

STORMWATER REPORT

FOR

LADY SLIPPER HOLLOW

148 HOLLISTON ST.
MEDWAY MA, 02053

DEFINITIVE RESIDENTIAL SUBDIVISION

MARCH 24, 2026

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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 residential subdivision as presented on a plan set entitled "Lady Slipper Estates Medway Definitive Subdivision" prepared by Legacy Engineering LLC with an original date of March 24, 2026. The development consists of three new residential lots.

EXISTING SITE

The proposed development lies on the easterly side of Holliston Street in Medway, totaling approximately 12.5 acres. The site is developed with two single family dwellings at the front of the property. Bordering Vegetated Wetlands are located in the southwestern, central, and southeastern portions of the site. The remainder of the property consists of woods.

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 Charlton (103B) class A soils in the center of the site, and Scituate (315B & 317B) class C soils for the remainder of the site.

GROUNDWATER CONDITIONS

On-site testing concluded that the site contains a groundwater table that varies in depth across the site. Groundwater depths at each infiltration facility can be found in Attachment H.

SOIL PERMEABILITY

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

FLOOD PLAIN

No portion of this site lies within a flood plain.

WETLAND PROTECTION ACT

The site contains three areas of bordering vegetated wetlands. A Notice of Intent will be filed for proposed work within wetland jurisdictional areas.

PROPOSED DEVELOPMENT

The proposed construction consists of three new single-family dwellings and a proposed street, along with associated driveways, landscape areas, utility systems, and stormwater management systems.

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS

The stormwater management system design consists of a series of catch basins, manholes, and piping which collect runoff from the proposed development and the 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 one primary stormwater discharge points. Note the following:

- Design Point #1: Flow to Wetlands – In the proposed condition, concentrated flows will be from infiltration facility overflows. All infiltration facilities that discharge towards the wetlands are equipped with level spreaders to prevent erosion.

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 Medway 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 occur¹:

<u>Design Storm</u>	<u>Rainfall</u>
2-Year	3.82 inches
10-Year	6.01 inches
25-Year	7.76 inches
100-Year	10.71 inches

DESIGN POINT #1: Flow to Wetlands

Description of Existing Conditions: In the existing condition, Watershed E1 represents uncontrolled overland flow to the wetland from the front portion of the site between the dwellings and Holliston Street. These wetlands are connected to the other wetlands on the site by a drain pipe. Watershed E2 represents the uncontrolled overland flow from the rest of the site towards the wetlands in the middle/rear of the site.

Description of Proposed Conditions: In the proposed condition, Watersheds P1a through P1d represent runoff from the proposed roadway and surrounding areas. This runoff is captured and treated by Infiltration Basins #1 & #2, which are connected by pipe. Infiltration Basin #3 collects and treats the runoff from much of the developed areas of Lots 3A and 4A, represented by Watersheds P1e and P1f. Watershed P1g and P1h represent the runoff from the front and middle wetland areas which flows under Lot 3A's driveway. Watershed P1i represents the uncontrolled runoff to the design point. The roof runoff treated by Infiltration Field #1 is represented by Watershed P1j.

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	4.17	3.67	0.450	0.277
10	9.52	8.52	1.025	0.809
25	14.43	13.76	1.617	1.409
100	24.93	24.38	2.806	2.643

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

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; 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	6,858 s.f.	0 s.f.	5,190 s.f.	0 s.f.
Required Recharge Volume (Rv)	343 c.f.	0 c.f.	108 c.f.	0 c.f.
Total Rv	451 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 Simple Dynamic method using the following values:

$$V - kTA = V'$$

$$V = 1,004 \text{ cubic feet (WOV)}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$T = 2 \text{ Hours}$$

$$A = 2,893 \text{ s.f.}$$

$$1,004 \text{ c.f.} - 0.20 \text{ ft/hr} * 2 \text{ hr} * 2,893 \text{ s.f.} = -158 \text{ c.f.}$$

The calculated recharge during the first 2 hours of the design storm exceeds the volume required to treat the WQV. It is therefore only required that the facilities' lowest outlet be slightly above the bottom of the basin to ensure recharge. The lowest outlet is 0.50 feet above the basin bottom.

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:

$$\text{Time}_{\text{drawdown}} = [Rv / (K \times \text{Bottom Area})]$$

Where:

$$WQV = 1,004 \text{ c.f.}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$\text{Bottom Area} = 2,893 \text{ s.f.}$$

It is concluded that the drawdown time for the infiltrated volume is 1.7 hours, which satisfies this requirement.

Mounding Analysis:

A mounding analysis has been conducted and can be found in attachment L. The bottom of Infiltration Basin #1 is at elevation 272.5, with a seasonal high groundwater elevation below the basin at 270.2. The calculated mound is 1.2 feet, which will not impact the bottom of the basin.

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	8,953 s.f.	0 s.f.	216 s.f.	0 s.f.
Required Recharge Volume (Rv)	448 c.f.	0 c.f.	5 c.f.	0 c.f.
Total Rv	452 c.f.			

For this infiltration facility, the required storage volume is calculated using the Simple Dynamic method using the following values:

$$V - kTA = V'$$

$$V = 764 \text{ cubic feet (WQV)}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$T = 2 \text{ Hours}$$

$$A = 1,557 \text{ s.f.}$$

$$764 \text{ c.f.} - 0.20 \text{ ft/hr} * 2 \text{ hr} * 1,557 \text{ s.f.} = 139 \text{ c.f.}$$

Infiltration Basin #2 has a storage volume of 854 c.f., which 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:

$$\text{Time}_{\text{drawdown}} = [Rv / (K \times \text{Bottom Area})]$$

Where:

$$WQV = 764 \text{ c.f.}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$\text{Bottom Area} = 1,557 \text{ s.f.}$$

It is concluded that the drawdown time for the infiltrated volume is 2.4 hours, which satisfies this requirement.

Mounding Analysis:

A mounding analysis has been conducted and can be found in attachment L. The bottom of Infiltration Basin #2 is at elevation 267.0, with a seasonal high groundwater elevation below the basin at 264.0. The calculated mound is 1.1 feet, which will not impact the bottom of the basin.

STORMWATER INFILTRATION BASIN #3

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	9,895 s.f.	0 s.f.	6,061 s.f.	0 s.f.
Required Recharge Volume (Rv)	495 c.f.	0 c.f.	126 c.f.	0 c.f.
Total Rv	621 c.f.			

For this infiltration facility, the required storage volume is calculated using the Simple Dynamic method using the following values:

$$V - kTA = V'$$

$$V = 1,330 \text{ cubic feet (WQV)}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$T = 2 \text{ Hours}$$

$$A = 1,784 \text{ s.f.}$$

$$1,330 \text{ c.f.} - 0.20 \text{ ft/hr} * 2 \text{ hr} * 1,784 \text{ s.f.} = 613 \text{ c.f.}$$

Infiltration Basin #3 has a storage volume of 827 c.f., which 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:

$$\text{Time}_{\text{drawdown}} = [Rv / (K \times \text{Bottom Area})]$$

Where:

$$WQV = 1,330 \text{ c.f.}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$\text{Bottom Area} = 1,784 \text{ s.f.}$$

It is concluded that the drawdown time for the infiltrated volume is 3.7 hours, which satisfies this requirement.

Mounding Analysis:

Based on soils testing in the basin, seasonal high groundwater under the infiltration basin below elevation 255.4. With a proposed bottom elevation of 262.0, the proposed basin lies 6.6 feet above seasonal high groundwater. Thus, a mounding analysis is not required.

STORMWATER INFILTRATION FIELD #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	1,057 s.f.	0 s.f.	543 s.f.	0 s.f.
Required Recharge Volume (Rv)	53 c.f.	0 c.f.	11 c.f.	0 c.f.
Total Rv	64 c.f.			

For this infiltration facility, the required storage volume is calculated using the Simple Dynamic method using the following values:

$$V - kTA = V'$$

$$V = 133 \text{ cubic feet (WOV)}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$T = 2 \text{ Hours}$$

$$A = 204 \text{ s.f.} * 40\% \text{ Voids} = 82 \text{ s.f.}$$

$$133 \text{ c.f.} - 0.20 \text{ ft/hr} * 2 \text{ hr} * 82 \text{ s.f.} = 101 \text{ c.f.}$$

Infiltration Field #1 has a storage volume of 219 c.f., which meets this requirement.

A secondary check is required to ensure that the Rv will recharge within at least 72 hours. The required WOV 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:

$$\text{Time}_{\text{drawdown}} = [Rv / (K \times \text{Bottom Area})]$$

Where:

$$WOV = 133 \text{ c.f.}$$

$$K = 2.41 \text{ inches per hour} = 0.20 \text{ feet per hour}$$

$$\text{Bottom Area} = 82 \text{ s.f.}$$

It is concluded that the drawdown time for the infiltrated volume is 8.1 hours, which satisfies this requirement.

Mounding Analysis:

A mounding analysis has been conducted and can be found in attachment L. The bottom of Infiltration Field #1 is at elevation 260.3, with a seasonal high groundwater elevation below the field at 257.8. The calculated mound is 0.4 feet, which will not impact the bottom of the field.

Capture Area Adjustment: All new impervious surfaces are routed through infiltration BMPs except for some of the roof area of the existing houses. A capture area adjustment is provided as follows:

➤ Total On-Site Impervious Coverage:	39,537 s.f.
➤ Treated Impervious Coverage:	38,773 s.f.
➤ Percent to Infiltration BMP:	98.1%
➤ Ratio:	1.02
➤ <u>Capture Area Adjusted Rv:</u>	<u>1,620 c.f.</u>

The capture adjusted Rv increases the total Rv requirement by 32 c.f. As shown earlier in this section of the report, each infiltration facility is designed to infiltrate more than the required Rv attributed to it. This standard is therefore met.

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 Medway requires that 1" of runoff be used for these calculations. 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: $WQV = (12,048 \text{ sq. ft.}) * (1 \text{ in.}) / (12 \text{ in/ft}) = 1,004 \text{ c.f.}$

Provided: 1,533 c.f.

Infiltration Basin #2

Required: $WQV = (9,169 \text{ sq. ft.}) * (1 \text{ in.}) / (12 \text{ in/ft}) = 764 \text{ c.f.}$

Provided: 854 c.f.

Infiltration Basin #3

Required: $WQV = (15,956 \text{ sq. ft.}) * (1 \text{ in.}) / (12 \text{ in/ft}) = 1,330 \text{ c.f.}$

Provided: 827 c.f.

The required WQV is reduced through use of the simple dynamic method, which is calculated in the Standard 3 section of this report. The reduced WQV for this infiltration facility is 613 c.f., which is met by the proposed facility.

Infiltration Field #1

Required: $WQV = (1,600 \text{ sq. ft.}) * (1 \text{ in.}) / (12 \text{ in/ft}) = 133 \text{ c.f.}$

Provided: 219 c.f.

Each infiltration facility has been sized to treat the WQV attributed to it. This requirement is therefore met.

Not all impervious area is being treated by the proposed stormwater facilities however. 764 s.f. of roof area from the existing dwelling is not treated. As a partial redevelopment, this area is required to be treated to the maximum extent practicable. It is not practicable to treat this small roof area. Overall, the site represents a significant improvement over existing conditions, where none of the 2,287 s.f. of impervious area is treated.

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 Forebays:

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 #2, the tributary impervious area is 9,168 s.f. and the minimum forebay volume is 76 cubic feet. With the water trapped behind the 6" high checkdams at the inlets, the designed forebays will each contain 76 cubic feet, meeting the requirement.

For Stormwater Infiltration Basin #3, the tributary impervious area is 15,956 s.f. and the minimum forebay volume is 132 cubic feet. With the water trapped behind the 6" high checkdam at the piped outlet, the designed forebay will contain more than the required volume, meeting the requirement.

Stormwater Infiltration Basins:

Infiltration Basins #1 & #2 have been designed with piped outlets, with Basin #1 discharging to Basin #2. Basins #2 & #3 discharge stormwater through level spreaders.

Infiltration Basin #1 is designed with a total depth of 3 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 1.89 feet, leaving 1.11 feet of freeboard.

Infiltration Basin #2 is designed with a total depth of 3 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 1.78 feet, leaving 1.22 feet of freeboard.

Infiltration Basin #3 is designed with a total depth of 1.5 feet. Trapped infiltration water reaches a maximum depth of 0.4 feet (elevation of lowest basin outlet) and the maximum water level in the 100-year storm event is 0.93 feet, leaving 0.57 feet of freeboard.

According to EPA performance curves, Infiltration Basins provide 100% TSS removal when including a pretreatment facility.

Underground Infiltration Systems:

Underground infiltration fields are made up of Cultec chambers surrounded in crushed stone. According to EPA performance curves, these fields achieve 100% TSS removal when including a pretreatment facility. Pretreatment is not required when treating roof runoff.

TSS REMOVAL CALCULATIONS

In accordance with the DEP Stormwater Management Handbook, each of the drainage treatment trains has been analyzed for TSS removal. The Town of Medway also requires that 90% TSS is removed. The required TSS removal calculation sheets are included in Attachment E and the following sections provide a narrative discussion of each. Also see Attachment E for the EPA's BMP Performance Analysis.

Infiltration Basin:

Each infiltration basin is provided with 25% pretreatment TSS removal through either deep sump catch basins or sediment forebays. According to the EPA's Stormwater BMP Performance Analysis (included in Attachment E), infiltration basins provide 100% TSS removal when provided with proper pretreatment and infiltrate 1" of runoff in a residential development. Each basin therefore satisfies the TSS removal requirement.

Underground infiltration Systems:

Infiltration Field #1 does not require pretreatment for roof runoff. According to the EPA's Stormwater BMP Performance Analysis, infiltration fields provide 100% TSS removal when provided with proper pretreatment and infiltrate 1" of runoff in a residential development. Each field therefore satisfies the TSS removal requirement.

TP REMOVAL CALCULATIONS

In accordance with the Town of Medway Regulations, each of the drainage treatment trains has been analyzed for Total Phosphorus (TP) removal. The Town of Medway requires that stormwater treatment provides 60% TP removal. See Attachment E for the EPA's BMP Performance Analysis.

Infiltration Basin:

According to the EPA's BMP Performance Curves, Infiltration Basins remove 98% TP when provided with proper pretreatment and infiltrates 1" of runoff in a residential development. Each basin therefore meets this requirement.

Infiltration Field:

According to the EPA's BMP Performance Curves, Infiltration Fields remove 97% TP when provided with proper pretreatment and infiltrates 1" of runoff in a residential development.

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 partially developed with two single family dwellings and appurtenances. For redevelopment of these developed areas, these standards are required to be met only to the maximum extent practicable. All standards are met except for Standard 4, an explanation for which can be found in the Standard 4 section of this report.

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 M.

ATTACHMENT A: OPERATIONS AND MAINTENANCE PLAN

OPERATIONS & MAINTENANCE PLAN

FOR

LADY SLIPPER HOLLOW RESIDENTIAL SUBDIVISION

148 HOLLISTON ST.
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DEFINITIVE RESIDENTIAL SUBDIVISION

MARCH 24, 2026

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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

Lady Slipper Hollow

Project Location

148 Holliston Street
Medway, MA 02053

Operator Name and Address

Alden Ellis Jr.
148A Holliston Street
Medway, MA 02053

References

This O&M Plan references other documents as follows:

Site Plan - Plans entitled “Lady Slipper Hollow Medway Definitive Subdivision” with an original date of March 24, 2026 (as may be amended), and prepared by Legacy Engineering LLC, hereinafter referred to as the “Site Plan”.

Stormwater Report – Report entitled “Stormwater Report for Lady Slipper Hollow” prepared by Legacy Engineering LLC with an original date of March 24, 2026 (as may be amended).

Site Description

The site consists of five residential buildings (2 existing and 3 proposed) located on 12.5 acres of land on Holliston Street in Medway 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

Single-family residential buildings 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.

Easement Areas

The Development contains a stormwater easement on Lots 2A & 3A for maintenance of Stormwater Infiltration Basins #1 & #2.

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

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 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.

Underground Infiltration Field:

1. Perform all pretreatment BMP maintenance, structural and non-structural, as required herein.
2. Inspect the infiltration field at least twice per year, approximately 2-4 days after a rainfall event to ensure that water is not still in the field (as it should have infiltrated into underlying soils by then). Should the infiltration field fail to infiltrate water sufficiently, the field system shall be excavated and replaced in accordance with the original design.

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 gluten (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" – 1/4" 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 on 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

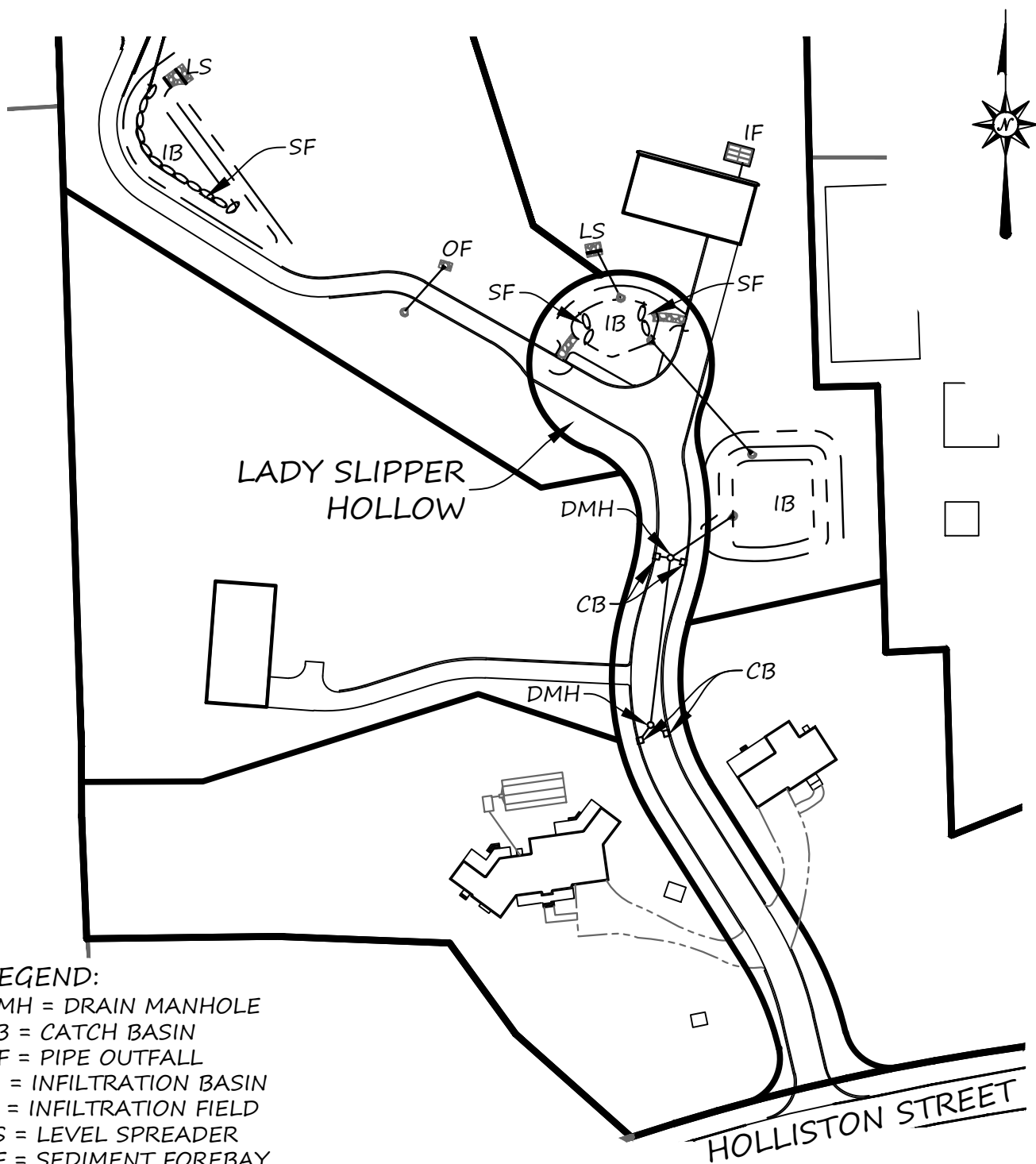
It is estimated that the regular annual maintenance tasks described herein will cost \$1,500 per year (2026 value).

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:
 - Medway Fire Department at 911,
 - Medway Board of Health at 508-533-3206,
 - Medway Conservation Commission at 508-533-3292,
 - 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.

EXHIBIT 1 STORMWATER FACILITIES SITE PLAN



LEGEND:

DMH = DRAIN MANHOLE
 CB = CATCH BASIN
 OF = PIPE OUTFALL
 IB = INFILTRATION BASIN
 IF = INFILTRATION FIELD
 LS = LEVEL SPREADER
 SF = SEDIMENT FOREBAY

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

SHEET 1 OF 1

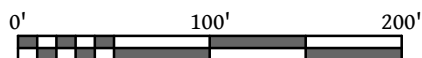


LEGACY
 ENGINEERING

LADY SLIPPER
 HOLLOW
 O&M
 PLAN OF LAND IN
 MEDWAY, MA

PLAN DATE: 2026-03-24

PLAN SCALE: 1"=100'



REVISION

DATE

EXHIBIT 2 STORMWATER SYSTEM OPERATIONS AND MAINTENANCE LOG FORM

Stormwater System Operations and Maintenance Log

Year _____

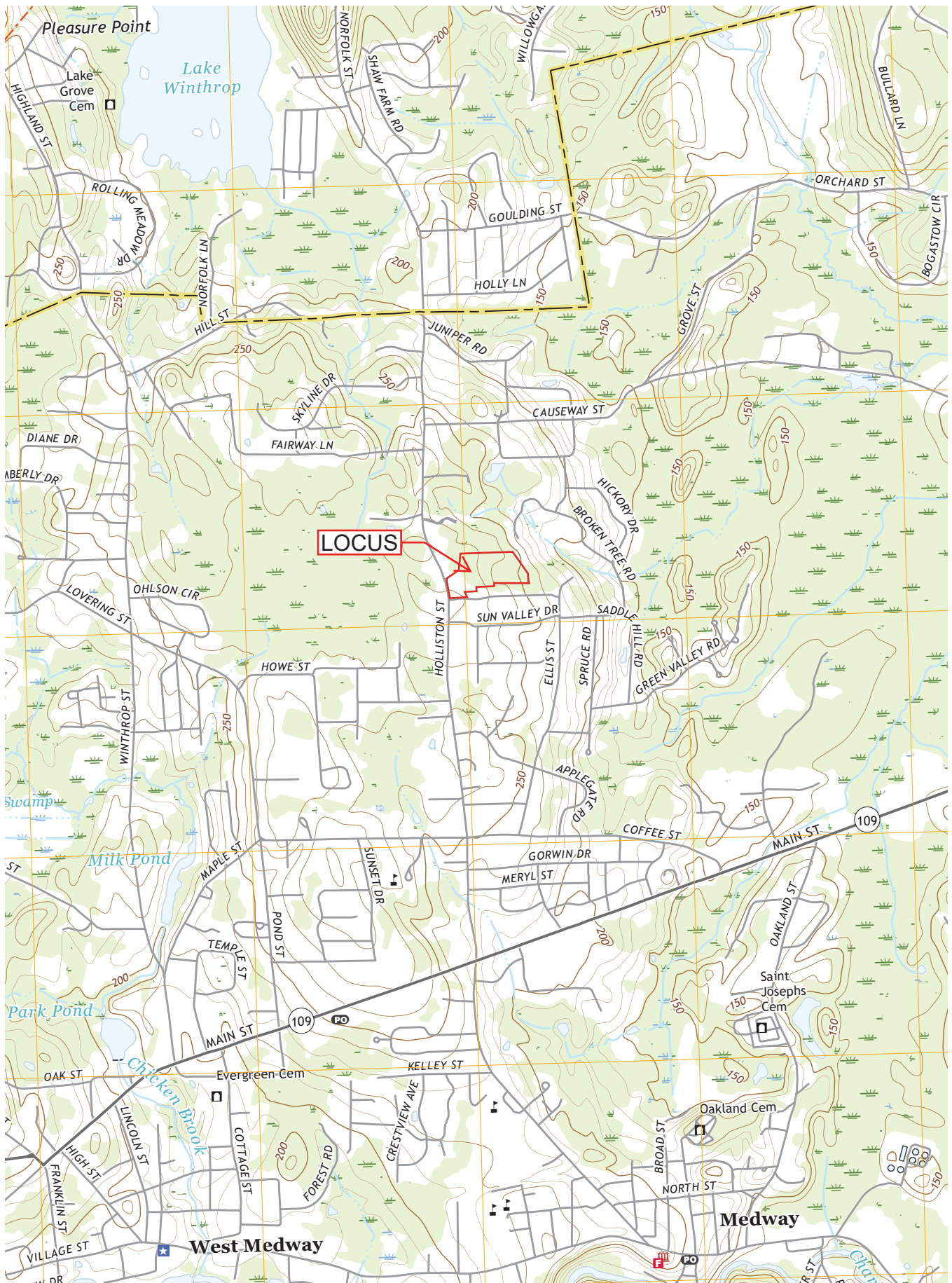
General Information	
Project Name	Lady Slipper Hollow
Site Location	148 Holliston Street, Medway Ma, 02053
Inspector's Name	
Inspector's Title	
Inspector's Phone	
Signature of Operator at end of Year, Certifying that Work was Completed as Noted. Date:	

O&M Task Checklist

	O&M Activity	Date Completed	Notes/Comments
Deep Sump Catch Basins			
	1 st Quarter Cleanout		
	2 nd Quarter Cleanout		
	3 rd Quarter Cleanout		
	4 th Quarter Cleanout		
Sediment Forebay			
	1 st Annual Inspection		
	2 nd Annual Inspection		
	3 rd Annual Inspection		
	4 th Annual Inspection		
	1 st Annual Mowing		
	2 nd Annual Mowing		
	Sediment Rem. Req'd?		
Stormwater Infiltration Basin			
	1 st Annual Inspection		

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

ATTACHMENT B: USGS MAP



ATTACHMENT C: ILLICIT DISCHARGE COMPLIANCE STATEMENT

ILLICIT DISCHARGE COMPLIANCE STATEMENT

Lady Slipper Hollow
Medway, 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.

Owner's Signature

Date

**ATTACHMENT D: CONSTRUCTION
ACTIVITY NPDES STORMWATER POLLUTION
PREVENTION PLAN**

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

Lady Slipper Hollow
148 Holliston Street
Medway, MA 02053
508-922-4535

SWPPP Prepared For:

Alden Ellis Jr.
148A Holliston Street
Medway, MA 02053
508-922-4535
Ace1157@comcast.net

SWPPP Prepared By:

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

SWPPP Preparation Date:

03/24/2026

Estimated Project Dates:

Project Start Date: [Insert Date](#)

Project Completion Date: [Insert Date](#)

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SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Operator(s):

Alden Ellis Jr.
148A Holliston Street
Medway, MA 02053
508-922-4535
Ace1157@comcast.net
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
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 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: Lady Slipper Hollow

Street/Location: 148 Holliston Street

City: Medway

State: MA

ZIP Code: 02053

County or Similar Government Division: Norfolk

Project Latitude/Longitude

Latitude: 42.1679° N
(decimal degrees)

Longitude: - 71.4089 ° 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)?
5000700041044	Bogastow Brook, Great Black Swamp	☐ Yes ☒ No		☒ Yes ☐ No	Charles River Watershed Pathogen (32373)	Pathogens	☐ Yes ☒ No	
[002]	Insert Text Here	☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No	[INSERT "Tier 2", "Tier 2.5", or "Tier 3"]
[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 road and three new single-family dwellings along with all appurtenances.

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 7:00 pm

Size of Construction Site

Size of Property	12.5 Acres
Total Area Expected to be Disturbed by Construction Activities	3.3 Acres
Maximum Area Expected to be Disturbed at Any One Time, Including On-site and Off-site Construction Support Areas	2.0 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

Road 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 <i>[Add additional dates as necessary]</i>
Estimated Date(s) when Stormwater Controls will be Removed	Insert Estimated Date <i>[Add additional dates as necessary]</i>

Phase II

House 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]

[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 resource list

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: Infiltration Field

(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 not located in an arid, semi-arid, or drought-stricken area and are not discharging to a sediment- or nutrient-impaired water or Tier 2, Tier 2.5, or Tier 3 water.

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 14 days of completion of work and complete stabilization within 14 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 14 days of completion of work and complete stabilization within 14 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	Maintain to ensure effective stabilization control

Temporary Non-Vegetative Site Stabilization	
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. - For disturbed areas less than 5 acres, initiate within 14 days of completion of work and complete stabilization within 14 days of the initiation of stabilization measures.	
Installation	Insert approximate date of installation
Completion	Insert approximate completion date
Maintenance Requirements	None
Design Specifications	Refer to site plan

[Repeat as needed for additional stabilization practices.]

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
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:
 - Medway Fire Department at 911,
 - Medway Board of Health at 508-533-3206,
 - Medway Conservation Commission at 508-533-3292,
 - 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):

Alden Ellis Jr.
148A Holliston Street
Medway, MA 02053
508-922-4535
Ace1157@comcast.net

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 necessary

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 specific 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 <u>within 24 hours</u> 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? <i>(Check the box that applies. See instructions for a description of each triggering condition (1 thru 6).)</i> ☐ 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 <u>within 24 hours</u> 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: <i>(Insert additional rows below if applicable)</i>	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 discovery 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

- 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.

[illegible]

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

[illegible]

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		
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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 Basins

TSS Removal Calculation Worksheet	A	B	C	D	E
	BMP1	TSS Removal Rate1	Starting TSS Load*	Amount Removed (B*C)	Remaining Load (C-D)
	Deep Sump CB or Sed. Forebay w/ Infiltration Basin	80%	1.00	20%	20%

Total TSS Removal =

80%

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

Project: Lady Slipper Hollow
Prepared By: Legacy Engineering LLC
Date: March 24, 2026

*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: Roof Infiltration Field

TSS Removal Calculation
Worksheet

A	B	C	D	E
BMP1	TSS Removal Rate1	Starting TSS Load*	Amount Removed (B*C)	Remaining Load (C-D)
Infiltration Field	80%	1.00	20%	20%

Total TSS Removal =

80%

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

Project: Lady Slipper Hollow
Prepared By: Legacy Engineering LLC
Date: March 24, 2026

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

BMP Performance Curve: Infiltration Basin

BMP Performance Table

BMP Name: Infiltration Basin

Soil Infiltration Rate: 2.41 in/hr

Land Use	Pollutant	Depth of Runoff Treated (inches)							
		0.1	0.2	0.4	0.6	0.8	1	1.5	2
Commercial	TSS	70%	88%	98%	100%	100%	100%	100%	100%
	TP	45%	67%	87%	94%	97%	98%	100%	100%
	Zn	82%	95%	100%	100%	100%	100%	100%	100%
Industrial	TSS	70%	88%	98%	100%	100%	100%	100%	100%
	TP	46%	67%	87%	94%	97%	99%	100%	100%
	Zn	69%	88%	99%	100%	100%	100%	100%	100%
High Density Residential	TSS	71%	88%	98%	100%	100%	100%	100%	100%
	TP	46%	67%	87%	94%	97%	98%	100%	100%
	Zn	74%	91%	99%	100%	100%	100%	100%	100%
Medium Density Residential	TSS	76%	91%	99%	100%	100%	100%	100%	100%
	TP	46%	67%	87%	94%	97%	98%	100%	100%
	Zn	45%	68%	89%	96%	99%	100%	100%	100%
Low Density Residential	TSS	74%	89%	98%	99%	100%	100%	100%	100%
	TP	48%	68%	87%	94%	97%	98%	100%	100%
	Zn	38%	61%	84%	94%	98%	99%	100%	100%
Runoff Volume Reduction		33%	54%	78%	88%	93%	96%	99%	100%

Annual Pollutant Loading Rates

Land use	Pollutant load (lbs/acre-year)		
	TSS	TP	Zn
Commercial	1117.77	1.66	2.33
Industrial	745.22	1.43	0.45
High Density Residential	465.08	1.10	0.79
Medium Density Residential	274.63	0.55	0.11
Low Density Residential	72.11	0.042	0.043

BMP Performance Curve: Infiltration Trench

BMP Performance Table

BMP Name: Infiltration Trench

Soil Infiltration Rate: 2.41 in/hr

Land Use	Pollutant	Depth of Runoff Treated (inches)							
		0.1	0.2	0.4	0.6	0.8	1	1.5	2
Commercial	TSS	50%	77%	97%	100%	100%	100%	100%	100%
	TP	32%	55%	81%	91%	96%	98%	100%	100%
	Zn	81%	98%	100%	100%	100%	100%	100%	100%
Industrial	TSS	51%	78%	97%	100%	100%	100%	100%	100%
	TP	33%	56%	81%	92%	96%	98%	100%	100%
	Zn	55%	84%	99%	100%	100%	100%	100%	100%
High-Density Residential	TSS	52%	79%	97%	100%	100%	100%	100%	100%
	TP	33%	55%	81%	91%	96%	98%	100%	100%
	Zn	63%	92%	100%	100%	100%	100%	100%	100%
Medium-Density Residential	TSS	62%	86%	98%	100%	100%	100%	100%	100%
	TP	33%	55%	80%	90%	95%	97%	99%	100%
	Zn	25%	48%	79%	94%	99%	100%	100%	100%
Low-Density Residential	TSS	57%	80%	96%	99%	100%	100%	100%	100%
	TP	35%	56%	80%	90%	95%	97%	99%	100%
	Zn	19%	39%	71%	89%	97%	100%	100%	100%
Runoff Volume Reduction		34%	55%	78%	88%	93%	96%	99%	100%

Annual Pollutant Loading Rates

Land use	Pollutant load (lbs/acre-year)		
	TSS	TP	Zn
Commercial	1117.77	1.66	2.33
Industrial	745.22	1.43	0.45
High-Density Residential	465.08	1.10	0.79
Medium-Density Residential	274.63	0.55	0.11
Low-Density Residential	72.11	0.042	0.043

ATTACHMENT F: STORMWATER MANAGEMENT HANDBOOK CHECKLIST



Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

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

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

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

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

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

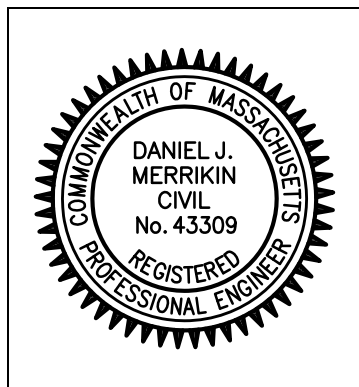
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Digitally signed by Daniel J.
Merrikin, P.E.
Date: 2026.04.01 13:50:31 -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 Field¹
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☒ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☐ is within the Zone II or Interim Wellhead Protection Area
 - ☐ is near or to other critical areas
 - ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

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

- ☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
- ☒ Redevelopment portion of mix of new and redevelopment.
- ☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

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

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☐ The project is **not** covered by a NPDES Construction General Permit.
- ☒ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☒ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

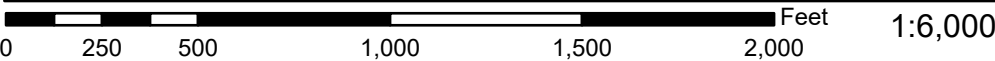
- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

ATTACHMENT G: FEMA FIRMETTE

National Flood Hazard Layer FIRMMette



71°24'48"W 42°10'19"N



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 Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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

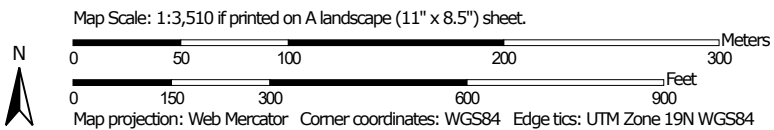
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/5/2024 at 3:58 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

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/5/2024
Page 1 of 4

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 19, Sep 10, 2023

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
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	3.4	6.2%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	11.2	20.6%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	C	3.6	6.7%
317B	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	C	27.1	50.1%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	0.5	0.8%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	8.4	15.5%
Totals for Area of Interest			54.1	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

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-1 Date of Test Hole: July 21, 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"	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
26"	Bw	10YR6/8				Loamy Sand	1%	1%	Massive	V. Friable	
100"	C	2.5Y6/4	36"	7.5Y6/8	5%	Loamy Sand/Sand	4%	3%	Massive	V. Friable	Pocket of Fine Sand

Additional Notes: Ground Elev.=273.0

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 36" (Elev.=270.0)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-2 Date of Test Hole: July 21, 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	
41"	B	10YR6/6	34"	7.5Y6/8	5%	Loamy Sand	1%	1%	Massive	V. Friable	
98"	C	2.5Y6/4				Loamy Sand/Sand	4%	3%	Massive	V. Friable	

Additional Notes: Ground Elev.=273.0

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 34" (Elev.=270.2)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-3 Date of Test Hole: July 21, 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%	2%	Massive	V. Friable	Boulders
38"	Bw	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	Boulders
89"	C	2.5Y6/4				Loamy Sand/Sand	3%	5%	Massive	V. Friable	Large Boulders

Additional Notes: Ground Elev.=268.3

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-4 Date of Test Hole: July 21, 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			
5"	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	Boulders
32"	Bw	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	Boulders
51"	C1	2.5Y6/3	51"	7.5Y6/8	5%	Loamy Sand	1%	1%	Massive	V. Friable	Boulders
92"	C2	2.5Y6/4				Loamy Sand	4%	3%	Massive	V. Friable	

Additional Notes: Ground Elev.=262.0

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth weeping from side of observation hole: None

☒ Depth to soil redoximorphic features (mottles): 51" (Elev.=257.8)

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-5 Date of Test Hole: July 21, 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%	2%	Massive	V. Friable	Boulders
36"	B	2.5Y6/6				Loamy Sand	1%	2%	Massive	V. Friable	Boulders
100"	C	2.5Y6/4				Loamy Sand/Sand	4%	3%	Massive	V. Friable	Boulders

Additional Notes: Ground Elev.=268.6

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-6 Date of Test Hole: July 21, 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			
5"	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	Boulders
22"	Bw	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	Boulders
100"	C	2.5Y6/4	46"	7.5Y6/8	5%	Loamy Sand/Sand	4%	3%	Massive/ Single Grain	V. Friable/ Loose	Boulders

Additional Notes: Ground Elev.=267.8

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth weeping from side of observation hole: None

☒ Depth to soil redoximorphic features (mottles): 46" (Elev.=264.0)

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-7 Date of Test Hole: July 21, 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	
34"	Bw	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	Boulders
87"	C	2.5Y6/4	35"	7.5Y6/8	5%	Loamy Sand/Sand	4%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=262.5

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth weeping from side of observation hole: None

☒ Depth to soil redoximorphic features (mottles): 35" (Elev.=259.6)

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-8 Date of Test Hole: July 21, 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	Boulders
36"	Bw	10YR6/8				Loamy Sand	1%	3%	Massive	V. Friable	Boulders
90"	C	2.5Y6/4				Loamy Sand/Sand	3%	4%	Massive	V. Friable	Boulders, Cobbles

Additional Notes: Ground Elev.=262.9

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-9 Date of Test Hole: July 21, 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"	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
26"	Bw	10YR6/8				Loamy Sand	2%	2%	Massive	V. Friable	
90"	C	2.5Y6/4				Loamy Sand/Sand	3%	4%	Massive	V. Friable	

Additional Notes: Ground Elev.=273.6

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth to soil redoximorphic features (mottles): None

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-10 Date of Test Hole: July 21, 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"	A	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
32"	B	10YR6/8				Loamy Sand	1%	2%	Massive	V. Friable	
100"	C	2.5Y6/4	48"	7.5Y6/8	5%	Loamy Sand	3%	3%	Massive	V. Friable	Boulders

Additional Notes: Ground Elev.=269.5

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth weeping from side of observation hole: None

☒ Depth to soil redoximorphic features (mottles): 48" (Elev.=265.5)

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-11 Date of Test Hole: July 21, 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			
10"	Ap	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
26"	B	10YR6/6	26"	7.5Y6/8	5%	Loamy Sand	1%	2%	Massive	V. Friable	
60"	C1	2.5Y6/2				Sandy Loam	2%	2%	Massive	V. Friable	
90"	C2	2.5Y6/4				Loamy Sand	3%	2%	Massive	V. Friable	

Additional Notes: Ground Elev.=269.3

Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☒ Depth to soil redoximorphic features (mottles): 26" (Elev.=267.1)

☐ Depth weeping from side of observation hole: None

DEEP OBSERVATION TEST HOLE SOIL LOG

148 Holliston Street, Medway, MA 02053

Deep Observation Hole: OTH 25-12 Date of Test Hole: July 21, 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			
9"	Ap	10YR4/3				Loamy Sand	1%	1%	Massive	V. Friable	
31"	Bw	10YR6/8				Loamy Sand	1%	3%	Massive	V. Friable	Boulders
98"	C	2.5Y6/4	48"	7.5Y6/8	5%	Loamy Sand	3%	4%	Massive	V. Friable	Boulders

Additional Notes: Ground Elev.=268.4

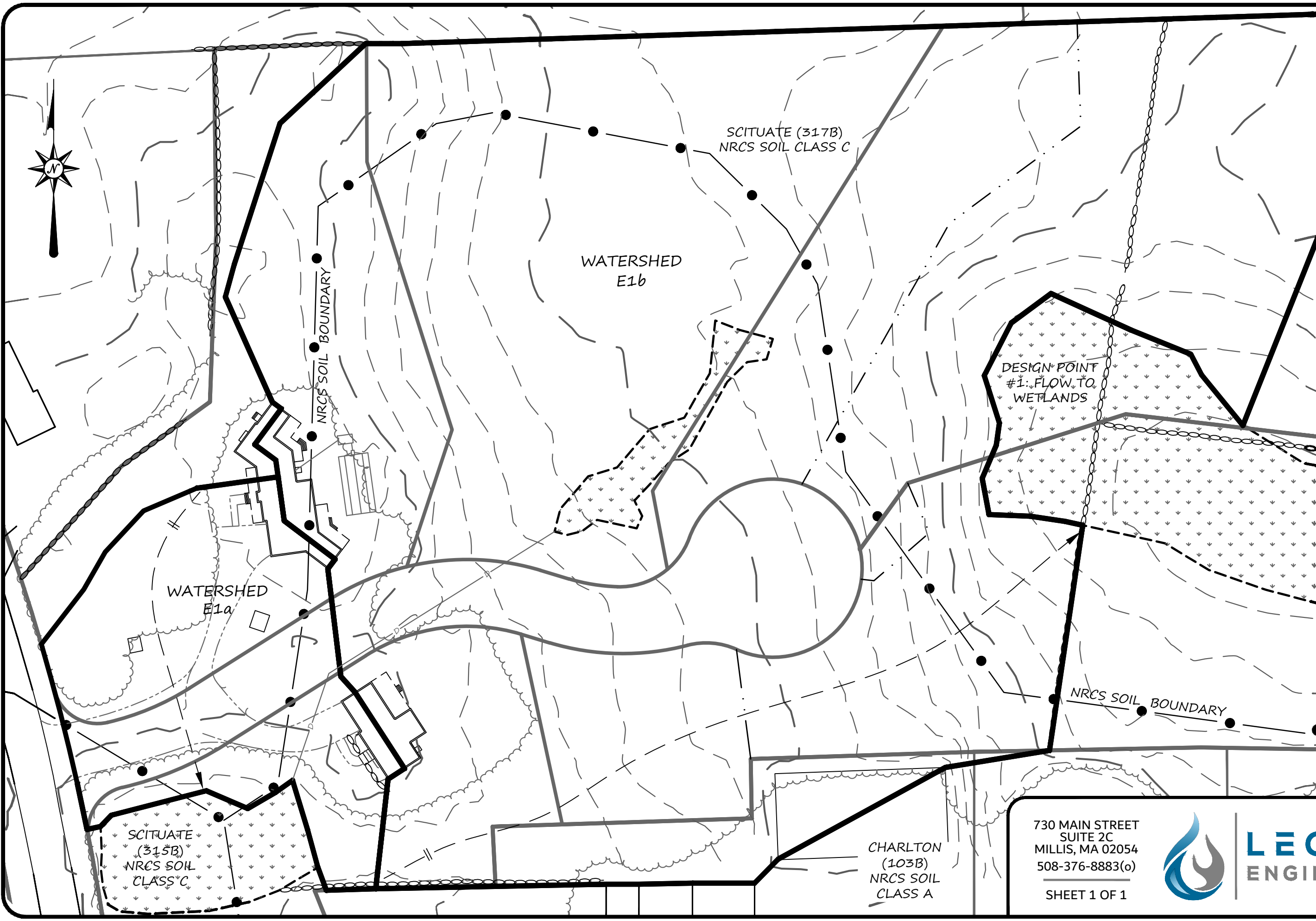
Groundwater Indicators Observed at Time of Testing:

☐ Depth observed standing water in observation hole: None

☐ Depth weeping from side of observation hole: None

☒ Depth to soil redoximorphic features (mottles): 48" (Elev.=264.4)

ATTACHMENT I: EXISTING WATERSHED PLAN



PLAN SCALE: 1"=60'



PLAN DATE: MARCH 24, 2026

REVISION	DATE	BY

LADY SLIPPER HOLLOW
EXISTING WATERSHED
PLAN OF LAND
IN
MEDWAY, MA

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

SHEET 1 OF 1



LEGACY
ENGINEERING

CHARLTON
(103B)
NRCS SOIL
CLASS A

SCITUATE
(315B)
NRCS SOIL
CLASS C

WATERSHED
E1b

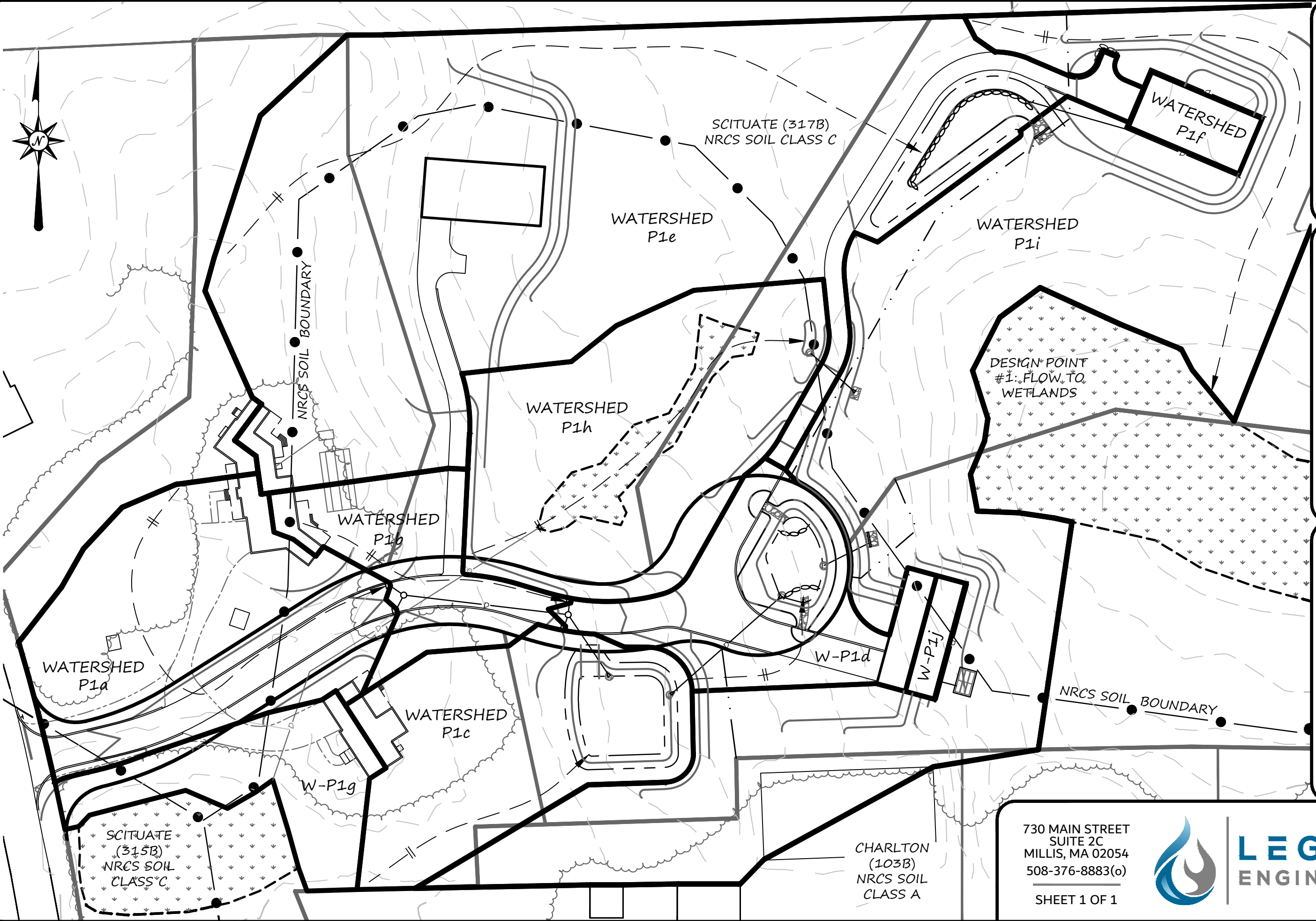
WATERSHED
E1a

DESIGN POINT
#1: FLOW TO
WETLANDS

NRCS SOIL BOUNDARY

NRCS SOIL BOUNDARY

ATTACHMENT J: PROPOSED WATERSHED PLAN



PLAN SCALE: 1"=60'

0' 60' 120'

PLAN DATE: MARCH 24, 2026		
REVISION	DATE	BY

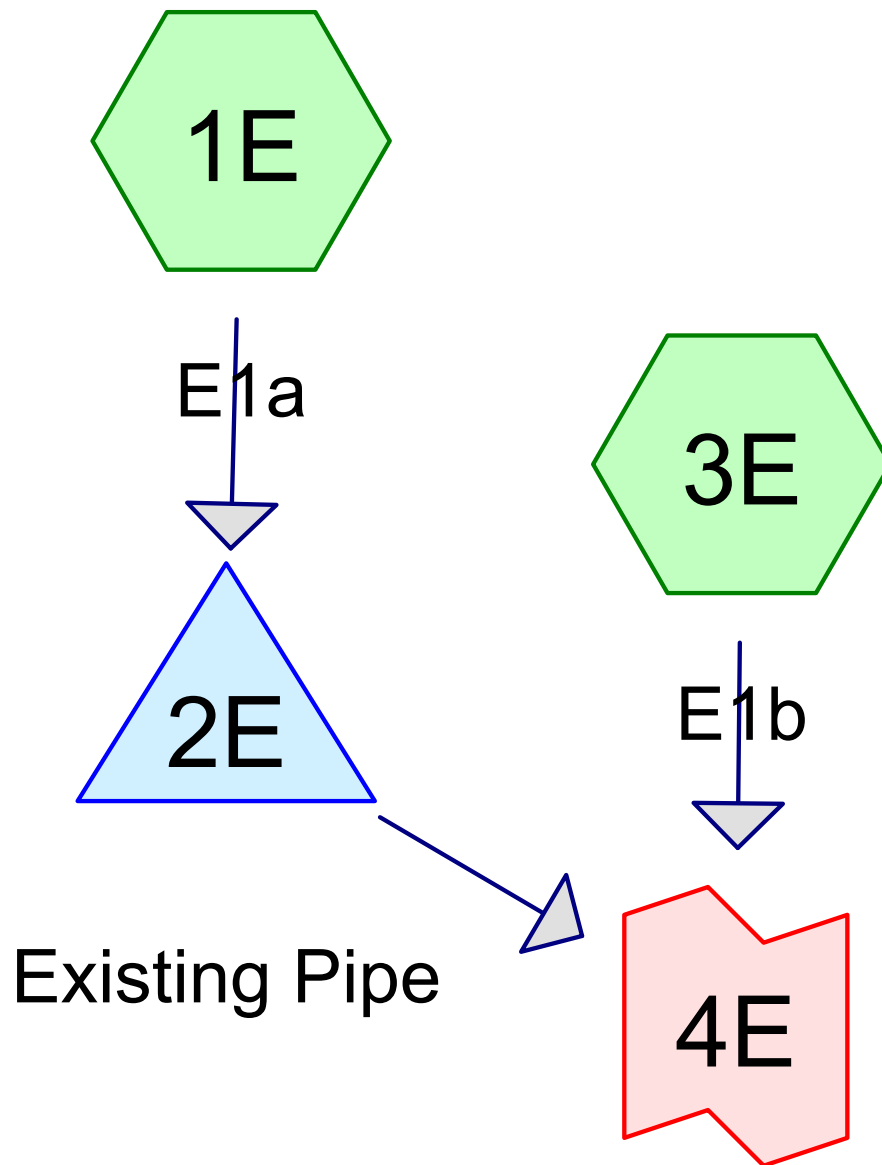
LADY SLIPPER HOLLOW
PROPOSED WATERSHED
PLAN OF LAND
IN
MEDWAY, MA

730 MAIN STREET
SUITE 2C
MILLIS, MA 02054
508-376-8883(o)
SHEET 1 OF 1

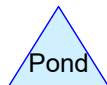
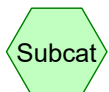


ATTACHMENT K: HYDROCAD HYDROLOGY CALCULATIONS

DESIGN POINT #1: FLOW TO WETLAND
EXISTING CONDITIONS



Design Point #1: Flow to Wetlands



Routing Diagram for HydroCAD

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HydroCAD

Prepared by Legacy Engineering LLC

Printed 3/31/2026

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Page 2

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	3.82	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.01	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.76	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.71	2

HydroCAD

Prepared by Legacy Engineering LLC

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.628	39	>75% Grass cover, Good HSG A (1E, 3E)
0.236	74	>75% Grass cover, Good HSG C (1E, 3E)
0.023	96	Gravel roads HSG A (1E)
0.163	96	Gravel roads HSG C (1E)
0.053	98	Roofs HSG A (1E, 3E)
0.058	98	Roofs HSG C (1E, 3E)
3.662	30	Woods, Good HSG A (1E, 3E)
3.314	70	Woods, Good HSG C (1E, 3E)
8.138	51	TOTAL AREA

HydroCAD

Prepared by Legacy Engineering LLC

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NOAA10 24-hr D 2-YR Rainfall=3.82"

Printed 3/31/2026

Page 4

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

Subcatchment1E: E1a

Runoff Area=40,326 sf 5.56% Impervious Runoff Depth=1.60"
Flow Length=215' Tc=13.6 min CN=WQ Runoff=1.25 cfs 0.123 af

Pond 2E: Existing Pipe

Inflow=1.25 cfs 0.123 af
Primary=1.25 cfs 0.123 af

Subcatchment3E: E1b

Runoff Area=314,148 sf 0.83% Impervious Runoff Depth=0.54"
Flow Length=534' Tc=17.2 min CN=WQ Runoff=2.99 cfs 0.327 af

Link 4E: Design Point #1: Flow to Wetlands

Inflow=4.17 cfs 0.450 af
Primary=4.17 cfs 0.450 af

Total Runoff Area = 8.138 ac Runoff Volume = 0.450 af Average Runoff Depth = 0.66"
98.64% Pervious = 8.027 ac 1.36% Impervious = 0.111 ac

Summary for Subcatchment 1E: E1a

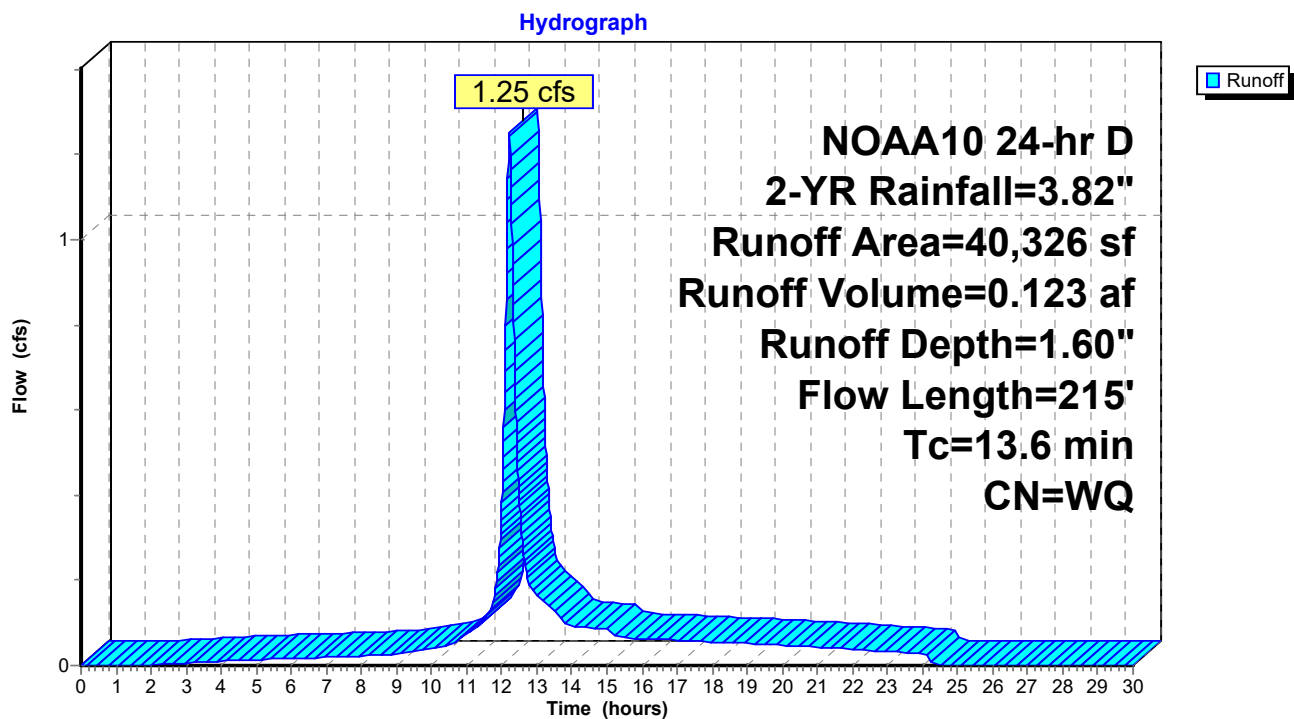
Runoff = 1.25 cfs @ 12.22 hrs, Volume= 0.123 af, Depth= 1.60"
 Routed to Pond 2E : Existing Pipe

