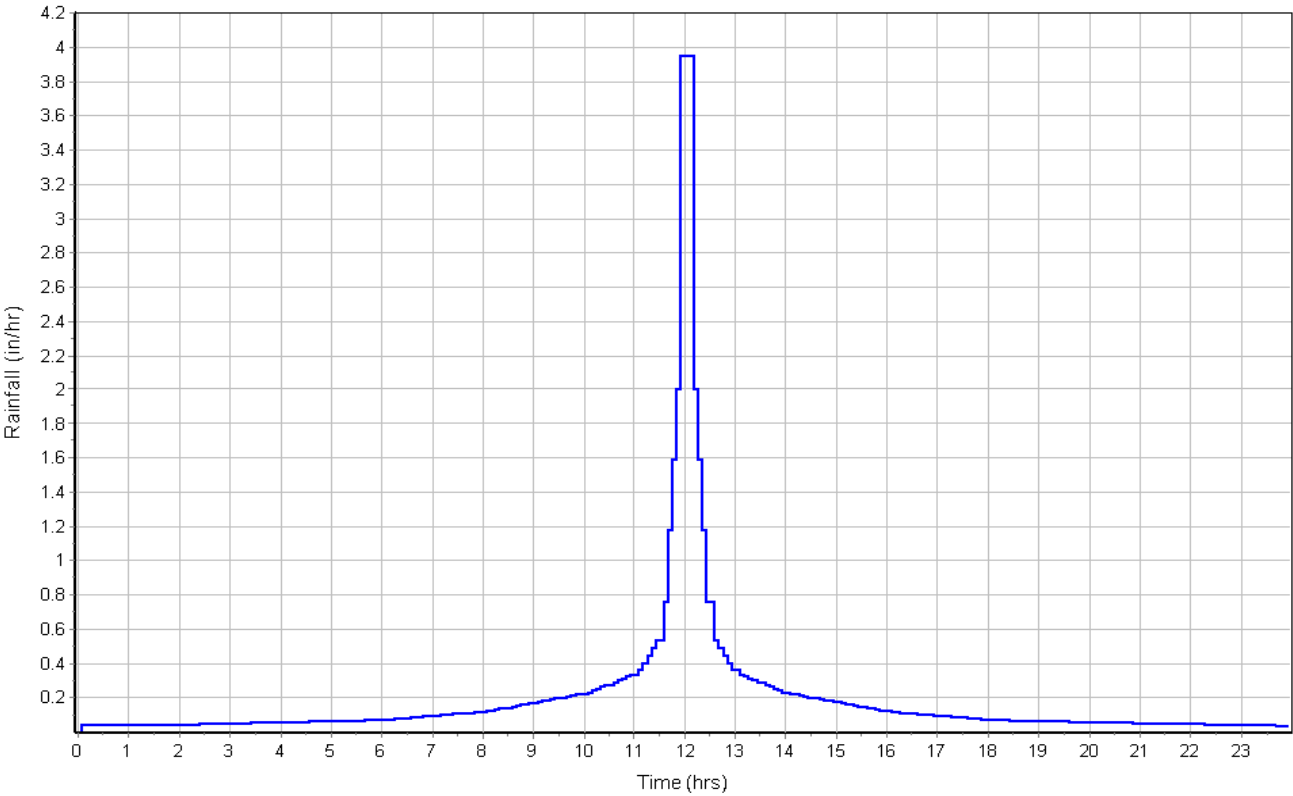
Time of Concentration

User-Defined TOC override (minutes): 5

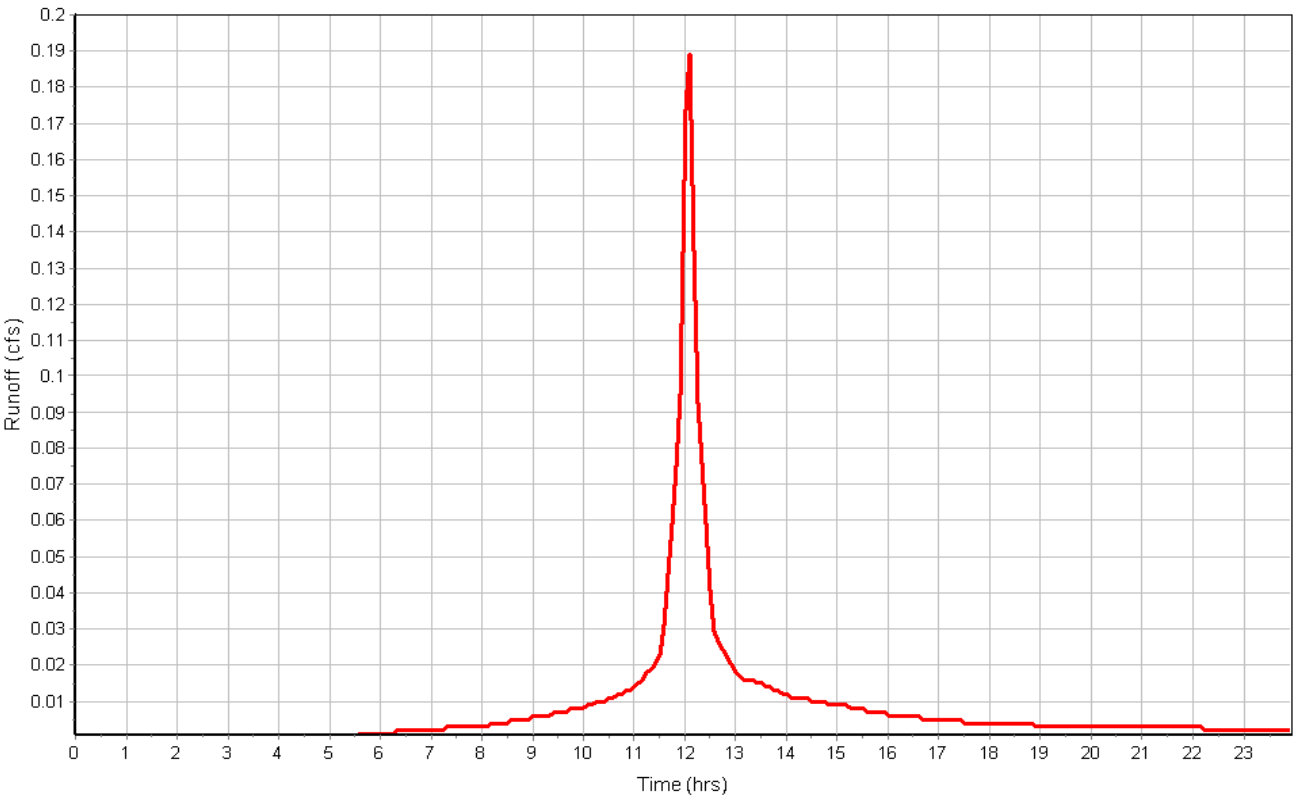
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 3.84
Peak Runoff (cfs) 0.19
Weighted Curve Number 92.57
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1C

Input Data

Area (ft²) 4143.99
Peak Rate Factor 484.00
Weighted Curve Number 96.30
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	3773.99	C	98.00
50 - 75% grass cover, Fair	370.00	C	79.00
Composite Area & Weighted CN	4143.99		96.30

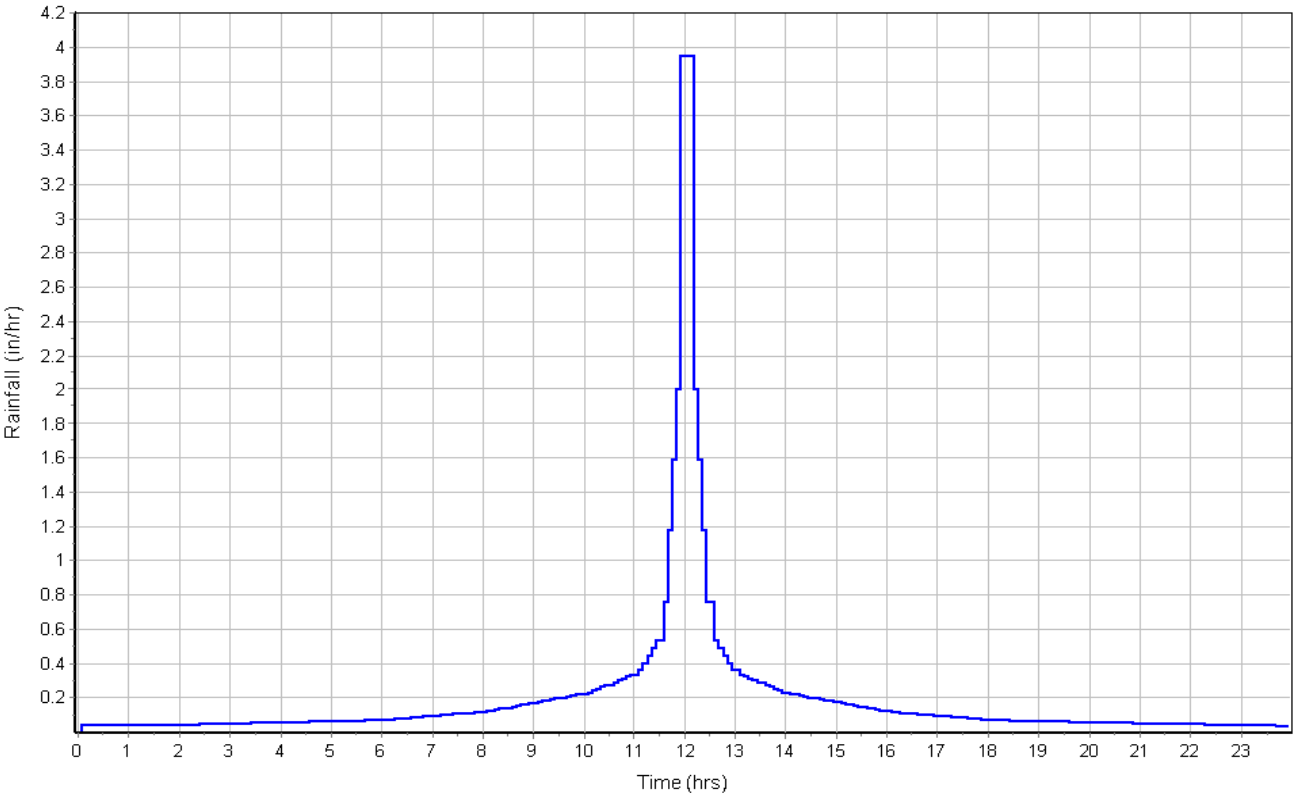
Time of Concentration

User-Defined TOC override (minutes): 5

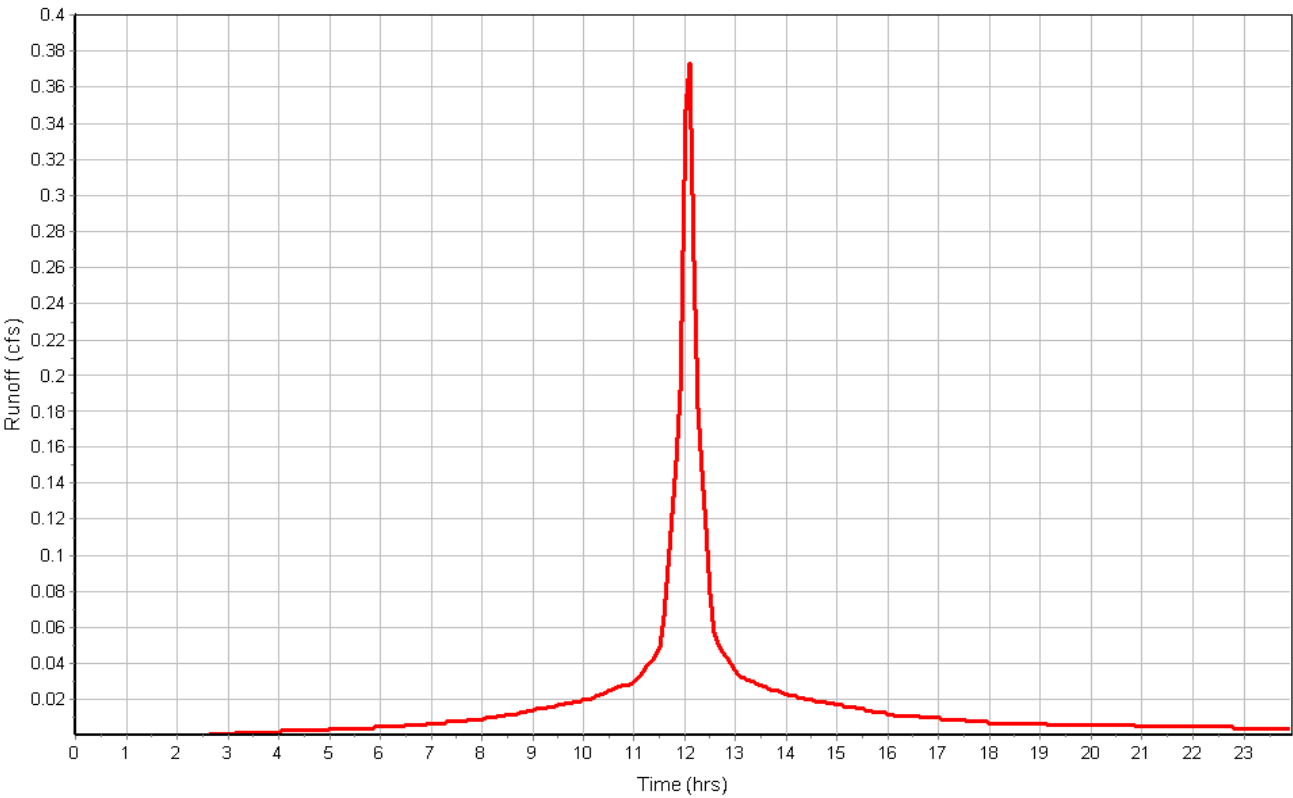
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.26
Peak Runoff (cfs) 0.37
Weighted Curve Number 96.30
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1D

Input Data

Area (ft²) 4344.02
Peak Rate Factor 484.00
Weighted Curve Number 96.71
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	4047.99	C	98.00
50 - 75% grass cover, Fair	295.99	C	79.00
Composite Area & Weighted CN	4343.98		96.71

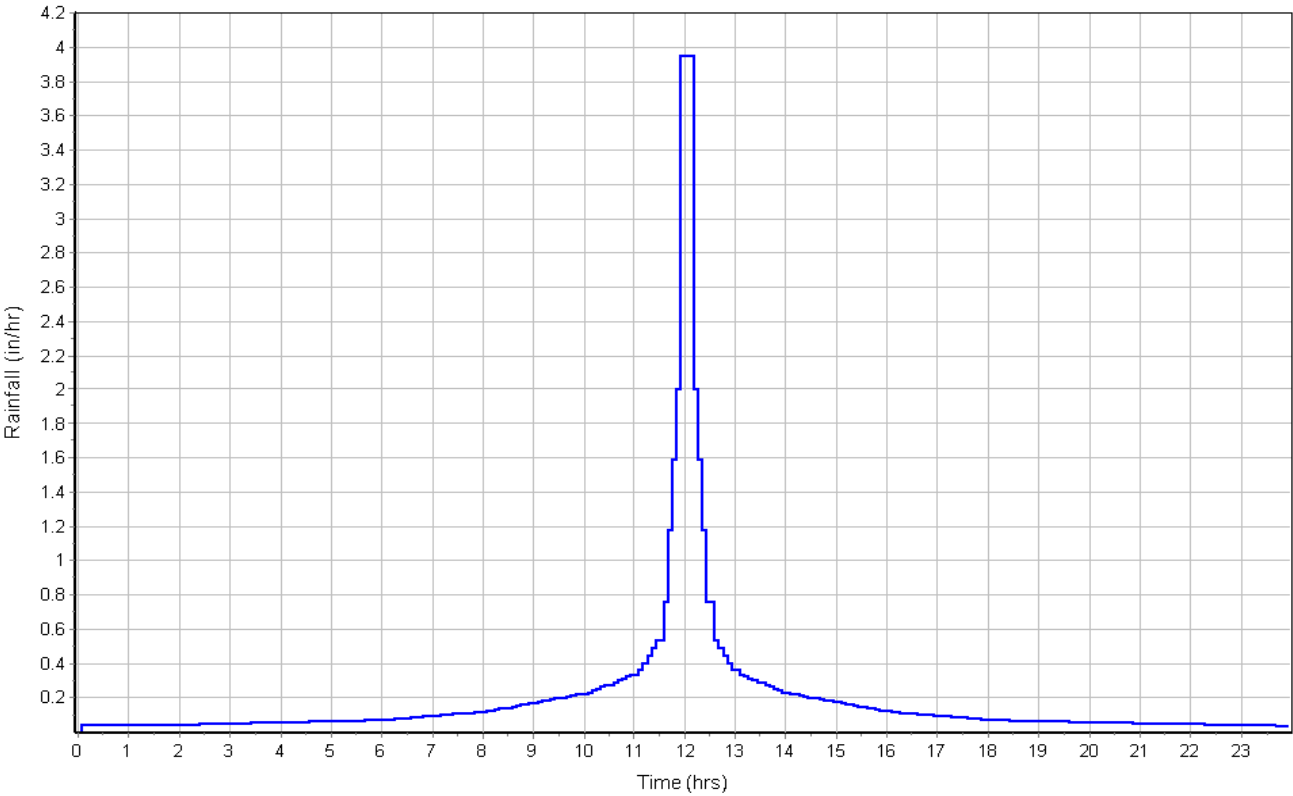
Time of Concentration

User-Defined TOC override (minutes): 5

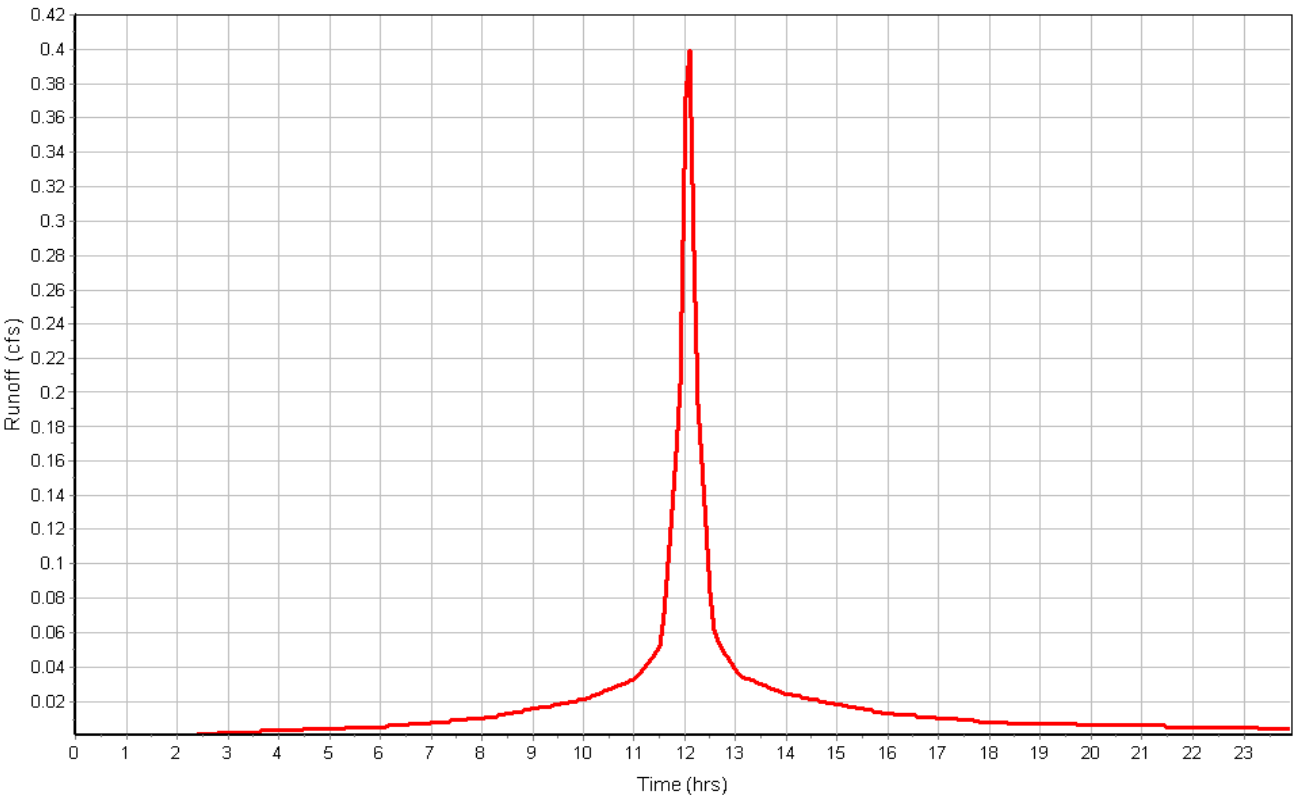
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.31
Peak Runoff (cfs) 0.40
Weighted Curve Number 96.71
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7A

Input Data

Area (ft²) 10845.00
Peak Rate Factor 484.00
Weighted Curve Number 97.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	10597.02	C	98.00
50 - 75% grass cover, Fair	247.99	C	79.00
Woods, Fair	0.00	C	73.00
Composite Area & Weighted CN	10845.01		97.57

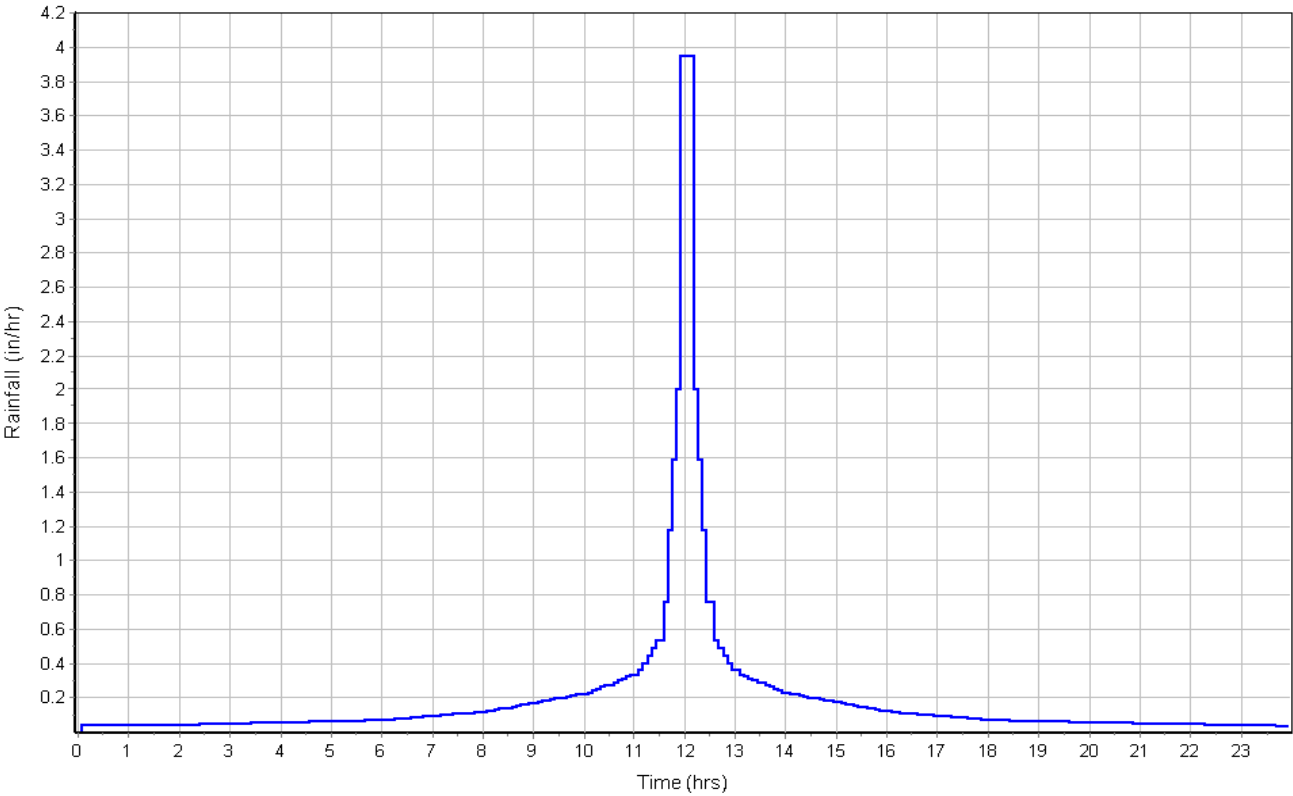
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

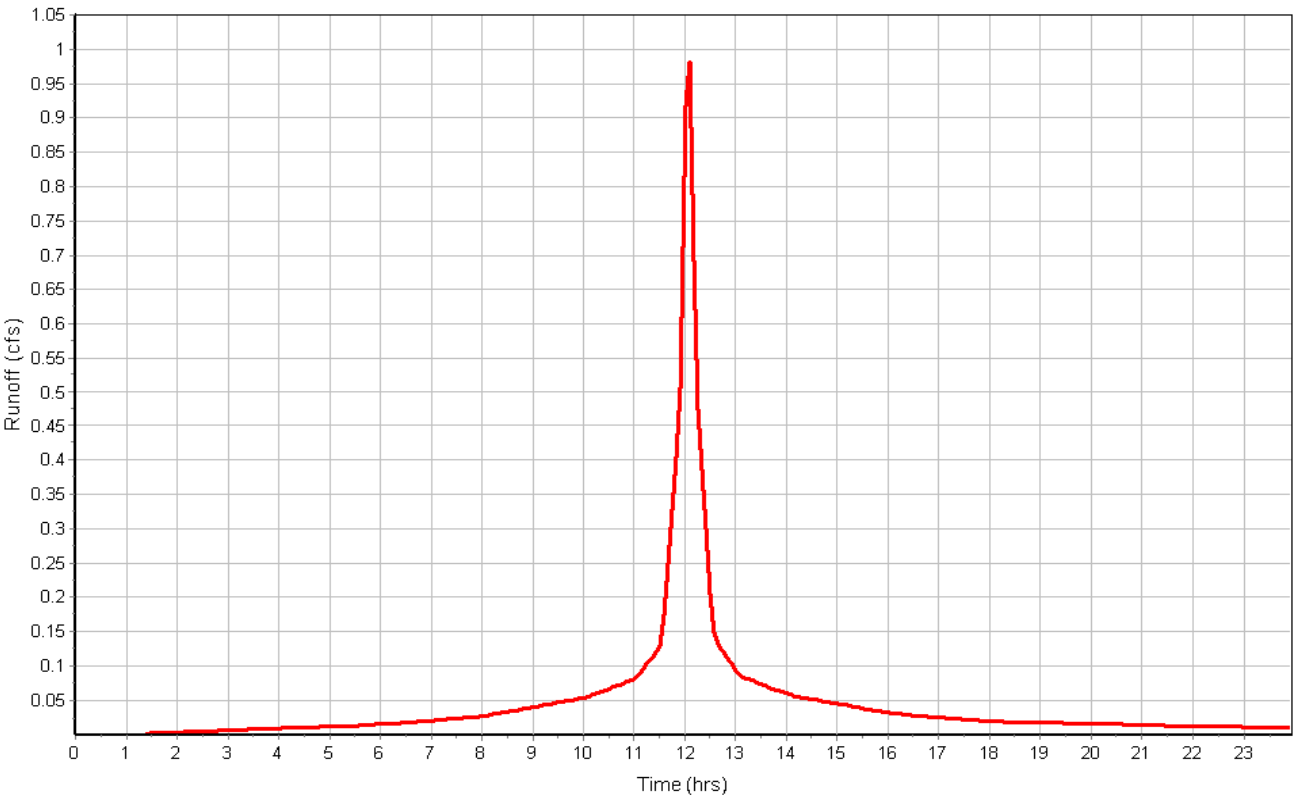
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.41
Peak Runoff (cfs) 0.98
Weighted Curve Number 97.57
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7B

Input Data

Area (ft²) 19698.01
Peak Rate Factor 484.00
Weighted Curve Number 90.20
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	11902.99	C	98.00
50 - 75% grass cover, Fair	6880.00	C	79.00
Woods, Fair	915.02	C	73.00
Composite Area & Weighted CN	19698.01		90.20

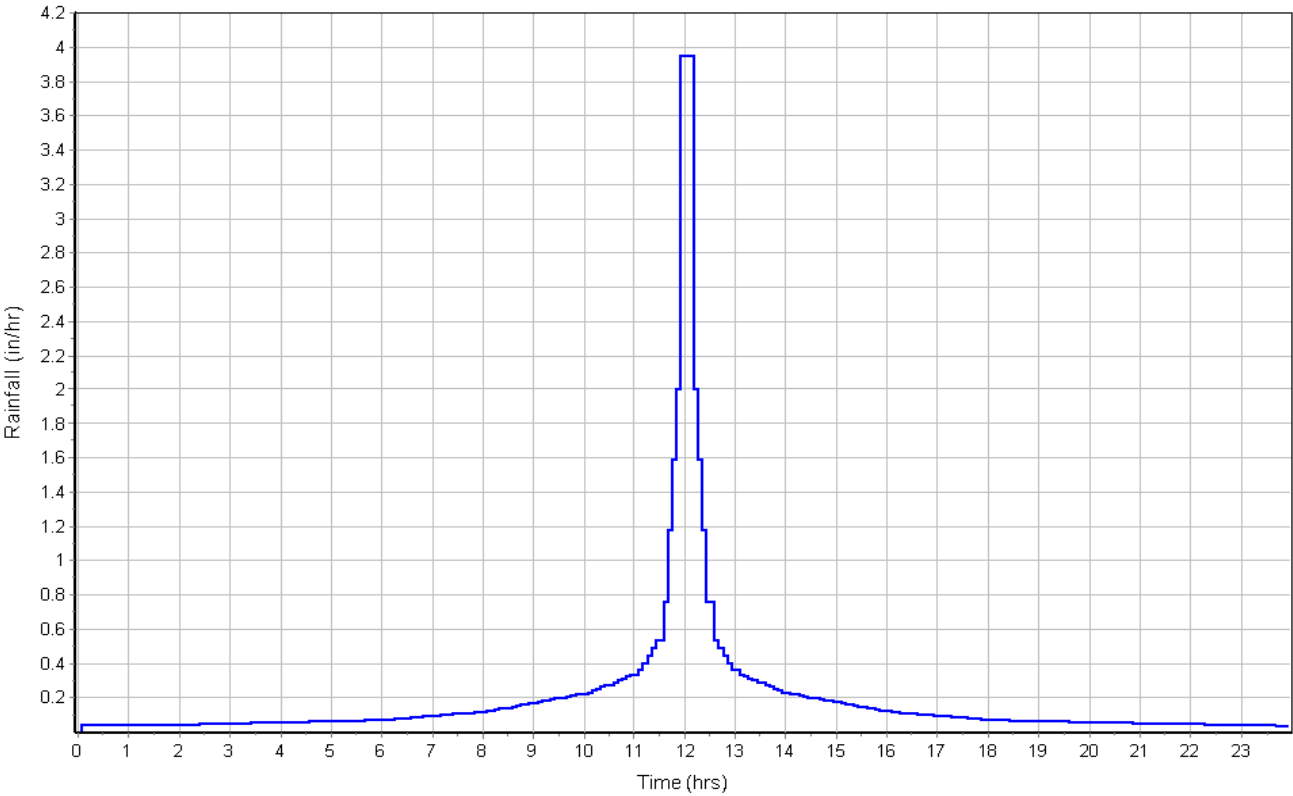
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

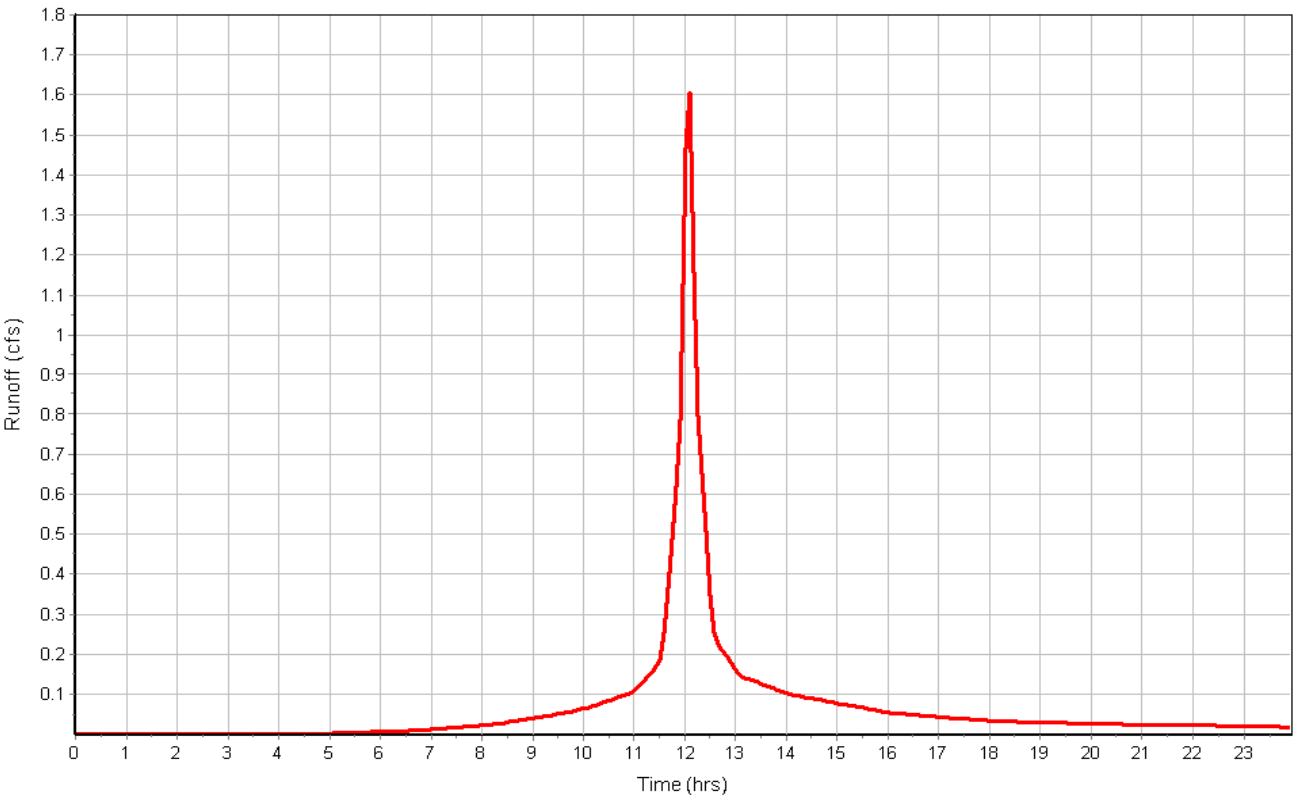
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 3.61
Peak Runoff (cfs) 1.62
Weighted Curve Number 90.20
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : PRE-08

Input Data

Area (ft²) 1080.98
Peak Rate Factor 484.00
Weighted Curve Number 73.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Woods, Fair	1080.98	C	73.00
Composite Area & Weighted CN	1080.98		73.00

Time of Concentration

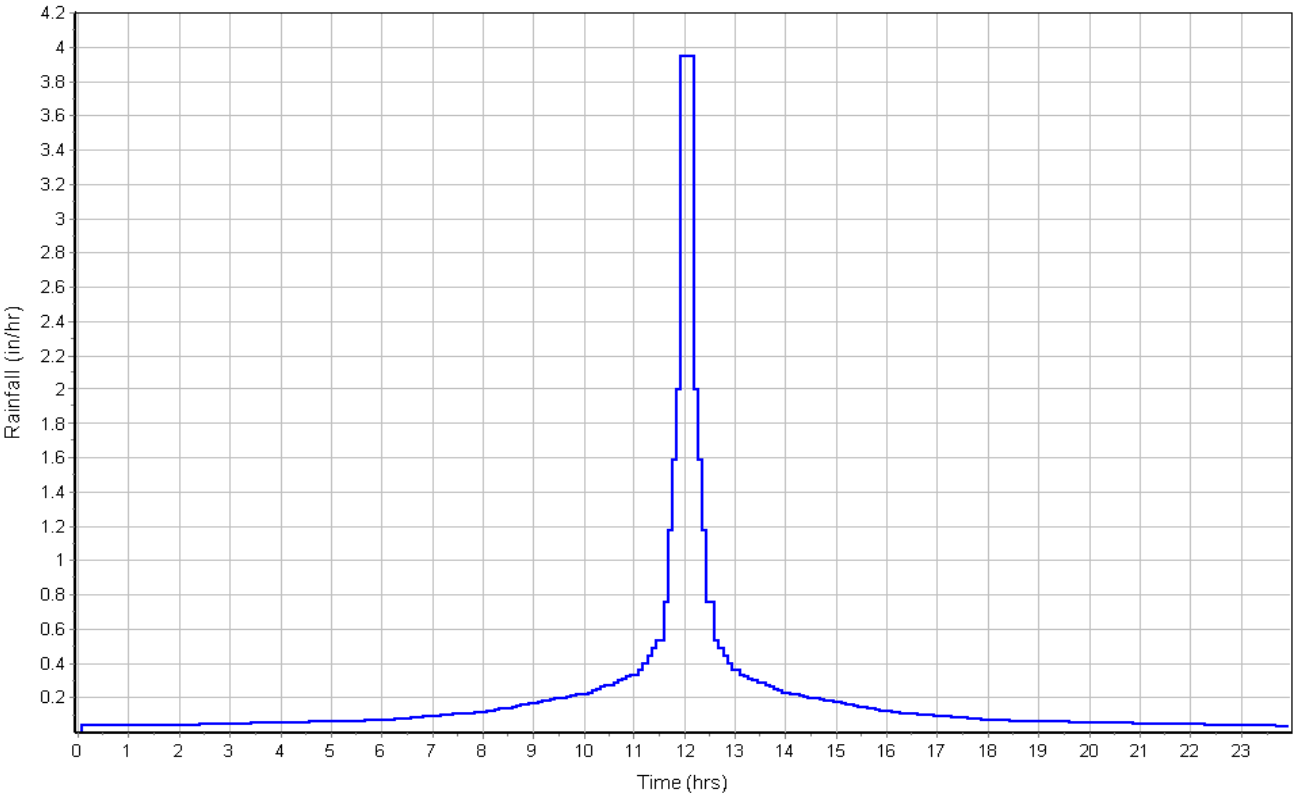
	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	15.79	0.00	0.00

	Subarea A	Subarea B	Subarea C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	28	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.61	0.00	0.00
Computed Flow Time (min) :	0.29	0.00	0.00
Total TOC (min)	16.08		

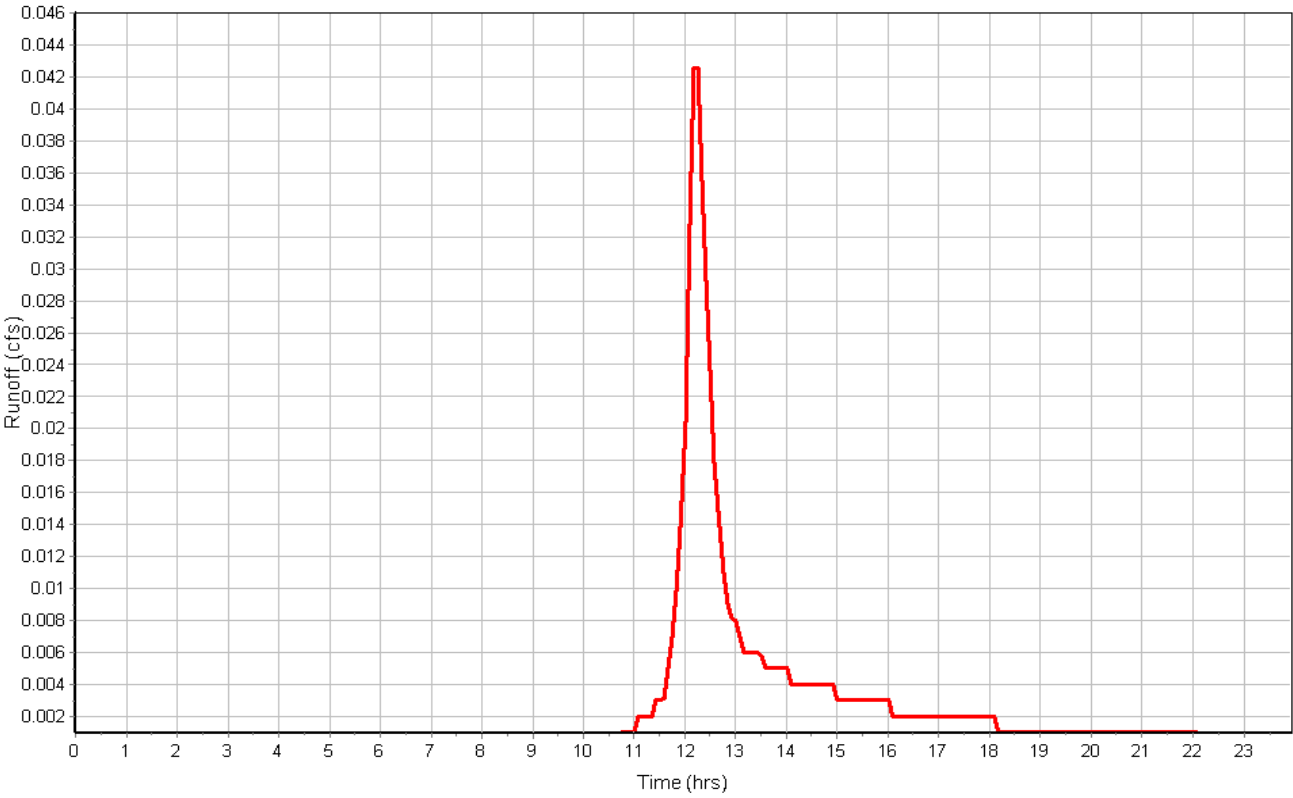
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 1.96
Peak Runoff (cfs) 0.04
Weighted Curve Number 73.00
Time of Concentration (days hh:mm:ss) 0 00:16:05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Pre-1

Input Data

Area (ft²) 85389.01
Peak Rate Factor 484.00
Weighted Curve Number 94.21
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	32210.01	C	98.00
50 - 75% grass cover, Fair	17018.98	C	79.00
Paved parking & roofs	36159.98	C	98.00
Composite Area & Weighted CN	85388.97		94.21

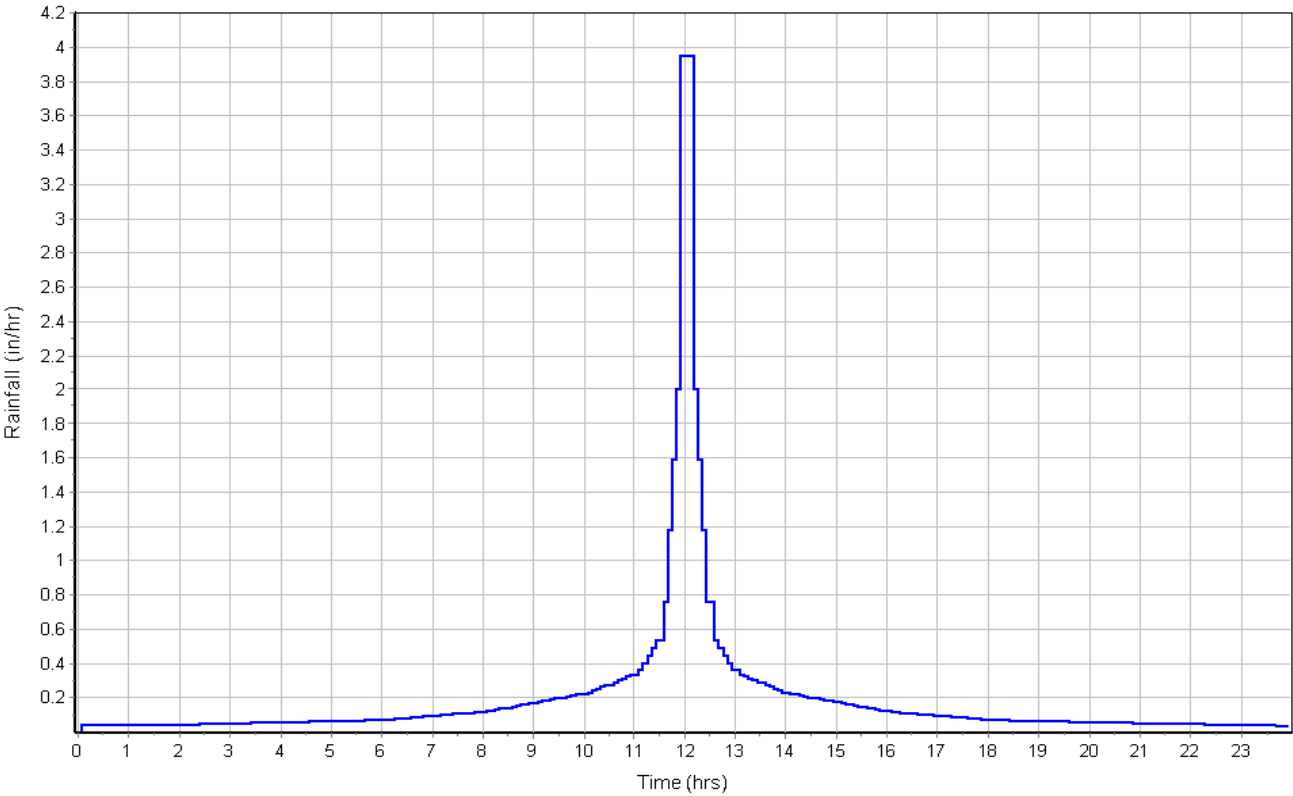
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.4	0.00
Flow Length (ft) :	25	25	0.00
Slope (%) :	6	5	0.00
2 yr, 24 hr Rainfall (in) :	3.4	3.4	0.00
Velocity (ft/sec) :	0.09	0.09	0.00
Computed Flow Time (min) :	4.43	4.76	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	302	166	220
Slope (%) :	1	2	2
Surface Type :	Unpaved	Unpaved	Paved
Velocity (ft/sec) :	1.61	2.28	2.87
Computed Flow Time (min) :	3.13	1.21	1.28
Total TOC (min)	14.81		

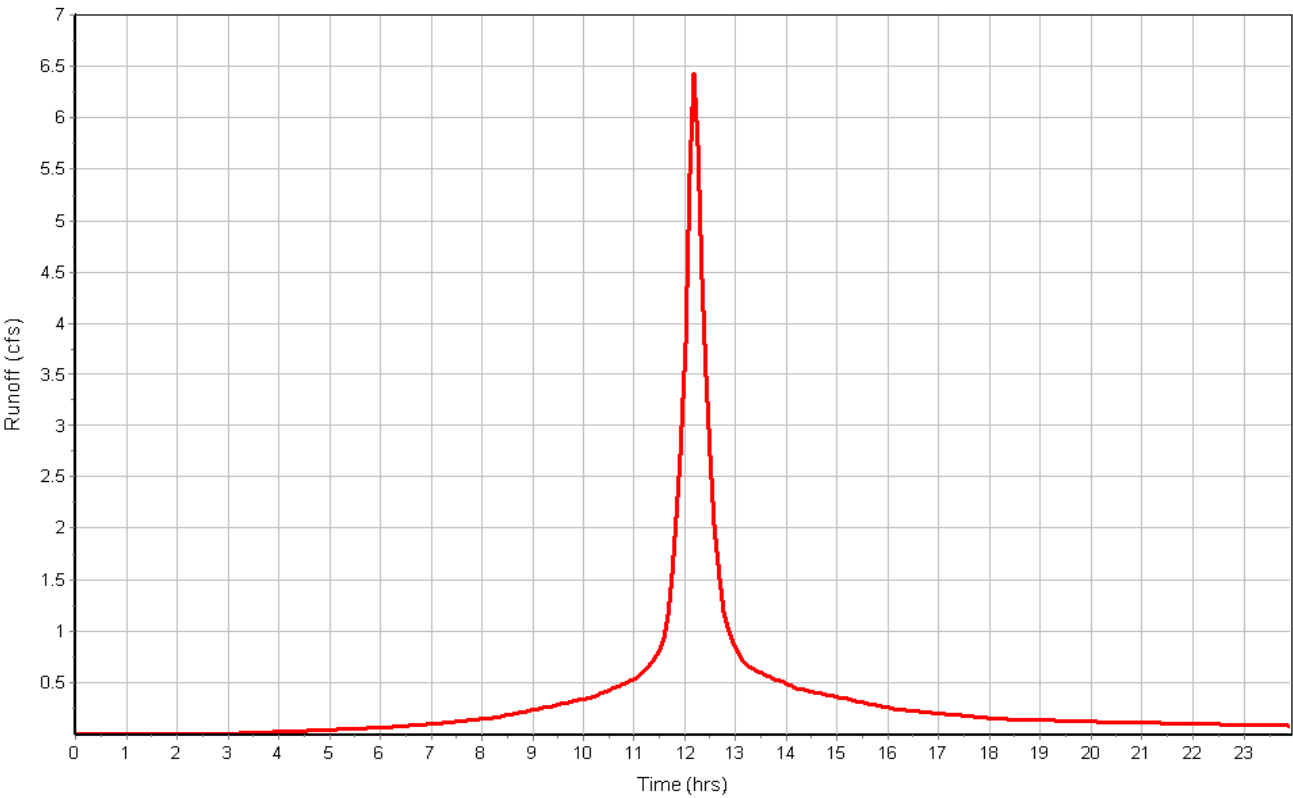
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 4.04
Peak Runoff (cfs) 6.43
Weighted Curve Number 94.21
Time of Concentration (days hh:mm:ss) 0 00:14:49

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-09

Input Data

Area (ft²) 3079.00
Peak Rate Factor 484.00
Weighted Curve Number 79.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
50 - 75% grass cover, Fair	3079.00	C	79.00
Composite Area & Weighted CN	3079.00		79.00

