Stormwater Report

For

455 Hartford Avenue

BELLINGHAM MA, 02019

Proposed Commercial Development

September 22, 2025

PREPARED BY:
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VOLUME 1 OF 1

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INTRODUCTION

This report presents a description along with supporting calculations for the stormwater runoff treatment and mitigation systems proposed for the commercial development as presented on a plan set entitled "455 Hartford Avenue Bellingham, MA Site Plan" prepared by Legacy Engineering LLC with an original date of September 22, 2025. The development proposes the construction of a new commercial building.

EXISTING SITE

The proposed development lies on the easterly side of Hartford Avenue in Bellingham, totaling approximately 4.41 acres. The site predominately consists of woods, with wetlands to the rear and southwest of the site.

SOILS

A series of test pits have been conducted across the site, which have generally confirmed the soils conditions described in the soils conservation service on-line soils website maps (see Attachment H). The soils conservation service maps indicate that the site is comprised of various soils types as follows:

Westerly Portions:

- Ridgebury (71B): A class D soil.

Easterly Portions:

- Merrimac (254B): A class A soil.

Southerly Portions:

- Saco (5): A class B/D soil.

GROUNDWATER CONDITIONS

According to on-site testing conducted across the site, the groundwater elevation is 22" or more below existing grade. Refer to Attachment H for all soil testing logs and groundwater depth at each test pit.

SOIL PERMEABILITY

For the purposes of this report and based on the soils present at the proposed stormwater infiltration facility, a Rawls rate 2.41 inches per hour is used for infiltration related calculations in loamy sand soils, and 8.21 inches per hour is used in sandy soils.

FLOOD PLAIN

No portion of this site lies within a flood plain.

WETLAND PROTECTION ACT

Portions of the site include isolated or bordering vegetated wetland. A Notice of Intent will be filed for proposed work within wetland jurisdictional areas.

PROPOSED DEVELOPMENT

The proposed construction consists of a new commercial building, along with associated driveways, landscape areas, utility systems, and stormwater management systems.

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS

The stormwater management system design collects runoff from the proposed development and adjacent watersheds. These devices provide pretreatment prior to conveying stormwater into the various BMPs described herein. The stormwater management system is designed in accordance with the provisions of the DEP Stormwater Management Standards and Handbook, which are summarized below.

STANDARD 1 - New Stormwater Conveyances

No New Stormwater Conveyances (e.g. outfalls) May Discharge Untreated Stormwater Directly to or Cause Erosion in Wetlands or Waters of the Commonwealth. The proposed development complies with this standard.

The development includes three primary stormwater discharge points. Note the following:

- Design Point #1: Flow to Abutter – Flow to this design point in both the existing and proposed condition will be uncontrolled flow through wooded areas.
- Design Point #2: Flow to Rear Wetland – Flow to this design point will be through discharge from Infiltration Basin #1. Flows will pass through a level spreader which will prevent erosion to the surrounding soils at the discharge location.
- Design Point #3: Flow to Western Wetland – Flow this design point will be through discharge from Infiltration Basin #2. The proposed rip-rap at the outlet will prevent erosion of the surrounding soils. Flows from the basin will be very minor in even the 100-year storm.

STANDARD 2 – Peak Discharge Rates

Stormwater Management Systems shall be designed so that the Post-Development Peak Discharge Rates do not Exceed Pre-Development Peak Discharge Rates. The proposed development complies with this standard.

In order to model pre and post peak discharges, a program called Hydrocad was used, which employs the TR-20 modeling system. The DEP Stormwater Management regulations require that the 2 and 10 year storms should be considered for peak rates and the 100-year storm for flooding considerations. The Town of Bellingham also requires that the 25-year storm be analyzed. The following theoretical storm events were used to model the site before and after the proposed activities occur[1]:

Design Storm	Rainfall
2-Year	3.84 inches
10-Year	6.04 inches
25-Year	7.77 inches
100-Year	10.62 inches

DESIGN POINT #1: Flow to Abutter

Description of Existing Conditions: In the existing condition, Watershed E1 represents uncontrolled overland flow from the northeast portion of the site.

Description of Proposed Conditions: In the proposed condition, Watershed P1 represents a similar area as in the existing condition that flows uncontrolled to the abutter.

Summary of Peak Flow Rates to Design Point:

Design Storm (Year)	Peak Runoff Rate (cfs)		Volume of Runoff (ac-ft)	
	Existing	Proposed	Existing	Proposed
2	0.00	0.00	0.000	0.000
10	0.01	0.00	0.003	0.002
25	0.02	0.02	0.016	0.007
100	0.30	0.15	0.053	0.022

[1] Rainfall depths are as specified by NOAA Atlas-14. Rainfall distribution is defined by the NOAA10 24-hr, curve "D" storm type.

DESIGN POINT #2: Flow to Rear Wetland

Description of Existing Conditions: In the existing condition, Watershed E2 represents uncontrolled overland flow from the central and rear portions of the site that flows into the rear wetlands.

Description of Proposed Conditions: In the proposed condition, Watersheds P2a through P2d represent stormwater that is routed to Infiltration Basin #1. Uncontrolled flow directly to the rear wetlands is represented by Watershed P2e.

Summary of Peak Flow Rates to Design Point:

Design Storm (Year)	Peak Runoff Rate (cfs)		Volume of Runoff (ac-ft)	
	Existing	Proposed	Existing	Proposed
2	0.59	0.45	0.071	0.054
10	1.92	1.21	0.197	0.136
25	3.17	2.16	0.339	0.255
100	6.03	5.69	0.631	0.556

DESIGN POINT #3: Flow to Western Wetland

Description of Existing Conditions: In the existing condition, Watershed E3 represents uncontrolled overland flow from the western portion of the site that flows into the western wetland.

Description of Proposed Conditions: In the proposed condition, Watersheds P3a and P3b represent stormwater that is captured and treated by Infiltration Basin #2. Uncontrolled flow directly to the western wetlands is represented by Watershed P3c.

Summary of Peak Flow Rates to Design Point:

Design Storm (Year)	Peak Runoff Rate (cfs)		Volume of Runoff (ac-ft)	
	Existing	Proposed	Existing	Proposed
2	0.62	0.62	0.067	0.066
10	1.90	1.86	0.174	0.169
25	3.09	3.02	0.281	0.268
100	5.39	5.25	0.484	0.459

STANDARD 3 - Loss of Annual Recharge

Loss of Annual Recharge to Groundwater shall be Eliminated or Minimized through the use of Environmentally Sensitive Site Design, Low Impact Development Techniques, Stormwater Best Management Practices, and Good Operation and Maintenance.

LID/ENVIRONMENTALLY SENSITIVE SITE DESIGN

The proposed stormwater system includes LID and environmentally sensitive site design. The techniques used for this site include:

- No disturbance to wetland areas;
- Use of country drainage; and
- Minimized disturbance to existing trees and shrubs

RECHARGE CALCULATIONS AND METHODS

The DEP Stormwater Management Standards typically require that a minimum volume of runoff (Required Recharge Volume, Rv) be recharged on the site based on soils conditions in accordance with the following table:

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
Runoff Depth (d) to be Recharged	d = 0.60 inches	d = 0.35 inches	d = 0.25 inches	d = 0.10 inches

The Required Recharge Volume is calculated by multiplying the runoff depth to be recharged (d) for each soils class by the amount of impervious coverage (on the site) under the proposed condition.

STORMWATER INFILTRATION BASIN #1

Recharge required (Rv)=(Impervious coverage)*(depth to be recharged)

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
On-Site Impervious Area	24,505 s.f.	4,045 s.f.	0 s.f.	0 s.f.
Required Recharge Volume (Rv)	1,225 c.f.	118 c.f.	0 c.f.	0 c.f.
Total Rv	1,343 c.f.			

Standard 3 requires that infiltration facilities be provided and sized in accordance with three acceptable methods; 1) the Static Method, 2) The Simple Dynamic Method, and 3) the Dynamic Field Method. Each method is summarized below.

Static Method: The Static Method simply requires that the proposed recharge facility contain a total raw volume (adjusted for void space if stone is used within the storage volume) equal to or greater than the Required Recharge Volume.

Simple Dynamic Method: The Simple Dynamic method allows for a conservative inclusion of some of the recharge which occurs within the infiltration facility during the design storm in accordance with the following formula:

$V - kTA = V'$

Where

V is the Required Recharge Volume. If the infiltration facility also treats the Water Quality Volume, the greater of the two values is used.
k is the saturated hydraulic conductivity determined by the Rawls Rate (Table 2.3.3 of Volume 3, Chapter 1 of the Stormwater Handbook)
T is the allowable drawdown during the peak of the storm = 2 hours for this method
A is the basin bottom area
V' is the minimum required storage volume of the infiltration facility when including 2 hours of recharge

This method allows the designer to include two hours of ongoing recharge during the design storm using a permeability rate (saturated hydraulic conductivity) selected based on the classification of the soil under the infiltration facility.

Dynamic Field Method: The Dynamic Field Method uses a more aggressive inclusion of on-going recharge from an infiltration facility during the design storm. This method is calculated using rainfall routing software (Hydrocad) and a truncated hydrograph which assumes that the Required Recharge Volume is loaded to the infiltration facility during a 12 hour period. For this method the design permeability rate must be based on in-situ permeability testing with a safety factor of 50% applied to the actual rate found.

For this infiltration facility, the required storage volume is calculated using the static method, which simply requires that the treated volume be equal to the Rv. The WQV is greater than the Rv and is therefore used for this calculation. This proposed infiltration facility treats 4,575 c.f. below the lowest outlet, which is greater than the required 2,379 c.f. and therefore meets this requirement.

A secondary check is required to ensure that the Rv will recharge within at least 72 hours. The required WQV exceeds the Rv and is used for this calculation. A K value of 2.41 is used for drawdown design purposes since soils testing found loamy sand soils at this location. Using the following formula, the drawdown time is calculated:

$Time_{drawdown}$ = [Rv/(K x Bottom Area)]

Where:

WQV = 2,379 c.f.
K = 2.41 inches per hour = 0.20 feet per hour
Bottom Area = 8,727 s.f.

It is concluded that the drawdown time for the infiltrated volume is 1.4 hours, which satisfies this requirement.

Mounding Analysis:

A mounding analysis has been conducted and can be found in attachment M. The bottom of Stormwater Basin #1 is at elevation 202.0, with a seasonal high groundwater elevation below the basin at 199.4. The mound for the infiltration of the WQV of this basin is 1.09 feet.

STORMWATER INFILTRATION BASIN #2

Recharge required (Rv)=(Impervious coverage)*(depth to be recharged)

	Class A Soils	Class B Soils	Class C Soils	Class D Soils
On-Site Impervious Area	3,570 s.f.	0 s.f.	0 s.f.	0 s.f.
Required Recharge Volume (Rv)	179 c.f.	0 c.f.	0 c.f.	0 c.f.
Total Rv	179 c.f.			

For this infiltration facility, the required storage volume is calculated using the static method, which simply requires that the treated volume be equal to the Rv. The WQV is greater than the Rv and is therefore used for this calculation. This proposed infiltration facility treats 385 c.f. below the lowest outlet, which is greater than the required 179 c.f. and therefore meets this requirement.

A secondary check is required to ensure that the Rv will recharge within at least 72 hours. The required WQV exceeds the Rv and is used for this calculation. A K value of 8.27 is used for drawdown design purposes since soils testing found

sand soils at this location. Using the following formula, the drawdown time is calculated:

$Time_{drawdown}$ = [Rv/(K x Bottom Area)]

Where:

WQV = 298 c.f.
K = 8.27 inches per hour = 0.69 feet per hour
Bottom Area = 728 s.f.

It is concluded that the drawdown time for the infiltrated volume is 0.7 hours, which satisfies this requirement.

Mounding Analysis:

A mounding analysis has been conducted and can be found in Attachment M. The bottom of Stormwater Basin #2 is at elevation 203.0, with a seasonal high groundwater elevation below the basin at 201.0. The mound for the infiltration of the WQV of this basin is 0.25 feet.

STANDARD 4 - TSS Removal

Stormwater Management Systems shall be Designed to Remove 80% of Average Annual Post-Construction Load of Total Suspended Solids (TSS). This standard is met when:

a) A long-term pollution prevention plan is provided and implemented as required (refer to Attachment A),
b) Structural stormwater BMP's are provided as required, and
c) Pretreatment is provided as required.

The proposed stormwater management system has been designed to provide a series of Best Management Practices in accordance with the Stormwater Management Policy to remove the pollutants found in runoff as described below for each drainage sub-system.

WATER QUALITY VOLUME (WQV)

The Water Quality Volume represents the volume of water which must receive TSS removal treatment in order to comply with Standard 4. The water quality volume is calculated based on either 0.5 inches of runoff or 1.0 inches of runoff from all impervious surfaces on the site. 0.5 inches is used except in sensitive locations as described in the Stormwater Handbook. The Town of Bellingham considers the TSS and TP removal requirements to be met when 1" of runoff is retained. The total WQV for the site is split amongst the various BMP treatment

trains as described below (or may not apply if the specific BMP's utilized do not use it as a sizing criteria). Using the following formula, the WQV is calculated:

Infiltration Basin #1
Required: WQV=(28,550 sq. ft.)*(1 in.)/(12 in/ft)=2,379 c.f.
Provided: 4,575 c.f.

Infiltration Basin #2
Required: WQV=(3,570 sq. ft.)*(1 in.)/(12 in/ft)=298 c.f.
Provided: 385 c.f.

The water volume to be treated below the infiltration basin outlet is 4,960 c.f., which is greater than the required 2,677 c.f. This satisfies the WQV requirement.

PROPOSED BMP DESIGN

Deep Sump Catch Basins:

All proposed deep sump catch basins have 4' sumps with hoods designed in accordance with the DEP Stormwater Handbook. Each structure represents one of the pretreatment BMP's in each treatment train and provides a 25% TSS removal credit.

Sediment Forebay

In accordance with the DEP Handbook, a forebay is sized to hold 0.1" of runoff from its tributary impervious area.

For Stormwater Infiltration Basin #1, the tributary paved area is 21,230 s.f. and the minimum forebay volume is 177 cubic feet. With the water trapped behind the 6" high checkdams, the designed forebays will each contain 89 cubic feet each for a total of 178 c.f., meeting the requirement.

For Stormwater Infiltration Basin #2, the tributary impervious area is 3,570 s.f. and the minimum forebay volume is 30 cubic feet. With the water trapped behind the 6" high checkdam, the designed forebay will contain more than 30 cubic feet, meeting the requirement.

Stormwater Infiltration Basin:

The infiltration basins have been designed with a weir outlet, which discharges towards the wetlands via level spreaders.

Infiltration Basin #1 is designed with a total depth of 2 feet. Trapped infiltration water reaches a maximum depth of 0.5 feet (elevation of lowest basin outlet) and

the maximum water level in the 100-year storm event is 0.87 feet, leaving 1.13 feet of freeboard.

Infiltration Basin #2 is designed with a total depth of 2 feet. Trapped infiltration water reaches a maximum depth of 0.5 feet (elevation of lowest basin outlet) and the maximum water level in the 100-year storm event is 0.99 feet, leaving 1.01 feet of freeboard.

Infiltration Basins provide 80% TSS removal when including a pretreatment facility.

TSS AND TP REMOVAL CALCULATIONS

In accordance with the DEP Stormwater Management Handbook, each of the drainage treatment trains has been analyzed for TSS removal. The required TSS removal calculation sheets are included in Attachment E and the following sections provide a narrative discussion of each.

The Town of Bellingham requires that a total of 90% TSS and 60% of TP be removed for new developments. This requirement is considered met when retaining 1" of impervious runoff.

Infiltration Basins:

Each infiltration basin meets the TSS and TP removal requirements of the Town of Bellingham by retaining more than 1" of impervious runoff. Infiltration Basin #1 is required to retain 2,379 c.f. and retains 4,575 c.f. of impervious runoff. Infiltration Basin #2 is required to retain 298 c.f. and retains 385 c.f. of impervious runoff.

Each basin also meets the TSS removal requirements of 80% as calculated by the DEP Stormwater Management Handbook and shown in Attachment E. Infiltration Basin #1 is provided with a sediment forebay for pretreatment. When combined with the basin itself, the total treatment for this treatment train is 80%. Infiltration Basin #2 is located in soils with a rapid infiltration rate and is therefore required to be provided with 44% TSS pretreatment. This requirement is met through the combination of a deep sump catch basin and a sediment forebay. When combined with the basin itself, this treatment train provides 85% TSS removal.

STANDARD 5 - Land Uses with Higher Potential Pollutant Loads

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If, through source control and/or pollution prevention, all land uses with higher potential pollutant load cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific structural stormwater BMP's determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

This development is not a Land Use with Higher Potential Pollutant Loads.

STANDARD 6 – Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharge near or to any other critical area requires the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "stormwater discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone 1 or Zone A are prohibited unless essential to the operation of the public water supply.

This site does not lie within or discharge to a critical area.

STANDARD 7 - Redevelopment

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structures stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply

with all other requirements of the Stormwater Management Standards and improve existing conditions.

The site is undeveloped and is therefore not considered to be a redevelopment.

STANDARD 8 – Erosion Control

A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

A construction activity NPDES Stormwater Pollution Prevention Plan has been prepared and included as Attachment D.

STANDARD 9 – Long-Term Operations and Maintenance Plan

A Long-Term Operations and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

A Drainage System Operations and Maintenance Plan has been prepared and included as Attachment A.

STANDARD 10 – Illicit Discharge Compliance

All illicit discharges to the stormwater management system are prohibited.

See Attachment C for the Illicit Discharge Compliance Statement.

PIPE SIZING CALCULATIONS

All on-site pipe sizing was calculated using two different methods, the Rational Method, and HydroCAD. Results are included in Attachments K and L.

ATTACHMENT A: Operations and Maintenance Plan

Operations & Maintenance Plan

For

455 Hartford Avenue

BELLINGHAM MA, 02019

Proposed Commercial Development

September 22, 2025

PREPARED BY:
LEGACY ENGINEERING LLC
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Millis, MA 02054

PREPARED FOR:
DARN PROPERTIES, LLC
1575 Highland Street
Holliston, MA 01746

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INTRODUCTION

This Operations and Maintenance Plan (hereinafter referred to "O&M Plan") is provided to ensure the long-term monitoring and maintenance of various components of the development's infrastructure. This O&M Plan includes the following provisions:

1. Stormwater System Operations and Maintenance
2. Integrated Pest Management Plan
3. Miscellaneous Provisions
4. Accidental Spill and Emergency Response Plan

The "Development" and the various components which are referenced in this O&M Plan are described on the site plan referenced below.

Project Name

455 Hartford Avenue

Project Location

455 Hartford Avenue
Bellingham MA, 02019

Operator Name and Address

Darn Properties, LLC
1575 Highland Street
Holliston, MA 01746

References

This O&M Plan references other documents as follows:

Site Plan - Plans entitled "455 Hartford Avenue Bellingham, MA Site Plan" with an original date of September 22, 2025 (as may be amended), and prepared by Legacy Engineering LLC, hereinafter referred to as the "Site Plan".

Stormwater Report – Report entitled "Stormwater Report for 455 Hartford Avenue" prepared by Legacy Engineering LLC with an original date of September 22, 2025 (as may be amended).

Site Description

The site consists of a commercial building located on 4.41 acres of land on Hartford Avenue in Bellingham and includes all appurtenant utility systems, landscape areas, and stormwater management systems. Those land areas are collectively referred to herein as the "Development."

Site Usage and Activities

Commercial building and associated appurtenances.

PART 1: STORMWATER SYSTEM OPERATIONS AND MAINTENANCE

In order to maximize the continued effectiveness of the Stormwater Management BMP's for the development, the following Operation and Maintenance requirements apply to all stormwater facilities within the extents of the Development. The stormwater facilities are depicted on the Site Plan and are hereinafter referred to as the "Stormwater Facilities."

Operations and Maintenance Responsibilities

The Operator or its designee shall be responsible for implementing all Operations and Maintenance (O&M) responsibilities.

Commencement of Operations and Maintenance Responsibilities

Operations and Maintenance tasks shall be commenced once each respective Stormwater Facility is fully constructed and is receiving runoff from the Development.

Operations and Maintenance Tasks

Grassed Swales:

1. Swales shall be inspected at least twice per year to insure proper operation (during a storm event).
2. Inspections shall include slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation.
3. Regular maintenance includes mowing, fertilizing, liming, watering, pruning, and weed/pest control. Grass height should not exceed 6 inches.
4. Manually remove sediment at least once per year.
5. Reseed as necessary.

Deep Sump Catch Basins:

1. Deep sump catch basins shall be inspected daily during construction activities and all sediments and debris shall be removed four times per year unless the owner can determine through recorded observations that sediment accumulation does not warrant such frequent cleanings. If deep sump catch

basin cleaning occurs less than four times per year, cleaning shall occur when two feet of sediments have accumulated in the sump and at least once per year.
2. Silt sacks shall be installed on all catch basins throughout the time of construction.
3. All sediments and hydrocarbons shall be disposed of off-site in accordance with all applicable local, state, and federal regulations.

Sediment Forebays:

1. Sediment forebays shall be inspected at least four times per year to insure proper operation (during a storm event).
2. Sediment forebays should be mowed and all clippings and debris removed at least twice per year. Debris shall be removed at more frequent intervals if warranted by extreme weather events.
3. Sediment should be removed when 3-inches of sediment accumulates anywhere in the forebay.
4. Remove woody vegetation, leaves, and other materials that would affect the life of the system or its operations.

Stormwater Infiltration Basin:

1. Stormwater basins shall be inspected at least twice per year to insure proper operation (during a storm event).
2. Inspections shall include ensuring that inlet, outlet, and splash pad rip-rap aprons are in good condition and that that interior wall systems are in good condition. Deficiencies shall be remedied immediately.
3. Inspections shall include an observation of the accumulation of sediment in the basin. Pretreatment BMPs are intended to capture and contain coarse sediments. Should indication of significant accumulation of sediments in the infiltration basin be observed, increased frequency of cleaning of the preceding sediment forebay and catch basins shall be implemented.
4. Inspections shall include ensuring that outlet structures are unobstructed and free-flowing per the Site Plan design specifications.
5. Inspections shall include ensuring that all berms are fully stabilized, structurally sound and not eroded. Deficiencies shall be remedied immediately.
6. Stormwater basins should be mowed and all clippings and debris removed at least twice per year. Debris shall be removed at more frequent intervals if warranted by extreme weather events. If wetland vegetation grows at the bottom of the stormwater basin, it shall only be mowed once per year at the beginning of the winter season.
7. Sediment should be removed at least once every 5 years or when 2-inches of sediment accumulates anywhere in the basin and disposed of off-site in accordance with all applicable local, state, and federal regulations. Two sedimentation markers shall be installed in the basin by a Registered Land Surveyors with a clear marking of the 2-inch accumulation line. It is

recommended that stone bounds be installed with chiseled marks indicating the limit of accumulation, although other similarly permanent marking methods may be utilized.

Stormwater Pipes, Inlets and Outfalls:

1. All stormwater inlets and outfalls shall be inspected twice per year.
2. Trash, leaves, debris and sediment shall be removed from inlets and outfalls as needed to keep them free flowing.
3. If inspections indicate that stormwater pipelines have become partially obstructed with trash, leaves, debris or sediment, the pipelines shall be cleaned by water jet truck and the obstructions removed and disposed of.

The various operations and maintenance schedule requirements listed above may be reduced in frequency by approval from the Town. Should such permission be desired, the Operator shall provide documentation of actual on-site maintenance observations by a qualified source (engineer or other qualified person meeting the approval of the Town) demonstrating that the particular Stormwater BMP in question does not warrant the specified frequency of inspection or maintenance activities.

Reporting Requirements

The following documentation shall be submitted no later than December 31st of each calendar year to the Town:

1. A statement, signed by an authorized representative of the Operator indicating that the requirements of this O&M Plan were performed during the previous calendar year. Where requirements were not met, a schedule for their completion shall be provided and a follow-up statement submitted when complete.
2. A list of the maintenance activities performed along with the approximate date of the work.
3. A list of the inspections performed along with a statement by each inspector summarizing the results of the inspections performed in accordance with this O&M plan.
4. Copies of appurtenant documentation supporting the completion of the O&M responsibilities such as copies of contracts and/or receipts with parties engaged to perform maintenance and inspection services.
5. A notation regarding whether there has been any change in the name and or contact information for the Operator.

Public Safety Features

The stormwater system has been designed to safely collect surface runoff from developed areas (as described on the Site Plan and Stormwater Report) by providing

collections systems at regular intervals to prevent surface flooding and to treat that runoff in accordance with the provisions of the Massachusetts Stormwater Management Standards and Handbook.

PART 2: INTEGRATED PEST MANAGEMENT PLAN

Applicability

The Development shall adhere to this IPM in perpetuity, unless the conservation Commission releases the Operator from this obligation in writing.

Lawn Preparation and Installation

The following methods shall be employed for all lawn installation and replacements.

- Topsoil installed in lawn areas shall be installed to a minimum thickness of 4-inches. Installation shall be in a manner that minimizes compaction of the topsoil. Topsoil should include a minimum organic content of 18% in the top 4-inches. In areas where existing topsoil is limited or non-existent due to bedrock or hardpan, 6-24 inches of sandy loam topsoil should be spread with a minimum 18% organic content in the top 6-inches.
- Topsoil shall be tested for pH, organic content and mineral content including calcium, magnesium, potassium and sodium at the time of installation and supplements shall be added as recommended. Lime shall be added at the rates recommended by the soil test lab to bring topsoil pH within recommended levels.
- Seeding shall include at least three of the following turf types: Fine Fescue, Kentucky Bluegrass, Perennial Rye Grass, and Tall Fescue.
- Fertilizer application at the time of seeding shall not exceed 0.5 pounds per 1,000 square feet and shall be either organic or mineral.
- During the period of turf establishment (1-2 seasons after seeding), up to two broadleaf weed control applications per year may be applied to the entire lawn area to encourage the establishment of the turf and prevent weed infestations.

Mechanical Lawn Care Standards

The following maintenance guidelines shall be generally applied to lawn care, although specific adherence to every standard is not necessary. Adherence to these mechanical lawn care standards will encourage the development of a thick, dense, and healthy turf system which will ultimately result in fewer Lawn Care Treatment requirements.

- Lawn cutting height should be adjusted according to the season using the following as guidance:
    - May – June: 2.5″ Cut Height
    - July – August: 3-3.5″ Cut Height

- September: 2.5-3" Cut Height
- October – November: 2" Cut Height

- Lawn mowing should be at sufficient frequency such that not more than 1/3 of the leaf blade height is cut off.
- Aerate the lawn generally once per year in the mid-summer to mid-fall period. A second aeration in the spring may be appropriate for compact soils conditions.
- Dethatching is generally not necessary unless the thatch layer exceed ¾".

Core Lawn Care Treatment Program

Each lawn shall adhere to the following lawn care practices and restrictions:

- A soil test shall be conducted at least once every two years to evaluate topsoil pH level and the necessary application of lime will be made to bring soil pH within recommended levels. Recommended topsoil pH levels are between 6.5 and 6.8. Soils testing shall also include organic content, mineral content, including calcium, magnesium, potassium and sodium, total cation exchange capacity, and hydrogen. Ideal base saturation percentages for these parameters are as follows:
  - Calcium: 68-70%
  - Magnesium: 15-20%
  - Potassium: 4.5-6%
  - Sodium: <3%
  - Other Bases: 4-8%
  - Hydrogen: 5-10%
- Fertilizer application shall be as-needed based on the results of the latest soils test, plant health, rooting characteristics, growth rate desired, and season. Fertilizer application shall not exceed five times per calendar year and the total quantity of fertilizer applied in any given year shall not result in the application of more than three pounds of nitrogen per 1,000 square feet with not more than one pound of nitrogen applied per 1,000 square feet in any single application. Nitrogen, in the form of fertilizer, should generally be applied in small increments to avoid nitrate leachate and runoff, undesired sprits in growth, and increase in pest population. Granular organic and/or organic/synthetic slow release fertilizers shall be used. The optimal use of fertilizers is to create an organic foundation for soil health and development which provides sufficient nutrients for controlled plant growth and avoiding subsurface and surface nutrient loss to groundwater or stormwater runoff.
- Except as noted below, only one application of crab-grass prevention product is permitted per year during March or April, and only in portions of the lawn in full sun which are prone to such infestations. The use of corn gluton (organic crab-grass control method) is permitted twice per year.
- At the time of fertilizer application, any accidental spillage onto impervious surfaces such as driveways, walkways, patios, and streets shall be swept up and either applied to the lawn or removed from the site.

Optional Maintenance Practices to be Applied as Needed

- Where topsoil testing demonstrates a deficiency, mineral or organic micro-nutrients may be added to achieve recommended levels.
- Generally, chemical pesticides should be used as a final option and the minimum amount necessary to achieve the desired result should be used. Non chemical means of pest control should be tried first. In the event of suspected pest problem, a visual inspection shall first be made by qualified personnel to confirm the presence of stressed vegetation, wildlife activity, pathogens, and other similar indicators. Should a pest problem be identified, the condition shall be monitored periodically such that if the problem subsides, treatment methods can stop as soon as possible thereafter.
- Root bio-stimulants from organic sources (examples include Roots, Organica, or PHC type products, which are brand names and which may change depending on market conditions) may be used as needed.
- Compost topdressing (1/8" – ¼" depth) may be applied as needed.
- Spot treatment of weeds and Crabgrass may be implemented at any time as needed, but only on a spot-treatment basis and only to those areas affected.
- Spot treatment for turf disease may be implemented at any time as needed, but only one a spot-treatment basis and only to those areas affected.
- Grub control products and similar products may be applied to localized areas only where grub activity is evident. Grub control may be applied when grub populations reach an average of 8 -10 grubs per square foot or if the plant/lawns are showing signs of stress from grub activity.
- One application of Imidacloprid (Merit) or similar products per year is permitted during June and July in areas where grub activity has historically occurred.
- Pesticides which are classified for Restricted Use pursuant to 333 CMR may only be applied by properly licensed or certified personnel or by individuals under the direct on-site supervision of properly licensed or certified personnel in accordance with 333 CMR.

PART 3: MISCELLANEOUS PROVISIONS

Good Housekeeping Controls

The following good housekeeping measures will be implemented in the day-to-day operation of the Development:

1. The site will be maintained in a neat and orderly manner.
2. Fertilizers and pesticide application shall be in accordance with manufacturer recommendations.
3. All waste materials from the development will be collected in dumpsters and removed from the site by properly licensed disposal companies.

Management of Deicing Chemicals and Snow

Management of on-site snow will be as follows:

1. The site shall be plowed as needed to maintain safe driving conditions. Snow will be stored in windrows along pavement edges and shall be piled in landscape strips as needed.
2. Snow will not be plowed into piles which block or obstruct stormwater management facilities.
3. Snow will not be plowed into piles at roadway intersections such that it would obstruct visibility for entering or exiting vehicles.
4. Deicing chemicals application will be as little as possible while provide a safe environment for vehicular operation and function.
5. At such time as snow accumulations exceed the capacity of on-site storage areas, such excess snow shall be removed from the site and disposed of in accordance with state, local, and federal laws and regulations.

Operator Training

The Operator is responsible for providing training for the staff that will be responsible for the implementation of this O&M Plan. Such training shall occur at least once annually.

Illicit Discharges

The Operator shall not allow non-stormwater discharges into the development's stormwater system. Any discovered non-stormwater discharges into the development's stormwater system shall be immediately disconnected.

Estimated Operations and Maintenance Budget

It is estimated that the regular annual maintenance tasks described herein will cost $1,000 per year (2025 value).

PART 4: ACCIDENTAL SPILL AND EMERGENCY RESPONSE PLAN

In the event of an accident within the boundaries of the Site, where significant gasoline or other petroleum products or other hazardous materials are released, the following procedure shall be followed in the order noted.

1. As quickly as possible, attempt to block the nearest stormwater catch basins if on a roadway, or if in proximity to wetlands, create a berm of soil downslope of the spill.
2. Immediately, and while the containment measures are implemented as described above, notify the following governmental entities and inform them of the type of spill that occurred:
   - Bellingham Fire Department at 508-966-1112,
   - Bellingham Board of Health at 508-966-5820,
   - Bellingham Conservation Commission at 508-657-2858,
   - Mass. Department of Environmental Protection (DEP) Central Region at (508) 792-7650 (address is 8 New Bond Street, Worcester, MA 01606), and
   - National Response Center (NRC) at (800) 424-8802 (for spills that require such notification pursuant to 40 CFR Part 110, 40 CFR Part 117, and 40 CR Part 302).
3. Once the various emergency response teams have arrived at the site and if the spill occurs on a lot, the owner shall follow the instructions of the various governmental entities, which may include the following:
   - A clean up firm may need to be immediately contacted.
   - If the hazardous materials have entered the stormwater system, portions of it may need to be cleaned and restored per the DEP. All such activities shall be as specified by the DEP.

Owner's Signature

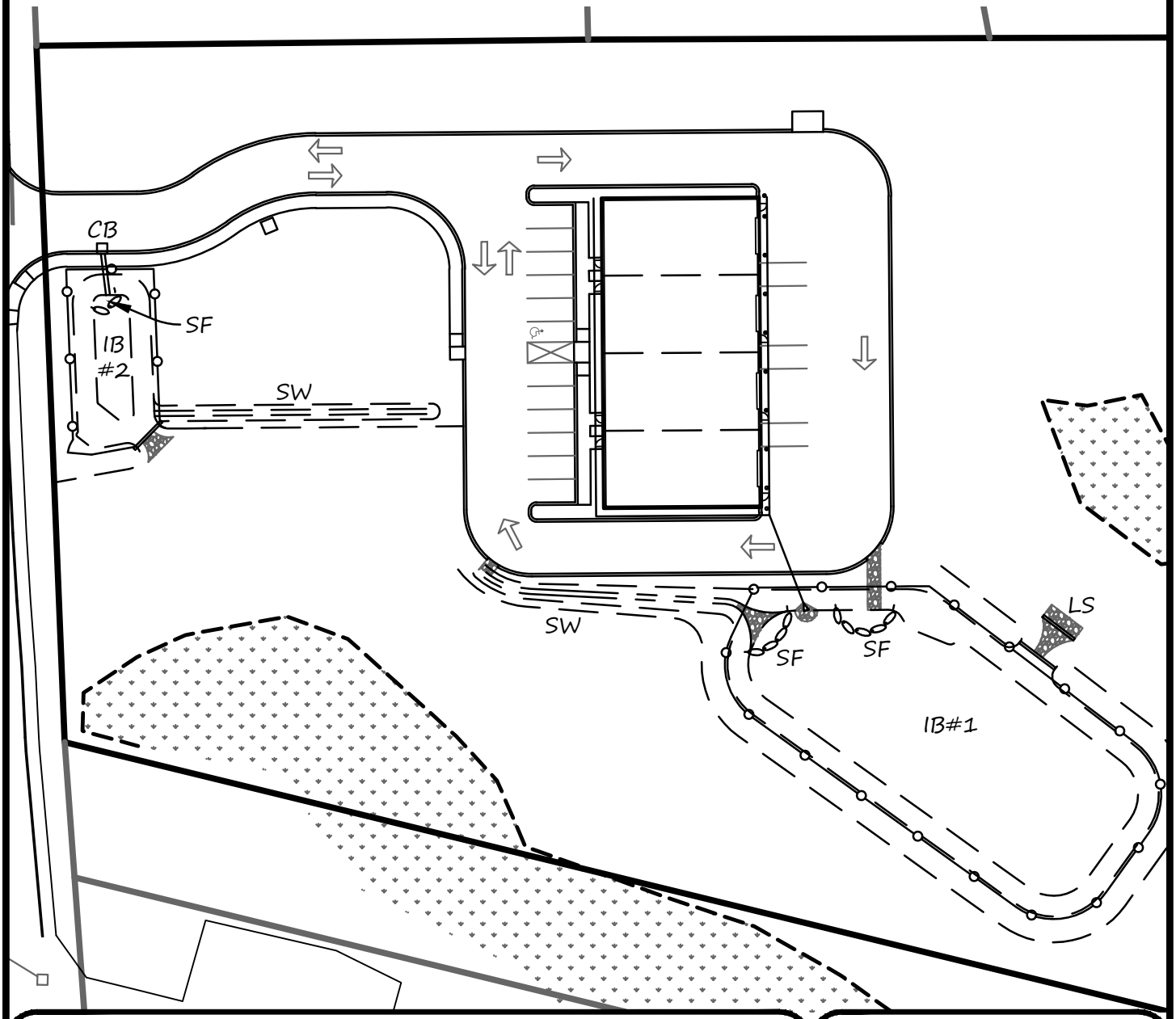
9-23-25

Date

EXHIBIT 1 STORMWATER FACILITIES SITE PLAN

LEGEND

CB = CATCH BASIN
IB = INFILTRATION BASIN
LS = LEVEL SPREADER
SF = SEDIMENT FOREBAY
SW = SWALE



730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)

SHEET 1 OF 1

LEGACY ENGINEERING

455 HARTFORD AVE.
O&M
PLAN OF LAND
IN
BELLINGHAM, MA

PLAN DATE: 2025-09-22

PLAN SCALE: 1"=60'

0' 60' 120'

REVISION	DATE

EXHIBIT 2 STORMWATER SYSTEM OPERATIONS AND MAINTENANCE LOG FORM

Stormwater System Operations and Maintenance Log

Year _____

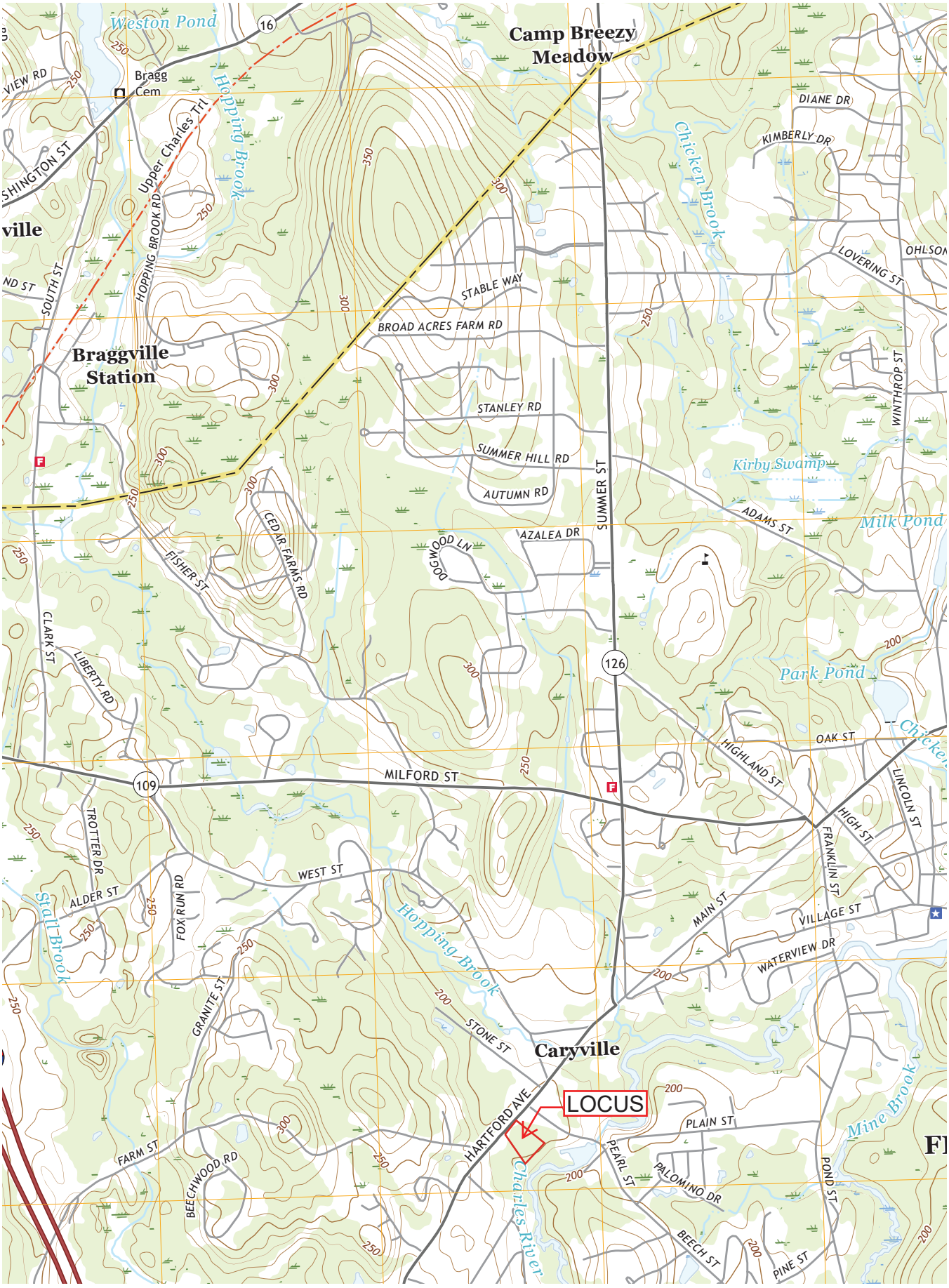
General Information	
Project Name	455 Hartford Avenue
Site Location	455 Hartford Avenue Bellingham, MA 02019
Inspector's Name	
Inspector's Title	
Inspector's Phone	
Signature of Operator at end of Year, Certifying that Work was Completed as Noted. Date:	

O&M Task Checklist

	O&M Activity	Date Completed	Notes/Comments
Swales			
	1st Inspection		
	2nd Inspection		
	Sediment Removal		
Deep Sump Catch Basins			
	1st Quarter Cleanout		
	2nd Quarter Cleanout		
	3rd Quarter Cleanout		
	4th Quarter Cleanout		
Sediment Forebay			
	1st Annual Inspection		
	2nd Annual Inspection		
	3rd Annual Inspection		
	4th Annual Inspection		
	1st Annual Mowing		

	O&M Activity	Date Completed	Notes/Comments
	2nd Annual Mowing		
	Sediment Rem. Req'd?		
Stormwater Infiltration Basin			
	1st Annual Inspection		
	2nd Annual Inspection		
	1st Annual Mowing		
	2nd Annual Mowing		
	Sediment Removal Req'd?		
Stormwater Pipes, Inlets and Outlets			
	1st Annual Inspection		
	2nd Annual inspection		

ATTACHMENT B: USGS MAP


Weston Pond
Camp Breezy Meadow
Bragg Cem
Upper Charles Trl
Hopping Brook
Chicken Brook
DIANE DR
KIMBERLY DR
LOVERING ST
OHLSON
WINTHROP ST
HOPPING BROOK RD
SOUTH ST
STABLE WAY
BROAD ACRES FARM RD
Braggville Station
STANLEY RD
SUMMER HILL RD
AUTUMN RD
SUMMER ST
Kirby Swamp
ADAMS ST
Milk Pond
AZALEA DR
DOGWOOD LN
CEDAR FARMS RD
FISHER ST
CLARK ST
LIBERTY RD
126
Park Pond
OAK ST
HIGHLAND ST
LINCOLN ST
HIGH ST
FRANKLIN ST
MILFORD ST
109
TROTTER DR
WEST ST
ALDER ST
FOX RUN RD
Stall Brook
Hopping Brook
MAIN ST
VILLAGE ST
WATERVIEW DR
GRANITE ST
STONE ST
Caryville
LOCUS
HARTFORD AVE
PLAIN ST
PEARL ST
PALOMINO DR
POND ST
Mine Brook
FARM ST
BEECHWOOD RD
Charles River
BEECH ST
PINE ST

ATTACHMENT C: Illicit Discharge Compliance Statement

ILLICIT DISCHARGE COMPLIANCE STATEMENT

455 Hartford Avenue
Bellingham, MA

This statement is provided in accordance with the provisions of the Massachusetts Stormwater Management Standard 10 and of the Massachusetts Stormwater Management Handbook.

Note the following:

- All stormwater management systems contain no connection to the site's wastewater sewer system or to any other non-stormwater collection system.
- Groundwater collection systems on the site are not connected to the site's wastewater sewer system or to any other non-stormwater collection system.
- The facility's Operations & Maintenance Plan is designed to prevent any discharge of non-stormwater to the drainage system.
- Any illicit discharges identified during or after construction will be immediately disconnected.

Date: September 22, 2025

Owner's Signature

9-23-25

Date

ATTACHMENT D: Construction Activity NPDES Stormwater Pollution Prevention Plan

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

455 Hartford Avenue
Bellingham, MA 02019
508-320-6262

SWPPP Prepared For:

Darn Properties, LLC
Moshe Attias
1575 Highland Street
Holliston, MA 01746
508-320-6262
darnproperties@yahoo.com

SWPPP Prepared By:

Legacy Engineering, LLC
730 Main Street, Suite 2C
Millis, MA 02054
508-376-8883
dan@legacy-ce.com

SWPPP Preparation Date:

09/22/2025

Estimated Project Dates:

Project Start Date: Insert Date

Project Completion Date: Insert Date

Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Operator(s):

Darn Properties, LLC
Moshe Attias
1575 Highland Street
Holliston, MA 01746
508-320-6262
darnproperties@yahoo.com
Insert area of control (if more than one operator at site)

[Repeat as necessary.]

Subcontractor(s):

To Be Determined Prior to Construction
Insert Name
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email
Insert area of control (if more than one operator at site)

[Repeat as necessary.]

Emergency 24-Hour Contact:

To Be Determined Prior to Construction
Insert Name
Insert Telephone Number

1.2 Stormwater Team

Stormwater Team

Name and/or Position, and Contact	Responsibilities	I Have Completed Training Required by CGP Part 6.2	I Have Read the CGP and Understand the Applicable Requirements
Daniel Merrikin, P.E. President 508-376-8883 dan@legacy-ce.com	Design of stormwater controls	☒ Yes ☐ No	☒ Yes Date: 3/1/2022
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Inspections of stormwater controls	☐ Yes ☒ No	☐ Yes Date: Click here to enter a date.
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Installation, maintenance and/or repair of stormwater controls. Taking corrective actions	☐ Yes ☒ No	☐ Yes Date: Click here to enter a date.

[Insert or delete rows as necessary.]

Stormwater Team Members Who Conduct Inspections Pursuant to CGP Part 4

Name and/or Position and Contact	Training(s) Received	Date Training(s) Completed	If Training is a Non-EPA Training, Confirm that it Satisfies the Minimum Elements of CGP Part 6.3.b
Daniel Merrikin, P.E. President 508-376-8883 dan@legacy-ce.com	EPA's Construction Inspection Training Course	Date: 2/10/2023	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4
Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4

[Insert or delete rows as necessary.]

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Project Name and Address

Project/Site Name: 455 Hartford Avenue
Street/Location: 455 Hartford Avenue
City: Bellingham
State: MA
ZIP Code: 02019
County or Similar Government Division: Norfolk

Project Latitude/Longitude

Latitude: 42.1313º N
(decimal degrees)

Longitude: - 71.4486 º W
(decimal degrees)

Latitude/longitude data source: ☒ Map ☐ GPS ☐ Other (please specify): _____

Horizontal Reference Datum: ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

Additional Site Information

Is your site located on Indian country lands, or on a property of religious or cultural significance to an Indian Tribe? ☐ Yes ☒ No

If yes, provide the name of the Indian Tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian Tribe associated with the property: Not applicable

2.2 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ Yes ☒ No

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? ☐ Yes ☒ No

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first receiving water that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:

Point of Discharge ID	Name of receiving water that receives stormwater discharge:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?
[001]	Hopping Brook	☐ Yes ☒ No	E. Coli	☐ Yes ☒ No			☐ Yes ☒ No	
[002]	Charles River	☒ Yes ☐ No	E. Coli Pathogens	☒ Yes ☐ No	Charles River Watershed Pathogen (32366)	Pathogens	☒ Yes ☐ No	Tier 2
[003]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[004]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[005]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[006]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]

[Include additional rows or delete as necessary.]

2.3 Nature of the Construction Activities

General Description of Project

Provide a general description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition:

Construction of a commercial building on a vacant parcel along with all associated parking areas, driveways, utilities, and stormwater management facilities.

If you are conducting earth-disturbing activities in response to a public emergency, document the cause of the public emergency *(e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services)*, information substantiating its occurrence *(e.g., State disaster declaration or similar State or local declaration)*, and a description of the construction necessary to reestablish affected public services:

- The work is not related to a public emergency

Business days and hours for the project: Monday through Saturday, 7:00 am to 9:00 pm.

Size of Construction Site

Size of Property	4.41 Acres
Total Area Expected to be Disturbed by Construction Activities	1.8 Acres
Maximum Area Expected to be Disturbed at Any One Time, Including On-site and Off-site Construction Support Areas	1.8 Acres

[Repeat as necessary for individual project phases.]

Type of Construction Site *(check all that apply):*

☐ Single-Family Residential ☐ Multi-Family Residential ☒ Commercial ☐ Industrial

☐ Institutional ☐ Highway or Road ☐ Utility ☐ Other _____

Will you be discharging dewatering water from your site? ☐ Yes ☒ No

If yes, will you be discharging dewatering water from a current or former Federal or State remediation site? ☐ Yes ☒ No

Pollutant-Generating Activities

List and describe all pollutant-generating activities and indicate for each activity the associated pollutants or pollutant constituents that could be discharged in stormwater from your construction site. Take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed during construction.

Pollutant-Generating Activity (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations)	**Pollutants or Pollutant Constituents** (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels)
Paving operations	Asphalt
Concrete washout	Concrete byproducts
Solid waste storage and disposal	Solid waste, trash, construction debris, etc..

[Include additional rows or delete as necessary.]

Construction Support Activities *(only provide if applicable)*

Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas):

1. Equipment staging yards, including construction equipment (trucks, excavators, rollers, etc..)
2. Material storage areas, including site-related construction materials (pipes, manholes, fittings, etc…) and building related materials (concrete, wood, lumber, trim, siding, steel, roofing materials, etc…), and
3. Earthen materials stockpiles, including items like soil, crushed stone, sand, general fill, topsoil, etc…

Contact information for construction support activity:
To be Determined
Insert Telephone No.
Insert Email
Insert Address And/Or Latitude/Longitude

[Repeat as necessary.]

2.4 Sequence and Estimated Dates of Construction Activities

Phase I

General Construction	
Estimated Start Date of Construction Activities for this Phase	Insert Estimated Date
Estimated End Date of Construction Activities for this Phase	Insert Estimated Date
Estimated Date(s) of Application of Stabilization Measures for Areas of the Site Required to be Stabilized	Insert Estimated Date *[Add additional dates as necessary]*
Estimated Date(s) when Stormwater Controls will be Removed	Insert Estimated Date *[Add additional dates as necessary]*

Phase II

Insert General Discription of Phase	
Estimated Start Date of Construction Activities for this Phase	Insert Estimated Date
Estimated End Date of Construction Activities for this Phase	Insert Estimated Date
Estimated Date(s) of Application of Stabilization Measures for Areas of the Site Required to be Stabilized	Insert Estimated Date *[Add additional dates as necessary]*
Estimated Date(s) when Stormwater Controls will be Removed	Insert Estimated Date *[Add additional dates as necessary]*

[Repeat as needed.]

2.5 Authorized Non-Stormwater Discharges

List of Authorized Non-Stormwater Discharges Present at the Site

Authorized Non-Stormwater Discharge	**Will or May Occur at Your Site?**
Discharges from emergency fire-fighting activities	☐ Yes ☒ No
Fire hydrant flushings	☒ Yes ☐ No
Landscape irrigation	☒ Yes ☐ No
Water used to wash vehicles and equipment	☐ Yes ☒ No
Water used to control dust	☒ Yes ☐ No
Potable water including uncontaminated water line flushings	☒ Yes ☐ No
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	☒ Yes ☐ No
Pavement wash waters	☐ Yes ☒ No
Uncontaminated air conditioning or compressor condensate	☒ Yes ☐ No
Uncontaminated, non-turbid discharges of ground water or spring water	☒ Yes ☐ No
Foundation or footing drains	☒ Yes ☐ No
Uncontaminated construction dewatering water	☒ Yes ☐ No

(Note: You are required to identify the likely locations of these authorized non-stormwater discharges on your site map. See Section 2.6, below, of this SWPPP Template.)

2.6 Site Maps

The project "Site Maps" are comprised of a variety of documents which cumulatively contain the information required by the SWPPP. These documents include the full detailed site or subdivision plans ("site plan") (as applicable) and the stormwater report (if applicable).

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 Endangered Species Protection

Eligibility Criterion

Following the process outlined in Appendix D, under which criterion are you eligible for coverage under this permit?

☒ **Criterion A**: No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix D of the CGP, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of the CGP. *Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.*

☒ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D (Note: reliance on State resources is not acceptable; see CGP Appendix D).

Documentation: IPaC Endangered Species printout, see attachment K.

3.2 Historic Property Screening Process

Appendix E, Step 1

Do you plan on installing any stormwater controls that require subsurface earth disturbance, including, but not limited to, any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

☐ Dike
☐ Berm
☒ Catch Basin
☐ Pond
☐ Constructed Site Drainage Feature (e.g., ditch, trench, perimeter drain, swale, etc.)
☐ Culvert
☐ Channel
☐ Other type of ground-disturbing stormwater control: Insert Specific Type of Stormwater Control

(Note: If you will not be installing any subsurface earth-disturbing stormwater controls, no further documentation is required for Section 3.2 of the Template.)

Appendix E, Step 2

If you answered yes in Step 1, have prior professional cultural resource surveys or other evaluations determined that historic properties do not exist, or have prior disturbances at the site have precluded the existence of historic properties? ☐ YES ☒ NO

- If yes, no further documentation is required for Section 3.2 of the Template and you may provide the prior documentation in your SWPPP.
  - Not applicable.
- If no, proceed to Appendix E, Step 3.

Appendix E, Step 3

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? ☒ YES ☐ NO

- If yes, provide documentation of the basis for your determination:
  A search on the MA Historical Commission website did not return any results for the site.
- If no, proceed to Appendix E, Step 4.

3.3 Safe Drinking Water Act Underground Injection Control Requirements

Do you plan to install any of the following controls? Check all that apply below.

☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow

☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

Construction-stage erosion controls do not include the items noted above.

SECTION 4: EROSION AND SEDIMENT CONTROLS AND DEWATERING PRACTICES

4.1 Natural Buffers or Equivalent Sediment Controls

Buffer Compliance Alternatives

Are there any receiving waters within 50 feet of your project's earth disturbances? ☐ YES ☒ NO

(Note: If no, no further documentation is required for Section 4.1 in the SWPPP Template. Continue to Section 4.2.)

4.2 Perimeter Controls

General

- Perimeter erosion and sediment control barriers will be provided, installed, and maintained downstream of all proposed construction activities in accordance with this Plan, the Site Plan,

and all permits issued for the site development. Such controls must be installed before any earth-disturbing activities occur on the site in question. Erosion and sediment controls may be installed in phases so long as it precedes any earth-disturbing activities within the controls' upstream watershed.

- The proposed perimeter erosion controls will provide adequate protection. The ends of the perimeter controls shall extend upslope at a 45-degree angle to prevent stormwater from circumnavigating the edge of the perimeter control. After a storm event, erosion controls are to be extended where evidence of circumventing or undercutting of the perimeter control is found.
- Sediment shall be removed along such controls on a regular basis. In no case, shall sediment be allowed to reach a depth equal to one half of the above ground height of the erosion control device.

Specific Perimeter Controls

Compost Sock & Orange Snow Fence	
Description: Compost sock & orange snow fence	
Installation	Insert approximate date of installation
Maintenance Requirements	Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control. After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.
Design Specifications	Refer to details on Site Plan

[Repeat as needed for individual perimeter controls.]

