

# SITEC

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Land Use Planning

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## STORMWATER OPERATION & MAINTENANCE PLAN

PROJECT: Self Storage Facility  
91 Cove Street  
New Bedford, MA 02744

OWNER/OPERATOR: WoodNB, LLC  
23219 West 30<sup>th</sup> Street North  
Haskell, OK 74436

**Responsible Party:** The maintenance of the stormwater management system for the proposed project shall be the responsibility of the contractor during the construction period. Upon completion of construction and full stabilization of the site, the responsibility for the maintenance will shift to the property owner.

### INSPECTION PROTOCOL

1. The parking area and adjacent portions of the site will be checked and cleaned of accumulated litter on a daily basis.
2. The parking surface, catch basins, and surrounding areas shall be cleaned upon completion of all construction activities prior to acceptance by the Owner.
3. The catch basins shall be inspected in the Spring and Fall and cleaned of accumulated debris as needed.
4. The FloGard inserts shall be inspected quarterly and cleaned as needed. The insert media shall be replaced annually as recommended by the manufacturer.
5. The perimeter shall be inspected quarterly for accumulated debris and/or erosion. Sediment shall be removed and repairs, if required, shall be completed.

### NOTES

1. All sediment and hydrocarbons shall be properly handled and disposed of in accordance with local, state, and Federal guidelines and regulations.
2. Where the need for maintenance is contributing to a water quality problem, immediate action shall be taken by the Owner to correct the problem. Corrective action shall be taken within 14 days.

3. Estimated cost of yearly maintenance - \$1,00 - \$1,500
4. Snow disposal shall be the Owner's responsibility. Snow will be disposed of in the area designated on the site plan or removed from the site for legal, offsite disposal.



# Checklist for Stormwater Report

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



## A. Introduction

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.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- 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.

<sup>1</sup> 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.

<sup>2</sup> 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

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## 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.

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### Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

Signature and Date

---

## Checklist

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

- ☐ New development
- ☒ Redevelopment
- ☐ Mix of New Development and Redevelopment



# Checklist for Stormwater Report

## Checklist (continued)

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

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

## Standard 1: No New Untreated Discharges

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



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - ☒ Static
  - ☐ Simple Dynamic
  - ☐ Dynamic Field<sup>1</sup>
- ☐ 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.

<sup>1</sup> 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.

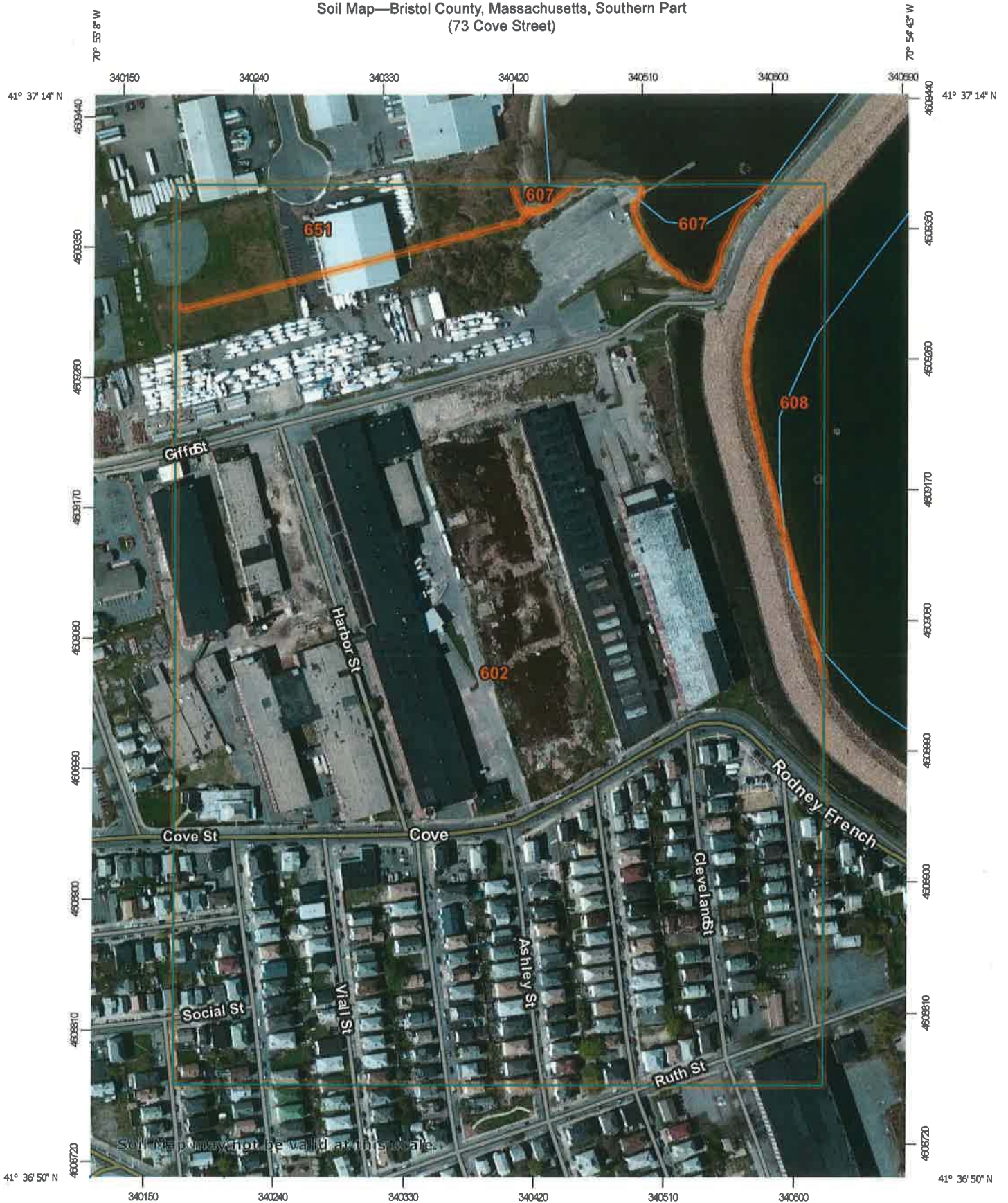
### Standard 9: Operation and Maintenance Plan

- ☒ 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.

Soil Map—Bristol County, Massachusetts, Southern Part  
(73 Cove Street)



Map Scale: 1:3,640 if printed on A portrait (8.5" x 11") sheet.



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

























































Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

1/31/2018  
Page 1 of 3

## MAP LEGEND

<b>Area of Interest (AOI)</b>		<b>Area of Interest (AOI)</b>	
<b>Soils</b>		<b>Soil Map Unit Polygons</b>	
		<b>Soil Map Unit Lines</b>	
		<b>Soil Map Unit Points</b>	
<b>Special Point Features</b>		<b>Water Features</b>	
		<b>Streams and Canals</b>	
		<b>Transportation</b>	
		<b>Rails</b>	
		<b>Interstate Highways</b>	
		<b>US Routes</b>	
		<b>Major Roads</b>	
		<b>Local Roads</b>	
		<b>Background</b>	
		<b>Aerial Photography</b>	
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			
			

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Bristol County, Massachusetts, Southern Part  
Survey Area Data: Version 11, Oct 6, 2017

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

Date(s) aerial images were photographed: Dec 31, 2009—Jun 7, 2016

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.


## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres In AOI	Percent of AOI
602	Urban land	62.1	89.8%
607	Water, saline	1.1	1.6%
608	Water, ocean	2.6	3.7%
651	Udorthents, smoothed	3.4	4.9%
<b>Totals for Area of Interest</b>		<b>69.2</b>	<b>100.0%</b>

  
Developed Area 1



Infiltration System #1

  
Developed Area 2



Infiltration System #2

  
Developed Area 3



Infiltration System #3



**Green River Development**

Prepared by {enter your company name here}

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Type III 24-hr 2 Year Storm Rainfall=3.40"

Printed 2/13/2018

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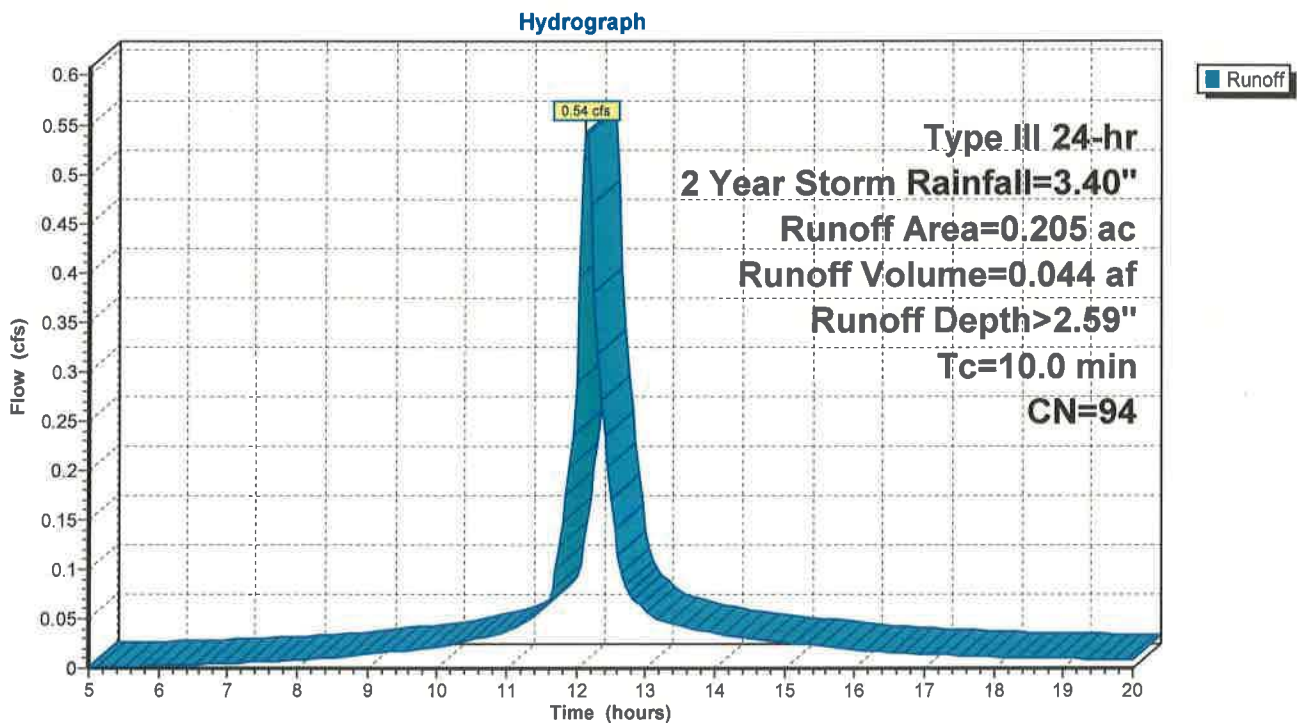
**Summary for Subcatchment D-1: Developed Area 1**

