

**STORMWATER MANAGEMENT REPORT**

# SITEC

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Land Use Planning

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## **DRAINAGE SUMMARY CISCO NEW BEDFORD RESTAURANT FACILITY 1480 EAST RODNEY FRENCH BLVD.**

The subject project is a proposed restaurant/event facility located on an existing commercial parcel located on the east side of East Rodney French Blvd. Located adjacent to Buzzard's Bay, the site is located in a coastal flood zone. A small portion of the eastern edge of the site is located in a designated velocity zone with the balance of the site located in a coastal AE zone. Due to the location of the project in a coastal flood zone, peak flow mitigation is not required.

The design includes upgrades to the existing stormwater system which is limited to two catch basins that are clogged with debris. The new system will include (4) Stormceptor Treatment Units which will provide 80% total suspended solids mitigation. The drainage areas for these (4) units are divided to minimize the potential for overloading a single system during rainfall events.

Each of the Stormceptors will direct the screened runoff to Cultec recharge systems. These systems have been designed to accept 100% of the site surface runoff for storms up to and including the two year event (3.4" of rainfall in 24 hour period).

The available recharge volume that these systems provide greatly exceed the minimum required recharge volume based on the following calculation:

Soil Type: HSG A

Recharge Volume Required =  $0.67/12 \times 66,080 \text{ SF} = 3,304 \text{ CF}$

Recharge Provided = 13,400 CF



# 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.<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

## 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.

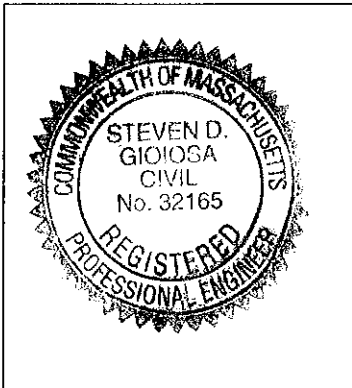
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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



5-9-19

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

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## 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

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## 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.

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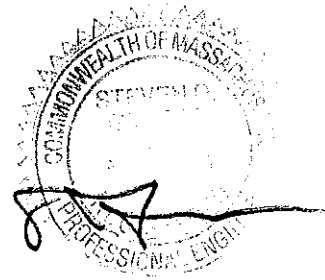
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## CONSTRUCTION EROSION AND SEDIMENT CONTROL PLAN

Cisco New Bedford  
1480 East Rodney French Blvd  
Map 12 Lots 77,264,287-291  
New Bedford, MA  
May 6, 2019

### 1. SITE DESCRIPTION:

**OWNER:** Servedwell New Bedford, LLC  
307 Smith Neck Rd  
Dartmouth, MA



### **PROJECT NAME AND LOCATION**

**Proposed Restaurant/Event Facility  
East Rodney French Blvd, New Bedford, MA**

### **DESCRIPTION: (Purpose and Types of Soil Disturbing Activities)**

This project involves the reconstruction of a restaurant building and parking lot/loading area to accommodate an expanded restaurant/event facility with associated, landscaping and drainage on a 2.55 acre parcel. The site is relatively flat and currently includes a building with parking and a combination of gravel, brush, and broken paved surfaces. The onsite soils have been classified by a licensed soil evaluator and consist of fill material over a medium to coarse sand.

Soil disturbing activities will include: installing perimeter and other sediment controls, finish grading of the site, followed by the installation of the stormwater infiltration systems, parking facility, utilities, curbing, boardwalk, lighting and sidewalks. Upon completion of construction, landscaping will be installed and all disturbed areas

will be stabilized.

## **SEQUENCE OF MAJOR ACTIVITIES**

1. Install all erosion and sediment control measures per the enclosed approved plans. The Contractor will implement the use of widely accepted principles for erosion and sediment control during construction.
2. Adjust site grades to design base elevations.
3. Installation of new deck, utilities, drainage, and retention system.
4. Construct event area with firepit, sand and play area, sidewalks, and parking. Stabilize site with landscaping
5. Construction sequence may vary to minimize disturbance on site.

## **2. EROSION AND SEDIMENT CONTROLS**

In addition to the perimeter controls, erosion control will be accomplished using temporary measures such as tracking entrance, seeding or mulching, spraying of liquid stabilizers or any combination of these measures. Seeds should be applied at a rate of 2 lbs/ 1000 square feet at a depth of ½ inch. Soil netting or covering should be used in extreme conditions.

Only minor stockpiling of soils will be allowed on site. Soil stockpiles will be ringed with hay bales/ silt fencing or covered in extreme conditions.

### **Maintenance / Inspection Procedures for Erosion and Sediment Controls**

- Construction to commence in a phased manner.
- All control measures will be inspected at least once each week and following any storm event of 0.5 inches of precipitation or greater.
- All measures will be maintained in good working order; if repair is necessary, it will be initiated within 24 hours of report.
- Built up sediment will be removed from erosion control when it has reached one-third the height of the fence or bale.
- Silt fence will be inspected for depth of sediment, tears and to see if fabric is securely attached to the fence posts, are firmly in the ground.
- Any temporary sediment basin used will be inspected for depth of

sediment. Any build up of sediment will be removed when it reaches 10% of the design capacity or at the end of project completion.

- Temporary and permanent seeding and planting will be inspected for bare spots, washouts and healthy growth.
- A maintenance and inspection report will be made after each inspection. A copy of the report form to be completed by the inspector and kept on site.
- Construction site supervisor will be responsible for training workers in all inspection and maintenance practices necessary for keeping erosion and sediment controls in good working order.

### 3. OTHER CONTROLS

#### **Waste Disposal**

All waste materials will be disposed of off site in accordance with all applicable local, State, Federal regulations. No construction waste is to be buried on site. All personnel will be instructed regarding the correct procedure for waste disposal. The individual, who manages the day-to-day site operations, will be responsible for seeing that these procedures are followed.

#### **Hazardous Waste**

All hazardous waste materials will be disposed of in a manner specified by local, State, Federal regulations and in accordance with any manufactures recommendations.

#### **Sanitary Waste**

All sanitary waste will be collected in portable units installed on site. The portable units will be cleaned and emptied by a qualified licensed contractor.

#### **Concrete Waste**

All concrete washings will be disposed on in a designated area away from wetlands and any property line. When the concrete hardens it will be removed from the site.

#### 4. POLLUTION AND SPILL PREVENTION

##### **INVENTORY FOR POLLUTION PREVENTION PLAN**

The following substances listed below are expected to be present onsite during construction:

- General construction materials
- Asphalt/concrete
- Paints
- Petroleum based products
- Cleaning solvents

##### **MATERIAL MANAGEMENT PRACTICES**

###### **Good Housekeeping Practices**

- Store only enough products on site to do the job.
- All materials stored outside will be stored in a neat, orderly manner in the original containers.
- Products will be kept in their original containers with the original manufacture's label.
- Whenever possible, all products will be used up before disposing of the container.
- The site contractor will inspect daily to ensure proper use and disposal of materials onsite.

###### **Product Specific Practices**

###### **Petroleum Products:**

- Refueling vehicles will be DOT Certified and have SPCC Plans in place and contain emergency equipment to contain and clean up small spills.
- All on site construction vehicles will be inspected for leaks and receive regular preventative maintenance to reduce the chance of leakage.
- Petroleum products will be stored in tightly sealed containers, which are properly marked.

###### **Fertilizers:**

- All fertilizers will be stored in a dry protected area and only used according to manufacturers recommendations.

Paints:

- All containers will be tightly sealed and stored when not required for use.
- All procedures will be followed to minimize spills and to keep products in the original containers.

Concrete Trucks:

- The site contractor is responsible for designating a safe area, away from abutting property and resource areas, for excess concrete disposal.

### **SPILL CONTROL PRACTICES**

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for Spill Prevention and clean up during construction:

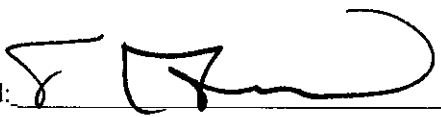
- Manufacturers recommended methods for spill clean up will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- All spills will be cleaned up immediately after discovery.
- If any threat of explosion of life threatening condition, all personnel will evacuate the area to safety and then contact the local fire department for assistance.
- The spill area will be ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- The site contractor responsible for day-to-day operations will be the spill prevention and clean up coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of the responsible personnel will be posted in the material storage area in the office trailer onsite.

**NPDES Construction Permit Storm Water Pollution Prevention Plan**

This Construction Erosion and Sedimentation Control Plan will also be used for the NPDES Construction Permit Storm Water Pollution Prevention Plan.

**STORM WATER POLLUTION PREVENTION PLAN CERTIFICATION**

I certify under the 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 person directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, 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.