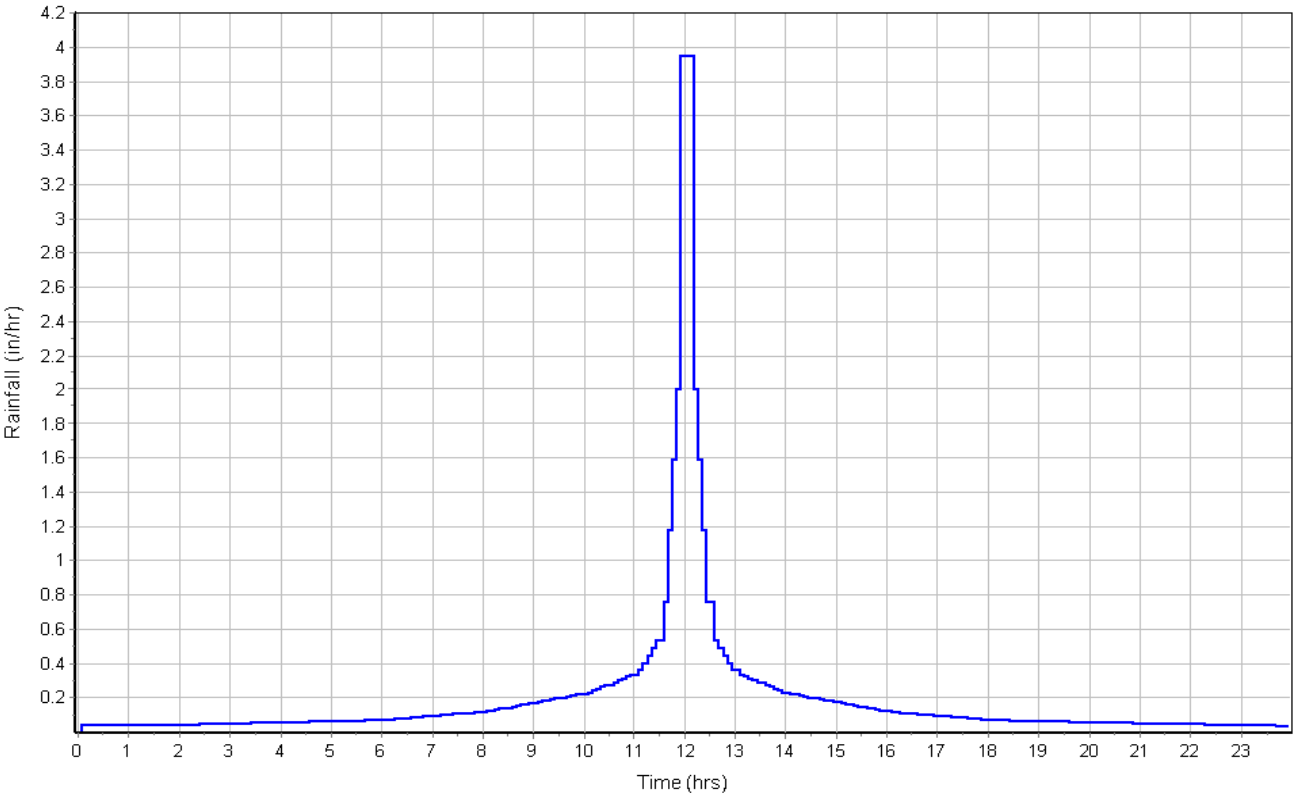
Time of Concentration

User-Defined TOC override (minutes): 5

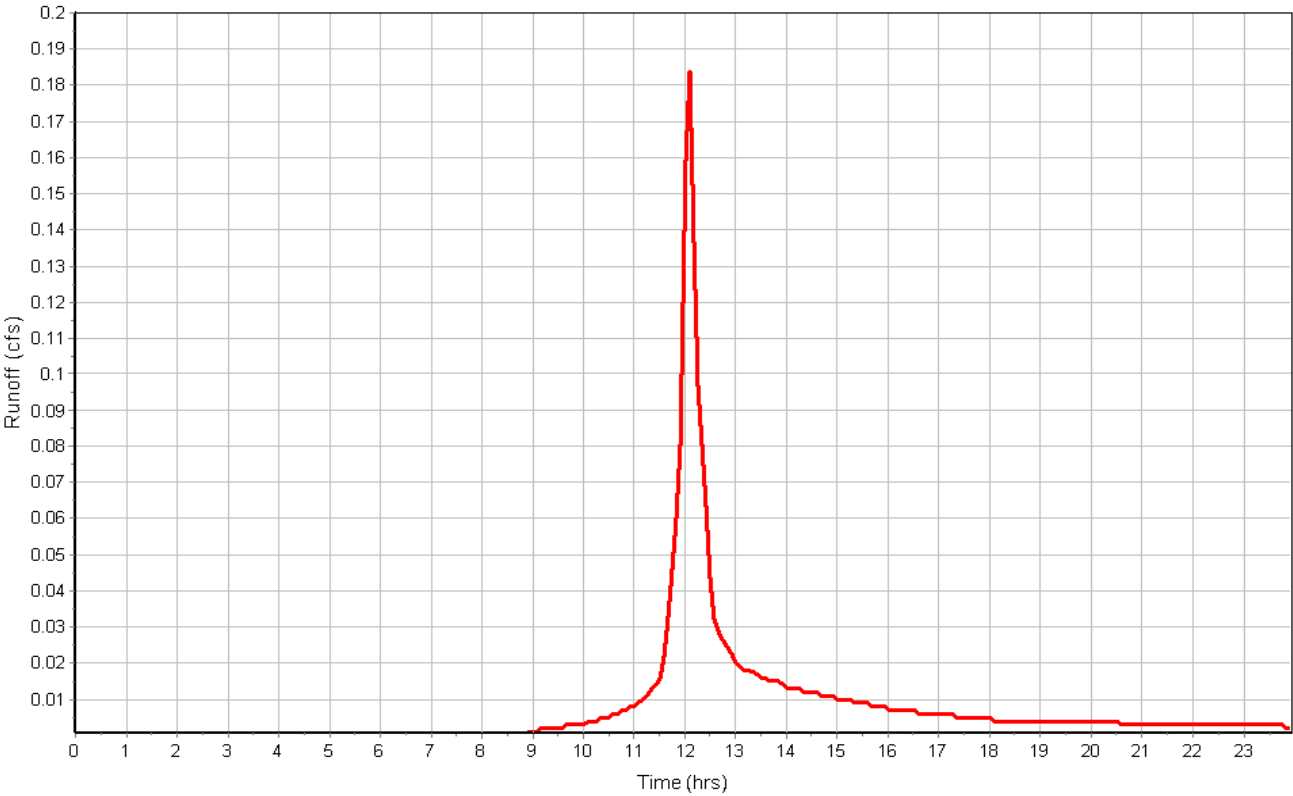
Subbasin Runoff Results

Total Rainfall (in) 4.70
Total Runoff (in) 2.54
Peak Runoff (cfs) 0.19
Weighted Curve Number 79.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation	Ground/Rim (Max) Offset	Initial Water Elevation	Initial Water Depth	Surcharge Elevation	Surcharge Depth	Ponded Area	Minimum Pipe Cover
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft²)	(in)
1 DMH(1)	163.80	170.13	6.33	163.80	0.00	170.13	0.00	0.00	0.00
2 DMH(10)	162.00	165.40	3.40	162.00	0.00	165.40	0.00	0.00	19.80
3 DMH(3)	163.75	169.82	6.07	163.75	0.00	169.82	0.00	0.00	60.22
4 DMH(4)	163.30	170.24	6.94	163.30	0.00	170.24	0.00	0.00	67.05
5 DMH(5)	162.70	169.84	7.14	162.70	0.00	169.84	0.00	0.00	67.69
6 DMH(6)	162.55	173.51	10.96	162.55	0.00	173.51	0.00	0.00	0.00
7 DMH(8)	161.95	168.06	6.11	161.95	0.00	168.06	0.00	0.00	54.74
8 Jun-01	167.00	174.00	7.00	0.00	-167.00	0.00	-174.00	0.00	70.00
9 Jun-02	168.30	174.90	6.60	168.30	0.00	174.90	0.00	0.00	0.00
10 Jun-03	168.30	174.30	6.00	168.30	0.00	174.30	0.00	1000.00	0.00
11 Jun-05	166.70	172.70	6.00	166.70	0.00	172.70	0.00	0.00	64.00
12 Out-1Pipe - (13) (1) (1)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	16.80
13 Out-1Pipe - (9)	161.01	171.00	9.99	161.01	0.00	0.00	-171.00	0.00	20.00
14 Structure - (11)	167.68	171.00	3.32	167.68	0.00	168.62	-2.38	0.00	20.00
15 Structure - (12)	161.54	171.00	9.46	161.54	0.00	162.48	-8.52	0.00	26.00
16 Structure - (15)	164.88	171.00	6.12	164.88	0.00	165.82	-5.18	0.00	26.00
17 Structure - (18)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	20.00
18 Structure - (20)	168.25	171.00	2.75	168.25	0.00	168.25	-2.75	0.00	23.00
19 Structure - (22)	168.25	171.00	2.75	168.25	0.00	171.00	0.00	0.00	4.40

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	1.07	0.00	164.61	0.81	0.00	5.52	164.25	0.45	0 12:10	0 00:00	0.00	0.00
2 DMH(10)	1.64	1.64	163.20	1.20	0.00	2.20	162.69	0.69	0 12:10	0 00:00	0.00	0.00
3 DMH(3)	1.25	0.00	164.38	0.63	0.00	5.44	164.01	0.26	0 12:10	0 00:00	0.00	0.00
4 DMH(4)	2.59	0.00	164.11	0.81	0.00	6.12	163.58	0.28	0 12:10	0 00:00	0.00	0.00
5 DMH(5)	2.96	0.00	163.63	0.93	0.00	6.21	163.00	0.30	0 12:10	0 00:00	0.00	0.00
6 DMH(6)	3.65	0.00	163.46	0.91	0.00	10.05	162.85	0.30	0 12:11	0 00:00	0.00	0.00
7 DMH(8)	5.19	0.00	163.01	1.06	0.00	5.05	162.27	0.32	0 12:11	0 00:00	0.00	0.00
8 Jun-01	0.08	0.00	167.66	0.66	0.00	6.34	167.50	0.50	0 15:02	0 00:00	0.00	0.00
9 Jun-02	0.00	0.00	168.52	0.22	0.00	6.38	168.42	0.12	0 12:25	0 00:00	0.00	0.00
10 Jun-03	0.08	0.00	168.47	0.17	0.00	5.83	168.42	0.12	0 15:00	0 00:00	0.00	0.00
11 Jun-05	0.08	0.00	166.96	0.26	0.00	5.74	166.88	0.18	0 15:05	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	0.47	0.00	169.38	0.88	0.00	1.62	168.67	0.17	0 12:14	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	0.00	0.00	161.01	0.00	0.00	9.99	161.01	0.00	0 00:00	0 00:00	0.00	0.00
14 Structure - (11)	0.00	0.00	167.68	0.00	0.00	3.32	167.68	0.00	0 00:00	0 00:00	0.00	0.00
15 Structure - (12)	0.40	0.40	168.26	6.72	0.00	2.74	167.56	6.02	0 12:10	0 00:00	0.00	0.00
16 Structure - (15)	0.40	0.40	168.26	3.38	0.00	2.74	167.89	3.01	0 12:10	0 00:00	0.00	0.00
17 Structure - (18)	0.06	0.00	169.42	0.92	0.00	1.58	168.67	0.17	0 12:14	0 00:00	0.00	0.00
18 Structure - (20)	0.40	0.40	169.42	1.17	0.00	1.58	168.56	0.31	0 12:13	0 00:00	0.00	0.00
19 Structure - (22)	0.59	0.40	169.41	1.16	0.00	1.59	168.55	0.30	0 12:13	0 00:00	0.00	0.00

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1 Link-01	32.20	166.00	0.00	165.75	3.20	0.25	0.7800	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
2 Link-02	38.96	170.30	2.05	166.00	2.00	4.30	11.0400	CIRCULAR	3.960	3.960	0.0150	0.5000	0.5000	0.0000	0.00	No
3 Link-03	31.15	169.10	0.60	168.00	5.45	1.10	3.5300	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
4 Link-04	35.30	170.00	1.00	168.50	3.14	1.50	4.2500	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
5 Link-05	216.63	167.50	0.50	166.70	0.00	0.80	0.3700	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
6 Link-06	163.00	169.00	0.70	168.35	0.05	0.65	0.4000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
7 Link-07	55.66	164.00	0.20	163.80	0.05	0.20	0.3600	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
8 Link-08	85.00	168.35	0.05	167.50	0.50	0.85	1.0000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
9 Link-11	100.00	166.70	0.00	166.64	0.00	0.06	0.0600	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
10 Pipe - (10)	30.11	168.00	6.46	167.00	1.64	1.00	3.3200	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
11 Pipe - (11)	30.51	168.00	3.12	167.00	1.64	1.00	3.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
12 Pipe - (13)	54.74	168.50	0.00	168.25	0.00	0.25	0.4600	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
13 Pipe - (13) (1)	45.20	168.25	0.00	168.25	0.00	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
14 Pipe - (13) (1) (1)	50.87	168.50	0.25	168.25	-0.25	0.25	0.4900	CIRCULAR	9.960	9.960	0.0120	0.5000	0.5000	0.0000	0.00	No
15 Pipe - (14)	12.24	168.25	0.00	168.00	0.30	0.25	2.0400	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
16 Pipe - (15)	10.98	168.25	0.00	168.00	0.30	0.25	2.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
17 Pipe - (18)	18.00	164.50	0.00	164.00	0.20	0.50	2.7800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
18 Pipe - (20)	18.71	164.00	0.00	163.65	0.35	0.35	1.8700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
19 Pipe - (21)	28.88	164.00	0.00	163.20	0.50	0.80	2.7700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
20 Pipe - (3)	38.84	163.75	0.00	163.65	0.35	0.10	0.2600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
21 Pipe - (3) (2)	100.57	163.30	0.00	162.95	0.25	0.35	0.3500	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
22 Pipe - (3) (2) (1)	49.46	162.70	0.00	162.55	0.00	0.15	0.3000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
23 Pipe - (4)	172.11	162.55	0.00	162.00	0.05	0.55	0.3200	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
24 Pipe - (4) (1)	68.77	161.95	0.00	161.60	0.00	0.35	0.5100	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25 Pipe - (5)	6.17	163.85	0.00	163.80	0.05	0.05	0.8100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
26 Pipe - (6)	249.75	162.00	0.05	162.50	0.50	-0.50	-0.2000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
27 Pipe - (7)	108.19	165.00	-2.70	163.65	0.35	1.35	1.2500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
28 Pipe - (8)	34.98	168.50	0.82	168.00	3.12	0.50	1.4300	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
29 Pipe - (8) (1)	41.80	168.00	3.12	168.00	6.46	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
30 Pipe - (9)	52.56	168.50	7.49	168.00	6.46	0.50	0.9500	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No

[illegible]

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-01	0.18	0 12:10	2.72	0.07	1.89	0.28	0.18	0.18	0.00		Calculated
2 Link-02	0.00	0 00:00	2.19	0.00	0.00		0.00	0.00	0.00		Calculated
3 Link-03	0.47	0 12:14	0.91	0.52	4.40	0.12	0.27	0.54	0.00		Calculated
4 Link-04	1.29	0 12:13	2.00	0.64	5.07	0.12	0.31	0.62	0.00		Calculated
5 Link-05	0.08	0 15:02	0.64	0.12	0.93	3.88	0.21	0.31	0.00		Calculated
6 Link-06	0.00	0 00:00	0.66	0.00	0.00		0.06	0.09	0.00		Calculated
7 Link-07	1.07	0 12:10	1.85	0.58	2.18	0.43	0.59	0.60	0.00		Calculated
8 Link-08	0.08	0 15:00	1.05	0.07	1.45	0.98	0.14	0.21	0.00		Calculated
9 Link-11	0.08	0 15:05	0.47	0.16	0.91	1.83	0.19	0.29	0.00		Calculated
10 Pipe - (10)	0.40	0 12:10	0.89	0.45	4.14	0.12	0.25	0.50	0.00		Calculated
11 Pipe - (11)	0.40	0 12:10	0.88	0.45	4.12	0.12	0.25	0.50	0.00		Calculated
12 Pipe - (13)	0.06	0 12:05	1.28	0.04	0.19	4.80	0.83	1.00	13.00		SURCHARGED
13 Pipe - (13) (1)	0.21	0 12:12	0.85	0.25	0.39	1.93	0.83	1.00	58.00		SURCHARGED
14 Pipe - (13) (1) (1)	0.47	0 12:13	1.06	0.44	0.86	0.99	0.83	1.00	11.00		SURCHARGED
15 Pipe - (14)	0.30	0 12:05	0.70	0.43	1.51	0.14	0.50	1.00	125.00		SURCHARGED
16 Pipe - (15)	0.30	0 12:06	0.73	0.41	1.54	0.12	0.50	1.00	125.00		SURCHARGED
17 Pipe - (18)	0.68	0 12:10	6.43	0.11	2.28	0.13	0.42	0.42	0.00		Calculated
18 Pipe - (20)	0.37	0 12:10	5.28	0.07	2.75	0.11	0.32	0.32	0.00		Calculated
19 Pipe - (21)	0.40	0 12:10	6.42	0.06	3.72	0.13	0.30	0.30	0.00		Calculated
20 Pipe - (3)	1.25	0 12:10	1.96	0.64	2.81	0.23	0.55	0.55	0.00		Calculated
21 Pipe - (3) (2)	2.57	0 12:10	4.13	0.62	3.43	0.49	0.74	0.60	0.00		Calculated
22 Pipe - (3) (2) (1)	2.94	0 12:10	6.27	0.47	2.78	0.30	0.90	0.61	0.00		Calculated
23 Pipe - (4)	3.64	0 12:11	6.43	0.57	3.05	0.94	0.93	0.64	0.00		Calculated
24 Pipe - (4) (1)	5.15	0 12:11	8.12	0.63	4.29	0.27	0.94	0.64	0.00		Calculated
25 Pipe - (5)	0.19	0 12:10	3.48	0.05	0.85	0.12	0.55	0.56	0.00		Calculated
26 Pipe - (6)	1.59	0 12:10	3.13	0.51	2.01	2.07	0.84	0.68	0.00		Calculated
27 Pipe - (7)	0.98	0 12:10	7.47	0.13	5.21	0.35	0.35	0.35	0.00		Calculated
28 Pipe - (8)	0.00	0 00:00	2.27	0.00	0.00		0.13	0.16	0.00		Calculated
29 Pipe - (8) (1)	0.00	0 12:05	0.85	0.00	0.14	4.98	0.26	0.31	0.00		Calculated
30 Pipe - (9)	0.00	0 00:00	1.85	0.00	0.00		0.13	0.16	0.00		Calculated

Inlet Input

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	5.00	164.50	0.00	0.00	0.00
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	2.55	163.85	0.00	200.00	0.00
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	3.00	164.00	-2.00	200.00	0.00
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	6.50	164.00	0.00	0.00	0.00
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	8.59	164.00	0.00	0.00	0.00
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	4.26	167.70	0.00	0.00	0.00

Roadway & Gutter Input

SN Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1 CB(1)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2 CB(2)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3 Inlet-04	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4 Structure - (29)	N/A	0.0200	0.0160	0.0620	2.00	0.0657	7.00
5 Structure - (31)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6 Structure - (9)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN Element ID	Peak Flow	Peak Lateral Inflow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow	Max Gutter Water Depth during Peak Flow	Time of Max Depth Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 CB(1)	0.68	0.68	N/A	N/A	N/A	0.00	169.53	0.03	0 12:10	0.00	0.00
2 CB(2)	0.19	0.19	N/A	N/A	N/A	0.00	166.41	0.01	0 12:10	0.00	0.00
3 Inlet-04	0.18	0.18	N/A	N/A	N/A	0.00	169.01	0.01	0 12:10	0.00	0.00
4 Structure - (29)	0.37	0.37	N/A	N/A	N/A	0.00	170.52	0.02	0 12:10	0.00	0.00
5 Structure - (31)	0.40	0.40	N/A	N/A	N/A	0.00	172.61	0.02	0 12:10	0.00	0.00
6 Structure - (9)	0.98	0.98	N/A	N/A	N/A	0.00	172.02	0.05	0 12:10	0.00	0.00

Storage Nodes

Storage Node : Basin4

Input Data

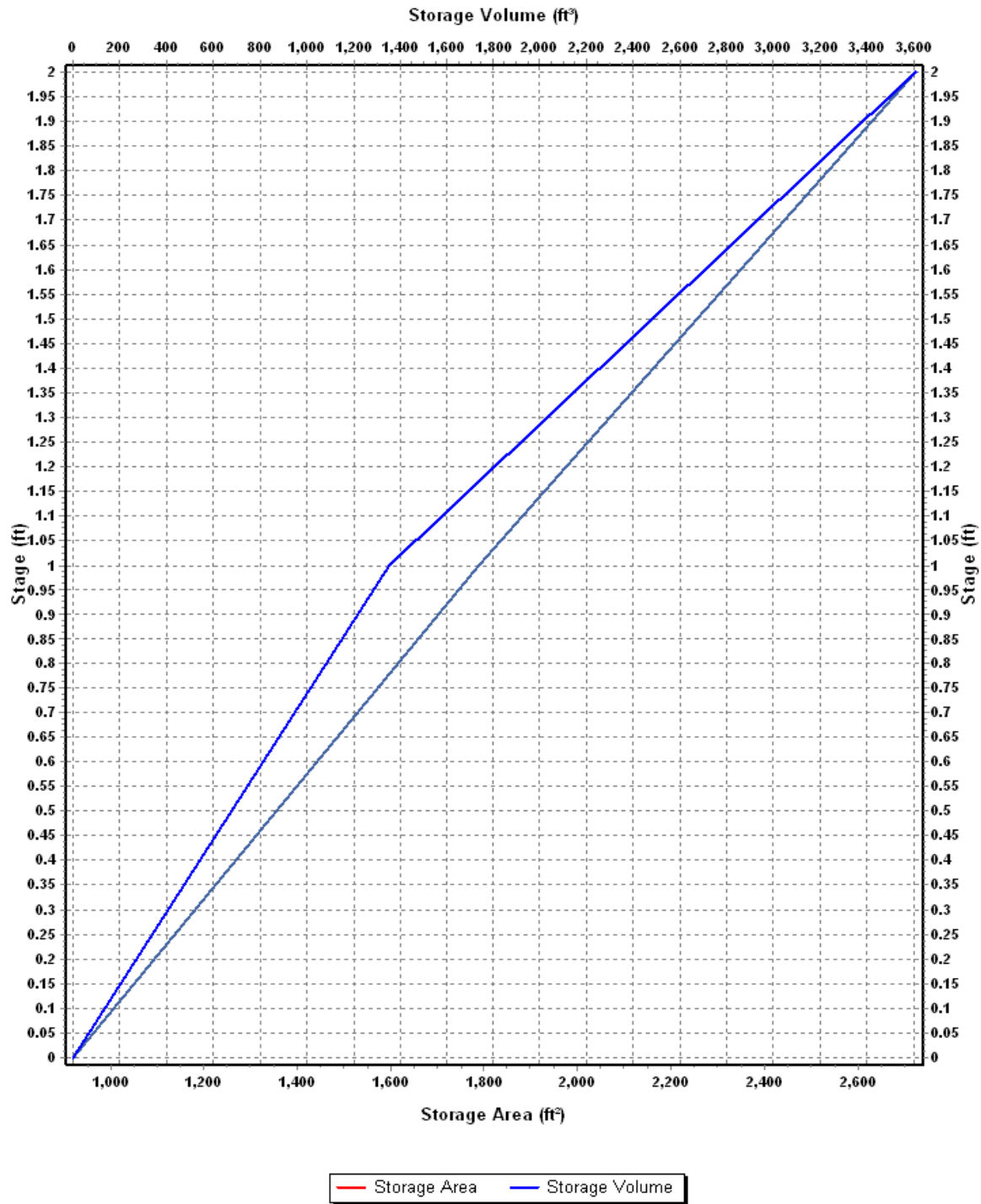
Invert Elevation (ft)	169.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-169.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-01

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	920	0.000
1	1787	1353.50
2	2722	3608.00

Storage Area Volume Curves



Storage Node : Basin4 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Trapezoidal	No	172.00	3.00	2.00	0.50	3.33
2 Weir-03	Rectangular	No	172.50	3.50	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-02	Side	CIRCULAR	No	1.00			170.25
2 Orifice-03	Side	CIRCULAR	No	2.00			171.80

Output Summary Results

Peak Inflow (cfs)	1.60
Peak Lateral Inflow (cfs)	1.60
Peak Outflow (cfs)	1.29
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	170.32
Max HGL Depth Attained (ft)	1.32
Average HGL Elevation Attained (ft)	169.86
Average HGL Depth Attained (ft)	0.86
Time of Max HGL Occurrence (days hh:mm)	0 12:13
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Basin5

Input Data

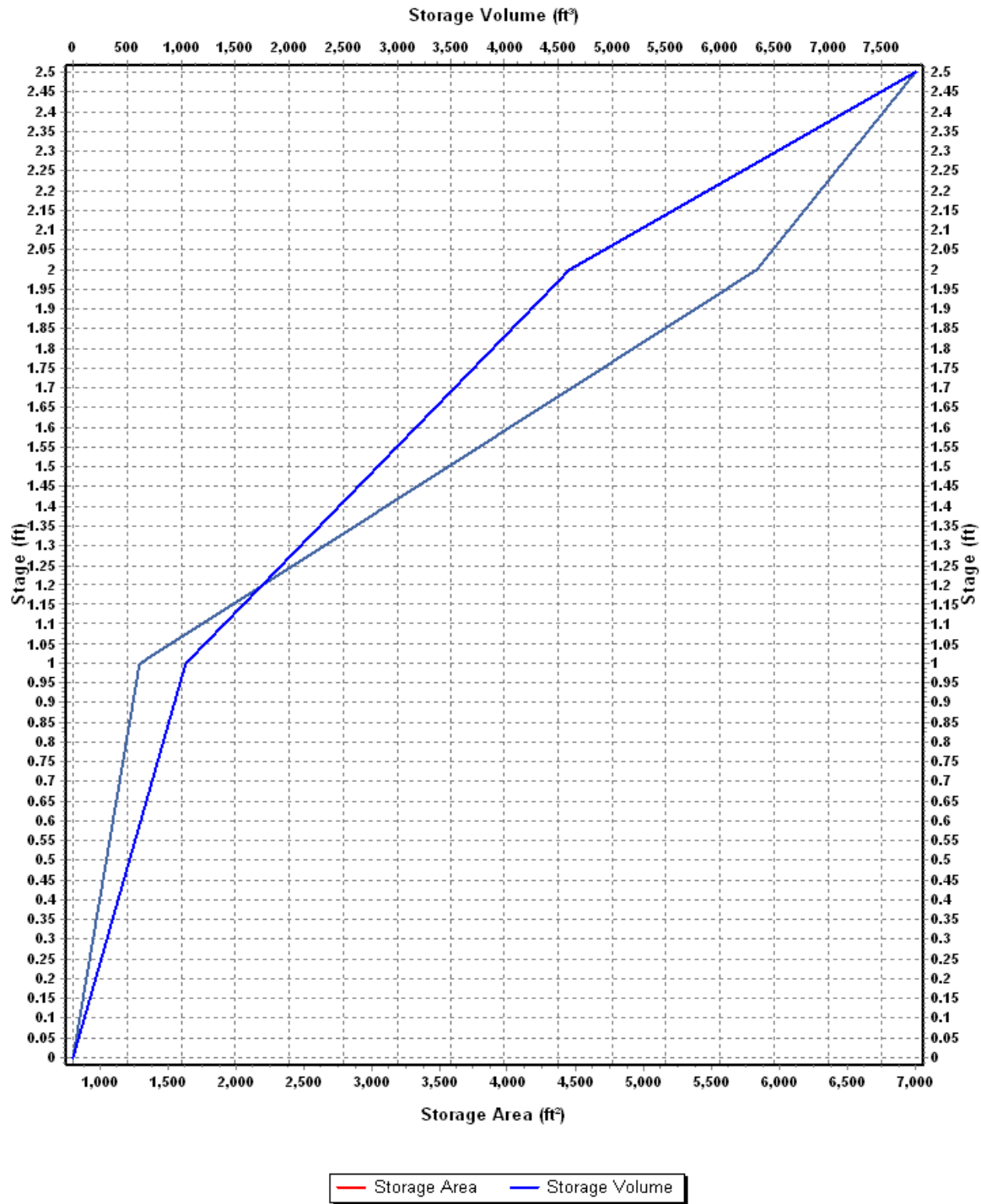
Invert Elevation (ft)	170.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	2.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-170.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-11

Stage	Storage Area	Storage Volume
(ft)	(ft²)	(ft³)
0	801.21	0.000
1	1286.66	1043.94
2	5828.53	4601.54
2.5	7000	7808.67

Storage Area Volume Curves



Storage Node : Basin5 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Trapezoidal	No	172.00	2.00	2.00	0.50	3.33
2 Weir-04	Rectangular	No	171.85	1.85	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-01	Side	CIRCULAR	No	1.25			171.25
2 Orifice-04	Side	CIRCULAR	No	1.25			170.55

Output Summary Results

Peak Inflow (cfs)	1.52
Peak Lateral Inflow (cfs)	1.52
Peak Outflow (cfs)	0.08
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	171.83
Max HGL Depth Attained (ft)	1.83
Average HGL Elevation Attained (ft)	171.26
Average HGL Depth Attained (ft)	1.26
Time of Max HGL Occurrence (days hh:mm)	0 15:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Stor-06

Input Data

Invert Elevation (ft)	167.70
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-167.70
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

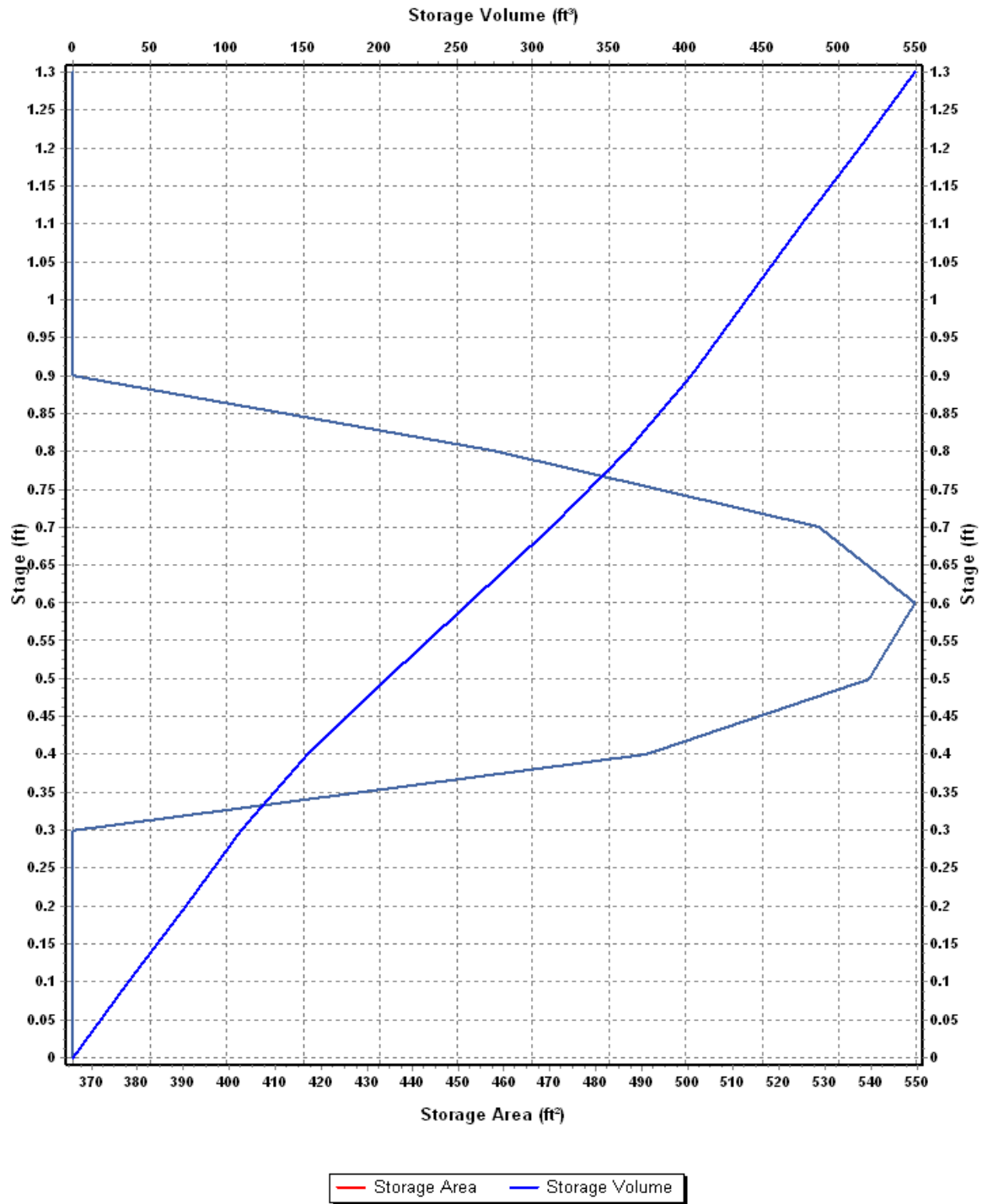
Exfiltration Rate (in/hr)	1.0200
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Storage Area Volume Curves

Storage Curve : Storage-08

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	366.0000	0.000
0.1	366.0000	36.60
0.2	366.0000	73.20
0.3	366.0000	109.80
0.4	491.0282	152.65
0.5	539.3827	204.17
0.6	549.4909	258.61
0.7	528.6472	312.52
0.8	457.7450	361.84
0.9	366.0000	403.03
1	366.0000	439.63
1.1	366.0000	476.23
1.2	366.0000	512.83
1.3	366.0000	549.43

Storage Area Volume Curves



Storage Node : Stor-06 (continued)

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-05	Side	CIRCULAR	No	2.00			168.00

Output Summary Results

Peak Inflow (cfs)	0.60
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.14
Peak Exfiltration Flow Rate (cfm)	0.79
Max HGL Elevation Attained (ft)	169.41
Max HGL Depth Attained (ft)	1.71
Average HGL Elevation Attained (ft)	168.41
Average HGL Depth Attained (ft)	0.71
Time of Max HGL Occurrence (days hh:mm)	0 12:14
Total Exfiltration Volume (1000-ft ³)	0.802
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61

Storage Node : Stor-07

Input Data

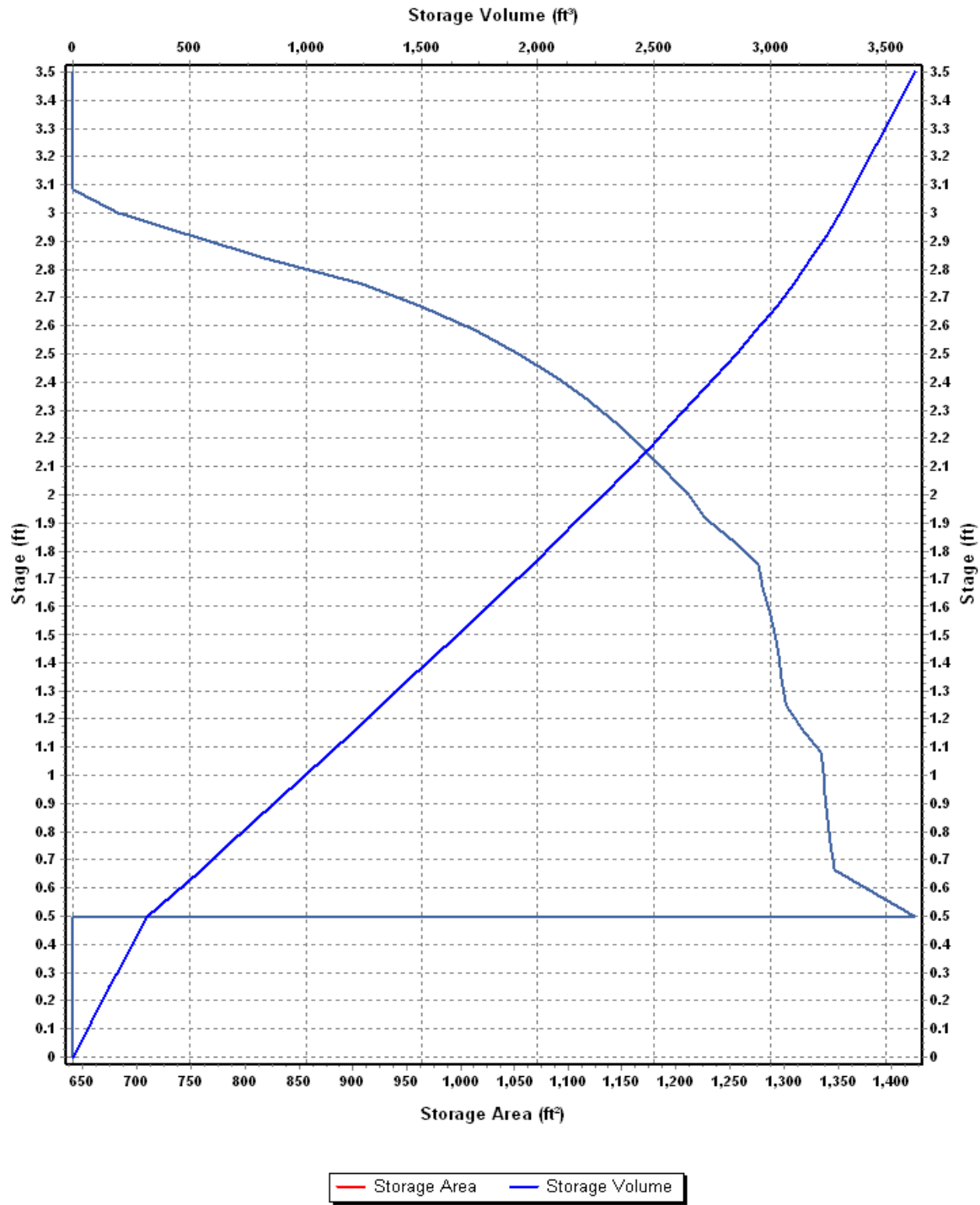
Invert Elevation (ft)	165.36
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	5.64
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-165.36
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-07

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0.000	640.8000	0.000
0.083	640.8000	53.19
0.167	640.8000	107.02
0.250	640.8000	160.21
0.333	640.8000	213.40
0.417	640.8000	267.23
0.500	640.800	320.42
0.501	1420.9200	321.45
0.667	1347.1200	551.20
0.750	1342.8000	662.83
0.833	1340.6400	774.19
0.917	1338.4800	886.71
1.000	1336.3200	997.71
1.083	1334.1600	1108.53
1.167	1316.8800	1219.87
1.250	1301.7600	1328.54
1.333	1297.4400	1436.41
1.417	1295.2800	1545.30
1.500	1290.9600	1652.63
1.583	1286.6400	1759.60
1.667	1280.1600	1867.41
1.750	1275.8400	1973.48
1.833	1252.0800	2078.39
1.917	1226.1600	2182.48
2.000	1211.0400	2283.62
2.083	1189.4400	2383.24
2.167	1167.8400	2482.25
2.250	1144.0800	2578.19
2.333	1118.1600	2672.07
2.417	1087.9200	2764.73
2.500	1053.3600	2853.59
2.583	1014.4800	2939.41
2.667	964.8000	3022.54
2.750	908.6400	3100.29
2.833	822.2400	3172.12
2.917	750.9600	3238.19
3.000	681.8400	3297.65
3.083	640.8000	3352.54
3.167	640.8000	3406.37
3.250	640.8000	3459.56
3.333	640.8000	3512.75
3.417	640.8000	3566.58
3.500	640.8000	3619.77

Storage Area Volume Curves



Storage Node : Stor-07 (continued)

Output Summary Results

Peak Inflow (cfs)	2.02
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.58
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	167.37
Max HGL Depth Attained (ft)	2.01
Average HGL Elevation Attained (ft)	165.89
Average HGL Depth Attained (ft)	0.53
Time of Max HGL Occurrence (days hh:mm)	0 12:38
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name Proposed stormwater.SPF
Description J:\2016\16-006\DWG\Siteplan.dwg

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method SCS TR-20
Time of Concentration (TOC) Method SCS TR-55
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On Feb 16, 2016 00:00:00
End Analysis On Feb 17, 2016 00:00:00
Start Reporting On Feb 16, 2016 00:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:05:00 days hh:mm:ss
Routing Time Step 30 seconds

Number of Elements

Qty
Rain Gages 2
Subbasins 15
Nodes 35
 Junctions 19
 Outfalls 6
 Flow Diversions 0
 Inlets 6
 Storage Nodes 4
Links 40
 Channels 0
 Pipes 30
 Pumps 0
 Orifices 6
 Weirs 4
 Outlets 0
Pollutants 0
Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	25 Year	Intensity	inches	Massachusetts	Plymouth	25	5.60	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate Factor	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ft ²)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	1/2Roof	18080.01	484.00	98.00	5.60	5.36	2.23	1.96	0 00:05:00
2	1/8Roof	4520.00	484.00	98.00	5.60	5.36	0.56	0.48	0 00:05:00
3	1/8Roof-2	4520.00	484.00	98.00	5.60	5.36	0.56	0.48	0 00:05:00
4	1/8Roof-3	4520.00	484.00	98.00	5.60	5.36	0.56	0.48	0 00:05:00
5	1/8Roof-4	4520.00	0.00	98.00	5.60	5.36	0.56	0.48	0 00:05:00
6	Post-06	18885.00	484.00	89.60	5.60	4.41	1.91	1.88	0 00:05:00
7	Post-1A	7754.99	484.00	94.53	5.60	4.96	0.88	0.82	0 00:05:00
8	Post-1B	2348.01	484.00	92.57	5.60	4.72	0.25	0.23	0 00:05:00
9	Post-1C	4143.99	484.00	96.30	5.60	5.16	0.49	0.45	0 00:05:00
10	Post-1D	4344.02	484.00	96.71	5.60	5.21	0.52	0.48	0 00:05:00
11	Post7A	10845.00	484.00	97.57	5.60	5.31	1.32	1.17	0 00:05:00
12	Post7B	19698.01	484.00	90.20	5.60	4.48	2.02	1.98	0 00:05:00
13	PRE-08	1080.98	484.00	73.00	5.60	2.73	0.07	0.06	0 00:16:04
14	Pre-1	85389.01	484.00	94.21	5.60	4.92	9.65	7.77	0 00:14:48
15	Sub-09	3079.00	484.00	79.00	5.60	3.32	0.23	0.24	0 00:05:00

Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	Junction	163.80	170.13	163.80	170.13	0.00	1.30	164.71	0.00	5.42	0 00:00	0.00	0.00
2 DMH(10)	Junction	162.00	165.40	162.00	165.40	0.00	1.96	163.39	0.00	2.01	0 00:00	0.00	0.00
3 DMH(3)	Junction	163.75	169.82	163.75	169.82	0.00	1.52	164.50	0.00	5.32	0 00:00	0.00	0.00
4 DMH(4)	Junction	163.30	170.24	163.30	170.24	0.00	3.11	164.25	0.00	5.99	0 00:00	0.00	0.00
5 DMH(5)	Junction	162.70	169.84	162.70	169.84	0.00	3.56	163.80	0.00	6.04	0 00:00	0.00	0.00
6 DMH(6)	Junction	162.55	173.51	162.55	173.51	0.00	4.54	163.64	0.00	9.87	0 00:00	0.00	0.00
7 DMH(8)	Junction	161.95	168.06	161.95	168.06	0.00	6.38	163.20	0.00	4.86	0 00:00	0.00	0.00
8 Jun-01	Junction	167.00	174.00	0.00	0.00	0.00	0.23	167.78	0.00	6.22	0 00:00	0.00	0.00
9 Jun-02	Junction	168.30	174.90	168.30	174.90	0.00	0.01	168.91	0.00	5.99	0 00:00	0.00	0.00
10 Jun-03	Junction	168.30	174.30	168.30	174.30	1000.00	0.23	168.56	0.00	5.74	0 00:00	0.00	0.00
11 Jun-05	Junction	166.70	172.70	166.70	172.70	0.00	0.23	167.14	0.00	5.56	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	Junction	168.50	171.00	168.50	171.00	0.00	0.66	169.46	0.00	1.54	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	Junction	161.01	171.00	161.01	0.00	0.00	0.00	161.01	0.00	9.99	0 00:00	0.00	0.00
14 Structure - (11)	Junction	167.68	171.00	167.68	168.62	0.00	0.00	167.68	0.00	3.32	0 00:00	0.00	0.00
15 Structure - (12)	Junction	161.54	171.00	161.54	162.48	0.00	0.48	168.29	0.00	2.71	0 00:00	0.00	0.00
16 Structure - (15)	Junction	164.88	171.00	164.88	165.82	0.00	0.48	168.29	0.00	2.71	0 00:00	0.00	0.00
17 Structure - (18)	Junction	168.50	171.00	168.50	171.00	0.00	0.05	169.54	0.00	1.46	0 00:00	0.00	0.00
18 Structure - (20)	Junction	168.25	171.00	168.25	168.25	0.00	0.48	169.54	0.00	1.46	0 00:00	0.00	0.00
19 Structure - (22)	Junction	168.25	171.00	168.25	171.00	0.00	0.78	169.52	0.00	1.48	0 00:00	0.00	0.00
20 Basin4out	Outfall	170.00					0.00	170.00					
21 Basin5out	Outfall	170.00					0.00	170.00					
22 Out-Post1-DP	Outfall	161.60					6.35	162.57					
23 Out-Pre-1	Outfall	163.20					7.76	163.20					
24 Post5A	Outfall	166.64					0.23	166.86					
25 Post8	Outfall	172.00					0.06	172.00					
26 Basin4	Storage Node	169.00	172.50	0.00		0.00	1.97	170.39				0.00	0.00
27 Basin5	Storage Node	170.00	172.50	0.00		0.00	1.86	171.91				0.00	0.00
28 Stor-06	Storage Node	167.70	171.00	0.00		0.00	0.57	169.52				0.00	0.00
29 Stor-07	Storage Node	165.36	171.00	0.00		0.00	2.50	168.19				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)
1 Link-01	Pipe	Inlet-04	DMH(6)	32.20	166.00	165.75	0.7800	12.000	0.0150	0.24	2.72	0.09	2.02	0.20
2 Link-02	Pipe	Structure - (22)	Structure - (31)	38.96	170.30	166.00	11.0400	4.000	0.0150	0.00	2.19	0.00	0.00	0.00
3 Link-03	Pipe	Out-1Pipe - (13) (1) (1)	DMH(6)	31.15	169.10	168.00	3.5300	6.000	0.0150	0.66	0.91	0.73	4.69	0.33
4 Link-04	Pipe	Basin4	Stor-07	35.30	170.00	168.50	4.2500	6.000	0.0150	1.60	2.00	0.80	5.25	0.36
5 Link-05	Pipe	Jun-01	Jun-05	216.63	167.50	166.70	0.3700	8.000	0.0150	0.23	0.64	0.36	1.20	0.36
6 Link-06	Pipe	Jun-02	Jun-03	163.00	169.00	168.35	0.4000	8.000	0.0150	0.00	0.66	0.00	0.00	0.11
7 Link-07	Pipe	DMH(1)	DMH(3)	55.66	164.00	163.80	0.3600	12.000	0.0150	1.30	1.85	0.70	2.23	0.70
8 Link-08	Pipe	Jun-03	Jun-01	85.00	168.35	167.50	1.0000	8.000	0.0150	0.23	1.05	0.22	1.98	0.24
9 Link-11	Pipe	Jun-05	Post5A	100.00	166.70	166.64	0.0600	8.000	0.0150	0.23	0.47	0.49	1.33	0.33
10 Pipe - (10)	Pipe	Structure - (12)	Stor-07	30.11	168.00	167.00	3.3200	6.000	0.0150	0.48	0.89	0.54	4.30	0.35
11 Pipe - (11)	Pipe	Structure - (15)	Stor-07	30.51	168.00	167.00	3.2800	6.000	0.0150	0.48	0.88	0.54	4.28	0.35
12 Pipe - (13)	Pipe	Structure - (18)	Structure - (20)	54.74	168.50	168.25	0.4600	10.000	0.0150	0.05	1.28	0.04	0.17	0.83
13 Pipe - (13) (1)	Pipe	Structure - (20)	Structure - (22)	45.20	168.25	168.25	0.0000	10.000	0.0150	0.30	0.85	0.35	0.54	0.83
14 Pipe - (13) (1) (1)	Pipe	Structure - (22)	Out-1Pipe - (13) (1) (1)	50.87	168.50	168.25	0.4900	10.000	0.0120	0.66	1.06	0.63	1.22	0.83
15 Pipe - (14)	Pipe	Structure - (20)	Stor-06	12.24	168.25	168.00	2.0400	6.000	0.0150	0.28	0.70	0.41	1.44	0.50
16 Pipe - (15)	Pipe	Structure - (22)	Stor-06	10.98	168.25	168.00	2.2800	6.000	0.0150	0.28	0.73	0.39	1.45	0.50
17 Pipe - (18)	Pipe	CB(1)	DMH(1)	18.00	164.50	164.00	2.7800	12.000	0.0120	0.82	6.43	0.13	2.33	0.48
18 Pipe - (20)	Pipe	Structure - (29)	DMH(4)	18.71	164.00	163.65	1.8700	12.000	0.0120	0.44	5.28	0.08	2.73	0.41
19 Pipe - (21)	Pipe	Structure - (31)	DMH(5)	28.88	164.00	163.20	2.7700	12.000	0.0120	0.48	6.42	0.07	3.59	0.39
20 Pipe - (3)	Pipe	DMH(3)	DMH(4)	38.84	163.75	163.65	0.2600	12.000	0.0120	1.52	1.96	0.78	2.90	0.67
21 Pipe - (3) (2)	Pipe	DMH(4)	DMH(5)	100.57	163.30	162.95	0.3500	15.000	0.0120	3.09	4.13	0.75	3.45	0.89
22 Pipe - (3) (2) (1)	Pipe	DMH(5)	DMH(6)	49.46	162.70	162.55	0.3000	18.000	0.0120	3.53	6.27	0.56	2.75	1.08
23 Pipe - (4)	Pipe	DMH(6)	DMH(8)	172.11	162.55	162.00	0.3200	18.000	0.0120	4.52	6.43	0.70	3.13	1.12
24 Pipe - (4) (1)	Pipe	DMH(8)	Out-Post1-DP	68.77	161.95	161.60	0.5100	18.000	0.0120	6.35	8.12	0.78	4.53	1.09
25 Pipe - (5)	Pipe	CB(2)	DMH(3)	6.17	163.85	163.80	0.8100	12.000	0.0120	0.23	3.48	0.06	0.74	0.67
26 Pipe - (6)	Pipe	DMH(8)	DMH(10)	249.75	162.00	162.50	-0.2000	15.000	0.0120	1.90	3.13	0.61	2.00	1.03
27 Pipe - (7)	Pipe	Structure - (9)	DMH(4)	108.19	165.00	163.65	1.2500	12.000	0.0120	1.17	7.47	0.16	5.13	0.43
28 Pipe - (8)	Pipe	Structure - (11)	Structure - (15)	34.98	168.50	168.00	1.4300	10.000	0.0150	0.00	2.27	0.00	0.00	0.15
29 Pipe - (8) (1)	Pipe	Structure - (15)	Structure - (12)	41.80	168.00	168.00	0.0000	10.000	0.0150	0.00	0.85	0.00	0.14	0.29
30 Pipe - (9)	Pipe	Out-1Pipe - (9)	Structure - (12)	52.56	168.50	168.00	0.9500	10.000	0.0150	0.00	1.85	0.00	0.00	0.15
31 Orifice-01	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.03				
32 Orifice-02	Orifice	Basin4	Jun-02		169.00	168.30		1.000		0.01				
33 Orifice-03	Orifice	Basin4	Jun-02		169.00	168.30		2.000		0.00				
34 Orifice-04	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.05				
35 Orifice-05	Orifice	Stor-06	DMH(6)		167.70	162.55		2.000		0.13				
36 Pipe - (12)	Orifice	DMH(1)	Stor-07		163.80	165.36		4.000		0.70				
37 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Weir	Basin4	Basin4out		169.00	170.00				0.00				
38 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Weir	Basin5	Basin5out		170.00	170.00				0.00				
39 Weir-03	Weir	Basin4	Jun-02		169.00	168.30				0.00				
40 Weir-04	Weir	Basin5	Jun-03		170.00	168.30				0.15				

Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition (min)	
0.21	0.00	Calculated
0.00	0.00	Calculated
0.68	0.00	Calculated
0.73	0.00	Calculated
0.54	0.00	Calculated
0.16	0.00	Calculated
0.70	0.00	Calculated
0.37	0.00	Calculated
0.49	0.00	Calculated
0.71	0.00	Calculated
0.71	0.00	Calculated
1.00	21.00	SURCHARGED
1.00	69.00	SURCHARGED
1.00	18.00	SURCHARGED
1.00	147.00	SURCHARGED
1.00	147.00	SURCHARGED
0.48	0.00	Calculated
0.42	0.00	Calculated
0.39	0.00	Calculated
0.67	0.00	Calculated
0.72	0.00	Calculated
0.73	0.00	Calculated
0.76	0.00	Calculated
0.74	0.00	Calculated
0.67	0.00	Calculated
0.83	0.00	Calculated
0.43	0.00	Calculated
0.17	0.00	Calculated
0.35	0.00	Calculated
0.17	0.00	Calculated

Inlet Summary

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation	Max (Rim) Elevation	Initial Water Elevation	Ponded Area	Peak Flow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Allowable Spread	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow
					(ft)	(ft)	(ft)	(ft²)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	164.50	0.00	0.82	N/A	N/A	N/A	7.00	0.00	169.54
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	163.85	200.00	0.23	N/A	N/A	N/A	7.00	0.00	166.41
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	164.00	200.00	0.24	N/A	N/A	N/A	7.00	0.00	169.01
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	164.00	0.00	0.45	N/A	N/A	N/A	7.00	0.00	170.52
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	164.00	0.00	0.48	N/A	N/A	N/A	7.00	0.00	172.62
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	167.70	0.00	1.17	N/A	N/A	N/A	7.00	0.00	172.03

Subbasin Hydrology

Subbasin : 1/2Roof

Input Data

Area (ft²) 18080.01
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

T_c = Time of Concentration (hr)
n = Manning's roughness
L_f = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (S_f^{0.5}) (unpaved surface)
V = 20.3282 * (S_f^{0.5}) (paved surface)
V = 15.0 * (S_f^{0.5}) (grassed waterway surface)
V = 10.0 * (S_f^{0.5}) (nearly bare & untilled surface)
V = 9.0 * (S_f^{0.5}) (cultivated straight rows surface)
V = 7.0 * (S_f^{0.5}) (short grass pasture surface)
V = 5.0 * (S_f^{0.5}) (woodland surface)
V = 2.5 * (S_f^{0.5}) (forest w/heavy litter surface)
T_c = (L_f / V) / (3600 sec/hr)

Where:

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n
R = A_q / W_p
T_c = (L_f / V) / (3600 sec/hr)

Where :

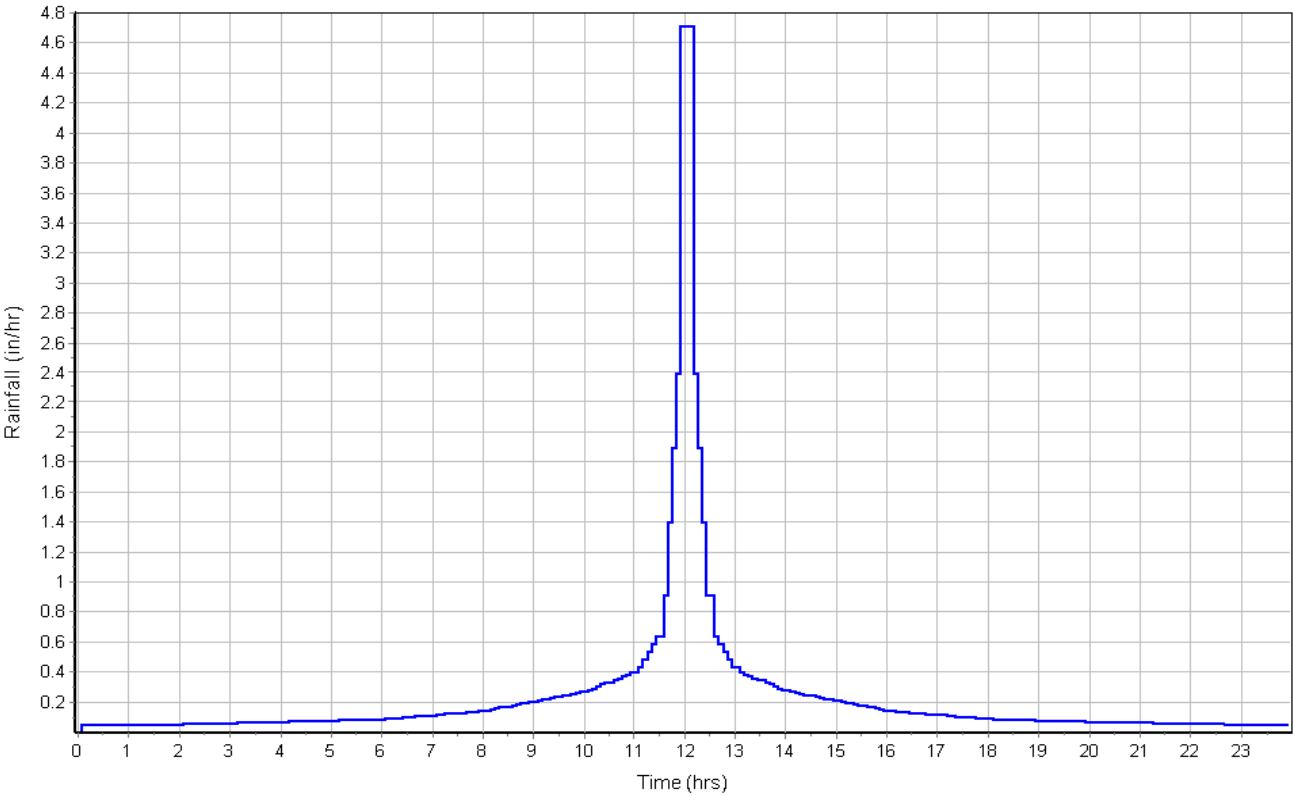
T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
R = Hydraulic Radius (ft)
A_q = Flow Area (ft²)
W_p = Wetted Perimeter (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5