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=3.82"

	Area (sf)	CN	Description
*	7,120	96	Gravel roads HSG C
	1,320	98	Roofs HSG C
*	989	96	Gravel roads HSG A
	921	98	Roofs HSG A
	3,122	30	Woods, Good HSG A
	12,941	70	Woods, Good HSG C
	4,748	39	>75% Grass cover, Good HSG A
	9,165	74	>75% Grass cover, Good HSG C
	40,326		Weighted Average
	38,085		94.44% Pervious Area
	2,241		5.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	31	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.6	215	Total			

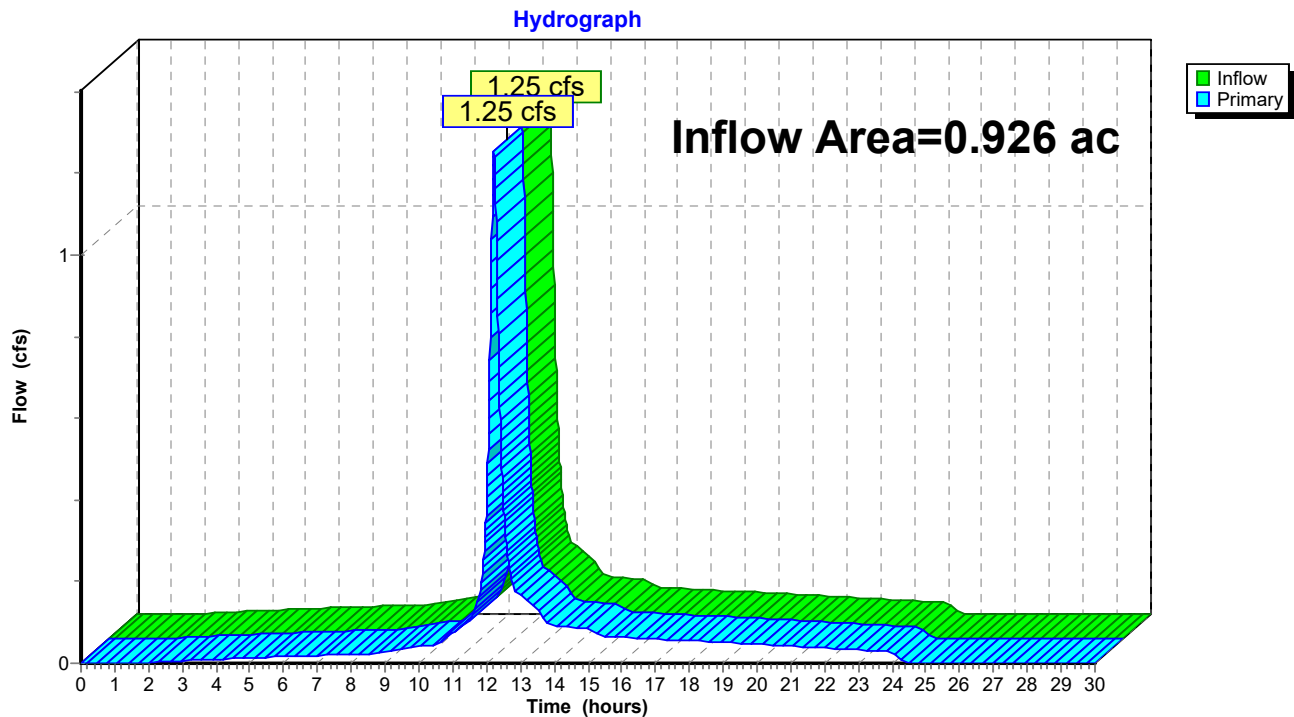
Subcatchment 1E: E1a



Summary for Pond 2E: Existing Pipe

Inflow Area = 0.926 ac, 5.56% Impervious, Inflow Depth = 1.60" for 2-YR event
Inflow = 1.25 cfs @ 12.22 hrs, Volume= 0.123 af
Primary = 1.25 cfs @ 12.22 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4E : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 2E: Existing Pipe

Summary for Subcatchment 3E: E1b

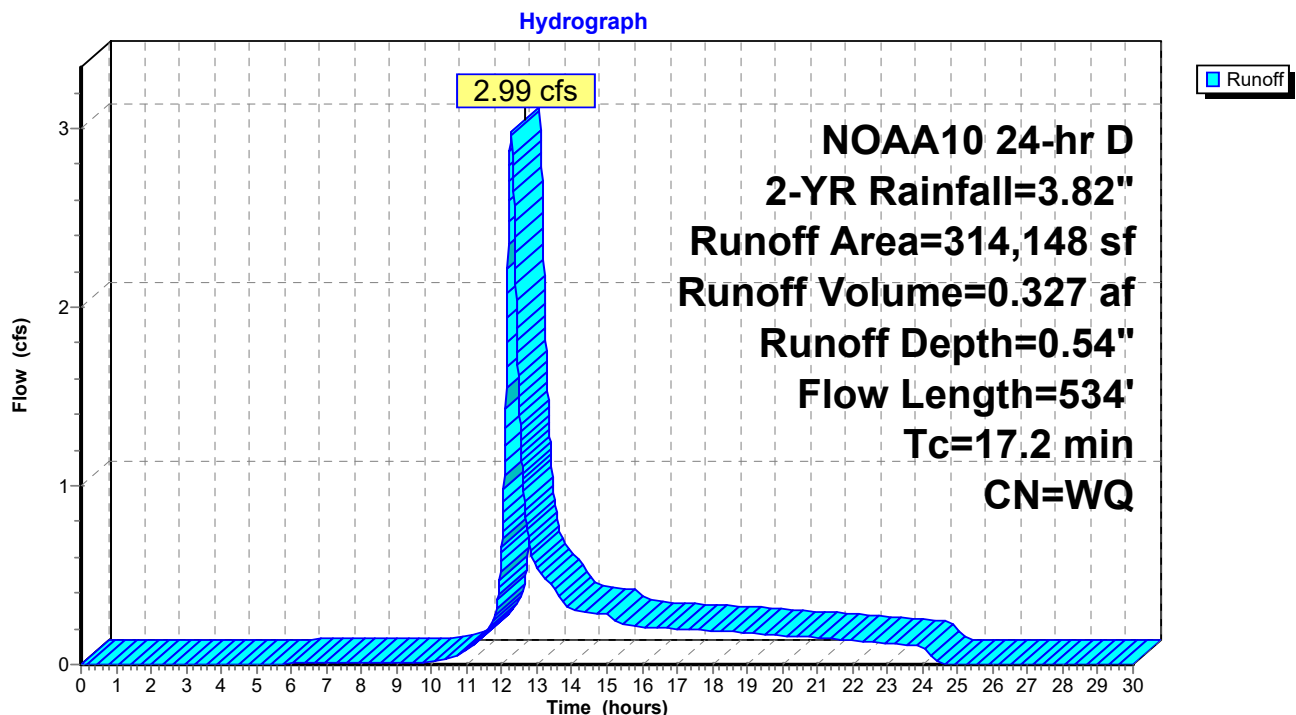
Runoff = 2.99 cfs @ 12.27 hrs, Volume= 0.327 af, Depth= 0.54"

Routed to Link 4E : Design Point #1: Flow to Wetlands

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=3.82"

Area (sf)	CN	Description
131,431	70	Woods, Good HSG C
1,228	98	Roofs HSG C
1,366	98	Roofs HSG A
156,409	30	Woods, Good HSG A
22,617	39	>75% Grass cover, Good HSG A
1,097	74	>75% Grass cover, Good HSG C
314,148		Weighted Average
311,554		99.17% Pervious Area
2,594		0.83% Impervious Area

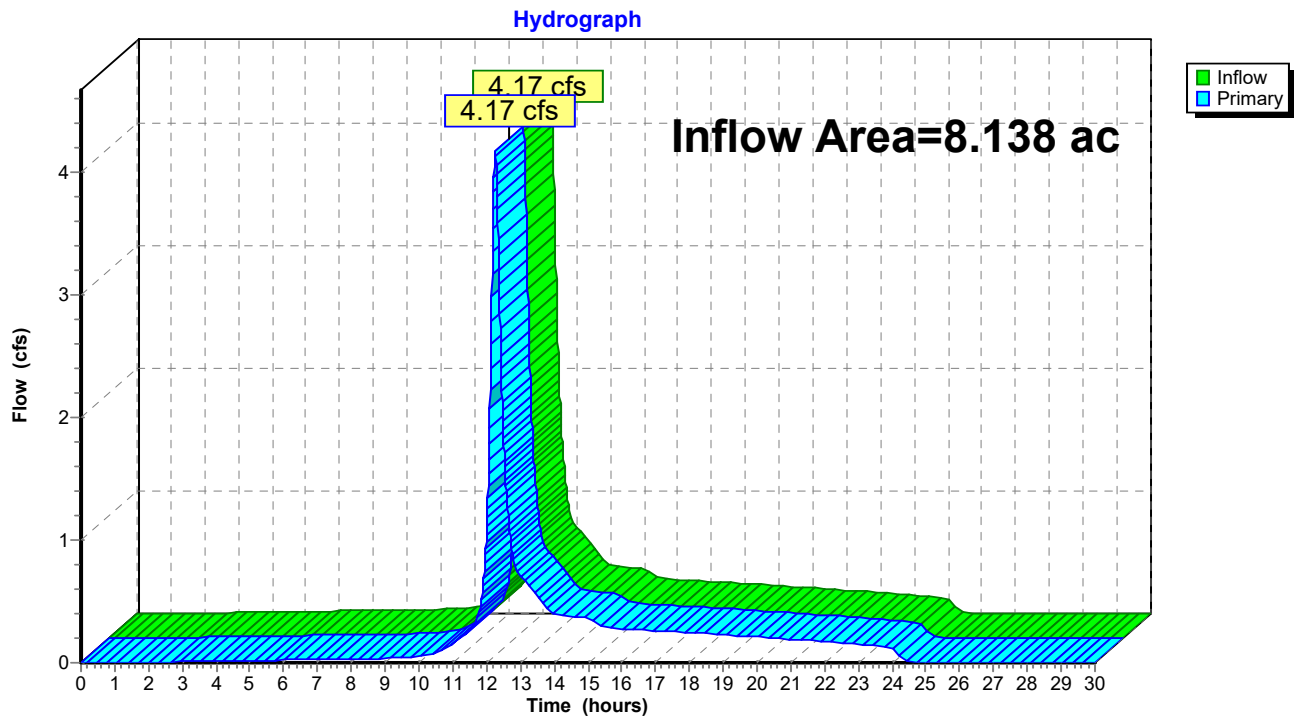
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
7.9	500	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.2	534	Total			

Subcatchment 3E: E1b

Summary for Link 4E: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 1.36% Impervious, Inflow Depth = 0.66" for 2-YR event
Inflow = 4.17 cfs @ 12.25 hrs, Volume= 0.450 af
Primary = 4.17 cfs @ 12.25 hrs, Volume= 0.450 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 #1: Flow to Wetlands

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NOAA10 24-hr D 10-YR Rainfall=6.01"

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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

Subcatchment1E: E1a

Runoff Area=40,326 sf 5.56% Impervious Runoff Depth=3.12"
Flow Length=215' Tc=13.6 min CN=WQ Runoff=2.45 cfs 0.241 af

Pond 2E: Existing Pipe

Inflow=2.45 cfs 0.241 af
Primary=2.45 cfs 0.241 af

Subcatchment3E: E1b

Runoff Area=314,148 sf 0.83% Impervious Runoff Depth=1.30"
Flow Length=534' Tc=17.2 min CN=WQ Runoff=7.19 cfs 0.784 af

Link 4E: Design Point #1: Flow to Wetlands

Inflow=9.52 cfs 1.025 af
Primary=9.52 cfs 1.025 af

Total Runoff Area = 8.138 ac Runoff Volume = 1.025 af Average Runoff Depth = 1.51"
98.64% Pervious = 8.027 ac 1.36% Impervious = 0.111 ac

Summary for Subcatchment 1E: E1a

Runoff = 2.45 cfs @ 12.21 hrs, Volume= 0.241 af, Depth= 3.12"

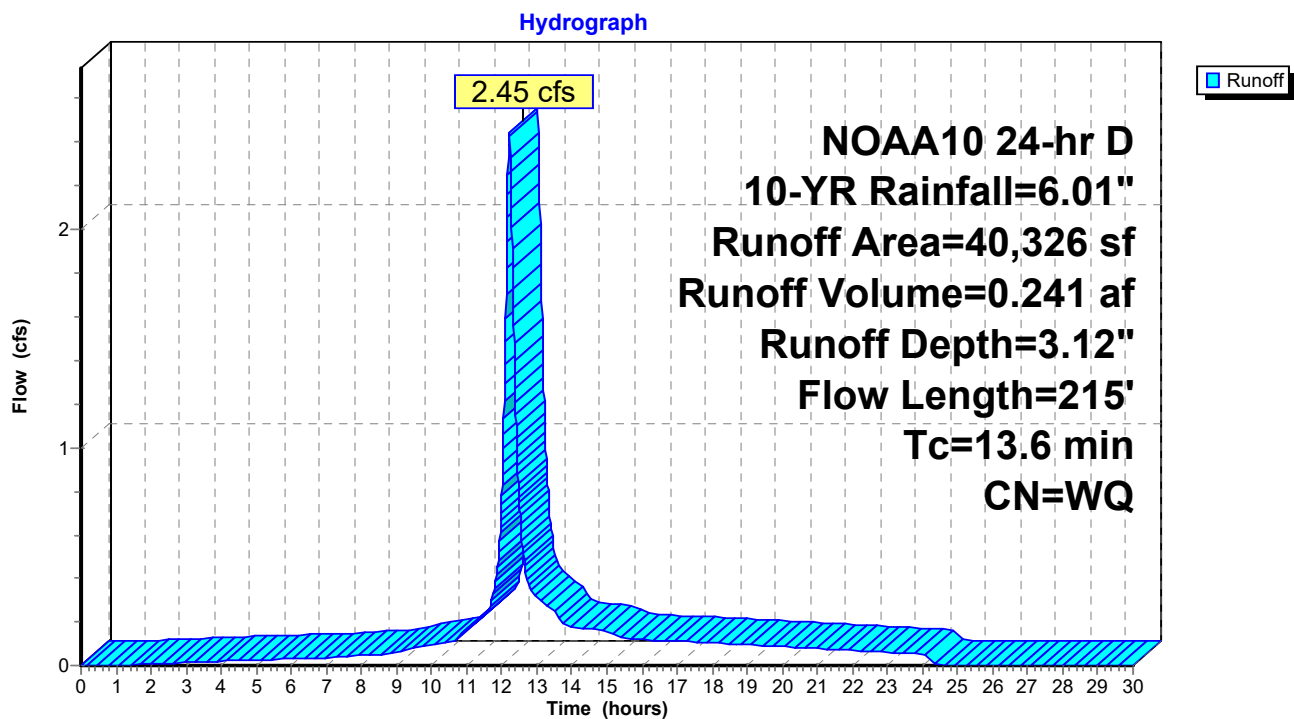
Routed to Pond 2E : Existing Pipe

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=6.01"

	Area (sf)	CN	Description
*	7,120	96	Gravel roads HSG C
	1,320	98	Roofs HSG C
*	989	96	Gravel roads HSG A
	921	98	Roofs HSG A
	3,122	30	Woods, Good HSG A
	12,941	70	Woods, Good HSG C
	4,748	39	>75% Grass cover, Good HSG A
	9,165	74	>75% Grass cover, Good HSG C
	40,326		Weighted Average
	38,085		94.44% Pervious Area
	2,241		5.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	31	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.6	215	Total			

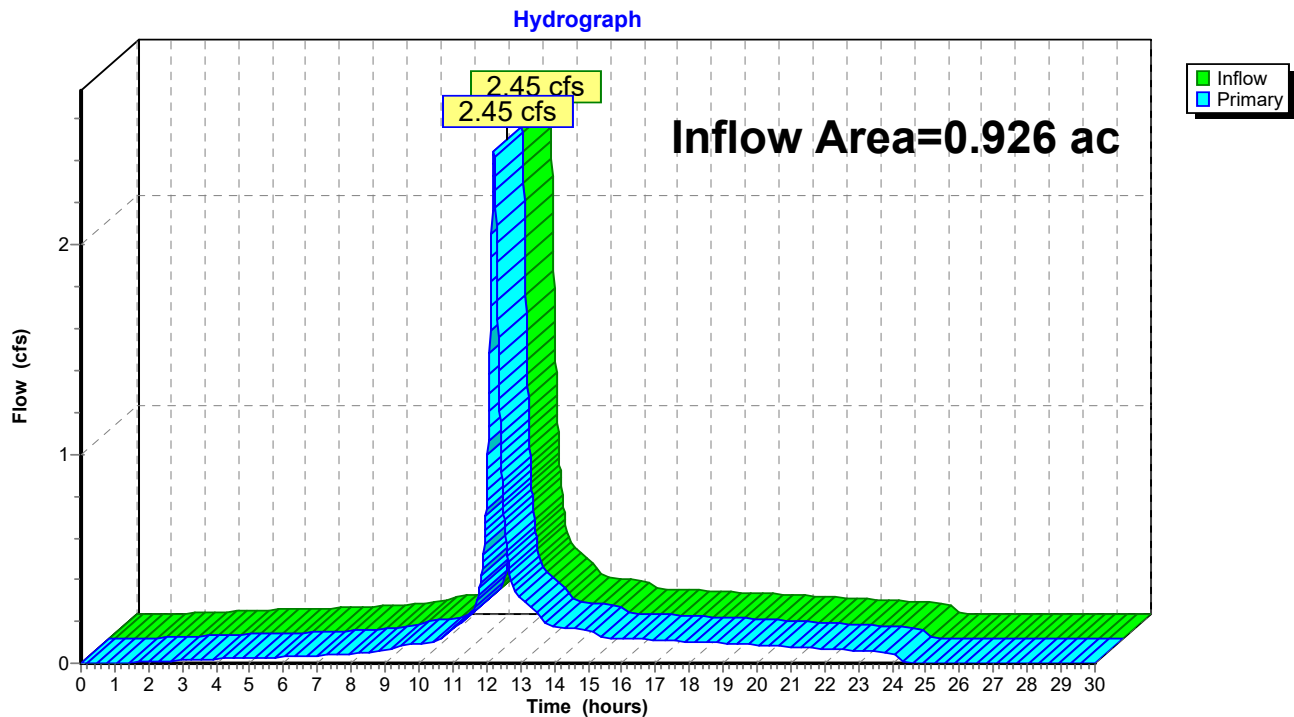
Subcatchment 1E: E1a



Summary for Pond 2E: Existing Pipe

Inflow Area = 0.926 ac, 5.56% Impervious, Inflow Depth = 3.12" for 10-YR event
Inflow = 2.45 cfs @ 12.21 hrs, Volume= 0.241 af
Primary = 2.45 cfs @ 12.21 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4E : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 2E: Existing Pipe

Summary for Subcatchment 3E: E1b

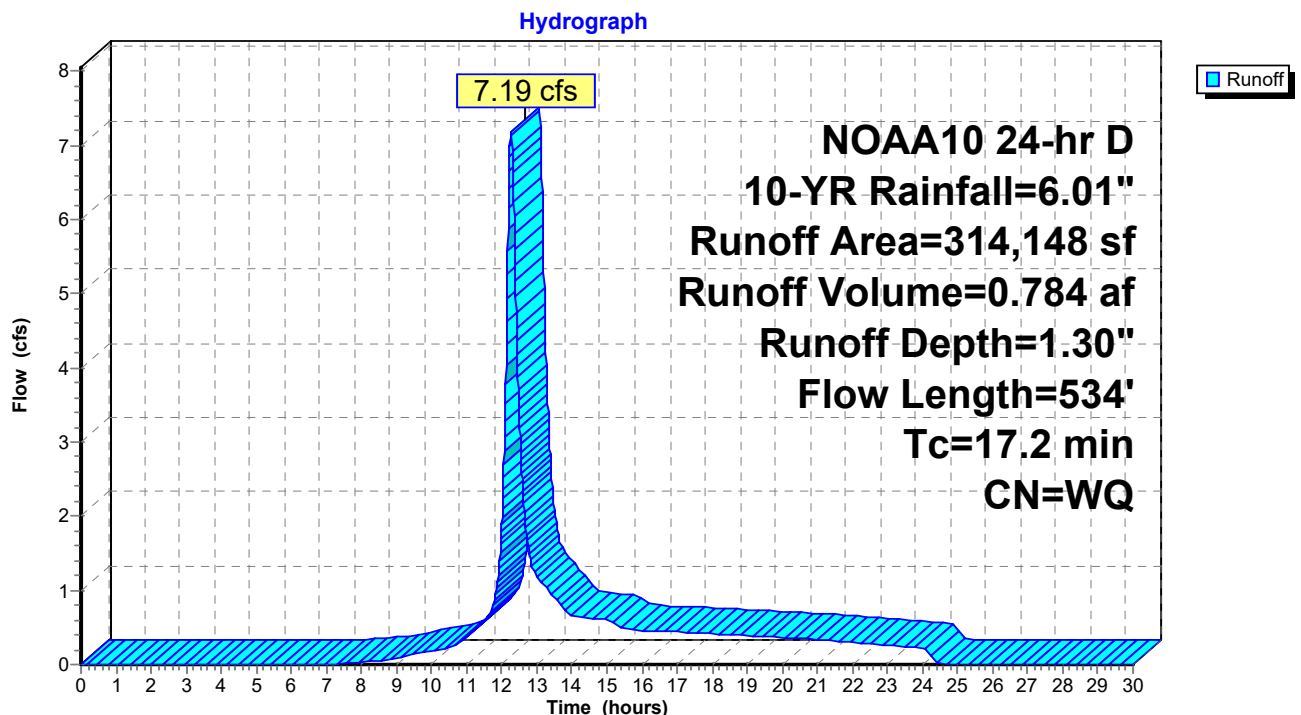
Runoff = 7.19 cfs @ 12.26 hrs, Volume= 0.784 af, Depth= 1.30"

Routed to Link 4E : Design Point #1: Flow to Wetlands

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=6.01"

Area (sf)	CN	Description
131,431	70	Woods, Good HSG C
1,228	98	Roofs HSG C
1,366	98	Roofs HSG A
156,409	30	Woods, Good HSG A
22,617	39	>75% Grass cover, Good HSG A
1,097	74	>75% Grass cover, Good HSG C
314,148		Weighted Average
311,554		99.17% Pervious Area
2,594		0.83% Impervious Area

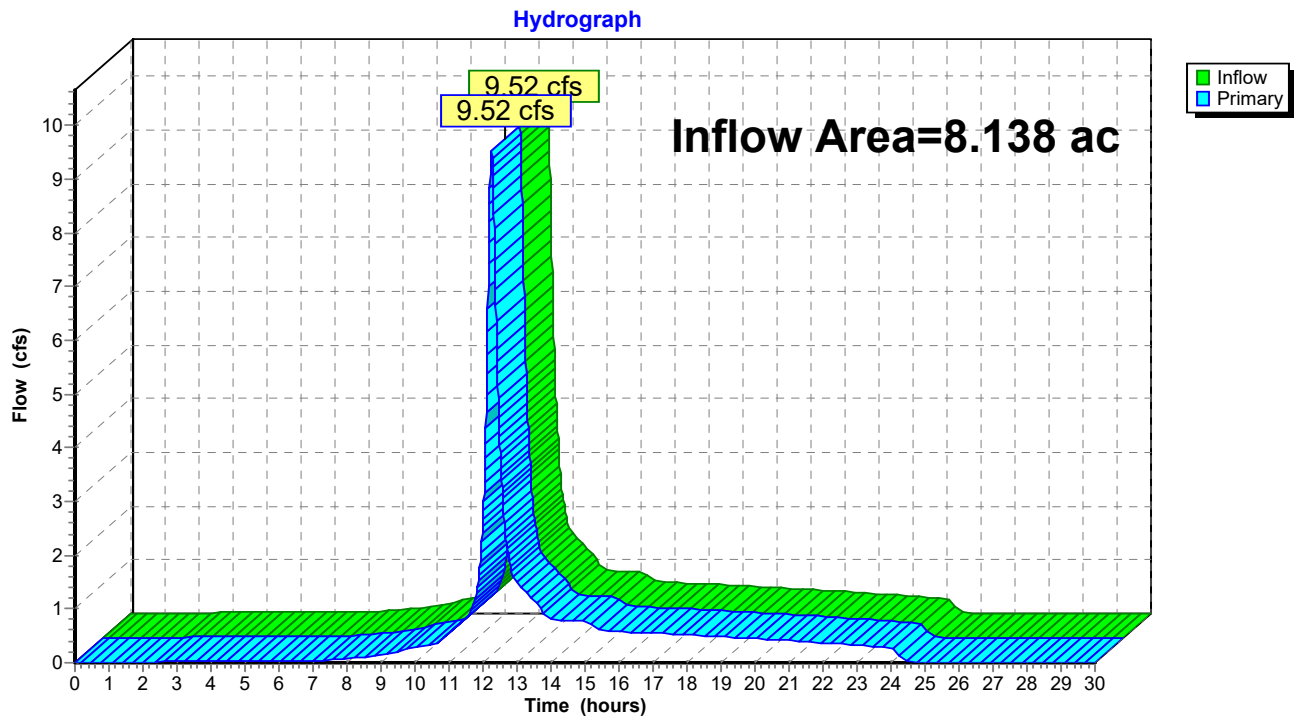
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
7.9	500	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.2	534	Total			

Subcatchment 3E: E1b

Summary for Link 4E: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 1.36% Impervious, Inflow Depth = 1.51" for 10-YR event
Inflow = 9.52 cfs @ 12.25 hrs, Volume= 1.025 af
Primary = 9.52 cfs @ 12.25 hrs, Volume= 1.025 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 #1: Flow to Wetlands

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NOAA10 24-hr D 25-YR Rainfall=7.76"

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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

Subcatchment1E: E1a

Runoff Area=40,326 sf 5.56% Impervious Runoff Depth=4.47"
Flow Length=215' Tc=13.6 min CN=WQ Runoff=3.50 cfs 0.345 af

Pond 2E: Existing Pipe

Inflow=3.50 cfs 0.345 af
Primary=3.50 cfs 0.345 af

Subcatchment3E: E1b

Runoff Area=314,148 sf 0.83% Impervious Runoff Depth=2.12"
Flow Length=534' Tc=17.2 min CN=WQ Runoff=11.11 cfs 1.272 af

Link 4E: Design Point #1: Flow to Wetlands

Inflow=14.43 cfs 1.617 af
Primary=14.43 cfs 1.617 af

Total Runoff Area = 8.138 ac Runoff Volume = 1.617 af Average Runoff Depth = 2.38"
98.64% Pervious = 8.027 ac 1.36% Impervious = 0.111 ac

Summary for Subcatchment 1E: E1a

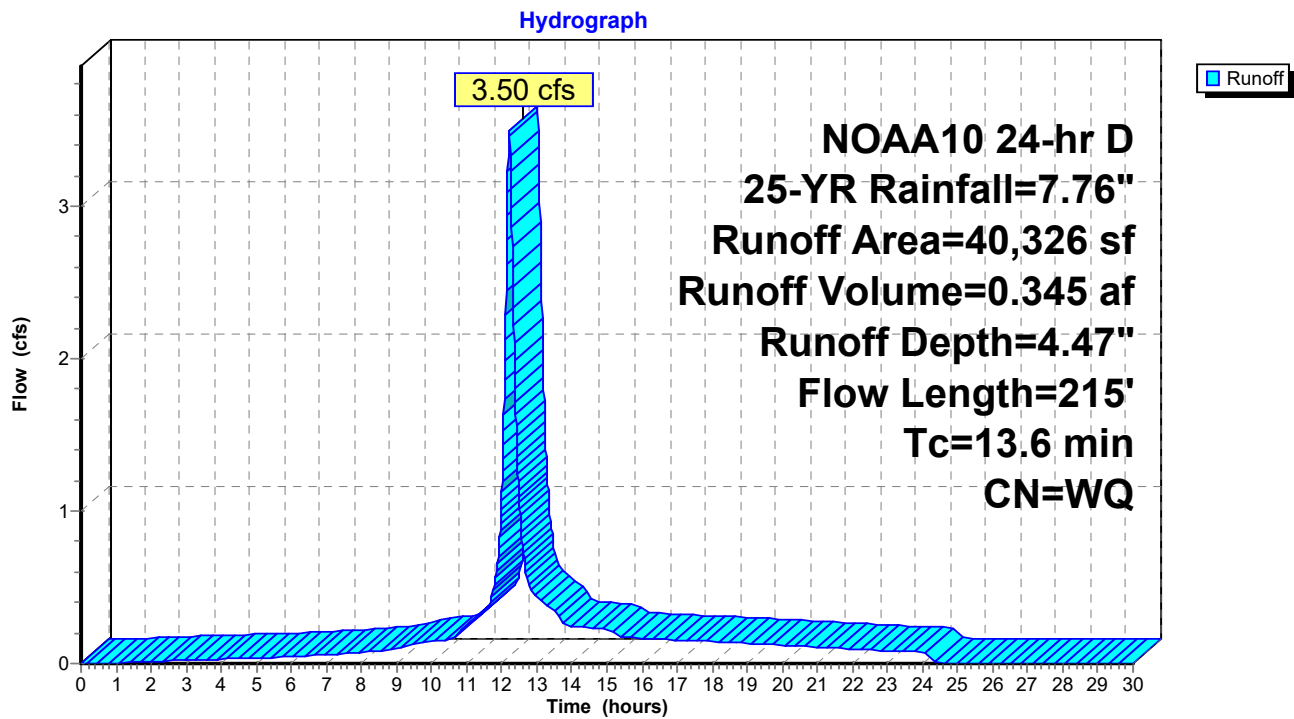
Runoff = 3.50 cfs @ 12.21 hrs, Volume= 0.345 af, Depth= 4.47"
 Routed to Pond 2E : Existing Pipe

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=7.76"

	Area (sf)	CN	Description
*	7,120	96	Gravel roads HSG C
	1,320	98	Roofs HSG C
*	989	96	Gravel roads HSG A
	921	98	Roofs HSG A
	3,122	30	Woods, Good HSG A
	12,941	70	Woods, Good HSG C
	4,748	39	>75% Grass cover, Good HSG A
	9,165	74	>75% Grass cover, Good HSG C
	40,326		Weighted Average
	38,085		94.44% Pervious Area
	2,241		5.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	31	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.6	215	Total			

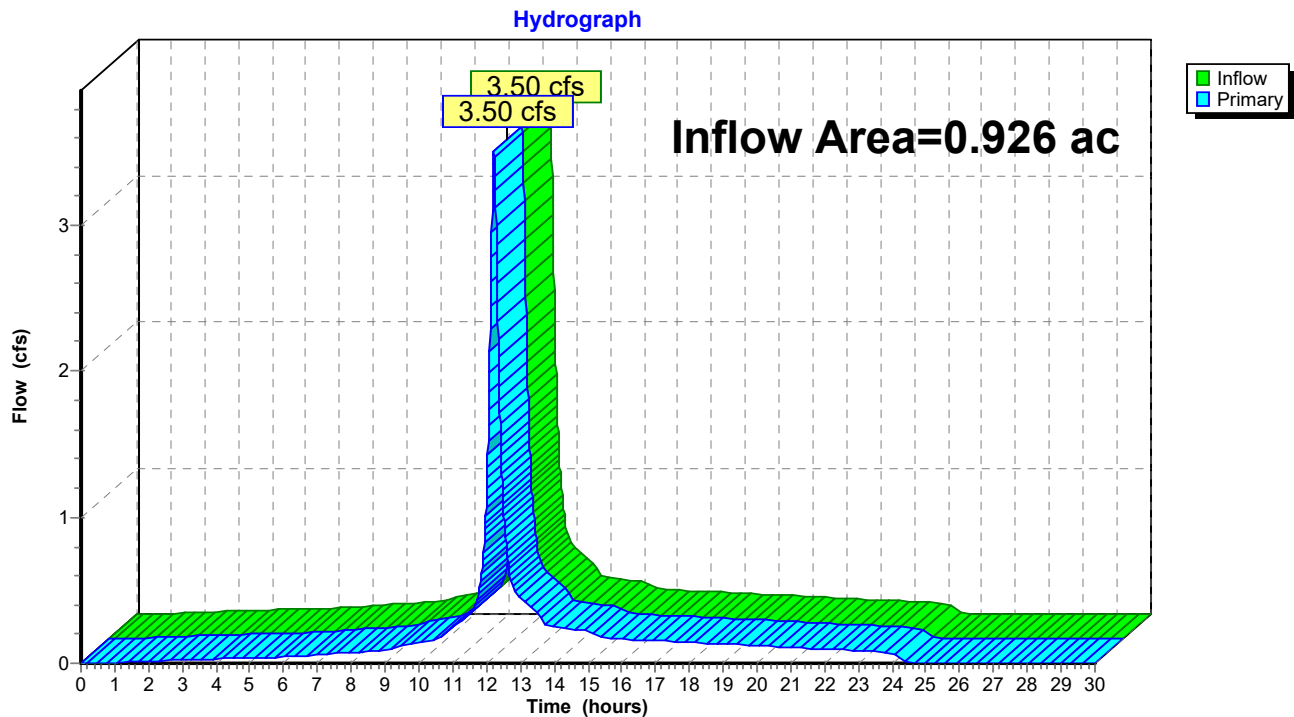
Subcatchment 1E: E1a



Summary for Pond 2E: Existing Pipe

Inflow Area = 0.926 ac, 5.56% Impervious, Inflow Depth = 4.47" for 25-YR event
Inflow = 3.50 cfs @ 12.21 hrs, Volume= 0.345 af
Primary = 3.50 cfs @ 12.21 hrs, Volume= 0.345 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4E : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 2E: Existing Pipe

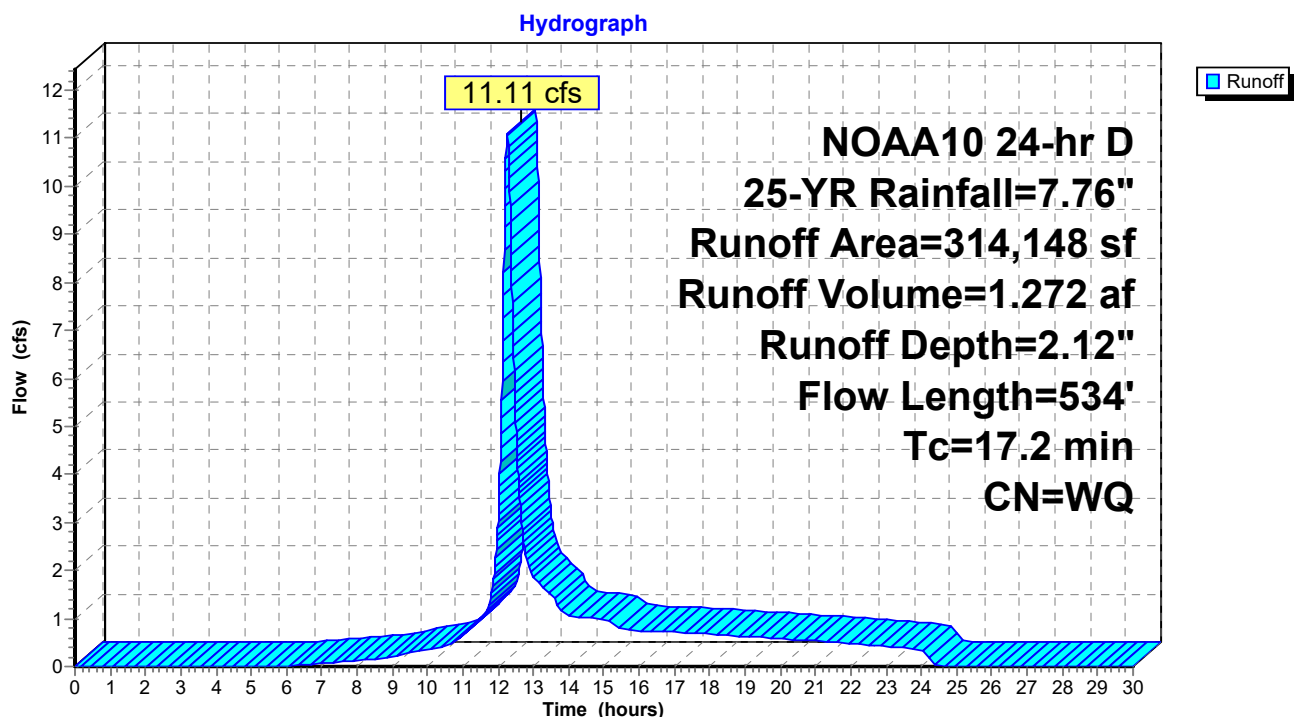
Summary for Subcatchment 3E: E1b

Runoff = 11.11 cfs @ 12.25 hrs, Volume= 1.272 af, Depth= 2.12"
 Routed to Link 4E : Design Point #1: Flow to Wetlands

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=7.76"

Area (sf)	CN	Description
131,431	70	Woods, Good HSG C
1,228	98	Roofs HSG C
1,366	98	Roofs HSG A
156,409	30	Woods, Good HSG A
22,617	39	>75% Grass cover, Good HSG A
1,097	74	>75% Grass cover, Good HSG C
314,148		Weighted Average
311,554		99.17% Pervious Area
2,594		0.83% Impervious Area

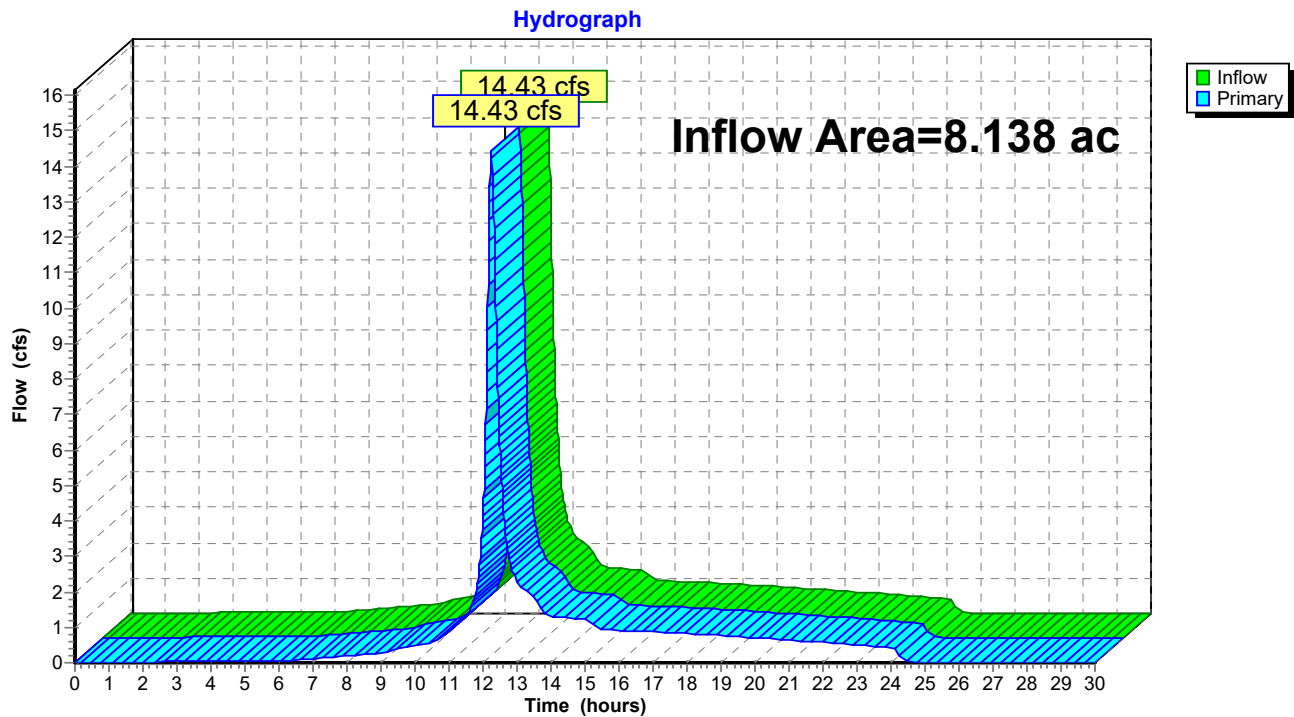
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	34	0.0150	0.06		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
7.9	500	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.2	534	Total			

Subcatchment 3E: E1b

Summary for Link 4E: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 1.36% Impervious, Inflow Depth = 2.38" for 25-YR event
Inflow = 14.43 cfs @ 12.25 hrs, Volume= 1.617 af
Primary = 14.43 cfs @ 12.25 hrs, Volume= 1.617 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 #1: Flow to Wetlands

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NOAA10 24-hr D 100-YR Rainfall=10.71"

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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

Subcatchment1E: E1a

Runoff Area=40,326 sf 5.56% Impervious Runoff Depth=6.91"
Flow Length=215' Tc=13.6 min CN=WQ Runoff=5.41 cfs 0.533 af

Pond 2E: Existing Pipe

Inflow=5.41 cfs 0.533 af
Primary=5.41 cfs 0.533 af

Subcatchment3E: E1b

Runoff Area=314,148 sf 0.83% Impervious Runoff Depth=3.78"
Flow Length=534' Tc=17.2 min CN=WQ Runoff=19.82 cfs 2.273 af

Link 4E: Design Point #1: Flow to Wetlands

Inflow=24.93 cfs 2.806 af
Primary=24.93 cfs 2.806 af

Total Runoff Area = 8.138 ac Runoff Volume = 2.806 af Average Runoff Depth = 4.14"
98.64% Pervious = 8.027 ac 1.36% Impervious = 0.111 ac

Summary for Subcatchment 1E: E1a

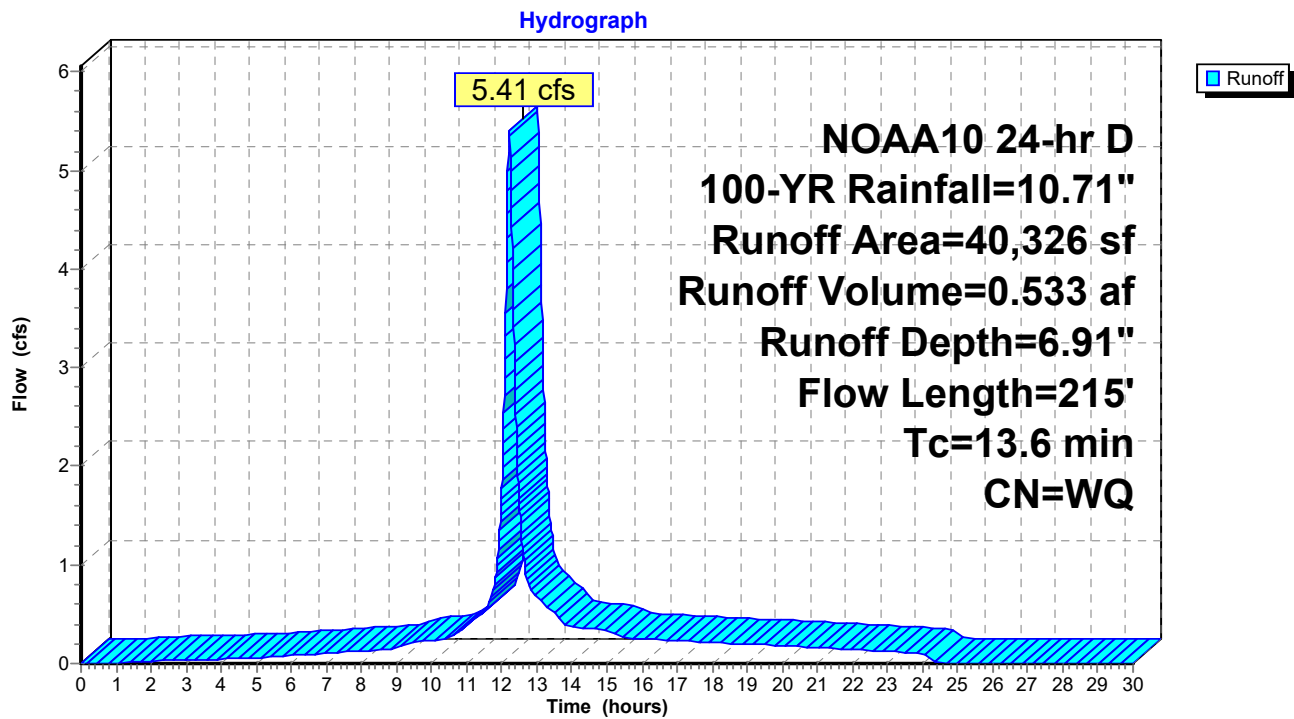
Runoff = 5.41 cfs @ 12.21 hrs, Volume= 0.533 af, Depth= 6.91"
 Routed to Pond 2E : Existing Pipe

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=10.71"

	Area (sf)	CN	Description
*	7,120	96	Gravel roads HSG C
	1,320	98	Roofs HSG C
*	989	96	Gravel roads HSG A
	921	98	Roofs HSG A
	3,122	30	Woods, Good HSG A
	12,941	70	Woods, Good HSG C
	4,748	39	>75% Grass cover, Good HSG A
	9,165	74	>75% Grass cover, Good HSG C
	40,326		Weighted Average
	38,085		94.44% Pervious Area
	2,241		5.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	31	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.6	215	Total			

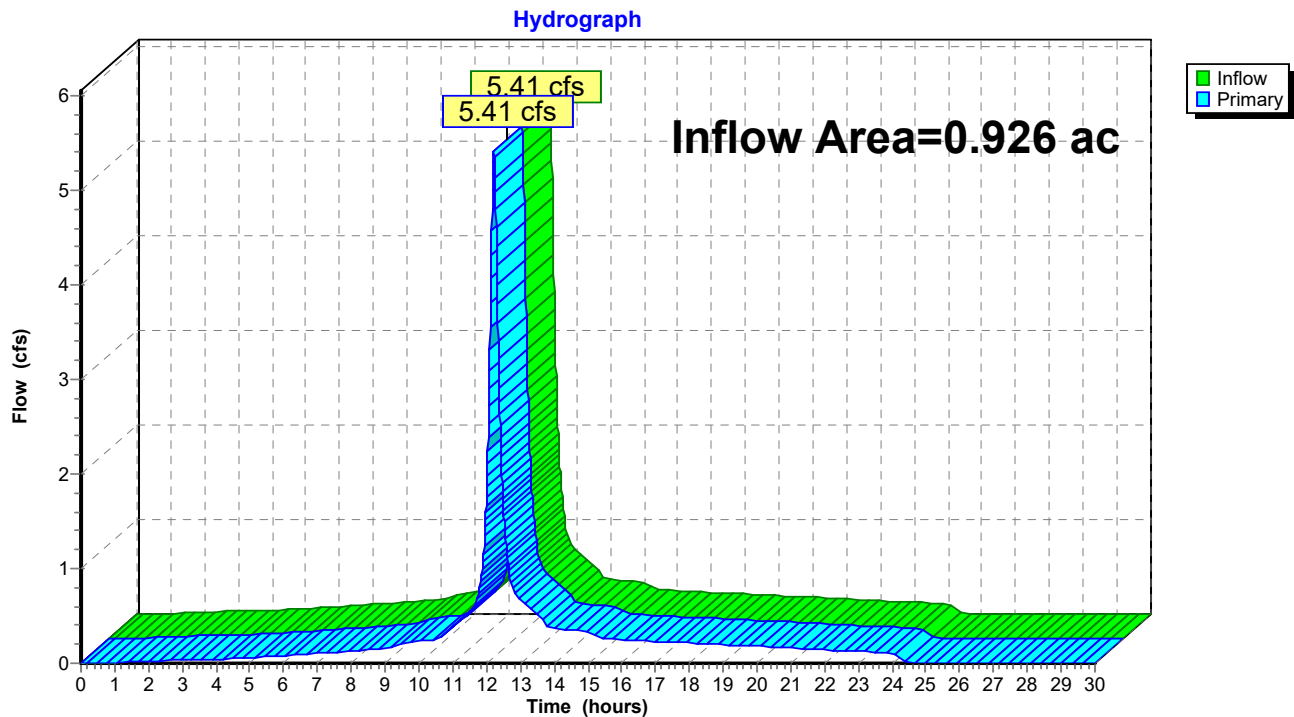
Subcatchment 1E: E1a



Summary for Pond 2E: Existing Pipe

Inflow Area = 0.926 ac, 5.56% Impervious, Inflow Depth = 6.91" for 100-YR event
Inflow = 5.41 cfs @ 12.21 hrs, Volume= 0.533 af
Primary = 5.41 cfs @ 12.21 hrs, Volume= 0.533 af, Atten= 0%, Lag= 0.0 min
Routed to Link 4E : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 2E: Existing Pipe

Summary for Subcatchment 3E: E1b

Runoff = 19.82 cfs @ 12.26 hrs, Volume= 2.273 af, Depth= 3.78"

Routed to Link 4E : Design Point #1: Flow to Wetlands

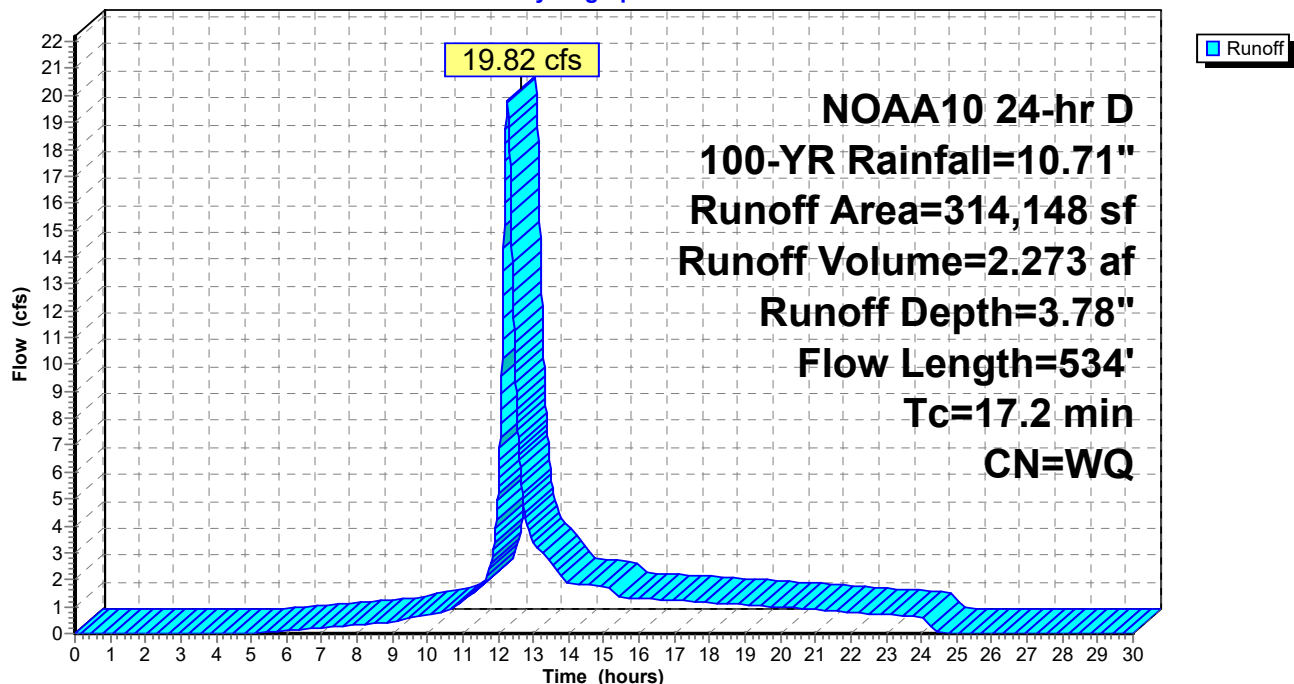
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 100-YR Rainfall=10.71"

Area (sf)	CN	Description
131,431	70	Woods, Good HSG C
1,228	98	Roofs HSG C
1,366	98	Roofs HSG A
156,409	30	Woods, Good HSG A
22,617	39	>75% Grass cover, Good HSG A
1,097	74	>75% Grass cover, Good HSG C
314,148		Weighted Average
311,554		99.17% Pervious Area
2,594		0.83% Impervious 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= 3.82"
7.9	500	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
17.2	534	Total			

Subcatchment 3E: E1b

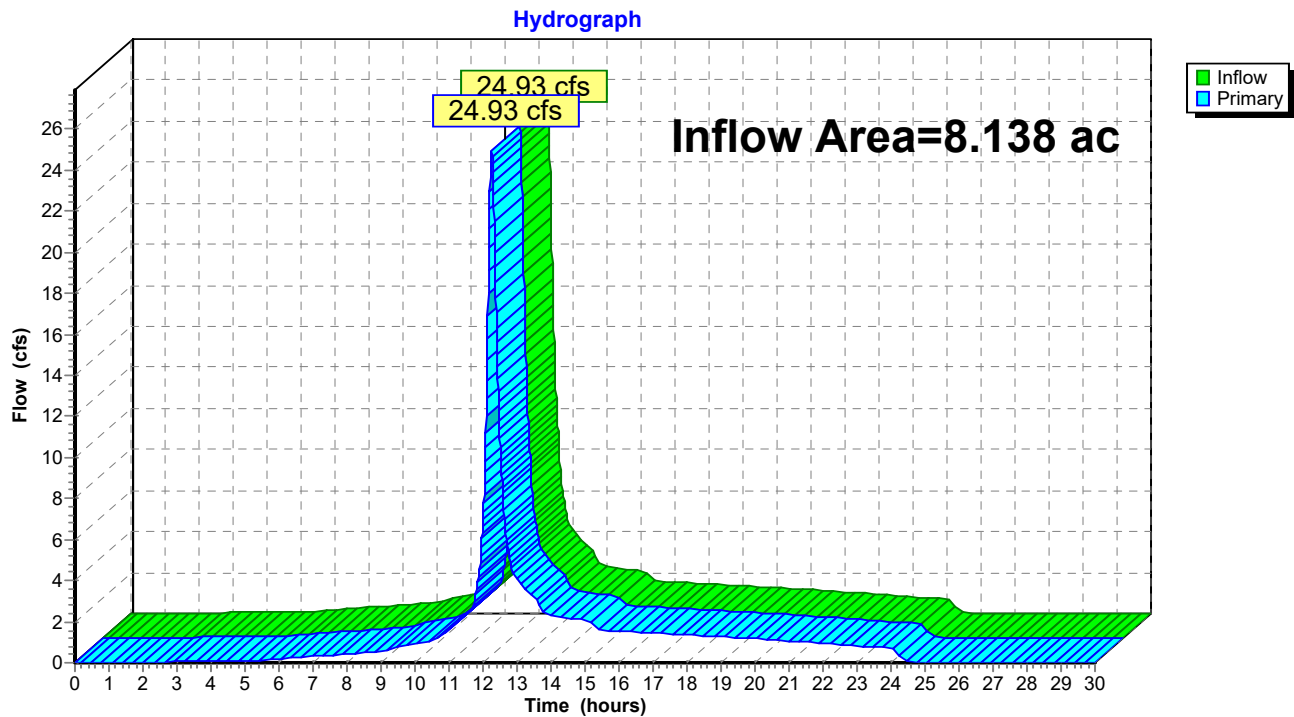
Hydrograph



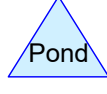
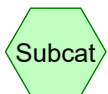
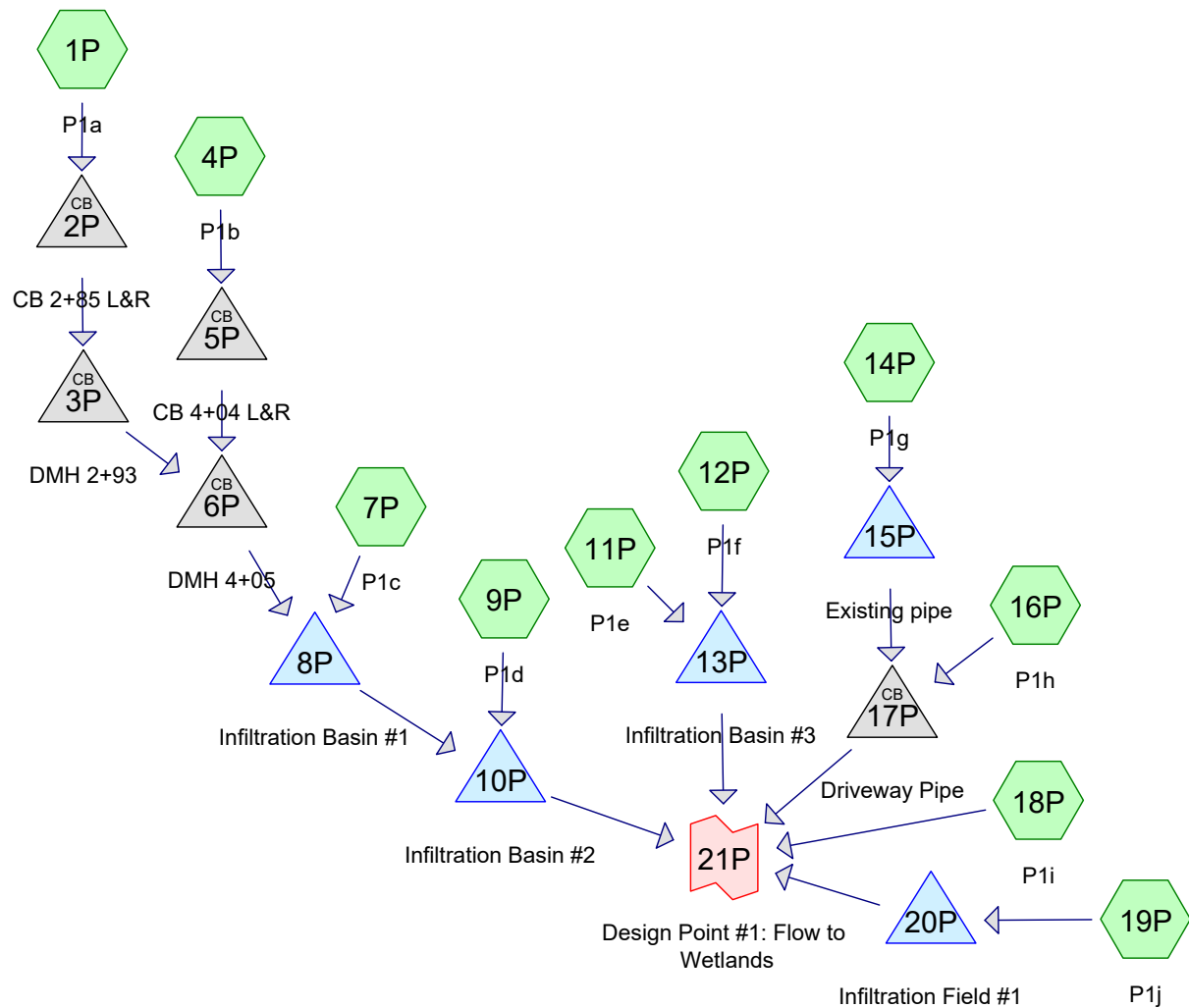
Summary for Link 4E: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 1.36% Impervious, Inflow Depth = 4.14" for 100-YR event
Inflow = 24.93 cfs @ 12.25 hrs, Volume= 2.806 af
Primary = 24.93 cfs @ 12.25 hrs, Volume= 2.806 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 #1: Flow to Wetlands