Signed: 

Steven D. Gioiosa, President  
SITEC, Inc.



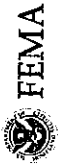
**CONTRACTOR'S CERTIFICATION**

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

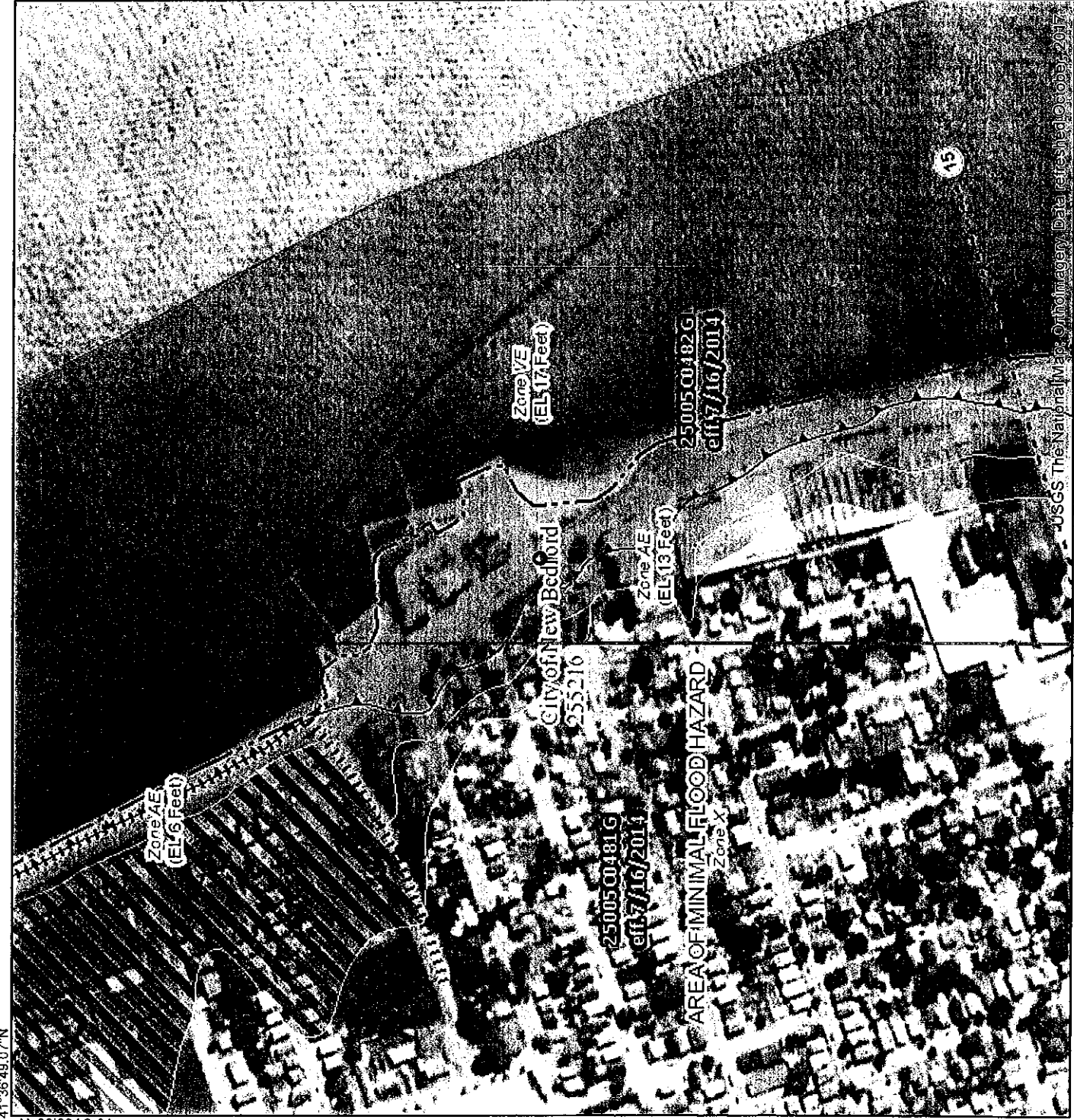
Signature	For	Responsible for
<hr/> <hr/> Date		



# National Flood Hazard Layer FIRMette



41°36'49.07"N



## 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, Area 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

- Area of Minimal Flood Hazard (Zone X)
- Effective LOMRs
- Area of Undetermined Flood Hazard (Zone X)

### GENERAL STRUCTURES

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

### OTHER FEATURES

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

### MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped



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

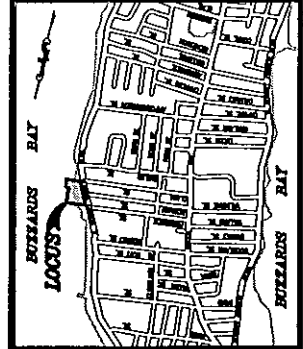
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/1/2019 at 2:59:21 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.

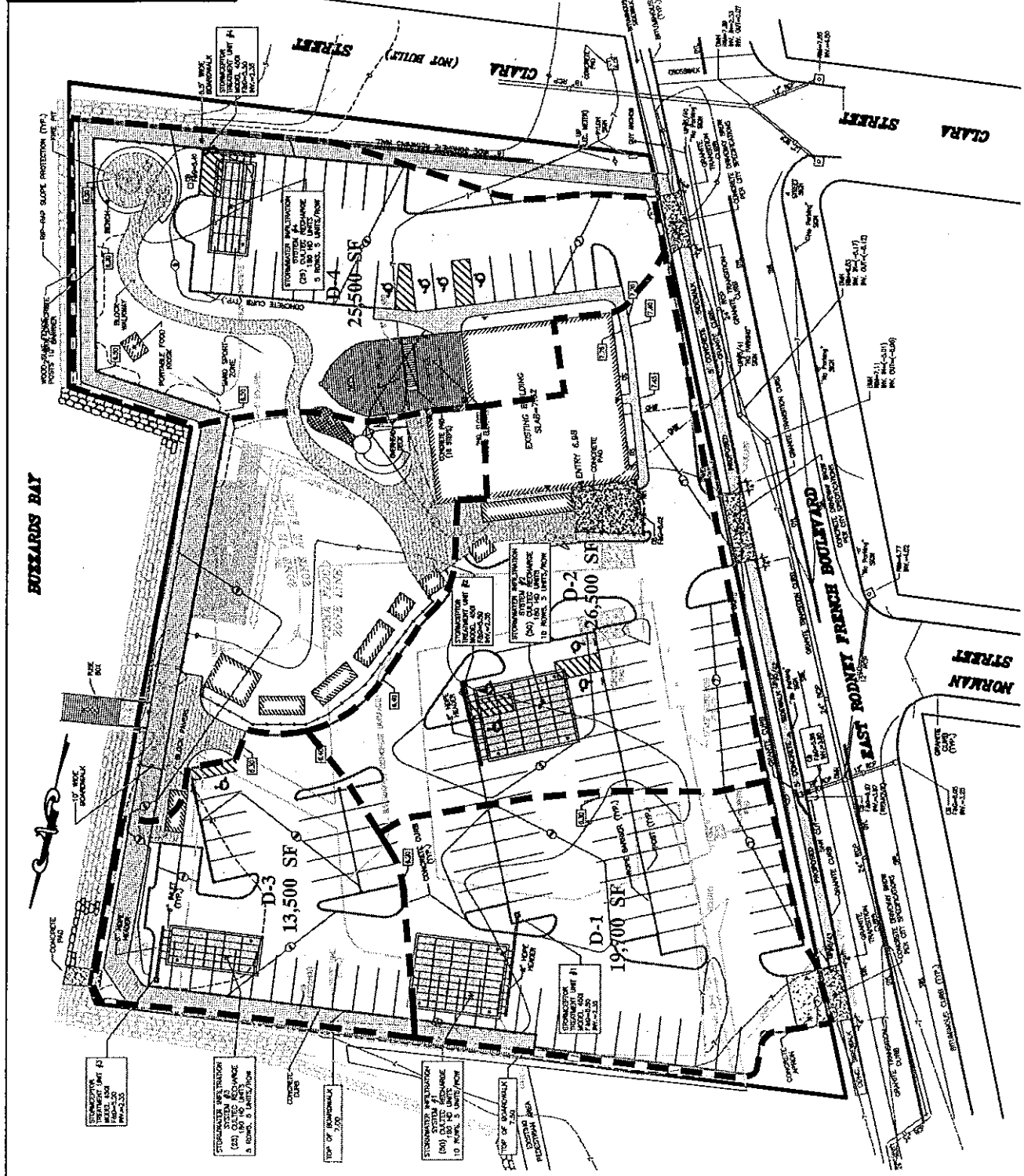
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory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



