

# HANGARS 4 PLANES AIRPORT ROAD PROJECT

## STORMWATER MANAGEMENT REPORT

**Prepared for:**

**Hangars 4 Planes**  
127 Tell Street  
Providence, RI 02909

**Prepared by:**



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**P&O #:21153.0**

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## SECTION 1: INTRODUCTION

### 1.1 Project Description & Existing Conditions

The proposed project involves the redevelopment of an existing airport tarmac area into a 124' x 60' airplane storage hangar, owned by Hangars 4 Planes on a long-term ground lease from the New Bedford Regional Airport. The site is situated completely within the 96.5 +/- acre parcel owned by the City (Map 123, Lot 03). The project aims at converting the existing tarmac into a parking area, while also increasing the amount of green space in the area.

The existing site is asphalt pavement tarmac with a very gradual slope of approximately 1%. The site is bordered by the Claremont Aviation Hangar to the west and Downey Street (Airport Road) to the south. Stormwater on the existing site currently flows into a series of catch basins and stormwater lines that flow east. Proposed redevelopment adds two (2) catch basins as outlets to proposed infiltration basins, which outlet to two (2) of the existing catch basins.

### 1.2 Relevant Standards and Guidelines

The erosion and sediment control measures and post-construction practices have been designed to minimize soil loss, eroded soil, prevent sedimentation of water bodies, and ensure peak attenuation is lowered for each design storm. The following documents were utilized in the design process:

1. Massachusetts Stormwater Handbook, Volumes 1-3, effective February 2008 and accessed in July/August 2022.
2. City of New Bedford, Massachusetts, Stormwater Rules and Regulations. Revised June 2021 (Version 2) and accessed in July/August 2022.

### 1.3 Participant Contact Information

#### Owner

New Bedford Airport Commission  
New Bedford Regional Airport  
1569 Airport Road, New Bedford, MA 02746

#### Lessee

Hangars 4 Planes  
127 Tell Street, Providence, RI 02909  
802-309-8707  
leonshabott@gmail.com

#### Stormwater Management Preparer

Proper & O'Leary Engineering, dpc  
1915 5<sup>th</sup> Avenue, PO Box 246  
Troy, NY 12181  
518-610-8331

Contractor  
To Be Determined

## 1.4 Soils

The site consists mostly of loamy sand and loamy gravel that has a hydrologic soil group A. The USDA soil survey can be found in Appendix E.

Soil borings were conducted for the Airport in 2009. Three (3) borings were drilled near the proposed hangar building location. All borings consisted of a silty sand with gravel. The boring log and sieve analysis can be found in Appendix F.

## 1.5 Wetlands and Waterbodies

According to the MassDEP Wetland and Wetland Change Areas Map, there is a deciduous wooded swamp "WS1" of 9.75 acres across Downey Street from the project location. A map of the MassDEP Wetland can be found in Appendix C.

A map was provided to the Airport in January 2020 by Airport Solutions Group, with a delineation of the leading wetland edge. The proposed redevelopment project is not within the 25' buffer of this wetland but is within the 100' buffer.

## SECTION 2: MASSDEP STORMWATER STANDARDS

### 2.1 Standard 1 - Untreated Discharges

*Standard 1 requires that no new stormwater conveyances (outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The proposed project uses the existing stormwater system outlet at the Airport. Peak discharges dictated by Standard 2 are lessened, therefore no erosion is created at this outlet, indicating full compliance with Standard 1.

## 2.2 Standard 2 – Peak Attenuation

*Standard 2 requires that stormwater management systems shall be designed so post-development discharge rates do not exceed pre-development rates. This applies for a 2-Year, 10-Year, and 100-Year, 24-Hour storm event.*

The proposed project uses two (2) infiltration basins to attenuate the storm events listed above. The results of the pre-development vs. post-development discharge rates are presented in the table below.

<b>PEAK DISCHARGE SUMMARY</b>		
STORM EVENT	PRE-DEVELOPMENT	POST-DEVELOPMENT
2-YEAR	3.48 CFS	2.61 CFS
10-YEAR	5.25 CFS	4.49 CFS
100-YEAR	8.66 CFS	8.56 CFS

***Table # 1 - Peak Discharge Summary***

As presented in Table #1 above, all discharge rates for the post-development storm events decreased from pre-development, indicating full compliance with Standard 2. A HydroCad report outlining analysis of drainage conditions, sizing, and results can be found in Appendix G.

## 2.3 Standard 3 – Groundwater Recharge

*Standard 3 requires the annual recharge volume of groundwater in the post-development state to approximate the pre-development state based on soil type. This standard is met when the stormwater management system is designed to infiltrate the theoretical required recharge volume specified in the Massachusetts Stormwater Handbook.*

According to the USDA Soil Map, all soils at the project location are classified as Hydrologic Soil Group A. From the Stormwater Handbook, the recharge volume required for this group is 0.6 inches of runoff over the total impervious area. Total impervious area for this site is 0.824 acres, resulting in a total required recharge of 1,795 CF.

The infiltration basins have been sized to accommodate the full recharge volume using a worst-case infiltration rate of 1 inch per hour, referenced from Table 2.3.3 in V3C1 of the Stormwater Handbook, indicating full compliance with Standard 3.

The basin on the western portion of the site accounts for 62% of recharge storage and the eastern basin accounts for 38%. The basin sizing requirement calculations can be found in Appendix G.

## 2.4 Standard 4 – Water Quality

*Standard 4 requires stormwater management systems to remove 80% of the average annual post-construction load of total suspended solids (TSS). This is achieved by following suitable practices identified in a long-term pollution prevention plan (Standard 9), sizing of the best management practice in accordance with the Stormwater Handbook, and achieving adequate solid removal.*

The two (2) infiltration basins have been sized to accommodate 1/2" of runoff over the total impervious area of the site, totaling 1,496 CF. The basin on the western portion of the site accounts for 62% of volume and the eastern basin accounts for 38%. The basin controls can be found in the plans in Appendix I.

To remove suspended solids, runoff is conveyed through grass swales and into the two (2) infiltration basins. According to the Stormwater Handbook TSS efficiency worksheet, the percent of suspended solids removed is 90%, 10% more than the 80% requirement. The solid removal worksheet can be found in Appendix G. This indicates full compliance with Standard 4.

## 2.5 Standard 5 – Higher Potential Pollutant Loads

*Standard 5 requires that land uses with a higher potential pollutant load implement source control and pollution prevention to the maximum extent practicable.*

This project has an intended use as a storage facility and shall not be considered a use with higher potential pollutant loading. Airplane de-icing shall not occur at the project location and shall only be done at an area specified by the Airport.

## 2.6 Standard 6 – Critical Areas

*Standard 6 requires that stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and discharges near to or any other critical area, use specific pollution prevention measures determined by the DEP.*

This project is not located in any critical area, indicating full compliance with Standard 6.

## **2.7 Standard 7 – Redevelopment Projects**

*Standard 7 allows redevelopment projects to meet standards 1-6 only to the maximum extent practicable.*

This project is considered a redevelopment project since the existing site consists entirely of asphalt pavement and there is a decrease in impervious area. The redevelopment has been designed to fully comply with standards 1-6.

## **2.8 Standard 8 – Construction Period Control**

*Standard 8 requires a plan to control construction-related impacts to erosion, sedimentation, and other pollutant sources during construction.*

This plan can be found in Section 3 and corresponds to the construction plans found in Appendix I.

## **2.9 Standard 9 – Long-Term Operation and Maintenance Plan**

*Standard 9 requires development of a long-term operation and maintenance plan to ensure Standards 1-6 continue to be met over time.*

This plan can be found in Section 4.

## **2.10 Standard 10 – Illicit Discharges**

*Standard 10 prohibits illicit discharge to the stormwater management system.*

A final certification statement shall be provided at the termination of construction.

## SECTION 3: CONSTRUCTION PERIOD CONTROL PLAN

### 3.1 Erosion and Sediment Control Sequence

The following table is an outline of erosion and sediment control practices to be followed from pre-construction until the Notice of Termination of work. These tasks are listed sequentially in order of which they will commence and how long each practice shall be followed, executed by the contractor. These tasks correspond to the erosion control plan in Appendix I.

Table 1: Erosion and Sediment Control Implementation Plan					
Task ID	Practice	Duration	Time of Implementation	Time of Removal	Reference
1.0	Stabilized Construction Entrance	Temporary	Prior to disturbance.	Upon completion of construction and after final site stabilization.	Detail A/C3.0
2.0	Silt Sock	Temporary	After installing construction entrance; prior to earth disturbing activities.	Upon upgradient site stabilization.	Detail B/C3.0
3.0	Temporary Stockpiles	Temporary	Upon commencement of earthmoving activity.	Upon completion of final grading.	Stockpile Notes Sheet C3.0
4.0	Concrete Washout	Temporary	Prior to commencement of construction.	Upon completion of construction and just before final site stabilization.	Detail C/C3.0
5.0	Dust Control	Temporary	As needed.	Upon construction completion.	N/A
6.0	Soil Restoration	Permanent	Prior to seeding.	N/A	N/A
7.0	Topsoil	Permanent	Prior to seeding.	N/A	N/A
8.0	Seeding	Temporary/ Permanent	Within one day of final disturbance.	If temporary, upon reconvening site work in location of temporary seeding.	Seeding Notes Sheet C3.0
9.0	Mulching	Temporary	After seeding.	N/A	Mulching Notes Sheet C3.0

### 3.2 Erosion and Sediment Control Maintenance

The following table is an outline of maintenance procedures for all erosion and sediment control practices to be conducted in Table 1. These procedures include the type of maintenance required for each practice and how often these protective measures shall be inspected and maintained by the contractor. These maintenance measures correspond to the plans in Appendix I.



Table 2: Erosion and Sediment Plan - Maintenance Measures					
Task ID	Practice	Duration	Maintenance Required	Maintenance Frequency	Responsible Party
1.0	Stabilized Construction Entrance	Temporary	Replacement of gravel when voids are full.	As sediment fills the voids of the aggregate or every two weeks (whichever occurs first).	Contractor
2.0	Silt Sock	Temporary	Replace upon identification of damaged materials and when sediment reaches half the height of the fiber roll.	Inspect daily and after each runoff event.	Contractor
3.0	Temporary Stockpiles	Temporary	Ensure appropriate site slopes and functioning perimeter barriers.	Weekly	Contractor
4.0	Concrete Washout	Temporary	Remove hardened concrete and clean area when 75% capacity is reached.	Weekly	Contractor
5.0	Dust Control	Temporary	N/A	Throughout dry weather periods until site is stabilized.	Contractor
6.0	Soil Restoration	Permanent	Once restored, keep free of vehicular traffic, and other activities that cause compaction or rutting.	Daily throughout construction.	Contractor
7.0	Topsoil	Permanent	Re-dress rutted or eroded areas.	Inspect daily and after each runoff event throughout duration of construction.	Contractor
8.0	Seeding	Temporary/Permanent	Reseed bare spots, water to establish growth, keep free of vehicular travel.	Weekly until stabilization occurs.	Contractor/Own
9.0	Mulching	Temporary	Reapply to bare spots and maintenance appropriate density of cover until stabilized.	Inspect daily and after each runoff event.	Contractor
Notes: 1) All erosion and sediment control practices will be installed and operational prior to start of work. 2) Temporary practices will remain in place and operational until vegetative site stabilization, as directed by the Engineer.					

### 3.3 Other Pollutant Controls

#### Solid Waste

No solid materials are allowed to be discharged from the site with stormwater. All solid waste shall be collected and placed in containers. The containers will be emptied periodically by a contract trash disposal service and hauled away from the site. The contractor shall walk the site daily and pick up any waste or litter and dispose of them properly.

#### Sanitary Facilities

Temporary facilities will be used by all construction personnel and will be serviced by a commercial contractor. The facilities shall comply with all sanitary and septic regulations of the Commonwealth and City.

### **3.4 Spill Prevention and Control**

The contractor shall acquire proper cleanup materials, apparatus, and personnel to be on site whenever active construction is occurring. This shall include sorbents for accidental spills, restrictions on certain activities, location of materials and equipment, and a protocol to be followed in the event of an accidental spill. The contractor shall include training for spill prevention countermeasures and control as part of the health and safety program for the project.

#### Good Housekeeping

- An effort will be made to store only enough product required for the job.
- All materials stored on site will be stored in a neat, orderly manner in their appropriate container and under enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- When possible, all products shall be utilized before disposal of the container.
- Follow manufacturer's recommendations for use and disposal.
- Refueling shall occur at locations where the site is paved.
- All diesel or gasoline kept on site should be located near the existing access routes to provide access by pickup trucks, refueling trucks, and the fire department.
- Diesel or gasoline shall be kept within sealed protective enclosures.

#### Response Techniques

- Site personnel should be made aware of the recommended procedures and the location of the information and cleanup supplies from prior training.
- Large spills will require an emergency response contractor to be engaged by the contractor.
- Materials and equipment necessary for cleanup shall be kept in the material storage area on site. This includes but is not limited to brooms, dustpans, mops, rags, gloves, goggles, litter, sand, and sawdust.
- All spills shall be cleaned up immediately upon discovery and documented using an incident report form.

- In the event of an accidental spill or breakage, workers shall immediately arrange for shutdown of equipment and contact the supervisor.
- Spill areas shall be kept well ventilated, and personnel shall wear appropriate protective clothing.
- Spills of toxic or hazardous material shall be reported to the appropriate State or City agency.
- As soon as immediate actions have been taken, the fire department and owner shall be notified.

## **SECTION 4: LONG-TERM OPERATION & MAINTENANCE PLAN**

### **4.1 Responsible Party**

The lessee shall be responsible for long-term operation and maintenance of all stormwater management systems and practices set forth below. Contact information can be found in Section 1.3.

Prior to any sale or transfer of property lease, the lessee shall notify the prospective buyer of all stormwater management system operations set forth below.

### **4.2 Routine Operation and Maintenance**

#### Grass Channel (Biofilter Swale)

Grass channels shall be mowed as needed to maintain a grass height of between 3 inches and 6 inches. All trash and debris shall be removed and disposed of properly prior to each mowing. Grass channels shall be inspected two (2) times per year for one year, and then one (1) time per year thereafter. Inspections shall consist of monitoring grass growth / damage, and accumulation of sediment. Sediment removal and regrading of the channel shall be conducted as needed.

#### Drip Edge

Gravel drip edge shall be cleaned of all trash and debris at the same frequency as grass mowing. Gravel drip edge shall be weeded free of unwanted vegetation as needed. Replacement of stone and regrading of the edge shall also be conducted as needed.

#### Sediment Forebay

Sediment forebays shall be inspected at least one (1) time per month and cleaned of sediment at least four (4) times per year. Stone check dams shall be cleaned of sediment and re-set as necessary. Grass shall be replaced as needed after sediment removal and techniques to eliminate scour shall be used, such as hydroseeding or blanket control. Forebays shall be mowed as needed to maintain a grass height of between 3 inches and 6 inches.

#### Infiltration Basin

Infiltration basins shall be inspected at least two (2) times per year to ensure proper function. After construction, inspections shall be conducted after every major storm event for at least three (3) months. Inspections shall consist of sediment accumulation, grass health, embankment leakage, and differential settlement of the basin. Basins shall be mowed at least two (2) times per year. All grass clippings, other organic matter, and any trash and debris shall be removed to maintain infiltration. Sediment shall be removed as necessary and done without the use of heavy machinery.

#### Catch Basin

Catch basins shall be inspected at least four (4) times per year, including at the end of foliage season and snow removal season. Catch basins shall be cleaned of all sediment and debris at each inspection and grates shall be inspected for signs of clogging.

### **4.3 Non-Routine Maintenance**

All catch basins shall be inspected once every four (4) years to ensure proper seals between the basin walls and pipe inlets and outlets. Pipes shall be video scoped to ensure proper structural integrity and inspected for signs of clogging.

### **4.4 Inspection Requirements**

All stormwater management practices shall be operated and maintained in accordance with the design plans and the Long-Term Operation and Maintenance Plan. The lessee shall maintain an operation and maintenance log for the last three (3) years minimum, which includes inspections, repairs, and material disposal. This log can be found in Appendix H. The log shall be available to the DEP and Conservation Commission upon request, and agents of both parties shall be allowed to inspect and evaluate the premises for compliance.

#### Compliance Statement

The lessee shall submit an O&M Compliance Statement when requesting a Certificate of Compliance. The statement shall identify the responsible party and state that the site has been inspected for erosion and appropriate steps have

been taken to permanently stabilize any eroded areas. It shall also be stated that all stormwater management practices have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace any failed components as necessary. The statement shall also contain a provision to notify future parties referenced in Section 4.1. Lastly, the statement shall confirm that the Operation and Maintenance Plan is being implemented per Section 4.

#### **4.5 Public Safety**

All stormwater management practices have been designed to ensure the safety of the public. This includes but is not limited to, fencing around the leased area to prevent access to other areas of the airport, slope design of the infiltration basin walls, and parking stops for vehicles.

#### **4.6 Operation and Maintenance Budget**

It is estimated that the operation and maintenance budget to comply with Section 4.2 above is approximately \$3,000 annually.

# Appendix A: Checklist for Stormwater Report



# 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.

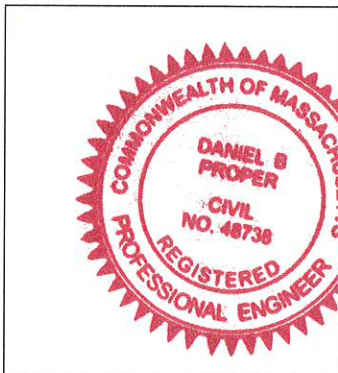
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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



*Daniel B Proper* 9-8-22  
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

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## 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.

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



# Checklist for Stormwater Report

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## 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

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## 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

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## 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.

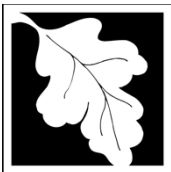
### Standard 9: Operation and Maintenance Plan

- 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; **TO BE PROVIDED AT A LATER DATE**
  - 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.

## **Appendix B: WPA Form 3 – Notice of Intent Draft**



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

**WPA Form 3 – Notice of Intent**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

New Bedford

City/Town

**Important:**

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



Note:  
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

**A. General Information**

1. Project Location (**Note:** electronic filers will click on button to locate project site):

<u>Downey Street (Airport Road)</u>	<u>New Bedford</u>	<u>02746</u>
a. Street Address	b. City/Town	c. Zip Code
Latitude and Longitude:	<u>41.671667</u>	<u>70.953333</u>
	d. Latitude	e. Longitude
<u>123</u>	<u>03</u>	
f. Assessors Map/Plat Number	g. Parcel /Lot Number	

2. Applicant:

<u>Leon</u>	<u>Shabott</u>	
a. First Name	b. Last Name	
<u>Hangars 4 Planes, Inc.</u>		
c. Organization		
<u>127 Tell Street</u>		
d. Street Address		
<u>Providence</u>	<u>RI</u>	<u>02909</u>
e. City/Town	f. State	g. Zip Code
<u>802-309-8707</u>	<u>leonshabott@gmail.com</u>	
h. Phone Number	i. Fax Number	j. Email Address

3. Property owner (required if different from applicant):  Check if more than one owner

<u></u>	<u></u>	
a. First Name	b. Last Name	
<u>New Bedford Airport Commission</u>		
c. Organization		
<u>131 William Street</u>		
d. Street Address		
<u>New Bedford</u>	<u>MA</u>	<u>02740</u>
e. City/Town	f. State	g. Zip Code
<u>508-991-6160</u>		
h. Phone Number	i. Fax Number	j. Email address

4. Representative (if any):

<u>Daniel</u>	<u>Proper</u>	
a. First Name	b. Last Name	
<u>Proper &amp; O'Leary Engineering, dpc</u>		
c. Company		
<u>1915 5th Avenue / PO Box 246</u>		
d. Street Address		
<u>Troy</u>	<u>NY</u>	<u>12181</u>
e. City/Town	f. State	g. Zip Code
<u>518-610-8331</u>	<u>dproper@po-eng.com</u>	
h. Phone Number	i. Fax Number	j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

<u>\$1050</u>	<u>\$512.50</u>	<u>\$537.50</u>
a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid





Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

# WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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## A. General Information (continued)

6. General Project Description:

Redevelopment of an existing airport tarmac area into a 124' x 60' airplane storage hangar. The site will increase green space and achieve storm attenuation, recharge, and water quality through two infiltration basins.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- 1.  Single Family Home
- 2.  Residential Subdivision
- 3.  Commercial/Industrial
- 4.  Dock/Pier
- 5.  Utilities
- 6.  Coastal engineering Structure
- 7.  Agriculture (e.g., cranberries, forestry)
- 8.  Transportation
- 9.  Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

- 1.  Yes  No      If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Bristol	
a. County	b. Certificate # (if registered land)
930	214
c. Book	d. Page Number

## B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- 1.  Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- 2.  Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



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**B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)**

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. <input type="checkbox"/> Bank	1. linear feet	2. linear feet
b. <input type="checkbox"/> Bordering Vegetated Wetland	1. square feet	2. square feet
c. <input type="checkbox"/> Land Under Waterbodies and Waterways	1. square feet	2. square feet
	3. cubic yards dredged	

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. <input type="checkbox"/> Bordering Land Subject to Flooding	1. square feet	2. square feet
	3. cubic feet of flood storage lost	4. cubic feet replaced
e. <input type="checkbox"/> Isolated Land Subject to Flooding	1. square feet	
	2. cubic feet of flood storage lost	3. cubic feet replaced

- f.  Riverfront Area
1. Name of Waterway (if available) - **specify coastal or inland** \_\_\_\_\_
2. Width of Riverfront Area (check one):
- 25 ft. - Designated Densely Developed Areas only
  - 100 ft. - New agricultural projects only
  - 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: \_\_\_\_\_ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.
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5. Has an alternatives analysis been done and is it attached to this NOI?  Yes  No

6. Was the lot where the activity is proposed created prior to August 1, 1996?  Yes  No

3.  Coastal Resource Areas: (See 310 CMR 10.25-10.35)

**Note:** for coastal riverfront areas, please complete **Section B.2.f.** above.



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**B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)**

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. <input type="checkbox"/> Land Under the Ocean	_____	
	1. square feet	
	_____	
	2. cubic yards dredged	
c. <input type="checkbox"/> Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. <input type="checkbox"/> Coastal Beaches	_____	_____
	1. square feet	2. cubic yards beach nourishment
e. <input type="checkbox"/> Coastal Dunes	_____	_____
	1. square feet	2. cubic yards dune nourishment
	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. <input type="checkbox"/> Coastal Banks	_____	
	1. linear feet	
g. <input type="checkbox"/> Rocky Intertidal Shores	_____	
	1. square feet	
h. <input type="checkbox"/> Salt Marshes	_____	_____
	1. square feet	2. sq ft restoration, rehab., creation
i. <input type="checkbox"/> Land Under Salt Ponds	_____	
	1. square feet	
	_____	
	2. cubic yards dredged	
j. <input type="checkbox"/> Land Containing Shellfish	_____	
	1. square feet	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	_____	
	1. cubic yards dredged	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	_____	
	1. square feet	
4. <input type="checkbox"/> Restoration/Enhancement	If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.	
	_____	_____
	a. square feet of BVW	b. square feet of Salt Marsh
5. <input type="checkbox"/> Project Involves Stream Crossings		
	_____	_____
	a. number of new stream crossings	b. number of replacement stream crossings



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## C. Other Applicable Standards and Requirements

- This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

### Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

- Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to [http://maps.massgis.state.ma.us/PRI\\_EST\\_HAB/viewer.htm](http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm).

a.  Yes  No **If yes, include proof of mailing or hand delivery of NOI to:**

**Natural Heritage and Endangered Species Program  
Division of Fisheries and Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581**

08/01/2021  
b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

c. Submit Supplemental Information for Endangered Species Review\*

- Percentage/acreage of property to be altered:
  - (a) within wetland Resource Area \_\_\_\_\_ percentage/acreage
  - (b) outside Resource Area \_\_\_\_\_ percentage/acreage

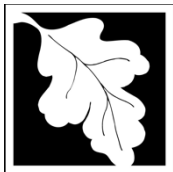
2.  Assessor’s Map or right-of-way plan of site

- Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work \*\*
  - (a)  Project description (including description of impacts outside of wetland resource area & buffer zone)
  - (b)  Photographs representative of the site

\* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <https://www.mass.gov/endangered-species-act-mesa-regulatory-review>).

Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

\*\* MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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### C. Other Applicable Standards and Requirements (cont'd)

- (c)  MESA filing fee (fee information available at <https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review>).

Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

*Projects altering 10 or more acres of land, also submit:*

- (d)  Vegetation cover type map of site

- (e)  Project plans showing Priority & Estimated Habitat boundaries

- (f) OR Check One of the Following

1.  Project is exempt from MESA review.  
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2.  Separate MESA review ongoing. a. NHESP Tracking # \_\_\_\_\_ b. Date submitted to NHESP \_\_\_\_\_

3.  Separate MESA review completed.  
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

- a.  Not applicable – project is in inland resource area only      b.  Yes     No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and  
the Cape & Islands:

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -  
Southeast Marine Fisheries Station  
Attn: Environmental Reviewer  
836 South Rodney French Blvd.  
New Bedford, MA 02744  
Email: [dmf.envreview-south@mass.gov](mailto:dmf.envreview-south@mass.gov)

Division of Marine Fisheries -  
North Shore Office  
Attn: Environmental Reviewer  
30 Emerson Avenue  
Gloucester, MA 01930  
Email: [dmf.envreview-north@mass.gov](mailto:dmf.envreview-north@mass.gov)

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

- c.  Is this an aquaculture project?      d.  Yes     No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).



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**C. Other Applicable Standards and Requirements (cont'd)**

**Online Users:**  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

- 4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?  
 a.  Yes  No      If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.  
 b. ACEC

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- 5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?  
 a.  Yes  No
- 6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?  
 a.  Yes  No
- 7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?  
 a.  Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
  - 1.  Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
  - 2.  A portion of the site constitutes redevelopment
  - 3.  Proprietary BMPs are included in the Stormwater Management System.
 b.  No. Check why the project is exempt:
  - 1.  Single-family house
  - 2.  Emergency road repair
  - 3.  Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

**D. Additional Information**

- This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

**Online Users:** Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

- 1.  USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
- 2.  Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

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## D. Additional Information (cont'd)

3.  Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4.  List the titles and dates for all plans and other materials submitted with this NOI.

Hangars 4 Planes Airport Road Project

a. Plan Title

Proper & O'Leary Engineering, dpc

Daniel B. Proper, PE

b. Prepared By

c. Signed and Stamped by

August 10, 2022

Varies

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5.  If there is more than one property owner, please attach a list of these property owners not listed on this form.