DESIGN POINT #1: FLOW TO WETLAND
PROPOSED CONDITIONS



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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	3.82	2
2	10-YR	NOAA10 24-hr	D	Default	24.00	1	6.01	2
3	25-YR	NOAA10 24-hr	D	Default	24.00	1	7.76	2
4	100-YR	NOAA10 24-hr	D	Default	24.00	1	10.71	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.041	39	>75% Grass cover, Good HSG A (1P, 4P, 7P, 9P, 11P, 14P, 16P, 18P)
1.223	74	>75% Grass cover, Good HSG C (1P, 11P, 14P, 16P, 18P)
0.060	96	Gravel HSG C (1P)
0.023	76	Gravel roads HSG A (14P)
0.013	89	Gravel roads HSG C (14P)
0.376	98	Paved parking HSG A (1P, 4P, 9P, 11P)
0.204	98	Paved parking HSG C (1P, 11P)
0.046	98	Roofs HSG A (1P, 4P, 9P)
0.114	98	Roofs HSG C (1P, 4P, 9P, 12P)
0.136	98	Roofs, HSG A (7P, 11P, 14P, 19P)
0.031	98	Roofs, HSG C (11P, 19P)
1.744	30	Woods, Good HSG A (4P, 7P, 11P, 14P, 16P, 18P)
2.127	70	Woods, Good HSG C (1P, 11P, 14P, 18P)
8.138	58	TOTAL AREA

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NOAA10 24-hr D 2-YR Rainfall=3.82"

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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

Subcatchment1P: P1a

Runoff Area=32,129 sf 21.86% Impervious Runoff Depth=1.82"
Flow Length=308' Tc=14.2 min CN=WQ Runoff=1.10 cfs 0.112 af

Pond 2P: CB 2+85 L&R

Peak Elev=274.67' Inflow=1.10 cfs 0.112 af
12.0" Round Culvert x 2.00 n=0.011 L=8.0' S=0.0187 '/' Outflow=1.10 cfs 0.112 af

Pond 3P: DMH 2+93

Peak Elev=274.54' Inflow=1.10 cfs 0.112 af
12.0" Round Culvert n=0.011 L=106.0' S=0.0108 '/' Outflow=1.10 cfs 0.112 af

Subcatchment4P: P1b

Runoff Area=12,532 sf 32.92% Impervious Runoff Depth=1.20"
Flow Length=181' Tc=6.6 min CN=WQ Runoff=0.36 cfs 0.029 af

Pond 5P: CB 4+04 L&R

Peak Elev=273.42' Inflow=0.36 cfs 0.029 af
12.0" Round Culvert x 2.00 n=0.011 L=5.0' S=0.0060 '/' Outflow=0.36 cfs 0.029 af

Pond 6P: DMH 4+05

Peak Elev=273.42' Inflow=1.31 cfs 0.141 af
15.0" Round Culvert n=0.011 L=47.0' S=0.0055 '/' Outflow=1.31 cfs 0.141 af

Subcatchment7P: P1c

Runoff Area=25,973 sf 3.46% Impervious Runoff Depth=0.14"
Flow Length=168' Tc=11.9 min CN=WQ Runoff=0.06 cfs 0.007 af

Pond 8P: Infiltration Basin #1

Peak Elev=273.02' Storage=1,595 cf Inflow=1.37 cfs 0.148 af
Discarded=0.18 cfs 0.148 af Primary=0.00 cfs 0.000 af Outflow=0.18 cfs 0.148 af

Subcatchment9P: P1d

Runoff Area=18,728 sf 48.96% Impervious Runoff Depth=1.77"
Flow Length=95' Tc=5.3 min CN=WQ Runoff=0.84 cfs 0.063 af

Pond 10P: Infiltration Basin #2

Peak Elev=267.36' Storage=596 cf Inflow=0.84 cfs 0.064 af
Discarded=0.10 cfs 0.064 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.064 af

Subcatchment11P: P1e

Runoff Area=110,274 sf 11.57% Impervious Runoff Depth=1.03"
Flow Length=526' Tc=16.3 min CN=WQ Runoff=2.01 cfs 0.217 af

Subcatchment12P: P1f

Runoff Area=3,200 sf 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=98 Runoff=0.30 cfs 0.022 af

Pond 13P: Infiltration Basin #3

Peak Elev=262.57' Storage=1,248 cf Inflow=2.10 cfs 0.239 af
Discarded=0.15 cfs 0.163 af Primary=1.81 cfs 0.076 af Outflow=1.96 cfs 0.239 af

Subcatchment14P: P1g

Runoff Area=12,195 sf 6.26% Impervious Runoff Depth=0.93"
Flow Length=91' Slope=0.0200 '/' Tc=10.5 min CN=WQ Runoff=0.25 cfs 0.022 af

Pond 15P: Existing pipe

Inflow=0.25 cfs 0.022 af
Primary=0.25 cfs 0.022 af

Subcatchment16P: P1h

Runoff Area=35,457 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=280' Tc=12.1 min CN=WQ Runoff=0.02 cfs 0.002 af

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Prepared by Legacy Engineering LLC

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NOAA10 24-hr D 2-YR Rainfall=3.82"

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Pond 17P: Driveway Pipe

Peak Elev=264.25' Inflow=0.27 cfs 0.024 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0205 '/' Outflow=0.27 cfs 0.024 af

Subcatchment 18P: P1i

Runoff Area=102,384 sf 0.00% Impervious Runoff Depth=0.91"
Flow Length=448' Tc=15.8 min CN=WQ Runoff=1.72 cfs 0.178 af

Subcatchment 19P: P1j

Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=WQ Runoff=0.15 cfs 0.011 af

Pond 20P: Infiltration Field #1

Peak Elev=261.36' Storage=124 cf Inflow=0.15 cfs 0.011 af
Discarded=0.01 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.011 af

Link 21P: Design Point #1: Flow to Wetlands

Inflow=3.67 cfs 0.277 af
Primary=3.67 cfs 0.277 af

Total Runoff Area = 8.138 ac Runoff Volume = 0.663 af Average Runoff Depth = 0.98"
88.85% Pervious = 7.230 ac 11.15% Impervious = 0.908 ac

Summary for Subcatchment 1P: P1a

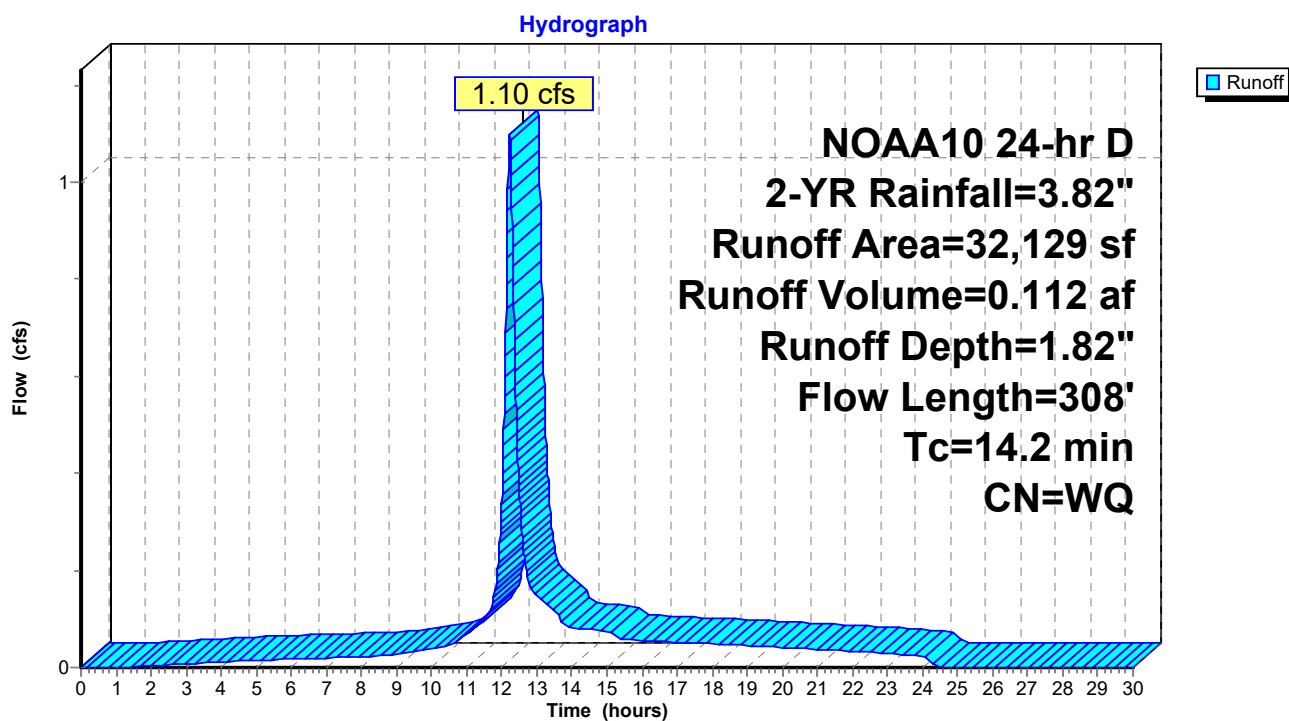
Runoff = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 1.82"
 Routed to Pond 2P : CB 2+85 L&R

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=3.82"

Area (sf)	CN	Description
3,629	98	Paved parking HSG C
9,045	70	Woods, Good HSG C
1,201	98	Roofs HSG C
305	98	Roofs HSG A
* 2,623	96	Gravel HSG C
1,890	98	Paved parking HSG A
4,307	39	>75% Grass cover, Good HSG A
9,129	74	>75% Grass cover, Good HSG C
32,129		Weighted Average
25,104		78.14% Pervious Area
7,025		21.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.2	144	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
14.2	308	Total			

Subcatchment 1P: P1a



Summary for Pond 2P: CB 2+85 L&R

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 1.82" for 2-YR event
 Inflow = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af
 Outflow = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af
 Routed to Pond 3P : DMH 2+93

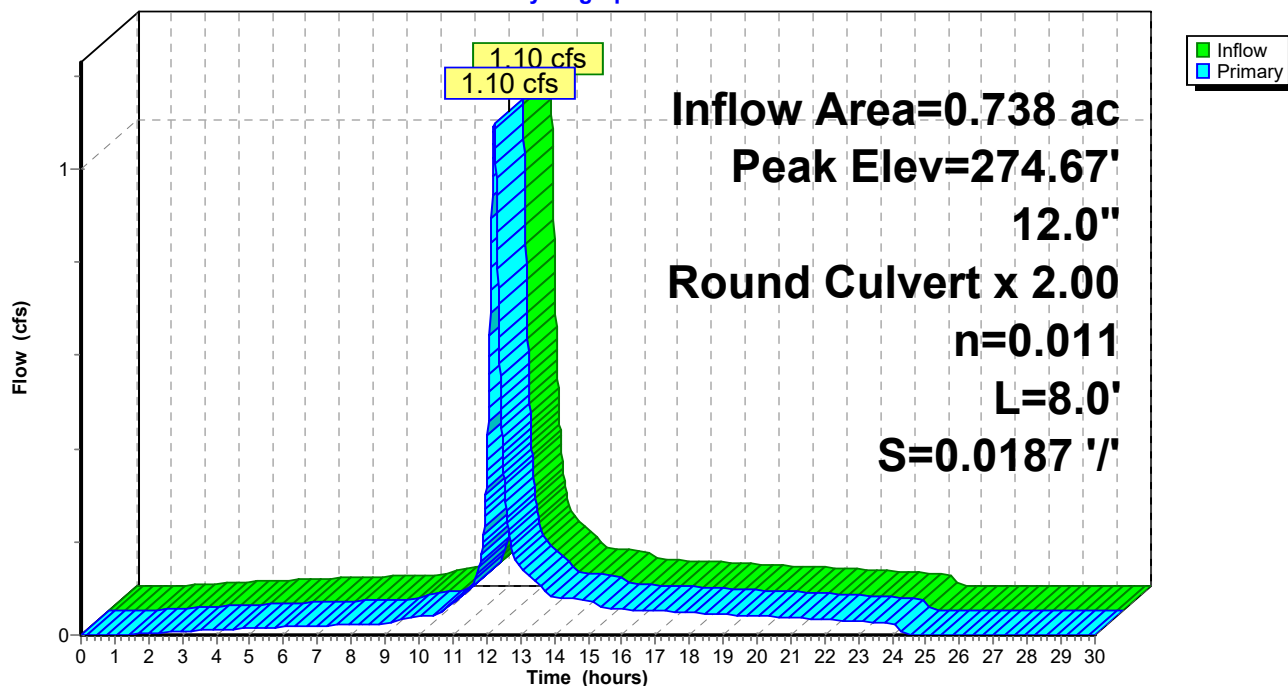
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 274.67' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.20'	12.0" Round Culvert X 2.00 L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.20' / 274.05' S= 0.0187 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.09 cfs @ 12.22 hrs HW=274.67' TW=274.54' (Dynamic Tailwater)
 ↳ **1=Culvert** (Outlet Controls 1.09 cfs @ 2.19 fps)

Pond 2P: CB 2+85 L&R

Hydrograph



Summary for Pond 3P: DMH 2+93

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 1.82" for 2-YR event
 Inflow = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af
 Outflow = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.10 cfs @ 12.22 hrs, Volume= 0.112 af
 Routed to Pond 6P : DMH 4+05

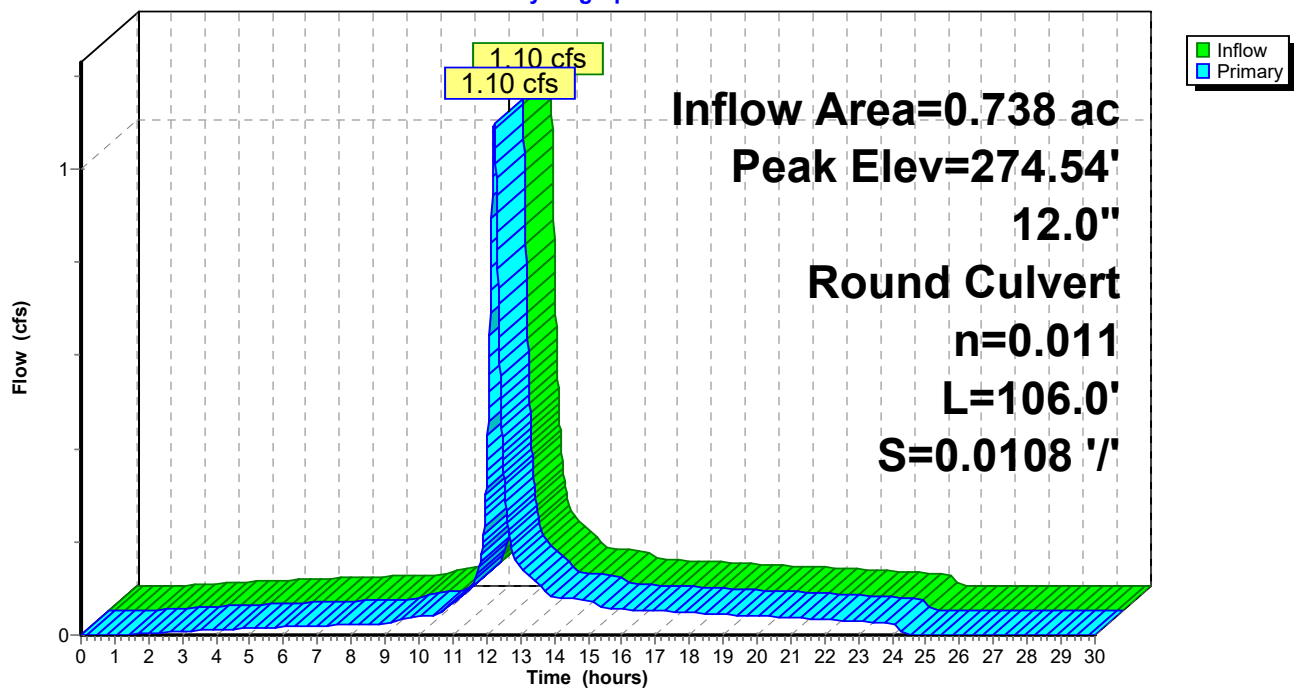
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 274.54' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	12.0" Round Culvert L= 106.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.86' S= 0.0108 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=1.10 cfs @ 12.22 hrs HW=274.54' TW=273.41' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 1.10 cfs @ 2.51 fps)

Pond 3P: DMH 2+93

Hydrograph



Summary for Subcatchment 4P: P1b

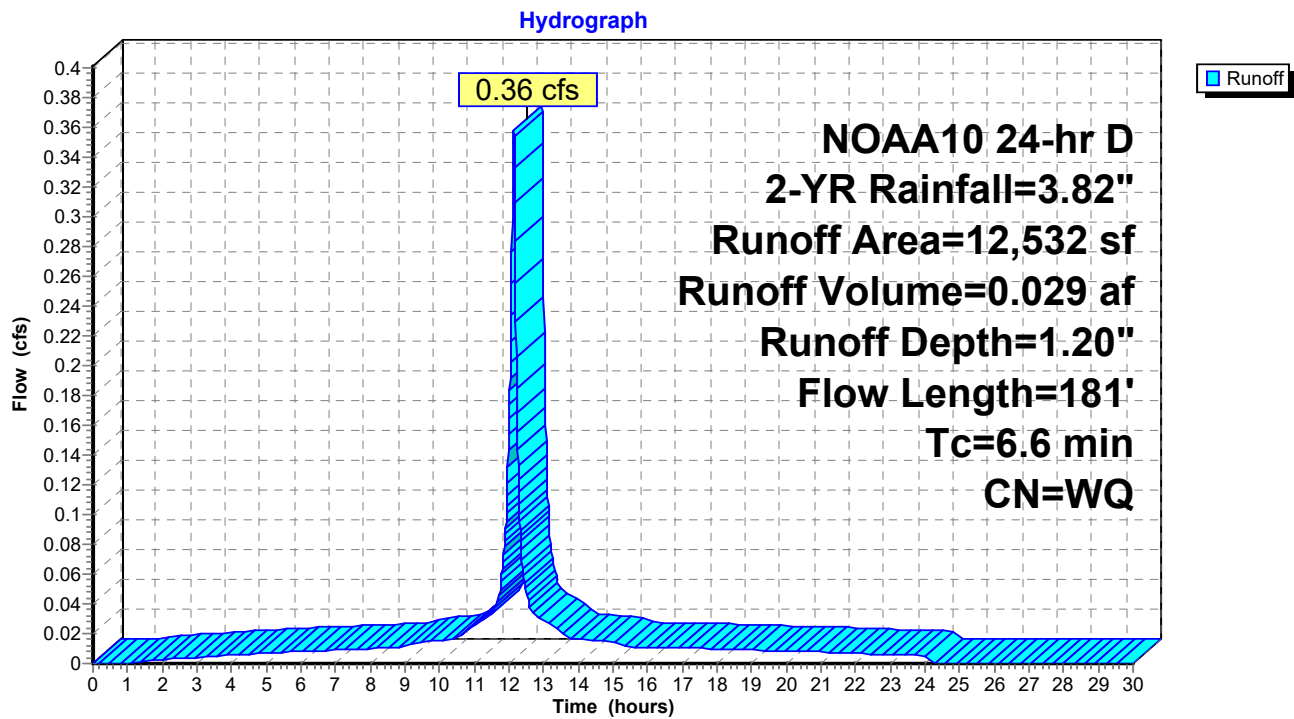
Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.029 af, Depth= 1.20"
 Routed to Pond 5P : CB 4+04 L&R

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=3.82"

Area (sf)	CN	Description
360	98	Roofs HSG C
996	30	Woods, Good HSG A
305	98	Roofs HSG A
3,460	98	Paved parking HSG A
7,411	39	>75% Grass cover, Good HSG A
12,532		Weighted Average
8,407		67.08% Pervious Area
4,125		32.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0400	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.2	26	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	105	0.0150	2.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.6	181	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: CB 4+04 L&R

Inflow Area = 0.288 ac, 32.92% Impervious, Inflow Depth = 1.20" for 2-YR event
 Inflow = 0.36 cfs @ 12.14 hrs, Volume= 0.029 af
 Outflow = 0.36 cfs @ 12.14 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.36 cfs @ 12.14 hrs, Volume= 0.029 af
 Routed to Pond 6P : DMH 4+05

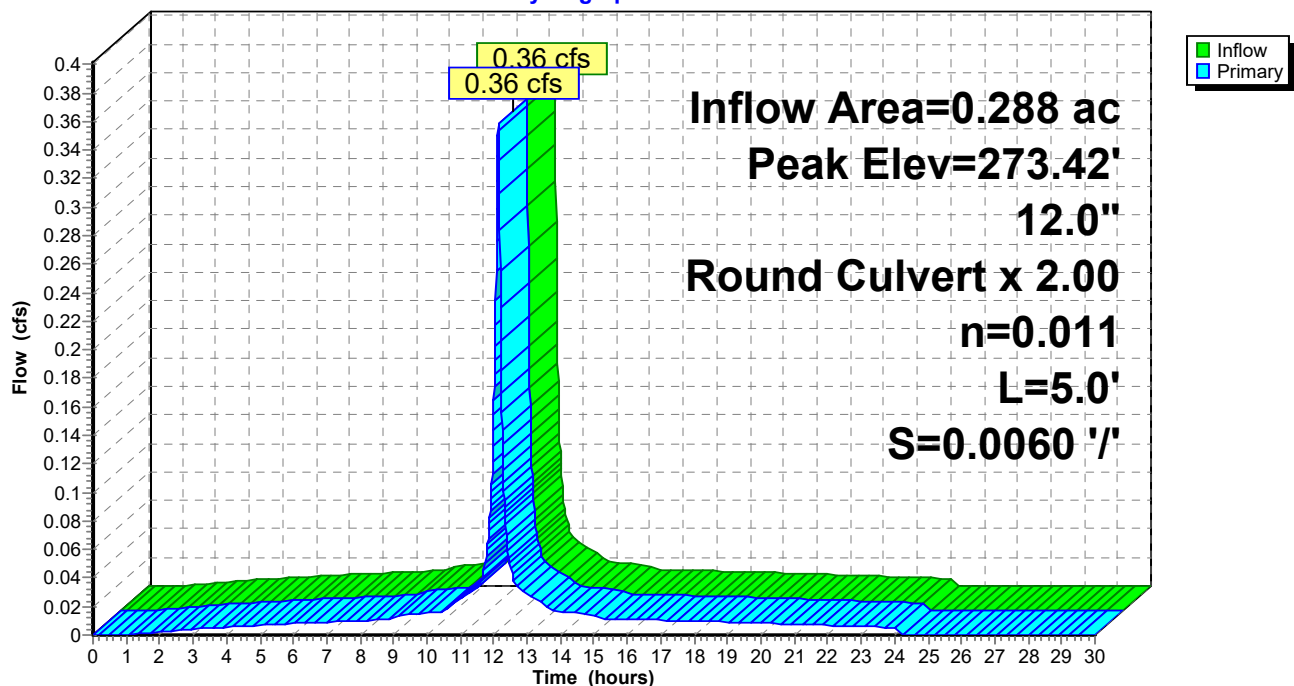
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.42' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.89'	12.0" Round Culvert X 2.00 L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.89' / 272.86' S= 0.0060 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=273.38' TW=273.38' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond 5P: CB 4+04 L&R

Hydrograph



Summary for Pond 6P: DMH 4+05

Inflow Area = 1.025 ac, 24.97% Impervious, Inflow Depth = 1.65" for 2-YR event
 Inflow = 1.31 cfs @ 12.19 hrs, Volume= 0.141 af
 Outflow = 1.31 cfs @ 12.19 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.31 cfs @ 12.19 hrs, Volume= 0.141 af
 Routed to Pond 8P : Infiltration Basin #1

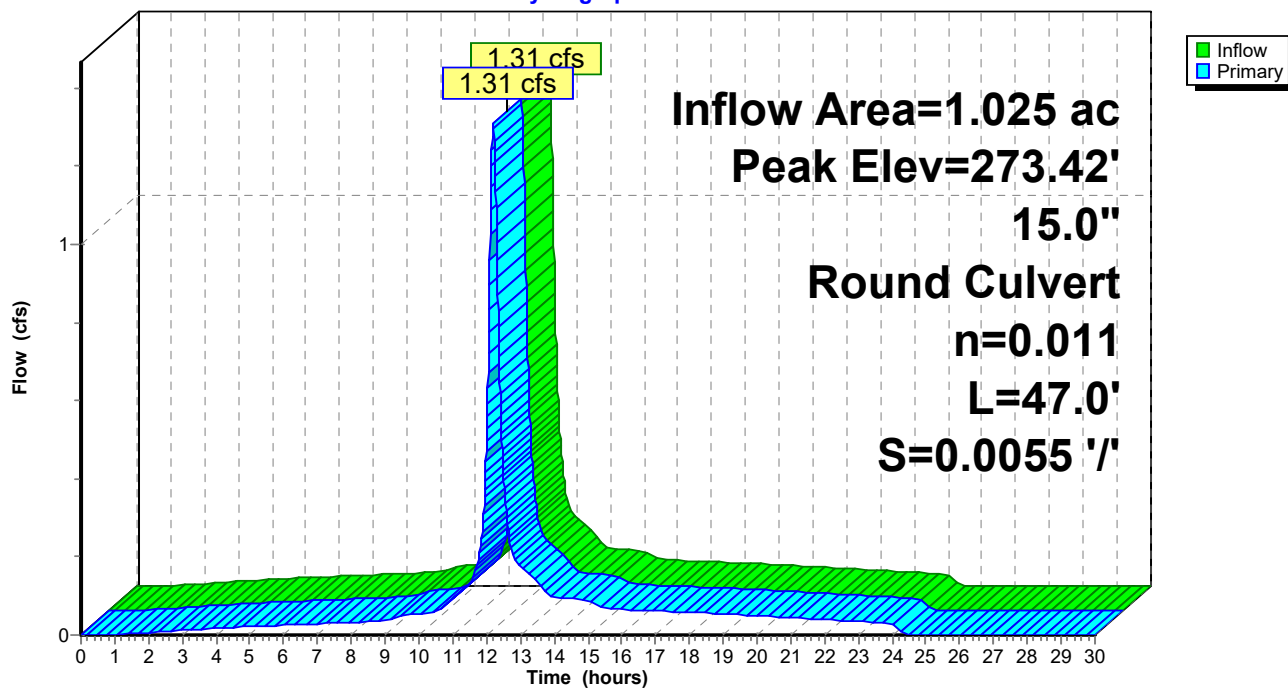
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.42' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.81'	15.0" Round Culvert L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.81' / 272.55' S= 0.0055 '/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=1.31 cfs @ 12.19 hrs HW=273.42' TW=272.73' (Dynamic Tailwater)
 ↳ **1=Culvert** (Barrel Controls 1.31 cfs @ 3.22 fps)

Pond 6P: DMH 4+05

Hydrograph



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NOAA10 24-hr D 2-YR Rainfall=3.82"

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Summary for Subcatchment 7P: P1c

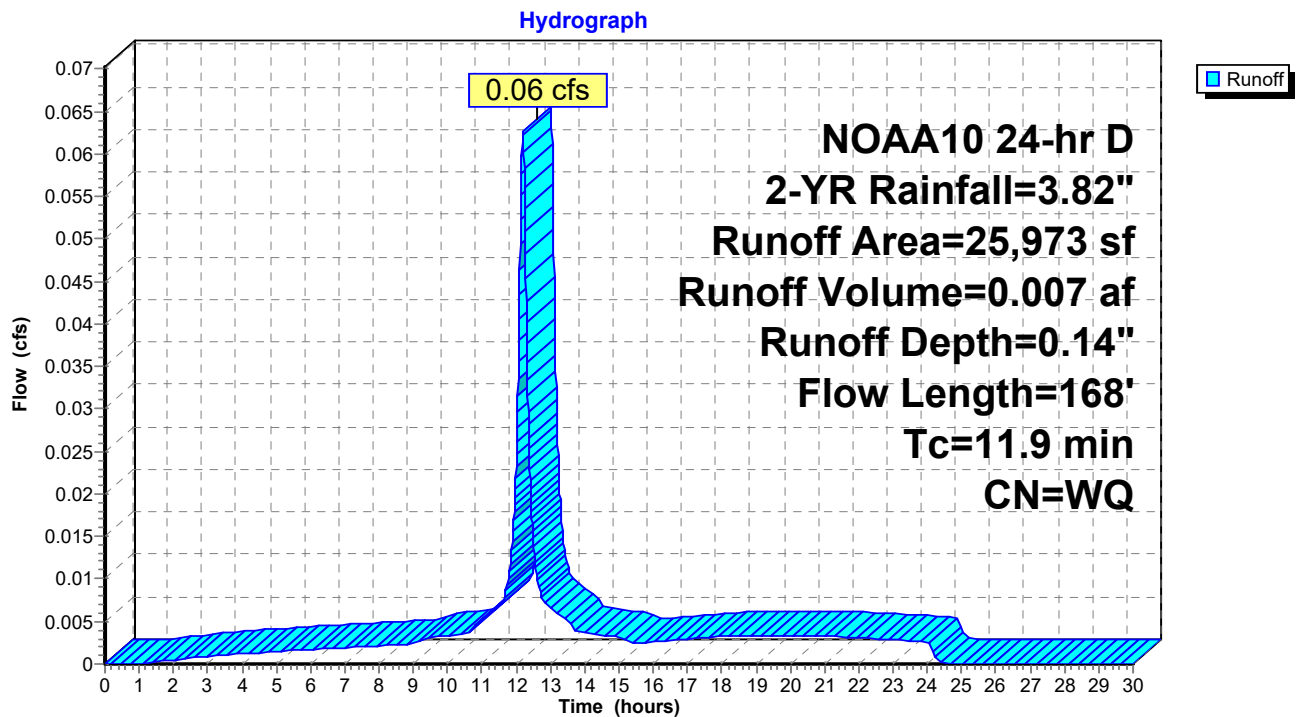
Runoff = 0.06 cfs @ 12.19 hrs, Volume= 0.007 af, Depth= 0.14"
Routed to Pond 8P : Infiltration Basin #1

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=3.82"

Area (sf)	CN	Description
898	98	Roofs, HSG A
7,786	30	Woods, Good HSG A
17,289	39	>75% Grass cover, Good HSG A
25,973		Weighted Average
25,075		96.54% Pervious Area
898		3.46% Impervious 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= 3.82"
2.5	104	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	30	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
11.9	168	Total			

Subcatchment 7P: P1c



Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.622 ac, 17.06% Impervious, Inflow Depth = 1.09" for 2-YR event
 Inflow = 1.37 cfs @ 12.19 hrs, Volume= 0.148 af
 Outflow = 0.18 cfs @ 12.99 hrs, Volume= 0.148 af, Atten= 87%, Lag= 48.0 min
 Discarded = 0.18 cfs @ 12.99 hrs, Volume= 0.148 af
 Primary = 0.00 cfs @ 12.99 hrs, Volume= 0.000 af
 Routed to Pond 10P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.02' @ 12.99 hrs Surf.Area= 3,256 sf Storage= 1,595 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 55.2 min (869.3 - 814.0)

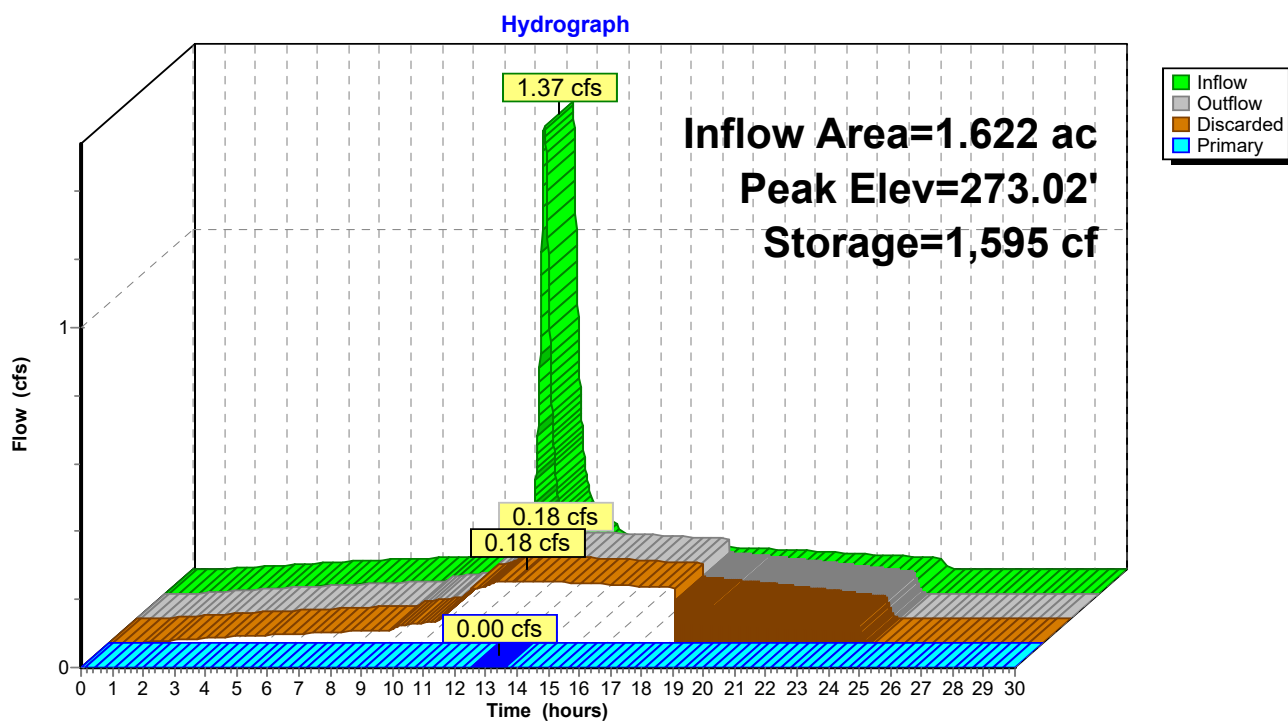
Volume	Invert	Avail.Storage	Storage Description
#1	272.50'	12,087 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.50	2,893	205.0	0	0	2,893
275.50	5,284	279.0	12,087	12,087	5,834

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	273.00'	10.0" Round Culvert L= 98.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 273.00' / 267.30' S= 0.0582 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf

Discarded OutFlow Max=0.18 cfs @ 12.99 hrs HW=273.02' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 12.99 hrs HW=273.02' TW=267.33' (Dynamic Tailwater)
 ↑**2=Culvert** (Inlet Controls 0.00 cfs @ 0.47 fps)

Pond 8P: Infiltration Basin #1

Summary for Subcatchment 9P: P1d

Runoff = 0.84 cfs @ 12.12 hrs, Volume= 0.063 af, Depth= 1.77"
 Routed to Pond 10P : Infiltration Basin #2

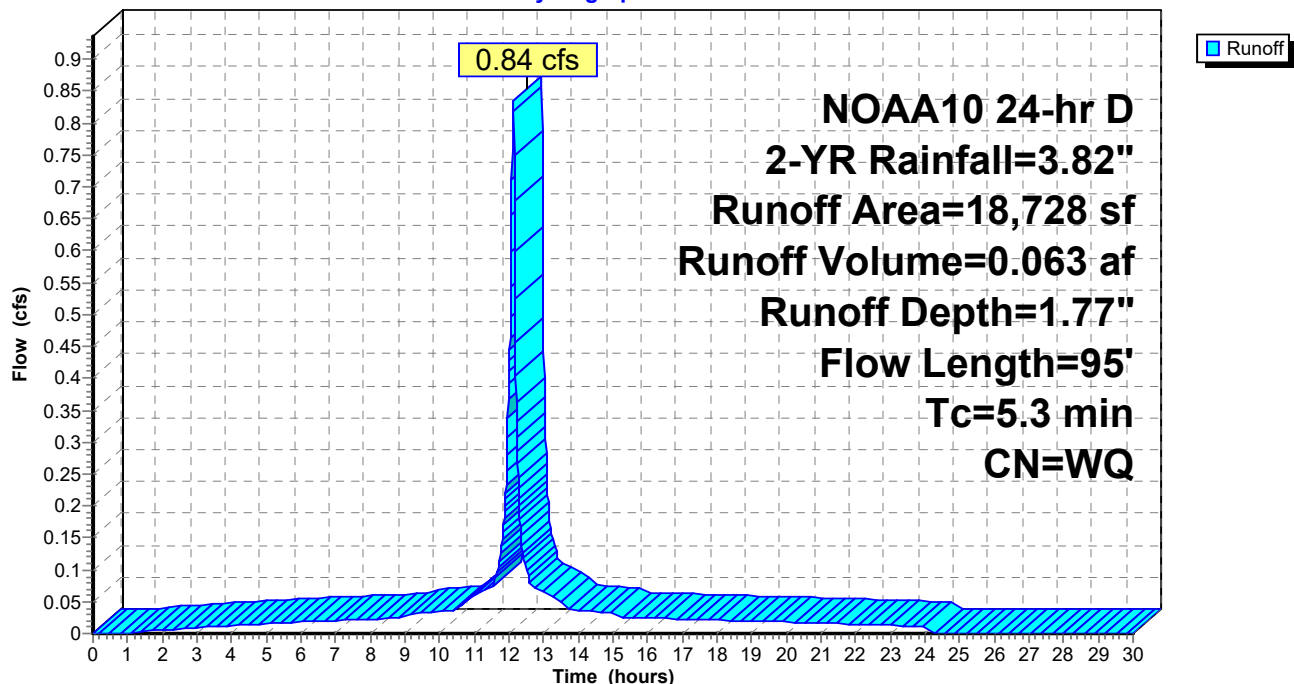
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 2-YR Rainfall=3.82"

Area (sf)	CN	Description
216	98	Roofs HSG C
1,384	98	Roofs HSG A
7,569	98	Paved parking HSG A
9,559	39	>75% Grass cover, Good HSG A
18,728		Weighted Average
9,559		51.04% Pervious Area
9,169		48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0600	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.4	24	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	21	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.3	95	Total			

Subcatchment 9P: P1d

Hydrograph



Summary for Pond 10P: Infiltration Basin #2

Inflow Area = 2.051 ac, 23.74% Impervious, Inflow Depth = 0.37" for 2-YR event
 Inflow = 0.84 cfs @ 12.12 hrs, Volume= 0.064 af
 Outflow = 0.10 cfs @ 12.50 hrs, Volume= 0.064 af, Atten= 88%, Lag= 22.4 min
 Discarded = 0.10 cfs @ 12.50 hrs, Volume= 0.064 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 267.36' @ 12.50 hrs Surf.Area= 1,774 sf Storage= 596 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 29.4 min (789.2 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1	267.00'	8,013 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)
267.00	1,557	147.0	0	0	1,557
268.00	2,200	176.0	1,869	1,869	2,320
270.00	4,036	311.0	6,144	8,013	7,574

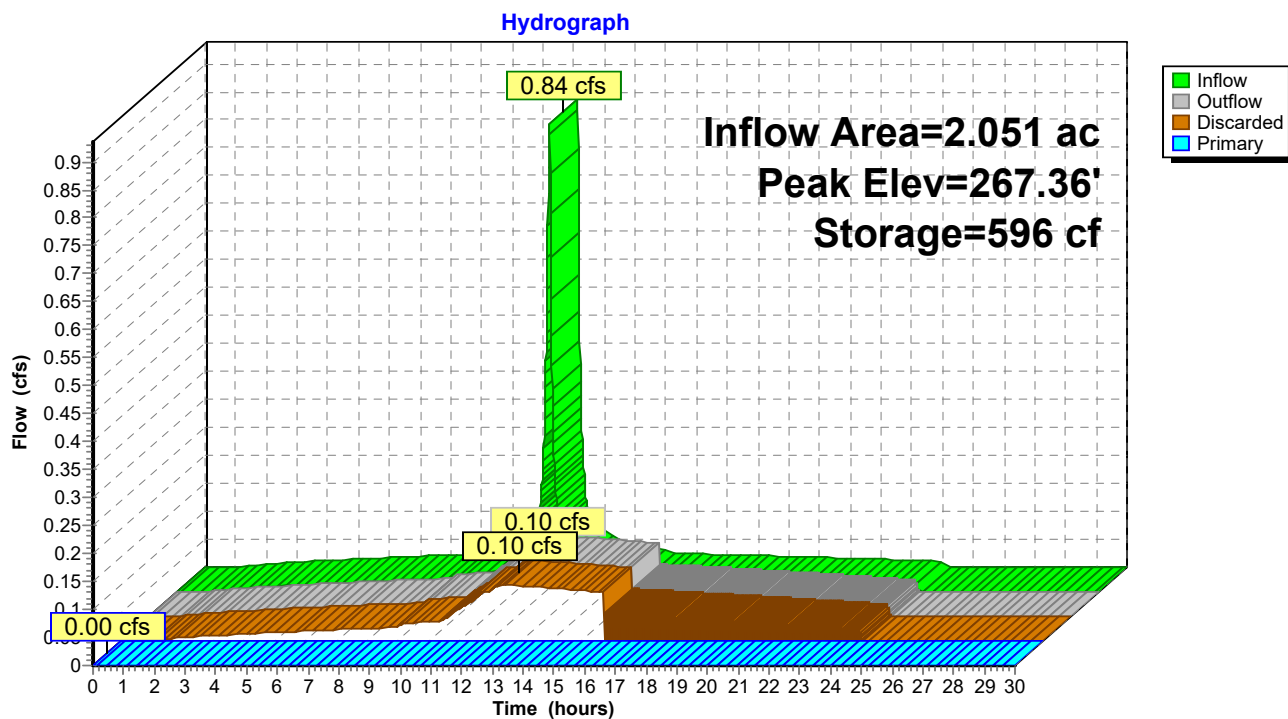
Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	267.50'	10.0" Round Culvert L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 265.00' S= 0.0758 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf

Discarded OutFlow Max=0.10 cfs @ 12.50 hrs HW=267.36' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=267.00' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Controls 0.00 cfs)

Pond 10P: Infiltration Basin #2

Summary for Subcatchment 11P: P1e

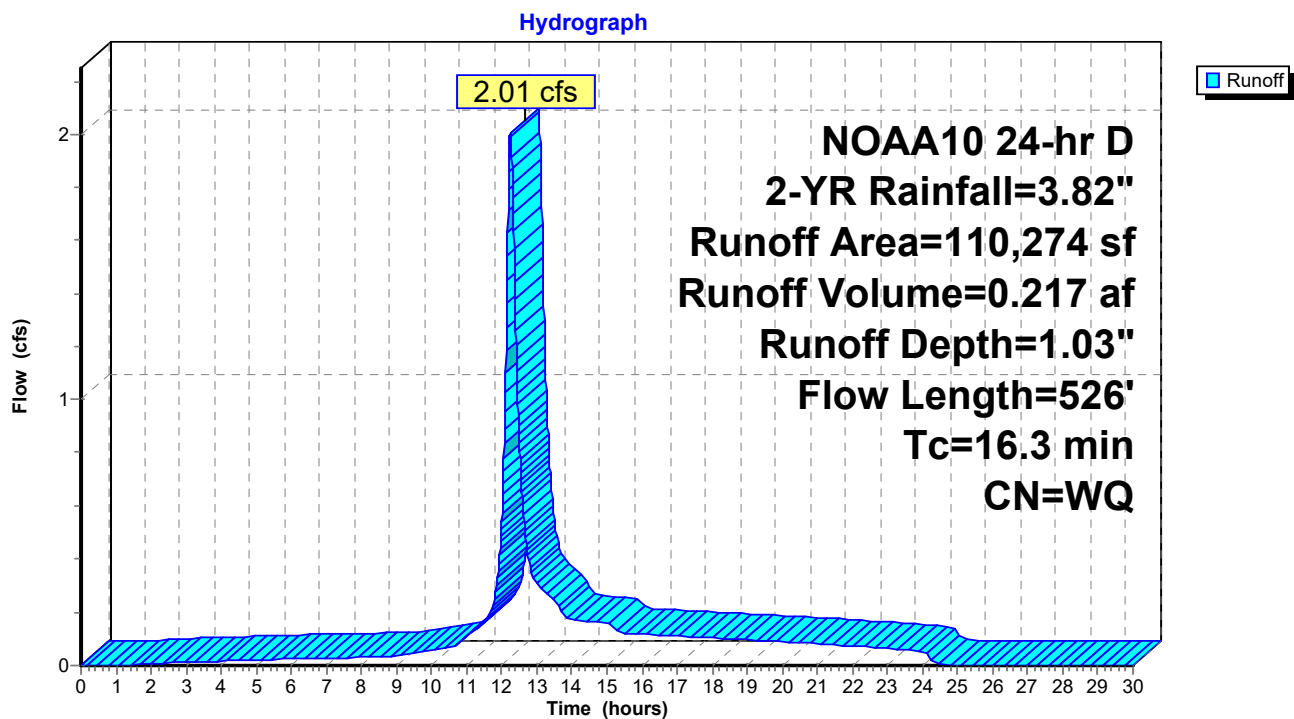
Runoff = 2.01 cfs @ 12.25 hrs, Volume= 0.217 af, Depth= 1.03"
 Routed to Pond 13P : Infiltration Basin #3

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=3.82"

Area (sf)	CN	Description
5,251	98	Paved parking HSG C
3,215	98	Roofs, HSG A
810	98	Roofs, HSG C
34,332	70	Woods, Good HSG C
24,079	30	Woods, Good HSG A
3,480	98	Paved parking HSG A
21,567	39	>75% Grass cover, Good HSG A
17,540	74	>75% Grass cover, Good HSG C
110,274		Weighted Average
97,518		88.43% Pervious Area
12,756		11.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
0.8	56	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	135	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	263	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	12	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.0	10	0.3000	3.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
16.3	526	Total			

Subcatchment 11P: P1e



Summary for Subcatchment 12P: P1f

Runoff = 0.30 cfs @ 12.12 hrs, Volume= 0.022 af, Depth= 3.59"
 Routed to Pond 13P : Infiltration Basin #3

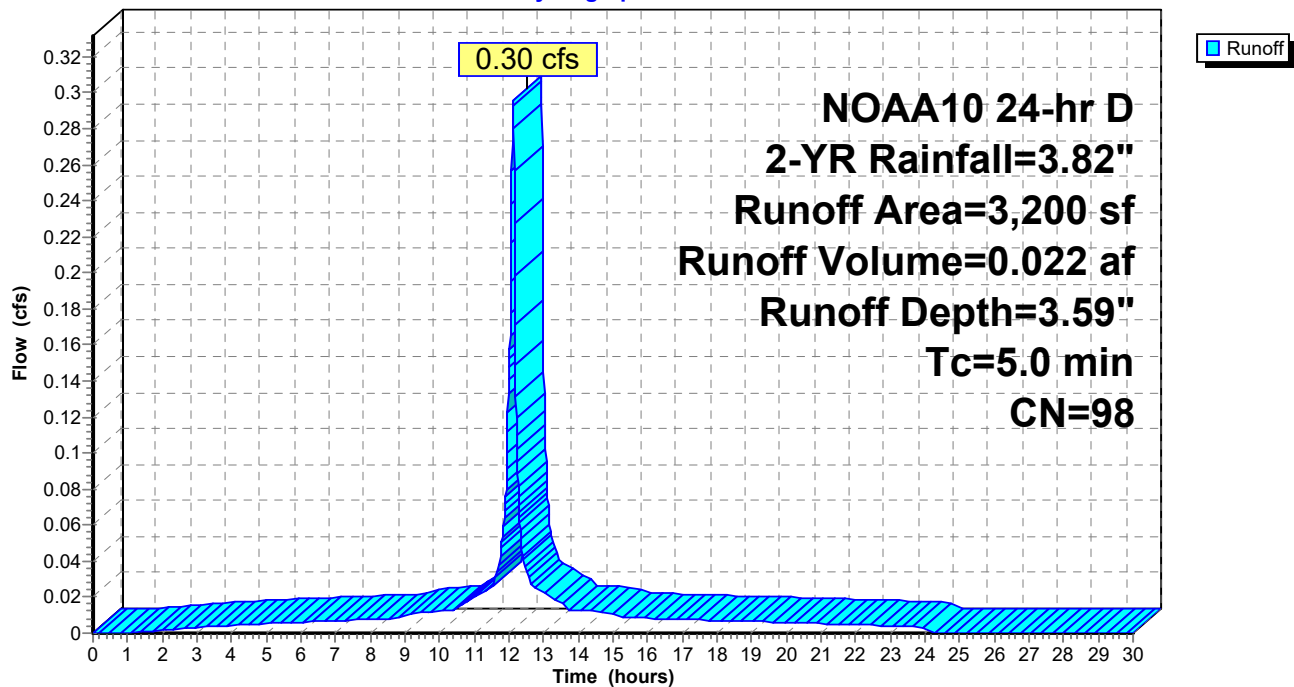
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 2-YR Rainfall=3.82"

Area (sf)	CN	Description
3,200	98	Roofs HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 12P: P1f

Hydrograph



Summary for Pond 13P: Infiltration Basin #3

Inflow Area = 2.605 ac, 14.06% Impervious, Inflow Depth = 1.10" for 2-YR event
 Inflow = 2.10 cfs @ 12.24 hrs, Volume= 0.239 af
 Outflow = 1.96 cfs @ 12.29 hrs, Volume= 0.239 af, Atten= 7%, Lag= 3.2 min
 Discarded = 0.15 cfs @ 12.29 hrs, Volume= 0.163 af
 Primary = 1.81 cfs @ 12.29 hrs, Volume= 0.076 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.57' @ 12.29 hrs Surf.Area= 2,633 sf Storage= 1,248 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 46.3 min (890.1 - 843.7)

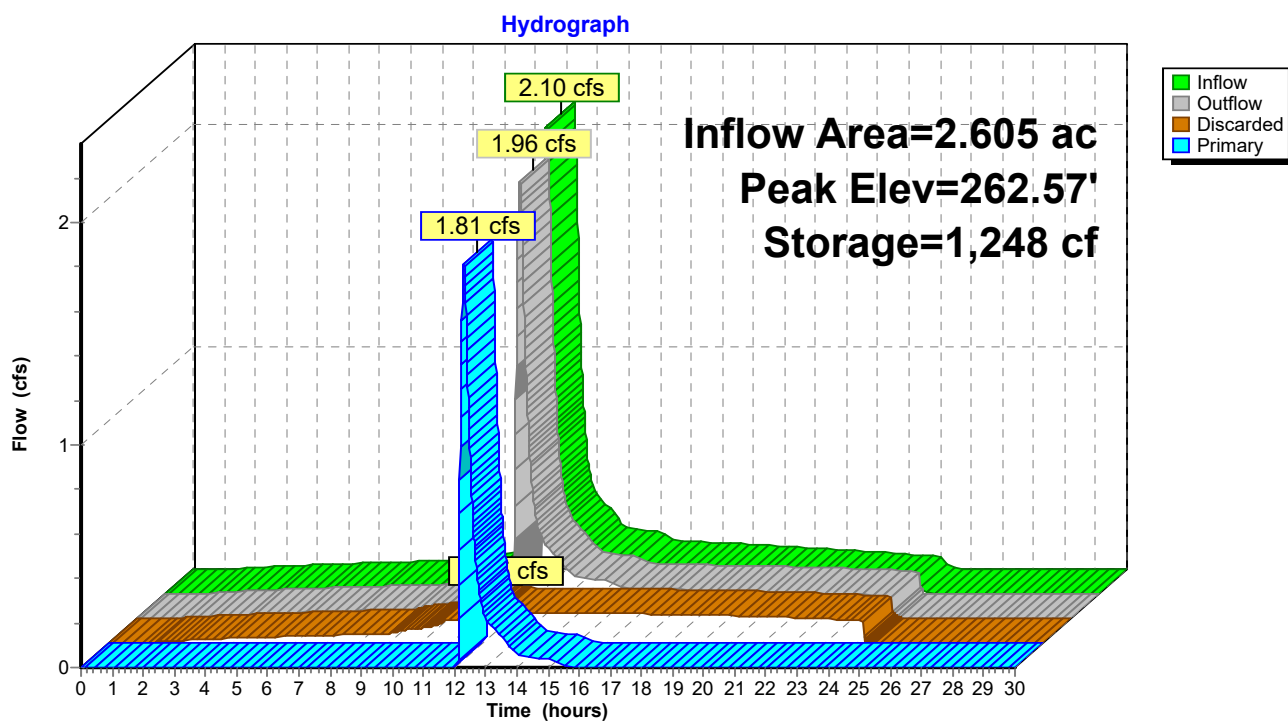
Volume	Invert	Avail.Storage	Storage Description		
#1	262.00'	4,479 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
262.00	1,784	213.0	0	0	1,784
263.50	4,379	317.0	4,479	4,479	6,188

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28)
			Elev. (feet) 262.40 263.50
			Width (feet) 8.00 8.00

Discarded OutFlow Max=0.15 cfs @ 12.29 hrs HW=262.57' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=1.81 cfs @ 12.29 hrs HW=262.57' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Custom Weir/Orifice** (Weir Controls 1.81 cfs @ 1.34 fps)

Pond 13P: Infiltration Basin #3



Summary for Subcatchment 14P: P1g

Runoff = 0.25 cfs @ 12.18 hrs, Volume= 0.022 af, Depth= 0.93"