USGS The National Map: Orthoimagery, Data (retrieved 06/09/2019)



- LEGEND**
- PROPERTY LINE
  - EXISTING BUILDING ENTRANCE
  - EXISTING CURB
  - EXISTING DOUBLE YELLOW LINE
  - EXISTING SOLID WHITE LINE
  - EXISTING STORAGE ROOF
  - CHAIN LINK FENCE
  - DRAINAGE LAKE
  - CATCH BASIN
  - SPAWN HATCHES
  - DRAIN INLET
  - UTILITY POLE
  - TREE LINE
  - PROPOSED BUILDING ENTRANCE
  - PROPOSED CHAIN LINK FENCE
  - PROPOSED SOLID BLUE FENCE
  - PROPOSED CONDUIT
  - PROPOSED SPOT ELEVATION
  - PROPOSED CATCH BASIN
- MONITORING SPIKE SET AT UTILITY POLE #V/49  
 ELEV. = 6.83 MWD  
 FLOOD ZONE BASED ON FEMA FLOOD INSURANCE  
 RATE MAP PANEL 20003 C DATED  
 ESTIMATED DATE JULY 16, 2014



STORMWATER WATERSHED  
 (S) DATED 05/10/10  
 100% COMPLETE  
 3' DRAIN, 3' LATERAL/ROW

TOP OF BENCHMARK  
 2.00'

STORMWATER WATERSHED  
 (S) DATED 05/10/10  
 100% COMPLETE  
 10' DRAIN, 3' LATERAL/ROW

TOP OF BENCHMARK  
 2.00'

TOP OF BENCHMARK  
 2.00'



Developed Area 1



Recharge Area 1



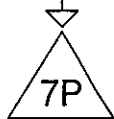
Developed Area 2



Recharge Area 2



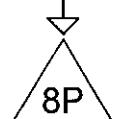
Developed Area 3



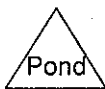
Recharge Area 3



Developed Area 4



Recharge Area 4



**Routing Diagram for Cisco New Bedford**

Prepared by {enter your company name here}, Printed 5/6/2019  
HydroCAD® 10.00 s/n 01164 © 2012 HydroCAD Software Solutions LLC

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

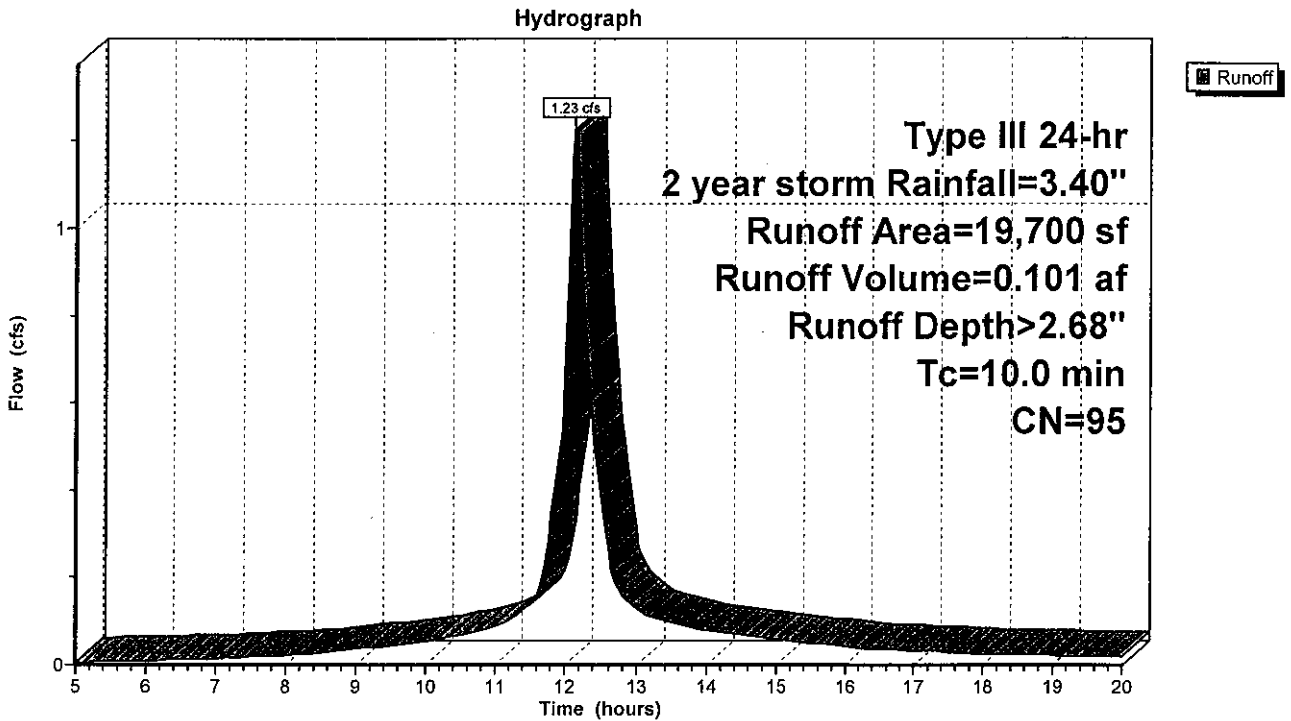
Runoff = 1.23 cfs @ 12.14 hrs, Volume= 0.101 af, Depth> 2.68"

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 (sf)	CN	Description
* 18,700	98	Impervious
1,000	39	>75% Grass cover, Good, HSG A
19,700	95	Weighted Average
1,000		5.08% Pervious Area
18,700		94.92% 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 = 1.51 cfs @ 12.14 hrs, Volume= 0.120 af, Depth> 2.40"

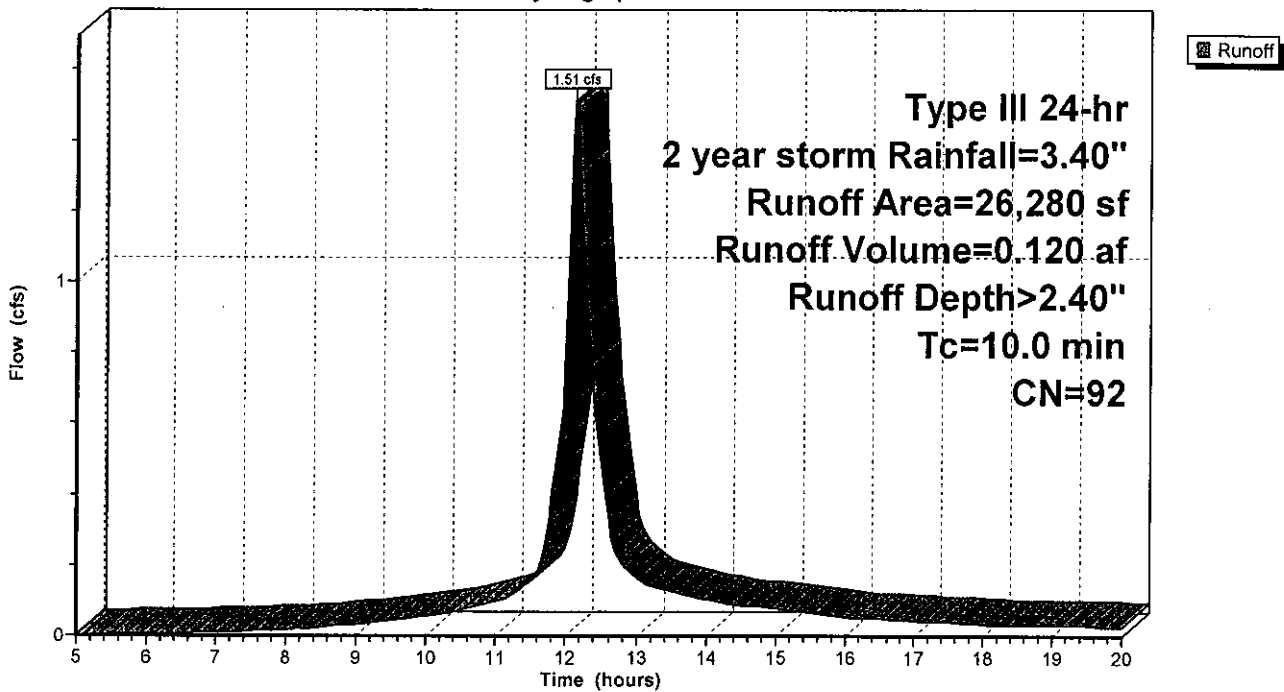
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 year storm Rainfall=3.40"

Area (sf)	CN	Description
* 23,480	98	Impervious
2,800	39	>75% Grass cover, Good, HSG A
26,280	92	Weighted Average
2,800		10.65% Pervious Area
23,480		89.35% 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 = 0.64 cfs @ 12.09 hrs, Volume= 0.043 af, Depth> 1.72"