Runoff = 0.54 cfs @ 12.14 hrs, Volume= 0.044 af, Depth&gt; 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.40"

Area (ac)	CN	Description
* 0.185	98	Impervious
0.020	61	>75% Grass cover, Good, HSG B
0.205	94	Weighted Average
0.020		9.76% Pervious Area
0.185		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, AB

**Subcatchment D-1: Developed Area 1**

**Summary for Subcatchment D-2: Developed Area 2**

Runoff = 0.54 cfs @ 12.14 hrs, Volume= 0.044 af, Depth> 2.59"

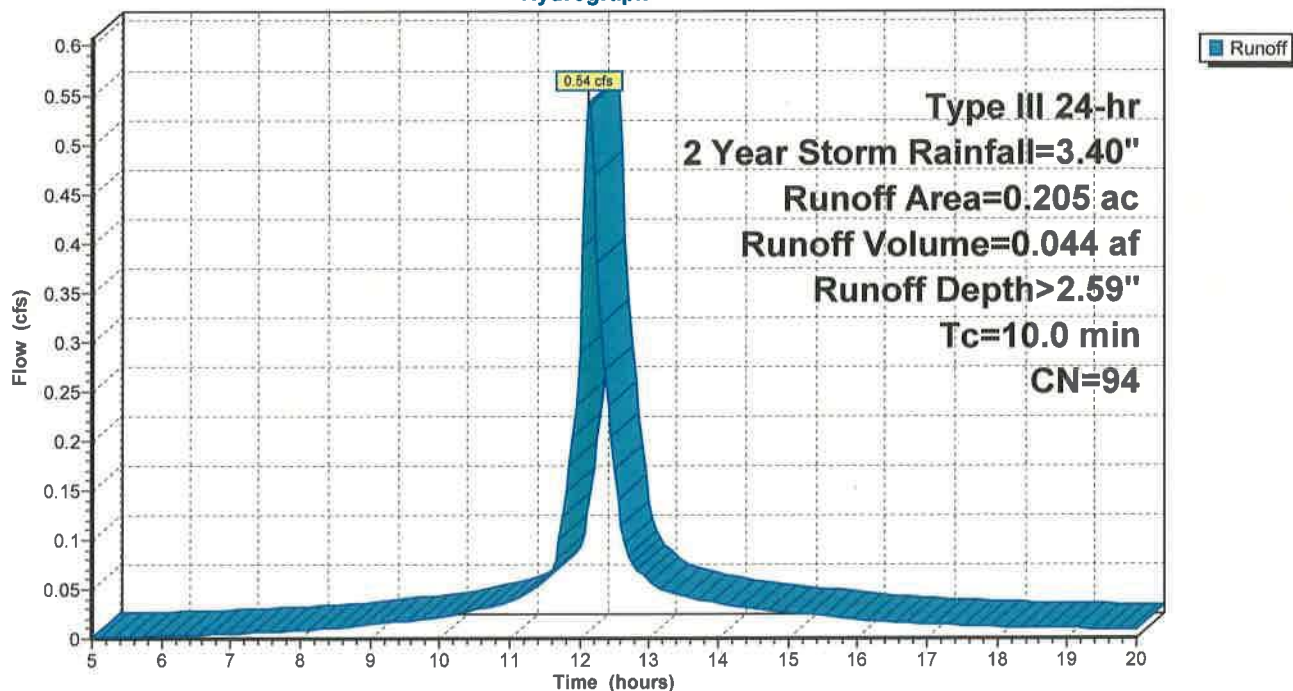
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.40"

Area (ac)	CN	Description
* 0.185	98	Impervious
0.020	61	>75% Grass cover, Good, HSG B
0.205	94	Weighted Average
0.020		9.76% Pervious Area
0.185		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, AB

**Subcatchment D-2: Developed Area 2**

Hydrograph



**Summary for Subcatchment D-3: Developed Area 3**

Runoff = 0.61 cfs @ 12.14 hrs, Volume= 0.051 af, Depth> 2.78"

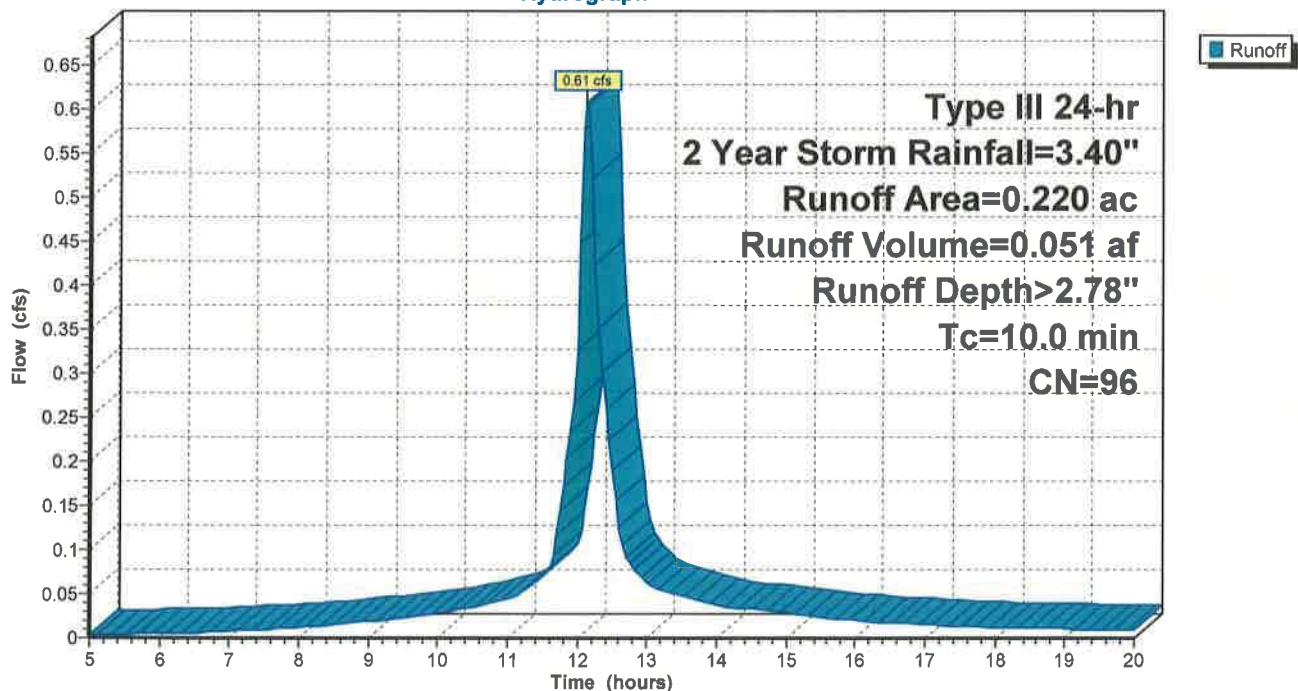
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.40"

Area (ac)	CN	Description
* 0.210	98	Impervious
0.010	61	>75% Grass cover, Good, HSG B
0.220	96	Weighted Average
0.010		4.55% Pervious Area
0.210		95.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, AB

**Subcatchment D-3: Developed Area 3**

Hydrograph



**Green River Development**

Type III 24-hr 2 Year Storm Rainfall=3.40"

Prepared by {enter your company name here}

Printed 2/13/2018

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**Summary for Pond I-1: Infiltration System #1**

Inflow Area = 0.205 ac, 90.24% Impervious, Inflow Depth > 2.59" for 2 Year Storm event  
 Inflow = 0.54 cfs @ 12.14 hrs, Volume= 0.044 af  
 Outflow = 0.10 cfs @ 11.75 hrs, Volume= 0.044 af, Atten= 82%, Lag= 0.0 min  
 Discarded = 0.10 cfs @ 11.75 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 3.98' @ 12.64 hrs Surf.Area= 0 sf Storage= 579 cf

Plug-Flow detention time= 37.5 min calculated for 0.044 af (100% of inflow)  
 Center-of-Mass det. time= 37.1 min ( 796.8 - 759.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	3.00'	1,894 cf	<b>Custom Stage Data</b> Listed below

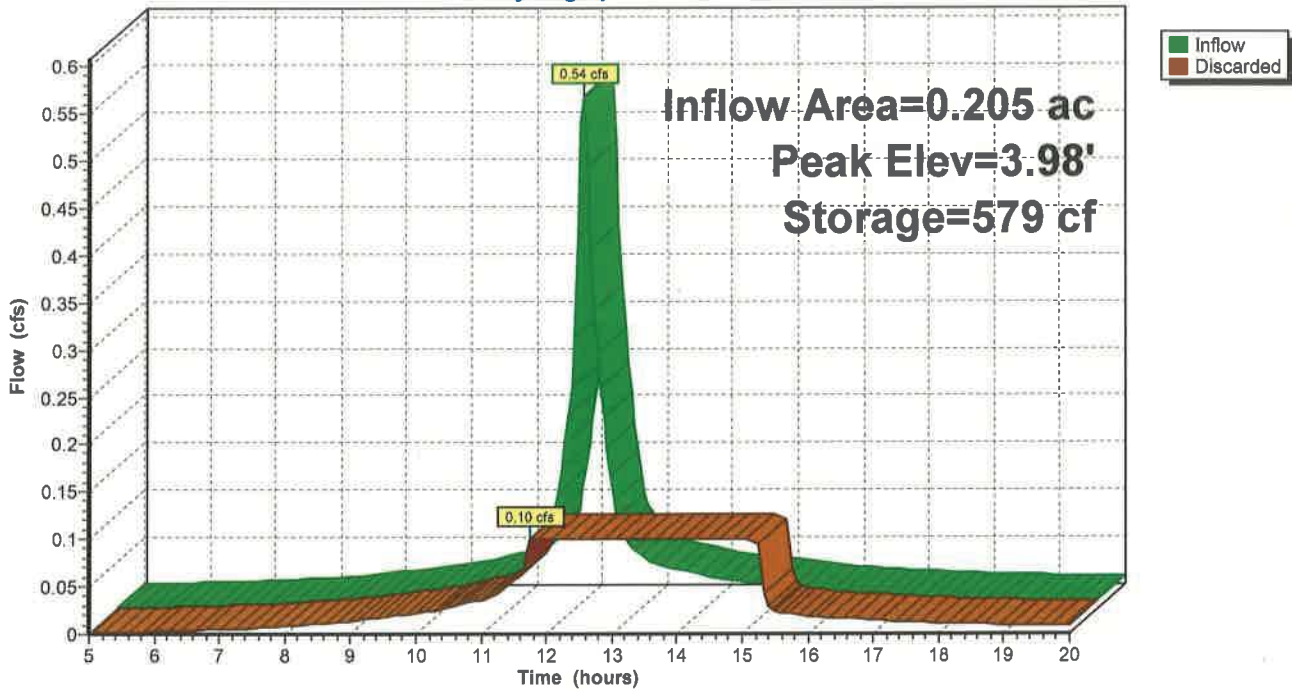
Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
3.00	0	0
3.50	272	272
4.00	319	591
4.50	321	912
5.00	315	1,227
5.67	395	1,622
6.17	272	1,894