4.3 Sediment Track-Out

General

- Construction vehicles will use designated entry points for each site. Crushed stone or rip-rap entry/construction apron(s) will be installed and properly maintained during construction until the site is paved. All construction access will be via the construction entrances noted on the Site Plan. At construction entrances and in their general vicinity, existing roads will be kept clean and swept as needed to minimize the tracking of soils and dust from the site.

Specific Track-Out Controls

Construction Entrance	
Description: Crushed stone or rip-rap construction entrance	
Installation	Insert approximate date of installation
Maintenance Requirements	Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any constructed or natural site drainage feature, storm drain inlet, or receiving water.

Construction Entrance	
Design Specifications	Refer to details on Site Plan

[Repeat as needed for individual track-out controls.]

4.4 Stockpiles or Land Clearing Debris Piles Comprised of Sediment or Soil

General

- Soil stockpiles to be left in place more than 24 hours shall be surrounded with a line of compost sock to prevent the piles from eroding into the site and to discourage on-site runoff from eroding the stockpiles. Soil stockpiles to be left in place more than 14 days shall be stabilized temporarily in accordance with this temporary stabilization provisions of this plan. Dust control measures shall be implemented to prevent wind erosion of the stockpiles.

Specific Stockpile Controls

Stockpile Perimeter Controls	
Description: Compost sock around stockpile area	
Installation	As Needed
Maintenance Requirements	Secure stockpiles to prevent erosion during rainfall events that may impact wetland resource areas. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any constructed or natural site drainage feature, storm drain inlet, or receiving water.
Design Specifications	Refer to details on Site Plan

[Repeat as needed for individual stockpile controls.]

4.5 Minimize Dust

General

- Dust control measures will be implemented regularly to prevent the off-site deposition of wind-eroded soils. The principal form of dust control will be water application.

Specific Dust Controls

Water Application	
Description: Use of a water truck to spray down dry areas of disturbed ground to prevent dust generation.	
Installation	As Needed
Maintenance Requirements	Apply as needed to prevent dust generation
Design Specifications	Water truck on-site

[Repeat as needed for individual dust controls.]

4.6 Minimize Steep Slope Disturbances

General

- Contractors must pay careful attention to steep slopes and must implement additional temporary erosion and sediment control measures during work on steep slopes to prevent erosion.

Specific Steep Slope Controls

Erosion Control Blankets	
Description: Installation of erosion control blankets	
Installation	As Needed
Maintenance Requirements	Replace or reinforce as needed to prevent erosion.
Design Specifications	New England Wetland Plants, Inc. ECS-2B or equal

Hydroseed	
Description: Hydroseed with tackifier	
Installation	Insert approximate date of installation
Maintenance Requirements	Ensure vegetation growth and supplement with additional hydroseed as needed.
Design Specifications	Slope control mix

[Repeat as needed for individual steep slope controls.]

4.7 Topsoil

General

- Topsoil generated from the site construction activities must either be stockpiled for reuse on site in accordance with the practices noted above, or shall be removed from the site for reuse on other sites. Topsoil may not be mixed with general fill.

Specific Topsoil Controls

Preserve Topsoil	
Description: Stockpile all topsoil from work areas and reuse on site or truck off-site for use on other sites.	
Installation	As Needed
Maintenance Requirements	None
Design Specifications	None

[Repeat as needed for individual topsoil controls.]

4.8 Soil Compaction

General

- Areas designated for final vegetative surfaces or construction-stage or final stormwater infiltration practices shall be protected from excessive compaction by restricting vehicle access and the types of equipment that may be used in such areas.

Specific Soil Compaction Controls

Access Restrictions	
Description: Prevent access by vehicles to areas that will be vegetated or used for stormwater infiltration once rough grading is complete.	
Installation	Various
Maintenance Requirements	Prevent vehicular access to affected areas
Design Specifications	None

Soil Conditioning	
Description: Prior to seeding/planting of such areas, exposed soil that has been compacted shall be loosened by tilling or other similar methods. Conditioning shall consist of deep tilling with a rotary tiller, disc harrowing, or manual loosening and re-grading with an excavator bucket. Conditioning shall extend to a depth of at least 12-inches.	
Installation	Insert approximate date of installation
Maintenance Requirements	Once conditioned, prevent re-compaction by excluding vehicular access
Design Specifications	None

[Repeat as needed for individual soil compaction controls.]

4.9 Storm Drain Inlets

General

- All storm drain system inlets inside of perimeter controls shall be protected with sediment control measures designed to remove sediment from stormwater prior to entering the inlet. Catch basins along the street frontage shall also be protected.

Specific Storm Drain Inlet Controls

Silt Sack	
Description: Install silt socks in downstream catch basin grates	
Installation	Insert approximate date of installation
Maintenance Requirements	Clean, or remove and replace, the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.
Design Specifications	Siltsack or equal

[Repeat as needed for individual storm drain inlet controls.]

4.10 Constructed Site Drainage Feature

General

- Where appropriate, temporary sediment traps will be installed at stormwater collection points. Each trap will include a rip-rap outlet apron to prevent discharge erosion.

Specific Constructed Site Drainage Features

Temporary Sediment Trap	
Description: Where shown on the site plan or where determined appropriate in the field, provide temporary sediment traps to collect and control construction-stage stormwater runoff.	
Installation	Insert approximate date of installation
Maintenance Requirements	Periodically inspect and remove accumulated sediments as needed to prevent the discharge of sediment from the traps. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition
Design Specifications	Refer to Site Plan

[Repeat as needed for individual constructed site drainage features.]

4.11 Sediment Basins or Similar Impoundments

General

- Where appropriate, temporary sediment traps will be installed at stormwater collection points. Each trap will include a rip-rap outlet apron to prevent discharge erosion.

Specific Sediment Basin Controls

Temporary Sediment Trap	
Description: Where shown on the site plan or where determined appropriate in the field, provide temporary sediment traps to collect and control construction-stage stormwater runoff.	
Installation	Insert approximate date of installation
Maintenance Requirements	Periodically inspect and remove accumulated sediments as needed to prevent the discharge of sediment from the traps. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition
Design Specifications	Refer to Site Plan

[Repeat as needed for individual sediment basin controls.]

4.12 Chemical Treatment

Soil Types

List all the soil types including soil types expected to be exposed during construction in areas of the project that will drain to chemical treatment systems and those expected to be found in fill material:

- Not applicable. No chemical treatment expected.

Treatment Chemicals

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics:

- Not applicable

Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage:
- Not applicable

Provide information from any applicable Safety Data Sheets (SDS):
- Not applicable

Describe how each of the chemicals will be stored consistent with CGP Part 2.2.13c:
- Not applicable

Include references to applicable State or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems:
- Not applicable

Special Controls for Cationic Treatment Chemicals (if applicable)
If the applicable EPA Regional Office authorized you to use cationic treatment chemicals, include the official EPA authorization letter or other communication, and identify the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a discharge that does not meet water quality standards:
- Not applicable

Schematic Drawings of Stormwater Controls/Chemical Treatment Systems
Provide schematic drawings of any chemically-enhanced stormwater controls or chemical treatment systems to be used for application of treatment chemicals:
- Not applicable

Training
Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals:
- Not applicable

4.13 Dewatering Practices

General
- Dewatering is not expected to be needed. However, should dewatering be required, it will be pumped into a temporary dewatering pit or designated dewatering area to prevent any discharge of dewatering water to receiving waters. Should the discharge of dewatering waters to receiving waters be required, the requirements of section 2.4 and 3.0 of the CGP shall be adhered to, including required testing and reporting.

Specific Dewatering Practices

Temporary Dewatering Pit	
Description: Construction of temporary dewatering pit of suitable size and volume to contain anticipated dewatering volume. The pit can be excavated or can be created by the installation of earthen berms to create a containment area.	
Installation	Insert approximate date of installation
Maintenance Requirements	Maintain volume of temporary area as needed to contain discharge volume. For backwash water, either haul it away for disposal or return it to the beginning of the treatment process; replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.
Design Specifications	None

[Repeat as needed for individual dewatering practices.]

4.14 Other Stormwater Controls

General

- None. Not applicable.

4.15 Site Stabilization

Total Amount of Land Disturbance Occurring at Any One Time

☒ *Five Acres or less*

☐ *More than Five Acres*

Use this template box if you are discharging to a sediment- or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes.

Temporary Vegetative Site Stabilization	
☒ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Where seeded for temporary erosion control purposes, a minimum of 6 pounds per 1,000 square feet of seed will be applied along with an appropriate fertilizer (based on the time of year applied) or as necessary to obtain a 70% vegetative cover. Additional seeding will be completed if needed and periodic watering will also be employed if necessary. Where stabilization by the 14th day is precluded by snow cover, frozen ground conditions, or other similar circumstances, stabilization measures will be initiated as soon as practicable. ▪ For disturbed areas less than 5 acres, initiate within 7 days of completion of work and complete stabilization within 7 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	Water periodically as needed to maintain vegetative cover
Design Specifications	Native grass seed mixture

Temporary Non-Vegetative Site Stabilization	
☐ *Vegetative* ☒ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Apply erosion control blankets, mulch, straw or stump grindings to disturbed areas. ▪ For disturbed areas less than 5 acres, initiate within 7 days of completion of work and complete stabilization within 7 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date

Temporary Non-Vegetative Site Stabilization	
Maintenance Requirements	Maintain to ensure effective stabilization control
Design Specifications	Wood mulch, erosion control blankets, straw, and/or stump grindings.

Final Site Stabilization	
☐ *Vegetative* ☒ *Non-Vegetative* ☒ *Temporary* ☒ *Permanent*	
Description: ▪ Final site stabilization per the site plan including lawn and landscape areas, pavement, walkways and other final site features, ▪ Initiate within 7 days of completion of work and complete stabilization within 7 days of the initiation of stabilization measures	
Installation	Insert approximate date of installation
Completion	*(Must be completed as soon as practicable, but no later than seven calendar days after stabilization has been initiated)* Insert approximate completion date
Maintenance Requirements	None
Design Specifications	Refer to site plan

Use this template box if unforeseen circumstances have delayed the initiation and/or completion of vegetative stabilization. Note: You will not be able to include this information in your initial SWPPP. If you are affected by circumstances such as those described in CGP Part 2.2.14.b.ii, you will need to modify your SWPPP to include this information.

Insert name of site stabilization practice	
☐ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☐ *Permanent*	
Description: ▪ Insert description of stabilization practice to be installed ▪ Note how design will meet requirements of Part 2.2.14.b.ii	
Justification	Insert description of circumstances that prevent you from meeting the deadlines required in CGP CGP Parts 2.2.14.a
Installation and completion schedule	**Vegetative Measures:** Describe the schedule you will follow for initiating and completing vegetative stabilization ▪ Approximate installation date: Insert approximate date ▪ Approximate completion date: Insert the approximate date
	Non-Vegetative Measures: *(Must be completed within 14 days of the cessation of construction if disturbing 5 acres or less; within 7 days if disturbing more than 5 acres)* ▪ Approximate installation date: Insert the approximate date ▪ Approximate completion date: Insert the approximate date
Maintenance Requirements	Insert maintenance requirements for the stabilization practice

Insert name of site stabilization practice	
Design Specifications	Include copies of design specifications here

[Repeat as needed for additional stabilization practices.]

SECTION 5: POLLUTION PREVENTION CONTROLS

5.1 Potential Sources of Pollution

Construction Site Pollutants

Insert text or use table below: To be determined at the time of construction

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (That could be discharged if exposed to stormwater)	**Location on Site** (Or reference SWPPP site map where this is shown)

[Include additional rows as necessary.]

5.2 Spill Prevention and Response

(This portion of the document is written as if giving instructions to parties working on the property and/or the owner of the property)

In the event of an accident where significant gasoline or other petroleum products are released, the following procedure shall be followed in the order noted.

- ✓ Seek to contain the spill by constructing a berm of earthen or other materials around the spill site until the appropriate emergency response personnel has arrived. Seek to seal off any downstream stormwater facilities by earthen berms or the emergency spill kit materials.
- ✓ Immediately notify the following governmental entities and inform them of the type of spill that occurred:
  - Bellingham Fire Department at 508-966-1112,
  - Bellingham Board of Health at 508-966-5820,
  - Bellingham Conservation Commission at 508-657-2858,
  - Mass. Department of Environmental Protection (DEP) Central Region at (508) 792-7650 (address is 8 New Bond Street, Worcester, MA 01606), and
  - National Response Center (NRC) at (800) 424-8802 (for spills that require such notification pursuant to 40 CFR Part 110, 40 CFR Part 117, and 40 CR Part 302).
- ✓ Once the various emergency response teams have arrived at the site, the owner shall follow the instructions of the various governmental entities, which may include the following:
  - A clean up firm may need to be immediately contacted.
  - If the materials have remained trapped in the catch basins or proprietary stormwater treatment units, then these structures may be pumped out. All materials shall be removed by qualified personnel and disposed of in accordance with all applicable local, state, and federal regulations.

5.3 Fueling and Maintenance of Equipment or Vehicles

General

The Operator will designate a specific area of the site for fueling and overnight storage of vehicles on the site. Such area shall be located as far from wetlands areas and stormwater inlets as practicable and outside of the 100' buffer zone. Refer to the Site Plan for vehicle storage area location(s).

All equipment stored on-site will be monitored for leaks and will receive regular preventative maintenance to reduce the chance of leakage. Where vehicle leaks are identified, drip pans and absorbent pads shall be employed until the leak can be repaired, which shall be completed as soon as practicable. The Operator will maintain a bag of chemical sorbent, absorbent pads and an emergency spill kit on the site at all times within one of the designated Staging Areas. A sign shall be posted at the entrance to each Staging Area noting the location of the emergency spill kit. Spill kits shall include the following at a minimum.

- Universal chemical sorbent capable of absorbing up to 15 gallons of liquid.
- Gloves and safety glasses,
- Four chemical socks,
- Four chemical pads,
- Four chemical pillows, and
- Four plastic disposal bags.

5.4 Washing of Equipment and Vehicles

General
- Vehicle or equipment washing is not allowed on-site.

5.5 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

5.5.1 Building Materials and Building Products
(Note: Examples include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.)

General
- The site will be maintained in a neat and orderly manner, with debris regularly disposed of.
- All products and materials stored on-site will be stored in a neat and orderly manner in appropriate containers. Building materials that may discharge pollutants if in contact with water must be stored under cover (i.e. under a roof or under plastic sheeting) to prevent contact with rainwater.
- Manufacturer recommendations relative to the proper storage, use, and disposal of products and materials will be followed.
- An effort will be made to minimize the on-site storage of excess construction materials. In all cases, materials will be removed from the site if unused for more than three months.
- When use of products and materials have been completed, any excess products and materials will be promptly removed from the site and/or properly disposed of in accordance with all applicable state and federal regulations.
- All equipment to be stored on-site will be stored in a neat and orderly manner and such equipment will only be stored in the designated equipment Staging Areas on the site.

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

General
- Such materials may not be stored on-site and shall only be brought on-site in the quantities needed for application. Application shall be in accordance with manufacturer recommendation. Disposal of excess products shall follow local, state and federal law.

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General
- Petroleum products may only be stored on-site in the limited quantities necessary for the ongoing work.
- All chemical containers must be watertight and closed, sealed, and secured when not in use.
- Outside storage must use a containment pallet or similar, to capture small leaks and spills.
- A spill kit must be readily available and in good working condition. Personnel must be available to respond immediately in the event of a leak or spill.
- Containers storing chemical with a storage capacity of 55 gallons or more must be stored more than 50 feet from receiving waters, drainage features, or inlets and must be provided with cover.

5.5.4 Hazardous or Toxic Waste
(Note: Examples include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.)

General

- The use of hazardous products during construction will be in accordance with manufacturer recommendations and established construction practices.
- Hazardous materials must be stored in a separately designated area, under cover, and within secondary storage containers designed to hold at least 110% of the volume of the substance in question.
- Hazardous products will be kept in their original containers until they are used, and the container labels will be kept on-site within a designated Staging Area until use of the product is no longer needed.
- Unused quantities of hazardous products will be removed from the site in accordance with all applicable state and federal regulations.
- Hazardous waste materials generated by the construction (if any) will be disposed of off-site in accordance with all applicable state and federal regulations pertaining to such disposal. The Site Manager will be informed of these requirements and will ensure that this provision is adhered to.
- Any spills of hazardous materials found on the site will be cleaned up immediately using dry-cleanup procedures and reported in accordance with procedures established by local, state, and federal regulations. Washdowns of spill areas is prohibited.
- The Site Manager will be properly trained in hazardous materials spill prevention and clean-up.

5.5.5 Construction and Domestic Waste

(Note: Examples include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris, and other trash or discarded materials.)

General

- All waste materials from the site will be collected in dumpsters and disposed of off-site in accordance with all applicable state and federal regulations. The dumpster will be emptied as needed and the Operator will ensure that trash collection does not accumulate outside the dumpster. Trash and debris will be collected at least once per working day.
- Containers with lids shall be sealed at the end of each day. Containers without lids shall be covered with sheeting or a tarp. Cleanup trash and debris on the site at the end of each workday.

5.5.6 Sanitary Waste

General

- The Operator will keep a portable toilet on the site for the use of work personnel and shall dispose of the waste materials in accordance with local, state, and federal regulations. The portable toilet shall be located away from receiving waters, storm drains, and constructed or natural site drainage features. Portable toilets will be positioned so that they are secure and will not be tipped or knocked over.

5.6 Washing of Applicators and Containers used for Stucco, Paint, Concrete, Form Release Oils, Cutting Compounds, or Other Materials

General

- Any such wash water shall be directed into a leak-proof container and disposed of off-site in accordance with local, state and federal regulations.

- No liquid waste shall be allowed to enter drainage features and receiving waters or be allowed to infiltrate into the ground.
- Concrete trucks will only wash out or dump surplus concrete within areas designated by the Operator on the site in designated depressions to prevent uncontrolled migration of such materials. All such surplus concrete will be cleaned-up by crushing the concrete and either re-using it in the construction activities or by removing it from the site.
- Wash waters from concrete or stucco applications, or from paint brushes or other similar activities must be directed into a leak-proof container or pit designed to prevent overflows due to precipitation. Accumulated wastewater must be disposed of in accordance with all local, state, and federal regulations to the extent it is deemed hazardous. Washwater generating activities must be conducted as far away from wetlands areas and storm drain inlets as possible.

5.7 Application of Fertilizers

General

- Fertilizer shall be applied in accordance with the rates specified herein and in no case more than stipulated in the manufacturer's specifications.
- To the extent practicable, apply fertilizers in optimal seasons to maximize vegetation uptake and growth.
- Avoid applying fertilizers before heavy rains are expected and never apply to frozen ground or during winter conditions.
- Fertilizer may not be used in constructed or natural site drainage features.
- Fertilizers are not to be applied within buffer zones or within the Zone II for drinking water.

5.8 Other Pollution Prevention Practices

Instructions:

Describe any additional pollution prevention practices that do not fit into the above categories.

General

- Insert general description of the problem this control is designed to address

Specific Pollution Prevention Practices

Insert name of pollution prevention practice	
Description: Insert description of practice to be implemented	
Implementation	Insert approximate date of implementation
Maintenance Requirements	Insert maintenance requirements for the pollution prevention practice
Design Specifications	If applicable include copies of design specifications here

[Repeat as needed.]

SECTION 6: INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

6.1 Inspection Personnel and Procedures

Site Inspection Schedule

Select the inspection frequency(ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4

(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply and indicate which portion(s) of the site it applies to.)

Standard Frequency:

☐ Every 7 calendar days

☐ Every 14 calendar days and within 24 hours of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period (including when there are multiple, smaller storms that alone produce less than 0.25 inches but together produce 0.25 inches or more in 24 hours), or
- A storm event that produces 0.25 inches or more of rain within a 24-hour period on the first day of a storm and continues to produce 0.25 inches or more of rain on subsequent days (you conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the last day of the storm that produces 0.25 inches or more of rain (i.e., only two inspections would be required for such a storm event)), or
- A discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

Increased Frequency (if applicable):

For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3

☒ Every 7 days and within 24 hours of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

Reduced Frequency (if applicable)

For stabilized areas

☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month until permit coverage is terminated consistent with Part 9 in any area of your site where the stabilization steps in 2.2.14.a have been completed.

- Specify locations where stabilization steps have been completed
- Insert date that they were completed

(Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable.)

For frozen conditions where construction activities are being conducted
☐ Once per month Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: Insert approximate date ▪ Ending date of frozen conditions: Insert approximate date
For frozen conditions where construction activities are suspended
☐ Inspections are temporarily suspended Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: Insert approximate date ▪ Ending date of frozen conditions: Insert approximate date

Dewatering Inspection Schedule

Select the inspection frequency that applies based on CGP Part 4.3.2

Dewatering Inspection
☐ Once per day on which the discharge of dewatering water occurs.

Rain Gauge Location (if applicable)

The site will make use of a weather station representative of the project location via a phone app.

Inspection Report Forms

Insert a copy of any inspection report forms you will use here or in Appendix D of this SWPPP template

(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.2 *Corrective Action*

Personnel Responsible for Corrective Actions
Insert names of personnel or types of personnel responsible for corrective actions

Corrective Action Logs
See Appendix E

(Note: EPA has developed a sample corrective action log that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.3 *Delegation of Authority*

Instructions:

- Identify the individual(s) or positions within the company who have been delegated authority to sign inspection reports.
- Attach a copy of the signed delegation of authority (see example in Appendix J of this SWPPP Template.)
- For more on this topic, see Appendix G, Subsection 11 of EPA's CGP.

Duly Authorized Representative(s) or Position(s):

Darn Properties, LLC
Moshe Attias
Insert Position
1575 Highland Street
Holliston, MA 01746
508-320-6262
darnproperties@yahoo.com

SECTION 7: TURBIDITY BENCHMARK MONITORING FOR DEWATERING DISCHARGES

Instructions (see CGP Part 3.3 and 7.2.8):

– If you are required to comply with the Part 3.3 turbidity benchmark monitoring requirements, describe the procedures you will follow to:
  - ✓ Collect and evaluate samples,
  - ✓ Report results to EPA and keep records of monitoring information, and
  - ✓ Take corrective action when necessary.

– Include the specific type of turbidity meter you will use for monitoring, as well as any manuals or manufacturer instructions on how to operate and calibrate the meter.

– Describe any coordinating arrangement you may have with any other permitted operators on the same site with respect to compliance with the turbidity monitoring requirements, including which parties are tasked with specific responsibilities.

– If EPA has approved of an alternate turbidity benchmark pursuant to Part 3.3.2.b, include any data and other documentation you relied on to request use of the specific alternative benchmark.

Procedures:

Collecting and evaluating samples	Describe how you will collect and evaluate samples
Reporting results and keeping monitoring information records	Describe how you will report results to EPA and keep monitoring information records
Taking corrective action when necessary	Describe how you will take corrective action when necesary

Turbidity Meter:

Type of turbidity meter	Insert the type of turbidity meter

Turbidity meter manuals and manufacturer instructions

Insert a copy of any manuals and manufacturer instructions in Appendix N of this SWPPP Template.

Coordinating Arrangements for Turbidity Monitoring (if applicable):

Permitted operator name	Insert operator name
Permitted operator NPDES ID	Insert operator NPDES ID
Coordinating Arrangement	Describe the coordinating arrangement including which parties are tasked with specifc responsibilities

[Repeat as necessary.]

Alternate turbidity benchmark (if applicable):

Alternate turbidity benchmark (NTU)	Insert alternate turbidity benchmark
Data and documentation used to request the alternate benchmark	Insert the data and documentation that was submitted to EPA to request the alternate benchmark

SECTION 8: CERTIFICATION AND NOTIFICATION

Instructions (CGP Appendix G, Part G.11.2):

- The following certification statement must be signed and dated by a person who meets the requirements of Appendix G, Part G.11.2.
- This certification must be re-signed in the event of a SWPPP Modification.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

[Repeat as needed for multiple construction operators at the site.]

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B – Copy of 2022 CGP

Appendix C – NOI and EPA Authorization Email

Appendix D – Site Inspection Form and Dewatering Inspection Form (if applicable)

Appendix E – Corrective Action Log

Appendix F – SWPPP Amendment Log

Appendix G – Subcontractor Certifications/Agreements

Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Documentation

Appendix J – Delegation of Authority

Appendix K – Endangered Species Documentation

Appendix L – Historic Preservation Documentation

Appendix M – Rainfall Gauge Recording

Appendix N – Turbidity Meter Manual and Manufacturer's Instructions

Appendix A – Site Maps

An overview site map is included below. For detailed information, refer to the detailed project Site Plan/Subdivision Plan and any associated stormwater report.

Appendix B – Copy of 2022 CGP

INSERT COPY OF 2022 CGP

Appendix C – Copy of NOI and EPA Authorization Email

INSERT COPY OF NOI AND EPA'S AUTHORIZATION EMAIL PROVIDING COVERAGE UNDER THE CGP

Appendix D – Copy of Site and Dewatering Inspection Forms

Not expected to be applicable. Should it become necessary, utilize the EPA template available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates

Appendix E – Copy of Corrective Action Log

The following corrective action log form will be used and is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources

2022 CGP Corrective Action Log
Project Name:

_____

NPDES ID Number:

_____

Section A – Individual Completing this Log	
Name:	**Title:**
Company Name:	**Email:**
Address:	**Phone Number:**
Section B – Details of the Problem (CGP Part 5.4.1.a) Complete this section within 24 hours of discovering the condition that triggered corrective action.	
Date problem was first identified:	**Time problem was first identified**:
What site conditions triggered this corrective action? *(Check the box that applies. See instructions for a description of each triggering condition (1 thru 6).)* ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5a ☐ 5b ☐ 6	
Specific location where problem identified:	
Provide a description of the specific condition that triggered the need for corrective action and the cause (if identifiable):	
Section C – Corrective Action Completion (CGP Part 5.4.1.b) Complete this section within 24 hours after completing the corrective action.	
For site condition # 1, 2, 3, 4, or 6 (those not related to a dewatering discharge) confirm that you met the following deadlines (CGP Part 5.2.1):	
☐ Immediately took all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events. **AND**	
☐ Completed corrective action by the close of the next business day, unless a new or replacement control, or significant repair, was required. **OR**	
☐ Completed corrective action within seven (7) calendar days from the time of discovery because a new or replacement control, or significant repair, was necessary to complete the installation of the new or modified control or complete the repair. **OR**	
☐ It was infeasible to complete the installation or repair within 7 calendar days from the time of discovery. Provide the following additional information:	

Explain why 7 calendar days was infeasible to complete the installation or repair:

Provide your schedule for installing the stormwater control and making it operational as soon as feasible after the 7 calendar days:

For site condition # 5a, 5b, or 6 (those related to a dewatering discharge), confirm that you met the following deadlines:

- ☐ Immediately took all reasonable steps to minimize or prevent the discharge of pollutants until a solution could be implemented, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition taking safety considerations into account.
- ☐ Determined whether the dewatering controls were operating effectively and whether they were causing the conditions.
- ☐ Made any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.

Describe any modification(s) made as part of corrective action: (Insert additional rows below if applicable)	**Date of completion:**	**SWPPP update necessary?**	**If yes, date SWPPP was updated:**
1.		☐ Yes ☐ No	
2.		☐ Yes ☐ No	

Section D - Signature and Certification (CGP Part 5.4.2)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

MANDATORY: Signature of Operator or "Duly Authorized Representative:"	
Signature:	**Date:**
Printed Name:	**Affiliation:**
OPTIONAL: Signature of Contractor or Subcontractor	
Signature:	**Date:**
Printed Name:	**Affiliation:**

General Instructions

This Corrective Action Log Template is provided to assist you creating a corrective action log that complies with the minimum reporting requirements of Part 5.4 of the EPA's Construction General Permit (CGP). For each triggering condition on your site, you will need to fill out a separate corrective action log.

The entire form must be completed to be compliant with the requirements of the permit. (Note: In Section C, if you do not need the number of rows provided in the corrective action log, you may delete these or cross them off. Alternatively, if you need more space to describe any modifications, you may insert additional rows in the electronic version of this form or use the bottom of the page in the field version of this form.)

If you are covered under a State CGP, this template may be helpful in developing a log that can be used for that permit; however, you will likely need to modify this form to meet the specific requirements of any State-issued permit. If your permitting authority requires you to use a specific corrective action log, you should not use this template.

Instructions for Section A

Individual completing this form Enter the name of the person completing this log. Include the person's contact information (title, affiliated company name, address, email, and phone number).

Instructions for Section B

You must complete Section B within 24 hours of discovering the condition that triggered corrective action. (CGP Part 5.4)

When was the problem first discovered?
Specify the date and time when the triggering condition was first discovered.

What site conditions triggered this corrective action? (CGP Parts 5.1 and 5.3)
Check the box corresponding to the numbered triggering condition below that applies to your site.

1. A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part Error! Reference source not found., you find it necessary to repeatedly (i.e., 3 or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under Part Error! Reference source not found. that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under Part Error! Reference source not found.);
2. A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly;
3. Your discharges are not meeting applicable water quality standards;
4. A prohibited discharge has occurred (see Part 1.3);
5. During discharge from site dewatering activities:
    a. The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to Part **Error! Reference source not found.**); or
    b. You observe or you are informed by EPA, State, or local authorities of the presence of any of the following at the point of discharge to a receiving water flowing through or immediately adjacent to your site and/or to constructed or natural site drainage features or storm drain inlets:
        - sediment plume
        - suspended solids
        - unusual color
        - presence of odor
        - decreased clarity
        - presence of foam
        - visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water

6. EPA requires corrective action as a result of permit violations found during an inspection carried out under Part 4.8.

Provide a description of the problem (CGP Part 5.4.1.a)
Provide a summary description of the condition you found that triggered corrective action, the cause of the problem (if identifiable), and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map.

Instructions for Section C

You must complete Section C within 24 hours after completing the correction action. (CGP Part 5.4)

Deadlines for completing corrective action for condition # 1, 2, 3, 4, or 6 (if not relating to a dewatering discharge) (CGP Part 5.2.1)
Check the box to confirm that you met the deadlines that apply to each triggering condition. You are always required to check the first box (i.e., Immediately took all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events.). Only one of the next three boxes should be checked depending on the situation that applies to this corrective action.

Check the second box if the corrective action for this particular triggering condition does not require a new or replacement control, or a significant repair. These actions must be completed by the close of the next business day from the time of discovery of the condition.

Check the third box if the corrective action for this particular triggering condition requires a new or replacement control, or a significant repair. These actions must be completed by no later than seven calendar days from the time of discover of the condition.

Check the fourth box if the corrective action for this particular triggering condition requires a new or replacement control, or a significant repair, and if it is infeasible to complete the work within seven calendar days. Additionally, you will need to fill out the table below the checkbox that requires:

1. An explanation as to why it was infeasible to complete the installation or repair within seven calendar days of discovering the condition.
2. Provide the schedule you will adhere to for installing the stormwater control and making it operational as soon as feasible after the seventh day following discovery.

Note: Per Part 5.2.1.c, where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven calendar days of completing this work.

Deadlines for completing corrective action for condition # 5a, 5b, or 6 related to a dewatering discharge (CGP Part 5.2.2)
These deadlines apply to conditions relating to construction dewatering activities. Check the box to confirm that you met the deadlines that apply to each triggering condition. You are required to check all of the boxes in this section to indicate your compliance with the corrective action deadlines.

List of modification(s) to correct problem
Provide a list of modifications you completed to correct the problem.

Date of completion
Enter the date you completed the modification. The work must be completed by the deadline you indicated above.

SWPPP update necessary?
Check "Yes" or "No" to indicate if a SWPPP update is necessary consistent with Part 7.4.1.a in order to reflect changes implemented at your site. If "Yes," then enter the date you updated your SWPPP. The

SWPPP updates must be made within seven calendar days of completing a corrective action. (CGP Part 5.2.1.c)

Instructions for Section D

Each corrective action log entry must be signed and certified following completion of Section D to be considered complete. (CGP Part 5.4.2)

Operator or "Duly Authorized Representative" – MANDATORY (CGP Appendix G Part G.11.2 and CGP Appendix H Section X)

At a minimum, the corrective action log must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply:

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: By a general partner or the proprietor, respectively.
- *For a municipality, State, Federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Sign, date and print your name and affiliation.

Contractor or Subcontractor - OPTIONAL

Where you rely on a contractor or subcontractor to complete this log and the associated corrective action, you should consider requiring the individual(s) to sign and certify each log entry. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the log as well. If applicable, sign, date, and print your name and affiliation.

Recordkeeping

Logs must be retained for at least 3 years from the date your permit coverage expires or is terminated. (CGP Part 5.4.4)

Keep copies of your signed corrective action log entries at the site or at an easily accessible location so that it can be made immediately available at the time of an on-site inspection or upon request by EPA. (CGP Part 5.4.3) Include a copy of the corrective action log in your SWPPP. (CGP Part 7.2.7.e)

Note

While EPA has made every effort to ensure the accuracy of all instructions contained in this template, it is the permit, not this template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between this template and any corresponding provision of the CGP, you must abide by the requirements in the permit. EPA welcomes comments on this Corrective Action Log Template at any time and will consider those comments in any future revision. You may contact EPA for CGP-related inquiries at cgp@epa.gov

Appendix F – SWPPP Amendment Log

Instructions (see CGP Part 7.4):

- Create a log here of changes and updates to the SWPPP. You may use the table below to track these modifications.
- SWPPP modifications are required pursuant to CGP Part 7.4.1 in the following circumstances:
  - ✓ Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP (this includes changes made in response to corrective actions triggered under CGP Part 5);
  - ✓ To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - ✓ If inspections or investigations determine that SWPPP modifications are necessary for compliance with this permit;
  - ✓ Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet requirements of the permit;
  - ✓ To reflect any revisions to applicable Federal, State, Tribal, or local requirements that affect the stormwater control measures implemented at the site; and
  - ✓ If applicable, if a change in chemical treatment systems or chemically-enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	

Appendix G – *Sample* Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Appendix H – Grading and Stabilization Activities Log

Date Grading Activity Initiated	**Description of Grading Activity**	**Description of Stabilization Measure and Location**	**Date Grading Activity Ceased** (Indicate Temporary or Permanent)	**Date When Stabilization Measures Initiated**
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE

Appendix I –Training Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 1.2 AND CGP PART 7.2.2

Appendix J – *Sample* Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the EPA's Construction General Permit (CGP), at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, State, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix G of EPA's CGP, and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix G.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Appendix K – Endangered Species Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.1 AND CGP APPENDIX D

Appendix L – Historic Properties Documentation

The attached image is from the MACRIS website map. There are no locations of historical significance in or around the site.

Appendix M – Rainfall Gauge Recording

Not expected to be needed as it is expected that the Operator will rely on a weather station that is representative of the site location, but if this option is elected by the Operator, use the table below to record on-site rainfall gauge readings at the beginning and end of each work day.

Month/Year			Month/Year			Month/Year		
Day	Start time	End time	Day	Start time	End time	Day	Start time	End time
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
10			10			10		
11			11			11		
12			12			12		
13			13			13		
14			14			14		
15			15			15		
16			16			16		
17			17			17		
18			18			18		
19			19			19		
20			20			20		
21			21			21		
22			22			22		
23			23			23		
24			24			24		
25			25			25		
26			26			26		
27			27			27		
28			28			28		
29			29			29		
30			30			30		
31			31			31		

Example Rainfall Gauge Recording

April 2022			May 2022			June 2022		
Day	7:00 am	4:400 pm	Day	7:00 am	4:00 pm	Day	7:00 am	4:00 pm
1	--	--	1	0.2	0	1	0	0.4
2	--	--	2	0	0	2	0	0
3	0	0	3	0.1	0.3	3	--	--
4	0	0.3	4	0	0	4	--	--
5	0	0	5	0	0	5	0	0

In this example (for only partial months), 0.25-inch rainfall inspections would have been conducted on April 4 and June 1.

Appendix N – Turbidity Monitoring Sampling Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 7.2.8 AND CGP PART 3.3.4

ATTACHMENT E: TSS Removal Calculation Sheets

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Infiltration Basin #1

TSS Removal Calculation Worksheet

A BMP1	B TSS Removal Rate1	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Infiltration Basin w/ Sediment Forebay	80%	1.00	80%	20%

Total TSS Removal = 80%

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

Project:	455 Hartford Ave.
Prepared By:	Legacy Engineering LLC
Date:	September 22, 2025

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

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Infiltration Basin #2 Pretreatment

TSS Removal Calculation Worksheet

A BMP1	B TSS Removal Rate1	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catch Basin	25%	1.00	25%	75%
Sediment Forebay	25%	0.75	19%	56%

Total TSS Removal = 44%

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

Project:	455 Hartford Ave.
Prepared By:	Legacy Engineering LLC
Date:	September 22, 2025

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

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From Mass DEP Stormwater Handboook Vol. 1

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Infiltration Basin #2

TSS Removal Calculation Worksheet

A BMP1	B TSS Removal Rate1	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catch Basin	25%	1.00	25%	75%
Infiltration Basin w/ Sediment Forebay	80%	0.75	60%	15%

Total TSS Removal = 85%

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

Project:	455 Hartford Ave.
Prepared By:	Legacy Engineering LLC
Date:	September 22, 2025

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

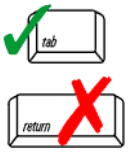
ATTACHMENT F: Stormwater Management Handbook Checklist

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

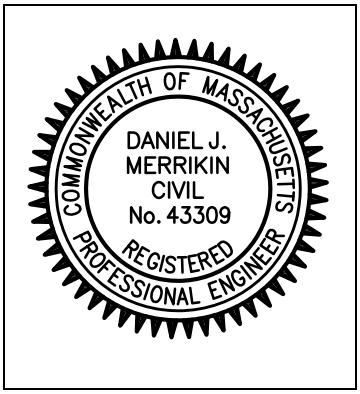
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Digitally signed by Daniel J. Merrikin, P.E.
Date: 2025.10.09 15:15:41 -04'00'

Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

- ☒ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☒ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☒ An Illicit Discharge Compliance Statement is attached;

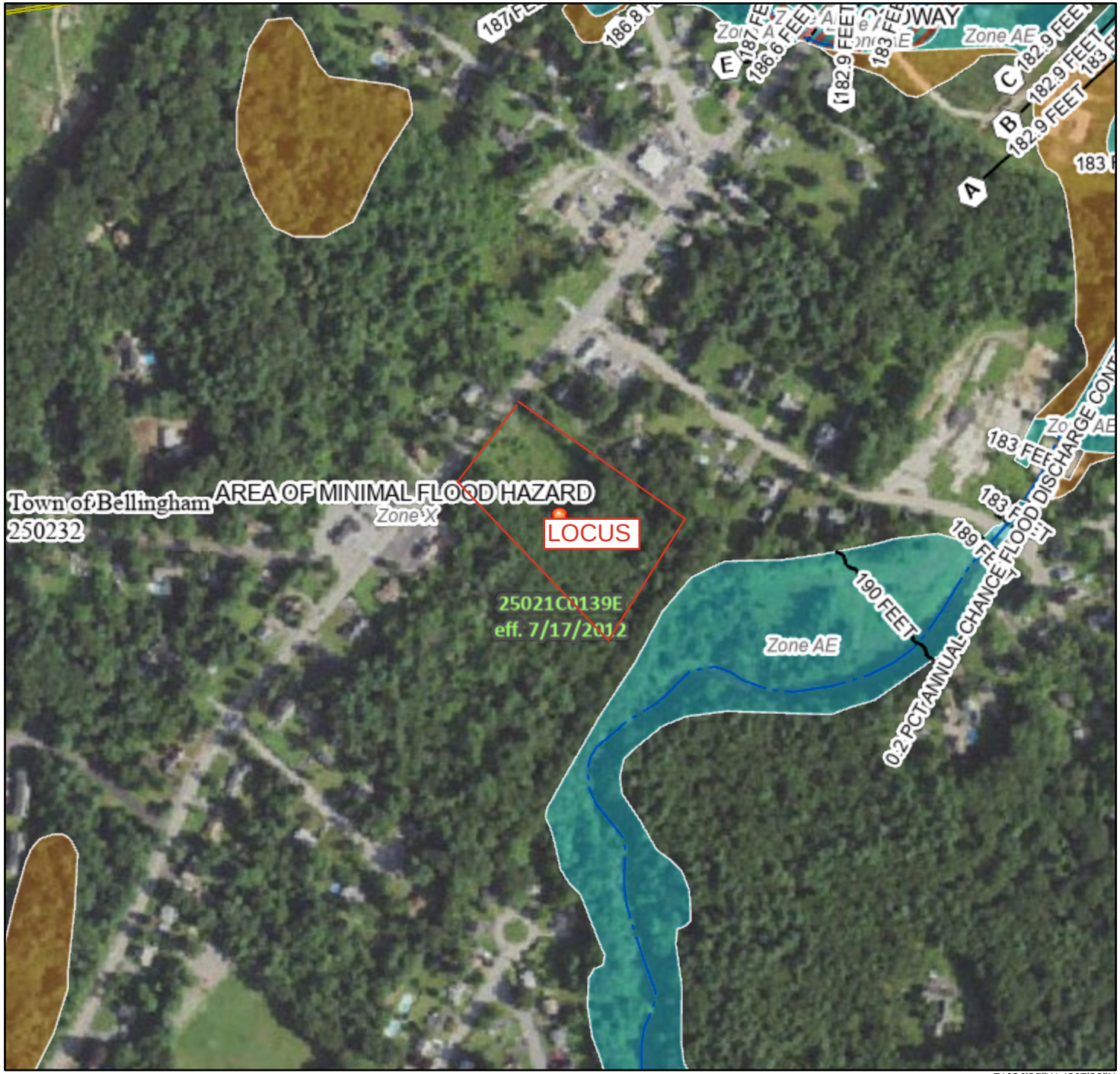
☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

ATTACHMENT G: FEMA FIRMETTE

National Flood Hazard Layer FIRMette

FEMA

71°27'12"W 42°8'5"N



71°26'35"W 42°7'38"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/21/2025 at 8:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

ATTACHMENT H: Soils Data

Map Scale: 1:2,040 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 20, Aug 27, 2024

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		0.0	0.1%
5	Saco silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded	B/D	1.6	11.2%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	4.3	29.5%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	A	1.7	11.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	6.2	42.3%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	0.2	1.6%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	0.5	3.3%
Totals for Area of Interest			**14.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

DEEP OBSERVATION TEST HOLE SOIL LOG
455 Hartford Avenue, MA 02019

Deep Observation Hole: OTH 25-1 **Date of Test Hole: June 12, 2025** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6”	A	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
22”	B	10YR6/6				Loamy Sand	1%	<1%	Massive	V. Friable	
42”	C1	2.5Y6/4	22”	7.5Y6/8	5%	Med. Sand	<1%	<1%	Single Grain	Loose	
56”	C2	2.5Y6/3				Sand	<1%	<1%	Single Grain	Loose	Layering of fine and medium sand
110”	C3	2.5Y6/3				Loamy Sand	2%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=202.8

Groundwater Indicators Observed at Time of Testing:

☒ Depth observed standing water in observation hole: 100” (Elev.=194.5)

☒ Depth to soil redoximorphic features (mottles): 22” (Elev.=201.0)

☒ Depth weeping from side of observation hole: 56” (Elev.=198.1)

DEEP OBSERVATION TEST HOLE SOIL LOG
455 Hartford Avenue, MA 02019

Deep Observation Hole: OTH 25-2 **Date of Test Hole: June 12, 2025** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
6”	Ap	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
24”	B	10YR6/6				Loamy Sand	1%	<1%	Massive	V. Friable	
100”	C	2.5Y6/4	25”	7.5Y6/8	5%	Loamy Sand	2%	<1%	Massive	V. Friable	Lenses of medium sand

Additional Notes: Ground Elev.=201.0

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 25” (Elev.=198.9)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
455 Hartford Avenue, MA 02019

Deep Observation Hole: OTH 25-3 **Date of Test Hole: June 12, 2025** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
8”	Ap	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
24”	B	10YR6/6				Loamy Sand	1%	<1%	Massive	V. Friable	
101”	C	2.5Y6/4	25”	7.5Y6/8	5%	Loamy Sand	2%	2%	Massive	V. Friable	Boulders

Additional Notes: Ground Elev.=200.8

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 25” (Elev.=198.7)

☒ Depth weeping from side of observation hole: 64” (Elev.=194.5)

DEEP OBSERVATION TEST HOLE SOIL LOG
455 Hartford Avenue, MA 02019

Deep Observation Hole: OTH 25-4 **Date of Test Hole: June 12, 2025** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7”	Ap	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
24”	B	10YR6/6				Loamy Sand	1%	<1%	Massive	V. Friable	
100”	C	2.5Y6/4	24”	7.5Y6/8	5%	Loamy Sand	2%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=201.4

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 24” (Elev.=199.4)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG
455 Hartford Avenue, MA 02019

Deep Observation Hole: OTH 25-5 **Date of Test Hole: June 12, 2025** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7”	Ap	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
29”	Bw	10YR6/8				Loamy Sand	1%	3%	Massive	V. Friable	Boulders
120”	C	2.5Y6/3	24”	7.5Y6/8	5%	Loamy Sand	2%	2%	Massive	V. Friable	SL lenses

Additional Notes: Ground Elev.=202.6

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 24” (Elev.=200.6)

☒ Depth weeping from side of observation hole: 42” (Elev.=199.1)

DEEP OBSERVATION TEST HOLE SOIL LOG
455 Hartford Avenue, MA 02019

Deep Observation Hole: OTH 25-6 **Date of Test Hole: June 12, 2025** **Soil Evaluation By: Daniel J. Merrikin, P.E.**
(Mass. Approved Soil Evaluator)

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
7”	Ap	10YR4/3				Loamy Sand	1%	<1%	Massive	V. Friable	
28”	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
120”	C	2.5Y6/4	24”	7.5Y6/8	5%	Loamy Sand	2%	2%	Massive	V. Friable	SL lenses

Additional Notes: Ground Elev.=202.6

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 24” (Elev.=200.6)

☒ Depth weeping from side of observation hole: 42” (Elev.=199.1)

ATTACHMENT I: Existing Watershed Plan

DESIGN POINT #1: FLOW TO ABUTTER

WATERSHED E1

WATERSHED E2

WATERSHED E3

NRCS SOIL BOUNDARY

MERRIMAC (254B) NRCS SOIL CLASS A

DESIGN POINT #2: FLOW TO REAR WETLAND

SACO (5) NRCS SOIL CLASS B/D

NRCS SOIL BOUNDARY

RIDGEBURY (71B) NRCS SOIL CLASS D

DESIGN POINT #3: FLOW TO WESTERN WETLAND

HARTFORD AVE.

N

PLAN SCALE: 1"=50'

0' 50' 100'

PLAN DATE: SEPTEMBER 22, 2025

REVISION	DATE	BY

455 HARTFORD AVENUE EXISTING WATERSHED PLAN OF LAND IN BELLINGHAM, MA

730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)

SHEET 1 OF 1

LEGACY ENGINEERING

ATTACHMENT J: Proposed Watershed Plan

DESIGN POINT #1: FLOW TO ABUTTER

WATERSHED P1

WATERSHED P2b

WATERSHED P2e

W-P3a

MERRIMAC (254B) NRCS SOIL CLASS A

W-P2a

W-P2c

WATERSHED P3b

NRCS SOIL BOUNDARY

WATERSHED P3c

DESIGN POINT #2: FLOW TO REAR WETLAND

HARTFORD AVE.

RIDGEBURY (71B) NRCS SOIL CLASS D

WATERSHED P2d

SACO (5) NRCS SOIL CLASS B/D

DESIGN POINT #3: FLOW TO WESTERN WETLAND

NRCS SOIL BOUNDARY

N

PLAN SCALE: 1"=50'

0' 50' 100'

PLAN DATE: SEPTEMBER 22, 2025

REVISION	DATE	BY

455 HARTFORD AVENUE PROPOSED WATERSHED PLAN OF LAND IN BELLINGHAM, MA

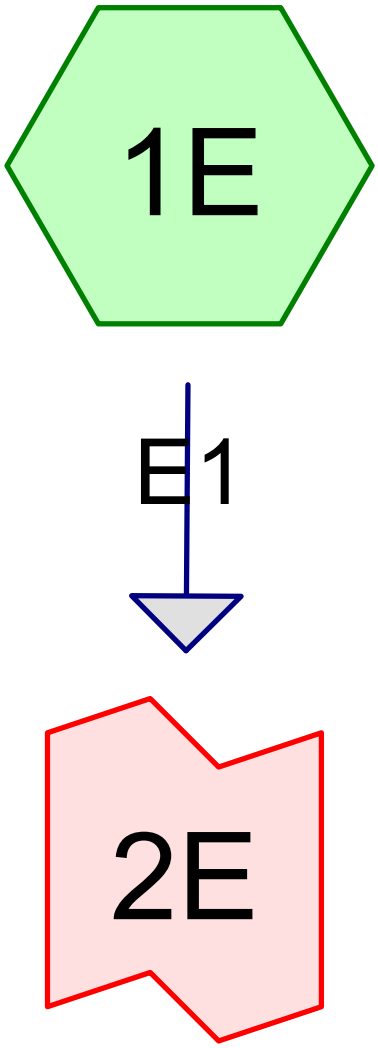
730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)

SHEET 1 OF 1

LEGACY ENGINEERING

ATTACHMENT K: HYDROCAD HYDROLOGY CALCULATIONS

DESIGN POINT #1: FLOW TO ABUTTER
EXISTING CONDITIONS



Design Point #1: Flow to Abutter

Subcat Reach Pond Link

Routing Diagram for HydroCAD
Prepared by Legacy Engineering LLC, Printed 2/18/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NOAA10 24-hr	D	Default	24.00	1	3.84	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.04	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.77	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.62	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.523	30	Woods, Good HSG A (1E)
0.523	**30**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=22,777 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=153' Tc=12.8 min CN=30 Runoff=0.00 cfs 0.000 af

Link 2E: Design Point #1: Flow to Abutter Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.523 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1E: E1

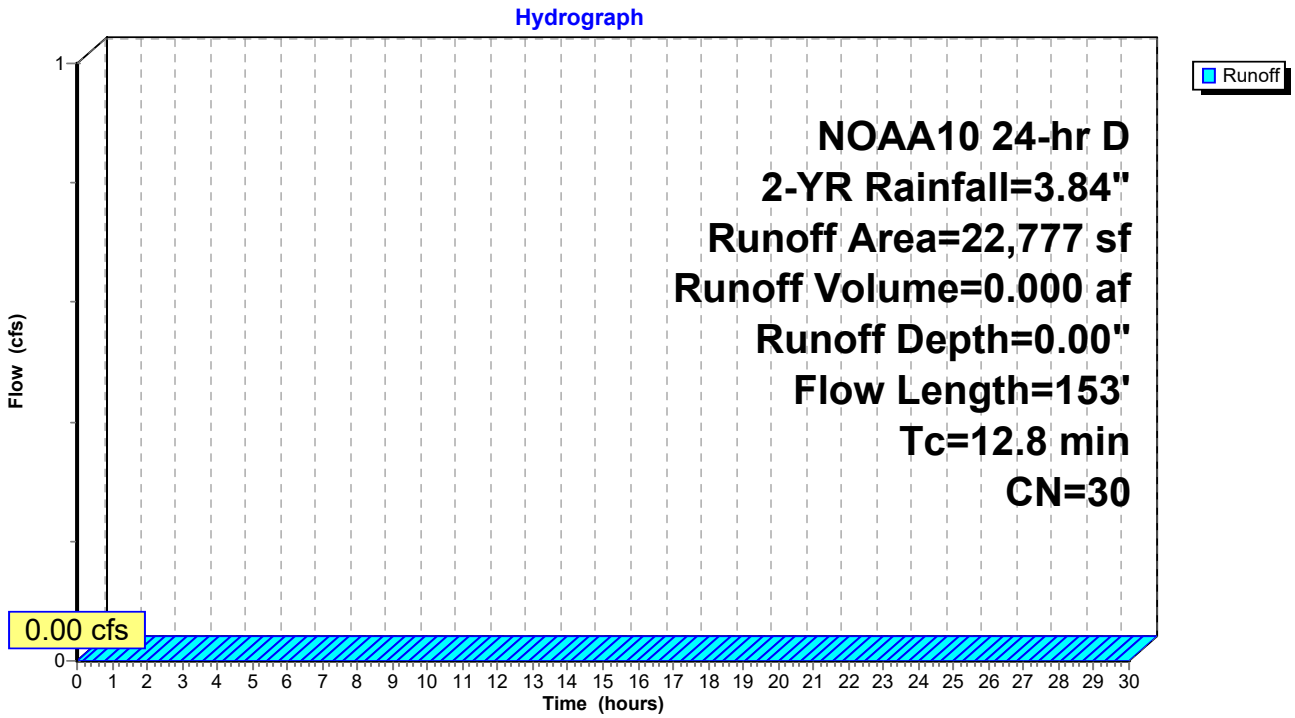
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 2E : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
22,777	30	Woods, Good HSG A
22,777		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1E: E1

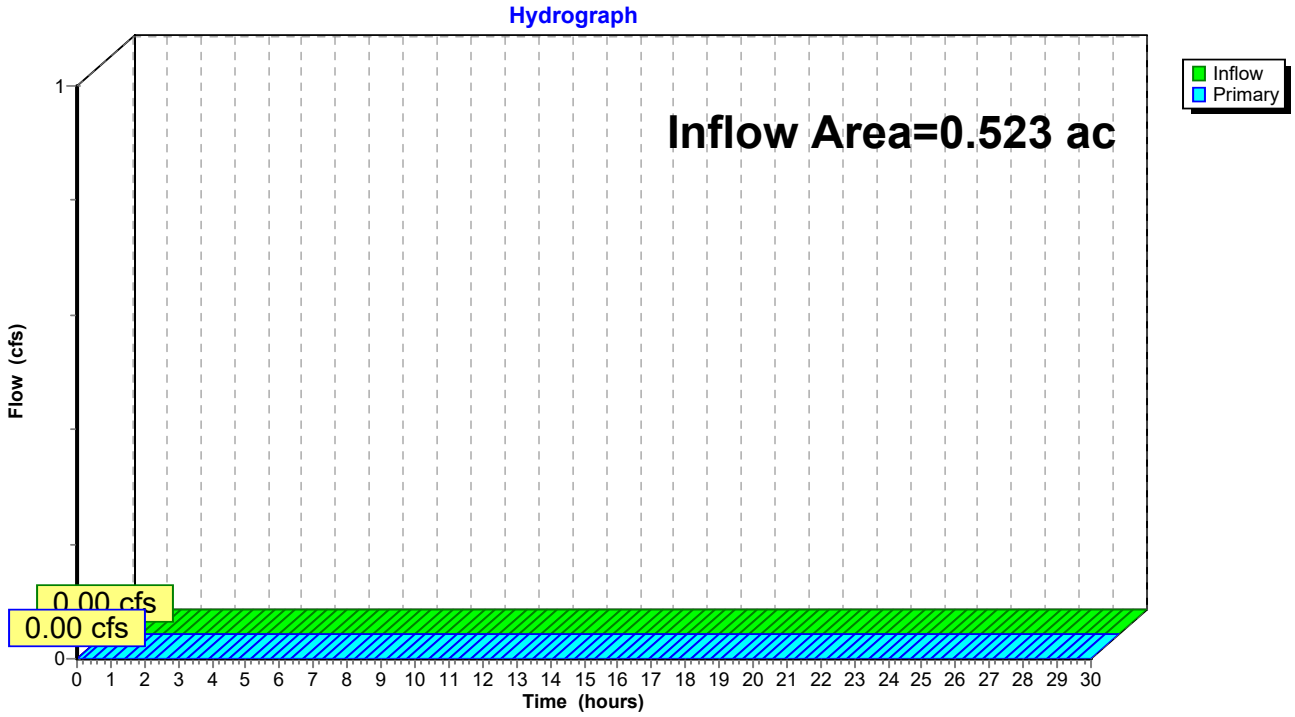


Summary for Link 2E: Design Point #1: Flow to Abutter

Inflow Area = 0.523 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2E: Design Point #1: Flow to Abutter