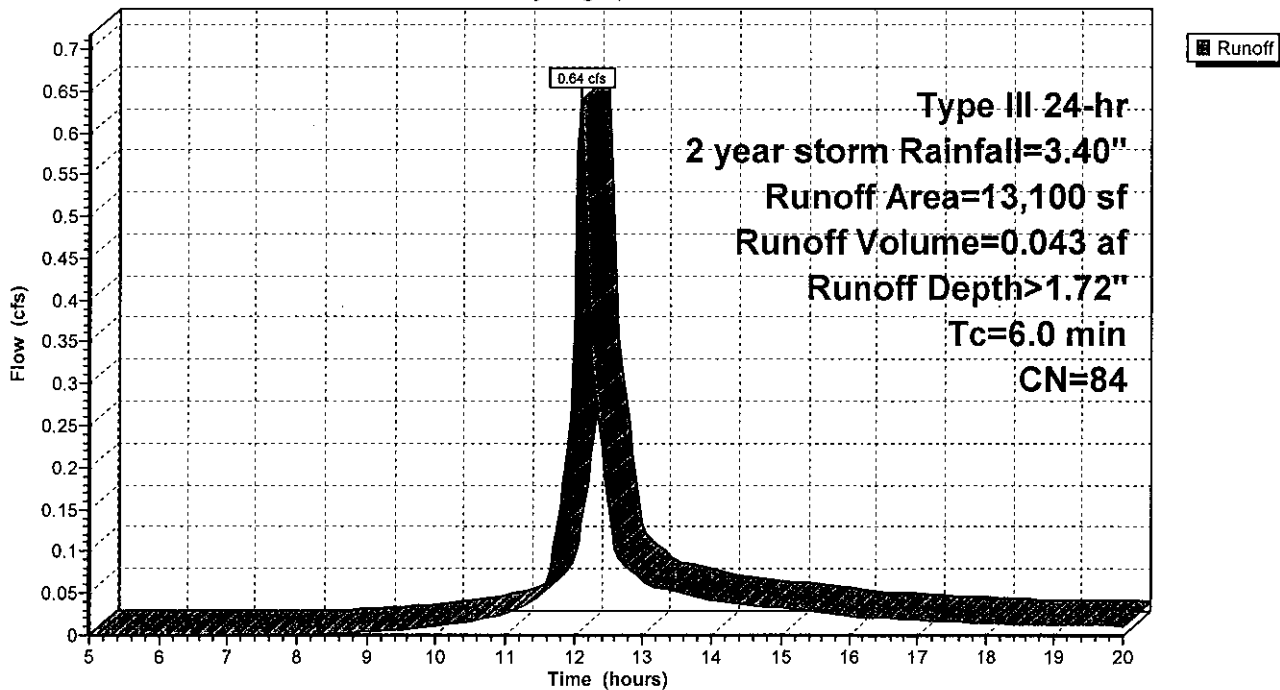
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 year storm Rainfall=3.40"

Area (sf)	CN	Description
* 10,100	98	Impervious
3,000	39	>75% Grass cover, Good, HSG A
13,100	84	Weighted Average
3,000		22.90% Pervious Area
10,100		77.10% Impervious Area

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

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

Hydrograph



**Summary for Subcatchment D-4: Developed Area 4**

Runoff = 0.55 cfs @ 12.16 hrs, Volume= 0.044 af, Depth> 0.91"

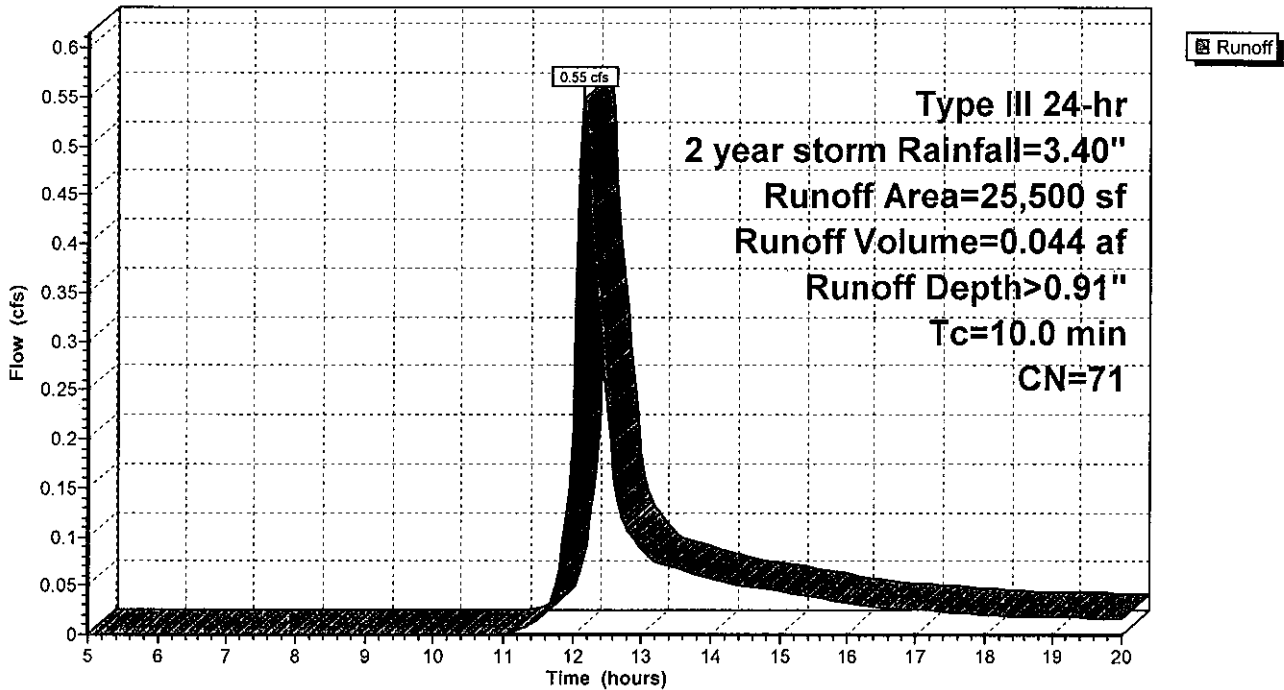
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 year storm Rainfall=3.40"

Area (sf)	CN	Description
* 13,800	98	Impervious
9,000	39	>75% Grass cover, Good, HSG A
* 2,700	35	Sand Play Area
25,500	71	Weighted Average
11,700		45.88% Pervious Area
13,800		54.12% Impervious Area

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

**Subcatchment D-4: Developed Area 4**

Hydrograph



**Summary for Pond 5P: Recharge Area 1**

Inflow Area = 0.452 ac, 94.92% Impervious, Inflow Depth > 2.68" for 2 year storm event  
 Inflow = 1.23 cfs @ 12.14 hrs, Volume= 0.101 af  
 Outflow = 0.25 cfs @ 11.75 hrs, Volume= 0.101 af, Atten= 80%, Lag= 0.0 min  
 Discarded = 0.25 cfs @ 11.75 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 3.13' @ 12.61 hrs Surf.Area= 0 sf Storage= 1,210 cf

Plug-Flow detention time= 28.8 min calculated for 0.101 af (100% of inflow)  
 Center-of-Mass det. time= 28.6 min ( 783.8 - 755.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1.75'	2,006 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1.75	0	0
2.25	282	282
2.75	545	827
3.25	507	1,334
3.95	390	1,724
4.45	282	2,006