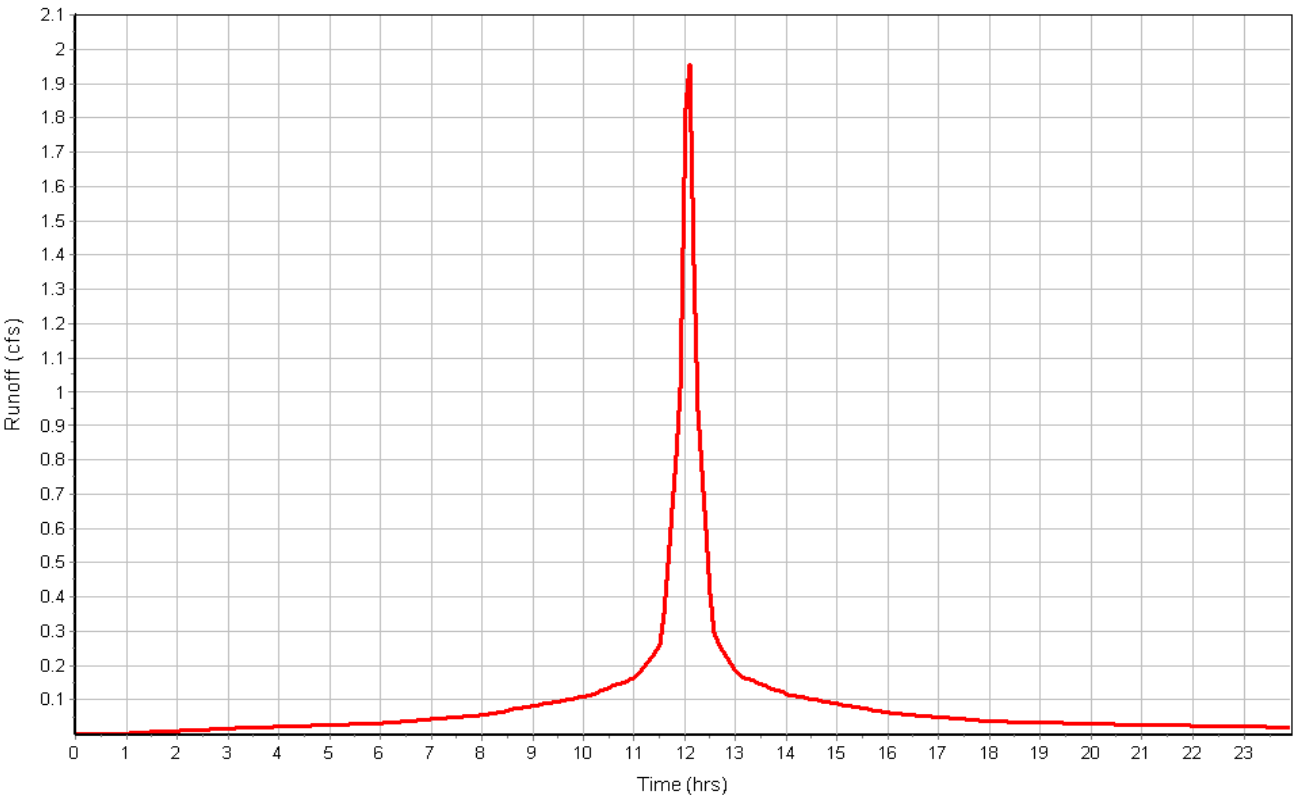
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.36
Peak Runoff (cfs) 1.96
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

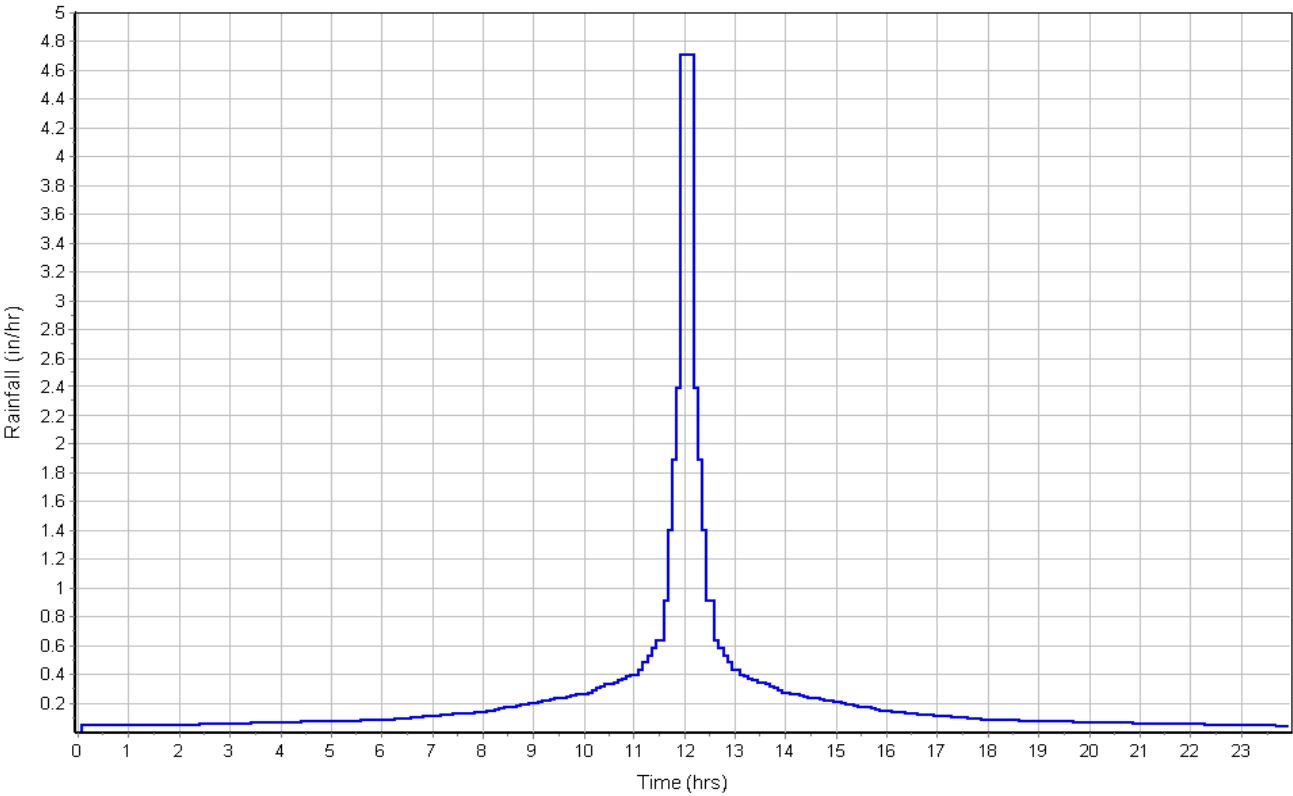
Time of Concentration

User-Defined TOC override (minutes): 5

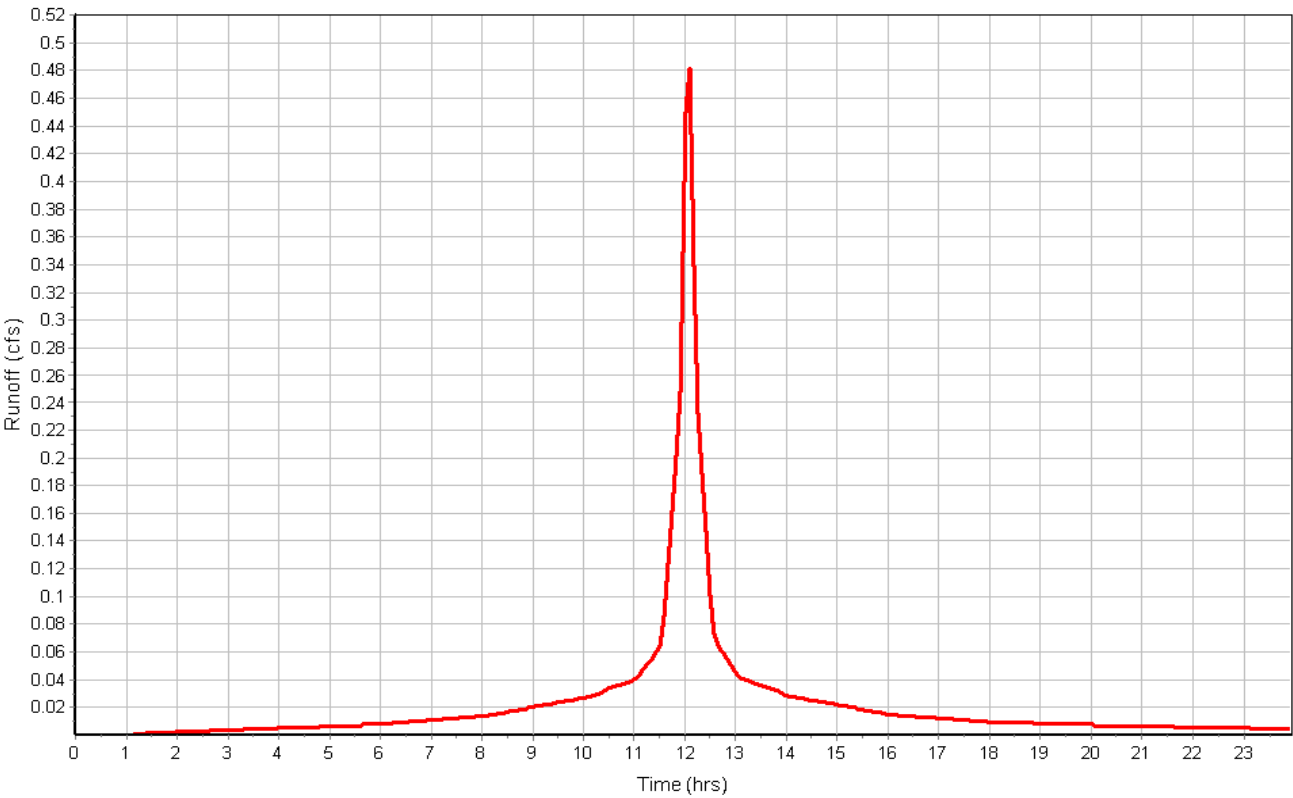
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.36
Peak Runoff (cfs) 0.48
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-2

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

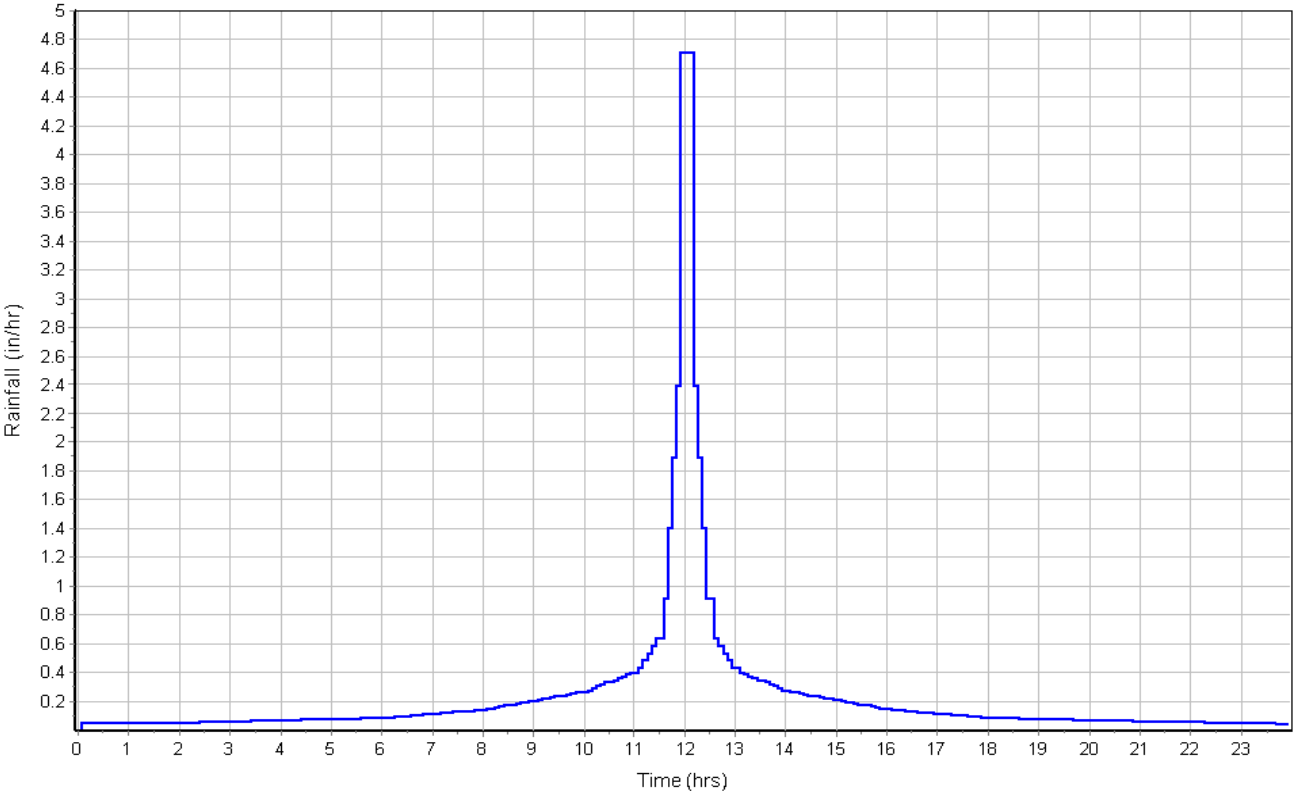
Time of Concentration

User-Defined TOC override (minutes): 5

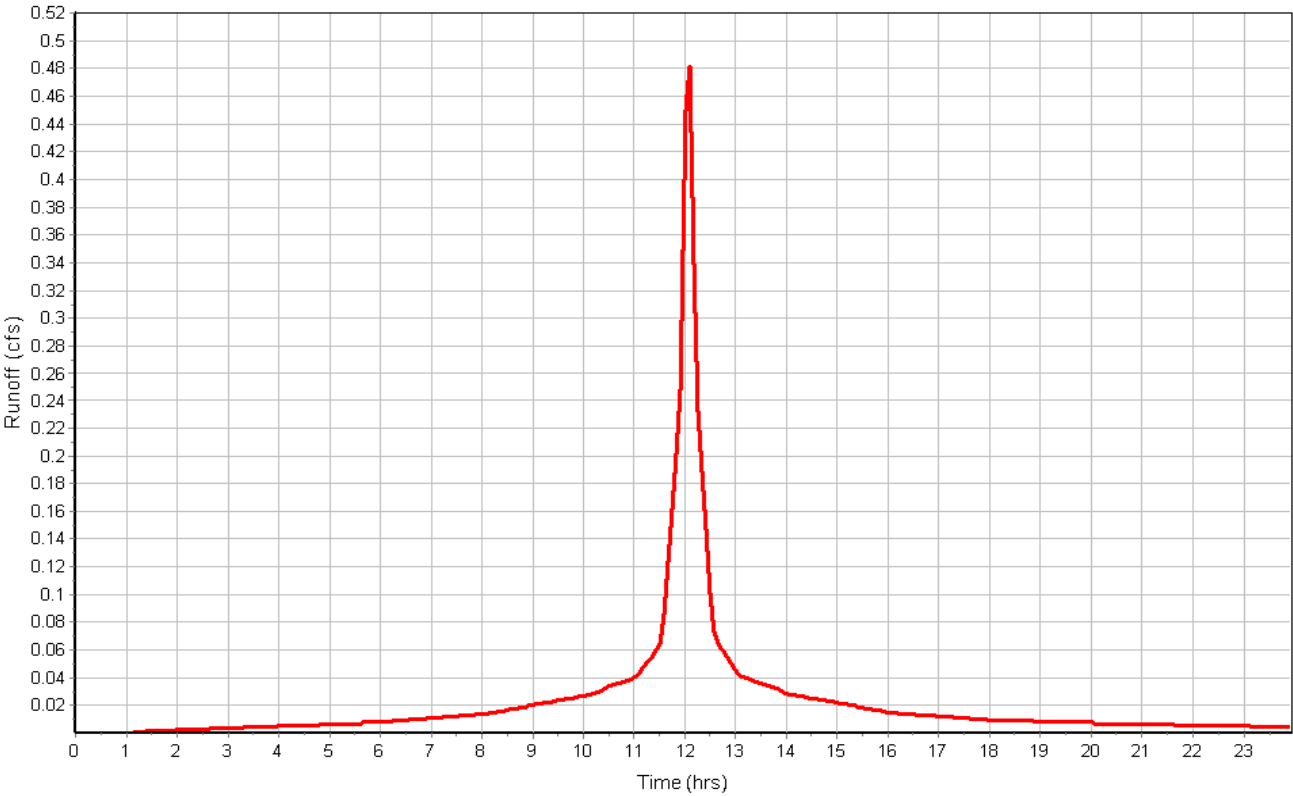
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.36
Peak Runoff (cfs) 0.48
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-3

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

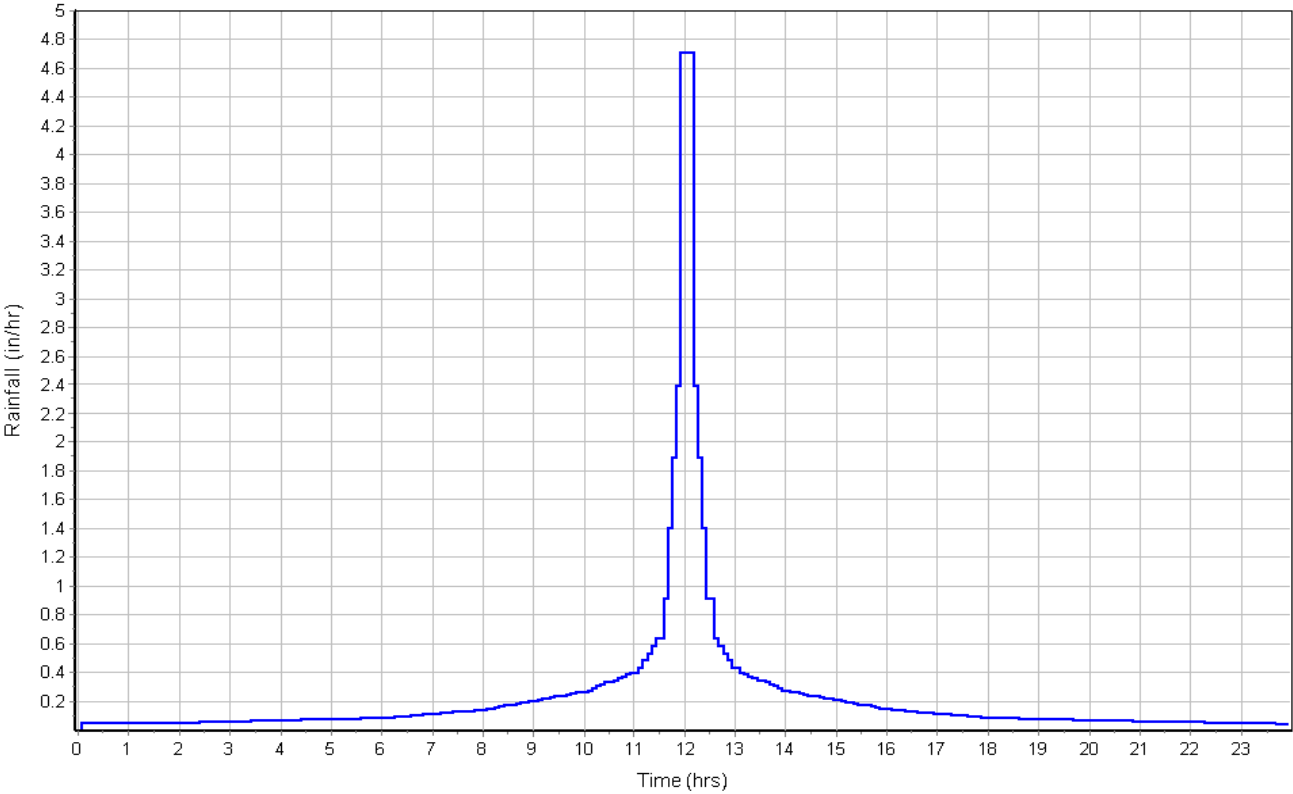
Time of Concentration

User-Defined TOC override (minutes): 5

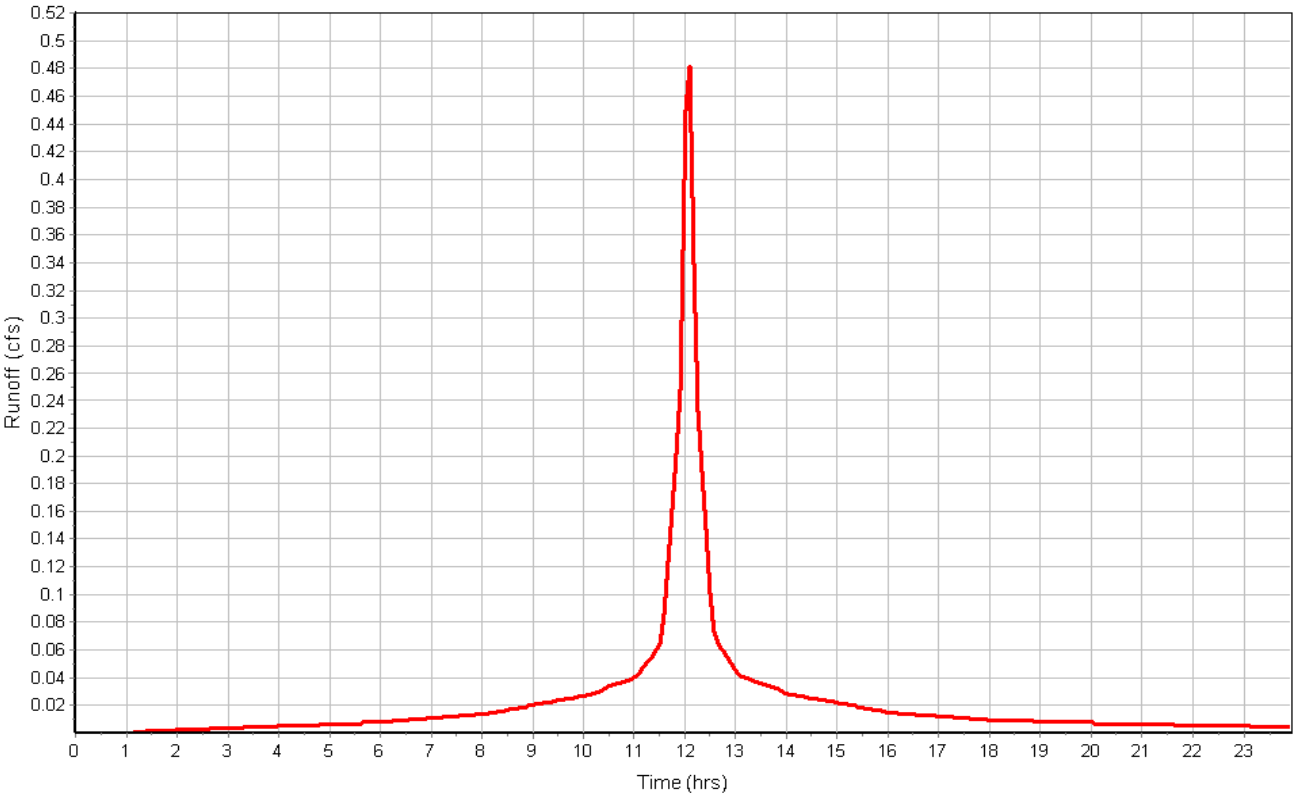
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.36
Peak Runoff (cfs) 0.48
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-4

Input Data

Area (ft²) 4520.00
Peak Rate Factor 0.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

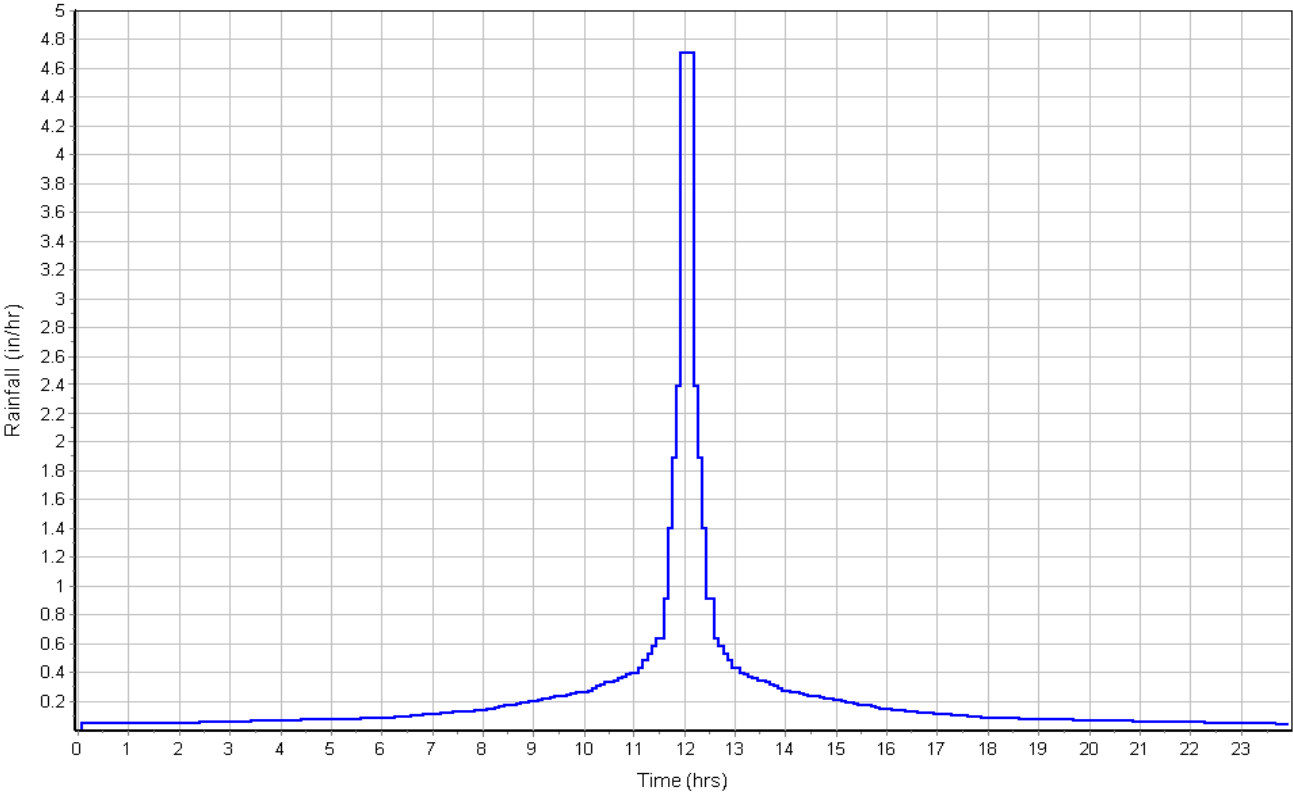
Time of Concentration

User-Defined TOC override (minutes): 5

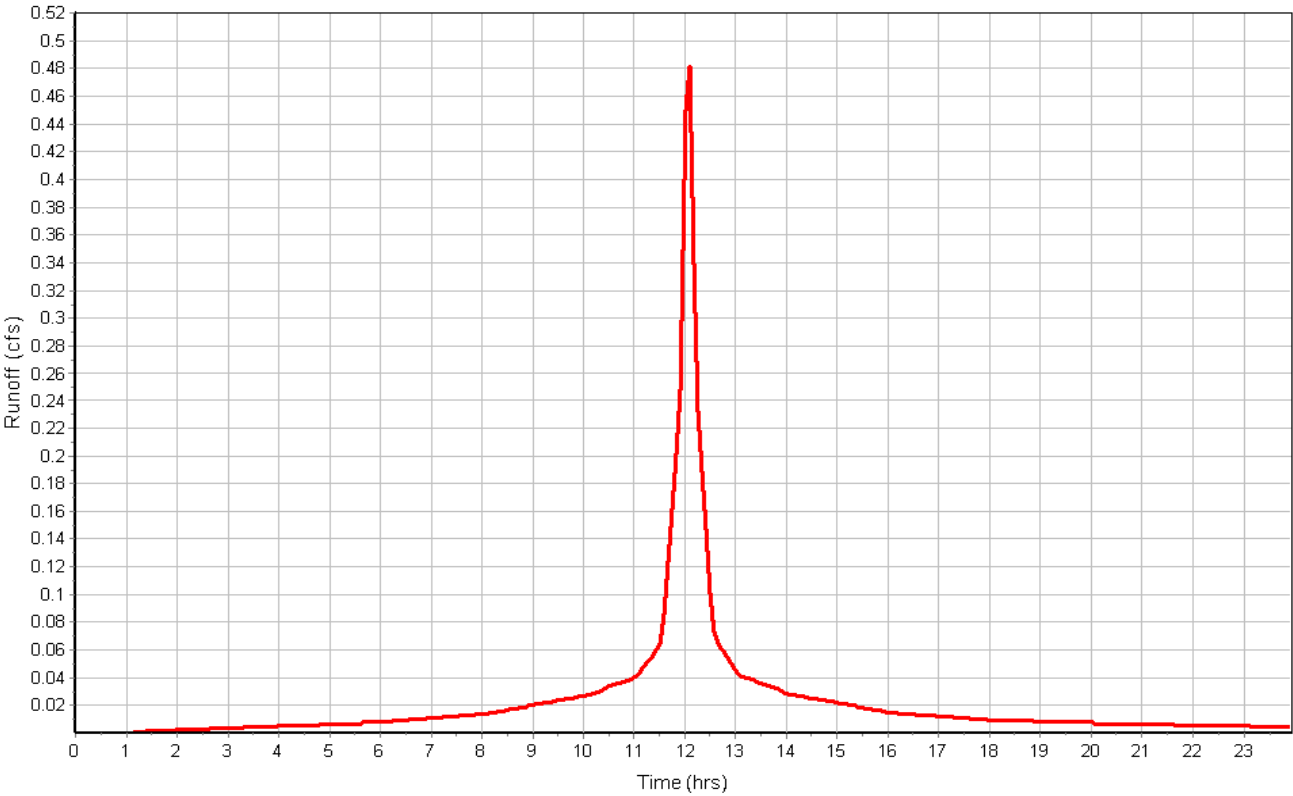
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.36
Peak Runoff (cfs) 0.48
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-06

Input Data

Area (ft²) 18885.00
Peak Rate Factor 484.00
Weighted Curve Number 89.60
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	11590.01	C	98.00
50 - 75% grass cover, Fair	3967.01	C	79.00
Woods, Fair	3327.98	C	73.00
Composite Area & Weighted CN	18885.00		89.60

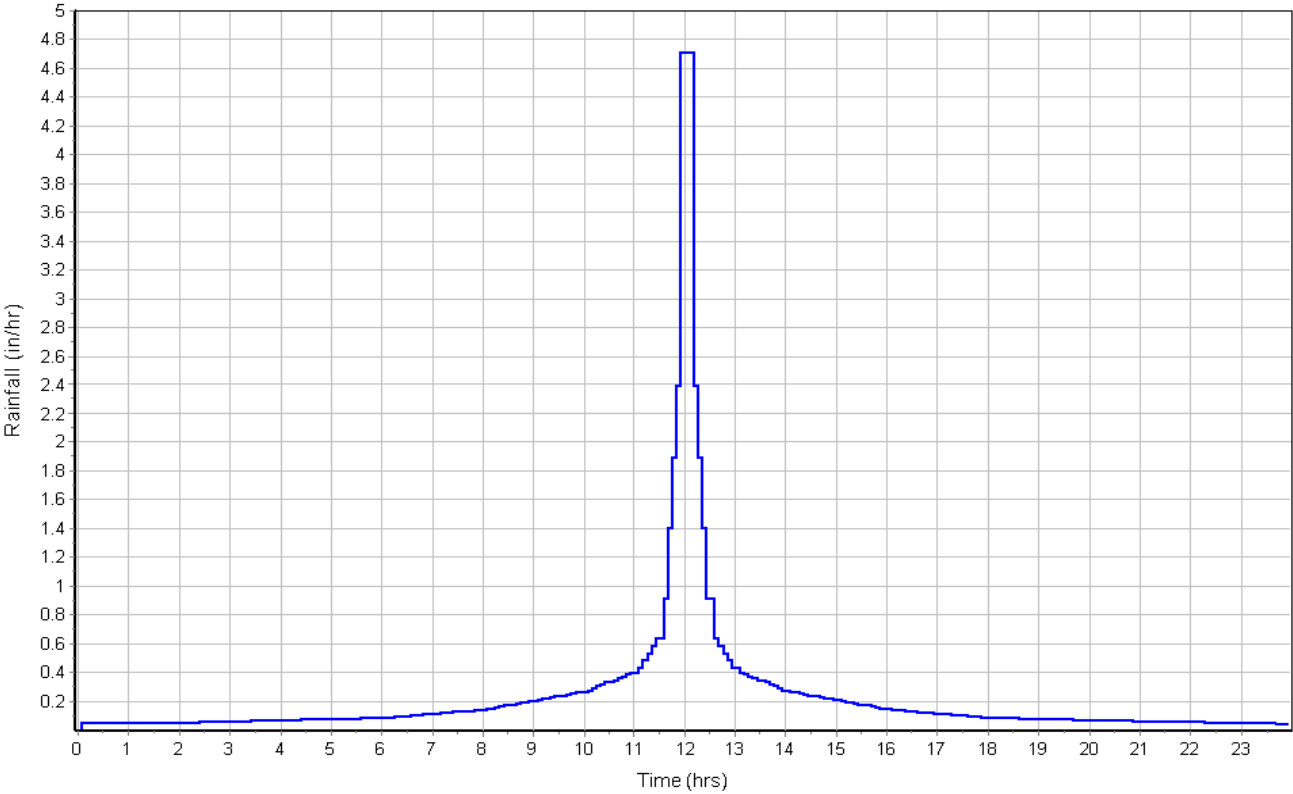
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	2	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	1.08	0.00	0.00
Computed Flow Time (min) :	0.77	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	153	0.00	0.00
Slope (%) :	1.5	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.49	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Total TOC (min)	1.80		

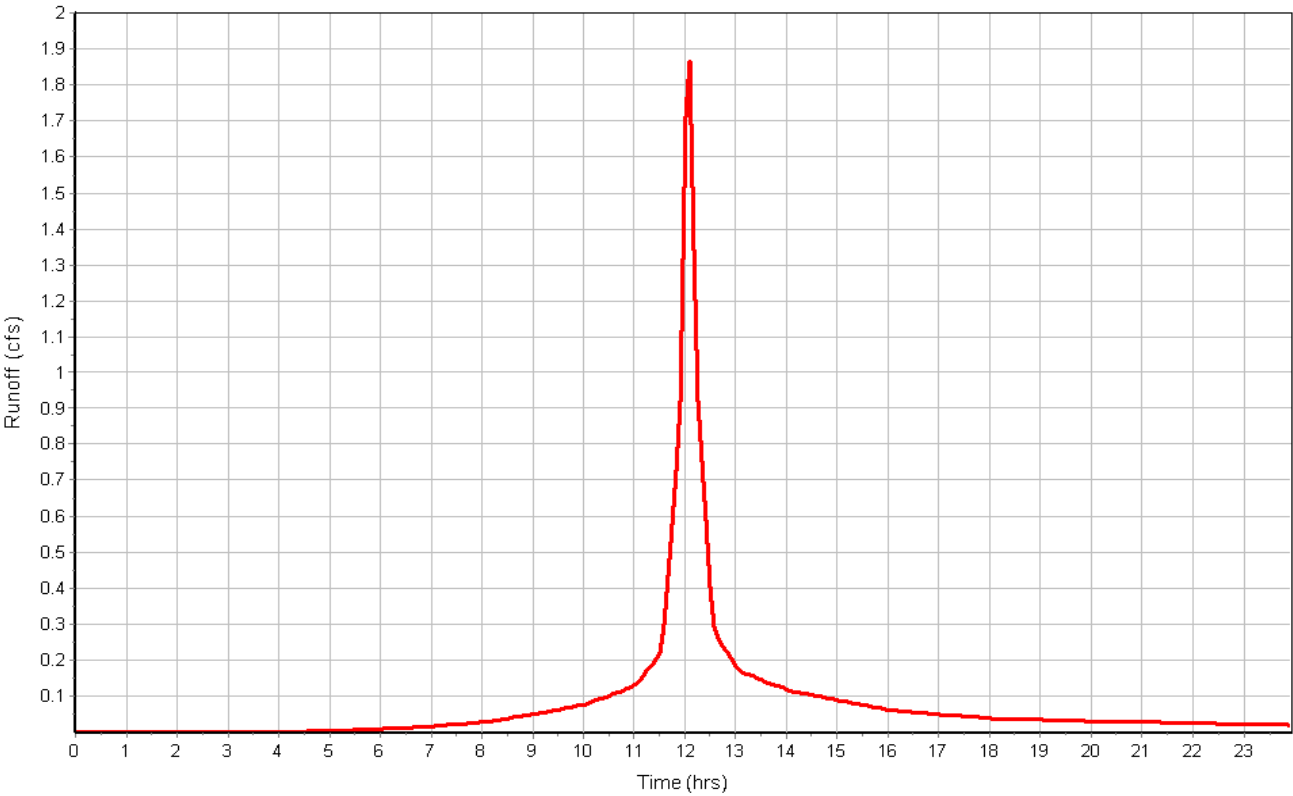
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 4.41
Peak Runoff (cfs) 1.88
Weighted Curve Number 89.60
Time of Concentration (days hh:mm:ss) 0 00:01:48

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1A

Input Data

Area (ft²) 7754.99
Peak Rate Factor 484.00
Weighted Curve Number 94.53
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	6337.02	C	98.00
50 - 75% grass cover, Fair	1418.01	C	79.00
Composite Area & Weighted CN	7755.03		94.53

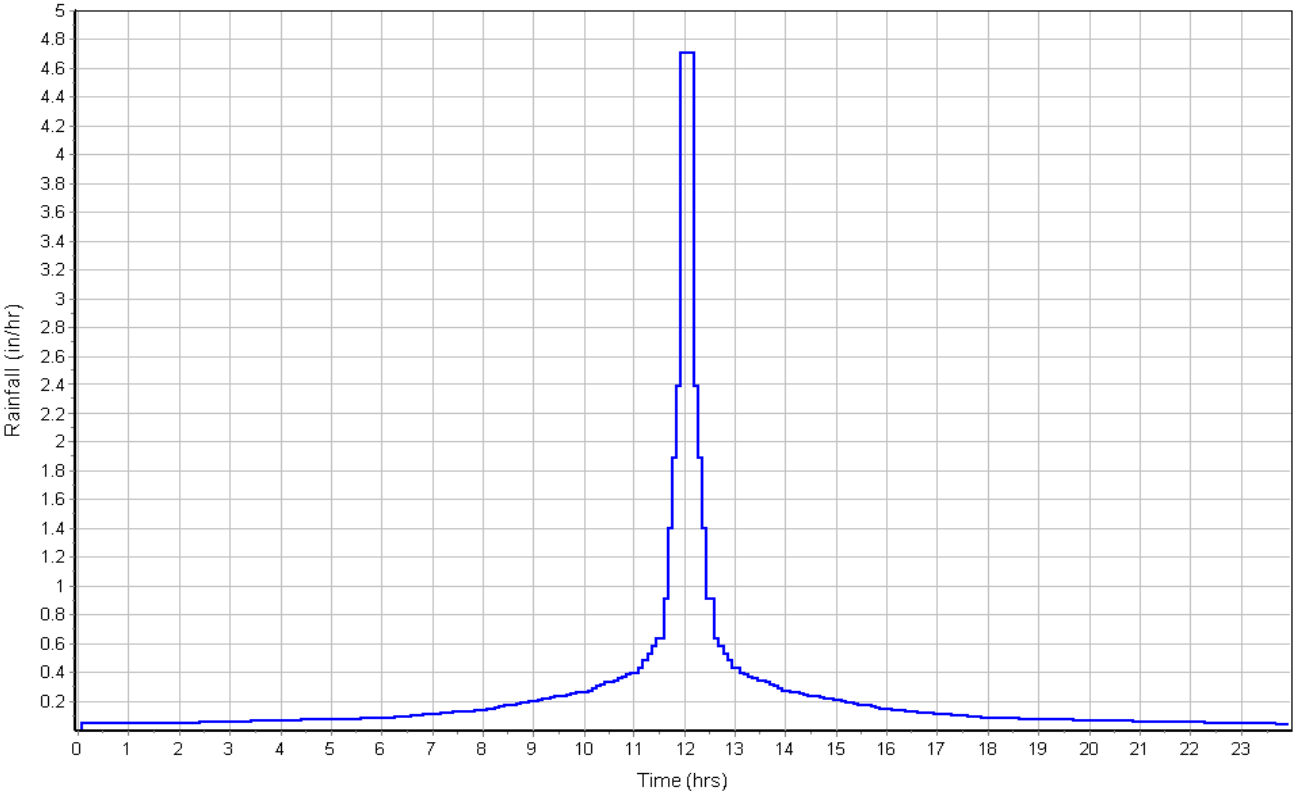
Time of Concentration

User-Defined TOC override (minutes): 5

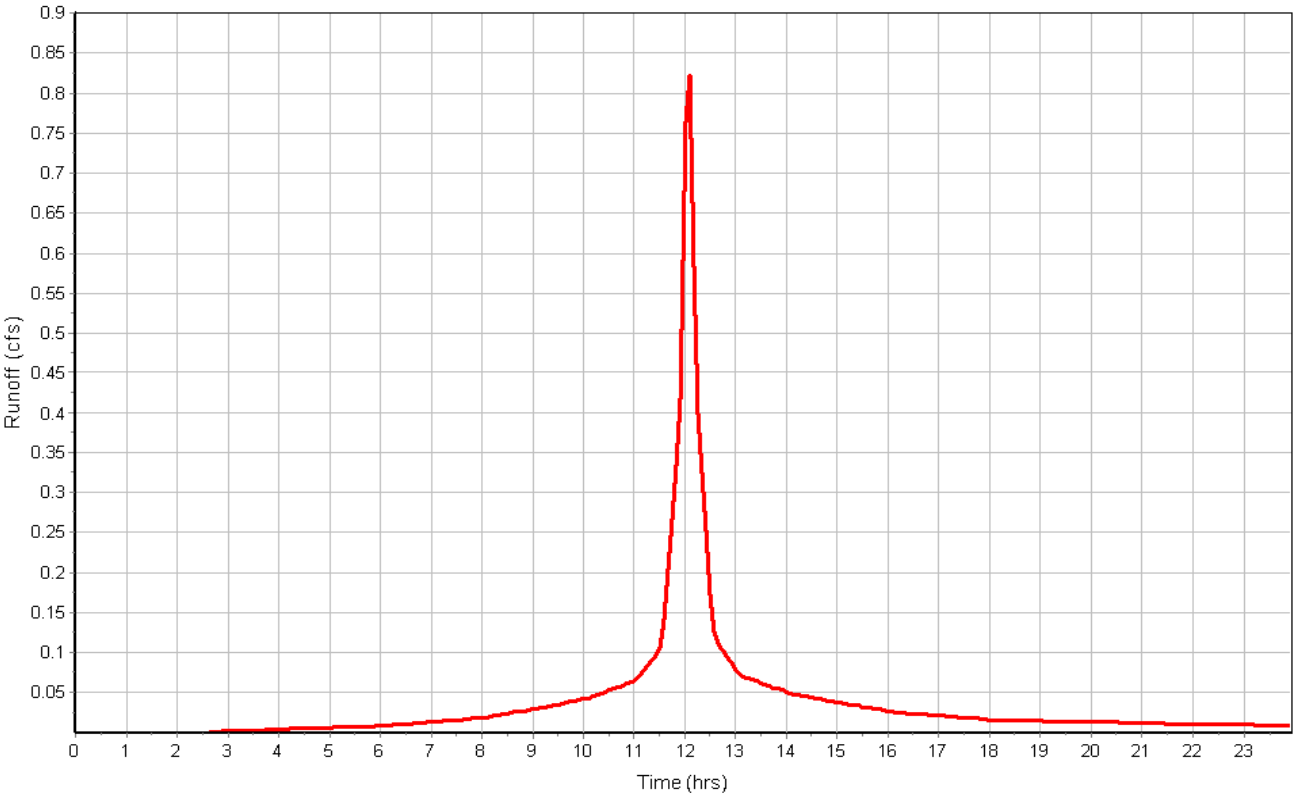
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 4.96
Peak Runoff (cfs) 0.82
Weighted Curve Number 94.53
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1B

Input Data

Area (ft²) 2348.01
Peak Rate Factor 484.00
Weighted Curve Number 92.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	1677.02	C	98.00
50 - 75% grass cover, Fair	671.00	C	79.00
Composite Area & Weighted CN	2348.02		92.57

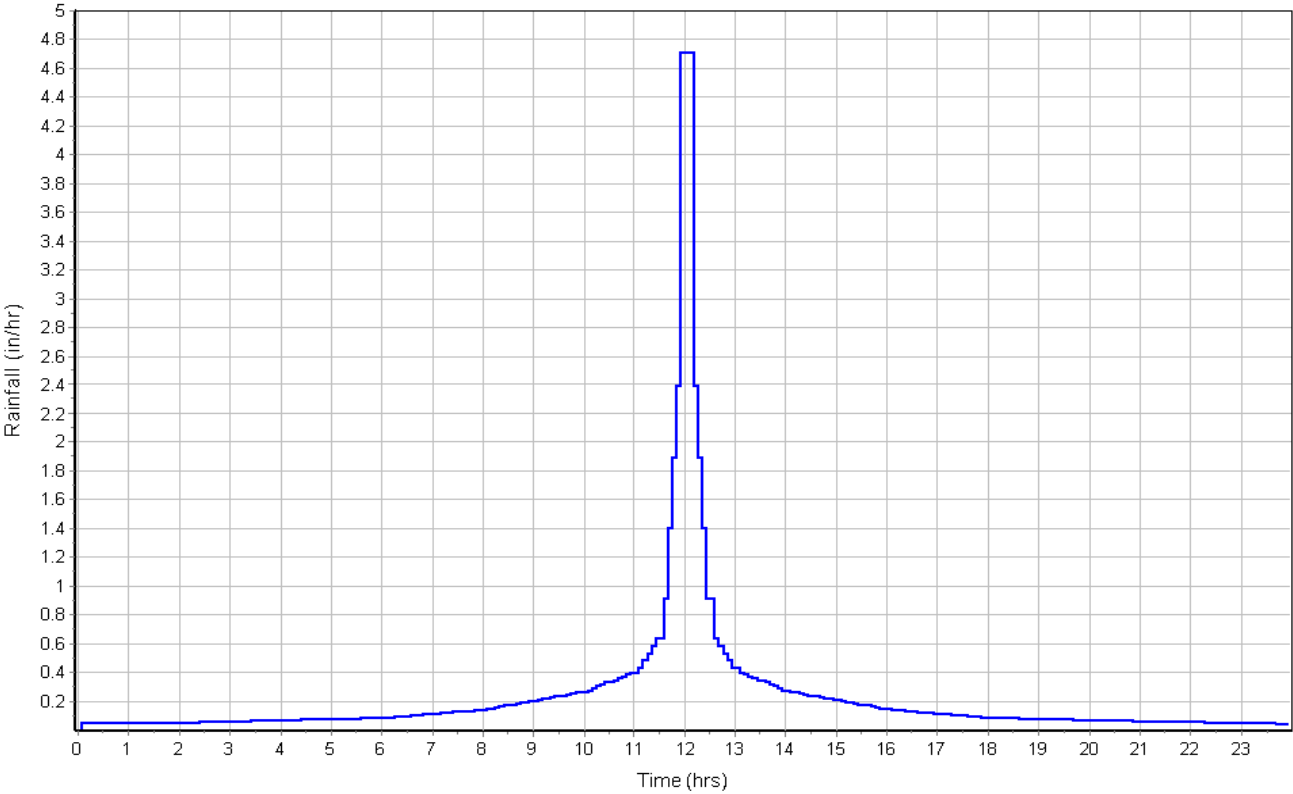
Time of Concentration

User-Defined TOC override (minutes): 5

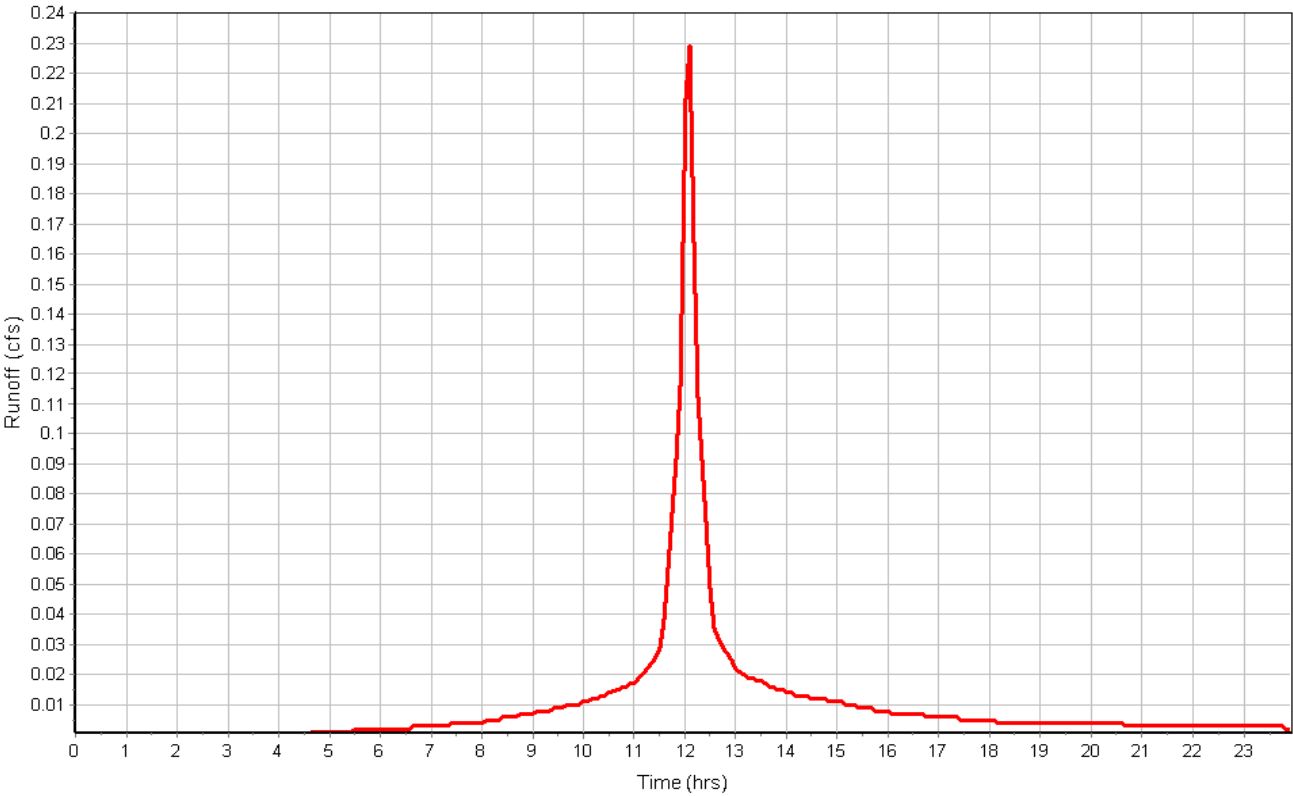
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 4.72
Peak Runoff (cfs) 0.23
Weighted Curve Number 92.57
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1C

Input Data

Area (ft²) 4143.99
Peak Rate Factor 484.00
Weighted Curve Number 96.30
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	3773.99	C	98.00
50 - 75% grass cover, Fair	370.00	C	79.00
Composite Area & Weighted CN	4143.99		96.30