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=22,777 sf 0.00% Impervious Runoff Depth=0.08"
Flow Length=153' Tc=12.8 min CN=30 Runoff=0.01 cfs 0.003 af

Link 2E: Design Point #1: Flow to Abutter Inflow=0.01 cfs 0.003 af
Primary=0.01 cfs 0.003 af

Total Runoff Area = 0.523 ac Runoff Volume = 0.003 af Average Runoff Depth = 0.08"
100.00% Pervious = 0.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1E: E1

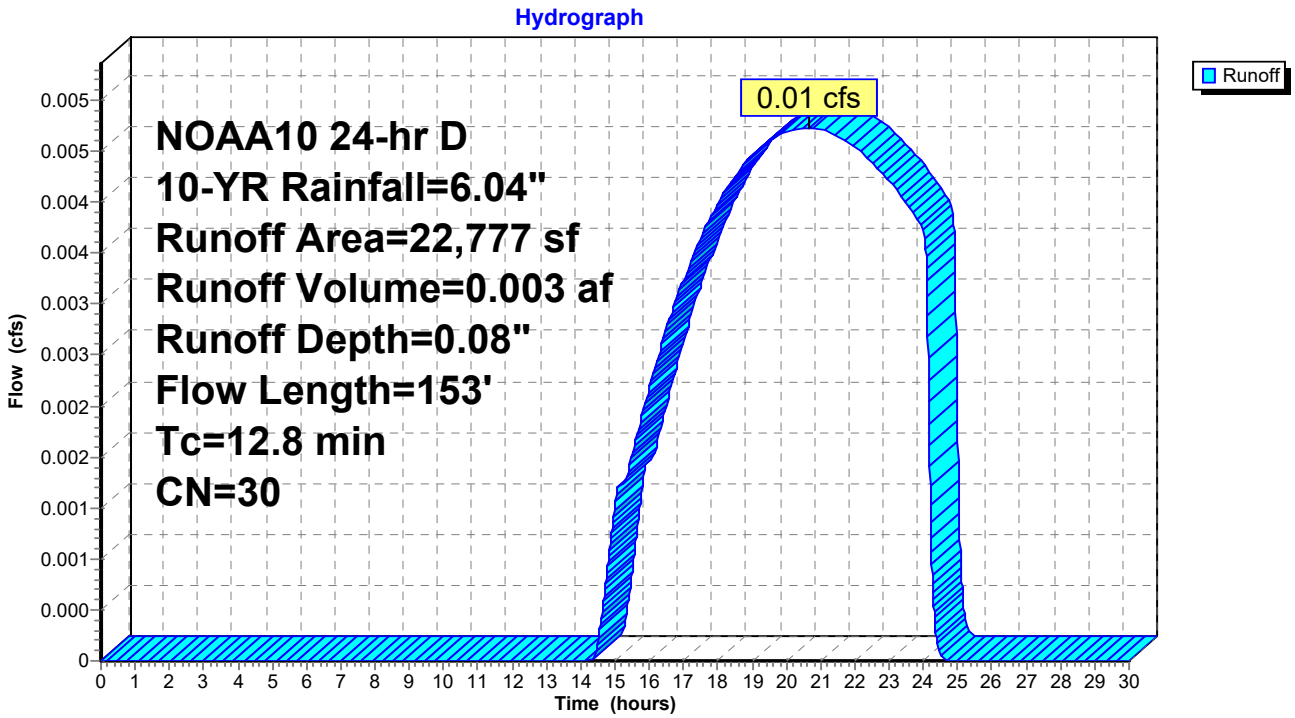
Runoff = 0.01 cfs @ 20.64 hrs, Volume= 0.003 af, Depth= 0.08"
Routed to Link 2E : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
22,777	30	Woods, Good HSG A
22,777		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1E: E1

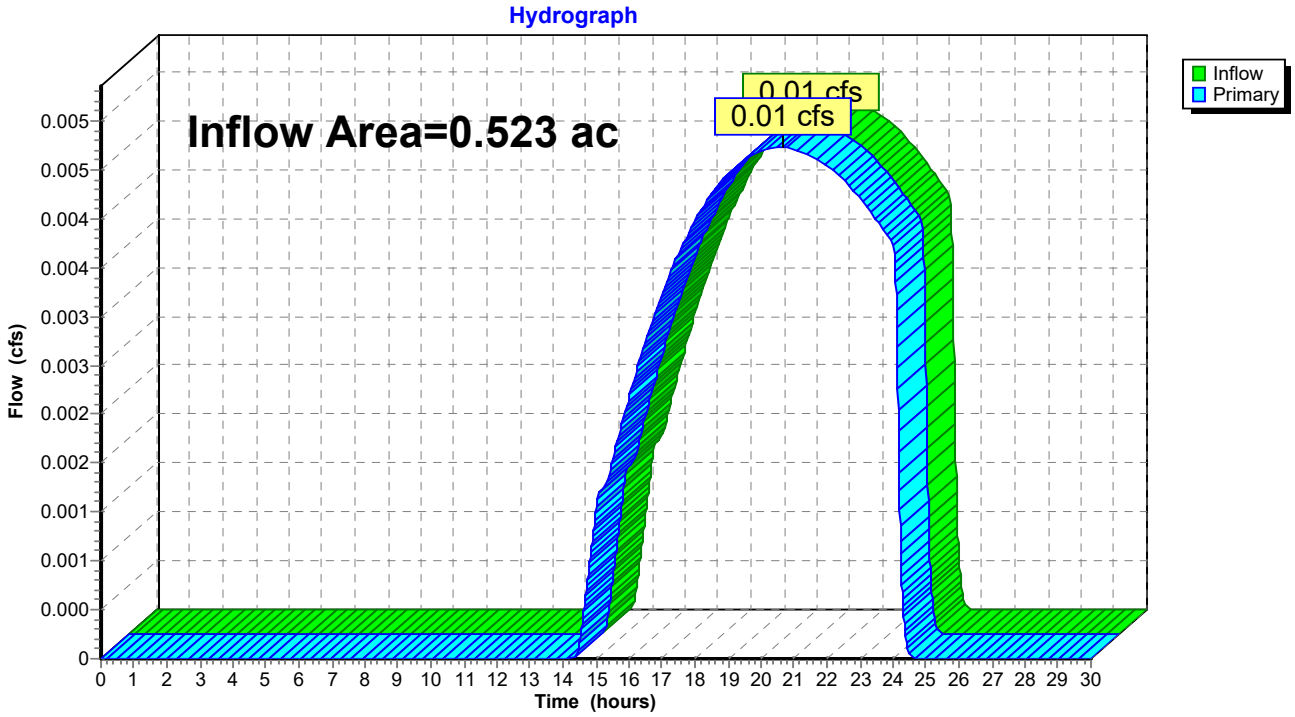


Summary for Link 2E: Design Point #1: Flow to Abutter

Inflow Area = 0.523 ac, 0.00% Impervious, Inflow Depth = 0.08" for 10-YR event
Inflow = 0.01 cfs @ 20.64 hrs, Volume= 0.003 af
Primary = 0.01 cfs @ 20.64 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2E: Design Point #1: Flow to Abutter



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=22,777 sf 0.00% Impervious Runoff Depth=0.36"
Flow Length=153' Tc=12.8 min CN=30 Runoff=0.02 cfs 0.016 af

Link 2E: Design Point #1: Flow to Abutter Inflow=0.02 cfs 0.016 af
Primary=0.02 cfs 0.016 af

Total Runoff Area = 0.523 ac Runoff Volume = 0.016 af Average Runoff Depth = 0.36"
100.00% Pervious = 0.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1E: E1

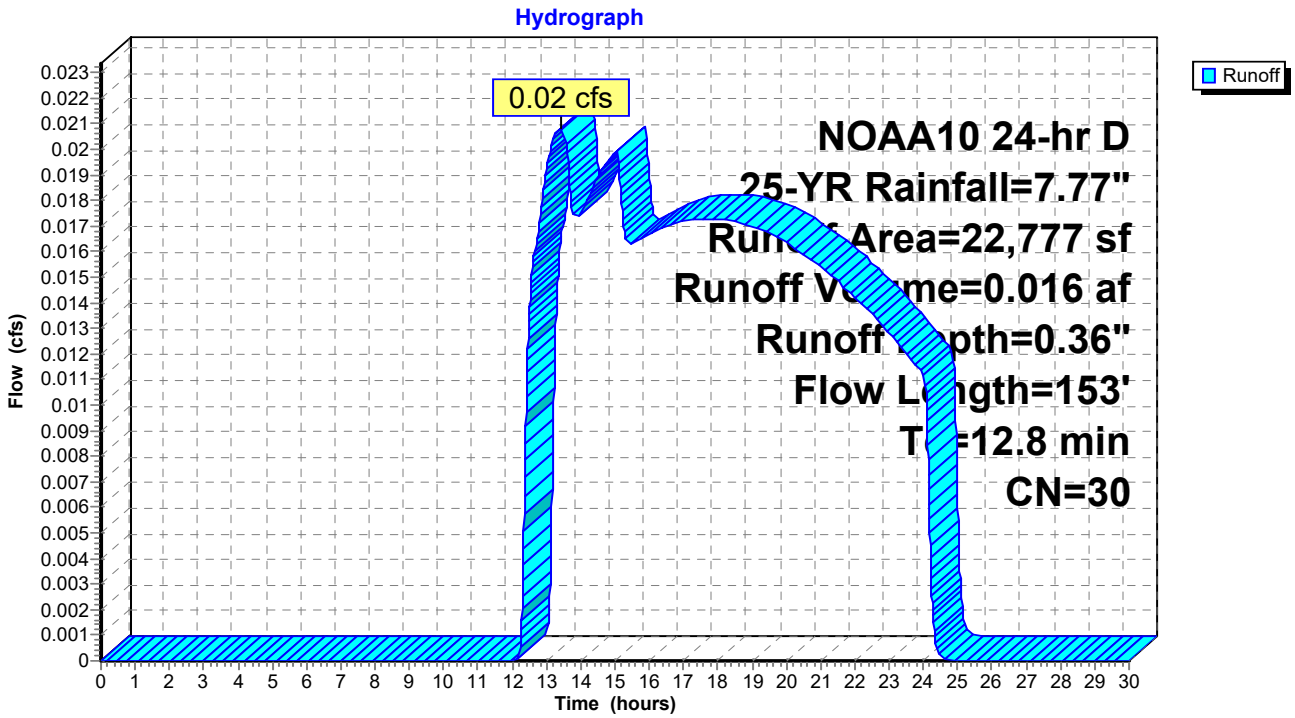
Runoff = 0.02 cfs @ 13.41 hrs, Volume= 0.016 af, Depth= 0.36"
Routed to Link 2E : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
22,777	30	Woods, Good HSG A
22,777		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1E: E1

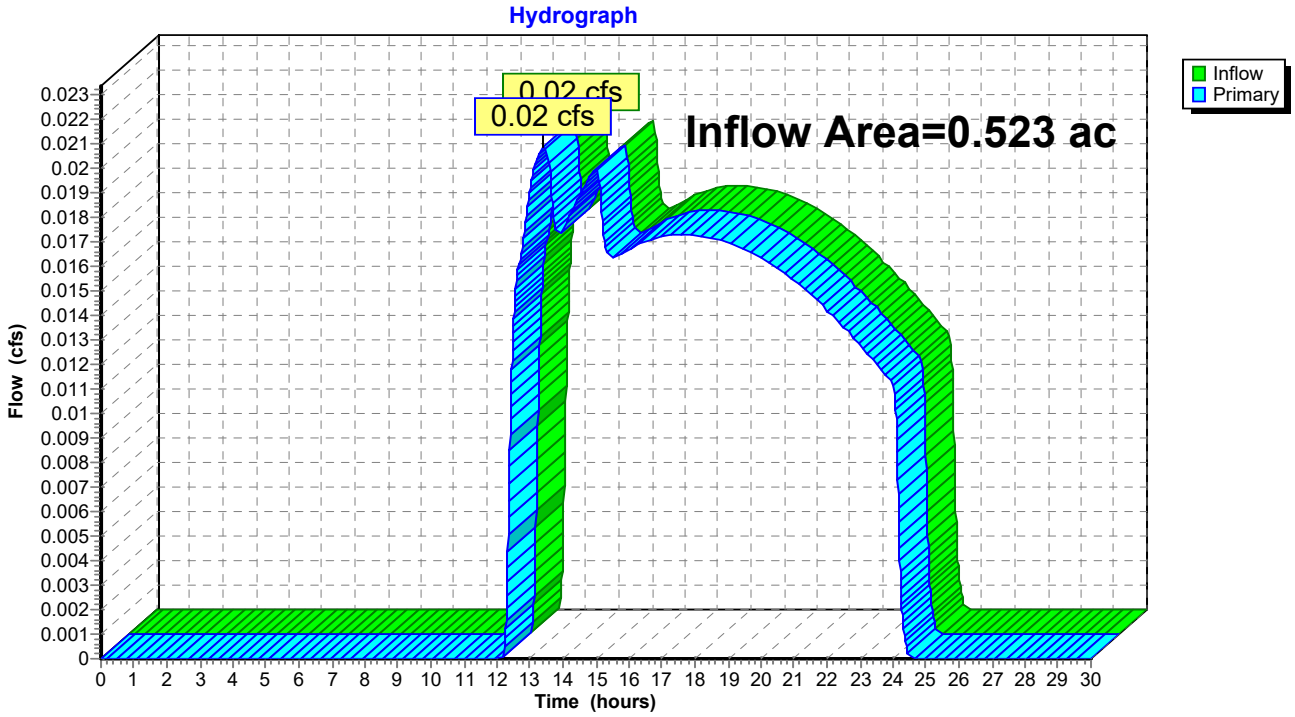


Summary for Link 2E: Design Point #1: Flow to Abutter

Inflow Area = 0.523 ac, 0.00% Impervious, Inflow Depth = 0.36" for 25-YR event
Inflow = 0.02 cfs @ 13.41 hrs, Volume= 0.016 af
Primary = 0.02 cfs @ 13.41 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2E: Design Point #1: Flow to Abutter



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1E: E1 Runoff Area=22,777 sf 0.00% Impervious Runoff Depth=1.21"
Flow Length=153' Tc=12.8 min CN=30 Runoff=0.30 cfs 0.053 af

Link 2E: Design Point #1: Flow to Abutter Inflow=0.30 cfs 0.053 af
Primary=0.30 cfs 0.053 af

Total Runoff Area = 0.523 ac Runoff Volume = 0.053 af Average Runoff Depth = 1.21"
100.00% Pervious = 0.523 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1E: E1

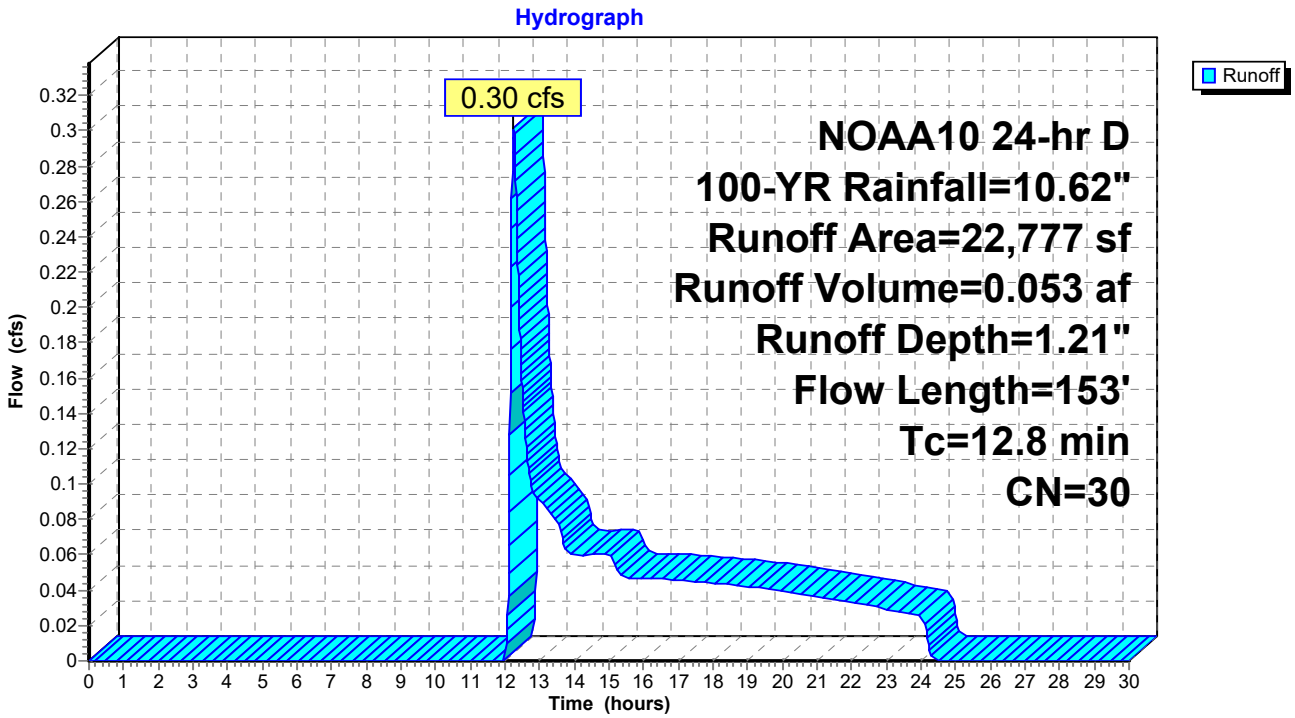
Runoff = 0.30 cfs @ 12.25 hrs, Volume= 0.053 af, Depth= 1.21"
Routed to Link 2E : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
22,777	30	Woods, Good HSG A
22,777		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1E: E1

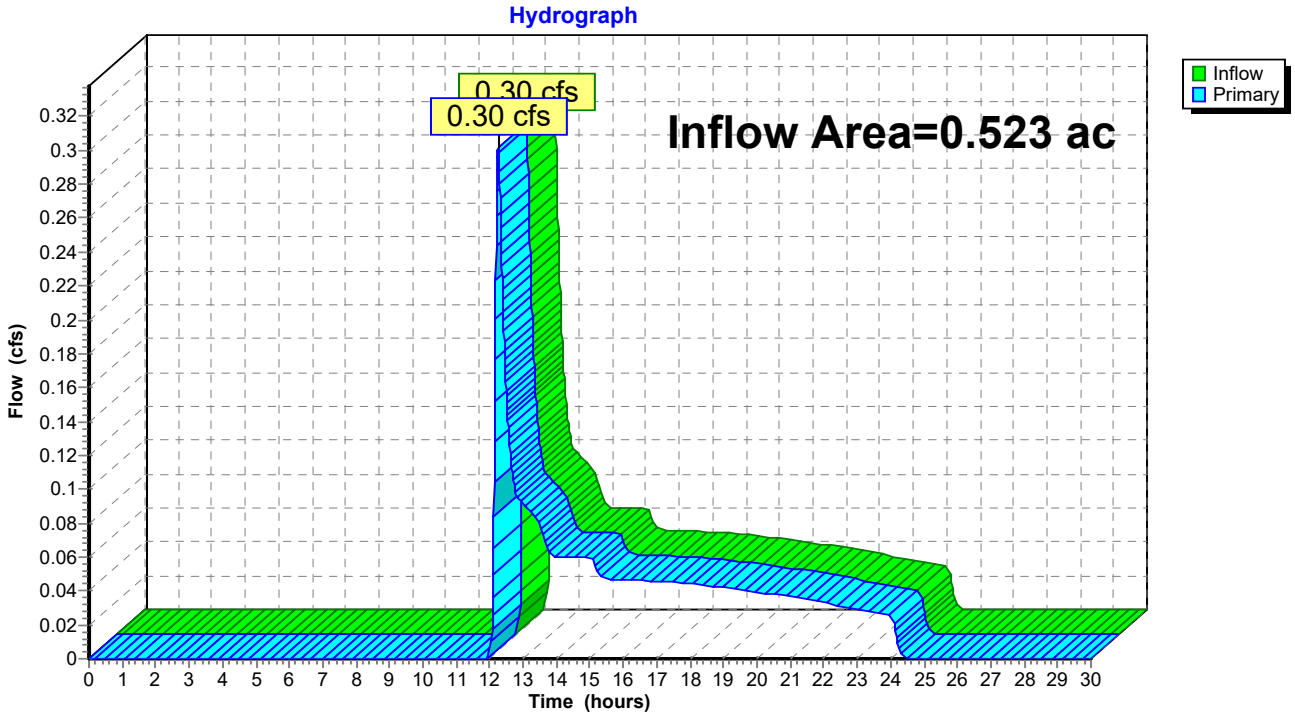


Summary for Link 2E: Design Point #1: Flow to Abutter

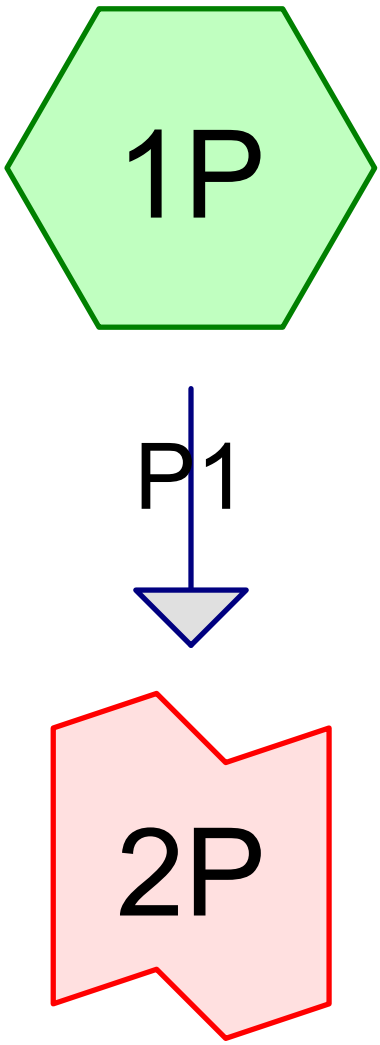
Inflow Area = 0.523 ac, 0.00% Impervious, Inflow Depth = 1.21" for 100-YR event
Inflow = 0.30 cfs @ 12.25 hrs, Volume= 0.053 af
Primary = 0.30 cfs @ 12.25 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2E: Design Point #1: Flow to Abutter



DESIGN POINT #1: FLOW TO ABUTTER
PROPOSED CONDITIONS



Design Point #1: Flow to Abutter

Subcat Reach Pond Link

Routing Diagram for HydroCAD
Prepared by Legacy Engineering LLC, Printed 8/19/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NOAA10 24-hr	D	Default	24.00	1	3.84	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.04	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.77	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.62	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.029	39	>75% Grass cover, Good HSG A (1P)
0.163	30	Woods, Good HSG A (1P)
0.192	**31**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1 Runoff Area=8,360 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=153' Tc=12.8 min CN=WQ Runoff=0.00 cfs 0.000 af

Link 2P: Design Point #1: Flow to Abutter Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.192 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.192 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1P: P1

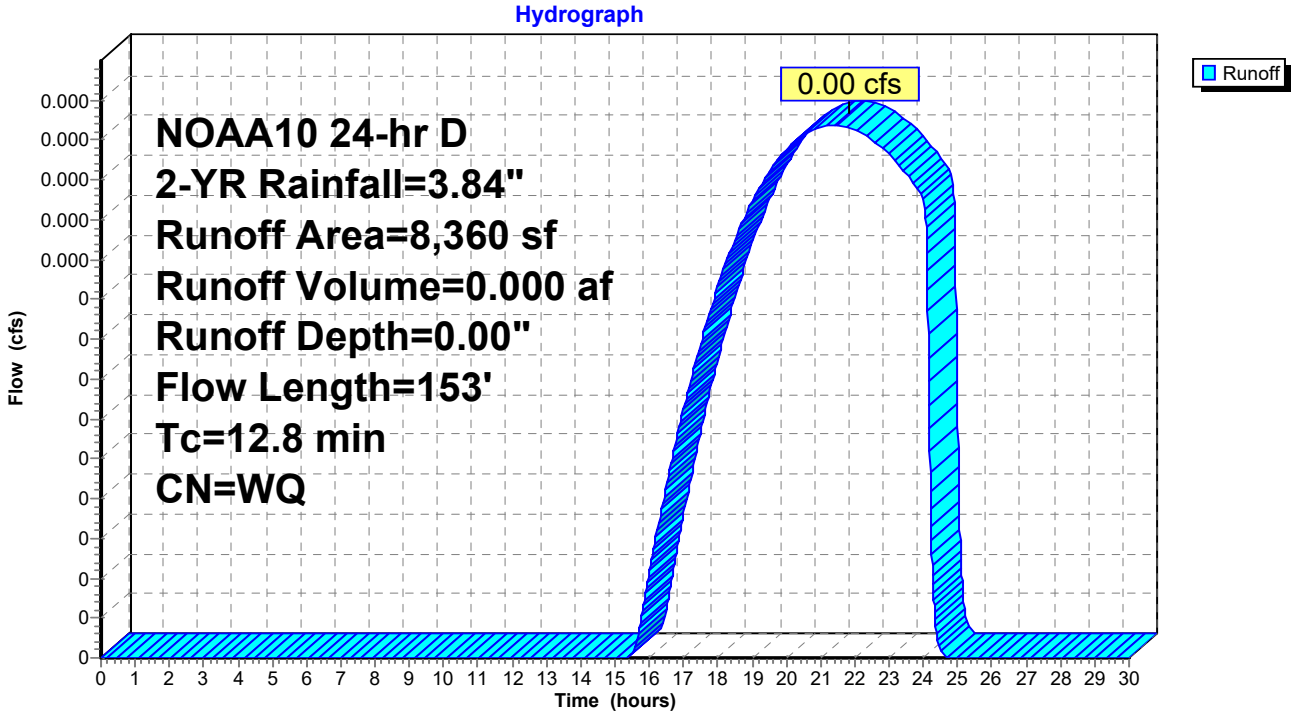
Runoff = 0.00 cfs @ 21.43 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 2P : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
7,118	30	Woods, Good HSG A
1,242	39	>75% Grass cover, Good HSG A
8,360		Weighted Average
8,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1P: P1

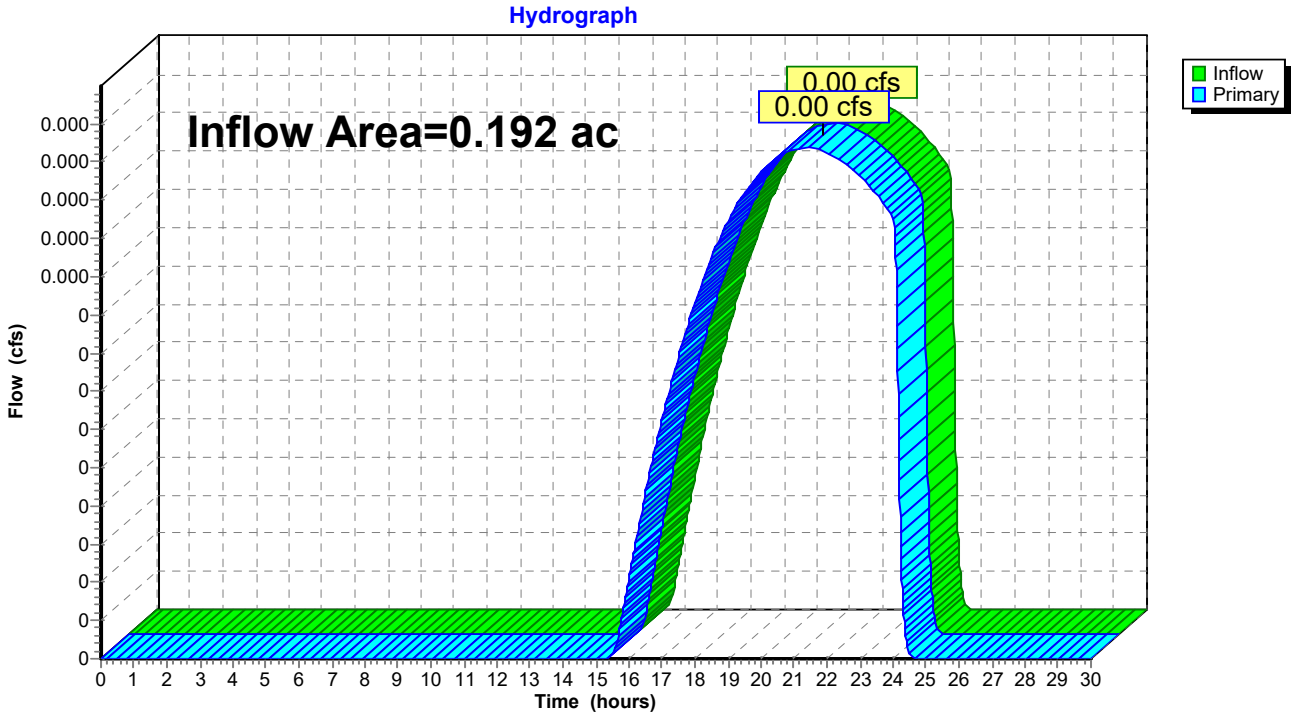


Summary for Link 2P: Design Point #1: Flow to Abutter

Inflow Area = 0.192 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 21.43 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 21.43 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2P: Design Point #1: Flow to Abutter



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1 Runoff Area=8,360 sf 0.00% Impervious Runoff Depth=0.13"
Flow Length=153' Tc=12.8 min CN=WQ Runoff=0.00 cfs 0.002 af

Link 2P: Design Point #1: Flow to Abutter Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Total Runoff Area = 0.192 ac Runoff Volume = 0.002 af Average Runoff Depth = 0.13"
100.00% Pervious = 0.192 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1P: P1

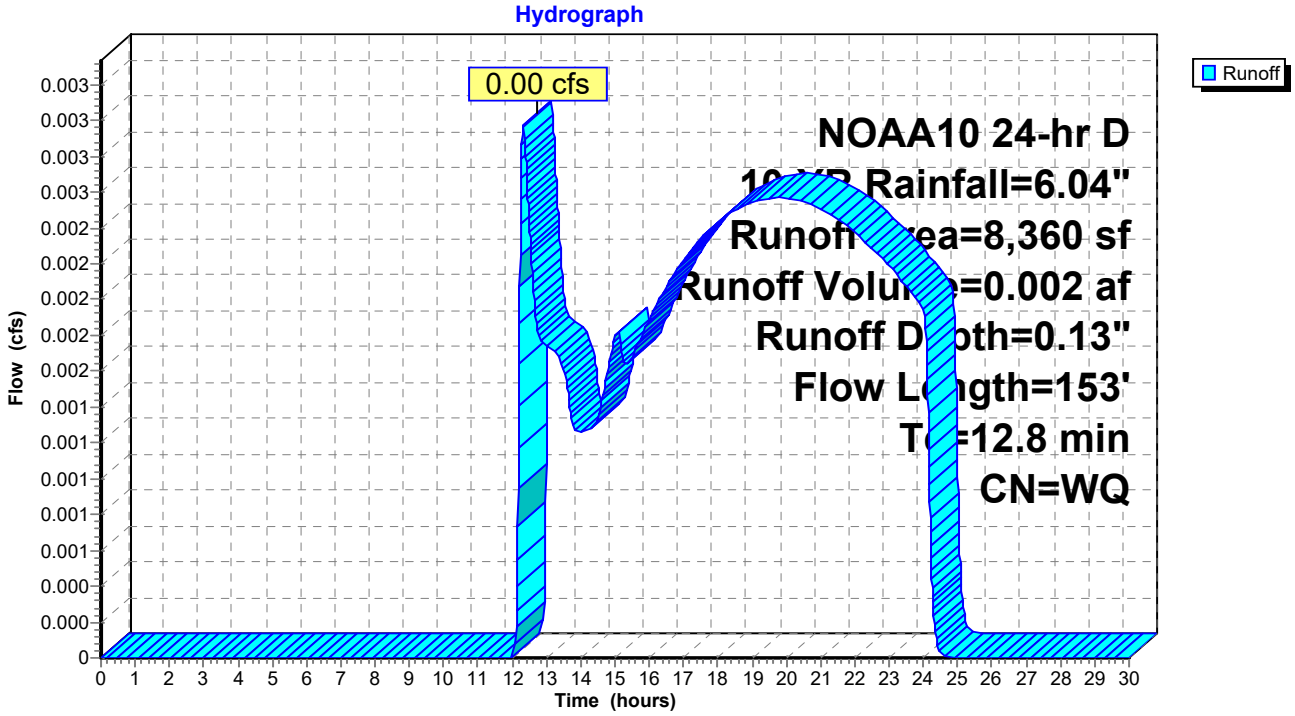
Runoff = 0.00 cfs @ 12.31 hrs, Volume= 0.002 af, Depth= 0.13"
Routed to Link 2P : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
7,118	30	Woods, Good HSG A
1,242	39	>75% Grass cover, Good HSG A
8,360		Weighted Average
8,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1P: P1

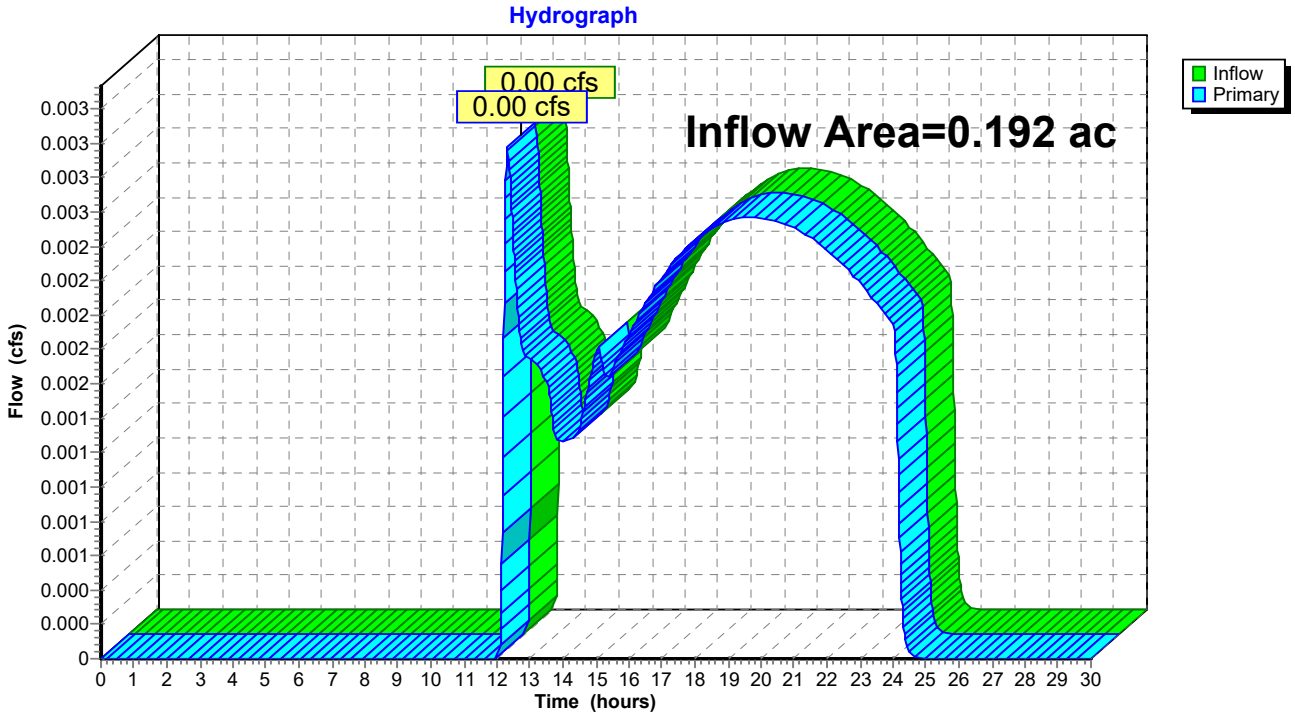


Summary for Link 2P: Design Point #1: Flow to Abutter

Inflow Area = 0.192 ac, 0.00% Impervious, Inflow Depth = 0.13" for 10-YR event
Inflow = 0.00 cfs @ 12.31 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 12.31 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2P: Design Point #1: Flow to Abutter



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1 Runoff Area=8,360 sf 0.00% Impervious Runoff Depth=0.47"
Flow Length=153' Tc=12.8 min CN=WQ Runoff=0.02 cfs 0.007 af

Link 2P: Design Point #1: Flow to Abutter Inflow=0.02 cfs 0.007 af
Primary=0.02 cfs 0.007 af

Total Runoff Area = 0.192 ac Runoff Volume = 0.007 af Average Runoff Depth = 0.47"
100.00% Pervious = 0.192 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1P: P1

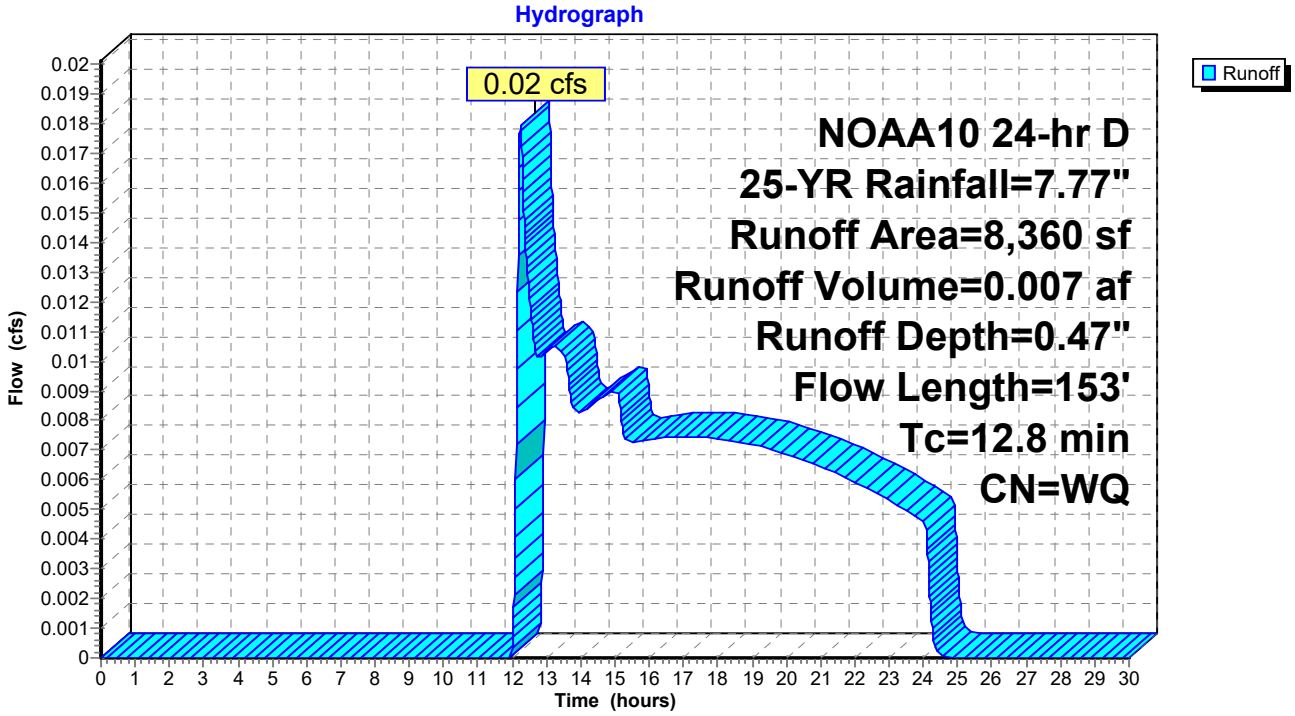
Runoff = 0.02 cfs @ 12.24 hrs, Volume= 0.007 af, Depth= 0.47"
Routed to Link 2P : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
7,118	30	Woods, Good HSG A
1,242	39	>75% Grass cover, Good HSG A
8,360		Weighted Average
8,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1P: P1

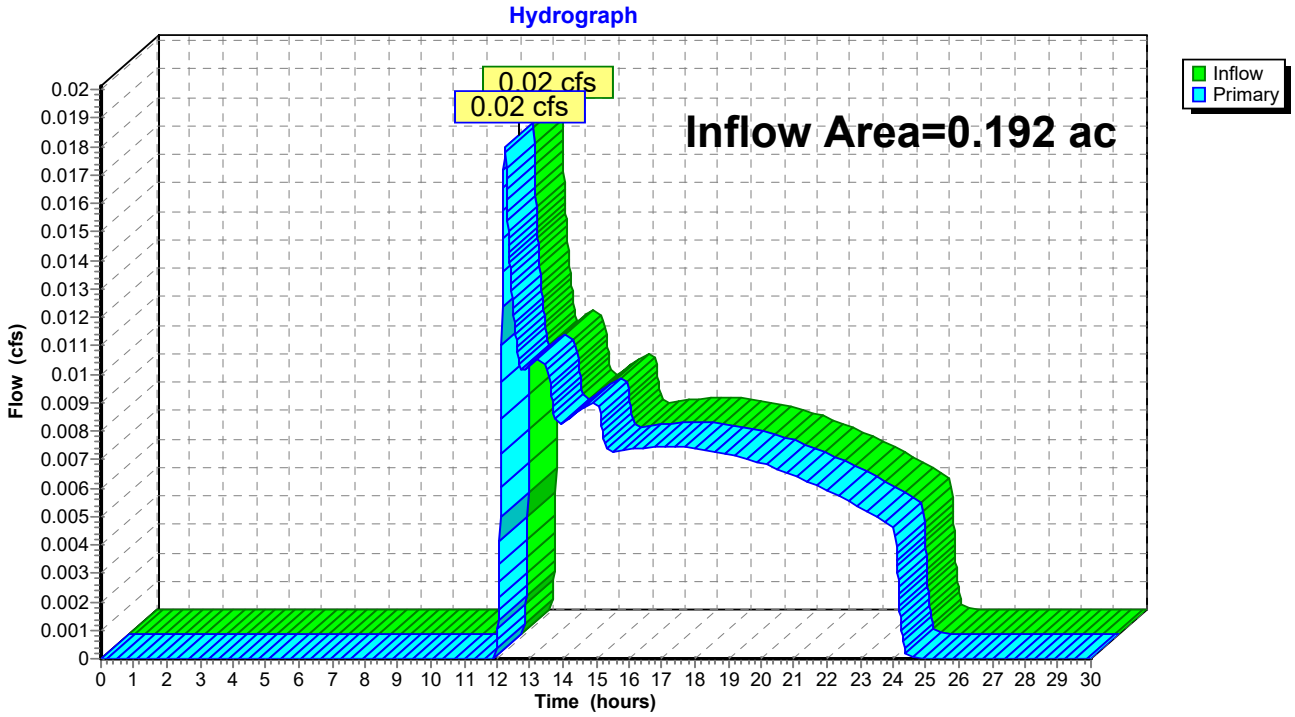


Summary for Link 2P: Design Point #1: Flow to Abutter

Inflow Area = 0.192 ac, 0.00% Impervious, Inflow Depth = 0.47" for 25-YR event
Inflow = 0.02 cfs @ 12.24 hrs, Volume= 0.007 af
Primary = 0.02 cfs @ 12.24 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2P: Design Point #1: Flow to Abutter



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1P: P1 Runoff Area=8,360 sf 0.00% Impervious Runoff Depth=1.39"
Flow Length=153' Tc=12.8 min CN=WQ Runoff=0.15 cfs 0.022 af

Link 2P: Design Point #1: Flow to Abutter Inflow=0.15 cfs 0.022 af
Primary=0.15 cfs 0.022 af

Total Runoff Area = 0.192 ac Runoff Volume = 0.022 af Average Runoff Depth = 1.39"
100.00% Pervious = 0.192 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1P: P1

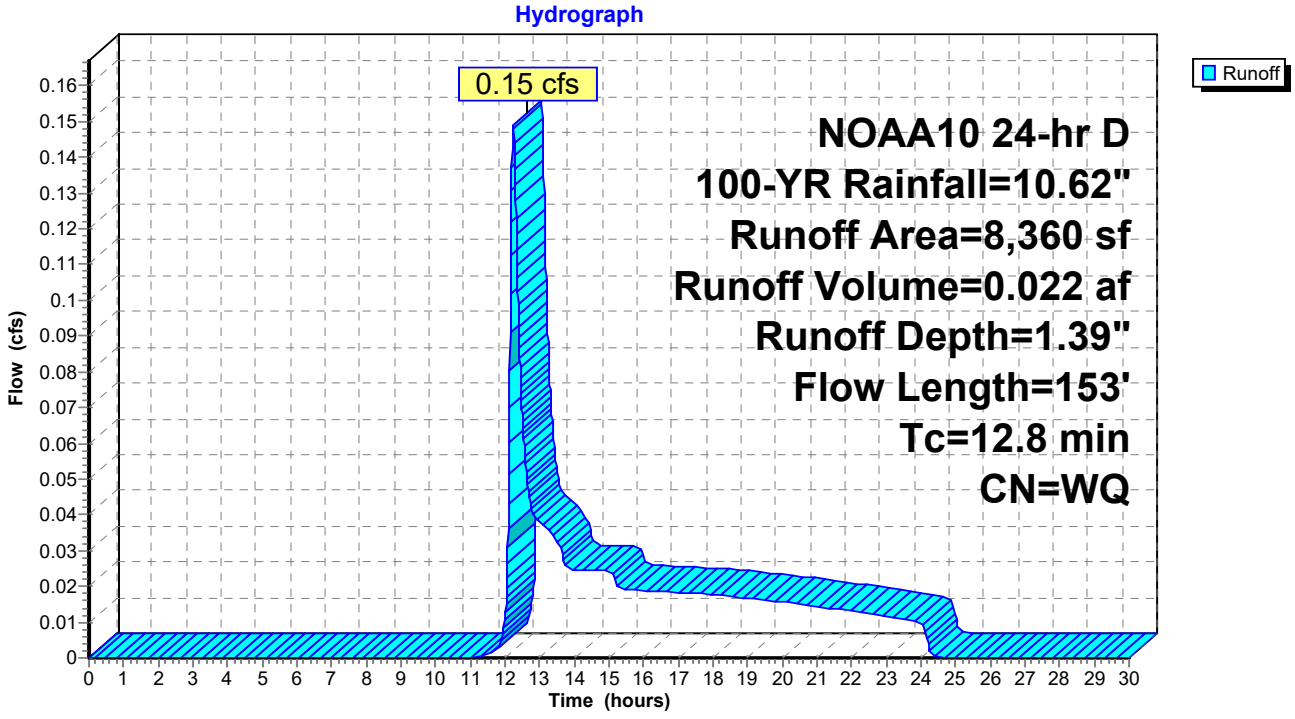
Runoff = 0.15 cfs @ 12.24 hrs, Volume= 0.022 af, Depth= 1.39"
Routed to Link 2P : Design Point #1: Flow to Abutter

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
7,118	30	Woods, Good HSG A
1,242	39	>75% Grass cover, Good HSG A
8,360		Weighted Average
8,360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
3.5	105	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.8	153	Total			

Subcatchment 1P: P1

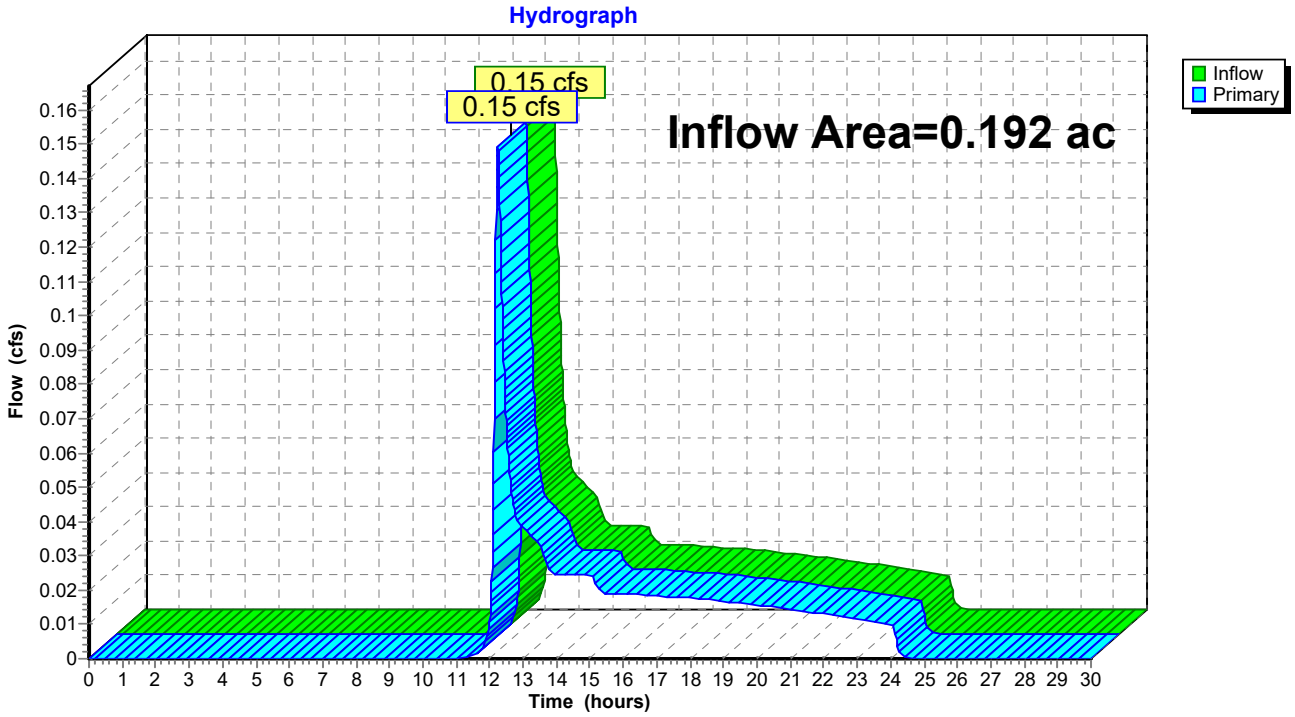


Summary for Link 2P: Design Point #1: Flow to Abutter

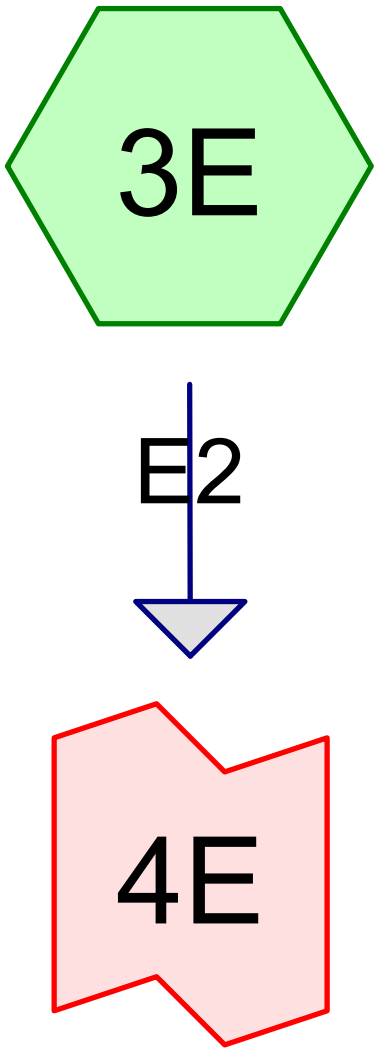
Inflow Area = 0.192 ac, 0.00% Impervious, Inflow Depth = 1.39" for 100-YR event
Inflow = 0.15 cfs @ 12.24 hrs, Volume= 0.022 af
Primary = 0.15 cfs @ 12.24 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 2P: Design Point #1: Flow to Abutter



DESIGN POINT #2: FLOW TO REAR WETLANDS EXISTING CONDITIONS



Design Point #2: Flow to Rear Wetland

Subcat Reach Pond Link

Routing Diagram for HydroCAD
Prepared by Legacy Engineering LLC, Printed 2/18/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NOAA10 24-hr	D	Default	24.00	1	3.84	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.04	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.77	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.62	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.193	30	Woods, Good HSG A (3E)
0.865	55	Woods, Good HSG B (3E)
0.268	77	Woods, Good HSG D (3E)
2.325	**45**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2 Runoff Area=101,292 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=212' Slope=0.0150 '/' Tc=14.1 min CN=WQ Runoff=0.59 cfs 0.071 af

Link 4E: Design Point #2: Flow to Rear Wetland Inflow=0.59 cfs 0.071 af
Primary=0.59 cfs 0.071 af

Total Runoff Area = 2.325 ac Runoff Volume = 0.071 af Average Runoff Depth = 0.37"
100.00% Pervious = 2.325 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 3E: E2

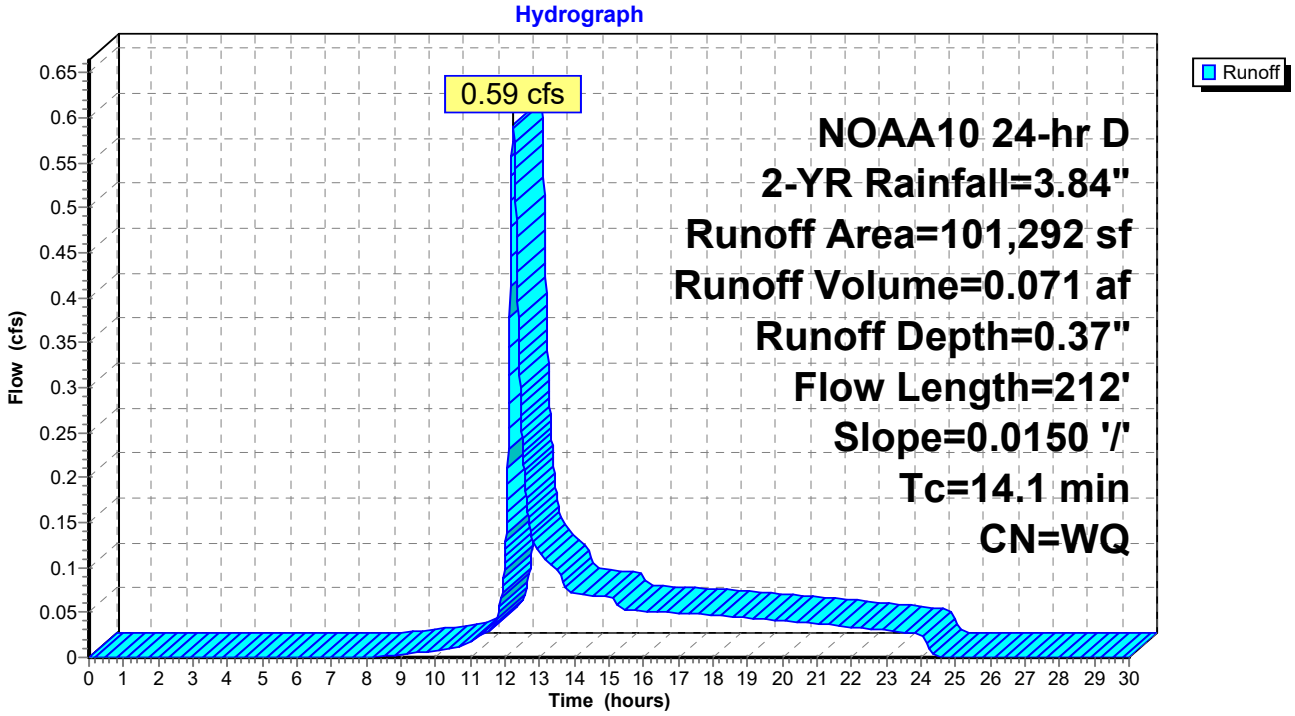
Runoff = 0.59 cfs @ 12.24 hrs, Volume= 0.071 af, Depth= 0.37"
Routed to Link 4E : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
37,674	55	Woods, Good HSG B
51,962	30	Woods, Good HSG A
101,292		Weighted Average
101,292		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
4.8	178	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.1	212	Total			