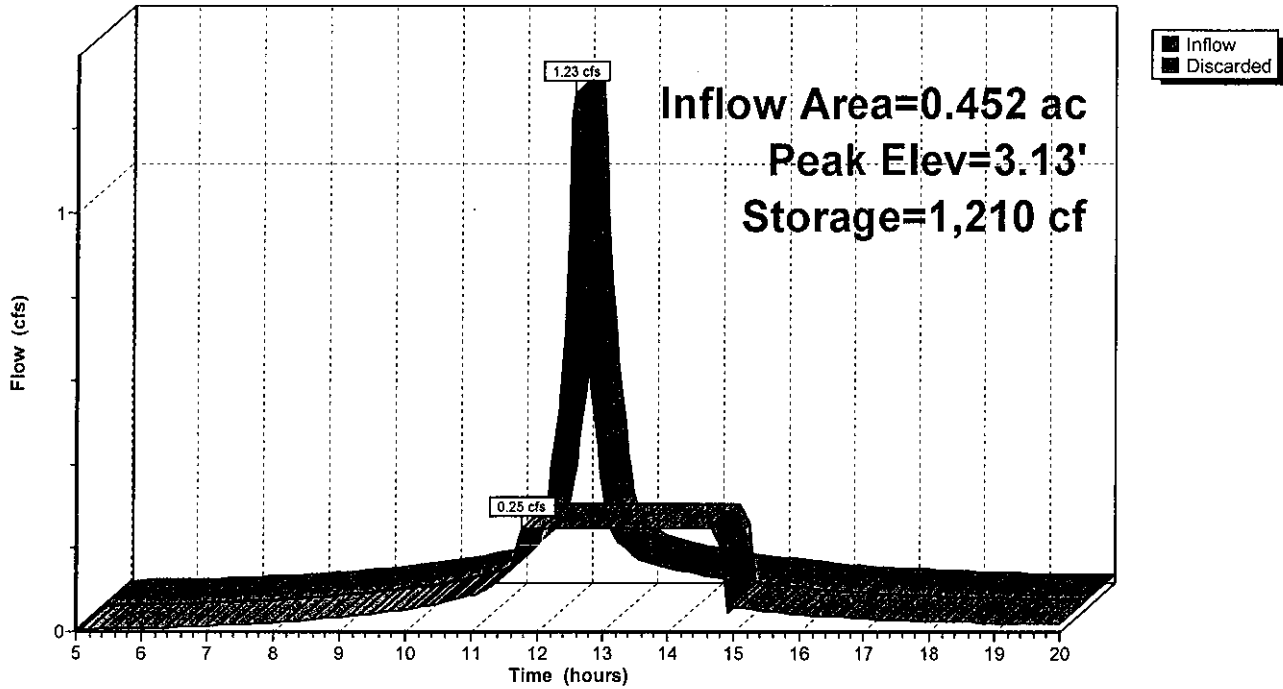
Device	Routing	Invert	Outlet Devices
#1	Discarded	1.75'	0.25 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.25 cfs @ 11.75 hrs HW=1.78' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.25 cfs)



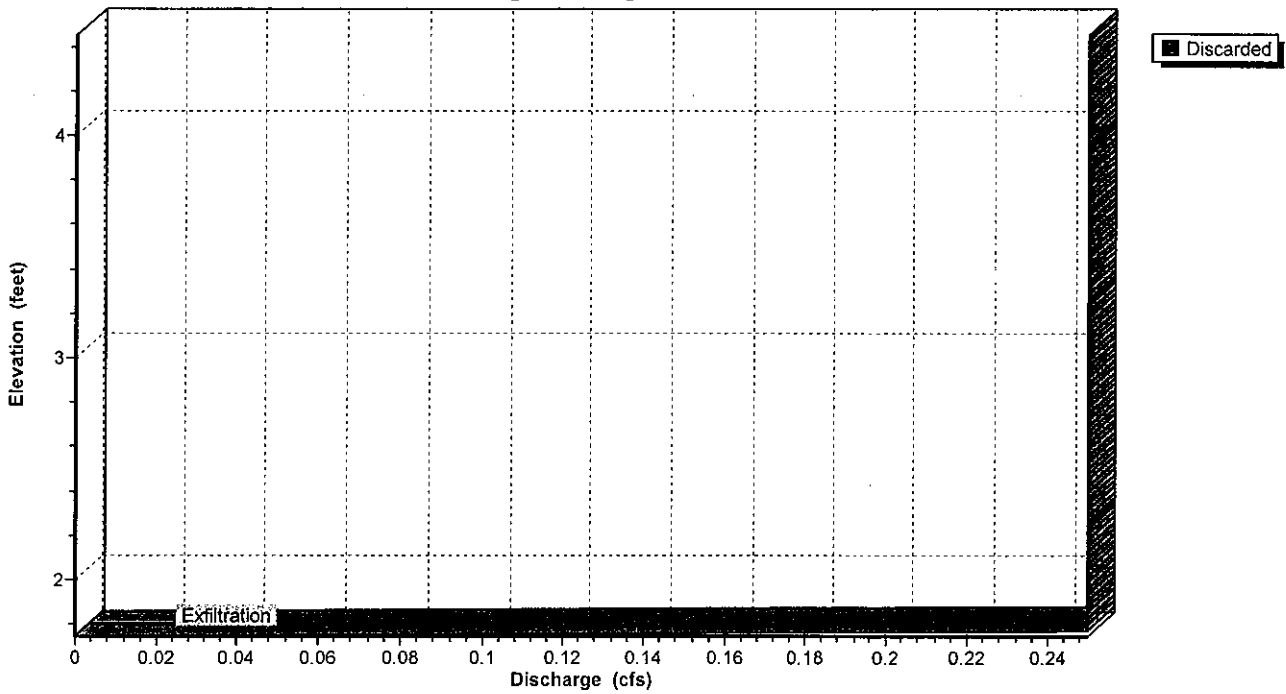
### Pond 5P: Recharge Area 1

Hydrograph



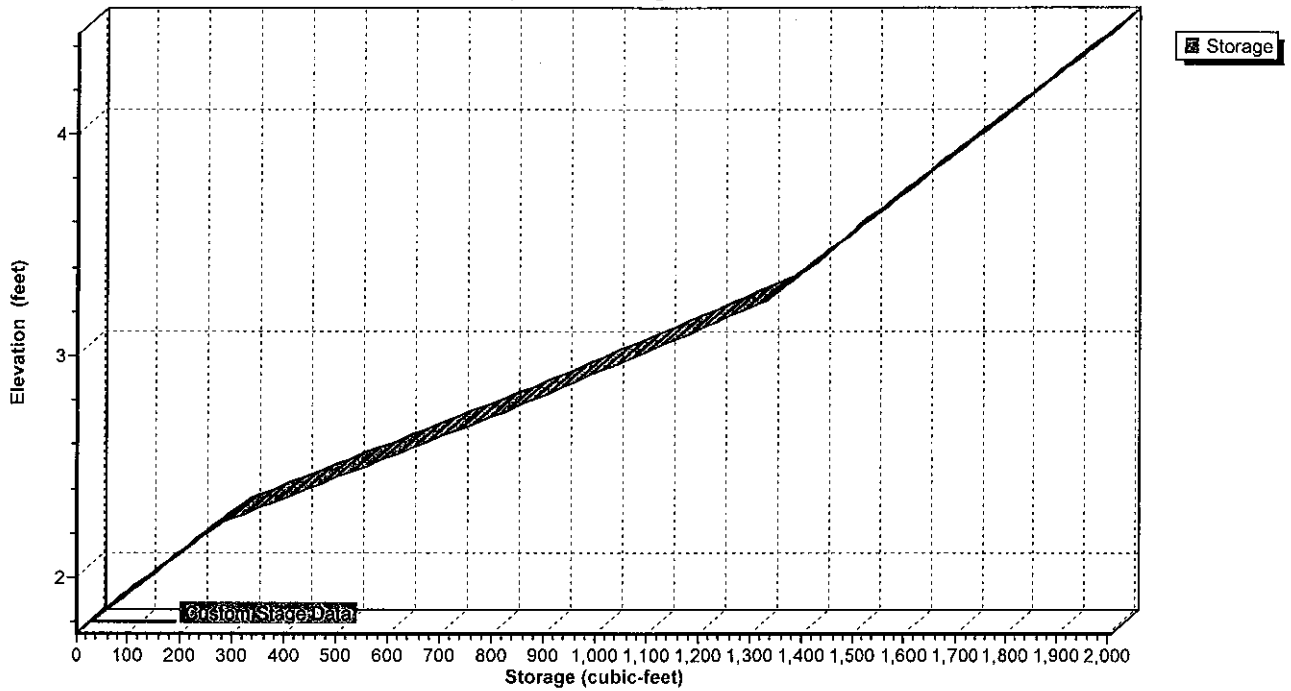
### Pond 5P: Recharge Area 1

Stage-Discharge



### Pond 5P: Recharge Area 1

Stage-Area-Storage



**Summary for Pond 6P: Recharge Area 2**

Inflow Area = 0.603 ac, 89.35% Impervious, Inflow Depth > 2.40" for 2 year storm event  
 Inflow = 1.51 cfs @ 12.14 hrs, Volume= 0.120 af  
 Outflow = 0.25 cfs @ 11.75 hrs, Volume= 0.120 af, Atten= 83%, Lag= 0.0 min  
 Discarded = 0.25 cfs @ 11.75 hrs, Volume= 0.120 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 3.86' @ 12.69 hrs Surf.Area= 0 sf Storage= 1,675 cf

Plug-Flow detention time= 45.6 min calculated for 0.120 af (100% of inflow)  
 Center-of-Mass det. time= 45.4 min ( 813.5 - 768.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1.75'	2,006 cf	Custom Stage Data Listed below