Routed to Pond 15P : Existing pipe

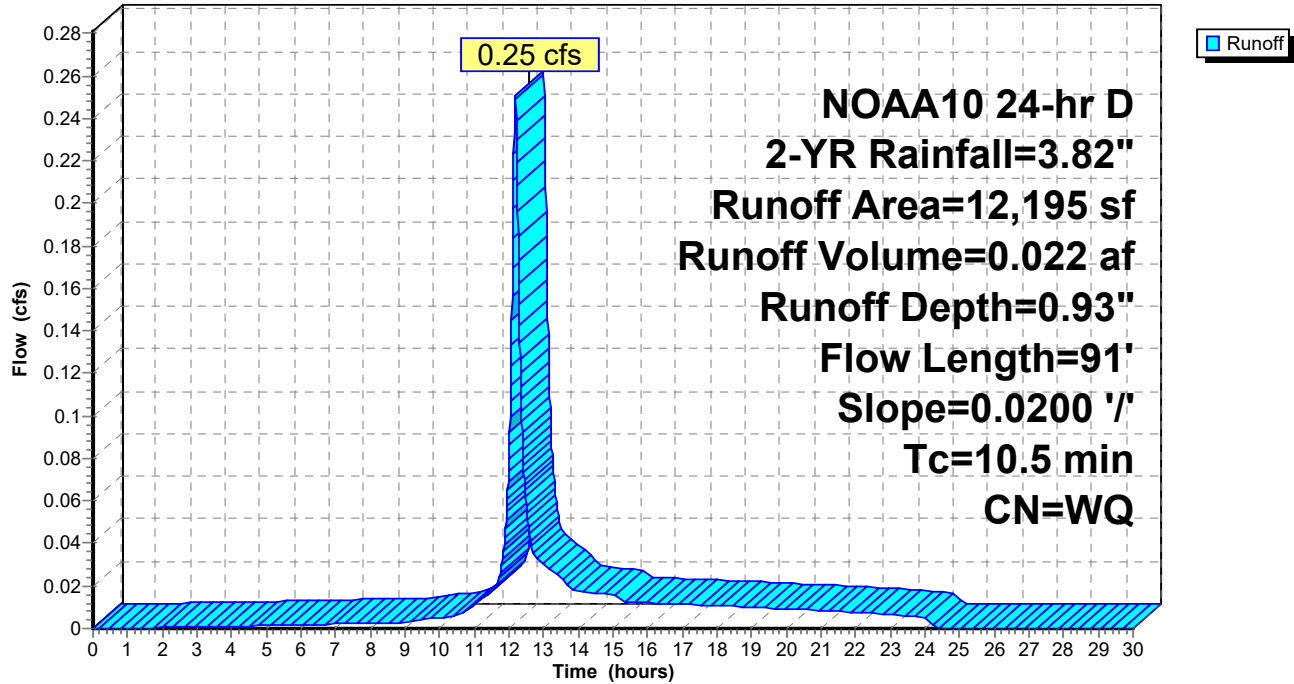
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.82"

Area (sf)	CN	Description
764	98	Roofs, HSG A
558	89	Gravel roads HSG C
3,895	70	Woods, Good HSG C
3,122	30	Woods, Good HSG A
989	76	Gravel roads HSG A
2,345	39	>75% Grass cover, Good HSG A
522	74	>75% Grass cover, Good HSG C
12,195		Weighted Average
11,431		93.74% Pervious Area
764		6.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	39	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
1.2	52	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.5	91	Total			

Subcatchment 14P: P1g

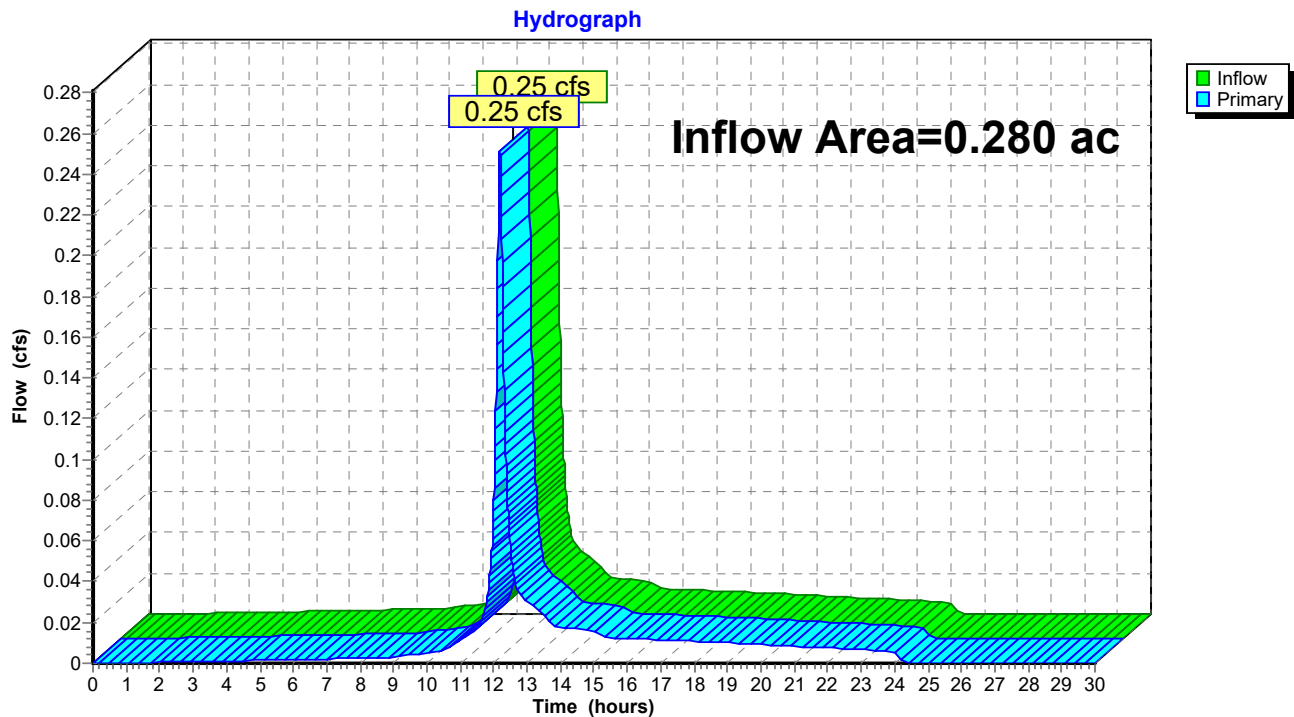
Hydrograph



Summary for Pond 15P: Existing pipe

Inflow Area = 0.280 ac, 6.26% Impervious, Inflow Depth = 0.93" for 2-YR event
Inflow = 0.25 cfs @ 12.18 hrs, Volume= 0.022 af
Primary = 0.25 cfs @ 12.18 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 17P : Driveway Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 15P: Existing pipe

Summary for Subcatchment 16P: P1h

Runoff = 0.02 cfs @ 12.20 hrs, Volume= 0.002 af, Depth= 0.03"
 Routed to Pond 17P : Driveway Pipe

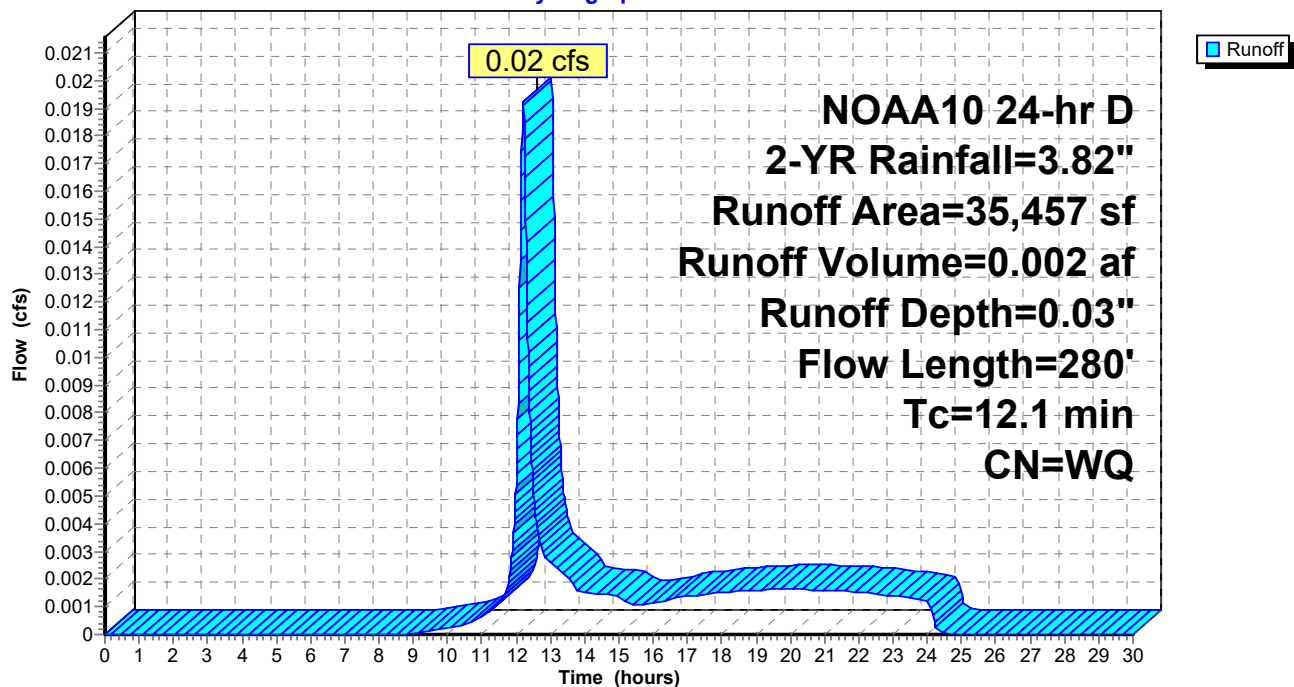
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 2-YR Rainfall=3.82"

Area (sf)	CN	Description
26,257	30	Woods, Good HSG A
8,598	39	>75% Grass cover, Good HSG A
602	74	>75% Grass cover, Good HSG C
35,457		Weighted Average
35,457		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
4.2	220	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	10	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
12.1	280	Total			

Subcatchment 16P: P1h

Hydrograph



Summary for Pond 17P: Driveway Pipe

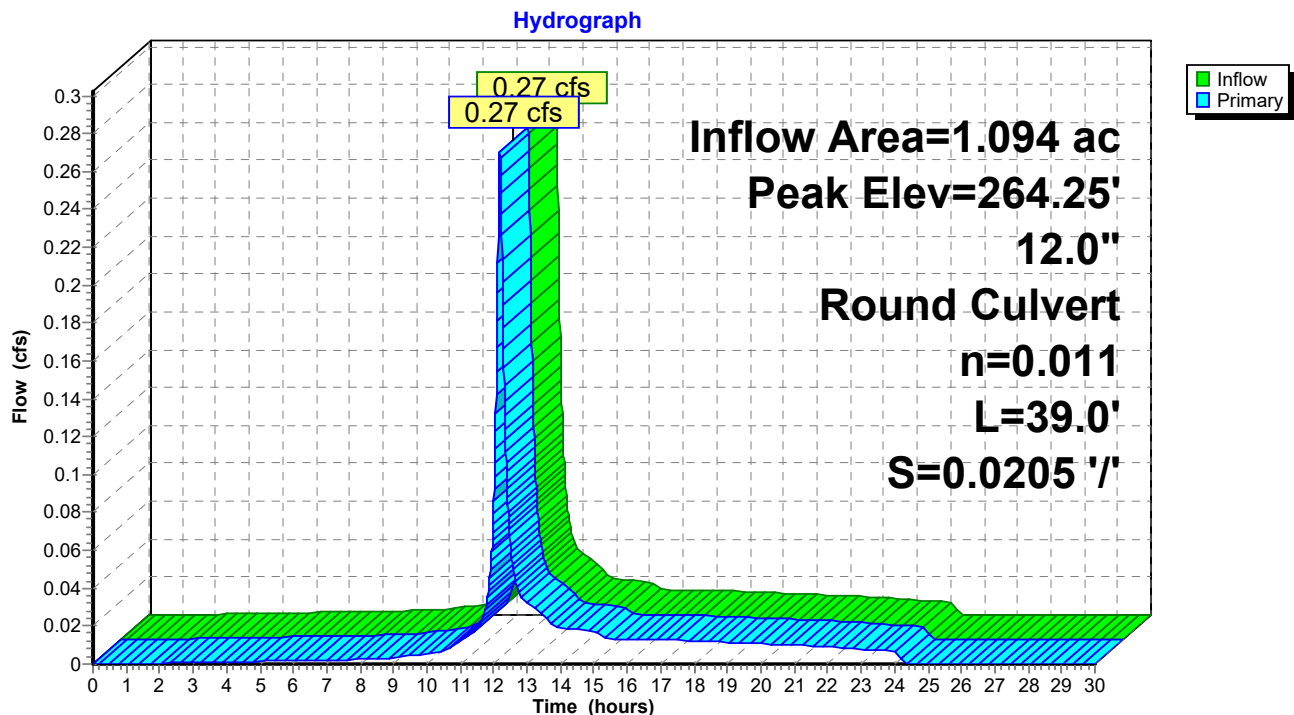
Inflow Area = 1.094 ac, 1.60% Impervious, Inflow Depth = 0.26" for 2-YR event
 Inflow = 0.27 cfs @ 12.18 hrs, Volume= 0.024 af
 Outflow = 0.27 cfs @ 12.18 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.27 cfs @ 12.18 hrs, Volume= 0.024 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 264.25' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.00'	12.0" Round Culvert L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 264.00' / 263.20' S= 0.0205 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.18 hrs HW=264.25' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.27 cfs @ 1.72 fps)

Pond 17P: Driveway Pipe



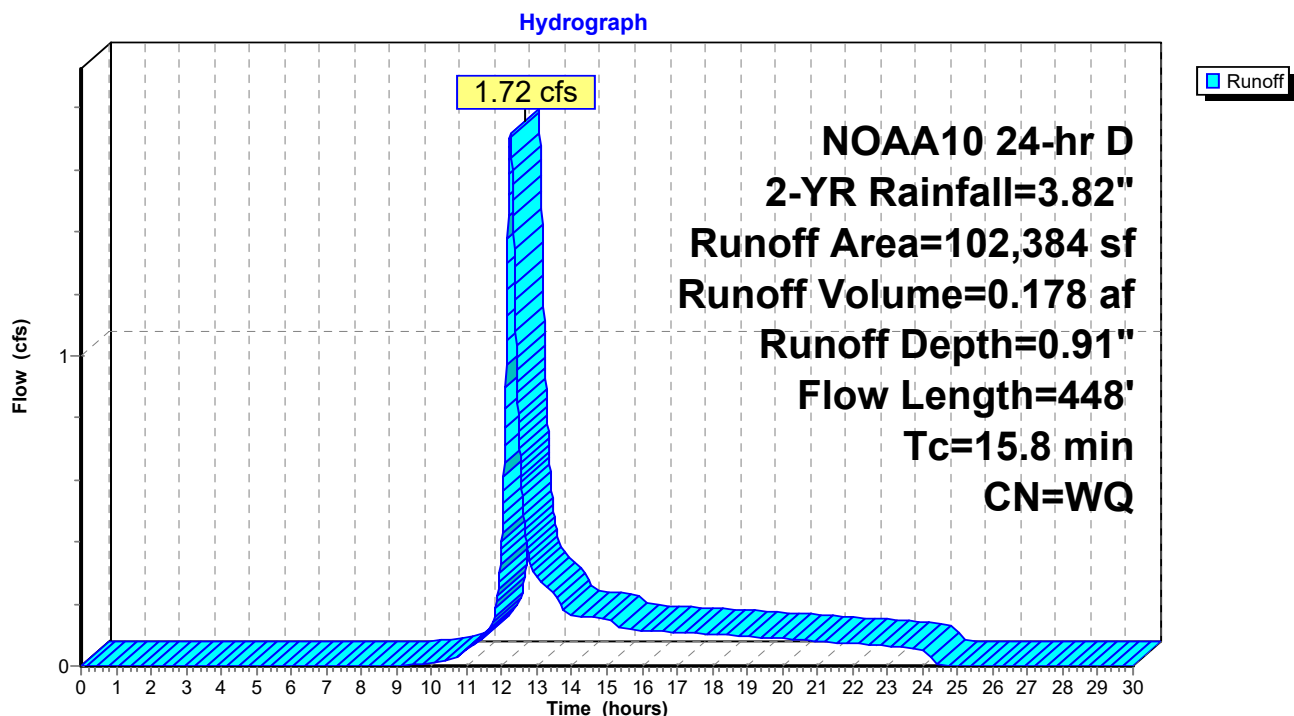
Summary for Subcatchment 18P: P1i

Runoff = 1.72 cfs @ 12.25 hrs, Volume= 0.178 af, Depth= 0.91"
 Routed to Link 21P : Design Point #1: Flow to Wetlands

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=3.82"

Area (sf)	CN	Description
45,368	70	Woods, Good HSG C
13,717	30	Woods, Good HSG A
17,824	39	>75% Grass cover, Good HSG A
25,475	74	>75% Grass cover, Good HSG C
102,384		Weighted Average
102,384		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
5.5	285	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	113	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	448	Total			

Subcatchment 18P: P1i

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NOAA10 24-hr D 2-YR Rainfall=3.82"

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Summary for Subcatchment 19P: P1j

Runoff = 0.15 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 3.59"
Routed to Pond 20P : Infiltration Field #1

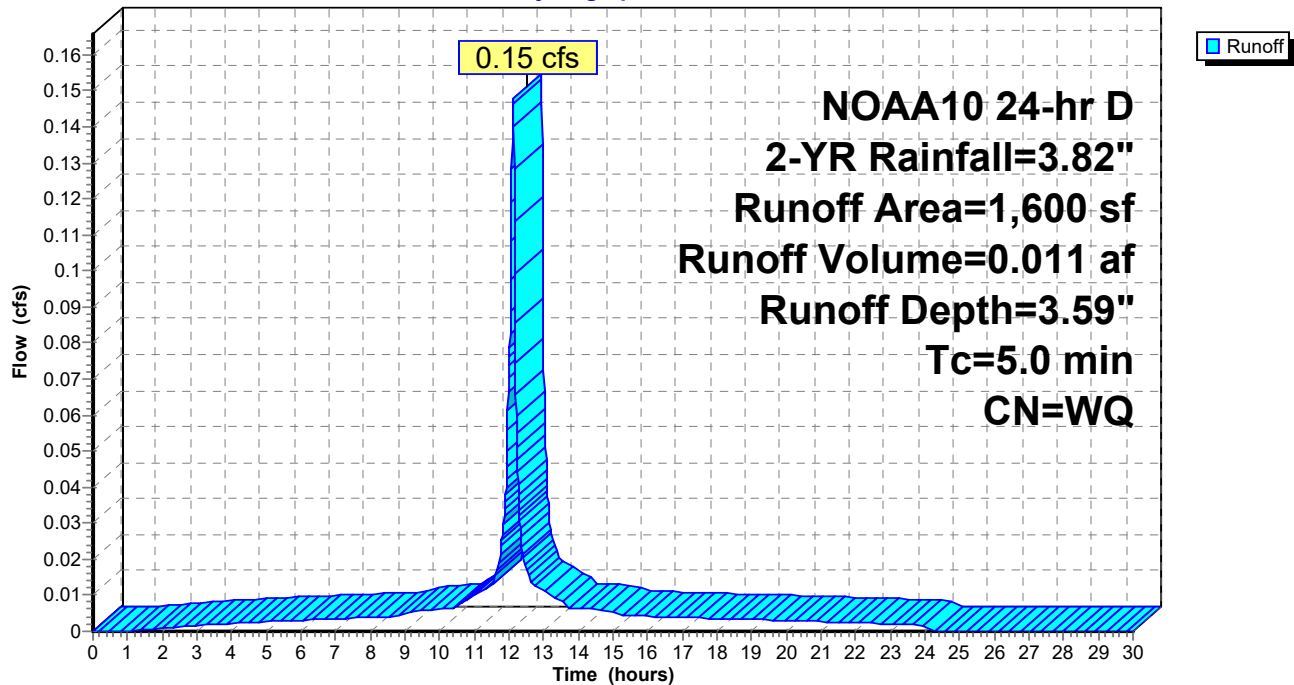
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 2-YR Rainfall=3.82"

Area (sf)	CN	Description
543	98	Roofs, HSG C
1,057	98	Roofs, HSG A
1,600		Weighted Average
1,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 19P: P1j

Hydrograph



Summary for Pond 20P: Infiltration Field #1

Inflow Area = 0.037 ac, 100.00% Impervious, Inflow Depth = 3.59" for 2-YR event
 Inflow = 0.15 cfs @ 12.12 hrs, Volume= 0.011 af
 Outflow = 0.01 cfs @ 11.66 hrs, Volume= 0.011 af, Atten= 92%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.66 hrs, Volume= 0.011 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 261.36' @ 12.96 hrs Surf.Area= 204 sf Storage= 124 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 63.4 min (818.9 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	260.30'	132 cf	11.67'W x 17.50'L x 2.04'H Field A 417 cf Overall - 87 cf Embedded = 330 cf x 40.0% Voids
#2A	260.80'	87 cf	Cultec C-100HD x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	262.30'	1 cf	1.00'D x 1.00'H Vertical Cone/Cylinder
		219 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.30'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.30'	4.0" Round Culvert X 3.00 L= 1.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 262.30' / 262.20' S= 0.1000 ' /' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 11.66 hrs HW=260.33' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=260.30' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Culvert** (Controls 0.00 cfs)

Pond 20P: Infiltration Field #1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

2 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 15.50' Row Length +12.0" End Stone x 2 = 17.50' Base Length

3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 12.0" Side Stone x 2 = 11.67' Base Width

6.0" Stone Base + 12.5" Chamber Height + 6.0" Stone Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 86.6 cf Chamber Storage

416.8 cf Field - 86.6 cf Chambers = 330.3 cf Stone x 40.0% Voids = 132.1 cf Stone Storage

Chamber Storage + Stone Storage = 218.7 cf = 0.005 af

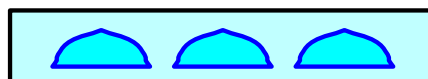
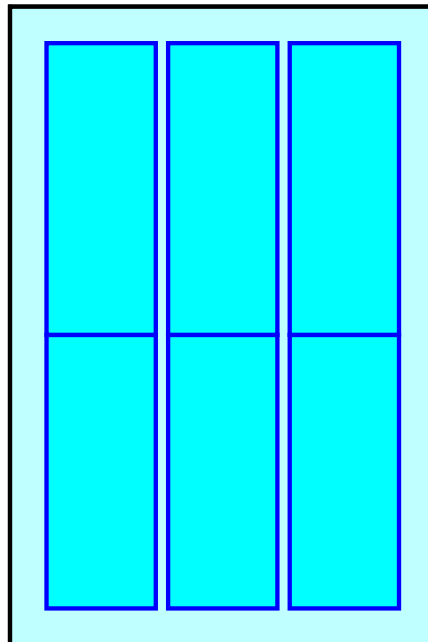
Overall Storage Efficiency = 52.5%

Overall System Size = 17.50' x 11.67' x 2.04'

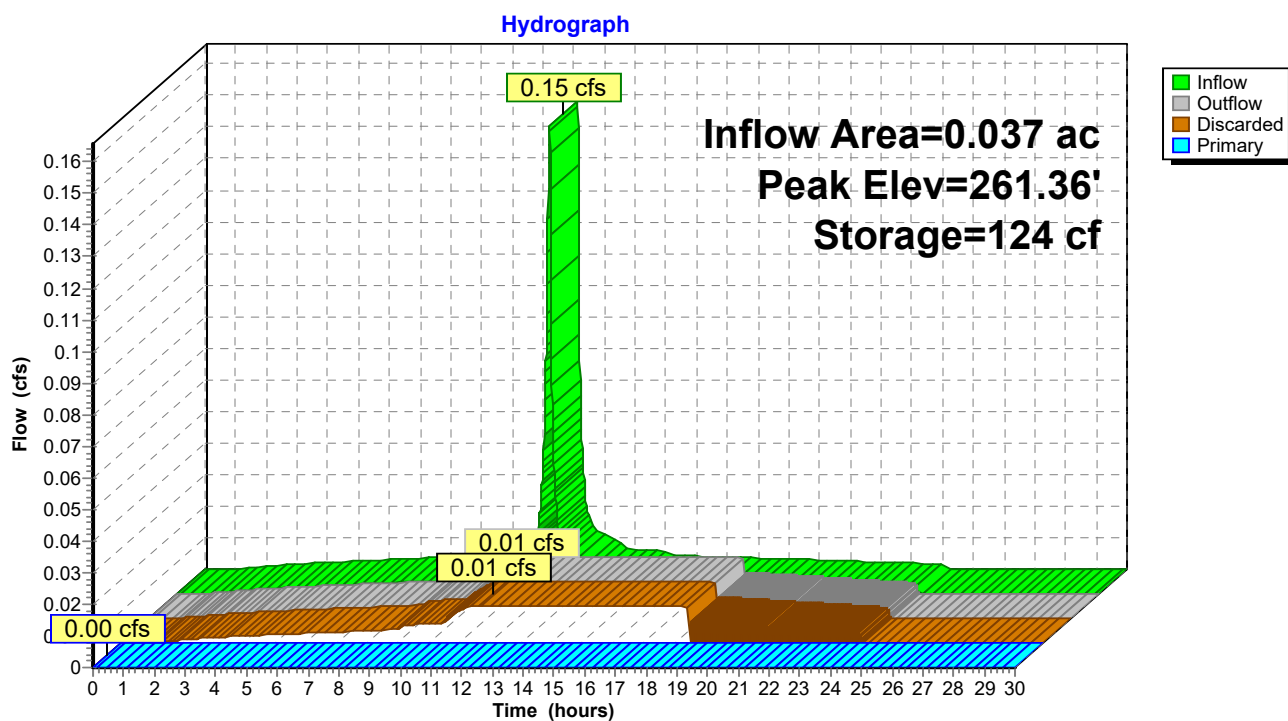
6 Chambers

15.4 cy Field

12.2 cy Stone



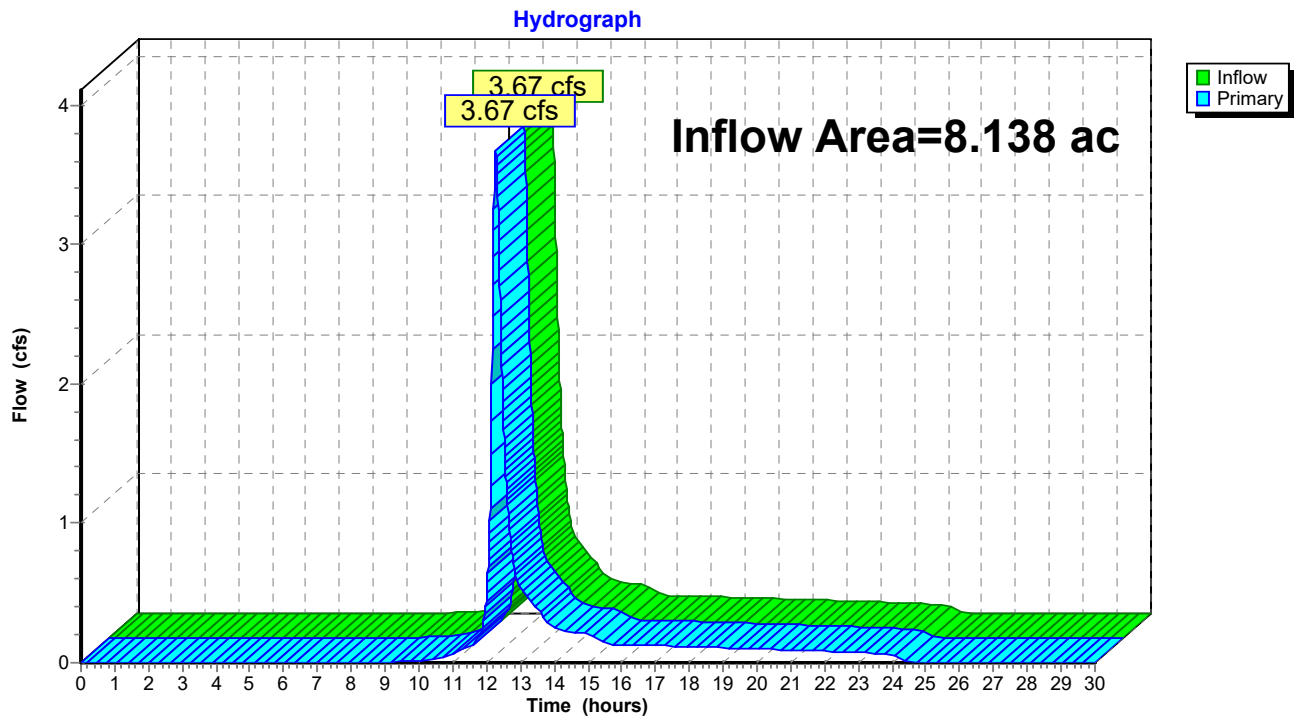
Pond 20P: Infiltration Field #1



Summary for Link 21P: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 11.15% Impervious, Inflow Depth = 0.41" for 2-YR event
Inflow = 3.67 cfs @ 12.27 hrs, Volume= 0.277 af
Primary = 3.67 cfs @ 12.27 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.0 min

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

Link 21P: Design Point #1: Flow to Wetlands

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NOAA10 24-hr D 10-YR Rainfall=6.01"

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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

Subcatchment1P: P1a

Runoff Area=32,129 sf 21.86% Impervious Runoff Depth=3.47"
Flow Length=308' Tc=14.2 min CN=WQ Runoff=2.10 cfs 0.213 af

Pond 2P: CB 2+85 L&R

Peak Elev=274.95' Inflow=2.10 cfs 0.213 af
12.0" Round Culvert x 2.00 n=0.011 L=8.0' S=0.0187 '/' Outflow=2.10 cfs 0.213 af

Pond 3P: DMH 2+93

Peak Elev=274.81' Inflow=2.10 cfs 0.213 af
12.0" Round Culvert n=0.011 L=106.0' S=0.0108 '/' Outflow=2.10 cfs 0.213 af

Subcatchment4P: P1b

Runoff Area=12,532 sf 32.92% Impervious Runoff Depth=2.17"
Flow Length=181' Tc=6.6 min CN=WQ Runoff=0.58 cfs 0.052 af

Pond 5P: CB 4+04 L&R

Peak Elev=273.70' Inflow=0.58 cfs 0.052 af
12.0" Round Culvert x 2.00 n=0.011 L=5.0' S=0.0060 '/' Outflow=0.58 cfs 0.052 af

Pond 6P: DMH 4+05

Peak Elev=273.69' Inflow=2.45 cfs 0.266 af
15.0" Round Culvert n=0.011 L=47.0' S=0.0055 '/' Outflow=2.45 cfs 0.266 af

Subcatchment7P: P1c

Runoff Area=25,973 sf 3.46% Impervious Runoff Depth=0.52"
Flow Length=168' Tc=11.9 min CN=WQ Runoff=0.13 cfs 0.026 af

Pond 8P: Infiltration Basin #1

Peak Elev=273.42' Storage=2,965 cf Inflow=2.58 cfs 0.291 af
Discarded=0.20 cfs 0.233 af Primary=0.61 cfs 0.058 af Outflow=0.81 cfs 0.291 af

Subcatchment9P: P1d

Runoff Area=18,728 sf 48.96% Impervious Runoff Depth=3.05"
Flow Length=95' Tc=5.3 min CN=WQ Runoff=1.34 cfs 0.109 af

Pond 10P: Infiltration Basin #2

Peak Elev=267.87' Storage=1,593 cf Inflow=1.34 cfs 0.168 af
Discarded=0.12 cfs 0.113 af Primary=0.49 cfs 0.054 af Outflow=0.61 cfs 0.168 af

Subcatchment11P: P1e

Runoff Area=110,274 sf 11.57% Impervious Runoff Depth=2.16"
Flow Length=526' Tc=16.3 min CN=WQ Runoff=4.17 cfs 0.455 af

Subcatchment12P: P1f

Runoff Area=3,200 sf 100.00% Impervious Runoff Depth=5.77"
Tc=5.0 min CN=98 Runoff=0.47 cfs 0.035 af

Pond 13P: Infiltration Basin #3

Peak Elev=262.69' Storage=1,569 cf Inflow=4.32 cfs 0.490 af
Discarded=0.16 cfs 0.214 af Primary=4.01 cfs 0.276 af Outflow=4.17 cfs 0.490 af

Subcatchment14P: P1g

Runoff Area=12,195 sf 6.26% Impervious Runoff Depth=1.99"
Flow Length=91' Slope=0.0200 '/' Tc=10.5 min CN=WQ Runoff=0.53 cfs 0.047 af

Pond 15P: Existing pipe

Inflow=0.53 cfs 0.047 af
Primary=0.53 cfs 0.047 af

Subcatchment16P: P1h

Runoff Area=35,457 sf 0.00% Impervious Runoff Depth=0.22"
Flow Length=280' Tc=12.1 min CN=WQ Runoff=0.06 cfs 0.015 af

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NOAA10 24-hr D 10-YR Rainfall=6.01"

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Pond 17P: Driveway Pipe

Peak Elev=264.38' Inflow=0.58 cfs 0.061 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0205 '/' Outflow=0.58 cfs 0.061 af

Subcatchment 18P: P1i

Runoff Area=102,384 sf 0.00% Impervious Runoff Depth=2.13"
Flow Length=448' Tc=15.8 min CN=WQ Runoff=4.08 cfs 0.417 af

Subcatchment 19P: P1j

Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=5.77"
Tc=5.0 min CN=WQ Runoff=0.23 cfs 0.018 af

Pond 20P: Infiltration Field #1

Peak Elev=262.37' Storage=219 cf Inflow=0.23 cfs 0.018 af
Discarded=0.01 cfs 0.017 af Primary=0.03 cfs 0.001 af Outflow=0.04 cfs 0.018 af

Link 21P: Design Point #1: Flow to Wetlands

Inflow=8.52 cfs 0.809 af
Primary=8.52 cfs 0.809 af

Total Runoff Area = 8.138 ac Runoff Volume = 1.387 af Average Runoff Depth = 2.04"
88.85% Pervious = 7.230 ac 11.15% Impervious = 0.908 ac

Summary for Subcatchment 1P: P1a

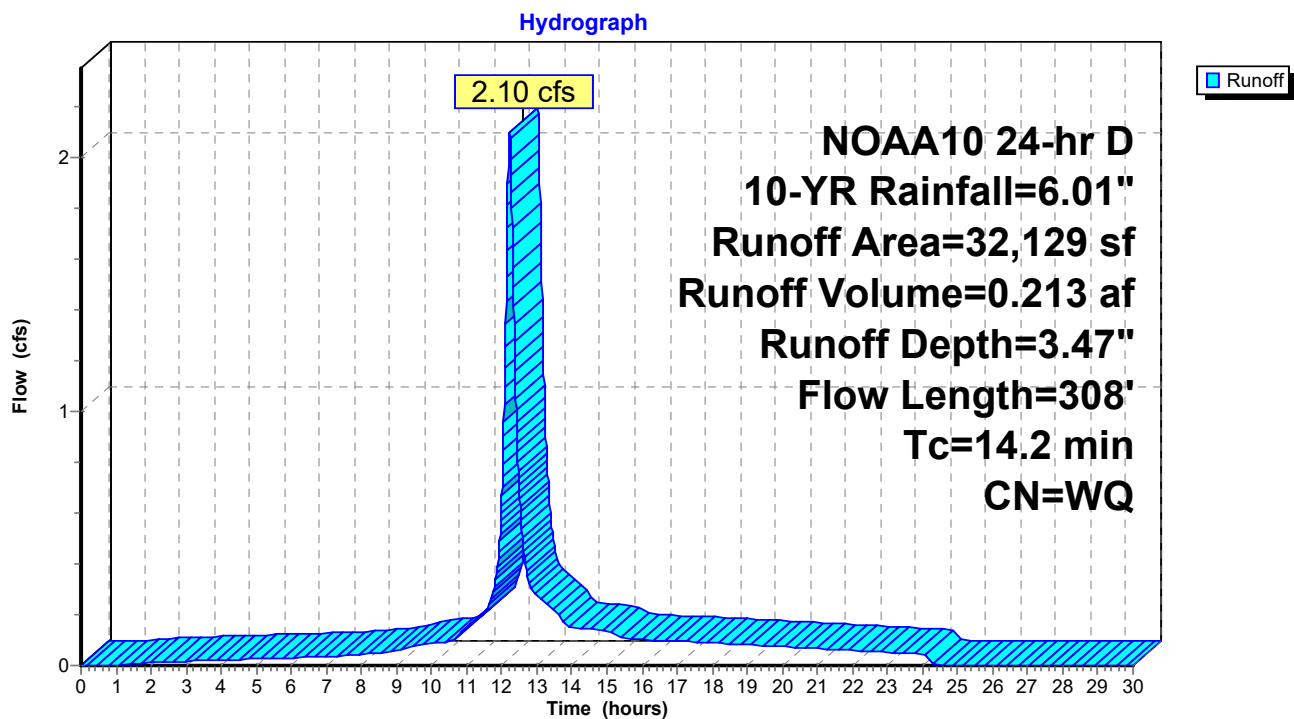
Runoff = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af, Depth= 3.47"
 Routed to Pond 2P : CB 2+85 L&R

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=6.01"

Area (sf)	CN	Description
3,629	98	Paved parking HSG C
9,045	70	Woods, Good HSG C
1,201	98	Roofs HSG C
305	98	Roofs HSG A
* 2,623	96	Gravel HSG C
1,890	98	Paved parking HSG A
4,307	39	>75% Grass cover, Good HSG A
9,129	74	>75% Grass cover, Good HSG C
32,129		Weighted Average
25,104		78.14% Pervious Area
7,025		21.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.2	144	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
14.2	308	Total			

Subcatchment 1P: P1a



Summary for Pond 2P: CB 2+85 L&R

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 3.47" for 10-YR event
 Inflow = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af
 Outflow = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af
 Routed to Pond 3P : DMH 2+93

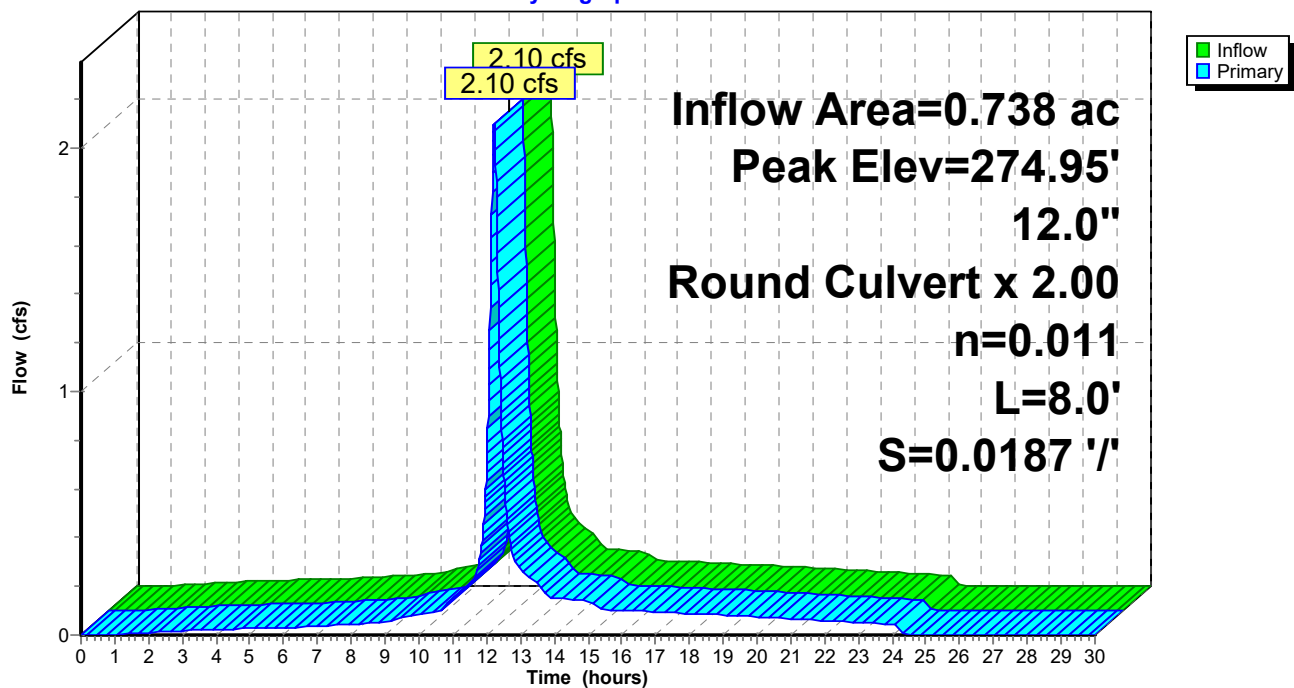
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 274.95' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.20'	12.0" Round Culvert X 2.00 L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.20' / 274.05' S= 0.0187 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.09 cfs @ 12.22 hrs HW=274.95' TW=274.81' (Dynamic Tailwater)
 ↑ **1=Culvert** (Outlet Controls 2.09 cfs @ 2.30 fps)

Pond 2P: CB 2+85 L&R

Hydrograph



Summary for Pond 3P: DMH 2+93

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 3.47" for 10-YR event
 Inflow = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af
 Outflow = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.10 cfs @ 12.22 hrs, Volume= 0.213 af
 Routed to Pond 6P : DMH 4+05

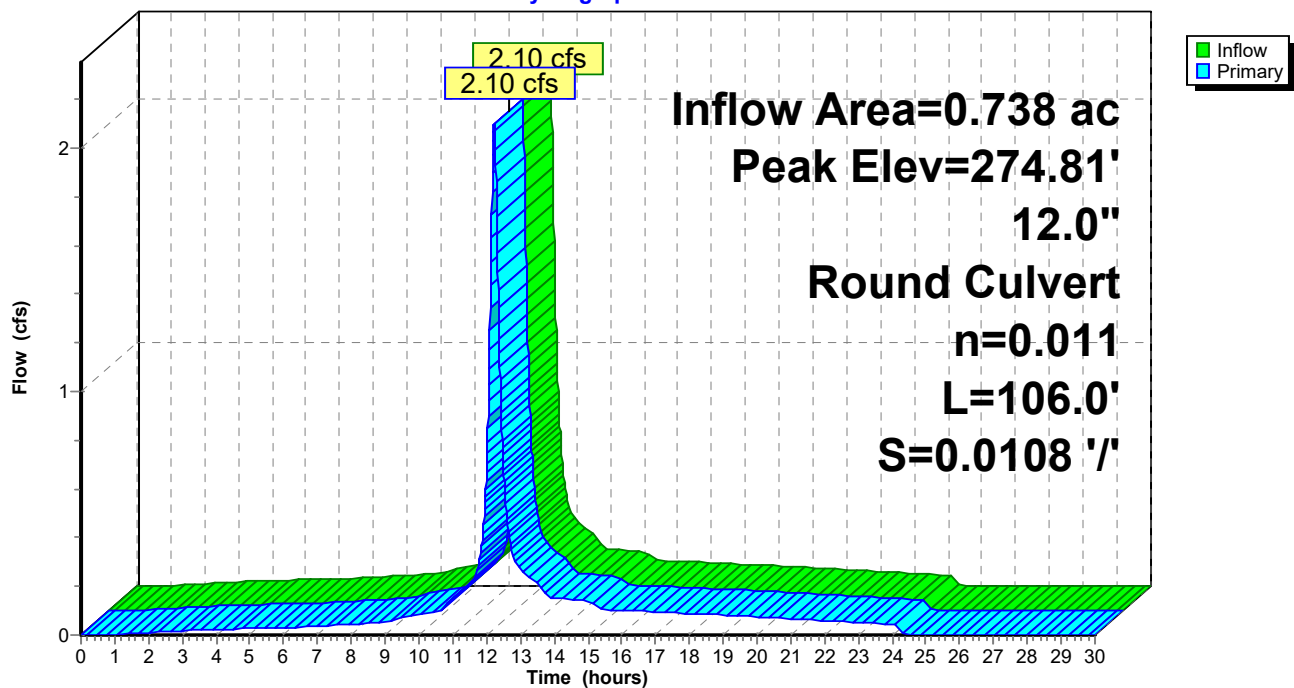
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 274.81' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	12.0" Round Culvert L= 106.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.86' S= 0.0108 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.10 cfs @ 12.22 hrs HW=274.81' TW=273.68' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 2.10 cfs @ 3.07 fps)

Pond 3P: DMH 2+93

Hydrograph



Summary for Subcatchment 4P: P1b

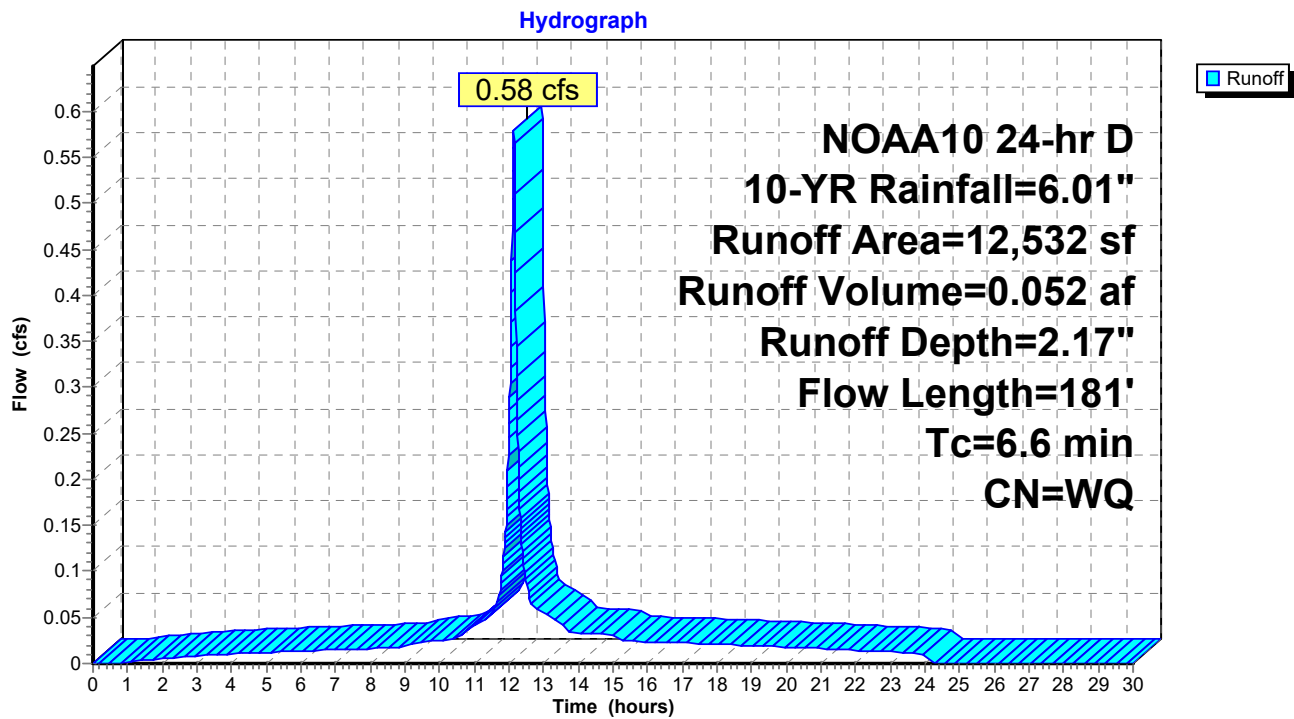
Runoff = 0.58 cfs @ 12.14 hrs, Volume= 0.052 af, Depth= 2.17"
 Routed to Pond 5P : CB 4+04 L&R

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=6.01"

Area (sf)	CN	Description
360	98	Roofs HSG C
996	30	Woods, Good HSG A
305	98	Roofs HSG A
3,460	98	Paved parking HSG A
7,411	39	>75% Grass cover, Good HSG A
12,532		Weighted Average
8,407		67.08% Pervious Area
4,125		32.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0400	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.2	26	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	105	0.0150	2.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.6	181	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: CB 4+04 L&R

Inflow Area = 0.288 ac, 32.92% Impervious, Inflow Depth = 2.17" for 10-YR event
 Inflow = 0.58 cfs @ 12.14 hrs, Volume= 0.052 af
 Outflow = 0.58 cfs @ 12.14 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.58 cfs @ 12.14 hrs, Volume= 0.052 af
 Routed to Pond 6P : DMH 4+05

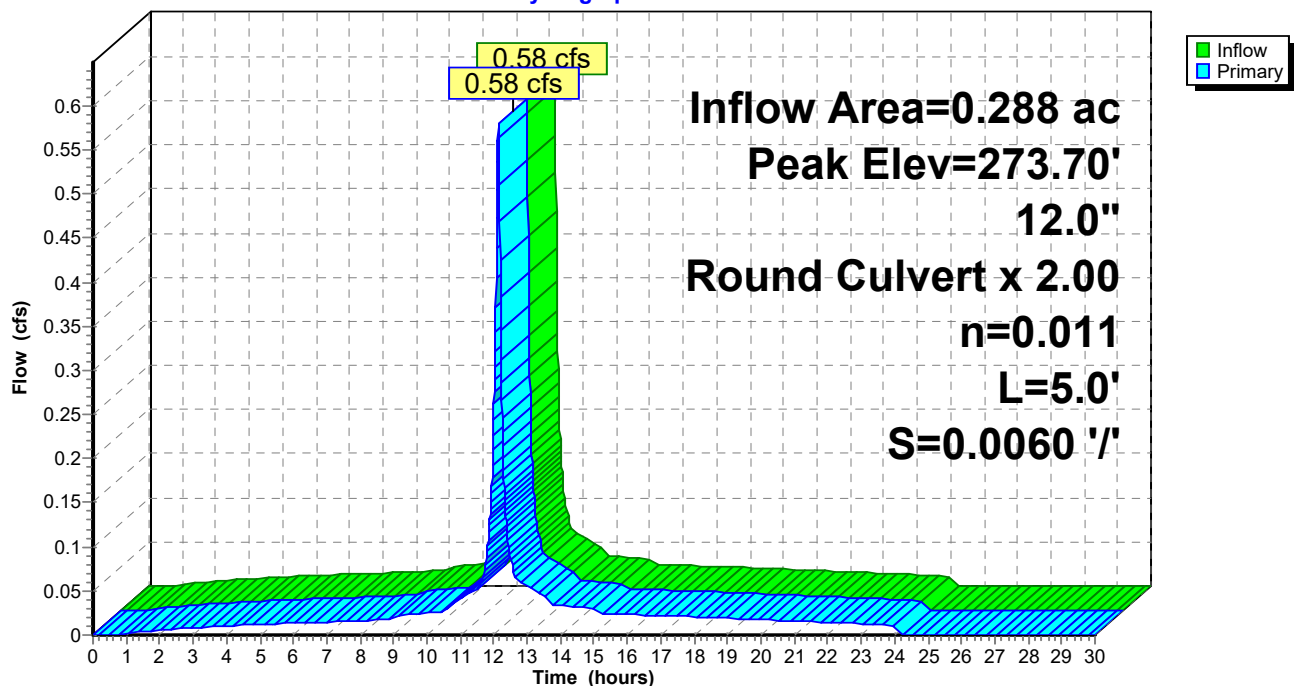
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.70' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.89'	12.0" Round Culvert X 2.00 L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.89' / 272.86' S= 0.0060 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=273.62' TW=273.64' (Dynamic Tailwater)
 ↑ **1=Culvert** (Controls 0.00 cfs)

Pond 5P: CB 4+04 L&R

Hydrograph



Summary for Pond 6P: DMH 4+05

Inflow Area = 1.025 ac, 24.97% Impervious, Inflow Depth = 3.11" for 10-YR event
 Inflow = 2.45 cfs @ 12.20 hrs, Volume= 0.266 af
 Outflow = 2.45 cfs @ 12.20 hrs, Volume= 0.266 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.45 cfs @ 12.20 hrs, Volume= 0.266 af
 Routed to Pond 8P : Infiltration Basin #1

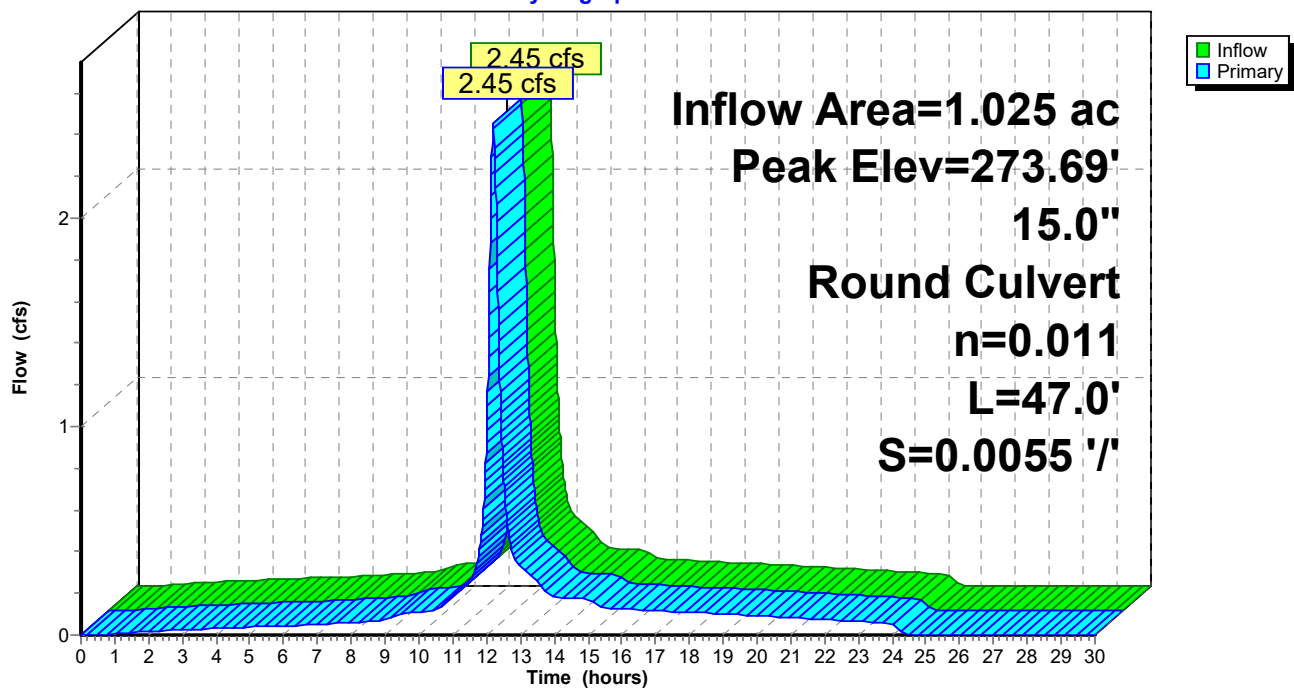
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.69' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.81'	15.0" Round Culvert L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.81' / 272.55' S= 0.0055 '/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=2.45 cfs @ 12.20 hrs HW=273.69' TW=273.08' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 2.45 cfs @ 3.71 fps)

Pond 6P: DMH 4+05

Hydrograph



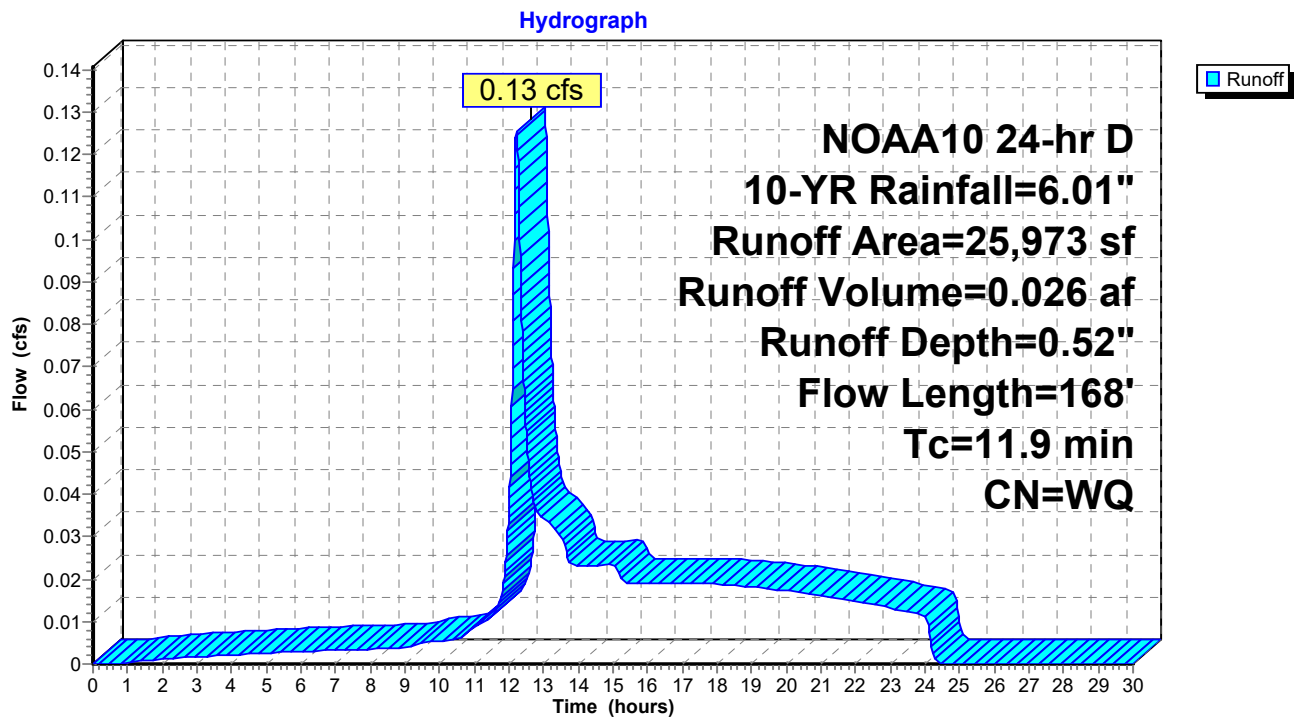
Summary for Subcatchment 7P: P1c

Runoff = 0.13 cfs @ 12.22 hrs, Volume= 0.026 af, Depth= 0.52"
 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=6.01"

Area (sf)	CN	Description
898	98	Roofs, HSG A
7,786	30	Woods, Good HSG A
17,289	39	>75% Grass cover, Good HSG A
25,973		Weighted Average
25,075		96.54% Pervious Area
898		3.46% Impervious 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= 3.82"
2.5	104	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	30	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
11.9	168	Total			