Device	Routing	Invert	Outlet Devices
#1	Discarded	3.00'	<b>0.10 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.10 cfs @ 11.75 hrs HW=3.03' (Free Discharge)  
 ↑ **1=Exfiltration** (Exfiltration Controls 0.10 cfs)

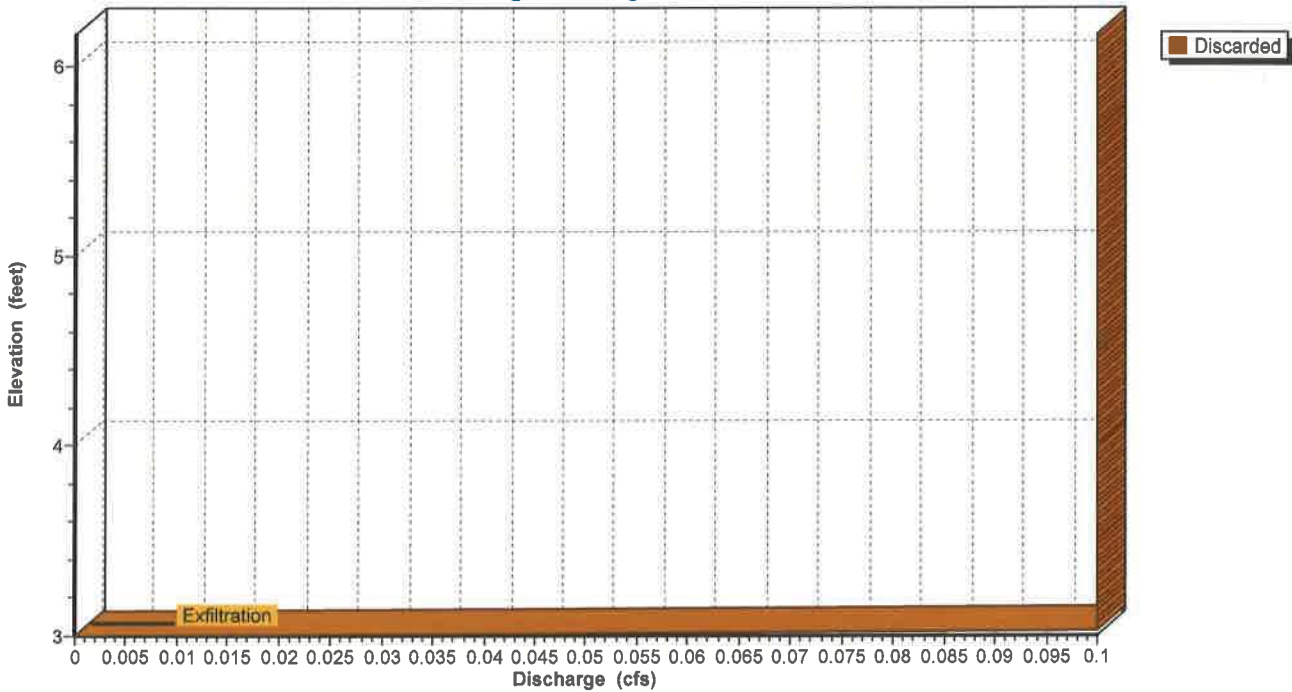
### Pond I-1: Infiltration System #1

Hydrograph

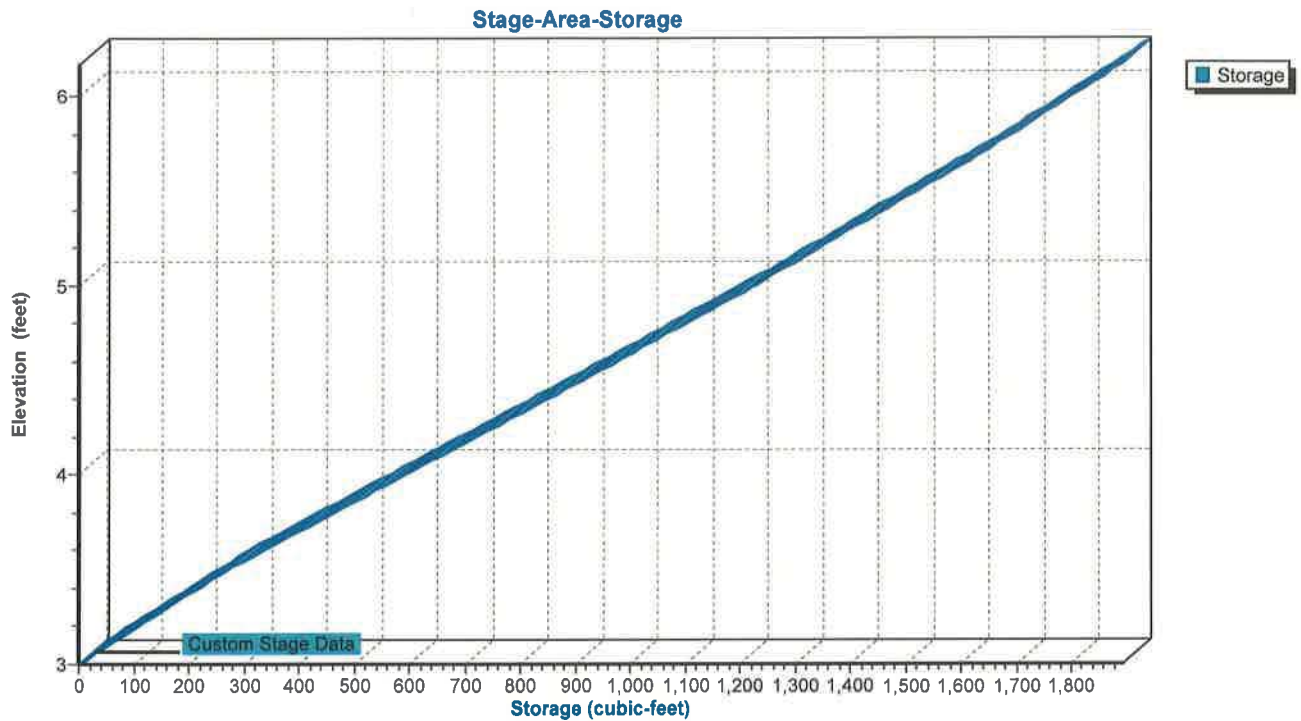


### Pond I-1: Infiltration System #1

Stage-Discharge



### Pond I-1: Infiltration System #1



**Green River Development**

Type III 24-hr 2 Year Storm Rainfall=3.40"

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Printed 2/13/2018

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**Summary for Pond I-2: Infiltration System #2**

Inflow Area = 0.205 ac, 90.24% Impervious, Inflow Depth > 2.59" for 2 Year Storm event  
 Inflow = 0.54 cfs @ 12.14 hrs, Volume= 0.044 af  
 Outflow = 0.08 cfs @ 11.70 hrs, Volume= 0.044 af, Atten= 85%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.70 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 4.80' @ 12.73 hrs Surf.Area= 0 sf Storage= 648 cf

Plug-Flow detention time= 57.3 min calculated for 0.044 af (100% of inflow)  
 Center-of-Mass det. time= 56.9 min ( 816.5 - 759.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	1,572 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
3.50	0	0
4.00	226	226
4.50	265	491
5.00	266	757
5.50	261	1,018
6.17	328	1,346
6.67	226	1,572

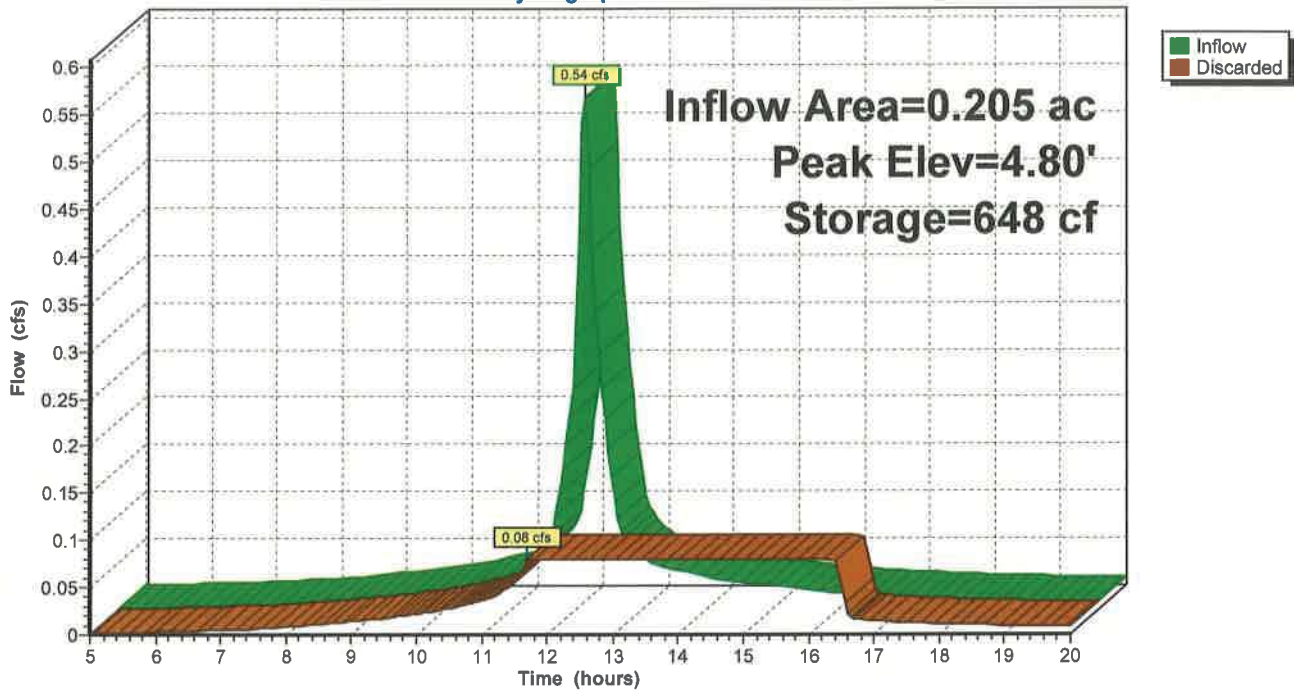
Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	<b>0.08 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.08 cfs @ 11.70 hrs HW=3.53' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