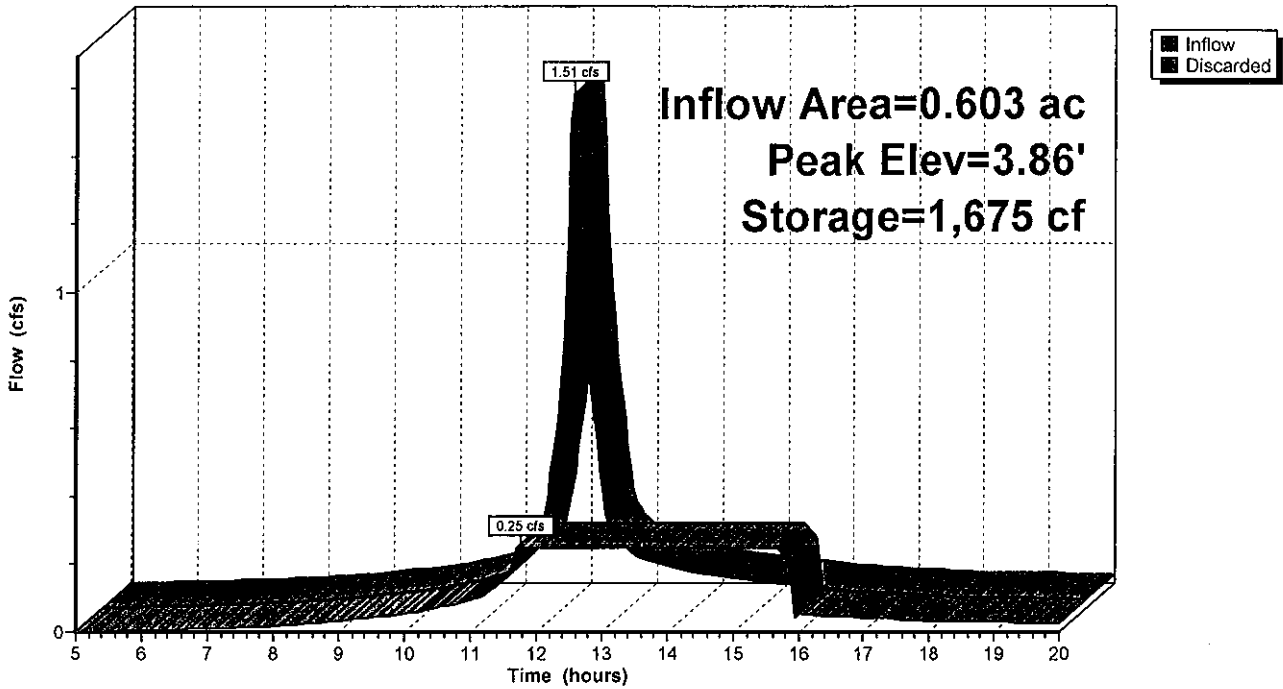
Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1.75	0	0
2.25	282	282
2.75	545	827
3.25	507	1,334
3.95	390	1,724
4.45	282	2,006

Device	Routing	Invert	Outlet Devices
#1	Discarded	1.75'	0.25 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.25 cfs @ 11.75 hrs HW=1.79' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.25 cfs)

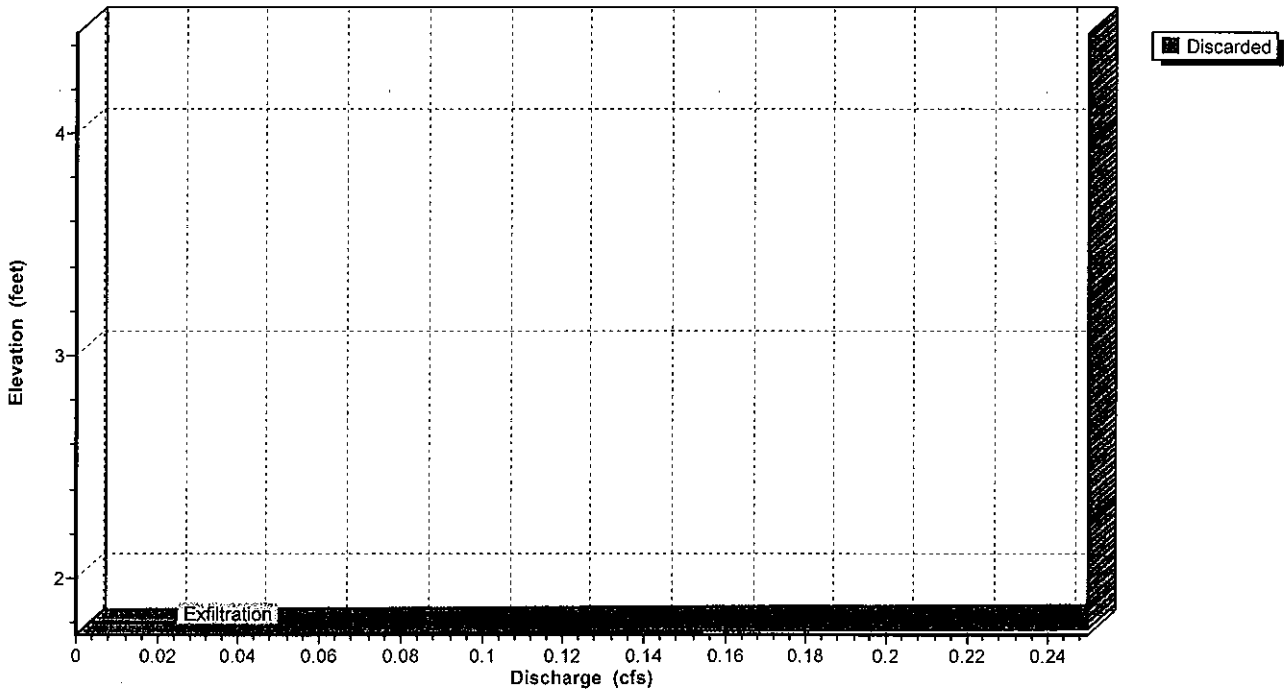
### Pond 6P: Recharge Area 2

Hydrograph

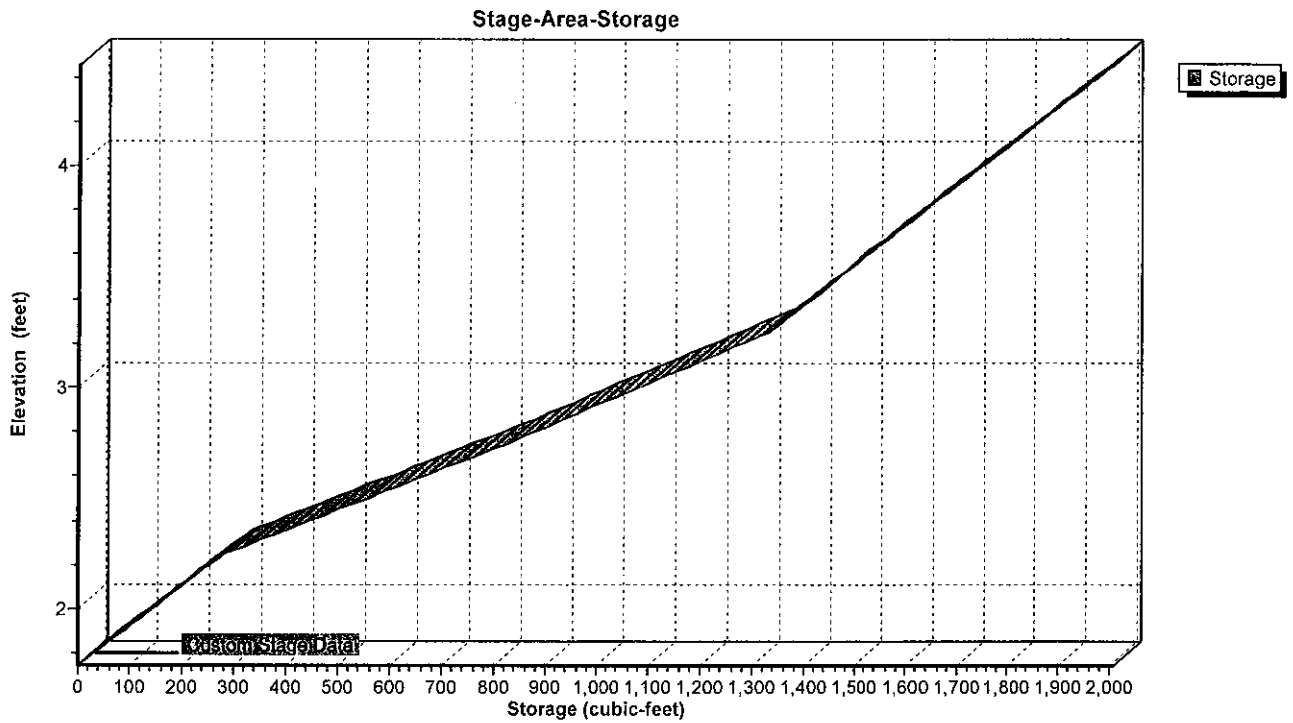


### Pond 6P: Recharge Area 2

Stage-Discharge



### Pond 6P: Recharge Area 2



**Summary for Pond 7P: Recharge Area 3**

Inflow Area = 0.301 ac, 77.10% Impervious, Inflow Depth > 1.72" for 2 year storm event  
 Inflow = 0.64 cfs @ 12.09 hrs, Volume= 0.043 af  
 Outflow = 0.13 cfs @ 11.80 hrs, Volume= 0.043 af, Atten= 80%, Lag= 0.0 min  
 Discarded = 0.13 cfs @ 11.80 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 2.95' @ 12.54 hrs Surf.Area= 0 sf Storage= 512 cf