Subcatchment 7P: P1c

Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.622 ac, 17.06% Impervious, Inflow Depth = 2.16" for 10-YR event
 Inflow = 2.58 cfs @ 12.20 hrs, Volume= 0.291 af
 Outflow = 0.81 cfs @ 12.50 hrs, Volume= 0.291 af, Atten= 69%, Lag= 18.4 min
 Discarded = 0.20 cfs @ 12.50 hrs, Volume= 0.233 af
 Primary = 0.61 cfs @ 12.50 hrs, Volume= 0.058 af
 Routed to Pond 10P : Infiltration Basin #2

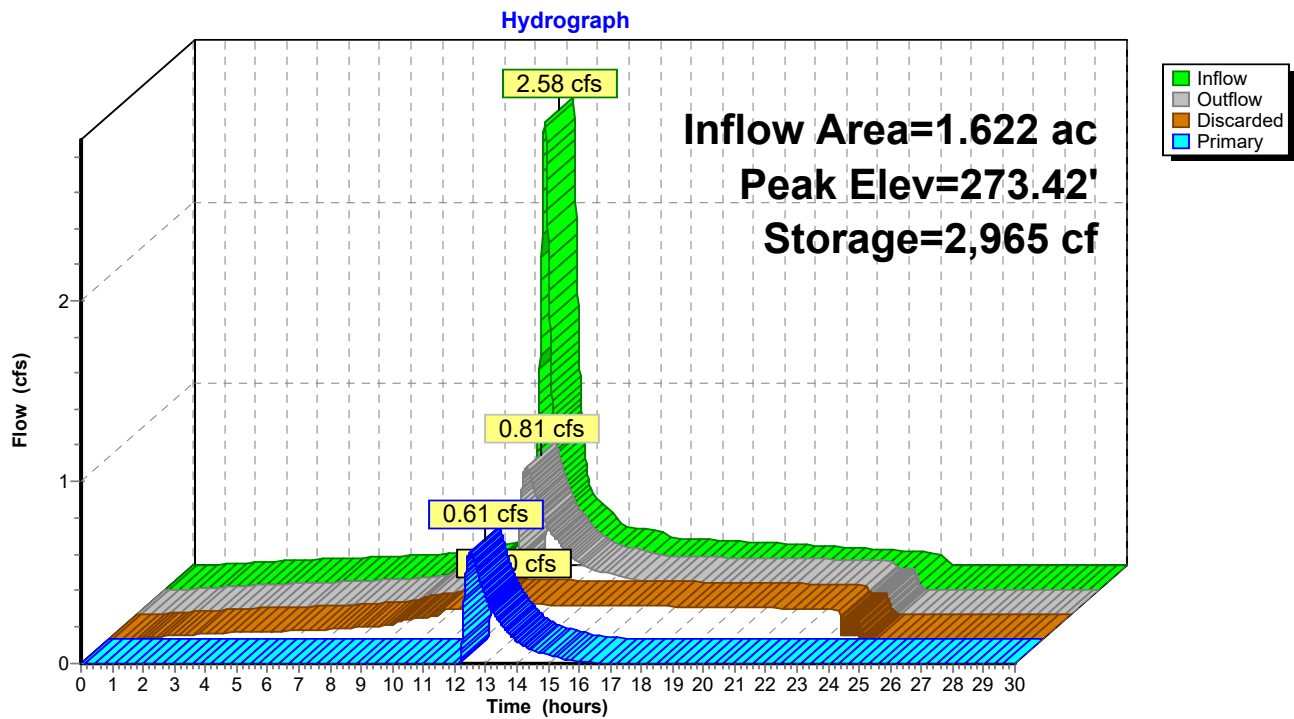
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.42' @ 12.50 hrs Surf.Area= 3,552 sf Storage= 2,965 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 75.1 min (897.3 - 822.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	272.50'	12,087 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)
272.50	2,893	205.0	0	0	2,893
275.50	5,284	279.0	12,087	12,087	5,834
Device	Routing	Invert	Outlet Devices		
#1	Discarded	272.50'	2.410 in/hr Exfiltration over Surface area		
#2	Primary	273.00'	10.0" Round Culvert		
			L= 98.0' CPP, square edge headwall, Ke= 0.500		
			Inlet / Outlet Invert= 273.00' / 267.30' S= 0.0582 '/' Cc= 0.900		
			n= 0.011, Flow Area= 0.55 sf		

Discarded OutFlow Max=0.20 cfs @ 12.50 hrs HW=273.42' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.61 cfs @ 12.50 hrs HW=273.42' TW=267.81' (Dynamic Tailwater)
 ↑ **2=Culvert** (Inlet Controls 0.61 cfs @ 2.21 fps)

Pond 8P: Infiltration Basin #1

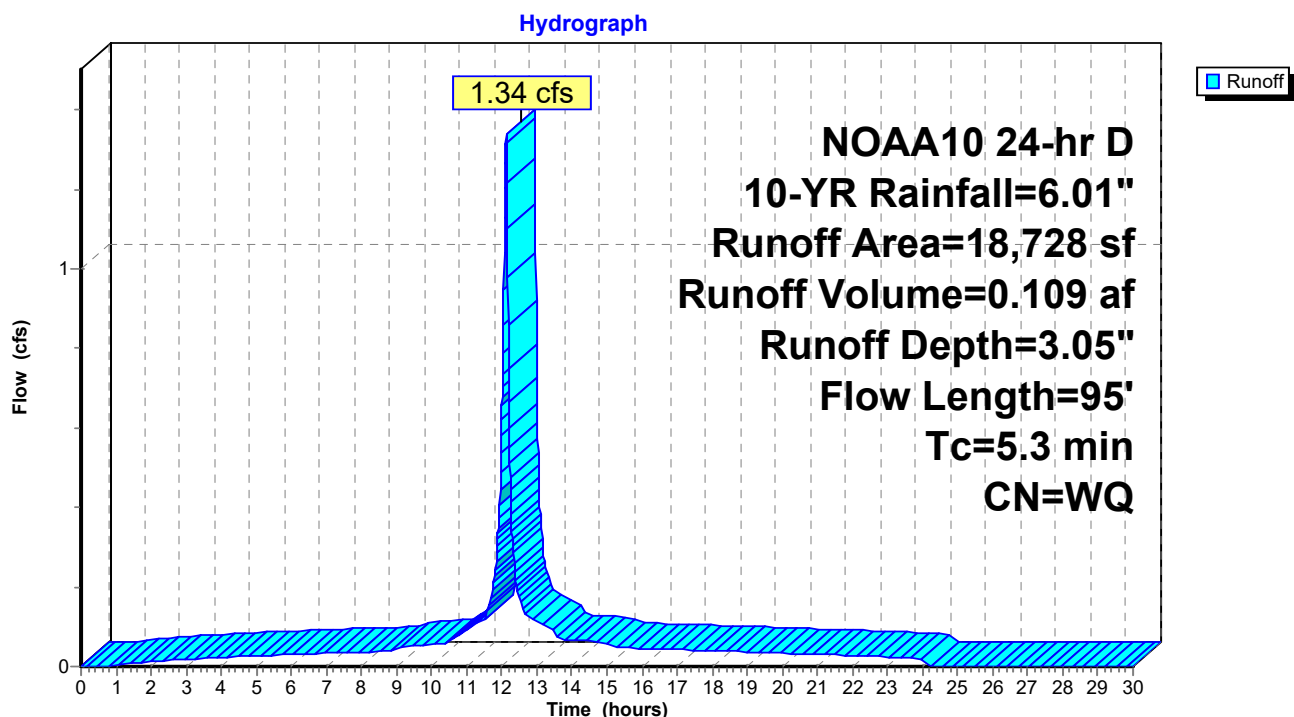
Summary for Subcatchment 9P: P1d

Runoff = 1.34 cfs @ 12.12 hrs, Volume= 0.109 af, Depth= 3.05"
 Routed to Pond 10P : 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=6.01"

Area (sf)	CN	Description
216	98	Roofs HSG C
1,384	98	Roofs HSG A
7,569	98	Paved parking HSG A
9,559	39	>75% Grass cover, Good HSG A
18,728		Weighted Average
9,559		51.04% Pervious Area
9,169		48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0600	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.4	24	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	21	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.3	95	Total			

Subcatchment 9P: P1d

Summary for Pond 10P: Infiltration Basin #2

Inflow Area = 2.051 ac, 23.74% Impervious, Inflow Depth = 0.98" for 10-YR event
 Inflow = 1.34 cfs @ 12.12 hrs, Volume= 0.168 af
 Outflow = 0.61 cfs @ 12.78 hrs, Volume= 0.168 af, Atten= 55%, Lag= 39.1 min
 Discarded = 0.12 cfs @ 12.78 hrs, Volume= 0.113 af
 Primary = 0.49 cfs @ 12.78 hrs, Volume= 0.054 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 267.87' @ 12.78 hrs Surf.Area= 2,111 sf Storage= 1,593 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 55.4 min (831.0 - 775.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	267.00'	8,013 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)
267.00	1,557	147.0	0	0	1,557
268.00	2,200	176.0	1,869	1,869	2,320
270.00	4,036	311.0	6,144	8,013	7,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	267.50'	10.0" Round Culvert L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 265.00' S= 0.0758 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf

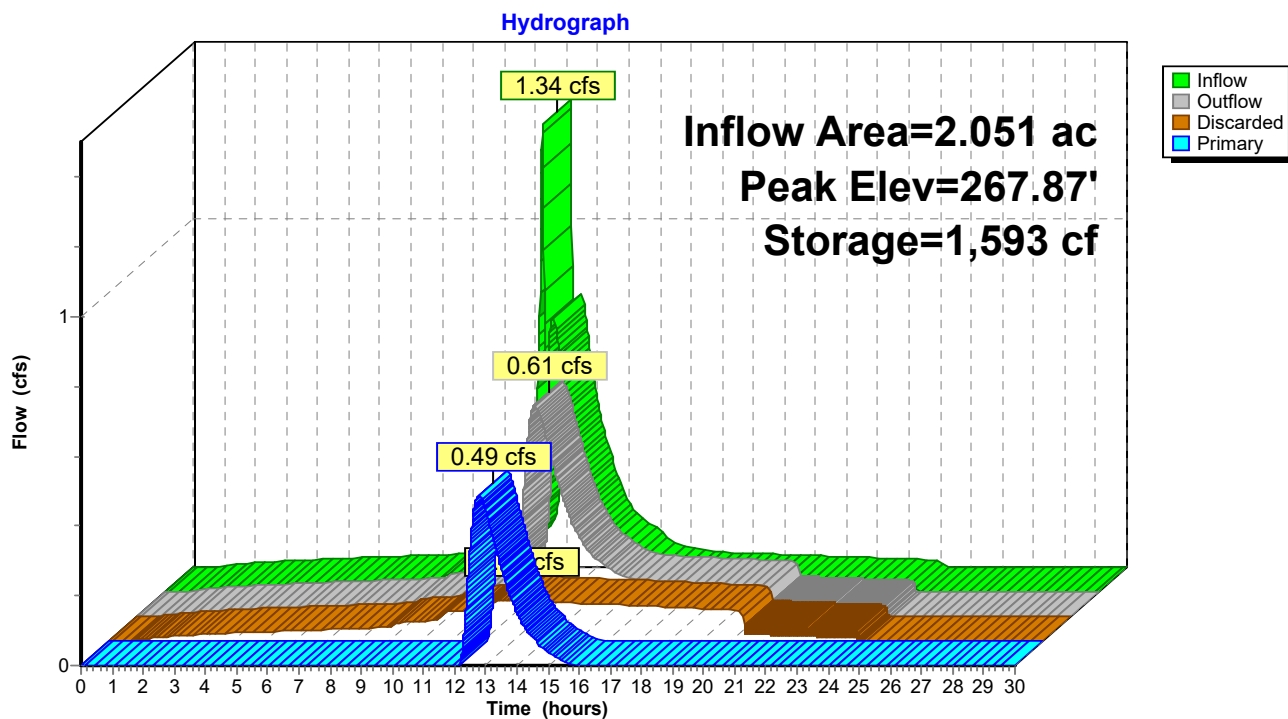
Discarded OutFlow Max=0.12 cfs @ 12.78 hrs HW=267.87' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.49 cfs @ 12.78 hrs HW=267.87' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 0.49 cfs @ 2.08 fps)

Pond 10P: Infiltration Basin #2



Summary for Subcatchment 11P: P1e

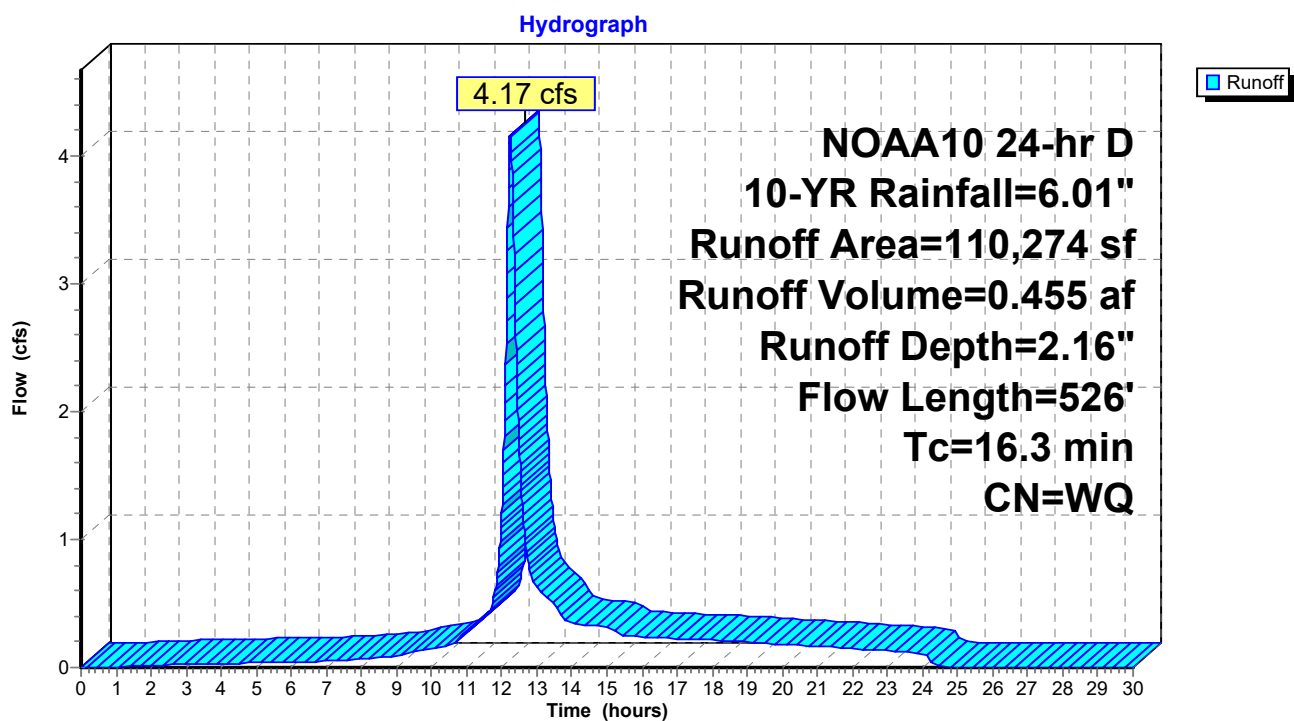
Runoff = 4.17 cfs @ 12.24 hrs, Volume= 0.455 af, Depth= 2.16"
 Routed to Pond 13P : Infiltration Basin #3

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=6.01"

Area (sf)	CN	Description
5,251	98	Paved parking HSG C
3,215	98	Roofs, HSG A
810	98	Roofs, HSG C
34,332	70	Woods, Good HSG C
24,079	30	Woods, Good HSG A
3,480	98	Paved parking HSG A
21,567	39	>75% Grass cover, Good HSG A
17,540	74	>75% Grass cover, Good HSG C
110,274		Weighted Average
97,518		88.43% Pervious Area
12,756		11.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
0.8	56	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	135	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	263	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	12	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.0	10	0.3000	3.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
16.3	526	Total			

Subcatchment 11P: P1e



Summary for Subcatchment 12P: P1f

Runoff = 0.47 cfs @ 12.12 hrs, Volume= 0.035 af, Depth= 5.77"
 Routed to Pond 13P : Infiltration Basin #3

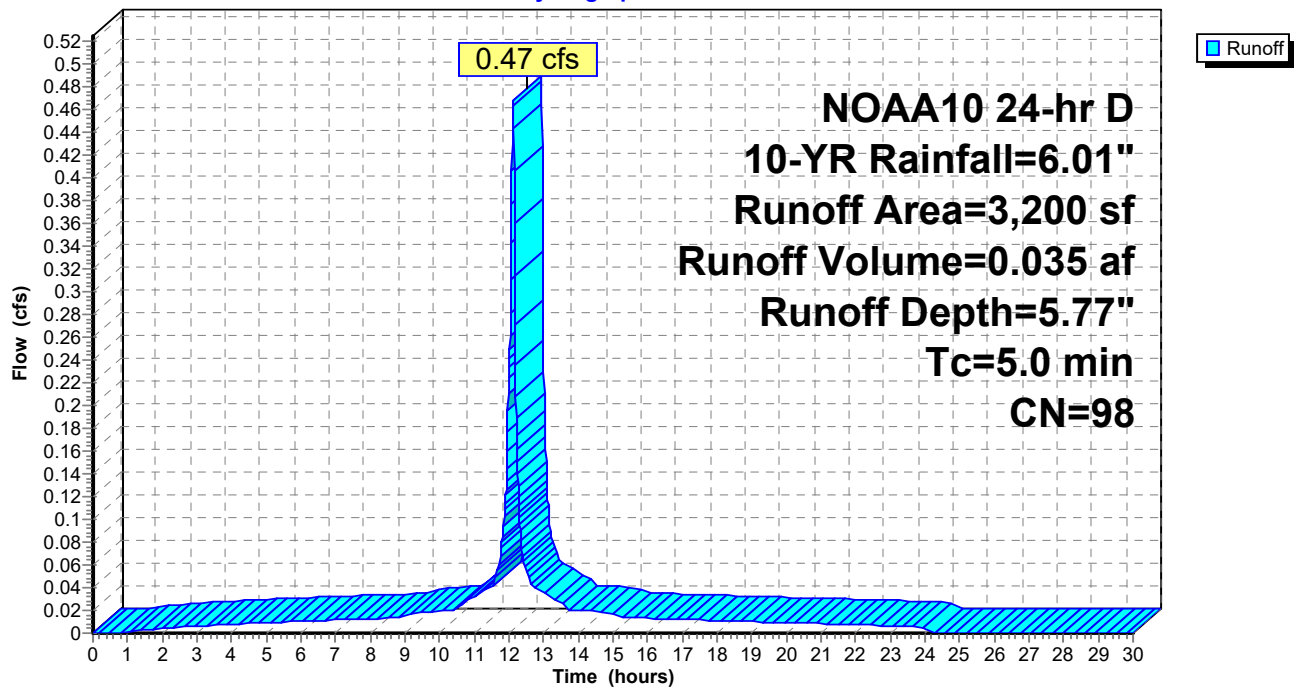
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 10-YR Rainfall=6.01"

Area (sf)	CN	Description
3,200	98	Roofs HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 12P: P1f

Hydrograph



Summary for Pond 13P: Infiltration Basin #3

Inflow Area = 2.605 ac, 14.06% Impervious, Inflow Depth = 2.26" for 10-YR event
 Inflow = 4.32 cfs @ 12.24 hrs, Volume= 0.490 af
 Outflow = 4.17 cfs @ 12.28 hrs, Volume= 0.490 af, Atten= 3%, Lag= 2.2 min
 Discarded = 0.16 cfs @ 12.28 hrs, Volume= 0.214 af
 Primary = 4.01 cfs @ 12.28 hrs, Volume= 0.276 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.69' @ 12.28 hrs Surf.Area= 2,829 sf Storage= 1,569 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 36.8 min (877.0 - 840.2)

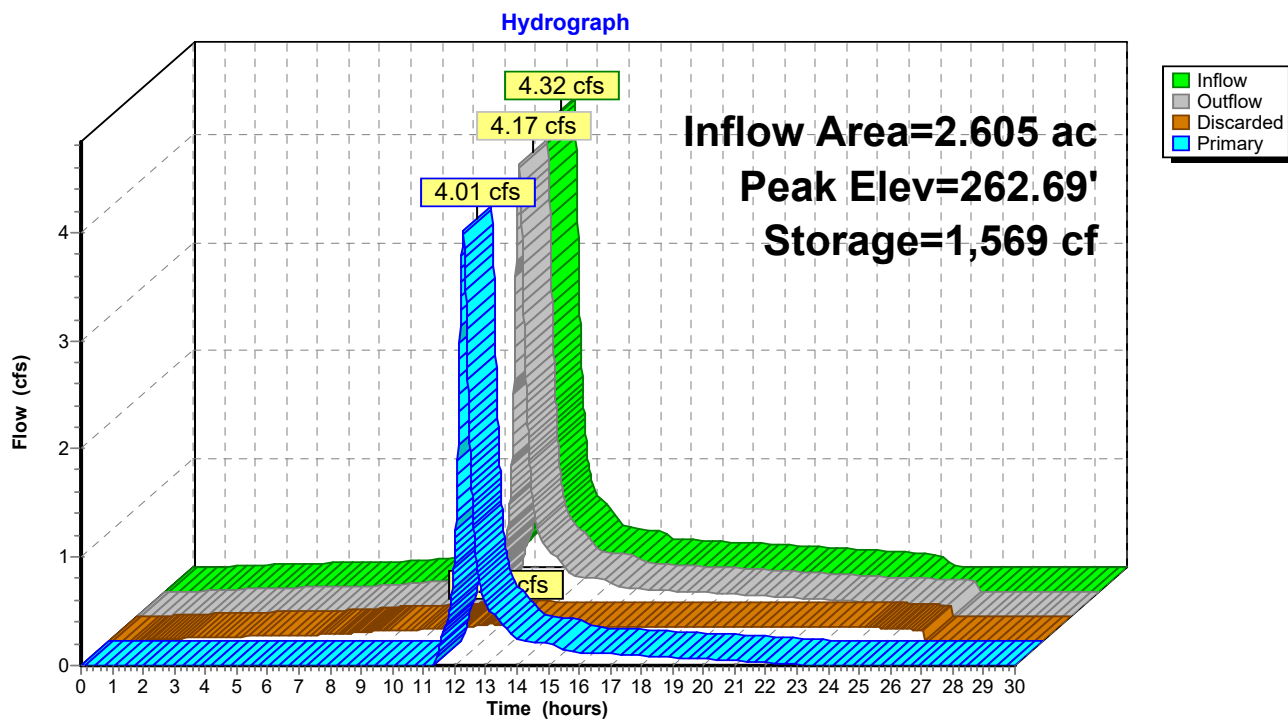
Volume	Invert	Avail.Storage	Storage Description		
#1	262.00'	4,479 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
262.00	1,784	213.0	0	0	1,784
263.50	4,379	317.0	4,479	4,479	6,188

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28)
			Elev. (feet) 262.40 263.50
			Width (feet) 8.00 8.00

Discarded OutFlow Max=0.16 cfs @ 12.28 hrs HW=262.69' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=4.01 cfs @ 12.28 hrs HW=262.69' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Custom Weir/Orifice** (Weir Controls 4.01 cfs @ 1.75 fps)

Pond 13P: Infiltration Basin #3



Summary for Subcatchment 14P: P1g

Runoff = 0.53 cfs @ 12.18 hrs, Volume= 0.047 af, Depth= 1.99"

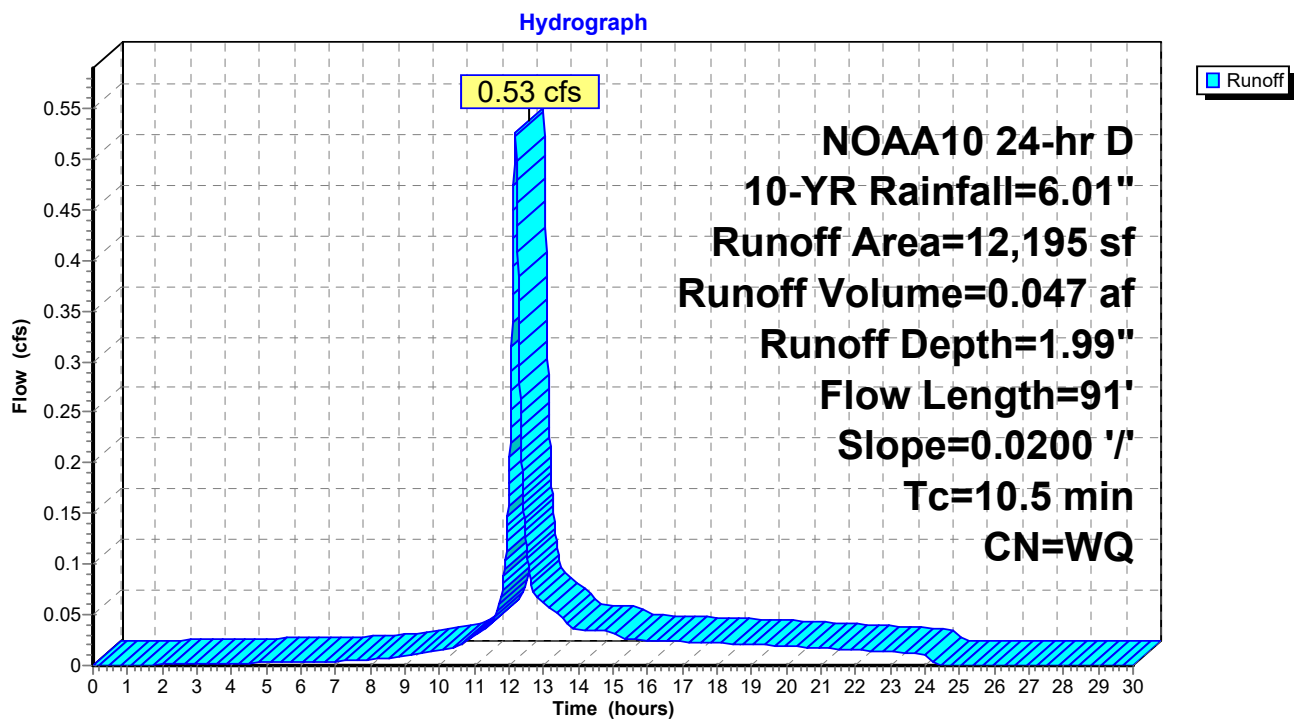
Routed to Pond 15P : Existing pipe

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=6.01"

Area (sf)	CN	Description
764	98	Roofs, HSG A
558	89	Gravel roads HSG C
3,895	70	Woods, Good HSG C
3,122	30	Woods, Good HSG A
989	76	Gravel roads HSG A
2,345	39	>75% Grass cover, Good HSG A
522	74	>75% Grass cover, Good HSG C
12,195		Weighted Average
11,431		93.74% Pervious Area
764		6.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	39	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
1.2	52	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.5	91	Total			

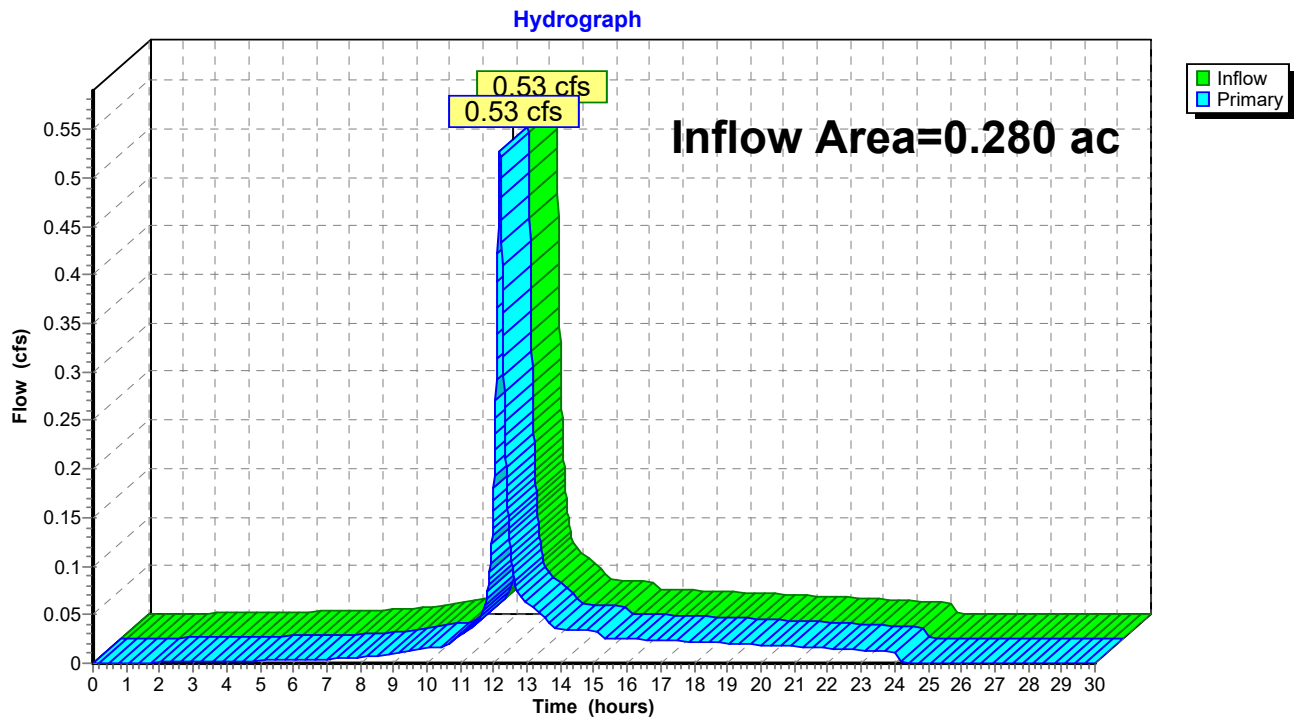
Subcatchment 14P: P1g



Summary for Pond 15P: Existing pipe

Inflow Area = 0.280 ac, 6.26% Impervious, Inflow Depth = 1.99" for 10-YR event
Inflow = 0.53 cfs @ 12.18 hrs, Volume= 0.047 af
Primary = 0.53 cfs @ 12.18 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 17P : Driveway Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 15P: Existing pipe

Summary for Subcatchment 16P: P1h

Runoff = 0.06 cfs @ 12.22 hrs, Volume= 0.015 af, Depth= 0.22"
 Routed to Pond 17P : Driveway Pipe

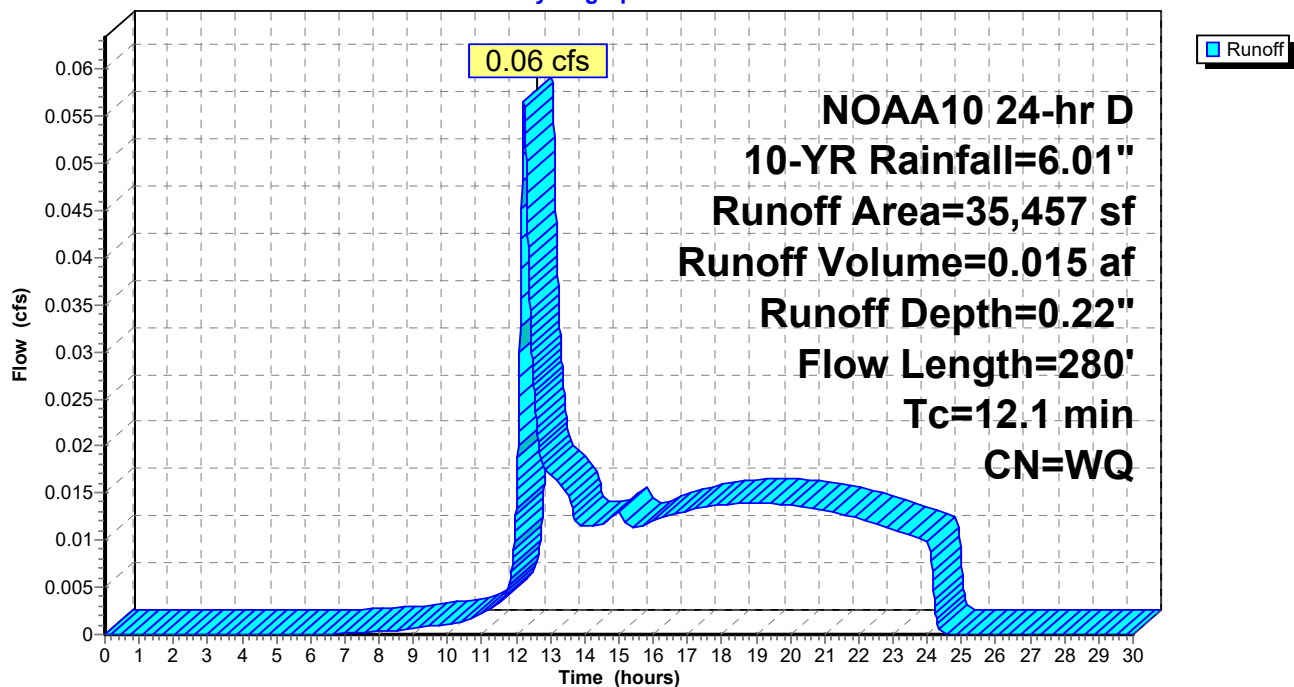
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 10-YR Rainfall=6.01"

Area (sf)	CN	Description
26,257	30	Woods, Good HSG A
8,598	39	>75% Grass cover, Good HSG A
602	74	>75% Grass cover, Good HSG C
35,457		Weighted Average
35,457		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
4.2	220	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	10	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
12.1	280	Total			

Subcatchment 16P: P1h

Hydrograph



Summary for Pond 17P: Driveway Pipe

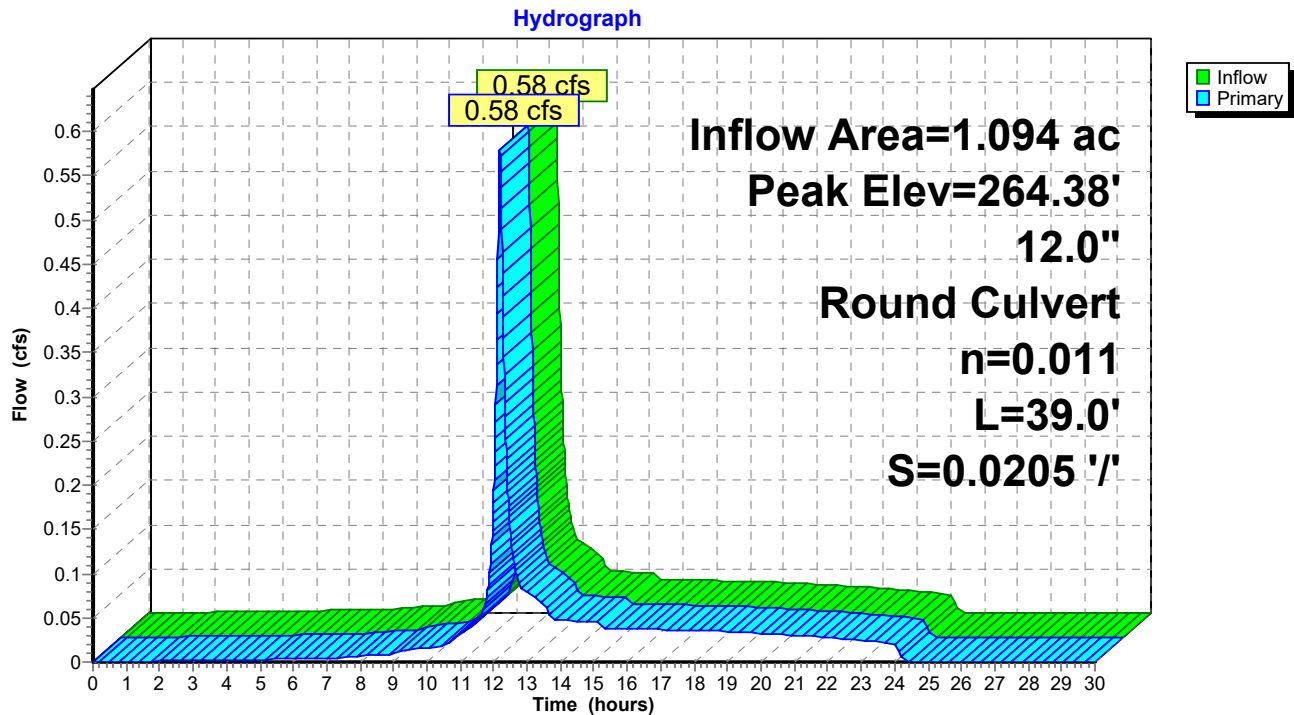
Inflow Area = 1.094 ac, 1.60% Impervious, Inflow Depth = 0.67" for 10-YR event
 Inflow = 0.58 cfs @ 12.18 hrs, Volume= 0.061 af
 Outflow = 0.58 cfs @ 12.18 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.58 cfs @ 12.18 hrs, Volume= 0.061 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 264.38' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.00'	12.0" Round Culvert L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 264.00' / 263.20' S= 0.0205 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 12.18 hrs HW=264.38' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.58 cfs @ 2.10 fps)

Pond 17P: Driveway Pipe



Summary for Subcatchment 18P: P1i

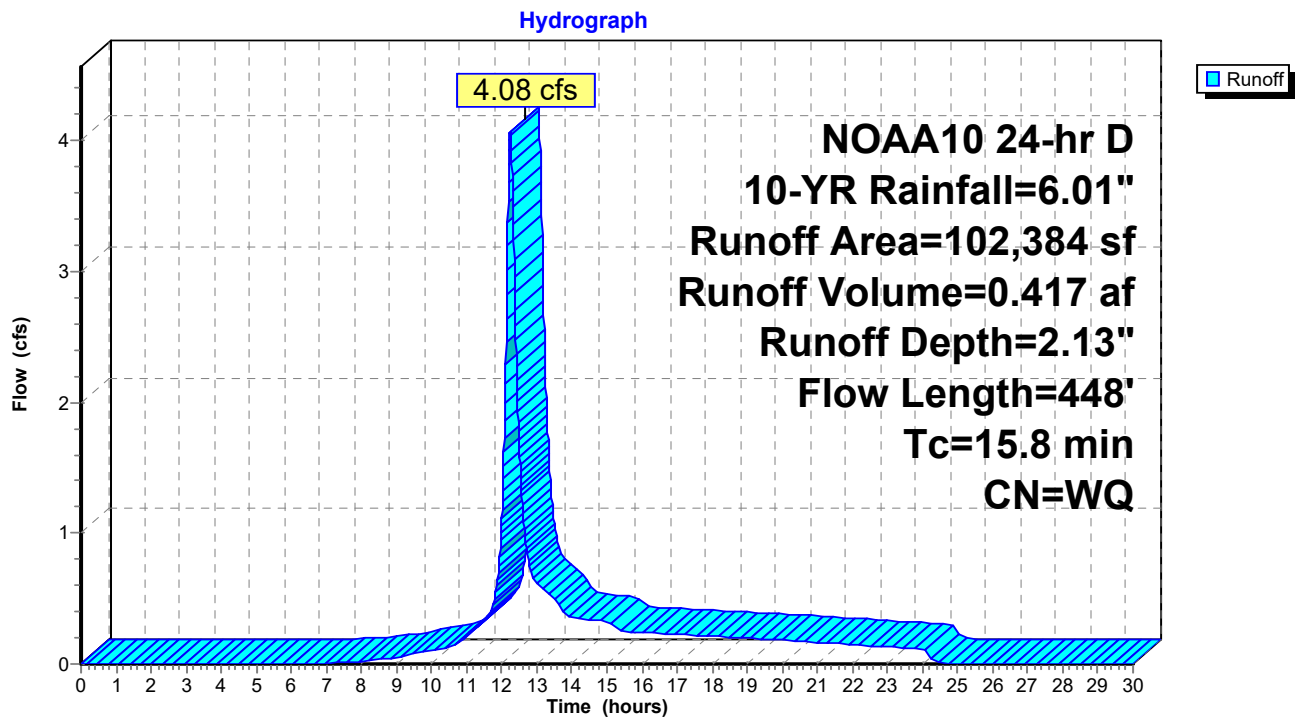
Runoff = 4.08 cfs @ 12.24 hrs, Volume= 0.417 af, Depth= 2.13"

Routed to Link 21P : Design Point #1: Flow to Wetlands

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=6.01"

Area (sf)	CN	Description
45,368	70	Woods, Good HSG C
13,717	30	Woods, Good HSG A
17,824	39	>75% Grass cover, Good HSG A
25,475	74	>75% Grass cover, Good HSG C
102,384		Weighted Average
102,384		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
5.5	285	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	113	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	448	Total			

Subcatchment 18P: P1i

Summary for Subcatchment 19P: P1j

Runoff = 0.23 cfs @ 12.12 hrs, Volume= 0.018 af, Depth= 5.77"
 Routed to Pond 20P : Infiltration Field #1

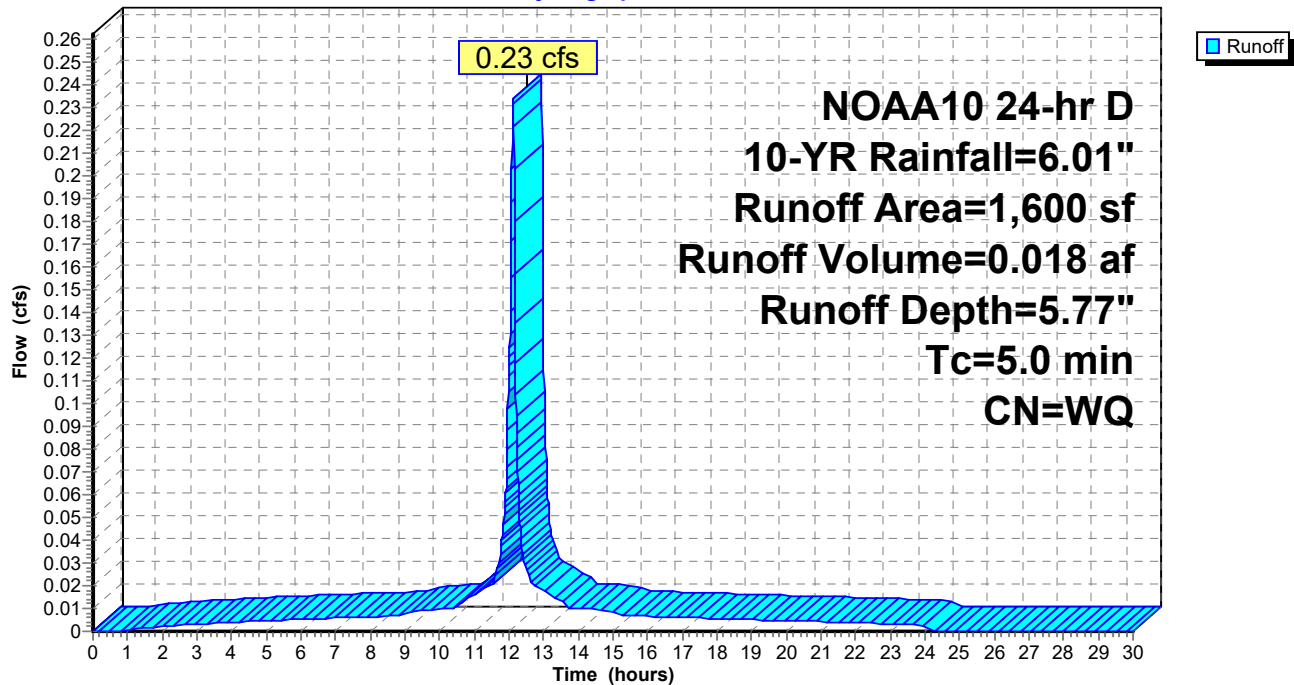
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 10-YR Rainfall=6.01"

Area (sf)	CN	Description
543	98	Roofs, HSG C
1,057	98	Roofs, HSG A
1,600		Weighted Average
1,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 19P: P1j

Hydrograph



Summary for Pond 20P: Infiltration Field #1

Inflow Area = 0.037 ac, 100.00% Impervious, Inflow Depth = 5.77" for 10-YR event
 Inflow = 0.23 cfs @ 12.12 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.35 hrs, Volume= 0.018 af, Atten= 81%, Lag= 14.0 min
 Discarded = 0.01 cfs @ 12.32 hrs, Volume= 0.017 af
 Primary = 0.03 cfs @ 12.35 hrs, Volume= 0.001 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.37' @ 12.35 hrs Surf.Area= 205 sf Storage= 219 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 131.5 min (877.8 - 746.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	260.30'	132 cf	11.67'W x 17.50'L x 2.04'H Field A 417 cf Overall - 87 cf Embedded = 330 cf x 40.0% Voids
#2A	260.80'	87 cf	Cultec C-100HD x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	262.30'	1 cf	1.00'D x 1.00'H Vertical Cone/Cylinder
		219 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.30'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.30'	4.0" Round Culvert X 3.00 L= 1.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 262.30' / 262.20' S= 0.1000 ' / ' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 12.32 hrs HW=262.31' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 12.35 hrs HW=262.36' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Culvert** (Inlet Controls 0.03 cfs @ 0.86 fps)

Pond 20P: Infiltration Field #1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

2 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 15.50' Row Length +12.0" End Stone x 2 = 17.50' Base Length

3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 12.0" Side Stone x 2 = 11.67' Base Width

6.0" Stone Base + 12.5" Chamber Height + 6.0" Stone Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 86.6 cf Chamber Storage

416.8 cf Field - 86.6 cf Chambers = 330.3 cf Stone x 40.0% Voids = 132.1 cf Stone Storage

Chamber Storage + Stone Storage = 218.7 cf = 0.005 af

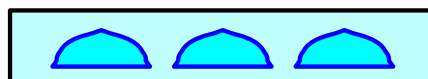
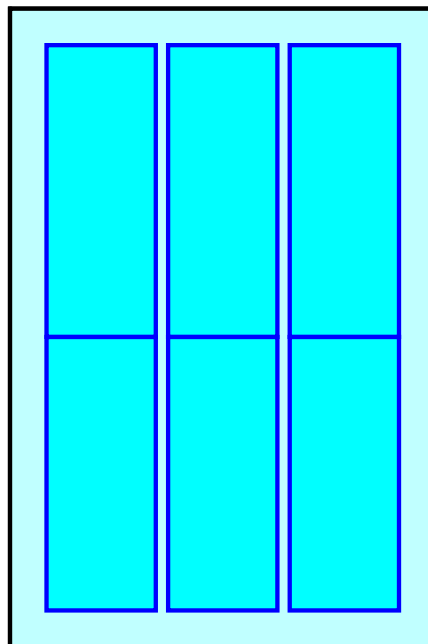
Overall Storage Efficiency = 52.5%

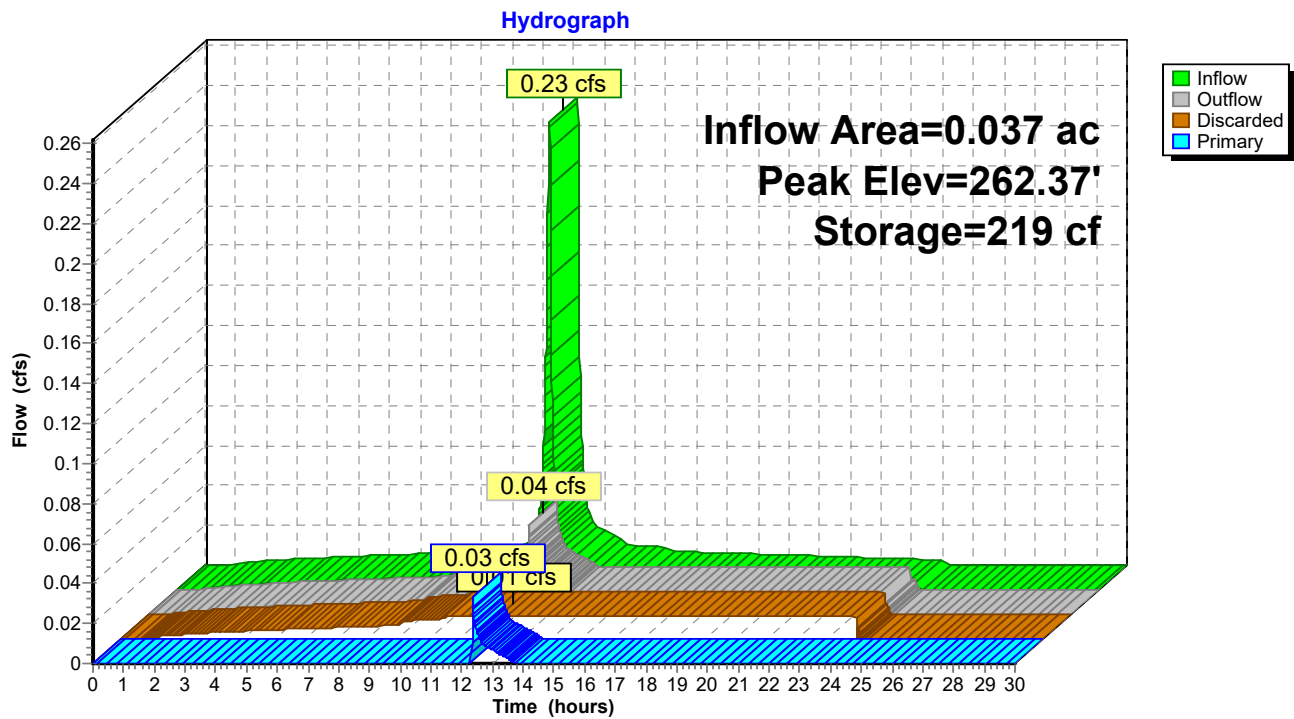
Overall System Size = 17.50' x 11.67' x 2.04'

6 Chambers

15.4 cy Field

12.2 cy Stone

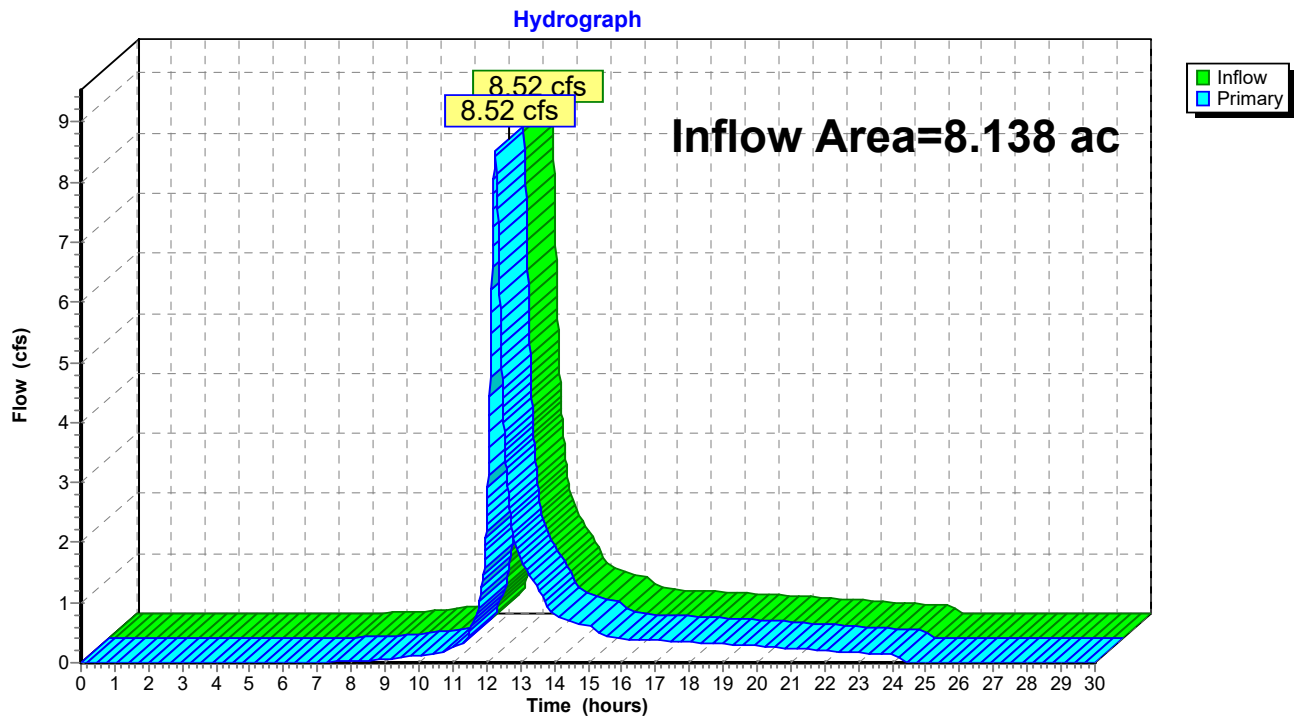


Pond 20P: Infiltration Field #1

Summary for Link 21P: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 11.15% Impervious, Inflow Depth = 1.19" for 10-YR event
Inflow = 8.52 cfs @ 12.26 hrs, Volume= 0.809 af
Primary = 8.52 cfs @ 12.26 hrs, Volume= 0.809 af, Atten= 0%, Lag= 0.0 min

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

Link 21P: Design Point #1: Flow to Wetlands

HydroCAD

Prepared by Legacy Engineering LLC

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NOAA10 24-hr D 25-YR Rainfall=7.76"

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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

Subcatchment1P: P1a

Runoff Area=32,129 sf 21.86% Impervious Runoff Depth=4.92"
Flow Length=308' Tc=14.2 min CN=WQ Runoff=2.99 cfs 0.302 af

Pond 2P: CB 2+85 L&R

Peak Elev=275.28' Inflow=2.99 cfs 0.302 af
12.0" Round Culvert x 2.00 n=0.011 L=8.0' S=0.0187 '/' Outflow=2.99 cfs 0.302 af

Pond 3P: DMH 2+93

Peak Elev=275.13' Inflow=2.99 cfs 0.302 af
12.0" Round Culvert n=0.011 L=106.0' S=0.0108 '/' Outflow=2.99 cfs 0.302 af

Subcatchment4P: P1b

Runoff Area=12,532 sf 32.92% Impervious Runoff Depth=3.13"
Flow Length=181' Tc=6.6 min CN=WQ Runoff=0.88 cfs 0.075 af

Pond 5P: CB 4+04 L&R

Peak Elev=273.97' Inflow=0.88 cfs 0.075 af
12.0" Round Culvert x 2.00 n=0.011 L=5.0' S=0.0060 '/' Outflow=0.88 cfs 0.075 af

Pond 6P: DMH 4+05

Peak Elev=273.97' Inflow=3.53 cfs 0.377 af
15.0" Round Culvert n=0.011 L=47.0' S=0.0055 '/' Outflow=3.53 cfs 0.377 af

Subcatchment7P: P1c

Runoff Area=25,973 sf 3.46% Impervious Runoff Depth=1.07"
Flow Length=168' Tc=11.9 min CN=WQ Runoff=0.38 cfs 0.053 af

Pond 8P: Infiltration Basin #1

Peak Elev=273.73' Storage=4,111 cf Inflow=3.91 cfs 0.431 af
Discarded=0.21 cfs 0.285 af Primary=1.48 cfs 0.146 af Outflow=1.70 cfs 0.431 af

Subcatchment9P: P1d

Runoff Area=18,728 sf 48.96% Impervious Runoff Depth=4.22"
Flow Length=95' Tc=5.3 min CN=WQ Runoff=1.91 cfs 0.151 af

Pond 10P: Infiltration Basin #2

Peak Elev=268.18' Storage=2,288 cf Inflow=2.05 cfs 0.297 af
Discarded=0.13 cfs 0.143 af Primary=1.35 cfs 0.154 af Outflow=1.48 cfs 0.297 af

Subcatchment11P: P1e

Runoff Area=110,274 sf 11.57% Impervious Runoff Depth=3.23"
Flow Length=526' Tc=16.3 min CN=WQ Runoff=6.22 cfs 0.682 af

Subcatchment12P: P1f

Runoff Area=3,200 sf 100.00% Impervious Runoff Depth=7.52"
Tc=5.0 min CN=98 Runoff=0.61 cfs 0.046 af

Pond 13P: Infiltration Basin #3

Peak Elev=262.78' Storage=1,832 cf Inflow=6.42 cfs 0.728 af
Discarded=0.17 cfs 0.233 af Primary=6.06 cfs 0.495 af Outflow=6.22 cfs 0.728 af

Subcatchment14P: P1g

Runoff Area=12,195 sf 6.26% Impervious Runoff Depth=3.03"
Flow Length=91' Slope=0.0200 '/' Tc=10.5 min CN=WQ Runoff=0.79 cfs 0.071 af

Pond 15P: Existing pipe

Inflow=0.79 cfs 0.071 af
Primary=0.79 cfs 0.071 af

Subcatchment16P: P1h

Runoff Area=35,457 sf 0.00% Impervious Runoff Depth=0.60"
Flow Length=280' Tc=12.1 min CN=WQ Runoff=0.19 cfs 0.041 af

HydroCAD

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NOAA10 24-hr D 25-YR Rainfall=7.76"

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Pond 17P: Driveway Pipe

Peak Elev=264.51' Inflow=0.97 cfs 0.112 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0205 '/' Outflow=0.97 cfs 0.112 af

Subcatchment 18P: P1i

Runoff Area=102,384 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=448' Tc=15.8 min CN=WQ Runoff=6.30 cfs 0.645 af