6.  Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7.  Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8.  Attach NOI Wetland Fee Transmittal Form

9.  Attach Stormwater Report, if needed.

## E. Fees

1.  Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name



Massachusetts Department of Environmental Protection  
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## F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant

2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date

### For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

### For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

### Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

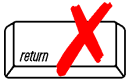
The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.





**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**NOI Wetland Fee Transmittal Form**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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



**A. Applicant Information**

1. Location of Project:

1569 Airport Road

a. Street Address

New Bedford

b. City/Town

\$1050

d. Fee amount

c. Check number

2. Applicant Mailing Address:

Leon

a. First Name

Shabott

b. Last Name

Hangars 4 Planes. Inc.

c. Organization

127 Tell Street

d. Mailing Address

Providence

e. City/Town

RI

f. State

02909

g. Zip Code

802-309-8707

h. Phone Number

i. Fax Number

leonshabott@gmail.com

j. Email Address

3. Property Owner (if different):

a. First Name

b. Last Name

New Bedford Airport Commission

c. Organization

131 William Street

d. Mailing Address

New Bedford

e. City/Town

MA

f. State

02740

g. Zip Code

508-991-6160

h. Phone Number

i. Fax Number

j. Email Address

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

**B. Fees**

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

**Step 1/Type of Activity:** Describe each type of activity that will occur in wetland resource area and buffer zone.

**Step 2/Number of Activities:** Identify the number of each type of activity.

**Step 3/Individual Activity Fee:** Identify each activity fee from the six project categories listed in the instructions.

**Step 4/Subtotal Activity Fee:** Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

**Step 5/Total Project Fee:** Determine the total project fee by adding the subtotal amounts from Step 4.

**Step 6/Fee Payments:** To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.



**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**NOI Wetland Fee Transmittal Form**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Fees** (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Each building (for development) including site	1	\$1050	\$1050
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
<b>Step 5/Total Project Fee:</b>			\$1050
<b>Step 6/Fee Payments:</b>			
Total Project Fee:			\$1050
State share of filing Fee:			\$512.50
City/Town share of filing Fee:			\$537.50
			a. Total Fee from Step 5
			b. 1/2 Total Fee <b>less</b> \$12.50
			c. 1/2 Total Fee <b>plus</b> \$12.50

**C. Submittal Requirements**

- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection  
 Box 4062  
 Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

**To MassDEP Regional Office** (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

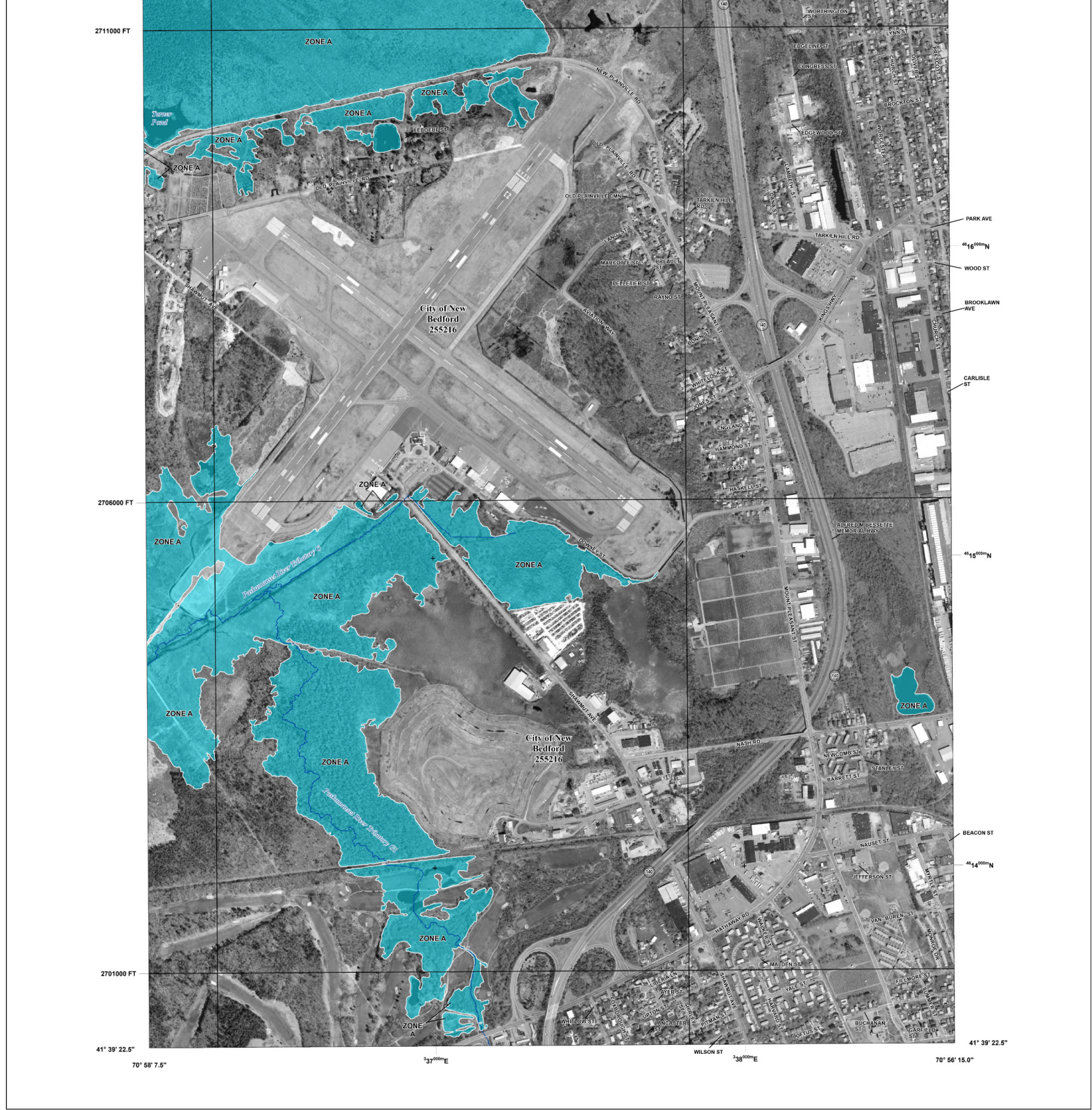
## Appendix C: MassDEP Wetland Map



DOWNEY STREET

WS1

# Appendix D: FEMA Flood Map



**FLOOD HAZARD INFORMATION**

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT**  
[HTTPS://MSC.FEMA.GOV](https://MSC.FEMA.GOV)

- 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
  - 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
- OTHER AREAS OF FLOOD HAZARD**
  - Area with Flood Risk due to Levee Zone D
  - NO SCREEN Area of Minimal Flood Hazard Zone X
  - Area of Undetermined Flood Hazard Zone D
- OTHER AREAS**
- GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
  - Cross Sections with 1% Annual Chance Water Surface Elevation
 

18.2
17.6

**NOTES TO USERS**

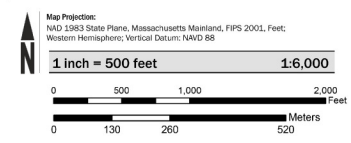
For information and questions about the Flood Insurance Rate Map (FIRM), available products associated with the FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eExchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <http://mfc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above. For community and countywide map dates refer to the Flood Insurance Study report for that jurisdiction.

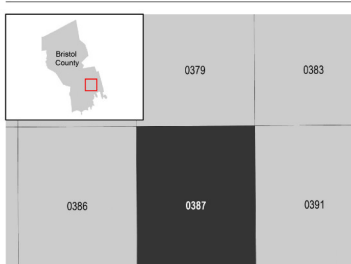
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on the FIRM uses 2013 or 2014 imagery provided by the U.S. Geological Survey at a resolution of 0.3 meter and 2016 transportation data provided by the U.S. Census Bureau, with all other vector data unchanged from the previous FIRM.

**SCALE**



**PANEL LOCATOR**



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
 FLOOD INSURANCE RATE MAP

**BRISTOL COUNTY, MASSACHUSETTS**  
 (ALL JURISDICTIONS)

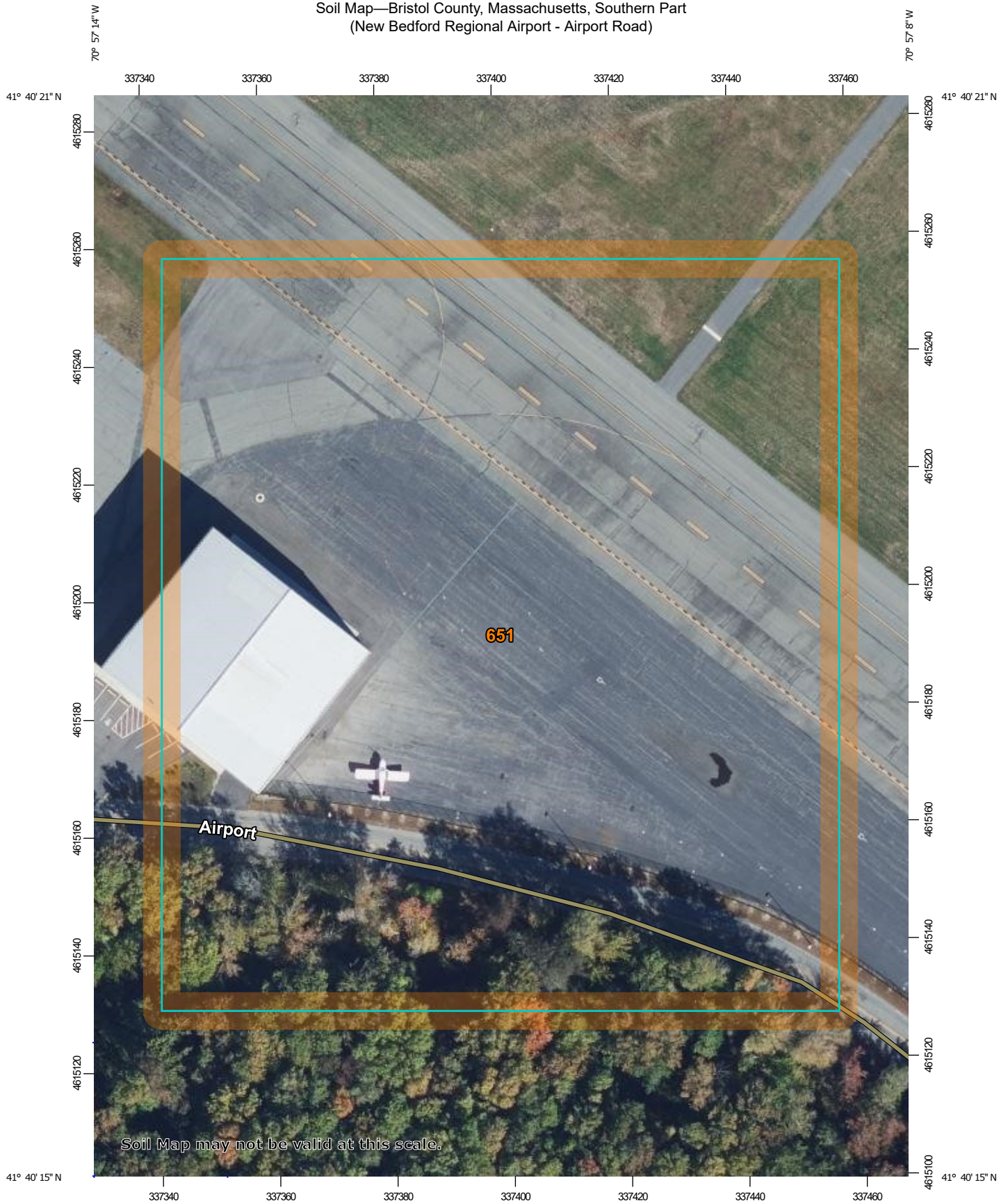
PANEL **387** of 550

Panel Contains:

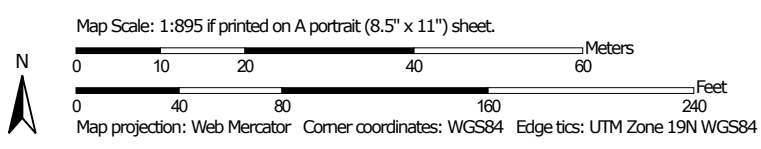
COMMUNITY	NUMBER	PANEL	SUFFIX
NEW BEDFORD, CITY OF	255216	0387	G

## **Appendix E: Soil Report - USDA**

Soil Map—Bristol County, Massachusetts, Southern Part  
(New Bedford Regional Airport - Airport Road)



Soil Map may not be valid at this scale.






Soil Map—Bristol County, Massachusetts, Southern Part  
(New Bedford Regional Airport - Airport Road)


### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)

**Soils**

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

**Special Point Features**



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

**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 1:20,000.

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 15, Sep 2, 2021

Soil map units are labeled (as space allows) for map scales

1:50,000 or larger.

Date(s) aerial images were photographed: Sep 26, 2020—Oct

15, 2020

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
651	Udorthents, smoothed	3.7	100.0%
<b>Totals for Area of Interest</b>		<b>3.7</b>	<b>100.0%</b>

## Bristol County, Massachusetts, Southern Part

### 651—Udorthents, smoothed

#### Map Unit Setting

*National map unit symbol:* v5rw

*Elevation:* 0 to 3,000 feet

*Mean annual precipitation:* 45 to 54 inches

*Mean annual air temperature:* 43 to 54 degrees F

*Frost-free period:* 145 to 240 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Udorthents, smoothed, and similar soils:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Udorthents, Smoothed

##### Setting

*Parent material:* Made land over loose sandy and gravelly glaciofluvial deposits and/or firm coarse-loamy basal till derived from granite and gneiss

##### Typical profile

*H1 - 0 to 6 inches:* variable

*H2 - 6 to 60 inches:* variable

##### Properties and qualities

*Slope:* 0 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately low to very high (0.06 to 20.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* A

*Hydric soil rating:* Unranked

## Data Source Information

Soil Survey Area: Bristol County, Massachusetts, Southern Part

Survey Area Data: Version 15, Sep 2, 2021

## **Appendix F: Soil Report - Airport**

RUNWAY 14 - 32

515

702

TAXIWAY "B"

F-3

G

NOR-EAST 2

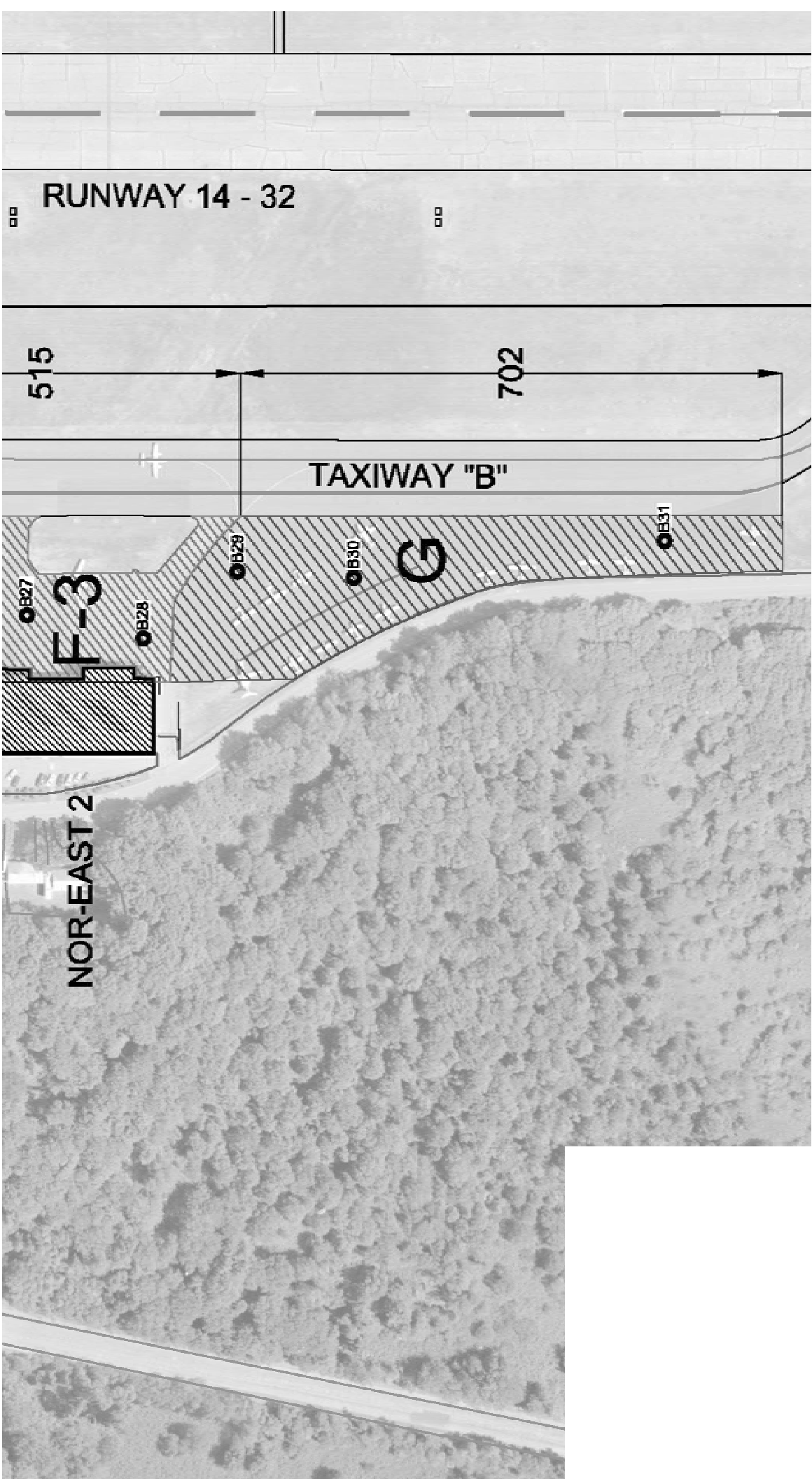
B27

B28

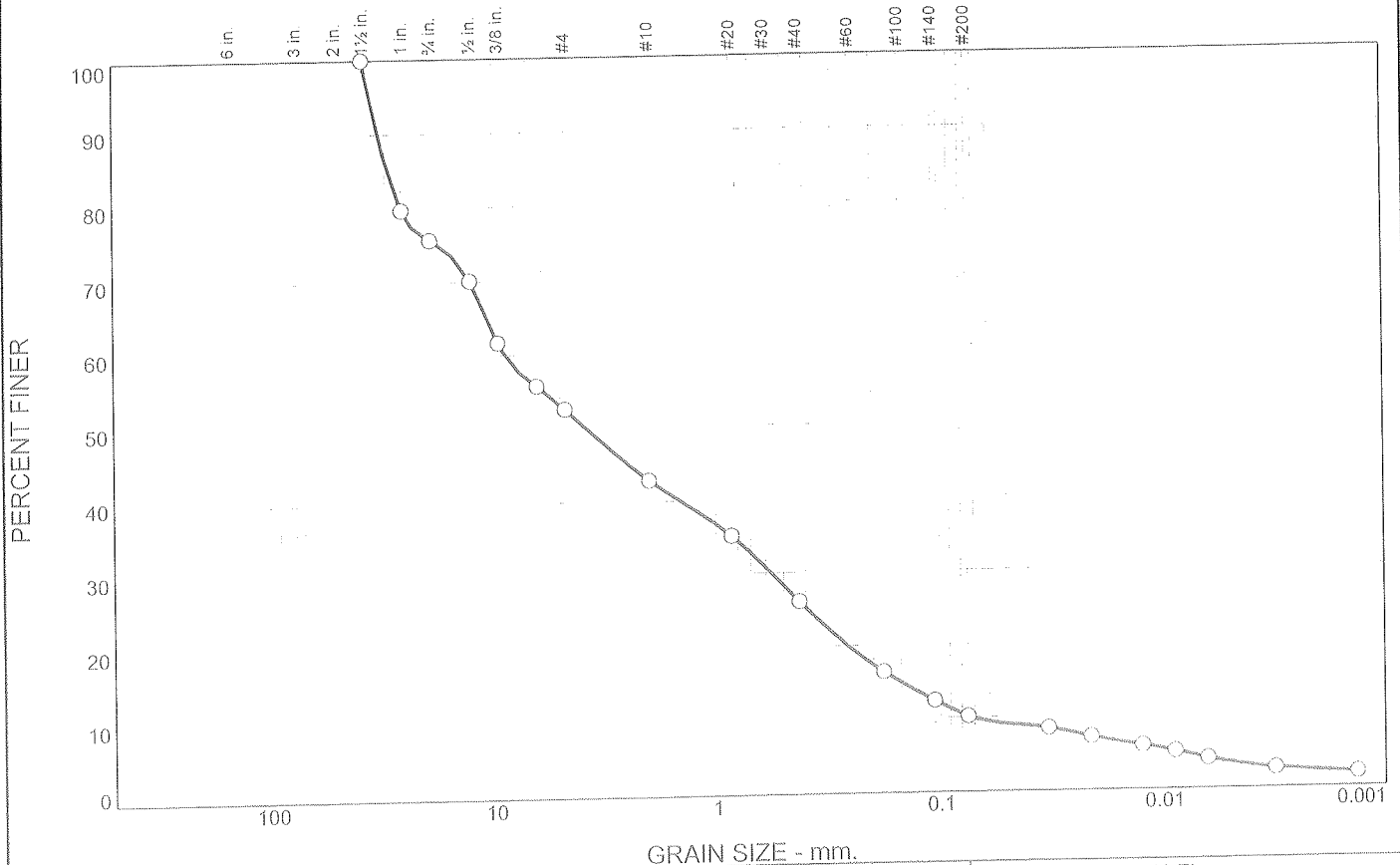
B29

B30

B31



# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	24.3	23.1	9.8	16.7	15.9	6.8	3.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	79.8		
3/4"	75.7		
1/2"	70.1		
3/8"	61.7		
1/4"	55.7		
#4	52.6		
#10	42.8		
#20	35.1		
#40	26.1		
#80	16.4		
#140	12.4		
#200	10.2		
0.0328 mm.	8.4		
0.0211 mm.	7.2		
0.0124 mm.	5.9		
0.0089 mm.	5.1		
0.0064 mm.	4.0		
0.0032 mm.	2.6		
0.0013 mm.	1.9		

**Soil Description**  
poorly graded gravel with silt and sand

**Atterberg Limits**  
 PL= np      LL= nv      PI=

**Coefficients**  
 D<sub>85</sub>= 29.1211      D<sub>60</sub>= 8.8347      D<sub>50</sub>= 3.8267  
 D<sub>30</sub>= 0.5661      D<sub>15</sub>= 0.1525      D<sub>10</sub>= 0.0724  
 C<sub>u</sub>= 122.11      C<sub>c</sub>= 0.50

**Classification**  
 USCS= GP-GM      AASHTO= A-1-a

**Remarks**  
 Moisture content: 4.1%

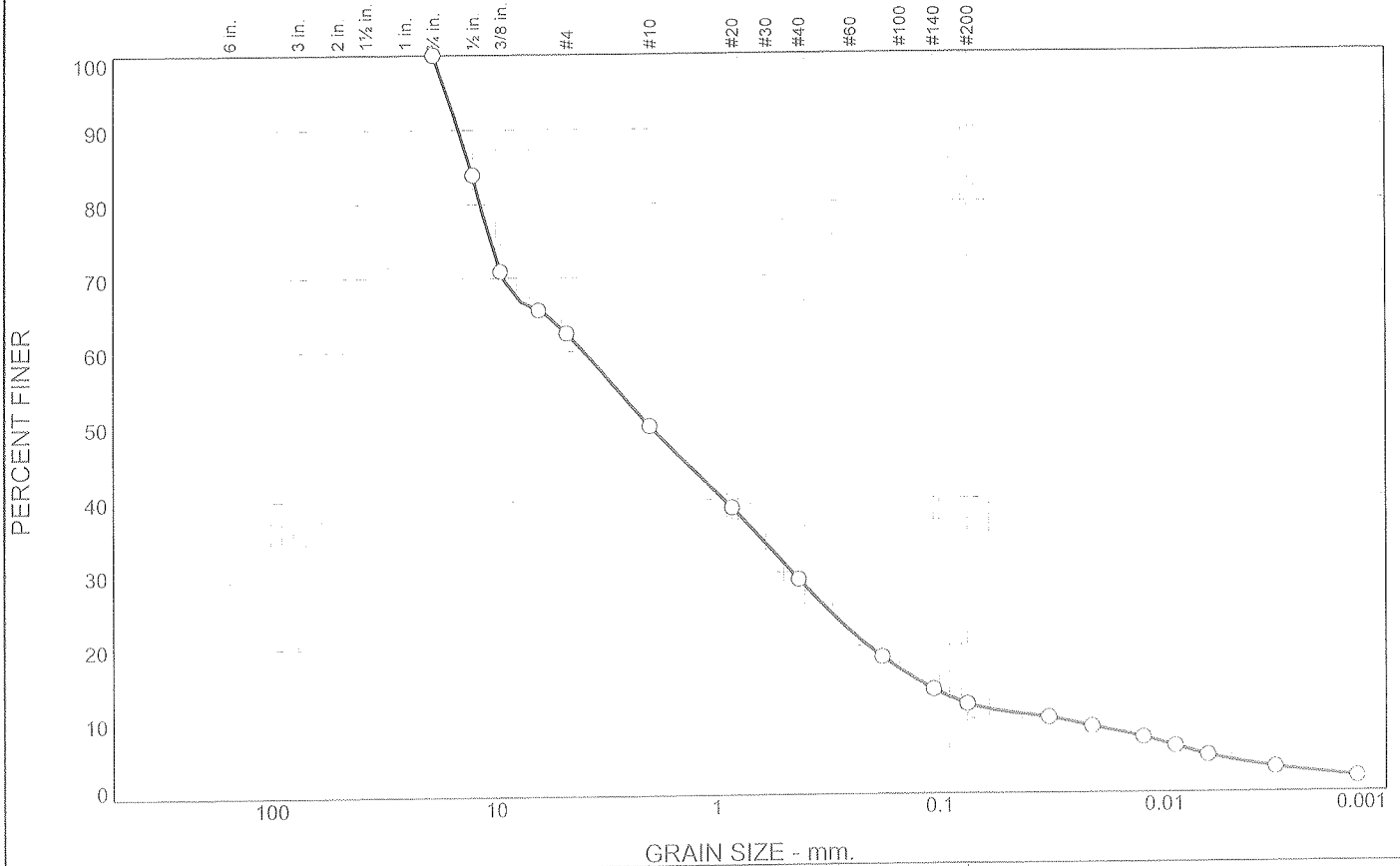
\* (no specification provided)

Sample No.: S-1      Source of Sample: B-29      Date: 10/19/09  
 Location: New Bedford, MA      Elev./Depth: 0.3'-2.3'