Subcatchment 3E: E2

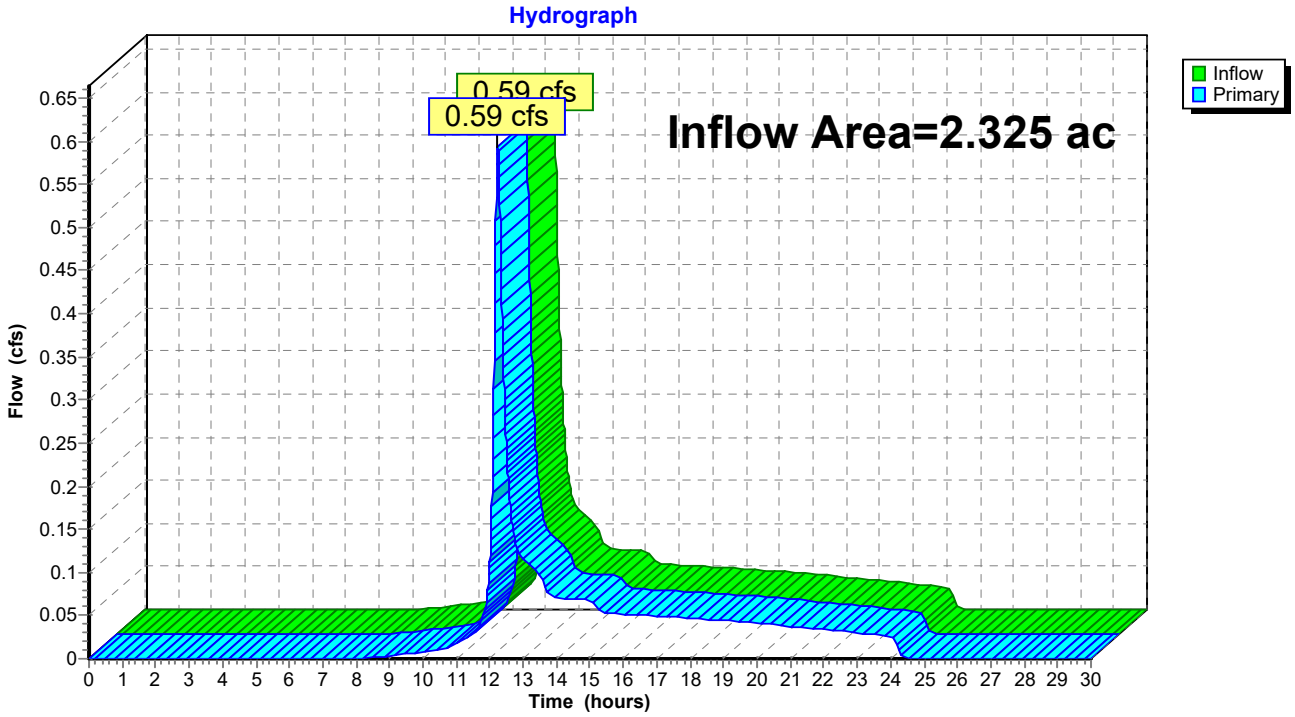


Summary for Link 4E: Design Point #2: Flow to Rear Wetland

Inflow Area = 2.325 ac, 0.00% Impervious, Inflow Depth = 0.37" for 2-YR event
Inflow = 0.59 cfs @ 12.24 hrs, Volume= 0.071 af
Primary = 0.59 cfs @ 12.24 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4E: Design Point #2: Flow to Rear Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2 Runoff Area=101,292 sf 0.00% Impervious Runoff Depth=1.02"
Flow Length=212' Slope=0.0150 '/' Tc=14.1 min CN=WQ Runoff=1.92 cfs 0.197 af

Link 4E: Design Point #2: Flow to Rear Wetland Inflow=1.92 cfs 0.197 af
Primary=1.92 cfs 0.197 af

Total Runoff Area = 2.325 ac Runoff Volume = 0.197 af Average Runoff Depth = 1.02"
100.00% Pervious = 2.325 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 3E: E2

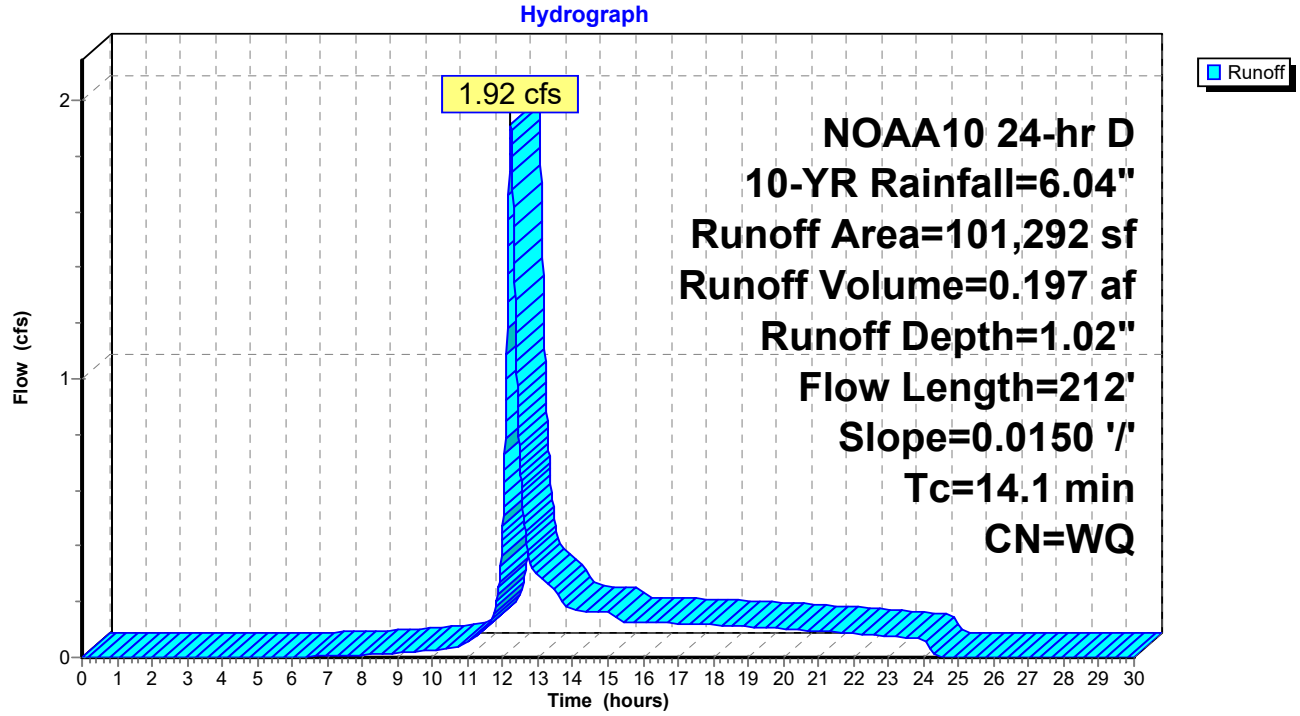
Runoff = 1.92 cfs @ 12.23 hrs, Volume= 0.197 af, Depth= 1.02"
Routed to Link 4E : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
37,674	55	Woods, Good HSG B
51,962	30	Woods, Good HSG A
101,292		Weighted Average
101,292		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
4.8	178	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.1	212	Total			

Subcatchment 3E: E2

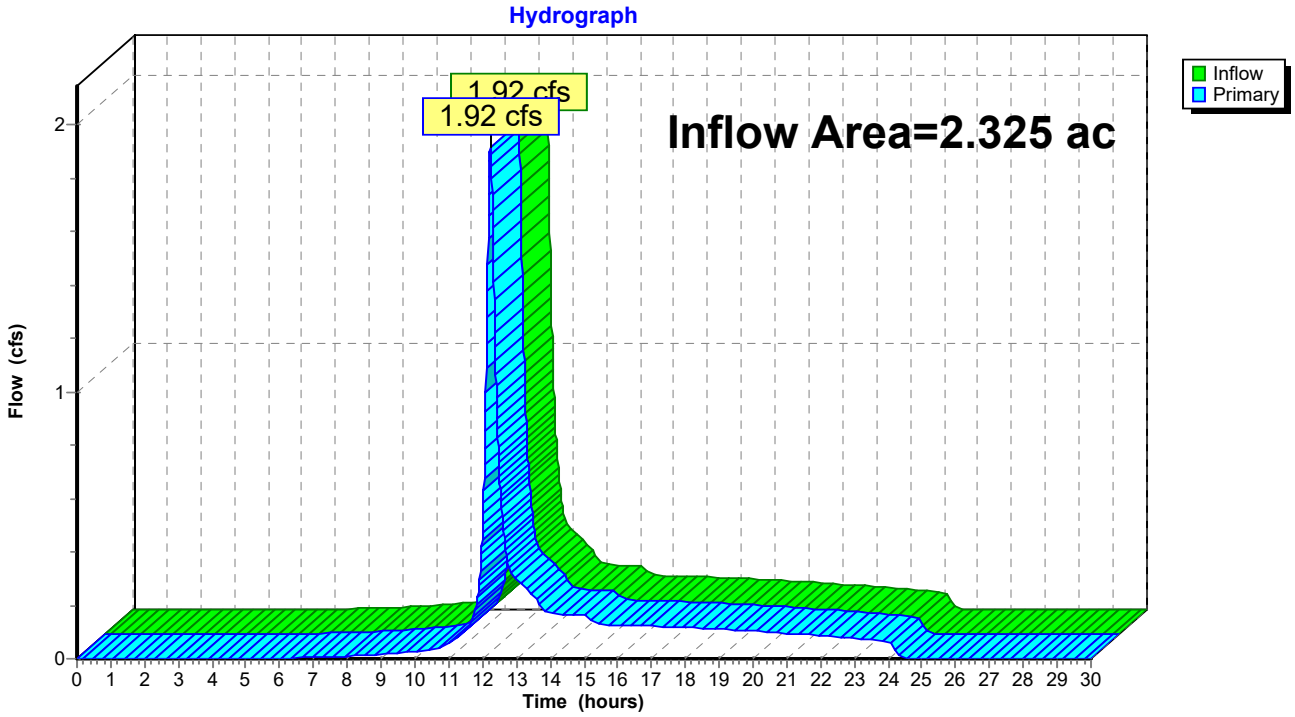


Summary for Link 4E: Design Point #2: Flow to Rear Wetland

Inflow Area = 2.325 ac, 0.00% Impervious, Inflow Depth = 1.02" for 10-YR event
Inflow = 1.92 cfs @ 12.23 hrs, Volume= 0.197 af
Primary = 1.92 cfs @ 12.23 hrs, Volume= 0.197 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4E: Design Point #2: Flow to Rear Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2 Runoff Area=101,292 sf 0.00% Impervious Runoff Depth=1.75"
Flow Length=212' Slope=0.0150 '/' Tc=14.1 min CN=WQ Runoff=3.17 cfs 0.339 af

Link 4E: Design Point #2: Flow to Rear Wetland Inflow=3.17 cfs 0.339 af
Primary=3.17 cfs 0.339 af

Total Runoff Area = 2.325 ac Runoff Volume = 0.339 af Average Runoff Depth = 1.75"
100.00% Pervious = 2.325 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 3E: E2

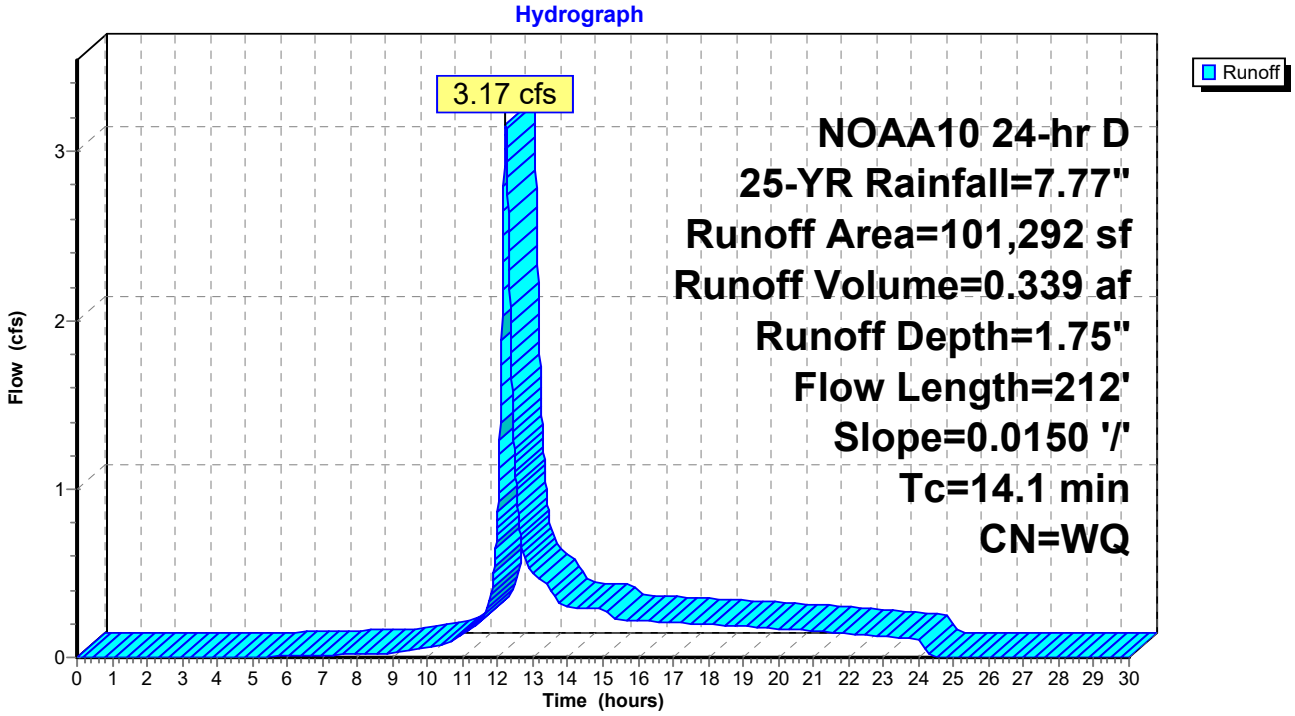
Runoff = 3.17 cfs @ 12.22 hrs, Volume= 0.339 af, Depth= 1.75"
Routed to Link 4E : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
37,674	55	Woods, Good HSG B
51,962	30	Woods, Good HSG A
101,292		Weighted Average
101,292		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
4.8	178	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.1	212	Total			

Subcatchment 3E: E2

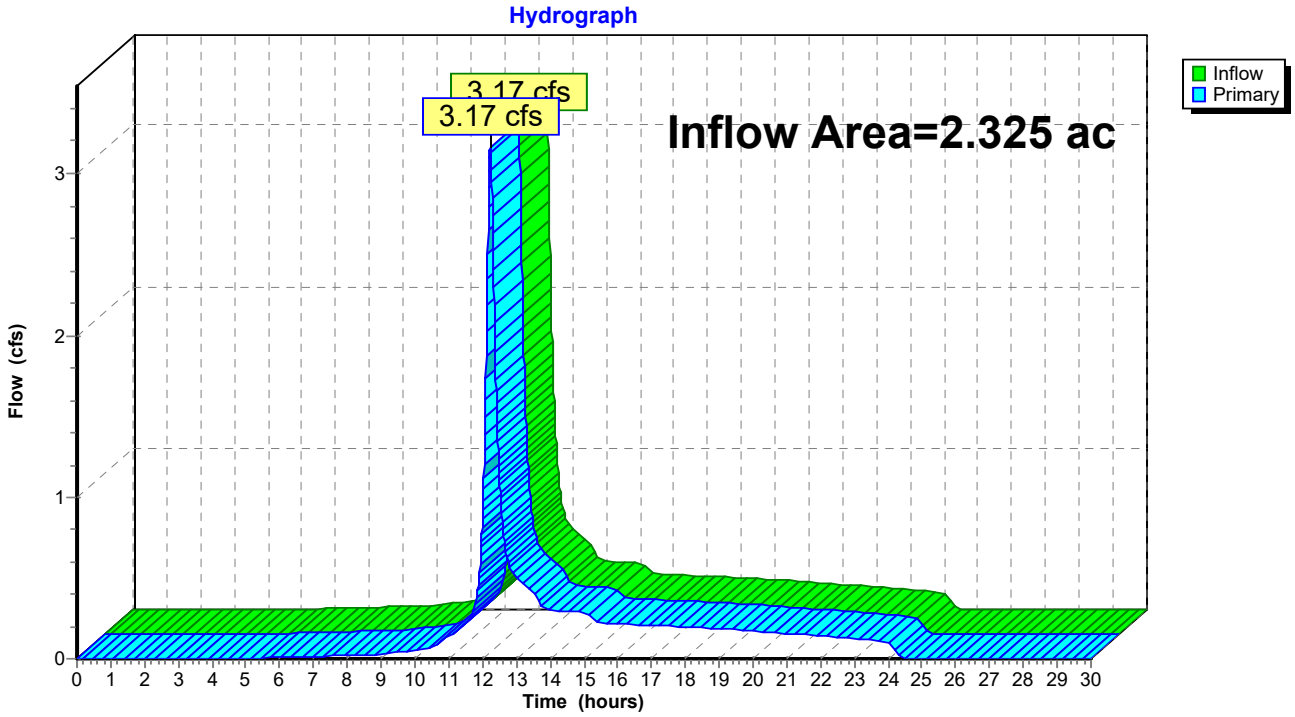


Summary for Link 4E: Design Point #2: Flow to Rear Wetland

Inflow Area = 2.325 ac, 0.00% Impervious, Inflow Depth = 1.75" for 25-YR event
Inflow = 3.17 cfs @ 12.22 hrs, Volume= 0.339 af
Primary = 3.17 cfs @ 12.22 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4E: Design Point #2: Flow to Rear Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3E: E2 Runoff Area=101,292 sf 0.00% Impervious Runoff Depth=3.26"
Flow Length=212' Slope=0.0150 '/' Tc=14.1 min CN=WQ Runoff=6.03 cfs 0.631 af

Link 4E: Design Point #2: Flow to Rear Wetland Inflow=6.03 cfs 0.631 af
Primary=6.03 cfs 0.631 af

Total Runoff Area = 2.325 ac Runoff Volume = 0.631 af Average Runoff Depth = 3.26"
100.00% Pervious = 2.325 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 3E: E2

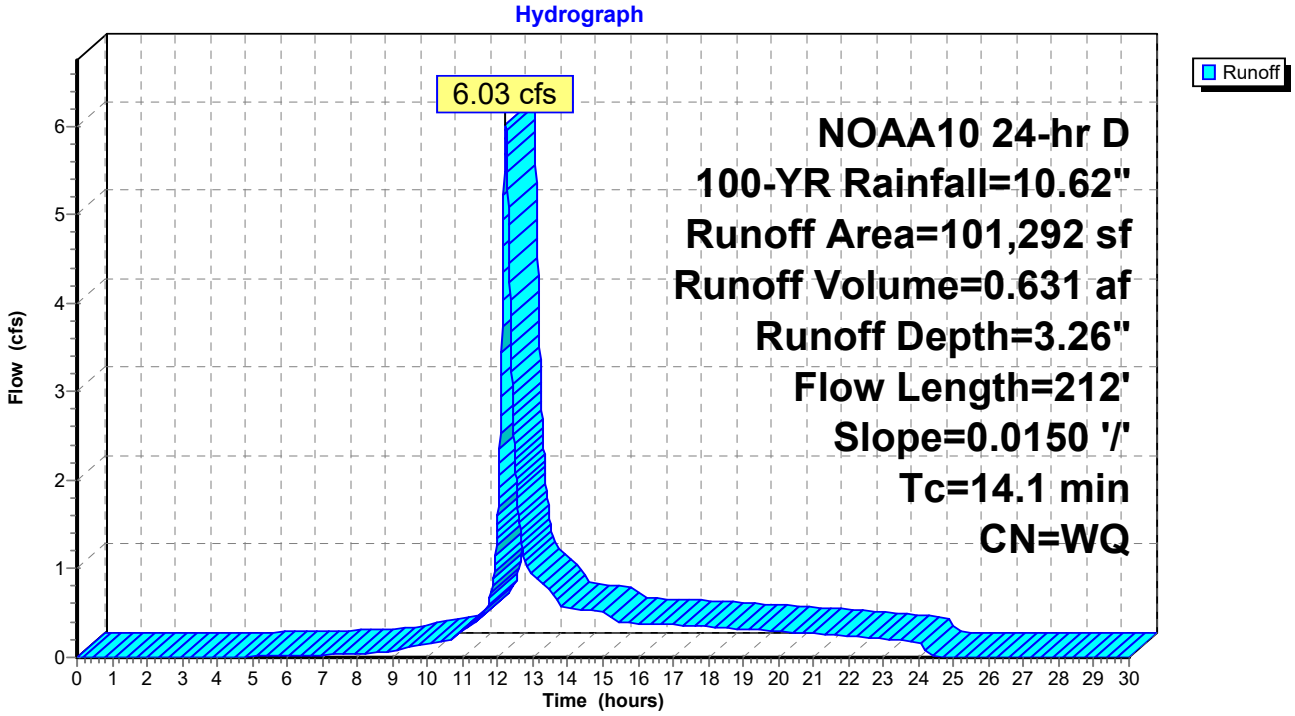
Runoff = 6.03 cfs @ 12.23 hrs, Volume= 0.631 af, Depth= 3.26"
Routed to Link 4E : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
37,674	55	Woods, Good HSG B
51,962	30	Woods, Good HSG A
101,292		Weighted Average
101,292		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
4.8	178	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.1	212	Total			

Subcatchment 3E: E2

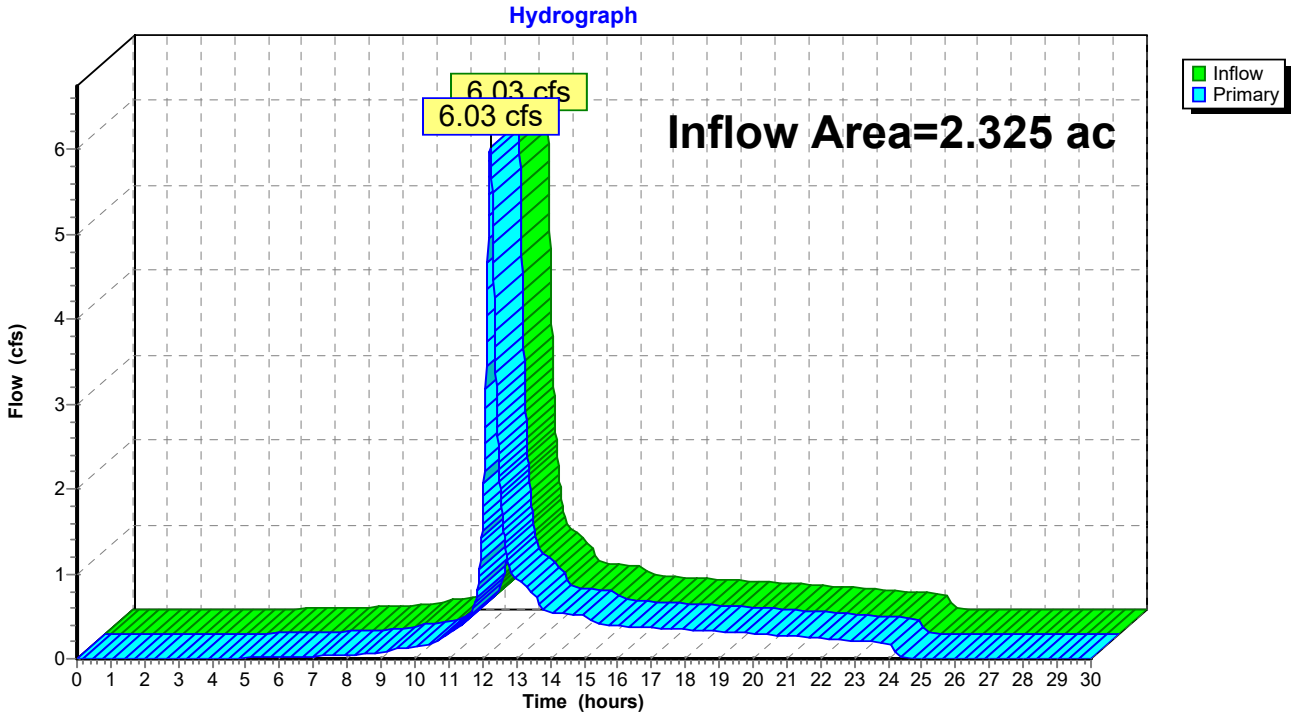


Summary for Link 4E: Design Point #2: Flow to Rear Wetland

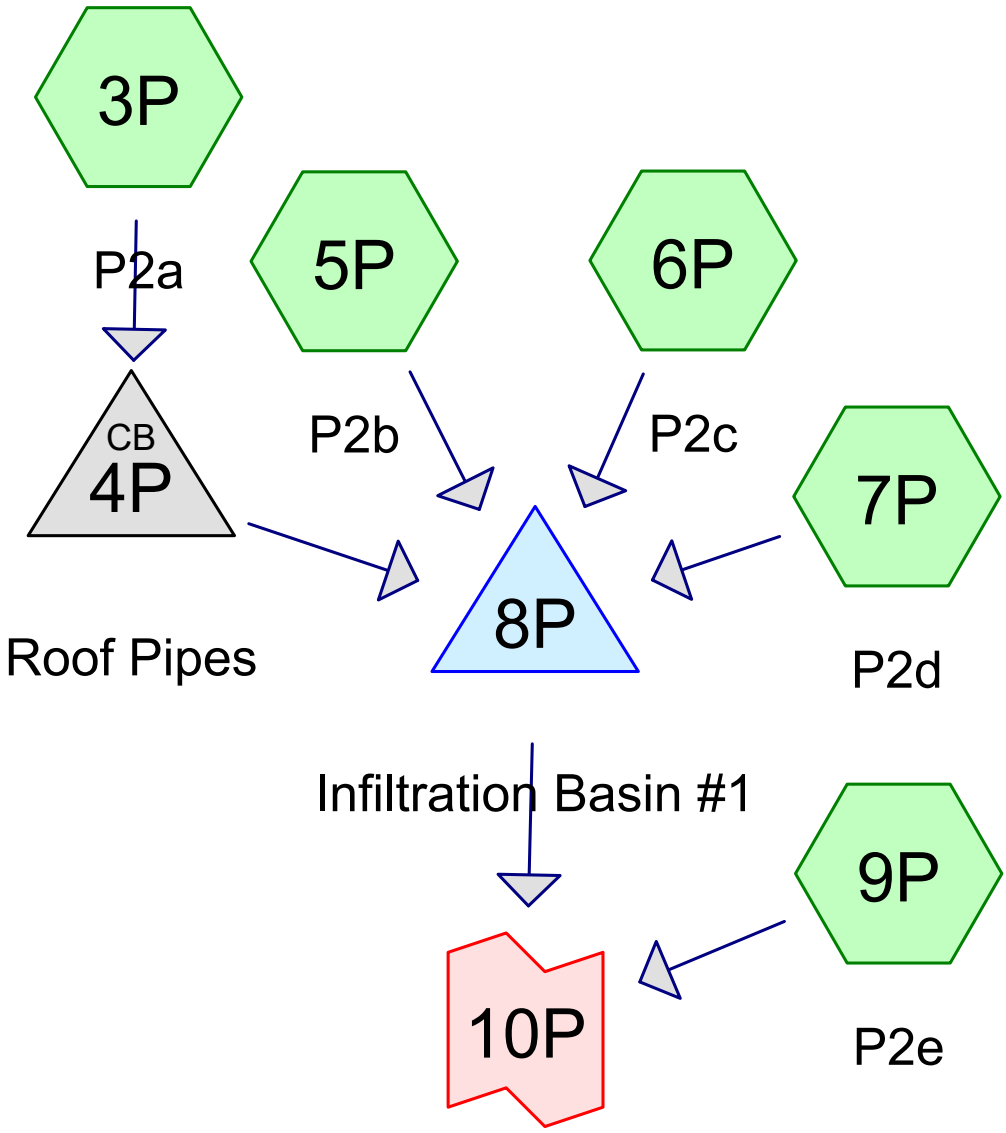
Inflow Area = 2.325 ac, 0.00% Impervious, Inflow Depth = 3.26" for 100-YR event
Inflow = 6.03 cfs @ 12.23 hrs, Volume= 0.631 af
Primary = 6.03 cfs @ 12.23 hrs, Volume= 0.631 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 4E: Design Point #2: Flow to Rear Wetland



DESIGN POINT #2: FLOW TO REAR WETLANDS PROPOSED CONDITIONS



Design Point #2: Flow to Rear Wetland

Subcat Reach Pond Link

Routing Diagram for HydroCAD
Prepared by Legacy Engineering LLC, Printed 8/19/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NOAA10 24-hr	D	Default	24.00	1	3.84	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.04	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.77	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.62	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.135	39	>75% Grass cover, Good HSG A (5P, 6P, 7P, 9P)
0.488	61	>75% Grass cover, Good, HSG B (5P, 6P, 7P, 9P)
0.398	98	Paved parking HSG A (5P, 6P)
0.089	98	Paved parking, HSG B (5P, 6P)
0.165	98	Roofs HSG A (3P)
0.003	98	Roofs, HSG B (3P)
0.732	30	Woods, Good HSG A (9P)
0.329	55	Woods, Good HSG B (9P)
0.268	77	Woods, Good HSG D (9P)
2.606	**61**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3P: P2a Runoff Area=7,320 sf 100.00% Impervious Runoff Depth=3.61"
Tc=5.0 min CN=WQ Runoff=0.68 cfs 0.050 af

Pond 4P: Roof Pipes Peak Elev=203.82' Inflow=0.68 cfs 0.050 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0308 '/' Outflow=0.68 cfs 0.050 af

Subcatchment 5P: P2b Runoff Area=15,169 sf 74.92% Impervious Runoff Depth=2.72"
Flow Length=200' Tc=5.0 min CN=WQ Runoff=1.06 cfs 0.079 af

Subcatchment 6P: P2c Runoff Area=10,060 sf 97.66% Impervious Runoff Depth=3.53"
Flow Length=202' Slope=0.0100 '/' Tc=5.0 min CN=WQ Runoff=0.92 cfs 0.068 af

Subcatchment 7P: P2d Runoff Area=18,687 sf 0.00% Impervious Runoff Depth=0.73"
Flow Length=31' Slope=0.3000 '/' Tc=5.0 min CN=WQ Runoff=0.35 cfs 0.026 af

Pond 8P: Infiltration Basin #1 Peak Elev=202.19' Storage=1,648 cf Inflow=3.01 cfs 0.224 af
Discarded=0.50 cfs 0.224 af Primary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.224 af

Subcatchment 9P: P2e Runoff Area=62,297 sf 0.00% Impervious Runoff Depth=0.45"
Flow Length=370' Tc=17.4 min CN=WQ Runoff=0.45 cfs 0.054 af

Link 10P: Design Point #2: Flow to Rear Wetland Inflow=0.45 cfs 0.054 af
Primary=0.45 cfs 0.054 af

Total Runoff Area = 2.606 ac Runoff Volume = 0.277 af Average Runoff Depth = 1.28"
74.89% Pervious = 1.952 ac 25.11% Impervious = 0.654 ac

Summary for Subcatchment 3P: P2a

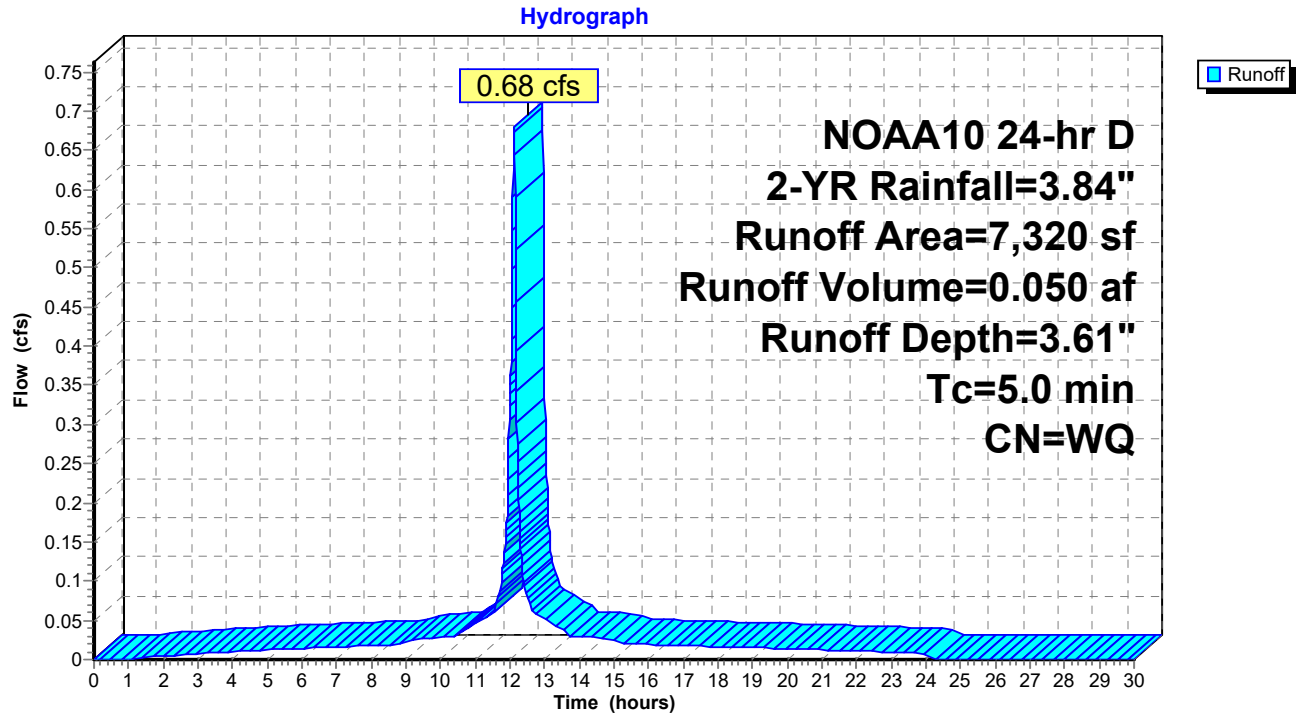
Runoff = 0.68 cfs @ 12.12 hrs, Volume= 0.050 af, Depth= 3.61"
Routed to Pond 4P : Roof Pipes

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
147	98	Roofs, HSG B
7,173	98	Roofs HSG A
7,320		Weighted Average
7,320		100.00% Impervious Area

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

Subcatchment 3P: P2a



Summary for Pond 4P: Roof Pipes

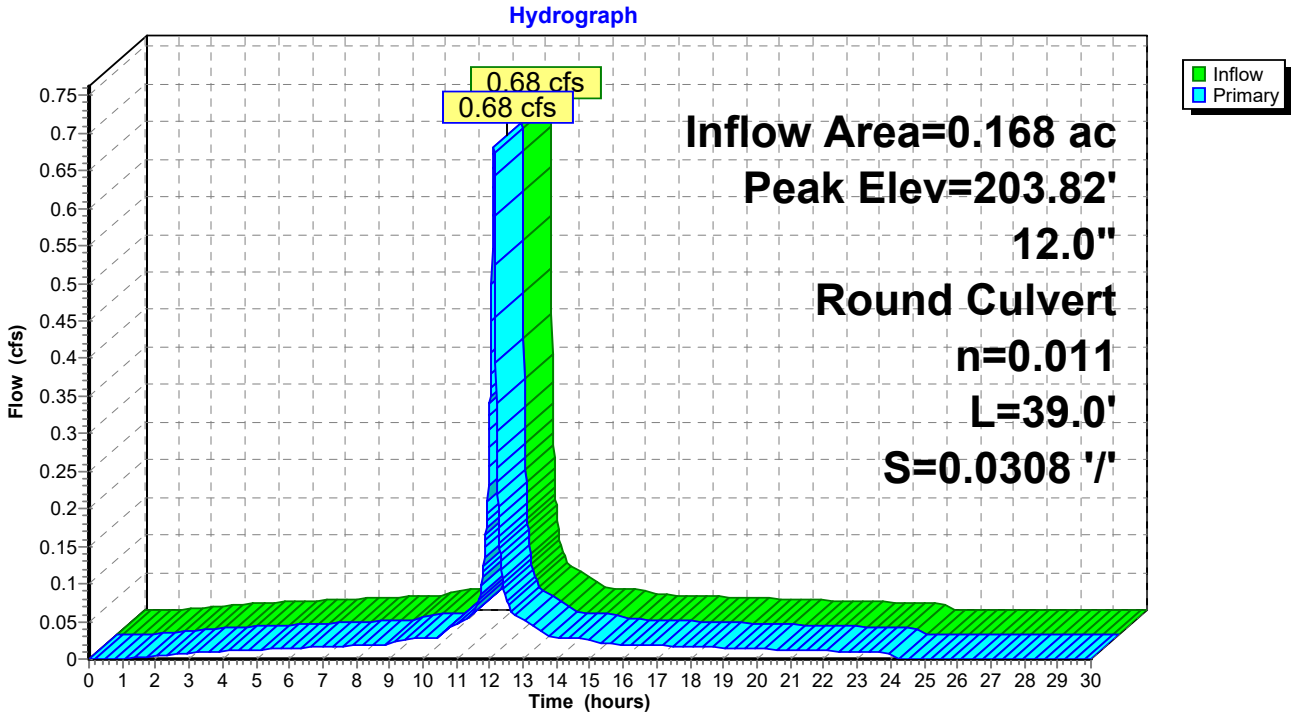
Inflow Area = 0.168 ac,100.00% Impervious, Inflow Depth = 3.61" for 2-YR event
Inflow = 0.68 cfs @ 12.12 hrs, Volume= 0.050 af
Outflow = 0.68 cfs @ 12.12 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.12 hrs, Volume= 0.050 af
Routed to Pond 8P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.82' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.40'	**12.0" Round Culvert** L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.40' / 202.20' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.68 cfs @ 12.12 hrs HW=203.82' TW=202.11' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.68 cfs @ 2.20 fps)

Pond 4P: Roof Pipes



Summary for Subcatchment 5P: P2b

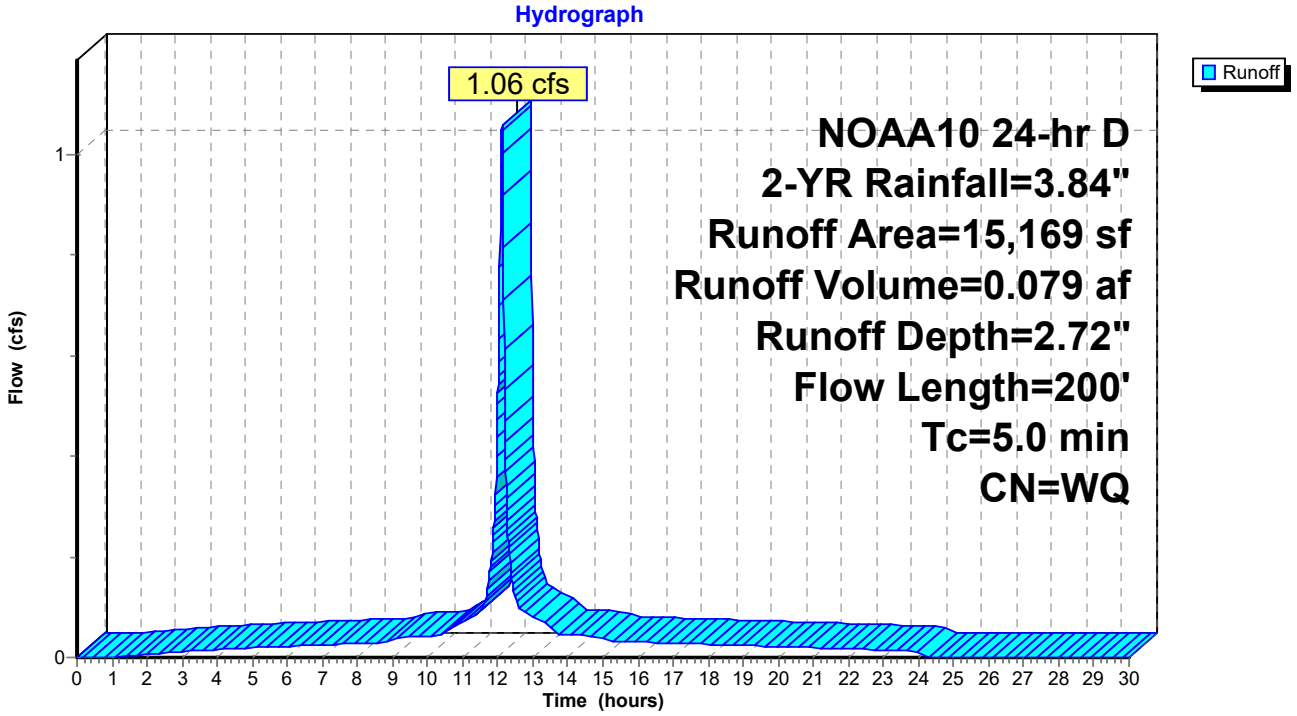
Runoff = 1.06 cfs @ 12.12 hrs, Volume= 0.079 af, Depth= 2.72"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
9,165	98	Paved parking HSG A
2,200	98	Paved parking, HSG B
3,503	39	>75% Grass cover, Good HSG A
301	61	>75% Grass cover, Good, HSG B
15,169		Weighted Average
3,804		25.08% Pervious Area
11,365		74.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.0150	0.35		**Sheet Flow,** Fallow n= 0.050 P2= 3.84"
1.2	150	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	200	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5P: P2b



Summary for Subcatchment 6P: P2c

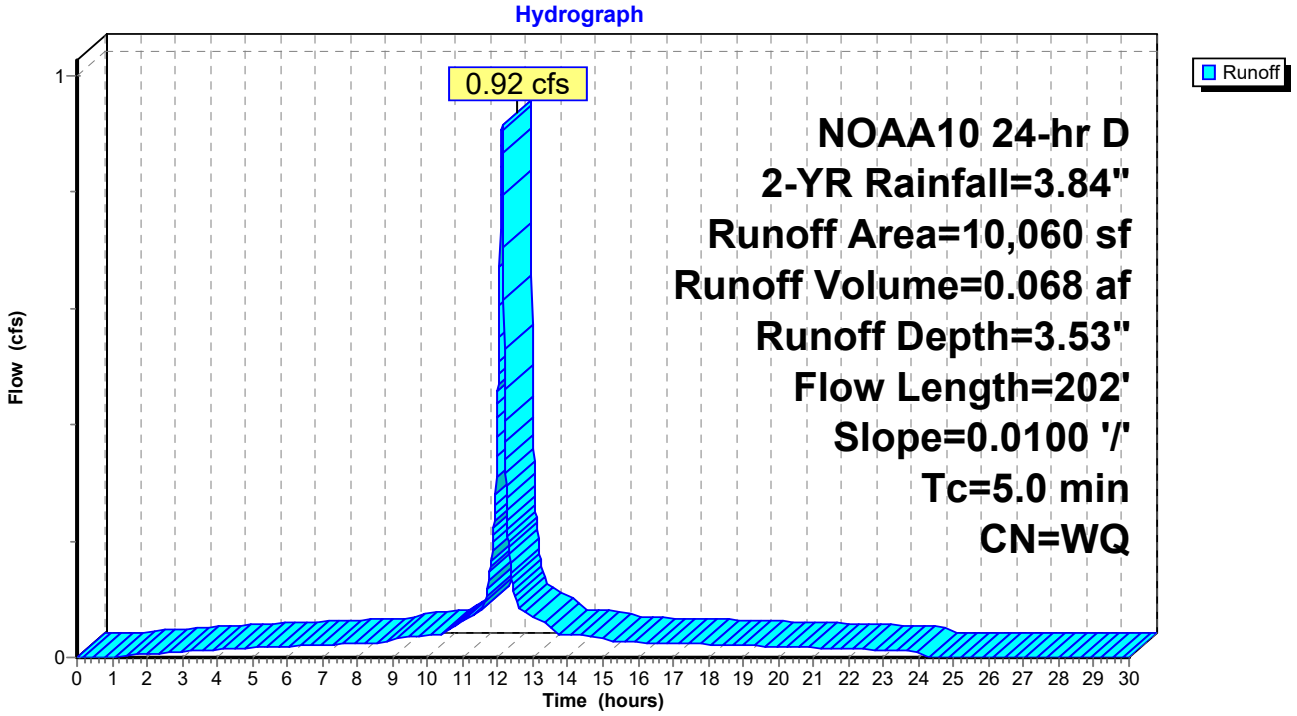
Runoff = 0.92 cfs @ 12.12 hrs, Volume= 0.068 af, Depth= 3.53"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
1,673	98	Paved parking, HSG B
8,152	98	Paved parking HSG A
120	39	>75% Grass cover, Good HSG A
115	61	>75% Grass cover, Good, HSG B
10,060		Weighted Average
235		2.34% Pervious Area
9,825		97.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0100	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
1.2	152	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.0	202	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6P: P2c



Summary for Subcatchment 7P: P2d

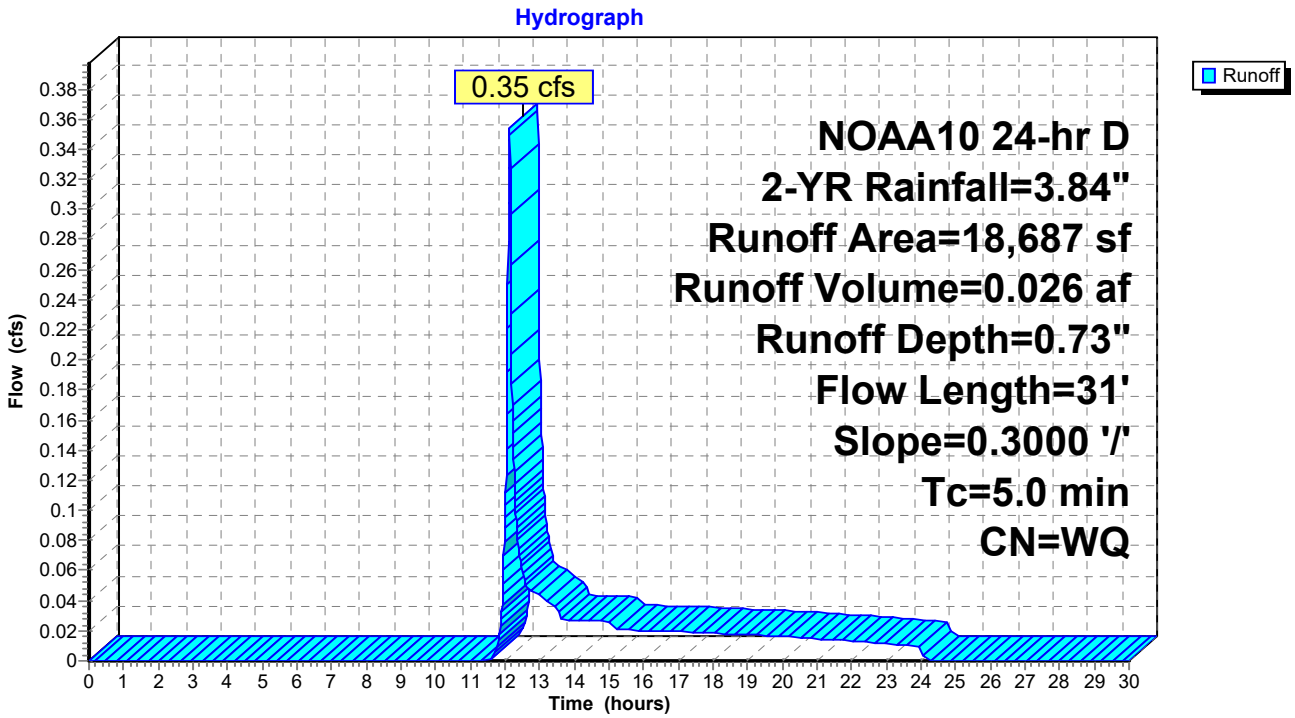
Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.026 af, Depth= 0.73"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
9	39	>75% Grass cover, Good HSG A
18,678	61	>75% Grass cover, Good, HSG B
18,687		Weighted Average
18,687		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	31	0.3000	0.30		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
1.7	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7P: P2d



Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.176 ac, 55.64% Impervious, Inflow Depth = 2.28" for 2-YR event
Inflow = 3.01 cfs @ 12.12 hrs, Volume= 0.224 af
Outflow = 0.50 cfs @ 12.37 hrs, Volume= 0.224 af, Atten= 83%, Lag= 15.1 min
Discarded = 0.50 cfs @ 12.37 hrs, Volume= 0.224 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 202.19' @ 12.37 hrs Surf.Area= 9,039 sf Storage= 1,648 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.8 min (791.0 - 778.2)

Volume	Invert	Avail.Storage	Storage Description
#1	202.00'	20,998 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

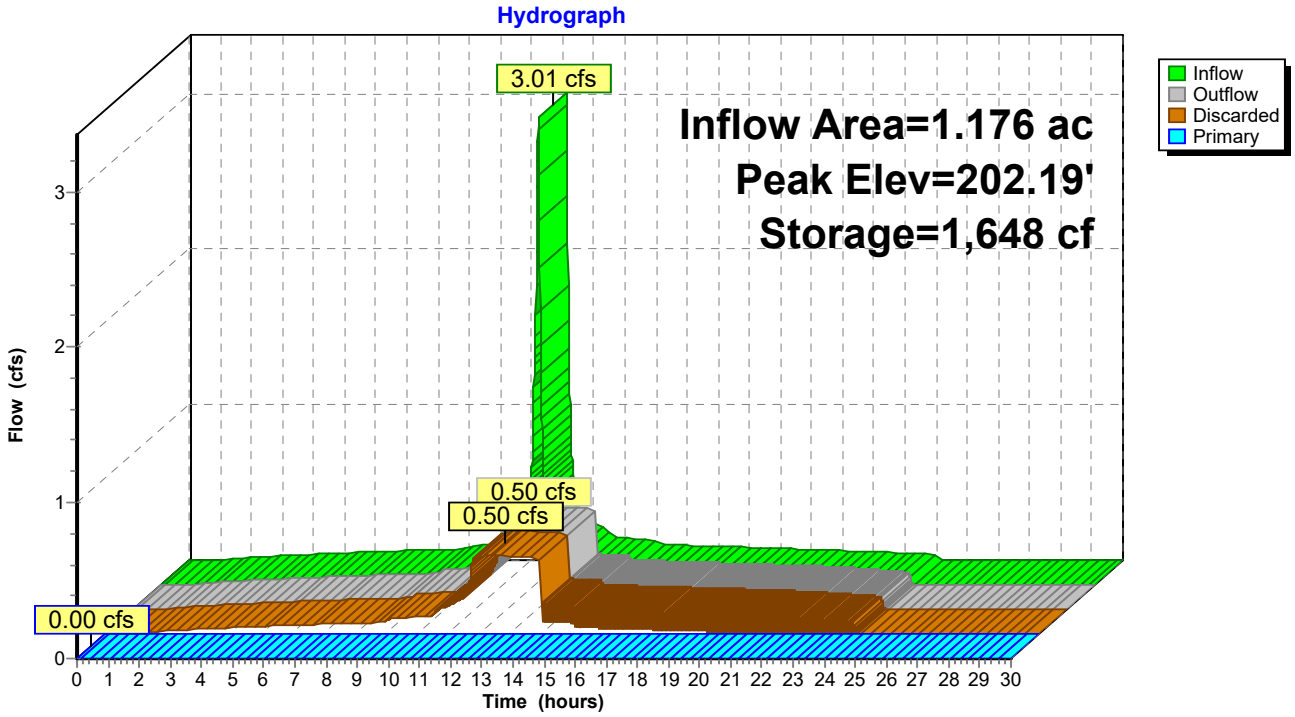
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
202.00	8,727	396.0	0	0	8,727
204.00	12,377	455.0	20,998	20,998	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	202.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 202.50 204.00 Width (feet) 3.00 3.00
#2	Discarded	202.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.50 cfs @ 12.37 hrs HW=202.19' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.50 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=202.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 8P: Infiltration Basin #1



Summary for Subcatchment 9P: P2e

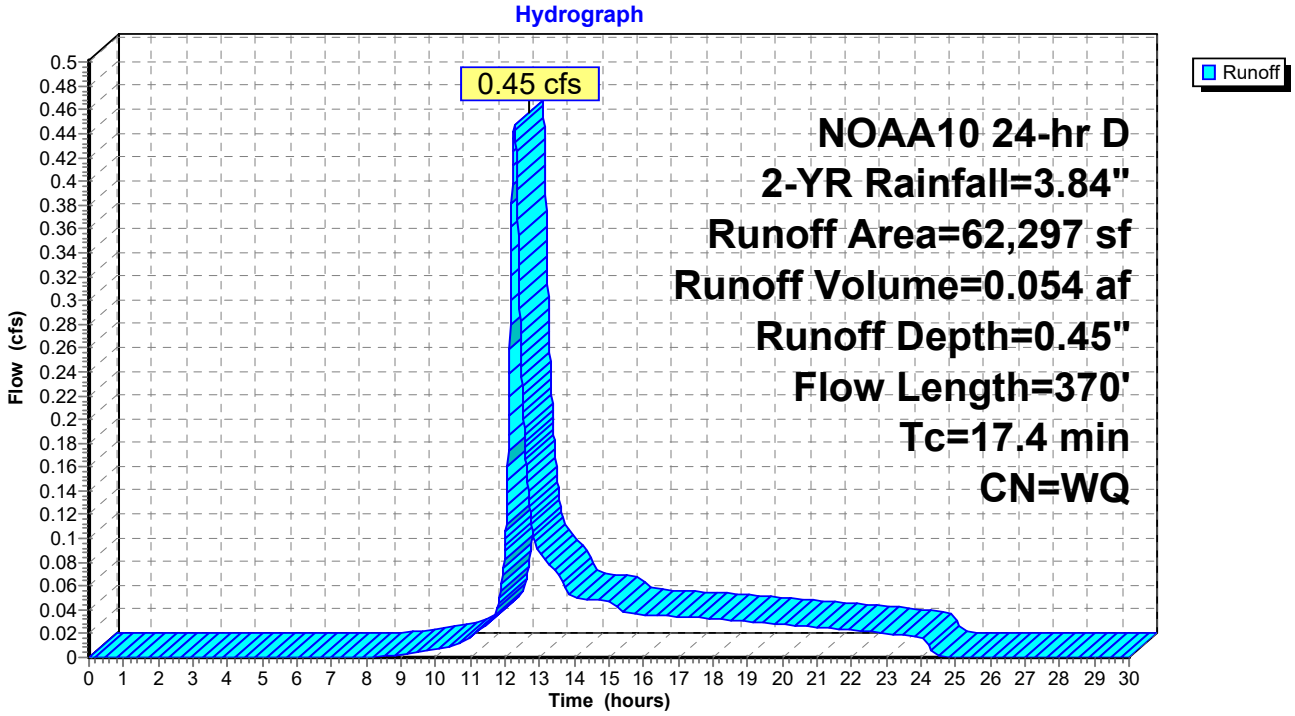
Runoff = 0.45 cfs @ 12.27 hrs, Volume= 0.054 af, Depth= 0.45"
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
14,351	55	Woods, Good HSG B
31,906	30	Woods, Good HSG A
2,239	39	>75% Grass cover, Good HSG A
2,145	61	>75% Grass cover, Good, HSG B
62,297		Weighted Average
62,297		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	28	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
8.1	342	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.4	370	Total			