Subcatchment 19P: P1j

Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=7.52"
Tc=5.0 min CN=WQ Runoff=0.30 cfs 0.023 af

Pond 20P: Infiltration Field #1

Peak Elev=262.57' Storage=219 cf Inflow=0.30 cfs 0.023 af
Discarded=0.01 cfs 0.019 af Primary=0.41 cfs 0.004 af Outflow=0.42 cfs 0.023 af

Link 21P: Design Point #1: Flow to Wetlands

Inflow=13.76 cfs 1.409 af
Primary=13.76 cfs 1.409 af

Total Runoff Area = 8.138 ac Runoff Volume = 2.089 af Average Runoff Depth = 3.08"
88.85% Pervious = 7.230 ac 11.15% Impervious = 0.908 ac

Summary for Subcatchment 1P: P1a

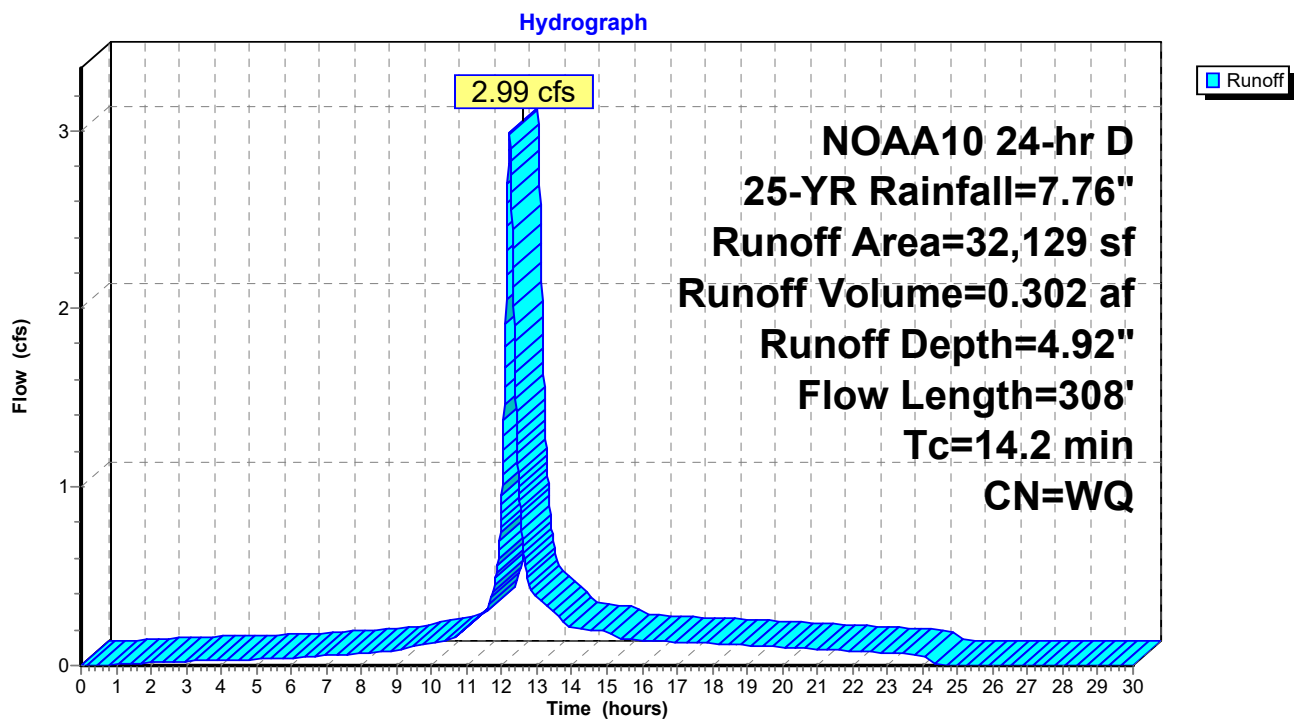
Runoff = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af, Depth= 4.92"
 Routed to Pond 2P : CB 2+85 L&R

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=7.76"

Area (sf)	CN	Description
3,629	98	Paved parking HSG C
9,045	70	Woods, Good HSG C
1,201	98	Roofs HSG C
305	98	Roofs HSG A
* 2,623	96	Gravel HSG C
1,890	98	Paved parking HSG A
4,307	39	>75% Grass cover, Good HSG A
9,129	74	>75% Grass cover, Good HSG C
32,129		Weighted Average
25,104		78.14% Pervious Area
7,025		21.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.2	144	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
14.2	308	Total			

Subcatchment 1P: P1a



Summary for Pond 2P: CB 2+85 L&R

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 4.92" for 25-YR event
 Inflow = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af
 Outflow = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af
 Routed to Pond 3P : DMH 2+93

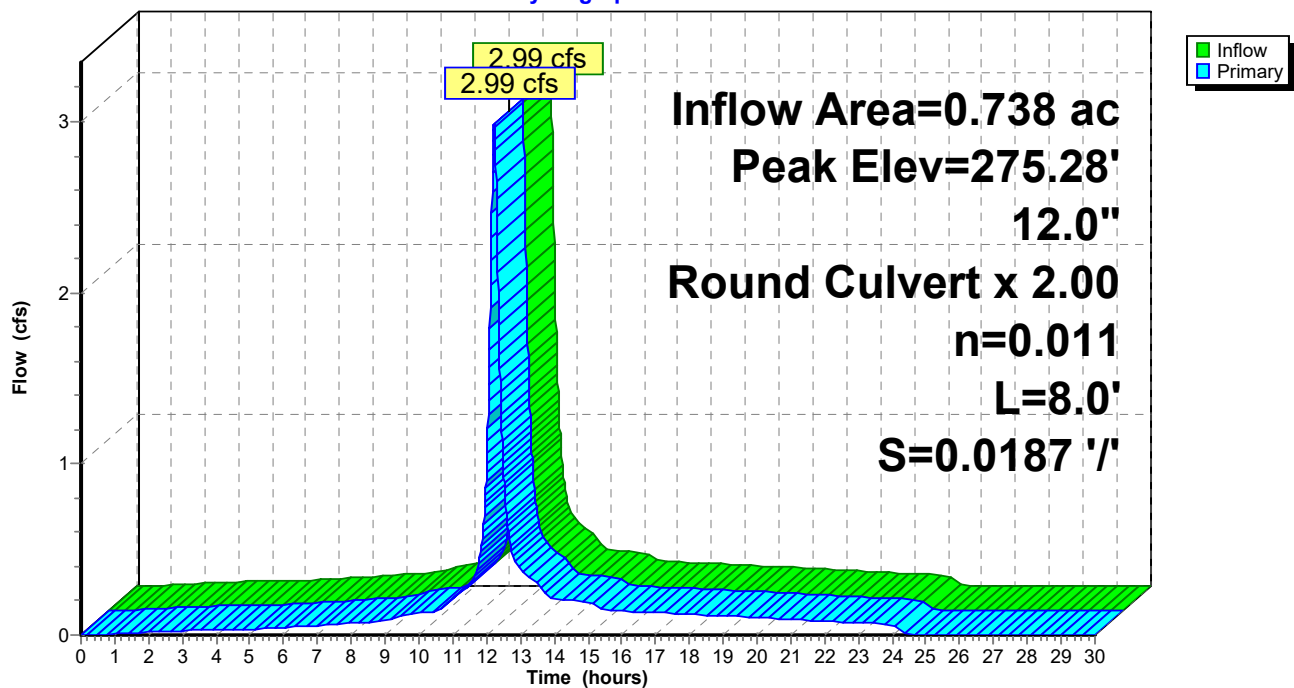
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 275.28' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.20'	12.0" Round Culvert X 2.00 L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.20' / 274.05' S= 0.0187 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.95 cfs @ 12.22 hrs HW=275.28' TW=275.12' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 2.95 cfs @ 1.88 fps)

Pond 2P: CB 2+85 L&R

Hydrograph



Summary for Pond 3P: DMH 2+93

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 4.92" for 25-YR event
 Inflow = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af
 Outflow = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.99 cfs @ 12.22 hrs, Volume= 0.302 af
 Routed to Pond 6P : DMH 4+05

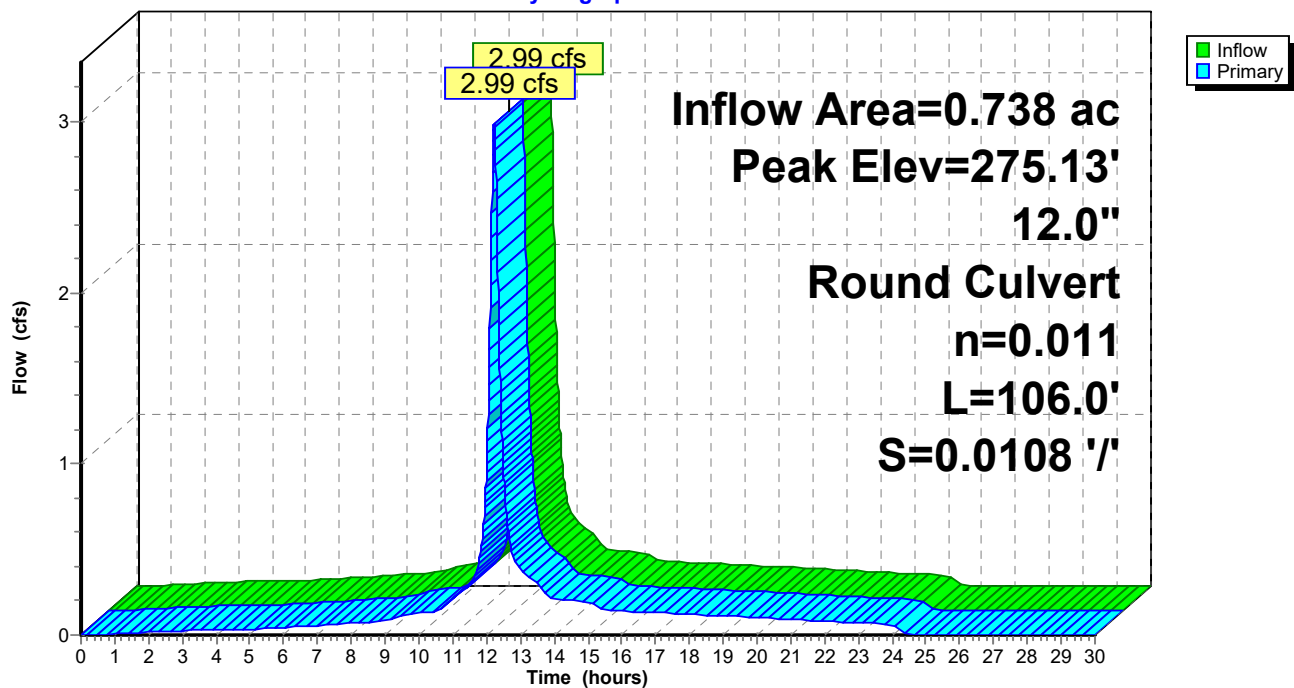
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 275.13' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	12.0" Round Culvert L= 106.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.86' S= 0.0108 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.99 cfs @ 12.22 hrs HW=275.12' TW=273.95' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 2.99 cfs @ 3.81 fps)

Pond 3P: DMH 2+93

Hydrograph



Summary for Subcatchment 4P: P1b

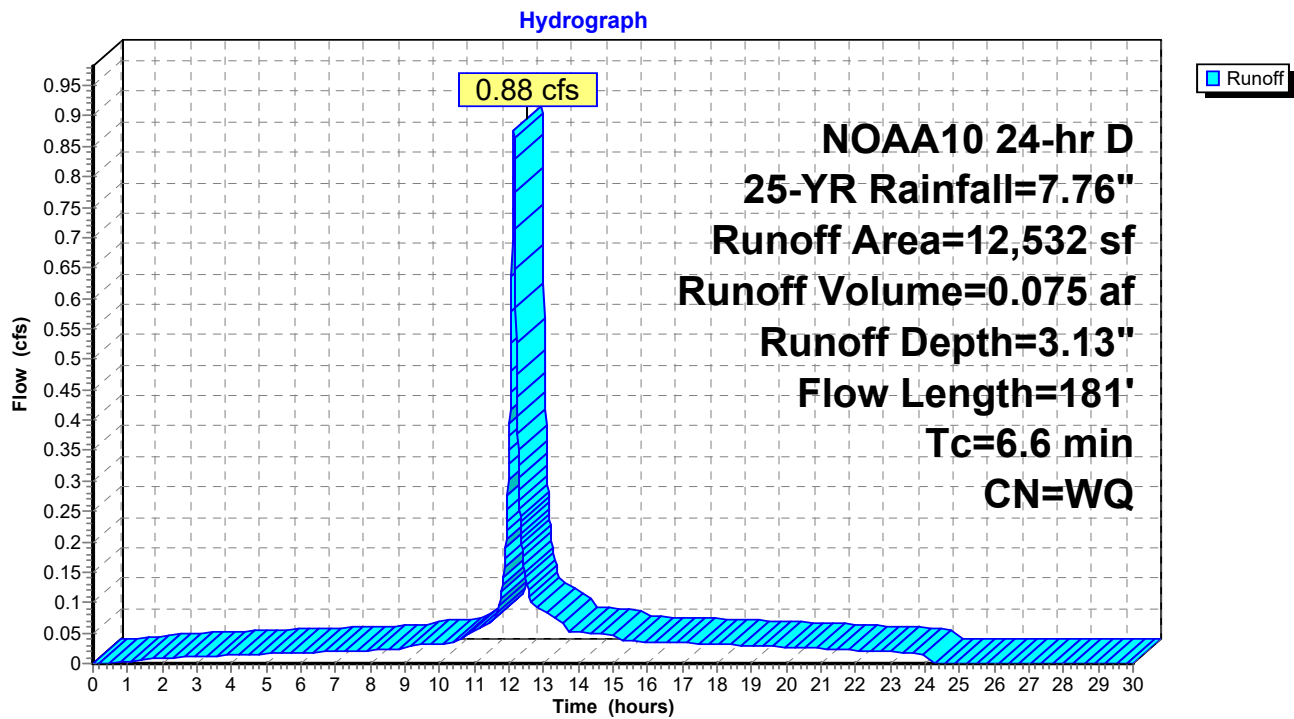
Runoff = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af, Depth= 3.13"
 Routed to Pond 5P : CB 4+04 L&R

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=7.76"

Area (sf)	CN	Description
360	98	Roofs HSG C
996	30	Woods, Good HSG A
305	98	Roofs HSG A
3,460	98	Paved parking HSG A
7,411	39	>75% Grass cover, Good HSG A
12,532		Weighted Average
8,407		67.08% Pervious Area
4,125		32.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0400	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.2	26	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	105	0.0150	2.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.6	181	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: CB 4+04 L&R

Inflow Area = 0.288 ac, 32.92% Impervious, Inflow Depth = 3.13" for 25-YR event
 Inflow = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af
 Outflow = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af
 Routed to Pond 6P : DMH 4+05

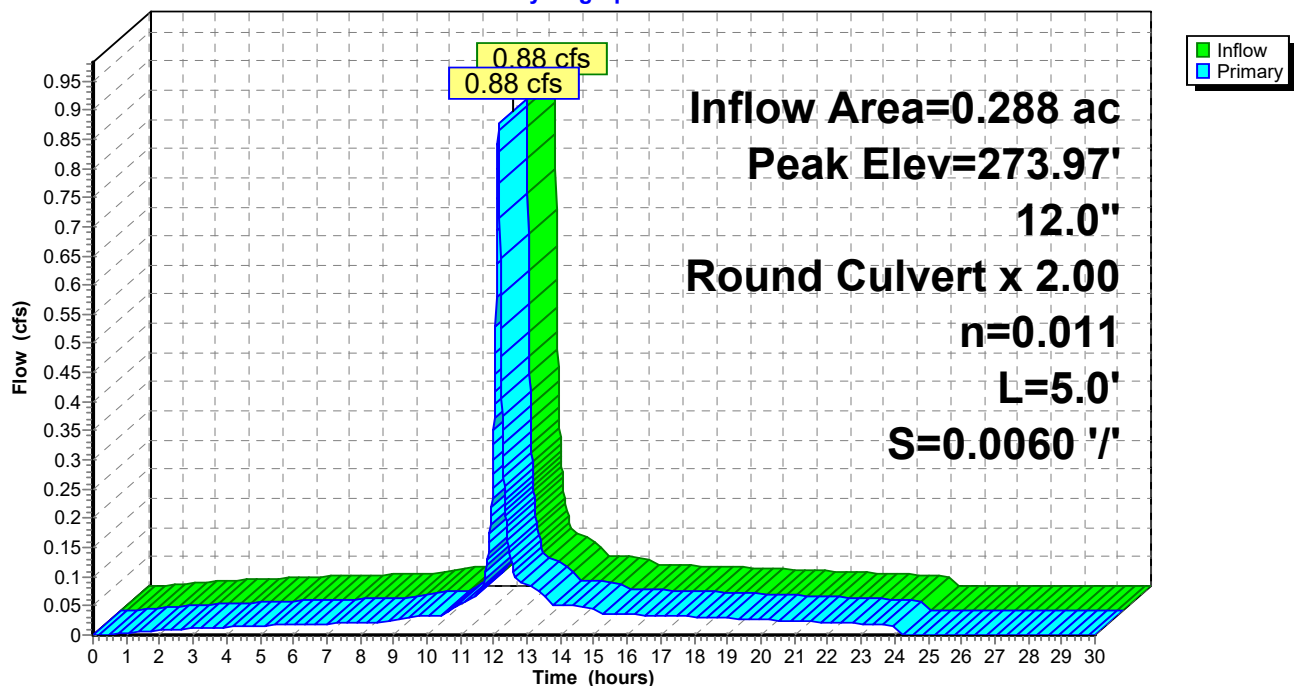
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.97' @ 12.27 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.89'	12.0" Round Culvert X 2.00 L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.89' / 272.86' S= 0.0060 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=273.84' TW=273.86' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond 5P: CB 4+04 L&R

Hydrograph



Summary for Pond 6P: DMH 4+05

Inflow Area = 1.025 ac, 24.97% Impervious, Inflow Depth = 4.42" for 25-YR event
 Inflow = 3.53 cfs @ 12.19 hrs, Volume= 0.377 af
 Outflow = 3.53 cfs @ 12.19 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.53 cfs @ 12.19 hrs, Volume= 0.377 af
 Routed to Pond 8P : Infiltration Basin #1

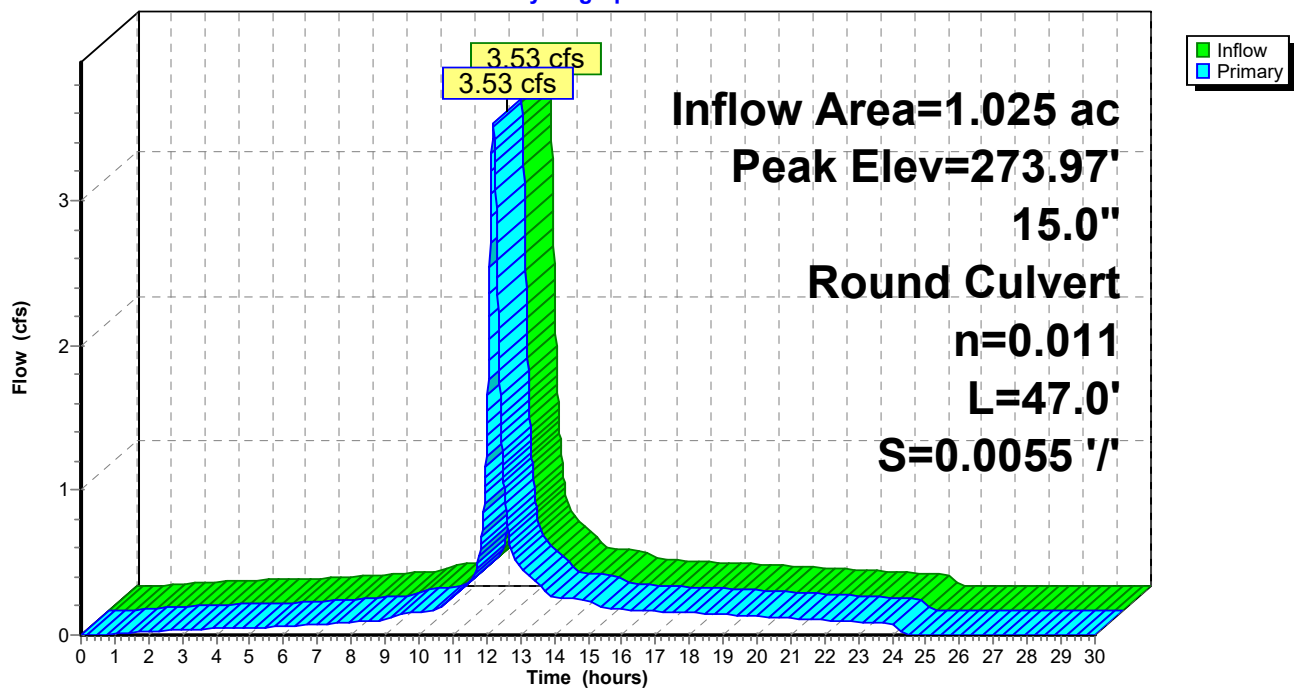
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.97' @ 12.26 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.81'	15.0" Round Culvert L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.81' / 272.55' S= 0.0055 '/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=3.49 cfs @ 12.19 hrs HW=273.93' TW=273.40' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 3.49 cfs @ 3.98 fps)

Pond 6P: DMH 4+05

Hydrograph



Summary for Subcatchment 7P: P1c

Runoff = 0.38 cfs @ 12.21 hrs, Volume= 0.053 af, Depth= 1.07"
 Routed to Pond 8P : Infiltration Basin #1

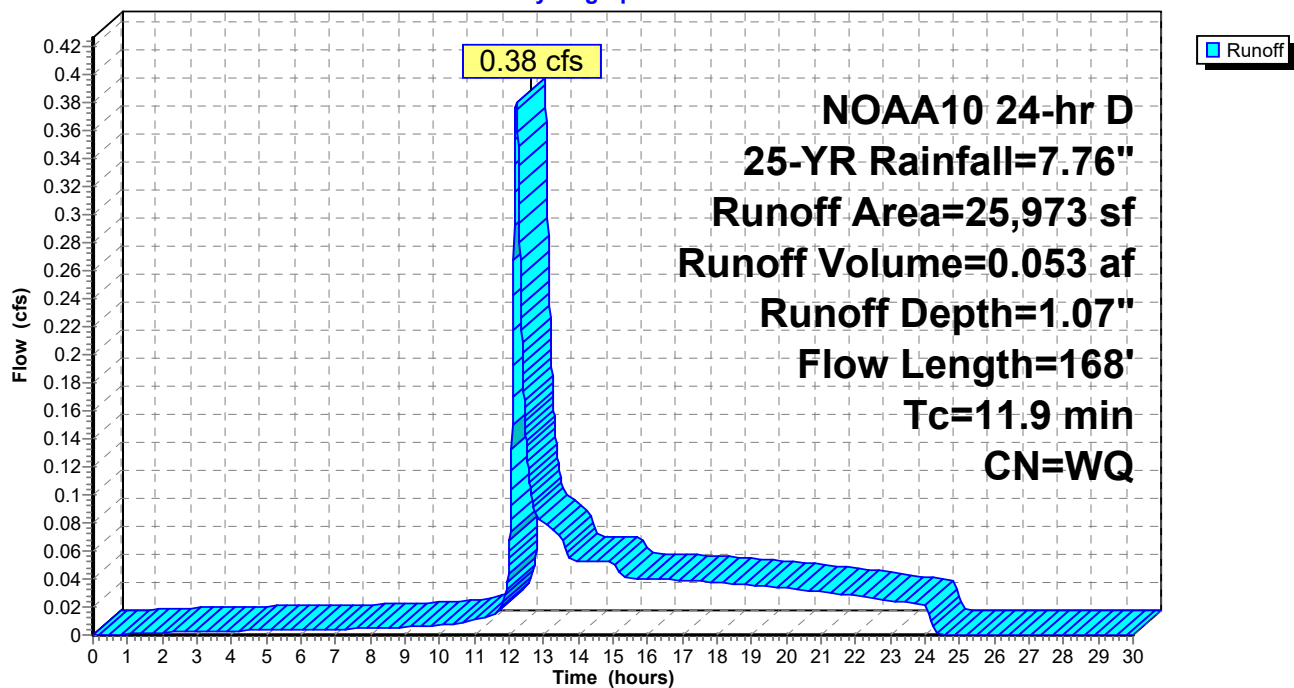
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 25-YR Rainfall=7.76"

Area (sf)	CN	Description
898	98	Roofs, HSG A
7,786	30	Woods, Good HSG A
17,289	39	>75% Grass cover, Good HSG A
25,973		Weighted Average
25,075		96.54% Pervious Area
898		3.46% Impervious 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= 3.82"
2.5	104	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	30	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
11.9	168	Total			

Subcatchment 7P: P1c

Hydrograph



Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.622 ac, 17.06% Impervious, Inflow Depth = 3.19" for 25-YR event
 Inflow = 3.91 cfs @ 12.20 hrs, Volume= 0.431 af
 Outflow = 1.70 cfs @ 12.42 hrs, Volume= 0.431 af, Atten= 57%, Lag= 13.4 min
 Discarded = 0.21 cfs @ 12.42 hrs, Volume= 0.285 af
 Primary = 1.48 cfs @ 12.42 hrs, Volume= 0.146 af
 Routed to Pond 10P : Infiltration Basin #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 273.73' @ 12.42 hrs Surf.Area= 3,790 sf Storage= 4,111 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 78.0 min (901.9 - 823.9)

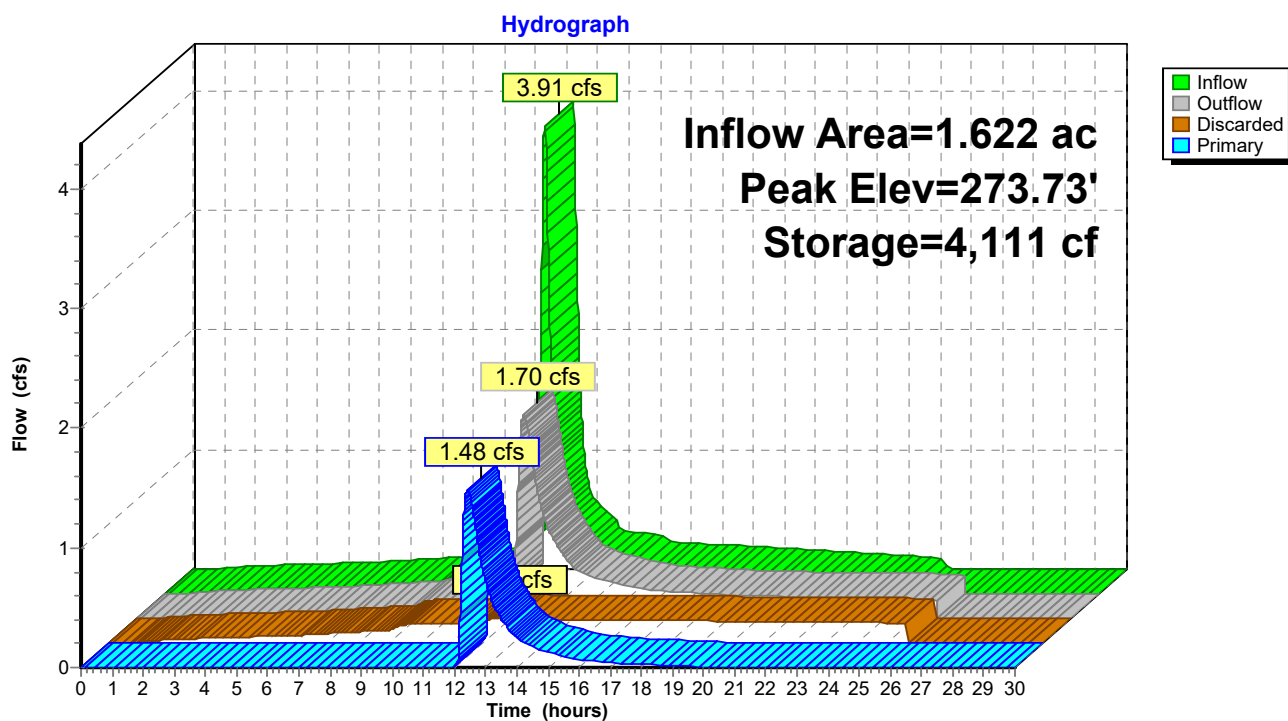
Volume	Invert	Avail.Storage	Storage Description		
#1	272.50'	12,087 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
272.50	2,893	205.0	0	0	2,893
275.50	5,284	279.0	12,087	12,087	5,834

Device	Routing	Invert	Outlet Devices
#1	Discarded	272.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	273.00'	10.0" Round Culvert L= 98.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 273.00' / 267.30' S= 0.0582 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf

Discarded OutFlow Max=0.21 cfs @ 12.42 hrs HW=273.73' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=1.48 cfs @ 12.42 hrs HW=273.73' TW=268.12' (Dynamic Tailwater)
 ↑**2=Culvert** (Inlet Controls 1.48 cfs @ 2.92 fps)

Pond 8P: Infiltration Basin #1



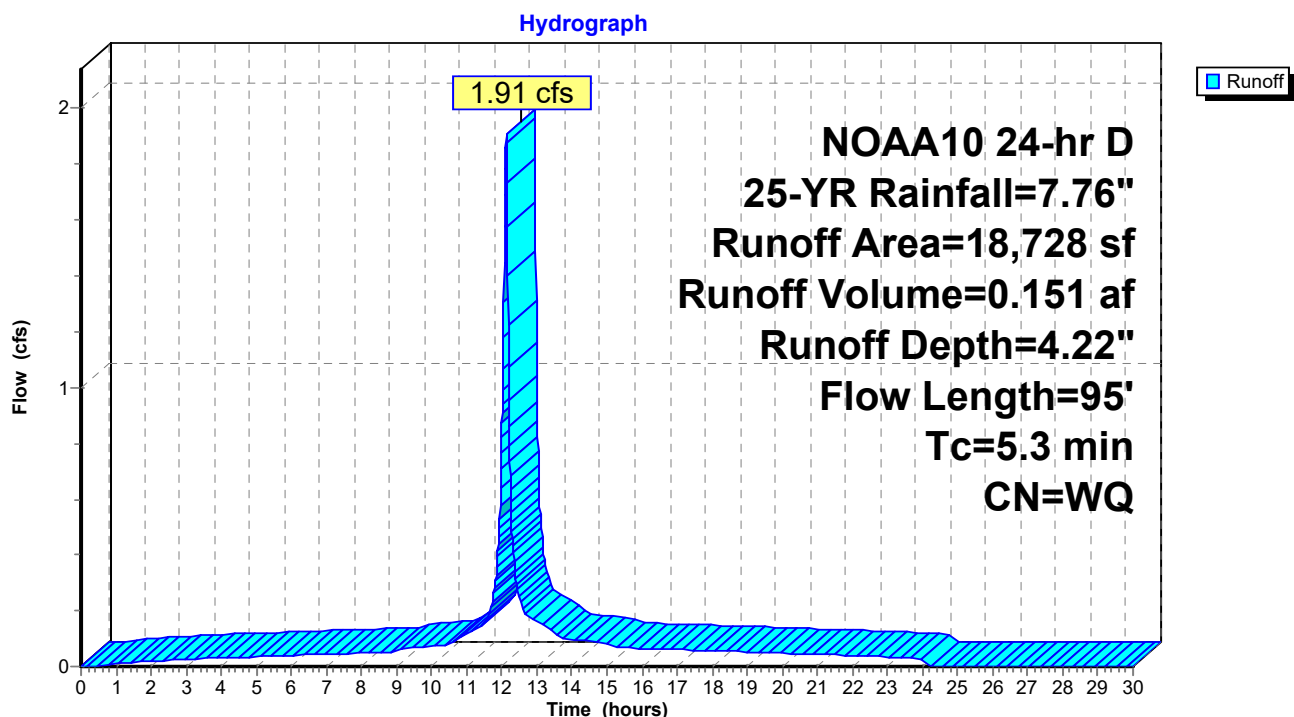
Summary for Subcatchment 9P: P1d

Runoff = 1.91 cfs @ 12.13 hrs, Volume= 0.151 af, Depth= 4.22"
 Routed to Pond 10P : 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=7.76"

Area (sf)	CN	Description
216	98	Roofs HSG C
1,384	98	Roofs HSG A
7,569	98	Paved parking HSG A
9,559	39	>75% Grass cover, Good HSG A
18,728		Weighted Average
9,559		51.04% Pervious Area
9,169		48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0600	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.4	24	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	21	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.3	95	Total			

Subcatchment 9P: P1d

Summary for Pond 10P: Infiltration Basin #2

Inflow Area = 2.051 ac, 23.74% Impervious, Inflow Depth = 1.74" for 25-YR event
 Inflow = 2.05 cfs @ 12.13 hrs, Volume= 0.297 af
 Outflow = 1.48 cfs @ 12.61 hrs, Volume= 0.297 af, Atten= 28%, Lag= 28.5 min
 Discarded = 0.13 cfs @ 12.61 hrs, Volume= 0.143 af
 Primary = 1.35 cfs @ 12.61 hrs, Volume= 0.154 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 268.18' @ 12.61 hrs Surf.Area= 2,346 sf Storage= 2,288 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 50.2 min (838.9 - 788.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	267.00'	8,013 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)
267.00	1,557	147.0	0	0	1,557
268.00	2,200	176.0	1,869	1,869	2,320
270.00	4,036	311.0	6,144	8,013	7,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	267.50'	10.0" Round Culvert L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 265.00' S= 0.0758 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf

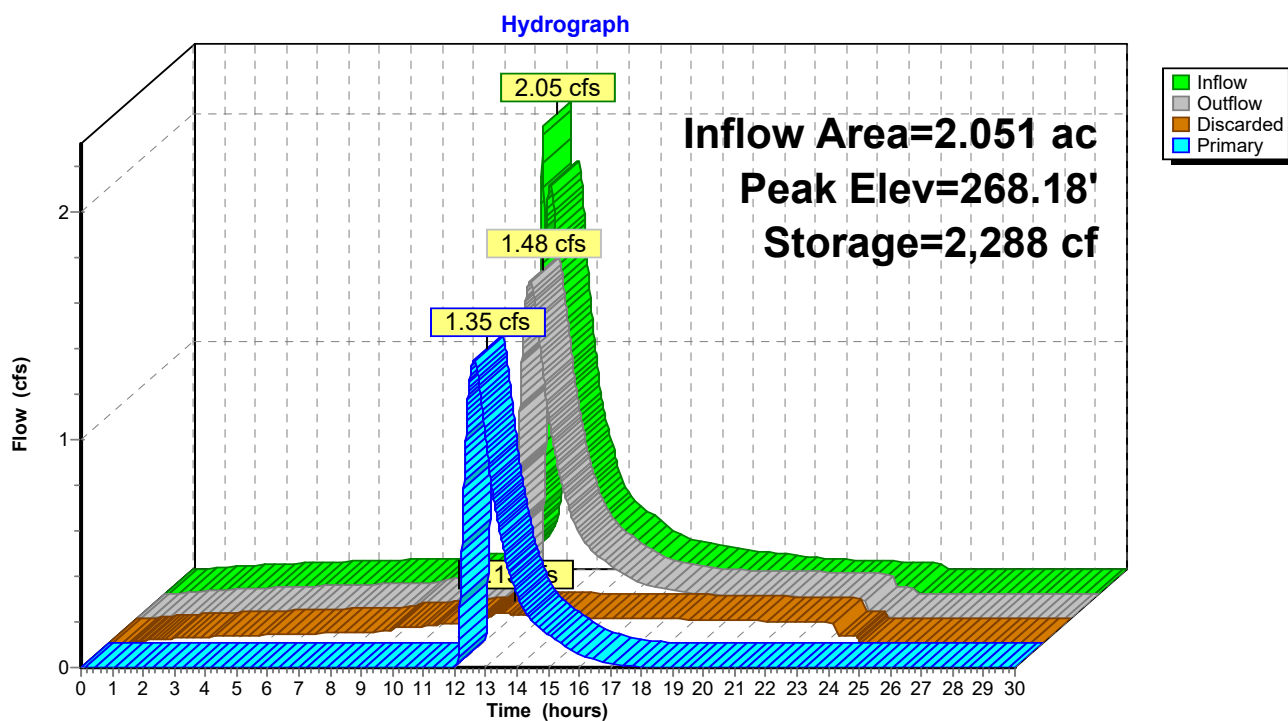
Discarded OutFlow Max=0.13 cfs @ 12.61 hrs HW=268.18' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=1.35 cfs @ 12.61 hrs HW=268.18' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 1.35 cfs @ 2.82 fps)

Pond 10P: Infiltration Basin #2



Summary for Subcatchment 11P: P1e

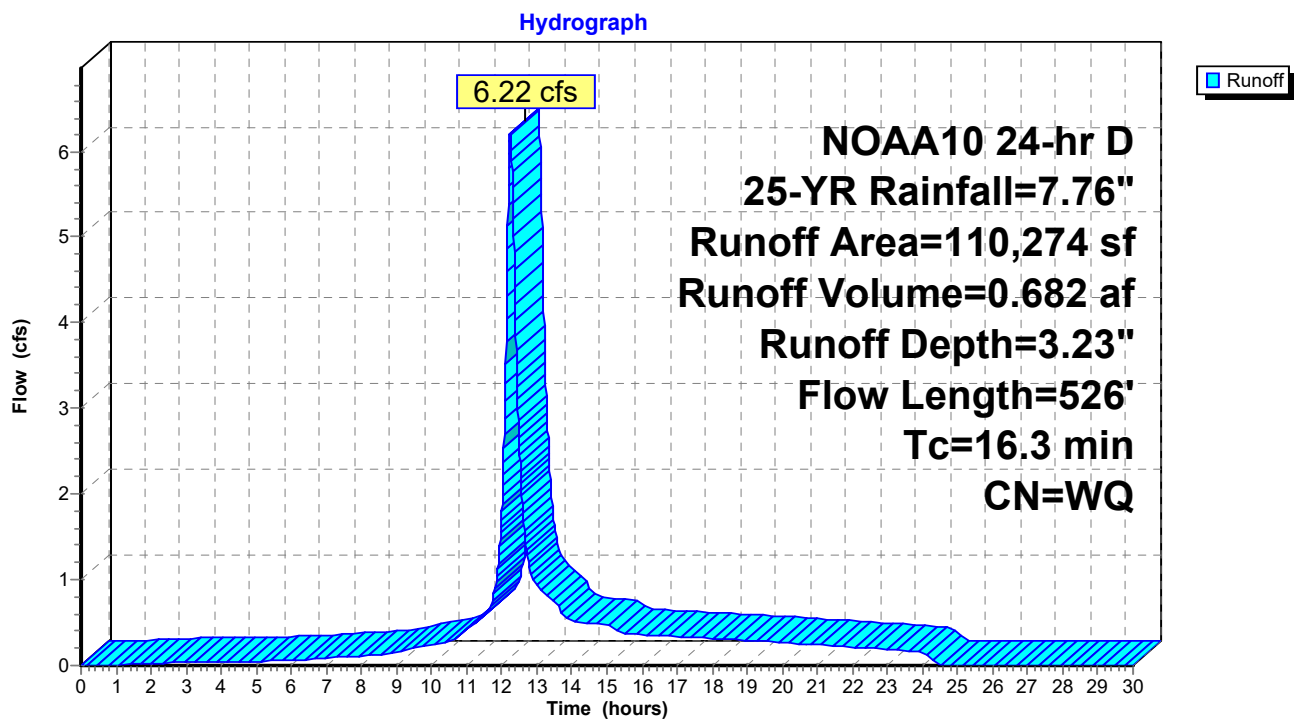
Runoff = 6.22 cfs @ 12.24 hrs, Volume= 0.682 af, Depth= 3.23"
 Routed to Pond 13P : Infiltration Basin #3

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=7.76"

Area (sf)	CN	Description
5,251	98	Paved parking HSG C
3,215	98	Roofs, HSG A
810	98	Roofs, HSG C
34,332	70	Woods, Good HSG C
24,079	30	Woods, Good HSG A
3,480	98	Paved parking HSG A
21,567	39	>75% Grass cover, Good HSG A
17,540	74	>75% Grass cover, Good HSG C
110,274		Weighted Average
97,518		88.43% Pervious Area
12,756		11.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
0.8	56	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	135	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	263	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	12	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.0	10	0.3000	3.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
16.3	526	Total			

Subcatchment 11P: P1e



Summary for Subcatchment 12P: P1f

Runoff = 0.61 cfs @ 12.12 hrs, Volume= 0.046 af, Depth= 7.52"
 Routed to Pond 13P : Infiltration Basin #3

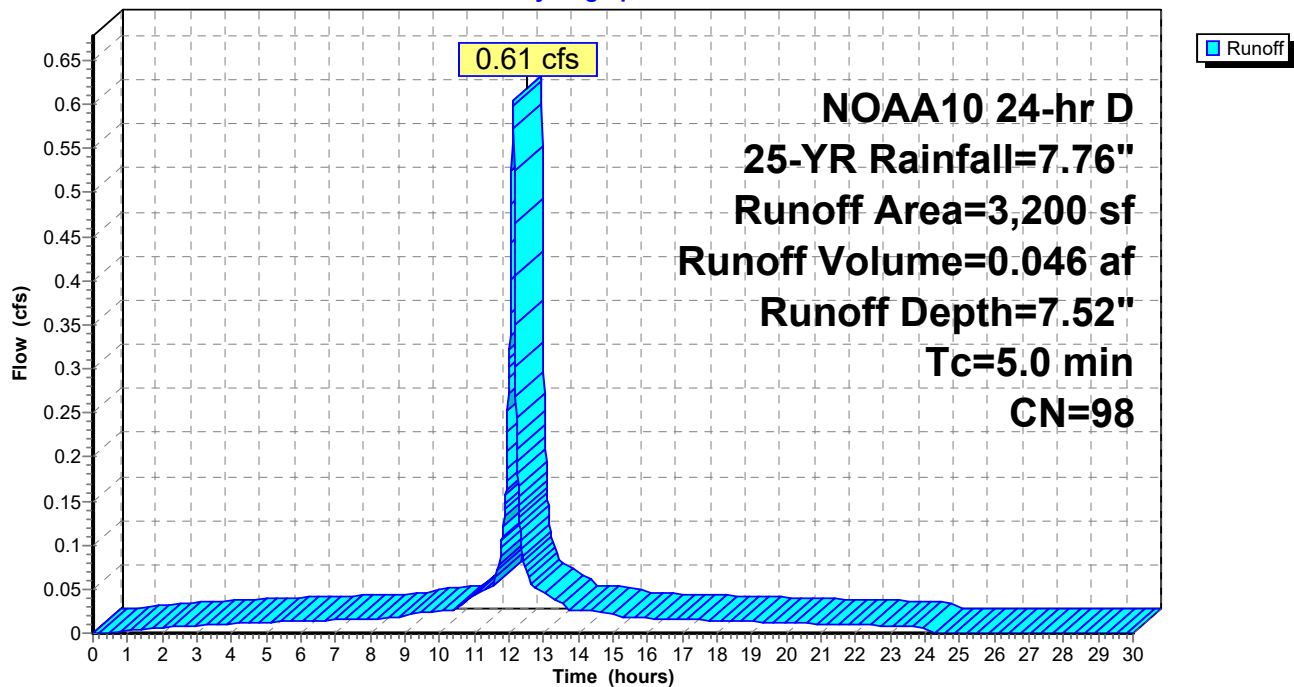
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 25-YR Rainfall=7.76"

Area (sf)	CN	Description
3,200	98	Roofs HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 12P: P1f

Hydrograph



Summary for Pond 13P: Infiltration Basin #3

Inflow Area = 2.605 ac, 14.06% Impervious, Inflow Depth = 3.35" for 25-YR event
 Inflow = 6.42 cfs @ 12.24 hrs, Volume= 0.728 af
 Outflow = 6.22 cfs @ 12.27 hrs, Volume= 0.728 af, Atten= 3%, Lag= 2.1 min
 Discarded = 0.17 cfs @ 12.27 hrs, Volume= 0.233 af
 Primary = 6.06 cfs @ 12.27 hrs, Volume= 0.495 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.78' @ 12.27 hrs Surf.Area= 2,985 sf Storage= 1,832 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 28.4 min (865.7 - 837.3)

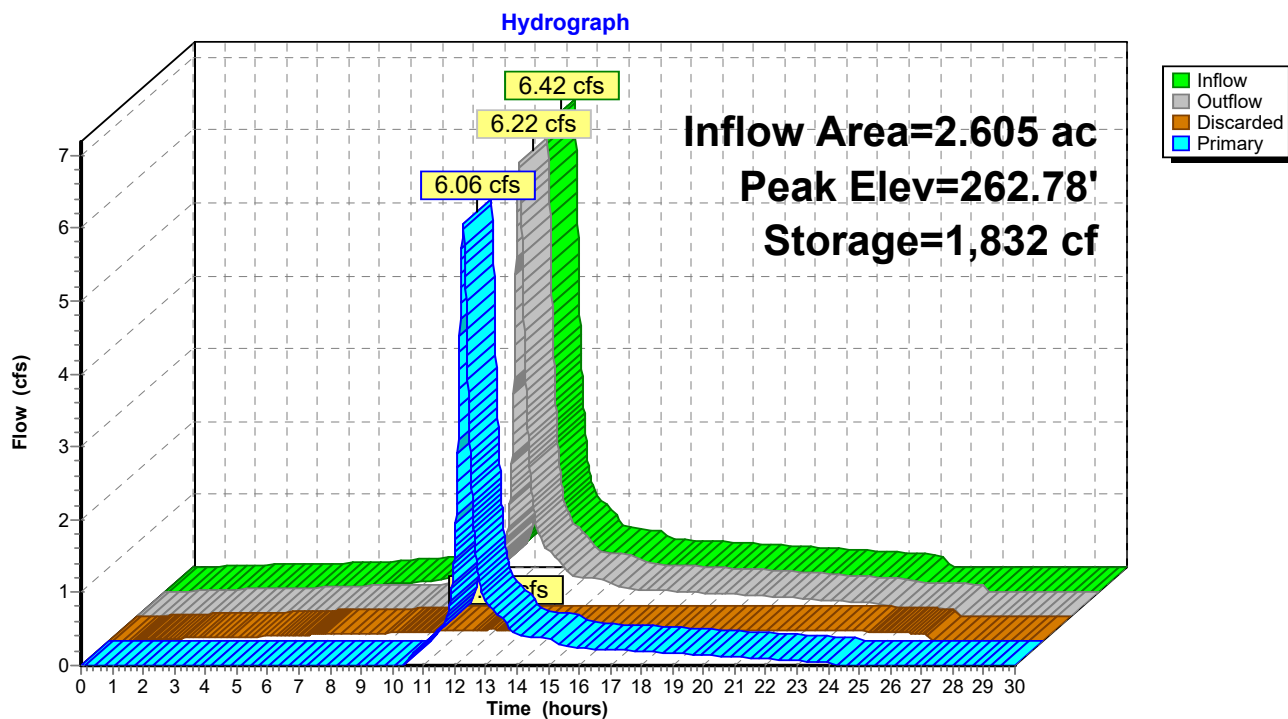
Volume	Invert	Avail.Storage	Storage Description		
#1	262.00'	4,479 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
262.00	1,784	213.0	0	0	1,784
263.50	4,379	317.0	4,479	4,479	6,188

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28)
			Elev. (feet) 262.40 263.50
			Width (feet) 8.00 8.00

Discarded OutFlow Max=0.17 cfs @ 12.27 hrs HW=262.78' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=6.05 cfs @ 12.27 hrs HW=262.78' TW=0.00' (Dynamic Tailwater)
 ↑ **2=Custom Weir/Orifice** (Weir Controls 6.05 cfs @ 2.01 fps)

Pond 13P: Infiltration Basin #3



Summary for Subcatchment 14P: P1g

Runoff = 0.79 cfs @ 12.18 hrs, Volume= 0.071 af, Depth= 3.03"

Routed to Pond 15P : Existing pipe

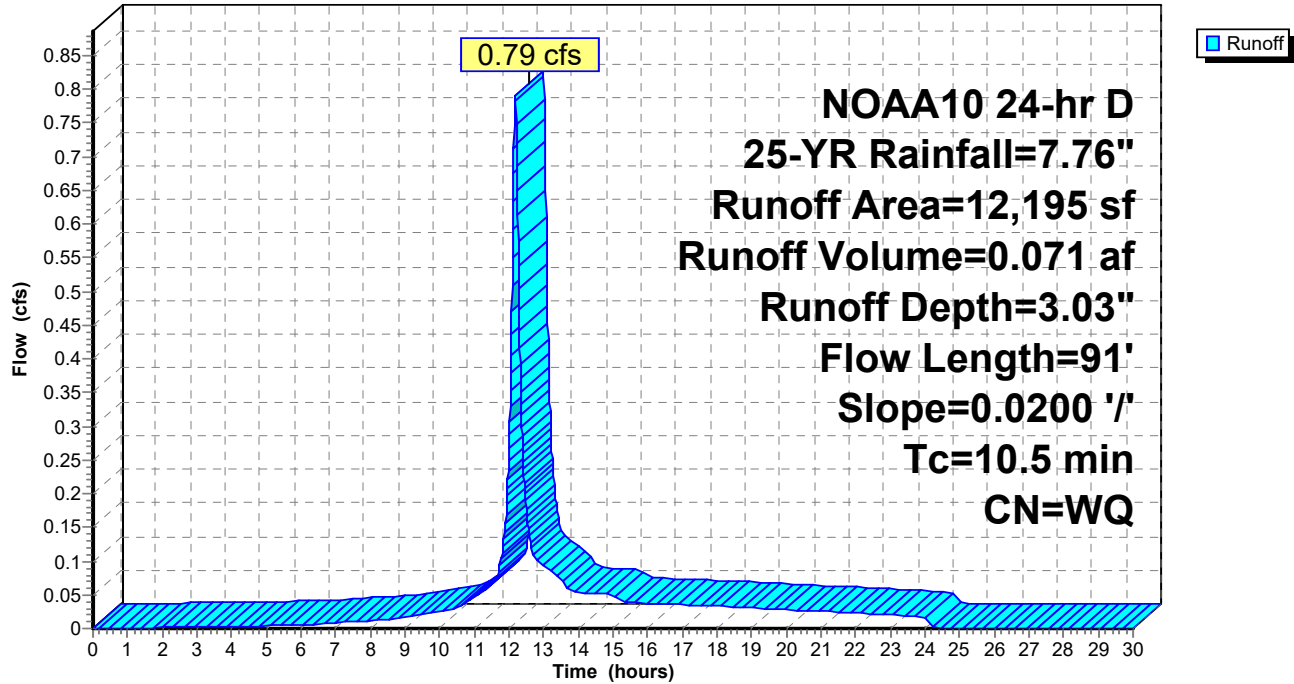
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
NOAA10 24-hr D 25-YR Rainfall=7.76"

Area (sf)	CN	Description
764	98	Roofs, HSG A
558	89	Gravel roads HSG C
3,895	70	Woods, Good HSG C
3,122	30	Woods, Good HSG A
989	76	Gravel roads HSG A
2,345	39	>75% Grass cover, Good HSG A
522	74	>75% Grass cover, Good HSG C
12,195		Weighted Average
11,431		93.74% Pervious Area
764		6.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	39	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
1.2	52	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.5	91	Total			

Subcatchment 14P: P1g

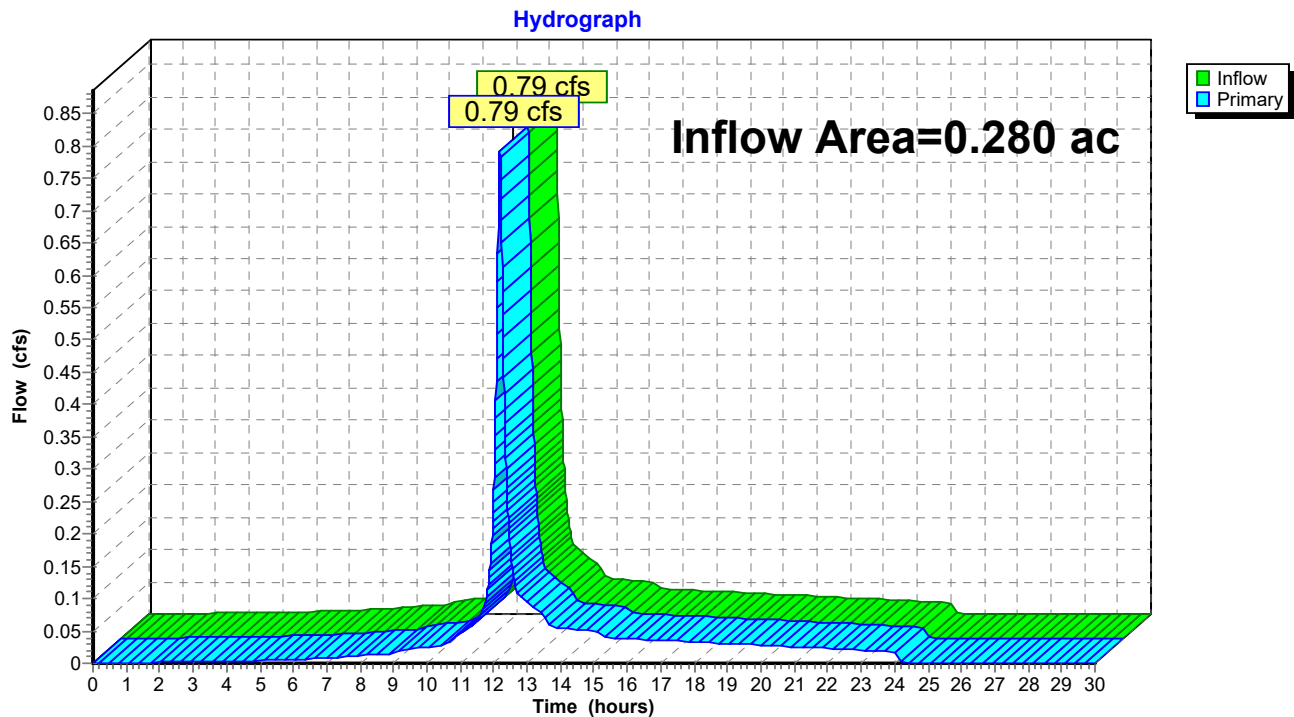
Hydrograph



Summary for Pond 15P: Existing pipe

Inflow Area = 0.280 ac, 6.26% Impervious, Inflow Depth = 3.03" for 25-YR event
Inflow = 0.79 cfs @ 12.18 hrs, Volume= 0.071 af
Primary = 0.79 cfs @ 12.18 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 17P : Driveway Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 15P: Existing pipe

Summary for Subcatchment 16P: P1h

Runoff = 0.19 cfs @ 12.22 hrs, Volume= 0.041 af, Depth= 0.60"
 Routed to Pond 17P : Driveway Pipe

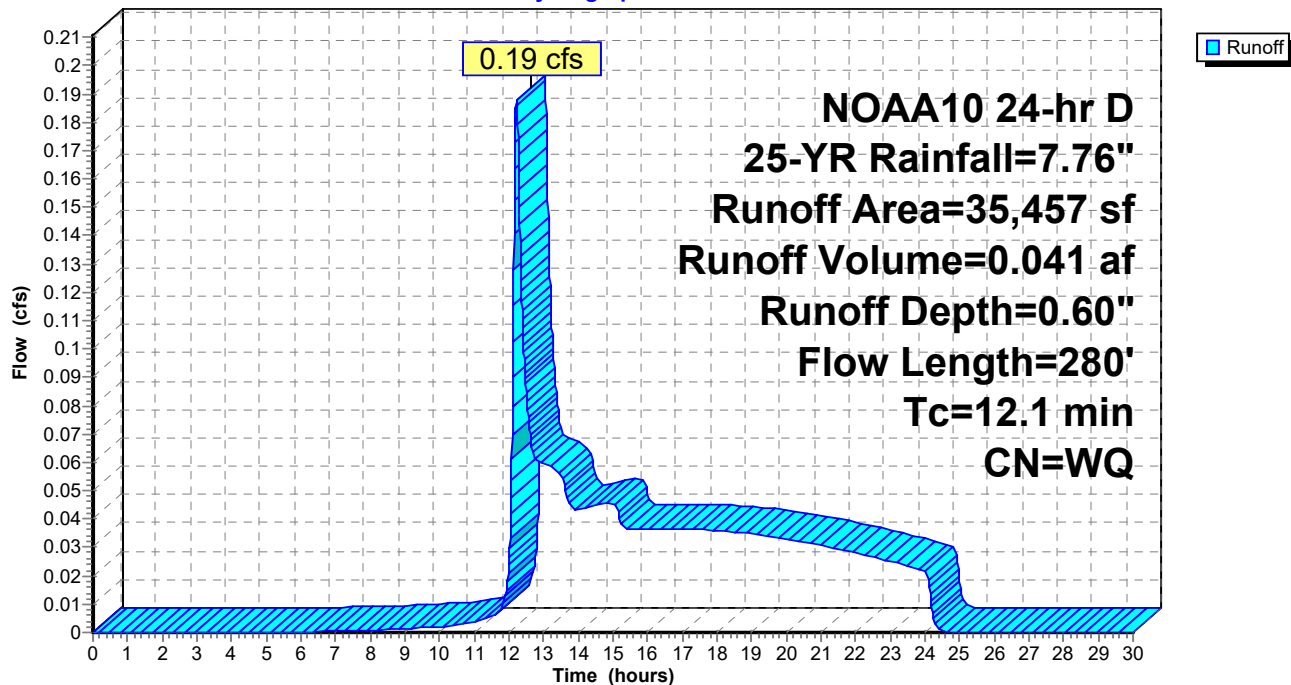
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 25-YR Rainfall=7.76"