<b>R.W. Gillespie &amp; Associates, Inc.</b> Saco, Maine	Client: Airport Solutions Group Project: Pavement Rehabilitation Strategies for Ramps Project No: 1229-01      Lab No. 10972VV
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Tested By: JJH/MCS      Checked By: MTG *MTG*

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	37.5	12.6	20.8	17.1	7.7	4.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	83.9		
3/8"	70.9		
1/4"	65.6		
#4	62.5		
#10	49.9		
#20	38.9		
#40	29.1		
#80	18.5		
#140	14.0		
#200	12.0		
0.0326 mm.	10.1		
0.0210 mm.	8.9		
0.0124 mm.	7.4		
0.0089 mm.	6.2		
0.0064 mm.	5.0		
0.0032 mm.	3.3		
0.0014 mm.	2.0		

**Soil Description**

poorly graded sand with silt and gravel

**Atterberg Limits**

PL= np      LL= nv      PI=

**Coefficients**

D<sub>85</sub>= 12.9947      D<sub>60</sub>= 3.9714      D<sub>50</sub>= 2.0073  
D<sub>30</sub>= 0.4542      D<sub>15</sub>= 0.1209      D<sub>10</sub>= 0.0312  
C<sub>u</sub>= 127.29      C<sub>c</sub>= 1.67

**Classification**

USCS= SW-SM      AASHTO= A-1-a

**Remarks**

Moisture content: 4.5%

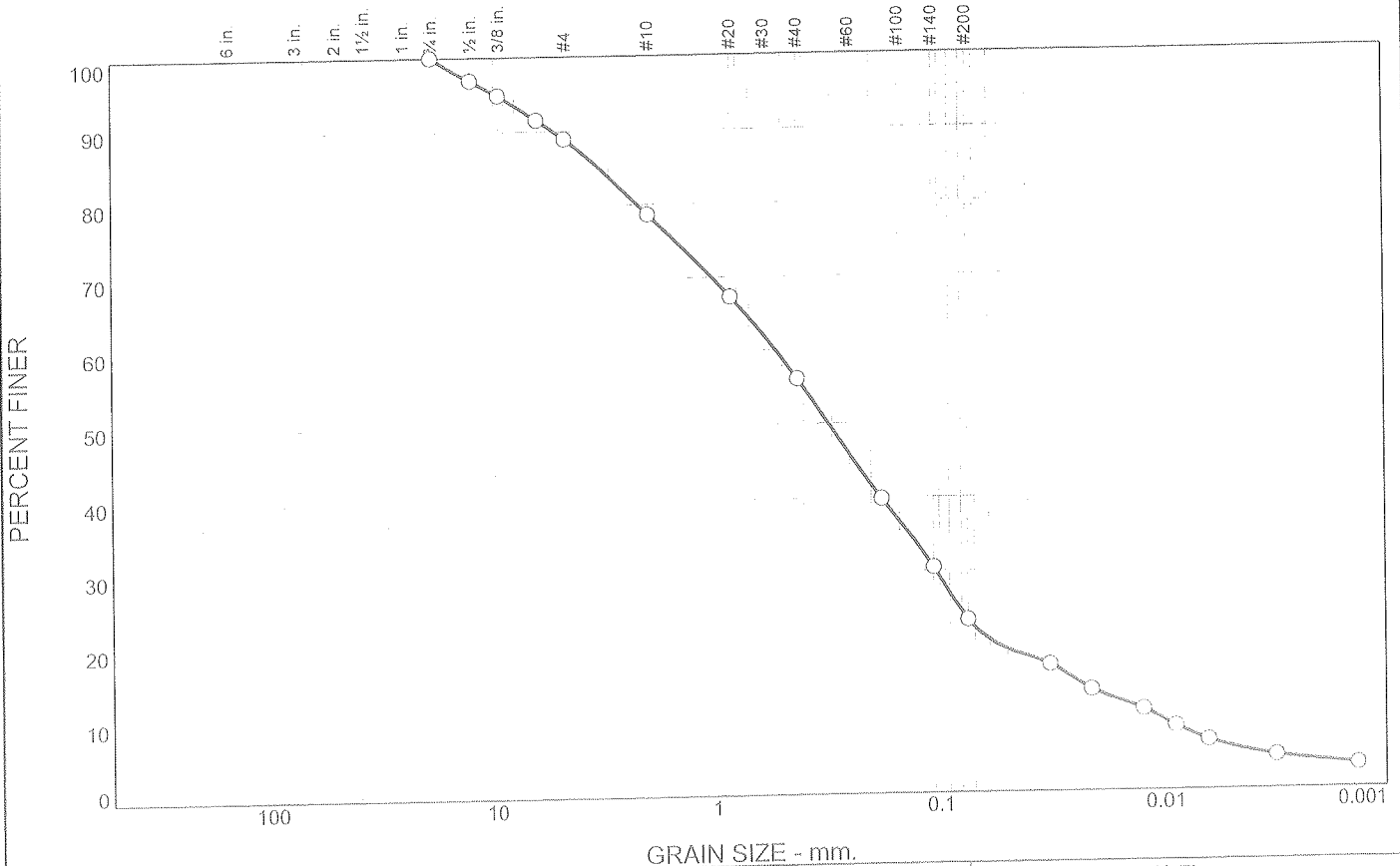
\* (no specification provided)

Sample No.: S-1      Source of Sample: B-30      Date: 10/19/09  
Location: New Bedford, MA      Elev./Depth: 0.3'-2.3'

<b>R.W. Gillespie &amp; Associates, Inc.</b> <b>Saco, Maine</b>	Client: Airport Solutions Group Project: Pavement Rehabilitation Strategies for Ramps Project No: 1229-01      Lab No. 10972WW
--	--

Tested By: JJH/MCS      Checked By: MTG *MTG*

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.0	10.4	22.5	32.8	17.6	5.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	96.9		
3/8"	94.9		
1/4"	91.6		
#4	89.0		
#10	78.6		
#20	67.3		
#40	56.1		
#80	39.8		
#140	30.5		
#200	23.3		
0.0323 mm.	17.1		
0.0211 mm.	13.6		
0.0124 mm.	10.9		
0.0090 mm.	8.6		
0.0064 mm.	6.7		
0.0032 mm.	4.5		
0.0014 mm.	3.2		

**Soil Description**  
silty sand

**Atterberg Limits**  
 PL= np      LL= nv      PI=

**Coefficients**  
 D<sub>85</sub>= 3.3033      D<sub>60</sub>= 0.5299      D<sub>50</sub>= 0.3081  
 D<sub>30</sub>= 0.1037      D<sub>15</sub>= 0.0250      D<sub>10</sub>= 0.0108  
 C<sub>u</sub>= 48.92      C<sub>c</sub>= 1.87

**Classification**  
 USCS= SM      AASHTO= A-2-4(0)

**Remarks**  
 Moisture content: 44.2%

\* (no specification provided)

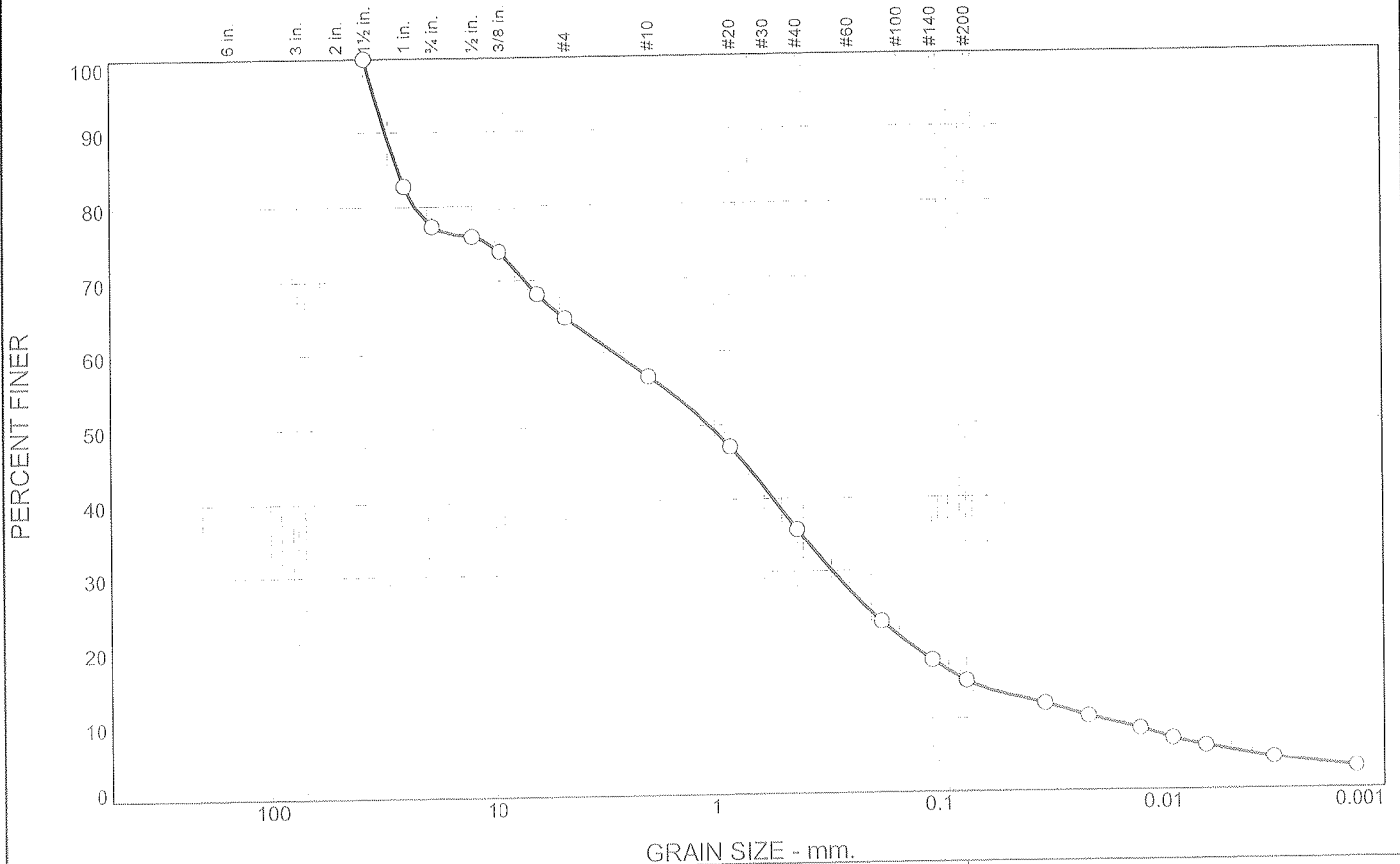
Sample No.: S-3      Source of Sample: B-30      Date: 10/19/09  
 Location: New Bedford, MA      Elev./Depth: 4.5'-6.5'

<b>R.W. Gillespie &amp; Associates, Inc. Saco, Maine</b>	Client: Airport Solutions Group Project: Pavement Rehabilitation Strategies for Ramps Project No: 1229-01      Lab No. 10972XX
--	--

Tested By: JJH/MCS      Checked By: MTG *MTG*



# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	22.7	12.5	8.1	20.9	20.7	9.8	5.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	82.8		
3/4"	77.3		
1/2"	76.0		
3/8"	73.9		
1/4"	68.1		
#4	64.8		
#10	56.7		
#20	47.1		
#40	35.8		
#80	23.1		
#140	17.9		
#200	15.1		
0.0335 mm.	11.9		
0.0215 mm.	10.1		
0.0126 mm.	8.4		
0.0090 mm.	7.0		
0.0064 mm.	6.0		
0.0032 mm.	4.3		
0.0013 mm.	2.9		

\* (no specification provided)

**Soil Description**

silty sand with gravel

**Atterberg Limits**

PL= np      LL= nv      PI=

**Coefficients**

D<sub>85</sub>= 27.1497      D<sub>60</sub>= 2.8521      D<sub>50</sub>= 1.0570  
D<sub>30</sub>= 0.2970      D<sub>15</sub>= 0.0741      D<sub>10</sub>= 0.0207  
C<sub>u</sub>= 138.05      C<sub>c</sub>= 1.50

**Classification**

USCS= SM      AASHTO= A-1-b

**Remarks**

Moisture content: 7.7%

Sample No.: S-1  
 Location: New Bedford, MA

Source of Sample: B-31

Date: 10/09/09  
 Elev./Depth: 0.5'-2.5'

<b>R.W. Gillespie &amp; Associates, Inc. Saco, Maine</b>	Client: Airport Solutions Group Project: Pavement Rehabilitation Strategies for Ramps Project No: 1229-01 Lab No. 10972YY
--	--

Tested By: JJH/MCS

Checked By: MTG



Project Name: Pavement Rehabilitation Strategies for Ramps  
 RWG&A Project No. 1229-01  
 Location: New Bedford, MA  
 Client: Airport Solutions Group, LLC  
 RWG&A Representative: C. Morrell  
 Boring Location: As marked  
 Boring Abandonment Method: Backfilled with cuttings  
 Observed Water Depth: 3'

Drilling Contractor: Great Works Test Boring  
 Drill Rig: Mobile Acker  
 Driller Rep.: Jeff & Will  
 Date Started: 09/15/09  
 Date Completed: 09/15/09  
 Surface Elevation: ()  
 Drilling Method: 2 1/4" HSA  
 Casing Type: n/a

DEPTH, FT.	SYMBOL	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0		S-1	ASPHALTIC PAVEMENT (4 inches). FILL; Gravelly sand, very dense, moist, fine to medium sand, little gravel, few silt, gray-brown.	12	15 26 27 23	53	4	GS
2.5		S-2	FILL; Sand, dense, moist, fine to medium sand, trace coarse sand, trace silt, brown.	14	14 16 15 12	31		
5		S-3	SAND (SP); Dense, wet, fine to medium sand, few coarse sand, trace silt, gray.	12	14 19 16 14	35	14	AL
7.5		S-4		14	5 5 8 7	13		
			Bottom of Exploration at 8'; Not refusal.					
10								
12.5								
15								

Notes:



Project Name: Pavement Rehabilitation Strategies for Ramps  
 RWG&A Project No. 1229-01  
 Location: New Bedford, MA  
 Client: Airport Solutions Group, LLC  
 RWG&A Representative: C. Morrell  
 Boring Location: As marked  
 Boring Abandonment Method: Backfilled with cuttings  
 Observed Water Depth: 2.5'

Drilling Contractor: Great Works Test Boring  
 Drill Rig: Mobile Acker  
 Driller Rep.: Jeff & Will  
 Date Started: 09/15/09  
 Date Completed: 09/15/09  
 Surface Elevation: ()  
 Drilling Method: 2 1/4" HSA  
 Casing Type: n/a

DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0		S-1	ASPHALTIC PAVEMENT (4 inches). FILL; Gravelly sand, dense, to very dense, moist, fine to medium sand, little gravel and coarse sand, few silt, gray to brown.	13	14 25 25 29	50	5	GS
2.5		S-2	SAND WITH GRAVEL (SP); Dense, wet, fine to coarse sand, trace gravel, gray.	16	11 16 20 40	36		
5		S-3	SILTY SAND (SP-SM); Medium dense, wet, fine sand, little silt, gray. SAND WITH GRAVEL (SP); Medium dense, wet, fine to coarse sand, trace gravel, gray.	12	8 8 4 8	12	44	GS
7.5		S-4	ORGANIC SILT (OL); Medium dense, wet, organic odor, wood fragments, some silt, red-brown. SILTY SAND (SM); Dense, wet, fine sand, little silt, gray.	10	19 25 22 16	47	26	AL
8.5			Bottom of Exploration at 8.5'; Not refusal.					

Notes:



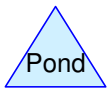
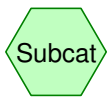
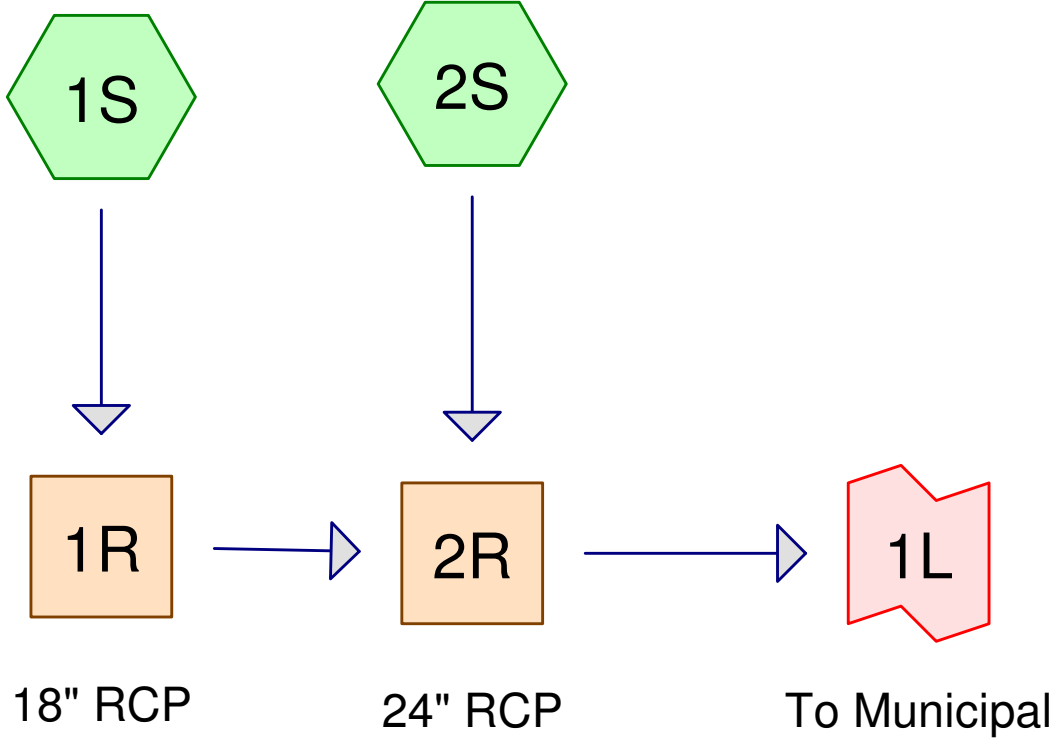
Project Name: Pavement Rehabilitation Strategies for Ramps  
 RWG&A Project No. 1229-01  
 Location: New Bedford, MA  
 Client: Airport Solutions Group, LLC  
 RWG&A Representative: C. Morrell  
 Boring Location: As marked  
 Boring Abandonment Method: Backfilled with cuttings  
 Observed Water Depth: 4'

Drilling Contractor: Great Works Test Boring  
 Drill Rig: Mobile Acker  
 Driller Rep.: Jeff & Will  
 Date Started: 09/15/09  
 Date Completed: 09/15/09  
 Surface Elevation: ( )  
 Drilling Method: 2 1/4" HSA  
 Casing Type: n/a

DEPTH, FT.	SYMBOL SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT %	LAB TESTS
0			ASPHALTIC PAVEMENT (5 inches).					
		S-1	FILL; Gravelly sand with silt, very dense, moist, fine to medium sand, little gravel and coarse sand, trace silt, gray.	14	18 25 32 35	57	8	GS
2.5		S-2	SAND (SP); Dense, moist to wet, fine to medium sand, few silt, gray.	15	14 20 24 20	44		
5		S-3		5	5 8 50/4"	58+		
			Bottom of Exploration at 6'; Auger and spoon refusal, possible bedrock.					
7.5								
1.0								
12.5								
1.5								

Notes:

## **Appendix G: HydroCad Report & Sizing Calculations**





Proper & O'Leary  
Engineering, dpc

STRUCTURAL • CIVIL CONSULTANTS  
PO Box 246 Troy, New York 12180  
518.610.8331 www.po-eng.com

P&O #: 21153.0

DATE: 08/01/2022

SCALE: AS NOTED

DRAWN BY: ARL

APPROVED BY: DBP

# HANGARS 4 PLANES AIRPORT ROAD PROJECT





BRISTOL COUNTY, MASSACHUSETTS

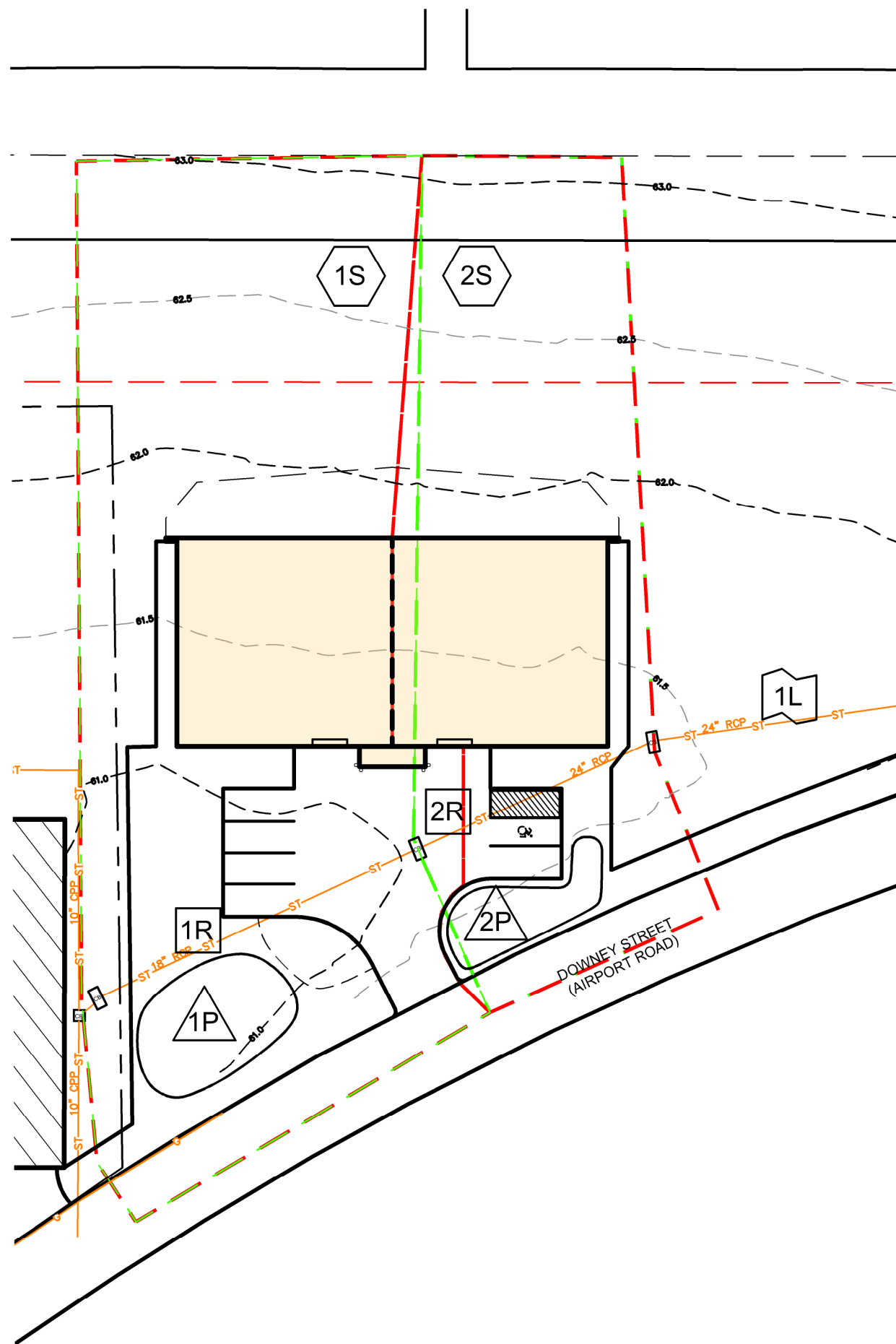
C/O NEW BEDFORD

DRAINAGE MAP

# 1 of 1

## LEGEND

-  PRE-DEVELOPMENT SUBCATCHMENT BOUNDARY
-  POST-DEVELOPMENT SUBCATCHMENT BOUNDARY
-  SUBCATCHMENT DESIGNATION
-  CULVERT DESIGNATION
- #P triangle symbol" data-bbox="535 445 565 485"/> CULVERT DESIGNATION
- #L pentagon symbol" data-bbox="535 500 565 540"/> OUTLET LINK DESIGNATION



SCALE: 1" = 40'

9/2/2022 8:20 AM P&O#5 C:\Users\P&O#5\Desktop (P&O Engineering)\P&O WORK FILES\21153.0 New Bedford MA Airport - Hangar Project\DWG\Site - Airport Road.dwg

# Airport Road - Predevelopment

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NRCC 24-hr C 2-Year Rainfall=3.30"

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Page 2

## Summary for Subcatchment 1S:

Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.148 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 2-Year Rainfall=3.30"

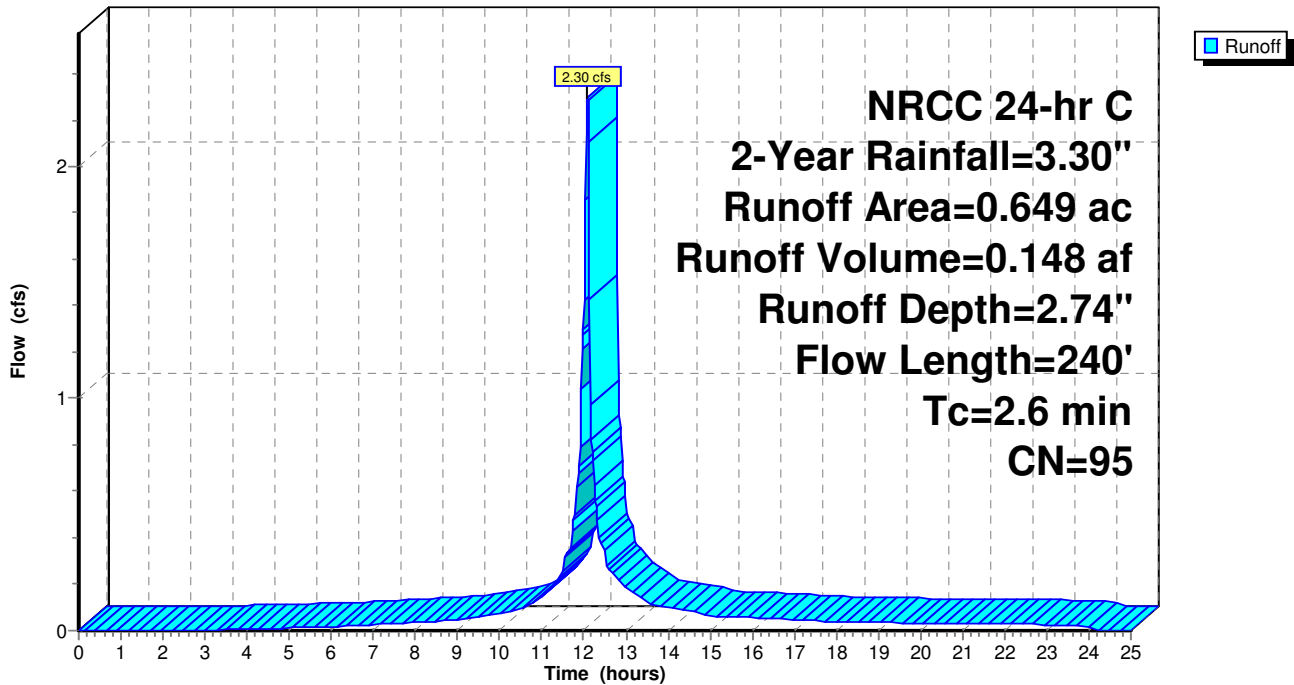
Area (ac)	CN	Description
0.029	39	>75% Grass cover, Good, HSG A
0.620	98	Paved parking, HSG A
0.649	95	Weighted Average
0.029		4.47% Pervious Area
0.620		95.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.30"
1.1	140	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
2.6	240	Total			