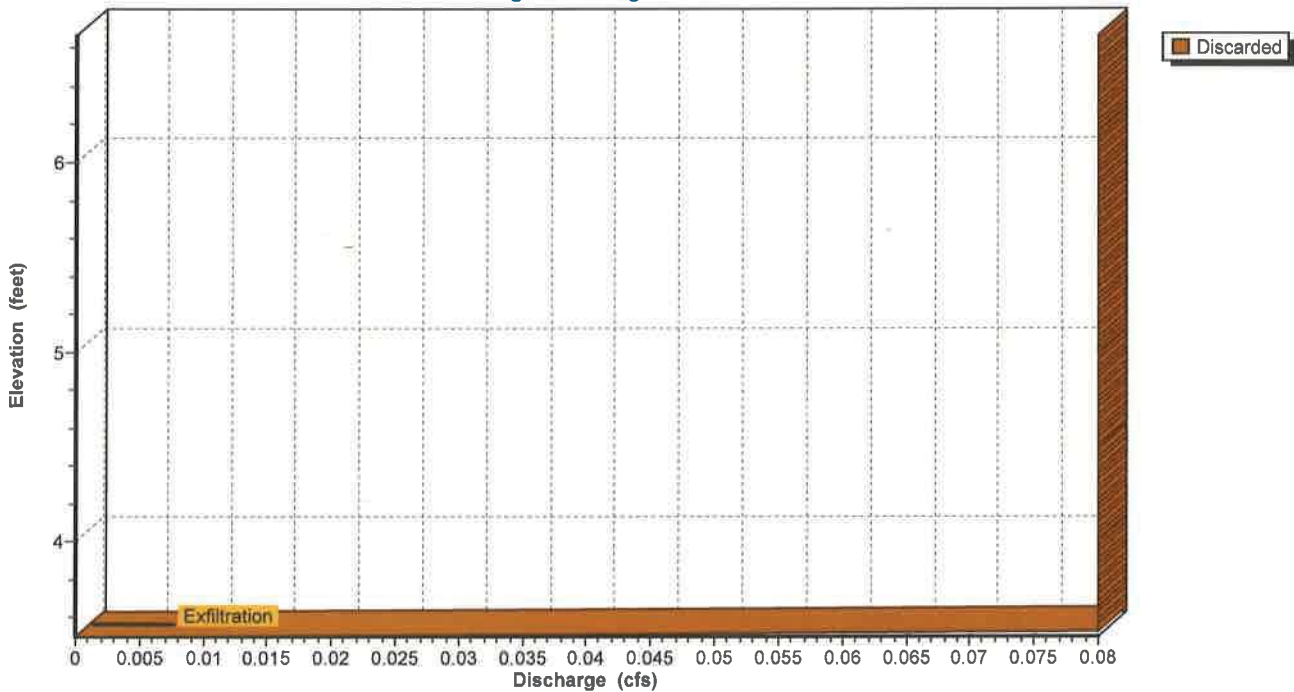
## Pond I-2: Infiltration System #2

Hydrograph

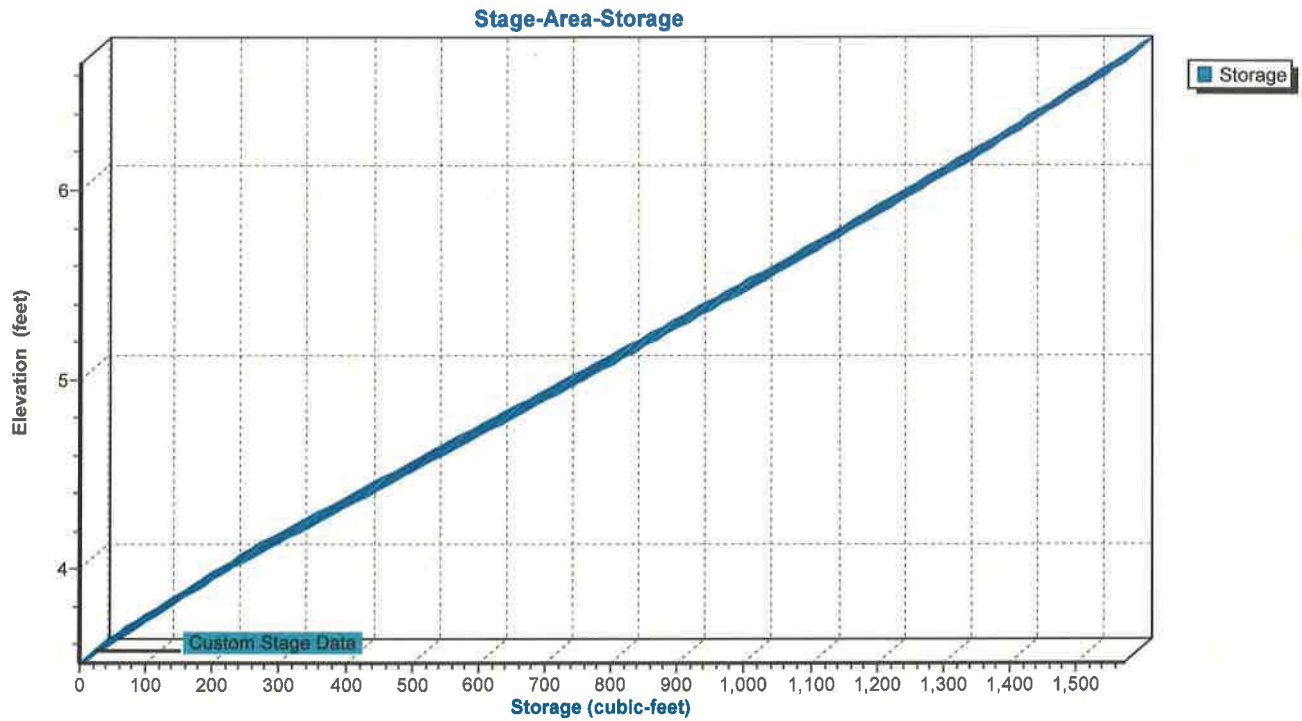


## Pond I-2: Infiltration System #2

Stage-Discharge



## Pond I-2: Infiltration System #2



**Green River Development**

Type III 24-hr 2 Year Storm Rainfall=3.40"

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**Summary for Pond I-3: Infiltration System #3**

Inflow Area = 0.220 ac, 95.45% Impervious, Inflow Depth > 2.78" for 2 Year Storm event  
 Inflow = 0.61 cfs @ 12.14 hrs, Volume= 0.051 af  
 Outflow = 0.10 cfs @ 11.70 hrs, Volume= 0.051 af, Atten= 84%, Lag= 0.0 min  
 Discarded = 0.10 cfs @ 11.70 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 3.53' @ 12.67 hrs Surf.Area= 0 sf Storage= 691 cf

Plug-Flow detention time= 45.1 min calculated for 0.051 af (100% of inflow)  
 Center-of-Mass det. time= 44.7 min ( 795.3 - 750.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	2.15'	1,572 cf	<b>Custom Stage Data Listed below</b>

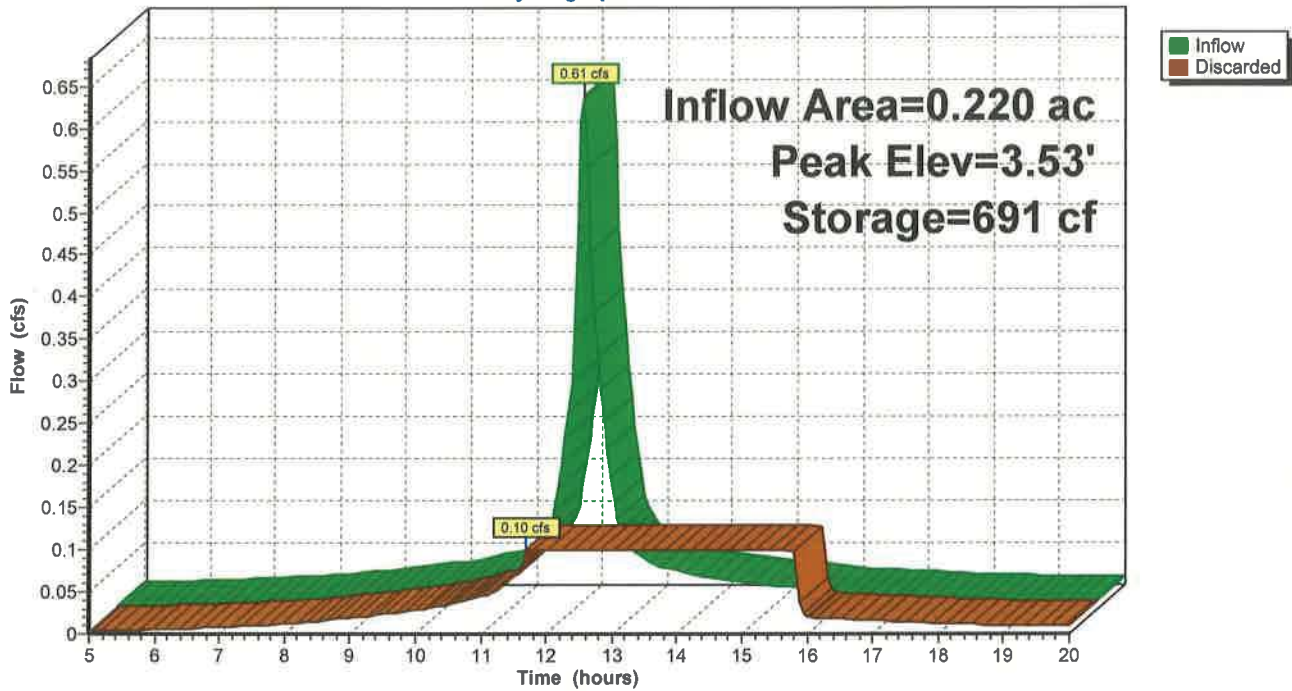
Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2.15	0	0
2.65	226	226
3.15	265	491
3.65	266	757
4.15	261	1,018
4.82	328	1,346
5.32	226	1,572

Device	Routing	Invert	Outlet Devices
#1	Discarded	2.15'	<b>0.10 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.10 cfs @ 11.70 hrs HW=2.18' (Free Discharge)  
 ↑**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