Area (sf)	CN	Description
26,257	30	Woods, Good HSG A
8,598	39	>75% Grass cover, Good HSG A
602	74	>75% Grass cover, Good HSG C
35,457		Weighted Average
35,457		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
4.2	220	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	10	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
12.1	280	Total			

Subcatchment 16P: P1h

Hydrograph



Summary for Pond 17P: Driveway Pipe

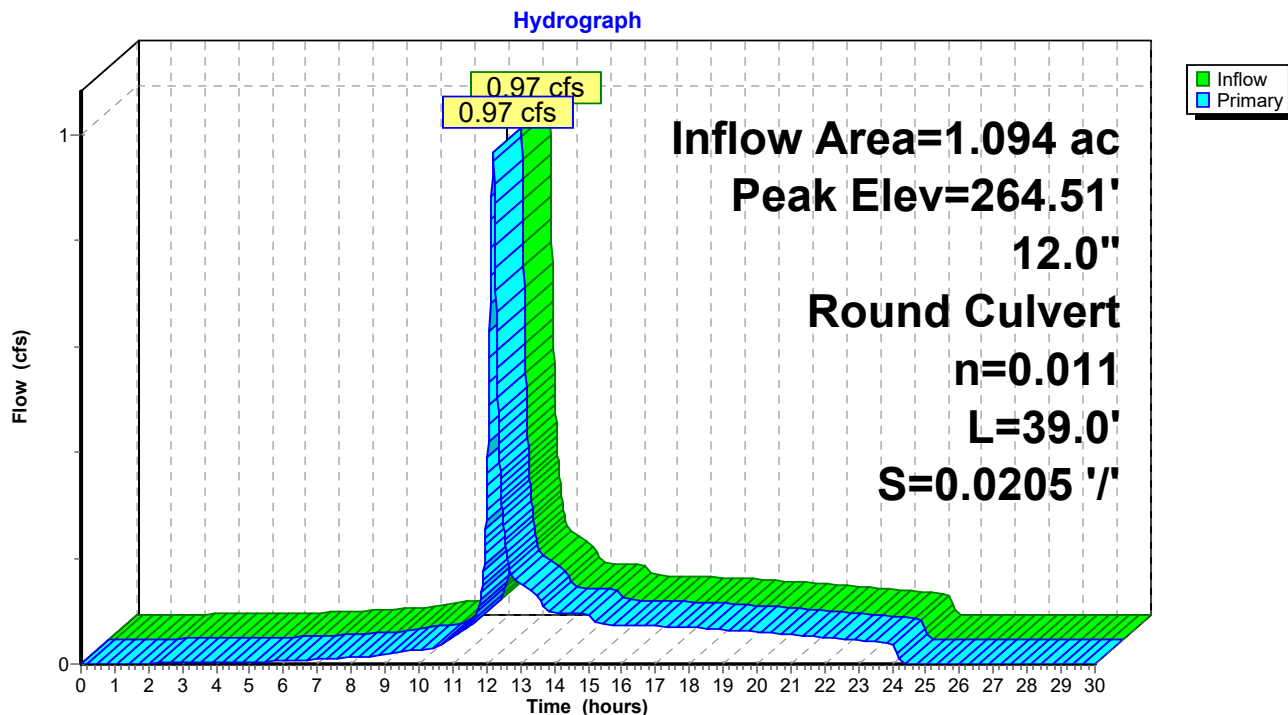
Inflow Area = 1.094 ac, 1.60% Impervious, Inflow Depth = 1.22" for 25-YR event
 Inflow = 0.97 cfs @ 12.19 hrs, Volume= 0.112 af
 Outflow = 0.97 cfs @ 12.19 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.97 cfs @ 12.19 hrs, Volume= 0.112 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 264.51' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.00'	12.0" Round Culvert L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 264.00' / 263.20' S= 0.0205 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.97 cfs @ 12.19 hrs HW=264.51' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.97 cfs @ 2.42 fps)

Pond 17P: Driveway Pipe



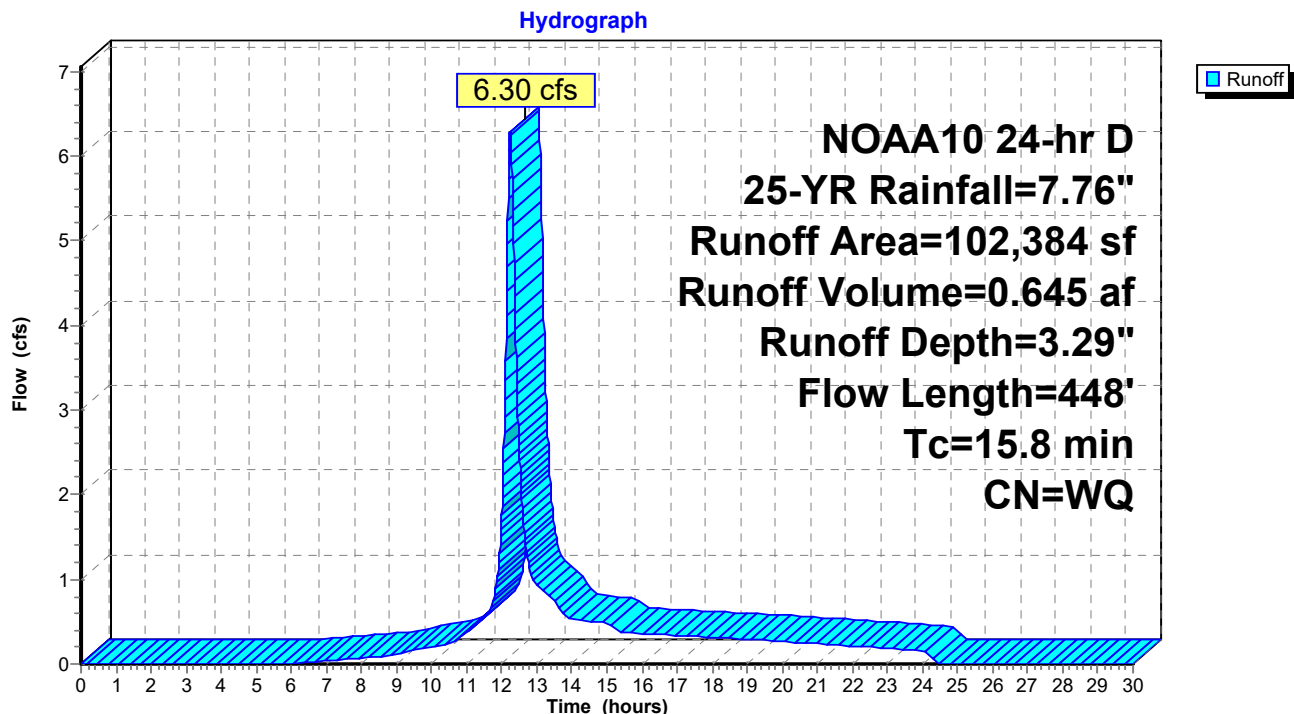
Summary for Subcatchment 18P: P1i

Runoff = 6.30 cfs @ 12.24 hrs, Volume= 0.645 af, Depth= 3.29"
 Routed to Link 21P : Design Point #1: Flow to Wetlands

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=7.76"

Area (sf)	CN	Description
45,368	70	Woods, Good HSG C
13,717	30	Woods, Good HSG A
17,824	39	>75% Grass cover, Good HSG A
25,475	74	>75% Grass cover, Good HSG C
102,384		Weighted Average
102,384		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
5.5	285	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	113	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	448	Total			

Subcatchment 18P: P1i

Summary for Subcatchment 19P: P1j

Runoff = 0.30 cfs @ 12.12 hrs, Volume= 0.023 af, Depth= 7.52"
 Routed to Pond 20P : Infiltration Field #1

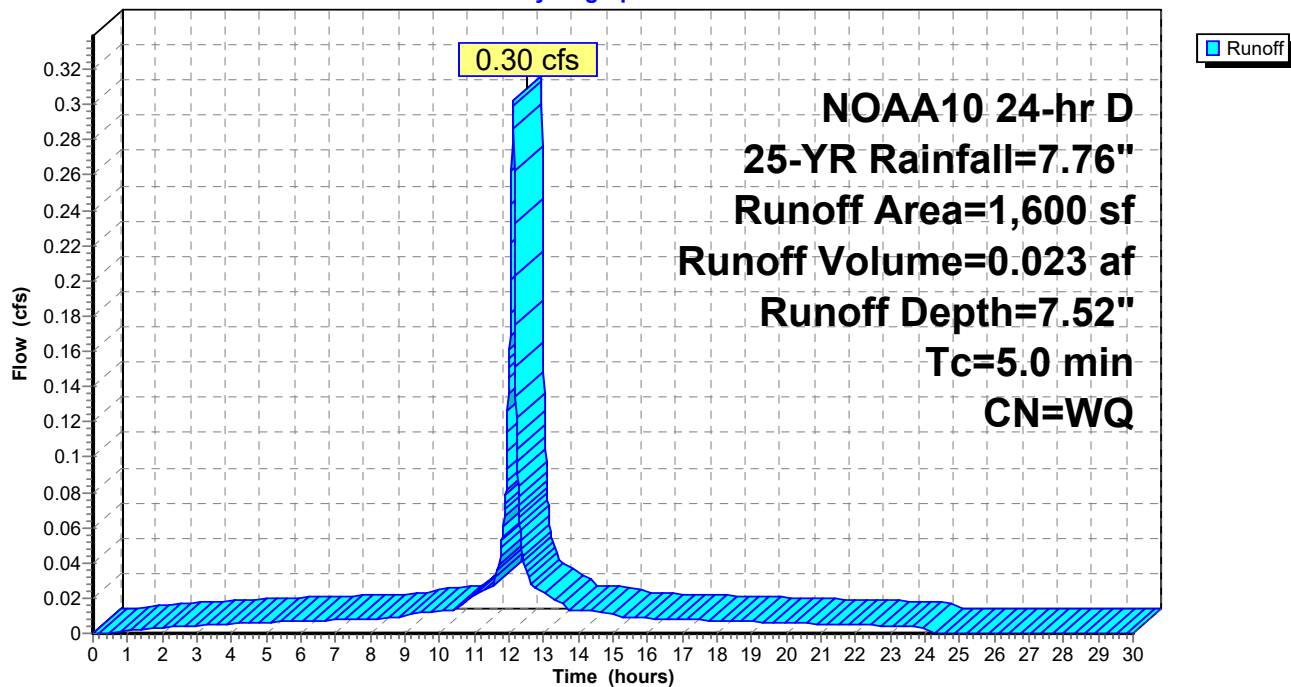
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 25-YR Rainfall=7.76"

Area (sf)	CN	Description
543	98	Roofs, HSG C
1,057	98	Roofs, HSG A
1,600		Weighted Average
1,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 19P: P1j

Hydrograph



Summary for Pond 20P: Infiltration Field #1

Inflow Area = 0.037 ac, 100.00% Impervious, Inflow Depth = 7.52" for 25-YR event
 Inflow = 0.30 cfs @ 12.12 hrs, Volume= 0.023 af
 Outflow = 0.42 cfs @ 12.14 hrs, Volume= 0.023 af, Atten= 0%, Lag= 1.2 min
 Discarded = 0.01 cfs @ 12.13 hrs, Volume= 0.019 af
 Primary = 0.41 cfs @ 12.14 hrs, Volume= 0.004 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.57' @ 12.14 hrs Surf.Area= 205 sf Storage= 219 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 124.6 min (866.8 - 742.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	260.30'	132 cf	11.67'W x 17.50'L x 2.04'H Field A 417 cf Overall - 87 cf Embedded = 330 cf x 40.0% Voids
#2A	260.80'	87 cf	Cultec C-100HD x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	262.30'	1 cf	1.00'D x 1.00'H Vertical Cone/Cylinder
		219 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.30'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.30'	4.0" Round Culvert X 3.00 L= 1.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 262.30' / 262.20' S= 0.1000 ' ' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=262.45' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.40 cfs @ 12.14 hrs HW=262.57' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Inlet Controls 0.40 cfs @ 1.77 fps)

Pond 20P: Infiltration Field #1 - Chamber Wizard Field A**Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)**

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

2 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 15.50' Row Length +12.0" End Stone x 2 = 17.50' Base Length

3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 12.0" Side Stone x 2 = 11.67' Base Width

6.0" Stone Base + 12.5" Chamber Height + 6.0" Stone Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 86.6 cf Chamber Storage

416.8 cf Field - 86.6 cf Chambers = 330.3 cf Stone x 40.0% Voids = 132.1 cf Stone Storage

Chamber Storage + Stone Storage = 218.7 cf = 0.005 af

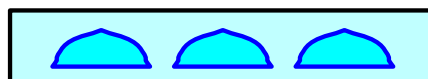
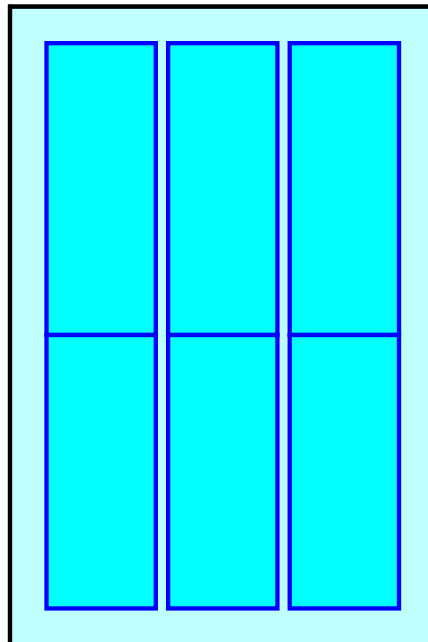
Overall Storage Efficiency = 52.5%

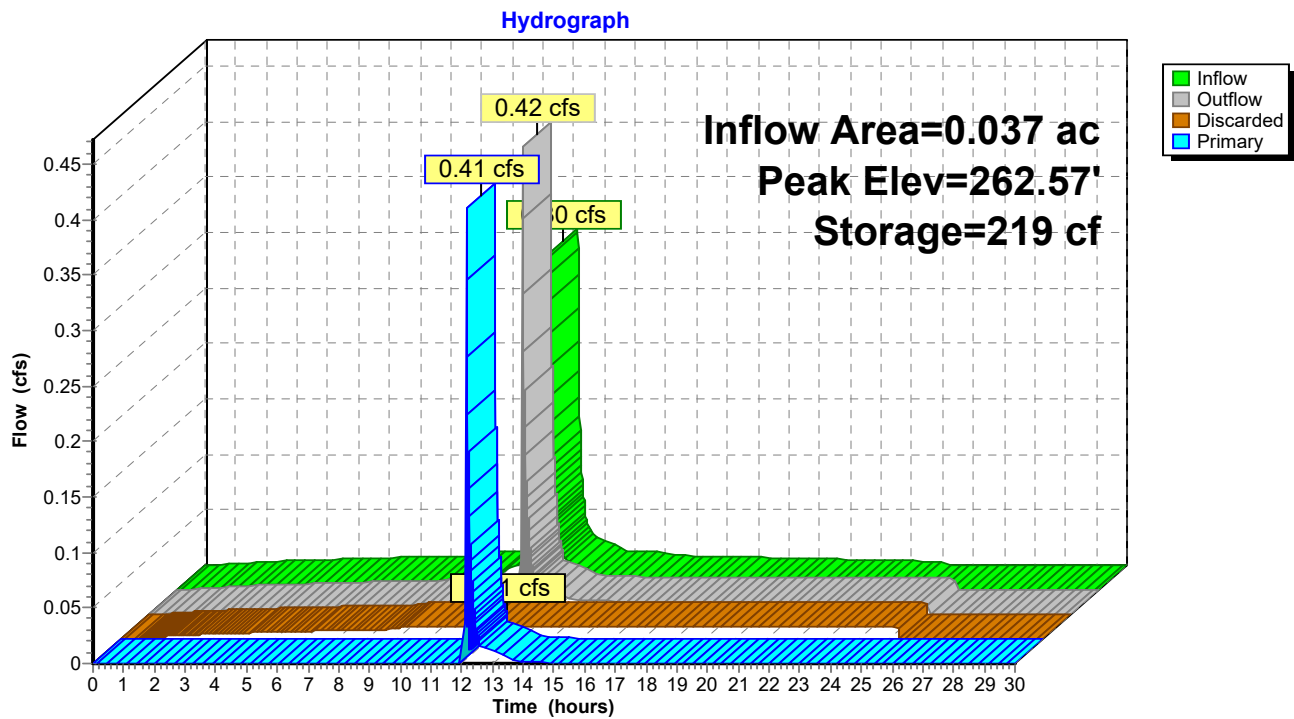
Overall System Size = 17.50' x 11.67' x 2.04'

6 Chambers

15.4 cy Field

12.2 cy Stone

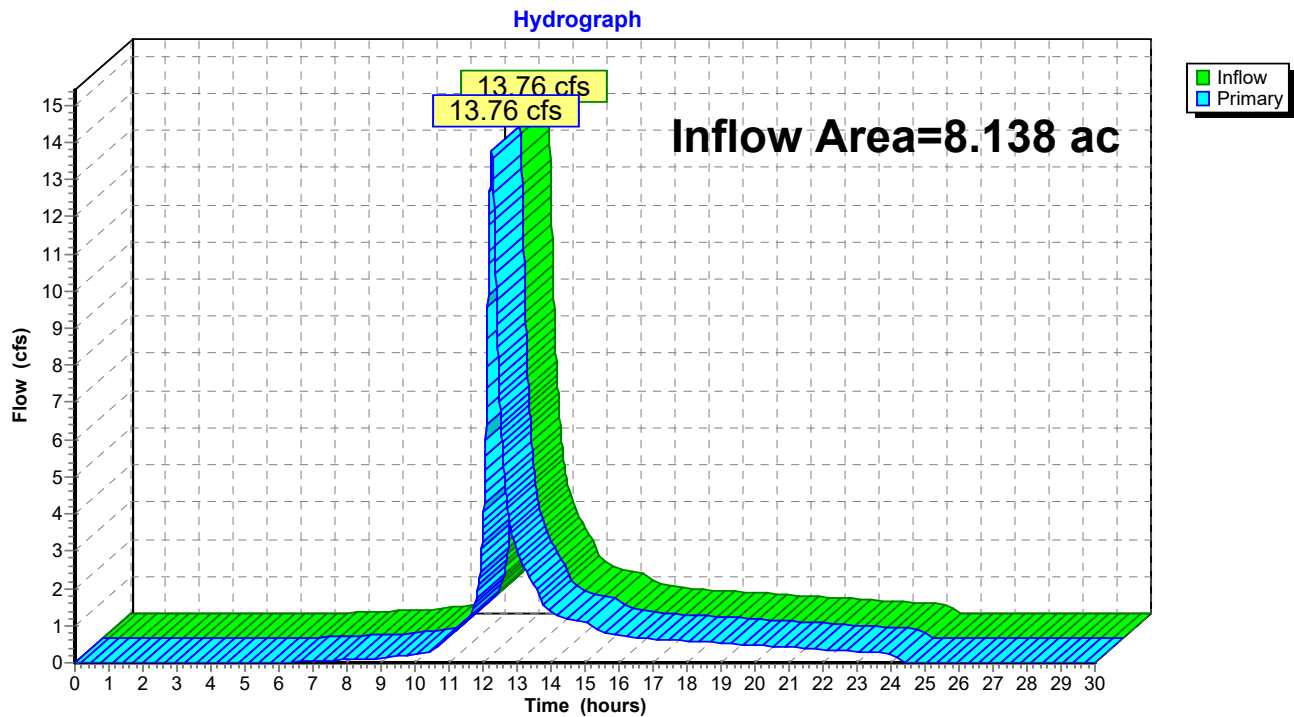


Pond 20P: Infiltration Field #1

Summary for Link 21P: Design Point #1: Flow to Wetlands

Inflow Area = 8.138 ac, 11.15% Impervious, Inflow Depth = 2.08" for 25-YR event
Inflow = 13.76 cfs @ 12.26 hrs, Volume= 1.409 af
Primary = 13.76 cfs @ 12.26 hrs, Volume= 1.409 af, Atten= 0%, Lag= 0.0 min

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

Link 21P: Design Point #1: Flow to Wetlands

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Prepared by Legacy Engineering LLC

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NOAA10 24-hr D 100-YR Rainfall=10.71"

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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

Subcatchment1P: P1a

Runoff Area=32,129 sf 21.86% Impervious Runoff Depth=7.49"
Flow Length=308' Tc=14.2 min CN=WQ Runoff=4.57 cfs 0.461 af

Pond 2P: CB 2+85 L&R

Peak Elev=277.24' Inflow=4.57 cfs 0.461 af
12.0" Round Culvert x 2.00 n=0.011 L=8.0' S=0.0187 '/' Outflow=4.57 cfs 0.461 af

Pond 3P: DMH 2+93

Peak Elev=276.88' Inflow=4.57 cfs 0.461 af
12.0" Round Culvert n=0.011 L=106.0' S=0.0108 '/' Outflow=4.57 cfs 0.461 af

Subcatchment4P: P1b

Runoff Area=12,532 sf 32.92% Impervious Runoff Depth=5.01"
Flow Length=181' Tc=6.6 min CN=WQ Runoff=1.49 cfs 0.120 af

Pond 5P: CB 4+04 L&R

Peak Elev=274.88' Inflow=1.49 cfs 0.120 af
12.0" Round Culvert x 2.00 n=0.011 L=5.0' S=0.0060 '/' Outflow=1.49 cfs 0.120 af

Pond 6P: DMH 4+05

Peak Elev=274.87' Inflow=5.52 cfs 0.581 af
15.0" Round Culvert n=0.011 L=47.0' S=0.0055 '/' Outflow=5.52 cfs 0.581 af

Subcatchment7P: P1c

Runoff Area=25,973 sf 3.46% Impervious Runoff Depth=2.38"
Flow Length=168' Tc=11.9 min CN=WQ Runoff=1.12 cfs 0.118 af

Pond 8P: Infiltration Basin #1

Peak Elev=274.39' Storage=6,776 cf Inflow=6.62 cfs 0.699 af
Discarded=0.24 cfs 0.335 af Primary=2.59 cfs 0.365 af Outflow=2.83 cfs 0.699 af

Subcatchment9P: P1d

Runoff Area=18,728 sf 48.96% Impervious Runoff Depth=6.39"
Flow Length=95' Tc=5.3 min CN=WQ Runoff=3.00 cfs 0.229 af

Pond 10P: Infiltration Basin #2

Peak Elev=268.78' Storage=3,835 cf Inflow=4.41 cfs 0.593 af
Discarded=0.16 cfs 0.187 af Primary=2.44 cfs 0.407 af Outflow=2.60 cfs 0.593 af

Subcatchment11P: P1e

Runoff Area=110,274 sf 11.57% Impervious Runoff Depth=5.28"
Flow Length=526' Tc=16.3 min CN=WQ Runoff=10.28 cfs 1.114 af

Subcatchment12P: P1f

Runoff Area=3,200 sf 100.00% Impervious Runoff Depth=10.47"
Tc=5.0 min CN=98 Runoff=0.84 cfs 0.064 af

Pond 13P: Infiltration Basin #3

Peak Elev=262.93' Storage=2,307 cf Inflow=10.54 cfs 1.178 af
Discarded=0.18 cfs 0.254 af Primary=10.08 cfs 0.924 af Outflow=10.27 cfs 1.179 af

Subcatchment14P: P1g

Runoff Area=12,195 sf 6.26% Impervious Runoff Depth=5.01"
Flow Length=91' Slope=0.0200 '/' Tc=10.5 min CN=WQ Runoff=1.32 cfs 0.117 af

Pond 15P: Existing pipe

Inflow=1.32 cfs 0.117 af
Primary=1.32 cfs 0.117 af

Subcatchment16P: P1h

Runoff Area=35,457 sf 0.00% Impervious Runoff Depth=1.65"
Flow Length=280' Tc=12.1 min CN=WQ Runoff=0.88 cfs 0.112 af

HydroCAD

Prepared by Legacy Engineering LLC

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NOAA10 24-hr D 100-YR Rainfall=10.71"

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Pond 17P: Driveway Pipe

Peak Elev=264.83' Inflow=2.15 cfs 0.229 af
12.0" Round Culvert n=0.011 L=39.0' S=0.0205 '/' Outflow=2.15 cfs 0.229 af

Subcatchment 18P: P1i

Runoff Area=102,384 sf 0.00% Impervious Runoff Depth=5.48"
Flow Length=448' Tc=15.8 min CN=WQ Runoff=10.52 cfs 1.074 af

Subcatchment 19P: P1j

Runoff Area=1,600 sf 100.00% Impervious Runoff Depth=10.47"
Tc=5.0 min CN=WQ Runoff=0.42 cfs 0.032 af

Pond 20P: Infiltration Field #1

Peak Elev=262.60' Storage=219 cf Inflow=0.42 cfs 0.032 af
Discarded=0.01 cfs 0.023 af Primary=0.47 cfs 0.009 af Outflow=0.48 cfs 0.032 af

Link 21P: Design Point #1: Flow to Wetlands

Inflow=24.38 cfs 2.643 af
Primary=24.38 cfs 2.643 af

Total Runoff Area = 8.138 ac Runoff Volume = 3.441 af Average Runoff Depth = 5.07"
88.85% Pervious = 7.230 ac 11.15% Impervious = 0.908 ac

Summary for Subcatchment 1P: P1a

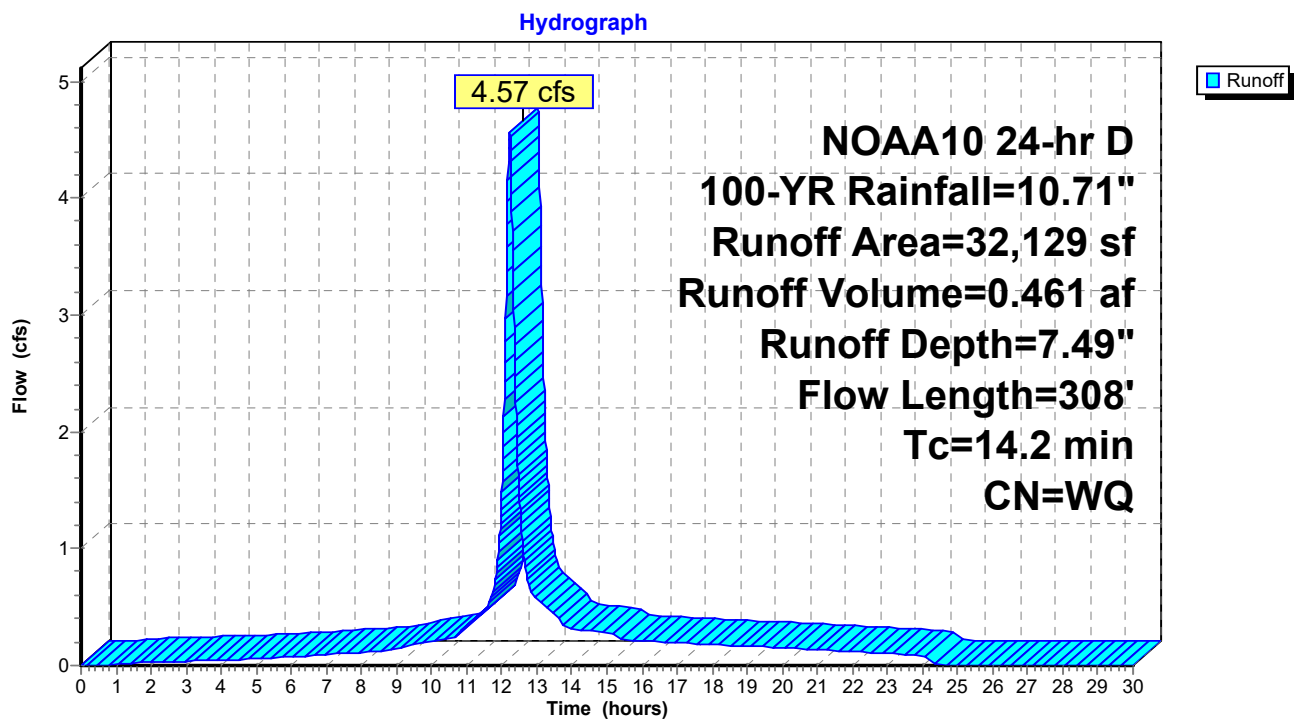
Runoff = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af, Depth= 7.49"
 Routed to Pond 2P : CB 2+85 L&R

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=10.71"

Area (sf)	CN	Description
3,629	98	Paved parking HSG C
9,045	70	Woods, Good HSG C
1,201	98	Roofs HSG C
305	98	Roofs HSG A
* 2,623	96	Gravel HSG C
1,890	98	Paved parking HSG A
4,307	39	>75% Grass cover, Good HSG A
9,129	74	>75% Grass cover, Good HSG C
32,129		Weighted Average
25,104		78.14% Pervious Area
7,025		21.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	28	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
2.6	77	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	39	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.2	144	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
14.2	308	Total			

Subcatchment 1P: P1a



Summary for Pond 2P: CB 2+85 L&R

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 7.49" for 100-YR event
Inflow = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af
Outflow = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af, Atten= 0%, Lag= 0.0 min
Primary = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af
Routed to Pond 3P : DMH 2+93

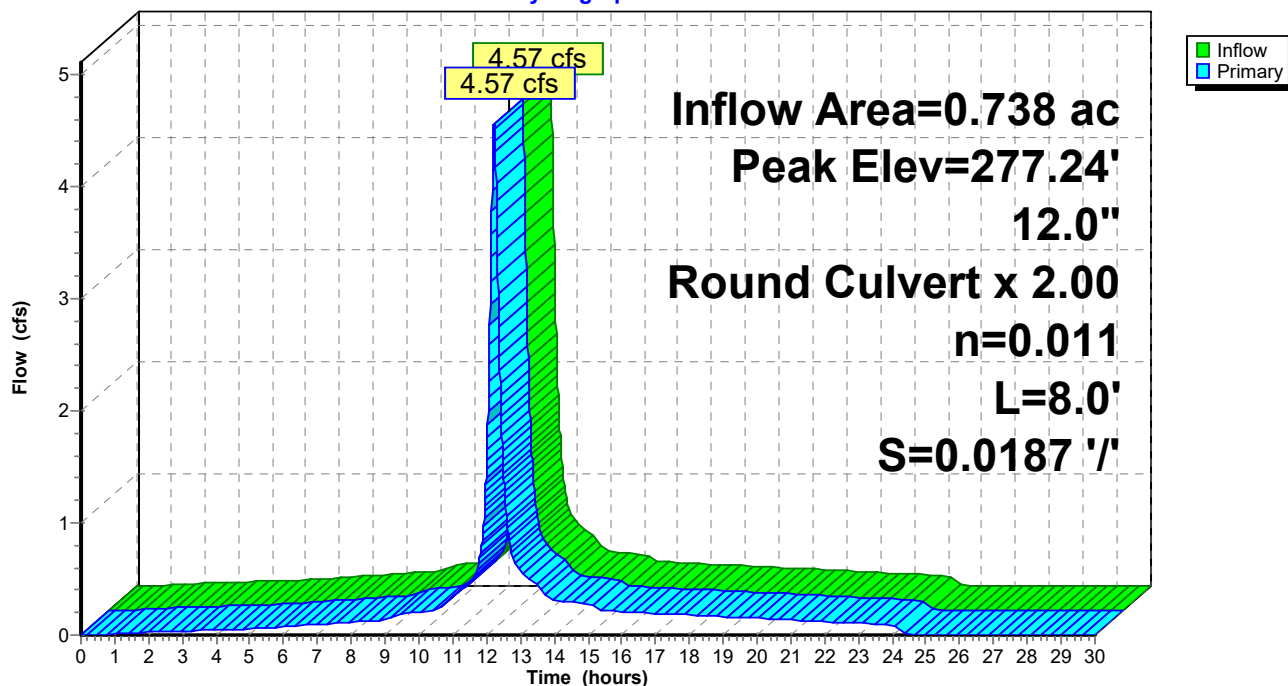
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 277.24' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.20'	12.0" Round Culvert X 2.00 L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.20' / 274.05' S= 0.0187 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=4.33 cfs @ 12.22 hrs HW=277.20' TW=276.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.33 cfs @ 2.76 fps)

Pond 2P: CB 2+85 L&R

Hydrograph



Summary for Pond 3P: DMH 2+93

Inflow Area = 0.738 ac, 21.86% Impervious, Inflow Depth = 7.49" for 100-YR event
 Inflow = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af
 Outflow = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.57 cfs @ 12.22 hrs, Volume= 0.461 af
 Routed to Pond 6P : DMH 4+05

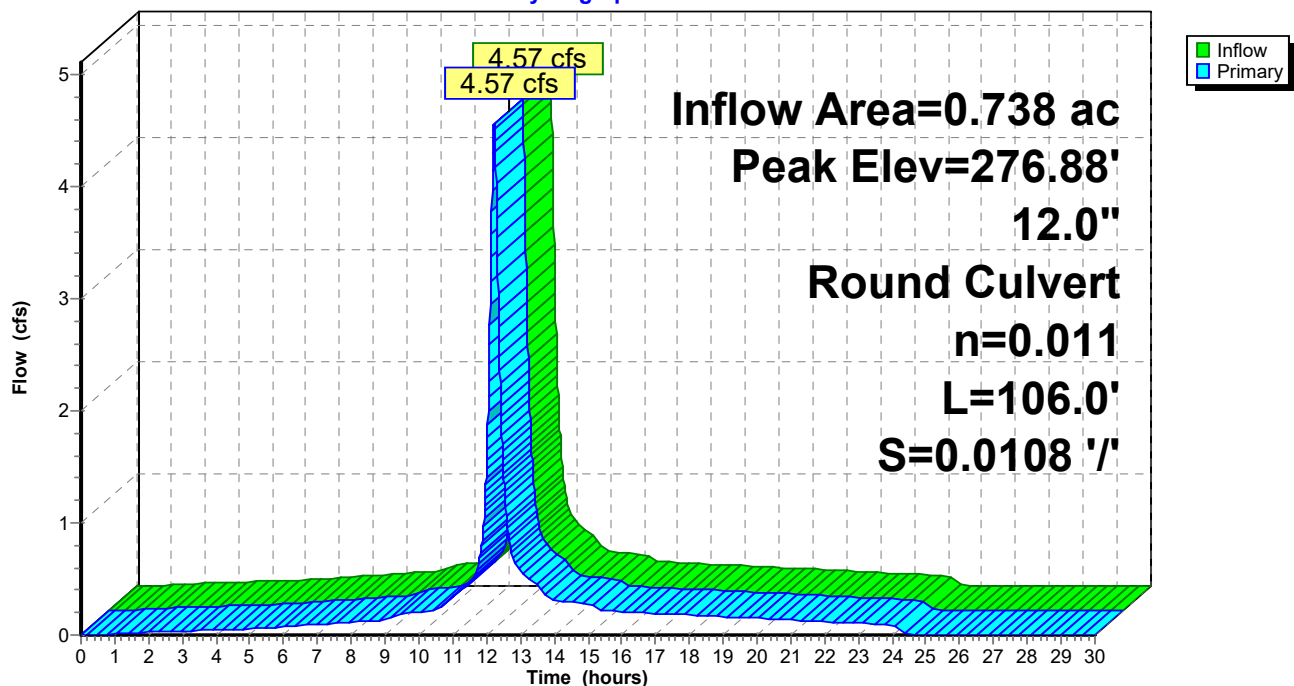
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 276.88' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	274.00'	12.0" Round Culvert L= 106.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 274.00' / 272.86' S= 0.0108 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=4.55 cfs @ 12.22 hrs HW=276.87' TW=274.85' (Dynamic Tailwater)
 1=Culvert (Outlet Controls 4.55 cfs @ 5.79 fps)

Pond 3P: DMH 2+93

Hydrograph



Summary for Subcatchment 4P: P1b

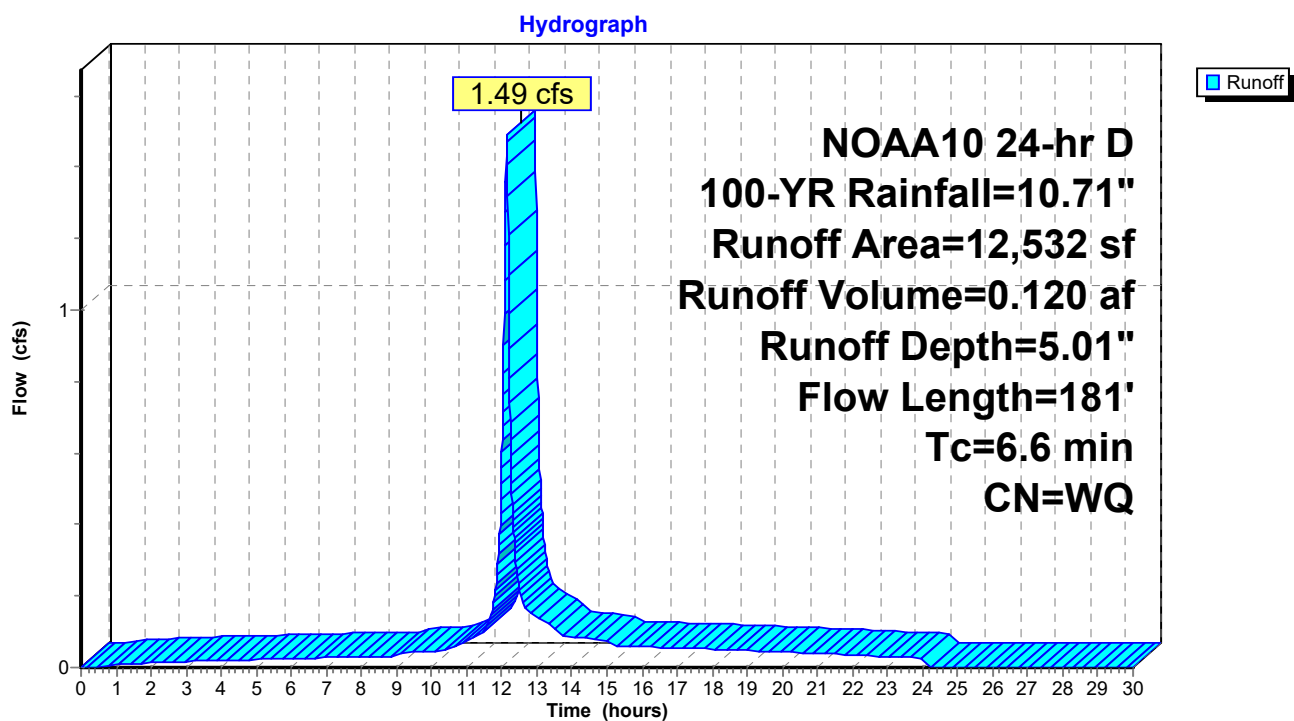
Runoff = 1.49 cfs @ 12.14 hrs, Volume= 0.120 af, Depth= 5.01"
 Routed to Pond 5P : CB 4+04 L&R

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=10.71"

Area (sf)	CN	Description
360	98	Roofs HSG C
996	30	Woods, Good HSG A
305	98	Roofs HSG A
3,460	98	Paved parking HSG A
7,411	39	>75% Grass cover, Good HSG A
12,532		Weighted Average
8,407		67.08% Pervious Area
4,125		32.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.0400	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.2	26	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.7	105	0.0150	2.49		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.6	181	Total			

Subcatchment 4P: P1b



Summary for Pond 5P: CB 4+04 L&R

Inflow Area = 0.288 ac, 32.92% Impervious, Inflow Depth = 5.01" for 100-YR event
 Inflow = 1.49 cfs @ 12.14 hrs, Volume= 0.120 af
 Outflow = 1.49 cfs @ 12.14 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.49 cfs @ 12.14 hrs, Volume= 0.120 af
 Routed to Pond 6P : DMH 4+05

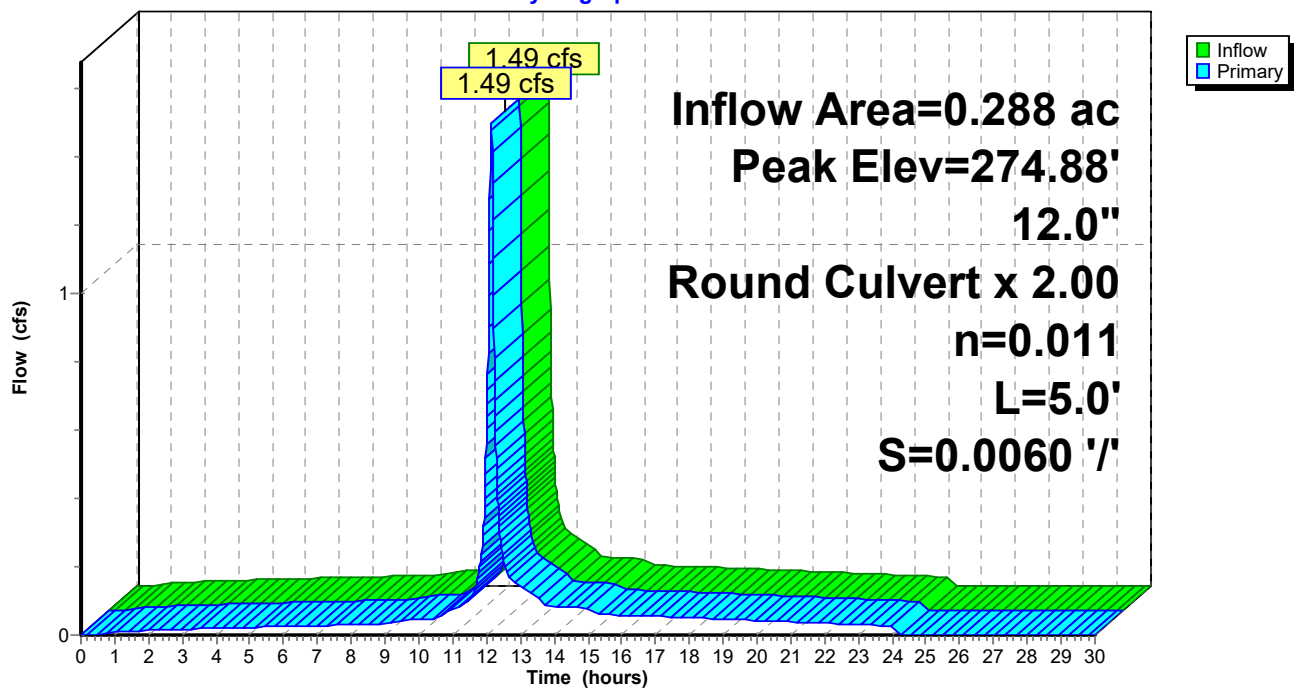
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 274.88' @ 12.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.89'	12.0" Round Culvert X 2.00 L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.89' / 272.86' S= 0.0060 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=274.37' TW=274.43' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond 5P: CB 4+04 L&R

Hydrograph



Summary for Pond 6P: DMH 4+05

Inflow Area = 1.025 ac, 24.97% Impervious, Inflow Depth = 6.80" for 100-YR event
Inflow = 5.52 cfs @ 12.19 hrs, Volume= 0.581 af
Outflow = 5.52 cfs @ 12.19 hrs, Volume= 0.581 af, Atten= 0%, Lag= 0.0 min
Primary = 5.52 cfs @ 12.19 hrs, Volume= 0.581 af
Routed to Pond 8P : Infiltration Basin #1

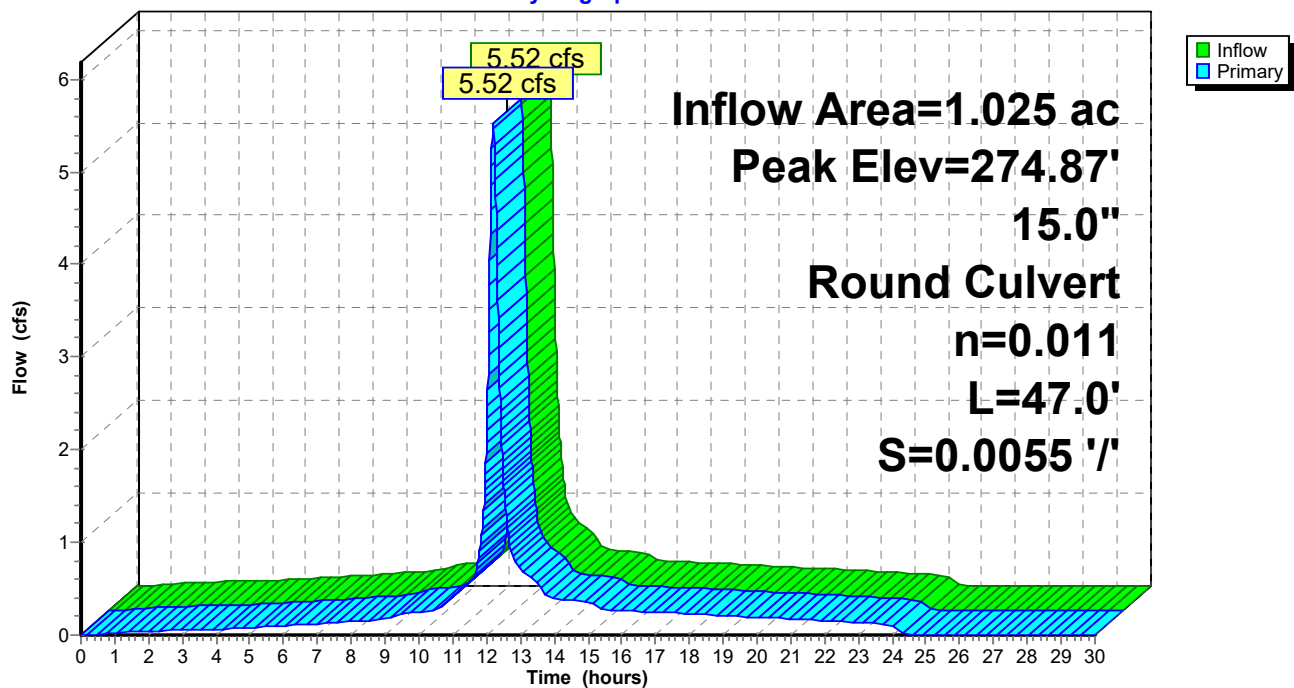
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 274.87' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	272.81'	15.0" Round Culvert L= 47.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.81' / 272.55' S= 0.0055 '/ Cc= 0.900 n= 0.011, Flow Area= 1.23 sf

Primary OutFlow Max=5.38 cfs @ 12.19 hrs HW=274.77' TW=273.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.38 cfs @ 4.39 fps)

Pond 6P: DMH 4+05

Hydrograph



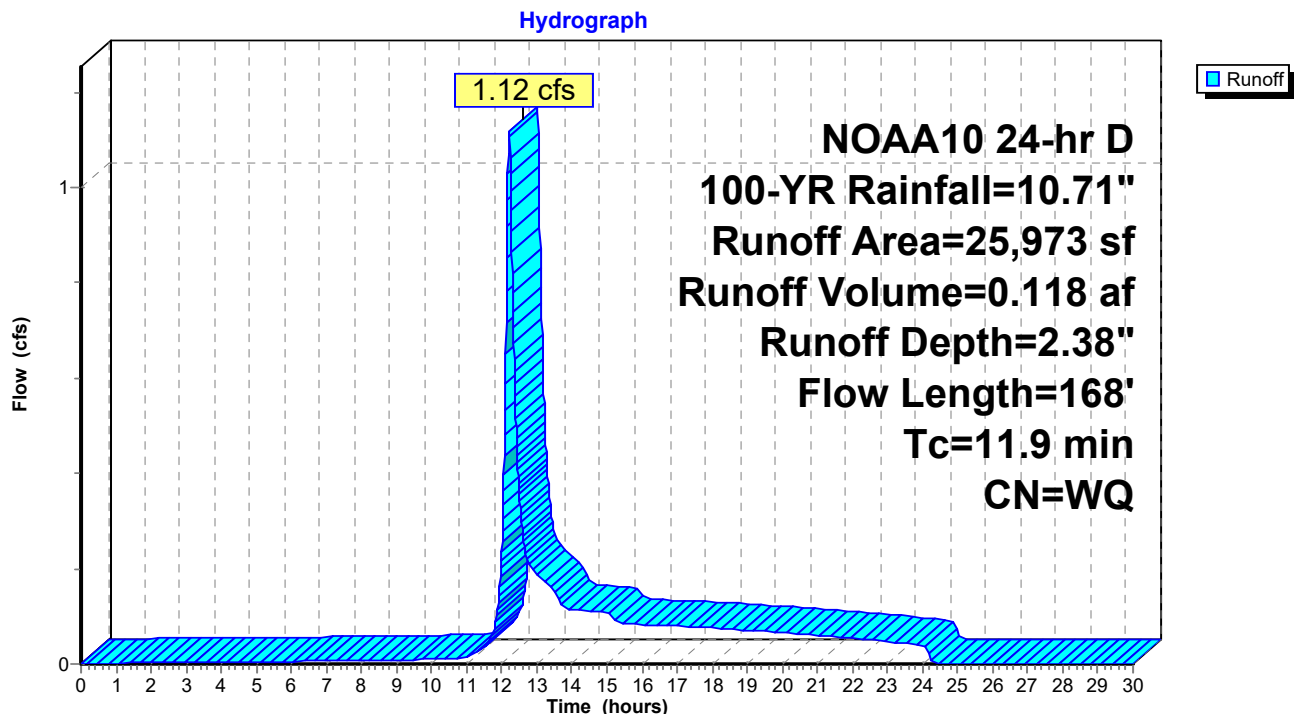
Summary for Subcatchment 7P: P1c

Runoff = 1.12 cfs @ 12.21 hrs, Volume= 0.118 af, Depth= 2.38"
 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=10.71"

Area (sf)	CN	Description
898	98	Roofs, HSG A
7,786	30	Woods, Good HSG A
17,289	39	>75% Grass cover, Good HSG A
25,973		Weighted Average
25,075		96.54% Pervious Area
898		3.46% Impervious 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= 3.82"
2.5	104	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	30	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
11.9	168	Total			

Subcatchment 7P: P1c

Summary for Pond 8P: Infiltration Basin #1

Inflow Area = 1.622 ac, 17.06% Impervious, Inflow Depth = 5.17" for 100-YR event
 Inflow = 6.62 cfs @ 12.19 hrs, Volume= 0.699 af
 Outflow = 2.83 cfs @ 12.42 hrs, Volume= 0.699 af, Atten= 57%, Lag= 13.3 min
 Discarded = 0.24 cfs @ 12.42 hrs, Volume= 0.335 af
 Primary = 2.59 cfs @ 12.42 hrs, Volume= 0.365 af
 Routed to Pond 10P : Infiltration Basin #2

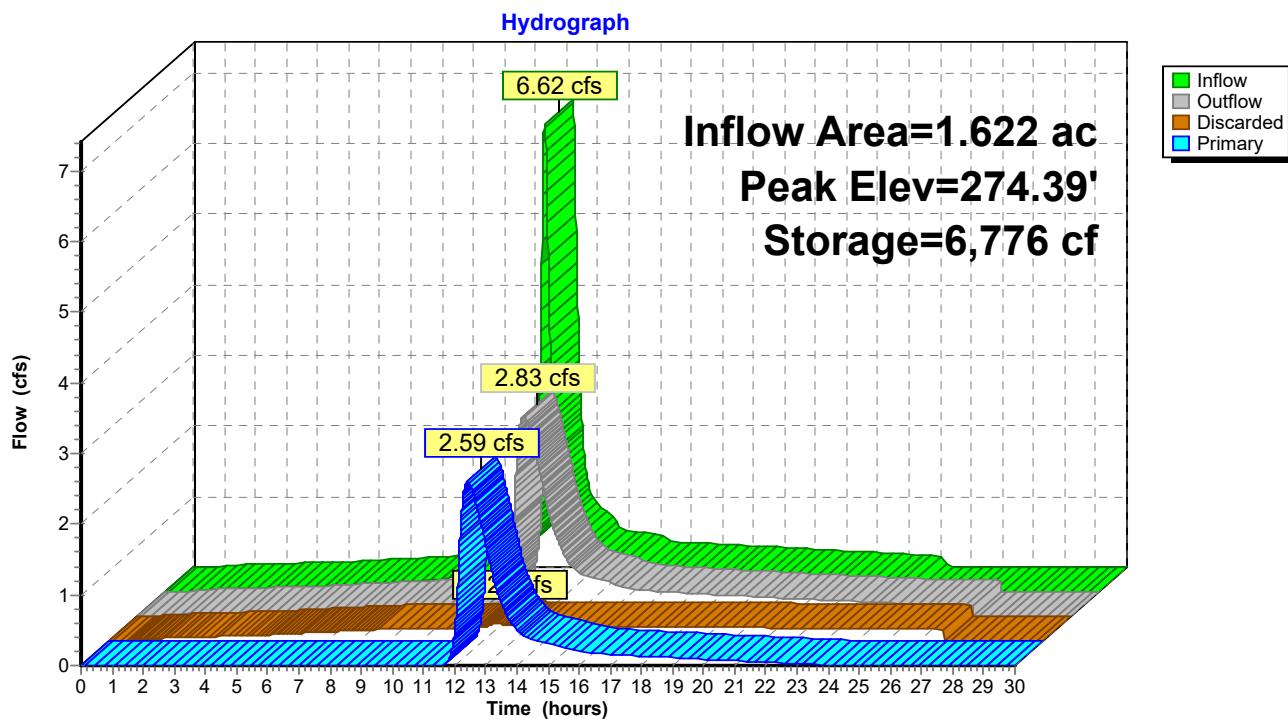
Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 274.39' @ 12.42 hrs Surf.Area= 4,318 sf Storage= 6,776 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 68.1 min (890.7 - 822.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	272.50'	12,087 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)
272.50	2,893	205.0	0	0	2,893
275.50	5,284	279.0	12,087	12,087	5,834
Device	Routing	Invert	Outlet Devices		
#1	Discarded	272.50'	2.410 in/hr Exfiltration over Surface area		
#2	Primary	273.00'	10.0" Round Culvert		
L= 98.0' CPP, square edge headwall, Ke= 0.500					
Inlet / Outlet Invert= 273.00' / 267.30' S= 0.0582 '/' Cc= 0.900					
n= 0.011, Flow Area= 0.55 sf					

Discarded OutFlow Max=0.24 cfs @ 12.42 hrs HW=274.39' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=2.59 cfs @ 12.42 hrs HW=274.39' TW=268.68' (Dynamic Tailwater)
 ↑**2=Culvert** (Inlet Controls 2.59 cfs @ 4.75 fps)

Pond 8P: Infiltration Basin #1

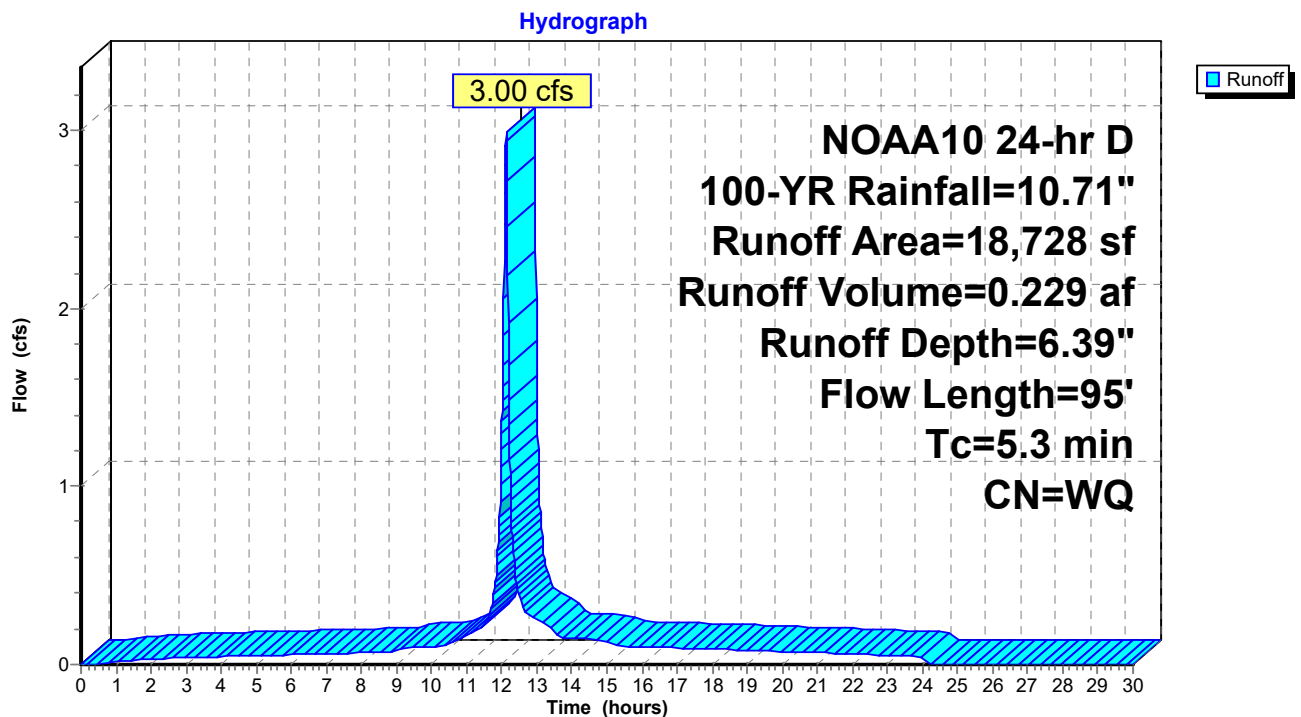
Summary for Subcatchment 9P: P1d

Runoff = 3.00 cfs @ 12.13 hrs, Volume= 0.229 af, Depth= 6.39"
 Routed to Pond 10P : 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=10.71"