## Subcatchment 1S:

Hydrograph





# Airport Road - Predevelopment

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NRCC 24-hr C 2-Year Rainfall=3.30"

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Page 3

## Summary for Subcatchment 2S:

[49] Hint:  $T_c < 2dt$  may require smaller  $dt$

Runoff = 1.28 cfs @ 12.09 hrs, Volume= 0.082 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs,  $dt= 0.02$  hrs  
NRCC 24-hr C 2-Year Rainfall=3.30"

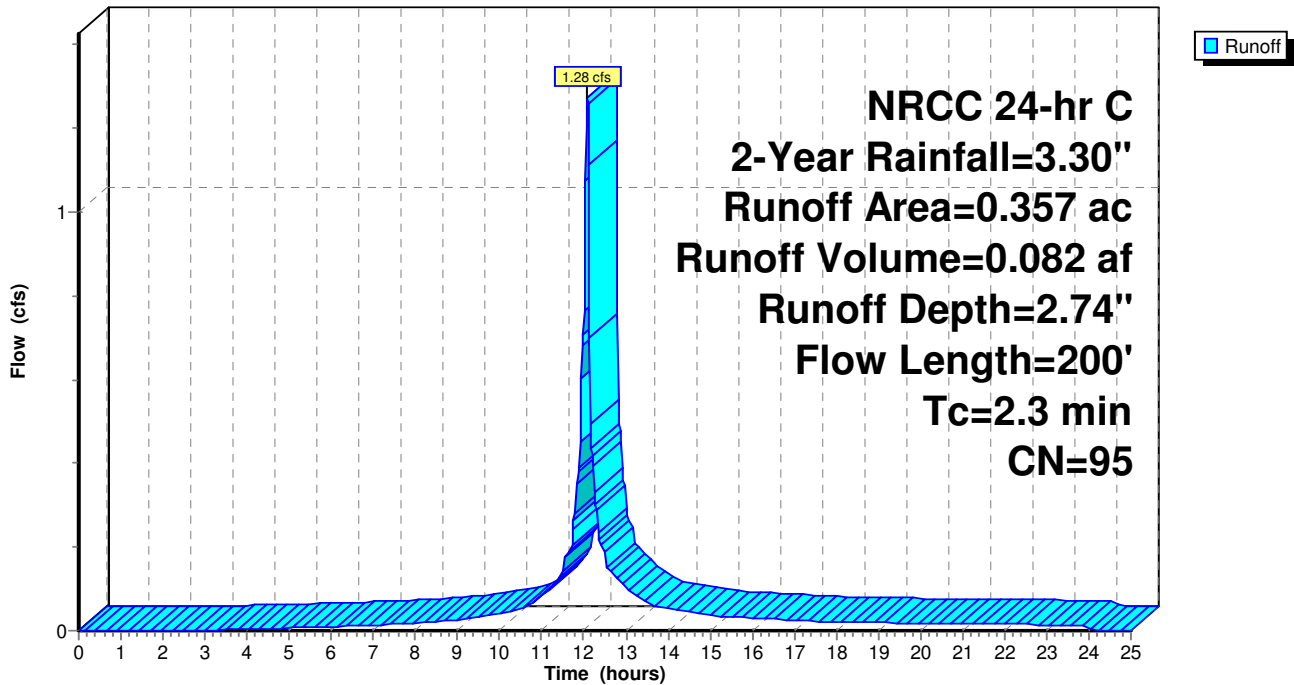
Area (ac)	CN	Description
0.018	39	>75% Grass cover, Good, HSG A
0.339	98	Paved parking, HSG A
0.357	95	Weighted Average
0.018		5.04% Pervious Area
0.339		94.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow,</b> Smooth surfaces $n= 0.011$ $P2= 3.30"$
0.8	100	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved $K_v= 20.3$ fps
2.3	200	Total			

### Subcatchment 2S:

Hydrograph



# Airport Road - Predevelopment

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NRCC 24-hr C 2-Year Rainfall=3.30"

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## Summary for Reach 1R: 18" RCP

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.649 ac, 95.53% Impervious, Inflow Depth = 2.74" for 2-Year event  
Inflow = 2.30 cfs @ 12.09 hrs, Volume= 0.148 af  
Outflow = 2.26 cfs @ 12.11 hrs, Volume= 0.148 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs

Max. Velocity= 2.87 fps, Min. Travel Time= 0.6 min

Avg. Velocity = 0.91 fps, Avg. Travel Time= 1.8 min

Peak Storage= 79 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.69'

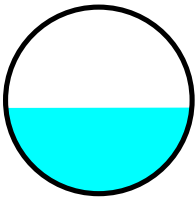
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 5.25 cfs

18.0" Round Pipe

n= 0.013 Concrete pipe, straight & clean

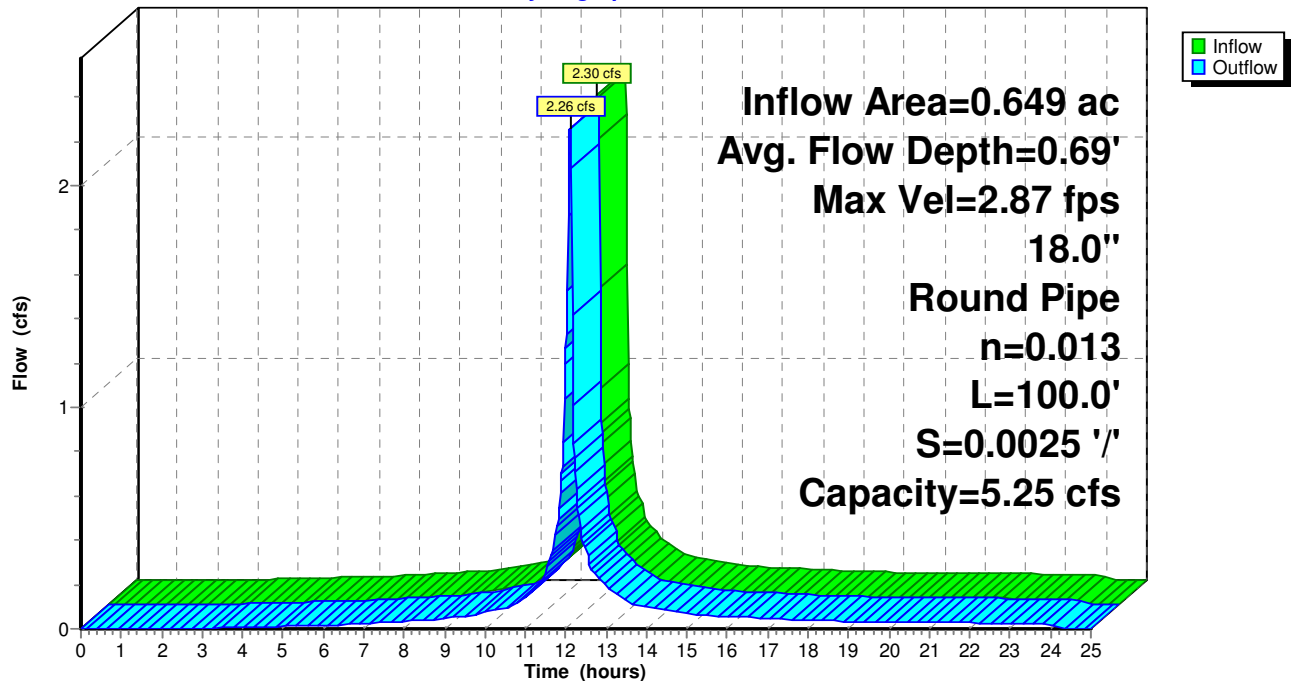
Length= 100.0' Slope= 0.0025 '/'

Inlet Invert= 57.65', Outlet Invert= 57.40'



## Reach 1R: 18" RCP

Hydrograph



## Airport Road - Predevelopment

Prepared by HP Inc.

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NRCC 24-hr C 2-Year Rainfall=3.30"

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Page 5

### Summary for Reach 2R: 24" RCP

[52] Hint: Inlet/Outlet conditions not evaluated

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.09' @ 12.16 hrs

Inflow Area = 1.006 ac, 95.33% Impervious, Inflow Depth = 2.74" for 2-Year event  
Inflow = 3.51 cfs @ 12.10 hrs, Volume= 0.230 af  
Outflow = 3.48 cfs @ 12.11 hrs, Volume= 0.230 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs

Max. Velocity= 2.97 fps, Min. Travel Time= 0.4 min

Avg. Velocity = 0.94 fps, Avg. Travel Time= 1.3 min

Peak Storage= 85 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.80'

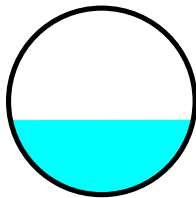
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 10.33 cfs

24.0" Round Pipe

n= 0.013 Concrete pipe, straight & clean

Length= 72.0' Slope= 0.0021 '/'

Inlet Invert= 57.35', Outlet Invert= 57.20'



# Airport Road - Predevelopment

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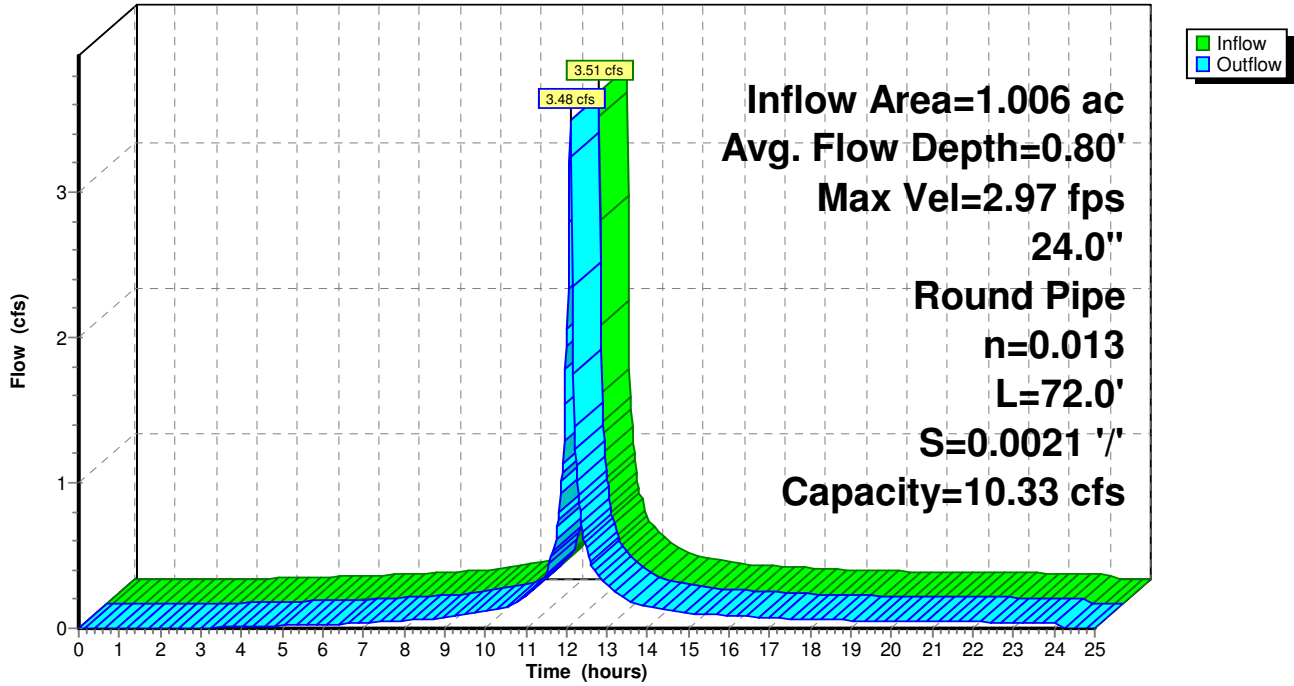
NRCC 24-hr C 2-Year Rainfall=3.30"

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Page 6

## Reach 2R: 24" RCP

Hydrograph



**Airport Road - Predevelopment**

Prepared by HP Inc.

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NRCC 24-hr C 10-Year Rainfall=4.85"

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Page 8

**Summary for Subcatchment 1S:**

Runoff = 3.48 cfs @ 12.09 hrs, Volume= 0.231 af, Depth= 4.27"

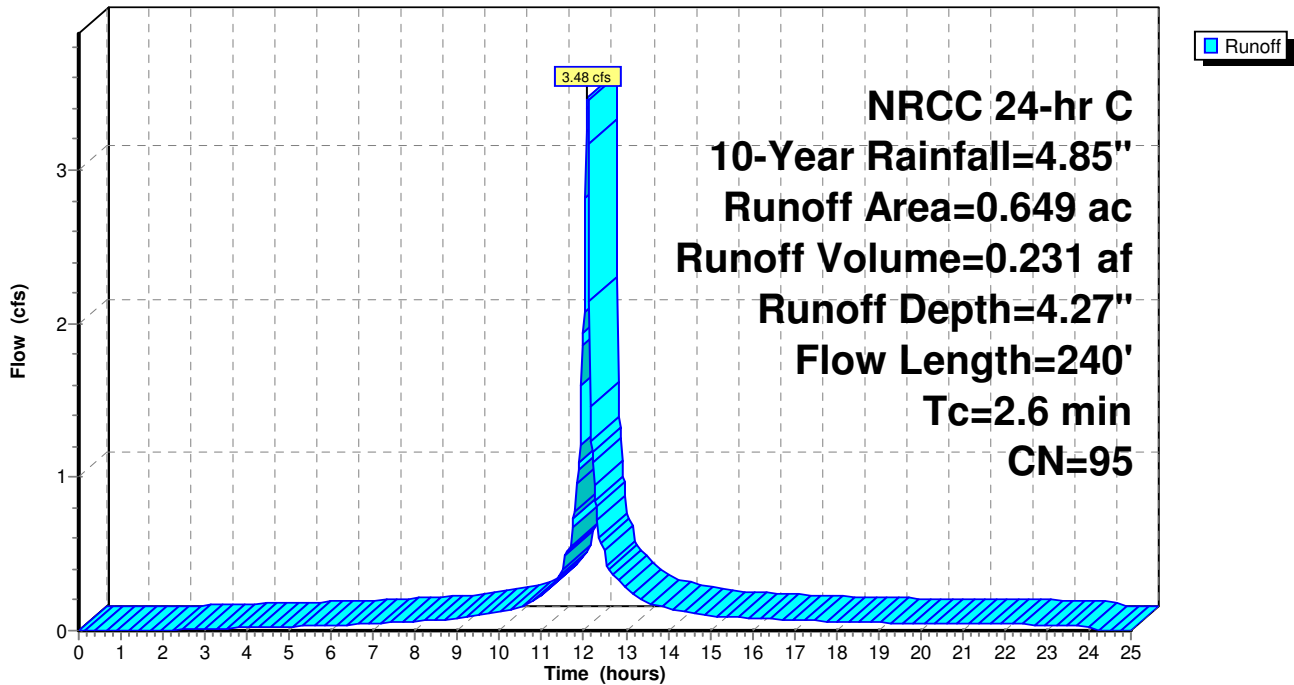
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 10-Year Rainfall=4.85"

Area (ac)	CN	Description
0.029	39	>75% Grass cover, Good, HSG A
0.620	98	Paved parking, HSG A
0.649	95	Weighted Average
0.029		4.47% Pervious Area
0.620		95.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.30"
1.1	140	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
2.6	240	Total			

**Subcatchment 1S:**

Hydrograph



**Airport Road - Predevelopment**

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NRCC 24-hr C 10-Year Rainfall=4.85"

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Page 9

**Summary for Subcatchment 2S:**

[49] Hint:  $T_c < 2dt$  may require smaller dt

Runoff = 1.93 cfs @ 12.09 hrs, Volume= 0.127 af, Depth= 4.27"

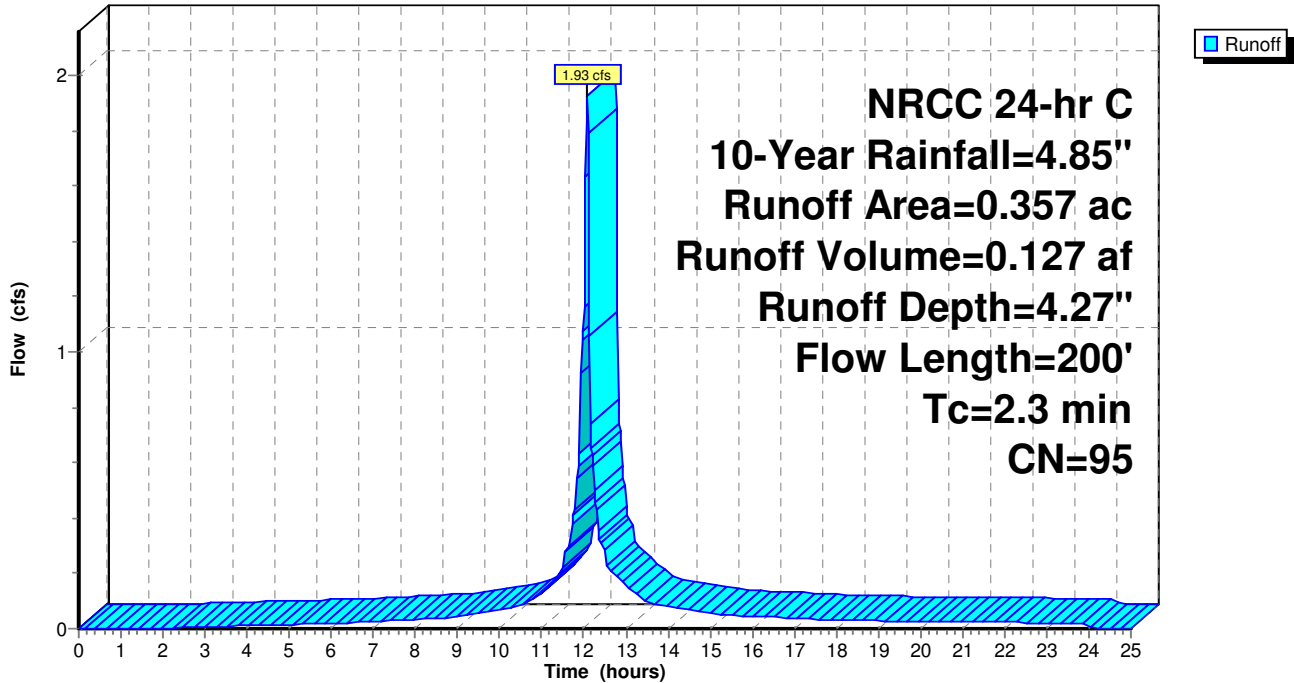
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 10-Year Rainfall=4.85"

Area (ac)	CN	Description
0.018	39	>75% Grass cover, Good, HSG A
0.339	98	Paved parking, HSG A
0.357	95	Weighted Average
0.018		5.04% Pervious Area
0.339		94.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
2.3	200	Total			

**Subcatchment 2S:**

Hydrograph



# Airport Road - Predevelopment

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NRCC 24-hr C 10-Year Rainfall=4.85"

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## Summary for Reach 1R: 18" RCP

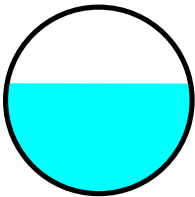
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.649 ac, 95.53% Impervious, Inflow Depth = 4.27" for 10-Year event  
Inflow = 3.48 cfs @ 12.09 hrs, Volume= 0.231 af  
Outflow = 3.42 cfs @ 12.10 hrs, Volume= 0.231 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 3.17 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 1.04 fps, Avg. Travel Time= 1.6 min

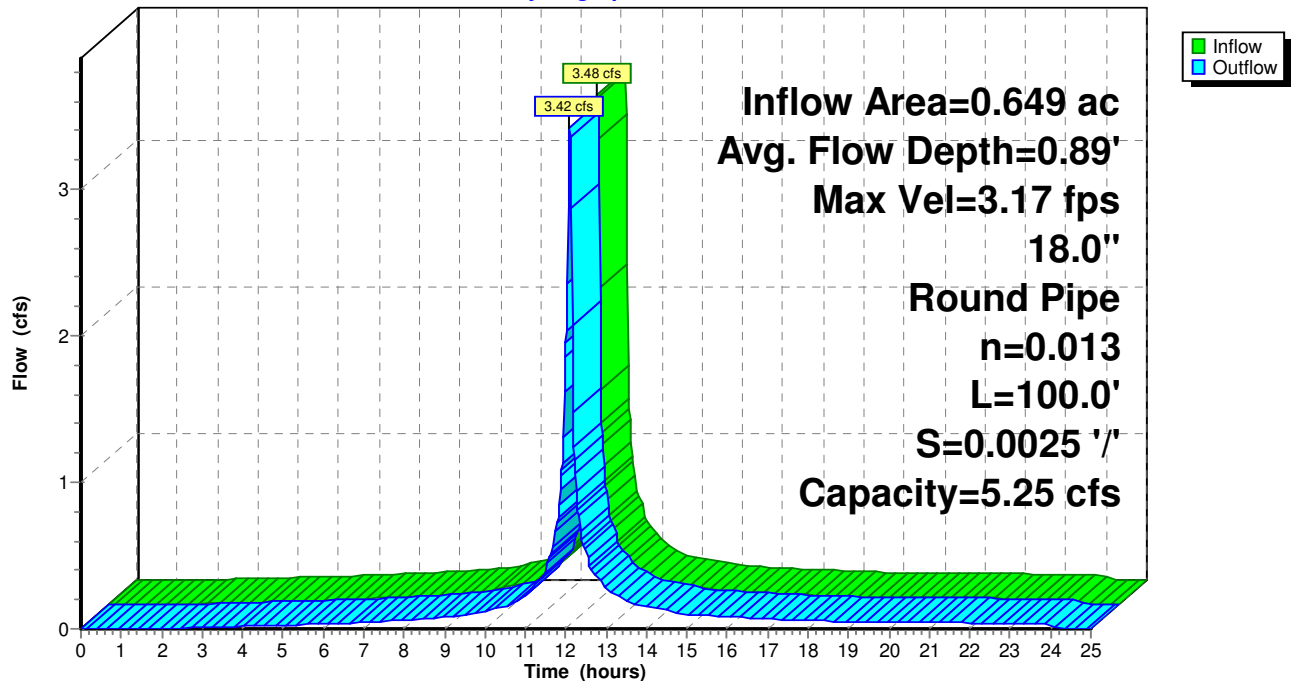
Peak Storage= 109 cf @ 12.10 hrs  
Average Depth at Peak Storage= 0.89'  
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 5.25 cfs

18.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 100.0' Slope= 0.0025 '/'  
Inlet Invert= 57.65', Outlet Invert= 57.40'



## Reach 1R: 18" RCP

Hydrograph



**Summary for Reach 2R: 24" RCP**

[52] Hint: Inlet/Outlet conditions not evaluated

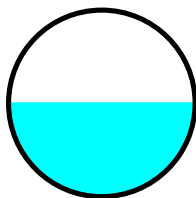
[62] Hint: Exceeded Reach 1R OUTLET depth by 0.11' @ 12.16 hrs

Inflow Area = 1.006 ac, 95.33% Impervious, Inflow Depth = 4.27" for 10-Year event  
Inflow = 5.32 cfs @ 12.10 hrs, Volume= 0.358 af  
Outflow = 5.25 cfs @ 12.11 hrs, Volume= 0.358 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 3.31 fps, Min. Travel Time= 0.4 min  
Avg. Velocity = 1.07 fps, Avg. Travel Time= 1.1 min

Peak Storage= 115 cf @ 12.10 hrs  
Average Depth at Peak Storage= 1.02'  
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 10.33 cfs

24.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 72.0' Slope= 0.0021 '/'  
Inlet Invert= 57.35', Outlet Invert= 57.20'





**Airport Road - Predevelopment**

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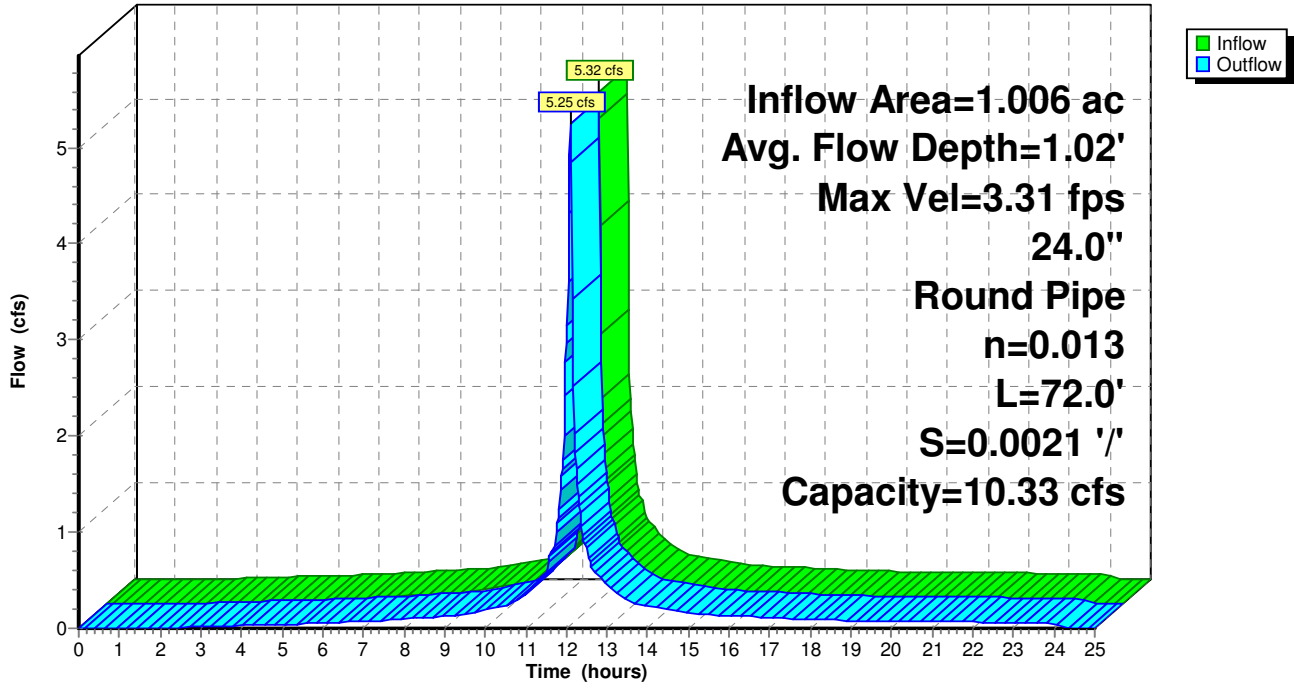
NRCC 24-hr C 10-Year Rainfall=4.85"