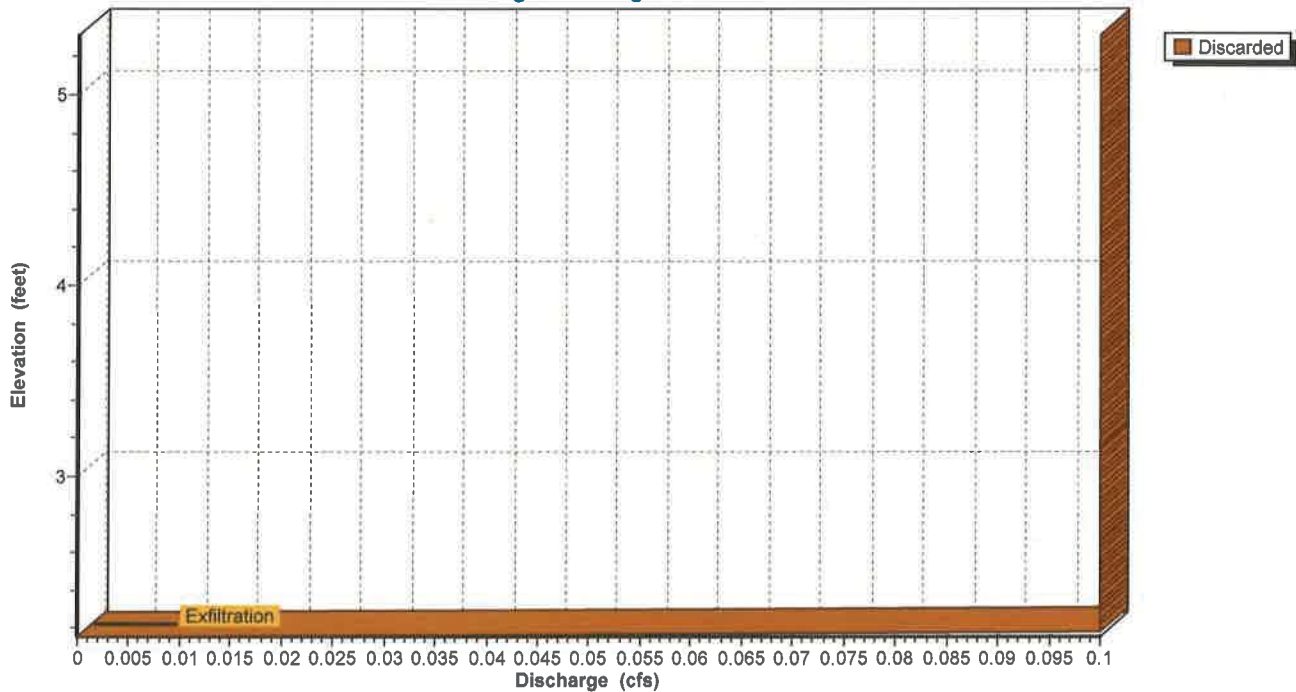
### Pond I-3: Infiltration System #3

Hydrograph

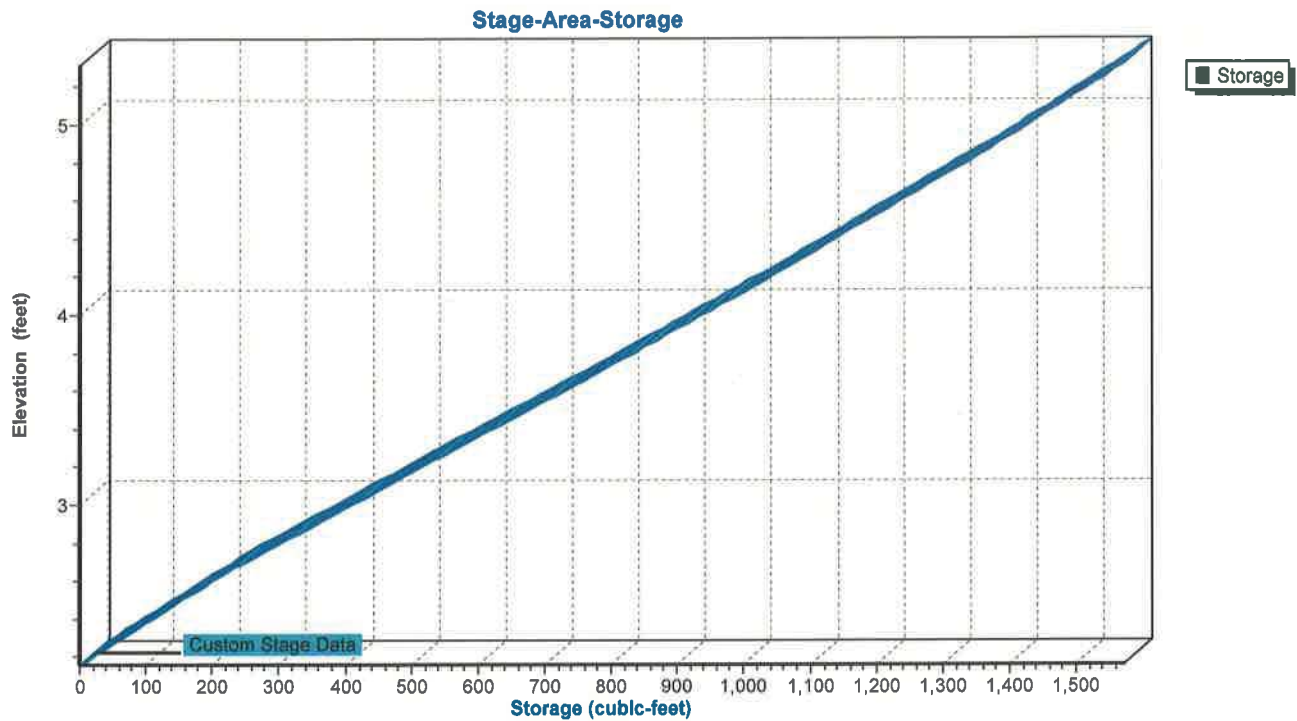


### Pond I-3: Infiltration System #3

Stage-Discharge



### Pond I-3: Infiltration System #3



## Green River Development

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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### Summary for Subcatchment D-1: Developed Area 1

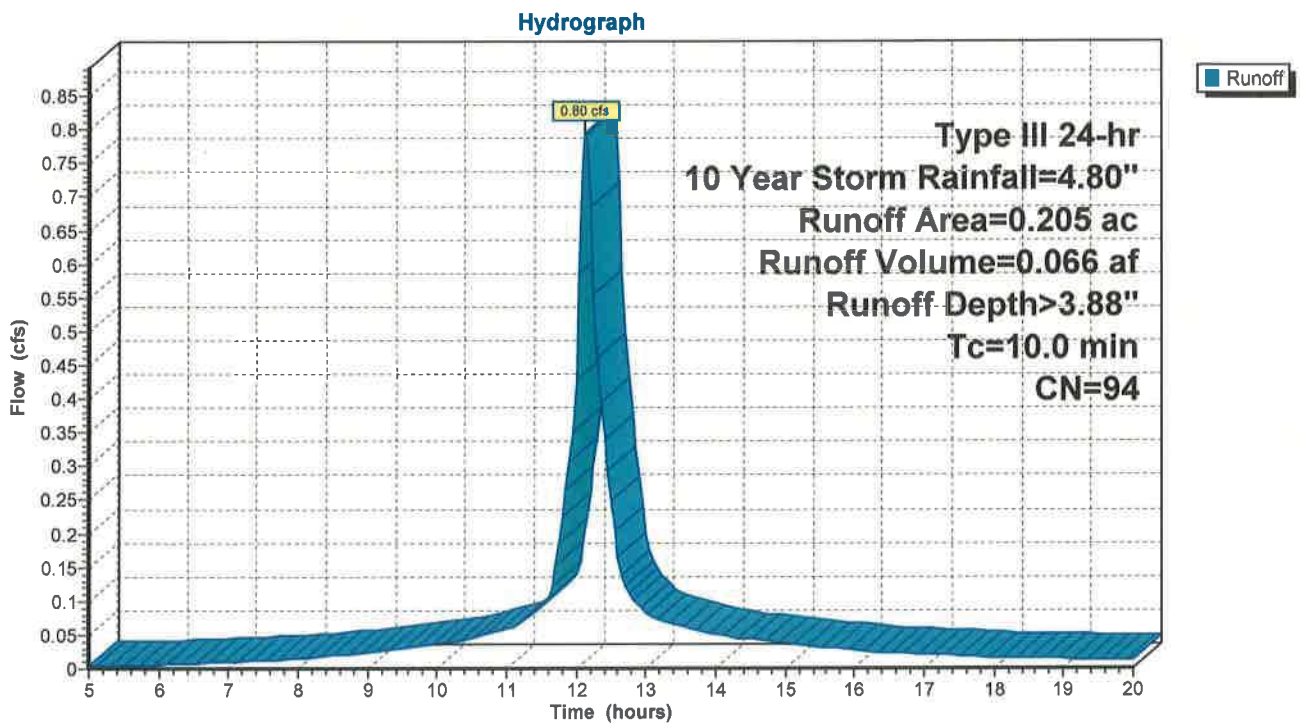
Runoff = 0.80 cfs @ 12.14 hrs, Volume= 0.066 af, Depth> 3.88"

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

Area (ac)	CN	Description
* 0.185	98	Impervious
0.020	61	>75% Grass cover, Good, HSG B
0.205	94	Weighted Average
0.020		9.76% Pervious Area
0.185		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, AB

### Subcatchment D-1: Developed Area 1



## Green River Development

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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### Summary for Subcatchment D-2: Developed Area 2

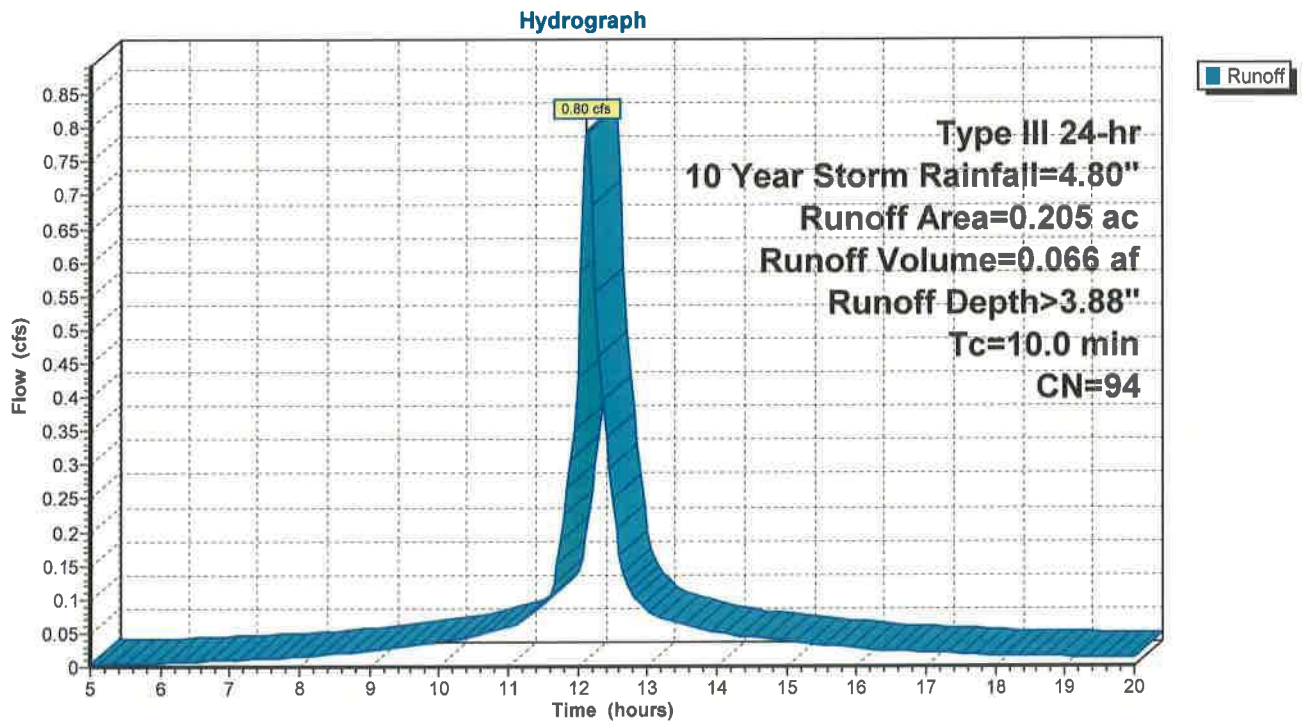
Runoff = 0.80 cfs @ 12.14 hrs, Volume= 0.066 af, Depth> 3.88"