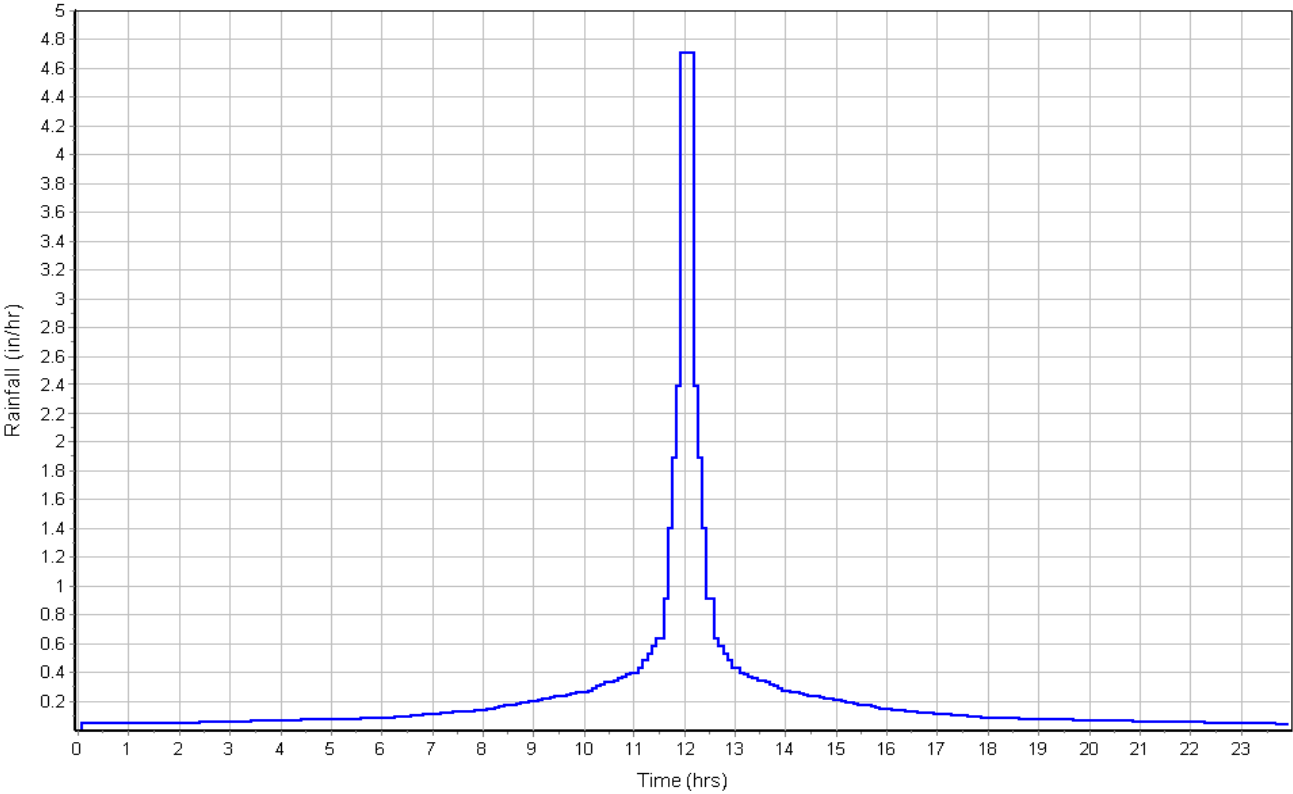
Time of Concentration

User-Defined TOC override (minutes): 5

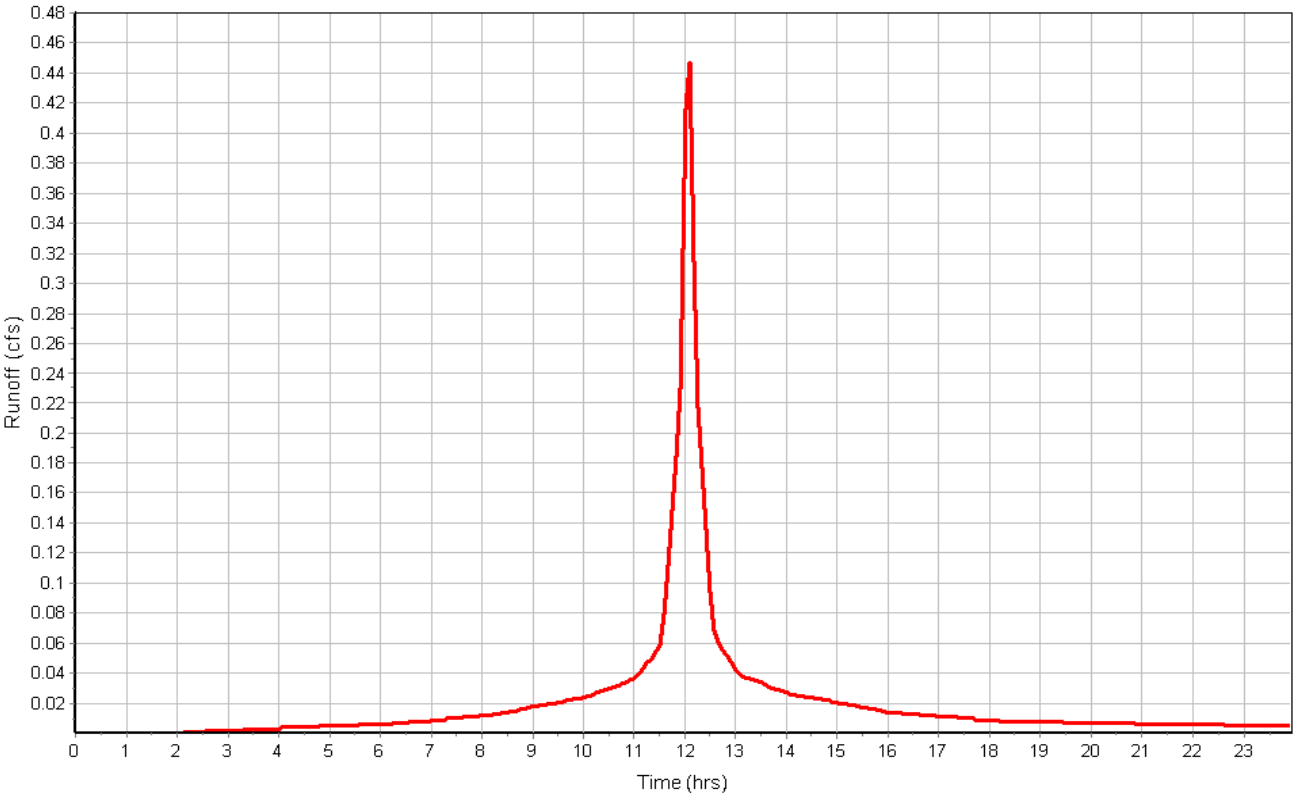
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.16
Peak Runoff (cfs) 0.45
Weighted Curve Number 96.30
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1D

Input Data

Area (ft²) 4344.02
Peak Rate Factor 484.00
Weighted Curve Number 96.71
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	4047.99	C	98.00
50 - 75% grass cover, Fair	295.99	C	79.00
Composite Area & Weighted CN	4343.98		96.71

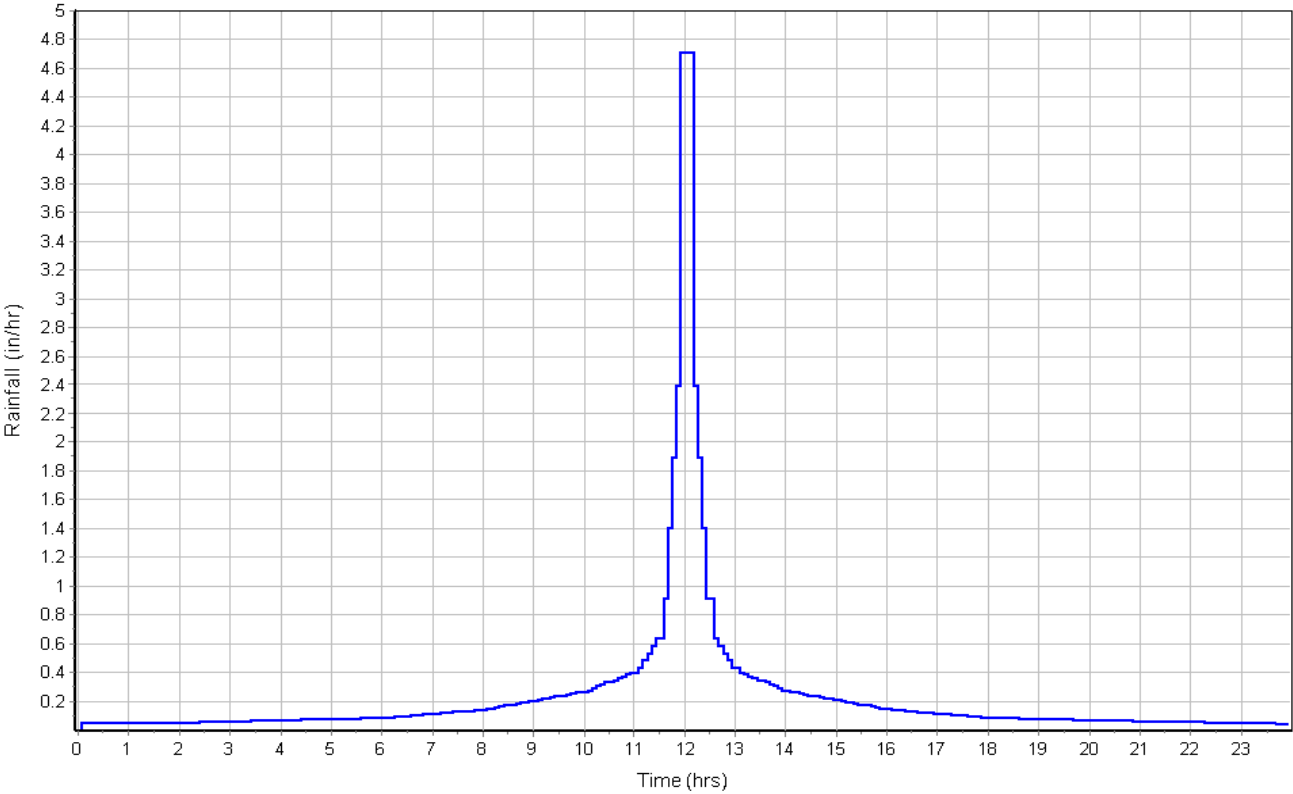
Time of Concentration

User-Defined TOC override (minutes): 5

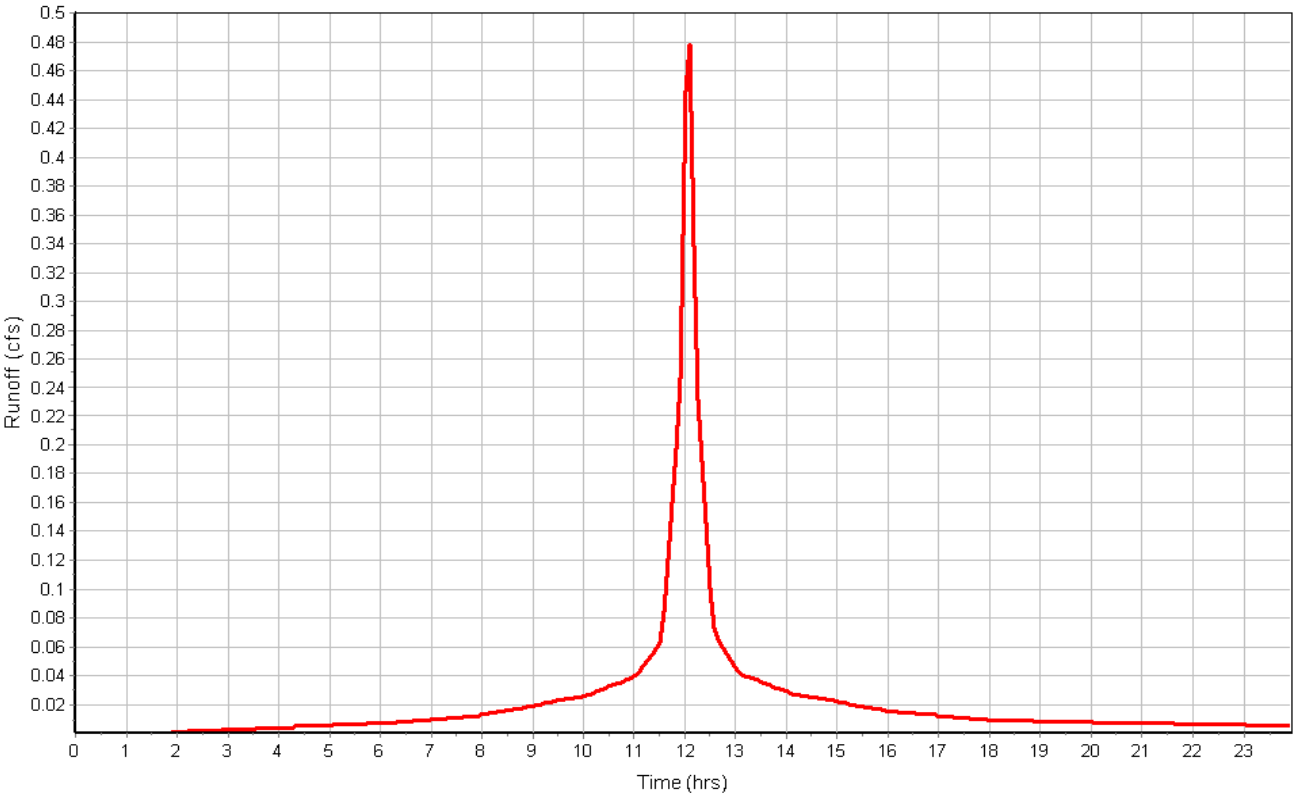
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.21
Peak Runoff (cfs) 0.48
Weighted Curve Number 96.71
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7A

Input Data

Area (ft²) 10845.00
Peak Rate Factor 484.00
Weighted Curve Number 97.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	10597.02	C	98.00
50 - 75% grass cover, Fair	247.99	C	79.00
Woods, Fair	0.00	C	73.00
Composite Area & Weighted CN	10845.01		97.57

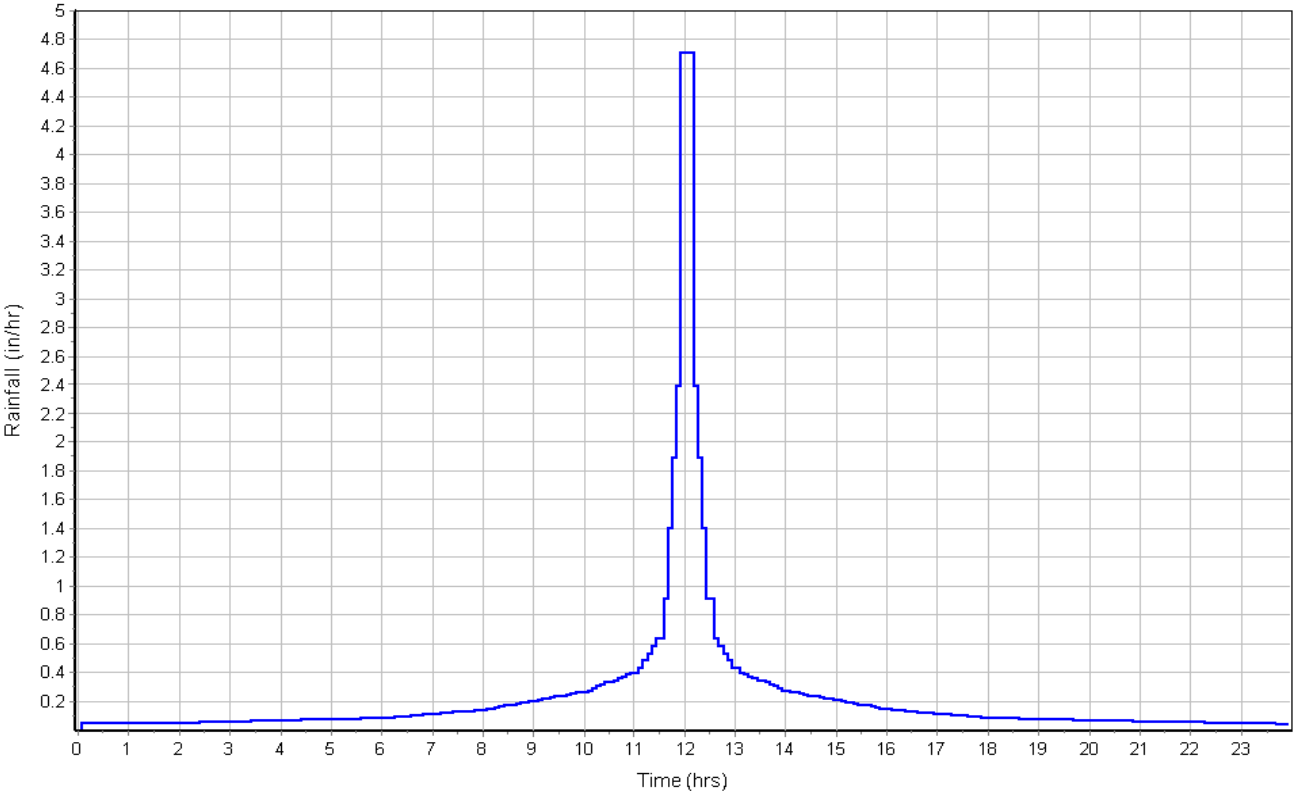
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

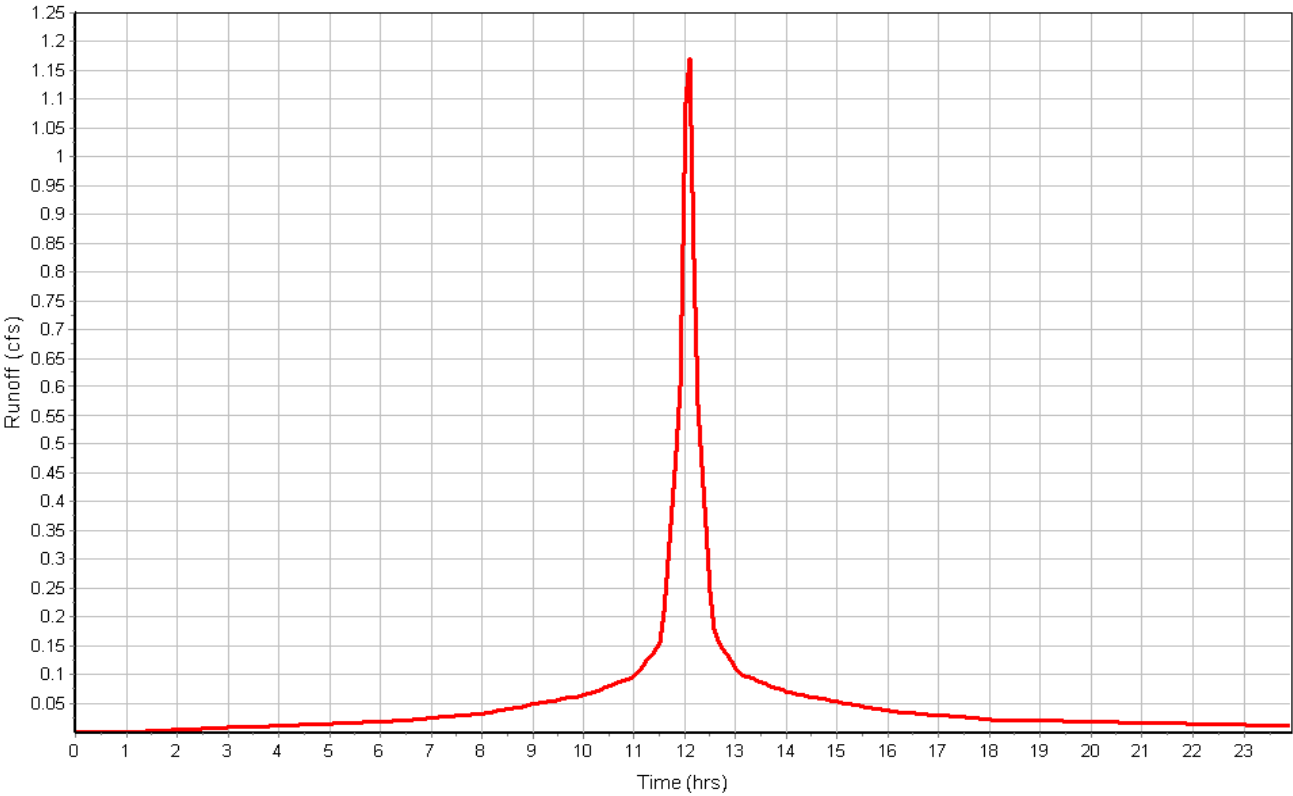
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 5.31
Peak Runoff (cfs) 1.17
Weighted Curve Number 97.57
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7B

Input Data

Area (ft²) 19698.01
Peak Rate Factor 484.00
Weighted Curve Number 90.20
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	11902.99	C	98.00
50 - 75% grass cover, Fair	6880.00	C	79.00
Woods, Fair	915.02	C	73.00
Composite Area & Weighted CN	19698.01		90.20

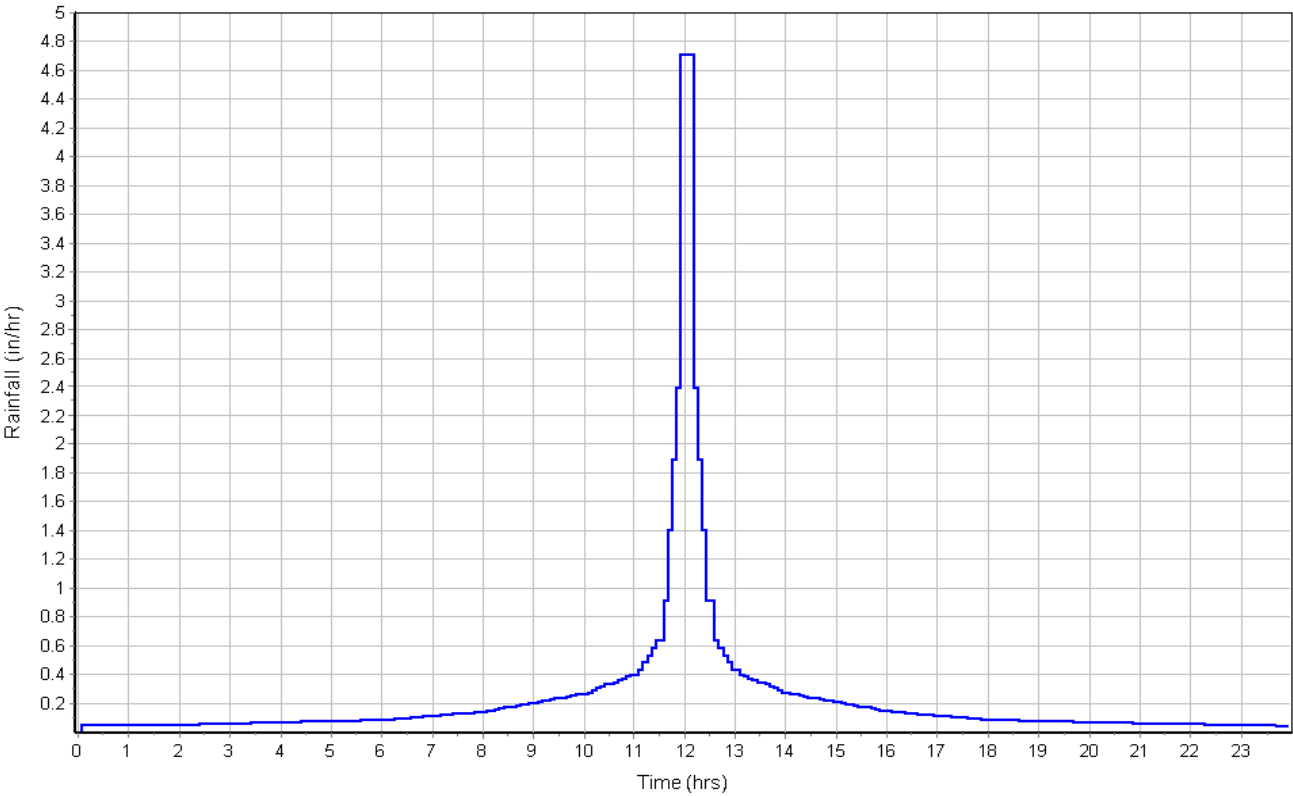
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

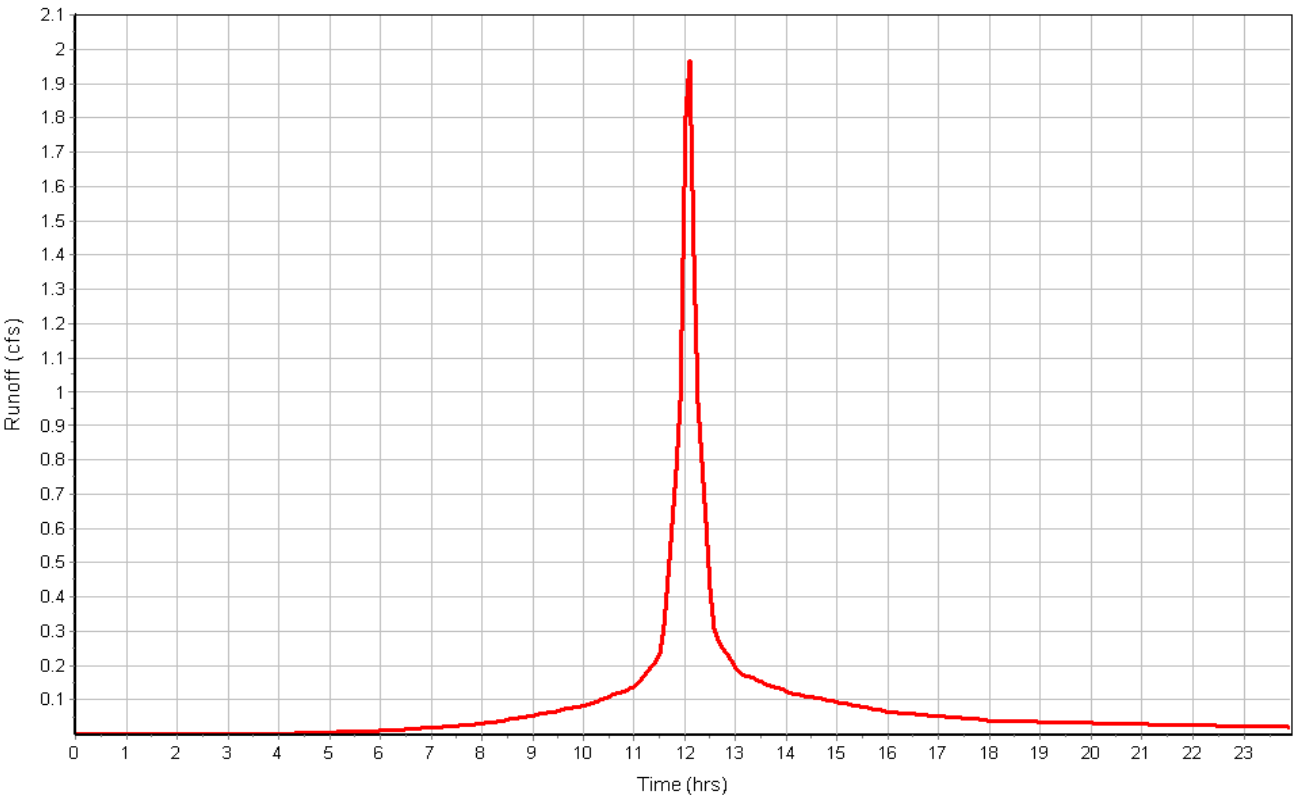
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 4.48
Peak Runoff (cfs) 1.98
Weighted Curve Number 90.20
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : PRE-08

Input Data

Area (ft²) 1080.98
Peak Rate Factor 484.00
Weighted Curve Number 73.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Woods, Fair	1080.98	C	73.00
Composite Area & Weighted CN	1080.98		73.00

Time of Concentration

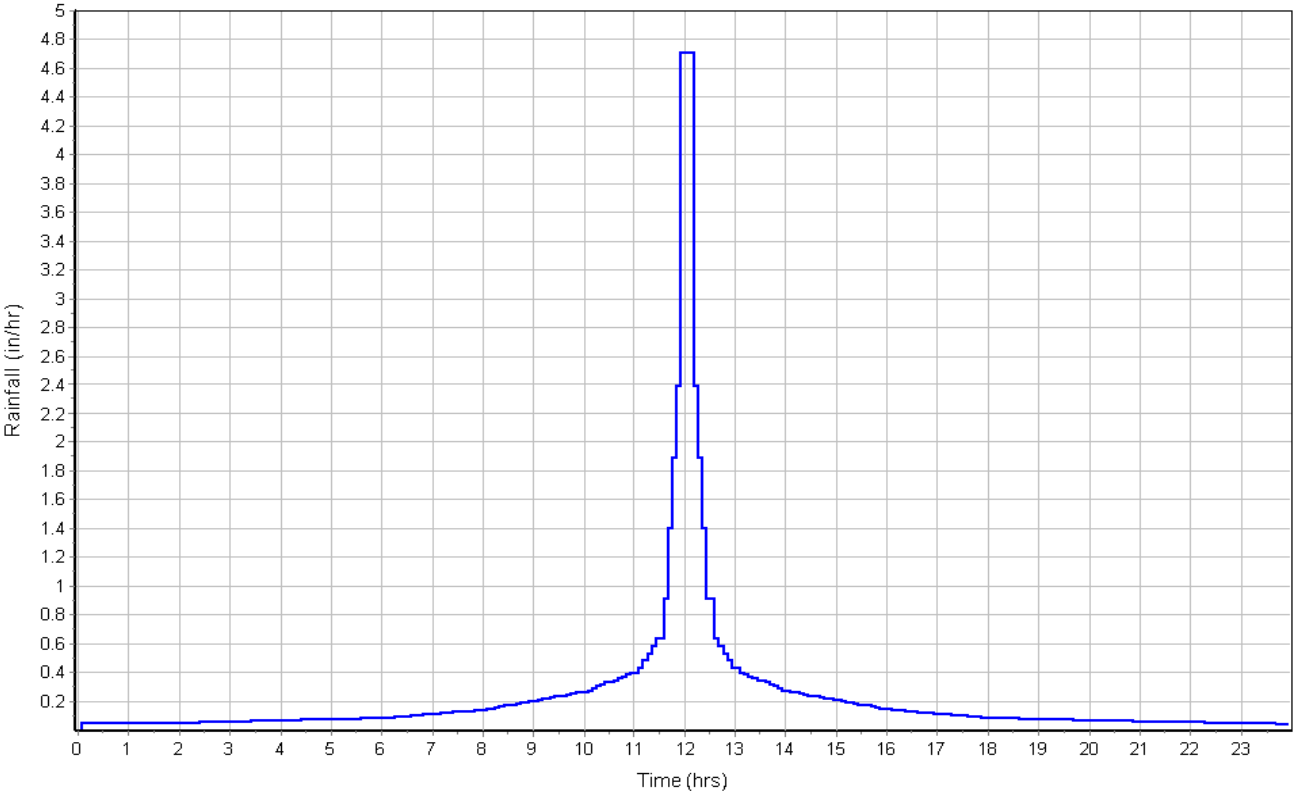
	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	15.79	0.00	0.00

	Subarea A	Subarea B	Subarea C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	28	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.61	0.00	0.00
Computed Flow Time (min) :	0.29	0.00	0.00
Total TOC (min)	16.08		

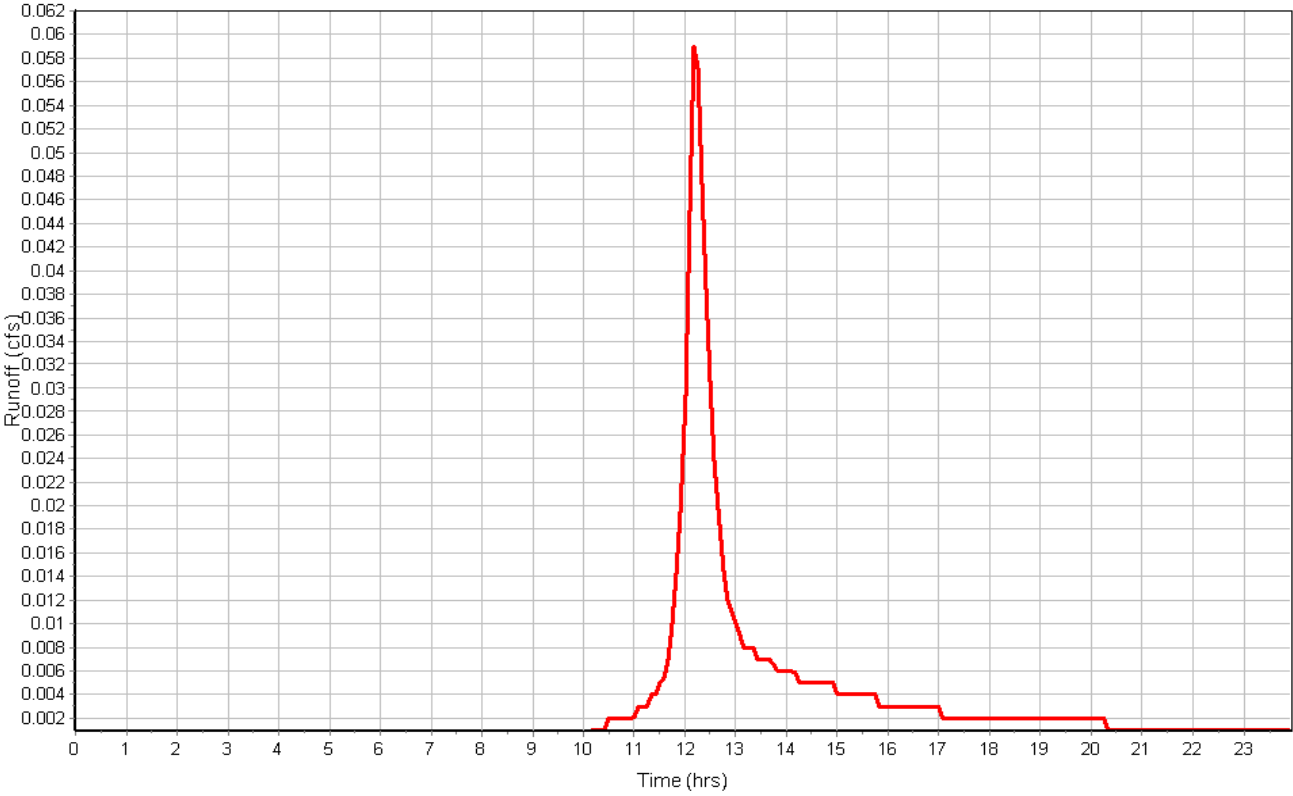
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 2.73
Peak Runoff (cfs) 0.06
Weighted Curve Number 73.00
Time of Concentration (days hh:mm:ss) 0 00:16:05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Pre-1

Input Data

Area (ft²) 85389.01
Peak Rate Factor 484.00
Weighted Curve Number 94.21
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	32210.01	C	98.00
50 - 75% grass cover, Fair	17018.98	C	79.00
Paved parking & roofs	36159.98	C	98.00
Composite Area & Weighted CN	85388.97		94.21

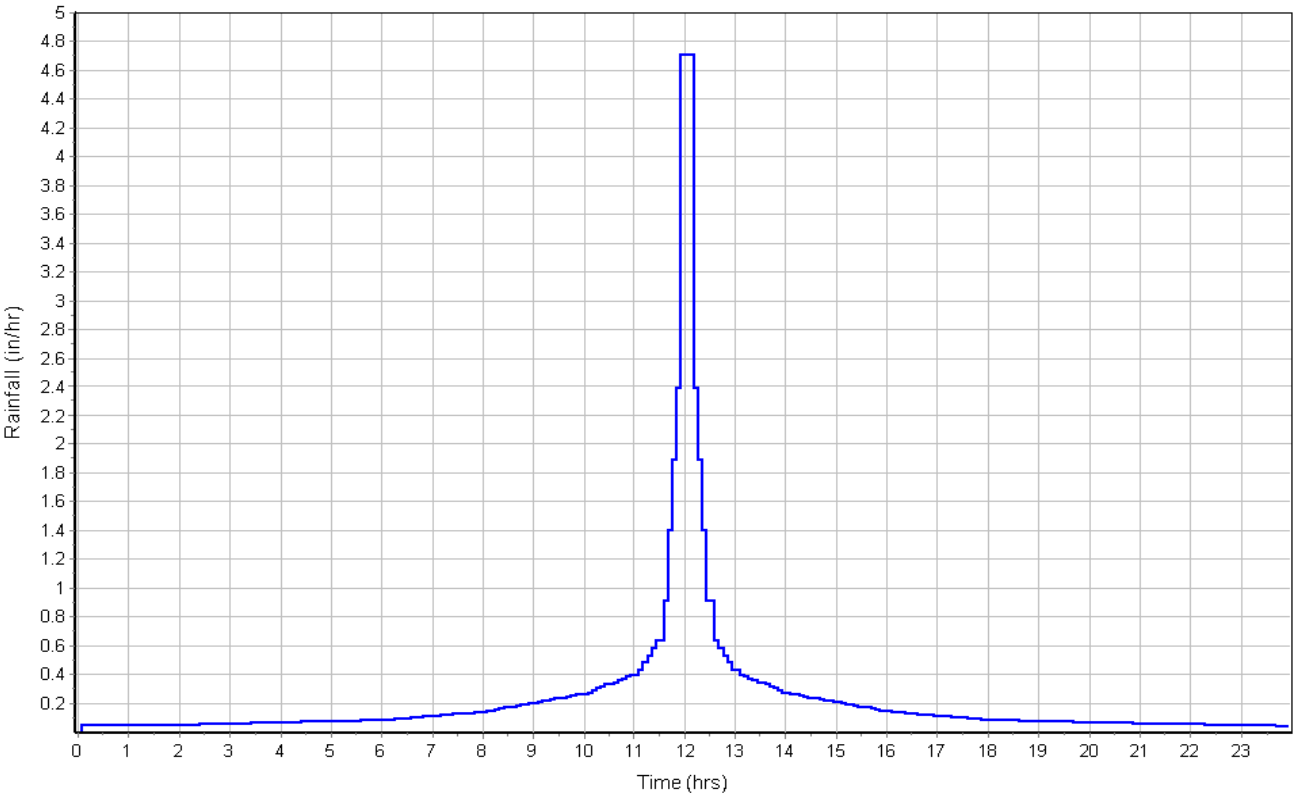
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.4	0.00
Flow Length (ft) :	25	25	0.00
Slope (%) :	6	5	0.00
2 yr, 24 hr Rainfall (in) :	3.4	3.4	0.00
Velocity (ft/sec) :	0.09	0.09	0.00
Computed Flow Time (min) :	4.43	4.76	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	302	166	220
Slope (%) :	1	2	2
Surface Type :	Unpaved	Unpaved	Paved
Velocity (ft/sec) :	1.61	2.28	2.87
Computed Flow Time (min) :	3.13	1.21	1.28
Total TOC (min)	14.81		

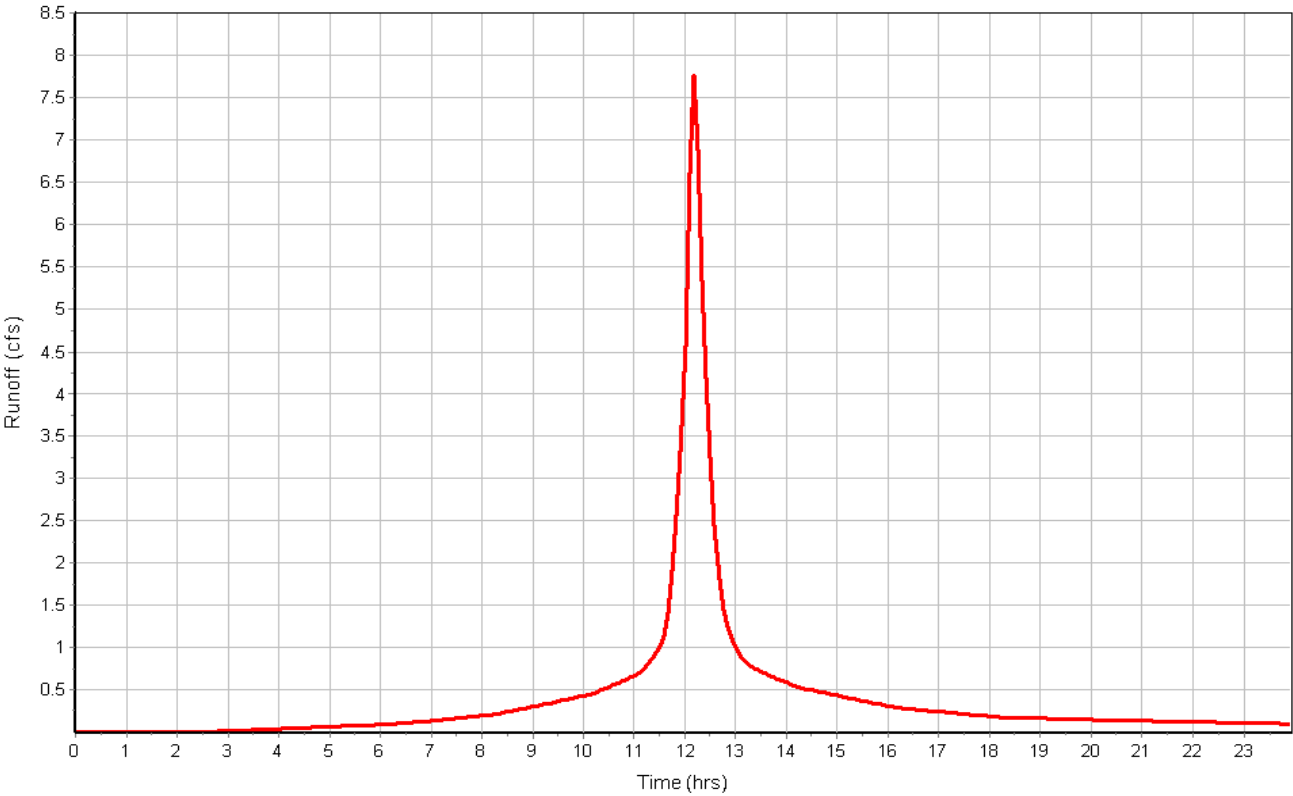
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 4.92
Peak Runoff (cfs) 7.77
Weighted Curve Number 94.21
Time of Concentration (days hh:mm:ss) 0 00:14:49

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-09

Input Data

Area (ft²) 3079.00
Peak Rate Factor 484.00
Weighted Curve Number 79.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
50 - 75% grass cover, Fair	3079.00	C	79.00
Composite Area & Weighted CN	3079.00		79.00

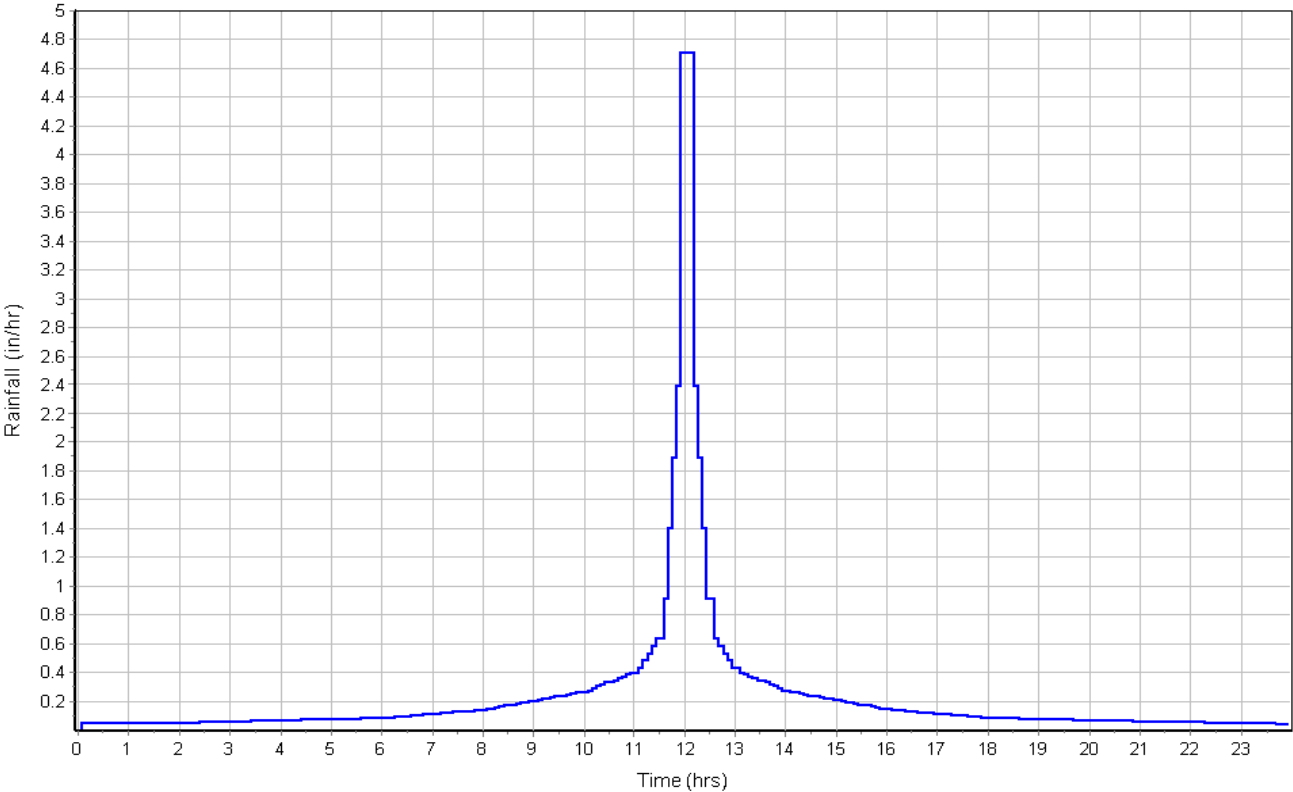
Time of Concentration

User-Defined TOC override (minutes): 5

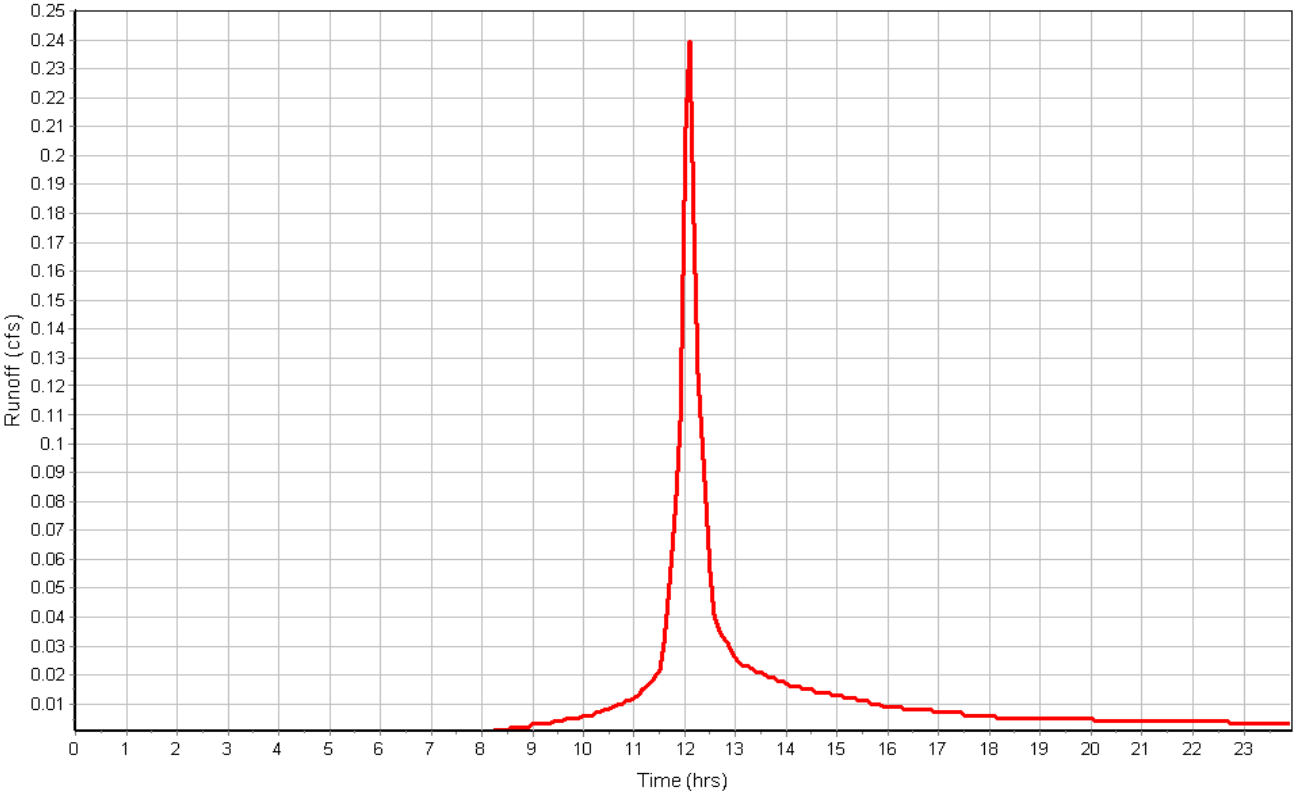
Subbasin Runoff Results

Total Rainfall (in) 5.60
Total Runoff (in) 3.32
Peak Runoff (cfs) 0.24
Weighted Curve Number 79.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation	Ground/Rim (Max) Offset	Initial Water Elevation	Initial Water Depth	Surcharge Elevation	Surcharge Depth	Ponded Area	Minimum Pipe Cover
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft²)	(in)
1 DMH(1)	163.80	170.13	6.33	163.80	0.00	170.13	0.00	0.00	0.00
2 DMH(10)	162.00	165.40	3.40	162.00	0.00	165.40	0.00	0.00	19.80
3 DMH(3)	163.75	169.82	6.07	163.75	0.00	169.82	0.00	0.00	60.22
4 DMH(4)	163.30	170.24	6.94	163.30	0.00	170.24	0.00	0.00	67.05
5 DMH(5)	162.70	169.84	7.14	162.70	0.00	169.84	0.00	0.00	67.69
6 DMH(6)	162.55	173.51	10.96	162.55	0.00	173.51	0.00	0.00	0.00
7 DMH(8)	161.95	168.06	6.11	161.95	0.00	168.06	0.00	0.00	54.74
8 Jun-01	167.00	174.00	7.00	0.00	-167.00	0.00	-174.00	0.00	70.00
9 Jun-02	168.30	174.90	6.60	168.30	0.00	174.90	0.00	0.00	0.00
10 Jun-03	168.30	174.30	6.00	168.30	0.00	174.30	0.00	1000.00	0.00
11 Jun-05	166.70	172.70	6.00	166.70	0.00	172.70	0.00	0.00	64.00
12 Out-1Pipe - (13) (1) (1)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	16.80
13 Out-1Pipe - (9)	161.01	171.00	9.99	161.01	0.00	0.00	-171.00	0.00	20.00
14 Structure - (11)	167.68	171.00	3.32	167.68	0.00	168.62	-2.38	0.00	20.00
15 Structure - (12)	161.54	171.00	9.46	161.54	0.00	162.48	-8.52	0.00	26.00
16 Structure - (15)	164.88	171.00	6.12	164.88	0.00	165.82	-5.18	0.00	26.00
17 Structure - (18)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	20.00
18 Structure - (20)	168.25	171.00	2.75	168.25	0.00	168.25	-2.75	0.00	23.00
19 Structure - (22)	168.25	171.00	2.75	168.25	0.00	171.00	0.00	0.00	4.40

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	1.30	0.00	164.71	0.91	0.00	5.42	164.29	0.49	0 12:10	0 00:00	0.00	0.00
2 DMH(10)	1.96	1.96	163.39	1.39	0.00	2.01	162.72	0.72	0 12:10	0 00:00	0.00	0.00
3 DMH(3)	1.52	0.00	164.50	0.75	0.00	5.32	164.05	0.30	0 12:10	0 00:00	0.00	0.00
4 DMH(4)	3.11	0.00	164.25	0.95	0.00	5.99	163.62	0.32	0 12:10	0 00:00	0.00	0.00
5 DMH(5)	3.56	0.00	163.80	1.10	0.00	6.04	163.05	0.35	0 12:11	0 00:00	0.00	0.00
6 DMH(6)	4.54	0.00	163.64	1.09	0.00	9.87	162.90	0.35	0 12:11	0 00:00	0.00	0.00
7 DMH(8)	6.38	0.00	163.20	1.25	0.00	4.86	162.33	0.38	0 12:11	0 00:00	0.00	0.00
8 Jun-01	0.23	0.00	167.78	0.78	0.00	6.22	167.55	0.55	0 12:54	0 00:00	0.00	0.00
9 Jun-02	0.01	0.00	168.91	0.61	0.00	5.99	168.62	0.32	0 12:30	0 00:00	0.00	0.00
10 Jun-03	0.23	0.00	168.56	0.26	0.00	5.74	168.44	0.14	0 12:52	0 00:00	0.00	0.00
11 Jun-05	0.23	0.00	167.14	0.44	0.00	5.56	166.91	0.21	0 12:56	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	0.66	0.00	169.46	0.96	0.00	1.54	168.71	0.21	0 12:12	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	0.00	0.00	161.01	0.00	0.00	9.99	161.01	0.00	0 00:00	0 00:00	0.00	0.00
14 Structure - (11)	0.00	0.00	167.68	0.00	0.00	3.32	167.68	0.00	0 00:00	0 00:00	0.00	0.00
15 Structure - (12)	0.48	0.48	168.29	6.75	0.00	2.71	167.70	6.16	0 12:10	0 00:00	0.00	0.00
16 Structure - (15)	0.48	0.48	168.29	3.41	0.00	2.71	167.95	3.07	0 12:10	0 00:00	0.00	0.00
17 Structure - (18)	0.05	0.00	169.54	1.04	0.00	1.46	168.71	0.21	0 12:12	0 00:00	0.00	0.00
18 Structure - (20)	0.48	0.48	169.54	1.29	0.00	1.46	168.60	0.35	0 12:12	0 00:00	0.00	0.00
19 Structure - (22)	0.78	0.48	169.52	1.27	0.00	1.48	168.60	0.35	0 12:12	0 00:00	0.00	0.00