Plug-Flow detention time= 25.0 min calculated for 0.043 af (100% of inflow)  
 Center-of-Mass det. time= 24.8 min ( 815.9 - 791.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1.75'	1,042 cf	Custom Stage Data Listed below

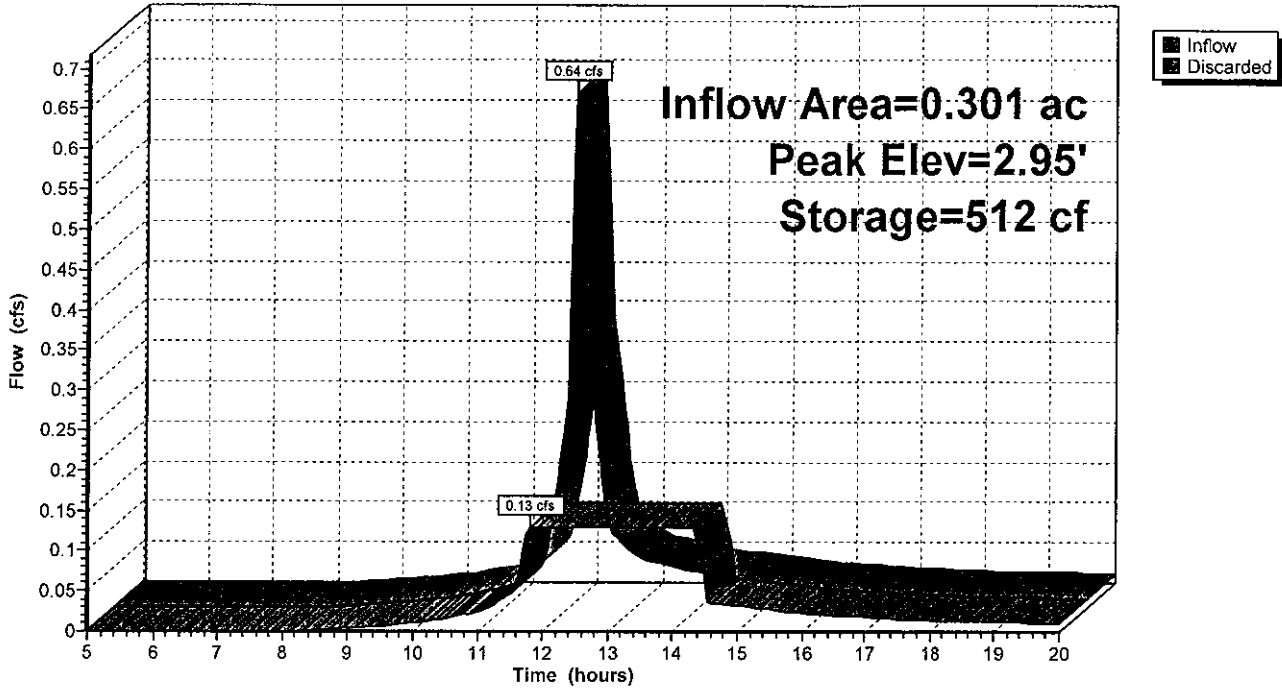
Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1.75	0	0
2.25	141	141
2.75	272	413
3.25	253	666
3.95	195	861
4.35	181	1,042

Device	Routing	Invert	Outlet Devices
#1	Discarded	1.75'	0.13 cfs Exfiltration at all elevations

Discarded OutFlow Max=0.13 cfs @ 11.80 hrs HW=1.78' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.13 cfs)