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

Area (ac)	CN	Description
* 0.185	98	Impervious
0.020	61	>75% Grass cover, Good, HSG B
0.205	94	Weighted Average
0.020		9.76% Pervious Area
0.185		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, AB

### Subcatchment D-2: Developed Area 2



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Type III 24-hr 10 Year Storm Rainfall=4.80"

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### Summary for Subcatchment D-3: Developed Area 3

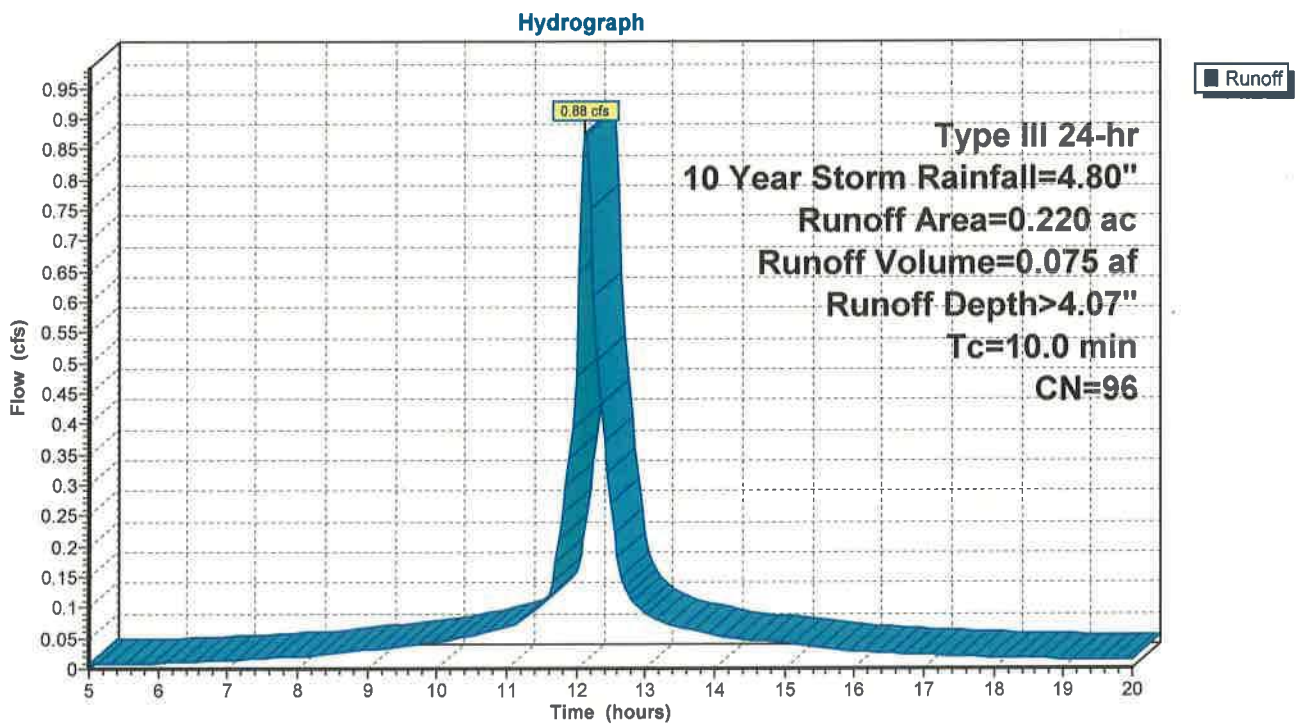
Runoff = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af, Depth> 4.07"

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

Area (ac)	CN	Description
* 0.210	98	Impervious
0.010	61	>75% Grass cover, Good, HSG B
0.220	96	Weighted Average
0.010		4.55% Pervious Area
0.210		95.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, AB

### Subcatchment D-3: Developed Area 3



**Green River Development**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Summary for Pond I-1: Infiltration System #1**

Inflow Area = 0.205 ac, 90.24% Impervious, Inflow Depth > 3.88" for 10 Year Storm event  
 Inflow = 0.80 cfs @ 12.14 hrs, Volume= 0.066 af  
 Outflow = 0.10 cfs @ 11.65 hrs, Volume= 0.066 af, Atten= 87%, Lag= 0.0 min  
 Discarded = 0.10 cfs @ 11.65 hrs, Volume= 0.066 af

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

Peak Elev= 4.68' @ 12.84 hrs Surf.Area= 0 sf Storage= 1,024 cf

Plug-Flow detention time= 74.7 min calculated for 0.066 af (100% of inflow)

Center-of-Mass det. time= 74.3 min ( 826.4 - 752.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	3.00'	1,894 cf	<b>Custom Stage Data Listed below</b>

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
3.00	0	0
3.50	272	272
4.00	319	591
4.50	321	912
5.00	315	1,227
5.67	395	1,622
6.17	272	1,894

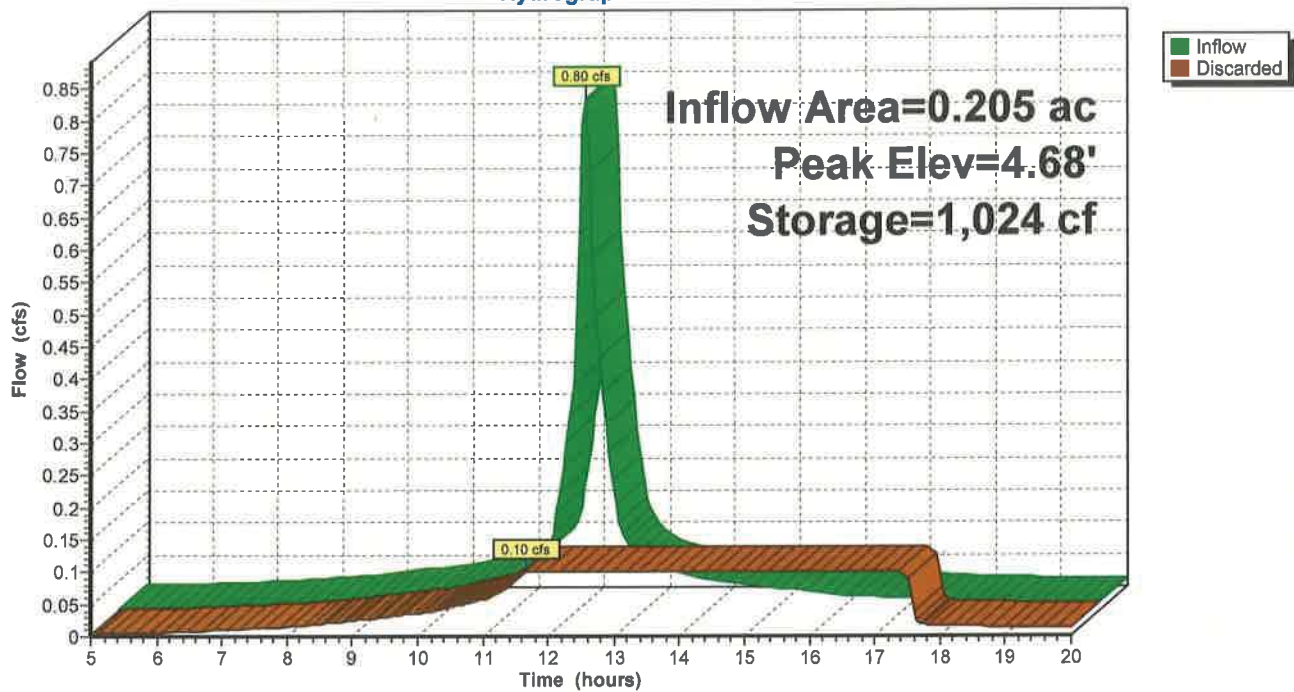
Device	Routing	Invert	Outlet Devices
#1	Discarded	3.00'	<b>0.10 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.10 cfs @ 11.65 hrs HW=3.04' (Free Discharge)

1=Exfiltration (Exfiltration Controls 0.10 cfs)