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1 Link-01	32.20	166.00	0.00	165.75	3.20	0.25	0.7800	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
2 Link-02	38.96	170.30	2.05	166.00	2.00	4.30	11.0400	CIRCULAR	3.960	3.960	0.0150	0.5000	0.5000	0.0000	0.00	No
3 Link-03	31.15	169.10	0.60	168.00	5.45	1.10	3.5300	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
4 Link-04	35.30	170.00	1.00	168.50	3.14	1.50	4.2500	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
5 Link-05	216.63	167.50	0.50	166.70	0.00	0.80	0.3700	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
6 Link-06	163.00	169.00	0.70	168.35	0.05	0.65	0.4000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
7 Link-07	55.66	164.00	0.20	163.80	0.05	0.20	0.3600	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
8 Link-08	85.00	168.35	0.05	167.50	0.50	0.85	1.0000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
9 Link-11	100.00	166.70	0.00	166.64	0.00	0.06	0.0600	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
10 Pipe - (10)	30.11	168.00	6.46	167.00	1.64	1.00	3.3200	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
11 Pipe - (11)	30.51	168.00	3.12	167.00	1.64	1.00	3.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
12 Pipe - (13)	54.74	168.50	0.00	168.25	0.00	0.25	0.4600	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
13 Pipe - (13) (1)	45.20	168.25	0.00	168.25	0.00	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
14 Pipe - (13) (1) (1)	50.87	168.50	0.25	168.25	-0.25	0.25	0.4900	CIRCULAR	9.960	9.960	0.0120	0.5000	0.5000	0.0000	0.00	No
15 Pipe - (14)	12.24	168.25	0.00	168.00	0.30	0.25	2.0400	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
16 Pipe - (15)	10.98	168.25	0.00	168.00	0.30	0.25	2.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
17 Pipe - (18)	18.00	164.50	0.00	164.00	0.20	0.50	2.7800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
18 Pipe - (20)	18.71	164.00	0.00	163.65	0.35	0.35	1.8700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
19 Pipe - (21)	28.88	164.00	0.00	163.20	0.50	0.80	2.7700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
20 Pipe - (3)	38.84	163.75	0.00	163.65	0.35	0.10	0.2600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
21 Pipe - (3) (2)	100.57	163.30	0.00	162.95	0.25	0.35	0.3500	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
22 Pipe - (3) (2) (1)	49.46	162.70	0.00	162.55	0.00	0.15	0.3000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
23 Pipe - (4)	172.11	162.55	0.00	162.00	0.05	0.55	0.3200	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
24 Pipe - (4) (1)	68.77	161.95	0.00	161.60	0.00	0.35	0.5100	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25 Pipe - (5)	6.17	163.85	0.00	163.80	0.05	0.05	0.8100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
26 Pipe - (6)	249.75	162.00	0.05	162.50	0.50	-0.50	-0.2000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
27 Pipe - (7)	108.19	165.00	-2.70	163.65	0.35	1.35	1.2500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
28 Pipe - (8)	34.98	168.50	0.82	168.00	3.12	0.50	1.4300	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
29 Pipe - (8) (1)	41.80	168.00	3.12	168.00	6.46	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
30 Pipe - (9)	52.56	168.50	7.49	168.00	6.46	0.50	0.9500	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No

[illegible]

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-01	0.24	0 12:10	2.72	0.09	2.02	0.27	0.20	0.21	0.00		Calculated
2 Link-02	0.00	0 00:00	2.19	0.00	0.00		0.00	0.00	0.00		Calculated
3 Link-03	0.66	0 12:12	0.91	0.73	4.69	0.11	0.33	0.68	0.00		Calculated
4 Link-04	1.60	0 12:13	2.00	0.80	5.25	0.11	0.36	0.73	0.00		Calculated
5 Link-05	0.23	0 12:54	0.64	0.36	1.20	3.01	0.36	0.54	0.00		Calculated
6 Link-06	0.00	0 00:00	0.66	0.00	0.00		0.11	0.16	0.00		Calculated
7 Link-07	1.30	0 12:10	1.85	0.70	2.23	0.42	0.70	0.70	0.00		Calculated
8 Link-08	0.23	0 12:52	1.05	0.22	1.98	0.72	0.24	0.37	0.00		Calculated
9 Link-11	0.23	0 12:56	0.47	0.49	1.33	1.25	0.33	0.49	0.00		Calculated
10 Pipe - (10)	0.48	0 12:10	0.89	0.54	4.30	0.12	0.35	0.71	0.00		Calculated
11 Pipe - (11)	0.48	0 12:10	0.88	0.54	4.28	0.12	0.35	0.71	0.00		Calculated
12 Pipe - (13)	0.05	0 12:02	1.28	0.04	0.17	5.37	0.83	1.00	21.00		SURCHARGED
13 Pipe - (13) (1)	0.30	0 12:10	0.85	0.35	0.54	1.40	0.83	1.00	69.00		SURCHARGED
14 Pipe - (13) (1) (1)	0.66	0 12:12	1.06	0.63	1.22	0.69	0.83	1.00	18.00		SURCHARGED
15 Pipe - (14)	0.28	0 12:03	0.70	0.41	1.44	0.14	0.50	1.00	147.00		SURCHARGED
16 Pipe - (15)	0.28	0 12:03	0.73	0.39	1.45	0.13	0.50	1.00	147.00		SURCHARGED
17 Pipe - (18)	0.82	0 12:10	6.43	0.13	2.33	0.13	0.48	0.48	0.00		Calculated
18 Pipe - (20)	0.44	0 12:09	5.28	0.08	2.73	0.11	0.41	0.42	0.00		Calculated
19 Pipe - (21)	0.48	0 12:10	6.42	0.07	3.59	0.13	0.39	0.39	0.00		Calculated
20 Pipe - (3)	1.52	0 12:10	1.96	0.78	2.90	0.22	0.67	0.67	0.00		Calculated
21 Pipe - (3) (2)	3.09	0 12:10	4.13	0.75	3.45	0.49	0.89	0.72	0.00		Calculated
22 Pipe - (3) (2) (1)	3.53	0 12:10	6.27	0.56	2.75	0.30	1.08	0.73	0.00		Calculated
23 Pipe - (4)	4.52	0 12:11	6.43	0.70	3.13	0.92	1.12	0.76	0.00		Calculated
24 Pipe - (4) (1)	6.35	0 12:11	8.12	0.78	4.53	0.25	1.09	0.74	0.00		Calculated
25 Pipe - (5)	0.23	0 12:10	3.48	0.06	0.74	0.14	0.67	0.67	0.00		Calculated
26 Pipe - (6)	1.90	0 12:10	3.13	0.61	2.00	2.08	1.03	0.83	0.00		Calculated
27 Pipe - (7)	1.17	0 12:10	7.47	0.16	5.13	0.35	0.43	0.43	0.00		Calculated
28 Pipe - (8)	0.00	0 00:00	2.27	0.00	0.00		0.15	0.17	0.00		Calculated
29 Pipe - (8) (1)	0.00	0 12:05	0.85	0.00	0.14	4.98	0.29	0.35	0.00		Calculated
30 Pipe - (9)	0.00	0 00:00	1.85	0.00	0.00		0.15	0.17	0.00		Calculated

Inlet Input

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	5.00	164.50	0.00	0.00	0.00
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	2.55	163.85	0.00	200.00	0.00
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	3.00	164.00	-2.00	200.00	0.00
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	6.50	164.00	0.00	0.00	0.00
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	8.59	164.00	0.00	0.00	0.00
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	4.26	167.70	0.00	0.00	0.00

Roadway & Gutter Input

SN Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1 CB(1)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2 CB(2)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3 Inlet-04	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4 Structure - (29)	N/A	0.0200	0.0160	0.0620	2.00	0.0657	7.00
5 Structure - (31)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6 Structure - (9)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN Element ID	Peak Flow	Peak Lateral Inflow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow	Max Gutter Water Depth during Peak Flow	Time of Max Depth Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 CB(1)	0.82	0.82	N/A	N/A	N/A	0.00	169.54	0.04	0 12:10	0.00	0.00
2 CB(2)	0.23	0.23	N/A	N/A	N/A	0.00	166.41	0.01	0 12:10	0.00	0.00
3 Inlet-04	0.24	0.24	N/A	N/A	N/A	0.00	169.01	0.01	0 12:10	0.00	0.00
4 Structure - (29)	0.45	0.45	N/A	N/A	N/A	0.00	170.52	0.02	0 12:10	0.00	0.00
5 Structure - (31)	0.48	0.48	N/A	N/A	N/A	0.00	172.62	0.02	0 12:10	0.00	0.00
6 Structure - (9)	1.17	1.17	N/A	N/A	N/A	0.00	172.03	0.06	0 12:10	0.00	0.00

Storage Nodes

Storage Node : Basin4

Input Data

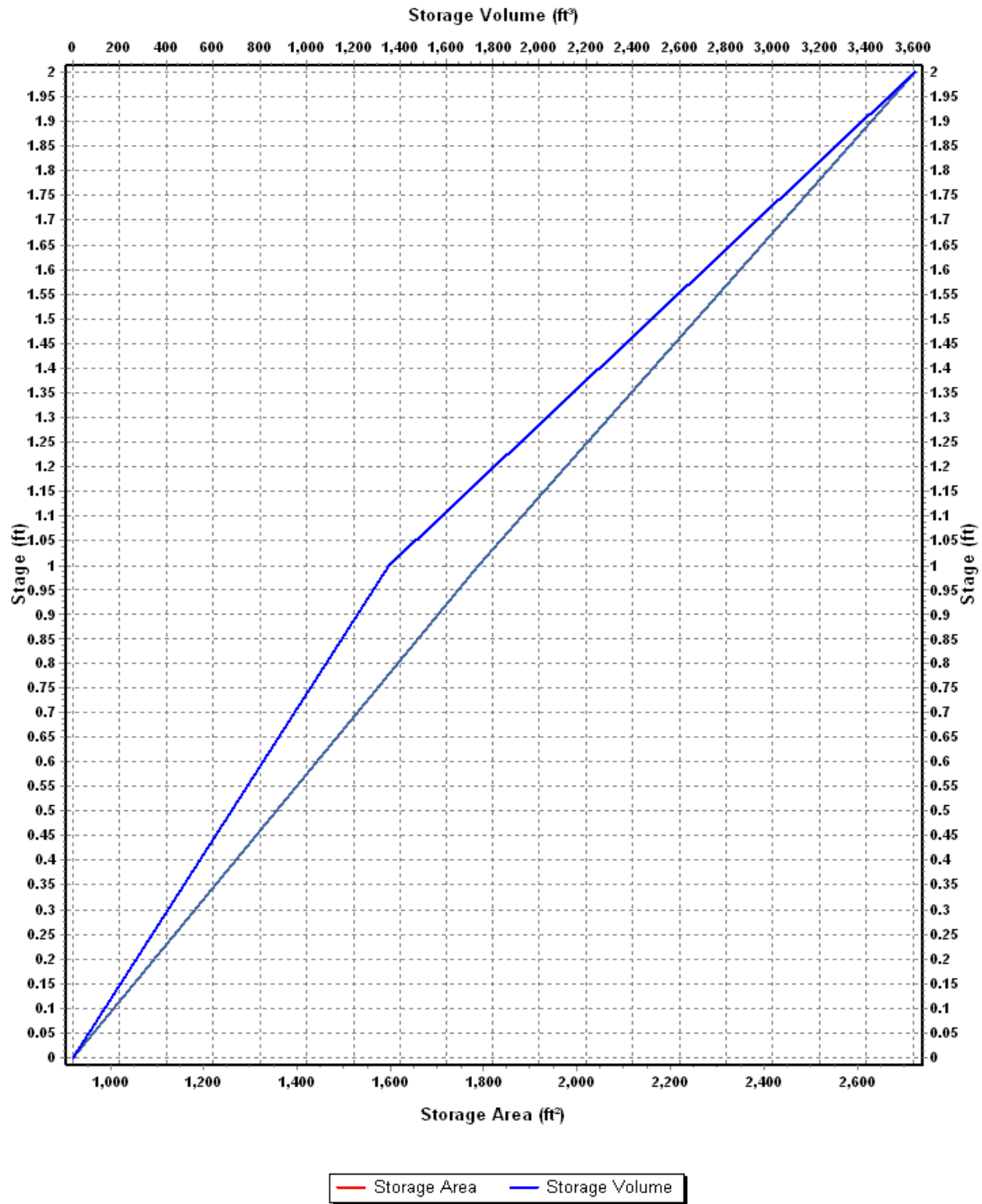
Invert Elevation (ft)	169.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-169.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-01

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	920	0.000
1	1787	1353.50
2	2722	3608.00

Storage Area Volume Curves



Storage Node : Basin4 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Trapezoidal	No	172.00	3.00	2.00	0.50	3.33
2 Weir-03	Rectangular	No	172.50	3.50	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-02	Side	CIRCULAR	No	1.00			170.25
2 Orifice-03	Side	CIRCULAR	No	2.00			171.80

Output Summary Results

Peak Inflow (cfs)	1.97
Peak Lateral Inflow (cfs)	1.97
Peak Outflow (cfs)	1.61
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	170.39
Max HGL Depth Attained (ft)	1.39
Average HGL Elevation Attained (ft)	169.92
Average HGL Depth Attained (ft)	0.92
Time of Max HGL Occurrence (days hh:mm)	0 12:13
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Basin5

Input Data

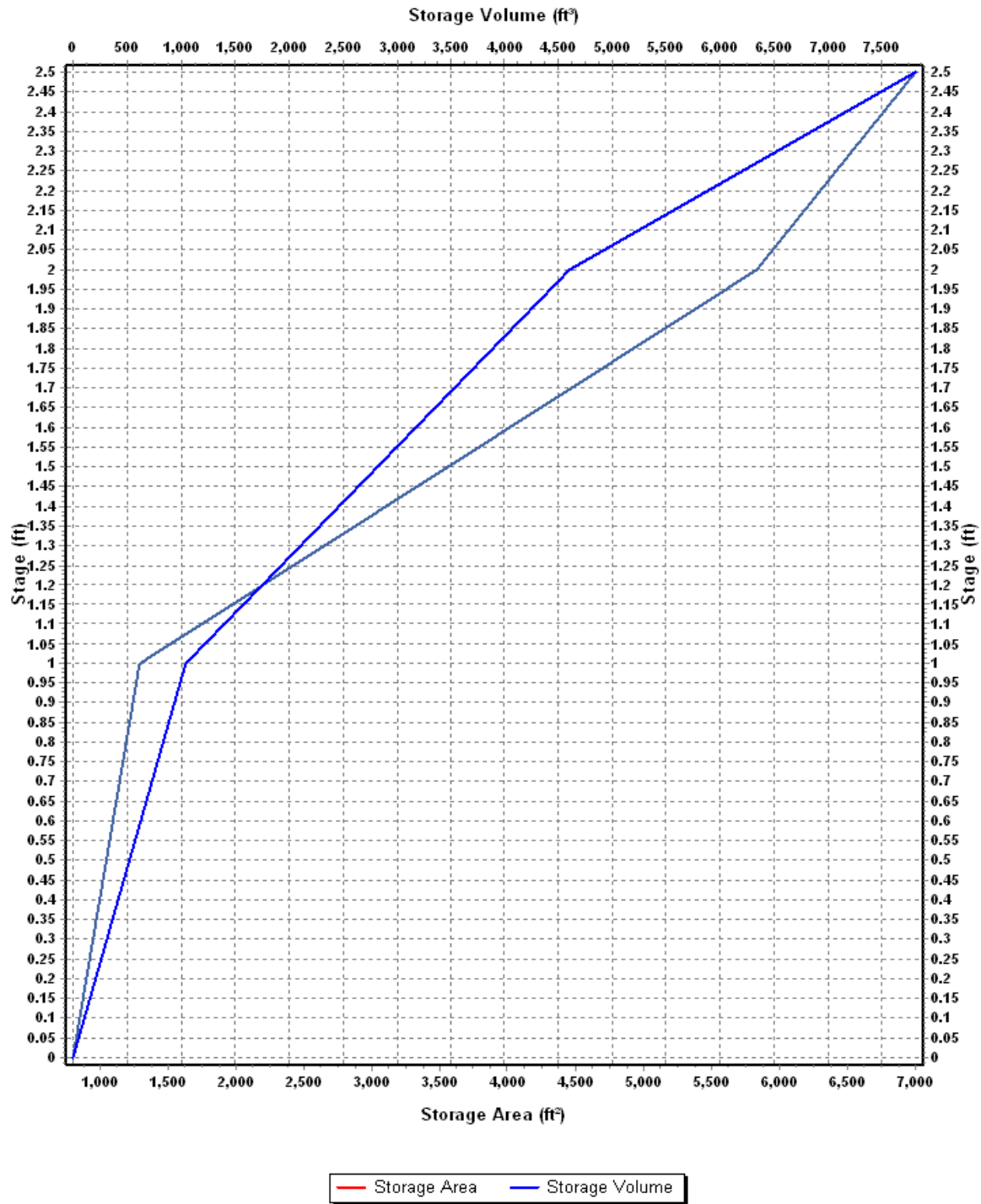
Invert Elevation (ft)	170.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	2.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-170.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-11

Stage	Storage Area	Storage Volume
(ft)	(ft²)	(ft³)
0	801.21	0.000
1	1286.66	1043.94
2	5828.53	4601.54
2.5	7000	7808.67

Storage Area Volume Curves



Storage Node : Basin5 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Trapezoidal	No	172.00	2.00	2.00	0.50	3.33
2 Weir-04	Rectangular	No	171.85	1.85	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-01	Side	CIRCULAR	No	1.25			171.25
2 Orifice-04	Side	CIRCULAR	No	1.25			170.55

Output Summary Results

Peak Inflow (cfs)	1.86
Peak Lateral Inflow (cfs)	1.86
Peak Outflow (cfs)	0.23
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	171.91
Max HGL Depth Attained (ft)	1.91
Average HGL Elevation Attained (ft)	171.35
Average HGL Depth Attained (ft)	1.35
Time of Max HGL Occurrence (days hh:mm)	0 12:52
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Stor-06

Input Data

Invert Elevation (ft)	167.70
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-167.70
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

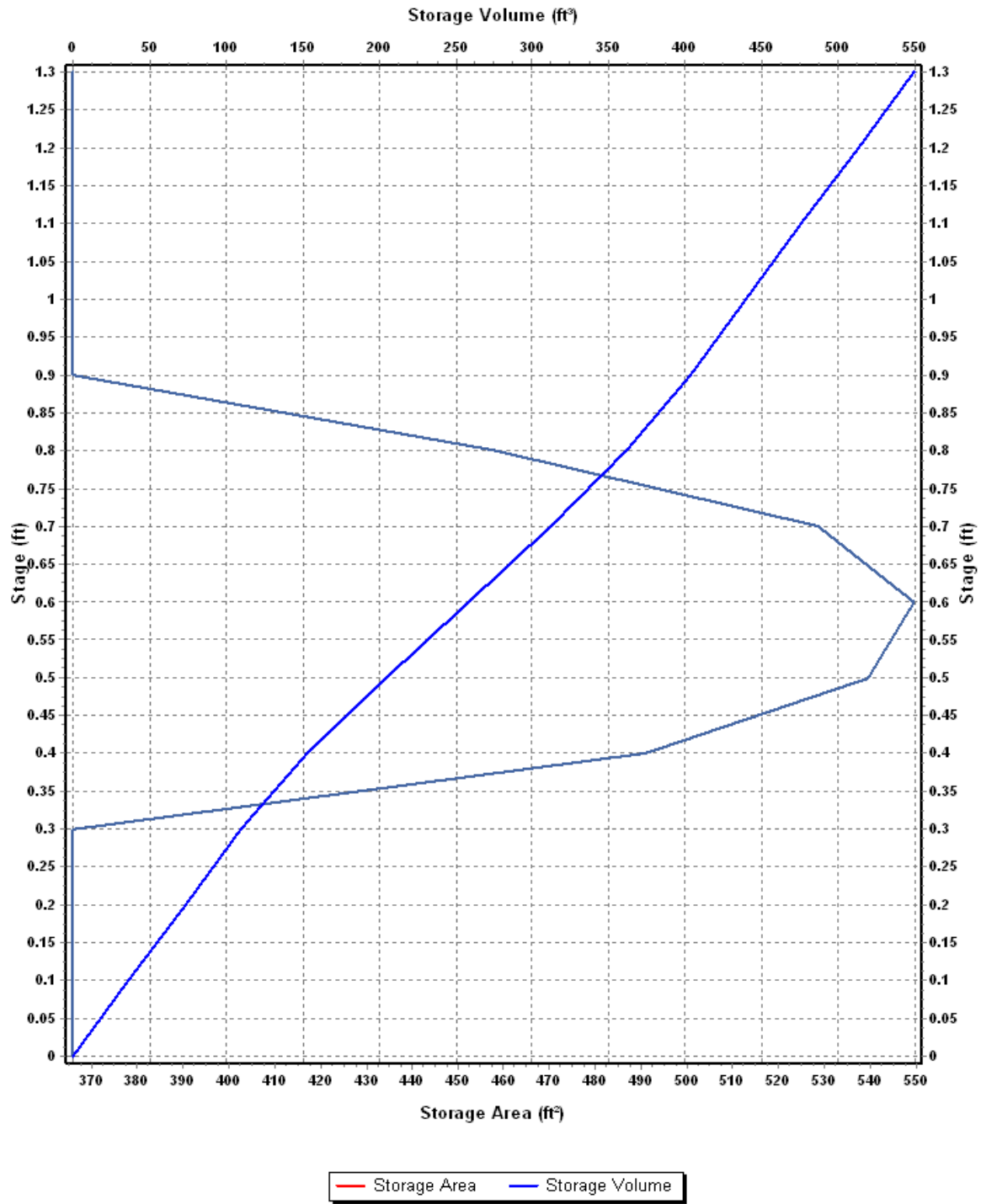
Exfiltration Rate (in/hr)	1.0200
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Storage Area Volume Curves

Storage Curve : Storage-08

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	366.0000	0.000
0.1	366.0000	36.60
0.2	366.0000	73.20
0.3	366.0000	109.80
0.4	491.0282	152.65
0.5	539.3827	204.17
0.6	549.4909	258.61
0.7	528.6472	312.52
0.8	457.7450	361.84
0.9	366.0000	403.03
1	366.0000	439.63
1.1	366.0000	476.23
1.2	366.0000	512.83
1.3	366.0000	549.43

Storage Area Volume Curves



Storage Node : Stor-06 (continued)

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-05	Side	CIRCULAR	No	2.00			168.00

Output Summary Results

Peak Inflow (cfs)	0.57
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.18
Peak Exfiltration Flow Rate (cfm)	0.79
Max HGL Elevation Attained (ft)	169.52
Max HGL Depth Attained (ft)	1.82
Average HGL Elevation Attained (ft)	168.49
Average HGL Depth Attained (ft)	0.79
Time of Max HGL Occurrence (days hh:mm)	0 12:12
Total Exfiltration Volume (1000-ft ³)	0.838
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61

Storage Node : Stor-07

Input Data

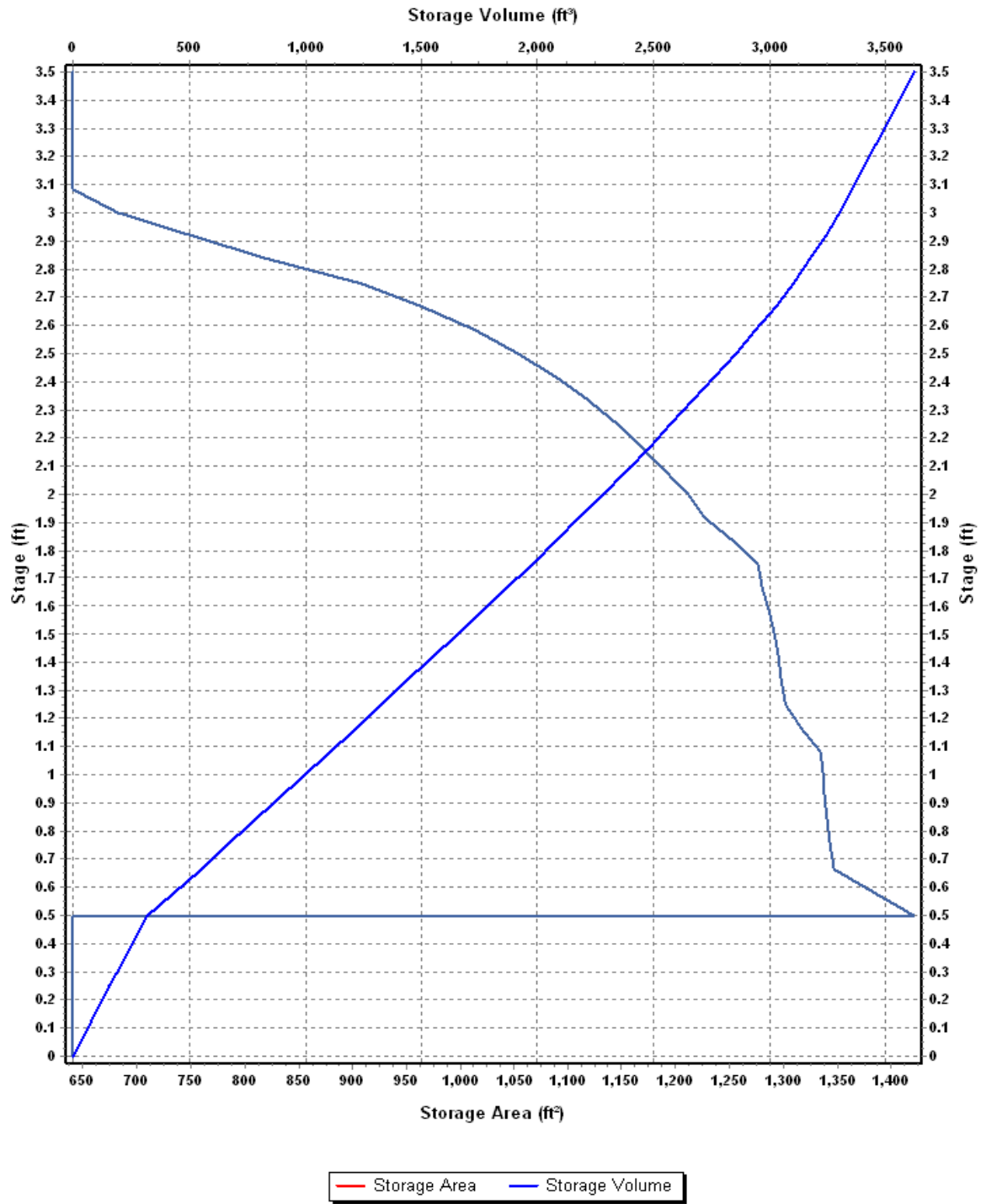
Invert Elevation (ft)	165.36
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	5.64
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-165.36
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-07

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0.000	640.8000	0.000
0.083	640.8000	53.19
0.167	640.8000	107.02
0.250	640.8000	160.21
0.333	640.8000	213.40
0.417	640.8000	267.23
0.500	640.800	320.42
0.501	1420.9200	321.45
0.667	1347.1200	551.20
0.750	1342.8000	662.83
0.833	1340.6400	774.19
0.917	1338.4800	886.71
1.000	1336.3200	997.71
1.083	1334.1600	1108.53
1.167	1316.8800	1219.87
1.250	1301.7600	1328.54
1.333	1297.4400	1436.41
1.417	1295.2800	1545.30
1.500	1290.9600	1652.63
1.583	1286.6400	1759.60
1.667	1280.1600	1867.41
1.750	1275.8400	1973.48
1.833	1252.0800	2078.39
1.917	1226.1600	2182.48
2.000	1211.0400	2283.62
2.083	1189.4400	2383.24
2.167	1167.8400	2482.25
2.250	1144.0800	2578.19
2.333	1118.1600	2672.07
2.417	1087.9200	2764.73
2.500	1053.3600	2853.59
2.583	1014.4800	2939.41
2.667	964.8000	3022.54
2.750	908.6400	3100.29
2.833	822.2400	3172.12
2.917	750.9600	3238.19
3.000	681.8400	3297.65
3.083	640.8000	3352.54
3.167	640.8000	3406.37
3.250	640.8000	3459.56
3.333	640.8000	3512.75
3.417	640.8000	3566.58
3.500	640.8000	3619.77

Storage Area Volume Curves



Storage Node : Stor-07 (continued)

Output Summary Results

Peak Inflow (cfs)	2.50
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.70
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	168.19
Max HGL Depth Attained (ft)	2.83
Average HGL Elevation Attained (ft)	166.09
Average HGL Depth Attained (ft)	0.73
Time of Max HGL Occurrence (days hh:mm)	0 12:38
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name Proposed stormwater.SPF
Description J:\2016\16-006\DWG\Siteplan.dwg

Project Options

Flow Units CFS
Elevation Type Elevation
Hydrology Method SCS TR-20
Time of Concentration (TOC) Method SCS TR-55
Link Routing Method Hydrodynamic
Enable Overflow Ponding at Nodes YES
Skip Steady State Analysis Time Periods ... YES

Analysis Options

Start Analysis On Feb 16, 2016 00:00:00
End Analysis On Feb 17, 2016 00:00:00
Start Reporting On Feb 16, 2016 00:00:00
Antecedent Dry Days 0 days
Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
Reporting Time Step 0 00:05:00 days hh:mm:ss
Routing Time Step 30 seconds

Number of Elements

Qty
Rain Gages 2
Subbasins 15
Nodes 35
 Junctions 19
 Outfalls 6
 Flow Diversions 0
 Inlets 6
 Storage Nodes 4
Links 40
 Channels 0
 Pipes 30
 Pumps 0
 Orifices 6
 Weirs 4
 Outlets 0
Pollutants 0
Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	100 Year	Intensity	inches	Massachusetts	Plymouth	100	7.00	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Peak Rate Factor	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ft ²)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	1/2Roof	18080.01	484.00	98.00	7.00	6.76	2.81	2.45	0 00:05:00
2	1/8Roof	4520.00	484.00	98.00	7.00	6.76	0.70	0.60	0 00:05:00
3	1/8Roof-2	4520.00	484.00	98.00	7.00	6.76	0.70	0.60	0 00:05:00
4	1/8Roof-3	4520.00	484.00	98.00	7.00	6.76	0.70	0.60	0 00:05:00
5	1/8Roof-4	4520.00	0.00	98.00	7.00	6.76	0.70	0.60	0 00:05:00
6	Post-06	18885.00	484.00	89.60	7.00	5.78	2.50	2.41	0 00:05:00
7	Post-1A	7754.99	484.00	94.53	7.00	6.35	1.13	1.04	0 00:05:00
8	Post-1B	2348.01	484.00	92.57	7.00	6.11	0.33	0.29	0 00:05:00
9	Post-1C	4143.99	484.00	96.30	7.00	6.56	0.62	0.56	0 00:05:00
10	Post-1D	4344.02	484.00	96.71	7.00	6.61	0.66	0.60	0 00:05:00
11	Post7A	10845.00	484.00	97.57	7.00	6.71	1.67	1.47	0 00:05:00
12	Post7B	19698.01	484.00	90.20	7.00	5.85	2.64	2.53	0 00:05:00
13	PRE-08	1080.98	484.00	73.00	7.00	3.91	0.10	0.09	0 00:16:04
14	Pre-1	85389.01	484.00	94.21	7.00	6.31	12.38	9.82	0 00:14:48
15	Sub-09	3079.00	484.00	79.00	7.00	4.58	0.32	0.33	0 00:05:00

Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	Junction	163.80	170.13	163.80	170.13	0.00	1.61	164.94	0.00	5.19	0 00:00	0.00	0.00
2 DMH(10)	Junction	162.00	165.40	162.00	165.40	0.00	2.45	163.85	0.00	1.55	0 00:00	0.00	0.00
3 DMH(3)	Junction	163.75	169.82	163.75	169.82	0.00	1.87	164.75	0.00	5.07	0 00:00	0.00	0.00
4 DMH(4)	Junction	163.30	170.24	163.30	170.24	0.00	3.84	164.58	0.00	5.65	0 00:00	0.00	0.00
5 DMH(5)	Junction	162.70	169.84	162.70	169.84	0.00	4.34	164.17	0.00	5.67	0 00:00	0.00	0.00
6 DMH(6)	Junction	162.55	173.51	162.55	173.51	0.00	5.56	164.02	0.00	9.49	0 00:00	0.00	0.00
7 DMH(8)	Junction	161.95	168.06	161.95	168.06	0.00	7.91	163.49	0.00	4.57	0 00:00	0.00	0.00
8 Jun-01	Junction	167.00	174.00	0.00	0.00	0.00	0.72	168.78	0.00	5.22	0 00:00	0.00	0.00
9 Jun-02	Junction	168.30	174.90	168.30	174.90	0.00	0.05	169.25	0.00	5.65	0 00:00	0.00	0.00
10 Jun-03	Junction	168.30	174.30	168.30	174.30	1000.00	0.77	169.25	0.00	5.05	0 00:00	0.00	0.00
11 Jun-05	Junction	166.70	172.70	166.70	172.70	0.00	0.72	167.70	0.00	5.00	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	Junction	168.50	171.00	168.50	171.00	0.00	0.86	169.63	0.00	1.37	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	Junction	161.01	171.00	161.01	0.00	0.00	0.63	169.78	0.00	1.22	0 00:00	0.00	0.00
14 Structure - (11)	Junction	167.68	171.00	167.68	168.62	0.00	0.21	169.78	0.00	1.22	0 00:00	0.00	0.00
15 Structure - (12)	Junction	161.54	171.00	161.54	162.48	0.00	0.64	169.78	0.00	1.22	0 00:00	0.00	0.00
16 Structure - (15)	Junction	164.88	171.00	164.88	165.82	0.00	0.60	169.78	0.00	1.22	0 00:00	0.00	0.00
17 Structure - (18)	Junction	168.50	171.00	168.50	171.00	0.00	0.03	169.74	0.00	1.26	0 00:00	0.00	0.00
18 Structure - (20)	Junction	168.25	171.00	168.25	168.25	0.00	0.60	169.74	0.00	1.26	0 00:00	0.00	0.00
19 Structure - (22)	Junction	168.25	171.00	168.25	171.00	0.00	0.99	169.72	0.00	1.28	0 00:00	0.00	0.00
20 Basin4out	Outfall	170.00					0.00	170.00					
21 Basin5out	Outfall	170.00					0.01	170.00					
22 Out-Post1-DP	Outfall	161.60					7.88	162.69					
23 Out-Pre-1	Outfall	163.20					9.81	163.20					
24 Post5A	Outfall	166.64					0.72	167.04					
25 Post8	Outfall	172.00					0.08	172.00					
26 Basin4	Storage Node	169.00	172.50	0.00		0.00	2.52	170.50				0.00	0.00
27 Basin5	Storage Node	170.00	172.50	0.00		0.00	2.40	172.01				0.00	0.00
28 Stor-06	Storage Node	167.70	171.00	0.00		0.00	0.44	169.72				0.00	0.00
29 Stor-07	Storage Node	165.36	171.00	0.00		0.00	3.06	169.76				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)
1 Link-01	Pipe	Inlet-04	DMH(6)	32.20	166.00	165.75	0.7800	12.000	0.0150	0.32	2.72	0.12	2.20	0.24
2 Link-02	Pipe	Structure - (22)	Structure - (31)	38.96	170.30	166.00	11.0400	4.000	0.0150	0.00	2.19	0.00	0.00	0.00
3 Link-03	Pipe	Out-1Pipe - (13) (1) (1)	DMH(6)	31.15	169.10	168.00	3.5300	6.000	0.0150	0.84	0.91	0.92	4.79	0.43
4 Link-04	Pipe	Basin4	Stor-07	35.30	170.00	168.50	4.2500	6.000	0.0150	1.86	2.00	0.93	5.28	0.44
5 Link-05	Pipe	Jun-01	Jun-05	216.63	167.50	166.70	0.3700	8.000	0.0150	0.72	0.64	1.13	2.05	0.67
6 Link-06	Pipe	Jun-02	Jun-03	163.00	169.00	168.35	0.4000	8.000	0.0150	0.04	0.66	0.06	0.20	0.46
7 Link-07	Pipe	DMH(1)	DMH(3)	55.66	164.00	163.80	0.3600	12.000	0.0150	1.59	1.85	0.86	2.30	0.90
8 Link-08	Pipe	Jun-03	Jun-01	85.00	168.35	167.50	1.0000	8.000	0.0150	0.72	1.05	0.68	2.59	0.67
9 Link-11	Pipe	Jun-05	Post5A	100.00	166.70	166.64	0.0600	8.000	0.0150	0.72	0.47	1.53	2.40	0.53
10 Pipe - (10)	Pipe	Structure - (12)	Stor-07	30.11	168.00	167.00	3.3200	6.000	0.0150	0.61	0.89	0.69	4.48	0.50
11 Pipe - (11)	Pipe	Structure - (15)	Stor-07	30.51	168.00	167.00	3.2800	6.000	0.0150	0.61	0.88	0.69	4.46	0.50
12 Pipe - (13)	Pipe	Structure - (18)	Structure - (20)	54.74	168.50	168.25	0.4600	10.000	0.0150	0.03	1.28	0.03	0.07	0.83
13 Pipe - (13) (1)	Pipe	Structure - (20)	Structure - (22)	45.20	168.25	168.25	0.0000	10.000	0.0150	0.39	0.85	0.46	0.72	0.83
14 Pipe - (13) (1) (1)	Pipe	Structure - (22)	Out-1Pipe - (13) (1) (1)	50.87	168.50	168.25	0.4900	10.000	0.0120	0.86	1.06	0.81	1.57	0.83
15 Pipe - (14)	Pipe	Structure - (20)	Stor-06	12.24	168.25	168.00	2.0400	6.000	0.0150	0.24	0.70	0.35	1.34	0.50
16 Pipe - (15)	Pipe	Structure - (22)	Stor-06	10.98	168.25	168.00	2.2800	6.000	0.0150	0.22	0.73	0.30	1.41	0.50
17 Pipe - (18)	Pipe	CB(1)	DMH(1)	18.00	164.50	164.00	2.7800	12.000	0.0120	1.02	6.43	0.16	2.29	0.65
18 Pipe - (20)	Pipe	Structure - (29)	DMH(4)	18.71	164.00	163.65	1.8700	12.000	0.0120	0.54	5.28	0.10	2.92	0.71
19 Pipe - (21)	Pipe	Structure - (31)	DMH(5)	28.88	164.00	163.20	2.7700	12.000	0.0120	0.60	6.42	0.09	3.56	0.57
20 Pipe - (3)	Pipe	DMH(3)	DMH(4)	38.84	163.75	163.65	0.2600	12.000	0.0120	1.86	1.96	0.95	2.99	0.92
21 Pipe - (3) (2)	Pipe	DMH(4)	DMH(5)	100.57	163.30	162.95	0.3500	15.000	0.0120	3.74	4.13	0.91	3.42	1.20
22 Pipe - (3) (2) (1)	Pipe	DMH(5)	DMH(6)	49.46	162.70	162.55	0.3000	18.000	0.0120	4.29	6.27	0.69	2.69	1.43
23 Pipe - (4)	Pipe	DMH(6)	DMH(8)	172.11	162.55	162.00	0.3200	18.000	0.0120	5.58	6.43	0.87	3.19	1.46
24 Pipe - (4) (1)	Pipe	DMH(8)	Out-Post1-DP	68.77	161.95	161.60	0.5100	18.000	0.0120	7.88	8.12	0.97	4.86	1.29
25 Pipe - (5)	Pipe	CB(2)	DMH(3)	6.17	163.85	163.80	0.8100	12.000	0.0120	0.28	3.48	0.08	0.78	0.88
26 Pipe - (6)	Pipe	DMH(8)	DMH(10)	249.75	162.00	162.50	-0.2000	15.000	0.0120	2.45	3.13	0.78	1.99	1.25
27 Pipe - (7)	Pipe	Structure - (9)	DMH(4)	108.19	165.00	163.65	1.2500	12.000	0.0120	1.46	7.47	0.20	5.02	0.59
28 Pipe - (8)	Pipe	Structure - (11)	Structure - (15)	34.98	168.50	168.00	1.4300	10.000	0.0150	0.21	2.27	0.09	0.69	0.83
29 Pipe - (8) (1)	Pipe	Structure - (15)	Structure - (12)	41.80	168.00	168.00	0.0000	10.000	0.0150	0.28	0.85	0.33	0.51	0.83
30 Pipe - (9)	Pipe	Out-1Pipe - (9)	Structure - (12)	52.56	168.50	168.00	0.9500	10.000	0.0150	0.63	1.85	0.34	1.50	0.83
31 Orifice-01	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.04				
32 Orifice-02	Orifice	Basin4	Jun-02		169.00	168.30		1.000		0.01				
33 Orifice-03	Orifice	Basin4	Jun-02		169.00	168.30		2.000		0.00				
34 Orifice-04	Orifice	Basin5	Jun-03		170.00	168.30		1.250		0.05				
35 Orifice-05	Orifice	Stor-06	DMH(6)		167.70	162.55		2.000		0.14				
36 Pipe - (12)	Orifice	DMH(1)	Stor-07		163.80	165.36		4.000		0.88				
37 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Weir	Basin4	Basin4out		169.00	170.00				0.00				
38 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Weir	Basin5	Basin5out		170.00	170.00				0.01				
39 Weir-03	Weir	Basin4	Jun-02		169.00	168.30				0.00				
40 Weir-04	Weir	Basin5	Jun-03		170.00	168.30				0.68				

Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition (min)	
0.24	0.00	Calculated
0.00	0.00	Calculated
0.87	0.00	Calculated
0.90	0.00	Calculated
1.00	26.00	SURCHARGED
0.69	0.00	Calculated
0.95	0.00	Calculated
1.00	16.00	SURCHARGED
0.80	0.00	> CAPACITY
1.00	67.00	SURCHARGED
1.00	67.00	SURCHARGED
1.00	30.00	SURCHARGED
1.00	92.00	SURCHARGED
1.00	27.00	SURCHARGED
1.00	184.00	SURCHARGED
1.00	184.00	SURCHARGED
0.69	0.00	Calculated
0.76	0.00	Calculated
0.59	0.00	Calculated
0.97	0.00	Calculated
0.99	0.00	Calculated
0.98	0.00	Calculated
0.99	0.00	Calculated
0.86	0.00	Calculated
0.93	0.00	Calculated
1.00	3.00	SURCHARGED
0.61	0.00	Calculated
1.00	33.00	SURCHARGED
1.00	53.00	SURCHARGED
1.00	33.00	SURCHARGED

Inlet Summary

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation	Max (Rim) Elevation	Initial Water Elevation	Ponded Area	Peak Flow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Allowable Spread	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow
					(ft)	(ft)	(ft)	(ft²)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	164.50	0.00	1.04	N/A	N/A	N/A	7.00	0.00	169.55
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	163.85	200.00	0.29	N/A	N/A	N/A	7.00	0.00	166.41
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	164.00	200.00	0.33	N/A	N/A	N/A	7.00	0.00	169.02
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	164.00	0.00	0.56	N/A	N/A	N/A	7.00	0.00	170.52
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	164.00	0.00	0.60	N/A	N/A	N/A	7.00	0.00	172.62
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	167.70	0.00	1.47	N/A	N/A	N/A	7.00	0.00	172.04

Subbasin Hydrology

Subbasin : 1/2Roof

Input Data

Area (ft²) 18080.01
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

T_c = Time of Concentration (hr)
n = Manning's roughness
L_f = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (S_f^{0.5}) (unpaved surface)
V = 20.3282 * (S_f^{0.5}) (paved surface)
V = 15.0 * (S_f^{0.5}) (grassed waterway surface)
V = 10.0 * (S_f^{0.5}) (nearly bare & untilled surface)
V = 9.0 * (S_f^{0.5}) (cultivated straight rows surface)
V = 7.0 * (S_f^{0.5}) (short grass pasture surface)
V = 5.0 * (S_f^{0.5}) (woodland surface)
V = 2.5 * (S_f^{0.5}) (forest w/heavy litter surface)
T_c = (L_f / V) / (3600 sec/hr)

Where:

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n
R = A_q / W_p
T_c = (L_f / V) / (3600 sec/hr)

Where :

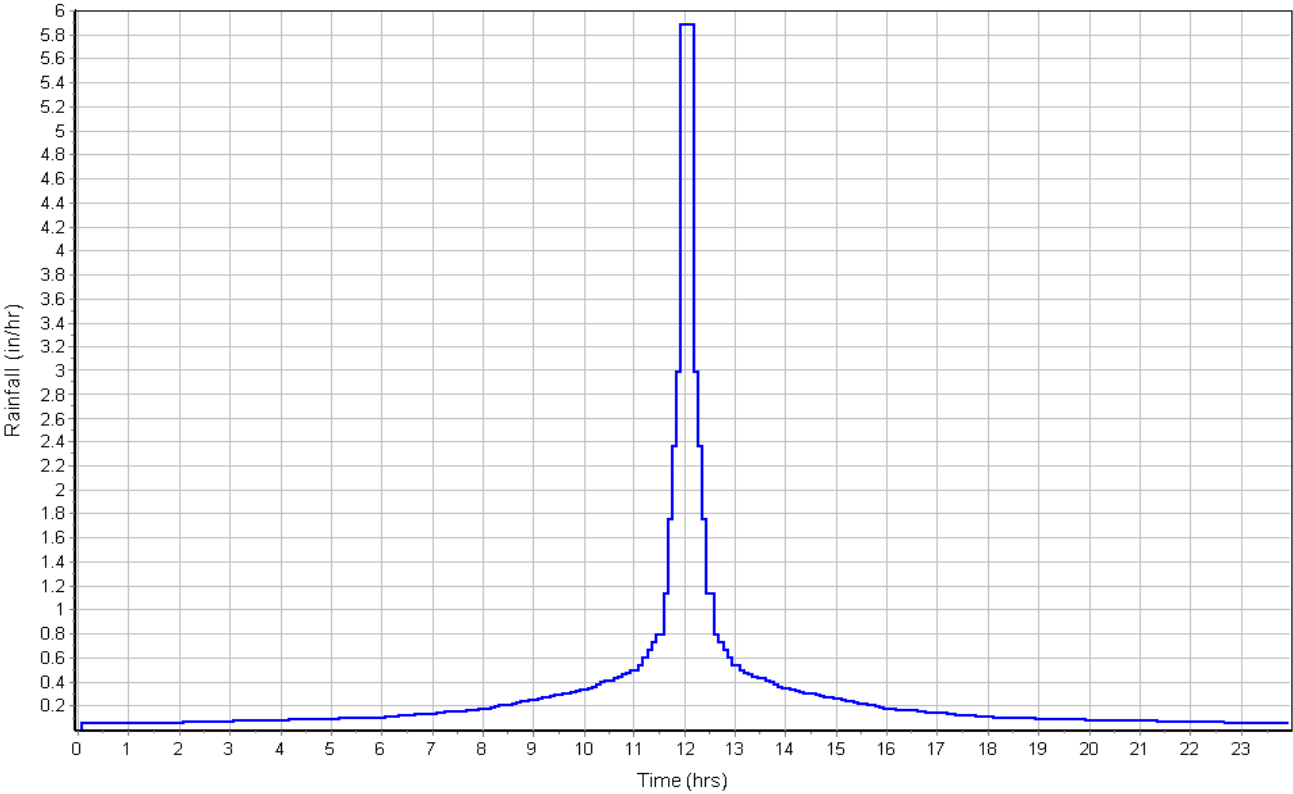
T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
R = Hydraulic Radius (ft)
A_q = Flow Area (ft²)
W_p = Wetted Perimeter (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)
n = Manning's roughness

User-Defined TOC override (minutes): 5

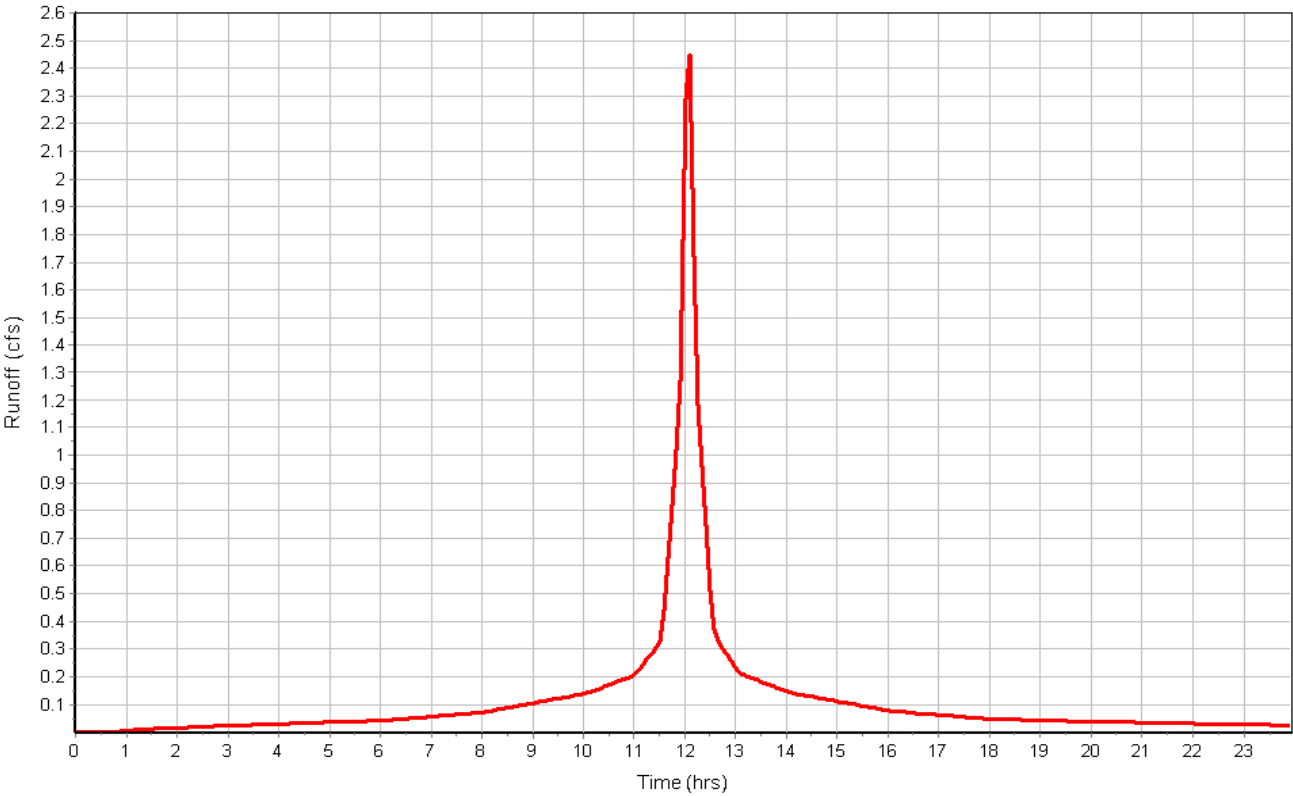
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.76
Peak Runoff (cfs) 2.45
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