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**Reach 2R: 24" RCP**

Hydrograph



# Airport Road - Predevelopment

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NRCC 24-hr C 100-Year Rainfall=8.41"

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## Summary for Subcatchment 1S:

Runoff = 6.14 cfs @ 12.09 hrs, Volume= 0.422 af, Depth= 7.81"

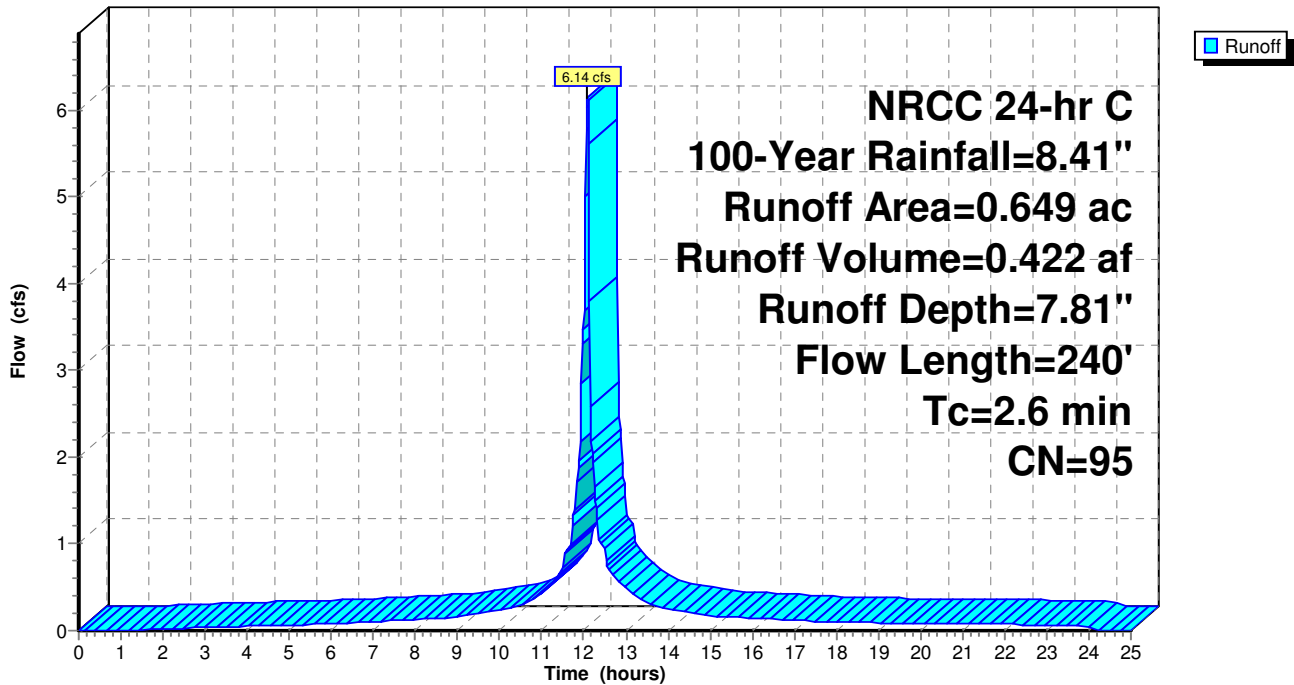
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 100-Year Rainfall=8.41"

Area (ac)	CN	Description
0.029	39	>75% Grass cover, Good, HSG A
0.620	98	Paved parking, HSG A
0.649	95	Weighted Average
0.029		4.47% Pervious Area
0.620		95.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.30"
1.1	140	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
2.6	240	Total			

## Subcatchment 1S:

Hydrograph



# Airport Road - Predevelopment

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NRCC 24-hr C 100-Year Rainfall=8.41"

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## Summary for Subcatchment 2S:

[49] Hint:  $T_c < 2dt$  may require smaller  $dt$

Runoff = 3.41 cfs @ 12.09 hrs, Volume= 0.232 af, Depth= 7.81"

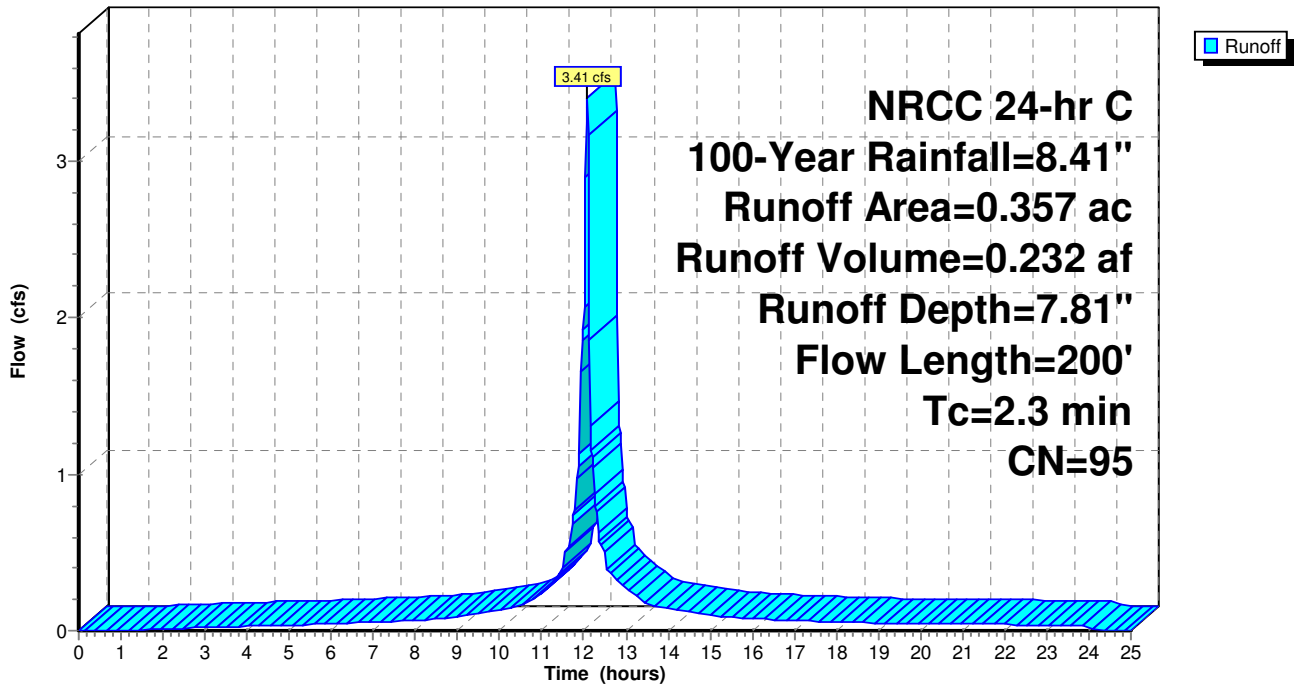
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs,  $dt= 0.02$  hrs  
NRCC 24-hr C 100-Year Rainfall=8.41"

Area (ac)	CN	Description
0.018	39	>75% Grass cover, Good, HSG A
0.339	98	Paved parking, HSG A
0.357	95	Weighted Average
0.018		5.04% Pervious Area
0.339		94.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow,</b> Smooth surfaces $n= 0.011$ $P2= 3.30"$
0.8	100	0.0100	2.03		<b>Shallow Concentrated Flow,</b> Paved $K_v= 20.3$ fps
2.3	200	Total			

### Subcatchment 2S:

Hydrograph



**Summary for Reach 1R: 18" RCP**

[52] Hint: Inlet/Outlet conditions not evaluated

[55] Hint: Peak inflow is 117% of Manning's capacity

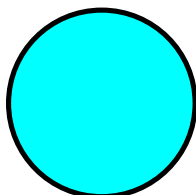
[76] Warning: Detained 0.003 af (Pond w/culvert advised)

Inflow Area = 0.649 ac, 95.53% Impervious, Inflow Depth = 7.81" for 100-Year event  
Inflow = 6.14 cfs @ 12.09 hrs, Volume= 0.422 af  
Outflow = 5.36 cfs @ 12.08 hrs, Volume= 0.422 af, Atten= 13%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 3.37 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 1.24 fps, Avg. Travel Time= 1.3 min

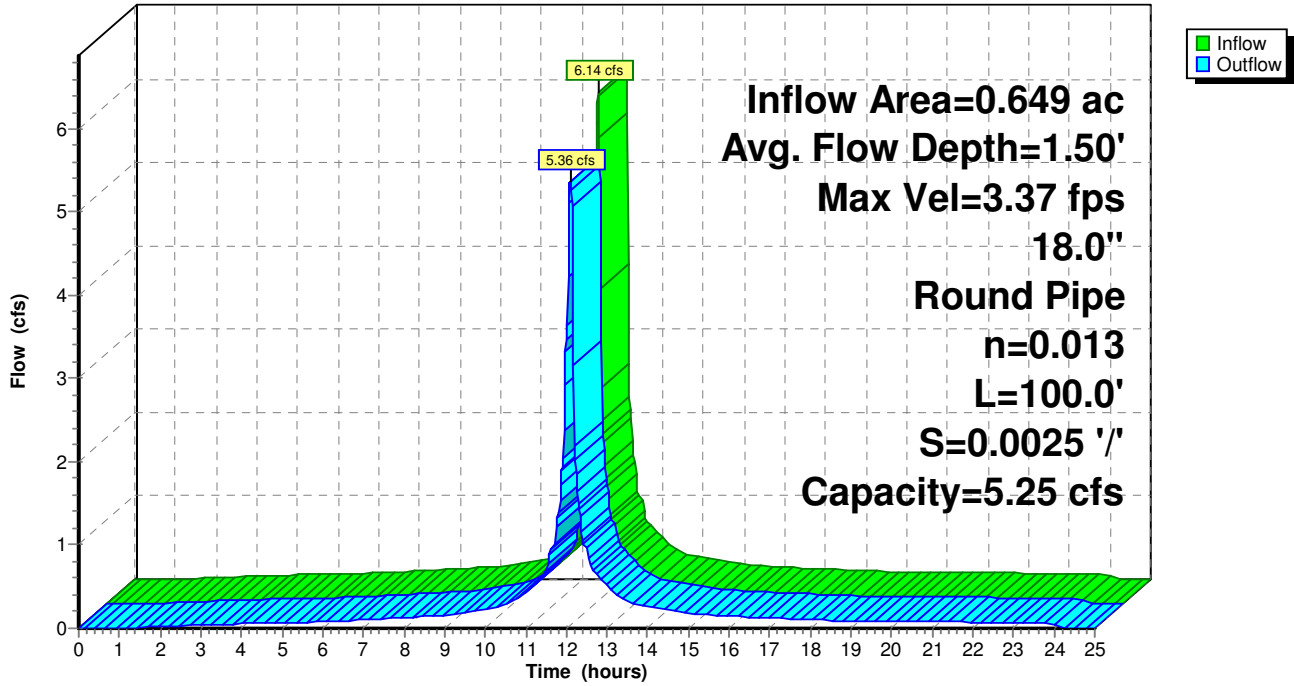
Peak Storage= 177 cf @ 12.08 hrs  
Average Depth at Peak Storage= 1.50'  
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 5.25 cfs

18.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 100.0' Slope= 0.0025 '/'  
Inlet Invert= 57.65', Outlet Invert= 57.40'



**Reach 1R: 18" RCP**

Hydrograph



## Airport Road - Predevelopment

NRCC 24-hr C 100-Year Rainfall=8.41"

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### Summary for Reach 2R: 24" RCP

[52] Hint: Inlet/Outlet conditions not evaluated

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.20' @ 12.18 hrs

Inflow Area = 1.006 ac, 95.33% Impervious, Inflow Depth = 7.81" for 100-Year event  
Inflow = 8.71 cfs @ 12.09 hrs, Volume= 0.655 af  
Outflow = 8.66 cfs @ 12.10 hrs, Volume= 0.655 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs

Max. Velocity= 3.68 fps, Min. Travel Time= 0.3 min

Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.9 min

Peak Storage= 171 cf @ 12.09 hrs

Average Depth at Peak Storage= 1.41'

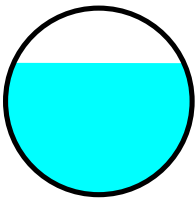
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 10.33 cfs

24.0" Round Pipe

n= 0.013 Concrete pipe, straight & clean

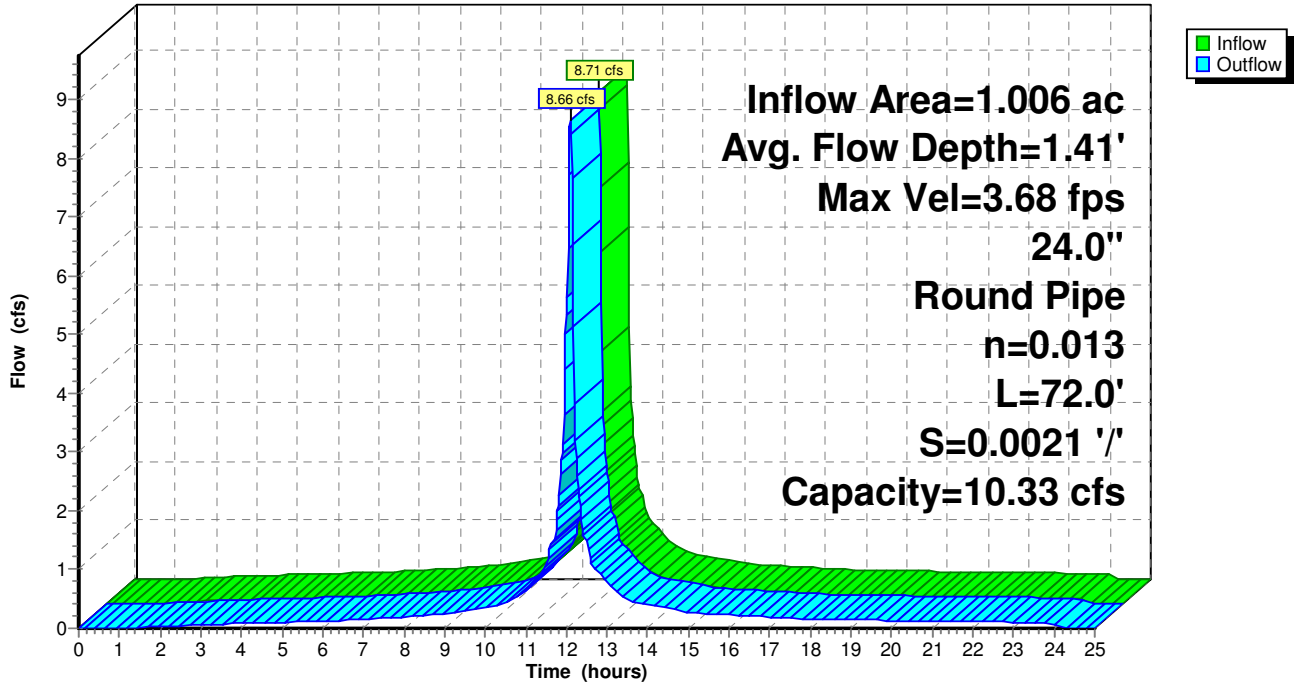
Length= 72.0' Slope= 0.0021 '/'

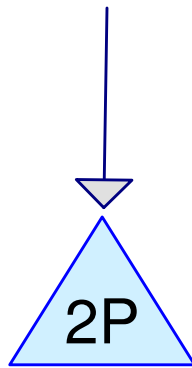
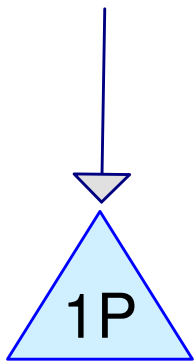
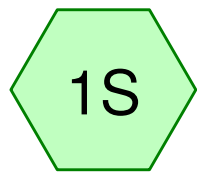
Inlet Invert= 57.35', Outlet Invert= 57.20'



**Reach 2R: 24" RCP**

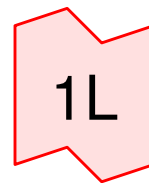
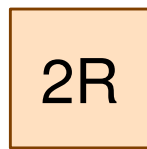
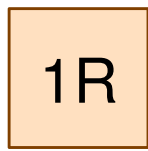
Hydrograph





West Basin

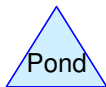
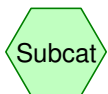
East Basin



18" RCP

24" RCP

To Municipal



Routing Diagram for Airport Road - Postdevelopment  
Prepared by HP Inc., Printed 8/1/2022  
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# Airport Road - Postdevelopment

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NRCC 24-hr C 2-Year Rainfall=3.30"

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Page 2

## Summary for Subcatchment 1S:

Runoff = 1.77 cfs @ 12.10 hrs, Volume= 0.107 af, Depth= 2.00"

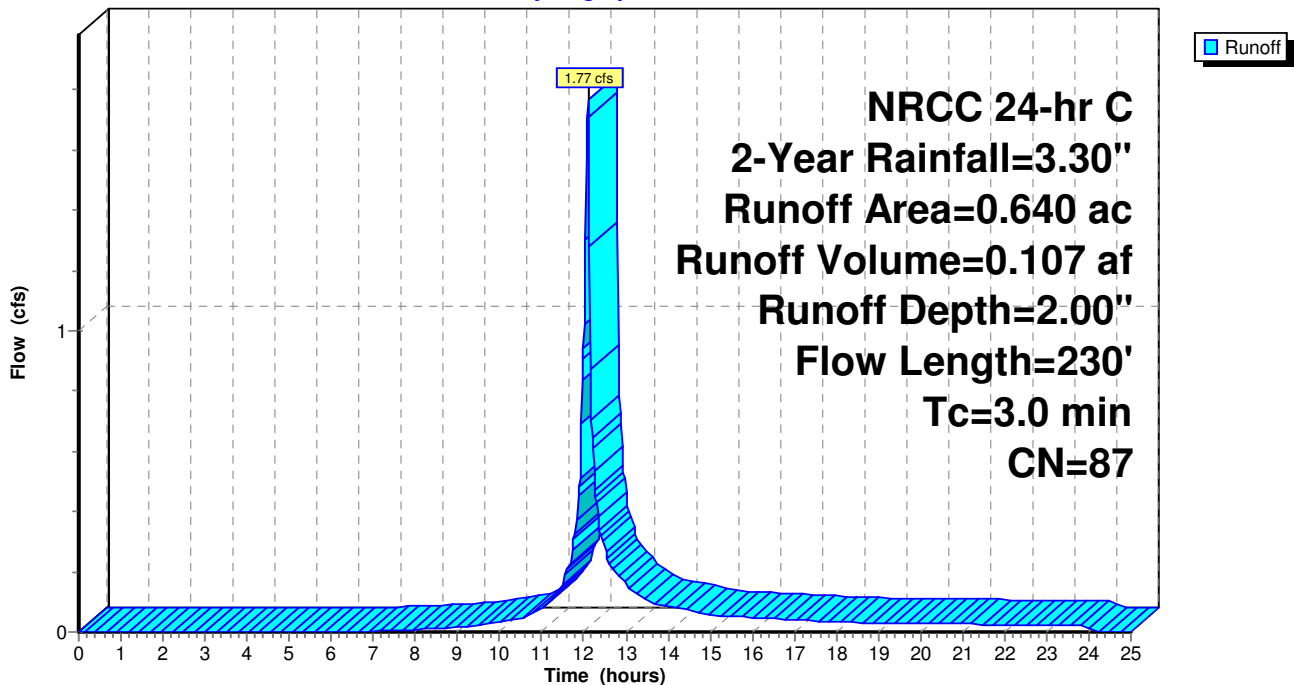
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 2-Year Rainfall=3.30"

Area (ac)	CN	Description
* 0.087	98	1/2 Hangar Building
* 0.390	98	Pavement
* 0.035	98	1/2 Downey Street
0.120	39	>75% Grass cover, Good, HSG A
0.008	76	Gravel roads, HSG A
0.640	87	Weighted Average
0.128		20.00% Pervious Area
0.512		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow, Pavement Apron</b> Smooth surfaces n= 0.011 P2= 3.30"
0.6	60	0.0067	1.66		<b>Shallow Concentrated Flow, Along Building</b> Paved Kv= 20.3 fps
0.9	70	0.0070	1.25		<b>Shallow Concentrated Flow, To Pond</b> Grassed Waterway Kv= 15.0 fps
3.0	230	Total			

## Subcatchment 1S:

Hydrograph



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NRCC 24-hr C 2-Year Rainfall=3.30"

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## Summary for Subcatchment 2S:

Runoff = 1.12 cfs @ 12.10 hrs, Volume= 0.069 af, Depth= 2.26"

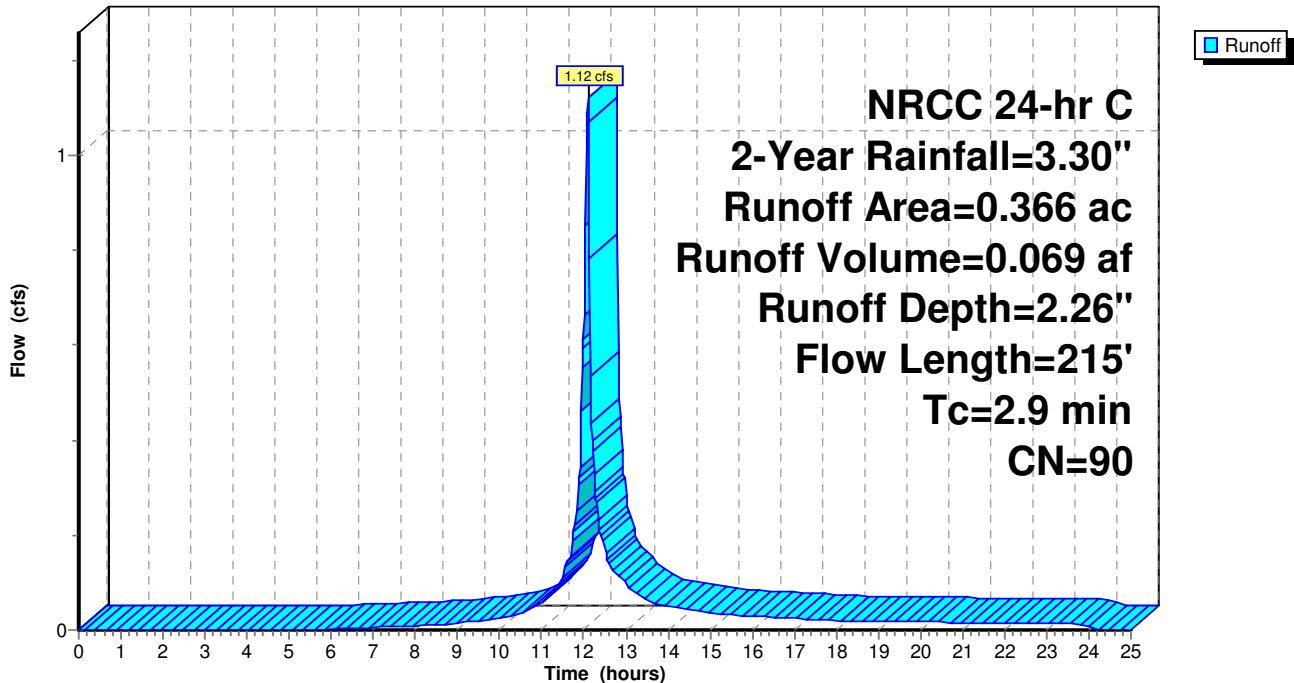
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 2-Year Rainfall=3.30"

Area (ac)	CN	Description
* 0.087	98	1/2 Hangar Building
* 0.205	98	Pavement
* 0.020	98	1/2 Downey Street
0.046	39	>75% Grass cover, Good, HSG A
0.008	76	Gravel roads, HSG A
0.366	90	Weighted Average
0.054		14.75% Pervious Area
0.312		85.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	110	0.0110	1.12		<b>Sheet Flow, Pavement Apron</b> Smooth surfaces n= 0.011 P2= 3.30"
1.0	80	0.0063	1.28		<b>Shallow Concentrated Flow, Along Building</b> Unpaved Kv= 16.1 fps
0.3	25	0.0120	1.64		<b>Shallow Concentrated Flow, To Pond</b> Grassed Waterway Kv= 15.0 fps
2.9	215	Total			

## Subcatchment 2S:

Hydrograph



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### Summary for Reach 1R: 18" RCP

[52] Hint: Inlet/Outlet conditions not evaluated

[79] Warning: Submerged Pond 1P Primary device # 1 INLET by 0.23'

Inflow Area = 0.640 ac, 80.00% Impervious, Inflow Depth = 1.44" for 2-Year event  
Inflow = 1.68 cfs @ 12.12 hrs, Volume= 0.077 af  
Outflow = 1.63 cfs @ 12.14 hrs, Volume= 0.077 af, Atten= 3%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs

Max. Velocity= 2.63 fps, Min. Travel Time= 0.6 min

Avg. Velocity = 0.91 fps, Avg. Travel Time= 1.8 min

Peak Storage= 63 cf @ 12.13 hrs

Average Depth at Peak Storage= 0.58'

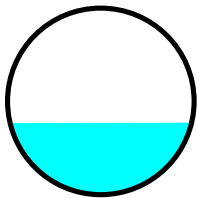
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 5.25 cfs

18.0" Round Pipe

n= 0.013 Concrete pipe, straight & clean

Length= 100.0' Slope= 0.0025 '/'

Inlet Invert= 57.65', Outlet Invert= 57.40'