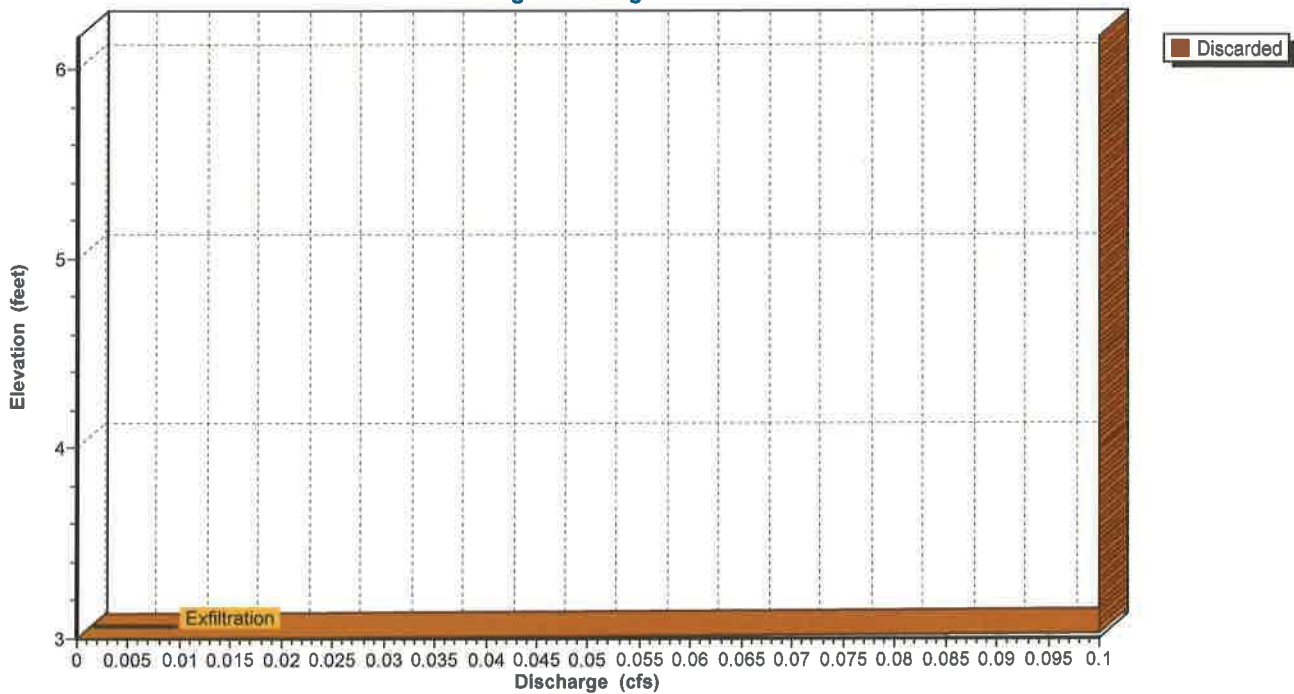
### Pond I-1: Infiltration System #1

Hydrograph

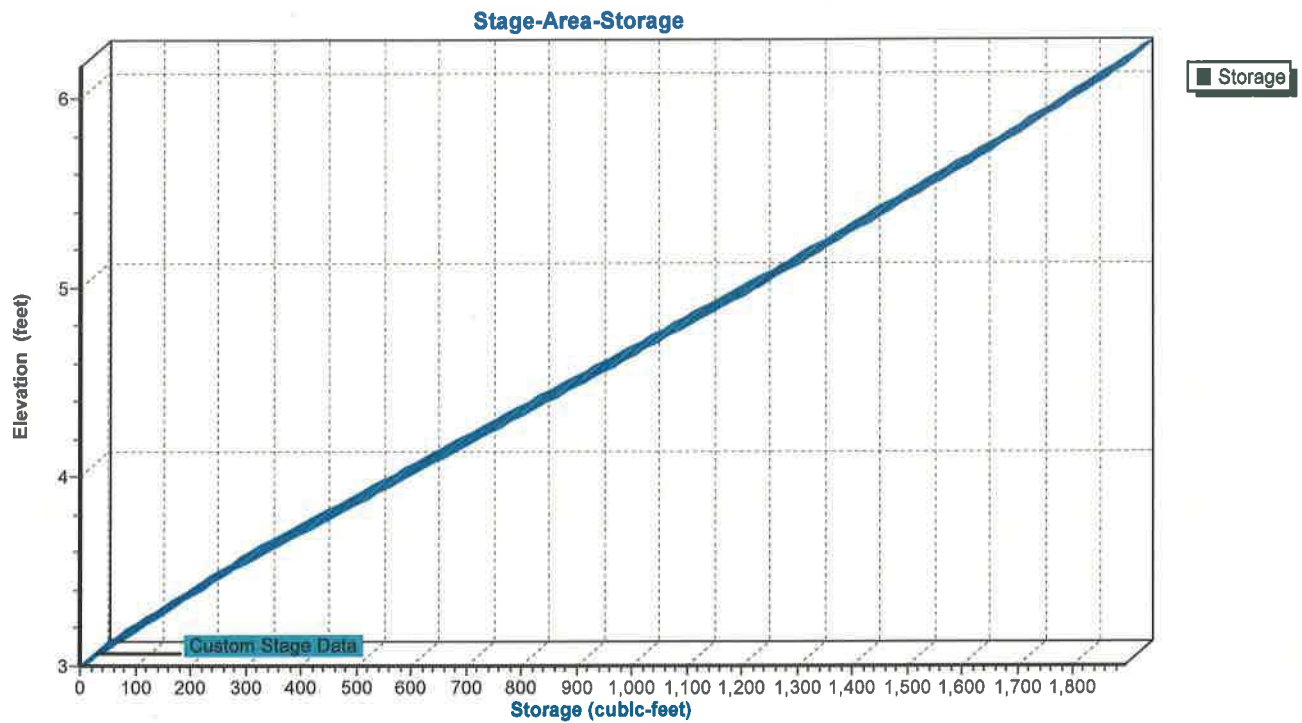


### Pond I-1: Infiltration System #1

Stage-Discharge



### Pond I-1: Infiltration System #1



**Green River Development**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Summary for Pond I-2: Infiltration System #2**

Inflow Area = 0.205 ac, 90.24% Impervious, Inflow Depth > 3.88" for 10 Year Storm event  
 Inflow = 0.80 cfs @ 12.14 hrs, Volume= 0.066 af  
 Outflow = 0.08 cfs @ 11.45 hrs, Volume= 0.066 af, Atten= 90%, Lag= 0.0 min  
 Discarded = 0.08 cfs @ 11.45 hrs, Volume= 0.066 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 5.72' @ 13.05 hrs Surf.Area= 0 sf Storage= 1,127 cf

Plug-Flow detention time= 111.0 min calculated for 0.066 af (100% of inflow)  
 Center-of-Mass det. time= 110.5 min ( 862.6 - 752.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	3.50'	1,572 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
3.50	0	0
4.00	226	226
4.50	265	491
5.00	266	757
5.50	261	1,018
6.17	328	1,346
6.67	226	1,572

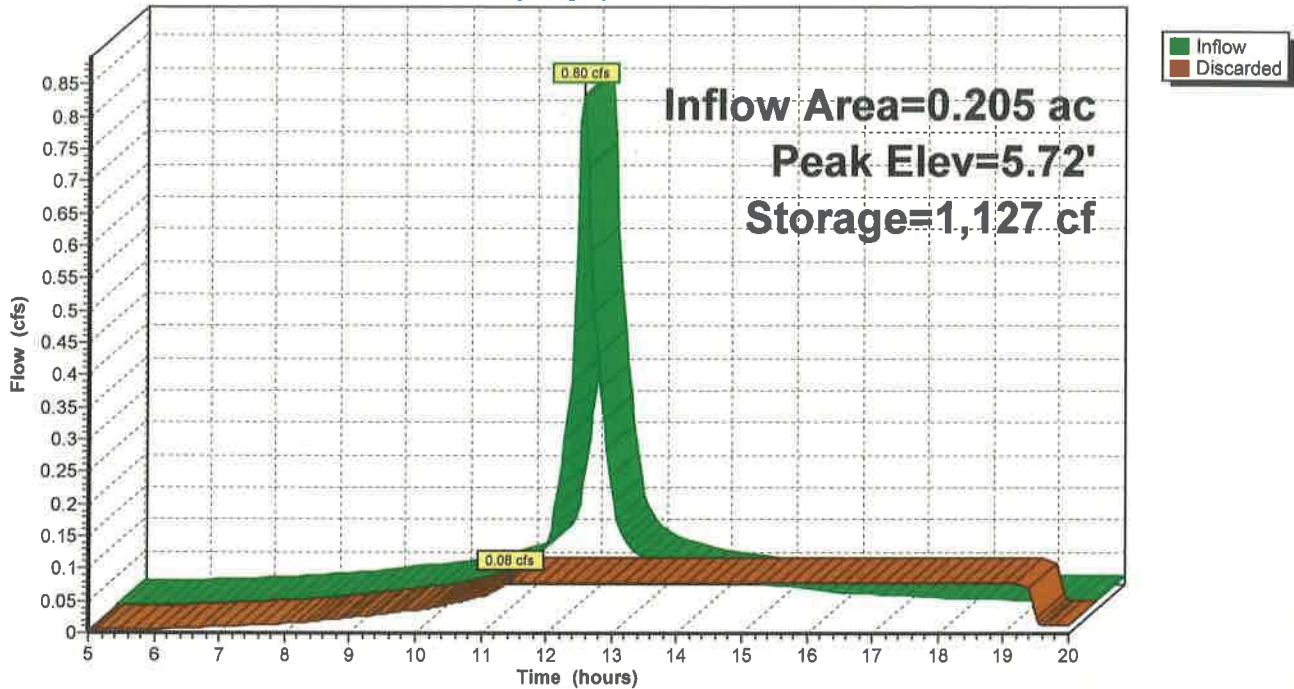
Device	Routing	Invert	Outlet Devices
#1	Discarded	3.50'	<b>0.08 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.08 cfs @ 11.45 hrs HW=3.53' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