Subcatchment 9P: P2e

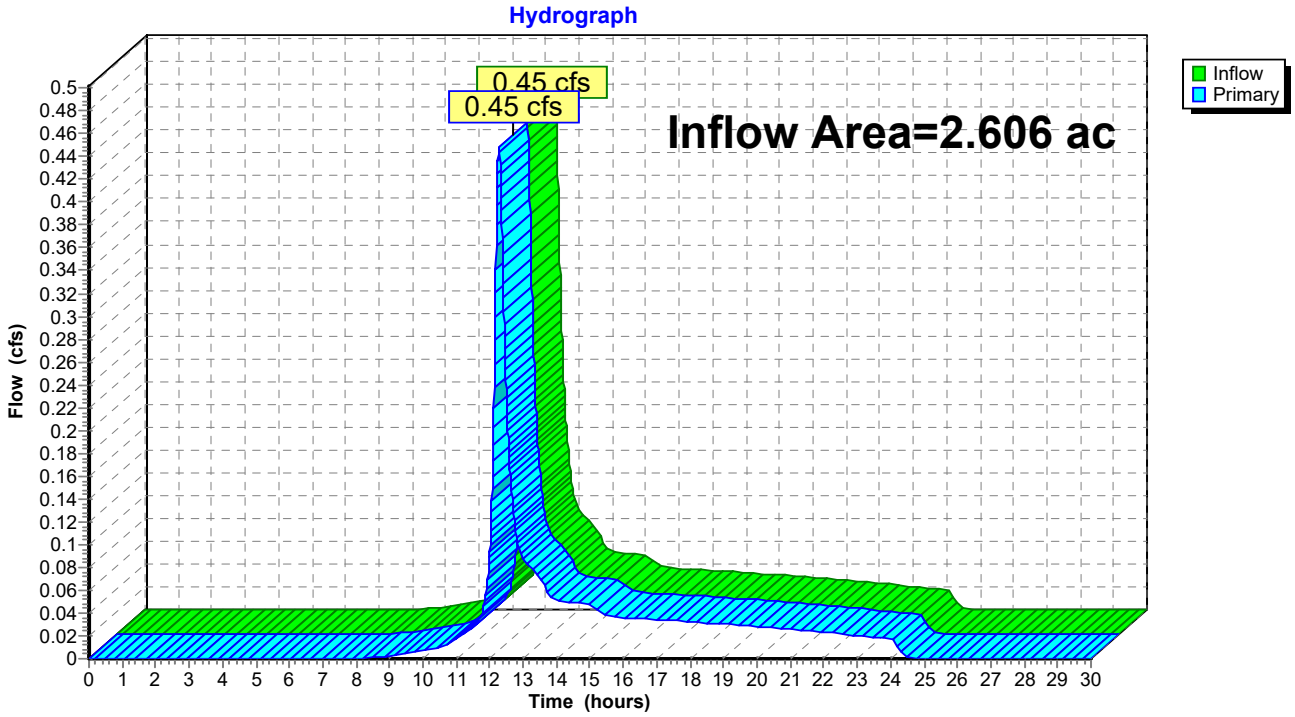


Summary for Link 10P: Design Point #2: Flow to Rear Wetland

Inflow Area = 2.606 ac, 25.11% Impervious, Inflow Depth = 0.25" for 2-YR event
Inflow = 0.45 cfs @ 12.27 hrs, Volume= 0.054 af
Primary = 0.45 cfs @ 12.27 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 10P: Design Point #2: Flow to Rear Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3P: P2a Runoff Area=7,320 sf 100.00% Impervious Runoff Depth=5.80"
Tc=5.0 min CN=WQ Runoff=1.08 cfs 0.081 af

Pond 4P: Roof Pipes Peak Elev=203.94' Inflow=1.08 cfs 0.081 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0308 '/' Outflow=1.08 cfs 0.081 af

Subcatchment 5P: P2b Runoff Area=15,169 sf 74.92% Impervious Runoff Depth=4.49"
Flow Length=200' Tc=5.0 min CN=WQ Runoff=1.70 cfs 0.130 af

Subcatchment 6P: P2c Runoff Area=10,060 sf 97.66% Impervious Runoff Depth=5.69"
Flow Length=202' Slope=0.0100 '/' Tc=5.0 min CN=WQ Runoff=1.45 cfs 0.110 af

Subcatchment 7P: P2d Runoff Area=18,687 sf 0.00% Impervious Runoff Depth=2.03"
Flow Length=31' Slope=0.3000 '/' Tc=5.0 min CN=WQ Runoff=1.13 cfs 0.073 af

Pond 8P: Infiltration Basin #1 Peak Elev=202.43' Storage=3,936 cf Inflow=5.34 cfs 0.394 af
Discarded=0.53 cfs 0.394 af Primary=0.00 cfs 0.000 af Outflow=0.53 cfs 0.394 af

Subcatchment 9P: P2e Runoff Area=62,297 sf 0.00% Impervious Runoff Depth=1.14"
Flow Length=370' Tc=17.4 min CN=WQ Runoff=1.21 cfs 0.136 af

Link 10P: Design Point #2: Flow to Rear Wetland Inflow=1.21 cfs 0.136 af
Primary=1.21 cfs 0.136 af

Total Runoff Area = 2.606 ac Runoff Volume = 0.529 af Average Runoff Depth = 2.44"
74.89% Pervious = 1.952 ac 25.11% Impervious = 0.654 ac

Summary for Subcatchment 3P: P2a

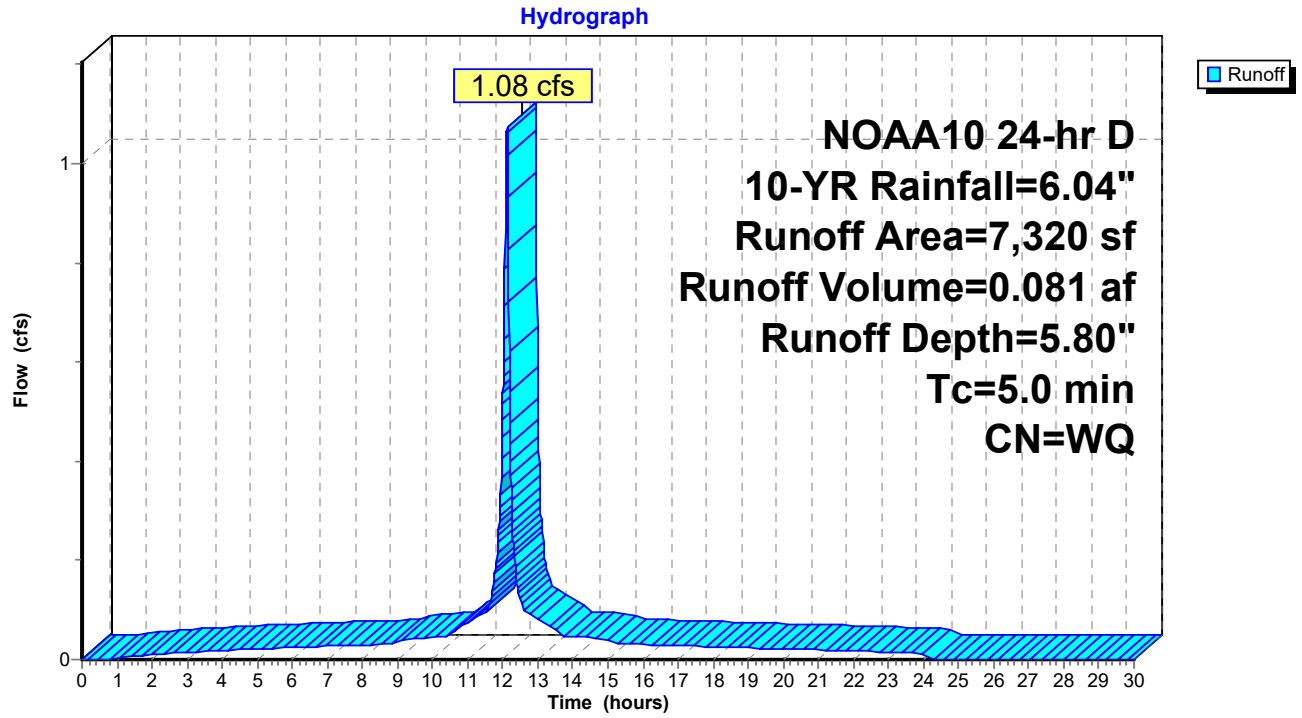
Runoff = 1.08 cfs @ 12.12 hrs, Volume= 0.081 af, Depth= 5.80"
Routed to Pond 4P : Roof Pipes

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
147	98	Roofs, HSG B
7,173	98	Roofs HSG A
7,320		Weighted Average
7,320		100.00% Impervious Area

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

Subcatchment 3P: P2a



Summary for Pond 4P: Roof Pipes

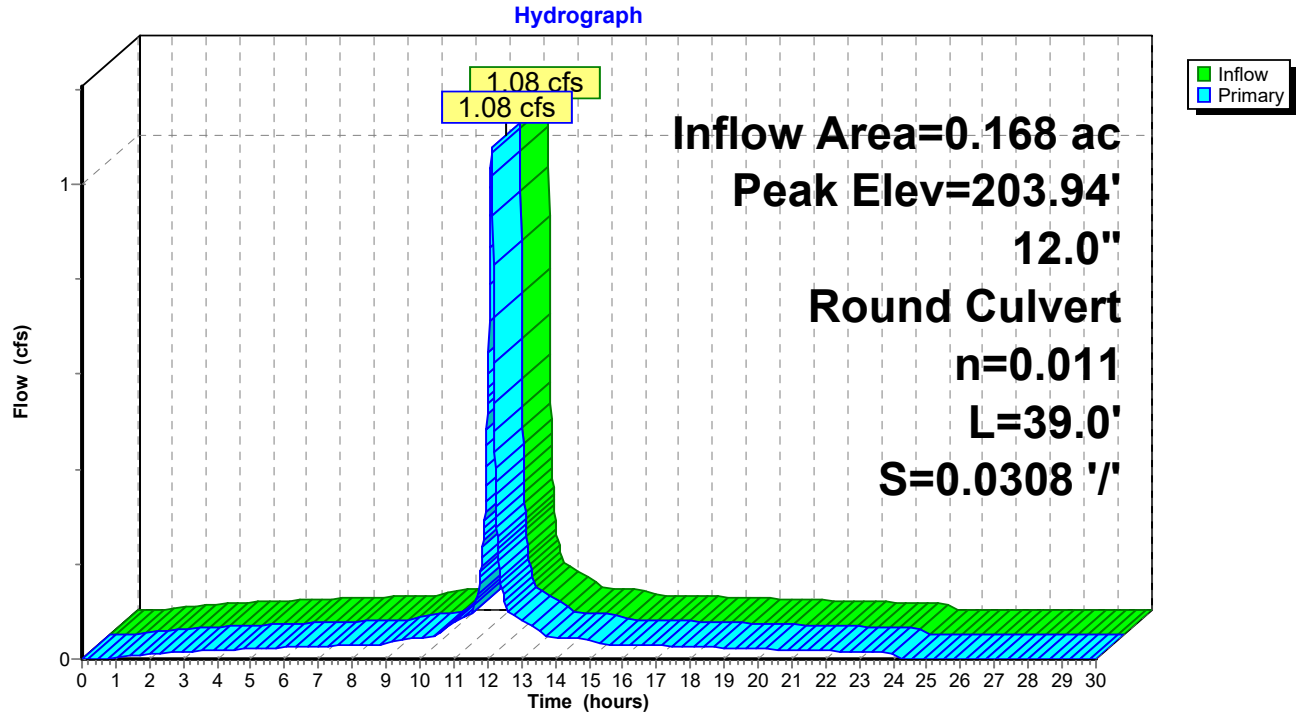
Inflow Area = 0.168 ac,100.00% Impervious, Inflow Depth = 5.80" for 10-YR event
Inflow = 1.08 cfs @ 12.12 hrs, Volume= 0.081 af
Outflow = 1.08 cfs @ 12.12 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
Primary = 1.08 cfs @ 12.12 hrs, Volume= 0.081 af
Routed to Pond 8P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.94' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.40'	**12.0" Round Culvert** L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.40' / 202.20' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.12 hrs HW=203.94' TW=202.25' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.08 cfs @ 2.50 fps)

Pond 4P: Roof Pipes



Summary for Subcatchment 5P: P2b

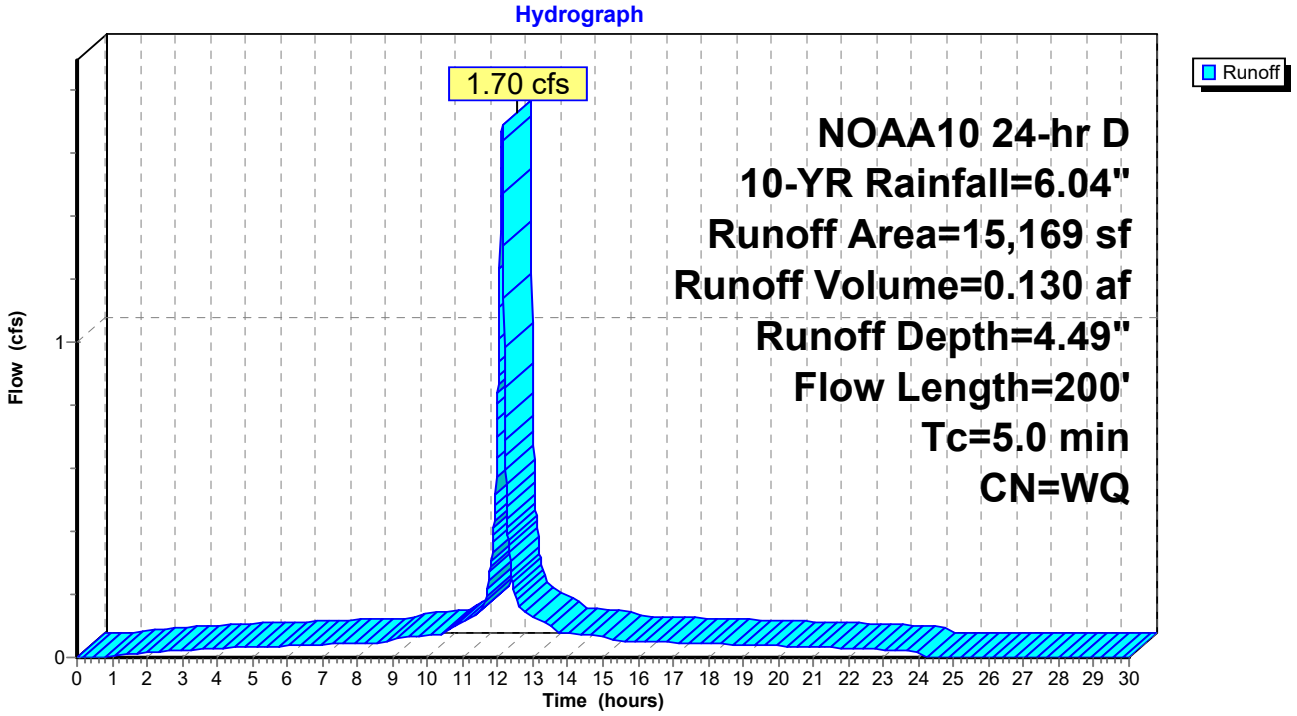
Runoff = 1.70 cfs @ 12.12 hrs, Volume= 0.130 af, Depth= 4.49"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
9,165	98	Paved parking HSG A
2,200	98	Paved parking, HSG B
3,503	39	>75% Grass cover, Good HSG A
301	61	>75% Grass cover, Good, HSG B
15,169		Weighted Average
3,804		25.08% Pervious Area
11,365		74.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.0150	0.35		**Sheet Flow,** Fallow n= 0.050 P2= 3.84"
1.2	150	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	200	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5P: P2b



Summary for Subcatchment 6P: P2c

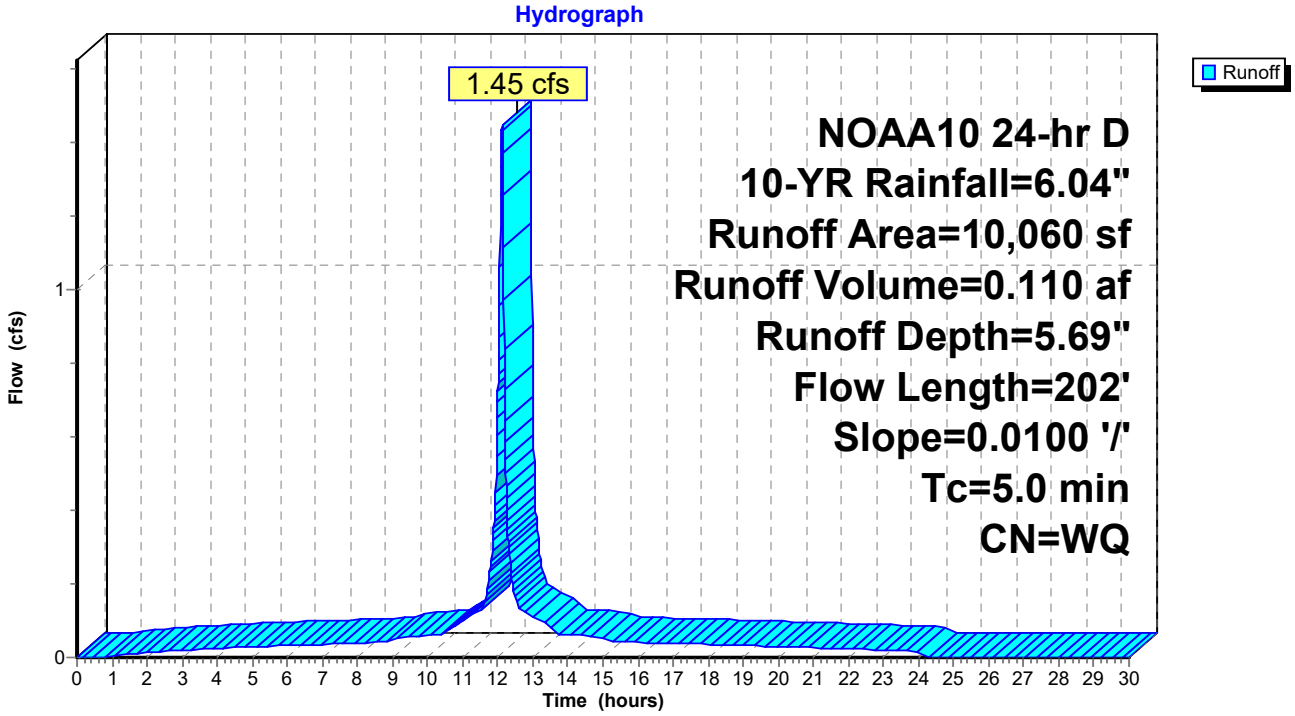
Runoff = 1.45 cfs @ 12.12 hrs, Volume= 0.110 af, Depth= 5.69"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
1,673	98	Paved parking, HSG B
8,152	98	Paved parking HSG A
120	39	>75% Grass cover, Good HSG A
115	61	>75% Grass cover, Good, HSG B
10,060		Weighted Average
235		2.34% Pervious Area
9,825		97.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0100	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
1.2	152	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.0	202	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6P: P2c



Summary for Subcatchment 7P: P2d

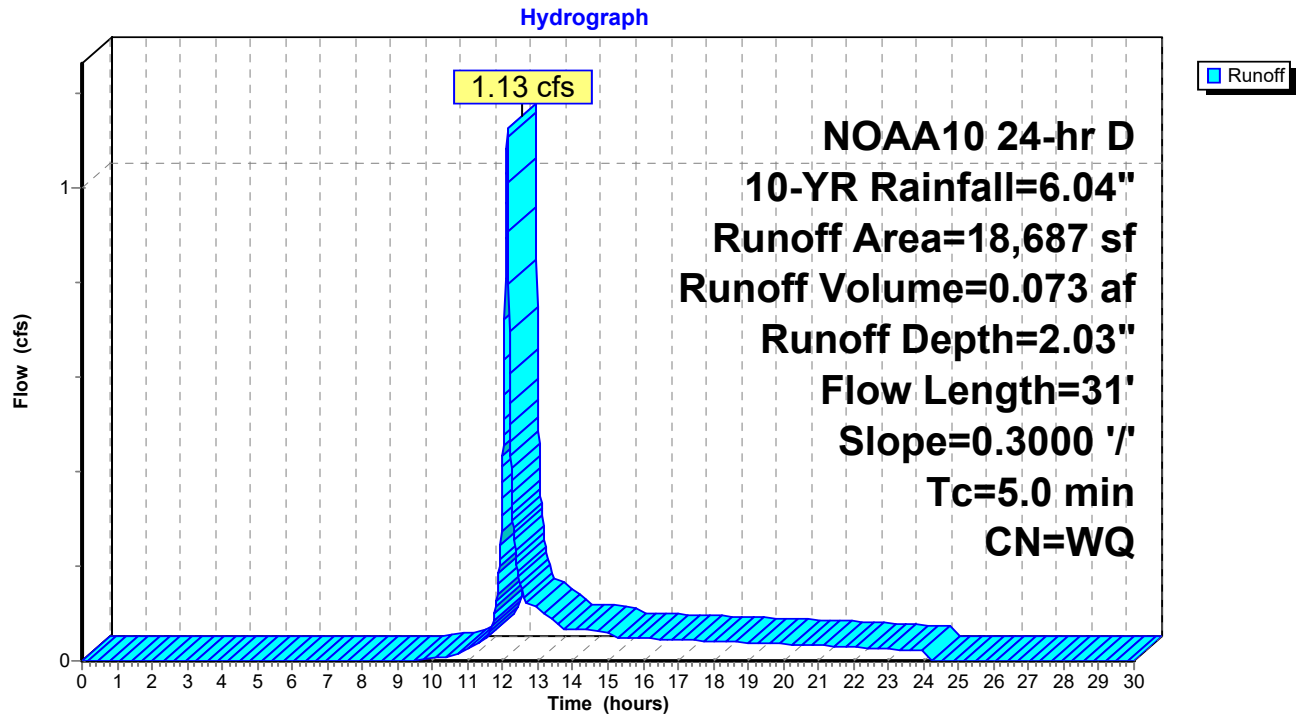
Runoff = 1.13 cfs @ 12.13 hrs, Volume= 0.073 af, Depth= 2.03"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
9	39	>75% Grass cover, Good HSG A
18,678	61	>75% Grass cover, Good, HSG B
18,687		Weighted Average
18,687		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	31	0.3000	0.30		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
1.7	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7P: P2d



Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.176 ac, 55.64% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 5.34 cfs @ 12.12 hrs, Volume= 0.394 af
Outflow = 0.53 cfs @ 12.60 hrs, Volume= 0.394 af, Atten= 90%, Lag= 28.9 min
Discarded = 0.53 cfs @ 12.60 hrs, Volume= 0.394 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 202.43' @ 12.60 hrs Surf.Area= 9,463 sf Storage= 3,936 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 41.2 min (818.3 - 777.2)

Volume	Invert	Avail.Storage	Storage Description
#1	202.00'	20,998 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

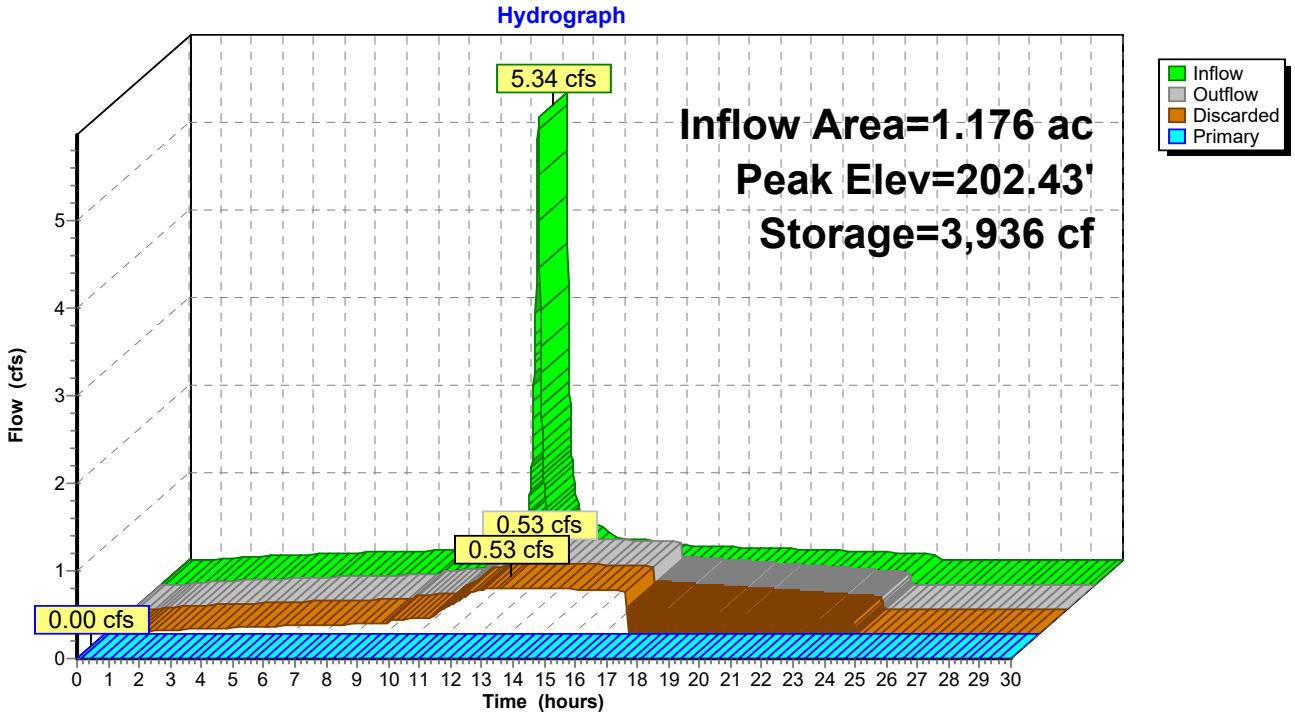
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
202.00	8,727	396.0	0	0	8,727
204.00	12,377	455.0	20,998	20,998	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	202.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 202.50 204.00 Width (feet) 3.00 3.00
#2	Discarded	202.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.53 cfs @ 12.60 hrs HW=202.43' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=202.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Controls 0.00 cfs)

Pond 8P: Infiltration Basin #1



Summary for Subcatchment 9P: P2e

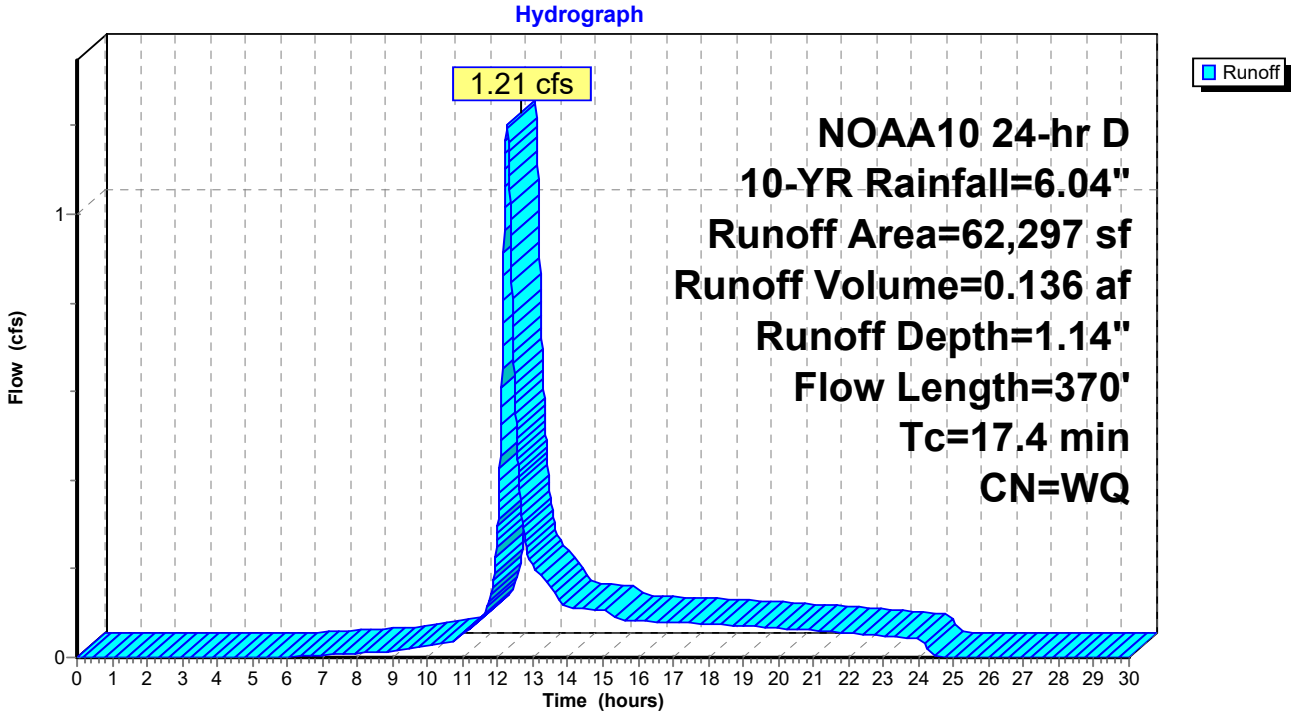
Runoff = 1.21 cfs @ 12.26 hrs, Volume= 0.136 af, Depth= 1.14"
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
14,351	55	Woods, Good HSG B
31,906	30	Woods, Good HSG A
2,239	39	>75% Grass cover, Good HSG A
2,145	61	>75% Grass cover, Good, HSG B
62,297		Weighted Average
62,297		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	28	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
8.1	342	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.4	370	Total			

Subcatchment 9P: P2e

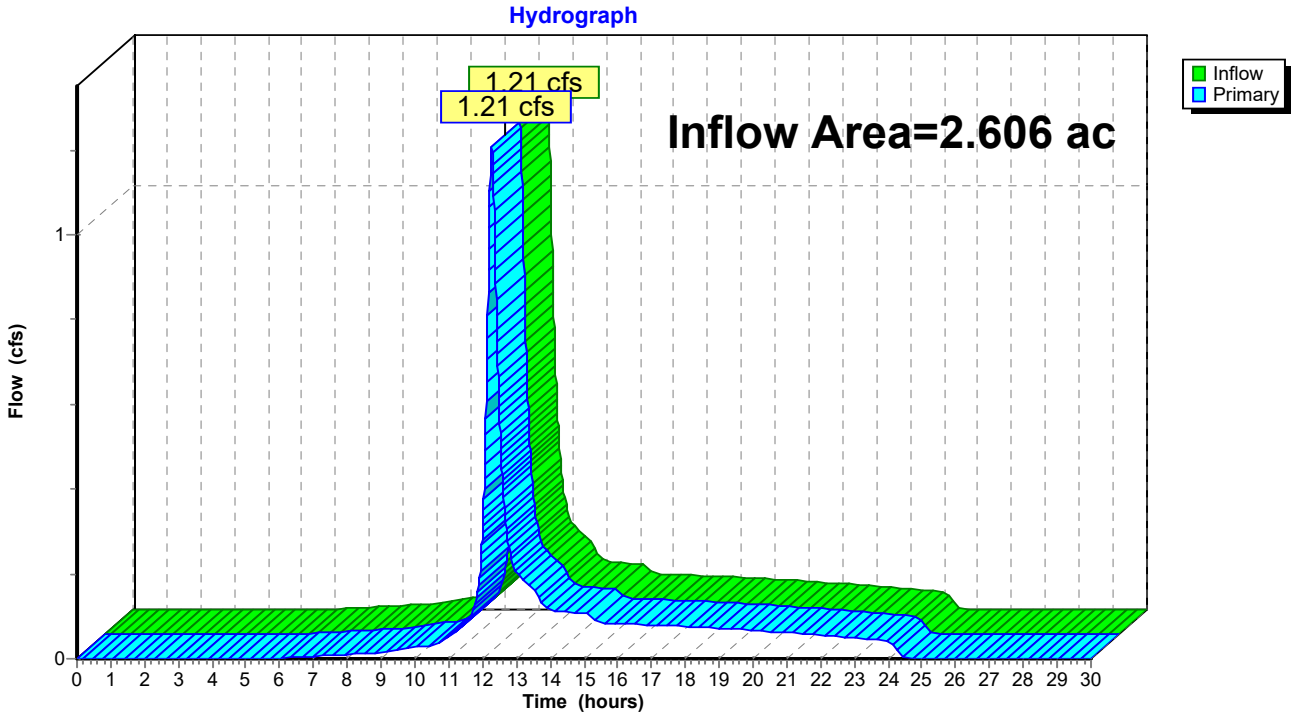


Summary for Link 10P: Design Point #2: Flow to Rear Wetland

Inflow Area = 2.606 ac, 25.11% Impervious, Inflow Depth = 0.62" for 10-YR event
Inflow = 1.21 cfs @ 12.26 hrs, Volume= 0.136 af
Primary = 1.21 cfs @ 12.26 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 10P: Design Point #2: Flow to Rear Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3P: P2a Runoff Area=7,320 sf 100.00% Impervious Runoff Depth=7.53"
Tc=5.0 min CN=WQ Runoff=1.39 cfs 0.105 af

Pond 4P: Roof Pipes Peak Elev=204.02' Inflow=1.39 cfs 0.105 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0308 '/' Outflow=1.39 cfs 0.105 af

Subcatchment 5P: P2b Runoff Area=15,169 sf 74.92% Impervious Runoff Depth=5.95"
Flow Length=200' Tc=5.0 min CN=WQ Runoff=2.26 cfs 0.173 af

Subcatchment 6P: P2c Runoff Area=10,060 sf 97.66% Impervious Runoff Depth=7.40"
Flow Length=202' Slope=0.0100 '/' Tc=5.0 min CN=WQ Runoff=1.87 cfs 0.143 af

Subcatchment 7P: P2d Runoff Area=18,687 sf 0.00% Impervious Runoff Depth=3.27"
Flow Length=31' Slope=0.3000 '/' Tc=5.0 min CN=WQ Runoff=1.84 cfs 0.117 af

Pond 8P: Infiltration Basin #1 Peak Elev=202.62' Storage=5,711 cf Inflow=7.35 cfs 0.538 af
Discarded=0.55 cfs 0.508 af Primary=0.39 cfs 0.030 af Outflow=0.94 cfs 0.538 af

Subcatchment 9P: P2e Runoff Area=62,297 sf 0.00% Impervious Runoff Depth=1.89"
Flow Length=370' Tc=17.4 min CN=WQ Runoff=1.91 cfs 0.225 af

Link 10P: Design Point #2: Flow to Rear Wetland Inflow=2.16 cfs 0.255 af
Primary=2.16 cfs 0.255 af

Total Runoff Area = 2.606 ac Runoff Volume = 0.763 af Average Runoff Depth = 3.51"
74.89% Pervious = 1.952 ac 25.11% Impervious = 0.654 ac

Summary for Subcatchment 3P: P2a

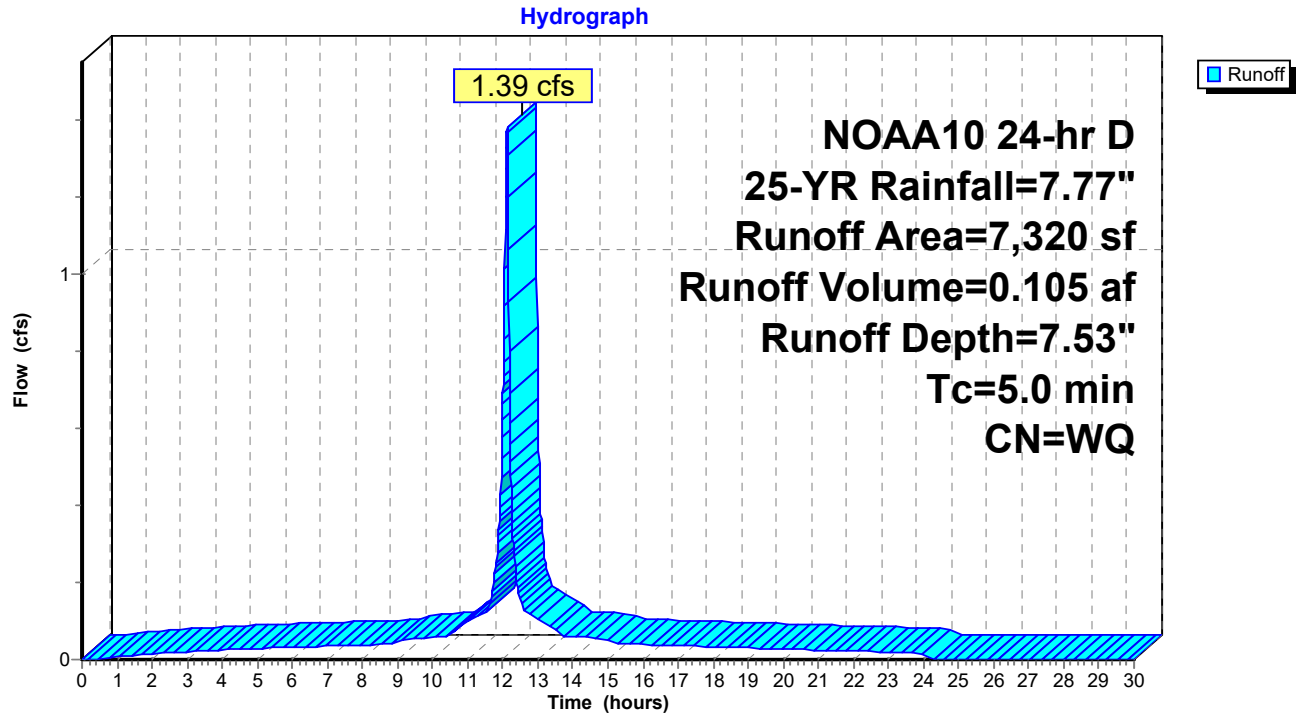
Runoff = 1.39 cfs @ 12.12 hrs, Volume= 0.105 af, Depth= 7.53"
Routed to Pond 4P : Roof Pipes

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
147	98	Roofs, HSG B
7,173	98	Roofs HSG A
7,320		Weighted Average
7,320		100.00% Impervious Area

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

Subcatchment 3P: P2a



Summary for Pond 4P: Roof Pipes

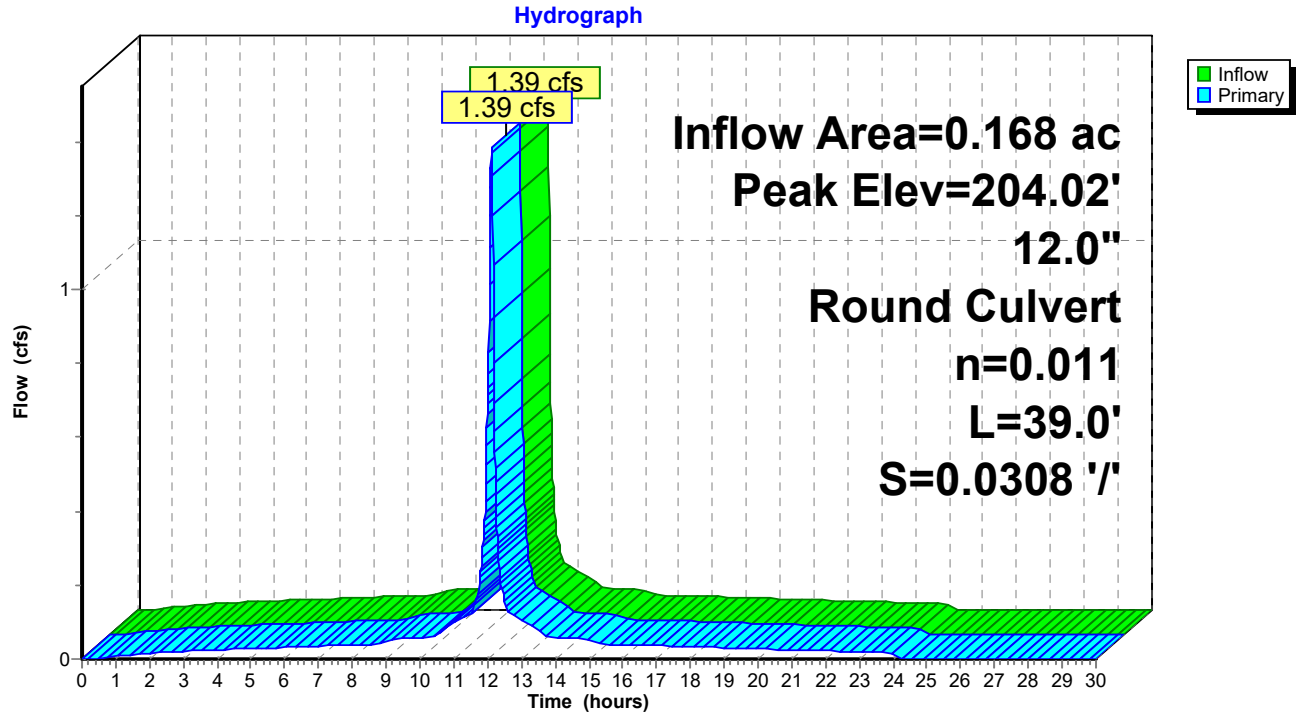
Inflow Area = 0.168 ac,100.00% Impervious, Inflow Depth = 7.53" for 25-YR event
Inflow = 1.39 cfs @ 12.12 hrs, Volume= 0.105 af
Outflow = 1.39 cfs @ 12.12 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min
Primary = 1.39 cfs @ 12.12 hrs, Volume= 0.105 af
Routed to Pond 8P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 204.02' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.40'	**12.0" Round Culvert** L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.40' / 202.20' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.39 cfs @ 12.12 hrs HW=204.02' TW=202.39' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.39 cfs @ 2.69 fps)

Pond 4P: Roof Pipes



Summary for Subcatchment 5P: P2b

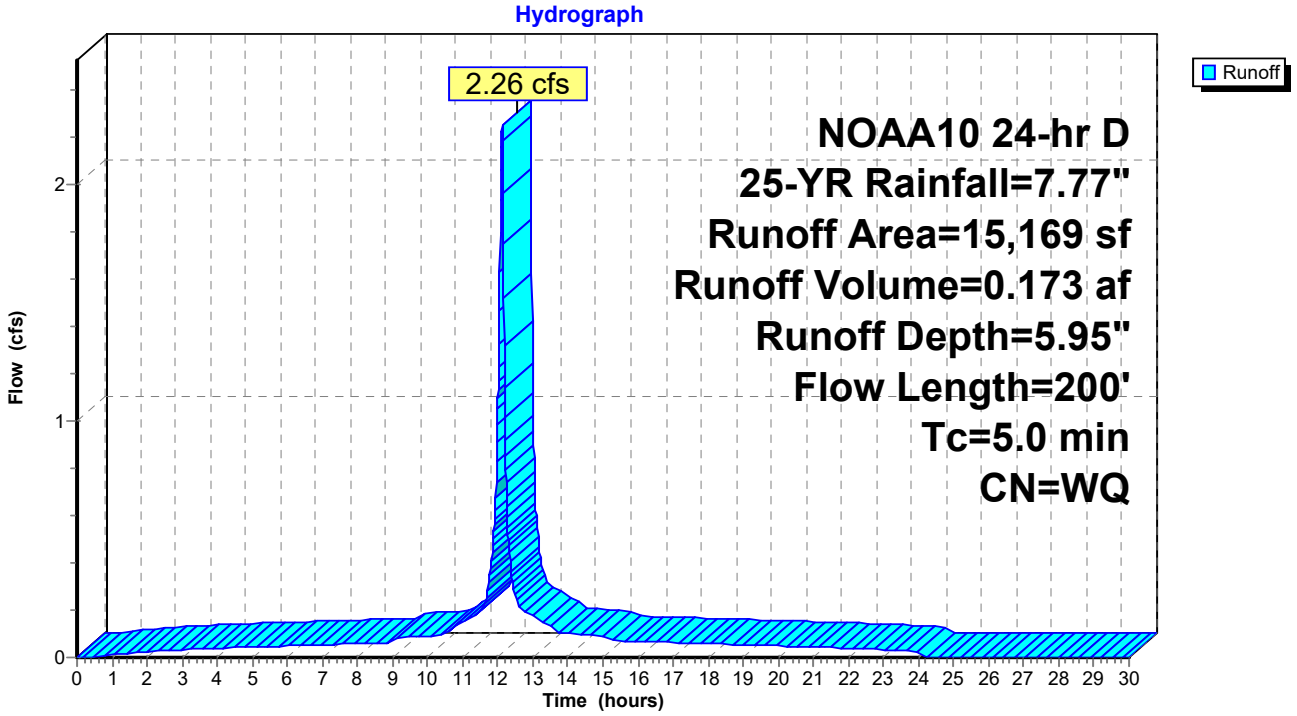
Runoff = 2.26 cfs @ 12.12 hrs, Volume= 0.173 af, Depth= 5.95"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
9,165	98	Paved parking HSG A
2,200	98	Paved parking, HSG B
3,503	39	>75% Grass cover, Good HSG A
301	61	>75% Grass cover, Good, HSG B
15,169		Weighted Average
3,804		25.08% Pervious Area
11,365		74.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.0150	0.35		**Sheet Flow,** Fallow n= 0.050 P2= 3.84"
1.2	150	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	200	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5P: P2b



Summary for Subcatchment 6P: P2c

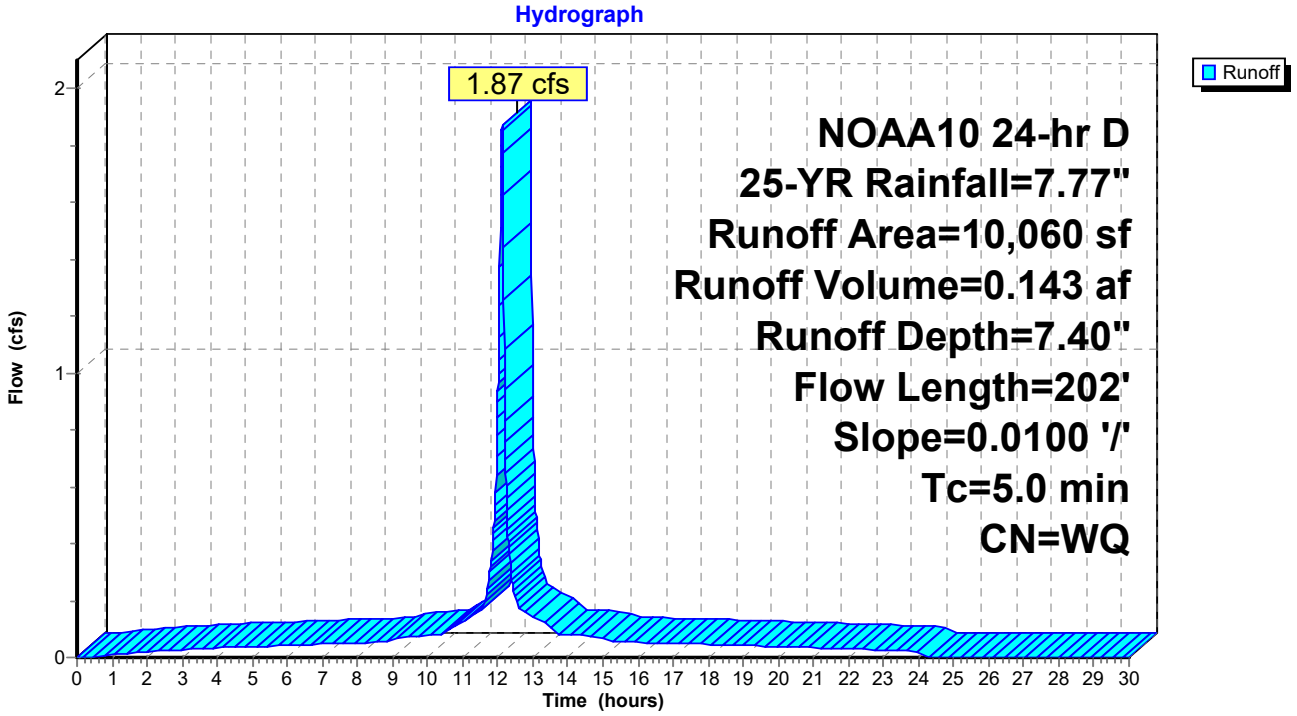
Runoff = 1.87 cfs @ 12.12 hrs, Volume= 0.143 af, Depth= 7.40"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
1,673	98	Paved parking, HSG B
8,152	98	Paved parking HSG A
120	39	>75% Grass cover, Good HSG A
115	61	>75% Grass cover, Good, HSG B
10,060		Weighted Average
235		2.34% Pervious Area
9,825		97.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0100	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
1.2	152	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.0	202	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6P: P2c



Summary for Subcatchment 7P: P2d

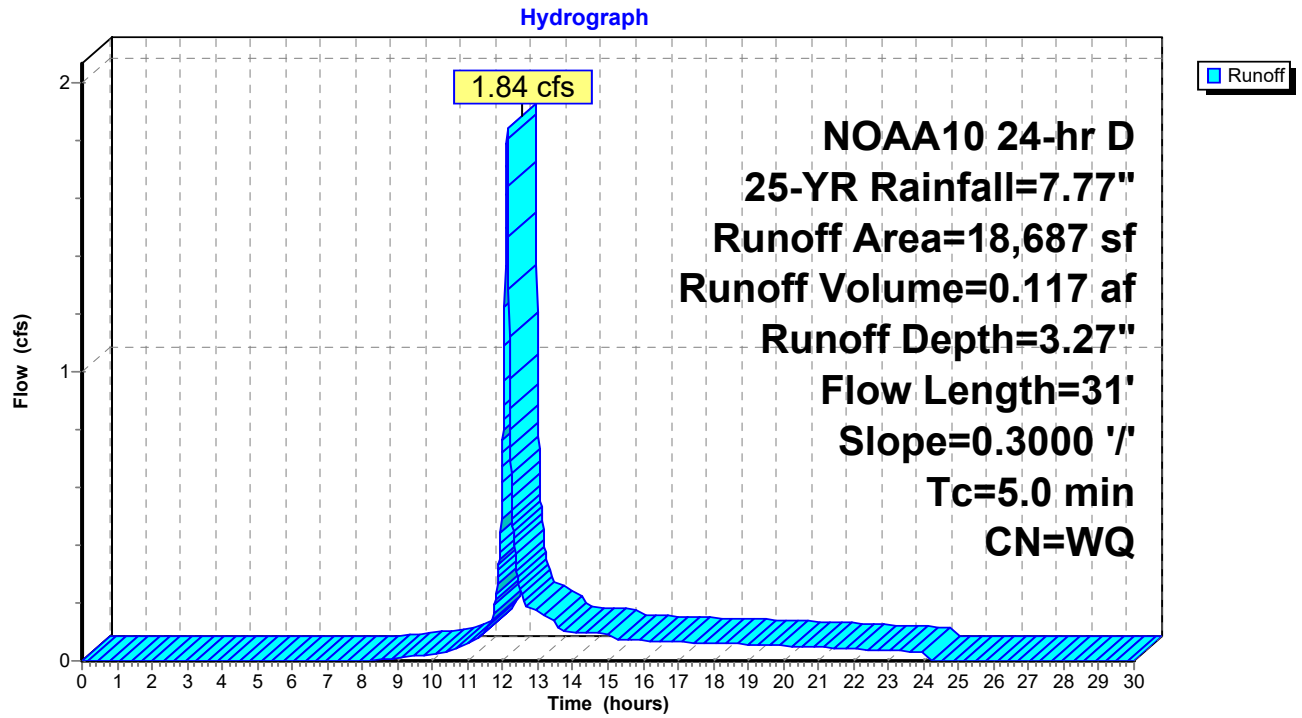
Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.117 af, Depth= 3.27"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
9	39	>75% Grass cover, Good HSG A
18,678	61	>75% Grass cover, Good, HSG B
18,687		Weighted Average
18,687		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	31	0.3000	0.30		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
1.7	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7P: P2d



Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.176 ac, 55.64% Impervious, Inflow Depth = 5.48" for 25-YR event
Inflow = 7.35 cfs @ 12.12 hrs, Volume= 0.538 af
Outflow = 0.94 cfs @ 12.47 hrs, Volume= 0.538 af, Atten= 87%, Lag= 20.9 min
Discarded = 0.55 cfs @ 12.47 hrs, Volume= 0.508 af
Primary = 0.39 cfs @ 12.47 hrs, Volume= 0.030 af
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 202.62' @ 12.47 hrs Surf.Area= 9,786 sf Storage= 5,711 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.4 min (832.3 - 775.9)

Volume	Invert	Avail.Storage	Storage Description
#1	202.00'	20,998 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

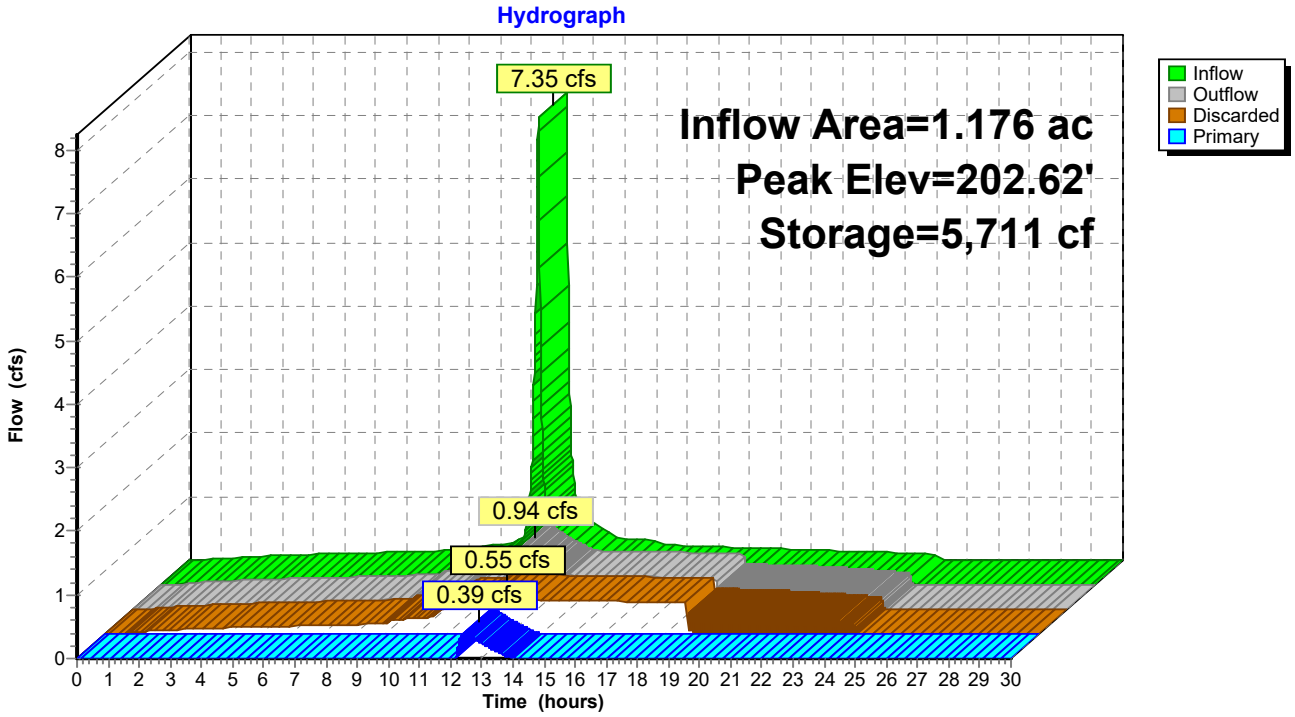
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
202.00	8,727	396.0	0	0	8,727
204.00	12,377	455.0	20,998	20,998	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	202.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 202.50 204.00 Width (feet) 3.00 3.00
#2	Discarded	202.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.55 cfs @ 12.47 hrs HW=202.62' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.55 cfs)

Primary OutFlow Max=0.39 cfs @ 12.47 hrs HW=202.62' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 0.39 cfs @ 1.12 fps)