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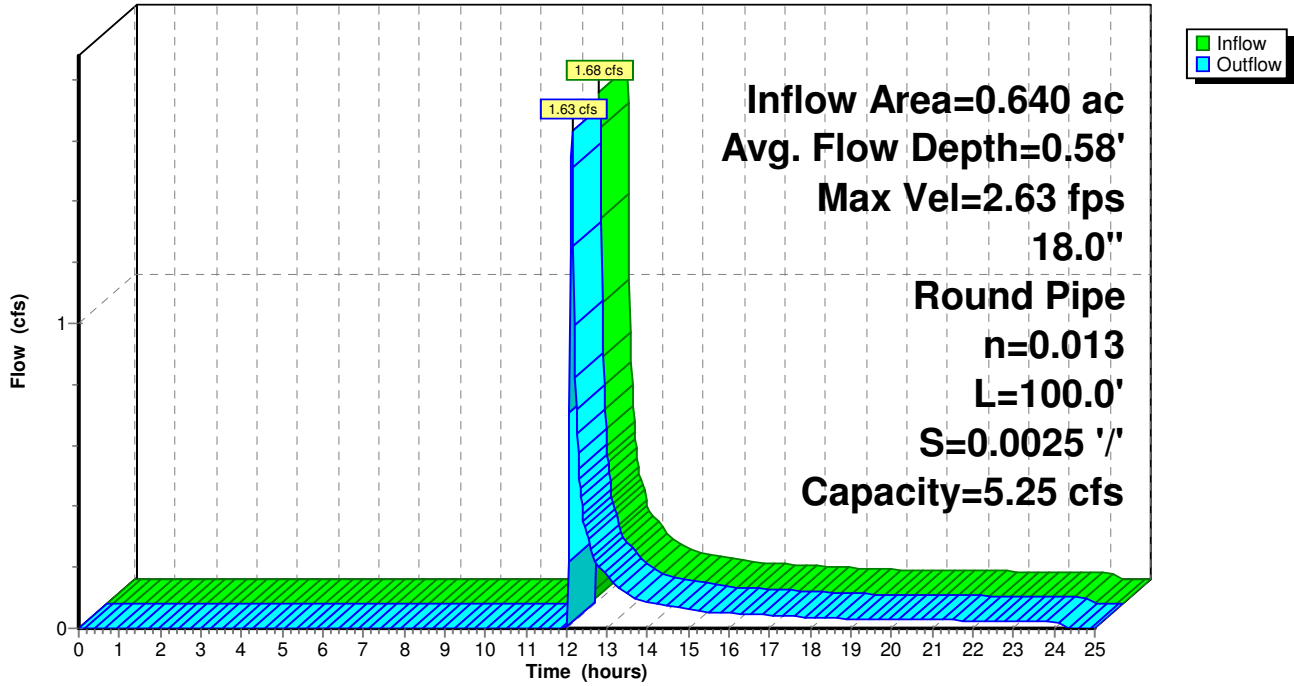
NRCC 24-hr C 2-Year Rainfall=3.30"

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**Reach 1R: 18" RCP**

Hydrograph



**Summary for Reach 2R: 24" RCP**

[52] Hint: Inlet/Outlet conditions not evaluated

[63] Warning: Exceeded Reach 1R INLET depth by 0.03' @ 12.02 hrs

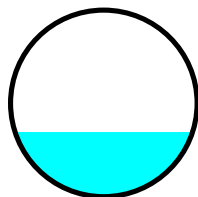
[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.04'

Inflow Area = 1.006 ac, 81.91% Impervious, Inflow Depth = 1.55" for 2-Year event  
Inflow = 2.66 cfs @ 12.13 hrs, Volume= 0.130 af  
Outflow = 2.61 cfs @ 12.14 hrs, Volume= 0.130 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 2.74 fps, Min. Travel Time= 0.4 min  
Avg. Velocity = 0.95 fps, Avg. Travel Time= 1.3 min

Peak Storage= 69 cf @ 12.13 hrs  
Average Depth at Peak Storage= 0.69'  
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 10.33 cfs

24.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 72.0' Slope= 0.0021 '/'  
Inlet Invert= 57.35', Outlet Invert= 57.20'



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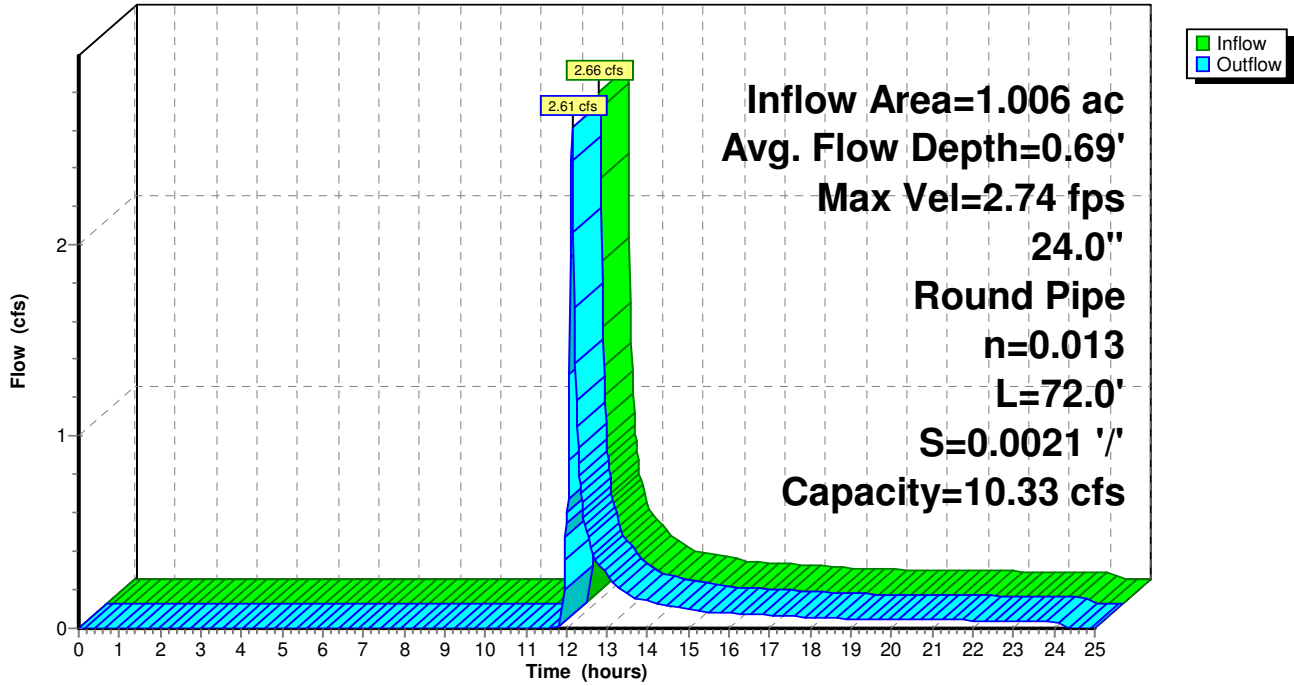
NRCC 24-hr C 2-Year Rainfall=3.30"

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## Reach 2R: 24" RCP

Hydrograph



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NRCC 24-hr C 2-Year Rainfall=3.30"

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## Summary for Pond 1P: West Basin

Inflow Area = 0.640 ac, 80.00% Impervious, Inflow Depth = 2.00" for 2-Year event  
 Inflow = 1.77 cfs @ 12.10 hrs, Volume= 0.107 af  
 Outflow = 1.68 cfs @ 12.12 hrs, Volume= 0.077 af, Atten= 5%, Lag= 1.2 min  
 Primary = 1.68 cfs @ 12.12 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
 Peak Elev= 60.16' @ 12.12 hrs Surf.Area= 0.027 ac Storage= 0.034 af

Plug-Flow detention time= 162.4 min calculated for 0.077 af (72% of inflow)  
 Center-of-Mass det. time= 61.8 min ( 885.2 - 823.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	0.044 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
58.50	0.014	0.000	0.000
59.00	0.018	0.008	0.008
60.00	0.026	0.022	0.030
60.50	0.030	0.014	0.044

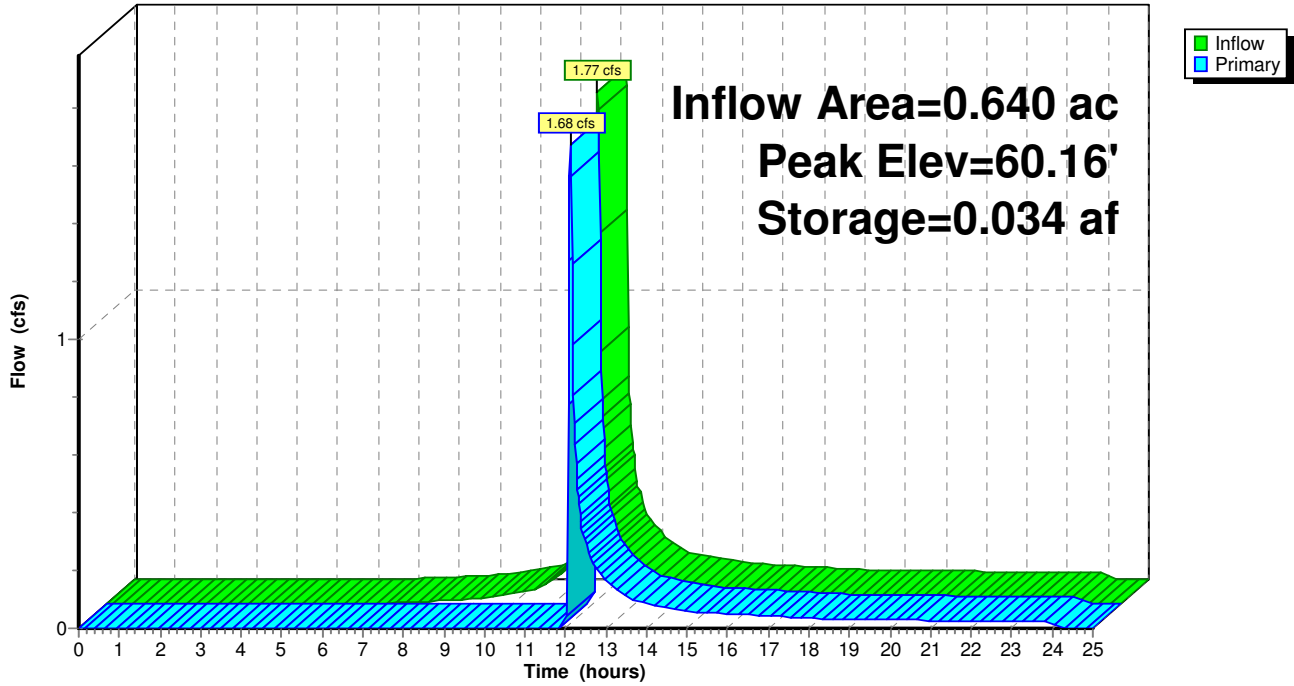
Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	<b>16.0" Round Culvert</b> L= 14.0' Ke= 1.000 Inlet / Outlet Invert= 58.00' / 57.70' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.40 sf
#2	Device 1	60.00'	<b>24.0" x 24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=1.68 cfs @ 12.12 hrs HW=60.16' (Free Discharge)

- ↑1=Culvert (Passes 1.68 cfs of 6.16 cfs potential flow)
- ↑2=Orifice/Grate (Weir Controls 1.68 cfs @ 1.31 fps)

**Pond 1P: West Basin**

Hydrograph





# Airport Road - Postdevelopment

NRCC 24-hr C 2-Year Rainfall=3.30"

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## Summary for Pond 2P: East Basin

Inflow Area = 0.366 ac, 85.25% Impervious, Inflow Depth = 2.26" for 2-Year event  
 Inflow = 1.12 cfs @ 12.10 hrs, Volume= 0.069 af  
 Outflow = 1.10 cfs @ 12.11 hrs, Volume= 0.053 af, Atten= 2%, Lag= 0.7 min  
 Primary = 1.10 cfs @ 12.11 hrs, Volume= 0.053 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
 Peak Elev= 60.87' @ 12.11 hrs Surf.Area= 0.014 ac Storage= 0.018 af

Plug-Flow detention time= 142.6 min calculated for 0.053 af (77% of inflow)  
 Center-of-Mass det. time= 52.9 min ( 863.1 - 810.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	0.024 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
59.00	0.004	0.000	0.000
60.00	0.010	0.007	0.007
60.75	0.014	0.009	0.016
61.00	0.015	0.004	0.020
61.25	0.018	0.004	0.024

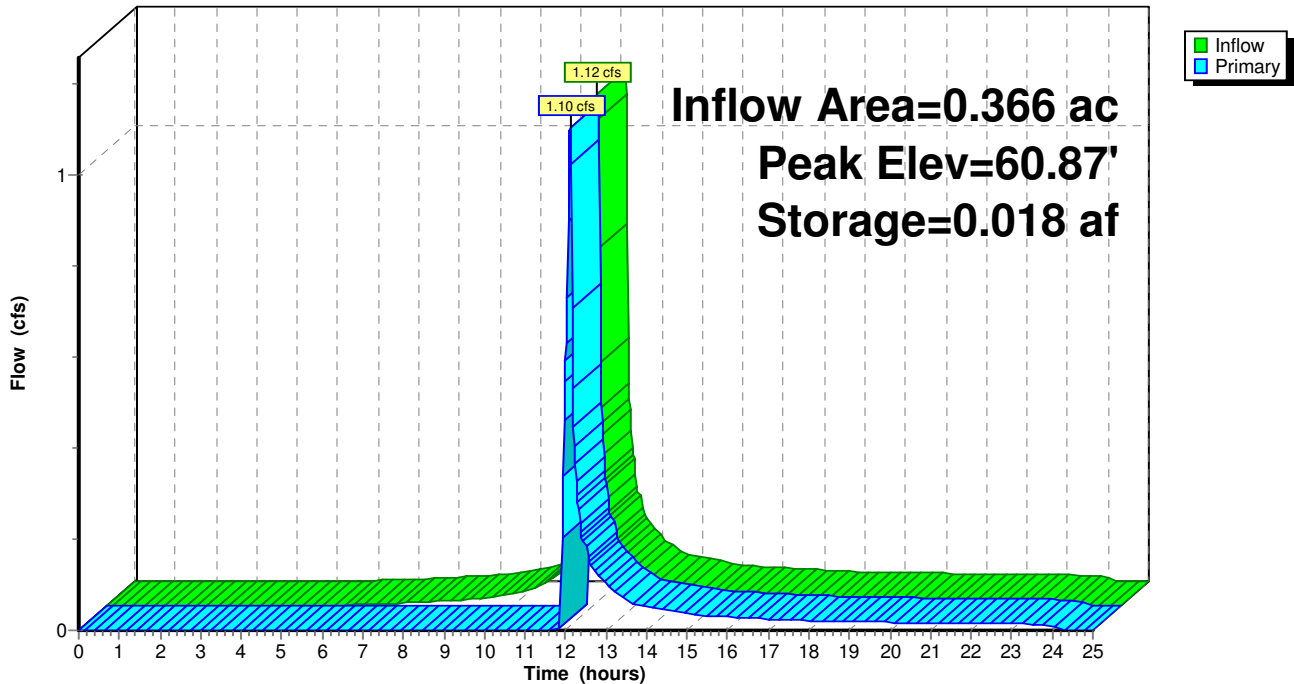
Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	<b>16.0" Round Culvert</b> L= 17.0' Ke= 1.000 Inlet / Outlet Invert= 58.00' / 57.40' S= 0.0353 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.40 sf
#2	Device 1	60.75'	<b>24.0" x 24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=1.09 cfs @ 12.11 hrs HW=60.87' (Free Discharge)

- ↑1=Culvert (Passes 1.09 cfs of 7.49 cfs potential flow)
- ↑2=Orifice/Grate (Weir Controls 1.09 cfs @ 1.14 fps)

**Pond 2P: East Basin**

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=4.85"

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## Summary for Subcatchment 1S:

Runoff = 2.95 cfs @ 12.10 hrs, Volume= 0.183 af, Depth= 3.43"

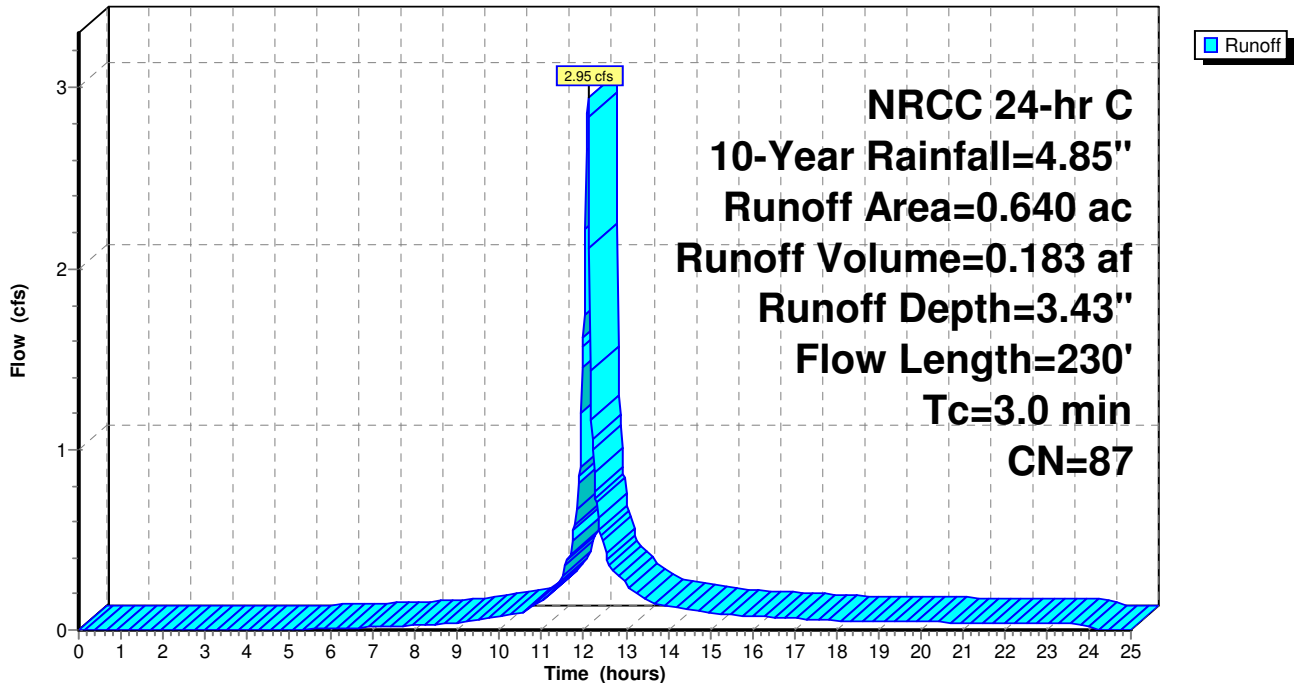
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 10-Year Rainfall=4.85"

Area (ac)	CN	Description
* 0.087	98	1/2 Hangar Building
* 0.390	98	Pavement
* 0.035	98	1/2 Downey Street
0.120	39	>75% Grass cover, Good, HSG A
0.008	76	Gravel roads, HSG A
0.640	87	Weighted Average
0.128		20.00% Pervious Area
0.512		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow, Pavement Apron</b> Smooth surfaces n= 0.011 P2= 3.30"
0.6	60	0.0067	1.66		<b>Shallow Concentrated Flow, Along Building</b> Paved Kv= 20.3 fps
0.9	70	0.0070	1.25		<b>Shallow Concentrated Flow, To Pond</b> Grassed Waterway Kv= 15.0 fps
3.0	230	Total			

## Subcatchment 1S:

Hydrograph



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## Summary for Subcatchment 2S:

Runoff = 1.80 cfs @ 12.10 hrs, Volume= 0.114 af, Depth= 3.73"

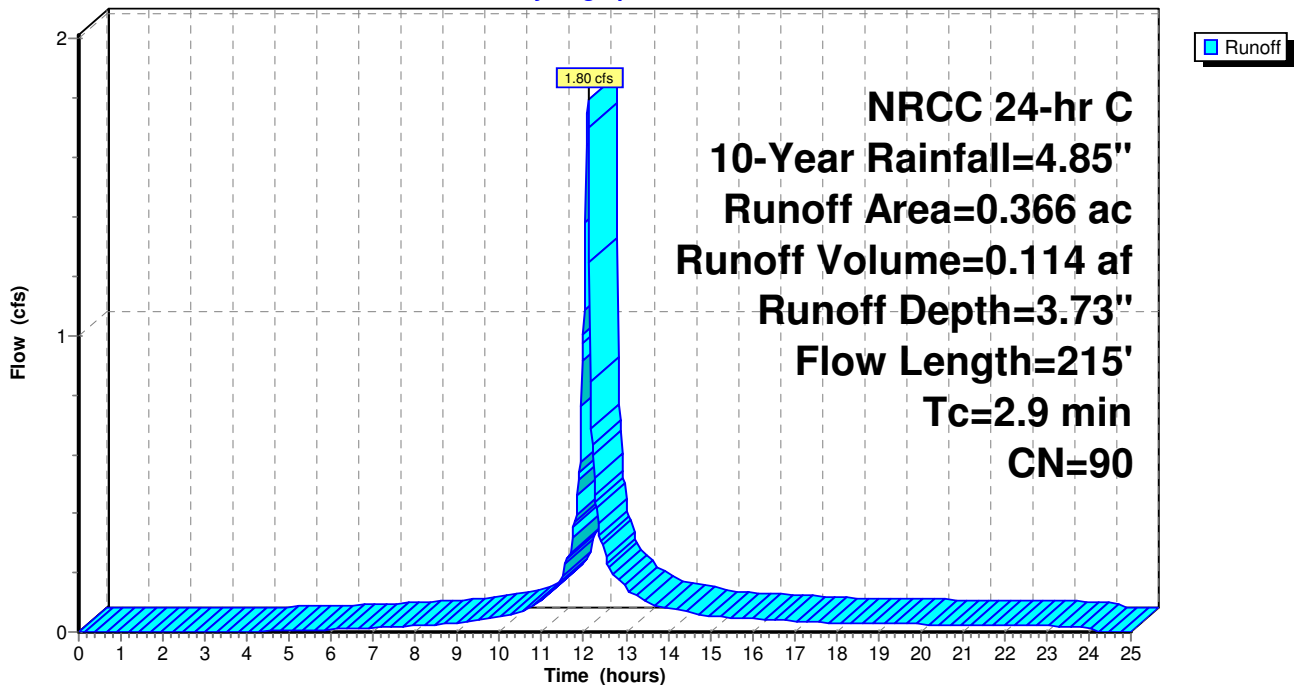
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 10-Year Rainfall=4.85"

Area (ac)	CN	Description
* 0.087	98	1/2 Hangar Building
* 0.205	98	Pavement
* 0.020	98	1/2 Downey Street
0.046	39	>75% Grass cover, Good, HSG A
0.008	76	Gravel roads, HSG A
0.366	90	Weighted Average
0.054		14.75% Pervious Area
0.312		85.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	110	0.0110	1.12		<b>Sheet Flow, Pavement Apron</b> Smooth surfaces n= 0.011 P2= 3.30"
1.0	80	0.0063	1.28		<b>Shallow Concentrated Flow, Along Building</b> Unpaved Kv= 16.1 fps
0.3	25	0.0120	1.64		<b>Shallow Concentrated Flow, To Pond</b> Grassed Waterway Kv= 15.0 fps
2.9	215	Total			

## Subcatchment 2S:

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=4.85"

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## Summary for Reach 1R: 18" RCP

[52] Hint: Inlet/Outlet conditions not evaluated

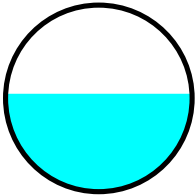
[79] Warning: Submerged Pond 1P Primary device # 1 INLET by 0.44'

Inflow Area = 0.640 ac, 80.00% Impervious, Inflow Depth = 2.86" for 10-Year event  
Inflow = 2.89 cfs @ 12.11 hrs, Volume= 0.153 af  
Outflow = 2.82 cfs @ 12.13 hrs, Volume= 0.153 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 3.04 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 1.07 fps, Avg. Travel Time= 1.6 min

Peak Storage= 94 cf @ 12.12 hrs  
Average Depth at Peak Storage= 0.79'  
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 5.25 cfs

18.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 100.0' Slope= 0.0025 '/'  
Inlet Invert= 57.65', Outlet Invert= 57.40'



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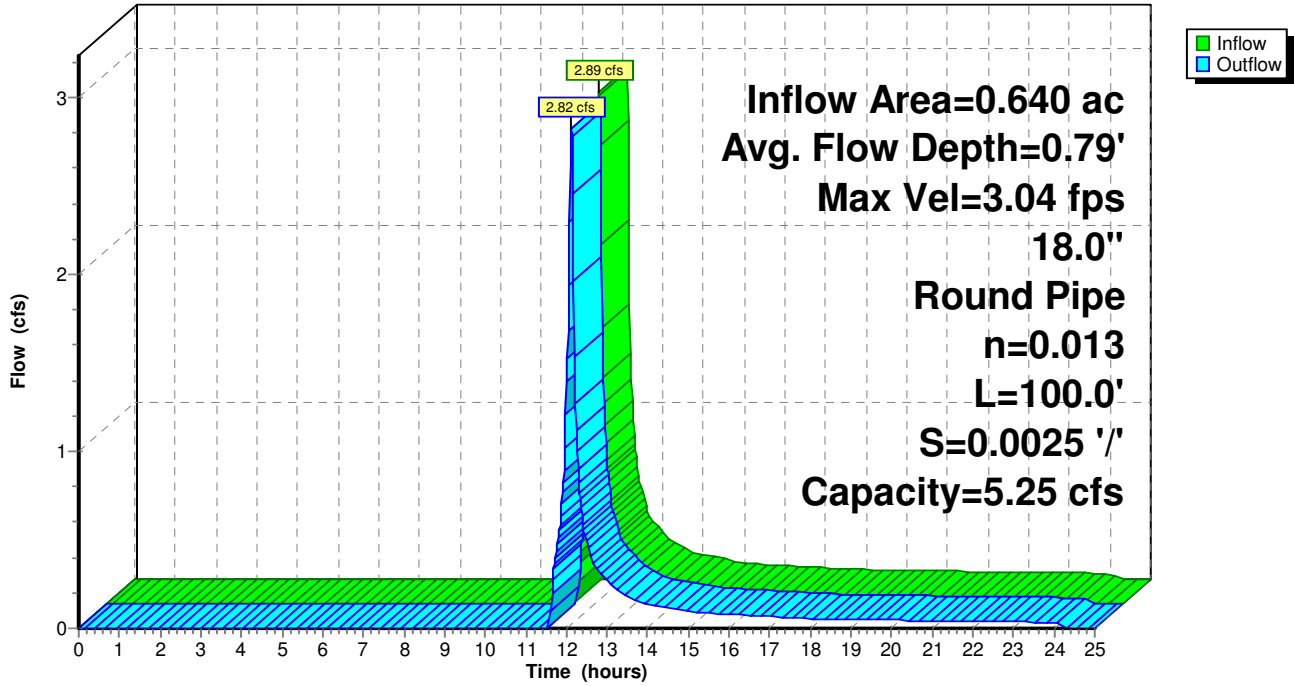
NRCC 24-hr C 10-Year Rainfall=4.85"