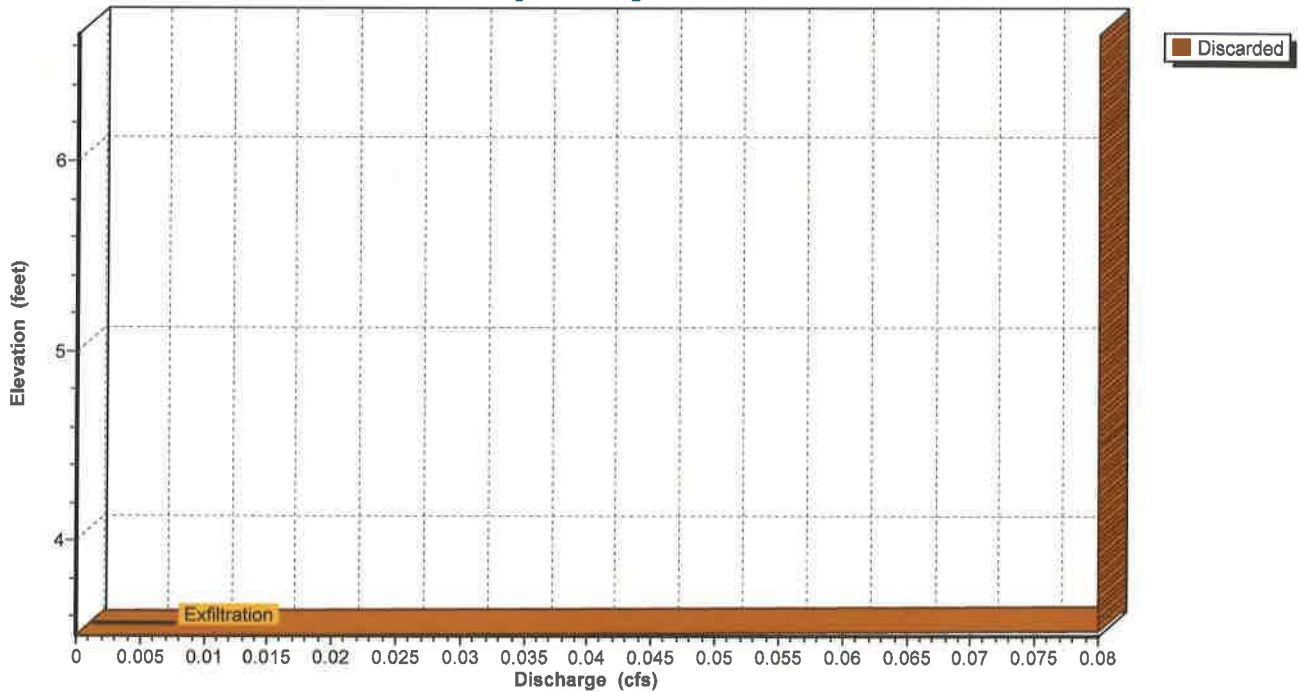
## Pond I-2: Infiltration System #2

Hydrograph

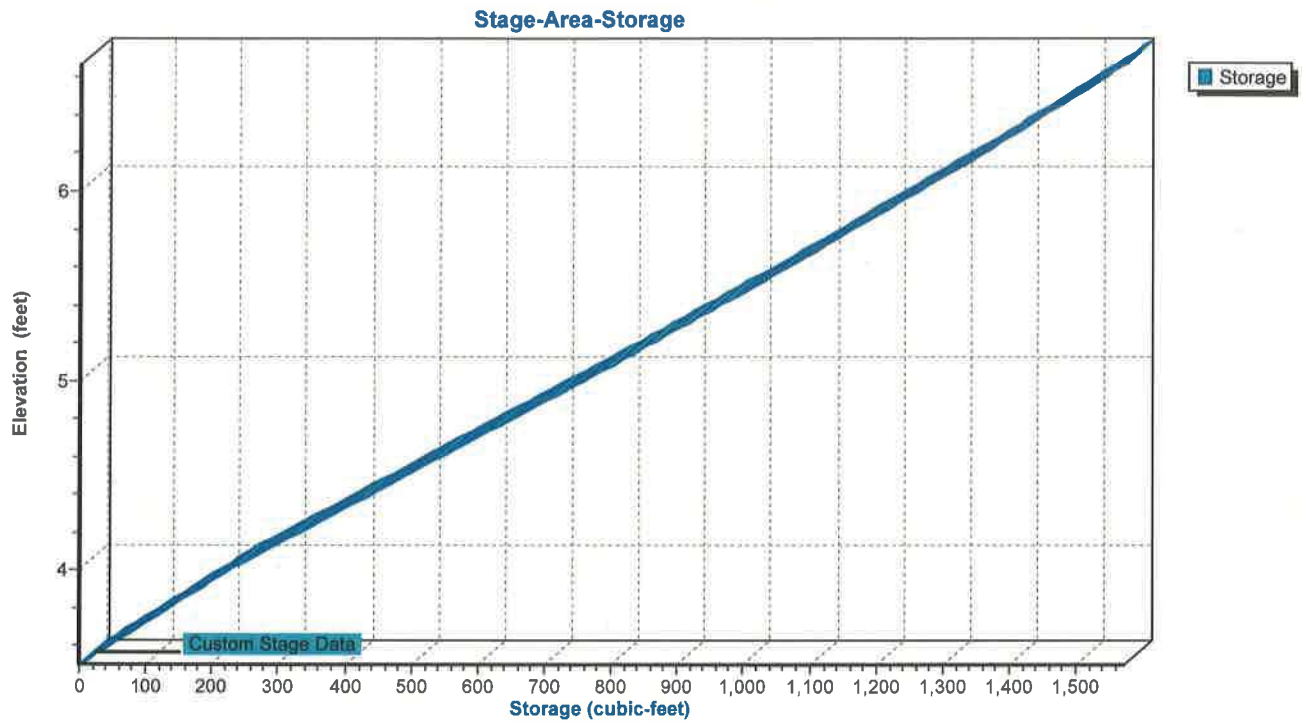


## Pond I-2: Infiltration System #2

Stage-Discharge



## Pond I-2: Infiltration System #2



**Green River Development**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Summary for Pond I-3: Infiltration System #3**

Inflow Area = 0.220 ac, 95.45% Impervious, Inflow Depth > 4.07" for 10 Year Storm event  
 Inflow = 0.88 cfs @ 12.14 hrs, Volume= 0.075 af  
 Outflow = 0.10 cfs @ 11.50 hrs, Volume= 0.075 af, Atten= 89%, Lag= 0.0 min  
 Discarded = 0.10 cfs @ 11.50 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 4.48' @ 12.92 hrs Surf.Area= 0 sf Storage= 1,178 cf

Plug-Flow detention time= 86.7 min calculated for 0.074 af (100% of inflow)  
 Center-of-Mass det. time= 86.0 min ( 831.1 - 745.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	2.15'	1,572 cf	<b>Custom Stage Data</b> Listed below

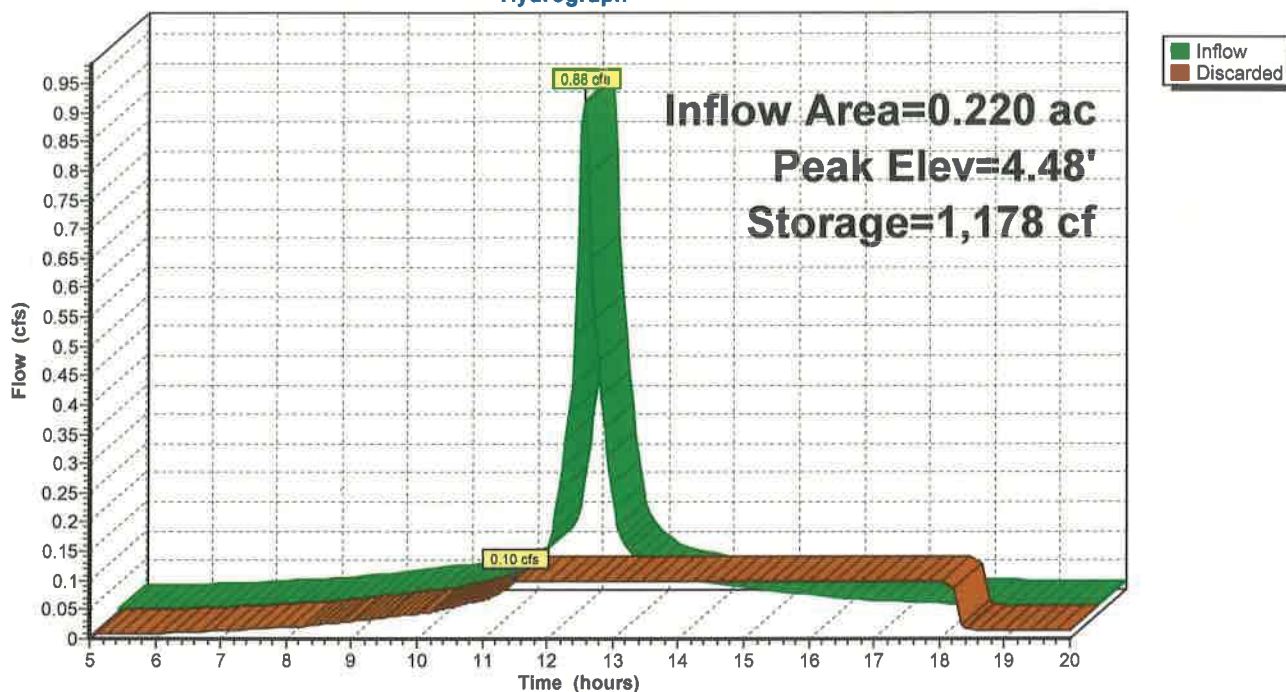
Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2.15	0	0
2.65	226	226
3.15	265	491
3.65	266	757
4.15	261	1,018
4.82	328	1,346
5.32	226	1,572

Device	Routing	Invert	Outlet Devices
#1	Discarded	2.15'	<b>0.10 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.10 cfs @ 11.50 hrs HW=2.18' (Free Discharge)  
 1=Exfiltration (Exfiltration Controls 0.10 cfs)

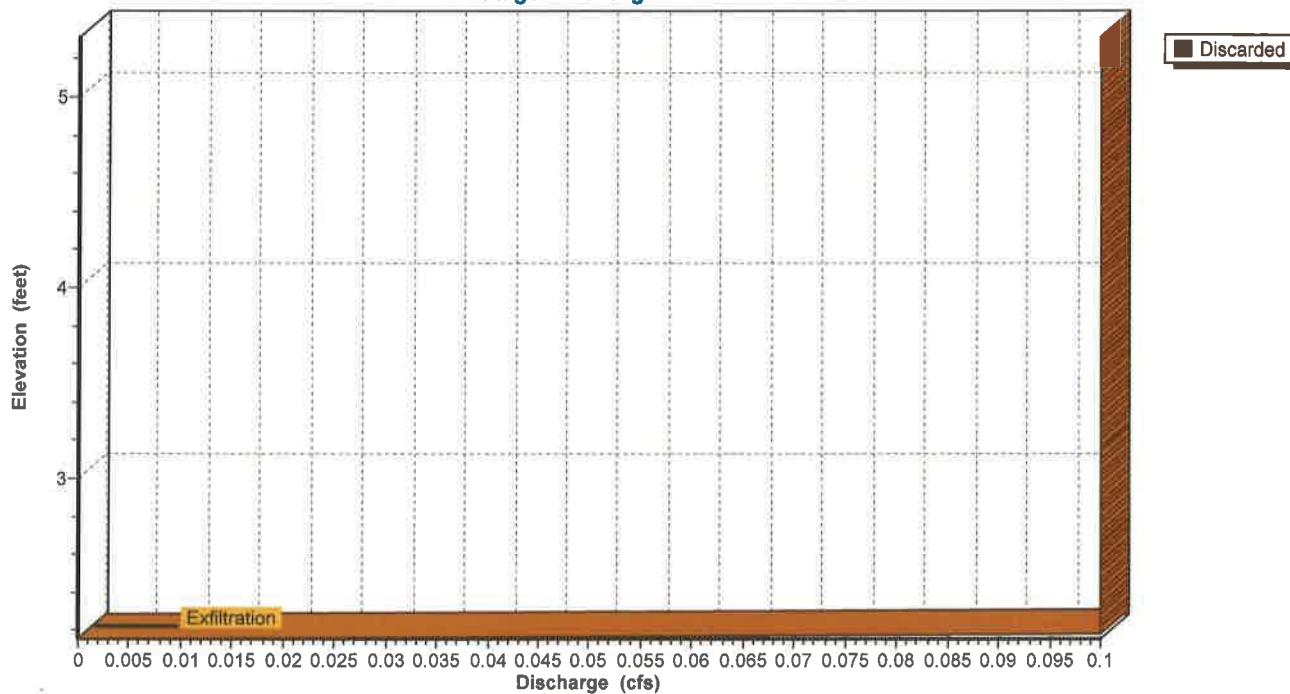
### Pond I-3: Infiltration System #3

Hydrograph



### Pond I-3: Infiltration System #3

Stage-Discharge



### Pond I-3: Infiltration System #3

Stage-Area-Storage