Pond 8P: Infiltration Basin #1



Summary for Subcatchment 9P: P2e

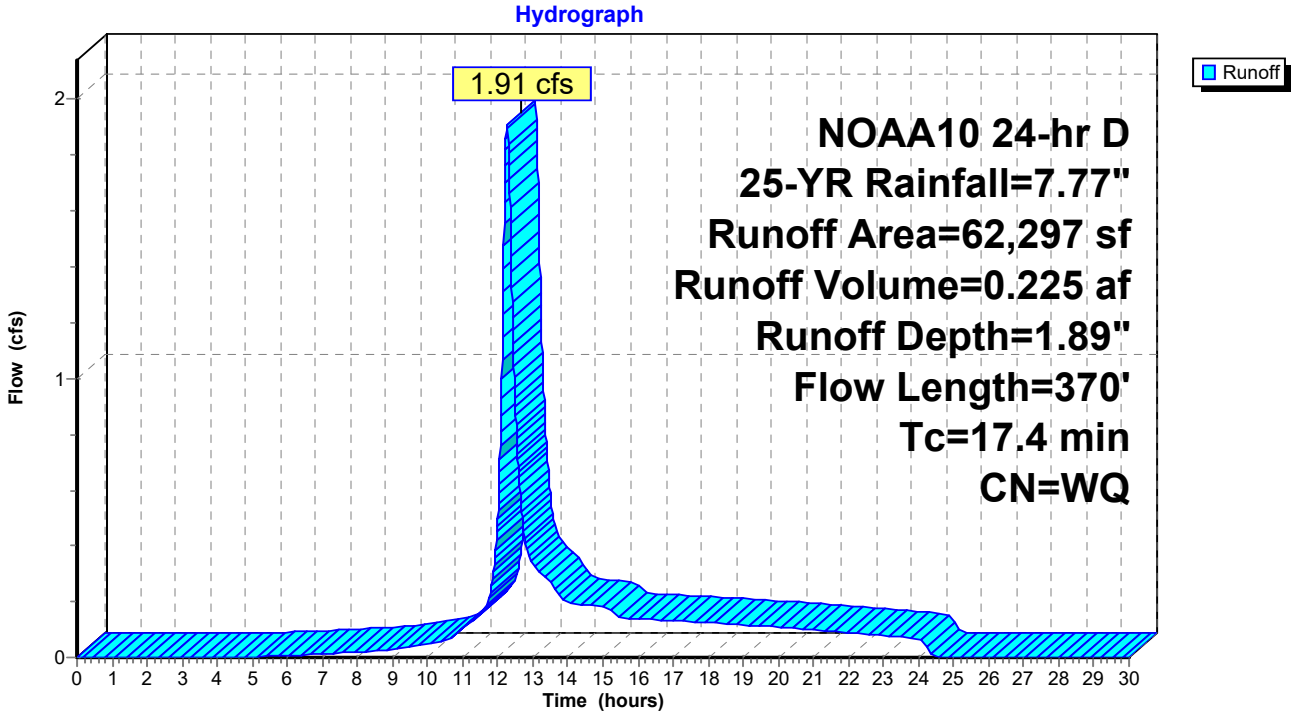
Runoff = 1.91 cfs @ 12.26 hrs, Volume= 0.225 af, Depth= 1.89"
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
14,351	55	Woods, Good HSG B
31,906	30	Woods, Good HSG A
2,239	39	>75% Grass cover, Good HSG A
2,145	61	>75% Grass cover, Good, HSG B
62,297		Weighted Average
62,297		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	28	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
8.1	342	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.4	370	Total			

Subcatchment 9P: P2e

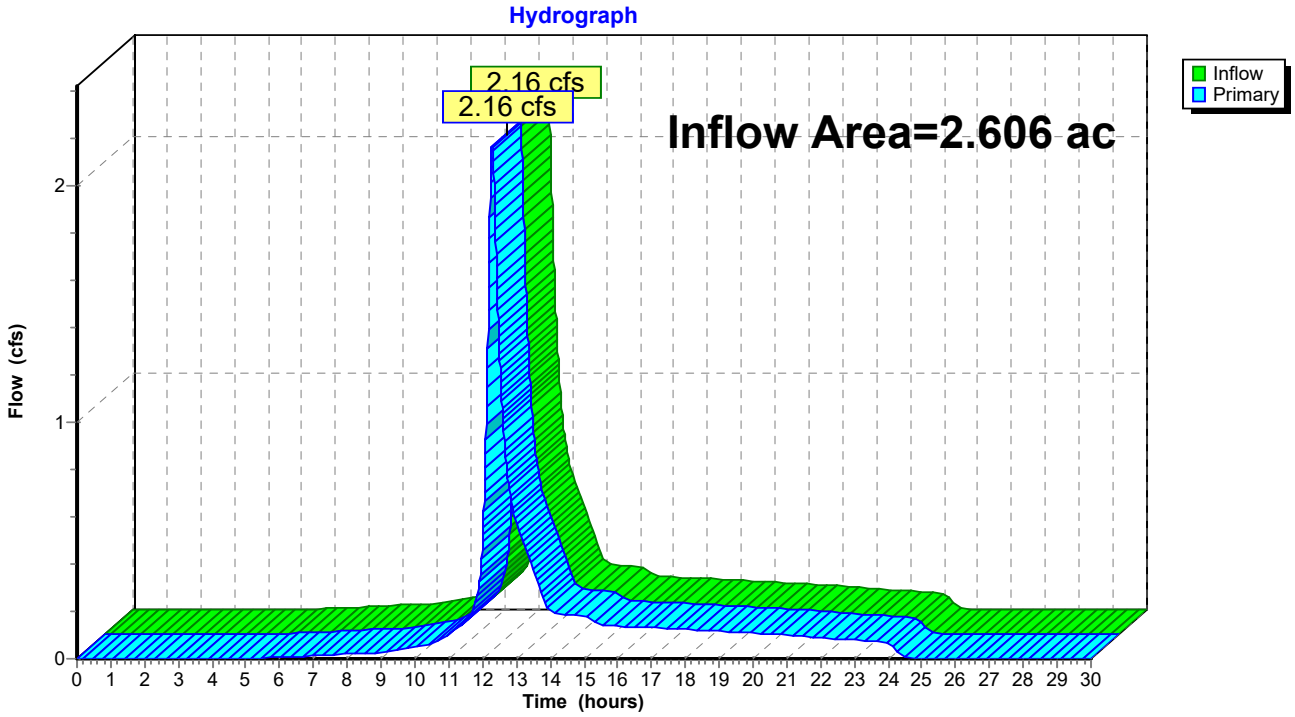


Summary for Link 10P: Design Point #2: Flow to Rear Wetland

Inflow Area = 2.606 ac, 25.11% Impervious, Inflow Depth = 1.18" for 25-YR event
Inflow = 2.16 cfs @ 12.28 hrs, Volume= 0.255 af
Primary = 2.16 cfs @ 12.28 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 10P: Design Point #2: Flow to Rear Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 3P: P2a Runoff Area=7,320 sf 100.00% Impervious Runoff Depth=10.38"
Tc=5.0 min CN=WQ Runoff=1.90 cfs 0.145 af

Pond 4P: Roof Pipes Peak Elev=204.16' Inflow=1.90 cfs 0.145 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0308 '/' Outflow=1.90 cfs 0.145 af

Subcatchment 5P: P2b Runoff Area=15,169 sf 74.92% Impervious Runoff Depth=8.45"
Flow Length=200' Tc=5.0 min CN=WQ Runoff=3.23 cfs 0.245 af

Subcatchment 6P: P2c Runoff Area=10,060 sf 97.66% Impervious Runoff Depth=10.23"
Flow Length=202' Slope=0.0100 '/' Tc=5.0 min CN=WQ Runoff=2.57 cfs 0.197 af

Subcatchment 7P: P2d Runoff Area=18,687 sf 0.00% Impervious Runoff Depth=5.54"
Flow Length=31' Slope=0.3000 '/' Tc=5.0 min CN=WQ Runoff=3.12 cfs 0.198 af

Pond 8P: Infiltration Basin #1 Peak Elev=202.87' Storage=8,216 cf Inflow=10.81 cfs 0.786 af
Discarded=0.57 cfs 0.638 af Primary=2.19 cfs 0.148 af Outflow=2.76 cfs 0.786 af

Subcatchment 9P: P2e Runoff Area=62,297 sf 0.00% Impervious Runoff Depth=3.43"
Flow Length=370' Tc=17.4 min CN=WQ Runoff=3.50 cfs 0.408 af

Link 10P: Design Point #2: Flow to Rear Wetland Inflow=5.69 cfs 0.556 af
Primary=5.69 cfs 0.556 af

Total Runoff Area = 2.606 ac Runoff Volume = 1.194 af Average Runoff Depth = 5.50"
74.89% Pervious = 1.952 ac 25.11% Impervious = 0.654 ac

Summary for Subcatchment 3P: P2a

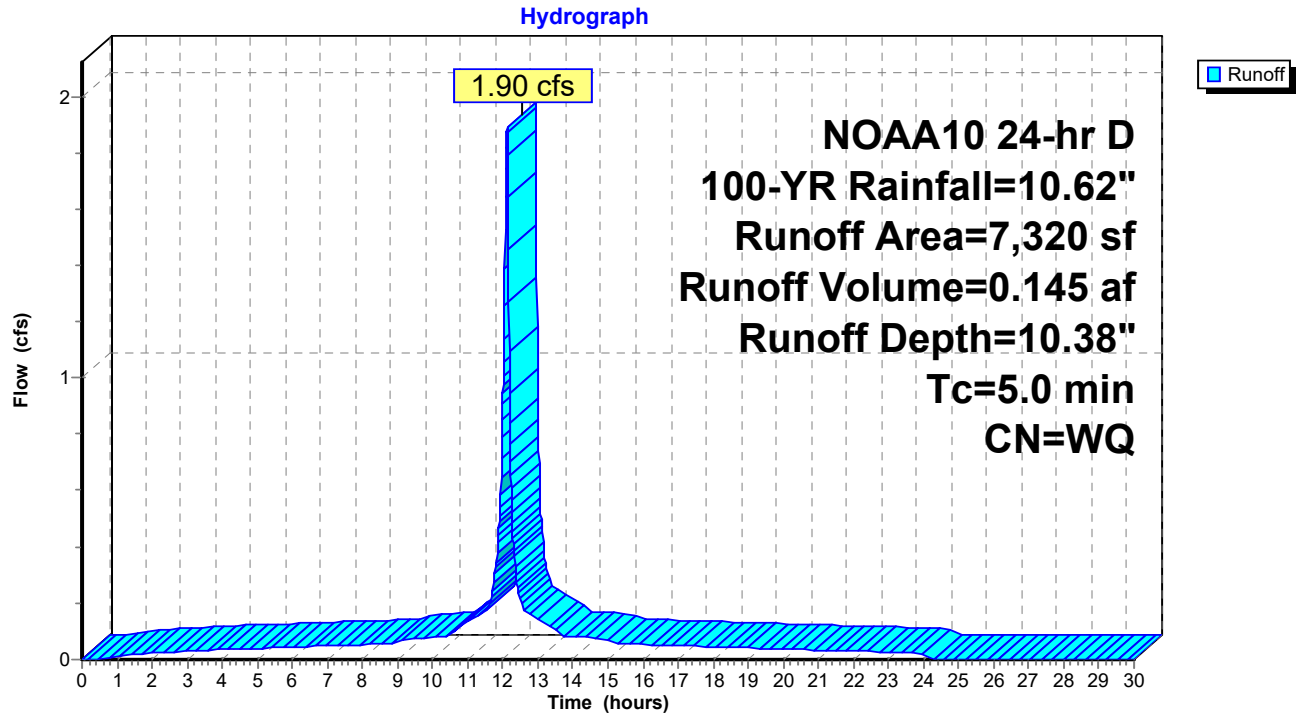
Runoff = 1.90 cfs @ 12.12 hrs, Volume= 0.145 af, Depth=10.38"
Routed to Pond 4P : Roof Pipes

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
147	98	Roofs, HSG B
7,173	98	Roofs HSG A
7,320		Weighted Average
7,320		100.00% Impervious Area

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

Subcatchment 3P: P2a



Summary for Pond 4P: Roof Pipes

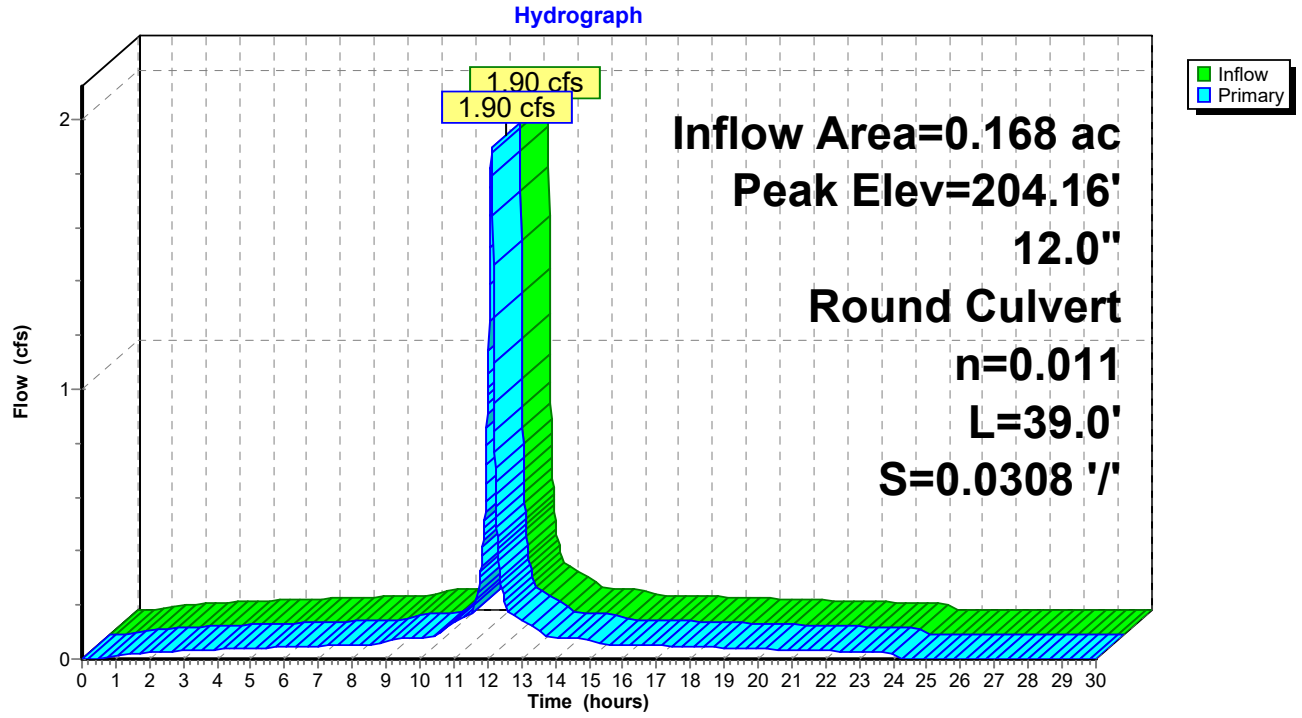
Inflow Area = 0.168 ac,100.00% Impervious, Inflow Depth = 10.38" for 100-YR event
Inflow = 1.90 cfs @ 12.12 hrs, Volume= 0.145 af
Outflow = 1.90 cfs @ 12.12 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min
Primary = 1.90 cfs @ 12.12 hrs, Volume= 0.145 af
Routed to Pond 8P : Infiltration Basin #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 204.16' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.40'	**12.0" Round Culvert** L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.40' / 202.20' S= 0.0308 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.90 cfs @ 12.12 hrs HW=204.16' TW=202.66' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.90 cfs @ 2.97 fps)

Pond 4P: Roof Pipes



Summary for Subcatchment 5P: P2b

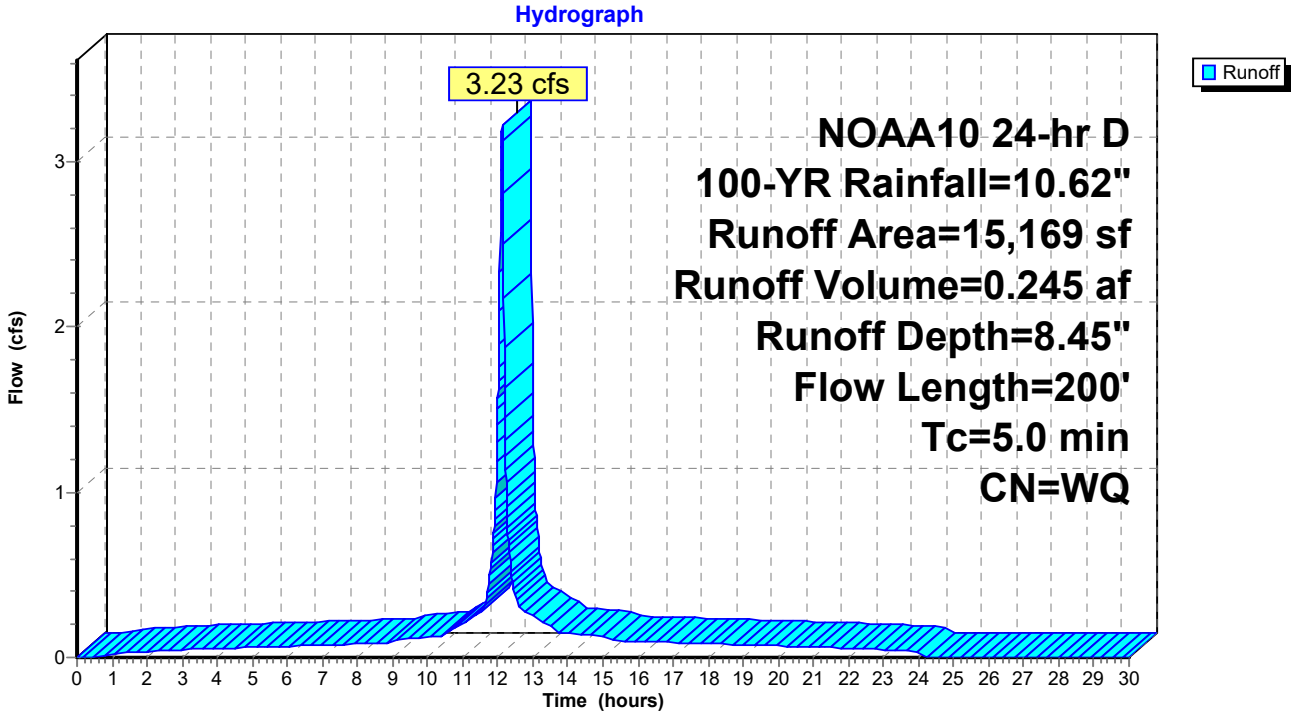
Runoff = 3.23 cfs @ 12.12 hrs, Volume= 0.245 af, Depth= 8.45"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
9,165	98	Paved parking HSG A
2,200	98	Paved parking, HSG B
3,503	39	>75% Grass cover, Good HSG A
301	61	>75% Grass cover, Good, HSG B
15,169		Weighted Average
3,804		25.08% Pervious Area
11,365		74.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	50	0.0150	0.35		**Sheet Flow,** Fallow n= 0.050 P2= 3.84"
1.2	150	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.6	200	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 5P: P2b



Summary for Subcatchment 6P: P2c

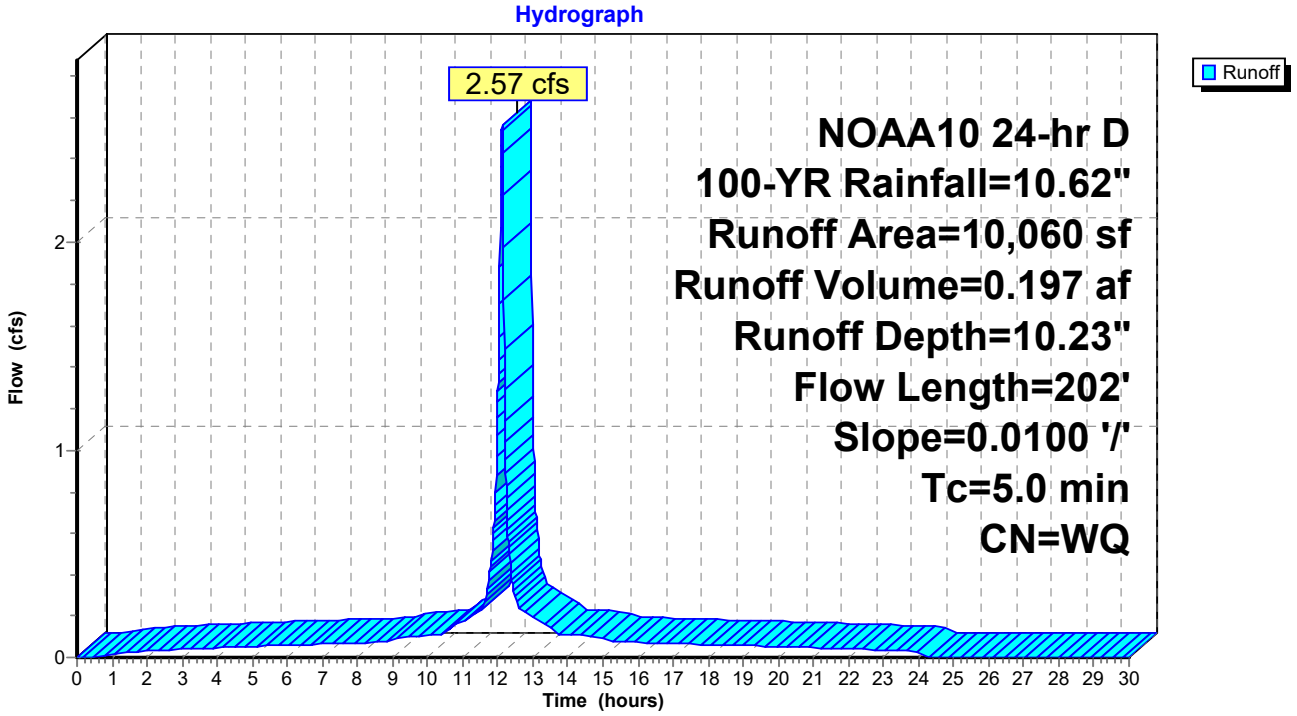
Runoff = 2.57 cfs @ 12.12 hrs, Volume= 0.197 af, Depth=10.23"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
1,673	98	Paved parking, HSG B
8,152	98	Paved parking HSG A
120	39	>75% Grass cover, Good HSG A
115	61	>75% Grass cover, Good, HSG B
10,060		Weighted Average
235		2.34% Pervious Area
9,825		97.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0100	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
1.2	152	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.0	202	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 6P: P2c



Summary for Subcatchment 7P: P2d

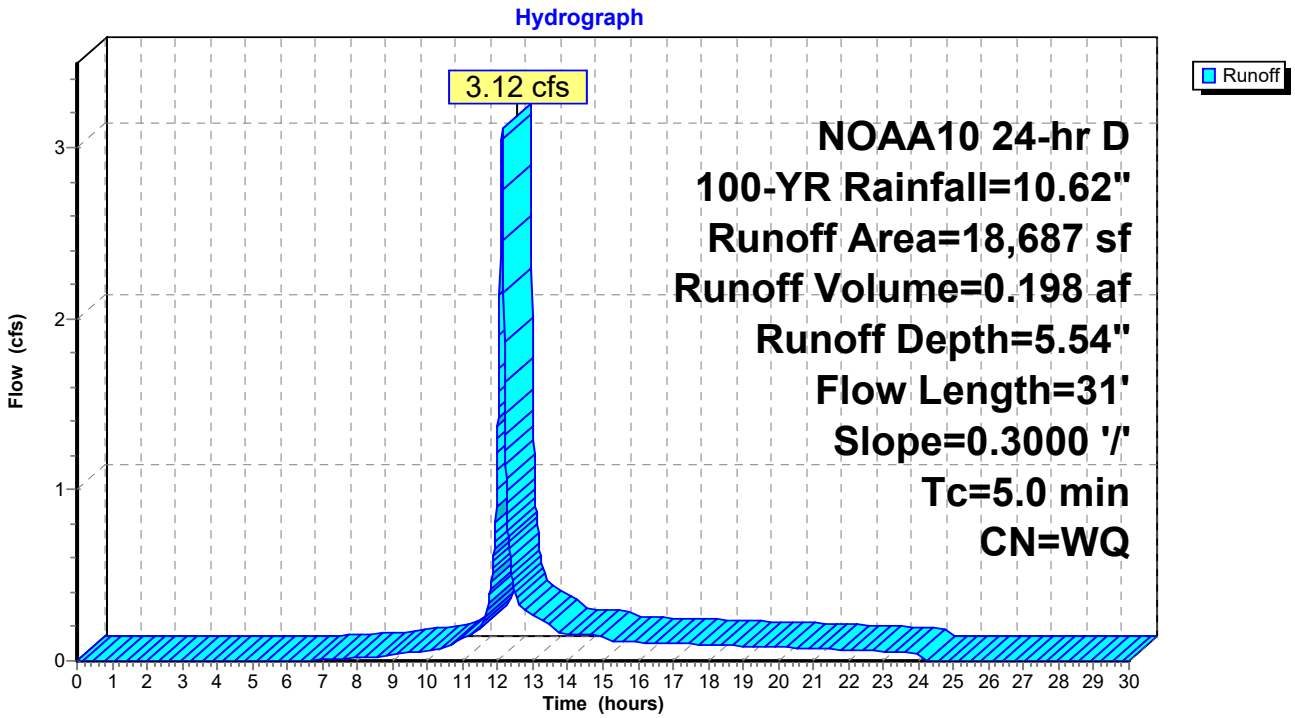
Runoff = 3.12 cfs @ 12.12 hrs, Volume= 0.198 af, Depth= 5.54"
Routed to Pond 8P : Infiltration Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
9	39	>75% Grass cover, Good HSG A
18,678	61	>75% Grass cover, Good, HSG B
18,687		Weighted Average
18,687		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	31	0.3000	0.30		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
1.7	31	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7P: P2d



Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.176 ac, 55.64% Impervious, Inflow Depth = 8.01" for 100-YR event
Inflow = 10.81 cfs @ 12.12 hrs, Volume= 0.786 af
Outflow = 2.76 cfs @ 12.27 hrs, Volume= 0.786 af, Atten= 74%, Lag= 9.2 min
Discarded = 0.57 cfs @ 12.27 hrs, Volume= 0.638 af
Primary = 2.19 cfs @ 12.27 hrs, Volume= 0.148 af
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 202.87' @ 12.27 hrs Surf.Area= 10,232 sf Storage= 8,216 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.9 min (831.3 - 773.3)

Volume	Invert	Avail.Storage	Storage Description
#1	202.00'	20,998 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

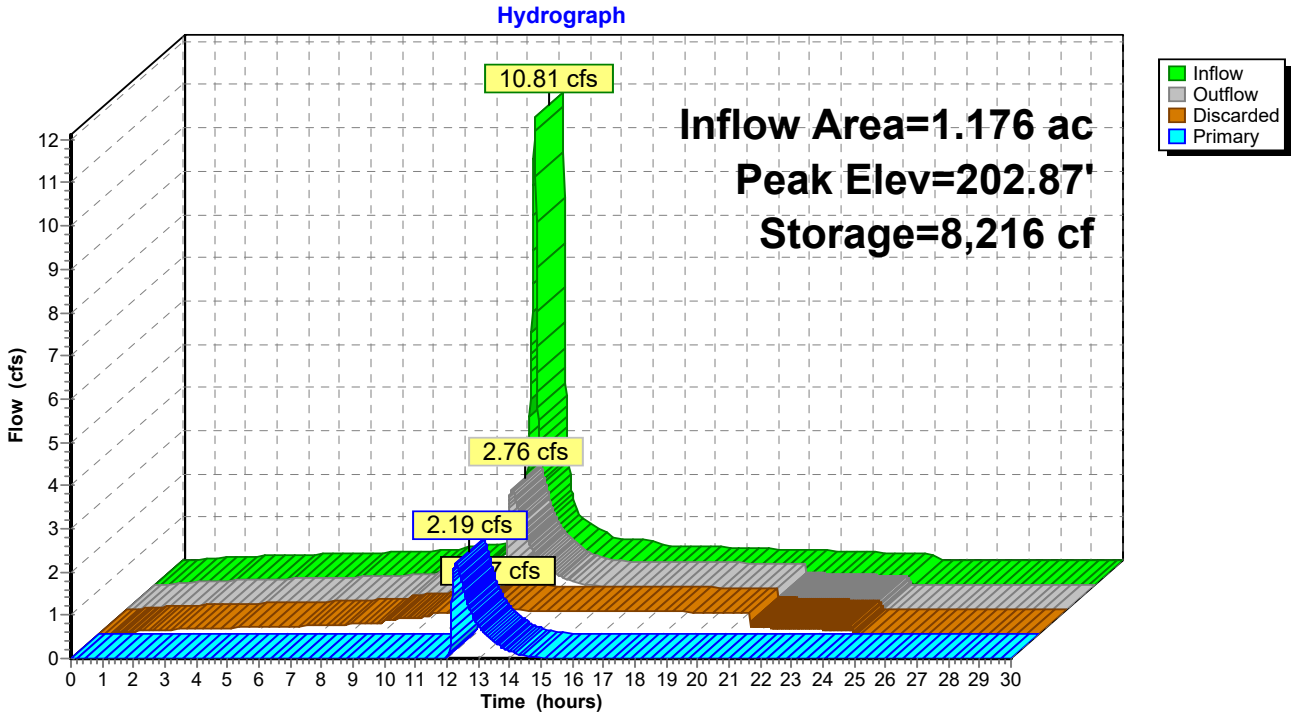
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
202.00	8,727	396.0	0	0	8,727
204.00	12,377	455.0	20,998	20,998	12,812

Device	Routing	Invert	Outlet Devices
#1	Primary	202.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Elev. (feet) 202.50 204.00 Width (feet) 3.00 3.00
#2	Discarded	202.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.57 cfs @ 12.27 hrs HW=202.87' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.57 cfs)

Primary OutFlow Max=2.19 cfs @ 12.27 hrs HW=202.87' TW=0.00' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 2.19 cfs @ 1.99 fps)

Pond 8P: Infiltration Basin #1



Summary for Subcatchment 9P: P2e

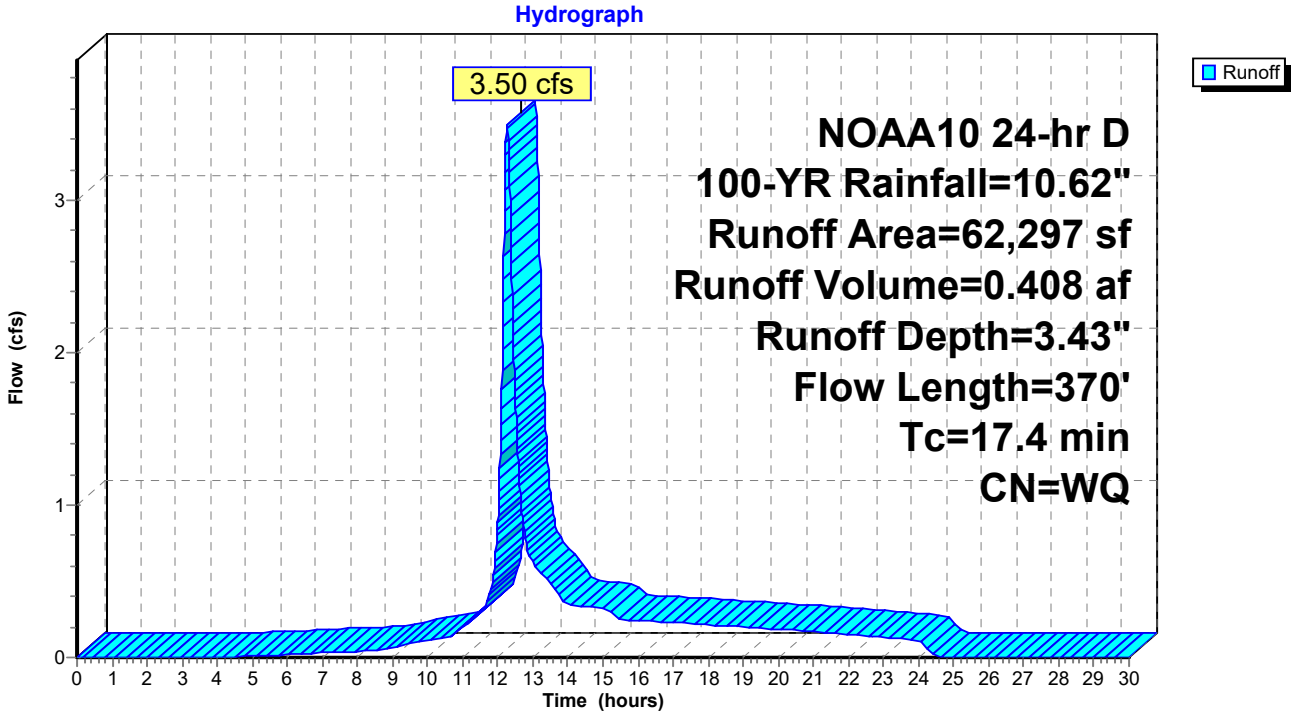
Runoff = 3.50 cfs @ 12.27 hrs, Volume= 0.408 af, Depth= 3.43"
Routed to Link 10P : Design Point #2: Flow to Rear Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
11,656	77	Woods, Good HSG D
14,351	55	Woods, Good HSG B
31,906	30	Woods, Good HSG A
2,239	39	>75% Grass cover, Good HSG A
2,145	61	>75% Grass cover, Good, HSG B
62,297		Weighted Average
62,297		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	28	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
8.1	342	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.4	370	Total			

Subcatchment 9P: P2e

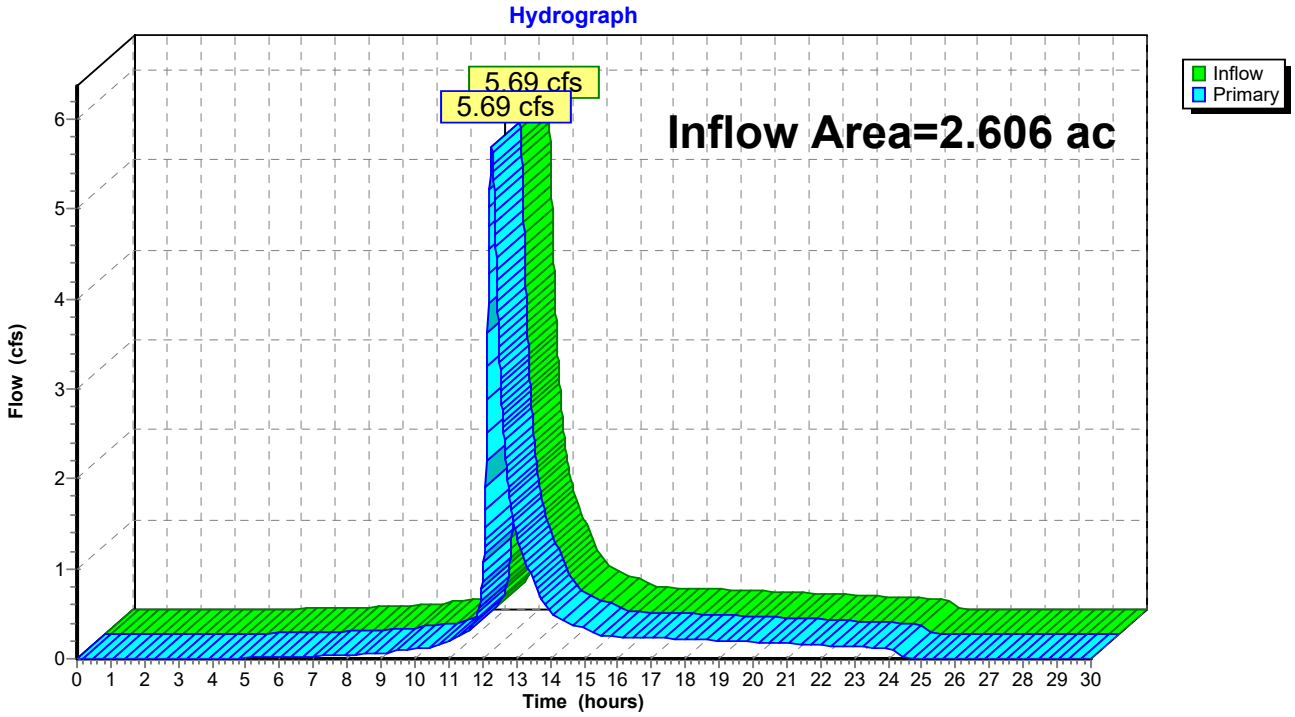


Summary for Link 10P: Design Point #2: Flow to Rear Wetland

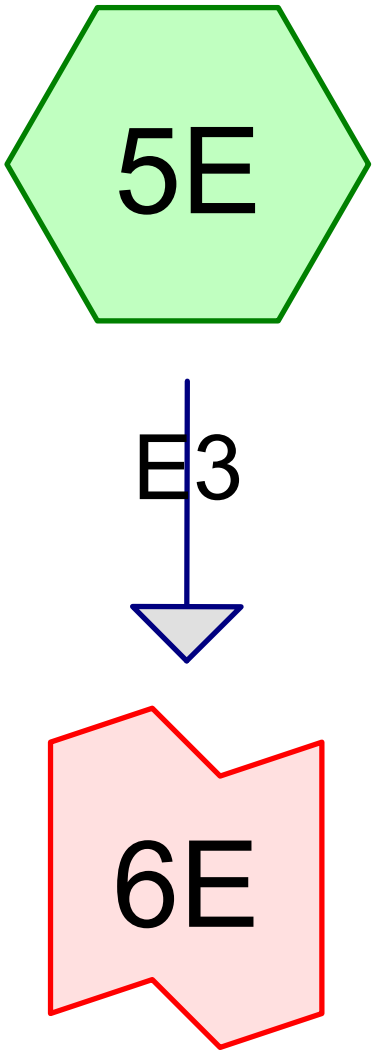
Inflow Area = 2.606 ac, 25.11% Impervious, Inflow Depth = 2.56" for 100-YR event
Inflow = 5.69 cfs @ 12.27 hrs, Volume= 0.556 af
Primary = 5.69 cfs @ 12.27 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 10P: Design Point #2: Flow to Rear Wetland



DESIGN POINT #3: FLOW TO WESTERN WETLANDS EXISTING CONDITIONS



Design Point #3: Flow to Western Wetland

Subcat Reach Pond Link

Routing Diagram for HydroCAD
Prepared by Legacy Engineering LLC, Printed 2/18/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NOAA10 24-hr	D	Default	24.00	1	3.84	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.04	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.77	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.62	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.277	30	Woods, Good HSG A (5E)
0.709	55	Woods, Good HSG B (5E)
0.278	77	Woods, Good HSG D (5E)
1.264	**54**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5E: E3 Runoff Area=55,051 sf 0.00% Impervious Runoff Depth=0.63"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=0.62 cfs 0.067 af

Link 6E: Design Point #3: Flow to Western Wetland Inflow=0.62 cfs 0.067 af
Primary=0.62 cfs 0.067 af

Total Runoff Area = 1.264 ac Runoff Volume = 0.067 af Average Runoff Depth = 0.63"
100.00% Pervious = 1.264 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5E: E3

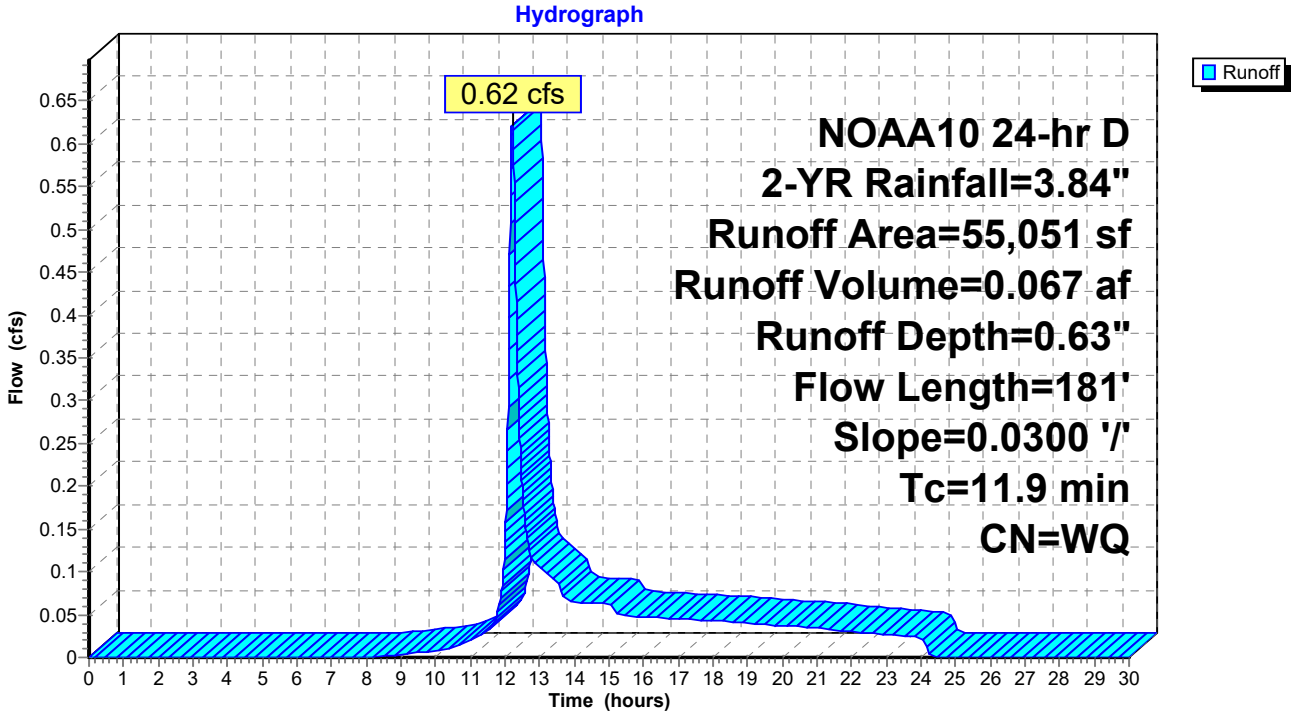
Runoff = 0.62 cfs @ 12.21 hrs, Volume= 0.067 af, Depth= 0.63"
Routed to Link 6E : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
30,873	55	Woods, Good HSG B
12,075	30	Woods, Good HSG A
55,051		Weighted Average
55,051		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 5E: E3

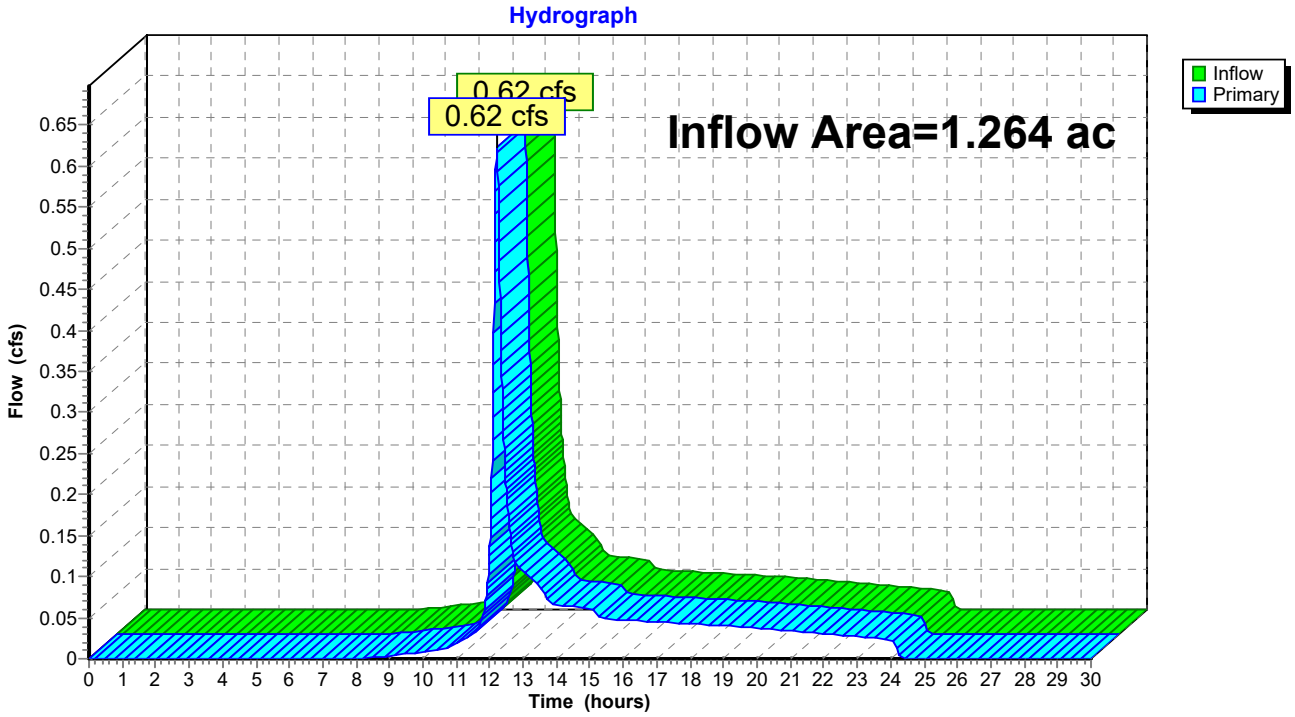


Summary for Link 6E: Design Point #3: Flow to Western Wetland

Inflow Area = 1.264 ac, 0.00% Impervious, Inflow Depth = 0.63" for 2-YR event
Inflow = 0.62 cfs @ 12.21 hrs, Volume= 0.067 af
Primary = 0.62 cfs @ 12.21 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 6E: Design Point #3: Flow to Western Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5E: E3 Runoff Area=55,051 sf 0.00% Impervious Runoff Depth=1.65"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=1.90 cfs 0.174 af

Link 6E: Design Point #3: Flow to Western Wetland Inflow=1.90 cfs 0.174 af
Primary=1.90 cfs 0.174 af

Total Runoff Area = 1.264 ac Runoff Volume = 0.174 af Average Runoff Depth = 1.65"
100.00% Pervious = 1.264 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5E: E3

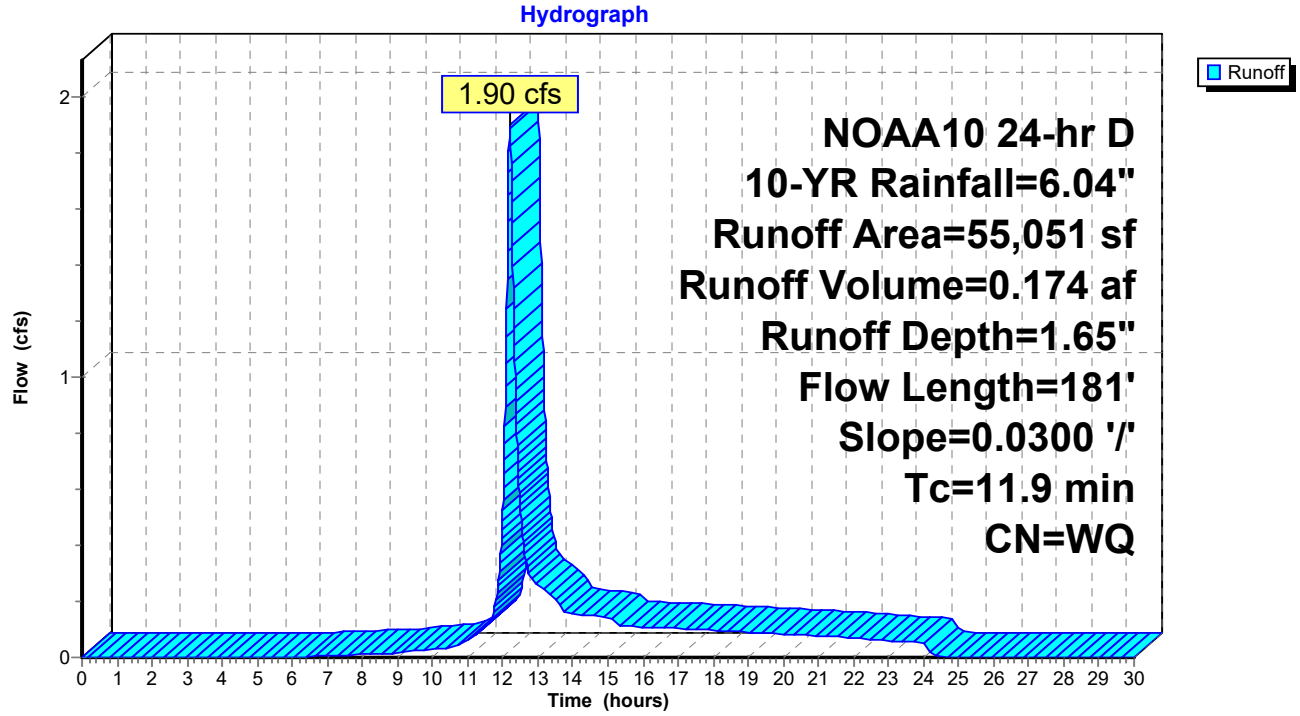
Runoff = 1.90 cfs @ 12.20 hrs, Volume= 0.174 af, Depth= 1.65"
Routed to Link 6E : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
30,873	55	Woods, Good HSG B
12,075	30	Woods, Good HSG A
55,051		Weighted Average
55,051		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 5E: E3

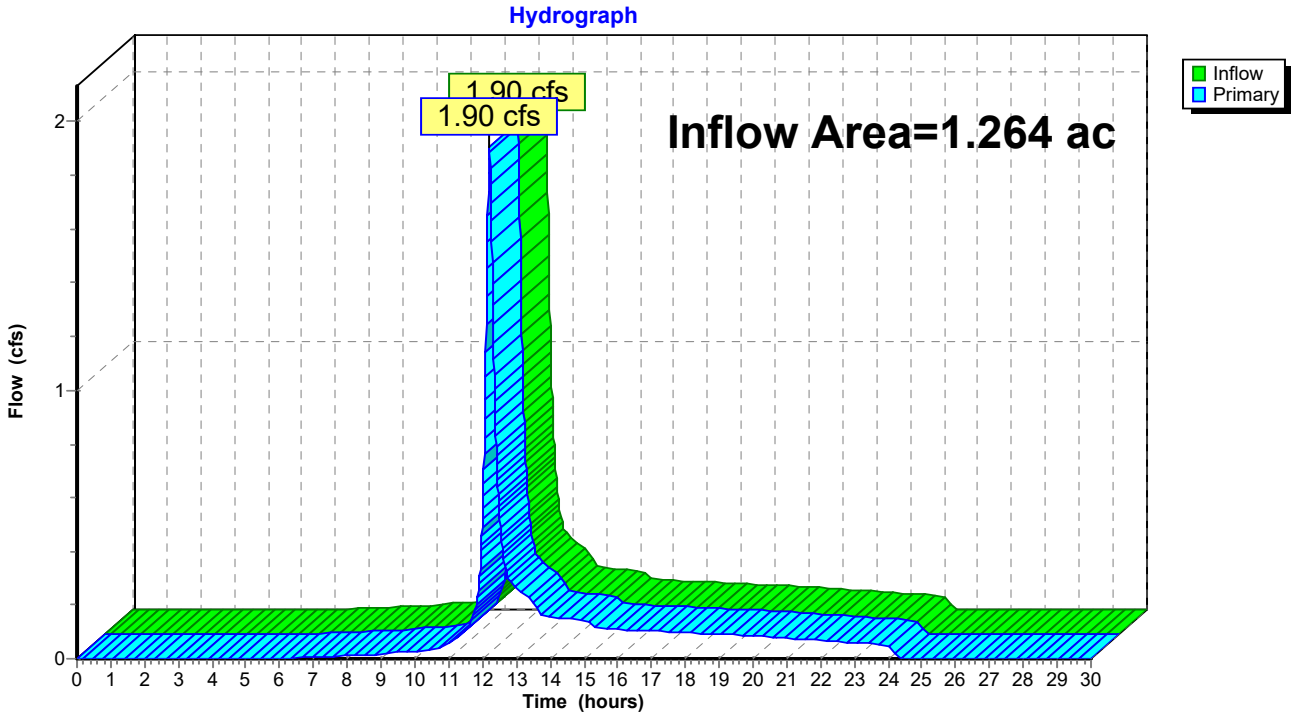


Summary for Link 6E: Design Point #3: Flow to Western Wetland

Inflow Area = 1.264 ac, 0.00% Impervious, Inflow Depth = 1.65" for 10-YR event
Inflow = 1.90 cfs @ 12.20 hrs, Volume= 0.174 af
Primary = 1.90 cfs @ 12.20 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 6E: Design Point #3: Flow to Western Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5E: E3 Runoff Area=55,051 sf 0.00% Impervious Runoff Depth=2.67"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=3.09 cfs 0.281 af

Link 6E: Design Point #3: Flow to Western Wetland Inflow=3.09 cfs 0.281 af
Primary=3.09 cfs 0.281 af

Total Runoff Area = 1.264 ac Runoff Volume = 0.281 af Average Runoff Depth = 2.67"
100.00% Pervious = 1.264 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5E: E3

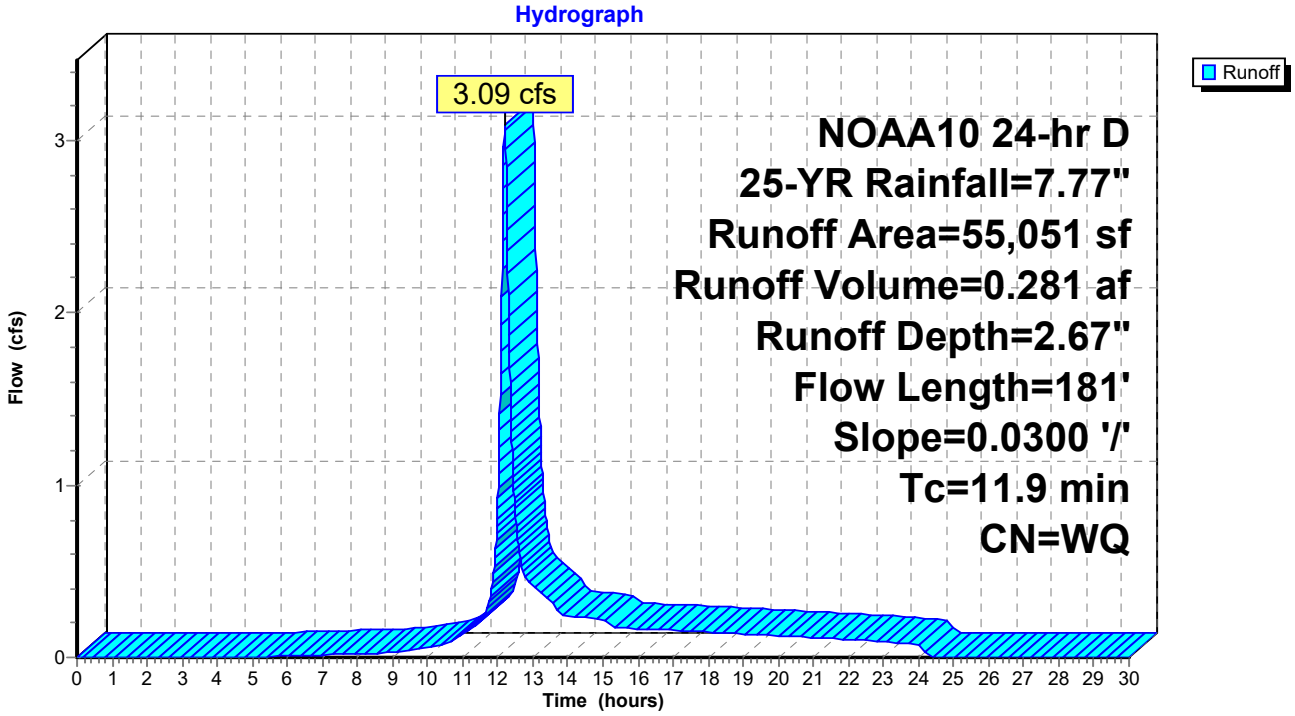
Runoff = 3.09 cfs @ 12.20 hrs, Volume= 0.281 af, Depth= 2.67"
Routed to Link 6E : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
30,873	55	Woods, Good HSG B
12,075	30	Woods, Good HSG A
55,051		Weighted Average
55,051		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 5E: E3