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**Reach 1R: 18" RCP**

Hydrograph



**Summary for Reach 2R: 24" RCP**

[52] Hint: Inlet/Outlet conditions not evaluated

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.14' @ 11.56 hrs

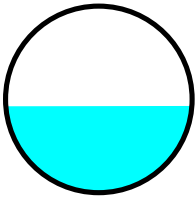
[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.28'

Inflow Area = 1.006 ac, 81.91% Impervious, Inflow Depth = 2.99" for 10-Year event  
Inflow = 4.56 cfs @ 12.12 hrs, Volume= 0.251 af  
Outflow = 4.49 cfs @ 12.13 hrs, Volume= 0.251 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 3.18 fps, Min. Travel Time= 0.4 min  
Avg. Velocity = 1.11 fps, Avg. Travel Time= 1.1 min

Peak Storage= 103 cf @ 12.12 hrs  
Average Depth at Peak Storage= 0.93'  
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 10.33 cfs

24.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 72.0' Slope= 0.0021 '/'  
Inlet Invert= 57.35', Outlet Invert= 57.20'



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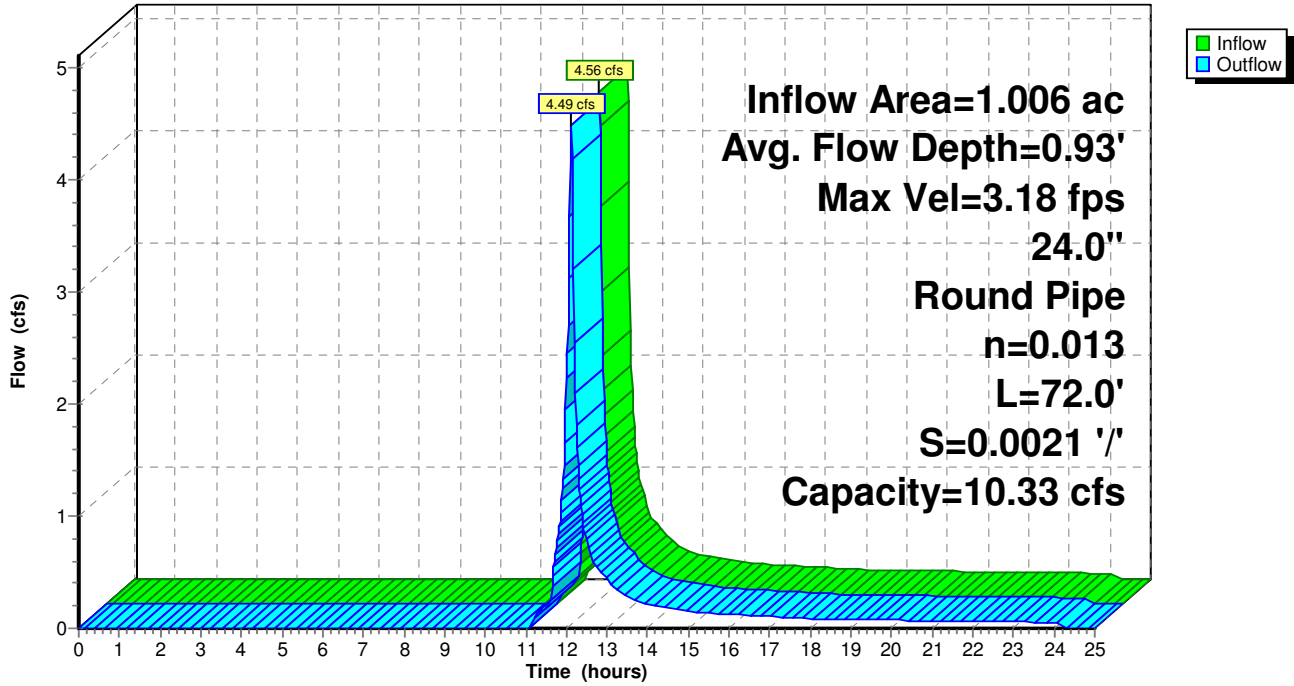
NRCC 24-hr C 10-Year Rainfall=4.85"

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**Reach 2R: 24" RCP**

Hydrograph





# Airport Road - Postdevelopment

NRCC 24-hr C 10-Year Rainfall=4.85"

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## Summary for Pond 1P: West Basin

Inflow Area = 0.640 ac, 80.00% Impervious, Inflow Depth = 3.43" for 10-Year event  
Inflow = 2.95 cfs @ 12.10 hrs, Volume= 0.183 af  
Outflow = 2.89 cfs @ 12.11 hrs, Volume= 0.153 af, Atten= 2%, Lag= 0.9 min  
Primary = 2.89 cfs @ 12.11 hrs, Volume= 0.153 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Peak Elev= 60.23' @ 12.11 hrs Surf.Area= 0.028 ac Storage= 0.036 af

Plug-Flow detention time= 115.6 min calculated for 0.153 af (84% of inflow)  
Center-of-Mass det. time= 42.3 min ( 848.9 - 806.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	0.044 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
58.50	0.014	0.000	0.000
59.00	0.018	0.008	0.008
60.00	0.026	0.022	0.030
60.50	0.030	0.014	0.044

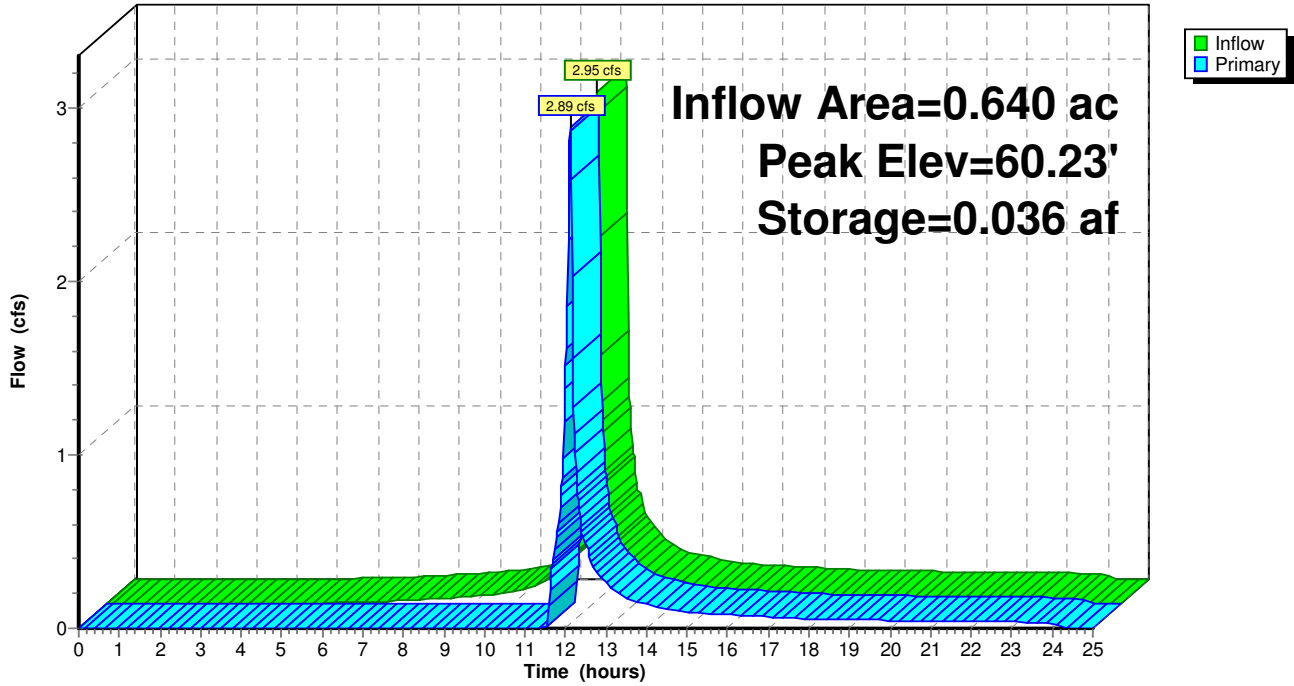
Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	<b>16.0" Round Culvert</b> L= 14.0' Ke= 1.000 Inlet / Outlet Invert= 58.00' / 57.70' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.40 sf
#2	Device 1	60.00'	<b>24.0" x 24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=2.85 cfs @ 12.11 hrs HW=60.23' (Free Discharge)

↑1=Culvert (Passes 2.85 cfs of 6.30 cfs potential flow)  
↑2=Orifice/Grate (Weir Controls 2.85 cfs @ 1.56 fps)

**Pond 1P: West Basin**

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=4.85"

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## Summary for Pond 2P: East Basin

Inflow Area = 0.366 ac, 85.25% Impervious, Inflow Depth = 3.73" for 10-Year event  
Inflow = 1.80 cfs @ 12.10 hrs, Volume= 0.114 af  
Outflow = 1.77 cfs @ 12.11 hrs, Volume= 0.098 af, Atten= 1%, Lag= 0.6 min  
Primary = 1.77 cfs @ 12.11 hrs, Volume= 0.098 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Peak Elev= 60.92' @ 12.11 hrs Surf.Area= 0.015 ac Storage= 0.018 af

Plug-Flow detention time= 106.6 min calculated for 0.098 af (86% of inflow)  
Center-of-Mass det. time= 40.5 min ( 835.1 - 794.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	0.024 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
59.00	0.004	0.000	0.000
60.00	0.010	0.007	0.007
60.75	0.014	0.009	0.016
61.00	0.015	0.004	0.020
61.25	0.018	0.004	0.024

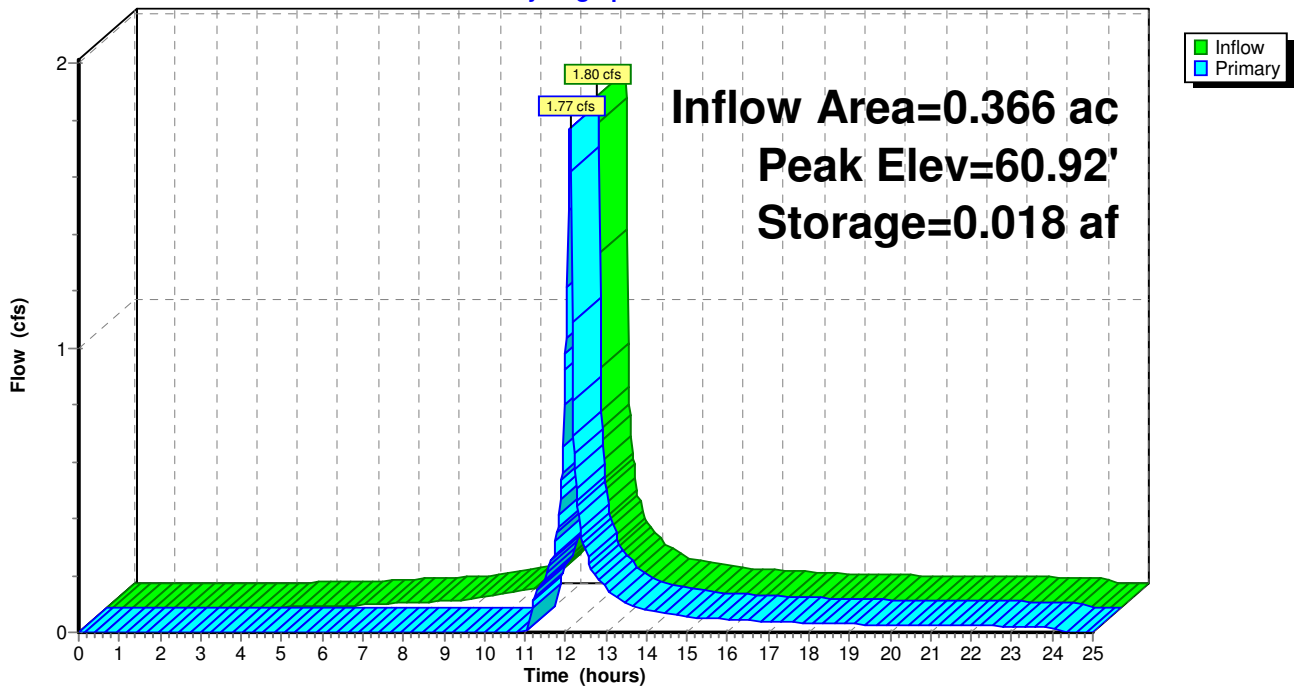
Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	<b>16.0" Round Culvert</b> L= 17.0' Ke= 1.000 Inlet / Outlet Invert= 58.00' / 57.40' S= 0.0353 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.40 sf
#2	Device 1	60.75'	<b>24.0" x 24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=1.76 cfs @ 12.11 hrs HW=60.92' (Free Discharge)

↑ **1=Culvert** (Passes 1.76 cfs of 7.56 cfs potential flow)  
↑ **2=Orifice/Grate** (Weir Controls 1.76 cfs @ 1.33 fps)

**Pond 2P: East Basin**

Hydrograph



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NRCC 24-hr C 100-Year Rainfall=8.41"

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## Summary for Subcatchment 1S:

Runoff = 5.64 cfs @ 12.10 hrs, Volume= 0.365 af, Depth= 6.85"

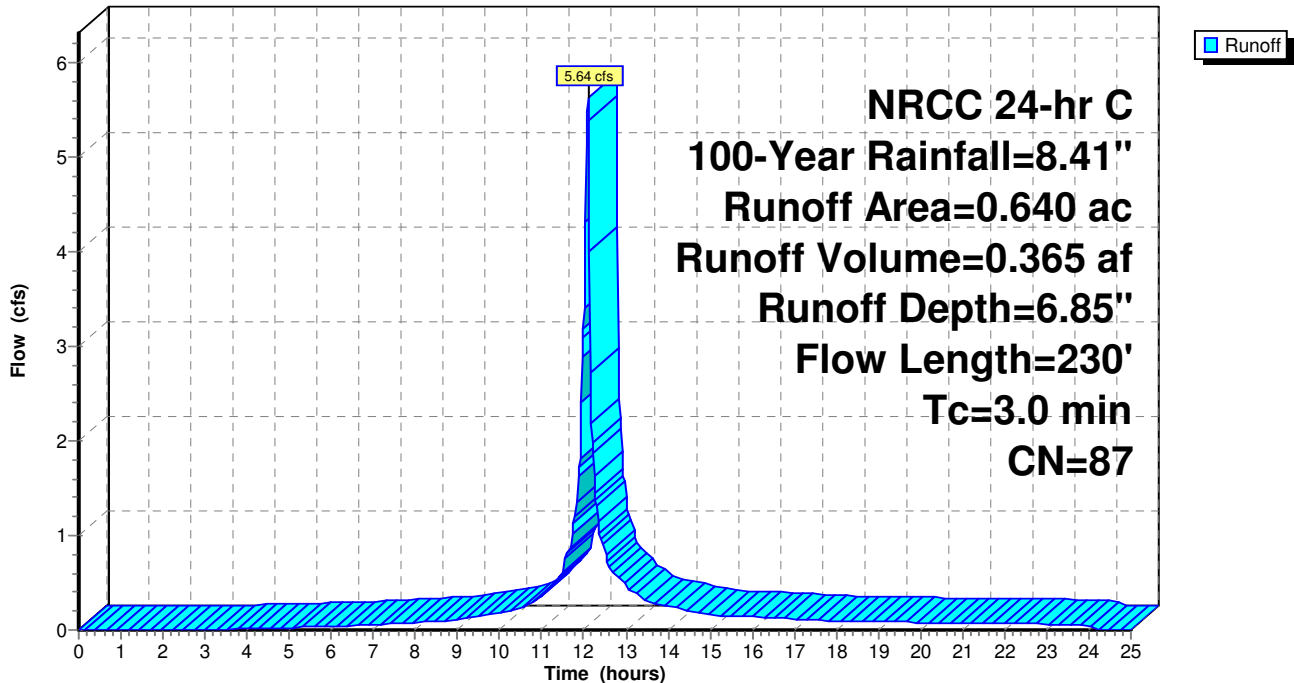
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 100-Year Rainfall=8.41"

Area (ac)	CN	Description
* 0.087	98	1/2 Hangar Building
* 0.390	98	Pavement
* 0.035	98	1/2 Downey Street
0.120	39	>75% Grass cover, Good, HSG A
0.008	76	Gravel roads, HSG A
0.640	87	Weighted Average
0.128		20.00% Pervious Area
0.512		80.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0120	1.14		<b>Sheet Flow, Pavement Apron</b> Smooth surfaces n= 0.011 P2= 3.30"
0.6	60	0.0067	1.66		<b>Shallow Concentrated Flow, Along Building</b> Paved Kv= 20.3 fps
0.9	70	0.0070	1.25		<b>Shallow Concentrated Flow, To Pond</b> Grassed Waterway Kv= 15.0 fps
3.0	230	Total			

### Subcatchment 1S:

Hydrograph



# Airport Road - Postdevelopment

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NRCC 24-hr C 100-Year Rainfall=8.41"

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## Summary for Subcatchment 2S:

Runoff = 3.33 cfs @ 12.10 hrs, Volume= 0.220 af, Depth= 7.21"

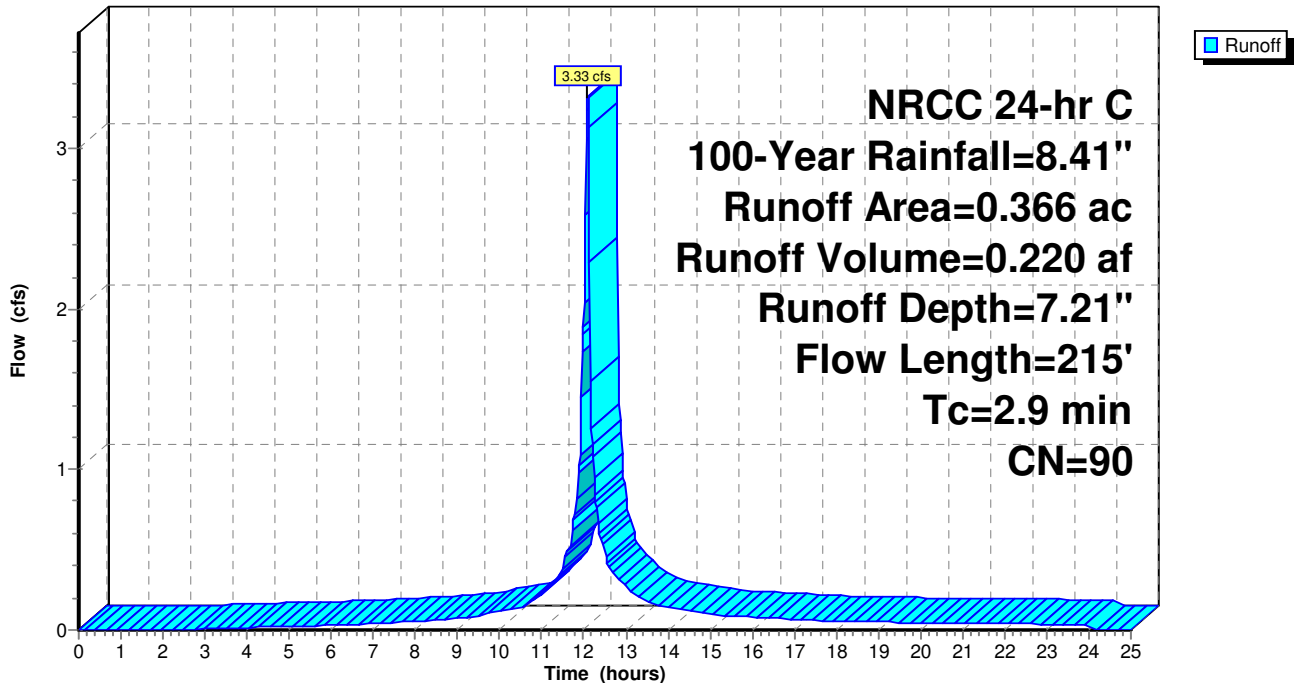
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
NRCC 24-hr C 100-Year Rainfall=8.41"

Area (ac)	CN	Description
* 0.087	98	1/2 Hangar Building
* 0.205	98	Pavement
* 0.020	98	1/2 Downey Street
0.046	39	>75% Grass cover, Good, HSG A
0.008	76	Gravel roads, HSG A
0.366	90	Weighted Average
0.054		14.75% Pervious Area
0.312		85.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	110	0.0110	1.12		<b>Sheet Flow, Pavement Apron</b> Smooth surfaces n= 0.011 P2= 3.30"
1.0	80	0.0063	1.28		<b>Shallow Concentrated Flow, Along Building</b> Unpaved Kv= 16.1 fps
0.3	25	0.0120	1.64		<b>Shallow Concentrated Flow, To Pond</b> Grassed Waterway Kv= 15.0 fps
2.9	215	Total			

### Subcatchment 2S:

Hydrograph



## Airport Road - Postdevelopment

NRCC 24-hr C 100-Year Rainfall=8.41"

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### Summary for Reach 1R: 18" RCP

[52] Hint: Inlet/Outlet conditions not evaluated

[55] Hint: Peak inflow is 106% of Manning's capacity

[79] Warning: Submerged Pond 1P Primary device # 1 INLET by 0.95'

Inflow Area = 0.640 ac, 80.00% Impervious, Inflow Depth = 6.29" for 100-Year event  
Inflow = 5.57 cfs @ 12.11 hrs, Volume= 0.335 af  
Outflow = 5.44 cfs @ 12.12 hrs, Volume= 0.335 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs

Max. Velocity= 3.39 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 1.31 fps, Avg. Travel Time= 1.3 min

Peak Storage= 163 cf @ 12.12 hrs

Average Depth at Peak Storage= 1.30'

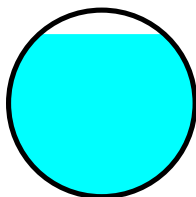
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 5.25 cfs

18.0" Round Pipe

n= 0.013 Concrete pipe, straight & clean

Length= 100.0' Slope= 0.0025 '/'

Inlet Invert= 57.65', Outlet Invert= 57.40'



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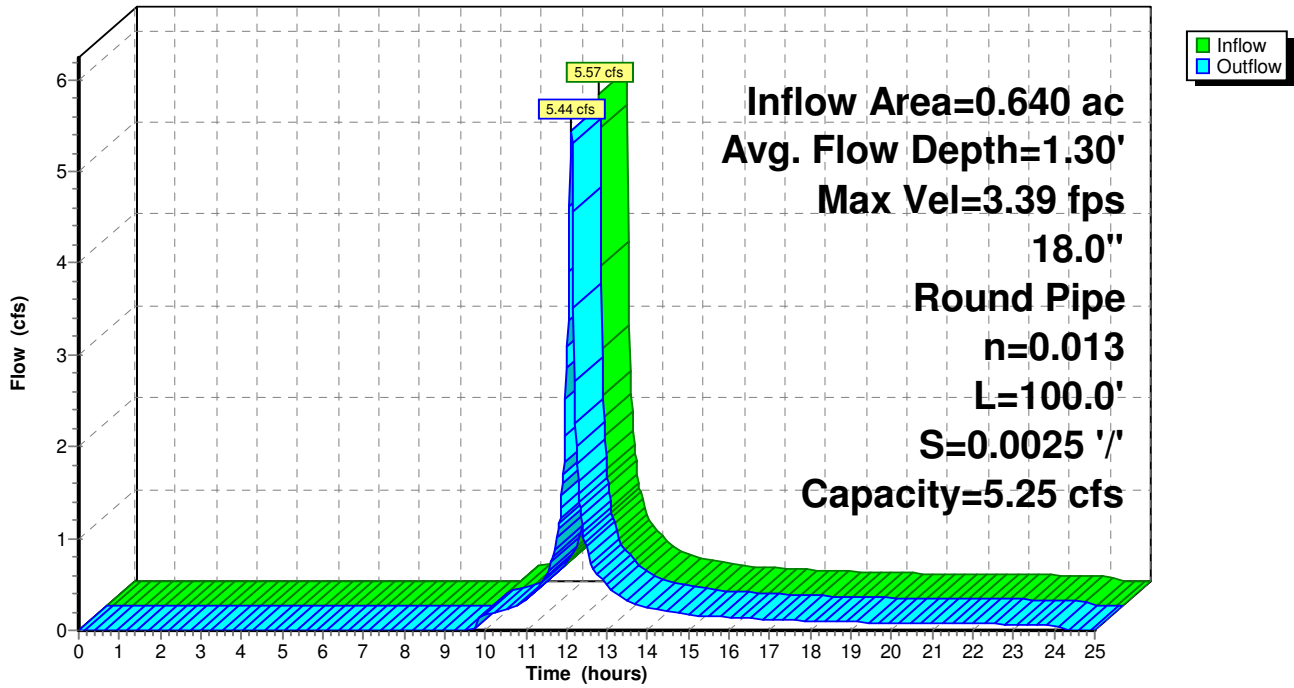
NRCC 24-hr C 100-Year Rainfall=8.41"

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## Reach 1R: 18" RCP

Hydrograph





**Summary for Reach 2R: 24" RCP**

[52] Hint: Inlet/Outlet conditions not evaluated

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.14' @ 12.18 hrs

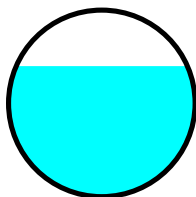
[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.75'

Inflow Area = 1.006 ac, 81.91% Impervious, Inflow Depth = 6.43" for 100-Year event  
Inflow = 8.69 cfs @ 12.11 hrs, Volume= 0.539 af  
Outflow = 8.56 cfs @ 12.12 hrs, Volume= 0.539 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
Max. Velocity= 3.68 fps, Min. Travel Time= 0.3 min  
Avg. Velocity = 1.34 fps, Avg. Travel Time= 0.9 min

Peak Storage= 169 cf @ 12.12 hrs  
Average Depth at Peak Storage= 1.40'  
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 10.33 cfs

24.0" Round Pipe  
n= 0.013 Concrete pipe, straight & clean  
Length= 72.0' Slope= 0.0021 '/'  
Inlet Invert= 57.35', Outlet Invert= 57.20'