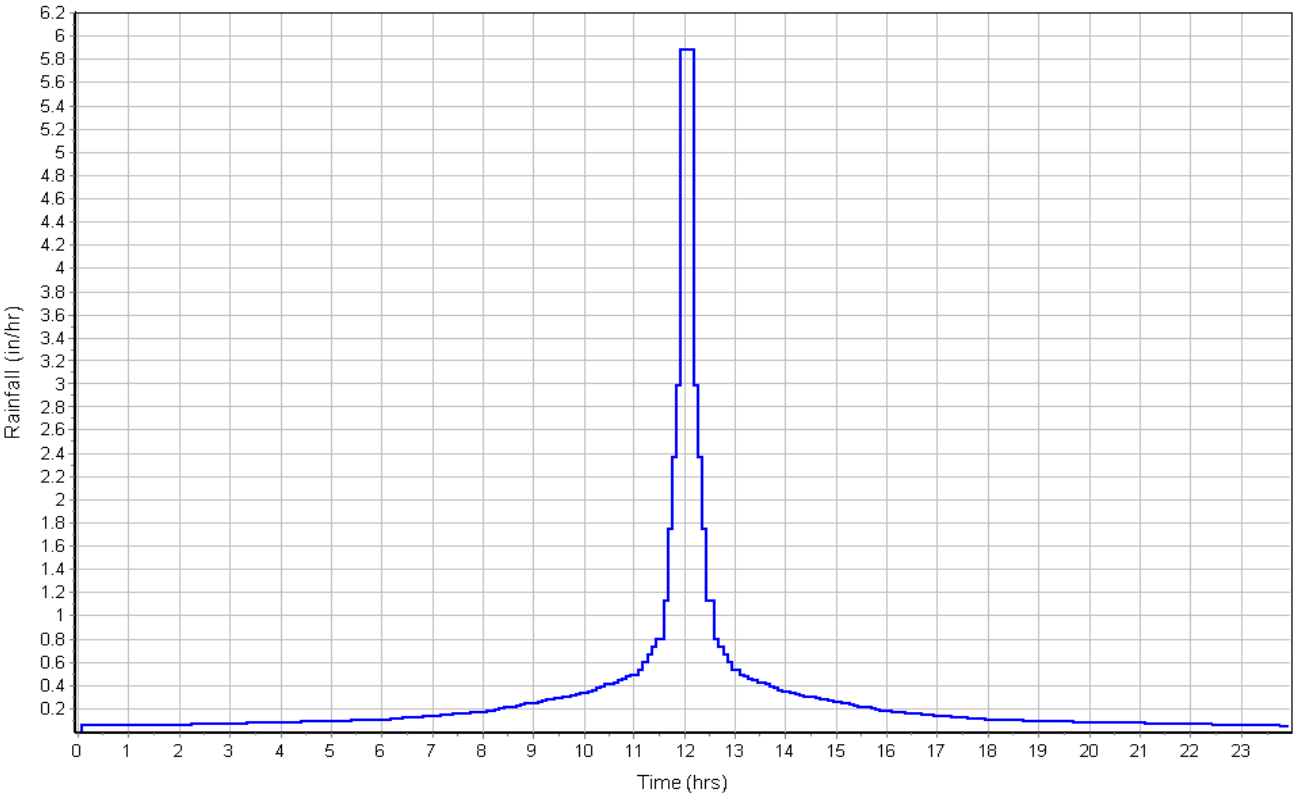
Time of Concentration

User-Defined TOC override (minutes): 5

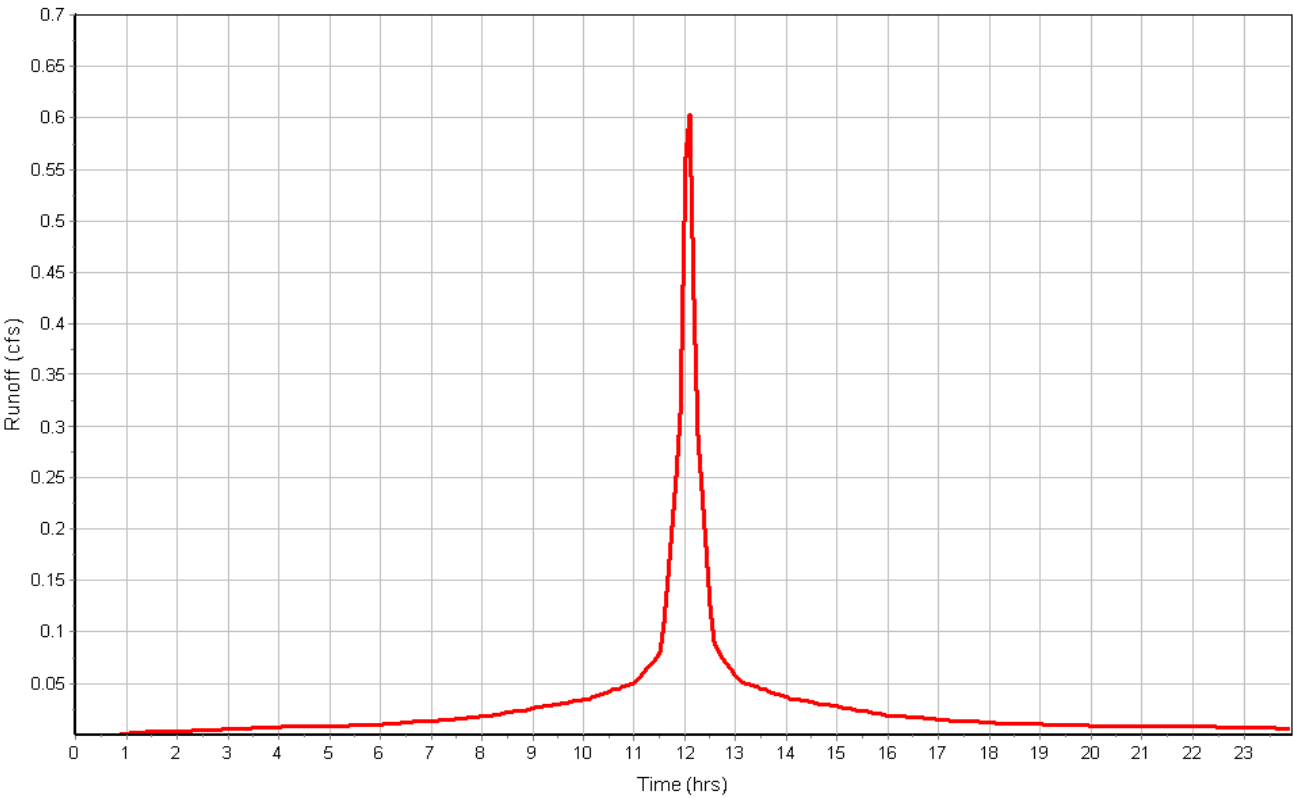
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.76
Peak Runoff (cfs) 0.60
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-2

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

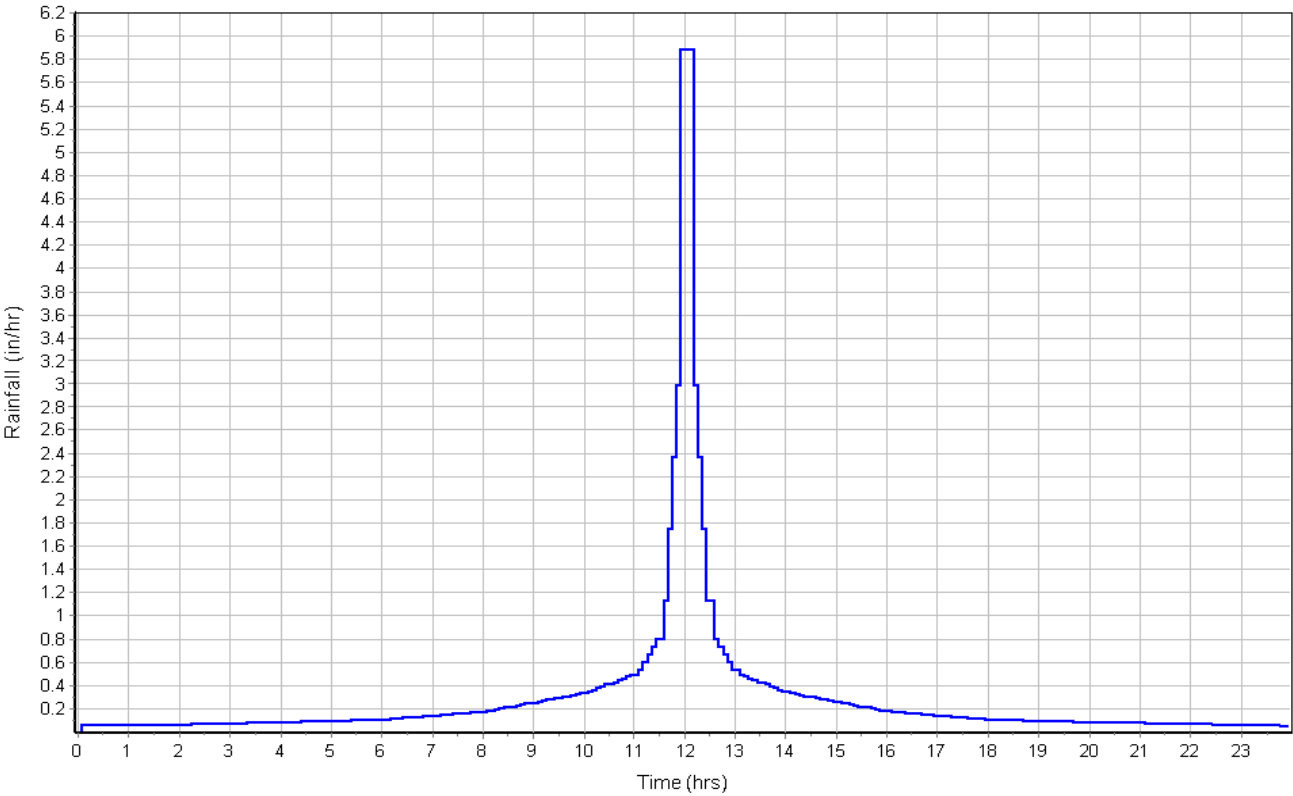
Time of Concentration

User-Defined TOC override (minutes): 5

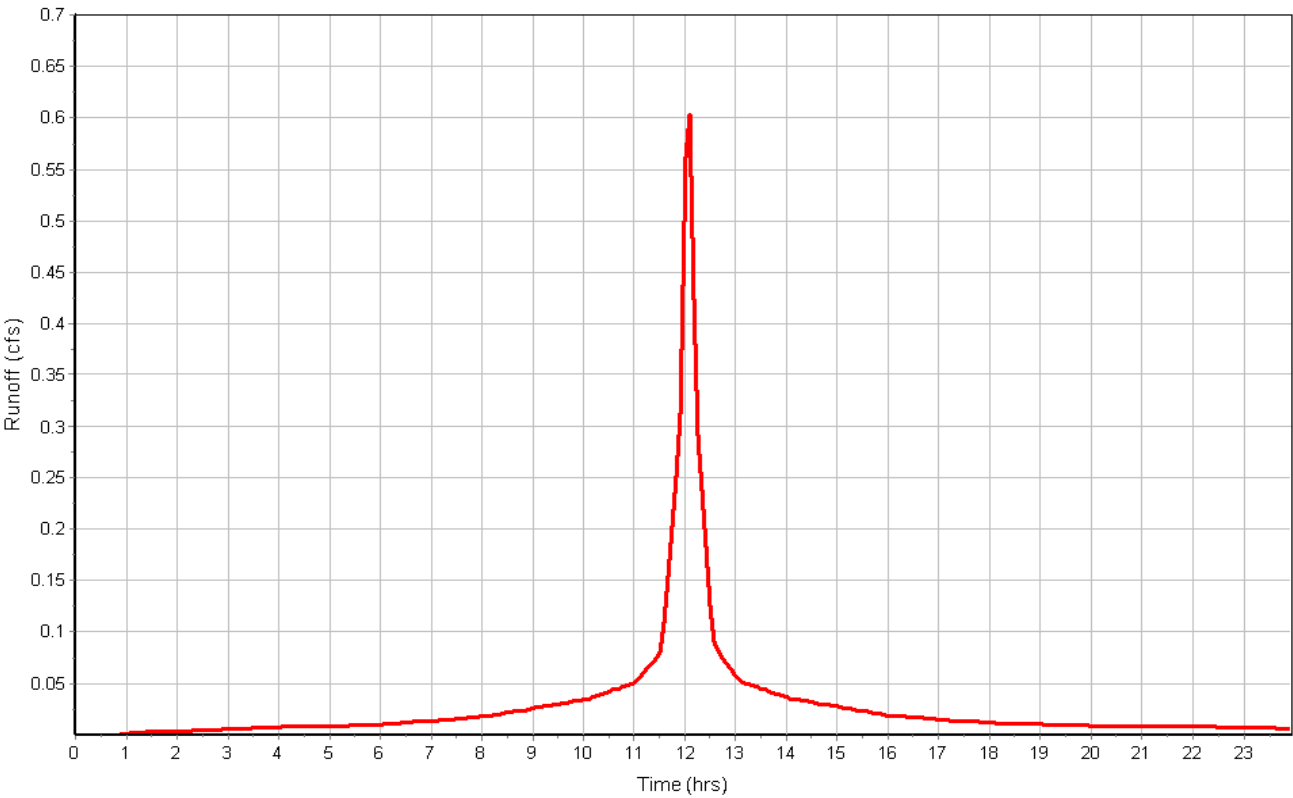
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.76
Peak Runoff (cfs) 0.60
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-3

Input Data

Area (ft²) 4520.00
Peak Rate Factor 484.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

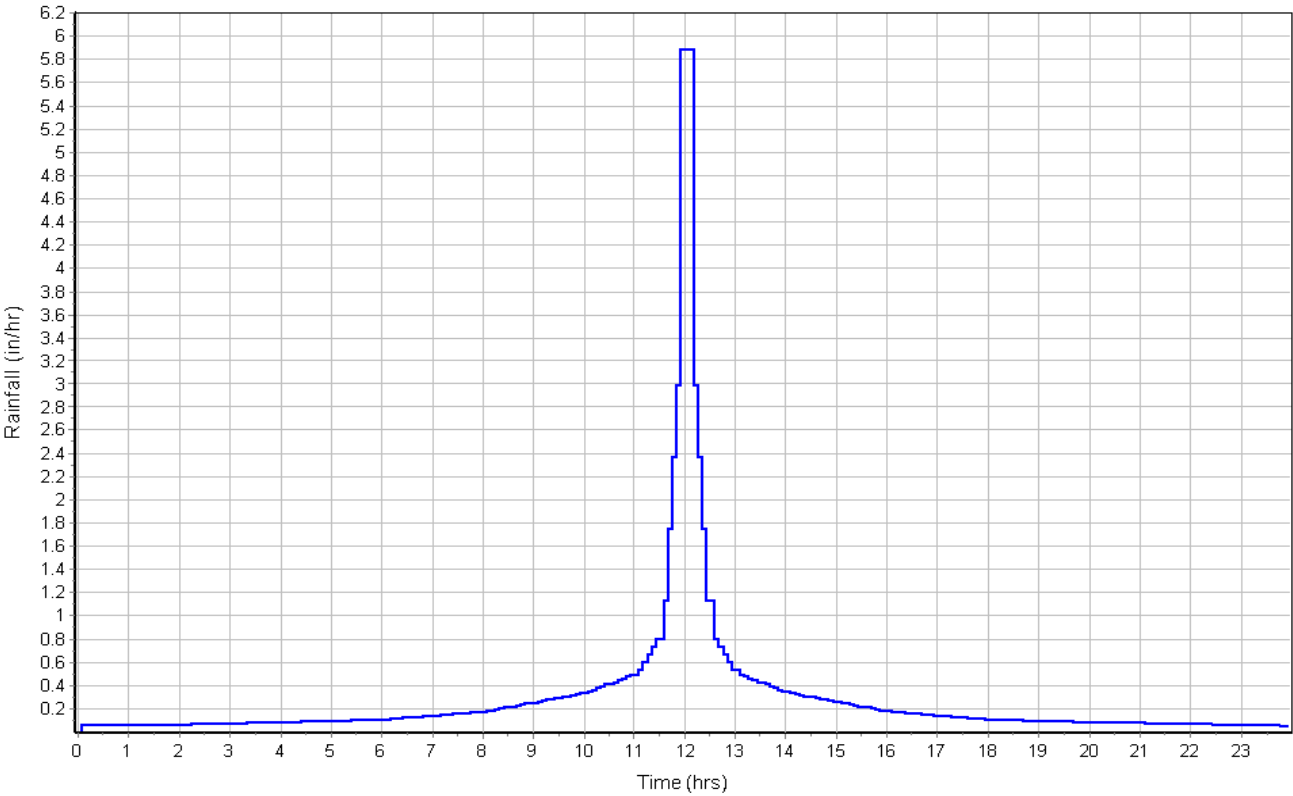
Time of Concentration

User-Defined TOC override (minutes): 5

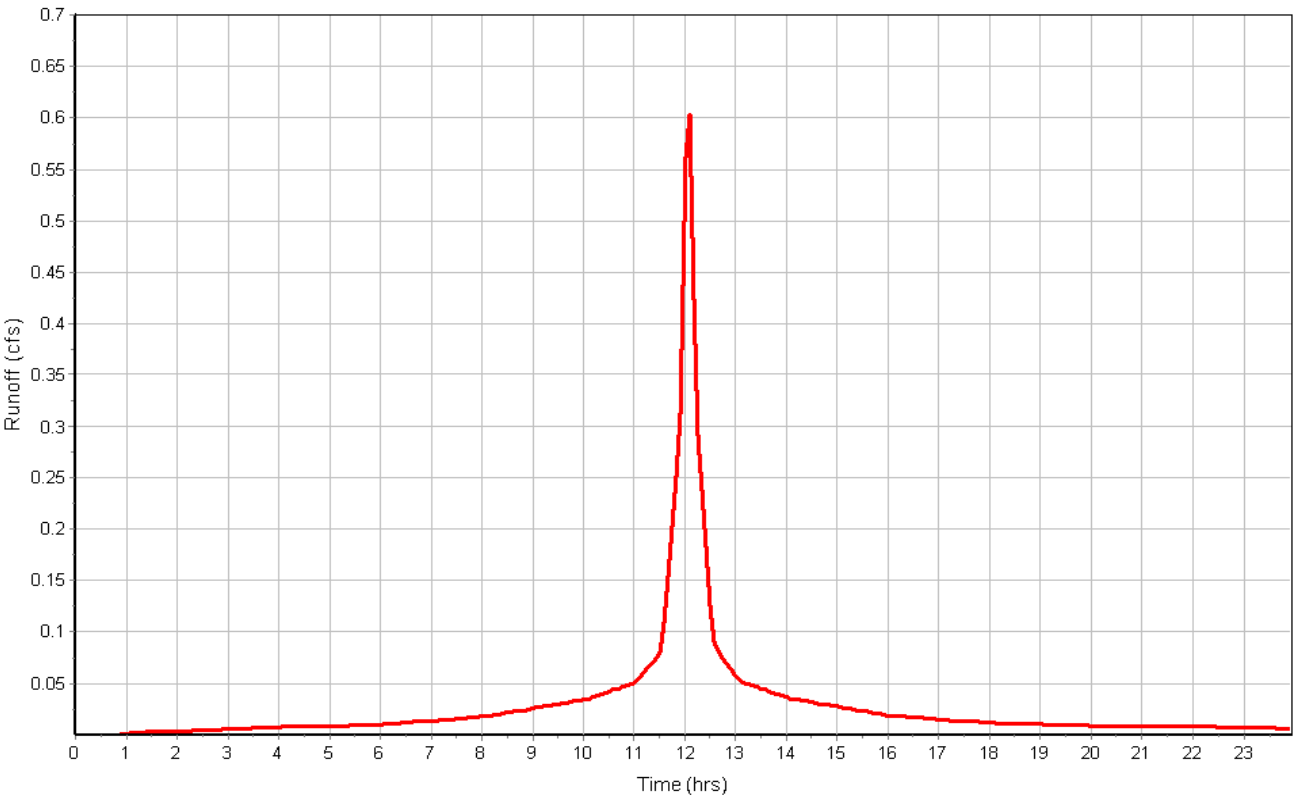
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.76
Peak Runoff (cfs) 0.60
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 1/8Roof-4

Input Data

Area (ft²) 4520.00
Peak Rate Factor 0.00
Weighted Curve Number 98.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	9040.01	C	98.00
Composite Area & Weighted CN	9040.01		98.00

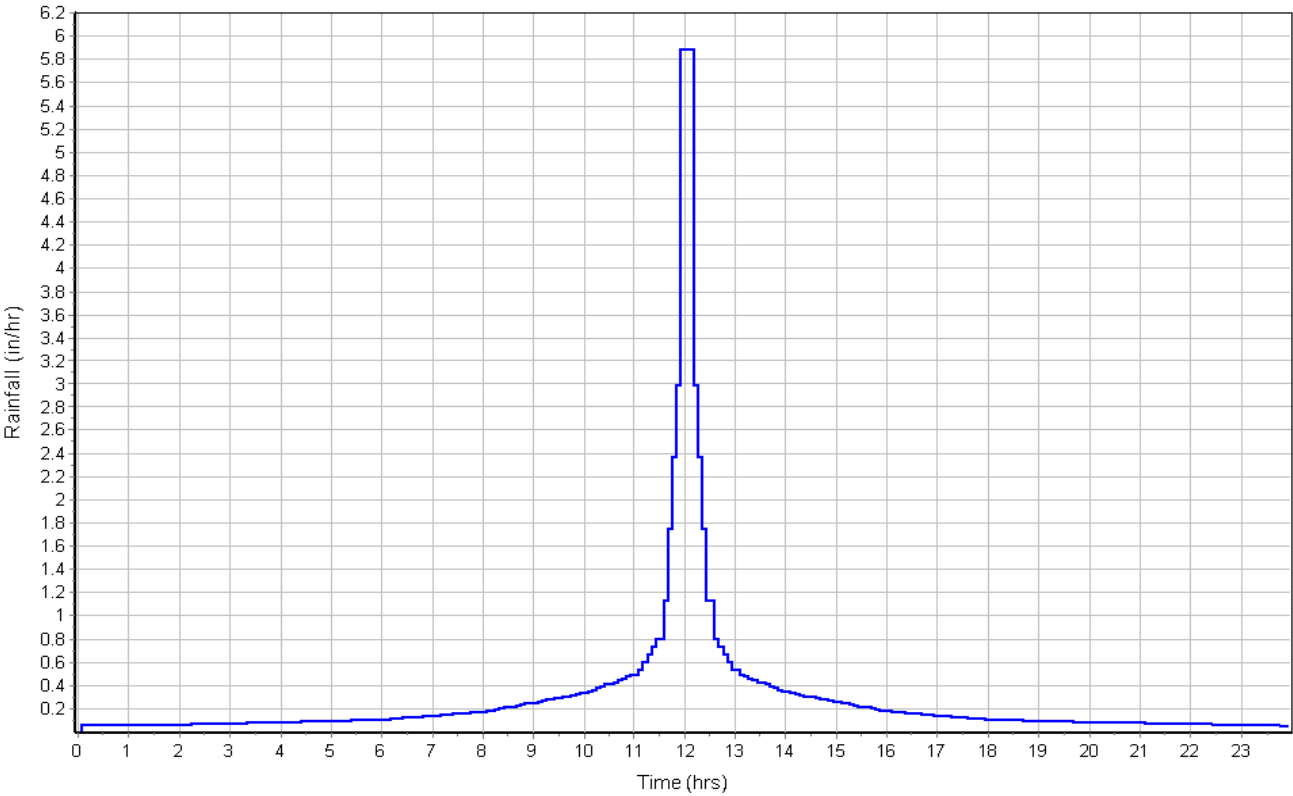
Time of Concentration

User-Defined TOC override (minutes): 5

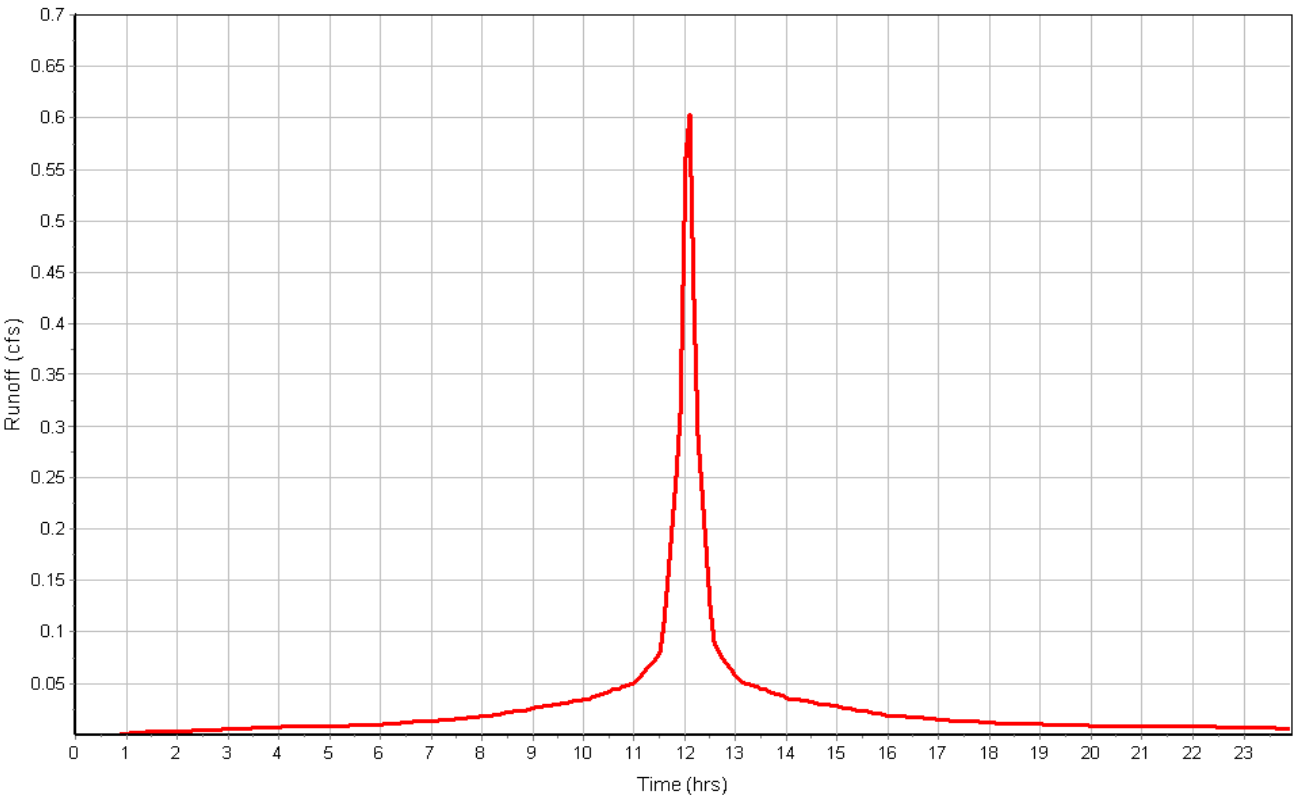
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.76
Peak Runoff (cfs) 0.60
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-06

Input Data

Area (ft²) 18885.00
Peak Rate Factor 484.00
Weighted Curve Number 89.60
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	11590.01	C	98.00
50 - 75% grass cover, Fair	3967.01	C	79.00
Woods, Fair	3327.98	C	73.00
Composite Area & Weighted CN	18885.00		89.60

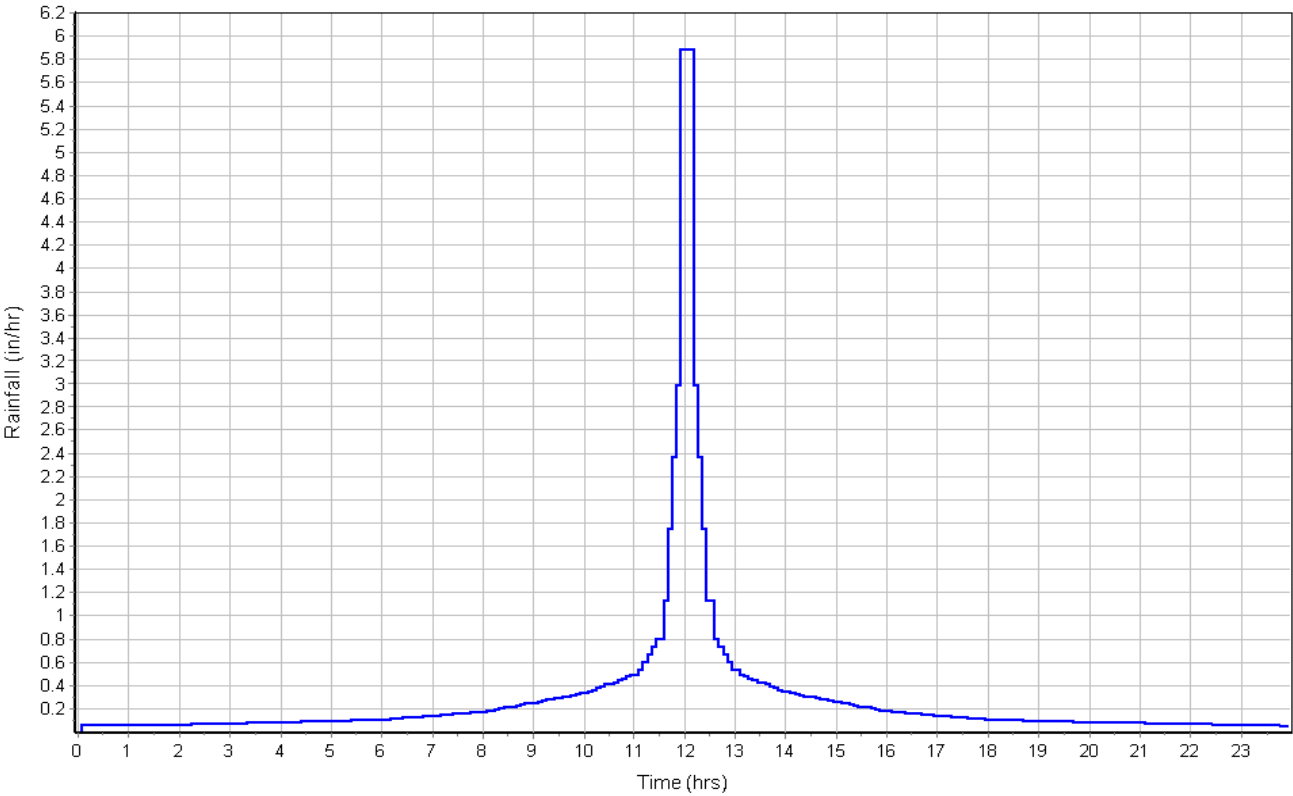
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	2	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	1.08	0.00	0.00
Computed Flow Time (min) :	0.77	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	153	0.00	0.00
Slope (%) :	1.5	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.49	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Total TOC (min)	1.80		

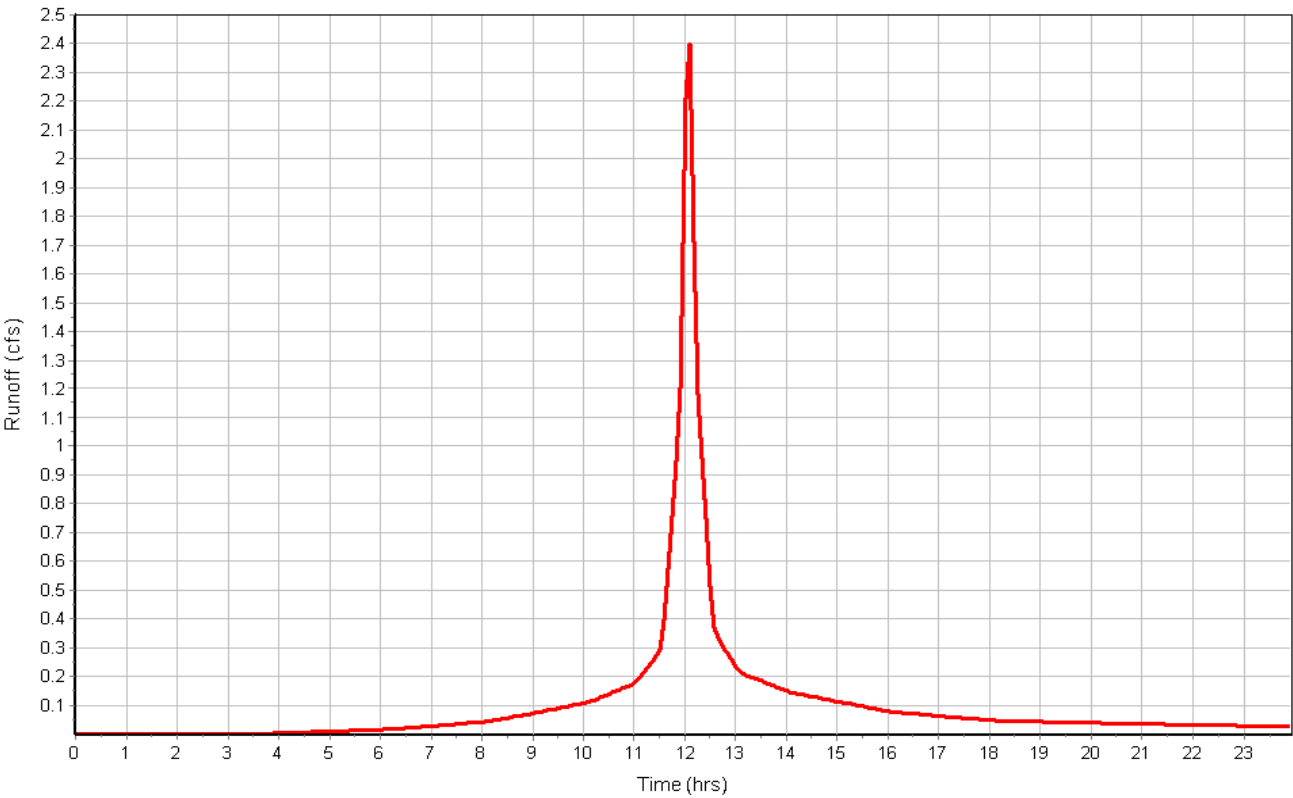
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 5.78
Peak Runoff (cfs) 2.41
Weighted Curve Number 89.60
Time of Concentration (days hh:mm:ss) 0 00:01:48

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1A

Input Data

Area (ft²) 7754.99
Peak Rate Factor 484.00
Weighted Curve Number 94.53
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	6337.02	C	98.00
50 - 75% grass cover, Fair	1418.01	C	79.00
Composite Area & Weighted CN	7755.03		94.53

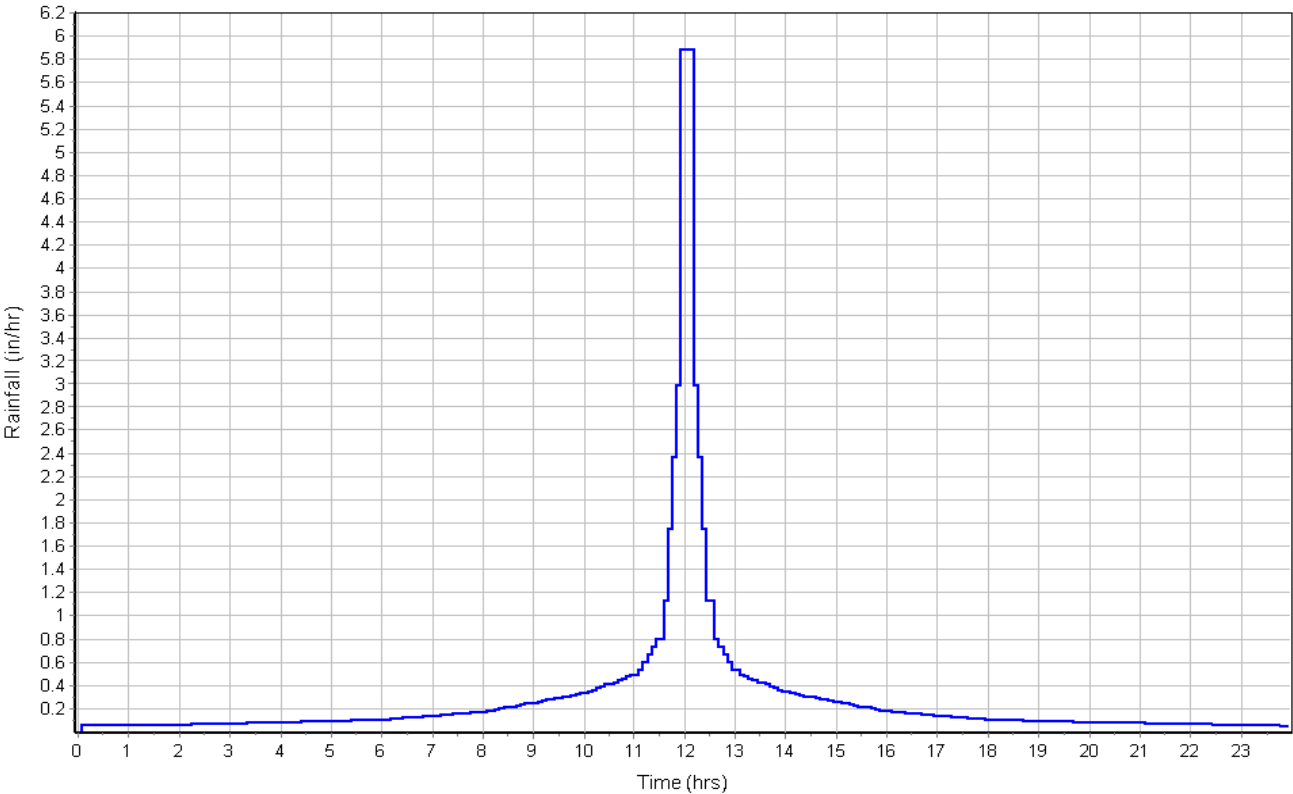
Time of Concentration

User-Defined TOC override (minutes): 5

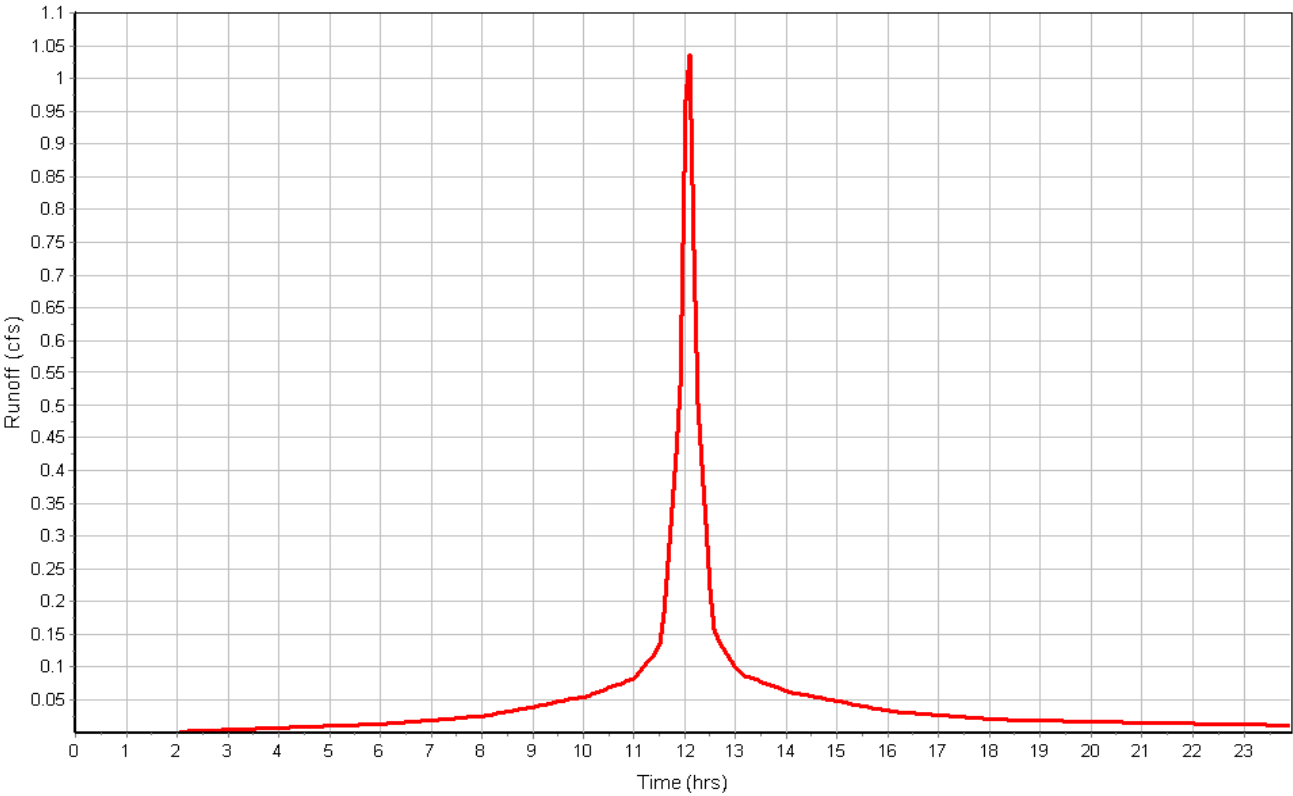
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.35
Peak Runoff (cfs) 1.04
Weighted Curve Number 94.53
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1B

Input Data

Area (ft²) 2348.01
Peak Rate Factor 484.00
Weighted Curve Number 92.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	1677.02	C	98.00
50 - 75% grass cover, Fair	671.00	C	79.00
Composite Area & Weighted CN	2348.02		92.57

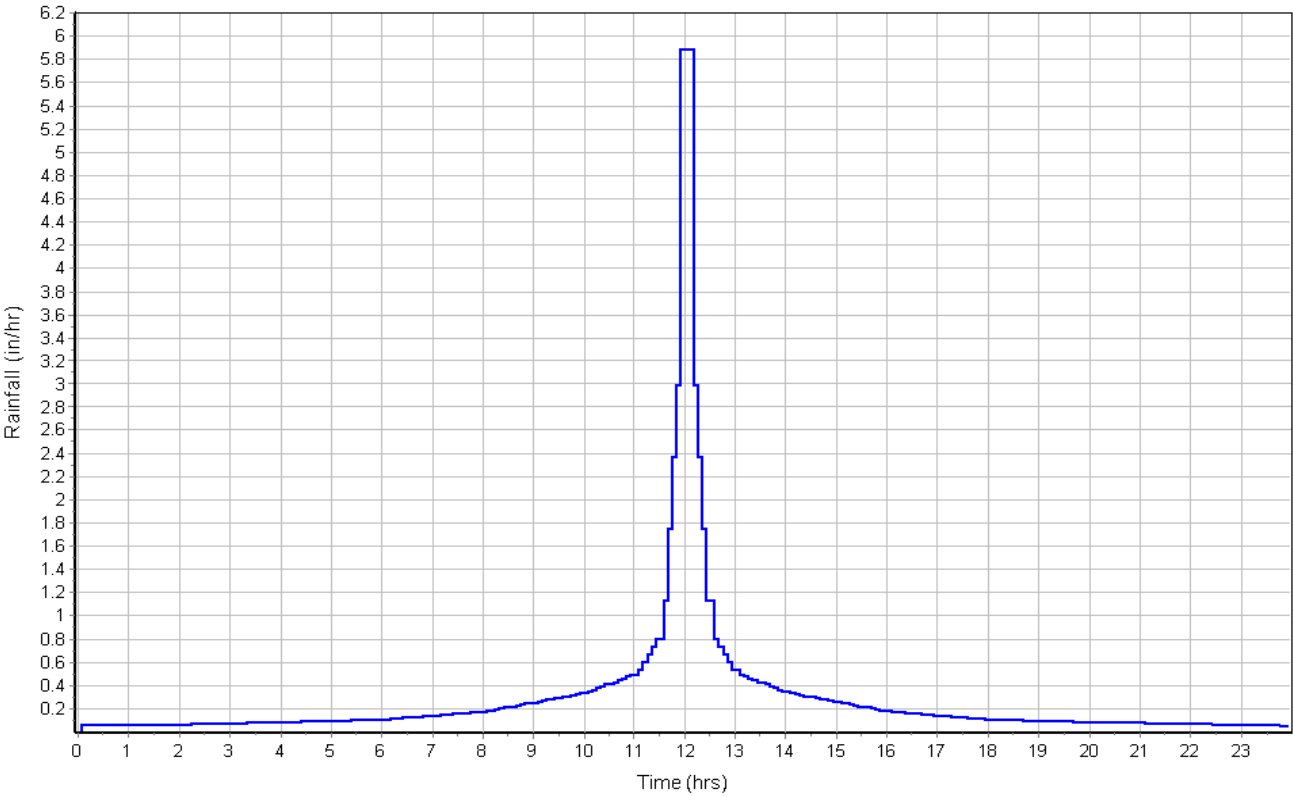
Time of Concentration

User-Defined TOC override (minutes): 5

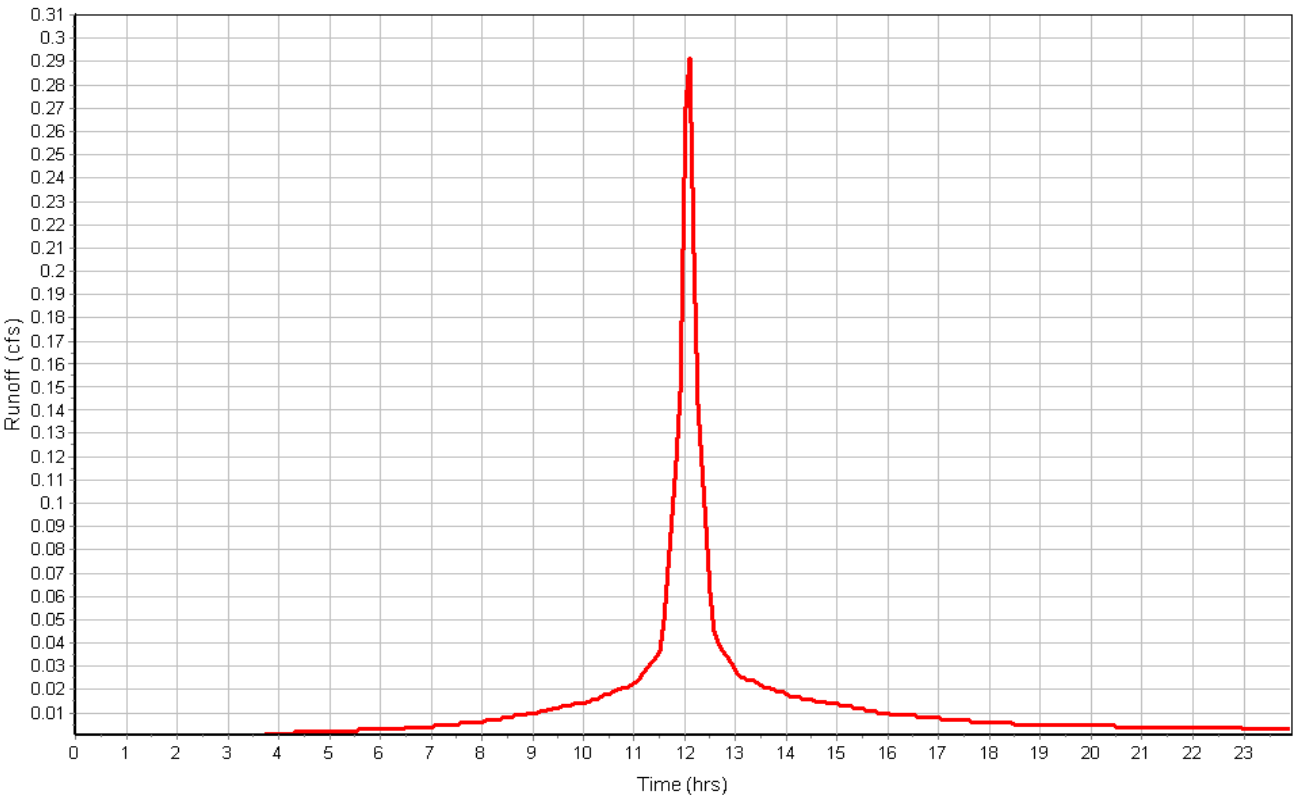
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.11
Peak Runoff (cfs) 0.29
Weighted Curve Number 92.57
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1C

Input Data

Area (ft²) 4143.99
Peak Rate Factor 484.00
Weighted Curve Number 96.30
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	3773.99	C	98.00
50 - 75% grass cover, Fair	370.00	C	79.00
Composite Area & Weighted CN	4143.99		96.30

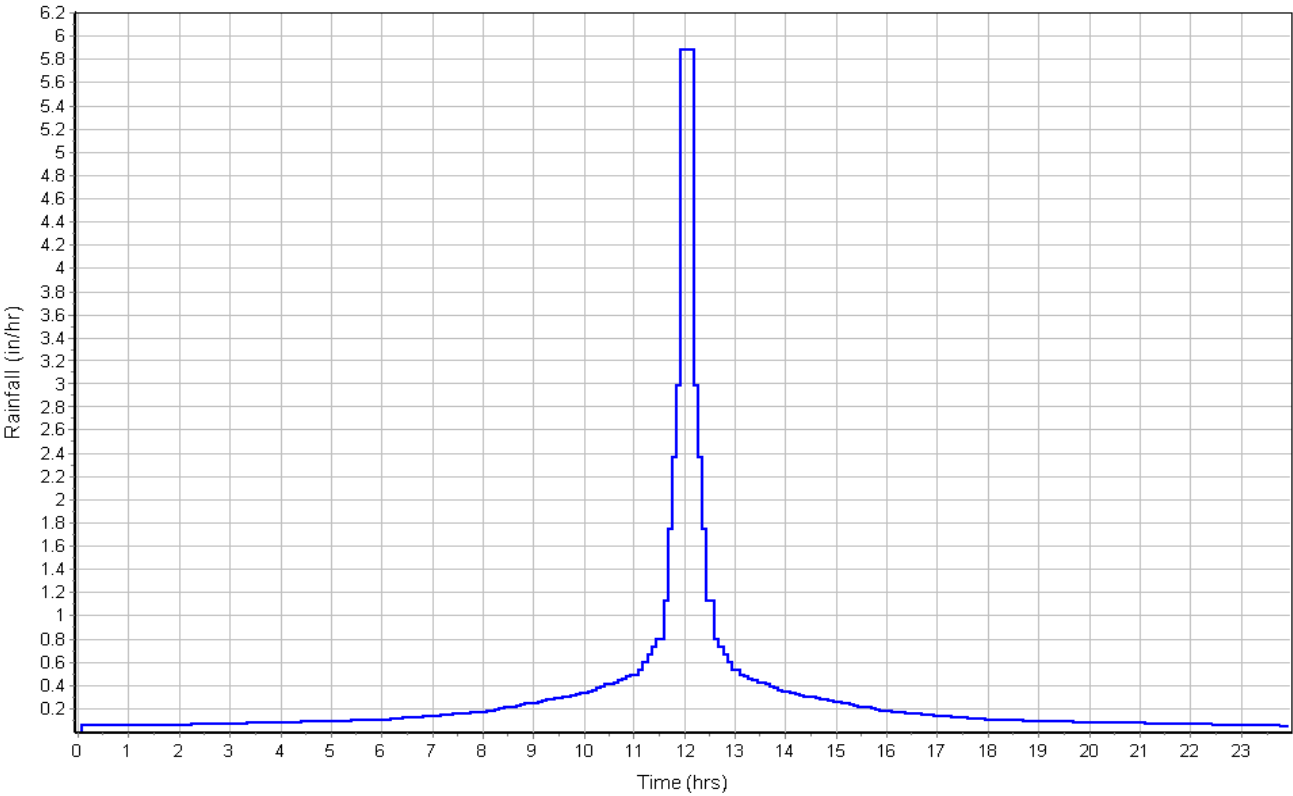
Time of Concentration

User-Defined TOC override (minutes): 5

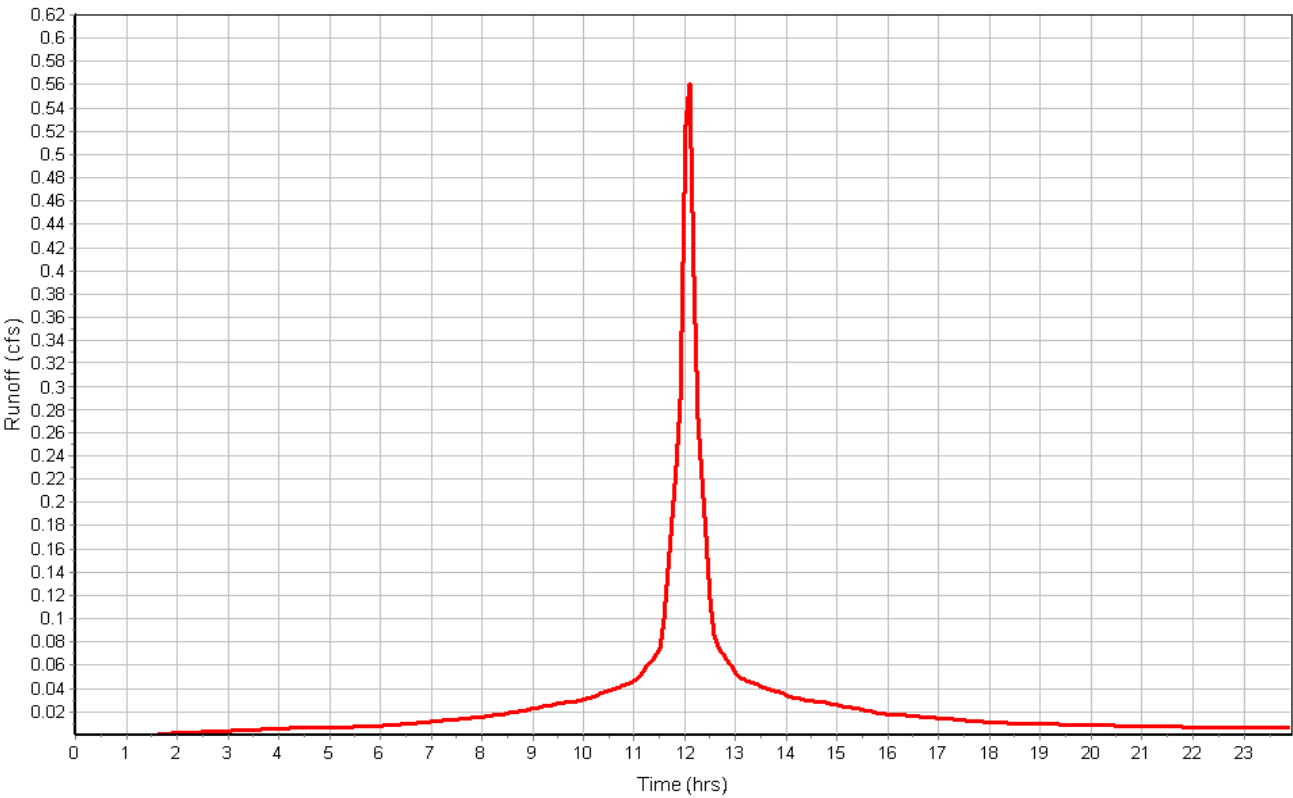
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.56
Peak Runoff (cfs) 0.56
Weighted Curve Number 96.30
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post-1D

Input Data

Area (ft²) 4344.02
Peak Rate Factor 484.00
Weighted Curve Number 96.71
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	4047.99	C	98.00
50 - 75% grass cover, Fair	295.99	C	79.00
Composite Area & Weighted CN	4343.98		96.71