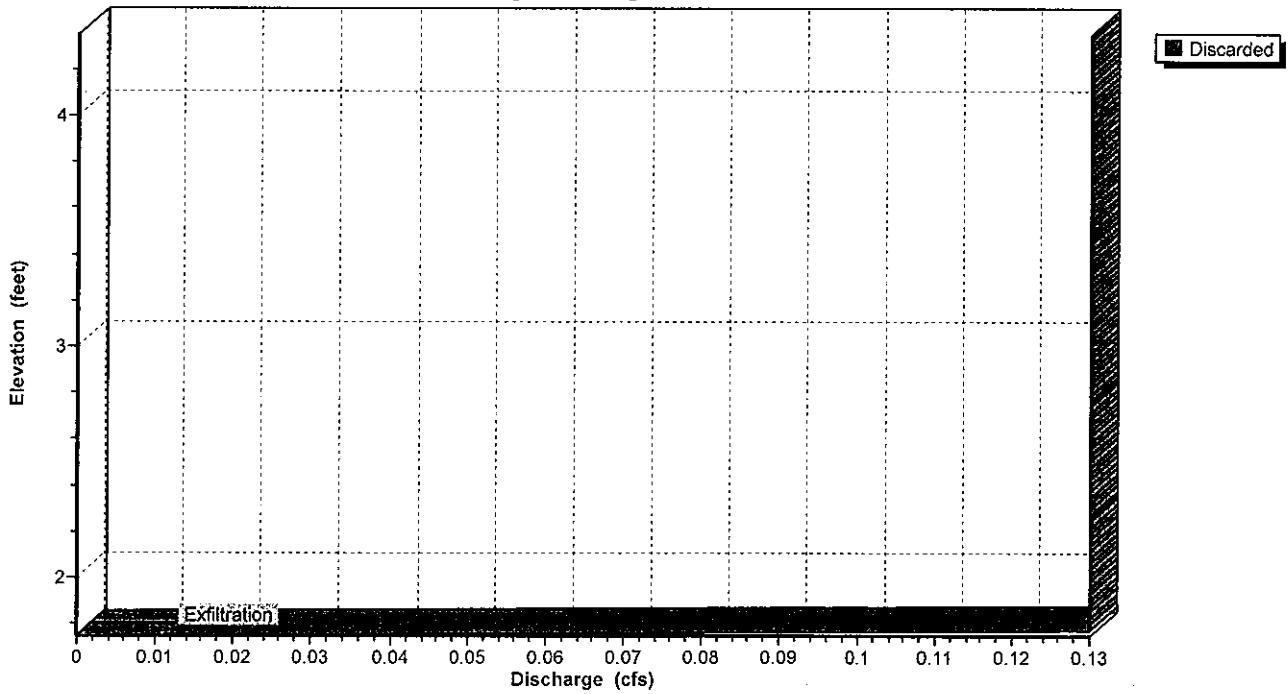
### Pond 7P: Recharge Area 3

Hydrograph



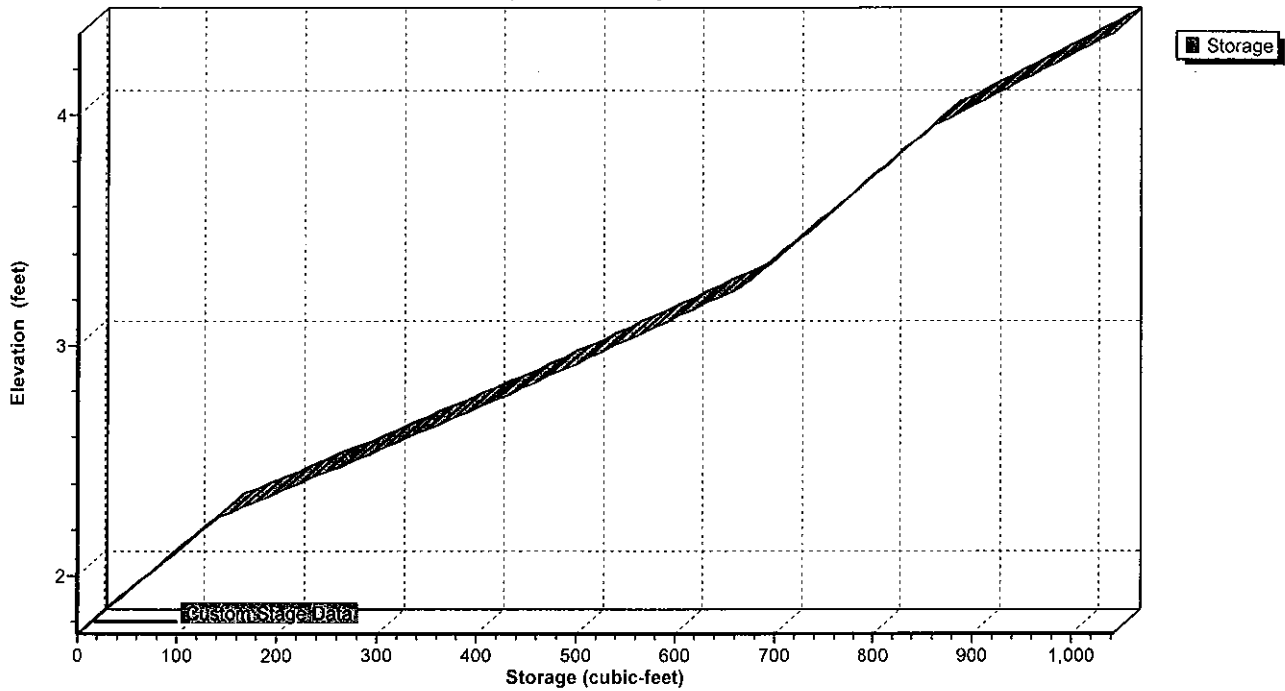
### Pond 7P: Recharge Area 3

Stage-Discharge



### Pond 7P: Recharge Area 3

Stage-Area-Storage





**Summary for Pond 8P: Recharge Area 4**

Inflow Area = 0.585 ac, 54.12% Impervious, Inflow Depth > 0.91" for 2 year storm event  
 Inflow = 0.55 cfs @ 12.16 hrs, Volume= 0.044 af  
 Outflow = 0.13 cfs @ 11.95 hrs, Volume= 0.044 af, Atten= 76%, Lag= 0.0 min  
 Discarded = 0.13 cfs @ 11.95 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 2.92' @ 12.67 hrs Surf.Area= 0 sf Storage= 499 cf

Plug-Flow detention time= 26.8 min calculated for 0.044 af (100% of inflow)  
 Center-of-Mass det. time= 26.6 min ( 852.3 - 825.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1.75'	1,002 cf	<b>Custom Stage Data</b> Listed below

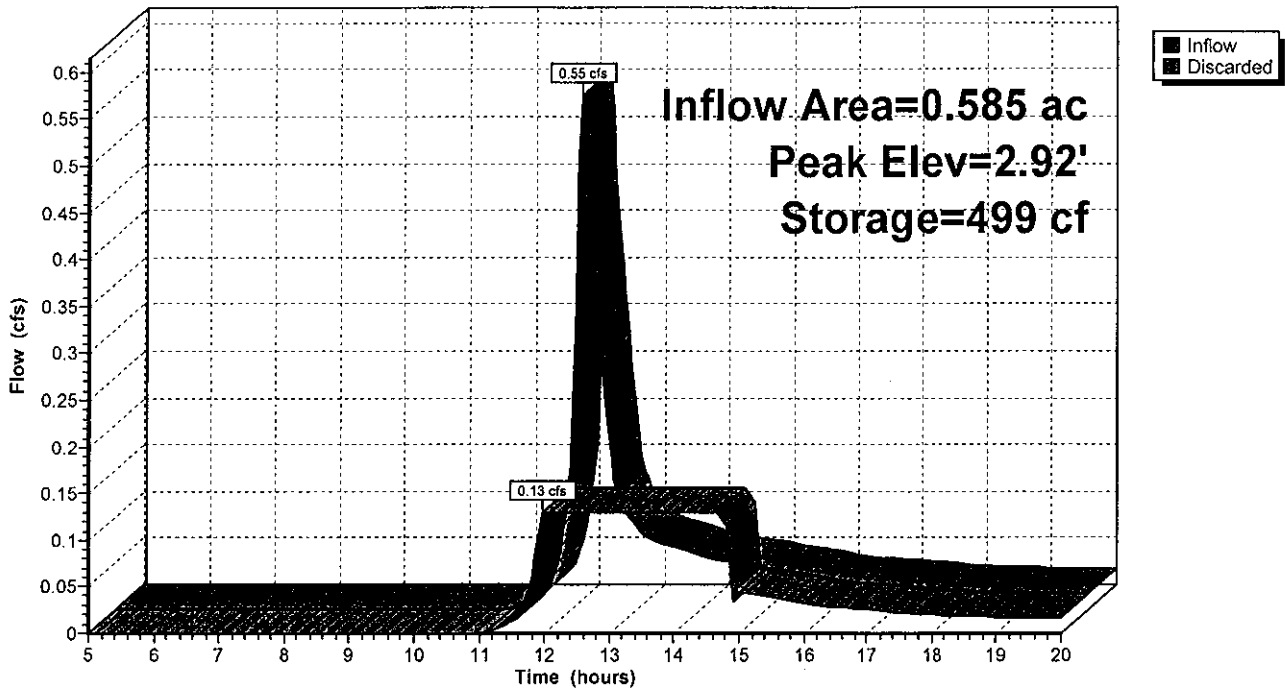
Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1.75	0	0
2.25	141	141
2.75	272	413
3.25	253	666
3.95	195	861
4.45	141	1,002

Device	Routing	Invert	Outlet Devices
#1	Discarded	1.75'	<b>0.13 cfs Exfiltration at all elevations</b>

**Discarded OutFlow** Max=0.13 cfs @ 11.95 hrs HW=1.78' (Free Discharge)  
 ↑=Exfiltration (Exfiltration Controls 0.13 cfs)

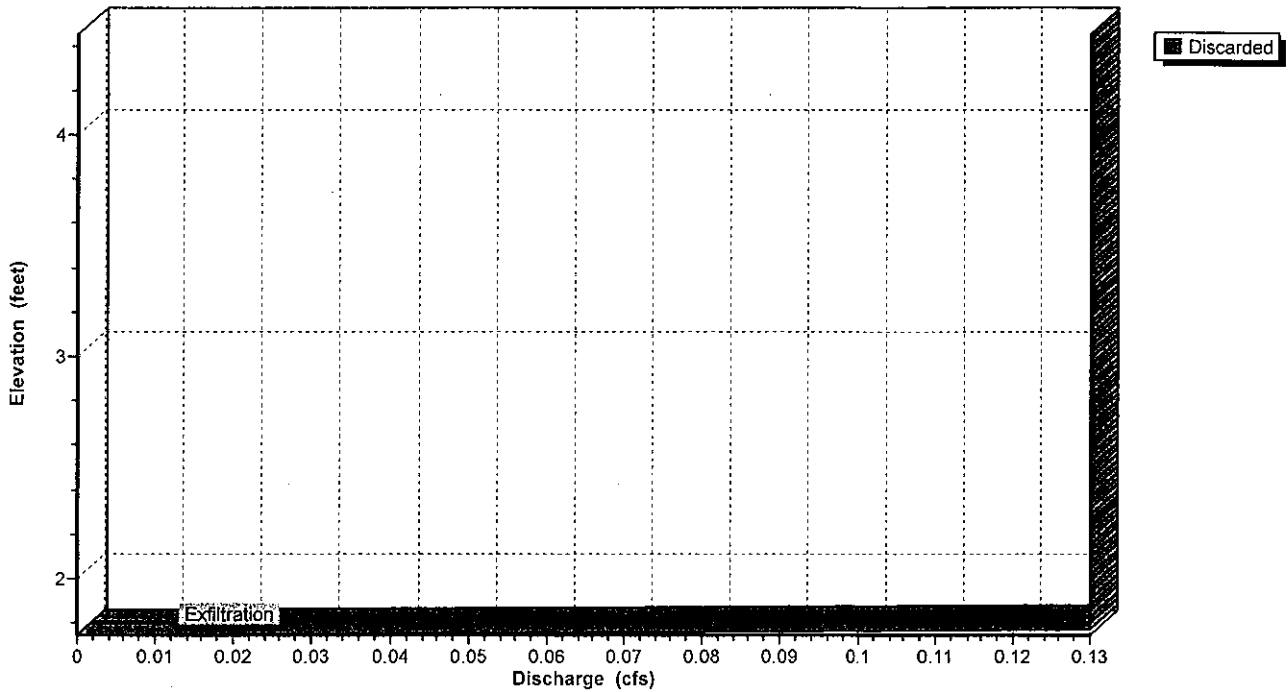
### Pond 8P: Recharge Area 4

Hydrograph



### Pond 8P: Recharge Area 4

Stage-Discharge



### Pond 8P: Recharge Area 4