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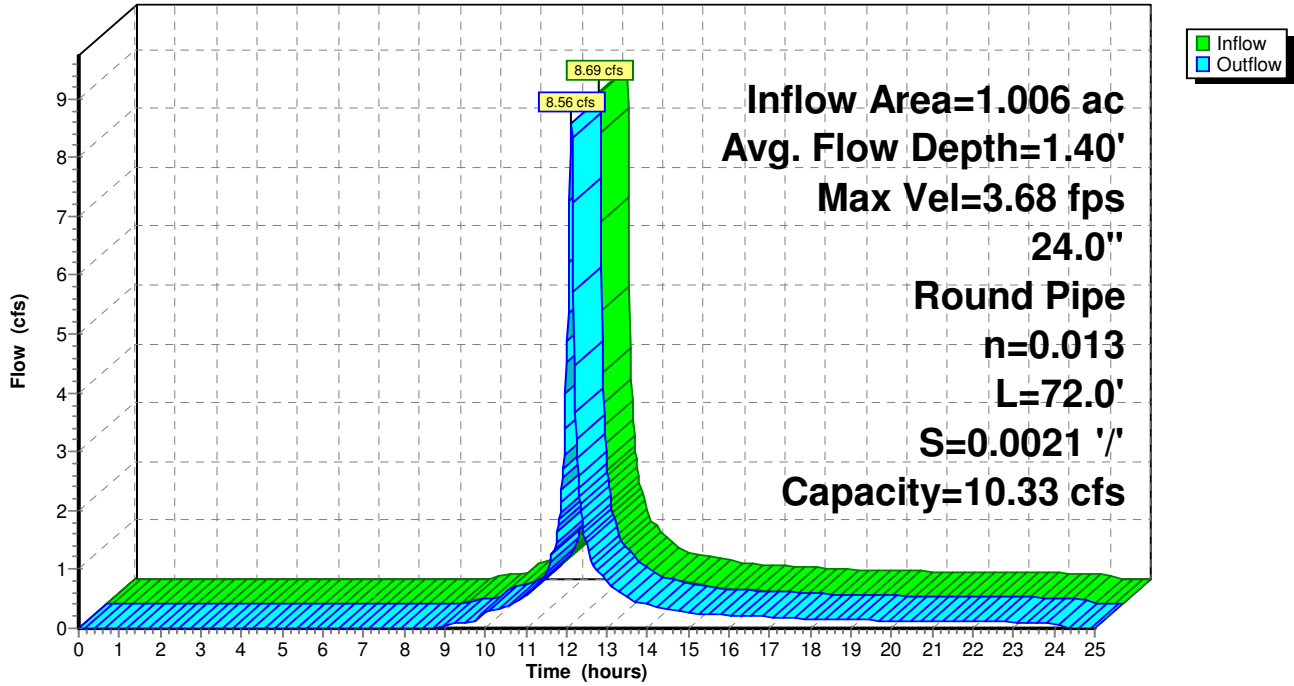
NRCC 24-hr C 100-Year Rainfall=8.41"

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**Reach 2R: 24" RCP**

Hydrograph



# Airport Road - Postdevelopment

NRCC 24-hr C 100-Year Rainfall=8.41"

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## Summary for Pond 1P: West Basin

Inflow Area = 0.640 ac, 80.00% Impervious, Inflow Depth = 6.85" for 100-Year event  
 Inflow = 5.64 cfs @ 12.10 hrs, Volume= 0.365 af  
 Outflow = 5.57 cfs @ 12.11 hrs, Volume= 0.335 af, Atten= 1%, Lag= 0.8 min  
 Primary = 5.57 cfs @ 12.11 hrs, Volume= 0.335 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
 Peak Elev= 60.36' @ 12.11 hrs Surf.Area= 0.029 ac Storage= 0.040 af

Plug-Flow detention time= 76.0 min calculated for 0.335 af (92% of inflow)  
 Center-of-Mass det. time= 31.6 min ( 817.0 - 785.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	0.044 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
58.50	0.014	0.000	0.000
59.00	0.018	0.008	0.008
60.00	0.026	0.022	0.030
60.50	0.030	0.014	0.044

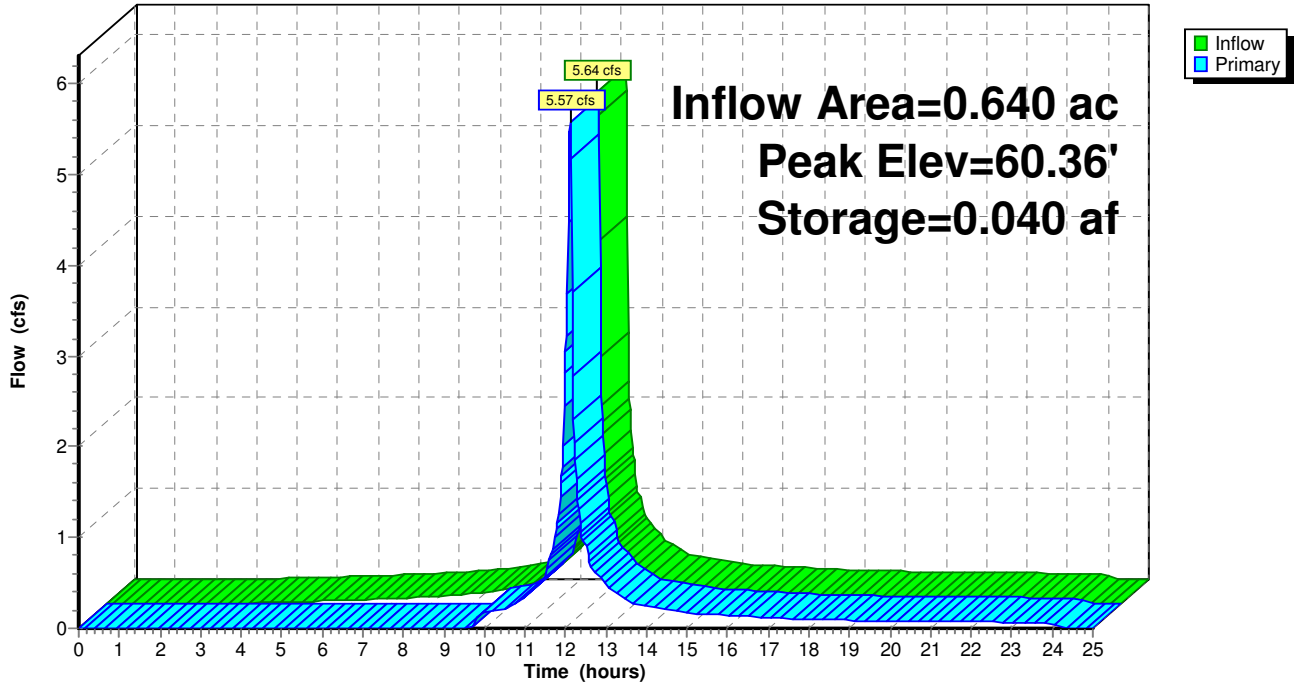
Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	<b>16.0" Round Culvert</b> L= 14.0' Ke= 1.000 Inlet / Outlet Invert= 58.00' / 57.70' S= 0.0214 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.40 sf
#2	Device 1	60.00'	<b>24.0" x 24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=5.49 cfs @ 12.11 hrs HW=60.35' (Free Discharge)

- ↑1=Culvert (Passes 5.49 cfs of 6.55 cfs potential flow)
- ↑2=Orifice/Grate (Weir Controls 5.49 cfs @ 1.94 fps)

**Pond 1P: West Basin**

Hydrograph



# Airport Road - Postdevelopment

NRCC 24-hr C 100-Year Rainfall=8.41"

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## Summary for Pond 2P: East Basin

Inflow Area = 0.366 ac, 85.25% Impervious, Inflow Depth = 7.21" for 100-Year event  
 Inflow = 3.33 cfs @ 12.10 hrs, Volume= 0.220 af  
 Outflow = 3.29 cfs @ 12.10 hrs, Volume= 0.204 af, Atten= 1%, Lag= 0.5 min  
 Primary = 3.29 cfs @ 12.10 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.02 hrs  
 Peak Elev= 61.00' @ 12.10 hrs Surf.Area= 0.015 ac Storage= 0.020 af

Plug-Flow detention time= 70.9 min calculated for 0.204 af (93% of inflow)  
 Center-of-Mass det. time= 30.6 min ( 806.0 - 775.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	0.024 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
59.00	0.004	0.000	0.000
60.00	0.010	0.007	0.007
60.75	0.014	0.009	0.016
61.00	0.015	0.004	0.020
61.25	0.018	0.004	0.024

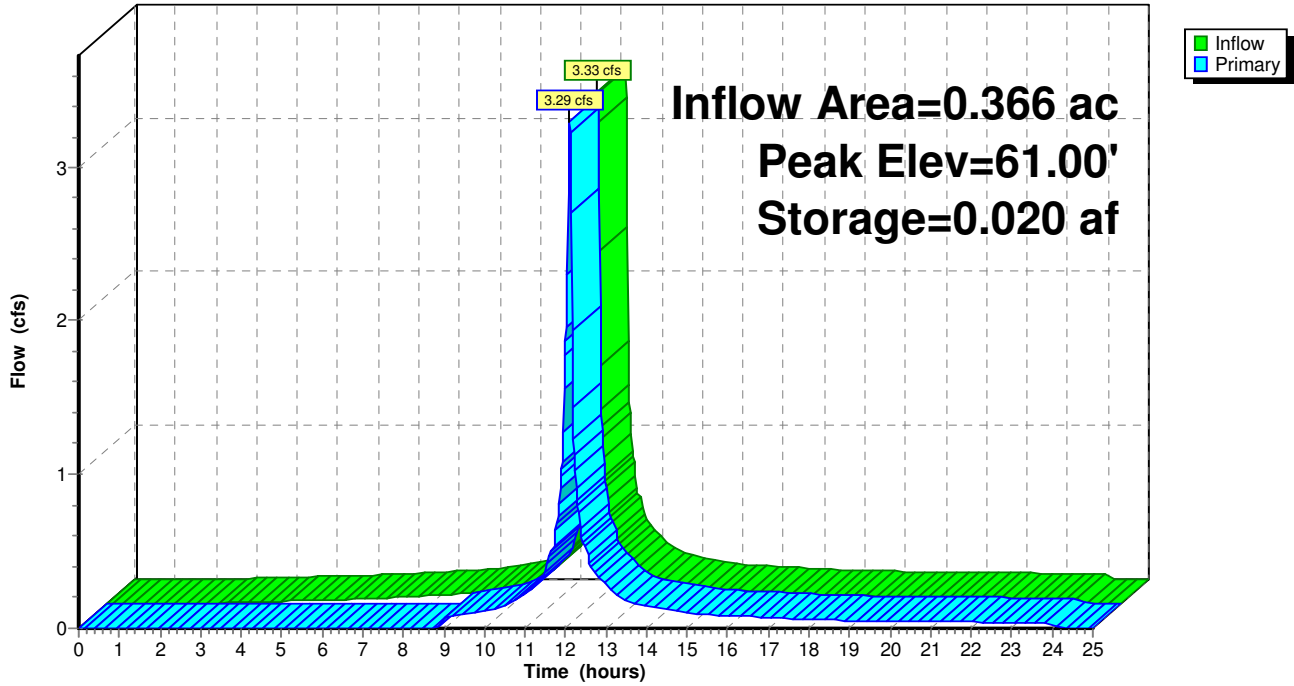
Device	Routing	Invert	Outlet Devices
#1	Primary	58.00'	<b>16.0" Round Culvert</b> L= 17.0' Ke= 1.000 Inlet / Outlet Invert= 58.00' / 57.40' S= 0.0353 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.40 sf
#2	Device 1	60.75'	<b>24.0" x 24.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Primary OutFlow** Max=3.28 cfs @ 12.10 hrs HW=61.00' (Free Discharge)

- ↑1=Culvert (Passes 3.28 cfs of 7.70 cfs potential flow)
- ↑2=Orifice/Grate (Weir Controls 3.28 cfs @ 1.64 fps)

**Pond 2P: East Basin**

Hydrograph



# Airport Road - Predevelopment

NRCC 24-hr C 2-Year Rainfall=3.30"

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## Comparison Report

Node	Inflow (cfs)	Primary (cfs)
Postdevelopment Link 1L	2.61	2.61
Predevelopment Link 1L	<b>3.48</b>	<b>3.48</b>

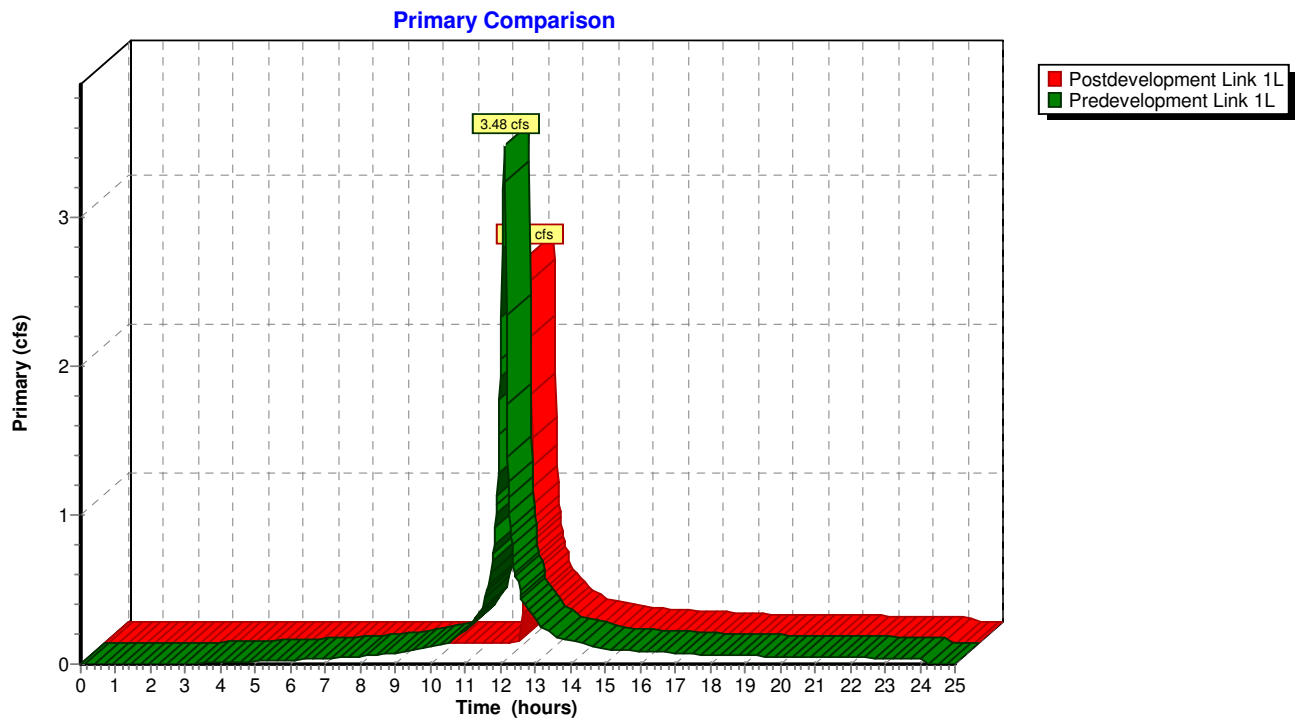
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NRCC 24-hr C 2-Year Rainfall=3.30"

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# Airport Road - Postdevelopment

NRCC 24-hr C 10-Year Rainfall=4.85"

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## Comparison Report

Node	Inflow (cfs)	Primary (cfs)
Postdevelopment Link 1L	4.49	4.49
Predevelopment Link 1L	<b>5.25</b>	<b>5.25</b>

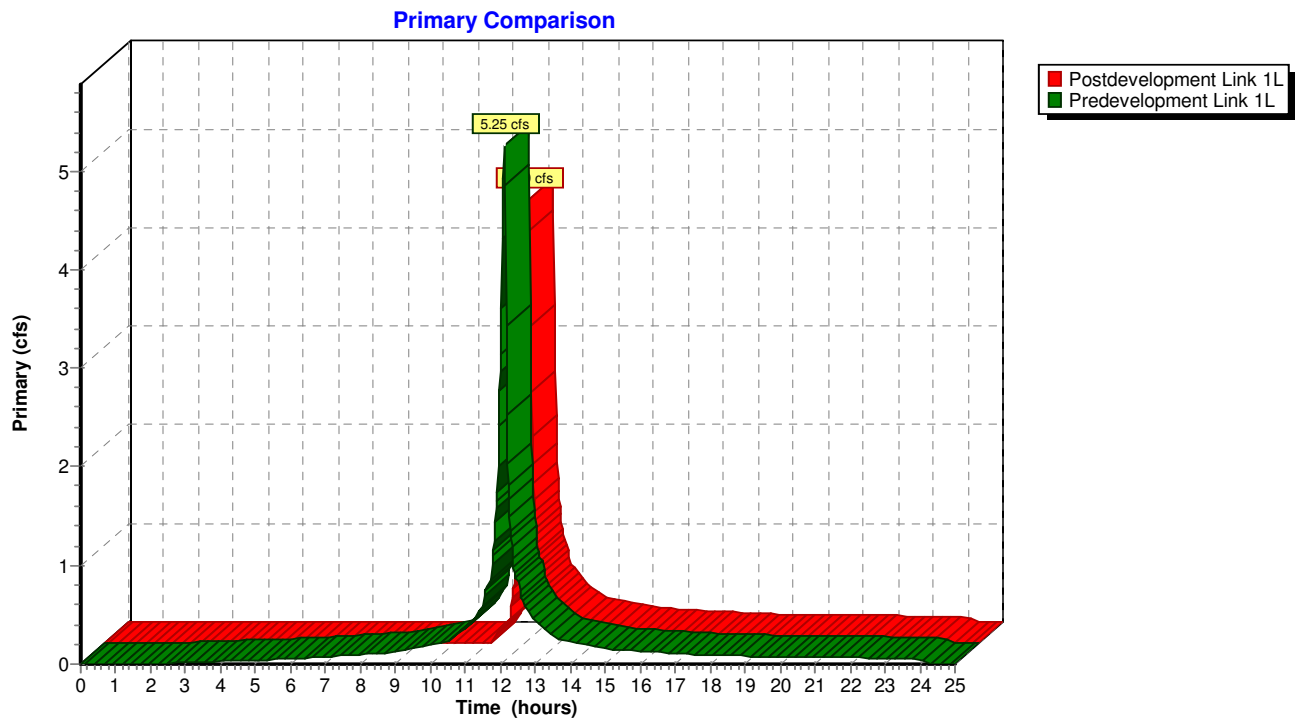
# Airport Road - Postdevelopment

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NRCC 24-hr C 10-Year Rainfall=4.85"

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# Airport Road - Predevelopment

NRCC 24-hr C 100-Year Rainfall=8.41"

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## Comparison Report

Node	Inflow (cfs)	Primary (cfs)
Postdevelopment Link 1L	8.56	8.56
Predevelopment Link 1L	<b>8.66</b>	<b>8.66</b>

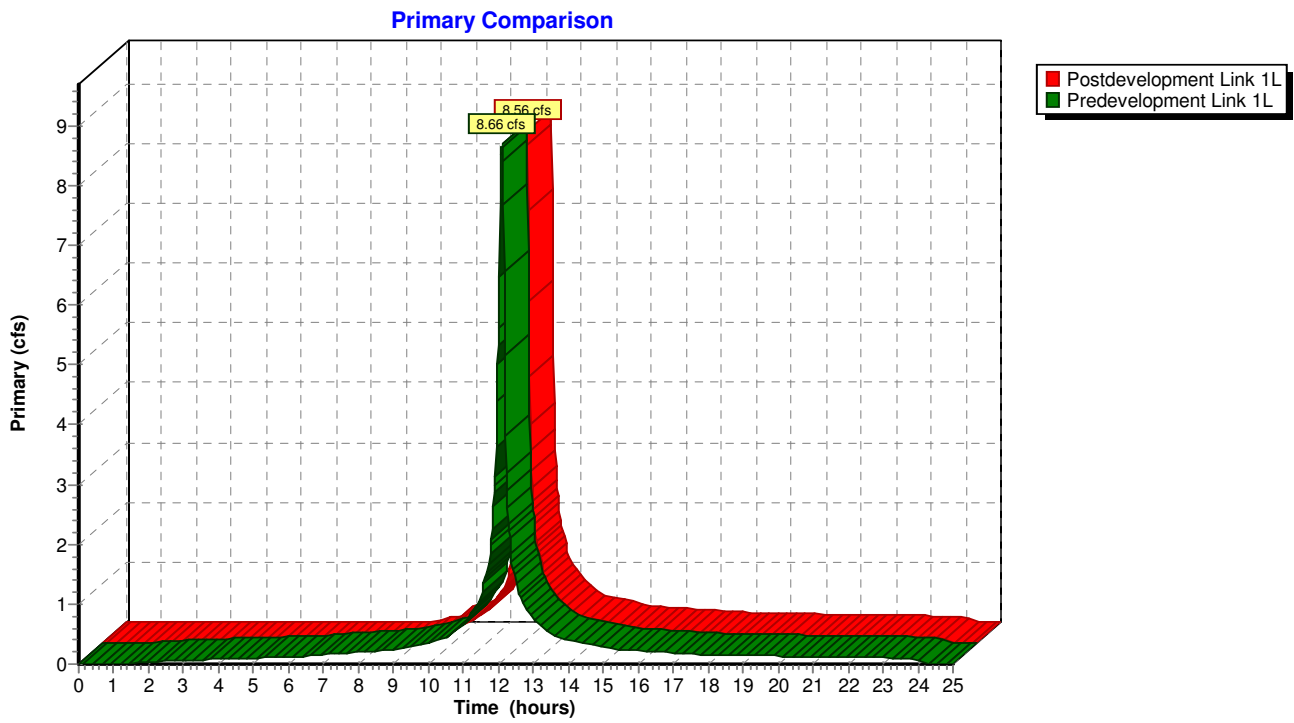
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NRCC 24-hr C 100-Year Rainfall=8.41"

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## HANGARS 4 PLANES - AIRPORT ROAD PROJECT

REQUIRED RECHARGE VOLUME				
ITEM #	DATA DESCRIPTION	REQUIRED	ACTUAL	CHECK COMMENT
1.0	IMPERVIOUS AREA (A)	0.824 ACRE-FT		OBTAINED FROM SITE MAP
2.0	RECHARGE FACTOR (F)	0.6 IN		SOIL MAP & V3C1 TABLE 2.3.2 <sup>1</sup>
3.0	VOLUME REQUIRED (Rv)	0.041 ACRE-FT		$Rv = A * F / 12$
4.0	VOLUME PROVIDED - WEST		1115.0 CF	OBTAINED FROM SITE MAP
5.0	VOLUME PROVIDED - EAST		680.0 CF	OBTAINED FROM SITE MAP
6.0	VOLUME TOTAL	1794.7 CF	1795.0 CF	OK VOL WEST + VOL EAST

NOTES:  
1.0 MASSACHUSETTS STORMWATER HANDBOOK VOLUME (V) 3 CHAPTER (C) 1



## HANGARS 4 PLANES - AIRPORT ROAD PROJECT

DRAWDOWN TIME					
ITEM #	DATA DESCRIPTION	REQUIRED	ACTUAL	CHECK	COMMENT
1.0	CONDUCTIVITY (K)	0.08 ACRE-FT			SOIL MAP & V3C1 TABLE 2.3.3 <sup>1</sup>
2.0	BOTTOM AREA - WEST		600.0 SF		C4.0 - GRADING PLAN
3.0	BOTTOM AREA - EAST		250.0 SF		C4.0 - GRADING PLAN
4.0	DRAWDOWN TIME - WEST	72.0 HR	22.3 HR	OK	(VOL PROV)/(K*BOTTOM AREA)
5.0	DRAWDOWN TIME - EAST	72.0 HR	32.6 HR	OK	(VOL PROV)/(K*BOTTOM AREA)

NOTES:  
1.0 MASSACHUSETTS STORMWATER HANDBOOK VOLUME (V) 3 CHAPTER (C) 1



**HANGARS 4 PLANES - AIRPORT ROAD PROJECT**

<b>WATER QUALITY VOLUME</b>				
<b>ITEM #</b>	<b>DATA DESCRIPTION</b>	<b>REQUIRED</b>	<b>ACTUAL</b>	<b>CHECK COMMENT</b>
1.0	IMPERVIOUS AREA - WEST	0.512 ACRES		OBTAINED FROM SITE MAP
2.0	IMPERVIOUS AREA - EAST	0.312 ACRES		OBTAINED FROM SITE MAP
3.0	REQUIRED DEPTH (DWQ)	0.04 FT		V1C1 <sup>1</sup>
4.0	VOLUME REQUIRED - WEST		929.3 CF	VOL REQ = IMPERV AREA * REQ DEPTH *43560
5.0	VOLUME REQUIRED - EAST		566.3 CF	VOL REQ = IMPERV AREA * REQ DEPTH *43560
NOTES:				
1.0 MASSACHUSETTS STORMWATER HANDBOOK VOLUME (V) 1 CHAPTER (C) 1				



**HANGARS 4 PLANES - AIRPORT ROAD PROJECT**

<b>FOREBAY SIZE</b>					
<b>ITEM #</b>	<b>DATA DESCRIPTION</b>	<b>REQUIRED</b>	<b>ACTUAL</b>	<b>CHECK</b>	<b>COMMENT</b>
1.0	IMPERVIOUS AREA - WEST	0.512 ACRES			OBTAINED FROM SITE MAP
2.0	IMPERVIOUS AREA - EAST	0.312 ACRES			OBTAINED FROM SITE MAP
3.0	REQUIRED DEPTH (DWG)	0.0083 FT/ACRE			V2C2 PG15
4.0	VOLUME REQUIRED - WEST	185.9 CF	190.0 CF	OK	VOL REQ = IMPERV AREA * REQ DEPTH *43560
5.0	VOLUME REQUIRED - EAST	113.3 CF	115.0 CF	OK	VOL REQ = IMPERV AREA * REQ DEPTH *43560
NOTES: 1.0 MASSACHUSETTS STORMWATER HANDBOOK VOLUME (V) 2 CHAPTER (C) 2 PAGE (PG) 15					



**INSTRUCTIONS:**

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

Version 1, Automated: Mar. 4, 2008

Location:

**TSS Removal Calculation Worksheet**

	B BMP <sup>1</sup>	C TSS Removal Rate <sup>1</sup>	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
	Grass Channel	0.50	1.00	0.50	0.50
	Infiltration Basin	0.80	0.50	0.40	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10

**Total TSS Removal =**

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

Project:   
 Prepared By:   
 Date:

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

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed  
 1. From MassDEP Stormwater Handbook Vol. 1

# Appendix H: Inspection and Maintenance Log Form

# OPERATION & MAINTENANCE INSPECTION LOG FORM

Airport Road  
New Bedford, MA

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Component	Status/Inspection	Action Taken/Recommendations
Grass Channel (Biofilter Swale)		
Drip Edge		
Sediment Forebay		
Infiltration Basin		
Catch Basin		

# Appendix I: Project Plan Set