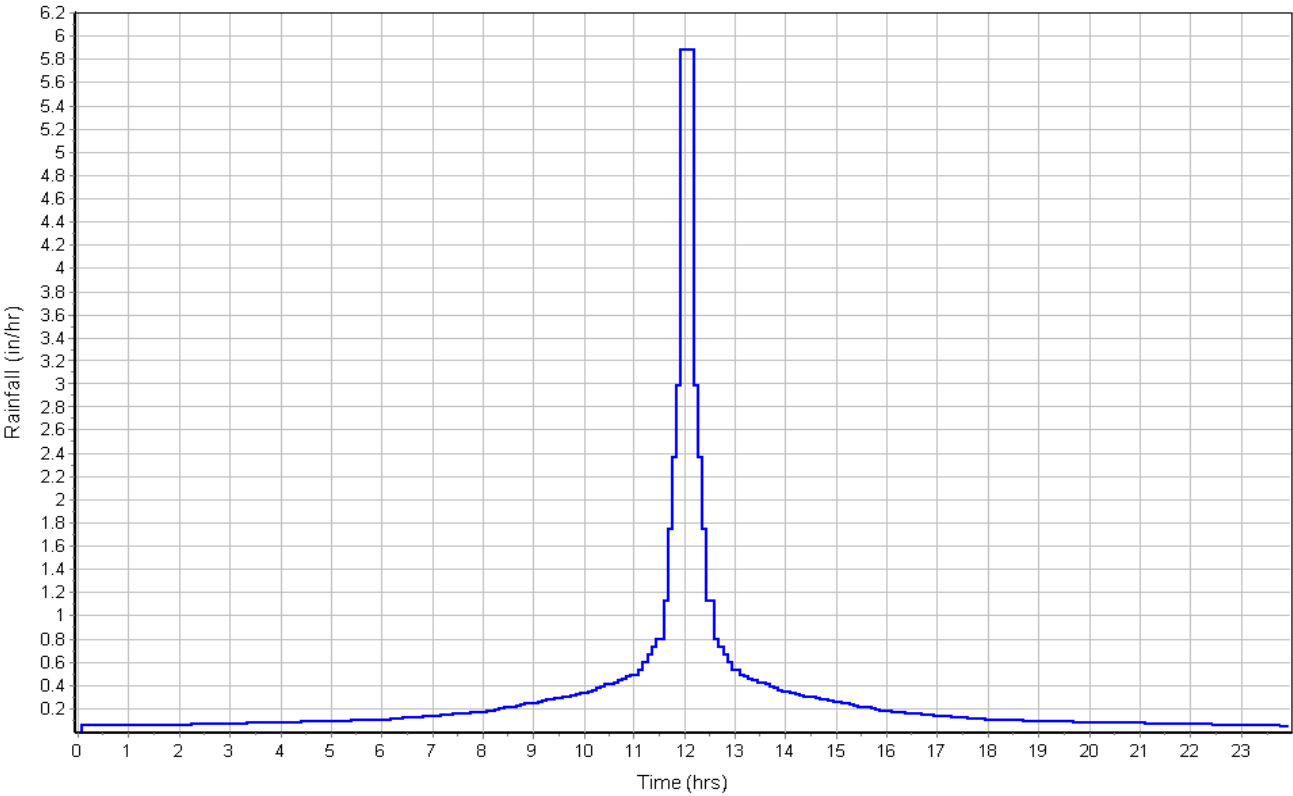
Time of Concentration

User-Defined TOC override (minutes): 5

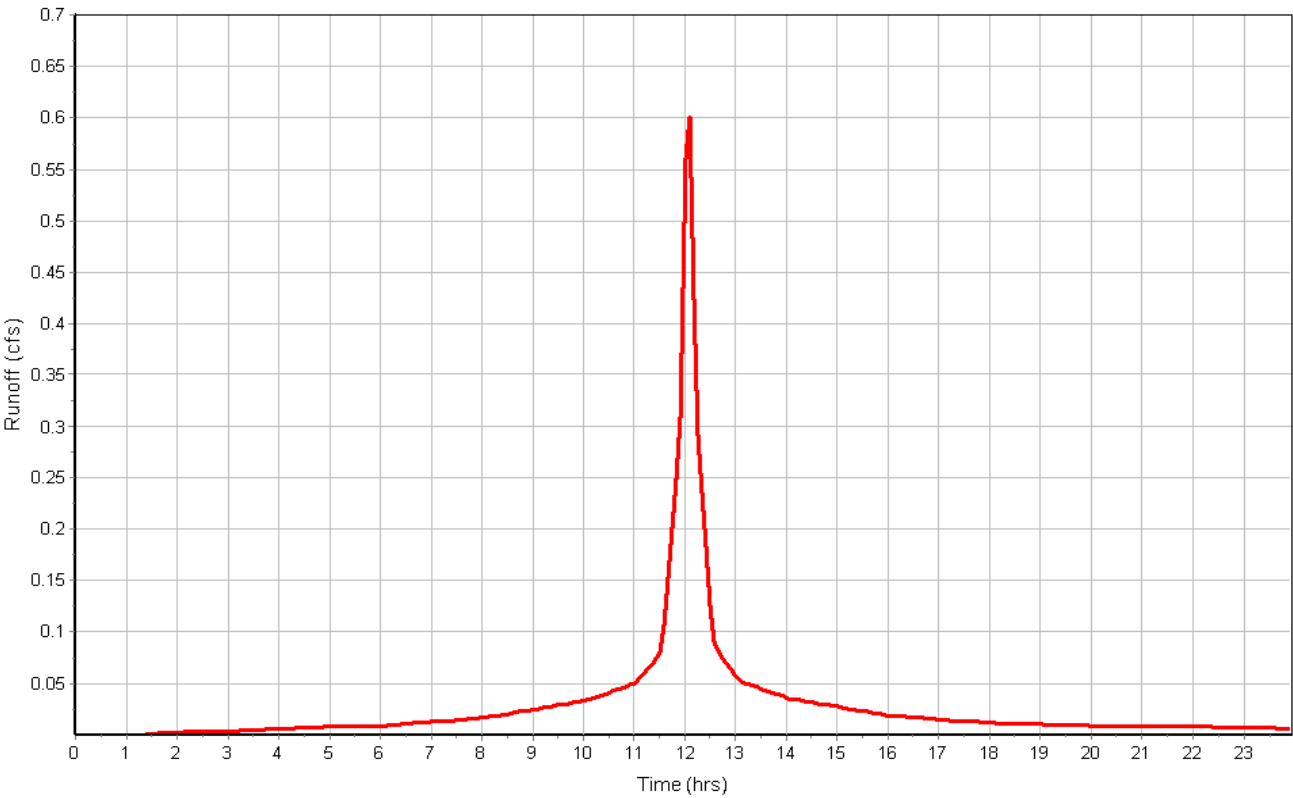
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.61
Peak Runoff (cfs) 0.60
Weighted Curve Number 96.71
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7A

Input Data

Area (ft²) 10845.00
Peak Rate Factor 484.00
Weighted Curve Number 97.57
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft ²)	Soil Group	Curve Number
Paved parking & roofs	10597.02	C	98.00
50 - 75% grass cover, Fair	247.99	C	79.00
Woods, Fair	0.00	C	73.00
Composite Area & Weighted CN	10845.01		97.57

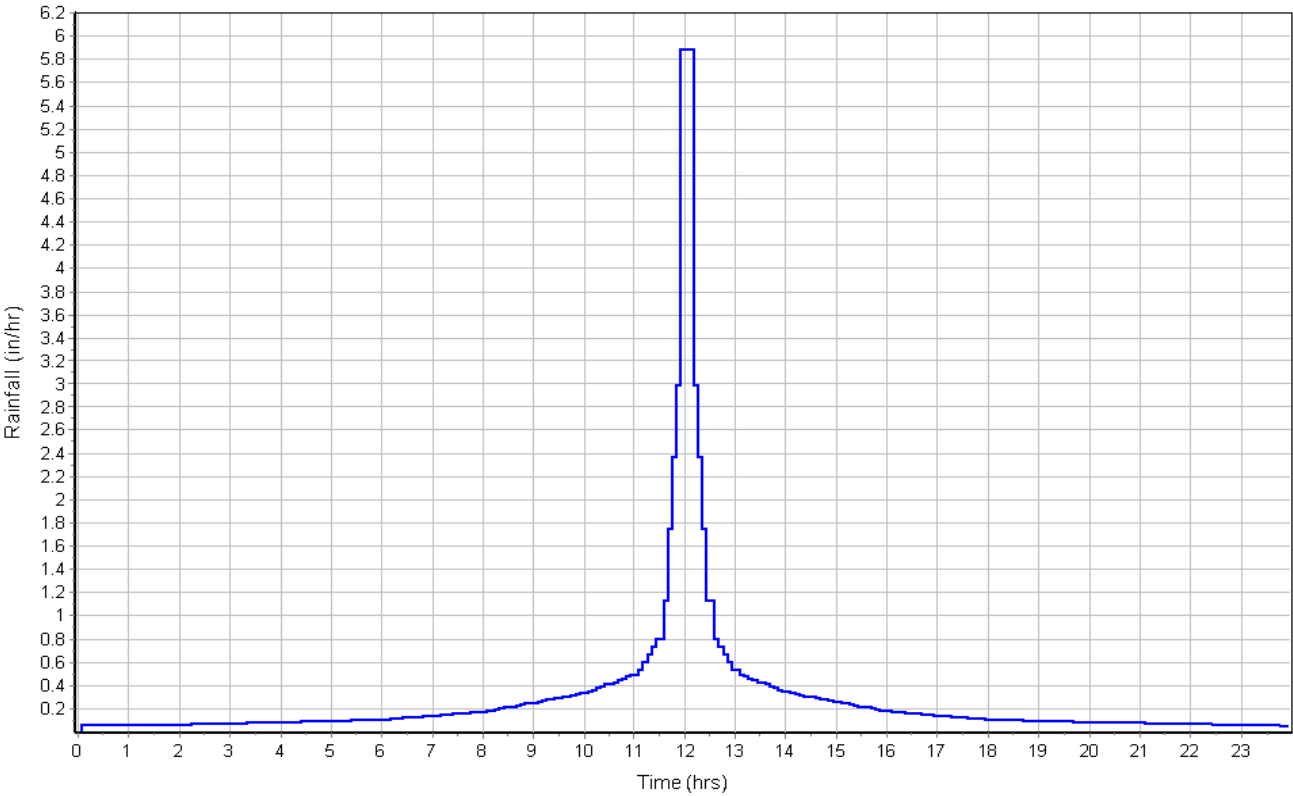
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

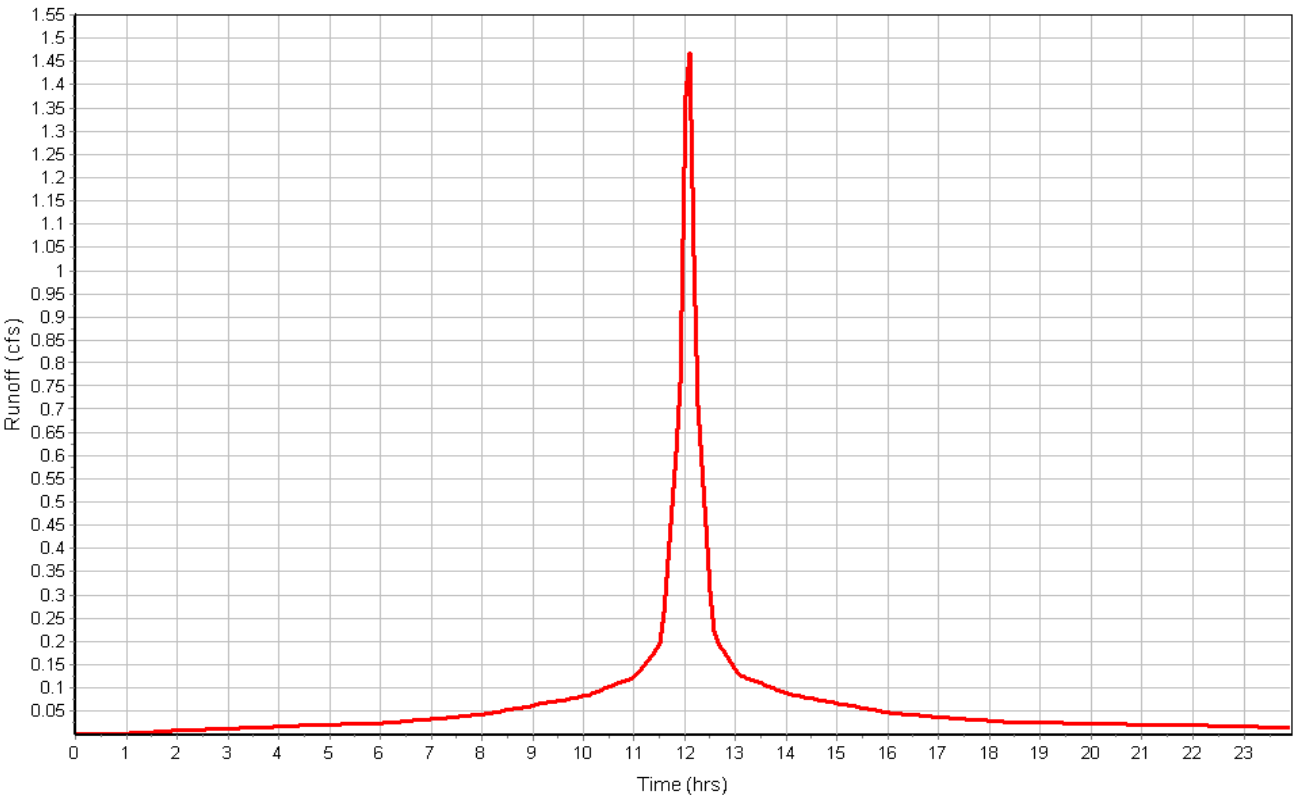
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.71
Peak Runoff (cfs) 1.47
Weighted Curve Number 97.57
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Post7B

Input Data

Area (ft²) 19698.01
Peak Rate Factor 484.00
Weighted Curve Number 90.20
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	11902.99	C	98.00
50 - 75% grass cover, Fair	6880.00	C	79.00
Woods, Fair	915.02	C	73.00
Composite Area & Weighted CN	19698.01		90.20

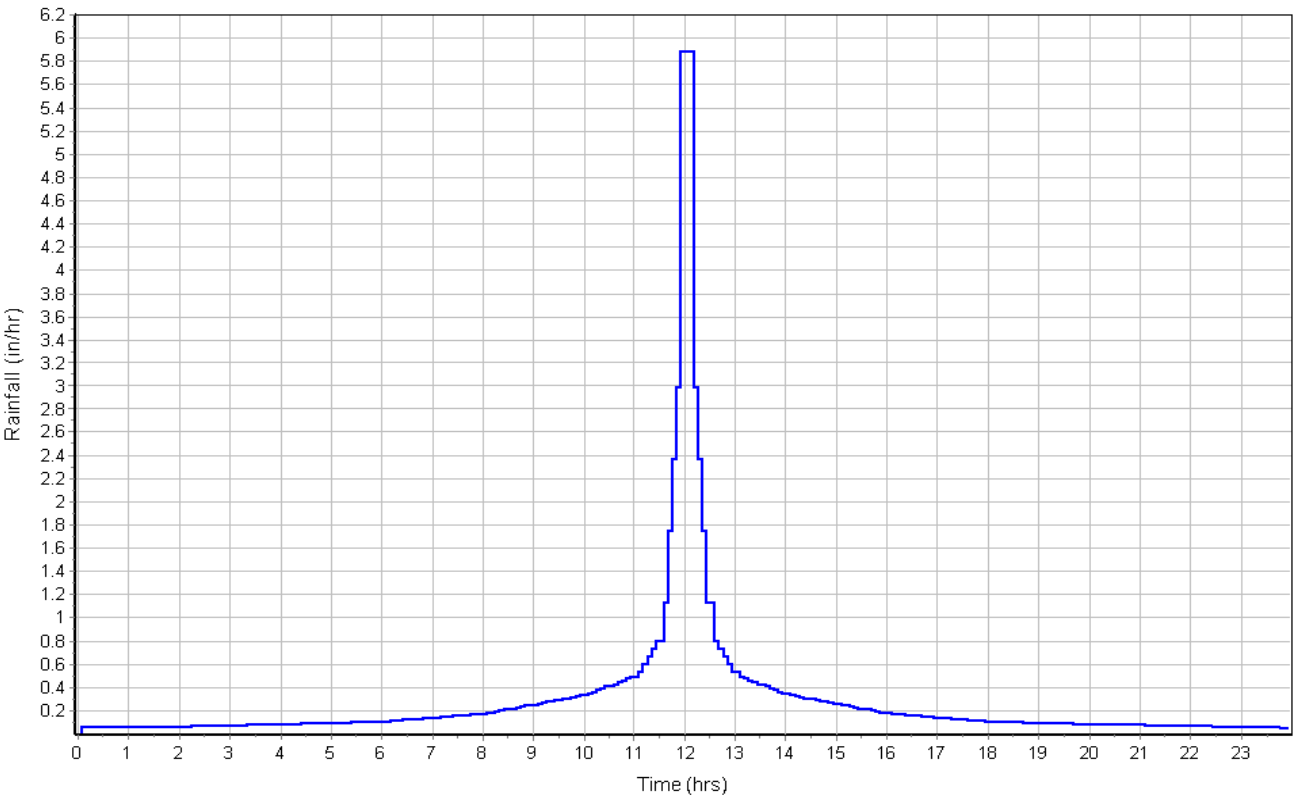
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.013	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.82	0.00	0.00
Computed Flow Time (min) :	1.02	0.00	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	210	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.03	0.00	0.00
Computed Flow Time (min) :	1.72	0.00	0.00
Total TOC (min)	2.74		

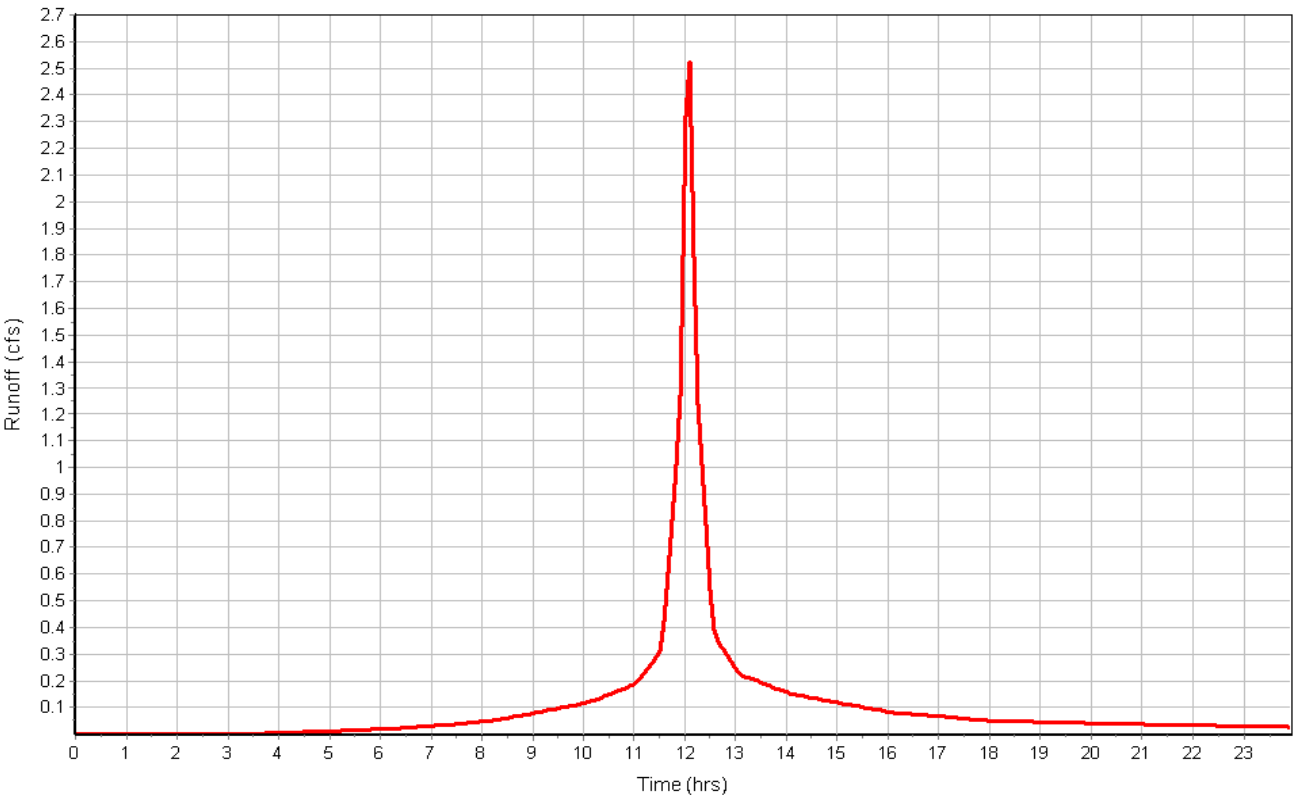
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 5.85
Peak Runoff (cfs) 2.53
Weighted Curve Number 90.20
Time of Concentration (days hh:mm:ss) 0 00:02:44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : PRE-08

Input Data

Area (ft²) 1080.98
Peak Rate Factor 484.00
Weighted Curve Number 73.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Woods, Fair	1080.98	C	73.00
Composite Area & Weighted CN	1080.98		73.00

Time of Concentration

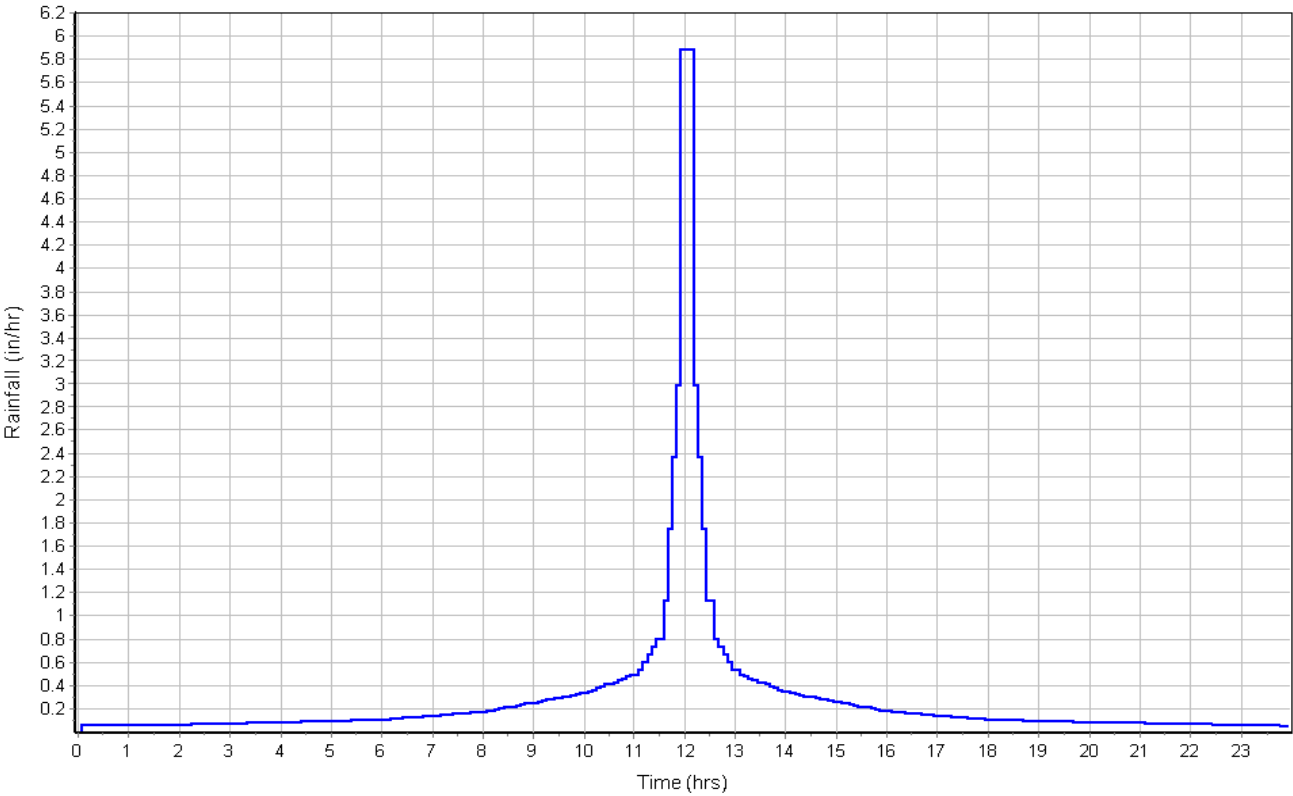
	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.00	0.00
Flow Length (ft) :	50	0.00	0.00
Slope (%) :	1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	3.4	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	15.79	0.00	0.00

	Subarea A	Subarea B	Subarea C
Shallow Concentrated Flow Computations			
Flow Length (ft) :	28	0.00	0.00
Slope (%) :	1	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.61	0.00	0.00
Computed Flow Time (min) :	0.29	0.00	0.00
Total TOC (min)	16.08		

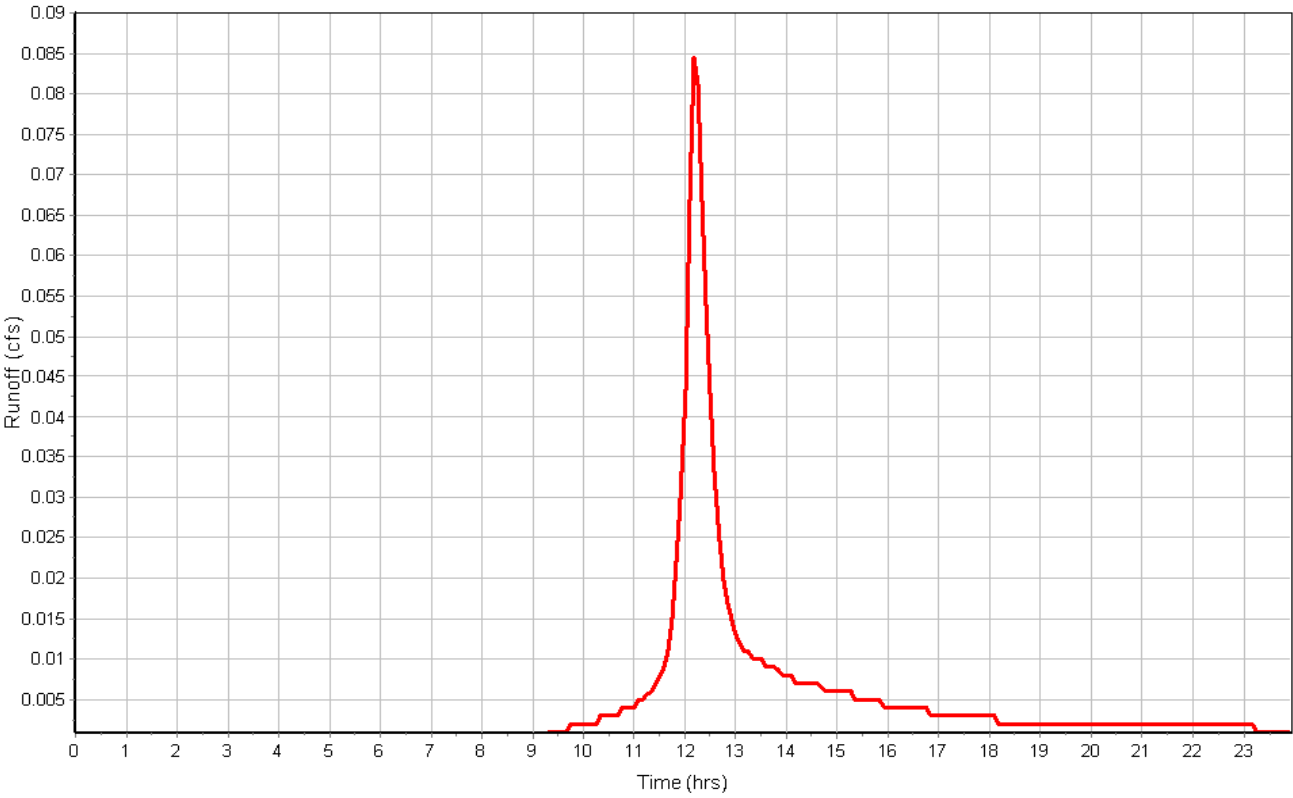
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 3.91
Peak Runoff (cfs) 0.09
Weighted Curve Number 73.00
Time of Concentration (days hh:mm:ss) 0 00:16:05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Pre-1

Input Data

Area (ft²) 85389.01
Peak Rate Factor 484.00
Weighted Curve Number 94.21
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
Paved parking & roofs	32210.01	C	98.00
50 - 75% grass cover, Fair	17018.98	C	79.00
Paved parking & roofs	36159.98	C	98.00
Composite Area & Weighted CN	85388.97		94.21

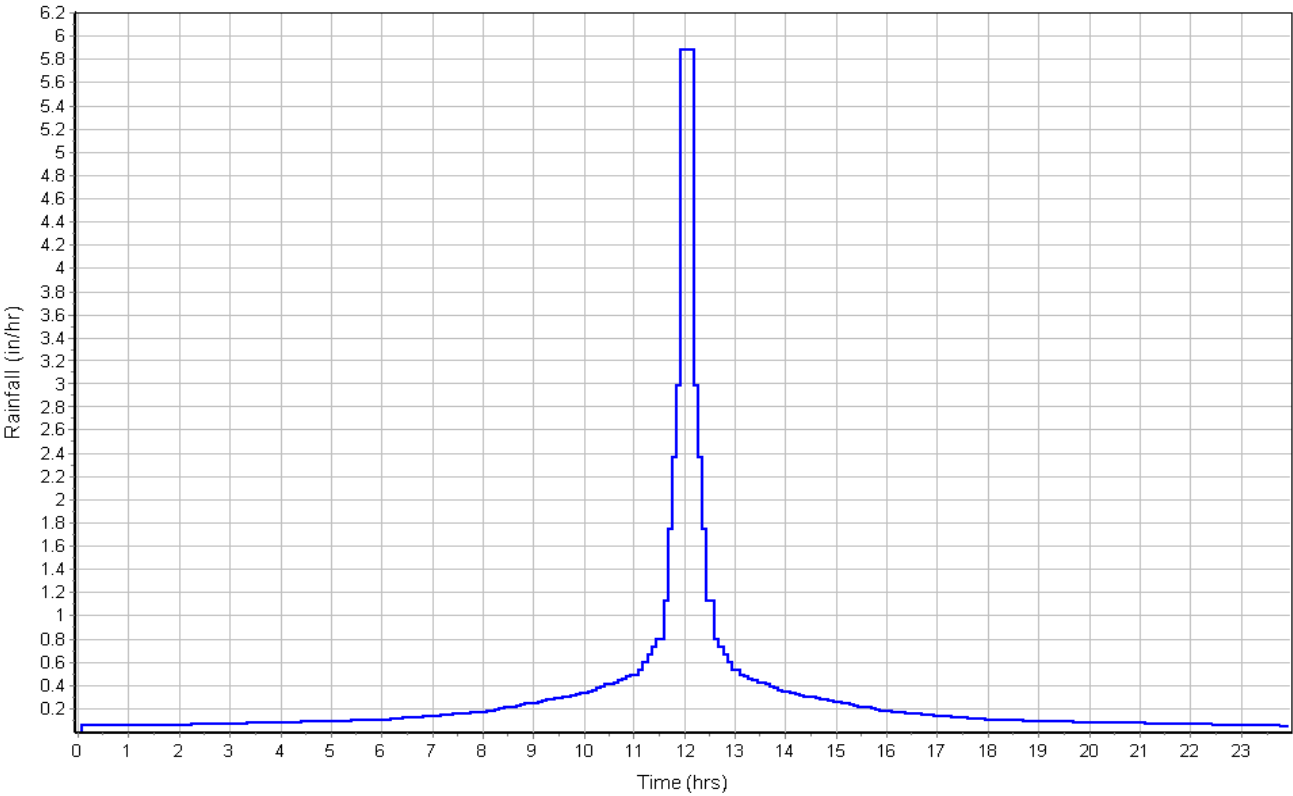
Time of Concentration

	Subarea A	Subarea B	Subarea C
Sheet Flow Computations			
Manning's Roughness :	0.4	0.4	0.00
Flow Length (ft) :	25	25	0.00
Slope (%) :	6	5	0.00
2 yr, 24 hr Rainfall (in) :	3.4	3.4	0.00
Velocity (ft/sec) :	0.09	0.09	0.00
Computed Flow Time (min) :	4.43	4.76	0.00
Shallow Concentrated Flow Computations			
Flow Length (ft) :	302	166	220
Slope (%) :	1	2	2
Surface Type :	Unpaved	Unpaved	Paved
Velocity (ft/sec) :	1.61	2.28	2.87
Computed Flow Time (min) :	3.13	1.21	1.28
Total TOC (min)	14.81		

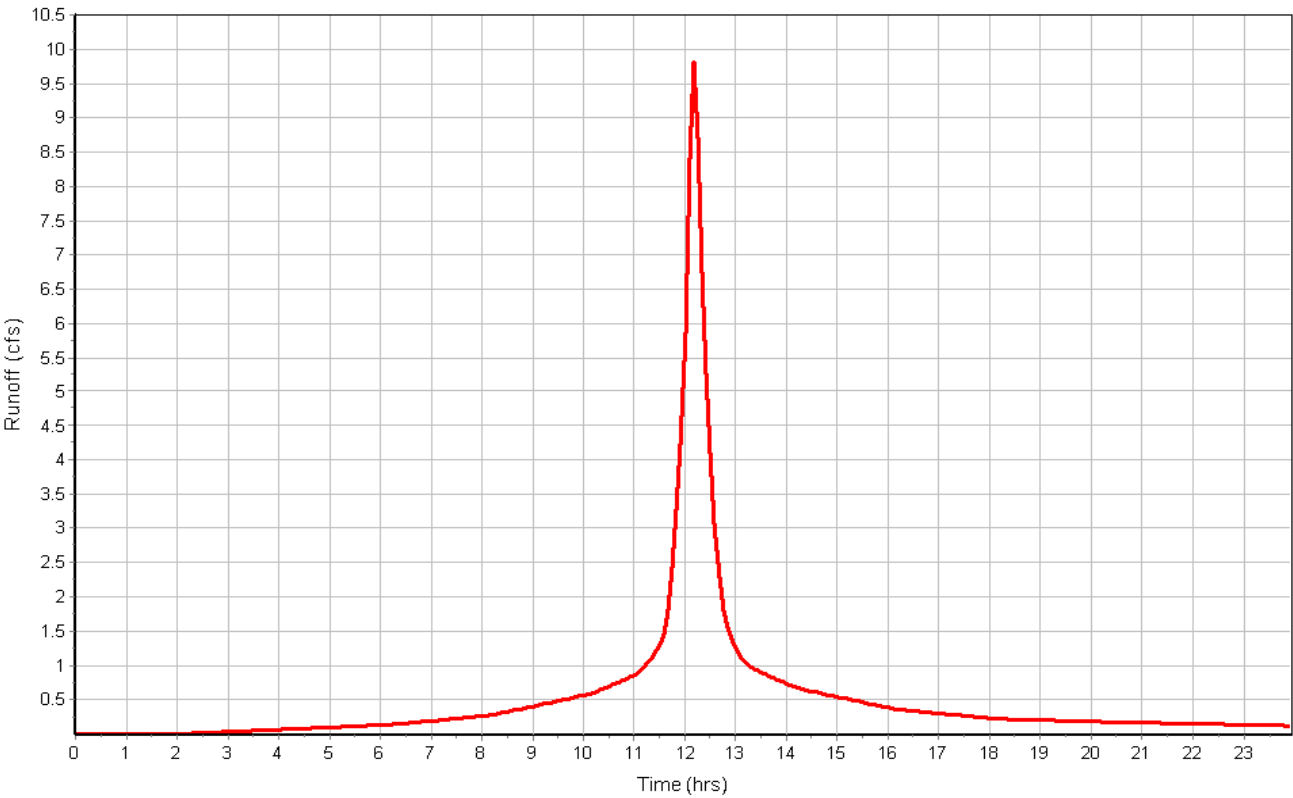
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 6.31
Peak Runoff (cfs) 9.82
Weighted Curve Number 94.21
Time of Concentration (days hh:mm:ss) 0 00:14:49

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-09

Input Data

Area (ft²) 3079.00
Peak Rate Factor 484.00
Weighted Curve Number 79.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (ft²)	Soil Group	Curve Number
50 - 75% grass cover, Fair	3079.00	C	79.00
Composite Area & Weighted CN	3079.00		79.00

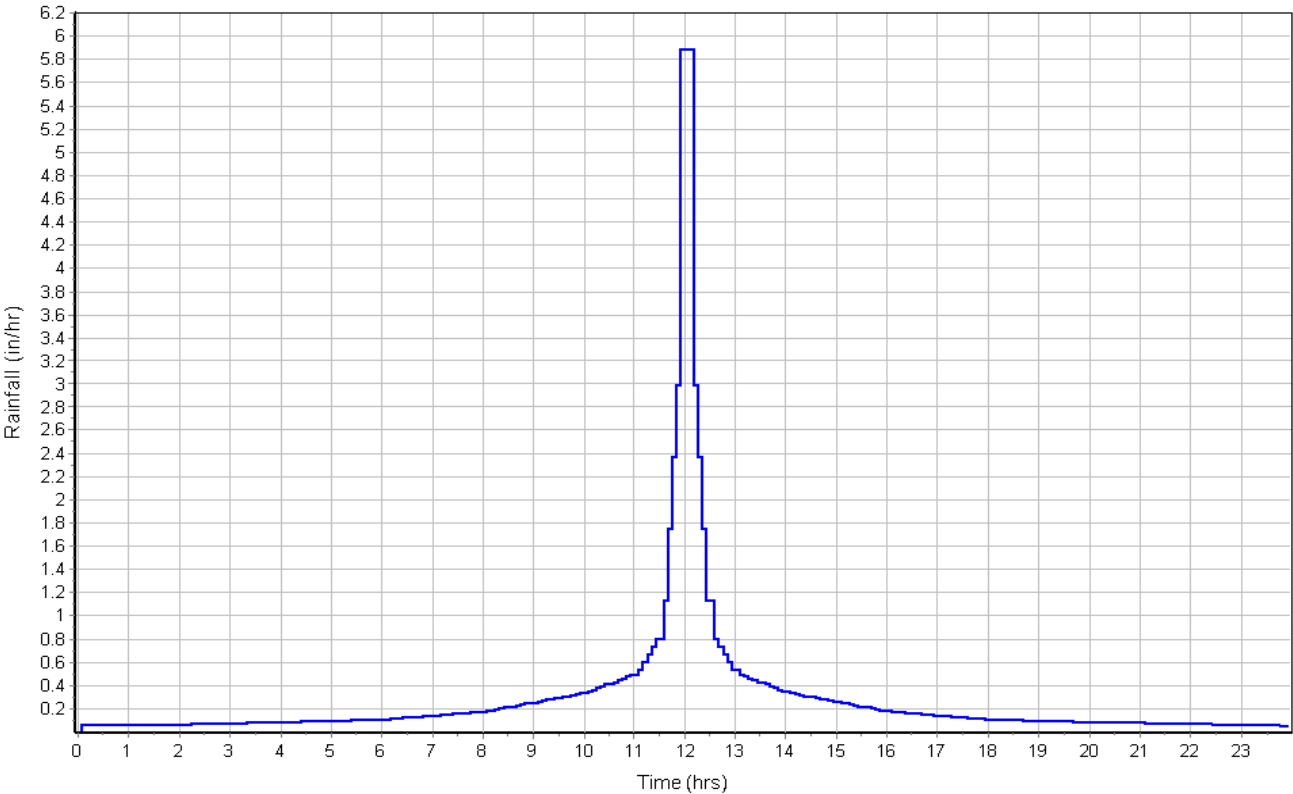
Time of Concentration

User-Defined TOC override (minutes): 5

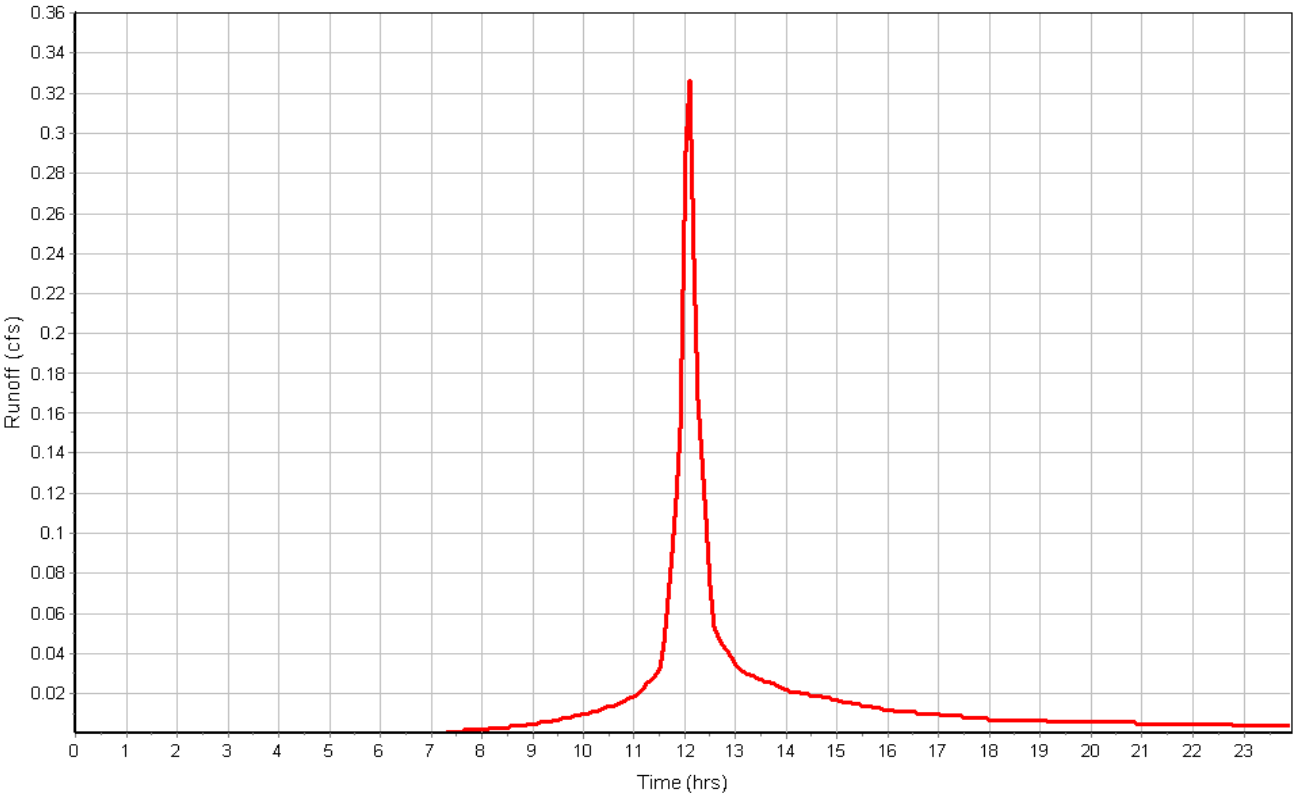
Subbasin Runoff Results

Total Rainfall (in) 7.00
Total Runoff (in) 4.58
Peak Runoff (cfs) 0.33
Weighted Curve Number 79.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation	Ground/Rim (Max) Offset	Initial Water Elevation	Initial Water Depth	Surcharge Elevation	Surcharge Depth	Ponded Area	Minimum Pipe Cover
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft²)	(in)
1 DMH(1)	163.80	170.13	6.33	163.80	0.00	170.13	0.00	0.00	0.00
2 DMH(10)	162.00	165.40	3.40	162.00	0.00	165.40	0.00	0.00	19.80
3 DMH(3)	163.75	169.82	6.07	163.75	0.00	169.82	0.00	0.00	60.22
4 DMH(4)	163.30	170.24	6.94	163.30	0.00	170.24	0.00	0.00	67.05
5 DMH(5)	162.70	169.84	7.14	162.70	0.00	169.84	0.00	0.00	67.69
6 DMH(6)	162.55	173.51	10.96	162.55	0.00	173.51	0.00	0.00	0.00
7 DMH(8)	161.95	168.06	6.11	161.95	0.00	168.06	0.00	0.00	54.74
8 Jun-01	167.00	174.00	7.00	0.00	-167.00	0.00	-174.00	0.00	70.00
9 Jun-02	168.30	174.90	6.60	168.30	0.00	174.90	0.00	0.00	0.00
10 Jun-03	168.30	174.30	6.00	168.30	0.00	174.30	0.00	1000.00	0.00
11 Jun-05	166.70	172.70	6.00	166.70	0.00	172.70	0.00	0.00	64.00
12 Out-1Pipe - (13) (1) (1)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	16.80
13 Out-1Pipe - (9)	161.01	171.00	9.99	161.01	0.00	0.00	-171.00	0.00	20.00
14 Structure - (11)	167.68	171.00	3.32	167.68	0.00	168.62	-2.38	0.00	20.00
15 Structure - (12)	161.54	171.00	9.46	161.54	0.00	162.48	-8.52	0.00	26.00
16 Structure - (15)	164.88	171.00	6.12	164.88	0.00	165.82	-5.18	0.00	26.00
17 Structure - (18)	168.50	171.00	2.50	168.50	0.00	171.00	0.00	0.00	20.00
18 Structure - (20)	168.25	171.00	2.75	168.25	0.00	168.25	-2.75	0.00	23.00
19 Structure - (22)	168.25	171.00	2.75	168.25	0.00	171.00	0.00	0.00	4.40

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 DMH(1)	1.61	0.00	164.94	1.14	0.00	5.19	164.35	0.55	0 12:11	0 00:00	0.00	0.00
2 DMH(10)	2.45	2.45	163.85	1.85	0.00	1.55	162.79	0.79	0 12:10	0 00:00	0.00	0.00
3 DMH(3)	1.87	0.00	164.75	1.00	0.00	5.07	164.11	0.36	0 12:11	0 00:00	0.00	0.00
4 DMH(4)	3.84	0.00	164.58	1.28	0.00	5.65	163.69	0.39	0 12:11	0 00:00	0.00	0.00
5 DMH(5)	4.34	0.00	164.17	1.47	0.00	5.67	163.13	0.43	0 12:11	0 00:00	0.00	0.00
6 DMH(6)	5.56	0.00	164.02	1.47	0.00	9.49	162.98	0.43	0 12:11	0 00:00	0.00	0.00
7 DMH(8)	7.91	0.00	163.49	1.54	0.00	4.57	162.41	0.46	0 12:10	0 00:00	0.00	0.00
8 Jun-01	0.72	0.00	168.78	1.78	0.00	5.22	167.63	0.63	0 12:35	0 00:00	0.00	0.00
9 Jun-02	0.05	0.00	169.25	0.95	0.00	5.65	168.69	0.39	0 12:35	0 00:00	0.00	0.00
10 Jun-03	0.77	0.00	169.25	0.95	0.00	5.05	168.49	0.19	0 12:35	0 00:00	0.00	0.00
11 Jun-05	0.72	0.00	167.70	1.00	0.00	5.00	166.97	0.27	0 12:35	0 00:00	0.00	0.00
12 Out-1Pipe - (13) (1) (1)	0.86	0.00	169.63	1.13	0.00	1.37	168.77	0.27	0 12:13	0 00:00	0.00	0.00
13 Out-1Pipe - (9)	0.63	0.00	169.78	8.77	0.00	1.22	164.68	3.67	0 12:40	0 00:00	0.00	0.00
14 Structure - (11)	0.21	0.00	169.78	2.10	0.00	1.22	168.15	0.47	0 12:40	0 00:00	0.00	0.00
15 Structure - (12)	0.64	0.60	169.78	8.24	0.00	1.22	167.95	6.41	0 12:40	0 00:00	0.00	0.00
16 Structure - (15)	0.60	0.60	169.78	4.90	0.00	1.22	168.12	3.24	0 12:40	0 00:00	0.00	0.00
17 Structure - (18)	0.03	0.00	169.74	1.24	0.00	1.26	168.78	0.28	0 12:12	0 00:00	0.00	0.00
18 Structure - (20)	0.60	0.60	169.74	1.49	0.00	1.26	168.69	0.44	0 12:12	0 00:00	0.00	0.00
19 Structure - (22)	0.99	0.60	169.72	1.47	0.00	1.28	168.68	0.43	0 12:13	0 00:00	0.00	0.00

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1 Link-01	32.20	166.00	0.00	165.75	3.20	0.25	0.7800	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
2 Link-02	38.96	170.30	2.05	166.00	2.00	4.30	11.0400	CIRCULAR	3.960	3.960	0.0150	0.5000	0.5000	0.0000	0.00	No
3 Link-03	31.15	169.10	0.60	168.00	5.45	1.10	3.5300	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
4 Link-04	35.30	170.00	1.00	168.50	3.14	1.50	4.2500	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
5 Link-05	216.63	167.50	0.50	166.70	0.00	0.80	0.3700	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
6 Link-06	163.00	169.00	0.70	168.35	0.05	0.65	0.4000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
7 Link-07	55.66	164.00	0.20	163.80	0.05	0.20	0.3600	CIRCULAR	12.000	12.000	0.0150	0.5000	0.5000	0.0000	0.00	No
8 Link-08	85.00	168.35	0.05	167.50	0.50	0.85	1.0000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
9 Link-11	100.00	166.70	0.00	166.64	0.00	0.06	0.0600	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
10 Pipe - (10)	30.11	168.00	6.46	167.00	1.64	1.00	3.3200	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
11 Pipe - (11)	30.51	168.00	3.12	167.00	1.64	1.00	3.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
12 Pipe - (13)	54.74	168.50	0.00	168.25	0.00	0.25	0.4600	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
13 Pipe - (13) (1)	45.20	168.25	0.00	168.25	0.00	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
14 Pipe - (13) (1) (1)	50.87	168.50	0.25	168.25	-0.25	0.25	0.4900	CIRCULAR	9.960	9.960	0.0120	0.5000	0.5000	0.0000	0.00	No
15 Pipe - (14)	12.24	168.25	0.00	168.00	0.30	0.25	2.0400	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
16 Pipe - (15)	10.98	168.25	0.00	168.00	0.30	0.25	2.2800	CIRCULAR	6.000	6.000	0.0150	0.5000	0.5000	0.0000	0.00	No
17 Pipe - (18)	18.00	164.50	0.00	164.00	0.20	0.50	2.7800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
18 Pipe - (20)	18.71	164.00	0.00	163.65	0.35	0.35	1.8700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
19 Pipe - (21)	28.88	164.00	0.00	163.20	0.50	0.80	2.7700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
20 Pipe - (3)	38.84	163.75	0.00	163.65	0.35	0.10	0.2600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
21 Pipe - (3) (2)	100.57	163.30	0.00	162.95	0.25	0.35	0.3500	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
22 Pipe - (3) (2) (1)	49.46	162.70	0.00	162.55	0.00	0.15	0.3000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
23 Pipe - (4)	172.11	162.55	0.00	162.00	0.05	0.55	0.3200	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
24 Pipe - (4) (1)	68.77	161.95	0.00	161.60	0.00	0.35	0.5100	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25 Pipe - (5)	6.17	163.85	0.00	163.80	0.05	0.05	0.8100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
26 Pipe - (6)	249.75	162.00	0.05	162.50	0.50	-0.50	-0.2000	CIRCULAR	15.000	15.000	0.0120	0.5000	0.5000	0.0000	0.00	No
27 Pipe - (7)	108.19	165.00	-2.70	163.65	0.35	1.35	1.2500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
28 Pipe - (8)	34.98	168.50	0.82	168.00	3.12	0.50	1.4300	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
29 Pipe - (8) (1)	41.80	168.00	3.12	168.00	6.46	0.00	0.0000	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No
30 Pipe - (9)	52.56	168.50	7.49	168.00	6.46	0.50	0.9500	CIRCULAR	9.960	9.960	0.0150	0.5000	0.5000	0.0000	0.00	No

[illegible]