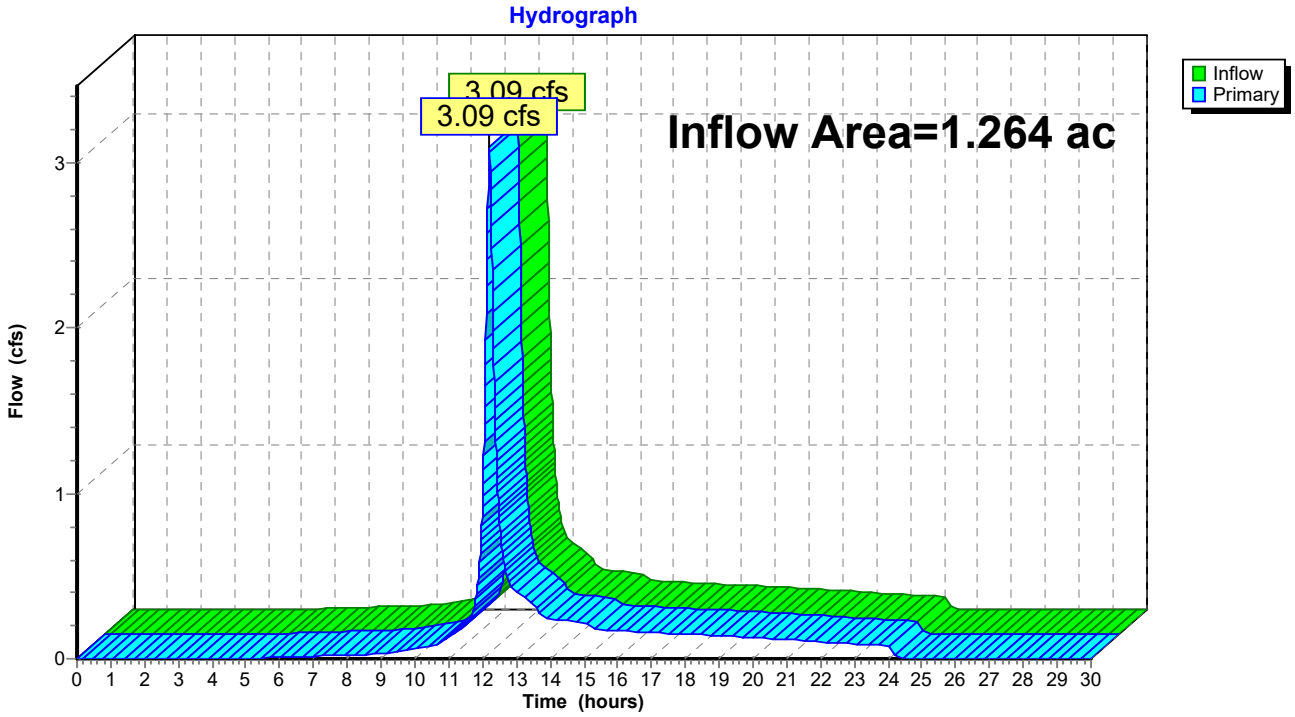


Summary for Link 6E: Design Point #3: Flow to Western Wetland

Inflow Area = 1.264 ac, 0.00% Impervious, Inflow Depth = 2.67" for 25-YR event
Inflow = 3.09 cfs @ 12.20 hrs, Volume= 0.281 af
Primary = 3.09 cfs @ 12.20 hrs, Volume= 0.281 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 6E: Design Point #3: Flow to Western Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5E: E3 Runoff Area=55,051 sf 0.00% Impervious Runoff Depth=4.60"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=5.39 cfs 0.484 af

Link 6E: Design Point #3: Flow to Western Wetland Inflow=5.39 cfs 0.484 af
Primary=5.39 cfs 0.484 af

Total Runoff Area = 1.264 ac Runoff Volume = 0.484 af Average Runoff Depth = 4.60"
100.00% Pervious = 1.264 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 5E: E3

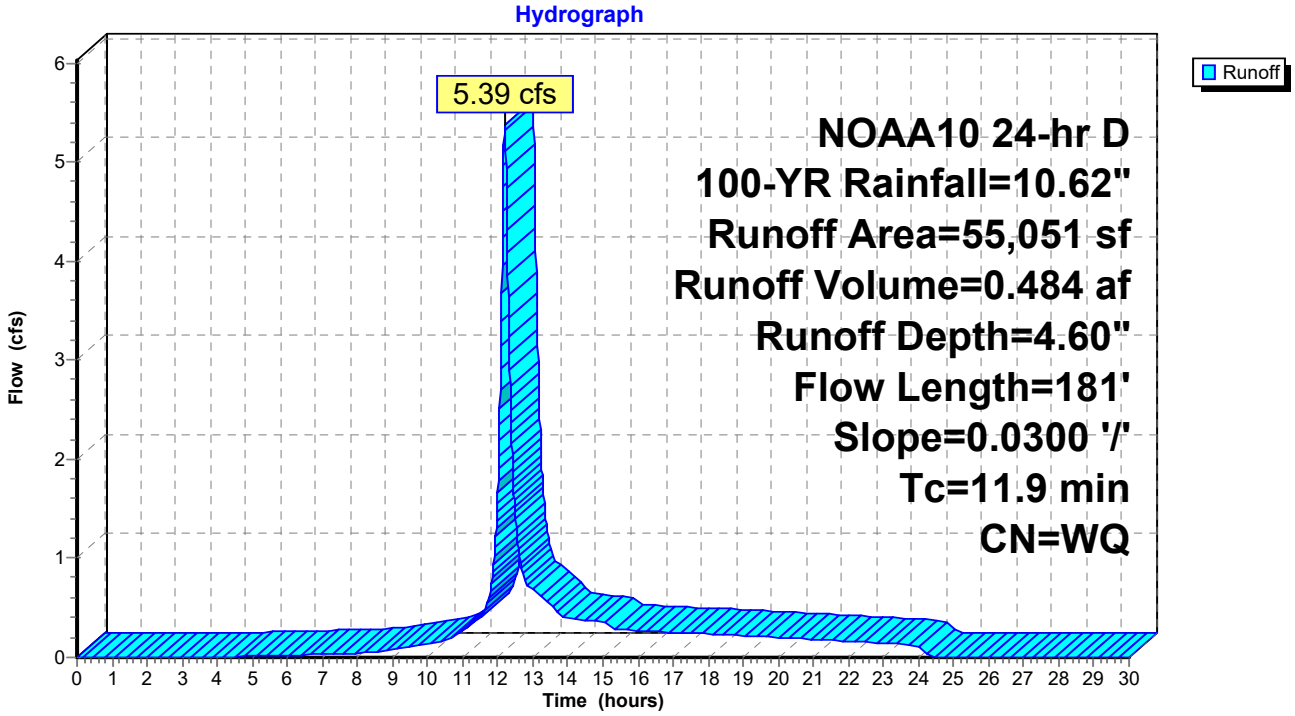
Runoff = 5.39 cfs @ 12.20 hrs, Volume= 0.484 af, Depth= 4.60"
Routed to Link 6E : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
30,873	55	Woods, Good HSG B
12,075	30	Woods, Good HSG A
55,051		Weighted Average
55,051		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 5E: E3

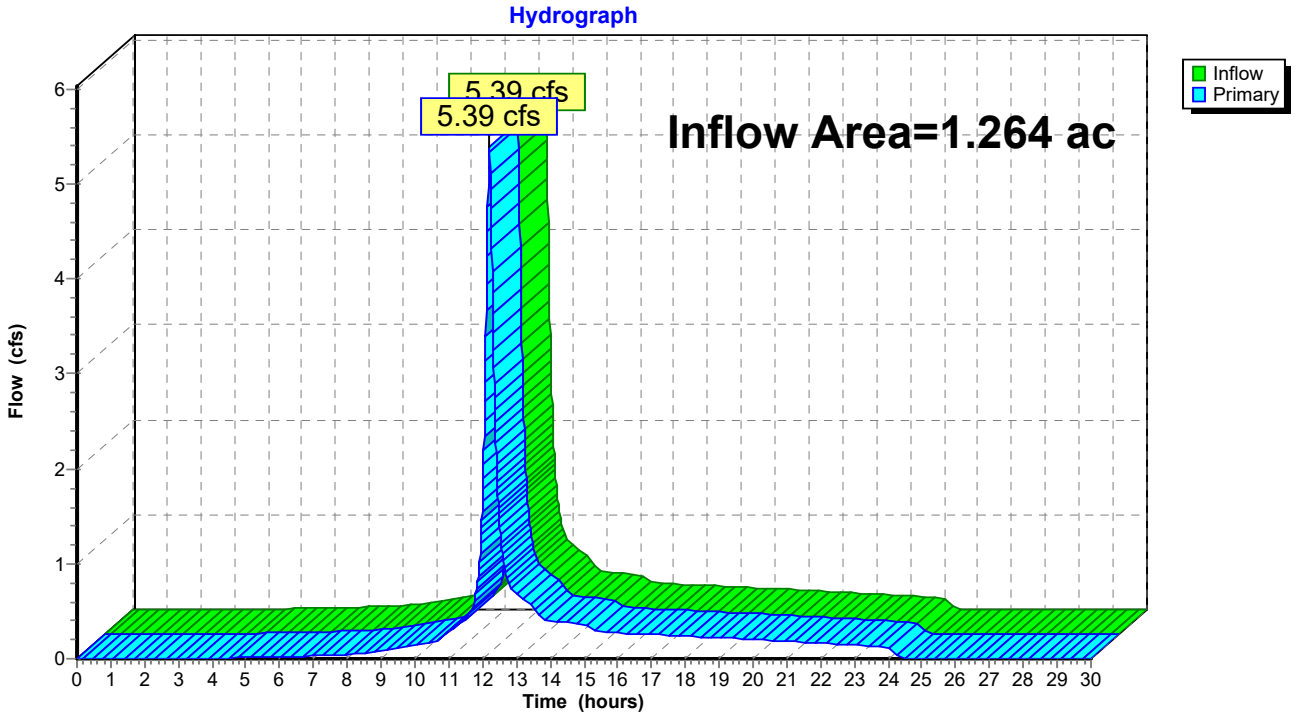


Summary for Link 6E: Design Point #3: Flow to Western Wetland

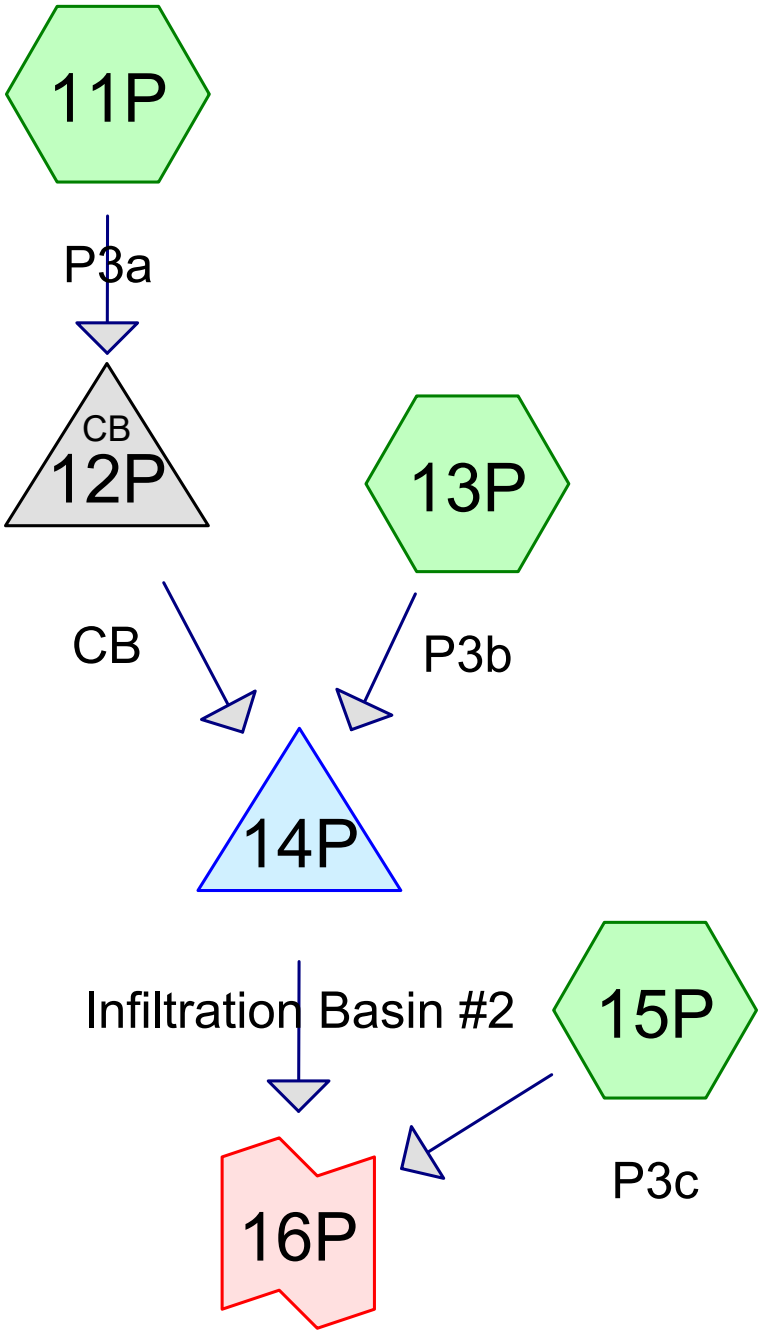
Inflow Area = 1.264 ac, 0.00% Impervious, Inflow Depth = 4.60" for 100-YR event
Inflow = 5.39 cfs @ 12.20 hrs, Volume= 0.484 af
Primary = 5.39 cfs @ 12.20 hrs, Volume= 0.484 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 6E: Design Point #3: Flow to Western Wetland



DESIGN POINT #3: FLOW TO WESTERN WETLANDS PROPOSED CONDITIONS



Design Point #3: Flow to Western Wetland

Subcat Reach Pond Link

Routing Diagram for HydroCAD
Prepared by Legacy Engineering LLC, Printed 8/19/2025

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	NOAA10 24-hr	D	Default	24.00	1	3.84	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.04	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.77	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.62	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.259	39	>75% Grass cover, Good HSG A (11P, 13P, 15P)
0.039	61	>75% Grass cover, Good, HSG B (13P, 15P)
0.082	98	Paved parking HSG A (11P)
0.030	30	Woods, Good HSG A (15P)
0.625	55	Woods, Good HSG B (15P)
0.278	77	Woods, Good HSG D (15P)
1.313	**59**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 11P: P3a Runoff Area=4,723 sf 75.59% Impervious Runoff Depth=2.73"
Flow Length=120' Tc=5.0 min CN=WQ Runoff=0.33 cfs 0.025 af

Pond 12P: CB Peak Elev=203.38' Inflow=0.33 cfs 0.025 af
6.0" Round Culvert x 2.00 n=0.011 L=16.0' S=0.0062 '/' Outflow=0.33 cfs 0.025 af

Subcatchment 13P: P3b Runoff Area=9,191 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=123' Tc=6.6 min CN=WQ Runoff=0.00 cfs 0.001 af

Pond 14P: Infiltration Basin #2 Peak Elev=203.13' Storage=90 cf Inflow=0.33 cfs 0.025 af
Discarded=0.14 cfs 0.025 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.025 af

Subcatchment 15P: P3c Runoff Area=43,291 sf 0.00% Impervious Runoff Depth=0.79"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=0.62 cfs 0.066 af

Link 16P: Design Point #3: Flow to Western Wetland Inflow=0.62 cfs 0.066 af
Primary=0.62 cfs 0.066 af

Total Runoff Area = 1.313 ac Runoff Volume = 0.091 af Average Runoff Depth = 0.83"
93.76% Pervious = 1.231 ac 6.24% Impervious = 0.082 ac

Summary for Subcatchment 11P: P3a

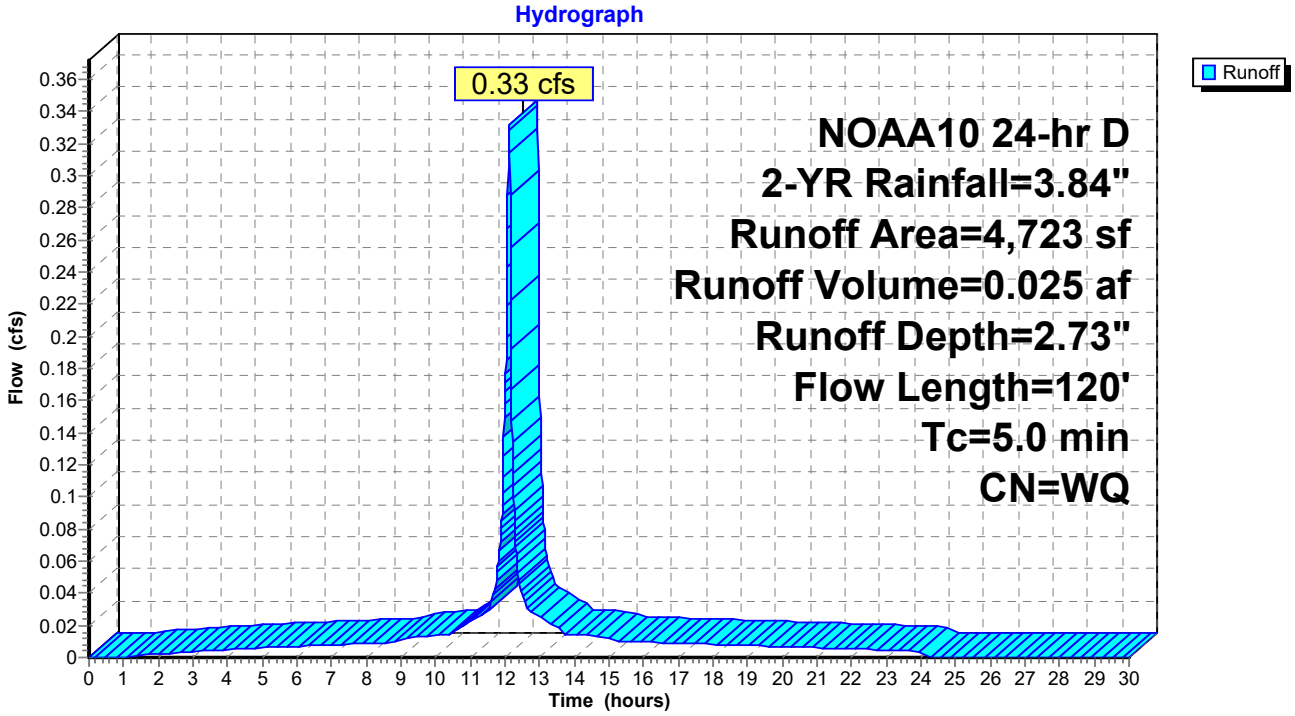
Runoff = 0.33 cfs @ 12.12 hrs, Volume= 0.025 af, Depth= 2.73"
Routed to Pond 12P : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
3,570	98	Paved parking HSG A
1,153	39	>75% Grass cover, Good HSG A
4,723		Weighted Average
1,153		24.41% Pervious Area
3,570		75.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	38	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
0.2	12	0.0200	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
0.4	70	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11P: P3a



Summary for Pond 12P: CB

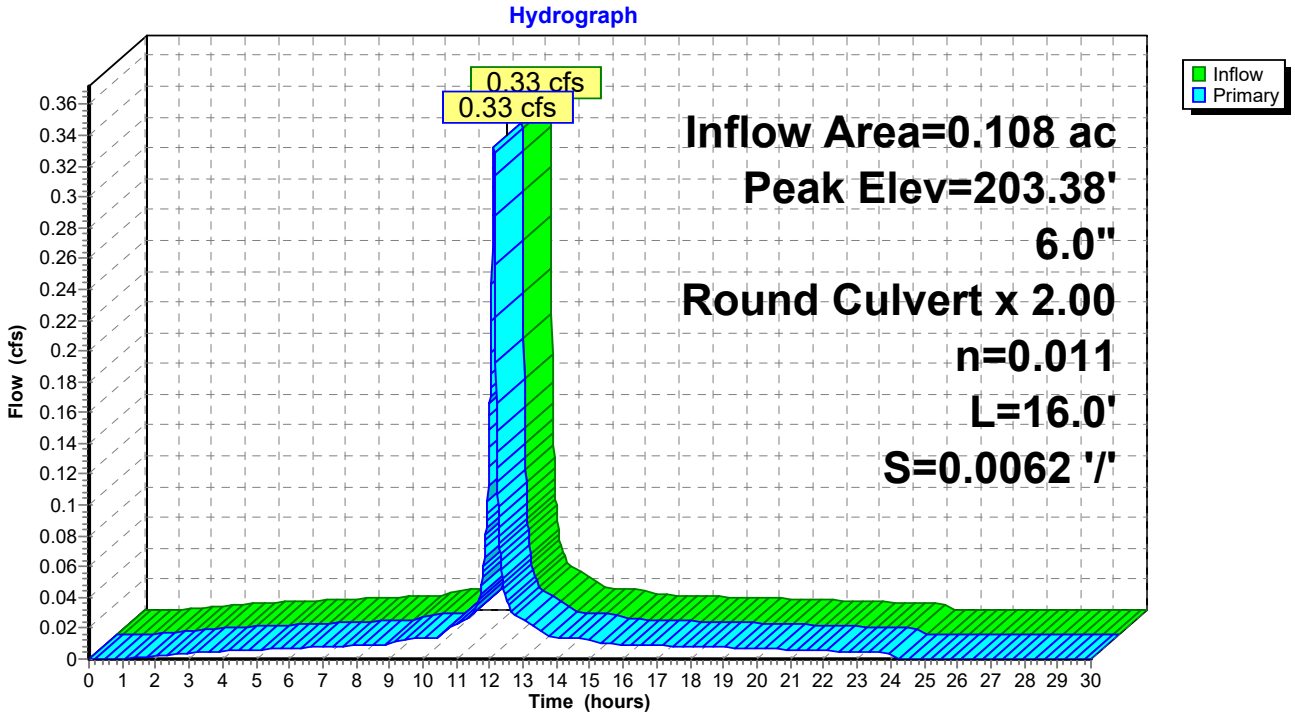
Inflow Area = 0.108 ac, 75.59% Impervious, Inflow Depth = 2.73" for 2-YR event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.025 af
Outflow = 0.33 cfs @ 12.12 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.12 hrs, Volume= 0.025 af
Routed to Pond 14P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.38' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.10'	**6.0" Round Culvert X 2.00** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.10' / 203.00' S= 0.0062 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.33 cfs @ 12.12 hrs HW=203.38' TW=203.09' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.33 cfs @ 2.08 fps)

Pond 12P: CB



Summary for Subcatchment 13P: P3b

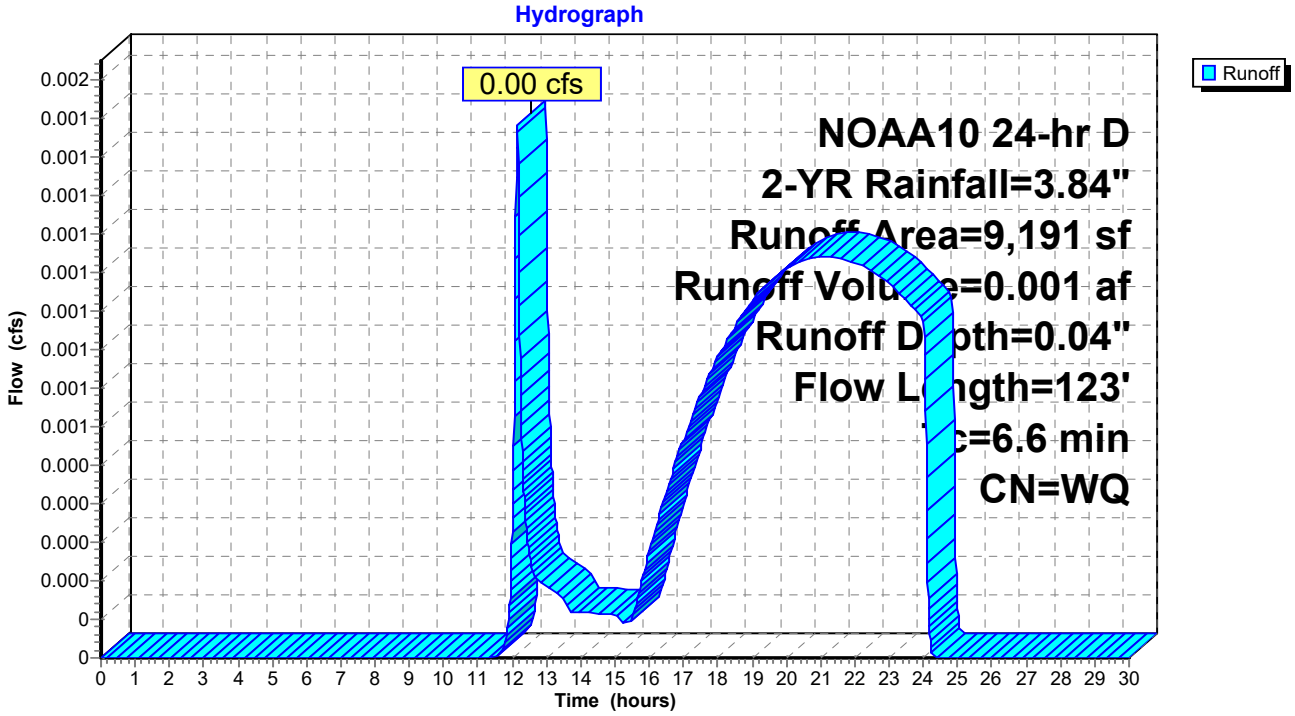
Runoff = 0.00 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 0.04"
Routed to Pond 14P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
9,111	39	>75% Grass cover, Good HSG A
80	61	>75% Grass cover, Good, HSG B
9,191		Weighted Average
9,191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0900	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
2.5	73	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.6	123	Total			

Subcatchment 13P: P3b



Summary for Pond 14P: Infiltration Basin #2

Inflow Area = 0.319 ac, 25.66% Impervious, Inflow Depth = 0.95" for 2-YR event
Inflow = 0.33 cfs @ 12.12 hrs, Volume= 0.025 af
Outflow = 0.14 cfs @ 12.21 hrs, Volume= 0.025 af, Atten= 59%, Lag= 5.4 min
Discarded = 0.14 cfs @ 12.21 hrs, Volume= 0.025 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.13' @ 12.21 hrs Surf.Area= 707 sf Storage= 90 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.7 min (769.2 - 767.6)

Volume	Invert	Avail.Storage	Storage Description
#1	203.00'	2,468 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

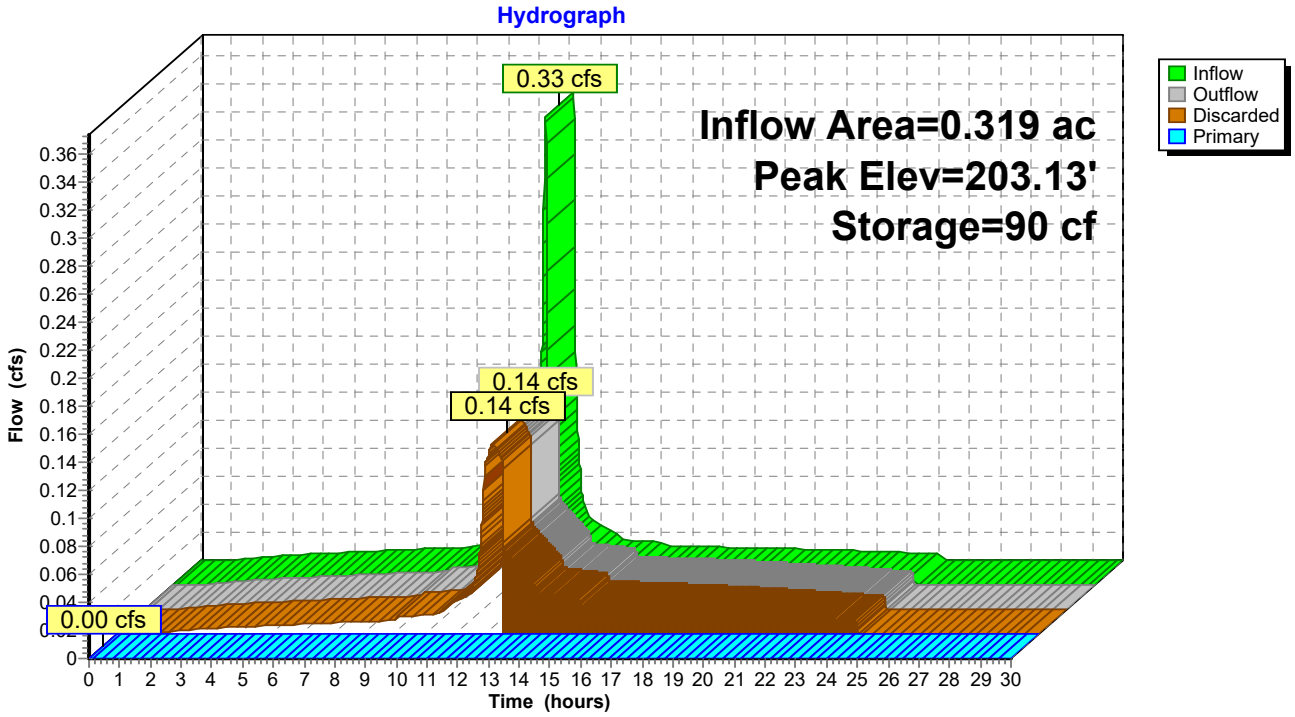
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.00	639	117.0	0	0	639
204.00	1,230	154.0	919	919	1,448
205.00	1,893	178.0	1,550	2,468	2,104

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	203.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 12.21 hrs HW=203.13' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=203.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 14P: Infiltration Basin #2



Summary for Subcatchment 15P: P3c

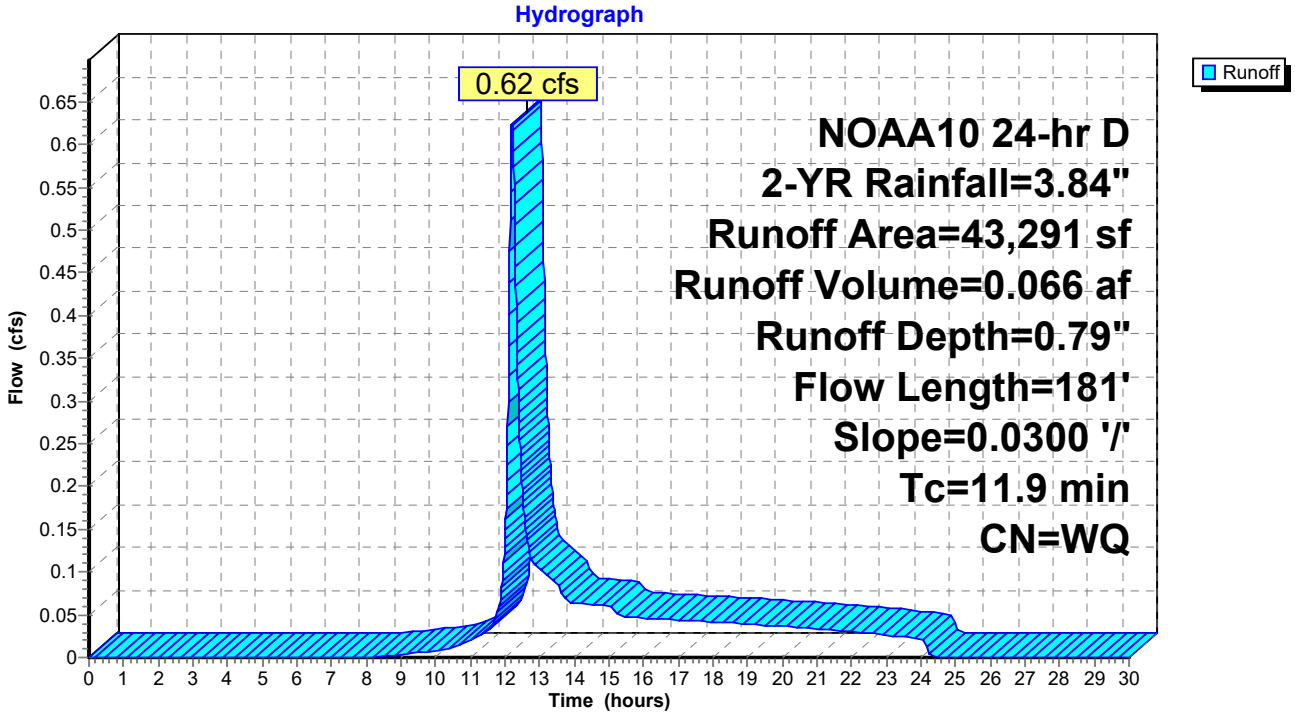
Runoff = 0.62 cfs @ 12.21 hrs, Volume= 0.066 af, Depth= 0.79"
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.84"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
27,238	55	Woods, Good HSG B
1,299	30	Woods, Good HSG A
1,032	39	>75% Grass cover, Good HSG A
1,619	61	>75% Grass cover, Good, HSG B
43,291		Weighted Average
43,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 15P: P3c

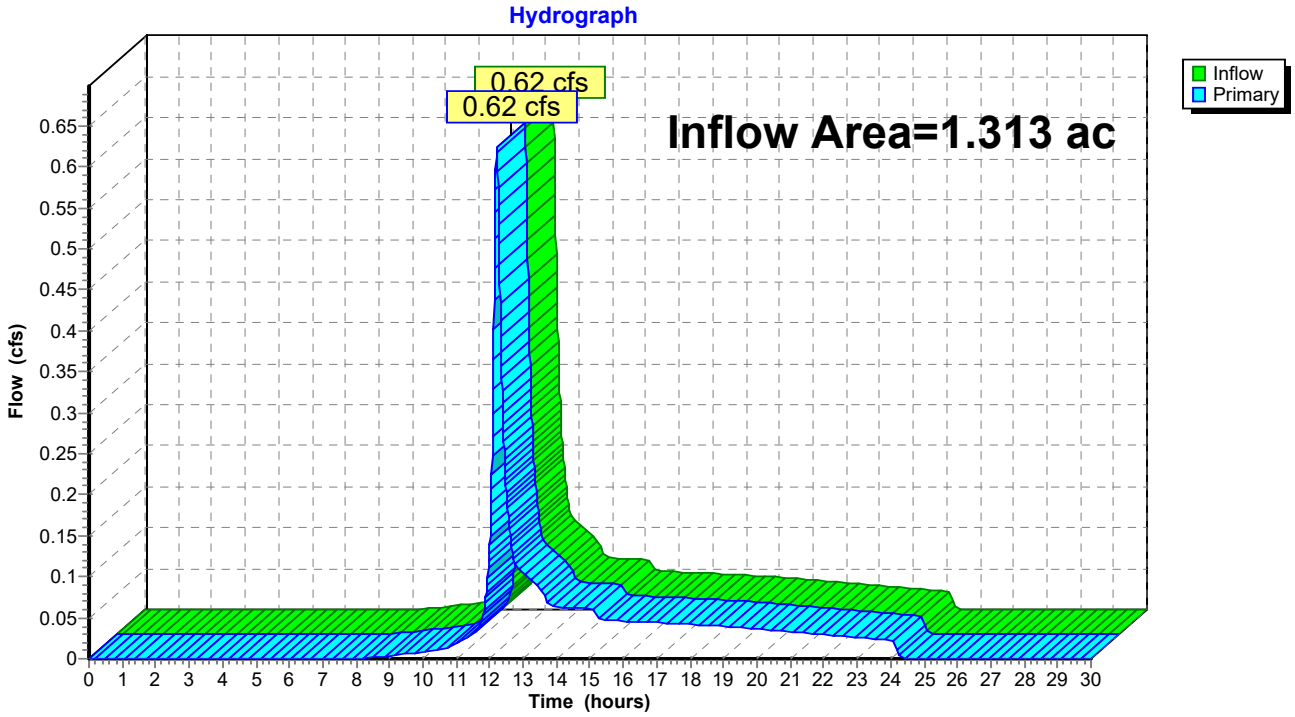


Summary for Link 16P: Design Point #3: Flow to Western Wetland

Inflow Area = 1.313 ac, 6.24% Impervious, Inflow Depth = 0.60" for 2-YR event
Inflow = 0.62 cfs @ 12.21 hrs, Volume= 0.066 af
Primary = 0.62 cfs @ 12.21 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 16P: Design Point #3: Flow to Western Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 11P: P3a Runoff Area=4,723 sf 75.59% Impervious Runoff Depth=4.50"
Flow Length=120' Tc=5.0 min CN=WQ Runoff=0.53 cfs 0.041 af

Pond 12P: CB Peak Elev=203.48' Inflow=0.53 cfs 0.041 af
6.0" Round Culvert x 2.00 n=0.011 L=16.0' S=0.0062 '/' Outflow=0.53 cfs 0.041 af

Subcatchment 13P: P3b Runoff Area=9,191 sf 0.00% Impervious Runoff Depth=0.47"
Flow Length=123' Tc=6.6 min CN=WQ Runoff=0.03 cfs 0.008 af

Pond 14P: Infiltration Basin #2 Peak Elev=203.32' Storage=231 cf Inflow=0.54 cfs 0.049 af
Discarded=0.15 cfs 0.049 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.049 af

Subcatchment 15P: P3c Runoff Area=43,291 sf 0.00% Impervious Runoff Depth=2.04"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=1.86 cfs 0.169 af

Link 16P: Design Point #3: Flow to Western Wetland Inflow=1.86 cfs 0.169 af
Primary=1.86 cfs 0.169 af

Total Runoff Area = 1.313 ac Runoff Volume = 0.218 af Average Runoff Depth = 1.99"
93.76% Pervious = 1.231 ac 6.24% Impervious = 0.082 ac

Summary for Subcatchment 11P: P3a

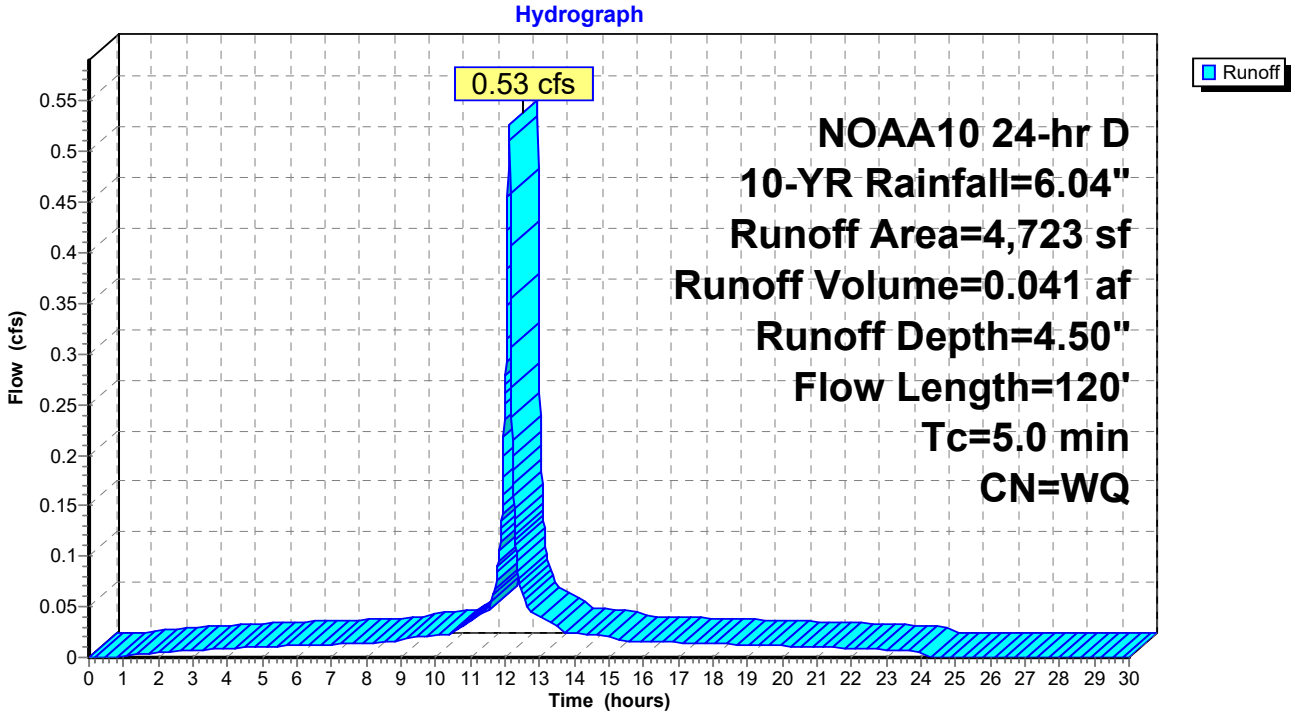
Runoff = 0.53 cfs @ 12.12 hrs, Volume= 0.041 af, Depth= 4.50"
Routed to Pond 12P : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
3,570	98	Paved parking HSG A
1,153	39	>75% Grass cover, Good HSG A
4,723		Weighted Average
1,153		24.41% Pervious Area
3,570		75.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	38	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
0.2	12	0.0200	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
0.4	70	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11P: P3a



Summary for Pond 12P: CB

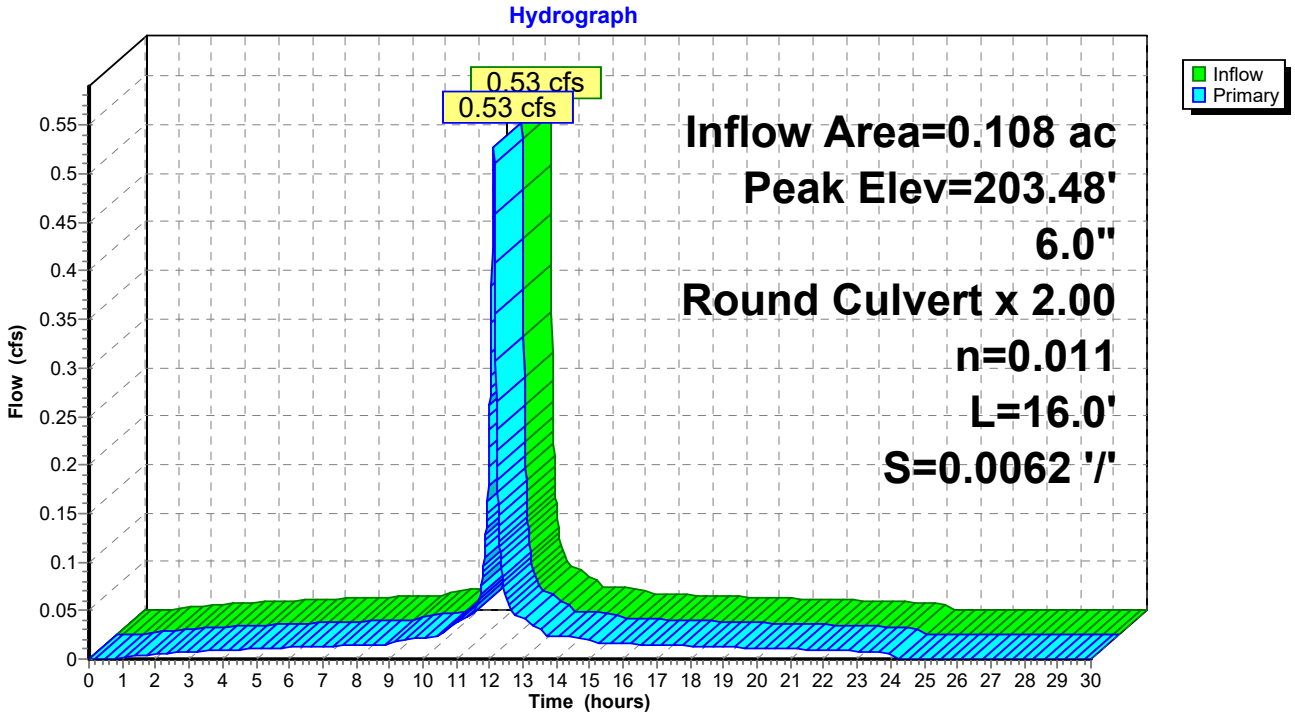
Inflow Area = 0.108 ac, 75.59% Impervious, Inflow Depth = 4.50" for 10-YR event
Inflow = 0.53 cfs @ 12.12 hrs, Volume= 0.041 af
Outflow = 0.53 cfs @ 12.12 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.12 hrs, Volume= 0.041 af
Routed to Pond 14P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.48' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.10'	**6.0" Round Culvert X 2.00** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.10' / 203.00' S= 0.0062 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.53 cfs @ 12.12 hrs HW=203.47' TW=203.20' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.53 cfs @ 2.32 fps)

Pond 12P: CB



Summary for Subcatchment 13P: P3b

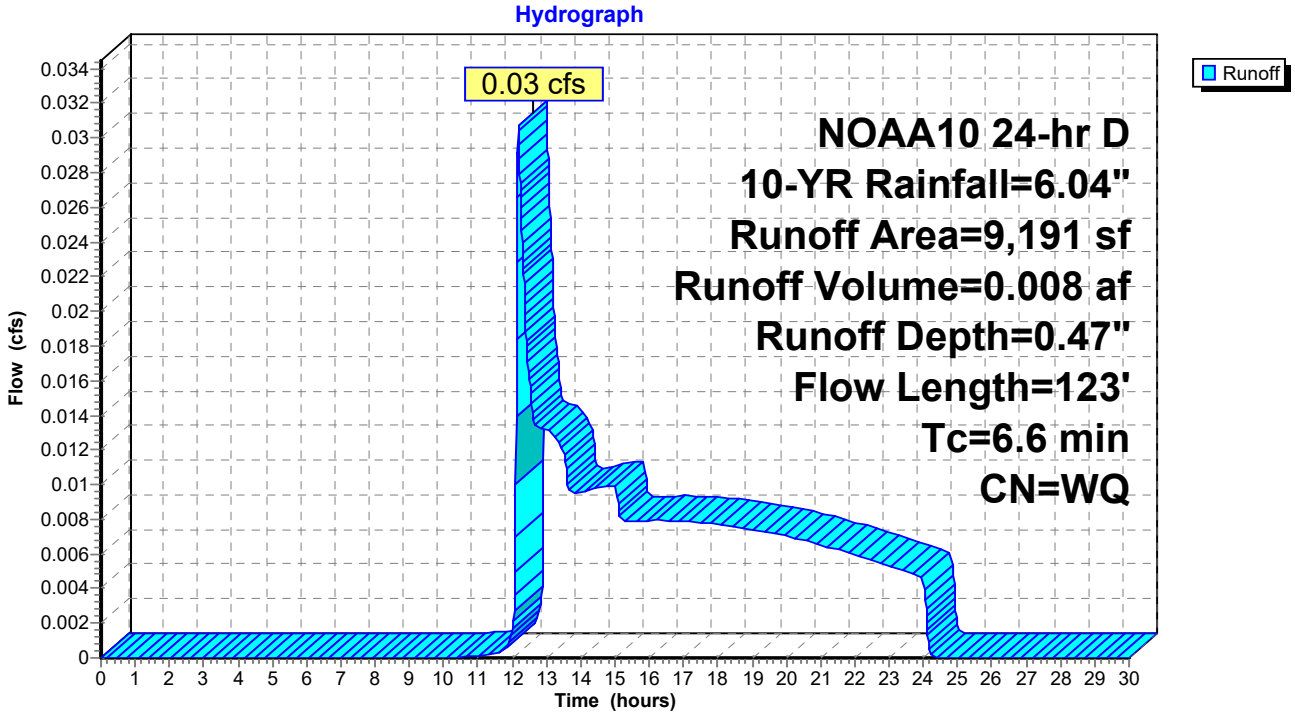
Runoff = 0.03 cfs @ 12.18 hrs, Volume= 0.008 af, Depth= 0.47"
Routed to Pond 14P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
9,111	39	>75% Grass cover, Good HSG A
80	61	>75% Grass cover, Good, HSG B
9,191		Weighted Average
9,191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0900	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
2.5	73	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.6	123	Total			

Subcatchment 13P: P3b



Summary for Pond 14P: Infiltration Basin #2

Inflow Area = 0.319 ac, 25.66% Impervious, Inflow Depth = 1.84" for 10-YR event
Inflow = 0.54 cfs @ 12.12 hrs, Volume= 0.049 af
Outflow = 0.15 cfs @ 12.28 hrs, Volume= 0.049 af, Atten= 72%, Lag= 9.3 min
Discarded = 0.15 cfs @ 12.28 hrs, Volume= 0.049 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.32' @ 12.28 hrs Surf.Area= 807 sf Storage= 231 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.5 min (802.4 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	203.00'	2,468 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

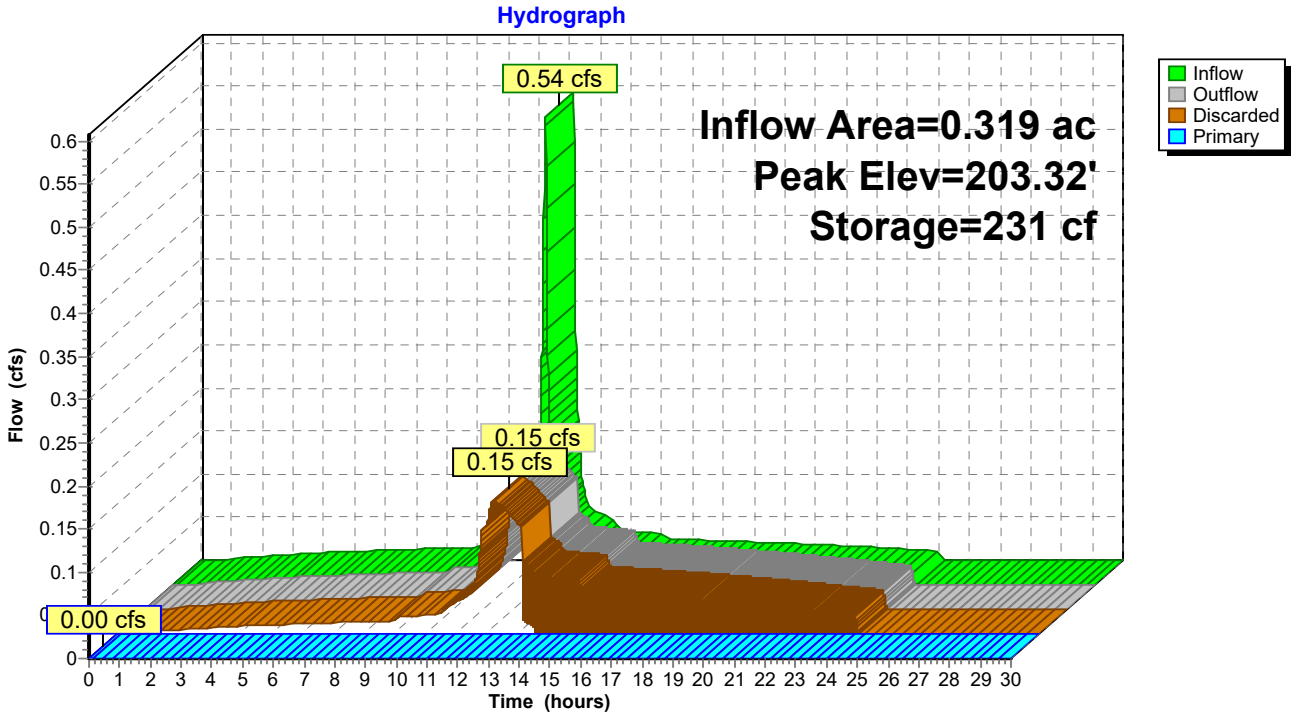
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.00	639	117.0	0	0	639
204.00	1,230	154.0	919	919	1,448
205.00	1,893	178.0	1,550	2,468	2,104

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	203.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 12.28 hrs HW=203.32' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=203.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 14P: Infiltration Basin #2



Summary for Subcatchment 15P: P3c

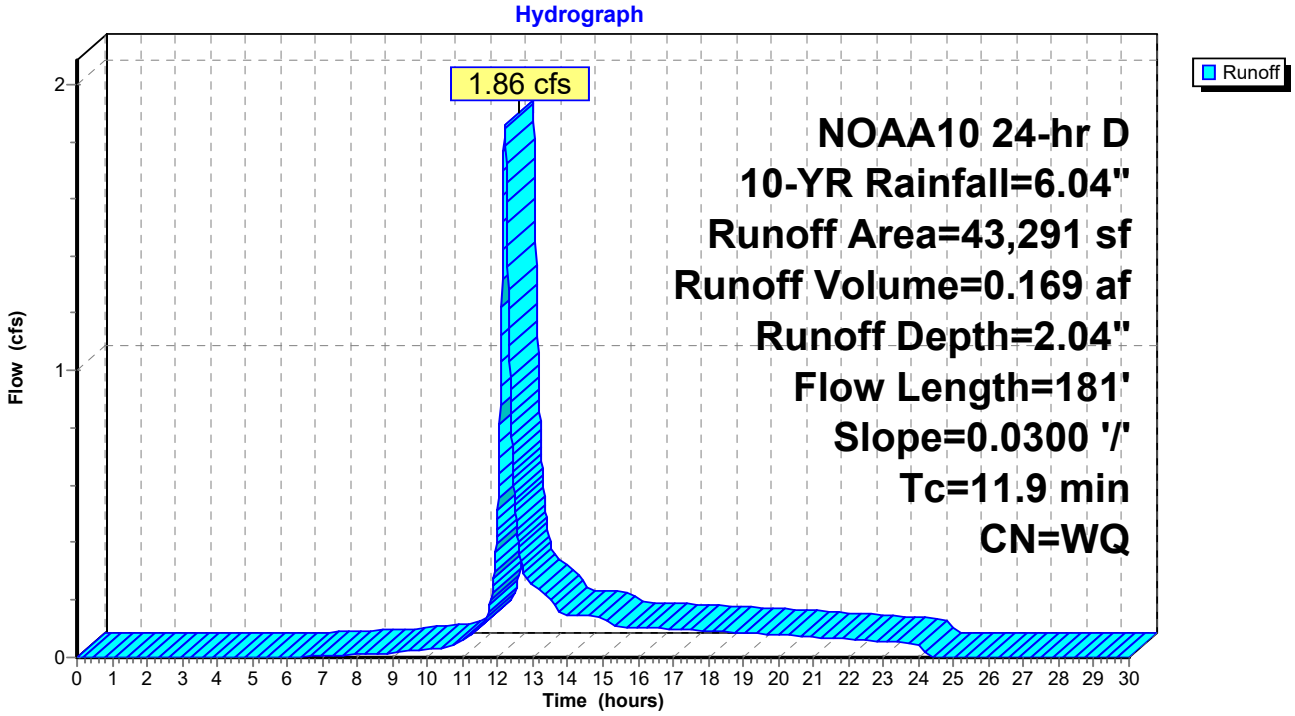
Runoff = 1.86 cfs @ 12.20 hrs, Volume= 0.169 af, Depth= 2.04"
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 10-YR Rainfall=6.04"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
27,238	55	Woods, Good HSG B
1,299	30	Woods, Good HSG A
1,032	39	>75% Grass cover, Good HSG A
1,619	61	>75% Grass cover, Good, HSG B
43,291		Weighted Average
43,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 15P: P3c