Area (sf)	CN	Description
216	98	Roofs HSG C
1,384	98	Roofs HSG A
7,569	98	Paved parking HSG A
9,559	39	>75% Grass cover, Good HSG A
18,728		Weighted Average
9,559		51.04% Pervious Area
9,169		48.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0600	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 3.82"
0.4	24	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	21	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.3	95	Total			

Subcatchment 9P: P1d

Summary for Pond 10P: Infiltration Basin #2

Inflow Area = 2.051 ac, 23.74% Impervious, Inflow Depth = 3.47" for 100-YR event
 Inflow = 4.41 cfs @ 12.14 hrs, Volume= 0.593 af
 Outflow = 2.60 cfs @ 12.68 hrs, Volume= 0.593 af, Atten= 41%, Lag= 32.5 min
 Discarded = 0.16 cfs @ 12.68 hrs, Volume= 0.187 af
 Primary = 2.44 cfs @ 12.68 hrs, Volume= 0.407 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 268.78' @ 12.68 hrs Surf.Area= 2,851 sf Storage= 3,835 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 43.6 min (861.1 - 817.5)

Volume	Invert	Avail.Storage	Storage Description
#1	267.00'	8,013 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)
267.00	1,557	147.0	0	0	1,557
268.00	2,200	176.0	1,869	1,869	2,320
270.00	4,036	311.0	6,144	8,013	7,574

Device	Routing	Invert	Outlet Devices
#1	Discarded	267.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	267.50'	10.0" Round Culvert L= 33.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 267.50' / 265.00' S= 0.0758 '/' Cc= 0.900 n= 0.011, Flow Area= 0.55 sf

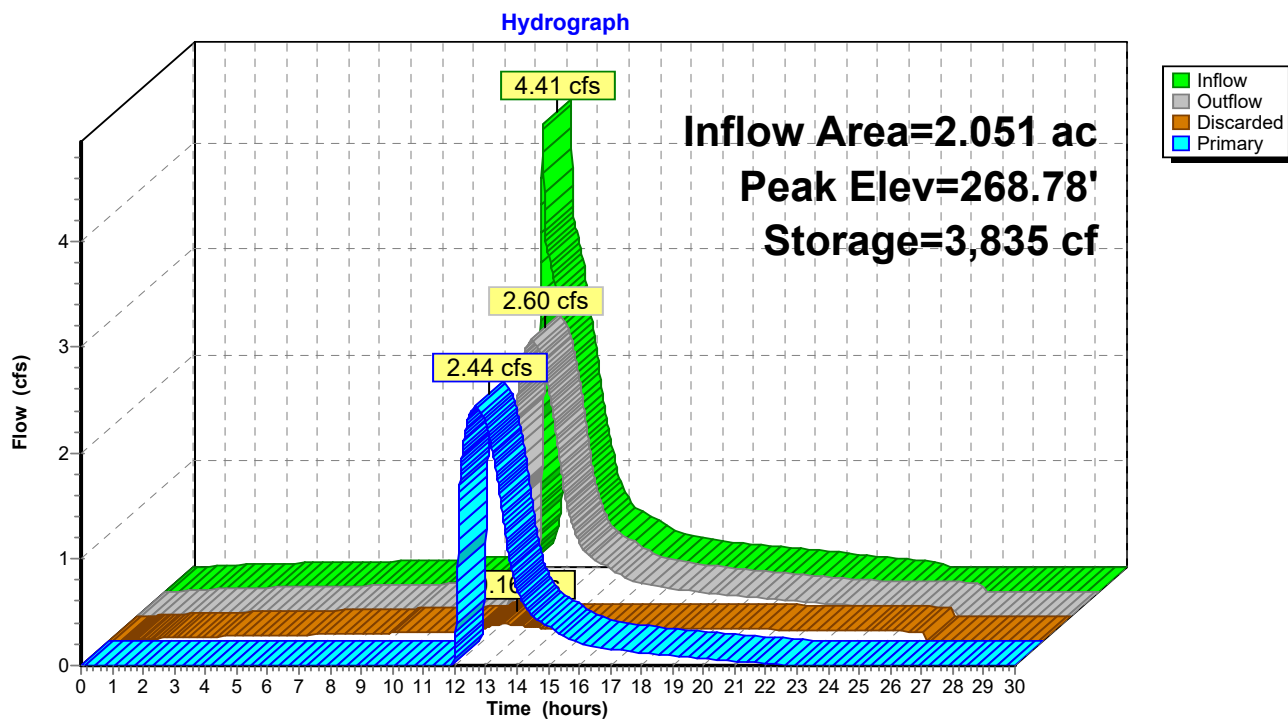
Discarded OutFlow Max=0.16 cfs @ 12.68 hrs HW=268.78' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=2.44 cfs @ 12.68 hrs HW=268.78' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 2.44 cfs @ 4.48 fps)

Pond 10P: Infiltration Basin #2



Summary for Subcatchment 11P: P1e

Runoff = 10.28 cfs @ 12.24 hrs, Volume= 1.114 af, Depth= 5.28"
 Routed to Pond 13P : Infiltration Basin #3

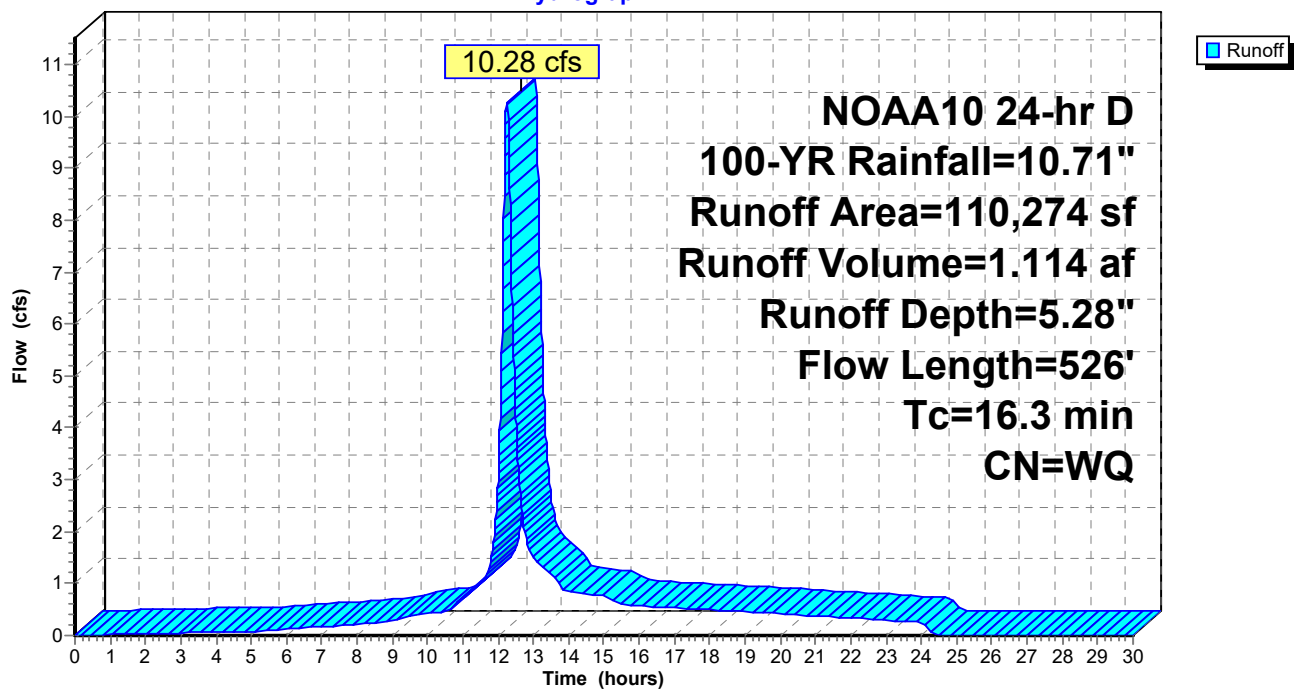
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 100-YR Rainfall=10.71"

Area (sf)	CN	Description
5,251	98	Paved parking HSG C
3,215	98	Roofs, HSG A
810	98	Roofs, HSG C
34,332	70	Woods, Good HSG C
24,079	30	Woods, Good HSG A
3,480	98	Paved parking HSG A
21,567	39	>75% Grass cover, Good HSG A
17,540	74	>75% Grass cover, Good HSG C
110,274		Weighted Average
97,518		88.43% Pervious Area
12,756		11.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
0.8	56	0.0600	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	135	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	263	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	12	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.0	10	0.3000	3.83		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
16.3	526	Total			

Subcatchment 11P: P1e

Hydrograph



Summary for Subcatchment 12P: P1f

Runoff = 0.84 cfs @ 12.12 hrs, Volume= 0.064 af, Depth=10.47"
 Routed to Pond 13P : Infiltration Basin #3

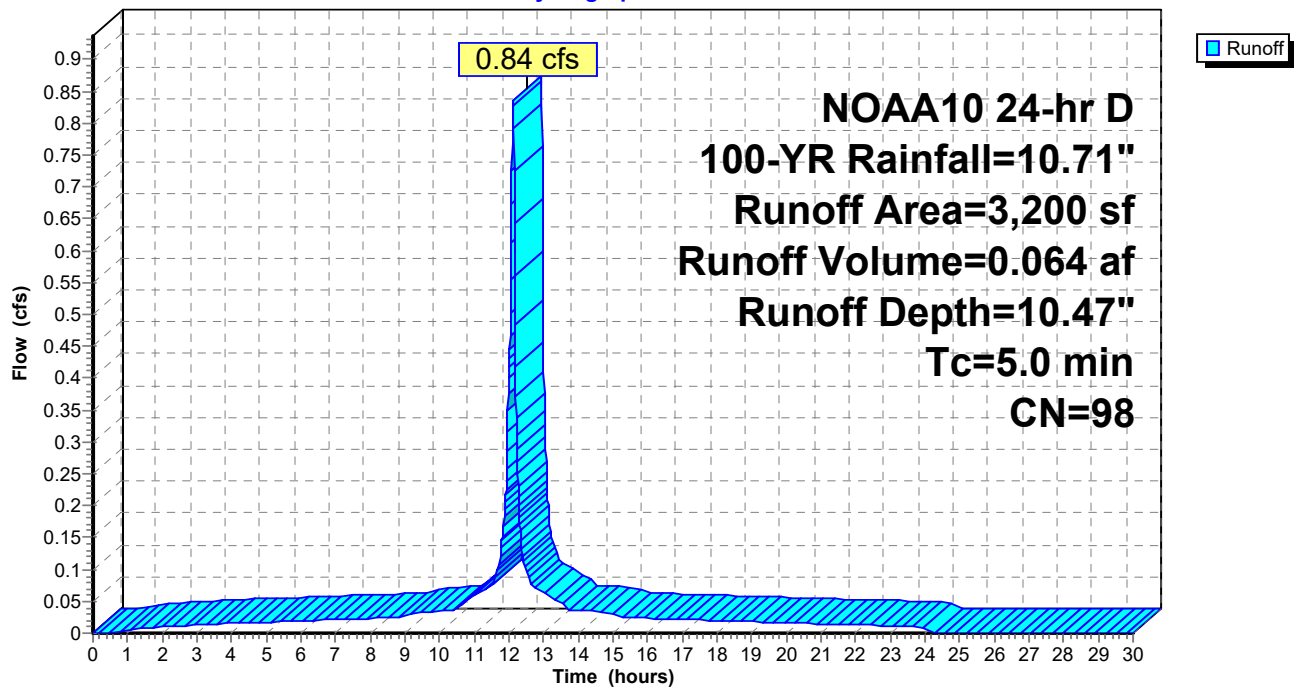
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 100-YR Rainfall=10.71"

Area (sf)	CN	Description
3,200	98	Roofs HSG C
3,200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 12P: P1f

Hydrograph



Summary for Pond 13P: Infiltration Basin #3

Inflow Area = 2.605 ac, 14.06% Impervious, Inflow Depth = 5.43" for 100-YR event
 Inflow = 10.54 cfs @ 12.24 hrs, Volume= 1.178 af
 Outflow = 10.27 cfs @ 12.27 hrs, Volume= 1.179 af, Atten= 3%, Lag= 1.9 min
 Discarded = 0.18 cfs @ 12.27 hrs, Volume= 0.254 af
 Primary = 10.08 cfs @ 12.27 hrs, Volume= 0.924 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.93' @ 12.27 hrs Surf.Area= 3,256 sf Storage= 2,307 cf

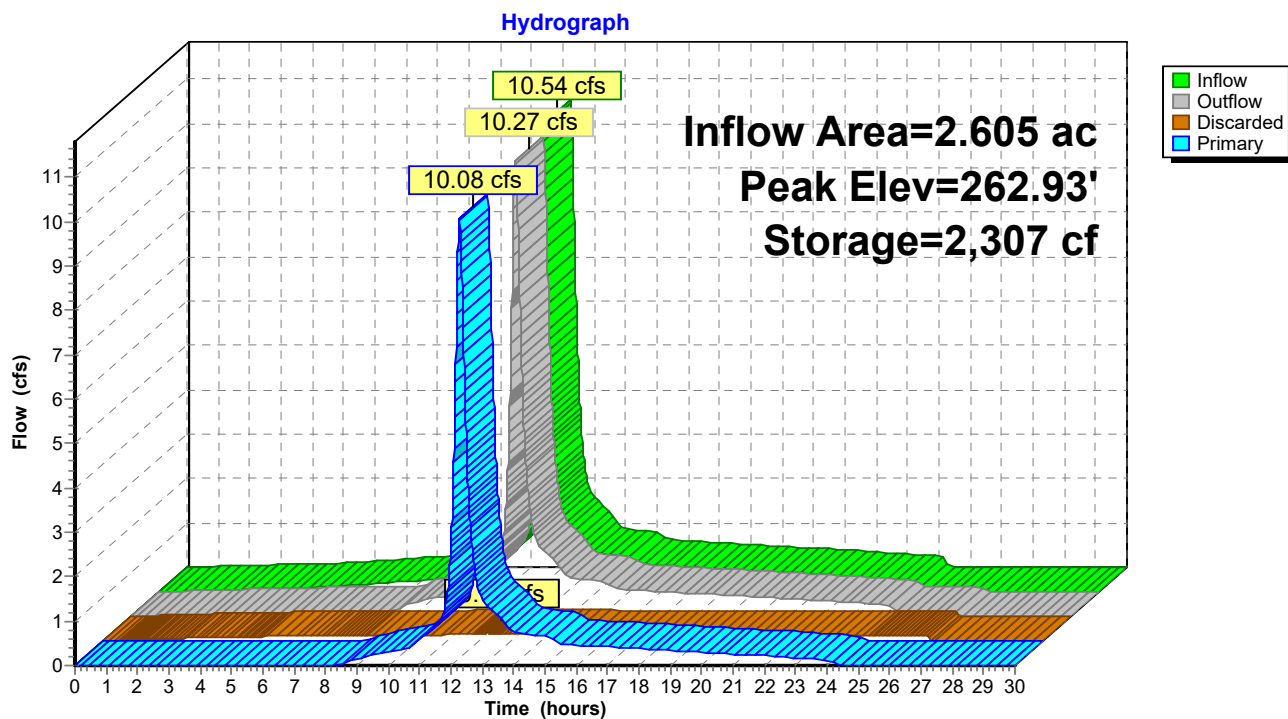
Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 21.0 min (852.2 - 831.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	262.00'	4,479 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)
262.00	1,784	213.0	0	0	1,784
263.50	4,379	317.0	4,479	4,479	6,188

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28)
			Elev. (feet) 262.40 263.50
			Width (feet) 8.00 8.00

Discarded OutFlow Max=0.18 cfs @ 12.27 hrs HW=262.93' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=10.08 cfs @ 12.27 hrs HW=262.93' TW=0.00' (Dynamic Tailwater)
 ↑**2=Custom Weir/Orifice** (Weir Controls 10.08 cfs @ 2.38 fps)

Pond 13P: Infiltration Basin #3

Summary for Subcatchment 14P: P1g

Runoff = 1.32 cfs @ 12.18 hrs, Volume= 0.117 af, Depth= 5.01"

Routed to Pond 15P : Existing pipe

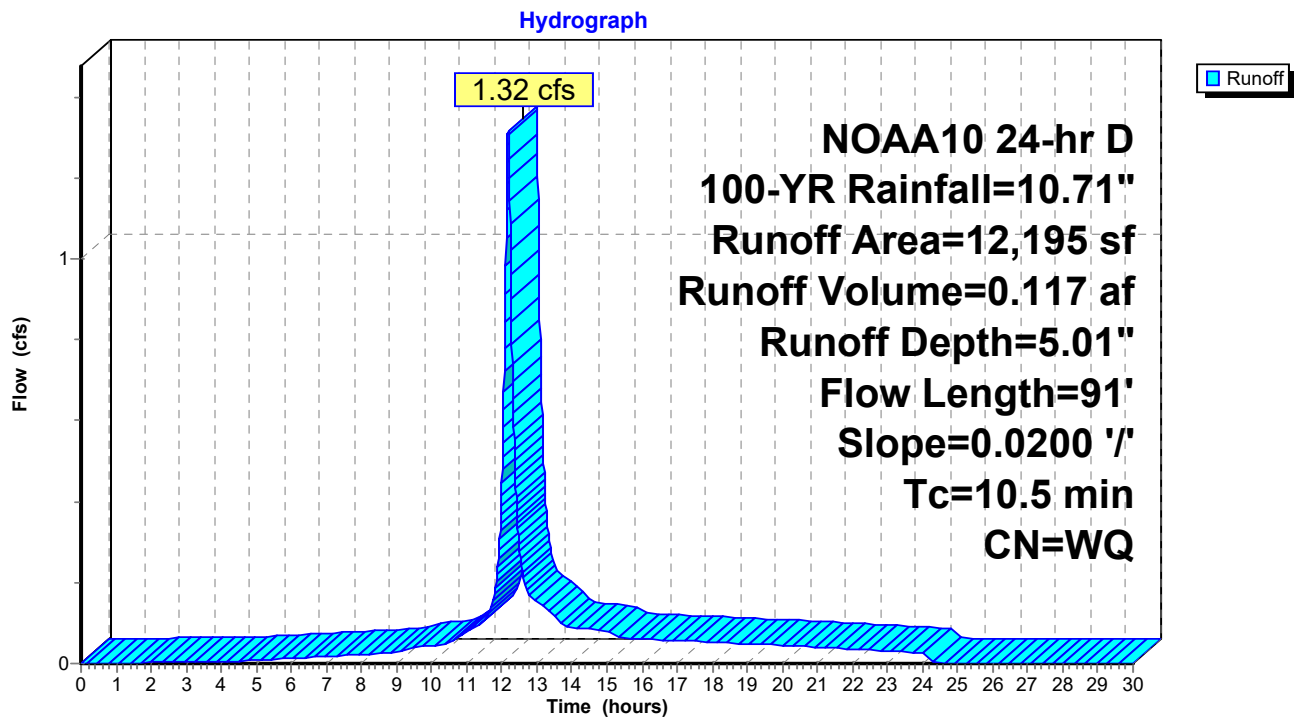
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

NOAA10 24-hr D 100-YR Rainfall=10.71"

Area (sf)	CN	Description
764	98	Roofs, HSG A
558	89	Gravel roads HSG C
3,895	70	Woods, Good HSG C
3,122	30	Woods, Good HSG A
989	76	Gravel roads HSG A
2,345	39	>75% Grass cover, Good HSG A
522	74	>75% Grass cover, Good HSG C
12,195		Weighted Average
11,431		93.74% Pervious Area
764		6.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	39	0.0200	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
1.2	52	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.5	91	Total			

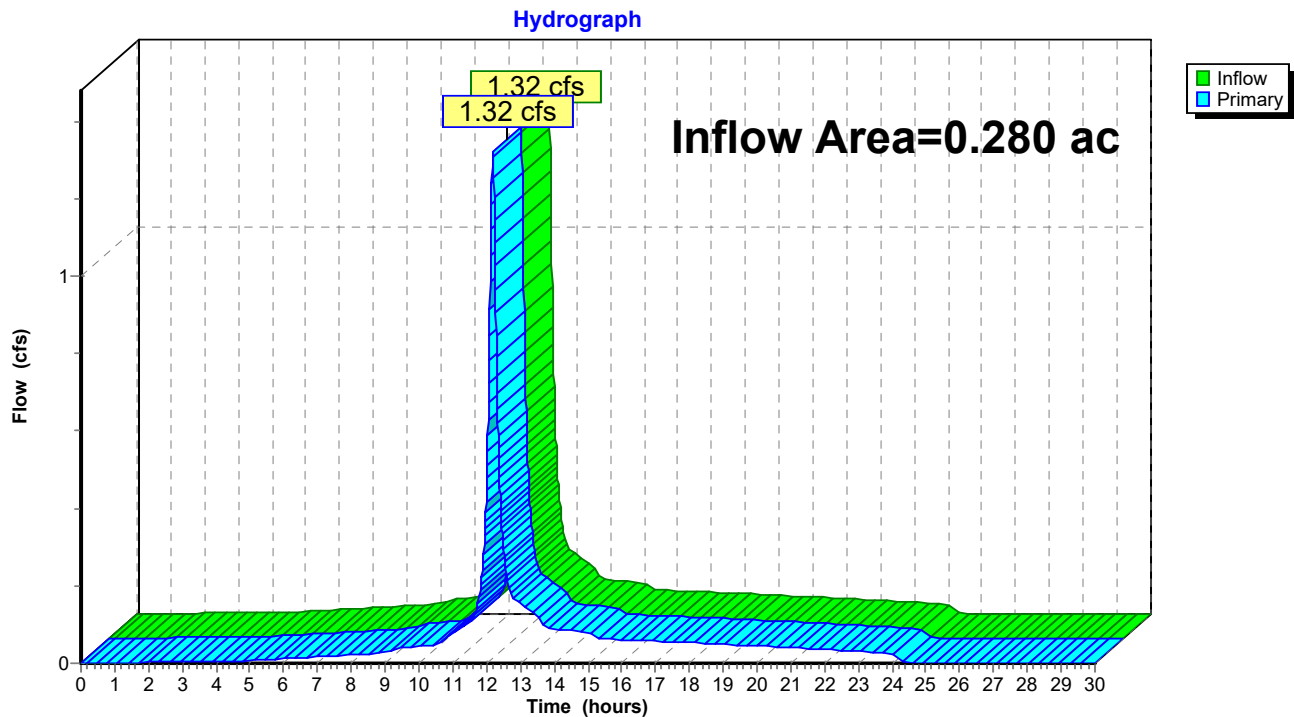
Subcatchment 14P: P1g



Summary for Pond 15P: Existing pipe

Inflow Area = 0.280 ac, 6.26% Impervious, Inflow Depth = 5.01" for 100-YR event
Inflow = 1.32 cfs @ 12.18 hrs, Volume= 0.117 af
Primary = 1.32 cfs @ 12.18 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 17P : Driveway Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Pond 15P: Existing pipe

Summary for Subcatchment 16P: P1h

Runoff = 0.88 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 1.65"
 Routed to Pond 17P : Driveway Pipe

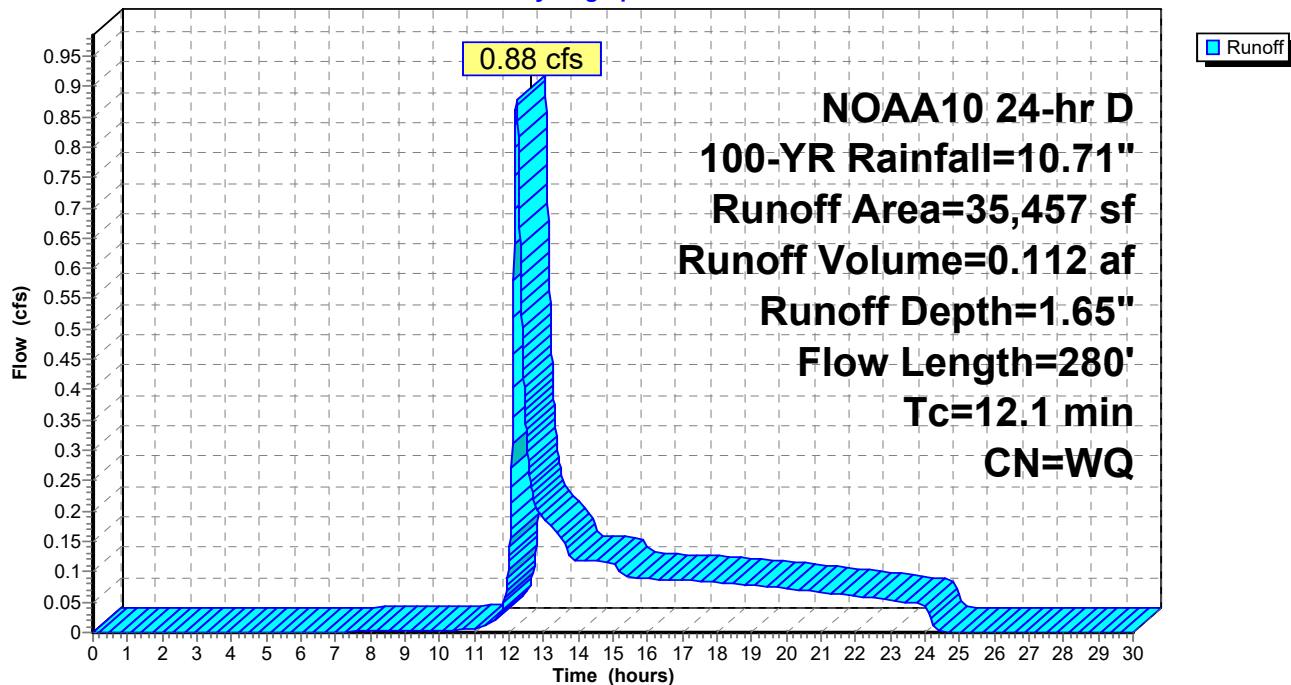
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 100-YR Rainfall=10.71"

Area (sf)	CN	Description
26,257	30	Woods, Good HSG A
8,598	39	>75% Grass cover, Good HSG A
602	74	>75% Grass cover, Good HSG C
35,457		Weighted Average
35,457		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0500	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
4.2	220	0.0300	0.87		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	10	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
12.1	280	Total			

Subcatchment 16P: P1h

Hydrograph



Summary for Pond 17P: Driveway Pipe

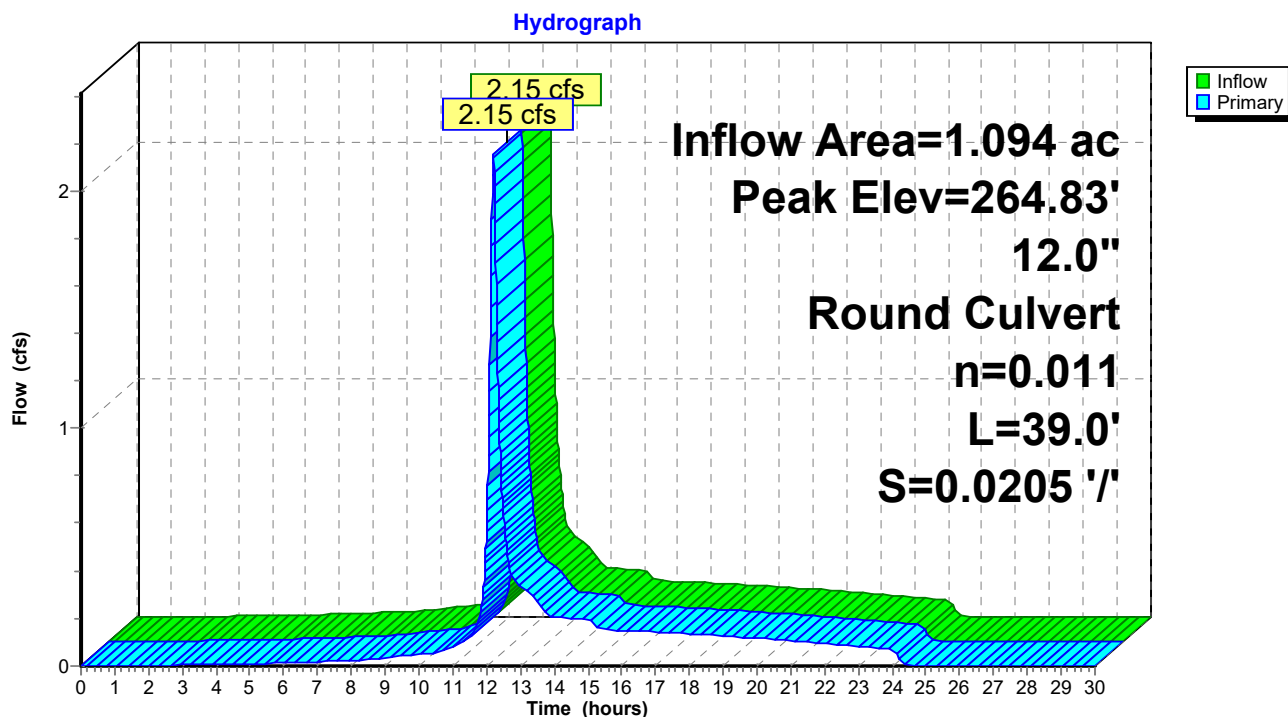
Inflow Area = 1.094 ac, 1.60% Impervious, Inflow Depth = 2.51" for 100-YR event
 Inflow = 2.15 cfs @ 12.19 hrs, Volume= 0.229 af
 Outflow = 2.15 cfs @ 12.19 hrs, Volume= 0.229 af, Atten= 0%, Lag= 0.0 min
 Primary = 2.15 cfs @ 12.19 hrs, Volume= 0.229 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 264.83' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.00'	12.0" Round Culvert L= 39.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 264.00' / 263.20' S= 0.0205 '/ Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.15 cfs @ 12.19 hrs HW=264.83' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 2.15 cfs @ 3.10 fps)

Pond 17P: Driveway Pipe



Summary for Subcatchment 18P: P1i

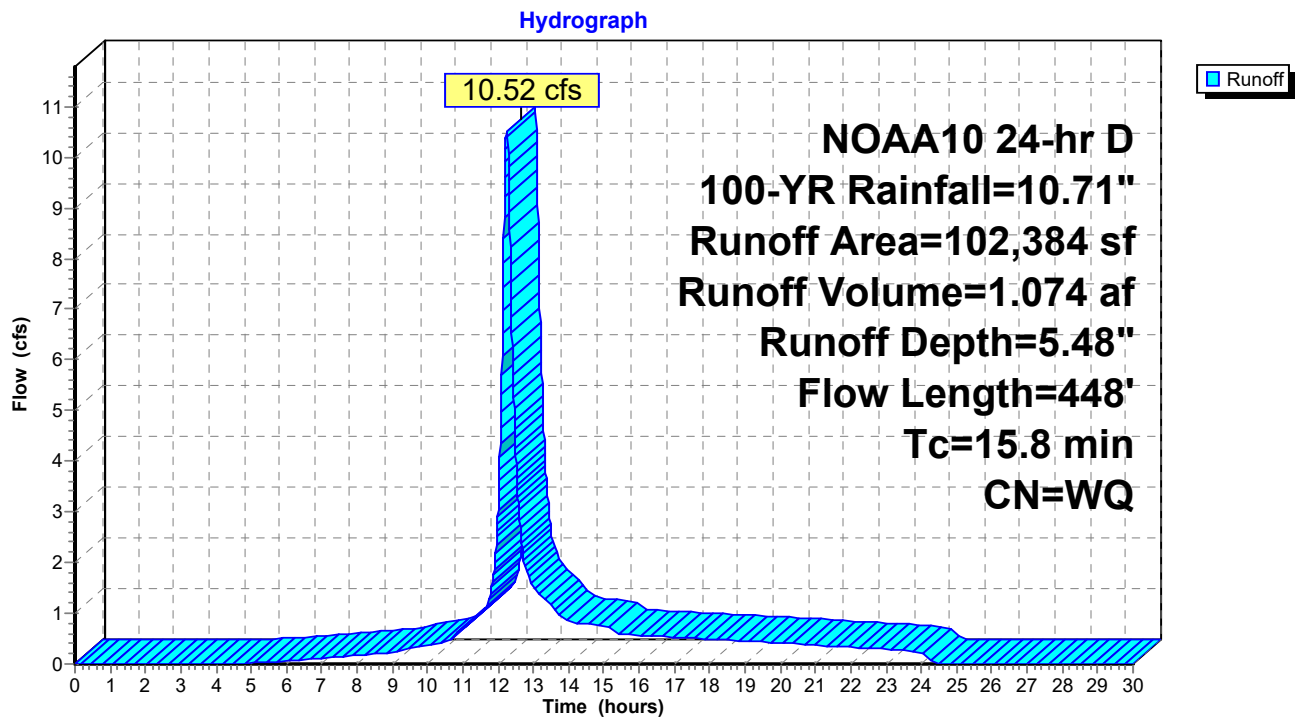
Runoff = 10.52 cfs @ 12.24 hrs, Volume= 1.074 af, Depth= 5.48"

Routed to Link 21P : Design Point #1: Flow to Wetlands

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=10.71"

Area (sf)	CN	Description
45,368	70	Woods, Good HSG C
13,717	30	Woods, Good HSG A
17,824	39	>75% Grass cover, Good HSG A
25,475	74	>75% Grass cover, Good HSG C
102,384		Weighted Average
102,384		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0400	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.82"
5.5	285	0.0150	0.86		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	113	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	448	Total			

Subcatchment 18P: P1i

Summary for Subcatchment 19P: P1j

Runoff = 0.42 cfs @ 12.12 hrs, Volume= 0.032 af, Depth=10.47"
 Routed to Pond 20P : Infiltration Field #1

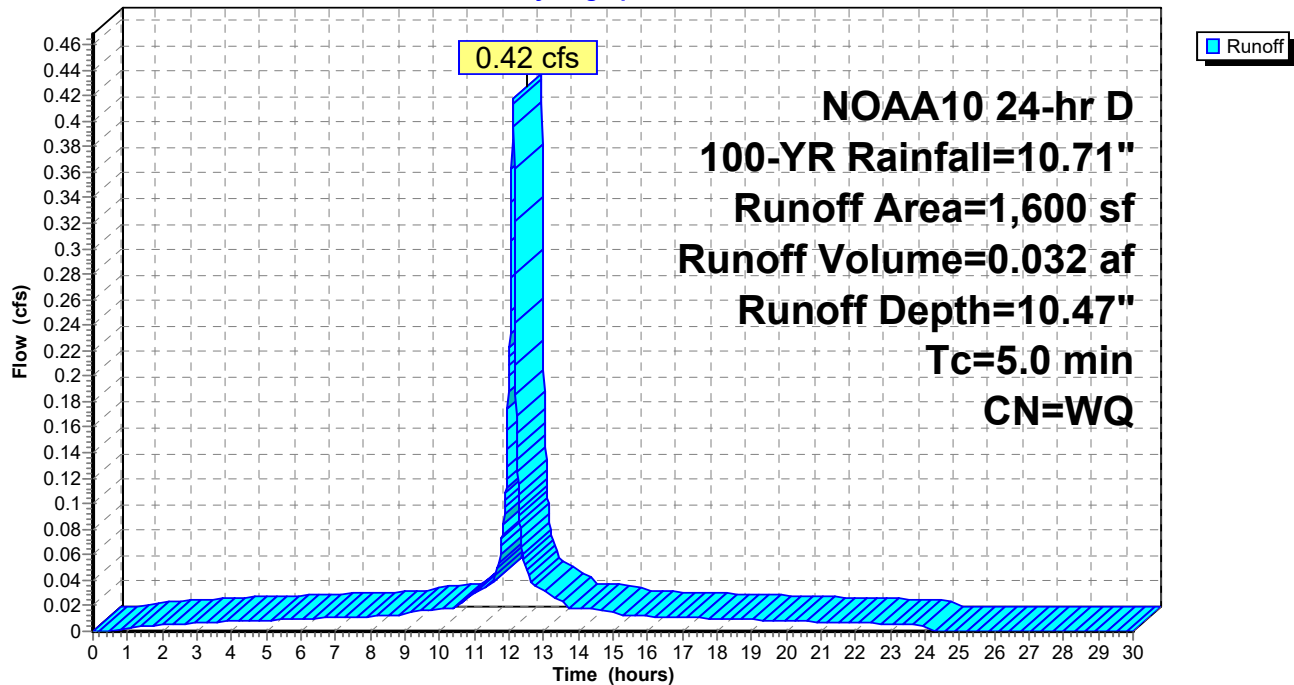
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 NOAA10 24-hr D 100-YR Rainfall=10.71"

Area (sf)	CN	Description
543	98	Roofs, HSG C
1,057	98	Roofs, HSG A
1,600		Weighted Average
1,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry, Roof
2.0	0				Total, Increased to minimum Tc = 5.0 min

Subcatchment 19P: P1j

Hydrograph



Summary for Pond 20P: Infiltration Field #1

Inflow Area = 0.037 ac, 100.00% Impervious, Inflow Depth = 10.47" for 100-YR event
 Inflow = 0.42 cfs @ 12.12 hrs, Volume= 0.032 af
 Outflow = 0.48 cfs @ 12.12 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 12.01 hrs, Volume= 0.023 af
 Primary = 0.47 cfs @ 12.12 hrs, Volume= 0.009 af
 Routed to Link 21P : Design Point #1: Flow to Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
 Peak Elev= 262.60' @ 12.12 hrs Surf.Area= 205 sf Storage= 219 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 116.9 min (855.0 - 738.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	260.30'	132 cf	11.67'W x 17.50'L x 2.04'H Field A 417 cf Overall - 87 cf Embedded = 330 cf x 40.0% Voids
#2A	260.80'	87 cf	Cultec C-100HD x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 3 rows
#3	262.30'	1 cf	1.00'D x 1.00'H Vertical Cone/Cylinder
		219 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.30'	2.410 in/hr Exfiltration over Surface area
#2	Primary	262.30'	4.0" Round Culvert X 3.00 L= 1.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 262.30' / 262.20' S= 0.1000 ' ' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 12.01 hrs HW=262.42' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.47 cfs @ 12.12 hrs HW=262.60' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 0.47 cfs @ 1.87 fps)

Pond 20P: Infiltration Field #1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

2 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 15.50' Row Length +12.0" End Stone x 2 = 17.50' Base Length

3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 12.0" Side Stone x 2 = 11.67' Base Width

6.0" Stone Base + 12.5" Chamber Height + 6.0" Stone Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 86.6 cf Chamber Storage

416.8 cf Field - 86.6 cf Chambers = 330.3 cf Stone x 40.0% Voids = 132.1 cf Stone Storage

Chamber Storage + Stone Storage = 218.7 cf = 0.005 af

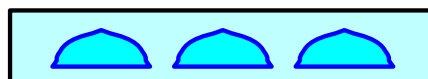
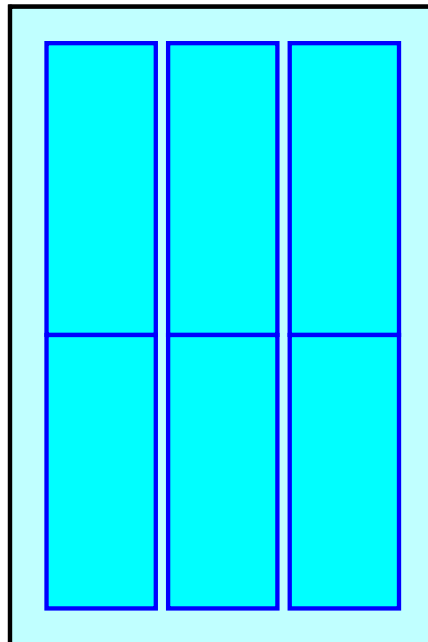
Overall Storage Efficiency = 52.5%

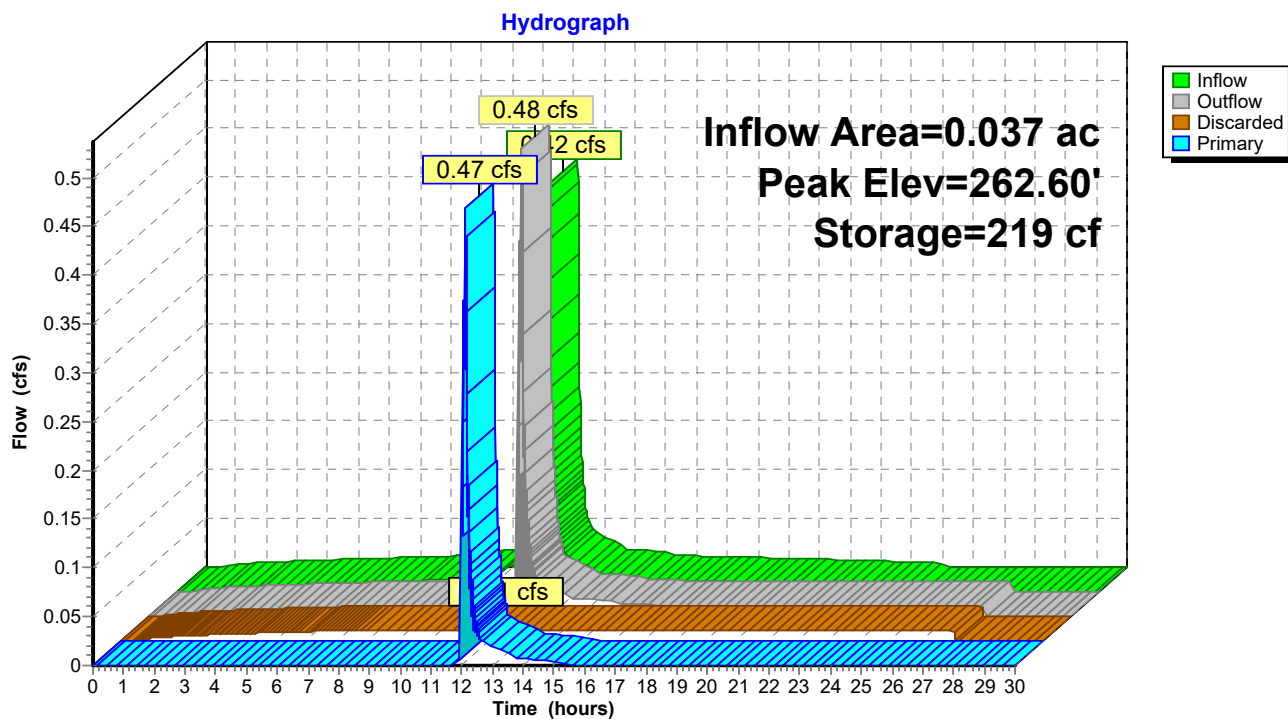
Overall System Size = 17.50' x 11.67' x 2.04'

6 Chambers

15.4 cy Field

12.2 cy Stone

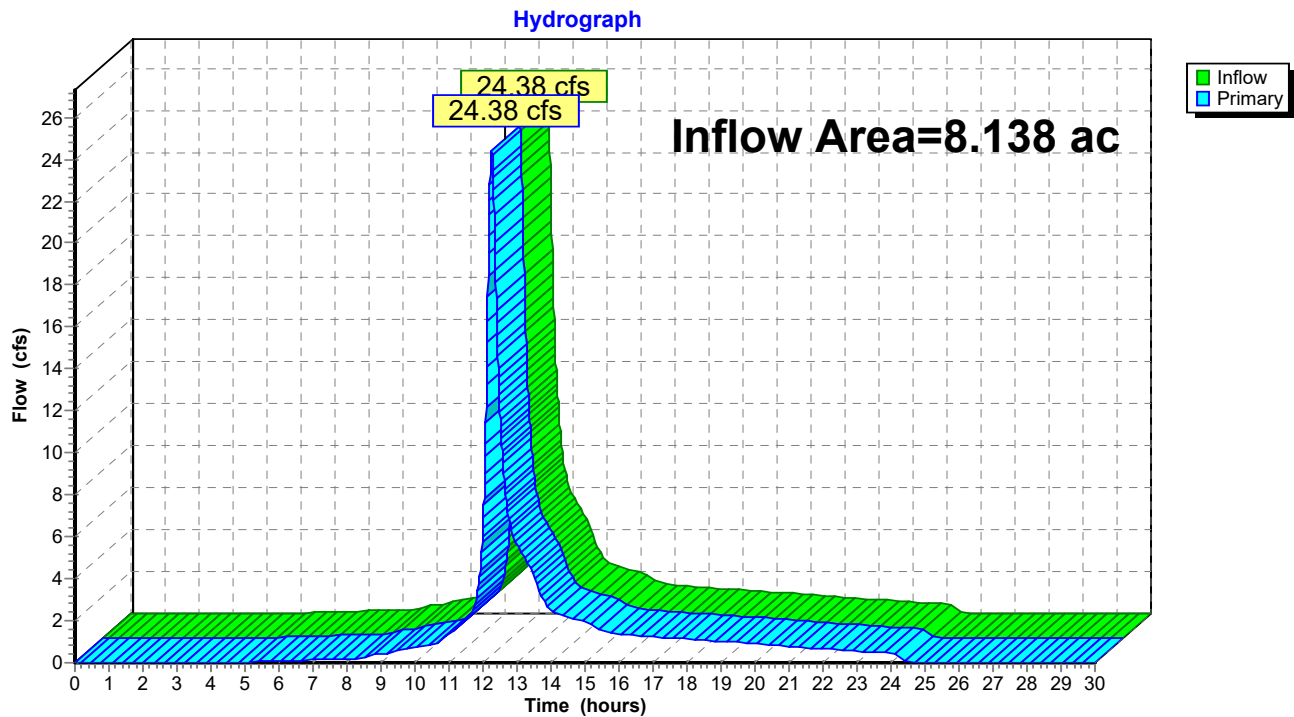


Pond 20P: Infiltration Field #1

Summary for Link 21P: Design Point #1: Flow to Wetlands

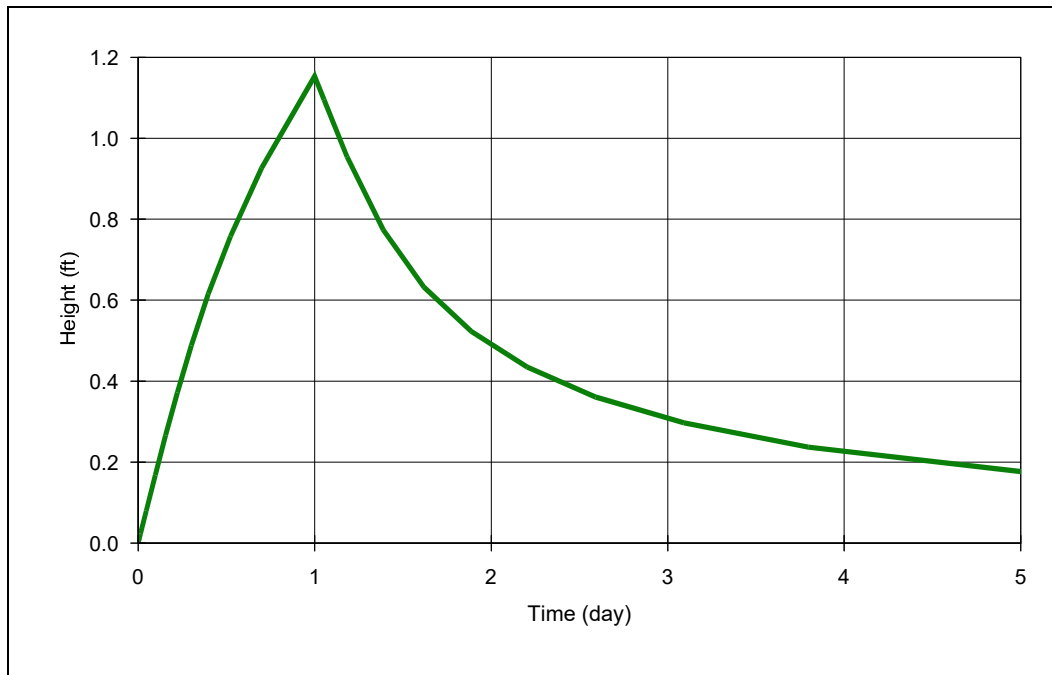
Inflow Area = 8.138 ac, 11.15% Impervious, Inflow Depth = 3.90" for 100-YR event
Inflow = 24.38 cfs @ 12.24 hrs, Volume= 2.643 af
Primary = 24.38 cfs @ 12.24 hrs, Volume= 2.643 af, Atten= 0%, Lag= 0.0 min

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

Link 21P: Design Point #1: Flow to Wetlands

ATTACHMENT L: 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: 2/10/2026 TIME: 12:09:44 PM

INPUT PARAMETERS

Application rate: 0.35 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: 55 ft

Width of application area: 52.6 ft

Constant head boundary used at: 200 ft

Groundwater mounding @

X coordinate: 0 ft

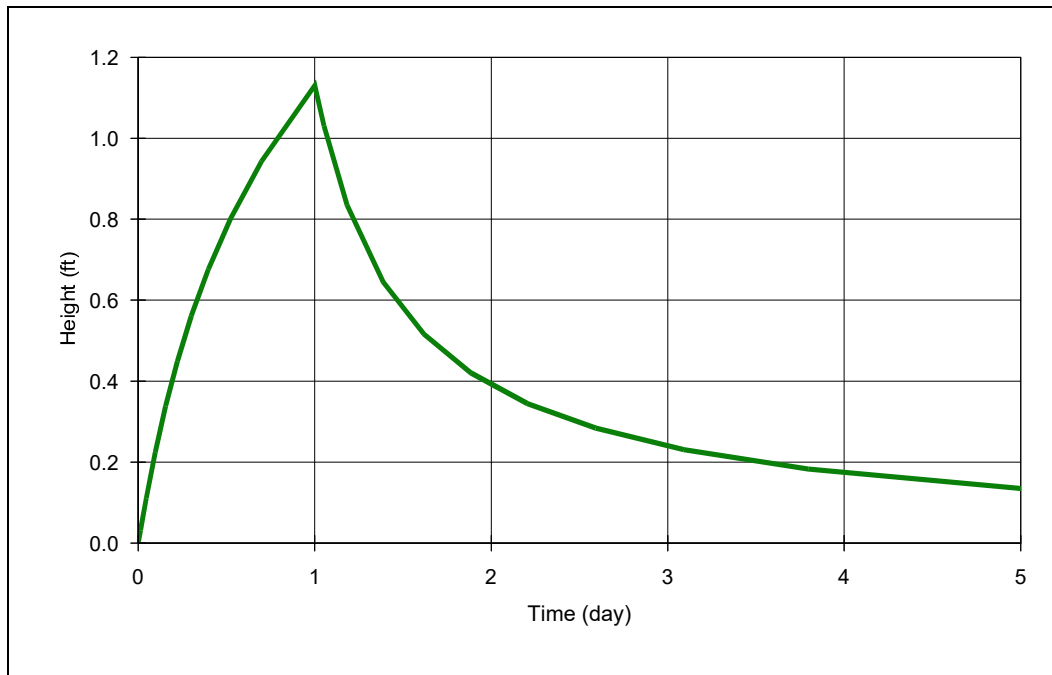
Y coordinate: 0 ft

Total volume applied: 1012.55 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.02
0	0.08
0.1	0.17
0.2	0.27
0.2	0.37
0.3	0.49
0.4	0.62
0.5	0.76
0.7	0.93
1	1.15
1.1	1.1
1.2	0.95
1.4	0.77
1.6	0.63
1.9	0.52
2.2	0.44
2.6	0.36
3.1	0.3
3.8	0.24
5	0.18

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Legacy Engineering

PROJECT: Infiltration Basin #2

ANALYST: Daniel J. Merrikin, P.E.

DATE: 2/10/2026 TIME: 12:18:00 PM

INPUT PARAMETERS

Application rate: 0.49 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: 55 ft

Width of application area: 28.3 ft

Constant head boundary used at: 200 ft

Groundwater mounding @

X coordinate: 0 ft

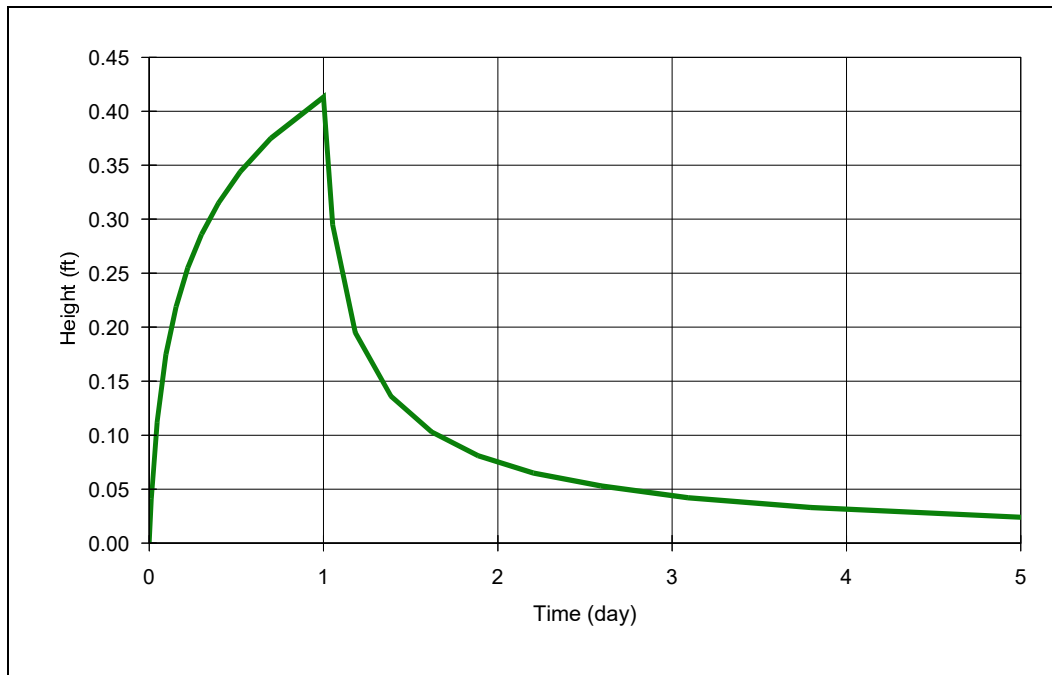
Y coordinate: 0 ft

Total volume applied: 762.685 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.03
0	0.11
0.1	0.22
0.2	0.34
0.2	0.45
0.3	0.56
0.4	0.68
0.5	0.8
0.7	0.94
1	1.13
1.1	1.03
1.2	0.84
1.4	0.64
1.6	0.52
1.9	0.42
2.2	0.34
2.6	0.28
3.1	0.23
3.8	0.18
5	0.14

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Legacy Engineering

PROJECT: Infiltration Field #1

ANALYST: Daniel J. Merrikin, P.E.

DATE: 2/10/2026 TIME: 1:17:36 PM

INPUT PARAMETERS

Application rate: 0.65 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: 17.5 ft

Width of application area: 11.67 ft

Constant head boundary used at: 200 ft

Groundwater mounding @

X coordinate: 0 ft

Y coordinate: 0 ft

Total volume applied: 132.7462 cft

MODEL RESULTS

Time (day)	Mound Height (ft)
0	0
0	0.04
0	0.11
0.1	0.18
0.2	0.22
0.2	0.26
0.3	0.29
0.4	0.32
0.5	0.34
0.7	0.38
1	0.41
1.1	0.3
1.2	0.2
1.4	0.14
1.6	0.1
1.9	0.08
2.2	0.06
2.6	0.05
3.1	0.04
3.8	0.03
5	0.02

ATTACHMENT M: RATIONAL METHOD CALCULATIONS

RATIONAL METHOD DRAINAGE STRUCTURE CALCULATIONS

LOCATION: 148 Holliston Street OWNER: Alden Ellis Jr.

DATE: 2026/03/24

BY: DJM

DESIGN STORM: 25 YR.

LOCATION			AREA		C	C x A	Sum C x A	FLOW TIME (min.)			i	Q (cfs)	DESIGN				
STREET	FROM	TO	INCRE- MENT	TOTAL				To Inlet	In Chnl	Time Conc			Size (in.)	Slope %	n	Full Cap (cfs)	Full Vel. (fps)
	CB2+85	DMH2+93	0.74		0.39	0.29		14.2		14.2	5.2	1.5	12	0.020	0.011	6.0	7.6
	DMH2+93	DMH4+05		0.74			0.29	14.2		14.2	5.2	1.5	12	0.010	0.011	4.2	5.4
	CB4+04	DMH4+05	0.29		0.46	0.13		6.6		6.6	6.5	0.9	12	0.006	0.011	3.3	4.2
	DMH4+05	Basin#1		1.03			0.42	14.2		14.2	6.5	2.8	15	0.005	0.011	5.4	4.4