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-01	0.32	0 12:10	2.72	0.12	2.20	0.24	0.24	0.24	0.00		Calculated
2 Link-02	0.00	0 00:00	2.19	0.00	0.00		0.00	0.00	0.00		Calculated
3 Link-03	0.84	0 12:10	0.91	0.92	4.79	0.11	0.43	0.87	0.00		Calculated
4 Link-04	1.86	0 12:11	2.00	0.93	5.28	0.11	0.44	0.90	0.00		Calculated
5 Link-05	0.72	0 12:36	0.64	1.13	2.05	1.76	0.67	1.00	26.00		SURCHARGED
6 Link-06	0.04	0 12:29	0.66	0.06	0.20	13.58	0.46	0.69	0.00		Calculated
7 Link-07	1.59	0 12:10	1.85	0.86	2.30	0.40	0.90	0.95	0.00		Calculated
8 Link-08	0.72	0 12:35	1.05	0.68	2.59	0.55	0.67	1.00	16.00		SURCHARGED
9 Link-11	0.72	0 12:36	0.47	1.53	2.40	0.69	0.53	0.80	0.00		> CAPACITY
10 Pipe - (10)	0.61	0 12:10	0.89	0.69	4.48	0.11	0.50	1.00	67.00		SURCHARGED
11 Pipe - (11)	0.61	0 12:10	0.88	0.69	4.46	0.11	0.50	1.00	67.00		SURCHARGED
12 Pipe - (13)	0.03	0 11:55	1.28	0.03	0.07	13.03	0.83	1.00	30.00		SURCHARGED
13 Pipe - (13) (1)	0.39	0 12:10	0.85	0.46	0.72	1.05	0.83	1.00	92.00		SURCHARGED
14 Pipe - (13) (1) (1)	0.86	0 12:10	1.06	0.81	1.57	0.54	0.83	1.00	27.00		SURCHARGED
15 Pipe - (14)	0.24	0 12:05	0.70	0.35	1.34	0.15	0.50	1.00	184.00		SURCHARGED
16 Pipe - (15)	0.22	0 11:56	0.73	0.30	1.41	0.13	0.50	1.00	184.00		SURCHARGED
17 Pipe - (18)	1.02	0 12:09	6.43	0.16	2.29	0.13	0.65	0.69	0.00		Calculated
18 Pipe - (20)	0.54	0 12:09	5.28	0.10	2.92	0.11	0.71	0.76	0.00		Calculated
19 Pipe - (21)	0.60	0 12:10	6.42	0.09	3.56	0.14	0.57	0.59	0.00		Calculated
20 Pipe - (3)	1.86	0 12:12	1.96	0.95	2.99	0.22	0.92	0.97	0.00		Calculated
21 Pipe - (3) (2)	3.74	0 12:09	4.13	0.91	3.42	0.49	1.20	0.99	0.00		Calculated
22 Pipe - (3) (2) (1)	4.29	0 12:12	6.27	0.69	2.69	0.31	1.43	0.98	0.00		Calculated
23 Pipe - (4)	5.58	0 12:12	6.43	0.87	3.19	0.90	1.46	0.99	0.00		Calculated
24 Pipe - (4) (1)	7.88	0 12:10	8.12	0.97	4.86	0.24	1.29	0.86	0.00		Calculated
25 Pipe - (5)	0.28	0 12:09	3.48	0.08	0.78	0.13	0.88	0.93	0.00		Calculated
26 Pipe - (6)	2.45	0 12:09	3.13	0.78	1.99	2.09	1.25	1.00	3.00		SURCHARGED
27 Pipe - (7)	1.46	0 12:10	7.47	0.20	5.02	0.36	0.59	0.61	0.00		Calculated
28 Pipe - (8)	0.21	0 12:20	2.27	0.09	0.69	0.84	0.83	1.00	33.00		SURCHARGED
29 Pipe - (8) (1)	0.28	0 12:24	0.85	0.33	0.51	1.37	0.83	1.00	53.00		SURCHARGED
30 Pipe - (9)	0.63	0 12:24	1.85	0.34	1.50	0.58	0.83	1.00	33.00		SURCHARGED

Inlet Input

SN Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1 CB(1)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.50	169.50	5.00	164.50	0.00	0.00	0.00
2 CB(2)	NEENAH FOUNDRY	R-2420-A	On Sag	1	163.85	166.40	2.55	163.85	0.00	200.00	0.00
3 Inlet-04	NEENAH FOUNDRY	R-2420-A	On Sag	1	166.00	169.00	3.00	164.00	-2.00	200.00	0.00
4 Structure - (29)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	170.50	6.50	164.00	0.00	0.00	0.00
5 Structure - (31)	NEENAH FOUNDRY	R-2420-A	On Sag	1	164.00	172.59	8.59	164.00	0.00	0.00	0.00
6 Structure - (9)	NEENAH FOUNDRY	R-2420-A	On Sag	1	167.70	171.97	4.26	167.70	0.00	0.00	0.00

Roadway & Gutter Input

SN Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1 CB(1)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2 CB(2)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3 Inlet-04	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4 Structure - (29)	N/A	0.0200	0.0160	0.0620	2.00	0.0657	7.00
5 Structure - (31)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6 Structure - (9)	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN Element ID	Peak Flow	Peak Lateral Inflow	Peak Flow Intercepted by Inlet	Peak Flow Bypassing Inlet	Inlet Efficiency during Peak Flow	Max Gutter Spread during Peak Flow	Max Gutter Water Elev. during Peak Flow	Max Gutter Water Depth during Peak Flow	Time of Max Depth Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(cfs)	(cfs)	(%)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 CB(1)	1.04	1.04	N/A	N/A	N/A	0.00	169.55	0.05	0 12:11	0.00	0.00
2 CB(2)	0.29	0.29	N/A	N/A	N/A	0.00	166.41	0.01	0 12:11	0.00	0.00
3 Inlet-04	0.33	0.33	N/A	N/A	N/A	0.00	169.02	0.02	0 12:10	0.00	0.00
4 Structure - (29)	0.56	0.56	N/A	N/A	N/A	0.00	170.52	0.03	0 12:11	0.00	0.00
5 Structure - (31)	0.60	0.60	N/A	N/A	N/A	0.00	172.62	0.03	0 12:10	0.00	0.00
6 Structure - (9)	1.47	1.47	N/A	N/A	N/A	0.00	172.04	0.07	0 12:10	0.00	0.00

Storage Nodes

Storage Node : Basin4

Input Data

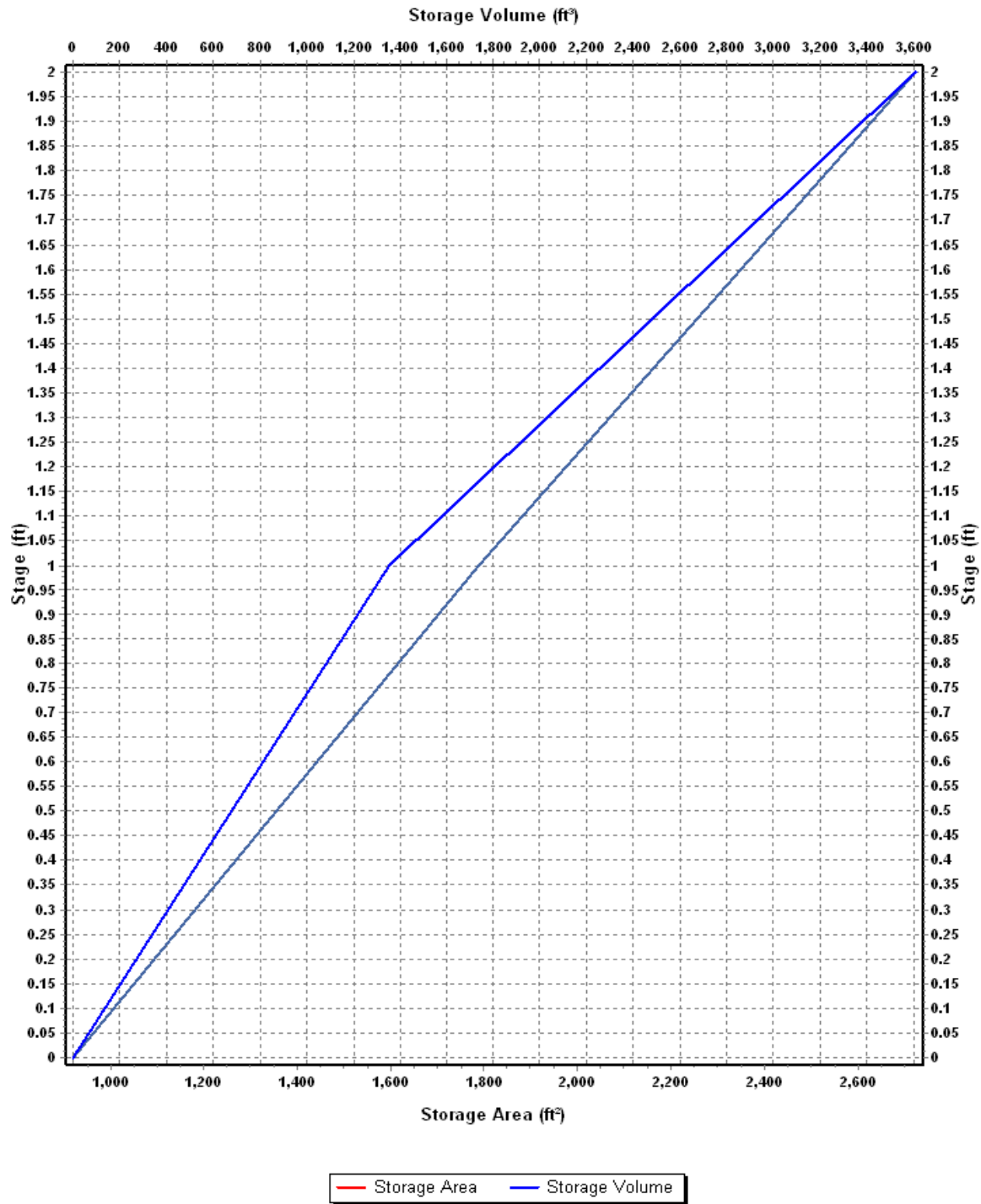
Invert Elevation (ft)	169.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	3.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-169.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-01

Stage	Storage	Storage
(ft)	Area	Volume
	(ft²)	(ft³)
0	920	0.000
1	1787	1353.50
2	2722	3608.00

Storage Area Volume Curves



Storage Node : Basin4 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 4)}.Pipe - (10) (Network - (basin 4))	Trapezoidal	No	172.00	3.00	2.00	0.50	3.33
2 Weir-03	Rectangular	No	172.50	3.50	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-02	Side	CIRCULAR	No	1.00			170.25
2 Orifice-03	Side	CIRCULAR	No	2.00			171.80

Output Summary Results

Peak Inflow (cfs)	2.52
Peak Lateral Inflow (cfs)	2.52
Peak Outflow (cfs)	1.87
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	170.50
Max HGL Depth Attained (ft)	1.5
Average HGL Elevation Attained (ft)	170.00
Average HGL Depth Attained (ft)	1
Time of Max HGL Occurrence (days hh:mm)	0 12:15
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Basin5

Input Data

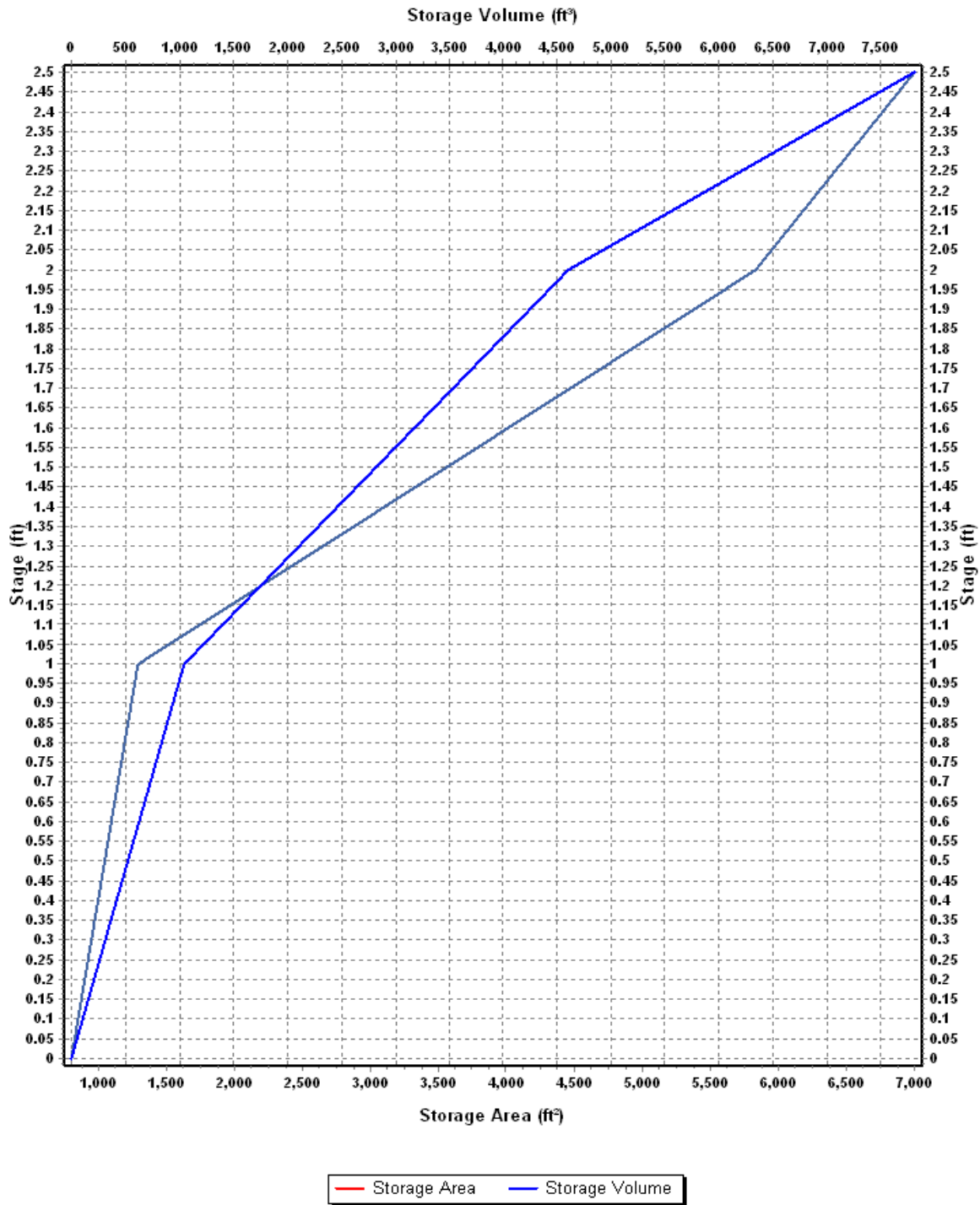
Invert Elevation (ft)	170.00
Max (Rim) Elevation (ft)	172.50
Max (Rim) Offset (ft)	2.50
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-170.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-11

Stage	Storage Area	Storage Volume
(ft)	(ft²)	(ft³)
0	801.21	0.000
1	1286.66	1043.94
2	5828.53	4601.54
2.5	7000	7808.67

Storage Area Volume Curves



Storage Node : Basin5 (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 {Network - (basin 5)}.Pipe - (11) (Network - (basin 5))	Trapezoidal	No	172.00	2.00	2.00	0.50	3.33
2 Weir-04	Rectangular	No	171.85	1.85	3.14	1.00	3.33

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-01	Side	CIRCULAR	No	1.25			171.25
2 Orifice-04	Side	CIRCULAR	No	1.25			170.55

Output Summary Results

Peak Inflow (cfs)	2.40
Peak Lateral Inflow (cfs)	2.40
Peak Outflow (cfs)	0.77
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	172.01
Max HGL Depth Attained (ft)	2.01
Average HGL Elevation Attained (ft)	171.45
Average HGL Depth Attained (ft)	1.45
Time of Max HGL Occurrence (days hh:mm)	0 12:29
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61
0.61

Storage Node : Stor-06

Input Data

Invert Elevation (ft)	167.70
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	3.30
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-167.70
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Infiltration/Exfiltration

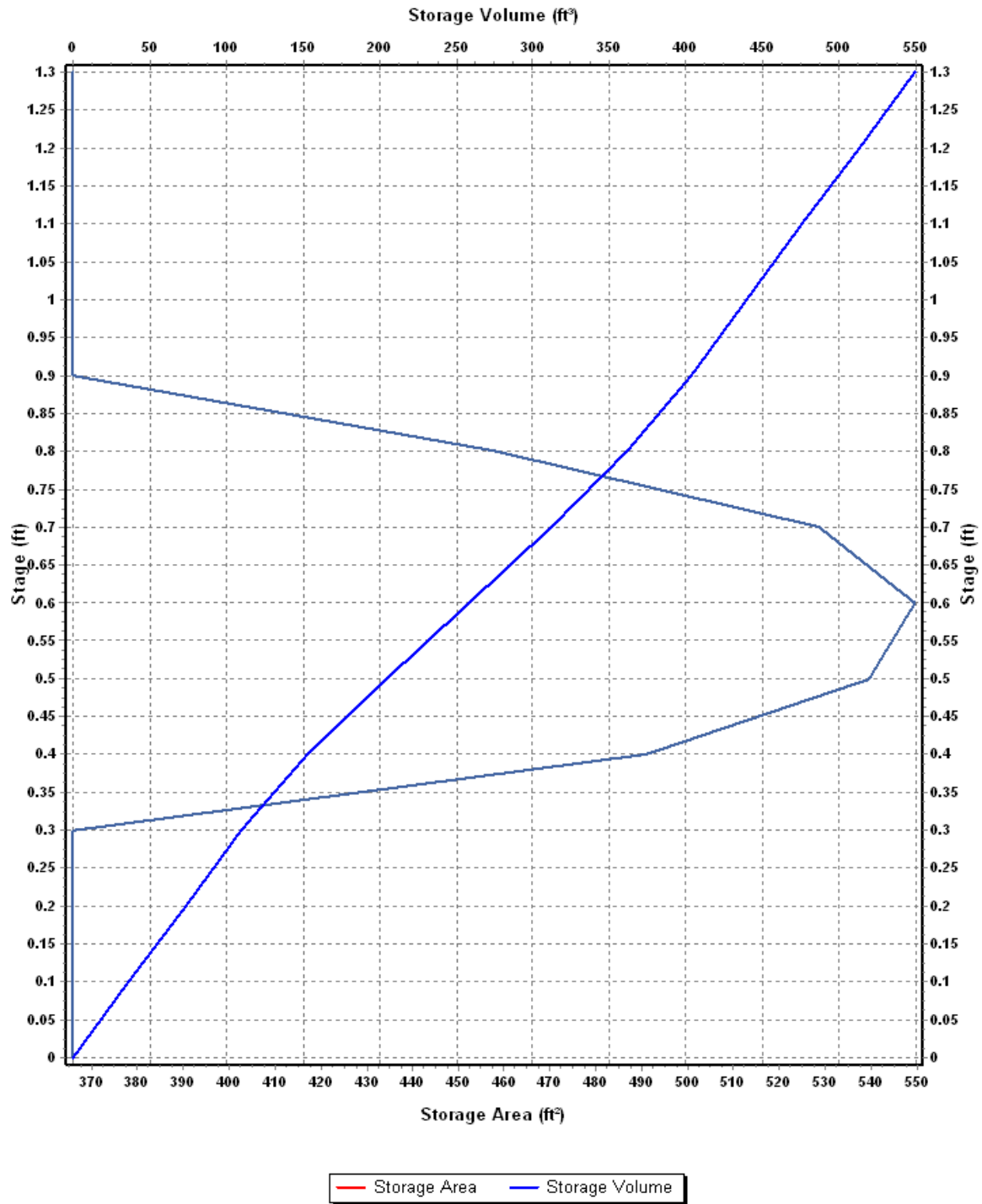
Exfiltration Rate (in/hr)	1.0200
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Storage Area Volume Curves

Storage Curve : Storage-08

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	366.0000	0.000
0.1	366.0000	36.60
0.2	366.0000	73.20
0.3	366.0000	109.80
0.4	491.0282	152.65
0.5	539.3827	204.17
0.6	549.4909	258.61
0.7	528.6472	312.52
0.8	457.7450	361.84
0.9	366.0000	403.03
1	366.0000	439.63
1.1	366.0000	476.23
1.2	366.0000	512.83
1.3	366.0000	549.43

Storage Area Volume Curves



Storage Node : Stor-06 (continued)

Outflow Orifices

SN Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)
1 Orifice-05	Side	CIRCULAR	No	2.00			168.00

Output Summary Results

Peak Inflow (cfs)	0.44
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.26
Peak Exfiltration Flow Rate (cfm)	0.79
Max HGL Elevation Attained (ft)	169.72
Max HGL Depth Attained (ft)	2.02
Average HGL Elevation Attained (ft)	168.60
Average HGL Depth Attained (ft)	0.9
Time of Max HGL Occurrence (days hh:mm)	0 12:13
Total Exfiltration Volume (1000-ft ³)	0.880
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Orifice
Coefficient

0.61

Storage Node : Stor-07

Input Data

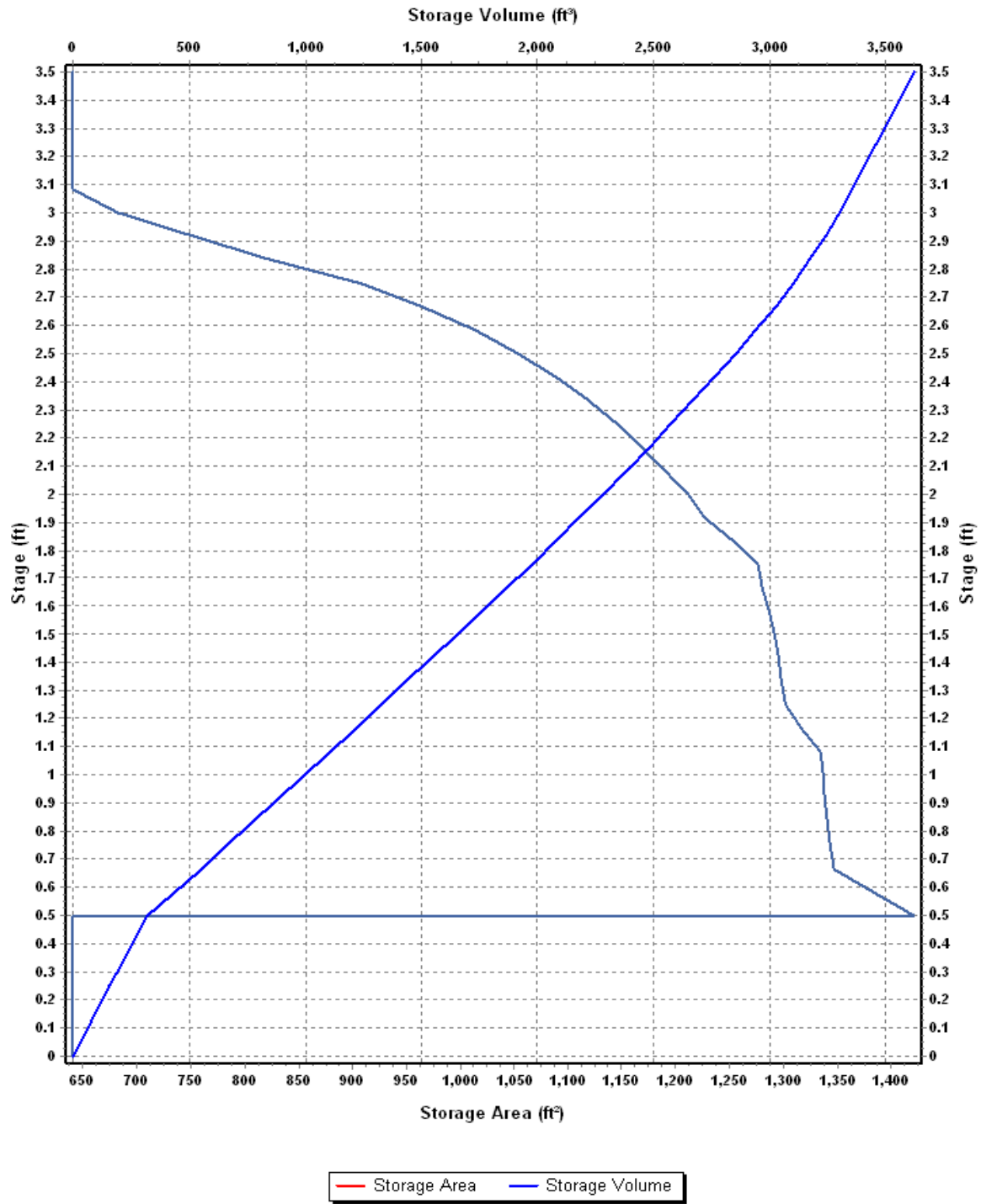
Invert Elevation (ft)	165.36
Max (Rim) Elevation (ft)	171.00
Max (Rim) Offset (ft)	5.64
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-165.36
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-07

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0.000	640.8000	0.000
0.083	640.8000	53.19
0.167	640.8000	107.02
0.250	640.8000	160.21
0.333	640.8000	213.40
0.417	640.8000	267.23
0.500	640.8000	320.42
0.501	1420.9200	321.45
0.667	1347.1200	551.20
0.750	1342.8000	662.83
0.833	1340.6400	774.19
0.917	1338.4800	886.71
1.000	1336.3200	997.71
1.083	1334.1600	1108.53
1.167	1316.8800	1219.87
1.250	1301.7600	1328.54
1.333	1297.4400	1436.41
1.417	1295.2800	1545.30
1.500	1290.9600	1652.63
1.583	1286.6400	1759.60
1.667	1280.1600	1867.41
1.750	1275.8400	1973.48
1.833	1252.0800	2078.39
1.917	1226.1600	2182.48
2.000	1211.0400	2283.62
2.083	1189.4400	2383.24
2.167	1167.8400	2482.25
2.250	1144.0800	2578.19
2.333	1118.1600	2672.07
2.417	1087.9200	2764.73
2.500	1053.3600	2853.59
2.583	1014.4800	2939.41
2.667	964.8000	3022.54
2.750	908.6400	3100.29
2.833	822.2400	3172.12
2.917	750.9600	3238.19
3.000	681.8400	3297.65
3.083	640.8000	3352.54
3.167	640.8000	3406.37
3.250	640.8000	3459.56
3.333	640.8000	3512.75
3.417	640.8000	3566.58
3.500	640.8000	3619.77

Storage Area Volume Curves



Storage Node : Stor-07 (continued)

Output Summary Results

Peak Inflow (cfs)	3.06
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.98
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	169.76
Max HGL Depth Attained (ft)	4.4
Average HGL Elevation Attained (ft)	166.44
Average HGL Depth Attained (ft)	1.08
Time of Max HGL Occurrence (days hh:mm)	0 12:40
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Section III

Operation & Maintenance

OPERATION AND MAINTENANCE PLAN

PROPOSED SITE WORK – DURING CONSTRUCTION

**UPPAbaby
Assessors Map 8 Lot 2
Rockland, Massachusetts**

Owner:

UPPAbaby
276 Weymouth Street
Rockland, MA 02370 Contact: 781-413-3014

Party Responsible for Operation and Maintenance:

UPPAbaby
276 Weymouth Street
Rockland, MA 02370 Contact: 781-413-3014

Source of Funding:

Operation and Maintenance of this stormwater management system will be the responsibility of the property owner to include its successor and/or assigns, as the same may appear on record with the appropriate register of deeds.

During Construction:

Construction activities shall follow the Construction Sequence shown on the approved plans. During periods of active construction the stormwater management system shall be inspected on a weekly basis and within 24 hours of a storm event of greater than ½". Maintenance tasks shall be performed monthly or after significant rainfall events of 1" of rain or greater. During construction, silt-laden runoff shall be prevented from entering the drainage system and off-site properties. Temporary swales shall be constructed as needed during construction to direct runoff to sediment traps. Infiltration systems and subsurface storage systems shall not be placed in service until after the installation of base course pavement and vegetative stabilization of the areas contributing to the systems.

During dewatering operations, all water pumped from the dewatering shall be directed to a "dirt bag" pumped sediment removal system (or approved equal) as manufactured by ACF Environmental. Water from construction dewatering activities should not be directed into any of the existing or proposed stormwater management facilities system unless it is fully treated prior to discharge. The unit shall be placed on a crushed stone blanket. Disposal of such "dirt bag" shall occur when the device is full and can no longer effectively filter sediment or allow water to pass at a reasonable flow rate. Disposal of this unit shall be the responsibility of the contractor and shall be as directed by the owner in accordance with applicable local, state, and federal guidelines and regulations.

Stabilized construction entrances shall be placed at the entrances and shall consist of 1½" to 2" stone and be constructed as shown on the approved plans.

All erosion and sedimentation control measures shall be in place prior to the commencement of any site work or earthwork operations, and shall be maintained during construction, and shall remain in place until all site work is complete and ground cover is established.

Heavy equipment shall not be used on basin bottoms.

All exposed soils not to be paved shall be stabilized as soon as practical. Seed mixes shall only be applied during appropriate periods as recommended by the seed supplier, typically May 1 to October 15. Any exposed soils that cannot be stabilized by vegetation during these dates shall be stabilized with hay bales, hay mulch, check dams, jute netting or other acceptable means.

Once each structure is in place, it should be maintained in accordance with the procedures described in the post-construction Operations and Maintenance Plan.

During dry periods where dust is created by construction activities the following control measures should be implemented.

- Sprinkling – The contractor may sprinkle the ground along haul roads and traffic areas until moist.
- Vegetative cover – Areas that are not expected to be disturbed regularly may be stabilized with vegetative cover.
- Mulch – Mulching can be used as a quick and effective means of dust control in recently disturbed areas.
- Spray on chemical soil treatments may be utilized. Application rates shall conform to manufacturers recommendations.

Illicit Discharges

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Illicit discharges are prohibited from the stormwater management system and the stormwater management system shall be inspected for illicit discharges annually.

The following is a list of discharges that are allowed under the EPA Construction General Permit (CGP) provided that appropriate stormwater controls are designed, installed, and maintained:

- a. Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR §122.26(b)(14) or § 122.26(b)(15)(i);
- b. Stormwater discharges designated by EPA as needing a permit under 40 CFR § 122.26(a)(1)(v) or §122.26(b)(15)(ii);
- c. Stormwater discharges from construction support activities (*e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas*) provided:
 - i. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
 - ii. The support activity is not a commercial operation, nor does it serve multiple unrelated construction projects;
 - iii. The support activity does not continue to operate beyond the completion of the construction activity at the project it supports; and
 - iv. Stormwater controls are implemented in accordance with Part 2 of the CGP and, if applicable, Part 3 of the CGP, for discharges from the support activity areas.

The following non-stormwater discharges from your construction activity, provided that, with the exception of water used to control dust and to irrigate areas to be vegetatively stabilized, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Part 2 of the CGP:

- i. Discharges from emergency fire-fighting activities;
- ii. Fire hydrant flushings;
- iii. Landscape irrigation;
- iv. Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
- v. Water used to control dust;
- vi. Potable water including uncontaminated water line flushings;
- vii. Routine external building washdown that does not use detergents;
- viii. Pavement wash waters provided spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used. You are prohibited from directing pavement wash waters directly into any surface water, storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;
- ix. Uncontaminated air conditioning or compressor condensate;
- x. Uncontaminated, non-turbid discharges of ground water or spring water;
- xi. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and
- xii. Construction dewatering water that has been treated by an appropriate control under Part 2.1.3.4 of the CGP; and
- e. Discharges of stormwater listed above in Parts a, b, and c, or authorized nonstormwater discharges in Part d above, commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

For additional information, refer to Performance, Standards and Guidelines for Stormwater Management in Massachusetts, published by the Department of Environmental Protection.

STORMWATER MANAGEMENT
BEST MANAGEMENT PRACTICES
INSPECTION SCHEDULE AND EVALUATION CHECKLIST – CONSTRUCTION PHASE

PROJECT LOCATION: Lovell Academy

Latest Revision: October 22, 2021

Stormwater Control Manager: _____

Stamp

Best Management Practice	Inspection Frequency (1)	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed yes/no List items	Date of Cleaning/Repair	Performed By	Water Level in Detention System
Silt socks & swales and silt traps	After every major storm event							
Dewatering Operations	Daily-during actual dewatering							
Temporary Construction Entrance	Daily or as needed.							

(1) Refer to the Massachusetts Stormwater Management, Volume Two: Stormwater Technical Handbook for recommendations regarding frequency for inspection and maintenance of specific BMPs.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended. Slow release fertilizer recommended.
 Other notes:(Include deviations from: Con Com Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

OPERATION AND MAINTENANCE PLAN
PROPOSED DRAINAGE SYSTEM – POST CONSTRUCTION
UPPAbaby
Assessors Map 8 Lot 2
Rockland, Massachusetts

Owner:

UPPAbaby
276 Weymouth Street
Rockland, MA 02370 Contact: 781-413-3014

Party Responsible for Operation and Maintenance:

After construction is complete the owner will be the party responsible for operation and maintenance of the drainage system. When the property is conveyed, the new owner will be the party responsible for operation and maintenance.

Source of Funding:

Operation and Maintenance of this stormwater management system will be the responsibility of the owner. The estimated annual budget for the operation and maintenance of the stormwater system is \$3000.

Schedule for Inspection and Maintenance:

Deep Sump Catch Basins

Deep sump catch basins shall be inspected 4 times per year and after every major storm event during construction and cleaned when sediment exceeds 24" depth. Disposal of the accumulated sediment shall be in accordance with applicable local, state, and federal guidelines and regulations.

Subsurface Drainage Systems Maintenance Schedule

Activity Time of Year Frequency

Inspect Inlets and access manholes twice per year
Remove any debris that might clog the system

After construction, the systems should be inspected for standing water 1-2 days after any significant rainfall exceeding 1" of rainfall in 24 hours or major storm event. If the system is continuing to hold standing water after 2 days the owner should have it inspected and repaired. The systems should also be inspected to verify whether infiltration function has been lost. If infiltration capacity has become degraded, it should be restored under the direction of a qualified professional.

The subsurface systems should be inspected twice per year and at least once per year by a drainage system professional to ensure that the system is operating as intended. The owner shall implement and pay for the inspector's recommendations.

Lawn Fertilization

Lawn fertilizer shall be slow release and limited to 3 lbs per 1000 s.f. per year.

Stormwater Contamination Prevention

Exterior storage of hazardous materials including deicing chemicals, fertilizers, herbicides, pesticides, and other hazardous materials is prohibited. All materials are to be stored inside of the buildings no exterior storage of materials is allowed. No fueling of equipment is allowed on the premises and is prohibited.

Individual storage unit users shall be notified of the prohibition of illicit discharges to the stormwater management system.

Snow Removal and De-icing

Snow removal will be the responsibility of the Owner. Snow will be plowed from Parking areas and driveways and shoveled or removed with a snow blower from walkways. Snow will be stored along roadways and walkways as shown on the Site Plan. If additional stockpiling area is needed, excess snow will be removed from the site with proper off-site disposal. Snow shall be stockpiled in areas where melting will be directed through the drainage systems and not directly to the wetlands. Stockpiling within any rain garden and infiltration areas is prohibited.

Inspections

Yearly inspections of the stormwater management system shall be performed and an Inspection Schedule and Evaluation Checklist shall be maintained by the Owner and made available to regulatory officials if requested. Copies of the receipts for cleaning of the systems shall also be maintained.

The Owner shall be responsible to secure the services of a Licensed Engineer on an on-going basis. The inspector shall review the project with respect to the following:

- Proper installation and performance of the Stormwater Management System.
- Review of the controls to determine any damaged or ineffective controls.
- Corrective actions.

The Engineer shall prepare, stamp and submit, to the Owner, a report documenting the findings and should request the required maintenance or repair for the pollution prevention controls when the inspector finds that it is necessary for the control to be effective (see attached Inspection Schedule and Evaluation Checklist). The inspector shall notify the Owner to make the changes.

The owner and/or their employees responsible for the O&M of the stormwater management system shall be trained annually. Records of trained individuals shall be kept and submitted to the town with the check list. The records shall indicate the latest training date.

The attached inspection form shall be retained and kept available for a minimum of three years.

For additional information, refer to Performance, Standards and Guidelines for Stormwater Management in Massachusetts, published by the Department of Environmental Protection

Definition of Major Storm Event

For the purposes of this operation and maintenance plan a major storm event should be defined as a rainfall of such intensity or duration that causes observable movement of sediment on the roadway or site. It is the intent of this plan to prevent this sediment from entering the drainage

system. Prior to stabilization of the site this may occur more frequently with less intense storms. As the site is stabilized with ground cover the movement of sediment will only occur during more severe storms.

Illicit Discharges

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Illicit discharges are prohibited from the stormwater management system and the stormwater management system shall be inspected for illicit discharges annually.

This Standard prohibits illicit discharges to stormwater management systems. The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

For additional information, refer to Performance Standards and Guidelines for Stormwater Management in Massachusetts, published by the Department of Environmental Protection.

STORMWATER MANAGEMENT
BEST MANAGEMENT PRACTICES

INSPECTION SCHEDULE AND EVALUATION CHECKLIST – POST CONSTRUCTION PHASE

PROJECT LOCATION: Lovell Academy
Latest Revision 10/22/21

Best Management Practice	Inspection Frequency (1)	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/Repair Needed yes/no List items	Date of Cleaning/Repair	Performed By	Water Level in Drainage System
Deep Sump Hooded Catch Basins	4 times per year							
Subsurface Infiltration Systems	Once per year							
	Twice per year							
	Twice per year							

- (1) Refer to the Massachusetts Stormwater Management, Volume Two: Stormwater Technical Handbook for recommendations regarding frequency for inspection and maintenance of specific BMPs.
(2) records shall be kept for a minimum of three years.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended. Slow release fertilizer recommended.
Other notes:(Include deviations from: Con Com Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: _____

Stamp

Owner: _____

Date

Commonwealth of Massachusetts

Rockland

, Massachusetts

Soil Suitability Assessment for On-site Sewage Disposal

Performed by:

Kevin Grady

Date:

1/12/24

GRADY CONSULTING, L.L.C.

71 Evergreen Street, Suite 1

Kingston, MA 02364

Phone: (781) 585-2300 Fax: (781) 585-2378

Witnessed by:

N/A

Location Address or Lot #

*Owner's Name

*Address &

*Telephone #

53 Airport Park DrNew Construction ☐Repair ☐Title V Inspection ☐Drainage XOffice ReviewPublished Soil Survey Available: No ☒ Yes ☐

Year Published: _____ Publication Scale: _____ Soil Map Unit: _____

Drainage Class: _____ Soil Limitations: _____

Surficial Geology Report Available: No ☒ Yes ☐

Year Published: _____ Publication Scale: _____

Geologic Material (Map Unit): _____

Landform: _____

Flood Insurance Rate Map:Above 500 year flood boundary: No ☐ Yes ☒Within 500 year flood boundary: No ☒ Yes ☐Within 100 year flood boundary: No ☒ Yes ☐Wetland Area:National Wetland Inventory Map (map unit): N/A

Wetlands Conservancy Program Map (map unit): _____

Current Water Resource Conditions (USGS):Month: JanuaryRange: Above Normal ☒Normal ☐Below Normal ☐Other References Reviewed:Depth of Naturally Occurring Pervious Material

Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

N/A

If not, what is the depth of naturally occurring pervious material?

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise, and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated on the attached soil evaluation form, are accurate and in accordance with CMR 15.100 through 15.107.

Signature: KGDate: 1/12/24

TITLE 5 ON-SITE REVIEW

Deep Hole # 1 Date 1/12/24 Time 9:00 Weather Sunny 40°
 Location (identify on Site Plan) _____
 Land Use Commercial Slope(%) 0-2 Surface Stones Boulders
 Vegetation Weeds Landform _____

Distances from: Open Water Body ft. Possible Wet Area 250 ft. Drinking Water Well ft.

Drainageway ft. Propertyline 15 ft Other

DEEP OBSERVATION HOLE LOG

Depth From Surface (Inches)	Soil Horizon (USDA)	Soil Texture (Munsell)	Soil Color	Soil Mottling	Other: Structures, Stones, Boulders, Consistency, %Gravel
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0"-12'	A	Loam	10YR 6/3		
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12"-20'	B	Sand/Loam	2.5Y 5/4		
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20"-84"	C	Loose Loamy Sand	2.5Y 5/4	none	some cobbles Loose 5% gravel
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weeping @ 55"

Parent Material (geologic) glacial Till Depth to Bedrock _____
 Depth to Groundwater: Standing Water in Hole: 80" Weeping from Pit Face 55"
 Estimated Seasonal High Groundwater 4'-7"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method Used:

____ Depth observed standing in observation hole: _____ inches ____ Depth to soil mottles: _____ inches
 ____ Depth to weeping from side of observation hole: _____ inches ____ Groundwater adjustment _____ ft
 Index Well # ____ Reading Date ____ Index well level ____ Adj.factor ____ Adj.Groundwater level ____

PERCOLATION TEST

Date _____ Time _____

Observation Hole #	_____	Time at 9"	_____
Depth of Perc	_____	Time at 6"	_____
Start Presoak	_____	Time (9"-6")	_____
End Presoak	_____	Rate Min/Inch	_____

Site Suitability Assessment: Site Passed _____ Site Failed _____ Additional Testing Needed: _____

Performed By _____ Certification # _____

Witnessed By _____

Comments: _____

TITLE 5 ON-SITE REVIEW

Deep Hole # 2 Date 11/2/24 Time 10:00 Weather SUNNY 40°
 Location(identify on Site Plan) _____
 Land Use Commercial Slope(%) _____ Surface Stones _____
 Vegetation Weeds Landform _____

Distances from: Open Water Body _____ ft. Possible Wet Area 200 ft. Drinking Water Well _____ ft.

Drainageway _____ ft. Propertyline 10 ft Other _____

DEEP OBSERVATION HOLE LOG

Depth From Surface (Inches)	Soil Horizon (USDA)	Soil Texture (Munsell)	Soil Color	Soil Mottling	Other: Structures, Stones, Boulders, Consistency, %Gravel
0"-6"	A	loam	10YR ³ /3		Friable
6"-24"	B	sand-loam	2.5Y5/4		Friable
24"-78"	C	Med-coarse loam/sand	2.5Y5/4	none	5% gravel few cobblestones

Parent Material (geologic) Glacial Till Depth to Bedrock _____
 Depth to Groundwater: Standing Water in Hole: 74 Weeping from Pit Face 42"
 Estimated Seasonal High Groundwater 3'-8"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method Used:

____ Depth observed standing in observation hole: _____ inches ____ Depth to soil mottles: _____ inches
 ____ Depth to weeping from side of observation hole: _____ inches ____ Groundwater adjustment _____ ft
 Index Well # _____ Reading Date _____ Index well level _____ Adj.factor _____ Adj.Groundwater level _____

PERCOLATION TEST

Date _____ Time _____

Observation Hole #	Time at 9"
_____	_____
Depth of Perc	Time at 6"
_____	_____
Start Presoak	Time (9"-6")
_____	_____
End Presoak	Rate Min/Inch
_____	_____

Site Suitability Assessment: Site Passed _____ Site Failed _____ Additional Testing Needed:

Performed By _____ Certification # _____

Witnessed By _____

Comments:

TITLE 5 ON-SITE REVIEW

Deep Hole # 3 Date 11/12/24 Time 11:00 Weather Sunny 45°
 Location (identify on Site Plan) _____
 Land Use commercial Slope(%) 0-2 Surface Stones Boulders
 Vegetation Woods / Pavement Landform _____

Distances from: Open Water Body _____ ft. Possible Wet Area 200 ft. Drinking Water Well _____ ft.

Drainageway _____ ft. Propertyline 10 ft Other _____

DEEP OBSERVATION HOLE LOG

Depth From Surface (Inches) Soil Horizon (USDA) Soil Texture (Munsell) Soil Color Soil Mottling Other: Structures, Stones, Boulders, Consistency, %Gravel

0"-4"	A	Loam	10YR 7/3		
4"-24"	B	Loamy Sand	10YR 7/6		
24"-90"	C	Medium-coarse Loamy Sand	2.5Y 7/4	none	5-10% gravel Few cobbles

Parent Material (geologic) Outwash Depth to Bedrock _____
 Depth to Groundwater: Standing Water in Hole: 84 Weeping from Pit Face 500
 Estimated Seasonal High Groundwater 4'-10"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method Used:

____ Depth observed standing in observation hole: _____ inches ____ Depth to soil mottles: _____ inches
 ____ Depth to weeping from side of observation hole: _____ inches ____ Groundwater adjustment _____ ft
 Index Well # _____ Reading Date _____ Index well level _____ Adj.factor _____ Adj.Groundwater level _____

PERCOLATION TEST

Date _____ Time _____

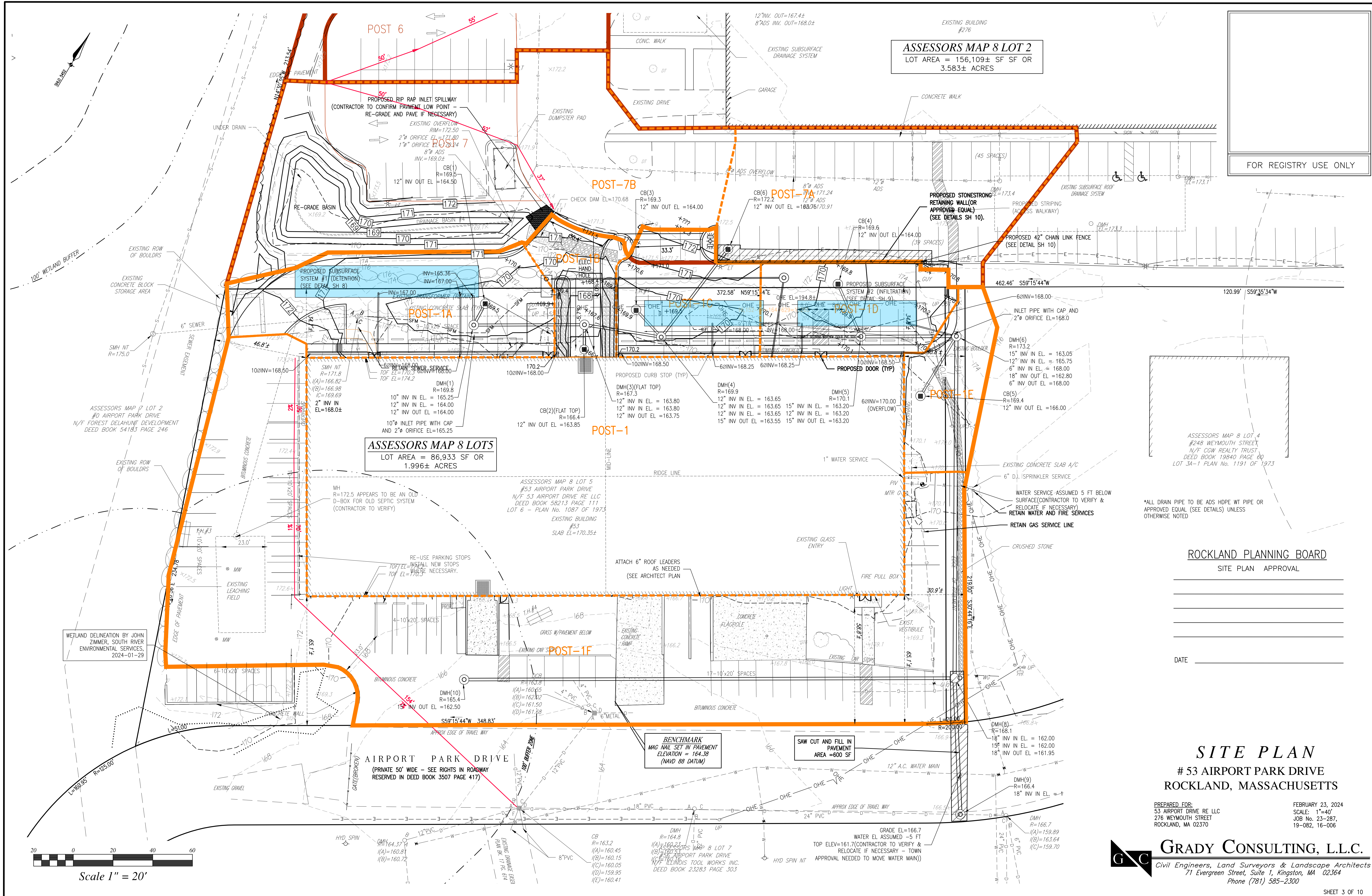
Observation Hole # _____ Time at 9" _____
 Depth of Perc _____ Time at 6" _____
 Start Presoak _____ Time (9"-6") _____
 End Presoak _____ Rate Min/Inch _____

Site Suitability Assessment: Site Passed _____ Site Failed _____ Additional Testing Needed:

Performed By _____ Certification # _____

Witnessed By _____

Comments: T.P. 4 Hit Asphalt 30" down



ASSESSORS MAP 8 LOT 2
LOT AREA = 156,109± SF SF OR
3.583± ACRES

FOR REGISTRY USE ONLY

ASSESSORS MAP 8 LOTS
LOT AREA = 86,933 SF OR
1.996± ACRES

ASSESSORS MAP 8 LOT 4
#248 WEYMOUTH STREET
N/F CGW REALTY TRUST
DEED BOOK 19840 PAGE 60
LOT 3A-1 PLAN No. 1191 OF 1973

*ALL DRAIN PIPE TO BE ADS HOPE WT PIPE OR
APPROVED EQUAL (SEE DETAILS) UNLESS
OTHERWISE NOTED

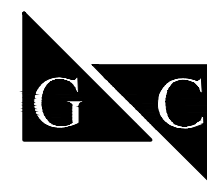
ROCKLAND PLANNING BOARD
SITE PLAN APPROVAL

DATE _____

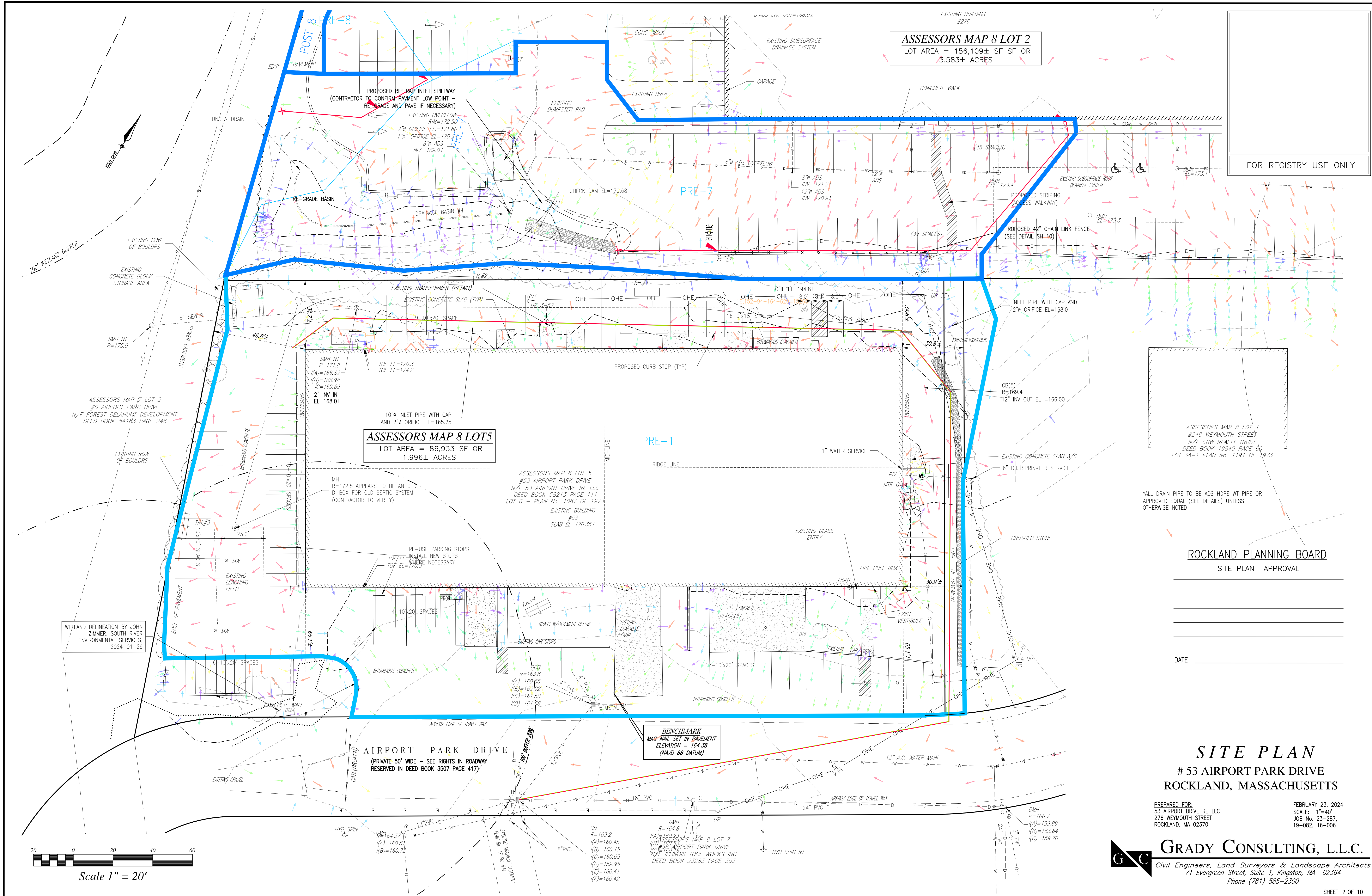
SITE PLAN
53 AIRPORT PARK DRIVE
ROCKLAND, MASSACHUSETTS

PREPARED FOR:
53 AIRPORT DRIVE RE LLC
276 WEYMOUTH STREET
ROCKLAND, MA 02370

FEBRUARY 23, 2024
SCALE: 1"=40'
JOB No. 23-287,
19-082, 16-006



GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300



ASSESSORS MAP 8 LOT 2
LOT AREA = 156,109± SF OR
3.583± ACRES

ASSESSORS MAP 8 LOT 5
LOT AREA = 86,933 SF OR
1.996± ACRES

ASSESSORS MAP 8 LOT 7
#53 AIRPORT PARK DRIVE
N/F 53 AIRPORT DRIVE RE LLC
DEED BOOK 58213 PAGE 111
LOT 6 - PLAN No. 1087 OF 1973
EXISTING BUILDING
#53
SLAB EL=170.35±

AIRPORT PARK DRIVE
(PRIVATE 50' WIDE - SEE RIGHTS IN ROADWAY
RESERVED IN DEED BOOK 3507 PAGE 417)

BENCHMARK
MAG NAIL SET IN PAVEMENT
ELEVATION = 164.38
(NAVD 88 DATUM)

ASSESSORS MAP 8 LOT 4
#248 WEYMOUTH STREET
N/F CCW REALTY TRUST
DEED BOOK 19840 PAGE 60
LOT 3A-1 PLAN No. 1191 OF 1973

*ALL DRAIN PIPE TO BE ADS HOPE WT PIPE OR
APPROVED EQUAL (SEE DETAILS) UNLESS
OTHERWISE NOTED

ROCKLAND PLANNING BOARD
SITE PLAN APPROVAL

DATE _____

SITE PLAN
53 AIRPORT PARK DRIVE
ROCKLAND, MASSACHUSETTS

PREPARED FOR:
53 AIRPORT DRIVE RE LLC
276 WEYMOUTH STREET
ROCKLAND, MA 02370

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