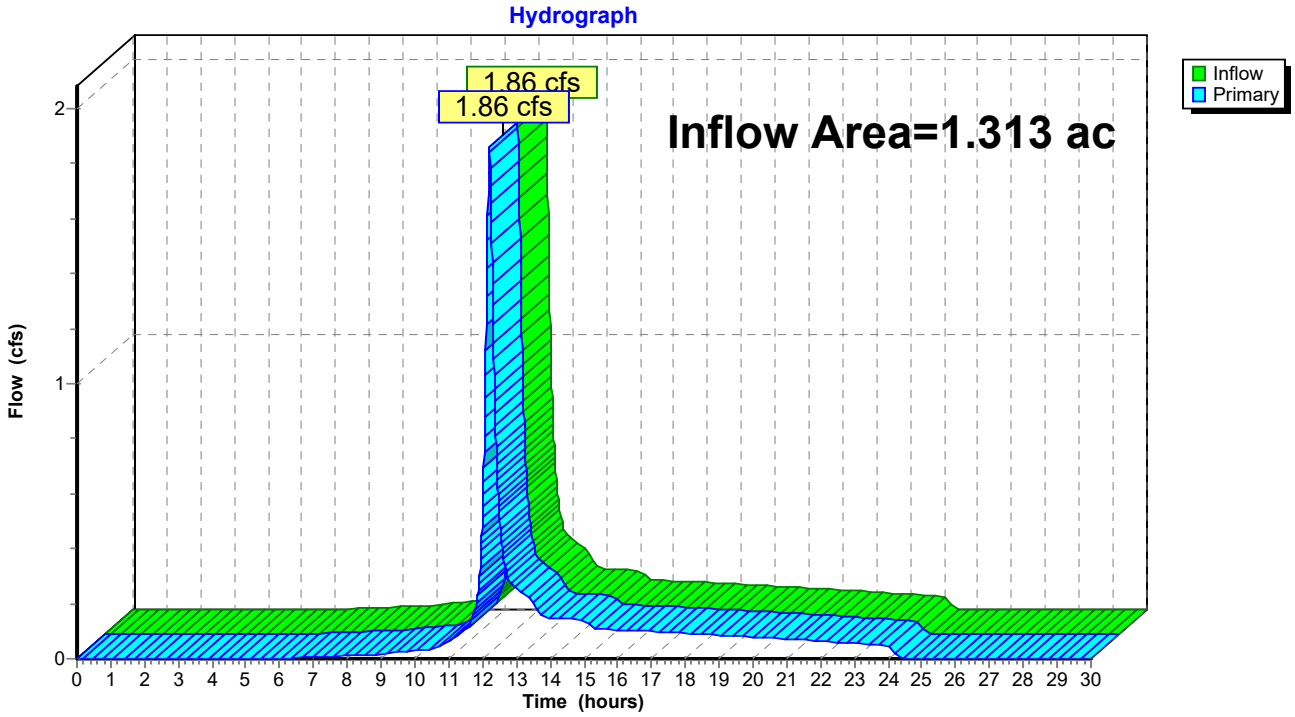


Summary for Link 16P: Design Point #3: Flow to Western Wetland

Inflow Area = 1.313 ac, 6.24% Impervious, Inflow Depth = 1.54" for 10-YR event
Inflow = 1.86 cfs @ 12.20 hrs, Volume= 0.169 af
Primary = 1.86 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 16P: Design Point #3: Flow to Western Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 11P: P3a Runoff Area=4,723 sf 75.59% Impervious Runoff Depth=5.95"
Flow Length=120' Tc=5.0 min CN=WQ Runoff=0.70 cfs 0.054 af

Pond 12P: CB Peak Elev=203.58' Inflow=0.70 cfs 0.054 af
6.0" Round Culvert x 2.00 n=0.011 L=16.0' S=0.0062 '/' Outflow=0.70 cfs 0.054 af

Subcatchment 13P: P3b Runoff Area=9,191 sf 0.00% Impervious Runoff Depth=1.08"
Flow Length=123' Tc=6.6 min CN=WQ Runoff=0.19 cfs 0.019 af

Pond 14P: Infiltration Basin #2 Peak Elev=203.57' Storage=455 cf Inflow=0.87 cfs 0.073 af
Discarded=0.18 cfs 0.073 af Primary=0.01 cfs 0.000 af Outflow=0.19 cfs 0.073 af

Subcatchment 15P: P3c Runoff Area=43,291 sf 0.00% Impervious Runoff Depth=3.23"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=3.02 cfs 0.267 af

Link 16P: Design Point #3: Flow to Western Wetland Inflow=3.02 cfs 0.268 af
Primary=3.02 cfs 0.268 af

Total Runoff Area = 1.313 ac Runoff Volume = 0.340 af Average Runoff Depth = 3.11"
93.76% Pervious = 1.231 ac 6.24% Impervious = 0.082 ac

Summary for Subcatchment 11P: P3a

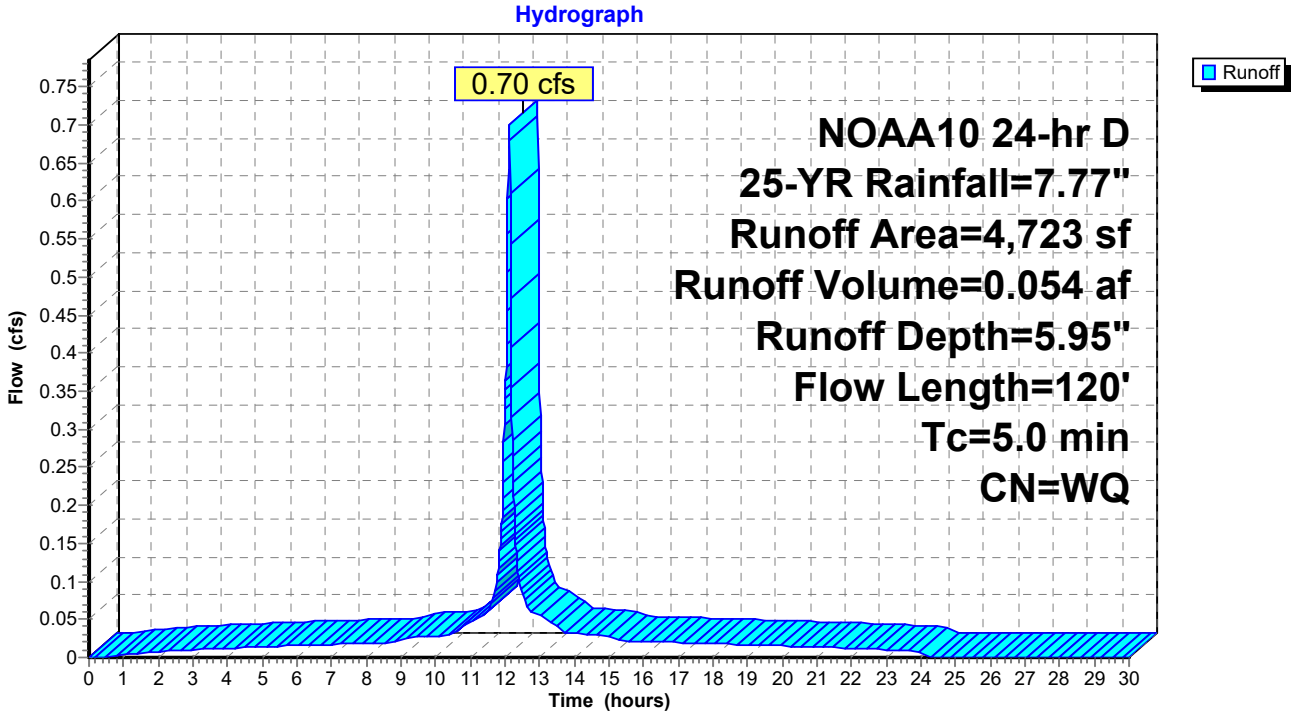
Runoff = 0.70 cfs @ 12.12 hrs, Volume= 0.054 af, Depth= 5.95"
Routed to Pond 12P : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
3,570	98	Paved parking HSG A
1,153	39	>75% Grass cover, Good HSG A
4,723		Weighted Average
1,153		24.41% Pervious Area
3,570		75.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	38	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
0.2	12	0.0200	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
0.4	70	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11P: P3a



Summary for Pond 12P: CB

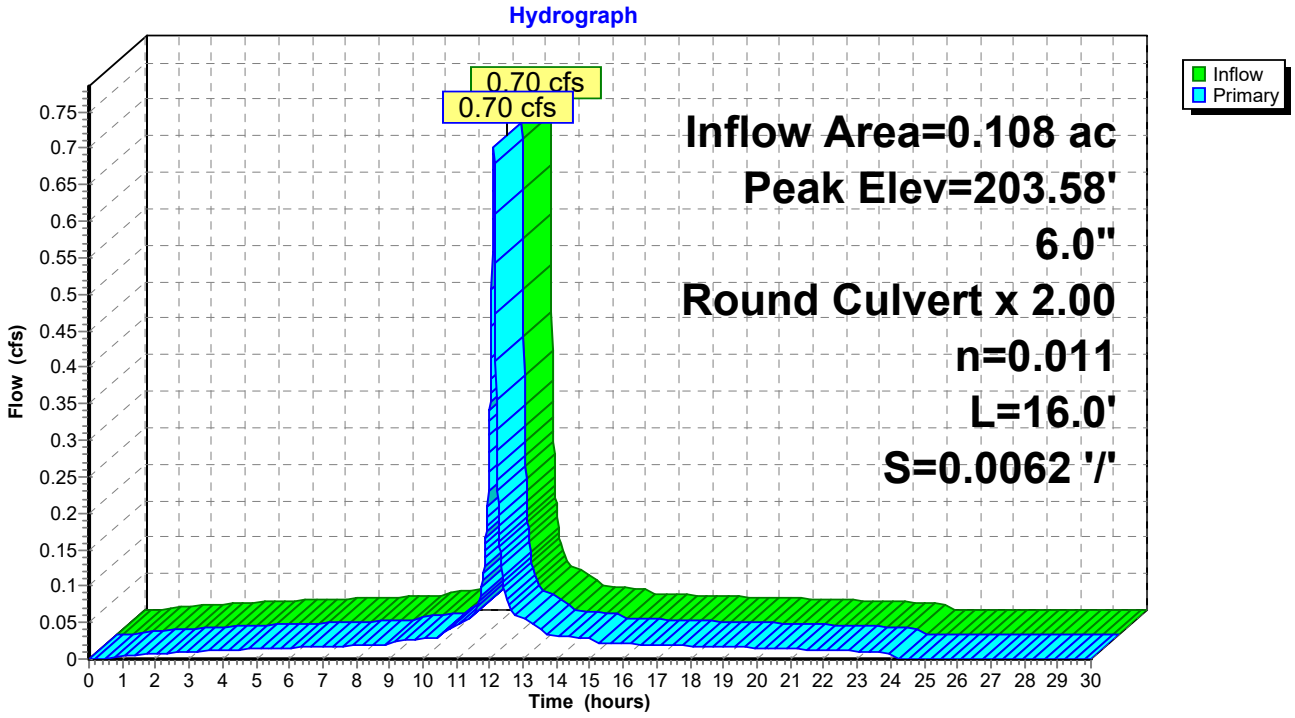
Inflow Area = 0.108 ac, 75.59% Impervious, Inflow Depth = 5.95" for 25-YR event
Inflow = 0.70 cfs @ 12.12 hrs, Volume= 0.054 af
Outflow = 0.70 cfs @ 12.12 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.12 hrs, Volume= 0.054 af
Routed to Pond 14P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.58' @ 12.34 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.10'	**6.0" Round Culvert X 2.00** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.10' / 203.00' S= 0.0062 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.69 cfs @ 12.12 hrs HW=203.55' TW=203.34' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.69 cfs @ 2.46 fps)

Pond 12P: CB



Summary for Subcatchment 13P: P3b

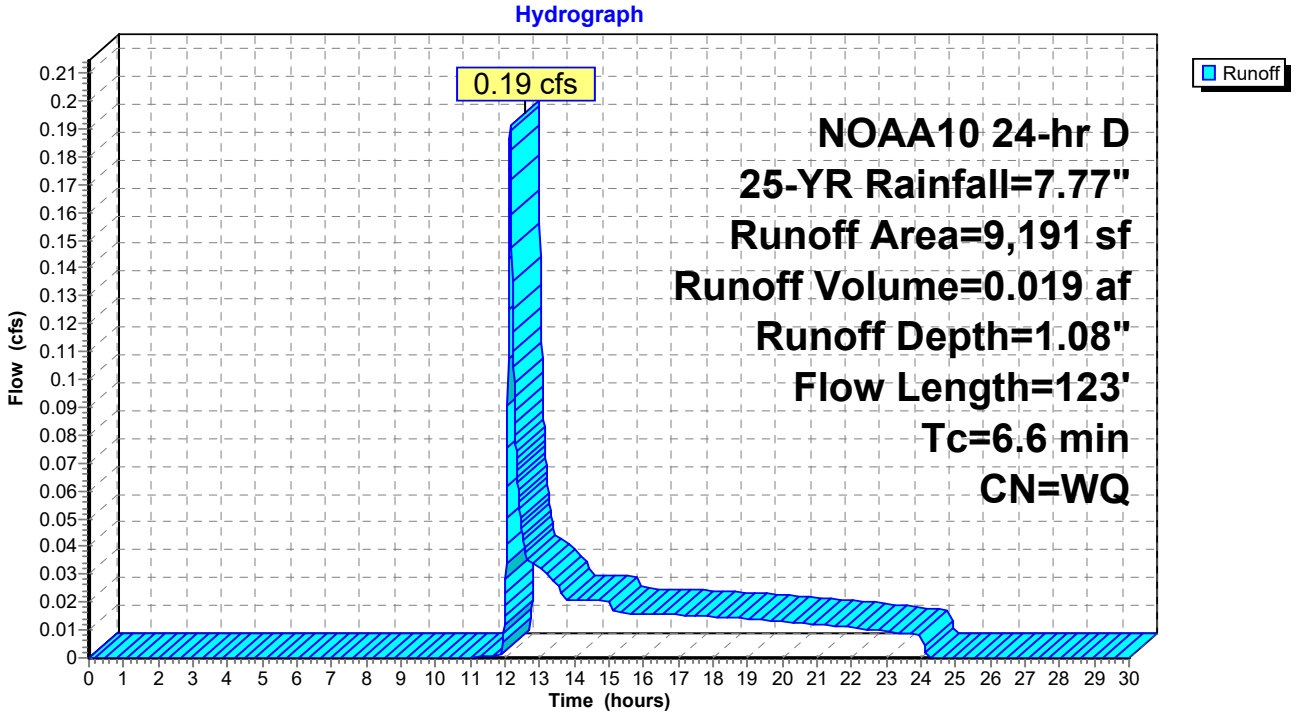
Runoff = 0.19 cfs @ 12.15 hrs, Volume= 0.019 af, Depth= 1.08"
Routed to Pond 14P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
9,111	39	>75% Grass cover, Good HSG A
80	61	>75% Grass cover, Good, HSG B
9,191		Weighted Average
9,191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0900	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
2.5	73	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.6	123	Total			

Subcatchment 13P: P3b



Summary for Pond 14P: Infiltration Basin #2

Inflow Area = 0.319 ac, 25.66% Impervious, Inflow Depth = 2.73" for 25-YR event
Inflow = 0.87 cfs @ 12.13 hrs, Volume= 0.073 af
Outflow = 0.19 cfs @ 12.35 hrs, Volume= 0.073 af, Atten= 78%, Lag= 13.5 min
Discarded = 0.18 cfs @ 12.35 hrs, Volume= 0.073 af
Primary = 0.01 cfs @ 12.35 hrs, Volume= 0.000 af
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.57' @ 12.35 hrs Surf.Area= 955 sf Storage= 455 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.9 min (818.6 - 808.7)

Volume	Invert	Avail.Storage	Storage Description
#1	203.00'	2,468 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

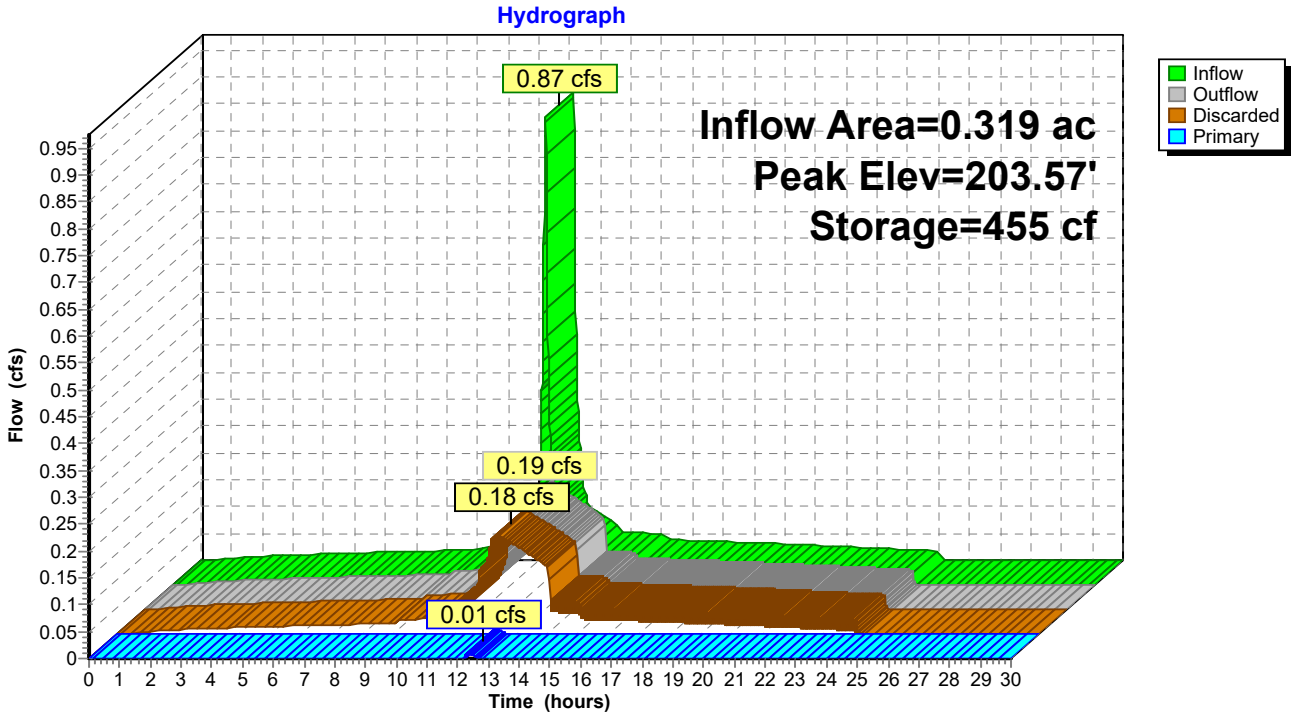
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.00	639	117.0	0	0	639
204.00	1,230	154.0	919	919	1,448
205.00	1,893	178.0	1,550	2,468	2,104

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	203.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.18 cfs @ 12.35 hrs HW=203.57' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.01 cfs @ 12.35 hrs HW=203.57' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.93 fps)

Pond 14P: Infiltration Basin #2



Summary for Subcatchment 15P: P3c

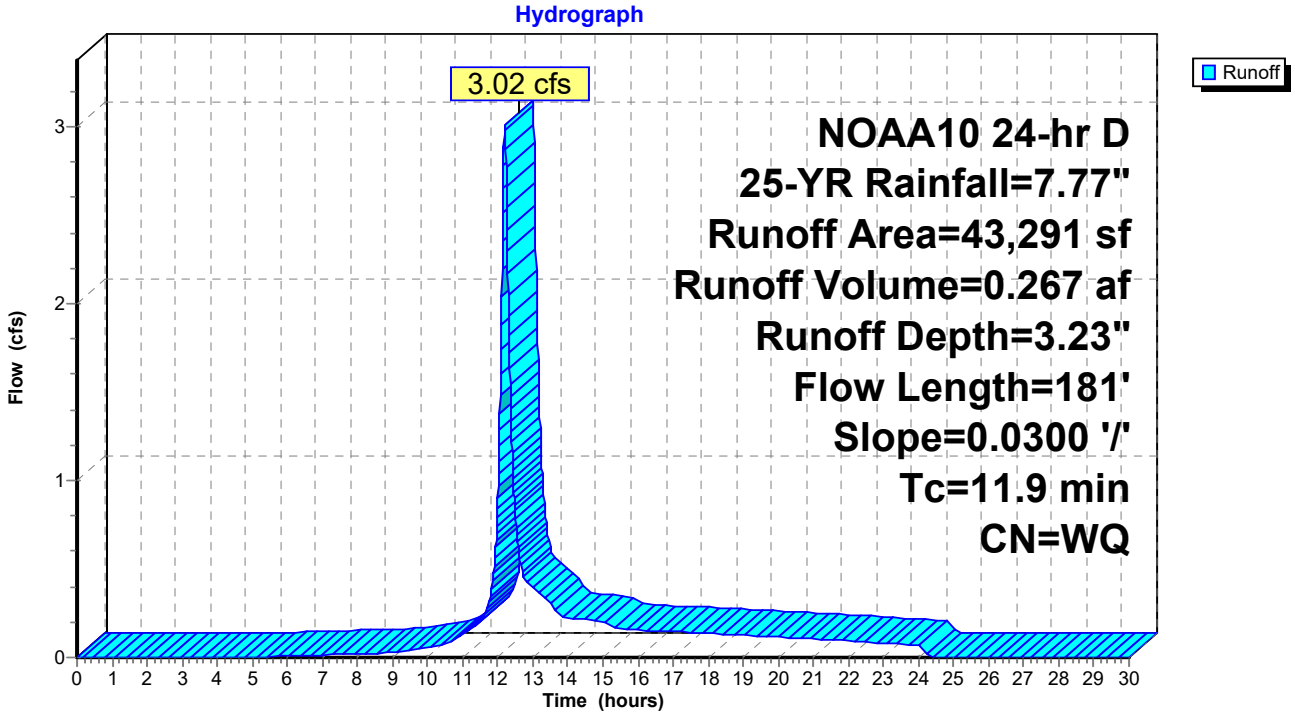
Runoff = 3.02 cfs @ 12.20 hrs, Volume= 0.267 af, Depth= 3.23"
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.77"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
27,238	55	Woods, Good HSG B
1,299	30	Woods, Good HSG A
1,032	39	>75% Grass cover, Good HSG A
1,619	61	>75% Grass cover, Good, HSG B
43,291		Weighted Average
43,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 15P: P3c

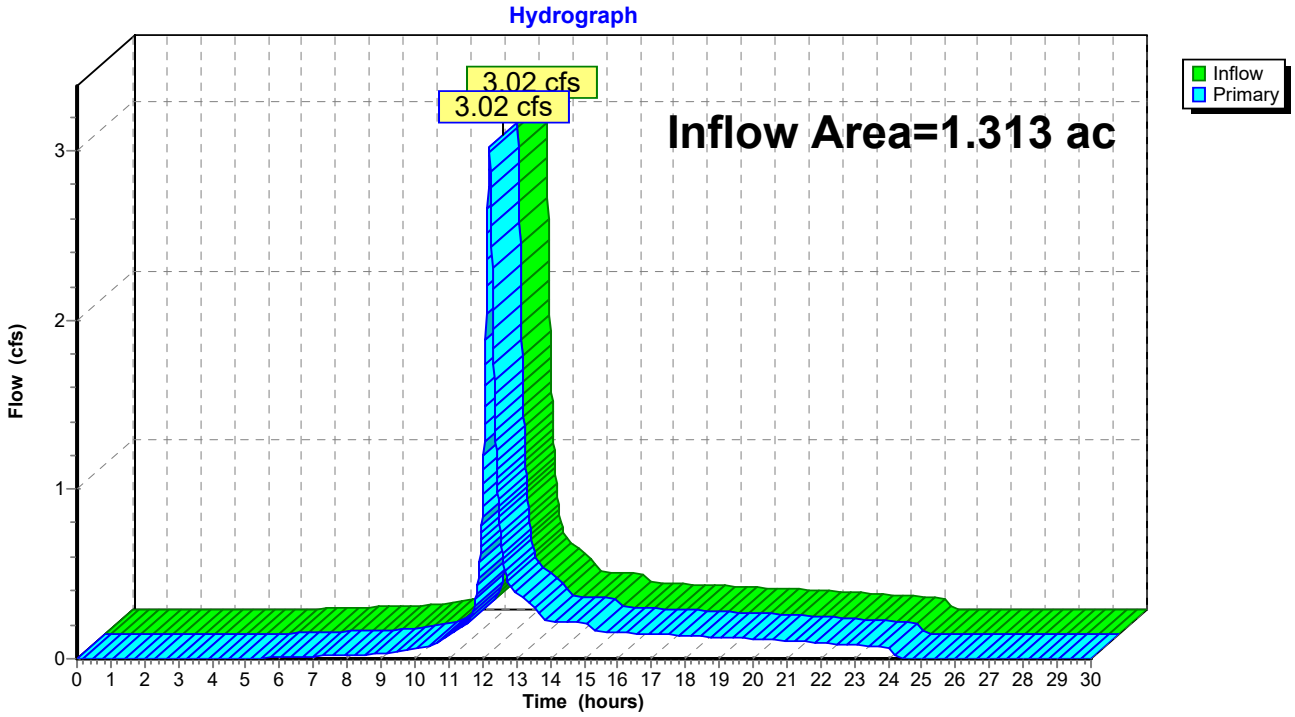


Summary for Link 16P: Design Point #3: Flow to Western Wetland

Inflow Area = 1.313 ac, 6.24% Impervious, Inflow Depth = 2.44" for 25-YR event
Inflow = 3.02 cfs @ 12.20 hrs, Volume= 0.268 af
Primary = 3.02 cfs @ 12.20 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 16P: Design Point #3: Flow to Western Wetland



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 11P: P3a Runoff Area=4,723 sf 75.59% Impervious Runoff Depth=8.44"
Flow Length=120' Tc=5.0 min CN=WQ Runoff=1.00 cfs 0.076 af

Pond 12P: CB Peak Elev=204.00' Inflow=1.00 cfs 0.076 af
6.0" Round Culvert x 2.00 n=0.011 L=16.0' S=0.0062 '/' Outflow=1.00 cfs 0.076 af

Subcatchment 13P: P3b Runoff Area=9,191 sf 0.00% Impervious Runoff Depth=2.45"
Flow Length=123' Tc=6.6 min CN=WQ Runoff=0.57 cfs 0.043 af

Pond 14P: Infiltration Basin #2 Peak Elev=203.99' Storage=911 cf Inflow=1.55 cfs 0.119 af
Discarded=0.23 cfs 0.110 af Primary=0.14 cfs 0.010 af Outflow=0.38 cfs 0.119 af

Subcatchment 15P: P3c Runoff Area=43,291 sf 0.00% Impervious Runoff Depth=5.42"
Flow Length=181' Slope=0.0300 '/' Tc=11.9 min CN=WQ Runoff=5.12 cfs 0.449 af

Link 16P: Design Point #3: Flow to Western Wetland Inflow=5.25 cfs 0.459 af
Primary=5.25 cfs 0.459 af

Total Runoff Area = 1.313 ac Runoff Volume = 0.568 af Average Runoff Depth = 5.19"
93.76% Pervious = 1.231 ac 6.24% Impervious = 0.082 ac

Summary for Subcatchment 11P: P3a

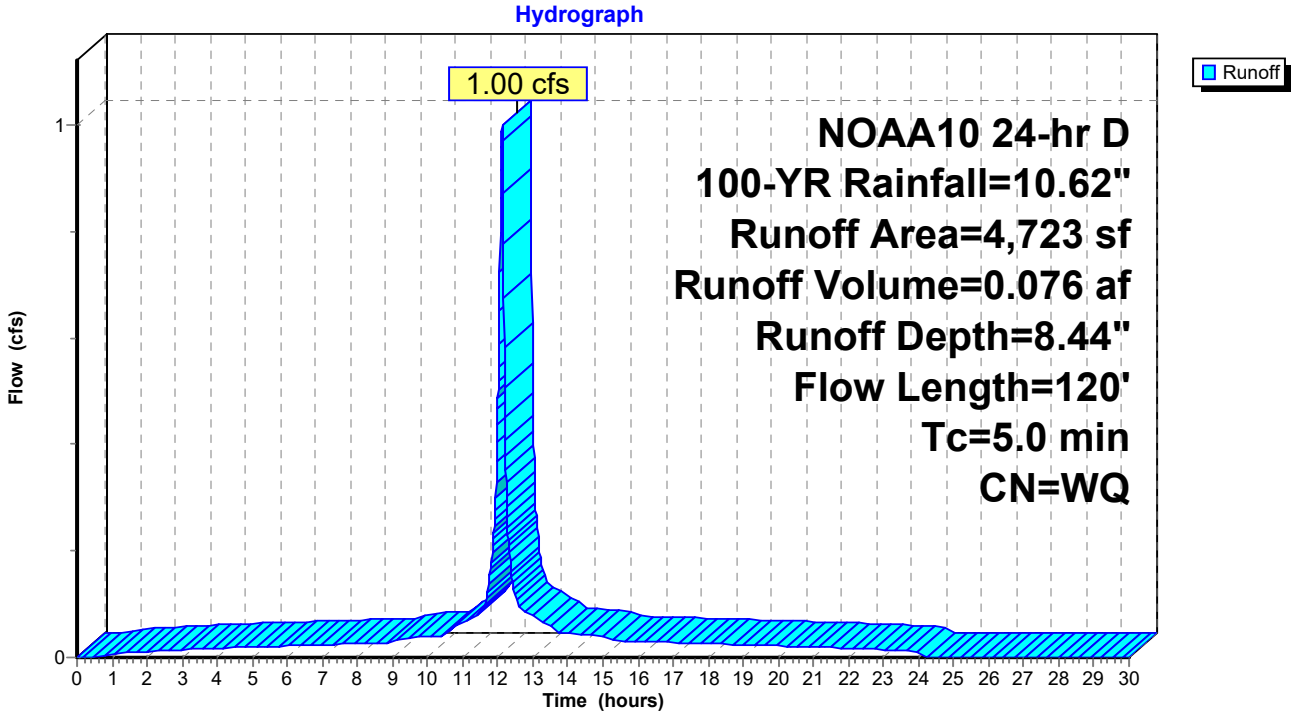
Runoff = 1.00 cfs @ 12.12 hrs, Volume= 0.076 af, Depth= 8.44"
Routed to Pond 12P : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
3,570	98	Paved parking HSG A
1,153	39	>75% Grass cover, Good HSG A
4,723		Weighted Average
1,153		24.41% Pervious Area
3,570		75.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	38	0.0600	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
0.2	12	0.0200	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.84"
0.4	70	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11P: P3a



Summary for Pond 12P: CB

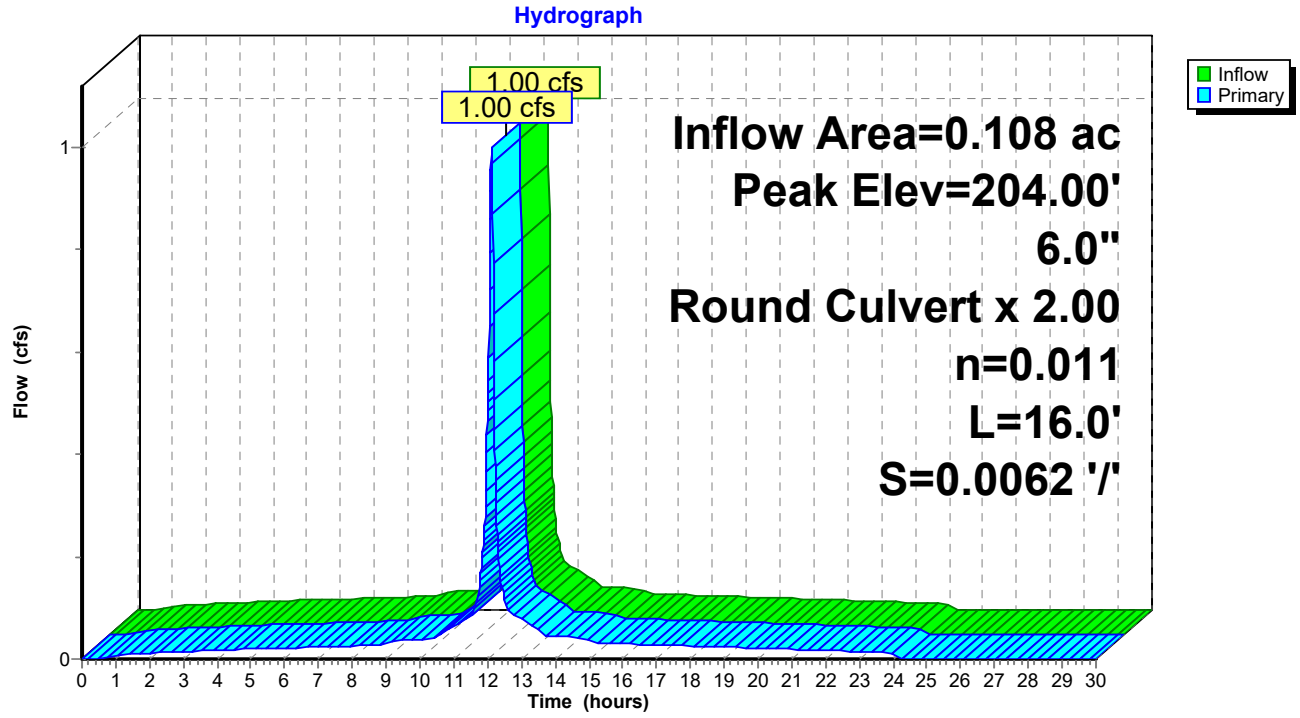
Inflow Area = 0.108 ac, 75.59% Impervious, Inflow Depth = 8.44" for 100-YR event
Inflow = 1.00 cfs @ 12.12 hrs, Volume= 0.076 af
Outflow = 1.00 cfs @ 12.12 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min
Primary = 1.00 cfs @ 12.12 hrs, Volume= 0.076 af
Routed to Pond 14P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 204.00' @ 12.32 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	203.10'	**6.0" Round Culvert X 2.00** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 203.10' / 203.00' S= 0.0062 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.91 cfs @ 12.12 hrs HW=203.91' TW=203.68' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.91 cfs @ 2.33 fps)

Pond 12P: CB



Summary for Subcatchment 13P: P3b

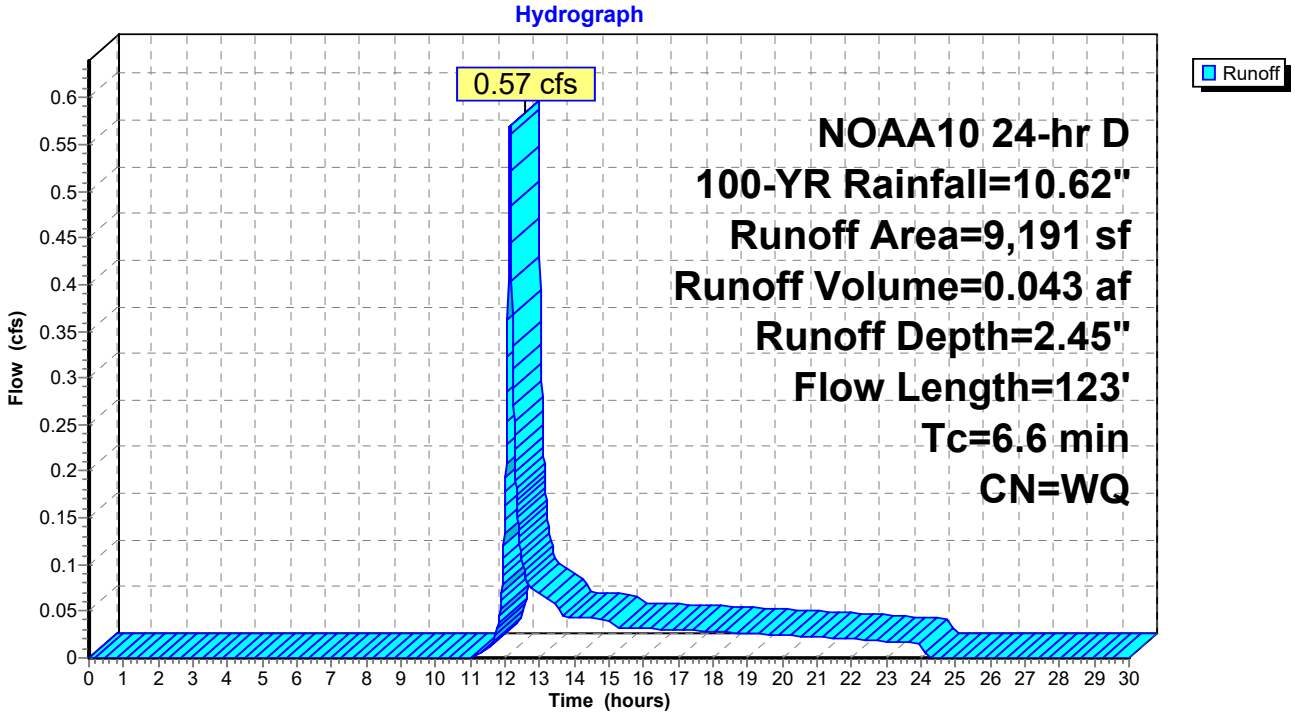
Runoff = 0.57 cfs @ 12.15 hrs, Volume= 0.043 af, Depth= 2.45"
Routed to Pond 14P : Infiltration Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
9,111	39	>75% Grass cover, Good HSG A
80	61	>75% Grass cover, Good, HSG B
9,191		Weighted Average
9,191		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.0900	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.84"
2.5	73	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.6	123	Total			

Subcatchment 13P: P3b



Summary for Pond 14P: Infiltration Basin #2

Inflow Area = 0.319 ac, 25.66% Impervious, Inflow Depth = 4.48" for 100-YR event
Inflow = 1.55 cfs @ 12.13 hrs, Volume= 0.119 af
Outflow = 0.38 cfs @ 12.33 hrs, Volume= 0.119 af, Atten= 76%, Lag= 11.9 min
Discarded = 0.23 cfs @ 12.33 hrs, Volume= 0.110 af
Primary = 0.14 cfs @ 12.33 hrs, Volume= 0.010 af
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 203.99' @ 12.33 hrs Surf.Area= 1,226 sf Storage= 911 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 15.7 min (831.4 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	203.00'	2,468 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

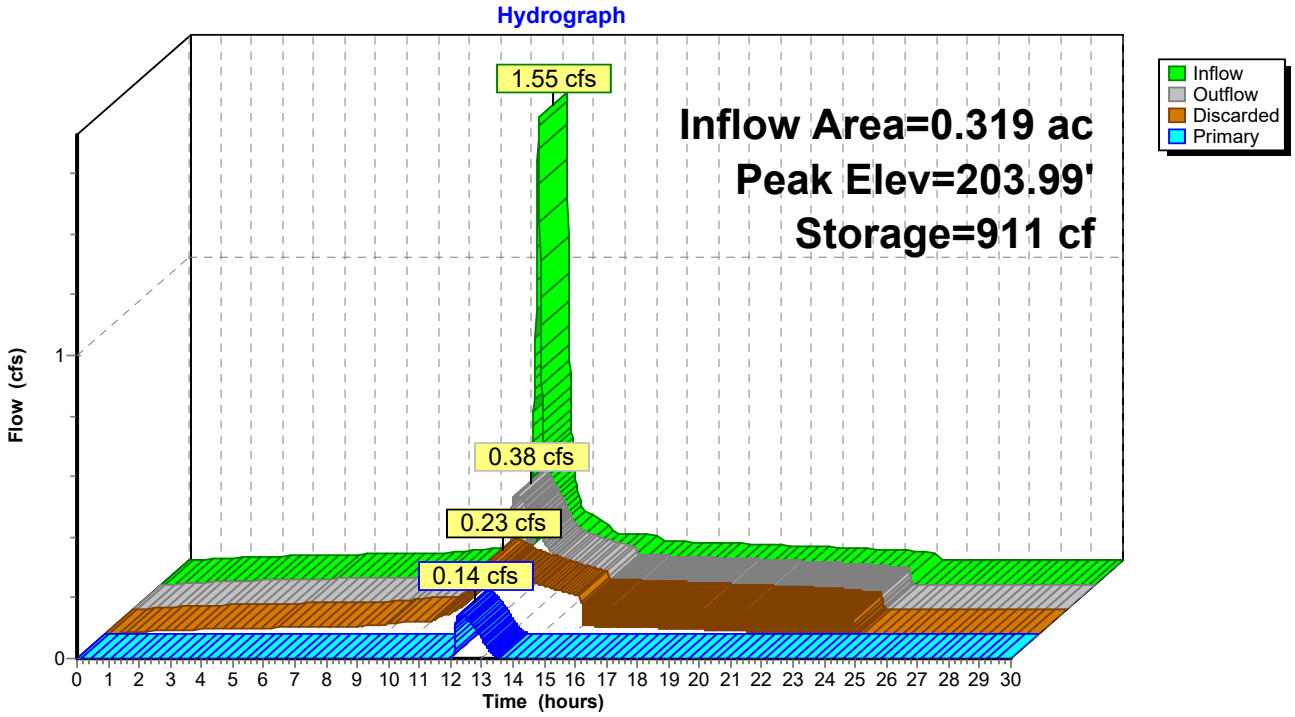
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.00	639	117.0	0	0	639
204.00	1,230	154.0	919	919	1,448
205.00	1,893	178.0	1,550	2,468	2,104

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	203.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.23 cfs @ 12.33 hrs HW=203.99' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.14 cfs @ 12.33 hrs HW=203.99' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.92 fps)

Pond 14P: Infiltration Basin #2



Summary for Subcatchment 15P: P3c

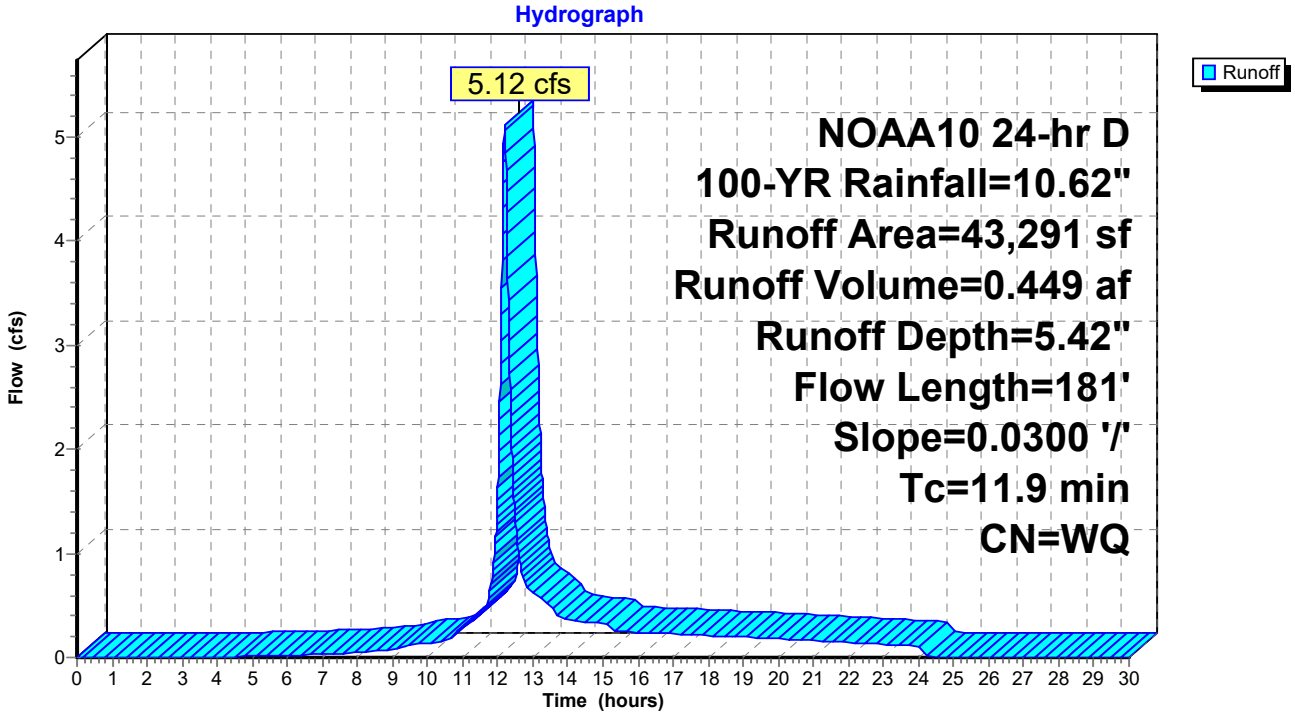
Runoff = 5.12 cfs @ 12.20 hrs, Volume= 0.449 af, Depth= 5.42"
Routed to Link 16P : Design Point #3: Flow to Western Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.62"

Area (sf)	CN	Description
12,103	77	Woods, Good HSG D
27,238	55	Woods, Good HSG B
1,299	30	Woods, Good HSG A
1,032	39	>75% Grass cover, Good HSG A
1,619	61	>75% Grass cover, Good, HSG B
43,291		Weighted Average
43,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	48	0.0300	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.84"
2.6	133	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.9	181	Total			

Subcatchment 15P: P3c

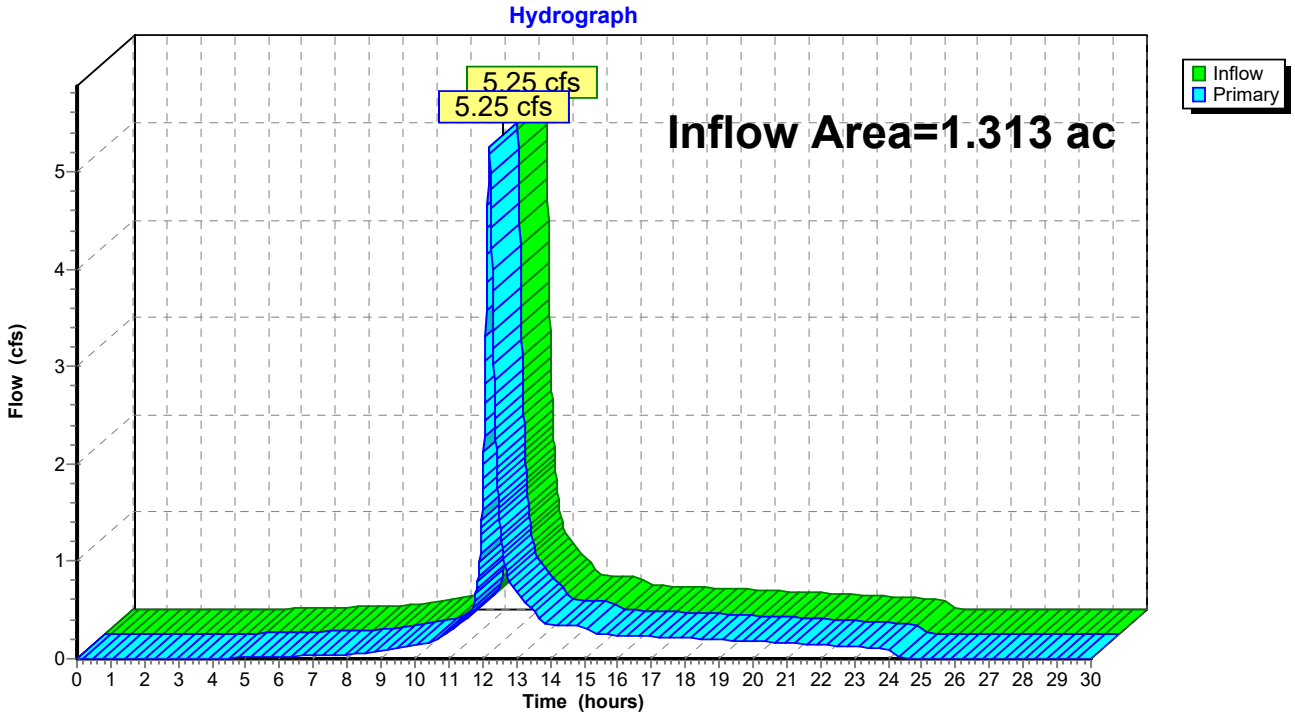


Summary for Link 16P: Design Point #3: Flow to Western Wetland

Inflow Area = 1.313 ac, 6.24% Impervious, Inflow Depth = 4.19" for 100-YR event
Inflow = 5.25 cfs @ 12.20 hrs, Volume= 0.459 af
Primary = 5.25 cfs @ 12.20 hrs, Volume= 0.459 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 16P: Design Point #3: Flow to Western Wetland



ATTACHMENT L: Rational Method Calculations

RATIONAL METHOD DRAINAGE STRUCTURE CALCULATIONS

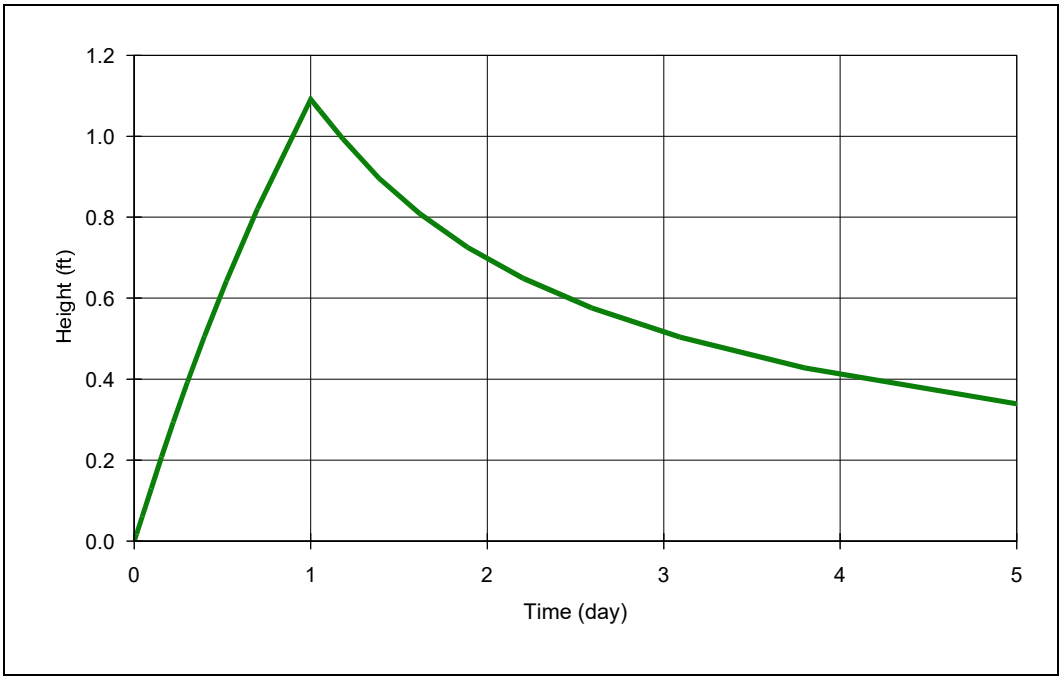
455 HARTFORD AVENUE BELLINGHAM, MA

OWNER: DARN PROPERTIES, LLC ***DATE: 2025-02-10*** ***BY: DJM*** ***DESIGN STORM: 25 YR.***

LOCATION			AREA					FLOW TIME (min.)					DESIGN								
STREET	FROM	TO	INCRE-MENT	TOTAL	C	C x A	Sum C x A	To Inlet	In Chnl	Time Conc	i	Q (cfs)	Size (in.)	Slope %	n	Full Cap (cfs)	Full Vel. (fps)	Q/ Qfull	V/ Vfull (chart)	V partial (fps)
	CB1	Basin1	0.11		0.74	0.08		4.5		4.5	6.8	0.5	6	0.006	0.011	1.0	2.6	0.53	1.06	2.77

ATTACHMENT M: MOUNDING CALCULATIONS

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Legacy Engineering

PROJECT: Infiltration Basin #1

ANALYST: Daniel J. Merrikin, P.E.

DATE: 8/19/2025 TIME: 12:09:56 PM

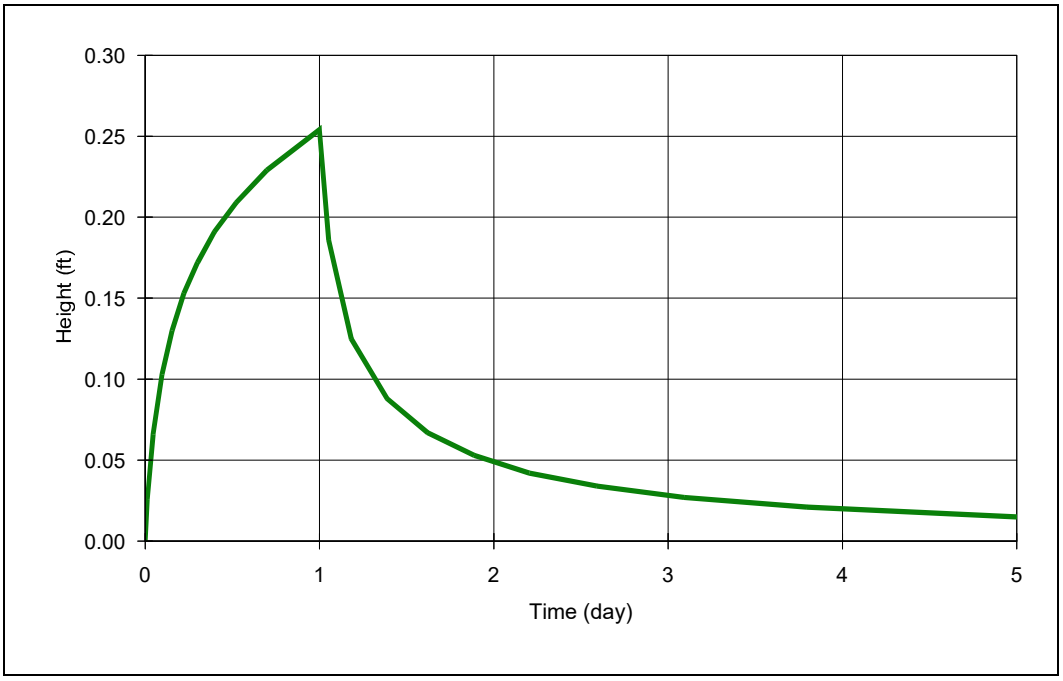
INPUT PARAMETERS

Application rate: 0.27 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 5 day
Fillable porosity: 0.2
Hydraulic conductivity: 4.8 ft/day
Initial saturated thickness: 20 ft
Length of application area: 158 ft
Width of application area: 55.2 ft
Constant head boundary used at: 200 ft
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 2354.832 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.02
0	0.06
0.1	0.13
0.2	0.21
0.2	0.29
0.3	0.39
0.4	0.51
0.5	0.64
0.7	0.82
1	1.09
1.1	1.06
1.2	0.99
1.4	0.9
1.6	0.81
1.9	0.73
2.2	0.65
2.6	0.58
3.1	0.5
3.8	0.43
5	0.34

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Legacy Engineering

PROJECT: Infiltration Basin #2

ANALYST: Daniel J. Merrikin, P.E.

DATE: 8/19/2025 TIME: 12:16:53 PM

INPUT PARAMETERS

Application rate: 0.47 c.ft/day/sq. ft
Duration of application: 1 day
Total simulation time: 5 day
Fillable porosity: 0.2
Hydraulic conductivity: 16.5 ft/day
Initial saturated thickness: 20 ft
Length of application area: 45.5 ft
Width of application area: 14 ft
Constant head boundary used at: 200 ft
Groundwater mounding @
X coordinate: 0 ft
Y coordinate: 0 ft
Total volume applied: 299.39 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.03
0	0.07
0.1	0.1
0.2	0.13
0.2	0.15
0.3	0.17
0.4	0.19
0.5	0.21
0.7	0.23
1	0.25
1.1	0.19
1.2	0.12
1.4	0.09
1.6	0.07
1.9	0.05
2.2	0.04
2.6	0.03
3.1	0.03
3.8	0.02
5	0.02